TEXAS TECH UNIVERSITY
HEALTH SCIENCES CENTER™
EL PASO

Laboratory Compliance and Biosafety Manual

September 2019

TTUHSC El Paso

Laboratory Compliance & Biosafety Manual

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Introduction

The Laboratory Compliance and Biosafety Manual is intended to be used as a guide for Principal Investigators (PIs) and their laboratory staff, to ensure their laboratories remains compliant and safe. The Laboratory Compliance and Biosafety Manual will be revised and updated as new guidelines, clarifications and/or other information becomes available. The Sr. Director of Safety Services, as well as the Institutional Biosafety Committee (IBC), will review and approve any changes, prior to the dissemination of the manual.

This manual contains plans, that need to be filled out with information specific to the laboratory; Exposure Control Plan (ECP), Hazardous Communication Plan (HCP), Chemical Hygiene Plan (CHP). Each of these sections must be signed by all laboratory staff, including the PI, staff and students. The completion of these plans, as well as the signatures, will be inspected during the quarterly laboratory inspections.

Statement of Acknowledgment and Agreement

I have received, read, and understand the information contained in the Texas Tech University Health Sciences Center El Paso Laboratory Compliance and Biosafety Manual. I agree to observe and comply with all institutional policies related to the possession, use, storage, handling, shipping and transport of hazardous materials.

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Chemical Inventory Management Program

User's Guide -Quartzy

1. Contact Safety Services at safetyserviceselp@ttuhsc.edu or 915-215-4820 to request initial access to the Quartzy Chemical Inventory Program, www.quartzy.com.
2. Please include the name of the PI for your lab, the location of the lab and your job title and your email address. Please indicate if you will be ordering chemicals for the PI.
3. You will then be receiving an e-mail from Quartzy to create a password and be granted access to your lab's Chemical Inventory.
4. For Quartzy training on Inventory please go to Quartzy Support and click on the **Inventory Module**.
5. It is the responsibility of the PI and lab workers to update the Chemical Inventory when changes have occurred.
6. For further assistance on the Quartzy Chemical Inventory Program please contact Safety Services or Richard Chacon at richard.chacon@ttuhsc.edu.

Globally Harmonized System (GHS)-Fact Sheet

GHS PICTOGRAMS

Corrosive

Flammable

Irritant

Acute Toxicity

Oxidizer

Explosive

Environmental Hazard

Compressed Gas

Health Hazard

The United States Occupational Safety and Health Administration (OSHA) has adopted and is requiring the implementation of the United Nations' Globally Harmonized System (GHS) of Classification and Labeling of Chemicals. Implementation of the Globally Harmonized System will include changes in Safety Data Sheets, Labeling, and Pictograms.

The goal of GHS is to communicate hazard information in a prescribed and uniform way on labels and safety data sheets.

SAFETY DATA SHEET (SDS)

The documents formally called Material Safety Data Sheets (MSDS) are now known as Safety Data Sheets (SDS) under the Globally Harmonized System.

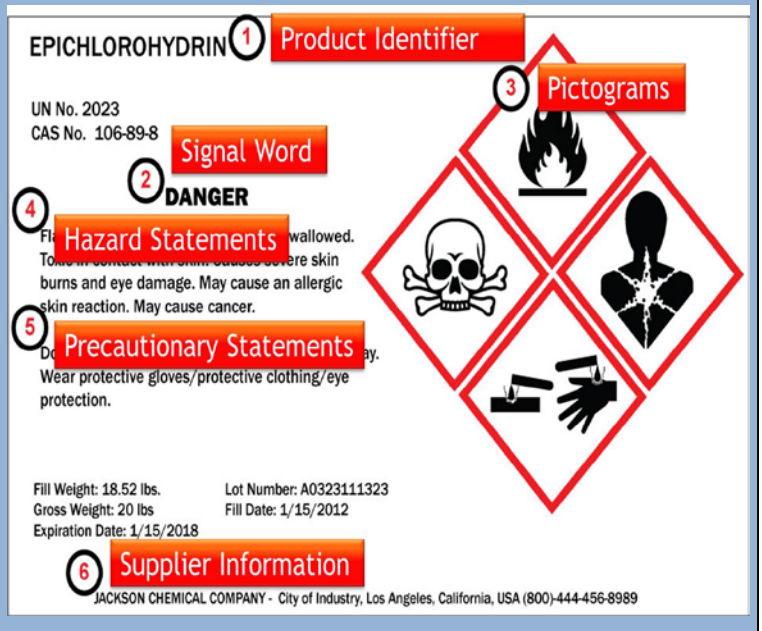
A SDS identifies the substance and its hazardous properties, and outline appropriate safety precautions. A SDS is comprised of 16 standardized sections:

1.Identification of Substance	*9. Physical/Chemical Properties*
2. Hazard Identification	*10. Stability & Reactivity*
3. Composition of Ingredients	*11. Toxicological Information*
4. First-Aid Measures	*12. Ecological Information*
5. Fire-Fighting Measures	*13. Disposal Considerations*
6. Accidental Release Measures	*14. Transport Information*
7. Handling & Storage	*15. Regulatory Information*
8.Exposure Controls/PPE	*16. Other Information*

Safety
Data
Sheets

GHS LABELING

1. Product Identifier
2. Signal Word
3. Pictograms
4. Hazard Statements
5. Precautionary Statements
6. Supplier Information



This fact sheet is not all inclusive, but provides background information on GHS. For further questions or information, please contact Safety Services at 915-215-4820.

Texas Hazard Communication Act

- You, as an employee, have a **Right to Know and Understand** the information about the hazardous materials used in your work area and the potential effects of these materials upon your health and safety.
- You are informed of these hazards in the following ways…..

- Chemical Inventory
  - Request a copy of your lab's chemical inventory from your supervisor or from Safety Services
- Safety Data Sheets (SDS)
  - Vendors are required to send hard copies when a chemical is purchased. The lab should keep these SDSs in a designated and labeled binder or location.
  - SDSs may also be found online http://www.flinnsci.com/msds-search.aspx
- Labeling
  1. Containers must have labels which identify the material and warn of its potential hazards
  2. With the new Globally Harmonized System of Classification and Labeling of Chemicals (GHS), information on secondary containers must contain the following information that can be found in the SDS document.
     Product Identifier, Signal Word, Pictogram(s), Special Hazard/Precautionary Infromation

When do you use a SDS?

- Whenever you need additional information about a hazardous material that is not included on the label.
- For example: If you just spilled a hazardous chemical and you need to know how to clean it up safely.

Doing your part……

- Bookmark the SDS site on your browser: http://www.flinnsci.com/msds-search.aspx
- Read labels and SDSs ***before*** using a substance
- Do not deface or remove labels, and replace when necessary.

Texas Tech University Health Sciences Center El Paso

Right-To-Know Acknowledgement Form

I certify I have read the training pursuant to the Right-To-Know Act and know where to locate SDS sheets.

_____ (Name) _____(Signature)

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Introduction to Biosafety

The goals of the Biological Safety (or Biosafety) Program are to protect laboratory workers, the public and the environment from potentially hazardous biological materials. Compliance with State and Federal regulations is essential if experiments are to be done safely, although excessive interference would hinder research unnecessarily. The Texas Tech University Health Sciences Center El Paso's Institutional Biosafety Committee (IBC), provides guidance in determining the use of biological safety precautions that effectively reduce or eliminate the risk of exposure to potentially hazardous biological materials used in research. The other essential goal of the Committee, and by extension, the Biosafety Officer (BSO), is to protect the University from punitive sanctions by Federal or State agencies as a result of compliance failures on the part of the research community. It is a difficult balance to maintain, and full cooperation and dialog between the research community and the IBC is essential to successfully achieve this balance.

Risk Groups and Biosafety Levels

The tools used during risk assessments conducted for each agent, include identifying an agent's Risk Group, and determining the appropriate Biosafety Level (BSL) required for adequate containment. The characteristics of Risk Groups and BSLs are described in the tables below. Note that Risk Groups are only based upon the potential for an agent causing disease in healthy adults, not children or those who may be at increased risk due to immunocompromised conditions. Also note that the Biosafety Level often corresponds to the Risk Group, **but not always.** There are many cases where an agent poses little or no risk to a person but could do serious harm to agriculture or the environment if released. The Biosafety Level will be higher than the risk group would indicate. **The BSL may also be increased for working with large quantities of culture (greater than 10 liters) or if laboratory manipulations dictate higher containment conditions (i.e. generating aerosols).**

Risk Group	Basis for Classification	Examples
1	Agents do not cause disease **in healthy adult humans**	*Escherichia coli* K12, asporogenic *Bacillus subtilis*, *Saccharomyces cerevisiae*, bacteriophages, Baculovirus
2	Agents cause disease but rarely serious; vaccines or treatment *usually* available. Infection generally not by inhalation.	Salmonella, bloodborne pathogens, Influezna
3	Agents cause serious or lethal human disease; vaccines or treatment may be available. Infection usually via inhalation.	*Mycobacterium tuberculosis*, *Coxiella burnetii*, *Yersinia pestis*, *Histoplasma capsulatum*; St. Louis Encephalitis virus
4	Agents cause serious or lethal human disease; vaccines or treatment *not usually* available)	Lassa, Junin, Machupo, Ebola and Marburg viruses and *Herpesvirus simiae B* cultures

Biosafety Level	Basis for Classification	Common Examples
1	Suitable for work involving well-characterized agents not known to cause disease in healthy adult humans and of minimal hazard	*Escherichia coli* K12, asporogenic *Bacillus subtilis*, *Saccharomyces cerevisiae*, bacteriophages, Baculovirus
2	Suitable for work involving agents of moderate potential hazard to personnel and the environment	Salmonella, bloodborne pathogens, Influezna, Rhinovirus
3	Suitable for work with infectious agents which may cause serious or potentially lethal disease as a result of exposure by inhalation	*Mycobacterium tuberculosis*, *Coxiella burnetii*, *Yersinia pestis*, *Histoplasma capsulatum*; St. Louis Encephalitis virus
4	Suitable for work involving exotic infectious agents that pose a high risk or life threatening disease and for which there is no vaccine or treatment	Lassa, Junin, Machupo, Ebola and Marburg viruses and *Herpesvirus simiae B* cultures

Biosafety Cabinets (BSC)

Biological Safety Cabinets (BSCs) are designed to provide personnel, environmental and product protection when appropriate practices and procedures are followed. Three kinds of BSCs, designated as Class I, II and III, have been developed to meet varying research and clinical needs. Here at Texas Tech University Health Sciences Center El Paso, we have Class II cabinets throughout campus. **As with all laboratory equipment, these must be used appropriately to ensure that maximum safety is achieved at all time.**

Below is a table that describes the different types and usage for each class.

BSC CLASS	FACE VELOCITY	AIRFLOW PATTERN	NON-VOLITILE TOXIC CHEMICALS AND RADIONUCLIDES	VOLITILE TOXIC CHEMICALS AND RADIONUCLIDES
I	75	Enters under sash, through HEPA to outside or to room through HEPA. No cabinet blower, uses exhaust fan outside.	YES	**Only** if exhaust outdoors [1,2] "filtered fume hood"
II, A1	75	Enters under sash and work surface, through work area HEPA, 70% recirculates back to work area through cabinet blower to plenum positively pressured relative to the room, 30% exhausts through exhaust HEPA either into room or to outside via canopy ("thimble") duct.	YES, minute amounts	NO
II, B1 Classic design	100	Enters under sash and work surface, through HEPA to cabinet blower to work area HEPA, 30% recirculates back to work area, 70% exhausts through exhaust HEPA to outside via dedicated non-canopied duct.	YES	YES, minute amounts [1,2]
II, B1 Bench top design (now most common)	100	Enters under sash and work surface to cabinet blower, through work area HEPA, 30% recirculates back to work area, 70% exhausts through exhaust HEPA outside via dedicated non-canopied duct.	YES	YES, minute amounts [1,2]
II, B2	100	Enters through cabinet blower and under sash and work surface to blower, through work area HEPA, no recirculation, 100% through exhaust HEPA to dedicated non-canopied duct.	YES	YES, small amounts [1,2]
II, A2	100	Similar to II, A1 but has 100 fpm face velocity and plenums are negatively pressured relative to the room; can exhaust via exhaust HEPA to either room or outside via canopied duct.	YES	YES, minute amounts [1,2] **Only** if exhaust outdoors Formerly "B3"
III	N/A	Supply air is HEPA-filtered at entry. Exhaust is through two HEPA filters to outside via non-canopied duct.	YES	YES, small amounts [1,2] "glove box"

Working Safely in a Biosafety Cabinet

Please note the following guidelines:

- Only the materials and equipment required for the immediate work should be placed in the BSC. Extra supplies (e.g., additional gloves, culture plates or flasks, culture media) should be stored outside the cabinet. Cluttered conditions inside the cabinet while working contribute to disruption of the laminar air flow. When notin use, the BSC should be as empty as possible.

- A BSC should never be used when an alarm is sounding, a warning light is flashing, or you detect a problem with the airflow. Check the magnehelic gauge, if present, before use – if it is on "0", do not use the cabinet, as it may have a hole in the HEPA filter.

- Prior to using the BSC, check for a current certification sticker. If there is no sticker or the sticker is out of date, contact the person designated on the sticker to coordinate/schedule the certification. The BSC needs to be certified when newly installed, annually thereafter or whenever moved or repaired. In addition, the BSC will be decontaminated professionally prior to moving or decommissioning.

- The BSC is not a chemical fume hood; work with volatile or toxic chemicals only in a Class II Type B2BSC. With other types of BSCs, there is increased risk of exposure to potentially hazardous chemical vapors because air is recirculated within the cabinet, and vapors may concentrate. Also, volatiles will not be stopped by the HEPA filter, so if a cabinet exhausts into the room, personnel canbe exposed to volatiles. If tasks require the use of any volatile or toxic chemicals, use a fume hood or contact Safety Services to discuss alternatives.

- Do not use the top of the BSC for storage. The HEPA filter could be damaged and the airflow disrupted.

Prior to Working in the BSC

- Turn off the ultraviolet light if the unit has one. NOTE: the use of ultraviolet lights is not recommended. Reflected UV can damage retinas. The UV light does not replace a thorough cleaning before/after every use of the BSC. If you want to use the UV light, it must be be dusted regularly. Remember that UV light does not penetrate items, and will only affect the surfaces nearby.

- Turn on the BSC if it is off, by pressing the blower on/off switch. NOTE: Many units are designed to continuously run 24 hours a day.

- **Put on gloves, lab coat at a minimum.**

- Wipe down the entire BSC (walls, work surface, glass) with a disinfectant-a disinfectant is recommended if someone else used the unit before you, and you are not sure they did a thorough cleaning job. Appropriate disinfectants can include 10% bleach (freshly made daily) followed be 70% Ethanol, or Cavicide,
    - NOTE: A dry Swiffer® can be used very effectively for the cleaning step –spray the disinfectant on the dry pads. Use a new pad before and after working.

- Load the cabinet with only the articles needed for the first part of the procedure (e.g., until you would get up to place something in the incubator, refrigerator, centrifuge). This is so that the cabinet is not overloaded. It is handy to have a small biohazard bag inside the cabinet for paper towels, pipet wrappers, glove disposal, etc.

- Position materials and equipment to avoid blocking any air vents or grills. Do not ever place anything on the front grill. Blocking the grills at the opening of the BSC may allow contaminated air from inside the cabinet to enter the user's breathing zone, and also allow contaminated room air to enter the cabinet without filtration.

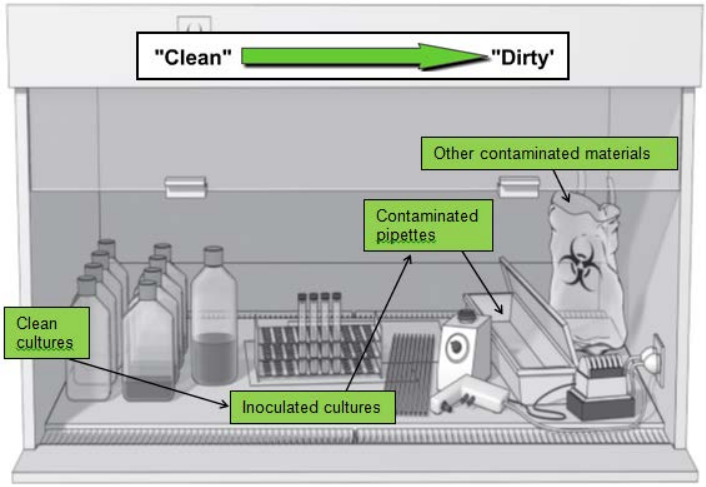
- Arrange items inside the cabinet so that you will not cross hands. For example, if you are right handed, the pipet aid should be on the right side of the cabinet, serological pipets on the left, pipet tip boxes on the right, discard beaker/pan in the middle or right side of the cabinet. Avoid crossing hands, withdrawing hands, chair movement as much as possible. Place the disinfectant of choice in a beaker or flat pan inside the cabinet. Place absorbent towels and a spray bottle of the disinfectant inside the cabinet before starting work. This will be used for spills, spraying gloves and removing materials.

- Confirm that the BSC alarm is operational and the sash is at its proper position. Never disable the BSC alarm (which indicates improper airflow), since improper airflow affects performance and could endanger the researcher or the experiment. Position the chair so that the operator is looking down (through the sash glass) onto the work surface. The chair must not be so low that the user is looking under the sash at the work surface.

- Do not open anything inside the cabinet or perform any work for 5-10 minutes, as this time is needed to purge any contaminants inside the BSC before work begins.

Working in the BSC

- Use good microbiological techniques appropriate for working in the BSC to avoid aerosol generation, splatter and cross contamination. Good microbiological techniques include:
    - Arrange materials inside the BSC to segregate contaminated and clean items. Avoid movement of contaminated items over clean items. The general workflow should be from clean to dirty (contaminated)
    - If appropriate, work on absorbent toweling to reduce splatter and aerosol formation. When discarding pipets and tips, draw the disinfectant up inside the pipet, so that the inside is decontaminated.
    - Work at least 6 inches in from the front of the BSC. Manipulation of materials should be delayed for approximately one minute after placing the hands/arms inside the cabinet if possible –this will allow the BSC to stabilize and to "air sweep" the hands and arms to remove surface microbial contaminants. Keep arms as far inside the BSC as is comfortable. Work as far towards the back of the BSC as is comfortable – it is safer for the contaminated air to go out via the rear vent than the front grill.



- Keep arms inside the BSC while work is ongoing. Keep movements slow and at a minimum in the cabinet to avoid generating turbulence. You should avoid reaching outside the cabinet for pipets and other supplies, or to discard materials. Every time your hands leave and re-enter the cabinet you risk pulling out infectious aerosols and/or introducing dirty unfiltered air into the cabinet.
- Do not use Bunsen burners in the unit, as the heat disrupts airflow and may damage the filtration system. Instead, use a micro burner, electric incinerator, or disposable plastic inoculating needles/loops.
- Do not mouth pipet, eat, drink, smoke, apply cosmetics, or handle contact lenses while working in the BSC.
- To reduce the chances for cross contamination, hold open tubes or bottles at a slight angle. Items should be recapped or covered as soon as possible. If possible, avoid putting down caps and lids, since this increases the chance that they will become contaminated.

- When a vacuum is used inside the cabinet (either the house vacuum system or a vacuum pump), the aspiration system must be connected to a liquid disinfectant trap and a filter capable of capturing he organisms being handled and suitable for use in vacuum lines.

- Keep room activity in the vicinity of the BSC to a minimum.

- Spills inside the BSC must be handled per the spill procedure on IBC/laboratory protocols.

- Aerosol generating equipment (vortex mixers, blenders, cell homogenizers, bead beaters, small centrifuges, tissue grinders, etc.) **should all be used inside the BSC,** particularly when human-sourced materials or infectious agents are involved. BSCs may not provide sufficient containment for large equipment that generates turbulence, e.g., a large clinical centrifuge. If you plan to use a larger piece of equipment inside the BSC, pre-test the ability to maintain containment by running the equipment (without samples) inside the cabinet and testing the airflow with dry ice and water, a smoke stick, incense stick, etc., to confirm that any aerosols will be contained.

After working in the BSC

- Ensure waste has been discarded into the appropriate waste container(s) located inside of the cabinet.

- Disinfect all surfaces, equipment, containers and other materials that have come in contact with a biological agent.

- Remove contaminated gloves within the cabinet and discard in the appropriate waste container located inside of the cabinet. Alternatively, you can spray gloves with a disinfectant that is compatible with the glove material.

- Exit the cabinet.

- Don a new pair of gloves.

- Remove all disinfected materials from the cabinet.

- After all items have been removed, wipe down all surfaces of the cabinet with a disinfectant, including the sides and back, and the interior of the glass.

- The cabinet should be allowed to run for at least three minutes with no activity so that the airborne contaminants will be purged from the work area. Again, some BSCs can be run continuously. If the cabinet will be shut off, ensure the sash is closed completely.

Biohazardous Agent Requiring Registration with TTUHSC El Paso Institutional Biosafety Committee (IBC)

INSTRUCTIONS: When registering hazardous biological or chemical agents, the IBC Protocol Registration Application form https://ttuep.imedris.net/ must be completed first. For any biological agent found on this list, **Addendum A** of the IBC Registration must **also** be completed and submitted for review. Please see the following link for **Addendum A** http://www.elpaso.ttuhsc.edu/research/committees/ibc/default.aspx

DEFINITION: The IBC defines "biohazardous materials" as all infectious organisms (bacteria, fungi, parasites, prions, rickettsiae, viruses) that can cause disease in humans or cause significant environmental or agricultural impact, in addition to all human or non-human primate tissues, fluids, and primary cell lines, all transgenic animals and plants, recombinant DNA, and all natural or genetically-engineered human and animal cell lines that are pathogenic to humans.

CDC/NIH/USDA "select agents" are highlighted in green for quick reference. The federal government decides which agents are at high risk of being used in terrorist activities and refers to them as "select agents". Select agents can either be pathogens (listed below) or biological toxins. Even though biological toxins are derived from animals and plants, they are included in the highly hazardous chemical list because they have no pathogenic potential. NOTE: All manipulations of select agents at TTUHSC El Paso must be in accordance with institutional policy 73.12. You may find the policy at this link: http://elpaso.ttuhsc.edu/elpaso/opp/

NOTE: The following list should be used as a reference and does not necessarily reflect ALL BSL-2 and higher agents or materials that require IBC protocol approval.

NOTE: BSL-1 and non-hazardous biological agents will be exempt from IBC protocol registration, as described above. However, a complete inventory list of biologicals must be submitted to the IBC before any use of these materials will be approved. There are no forms to fill out. The Excel file should be named as follows and submitted with the rest of the application:
LastName_FirstName_Biologicals_Year

Hard copies of this inventory may be kept in the lab for documentation and use, but should not be submitted as part of this registration. Please sort entries alphabetically before submitting electronically.

NOTE: If you are registering for the first time, you should submit a *proposed* biological inventory for the year.

These materials require an approved IBC protocol for possession or use*
HUMAN and non-HUMAN PRIMATE MATERIALS

--Primary cell lines **
--Blood or blood products

--Fluids surrounding internal organs, the joints, or a fetus and semen or vaginal secretions
--Any body fluids contaminated with visible blood
--Any tissues (unfixed)
***** Before possession or use of these materials, investigators must have an IBC-approved protocol and either an approved Institutional Review Board (IRB) protocol or an approved IRB exemption. Contact Sponsored Programs for further information.
** BSL-1 materials are exempt. Contact Laboratory Safety Services (743-2597) for other possible exemptions.

BIOSAFETY LEVEL II AGENTS
BSL II agents are associated with human disease which is rarely serious and for which preventive or therapeutic interventions are *often* available.

Bacterial Agents
--*Acinetobacter baumannii* (formerly *Acinetobacter calcoaceticus*)
--*Actinobacillus*
--*Actinomyces pyogenes* (formerly *Corynebacterium pyogenes*)
--*Aeromonas hydrophila*
--*Amycolata autotrophica*
--*Archanobacterium haemolyticum* (formerly *Corynebacterium haemolyticum*)
--*Arizona hinshawii* - all serotypes
--*Bacillus anthracis*
--*B. cereus* Biovar *anthracis*
--*Bartonella henselae, B. quintana, B. vinsonii*
--*Bordetella* including *B. pertussis*
--*Borrelia recurrentis, B. burgdorferi*
--*Burkholderia* (formerly *Pseudomonas* species) except those listed in BSL III)
--*Campylobacter coli, C. fetus, C. jejuni*
--*Chlamydia psittaci*, *C. trachomatis*, *C. pneumoniae*
--*Clostridium botulinum* (neurotoxin producing species), *Clostridium botulinum neurotoxins, Cl. chauvoei, Cl. haemolyticum, Cl. histolyticum, Cl. novyi, Cl.septicum, Cl. Tetani, Cl. Perfirngens* epsilon toxin
--*Corynebacterium diphtheriae, C. pseudotuberculosis, C. renale*
--*Dermatophilus congolensis*
--*Edwardsiella tarda*
--*Erysipelothrix rhusiopathiae*
--*Escherichia coli* - all enteropathogenic, enterotoxigenic, enteroinvasive and strains bearing K1 antigen, including *E. coli* O157:H7
--*Haemophilus ducreyi, H. influenzae*
--*Helicobacter pylori*
--*Klebsiella* - all species except *K. oxytoca* (RG1)
--*Legionella* including *L. pneumophila*
--*Leptospira interrogans* - all serotypes
--*Listeria*
--*Moraxella*

--*Mycobacterium* (except those listed in BSL III) including *M. avium* complex, *M. asiaticum, M. bovis* BCG

vaccine strain, *M. chelonei, M. fortuitum, M. kansasii, M. leprae, M. malmoense, M. marinum, M. paratuberculosis, M. scrofulaceum, M. simiae, M. szulgai, M. ulcerans, M. xenopi*

--*Mycoplasma*, except *M. mycoides* and *M. agalactiae* which are restricted animal pathogens
--*Neisseria gonorrhoeae*, *N. meningitidis*
--*Nocardia asteroides, N. brasiliensis, N. otitidiscaviarum, N. transvalensis*
--*Rhodococcus equi*
--*Salmonella* including *S. arizonae, S. cholerasuis, S. enteritidis, S. gallinarum-pullorum, S. meleagridis, S. paratyphi,* A, B, C, *S. typhi*, *S. typhimurium*
--*Shigella* including *S. boydii, S. dysenteriae,* type 1, *S. flexneri, S. sonnei*
--Shiga-like ribosome inactivating proteins
--*Sphaerophorus necrophorus*
--Staphylococcal enterotoxins
--*Staphylococcus aureus*
--*Streptobacillus moniliformis*
--*Streptococcus* including *S. pneumoniae, S. pyogenes*
--*Treponema pallidum, T. carateum*
--*Vibrio cholerae, V. parahemolyticus, V. vulnificus*
--*Yersinia enterocolitica*

Fungal Agents

--*Blastomyces dermatitidis*
--*Cladosporium bantianum, C. (Xylohypha) trichoides*
--*Cryptococcus neoformans*
--*Dactylaria galopava (Ochroconis gallopavum)*
--*Epidermophyton*
--*Exophiala (Wangiella) dermatitidis*
--*Fonsecaea pedrosoi*
--*Microsporum*
--*Paracoccidioides braziliensis*
--*Penicillium marneffei*
--*Sporothrix schenckii*
--*Trichophyton*

Parasitic Agents

--*Ancylostoma* human hookworms including *A. duodenale, A. ceylanicum*
--*Ascaris* including *Ascaris lumbricoides suum*
--*Babesia* including *B. divergens, B. microti*
--*Brugia* filaria worms including *B. malayi, B. timori*
--*Coccidia*
--*Cryptosporidium* including *C. parvum*
--*Cysticercus cellulosae* (hydatid cyst, larva of *T. solium*)
--*Echinococcus* including *E. granulosis, E. multilocularis, E. vogeli*
--*Entamoeba histolytica*
--*Enterobius*
--*Fasciola* including *F. gigantica, F. hepatica*
--*Giardia* including *G. lamblia*
--*Heterophyes*

--*Hymenolepis* including *H. diminuta, H. nana*
--*Isospora*
--*Leishmania* including *L. braziliensis, L. donovani, L. ethiopia, L. major, L. mexicana, L. peruvania, L. tropica*
--*Loa loa* filaria worms
--*Microsporidium*
--*Naegleria fowleri*
--*Necator* human hookworms including *N. americanus*
--*Onchocerca* filaria worms including, *O. volvulus*
--*Plasmodium* including simian species, *P. cynomologi, P. falciparum, P. malariae, P. ovale, P. vivax*
--*Sarcocystis* including *S. sui hominis*
--*Schistosoma* including *S. haematobium, S. intercalatum, S. japonicum, S. mansoni, S. mekongi*
--*Strongyloides* including *S. stercoralis*
--*Taenia solium*
--*Toxocara* including *T. canis*
--*Toxoplasma* including *T. gondii*
--*Trichinella spiralis*
--*Trypanosoma* including *T. brucei brucei, T. brucei gambiense, T. brucei rhodesiense, T. cruzi*
--*Wuchereria bancrofti* filaria worms

Viruses
Adenoviruses, human - all types
Alphaviruses (Togaviruses) - Group A Arboviruses
--Eastern equine encephalitis virus
--Eastern equine encephalomyelitis virus
--Venezuelan equine encephalomyelitis vaccine strain TC-83
--Western equine encephalomyelitis virus
Arenaviruses
--Lymphocytic choriomeningitis virus (non- neurotropic strains)
--Tacaribe virus complex
-- Bunyaviruses
--Bunyamwera virus
--Rift Valley fever virus vaccine strain MP-12
-- Calciviruses
Coronaviruses
Flaviviruses (Togaviruses) - Group B Arboviruses
-- Dengue virus serotypes 1, 2, 3, and 4
-- Yellow fever virus vaccine strain 17D
-- Hepatitis A, B, C, D, and E viruses
-- Zika virus
Herpesviruses - except Herpesvirus simiae (Monkey B virus see BSL IV - *Viral Agents*)
--Cytomegalovirus
--Epstein Barr virus
--*Herpes simplex* types 1 and 2
--*Herpes zoster*
--Human herpesvirus types 6 and 7
Orthomyxoviruses

--Influenza viruses types A, B, and C
-- Papovaviruses
--All human papilloma viruses
Paramyxoviruses
--Newcastle disease virus
--Measles virus
--Mumps virus
--Parainfluenza viruses types 1, 2, 3, and 4
--Respiratory syncytial virus
Parvoviruses
--Human parvovirus (B19)
Picornaviruses
--Coxsackie viruses types A and B
--Echoviruses - all types
--Polioviruses - all types, wild and attenuated
--Rhinoviruses - all types
Poxviruses - all types except Monkeypox virus (see BSL III - *Viruses and Prions*) and restricted poxviruses including Alastrim (Variola minor virus), Smallpox (Variola major virus), and Whitepox Reoviruses - all types including Coltivirus, human Rotavirus, and Orbivirus (Colorado tick fever virus)
Rhabdoviruses
--Rabies virus - all strains
--Vesicular stomatitis virus - laboratory adapted strains including VSV-Indiana, San Juan, and Glasgow
Togaviruses (see Alphaviruses and Flaviviruses)
--Rubivirus (rubella)

BIOSAFETY LEVEL III AGENTS
BSL III agents are associated with serious or lethal human disease for which preventive or therapeutic interventions *may be* available.

Bacterial Agents
--*Bartonella*
--*Brucella* including *B. abortus*, *B. canis*, *B. suis*, *B. melitensis*
--*Burkholderia (Pseudomonas) mallei, B. pseudomallei*
--*Coxiella burnetii*
--*Francisella tularensis*
--*Mycobacterium bovis* (except BCG strain, BSL II - *Bacterial Agents Including Chlamydia*), *M. tuberculosis*
--*Pasteurella multocida* type B -"buffalo" and other virulent strains
--*Rickettsia akari, R. australis, R. canada, R. conorii, R. prowazekii, R. rickettsii, R, siberica, R. tsutsugamushi,R. typhi (R. mooseri)*
--*Yersinia pestis*

Fungal Agents
--*Coccidioides immitis* (sporulating cultures; contaminated soil)
--*Coccidioides posadasii*
--*Histoplasma capsulatum, H. capsulatum var.. duboisii*

Parasitic Agents

None

Viruses and Prions
Alphaviruses (Togaviruses) - Group A Arboviruses
--Semliki Forest virus
--St. Louis encephalitis virus
--Venezuelan equine encephalitis virus
--Venezuelan equine encephalomyelitis virus (except the vaccine strain TC-83)
Arenaviruses (aka South American Haemorrhagic Fever virus; also see BSL IV)
--Flexal
--Lymphocytic choriomeningitis virus (LCM) (neurotropic strains)
Bunyaviruses
--Hantaviruses including Hantaan virus
--Rift Valley fever virus
Flaviviruses (Togaviruses) - Group B Arboviruses
--Japanese encephalitis virus
--Yellow fever virus
-- Poxviruses
--Monkeypox virus
Prions
--Transmissible spongioform encephalopathies (TME) agents (Creutzfeldt-Jacob disease and kuru agents, (BSE) Bovine spongiform encephalopathy agent)
--West Nile virus
Retroviruses
--Human immunodeficiency virus (HIV) types 1 and 2
--Human T cell lymphotropic virus (HTLV) types 1 and 2
--Simian immunodeficiency virus (SIV)
Rhabdoviruses
--Vesicular stomatitis virus

BIOSAFETY LEVEL IV AGENTS
BSL IV agents are likely to cause serious or lethal human disease for which preventive or therapeutic interventions are *not usually* available.

Bacterial Agents
None

Fungal Agents
None

Parasitic Agents
None

Viral Agents
Arenaviruses (aka South American Haemorrhagic Fever viruses; also see BSL III)
--Guanarito virus
--Lassa fever virus

--Junin virus
--Machupo virus
--Sabia
Bunyaviruses (Nairovirus)
--Crimean-Congo hemorrhagic fever virus
Filoviruses
--Ebola viruses
--Marburg virus
Flaviruses (Togaviruses) - Group B Arboviruses
--Tick-borne encephalitis virus complex (flavi) including Central European tick-borne encephalitis, Far Eastern tick-borne encephalitis, Hanzalova, Hypr, Kumlinge, Kyasanur Forest disease, Omsk hemorrhagic fever, and Russian Spring Summer encephalitis viruses
Herpesviruses (alpha)
--Herpesvirus simiae (Herpes B or Monkey B virus)
--Cercopithecine herpesvirus 1 (Herpes B virus)
Paramyxoviruses
--Equine morbillivirus (Hendra and Hendra-like viruses)
--Nipah virus
Poxviruses
--Variola major virus (Smallpox virus)
Hemorrhagic fever agents and viruses as yet undefined

USDA HIGH CONSEQUENCE LIVESTOCK PATHOGENS AND TOXINS (Non-overlap agents and toxins)
Fungal Agents
--*Mycoplasma capricoluml* / M.F38/*M. mycoides capri* (contagious caprine pleuropneumonia)
--*Mycoplasma mycoides mycoides* (contagious bovine pleuropneumonia)

Viral agents BSL3 and BSL4(Arenaviruses, Arboviruses, Flaviviruses)
--African swine fever virus
--African horse sickness virus
--Akabane virus
--Avian influenza virus (highly pathogenic)
--Blue tongue virus (exotic)
--Bovine spongiform encephalopathy agent
--Camel pox virus
--Classical swine fever virus
--*Cowdria ruminantium* (heartwater)
--Foot and mouth disease virus
--Goat pox virus
--Japanese encephalitis virus
--Lumpy skin disease virus
--Malignant catarrhal fever virus
--Menangle virus
--Newcastle disease virus (VVND)
--Peste Des Petits Ruminants virus
--Rinderpest virus
--Sheep pox virus
--Swine vesicular disease virus
--Vesicular stomatitis virus (exotic)

Listed Plant Pathogens

--*Liberobacter africanus*
--*Liberobacter asiaticus*
--*Peronosclerospora philippinensis*
--*Phakopsora pachyrhizi*
--Plum Pox Potyvirus
--*Ralstonia solanacearum* race 3, biovar 2
--*Schlerophthora rayssiae var zeae*
--*Synchytrium endobioticum*
--*Xanthomonas oryzae*
--*Xylella fastidiosa* (citrus variegated chlorosis strain

Hazardous chemicals, Chemical Toxicants and Select Agents Requiring IBC Registration

DEFINITION: The hazardous toxicants and toxins which require an approved IBC protocol are now defined as any chemical or toxin which is a: highly toxic, hazardous chemical = LD_{50} (oral/rat) of ≤50 mg/kg or, if LD_{50} not available, a GHS rating of 1 or 2 oral, 1 dermal, or 1 inhalation; or HMIS rating of 4. Some of these chemical agents are listed in the chart below. **Note that this is not an all-inclusive list.**

NOTE: Investigational quantities of most standard lab chemicals are now exempt from IBC protocol registration, as described above. However, a complete inventory list of lab chemicals must be recorded and updated online through the Quartzy system, at least once a month; https://www.quartzy.com/.
((For any questions on whether a chemical needs registration or how to access Quartzy, please contact Safety Services at 915-215-4820)).

IBC PROTOCOL REGISTRATION REQUIRED:	CAS Number	Toxicity	Sp
1,3-Butadiene diepoxide	1464-53-5	(78 mg/kg LD50)	
2-(Dimethylamino)ethyl acrylate	2439-35-2	GHS 1 inhalation HMIS- Health 4	
2,3,7,8 tetrachlorodibenzo-p-dioxin (TCDD-dioxin)	1746-01-6	(0.05 mg/kg LD50)	
3-acetylpyridine	350-03-8	(46 uL/kg LD50)	
4-aminopyridine	504-24-5	(21 mg/kg LD50)	
abrin	1393-62-0	SELECT AGENT	
acrolein	107-02-8	(44 mg/kg LD50)	
acontinine	302-27-2	(1mg/kg LD50)	
actinomycin D	50-76-0	(7.2 mg/kg LD50)	
alpha-bungarotoxin	11032-79-4	(150 ug/kg LD50 Intraperitoneal)	
aminopterin	54-62-6	(3 mg/kg LD50)	
antimycin A	1397-94-0	(28 mg/kg LD50)	
arterenol free base	51-41-2	(20 mg/kg LD50)	
Atropine	51-55-8	GHS 2 Oral	
BCNU (carmustine)	154-93-8	GHS 2 Oral	
Botulinum neurotoxins	No CAS	SELECT AGENT	
butyl methyl ether (TBME)	1634-04-04	(4 mg/kg LD50)	
carbamylcholine chloride (carbachol)	51-83-2	(40 mg/kg LD50)	
carbon fuchsin	4197-24-4	(36 mg/kg LD50)	
colchicine	64-86-8	(26 mg/kg LD50)	
"some" or "certain" conotoxins (see CDC.gov for more info)	no CAS	SELECT AGENT	
cyanogen bromide	506-68-3	GHS 2 Oral	
cycloheximide	66-81-9	(2 mg/kg LD50)	
cyclopiazonic acid	18172-33-3	(36 mg/kg LD50)	
cytochalasin B	14930-96-2	(11 mg/kg LD50)	
diacetoxyscirpenol	2770-40-8	(7mg/kg LD50)	
diisopropyl fluorophosphate	55-91-4	(5mg/kg LD50)	
heptachlor	76-44-8	(40mg/kg LD50)	
Hydrofluoric acid	7664-39-3	GHS 2 Oral, 1 Dermal	
hydrogen cyanide	74-90-8	(10 mg/kg LD50)	
Iberiotoxin, recombinant, from Mesobuthus tamulus	129203-60-7		
Indomethacin	53-86-1	GHS 1 Oral, 2.42 mg/kg	
L-(−)-Norepinephrine (+)-bitartrate salt monohydrate	108341-18-0	GHS 2 Oral, 1 Inhalation	
melphalan	148-82-3	(11.2 mg/kg LD50)	
mercuric acetate	1600-27-7	(40.9 mg/kg LD50)	

mercuric chloride	7487-94-7	**(1mg/kg LD50)**
Methanesulfonyl chloride	124-63-0	**GHS 2 Oral, 1 Inhalation**
mitomycin C	50-07-7	**(23 mg/kg LD50)**
muscimol	2763-96-4	**(45 mg/kg LD50)**
nicotine	54-11-5	**(50 mg/kg LD50)**
nitric oxide	10102-43-9	**(200ppm/1mm LCLO)**
N-nitrosomethylvinylamine (24 mg/kg LD50)	4549-40-0	**(24 mg/kg LD50)**
***N,N*-Dimethyl-*p*-phenylenediamine sulfate salt**	536-47-0	
Ouabain octahydrate	11018-89-6	**GHS 1 Oral**
Osmium tetroxide	20816-12-0	**"4"HEALTH**
Paraquat dichloride hydrate	75365-73-0	**GHS, 1 inhalation**
Paraoxon-ethyl (Synonym: Diethyl p-nitrophenyl phosphate)	311-45-5	**GHS 2 Oral, 1 Inhalation**
pentachlorophenol (PCP)	87-86-5	**(27mg/kg)**
phenyl mercuric acetate (PMA)	62-38-4	**(22 mg/kg LD50)**
phosphorus (red)	7723-14-0	**(3 mg/kg LD50)**
phosphorus (white)	7723-14-0	**(3 mg/kg LD50)**
picrotoxin	124-87-8	**(15 mg/kg LD50)**
potassium cyanide	151-50-8	**(5 mg/kg LD50)**
potassium dichromate	7778-50-9	**(25 mg/kg LD50)**
Ricin	9009-86-3	
ricin toxin subunit A	96638-28-7	
ricin toxin subunit B	96638-29-8	
saxitoxin/STX (0.26 mg/kg LD50)	35554-08-6, 35523-89-8	
Shiga and Shiga-like toxins (1 and 2)	no CAS	
sodium arsenite anhydrous	7784-46-5	**(41 mg/kg LD50)**
sodium azide	26628-22-8	**(27 mg/kg LD50)**
sodium cyanide	143-33-9	**(6.64 mg/kg LD50)**
sodium fluoride	7681-49-4	**(31 mg/kg LD50)**
sodium selenite	10102-18-8	**(7 mg/kg LD50)**
Staphylococcal enterotoxins	11100-45-1	
strychnine	57-24-9	**(23.5 mg/kg LD50)**
strychnine hydrochloride	1421-86-9	**(2 mg/kg LD50)**
T-2 toxin)	21259-20-1	**(2.7 mg/kg LD50**
tetramethylammonium chloride	75-57-0	**(50 mg/kg LD50)**
tetrodotoxin	4368-28-9	**(10 mg/kg LD50)**
Thallium(I) nitrate	10102-45-1	**GHS 1 Oral**
Thiophenol	108-98-5	**46.2 mg/kg**
Valinomycin	2001-95-8	**(4 mg/kg LD50)**
vinorelbine	125317-39-7	**(26-34 mg/kg LD50)**
vitamin d2 (calciferol)	50-14-6	**(10 mg/kg LD50)**
vitamin d3 (cholecalciferol)	67-97-0	**(42 mg/kg LD50)**
Wortmannin	19545-26-7	**(18 mg/kg LD50)**

KEY:

All Yellow and several of the Green highlighted agents meet the criterion of ≤50 mg/kg LD50 (rat, oral)

- GHS=Globally Harmonized System
- SELECT AGENT = select agents as designated by the CDC/NIH and/or USDA.
    - All SELECT AGENTS are highlighted in Green.
- LD50 values are indicated if current tox data is available
- CDC CHEM AGENT = agents designated by the CDC as potential chemical warfare agents.
- EPA = on the EPA's extremely hazardous substances list.

CHEMICAL HYGIENE PLAN

Texas Tech University Health Sciences Center El Paso is committed to providing a safe and healthful work environment for faculty, staff, students, and visitors. In pursuit of this endeavor, the following Chemical Hygiene Plan (CHP) is provided to eliminate or minimize occupational exposure to hazardous chemicals in accordance with OSHA standard 29 CFR 1910.1450, "Occupational Exposures to Hazardous Chemicals in Laboratories".

Calvin Shanks, MS. Sr. Director Safety Services

Jacqueline Lomeli, Safety Services

November 2017

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TTUHSC El Paso Chemical Hygiene Plan

I. Foreword

The use of hazardous chemicals is necessary to the research and academic operations at Texas Tech University Health Sciences Center El Paso. TTUHSC El Paso is committed to assure the safe and proper acquisition, use, and disposal of hazardous chemicals. Therefore, TTUHSC El Paso complies with the mandates of the Occupational Safety and Health Administration (OSHA) promulgated as 29 CFR 1910.1450, under the title, "Occupational Exposures to Hazardous Chemicals in Laboratories".

This regulation requires the development and implementation of a written Chemical Hygiene Plan that is, "capable of protecting employees from health hazards associated with hazardous chemicals used in the laboratory." The Chemical Hygiene Plan (CHP) included below was developed and implemented to meet this requirement. It sets forth procedures, and work practices needed for the protection of TTUHSC El Paso employees, students, visitors, and volunteers from health hazards associated with potential exposures to hazardous chemicals used in TTUHSC El Paso laboratories.

II. Training

All laboratory personnel are required to successfully complete the online course, "Laboratory Safety Essentials", which covers basic safety principles. This requirement applies to all laboratory workers. This includes but is not limited to employees, students, and volunteers who work in a laboratory or participate in laboratory activities.

Site specific, job-specific training is the responsibility of each employee's supervisor, Principal Investigator (PI), or faculty advisor and should cover specific hazards and work practices as follows.

A. Supervisors shall provide information about the specific hazards inherent in the work materials and/or procedures conducted in the lab;
B. Safety considerations shall be included in project and experiment planning;
C. Supervisors shall disallow untrained or unaware individuals to use laboratory materials or equipment.

In addition, each worker must take personal responsibility for their own safety. Laboratory workers should ask for job specific training from their supervisor. It should not be assumed that if no training is given there are no hazards. Workers shall also read chemical labels and Safety Data Sheets (SDSs), and ask questions when information is not clear. If the laboratory supervisor or PI cannot resolve a question, the worker should consult others, including their faculty advisors, department chair, or Safety Services.

III. Chemical Inventory

A current chemical inventory for each lab will be maintained through cooperative efforts between the laboratory staff and Safety Services.

When a new lab is set up, a chemical inventory will be provided by the new faculty member. Alternatively, Safety Services will assist the lab to perform an initial inventory. This will be determined on a case-by-case basis.

When new chemicals are ordered through the Tech Buy system, they must be added to the laboratory's online inventory, by laboratory staff. In addition, inventories should be updated at least once a month.

When chemical containers are empty, the laboratory staff shall dispose of them into specially marked collection containers. These containers will be for deposition of empty containers only. If there is any chemical remaining, then it is considered chemical waste and shall be disposed of according to chemical waste procedures (refer to

section VII.F). Safety Services will pick up empty containers and remove those items from the researcher's inventory in order to maintain an accurate chemical inventory.

IV. Approvals

Certain chemicals require registration with the Institutional Biosafety Committee (IBC) prior to initiation of work. Chemicals that meet any of the following criteria must be registered:

A. A GHS classification rating of 1 or 2 Oral, 1 Dermal, or 1 Inhalation;
B. A HMIS rating of 4;
C. An animal, oral LD_{50} of 50 mg/kg or less.

For proprietary compounds and chemicals of unknown toxicity, a judgment will be made on a case by case basis. Please contact Safety Services for assistance as soon as possible.

Forms may be found on the Research Integrity Website:
http://elpaso.ttuhsc.edu/research/committees/ibc/default.aspx

V. Safety Data Sheets

The Safety Data Sheet, or SDS, (formerly known as MSDS) is a summary of safety information for a chemical or solution. The SDS typically includes information about a chemical's physical properties, hazards, permissible exposure limits (PELs), as well as storage, spill, and handling precautions.

OSHA requires *manufacturers* and importers of chemicals to develop a SDS for these materials.

OSHA requires *users* of chemicals to maintain any SDSs received from vendors, and make them readily accessible to employees in their work areas.

At TTUHSC EP, SDSs can be accessed via our contract with ChemTel Expert Assistance Hotline / MSDS Fax Access by dialing 1-800-255-3924 (reference our Contract number: MIS0006468).

SDSs may also be found through the chemical vendor.

It is recommended that each work location keep a hard copy of SDSs for hazardous chemicals commonly used in that area.

VI. General Principles of Chemical Safety

A. Minimize all chemical exposures:

i. Implement Administrative Controls such as written SOPs, posted warning signs, careful planning of experiments, etc..;

ii. Utilize Engineering Controls such as chemical fume hoods or shielded chemical scales when needed;

iii. Don appropriate Personal Protective Equipment (PPE) as a final measure of protection. Choose quality PPE appropriate for the materials in use and the work procedures performed. Use

proper donning and doffing procedures to reduce the risk of exposure. Request assistance and/or training from your supervisor or Safety Services if needed;

iv. Make use of Good Laboratory Practices. Develop safe habits for good chemical hygiene and general lab safety. Periodically evaluate plans and procedures and modify as needed.

B. Avoid underestimation of risk:

i. For substances of no known significant hazard, exposure should be minimized;

ii. For work with substances that present special hazards, special precautions should be taken;

iii. Assume that any mixture will be more toxic than its most toxic component and that all substances of unknown toxicity are toxic.

C. Become familiar with emergency equipment such as eye washes, safety showers, and fire extinguishers. Know the location of these items and how to use them;

D. Avoid working alone in a building; do not work alone in a laboratory if the procedures being conducted are hazardous.

VII. Rules and Procedures for Working with Chemicals

The following should be used for essentially all laboratory work with chemicals:

A. **Planning**

i. Prior to receipt of a substance, information on proper handling, storage, and disposal should be known to those who will be involved.

ii. Plan appropriate protective procedures, and plan positioning of equipment before beginning any new operation;

iii. Substitute less hazardous chemicals in laboratory procedures whenever possible;

iv. Consult a qualified physician to determine on an individual basis whether a regular schedule of medical surveillance is needed when working with toxicologically significant quantities of chemicals.

B. **Procurement**

i. All chemical purchases shall be ordered according to TTUHSC EP Purchasing policies;

ii. Chemicals should not be purchased in bulk or excessive amounts;

iii. Do not accept chemical containers without a proper label. Upon receipt of a package containing hazardous substances, don the appropriate PPE, and inspect the package carefully for any signs of breakage or leakage of material. If there are any signs of leakage, place the package in a chemical fume hood, protect from exposure, and call Safety Services for assistance.

C. **Distribution**

i. When chemicals are hand-carried through the building or from one building to another, the primary container should be placed in an outer secondary container such as a plastic tote, or rubber bottle carrier capable of containing the contents of the original container in the event of a spill;

ii. Use a cart to minimize risk;

iii. When transporting highly hazardous chemicals, use the freight-only elevators;

iv. Transport from the institution ("Shipping") must be in accordance with Department of Transportation (DOT) and International Air Transport Association (IATA) regulations. Consult the chemical SDS to find out if the chemical is regulated by DOT or IATA. **Shippers must be trained and certified before they may ship.** Contact Safety Services for information on training. See TTUHSC EP OP 75.13 "Shipment of Hazardous and Infectious Materials" for more information. If the shipment is leaving the country then also refer to TTUHSC EP OP 73.16 "Export Controls" for export license information.

D. **Avoidance of Routine Exposure / Good Laboratory Practices**

Good Laboratory Practices are necessary to provide valid and reproducible scientific results, prevent contamination, and improve overall laboratory safety and security.
Develop and encourage safe habits; and avoid unnecessary exposure to chemicals by observing the following Good Laboratory Practices:

i. Ensure that all chemical containers are properly labeled;
    1. Do not remove or deface manufacturer labels;
    2. When using secondary containers, label the container with the name of the chemical, and at least general information regarding the hazards of the chemical(s).

ii. Do not smell or taste chemicals;

iii. Vent apparatus which may discharge toxic chemicals (vacuum pumps, distillation columns, etc.) into local exhaust devices;

iv. Inspect gloves before use to make sure they are not torn or damaged;

v. Workers who are allergic to latex should inform their supervisor as soon as possible so an alternative can be found;

vi. Choose gloves that are compatible with the chemicals you are working with;

vii. Glove compatibility charts may be found online. The following is one example: http://ansellpro.com/specware/index.asp ;

viii. Do not allow release of volatile substances in cold rooms, warm rooms, or biological safety cabinets since these have contained re-circulated atmospheres, which might allow vapors to build to dangerous levels;

ix. Do not use mouth suction for pipetting or starting a siphon;

x. Avoid practical jokes or other behavior that might confuse, startle or distract another worker;

xi. Eating, drinking, smoking, or application of cosmetics in any laboratory at TTUHSC EP is prohibited;

xii. Although hand lotion is considered a cosmetic and not recommended to be in the laboratory, it is acceptable if located at a desk or computer station;

xiii. Storage of food, beverages, or eating utensils in laboratory refrigerators, freezers, cold rooms, or storage areas is prohibited;

xiv. Wash hands before leaving the laboratory, and at the conclusion of each experiment or procedure;

xv. Unattended operations (laboratory procedures occurring unsupervised / unobserved) are strongly discouraged. However, if absolutely necessary, leave lights on, place an appropriate sign on the door, and provide for containment of harmful substances in the event of failure of a utility service (such as cooling water) to an unattended operation;

xvi. **Never** leave an open flame unattended;

xvii. Handle and store laboratory glassware with care to avoid damage; inspect glassware for damage before use, and do not use damaged glassware;

xviii. Use extra care with Dewar flasks and other evacuated glass apparatus; shield or wrap them to contain chemicals and fragments should implosion occur.

E. **Housekeeping**

i. Keep the work area clean and uncluttered, with chemicals and equipment being properly labeled and stored;

ii. Replace or reinforce container labels that are faded, blurred, or otherwise difficult to read;

iii. Clean up the work area upon completion of an operation and at the end of each work shift;

iv. Do not block access to exits, fire extinguishers, safety showers, eye washes, electrical panels, or other emergency equipment;

v. Dispose of old or unused chemicals, mixtures, and solutions routinely (e.g., after each semester). Dispose of chemicals that have passed the expiration date printed on the manufacturer's label;

vi. Ensure trash, broken glass, sharps, recyclables, and chemical wastes are properly disposed;

vii. Ensure that all spills are cleaned up promptly and safely.

F. **Waste Disposal**

i. All chemical wastes generated in the lab will be disposed of through Safety Services in accordance with the TTUHSC EP Regulated Waste Disposal Manual, located on the Safety Services website;

ii. Safety Services will pick up chemical waste from the labs upon request in writing via the online form: https://idp.ttuhsc.edu/cas/login?service=http%3a%2f%2felpaso.ttuhsc.edu%2felpsafetyservices%2fforms%2fdispose_chemicals.aspx

iii. Waste should not be allowed to accumulate in the labs. Research personnel shall request pick up of waste on a regular basis;

iv. Before a worker's employment in the laboratory ends, chemicals for which that person was responsible should be discarded or assigned to another worker;

v. Indiscriminate disposal by pouring waste chemicals down the drain or adding them to mixed refuse for landfill burial is prohibited;

vi. Fume hoods shall not be used as a means of disposal for volatile chemicals.

G. **General Chemical Storage**

i. Amounts kept on hand should be as small as practical;

ii. Chemical inventories should be reviewed and evaluated at least annually, with any unneeded items being discarded or transferred to another laboratory;

iii. Chemicals should be stored based on compatibility;

iv. Chemicals within a compatible group may be stored alphabetically;

v. Incompatible chemicals must be physically separated during storage. If alternate cabinets are not available, items can be separated using physical containment barriers (ex: plastic tubs) inside a single cabinet;

1. Corrosives, flammable liquids, oxidizers, and highly reactive chemicals must be separated and stored properly to avoid an unwanted chemical reaction. In addition:
    a. Segregate acids from bases.
    b. Separate oxidizing acids (e.g., Hydrogen chloride) from organic acids (e.g., Acetic acid, formic acid).
    c. Segregate nitric acid from other acids.
2. See Table 1 below for more information on segregation.

vi. Hazardous chemicals should not be stored:
1. under sinks;
2. in fume hoods or biosafety cabinets;
3. on bench tops;
4. in hallways or stairwells (see OP 75.06);

vii. Large volume containers of hazardous chemicals should be stored on low shelving, preferably in trays to contain any spills or leaks;

viii. Avoid exposure to heat or direct sunlight;

ix. Examine chemical containers periodically (at least annually) for expiration date, deterioration, and container integrity.

H. **Flammable Liquid Storage**

i. Keep storage of flammable liquids in the laboratory at a minimum; Do not stock pile supplies of flammable chemicals;

ii. Flammables shall not be stored under fume hoods unless the cabinet under the fume hood was designed as a flammable storage cabinet;

iii. Storage of flammable liquids (including waste) outside approved flammable storage cabinets and safety cans must not exceed 10 gallons per 100 square feet of laboratory space;

iv. Storage inside flammable storage cabinets and approved safety cans must not exceed 20 gallons per 100 square feet of laboratory space;

v. Flammable storage cabinets should not be located near exits, electrical panels, or sources of heat or ignition;

vi. When cabinets are used for flammable liquid storage, they must be labeled as a flammable storage location;

vii. Corrosive materials should not be stored in flammable storage cabinets due to possible corrosion of the cabinet and incompatibility with organic solvents;

I. **Compressed Gas Storage**

i. Compressed gas cylinders must be stored in a secured upright position. The restraint must be appropriate and of adequate strength to prevent the cylinder from falling;

ii. Protective caps must be in place to cover the valve while cylinders are not in use;

iii. Always use a dolly when moving a tank;

iv. Always treat a cylinder or tank as if it were full;

v. Cylinders shall be labeled with the name of the contents;

J. **Controlled Substances**

i. The U.S. Drug Enforcement Administration (DEA) requires that personnel working with controlled substances must have a DEA license. Special inventory, security, record keeping requirements may apply. Please visit the U.S. DEA website at http://www.usdoj.gov/dea/ for more information.

Table 1. Chemical Storage Guidelines

CHEMICAL CLASS	RECOMMENDED STORAGE METHOD	EXAMPLES	INCOMPATIBLES SEE SDS IN ALL CASES
Corrosives –Acids INORGANIC	Store in a separate, lined/protected acid storage cabinet, or in deep corrosion-resistant spill trays. DO NOT store acids directly on metal shelves	Inorganic (Mineral) acids – Hydrochloric acid, Hydrofluoric acid, Phosphoric acid, Sulfuric acid, Chromic acid, Nitric acid	Flammable liquids, flammable solids, bases, and oxidizers, **organic acids**
Corrosives – Acids ORGANIC	Store in a separate, lined/protected acid storage cabinet, or in deep corrosion-resistant spill trays. DO NOT store acids directly on metal shelves.	Organic acids –Acetic acid, Formic acid, Trichloroacetic acid, Lactic acid	Flammable liquids, flammable solids, bases, and oxidizers, **inorganic acids**
Corrosives – Bases	Store in a separate storage cabinet or segregate with deep, corrosion-resistant spill tray.	Ammonium hydroxide, Potassium hydroxide, Sodium hydroxide	Flammable liquids, oxidizers, poisons, and acids
Explosives	Store in a secure location away from all other chemicals. Do not store in an area where they can fall.	Ammonium nitrate, Nitro urea, Sodium amide, Trinitroaniline, Trinitrophenol / Picric acid, Trinitrotoluene (TNT)	All other chemicals. *Keep away from sources of ignition*
Flammable Liquids	Store in a flammable storage cabinet. *Peroxide forming chemicals must be dated upon opening; e.g. Ether, Tetrahydrofuran, Dioxane*	Acetone, Benzene, Diethyl ether, Methanol, Ethanol, Hexanes, Toluene	Acids, bases, oxidizers, and poisons. *Keep away from sources of ignition*
Flammable Solids	Store in a separate dry cool area away from oxidizers, corrosives	Phosphorus, Carbon, Charcoal	Acids, bases, oxidizers, and poisons. *Keep away from sources of ignition*
Water Reactive	Store in a dry, cool location. Protect from water and the fire sprinkler system if applicable. Label location "Water Reactive Chemicals"	Sodium metal, Potassium metal, lithium metal, lithium aluminum hydride, sodium hydride	Separate from all aqueous solutions and oxidizers.
Oxidizers	Store in a deep spill containment tray inside a non-combustible cabinet, separate from flammable or combustible materials and reducing agents.	Sodium hypochlorite, Benzoyl peroxide, Potassium permanganate, Potassium chlorate, Potassium dichromate. The following are generally considered oxidizing substances: Peroxides, Perchlorates, Chlorates, Nitrates, Bromates, Superoxides	Separate from reducing agents, flammables, and combustibles and organic materials.
Poisons / Toxic	Store separately in a vented, cool, dry, area in chemically resistant secondary containers.	Cyanides, heavy metal compounds, i.e. Cadmium, Mercury, Osmium	Flammables liquids, acids, bases, and oxidizers.

General Chemicals – Non-Reactive	Store on general laboratory benches or shelving.	Agar, Sodium chloride, Sodium bicarbonate, and most non-reactive salts	See SDS

VIII. Particularly Hazardous Substances

Some substances are considered particularly hazardous because they carry a higher level of risk. When working with a substance that is particularly hazardous, it is important to increase the safety and containment measures accordingly in order to maintain a safe work environment. Use and store these substances only in areas of restricted access with special warning signs. The below recommendations are in addition to the general chemical safety guidelines outlined above.

A. Highly Reactive Chemicals

i. These are inherently unstable and can react in an uncontrolled manner to liberate heat, toxic gases, or explode. These include shock sensitive chemicals, high-energy oxidizers and peroxide formers;

ii. Before working with these materials, employees shall review relevant safety information to evaluate proper storage and handling procedures;

iii. Use a chemical fume hood with the sash as low as possible for all reactions;

iv. Secure reaction equipment properly;

v. Use impact protection (e.g. shields / guards) in addition to chemical splash protection (e.g., goggles, face shields, gloves, lab coats);

vi. Handle shock sensitive chemicals gently to avoid friction, grinding, and impact;

vii. Reagents with suspect purity and/or age should be disposed through Safety Services.

B. Peroxidizable compounds

These have caused many laboratory accidents, including unexpected explosions of residues remaining after solvent distillation. Peroxides form by the reaction of the chemical with oxygen allowed in the headspace of chemical containers after the container is opened for the first time.
Most organic peroxides are sensitive to varying degrees to shock, heat, or friction. The rate of peroxide formation will depend upon the compound. Some peroxides quickly build up to an explosive level and some are only explosive on concentration, such as when a solvent is distilled.

i. Date all incoming containers of peroxide formers when received and again when opened. If there is an expiration date on the container, be sure to use or dispose of the chemical by that date;

ii. Purchase the smallest possible quantity for your needs;

iii. Store peroxide formers in sealed, air tight containers such as dark amber glass with a tight-fitting cap. Iron inhibits the formation of peroxides in some materials, which is why diethyl ether and some other materials are sold in metal cans;

iv. Containers of peroxide formers should be stored away from heat and light and protected from physical damage and ignition sources;

v. Peroxide forming compounds should not be stored at or lower than the temperature at which the peroxide freezes or precipitates, as this will make these compounds extremely sensitive to shock. NOTE: Refrigeration does not prevent (nor inhibit) peroxide formation;

vi. Inspect containers of peroxide forming compounds frequently, looking for signs of precipitation, stratification of liquid, crystal formation or other irregularities;

1. The presence of any of these signs indicates the potential for a shock sensitive container. **Do not move the container and contact Safety Services as soon as possible. Do not attempt to open a container of peroxide forming liquid if there are crystals around the cap and / or in the bottle. The vibration / friction of screwing the cap could detonate the bottle.**
2. Diethyl ether or other compounds commonly sold in metal cans cannot be visually inspected. Therefore, metal containers of peroxide forming materials whose age and use history are unknown should be assumed to contain dangerous levels of peroxides and should be disposed by contacting Safety Services.

vii. Avoid the distillation of peroxide formers without first testing for the existence of peroxides. Most explosions occur when a material is distilled to dryness;

viii. Test strips for the detection of peroxides may be purchased from various safety supply vendors. Establish a laboratory routine to test all peroxide-forming chemicals on a regular basis (no less than every three months).

C. **Chemicals of Highly Acute and Chronic Toxicity**

i. These chemicals are hazardous at very low concentrations. Substances of high *acute* toxicity cause immediate health effects at very low concentrations. Substances that have high *chronic* toxicity cause damage after repeated exposure over a period of time;

ii. Some common examples of chemicals with high acute toxicity are sodium cyanide, sodium fluoride, and sodium azide;

iii. When working with chemicals of high acute or chronic toxicity, the following practices must be observed:

1. The SDS must be read, and all recommended precautions be taken.
2. Notify all employees of the particular hazards associated with this work.
3. Minimize contact with these chemicals by any route of exposure (e.g., inhalation, skin contact, mucous membrane contact, or injection).
4. Develop and implement an emergency plan for each operation.
5. Decontaminate work surfaces after completing procedures.
6. Remove potentially contaminated PPE before leaving the area and decontaminate it or properly dispose.

D. **Reproductive Toxins**

i. This includes embryotoxins, mutagens, teratogens, and abortogens (e.g. organomercurials, lead, formamide);

ii. Women of child-bearing potential shall handle such substances in a hood, using protective apparel including gloves and a lab coat;

iii. Review continued use annually, and consult a physician when appropriate.

IX. Personal Protective Equipment (PPE)

A. Personal protective equipment is extremely important for protection from workplace hazards. It is the last line of defense after engineering controls (e.g. fume hood) and administrative controls (e.g. SOPs). Laboratory workers must use careful consideration when selecting the proper PPE to use for any given task. The specific hazards associated with the work being done must be carefully considered when selecting PPE. In addition, PPE must be carefully maintained, and users must know how to properly use and care for the PPE. Most importantly, they must know the limitations of their PPE and not use PPE that is inappropriate for the job or is damaged or compromised.

B. Responsibilities

i. It is the responsibility of the PI to make all necessary PPE available to laboratory employees;

ii. It is the responsibility of the laboratory personnel to conduct hazard assessments of the specific conditions occurring in the laboratory in order to determine what PPE is necessary to safely carry out the operation;

iii. PPE shall be inspected before each use for signs of damage, wear, or contamination, and replaced as needed;

iv. Safety Services staff are available to assist with hazard assessments, PPE selection, and training on the proper use and maintenance and limitations of PPE.

C. Basic PPE requirements:

i. Always wear protective apparel compatible with the required degree of protection for substances being handled;

ii. Do not wear personal clothing that leaves large areas of skin exposed (ex: shorts and tank tops);

iii. Wear closed toe shoes at all times in the laboratory; Do not wear sandals or perforated shoes;

iv. Confine long hair and loose clothing;

v. Wear a lab coat when working with hazardous materials, or when hazardous materials are being used in the same work area;

vi. Wear appropriate eye protection where chemicals are stored or handled;

vii. Wear appropriate gloves when the potential for contact with hazardous materials exists. Some chemicals can quickly “break though” the glove material. For glove selection for a particular

hazard, refer to the specific glove manufacturer's selection chart. Additionally, the following are a few examples of the many helpful resources that can easily be found with a quick internet search:

1. http://www.showabestglove.com/site/default.aspx
2. http://www.microflex.com/Products/~/media/Files/Literature/Domestic%20Reference%20Materials/DOM_Reference_Chemical%20Resistance.ashx
3. https://www.uic.edu/depts/envh/HSS/Documents/Resistance%20Guide%20for%20Microflex%20Chemical%20Resistant%20Gloves.pdf
4. http://www.aps.anl.gov/Safety_and_Training/User_Safety/gloveselection.html

viii. Inspect gloves before each use; Do not use damaged gloves; Do not re-use disposable gloves that have become contaminated with hazardous chemicals;

ix. Use appropriate respiratory protection when air contaminant concentrations are not sufficiently restricted by engineering controls; Before use, inspect the respirator for wear or defects; Contact Safety Services for fit testing before wearing a respirator;

x. Avoid use of contact lenses in the laboratory unless necessary; if they are used, inform supervisor so special precautions can be taken;

xi. Use any other protective and emergency apparel and equipment as appropriate;

xii. Remove PPE, and wash areas of exposed skin with soap and water before leaving the laboratory, or upon significant contamination;

xiii. Do not wear potentially contaminated PPE out of the lab and into public areas, which could potentially spread contamination. (Ex: elevator buttons, door handles.

X. Signs and Labels (Hazard Communication)

A. A laboratory placard at the entrance to the lab will show the general type of hazards present (i.e. radioactive, biohazard, etc.) and will list the daytime and after hours contact information for a person responsible for the lab. To request or update a placard contact Safety Services;

B. Location signs for safety showers, eyewash stations, other safety and first aid equipment, and exits shall be prominent;

C. Warning signs shall be posted at areas or on equipment where special or unusual hazards exist;

D. Manufacturer's labels on incoming containers must not be removed or defaced. Upon receipt of a chemical, the date received, and the name of the responsible researcher shall be written on the container;

E. If chemicals from commercial sources are repackaged into secondary containers, the new containers shall be labeled with all essential information from the original container. At a minimum this must include the identity of the material(s) and the hazards present. The exception to this rule is when solutions are used up entirely during the work shift in which they were made;

F. Waste collection containers shall be labeled with the contents, hazard, name of responsible person, and the date waste collection began.

XI. Safety Equipment

A. The following equipment shall be available to all members of the laboratory:

   i. An easily accessible drench-type safety shower;

   ii. An eyewash fountain;

   iii. A fire extinguisher;

   iv. Respiratory protection, if needed, (e.g. mask, face shield)

   v. Fire alarm and telephone for emergency use nearby.

B. Equipment shall be used only for its designed purpose;

C. Eye wash fountains (drench hoses) should be tested by lab personnel for usability (water flows out of eyewash when turned on) once a week. Eyewashes and safety showers will be formally tested for flow rate and temperature at least twice per year by TTUHSC EP Safety Services.

XII. Fume Hoods

A. Fume hoods shall be used for operations with a potential release of toxic or harmful chemical vapors or dust;

B. Personnel chemical exposures must not exceed the Permissible Exposure Limits (PELs) established by OSHA. Laboratory operations conducted in a properly operating fume hood are unlikely to result in excessive airborne exposures;

C. Materials stored in fume hoods should be kept to a minimum, and not allowed to obstruct vents or air flow;

D. The sash should be positioned below the worker's chin in order to provide protection from hazardous vapors;

E. Chemical fume hoods will be formally inspected by Safety Services on a quarterly basis;

F. Each hood should have a continuous monitoring device to provide constant visualization of hood performance. A simple way to accomplish this is to tape a small strip of paper to the bottom of the sash so that it can be seen being pulled into the hood by the air flow;

G. If the hood does not function properly, it is the responsibility of the Principle Investigator to contact Plant Operations for repair;

H. Fume hoods shall not be used as a means of chemical disposal. Do not allow chemicals to evaporate in the fume hood.

XIII. The Laboratory Facility

A. General laboratory ventilation should:

   i. Ensure that laboratory air is continually replaced in order to prevent buildup of any contaminants;

   ii. Not be relied upon for protection from toxic substances released into the laboratory;

   iii. Provide negative pressure relative to non-laboratory areas. Laboratory doors should not be propped open, as this disrupts the air balancing.

B. Hazardous chemicals may only be used in laboratory facilities or areas specifically designed for such work. Hazardous chemicals should never be used in areas lacking appropriate infrastructure and ventilation, such as offices, break rooms, hallways or stairwells, etc…

C. Hazardous chemicals should never be used or stored in carpeted areas.

XIV. Accidents and Spills

A. **Minor Spills** (within the clean-up abilities of the lab)

   Each lab should have access to a chemical spill kit, and shall use their kit to promptly clean up small spills, following the below guidelines:

   i. The first to be aware of the spill shall notify others in the immediate area of the spill;

   ii. Consult SDS for information on appropriate measures;

   iii. Promptly clean up spills, using appropriate protective apparel and equipment. Collect the spilled and clean-up materials, and properly dispose of waste.

B. **Major Spills** (beyond the capabilities of the lab to clean up safely)

   i. Take measures to stop the spread – if safe to do so;

   ii. Evacuate the area, and prevent others from entering the spill area;

   iii. Activate the nearest fire alarm if there is an uncontrolled open flame, uncontrolled compressed gas release, or any situation which poses an imminent threat to health or safety;

   iv. Isolate the spill by closing doors to the area;

   v. Contact Safety Services who will activate an emergency response team, such as police and fire departments. After normal business hours, call 911 directly.
   Be prepared to give the location of the spill, the type and amount of material spilled, and the status of any injuries. Unless instructed otherwise, stay at this location until a representative of the response team arrives;

vi. Assess if anyone working in the area was exposed. If an exposure occurred, see below on Exposures;

vii. Notify the laboratory supervisor, or principal investigator.

C. **Exposure**

If injury or exposure is severe, seek immediate medical attention.

i. Eye Contact
   1. Promptly flush eyes with water for a prolonged period (15 minutes) and seek medical attention;

ii. Ingestion
   1. If toxic, immediately seek medical attention;

   2. Locate the SDS and read and the recommendations followed regarding ingestion;

iii. Skin Contact
   1. Promptly flush the affected area with water and remove any contaminated clothing. If symptoms persist after washing, seek medical attention.

XV. Chemical Waste

A. Assure that the plan for each laboratory operation includes provisions and training for waste disposal;

B. Collect chemical waste in receptacles labeled with the date collection began, and an itemized list of contents;

C. Waste collection containers must have a cap in place at all times except when actively filling or discharging the container. It is not acceptable to leave a funnel in a chemical waste container when it is not in use;

D. Do not discharge to the sewer concentrated acids or bases; highly toxic, malodorous, or lachrymatory substances; or any substances which might interfere with the biological activity of waste water treatment plants, create fire or explosion hazards, cause structural damage or obstruct flow;

E. Indiscriminate disposal by pouring waste chemicals down the drain or adding them to mixed refuse for landfill burial is unacceptable;

F. Fume hoods shall not be used as a means of disposal for volatile chemicals;

G. Disposal by recycling or chemical decontamination should be used when possible;

H. To request a chemical pick up from Safety Services for proper disposal, complete an on-line Request for Transfer of Chemicals, located on the Safety Services webpage; https://idp.ttuhsc.edu/cas/login?service=http%3a%2f%2felpaso.ttuhsc.edu%2felpsafetyservices%2fforms%2fdispose_chemicals.aspx

I. All policies for waste disposal are outlined in the TTUHSC EP *Regulated Waste Disposal Manual,* which may be found on the Safety Services website. For any questions dealing with waste disposal, contact Safety Services.

XVI. Chemical Hygiene Responsibilities

A. **The Principal Investigator (PI)**
The PI has ultimate responsibility for chemical hygiene within their lab. Specifically they are responsible for:

i. Providing laboratory specific information under the SOP section of the TTUHSC EP Laboratory Compliance and Biosafety Manual which will facilitate the protection of employees from the health hazards associated with hazardous chemicals in the laboratory. This information shall include appropriate safety measures, signs and symptoms of exposure, and methods and observations that may be used to detect the presence or release of a hazardous chemicals such as monitors (if applicable), visual appearance, or odor. This information must advise personnel that specific information is available for individual chemicals through SDSs;

ii. Providing specialized training applicable to the specific activities performed in the lab. This training for new or newly assigned personnel shall take place before the person works with or in an area containing hazardous chemicals;

iii. Providing additional information and training as different hazards or procedures are introduced, or new and significant information concerning hazardous chemicals is received;

iv. Implementing procedures for the safe use and handling of hazardous chemicals to reduce or eliminate exposure. These shall include all necessary engineering controls, administrative controls, PPE, emergency shut-down procedures, decontamination and spill response procedures, and appropriate waste disposal methods;

v. Providing all necessary protective equipment for laboratory employees, including information on their use and limitations;

vi. Registering with the appropriate TTUHSC EP oversight committees all use of highly hazardous chemicals, hazardous biological agents, recombinant DNA, animals, or human subjects;

vii. Providing appropriate information to physicians in cases of occupational exposure or suspected exposure. This information includes: identity of the hazardous chemical(s), conditions of exposure and quantities involved, and signs and symptoms of the exposure;

viii. Reporting accidents and near misses to Safety Services.

B. **The Laboratory Supervisor**
Has responsibility to oversee chemical hygiene in the laboratory. If the lab does not have a supervisor, these will fall to the PI. Specifically, the lab supervisor shall:

i. Ensure that workers know and follow the chemical hygiene rules, that appropriate protective equipment is available and in working order, and that appropriate training has been provided;

ii. Perform regular, formal chemical hygiene and housekeeping inspections including routine inspections of emergency equipment;

iii. Ensure that facilities and training for use of any material being ordered are adequate;

iv. Report lab accidents and near misses to the PI.

C. **Laboratory worker**

Each laboratory worker is responsible for his or her personal safety. Each lab employee shall:

i. Plan and conduct each operation in accordance with these chemical hygiene procedures;

ii. Develop good personal chemical hygiene habits;

iii. Follow all rules and guidelines imposed by the lab supervisor and/or PI;

iv. Ask questions when instruction or guidelines are unclear;

v. Report accidents and near misses to the lab supervisor or PI.

D. **The Chemical Hygiene Officer (CHO)**

Will be appointed or designated by the job title of "Chem/Rad/Bio Safety Manager"

i. Serves as a consultant;

ii. Works with administrators and other personnel to develop and implement appropriate chemical hygiene policies and procedures;

iii. Monitors procurement, use, and disposal of chemicals used in the laboratories;

iv. Ensures that appropriate audits are maintained;

v. Helps project managers develop safe and adequate facilities;

vi. Knows the current legal requirements concerning regulated substances.

This Chemical Hygiene Plan was implemented for the above listed laboratory room numbers on _____ (date) and remains in effect until further notice.

_____

(Signature of Principal Investigator or Laboratory Supervisor)

I have read the above Chemical Hygiene Plan, understand it and agree to follow all appropriate procedures and recommendations.

_____ (Name) _____(Signature)
_____(Title) _____ (Date)

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Exposure Control Plan*

_____ (name of Principal Investigator)

_____ (laboratory room numbers)

_____(contact location/phone number)

This document must be filled out only for research involving human or human derived materials. It is an incomplete document and must be modified to the characteristics in your lab. The PI is the responsible party, unless designated otherwise.

Section on HIV, and HBV/HCV Research Laboratories must only be completed by laboratories that are engaged in the production, culture, concentration, experimentation and manipulation of HIV, HCV and HBV. This includes laboratories that work with animals. Clinical or diagnostic labs engaged solely in the analysis of blood, tissue, or organs are exempted from completing this section. **No information in this section may be subtracted and all must be followed.**

In this document, "the above listed Principal Investigator" refers to the Principal Investigator listed on this page, "the above listed laboratory room numbers" refers to the laboratory room numbers listed on this page and "the above listed contact location/phone number" refers to the contact location/phone number listed on this page. This along, with the rest of the Laboratory Compliance and Biosafety Manual must be made available to all laboratory employees.

*Adapted from OSHA's Bloodborne Pathogens Standard, OSHA Directives CPL 2-2.44D - Enforcement Procedures for the Occupational Exposure to Bloodborne Pathogens 11/05/1999.

STANDARD

The above listed Principal Investigator / Laboratory Supervisor is committed to providing a safe and healthful work environment for the entire laboratory staff. In pursuit of this endeavor, the following Exposure Control Plan (ECP) is provided to eliminate or minimize occupational exposure to bloodborne pathogens in accordance with OSHA standard 29 CFR 1910.1030, "Occupational Exposure to Bloodborne Pathogens."

This ECP document is used to assist this laboratory in implementing and ensuring compliance with the standard, thereby protecting laboratory personnel. This ECP includes:

- Determination of personnel exposure
- Implementation of various methods of exposure control, including:
  - Standard precautions
  - Engineering and work practice controls
  - Personal protective equipment
  - Housekeeping
- Hepatitis B vaccination
- Post-exposure evaluation and follow-up
- Communication of hazards to personnel
- Training
- Recordkeeping
- Procedures for evaluating circumstances surrounding an exposure incident

The methods of implementation of these elements of the standard are discussed in the subsequent pages of this ECP.

PROGRAM ADMINISTRATION

The above listed Principal Investigator is responsible for the implementation of the ECP and will maintain, review, and update the ECP at least annually, and whenever necessary to include new or modified tasks and procedures.

Personnel who are determined to have occupational exposure to blood or other potentially infectious materials (OPIM) must comply with the procedures and work practices outlined in this ECP.

The above listed Principal Investigator will maintain and provide all necessary personal protective equipment (PPE), engineering controls (e.g., sharps containers), labels, and red (biohazard) bags as required by the standard and will ensure that adequate supplies of the aforementioned equipment are available in the appropriate sizes.

The above listed Principal Investigator will be responsible for ensuring that all medical actions required are performed and that appropriate personnel health and OSHA records are maintained.

The above listed Principal Investigator will be responsible for training, documentation of training, and making the written ECP available to personnel, OSHA, and Safety Services representatives.

EMPLOYEE EXPOSURE DETERMINATION

The following is a list of all job classifications in this laboratory in which **all** personnel have occupational exposure:

JOB TITLE	LOCATION

The following is a list of job classifications in which **some** personnel in this laboratory have occupational exposure. Included is a list of tasks and procedures, or groups of closely related tasks and procedures, in which occupational exposure may occur for these individuals:

JOB TITLE	LOCATION	TASK/PROCEDURE

Part-time, temporary, contract personnel and volunteers are covered by the standard. The provisions of the standard will be met for these personnel as described below:

METHODS OF IMPLEMENTATION AND CONTROL

Standard precautions

All personnel will utilize standard precautions.

Exposure Control Plan

Personnel covered by the bloodborne pathogens standard receive an explanation of this ECP during initial laboratory orientation training for this laboratory. This ECP will also be reviewed in annual refresher training. All personnel have an opportunity to review this plan at any time during work shifts by contacting the above listed Principal Investigator.

If requested, the above listed Principal Investigator will provide personnel with a copy of the ECP free of charge and within 15 days of the request and is responsible for reviewing and updating the ECP annually or more frequently if necessary to reflect any new or modified tasks and procedures which affect occupational exposure and to reflect new or revised personnel positions with occupational exposure.

Engineering Controls and Work Practices

Engineering controls and work practice controls will be used to prevent or minimize exposure to bloodborne pathogens. The specific engineering controls and work practice controls used are listed below:
(For example: use of blunt cannula instead of needle and syringe)

Sharps disposal containers are inspected and maintained or replaced by (Name of responsible person) whenever $^{2}/_{3}$ – ¾ full to prevent overfilling.

This laboratory identifies the need for changes in engineering control and work practices through (Examples: Review of records, personnel interviews, committee activities, etc.)

Additional needed procedures or new products are evaluated by (Describe the process)

The following staff are involved in this process: (Describe how employees will be involved)

The above listed Principal Investigator will ensure effective implementation of these recommendations.

Personal Protective Equipment (PPE)

PPE is provided to personnel by this laboratory at no cost. Training is provided by the above listed Principal Investigator in the use of the appropriate PPE for the tasks or procedures personnel will perform.

The types of PPE available to personnel are as follows: (Ex., gloves, eye protection, etc.) _____

PPE is located (List location) and may be obtained through

(Name of responsible person)
(Specify how personnel are to obtain PPE, and who is responsible for ensuring that it is available.)

All personnel using PPE must observe the following precautions:

- Wash hands immediately or as soon as feasible after removal of gloves or other PPE.
- Remove PPE after it becomes contaminated, and before leaving the work area.
- Used PPE may be disposed of in the biohazard waste container.
- Wear appropriate gloves when it can be reasonably anticipated that there may be hand contact with blood or OPIM, and when handling or touching contaminated items or surfaces; replace gloves if torn, punctured, contaminated, or if their ability to function as a barrier is compromised.
- Utility gloves may be decontaminated for reuse if glove integrity is not compromised; discard utility gloves if they show signs of cracking, peeling, tearing, puncturing, or deterioration.

- Never wash or decontaminate disposable gloves for reuse.

- Wear appropriate face and eye protection when splashes, sprays, spatters, or droplets of blood or OPIM pose a hazard to the eyes, nose, or mouth.

- Remove immediately or as soon as feasible any garment contaminated by blood or OPIM, in such a way as to avoid contact with the outer surface.

The procedure for handling used PPE is as follows: (For example, how and where to decontaminate face shields, eye protection, etc.)

_____

_____

_____

_____

Housekeeping

Regulated waste is placed in containers which are closable or covered, constructed to contain all contents and prevent leakage, appropriately labeled or color-coded (see Labels), and closed prior to removal to prevent spillage or protrusion of contents during handling.

The procedure for handling **sharps disposal containers** is to place sharps container in a biohazard bin, within a biohazard bin/box. When the bag is ¾ full, tie the bag off and place the lid on the bin/box. Housekeeping will pick it up during evening rounds. If biohazard bin is not closed , housekeeping will NOT pick it up. If housekeeping fails to pick up biohazard waste, contact Safety Services for appropriate disposal.

The procedure for handling **other regulated waste** is to dispose of in biohazard waste container. Tie the bag off and housekeeping will pick it up during their evening rounds. If the bag is not tied off, housekeeping will NOT pick it up. If housekeeping fails to pick up biohazard waste, then contact Safety Services for appropriate disposal.

Contaminated sharps are discarded immediately or as soon as possible in containers that are closable or covered, puncture-resistant, leak proof on sides and bottoms, and labeled or color-coded appropriately.

Sharps disposal containers are available at (must be easily accessible and as close as feasible to the immediate area where sharps are used).

Broken glassware which may be **contaminated** is picked up using mechanical means, such as a brush and dust pan or tongs and placed in a sharps container. If the contaminated, broken glassware is autoclaved prior to disposal, it may be placed into the broken glass bin.

Laundry

Laboratory coats will be laundered by contract service with TTUHSC EP for faculty, staff, and other employees. Students must have lab coats autoclaved prior to the lab coats leaving the building. This ensures the lab coat has been decontaminated and is safe to take home and wash in bleach. If the student is working with radioactive materials, the lab coat must be surveyed for radioactive contamination prior to leaving the premises. The lab coat must be disposed of if radioactive contamination is present. PPE not autoclaved may not leave the building due the hazards that it may present to an unknowing public.

Laundering will be performed as specified in contract with outside vendor.

The following laundering requirements must be met if not using TTUHSC EP contract service:

- Handle contaminated laundry as little as possible, with minimal agitation.

- Place wet contaminated laundry in leak-proof, labeled or color-coded containers before transport.

Labels

The following labeling method(s) is used in this facility:

EQUIPMENT TO BE LABELED (e.g., specimens, work locations, refrigerators, etc.)	LABEL TYPE (size, color, etc.) (red bag, biohazard label, color code, etc.)

(Name of responsible person) will ensure warning labels are affixed or red bags are used as required if regulated waste or contaminated equipment is brought into the facility.

Employees are to notify the above listed responsible person if they discover regulated waste containers, refrigerators containing blood or OPIM, contaminated equipment, etc. without proper labels.

HEPATITIS B VACCINATION

The head nurse of Employee Health / Infection Control will provide training to employees on hepatitis B vaccinations, addressing the safety, benefits, efficacy, methods of administration, and availability.

The hepatitis B vaccination series is available at no cost after training and within 10 days of initial assignment to employees identified in the exposure determination section of this plan. Vaccination is encouraged unless: 1) documentation exists that the employee has previously received the series, 2) antibody testing reveals that the employee is immune, or 3) medical evaluation shows that vaccination is contraindicated.

However, if an employee chooses to decline vaccination, the employee must sign a declination form. Employees who decline may request and obtain the vaccination at a later date at no cost. Documentation of refusal of the vaccination is kept at the office of the head nurse of Infection Control.

Vaccination will be provided at a location specified by the head nurse of Employee Health / Infection Control. Following hepatitis B vaccinations, the health care professional's Written Opinion will be limited to whether the employee requires the hepatitis vaccine, and whether the vaccine was administered.

POST-EXPOSURE EVALUATION AND FOLLOW-UP

Should an exposure incident occur, contact the head nurse of Infection Control 915-215-4510

An immediately available confidential medical evaluation and follow-up will be conducted by the head nurse of Infection Control, and the Safety Services Office.

Following the initial first aid (clean the wound, flush eyes or other mucous membrane, etc.), the following activities will be performed:

- Document the routes of exposure and how the exposure occurred.
- Identify and document the source individual (unless the supervisor can establish that identification is infeasible or prohibited by state or local law).

- Obtain consent and make arrangements to have the source individual tested as soon as possible to determine HIV, HCV, and HBV infectivity; document that the source individual's test results were conveyed to the employee's health care provider.

- If the source individual is already known to be HIV, HCV and/or HBV positive, new testing need not be performed.

- Assure that the exposed employee is provided with the source individual's test results and with information about applicable disclosure laws and regulations concerning the identity and infectious status of the source individual (e.g., laws protecting confidentiality).

- After obtaining consent, collect exposed employee's blood as soon as feasible after exposure incident, and test blood for HBV and HIV serological status

- If the employee does not give consent for HIV serological testing during collection of blood for baseline testing, preserve the baseline blood sample for at least 90 days; if the exposed employee elects to have the baseline sample tested during this waiting period, perform testing as soon as feasible.

ADMINISTRATION OF POST-EXPOSURE EVALUATION AND FOLLOW-UP

The head nurse of Employee Health / Infection Control ensures that health care professional(s) responsible for employee's hepatitis B vaccination and post-exposure evaluation and follow-up are given a copy of OSHA's bloodborne pathogens standard. The head nurse of Employee Health / Infection Control also ensures that the health care professional evaluating an employee after an exposure incident receives the following:

- A description of the employee's job duties relevant to the exposure incident

- Route(s) of exposure

- Circumstances of exposure

- If possible, results of the source individual's blood test

- Relevant employee medical records, including vaccination status

The head nurse of Employee Health / Infection Control also provides the employee with a copy of the evaluating health care professional's written opinion within 15 days after completion of the evaluation.

PROCEDURES FOR EVALUATING THE CIRCUMSTANCES SURROUNDING AN EXPOSURE INCIDENT

The above listed Principal Investigator will review the circumstances of all exposure incidents to determine:

- Engineering controls in use at the time of exposure.

- Were the appropriate work practices followed?

- A description of the device being used.

- Protective equipment or clothing that was used at the time of the exposure incident (gloves, eye shields, lab coats, etc.).

- Location of the incident (Laboratory, O.R., E.R., patient room, etc.).

- Procedure being performed when the incident occurred.

- Employee's training.

If it is determined that revisions need to be made, the above listed Principal Investigator will ensure that appropriate changes are made to this ECP. (Changes may include an evaluation of safer devices, adding employees to the exposure determination list, etc.)

EMPLOYEE TRAINING

All employees who have potential occupational exposure to bloodborne pathogens receive training conducted by Safety Services and the above listed Principal Investigator.

All employees who have potential occupational exposure to bloodborne pathogens receive training on the epidemiology, symptoms, and transmission of bloodborne pathogen diseases. In addition, the training program covers, at a minimum, the following elements:

- A copy and explanation of the standard.
- An explanation of the ECP and how to obtain a copy.
- An explanation of the methods to recognize tasks and other activities that may involve exposure to blood and OPIM, including what constitutes an exposure incident.
- An explanation of the use and limitations of engineering controls, work practices, and PPE.
- An explanation of the types, uses, location, removal, handling, decontamination, and disposal of PPE.
- An explanation of the basis for PPE selection.
- Information on the hepatitis B vaccine, including information on its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine will be offered free of charge.
- Information on the appropriate actions to take and persons to contact in an emergency involving blood or OPIM.
- An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available.
- Information of the post-exposure evaluation and follow-up that the employer is required to provide for the employee following an exposure incident.
- An explanation of the signs and labels and/or color coding required by the standard and used at this facility.
- An opportunity for interactive questions and answers with the person conducting the training session.

Training materials for this laboratory are available at the above listed laboratory, the head nurse of Employee Health / Infection Control's office and Safety Services.

HIV, HBV AND HCV RESEARCH LABORATORIES

In addition to the basic elements in this Exposure Control Plan, research and animal laboratories, which culture, manipulate, produce, manipulate and experiment with HIV, HBV and HCV must implement additional procedures.

- Only authorized personnel will be permitted in HIV, HBV or HCV research laboratories. The Principal Investigator is responsible for establishing written policies and procedures whereby only persons who have been advised of the

potential biohazard, meet any specific entry requirements and comply with all entry and exit procedures are allowed to enter the work areas and animal rooms.

- The PI will determine the sufficiency of training and experience for all technical staff working in HIV, HBV or HCV laboratories. No faculty, staff or student may begin work with HIV, HBV or HCV contatinig materials prior to their demonstrating proficiency in standard microbiological techniques and in the specific operations to be performed involving these infectious agents. Any employee lacking adequate training or experience will receive appropriate instruction and experience under the guidance of they faculty member in charge of the laboratory.

RECORDKEEPING

Training Records

Upon completion of training, records will be maintained for a period of at least three years by Safety Services.
The training records include:

- The dates of the training sessions.
- The contents or a summary of the training sessions.
- The names and qualifications of persons conducting the training.
- The names and job titles of all persons attending the training sessions.

Employee training records are provided upon request to the employee or the employee's authorized representative within 15 working days. Such requests should be addressed to Safety Services.

Medical Records

Medical records are maintained for each employee with occupational exposure in accordance with 29 CFR 1910.20, "Access to Employee Exposure and Medical Records**.**"

The head nurse of Employee Health / Infection Control is responsible for maintenance of the required medical records. These confidential records are kept at a location specified by the above nurse for at least the duration of employment plus 30 years.

Employee medical records are provided upon request of the employee or to anyone having written consent of the employee within 15 working days. Such requests should be sent to the head nurse of Employee Health / Infection Control.

HEPATITIS B VACCINE DECLINATION (MANDATORY)

I understand that due to my potential occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to me. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

Printed Name:

Signed:(Employee Name)_____

Date:

All TTUHSC EP laboratories that are involved

This Exposure Control Plan was implemented for the above listed laboratory room numbers on _____ (date) and remains in effect until further notice.

_____

(Signature of Principal Investigator or Laboratory Supervisor)

I have read the above Exposure Control Plan, understand it and agree to follow all appropriate procedures and recommendations.

_____ (Name) _____(Signature)

_____(Title) _____ (Date)

_____ (Name) _____(Signature)

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_____(Title) _____ (Date)

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_____(Title) _____ (Date)

_____ (Name) _____(Signature)

_____(Title) _____ (Date)

Hazard Communication Plan For

_____ (name of Principal Investigator)

_____ (laboratory room number(s))

In this document, “the above listed Principal Investigator” refers to the Principal Investigator listed on this page and “the above listed laboratory room numbers” refers to the laboratory room numbers listed on this page.

Table of Contents

I. Policy Statement for Employee Health and Safety:

As the Principal Investigator (PI) of this laboratory, I am committed to protecting laboratory personnel by assuring that:

1. The work environment is free from recognized hazards that could cause injury, illness or death.
2. Safety and Health factors have priority when in competition with economic factors.
3. Contact information for professional expertise is available to staff to maintain and support the Safety and Health of the Texas Tech University Health Sciences El Paso Center.
4. Each employee is accountable for the safety performance of his/her activity and that this performance is measured regularly against the goal of zero (0) accidents and losses.
5. Each employee is trained and educated in safety procedures and performs the work in compliance with these safety measures.
6. The work environment is monitored on a regular basis to assure a safe and healthy workplace.
7. Each employee assumes personal responsibility for the development and support of a safe workplace.

_____Date_____

(Principal Investigator signature)

II. Hazard Communication Plan

A. Objective:

The objective of this program is to set forth policies and procedures concerning Hazard Communication which will enhance the safety and wellbeing of Texas Tech University Health Science Center El Paso employees. Furthermore, execution of this program is designed to help Texas Tech University Health Science Center El Paso comply with the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard(29 CFR 1910.1200).

B. Responsibilities:

This Hazard Communication Plan has been adapted specifically for the above listed Principal Investigator working in the above listed laboratory room numbers. This program meets the requirements of the Hazard Communication Standard in the areas of:

1. Hazardous Chemical List
2. Labeling and Pictograms
3. Safety Data Sheets (SDS)
4. Employee Information and Training.

This written program is posted in the above listed Principal Investigator's Laboratory Compliance and Biosafety Manual and the Safety Data Sheet Reference Manual (SDS). Copies of the written program are available from _____ (Principal Investigator)) at _____ (location) for review by any interested party.

The above listed Principal Investigator will verify that all containers received for use within the above listed laboratory room numbers meet GHS labeling requirements and will ensure all secondary containers will meet GHS requirements for secondary containment.

1. Hazardous Chemical List:

(a) A list of hazardous materials and chemicals used in the course of TTUHSC-El Paso _____ (Lab) activities will be maintained and updated by _____ (PI). This list is to include all substances that require a Safety Data Sheet (SDS) from the Global Harmonized System (GHS).

(b) One copy of this list will be kept in the front of each SDS book and one copy will be kept in the Laboratory Compliance and Biosafety Manual. An updated copy must also be sent to Safety Services if any changes occur. For each chemical used in the workplace, an SDS sheet must be available at the workplace at all times.

2. Labeling and Pictograms:

(a) The above listed Principal Investigator will verify that all containers received for use within the above listed laboratory room numbers meet GHS labeling requirements and will ensure all secondary containers will meet GHS requirements for secondary containment.

(b) The GHS Labeling requirements:

1. The Identity of the chemical and appropriate hazard warnings must be shown on the label
2. The hazard warning must provide users with an immediate understanding of the primary health and/or physical hazards of the hazardous chemical through the use of words, pictures, symbols, or any combination of these elements.
3. The name and address of the manufacturer, importer, or other responsible party must be included on the label.
4. The hazard label message must be legible, permanently displayed and written in English.
5. Portable containers must comply with the labeling requirements listed above, 2. if any of the following events occur:
    (a) The material is not used within a work shift of the individual who makes the transfer.
    (b) The worker who made the transfer leaves the work area.
    (c) The container is moved to another work area and is no longer in the passion of the worker who filled the container.
    (d) Labels on portable containers are not required if the worker who made the transfer uses all the contents during the work shift. When a secondary container is used for longer than one shift or does not meet the requirements of the Permanent Container Labels section, the label must contain two key pieces of information: the identity of the hazardous chemical(s) in the container (chemical name) and the hazards present.

3. Safety Data Sheet (SDS):

a) _____ (PI) will keep all SDS's in an organized fashion and will place them in (identified and accessible location) for all employees to view at will. A duplicate set of SDS information will be maintained by the Safety Services.
The person listed in (a) will be responsible for adding access to the EHSA program website to all laboratory employees' computer desktops.

b) The PI will also maintain the acknowledgement forms in the Laboratory Compliance and Biosafety Manual.

c) The person listed in 3. (a) Will also post the IBC License in a common area where all laboratory employees will have access to the information. This license will list all certified personnel as well as all highly hazardous materials registered with the IBC.

4. Employee Information and Training

(a) Safety Services is responsible for assuring that:

1. The Notice to Employees required by the Hazard Communication Standard is posted in an area that all members of this laboratory have access to.
2. An explanation of the program is included in the new employee orientation. The orientation will include:
   (a) An overview of the requirements of the program.
   (b) Informing the new employee of the safety training requirements for laboratory employees.

b) Employee Training

Safety Services is responsible for the development and presentation of training and education programs to the members of this laboratory that:

1. Provide general requirements of the Hazard Communications Standard.
2. Review general chemical safety information
3. Review proper use of personal protective equipment (PPE)
4. Develop employee skills for emergency handling of hazardous substances that are released or spilled.
5. Show how to read container labels and Safety Data Sheets (SDS) to obtain appropriate hazard information.
6. Utilize online programs as a resource for further questions about chemical handling and storage.

c) Specific Hazards Training

The above listed Principal Investigator is responsible for providing information about any specific hazardous chemicals an employee may be exposed to. This information will include:

(a) Information on interpreting labels and SDSs and the relationship between those two methods of hazard communication.

(b) The location by work area, acute and chronic effects, and safe handling of hazardous chemicals known to be present in the employees' work area and to which the employee may be exposed.

(c) The proper use of personal protective equipment (PPE) and first aid treatment to be used with respect to the specific hazardous chemicals to which the employees may be exposed.

(d) Safety instructions on the handling, cleanup procedures, and disposal of hazardous materials.

d) Informing Temporary Help and Volunteers

Temporary help and volunteers will be treated as a new employee and must be provided all of the orientation and training required of a new employee placed in a laboratory at TTUHSC El Paso.

This Hazard Communication Plan was implemented for the above listed laboratory room numbers on ___________ (date) and remains in effect until further notice.

____

(Signature of Principal Investigator or Laboratory Supervisor)

I have read the above Hazard Communication Plan, understand it and agree to follow all appropriate procedures and recommendations.

____________________________ (Name) __________________________ (Signature)
____________________________ (Title) __________________________ (Date)

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Shipping Hazardous or Infectious Materials

Shipments of hazardous materials are regulated by the United States Department of Transportation (DOT), and the International Air Transport Association (IATA) in order to promote safe and secure transportation of hazardous materials and to minimize threats to life, property, and the environment.

Any employee of TTUHSC El Paso who ships hazardous items **must first be trained and certified** in the applicable rules. Safety Services coordinates training for TTUHSC El Paso hazmat employees. A hazmat employee is any employee who handles, offers for transport, transports, or causes hazardous materials to be transported. **Training must be renewed every two years.**

How do you know if your shipment is considered hazardous? For chemicals, this information is found in the SDS, for biological material, you can refer to the Pathogen Safety Data Sheets, which can be found through this link http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/index-eng.php

In all cases there is a certain amount of professional judgment involved and **if you are ever unsure, please contact Safety Services** for help in determining the status.

Contact Safety Services for assistance in determining the best program for your needs.

Note: If you have received a shipping certification from another entity, please forward a copy of your certificate to Safety Services.

Transporting Research Materials On/Off Campus

When transporting materials (biologicals or hazardous chemicals) either on or off campus by foot or vehicle, specific guidelines must be followed to ensure the safety of personnel, the public and the environment. Personnel should be trained on how to respond in the event of an accidental spill of the material they are transporting and therefore, must be familiar with the material. Please see OP 75.34, TTUHSC El Paso Research Materials Transport on Campus, for additional information.

Training on the guidelines for transporting materials on or off campus, is available through Safety Services. Note: This training is not the same, nor to be followed, for when personnel will use a carrier (FedEx, UPS, etc.) to ship hazardous materials. Please see the section "Shipping Hazardous or Infectious Materials".

Below are the guidelines to follow when personnel wish to transport on/off campus.

Transport on Campus Not Using a Vehicle:

These steps apply when transporting materials between laboratories within walking distance within a building or laboratory (e.g. in stairwells, elevators, through public or non-public spaces) and between laboratory buildings within a short distance (e.g. across a street, on a sidewalk, or across the parking lot).

A. Packaging and Labeling

1. Primary container containing biological sample, hazardous chemical or laboratory material:

    a) Must be leak-proof, sealed and labeled with applicable information, such as; the biohazardous label, chemical or material name and possible hazards. Multiple biological samples should be separated by padding to prevent breakage.

    b) Secured to avoid shifting during transport.

    c) High-risk infectious specimens should be closed within another leak-proof layer (e.g. clear plastic zip bag or lidded bin), and the outside of that layer disinfected prior to placing within secondary (outer) container.

2. Secondary (outer) Container

    a) Leak-resistant with a secure lid, preferably a rigid container (e.g. plastic bin, box).

    b) Absorbent material should be used to prevent breakage and to absorb spillage.

    c) Chemical solids (including powders, granules, etc.) should be placed in a secondary container suitable to preventing release of the material in case of accidental drop or crushing of the primary container.

d) Label exterior with contact name & telephone number, to/from information and with a description of the enclosed material hazard.

e) Labels must be legible and durable (i.e. water and smudge resistant).

f) Outer container must be clean/disinfected if necessary to remove possible laboratory-acquired contamination.

B. Handling

1. Avoid moving large, fragile or multiple samples by hand; use a cart if it is available to transport materials between laboratories, building floors or between buildings.

2. Take care when moving materials through public spaces or high-traffic walkways.

3. Do not leave the package unattended.

C. Safety

1. Be prepared to clean up a spill immediately.

2. Portable spill kits may be assembled easily; and should include gloves, eyewear, disinfectant, absorbent material, hand sanitizer, waste disposal bags. Read Safety Data Sheet to prepare materials if need to clean up hazardous chemical.

3. Be prepared to contact someone for assistance or emergency services in the event of an accident. Phone contact for the Department of Safety Services is 215-4820 and for TTUHSC El Paso Police Department is 215-7111.

Transport on Campus by Vehicle

A. Transport using a personal vehicle on roadways is not permitted.

1. Use multiple leak-proof containment layers to house your materials.

2. Primary container:

a) Leak-proof and sealed. Multiple biological samples should be separated by padding to prevent breakage.

b) Secure to avoid shifting during transport.

3. Secondary container:

a) Leak-resistant with a secure lid, preferably a rigid container (e.g. plastic bin, box).

b) Absorbent material should be used to prevent breakage and to absorb spillage.

4. Outer container:

a) Secure closure but does not need to be leak-proof. Preferably a rigid container with a secure lid.

b) Absorbent material should be used to prevent breakage and to absorb spillage.

c) Label exterior with contact name & telephone number, to/from information and with a description of the enclosed material hazard.

d) Labels must be legible and durable (i.e. water and smudge resistant).

B. Handling:

1. Place package in a secure location within vehicle to avoid tipping or shifting.

2. If possible, place package in inconspicuous location in the vehicle (reduces risk of theft).

3. Avoid moving materials by hand. Use cart to transport to and from the vehicle.

4. Avoid moving large, fragile or multiple samples by hand. Use cart for transport between laboratories, building floors or between buildings.

5. Be careful when moving materials through public spaces or high-traffic walkways.

6. Do not leave the package unattended.