Workplace Hazardous Materials Information System (WHMIS) Training
Environmental Health and Safety Office
Objectives

- Learn the 6 classes of controlled products
  - Understand the main hazards associated with each class
- Be able to identify and understand the two types of WHMIS labels
- Learn how to utilize Material Safety Data Sheets (MSDS)
What does WHMIS mean?

Workplace Hazardous Materials Information System
What is WHMIS?

- WHMIS is a Canada wide hazard communication system developed to provide employers and workers information about hazardous products used in the workplace.

- WHMIS legislation is a combined effort between industry, and provincial and federal governments.

- Manitoba WHMIS requirements are set by the Workplace Safety and Health Regulations (Part 35).
WHMIS was created as a response to a workers “right to know” about both the safety and health hazards associated with the hazardous materials they might use at work.

WHMIS was also created to reduce injuries and illnesses associated with handling hazardous materials in the workplace.
WHMIS Components

WHMIS is composed of **3 main elements** to communicate the hazards of controlled products:

1. **Labels** – affixed to containers of hazardous materials and provides information regarding the hazards

2. **Material Safety Data Sheets (MSDS)** – provide supplementary information to hazards outlined on the labels

3. **Education** – training on how to use the information provided
WHMIS Responsibilities

- WHMIS is a shared responsibility amongst:
  - Suppliers
  - Employers
  - Employees
Supplier Responsibilities

Supplier responsibilities include:

- Determining which products are “controlled” products and classifying them appropriately
- Establishing health and safety information regarding a product
- Labelling products with WHMIS labels
- Preparing and providing MSDS’s for customers and updating them every three years
Employer Responsibilities

Employer responsibilities include:

- Ensure all controlled products at their work site have WHMIS labels
- Have readily accessible the MSDS’s of controlled products for employees
- Update MSDS’s every three years and maintain records of MSDS’s for 30 years
- Train workers to read labels and MSDS’s, recognize WHMIS labels, and, if required, use personal protective equipment
- Develop safe work procedures (SWPs)
- Train workers on how to handle, use, and store controlled products
Employee Responsibilities

Employee responsibilities include:

- Participating in education and training provided by the employer
- Following prescribed safe work procedures
What is a Controlled Product?

- Controlled products are materials, products, or substances that meet any of the criteria for one or more of the six WHMIS Hazard Classes as defined in the Federal Controlled Product Regulation.
  - Some classes have divisions and subdivisions.
  - Each class has a unique hazard symbol to allow for quick identification of hazards.
- WHMIS does not provide a comprehensive list of controlled products, only a list of hazard criteria.
Exclusions from WHMIS

- WHMIS may not apply if there is another act or regulation in place.
- The following are exempt from the supplier responsibilities of WHMIS (no label or MSDS required):
  - Consumer restricted products: products sold in stores that already have labels in accordance with the Hazardous Products Act.
  - Explosives: covered by the Explosives Act.
  - Cosmetics, drug, food, or devices: covered by the Food and Drug Act.
  - Pesticides, herbicides, and insecticides: covered by the Pest Control Products Act.
  - Radioactive materials: covered by the Nuclear Safety and Control Act.
The following are exempt from **all responsibilities** under WHMIS (no supplier label, MSDS, or training required):

- Wood and wood products
- Manufactured articles the will not release chemicals
- Tobacco or tobacco products
- In-house generated hazardous waste
- Hazardous materials transported under the Transportation of Dangerous Goods act (TDG)

*For more information regarding TDG, please visit:*

http://umanitoba.ca/admin/vp_admin/risk_management/ehso/emanagement/tdg.html
WHMIS and Radioactive Materials

- WHMIS labels and MSDS’s are still required when there are mixtures of radioactive nuclide(s) and non-radioactive carrier material whereby:
  - The carrier material is greater than 1 mL / 1 g
  - The carrier material poses a carcinogenic, toxic, reactive, or infectious hazard

  For more information regarding radiation safety, please visit:

WHMIS Hazard Classes and Symbols

- Class A: Compressed Gas
- Class B: Flammable and Combustible Material
- Class C: Oxidizing Material
- Class D: Poisonous and Infectious
  - Division 1
  - Division 2
  - Division 3
- Class E: Corrosive Material
- Class F: Dangerously Reactive Material
Class A: Compressed Gas

- Characteristics
  - Gas inside cylinder is under pressure

- Hazards
  - Cylinder may explode if dropped or heated
  - Hazards associated with force of explosion and contents of cylinder

- Handling and Use
  - Transport with specialized cart
  - Use gas specific regulator
  - Store away from heat and fire sources
  - Test connections for leaks
  - Ensure cylinders are properly secured
Class B: Flammable and Combustible

Six divisions:

- Division 1: Flammable gas (ex. Hydrogen, methane)
- Division 2: Flammable liquids (flash point < 38°C) (ex. Gasoline, ether)
- Division 3: Combustible liquids (flash point > 38°C but < 93°C) (ex. Diesel fuel, kerosene)
- Division 4: Flammable solids (ex. White phosphorus, magnesium metal)
- Division 5: Flammable aerosols (ex. Flammable propellants such as propane, butane)
- Division 6: Reactive flammable materials (ex. Metallic sodium, lithium aluminum hydride (LAH))
Class B: Flammable and Combustible

Characteristics
- May burn or explode when exposed to heat, sparks, or flames

Hazards
- May ignite spontaneously
- May ignite upon decomposing or being exposed to water

Handling and Use
- Store away from Class C: Oxidizing Materials
- Avoid storing near sources of heat, sparks, or flames
- Keep containers tightly sealed
- Ground and bond when dispensing from 25 L containers
- Store in flammable cabinets if quantities exceed 50 L
- Transport using secondary containment
Class C: Oxidizing Material

- Characteristics
  - Can promote burning or explosions of other materials by providing an oxygen source for combustion

- Hazards
  - May burn skin and eyes on contact
  - Increase fire and explosion hazard
  - May cause combustibles to explode or react violently
Class C: Oxidizing Material

Handling and Use
- Transport and store separately from flammables and organics
- Store in non-corroding containers
- Store away from sources of heat and ignition
- Wear proper personal protective equipment

Examples
- Hydrogen peroxide
- Bleach
- Nitrates
- Persulfates
Class D: Poisonous and Infectious

Division 1

- Division 1: Materials causing immediate and serious toxic effects (acute)
  - Subdivision A: Very toxic material
  - Subdivision B: Toxic material

- Characteristics
  - Poisonous and potentially fatal materials resulting in immediate and severe harm

- Hazards
  - Small quantities may be harmful or lethal
  - May cause immediate death or serious harm if inhaled, swallowed, or absorbed through the skin
Class D: Poisonous and Infectious
Division 1

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Handling and Use
- Avoid skin and eye contact
- Minimize vapor exposure
- Wear the recommended personal protective equipment
- Wash hands after handling

Examples
- Arsenic
- Cyanides
- All halogens
- Carbon monoxide
Class D: Poisonous and Infectious Division 2

- Division 2: Materials causing other toxic effects (chronic, delayed)
  - Subdivision A: Very toxic material
  - Subdivision B: Toxic material

Characteristics
- Materials which have harmful effects after repeated exposures over long periods of time

Hazards
- May cause death or permanent injury
- May cause organ damage, cancer, birth defects, or sterility
- May lead to sensitization or allergies
Class D: Poisonous and Infectious Division 2

Handling and Use
- Avoid skin and eye contact
- Minimize vapor exposure
- Wear the recommended personal protective equipment
- Wash hands after handling

Examples
- Asbestos
- Silica
- Benzene
Class D: Poisonous and Infectious Division 3

- Division 3: Biohazardous infectious material

- Characteristics
  - Infectious agents or biological toxins resulting in serious disease or death

- Hazards
  - May cause serious disease resulting in illness or death

- Handling and Use
  - Work with materials in designated area (ie. Biosafety cabinet)
  - Disinfect area after cleaning
  - Wash hands after handling
  - Wear proper personal protective equipment

- Examples
  - E. coli
  - Tissues
  - Bodily fluids
  - Viruses
Class E: Corrosive Material

- **Characteristics**
  - Materials that will erode metals or destroy tissues

- **Hazards**
  - Will burn human tissue upon contact
  - Can corrode laboratory materials, in particular metals

- **Handling and Use**
  - Store acids and bases separately
  - Store chemicals in non-corroding containers
  - When possible, work in a fumehood
  - Wear recommended personal protective equipment
Class E: Corrosive Material

- Handling and Use
  - Store acids and bases separately
  - Store chemicals in non-corroding containers
  - When possible, work in a fume hood
  - Wear recommended personal protective equipment
  - Always add acid to water
  - Store away from combustibles, organics, and sources of heat and ignition

- Examples
  - Strong acids and bases
  - Hydrogen Fluoride
Class F: Dangerously Reactive

Characteristics
- Materials may undergo unexpected reactions under certain conditions

Hazards
- May be chemically unstable
- May vigorously polymerize
- May react with water to release a toxic or flammable gas
- May explode if exposed to heat or shock
- May burn unexpectedly
Class F: Dangerously Reactive

Handling and Use
- Follow MSDS recommendations for storage and use
- Wear recommended personal protective equipment
- Examine storage containers frequently
- Store and transport securely

Examples
- Azides
- Hydrazine
- Ether
Labels

Two types of labels

Supplier labels
- Labels that suppliers are required to affix to the containers of their controlled products
- Distinctive hatched border
- 7 components

Workplace labels
- Used by employers when supplier labels are not available, have been damaged, the material has been transferred to a different container, or a material has been produced and is being used at the workplace
- If a controlled product is transferred to a new container and consumed within one shift, a workplace label is not required
- 3 components
Products that require supplier labels include:

- Controlled products sold by Canadian suppliers and distributors to Canadian worksites
- Controlled products imported into Canada to be used at Canadian worksites
- You have the right to refuse hazardous materials if they do not have a proper supplier label
The following is required to appear on supplier labels:

- All information must be within a hatched border.
- Must be provided in English and French.

Product identifier

Risk phrases

Precautionary statements

First aid measures

Supplier identifier

Hazard symbol(s)

MSDS reference
Small Container Labels

- Controlled products packaged in containers less than 100 mL require the following on their label:
  - Product identifier
  - Supplier identifier
  - Hazard symbols
  - MSDS reference
Workplace Labels

The following is required to appear on workplace labels:

- **Product name**: Methanol
- **Precautionary measures**: Flammable, poisonous, harmful vapor. Keep away from heat, sparks, flames. Avoid contact with eyes and skin.
- **MSDS reference**: See MATERIAL SAFETY DATA SHEET

You can print your own workplace labels at:

http://umanitoba.ca/admin/vp_admin/risk_management/ehso/chemical_safety/WHMISProgram.html
Laboratory Supply House Labels

Do not require a full WHMIS label

The following is required to appear on laboratory supply house labels:

- Product identifier
- MSDS statement
- Risk phrase(s)
- Precautionary measures
- First aid measures
Material Safety Data Sheets (MSDS)

- Suppliers must supply a current (less than 3 years old) MSDS at the time of sale
  - Employers must update MSDS every 3 years
- MSDS must be accessible to all workers
  - Store in a readily accessible area known to everyone
- MSDS must be kept for at least 30 years
- Risk group 2 and higher biological agents also require a MSDS or a Pathogen Safety Data Sheet (PSDS)
- You have the right to refuse a controlled product that comes without an MSDS
- MSDS’s contain nine different information items
Information Items on MSDS

1. Product information
   - Product identifier
   - Product use
   - Manufacturer’s name, address, and emergency phone number
   - Supplier’s name, address, and emergency phone number

2. Hazardous ingredients
   - Lists all of the potentially hazardous ingredients, along with their approximate percentages, as well as the CAS registry number
   - The LD$_{50}$, LC$_{50}$, and threshold limit value (TLV) is provided for each hazardous ingredient
     - The lower the LD$_{50}$ and LC$_{50}$, the greater the lethality
Information Items on MSDS

3. Physical Data
   - Provides information on the physical and chemical properties such as odour, boiling point, and vapour density

4. Fire and Explosion Hazard
   - Provides the conditions under which the product may catch fire or explode, as well as information for developing strategies and procedures to deal with fire and explosion hazards

5. Reactivity data
   - Provides information regarding stability, self-reactivity, hazardous decomposition products, and conditions to avoid when using the product
Information Items on MSDS

6. Toxicological properties
   - Identifies how the substance can enter the body and the possible health effects from short term (acute) exposures such as irritation, sensitization, and long-term (chronic) such as liver or kidney damage, sensitization, cancer, or reproductive effects.

7. Preventative measures
   - Provides preventive measures you can take to protect yourself from exposure including: extra ventilation, personal protective equipment (PPE), safe use, handling, storage, disposal, transport, and spill control.
8. First aid measures
   ➤ Provides first aid information

9. Preparation information
   ➤ Indicates who was responsible for preparation and date of preparation of MSDS
      ➤ This date must not be more than 3 years old
   ➤ MSDS information may be labeled as Trade Secret if a claim has been filed
   ➤ This information is released to medical professionals in case of emergency
Globally Harmonized System (GHS)

- Implementation: June 2015

- Internationally recognized system for chemical hazard classification and communication

- To be integrated into existing WHMIS framework
  - Roles and responsibilities of supplier, employer, and employee not to change

- Changes include new symbols, labels, and safety data sheets (SDS)
GHS Hazard Classes

- Total of 3 GHS hazard classes, each which have subclasses
  - Physical hazard class
    - 19 subclasses
  - Health hazard class
    - 10 subclasses
  - Environmental hazard class
    - Canada will not be adopting this class or its subclasses

- Canada will:
  - Retain the Biohazardous Infectious Materials WHMIS Hazard Class
  - Introduce the health hazards not otherwise specified and physical hazards not otherwise specified subclasses
<table>
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<tr>
<th>GHS Pictograms</th>
<th>\begin{itemize} \item Flammables (gases, aerosols, liquids, solids) \item Self-reactive substances and mixtures \item Pyrophoric liquids, solids, and gases \item Self-heating substances and mixtures \item Substances and mixtures that in contact with water emit flammable gas \item Organic peroxides \end{itemize}</th>
<th>\begin{itemize} \item Carcinogenicity \item Respiratory sensitization \item Reproductive toxicity \item Specific target organ toxicity – repeated exposure \item Specific target organ toxicity – single exposure (category 1, 2) \item Aspiration hazard \item Germ cell mutagenicity \end{itemize}</th>
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<td>\begin{itemize} \item Skin sensitization \item Acute toxicity (harmful) \item Specific target organ toxicity – single exposure (category 3) \item Eye irritation \item Skin irritation \item Hazardous to the ozone layer \end{itemize}</td>
<td>\begin{itemize} \item Corrosive to metals \item Serious eye damage \item Skin corrosion \end{itemize}</td>
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<td>\begin{itemize} \item Acute toxicity (severe) \end{itemize}</td>
<td>\begin{itemize} \item Gases under pressure \end{itemize}</td>
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<td>\begin{itemize} \item Oxidizing gases, liquids, solids \end{itemize}</td>
<td>\begin{itemize} \item Biohazardous infectious material \end{itemize}</td>
</tr>
<tr>
<td></td>
<td>\begin{itemize} \item Self-reactive substances and mixtures \item Organic peroxides \item Explosives \end{itemize}</td>
<td>\begin{itemize} \item Hazardous to the aquatic environment \item Canada will not be implementing \end{itemize}</td>
</tr>
</tbody>
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Safety Data Sheets (SDS)

- Updated terminology for the MSDS
- Will consist of 16 sections
- **Will not** need to be updated every 3 years
- Must be current at time of sale/import
# Safety Data Sheets (SDS)

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<td>12-15</td>
<td>Ecological, transport and regulatory information, disposal considerations</td>
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<td>16</td>
<td>Other information</td>
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</table>
Labels

Product K

Danger
Fatal if swallowed
Causes skin irritation

Precautions:
Wear protective gloves.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.

Store locked up.
Dispose of contents/containers in accordance with local regulations.

IF ON SKIN: Wash with plenty of water.
If skin irritation occurs: Get medical advice or attention.
Take off contaminated clothing and wash it before reuse.
IF SWALLOWED: Immediately call a POISON CENTRE or doctor. Rinse mouth.

ABC Chemical Co., 123 Anywhere St., (123) 456-7890

Product identifier
Pictogram
Signal word
Hazard statement
Precautions
Initial supplier information
Questions

- For any questions regarding WHMIS or GHS, please contact your area WHMIS coordinator.

- If you are experiencing any difficulties with this presentation, please contact the Environmental Health and Safety Office.
  - ehso@umanitoba.ca
  - 204-474-6633