28.0 OBJECTIVES

After studying this unit, you should be able to:

- discuss the concept of occupational safety
- describe occupational risks to health care workers
- discuss the preventive measures
- define Hierarchy of Controls
- enumerate the minimum approaches to health and safety practices

28.1 INTRODUCTION

You have already read about the impact of chemical and infectious health care waste in the Units 9 and 10, Block 3, BHM-101. Since the health care personnel are the ones working in maximum proximity to the waste, they are more prone to the impact. However, the occupational safety of health care personnel of all cadres of including workers – handling the waste is often overlooked. The purpose of this unit is to explain the hazards and the infection that they may encounter as well as the prevention and control measures. Bio-Medical Waste (BMW) Management Rules, 2016 of India, as amended include policies or plans incorporating arrangement for continuous monitoring of workers’ health and safety. This is to ensure that correct handling, treatment, storage and disposal procedures are followed. Occupational health and safety measures should be included in all procedures performed on patients from generation of BMW till its final disposal.

You must read the Unit 18, Block-1, BHM-102, on infection prevention and control, before you proceed reading this unit, since many of the concepts discussed here have been also elaborated there.

In this unit you shall learn about the various risks. The various risks that a health care worker is exposed to have been enumerated. In case you have also opted for the BIIME-102, you shall learn in detail about each type of risk that a worker could be exposed to in different situations. In this unit, you will learn in detail the different methods of preventing the risk or the exposure to various hazards. We are sure that with this knowledge you shall be able to prevent or minimise the risks.

28.2 CONCEPT OF OCCUPATIONAL SAFETY

Occupational safety of the employees is of importance, not only for their own health, but also for the patient’s safety.

As per the Indian rules, the occupational safety has to be ensured in the different ways mentioned in Box 28.1.

a. Ensuring that the staff involved in the handling of BMW are immunised at least against Hepatitis B and Tetanus

b. Providing adequate and appropriate PPE to the staff involved in handling health care waste
Box 28.1: Components of occupational safety to be ensured by the occupier as per BMWM Rules, 2016, as amended

In order to achieve the above objectives, it is required that the strategies are in place Box 28.2.

a. A standardised set of management rules and operating procedures for health care waste

Standardised and written health care waste management procedures, should be in place, respected by all the personnel working in the health care institutions and monitored by the hospital management. This can dramatically reduce the risk of accidents. Hospital staff should be taught and kept informed about the health care waste management system and procedures that are in place.

b. Waste workers are adequately trained so that they perform their duties properly and safely

Training in health care safety should be in place, to ensure that workers understand the potential risks associated with health care waste. They must also be made aware about the rules and procedures they are required to abide by, for safe management of health care waste. They should also realise the importance of proper hand hygiene and PPE.

c. Waste workers should be involved in the identification of hazards and strategies for its prevention and control.

It is equally important to have medical surveillance and post exposure prophylaxis for those exposed to injuries. Health care personnel should be trained for emergency response, if injured by a waste item and the necessary equipment for managing the emergency should be readily available at all times. Written procedures for the different types of emergencies should be drawn up. For dangerous spills of hazardous chemicals or highly infectious materials, the clean-up operation should be carried out by designated personnel specially trained for the purpose. To limit the risks, the hospital management must set up management rules and operating procedures for health care waste and establish standardised emergency procedures. It is the responsibility of everybody involved in handling waste to know the emergency procedures and to act accordingly. One person should be designated as responsible for handling of the emergencies, including coordination of actions, reporting to managers and regulators, and liaising with emergency services. A deputy should be appointed to act in case of absence of nodal person.

Box 28.2: Strategies for ensuring occupational safety
Check Your Progress 1

1. The responsibility of the occupier to ensure worker safety consists of the following components. However, the names of these components have got jumbled up. Can you guess the components?

   \[\text{NIISIATUMON} \quad \text{LA12S9NP-TIDPVE2C-TIRQULNEA} \quad \text{LEAHTH-UCHCHX} \quad \text{CADBNTI-PERNOIGHT}\]

2. What are the strategies for adopting occupational safety?

   ...................................................................................................................................................
   ...................................................................................................................................................
   ...................................................................................................................................................

28.3 TYPES OF RISKS TO HEALTH CARE WORKERS

Cadres of Workers at risk of acquiring infection and injury include health care providers, hospital cleaners, maintenance workers, operators of waste-treatment equipment, and all personnel involved in waste handling and disposal within as well as outside health care facilities. In fact anyone working in the health care environment is at risk of one or more hazards.

Types of health risks to health care waste workers include exposure to infectious biological agents, chemical exposures such as chemotherapeutic drugs, disinfectants and sterilants; physical risks such as ionising radiation; and ergonomic hazards such as manual lifting and transporting of heavy waste loads. (Table 28.1).

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Impact of Risk</th>
<th>Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharps injuries and resulting exposure to bloodborne pathogens</td>
<td>Infections with hepatitis B or C, HIV, malaria or other bloodborne infections</td>
<td>Immunisation against hepatitis B virus (WHO, 2009a). Appropriate disposal of sharps at site of use into a puncture-resistant container without recapping. Use of engineered needles which automatically retract, blunt, resheath, or disable the sharp</td>
</tr>
<tr>
<td>Other biological hazards</td>
<td>SARS, Tuberculosis, Influenza</td>
<td>Exhaust ventilation (natural or respiratory protection with N95, respirators for high-risk cough-inducing procedures)</td>
</tr>
<tr>
<td>Chemicals, Chlorine disinfectants (e.g. sodium hypochlorite)</td>
<td>Skin and respiratory sensitisation. Eye and skin irritation, weakness, exhaustion, drowsiness, dizziness, numbness and nausea</td>
<td>Autoclaving laboratory waste in the laboratory before disposal. Handwashing.</td>
</tr>
<tr>
<td>High-level disinfectants (e.g. glutaraldehyde)</td>
<td>Irritation of the eyes, nose and throat, skin sensitisation. Occupational asthma where the symptoms in affected individuals include chest tightness and difficulty in breathing</td>
<td>Substitution by steam sterilisation except for pressure sensitive instruments. Ensure appropriate dilution and use in closed, ventilated system.</td>
</tr>
<tr>
<td>Sterilants: ethylene oxide</td>
<td>Eye and skin irritation, difficulty breathing, nausea, vomiting, and neurological problems such as headache and dizziness. Reproductive hazard, linked to nerve and genetic damage, spontaneous abortion and muscle weakness. Carcinogen.</td>
<td>Substitution by steam sterilisation for ethylene oxide except for pressure-sensitive instruments. Use only in a closed and ventilated system.</td>
</tr>
<tr>
<td>Heavy lifting Handling heavy loads over long periods</td>
<td>Degenerative diseases of the lumbar spine</td>
<td>Reduce mass of objects or number of loads carried per day. Use waste carts with wheels, automated waste transfer from cart to truck and treatment. Use lifts and pulleys to assist in transferring loads.</td>
</tr>
<tr>
<td>Back injuries and musculoskeletal disorders</td>
<td>Irreversible damage of cells, anaemia, leukaemia, lung cancer from inhalation</td>
<td>Safe waste management, in full compliance with all relevant regulations, must be considered and planned for at the early stages of any projects involving radioactive materials. It should be established from the outset that the waste can be properly handled, treated and ultimately disposed of. (See International Atomic Energy Agency for national regulatory standards and safety guidance).</td>
</tr>
</tbody>
</table>

You will learn more about the various risks, their effects and preventive measures and management in the optional BHME-101 on worker safety and patient safety.
28.4 PREVENTING THE RISKS

Let us now read one by one what are the different measures to be adopted to minimise the risk to the health care worker and other staff.

![Fig. 28.1 : Preventing risks to health care workers](image)

28.4.1 Immunisation of the Health Care Workers

Health care waste handlers are at greatest risk from infectious hazards, especially from sharps that are not disposed of into puncture-resistant containers. The risk of acquiring a secondary infection following injury from a contaminated sharp depends on the amount of the contamination and nature of the infection from the source patient. The risk of infection following a needlestick injury with needle from an infected source patient is ~0.3% for HIV, 3% for hepatitis C and 6–30% for hepatitis B.

The hospital is also required to maintain immunisation records of all staff with dates of immunisation and due date of first dose, second dose and the booster dose.

28.4.2 Identification and Management of Health Care Waste

You have read in the previous sections that health care waste poses a risk to the worker and staff. In order to remove the risk we must follow the proper guidelines for management and disposal of waste. Although you have already read about the guidelines, we shall quickly recap them here.

**Steps for safe management of the health care waste is explained in box 28.3.**

a. Minimisation of waste

When less waste is generated, the risk from the waste also reduces.

b. Segregation

i. Should be done at the site of generation of waste, so that the risk of infection while transferring the waste is avoided

ii. Segregation reduces the amount of risk wastes
iii. The waste should be disposed of in the correct colour coded containers
iv. In case of error, it should not be corrected, and waste should be treated as the higher risk category

c. Collection of waste
i. Should be done following all the universal precautions like hand washing, wearing PPE, etc
ii. Collected in the correct colour coded container,
iii. Secured by tying the bag before transportation,
iv. Filling the bags only up to ¾ full, and then replacing them
v. Fixed schedules and timely collection so that the microorganisms will not increase

d. Pre-treatment
This is essential for some waste classes to prevent the increase in risk to the health workers. Infectious waste like the laboratory and microbiological waste is required to be pre treated before it can be sent for further treatment.

e. Storage
The waste collected from various locations are stored in a safe and secure storage site which is far from the patient area and the visitor area.

f. Transportation
i. Tie the bags
ii. Put bar code and label the waste
iii. Carry the colour coded waste in the trolley of the same colour
iv. Proper body mechanics should be maintained so that the risk to the person transporting the waste is minimal.

g. Treatment
All health care facilities having a central bio-medical treatment facility within 75 km of their premises, are required to send their waste to the central treatment facility. Those health care facilities not having the central treatment facility within 75 km, will have to treat and dispose the waste in their own facility
i. All the equipments must be operating as per recommended operating norms.
ii. Safety precautions should be adhered to.

h. Disposal
It is important to dispose of the waste in a safe and secure manner, so that there is no leachate which can be harmful to health.
28.4.3 Personal Hygiene

The measures as mentioned in Box 28.4 must be kept in mind for personal hygiene.

a. Convenient washing facilities (with warm water and soap) should be available to all, including cleaning staff and waste workers.
b. Appropriate PPE should be available and used to reduce exposures.
c. Cuts/abrasions should be covered with waterproof dressing to help reduce exposure of the affected area.
d. Personnel should be trained in personal hygiene issues that reduce the risks from handling hazardous waste.

Box 28.4: Measures for personal hygiene

All workers and staff must wash hands for all the occasions a mentioned in the Box 28.5.

a. Immediately after arriving for work
b. Always after handling health care waste
c. After removing gloves and/or coveralls
d. After using the toilet or before eating
e. After cleaning up a spill
f. Before leaving work

Box 28.5 : Moments of hand washing for a health care workers

The details of how and why to wash hands has been adequately covered in the Unit 18, Block 1, BHM-102.

28.4.4 Personal Protective Equipment (PPE)

You have already read in details about the use of PPE in the Unit 18. You must have understood how important it is to wear the proper PPE to protect yourself from getting infected. The PPE includes gloves, face mask, cap, gown, apron, shoe covers, or heavy duty gloves. All personnel generating waste also need protection and not just the people who are collecting, transporting, storing or treating the waste.

Not all the PPE is worn in all situations. The type of protective clothing used will depend on an extent upon the risk associated with the health care waste.

1. Heavy duty boots

Heavy duty boots must be worn by the waste handlers to protect themselves from the injuries and infections of sharps and infectious waste (Fig. 28.2).

Fig. 28.2: Heavy duty boots
2. Boots and Shoe cover
Shoe covers are required in locations when splashes or contaminated floors occur. It protects the wearer from contaminating the shoes or boots (Fig. 28.3).

3. Caps
Caps must be worn in locations like the operation theatre and wards and during procedures in which splashes can occur (Fig. 28.4).

4. Masks
A surgical mask protects health care providers from inhaling respiratory pathogens transmitted by the droplet route. It prevents the spread of infectious diseases such as varicella (chickenpox) and meningococcal diseases (meningococcal meningitis). An N95 mask protects health care providers from inhaling respiratory pathogens that are transmitted via the airborne route. This helps to prevent the spread of infectious diseases such as TB, MDR-Tand SARS (Fig. 28.5).
5. Apron

An apron protects the wearer and the uniform from contact with the contaminated body fluids. Plastic aprons are used over the gown when caring for patients where possible splashes with blood and body substances may occur. Need not be used if the gown is of impermeable material (Fig. 28.6).

![Apron](image)

**Selecting the Apron**
Select water repellent, plastic aprons, which are disposable. If disposable ones are not available then reusable plastic aprons can be used.

**Size**
Long enough to protect the uniform but the gown should not touch the ground. Should cover the front and sides. It should open in the back. A tie around the waist keeps the apron in place.

**Wearing the Apron**
Wash hands. Ensure that the sleeves are rolled above the elbows before putting on the apron. Wear the apron over the uniform and tie around the waist at the back.

**Removing the Apron**
Wash hands and dry. Remove touching only the inside part of apron. Discard folding the outside part in. Decontaminate or dispose according to the health care facility guidelines. Wash hands thoroughly before touching anything else.

![Fig. 28.6 : Selecting, wearing and removing the apron](image)

6. Gown

Gowns made of impervious material are worn to protect the wearer’s clothing/uniform from possible contamination with microorganisms and exposure to blood, body fluids secretions and excretions. The gown should be used only once for one patient and discarded or sent for laundering. Health care workers should remove gowns before leaving the unit (Fig. 28.7).

![Gown](image)

**Selecting a Gown**
Gowns should be clean and non-sterile. The gown should be impervious and water repellent. It should be long enough to cover the clothing of the wearer and should have long sleeves and high neck. Disposable gowns are preferable. If they are not available, cotton reusable gowns can be used with a plastic apron underneath.

**Wearing the Gown**
Wash hands and dry. Hold the gown at the neck on the inside permitting to unfold. Slide hands and arms down the sleeves. Fasten the ties at the neck. Overlay the gown at the back as much as possible and secure the waistband. Request assistance to fasten the neck and the waist ties.

**Removing the Gown**
Remove the gown after removing gloves. Untie the waist-band with a gloved hand if it is tied in front before removing the gloves. Remove gloves and wash hands. Untie the neck-ties (be sure not to touch outside of the gown). Slide the gown down the arms and over the hands by holding in inside of the sleeves. Hold the gown with both the hands (inside the shoulders) at the shoulder seams. Turn the gown inside out (contaminated side in). The hands are then brought together and the gown is rolled and discarded appropriately in the container provided. If reusable—discard if visibly contaminated. If there is shortage of gowns they may be reused during one shift for the same patient. Hang gown with outside facing in when not in use. Discard at the end of each shift. Wash hands thoroughly before touching anything else.

![Fig. 28.7: Selecting, wearing and taking off gown](image)

7. Protective Eyewear

Protective eyewear/goggles should be worn at all times during patient contact when there is a possibility that a patient’s body fluids may splash or spray onto the caregiver’s face/eyes (e.g., during throat, endotracheal and tracheostomy suctioning, removal of catheter, etc.).

The amount of exposure can be reduced through the use of protective eyewear. Full face shields may also be used to protect the eyes and mouth of the health care worker in such high-risk situations (Fig. 28.8).
8. Gloves

Use gloves when there is a probability of exposure to blood, body fluid, excretions of secretions. Change gloves between patients, between tasks and procedures on the same patient, and when they become soiled. Remove gloves promptly after touching contaminated items and environmental surfaces and before moving to another patient. Remove gloves before leaving the patient’s bedside and wash hands immediately. After glove removal and hand washing ensure that hands do not touch potentially contaminated environmental surfaces or items in the patient’s room. Discard gloves after attending to each patient (Fig. 28.9).

The procedure for taking off the gloves can be understood from the Fig. 28.10.
How to Remove Gloves

To protect yourself, use the following steps to take off gloves

1. With both hands gloved, grasp the outside of one glove at the top of your wrist, being careful not to touch your bare skin.
2. Peel off the first glove, peeling away from your body and from wrist to fingertips, turning the glove inside out.
3. Hold the glove you just removed in your gloved hand.
4. With your ungloved hand, peel off the second glove by inserting your fingers inside the glove at the top of your wrist.
5. Turn the second glove inside out while tilting it away from your body, leaving the first glove inside the second.
6. Dispose of the gloves safely. Do not reuse the gloves.
7. Clean your hands immediately after removing gloves.

Fig. 28.10: Procedure for removing the disposable gloves

Source: https://www.cdc.gov/vhf/ebola/pdf/poster-how-to-remove-gloves.pdf

It is important for availability and access to soap and water, and alcohol hand rub, for hand hygiene. The hand hygiene must be performed before and/or after using PPE. This also important to maintain cleanliness and prevent the transfer of infection via dirty hands.

Managing PPE in the facility

The PPE listed in Box 28.6 should be made available to all personnel who collect or handle waste.

**Obligatory**

- Disposable gloves (medical staff) or heavy-duty gloves (waste workers)
- Industrial aprons - overalls (coveralls)
- Leg protectors and/or industrial boots
Depending on type of operation

- a. eye protectors (safety goggles)
- b. face masks (if there is a risk of splash into eyes)
- c. helmets, with or without visors may also be required.

**Box 28.6: List of PPE to be used**

Sequence of donning PPE is explained in **Box 28.7**. The hand hygiene must be performed first and then the gown worn followed by mask, eyewear and then gloves in the end.

- a. Perform hand hygiene
- b. Scrub suit and boots
- c. Gown
- d. Face Mask
- e. Face shield or goggles if required
- f. Head cover/cap if available
- g. Perform hand hygiene
- h. Gloves
- i. Waterproof apron

**Box 28.7: Sequence of donning PPE**

**Sequence of removing PPE**

The PPE also must be removed in a particular sequence (**Fig. 28.8**). The first to be removed is the gloves, followed by gown, then goggles, followed by mask. In the end hand hygiene should be performed.

- a. Waterproof apron (assume front and sleeves are contaminated)
- b. Gown (assume front and sleeves are contaminated) and Gloves (assume outside of gloves is contaminated)
- c. Boots (without touching them)
- d. Perform hand hygiene
- e. Head cover/cap from behind
- f. Face shield or goggles (assume outside is contaminated)
- g. Face Mask from behind (assume front is contaminated)
- h. Perform hand hygiene

**Box 28.8: Sequence of removing PPE**

**Check Your Progress 2**

1. Enumerate the important personal protective clothing.

   ........................................................................................................................................
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   ........................................................................................................................................
   ........................................................................................................................................
   ........................................................................................................................................
   ........................................................................................................................................
   ........................................................................................................................................
   ........................................................................................................................................

79
2. Try to solve the crossword with the clues provided

Across
3. One must always adopt this procedure before wearing and after removing gloves (4,7)
6. Gum boots are made up of this material
7. If the gown has to be reused it should be made of
8. used to protect the wearer from splashes of blood

Down
1. helps to prevent the inhaling of microorganisms (4,4)
2. cover the shoes adequately (4,5)
4. protects the wearer and the uniform from contact with the contaminated body fluids
5. All procedures on a patient should always be performed wearing
8. Protects the feet from sharp injuries to the workers (3,5)

28.4.5 Dealing with Spillages

Spillages require clean-up of the area contaminated by the spilt waste.

In general, the most hazardous spillages occur in laboratories rather than in medical care departments. Procedures for dealing with spillages should specify safe handling operations and appropriate protective clothing.

The immediate measures to be taken to protect yourself from harm is mentioned in Box 28.9.

- a. Appropriate equipment for collecting the waste and new containers should be available, as should means for disinfection.

- b. Special attention should be paid to the eyes and any open wounds. In case of skin and eye contact with hazardous substances, there should be immediate decontamination. In case of eye contact with corrosive chemicals, the eyes should be irrigated continuously with clean water for 10–30 minutes; the entire face should be washed in a basin, with the eyes being continuously opened and closed.
c. An exposed person should be removed from the area of the incident for decontamination, generally with copious amounts of water.

**Box 28.9: Immediate measures during a spill for self protection**

**General procedure for dealing with spillages**

You have already read about how to deal with an infectious spill in Unit 18, Block 1, BHM-102. This could be blood or any other body fluid. Salient points of managing a spill have been summarised in the **Box 28.10**.

a. Restrict the activity around the spill

b. The individual(s) cleaning the blood spill need to use the proper PPE after hand hygiene.

c. Spray the blood contaminated surfaces with a 1–10 solution of bleach and water.

d. Use absorbent material to absorb and remove all traces of the spill.

e. Re-spray the cleaned area with the bleach solution and allow to air dry.

f. Place all waste materials, including disposable PPE, into a plastic autoclavable biohazard bag.

g. Perform hand hygiene.

h. Report the incidence.

**Box 28.10: Managing an infectious spill**

**Mercury/chemical spill**

You have already read the procedure of management of a mercury spill in the Unit 10, Block 3, BHM-101. The procedure has been summarised in **Box 28.11** for your reference.

a. Put on protective GLOVES and MASK to reduce dust inhalation. Increase ventilation by opening a window.

b. Use two pieces of firm straight edge paper, (e.g. copying paper) and slowly guide the droplets together into a pool.

c. Use glass pipette with rubber ball to suck up the mercury and collect it in the smallest size possible bottle (glass or plastic) with a tightly fitting lid.

d. For picking up tiny droplets in cracks or uneven surfaces, use pieces of metallic Zinc rinsed in 10% HCl. Run the Zinc along the cracks and touch visible droplets directly with it. To neutralise unreachable mercury in crevices etc., drizzle area with sulphur flour or zinc powder.

e. Label the bottle with “Mercury waste”.

f. Tightly close the container.

**Box 28.11: Summary of procedure of management of a mercury spill**
28.4.6 Injury Management

The steps mentioned in Fig. 28.11, must be followed in case of an injury.

Fig. 28.11: Managing injuries

28.4.7 Occupational Post Exposure Prophylaxis

Post-exposure prophylaxis (PEP) is short-term antiretroviral treatment (for HIV) or immunisation (for hepatitis B) to reduce the likelihood of infection after potential exposure, either occupationally or through sexual intercourse. Within the health sector, PEP should be provided as part of a comprehensive universal precautions package that reduces staff exposure to infectious hazards at work. PEP for HIV comprises a set of services to prevent development of the infection in the exposed person. These include first-aid care; counselling and risk assessment; HIV blood testing; and, depending on the risk assessment, the provision of short-term (28 days) antiretroviral drugs, with follow-up and support. Most incidents linked to occupational exposure to bloodborne pathogens occur in health care facilities.

Health care workers are normally at a very low risk of acquiring infection during management of the infected patient. Most exposures do not result in infection. In addition to blood, the other body fluids that can result in risk of infection are semen, vaginal secretions, cerebro-spinal fluid, synovial fluid, peritoneal, pericardial amniotic and other body fluids contaminated with visible blood.

The risk of infection varies with the type of exposure and other factors as mentioned in Fig. 28.12.

Fig. 28.12: Factors deciding the risk of exposure

Immediately following an exposure, steps should be taken as shown in Fig. 28.13.
Fig. 28.13: Procedure adopted following an exposure to infectious waste list of Do’s and Don’t

- Do not use antiseptic
- If using contact lens leave them in place while irrigating; remove them once eyes are cleaned and then clean
- For splashes in the mouth – Do not use soap or disinfectant
- Do not squeeze
- Do not put the exposed / cut / bleeding finger in your mouth

“Please refer to NACO website for latest guideline on PEP for HIV.”

The World Health Organisation (WHO) has published guidelines on PEP to prevent HIV infection. A summary of PEP recommendations from these guidelines as given in Fig. 28.14.

Fig. 28.14: Guidelines for post exposure prophylaxis

Check Your Progress 3

1. Could you find the words associated with PEP in the word search?

O C F Y G K M F C P A X N H
C A O R E P G J Y B S O O E
Q S Y U P M O S R T I B W I P
R Q O J N X K A J T U N M T A
P E T N S S S T A I D Z W A T
J D I I C I E S R F B X K C I
I A S R O L I L K A S M Z I T
I H L N R N E S L P I F M N I
G Z S R U A I E F I C M H U S
H T V M O R B B Z A N W T M M
Y S M S E H S A L P S G O M G
H I P R O P H Y L A X I S O D
G Q E S U E E A L S F A B C J
I B L B W U I H T R G Z K L W
V H Y K O J E N U C U H Y R M
28.4.8 Employee Health Check Up

As per Bio-Medical Waste Management Rules, 2016, every HCF must ensure that a comprehensive health check-up of each employee and other staff involved in BMW handling is carried out at the time of induction and also as a mandatory procedure to be followed for each year for every employee.

Comprehensive Health Check-up includes suggestive examination and investigations but not limited to these as given in Fig. 28.15.

![Diagram of suggested comprehensive health check-up]

Fig. 28.15: Suggestive comprehensive health check-up


http://www.cpcb.nic.in/wast/biomedicalwast/

Check-up records of all the employees are needed to be maintained in the personal record of each employee for proving compliance. Please refer to:

28.4.9 Training of Health Care Workers

As per Bio-Medical Waste Management Rules, 2016, as amended it is mandatory for all the employees of the health care facility to be trained in handling of bio-medical waste management and handling.

a. Training need analysis

It is mandatory for each health care worker inducted in the HCF to undergo the training in management of Bio-Medical Waste at the time of induction. As per BMW Rules, 2016, as amended an annual training for the entire health care staff of HCF on Bio-Medical Waste Management is a mandatory requirement.
Training need analysis of the staff should be carried out based on following parameters:

i. Theoretical Knowledge

ii. Demonstration of methods of handling of health care waste

iii. Practical Implementation

iv. If any scope of improvement is observed by the committee or designated person, training must be provided to the relevant section of staff.

b. Training schedule

As per the BMWM Rules, 2016, as amended the minimum requirements for health care facilities is to conduct the training on BMW activities at least annually for all the staff of the facility and also whenever a new staff is inducted into Health Care Facility. It is preferable for each health care facility to create a training calendar for imparting the training on Health Care Waste Management Handling. Training must be provided as per the training plan.

c. Trainers

The trainers for the training could be selected by the health care facility from among the nodal officers or as endorsed by the legislative or regulatory authorities of the respective countries.

As per the BMWM Rules, 2016, as amended it is the responsibility of the SPCB/PCC and CBMWTF to impart training on BMW Management in the health care facilities. SIHFW may take the responsibility to provide induction trainings. It is a requirement of BMWM Rules, 2016 to have a standard training module for imparting the training in the health care facilities. For this purpose, the guidelines can be used as training material for imparting the training or any other relevant material published by approved authorities like SPCB/PCC, State Guidelines can be used as training material. IGNOU’s programme of CHCWM is also endorsed by the MOEF&CC and MOHFW. Various state pollution control boards have also endorsed it.

d. Training records

Health care facilities need to ensure that all the training records pertaining to the health care waste management including the induction training records and in service training, for all the staff is needed to be kept for proving compliance. Attendance records of each training needs to maintained and signed by the trainees with name and designation. In India in compliance to the BMWM Rules, 2016, as amended, HCFs need to maintain, compile and provide details of trainings provided for BMW handling to State Pollution Control Board (SPCB)/Pollution Control Committee (PCC).

These details have to be submitted along with the annual report to the prescribed authority i.e. SPCB//PCC, on or before 30th June of every year.
e. The training details could include the following:

i) Total Number of trainings conducted along with the date of imparting the training
ii) Total number of participant of each training
iii) Attendance Record
iv) Total Number of staff trained on BMW Handling
v) Total number of staff trained on BMW handling at the time of Induction
vi) Total number of staff, not undergone any sought of training on BMW Handling.

f. Training effectiveness

Effectiveness of the training can be evaluated by observing the same parameters as listed in training need analysis of the staff or through a test mock/verbal or written, to be conducted after training.

Implementation of standardized management procedures;
Hepatitis B vaccination (in addition to compulsory vaccinations) for all personnel who are at risk of exposure to blood (these personnel include cleaners and waste handlers);
Provision of sharps boxes where injections are taking place;
Implementation of standard precautions, such as no recapping of needles after use;
Promotion of proper hand hygiene;
Availability, as a minimum, of gloves to provide personal protection from patients’ body fluids;
Allocation of an additional role (e.g. for an infection-control nurse) to assume responsibility for promoting better worker safety.

Box 28.12: Training in health care waste management

28.4.10 Reporting Accidents and Incidents

All waste-management staff should be trained in emergency response and made aware of the correct procedure for prompt reporting. Accidents or incidents, including near misses, spillages, damaged containers, inappropriate segregation and any incidents involving sharps, should be reported to the waste-management officer (if waste is involved) or to another designated person. Box 28.13 outlines the content that each report must contain.

i. the nature of the accident or incident
ii. the place and time of the accident or incident Question
iii. the staff who were directly involved
iv. any other relevant circumstances.

The cause of the accident or incident should be investigated by the waste-management officer (in case of waste) or other responsible officer, who should also take action to prevent recurrence. The records of the investigation and subsequent remedial measures should be kept.

Box 28.13: Content of Accident Report
Remedial steps must be considered for implementing in the health care facility following the accident/incident (Box 28.14).

<table>
<thead>
<tr>
<th>a. Elimination of hazard – e.g Avoid unnecessary injections</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Substitution – e.g Jet injectors may substitute syringes and needles</td>
</tr>
<tr>
<td>c. Engineering Controls – Puncture-resistant containers to isolate sharps</td>
</tr>
<tr>
<td>d. Administrative Controls – e.g training</td>
</tr>
<tr>
<td>e. Work Practice Controls – e.g no recapping of needles</td>
</tr>
<tr>
<td>f. Personal Protective Equipment (PPE) e.g gloves etc</td>
</tr>
</tbody>
</table>

Box 28.14: Suggestive remedial steps following an accident/incident.

**FORM-I**

[See rule 4(o), 5(i) and 15(2)]*

**ACCIDENT REPORTING**

1. Date and time of accident:
2. Type of Accident:
3. Sequence of events leading to accident:
4. Has the Authority been informed immediately:
5. The type of waste involved in accident:
6. Assessment of the effects of the accidents on human health and the environment:
7. Emergency measures taken:
8. Steps taken to alleviate the effects of accidents:
9. Steps taken to prevent the recurrence of such as accident:
10. Does you facility has an Emergency Control policy? If yes, give details.

Date : .........................  Signature : .....................................
Place : .....................  Designation : .................................

*Responsibility of Occupier 4 (o): Report major accidents including accidents caused by fire hazards, blasts during handling of bio-medical waste and the remedial action taken and the records relevant thereto, (including nil report) in Form I to the prescribed authority and also along with the annual report;
**28.5 HIERARCHY OF CONTROLS**

Methods to control occupational hazards have traditionally been discussed in terms of hierarchy and presented in order of priority for their effectiveness in preventing exposure to the hazard or preventing injury resulting from exposure to the hazard. The methods in decreasing order of effectiveness is explained in **Box 28.15**.

- **a.** Elimination of hazard — e.g. Avoid unnecessary injections.
- **b.** Substitution — e.g. Jet injectors may substitute syringes and needles.
- **c.** Engineering Controls — Puncture-resistant containers to isolate sharps.
- **d.** Administrative Controls — e.g. training.
- **e.** Work Practice Controls — e.g. no recapping of needles.
- **f.** Personal Protective Equipment (PPE) e.g. gloves etc.

**Box 28.15 : Preventing Occupational hazards**

You will learn more about these methods if you have opted for the optional course BHME-102 on worker safety and patient safety.

### Check Your Progress 4

1. Try unjumbling the words related to hierarchy of controls.

   *NIBNIMATIOLA*
   *SIUQNUSBTIT*
   *GIGniejnen*
   *TIRDAENAVSITAM*
   *WOKR-TACRECPI*
   *LAREPNOS-TEETRPICOVO*

**28.6 MINIMUM APPROACHES TO HEALTH AND SAFETY PRACTICES**

The minimum approach to health and safety practices for health care personnel and waste workers are enumerated in **Fig. 28.16**.
1. Desirable improvements to the minimum approach
Desirable improvements or additions to the minimum approach to health and safety practices are given in Fig. 28.17.

28.7 LET US SUM UP
Exposures and injuries are preventable. Most of the health care waste is not hazardous. However, segregation of the waste is essential so that risks and non-risks wastes are separated and the small proportion of risk waste can be handled safely. Standard safe working precautions are the principle management approach to protect patients and workers from health care-associated infections. The waste generation and segregation activities in medical areas have a significant impact on workers involved in waste handling and treatment. Training of medical staff and other users of sharps should include explaining the impact of incorrect waste practices on cleaners and waste handlers. The intention is to emphasise their responsibility to segregate waste properly, to protect not only themselves and their patients, but also other workers and the community as a whole. Preventive measures to protect staff performing injections will also protect waste handlers. Placing used sharps in puncture-proof containers is a major part of eliminating needlestick injuries. Safer needle devices, such as retractables or needles that blunt or automatically reshape after use, offer added protection but also added cost. Adequate measures need to be taken to protect health care workers from exposure, injury and occupational disease. Provide all three doses of
hepatitis B immunisation to health care and waste workers. Identify a responsible person for occupational health. Allocate sufficient budget to the programme and procure the necessary personal protective equipment. Provide training to health care workers and involve them in the identification and control of hazards. Promote knowledge of the transmission of HIV, hepatitis and tuberculosis through orientation or pre-screening for HIV and tuberculosis, and vaccinate against hepatitis B. Prevent exposure to bloodborne pathogens by applying the hierarchy of controls (see Annex 4 of Joint ILO/WHO guidelines on health services and HIV/AIDS; ILO & WHO, 2005). Maintain a continuous effort to prevent needle-stick injuries and occupational exposures to blood. This could include eliminating unnecessary injections and sharps use, and applying standard precautions (e.g. prohibiting the recapping of needles and ensuring safe disposal immediately after use). Provide free access to post-exposure prophylaxis for HIV and tuberculosis following an injury. Promote a “no blame” approach to incident reporting and monitor the quality of services provided. **Fig. 28.18** presents the summary of this unit.

**OCCUPATIONAL SAFETY FOR HEALTH CARE WORKERS**

- Concept of occupational safety
  - Standardized set of management rules and operating procedures for HCW
  - Adequate training of HCW
  - Involving waste workers in the hazards and strategies for its prevention and control

- Types of Risks to healthcare worker
  - Sharps injuries and exposure
  - Biological hazards
  - Chemicals disinfectants
  - Sterilants
  - Heavy lifting Handling heavy loads over long periods
  - Ionizing radiation

- Preventing the risks
  - Immunisation of the health care workers (Hepatitis B, Tetanus)
  - Identification and Management of Health Care Waste (minimisation, collection, segregation, pretreatment, collection, storage, transport, treatment, disposal)
  - Personal hygiene (hand washing)
  - Personal protective equipment (Heavy duty boot, boots/shoe cover, apron, gown, cap, mask, protective eyewear, gloves)
  - Dealing with spillages (infectious and chemical)
  - Injury management
  - Occupational post exposure prophylaxis
  - Employee health check up
  - Training of healthcare workers
  - Reporting accidents and incidents

- Hierarchy of controls
  - Elimination of hazard
  - Substitution
  - Engineering controls
  - Administrative controls
  - Work practice controls
  - Personal Protective Equipment

- Minimum approaches to health and safety practices
  - Implementation of standard standardised management procedure
  - Hepatitis B vaccination for all personnel at risk
  - Provision of shaft boxes where injections take place
  - Implementation of standard precautions
  - Promotion of proper hand hygiene
  - Availability of gloves
  - Allocation of additional role in promoting better safety

**Fig. 28.18: Mind Map**
28.8 GLOSSARY

Biological : That caused by some living organism

Contamination : Containing micro organisms which can cause disease.

Comprehensive health check up : Examination and investigations to detect most of the problems that the person could be suffering from.

Occupational health and safety : The safety health and welfare of people at work.

Surveillance : To keep a close watch.

28.9 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

1. Immunisation, personal protective equipment, health check-up, accident reporting

2. a. A standardised set of management rules and operating procedures for health care waste

   b. Waste workers are adequately trained so that they perform their duties properly and safely

   c. Waste workers should be involved in the identification of hazards and strategies for it’s prevention and control.

Check Your Progress 2

1. The PPE includes gloves, face mask, cop, gown, apron, shoe covers, or heavy duty gloves


Check Your Progress 3

Hepatitis, splashes, abrasions, injury, prophylaxis, counselling, immunisation, risk, communication, barrier.

Check Your Progress 4

Elimination, substitution, engineering, administrative, work practice, personal protective.

28.10 REFERENCES AND FURTHER READINGS


3. HSE (Health and Safety Executive) (2005). Controlling the risks of
infection at work from human remains – a guide for those involved in funeral services (including embalmers) and those involved in exhumation. Suffolk, Health and Safety Executive (http://www.hse.gov.uk/pubns/web01.pdf).


10. UNDP presentations.