



In lecture (1) we discussed the following:

- 1- What is the environment? What are the components of the environment?
- 2- What is health?
- 3- What is environmental health?
- 4- Natural & built environment.
- 5- Benefits of environmental health.
- 6- Aims of environmental health.
- 7- What is Pollution? Sources of outdoor air pollution.
- 8- 1ry. & 2ry. Air pollutants.
- 9- The most important 6 air pollutants according to EPA.



كلية الطب والجراحة



Lecture (2)

Environmental Health



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I-Water and Health

- Fresh water is essential for human health. Every day, each person needs 20-50 liters of water for daily activities.
- Sources of water in Egypt:
 - 1- Surface water: Nile River represents 97% of all water resources in Egypt.
 - 2- Underground water: Comes from two types of wells:
 - Deep wells: It is essential source of water in the Egyptian desert.
 - Superficial wells: This type of well is very liable to contamination. They are distributed between Nile Valley and Delta Regions.

Freshwater pollution

- Freshwater pollution originates from many sources, including:

1. Municipal (**Sewage Treatment Plants**).



2. Industrial activities

3. Agricultural waste

4. Power generation



There are two types of water pollution:

1.Organic pollution:

Due to microorganisms (bacteria and viruses) present in the water, generated by human, animal and vegetable waste.

2.Chemical pollution:

Generated by the nitrates and phosphates of pesticides, human and animal drugs, heavy metals, acids and hydrocarbons used in industries.

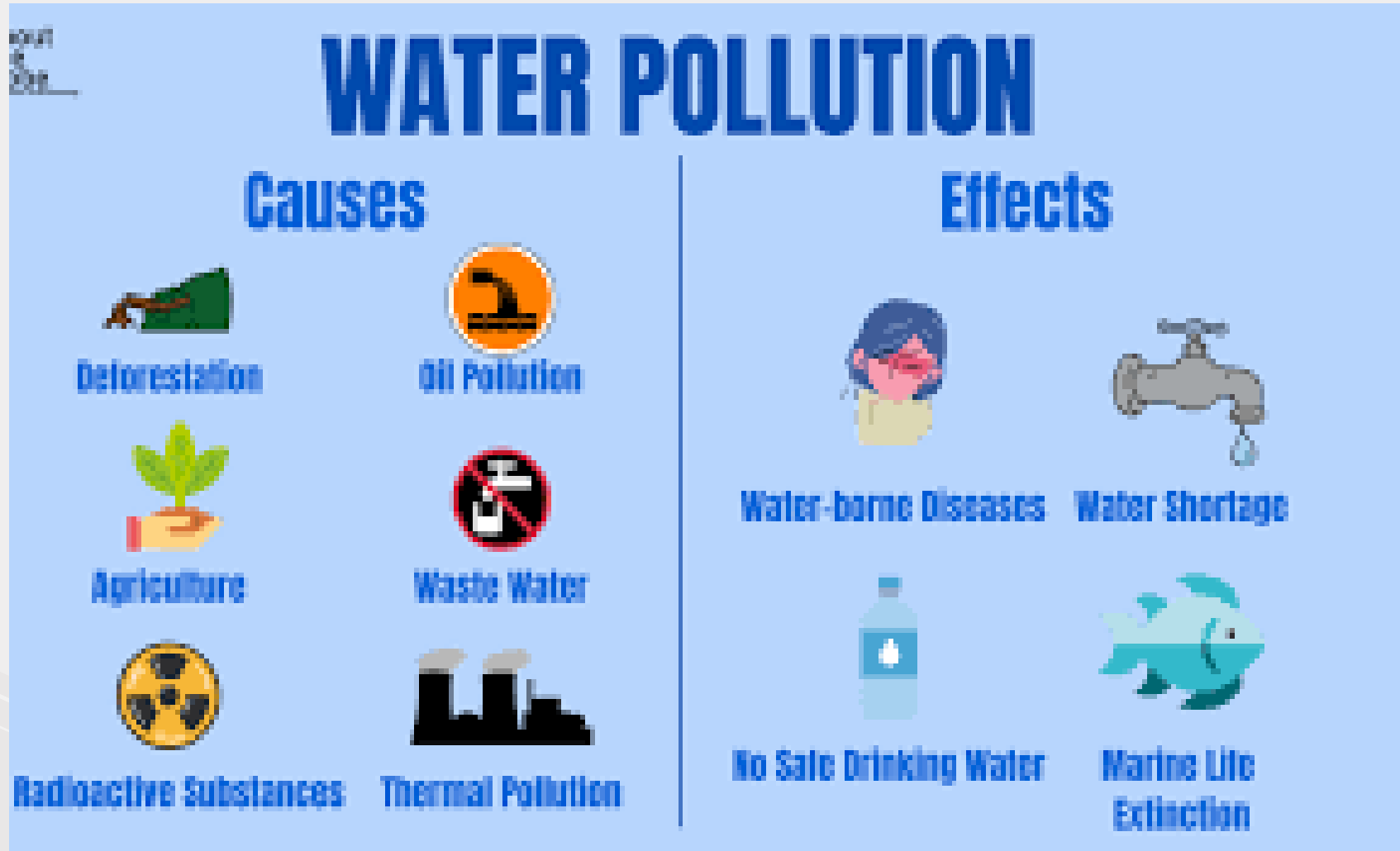
Challenges of inadequate water quantity and /or quality

(1) Rising inadequate quantity due :

- Growing population size.
- Growing Per capita water demand.
- Growing livestock production.
- Growing industrial activities.
- Lack of rain and/or dam building.

(2) Rising inadequate quality due to:

- Sewage.
- Run-off from fields treated with fertilizers and pesticides.
- Chemical toxins from industries.



Water Purification

- It is the process of removing undesirable chemical and biological contaminants, suspended solids and gases from raw water to be fit for drinking and other purposes.
- Methods of water purification depends upon number of inhabitants / purpose:

(1) Large scale water purification:

They provide safe water supply for large communities. The method depends if the source of water is either surface water or from deep wells.

A- Large scale water purification plants using surface water (Nile River):

- **Main Steps:**

1- Raw water intake.

2- **Coagulation:** It is a chemical process in which a chemical compound, a “coagulant”, is added to the water in order to deposit the suspended particles to form (flocs).

3- **Sedimentation tanks:** where Aluminum sulphate is added to help precipitation of mud and 30% of the bacterial content.

4- **Filtration tanks:** Using sand or mechanical filters that will get rid of 95% of organisms.

5- **Disinfection:** using chlorine (effective, cheap and easily applied).

WATER PURIFICATION



B- Large scale water purification of the underground deep wells' water:

- Under usual conditions (no threatening epidemic as cholera), the deep underground water is safe from the biological point of view.
- In case of impending epidemics, large scale disinfection is required.

(2) Small scale water purification e.g. household level:

- 1- **Boiling:** 100C° for at least one minute.
- 2- **Bacterial filter:** The essential part of any filter is **the candle** which should be cleaned by a hard brush under running water and boiled at least once/week.

3- Chemical disinfectants: e.g. A- Chlorine tablet.

B- Iodine: 2drops/1 liter of water.

N.B: All these methods don not deal with chemical pollution.

Examination of drinking water

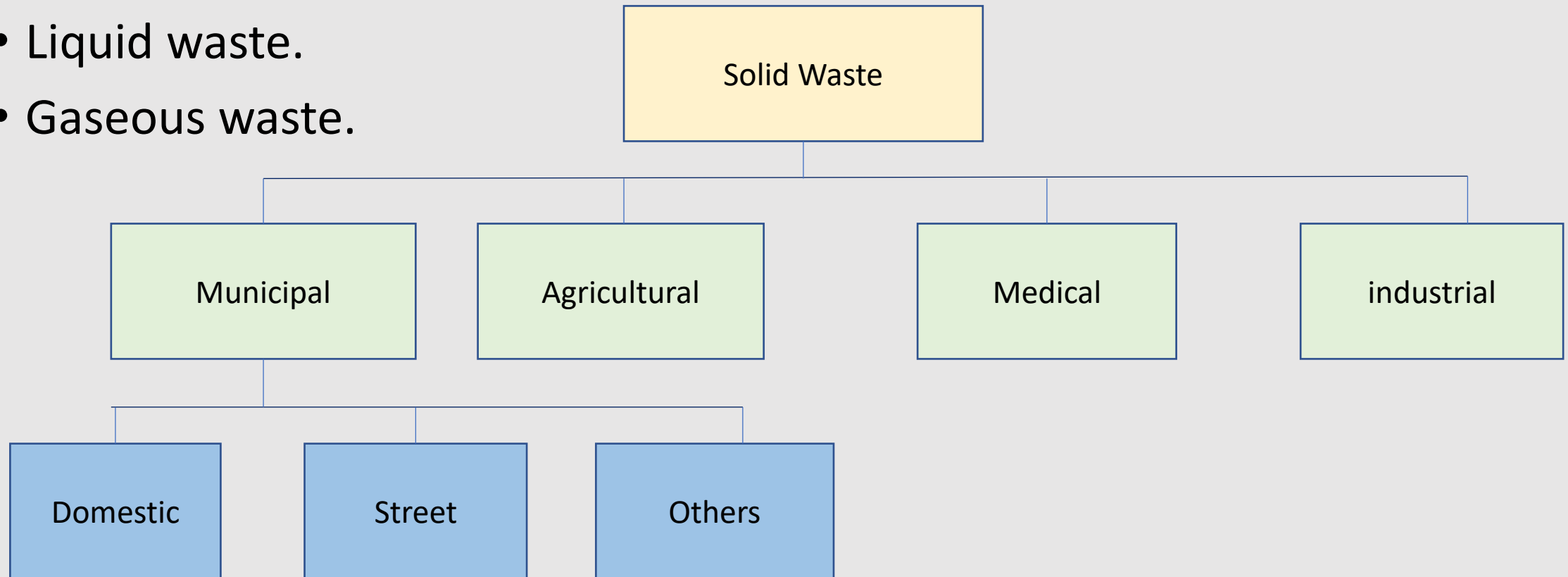
- Drinking water should be free from any pathogenic organisms.
- Determination of coliform organisms in drinking water is routinely required.
- Presence of nitrites indicates fresh contamination by organic matter (sewage).
- The presence of certain chemicals (as lead, arsine, iron) above the prescribed limits lead to rejection of the water as a source of public water supply.

Waste

- **Waste:** Discarded material that is no longer useful or not required after completion of a process.
 - a. **Hazardous waste:** Any discarded material that have potential harmful effect on the environment or human health, that may be infectious, radioactive or toxic.
 - b. **Municipal solid waste:** It is the waste collected by municipality. It consists of everyday items discarded by the public from residential areas, shops, public places streets and it requires sorting for better management.

According to consistency, waste could be:

- Solid waste.
- Liquid waste.
- Gaseous waste.



Health care waste

- Definition:

- Health care waste is the total waste (solid, liquid hazardous or non hazardous) from health care facilities.
- Major sources of Health care waste include, hospitals, clinics, laboratories, research centers, animal research, blood banks, nursing homes and autopsy centers.
- Hospitals generate approximately 75% of Health care waste.



Types of Healthcare Waste

1. Infectious Waste:

It includes waste contaminated with blood or other body fluids and capable of transmitting infectious agents.

Examples include used bandages and surgical gloves.

2. Cytotoxic Waste:

- It refers to waste containing genotoxic properties. For example, cytotoxic drugs that are used in cancer treatment and their metabolites.

3. Pathological Waste:

- Pathological waste refers to any tissue, organ, or body part that has been removed during surgery and autopsy. It also includes human body fluids, such as blood or other secretions.

4. Sharps Waste:

- It includes any object or device that can puncture or cut the skin. For example, needles and syringes.

5. Chemical Waste:

Includes any chemical substance that is no longer needed or has expired. It includes medications, solvents, disinfectants, and laboratory reagents.

6. Radioactive Waste:

Includes glassware contaminated with radioactive material, such as used nuclear medicine or radiation therapy sources.

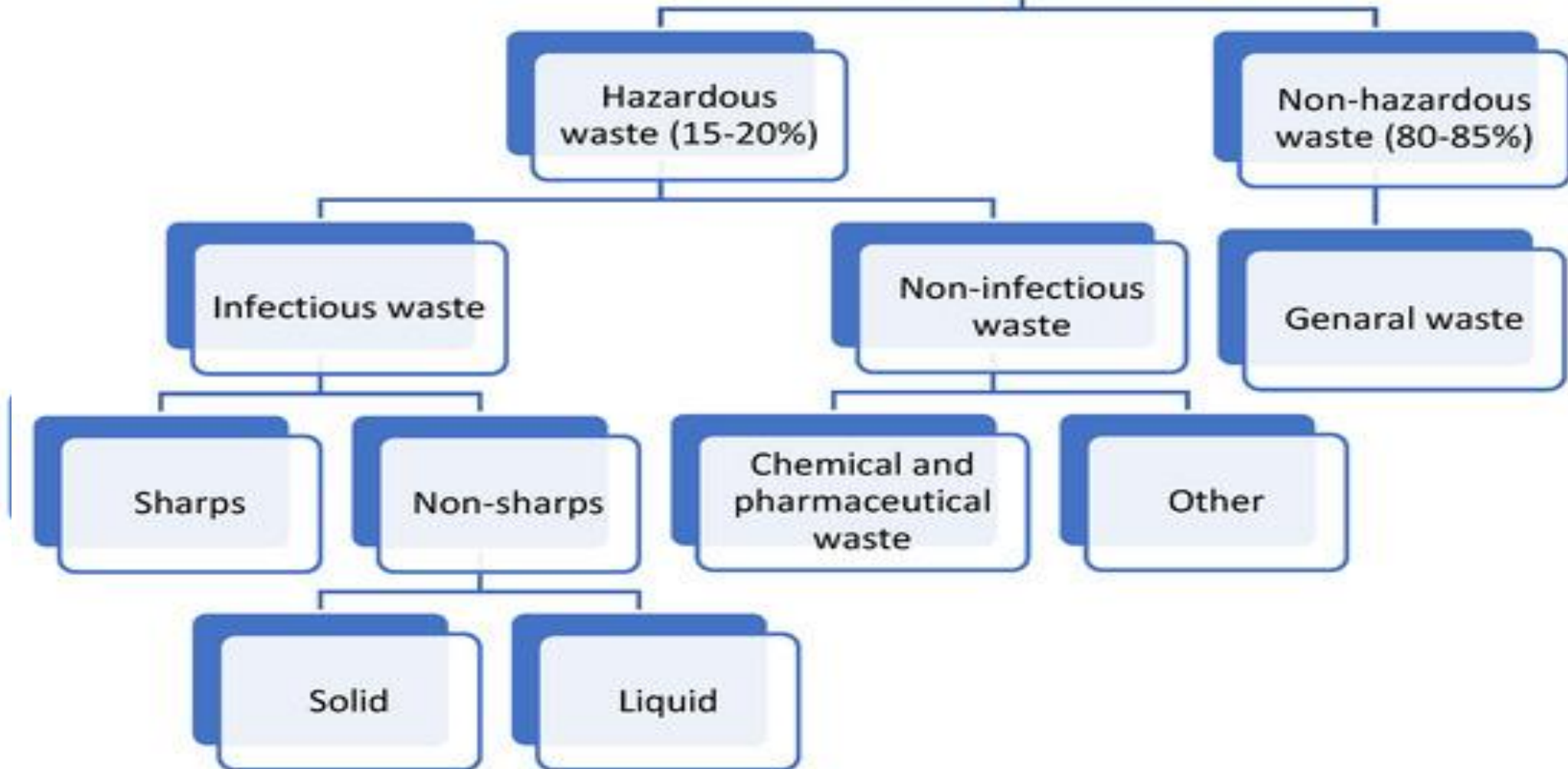
7. Pharmaceutical Waste:

Includes expired, unused drugs, vaccines and sera.

8. Non-hazardous or General Waste: (80-85%)

Includes domestic waste.

Classification of Health Care Risk Waste



Management of healthcare hazardous waste

This can be done by Waste Management Plan that include:

1) *Sorting and packing:*

Sorting is segregating waste by type into color coded containers at place where it is generated with label or symbol.

- **Red bags** for infectious and pathologic waste.
- **Yellow bags** for radioactive waste.
- **Black bags** for general waste.



2) *Collecting and transporting* within facility in closed containers.

3) *Internal storage within facility* until it is transported to final disposal.

- The room should be adequately ventilated with windows protecting from insects and rodents.
- Storage time not more than **24 hours in the summer** and **48 hours in winter**

4) *Treatment* by incinerators and sterilization.

5) *Final disposal* of the treated waste in a sanitary landfill.

Thank You