PROTECTION OF THE ENVIRONMENT FROM HOSPITAL WASTE UNDER LAW NO. 18/11

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Abstract:

Hospital waste is an important issue that has attracted the attention of various health and environmental systems and agencies, as well as all stakeholders and interested parties worldwide. This is due to the fact that it poses a real threat to both the environment and public health, as it has the potential to transmit deadly diseases and destroy natural ecosystems if not properly disposed of according to international standards that consider the environmental costs of this waste before its economic costs.

In line with other countries around the world, Algeria has amended its legal framework to address current and future challenges in waste management, particularly medical waste, with the aim of reducing potential environmental risks associated with medical waste.

Keywords: Waste Management, hospitals, Environmental damage, environmental damage, Environmental risks.

INTRODUCTION

Hospital or medical waste is one of the most significant factors affecting the environment due to the risks posed by the hazardous substances and biological and gaseous by-products it contains. Medical waste is the waste generated from materials used in the examination, diagnosis and treatment of patients, whether inside or outside healthcare facilities. This waste includes needles, syringes, cotton, gauze, blood and body fluid specimens, pharmaceutical waste, chemical and radioactive waste, and surgical waste from human organs. These types of waste are among the most hazardous to both the environment and human health because they contain bacteria, viruses, fungi and other pathogens from the patients themselves. As a result, they contribute significantly to the emergence of fast-spreading diseases and life-threatening epidemics.

According to the ResearchGate website, this waste can cause viral hepatitis, AIDS, typhoid, bronchitis, anthrax and various infectious and allergic diseases. In addition, it degrades the aesthetic quality of the environment, so it is essential to control and safely collect this waste to prevent it from becoming a threat to both the environment and people.

Today, despite widespread knowledge of the impact of medical waste on humans and the environment, some medical facilities and treatment companies still dispose of medical waste inadequately, often due to inadequate staff training or inappropriate disposal methods. The core problem lies in the fact that "many hospitals try to circumvent the law by disposing of some of this waste indiscriminately, either by dumping it at sea or in remote areas, or by paying certain individuals to dispose of this hazardous waste by illegal means. Unfortunately, some hospitals try to reduce the costs they incur by hiring authorised and licensed companies to dispose of this waste".

Due to the importance of the subject, this article will attempt to address an important issue that arises mainly from the following questions: To what extent can hospital waste affect the environment? Is it possible to establish regulations to control the management of this type of waste? What is the position of Law 18/11 in this matter?

In order to answer these questions, the article can be divided into two main axes:

Axis One: Types of medical waste and their impact

Part One: Types of medical waste

1. Infectious waste:

This type of waste contains or is suspected of containing infectious agents. It includes wastes that may transmit infectious diseases due to contamination by bacteria, viruses, parasites and fungi. It includes:

- Contaminated cotton and gauze dressings.

- Swabs and other waste contaminated with patient secretions.

- Items used by or in contact with patients with infectious diseases (cups, plates, etc.) and bacterial and viral cultures in laboratories.

- Waste from dialysis units, including equipment, tools, gloves, disposable shoe covers and filters[1].

- Waste from patients isolated in infectious disease wards.

- Bed linen and furniture contaminated with pathogens.

2. Chemical waste.

Includes solid, liquid or gaseous chemical materials derived from diagnostic or laboratory activities or used in cleaning and disinfection procedures.

Classification:[2]

- Hazardous chemical waste.

- Non-hazardous chemical waste.

**Hazardous chemical waste:

This is further subdivided according to its chemical properties into

- Toxic waste

- Highly flammable waste.

- Highly reactive wastes (which may be explosive, sensitive to shock or vibration, reactive to water or air, allergenic) and may affect chromosomes and cell genes, causing cancer and genetic mutations, similar to drugs used for malignant diseases.

Non-hazardous chemical waste:[3]

This is a group of wastes that do not have the characteristics of hazardous chemical wastes, such as sugar compounds, amino acids and organic and inorganic salts.

3. Sharps waste

This type of waste includes sharp instruments such as syringes, scalpels, saws, blades, broken glass and any other sharp tool that can cause cuts or punctures to the body.

Important note:

The most common uses of sharp instruments in the medical field are injections and needles, which are among the most dangerous items handled by healthcare workers, including doctors, nurses and cleaning staff. This is due to the high risk of contracting deadly infectious diseases from punctures or scratches with these sharp instruments, which are contaminated with patients' blood and fluids containing pathogens[4].

4. Pharmaceutical waste:

- This includes damaged or expired medicines.

- Food and vaccine residues.

- Residues of drugs and chemical preparations collected from patient wards suspected of contamination.

- Medicines that have been spilled on the floor and need to be disposed of for one reason or another.

- Residues of drugs used in the treatment of malignant diseases (ampoules, bottles, solutions, etc.).

The chief pharmacist is responsible for determining the appropriate time for the disposal of pharmaceutical waste, except for vaccines used in immunisation, for which the head of the immunisation team is responsible.

5. Radioactive waste:

This includes all solid, liquid and gaseous materials contaminated with radioactive substances resulting from their use in the examination of human tissues and fluids and in the diagnosis and treatment of tumours.

Sources:[5]

Closed sources:

These contain isotopes with higher radioactive activity than those found in open sources and are disposed of by specialised agencies.

Open sources:

These are used for diagnostic, therapeutic and scientific research purposes. They have low radioactive activity and may be in solid, liquid or gaseous form.

6. Compressed Containers:

This category includes all containers used for the storage of gases under pressure, such as nitrous oxide, ethylene oxide, oxygen and compressed air, including

- Empty or damaged gas cylinders and sterilisation containers.

- Other items such as aerosol cans of pesticides.

Hazards of these compounds:[6]

Gas leakage may occur due to corrosion of valves or safety fittings. In such cases, contact the supplier immediately to dispose of the damaged containers. They may explode if punctured or exposed to high temperatures, particularly during incineration.

7. Genotoxic and cytotoxic waste:

This is a specific type of pharmaceutical waste that is highly hazardous and has the potential to kill or inhibit cell division or affect genetic components.

This includes

- Materials used in the treatment of certain cancers and organ transplants.

- Supplies used in the preparation of these materials.

- Waste from patients treated with these materials for up to one week after their last dose.

Examples of medical waste by source and type:[7]

- Medical waste from obstetrics and gynaecology departments:

- Pathological waste:

- Human placenta weighing between 500-700 grams per birth.

- Infectious waste:

- Contaminated blankets, sheets and cotton from childbirth.

- Disposable gloves, masks, headgear and gowns.

- Empty blood bags after use.

- Blood samples and cervical swabs from the laboratory associated with these departments.

- Medical waste from dialysis centres:

- Produces large quantities of both liquid and solid medical waste. As blood is at the centre of this process, it is extremely hazardous to both the individual and the community.

- Infectious waste:

- Blood filters: single-use and highly infectious as they contain patient blood.

- Blood tubes: each patient uses one tube for each dialysis session, along with injection needles, fistulas, gloves and plastic gallons.

- Liquid waste:

- Varies from 2.5 to 6 kilograms per patient per session and is typically disposed of in the wastewater.

- Chemical waste:

- Disinfectants and fluids used with each dialysis machine after each treatment session.

- Medical waste from medical laboratories:

- Infectious waste:

- Liquid waste: Blood samples, sera, urine samples, stool samples, semen samples, saliva and swabs.

- Solid waste: Tissue samples and somatic cells from pathology laboratories.

- Semi-solid waste: bacterial cultures, cervical swabs, tonsil swabs, wound swabs, and eye and nose samples.

- Sharps waste:

- Includes needles, scalpels, glass slides, broken glass covers and remains of broken and sharp bottles.

- Liquid waste:

- Includes chemical fluids used to operate analytical equipment, as well as disinfectants for this equipment, and cleaning fluids for laboratory surfaces and floors, including dyes and acids used in pathology laboratories.

Sources of infection in healthcare settings:

The causes of infections and many injuries in healthcare facilities can be attributed to

- Failure to comply with public health and personal hygiene regulations, whether by medical staff, patients or visitors.

- Poor food preparation or poor quality water supply.

- Contamination of tools and equipment used in medical procedures.

- Medical waste, if not properly handled and disposed of, can be a significant source of infection for patients, medical teams, cleaners and staff.

- Hazardous medical waste.

Hazardous characteristics of medical waste:

- Contains infectious elements such as laboratory cultures, contaminated blood, contaminated cotton, isolation ward waste and highly infectious and deadly microbes.

- Presence of highly toxic substances that can cause cell death or mutations (cytotoxicity, e.g. waste containing chemical treatments).

- Presence of hazardous drugs and chemicals (such as cancer drugs, expired drugs and materials contaminated with drugs).

- Presence of lethal radioactive materials (such as residues from radiology rooms and specialised research laboratories, and radioactive solutions used such as radioactive iodine).

- Sharps and cutting materials (including surgical instruments/sharp tools such as needles, scalpels, blades and broken glass).

Pathways of transmission of pathogens from medical waste:

All of these infectious agents can be transmitted by a number of routes, including:

- Absorption through wounds or openings in the skin or through skin punctures.

- Absorption through mucous membranes.

- Inhalation.

- Ingestion.

**Who is at risk?

Anyone exposed to hazardous healthcare waste is at risk. This requires a strict and well organised waste management system.

Main risk groups:

Within the healthcare facility (source of waste):

- Doctors and nurses, allied health professionals, maintenance workers or any staff within the healthcare facility.

- Patients.

- Visitors to healthcare facilities.

- Support staff in healthcare facilities, such as laundry workers, cleaning staff and waste handlers.

Outside the healthcare facility:

- Workers in waste collection, transport and disposal facilities (such as landfills or incinerators) or others exposed by negligence or accident.

- Scavengers or people who handle waste (e.g. drug addicts using contaminated needles)[8].

Section 2: Areas of impact of waste on individuals and the environment.**

Some of the most significant impacts include:

First: The impact of medical waste on individuals.

All staff working in healthcare facilities, as well as patients and their visitors, are at risk of infection from microbes (pathogenic micro-organisms) that may be transmitted to them through hazardous waste handled in these facilities. These wastes are classified as hazardous, polluting and capable of transmitting fatal diseases.

1. Impact of infectious and pathogenic waste:

Infectious or pathogenic waste may contain various types of disease-causing micro-organisms, some of which may remain active for long periods of time. Pathogenic organisms can cause infection in exposed individuals by several routes, including puncture or severe abrasion of the skin or mucous membranes, wounds and cuts on the skin, inhalation through the respiratory system, and ingestion.

Many diseases or symptomatic conditions can be anticipated, with particular attention being paid to the potential transmission of viruses that cause Acquired Immune Deficiency Syndrome (AIDS) and Hepatitis B and C viruses through exposure to blood-contaminated medical waste containing any of these viruses.

In addition, contaminated sharp instruments (especially intravenous needles) and microbial cultures or other micro-organisms are among the most dangerous types of waste to human health, as they can cause cuts or penetrating wounds and the possibility of transmitting infections.

2. Effects of chemical and pharmaceutical waste:

Chemical and pharmaceutical waste can cause poisoning and injury, including burns. Poisoning occurs when chemicals or pharmaceuticals are absorbed through the skin, mucous membranes, inhalation or ingestion. Disinfectants are among the most important members of this group. These chemicals are hazardous and can pose additional risks, such as the potential for fire or environmental contamination through improper disposal. Some pharmaceutical wastes can have devastating effects on natural ecosystems.

3. Impact of genotoxic wastes:

Exposure to genotoxic substances in healthcare can occur during the preparation or handling of certain drugs and chemicals. The main routes of exposure are inhalation of dust or aerosols, absorption through the skin and ingestion of food contaminated with cytotoxic drugs. Exposure can also occur through direct contact with body fluids and excretions of patients undergoing chemotherapy. These substances can kill or induce mutations in human cells.

4. Effects of radioactive waste:

Radioactive waste can affect genetic material. Exposure to high-level radioactive waste can cause serious injury, such as tissue destruction.

Second, the impact of medical waste on the environment.

In general, there are several main ways in which waste enters and affects the environment:[9]

- Disposal of medical waste without treatment: This occurs in poorly managed and designed landfills, where harmful elements in the waste can be spread by wind, insects or rodents. In addition, rain and possible flooding can leach waste liquids into the soil, contaminating groundwater.

- Spillage of hazardous medical waste fluids: These harmful fluids can be released into sewers or directly into lakes, rivers or other bodies of water. This allows harmful elements to reach humans, animals and plants through direct consumption of drinking water from surface or groundwater, or through the food chain.

- Landfill of medical waste: This has negative effects such as soil degradation, release of harmful vapours and contamination of groundwater. In addition, dumping waste on the seabed endangers water and fish resources.

- Emissions from incineration: When waste is incinerated improperly, especially in densely populated areas, harmful elements in the smoke can lead to air pollution with smoke, gases and ash. When it rains, these pollutants can be carried into ground and surface water.

- Incineration of medical waste: This is a major source of dioxins (a carcinogen), mercury and other pollutants. Incineration is intended to destroy materials containing infectious agents, such as paper, cardboard, plastics, glass and metals. However, the process produces acid gases (due to the presence of chlorinated plastics) and releases toxic metals from dyes and additives in paper, plastics and other materials such as batteries.

A study by the US Environmental Protection Agency identified medical waste incinerators as a major source of dioxin and mercury contamination in the environment and food supply. This makes incineration of hazardous medical waste a technology of concern and suggests that alternatives to incineration are more economically beneficial.

Chapter Two: Medical waste management and the position of Algerian legislation (under Law No. 18/11)

Section One: Medical waste treatment techniques

Some solutions for the treatment of medical waste, which reduce the risk of infection and prevent the potential for waste scavenging, may lead to other health and environmental hazards. For example, incineration of certain types of medical waste, especially those containing heavy metals or chlorine, can release toxic substances into the atmosphere (especially if incineration temperatures are not high enough or emissions are not adequately controlled).

In addition, the disposal of medical waste in landfills can lead to groundwater contamination (if the facility is not well designed or managed). Because of these risks, when choosing a solution for the treatment or disposal of medical waste (especially where there is a risk of release of toxic substances or other serious environmental consequences), the relative risks and the integration of the chosen method into an overall operational plan must be carefully considered, taking into account local conditions.

The main techniques for the disposal of medical waste include:

- Incineration

- Chemical disinfection

- Wet heat treatment (steam sterilisation)

- Short wave irradiation

- Landfill

- Stabilisation of hazardous waste

While incineration is still widely used, alternative methods are gaining in popularity. There are several factors to consider when choosing a method, most of which depend on local conditions such as health and safety requirements and available options for final waste disposal.

The effectiveness of waste incineration is undeniable, but it can cause serious air quality problems. As the reactive element in the incineration process is the ambient oxygen, large volumes of air must pass through the incineration system. If the incoming air is not treated by a controlled device, all volatile compounds at operating temperature will be emitted with the flue gas.

Disadvantages of incineration:

- High investment and running costs.

- Cytotoxic substances cannot be completely eliminated.

- Significant emission of air pollutants.

- Regular removal of ash and soot required.

- Destruction of heat resistant chemicals and certain types of toxic narcotics is not complete.

- This method can only eliminate about 99% of microbes.

- Many chemical and pharmaceutical substances cannot be destroyed.

- Large amounts of black smoke, rising ash, toxic gases and odours are emitted[10].

Simple chemical disinfection:

Chemical disinfection plays an important role in the healthcare sector as it is used to remove microbes from medical equipment and to disinfect walls and floors. Nowadays, chemical disinfection is also used to treat medical waste. The addition of chemicals to the waste helps to eliminate and inactivate pathogens, resulting in disinfection rather than complete sterilisation. This method is most suitable for treating liquid waste such as blood, discarded fluids and hospital waste water. However, solid medical waste (including hazardous waste) such as microbial cultures and sharp instruments can also be chemically treated.

Despite its advantages, this method has the following disadvantages:

- The effectiveness of disinfection depends on the working conditions.

- If solid waste is intact, disinfection is superficial.

- Human remains and animal carcasses should not be chemically disinfected unless there is no alternative. If there are no alternatives, chemical disinfection may be used on these materials, but only after they have been shredded.

When planning a chemical disinfection process, it is essential to carefully consider the final disposal of the treated waste, as improper disposal can have serious consequences for the environment.

Chemical disinfection is usually carried out on site, i.e. within the hospital. However, there is a growing trend towards the development of self-contained commercial systems located in industrial areas that operate fully automatically to dispose of medical waste. The treated waste can then be managed as non-hazardous medical waste. However, if the chemicals used for disinfection leak or the waste is not disposed of properly, there can be harmful effects on the environment.

Disadvantages of chemical disinfection:

- The use of hazardous materials requires comprehensive safety procedures

- This method is inadequate if the waste contains pharmaceutical or chemical substances or materials that can transmit infections.

- If the disinfectants are expensive, this increases the overall cost of the process.

Ozone gas is an effective disinfectant for medical waste and does not produce the by-products of chlorine compounds. However, as ozone gas is extremely harmful to the lungs, precautions must be taken to ensure that workers near the disinfection system are not exposed to the gas.

Other agents used in the chemical treatment of medical waste include alkalis, which can be highly corrosive (such as sodium hydroxide or caustic soda) or milder (such as calcium oxide or quicklime). One of the additional effects of alkalis is their ability to cause protein dissolution. Therefore, regardless of cost, the main disadvantage of alkalis is the risk of contact, as they are harmful to the skin and lungs[11].

Wet thermal treatment (steam sterilisation / autoclaving):

Wet thermal treatment involves shredding the waste and then exposing it to high-pressure, high-temperature steam. This process is similar to autoclave sterilisation. By providing an appropriate temperature and exposure time, most microbes are inactivated by wet thermal disinfection (e.g. spore forming bacteria require a temperature of 121°C).

To increase the effectiveness of disinfection, sharp materials should be crushed or ground. This solution is unsuitable for the treatment of anatomical waste and animal carcasses, and is ineffective for chemical and pharmaceutical waste.

Disadvantages of wet heat treatment:[12]

- Working conditions have a significant effect on the effectiveness of disinfection.

- If the shredding equipment is not up to standard, this will reduce the effectiveness.

- This method is not suitable for anatomical, pharmaceutical and chemical wastes, especially those that do not allow steam penetration.

Microwave radiation treatment:

At a frequency of 2450 MHz and a wavelength of 12.24 cm, microwave radiation can eliminate most microbes. Microwaves can quickly raise the temperature of the water in the waste, while heat conduction destroys infectious agents. The waste is first shredded, then moistened and transferred to a treatment chamber equipped with a series of microwave generators; irradiation takes about 20 minutes. The waste is then compacted in a container and discharged into the local sewerage system.

Microwave irradiation is used in several countries and its popularity is growing. However, it is expensive and not recommended for use in developing countries due to operational risks and maintenance issues. Other similar solutions using different wavelengths or electron beams are under development[13].

Disadvantages of microwave radiation treatment:

- Relatively high capital and operating costs.

- Risks associated with operation and maintenance.

- Metals cannot be treated by this method.

- Worldwide acceptance is declining due to the inherent risks of radiation.

There is an alternative method of treating waste prior to disposal. For example, if waste accumulates in hospitals, there is a greater risk of spreading infection than if the waste is carefully dumped in designated sites[14].

Objections to this method are usually religious or cultural, or may be based on the perceived risks of infectious agents being released into the air, soil or water, or the dangers posed by refuse lorries coming into contact with the waste.

The inability to manage waste dumped in open landfills and its dispersal can lead to serious pollution problems, fires and an increased risk of disease spread, as well as the presence of people or animals scavenging through the waste. Medical waste should never be disposed of in or near open dumps. The risks posed by the presence of humans or animals in contact with active pathogens are exacerbated by the dangers of subsequent transmission of infection, either directly through wounds, inhalation or ingestion, or indirectly via host organisms or the food chain.

**Sanitary landfills are considered preferable to open dumps for at least four reasons:

1. The waste is geologically isolated from the environment.

2. The technical conditions for accepting the waste are met.

3. Operations are managed by on-site personnel.

4. Waste disposal is organised and covered on a daily basis.

It is acceptable to dispose of certain types of medical waste (such as infectious waste and small quantities of pharmaceutical waste) in this way. Sanitary landfills help prevent contamination of soil, surface water and groundwater, reduce air pollution and odours, and minimise direct human contact with the waste[15].

Stabilisation: There is also a stabilisation process that reduces the risk of toxic substances leaching into surface water or groundwater by mixing the waste with cement and other materials before disposal. This solution is suitable for cases involving pharmaceuticals and ash with a high metal content (this process is also known as stabilisation).

In the case of pharmaceutical waste, the first step is to remove the packaging and then grind the medicines. A mixture of water, lime and cement is added to create a homogeneous mass. This mixture is then poured into cubes (e.g. one cubic metre) or tablets, which are transported from the treatment facility to the storage site. The mixture, which contains inert waste, can also be transported to a landfill, where it is discharged into municipal sewers[16].

The stabilisation process is relatively inexpensive and does not necessarily require advanced technology. Basic equipment includes a grinder or road roller to crush the pharmaceuticals, cement, lime and water to produce the mix, and a cement mixer to combine the waste with the cement mix.

There is no one-size-fits-all method for the appropriate treatment and disposal of hazardous medical waste. The method chosen should primarily focus on minimising health and environmental impacts, but in most cases some trade-offs will be made due to local conditions[17].

Aims of hospital waste management:[18]

- Reduce harm to healthcare workers, the public and the environment.

- Minimise the amount of waste generated.

- Ensure selective collection of waste.

- Establish appropriate waste collection points in medical departments and hospitals.

- Establish appropriate internal transport routes.

- Maximise the recovery of valuable materials from waste.

- Dispose of waste in a way that is safe for the environment and human health.

Section Two: The position of Algerian legislation (under Law No. 18/11)

It is noteworthy that the Algerian legislator has addressed medical waste and its risks in Law No. 18/11. Articles 114 to 119 emphasise that all health structures and institutions must contribute to the establishment of protective measures against ionising radiation. They are required to implement specific measures for the treatment and disposal of their waste in accordance with updated standards defined by regulations.

In addition, these institutions must ensure compliance with standards for the maintenance of health and the disposal of waste generated by therapeutic activities that pose a risk of infection, in order to prevent related infections. They are also empowered to propose to the competent

authority any necessary measures against activities, services or facilities that may be detrimental to public health, including the temporary closure of such facilities as a precautionary measure[19].

CONCLUSION

Based on the previous short study on the adequacy of legislation to protect the environment from hospital waste, several findings can be summarised as follows:

- Despite the existence of legislation aimed at protecting the environment, particularly with regard to the impact of hospital waste, there is a notable lack of effective mechanisms for managing this waste.

- All waste generated by public health institutions, both hazardous and non-hazardous, contributes to environmental damage. If medical waste is not properly managed, it will cause significant damage to natural ecological systems

- There is also a lack of a specific guidance framework that outlines proper management methods for medical waste, which could serve as a stable national reference that could be updated.

- Due to the high costs associated with medical waste treatment technologies, investment decisions should prioritise the rational selection of optimal technologies that address the issue of limited storage capacity while ensuring the safe processing of large quantities, thereby protecting both individuals and the environment.

- The practice of indiscriminate incineration of medical waste by public healthcare institutions, although considered one of the better waste disposal techniques, remains unacceptable due to its severe negative impact on both people and the environment.

- Steam treatment using shredding and sterilisation machines is one of the most efficient and effective techniques, ensuring a reduction in the volume of medical waste and full control of its environmental risks. As this process takes place within public health facilities, it eliminates storage problems, particularly limited capacity, and transport costs to treatment sites.

- The lack of an independent management body to oversee the planning and implementation of international recommendations for medical waste management, coupled with the low efficiency of personnel involved in these processes, has led to continued ineffective management and unsafe treatment, exacerbating risks and negative environmental impacts.

- Indifference in the handling of medical waste due to work pressures that push workers to rush through their extensive tasks, combined with a lack of ongoing training, results in an automated approach to waste management.

RECOMMENDATIONS:

- Establish a specific law to regulate the medical waste management system and activate this framework by organising the efforts and defining the responsibilities of the various stakeholders involved in medical waste management (joint ministerial directives), along with reference to a national guideline to serve as a resource for all parties.

- Appoint a dedicated team to oversee and implement the stages of medical waste management, from sorting to final disposal. This will help to delineate tasks, clarify responsibilities and reduce the workload on cleaning staff.

- Designate closed areas for the collection of medical waste containers after sorting, rather than leaving them in hospital corridors awaiting transport to storage facilities.

- Provide central storage facilities within facilities that meet international standards for space, ventilation, lighting, cleanliness, solid flooring and accessibility for waste transport vehicles, while respecting maximum storage periods.

- Provide safe means of transport (internal trolleys and external vehicles) that meet international standards.

- Establish a list of specifications and requirements for the proper treatment of medical waste.

- Use mechanical steam treatment technology, as this is one of the most efficient and effective methods. It ensures a reduction in the volume of medical waste and total control of environmental risks. As it takes place within public health facilities, it solves storage problems, particularly limited capacity, and eliminates transportation costs to treatment sites.

- Organise study days and intensify all forms of awareness-raising activities within public health institutions. In addition, organise national and international training sessions to exchange knowledge and benefit from international experiences that contribute to the management of medical waste for the protection of the environment.

- Activate the role of specialised bodies in inspection and monitoring by carrying out unannounced evaluation visits to health facilities and treatment sites.

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