

MODULE B

# One Day Training on Health Care Waste Management (HCWM)

(For Medical Personnel: Doctors, Nurses, Paramedics)

**Submitted to:**

Promoting Green Recovery Project (PGRP)  
United Nations Development Programme (UNDP)  
Nepal

**Submitted by:**



**Eco Concern Pvt. Ltd**  
Khumaltar, Lalitpur, Nepal  
Email: [info@ecoconcern.com.np](mailto:info@ecoconcern.com.np)  
Contact number: +977-5151358

## **Normative References**

This Training Module has been produced for delivery of one day training (on-site) for the health care waste management for Medical Personnel (Doctors, Nurses, Paramedics). The following mentioned documents have been used as references for the preparation of this document.

- Master Training of Trainers (MTOT) training package on Environmental Health, Health Care Waste Management and WASH Developed by NHTC, Teku.
- National Healthcare Waste Management Standards and operating Procedures 2020, MoHP (2020)
- National Standards on WASH for Healthcare Institutions, MoHP (2078)

Name of the Training: 1 Day Training on Health Care Waste Management (HCWM)  
*(For Medical Personnel: Doctors, Nurses, Paramedics)*

### Objective of the Training

- Understand the concept of Integrated management of HCWM.
- Gain insight about appropriate Health care waste management in relation to Zero waste concept, waste minimization and entire waste management cycle; waste generation, classification, segregation, storage, transportation and treatment methods.
- Gain insight about waste treatment and Disposal methods including new technologies and selection of treatment method.
- Understand the concept of Occupational Safety and Health (OSH)
- understand the work environment, its surroundings and the risks they are exposed to through Facility walk through session

### Target Participants:

The target participants of the training are Medical Personnel such as Doctors, Nurses, Paramedics

## List of Acronyms

---

EH	Environmental Health
HCF	Health Care Facility
HCW	Health Care Waste Management
HCWM	Health Care Waste Management
ICU	Intensive Care Unit
NHTC	National Health Training Centre
OPEP	Occupational Post-Exposure Prophylaxis
OSH	Occupational Safety and Health
PPE	Personal Protective Equipment
SOP	Standard Operating Procedure
SWM	Solid Waste Management
WASH	Water, Sanitation and Hygiene
WASH FIT	Water and Sanitation for Health Facility Improvement Tool

---

## CONTENTS

Objective of the Training .....	II
Target Participants:.....	II
List of Acronyms.....	III
Module Session Plan .....	1
SESSION 1: INTRODUCTION TO HEALTH CARE WASTE MANAGEMENT (HCWM).....	2
1.1    Situational Analysis of Health Care Waste Management in Nepal .....	2
1.2    Regulations, Policy, Existing National Guidelines and Directives on HCWM/WASH.....	2
1.3    National Commitments for Sustainable Management of HCWM and WASH.....	6
SESSION 2: PRINCIPLE FOR HEALTHCARE WASTE MANAGEMENT .....	8
2.1    Zero Waste Concept and Waste Minimization.....	8
2.2    Definition and Sources of Health Care Waste.....	9
2.3    Principles of waste treatment and commitment of health workers .....	10
SESSION 3: APPROPRIATE HEALTH CARE WASTE MANAGEMENT .....	11
3.1    Classification of Health Care waste.....	11
3.2    Waste Segregation and Collection .....	12
3.3    Waste Transportation .....	14
SESSION 4: WASTE TREATMENT AND DISPOSAL METHODS.....	16
4.1    Types of Waste Treatment and Disposal Methods.....	16
4.2    Selection of Treatment Methods .....	18
4.3    New Treatment Technologies .....	18
4.4    Storage of HCW .....	18
4.5    Central Treatment Facility (CTF) .....	19
4.6    Steps for implementation of Health Care Waste Management System in HCF .....	20
SESSION 5: OCCUPATIONAL SAFETY AND HEALTH AND INFECTION CONTROL.....	21
5.1    Occupational Health Impact .....	21
5.2    Personal hygiene and hand hygiene .....	21
5.3    Safety of Healthcare workers.....	22
5.4    Safe use of cytotoxic drugs and radioactive materials .....	23
5.5    Occupational Post-Exposure Prophylaxis (OPEP).....	24
5.6    Emergency Response in case of Leakage .....	25
5.7    Infection Prevention and Control Measures.....	25
5.8    Role and responsibility in infection prevention and control .....	26

SESSION 6: NATIONAL STANDARD FOR WASH IN HEALTH CARE FACILITIES .....	28
SESSION 7: HEALTH CARE WASTE MANAGEMENT DURING AN EMERGENCY (COVID-19).....	34
SESSION 8: FACILITY WALK THROUGH AND DISCUSSION .....	39

## List of Figures

Figure 1:Flow chart with steps to achieve a circular economy (UNIDO 2017) .....	9
Figure 2 : Waste Collection Bins, Bucket with Medication trolley and stand .....	14
Figure 3 :Implementation of HCWM system at HCF.....	20
Figure 4 Flow chart for treatment of HCW during Covid-19 (source: MoHP (2020)) .....	37

## List of Tables

Table 1: Classification of HCW.....	11
Table 2:Recommended color-codes for the container, labelling and international signs for HCW.....	13
Table 3: Techniques currently available for the treatment and disposal of HCW .....	16
Table 4: Treatment technologies for treating various health care wastes .....	18
Table 5: Prevention from Infection due to unsafe health care waste and control measures.....	26
Table 6: Preventive measure for Disease Risks at HCF .....	28
Table 7: WASH standards for different level of Healthcare facilities.....	29
Table 8: HCF Categorization based on WASH Stanmdards.....	29
Table 9: Provision of the implementation of the standards at Federal, Province and Local levels.....	30
Table 10 : Roles and Responsibilities of Different Stakeholders.....	32

## Module Session Plan

This Module prepared for the Medical Personnel has been divided into 5 sessions

<i>TOPIC</i>	<b>Time</b>
<i>SESSION 1</i> <b>INTRODUCTION OF HCWM</b>	30 Min
1.1 Situational Analysis of HCWM in Nepal	
1.2 Regulations, Policy, Existing Guidelines and Directives on HCWM/WASH	
1.3 National Commitments for Sustainable Management of HCWM and WASH	
<i>SESSION 2</i> <b>PRINCIPLE FOR HEALTH CARE WASTE MANAGEMENT</b>	30 Min
2.1 Concept of Zero Waste and Minimization	
2.2 Definition and Sources of Health Care Waste	
2.3 Principles of Waste Treatment and Commitment of Health Workers	
<i>SESSION 3</i> <b>APPROPRIATE HEALTH CARE WASTE MANAGEMENT</b>	45 Min
3.1 Classification of Health Care Waste	
3.2 Waste Segregation and Collection	
3.3 Waste Transportation (Onsite/ Offsite)	
<i>SESSION 4</i> <b>WASTE TREATMENT AND DISPOSAL METHODS</b>	45 Min
4.1 Types of Waste Treatment and Disposal Methods	
4.2 Selection of Treatment Methods	
4.3 New Treatment Technologies	
4.4 Storage of HCW	
4.5 Central Treatment Facility (CTF)	
4.6 Steps for Implementation of HCWM in HCF	
<i>SESSION 5</i> <b>OCCUPATIONAL SAFETY AND HEALTH</b>	45 Min
5.1 Occupational Health Impact	
5.2 Personal Hygiene and Hand Hygiene	
5.3 Safety of Healthcare Workers	
5.4 Safe use of Cytotoxic drugs and Radioactive Materials	
5.5 Occupational Post-exposure Prophylaxis (OPEP)	
5.6 Infection Control	
5.7 Role and Responsibilities in Infection Prevention and Control	
<i>SESSION 6</i> <b>NATIONAL STANDARD FOR WASH IN HEALTH CARE FACILITIES</b>	30 Min
<i>SESSION 7</i> <b>HCWM DURING AN EMERGENCY (COVID-19)</b>	15 Min
<i>SESSION 8</i> <b>FACILITY WALK THROUGH AND DISCUSSION</b>	1 hour
<b>Total Time Duration</b>	<b>5 hours</b>

## SESSION 1: INTRODUCTION TO HEALTH CARE WASTE MANAGEMENT (HCWM)

Objective: The main objective of this session is to Understand the situation of health care waste management in Nepal	TRAINING TOOLS <ul style="list-style-type: none"><li>• Presentation</li><li>• Video Display</li></ul>	Time 30 Min
--	---	----------------

By the end of the session participants will be able to

- Understand existing institutional status and opportunities for integrated management of HCWM
- Identify the challenges/hindrances of integrated waste management
- Access the existing national legislation, Policy and strategies and existing national guidelines and directives on HCWM and WASH including national commitments.

### 1.1 Situational Analysis of Health Care Waste Management in Nepal

Videos related to Environment Health, Health Care Wash management and WASH in Nepal and WASH in Health care Facilities to be displayed.

Some of the video links that can be used as a resource material during session:

Healthcare Waste Management and WASH in Nepal (by GIZ Health Nepal):

<https://www.youtube.com/watch?v=uplhe6mbDuc>

### 1.2 Regulations, Policy, Existing National Guidelines and Directives on HCWM/WASH

In Nepal, laws and policies related to the HCWM/WASH have been formulated at different times, but compliance with those laws and regulations and implementation is one of the main challenges. Endorsement of policies, acts, rules and regulations related to HCWM, hold health care facilities accountable to their responsibilities regarding the management of health care waste. The relevant documents are outlined as below:

#### The Constitution of Nepal 2015/2072

Regarding the protection of human rights, Section 35 of the constitution states that every citizen shall have the right to seek basic health care services from the state and have right to access to clean water and sanitation.

Section 30 ensures the right to clean environment. It states that every citizen shall have the right to live in a clean and healthy environment. For any injury caused from environmental pollution or degradation, the victim shall have the right to obtain compensation, in accordance with law. This Article shall not prevent the making of necessary legal provisions for a proper balance between the environment and development.

#### National Health Policy 2019/2076



Ministry of Health aims to improve the health care waste management system by endorsing Outcome 2 “Improved Quality of care at point of delivery” of the Nepal health sector strategy Implementation Plan 2016-2021, with one of the outputs being ‘Improved infection prevention and health care waste management’. Intervention activities such as ‘review and revise infection prevention and health care waste management and promote state non-state partnership models for waste management’ are listed as key activities for achieving the planned outputs.

#### **Public Health Services Rules, 2077 (2020)**

Article 3 of the rules provides for the provision of health care at various levels. As per Rule 11, the main responsibility of the Ministry will be to ensure compliance with the standards mentioned in Schedule 8 in various health institutions. These include environment, infection prevention and control, health institutional waste management and water and sewerage in health institutions. According to Rule 12, in order to get and renew a new license, every health institution has to follow certain quality criteria. It is monitored and evaluated by the public health authorities and if the standards are not followed, the authorities may ask the health institution to comply with the standards or recommend action to the concerned authorities.

#### **The Environmental Protection Act 2076 and Environmental Protection Regulation 2077 (2020)**

The Environmental Protection Act 1997 were formulated to reduce adverse impacts on the environment likely to be caused from environmental degradation on human beings and ensure the proper use of natural resources for environmental conservation.

Environmental Protection Regulation 2077 have made compulsory provisions for Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA), depending upon the size of the project. According to the regulation, IEE is required for the construction of a new hospital with 25 to 100 beds with teaching facilities whereas Environmental Impact Assessment(EIA) is made mandatory for the construction of new Hospitals with teaching facilities having more than 100-beds.

#### **Nepal Health Sector Strategy 2015-2020 / 2072-2076**

The national strategy responds to a national aspiration to fulfil a constitutional mandate by offering defined strategies to expand quality health services to all.

#### **Minimum Service Standards for Different Level of HCF in Nepal 2019/ 2076**

In 2076/2019, the Nepali government created five documents outlining the minimum service standards for different levels of healthcare facilities, specifically primary hospitals with general services, primary hospitals with specialized services, secondary hospitals, tertiary hospitals, and health posts. These standards cover a range of issues for health care facilities; “hospital waste management” is clearly addressed in the section “Hospital Support Services,” with a checklist for evaluating a hospital’s waste management system, including a scoring system for the segregation, collection and transportation, treatment and disposal of waste for the different levels of healthcare facilities.

#### **Public Health Act 2018/2075**

Public Health Act 2018 addresses the issues of health care waste management in section 41:

For the minimization of the potential health hazards in humans due to environment pollution and waste management, Nepal government can make required standards according to the relevant federal legislations. Nepal government will develop essential standards for the effective collection, reuse, treatment, disposal and enforcement of the health care waste. Provincial and Local government are responsible to follow the above sub section 1 and 2. Every health care facility is responsible for proper segregation of waste into hazardous and non-hazardous and proper disposal of the health care waste generated.

### **The Labour Act 2017/ 2073**

The Labour Act 2017, administered by the Ministry of Labour is the main regulation governing the working environment by making provision for the rights, interests, safety and insurance of workers and employees working in various enterprises. Section 80 is related to the management of infectious disease transmission in working environment and section 68 states the need of Health and safety regulation and working unit within the working place

### **The Industrial Enterprises Act 2073/2016**

The industrial enterprises act 2016 highlights the need to conduct Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) before establishment. This Act also states that the responsibility of the safe management of the waste lays with the entity that generates the waste. Furthermore, the act has empowered the concerned authority to punish those who do not comply with the conditions outlined in the license or registration section. The act gives priority and the provision of some benefits to those that use pollution control devices, or enterprises which process the waste into resources (i.e. recycling, upcycling).

### **Guideline for Health Institutions Establishment, Operation and Upgrade Standard 2014/2071**

This guideline contains the code of conducts required for the operation of health institutions. This guideline deals with the infrastructure and standards required for the operation of health institutions like emergency services, outpatient department and in-patient services, pharmacy, emergency preparedness, waste disposal and management and all other prerequisites.

### **Solid Waste Management Act 2011/2068**

Solid Waste Management (SWM) Act 2011 with amendments made in Kartik 2074 BS, provides legal basis and regulation for HCWM in health institutions.

Section 4 sub-section 1, 2 and 3 states the responsibility of the management of the solid waste as given below:

- i. The responsibility to manage or cause to manage solid waste shall rest with the local body
- ii. Notwithstanding anything contained in sub-section 1, the responsibility for processing and management of hazardous waste, medical waste, chemical waste or industrial waste under the prescribed standards shall rest with the person or institution that has generated the solid waste.

- iii. If any industry or medical institution requests for the management of solid waste remained after processing of hazardous waste, medical waste, chemical waste and industrial waste or other solid waste, or for using a sanitary landfill site constructed by the local body, the local body may manage the solid waste or allow the institution to use the sanitary landfill site by levying fees as determined by the local body.

#### **Drugs Act 1978/2035:**

Pursuant to Section 12, this Act mandates the return of drugs that are not safe for public consumption (including by virtue of expiration date), that are not efficacious, or that do not meet quality standards. It is the manufacturer or an agent of the manufacturer that must take back such pharmaceuticals from the seller or distributor.

#### **National Healthcare Waste Management Standards and Operating Procedures, 2020**

The “National Healthcare Waste Management Standards and Operating Procedures, 2020” covers all aspects of HCWM such as development of HCWM implementation plan, management and oversight and technical aspects related to waste management such as waste minimization, waste segregation, collection, storage, transportation, treatment, disposal and capacity-building and awareness creation.

#### **Healthcare Waste Management Standards 2077(2020)**

Healthcare Waste Management Standards 2077 has been prepared with objective of safe management of healthcare waste at all level of health institutions

#### **National Standard for WASH in Health Care Facilities (HCF) 2078**

As per the National standard for WASH in Healthcare Facilities for Healthcare Waste Management following principles have been mentioned:

- i. health organizations at all levels must follow National Healthcare Waste Management Standards and Operating Procedures, 2020 for Health care waste Management
- ii. In an appropriate place, colored waste bins with proper labelling should be provided.
- iii. Waste should be treated and managed in a safest (non-flammable) condition as possible. Schedule-14 must be complied for proper waste management.
- iv. Waste must be collected in a safest way and managed properly without affecting public in a designated waste collection center
- v. The floor and environment of the health system should be free from wastes
- vi. Employees should have adequate waste management equipment and personal safety equipment and should be provided with the means to safely collect and dispose of health-related waste
- vii. The head of the health organization, the concerned health workers, the authorized persons, the members of the health organization waste management committee and the concerned officials shall assume the responsibility of the health organization waste management.
- viii. Rainwater and surface water shall be safely stored in the health facility and in the surrounding external environment without any pollution.

#### **Health Care Waste Management in the context of COVID-19 Emergency (Interim Guidance)(2020)**

This guideline covers, Safe management of the waste generated in connection with all suspected and confirmed COVID-19 cases, both symptomatic and asymptomatic in different levels of health care facilities, isolation centers, quarantine centers including hotels, home quarantine and holding areas like port of entry from other countries. This guidance is considered as interim since many researches are

going on and hence, about the existence (duration of the activation) of this new corona virus in different environment including the waste, so these recommendations may need to be updated as new information and evidence become available (4).

### **1.3 National Commitments for Sustainable Management of HCWM and WASH**

First Workshop on Environmental Health, Health Institutional Waste Management, Drinking Water Sanitation and Hygiene was organized on 24-26 December, 2076 in Kathmandu. To ensure the sustainable management of EH/HCWM/WASH, following 12 commitments were made during workshop.<sup>1</sup>

1. **WELL-ALIGNED POLICY FRAMEWORK FOR HEALTHCARE WASTE MANAGEMENT & WASH:** The federal government will formulate medium- and long-term strategies for the sustainable management of Environmental Health, Waste Management, and Water, Sanitation and Hygiene (WASH) in healthcare facilities, including all necessary acts, policies, rules and standards as well as appropriate methodologies, technologies and equipment. Provincial and local governments will adapt these policies and guidelines to their own contexts, taking care not to contravene federal laws. The federal government will play a coordination and facilitation role in implementation.
2. **A HEALTHCARE WASTE MANAGEMENT CAMPAIGN:** A roadmap for healthcare waste management will be prepared and implemented as a campaign.
3. **INTEGRATED APPROACH, WITH WASTE SEGREGATION AT SOURCE AND NO-BURN TECHNOLOGIES** The practice of proper segregation at source, as per approved standards; disposal of infectious waste only after disinfection through the use of appropriate non-burning technology; and a model of Integrated Healthcare Waste Management will be developed and scaled up gradually, based on best practices.
4. **COLLABORATIVE FRAMEWORK, WITH ENHANCED COORDINATION AT ALL LEVELS:** Develop a collaborative framework which brings together stakeholder ministries, organizations and agencies working on Environmental Health, Healthcare Waste Management, and Water, Sanitation and Hygiene in healthcare facilities. A separate unit and/or responsible person will be assigned for implementation, monitoring, evaluation and regulation at federal, provincial and local levels, as necessary.
5. **OCCUPATIONAL SAFETY AND SOCIAL PROTECTION:** Promote occupational safety and social protection measures for service providers, professionals and people involved in waste management.
6. **A PILOT INFORMATION SYSTEM:** Develop, pilot and scale-up a model information system on Healthcare Waste Management and Water, Sanitation and Hygiene in hospitals and healthcare facilities.
7. **MANDATORY WASTE MANAGEMENT AND WASTE AUDITS:** Ensure that a waste management system and waste audits conducted by skilled personnel are mandatory elements during the establishment, operation, renewal and upgrading of healthcare facilities.

---

<sup>1</sup> Birdsall, K. (2020). No Time to Waste - Transforming healthcare waste management for a healthier, more sustainable Nepal. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Eschborn, Germany

8. INVESTMENT IN HUMAN RESOURCE CAPACITY: Coordinate, collaborate and partner with the three tiers of government and the private sector to promote the capacity building and management of skilled human resources in Environmental Health, Healthcare Waste Management and Water, Sanitation and Hygiene in healthcare facilities.
9. CLIMATE CHANGE ADAPTATIONS IN THE HEALTH SECTOR: Promote climate change resilience measures in health programmes to reduce the adverse effect of climate change on public health.
10. ADHERENCE TO 4R PRINCIPLES (REFUSE, REDUCE, REUSE, RECYCLE): Scale up good practices, lessons learned and cost-effective programmes which follow the 4R principles (i.e. Refuse, Reduce, Reuse, Recycle) and will discourage the use of plastics and related products.
11. MAINSTREAMING ENVIRONMENTAL HEALTH, HEALTHCARE WASTE MANAGEMENT & WASH Consider aspects related to Environmental Health, Healthcare Waste Management, and Water, Sanitation and Hygiene in the design and planning of all healthcare facility related programmes, bearing in mind the responsibilities of the three levels of government and following the principles of coordination, collaboration and co-existence.
12. RESEARCH AND INNOVATION: Promote studies, innovation and research, and prioritize the use of evidence which is generated in this sector.

## SESSION 2: PRINCIPLE FOR HEALTHCARE WASTE MANAGEMENT

<b>Objective:</b> The main objective of this session is to provide context of health care waste management principals to the participants	<b>TRAINING TOOLS</b> <ul style="list-style-type: none"><li>• Interactive Presentation</li><li>• Group Discussion</li><li>• Group Activities</li><li>• Q &amp;A</li></ul>	<b>Time</b> 30 Min
--	---	-----------------------

By the End of the session Participants will be able to

- Brief the concept Zero waste and waste minimization
- Brief the circular economy and contribution of HC Professionals
- Understand precautionary principle to be followed during waste minimization
- Define HCW, its sources and categories

### 2.1 Zero Waste Concept and Waste Minimization

#### Zero Waste Concept

The concept of zero waste is a summary of the principles centered on waste management that promotes the promotion of waste recycling frameworks based on the life cycle of waste mitigation. Its purpose is to prevent waste from being buried underground, incinerated and dumped in water sources. The concept of zero waste encourages proper management, reduction and disposal of resources.

#### Waste Minimization

Waste minimization is defined as both the prevention as well as the reduction of waste production. Waste minimization usually benefits the waste producer by reducing the costs for the purchase of goods. It involves specific strategies of changes in management and behavior. Waste minimization can be achieved through:

- Waste reduction at source (product substitution, product change, procedural change)
- Giving preference to recyclable and reusable items

The amount of waste generated is often dictated by processes and behaviors at the workplace. Sustainable behaviors such as choosing reusable equipment over single use, sending e-mails instead of using letters or paper memos, using reusable cups over disposable ones etc. can lead to a minimization of waste. Thus, methods of waste reduction include modification of purchasing procedures, control of inventory and use of less toxic materials. However, no actions should be taken that would impact the quality and limit the access to health care. Waste minimization can be achieved through the reduction of waste generation at source (product substitution, product change, procedural change) and by giving preference to recyclable and reusable items. In economics the approaches to move away from a linear economy to a more sustainable alternative can be summarized under the idea of a circular economy. During infectious pandemic situation

(e.g COVID-19) un-necessary visiting isolation are and unnecessary use of PPE generated lots of extra waste, that could be optimized. (MoHP- 2020)<sup>2</sup>

### Circular Economy

The concept of circular economy envisions a system in which end-of-life products can be reused, recycled or reinvented into new useful products. Rather than a cradle-to-grave system, this emphasizes the cradle-to-cradle system which generates revenue and saves resources with minimum production of waste. It is aligned with the concept of zero waste. Core ideas of the circular economy idea are shown in Figure 1.



Figure 1:Flow chart with steps to achieve a circular economy (UNIDO 2017)<sup>3</sup>

## 2.2 Definition and Sources of Health Care Waste

Waste generated through all medical activities is termed as Health Care waste. Medical activities include activities such as diagnosis, preventive, curative and palliative treatments, research pertaining to the above activities and production or testing of biologicals.

Sources of HCW are:

- Hospitals
- Primary health care centres, health posts, sub-health posts, Expanded Programme on Immunization (EPI) clinics, primary health care outreach clinics (PHC ORC)
- Clinics (medical, primary health care, alternative medicines, dental, maternity homes, dialysis centres, physician offices)
- Laboratories and research centres (medical and biomedical laboratories, medical research centres and institutions, blood banks and blood collection centres, biotechnology laboratories, pathological laboratories, microbiological laboratories)
- Pharmacies and medical stores
- Institutions (medical, nursing home, dental, nursing, paramedics, drug rehabilitation centres, drop in centre)
- Veterinary hospitals and clinics
- Ambulance and emergency care
- Home based care

<sup>2</sup> MoHP (2020), National Healthcare Waste Management Standards and operating Procedures 2020,

<sup>3</sup> UNIDO (2017), circular Economy . United Nations Industrial Development Organization

## 2.3 Principles of waste treatment and commitment of health workers

**Duty of care principle:** It is the duty of the waste generator to dispose the generated waste safely. Therefore, it is the HCF that has ultimate responsibility for how waste is containerized, handled on-site and off-site and ultimately treated and disposed of.

**Precautionary principle:** when the magnitude of a particular risk is uncertain, it should be assumed that this risk is significant, and the measures to protect health and safety should be designed accordingly. It must therefore always be assumed that waste is hazardous until it is proved to be safe. This is a key principle governing health and safety protection.

**Proximity principle:** treatment and disposal of hazardous waste should be conducted at the closest possible location to the source to minimize the risks and financial cost involved in its transport. Similarly, any community should recycle or dispose of the waste it produces inside its own territorial limits.

**Polluter pays principle (PPP):** All waste producers are legally and financially responsible for the safe handling and environmentally sound disposal of the waste they produce. In case of accidental pollution, the organization is liable for the costs of cleaning it. Therefore, if pollution results from poor management of HCW then the HCF is responsible. However, if the pollution is due to poor standards at the treatment facility then the HCF jointly with the treatment facility is likely to be held accountable for the pollution. Likewise, this could happen with the service provider. The fact that the polluters should pay for the costs they impose on the environment is seen as an efficient incentive to produce less and segregate well.

The main purpose of this principle is to make the service providers committed toward waste management to reduce the risk of potential risk and to keep human health and environment safe from health care waste.

### Health Workers Commitment

According to the national standards for HCWM and operating procedure-2020:

1. Properly manage the non-infectious HCW by separating it at the source.
2. Treat and dispose the hazardous waste according to the national standard adopting proper technology.
3. Pay more attention on waste management during treatment.
  - a. Institutional - Health Care Facilities treat their waste themselves.
  - b. Cluster / Hub Treatment - Health care facilities treat the waste of its own and other HCFs within the small area.
  - c. Central level treatment – Dedicated HCF treat waste from city, region or central level HCFs
4. Manage the HCW to prevent the risk of pollution of health and environment. Adopt 4R approach (Refuse, Reduce, Reuse and Recycle) during waste management.
5. Mobilize necessary resources to identify and manage the health care waste



## SESSION 3: APPROPRIATE HEALTH CARE WASTE MANAGEMENT

<p><b>Objective:</b> The main objective of this session is to understand the concept of health care waste management and learn how the waste generated from the various health care setting can be managed in an environmentally friendly way.</p>	<p><b>TRAINING TOOLS</b></p> <ul style="list-style-type: none"> <li>• Interactive Presentation</li> <li>• Group Discussion</li> <li>• Group Activities</li> <li>• Q &amp;A</li> </ul>	<p><b>Time</b> 45 min</p>
--	---	-------------------------------

By the End of the session Participants will be able to

- Classify waste generated within the HCFs
- Understand the segregation and collection methods
- Learn about the onsite and offsite waste transportation of HCW

### 3.1 Classification of Health Care waste

Solid Waste Management Act 2011 defines health care waste as ‘waste generated from hospitals, clinics, pharmacies, blood banks, pathology laboratories, other health care institutions or research centers which can be hazardous to human health and environment’. Based on the various physical and chemical properties and hazards associated with the waste, HCW are broadly categorized into general HCW and hazardous HCW as shown in Table 1. <sup>4</sup>

Table 1: Classification of HCW

Health Care Waste (HCW)		
<b>Non Risk HCW</b>	Biodegradable	Biodegradable waste can be decomposed like leftover food, garden waste
	Non-Biodegradable	Non- Biodegradable waste does not decompose, but its large volume can be recycled. It includes bottles and cans, paper, different plastics and glass
<b>Risk HCW</b>	Infectious Waste	Infectious wastes consist of pathogens and its contamination poses a risk of disease transmission. This category includes waste contaminated with blood and other body fluids, laboratory cultures and microbiological stocks and waste including excreta and other materials that have been in contact with patients infected with highly infectious diseases.
	Sharp Waste	Sharps are all objects and materials capable of cutting or penetrating the skin. These wastes pose a potential risk of injury and infection due to their puncturing or cutting properties. Examples of such wastes include all types of needles, broken glass ware, ampoules, scalpel blades, lancets, cover slips, glass slides, vials without content.
	Pharmaceutical Waste	Pharmaceuticals that have passed their recommended shelf life or pharmaceuticals that are unusable.

<sup>4</sup> - MoHP (2020), National Healthcare Waste Management Standards and operating Procedures 2020,

Cytotoxic Waste	Cytotoxic wastes can arise by use (administration to patients) or by manufacture and preparation of pharmaceuticals with a cytotoxic effect.
Pathological Waste	Pathological waste consists of human body parts, organs and tissues. Examples of such wastes are tissue waste, removed organs, amputated body parts, placentas, blood, body fluids, human fetus, animal and carcasses obtained through medical procedures.
Chemical Waste	Chemical waste is the waste with chemicals, which if managed or disposed improperly may pose substantial hazards to human health. It includes chemicals used in the laboratory, unused photo film, contaminants, solvents, batteries, broken thermometers and blood pressure measuring equipment.
Radioactive Waste	Materials contaminated with radionuclides, which arise from the medical or research use of radionuclides. It includes unused sealed radiation source, liquid and gaseous material contaminated with radionuclide, excreta of patients who underwent radionuclide diagnostic and therapeutic applications, paper cups, straws, needle syringes, test tubes and tap water used to wash paraphernalia.








## 3.2 Waste Segregation and Collection

### Waste Segregation

Waste segregation refers to the separation of different waste at the source and keeping them apart during handling, collection, interim storage and transportation. Segregation of the waste at point of generation is very crucial for a successful management of HCW. It is highly recommended to segregate HCW on-site at the time waste generation, e.g. when an injection is given, needle and syringe are deposited in their respective, different waste containers.

To reduce the amount of infectious waste as low as possible, infectious waste should not be mixed with non-infectious waste. Separating risky waste from non-risk waste also significantly reduces the risk of infection for staff and healthcare workers dealing with HCW. A suggested way of distinguishing HCW categories is by sorting the waste into color-coded and well-labelled containers.

Table 2: Recommended color-codes for the container, labelling and international signs for HCW

Waste Category	Symbol and label	
Non-risk HCW	Biodegradable	
	Non-biodegradable	
Risk HCW	Pathological waste	 <i>Danger! Pathological waste</i>
	Sharps Waste	 <i>Danger! Contaminated sharps</i>
	Infectious Waste	 Infectious
	Pharmaceuticals waste	
	Cytotoxic Waste	
	Chemical Waste	  <i>Danger! To be discarded by authorized staff only</i>
	Radioactive Waste	 <i>Danger! Radioactive Waste</i>

NOTE: Color indicates the color of the waste collection container as per National HCWM Standards and Operating Procedure-2020 (Source: MoHP (2020))<sup>5</sup>

### Waste Collection

<sup>5</sup> MoHP (2020), National Healthcare Waste Management Standards and operating Procedures 2020

Waste generated within the HCFs are collected in different sized color coded buckets or bins in accordance with type and quantity of waste. Waste collected are stored properly in utility room or temporary storage before it is transferred to final waste treatment area. If designated waste storage area is not available, infectious waste can be stored at the proper place away from patients and public areas.

Waste need to be collected and transported away in daily basis. Proper coded storage bins should be used for waste collection.



Figure 2 : Waste Collection Bins, Bucket with Medication trolley and stand<sup>6</sup>

### 3.3 Waste Transportation

Health Care waste collection and transportation activities should be designed and planned to ensure safe movement of waste from point of generation to the storage and ultimately to treatment center. Proper plan should be prepared for collection and transportation of waste.

Recommendations to the staff involved in waste collection:

- Collect waste on room to room basis once every shift. In case of difficulty in the collection of waste in every shift, waste should be collected on daily basis (or as frequently as required) and transported to the designated central storage site of HCF.
- No bags should be removed unless they are labelled with their point of production (hospital and ward or department) and contents.
- The bags or containers should be replaced immediately with new ones of the same type.
- A supply of fresh collection bags or containers should be readily available at all locations where waste is produced.

Process for on-site and off-site transportation of waste should be included in the waste disposal plan of HCF.

#### On-site transportation

---

<sup>6</sup> Photo Credit : Eco Concern Pvt. Ltd.

Onsite transportation should be planned avoiding the busy and peak hours with higher flow of patients. During transportation of waste, segregated waste should not mix with each other and need to be managed in accordance with the level of risk of waste.

Wheel trolleys, containers and carts should be used to transport waste from point of generation to the collection area. Wherever possible, dedicated waste transportation route should be allocated for transportation of HCW to reduce the passage of loaded carts through wards and other areas. General waste and hazardous waste should be transported separately. Infectious waste can be transported with sharp waste but not with other hazardous waste

The trolleys or vehicles should be:

- Easy to load and unload.
- Have no sharp edges that could potentially damage waste bags or containers during the loading and unloading.
- Easy to clean.
- Easy to push and pull
- Appropriately sized according to the volumes of waste generated at a health-care facility.

For the transportation from source to collection point, there should be separate trollies for the transportation of risk and general waste. Trolleys and collection vehicles must be cleaned and disinfected daily using chlorine solution and phenolic compounds. The people transporting the waste should be equipped with appropriate protective equipment.

#### **Offsite transportation**

The waste produced from healthcare facility should be transported offsite for proper disposal and treatment. the HCW producer is responsible for safe packaging and appropriate labelling of the waste to be transported offsite as well as for the authorization of its destination i.e. CTF and need to be safely disposed at landfill site after proper treatment.

A fundamental requirement for vehicle transporting hazardous waste should be roadworthy and be labelled with information such as its load, and its payload for minimizing risk of accidents and spillages. The responsibility of transportation of solid waste from collection point to transformation center and up to waste management point lies to local government or organization or body assigned by local government as per the Solid Waste Management Act 2068(2011) with amendment version of 2074 Kartik.

## SESSION 4: WASTE TREATMENT AND DISPOSAL METHODS

Objective: The main objective of this session is to Identify the best feasible treatment and disposal technology for various setting of health care wastes	TRAINING TOOLS <ul style="list-style-type: none"> <li>• Interactive Presentation</li> <li>• Group Discussion</li> <li>• Q &amp;A</li> </ul>	Time 45 Min
---	---	----------------

By the End of the session Participants will be able to

- Understand different treatment and disposal methods
- Select appropriate treatment technology for treating different HCW generated within HCFs
- Learn about new treatment technologies and central treatment Facilities
- Learn steps for implementation of HCWM system in HCFs

### 4.1 Types of Waste Treatment and Disposal Methods

The methods for treatment and disposal of HCWs depend on specific factors applicable to the HCF, relevant legislation and environmental aspects affecting the public. The bulk of HCW falls into the category of non-hazardous HCW, much of which can be recycled or reused. With correct segregation, low amounts of waste are categorized as risk HCW requiring specific attention. Hazardous waste and infectious waste must be treated with approved treatment methods. Once treated, the waste may be re-classified for disposal. As technology changes, HCFs should evaluate treatment alternatives regarding their safety, effectiveness, environmental impacts, costs and compliance with the country requirements. The techniques listed in Table are currently available for the treatment and disposal of HCW.

Table 3: Techniques currently available for the treatment and disposal of HCW

Biological Procedures	<b>Composting</b>	Composting is the natural, biological decomposition of organic matter by fungi, bacteria, insects, worms and other organisms. Successful composting entails the management of the decomposition process so that it is relatively quick, safe and clean.
	<b>Vermi composting</b>	Vermicomposting is the process of degradation of biodegradable matter through worms. The specialized worms used can speed up the digestion process through the vigorous digestion of the materials.
	<b>Anaerobic Digestion</b>	During anaerobic digestion biodegradable waste is degraded in absence of oxygen. The process occurs due to anaerobic organisms, which results in production of methane as a by-product.
Steam-based treatments:	<b>Autoclaving</b>	Autoclave is a process of steam sterilization under pressure. It is a low heat process in which steam is brought into direct contact with the waste material for a sufficient duration to disinfect the material. This technique has been used for a long time in HCFs for sterilization of reusable medical equipment.

	<b>Microwave</b>	Microwave treatment is a steam-based treatment technology where microwave energy generates moist heat and steam by heating the moisture in the waste. Microwave radiation is used for the treatment of the infectious HCW.
	<b>Frictional Heat Treatment</b>	<b>Frictional Heat Treatment:</b> This technology uses both steam as well as dry heat. Highspeed rotating shredders generate heat and the moisture in the waste turns into steam. Such technologies can achieve an up to 80% decrease in volume reduction When all fluids have evaporated. The system capacity ranges from 10 kg to 500 kg per hour.
	<b>Integrated steam-based treatment system</b>	<b>Integrated steam-based treatment system:</b> The integrated steam-based systems combine internal shredding, steam treatment-mixing and drying in a continuous unit. Since most autoclaves and hybrid autoclaves operate in batch processes, these technologies are sometime referred as advanced steam treatment technologies treating waste in continuous process (WHO 2014)
Chemical treatment	<b>Chemical Disinfectants, Alkaline hydrolysis, Chemical decomposition</b>	are Chemical treatment methods.
Burial based Disposal Methods	<b>Encapsulation and Inertization</b>	<b>Encapsulation and Inertization:</b> Encapsulation involves the filling of the containers with waste, adding an immobilizing material and sealing the container. The process uses either cubic boxes made of high- density polyethylene or metallic drums. When containers are three quarters filled with sharps, pharmaceuticals and chemical waste, an immobilizing agent such as plastic foam, bituminous sand, cement mortar or clay is poured into it. The material dries and the container is sealed and disposed safely.
	<b>Inertization</b>	<b>Inertization:</b> In this technique, HCW is mixed with cement and other substances in a composition of 65% waste, 15% lime, 15% cement and 5% water. The formed mixture is allowed to set into cubes or pellets and then is transported to a suitable storage site.
	<b>Sanitary landfill</b>	<b>Sanitary landfill:</b> Sanitary landfills are an engineered method, designed and constructed to keep the waste isolated from the environment. There should not be any contamination of the soil, surface, and ground water.
	<b>Burial</b>	<b>Burial:</b> Hazardous waste can be buried in a special pit. For this purpose, the pit should be 2-5 m deep and 1-2 m wide. The bottom of the pit should be at least 2 m above the water table. After each waste load, it should be covered with a 10–30 cm thick soil layer. If coverage with soil is not possible, lime may be deposited over the waste. When the level of the waste reaches up to 30 to 50 cm to the surface of the ground, the pit needs to be filled with dirt, sealed with concrete and a new pit should be dug if necessary.
	<b>Septic or Concrete Vault</b>	<b>Septic or Concrete Vault:</b> This method can be used for the disposal of used sharps and syringes. In this method a concrete pit of slabs of (1m x 1m x 1.8m depth), is constructed to accommodate sharps and syringes for certain period without contaminating the ground water level.

## 4.2 Selection of Treatment Methods

According to the Solid Waste Management Act, 2068, treatment and management of hazardous health waste, chemical waste or industrial waste is the responsibility of the producer. Therefore, the responsibility of managing health care waste lies with the head of the health institution.

The following table shows the appropriate treatment technologies for treating various health care wastes.

Table 4: Treatment technologies for treating various health care wastes

Waste Treatment Method	Infectious Waste	Sharp Waste	Pathological Waste	Chemical Waste	Pharmaceutical Waste	Cytotoxic Waste
Biological Procedure	X	X	✓	X	X	X
Autoclave	✓	✓	X	X	X	X
Microwave	✓	✓	X	X	X	X
Chemical Treatment	✓	✓	X	✓	X	✓
Encapsulation and Inertization	X	✓	X	✓	✓	✓
Sanitary landfill	✓#	✓*	X	✓*	✓*	✓*
Burial	✓#	✓#	✓	X	X	X
Septic or Concrete Vault	✓#	✓	X	X	X	X

\* After Encapsulation    # After Sterilization

## 4.3 New Treatment Technologies

Suitable selection of technology is a very important step for the successful implementation of a health care waste management system. Especially emerging technologies should be carefully reviewed prior to installation and operation. Some of the examples of emerging technologies are plasma pyrolysis, superheated steam, ozone and promession.

**Plasma pyrolysis:** Plasma pyrolysis involves plasma arc torches or electrodes which use ionized gas in the plasma state to convert electrical energy to super high temperatures, up to several thousand degrees Celsius.

**Superheated steam:** This technology uses superheated steam at 500°C to pulverize infectious, hazardous chemical or pharmaceutical wastes. These steams are further heated up to temperatures of 1500°C.

**Ozonization :** Ozone (O<sub>3</sub>) gas can be used as a disinfecting agent for waste. Ozone (O<sub>3</sub>) can break down to more stable forms such as Oxygen (O<sub>2</sub>) easily. The wastes are shredded and exposed to the agent.

**Promession:** Promession combines a mechanical process with the removal of heat to destroy pathological waste. It uses liquid nitrogen and mechanical vibration to disintegrate the pathological waste into a powder before burial.

## 4.4 Storage of HCW

Waste should be collected and transferred to the central storage within the health facility to prevent the accumulation of waste before treatment and relocation. The maximum storage period for infectious waste before treatment or disposal is 48 hours in winter and 24 hours in summer. Waste storage site



should be within the premises of the health institution. When allocating space for this, attention should be paid to the amount of waste produced, garbage collection rate, re-treatment and other means of disposal.

Wastes of each category should be stored separately and labeled in a clear manner. For example, infectious waste should not be mixed with medicinal waste.

In order to have complete control over the waste management system, records of stored waste, treated waste and disposal date of related waste etc. should be kept. All the health-related collected wastes should be deposited in the storage area until transported to the prescribed treatment center. Storage area should be separate from the patient's room, laboratory, hospital venue, operating room or any place that is easily accessible to the public. Such storage area should be locked, hygienic and with appropriate signs.

#### **4.5 Central Treatment Facility (CTF)**

In urban area most of the health facilities may not have the space required to set up treatment centers on their own premises. In such an environment, Central treatment facility can be a good option for better management of health-related wastes. The CTF will remain as a common center of treatment, regardless of whether the health-related waste treatment produced in the city is operated by a public body or the private sector. The cost of treatment and disposal depends mainly on the technology in use and the amount of waste accumulated in the central treatment center.

Some of the points to be taken into consideration while operating the Central Treatment Facility are as follows:

- i. Prior to the establishment and operation of such treatment center, the environmental impact assessment of the area should be completed and approval should be obtained from the concerned officials.
- ii. The central treatment center operated within the municipality should be owned by the municipality. Somewhere the central treatment center may have brought wastes from different levels. In such cases, the local level where the treatment center is located can take ownership of it. Ownership of such centers may be transferred to the private sector.
- iii. The Central treatment center may be operated in public, private, partnership model or by the municipality alone.
- iv. No Central Medical Hospital shall be established and operated in the premises of any health institution. Collecting potentially hazardous waste within health facilities should be strictly prohibited.
- v. The Central treatment center as a service provider may charge a fee from the health institution at the rate of quantity, weight or per bed.

#### 4.6 Steps for implementation of Health Care Waste Management System in HCF

For implementation of HCWM system at HCF more efficiently with safe and sustainable approach following steps need to be followed:

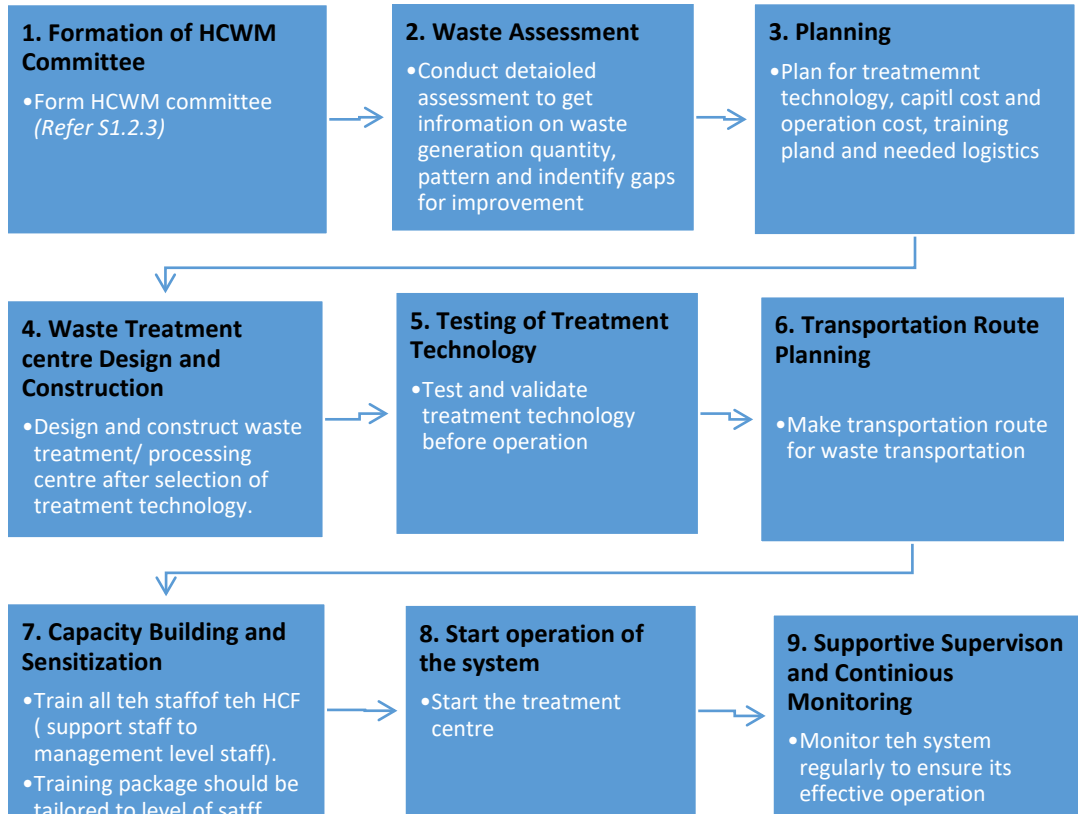


Figure 3 :Implementation of HCWM system at HCF

## SESSION 5: OCCUPATIONAL SAFETY AND HEALTH AND INFECTION CONTROL

<b>Objective:</b> The main objective of this session is to get an insight on occupational safety and health	<b>TRAINING TOOLS</b> <ul style="list-style-type: none"><li>• Interactive Presentation</li><li>• Group Discussion</li><li>• Q &amp;A</li></ul>	<b>Time</b> 45 Mins
--	--	------------------------

By the End of the session Participants will be able to

- Understand Occupational hazard and risk to health workers Health Impact from HCW
- Understand use and limitations of personal protective equipment
- Discuss the functions of an occupational health and safety committee
- Get insight on ways to reduce occupational hazards, spill management and risk waste management, post exposure prophylaxis

### 5.1 Occupational Health Impact

All Individuals exposed to hazardous HCW are potentially at risk of being infected. The potential healthcare workers at risk are:

- i. Medical staff – doctors, nurses, paramedics, pharmacists, laboratory technologists, sanitary staffs and hospital maintenance personnel
- ii. In and out patients receiving treatment in HCFs as well as their relatives
- iii. HCFs support staffs involved in services such as laundry, waste handling and transportation,
- iv. Workers involved in waste disposal facilities and,
- v. General public

The medical and auxiliary staff can be infected with wastes if not properly packed during handling of waste especially the infectious and sharps. These wastes contain variety of pathogenic microorganisms which may infect the human body through pathways such as crack or cut in the skin (injection). Unsafe disposal of HCW such as contaminated syringes and needles poses health risks to medical personnel.

### 5.2 Personal hygiene and hand hygiene

Basic personal hygiene is important for minimizing the risks during healthcare waste handling, and there should be easy access to hand washing for the staffs and individuals involved with healthcare waste. As there is a risk of infection from the hands of health workers, both hand washing and cleansing are the primary prevention measures. Infections can be prevented by using standard methods of hand washing. It is mandatory to wash hands with soap and water when in contact with wastes and also after examining patients to avoid all kinds of infections. Pure alcohols or alcohol-based compounds are quick and effective. If infected cells or body fluids are touched with non-gloved hands, it should be washed with soapy water or disinfected alcohol.

### **5.3 Safety of Healthcare workers**

Handling of potentially hazardous and infectious waste includes production, segregation, collection, transportation, treatment and disposal of HCW. Those who work in potentially hazardous and contagious health-related waste should be personally protected from the risk of injury. The person involved in health waste management should ensure that all risks have been identified and necessary safety measures have been taken. When preparing a health waste management plan, all the risks associated with such waste should be assessed, which will help in identifying the necessary safety measures. When designing such a system, there should be a level of protection against hazardous waste or contact with other hazards or keeping such contact within safe limits (WHO 1999) (2076). Appropriate training should be given to the concerned staff in this regard.

#### **Personal Protective Equipment**

Risks to healthcare workers depends to some extent on what kind of clothes are worn or whether protective equipment have been used or not. The following materials should be provided to the persons directly involved in the collection and operation of health-related waste:

- A cap with or without a helmet or visor, depending on the nature of the work.
- Face mask, depending on the nature of the work.
- Disposable gloves, utility gloves or heavy-duty gloves (for cleaners and healthcare waste handlers), both mandatory,
- Eye protection goggles for eye protection,
- Apron mandatory,
- Leg protector or boot mandatory

Boots and heavy-duty gloves are especially needed for cleaners. The thick sole of the boot provides protection against spillage and slippery debris when entering the storage area. If not properly segregated, needles and other sharp debris may be placed in a plastic bag, may harm the waste handlers. So, leg protector should be used while handling healthcare wastes.

#### **Vaccination and Needle-Stick Protection**

There have been cases of health workers and cleaners being infected with viral hepatitis. Therefore, vaccination against it is recommended. Such cleaners should be vaccinated against tetanus as well.

Medical professionals and health workers should be made aware of the needle-stick protection. The use of needles in health care is common all over the world. In developed and developing countries alone, 16 billion injections are given annually. More than 90 percent of injections are given for medical purposes, while 5 to 10 percent are used for family planning and other immunizations (WHO 2015)

(2072). Safe needles do not harm users, do not pose a risk to health workers, and are not considered as hazardous waste. The practice of using unsafe needles, such as reusing syringes and needles without treatment must be discouraged. The disposable syringe and the needles should be cut, squeezed and made unusable after use and disposed safely.

### **Injuries and Exposure to hazardous Materials**

The health organization should have a program in place to deal with injuries or exposure to hazardous materials. Sweepers who handle health-related wastes should be trained on what to do when injured and in contact.

The training program should include the following:

- Immediate first aid treatment, such as cleaning the injured area or wound, if eyes rinse with clean water.
- Immediately inform the designated responsible person.
- Identify the cause of the incident as much as possible and get detailed information of the cause for infection prevention
- Have additional medical monitoring of the accident,
- Contact the Department of Emergency or Occupational Health as soon as possible, Provide medicines for health protection after direct contact with the hazardous waste
- Medical monitoring.
- Carryout blood and other tests if necessary.
- Keep records of the incident.
- Investigate the accident and take corrective action to prevent such incident from happening again in future.

### **Spillage management**

In case of leakage or spillage of hazardous fluid, PPE such as gloves and gowns, eye protection material and mask should be worn while cleaning. Respiratory equipment (gas masks) may be required for risky activities such as cleaning toxic dust, incinerator residue or infected equipment. Wastes should be collected and packed safely with the help of shovels. Special care should be taken especially if there is mercury spillage. In case of spillage or leakage of contaminated material, the floor should be cleaned and sanitized immediately after collection of spilled material.

### **5.4 Safe use of cytotoxic drugs and radioactive materials**

Health institutes that use cytotoxic drugs and radioactive materials should prepare special guidelines to protect them and their employees and the environment. Ensuring safe use of cytotoxic drugs and radioactive materials is difficult. It is recommended that the use of these materials be restricted to competent health care providers providing specialist services (e.g., providing oncological care services).

The guideline on cytotoxic product operation should include the following waste management regulations:

- Collect separately in bags or containers with identification labels.
- Return the expired medicine to its supplier. For such works, the policy of returning back to the supplier should be adopted. When purchasing cytotoxic drugs and radioactive materials, an agreement must be signed with the supplier company or organization to take back the expired materials.
- Such waste should be stored safely apart from other health care waste.
- There should be provision for disposal of contaminated material, provision for treatment of reusable equipment and provision for appropriate treatment in case of spillage.
- Provision should be made for the treatment of waste contaminated by cytotoxic products including defecation of the patient and disposable cloth used by the patient.

### 5.5 Occupational Post-Exposure Prophylaxis (OPEP)

Occupational Post-Exposure Prophylaxis (OPEP) is the Short-term treatment that starts as soon as possible after high-risk occupational exposure to an infectious agent, such as HIV, hepatitis B virus (HBV), or hepatitis C virus (HCV). One of the example of a high-risk occupational exposure is exposure to an infectious agent as the result of a needle stick injury in a health care facility. The purpose of OPEP is to reduce the risk of infection. **If an occupational exposure occurs, the circumstances and post exposure management should be recorded. The following measures should be followed for OPEP <sup>7</sup>:**

- date and time of exposure should be recorded,
- informations such as where and how the exposure occurred, and if the exposure was related to a sharp device, the type of device and how and when in the course of handling the device the exposure occurred should be noted
- details of the exposure including the type and the severity of the exposure (e.g., for a percutaneous exposure, depth of injury and whether the fluid was injected; or for a skin or mucous-membrane exposure, the estimated volume of material and duration of contact and the condition of the skin [e.g., chapped, abraded, or intact]) should be recorded
- details about the exposure source (i.e., whether the source material contained HIV or other bloodborne pathogen[s]), and if the source is an HIV-infected person, the stage of the disease, history of antiretroviral therapy, and viral load, if known should be noted
- details about counseling, postexposure management, and follow-up should also be recorded.

---

<sup>7</sup> Guidelines for the Management of Health-Care Worker Exposures to HIV and Recommendations for Postexposure Prophylaxis. *Arch Dermatol.* 1998;134(10):1317–1318. doi:10.1001/archderm.134.10.1317 (for oPEP)

## 5.6 Emergency Response in case of Leakage

Spill and leakage of infectious and other hazardous materials are an emergency situation in a health care facility. Waste may spill or leak unknowingly, during its transportation within the HCFs. Waste may be spilled or dropped by accidents like colliding, falling or breaking of the containers and sometimes it can be due to full and leaky containers during transfer.

The following are some of the activities to be done in case of such leakage:

- Clear the contaminated area.
- Immediately wash the eyes, skin by the exposed person.
- Inform supervisor for additional work to be done in such a situation.
- Use personal protective equipment before cleaning.
- Properly disinfect the contaminated material and area.
- Collect all spilled material (in case of spillage of blood or other liquids, spray 0.5% chlorine, wait for 10 minutes before collection, if case of chemical product, disinfect it before picking it up).
- Start from less affected to more affected area during disinfection, change the wipe-cloth at each stage. In case of leakage of liquid, use dry cloth. Similarly, when a solid object is spilled, wipe with a cloth soaked in water (acid, basic or neutral, whichever is suitable).
- Thoroughly clean the spilled area and wipe with an absorbing cloth.
- Be aware that its impact on patients, health workers or other staff and the environment is minimal.
- If skin is in contact with any dangerous substance, it should be washed, cleaned and disinfected immediately.
- If burning chemical substance gets in the eyes, constantly pour water in the eyes for 10 to 30 minutes to wash it. For this, you have to open and close your eyes by dipping your face in the pot filled with water.

## 5.7 Infection Prevention and Control Measures

All Health care workers and patients are at the risk of infection. Therefore, prevention and control of infection is everyone's responsibility. While entering into the Health Care Facilities, the staff, patients and visitors can come in contact with the disease. However, in most cases the infection can be prevented from spreading. The only way to prevent the spreading of infection is to avoid the human contact with the germs.

The best way to prevent infection is to follow the standards, which includes the following:

- Wash hands thoroughly with soap and water regularly.
- Use personal protective equipment such as gloves, eye protection materials, face masks and gowns.
- Use tweezers to separate the waste.
- Follow appropriate respiratory / cough medicine and behavior change.
- Take precaution to avoid injury while using sharp tools.
- Treat the equipment and tools used in the treatment properly.
- Adopt proper environmental sanitation and waste management practices.

Table 5: Prevention from Infection due to unsafe health care waste and control measures

Risk of disease	Infection Prevention and Control Measures
Contaminated water in the incision area for wound / surgery, infections from medical equipment and dressings / syringe, such as nosocomial infections, etc.	<ul style="list-style-type: none"> <li>• Proper disposal management of single use medical device and dressing / needle after use</li> <li>• Pre infection-free management</li> <li>• Management of disinfecting and sanitizing equipment and dressing materials.</li> <li>• Management of clean water</li> <li>• Infection-free management during surgery and dressing</li> <li>• Management of appropriate fumigation of operating place, beds, operation theatre</li> <li>• Management of separate waste transportation routes</li> </ul>
Infections transmitted through blood (such as Hepatitis B, Hepatitis C, HIV etc.) with use of Infected syringes, needles	<ul style="list-style-type: none"> <li>• Management of HCW and proper disposal management of single use medical device and dressing / needle after use</li> <li>• Management of safe blood transfusion</li> <li>• Proper use of syringe and arrangement to avoid recapping the syringe after use</li> <li>• Arrangements for use of personal protective equipment (PPE)</li> </ul>

### 5.8 Role and responsibility in infection prevention and control

- i. All healthcare staffs and service receivers involved with healthcare facilities are at risk of having infections. So, it is the responsibility of everyone for infection prevention.
- ii. Employees should be properly trained for precautions according to infection control standards and ensure adequate cleaning and infection prevention equipment and personal safety equipment are provided.
- iii. Beds, floors, walls, toilets, showers, appliances and health facilities should be cleaned and disinfected regularly to ensure that all the HCF clean and disinfected.
- iv. Medical equipment should be cleaned, Disinfected and sterilized as per requirement.
- v. The designated areas should have adequate number of separate toilets, showers, laundry facilities and waste disposal facilities.
- vi. To eliminate contamination of defecation or vomiting in specified environment (such as isolation of cholera patients) half a cup of 0.5% chlorine solution will be used for 10 minutes.
- vii. Any area contaminated with blood, feces, vomit or body fluids should be cleaned and decontaminated immediately.
- viii. Laundry soap and detergent should be used for the contaminated clothes and linen kept in separate bags. When washed in washing machine a temperature of 60 to 90 degrees should be maintained. If washing machine is not available, the clothes should be cleaned using a solution of soap and water and stirred using a stick in a large container or drum. After some time, empty the large container and drum and soak the linen cloths in 0.05% sodium hypochlorite for 30



minutes. Finally rinse with clean water and dry the cloth thoroughly (as much as possible in the sun).

- ix. Clean and dirty linen should be stored and transported separately in bags with marked labels.
- x. Beds, mattresses, and pillows, which are contaminated with blood or fluid from the body, should be re-cleaned after each patient.
- xi. The distance between the beds in the ward should have maintained a distance of 4 feet.
- xii. In the event of an outbreak, patients and caregivers should be given adequate counseling and advice on the necessary personal infection control practices within 30 minutes of arriving at the health facility.
- xiii. Adequate management of corpses should be done to prevent the spread of infectious diseases.
- xiv. Open defecation is a serious public health risk in any environment. In addition to constructing additional toilets and increasing the number of sanitation workers, if necessary, the concerned health institution should immediately conduct sanitation awareness campaign.
- xv. Health organizations should take the following level of precautions to prevent infection:
  - a. by making full use of the 6 steps of hand washing.
  - b. Wearing personal protective equipment (PPE) such as gloves, eye protection goggles, mask, apron.
  - c. Maintaining proper environmental sanitation and waste disposal practice.
  - d. By preventing injuries caused by sharp objects.
- xvi. Special care must be taken in the operation theatre/ICU, such as using separate shoes, gowns, and food.

## SESSION 6: NATIONAL STANDARD FOR WASH IN HEALTH CARE FACILITIES

Objective: In this session the participants will get an insight on national standards for WASH in HCFs	TRAINING TOOLS <ul style="list-style-type: none"> <li>• Interactive presentation</li> <li>• Group Discussion</li> <li>• Q &amp;A</li> </ul>	Time 30 Mins
---	---	-----------------

Overview: By the End of the session Participants will be able to

- Know about National Standard for WASH in HCFs

### National Standard for WASH in HCFs

National standards for Water Sanitation and Hygiene (WASH) in Health Care Facilities (HCFs) – 2078 have following objectives:

- Support HCFs to identify the need of WASH and address the identified incomplete necessities and weaknesses
- Help to reduce infection during providing health services and improve occupational safety through quality WASH services in HCFs
- Encourage health workers, patient, their relatives and visitors to take health services, learn and adopt WASH related behaviors
- Encourage to adopt WASH related good behavior at community level

It includes following:

#### I. Measures to stop risk of disease at HCFs

Health-care facilities are settings with a high prevalence of infectious disease agents. Not only the patients, health-workers, carers but also general public who live near the facilities on the routes of the health care wastes face unacceptable risks of infection if environmental health is inadequate. The health-care setting might even become the origin of diseases such as typhus, diarrhoea etc.

Table 6: Preventive measure for Disease Risks at HCF

Disease risk	Prevention measures
Airborne infections (e.g. <i>Legionella</i> , avian influenza, SARS, tuberculosis)	<ul style="list-style-type: none"> <li>• Ventilation</li> <li>• Space available per patient</li> <li>• Spacing of beds</li> <li>• Use of separate rooms for highly vulnerable or infectious patients</li> <li>• Use of masks and correct incineration of wastes</li> </ul>
Water-, food- or hand borne infections (e.g. HEV, diarrhea)	<ul style="list-style-type: none"> <li>• Water supply (quality and access)</li> <li>• Excreta disposal</li> <li>• Hygiene facilities</li> <li>• Food hygiene</li> <li>• Hand hygiene</li> </ul>
Infection of wounds/surgical	<ul style="list-style-type: none"> <li>• Use of single-use medical devices and dressings</li> </ul>

incisions from contaminated water, medical devices and dressings (e.g. sepsis)	<ul style="list-style-type: none"> <li>• Pre-disinfection</li> <li>• Cleaning and sterilization of instruments and dressings</li> <li>• Good-quality water</li> <li>• Asepsis in surgical or dressings procedures</li> </ul>
Blood borne infections due to contaminated needles and syringes, unsafe blood transfusion (e.g. HBV, HCV, HIV)	<ul style="list-style-type: none"> <li>• HCWM and use of single-use needles and syringes</li> <li>• Safe blood transfusion</li> </ul>
Heat- and cold-related stress and discomfort (e.g. high fever)	<ul style="list-style-type: none"> <li>• Heating, ventilation, air-conditioning (HVAC) and insulation</li> </ul>
Vector-borne disease transmission (e.g. malaria, dengue, leishmaniasis)	<ul style="list-style-type: none"> <li>• Control of disease vectors in and around buildings</li> <li>• Protection of patients</li> <li>• Protection of infrastructure</li> </ul>

HBV: hepatitis B virus; HCV, hepatitis C virus; HEV, hepatitis E virus; HIV, human immunodeficiency virus; SARS, severe acute respiratory syndrome. (Source: WHO, 2008)<sup>8</sup>

## II. WASH standards for HCFs

Table 7: WASH standards for different level of Healthcare facilities.

HCF category	Water	Hygiene	Sanitation	HCWM
Primary level HCFs	Standard (II)	Standard (II)	Standard (II)	Standard (As per HCWM guideline 2069)
Secondary Level HCFs	Standard (II)	Standard (I)	Standard (II)	Standard (As per HCWM guideline 2069)
Tertiary level HCFs	Standard (I)	Basic	Standard (I)	Standard (As per HCWM guideline 2069)
Outreach services	Basic	Basic	Basic	Basic
Mobile camps	Basic	Basic	Basic	

Source: National Standard for WASH in HCF (2078)<sup>9</sup>

## III. Categorization of HCFs based on WASH Standards

Table 8: HCF Categorization based on WASH Stanmdards

Category of healthcare facility	Services provided by healthcare facility
Primary level HCFs	General Hospitals (100-300 beds), Specialist Hospitals, Specialized Hospitals, Teaching Hospitals and other Teaching Hospitals under the Institute of Health Sciences, Children's Hospitals, Specialist Ayurveda Hospitals, Dialysis Centers
Secondary Level HCFs	General Hospital 25-50 Beds, Ayurveda Health Center - General Ayurveda Hospital 25-50 Beds, Homeopathy Hospital, Laboratory, Specialist Clinic, Polyclinic, Geriatric Care Center, Eye Treatment Center, Physiotherapy Center, Rehabilitation Center

<sup>8</sup> Chartier Y. Essential environmental health standards in health care. Geneva, WHO2008

<sup>9</sup> Ministry of Health and Population (2078) National Standard for WASH in HCF

	(Psychosocial, Physical) , Radio Imaging Center, Hospice Center, Test Tube Baby (IVF)Center
<b>Tertiary level HCFs</b>	Basic Health Care Center, Basic Ayurveda Service Center, Ayurveda Health Center, Health Clinic, Dental Clinic, Geriatric Counseling Center, Ayurveda Clinic, Naturopathy Center, Acupuncture, Acupressure Center, Sowa Rigpa (Amchi) Clinic, Traditional Service Clinic, Homeopathy Clinic Treatment Center, Yoga Meditation and Physical Exercise Center, Circulatory Center
<b>Outreach services</b>	Outreach service sites
<b>Mobile camps</b>	Temporary/mobile camps-

Source: National Standard for WASH in HCF (2078)<sup>10</sup>

#### IV. Roles and Responsibilities of Federal, Provincial and local bodies

The three levels presented in the table are intended as a general illustration of how related activities are required at different levels in context of Nepal. There are essential steps at federal, provincial, and local level as presented in Table below.

Table 9: Provision of the implementation of the standards at Federal, Province and Local levels

S. No	Federal	Provincial	Local
1	<ul style="list-style-type: none"> <li>Review existing national policies and ensure that there is a national policy framework that supports improved conditions in HCSs.</li> </ul>	<ul style="list-style-type: none"> <li>Raise awareness on environmental health in HCFs among key stakeholders at district level.</li> </ul>	<ul style="list-style-type: none"> <li>Mobilize support from health workers, local communities and other local stakeholders to achieve and sustain a healthy health-care environment.</li> <li>Promote a working climate that encourages patient and staff safety.</li> </ul>
2	<ul style="list-style-type: none"> <li>Ensure that national bodies exist for setting and monitoring standards</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that an appropriate body or service exists at district level for overseeing compliance with national standards.</li> </ul>	<ul style="list-style-type: none"> <li>Create and assign responsibility to a local body to oversee the implementation of national standards at HCS level.</li> <li>Promote a working climate that encourages patient and staff safety.</li> </ul>
3	<ul style="list-style-type: none"> <li>Provide national expertise and knowledge through information dissemination mechanisms</li> </ul>	<ul style="list-style-type: none"> <li>Provide expertise and resources for assessment and planning at local level.</li> </ul>	<ul style="list-style-type: none"> <li>Assess existing conditions, consult local stakeholders (including staff and local community) and plan improvements and new developments.</li> </ul>
4	<ul style="list-style-type: none"> <li>Review national standards and add to them if needed.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that the national regulatory framework is reflected in guidance and</li> </ul>	<ul style="list-style-type: none"> <li>Define a set of targets, policies and procedures for implementing national standards and/or</li> </ul>

<sup>10</sup> Ministry of Health and Population (2078) National Standard for WASH in HCF

	<ul style="list-style-type: none"> <li>• Ensure that there is an effective regulatory framework that encourages and supports compliance.</li> </ul>	<p>support for compliance at district level.</p> <ul style="list-style-type: none"> <li>• Develop and use guidelines where national standards do <b>not exist</b>.</li> </ul>	<p>guidelines in a way that reflects local conditions.</p> <ul style="list-style-type: none"> <li>• Define how targets, policies and procedures will be applied.</li> </ul>
5	<ul style="list-style-type: none"> <li>• Provide and/or facilitate funding for national programmes</li> </ul>	<ul style="list-style-type: none"> <li>• Allocate funding for planned improvements and new developments.</li> </ul>	<ul style="list-style-type: none"> <li>• Seek funding for planned improvements and new developments.</li> </ul>
6	<ul style="list-style-type: none"> <li>• Monitor progress at national level and promote consistent application of standards in all regions and at all levels.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure oversight of improvements and new developments to ensure the consistent application of <b>national standards in all HCFs</b></li> </ul>	<ul style="list-style-type: none"> <li>• Oversee implementation of planned improvements and new developments</li> </ul>
7	<ul style="list-style-type: none"> <li>• Produce training and information materials appropriate to a range of health-care settings.</li> <li>• Ensure appropriate curriculum for health-care worker training.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide appropriate training and information to health-care workers.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide advice and training to health-care workers and patients.</li> </ul>
8	<ul style="list-style-type: none"> <li>• Periodic review and update of policies, standards, training contents, evaluation and monitoring tools.</li> </ul>	<ul style="list-style-type: none"> <li>• Inform key stakeholders at district level on updated environmental health <b>components in HCFs</b></li> </ul>	<ul style="list-style-type: none"> <li>• Mobilize support from health workers, local communities and other local stakeholders to improve, achieve and sustain a healthy health-care environment.</li> <li>• Promote a working climate that encourages patient and staff <b>safety</b>.</li> </ul>
9	<ul style="list-style-type: none"> <li>• To coordinate effectively with the concerned Ministries (Ministry of Drinking Water and Sanitation, Ministry of Forest and Environment, Ministry of Health and Population, etc.) for housing standards.</li> </ul>	<ul style="list-style-type: none"> <li>• To establish effective coordination between the responsible Ministries (Social Development, Physical Infrastructure Development).</li> </ul>	<ul style="list-style-type: none"> <li>• Effective coordination with service providers and management committees and enforcement of standards.</li> </ul>

Source : (WHO, 2008 <sup>11</sup>; MoHP, 2020)<sup>12</sup>

<sup>11</sup> WHO2008 Chartier Y. Essential environmental health standards in health care. Geneva,

<sup>12</sup> Ministry of Health and Population (2078) National Standard for WASH in HCF

## V. Roles and Responsibilities of stakeholders

Table 10 : Roles and Responsibilities of Different Stakeholders

Stakeholder group	Roles and Responsibilities
Patients	<ul style="list-style-type: none"> <li>Comply with the standards and guidelines for use and care of WASH facilities and observe hygiene practice by staff of HCF</li> </ul>
Patient's families and carers	<ul style="list-style-type: none"> <li>Comply with the standards for use and care of WASH facilities and observe hygiene practice by staff of HCF</li> </ul>
Health Facility operation and Maintenance (HFOMC)	<ul style="list-style-type: none"> <li>Plan and implement WASH activities for achieving and maintaining the WASH targets</li> <li>Active and regularly go through the plans and its achievement and continuous follow up for achieving the WASH targets</li> <li>To plan separate budget for WASH activities.</li> <li>Separate staff will be deployed for health care waste management.</li> <li>To ensure efficient manpower in health institutions for necessary plumbing services.</li> <li>To coordinate with the local stakeholders.</li> <li>Improvement method of risk based drinking water and sanitation facilities.</li> </ul>
Health care workers	<ul style="list-style-type: none"> <li>Comply the guidelines/standards should be included Carry out disease prevention work such and Hand hygiene, HCWM, consistently and well</li> <li>Care for and maintain WASH facilities</li> <li>Encourage patients and care taker to adopt appropriate hygiene behaviors.</li> <li>Actively participate in achieving and maintaining targets/ goals set on WASH promotion plan</li> </ul>
HF In-charge	<ul style="list-style-type: none"> <li>Comply the standard/guidelines and monitoring/assurance of compliance of standard/guidelines</li> <li>Plan and implement WASH activities for achieving and maintaining the WASH targets</li> </ul>
Support staff	<ul style="list-style-type: none"> <li>Carry out disease prevention work such and cleanliness of HCF, HCWM, consistently</li> <li>Actively work in achieving and maintaining targets/ goals set on WASH promotion plan</li> </ul>
National and international funding Bodies	<ul style="list-style-type: none"> <li>Provide funding for new HCFs, upgrading or renovation of existing ones and ongoing maintenance of targets.</li> </ul>
Other Communities	<ul style="list-style-type: none"> <li>Participate in disease control sessions through community health</li> <li>Inform the concerned bodies about the health institution related wastes and inadequate management practices found around the health institution.</li> </ul>

## VI. Level of WASH services available at HCFs

National standards on Water, Sanitation and Hygiene in Health Care Facilities have tried to include the basic and advance service level of water, sanitation and hygiene according to the SDG as in the table below:

Service level	Water in Health Facilities	Sanitation in Health Facilities	Hand Hygiene in Health Facilities	Waste Disposal in Health Facilities	Environmental sanitation

Advanced	To meet all the requirement as defined at WASH guideline for advanced level				
Basic	Water from an <i>improved</i> source is <i>available on premises</i>	Improved toilets are usable, separated for patients and staff, separated for women and allowing menstrual hygiene management, and meet the needs of people with limited mobility	Hand hygiene materials, either a basin with water and soap or alcohol hand rub(Sanitizer), are available at points of care and toilets	Waste is safely segregated into at least three bins in the consultation area and sharps and infectious wastes are treated and disposed of safely	The cleaners will be trained according to the basic protocols available.

## SESSION 7: HEALTH CARE WASTE MANAGEMENT DURING AN EMERGENCY (COVID-19)

As per the MoHP Interim Guidance-2020<sup>13</sup> for HCWM during Emergency, the steps for HCWM as are :

Minimization:	Reduction of wastes at source should be applied to the extent possible. It includes rational and risk-based use of PPEs, selection of materials with minimal packaging or unpackaging at green area (low risk of contamination with infectious agents) and use of materials that can be appropriately cleaned or disinfected etc.
Segregation:	The types of hazardous waste in a facility vary according to the size of the facility and the services offered. Only the waste generated in administrative/waiting areas of health-care facilities can be considered as non-hazardous waste, otherwise all waste produced during COVID-19 patient care, is considered to be infectious and need to be segregated accordingly. Normally, in a small health care facility where only limited health services are offered, it is recommended that the infectious waste must be segregated at least in three different bins -bio-degradable, non-bio-degradable and sharp wastes.
Collection, transportation and storage:	<p>All infectious wastes should be collected safely in clearly leveled lined containers and sharp waste in sharp-safe boxes. Even the waste segregated as non- hazardous from a health care setting should be collected and disposed in strong bags (preferably red colored bio-hazard bags) and closed completely before collection and disposal by municipal waste.</p> <p>Storage place for highly Infectious waste must be selected sealed and need to be identified as an infectious waste area by using the biohazard sign. Storage times for such infectious waste should not exceed 24 hours.</p> <p>Gloves, masks and other waste generated during at-home patient care should be placed into a waste bin with a lid in the patient’s room before being disposed of as infectious waste.</p>
Treatment:	<p>The waste should be treated with use of non-combustion or steam-based treatment technologies such as autoclaves, microwaves to the extent possible prior to final disposal</p> <p>Chemical disinfection could be another option depending upon the local context and resources available.</p> <p>The option of burning of wastes is discouraged</p>

<sup>13</sup> Ministry of Health and Population (2020), Health Care Waste Management in the context of COVID-19 Emergency (Interim Guidance)



Onsite burial in pits:	The HCF with limited resources may consider small burial sites/pits for different types of hazardous waste. It is practical for only limited periods of time (1–2 years) and for relatively small quantities of waste.
Leave for natural di-off:	some general waste like items such as water bottle, paper, card board, packing materials can be left for at least 7 days in a secured storage area, before sending for disposal as usual municipal waste.
Disposal:	<p>If there is a possibility that masks, or PPE are being targeted for illegal reuse, they can be cut or damaged before disposal.</p> <p>Sharp wastes should be decontaminated and then disposed of in concrete-lined sharps pits on facility premises or encapsulated by mixing waste with immobilizing material, such as cement, before disposal.</p> <p>Recycling activities should be avoided to prevent human contact with any potentially infectious domestic and medical waste. All non-biodegradable household waste should be treated as non-recyclable and disposed of through sanitary landfill as usual business. Landfill sites with informal waste picking will need increased restriction and high security.</p>
Safety and Health:	It is strongly recommended that healthcare facilities ensure that their employees and those of their sub-contractors are adequately trained, protected with PPE and provided with vaccination against tetanus, hepatitis and can access to 24 hours post exposure prophylaxis. All those who handle HCW should wear appropriate PPE and perform proper hand hygiene after removing it. For hand-hygiene, if alcohol-based hand rubs or soap and water are not available or feasible, then using chlorinated water (0.05%) for handwashing is an option as a short-term measure.

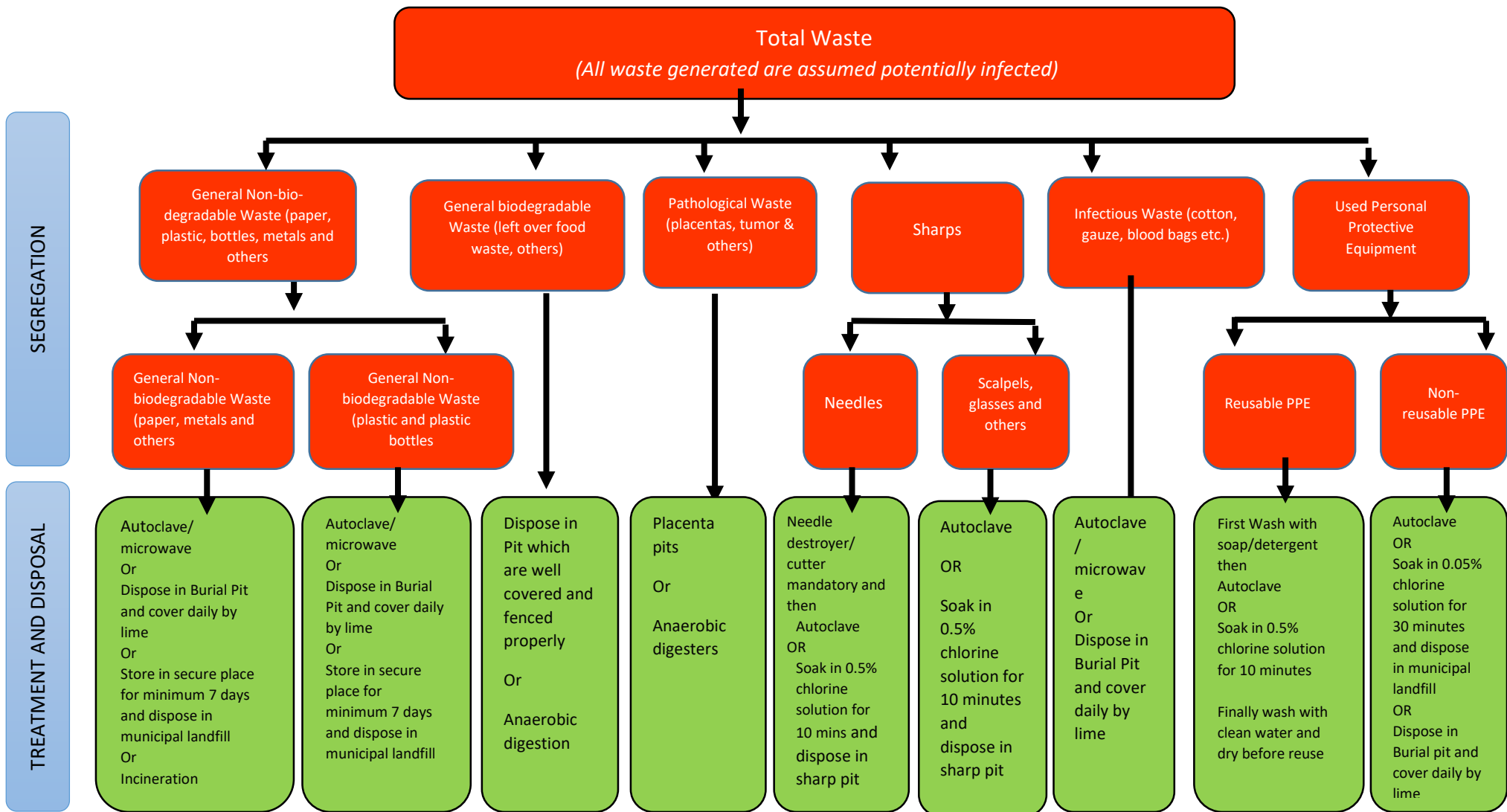


Figure 4 Flow chart for treatment of HCW during Covid-19 (source: MoHP (2020))<sup>14</sup>

---

<sup>14</sup> Ministry of Health and Population (2020), Health Care Waste Management in the context of COVID-19 Emergency (Interim Guidance)  
Page **37** of **45**

**Some of the videos links that can be used as a resource material during session:**

Waste during coronavirus (COVID-19) : (GIZ Nepal)

<https://www.youtube.com/watch?v=leYzlh-dZgk>

## SESSION 8: FACILITY WALK THROUGH AND DISCUSSION

Objective: The participants will understand better the work environment, its surroundings and the risks they are exposed to if not carefully instructed about how the work areas should be handled through this session	TRAINING TOOLS <ul style="list-style-type: none"> <li>• Field visit</li> <li>• Discussion</li> <li>• Q &amp; A</li> </ul>	Time 1 hour
--	---	----------------

### Facility Walk Through

Groups will be divided and the participants will be taken for a walkthrough in one or two units of the health care facility. A group leader will be selected in each group and ground rules will be strictly executed during the visit so that no one is off track. The group leader will ensure that proper discipline and silence are maintained throughout the visit. After the unit/ward visit, the inclusive health care waste management system will be observed and noted.

### Observations during walkthrough session:

Description	Things to be observed
<b>Waste Containers and segregation inside the units/wards</b>	<ul style="list-style-type: none"> <li>• Observe waste segregation practices.</li> <li>• Observe color-coded bins and note the contents.</li> <li>• Evaluate the level of segregation. Are there enough bins in the ward/department?</li> <li>• Observe the locations of the bins</li> </ul>
<b>Waste Collection and Transportation</b>	<ul style="list-style-type: none"> <li>• Observe the mode of collection and onsite transportation.</li> <li>• Evaluate the route of transportation.</li> <li>• Evaluate the frequency and times of collection.</li> <li>• Observe the type of collection carts or trolleys being used</li> <li>• Are the waste handlers using proper PPE?</li> </ul>
<b>Final Disposal</b>	<p>Observe the final disposal practice of HCW. What happens to the waste at the end? (recycles, burns, buries, or municipal disposal?)</p> <p>Observe the Waste storage area if available and evaluate:</p> <ul style="list-style-type: none"> <li>• Location, surroundings, access</li> <li>• Overall cleanliness</li> <li>• Labelling and signs</li> </ul>

## **DISCUSSION**

After the walkthrough session the participants will later share their findings and observations made. Each group will be provided with a chart paper and asked to note down the following;

- The HCW problems and difficulties at the unit/ward and ways of improvements
- Current waste collection and transportation practices; ideas of waste transportation route and frequency
- Final disposal practices
- Overall recommendation and suggestion

Each group will be given 15 minutes for discussion. After the group is ready, one of the participants from each group makes a presentation. The discussion will be further provoked by the trainer and the provided feedback will be noted.

## **Q & A**

After the round of discussion, the participants will be asked if they have any queries related to the overall training sessions. The training will then be ended after a short Q & A round.