

**UNIVERSITY OF ROCHESTER**

**STRONG MEMORIAL HOSPITAL**

**HAZARD COMMUNICATION**

**PROGRAM MANUAL**

FOR NURSES and MEDICAL CARE STAFF

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UNIVERSITY OF ROCHESTER'S  
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## **INTRODUCTION**

This manual is designed to instruct nursing and other medical care staff about the Occupational Safety and Health Administration's (OSHA's) Hazard Communication Standard (Haz Comm) 29CFR 1910.1200 and The University of Rochester Hazard Communication Program (Haz Comm). Nursing staff and others need to read this program and become familiar with its contents. Personnel should use this document as an instructional program to gain a better understanding of the hazards associated with chemicals used in the workplace and appropriate protective measures.

It is important to recognize that OSHA's Haz Comm Standard, as with any safety regulation, is designed to protect employees and is part of an overall program to provide a healthy and safe work environment. This standard is a performance-oriented regulation that mandates a program of evaluating potential hazards of chemicals, communicating information concerning hazards, and implementing appropriate protective measures for employees that use hazardous chemicals in a non-laboratory setting. 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 Haz Comm Standard.

The U of R's Haz Comm Program is designed to comply with OSHA's Haz Comm Standard. The program defines responsibilities, evaluates the potential hazards of chemicals and communicates information concerning the hazards and 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 Permissible Exposure Limits (PEL) of OSHA, 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 Haz Comm, employees can work to minimize chemical hazards.

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.

Because of the importance of this standard you may be interviewed during internal audits or by OSHA inspectors to determine if your supervisor is providing you with adequate training. You must be able to show that you have an understanding of the potential dangers of the chemicals in your work place and the means to protect yourself from these hazards. Any questions on the Haz Comm or its implementation should be referred to the Industrial Hygiene Unit of Environmental Health and Safety (EH&S) at x5-3241.

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

### **I. REQUIREMENTS**

The following are the requirements of the Hazard Communication Standard.

- A. **Staff Application:** The Hazard Communication Standard (Haz Com) applies to all employees who use hazardous chemicals. Those employees working in laboratories are covered under another OSHA standard the “Occupational Exposure to Hazardous Chemicals in Laboratories”, 29 CFR 1910.1450.
- B. **Applicable Chemicals:** The standard applies to all chemicals, 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 under conditions of use or foreseeable emergencies.

The standard defines a hazardous chemical as one that has physical hazards and/or health hazards.

Physical hazards include those that can catch on fire or explode and are classified as:

- combustible liquids;
- compressed gases;
- explosives;
- flammables;
- organic peroxides; and
- oxidizers.

Chemicals considered health hazards fall into one of the following categories:

- carcinogen;
- toxic or highly toxic;
- reproductive toxin;
- irritant;
- corrosive;
- sensitizer;
- hepatotoxin;
- nephrotoxin;
- neurotoxin;
- agents affecting the hematopoietic system; and
- agents which damage the lungs, skin, eyes or mucous membranes.

Definitions of these categories can be found in Appendix 1.

- C. **Written Program:** The employer is required to develop and maintain a written Hazard Communication Program, which describes how it will meet the requirements of the Standard. A copy of the University's Written Hazard Communication Program Manual for Nurses and Medical Care staff is found on the University's web site <http://www.safety.rochester.edu/ih/hazcomnurses.html> . Copies of this document are available through Nursing Services.

**D. Chemical Inventory and Material Safety Data Sheets:** The employer is required to compile a list of the hazardous chemicals present in the workplace along with corresponding Material Safety Data Sheets. All employees must have access to this information during their work shifts. A suggested chemical inventory form to compile the information and a sample MSDS are available in Appendixes 2 and 3. Within Strong Memorial Hospital, all departments who are responsible for bringing chemicals onsite are responsible for maintaining department specific chemical inventories with corresponding Material Safety Data Sheets. For example, Hospital Stores, Materials Processing and Environmental Services all maintain department specific chemical inventories. Due to the integrated nature of Patient Care Units (ie, staff and chemicals from various SMH departments) the following procedure will apply:

- A centralized chemical inventory/MSDS system will be maintained by EH&S. This system is networked to provide ready access to the inventories and MSDSs location. Departments/Units may modify their inventories by contacting EH&S at x5-3241.
- 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 MSDSs by calling 275-3241.
- Chemical information is available 24/7 at the Poison Control Center at 275-3232.

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

- the identity of the hazardous chemical(s);
- the appropriate hazard warnings; and,
- the 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 materials contain the required labeling information.

**F. Training:** Employers (supervisors) are also 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 Haz Com resides with each department where hazardous chemicals are utilized in a non-laboratory setting. The responsibility for implementing and fulfilling the mandates of the Haz Com 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. Completing a Job Hazard Assessment to determine the personal protective equipment needed to protect an employee (<http://www.safety.rochester.edu/ih/jhaassess.html>);
3. 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;
4. Investigating and reporting incidents relating to the use of hazardous chemicals;
5. Selecting chemicals, supervising the use and disposal of chemicals, and maintaining access to a current chemical inventory, and availability of MSDS of hazardous chemicals for all work locations under their direction; and,
6. Maintaining training records of all those in the department that have attended training sessions relating to Haz Com.

**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 appropriate PPE required for working with a chemical;
4. Disposing of chemicals in an appropriate manner;
5. Reporting unsafe conditions to their supervisor; and,
6. Reporting incidents of hazardous chemical exposure to their supervisor.

**III. RECORDS**

- A. Chemical inventories will be maintained by each department and maintained in the University's Chemical Inventory/ MSDS System.
- B. Attendance records of Haz Com sessions conducted by department supervisors are to be retained in employee files or in an office training file.
- C. Injuries or chemical exposures will be documented on an SMH115 Incident Report Form available on line 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 MSDSs to outside contractors for those hazardous chemicals used in the immediate work/construction area.

Outside contractors are required to have an MSDS 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, lists of hazardous chemicals used in the workplace and the location of MSDSs for these chemicals. 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 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.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. Site-specific training must be provided at the initial job assignment. EH&S will provide additional periodic training in those departments where special hazards have been identified.

**Documentation of the training provided at New Hire Orientation and other sessions held by EH&S will be maintained by EH&S for a period of up to 5 years. Continuing employee training for special hazards in an employee's work area will be the responsibility of the supervisor.** The IH Unit can provide reference and/or videotape materials to assist the supervisor in training for site specific chemicals or procedures that may introduce a risk to the employees.

Retraining is required when a new hazard is introduced in a work area. Supervisors may request the assistance of EH&S with the periodic retraining for their employees.

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

The purpose of Hazard Communication training is to inform individuals of the risks and hazards associated with chemical use and what to do if an emergency occurs. General awareness training conducted by EH&S consists of an overview of:

1. The existence of the Haz Comm program and its requirements;
2. How to read and understand the material found on an MSDS;
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 MSDS, 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 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 MSDSs & LABELS**

The two key written materials that convey information on the hazards of chemicals are Material Safety Data Sheets (MSDSs) and labels. The Hazard Communication Standard requires that MSDSs 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 MSDSs.

### **A. Material Safety Data Sheets (MSDSs)**

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

Departments must maintain department-specific chemical inventories and their MSDSs. On line access to department inventories will be maintained at [www.safety.rochester.edu](http://www.safety.rochester.edu). Departments will be responsible for providing EHS with annual updates. Any staff member may request a copy of any MSDS from the applicable department.

Patient Care Areas will maintain access to applicable department chemical inventories. In addition, any Patient Care Area which orders chemical products outside of SMH departments will maintain an inventory of the chemical products from outside vendors along with copies of the Material Safety Data Sheets.

Assistance with obtaining MSDSs is available by calling EHS at 275-3241. Chemical information is also available 24/7 by calling the Poison Control Center at 275-3232.

Because the Hazard Communication Standard requires certain information be included on MSDSs but not a rigid format, variation among MSDSs will occur. The following list is a breakdown of the required sections on an MSDS:

**Section I:** Manufacturer Information: Lists the manufacturer's name, address telephone and provides emergency numbers.

**Section II:** Hazardous Ingredients/Identity Information: Provides a listing of the chemicals found in the listed material and the allowable exposure limits.

**Section III:** Physical/Chemical Characteristics: Gives information including the boiling point, solubility, melting point and other technical information of the material.

**Section IV:** Fire and Explosion Hazard Data: Provides the temperature at which

product burns, type of extinguisher needed for fires and other information in case of a fire.

**Section V:** Reactivity Data: Lists chemicals that are not compatible with this material and gives hazard information.

**Section VI:** Health Hazard Data: Lists different ways the chemical can enter body. For each mode of entry, the possible health effects are listed. Specific health effects such as carcinogenicity and reproductive effects are also listed.

**Section VII:** Precautions for Safe Handling and Use: Gives special material handling data and spill procedures.

**Section VIII:** Control Measures: Lists recommendations for PPE and if special ventilation requirements are needed.

Appendix 3 is a blank MSDS which has been filled in with the kind of information that would be found on an actual MSDSs. Any reproductive health hazard information will be listed in the Health Hazard Data Section of the MSDS. Because many chemicals have not been tested for potential reproductive health effects some MSDSs will state that the effects are unknown.

## **B. Labels and Signs**

The hazard warnings on the label outlines the appropriate measures to be taken in the 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 removed on 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 an MSDS. The following information is required to be affixed on all containers of hazardous chemicals:

1. All purchased chemicals, purchased solutions, and in-house prepared solutions must have identity labels showing:
  - The identity of the hazardous chemical(s) with proper names.
  - Appropriate hazard warnings such as FLAMMABLE or CORROSIVE etc.
  - The name/address of the chemical manufacturer, importer or responsible party.
2. Abbreviations are not an acceptable method to identify the contents of a container.
3. Product labels and DOT shipping labels must be retained on all bulk quantities of chemicals.
4. Signs indicating the location of safety showers, eyewash stations, and other safety and first aid equipment are required.

5. Warnings signs are required in areas or on equipment where special or unusual hazards exist.

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

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

#### **A. Engineering Controls**

Engineering controls are the preferred method of reducing exposure. Engineering controls should be used whenever the chemical hazard information on the chemical label or the MSDS indicates a need. A common need for engineering controls is indicated when an MSDS states “use local exhaust.” Examples of engineering controls include switching to a less hazardous chemical, isolating the chemical by using isolation rooms or using remote equipment, and using special local ventilation.

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

Safe work practices offer a second method to reduce exposure after the use of engineering controls. MSDS and chemical labels should be reviewed for specific work practice instructions before using chemicals. Additional safe work practices include not working alone, 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 and face protection, gloves, hearing protection, and protective clothing. MSDS and chemical labels contain specific information on the proper PPE needed. The supervisor is to fill out the most recent edition of EH&S’s PPE Job Hazard Assessment Form, available on line at <http://www.safety.rochester.edu/ih/jhaassess.html>, to assist in the proper selection of PPE. 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. See the University’s Personal Protective Equipment Plan, available through EH&S or the web. Adequate PPE needed for the performance of an employee’s a 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, an MSDS 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 2. Updated information is to be entered into the University's Chemical Inventory / MSDS System. The Hazardous Waste Unit must be consulted before disposal of unneeded or excess items. At least annually a visual inspection for replacement, deterioration, and of container integrity should be performed when inventories are updated.
- b. Chemicals must be stored correctly. Consult the MSDS 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 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. Contact The Hazardous Waste Management Unit (x5-2056) for a copy of the "Learners Guide for Responsible Hazardous Chemical Waste Management" and/or the use of a training video on hazardous waste management.

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

### **I. EXPOSURE LEVELS**

Minimizing exposures to chemicals is important to worker safety. Consulting the MSDS can provide valuable information on preventing exposures to chemicals. Effects from adverse 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. OSHA's Permissible Exposure Limits (PEL's) for a chemical is a legal regulatory limit, time weighted average, which cannot be exceeded over an 8-hour work period. Short Term Exposure Limits (STEL's) are limits that cannot be exceeded for more than 15 minutes.

The American Congress of Governmental Industrial Hygienist (ACGIH) publishes a list of Threshold Limit Values (TLV's) for chemicals. The TLV for a chemical is the recommended maximum average airborne concentration of a chemical that is thought most people can be exposed to for an 8-hour limit with no ill effects.

Methods of detecting chemicals can include:

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

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

Medical consultations and examinations are available for chemical exposures from the University Health Service (UHS). 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 (AC) or Permissible Exposure Limit (PEL) for which there are exposure monitoring and medical surveillance requirements; and,

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**

1. Between 8:00 AM and 4:30 PM, phone the University Health Service (UHS) Occupational Health Nurse at X5-1164 (or pager 16-4152). Identify yourself, state that a person has been exposed to a chemical (how and which one), what preliminary precautions have been taken, and that the exposed patient is on the way to UHS. Send with the patient the name of the chemical(s) exposed to and, if possible, a copy of the MSDS. UHS is located at G-5000 of the Medical Center.
2. Between 4:30 PM and 8:00 AM, call x13 (Security Emergency Dispatch) and request a MERT Response.
3. For any serious situation, call x13 (Security Dispatch) and request a MERT Response.

**C. Pre-placement Assessments** Specific groups of employees receive pre-placement health assessments and annual reassessments through UHS.

**D. Special Programs** Special medical surveillance programs are provided when indicated by a department's or division's unique needs and are available through UHS. The department can call UHS Occupational Health Program at x5-4955 for department charges and other information.

## **III. SPILL CONTROL POLICY**

When working with chemicals, responding to chemical spills is vital to minimize hazards. Preplanning the 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. Appropriate emergency services should be notified immediately to arrange for a spill response team.

### **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. Direct the person to appropriate medical facilities.
  - 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 effect 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 personal exposure may have occurred, have the person use the eye wash station or safety shower. Remove the person from the area and seek medical assistance if needed.
  - 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 Security (x13) from a safe location.
  - 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

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 Protection Policy, Appendix 4, 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 Radiation Safety at x5-3781, for information on the hazards and safety precautions for these materials.

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

The chemicals 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/MSDS System. A brief summary of the chemicals/groups follows:

### 1. **Antineoplastic Agents**

Strong Memorial Hospital Policy 7.10 entitled **Antineoplastic and Other Toxic Agents - Guidelines for Handling** can be found in the SMH Policy Manual. A copy of this manual can be found on each hospital unit. This policy is designed to inform nurses and other staff on the precautions and handling procedures necessary to properly work with 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 in the hospital and includes a cross-reference listing for the drugs. Material Safety Data Sheets are available from the SMH Pharmacy and from EH&S.

### 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 cold disinfecting agents contain chemicals such as glutaraldehyde, which may have adverse health effects associated with them. Disinfectants containing chemicals such as glutaraldehyde should be used in well-ventilated areas. These areas must be pre-approved by Infection Control 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 USA employees. Environmental Services maintains MSDSs for all of the chemicals they use in SMH. In general the majority of chemicals used by Environmental Services have a low hazard level. 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, enflurane, 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, Enflurane, and Isoflurane. Acute exposure to these gases can cause respiratory depression, muscle relaxation 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 cancers, spontaneous abortions, fetal malformations, infertility and sterility.

#### 5. **Compressed Gases**

Compressed Gases are considered a physical hazard by the Hazard Communication Standard and should be treated with care. 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.

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.

All cylinders not being used should have a protective cap covering the cylinder valve. Also some compressed gases can present a health hazard to you.

## 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.

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 Nursing Practice Manual E 27.0 Guidelines for Disposal of Hazardous Material - Mercury. 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 SMH Housekeeping. Quick response and clean up by properly trained staff limits the exposure to mercury vapors and prevents lingering problems of contamination. EH&S' Industrial Hygiene Unit monitors areas where spills of "mercury" manometers occur to verify the clean up procedures removed all the mercury released from the spill. Appendix 5 provides information to assist personnel in the clean up of small mercury spills.

## 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 other 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, including gloves and gas-proof goggles, 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. Appendix 6 lists the steps to take for spills of formaldehyde containing materials.

## 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 mode of entry. The MSDS 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, Poison Center or EH&S.

## 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 another drug used in aerosol form in the clinical setting. Ribavirin is used to treat lower respiratory tract infections caused by respiratory syncytial virus (RSV). Ribavirin is aerosolized into a tent or hood containing the patient. Exposure occurs when staff are required to enter the tent and from passive leakage from the tent.

Health care workers exposed to ribavirin have complained of severe headaches 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 / MSDS System. Product labels and MSDSs contain valuable information on using chemicals safely, first aid and emergency procedures. In the event of a spill, call Security at x13 and request the assistance of EH&S. Should an exposure occur, personnel are to use the appropriate first aid. The Poison Center (x5-3232) can provide useful information for further medical treatment that may be needed.

If this guide raises questions, problems or if you have suggestions, please contact the Industrial Hygiene Unit at x53241.

## **APPENDIX 1 DEFINITIONS OF HAZARDS**

### **Physical Hazards**

Combustible - ignites at 100°F or above but below 200°F.

Compressed gas - gas under high pressure in a cylinder, hazard of violent release if valve is broken off or cylinder is dropped.

Explosive - ignites suddenly and violently.

Flammable - ignites at temperature below 100°F.

Organic peroxide - explodes if shaken or shocked; some liquids such as ether form organic peroxides after long storage times if stored improperly. It has a chemical structure related to hydrogen peroxide.

Oxidizer - gives off oxygen and will support combustion (Examples: sodium nitrate, sulfuric acid).

Pyrophoric - catches fire in air without needing a source of ignition at a temperature of 130°F or below.

Unstable (reactive) - may react in air or with other chemicals, causing explosion or heat.

Water reactive - reacts spontaneously in contact with water giving off toxic or ignitable vapors or causing hazardous pressure increases.

### **Health Hazards**

Carcinogen - has been found to cause cancer in humans or at least two experiments with animals.

Corrosive- causes burns to human tissue on contact (Examples: sulfuric acid, lye, phenol).

Highly Toxic - contact with a small amount of the chemical (1 teaspoon or less) may cause illness from single exposure.

Irritant - causes irritation of skin, eyes or upper respiratory tract.

Sensitizer - may cause allergic reactions such as skin rash, especially after repeated contact.

Toxic - causes illness, but need single contact with larger amount of the chemical than for "highly toxic" chemicals or repeated contacts with smaller amounts.

Target Organ Effects - chemical causes harm to a certain organ or organs of the body.

APPENDIX 2

**CHEMICAL INVENTORY**

NAME OF CHEMICAL	MANUFACTURER & ADDRESS	STORAGE LOCATION	HAS MSDS BEEN RECEIVED? YES/NO *	PPE REQUIRED FOR USE

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

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

List chemical whenever a new is introduced in the workplace

\* IF MSDS NOT AVAILABLE, OBTAIN FROM MANUFACTURER / SUPPLIER  
◆ LIST ALL OF THE PPE REQUIRED FOR USE

**APPENDIX 3**

**Material Safety Data Sheet**

**U.S. Dept. of Labor OSHA**

OSHA's Hazard Communication Standard,  
29 CFR 1910.1200. Standard must be  
consulted for specific requirements.

(Non-Mandatory Form)  
Form Approved  
OMB No. 1218-0072

IDENTITY (As Used on Label and List)	Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.
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**Section I**

Manufacturer's Name	Emergency Telephone Number
Address (Number, Street, City, State, and ZIP Code)	Telephone Number for Information
	Date Prepared
	Signature of Preparer (optional)

**Section II - Hazard Ingredients/Identity Information**

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)

**Section III - Physical/Chemical Characteristics**

Boiling Point		Specific Gravity (H <sub>2</sub> O = 1)	
Vapor Pressure (mm Hg.)		Melting Point	
Vapor Density (AIR = 1)		Evaporation Rate (Butyl Acetate = 1)	
Solubility in Water			
Appearance and Odor			

**Section IV - Fire and Explosion Hazard Data**

Flash Point (Method Used)	Flammable Limits	LEL	UEL
Extinguishing Media			
Special Fire Fighting Procedures			
Unusual Fire and Explosion Hazards			

**Section V - Reactivity Data**

Stability	Unstable	<input type="checkbox"/>	Conditions to Avoid
	Stable	<input type="checkbox"/>	
Incompatibility (Materials to Avoid)			
Hazardous Decomposition or Byproducts			

Hazardous Polymerization	May Occur	<input type="checkbox"/>	Conditions to Avoid
	Will Not Occur	<input type="checkbox"/>	

### Section VI - Health Hazard Data

Route(s) of Entry:	Inhalation?	Skin?	Ingestion?
Health Hazards (Acute and Chronic)			
Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
Signs and Symptoms of Exposure			
Medical Conditions Generally Aggravated by Exposure			
Emergency and First Aid Procedures			

### Section VII - Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled
Waste Disposal Method
Precautions to Be taken in Handling and Storing
Other Precautions

### Section VIII - Control Measures

Respiratory Protection (Specify Type)		
Ventilation	Local Exhaust	Special
	Mechanical (General)	Other
Protective Gloves	Eye Protection	
Other Protective Clothing or Equipment		
Work/Hygienic Practices		



## APPENDIX 4

### REPRODUCTIVE PROTECTIVE POLICY

The following is a reprint of the University of Rochester's Policy 167,  
Reproductive Protection Policy, issued 5/92 by Personnel.

Subject: **Reproductive Protection Policy**

Applies to: All Faculty and Staff

Applies to: All Faculty and Staff

- I. Policy: Some work locations at the University may, because of the nature of the work, pose potential health risk to employees during their fertile years. The University is committed to minimizing these risks through safety education and management but realizes that some risks may still exist. Employees need to understand those risks and be able to make informed decisions about working in those settings.  
The University will provide employees who work in areas which contain hazardous chemicals or radiation with a copy of this policy prior to their accepting employment or transfer opportunities. The University will advise final applicants and employees of the known risks and assist employees in taking appropriate precautions. While accepting employment may mean accepting some risks, the individual (applicant or staff member) is responsible for making this decision.
- II. Guidelines:
  - A. Administration of this policy is the responsibility of Deans and Directors. Implementation of this policy is the responsibility of the supervisor and the employee. All employees -- both male and female -- shall be made aware of the known risks and reproductive hazards in their work. Employees whose work involves possible exposure to agents that are known to cause injury to the sperm, egg or fetus shall be informed of the risks and how to minimize them.
  - B. Technical advice is available from the Environmental Health & Safety Office (EH&S), and medical advice from the University Health Service Occupational Health Staff.
    1. As part of its compliance with the OSHA Laboratory Safety Standard and the Hazard Communication Standard, the University will provide written information and training based on current scientific and medical consensus about the specific hazards of each workplace in which chemicals are used.
    2. Material Safety Data Sheets (MSDS) are available to each employee in the workplace to review. The MSDS's describe the specific hazards, including any reproductive hazards, of each chemical and what work practices and/or protective equipment are necessary to reduce risks of exposure.
  - C. Supervisors are required to inform final applicants and candidates for transfer about the known risks in areas which contain hazardous chemicals and/or radiation.
    1. Supervisors should provide final candidates for positions with a copy of this policy.
    2. It is the supervisor's responsibility continuously to train and reinforce good work practices and safety rules to minimize risks of exposure.
  - D. Current employees and applicants who are offered positions have the responsibility for knowing and understanding this policy. They also have the right to choose or refuse placement in an area which contains hazardous chemicals and/or radiation.\*

1. If an eligible employee becomes pregnant and wishes a change in duties, the supervisor, if possible, will attempt to accommodate the employee's request. If accommodations are not possible, the eligible employee has the choice of remaining in the position, seeking a transfer (with no guarantees of alternate placement), taking a leave without pay (with the approval of the supervisor), or resigning.
2. If a current employee's job changes so that he/she is placed in an area which contains hazardous chemicals and/or radiation, the employee will be provided the opportunity to seek a transfer. If no other positions are available, the employee has the option of remaining in the position, or being placed on layoff.
3. An internal applicant who seeks a transfer and is offered a position in an area which contains hazardous chemicals and/or radiation may decide to remain in his/her current position. If the employee is placed on layoff because his/her current position is being eliminated, the layoff policy will still be in effect.  
\*Departments with represented employees must consult the applicable collective bargaining agreement and the Offices of Human Resources at the Medical Center or River Campus.

### III. Procedures:

- A. Supervisors should provide copies of this policy to all final candidates.
- B. EH&S will provide written information and training as required.
  1. Departmental supervisors are responsible for providing immediate and on-going training about the safety precautions for specific work sites and about the hazardous chemicals and/or radiation in the employee's workplace. Compliance with OSHA Standards requires that employers make Material Safety Data Sheets (MSDS) readily available in the workplace to all employees and notify employees of that location.
  2. EH&S will conduct introductory training on safety for newly hired personnel and refresher training for current employees who will be or are assigned to areas which contain hazardous chemicals and/or radiation. The Offices of Human Resources at the Medical Center or River Campus will provide names of newly hired people and their area of assignment. EH&S will notify the appropriate departments about the time and place for the training and list the people who are required to attend. Compliance with OSHA Standards requires that employers provide training for all employees who work with hazardous chemicals.
  3. At the end of the EH&S initial training session, EH&S Staff will ask employees to sign a statement that they have received safety training. EH&S Staff will forward statements which will be placed in the University's personnel file of each individual trained.
- C. The Office of Human Resources at the Medical Center or River Campus is available for assistance when offers are being made to final candidates and for additional information.

## APPENDIX 5

### MERCURY SPILL CLEAN-UP PROCEDURES

Although mercury should not be found in patient care areas, the following guidelines have been established to prevent mercury exposures to personnel and prevent the release of mercury into the environment.

The proper clean up and disposal of mercury in the event of a spill outlined in the Nursing Practice Manual E 27.0 Guidelines for Disposal of Hazardous Material - Mercury. 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, nursing is to relocate the patient and contact Security for an EH&S response. Quick response and clean up by properly trained staff limits the exposure to mercury vapors and prevents lingering problems of contamination. EH&S' Industrial Hygiene Unit monitors areas where spills of "mercury" manometers occur to verify the clean up procedures removed all the mercury released from the spill.

Exposure to mercury is most likely through inhalation of mercury vapors. Health effects from mercury exposures can include kidney damage and central nervous system disorders. The small quantity of mercury in a thermometer does not present a health hazard if immediate action is taken when a thermometer is broken. The concentration of mercury vapors generated is very low. However, the use of personal protective equipment is still needed to prevent exposure.

#### **Broken Thermometers**

Only a small quantity of mercury can be found in a standard laboratory thermometer. When a thermometer breaks, some or all of the mercury may be released. Using a 3" x 5" index card, push the mercury into a pile. Make sure peripheral areas are checked for mercury. If any is found, push the mercury into the pile. Using two 3" x 5" cards, gather the mercury droplets onto one of the cards and transfer the mercury into a small plastic bottle. A special mercury sponge can also be used to absorb the mercury. For those droplets that cannot be picked up using either of these methods, use one of the following actions:

- Use a syringe (no needle) to suck up the mercury
- Use "scotch" tape and press the tape onto the mercury. By carefully lifting the tape, mercury will remain on the tape.

For each of the listed steps, place the collected mercury into a sealable non-metallic container. Place any part of the thermometer that still contains mercury into the container. Go over the area a second time to ensure that all the mercury has been removed. Contact the Hazardous Waste Management Unit (x5-2056) for disposal of the collected material as hazardous waste.

After a mercury spill is cleaned up, a flashlight can be used to check for any beads of mercury that may remain. Turn off the room lights and shine a flashlight at the spill area. Any mercury that still is present will be visible when the light shines on the mercury at a glancing angle.

#### **Barometers and Manometers**

These devices contain a large quantity of mercury. A trained responder must be called for clean up should a mercury spill occur from one of these devices. To reduce the possibility of airborne exposures or tracking the mercury into other areas, personnel should not be permitted to enter the area. Clean up of these spills requires special equipment. It is important to clean up the spill as soon as possible. Contact appropriate emergency resources as needed.

#### **Special Circumstances**

Occasionally, mercury is spilled onto carpeting. The only remedy for these spills is to remove the carpeting and dispose of it as hazardous waste.

## **APPENDIX 6 FORMALDEHYDE SPILL PROTOCOL FOR PATIENT CARE LOCATIONS**

Formaldehyde solutions are used by medical care personnel for the preservation of specimens. Typically, the concentration of these solutions is 3.7% formaldehyde, commonly called formalin. OSHA's Formaldehyde Standard, 29CFR1910.1048, requires special labels on all formaldehyde containers. Locations that store or use formaldehyde containing materials must have an established spill plan to comply with the OSHA standard. This protocol has been established specifically for those locations where specimen containers are used or stored.

Formaldehyde solutions can present a health hazard from inhalation and direct skin contact. Acute exposures to formaldehyde solutions can cause eye and skin irritations. Exposure to vapors can result in respiratory and eye irritation. To minimize possible exposures, storage containers must be stored properly and personnel must be aware of action to take should a spill occur.

### **STORAGE REQUIREMENTS**

Minimize the number of specimen containers in a location. The following guideline is recommended for medical care locations:

1. Central storage locations are to be non-patient care areas that are properly ventilated. The quantity stored in these locations should be restricted to a one month's supply for any size container. The specimen containers should be kept in the original shipping container, if possible. If bins are used, the containers are to be stored stacked upright in the bin to minimize potential spills. A label is to be placed on the shelf, cabinet, or bin to identify the formaldehyde storage location.
2. Storage in patient care rooms are to be limited to one week's supply. A recommended location is a labeled upper cabinet or a single drawer.

### **SPILL PROCEDURE**

The EMERGENCY 13 Flip Chart was prepared to assist personnel on the action to take for emergency situations. Please refer to this chart for detailed information. Additional information is available through the Industrial Hygiene Unit (x5-3241).

Commercially prepared specimen containers have tight fitting tops that have a very little probability of leaking. The most likely spill would be from an open specimen container. Depending upon the size of the container, the quantity of fluid is usually low (less than 100 ml) and is considered a minor spill, capable of being cleaned up without the assistance of safety and emergency personnel. The following steps are to be taken:

1. Inform others in the area of the minor spill.
2. Wearing the appropriate personal protective equipment to prevent exposure (minimum of gloves and an outer garment), absorb the spilled material with paper towels. Place the paper towels into a labeled hazardous waste container, such as a heavy duty bag.
3. Wash the contaminated area two times with some soap and water. Dry the area with paper towels. Place these paper towels into the labeled hazardous waste container. Seal the container to minimize the release of formaldehyde vapors.
4. Dispose of the labeled hazardous waste container through Hazardous Waste (call x5-2056 for a pick up – for SMH on-site locations only).