**Introduction**

Health and safety is an integral part of all activities at the University of Lethbridge. Part 2 of the *Alberta OH&S Code* requires that hazards be controlled so that workplace injuries can be prevented. A hazard is defined as a situation, condition or thing that may be dangerous to the safety or health of workers. Identified hazards must be evaluated to determine effective controls that will eliminate or reduce the risk to as low as reasonably achievable. This must be documented in a Hazard Assessment Report (HA) which identifies workplace hazards and the methods used to control or eliminate the hazards.

**Laboratory Hazard Assessments**

Each Laboratory Principal Investigator (PI) is required to ensure that a laboratory HA is completed for all work within their area of responsibility and that the HA is communicated. The PI should also ensure that the workers under their direction are involved in the hazard assessment process.

PIs are also required to ensure the HA is reviewed and updated post incident or when changes to the operation are implemented (i.e. new equipment or a process is introduced to the work area).

Please refer to the [Hazard Management element of the University of Lethbridge Environment, Health & Safety Management System (EHSMS)](https://www.uleth.ca/risk-and-safety-services/hazard-management) for instructions on how to conduct a hazard assessment.

A sample hazard assessment with typical laboratory tasks, associated hazards and recommended controls is provided below. **Note that this does not contain an exhaustive list of hazards or controls.** The risk assessment section has been left blank and needs to be completed. Use the sample hazard assessment as a guide and add or delete hazards and controls as appropriate. **Each hazard assessment must be conducted based upon the specific work to be done.**

**Contact Safety Services for assistance with completion of hazard assessments and for guidance on any safety related issues.**

The following is to be used as a guide for identifying laboratory hazards (this is not an exhaustive list of hazards). Principal Investigators will need to identify the hazards for their specific lab activities.

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| **Job/Position/Work Type**: | **Location of Work:** | **Date:** Click here to enter a date. |
| **Assessment completed by**: | **Reviewed/Revised:** |
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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Activity/Task**(List all tasks and activities of the job/work) | **Description of****Hazard**Note: There may be more than one hazard associated with an activity or task. | **Likelihood (L)** | **Severity (S)** | **Risk Total = (L\*S)** | **Rating (High, Moderate, Low)** | **Hierarchy of Hazard Controls**(OHS Code 2009, Part 2 section 9)**Elimination/Substitution (E/S)** ifthis not an option the following hierarchy of controls is to be followed:* **Engineering Controls (EC)**
* **Administrative Controls (AC)**
* **Personal Protective Equipment (PPE)**
 | High Risk Moderate Risk Low Risk  |
| Working Alone | • Lack of communication• Isolation |  |  |  |  | EC: telephone; cell phoneAC: training, organizing and planning work, rotation of workers, UofL working alone procedure and login system; check in/out procedure  |
| Working with chemicals | General hazards• Inhalation of vapours and dusts; contact with skin or eyes• Incompatibility reactions• Chronic exposure (irritation, allergic reaction) (e.g. animal procedures/drug injection, perfusions, tissue preparation) |  |  |  |  | EC: fume hoods for use and handling of volatile and toxic chemicals, scavengers and exhaust arms; proper carts, transport buckets/secondary containmentAC: substitution of a less toxic product if possible, training of personnel (WHMIS training, anesthetic machine procedure), MSDS, organizing and planning work, working as required by UofL Lab Safety Manual, spill and waste disposal procedures; access to emergency shower and eyewash station; inventory controlPPE: safety glasses, lab coats, gloves, fit-tested respirators |
| Working with Compressed Gases  | • High pressure• Poisonous• Flammable• Oxidizer |  |  |  |  |  EC: stored upright and secured to wall or bench top; transport carts designed for task, vented storage cabinet, gas detection & associated systems (as required); regulator and tubing appropriate/compatible for gasAC: safe work procedures, leak testing connections (with SNOOP or soap solution), training, WHMIS, MSDSPPE: Safety glasses |
| Working with Flammable and Combustible materials | • Exposure• Burns • Fire• Explosion(e.g. ethanol, isopentane, isopropanol) |  |  |  |  |  EC: fume hoods, local exhaust ventilation systems; flammable storage cabinets; appropriate storage containers; do not store with oxidizers; proper carts, transport buckets/ secondary containmentAC: access to fire extinguisher, fire extinguisher training, training, WHMIS, MSDS; working as required by UofL Lab Safety Manual, spill and waste disposal proceduresPPE: chemical resistant gloves, lab coat, safety glasses |
| Working with Pyrophoric and/or Water Reactive materials | • Uncontrolled reaction• burns • Fire(e.g. sodium metal, tert-butyllithium) |  |  |  |  | EC: inert atmosphere glove box; fume hood; appropriate storage cabinets; proper carts, transport buckets/ secondary containmentAC: safe work procedures, SOPs, working as required by UofL Lab Safety Manual, spill and waste disposal procedures; access to flammable metal extinguisherPPE: chemical and fire resistant gloves/lab coat; safety glasses |
| Working with Oxidizers | • Fire• Explosion |  |  |  |  | EC: segregated storage (do not store with flammables) AC: training, WHMIS, MSDS; working as required by UofL Lab Safety Manual, spill and waste disposal proceduresPPE: safety glasses, lab coats, gloves |
| Working with Toxic/Poisonous materials causing immediate and serious toxic effects  | • Skin, eye, lung irritation• aspiration• Neurotoxins• Systemic poisons• CNS depressants |  |  |  |  | EC: fume hoods, local exhaust ventilation systems; glove box manipulations; locked storage AC: SOPs, training, WHMIS MSDS; working as required by UofL Lab Safety Manual, spill and waste disposal proceduresPPE: safety glasses, goggles, lab coats, aprons, chemical resistant gloves, face shield, sleeve covers, fit-tested respirator |
| Working with Toxic materials causing other toxic effects  | • Carcinogens• Mutagens• teratogens• irritants• sensitizers |  |  |  |  | EC: fume hoods, local exhaust ventilation systems glove box manipulations; locked storage for carcinogens, teratogens, mutagensAC: SOPs, training, WHMIS MSDS; working as required by UofL Lab Safety Manual, spill and waste disposal proceduresPPE: safety glasses, goggles, lab coats, aprons, chemical resistant gloves, face shield, sleeve covers, fit-tested respirator |
| Working with Biological material | • cultures (irritants, allergies)• recombinant DNA/RNA (use and disposal) |  |  |  |  | EC: certified Biosafety Cabinets (BSC), autoclave; AC: SOPs; U of L GMLP; WHMIS, PSDS; spill and waste disposal procedures; use of disinfectants; access to emergency shower and eyewash stationPPE: lab coats, safety glasses, gloves, fit-tested N-95 respirator |
| Working with Biohazardous/infectious materials | • Viral Vectors• Pathogens (bacterial, fungal, viral)• Toxins• Cell lines• Human Blood and Bodily Fluids |  |  |  |  | EC: certified Biosafety Cabinets (BSC), aerosol proof devices, HEPA Filtration, effluent decontamination system; autoclave; proper carts, transport buckets/ secondary containment; locked storage and facilityAC: authorized access only; SOPs; generic Biosafety training and job specific training; WHMIS, PSDS; UofL Biosafety Program and Biosafety Committee approval; working as required by UofL Biosafety manual, spill and waste disposal procedures; signage and labelling; use of disinfectants; access to emergency shower and eyewash stationPPE: lab coats, gowns, gloves, sleeve covers, aprons, fit-tested N-95 respirator |
|  | • Human Blood and Bodily Fluids |  |  |  |  | EC: certified Biosafety Cabinets (BSC), aerosol proof devices, HEPA Filtration, autoclave; proper carts, transport buckets/ secondary containment; locked storage and facilityAC: SOPs; generic Universal Precautions, job specific training; WHMIS, PSDS; UofL Biosafety Program and Biosafety Committee approval; working as required by UofL Biosafety manual, spill and waste disposal procedures; signage and labelling; use of disinfectants; access to emergency shower and eyewash stationPPE: lab coats, gowns, gloves, sleeve covers, aprons, fit-tested N-95 respirator |
| Working with Corrosives | • Contact with eyes and skin• Inhalation(e.g. acids/bases) |  |  |  |  | EC: fume hoods and/or local exhaust ventilation; vented corrosive storage cabinets; proper carts, transport buckets/ secondary containmentAC: training; working as required by UofL Lab Safety Manual, spill and waste disposal procedures; access to emergency shower and eyewash stationPPE: goggles, face shield, chemical resistant apron, gloves, safety glasses |
| Working with Dangerously Reactive Materials | • May react vigorously with water and release a toxic gas• may be impact/shock sensitive or prone to polymerizatione.g. picric acid |  |  |  |  | EC: Fume hoods, local exhaust ventilation systems glove box manipulations; locked storage; proper carts, transport buckets/ secondary containmentAC: SOPs, training, WHMIS MSDS; working as required by UofL Lab Safety Manual, spill and waste disposal proceduresPPE: safety glasses, goggles, lab coats, aprons, chemical resistant gloves, face shield |
| Working with Cryogenic Liquids or Dry Ice | • Tissue damage (cryo burn)• Asphyxiation |  |  |  |  | EC: Adequate general exhaust; gas detection & associated systemsAC: SOPs; working as required by UofL Lab Safety Manual, spill and waste disposal procedures; access to emergency shower and eyewash stationPPE: safety glasses, face shield, cryo gloves |
| Working with sharps | • needle stick injury, cuts, broken glass, razor blades (animal procedures/drug injection, perfusions, tissue preparation, microcopy) |  |  |  |  | EC: sharps disposal container; shielded needles (as appropriate); broken glass container, tools for handling of sharp materials/equipmentAC: training, organizing and planning work, SOPs, access to first aid kitPPE: gloves |
| Animal handling  | • Scratches• Bites• allergic reactions |  |  |  |  | EC: design of the workplace (ventilated rooms), tubs for transporting animalsAC: policies and procedures, SOPs, animal handling training, organizing and planning work, safety plan and habituation of animalsPPE: gloves, fit-tested N-95 respirators (as required for individuals with allergies), lab coats |
| Working with electrical equip | • electrical shock• burns |  |  |  |  | EC: engineered design of equipment; properly groundedAC: SOPs, training |
| Slips, trips and falls | • poor housekeeping• wet floors• use of electrical cords |  |  |  |  | EC: anti-slip floor grip stripsAC: policies and procedures (maintenance of room and floors), training, ensure prompt cleanup of spills; keep electrical cords out of aisles/walkways; safety covers for electrical/extension cordsPPE: rubber soled shoes |
| Working with controlled drugs | •exposure, skin and eye contact, injection |  |  |  |  | EC: fume hoods; locked storageAC: use, storage, and disposal as per Health Canada requirement; training, SOPs, WHMIS training, MSDSPPE: gloves, lab coat, safety glasses |
| MRI | • magnetic field |  |  |  |  | EC: signage, barricades, gauss lines marked on floor; locked facilityAC: controlled key access; authorized access only; training and orientation; only non-ferrous equipment/tools allowed in MRI lab; supervision by MRI Scientist |
| MRI | • Asphyxiation/Cryogen Quench• Cryogen burns/Normal Cryogen Boil-off |  |  |  |  | EC: quench pipe; ventilation system; oxygen sensors and alarm system; flow meters on cryogen exit portsAC: emergency response procedure; training, records/log bookPPE: lab coat, cryo gloves and safety glasses/face shield |
| Working with Radioisotopes | • Radiation exposure |  |  |  |  | EC: shielding, barricades; locked storage and facilityAC: authorized access only; generic and job specific Radiation Safety training; UofL Radiation Safety Program and Radiation Safety Committee approval; spill and waste disposal procedures; SOPs, signage and labelling; dosimetry program; inventory and contamination survey requirementsPPE: safety glasses, lab coats, gloves |
| Working with Lasers | • Skin injuries• Eye injuries |  |  |  |  | EC: engineered design, safety interlocks, enclosures, barriers, protective housing; locked facilityAC: authorized access only; SOPs, UofL Radiation Safety Program and Radiation Safety Committee approval, generic and job specific laser safety training; laser safety manual; signage and labelling; determination of nominal hazard zone (NHZ)PPE: Laser safety eyewear rated for correct optical density and wavelength, lab coats, gloves |
| Working with LEDs | • Exposure to extremely bright light source |  |  |  |  | EC: engineered design, safety interlocksAC: SOPs, trainingPPE: protective eyewear required if not used in beam enclosed system |
| Working with X-ray emitting equipment | • X-ray radiation exposure(e.g. Faxitron and Torr x-ray cabinets) |  |  |  |  | EC: engineered design, safety interlocks, lead shieldingAC: SOPs; generic and job specific x-ray safety training; dosimetry program; UofL Radiation Safety Program and Radiation Safety Committee approvalPPE: lead shielded apron |
| Working with heat/flames | • Burns• Fire (e.g. hot plates, Bunsen burners) |  |  |  |  | EC: engineered design, safety interlocks; tongs; thermal protectors for bench topsAC: training; UofL Lab Safety Manual; ensure no flammable/combustible materials near sources of heat/flame; never leave hot plates and Bunsen burners unattendedPPE: thermal gloves for handling hot items |
| Travel-International | •Transportation• Security• health risks |  |  |  |  | AC: Attend a Pre Departure travel risk orientation; adhere to U of L travel procedure/documentation; U of L driver agreement; review country specific travel reports and advisories (DFAIT); investigate local customs and laws; awareness of seasonal weather patterns; vaccinations and awareness of associated health risks; emergency contact cards; check in procedure. |
| Travel-Domestic | • ground transportation• weather  |  |  |  |  | AC: University Driver Agreement; Use of Personal Vehicle for University Business Procedure; Vehicle Rental Guidelines; use properly maintained vehicles; practice defensive driving; observe all traffic laws; be aware of weather advisories; emergency contacts; check in procedure. |

(When describing the controls to reduce the risk associated with each hazard the above hierarchy must be followed, with personal protective equipment as the last means of control)

*By signing this form, you acknowledge that you understand the hazards and associated controls:*

Supervisor’s Name Supervisor’s Signature

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| **Worker Name** | **Signature** | **Date** |
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