



Safety in the Use of Chemicals

Health Worker Safety Training Module 8

Topics

- Introduction
- How chemicals enter the human body
- Effects of chemicals on the human body
- Managing exposure to chemicals
- Safe management of chemicals

Introduction

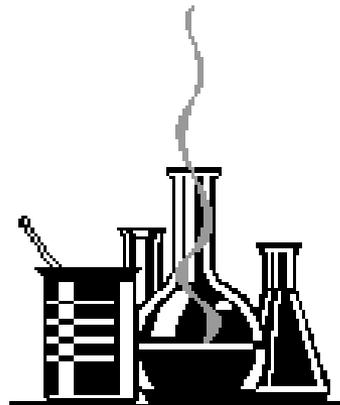
- Chemicals are important for fighting diseases
- However, they have the potential to cause serious harm to workers, the public, and the environment if improperly handled.
- There is an urgent need to protect ourselves and the environment from the harm that could be caused by chemicals.



How chemicals enter the human body

Ways Chemicals Enter the Human Body

- Chemicals can enter the human body the following ways:
 - Inhalation (breathing)
 - Skin contact
 - Swallowing
 - Injection
 - Contact with mucous membranes (e.g. the eyes)



Chemical Inhalation

- Most chemicals enter our bodies when we breathe. They enter in the form of dust, vapors, mists or gas.
- Smaller particles penetrate more deeply into the respiratory system
- Health effects depend on:
 - Amount inhaled
 - Length of exposure
 - Characteristics of exposed people (age, health status, etc.)
 - Children, the elderly, pregnant women and people weakened by illness are more at risk from side effects of chemicals



Many chemicals do not have an odor, so you may not realize you are inhaling harmful toxins!!

Chemical Absorption Through the Skin

- The skin is composed of a number of layers which can protect us from biological, physical and chemical hazards encountered in the natural environment.
- But a number of chemicals corrode or burn the skin, others dissolve the outer layer.
- If skin is damaged by injuries it is more likely to be penetrated by chemicals.
- Once chemicals enter through the skin they may be carried away in the blood stream, causing harm to the organs or to bodily functions related to breathing, the nervous system, etc.

Chemicals in Food and Drink

- Chemicals can be ingested accidentally through
 - Consuming contaminated food or beverages
 - Smoking
 - Touching your mouth with contaminated hands





Effects of chemicals on the human body

Health Problems Caused by Chemicals

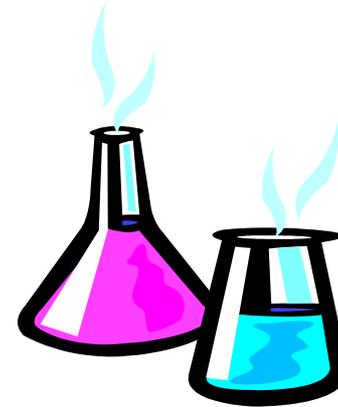
- The effects of chemicals on health depend upon a number of factors such as
 - how they enter the body
 - their chemical and physical properties
 - how dangerous they are
 - volume of exposure
 - duration of exposure
 - pregnancy
 - the personal characteristics of the individual such as age, sex, health status and susceptibility to certain chemicals
- Each chemical affects human health in its own way.

Length of Exposure

Acute Exposure	Chronic Exposure
Brief exposure to hazardous chemicals	Repeated exposure to small doses of hazardous chemicals over long periods of time
Measured in minutes, hours, days	Measured in months, years
Health effects are usually immediate and often reversible	Health effects of exposure may not be evident until many years later, sometimes after chemical exposure has stopped
Irreversible or permanent health effects may occur at very high concentrations of toxic chemicals	Health effects can be permanent and fatal

Effects of Chemicals on the Body

- Effects of chemicals on health can range from temporary discomfort to permanent damage.
- Chemical exposure can have severe effects on
 - Respiratory system
 - Nervous system
 - Reproductive system
 - Heart
 - Liver
 - Blood
 - Kidneys
 - Eyes
 - Skin
- Exposure to chemicals over long periods of time has been linked to cancers and birth defects

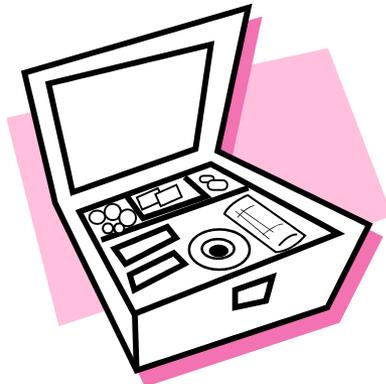




Managing Exposure to Chemicals

First Aid Response to Accidental Exposures

- Basic information about specific first-aid measures in response to chemical exposure can usually be found on the label of the chemical container
- All hospital settings where chemicals are used, handled, or stored should have first aid kits
- Health workers should be trained to administer first-aid and resuscitation in order to respond to exposure



First Aid by Route of Exposure

- **Inhalation:**

- Can result in irritation, headache, dizziness, nausea due to vapors, fumes, dust, or gases
- Move to an area with fresh air
- If the person is unconscious due to inhalation of a large amount of chemicals, move them to fresh air and lay them on their side

- **Ingestion:**

- Exposure can occur by eating or drinking contaminated food or drink or eating with contaminated hands
- Contact a doctor immediately
- Check the label of the chemical container. In some cases induced vomiting is not recommended as it may cause further damage.

First Aid by Route of Exposure (continued)

- **Skin exposure**

- First aid providers must wear appropriate PPE
- Contaminated clothing should be removed immediately.
- The affected parts should be rinsed thoroughly with water for at least 15 minutes.

- **Eye:**

- Rinse continuously with eye wash or clean water for at least 15 minutes, until irritation goes away
- If irritation or pain persists after 15 minutes of rinsing, seek medical attention



Safe management of chemicals

Labeling

- All chemical products are labeled with health and safety measures to be taken when the chemicals is in use
- Unlabeled chemicals put staff and patients at serious risk
- When transferring chemicals from larger to smaller containers, it is important to label the new containers with essential information
- The label should contain the following information
 - Trade name of the chemical
 - Identity of the chemical
 - Hazard symbols
 - Risks associated with the chemical
 - Safety precautions



Handling and Use of Chemicals

Principles for use of chemicals:

- **Isolation:** minimizing the contact between the worker and the chemical by incorporating physical barriers (e.g. gloves)
- **Ventilation:** removal or dilution of hazardous chemicals in the air to minimize or eliminate health risks



PPE must be used when risk of exposure is anticipated

Storage of Chemicals

- Store chemicals in a cool, dry, dark place
- Unauthorized people should not be allowed to access stored chemicals
- Only minimal amounts of chemicals should be stored
- All containers must be properly labeled



Storage of Chemicals (continued)

- Firefighting and personal protective materials must be readily available in storage areas
- Smoking, eating and drinking in chemical storage areas is prohibited
- Incompatible materials should not be stored near one another—this could pose health risks





Thank You

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