

# TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER EL PASO

## Potential Hazards in Research Laboratories

Scientific research involves exposure to various hazards. When deciding to allow your minor child to participate in research projects conducted in TTUHSCEP laboratories, you need to be aware of the potential hazards he or she may encounter. The following information provides the most common potential hazards, but is not intended to be a complete list of all hazards. Questions may be addressed to the minor's specific sponsor. If you have any further questions or concerns regarding this information, please contact the TTUHSCEP Director of Safety Services or designee .

### **Definitions:**

Allergens – substances capable of producing an allergic reaction or creating an allergic hypersensitivity by acting as a sensitizer through chronic exposure.

Asphyxiants – substances such as gases or toxins that cause a decrease in oxygen concentration or an increase of carbon dioxide concentration within the body.

Carcinogens – substances capable of producing cancer.

Mutagens – agents (chemical or physical) capable of inducing genetic mutation..

Pathogens – bacteria, viruses, prions, fungi, parasites, or other infectious agents capable of causing diseases.

Recombinant or synthetic genetic materials – DNA that has been genetically engineered (altered), usually incorporating DNA from more than one species of organism.

Transgenics – organisms that have had genes from another organism inserted into their DNA.

Toxins – poisonous substances produced by living organisms, plants, or animals.

Zoonotic diseases – diseases that can be passed from animals to humans.

### **Potential Hazards**

Your child's research project may involve one or more of the following potential hazards. A table is included with examples.

Chemicals – may be unstable, making them reactive and prone to explosion. Potential injuries include skin and eye burns, respiratory problems, allergic reactions, skin, eye, or mucous membrane irritation, or other illness.

Pathogens – found in human, animal and plant tissue may cause infections and acute or chronic illnesses.

Recombinant or synthetic genetic materials/technology – may interact with the human body and its cells and produce potentially hazardous or fatal results.

Mechanical/electrical equipment and instrumentation – may cause electrocution, burns, cuts, scrapes, and injuries from pinch points. High noise levels may cause hearing loss.

Radiation/irradiation – can cause skin and/or eye damage, cellular damage, and/or long-term health problems.

Animals – may bite, scratch, transmit zoonotic diseases such as rabies, toxoplasmosis, pox virus, cat bite fever, rat bite fever, and/or various parasitic infections, and/or may release allergens.

Gas cylinders/compressed gasses – gas cylinders with compressed gasses may explode, causing injury

from high speed projectiles. Released gasses may cause eye and/or skin irritations, respiratory problems, light-headedness, fainting, and/or asphyxiation.

**Hazard Table**

<b>Definition</b>	<b>Hazards</b>	<b>Examples</b>	
Chemicals	Refined compounds that could be in the form of a solid, liquid, or gas. These may or may not be hazardous. Some compounds may have numerous hazard classifications (flammable, toxin, and carcinogen)	Carcinogens: may cause some form of cancer with long-term exposure - usually many years in the future.	Benzene, acrylamide
		Teratogens: shown to affect the reproductive system of males and females. May cause birth defects in the developing fetus.	Alcohol, thalidomide, X-rays, acrylamide
		Neurotoxins: may affect the nervous system.	Ethidium Bromide, snake venom
		Flammables: will burn or explode.	Alcohol, Acetone, Xylene
		Reactives: will react explosively.	Peroxides, acrylamide
		Corrosives: will cause tissue damage with contact through inhalation, ingestion, eye exposure, skin absorption, etc.	Acids and bases
		Toxins: May cause illness or death on exposure.	Cyanide
Compressed Gases	High-pressure cylinders that hold gases. These are usually large and heavy. Gas may be harmless, toxic, corrosive, or flammable	Physical hazard: Explosion hazard if they rupture. Asphyxiant hazard if they vent the gas to the workplace and it displaces oxygen.	Asphyxiants: Nitrogen, helium, any other non-oxygen gas Flammable: Hydrogen Toxic: Ammonia
Radiation/Radioactive Material	High energy particles (alpha and beta) or electromagnetic waves (X-rays and gamma rays).	Tissue & organ damage with high doses.	Uranium, Phosphorus32, Sodium 35, Iodine 125, X-rays
Physical hazards	Hazards from noise, machinery, heat, cold, etc.	Tissue damage and hearing loss.	Scrapes, cuts Cold injuries: liquid nitrogen, dry ice Heat injuries: burners

Biological Agents	Living organisms or products of living organisms such as Viruses, Bacteria, Fungi, Prions & Parasites. Hazards from infection with these agents are organism dependent and may range from mild and treatable to severe and untreatable. Classification of hazard in four groups called biological safety levels with level 1 as the least hazard & level 4 as the extreme hazard.	Risk Group 1 - No hazard.	Baker's Yeast and E. coli K12
		Risk Group 2 - Mild to severe illness.	Influenza, Polio and Salmonella
		Risk Group 3 - Severe illness and/or possible death.	Tuberculosis and West Nile Virus
		Risk Group 4 - Not allowed at TTUHSCEP.	Ebola Virus
Recombinant or synthetic DNA	Genetically or synthetically modified organisms with variations in genes within the organism.	Often unknown consequences once introduced to the human body.	Viral vectors like Adeno and Adeno-associated viruses used to transfect or express genes.
Toxins - Microbial, Plant, Animal	Poisons produced by plants, animals, or other living organisms.	Tissue and organ damage or death.	Plant - Ricin Animal - Fish and Snake venom Microbial - Staph, Tetanus

**TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER EL PASO**  
**Rules for Minors Working in Laboratories**

1. Never work alone in any laboratory environment without direct, immediate supervision from the sponsor or someone designated by the sponsor.
2. Always follow the instructions of the sponsor or laboratory supervisor.
3. Always report any accident (regardless of severity) immediately to the sponsor or laboratory supervisor.
4. Always wear sponsor designated personal protective equipment as directed and dispose of it appropriately. Personal protective equipment includes, but is not limited to, safety glasses, goggles, gloves, lab coats/gowns/aprons, and other face/body protection as determined by your sponsor.
5. Always keep your hands away from your face; wash hands well with soap and water prior to leaving any laboratory area.
6. Never eat, drink, chew gum, apply makeup or lip balm, or touch contact lenses while in any laboratory environment.
7. Always wear closed-toe shoes while in any laboratory.
8. Always tie long hair back to keep it away from laboratory hazards.
9. Always wear clothing that reduces the amount of exposed skin. Shorts and sandals are prohibited in the laboratory.
10. Always ask questions if you don't understand the safety requirements.