

NATIONAL GUIDELINE ON INFECTION CONTROL AND MEDICAL WASTE MANAGEMENT



Health Care & Diagnostic Division
Department of Medical Services
Ministry of Health

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FOREWORD

The Infection Control and Medical Waste Management are the important components of clinical care in all healthcare settings. The changing pattern of infections and the emergence of microorganisms with multiple-antibiotic resistance emphasize the need for all health care workers to understand and practice evidence-based infection control practices that will protect patients, clients, and healthcare workers from health care-associated infections (HCAIs).

The common HCAIs include urinary tract infections, surgical-site infections, bloodstream infections and pneumonia. They are not only the common threats for patient safety but also prolong the hospital stays; cause long-term disabilities and increase resistance of microorganisms to antimicrobials incurring additional costs for patients and their families. Thus, it is important for all health care workers, patients, their family members, friends and close contacts to adhere to the infection control guidelines. It is also imperative for health care administrators to ensure implementation of the infection control programme in health care facilities.

This revised guideline will ensure a provision of an effective infection control practices at all the healthcare centres to reduce or prevent risks of HCAIs. Using this guideline, healthcare centres can plan the facilities and resources to support the infection control and waste management activities. Therefore, this guideline is expected to serve as a useful tool for all the health care providers, health care training institutions, Private Diagnostic Centers, Military Hospitals, and other stakeholders in designing, implementing, monitoring, and evaluating infection control practices in Bhutan.



(Dr. Ugen Dophu)

Secretary

LIST OF ABBREVIATIONS

3TC	-	Lamivudine
AZT	-	Zidovudine
BHU	-	Basic Health Unit
d4T	-	Stavudine
HAI	-	Hospital Acquired Infections
HBV	-	Hepatitis B virus
HCV	-	Hepatitis C virus
HCW	-	Healthcare workers
HIV	-	Human Immunodeficiency Virus
HLD	-	High Level Disinfection
ILD	-	Intermediate Level Disinfection
IPC	-	Infection control practices
JDWNRH	-	JigmeDorjiWangchuck National Referral Hospital
LPV/r	-	Lopinavir
MoH	-	MoH
ORC	-	Outreach Clinic
PEP	-	Post-Exposure prophylaxis
PI	-	Protease Inhibitor
PPE	-	Personnel Protective Equipment's
Psi	-	per square inch
RRH	-	Regional Referral Hospital
SARS	-	Severe Acute Respiratory Syndrome
WHO	-	World Health Organization
MRSA	-	Methicillin Resistant <i>Staphylococcus aureus</i>
ESBL	-	Extended spectrum beta lactamases
B.P	-	Blood pressure
MDRO	-	Multi drug resistant organisms
NDM	-	New Delhi metallo-beta-lactamase
VRE	-	Vancomycin resistant enterococci

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Chapter 1:

Infection Control

Introduction

Infection control can be defined as measures, practices, protocols and procedures to prevent and control infection transmission in health care settings. Healthcare-associated infection (HCAI) is one of the most common complications of health care management. It is a serious health hazard as it leads to increased patients' morbidity and mortality, length of hospital stay and the costs associated with hospital stay. Studies done elsewhere in the United Kingdom and United States reported that, 1 in every 10 patients in the wards suffer from a hospital acquired infection. In the developing countries, incident rates are as high as 15% of all admissions. Therefore, an effective infection prevention and control is central to providing high quality health care for patients and a safe working environment for those that work in healthcare settings. It is important to minimize the risk of spread of infection to patients and staff in hospital by implementing good infection control programme.

The overall aim of this document is to provide evidence based information in the control of infection. It is relevant to all staff including doctors, nurses, other clinical professionals and managers working in the hospital. This Guideline outlines the broad principles and practices of infection Control that are essential for the prevention and management of infection in all the healthcare centres. It has been revised to incorporate emerging issues and practices which were not addressed in the previous edition and it will be updated as and when required.

1.1. HEALTH CARE ASSOCIATED INFECTION (HCAI) AND INFECTION CONTROL MEASURES

1.1.2. Definition

HAIs are those infections that were neither present nor incubated at the time of admission to the health facility. Majority of HAIs become evident after 48 hours following an admission and may extend to more than a month after discharge from the health facility.

The practices for preventing and controlling infections in health facilities involve **standard precautions** and **additional (transmission-based) precautions**.

1.1.3. Standard Precautions

Standard Precautions represent the minimum infection prevention measures that apply to all patient care, regardless of suspected or confirmed status of infection in the patient, in any setting where healthcare is delivered. These evidence-based practices are designed to protect healthcare personnel and prevent the spread of infections among patients. It should be followed by **ALL** health workers at **ALL** times when attending to **ALL** patients regardless of their diagnosis or infectious status.

1.1.4. Component of Standard Precautions

Standard precautions include the following components:

1. Hand hygiene
2. Personal protective equipment (PPE)
3. Prevention of needle stick and injuries from sharps and other instruments
4. Respiratory hygiene and cough etiquette
5. Environmental cleaning
6. Linens
7. Waste disposal
8. Reprocessing of patient care equipment

Application of Standard Precautions

Standard Precautions apply to blood; all body fluids, secretions and excretions, regardless of whether or not they contain visible blood; non-intact skin; and mucous membranes in reducing the risk of transmission of pathogens to all patients receiving care in hospital.

Hand Hygiene

Hands of healthcare providers are often colonized with hospital pathogens from patients and environmental surfaces. Pathogens are transferred from patient to patient, staff to patient or vice versa or from contaminated surfaces through the contaminated hands of healthcare providers. It is important to wash hand to prevent cross infections.

When to perform hand washing

- a) On arrival and before leaving the work station

Before and after patient contact

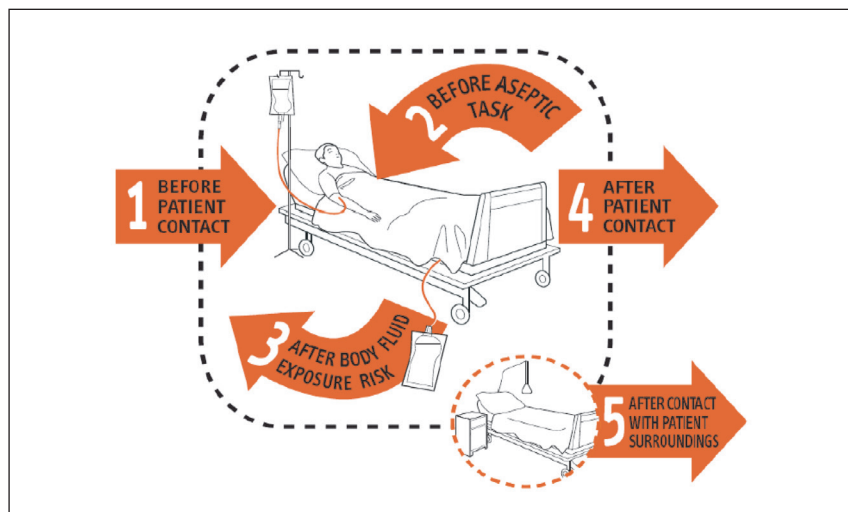
- b) After body fluid exposure
- c) Before and after performing any procedure
- d) In between patients
- e) Between contact with “dirty” and “clean” site on the same patient
- f) After any situation when hands are contaminated or visibly soiled
- g) Before wearing gloves and after removal of gloves
- h) After coming in contact with patient surroundings

Types of Hand Washing

Specific hand hygiene can be achieved by the following methods:

- a) Hand washing with soap and running water
- b) Alcohol hand rub
- c) Surgical hand washing

Fig1.1 Five moments for hand hygiene



Source, WHO 2009

Hand Washing with Soap and Water

Hand hygiene is the primary measure proven to be effective in preventing HCAI and the spread of antimicrobial resistance. Hand washing with soap and running water should be done when hands are visibly soiled or when gloves have not been worn in the care of a patient.

Important points for hand hygiene

1. Rings, watches and jewelries must be removed
2. Sleeves must be rolled up-to elbow level
3. Hands should be washed under running water
4. Do not wash hands in a basin with standing water
5. Liquid soap is recommended
6. Must ensure proper drainage of water from the soap case if bar soap is used
7. Dry hands with single use hand towel after washing
8. Finger nails must be cut short and kept clean
9. Artificial nails should not be worn

Figure 1.2: Steps for hand washing



Rub palms together



Rub the back of both hands



Interlock fingers and rub hands together



Interlock fingers and rub the back of fingers of both hands



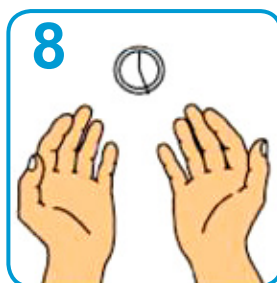
Rub thumb in a rotating manner followed by the area between index finger and thumb for both hands



Rub fingertips on palm for both hands



Rub both wrists in a rotating. Rinse and dry thoroughly



Hand washing should take 15-30 seconds

Hand Hygiene with Alcohol Hand Rub

The purpose of an alcohol-based hand rub is to inhibit or kill transient and resident flora. Alcohol hand rub is used as an alternative to hand washing but should never be used for visibly soiled or contaminated hand. However, it is used where hand washing facilities are inadequate, impractical or inaccessible (e.g. ambulances, home care, mass immunization, interrupted water supply, mass disaster).

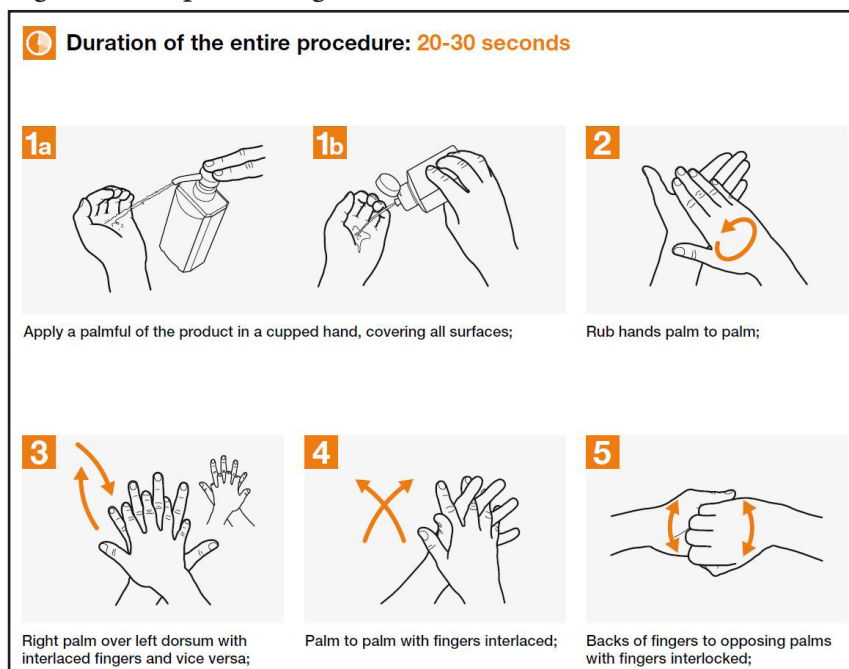
Preparations of Alcohol-based hand rub

- a) Alcohol hand rub may be available as a ready to use commercial product (if so, follow the manufacturer's instructions for use)

OR

- b) Prepare the alcohol hand rub by mixing 97 ml of 70% alcohol in 3 ml of glycerin. This can be prepared in bulk (not more than 50 Liter at a time).

Figure 1.3: Steps for using alcohol hand rub





Surgical Hand Washing

Prior to performing any surgical procedure, all surgical personnel, including surgeons, anesthesiologists, and nurses, must perform a surgical hand scrub to remove debris and transient microorganisms and to reduce resident flora from their hands. This helps to prevent post-procedure infections such as surgical site infections.

Steps to perform surgical hand wash

1. Remove watches and all jewelries.
2. Finger nails must be cut short and kept clean.
3. Do not wear artificial nails or nail polish.
4. Thoroughly wash hands and forearms up to the elbows with liquid, antiseptic soap and running water.
5. Apply 3-5 ml of liquid soap to hands, fingers, and forearms and rub thoroughly.
6. Pay special attention to nails and fingers - clean nail bed area with a nail file but avoid using the nail brushes.
7. Repeat applications and rub twice in each session lasting for at least 2-5 minutes.
8. Rinse with clean running water.
9. Dry thoroughly with a **sterile dry** towel.
10. Keep hands up above the waist and away from the body.
11. Do not touch any surface or article prior to putting sterile gown and surgical gloves.

1.1. 5. How to make single-use hand towels

- a) Single-use hand towels can be made locally with cloth pieces that can absorb water properly.
- b) Cloth should be cut into size of a handkerchief.

- c) Stitch all the sides to prevent thread from coming out.
- d) Wash, dry and store in appropriate clean and dry containers.

How to use single-use hand towels

Each identified site (wash basins/sinks) should have a box mounted on the wall with a small opening below.

The towels should be stacked into this box daily or refill when empty

After washing the hands, pull a towel from the opening at the bottom of the box and wipe hands until dry or air dry.

Dispose the used hand towels into the bucket near the sink

The used towels should be washed, dried and used again

**Use sterile towel for surgical hand washing and clean towel for routine hand washing.*



1.1.6. Personal protective equipments

Gloves

Gloves should be worn but not as a substitute for hand washing. Gloves must be changed between patients and after each different procedure on an individual patient. Gloves should be used when:

1. Performing invasive procedures.
2. Anticipating direct contact with blood or body substances, mucous membrane, non-intact skin and other potentially infectious materials.
3. Handling or touching visibly or potentially contaminated patient care equipment and environmental surfaces.
4. As part of contact precaution.

Types of gloves and indications for their use:

1. **Sterile/surgical gloves:** Used in all aseptic procedures and contact with sterile sites.
2. **Clean gloves:** Used in all non-aseptic procedures with risk of exposure to infectious material.
3. **Utility gloves:** Used during handling of contaminated instruments; medical wastes, soiled linens, surface cleaning, facility cleaning and decontamination process.

Plastic apron/gown

During surgeries plastic apron should be worn underneath the gown to prevent soiling of clothes and skin contamination. It should be changed after every procedure. For general procedures plastic apron may be worn with or without the gown. Reusable plastic apron should be decontaminated with 0.5% bleaching solution for 10 minutes, rinsed thoroughly with clean running water and dried in shade for reuse.

Gumboots

Gumboots should be water-proof, washable and high up-to knee level. It should be worn during procedures that involve splashing of blood and body fluid, laundry, washing and cleaning of heavily contaminated environment and handling of hazardous medical waste.


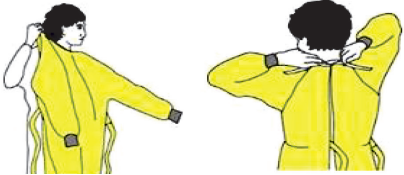


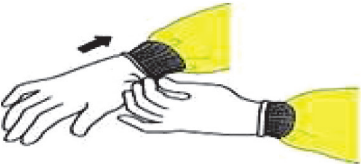
Cleaning and disinfection of gumboots

Gumboots should be cleaned with 0.1% bleaching solution after each use. But if the gumboot is heavily contaminated, it should be decontaminated with 0.5% bleaching solution, soaked for 10 minutes, rinsed with clean running water and dried.

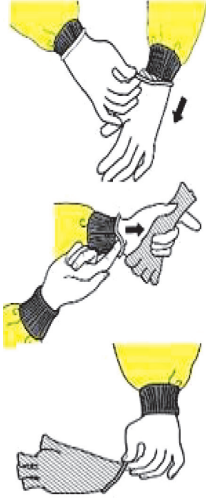


Table1.1. Sequence for wearing and removing PPE

Steps	Wearing of PPE	Removing of PPE
1	Perform hand hygiene	Remove gloves
2	Wear gown	Perform hand hygiene
3	Wear mask and caps	Remove face shield/goggle
4	Wear face shield /goggle	Remove apron/gown
5	Wear gloves	Remove mask
6		Perform hand hygiene

Steps in donning of PPE

<p>Step 1. Hand Hygiene</p> <p>Perform hand hygiene before putting on PPE using soap and water or a non-water cleanser.</p>	
<p>Step 2. Gown</p> <p>Fully cover torso from neck to knee, arms to end of wrist and wrap around the back.</p> <p>Fasten in back of neck and waist.</p>	
<p>Step 3. Mask</p> <p>Secure ties or elastic bands at middle of head and neck.</p> <p>Fit flexible band to nose bridge.</p> <p>Fit snug to face and below chin.</p> <p>Fit-check mask.</p>	
<p>Step 4. Goggles or face shield</p> <p>Place goggles or face shield over face and eyes adjust to fit.</p>	
<p>Step 5. Gloves</p> <p>Extend to cover wrist of gown.</p>	

Steps in doffing of PPE

<p>Step 1. Gloves</p> <p>Outside of gloves is contaminated! Grasp outside of glove with opposite gloved hand; peel off.</p> <p>Hold removed glove in gloved hand.</p> <p>Slide fingers of ungloved hand under remaining glove at wrist.</p> <p>Peel glove off over first glove.</p> <p>Discard gloves in waste container.</p>	 <p>The illustration shows three sequential steps for removing gloves. In the first step, a gloved hand reaches for the wrist of the other gloved hand. In the second step, the gloved hand is being peeled away from the wrist. In the third step, the gloves are being rolled together into a single bundle, held in the gloved hand.</p>
<p>Step 2. Hand Hygiene</p> <p>Perform hand hygiene following removal of gloves using soap and water or a non-water cleanser.</p>	 <p>The illustration shows two steps of hand hygiene. The first step shows hands being washed under a running faucet in a sink. The second step shows hands being held under a spray nozzle, likely for a hand sanitizer dispenser.</p>
<p>Step 3. Goggles or face shield</p> <p>Outside of goggles or face shield is contaminated!</p> <p>To remove, handle by head band or ear pieces.</p> <p>Place in designated receptacle for reprocessing or in waste container.</p>	 <p>The illustration shows two steps for removing eye protection. The first step shows a person pulling the top of their goggles by the headband. The second step shows a person holding a face shield by the top edge and placing it into a blue receptacle.</p>

Step 4. Gown

Growth front and sleeves are contaminated!

Unfasten ties.

Pull away from neck or shoulders, touching inside of gown only.

Turn gown inside out.

Fold or roll slowly into a bundle and discard into designated waste container.



Step 5. Gown

Front of mask is contaminated!-
DO NOT TOUCH!

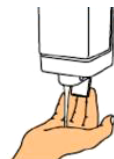
Remove by touching tapes or ties only.

Discard in designated waste container.



Step 6. Hand Hygiene

Perform hand hygiene immediately after removing all PPE using soap and water or a non-soap container.



CHAPTER 2: TRANSMISSIONS-BASED/ ADDITIONAL PRECAUTIONS

These are precautions in addition to standard precautions in patients documented or suspected to be infected or colonized with highly transmissible pathogens. They are used when the routes of transmission is not completely interrupted by using the standard precautions alone. Additional precaution includes:

- Precaution for *airborne* infection
- Precaution for *droplets* infection
- Precaution for *contact* transmitted infection (direct and indirect)

2.1. Precaution for airborne infection

Infection is transmitted through small droplets less than 5 micron in size, which are disseminated in the air. Diseases spread through this mode include active Pulmonary Tuberculosis (TB), Measles, Chicken Pox, Hemorrhagic Fever, Pneumonia etc.

The following precautions need to be practiced:

1. Follow and implement standard precaution
2. Isolate patient in a single, well ventilated isolated room or negative pressure isolation
3. Staff, attendants and patient should wear high filtration mask (N95 mask)
4. Minimize unnecessary transfer and movement of patients
5. Mask the patient with surgical mask during transportation

2.2. Precaution for droplet infections

Infection is transmitted through droplets more than 5 microns in size. The infection is transmitted when there is close proximity (within one meter) between the infected source and the recipient while coughing, sneezing or talking. Infections like diphtheria, *Haemophilus influenzae*

pneumonia, *Neisseria meningitidis* meningitis and septicemia, mumps and pertussis are transmitted by this route.

The following precautions need to be practiced:

1. Follow and implement standard precautions.
2. Put patient in a single room (if available) or with another patient with same infection (cohort).
3. If patient is kept in the common ward with others, place him/her in the corner and maintain a distance of at least one meter from the next patient.
4. Staff should wear surgical mask if working within one meter of the infected patient.
5. Mask the patient with surgical mask during transportation.

2.3. Precautions for contact transmission

These are required for diseases transmitted either by direct or indirect contact with the infected patient. E.g. Multi-drug resistant organisms (such as MRSA, ESBL), Shingles (Herpes Zoster), Impetigo.

The following precautions need to be practiced:

1. Follow and implement standard precautions
2. Put patient in a single room if available or with another patient with same infection (Cohort).
3. Staff should wear gloves and gown which should be removed before leaving the room.
4. Each patient must have dedicated equipment such as thermometer, BP apparatus and stethoscope, urinal, bedpan, sputum cup and bed linen.
5. The equipment should be decontaminated and disinfected appropriately after every use.
6. Maintain minimal/unnecessary contact with the patient.

Table 1.2: Summary of transmission based precautions

Precaution	Single room or cohort	Gloves	Gown	Mask	Face shield	Equipment	Visitors
Airborne	√	*	*	√ (N95)	*	Single use/reprocessed before use on next patient	Restrict visitor number. Provide surgical mask
Droplet	√	*	*	Surgical mask	*	As above	As above
Contact	√	√	√	Surgical mask if risk of aerosol or splashes	*	As above	As for staff

√ Required * Whenever there is potential of direct/indirect contact with blood or body substances

CHAPTER 3:

MULTIDRUG RESISTANT ORGANISMS (MDROS)

Multi-drug resistant organism (MDRO): The term multi-drug resistance as used in this guidelines describes a bacterial isolate which is resistant to one or more agents in three or more different classes of antimicrobials that the isolate is expected to be susceptible to; e.g., penicillins, cephalosporins, aminoglycosides, fluoroquinolones and carbapenems.

For infection control and prevention, the important MDROs include Methicillin Resistant *Staphylococcus aureus* (MRSA), Multi-resistant Gram negative bacteria (e.g. ESBL, NDM) and Vancomycin Resistant Enterococci (VRE).

Healthcare institutions worldwide are increasingly faced with the emergence and transmission of multidrug-resistant organisms (MDROs). Vigilant infection control, amongst other strategies to control antimicrobial resistance through management of antimicrobial utilization is needed.

Standard precautions should be implemented by all healthcare workers when dealing with all patients in all healthcare facilities regardless of whether they are infected or colonized with an MDRO.

For prevention and control of MDROs in hospitals the following should be practiced:

1. Effective hand hygiene is the most important measure to prevent and control spread of MDROs.
2. Contact precautions should be implemented in controlling MDROs – performing hand hygiene, using gloves and gown, using patient dedicated equipment.
3. Patients with MDROs should be isolated or cohorted (kept together) until discharge

4. Strict environmental cleaning with disinfectants
5. Consult microbiologist for culture and sensitivity for antimicrobial testing

CHAPTER 4:

INFECTION CONTROL FOR HEALTH CARE PROVIDERS

All health facilities should provide a safe working environment to minimize transmission of infections. Most occupational health hazards occur through percutaneous injuries, mucocutaneous splashes (eye, nose, mouth) and non-intact skin (e.g. cuts, abrasions and open wounds). The hospital administration must ensure that the following measures are implemented.

4.1. Pre-placement and safety program

Pre-placement examination

1. General health checkup and medical fitness certification for all categories of staff.
2. Assess existence of undue risk of infection or other medical conditions that may put the individual prone to infections.
3. Employees with pre-existing medical conditions with higher risk of getting infections should be posted in low risk areas.

4.2. Health workers immunization

1. All health staff must be immunized against TB, hepatitis B, measles, rubella and tetanus.
2. Employees must be vaccinated with other vaccines as and when they become available in the country.

4.3. Personnel health and safety education

1. Any new staff joining the health facility must receive orientation on infection control and medical waste management
2. All personnel joining the health facility must receive training on infection control and medical waste management
3. The level of training must be relevant to the nature of work and area where the employee works

4.4. Periodic infectious disease screening of healthcare workers

1. All health staff must be screened for infectious diseases like HIV, HBV, HCV and TB every 5 years.
2. Staff working in high risk areas of infectious in nature should be screened annually or in presence of signs and symptoms of infections.
3. Any cases of such infections among health workers related to work place should be documented and reported to the infection control team for necessary interventions.

Management of occupational exposures/injuries

Any accidental injury or exposure of the healthcare worker to sharps or body fluids should be reported using the accidental reporting form, and should be assessed and managed promptly.

Immediate care of exposed Healthcare worker

1. After sharps injury or exposure to blood or other body fluids the exposed person should do the following immediately:
2. Wash the exposed site with plenty of soap and water. If soap and water are not available wash with antiseptics. Do not squeeze the site of the injury.
3. If **eyes** are exposed, keep the eyes open and irrigate with plenty of clean water or normal saline.
4. If the **mouth** is exposed, spit out the material and rinse mouth with plenty of water several times.
5. If **clothing** is exposed, remove the clothes, decontaminate them and take a shower.

4.5. Risk assessment

Risk assessment includes assessing the significance of the injury and the serological status of both the patient and the health worker.

Assessment of the injury

1. The significance of the injury should be assessed by considering the following: Details of the exposed health worker.
2. Date and time of exposure.
3. Details of the incident (where and how the exposure occurred,

- exposure site on the body, type of needle etc.).
4. Type and amount of blood or body fluid involved.
 5. The nature and extent of injury.
 6. The nature of the item that caused the injury e.g. length and gauge of the needle.

Assessment and testing of the patient and the exposed health worker

Assessment of both the source/patient and the exposed health worker involves proper counseling, risk factors and medical history, vaccination history and collection of blood samples to assess the status of HIV, HBV and HCV. Testing must follow strict confidentiality, pre and post counseling and be done only with consent.

If source is likely to be in window period during testing, retest after 6 weeks and 3 months.

4.6. Treatment of exposed health worker

Treatment of the exposed health worker should be initiated immediately after assessment of the injury, the source and the exposed health worker. A decision to treat and the regimen of treatment should be based on the following table.

Table 1.3. Treatment of exposure to proven or potential HIV source

Risk and nature of injury	Source HIV positive	Source HIV negative	Source status unknown
<ul style="list-style-type: none"> - Blood or body fluid comes in contact with intact skin/ clothing. - Tears, urine, saliva, feces, nasal secretion, sweat, sputum, vomitus are not considered potentially infectious unless visibly blood stained 	No PEP	No PEP	No PEP

Risk and nature of injury	Source HIV positive	Source HIV negative	Source status unknown
<p>-Percutaneous injury – needle stick or cut with sharp object</p> <p>- Contact of mucus membrane (eye and mouth) or non-intact skin (exposed skin that is chapped, abraded or affected with dermatitis) with blood, tissue, or other body fluids that are potentially infectious (semen, vaginal secretions, CSF, synovial, pleural, peritoneal, pericardial and amniotic fluid)</p>	Provide PEP	No PEP	Generally no PEP, however consider in settings in where exposure to HIV is very likely

4.7. Important points for PEP administration

PEP is best given immediately or within 72 hrs.

Three drug regimen should be given in all cases PEP for 4 weeks as follows:

2 NRTIs + Boosted PI (TDF + 3TC + LPV/r)

- TDF = 300mg OD
- 3TC = 300mg OD
- LPV/r = 400mg/100mg OD

Monitor for drug toxicity for at least 2 weeks

Table 1.4. Treatment of exposure to proven or potential HBV source

Vaccination status and antibody response of exposed person	Treatment decisions depending on source status	
	Source HBV positive or unknown/unavailable for testing <i>(Consider source as positive for safety)</i>	Source HBV Negative
Unvaccinated	HBIG x 1 and initiate HBV vaccination	Initiate HBV vaccination
Vaccinated with proven adequate antibody response (Responder)	No treatment required	No treatment required
Vaccinated with proven inadequate antibody response (Non-responder)	HBIG x 2 (1 month apart) OR HBIG x 1 followed by revaccination 2 nd course	No treatment
Vaccinated with unknown antibody response	Test exposed person for antibody: 1.If antibody adequate no treatment is required 2. If inadequate give HBIG x 1 and a vaccine booster	No treatment

Note:

- *In the absence of HBV surface antibody testing facility, the documented evidence of 3 complete doses of HBV vaccine will be used as the surrogate indicator of immunity A HBV vaccine responder is a person with adequate levels of antibody after vaccination, i.e. antibody level of ≥ 10 IU/ml.*
- *A HBV vaccine non-responder is a person with inadequate antibody level after vaccination, i.e. <10 IU/ml.*

4.8. Exposure to proven or potential HCV source

At present there is no prophylaxis or vaccinations against HCV. The aim of detecting and follow-up for HCV infection is to detect acute hepatitis so that appropriate management can be instituted.

4.9. Follow –up testing and post-exposure counseling

After the immediate management and testing, follow-up of the exposed health worker is also important.

Follow-up for HIV exposures

1. Perform HIV testing for at least 6 months post-exposure with schedule of baseline, 6 weeks, 3 months and 6 months.
2. Perform HIV testing if illness compatible with acute retroviral infections occurs.
3. Advise exposed person to use precautions (use of condom, avoid blood or tissue donation, pregnancy, breast feeding) to prevent secondary transmission during the follow-up period.

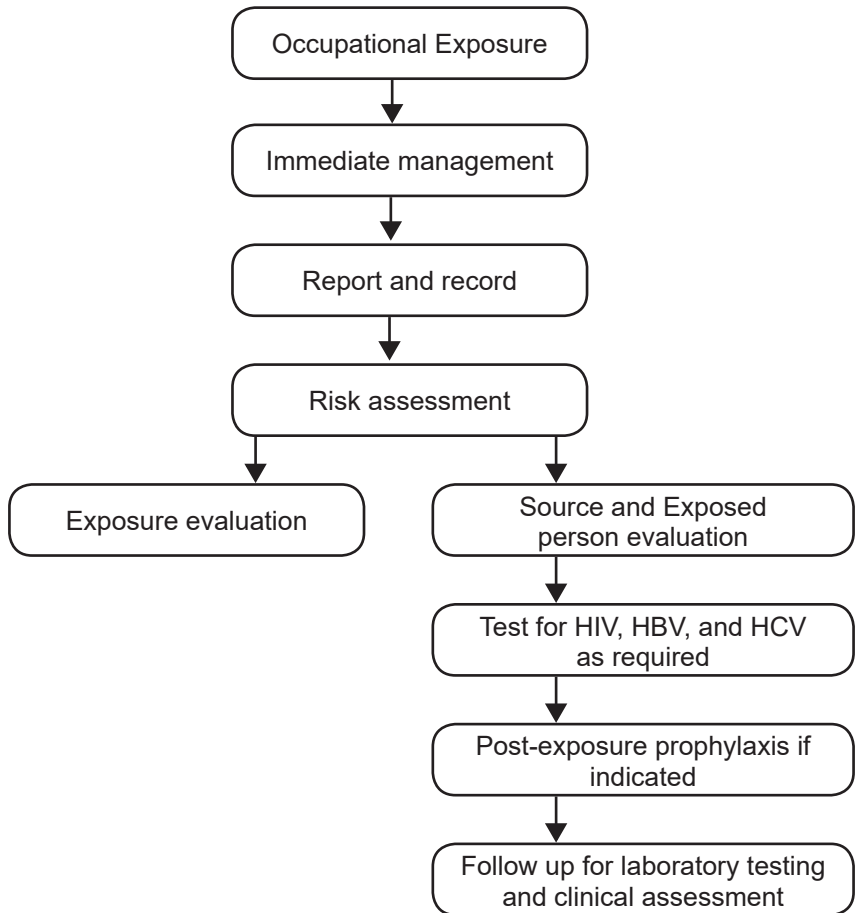
Follow-up for HBV and HCV exposures

1. Test for HBV antibodies if available after 1-2 months of completing HBV vaccination course.
2. Health worker exposed to HBV and HCV positive patients should be tested for infections at 6wks, 3 months and 6 months.

4.10. Report and recording of the incidents

1. The incident should be reported to the responsible authorities (Medical officer and/or Infection control focal person) and a record should be maintained.
2. CMO/medical officer is responsible for exposure evaluation and providing PEP.

Flow chart on management of exposures



CHAPTER 5:

SURVEILLANCE OF HOSPITAL ACQUIRED INFECTIONS

Surveillance is an ongoing systemic collection, analysis and interpretation of data, and dissemination of information to those who need to know in order that action may be taken (CDC evaluation of surveillance systems). As part of comprehensive infection control system, health facilities must develop and implement an effective surveillance to detect outbreaks as well as to ensure patient safety and quality standards as set by the MoH (Refer surveillance guideline).

5.1. Objectives of surveillance

The objectives are to:

1. Develop preventive and promotive strategies to reduce incidence of HCAIs.
2. Implement safe practices to ensure patient safety and quality care.
3. Detect and prevent outbreaks.
4. Enable planning and implementation of health programs.
5. Monitor and evaluate health programs and interventions.
6. Stimulate research activities.

5.2. Types of surveillance

1. *Active (community-based) surveillance:*
 - Surveillance of normal as well as affected people in the community.
2. *Passive (facility-based) surveillance:*
 - Surveillance of clinically affected people who seek health care services.
 - Periodic prevalence surveillance.
3. *Sentinel surveillance:*
 - Surveillance of people who are at risk.

5.3. Components of a surveillance system

1. Listing of diseases or cases,
2. Case definition,
3. System of sending case reports to higher level,
4. Two-way communication,
5. Data collection, collation, analysis and interpretation,
6. Recording, reporting and dissemination of information.

5.4. Basic requirements of a surveillance system

1. A good network of motivated people,
2. Efficient communication system,
3. Clear case definition,
4. Good recording & reporting mechanism,
5. Efficient feedback and rapid response system,
6. Laboratory support.

Note :

Follow the existing HAI protocol for surveillance of the ministry of health.

CHAPTER 6: OUTBREAKS INVESTIGATION AND MANAGEMENT

6.1. Definition

An outbreak is defined as the occurrence of more than usual expected number of cases in a population at a given time and place (Merrill, 2010).

6.2. Outbreak investigation and Management

Management of an outbreak is a team work and involves the following steps:

1. Inform hospital authorities.
2. Form an Outbreak Control Committee.
3. Establish a probable diagnosis of the outbreak based on clinical presentations.
4. Confirm existence of an outbreak.
5. Confirm reported cases represent a true outbreak.
6. Compare with the current number of cases from the previous records.
7. If no data, use your experience, observation of the existing situation.
8. Develop a case definition based on the case under investigation, clinical presentation, person, place, period and laboratory findings.
9. Search all cases under investigation.
10. Determine the magnitude of problems.
11. Identify number of people involved and the severity of the problem.
12. Laboratory findings - Contact the nearest laboratory for support if required.
13. Analyze and interpret the data.
14. Identify the common features of all cases such as person, place, period, risk factors and sources of infection.
15. Manage cases and implement appropriate control measures to prevent further outbreaks
16. Document, report and notify in the existing forms and formats of the outbreak investigation guideline of MoH.

Findings from the outbreak should be correctly documented and reported to the relevant authorities, stakeholders and public.

Staff, patients and the visitors should be briefed and educated about the outbreak to prevent unnecessary panic.

Announce the end of the outbreak to the relevant authorities.

6.3. Monitoring and evaluation

Continue follow-up of cases even after outbreak is brought under control. Evaluate control measures or strategies efficiency and efficacy to ensure control of outbreak and prevent future similar outbreaks.

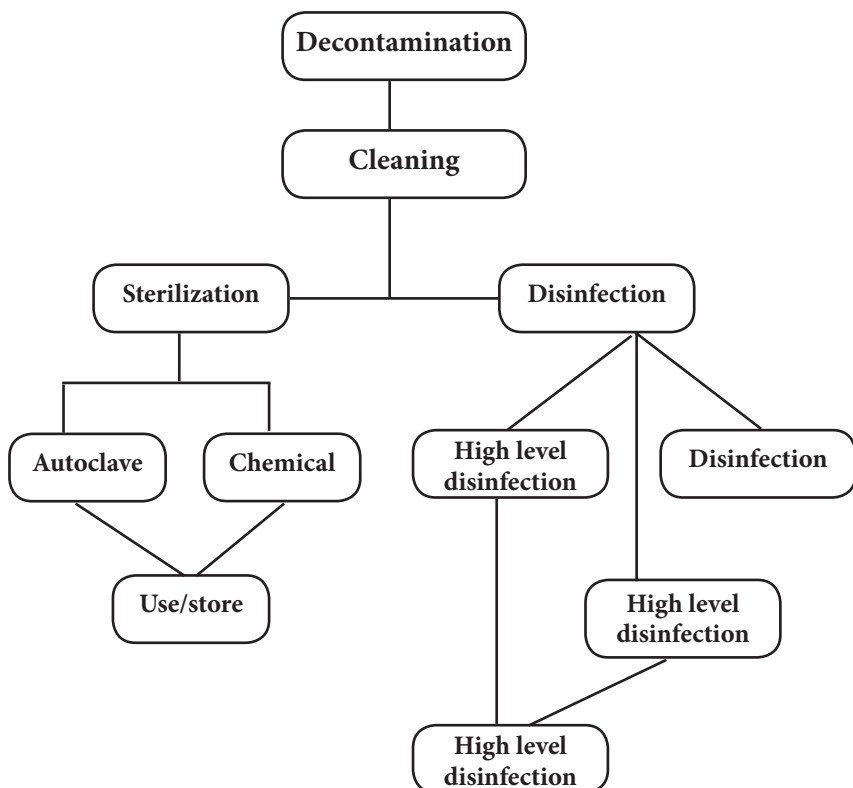
(refer RCDC guidelines)

CHAPTER 7: REPROCESSING OF REUSABLE MEDICAL DEVICES

Processing of instruments and other items involves decontamination, cleaning, sterilization or disinfection and storage (See Figure 7.1).

These steps should be carried out in all units like CSSD, wards, minor OT and other inpatient and outpatient departments.

Fig 7.1: Steps for reprocessing of instruments and equipment



7.1. Decontamination

Decontamination is the process of making an inanimate object safer to be handled by the staff. It should be done **before cleaning**. Use 0.5% bleaching (chlorine) solution to decontaminate for at least 10 minutes but not more than 30 minutes.

Always wear utility gloves, mask, face shield, plastic apron and gumboot during the decontamination process.

Steps in decontamination

Preparation of 0.5% bleaching solution (sodium hypochlorite)

Refer **manufacturer's concentration** of bleaching powder to prepare the correct strength of the solution.

Prepare fresh bleaching solution **every day OR as and when the solution becomes heavily contaminated with blood and body fluids**.

Take appropriate size plastic buckets depending on the amount of instruments to be decontaminated (to immerse completely)

Prepare the required volume of solution with the following formula:

Desired concentration ÷ active chlorine x 1000ml of water

For example:

To make 0.5% bleaching solution **for decontamination** with 30% available chlorine.

$0.5\% \div 30\% \times 1000 = 16.7$ grams of chlorine powder per liter of water

For example:

To make 0.1% bleaching solution **for cleaning** and mopping with 30% chlorine powder.

$0.1\% \div 30\% \times 1000 = 3.3$ grams of chlorine powder per liter of water

** The strength of the chemical may differ from manufacturer to manufacturer therefore dilution should be calculated based on the strength provided on the label.*

Decontamination procedure

1. Should be done immediately after using the instrument.
2. Open all hinged items fully before immersion.
3. Completely immerse in 0.5% bleaching solution.
4. Remove items from the bleaching solution after 10-15 minutes but **NEVER** leave more than 30 minutes.
5. Rinse with clean running water before cleaning.
6. Change the solution when it becomes heavily contaminated with blood and body fluids.

7.1. Cleaning

Cleaning is the physical removal of organic material and chemical residue. It is the most important step before disinfection/sterilization. Without proper cleaning, disinfection and sterilization will not be effective.

Cleaning procedures

1. Wear appropriate PPE (utility gloves, face mask and plastic apron and gumboot).
2. Cleaning should be done in a sink/bowl filled with water.
3. Use brush to remove gross soiling while keeping the item immersed during brushing.
4. Pay special attention to instruments with hinges, joints and teeth.
5. Rinse thoroughly under running water.
6. Dry all the instruments properly before packaging for sterilization.
7. Do not use steel wool and detergent powder for cleaning instruments.

7.3. Disinfection

Is the process which reduces the number of pathogenic microorganism (but not necessarily bacterial spores) to a level which is not harmful to health. There are three levels of disinfections depending on the intended use of the instrument.

High level disinfectants (HLD)

1. Destroys all microorganisms except some bacterial spores used for heat sensitive instruments that comes in direct contact with mucus membrane.
2. 2% Gluteraldehyde disinfection operates effectively when immersed for at least 20 minutes at room temperature (20-25 degree Celsius) for equipments instrument used from patient to patient for e.g endoscopes.
3. For immune-compromised patients immerse for one hour (SGNA, 2007).
4. 2% gluteraldehyde solution should be changed every 14 days or whenever color change is observed.
5. Instrument should not be soaked in 2% gluteraldehyde for more than one hour
6. The instruments should be removed and rinsed with sterile water or boiled cooled water and store in dry area.
7. The instrument not used after the above treatment should be disinfected again for use.

Intermediate level disinfections (ILD)

ILD inactivates vegetative bacteria including mycobacterium tuberculosis, most virus and fungi but does not kill bacterial spores. ILD disinfection is carried out for the instruments or a medical device that comes in contact with the intact mucus membrane for e.g. ventilators tubing, and gastrointestinal endoscopes.

Low level disinfectant (LLD)

LLD can kill most bacteria, some virus and fungi but not bacterial spores and mycobacterium tuberculosis. E.g. spirit to wipe stethoscopes and BP instruments, 0.1% bleaching solution for urinal and bedpans. Each unit of the hospital should develop and follow their own standard operating procedures (SOPs) for various disinfectants used in their department/units.

7.4. Sterilization

Sterilization is the process that eliminates, removes, kills, or deactivates all forms of life and other biological agents including bacterial spores. Sterilization methods used in health facilities in Bhutan include:

Autoclaving

This is the most common and reliable method of sterilization used in health care settings, as steam under pressure has shown to destroy even the most resistant bacteria spores effectively. Autoclave is used for the sterilization of the heat resistance equipments.

1. Autoclaving is sterilization using steam under high pressure of 15 pounds per square inch (PSI) at 121°C temperature for 30 minutes from the set temperature
2. 30 minutes should be counted after temperature has reached 121°C, not from start of operation of the autoclaving machine
3. Use autoclave indicating tape to monitor efficacy of autoclaving with every load
4. All instruments with hinges and locks should be kept open and unlocked during autoclaving
5. Write both sterilization and expiry date on the pack after autoclaving

Chemical sterilization

Plasma sterilization is currently used only in national and regional referral hospitals. For operation, follow manufacturer operational instructions. For sterilization using 2% glutaraldehyde immerse for 8-10 hours or follow manufacturer instruction

Important points for sterilization:

1. Read **MANUFACTURER INSTRUCTIONS** prior to autoclaving or chemical sterilization of items.
2. No articles should be added or removed once the time is noted for both chemical disinfection and sterilization.
3. After chemical sterilization, articles must be **RINSED THOROUGHLY** with **STERILE WATER (NOT BOILED WATER)** and should be dried
4. In centers where sterile water is not available, use thoroughly boiled and cooled water

7.5. Storage of sterile packs

Proper storage of sterile instruments/equipments is essential to maintain sterility. Write both **sterilization date** and **expiry date** on the sterilized pack before storage. Dried, sterile, packaged instruments/equipments should be stored in a clean, dry environment. Unwrapped items should not be stored but used immediately.

Table 7.2 Length of safe storage for sterile packs

Wrapping	Closed Cabinet	Clean Open Shelves
Single-wrapped muslin (2 layers)	1 week	2 days
Double-wrapped muslin (2 layers each)	3 weeks	2 weeks

CHAPTER 8:

HOUSE KEEPING

Housekeeping involves general cleaning and maintenance of the health facility.

1. Unit in-charges should develop and implement their own cleaning schedule
2. Use appropriate PPE (gloves, apron and gumboots) during cleaning.
3. **No dry dusting and sweeping only wet cleaning and damp dusting** should be practiced.
4. Walls must be washed from top to bottom, so that debris fall on the floor/ground.
5. The floor must be last to be cleaned.
6. Use separate cleaning items for cleaning toilets, clinical areas and kitchen.
7. Housekeeping items e.g. mops, buckets, cloths etc. must be cleaned with detergent and water, then rinsed in clean water and dried.

Table 8.1. Health facility cleaning methods and frequencies

Cleaning Methods	Frequency	Area	Detergent	Remarks
Damp dusting	Every morning and when visibly dirty	Walls, windows, doors, fans, AC and furniture in wards, OT & OPD	0.1% bleaching solution or any cleaning detergent	Use 2 buckets, one with disinfectant/detergent and another with clean water.
Wet mopping	Morning, evening and as and when required	Wards, all clinical areas and OT	Detergents (e.g. Surf) or 0.5% bleaching solution	

Cleaning Methods	Frequency	Area	Detergent	Remarks
Thorough washing	Weekly & as & when necessary	All clinical areas & OT	Detergents or 0.5% bleaching solution	Scrub using hard brush for cleaning
	Morning, afternoon and evening	Toilets, bathrooms and sinks	0.5% bleaching solution and any detergent	
Mass cleaning	Weekly	Drains, gutter, and surroundings	Water and detergent if required	

8.1. SPILL MANAGEMENT

8.1.1. Spillage of blood and body fluids

1. Prepare spill management kit by selecting appropriate PPE.
2. Select appropriate PPE according to nature of the spill (gloves, apron, gown and gumboot).
3. Place a sign board to caution the spillage if large.
4. After decontaminating and wiping the spillage, clean the floor with water and detergent.
5. Perform hand hygiene after the task.

Table 8.2. Management of blood or body substance spills

Spot cleaning	Wipe up spot with a damp cloth or tissue paper. Discard into infectious waste bin.
Small spills (up to 10 cm diameter)	Wipe immediately with absorbent material soaked in 0.5% bleaching solution. Discard into infectious waste bin.
Large spills (greater than 10 cm diameter)	Pour 0.5% bleaching solution in and around the spillage, let it stand for 10 minutes & wipe with absorbent material. Discard into infectious waste bin.

8.1.2. Spillage of mercury

1. Evacuate all people from the contaminated area.
2. Keep the heat below 20°C and ventilate the area if possible.
3. Wear gloves and mask in the clean-up.
4. Use cardboard or folded paper to make a small scoop or syringe to gather the mercury
5. Never use a broom or a vacuum cleaner.
6. Place all materials that have become contaminated in a sealable plastic bag and seal the bag.
7. Place this sealed plastic bag inside an impact-resistant sealable container made of plastic or metal.
8. Put the container holding the contaminated material in sturdy secondary container.
9. If there is mercury on shoes, take the shoe off so they do not spread the mercury around.
10. Open doors, and windows to ventilate the living or working area.
11. If there is broken glass, pick it up carefully using a glove. Put it into a sealable hard-sided container.
12. Use a flashlight to look for any additional mercury beads that may be sticking to the surface or in small cracked areas of the surface.
13. Storage in secured place or send it to Biomedical Engineering Division (BMED).

8.1.3. Spillage of cytotoxic drugs

1. Evacuate and seal the area by closing windows and doors.
2. Turn off any fans which may spread the spill/aerosols.
3. Any spill should be identified with a warning sign so that other people in the area will not be contaminated.
4. Put on personal protective attire
5. Cover the area immediately with thick absorbent pads, disposable towels or paper mats.
6. If there is a powder spill, cover with a wet paper towels and manage as liquid spill, cover gently to avoid spread of powder.
7. If there is a spill on carpeted area wash area with soap and water and disinfect with bleaching solution.
8. Contaminated linen should be double bagged in a specially marked linen bag labeled “cytotoxic” and keep separate from all other linen and manage appropriately.

8.1.4. Anti microbial spill

1. Turn off any fans which may spread the spill/aerosols.
2. Any spill should be identified with a warning sign so that other people in the area will not be contaminated.
3. Put on personal protective attire during handling of the spillage.
4. Cover the area immediately with thick absorbent pads, disposable towels or paper mats.
5. If there is a powder spill, cover with a wet paper towels and manage as liquid spill, cover gently to avoid spread of powder.
6. If there is a spill on carpeted area wash area with soap and water and disinfect with bleaching solution.

CHAPTER 9:

HOSPITAL LINEN MANAGEMENT

Hospital linen like any other used patient care item, is contaminated with a large number of microorganisms, yet the risk of disease transmissible are negligible. However linens can be the possible source of HCAI, if the linens are not reprocessed properly. Hospital linen includes all the textile used in hospitals including Mattress, bed cover, pillow cover, bed sheets, towel, blanket, screen, curtain, doctor's coat, table cover etc.

9.1. Management of un-soiled used linen

- Used un-soiled linen should be collected in linen bag and send for laundry directly.
- Linen should NEVER be DRIED on the GROUND.
- Clean linen must be stored separately in a clean, dry place.
- Linen which requires sterilization should be properly packed and sent for sterilization.

9.2. Management of soiled linen

Appropriate PPE must be worn while handling soiled linen (utility gloves, apron, mask/face shield and gumboot).

Soiled linen should not be mixed with other linen.

Faeces and blood clots should be removed prior to decontamination. Linen should be decontaminated with 0.5% bleaching solution for 10 minutes and rinsed. thoroughly before sending to laundry. After proper decontamination, linen should be washed with detergents.

9.3. Management of soiled bedding

Soiled mattresses and pillows should be wiped with 0.1% bleaching solution and dried in the sun.

The soiled bed should be cleaned with 0.1% bleaching solution before putting clean beddings.

Heavily soiled mackintosh should be decontaminated by soaking in 0.5% bleaching solution for 10 minutes. However, it can be cleaned by wiping with 0.1% if lightly contaminated.

CHAPTER 10: HANDLING OF DEAD BODY IN HEALTHCARE FACILITY

Introduction:

All dead bodies are potentially infectious and “**STANDARD PRECAUTION**” should be implemented for every case. Although most organism in the dead bodies are unlikely to infect healthy person, some infectious agent can be transmitted when persons are in contact with blood, body fluid or tissues of dead body of person with infectious disease. To minimize the risk of transmission of known and also unsuspected infectious disease, dead bodies should be handled in such a way that worker’s exposure to blood, body fluid and tissues is reduced.

A rational approach should include staff training and education, safe working environment, appropriate safe work practices, the use of recommended safe devices and vaccination against hepatitis B.

There is a need to maintain the confidentiality of a patient’s medical history even after his/her death. At the same time, there is obligation to inform personnel who may be at risk of infection through contact with dead bodies so that appropriate measures may be taken to guard against infection. The discreet use of label such as “Danger of Infection” on the dead body is considered appropriate.

The objectives of these guidelines are:

- to enable the deceased family to obtain funeral services and;
- to protect the involved personnel.

General Recommendation for all related persons:

- Vaccination;
- personnel Hygiene measure and protective equipments;
- Accidental exposure to blood or body fluids;
- Clinical waste management;
- Environmental control.

Table 10.1: showing the Category of death, their causative agent, standard precaution to use while handling dead bodies.

Categories of death	Infectious Disease	Standard Precaution	Does and Don'ts	Personnel Management	Environmental management
Category 1	Other than infectious disease	Standard precaution are recommended for all dead bodies other than those with infectious disease : Gloves, water repellent gown and surgical mask. Use goggles' or face shield to protect eyes, if there may be splashes.	<ul style="list-style-type: none"> • Make sure any wound, cuts and abrasions, are covered with water proof bandages or dressing • Do NOT smoke, drink or eat • Do NOT touch your eyes, mouth or nose • stick personnel hygiene • hand hygiene washing with liquid soap or proper use of alcohol based hand rub • Avoid sharp injury 	<ul style="list-style-type: none"> • Vaccination • Personnel Hygiene measure • Personnel protective equipments • Management of Accidental exposure to blood or body fluids 	<ul style="list-style-type: none"> • Clinical waste management • Environmental control
Category 2.	a. Human Immunodeficiency Virus Infection (HIV) b. Severe acute respiratory syndrome (SARS) c. Avian Influenza d. Middle East Respiratory Syndrome (MERS)	In addition to standard precaution, additional precaution are recommended for dead bodies with known cases : Gloves, water repellent gown and surgical mask. Use goggles' or face shield to protect eyes, if there may be splashes.			

Category 3.	<p>e. Other infectious disease as advised by the Physicians or microbiologist</p> <p>a. Anthrax b. Plague c. Rabies d. Viral Hemorrhagic Fever e. Other infectious disease as advices by Physician and Microbiologist</p>	<p>In addition to standard precaution, stringent precaution are recommended for dead bodies with known cases: Water resistant gown, surgical mask, eye protection (google or face shield) double gloves, shoe covers/boots</p>			
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PART II

GUIDELINE FOR MEDICAL WASTE MANAGEMENT

CHAPTER 1:

MEDICAL WASTE

1.1. Definition

Medical waste refers to all categories of waste generated from health facilities, clinics, animal husbandries, veterinary hospitals and other clinical laboratories, and home based treatment of patients.

All medical wastes are not hazardous; between 75% - 90% are comparable to domestic waste. The remaining 10% - 25% of it is hazardous which entails special treatment and management because of the potential to transmit infection, cause injury, and environmental pollution.

Figure 1.1 shows the different categories of medical waste. Hazardous waste is referred to any waste with properties which have the potential to cause harmful effects to human or environment when poorly managed.

Fig: 1.1.Categories of medical waste:

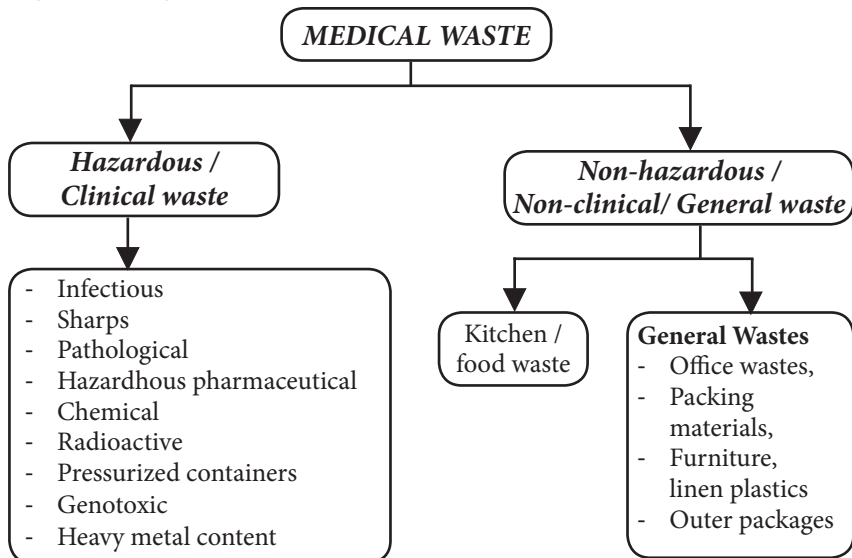


Table 1.2. Types and description of Medical waste

Type of waste	Description of waste
General waste	Waste free of pathogenic microorganisms or hazardous substances. Therefore waste is harmless and does not need special handling or treatment.
Infectious waste	Contains potentially pathogenic organisms which have the potential to cause infections. Wastes include, laboratory cultures stocks, live or attenuated vaccines, human and animal cell culture, infectious agents from research laboratories, wastes from biological, toxins, dishes and devices used for transfer of cultures, used syringes and contaminated materials.
Sharps waste	Suture needles, scalpel blades, lancets, broken vials / ampoules/ pipettes/glasses, knives and infusion sets
Pathological waste	Body parts and tissues, body fluids, dead fetuses, placenta, blood and blood products.
Pharmaceutical waste	Unused, contaminated expired drugs, vaccines, serum and recalled (quality failed) medicinal products. medicine returned by patients,
Genotoxic waste	Cytotoxic drugs, highly toxic and may contain mutagenic, teratogenic or carcinogenic properties
Chemical waste	Laboratory reagents, X-ray film developer, disinfectants and others like Deltamethrin etc.
Radioactive waste	Radioactive substances used for diagnostic or therapeutic purposes. Blood, urine and faeces of patients on treatment or tested with radionuclides
Pressurized containers	Gas cylinders (anesthetic gas, oxygen, compressed air in health facilities) stored in pressurized cylinders, cartridges, aerosols and cans
Heavy metals	Mercury from broken thermometers and mercury sphygmomanometer, dental amalgam, cadmium from batteries, tube lights and bulbs
E-wastes	Printer cartilages, computers etc

CHAPTER 2:

MEDICAL WASTE MANAGEMENT

2.1. MANAGMENT OF GENERAL MEDICAL WASTE

Segregate general waste into biodegradable and non-biodegradable waste (see Table 2.1)

Table 10.1. Management of general waste

General waste	Type of bin/ color-code	Disposal
Biodegradable waste /food waste	30L, *Blue plastic bin with wheels & lid	Compost pit
Non-biodegradable waste	50L, *Green plastic bin with wheels & lid	Segregate/Recycle/reuse/ landfill




**If the above mentioned color is not available label the bin with the waste type.*



2.2 MANAGMENT OF HAZARDOUS MEDICAL WASTE

Sharps, pathological and infectious wastes are considered as infectious/hazardous waste. If infectious waste is mixed with general waste the whole waste must be considered as infectious waste and will require special handling, treatment and disposal practices.

Segregate **all waste at the point of generation** in designated waste containers.

Table.2.2.1. Description of PPE, waste bin, color code and biohazard symbols

Hazardous waste	PPE	Color-code	Bin description	Plastic bag	Symbols
Solid Infectious waste	Utility gloves, plastic apron, gumboot mask	*Red	30L, strong leak-proof plastic bin with swing/pedal operated lid and wheels. <i>place the plastic bag inside the waste bin)</i>	Biodegradable red plastic bag with Biohazard symbol	
Sharps	Utility gloves, gumboot	*Yellow or *White	Puncture proof sharps container/ boxes with bio-hazard symbol labeled as 'SHARPS'		
Cytotoxic waste	Mask, goggle, Utility gloves, boot plastic apron & face shield	*Purple		Container or plastic bag with its symbol	

Hazardous waste	PPE	Color-code	Bin description	Plastic bag	Symbols
Chemical & Pharmaceutical waste	Utility gloves, plastic apron & mask, goggles, face shield	*Brown	Container or plastic bag		
Radioactive waste	Lead apron		Lead container with radioactive symbol, labeled as "BIOHAZARD"		

***If the above mentioned color is not available label the bin with the waste type**

2.3. LOCATION, COLLECTION, STORAGE, TREATMENT AND DISPOSAL OF HAZARDOUS MEDICAL WASTE

2.3.1. Location of waste bins

Infectious waste and **non-infectious waste** bins should be **located** in the area **accessible to authorized personnel ONLY**.

2.3.2. Waste level

Waste should **not** be **filled** up to the **brim** of the bin. **Only** $\frac{3}{4}$ of the bin should be filled and the waste bag should be tightly closed or sealed.

2.3.3. Waste Storage

Waste storage place should be designated within the facility in a separate area or room. Details of storage facility (see Table 2.3).

The storage duration of infectious medical waste should not exceed the following:

- Summer : 24 – 48 hours;
- Winter : 24 – 72 hours.

2.3.4. Storage of cytotoxic waste

Cytotoxic waste must be stored separately from other medical waste in a secure and designated area and should be under lock and key.

2.3.5. Storage of radioactive waste

Radioactive wastes should be stored in lead containers. During radioactive decay, it should be labeled with the type of radionuclide, dated and taken back by the concerned dealers.

Table 2.2.2. Description of storage facilities for hazardous medical waste

- | |
|---|
| <ul style="list-style-type: none">• Away from the kitchen, common passage and the main entrance.• Have a cement or impermeable floor.• Have access to water supply for cleaning purposes.• Have proper drainage system.• Have easy access to staff handling the waste and waste collecting vehicles.• The area must be always kept locked when not in use. |
|---|

- Inaccessible to animals, birds, insects, rodents and non-authorized personnel.
- The area should be well lit and ventilated.
- Supply of cleaning items (broom, mops, detergents/disinfectants, PPE (*utility gloves, face-shield, plastic apron, gumboots*)) should be placed close to the storage place.

2.4. Sharp waste:

This includes objects, devices or instruments that are used to puncture, cut or scrape body parts.

These include the following:

1. Needles used during injections, biopsies, venipuncture or for suturing
2. Blades including razors, surgical blades, scissors and stitch cutters
3. Glass including broken ampoules, vials, glass and suction bottles
4. Other sharps can include trocars, lancets, surgical instruments such as dissecting forceps and drill bits

2.4.1. Handling and Disposal of Sharps

As these instruments are contaminated with body fluids and can cut or puncture, they should be placed in a container which is:

1. Puncture resistant,
2. Does not leak,
3. Can be sealed,
4. Labeled as “biohazard” or Sharps,

2.4.2. Prevention of access to used needles

1. When sharps containers are full (3/4 of total capacity), it should be sealed and should not be re-opened.
2. Sharps containers should not be shaken.
3. Sealed containers should be put away at a safe, designated place.

2.5. Transportation of Infectious/hazardous medical waste

A pathway must be identified to transport Infectious/hazardous medical waste to the site of treatment and disposal. If there is no separate pathway, wastes should be transported after the busy hours of the facility. Waste should be secured to prevent leakage during transportation.

Specified hazardous waste trolleys or carts must **NOT** be used for any other purpose other than to transport waste.

Waste trolleys or carts must be thoroughly washed after disinfection at the waste disposal site.

Table 2.2.3. Collection, transportation, treatment & disposal of hazardous medical waste

Hazardous waste	Collection	Transportation	Treatment Method	Disposal
Solid Infectious waste	When the bin is $\frac{3}{4}$ full	Only on specified waste trolley or cart	1. Autoclaving 2. Chemical disinfection 3. Incineration	Municipal Bin Deep burial pit
Pathological waste	When the bin is $\frac{3}{4}$ full		Dispose of in deep burial pit	Deep burial pit
Liquid infectious waste	Procedure specific collecting container		Decontaminate with 0.5% bleaching solution in equal proportions (1:1) for 10 minutes	Sewage system with plenty of water
*Sharps	When the box is $\frac{3}{4}$ full		1. Autoclaving & shredding or incineration	Deep burial pit or recycle
Chemical & Pharmaceutical Waste	Collected and sent to pharmacy for final disposal	for pharmacy	Encapsulation	Landfill
Cytotoxic waste	Collect in leak-proof container and store in designated area		1. Encapsulation 2. Incineration 3. Chemical disinfection	Landfill and deep burial pit

Hazardous waste	Collection	Transportation	Treatment Method	Disposal
Radioactive waste	Collect in lead container		Decay by storage	

NOTE:

- Incineration will be done when such facilities are instituted in the country.
- Ashes generated from incineration must be either disposed of in deep pit burial.
- Pathological wastes if not incinerated must be disposed of into a deep burial pit.
- For liquid chemical waste dilute with water in 1:3 ratio and flush down the drain.
- Health facilities with needle destroyer must dispose of ash into deep burial pit.
- All health facilities must construct standard deep burial pit for infectious waste and separate burial pit for placenta.

CHAPTER 3: PHARMACEUTICAL WASTE MANAGEMENT

Table 3.1. Process of encapsulation

- a. Fill a steel/plastic drum up to 75% capacity with pharmaceutical waste.
- b. Fill the remaining space with the following at approximate ratios by weight:
 - Cement 15%;
 - Lime 15%;
 - Water 5% or more to obtain required consistency.
- c. Close the lids of the drum and place the drums at the base of the land fill and cover with soil.

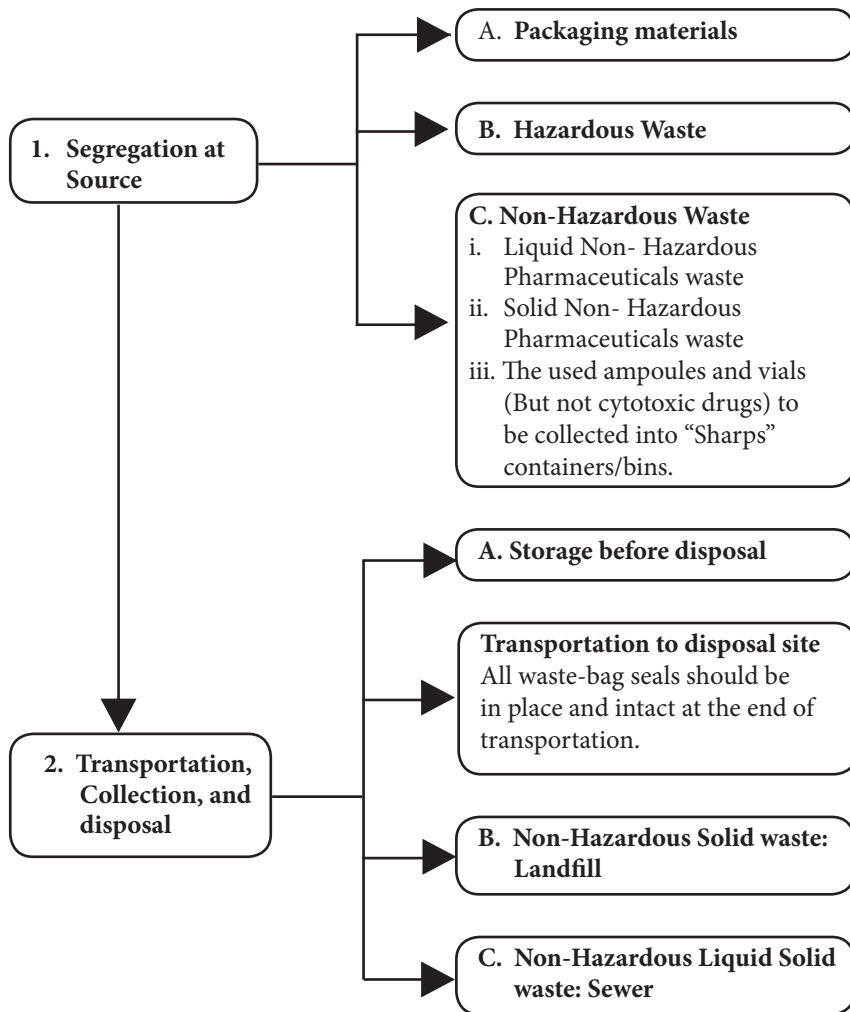
Note:

If pharmaceutical waste is with secondary packages, remove the packages but not from the primary packaging (strips /blisters/ bottles/ sachets).

Table 3.2. Medical wastes not to be incinerated

- a. Pressurized containers - may explode during incineration and cause damage to the equipment.
- b. Large amount of reactive chemicals
- c. Radiographic wastes
- d. Plastic wastes containing chlorine (*eg. polyvinyl chloride*)
- e. High mercury or cadmium content waste (*eg. broken thermometers, used batteries, lead*)
- f. Sealed ampoules or ampoules containing heavy metals

Figure 3.1. Management of pharmaceutical waste



*For detail refer "DRA Guidelines."

Pharmaceutical Waste

1. Segregate the pharmaceuticals waste into hazardous according to the hazardous list (Table 2.6).
2. Discard Hazardous waste into the leak –proof (double layered) **purple plastic bags or containers** labeled as “Hazardous Pharmaceuticals waste” with the name of place where produced (e.g. medical ward).
3. Biological and vaccines should be treated as infectious waste and disposed accordingly.

Non-Hazardous pharmaceutical waste

1. Pharmaceuticals not listed on the hazardous should be considered as non-hazardous and should be **further segregated into liquid and solid /semi solid dosage forms**.
2. The non-hazardous Pharmaceuticals waste should be discarded into the green plastic bags or containers and labeled as “**Non- Hazardous Pharmaceuticals waste: Liquid waste OR Non- Hazardous Pharmaceuticals waste: Solid waste**” and name of place where produced.
3. The used **ampoules or vials** which contained Non-hazardous Pharmaceutical wastes should be crushed on a hard, impermeable surface and disposed of as “Sharps”.

3.1. Transportation to storage site

Storage before disposal

1. In the health facilities, pharmaceuticals waste in hospital wards or departments should be returned to the pharmacy store for disposal with a duly filled waste generation record (Annexure VII).
2. For the private pharmacies, the pharmaceutical waste should be stored separately prior to disposal.

3.2. Non-Hazardous liquid pharmaceutical waste: Sewer

1. Non-hazardous pharmaceutical liquid dosage form waste such as large volume parenteral fluids (salts, amino acids, lipids, glucose), vitamins and eye drops (but not antibiotics or cytotoxic drugs) can be diluted (dilution factor - water in 1:3 Ratio) and flushed into the sewers in small quantities.

2. Fast flowing water sources should be used to flush the diluted liquid pharmaceutical wastes.
3. Do not discharge even small quantities of pharmaceutical waste into slow-moving or stagnant water bodies.

Table 3.1. Hazardous pharmaceutical wastes

i	All chemotherapy drugs
ii	Immunosuppressants
iii	Other category of drugs: <i>Epinephrine, Phentermine, Physostigmine, Nitroglycerine, Warfarin, Coumarol, Adrenalin, Disulfiram</i>
iv	Chemicals: <i>Phenol, Lindane, Choral Hydrate, Chloroform, Ethyl Ether, Fluori- methane Formaldehyde, Naphthalene, Selenium Pharmaceuticals containing more than 24% alcohol and 140° celcius flash point (inflammable). Pharmaceuticals containing heavy metals(Barium, mercury, cadmium, Thiomersal)</i>
Note: <i>This list is not comprehensive; it is subject to revision as and when notified by National Environment Commission.</i>	

Table 3.2. Standards for deep burial pits construction

<ul style="list-style-type: none"> • The deep burial pits should be at least 50 meters away from habitation, residential areas and water sources. • The area should not be prone to flooding or erosion. • The bottom of the pit should be at least 1.5 meters above ground water level to prevent pollution of ground water. • The entire pit should be lined with a 30cm layer of compacted clay or any other suitable low permeability material. • The pit should be 2-3m deep and approximately 2x2m wide (larger size for bigger hospitals). • After every load of wastes, it should be fully covered with soil.

- The top portion of the pit should be slightly elevated and properly sloped to keep surface waters from entering the pit.
- The pit should be covered with a simple, but sturdy removable cover.
- The entire pit area should be properly fenced in order to keep unauthorized personnel or animals from entering into the area.
- Burial must be performed under close and dedicated supervision.
- Once the pit is full, the top opening should be sealed with soil or with cement and the area clearly labeled.
- A new pit must be built before the old one is sealed off permanently.

Note: *The facility shall maintain a record of all deep burial pits*

Autoclaving standards:

The autoclaves should be dedicated for disinfecting and treating of medical waste only.

Table 3.3. Operational parameters for different types of autoclaves

Types of autoclave	Temperature (°C)	Pressure (pounds/inch ²)	Time (Min)
Gravity Flow	121	15	60
	135	31	45
	149	52	30
Vacuum Autoclave*	121	15	45
	135	31	30

* In operating vacuum autoclave, medical wastes should be subjected to at least one pre-vacuum pulse to purge the autoclave of all air.

1. Medical Wastes should not be considered treated unless the operational indicators indicated above for specific machines are reached during the autoclaving process.
2. In case, any operational parameter is not reached, the entire load of medical waste must be autoclaved again until the proper requirements are achieved.
3. Do not overload the autoclave; there should be at least 2 inches of

space around each waste bag on all sides to allow access to surfaces by the steam. No other materials should be autoclaved in the same load.

3.3. Recording of operational parameters:

1. There must be graphic or computer recording device for continuous monitoring and recording of parameters, along with date, time, load identification number throughout the length of autoclave cycle.
2. Records of repairs, service calls, and calibrations of autoclaves should be maintained.

3.4. Validation Test:

1. Routine test

Chemical indicator strips (Steritapes) that changes colour on reaching a specific temperature must be used at every process/cycle to verify that the desired temperature has been achieved. It is desirable to use more than one paper strip over the waste package at different locations to ensure efficacy of autoclaving.

2. Spore testing

Bacillus stearothermophilus spores are used as biological indicator using vials or spore strips, with minimum 10000 spores per ml. This should be carried out at least once in every month by the Microbiology laboratory.

3.5. Precautions

1. Always wear thermal protection gloves when handling items that have recently been autoclaved.
2. Use caution when opening the door of the autoclave after a run, as steam will be released.

3.6. Wastes that cannot be autoclaved

- Cytotoxic/chemotherapy waste
- Toxic and volatile chemicals
- Radioisotopes
- Hazardous waste that can be vaporized and disseminated with heat.

Note: In general, do not autoclave flammable, reactive, corrosive, toxic or radioactive materials.

CHAPTER 4:

RECORDING AND REPORTING OF MEDICAL WASTES

All the waste generated from the health care setting should be recorded on daily basis for proper reporting and planning.

4.1. Weighing:

Perquisite

1. Appropriate personnel protective equipment
2. Appropriate validated weighing machine
3. Waste record register/form

4.2. Weighing Methods:

1. The total waste generated from the facility should be weighed at the common storage site and recorded on the register/form.
2. The wastes should be weighed without opening the plastic bags

4.3. Responsible persons:

The designated personnel should be responsible for weighing and recording of waste.

The focal person for infection control and medical waste management should compile the total waste generated and report to the relevant committee or agency

4.4. Reporting Frequency:

Every out-reach clinics, basic health unit and hospital should submit their annual waste report to the District Health Officer/Chief Medical Officer latest by **15th November**.

The **annual waste report** should contain amount of waste generated in that particular year, disposal methods adopted and challenges in implementing the guideline or comments made by the monitoring committee (if any). The District Health Officer/Chief Medical Officer

should then compile and submit it to the Ministry latest by 5th **December** of every calendar year for onward submission to NEC on or before 15th **January**.

ANNEXURE 1: ANNUAL MEDICAL WASTE REPORTING FORM

NAME OF HEALTH FACILITY:

DATE OF REPORTING:

YEAR:

Types of waste	Types of Bins used	Amount of Waste generated (in Kgs)	Method of Treatment	Method of Disposal
General waste/dry wastes				
Food waste				
Pathological waste				
Infectious/hazardous waste				
Pharmaceutical waste				
Sharps				
Chemical waste				
Pressurized containers				
Radioactive				

Note: Report should be submitted by 15th November by every health centers to the DHO and the DHO will report to IC&WM program before 5th December every year.

Submitted by (Name & contact number)

Annexure 3: Checklist for Monitoring and Supervision of Infection control and Medical Waste Management Checklist for Infection Control and Waste management

Name & Category of Health Centre:.....Department/Unit.....
Name & Designation of In-charge.....Date of visit:.....
<p><i>Instruction: This checklist consists of questions for 5S-CQI implementation. Any activity not relevant to the checklist should be noted as 'NA'. Each activity should be carefully assessed and provided the most appropriate scores against the rating level provided in the following table:</i></p>

Rating and scoring Criteria: i) 5 or more problems=0; ii) 3-4 problems = 1; iii) 2 problems=2; iv) 1 problem = 3; v) 0 Problem = 4.

SL	A. Infection control	score	Remarks
1	Management: A trained IC focal person designated; regular review meeting for IC/WM; Periodic monitoring & supervision; availability of QA team to support IC/WM activities; Involvement of management; regular system for CME and orientation.		
2	Infection control information: Hand washing posters in front of wash basins.		
3	Hand washing System: Availability of hand rub solution; soap, single used towels; Appropriate place for hand rub solution; cleanliness of the wash basin; running water.		
4	Decontamination: Decontamination log for each work area; right decontamination solution; appropriate concentration of decontamination solution.		

SL	A. Infection control	score	Remarks
5	Sterilization of equipment/Instrument: Availability of autoclave/chemical disinfectants.		
6	Personal Protective equipment: Use of gloves; aprons; face mask; removing of gloves while handling computers, files and documents in the unit; use of gumboots; goggles; use of TLD batch & lead apron (Radiology) etc wherever applicable.		
7	Specimen collection: Use of appropriate disinfectants; dry cotton; circular motion while cleaning; avoid capping of needle after collection.		
8	Incident Recording and documentation: Record of Reporting accidental injury and intervention; reporting system for outbreak; HAI reporting system in place.		
	B. Waste Management		
9	Segregation of wastes at the source: Colour coded waste bins for general wastes like papers, plastics, pet bottles/saline bottles etc. (green); food wastes (blue); Infectious wastes (Red) and sharps (yellow).		
10	Waste Bins: Colour coded; foot operated with cover; adequate in size; properly labeled and cleaned; color coded plastic bag inside each waste bin.		
11	Pathological wastes: The pathological wastes like, urine, blood, serum, body fluids, biopsies, stool; microbiological wastes etc. are sterilized/disposed. (Applicable in Lab)		
12	Radiological wastes: Radioactive wastes; other chemical wastes; soiled and infected linens. (Applicable in Radiology).		
13	Pharmaceutical wastes: Record of expired drugs; proper storage; system for management of hazardous & nonhazardous drugs. (Applicable in Pharmacy)		

SL	A. Infection control	score	Remarks
14	Spill management: Management of spills like mercury, blood, body fluid and chemicals. (Availability of SOPs/guidelines).		
15	Other infectious wastes: Soiled and infected linins, IV tubes, catheters, syringe, dressing materials; blood bags, etc. are managed as per the national guideline.		
16	Storage and Transportation: Designated waste storage area; designated trolley for waste transportation; training for waste handlers.		
17	Disposal of Wastes: Availability of weighing machine; appropriate packaging materials; deep burial pits; availability of needle crusher.		
	Total scores		
	Percentage score (%)		

Name of the monitoring Officer: _____

Signature: _____

Date _____

Counter signed by staff: _____

ANNEXURE 4: High level Committee for IC & MWM

1. Secretary, MoH (Chairman)
2. Director General, Department of Medical Services, Member
3. Director General, Department of Public Health, Member
4. Director, Directorate Services, Member
5. CPO, Quality Assurance and Standardization Division
6. CPO, HC&DD
7. Director, DMSHI, MoH
8. CPO, PPD
9. IC&MWM, program, Secretariat

Responsibilities of the HL committee: (This committee will be at the policy level)

1. Provide directives on infection prevention/control and medical waste management policies, guidelines and standards.
2. Setting priorities related to infection prevention/control and medical waste management
3. Ensuring compliance with national standards across the health facilities
4. In cooperate new technology in infection control practices
5. Endorse any new policies, modify policies and strategies
6. Ensure appropriate staff training for all categories
7. Ensure adequate and appropriate supplies for infection prevention/control and MWM
8. Ensure regular monitoring and evaluation of infection control practices

ANNEXUR: 5: Hospital committee. (QA members) Roles and responsibilities

1. Plan and implement regular hospital infection prevention/control and medical waste management activities
2. Develop SOPs, guidelines , and protocols for the health facility
3. Conduct HAI surveillance at health care facility level
4. Procure adequate PPEs and supplies as per the IC&MWM guideline
5. Assess training needs of the staff and conduct trainings in coordination with the program
6. Monitor and evaluate infection prevention/control and medical waste management practices

7. Ensure timely reporting of IC&MWM activities

ANNEXURE 6: LIST OF PERSONNEL PROTECTIVE EQUIPMENTS (PPE)

Basic: PPE to be procured by Central supply

1. Surgical Mask
2. Surgical Cap
3. Surgical Gloves (different Sizes)
4. Unsterilized Gloves
5. Plastic Apron
6. Shoes cover
7. Goggle

Advanced: PPE

1. Cover all (Trivet)
2. Plastic apron long sleeves
3. N 95 (respirator mask)
4. Face shield
5. Disposal gown long sleeves

PPE to be procured local level/Dzongkhag

1. Gum Boots (different Sizes)
2. Utility Gloves, elbow length
3. Colour coding bins (30 litres)
4. Color coded plastic bags (degradable)

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