# Laboratory Safety

University of Toledo
Environmental Health and Radiation Safety

# Why Lab Safety?

- Protect yourself from laboratory hazards
- Protect others from laboratory hazards
- Protect the environment
- Comply with State and Federal regulations



# Laboratory Safety Training Objectives

- Laboratory Safety Recognition and Evaluation of Hazards
- Laboratory Chemical Hygiene Plan and Hazard Control
- Laboratory Emergency Preparedness and Spill Response
- Chemical Storage
- Laboratory Waste Disposal

# Recognition and Evaluation of Hazards

Lab surveys of each research and clinical lab are completed when requested or required by an oversight agency. In addition, clinical labs are walked through twice a year.

- General Laboratory Safety
- Chemical Handling and Storage
- Physical Hazards (Laser Safety Audits will be completed Separately)
- Waste Disposal
- Personal Protection
- Animal Care
- Biosafety (Separate Inspections for BSL2 & 3)

# Recognition and Evaluation of Hazards


- Routes of Exposure
  - Inhalation
  - Skin Absorption
  - Incidental Ingestion
  - Injection
  - Mucous Membranes

# Recognition and Evaluation of Hazards

- Eating and drinking in the laboratories and animal rooms is forbidden

# Recognition and Evaluation of Hazards

- Hazard Communication Standard
- Global Harmonization System (GHS)
- Standardized Safety Data Sheets (SDS) and labeling

# Recognition and Evaluation of Hazards

- You must make SDS's available and accessible, for all hazardous chemicals, to all employees and they MUST know where they are kept.
- SDS's must be kept via paper copies or Chemwatch

# Recognition and Evaluation of Hazards

"Hazardous chemical"

- Physical Hazard
- Health Hazard
- Simple asphyxiant
- Combustible dust
- Pyrophoric gas
- Hazard not otherwise classified.

# Numbering System Change

- The hazard category numbering system has changed!
- Keep in mind that you will mostly see this information on the SDS and not the label but there is that chance so you should be aware of it.

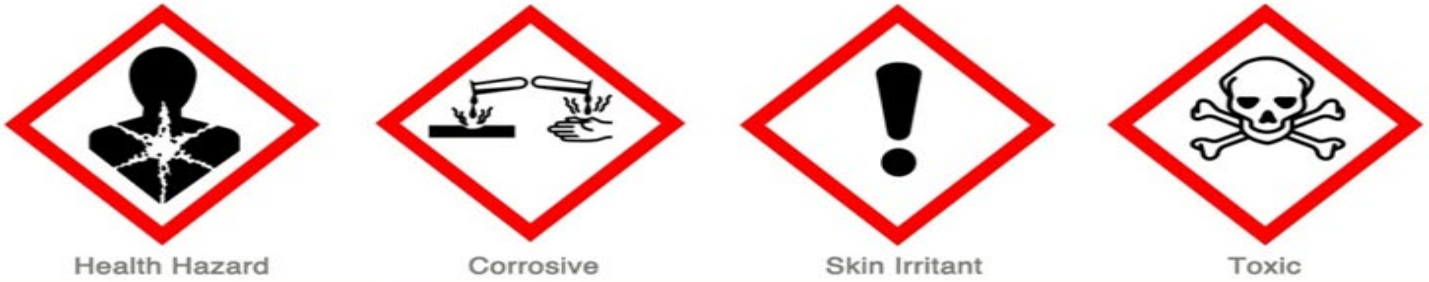
| HAZARD | |
|---|---|
| Category | Hazard |
| 1 | highest |
| 2 | high |
| 3 | medium |
| 4 | low |

| HMIS/NFPA | |
|---|---|
| Index | Hazard |
| 1 | slight |
| 2 | moderate |
| 3 | serious |
| 4 | severe |

# Recognition and Evaluation of Hazards

## Physical Hazards


## Health Hazards




## Reference Tools

http://www.osha.gov/dsg/hazcom/ghs.html

## Environmental Hazards

# Health Hazards

| Hazard Class | Hazard Category | | | |
|---|---|---|---|---|
| Acute toxicity | 1 | 2 | 3 | 4 |
| Skin Corrosion/Irritation | 1A | 1B | 1C | 2 |
| Serious Eye Damage/Eye Irritation | 1 | 2A | 2B | |
| Respiratory or Skin Sensitization | 1 | | | |
| Germ Cell Mutagenicity | 1A | 1B | 2 | |
| Carcinogenicity | 1A | 1B | 2 | |
| Reproductive Toxicity | 1A | 1B | 2 | Lactation |
| Specific Target Organ Toxicity – Single Exposure | 1 | 2 | 3 | |
| Specific Target Organ Toxicity – Repeated Exposure | 1 | 2 | | |
| Aspiration | 1 | | | |
| Simple Asphyxiants | Single Category | | | |

# Acute Toxicity

**Table A.1.1: Acute toxicity hazard categories and acute toxicity estimate (ATE) values defining the respective categories**

| Exposure route | Category 1 | Category 2 | Category 3 | Category 4 |
|---|---|---|---|---|
| Oral (mg/kg bodyweight) see: Note (a) Note (b) | ≤ 5 | >5 and ≤ 50 | >50 and ≤ 300 | >300 and ≤ 2000 |
| Dermal (mg/kg bodyweight) see: Note (a) Note (b) | ≤ 50 | >50 and ≤ 200 | >200 and ≤ 1000 | >1000 and ≤ 2000 |
| Inhalation - Gases (ppmV) see: Note (a) Note (b) Note (c) | ≤ 100 | >100 and ≤ 500 | >500 and ≤ 2500 | >2500 and ≤ 20000 |
| Inhalation - Vapors (mg/l) see: Note (a) Note (b) Note (c) Note (d) | ≤ 0.5 | >0.5 and ≤ 2.0 | >2.0 and ≤ 10.0 | >10.0 and ≤ 20.0 |
| Inhalation – Dusts and Mists (mg/l) see: Note (a) Note (b) Note (c) | ≤ 0.05 | >0.05 and ≤ 0.5 | >0.5 and ≤ 1.0 | >1.0 and ≤ 5.0 |

**Chemical Standard Operating Procedure Required if LD50 is <50mg/kg, or LC50 is <2mg/l**

# Recognition and Evaluation of Hazards

## Toxicity Classes: Gosselin, Smith and Hodge

Probable Oral Lethal Dose (Human)

| Toxicity Rating or Class | Dose | For 70-kg Person (150 lbs.) |
|---|---|---|
| 6 Super Toxic (Category 1) | Less than 5 mg/kg | 1 grain (a taste - less than 7 drops) |
| 5 Extremely Toxic (Category 2) | 5-50 mg/kg | 4 ml (between 7 drops and 1 tsp.) |
| 4 Very Toxic | 50-500 mg/kg | 30 ml (between 1 tsp. and 1 fl ounce) |
| 3 Moderately Toxic | 500-5000 mg/kg | 30-600 ml (between 1 fl oz. and 1 pint) |
| 2 Slightly Toxic | 5000-15,000 mg/kg | 600-1200 ml (between 1 pint to 1 quart) |
| 1 Practically Non-Toxic | Above 15,000 mg/kg | More than 1200 ml (more than 1 quart) |

# Hazard Categories for Physical Hazards

| Hazard Class | Hazard Category | | | | | | |
|---|---|---|---|---|---|---|---|
| Explosives | Unstable Explosives | Div 1.1 | Div 1.2 | Div 1.3 | Div 1.4 | Div 1.5 | Div 1.6 |
| Flammable Gases | 1 | 2 | | | | | |
| Flammable Aerosols | 1 | 2 | | | | | |
| Oxidizing Gases | 1 | | | | | | |
| Gases under Pressure<br>Compressed gases<br>Liquefied gases<br>Refrigerated liquefied gases<br>Dissolved gases | 1 | | | | | | |
| Flammable Liquids | 1 | 2 | 3 | 4 | | | |
| Flammable Solids | 1 | 2 | | | | | |
| Self-Reactive Chemicals | Type A | Type B | Type C | Type D | Type E | Type F | Type G |
| Pyrophoric Liquids | 1 | | | | | | |
| Pyrophoric Solids | 1 | | | | | | |
| Pyrophoric Gases | Single Category | | | | | | |
| Self-Heating Chemicals | 1 | 2 | | | | | |
| Chemicals in which contact with water emit flammable gases | 1 | 2 | 3 | | | | |
| Oxidizing Liquids | 1 | 2 | 3 | | | | |
| Oxidizing Solids | 1 | 2 | 3 | | | | |
| Organic Peroxides | Type A | Type B | Type C | Type D | Type E | Type F | Type G |
| Corrosive to Metals | 1 | | | | | | |
| Combustible Dust | Single | | | | | | |

# Recognition and Evaluation of Hazards

- Section 1 – Identification
- Section 2 – Hazard(s) identification
- Section 3 – Composition/information on ingredients
- Section 4 – First-aid measures
- Section 5 – Fire-fighting measures
- Section 6 – Accidental release measures
- Section 7 – Handling and storage
- Section 8 – Exposure controls/personal protection
- Section 9 – Physical and chemical properties
- Section 10 – Stability and Reactivity
- Section 11 – Toxilogical Information
- Section 12 – Ecological Information
- Section 13 – Disposal Considerations
- Section 14 – Transport Information
- Section 15 – Regulatory Information
- Section 16 – Other information including date of preparation or last revision

# Recognition and Evaluation of Hazards

- Know the properties of chemicals and biological agents you use before you use or transport them and understand how your planned manipulation may affect the safety of a process.
  - Toxicity (select carcinogens, acutely toxic, reproductive hazard)
  - Flammability
  - Reactivity/Incompatibilities
  - Corrosive
  - Unstable
  - Radioactive (Must be approved through Radiation Safety)
  - Bio-safety Level 1-4 (The use of all BSL2 agents must be approved through the Institutional Biosafety Committee)

# Dual Use Research of Concern (DURC)

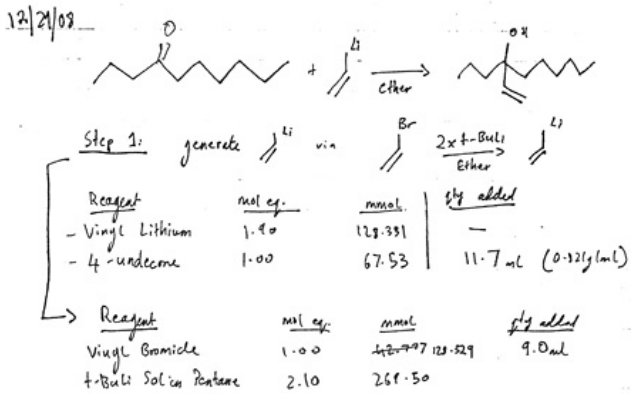
- "Research that…, can be reasonably anticipated to provide knowledge, products, or technologies that could be directly misapplied by others to pose a threat to public health and safety, agricultural crops and other plants, animals, the environment, or materiel."
- List of 15 agents that require oversight from the Institutional Review Entity

- Avian influenza virus
- Bacillus anthracis
- Botulinum neurotoxin (any quantity)
- Burkholderia mallei
- Burkholderia pseudomallei
- Ebola virus
- Foot-and-mouth disease virus
- Francisella tularensis
- Marburg virus
- Reconstructed 1918 Influenza virus
- Rinderpest virus
- Toxin-producing strains of Clostridium botulinum
- Variola major virus
- Variola minor virus
- Yersinia pestis

**If using any of the above listed agents, contact skylar.rohrs@utoledo.edu**

# UCLA Lab Accident

- In 2008 a UCLA laboratory worker, Sheri Sangji, died of burns after manipulating T-BuLi
  - In 2013 Patrick Harran, Chemistry Professor, was charged with willfully violating state occupational health and safety standards.



# U Hawaii at Manoa

- Graduate researcher Thea Ekins-Coward and PI, Jian Yu, built a bioreactor which used compressed $H_2$, $O_2$ and $CO_2$
- Static discharges reported prior to accident
- Explosion occurred March, 2017. Ekins-Coward lost right arm and elbow.
- Explosion caused by improper setup, grounding issues
- Lawsuit names the University, PI and Director of the research institute – currently pending as of September, 2020.

# Principal Investigator (PI) Responsibilities

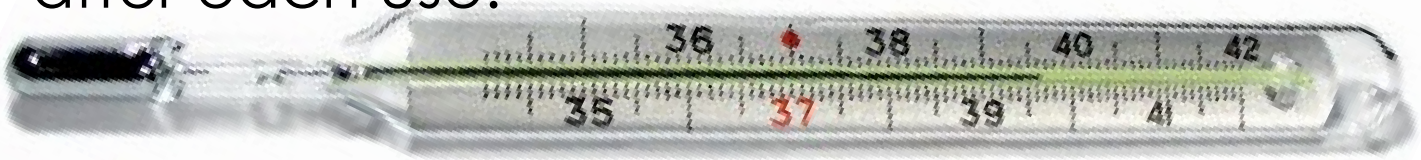
- Standard Operating Procedures are in-place for hazardous chemicals and potentially hazardous processes and/or equipment
- Lab Staff/Students have received annual safety training and job-specific training
- PPE is appropriate and adequate
- Access to emergency features (eyewashes/safety showers) are unimpeded
- All chemicals are labeled and no unlabeled containers exist
- **The PI can be held civilly and criminally liable in the event of an injury**

# Exposure Monitoring

- If you are utilizing local exhaust, or small quantities of non-hazardous substances there is no need for exposure monitoring.
  - Occupational Exposure limits (OEL's) refer to airborne concentrations of chemical substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, over a working life time, without adverse health effects.
  - If there is reason to believe exposure levels for a substance routinely exceed action levels or OEL's contact Environmental Health and Radiation Safety.

# Heavy Metals

- Lead, Cadmium, Mercury, etc.
  - Heavy metal toxicity can effect the nervous system and other body functions.
  - Heavy metals become toxic when they are not metabolized by the body and accumulate in the soft tissues.
  - Consider all routes of exposure when protecting yourself!
  - Consider substitution with less hazardous materials, consider forms that are in suspension or solid form, use local exhaust, wear gloves, wash hands frequently, decontaminate work surfaces after each use.



# Nanotechnology

- "Engineered Nanomaterials" are intentionally created (in contrast with natural or incidentally formed) with dimensions <100 nanometers. This definition excludes biomolecules (proteins, nucleic acids, and carbohydrates).
  - The following survey has been developed to provide the initial information necessary for a hazard control assessment (Engineered Nanomaterial Survey).
  - An additional training session is offered on-line for Nanomaterial users.

# Recognition and Evaluation of Hazards


- Controlled Substances
  - Extensive internal and external regulations which cover procurement, use, storage and disposal.
    - Guidance can be found at:
    - https://www.utoledo.edu/research/rsp/RC/controlled-substances-and-dangerous-drugs/

# Recognition and Evaluation of Hazards

- Controlled Substances
  - Access should be limited and documented (names, titles, initials, and signatures are required for all person designated by the DEA registrant as authorized)
  - Locked storage
  - Required Record Keeping

# List I and List II Chemicals

- Policy #3364-70-17
- List I and List II Chemicals are chemicals that can be used in manufacturing a controlled substance ( i.e. anthranilic acid, ergotamine, piperdine, and drug products containing ephedrine, pseudoephedrine, or phenylpropanolamine as well as other reagents and solvents).
- "Endusers" engaged in research should maintain accurate records of the intake (amount received), use and purpose of the List I and List II chemical.
- These records must be maintained for at least 3 years.

# Electrical Safety

- Do NOT use extension cords in the laboratory.
- Ensure all plugs have a ground prong and insulation is not worn, cracked or broken.
- Do NOT plug power strips into each other.
- Pay close attention to the end of the cord where the cord meets the plug.
- Do not use cheater plugs!!
- Do not modify electrical equipment yourself! The electrical shop will modify or fix electrical equipment for you SAFELY
- Do not block electrical panels

# Material Storage

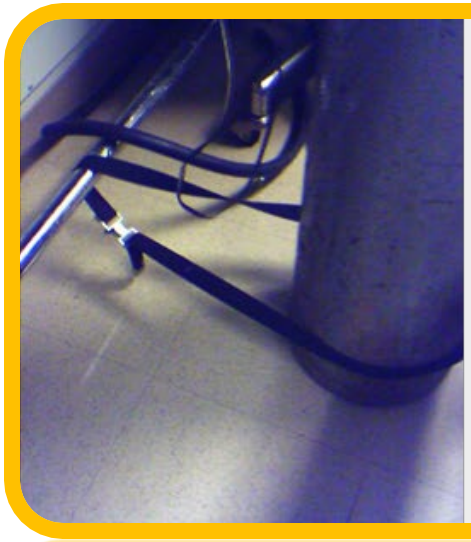
- Do not store materials within 18 inches of the ceiling.
- Do not block exits, safety showers and eyewashes, fire extinguishers, etc.

# Housekeeping


- A Clean lab is a safe lab

# Compressed Gas Storage

- Gas cylinders must be secured when in use or stored.
- Regulators must be removed and caps used when storing and moving cylinders.

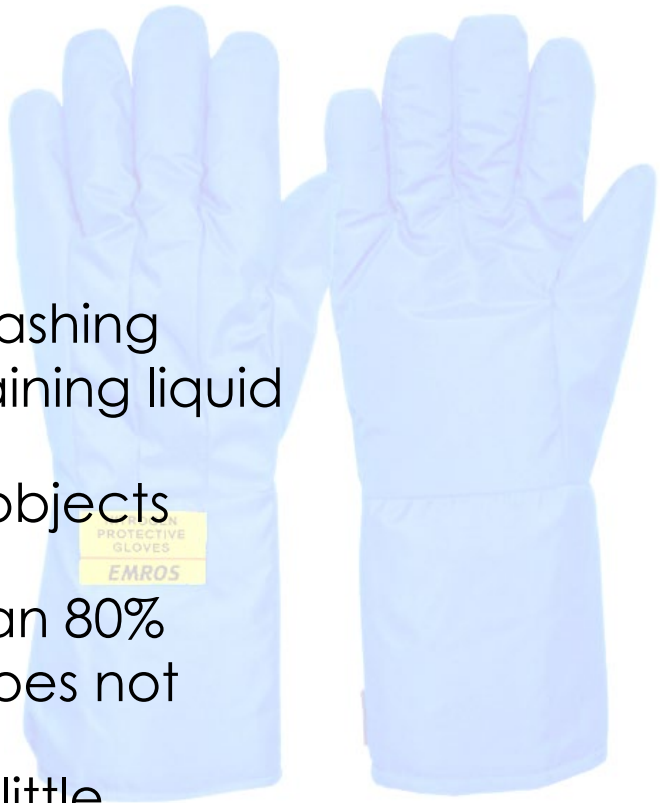



# Cryrogenic Safety

- Liquid nitrogen, liquid oxygen and carbon dioxide (dry ice) are the most common cryogenic materials used in labs
- Cryogenic Materials have temps lower than -150ºC
  - Instantly causes frostbite or burn exposed skin
  - Causes normally soft, flexible objects (hoses, seals, rubber floors, etc) to become brittle and crack
- Vaporization produces large volumes of gas
  - If in sealed containers, it can produce enormous pressures that could rupture the container

# Cryogenic Safety

- PPE Required
  - Chemical goggles and Face Shield
  - Impervious Coat
  - Thermal Gloves (Loose fitting)
  - Full pants that go over shoe tops
- Handling Safety
  - Pour slowly to minimize boiling and splashing
  - Never touch uninsulated vessels containing liquid or dry ice
  - Use wood or rubber tongs to remove objects from liquid
  - Do not fill cylinders or dewars more than 80%
  - Do not seal/cap any container that does not have a release valve
  - Do  not off-gas in confined areas with little ventilation



# Bloodborne Pathogens (29CFR1919.1030)

- Human Pathogens such as HIV, HBV, HBC and other potentially infectious materials should be handled with great care in the laboratory setting.
  - Signs and Symptoms can include: Loss of appetite, nausea, vomiting, fever, abdominal pain, jaundice etc.
- If your lab is working with human/animal bloodborne pathogens you are required to be in compliance with the Institutional Exposure Control Plan (annual training/HBV vaccinations).

# Bloodborne Pathogens

- A Bloodborne Pathogen Exposure Incident occurs when blood or OPIM enter the body:
  - Through a mucous membrane (eyes, mouth, or nose)
  - Through an opening in the skin (cuts, abrasions, open sores, acne)
  - Through a penetration of the skin by a contaminated sharp object (includes needlesticks and human bites)

# Bloodborne Pathogens

- If a potential bloodborne pathogen exposure incident has occurred:
  - Immediately care for the site of exposure - either wash with soap and water or if in eyes, nose or mouth – flush with water
  - Notify supervisor immediately
  - Go to UT Medical Center for evaluation within 24 hours:
    - To verify whether an exposure incident has occurred
    - To receive HB vaccine, if indicated
    - Receiving prophylaxis within two hours reduces chance of conversion.

# Containment Requirements for Potentially Infectious Body Fluids

- BSL-2 practices, containment equipment, and facilities are required for all activities utilizing known or potentially infectious body fluids and tissues
- Work should be done in a BSC
- The use of needles, syringes, and other sharp objects should be limited, using safety needles when possible

# Infection Control

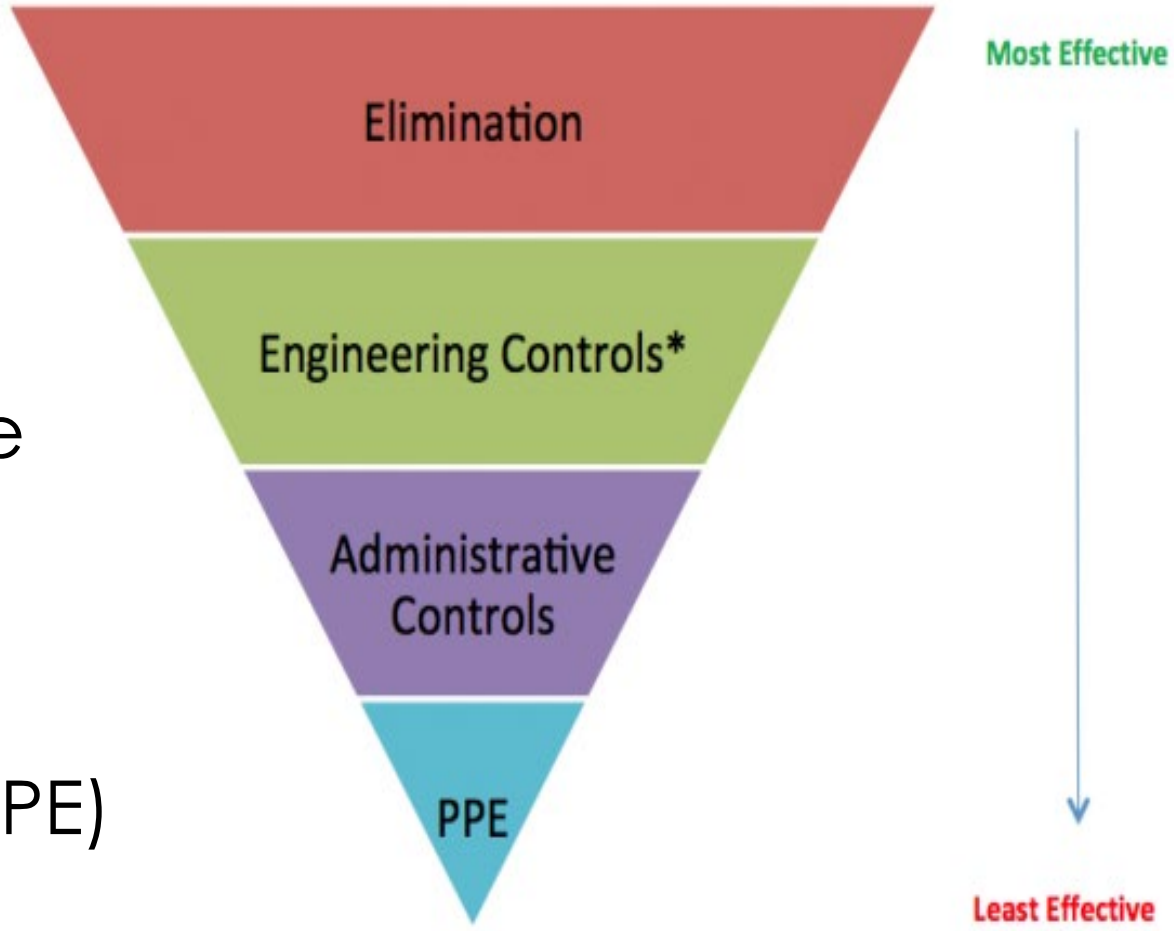
- The most important means of infection control is hand washing!!!
- Wear appropriate PPE (gloves, goggles, lab coat).
- Disinfect all areas that come into contact with blood or other potentially infectious materials.

# Shipping and Transferring


- All individuals packaging and shipping infectious substances and diagnostic specimens off the campus using commercial carriers must attend training though Environmental Health and Radiation Safety.
- This includes shipping biological materials from your colleagues at other universities inside and outside the United States.
- Anyone transporting anything across borders (including state) must contact EHRS for further information for USDA, DOT, and other permits.

# Laboratory Chemical Hygiene Plan and Hazard Control

- Hierarchy of Control
  - Engineering Controls
  - Administrative Controls
  - Personal Protective Equipment (PPE)



# Engineering Controls

- Fume Hoods
  - Keep sashes down when not in use.
  - Don't store Chemicals and equipment in hood.
  - Limit traffic behind you
  - All Fume hoods should be tested for face velocity at 18 inches annually.
- Do not use free standing units with activated carbon filters.

# Engineering Controls

- Biosafety Cabinets
  - Normally Class II BSC's in your lab protects worker and material.
  - Laminar flow hoods only protect the product.
  - Designed for removing particulates not chemical vapors.
  - All Biosafety cabinets should be certified annually. BSL2 and BSL3 cabinets MUST be certified before agents are used and annually thereafter.

# Administrative Controls

- Administrative Controls
  - Lab Standard 29CFR1910.1450
    - Scope and Application
    - Definitions
    - Permissible Exposure Determination
    - Chemical Hygiene Plan
    - Employee Information and Training
    - Medical Consultation/Examinations
    - Hazard Identification
    - Use of Respirators
    - Recordkeeping

# Administrative Controls

- Institutional Chemical Hygiene Plan
- Lab Specific Chemical Hygiene Plan
- Toxic Chemical Standard Operating Procedures (select carcinogens, reproductive toxins, and substances which have a high degree of acute toxicity)
  - General (Developed By Environmental Health and Radiation Safety)
  - Toxic Chemical Use Form/SOP
  - Sample of SOP's available on Environmental Health and Radiation Safety Website

# Administrative Controls

- Compounds of High (hazardous drugs/carcinogens) or Unknown Toxicity
  - These are chemicals for which there are no known statistically significant studies to establish their toxicity
  - Review standard operating procedures with your supervisor before starting work.
  - Use a designated work area, isolate items used there; decontaminate the area when work is completed.
  - Use local exhaust ventilation.
  - Use appropriate PPE and wash hands often.
  - Use Highest level of Protection.

# Administrative Controls

- Medical Surveillance
  - Animal Usage (Tetanus--good for 10 years)
  - Respirator Usage
    - Approved through Environmental Health and Radiation Safety
    - Must be medically cleared and fit tested annually
    - This includes dust masks
  - Unique Circumstances
    - Serum Sampling, PPD, Overexposures

# Administrative Controls

- Pregnancy/Fertility
  - Women who are pregnant are encouraged to discuss work assignments with their supervisor and to seek alternate work assignments if the potential for exposure to teratogens / embryo toxins exist.
  - Also males starting a family may also be at risk

# Personal Protective Equipment (PPE)

- PPE may include:
  - Gloves - rubber, butyl, latex, nitrile?
  - Eye Protection
    - chemical/splash/impact goggles, face shields (UV protection)
  - Clothing -Lab coats, aprons, scrubs
  - Respirators
- Open toed shoes and sandals are not acceptable footwear in laboratories or animal rooms

# Personal Protective Equipment

- A PPE hazard assessment should be completed prior to using a new chemical or biological agent.
- Identify the hazards associated with the agent and what PPE will be used to control those hazards.

# Personal Protective Equipment

- Gloves
  - Select gloves appropriate for the task—see glove charts.
  - Check gloves for leaks.
  - Do not touch your face, telephone, etc. with contaminated gloves.
  - Do NOT wear out of the area of use.

Contact the Environmental Health and Radiation Safety Department for assistance or questions regarding hazard control and PPE

419.530.3600

# Chemical Storage

- Do not store chemicals in alphabetical order.
- Examples
  - Methanol (Flammable)
  - Nitric Acid (Oxidizer)

  - Sodium Hydroxide (Base)
  - Sulfuric Acid (Acid)

  - Hydrogen (Flammable)
  - Oxygen (Oxidizer)
- *Oxygen and Hydrogen must be separated by a firewall or 25 feet.

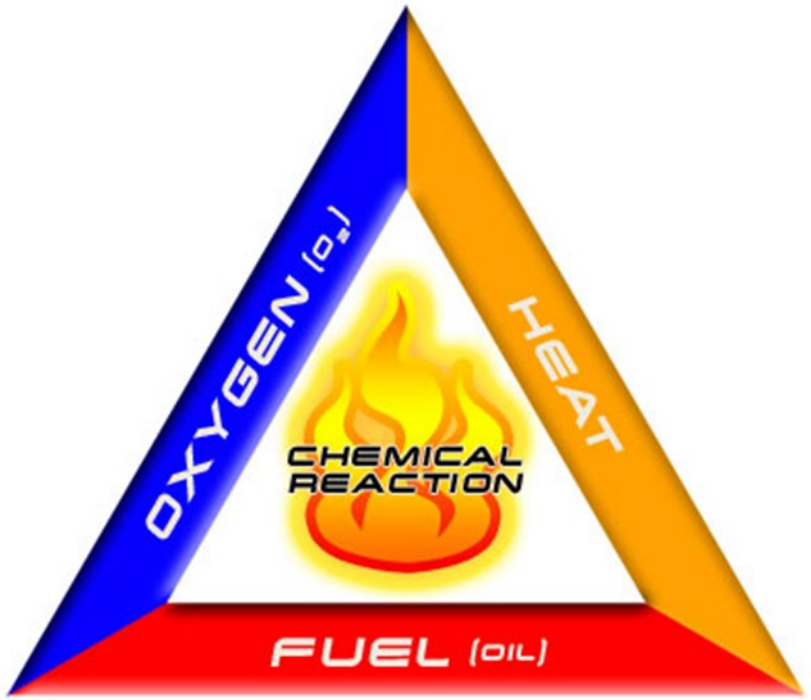
# Chemical Storage


Oxidizers next to Flammables


↑Base next to Acid or in Alphabetical Order↓


# Chemical Storage

- You need oxygen, fuel, and an ignition source to start a fire.
- Inorganic acids give off oxygen and flammables act as a source of fuel.
- Separate inorganic acids and flammables.
- Organic acids should be stored with flammables.



# Chemical Storage

- Chemicals presenting an eye hazard should be stored below eye level on shelves.
- Old and outdated chemicals should be disposed of through EHRS.
- Fume Hoods **ARE NOT** chemical storage areas and should be kept clean.
- Chemicals stored in secondary containers **MUST** be labeled!
  - Labels on containers must not be defaced

# Chemical Storage

- Flammable Storage
  - Keep flammable storage to a minimum!
  - Do not accumulate hazardous waste. Call EHRS for a pick up.
  - Maximum storage limitations are based on the size of the room, sprinklers, and fire ratings.
    - Each lab will need to be evaluated for limitations during lab safety surveys.

# Chemical Storage

- Peroxide Forming Materials
  - Date all peroxide formers upon receipt and opening. (i.e. ethyl ether, THF)
  - Dispose of after 18 months of receipt or 3 months after opening. (check for date)
  - Do not open container which has obvious crystal formation around the lid.
    - Call UTPD immediately 530-2600 to initiate a response.

# Chemical Spills

- Assess the hazard
  - Protect Yourself, Protect Others, Protect the Environment
- Restrict Access
- Are you comfortable cleaning up the Spill?
- No? Call 419-530-2600

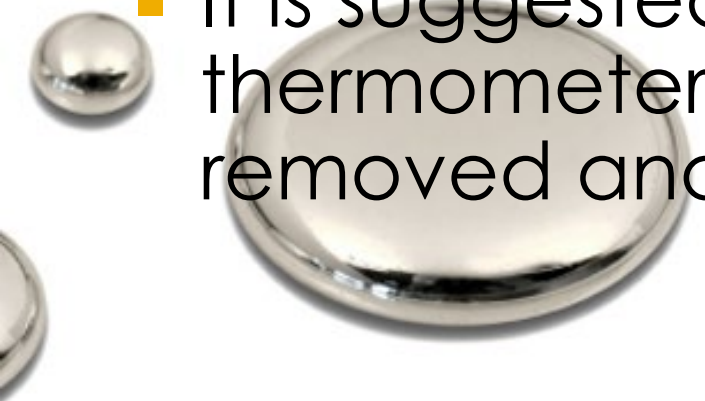
**If you are unsure of the hazard of a spill or need assistance with PPE selection, contact EHRS through UTPD**

# Chemical Spills

- Consult Environmental Health and Radiation Safety Policy HM-08-013 for all types of hazardous spills
- Areas where hazardous wastes are stored are posted with the Institutions Contingency Plan
- All spills of hazardous chemicals generate hazardous waste that must be labeled and disposed of properly

# Mercury Spills

- All mercury spills should be cleaned up in a timely fashion by EHRS.
- Contact Campus Police Immediately by dialing 419-530-2600 to reach EHRS
- Mercury spills often result in equipment being removed from lab, or labs being shut down for a hours to clean.
- It is suggested any mercury thermometers in the lab should be removed and disposed of through EHRS



# Fires and Fire Extinguishers

**R (rescue) - A (alarm) - C (confine) - E (Extinguish/Evacuate)**

**P (pull) – A (aim) – S (Squeeze) – S (Sweep)**

- Know that the fire extinguishers in your lab are located at the door
- Inspection of extinguishers is performed on a routine basis
- Contact UT Police at 419-530-2600 on the Health Science Campus if extinguishers are utilized.

# Laboratory Evacuations

- In the event of a fire, severe weather emergency or laboratory evacuation scientists should:
- Stabilize Reactions in Progress
- Close Fume Hood Sashes
- Close the Lab Door Upon Exit

# Waste Disposal Procedures

- Wastes Are Separated Due to Their Unique Hazards.
  - Safety of Handlers
  - Regulatory Restrictions
  - Identify/Label waste contained within
- Others on Campus Will Be Handling This Materials Based on How You Classify Them
- Intermingling of Streams Causes the New Stream to Take on the Highest Hazard Class(I.E. Mixed Solid and Infectious Is Now All Infectious)

# Glassware


- **ENSURE** that no needles or scalpels go in glassware bins
- **DO NOT** overload glassware bins
- When utilizing cardboard boxes for disposal of glassware be sure that they are labeled **"Broken Glass"**
  - Users can purchase boxes for broken glass on the Main Campus from 3rd party vendors.
  - Broken Glass containers can be obtained though Central Stores on the Health Science Campus.

# Infectious Waste

- Placed in leak proof containers lined with Red Plastic Bags or Red Labeled "Sharps" Containers.
- Treated by Autoclaving, Chemicals, or Incineration to Render It Non-infectious Prior to Disposal in the Landfill. Service provided by vendor.
- Call Environmental Services on the Health Science Campus and Environmental Health and Radiation Safety on the Main Campus for a pick up.

# Infectious Waste

- Sharps containers must be affixed to a wall, designed for table top disposal, or secured on a table top with a dog dish!

- **Do not store Sharps containers on the floor**

# Hazardous Chemical Waste

- Determining what is Hazardous Waste…
  1. If you are unsure, consider it hazardous and call EHRS for further information
  2. All organic solvent type waste is without exception hazardous waste.
  3. Most chemicals generated during research are hazardous wastes
  4. Some exceptions are weak acids and bases that can be disposed of in the sink.
  5. Strong acids should be collected and labeled.
  6. Sharps (needles) contaminated with chemicals must be placed in a puncture proof container and labeled as "Hazardous Waste-Chemical Name/Sharps".

# Hazardous Chemical Waste

- HCS
  - For removal of hazardous waste on the HSC please call 419-530-3600 or complete the on-line pick up form on the EHRS web site.
- MC
  - Hazardous waste is scheduled for pick up quarterly (March, June, Sept., and Dec.).
  - All PI's are notified by email in advance.
  - An internal hazardous waste manifest form must be submitted to EHRS to ensure collection.

# Hazardous Chemical Waste

- Principal Investigator Responsibility:
  - Label all waste containers as "Hazardous Waste – Chemical Name – Hazard Information"
    - Example: "Hazardous Waste – Phenol – Toxic, Corrosive"
    - The Hazard Information can be communicated with words (as above) or by using the appropriate GHS symbols.
  - Place that waste in a leak proof container
  - Designate a space as a hazardous waste accumulation area.
  - Date the container when full and contact EHRS.
- **Keep hazardous waste containers closed at all times except when adding waste.**

# Used Oil and Universal Waste

- Used Oil
  - Must be labeled as "Used Oil"
- Waste Oil
  - Must be labeled as such when oil is contaminated with other chemicals (Contact EHRS for Guidance)
- Universal Wastes such as fluorescent bulbs and rechargeable batteries must be disposed of through EHRS and labeled as universal waste.

# Pharmaceutical Waste

- Controlled substance waste
- The Ohio State Board of Pharmacy must be notified before disposing of controlled substances, with exceptions noted in Distribution and Disposal of Controlled Substances for Research Use Policy 3364-133-90
- Policy contains further information and template letters to send to the Ohio State Board of Pharmacy
- Documentation of drug disposal must be maintained per state and institutional regulations

# Pharmaceutical Waste

- Hazardous pharmaceutical waste
  - Disposed through EHRS
- Non-hazardous pharmaceutical waste
  - Researcher's responsibility to dispose of and document appropriately
- Maintain accurate and complete accountability of dangerous drugs and controlled substances at all times per institutional and state regulations
- Contact Tim Niederkorn in EHRS to determine which category applies to your waste streams.

# Radioactive Waste

- The Radiation Safety Office is now a part of the Environmental Health and Radiation Safety Department (EHRS).
- Please contact Radiation Safety at (419) 383-4301 for any questions

# Important Phone Numbers

- **All Emergencies** :
  - 911
- Environmental Health and Radiation Safety:
  - 419-530-3600
- UT Police:
  - 419-530-2600
- Radiation Safety:
  - 419-383-4301