

**UNIVERSITY OF ROCHESTER**

**STRONG MEMORIAL HOSPITAL**

**HAZARD COMMUNICATION**

**PROGRAM MANUAL**

**(This program also includes hazardous drugs)**

Prepared by:

UNIVERSITY OF ROCHESTER  
Environmental Health & Safety Department  
(Revised 2022)

# **TABLE OF CONTENTS**

	<u>Page #</u>
INTRODUCTION	1
SECTION 1 REQUIREMENTS AND RESPONSIBILITIES	
I.    REQUIREMENTS	2
II.   RESPONSIBILITIES	5
III.  RECORDS	6
IV.  MULTI-EMPLOYER WORKPLACE	6
SECTION 2 REQUIRED EMPLOYEE INFORMATION AND TRAINING	
I.    TRAINING	7
II.   READING AND INTERPRETING SDS AND LABELS	8
III.  LIMITING CHEMICAL EXPOSURES	11
SECTION 3 CHEMICALS, HAZARDS AND EMERGENCY RESPONSE	
I.    EXPOSURES LEVELS	13
II.   MEDICAL CONSULTATIONS AND EXAMINATIONS	13
III.  SPILL CONTROL	15
IV.  COMMON CHEMICALS	16
CLOSING COMMENTS	21
<u>APPENDICES</u>	
1.    CHEMICAL INVENTORY FORM	22
2.    GHS PICTOGRAMS	23

## **INTRODUCTION**

This manual is designed to inform nursing and other medical care staff about the Occupational Safety and Health Administration's (OSHA's) Hazard Communication Standard (HazCom) 29 CFR [1910.1200](#) and The University of Rochester Hazard Communication Program. Nursing staff and others need to read this program and become familiar with its contents. Clinical personnel should use this document to gain a better understanding of the hazards associated with chemicals / hazardous drugs used in the workplace and appropriate protective measures.

Hazardous chemicals include those regulated in 29 CFR 1910, Subpart Z, and any chemical meeting the definition of a hazardous chemical as set forth in OSHA's HazCom Standard. Hazardous drugs in a form which can present an exposure hazard to hospital personnel are also included in the definition of hazardous chemicals. Hazardous drugs which present either an inhalation or skin absorption hazard meet this definition. For the remainder of this document, the term hazardous chemicals will also include drugs that meet these criteria.

The U of R's HazCom Program is designed to comply with OSHA's HazCom Standard. The program defines responsibilities, communicates information concerning hazards, defines and communicates appropriate protective measures for employees. It is the policy of the University to provide an environment free from recognized hazards that could cause injury or illness. To this end, employees may not be exposed at or above the OSHA Permissible Exposure Limits (PEL), as described in Section 3. Also any personal protective equipment (PPE) to help prevent chemical exposures or needed for the performance of a job function is provided by the department at no cost to the employee. Working with any chemical involves a degree of risk. Through the use of all components of the HazCom Program, employees can work to minimize exposures.

This document is divided into three sections.

- Section I outlines the specific requirements of the standard and the manner in which the University is complying with the regulations.
- Section II focuses on required employee training information.
- Section III provides a summary of the hazards associated with some of the chemicals most commonly encountered by medical staff and emergency response actions to take in the event of a spill or exposure to a chemical agent.

Any questions on the HazCom Program or its implementation should be referred to the Occupational Safety Unit of Environmental Health and Safety (EH&S) at 275-3241.

## **SECTION 1: REQUIREMENTS AND RESPONSIBILITIES**

### **I. SCOPE AND REQUIREMENTS:**

The following are the requirements of the Hazard Communication Standard.

**A. Scope:** The Hazard Communication Standard (HazCom) applies to all employees who work in locations where hazardous chemicals or drugs are known to be present in such a manner as employees may be exposed under normal conditions of use or in a foreseeable emergency. Those employees working in laboratories are covered under another OSHA standard, "Occupational Exposure to Hazardous Chemicals in Laboratories", 29 CFR 1910.1450.

**B. Applicable Chemicals:** The standard applies to all chemicals or hazardous drugs, which are defined as hazardous by the standard and are used in the workplace in a manner in which employees may be exposed to the chemicals or drugs under conditions of use or foreseeable emergencies.

### **C. Requirements:**

**1. Written Program:** The employer is required to develop and maintain a written Hazard Communication Program, which describes how the requirements of the Standard will be met. This document is designated as the written program. A copy of this manual can be found on the University's EH&S web site [UofR: EHS: Occupational Safety: Hazard Communication Program \(rochester.edu\)](http://UofR:EHS:Occupational Safety: Hazard Communication Program (rochester.edu))

**2. Chemical Inventory:** The employer is required to compile a list of the hazardous chemicals present in the workplace along with corresponding Safety Data Sheets (SDSs, formerly known as MSDSs). All employees must have access to this information during their work shifts. A suggested chemical inventory form to compile the information is available in Appendix 1. Within Strong Memorial Hospital, all departments who are responsible for bringing chemicals onsite are responsible for maintaining department specific chemical inventories with corresponding Safety Data Sheets. For example, Hospital Stores, Facilities, Materials Processing, the Pharmacy and Environmental Services all maintain department specific chemical inventories. Due to the integrated nature of Patient Care Units (i.e., staff and chemicals from various SMH departments) the following procedure will apply:

- A centralized chemical inventory/SDS system will be maintained by EH&S. This system, called Chematix, is networked to provide ready access to the inventories and SDSs. EHS will instruct Departments/Units how to modify their inventories (contact EH&S at x5-3241 for this assistance).
- Patient Care Units that procure chemicals outside of SMH departments must maintain their chemical inventory as listed in the previous entry.
- EHS is available to assist all SMH staff with locating SDSs by calling 275-3241.
- Emergency information for exposures to chemicals is available 24/7 by calling the Poison Control Center at 1-800-222-1222.

**3. Labels:** All containers of hazardous chemicals must be labeled with the following information:

- Identity of the hazardous chemical(s)
- Signal Word
- Hazard Statement(s)
- Precautionary Statement(s)
- Pictogram(s)
- Name / Address of the chemical manufacturer, importer or other responsible party

Exceptions to this rule include:

- Containers in which chemicals are transferred from a labeled container for **immediate** use by the employee performing the transfer; and,
- Alternatives to labels may also be used such as signs, placards, process sheets, operating procedures or other written materials instead of affixing labels to individual stationary process containers as long as the alternatives contain the required labeling information.
- Secondary container labels must include at least the product identifier and hazard warnings.

**4. Training:** Employers (supervisors) are required to provide information and training to employees on this standard and the hazards of the chemicals used in the workplace.

## **II. RESPONSIBILITIES**

Responsibility for implementing the HazCom Program resides with each department where hazardous chemicals are utilized in a non-laboratory setting. The responsibility for implementing and fulfilling the mandates of the HazCom Program are as follows:

**A. Supervisors** have primary responsibility for:

1. Informing and training employees on potential hazards associated with the chemicals in their work area, and when new chemical hazards are introduced;
2. Supervising employees in the implementation of engineering controls, safe work practices, and Personal Protective Equipment (PPE) used to reduce potential exposure to the lowest practical level;
3. Investigating and reporting incidents relating to the use of hazardous chemicals;
4. Selecting chemicals, supervising the use and disposal of chemicals, and maintaining access to a current chemical inventory, and availability of SDS of hazardous chemicals for all work locations under their direction; and,
5. Ensure direct reports complete mandatory in-service training annually, which includes a HazCom module.

**B. Employees** responsibilities include:

1. Awareness of the hazards associated with the chemicals used and the methods of reducing exposures;

2. Planning and using chemicals in accordance with established safe work practices and protocols;
3. Using all of the PPE required for working with a chemical;
4. Disposing of chemicals in an appropriate manner;
5. Reporting unsafe conditions to their supervisor;
6. Reporting incidents of hazardous chemical exposure to their supervisor; and
7. Attending training as required under this standard.

### **III. RECORDS**

- A. Chemical inventories will be maintained by each department. Eventually all inventories will be maintained in the University's Chemical Inventory/ SDS System, Chematix. A link to Chematix may be found at: [http://www.safety.rochester.edu/labsafety/chematix\\_intro.html](http://www.safety.rochester.edu/labsafety/chematix_intro.html).
- B. Attendance records of HazCom training sessions conducted by department supervisors are to be retained in employee files, in an office training file, or electronically (i.e. MyPath transcript).
- C. Injuries or chemical exposures will be documented electronically through the Employee Incident/Injury Reporting System found on the web at <http://www.safety.rochester.edu/SMH115.html>.
- D. Medical records will be retained as established by University protocol.

### **IV. MULTI-EMPLOYER WORKPLACE**

EH&S will provide an inventory of the chemicals and a copy of the SDSs to outside contractors for those hazardous chemicals used by the university in the immediate work/construction area.

Outside contractors are required to have a SDS for any hazardous chemical brought onto University property and have them readily available to their employees and to the University. Contractors using particularly hazardous materials (based on flammability, toxicity or stench odor) must receive EH&S approval prior to use.

## **SECTION 2: REQUIRED EMPLOYEE INFORMATION & TRAINING**

The OSHA Hazard Communication Standard requires that employees be informed of the requirements of the Standard, the location of the written Hazard Communication Plan, operations in the workplace involving hazardous chemicals or drugs, lists of hazardous chemicals / drugs used in the workplace and the location of SDSs for these agents. Review of this program and completion of the attendance sheet and quiz meets the minimum requirement for awareness training. The supervisor must provide documented site-specific training to all staff on the chemicals and drugs used in the work area.

The University's Written Hazard Communication Plan is available from EH&S (x5-3241) and through the web at <http://www.safety.rochester.edu/ih/hazcom/hazcomindex.html>.

### **I. TRAINING**

#### **A. Required Training and Frequency of Training**

The University provides employees with information and training to ensure they are mindful of the hazards of chemicals present in their work area. Awareness Training is made available at New Hire Orientation before the employee's initial work assignment begins and is part of annual mandatory in-service training. Also, there is a HazCom general training module on MyPath (EHS Hazard Communication & Global Harmonization). Site-specific training must be provided at the initial job assignment by the employee's supervisor. Upon request, EH&S can provide additional training in those departments where special hazards have been identified.

Environmental Health & Safety (EH&S) can provide reference and/or electronic materials to assist the supervisor in training for site specific chemicals or procedures that may introduce a risk to the employees.

Upon request, SMH Pharmacy is also available to provide information on hazardous drugs.

Retraining is required when a new hazard is introduced in a work area. Supervisors may request the assistance of EH&S with information or materials, if desired. Documentation of site specific hazards, special hazards, new hazards or changed hazards will be maintained by the employee's department.

#### **B. Purpose and Content of Training**

The purpose of Hazard Communication training is to inform individuals of the risks and hazards associated with chemical or hazardous drug handling and what to do if an emergency occurs. General awareness training consists of an overview of:

1. The existence of the HazCom program and its requirements;
2. How to read and understand the material found on a SDS;
3. Methods to minimize employee exposure to hazardous chemicals;
4. Signs and symptoms associated with exposure to hazardous chemicals;
5. Location and availability of known reference materials, including SDS, outlining the hazards, safe handling, storage, and disposal of hazardous chemicals;
6. Proper use and limitations of personal protective equipment (PPE);
7. Proper use of emergency equipment and the limitations of safety equipment; and,
8. Emergency procedures to follow in the event of a chemical spill.

**Site-specific training needs to be provided by the supervisor at the employee's initial job assignment. Continuing employee training for special hazards in an employee's work area will be the responsibility of the supervisor.**

## **II. READING AND INTERPRETING SDSs & LABELS**

The two key written materials that convey information on the hazards of chemicals are Safety Data Sheets (SDSs) and labels. The Hazard Communication Standard requires that SDSs be available for all hazardous chemicals and that all containers of these chemicals be labeled. This section gives valuable information on what to expect and how to use the information on SDSs.

### **A. Safety Data Sheets (SDSs)**

A copy of the Safety Data Sheet (SDS) must be readily available for all chemicals used. SDSs are sent by the manufacturer/supplier for the first order of the chemical.

Departments must maintain department-specific chemical inventories and their SDSs. On line access to department inventories will be maintained in Chematix at [http://www.safety.rochester.edu/labsafety/chematix\\_intro.html](http://www.safety.rochester.edu/labsafety/chematix_intro.html). Departments will be responsible for providing EH&S with their initial inventory which is utilized to populate Chematix. Thereafter, it will be the responsibility of the department to maintain a current inventory. Any staff member may request a copy of any SDS from the applicable department, by calling EH&S at 275-3241 or 24/7 by calling the Poison Control Center at 1-800-222-1222.

Patient Care Areas which order chemical products outside of SMH departments will maintain an inventory of the chemical products from outside vendors along with copies of the Safety Data Sheets.

The 2012 update to the Hazard Communication Standard requires that by June 1, 2015 all Safety Data Sheets follow a standard 16-section format:



- **Section 1, Identification** includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.
- **Section 2, Hazard(s) identification** includes all hazards regarding the chemical; required label elements.
- **Section 3, Composition/information on ingredients** includes information on chemical ingredients; trade secret claims.
- **Section 4, First-aid measures** includes important symptoms/ effects, acute, delayed; required treatment.
- **Section 5, Fire-fighting measures** lists suitable extinguishing techniques, equipment; chemical hazards from fire.
- **Section 6, Accidental release measures** lists emergency procedures; protective equipment; proper methods of containment and cleanup.
- **Section 7, Handling and storage** lists precautions for safe handling and storage, including incompatibilities.
- **Section 8, Exposure controls/personal protection** lists OSHA's Permissible Exposure Limits (PELs); Threshold Limit Values (TLVs); appropriate engineering controls; personal protective equipment (PPE).
- **Section 9, Physical and chemical properties** lists the chemical's characteristics.
- **Section 10, Stability and reactivity** lists chemical stability and possibility of hazardous reactions.
- **Section 11, Toxicological information** includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.
- **Section 12, Ecological information\*** provides information to evaluate the environmental impact of the chemical(s) if it were released to the environment.
- **Section 13, Disposal considerations\*** provides guidance on proper disposal practices, recycling or reclamation of the chemical(s) or its container, and safe handling practices. To minimize exposure, this section should also refer the reader to Section 8 (Exposure Controls/Personal Protection) of the SDS.
- **Section 14, Transport information\*** provides guidance on classification information for shipping and transporting of hazardous chemical(s) by road, air, rail, or sea.
- **Section 15, Regulatory information\*** identifies the safety, health, and environmental regulations specific for the product that is not indicated anywhere else on the SDS.
- **Section 16, Other information** includes the date of preparation or last revision.

**\*Note:** Since other Agencies regulate this information, OSHA will not be enforcing Sections 12 through 15(29 CFR 1910.1200(g)(2)).

## **B. Labels and Signs**

The hazard and precautionary statements on the label outline the appropriate measures to be taken in case of an emergency and gives the main hazard(s) associated with the use of the chemical. If a label is missing from a container in which the chemical can be properly identified, a new label shall be affixed containing the appropriate information. Never mix chemicals that do not have proper labels. Never assume an unlabeled container is harmless. Also, never remove any label unless you immediately replace it with a new label containing the information from the previous label. Labels are an important first source of information on the chemicals used in the workplace. Labels can be seen as a condensed version of a SDS. The 2012 revision of the HazCom Standard requires that by June 1, 2015, all chemical container labels contain six standard elements:

- **Name, Address and Telephone number of the manufacturer, importer or other responsible party**
- **Product Identifier** - The same identifier must be on both the label and Sec. 1 of the SDS
- **Signal Word** - “Warning” (less severe) or “Danger” (more severe)
- **Hazard Statement(s)** - Describe the nature of the hazard, including, where appropriate, the degree of hazard
- **Precautionary Statement(s)** - Describe recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to the hazardous chemical or improper storage or handling
- **Pictograms** - Graphic symbols used to communicate specific information about the hazards of a chemical

### **A description of the HazCom pictograms can be found in Appendix 2**

- All purchased chemicals and solutions must be labeled with the required 6 elements.
- In-house prepared solutions that will remain within SMH must have identity labels showing:
  - The identity of the hazardous chemical(s) with proper names
  - Appropriate hazard warnings such as FLAMMABLE or CORROSIVE, etc.
- Product labels and DOT shipping labels must be retained on all bulk quantities of chemicals.
- Signs indicating the location of safety showers and eyewash stations, and other safety and first aid equipment are required.
- Warning signs are required in areas or on equipment where special or unusual hazards exist.

### **III. LIMITING CHEMICAL EXPOSURES**

Four main methods exist to control exposure: substitution, engineering controls, safe work practices, and personal protective equipment (PPE). Actions made when procuring, storing, and disposing of chemicals can limit exposures.

#### **A. Substitution / Engineering Controls**

Substitutions with less hazardous chemicals, followed by engineering controls are the preferred methods of reducing exposure. Engineering controls should be used whenever the chemical hazard information on the chemical label or the SDS indicates a need. A common need for engineering controls is indicated when an SDS states “use local exhaust.” Examples of engineering controls include, isolating the chemical by using isolation rooms or using remote equipment, and using special local ventilation, such as a chemical fume hood.

#### **B. Safe Work Practices**

Safe work practices offer another method to reduce exposure after the use of engineering controls. SDS and chemical labels should be reviewed for specific work practice instructions before using chemicals. Additional safe work practices include not working alone, keeping chemical containers covered when possible, washing hands after using chemicals, and reducing the amount of chemicals used or stored.

#### **C. Personal Protective Equipment (PPE)**

PPE should be used in addition to, but not as a substitute, for engineering controls and safe work practices to reduce exposure. PPE may consist of respiratory protection, eye protection, face protection, gloves, hearing protection, and protective clothing. SDSs and chemical labels contain specific information on the proper PPE needed. When PPE is selected, its use shall be in accordance with OSHA standard 29 CFR 1910 subpart I, sections 132-139, and in consultation with the manufacturer.

Personnel must wear PPE to help prevent chemical exposures. The [EH&S Personal Protective Equipment Program](#) has more detail on requirements regarding PPE use and selection. The [UofR: EH&S: Respiratory Protection Program document](#) also has information regarding the respirator program requirements. Adequate PPE needed for the performance of an employee’s job function is to be provided by the supervisor at no cost to the employee.

#### **D. Chemical Procurement, Distribution, Storage and Disposal**

##### **1. Procurement**

- a. Before a substance is used, a SDS with information on proper handling, storage, and disposal shall be obtained and made available for those

who will be using the substance. No container is to be accepted without an adequate identifying label. Manufacturers' labels are not to be defaced or removed.

- b. Whenever possible, supervisors should consider using alternative chemicals for very hazardous chemicals.
- c. To reduce future wastes, purchase only those quantities necessary.

## 2. Distribution

When chemicals are transported by hand or cart, the container should be placed within a second, larger container or bucket.

## 3. Storage

- a. Periodic inventories must be conducted. An example of a chemical inventory sheet is located in Appendix 1. Updated information is to be entered into the University's Chemical Inventory / SDS System. The Environmental Compliance / Hazardous Waste Unit, (275-2056) must be consulted before disposal of unneeded or excess items. A visual inspection for replacement, deterioration, and of container integrity should be performed when inventories are updated annually.
- b. Chemicals must be stored correctly. Consult the SDS and product labels for recommended storage procedures. Manufacturers should be consulted for additional storage recommendations.

## 4. Disposal

- a. All hazardous waste generated shall be disposed of in accordance with local, state and federal regulations. The Environmental Compliance / Hazardous Waste Unit shall be contacted for guidance on the disposal of any chemical waste.
- b. Training on the proper disposal of hazardous waste is available by contacting the Environmental Compliance / Hazardous Waste Management Unit (275-2056). The EH&S website has the [University of Rochester Management of Hazardous Materials and Waste Guide](#) available for reference.

## **SECTION 3: CHEMICALS - HAZARDS AND EMERGENCY RESPONSE**

### **I. EXPOSURE LEVELS**

Minimizing exposures to chemicals is important to worker safety. Consulting the SDS can provide valuable information on preventing exposures to chemicals. Adverse effects from chemical exposures can lead to long-term health effects. Exposures to chemicals are described in many ways. Acute or short term, exposures are exposures that occur over a very short period of time, usually less than 15 minutes. Chronic, or long-term, exposures occur over a long period of time, usually weeks or years.

OSHA regulates the amount of a chemical an employee can be exposed to via the inhalation route. OSHA's Permissible Exposure Limit (PEL) for a chemical is a legal regulatory limit of airborne exposure, averaged over an 8-hour work period which cannot be exceeded. Short Term Exposure Limits (STEL's) are 15-minute time-weighted average (TWA) airborne limits. STELs are typically defined for chemicals that have fast-acting acute effects.

The American Conference of Governmental Industrial Hygienist (ACGIH) publishes a list of Threshold Limit Values (TLV's) for chemicals. The TLVs are widely recognized guidelines to assist in the control of health hazards intended to be used in the practice of industrial hygiene. The TLV for a chemical is the 8-hr TWA airborne concentration of a chemical that is thought most people can be exposed to, day after day, over a working lifetime, without adverse health effects.

Methods of detecting chemicals can include:

- Monitoring by the employer
- Continuous monitoring devices
- Observation of the chemical's appearance, odor, or other physical characteristics.

### **II. MEDICAL CONSULTATIONS AND EXAMINATIONS**

Medical consultations and examinations are available for chemical or drug exposures from the University Health Service (UHS) or Employee Health Services. In the event of a serious injury or an after hour's emergency, care is available from Strong Memorial Hospital's Emergency Department. All required medical examinations and consultations are performed by, and under the direct supervision of, a licensed physician and are provided without cost to the employee.

#### **A. Consultations**

**Consultations and medical examinations for work-related illnesses, injuries, and exposures are made available under the following circumstances:**

1. When an employee develops signs or symptoms associated with a hazardous chemical to which he/she may have been exposed;

2. Where exposure monitoring reveals any exposure levels routinely above the OSHA Action Level (AL) or Permissible Exposure Limit (PEL) for which there are exposure monitoring and medical surveillance requirements
3. Whenever an unusual event takes place in the work area such as a spill, leak, explosion, or other occurrence resulting in the likelihood of an exposure above the PEL.

## **B. Chemical Exposures**

- When an employee believes they might have a potential chemical, hazardous/infectious exposure they are to immediately report their findings/ incident to their supervisor.
- The employee will seek immediate medical attention if required, Between 8:00 AM and 4:30 PM, phone UHS (x51164). The employee should bring the full name of the chemical exposed to and, if possible, a copy of the Safety Data Sheet (SDS), to the medical provider.
- Between 4:30 PM and 8:00 AM, or for an and serious situation at anytime, call x13 (Public Safety Dispatch) and request a MERT Response.
- Depending on the severity, the supervisor will notify their department head.
- The department head will notify EH&S and/or IP to complete a risk assessment. The risk assessment will be reviewed with the department head and employee. If there is a potential for a high risk exposure or multiple employee concerns identified the department head will notify senior management and the Exposure Control Team.
- Regardless if the risk is high or low, the employee needs to complete an [UNIVERSITY OF ROCHESTER EMPLOYEE INCIDENT REPORT FORM](#).

## **C. Pre-placement Assessments**

Specific groups of employees receive pre-placement health assessments and annual reassessments through Employee Health Services.

## **D. Special Programs**

Special medical surveillance programs are provided when indicated by a department's or division's unique needs and are available through Employee Health Services. The department can call Employee Health at 585-487-1000 for department charges and other information.

### III. SPILL CONTROL

Preplanning for a spill response saves time and minimizes hazards. Small spills are those spills, which by their small volume or low toxicity, are not deemed to present a health hazard to trained chemical users. Small chemical spills are to be cleaned up immediately by the chemical user. Some spills can create slippery conditions that can lead to additional hazards. The appropriate PPE must be worn when cleaning these spills to help prevent exposures.

Some hazardous substances necessitate special clean-up procedures to minimize hazards to clean-up personnel. Major spills are those spills, which by their large volume or high toxicity present a health hazard under normal conditions. Clean up of these spills should not be attempted by employees.

#### A. Spill Emergency Plan

1. Emergency preplanning to be followed before working with hazardous chemicals:
  - a. Determine the potential location of releases.
  - b. Determine the quantities of material that may be released.
  - c. Know the chemical and physical properties of the material (physical state, vapor pressure, air or water reactivity).
  - d. Know the material's hazardous properties (toxicity, corrosivity, flammability).
  - e. Have the required PPE and spill kits available.
2. In the event of a **small spill**, the following general procedures are to be followed:
  - a. Attend to any persons who may have been contaminated. If personal exposure may have occurred, have the person use the emergency eye wash station or safety shower. Direct the person to UHS or Employee Health Services if medical assistance is needed.
  - b. Notify persons in the immediate area of the spill.
  - c. Close the door.
  - d. Avoid breathing vapors of the spilled material.
  - e. Leave any local exhaust ventilation on.
  - f. Secure supplies to affect clean-up.
  - g. During clean-up, wear the appropriate PPE.
  - h. Place the collected waste in an appropriate container for disposal.
3. In the event of a **major spill**, the following procedures are to be followed:
  - a. Attend to any persons who may have been contaminated. If a personal exposure may have occurred, have the person use the eye wash station or safety shower.
  - b. Alert others in the immediate area of the spill. Evacuate personnel from the area.
  - c. Confine the fumes/vapors from the spill by closing the door to the room where the spill occurred.

- d. Contact Public Safety (x13) from a safe location and provide information on the spilled material (what spilled, quantity, location of the spill, etc.)
- e. Be available for the emergency spill response personnel to provide information concerning the spill and other hazards that may be present in the spill area.

#### **IV. COMMON CHEMICALS / HAZARDOUS DRUGS**

This section is designed to provide information of common chemicals used by medical staff in a clinical setting. This section might not include all chemicals used in specialty medical areas but it is designed to cover the majority of chemicals encountered. Those chemicals used that are not listed need to be reviewed by the supervisor so the hazards and means of protection can be established and explained to the employees.

Some chemicals in this section present potential reproductive hazards to personnel working with them. The [University's Reproductive Policy](#) should be consulted prior to the use of these chemicals.

Radionuclides, including radioactive iodine and implanted radioactive seeds, are not covered under this program. Contact the Radiation Safety Unit at 275-3781, for information on the hazards and safety precautions for these materials.

##### **A. Chemicals common to medical care personnel**

The chemicals and chemical groups medical staff most commonly comes in contact with are the following:

- Antineoplastic (chemotherapeutic) Agents
- Disinfecting Agents
- Housekeeping Chemicals
- Anesthetic Gases
- Compressed Gases
- Mercury (elemental)
- Isopropyl Alcohol
- Formaldehyde
- Prescription Drugs (liquid forms)
- Pentamidine
- Ribavirin

Information on chemicals/groups can be found in the University's Chemical Inventory/SDS System: [MSDSOnline](#) or the manufacturer's website. A brief summary of the chemicals/groups follows:



## 1. Antineoplastic Agents

Strong Memorial Hospital Policy 7.10 entitled **Hazardous Drug Agent Handling Policy** can be found in the SMH Policy Manual. This policy is designed to inform nurses and other staff on the precautions and safe handling procedures necessary to properly administer these agents. The policy has information regarding the routine use, administration, clean-up of spills, and disposal of excreta from patients being treated with these agents. The policy covers all antineoplastic agents used at SMH.

## 2. Disinfecting Agents

**Disinfecting Agents** are used by employees to disinfect instruments, contaminated surfaces and other items to prevent the spread of organisms and infection. Some disinfecting agents contain chemicals such as glutaraldehyde, which may have adverse health effects associated with them. High Level Disinfectants (HLD's) containing chemicals such as aldehydes (e.g. glutaraldehyde, o-phthalaldehyde), should be used in well-ventilated areas. These areas must be pre-approved by Infection Prevention and EH&S. The potential for skin contact or breathing vapors should be minimized.

When performing duties with the potential of creating splashes or sprays, proper eye protection must be worn to prevent eye contact with the chemicals. Appropriate gloves and gowns / lab coats must be used to minimize dermal exposures. Disinfecting agents should be sprayed onto a cloth whenever possible instead of spraying directly on surfaces to minimize the amount of chemical aerosolized.

## 3. Housekeeping Chemicals

**Housekeeping Chemicals** are used by staff for spot cleaning or by Environmental Services, or Patient Care Technicians. Environmental Services maintains SDSs for all of the chemicals they use in SMH. In general, the majority of chemicals used by Environmental Services are low hazard. Gloves are to be used to prevent dermal exposure. For those tasks where the risk of eye exposure is possible, safety glasses, goggles, or a face shield is required. The most hazardous chemicals, such as floor strippers, are used infrequently and require special precautions.

## 4. Anesthetic Gases

**Anesthetic Gases** can be found in the operating rooms, labor & delivery, emergency department, outpatient clinics, dental surgery, and recovery rooms and may be found much less frequently in other areas. Anesthetic gases used include nitrous oxide, halothane, sevoflurane, and isoflurane.

Anesthetic gases can be released and cause exposures by the following pathways: during hook-up and check-out of the system, gas seeping out of a patient's mask which does not fit properly, leaks in hoses fittings and other parts of the delivery system, gas escaping from scavenging systems (designed to capture excess and exhaled gas), and when a post-operative patient exhales gas into the room. The hazards associated with exposure to anesthetic gases are listed below.

a. **Nitrous Oxide**

Acute exposure by inhalation to high concentrations of nitrous oxide can cause central nervous system depression, drowsiness, lightheadedness, confusion, hysteria, anesthesia and unconsciousness. Chronic occupational exposure has been linked to neurologic problems, bone marrow depression, and kidney and liver disorders. Spontaneous abortions and fetal malformations have been reported in dentists and their assistants and linked to Nitrous Oxide exposure. Skin and eye exposure with liquid nitrous oxide can cause frostbite.

b. **Halogenated Anesthetic Gases**

These gases include Halothane, Sevoflurane, and Isoflurane. Acute exposure to these gases can cause respiratory depression, muscle relaxation and central nervous system effects including stupor, delayed response time and loss of consciousness. Waste anesthetic gases are considered chronic low-level health hazards. Suspected health effects include hepatic and renal diseases. Studies of health care workers have linked exposure to waste anesthetic gases with spontaneous abortions, fetal malformations, infertility and sterility when scavenging systems were not in use.

5. **Compressed Gases/ Cryogenic Gases**

Compressed Gases, including cryogenic gases, can present both a physical and health hazard to personnel. Regardless of the chemical composition of the compressed gas, any cylinder or other container with pressurized contents presents a significant physical hazard if the gas is released uncontrollably. Read the label of the compressed gas cylinder to determine the contents and the possible health hazard it may present to you (e.g. simple asphyxiant, central nervous system depressant, corrosive, etc.).

Cylinders also present a hazard to ankles, feet and toes when they are dropped or tipped over. All cylinders shall be fastened to a sturdy object with straps, chains or other devices. Two points of contact is preferred. All cylinders not being used are required to have a protective cap covering the cylinder valve. There is a training module on MyPath: EHS Compressed Gas Cylinder Training for Medical Care Personnel.

6. **Mercury**

**Elemental Mercury** or silver mercury can be found in many types of medical care equipment including thermometers, Cantor tubes, Coulter counters and sphygmomanometers. **Although most mercury containing items are no**

**longer used at SMH, some isolated locations may still be using them because of special needs.**

Mercury is an odorless chemical that generates vapors at room temperature. The main route of mercury exposure is the inhalation of mercury vapors. Skin contact and ingestion of elemental mercury should also be avoided. Short-term exposure to high levels of mercury can cause severe respiratory irritation, digestive disturbances and renal damage. The health hazards associated with chronic exposure to relatively low levels of mercury vapor are significant and include central nervous systems effects, tremors, irritability, emotional instability, gingivitis, anorexia and weight loss. Mercury is also nephrotoxic and can cause sensitization dermatitis. Care should be taken to avoid exposure to mercury vapors and keep all areas free of mercury contamination.

The proper clean up and disposal of mercury in the event of a spill is outlined in the "20.10 Disposal of Mercury and Batteries" on PolicyStat. Nurses are responsible for the clean-up of broken thermometers following the guidelines listed in the document. The amount of mercury in a thermometer is not enough to cause adverse health effects but must be properly cleaned up. Larger spills or releases of mercury such as a blood pressure manometer or a cantor tube are cleaned-up by emergency responders. Upon recognition of a broken manometer or other large source of mercury the nurse should relocate patient (if possible) and contact Public Safety (x13) for response by the University Spill Team. Quick response and clean up by properly trained staff limits the exposure to mercury vapors and prevents lingering problems of contamination. EH&S' Occupational Safety Unit monitors mercury vapor levels in areas where spills of "mercury" manometers occur to verify the clean-up procedures removed all the mercury released from the spill. Consult the [EH&S Mercury Spill Cleanup Procedures](#) for more information.

## 7. **Isopropyl Alcohol**

**Isopropyl Alcohol** is commonly used in medical applications as both an antiseptic and a disinfectant. In addition to being flammable, isopropyl alcohol can cause irritation to the eyes, nose and throat. It can cause defatting of the skin, which leads to irritation, drying and cracking. Contact dermatitis has also been noted. Exposure to high concentrations has a narcotic effect with symptoms of drowsiness, headache, staggering and unconsciousness.

## 8. **Formaldehyde and Formalin Solutions**

**Formaldehyde and Formalin Solutions** are used in some patient care areas to fix tissue samples. Formaldehyde is prepared in aqueous solutions ranging in concentration up to 37%. Formaldehyde is considered a carcinogen by OSHA, NTP, IARC and ACGIH. A number of cancers have been associated

with exposure to formaldehyde. However, the strongest associations found concern nasal and nasopharyngeal cancer. Chronic exposure can result in lung cancer or reproductive effects.

Acute exposure to formaldehyde can cause severe irritation of the skin, throat and nose. High levels can cause tissue damage and severe respiratory tract injury. Formaldehyde is also a pulmonary sensitizer. Specimen containers containing formaldehyde solutions should be handled carefully. Proper protective equipment should be worn and proper ventilation is required when there is a potential for exposure. In the event of a spill of a specimen container, soak up the spilled liquid with paper towels and place the debris in a sealed container for disposal as hazardous waste.

EH&S has a written [Formaldehyde Program](#) and a [Formaldehyde Spill Cleanup Protocol for Patient Care locations](#).

## 9. Prescription Drugs

**Prescription drugs** and other pharmaceutical agents in a liquid form can present an opportunity for chemical exposure. Prescription drugs in solid form can present a potential for exposure if the materials are cut, crushed, or powdered. The hazards to personnel vary based on the concentration of the active ingredient and the route of exposure. The SDS for these liquid chemical agents and those agents that may be crushed or powdered must be made available in accordance with the OSHA Hazard Communication Standard and are available from the SMH Pharmacy.

## 10. Pentamidine

**Pentamidine** is a drug that is administered primarily in aerosol form to patients being treated for *Pneumocystis carinii* pneumonia. Acute irritation has been noted in staff members exposed to the aerosol. Staff members administering Pentamidine should make efforts to minimize the release of aerosolized Pentamidine and limit the amount of time spent in the room where the drug is administered. Refer to the SMH's Pentamidine Policy, available on the web and SMH Policy Manual.

The chronic health effects and reproductive effects are unknown at this time so care should be taken to minimize exposure to the drug.

## 11. Ribavirin (Virazole)

**Ribavirin** is a drug used in aerosol form to treat lower respiratory tract infections caused by respiratory syncytial virus (RSV), and other diseases. Refer to the SMH Ribavirin Policy on Sharepoint, for the proper administration of Ribavirin and precautions that are to be observed.

Health care workers treating patients with Ribavirin in aerosolized form, without respiratory protection for a prolonged period, have complained of severe headache, eye irritation, coughing and upper respiratory tract irritation. Lung irritation, wheezing and shortness of breath has been noted in people with asthma. Ribavirin has also been found to be teratogenic and/or embryo lethal in studies on rodents. Currently there is no data on reproductive effects in humans. Pregnant employees or employees planning pregnancy should use the recommended procedures and personal protective equipment to limit exposure.

## **CLOSING COMMENTS**

Information on chemicals is readily available to personnel through the University's Chemical Inventory / SDS System, Chematix. Product labels and SDSs contain valuable information on using chemicals safely, first aid and emergency procedures. In the event of a spill, call Public Safety at x13 and request the assistance of the University Chemical Spill Team. Should an exposure occur, personnel are to use the appropriate first aid. The Poison Control Center (800-222-1222) can provide useful information for further medical treatment that may be needed. Document the exposure by completing an [Employee Incident Report](#).

If this guide raises questions, problems, or if you have suggestions for improvement, please contact Environmental Health & Safety at 275-3241.

APPENDIX 1

**CHEMICAL INVENTORY**

NAME OF CHEMICAL	MANUFACTURER & ADDRESS	STORAGE LOCATION	SDS Available? YES/NO*	Container size	# of containers

NAME of person conducting inventory: \_\_\_\_\_

DATE: \_\_\_\_\_

List chemical whenever a new is introduced in the workplace










\* IF SDS NOT AVAILABLE, OBTAIN FROM MANUFACTURER / SUPPLIER

## Appendix 2

# Hazard Communication Standard Pictogram

As of June 1, 2015, the Hazard Communication Standard (HCS) will require pictograms on labels to alert users of the chemical hazards to which they may be exposed. Each pictogram consists of a symbol on a white background framed within a red border and represents a distinct hazard(s). The pictogram on the label is determined by the chemical hazard classification.

## HCS Pictograms and Hazards

<h3>Health Hazard</h3>  <ul style="list-style-type: none"> <li>▪ Carcinogen</li> <li>▪ Mutagenicity</li> <li>▪ Reproductive Toxicity</li> <li>▪ Respiratory Sensitizer</li> <li>▪ Target Organ Toxicity</li> <li>▪ Aspiration Toxicity</li> </ul>	<h3>Flame</h3>  <ul style="list-style-type: none"> <li>▪ Flammables</li> <li>▪ Pyrophorics</li> <li>▪ Self-Heating</li> <li>▪ Emits Flammable Gas</li> <li>▪ Self-Reactives</li> <li>▪ Organic Peroxides</li> </ul>	<h3>Exclamation Mark</h3>  <ul style="list-style-type: none"> <li>▪ Irritant (skin and eye)</li> <li>▪ Skin Sensitizer</li> <li>▪ Acute Toxicity</li> <li>▪ Narcotic Effects</li> <li>▪ Respiratory Tract Irritant</li> <li>▪ Hazardous to Ozone Layer (Non-Mandatory)</li> </ul>
<h3>Gas Cylinder</h3>  <ul style="list-style-type: none"> <li>▪ Gases Under Pressure</li> </ul>	<h3>Corrosion</h3>  <ul style="list-style-type: none"> <li>▪ Skin Corrosion/Burns</li> <li>▪ Eye Damage</li> <li>▪ Corrosive to Metals</li> </ul>	<h3>Exploding Bomb</h3>  <ul style="list-style-type: none"> <li>▪ Explosives</li> <li>▪ Self-Reactives</li> <li>▪ Organic Peroxides</li> </ul>
<h3>Flame Over Circle</h3>  <ul style="list-style-type: none"> <li>▪ Oxidizers</li> </ul>	<h3>Environment (Non-Mandatory)</h3>  <ul style="list-style-type: none"> <li>▪ Aquatic Toxicity</li> </ul>	<h3>Skull and Crossbones</h3>  <ul style="list-style-type: none"> <li>▪ Acute Toxicity (fatal or toxic)</li> </ul>

For more information:



Occupational  
Safety and  
Health  
Administration

U.S. Department of Labor  
[www.osha.gov](http://www.osha.gov) (800) 321-OSHA (6742)