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| **Chemical Hygiene Plan** |
| **Policy** | This policy documents and provides guidance for the Chemical Hygiene Plan. |
| **Purpose** | The purpose of the Chemical Hygiene Plan is to ensure the hazards of chemicals used in the laboratory are evaluated, and information concerning their hazards is transmitted to laboratory staff. The transmittal of information is accomplished by a comprehensive hazard communication program which includes container labeling and other forms of warning, safety data sheets, and employee training. |
| **Laboratory Standard** | OSHA’s Occupational Exposure to Hazardous Chemicals in Laboratories standard (29 CFR 1910.1450) specifies the mandatory requirements of a Chemical Hygiene Plan (CHP) to protect laboratory workers from harm due to hazardous chemicals.Use the following link to access this standard: [OSHA 1910.1450 – Occupational exposure to hazardous chemicals in laboratories](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=Standards&p_id=10106) |
| **Procedures** | Standard Operating Procedures for Handling Chemicals:1. **Personal Injury, Spill or Accident:**
	1. Summon help immediately.
	2. To obtain emergency assistance call:
		* Minneapolis**:** 5-7777
		* St. Paul: 1-8899
	3. Protect yourself, patients, and other personnel from additional exposure or harm.
	4. Report the incident to laboratory management promptly.
	5. Depending on the nature of the incident, the employee may be directed to call Employee Health Service (EHS) at 952-992-5372 and complete an [Employee Incident Report](http://khan.childrensmn.org/forms/EmployeeIncident/EmployeeIncident.asp), file a [Safety Learning Report](https://rl6-2.rlsolutions.com/RL_Childrens_Minnesota_Prod/Homecenter/Client/Login.aspx?ReturnUrl=%2fRL_Childrens_Minnesota_Prod%2f) (SLR), and/or complete a [Hazardous Chemical Spill Report.](http://khan.childrensmn.org/Manuals/Safety/Hazard/Form/124619.pdf)
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| **Personal Injury** |
| **Eye or skin contact with chemical** | **Ingestion of chemical** | **Inhalation of chemical** | **Burns – chemical, thermal** | **Lacerations, cuts, or punctures**  |
| * Ask for help.
* Flush eye or skin contact area with water for at least 15 minutes at an eye wash, safety shower, or sink.
* Remove contaminated clothing without pulling over the face or head; cut with a scissor.
* Remove shoes, belts and other tight fitting clothing.
* Seek medical attention.
 | * Do not induce vomiting.
* Seek medical attention.
 | * Move to fresh air immediately.
* Seek medical attention.
 | * Flush affected area with cold water.
* Seek medical attention.
 | * Apply pressure to the area using a clean gauze or pad.
* Seek medical attention.
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| **Spill Containment**  |
| **Evaluate**  | **Protect** | **Contain** | **Neutralize** | **Dispose** |
| In some instances, (small spills) may be safely contained and cleaned up using a spill kit. Evaluate the incident for the appropriate actions, whether to be a first responder or to call Security for assistance (& evacuate). Minneapolis: 57777St. Paul: 18899 | Avoid contact with the material. Do not allow others to enter the spill area. | Contain the spill using an absorbent from the spill kit, FAN pad (for formalin) or other absorbent pad, e.g. paper towels. | Neutralize, if necessary – see Spill Kit. | Place contaminated materials into appropriate Hazardous Waste container and close tightly. Label the contents for Hazardous Waste disposal. |

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| **Equipment Accidents** |
| **Equipment contributed to personal injury** | **Instrument malfunction**  | **Notification** |
| See personal injury above. | Contact Biomed:Minneapolis: 5-6383St. Paul: 66297 Submit an online work order. | Notify laboratory management. |

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|  | 1. **Safety Data Sheets (SDS)**

The SDS library contains information on all chemicals used in the laboratory.This resource is located online on the Star Net page under the Emergency/Safety tab.SDS includes information on the hazards, safe handling, storage and disposal of hazardous chemicals. It also includes information on first aid and spill response. |
|  | 1. **Chemical Exposure Monitoring**

Definitions: *Action Level* – concentration level, calculated as an 8-hour time weighted average, that initiates certain required activities such as exposure monitoring and medical surveillance.*Permissible Exposure Limit (PEL)* –regulatory limits on the amount of concentration of a substance in the air and is based on an 8-hour time weighted average.* 1. Initial monitoring
		+ Upon notification that employees may be exposed to a certain substance (chemical) in concentrations near the action level or PEL, or if required by regulation, initial chemical exposure monitoring will be conducted.
		+ PEL’s for a specific chemical can be found on the manufacturer’s SDS.
		+ An initial chemical exposure assessment may also be requested by any employee by contacting their supervisor or the laboratory safety officer.
	2. Periodic Monitoring
		+ If the initial chemical exposure monitoring determines that concentrations are above the action level or PEL, a periodic monitoring program will be implemented and every effort will be made to make necessary changes to reduce concentration levels.
		+ All employees exposed to levels above the PEL will be referred to EHS.
	3. Termination of Monitoring
		+ If initial monitoring results conclude that concentrations are lower than the action level or PEL, or if two (2) consecutive periodic monitoring assessments show the concentration has dropped below the action level or PEL, monitoring may be terminated.
		+ Chemical exposure monitoring will be conducted if any change occurs in processes, equipment or control measures.
	4. Employee Notification of Monitoring Results
		+ Chemical exposure monitoring results will be provided to the tested individual within 15 working days after receiving the results.
		+ Individuals will be informed of monitoring results either electronically or in person.
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|  | 1. **Avoid Exposure:**
	1. Assume all chemicals of unknown toxicity are toxic. Minimize exposure to all chemicals, even those with no known significant hazard. Avoid skin contact with all chemicals.
	2. Wash your hands before leaving the laboratory.
	3. Eating, gum chewing, drinking, smoking, vaping, applying cosmetics or lip balm, and handling contact lensesare prohibited in all work areas of the laboratory.
	4. Wear appropriate clothing. Wear shoes at all times. Do not wear sandals or perforated shoes.
	5. Do not smell or taste chemicals.
	6. Do not perform mouth pipetting.
	7. Use ventilation (fume) hoods when working with toxic substances.
	8. Do not use damaged glassware. Handle and store laboratory glassware with care.
	9. Do not work alone in a laboratory if the procedures being conducted are hazardous.
2. **Housekeeping:**
	1. Keep work areas neat, clean and uncluttered.
	2. Chemical splashes or spills must be cleaned up immediately.
	3. Chemicals should be returned to their proper place; never left on counters or stored in aisles, halls or stairwells.
	4. Waste containers must be clearly identified and labeled and when full should be disposed of properly.
	5. Discard chemicals when they have been opened and haven’t been used in over a year, when they have expired, or when they are no longer needed.
3. **Protection Devices and Equipment:**
	1. Flammable storage cabinets – designed for the safe storage of flammable chemicals.
		* Store only compatible materials inside the cabinet.
		* Do not store paper or cardboard inside cabinets with flammables.
		* Do not overload the cabinets.
		* Maintain an inventory, which is posted away from the cabinet.
	2. Fume Hoods
		* The fume hood is a safety device used to trap and collect flammable or toxic vapors.
		* The vent ducts and fans must be kept clean and clear of obstruction.
		* The fume hood must remain ‘on’ at all times when a chemical is inside the hood, regardless of whether work is being done or not.
		* Fume hood shields should be lowered at all times except when adjusting apparatus inside.
		* Fume hoods are NOT storage areas.
		* Fume hoods are inspected annually for proper airflow and function. Records are kept in the Biomed department.
	3. Eye Washes and Safety Showers – wherever chemicals have the possibility of damaging the skin or eyes, an emergency supply of water must be available.
		* Keep the eyewash and shower clear of obstacles.
		* Water rinse from a chemical spill must not go into the sewer system, but must be contained and neutralized before disposal.
		* Use absorbent material to control the water from a drench bath.
		* Eyewashes shall be flushed weekly to reduce bacterial contamination and ensure proper operation.
		* Showers shall be flushed weekly to ensure proper operation.
4. **Personal Protective Equipment (PPE):**
	1. Laboratory coat – minimizes exposure to skin surfaces. Remove and launder when contaminated. Lab coats must be removed before entering clean areas, e.g., lab lounge, hospital dining room, lab offices, bathrooms. Lab coats should only be used outside of the laboratory for safety-related personal protection.
		* Fluid resistant
		* Worn closed
	2. Safety goggles – covers the eyes. Use when working with liquid chemicals.
	3. Face shield – covers the face from eyes to chin.
	4. Gloves – must fit properly. Remove before leaving the laboratory.
		* Nitrile gloves when handling biohazardous substances.
			+ Do not wash or reuse gloves.
		* Nitrile/Neoprene gloves when working with acids or bases or biohazard substances.
		* Thermo-protective gloves when handling hot or cold substances.
		* Utility gloves when cleaning.
	5. See [SA 10.04 Personal Protective Practices](http://khan.childrensmn.org/Manuals/Lab/SOP/Gen/Safety/SA/205901.pdf) for a complete list of PPE.
5. **Chemical Procurement:**

It is always a goal to reduce the amount of hazardous chemicals in the laboratory.Before purchasing hazardous chemicals, consider purchasing in smaller quantities and/or substituting with a less hazardous chemical whenever possible. This will decrease exposure to hazardous chemicals and reduce the volume of hazardous waste.* 1. Purchasing is done through the Children’s Purchasing department. Any item ordered which requires a Safety Data Sheet (SDS) will be researched and documented before the product is delivered.
	2. The Safety department should be notified of new products to evaluate hazards and determine proper disposal procedures prior to product delivery.
	3. The laboratory safety officer will annually submit an updated list of all hazardous chemicals used in the laboratory to the hospital safety manager.
1. **Safe Storage Conditions:**
	1. Corrosives
		* Containers should be stored below eye level.
		* Acids need to be separated from bases and alkaline metals.
		* Oxidizing acids need to be separated from organic acids.
		* Concentrated acids are stored in acid cabinets.
		* Concentrated bases are stored separately from acids.
	2. Poisons
		* May be stored on open shelves unless classified as flammable.
		* Store with other compatible chemicals. See SDS.
	3. Flammables
		* Up to 2 gallons of Class I, II and IIIA liquids may be stored outside of fire-resistant cabinets for each 100 ft2.
		* All others must be stored in a flammable cabinet or in approved safety cans in cabinets under fume hoods.
		* Segregate from oxidizing acids or oxidizers.
		* Keep away from sources of ignition, e.g. flames, heat, sparks.
	4. Oxidizers
		* Store in a cool, dry place.
		* Keep away from flammables and combustibles.
		* Keep away from reducing agents such as zinc, alkaline metals and formic acid.
		* Store with other compatible chemicals in glass or other inert containers.
		* Do not use corks or rubber stoppers.
	5. Irritants
		* May be stored on open shelves unless classified as flammables.
		* Store with other compatible chemicals. See SDS.
	6. Explosives
		* Store with other compatible chemicals.
		* See SDS for specifics on individual chemical.
		* Store in explosion-proof cabinet.
	7. Carcinogens
		* Label as cancer suspect agent.
		* Store as to hazardous nature of chemical, e.g. flammable, corrosive.
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|  | 1. **Safe Handling Conditions:**

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| **IRRITANTS Expoint_big** | **CORROSIVES Corrosion** | **POISONS SkullxCB_big** |
| Use under a hood (if possible) | Wear safety glasses when dispensing | Use under a hood (if possible) |
| Wear gloves and a lab coat | Wear chemical safety gloves & lab coat | Wear gloves and a lab coat |
| Wear eye protection | Bottle carriers must be used | Wear eye protection |
| Minimize skin contact | Dispense under hood | Minimize skin contact |
| Avoid inhalation | Do not sniff reagents | Avoid inhalation |
|  | Always add acid or base to diluents in small quantities and mix well. Allow to cool before adding more. |  |
| **OXIDIZERS Flameovercircle_big** | **FLAMMABLES Flame_big** | **EXPLOSIVES Explbomb_big** |
| Use under a hood (if possible) | Do not use near flame, heat or sparks | Avoid conditions of mechanical shock |
| Wear gloves and a lab coat | Keep fire-fighting equipment readily available | Avoid elevated temperatures |
| Wear eye protection | Should be dispensed in a fume hood (if possible) | Avoid chemical action that releases large volumes of gases, heat, or toxic vapors |
| Minimize skin contact |  | Work with smallest quantity adequate for test being performed |
| **TERATOGENS Healthhazard_big** | **CARCINOGENS Healthhazard_big** |  |
| Minimize exposure as much as possible. | Use under hood |
| Use under a hood | Wear nitrile gloves |
| Wear gloves & face mask; use appropriate PPE at all times. | Wear protective clothing to minimize skin contact |
| Avoid use if in first trimester of pregnancy  | Wear eye protection |

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|  | 1. **When Not to Proceed:** An employee, acting in good faith and reasonably believing the work conditions pose an imminent danger of death or serious physical harm should follow these steps:
	1. The employee must contact laboratory management to correct the hazardous condition, perform the required training, or reassign the employee to another work area.
	2. If the above response is not satisfactory, the employee can refuse to work.
	3. Human Resources and laboratory management will be responsible for the resolution of the issue.
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|  | 1. **Medical Consultation and Examinations:**
	1. Employee exposures will be referred to EHS. An exposure is defined as:
		* Employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed.
		* Exposure monitoring reveals an exposure level routinely above the action level (or in the absence of an action level, the PEL) for an OSHA regulated substance for which there are exposure monitoring requirements.
	2. After an exposure, the employee may receive treatment through the EHS medical provider or through their own personal medical provider.
		* Information to be relayed to the provider includes:
	* Identity of hazardous chemical
	* Description of the incident
	* Any signs or symptoms that the employee may have experienced
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|  | 1. **Record Keeping:**
	1. The following records are maintained:
		* Accident reports and investigations
		* Exposure reports and investigations
		* Inventories of high risk substances
		* Details of equipment inspections
		* Records of employee safety orientation and safety training
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| **Supporting Documents** | [SA 6.01 Employee Right to Know](http://khan.childrensmn.org/Manuals/Lab/SOP/Gen/Safety/SA/210125.pdf)[SA 1.02 Safety Education and Training](http://khan.childrensmn.org/manuals/lab/sop/gen/safety/sa/207196.pdf)[SA 1.04 Laboratory Safety Inspection](http://khan.childrensmn.org/manuals/lab/sop/gen/safety/sa/207202.pdf)[SA 7.04 Managing Chemical Hazardous Waste](http://khan.childrensmn.org/manuals/lab/sop/gen/safety/sa/208728.pdf)[SA 7.06 Hazardous Chemical Spill Cleanup](http://intranet.childrensmn.org/References/labsop/gen/safety/sa/sa-7.06-hazardous-chemical-spill-cleanup.pdf)[SA 10.01 Standard Precautions](http://khan.childrensmn.org/manuals/lab/sop/gen/safety/sa/207671.pdf)[SA 10.02 General Protection Requirements](http://khan.childrensmn.org/manuals/lab/sop/gen/safety/sa/208313.pdf)[SA 10.04 Personal Protective Practices](http://khan.childrensmn.org/manuals/lab/sop/gen/safety/sa/205901.pdf)[SA 11.03 Emergency Eyewashes and Safety Showers](http://khan.childrensmn.org/manuals/lab/sop/gen/safety/sa/208312.pdf)[1067.00 Work Related Injury/Illness Reporting and Management](http://khan.childrensmn.org/manuals/policy/1000/004975.pdf) |
| **References** | 1. OSHA. Occupational Exposure to Hazardous Chemicals in Laboratories standard (29 CFR 1910.1450).
2. CLSI. *Clinical Laboratory Safety; Approved Guideline-Third Edition*. CLSI document GP17-A3. Wayne, PA: Clinical and Laboratory Standards Institute; 2012.
3. OSHA. Laboratory Safety Guidance. 2011.
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| **Historical Record** | **Version** | **Written/Revised by:** | **Effective Date:** | **Summary of Revisions** |
| 1 | Carol Cram | September 1999 | Initial  |
|  | 2 | Kerstin Halverson | 05/21/2004 |  |
|  | 3 | Kerstin Halverson | 08/18/2008 |  |
|  | 4 | Carol Buhl | 06/29/2015 | Reformatted to CMS.Renumbered from 3.3.Added hyperlinks for Employee Incident Report, SLR and Hazardous Chemical Spill Report.Added SDS information.Expanded Chemical Exposure Monitoring section.Added Supporting Documents.Added References. |
|  | 5 | Lab Safety Committee and Carol Buhl | 05/25/2017 | Reconfigured personal injury table.Added GHS labels to Safe Handling Table.Added SA 7.06 Hazardous Chemical Spill Cleanup to Supporting Documents. |
|  | 6 | Andrew Fangel | 07/31/2020 | Updated guidelines for lab coat usage outside of the laboratory.Clarified: store concentrated acids and bases separately. Flammables: Up to 2 gallons of Class I, II and IIIA liquids may be stored outside of fire-resistant cabinets for each 100 ft2. Modified “Safety Officer” to Safety Manager”. Updated hyperlinks.Reformatted. |