

## Technical assistance on sustainable Medical Waste Management Activity No: N-E-PS-1

Consultation and Training Workshop  
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Health care waste security &  
environmental measures





**Water and  
Environment Support**  
in the ENI Southern Neighbourhood region

## Session 7: Health care waste security & environmental measures

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# Current HCW Facilities in Palestine



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Governorate	Hospital beds	HCW generated (kg/day)	HCW vehicles	120 L autoclave	575 L autoclave	50 kg/cycle Incinerator	160 L autoclave	Microwave	600 L autoclave
Jenin	284	346.48	0	2	1				
Tubas	44	53.68	0	2					
Qalqelia	120	146.4	0	2		1			
Tulkarem	169	206.18	0	2					
Nablus	646	788.12	0	2	1				
Ramallah	549	669.78	1	2		1			1
Hebron	691	843.02	2	7		1		1 (1.5 tn/day)	
Bethlehem	615	750.3	0	2	1				
Jericho	54	65.88	0	3		1			
Jerusalem	728	888.16	0	2					
Salfit	50	61	0	2					
North and Gaza Governorates			2			2	1	1 (700 kg/day)	
Middle, Khanyounis and Rafah Governorates			2			2		1	
Central lab							1		
<b>Total</b>	<b>3950</b>	<b>4819</b>	<b>3</b>	<b>28</b>	<b>3</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>1</b>



# Main challenges



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Policy, legal and enforcement	<p>Incomplete set of legislation in terms of legal instructions as identified above</p> <p>Lack of monitoring and enforcement</p> <p>Weak law enforcement</p> <p>Limited powers granted to operational staff</p>
Institutional and organizational	<p>Unclear roles and responsibilities of stakeholders (medical waste bylaw, national strategy)</p> <p>Institutional gap related to HCW within the MOH and EQA, MoLG</p> <p>Lack of institutionalized coordination between key stakeholders</p> <p>Insufficient coordination and participation of the Private Sector</p> <p>Lack of allocated budgets for HCWM at the national and HCFs level</p>
Technical / operational	<p>Insufficient coverage of organized waste collection</p> <p>Non adherence to national targets, benchmarks or clear standards of HCWM operations.</p> <p>Limited operational proficiency in a number of HCFs.</p> <p>Insufficient segregation of HCW, limited treatment options, and limited disposal options</p>



# Main challenges



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Emergency preparedness	<p>Limited planning for emergencies</p> <p>Limited resources to handle emergencies</p> <p>Limited infrastructure to deal with emergencies</p> <p>No institutional arrangements in HCW related to emergencies.</p>
Financial resources	<p>Limited special HCW budget at the MOH</p> <p>Limited donors' interest in HCW disposal</p> <p>Limited options and vision for sustained services</p>
Human Resources / Capacity Building	<p>Limited capacities of the national stakeholders</p> <p>Limited monitoring / enforcement capacities</p> <p>Lack of self-monitoring capacities</p>
Stakeholder & Public Awareness	<p>The need to institutionalize stakeholders' communication at all stakeholder levels under the national solid waste committee; meetings should be documented, a follow up mechanism is to be in place, regular meetings should be agreed upon with clear agenda items.</p> <p>Lack of communication strategy with the general public</p> <p>Additional awareness programs of HCW among public and generators</p>



# HCW Security responsibilities and measures



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## **Facility Director:**

- Overall responsibility and accountability for waste generated and managed on site, as well as for transport from the facility for treatment and/or disposal off-site;
- responsible for ensuring that sufficient resources are allocated to waste management to ensure compliance with legal and other requirements.

## **Facility Supervisors:**

- Responsible for checking that appropriate standards are set and maintained on a daily basis;
- ensuring that daily problems are resolved.



# HCW Security responsibilities and measures



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## **Waste producers:**

- Ensure that only they handle the waste
- ensure that it is properly segregated at the source
- Ensure that it is suitably contained to reduce risk of exposure of others.

## **Waste handlers:**

- Ensure that waste in the intermediate storage areas is properly segregated, contained and labelled.
- Any problems noted must be immediately brought to the attention of the responsible management



# HCW Security responsibilities and measures



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## **Waste management officers:**

- Responsible for ensuring that waste is managed according to legal and other requirements
- checking that standards are maintained,
- Checking everyone is aware of these requirements,
- Checking that relevant personnel are appropriately trained
- Ensure that all necessary data are recorded and transmitted to the waste management committee and regulatory authorities;

## **Waste contractors:**

- Ensure that employees are properly informed and trained to comply with waste management requirements, routinely checking to ensure standards are maintained





# HCW Security responsibilities and measures



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## **Waste Management Committee:**

- Comprising of representatives from senior management, those who generate waste, waste handlers, infection control, procurement and stores, catering, long-term or resident contractors and waste management service providers.
- This committee should meet monthly to discuss the key performance indicators (e.g., volume of waste generated, hazardous versus general waste ratio, incidents, audit findings, etc.) and to plan awareness programs and other initiatives to improve compliance with legal and other requirements.
- For smaller facilities, this committee can act as point of contact for infection control / safety, health and environmental protection



# Good practices for HCW segregation



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## HCW Segregation:

- HCW should be segregated into different fractions, based on their potential hazard and disposal route, by the person who produces each waste item;
- Segregation should be carried out by the producer of the waste as close as possible to its place of generation, which means segregation should take place in a medical area, at a bedside, in an operating theatre or laboratory by nurses, physicians and technicians.
- If classification of a waste item is uncertain, as a precaution it should be placed into a container used for hazardous health care waste.





## Good practices for HCW segregation

- Separate containers should be available in each medical area for each segregated waste fraction;
- Waste containers, when filled should be labelled to help managers control waste production.
- Closed local storage inside or near to a medical area may be needed if wastes are not collected frequently.
- Hazardous and non-hazardous wastes should not be mixed during collection, transport or storage.
- Collected waste is taken to central storage sites before onsite or offsite treatment and disposal.
- Staff should understand the risks and safety procedures for the wastes they are handling



# Good practices for HCW segregation



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Type of waste	Colour of container and markings	Type of container
Highly infectious waste	Yellow, marked “HIGHLY INFECTIOUS”, with biohazard symbol	Strong, leak-proof plastic bag, or container capable of being autoclaved
Other infectious waste, pathological and anatomical waste	Yellow with biohazard symbol	Leak-proof plastic bag or container
Sharps	Yellow, marked “SHARPS”, with biohazard symbol	Puncture-proof container
Chemical and pharmaceutical waste	Brown, labelled with appropriate hazard symbol	Plastic bag or rigid container
Radioactive waste	Labelled with radiation symbol	Lead box
General health-care waste	Black	Plastic bag





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Biohazard symbol



Old radiation symbol



New radiation symbol





# Good practices for HCW collection and on-site transport

- Collection times should be fixed and appropriate to the quantity of waste produced in each area of the HC facility.
- General waste should not be collected at the same time or in the same trolley as infectious or other hazardous wastes;
- Waste bags and sharps containers should be filled to no more than three quarters full. Once this level is reached, they should be sealed ready for collection;
- Plastic bags should never be stapled but may be tied or sealed with a plastic tag or tie. Replacement bags or containers should be available at each waste-collection location so that full ones can immediately be replaced;
- Waste bags and containers should be labelled with the date, type of waste and point of generation to allow them to be tracked through to disposal. Where possible, weight should also be routinely recorded.





## Good practices for HCW collection and on-site transport

Hazardous and non-hazardous waste should always be transported separately. In general, there are three different transport systems:

- Waste transportation trolleys for general waste should be painted black and labelled clearly “General waste” or “Non-hazardous waste”;
- Infectious waste can be transported together with used sharps waste. Infectious waste should not be transported together with other hazardous waste, to prevent the possible spread of infectious agents. Trolleys should be colored in the appropriate color code for infectious waste (yellow) and should be labelled with an “Infectious waste” sign;
- Other hazardous waste, such as chemical and pharmaceutical wastes, should be transported separately in boxes to central storage sites.



# Good practices for HCW on-site storage



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Central storage areas are places within a HCF where different types of waste should be brought for safe retention until it is treated or collected for transport offsite. The storage area should:

- have an impermeable, hard-standing floor with good drainage (away from watercourses); the floor should be easy to clean and disinfect;
- include the facility to keep general waste separated from infectious and other hazardous waste;
- have a water supply for cleaning purposes;
- have easy access for staff in charge of handling the waste;
- be lockable to prevent access by unauthorized persons;
- have easy access for waste collection vehicles;
- have protection from the sun;
- be inaccessible to animals, insects and birds.





# Good practices for HCW on-site storage



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- have good lighting and at least passive ventilation
- not be situated in the proximity of fresh food stores and food preparation areas;
- have a supply of cleaning equipment, protective clothing and waste bags or containers located conveniently close to the storage area;
- have a washing basin with running tap water and soap that is readily available for the staff;
- be cleaned regularly (at least once per week);
- have spillage containment equipment;
- be appropriate to the volumes of waste generated from each health care facility.



# Good practices for HCW off-site transport



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- Drivers of vehicles carrying hazardous health care waste should have appropriate training about risks and handling of hazardous waste. In addition, drivers should be declared medically fit to drive vehicles;
- In case of an accident, contact numbers or details of the emergency services and other essential departments should be carried in the driver's cab. For safety reasons, vaccination against tetanus and hepatitis A and B is recommended, and vaccination and training details of staff should be recorded;
- A fundamental requirement is for the vehicle transporting hazardous waste to be roadworthy and labelled to indicate its load, and its payload to be secured to minimize the risk of accidents and spillages;
- Vehicles should be kept locked at all times, except when loading and unloading, and kept properly maintained;
- Vehicles or containers used for transporting HCW should not be used for transporting any other material. Any vehicle used to transport health care waste should fulfil specific design criteria:



# Good practices for HCW Treatment



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There are five basic processes for the treatment of hazardous components in health-care waste, in particular, sharps, infectious and pathological wastes: thermal, chemical, irradiation, biological and mechanical.

Incineration:

- Incineration is one of the most widely used disposal methods for HCW [45]. It involves using a high temperature (800–1100 degrees Celsius) and a dry oxidation process. HCW incineration can employ different incinerator types
- Autoclaving is a HCW disposal technique that has been around since the 1800s as a means of sterilization. The method utilises moist heat at under pressure to kill microorganisms. Autoclaves can heat up to 250 degrees Celsius, but most autoclaves operate at around 160 degrees Celsius.



# Good practices for HCW Treatment



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- **Steam Augur:** The use of a steam augur involves utilising time and heat to kill microorganisms. This method differs from autoclaving in that it operates at atmospheric pressure and also requires that waste is shredded prior to the process;
- **Mechanical treatment processes** include several shredding, grinding, mixing and compaction technologies that reduce waste volume, although they cannot destroy pathogens. In most instances, mechanical processes are not stand-alone health-care waste-treatment processes, but supplement other treatment methods



# Preferred practices for HCW Treatment in Palestine



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- **On-site incineration** provides the advantage of a quick, easy disposal method, but there are emissions concerns; some countries have even enacted moratoriums on incinerators to suspend permitting until further information on the safety of the option is available. Operation and maintenance may require skills which are not readily available in Palestine and depend on availability of (imported) spare parts,
- **Autoclaving** is the most commonly utilized alternative to incineration. It is both less costly and carries no documented health impacts. Approximately 90% of regulated medical waste are suitable for autoclaving, particularly infectious waste,
- **Shredding:** Approximately 90% of medical waste can be treated with microwave process. The shredding process results in volume reduction and energy use is reportedly lower than that of an incinerator.



# Good practices for HCW Disposal



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Non-hazardous HCW streams, including properly disinfected HCW streams can be disposed of on sanitary landfills in a similar fashion of common household waste.

HC facilities should make arrangements with a local landfill to provide a special cell or pit, daily soil cover, and restricted access. Encapsulation, inertization and land disposal could be used for some pharmaceutical and chemical wastes, as well as sharps waste.

A well-designed sharps pit is another minimum option for sharps waste. Among the desirable features of a landfill are: restricted access, daily soil cover, sanitary landfilling to prevent contamination of the environment and well-trained staff.





For more information:



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Thank you for your attention!

