

Workplace Hazardous Materials Information System (WHMIS)

This information was compiled in consultation with the Joint Occupational Health and Safety Committees for the purpose of providing a reference tool and a self-education booklet for all staff and physicians. By law, all staff must understand the principles of Workplace Hazardous Materials Information System (WHMIS) legislation and how to follow its requirements.

Goals

- To educate employees about working safely with hazardous materials present in the workplace.
- To reduce and eliminate workplace injuries and illnesses resulting from exposure to hazardous materials.
- To comply with Workplace Hazardous Materials Information System (WHMIS) legislation.

Learning Objectives

When you finish this learning program, you should be able to:

- Apply the principles of WHMIS legislation.
- Communicate the three key elements of the WHMIS program.
- Identify the six classifications and eight hazard symbols.
- Know the difference between supplier and workplace labeling.
- Access information on a MSDS.
- Know about the hazards associated with exposure to controlled products - chemical, biological, physical.
- Summarize your responsibilities - what you 'need to know'.
- Complete the on-line WHMIS quiz and submit it for grading.

Why should I receive WHMIS Training?

As a health care worker, you may be exposed to potentially hazardous agents during:

- diagnostic tests
- maintenance activities
- housekeeping duties
- research activities
- therapeutic procedures

This potential exposure even applies to workers who do not normally work with hazardous materials.

In order to protect your health, you have the 'right to know' about the hazardous materials and controlled products in your work environment.



But with this right, you also have the responsibility to use this information in your work environment, regardless if you work with hazardous materials or not.

How Do I Use this Package?

The purpose of this information/guide is to give you a thorough understanding of the basics of WHMIS legislation. As you review this information, you will become familiar with how this legislation applies to your work environment. At the end, there is a link to a self-questionnaire for you to complete, and the quiz results will be submitted directly (there is no need to provide a copy to your leader).

What is WHMIS?

These are the initials for Workplace Hazardous Materials Information System. WHMIS is a legislated Canada-wide system to provide employers and workers with information about the hazardous materials with which they work. The goal of WHMIS is to reduce or eliminate illness and injury resulting from use or exposure to hazardous materials. This system is in place to protect your health and safety. There are 3 components to this legislation:

1. Labels
2. Material Safety Data Sheets
3. Education

Why was WHMIS developed?

WHMIS was developed because of concerns of workers, employers and the government about how hazardous materials were used, handled, and stored in the workplace. WHMIS is legislated federally and provincially and is enforced under Ontario's OHS Act under special WHMIS regulations. It is in place to protect your health, your safety and the environment.

Who decides if a product is hazardous?

It is the manufacturer's or supplier's responsibility to determine whether their products are hazardous. They must determine this based on the contents of the product and the standards described in the Controlled Products Regulation. If the product meets or exceeds the criteria listed in these standards and is not otherwise exempt from this regulation, it is a controlled product.

Hazard Classes and Symbols

When a material is listed as a controlled product, the manufacturer needs to treat the product according to WHMIS regulations. Part of this regulation is to classify it according to a hazard class. The WHMIS system groups hazardous materials into 6 distinct classifications.



CLASS A - COMPRESSED GAS:

Compressed gases are dangerous because they are under pressure. If a container of compressed gas is broken, dropped, crushed or punctured, it may torpedo, causing a safety hazard to anyone in the area. Containers of compressed gas may explode if exposed to variations in temperature or heated. A lot of compressed gas is liquefied because it is under extremely high pressure. Spills of liquefied compressed gas can cause frostbite and severe burns.

Safety measures:

1. Keep the container closed tightly at all times
2. Handle the container with care; do not drop
3. Do not subject the container to variances in temperature or heat (furnaces, open flames, etc.)
4. Store in areas designated by your supervisor.



CLASS B - FLAMMABLE AND COMBUSTIBLE MATERIAL:

Division 1 - Flammable Gases

Division 2 - Flammable Liquids

Division 3 - Combustible Liquids

Division 4 - Flammable Solids

Division 5 - Flammable Aerosols

Division 6 - Reactive Flammable Materials

These materials may explode, ignite or spontaneously burst into flame. Flammable materials will ignite at normal room temperatures. Combustible materials must be heated before they will ignite.

There are six separate divisions within this class:

1. Flammable Gases - compressed gases that are also flammable, ie. propane
2. Flammable Liquids - liquids with a flashpoint less than 100 degrees F
3. Combustible liquids - liquids with a flashpoint less than 200 degrees F but more than 100 degrees F
4. Flammable Solids - solids that cause fire through retained heat or friction from processing or that are easily ignitable and burn violently & persistently.
5. Flammable Aerosols - most common aerosols use flammable propellants
6. Reactive Flammable Materials - these materials may become spontaneously combustible in air or in contact with water

Safety Measures:

1. Keep away from heat/smoking/sources of ignition
2. Keep container tightly closed
3. Avoid sparks or static discharges
4. Separate the material from other combustible and incompatible materials
5. Store the material in a cool, well-ventilated area as designated by your immediate supervisor.



CLASS C - OXIDIZING MATERIAL:

Oxidizers may release oxygen which promotes burning of flammable and combustible material. Oxygen is necessary for combustion. Any substance that increases the supply of oxygen enhances combustion and could cause otherwise safe materials to become spontaneously combustible (ie. wood). They may burn skin and eyes on contact. Most oxidizers themselves are not

flammable.

Safety Measures:

1. Keep in a cool place
2. Avoid friction or shock
3. Keep away from combustible/flammable material and store materials in designated areas
4. Never smoke when working near combustibles.
5. Wear proper protective equipment including eye, face and hand protection and protective clothing.



CLASS D - POISONOUS AND INFECTIOUS MATERIAL

DIVISION 1 - MATERIALS CAUSING IMMEDIATE AND SERIOUS TOXIC EFFECTS

These materials are highly dangerous to health and life. Their effects may include nausea, dizziness, headaches and in severe cases, death. Their effects are immediate and usually result from a single (acute) exposure. These materials may be swallowed (ingested), absorbed or inhaled.

Safety Measures:

1. Avoid contact with the skin and eyes
2. Avoid inhalation of gas or vapours
3. Handle material with extreme caution
4. Wear proper protective equipment including eye, face and hand protection and protective clothing.
5. Wear proper respiratory equipment and work in well ventilated areas
6. Wash thoroughly after handling the material
7. Store material in designated areas only



DIVISION 2 - MATERIALS CAUSING OTHER TOXIC EFFECTS

These materials are toxic but their effects result from repeated exposure to the material over long periods of time (chronic). Some examples of chronic effects are cancer, asbestosis, skin/eye irritation, etc. These materials may produce a chemical allergy or may cause cancer, birth defects or sterility. These materials may be ingested, absorbed or inhaled.

Safety Measures:

1. Avoid skin contact
2. Avoid inhalation of gas or vapours
3. Wear proper protective equipment including eye, face and hand protection and protective clothing.
4. Wear proper respiratory equipment and work in well ventilated areas
5. Wash thoroughly after handling the material
6. Store material in designated areas only



DIVISION 3 - BIOHAZARDOUS INFECTIOUS MATERIAL

These are organisms that cause disease in persons and animals. They contain viruses, fungi, bacteria as well as diagnostic specimens/cultures containing or suspected of containing the organisms. These would typically be found in our work environment. You are to assume that all specimens/samples are contaminated and treat them accordingly.

Safety Measures:

1. Keep material contained in a tightly closed container; handle only in designated areas
2. Wear proper protective equipment including eye, face and hand protection and protective clothing.
3. See your doctor if you feel sick



CLASS E - CORROSIVE MATERIAL

These materials may cause severe burns to the skin, eyes and the tissues of the respiratory tract. These burns usually result in irreversible tissue damage. Acids and bases are corrosive. Most are liquid but it is important to remember that some gases are also corrosive such as chlorine.

Safety Measures:

1. Avoid skin contact
2. Keep material contained in a tightly closed container
3. Do not breath fumes/vapours - wear proper respirator and work in a well ventilated area
4. Wear proper protective equipment including eye, face and hand protection and protective clothing



CLASS F - DANGEROUSLY REACTIVE MATERIAL

This section contains a lot of different chemicals that are unstable and potentially self reactive. Chemicals in this class have the potential to be self reactive. They may react with water to release a poisonous gas, become self reactive under temperature/pressure increases or shock or they might undergo vigorous polymerization, decomposition or condensation.

The MSDS will indicate the material is UNSTABLE under Section 5 (reactivity data).

Safety Measures:

1. Avoid contact with water/dampness
2. Do not expose to heat
3. Avoid shock and friction or temperature changes
4. Wear appropriate personal protective equipment when handling
5. Handle containers with extreme care-do not drop or shake chemicals
6. Store chemicals in a cool, flame-proof area as designated by your immediate supervisor



What is a controlled product and how will I know that it is controlled?

A controlled product is the name given to a product, material or substance that is deemed a hazardous material. These controlled products are regulated by WHMIS.

All WHMIS controlled products fall into one or more hazard classes. Each of the six classes is uniquely identified by a symbol for quick recognition.

When household items such as bleach are used in the workplace, workplace labels need to be applied to the containers and proper training on use and disposal apply.

The label from the supplier must have one or more of the hazard symbols to help you identify any risk and see what class the material belongs to.

What is the difference between a hazardous material or product and a controlled product?

WHMIS does not apply to certain hazardous materials such as radioactive materials, pharmaceuticals, or pesticides. There are other regulations for these materials. WHMIS applies only to controlled products (those products meeting the criteria of the Controlled Products Regulation). In other words, all controlled products are hazardous materials but not all hazardous materials are controlled products.

Labels

Labels are the first information workers and employers will receive on the job. Labels must be attached to each container of hazardous material. The purpose of the label is to identify the product as controlled, indicate the nature of the risk (ie. flammable) and give some safe handling information. Under WHMIS legislation there are two types of labels:

A. SUPPLIER LABELS

Before a container is shipped, the supplier is required to affix a 'supplier label' to identify the hazardous material. Any container of hazardous material that falls under the Controlled Products Regulation and is brought into a Canadian workplace must carry a supplier label.

Seven pieces of information are required if volumes are greater than 100 millilitres:

1. PRODUCT IDENTIFIER:

Name of the material by chemical, brand name or trade name

2. HAZARD SYMBOLS:

Symbols representing classes and divisions of hazards as defined under W.H.M.I.S.

3. RISK PHRASES:

Phrases that explain the risks involved in misusing the product (i.e. flammable/vapour harmful)

4. PRECAUTIONARY MEASURES:

The essential measure to be taken when handling, using or working in the presence of this material (e.g.: store away from heat, store in a well ventilated area, wear face protection, etc.)

5. FIRST AID MEASURES:

Measures to be taken in case of acute (immediate) exposure to material (e.g.: flush eyes with water for 15 minutes, do not induce vomiting, etc.)

6. SUPPLIER INFO:

Name, address and emergency telephone number of the supplier

7. REFERENCE TO MSDS:

Statement that Material Safety Data Sheet (MSDS) is available for this material

The 'supplier label' must be shown in English and French and it must have the distinctive hatched border.

What should I do if the product does not have a supplier label?

Contact your manager or supervisor immediately. The product must not be used until you have both a supplier label and a MSDS for the product. If your supervisor/manager cannot provide one, contact:

- Jeff Tucker, Safety Consultant, All SJHC Sites

B. WORKPLACE LABELS

Under WHMIS you should never have a controlled product that is not labelled. As long as controlled product is in its original container, with the supplier label, no extra labelling is required. However, if the controlled product is put into another container for use in the workplace, it must be identified with a workplace label.

Some examples of when you must use a workplace label are:

- if you decant a controlled product from its original container into another
- if you transfer a controlled product that is stored in bulk into another container
- if the supplier label is damaged, lost or illegible.

Workplace labels are usually less detailed than supplier labels. They must contain the following three indicators:

1. PRODUCT IDENTIFIER:

Name of the material by chemical, brand name or trade name

2. PRECAUTIONARY MEASURES:

The essential measure to be taken when handling, using or working in the presence of the material. This section may contain hazard symbols, first aid measures, handling procedures, etc.

3. REFERENCE TO MSDS:

A statement telling the reader that a Material Safety Data Sheet (MSDS) is available for the material

This label does not require a hatched border, hazard symbols or special wording. A workplace label may also contain one or more of a series of internationally recognized symbols developed to indicate different Personal Protective Equipment.

They are also used as placards in certain instances to warn that protective equipment is required.

C. LABORATORY LABELS

A controlled product that is intended for laboratory use only, does not need a supplier label if it meets these conditions:

- Comes from a laboratory supply house
- Weighs less than 10 kilograms

If you work in a laboratory setting, you will get job-specific applications of WHMIS guidelines.

Personal Protective Equipment

The following series of symbols has been developed to recognize and indicate the different types of personal protective equipment available. The symbols are used internationally to provide workers with information about what equipment should be used when handling substances to prevent possible harmful exposure.

- | | |
|--|---|
| •  Cartridge Respirator | •  Full Body Protective Clothes |
| •  Chemical Goggles | •  Foot Protection |
| •  Disposable Dust Mask | •  Hand Protection |
| •  Face Shield | •  Protective Apron |
| •  Supplied Air Respirator | |

Poison/Toxic/ Infectious Substances

In order to protect yourself and understand the effects of hazardous materials, it is important to have a general knowledge of how toxic materials can harm you and what precautions you must take to protect yourself from toxic effects.

Routes of Entry

Remember, none of these substances can harm you unless they enter your body. The different methods by which they may enter your body are called routes of entry. There are three basic routes of entry: skin or eye absorption, inhalation (breathing) and ingestion (swallowing).

The most effective barrier between you and these substances is Personal Protective Equipment. By using the personal protective equipment recommended by the supplier on the MSDS, you are ensuring you are taking the best precautions possible to prevent exposure. Remember however, these are precautions only. They do not take the place of common sense and safe work practices.

The health effects of these substances vary according to the dose, or amount of exposure received. The higher the dosage, the worse the effect. It is also important to remember however there is a dose below which there are no recognizable adverse health effects. This dose is called

the exposure limit. All of these substances will exhibit a dose/response type of relationship but the limits of exposure will vary from material to material based on the product's toxicity.

Exposure Limits

Exposure limits are established by the government from a combination of testing and documented experience of exposure to a substance. The exposure limit may also be called the threshold limit value or TLV, permissible exposure level or PEL, or the occupational exposure level or OEL. Exposure limits let us know when we need to use personal protective equipment.

If you are exposed to a substance in amounts at or below the exposure limit, you should not experience any adverse health effects even without personal protective equipment. However, some individuals may experience adverse effects below the exposure limits if they are sensitive or allergic to a material.

Remember, if there is a chance of exceeding the exposure limit, you should be wearing the recommended personal protective equipment. If you are in doubt, ask first.

Before a material is controlled, testing is done to see if it is above the threshold for a controlled toxic product. The acute toxic effects of products are measured using two test values, Lethal Concentration 50 (LC₅₀) and Lethal Dose 50 (LD₅₀). The lethal concentration is used for materials that are inhaled or absorbed and the lethal dose is used for materials that are swallowed. The smaller the LC₅₀ or LD₅₀ value, the more toxic or harmful a material is.

Material Safety Data Sheets (MSDS)

A Material Safety Data Sheet (MSDS) is a document that contains detailed hazard and safe handling information for a controlled product. It provides more detailed safety information than that found on a label. The MSDS is provided for your safety and benefit.

A file of all MSDS for all controlled products used in your area should be readily available. Ask your supervisor/manager for the location. All MSDS sheets are available online and available on any hospital computer by going to the Occupational Health and Safety departmental web page, and double-clicking on "MSDS Quick Search". An interactive "Quick Search Tutorial" can be accessed at the top right of the Quick Search web page. Be sure to read and understand the information on the MSDS before you handle a controlled product. If a MSDS is not available, please contact the appropriate individual to obtain one before using the product.

- Jeff Tucker, Safety Consultant, All SJHC Sites

An MSDS must be current and updated every 3 years or as new information becomes available.

There are 9 categories of information required on a MSDS. The categories are as follows:

1. HAZARDOUS INGREDIENTS

list of all ingredients in the product that come under any of the 8 hazard classes

2. PREPARATION INFORMATION

name and phone number of who prepared the MSDS and the date it was prepared

3. PRODUCT INFORMATION

name of product, trade names, chemical family to which the product belongs, supplier or manufacturer data, and emergency phone #'s

4. PHYSICAL DATA

explains how material behaves when in use (includes 12 categories of information)

5. FIRE AND EXPLOSION DATA

describes the likelihood of the material burning or exploding under different circumstances

6. REACTIVITY DATA

stability of the material and how it behaves when exposed to certain other chemicals, heat, light, vibration, air, or moisture

7. TOXICOLOGICAL PROPERTIES

explains health effects of acute (immediate) and chronic exposure, and routes of entry

8. PREVENTIVE MEASURES

recommends safe procedures for handling, use and storage of material, personal protective equipment, and ventilation controls

9. FIRST AID MEASURE

describes the immediate treatment to be given to a person who has been exposed to the material

How to Read the MSDS

A MSDS contains a lot of information about a controlled product to help you handle the product safely and responsibly. However, a MSDS is not always easy to read or locate information on.

It is important to remember you do not necessarily need to know everything on the MSDS. A lot of information on the MSDS is not intended for use by you (the employee). For example, the MSDS contains fire and explosion details that would be referenced by the fire department. The MSDS will also contain engineering controls that are intended for use by designers/engineers in the design of a building/ventilation system.

Other information on the MSDS is technical and of limited value in a practical situation.

It is not normally necessary to read the MSDS all the way through. Read it selectively only concentrating on the information that is necessary to know for safe handling and storage. A standard approach to follow before using a chemical for the first time is to identify the chemical, understand the hazards, handling and storage procedures, and look at what to do in the event of emergency (spills, fire, exposure, first aid, etc).

Again, remember the MSDS is provided for your protection and benefit. Do not use or handle a controlled product until you have read and understood the relevant sections of the MSDS. Also remember if a MSDS is not available, get one before using the product by contacting your manager/supervisor, or Jeff Tucker, Safety Consultant, St. Joseph's & Parkwood Hospitals.

NOTE:

IF POSSIBLE, MSDS'S MUST BE UPDATED EVERY 3 YEARS FROM THE DATE OF PREPARATION INDICATED ON THE MATERIAL SAFETY DATA SHEET AND AS ANY NEW INFORMATION ABOUT THE MATERIAL IS AVAILABLE.

Glossary of Common Terms Found on MSDS

- **ACTIVE INGREDIENT**
The part of a product which actually does what the product is designed to do
- **ACUTE EXPOSURE**
A short-term exposure lasting for minutes, hours or days
- **CARCINOGEN**
A substance which can cause cancer
- **CHRONIC EXPOSURE**
A long-term exposure lasting for months or years
- **CONTROLLED PRODUCT**
Any product/material/substance included in any of the six classes listed in Schedule 11 of the Hazardous Products Act
- **DESIGNATED SUBSTANCE**
A biological, chemical or physical agent prescribed as a designated substance under the Occupational Health & Safety Act, and to which the exposure of a worker is prohibited, regulated, restricted, limited or controlled
- **EXPOSURE LIMITS**
The concentration of a chemical in the workplace air to which most people can be exposed without experiencing harmful effects
- **FLASH POINT**
The lowest temperature at which a liquid or solid gives off enough vapour to form a flammable air-vapour mixture near its surface. The lower the flash point the greater the fire hazard
- **LD50**
LD=Lethal Dose: the dose of the material which causes the death of 50% of a group of test animals when given a single dose
- **LC50**
LC=Lethal Concentration: the concentration of a material in air which causes the death of 50% of a group of test animals when given over a set period of time
- **MATERIAL SAFETY DATA SHEET**
A document disclosing prescribed information
- **ODOUR THRESHOLD**
The lowest concentration of a chemical in air that is detectable by smell

- **TERATOGEN**

A substance which can cause birth defects

- **TIME WEIGHTED AVERAGE (TWA)**

Average exposure concentration of a substance during an 8-hour workday, 40 hour work week at which nearly all workers can be exposed without adverse health effects

Health and Safety Hazards

Controlled products can be hazardous to your health if you do not limit your exposure to them. As you handle these materials, you'll need to know whether they are "health hazards" or "safety hazards."

A health hazard is the ability of a chemical to affect your health quickly (burn) or over a long period of time (cancer or lead poisoning).

A safety hazard is a sudden reaction such as a fire, explosion or corrosion. Safety hazards are controlled by handling chemicals properly.

Referring to the MSDS is the safest way to use, handle and store hazardous material.

Three categories for hazardous materials

Hazardous materials in the workplace are classified into three categories:

- Biological
- Chemical
- Physical

Biological Hazard

Biological hazards are living organisms or its properties that can adversely affect your health. A needle-stick injury is an example of an accidental exposure to possible blood borne pathogens.



Chemical Hazard

Chemical hazards include inhalation of fumes and powders. They also include skin contact from splashes, spills and touch. The MSDS contains safety information on the hazardous components, chemical characteristics and stability of the product and first aid measures.



Physical Hazard

Physical hazards are environmental. They include temperature, noise, vibration and radiation

Hazard Control

The most effective way to control exposures to hazardous materials is 'at the source' by eliminating, substituting or isolating the hazard.

The second best control is 'along the path'. This includes the use of controls such as general ventilation, barriers or shields.

The least satisfactory method for controlling a hazard is 'at the worker'. This includes personal protective equipment, job rotation, and good personal hygiene.



What are the supplier's responsibilities?

- Provide information
- Classify hazardous or WHMIS controlled products
- Provide supplier labels and MSDS

Employer's Responsibilities...

- Implement the WHMIS program
- Make available workplace labels and up-to-date MSDS for employees
- Educate and train on how to interpret and use information
- Prepare and maintain a chemical inventory of all hazardous materials in the workplace

Employee's Responsibilities...

- Attend and participate in WHMIS training
- Apply knowledge learned in training sessions
- Review labels and MSDS prior to use
- Report damaged, illegible or missing labels or MSDS to your immediate supervisor.

Successful Program

The goal of WHMIS is to create a safe and healthy workplace. WHMIS is successful only when suppliers, employers and employees assume their responsibilities.

Take the on-line test

When you are ready to take the on-line test, please click on the link below. This will test your knowledge of WHMIS procedures. If you are not ready, please review the above WHMIS information.

In order to record your completion with Medical Affairs, you will be required to enter your **surname** and **password** which can be found on the "Instruction Sheet for Online Training Modules" included with your hospital application package.

http://intra.sjhc.london.on.ca/depts/oh_ss/educate/whmis/quiz/whmis_quiz.php

If you have any further questions or concerns, please contact the Medical Affairs office at 519-685-8500 ext. 75125.