HOSPITAL INFECTION CONTROL MANUAL

HOSPITAL INFECTION CONTROL COMMITTEE (HICC)

GANDHI HOSPITAL, SECUNDERABAD

HOSPITAL INFECTION CONTROL MANUAL 2022

GANDHI MEDICAL COLLEGE

&

HOSPITAL

First Version: 2022

Hospital Infection Control Manual

Cover Design: Dr.R.K. Akhil Kumar

Logo Design: Dr. Abhinav Mishra

Publishing Consultancy

Typeset by

Printed by

Compiled & Edited by

Dr. C.Narender Kumar, Professor & HOD, Department of Hospital Administration

Dr. G.J.Archana, Assistant Professor, Department of Microbiology

Dr. Sindhu Jonnala, Senior Resident, Department of Hospital Administration

Dr. Mohamed Jasir KK, Junior Resident, Department of Hospital Administration

Dr. R. K Akhil Kumar, Junior Resident, Department of Hospital Administration

Dr. Abhinav Mishra, Junior Resident, Department of Hospital Administration

Validated by

Dr.Rajeshwar Rao Professor & HOD, Department of Microbiology

Dr.Nagamani Professor, Department of Microbiology

Dr.K.T.Reddy Associate Professor., Department of Hospital Administration

Approved by

Dr.Raja Rao, Medical Superintendent, Gandhi Hospital, Secunderabad

C O N T R I B U T O R S

Dr. Rajeshwar Rao
Prof & HOD, Department of Microbiology

Dr. Nagamani
Prof Department of Microbiology

Dr.G.J.Archana
Assist. Prof Department of Microbiology

Dr.M.Jayakrishna
CSA - RMO 1, Gandhi Hospital

Dr .I.S.S.V. Prasad Murthy
Prof & HOD, Department of General Medicine

Dr. N.L Eshwar Prasad
Prof & HOD, Department of General Surgery

Dr. S. Sangeetha
Prof & HOD, Department of Obstetrics and Gynecology

Dr. N. Ravinder Kumar
Prof & HOD, Department of Orthopedics

Dr. J.N George
Prof & HOD, Department of Pediatrics

Dr. H.L. Baby Rani
Prof & HOD, Department of Anaesthesia

Dr. G. Narsimha Rao Netha
Prof & HOD, Department of Dermatology

Dr. A. Shobhan Babu
Prof & HOD, Department of ENT

Dr. K. Ravi Shekar Rao
Prof & HOD, Department of Ophthalmology

Dr. M. Uma Shankar
Prof & HOD, Department of Psychiatry

Dr. M.G. Krishna Murthy
Prof & HOD, Department of Pulmonary Medicine

Dr. P. Sree Hari
Prof & HOD, Department of Radiology

Dr. Y. Manjusha
Prof & HOD, Department of Nephrology

Dr. Nitin Kabra Kumar
Prof & HOD, Department of Cardiology

Dr. Vijay Shekhar Reddy
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Dr. R. Ramesh
Prof & HOD, Department of Neurology

Dr. P. Shravan Kumar
Prof & HOD, Department of Gastroenterology

Dr. G. Ravi Chander
Prof & HOD, Department of Urology

Dr. K. Srinivas
Prof & HOD, Department of Neurosurgery

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Prof & HOD, Department of Pediatric Surgery

Dr. G. Ravindra
Prof & HOD, Department of CT surgery

Dr. Sanjeev (I/C)
Prof & HOD, Department of Dental Surgery

Dr.M. Devoji
Prof & HOD, Department of Pathology

Dr. Koteshwaramma
Prof & HOD, Department of SPM

Dr. T. Kripal Singh
Prof & HOD, Department of Forensic Medicine

Dr. Rama Shouri
Prof & HOD, Department of Biochemistry

Dr.L.Vinodini
Prof & HOD, Department of Anatomy

Dr. G. Bhuvaneshwari
Prof & HOD, Department of Pharmacology

Dr. G.S Prema
Prof & HOD, Department of Physiology

Dr.K.Malavika
Assistant Professor, Hospital Administration

Dr.Smitha Devi Boga
Junior Resident, Hospital Administration

Dr.Jangam Manisha
Junior Resident, Hospital Administration

Smt.B.Mangamma
Nursing Superintendent

MESSAGE BY HON'BLE HEALTH MINISTER

T. HARISH RAO
Minister for Finance,
Health, Medical & Family Welfare,
Government of Telangana,
Hyderabad.

Aranya Bhavan, 6th Floor,
Saifabad, Hyderabad.
Off: 040 - 23450872 (O)
040 - 23453220 (F)
Mobile No. : 9440471409
E-mail:harishrao1116@gmail.com

MESSAGE

We all know that the Healthcare-associated infections (HAI) are infections that are acquired in healthcare facilities or as a result of healthcare interventions and lapses in infection prevention, which are prevalent, perennial and preventable. This document lays down the policies and broad guidelines required for the practice of a nationally acceptable standard of infection prevention and control in hospitals. The Ministry of Health and Family Welfare (MOHFW), Telangana State is committed to create and sustain an environment that is safe and ensures that no patient is harmed due to an avoidable healthcare associated infection (HAI).

I am delighted that, the Manual for Infection prevention and control has been developed by Gandhi Medical College and Gandhi Hospital considering all inputs from all relevant national standards in the light of Quality Improvement Strategic Plan. I believe this will be an effective and useful document for the planners, health administrators and health managers including health care providers at different levels of health service system.

I appreciate the Principal, Gandhi Medical college, Superintendent, Gandhi Hospital and others concerned faculty members who were involved in the development process. I also hope this manual will be appropriately executed to reduce the hospital acquired infections in health care settings. I hope that by acquiring knowledge from this document, health professionals will play their respective roles in infection prevention and control in Telangana State.

(T. HARISH RAO)

MESSAGE BY SECRETARY, HM & FW, TELANGANA

Hospital acquired infections (HAIs) are a major burden for patients, society and health care management, which are preventable. The emergence of the life-threatening infections such as severe acute respiratory infections like Covid -19 and re-emerging infectious diseases have highlighted the need for efficient infection control programs in all hospitals, and capacity building for health care workers so they can implement them. Gandhi Medical College and Gandhi Hospital, Secunderabad have taken up a timely initiative in bringing out a Hospital Infection Control Manual which will be very useful when implemented appropriately.

An infection control program is considered efficient when it restricts the spread of infection among patient and staff in the hospital and reduces the cost to hospital. Good infection control program also considerably reduces patient morbidity and mortality, length of hospital stay and cost associated with hospital stay. This can be achieved by the prevention and management of infections through the application of research based knowledge to practices. I congratulate the Principal Gandhi Medical College, Superintendent of Gandhi Hospital and all other faculty who are involved in bringing out this Hospital Infection Control Manual.

S.A.M. Rizvi, IAS
Secretary
HM & FW Department
Government of Telangana

MESSAGE BY DIRECTOR OF MEDICAL EDUCATION

The Mission of Gandhi Hospital, is to provide quality Medical Care with Infection Prevention and Control initiative. A key strategy for doing so involves the assessment, planning, implementation, and evaluation of national infection control policies from a public health perspective, the development of a cross-cutting coordinated strategy for infection control in Hospital is of utmost importance to harmonize and strengthen infection prevention and control and preparedness and response to outbreaks. This is one of the core capacities of Physicians, Surgeons and other hospital staff for implementation of WHO guidelines.

Gandhi Hospital and Gandhi Medical College have made an extraordinary effort to implement the National guidelines for infection prevention and control, through this manual. Safe patient care, including infection prevention, is a priority in all hospitals. Patient safety requires teamwork, collaboration, communication, and measurement, as well as techniques and training and research such as re-engineering processes in hospital setting. I congratulate, Dr.M. Raja Rao, Medical Superintendent and his team for the publication of this Manual, and express my satisfaction at having contributed to the collaboration between the relevant inter-departmental specialists and experts. Anticipate that the Manual will achieve its ultimate goal: to promote high quality health care which is safe for patients, health care workers, and others in the health care setting and the environment, in a cost-effective manner.

Dr.K.Ramesh Reddy,
Principal,
Gandhi Medical College
DME, Telangana State

FOREWORD

It is my privilege to write this foreword for the first version of Manual on Hospital Infection control prepared by Department of Hospital Administration and Department of Microbiology.

Proper implementation and practice of policies and procedures on infection control by healthcare providers is a highly effective strategy in reducing Hospital Acquired Infections (HAI), which are cost effective not only for public sector hospitals but also for other health care organizations. The infection control policies and procedures, when consistently applied and integrated in a heath care setting significantly reduces infection rates thus reducing the mortality and morbidity due to (HAIs).

Practicing good infection control measures by health care personnel is the need of the hour to relieve this burden and limit the spread of infections in the situations, with the emergence of various infectious diseases, including zoonotic infectious diseases.

Misuse and abuse of antibiotics is causing multidrug resistance superbugs and unnecessary financial burden on the society. 'Antibiotic Stewardship' is the need of the hour for any Hospital. In this regard, I am happy that we are making our own antibiogram for our hospital and ensuring Antibiotic policy is in place at all times.

My sincere thanks to the Department of Hospital Administration and Department of Microbiology, Civil Surgeon Administrator-RMO-1 and Resident Medical Officers, Heads of all the Departments, Nursing Staff and other staff members who are instrumental in bringing this Hospital Infection Control Manual. My heart full thanks to our Honorable Health Minister Sri. T. Harish Rao Garu, Secretary Health & Family Welfare-T.S. Sri Syed Ali Murtaza Rizvi and Director of Medical Education Dr. K. Ramesh Reddy for their support from the inception to completion of the Hospital Infection Control Manual.

Dr.M.Raja Rao,
Medical Superintendent
Gandhi Hospital

CONTENTS

LIST OF FIGURES

LIST OF CHARTS

LIST OF TABLES

ANNEXURES

CHAPTER 1

Organization of Hospital Infection Control Programme in Gandhi Hospital

Introduction

Hospital acquired infection is a health hazard. It is important to minimize the risk of spread of infection to patients and staff in hospital. Good infection control programs reduce patients' morbidity and mortality, length of hospital stay and cost associated with hospital stay. An infection control policy has been adopted by Gandhi hospital.

This policy describes the precautions and control measures that are essential for the prevention and management of infection through the application of research-based knowledge to practices which include: standard precautions, sterilization and disinfection, waste management, surveillance and audit.

The following hospital infection control policies have been formulated and are being practiced and monitored by the hospital infection control team (HICT) and hospital infection control committee (HICC).

1. Hospital guidelines for prevention & control of infections
2. Antimicrobial policy
3. Surveillance policy
4. Disinfection policy
5. Isolation policy
6. Policy for investigation of an outbreak of infection

The overall aim of this document is to provide evidence-based information in the prevention and control of infection. To fulfill this, aim a hospital infection control committee has been formed that will look after the infection control needs of the hospital. It is relevant to all staff including doctors, nurses, other clinical professionals and managers working in the hospital to help to fulfill their professional obligations with regard to both communicable disease and infection control.

This document will be reviewed and updated by the HICC every two years.

Purpose

1. To maintain standards in infection control measures and minimize hospital acquired infections in patients and staff.
2. To define policy and procedure regarding nosocomial infections at Gandhi Hospital, Telangana

The HICC consists of the following members:

● Medical Superintendent	Chairperson
● HOD Department of Microbiology	Member Secretary
● Deputy Medical Superintendent	Member
● CSA RMO-1	Member
● All head of Departments	Member
● Infection control officer (Senior Microbiologist)	Member
● Nodal officer - Hospital Waste Management	Member
● Nursing In charge of all patient care units	Member
● TSMSIDC In charge	Member
● Infection Control Nurses	Member

All staff plays an important part in the control of healthcare-associated infections. Staff should follow the procedures and precautions in all of the HIC policies at all times to ensure safe practice for themselves and the patient. Good clinical practice can substantially reduce hospital acquired infections. Senior staff has managerial responsibility to ensure that all of their staff follow good infection control practices and comply fully with HIC policies.

Roles and Responsibilities of HICC

a. Developing and preparing various infection control policies and protocols.

b. Promote, implement and monitor optimum infection control practice at all levels of the health facilities.

c. To review and approve an annual program for surveillance and prevention of HAI.

d. To review epidemiological surveillance data and identify the areas for interventions.

e. To ensure appropriate staff training in infection control and prevention.

f. Developing an effective and practical Antimicrobial Stewardship Program (AMSP) for the hospital.

g. To review risks associated with new technologies and monitor infectious risks of new devices and products.

h. To provide expert advice, analysis and leadership in outbreak investigation and Control in community.

i. Research for Infection Control (IC).

j. To communicate and cooperate with other committees of the hospital with common interest such as Biomedical Waste Management Committee, Hospital Blood Transfusion Committee, Antibiotic Policy Committee.

Roles and Responsibilities of Member-Secretary, HICC

a. Making an Antimicrobial stewardship program (AMSP) for the institute. Proposing an AMSP team to the Chairperson of HICC.
b. Conducting regular meetings of HICC. Preparing minutes of the meeting and disseminating the same to all the stakeholders of healthcare facility.
c. Conducting emergency meetings in case of outbreak or any other emergency
d. Providing action plans in case of any outbreak or any other alert situation like isolation of MDRO from any patient of the hospital.
e. Procuring relevant data from various healthcare units (wards) and laboratories of the hospital for surveillance of HAIs, outbreak investigation and making policies/ recommendations for AMSP.
f. Coordinating the organization of various trainings and workshops for different cadres of HCWs on various aspects of Infection prevention and control.
g. Co-coordinating between hospital administration, Chairperson, other members of HICC and ICT (Infection Control Team). Developing recommendations of various Infection control policies with other members of HICC and ICT.

INFECTION CONTROL TEAM AT GANDHI HOSPITAL

Under the umbrella of HICC, there is an **Infection Control Team (ICT)** which is responsible for day-to-day activities of infection control practices.

Members of The Hospital Infection Control Team (ICT) of Gandhi hospital, Secunderabad

1. Infection Control Officer (ICO)
2. Epidemiologist (Senior faculty from Community Medicine department)
3. Infection Control Nursing Officer-2 Members
4. Junior Resident, Department of Hospital Administration – 2 Members
5. Junior Resident, Department of Microbiology - 2 Members
6. Infection Control Nurses - 6
7. RMO

Roles and Responsibilities of Infection Control Team (ICT)

1. Coordination and implementation of all infection control and prevention activities. The team is responsible for day-to-day functioning of infection control program.
2. Prepare standard operational procedures for various Infection Control practices.
3. Monitor/Audit the standard precautions as practiced by all cadres of HCWs.
4. Conduct active surveillance for the most common HAIs.
5. Periodical training of all categories of healthcare workers about Infection Control Protocols and Policies.
6. Monitor the ongoing methods of sterilization and disinfection.

7. Introduce new policies and protocols on the method of disinfection and sterilization.
8. Monitor the quality of in-use and newly purchased disinfectants.
9. Regular monitoring of engineering department and water supply.
10. On-site activities for investigation of an outbreak as recommended by Outbreak Control Team (OCT).
11. Implementation of AMSP and supervising the use of antimicrobials and ensuring its rational use, thereby reducing emergence of further antimicrobial resistance.

Roles and Responsibilities of Infection Control Officer (ICO)

1. To supervise the surveillance of healthcare associated infections.

2.To supervise the various infection control programs.

3. To Co-ordinate with the HICC in planning Infection Control Programme and Policies.

4. To Develop SOPs for various Infection Control Practices.

5. To Compile and disseminate data on monitoring of various infection control practices like hand hygiene audit, in-use disinfection testing, environmental microbial surveillance etc. to the stake holders.

6. To Compile and present the data of HAIs, hand hygiene audit, disinfection testing, occupational exposure events, environmental testing etc. in the HICC Meetings.

7. To keep a track of any developing outbreaks. Plan and participate in appropriate management of an outbreak.

8. To participate, guide in research activities related to infection control practices and publish them.

9. Advise on the appropriate use of antibiotics.

10. To implement appropriate action in case of isolation of a MDRO/ Pan drug resistant bacteria in the laboratory. This information may be received regularly from the hospital bacteriology laboratory or from the clinician.

11. To ensure safe laboratory practices to prevent laboratory acquired infections among staff.

12. To compile and provides summary reports of prevalence of resistance, bacteria-wise, syndrome-wise and/or unit-wise.

13. Monitoring sterilization, disinfection and the environment where necessary.

Responsibility of Infection Control Nurse (ICN)

The ICN is the link between the HICC and the wards/ICUs etc. in identifying problems and implementing solutions.

1. To conduct daily Infection control rounds and records observations and maintain records and statistics regarding IC activities.

2. Active surveillance for four common HAIs namely, CLABSI (Central Line Associated Blood Stream Infection), CAUTI (Catheter Associated Urinary Tract Infection), VAP (Ventilator Associated Pneumonia) and SSI (Surgical Site Infection).

3. To ensure that all relevant positive culture cases are traced from inpatient unit, if it complies with the definition of a HAI, a hospital infection surveillance sheet or surgical site infection sheet is to be filled and recorded.

4. To work as a clinical supervisor by ensuring all the established policies and protocols are practiced like hand washing procedures, use of hand rubs, isolation policies, care of IV and vascular access, urinary catheters, universal precautions, housekeeping, cleaning and disinfection, PPE, equipment cleaning, etc.

5. To perform on-site auditing of various Infection control practices especially, universal precautions like hand hygiene, use of PPE etc.

6. To liaison between laboratory and ward staff: Informing head of department and giving advice on infection control issues.

7. To take immediate action in Needle Stick Injuries (NSIs) and other occupational exposures and facilitate post-exposure measures and to maintain data of Sharps/NSIs and Post–exposure prophylaxis.

8. Notification of communicable diseases and other notifiable disease to the ICO.

9. To inform anomalous/irrational use of antibiotics to ICO that must be discussed in HICC meetings.

10. The ICN is involved in education of practices minimizing healthcare associated Infections and in promoting hand hygiene among healthcare workers.

11. Monitoring engineering activities like maintenance of water filters/RO plants registers and cleaning register of water tanks etc.

12. To Conduct special tasks given as per components and objectives of the hospital infection prevention and control.

Protocols for Infection Control Practices at Gandhi Hospital

Following protocols have been prepared by HICC, Gandhi Hospital and are recommended for strict compliance

S. No.	Name of the Protocol
1	Decontamination Of Hospital Environment
2	Cleaning, Disinfection And Sterilization Of Patient Care Items
3	Hand Hygiene
4	Personal Protective Equipment (PPE)
5	Isolation And Barrier Nursing (Old)/ Infection Control Precautions (New)
6	Organization Of Infection Control Program Gandhi Hospital
7	Surveillance Of Various HAI
8	Central Sterile Supply Department (CSSD) Workflow And Protocol
9	Spillage Management
10	Laundry And Linen Management
11	Occupational Exposure And Its Management
12	Prevention Of Surgical Site Infections
13	Immunization Of Healthcare Workers
14	Environmental Surveillance Protocol
15	Outbreak Policy
16	Prevention Of Device Associated Infections
17	MDRO Surveillance And Prevention
18	Prevention Of Sharp Injuries In HCW
19	Post-Exposure Prophylaxis

Table 1.1 Hospital Protocols for infection Control

HOSPITAL GUIDELINES FOR PREVENTION AND CONTROL OF INFECTIONS

Standard Precautions	Followed in all health care areas
Hand Hygiene Guidelines	Strictly observed to be and monitored
Safe Injection Practices	There is a model Infection Centre in Gandhi Hospital as a patient safety initiative.
Minimize Invasive Procedures	Invasive procedures are done when essential.
Patient Isolation Policy	Isolation policy in place at Gandhi Hospital
Disinfection And Sterilization Policy	Practiced and monitored regularly.
Antimicrobial Policy	Chapter 11
Safe Environment (Including Water, Air, Temperature & Housekeeping) Monitoring	Ensured to the best possible extent under the limited resources.
Maintenance & Cleanliness / Infrastructure	Housekeeping guidelines followed by the designated staff
Biomedical Waste Management (BMWM) Guidelines	Practiced as per government regulations, and waste audit done at monthly intervals.
Training And Education Of HCW On HIC Practices, Including BMWM & PEP For HIV &HBV	Conducted by the department of BMWM on monthly basis, every Pre and post evaluation tests conducted in the training program.
Occupational Safety Guidelines	Deputy MS is the Designated Safety Officer. Hepatitis B and H1N1 immunization is being done for all at risk, as and when required. Post exposure prophylaxis (PEP) for HIV/HBV in place.
Outbreak Investigation Policy	All outbreaks are investigated, analyzed and reported to the Chairperson, and appropriate measures are taken to control the outbreaks.
Audits Of Infection Control	Done regularly by the HIC team

Table 1.2 Hospital Guidelines for prevention and control of Infection

CHAPTER 2

Surveillance And Reporting of Infection

Surveillance is a data driven process including collection, analysis, timely dissemination, implementation, and evaluation of right data, in the right format, in right hands, at right time, at right place.

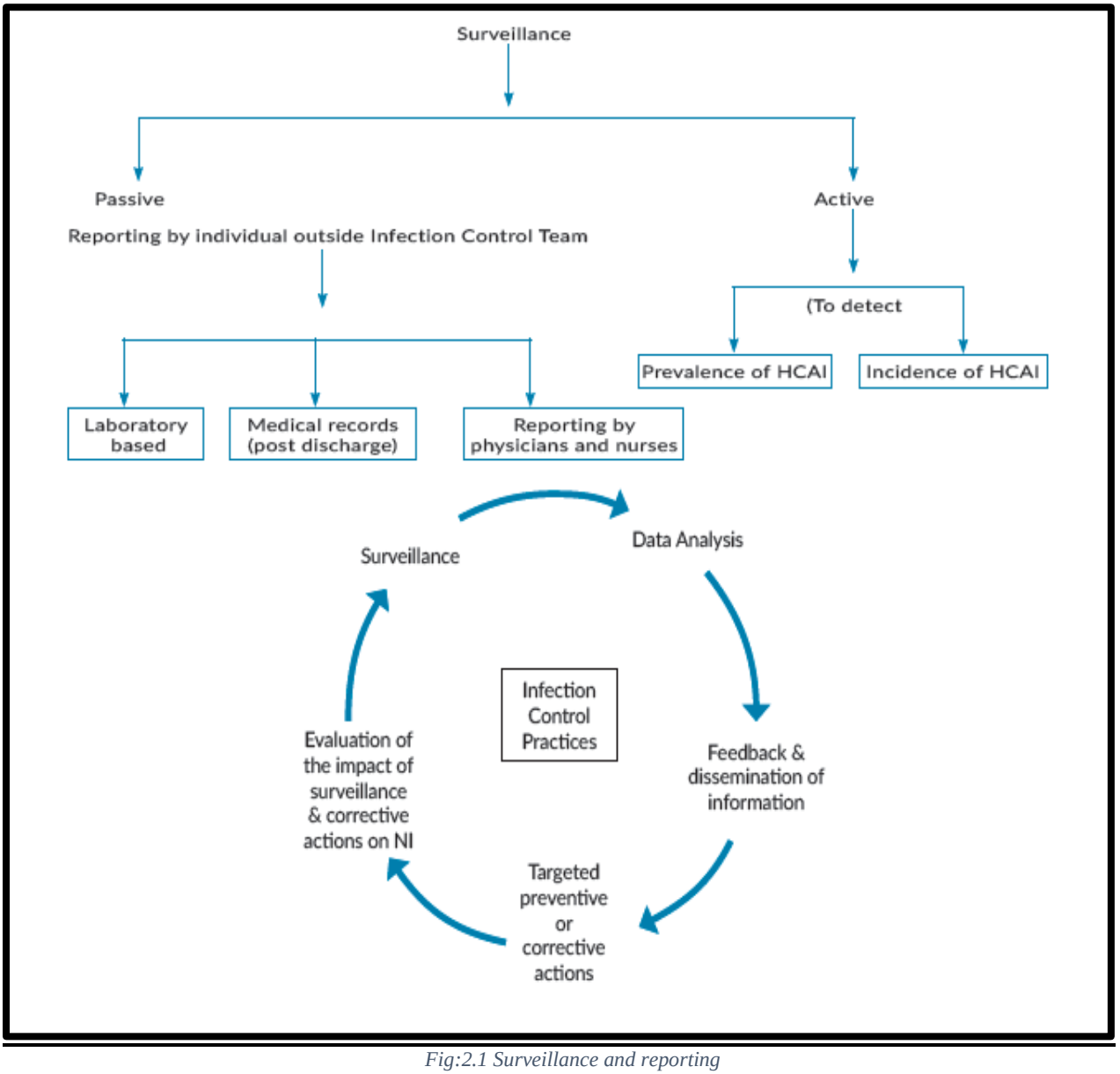

Fig:2.1 Surveillance and reporting

Statutory Notifications:

All notified by Hospital Infection Control Team are to report to the MS, Gandhi Hospital.
Prompt notification and reporting of disease is essential.

HCAI (HealthCare Associated Infection) INDICES

1. CLABSI (Central Line Associated Blood Stream Infection) rates
2. CAUTI (Catheter Associated Urinary Tract Infection) rates
3. MDROs (Multidrug Resistant Organisms)
4. SSI (Surgical Site Infection) rates
5. VAP (Ventilator Associated Pneumonia) rates
6. Hand Wash Compliance or Hand Hygiene Compliance
7. DUR (Device Utilization Ratio)

SURROGATE INDICES OF HCAI

1. IV extravasations/ thrombophlebitis
2. NSI (Needle Stick Injuries)/Sharp injuries
3. DAPU (Device Associated Pressure Ulcers)
4. HAPU (Hospital Acquired Pressure Ulcers)

In surveillance, it is best to combine the data from the laboratories and wards to have comprehensive and authentic information. This method is known as the **Lab Based Ward Surveillance (LBWS)**. Out breaks and cross transmissions can be detected early by this method.

Objectives of surveillance

1) Establishing endemic baseline rates
2) Evaluating and monitoring infection control measures
3) Monitoring antimicrobial susceptibility patterns
4) Identifying and containing outbreaks
5) Reducing infection rates in the hospital

Any patient suffering from a notifiable/reportable disease when detected shall be communicated to the designated authority immediately

CALCULATION OF HAI RATES

The standard CDC/ NSHN definition of HAIs is followed. The incidence of CAUTI, CLABSI and VAP are calculated for 1000 device days and the prevalence of SSI is calculated for 100 surgeries done. The formulae for calculation are given below.

HAI Infection Rates	Formula
VAP Rate	No. of VAP cases/ Total no. of ventilator days X 1000
CLABSI Rate	No. of CLABSI cases/ Total no. of central line days X 1000
CAUTI Rate	No. of CAUTI cases/ Total no. of catheter days X 1000
SSI Rate	No. of SSI/ No. of surgeries done X 100
DUR (Device Utilization Ratio)	No. of device (Foley's catheter/ central line/ ventilator) days /No. of patient days

Table 2.1 Healthcare Associated Infection Rate- Calculation

Active Surveillance of Healthcare Associated Infections (HCAI):

Active surveillance is recommended for high-risk Areas. The microbiology department shall be responsible for reporting any information about infections suspected to be hospital acquired on prescribed format to Infection Control Nurse (ICN). The ICN in consultation with ICO may proceed for investigation of HCAI. Following areas shall be chosen for the active surveillance:

- Intensive care units (NICU, PICU, ICUs – CTVS, CCU, Burns, Trauma, Respiratory, H1N1)
- Operation Rooms / Post-op wards
- Transplant units
- Dialysis Unit
- Burns Unit
- Chemotherapy wards
- Transfusion services unit
- Food handlers
- Drinking water
- CSSD

Operation Theatres:

Both surface contamination and air quality shall be investigated periodically. Settle plates and air sampling plates are to be sent from Operation Rooms (OR) periodically at least once in a month. Fogging of ORs to be done on the basis of these reports and/or clinical procedures carried out in the operating areas. No routine fogging is recommended. Any civil or engineering works should invite fogging of ORs.

Parameter	**Compliance**
a. Settle plates	Once in a month
b. Air Sampling	Once in a month
c. Disinfectant Monitoring	Once in a month

Table 2.2: Active Surveillance of Operation Theaters

Schedule may be changed to increased frequency in case of suspected increase in infection rate from ORs.

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***Sampling of in-use disinfectants*:** 1ml of sample of in-use disinfectants, hand wash agents should be sent to microbiology laboratory in a sterile container once a month preferably when other sampling (Air and surface) is being carried out.

Records are to be kept with nursing in charge OR and the results produced in HICC meetings. In case of unacceptable results, decisions on corrective measures are to be taken by HICC.

Intensive Care Units:

Monitoring of device associated infections needs to be done on regular basis. The basic indicators required ventilator associated pneumonia (VAP), catheter linked blood stream infections (CLBSI) and catheter associated urinary tract infections (CAUTI). VAP, CLBSI and CAUTI episodes should be monitored

Regular active surveillance is recommended through the emergence /clustering of positive cultures cases or similar clinical case clustering.

In case of surveillance following surveillance, specimens must be collected:

Surveillance Samples:

- Clinical Material
- Central line tips with blood culture
- ET tube secretions for microscopy and culture o Urine samples from catheterized patients
- Environmental Sampling
- Water samples from humidifiers
- Sampling of drugs prepared for patients on Ventilators
- Walls
- Floors
- Suction tubing
- Disinfectants on dressing trolleys & Others

Surveillance clinical samples are sent to microbiology lab on basis of clinical data or microbiological reports. Analysis of the data is presented at the subsequent HICC meeting. Records are maintained by ICO. At our hospital the surveillance is carried out once in every two weeks for each area mentioned above (clinical and environmental sampling). The data is presented in HICC meetings.

Transfusion Services Unit:

Environmental sampling shall be done once in a week. Blood component bags – FFP and platelets shall be screened for contamination, as and when required. The record will be maintained by blood bank officer and chairman/Secretary HICC and presented in HICC meetings.

Wards:

No active surveillance is required for routine non-ICU patient care units. Active surveillance is recommended whenever clustering of positive cultures from cases are seen in the laboratory. Sampling should be done in consultation with ICN under guidance of microbiologist.

Food Handlers:

Screening of food handlers is recommended every four months. Samples include stool samples for ova, cyst and cultures for typhoid carriers. Records to be maintained by the dietician and ICN

Drinking Water:

Bacteriological surveillance is to be done monthly. Potable water testing is routinely carried out once every month for bacterial cultures in laboratory from all patient care units, hospital kitchen, canteens and hostels.

Centralized Sterilized Supplies Department:

Air and surface sterility shall be monitored from sterile zone. Bowie Dick test and use of biological indicators for steam sterilization is to be carried out. Disinfectant screening should also be done. Records are to be kept by CSSD.

Passive Surveillance Of Healthcare Associated Infections (HCAI):

Reporting of hospital acquired infections

Passive Clinical Reporting:
It shall be mandatory for clinicians to fill the prescribed form for every admitted patient and the form may be sent to Infection Control Nurse (ICN).

Passive Microbiological Reporting:
In an event of clustering of cases passive surveillance shall be initiated. Respective clinicians would be informed about the suspected clustering and surveillance specimens are collected. The report thus generated from the study would be sent to the concerned physicians and surgeons.

Hand Hygiene:

- Training and compliance need to be monitored.
- Availability of hand rubs, Soaps hand towels and water should be ensured.
- Foot operated and wall mounted dispensing stations are required.
- Hand hygiene training program for doctors, nursing staff, students and housekeeping staff should be done regularly once a month for each category of staff.

Multidisciplinary Continuing Education Programme:

Continuous education program shall be conducted on regular basis for all categories of staff ensuring each staff attends the program at least once in three months

Data Analysis, Dissemination and Presentation:

The data would be analyzed using Microsoft Excel to generate a monthly report of HAI rate of Gandhi Hospital, Secunderabad. Monthly HAI Surveillance report is used for:

- Comparison between two consecutive months, or
- Between different ICUs for the same month, or
- To observe the trend of HAIs over a specified period of time.
- To compare the HAIs rates of the hospital with that of CDC/NSHN HAI rate (75%percentile)

CHAPTER 3

Hand Hygiene

OBJECTIVE: To promote and practice hand hygiene by all the healthcare providers while providing patient care at various levels.

SCOPE: This document applies to healthcare professionals of all the cadres

WHEN TO PERFORM HAND HYGIENE?

Perform hand hygiene while caring for patients using 'Five Moments Approach' recommended by WHO and as mentioned below:

a) Before touching the patient
b) Before any clean/aseptic procedures
c) After body fluid exposure risk
d) After touching the patient
e) After touching the patient surroundings

The "My 5 Moments for Hand Hygiene" Approach (WHO)

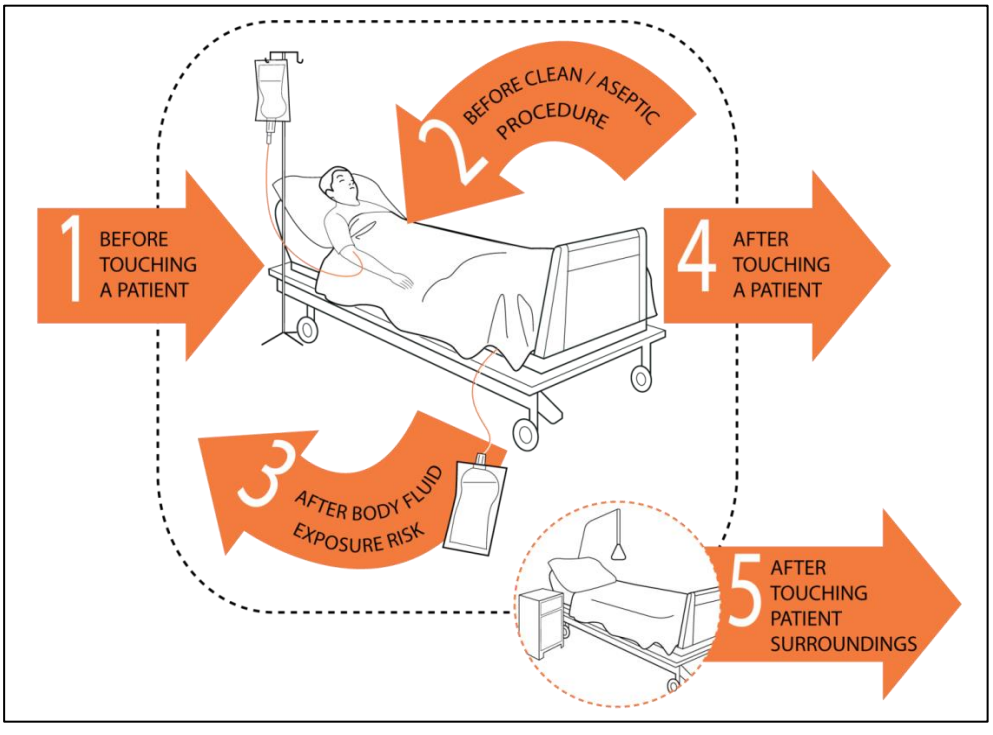


Fig: 3.1 Moments of Hand Hygiene

HOW TO PERFORM HAND HYGIENE?

Hand hygiene may be performed by following methods depending upon the indications:

a. Hand washing with plain/antimicrobial soap
b. Hand rubbing with alcohol-based hand rubs
c. Surgical hand antisepsis

Hand Washing with Soap and Water: Use plain or preferably antimicrobial soap for hand washing.

Perform hand washing during following instances

Indications for Hand Washing ***

- If there is visible contamination of hands with blood or body fluids.
- If there is visible contamination with dirt or organic material.
- If exposure to potential spore-forming pathogens is strongly suspected or proven, including outbreaks of C. difficile.
- After using toilets/washrooms.
- Before and after having meals
- If alcohol-based hand rub is not obtainable.

***Hand rubbing is not recommended during these procedures.

Procedure for Hand Washing

To effectively reduce the growth of germs on hands, hand washing must last 40–60 Seconds. Following precautions should be undertaken while performing hand washing:

- ✓ When washing hands with soap and water, wet hands with water and apply the amount of product necessary to cover all surfaces.
- ✓ Rinse hands with water and dry thoroughly with a single-use towel.
- ✓ Use clean, running water whenever possible. Avoid using hot water, as repeated exposure to hot water may increase the risk of dermatitis.
- ✓ Use a towel to turn off tap/faucet.
- ✓ Dry hands thoroughly using a method that does not re-contaminate hands.
- ✓ Make sure towels are not used multiple times or by multiple people.
- ✓ Liquid, bar, leaf or powdered forms of soap are acceptable.
- ✓ When bar soap is used, small bars of soap in racks that facilitate drainage should be used to allow the bars to dry.

Hand Hygiene Technique with Soap and Water

Duration of the entire procedure: 40-60 seconds

Fig: 3.2 Hand washing with soap and water

Hand Rubbing with Alcohol Based Hand Rubs

Indications for Hand Rubbing

- Before and after touching the patient
- Before handling an invasive device for patient care, regardless of whether or not gloves are used
- After contact with body fluids or excretions, mucous membranes, non-intact skin, or wound dressings
- If moving from a contaminated body site to another body site during care of the same patient
- After contact with inanimate surfaces and objects (including medical equipment) in the immediate vicinity of the patient
- After removing sterile or non-sterile gloves
- Before handling medication or preparing food

Hand Rub Formulations: Recommended by WHO

Hand rubs should be compatible with any of the following requirements:

- Any product containing WHO formulations I or II

✓ Formulation I: Ethanol 80% v/v, glycerol 1.45% v/v, hydrogen peroxide (H_2O_2) 0.125% v/v.
✓ Formulation II: Isopropyl alcohol 75% v/v, glycerol 1.45% v/v, hydrogen peroxide 0.125% v/v

OR

✓ Any commercially available alcohol-based hand rub preparation which meets recognized standards for microbicidal efficacy (ASTM or EN standards – EN 1500)
✓ Hand rub containing Ethyl alcohol 70% + Chlorhexidine gluconate 0.5% w/v should be preferred for hand rubbing in high-risk settings like ICUs or while caring for patients with suspected infections with enveloped viruses or spore bearing pathogens.

The hand rub preparations should be available within reach, preferably closer to the point of care within 3 feet or should be carried by healthcare professional for personal use.

Procedure For Hand Rubbing

✓ To effectively reduce the growth of germs on hands, hand rubbing must be performed by following all the steps illustrated in Fig. 3. **The process takes only 20–30 seconds!**
✓ Apply a palmful of alcohol-based hand rub and cover all surfaces of hand. Rub hands until dry.

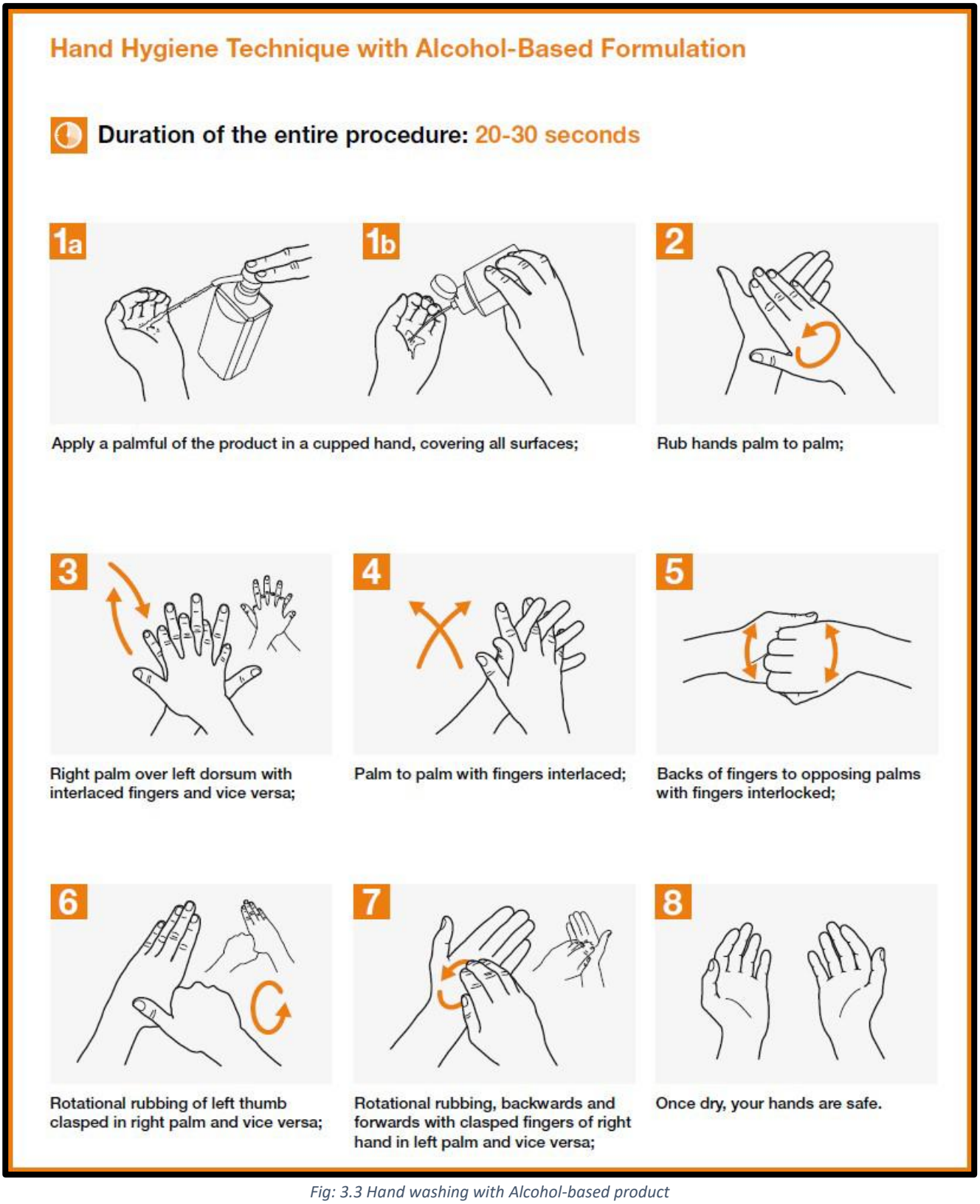


Fig: 3.3 Hand washing with Alcohol-based product

Surgical Hand Preparation

Objectives:

a. To eliminate the transient and to reduce the resident skin flora in contrast to the hygienic handwash or hand rub.
b. To reduce the release of skin bacteria from the hands of the surgical team for the duration of the procedure in case of an unnoticed puncture of the surgical glove.
c. To inhibit growth of bacteria under the gloved hand.

Preparations before Surgical Hand Antisepsis

- ✓ Keep nails short and pay attention to them when washing your hands—most microbes on hands reside beneath the fingernails.
- ✓ Do not wear artificial nails or nail polish.
- ✓ Remove all personal ornaments (rings, wrist-watch, bangles and bracelets) before entering the operation theatre.
- ✓ Wash hands and arms with a non-medicated soap before entering the operating theatre area or if hands are visibly soiled.
- ✓ Remove debris from underneath fingernails using a nail cleaner, preferably under running water.
- ✓ Nail Brushes are not recommended for surgical hand preparation as they may damage the skin and encourage shedding of cells.
- ✓ Sinks should be designed to reduce the risk of splashes.
- ✓ Surgical hand antisepsis should be performed using either a suitable antimicrobial soap or suitable alcohol-based hand rub, preferably with a product ensuring sustained activity, before donning sterile gloves.

- When performing surgical hand antisepsis using an antimicrobial soap, scrub hands and forearms for the length of time recommended by the manufacturer (typically 2–5 minutes) Long scrub times (e.g. 10 minutes) are not necessary.
- When using an alcohol-based surgical hand rub product with sustained activity, follow the manufacturer's instructions for application times. Apply the product to dry hands only.
- Do not combine surgical hand scrub and surgical hand rub with alcohol-based products sequentially.
- When using an alcohol-based hand rub, use sufficient product to keep hands and forearms wet with the hand rub throughout the surgical hand preparation procedure.
- After application of the alcohol-based hand rub as recommended, allow hands and forearms to dry thoroughly before donning sterile gloves.

Procedure for Surgical Hand Preparation using Medicated Soap

Following protocol should be followed for surgical hand preparation using medicated soap and water:

Procedural steps
• Start timing. Scrub each side of each finger, between the fingers, and the back and front of the hand for 2 minutes.
• Proceed to scrub the arms, keeping the hand higher than the arm at all times. This helps to avoid recontamination of the hands by water from the elbows and prevents bacteria-laden soap and water from contaminating the hands.
• Wash each side of the arm from wrist to the elbow for 1 minute.
• Repeat the process on the other hand and arm, keeping hands above elbows at all times. If the hand touches anything at any time, the scrub must be lengthened by 1 minute for the area that has been contaminated.
• Rinse hands and arms by passing them through the water in one direction only, from fingertips to elbow. Do not move the arm back and forth through the water.
• Proceed to the operating theatre holding hands above elbows.
• At all times during the scrub procedure, care should be taken not to splash water onto surgical attire.
• Once in the operating theatre, hands and arms should be dried using a sterile towel and aseptic technique before donning gown and gloves.

Procedure for Surgical Hand Preparation using Alcohol based Hand Rubs

- Use alcohol-based hand rub formulations mentioned earlier in this document.
- While using WHO formulations as above, minimum three applications for the period of 3–5 minutes must be ensured.
- Alternatively, alcohol-based hand rubs containing 50–90% of alcohol with additional long-acting compounds like Chlorhexidine Gluconate or Quaternary Ammonium compounds may be used.

Precautions before surgical hand preparation using alcohol-based hand rubs:

- ✓ Ensure that the hands are visibly clean before application of alcohol hand rub
- ✓ Ensure that the hands are well dried before application of alcohol hand rub
- ✓ Follow the manufacturer's instructions for application times
- ✓ Use sufficient product to keep hands and forearms wet with the hand rub throughout the surgical hand preparation procedure
- ✓ Repeat hand rubbing is sufficient before switching to the next procedure without need for hand scrubbing or washing.
- ✓ Surgical procedures of more than two hours duration, surgeon should practice a second-hand rub of one minute duration.
- ✓ Use hand rubs after removing gloves when operation is over OR wash with soap and water in case of glove puncture or if any residual talc or biological fluids are present

The handrubbing technique for surgical hand preparation must be performed on perfectly clean, dry hands.
On arrival in the operating theatre and after having donned theatre clothing (cap/hat/bonnet and mask), hands must be washed with soap and water.
After the operation when removing gloves, hands must be rubbed with an alcohol-based formulation or washed with soap and water if any residual talc or biological fluids are present (e.g. the glove is punctured).

Surgical procedures may be carried out one after the other without the need for handwashing, provided that the handrubbing technique for surgical hand preparation is followed (Images 1 to 17).

1

Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your left hand, using the elbow of your other arm to operate the dispenser

2

Dip the fingertips of your right hand in the handrub to decontaminate under the nails (5 seconds)

3

Images 3–7: Smear the handrub on the right forearm up to the elbow. Ensure that the whole skin area is covered by using circular movements around the forearm until the handrub has fully evaporated (10-15 seconds)

4

See legend for Image 3

5

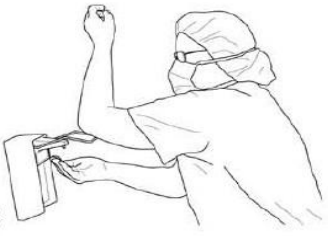
See legend for Image 3

6

See legend for Image 3

7

See legend for Image 3



8

Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your right hand, using the elbow of your other arm to operate the dispenser

9

Dip the fingertips of your left hand in the handrub to decontaminate under the nails (5 seconds)

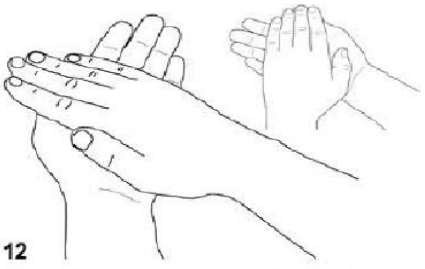
Fig: 3.4 Surgical Hand Preparation

10

Smear the handrub on the left forearm up to the elbow. Ensure that the whole skin area is covered by using circular movements around the forearm until the handrub has fully evaporated (10-15 seconds)

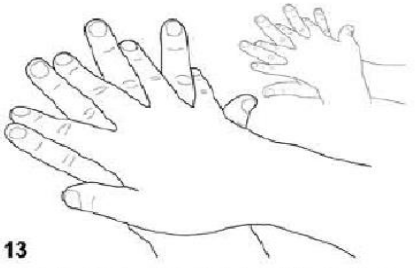
11

Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your left hand, using the elbow of your other arm to operate the distributor. Rub both hands at the same time up to the wrists, and ensure that all the steps represented in Images 12-17 are followed (20-30 seconds)



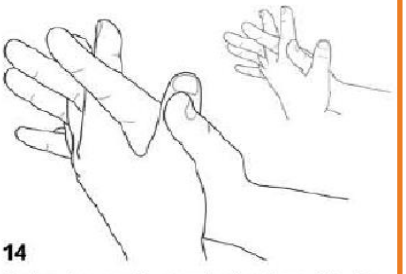
12

Cover the whole surface of the hands up to the wrist with alcohol-based handrub, rubbing palm against palm with a rotating movement



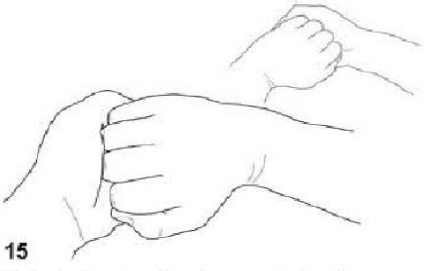
13

Rub the back of the left hand, including the wrist, moving the right palm back and forth, and vice-versa



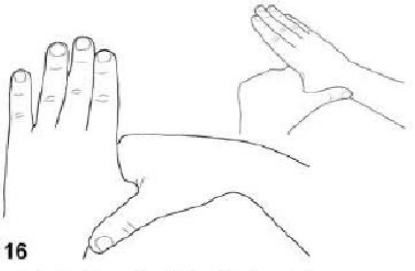
14

Rub palm against palm back and forth with fingers interlinked



15

Rub the back of the fingers by holding them in the palm of the other hand with a sideways back and forth movement



16

Rub the thumb of the left hand by rotating it in the clasped palm of the right hand and vice versa

17

When the hands are dry, sterile surgical clothing and gloves can be donned

Repeat the above-illustrated sequence (average duration, 60 sec) according to the number of times corresponding to the total duration recommended by the manufacturer for surgical hand preparation with an alcohol-based handrub.

Fig: 3.5 Surgical Hand Preparation

REFERENCE [1] WHO guidelines for hand hygiene in healthcare. First global patient safety challenge, clean care is safer care. World Health Organization, 2009.

CHAPTER 4

Personal Protective Equipment (PPE)

OBJECTIVE:

To promote and practice use of personal protective equipment's appropriate for the task while providing patient care by all the healthcare providers.

SCOPE:

This document applies to healthcare professionals of all cadres

DEFINITION:

PPE is specialized clothing or equipment worn by a healthcare professional for protection against infectious materials.

TYPES OF PPE USED IN HEALTHCARE

- Gloves—protect hands
- Gowns/aprons—protect skin and/or clothing
- Masks—protect mouth/nose
- Respirators—protect respiratory tract from airborne infectious agents
- Goggles—protect eyes
- Face shields—protect face, mouth, nose, and eyes.
- Cap/hair cover—to protect hairs
- Boots/shoe cover—to protect feet

HOW TO CHOOSE APPROPRIATE PPE?

Selection of PPE is based on the type of patient interaction, known or possible infectious agents, and/ or likely mode(s) of transmission. Following factors may be considered while choosing PPE:

- Probability of exposure to blood or body substances
- Type of body substance involved
- Probable type and probable route of transmission of infectious agents.

DO's AND DON'Ts WHILE USING PPE

- Always use PPE whenever contact with blood or body fluids of patients is expected.
- Always use PPE most 'appropriate' for the task.
- Use of PPE should not replace the basic procedures of infection control like hand hygiene.
- Do not share the PPE.
- Avoid contact with contaminated (used) PPE and surfaces.
- Change the PPE completely and wash your hands each time you leave a patient to attend another patient or another duty.
- Discard the used PPE in appropriate disposal bags.

GUIDELINES FOR USE OF PPE

Gloves

Objective: To protect both patients and healthcare workers from exposure to infectious agents that may be carried on hands.

Dos and Don'ts while using gloves

- Wear gloves when touching blood, body fluids, secretions, excretions or mucous membranes.
- Don't touch your face or adjust PPE with contaminated gloves.
- Don't touch environmental surfaces except as necessary during patient care.
- Change gloves:
    - During use if torn and when heavily soiled
    - Between contacts with different patients to prevent transmission of infectious material
    - Between tasks/ procedures on the same patient to prevent cross contamination between different body sites
    - If the patient interaction involves touching portable computer keyboards or other mobile equipment that is transported from room to room.
- Remove gloves immediately after use and before attending to another patient.
- Discard used/ contaminated gloves in red colored waste bin.
- Perform hand hygiene either by hand washing with soap and water or by alcohol-based hand rubs (refer to Chapter 4 of this manual) before putting gloves and after removing gloves.

Choosing Appropriate Glove type

Gloves should be chosen according to following factors:

- Who is at risk? —Choose sterile gloves if patient and healthcare worker both are at risk, while if safety of only healthcare worker is required, unsterile gloves may be used.

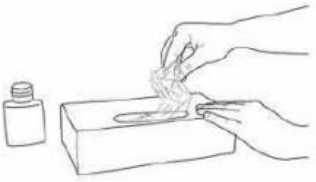
- Whether single use (disposable) or reusable gloves are required for the task.

- Material of glove—synthetic materials like Nitrile remains the material of choice unless contraindicated due to its efficacy in protecting against blood borne viruses and properties that enable to maintain dexterity.

- One or two pairs—requirement should be assessed based on risk of exposure involved. Procedure to Wear and Remove Sterile and non-Sterile Gloves.

When the hand hygiene indication occurs before a contact requiring glove use, perform hand hygiene by rubbing with an alcohol-based handrub or by washing with soap and water.

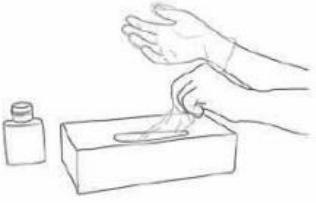
I. HOW TO DON GLOVES:



1. Take out a glove from its original box

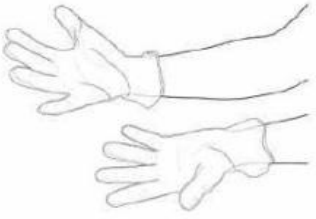
2. Touch only a restricted surface of the glove corresponding to the wrist (at the top edge of the cuff)

3. Don the first glove



4. Take the second glove with the bare hand and touch only a restricted surface of glove corresponding to the wrist

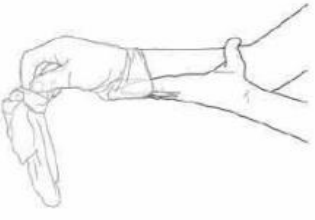
5. To avoid touching the skin of the forearm with the gloved hand, turn the external surface of the glove to be donned on the folded fingers of the gloved hand, thus permitting to glove the second hand



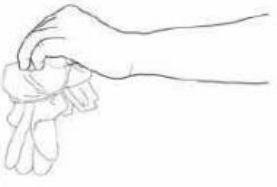
6. Once gloved, hands should not touch anything else that is not defined by indications and conditions for glove use

II. HOW TO REMOVE GLOVES:

1. Pinch one glove at the wrist level to remove it, without touching the skin of the forearm, and peel away from the hand, thus allowing the glove to turn inside out



2. Hold the removed glove in the gloved hand and slide the fingers of the ungloved hand inside between the glove and the wrist. Remove the second glove by rolling it down the hand and fold into the first glove



3. Discard the removed gloves

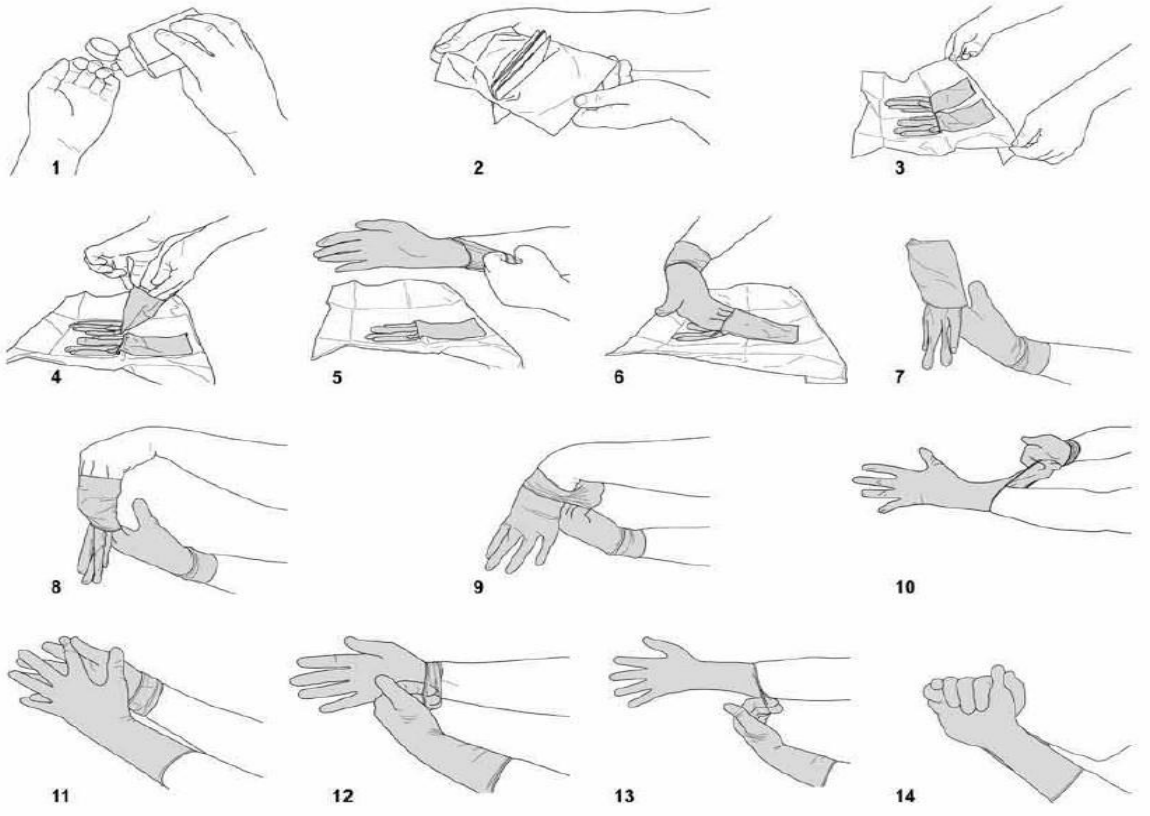
4. Then, perform hand hygiene by rubbing with an alcohol-based handrub or by washing with soap and water

Fig: 4.1 Donning & Doffing Non-sterile gloves

Follow the procedures as illustrated in Fig. 4.1 (for non-sterile gloves) and Fig. 4.2 & 4.3 (for sterile gloves) of this document.

The purpose of this technique is to ensure maximum asepsis for the patient and to protect the health-care worker from the patient's body fluid(s). To achieve this goal, the skin of the health-care worker remains exclusively in contact with the inner surface of the glove and has no contact with the outer surface. Any error in the performance of this technique leads to a lack of asepsis requiring a change of gloves.

I. HOW TO DON STERILE GLOVES



1. Perform hand hygiene before an "aseptic procedure" by handrubbing or hand washing.
2. Check the package for integrity. Open the first non-sterile packaging by peeling it completely off the heat seal to expose the second sterile wrapper, but without touching it.
3. Place the second sterile package on a clean, dry surface without touching the surface. Open the package and fold it towards the bottom so as to unfold the paper and keep it open.
4. Using the thumb and index finger of one hand, carefully grasp the folded cuff edge of the glove.
5. Slip the other hand into the glove in a single movement, keeping the folded cuff at the wrist level.

6-7. Pick up the second glove by sliding the fingers of the gloved hand underneath the cuff of the glove.

8-10. In a single movement, slip the second glove on to the ungloved hand while avoiding any contact/resting of the gloved hand on surfaces other than the glove to be donned (contact/resting constitutes a lack of asepsis and requires a change of glove).

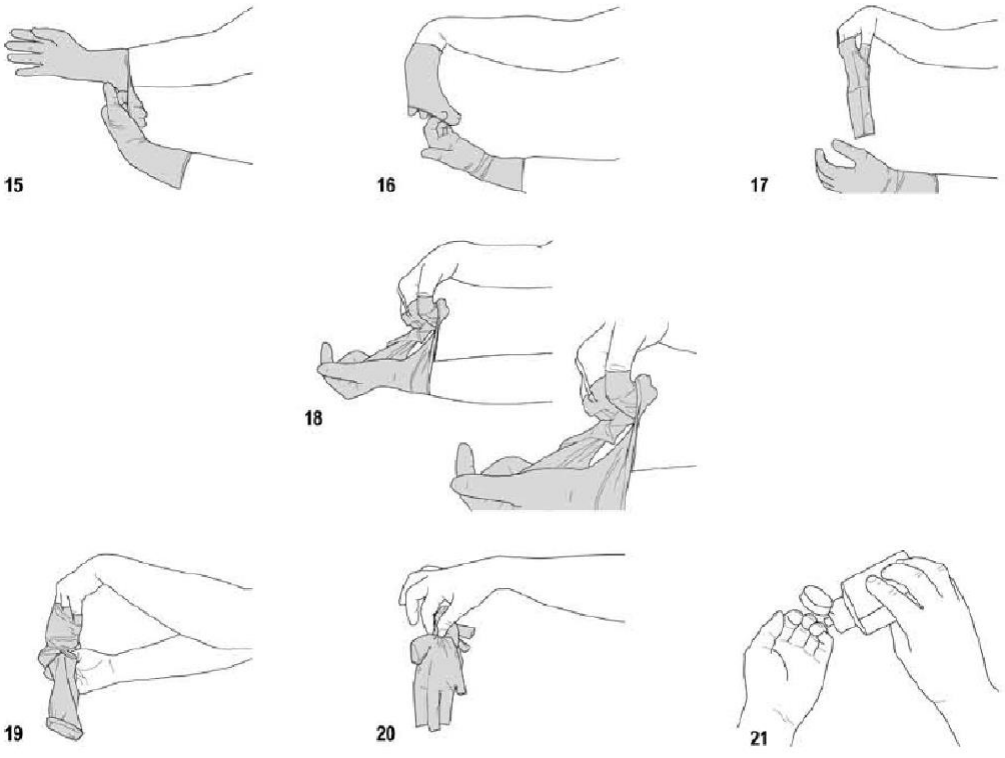
11. If necessary, after donning both gloves, adjust the fingers and interdigital spaces until the gloves fit comfortably.

12-13. Unfold the cuff of the first gloved hand by gently slipping the fingers of the other hand inside the fold, making sure to avoid any contact with a surface other than the outer surface of the glove (lack of asepsis requiring a change of gloves).

14. The hands are gloved and must touch exclusively sterile devices or the previously-disinfected patient's body area.

Fig: 4.2 Donning of sterile gloves

II. HOW TO REMOVE STERILE GLOVES



15-17. Remove the first glove by peeling it back with the fingers of the opposite hand. Remove the glove by rolling it inside out to the second finger joints (do not remove completely).
18. Remove the other glove by turning its outer edge on the fingers of the partially ungloved hand.
19. Remove the glove by turning it inside out entirely to ensure that the skin of the health-care worker is always and exclusively in contact with the inner surface of the glove.
20. Discard gloves.
21. Perform hand hygiene after glove removal according to the recommended indication.

NB: Donning surgical sterile gloves at the time of a surgical intervention follows the same sequences except that:
- it is preceeded by a surgical hand preparation;
- donning gloves is performed after putting on the sterile surgical gown;
- the opening of the first packaging (non-sterile) is done by an assistant;
- the second packaging (sterile) is placed on a sterile surface other than that used for the intervention;
- gloves should cover the wrists of the sterile gown.

Fig: 4.3 Doffing Sterile gloves

GOWNS

Objective: To protect the healthcare workers' arms and exposed body areas and prevent contamination of clothing with blood, body fluids and other potentially infectious material.

Dos and Don'ts while using Gowns

- ✓ Wear isolation gown when contact with blood or body fluid is expected while following standard precautions.

- ✓ While following contact precautions, wear both gowns and gloves while entering the isolation room.
- ✓ Wear gowns as a first piece of PPE followed by all others.
- ✓ Choose a gown with appropriate fitting.
- ✓ A clean non-sterile apron/gown is generally adequate to protect skin and prevent soiling of clothing during procedures and patient care activities that are likely to generate splashes/ sprays of blood or body fluids.
- ✓ Use fluid resistant apron gown (made of plastic) when there is a risk that clothing may become contaminated with blood, body fluids, excretions or secretions (Except sweat).
- ✓ Fluid resistant gowns are always to be used along with gloves and other PPE when indicated.
- ✓ Ensure that the gown provides full coverage of the arms and body front, from neck to mid-thigh or below.
- ✓ Removal of gown: The outer contaminated side of the gown should be turned inward and rolled into a bundle and then discarded into a designated container.
- ✓ Perform hand hygiene after removal of gown.

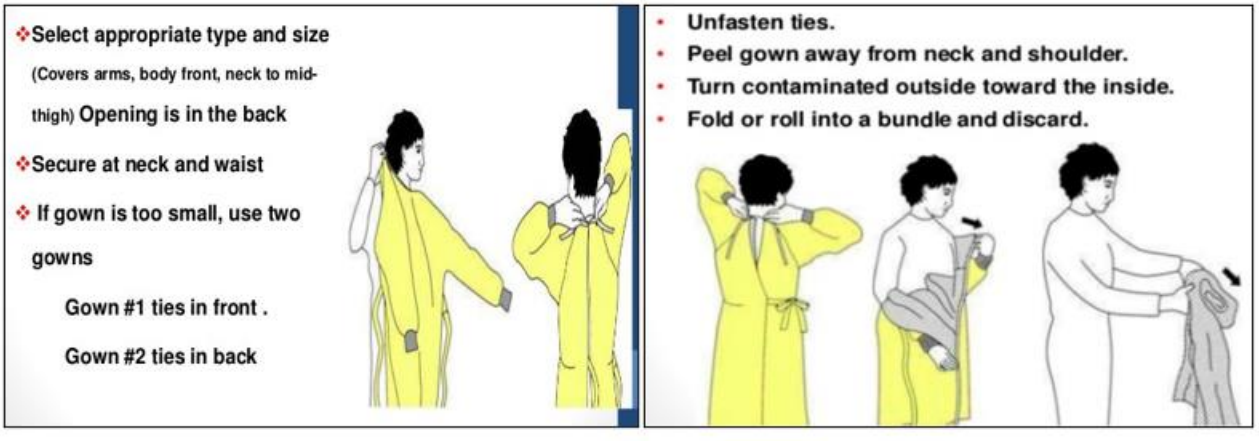


Fig: 4.4 Donning & Doffing of Gown

Masks

Objective: To protect patients from respiratory secretions of healthcare workers as well as to protect healthcare staff while caring for patients with airborne infections, or when performing any procedures with anticipated splashes of blood or body fluids.

Dos and Don'ts for Wearing a Mask

- ✓ Surgical masks are preferred over cotton or gauze masks.
- ✓ Do not reuse disposable masks
- ✓ Change masks whenever they are soiled or wet
- ✓ Do not reapply the same mask after they have been removed
- ✓ Masks should not be left dangling around the neck
- ✓ Do not touch the mask from front while wearing it
- ✓ Use specifically designed masks for children and their oxygen saturation should be monitored.

When to Use Surgical Mask?

- Use surgical masks on coughing patients to limit potential dissemination of respiratory pathogens.
- Use surgical masks as a part of standard precautions to keep splashes or sprays from reaching the mouth and nose of person exposed.
- While caring for patients on droplet precautions.

Fig: 4.5 Donning & Doffing of Mask

Using N95 Respirator / any Particulate Respirator

Indication for Use: When dealing with patients infected with highly transmissible respiratory pathogens while following droplet precautions (e.g., HCW dealing with open tuberculosis cases/ influenza patients)

Wearing the Respirator

- Select a fit tested respirator
- Place over nose, mouth and chin
- Fit flexible nose piece over nose bridge
- Secure on head with elastics
- Adjust to fit
- Perform a fit check
  - Inhale—respirator should collapse
  - Exhale—check for leakage around face

Fig: 4.6 Wearing the Respirator

Removing the Respirator

- Always remove it just outside the patient room.
- Lift the bottom elastic over your head first
- Then lift off the top elastic
- Discard and perform hand hygiene.

Fig: 4.7 Removing the Respirator

Protective Eye Wear and Face Shield

Objective: To protect the mucous membranes of the eyes when conducting procedures that are likely to generate splashes of blood, body fluids, secretions or excretions.

Types and Uses:

- Goggles—Used to protect eyes only
- Face shields—Used protect face, nose, mouth, and eyes.

Goggles

- Should fit snuggly over and around eyes
- Personal glasses not a substitute for goggles
- Antifog feature improves clarity

Face Shields

- Should cover forehead, extend below chin and wrap around side of face.
- Single use/reusable face shields may be used in addition to surgical masks as an alternative to protective eye wear.

Removing Face and Eye Protection

- Should be removed after gloves have been removed and hand hygiene performed.
- The ties, earpieces and /or headband used to secure the equipment to the head are considered 'clean' and therefore safe to touch with bare hands.
- The front of a mask, protective eyewear or face shield is considered contaminated.

Cleaning Reusable Face and Eye Protection

- Reusable face shields and protective eyewear should be cleaned according to the manufacturer's instructions, generally with detergent solution, and be completely dry before being stored.
- Disinfection may be done by any low-level disinfectant solution.

Caps and Boots/Shoe Covers

Objective: To protect against exposure to patient's blood, body fluids, secretions or excretions, which may splash onto hairs or shoes.

- ✓ **Dos and Don'ts**
- ✓ Launder caps and shoe covers appropriately if they are reusable, followed by disinfection.
- ✓ Do not reuse disposable caps/ shoe covers. Discard them after each use in appropriate container.

Sequence of Wearing and Removing the PPE

Following sequence should be followed while wearing and removing the full PPE as per the situation.

Sequence of Wearing
1. Gown first (wear shoe covers prior if required) 2. Cap/ head cover 3. Mask or respirator 4. Goggles or face shield

Sequence of Removing
1. Gloves 2. Face shield or goggles 3. Gown 4. Mask or respirator 5. Cap/ head cover 6. Shoe cover

REFERENCES:

[1] WHO guidelines for hand hygiene in Healthcare. First global patient safety challenge, Clean care is safer care. World Health Organization,2009.

[2] Prevention of hospital acquired infections, A practical guide, 2nd edition, WHO/CDS/CSR/EPH/2002.12

[3] Guidance for the Selection and Use of Personal Protective Equipment (PPE) in Healthcare Settings. CDC Atlanta. Accessed from https://www.cdc.gov/hai/prevent/ppe.html

CHAPTER 5

Laundry and Linen Management

INTRODUCTION

Hospital should have a policy for laundry infection control. It is important that linen is appropriately managed to ensure contamination does not occur as this can then lead to transmission of micro-organisms to people or the environment.

The purpose of this policy is the prevention of infection or injury in service users and healthcare staff involved in the use, handling or laundering of hospital linen.

CLASSIFICATION OF LINEN

For the purpose of infection control, linen can be classified as

- *Clean Linen:* Linen items that are new, have been processed or are otherwise clean and have not yet been used.
- *Used Linen:* Fouled or blood-stained linen from patients not considered to be infectious or have communicable diseases.
- *Infectious Linen***:** Linen from patients with known infectious etiology such as MRSA/ VRE/ MDRO or any other infections such as HIV, HAV, HBV, HCV etc.
- *High Risk Group Linen***:** Diseases that can be transmitted through a low infectious dose of organisms, e.g Escherichia coli O157, shigellosis etc.
- *Infested Linen*: From patients infested with lice and fleas.
    - ● The laundry should be informed before-hand to ensure proper arrangement for this type of linen.
- *Heat Labile Linen:* linen which is made from fabrics likely to be damaged by normal disinfection process, e.g. personal clothing.
- *For Category 4 Pathogens:* Linen originating from patients with these pathogens should be bagged in yellow clinical waste bags and incinerated, e.g., anthrax, viral hemorrhagic fever, bioterrorism agents.

FREQUENCY OF BED LINEN CHANGE

Ideally it should be changed daily.

Linen must be changed and laundered between patients and when visibly soiled.

Immediately, when fouled.

STORAGE OF NEW LINEN IN WARD / DEPARTMENT

Clean linen should be stored in a clean area of the ward in closed cupboard.

They must be stored separate from used/ soiled linen.

At least 5 sets per bed should be available.

INFECTION CONTROL PRACTICES FOR LINEN DISPOSAL

General Consideration All personnel involved in the collection, transport, sorting, and washing of soiled linen should be *adequately trained and wear appropriate* PPE.

All workers must cover all lesions on exposed skin with waterproof plasters and wear appropriate gloves.

Gloves used for the task of sorting laundry should be of sufficient thickness to minimize sharps injuries.

They must have access to hand washing facilities.

If the laundry services is outsourced then it is important that the hospital administration should include the hospital linen policy in the contract-setting process for provision of such services.

Laundry Bags Single bags of sufficient tensile strength must be used

Leak-proof containment is needed if the laundry is wet and can soak through a cloth bag.

Only two-thirds of the bag be filled to allow secure closure.

Bags containing soiled laundry should be clearly identified with labels containing site of origin and colour coding. HCWs may handle these items safely, regardless of whether the laundry is transported within the facility or destined for transport to an offsite laundry service.

Infected linen should be placed in an impervious bag that can be emptied into a washing machine with no or minimal handling and the bag either decontaminated in the washing process or disposed of as infectious healthcare waste.

Segregation

Infectious linen should be *segregated at the point of generation and not at the laundry site.*

Sorting

Soiled and infected linen must be handled with care at all times.

Linen should be placed into bags at the point of generation as soon as possible

3. Bags must be securely tied to prevent spill-over.
4. Rinsing soiled laundry at the point of generation should not be done.
5. Infectious linen must not be sorted and loaded into a washing machine with no or only minimal handling.

Transport

1. There should be separate, designated bags and storage receptacles for clean and used linen and must never be transported together.
2. Soiled linen in bags can be transported by cart.
3. Clean linen must be wrapped or transported in a closed container to prevent inadvertent contamination from dust and dirt during loading, delivery, and unloading.
4. Trolleys should be cleaned and disinfected

a. After any spillage
b. After transportation of dirty laundry
c. Thorough cleaning with soap and water at least weekly

Storage

1. Clean linen should be stored in a clean area of the ward in closed cupboard.
2. They must be stored separate from used/ soiled linen.

DISPOSAL OF LINEN

Criteria for Condemnation

- There will be no more than three patches in any 35cm square
- No repairs or patches will be larger than 15cm square
- There will be no more than 5 patches over the entire piece of Linen

1. The linen that required to be disposed off must be disinfected and duly washed as soiled linen

2. After maintaining a log book for such linens, it should be shredded and then dispose off in yellow bag to bio medical waste collector for final disposal

LAUNDRY PROCESS

Linen and clothing used in healthcare facilities are disinfected during laundering and generally rendered free of vegetative pathogens (hygienically clean), but they are not sterile.

STORAGE OF NEW LINEN IN WARD / DEPARTMENT

- Clean linen should be stored in a clean area of the ward in closed cupboard.
- They must be stored separate from used/ soiled linen.
- At least 5 sets per bed should be available.

Washing Cycles

The washing cycles used for laundering may be:

a. Thermal washing cycle
b. Low temperature cycle
c. Dry cleaning
d. home washing machines

Thermal Washing Cycle (A)

Washing machines in healthcare facilities can be either washer/ extractor units or continuous batch machines.

A typical washing cycle consists of three main phases, i.e., pre-wash, main wash, and rinse cycle.

a. Pre wash cycle—linen should be washed with water and soap and detergent. Anti-microbicidal action is due to cleaning, dilution and agitation during the pre-wash cycle.

b. Main wash—minimum holding time 65°C for 10 minutes. (71°C for 3 minutes). Additional time should be given to allow mixing and heat penetration.

c. Rinse cycle—removes excess of the soap and detergent present, if any.

Low-Temperature Washing Cycle (B)

This is useful in:

- Heat labile fabrics
- Reducing hot water consumption.

The steps are same as that of the typical thermal washer except that **Sodium Hypochlorite (NaClO)** is used as disinfectant instead of heat.

Usual recommendation for bleach–150 ppm

Dry Cleaning (C) It involves use of organic solvents such as *perchloroethylene* to remove soil from heat labile linen. It should not be used routinely as it is relatively ineffective in reducing the microorganisms.

Home Washing Machine (D)

Can be used for cleaning staff uniforms.

If the staff uniforms become grossly contaminated should be washed as "used" or "infected" hospital linen.

Drying and Ironing Drying of the linen is done preferably in a drier.

Heavy duty washers/ driers are recommended for drying.

Dryer temperatures and cycle times are determined by the type of materials in the fabric.

Ironing is done preferably by automated systems or may be manually.

If the laundry service is outsourced, then it is to be ascertained that the laundry process is being carried out properly by the vendor.

Pillows, Duvets, Blankets, Mattress Overlays These must be protected by heat-sealed, waterproof covers which are cleaned with detergent and water between service users.

Duvets, pillows, *blankets* must be laundered between service users if waterproof covers are not suitable.

i. ***Blankets*** can be dry cleaned or hand washed. Hand-washing can be done by first soaking for 15 minutes in lukewarm water. The soap suds are squeezed through the blanket and then rinsed in cold water at least twice. The blanket should not be twisted or wrung. It should be dried by spreading it on a clean surface.

ii. **Pillows and mattresses** can be washed with soap and water and left to dry in the sun.

If clostridium difficile is present, they should be wiped with a solution of chlorine-based disinfectant.

MONITORING

Routine microbiological sampling is not recommended.

Indication:

- When commissioning new machines.
- During outbreak investigation

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2. Management of Used and Infected Linen Policy, NHS Foundation Trust, 2016.
3. Kaya Kalp, National Guidelines for Clean Hospitals, 2015.
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. CHAPTER 6

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Hospital Waste Management Committee And It's Function

As per the provisions under BMW Management Rules, 2016, the following responsibilities have been bestowed upon Health Care Facilities;

1. To ensure that all the legal requirements related to the Bio Medical Waste Management are complied with and are regularly updated.

2. To ensure that annual reports and accidents reports are submitted to State Pollution Control Board (SPCB) in a timely manner.

3. To ensure that bio-medical waste is handled without any adverse effect to human health and the environment.

4. To make a provision within the premises for a safe, ventilated and secured location for storage of segregated biomedical waste at central storage area.

5. To ensure that there shall be no secondary handling, pilferage of recyclables or inadvertent scattering or spillage by animals.

6. To ensure that bio-medical waste from central storage area or the premises shall be directly transported to the common bio-medical waste treatment facility for the appropriate treatment and disposal.

7. To ensure pre-treatment of yellow-h waste comprising of microbiology, biotechnology and other clinical laboratory waste, waste blood bags (containing date expired or contaminated blood), Laboratory cultures, stocks or specimen of micro- organisms, live or attenuated vaccines, human cell cultures used in research, industrial laboratories, production of biological, residual toxins, dishes and devices used for cultures and other highly infectious wastes before handling to over to Common Bio-Medical Waste Treatment and Disposal Facility (CBWTF) for final disposal.

8. To pre-treat vacutainers/vials containing blood samples and handover to CBWTF as red category waste.

9. To ensure that all the requirements related to establishment of a pre-treatment facility within its premises (as given at section 3.1.1.h) fully complies with standards stipulated under BMWM Rules, 2016

10. To phase out use of chlorinated plastic bags (excluding blood bags) and gloves by 27 March, 2019.

11. To ensure that the solid waste other than BMW is disposed of as per Solid Waste Management Rules, 2016

12. To establish a bar-code system for bags or containers containing bio-medical waste destined for disposal at CBWTF or captive treatment and disposal facility before 27th March, 2019.

13. To ensure all the staffs of HCFs are provided regular training on BMW handling both at the time of induction and on annual basis as well

14. To ensure occupational safety of all the employees through annual health check- ups, immunization and provisions of appropriate and adequate PPEs.

15. To ensure that BMW Register is maintained and is updated on day-to-day basis

16. Bedded HCFs to ensure uploading annual records of the biomedical waste generated on its website by 15 March, 2020.

17. To immediately inform the SPCB in case of any lapse by waste collection agency or CBWTF in collection of waste from the HCF.

18. To ensure that all the activities of BMW management are monitored and reviewed.

19. To ensure that the committee formed for monitoring and review of BMW management is functioning properly.

20. To ensure that all the records related to BMW Management are maintained by HCF.

BMWM Rules 2016 stipulates that monitoring and review of the activities related to handling of bio medical waste, must be performed by a Quality Team and BMW Management Committee.

Quality Team (QT), framed as per National Quality Assurance standards, responsible for implementation of quality assurance can perform the overall role of monitoring and review the activities of BMW handling.

A hospital Waste Management Committee, has been formed which function under the Chairmanship of the Medical Superintendent. It is a broad-based committee with representative from various clinical departments, including medical store, sanitation, Nursing and engineering Depts. The committee holds meetings periodically.

Bio Medical Waste Management Committee: It is suggested that HCF must frame new committee at the facility level for monitoring of the BMW activities, which is to be termed as Bio Medical Waste Management Committee.

Composition of Committee :

- Medical Superintendent -Chairperson
- District Quality Consultant/ District BMW Officer -Invitee Members
- Quality Manager -Member
- Hospital Infection Control Nurse/ Officer -Member
- Nursing Superintendent -Member
- Medical Officer (Surgery) -Member
- Medical Officer (Emergency) -Member
- Medical Officer (Gynae &Obs) -Member
- Microbiologist/ Pathologist -Member

- OT Nurse / Technician/ Assistant -Member
- Lab Technician -Member
- Blood Bank/ Storage Unit Technician -Member
- Housekeeping in-charge -Member
- Pharmacist -Member

The responsibility of this committee is to:

1. Improve and steam line the bio medical waste (BMW) management Systems for proper implementation of Bio-Medical Waste Management Rules 2016.
2. Formulate and ensure implementation of the responsibilities of the various categories of the staff involved in the generation, collection, transportation, treatment and disposal of wastes.
3. Monitor biomedical waste handling practices in the Hospital.
4. Ensure periodic training of all categories of staff involved in generating and transporting waste.
5. Maintenance of all the records related to BMW handling as per BMWM Rules 2016.
6. Ensuring submission of reports to prescribing authority like Accident Reporting & Annual Reporting to SPCB/PCC within the stipulated due dates.
7. Update and maintain the valid authorization from SPCB/PCC
8. Have a valid agreement with Common Bio Medical Waste Treatment Facility (CBWTF).
9. Take appropriate remedial actions in event of any accident occurrence.

Meeting Schedule

It is to be ensured by the HCFs that the committee framed for monitoring of activities of bio medical waste handling in the facility must meet;

- At least once in six months and also when needed.
- Committee must meet in event of any accident reported.

Agenda and Meeting Records

It is to be ensured that committee meetings are held in accordance with a predefined agenda for the meeting.

The agenda of meeting, proceedings/ minutes of meeting along with the planned actions with the responsibility delegated for implementation should be recorded and records are to be kept with BMW Committee for proving compliance.

All the minutes of meeting of this committee is to be forwarded along with the Annual Report to the prescribing authority i.e., SPCB/PCC. The meeting records for the period from January to December of the preceding year are to be submitted along with Annual Report on or before 30th June of every year.

Health Care Waste

The health care facility, while generating the waste is responsible for segregation, collection, in-house transportation, pre-treatment of waste and storage of waste, before such waste is collected by Common Bio-medical Waste Treatment Facility (CBWTF) Operator. Thus, for proper management of the waste

in the healthcare facilities the technical requirements of waste handling are needed to be understood and practiced by each category of the staff in accordance with the BMWM Rules, 2016.

Waste generated from the healthcare facility is classified as:

- Bio Medical Waste
- General Waste
- Other Wastes

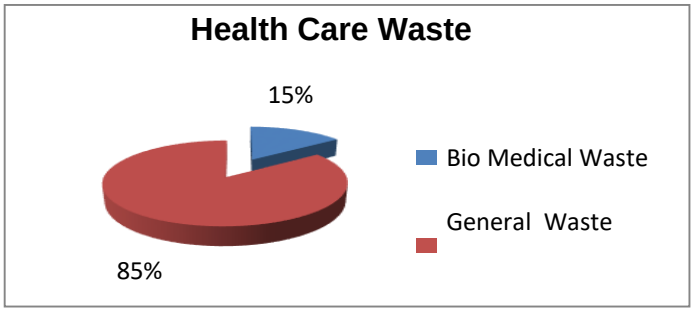

Fig 6.1 Waste Categorization

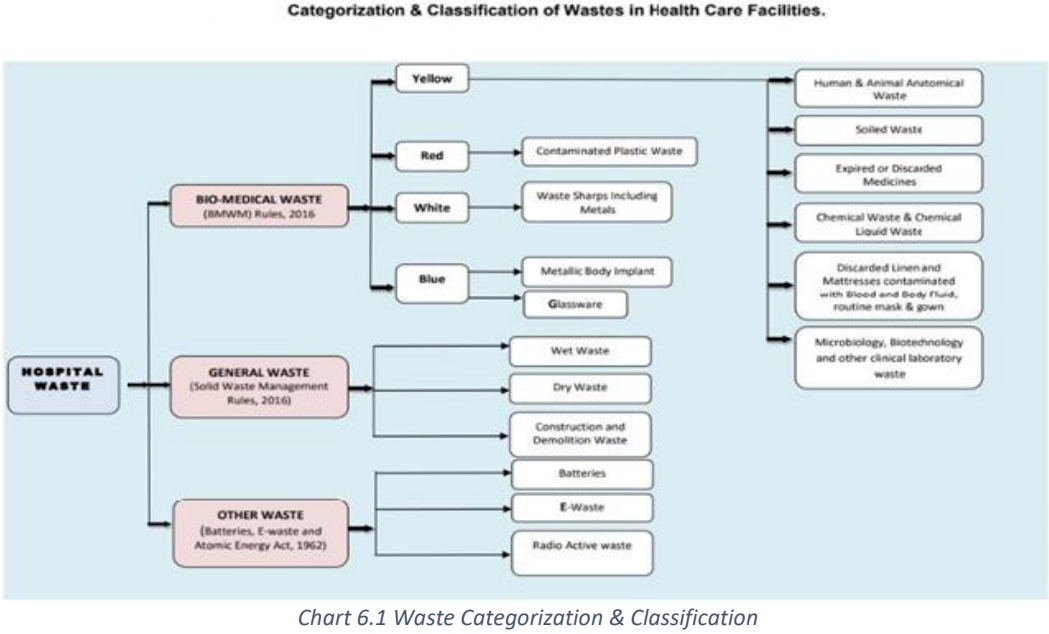

Chart 6.1 Waste Categorization & Classification

Bio-medical waste means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps. Bio-Medical waste includes all the waste generated from the Health Care Facility which can have any adverse effect to the health of a person or to the environment in general if not disposed properly.

BioMedicalWasteManagementRules,2016categorizesthebio-medicalwastegenerated from the health care facility into four categories based on the segregation pathway and color code. Various types of biomedical waste are further assigned to each one of the categories, as detailed below:

1. Yellow Category
2. Red Category
3. White Category
4. Blue Category

Table

Category	TYPE OF WASTE
YELLOW	**Human Anatomical Waste** Human tissues, organs, body parts and fetus below the viability period
	Animal Anatomical Waste Experimental animal carcasses, body parts, organs, tissues, including the waste generated from animals used in experiments or testing in veterinary hospitals or colleges or animal houses.
	Soiled Waste Items contaminated with blood, body fluids like dressings, plaster casts, cotton swabs and bags containing residual or discarded blood and blood components.
	Discarded or Expired Medicine Pharmaceutical waste like antibiotics, cytotoxic drugs including all items contaminated with cytotoxic drugs along with glass or plastic ampoules, vials etc.
	Chemical Waste Chemicalsusedinproductionofbiologicalandusedordiscardeddisinfectants
	Chemical Liquid Waste Liquid waste generated due to use of chemicals in production of biological and used or discarded disinfectants, Silver X-ray film developing liquid, discarded Formalin, infected secretions, aspirated body fluids, liquid from laboratories and floor washings, cleaning, house-keeping and disinfecting activities etc..
	Discarded linen, mattresses, beddings contaminated with blood or body fluid, routine mask& gown.
	Microbiology, Biotechnology and other clinical laboratory waste (Pre-treated) Microbiology, Biotechnology and other clinical laboratory waste: Blood bags, Laboratory cultures, stocks or specimens of microorganisms, live or attenuated vaccines, human and animal cell cultures used in research, industrial laboratories, production of biological, residual toxins, dishes and devices used for cultures.

Table 6.1 Color Coding of BMW

CATEGORY	TYPE OF WASTE
RED	Wastes generated from disposable items such as tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes without needles, fixed needle syringes with their needles cut, vacutainers and gloves
WHITE	**Waste Sharps including metals** Needles, syringes with fixed needles, needles from needle tip cutter or burner, scalpels, blades, or any other contaminated sharp object that may cause puncture and cuts. This includes both used, discarded and contaminated metal sharps.
BLUE	Broken or discarded and contaminated glass including medicine vials and ampoules except those contaminated with cytotoxic wastes.

Table 6.1 Color Coding of BMW

General Waste

General waste consists of all the waste other than bio-medical waste and which has not been in contact with any hazardous or infectious, chemical or biological secretions and does not include any waste sharps. This waste consists of mainly:

a. News Paper, paper and card boxes (dry waste)
b. Plastic water bottles (dry waste)
c. Aluminum cans of soft drinks (dry waste)
d. Packaging materials (dry waste)
e. Food Containers after emptying residual food (dry waste)
f. Organic / Bio-degradable waste - mostly food waste (wet waste)
g. Construction and Demolition wastes

These general wastes are further classified as dry wastes and wet wastes and should be collected separately.

Other Wastes

Other wastes consist of used electronic wastes, used batteries, and radio-active wastes which are not covered under biomedical wastes but have to be disposed as and when such wastes are generated as per the provisions laid down under E-Waste (Management) Rules, 2016, Batteries (Management & Handling) Rules, 2001, and Rules/guidelines under Atomic Energy Act, 1962 respectively.

BIO-MEDICAL WASTE MANAGEMENT

Steps involved in Bio-medical Waste Management

First five steps (Segregation, Collection, pre-treatment, Intramural Transportation and Storage) is the exclusive responsibility of Health Care Facility. While Treatment and Disposal is primarily responsibility of CBWTF operator except for lab and highly infectious waste, which is required to be pre-treated by the HCF.

The management of bio-medical waste can overall be summarized in the following steps;

- Waste Segregation in color coded and barcode labeled bags/ containers at source of generation
- Pre-treat Laboratory and Highly infectious waste
- Intra-mural transportation of segregated waste to central storage area
- Temporary storage of biomedical waste in central storage area
- Treatment and Disposal of biomedical waste through CBWTF or Captive facility

Bio Medical Waste Segregation

Bio- medical waste generated from a healthcare facility is required to be segregated at the point of generation as per the color coding stipulated under Schedule-I of BMWM Rules, 2016. Following activities to be followed to ensure proper waste segregation:

i. Waste must be segregated at the point of generation of source and not in later stages. As defined earlier too, **"Point of Generation"** means the location where wastes initially generate, accumulate and is under the control of doctor / nursing staff etc. who is providing treatment to the patient and in the process generating bio-medical waste.

ii. Posters / placards for bio-medical waste segregation should be provided in all the wards as well as in waste storage area.

iii. Adequate number of color-coded bins / containers and bags should be available at the point of generation of bio-medical waste.

iv. Color coded plastic bags should be in line with the Plastic Waste Management Rules, 2016 with specifications for plastic bags and containers to be followed.

v. Provide Personnel Protective Equipment to the bio-medical waste handling staff.

Color Coding and Type of Container/ Bags to be used for Waste Segregation & Collection

As per Schedule I of the Bio Medical Waste Management Rules, 2016 following color coding and type of container/bags is needed to be used by the HCFs for segregation and collection of generated Bio Medical Waste from the facility.

S.No:	Category	Color &Type of Container
	Yellow Category 	Yellow colored non-chlorinated Plastic Bags
	Red Category 	Red Colored Non-Chlorinated Plastic Bags (having thickness equal to morethan50µ
	White Category 	White Colored translucent, puncture proof, leakproof, Tamper-proof containers
	Blue Category 	Puncture proof, leak proof boxes or containers with blue coloured marking

Table 6.2 BMW Container requirements

Bio Medical Waste Collection

Time of Collection

i. Bio-medical waste should be collected on daily basis from each ward of the hospital at a fixed interval of time. There can be multiple collections from wards during the day.

ii. HCF should ensure collection, transportation, treatment and disposal of bio-medical waste as per BMWM Rules, 2016 and HCF should also ensure disposal of human anatomical waste, animal anatomical waste, soiled waste

and biotechnology waste within 48 hours.

iii. Collection times should be fixed and appropriate to the quantity of waste produced in each area of the health-care facility.

iv. General waste should not be collected at the same time or in the same trolley in which bio-medical waste is collected.

v. Collection should be daily for most wastes, with collection timed to match the pattern of waste generation during the day. For example, in an IPD ward where the morning routine begins with the changing of dressings, infectious waste could be collected mid- morning to prevent soiled bandages remaining in the area for longer than necessary.

vi. General waste collection, must be done immediately after the visiting hours of the HCFs, as visitors coming to facility generate a lot of general waste and in order to avoid accumulation of such general waste in the HCF. The collection timings must enable the HCF to minimize or nullify the use of interim storage of waste in the departments.

vii. Bio-medical waste collected by the staff, should be provided with PPEs.

Packaging

i. Bio-medical waste bags and sharps containers should be filled to no more than three quarters full. Once this level is reached, they should be sealed ready for collection.

ii. Plastic bags should never be stapled but may be tied or sealed with a plastic tag or tie.

iii. Replacement bags or containers should be available at each waste-collection location so that full ones can immediately be replaced.

iv. Color coded waste bags and containers should be printed with the bio-hazard symbol, labelled with details such as date, type of waste, waste quantity, senders name and receivers' details as well as bar coded label to allow them to be tracked till final disposal.

v. Ensure that Bar coded stickers are pasted on each bag as per the guidelines of CPCB by 27 March, 2019

Labeling

i. All the bags/ containers/ bins used for collection and storage of bio-medical waste, must be labelled with the Symbol of Bio Hazard or Cytotoxic Hazard as the case may be as per the type

of waste in accordance with the BMWM Rules, 2016.

ii. Bio-medical waste bags / containers are required to be provided with bar code labels in accordance with CPCB guidelines for "Guidelines for barcode System for Effective Management of Biomedical Waste".

Fig 6.3 QR Code

Fig 6.4 Bar Code

Fig 6.5 Bio-Hazard Label

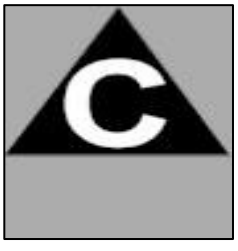

Fig 6.6 Cyto-Toxic Label

Interim Storage

i. Interim storage of bio medical waste is discouraged in the wards / different departments of HCF.

ii. If waste is needed to be stored on interim basis in the departments it must be stored in the dirty utility/sections.

iii. No waste should be stored in patient care area and procedures areas such as Operation Theatre. All infectious waste should be immediately removed from such areas.

iv. In absence of dirty utilities/ sections such BMW must be stored in designated place away from patient and visitor traffic or low traffic area.

In House Transportation of Bio Medical Waste

Transportation Trolleys

In house transportation of Bio Medical Waste from site of waste generation/ interim storage to central waste collection center, within the premises of the hospital must be done in closed trolleys / containers preferably fitted with wheels for easy maneuverability. Such trolleys or carts are designated for the purpose of Bio Medical Waste Collection only. Patient trolleys must not be used for BMW transportation. Size of such waste transport trolleys should be as per the volume of waste generated from the HCFs.

Fig.6.7 Transportation Trolley

Route Of Intramural Transportation Of Bio-Medical Waste

Bio-Medical Waste Generated from different wards or laboratories in the health care facilities must be transported in the covered trolleys/carts through a route which has low traffic flow of patients and visitors.

Route of transportation preferably be planned in such a way that:

1. Transportation does not occur through high-risk areas.
2. Supplies and waste are transported through separate routes.
3. Waste is not transported through areas having high traffic of patients and visitors.
4. Central Waste collection area can be easy accessed through this route.
5. Safe transportation of waste is undertaken to avoid spillage and scattering of waste.

Central Waste Collection Room for Bio-medical Waste

Each Healthcare facility should ensure that there is a designated central waste collection room situated within its premises for storage of bio-medical waste, till the waste is picked and transported for treatment and disposal at CBWTF. Such room should be under the responsibility of a designated person and should be under lock & key. The following points may be considered for construction of central waste collection room.

i. The location of central waste collection room must be away from the public/ visitor's access.

ii. The space allocation for this room must be as per the quantity of waste generated from the hospital.

iii. The planned space must be sufficient so as to store at least two days generation of waste.

iv. Central waste collection room must be roofed and manned and should be under lock and key under the responsibility of designated person.

v. The entrance of this center must be accessible through a concrete ramp for easy transportation of waste collection trolleys.

vi. Flooring should be of tiles or any other glazed material with slope so as to ease the cleaning of the area.

vii. Exhaust fans should be provided in the waste collection room for ventilation.

viii. It is to be ensured by the health care facility that such central storage room is safety inspected for potential fire hazard and based on such inspection preventive measure has to be taken by the health care facility like installation of fire extinguisher, smoke detector etc.

ix. There should also be provision for water supply adjacent to central waste storage area for cleaning and washing of this station and the containers. The drainage from the storage and washing area should be routed to the Effluent Treatment Plant.

x. Sign boards indicating relevant details such as contact person and the telephone number should be provided.

xi. The entrance of this station must be labelled with "Entry for Authorized Personal Only" and Logo of Bio Medical Waste Hazard.

xii. It is to be ensured that no general waste is stored in the central waste collection area.

xiii. To ensure there is no pilferage of recyclables, it is to be ensured that central storage area is under lock & key, guarded by a designated person.

xiv. Healthcare facilities need to maintain the record of waste generated and handed over to the authorized recyclers.

xv. To ensure protection from the animals, it is to be ensured by the health care facility that there is no stray animal in the health care facility premises and health care facility has installed cattle traps at the entrance of the health care facility.

xvi. To ensure protection against the pests it is to be ensured by the HCFs that it has engagement of the pest control agency for taking the pest control measures in the central storage area on regular basis.

Record Keeping

a. The Hospital will maintain the records w.r.to category wise bio-medical waste generation and its treatment disposal on daily basis.

b. Category wise quantity of waste generated from the Hospital must be recorded in Bio Medical Waste Register/logbook being maintained at central waste collection area.

c. A weighing machine as per the specifications given in CPCB guidelines for bar code system needs to be kept in central waste collection center of the HCF having 30 or more than 30 nos. of beds for weighing the quantity of Bio Medical Waste.

d. Records on Annual Report on bio-medical waste management submitted to SPCB/PCC

e. Records w.r.t. Accident Report submitted to SPCB/PCC including "NIL" report.

f. Records shall be maintained on training on BMW Management including both Induction and in service training records.

g. Maintain records for Annual Health check-up of all the employees.

h. Maintain record on Immunization of all the employees.

i. Records shall be maintained w.r.t. minutes of meeting of Bio Medical Waste Management committee

j. Records shall be maintained indicating details of accident occurred including preventive and corrective actions taken by the HCFs in relation to such accidents.

k. Records for the operation of the biomedical treatment equipment installed, if any for the treatment of biomedical waste. Please refer Annexure 9 for format of logbook/records maintained for incinerator/plasma pyrolysis and autoclave/hydroclave.

l. Records of testing of Effluent generated from health care facility

m. Record of recyclable waste (plastic/glass) handed over to the authorized recycler in kg/annum.

***The records related to the handling of BMW by healthcare facilities needs to be retained for a period of five years.

Segregation, Treatment and Disposal Of BMW

As per BMWM Rules, 2016 the treatment and disposal of BMW generated from the HCF must be carried out in accordance with Schedule I, and in compliance with the standards provided in Schedule II of BMWM Rules, 2016.

All the public healthcare facilities within reach of 75kilometres of CBWTF needs to dispose of the BMW through such CBWTF only and are not allowed to establish its own treatment and disposal facility.

No treatment of waste is required to be carried out at the health care facility. As per BMW Rules, 2016 all the expired and discarded medicines including cytotoxic drugs expired `cytotoxic drugs are either returned back to the manufacturer or are handed over to the CBWTF to be disposed of through incineration at temperature > 1200^{o}C.

Updating of Information in Website

All bedded healthcare facilities as prescribed under BMWM Rules, 2016 shall develop a separate page/web link in its website for displaying the information pertaining to their hospital by 15/03/2020. The following information should be uploaded and updated time to time:

1. Contact Address and details of the Healthcare Facility:

2. No. of beds:

3. Details of:

a) Authorization under BMWM Rules, 2016:

b) Consent under Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981:

4.Quantity of bio-medical waste generation (in kg/day):

5.Mode of disposal of bio-medical waste (through CBWTF or through captive treatment facility):

6.Name and address of the CBWTF through which waste is disposed of (as applicable) :

7.In case, HCF is having captive treatment facility,

a) bio-medical waste treated (in kg/day)
b) Details of treatment equipment
c) Total nos. and capacity of each treatment equipment (in kg/day)
d) Operating parameters of the treatment equipment as per BMWM Rules, 2016

8. Monthly records of bio-medical waste generation (category wise):

9.No. of trainings conducted on Bio-medical Waste Management in the current year:

10.Stats of immunization of Health Care Workers involved in handling of BMW

Spill Management Procedures:

Healthcare Facilities have to ensure environmentally sound management of mercury or other chemical spills.

In case of mercury spill, the following steps as given in CPCB guidelines on "Environmentally Sound Techniques for Mercury Waste Generated from Healthcare Facilities" shall be followed;

a. Evacuate area: As far as possible, keep people who are not involved in the cleanup away from spill area to limit exposures and to prevent the spread of contamination.

b. Put on face mask: In order to prevent breathing of mercury vapor, wear a protective face mask.

c. Remove jewelry so that the mercury cannot combine (amalgamate) with the precious metals.

d. Put on rubber or latex gloves. If there are any broken pieces of glass or sharp objects, pick them up with care. Place all broken objects on a paper towel, fold the paper towel and place in a puncture proof yellow bag or container. Secure the plastic bag/container and label it as items contaminated with mercury.

e. Locate all mercury beads and look for mercury in any surface cracks or in hard-to- reach areas of the floor. Check a wide area beyond the spill. Use the flashlight to locate additional

glistening beads of mercury that may be sticking to the surface or in small cracked areas. Cardboard sheets may be 'used to push the spilled beads of mercury together'.

f. A syringe (without a needle) shall be used to suck the beads of mercury. Collected mercury should be placed slowly and carefully into an unbreakable plastic container/glass bottle with an airtight lid half filled with water. After removing larger beads, use sticky tape to collect smaller hard-to-see beads. Place the sticky tape in a punctured proof yellow bag and secure properly. Commercially available powdered sulfur or zinc stains mercury a darker color and can make smaller beads easier to see (powder sulfur may be used because (i) it makes the mercury easier to see since there may be a color change from yellow to brown and (ii) it binds the mercury so that it can be easily removed and suppresses the vaporization of any missing mercury).

g. Place all the materials used during the cleanup, including gloves, mercury spills collected from the spill area into a yellow plastic bag or container with lid and sealed properly and labeled as mercury containing waste.

h. Sprinkle Sulphur or zinc powder over the area. Either powder will quickly bind any remaining mercury. In case, zinc powder is used, moisten the powder with water after it is sprinkled and use a paper towel to rub it into cracks in the flooring. Use the cardboard and then dampened paper towels to pick up the powder and bound mercury. Place all towels and cardboard in a yellow plastic bag and seal all the bags that were used and store in a designated area. All the mercury spill surfaces should be decontaminated with 10 % sodium thiosulfate solution. Keep a window open to ventilate after the cleanup. After ensuring all the mercury has been removed, resume normal vacuuming and utilize the cleaned area for routine operation.

i. All the bags or containers containing items contaminated with mercury should be marked properly and labeled as waste mercury containing. This waste shall be categorized as yellow-e chemical waste and shall be disposed as per the options given in flowchart

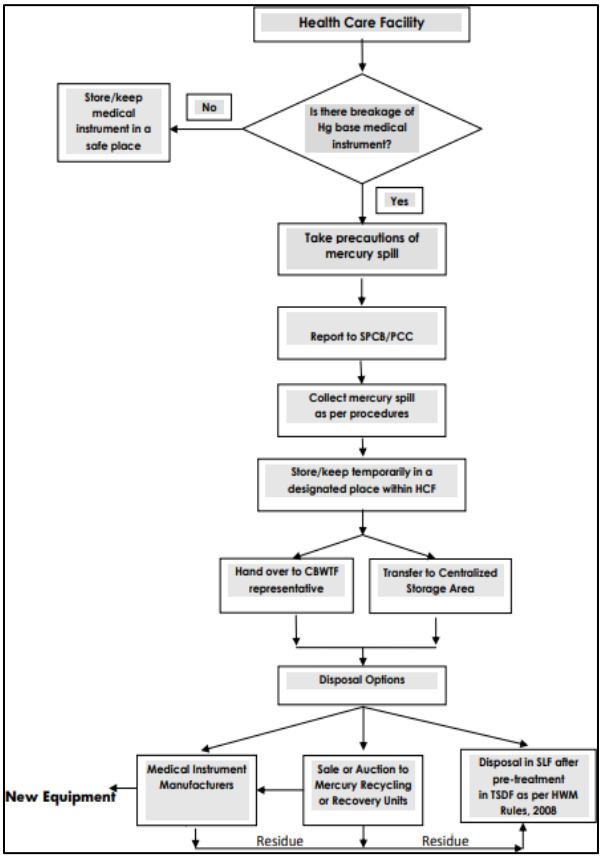

Chart 6.2 Management of Mercury Spills

Other chemical spills should be absorbed in suitable absorption media such as dry sand, proprietary booms, absorbent pads etc. and collected separately. Waste collected from chemical spills has to be categorized as yellow-e waste, which shall be collected in separate yellow bag and handed over to operator of CBWTF or Hazardous Waste (in case of captive facility).

Effluent Treatment Plant

Effluent Treatment Plant should be provided in every HCF to treat the wastewater generated from the hospital in order to comply with the effluent standards prescribed under the BMWM Rules, 2016. Sources of wastewater generation from the hospital are wards, laboratories, used disinfectants, floor washing, washing of patient's area, hand washing, laundry, discharge of accidental spillage, firefighting, bathroom/toilet etc. Liquid waste generated due to use of chemicals or discarded disinfectants, infected secretions, aspirated body fluids, liquid from laboratories and floor washings, cleaning, house-keeping and disinfecting activities should be collected separately and pre-treated prior to mixing with rest of the wastewater from HCF.

The combined wastewater should be treated in the ETP having three levels of treatment; primary, secondary and tertiary;

i. **Primary Treatment:** equalization, neutralization, precipitation and clarification

ii. **Secondary Treatment**: High-rate aerobic biological treatment, secondary settling tank

iii. **Tertiary Treatment**: Pressure Filtration, Disinfection and disposal to drain/sewer

Typical flow chart for the Effluent Treatment Plant is given below:

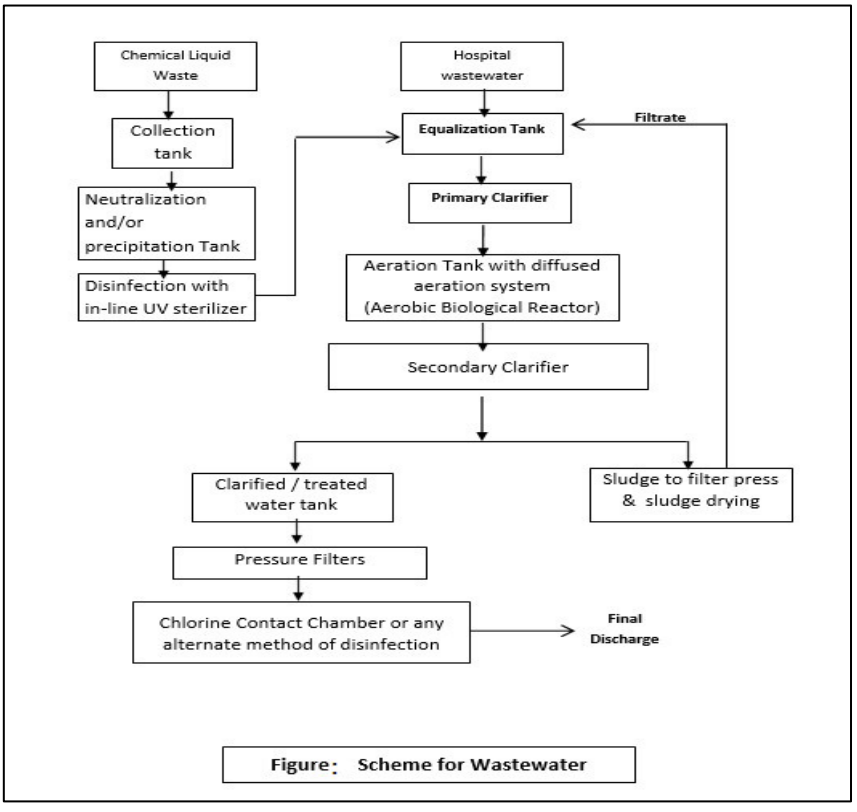

Chart 6.3 Effluent Treatment

BMW Management at Outreach Activities and By Occasional Generators

Health Care Facility may provide any of the outreach services given below;

1. Blood donation camps/Health camps;
2. Home delivery by Skilled Birth Attendant (SBA);
3. Antenatal Care;
4. Point of care diagnosis;
5. Immunization;
6. Family Planning activities;
7. Other similar activity

During the above activities, the bio medical waste generated is required to be segregated, collected at the site of generation itself and has to be transported back to HCF for treatment and disposal. Alternatively, arrangement can be made with CBWTF operator to pick-up the segregated waste directly from camp-site after completion of activity.

Accident Reporting

Any accident occur during the handling of Bio Medical Waste in the healthcare facility is having potential to either harm the environment or safety of the human health must be recorded by the HCF.

As per the Bio Medical Waste Management Rules, 2016, the accidents are classified into two categories; major and minor.

Major Accidents

Major accidents include but not limited to following

i. Toppling of the truck carrying bio-medical waste
ii. Accidental release of bio-medical waste in any water body
iii. Fire Hazard
iv. Blasts
v. Flooding or erosion of the deep burial pit etc.

It is mandatory under BMWM Rules 2016, for healthcare facilities to report each/any major accidents, to the respective State Pollution Control Board/Pollution Control Committee, occurred during the handling of BMW along with the records of remedial actions taken including corrective and preventive actions. The Accident Report is needed to be forwarded in written to the respective SPCB/PCC within 24hrs of accident. The reporting should be done on the prescribed Form 1 given in BMWM Rules 2016.

Minor Accidents

Minor accidents include but not limited to following

i. Needle stick injuries,
ii. Splash exposure or
iii. Spillage of mercury / chemicals etc.

Such minor accidents need not to be immediately reported to the State Pollution Control Board/Pollution Control Committee but is required to be recorded by the health care facility and appropriate remedial actions must be taken by health care facility.

Healthcare facility also needs to submit consolidated report on accidents both major and minor, along with the number of persons affected, remedial actions taken and number of fatalities, along with the annual report (for the preceding calendar year) to be submitted to SPCB/PCC, on or before 30th June of every year.

Other Reporting Requirements

Besides annual reporting and accident reporting each healthcare facility needs to report to the respective SPCB/PCC in event of following:

i. If the waste collection agency or CBWTF does not collect the waste within 48 hours of generation, it is the responsibility of the HCF to immediately inform the respective State Pollution Control Board/Pollution Control Committee about any such lapse.

ii. It is also mandatory to report to the respective State Pollution Control Board/Pollution Control Committee, the reason of storing the waste in the facility for a period beyond 48 hours and also the remedial actions taken by the HCFs to ensure that the waste does not adversely affect human health and the environment.

Occupational Safety

As per Bio Medical Waste Management Rules, 2016 occupational safety of the staff has to be ensured in following methods:

i. Providing adequate and appropriate Personal Protective Equipment (PPE) to the staff handling Bio Medical Waste. Use of PPE while handling of Bio Medical Waste must be encouraged and must be monitored regularly to ensure occupational safety of staff.
ii. Conducting health check-up of all the employees at the time of induction and also at least once in a year.
iii. Ensuring that all the staff of the health care facility involved in handling of BMW is immunized at least against the Hepatitis B and Tetanus.
iv. Taking remedial steps in accordance to any accident occurred, leading to any harm to the employee, during the handling of Bio medical waste

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. Evaluation of immunization status of the staff must be included in the annual health check- up.

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

Immunization

All the staff involved in handling of Bio Medical Waste in the health care facility must be immunized against the communicable diseases especially against Hepatitis B and Tetanus.

Training of Healthcare Workers

As per Bio Medical Waste Management Rules, 2016, it is mandatory for all the employee of the healthcare facility to be trained on handling of biomedical waste management and handling.

Training Need Analysis

It is mandatory for each health care worker inducted to the HCF to undergo the training on Bio Medical Waste Management at the time of induction.

BMW Rules, 2016 also stipulates annual training to the healthcare staff involved in handling of bio medical waste. It is suggested that the committee/person designated for monitor or review of the activities of BMW management does the training need analysis of the staff based on following parameters:

i. Theoretical Knowledge
ii. Demonstration of methods of handling of bio-medical waste
iii. Practical Implementation

Training Schedule

As per the BMWM Rules, 2016 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 Bio Medical Waste Management Handling and training must be provided as per the formed training plan.

Trainers

a. Apart from Professional Trainers, HCFs may also invite the concerned officials of the SPCB/PCCs and operators of CBWTF to attend in-house training programs organized by them so as to impart training to staff involved handling of BMW in health care facilities.

b. HCFs shall also depute the person designated and other identified staff for attending training programs as and when conducted by SPCBs/PCCs.

c. Nodal Officer for biomedical waste management in HCF may take the responsibility to provide induction training to the newly recruited healthcare staff

d. Trained employee of the HealthCare Worker can also take up the role of trainer.

Training Material

It is a requirement of BMWM Rules, 2016 to have a standard training module for imparting the training in the healthcare facilities. For this purpose, these guidelines can be used as training material for imparting the training or any other relevant material published by approved authorities like SPCB/PCC can be used as training material.

Training Records

Health care facilities need to ensure that all the training records pertaining to the Bio Medical 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.

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.

The training details include:

i. Total Number of trainings conducted along with the date of imparting the training
ii. Total number of participants 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.

Chapter 7

CSSD

CSSD Work Protocol

SAFETY AWARENESS IN STERILE SERVICE DEPARTMENT

Objective/ Purpose: To establish an overview of guidelines and safety awareness procedures in the sterile service department.

GENERAL GUIDELINES

1. All personnel must follow established workflow patterns.
2. Material Safety Data Sheets (MSDS) for all chemicals used in the sterile service department must be available in the department.
3. Employee must be trained in a safe work procedure and be aware of any relevant procedures, policies.
4. All employees must be trained in using appropriate personnel protective equipment designated for each area.
5. Employees must adhere to dress code and policies before entering and when leaving the area.
6. Employees must follow and practice hand washing guidelines (before and after each tasks) in accordance with WHO guidelines.
7. Eating and drinking is prohibited in all workspaces including supply storage, processing and decontamination sections
8. Visitors are prohibited from entering CSSD spaces without permission.
9. If visitors must enter restricted areas, appropriate attire is required and they should be escorted by CSSD staff.

PATIENT SAFETY

1. All CSSD personnel should be trained in Decontamination and Sterilization Practices.
2. Safe keeping of all items by ensuring that storage areas are kept clean, equipment is covered and preventive maintenance is performed on all equipment.
3. Assure there is no contamination of patient care areas during collection and transportation of contaminated items.

EMPLOYEE SAFETY

1. Prevent burn injuries when loading or unloading steam sterilizers and washer disinfectors by following procedure and wearing appropriate PPE.
2. Use care and caution when handling sharps.
3. When receiving or handling contaminated items, always wear the correct PPE for the task.

NOTE:

1. Use of electrical extension cords is prohibited in sterile service areas.
2. All employees must be aware of fire and safety regulations.
3. If spills occur, refer to policy management of body fluids spillages or consult safety representative

DEPARTMENT CLEANING PROCEDURE

OBJECTIVE/ PURPOSE: To ensure an acceptable level of hygiene and cleanliness throughout the CSSD area.

PROCEDURE

1. The CSSD will be cleaned in accordance with the cleaning schedule.
2. Cleaning will take place before work commences or after work is completed, in the case of a 24hour facility cleaning will be rotated through areas when work is not in progress
3. The cleaning schedule will specify frequency of cleaning
4. Designated cleaning equipment will be stored in a designated area for that area's use only.
5. Cleaning work will only be undertaken by staff trained to work in that area.
6. CSSD staff is responsible for making sure that all surfaces are clean.
7. All cleaning procedures and cleaning chemicals used in the department will be in line with Departmental recommendations.
8. The use of brooms is discouraged.

DEPARTMENTAL DRESS CODE

OBJECTIVE/PURPOSE: To ensure that staff are properly attired according to the requirements of their work area.

PROCEDURE

1. On entering the Sterile Service Department, all staff will change into departmental uniform provided in the changing area.

2. Staff moving into the wash area, who will be engaged in the handling and processing of incoming equipment, must use appropriate PPE.
3. When leaving the wash area staff will remove and discard the gown and gloves and wash their hands.

MANUAL DECONTAMINATION OF MEDICAL DEVICES

PURPOSE: To ensure that all soiled equipment returned to the CSSD is cleaned to an acceptable standard.

PROCEDURE:

When washing instruments manually, standard/ universal precautions must be applied at all times.

1. Only staff trained in decontamination should manually clean medical devices.
2. Maintain segregation of designated clean and other areas within the department.
3. Identify the correct process for the items to be decontaminated according to manufacturer's instruction.
4. Use and store all equipment, chemicals and materials in accordance with manufacturer's instructions and organizational policies and procedures.
5. Ensure that stock of chemicals and materials that are being accommodated is rotated so that oldest is used first.
6. Place Bio Medical Waste Containers in positions that will minimize hazards to staff and visitors.
7. Handle contaminated devices as little as possible.
8. Check instruments off against the checklist returned with the set and take notice of any comments made on the check list by the theatre team/user.
9. Identify if the medical devices can be decontaminated in the washer.
10. Identify items requiring special attention and handle in accordance with documented manufacturers' instructions.
11. Each instrument will be prepared for decontamination as follows:
    a. Remove the protective outer wraps
    b. If needles/blades are found, the instrument set should be set aside and the end user contacted to come and remove the sharps.
    c. Sort Cannulated and solid devices.
    d. Open all hinged instruments

e. Flush all Cannulated instruments with the pressure jet gun / syringe before and after brushing.
f. Pressure sprays can be used according to manufacturer's guidelines.
g. Disassemble all multi part instruments of Handle and process all devices in accordance with the manufacturers' instructions Keep sets of items being processed together where possible

12. Sinks and accessories must be cleaned at each water change
13. When cleaning manually, a pre-rinse, wash, rinse and drying process must be followed.
14. The water temperature should be according to detergent manufacturers' instructions.
15. Water and detergent should be measured according to manufacturers' instructions and should have the correct chemical mixture.
16. All devices being manually cleaned must be fully immersed in the washing water while being scrubbed.
17. Special attention must be paid to the joints of any jointed instrument and meticulous attention paid to the tips.
18. A clean soft brush or soft cloth /Sponge are required to clean the surfaces.
19. After decontamination, all devices must be visually inspected for soil, damage and functionality.
20. Dry items using a non-linting cloth.
21. Clean items should be stored and transported in such a manner that cross contamination is avoided.
22. Return cleaning equipment and cleaning materials in good working order and condition to the appropriate place after use.

PREPARE, LOAD AND OPERATE AUTOMATED DECONTAMINATION EQUIPMENT

OBJECTIVE: To ensure that medical devices/equipment are correctly prepared and loaded for decontamination.

PROCEDURE:

1. Identify the correct process for the items to be decontaminated following manufacturer's instructions
2. Staff working in this area will wear protective clothing at all times in compliance with the PPE guidelines.
3. Handle contaminated devices as little as possible.

4. Washer disinfectors will be prepared for use as described in the Working Instructions Manual. Follow manufacturers' instructions.
5. All equipment is transferred from the trolley to the work surface.
6. Each instrument will be prepared for decontamination same as manual cleaning.
7. Standardized washing and disinfecting processes should be used and validated.
8. Place instruments into a wash basket and check to ensure all items and parts are present.
9. Load items to be decontaminated in the correct position in baskets so that maximum exposure to the decontamination process is achieved on all surfaces of the instrument
10. Place heavier items at the bottom making sure that all surfaces can be reached by the spray jets
11. Detergents should be used according to washer manufacturers' instructions
12. A full-automated process should be used including pre-rinsing, washing, disinfection and drying.
13. Where more than one chemical is used in the automated washer disinfector, the tubing should be marked to indicate which chemical it carries.
14. Identify and follow operating instructions for washer disinfectors (W/D's) accurately
15. Maintain records of all items received and prepared for processing

PREPARE, LOAD AND OPERATE ULTRASONIC CLEANER

OBJECTIVE

To ensure that medical devices/ equipment's are correctly prepared and loaded for decontamination.

PROCEDURE

1. Maintain segregation of designated clean and other areas within the department.
2. Identify the correct process for the items to be decontaminated Equipment will be prepared for use as described in the Manufacturer's Guidelines.
3. Highly contaminated instruments should always be pre-cleaned in the ultrasonic bath as otherwise they cannot be properly cleaned in the washer-disinfector.
4. It is also recommended that all trays with instruments should be put through the ultrasonic cleaner at least once a week.
5. In the case of table top cleaners;
    a. Fill the tank with RO water to the operating level.
    b. De-gas the water as recommended by the machine manufacturer.
    c. Add detergent, as per requirement.
    d. Sort cannulated and solid devices. Avoid contaminating hands with soiled edge.

e. Open hinged items
f. Place the basket of instruments into the tank. Never put instruments directly onto the base of an ultrasonic washer.
g. Make sure that instruments do not stick out of baskets.

6. Only prescribed automatic cleaning agents should be used, enzymatic cleaners are recommended bearing in mind manufacturer's instructions.
7. Select a program or set the timer control to the time specified by the machine manufacturer.
8. After the cycle has been completed, remove the basket from the tank and rinse the items with clean, potable water-unless the machine has an automatic rinse stage, or the load is to be transferred directly into a washer/ disinfector for further processing.
9. Drain and dry the items using a non-linting cloth or mechanical drying system.
10. Drain the machine after completion of each cycle and left dry and empty until further use.

PACKING AREA OPERATION

OBJECTIVE: To describe the operation and procedure controls in the Packing Room.

PROCEDURE

1. After decontamination, all clean items are received into the packing area
2. Any item that is rejected due to evidence of residual blood, body fluid, stains are placed in a plastic bag and identified before being returned for washing again
3. Any item that is damaged or broken is sent for repair

STERILE PACKAGING

OBJECTIVE: To ensure that the correct materials are used and that items are correctly packaged in order to maintain sterility

PROCEDURE

1. Sterile packaging must provide protection against contamination during handling as well as providing an effective barrier against microbial penetration.
2. An ideal packaging should have the ability to allow sterilization agents to penetrate and then provide a barrier, which will maintain the sterility of the wrapped devices.
3. Use only medical grade packaging.
4. The type of packaging and the way you package the devices will determine if aseptic opening is possible in the operating theatre or the ward.
5. The packaging should protect the contents against damage during handling and transport.

6. The packaging should be able to withstand the conditions during the sterilization process such as pressure changes, high temperature and humidity
7. It is important that the following points are taken into consideration when choosing a tray/set and packaging method:
    a. The type of pack.
    b. The size and weight of items to be packed.
    c. The number of times the pack will be handled before use.
    d. The distance that packs will be transported.
    e. Whether the storage system is open or closed.
    f. The condition of the storage area (cleanliness, temperature, humidity).
    g. The method of sealing packs.
8. The packaging should bear a clearly visible marking indicating whether or not the product has been through a sterilization process.
9. Packaging material used in steam sterilization must be able to withstand high temperatures, allow for adequate air removal, be flexible considering changes in pressure during the process, permit steam penetration to the pack's contents and allow for adequate drying.
10. Packaging materials used with low temperature sterilization processes (e.g., ethylene oxide and gaseous hydrogen peroxide processes) must have similar properties, particularly being compatible with the sterilization chemicals, moisture, pressure changes and temperature ranges.

MEDICAL GRADE SINGLE USE DISPOSABLE STERILIZATION WRAP

1. Double wrapping creates a package within a package.
2. Two sheets of wraps are used providing multiple layers of protection of surgical instruments from contamination. Double wrap = wrap and wrap
3. The use of two layers of wraps reinforces the strength of the packaging.
4. The double wrap with two sequential folds also affords a two-step unwrapping process which assists in aseptic presentation and creation of a sterile field for users in the operating theatre; the outer wrap is removed before entering the operating room or by an assistant.
5. Do not re-use single use packaging
6. Use a hospital grade masking tape and autoclave tape when using wrap
7. Do not write on packaging

DISPOSABLE PEEL-OPEN POUCHES AND REELS

1. Paper/Plastic peel-open packaging materials are suitable for steam and EO.
2. Peel-open packaging should not be used for heavy or bulky items because the seals can become stressed and rupture.
3. Pouches are available in many sizes.
4. The open end of the pouch is closed with a sealing device. It is essential that the heat sealer is functioning effectively in order to get an adequate seal.
5. The user can cut reels to any size needed, in which case both sides of the pack will need to be sealed by the user.
6. Peel-open packaging is useful when visibility of the contents is important.
7. When packaging items, care must be taken to leave a minimum of 1 inch (2.5cm) space between the end of the item and the seal of the pouch or reel in order to facilitate aseptic opening.
8. When double pouching, the inner pouch should be at least a size smaller than the outer pouch to prevent folding which may entrap air and inhibit the sterilization process. They must be packaged paper against paper, plastic against plastic in order to enable sterilant penetration.
9. A felt-tip, indelible, non-toxic ink marker can be used on clear plastic side of the pouch to label.

REUSABLE RIGID CONTAINER SYSTEMS

1. Sterilization containers are a durable sterilization packaging system constructed of a rigid material such as metal, or plastic.
2. A variety of sizes can accommodate a wide range of instrument sets. need to be disassembled and cleaned after each use, following the reprocessing instructions supplied by the container manufacturer.
3. Containers are classified as devices themselves and as such should be reprocessed after each use, not just wiped down. Containers must be cleaned in the same way as any other reusable device.

STEAM STERILIZATION PROCEDURE

OBJECTIVE/ PURPOSE: To ensure consistent sterilization of items through quality control checks of the autoclave to ensure that all reprocessed medical devices are sterilized to an acceptable standard and ready for use.

PROCEDURE

1. Check to ensure printer, recorder is working properly
2. The first cycle will be a “warm up” cycle.
3. On the second cycle place a Bowie and Dick Test Pack, in the warm empty chamber above the drain, on a pre-vacuum cycle.
4. Once the cycle has run record the Bowie and Dick test according to procedure.
5. If the Bowie Dick test result is a fail, repeat the test with a new Bowie Dick Test pack.
6. If the Bowie Dick test is still fail shut down the autoclave for repairing.
7. Run Biological indicator once a week, according to CDC Guidelines, in the first full load of the day as well as any load containing implants.
8. Record the result according to procedure.
9. Record contents of load, information must be detailed enough to allow for tracking and recall if necessary.
10. Label package according to policy.
11. Make sure each pack has a tracking label affixed.
12. Ensure that items being loaded are compatible with High Temperatures.
13. Process full loads—not overloaded—to limit the number of cycles you need to run.
14. Load items in a loose fashion to facilitate air removal, and steam penetration of all surfaces—do not stack items one on top of the other.
15. Packages must not be in contact with walls or ceiling of chamber or else damage from heat or moisture may occur.
16. Load baskets and carts in a manner that hands won’t touch packs when removing the hot trolley.
17. On completion of cycle, ‘cycle complete indicator’ will appear, visually check the graph / printer to determine that all parameters have been met.
18. In the event of a cycle failure/ cycle aborted, the entire load will need to go through the full reprocessing cycle.
19. The person responsible for checking the load should sign their name on the printout before opening the sterilizer door.
20. Open the door while standing towards the side to avoid burns.
21. Put on heat resistant gloves and remove carrier from Autoclave.
22. Allow to cool for 10–15 minutes before storage or dispensing.
23. Do not touch hot packs
24. Inspect packages to ensure integrity and external chemical indicators have changed.

25. Record results in the register and file for each autoclave according to batch no.

LOADING AND UNLOADING ITEMS FROM THE AUTOCLAVE

OBJECTIVE/ PURPOSE: To ensure that items are correctly loaded and unloaded from autoclaves in order to maintain sterility.

PROCEDURE

1. Wear relevant protective clothing.
2. Load instruments sets flat in single layer.
3. Load soft packs on top shelf and large instrument trays on lower shelf.
4. Do not allow packs to touch top, bottom or sides of autoclave.
5. Do not compress pack.
6. Position peel packs on sides.
7. Do not overload
8. On completion of cycle record maintain according to policy.
9. Allow autoclave and packs to cool before handling.
10. Do not touch hot racks without heat resistant gloves.
11. Once cooled check for wet packs, tears, indicator changes etc.
12. Store according to policy

LOW TEMPERATURE STERILIZATION (H2O2)

OBJECTIVE/ PURPOSE

To ensure that all soiled returned equipment is sterilized according to an acceptable standard and ready to use. To ensure the work environment is safe for all employees.

PROCEDURE:

1. Sort Items that cannot be processed in a Hydrogen Peroxide Plasma/ Vaporized Hydrogen Peroxide.

2. Any item that is not completely dry
3. Items or materials that absorb liquids
4. Items made from materials containing cellulose e.g., cotton, paper, cardboard, linens, gauze or items that contain wood pulp Inserting and removing cassettes/ cartridge:
5. Check item for damage
6. Do not remove cassette from plastic wrapper if indicator strip is red, which indicates that the cassette might have been damaged

7. Check expiry date of biological indicator/ monitor.
8. Daily biological monitoring is recommended.
9. Place biological monitor in a load in the sterilizer
10. Process biological indictor
11. Incubate biological indicator at temperature as recommended by manufacturer. Preparing Items for loading:
12. All items must be thoroughly cleaned and dried before packaging.
13. Use packaging and containers recommended by the manufacture.
14. Arrange items in such a way as to ensure sterilant will come into contact with all surfaces.
15. Do not allow any items to touch the walls or the door.

STERILE PACK STORAGE

OBJECTIVE/PURPOSE: To ensure the safe storage of all sterile packs until their release to other departments.

PROCEDURE

1. This is a clean area and should be kept clean and tidy at all times with limited access.
2. Ensure that stock is rotated and monitor stock levels.
3. Any member of the CSSD staff may issue out packs to customers, provided that all the checks have been carried out by the person releasing the goods.
4. Only CSSD staff should be allowed access to the storage area.
5. Doors and windows must be kept closed.
6. Temperature and humidity should be controlled.
7. The sterile storage area should be arranged to make it easy to identify packs and be well lit and easy to clean.
8. Surgical and medical supplies should be stored at least 25 cm from the floor, 45 cm from the ceiling and 5 cm from outside walls to allow for air circulation in the room and to prevent contamination during cleaning.
9. Follow a system of use the First in First out (FIFO) system. Rotate stock so that oldest items are used first.
10. Products should be stored away from direct sunlight and water.
11. Do not squeeze packs into tight spaces as this can tear the packaging
12. Cardboard boxes should not be used as storage containers because they release fibres, cannot be easily cleaned and sometimes have rough edges which can make holes in packaging.
13. The shelf life of a pack is dependent on packaging, handling and storage conditions.

14. The shelf life of a CSSD processed sterile item is based on events rather than time.
15. Expiration date is a reminder “Use Before”/ “Use First”.
16. Events that can compromise the sterility of a sterile item include:
    a. Holes or torn wrappers.
    b. Broken or incomplete seals on laminated pouches
    c. Items that have been dropped on a dirty surface
    d. Elastic bands or tapes should not be used to bundle items

THE DELIVERY AND DISTRIBUTION OF PROCESSED ITEMS

OBJECTIVE/ PURPOSE: To ensure customers receive sterile items in a safe condition and ready to use.

PROCEDURE:

1. All items will be checked for sterility before they are released.
2. The following should be checked when deciding if the pack is still sterile:
    a. Holes or tears
    b. Wetness or stains
    c. Broken seals
    d. Dust
    e. Evidence of crushing
3. All damage items are returned to the decontamination area.
4. Various methods can be used in the transport of sterile packaged items to their point of use.
5. Sterile supplies should be transported in covered or enclosed trolleys with a solid bottom shelf. The solid bottom shelf prevents microorganism on the floor being picked up by the wheels of the trolley and then spun upwards onto the sterile packs.
6. If items are placed inside plastic or paper bags, they should be arranged to prevent them from being crushed or damaged during transport.
7. Items must be placed onto a clean trolley that can be covered.
8. Trolleys must not be overloaded.
9. Soiled items must NOT be loaded onto the same trolley.
10. Loaded trolleys must not be left to stand.

QUALITY CONTROL

OBJECTIVE: To ensure that the CSSD provides a quality service

PROCEDURE AREA WHERE TO PERFORM TEST

Detail of Test Washing Area Checks that complete set have been received from user. Check detergent level on washer. Packing Area All instruments to be visually inspected for cleanliness/ functionality—deal with rejected items according to policy.

1. Check all instrument are present and packed correctly.
2. Place a chemical in-pack indicator.
3. Check the functioning of heat sealers daily.

AUTOCLAVE AREA

1. Physical monitoring of all sterilizers.
2. Perform daily Vacuum Tests on all steam autoclaves (BD).
3. Perform weekly Biological Tests on all sterilizers.
4. Check that all packs have external chemical indicators before loading into sterilizer.
5. Check that all parameters have been met on autoclave. Take a printout and keep for record.
6. All items that have residual moisture, tears or from a failed cycle are to be dealt with in accordance with policy. Sterile Store Area
7. Before releasing goods for delivery, check the packaging for damage.
8. Check the external chemical indicator to ensure that the pack has been through a sterilizer.

MONITORING STEAM AUTOCLAVES

OBJECTIVE/ PURPOSE: To monitor that all steam autoclaves are functioning optimally.

PROCEDURE:

a. Monitoring includes all sterilizer components that track and record time, temperature and pressure during each cycle, printouts, gauges, round charts, etc.
b. Documentation of critical cycle parameters permits the earliest detection of equipment malfunctions since they can be evaluated when the cycle is in progress. Sterilization failure can be identified at a number of stages:
c. Autoclave parameters are not met
d. Biological Test shows growth
e. Bowie Dick Test Failure
f. Process Challenge Device or Load Control Failure
g. External Process Indicator Failure
h. Internal Chemical Test Failure

i. The ISO 11140-1 standard classifies indicators according to intended use or performance criteria as follows:

1. Class 1: Process indicators/ external indicators for use in specific tests/Bowie Dick
2. Class 3: Single parameter indicators/ respond to one parameter
3. Class 4: Multi-parameter indicators/ respond to 2 or more parameters
4. Class 5: Integrating indicators/ react to all parameters/ mirror the performance of biological indicators
5. Class 6: Emulating indicators/ react to all parameters/ verify specific cycle parameters

Bowie Dick Test (BD)

1. Bowie-Dick test should be run and documented at least daily before the first process load and after any steam autoclave shut-down.
2. This indicates if air is being removed completely from the autoclave.
3. The Bowie Dick is placed on a rack above the drain of the autoclave in an EMPTY load.
4. This test should be done daily in each machine, the machine must be warm.
5. There must be a complete, uniform color change which indicates a PASS.
6. A PASS indicates that the sterilization process was effective since it indicates no air was present.
7. An incomplete or no color change—FAIL.
8. A FAIL indicates air was present and sterilization was not achieved.
9. Repeat the test.
10. If results still show a FAIL do not use the autoclave.
11. The Autoclave number and test result must all be recorded in the record book provided.
12. A Process indicator is placed on the outside of each individual package to verify that the package has been exposed to a sterilization process.
13. Indicator should be clearly visible on the outside of the sterilized package. This helps differentiate sterilized from unsterilized items.
14. Fix the Process indicator tape or label on the outside of the package or rigid container, once it has been assembled for sterilization.
15. Color change according to the manufacturer's reference—Pass–Medical Device can be moved to the Sterile Storage Area for use
16. Color change not according to the manufacturer's reference—Fail–Medical Device should be reprocessed CSSD.

Internal Chemical Indicators (CI)

1. In-pack chemical indicator can detect sterilizer malfunction or human error in packaging or loading of the sterilizer.

2. Place the CI in an area of the package, instrument tray or rigid container in an area that is determined to be the densest part of each pack
3. Measure if sterilizing parameters have been met inside the pack
4. Color change even and according to the manufacturer's reference—Pass–Medical Device can be used
5. Color change uneven and/or not according to the manufacturer's reference—FAIL–Medical Device should not be used
6. Send back to Sterilization Department for reprocessing.

Biological Indicators (BI)

1. A biological indicator is a preparation of living spores which provide a defined resistance to a specified sterilization process.
2. A PASS indicates if sterilizing conditions are adequate to kill micro-organisms.
3. Non-pathogenic micro-organisms are used.
4. Manufacturer of the BI should provide data on the reliability, safety and performance characteristics of their product, as well as instructions for storage, handling.
5. A test must be performed once a week in each sterilizer.
6. Place the BI in a test pack, into the center of a FULL load.
7. After sterilization, retrieve the BI Test out of the pack.
8. Allow the BI to cool for 10 minutes after sterilization. (Note the BI contains a glass ampoule, which needs to cool prior to crushing and incubating)
9. Record the sterilizer, load and date on the BI label.
10. Send the BI to microbiology for incubation process.
11. Sterilization process was effective since it indicates no growth.
12. Positive '+' means color change/growth of microorganisms.
13. Indicates microorganism growth and sterilization was not achieved
14. If there is a BI failure on any load, the whole load must be recalled, repackaged and re-sterilized.
15. Results must be recorded and stored according to Hospital Policy

CHAPTER 8

Sterilization, Disinfection &Cleaning Practices

CLEANING PROTOCOL

A. Cleaning Of Patient Care Area/Room

Daily Routine Patient Bed Space/Room Cleaning

Cleaning of patient care areas/rooms should follow a methodical, planned format that includes the following elements:

Assessment

i. Check for additional precautions (isolation) signs and follow the precautions indicated
ii. Walk through room to determine what needs to be replaced (e.g., toilet paper, paper towels, soap, ABHR, gloves, sharps container) and whether any special materials are required; this may be done before or during the cleaning process.

Gather supplies

i. Ensure adequate supply of clean clothes is available
ii. Prepare fresh disinfectant solution according to manufacturer's instructions.

Wash hands and put on PPE

Clean room, working from clean to dirty and high to low areas of the room

i. Use fresh cloth(s) for cleaning each patient bed space:
ii. If a bucket is used, do not 'double-dip' cloth(s)
iii. Do not shake out cloth(s)
iv. Change the cleaning cloth when it is no longer saturated with disinfectant and after cleaning heavily soiled areas such as toilet and bedpan cleaner.
v. Start by cleaning doors, door handles, push plate and touched areas of frame
    1. Check walls for visible soiling and clean if required
    2. Clean light switches and thermostats

3. Clean wall mounted items such as (ABHR) dispenser
4. Check and remove fingerprints and soil from glass partitions, glass door panels, mirrors and
5. windows with glass cleaner
6. Check privacy curtains for visible soiling and replace, if required

ii. Clean all furnishings and horizontal surfaces in the room including chairs, window sill,

a. telephone, over bed table etc. Lift items to clean the table. Pay particular attention to high-
b. touch surfaces.
c. Wipe equipment on walls such as top of suction bottle, intercom and blood pressure
d. manometer as well as IV pole
e. Clean bedrails, bed controls and call bell
f. Clean bathroom/shower (applicable for single room) (see bathroom cleaning procedure)
g. Clean floors (see floor cleaning procedure).

Disposal

i. Place soiled clothes in designated container for laundering.
ii. Check sharps container and change when 2/3rd full (do not dust the top of a sharps container)
iii. Remove soiled linen if bag is full
iv. Place waste in color coded bins as prescribed under New BMW Rules
v. Remove waste.

Remove gloves and clean hands with ABHR; if hands are visibly soiled, wash with soap and water.

Do not leave room wearing soiled gloves

Replenish supplies as required (e.g., gloves, ABHR, soap, tissue roll/paper towel etc.)

Housekeeping in-charge should complete the monitoring and evaluation of the cleaning after each cleaning procedure.

In addition to routine daily cleaning of patient care areas/rooms, the following additional cleaning should be scheduled:

1. High dusting using damp mop (weekly)
2. Clean corners (weekly)
3. Removal and laundering privacy curtains/screen

4. Clean window curtains/coverings when soiled or at least monthly
5. Dust window blinds at least monthly.

High dusting includes all surfaces and fixtures above shoulder height, including vents. Ideally, the patient/resident should be out of the room during high dusting to reduce the risk of inhaling spores from dust particles.

B. Procedure for Routine, Discharge/Transfer Cleaning of a Patient Bed Space/Room

Assessment

i. Check for additional precautions signs and follow the precautions indicated
ii. Walk through room to determine what needs to be replaced (e.g., toilet paper, paper towels, soap, ABHR, gloves, sharps container) and whether any special materials are required; this may be done before or during the cleaning process.

Gather supplies

i. Ensure an adequate supply of clean clothes is available
ii. Prepare fresh disinfectant solution according to manufacturer's instructions.

Wash hands and put on PPE

Remove dirty linen

i. Strip the bed, discarding linen into soiled linen bag; roll sheets carefully to prevent aerosol formation
ii. Inspect bedside curtains and window treatments; if visibly soiled, clean or change
iii. Remove gloves and clean hands.

Clean room, working from clean to dirty and high to low areas of the room

a. Use fresh cloth(s) for cleaning each patient/resident bed space:

ii. If a bucket is used, do not 'double-dip' cloth(s)
iii. Do not shake out cloth(s)
iv. Change the cleaning cloth when it is no longer saturated with disinfectant and after cleaning heavily soiled areas such as toilet.

a. Start by cleaning doors, door handles, push plate and touched areas of frame
b. Check walls for visible soiling and clean if required

c. Clean light switches and thermostats
d. Clean wall mounted items such as (ABHR) dispenser
e. Check and remove fingerprints and soil from glass partitions, glass door panels, mirrors and windows with glass cleaner
f. Check privacy curtains for visible soiling and replace, if required
g. Clean all furnishings and surfaces in the room including chairs, window sill, television, telephone, computer keypads, over bed table etc. Lift items to clean the tables. Pay particular attention to high touch surfaces
h. Wipe equipment on walls such as top of suction bottle, intercom and blood pressure manometer as well as IV pole
i. Clean inside and outside of patient/resident cupboard or locker.

Clean the bed

i. Clean top and sides of mattress, turn over and clean underside
ii. Clean exposed bed springs and frame
iii. Check for cracks or holes in mattress and have mattress replaced as required
iv. Inspect for pest control
v. Clean headboard, foot board, bed rails, call bell and bed controls; pay particular attention to areas that are visibly soiled and surfaces frequently touched by staff
vi. Clean all lower parts of bed frame, including castors
vii. Allow mattress to dry.

Clean bathroom/shower (see bathroom cleaning procedure)

Clean floors (see floor cleaning procedure)

Disposal

i. Place soiled cloths in designated container for laundering
ii. Check sharps container and change when 2/3rd full (do not dust the top of a sharps container)
iii. Remove soiled linen bag and replace with fresh bag
iv. Place waste in color coded bins as prescribed under New BMW Rules
v. Close waste bags and remove and add a clean bag.

Remove gloves and clean hands with ABHR; if hands are visibly soiled, wash with soap and water.

Do not leave room wearing soiled gloves

Remake bed and replenish supplies as required (e.g., gloves, ABHR, soap, paper towel, toilet brush)

Return cleaned equipment (e.g., IV poles and pumps, walkers, commodes) to clean storage area.

C. CLEANING OPERATING ROOMS

Environmental cleaning in surgical settings minimizes patients' and healthcare providers' exposure to potentially infectious micro-organisms.

First cleaning of the day (before cases begin)

i. This should be performed first, every morning irrespective of whether the OT will be used or not
ii. Wear a clean gown, cap, mask and clean utility gloves
iii. The surgeon/anesthetist should not enter the OT before cleaning is complete
iv. Clean all horizontal surfaces by wet wiping with an HLD Every horizontal surface should be cleaned
v. Follow the sequence of cleaning as mentioned previously (top to down; in to out)
vi. Clean all antiseptic bottles and the trays in which they are kept. Clean the sterile containers
vii. Ensure color coded waste collection bags are placed in the waste bins
viii. Keep the OT closed for 10-15 min with ventilation equipment on after cleaning
ix. Wash the scrub basin and tap with soap and water. Check for leakage and report immediately if seen. Clean the soap and antiseptic bottles at the scrub basin. Replace the bottles if empty
x. During cleaning, only cleaning personnel should be present in the OT and the doors should be kept closed
xi. After cleaning is over, wash and remove utility gloves, gown and cap. Wash hands and disinfect them by using an alcohol hand rub before proceeding to other work.

Cleaning Operating Rooms in between Cases

i. Keep ventilation equipment on and OT door closed
ii. Wear OT dress, footwear and a cap
iii. Place a cautionary 'Wet Floor' sign at the entrance of the room

iv. Prepare fresh disinfectant solution according to manufacturer's instructions
v. Clean hands and put on gloves
vi. Collect and remove waste
vii. Collect and remove all soiled linen segregating soiled and dry linen
viii. Remove gloves and clean hands. Wear a different set of gloves
ix. Use a cloth dampened in hospital-approved disinfectant solution to clean and disinfect surfaces that have come in contact with a patient or body fluids, including tops of surgical lights, blood pressure cuffs, tourniquets and leads
x. Clean suction canisters, reflective portion of surgical lights
xi. Clean and disinfect OT table
xii. Clean electronic equipment (i.e., monitors) according to manufacturer's instructions
xiii. Damp mop floor in a 1-to-1.3-meter (3 to 4 feet) perimeter around the OT table (larger area if contamination present)
xiv. Insert color coded bags in waste bins
xv. Damp-dust equipment from other areas such as X-ray machines, C-arm etc. before being brought into the operating room and prior to leaving
xvi. When cleaning is complete, remove gloves and clean hands.

Procedure for Terminal Cleaning of Operating Rooms

i. Place a cautionary 'Wet Floor' sign at the entrance of the room
ii. Prepare fresh hospital approved disinfectant solution according to manufacturer's instructions
iii. Clean hands and put on gloves
iv. Collect and remove waste
v. Collect and remove all soiled linen
vi. Clean hands and change gloves
vii. Clean and disinfect lights and ceiling-mounted tracks
viii. Clean and disinfect all door handles, push plates, light switches and controls
ix. Clean and disinfect telephones and computer keyboards
x. Spot-check walls for cleanliness
xi. Clean and disinfect all exterior surfaces of machines and equipment (e.g., anaesthesia carts), allowing adequate drying time for the disinfectant before storage
xii. Clean and disinfect all furniture including wheels/casters

xiii. Clean and disinfect exterior of cabinets and doors, especially around handles
xiv. Clean and disinfect all surfaces
xv. Clean scrub sinks and surrounding walls
xvi. Mop floor, making sure the OT table is moved and the floor is washed underneath; move all furniture to the center of the room and continue cleaning the floor; apply a sufficient amount of disinfectant/detergent to ensure that the floor remains wet for five minutes; use a fresh mop/mop head and fresh solution for each room
xvii. Replace all furniture and equipment to its proper location
xviii. Wash the color-coded bins, dry them and put color coded bags once it is dried
xix. Report any needed repairs
xx. Clean and store cleaning equipment
xxi. Remove gloves and clean hands.

Detailed Wash-down of the OT Complex

i. A detailed wash-down should be done at least once a week for OTs that are used daily
ii. For OTs that are used less frequently, detailed wash-down should be done at least once a month and before any camp patients are operated.

Method

a. Wear utility gloves
b. Shift all movable equipment and materials out of the OT
c. Inspect the OT surfaces for cracks, loose tiles etc. If any maintenance work is required, perform the maintenance before proceeding
d. In case the maintenance involves civil work that generates dust, then the cleaning and disinfection protocol for cleaning and disinfection new OT should be followed after the maintenance work is completed.
e. Wipe all surfaces of the OT liberally with soap and water
f. Begin at the ceiling. Use a long-handled mop to wipe the ceiling
g. Proceed down the walls. Clean all wall fixtures on the way down
h. Clean all ceiling mounted fixtures e.g., OT lamp
i. Then clean all fixed floor-based equipment
j. Lastly scrub the floor with soap and water
k. Repeat cleaning until all visible dust is removed

l. Allow the OT to dry naturally
m. Then wipe all surfaces with HLD. Allow the disinfectant to dry naturally
n. Meanwhile, clean all the equipment moved outside with soap and water. Remove all dirt and dust. Clean every surface of the equipment
o. Remove all materials stored on trolleys and clean the entire trolley. Also clean the bottles, containers, etc. by wiping them on the outside to remove all soiling
p. Clean the wheels by running them 10-15 times over a Turkish towel soaked with soap and water
q. Wipe the equipment with HLD and allow to air dry
r. Move the equipment back into the OT. Wipe equipment with high-level disinfectant
s. Cover electronic equipment with properly fitting plastic covers and fog the OT with high-level disinfectant until a fog is seen in the air
t. Keep the OT closed for at least one hour
u. Meanwhile, clean the rest of the OT complex (passages, other rooms) with soap and water followed by wiping with high-level disinfectant. Clean and wipe from ceiling to floor. Clean all furniture
v. The OT may be used after it has remained closed for at least one hour.

Cleaning and Disinfection of New OT and after any Civil Work

i) First ensure all civil work is completed
ii) Ensure all movable equipment has been shifted out
iii) Wear utility gloves
iv) Wipe all surfaces of the OT using liberal amount of soap and water. Repeat wiping until all
v) Visible dust is removed. Clean all fixed equipment like OT lamp with soap water until all visible dust is removed
vi) The mechanical action of wiping is very important to remove spores and improve the
vii) Action of disinfectants used subsequently
viii) Allow all surfaces to dry completely
ix) Wipe all surfaces (including the ceiling) with a high-level disinfectant. Allow to dry completely
x) Wipe down all equipment to be moved into the OT with soap and water to remove all visible dust. Allow to dry

completely. Clean the wheels by running them 10-15 times over a Turkish

xi) Towel soaked with soap and water. This equipment cleaning is to be done outside the OT

xii) Move the cleaned equipment into the OT

xiii) Wipe all surfaces (excluding the ceiling and walls up to the height the hands can reach) with high-level disinfectant

xiv) Allow to dry completely

xv) Fog the OT with high-level disinfectant until a fog is seen in the air

xvi) Stop and remove the fogger and close the OT for at least one hour with any ventilation system/AC off

xvii) After 1-2 hours open the OT and take post fogging swabs. Change into OT dress, cap, mask and use sterile gloves when performing the sampling. Only the person taking the samples should enter the OT.

Sample the following sites at the minimum:

a. OT table upper surface
b. OT lights lower glass surface
c. Anaesthesia machine (swab the area where medications are placed during use)
d. Sterile instruments trolley surface
e. Any two walls (sample sites above OT table height)
f. Floor (two samples on either side of the OT table
g. Air conditioner outlet louvers (if AC present)

xviii) After sampling close the OT. No one should enter the OT until next day.

xix) On second day, wear OT dress, footwear and cap; wipe all surfaces (including ceiling with a long-handled mop) once with soap water, allow drying and then wiping once with a high-level disinfectant

xx) Keep OT closed for at least one hour with ventilation system/AC off

xxi) Repeat the OT swab sampling as mentioned above

xxii) On third day, repeat the entire procedure (third time) and sample the swabs (third sampling)

xxiii) Wait for the OT swab reports. The OT can be used if all the three swabs' reports show no growth of any organisms OR sparse growth of skin commensals in any one out of nine swabs taken per sampling

xxiv) In case growth of spore bearing organisms, pathogens (e.g., Staphylococcus aureus), aerobic gram-negative bacilli or fungus is seen, disinfectant wiping of the entire OT and fogging should be repeated and swabs sampled again (once only)

xxv) If results are not satisfactory even now, seek help of an expert in infection control.

D. Cleaning Of Sterile Areas

Sterile processing areas in CSSD/TSSU

a. Use same high-level disinfectant used for OT cleaning
b. Clean all counters and floors once daily
c. Clean shelves in sterilization areas, preparation and packing areas and decontamination areas once daily
d. Clean shelves once daily in sterile storage areas
e. Clean case carts after every use
f. Clean walls once every month and whenever visibly soiled
g. Clean light fixtures, sprinkler heads and other fixtures once every month

E. Cleaning Of Labor Rooms

General Rules

i. Whenever any equipment from the outside is brought into the labor room, wipe all
ii. Equipment surfaces down with HLD before bringing them into the room
iii. Cleaning sequence
    a. Always clean the labor room before cleaning the connected passages and rooms

b. When cleaning the labor room proceed in a top-to-down sequence i.e., ceiling-based equipment first, walls, then floor-based equipment and lastly the floor. When cleaning the floor, begin at the end farthest from the door and move towards the door (in to out). The cleaning staff should always move from clean to unclean areas and never vice versa
c. When cleaning individual equipment: clean from top to down

iv. Apply the following general rules to facilitate fast and easy cleaning:
    a. Minimizes the numbers of equipment
    b. Minimizes the number of horizontal surfaces
    c. Provide smooth finishes and minimum joints in surfaces
    d. Round off corners wherever possible for easy cleaning access
v. Equipment and environment surfaces that have become rough should be repaired/replaced.
vi. Soiling with blood/body fluids should be cleaned as soon as possible
vii. Items that are not regularly required in the labor room should not be stored there. Materials that are used at other locations should not be stored in the labor room
viii. A broom should not be used in the labor room. Use a dust pan and a piece of stiff plastic/cardboard to gather particulate debris from the floor. All cleaning should be done by wet mopping/wiping technique
ix. When picking up sharp items from the floor e.g., dropped needles, use a forceps to hold it. Do not pick up sharps by hand
x. Do not use domestic vacuum cleaners in the labor room
xi. Always use the recommended cleaning/mopping technique
xii. Never mix any two disinfectants or disinfectant with soap
xiii. During cleaning inspect all areas for water seepage and report immediately. Mop the affected area with HLD at least once a day until the problem is resolved
xiv. Use separate dedicated mops for
    a. Floor and ceiling-based equipment e.g., labor table, lights, trolleys etc.
    b. Floors and walls
    c. Use color coding (one color for each type a & b) to prevent accidental exchange
xv. Labor room walls may be cleaned 2-3 times a week. Clean as soon as possible if visible dust is present and whenever soiling with blood/body fluids occurs.

Daily Routine Cleaning and Disinfection for Labor Rooms

i) The labor room and connected passages and rooms should be cleaned at least twice a day at fixed times.

ii) At other times spot cleaning of visibly soiled areas and cleaning of blood/body fluid spills should be done as soon as possible when soiling occurs.

iii) Use an HLD. Use the same dilution as used for OT cleaning

iv) Wear utility gloves. Change the gloves when indicated

v) Perform all cleaning by wet mopping/wiping

Daily morning wet clean all surfaces as follows:

a. Prepare all cleaning material and wear clean utility gloves
b. Wipe all switches on the wall, the door handles
c. Wipe all equipment beginning at the top and moving downwards. Clean the sides and legs also
d. Clean all trays, bottles and sterile containers on the trolley
e. Clean the equipment in the new-born baby corner. Place clean covers on the equipment
f. Check all surfaces – especially horizontal surfaces – for visible dust and ensure all such dust is removed
g. Wash the hand wash basin with soap and water. Clean the soap and antiseptic bottles. Replace them if empty
h. Check BMW bins for presence of proper color-coded waste bags. Add bags to the bin if required.
i. Check whether the sharps waste container is available and ready for use
j. Clean the floor last, beginning farthest from the door and moving towards it.
k. BMW: Remove BMW at least thrice a day or when the waste container is 3/4ths full.

Cleaning after a Delivery

a. Begin cleaning as soon as possible
b. Wear utility gloves. Wear a gown and goggles if splashing is expected
c. Clean all blood/body fluid spills
d. Ensure BMW is discarded into the correct color-coded bag
e. Remove soiled linen carefully and put it in a waterproof container/bag

f. Remove any instruments used in the delivery and send/transport them for cleaning and sterilization
g. Change the utility gloves and wet wipe the equipment used in the delivery (i.e., table, IV stand, stool, etc.) with an HLD
h. Wet mop the floor around the labor table with an HLD
i. Labor room slippers should be washed with soap and water every evening and when they are visibly soiled/dirty
j. Soiled gowns used during delivery, soiled goggles, soiled footwear should be collected separately and disinfected by immersion in chlorine solution (500-1000 ppm) for 5-10 min) followed by a plain water rinse before washing them with soap water

Cleaning after all deliveries is over

i. Perform the steps mentioned for "cleaning after a delivery"
ii. Perform the steps mentioned for daily morning cleaning
iii. Keep the labor room closed after the final cleaning.

Detailed Wash-down of the Labor Room

i. Perform detailed wash-down of the labor room, using the procedure mentioned for detailed wash-down of the Operation Room
ii. Perform this cleaning at least twice a month.

F. Cleaning Of Toilets

i. All toilets should be cleaned at least thrice a day especially the ones in general areas
ii. Cleaning equipment for toilets (i.e., floor mops, hand mops, buckets, bottles used to prepare disinfectant dilutions) should be separate and not be used in other areas of the hospital
iii. Use the following method to clean toilets:
    a. Prepare all cleaning material first. Ensure mops and buckets are clean
    b. Wear utility gloves and waterproof apron and protective goggles
    c. Wash the basin and tap with soap and water and rinse with plain water
    d. Clean any buckets and tumblers in the toilet
    e. Clean the toilet fixtures and pans using a soap and brush. Brush walls up to waist height each time. Brush at higher levels if soiling is seen
    f. Rinse away the soap by spraying water under pressure. A piece of tubing can be fixed to the tap in the toilet and water sprayed through it with pressure by partially closing the outlet opening of the tube with the finger. A car sprayer attachment should be obtained if possible

g. Brush any remaining stains and soiled areas using more soap and water applying pressure
h. Drain away excess water on the floor using a rubber floor wiper
i. Sprinkle chlorine solution containing at least 5000 ppm chlorine on all surfaces except metal ones (taps). This can be prepared by making a 10% dilution by volume of a hypochlorite solution containing minimum 5% chlorine or by dissolving chorine powder in water in proportion recommended by the manufacturer to provide this strength of chlorine
j. Allow to dry naturally

iv. Wash the cleaning equipment with soap and water and keep it in the correct place
v. Wash the utility gloves with soap and water and hand them to dry
vi. Wash hands with soap and water and disinfect them using an alcohol hand rub before proceeding to other work.

G. Cleaning Of Isolation Wards

i. Cleaning of this area should preferably be done after cleaning other areas
ii. Additional PPE – disposable cap, mask, linen gown and if required, goggles - should be used during cleaning. These items should be put on just before entering the area and should be removed immediately after coming out. They should not be taken to other areas of the hospital without putting them in plastic bag first
iii. Prepare all cleaning equipment and chemicals before starting cleaning. All cleaning should be completed in one session. Use an HLD
iv. Wear cap, mask, gown and rubber gloves
v. Enter the area. Keep door closed to prevent traffic. If patient has a respiratory infection, keep windows open
vi. Clean blood and body fluid spills first
vii. Remove all contaminated items and items to be replaced from the area – linen, curtains, waste, sharps containers, etc. Inspect the area to make sure no item is missed. Soiled linen should be put in plastic bags at the point of removal itself. Make sure sharps containers are closed tightly and handle carefully to prevent dropping the container. Segregate any waste at source by putting it into the appropriate container. Waste bags should be closed, tied and labelled before transport
viii. Change gloves and begin cleaning

ix. First clean and disinfect all patient care items dedicated to the area e.g., thermometers, blood pressure apparatus, tongue depressors, weighing scales, ambu bags, sterile containers placed in the area, etc. Do not take these to another location or use on another patient before they are cleaned and disinfected properly

x. Begin cleaning the environment after this. General direction for cleaning – from clean to dirty and from top to down

xi. Begin cleaning from the periphery of the area e.g., clean doors, door handles, windows and walls first. Clean walls from top to down. Clean all wall mounted items (switches, hand rub bottles etc.).

xii. Next clean all floor-based items – lockers, chairs, IV stands, waste bins etc. Pay particular attention to high touch surfaces like handles, bedrails. Make sure all horizontal surfaces are cleaned

xiii. Clean the bed last

xiv. Clean any attached toilets next

xv. Lastly clean the floor

xvi. Gather used mops in a plastic bag to transport them to the cleaning and disinfection area. Mops and buckets used to clean this area should be cleaned and disinfected before using them in another area. Disinfectant bottles should be dedicated to the infected ward/rooms only and not used in other area

xvii. Disposable cap and masks should be removed immediately and discarded in the correct bio-medical waste container. Linen gown should be removed without touching the outer side and bagged as soiled linen

xviii. Wash and remove the utility gloves; wash hands with soap and water; disinfect them using an alcohol hand rub

xix. If any items are to be replaced in the area, do it now. Wear fresh PPE before entering the area

xx. Disinfect footwear by immersion in chlorine solution with 500-1000ppm chlorine for 5-10 minutes before using again. If they are soiled with blood and/or body fluids, first disinfect with chlorine solution before washing with soap and water using a brush.

Terminal Disinfection after Discharge of Infected Patients

Terminal disinfection of the room/ward should be done after discharge of infected patients. The aim of this procedure is to thoroughly clean and disinfect all items and surfaces in the room/ward (eliminate any reservoirs of infection) and prevent further transmission to patients admitted there and staff

working in the area. Detailed cleaning and disinfection of all surfaces and removal/disinfection of all potentially infected patient care items (thermometers, stethoscopes, tongue depressors etc.) is very critical to reduce the risk.

Steps for terminal disinfection of an area:

i. Determine whether the patient was on any particular isolation precautions – contact/droplet/airborne. If so appropriate precautions should be taken during cleaning and disposal of waste.
ii. Prepare for cleaning – gather the cleaning equipment and items to be replaced. Once cleaning begins, the cleaning staff should not go to other areas of the hospital until all cleaning is finished
iii. Clean hands and use an alcohol hand rub
iv. Put on utility gloves. Wear a cap, mask and gown if patients were on isolation precautions
v. Walk through the area and make a list of items that should be replaced e.g., soap, empty alcohol hand rub bottles, towels, linen etc.
vi. Remove all contaminated items and items to be replaced from the area – linen, curtains, waste, sharps containers, etc. Inspect the area to make sure no item is missed. Soiled linen should be put in plastic bags at the point of removal itself. Make sure sharps containers are closed tightly and handle carefully to prevent dropping the container. Segregate any waste at source by putting it into the appropriate container. Waste bags should be closed, tied and labelled before transport
vii. Clean any spills of blood/body fluid first
viii. Change gloves and begin terminal cleaning. Use a disinfectant. Use the pour wipes technique. Do not use plain water or only soap and water
ix. General direction for cleaning – from clean to dirty and from top to down
x. Begin cleaning from the periphery of the area e.g., clean doors, door handles, windows and walls first. Clean walls from top to down. Clean all wall mounted items (e.g., switches, hand rub bottles, etc.).
xi. Next, clean all floor-based items – beds, lockers, chairs, IV stands, waste bins etc. Pay particular attention to high touch surfaces like handles, bedrails, etc. Make sure all horizontal surfaces are cleaned
xii. Clean and disinfect all patient care items dedicated to the area e.g., thermometers, blood pressure apparatus, tongue depressors, weighing scales, ambu bags, sterile containers placed in the area, etc. Do not take these to another location or use on another patient before they are cleaned and disinfected properly

xiii. Cleaning the bed

a. Check all sides of the mattress for soiling (replace the mattress if soiled)
b. Wipe mattress with disinfectant (if there is waterproof cover). Otherwise, soiled mattresses should be replaced. Wipe the removed mattress with plenty of disinfectant and keep in bright sunlight until thoroughly dry. Thereafter check whether it is usable. If not discard the mattress
c. Clean the entire bed (i.e., frame, side rails, wheels, etc.)

xiv. Clean any attached toilets next

xv. Lastly clean the floor

xvi. If possible, clean and disinfect the used mops now. If not possible, keep them aside for later cleaning and disinfection. Mops and cleaning equipment used to clean an infected area should be cleaned and disinfected before using them in another area

xvii. Cap, masks and gown used for infected area cleaning should be removed using proper technique and bagged as soiled linen

xviii. Wash and remove the utility gloves and wash hands with soap and water

xix. Disinfect hands with an alcohol hand rub

xx. If fogging is to be done, go to the next step; otherwise proceed to one step after that

xxi. Use the same OT HLD to fog the area. In case of aldehyde-based chemical, use double concentration than what is used for routine OT fumigation. Close all doors and windows and cover electrical equipment with plastic covers. Run the fogger until a fog is seen in the air. Then turn off the machine, remove from the area and keep the area closed for at least one hour. Post a sign on the door and mention the hour until which the area should be kept closed on the sign

xxii. When room is cleared to enter again, replace the linen, towels, waste collection bags and any other materials

xxiii. Inspect the area for cleanliness and check that all replaceable items have been replenished.

H. Cleaning of Equipment

Materials required: Disinfectant working solution, hand mops, utility gloves

Prepare and arrange all materials before beginning.

Note: Use separate mops for equipment and environmental surfaces such as floors and walls.

a. Wear utility gloves.
b. Fold the mop twice (to make four layers)

c. Pour the disinfectant/cleaner on the mop. Quantity to be poured should be enough to leave the wiped surface wet for two minutes after wiping (exception: soap and water should be allowed to dry as soon as possible)
d. Wipe the equipment surface moving the mop in one direction over it. Wipe with pressure. Do not go back into the wiped area
e. Always begin cleaning at the top of the equipment and move downwards.
f. When moving from one piece of equipment to another, change the fold of the mop, add more disinfectant/cleaner and proceed

b. When all the folds of the mop are used, keep it aside for washing and continue with a new mop.
c. Change mops when the room is changed
d. Allow the disinfectant/cleaner to dry naturally.

Note: During equipment cleaning, do not rinse the mop in water.

I. Routine Cleaning Of Floors

Mopping Floors using Dust Control Mop (microfiber)

Working from clean areas to dirty areas:

i. Remove debris from floor and dry any wet spots with old newspaper
ii. Remove gum or other sticky residue from floor
iii. Starting in the farthest corner of the room, drag the mop toward you, then push it away, working in straight, slightly overlapping lines and keeping the mop head in full contact with the floor
iv. Do not lift dust mop off the floor once you have started, use swivel motion of frame and wrist to change direction
v. Move furniture and replace after dust mopping, including under and behind bed
vi. Carefully dispose off debris, being careful not to stir up dust
vii. Replace mop head/pad when soiled and after mopping a room.
viii. Mopping Floors using Wet Loop Mop and Bucket
ix. Working from clean areas to dirty areas:

a. Prepare fresh cleaning solution according to the manufacturer's instructions using appropriate PPE according to MSDS
b. Place 'wet floor' caution sign outside of room or area being mopped

c. Divide the area into sections (corridors may be divided into two halves, lengthwise, so that one side is available for movement of traffic while the other is being cleaned)
d. Immerse mop in cleaning solution and wring out
e. Push mop around skirtings first, paying particular attention to removing soil from corners; avoid splashing walls or furniture
f. In open areas use a figure eight stroke in open and wide spaces, overlapping each stroke; turn mop head over every five or six strokes. While in small spaces, starting in the farthest corner of the room, drag the mop toward you, then push it away, working in straight, slightly overlapping lines and keeping the mop head in full contact with the floor
g. Repeat until entire floor is done
h. Change the mop head when heavily soiled or at the end of the day.

J. Cleaning Of Ambulance

i. The ambulance should be cleaned daily morning and after every patient transport
ii. Morning cleaning – wipe all surfaces with freshly prepared low-level disinfectant. Clean both, the patient compartment as well as the driver's compartment.
iii. Check supplies and replenish if required
iv. After transport of the patient
v. Wear utility gloves and arrange cleaning mops, disinfectant bottles and paper
vi. Clean visible blood spills first
vii. Remove BMW (e.g., dressings, bandages, soiled linen) in an appropriate color-coded waste bag
viii. Dispose sharps that are found during cleaning in the sharp's container. Use a forceps to pick up sharps
ix. Remove used linen/blankets for laundering
x. Clean and disinfect/sterilize equipment used in the call
xi. Clean and disinfect the patient compartment by wet wiping with a low-level disinfectant
xii. If the vehicle is heavily contaminated, take it out of service and perform detailed cleaning by wiping all surfaces and equipment with an HLD
xiii. Restock the supplies as required

xiv. Detailed cleaning to be done in case of heavy contamination of the ambulance should be done as follows:

xv. Park the ambulance away from common traffic areas

xvi. Wear utility gloves, disposable cap, mask and clean linen gown

xvii. Remove all equipment from both compartments – driver and patient

xviii. Remove stretchers, trolleys, mattresses, belts, suction bottles, waste, kits and remove contents of all shelves and drawers

xix. Inspect the surfaces for visible blood and body fluid spills and clean them first with an HLD

xx. Clean all surfaces by wet wiping with a HLD. Every surface should be wiped.

xxi. Check all surfaces for spills of blood and body fluids

xxii. Clean the floor last. Wipe with an HLD.

xxiii. Clean all equipment by wiping with an HLD and allow to dry before putting it back into the vehicle

xxiv. Replenish the supplies as required

xxv. Once a month or more frequently depending on the use, wash down the vehicle interior and equipment by wiping with liberal amount of soap and water. The method is the same as detailed cleaning except that soap and water are used first followed by wiping with an HLD.

K. Cleaning Of Water Coolers

i) Water cooler tanks should be kept covered at all times

ii) The tank cover should fit properly with no gaps between the tank and the cover

iii) The outside of the cooler, electrical cord and plugs, the tap and the drain tray should be wet wiped daily with soap and water. Drainage should be provided for overflow of water

iv) The cooler tank should be emptied and cleaned at least once in two weeks or more frequently. In general, less frequently used coolers need more frequent cleaning as stagnation of water promotes microbial growth. In areas and at times when water supplied appears turbid/muddy, more frequent cleaning may be required e.g., every week

v) Empty the tank and clean it with soap and water using a brush. Rinse with plenty of water to remove all soap

vi) Wipe the inner surfaces of the tank liberally with chorine solution containing 500 ppm of chlorine (0.5% dilution of sodium hypochlorite or prepared from chlorine powder as per manufacturer recommendations).

vii) The chlorine solution should remain wet on the surface for at least 1-2 minutes. Rinse with plain water twice to remove the chorine. Check the level of residual chlorine in the water before allowing consumption

viii) In coolers without an attached carbon filter/softener the chlorine level should be 0.2 to 0.5 ppm. If the cooler has these attached, chlorine level will always be zero.

L. CLEANING OF AIR CONDITIONERS (Acs)

i. Wipe the outer surface of all ACs (especially the louvers on the air outlet) with soap and water at least once a week or more frequently (daily) if easily accessible. Wiping should be done more frequently (2-3 times a week) if the area is heavily used.

ii. Once a week, the dust filters in the AC should be removed, taken outside the area and washed to remove all dust and fibers. They should be dried and then fitted back into the AC.

iii. Proper drainage should be provided to drain away all condensation from the unit. Any leakage should immediately be reported and rectified urgently

iv. Regular servicing of the units should be carried and records maintained. During the servicing, the roller fan inside the unit should be wiped clean using an HLD

STERILIZATION

It is the process of destroying all micro –organisms including spores. Steam is the preferred method of sterilizing critical medical and surgical instruments that are not damaged by heat, steam, pressure and moisture. Some items can be sterilized by "dry heat". Low temperature sterilizations technologies e.g., Ethylene oxide (ETO) are used for reprocessing critical care patient equipment which are heat sensitive

Microbiological indicators are used once a week: namely spores of *Bacillus stearothermophilus* for steam sterilizers and *Bacillus subtilis* for ethylene oxide. Vials are removed from sterilizers and sent to microbiology laboratory where they are incubated at relevant temperatures for 48 hours. Report is sent to ICN.

An expiry date is given for sterile articles based on the packing material used

DISINFECTION

Disinfection is the process of destroying all pathogenic microorganisms. It can refer to the action of antiseptics as well as disinfectants. It is of 3 types.

1. Concurrent disinfection
2. Terminal disinfection
3. Pre-current (prophylactic) disinfection

Disinfection is required in the following situations:

i. Before use of a contaminated equipment/device for any patient.
ii. Before sending contaminated equipment for further processing in the CSSD.
iii. Before sending used &contaminated needles and syringes for disposal.
iv. For the inanimate environment which is likely to be infected and could be a potential source of HCAI.
v. Before any item is subjected to disinfection /sterilization, thorough cleaning is mandatory to remove organic material that may interfere with these processes.

Disinfectants can be classified according to their ability to destroy different categories of micro-organisms:

1. High Level disinfectants : glutaraldehyde 2%, ethylene oxide
2. Intermediate Level disinfectant: Alcohols, chlorine compounds, hydrogen peroxide, chlorhexidine, glutaraldehyde (short term exposure)
3. Low level disinfectants : benzalkonium chloride, some soaps

GENERAL GUIDELINES FOR DISINFECTION:

1. Critical instruments/equipment's (that are those penetrating skin or mucous membrane) should undergo sterilization before and after use. e.g., surgical instruments

2. Semi-critical instruments /equipment's (that are those in contact with intact mucous membrane without penetration) should undergo high level disinfection before use and intermediate level disinfection after use. e.g., endotracheal tubes

3. Non-critical instruments /equipment's (that are those in contact with intact skin and no contact with mucous membrane) require only intermediate or low-level disinfection before and after use. e.g., ECG electrode

Table : Disinfectants that are in use

S.No:	Disinfectant	Details
1.	**Glutaraldehyde**:	➢ Can be used up to 14 days after activation, ➢ Contact time: For disinfection 15-30 mins For sterilization 8-10 hours
2.	**Sterilium:**	➢ Contains 2-propanol, 1-propanol, macetronium ethyl sulphate ➢ Contact time for patient care hand wash: 1.5 ml for 30 seconds ➢ Contact time for surgical hand wash: 9 ml for 3 minutes
3.	**Ecoshield:**	➢ Contains stabilized hydrogen peroxide 11% w/v with 0.01% w/v, diluted silver nitrate solution. ➢ For surface disinfection: 10% v/v solution in de-ionized water with contact time of 60 minutes. ➢ For fumigation: 1 liter of 20% v/v solution /1000 cu ft of space in 60 minutes
4.	**Bacillocid:**	➢ Contains chemically bound formaldehyde, glutaraldehyde and benzalkonium chloride. ➢ Used as surface disinfectant at 2% solution in operation theatres and at 0.5% in wards and dressing rooms. ➢ Sprayed onto wet surfaces with a low-pressure sprayer and allowed to dry slowly.
5.	**Betadine:**	➢ Iodophor. This is a high-level disinfectant. Used for surgical hand scrub, skin disinfection.
6.	**Tincture Iodine:**	➢ For part preparation in operation theatres and blood specimen collection.
7.	**Sodium Hypochlorite:**	➢ Used for containing blood spills at 10%, disinfecting counter tops and other hard surfaces at 1 %.

		➢ Used in laboratory for decontamination of waste from equipment and glassware at 5%.
8.	**Alcohol (70%):**	➢ Used for disinfection of non-disposable patient care items in/out- patient departments and also in laboratory for cleaning of microscope lenses and surfaces of critical work surfaces.
9.	**ALDEHYDE**	➢ Glutaraldehyde may be used in places like the endoscopy unit, cardiac catheterization labs. Formaldehyde is used for fumigatio

Table 8.1; Disinfectants that are commonly used

Endoscopes - Cleaning And Disinfection

1. Mechanical cleaning: This is the most important step. Flush the air/water channel for 10-15 seconds to eject any blood or mucus. Aspirate detergent through the biopsy/suction channel to remove gross debris. Use a cleaning brush suitable for the instrument and channel size to brush through the suction channel.
2. Disinfection: The endoscope and all internal channels should be soaked in 2% glutaraldehyde for 20 minutes.
3. Rinsing: Following disinfection, rinse the instrument internally and externally to remove all traces of disinfectant.
4. Drying: Dry the endoscope externally. Flush air through each channel

FOGGING:

Criteria for Fogging

1. After new construction and renovation
2. Air borne diseases like Tuberculosis, Influenza, Ebola, etc. (After patient's discharge/death in the facility)
3. Any known fungal infection in the facility (e.g., Aspergillus)

Instructions to be followed

1. Use Personal Protective Equipment.
2. Use cap, face mask and gloves for protection.
3. Surface cleaning/Terminal disinfection.

4. Visibly contaminated areas to be cleaned with damp duster, water or soap and then, Ecoshield soaked duster is used to clean the surface areas.
5. For disinfection make 10% solution with Ecoshield/Baccishield.
   Example: For making 10% solution (v/v 01:09 ratio) i.e. 10 ml Ecoshield® + 90 ml water.
6. Pour reconstituted 10% solution into a container.
7. Take a clean duster and dip it into the 10% solution and squeeze.
8. Use this wet duster to clean all surfaces and underneath of metallic surfaces of equipment's, OT table, ICU beds, side lockers, lights, instrument tables, mattress, walls etc.
9. When duster is relatively dry, dip it again in 10% solution, and squeeze to carry on the above-mentioned procedure until all the surfaces are mopped clean.

Calculation of the disinfectant to be used for fogging:

a. To undertake Terminal Disinfection before fogging

   Calculate the area to be fogged in cubic feet i.e., Length X Breadth X Height

   Example: L= 10 ft, B=10 ft & H=10 ft

   Then cu. Ft area is 10 X 10 X 10=1000 cu. ft.

b. For fogging, make 20% solution with Ecoshield®/Baccishield® in distilled water.

Space in cubic feet L X B X H	**Dilution Ecoshield + Water**	**Timer of the fogger to be set at**
1000 cu ft	200 ml + 800 ml=1 L	1 L
2000 cu ft	400 ml + 1600 ml= 2 L	2 L
2500 cu ft	500 ml + 2000 ml=2.5 L	2.5 L

Table 8.2: Disinfectant preparation

c. As per the room size and example above, make Ecoshield/Baccishield solution and pour into the fogger tank.

d. Before starting the fogging, cover electronic equipment's with sterile drapes.

e. Take the fogger and place it at least 2 feet above the door surface, in one corner of the room. It's nozzle head should be kept at an angle of 45 degree facing the corner diagonal to it. If two foggers are used place them in opposite direction

f. Eco-shield is used for fogging using Fog spraying machine.

g. Operation theatres are fogged once a week and if necessary, such as in case of a septic wound being drained.

h. Other patient care areas regular fogging not recommended.

i. Necessary decision is taken by in charge of concerned patient care area

FLOOR MOPPING

1. General cleaning by plain soap and water in non-critical care areas.

2. In critical care areas generous mopping using wet cloth by 0.5% Sodium Hypochlorite solution

BEDDING AND BLANKET

1. Impermeable covers, mattresses should be mopped with 0.1% Sodium hypochlorite solution or spirit.

2. Blanket may be sent for laundry or dry cleaning

RECOMMENDATIONS FOR STERILIZATION AND DISINFECTION

1. For reprocessing of various equipment, manufacturers' recommendations should be followed.

2. Details of disinfections and sterilization of some commonly used items are given below:

Article	Method
Airways and endotracheal tubes	Autoclave preferably or Chemical high-level disinfection
Ambubag	Clean with detergent and water, dry and sterilize by autoclaving.
Applicators (Tonometer Prisms)	Immersion in 0.05% hypochlorite for 10 minutes.
Arterial catheters	Sterile, single use only, must be discarded after use.
Baby weighing scales	A fresh liner should be used for each baby. Clean tray with detergent and water. Wipe with 0.1% Hypochlorite if contaminated.
Baby bath	Clean after each use with detergent and water
Beds and couches Frame	Clean with detergent and water between patients and as required If contaminated with body fluids or if used in isolation room after cleaning, should be wiped with any of the surface disinfectant (sodium Hypochlorite 0.1% or Bacillocid 0.5%)
Bedpans / urinals	Clean and disinfect with 0.1% sodium hypochlorite or hot water. Ensure that the item is dry before re-use.
Breast pumps	Wash with detergent and water and immerse in freshly prepared sodium hypochlorite 0.1% solution at least for 20 minutes.
Bowls (surgical)	Wash with detergent and water and send for Autoclaving
Bowls (washing)	Wash with detergent and water and decontaminate with 1% sodium hypochlorite, rinse and dry after each use. Store inverted and separated
Buckets	Clean with detergent and water and decontaminate with 0.5% bleaching solution, rinse and store dry.
Carpets	Vacuum daily • Should be shampooed or steam cleaned in isolation rooms as a part of terminal cleaning.
Cheatle forceps	Autoclave daily and keep in fresh solution of 1% savlon (change solution daily) or Glutaraldehyde solution (2%) as per MR
Commodes	Seat and arms—clean with detergent and water, and dry. If soiled or used in isolation wards—wipe with sodium hypochlorite 0.5 % and dried, after cleaning

Couches (examination)	Cover with rubber mat followed by draw sheet between patients. Send to laundry after each day session, and the mattresses are cleaned with soap and water.
Cradles	Clean with detergent and water and dried. If contaminated use any of the surface disinfectant (sodium Hypochlorite 0.1% or Bacillocid 0.5%)
Cutlery and crockery	Should be heat disinfected in dishwasher. If washed in sink, wash with water and detergent.
Curtains	Should be changed as a part of rolling program by domestic services Should be changed as a part of terminal cleaning program.
Denture pots	. To be cleaned by patients themselves with detergent and water . Disposable with lid–single use.
Drainage bottles	. Disposable—Single use; discard after use. 2. Reusable—Wash with detergent and water, put jars in the disinfectant solution (1% hypochlorite). Leave for contact time (20 mins), rinse and store dry, or send to CSSD. Weekly autoclaving or HLD is highly recommended.
Dressing trolleys	Clean daily with detergent and water. After each use—wipe with 70% isopropyl alcohol.
Drip stands/IV stands	Should be cleaned with detergent and water and dried. After use in isolation, should be wiped with sodium hypochlorite 1% and dried after cleaning.
Dustbins	Detergent and water every morning
Ear Pieces for auroscope	Clean with detergent and water and dried.
Earphones	Clean with detergent and water and dried. Foam should be replaced after use in isolation.
ECG leads and machines	Wash with detergent and water and then wipe with 70% alcohol.
Leads and monitors	Dismantle to smallest components and clean with detergent and water and dry.
Furniture	Damp dusted with detergent and water.
Hemodialysis machines	Thoroughly clean between patients and disinfect at the end of the day as per manufacturer's recommendations. *Colonized/infected patients:* after cleaning with detergent, disinfect with hypochlorite (1000 ppm av Cl2) solution or other appropriate disinfectant as per manufacturer's recommendations.
Humidifiers	Clean and sterilize at low temperature by plasma/ ETO sterilizer/ immerse in glutaraldehyde solution (2%) for 10 hours. Water used in humidifiers—Use normal saline/ sterile distilled/ sterile tap water. Replace the water used daily/ for every patient. Humidifiers which are not in use should be cleaned and kept dry.
Infant incubators	Routinely wash with detergent and dry with disposable wipe in a daily basis. *Colonized/infected patients:* After cleaning, wipe with 70% isopropyl alcohol impregnated wipe or use hypochlorite (125 ppm av Cl2) solution. When the baby is discharged, dismantle incubator and wash *all removable parts* and clean with detergent and then disinfect with hypochlorite (125 ppm av Cl2) solution or other disinfectant as per manufacturer's recommendation and allow to dry. The cleaning and disinfection should be done in a separate area.
Intravenous monitoring pumps (and feed pumps)	Clean the outer surface with detergent and water and dry. If used in isolation rooms, wipe with 1% sodium hypochlorite and dry.

Laryngoscopes	Clean with detergent and water and HLD is done with glutaraldehyde 2%. Bulb of the laryngoscope should be removed and cleaned with water and then wiped with 70% alcohol.
Locker Tops	Damp dust daily with detergent solution and allow to dry. *Colonized/infected patients:* After cleaning with detergent, disinfect with hypochlorite 1000 ppm av Cl2 solution or other appropriate disinfectant and allow to dry.
Mattresses and pillows	Clean with detergent and water between patients and as required. Should not be used if cover is damaged. Contaminated pillows must be discarded. Torn mattress covers must be replaced before mattress is reused.
Medicine trays	To be cleaned with detergent and water weekly. In case of blood spillage—follow spillage policy
Metal buckets	Clean with Vim powder every week
Mops	Disposable use for one day. Re-usable to be laundered.
Peak flow	Disposable—single patient use.
Nebulizers and tubing's	Cleaning and low temperature sterilization by plasma/ ETO/ immerse in Glutaraldehyde solution (2%) for 10 hours.
Proctoscopes	Disposable—single use; Re-usable to be rinsed and autoclaved.
Scissors	Surface disinfect with a 70% alcohol impregnated wipe before use. If visibly soiled clean first with a detergent solution. For sterile use, follow high level disinfection with 2% glutaraldehyde.
Sphygmo-manometer cuffs (BP apparatus cuffs)	Use dedicated items in high-risk areas (e.g., ICU) or patients known to be *colonized/infected.* Wash sleeve with soap and water once a week. In between patients Disinfect with 70% alcohol impregnated wipe to clean tubing and inflation bladder. After use in isolation, should be laundered in washing machine
Splints and walking frames	Wash and clean with detergent and allow to dry.
Sputum pots	Disposable with close fitting lid—should be discarded into clinical waste for incineration. Reusable–Pre-treat with 15ml hypochlorite then toilet flush the material. Clean the emptied pot with detergent and water and disinfect with 0.1% hypochlorite for 30 minutes before reusing.
Soap dispensers	Should be cleaned weekly with detergent and water and dried.
Stethoscopes	Surface should be wiped with 70% alcohol impregnated wipe between patients. Use dedicated stethoscope in high-risk area e.g., ICU. NNU or patients with infection or colonized with MDROs
Suction bottles	Disposable liners—must be sealed when 75% full and placed in yellow plastic bag. Re-usable (jar and tubing's): Should be cleaned with soap and water followed by 1% sodium hypochlorite and dried. To be stored dry when not in use. Must be changed daily and in between each patient. • At least weekly autoclaving of jars should be done whenever applicable. Minimum 1%–2% sodium hypochlorite solution should be kept in jar in volume which is 1/10 volume of the jar. After use, add equal quantity of hypochlorite for disinfection at source before discarding the content.
stretcher and Wheel- chairs	Clean between patients with detergent and water.

Surgical Instruments	Should be cleaned in multi enzymatic cleaning solutions at source. Transport cleaned instruments in closed rigid containers to CSSD for sterilization by autoclaving/plasma sterilizer/ETO. The instruments may be subjected to cleaning by automated washer-disinfectors or ultrasonic cleaners at CSSD if required.
Thermometer	*Oral: Single-patient use thermometers* must be dedicated for infection patients and patients in high-risk areas, e.g., ICU. They should be cleaned and wiped with a 70% isopropyl alcohol impregnated wipe after each use and stored dry. On discharge of patient, wash both thermometer and thermometer holder with detergent, immerse in 70% alcohol for 10min. Wipe and store dry. *Communal thermometers:* wipe clean, wash in a cold neutral detergent, rinse, dry and immerse in 70% isopropyl alcohol for 10 min. Wipe and store dry. *Rectal:* clean and wash in detergent solution after each use, wipe dry and immerse in 70% alcohol for 10 min. Wipe and store dry. *Electronic:* where possible use a single-use sleeve. If not possible, use either single-use thermometer or clean and disinfect between use. Do not use without sleeve or on patients with an infectious disease. Single-use sleeve, single-patient use in high-risk areas or infected patient. Clean, then wipe with a 70% isopropyl alcohol impregnated wipe after each use. *Tympanic:* single-use sleeve. Disinfect in between patients by wiping with 70% alcohol
Telephones	To be wiped with70% alcohol
Toilet seats	To be cleaned at least twice daily with detergent.
Tonometer prisms (applicators)	Immersion in 0.05% hypochlorite (500 parts per million available chlorine) for 10 minutes
Toys	Clean with detergent and water and dried.
Ultrasound machines	Damp dust with detergent solution and allow surface to dry before use. Draw up local protocol for cleaning and disinfection based on the manufacture's recommendations
Urine pots/ Urine measuring jugs	Clean with detergent and water and disinfect with 0.1% hypochlorite for 30 minutes before reusing.
Vaginal speculae	After use immerse in hypochlorite for 15-30 min and Send to CSSD for sterilization or use single-use
Ventilator and breathing Circuits	Use single-use (disposable) tubing for every patient if possible or heat disinfect/ sterilize in CSSD. If re-used—Daily cleaning and disinfection of tubing must be done. After 72 hrs of use autoclaving should be done for autoclavable tubing's. After removing of ventilator tubes wash it with detergent and water and send to CSSD for autoclaving *Infected patients:* for patients with respiratory infection and other serious infection use disposable tubing. Never use glutaraldehyde to disinfect respiratory equipment
Ventilators	After every patient, clean and disinfect ventilators. Dismantle and sterilize/disinfect (high-level) all re-usable components as per the manufacture's recommendations Humidifier water must be changed at least every 8 hrs. Daily autoclaving of humidifiers is recommended where autoclavable. Heat and Moisture Exchangers (HMEs) must be changed at least every 72 hours or as per manufacturer's instructions.
Vomit bowls	Clean with detergent and water and disinfect with 0.1% hypochlorite for 30 minutes before reusing.

Wash bowls	Patients must have own dedicated bowl. After each patient's use, should be cleaned with detergent.
Wheel chairs	Patient's own—should be cleaned with detergent and water as necessary. Hospital—clean between patients with detergent and Water

Table 8.3: Disinfections and Sterilization of some commonly used items

REPROCESSING OF COMMONLY USED EQUIPMENT IN THE HOSPITAL

Process	Equipment	Examples of items	Products & Methods
Cleaning followed by low level disinfection	All reusable equipment	Certain environmental surfaces touched by personnel during procedures involving bed -pans, urinals, commodes, stethoscopes, BP cuffs, ear specula, hemodialysis equipment surfaces, in contact with dialysates	Water, detergent and cidizyme Clean instruments under running water and then make sure that the instruments a r e c o m p l e t e l y immersed.
Cleaning followed by immediate level disinfection	Some semi-critical items	After large environmental blood spills or spills of microbial cultures in the laboratories. Thermometers, hydrotherapy tanks used for patients with non- intact skin, involving parenteral and mucus membrane contact	Alcohols, Hypochlorite solutions, Iodophors, Phenolics (not recommended for nurseries)
Cleaning with high level disinfection	Semi critical items	Flexible endoscopes, respiratory therapy equipment, nebulizer cups, anesthesia equipment, nasal specula, tonometer foot plate, ear syringe nozzle, vaginal specula, vaginal probes used in sonographic scanning, breast pump accessories.	2% glutaraldehyde is the most commonly used high level disinfectant. All immersible internal and external surfaces of equipment should be allowed to be in contact with this for at least 20 minutes. 6% hydrogen peroxide.
Cleaning followed by sterilization	Critical items	All items coming in contact with sterile body tissues. Surgical instruments, all implantable device hemodialysis , plasmapheresis & Heart lung oxygenator surfaces in contact with blood, bronchoscopes, arthroscopes, laparoscopes, cystoscopes, transfer forceps, acupuncture needles & body piercing objects, neurologic test needles, high speed dental hand pieces.	Steam under pressure, dry heat , ethylene oxide g a s (E T O) , 2 % glutaraldehyde, plasma sterilization with hydrogen peroxide

Table 8.4: Reprocessing of commonly used equipment in the hospital

CHAPTER 9

Isolation Policy

Aim: To prevent the transmission of pathogenic microorganisms within the healthcare setting

The patients of following disease categories should be treated under isolation. Severe influenza cases, SARS, Open case of tuberculosis, Anthrax, C. diphtheriae, Pertussis, Pneumonic plague, Chicken pox, and patients suffering from multidrug resistant pathogens/MRSA.

The isolation of the patient would be done taking following into consideration:

1. Separate ward/room/area is designated for keeping the patient.

2. Isolation wards/area has double door entry with a separate changing room with availability of Personal Protective Equipment (PPE) and disinfectants and a hand washing area providing negative pressure with adequate air changes (6-12/hour) and HEPA filtered air in case of patients suffering from respiratory pathogens.

3. Central air conditioning and use of desert air coolers is not permitted.

4. Adequate distancing between patient beds (3-6 feet) to be ensured.

5. Overcrowding to be avoided in isolation ward/area.

6. Unauthorized Visitor's entry is to be prohibited.

7. Nobody is allowed to enter the ward without donning adequate PPE.

8. As far as possible dedicated health care staff to be posted for isolation ward

9. Regular daily cleaning and proper disinfection of isolation wards to be done at least twice a day. in addition, special attention should be given to cleaning and disinfecting frequently touched surfaces to prevent aerosolization. Damp sweeping/wet mopping to be performed.

10. Standard precautions which include barrier nursing to be followed with special stress on hand hygiene using soap water and alcoholic hand rubs (Preferably foot operated) and the procedures should be adequately displayed for the same.
11. Appropriate use of PPE should be strictly adhered to e.g., use of face masks N95 masks, gloves, gowns, aprons, shoe covers, head covers etc. as per the requirement (The procedures of donning/doffing of PPE will be displayed
12. Sharing of equipment's among the patients to be avoided, if unavoidable, ensure that reusable equipment's are disinfected before use on other subjects (Equipment's like Thermometer, Nebulizers, Stethoscopes, BP apparatus cuff to be dedicated for each patient).
13. All the equipment's coming in contact with the patient should be disinfected.

14. Use of mobile phones by healthcare staff to be avoided inside the isolation area.

15. Appropriate waste disposal facilities to be available in the isolation area, All waste to be treated as infectious and should be segregated and disinfected before removal from the isolation area.
16. All paper work/record keeping should be done outside the isolation area.

17. Sample collection to be done using appropriate PPE, following standard work precautions. Sample to be packaged/transported in triple packaging.

18. Used linen to be handled as little as possible with minimum agitation and should be transported in closed containers and should be labelled as infectious before sending to laundry for washing.

19. Regular training on PPE, standard precautions and other infection control for the healthcare workers and providers shall be under taken

CHAPTER 10

Spillage Management

Management Of Spills of Blood and OPIM (Other Potentially Infectious Material)

1. Blood and body fluid spillages should be dealt with immediately or as soon as it is safe to do so.
2. Other persons should be kept away from the spillage until the area has been cleaned and dried.
3. Care should be taken if there are sharps present and should first be disposed off appropriately into a sharp's container.
4. Spills should be removed before the area is cleaned.
5. Area should be well ventilated if using chlorinating agents.
6. Adding liquids to spills increases the size of the spill and should be avoided.
7. Chlorinating agents should be used (1% hypochlorite) in a well-ventilated area and are generally only recommended on a small spill.
8. Chlorinating agents should not be placed directly on spillages of urine.
9. Chlorinating agents are not suitable for use on soft furnishings.
10. It is recommended that supplies of personal protective equipment, paper towels and healthcare risk/ yellow waste bags are available for spills management.
11. If non-disposable cloths/ mops are used to clean spillage area they must be thermally or chemically disinfected.
12. Every patient care area must prepare the spill management kit.
13. The kit should be prominently labelled and placed at the most accessible site.
14. The kit contents should be reviewed daily to ensure completeness of the kit.
15. The spill kit must be immediately replenished after use and stored at the original location after every use.

Contents of spill management kit

- Personal Protective Equipment Gloves–2 pairs (single use)

  Plastic Apron–1
  Face masks–2
  Caps–2
  Goggle–1
  Shoe Covers–2 pairs
  Forceps

- Absorbent Material (Cotton/ Blotting Paper/ Tissue Paper)
- Yellow Biohazard bag
- Small card board Sheets
- Sodium hypochlorite solution (use Phenol/ Lysol in case of spill clean-up of urine)

Preparation of Hypochlorite Solution

Concentration of Commercially Available Hypochlorite Solution	Required Working Concentration	To Prepare 1000 ml		To Prepare 100 ml		Shelf Life
		Hypochlorite Solution (in ml)	Add water (in ml)	Hypochlorite Solution (in ml)	Add Water (in ml)	
5%	1%	200 ml	800 ml	20 ml	80 ml	8 hours
10%	1%	100 ml	900 ml	10 ml	90 ml	8 hours

Table 10.1: Preparation of Working Hypochlorite Solution from Available Sodium Hypochlorite Solution

Concentration of Commercially available Bleaching Powder	Required Working Concentration	To Prepare 1000 ml		To Prepare 100 ml		Shelf Life
		Quantity of Bleaching Powder (in gm)	Add water (in ml)	Quantity of Bleaching Powder (in gm)	dd Water (in ml)	
30%	1%	33.3 gm (2 table spoons/6 tea spoons)	1000 ml	3.3 gm (Half tea spoon)	100 ml	8 hours
30%	10%	330 gm (20 tablespoons)	1000 ml	33.3 gm (2 table spoons/6 tea spoons)	100 ml	8 hours

Table 10.2 Preparation of Working Hypochlorite Solution from Bleaching Powder

Procedure of Spill clean up

1. Assemble materials required for dealing with the spill prior to putting on PPE.
2. Inspect the area around the spill thoroughly for splatters or splashes.
3. Restrict the activity around the spill until the area has been cleaned and disinfected and is completely dry.

4. Promptly clean and decontaminate spills of blood and other potentially infectious materials. Discard blood-contaminated items.
5. Use 1% Sodium hypochlorite for small spills and 10% hypochlorite solution for large spills.
6. The detailed procedure is explained in the flow cart given below.

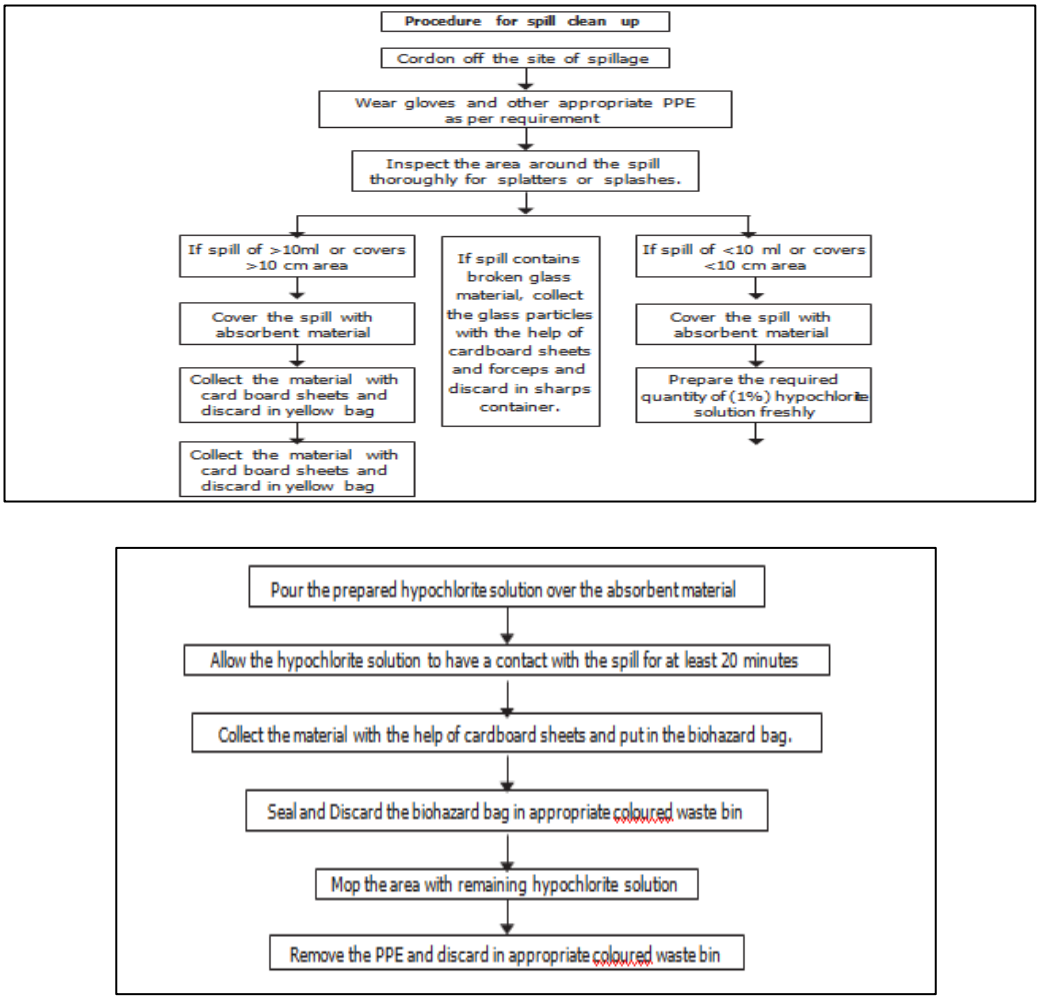

Chart 10.1: Procedure of Blood Spill clean up

MERCURY SPILL MANAGEMENT

Contents of a Mercury Spill Kit

1. Gloves
2. Mask
3. Goggles
4. Syringe 5 ml or dropper
5. Plastic container with lid that seals
6. Adhesive plaster strips

7. Cardboard strips or chart paper pieces
8. Thick plastic bag
9. Torch

Procedure of Mercury Spill Clean Up

i. Remove all items near the mercury spill area. Switch off the fan and Exhaust fan if in use
ii. Children and pregnant women to be evacuated from that space
iii. Wear face mask and goggles
iv. Remove the jewelry and watch from hands, then wear gloves
v. Locate all Mercury beads, then carefully use the cardboard strips or Chart Sheet to gather them together
vi. Use the syringe or dropper to draw up the Mercury beads, transfer them into the water filled plastic container and close and seal airtight
vii. Small and hard-to-see beads can be located with the flashlight, after removing the larger beads, use adhesive tape to collect those beads
viii. If Mercury spilled on linen, that portion to be cut and removed
ix. All the materials used for Mercury spill to be placed in the plastic bag and to be
x. labelled as “CONTAMINATED WITH MERCURY”.
xi. Hand over the kit to BMWM.
xii. Doors and windows of the room to be kept open for 24 hours.DO NOT’s
xiii. Never use broom to clean up mercury.
xiv. Never use Vacuum cleaner to clean up mercury.
xv. Never use bare hands to touch Mercury.
xvi. Never continue wearing shoes and clothing that are contaminated with Mercury.

CHEMICAL SPILLAGE MANAGEMENT

For Chemical spillage, follow the Manufacturer’s Instruction as mentioned in the MSDS (Material Safety Data Sheet) of the chemical products.

CHAPTER 11

Antibiotic Policy

GOAL OF ANTIMICROBIAL STEWARDSHIP PROGRAM (AMSP)

Goal of Antimicrobial Stewardship Program (AMSP) is to do the right clinical diagnosis of the patient which can be confirmed with laboratory diagnosis and give the timely and right antibiotic for the right patient at the right time with the right dose for route and frequency to get the best clinical outcome causing least harm to the patient according to the concurrent knowledge in vogue

AIMS OF ANTIMICROBIAL THERAPY

1. To provide a simple, best empirical/specific treatment of common infections.
2. To promote the safe, effective, economic and rational use of antibiotics.
3. To minimize the emergence of bacterial resistance in the community and hospital

LIST OF AVAILABLE ANTIMICROBIALS

Based on the available antimicrobials at the Govt institute (Hospital Medical Stores) must be categorized into 3 categories **(restricted/semi restricted and non-restricted antimicrobials)** as shown in the table below. This can be done after discussion with the pharmacy in charge to maintain and control and supply of antimicrobials. in the institute. This is **FORMULARY RESTRICTION WITH REAUTHORIZATION (FRP)** to improve antibiotic use by requiring clinicians.

1.	Cefixime DT 100mg [1621] **[SR]**
2.	Cefotaxime injection 1gm [1355] [**SR]**
3.	Ceftriaxone injection 1gm [1360**]** **[SR]**
4.	Ciprofloxacin injection 200mg[95**][U]**
5.	Vancomycin **[R]**
6.	Nitrofurantoin tablets 100mg [1896] **[U]**

GENERAL TREATMENT GUIDELINES

1. Identify the type of infection at the earliest i.e., bacterial or viral or parasitic, or fungal or endosymbionts causing serious invasive fungal diseases combined with bacterial infections e.g. Endofungal Mycetohabitans rhizoxinica bacteremia associated with Rhizopus microsporus).

2. Please send appropriate sample. All samples for culture and AST must be sent to Microbiology laboratory before initiating antimicrobial therapy and collected under strict aseptic conditions.

4. In case of asymptomatic bacteriuria with colony count > =10^5 CFU/ml antibiotic must be given only when same organism is isolated in 2 urine cultures obtained 2-7 days apart. Treatment given as per Antibiotic susceptibility testing. (AST). Once culture / sensitivity report available initiate specific antimicrobial therapy. Antimicrobial may require to be changed/de-escalated.

4. Intrinsic resistance of the causative agent must be considered before initiating the antimicrobial therapy for a particular infection., Klebsiella species are intrinsically resistant to Ampicillin and Ticarcillin.

4. Do not prescribe an antibiotic for viral sore throat, simple coughs and colds and viral diarrhea.

5. Use simple generic antibiotics first whenever possible. Avoid broad spectrum antibiotics (e.g., Amoxycillin + Clavulanate, quinolones and cephalosporins) when standard and less expensive antibiotics remain effective, as they increase risk of *Clostridium difficile*, MRSA and resistant UTIs.

Antibiotics	Doses, duration and route of administration
Cotrimoxazole	1 DS tab bd
Azithromycin	20 mg/kg/day)
Ceftriaxone	2 g IV od

Table 11.1: FORMAT-Standard doses, duration and route of administration of antimicrobial agents to be displayed

6. Aminoglycosides require aerobic metabolism to exert an antibacterial effect. Anaerobes are intrinsically resistant to aminoglycosides. Aminoglycosides do not show any antimicrobial effect in anaerobic environment, acidic Ph and in abscesses. Unnecessary double anaerobic coverage with antibiotics has been related to increased hospital stay, increased drug resistant organisms and increased adverse reactions.

***Avoid unnecessary double anaerobic therapy e.g., Piperacillin-Tazobactam and Metronidazole. Adding Metronidazole to the above-mentioned antibiotics for anaerobic coverage is unnecessary. Monotherapy is sufficient. Double anaerobic coverage is not associated with added clinical benefit or associated with worst outcome

ANTIBIOTICS WITH ANAEROBIC ACTIVITY		
Amoxyclav	Doripenem	Metronidazole
Ampicillin-sulbactum	Ertapenem	PiperacillinTazobactum
Moxifloxacin	Imipenem	Ticarcillin-clavulante
Clindamycin	Meropenem	Tigecycline

Table 11.2 Antibiotics with anaerobic activity

EXCEPTIONS:

1. Clindamycin can be added to give additional anti toxin effect in (1) necrotizing fasciitis,(2) necrotizing pneumonia (3) toxic shock syndrome
2. Fidoxamicin /Vancomycin can be added to the treatment of Clostridoides difficle infection(in 2021 IDSA,SHEA Clinical practice guidelines).

****VIRAL INFECTIONS** (NO ANTIBIOTICS TO BE GIVEN)

STEPS OF RATIONAL ANTIBIOTIC USE

Step 1: Making a clinical diagnosis is often not given enough importance leading us to most often stumble upon a diagnosis while sending multiple lab tests.

A clinical diagnosis most often helps us to predict causative pathogens fitting in to a clinical syndrome which would tailor the correct antibiotic rather than blindly relying on fever, procalcitonin levels, WBC counts, cultures or radiology to make a diagnosis of infection.

Our thought process here should be Diagnosis of infection

a. Is it an infection?
b. A risk assessment of how likely is it that the patient has an infection?
c. What are the possible non-infectious mimics?
d. Have we taken the appropriate cultures to confirm the final diagnosis?

Step 2: Limiting empiric antibiotic therapy to genuine seriously ill patients. Generally, empiric antibiotic therapy is ONLY recommended for a select group of patients as described below after taking appropriate cultures

i. Febrile neutropenia
ii. Severe sepsis and septic shock
iii. Community acquired pneumonia
iv. Ventilator associated pneumonia
v. Necrotizing fasciitis

Hence, it is important to start smart and then focus, i.e., evaluate if empiric therapy can be justified or de-escalated and then make a plan with regard to the duration of therapy.

Step 3: Know your bugs

Approach includes - Identify the clinical syndrome - Elucidate possible sources of infection 3 - Predict possible microbial pathogens

Step 4: Choose the appropriate antibiotic

Based on the spectrum of the antibiotic taking into account possible resistant patterns - Use the correct dose, route and duration - Ensure chosen antibiotic has adequate tissue penetration at the site of infection - Optimize PK-PD parameters according to co-morbidities

Step 5: De-escalation/modification

a. Modify empiric broad spectrum antibiotics depending on culture and antimicrobial susceptibility reports and patient status
b. Stop polymyxins and glycopeptides if no carbapenem resistant organisms (CRO) or methicillin resistant Staphylococcus aureus (MRSA) identified on cultures
c. Avoid double or redundant gram negative or anaerobic coverage
d. Discontinue antibiotics if a non-infectious mimic identified
e. De-escalate combination therapy to a single agent
f. Change a broad-spectrum antibiotic to a narrow spectrum one
g. Change IV to oral antibiotics

De-escalation is safe in all patients including febrile neutropenia and septic shock and reduces mortality and length of hospital stay.

Step 6: Stop antibiotics in the following clinical situations

i. **Respiratory tract syndromes**
    a. Viral pharyngitis
    b. Viral rhinosinusitis
    c. Viral bronchitis
    d. Non-infectious cardio-pulmonary syndromes misdiagnosed as pneumonia
ii. **II. Skin and Soft Tissue Infections - Subcutaneous abscesses - Lower extremity stasis dermatitis**
iii. **III. Asymptomatic bacteriuria and pyuria including in catheterized patients**
iv. **IV. Microbial colonization and culture contamination**
v. **V. Low grade fever**

Step 7: Reduce the duration of therapy

Duration of therapy should be optimized to minimum possible to reduce selection pressure. Practice guidelines and recommendations for optimum duration of therapy for various infectious disease syndromes suggest the following durations:

i. Community acquired pneumonia: 5 days
ii. Hospital acquired pneumonia: 8 days
iii. Skin and Soft tissue infections: 5 days
iv. Urinary tract infections - cystitis: 3-5 days
v. Pyelonephritis: 5-14 days
vi. Catheter associated: 7 days
vii. Staphylococcal aureus bacteremia
    a. low risk of complications = 2 weeks
    b. high risk of complications = 4-6 weeks
    c. Intra-abdominal infection: 4-7 days
viii. Surgical antibiotic prophylaxis: 1 dose A stop date should be planned and recorded in advance to ensure antibiotic is not given beyond the recommended duration.

Step 8: Optimize PK-PD parameters

We cannot influence how a drug gets metabolized but we can influence drug administration for maximum efficacy. Age and co-morbidities like renal failure, sepsis and burns also influence the

outcomes of the patients. Overall, exposure of the infective agent to the unbound antibiotic drug fraction at the relevant effect site seems to be the most important factor. Optimizing Pk-PD parameters include loading doses when needed, therapeutic drug monitoring for toxicity and efficacy and optimization of drug infusion or administration.

For e.g.,

a. Loading dose of Colistin 9 million units stat and then followed by 3 million units Q8H or 4.5 million units Q12H [to target Colistin Average Steady State Plasma Concentration (Css,avg = 2-2.5 mg/L)
b. Inj Vancomycin 1g IV Q12H and dose to be adjusted to maintain a trough level between 15-20 µg/ml [however there are increasing recent data that suggests that AUC/MIC may be a better indicator of clinical efficacy than a trough level]
c. Extended infusion of β lactams.

AMR SURVEILLANCE DATA OF THE INSTITUTE

Resistance pattern of common pathogens-overall, or OPD wise and Specimen wise must be prepared according to the hospital data including the organism isolated and the AST data. For Example

ORGANISM ISOLATED	No. of Isolates	PERCENTAGE	PIT	IPM	MRP	COT	CIP	CPM
KLEBSIELLA	19	33%	8(42%)	8(42%)	6(31%)	3(15%0	6(31%)	1(5%)
PSEUDOMONAS	15	27%	9(60%)	8(53%)	8(53%)	2(13%)	6(40%)	7(46%)
E COLI	11	19%	5(45%)	5(45%)	4(36%)	1(9%)	1(9%)	3(27%)
ACINETOBACTER	5	9%	0	5(100%)	3(60%)	0	1(20%)	1(20%)
PROTEUS	5	9%	3(60%)	5(100%)	4(80%)	2(40%)	2(40%)	2(40%)
CITROBACTER	1	2%	1(100%)	1(100%)	1(100%)	1(100%)	0	0
STENOTROPHOMONAS	1	2%	0	1(100%)	1(100%)	0		

Table 11.3: Gram negative organism isolated from exudates for a period of one month

SKIN & SOFT TISSUE INFECTIONS

Condition	Likely Causative Organisms	Empiric antibiotics (presumptive antibiotics)	Alternative antibiotics	Comments
Cellulitis	*Streptococcus pyogenes* (common), *S.aureus*	Amoxicillin- Clavulanate 1.2gmIV TDS/625mgoral TDS or Ceftriaxone2gmIVOD	Clindamycin 600-900mg IV TDS	Treat for 5-7days.
Furunculosis	*S.aureus*	Amoxicillin-Clavulanate 1-2gmIV/Oral 625 TDS or Ceftriaxone 2gmIV OD Duration–5-7days	Clindamycin 600-900mg IV TDS	Get pus cultures before starting antibiotics

Table 11.4 Skin & Soft Tissue Infections

URINARY TRACT INFECTIONS

i. Asymptomatic bacteriuria NOT to be treated except pregnant women and immunocompromised patients. All cases of dysuria may not be UTI. Refer to Obstetrics and gynecology infections for treatment of asymptomatic bacteriuria in pregnant women.

ii. Asymptomatic Bacteriuria>1,00,000cfu/ml of bacteria of same species in 2 urine cultures obtained 2-7days apart. Treat as per sensitivity result for 7days.

iii. Local antimicrobial resistance patterns should be the basis for empiric treatment.

iv. Antibiotics should be changed based on susceptibility results as soon as they are available.

v. Intravenous antibiotics must be reviewed at 48 hours, and stepping down to oral antibiotics should be considered.

vi. Post-treatment urine cultures in asymptomatic patients are not indicated routinely UTIs in males are usually complicated and uncommon in the absence of obstructive pathology.

vii. No antibiotic treatment is required when there is the presence of pus cells in urine, along with negative culture results or in those with asymptomatic bacteriuria. If the pyuria persists, causes for sterile pyuria should be investigated.

UTI in Children

Cystitis can be treated with nitrofurantoin or amoxycillin for duration of 5-7 days.

i. Acute pyelonephritis and complicated UTI is best treated with amikacin as a single dose for the first few days till the child is accepting oral feeds. Thereafter the antibiotic may be changed to an oral preparation based on susceptibility pattern. Duration of treatment is 14 days. There is no role for a short-term treatment in children.

ii. Children with a Vesicoureteric reflux may be treated with antibiotic prophylaxis as a single nighttime dose. Co-trimoxazole or Nitrofurantoin is preferred in children beyond three months of age.

OBSTETRICS AND GYNAECOLOGICAL INFECTIONS

i. Fluoroquinolones are contraindicated in 1sttrimester.

ii. Cotrimoxazole is contraindicated in 1sttrimester.

iii. Doxycycline is not recommended in nursing mothers. If need to administer doxycycline discontinuation ofnursing may be contemplated**.**

FUNGAL INFECTIONS

Routine antifungal prophylactic therapy in critically ill patients is NOT recommended. Fungal therapy is usually started based on positive cultures or systemic evidence of fungal infection. It is advised to take paired cultures if fungal infection is suspected. Evidence includes persistent sepsis / SIRS despite broad spectrum antibiotic (exclude sepsis, abscess, drug fever, DVT etc.). Treat according to identification and antifungal sensitivity of Candida isolate.

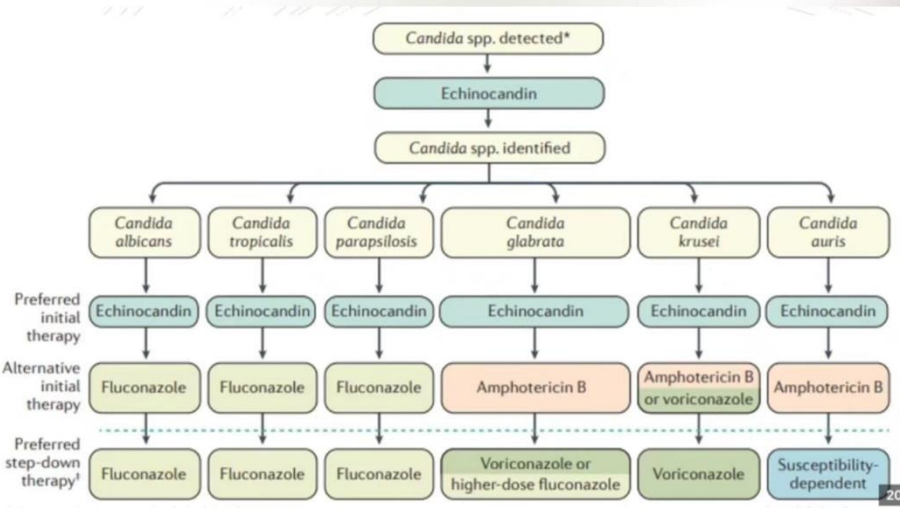

Chart 11.1: Management of fungal infection

In case of candidemia empiric treatment with echinocandins is preferred initial therapy over fluconazole.

Fluconazole IV/oral 800 mg OD first day (12mg/kg) and then 400 mg OD (6mg/kg from second day) if fluconazole naïve or sensitive

Or

2nd line Liposomal Amphotericin B (for Candida krusei and C.glabrata as inherently resistant to Fluconazole or Caspofungin (As Caspofungin is inherently inactive against Zygomycetes, Cryptococcus, Fusarium and TrichosporonSpp) Liposomal Amphotericin B IV 3mg/kg OD or Caspofungin dose: IV 70mg on Day 1 (loading), 50mg OD (<80kg) or 70mg OD (if >80kg) thereafter.

Moderate to severe hepatic dysfunction: reduce the subsequent daily dose to 35mg OD. Check fordrug interactions.

To be decided by Microbiologist/ID physician based on patient's hepatic / renal functions/Severity of infection /drug interactions e.g. rifampicin, carbamazepine, phenytoin, efavirenz, nevirapine, cyclosporin, dexamethasone, tacrolimus etc.

SURGICAL ANTIMICROBIAL PROPHYLAXIS

a. To be administered within **60 minutes (1hr)** before the surgical incision.
b. Single dose is recommended. Consider for second intra-operative dose in prolong surgerybased on the choice of antibiotic used for prophylaxis.
c. Prophylaxis should **not** be given beyond surgery duration (except for cardiothoracic surgery,up to 48 hours permissible)

SURGERY	MEDICATION
Breast	Inj.Cefazolin 2gm or Inj. Cefuroxime 1.5gm IV stat
Gastroduodenal & biliary	Inj. Cefaperazone-Sulbactam 2gm IV stat & BD for 24hrs (maximum)
ERCP	Inj. Piperacillin-Tazobactum 4.5 gm or Inj. Cefaperazone-Sulbactam 2 gm IV stat
Cardiothoracic	Inj. Cefuroxime 1.5gm IV stat & BD for 48 hrs
Colonic surgery	Inj. Cefaperazone-Sulbactam 2gm IV stat & BD for 24hrs (maximum)
Abdominal surgery(hernia)	Inj. Cefazolin 2gm or Inj.Cefuroxime 1.5gmIV stat
Head & Neck/ENT	Inj. Cefazolin 2gm IV stat
Neurosurgery	Inj. Cefazolin 2gm or Inj.Cefuroxime 1.5gm IV stat
Obstetrics & Gynecology	Inj. Cefuroxime 1.5gm IV stat
Orthopedic	Inj. Cefuroxime 1.5gm IV stat & BD for 24hrs(maximum) or Inj. Cefazolin 2gmIV stat Open reduction of closed fracture with internal fixation-Inj. Cefuroxime 1.5 gm IVstat and q12 h or Inj. Cefazolin 2gm IV stat and q12 h for 24hrs
Trauma	Inj. Cefuroxime 1.5gm IV stat and q 12h (for 24hrs) or Inj. Ceftriaxone 2gm IV OD
Urologic procedures	Antibiotics only to patients with documented bacteriuria
Trans-rectal prostatic surgery	Inj. Cefaperazone-Sulbactam 2 gm IV stat

Table 11.5: Surgical Antimicrobial Prophylaxis

WHO PRIORITY PATHOGENS LIST

1. This list is a new tool to ensure R&D responds to urgent public health needs.
2. The WHO list is divided into three categories: critical, high and medium priority.
   a. **PRIORITY 1: CRITICAL**
      - Acinetobacter baumannii, carbapenem-resistant
      - Pseudomonas aeruginosa, carbapenem-resistant
      - Enterobacteriaceae, carbapenem-resistant, ESBL-producing
   b. **PRIORITY 2: HIGH**

- Enterococcus faecium, vancomycin-resistant
- Staphylococcus aureus, methicillin-resistant, vancomycin-intermediate and resistant
- Helicobacter pylori, clarithromycin-resistant
- Campylobacter spp., fluoroquinolone-resistant
- Salmonellae, fluoroquinolone-resistant
- Neisseria gonorrhoeae, cephalosporin-resistant, fluoroquinolone-resistant

c. **PRIORITY 3: MEDIUM**

- Streptococcus pneumoniae, penicillin-non-susceptible
- Haemophilus influenzae, ampicillin-resistant
- Shigella spp., fluoroquinolone-resistant

The 2019 WHO AWaRe Classification Database was developed on the recommendation of the WHO Expert Committee on Selection and Use of Essential Medicines. It includes details of 180 antibiotics classified as Access, Watch or Reserve, their pharmacological classes, AWaRe classifies antibiotics into three stewardship groups: Access, Watch and Reserve, to emphasize the importance of their optimal uses and potential for antimicrobial resistance

ACCESS- Resident-Postgraduates/Senior residents	Amikacin Amoxicillin Ampicillin Amoxycillin-clavulanic acid Benzathine benzyl penicillin Benzyl penicillin Cefazolin Chloramphenicol Cindamycin	Cloxacillin Doxycycline Gentamicin Metronidazole Nitrofurantoin Phenoxy methyl penicillin Procaine penicillin Spectinomycin Sulfamethoxazole- trimethroprim
WATCH- Resident to prescribe under guidance of Assistant Prof. & Associate Prof.	Azithromycin Cefixime Ceftriaxone Cefotaxime Ceftazidime Cefuroxime	Vancomycin(intravenous and oral) Ciprofloxacin Clarithromycin Meropenem Piperacillin tazobactum
RESERVE- To be prescribed by Unit Chief	Fosfomycin (intravenous) Linezolid Colistin Polymyxin B	Ceftazidime avibactum Meropenem- varobactum Plazomicin

Table 11.6: AWARE Classification-WHO

The **Indian Pathogen Priority List (IPPL)** released by Union Ministry for Health and Family Welfare is aligned with WHO's Global Priority Pathogen List of antibiotic-resistant bacteria.

AWARE CLASSIFICATION ANTIBIOTICS

INDIAN PRIORITY PATHOGEN LIST

CRITICAL PRIORITY	
Enterobacteriaceae *(Klebsiella pneumoniae and Escherichia coli)*	Carbapenem – R Tigecycline – R Colistin – R
Non-fermenting bacteria *(Acinetobacter baumannii and Pseudomonas aeruginosa)*	Carbapenem – R Colistin – R
HIGH PRIORITY	
Staphylococcus aureus	MRSA, hVISA Daptomycin – NS Linezolid – R
Enterococcus species	Vancomycin – R Linezolid – R Daptomycin – NS
Salmonella species (Typhoidal and Non-typhoidal)	Azithromycin – NS Third generation cephalosporins – NS Carbapenem – NS
MEDIUM PRIORITY	
Streptococcus pneumoniae	Cephalosporin – R Fluoroquinolones – R Linezolid – R
Staphylococcus, coagulase-negative	Vancomycin – R Linezolid – R
Shigella species	Third generation cephalosporins – R Azithromycin – R
Haemophilus influenzae	Third generation cephalosporin – NS Carbapenem – NS
Neisseria meningitidis	Fluoroquinolones – NS Third generation cephalosporins – NS

R: resistant; NS: non-susceptible; MRSA: methicillin resistant *Staph. aureus*; hVISA: heterogenous vancomycin-intermediate *Staph. aureus*

Mycobacteria (including *Mycobacterium tuberculosis*) were not included in this prioritization exercise as it is a well-established global and national priority for which innovative new treatments are urgently needed and being developed.

Table 11.7: Indian Priority Pathogen List

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CHAPTER: 12

Food Safety In Hospitals And Pest Control

The need for adequate food hygiene facilities in hospitals is of paramount importance, since the consequences of an outbreak of food poisoning can be life threatening for susceptible patients. Particular care must be taken to minimize the risk of infection or intoxication through the food service system. The aim of food safety is to ensure that food is provided to patients and staff in a safe and hygienic manner. The kitchen manager should make sure that food is supplied in a hygienic way, identify food safety hazards, know which steps in the processes are critical for food safety, ensure that safety controls are in place maintained and controlled.

GENERAL RULES OF FOOD HYGIENE

Food services chain consists of

i. Receiving raw food
ii. Storing
iii. Food preparation (cutting/ sorting, cooking)
iv. Direct serving/chilling/ heat holding/ reheating before serving.
v. Strict standards pertaining to hygiene should be maintained during all the stages.

Kitchen staff:

1. Should be trained about personal hygiene, food safety and food-borne diseases
2. Should wear clean clothes and change work clothes at least once daily. They should wear protective aprons and keep their hair covered while preparing food.
3. They should clean their hands, face and hair and trim their nails.
4. Staff should be instructed not to touch their nose, lips and hair while preparing food.
5. Must wash hands before handling food, after going to the toilet, after handling raw food and after coming in contact with unclean equipment/ work surfaces
6. They must use hot water with soap (preferably liquid) and dry hands with clean dry cloth towels, fresh paper towels or by air drying. They may use an antibacterial soap during an outbreak.
7. Food should be handled using preferably disposable gloves. All injuries and cuts should be covered with waterproof tapes.

8. Workers suffering from acute diarrhea, enteric fever, draining abscess or skin infections should not handle food and such episodes should be bought to the notice of the medical officer.
9. Frequent training of the staff and inspection of the kitchen hygiene should be carried out by the infection control team.

***Kitchen infrastructure*:**

a. Proper maintenance of refrigerators and freezers is needed with checking and recording of their temperatures daily.
b. Adequate supply of clean and potable water to the kitchen should be ensured along with adequate hand washing facility. Preparation area should have the provision of sink with running hot and cold water, working drainage system and windows with screens.
c. Kitchen should be a no- smoking area There should be adequate storage area with adequate fire protection and sufficient ventilation.
d. Entry to the food preparation area should be restricted.

Preparation of food:

a. Serving to be done as soon as possible after preparation.
b. Preparation of raw and cooked food should have different designated areas to prevent cross contamination.
c. Never process cooked and uncooked meat using the same machines.
d. Maintain the temperature and refrigeration requirements for both raw and cooked foods for food protection.
e. Serve cooked perishable foods within two hours of preparation and dispose of thereafter.

Food storage and Distribution:

a. After cooking, all the food to be stored should be immediately cooled All food items should be kept in covered containers and labeled with date and content.
b. All food items should be within the expiration dates
c. Storage of all food items should be away from the walls and at least 6 inches above the floor level.
d. No storage of food items to be done with contaminated materials, clinical specimens or medical products such drugs, vaccines and blood
e. Only trained staffs should distribute food in dedicated, clean trolleys.
f. Protect food from vectors using nets, clean cloth or covers.

g. Maintain and wash trolleys daily or more frequently if soiled.

***Cleaning, Inspection And Supervision*:**

a. Strict protocols regarding cleaning and maintenance should be made and followed
b. The entire kitchen area should be dust- free and the work areas and food storage areas clean and well maintained.
c. Clean and disinfect the working areas and all utensils after each use. All equipment to be cleaned daily and kept in a way that the area around them can be cleaned daily should have smooth and impermeable surfaces.
d. Walls and ceiling should have smooth and impermeable surfaces.
e. Detergent and hot water can be used for cleaning. A clean cloth should be used and changed daily

***Screening of kitchen workers*:**

Surveillance must be conducted biannually for carriage of MRSA and Salmonella.

PEST CONTROL

Hospitals should have a Pest Control Program and can be contracted to an approved pest control contractor. Integrated pest management (IPM) is a targeted approach to pest control that focuses on proactive, nonchemical pest management techniques before employing chemical treatments as a last resort. IPM focuses on proactive strategies like exclusion, facility maintenance, stringent sanitation practices and ongoing inspections to keep pests away. If chemical treatments are needed, nonvolatile and the least-toxic formulations are used, and only in precision-targeted areas.

References:

1. Nizam Damani, Didier Pittet Manual of Infection Control and Prevention. University Press,Oxford;2012
2. Manual of prevention and control of healthcare associated infections, 2016. Lok Nayak hospital. New Delhi
3. Manual of Infection Control and Prevention. Jai Prakash Narayan Apex Trauma Centre. All India Institute of Medical Sciences, New Delhi.

CHAPTER - 13

Infection Control Policy For Deceased Bodies

INTRODUCTION:

Most of the dead bodies are potentially infectious, capable of transmit organisms. Therefore, it is essential for a hospital to make and adhere to the infection control guideline to handle dead bodies.

The objectives of drawing up this set of guidelines are :

1) To enable the deceased family to obtain funeral services and

2) To protect the involved personnel, eg. workers and relatives

There should be a committee/expert panel to formulate and monitor the guideline; comprising of forensic medicine specialist, microbiologist, infection control officer and a clinician and charred by medical superintendents.

CATEGORIZATION OF DEAD BODY:

Based on the mode of transmission and the risk of infection of different diseases, the following categories of precautions for handling and disposal of dead bodies are advised.

a. Guideline should clearly state what precautions to be taken while carrying out the important measure after death such as bagging, viewing, hygiene parlouring, embalming and final disposing off.
b. Implementation of tagging system dead bodies of each category should be labelled with color coded tags.
   (blue for dead bodies with category 1 infections, yellow for category 2 and red for category 3).

Danger of infection **Category 1** in handling dead bodies standard precautions are required				Danger of infection **Category 2** in handling dead bodies standard precautions are required				Danger of infection **Category 3** in handling dead bodies standard precautions are required			
Bagging	**Viewing in funeral Home**	**Embalming**	**Hygienic preparation in funeral Home**	**Bagging**	**Viewing in funeral home**	**Embalming**	**Hygienic preparation in funeral Home**	**Bagging**	**Viewing in funeral Home**	**Embalming**	**Hygienic preparation in funeral**
Not Necessary	Allowed	Allowed With Disposable Gloves Water Resistant Gown And Surgical Mask	Allowed With Disposable Gloves Water Resistant Gown And Surgical Mask	Must	Allowed	Not Allowed	Allowed With Disposable Gloves Water Resistant Gown/Plastic Apron Over Water Repellent Gown And Surgical Mask	Must	Not Allowed	Not Allowed	Not Allowed

Table 13.1 Categorization of Dead bodies-Risk of Infection &Transmission

Table 13.2 Implementation of Tagging System to Label Dead Bodies

Categories	Infection Included	Body Bag	Viewing	Hygienic Preparation	Embalming	Autopsy	Final Treatment
Category 1 **Low risk**	Rest all infection (other than category 2 and 3)	Not Needed	Allowed	Allowed with PPEs	Allowed	Yes	Cremation or cuffing
Category 2 **Moderate risk**	Intestinal infections • Typhoid • Hepatitis A and E • Diarrheal pathogens	Advised	Allowed	Allowed PPEs	Allowed	Avoid	Cremation is advisable
	Respiratory infection • Tuberculosis • diphtheria	Advised	Allowed	Allowed with PPEs	Allowed	Avoid	
	Blood borne infections • HBV, HCV, HIV	Must	Allowed	Allowed with PPEs	Not allowed	Avoid	
	Transmissible spongiform encephalopathies (TSE)	Must	Allowed	Allowed with PPEs	Not allowed	Avoid	
	Contact transmission • MRSA and MDROs • Invasive Streptococci	Must	Allowed	Not allowed	Not allowed	Avoid	
Category 3 **High risk**	Anthrax Plague Rabies Small pox Viral hemorrhagic fever TSE with autopsy	Must	Not Allowed	Not allowed	Not allowed	Avoid	Cremation is must

Measures	Precautions
Bagging	It is the placing the dead body in a plastic body bag for storage and transport a) Bagging of dead bodies has its own disadvantages such as 1) fastens the decay 2) makes the viewing unpleasant Indications: It is not indicated always, but restricted to the following situations: 1) leakage of blood or body fluids regardless of infectious status. 2) risk is unknown. 3) If infectious status documented as category 3 or some cases of category 2(BBVs, TSE, MDROs/MRSA). In countries such as Ireland-bagging has been made 127compulsory for all dead bodies. No of bags 1)for category 1 no bags needed, mortuary sheet wrapping is enough. 2)for category 2 body bag (one) 3) for category 3 body bag (two). -inner transparent and outer opaque and absorbent materials should be put in between Bag should be made up of 1) Robust and leak proof plastic bag of 150 micrometre thick 2) zippered closed. not pins closed Outer surface should always be cleaned by 1% hypoclorite.
Viewing in funeral Home	Allowing bereaved to see and spend time with the body before encoffing a. Bereaved-informed about the infection risk (not the organism). b. Touching /kissing to be avoided. c. Allowed except category 3.
Hygiene preparation in funeral Home	a. Cleaning and tidying the body so that it will look presentable b. Makeup and order c. Allowed with PPE- except d. Category 3 e. Category 2: contact transmission (MRSA, MDROs, Invasive Streptococcus)
Embalming	a. Injecting the body with preservatives and replacing the blood to slow down the process of decay. b. Risk of needle/sharp injury c. Allowed with PPE's – except d. Category 3 e. Category 2: BBV, TSE, contact transmission agents f. May also generate infectious aerosols
Final treatment	a. Category 1: cuffing or cremation b. Category 2: cremation advisable c. Category 3: cremation must

Table 13.3 Measures & Precautions to be taken on handling dead bodies

Organisms transmitted from dead bodies

Virtually any microorganism can be transmitted from dead bodies by various routes such as contact, droplet and aerosols. Most common route of transmission is contact followed by droplet. Aerosol transmission risk is less as dead bodies cease to breathe and generate aerosols.

a. Tuberculosis: Surprisingly, M. tuberculosis is the most common organism reported to be transmitted from deceased individuals. Infection is primarily caused by inhalation of infected aerosols generated by shaking of the body during transport & during autopsy or through tuberculous skin lesions.
b. Blood-borne viruses are the next common group to be reported. There are many reports of transmission of Hepatitis B, rarely HIV. High risk group being embalmers and autopsy workers.
c. Virtually any other organism from table-1 can also be transmitted from dead bodies.
d. Transmission of transmissible spongiform encephalopathies (TSES)- Not reported yet

PRECAUTIONS/PREVENTIVE MEASURES

General recommendations

Standard precaution and specific/transmission-based precautions should be taken as per the route of transmission of suspected infection. The PPEs to be worn during handling/autopsy is as follows.

Category-1	**Category-2**	**Category -3**
Gloves	Gloves	Long nitrile gloves/double nitrile gloves
Water repellent gown	Water resistant gown/plastic apron water repellent gown	Water resistant gown
Surgical mask	Surgical mask	N95 respirator
Goggles or face shield (if risk of splash)	Goggles nor face shield (if risk of splash)	Face shield /goggles
		Cap/hood
		Full length shoe covers/boots

Table 13.4 PPEs to be worn during handling/autopsy

Environmental control

a. Surface disinfection is must.

- General surface-should be disinfected with 1% hypochlorite
- Surface soiled with blood/body fluid- 10% hypochlorite

b. Proper biomedical waste disposal- according to BMW 2016/local policy (same as living body)

c. Linen disinfection -according to local policy (same as living body)

Specific recommendations

Guideline should state specific precautions that are necessary to be taken at various levels dead body handing such as by the HCWs during last offices, mortuary staff, autopsy room staff and funeral workers.

1. Last offices (HCWs)

Last offices are the procedures performed, usually by a nurse, to the body of a dead person shortly after death has been confirmed. She should follow the following precautions:

1. Perform HH as and when touching body /its surrounding
2. Handle with appropriate use of PPES
3. All tubes, drains and catheters on the dead body should be removed. IV catheters and other sharp devices should be disposed in sharp container
4. Wound drainage and needle puncture holes needs to be disinfected & banded
5. Secretions in oral and nasal orifices should be removed by gentle suction
6. Oral, nasal and rectal orifices should be plugged
7. Bagging the body and flagging with tag should be done as per guideline.
8. Flagging should be done about HIV/HBV/HCV status, presence of any other infections
9. Environmental control should be taken as described.

2. Mortuary staff

They should check for tag, bagging, flagging of HIV/HBV/HCV/other infection status. If not available, they should take necessary steps to arrange for the same.

a. Standard precautions- should be taken at all the time
b. Dead bodies should be stored in cold chambers (4°C) to prevent decay.
c. Mortuary room should be kept clean and properly ventilated with adequate lighting.
d. Environmental control should be taken as described.

3.Autopsy Room

a. Smoking, drinking and eating are forbidden in autopsy room
b. Autopsies on category 2 and 3 should not performed.
c. If unavoidable, then the following measures to be followed.
d. Trained Personnel should carry out the procedure.
e. Should have limited access, only to the HCWs carrying out the procedure.
f. Maximum barrier precautions (PPEs) should be followed.
g. Bag should be sealed immediately with outside of bag disinfected.
h. Funeral workers should be informed about the potential risk of infection.
i. The choice of saw during autopsy, Electrical (mechanical oscillating) has high risk of aerosol generation, Manual saws has less risk of aerosol generation, however it has increased risk of accidental injury. Hence cut-resistant gloves should be used while using manual saw.
j. For TSE- Dedicated saw should be used. Head and neck enclosed in a large plastic bag with absorbent wadding
k. Environmental control should be taken as described.

4.Funeral workers

a. The authority should make sure of supply of gloves, PPE, hand rub and disinfectant. These are usually not available at funeral.
b. Direct contact with blood or body fluids from the dead body should be avoided.
c. Use of PPE and HH as described
d. Make sure any wounds should be covered with waterproof bandages or dressings.
e. Do not smoke, drink or eat.
f. Do not touch your eyes, mouth or nose.
g. Environmental control should be taken as described.

Staff handling dead bodies of unknown category

a. Dead bodies of unknown category should be considered as high-risk category (category-3); and all the necessary measures should be taken accordingly.
b. Immediately bag sealed should be done.
c. Funeral precautions are same as for high-risk category.

References:

1. Damani NPinet D. Manual of Infection Control Procedures. 3rd ed. london: Oxford university press; 2012.
2. 2. HSE guideline 2005 (Health and Safety Executive, UK), Healing et al 1995, Centre for Health Protection, 14 Argyle Street, Kowloon.

CHAPTER 14
Occupational Exposure and its Management

INTRODUCTION

Occupational exposures to potentially infectious clinical material are not uncommon in healthcare setting. A percutaneous injury (e.g., needle-stick or cut with a sharp instrument), contact with the mucous membranes of the eye or mouth, contact with non-intact skin (particularly when the exposed skin is chapped, abraded, or afflicted with dermatitis), or contact with intact skin when the duration of contact is prolonged (e.g. several minutes or more) with blood or other potentially infectious body fluids is termed as exposure. Standardized practices should be followed in all kinds of Accidental Exposure to Blood (AEB). Most important concerns after NSI is the risk of infection from blood borne viruses. of all, most important viruses are HIV, Hepatitis B virus and Hepatitis C virus.

Risk of infection is 0.3 per cent with HIV infected percutaneous exposure to blood, 3% after Hepatitis B virus exposure and approximately 30% after Hepatitis C virus exposure.

Table 14.1: Infectious and Non-infectious materials in Hospital Setting

Potentially Infectious	**Non-Infectious (Unless Contaminated with Visible Blood)**
1. Blood/ Serum/ Plasma 2. Semen 3. Vaginal Secretions 4. Body fluids—cerebrospinal, synovial, pleural, peritoneal, pericardial, amniotic 5. Any other fluids/ secretions contaminated with visible blood 6. Tissues 7. Laboratory specimens that contain concentrated virus	1. Tears 2. Saliva 3. Urine 4. Stool 5. Sputum 6. Nasal secretions 7. Sweat 8. Vomitus
Don'ts	**Do's**
• Do not panic • Do not place the pricked finger into the • mouth reflexively • Do not squeeze blood from wound • Do not use bleach, alcohol, iodine, antiseptic, detergent, etc.	• Stay calm • Remove gloves, if appropriate • Wash exposed site thoroughly with running water and soap. Irrigate thoroughly with water, if splashes have gone into the eyes or mouth • Consult the designated physician/ personnel immediately as per institutional guidelines, for management of the occupational exposure.

POST-EXPOSURE MANAGEMENT

Steps to be followed after accidental exposure to blood/other potentially infectious materials:

1. First aid
2. Identify the source status if available
3. Report to the Infection Control Team immediately
4. Risk assessment by Nodal person (based on type of injury and source status)
5. Take first dose of PEP for HIV
6. Testing for HIV, HBV and HCV for source and HCW
7. Decision on prophylactic treatment for HIV and HBV
8. Monitoring and follow up of HIV, HBV, and HCV status
9. Documentation and recording of exposure

For Skin	For the Eye	For Mouth
1. Immediately wash the wound and surrounding skin with water and soap, and rinse with flowing water or normal saline. 2. In case of skin and mucus membrane exposure immediately wash the area and do not use antibiotics. 3. Do not scrub. 4. Do not use antiseptics or skin washes	1. Immediately irrigate the exposed eye thoroughly with running tap water or normal saline at least for 5 min for blood splash (15 min for chemical splash). 2. If wearing contact lenses, leave them in place while irrigating as they form a barrier over the eye and will help protect it. 3. Once the eye is cleaned, remove the contact lens and clean them in a normal manner. This will make them safe to wear again. 4. Do not use soap or disinfectant on the eye.	1. Spit fluid out immediately. 2. Rinse the mouth thoroughly using water or saline and spit again. Repeat the process several times. 3. Do not use soap or disinfectant in the mouth.

Table 14.2: First Aid: Management of Exposed Site

Identify the Source if Available

If source is found to be negative, first dose of PEP for exposed person is not required but the exposure should be reported to HICC for documenting the NSI. If the source status is unavailable or found as positive for HIV or source is unknown, then first dose of PEP is essentially required.

Reporting to the Infection Control Team

Consult the designated infection control nurse/ physician (who so ever is available earliest) of the institution for the management of exposure immediately (the helpline numbers are displayed in charts provided at every hospital area). The help line support is available for 24 hours.

Risk Assessment by Nodal Person

The evaluation to be done by the designated person (Nodal Officer) preferably within 2 hours but certainly within 72 hours.

Categories of exposure based on amount of blood/fluid involved and the entry port these includes.

Categories	**Description**	***Example***
Mild Exposure	Mucous membrane/ non-intact skin with small volumes	A superficial wound (erosion of the epidermis) with a plain or low calibre needle, contact with the eyes or mucous membranes, or subcutaneous injections following small bore needles
Moderate Exposure	Mucous membrane/ non-intact skin with large volumes or percutaneous superficial exposure with solid needle.	A cut or needle stick injury penetrating gloves.
Severe Exposure	Percutaneous with Large Volume	An accident with a high caliber needle visibly contaminated with blood; A deep wound (hemorrhagic wound and/or very painful); Transmission of a significant volume of blood; an accident with material that has previously been used intravenously or intra-arterially.

Table 14.3: Categories of occupational Exposure

In case of an exposure with material such as discarded sharps/ needles, contaminated for over 48 hours, the risk of infection becomes negligible for HIV, but still remains significant for HBV. Hepatitis B virus survives longer than HIV outside the body.

Take First Dose of PEP(Post Exposure Prophylaxis)

The first dose of PEP should be administered preferably within the first 2 hours of exposure but certainly within 72 hours. If the risk is insignificant, PEP could be discontinued, if already commenced.

Testing for HIV, HBV and HCV for Source and HCW

i. Once the HCW reports to the nodal center, both the source (in case the status of the source is unknown and source is available for) and the HCW are tested for their baseline status for HIV (antibody), HCV (antibody), and HBV (HBsAg) by rapid methods.

ii. If the HCW is Prior Vaccinated, then Check for HBsAb Titer

iii. (HCW's baseline status is determined. Otherwise, it may be difficult to attribute the infection acquired due to exposure in the occupational setting. This may have bearing on the claims for compensation from the health authorities.)

iv. A baseline HIV testing should be done after proper counseling; Informed consent should be obtained before testing of the source as well as person exposed. Initiation of PEP, where indicated, should not be delayed while waiting for the results of HIV testing of the source of exposure.

v. Exposed individual who are known or discovered to be HIV positive should not receive PEP. They should be offered counseling and information on prevention of transmission and referred to antiretroviral therapy (ART) center after their complete laboratory work up which also include testing for Hepatitis B and C virus infection.

Decision on Prophylactic Treatment for HIV and HBV

This is based on assessment of exposure and source status

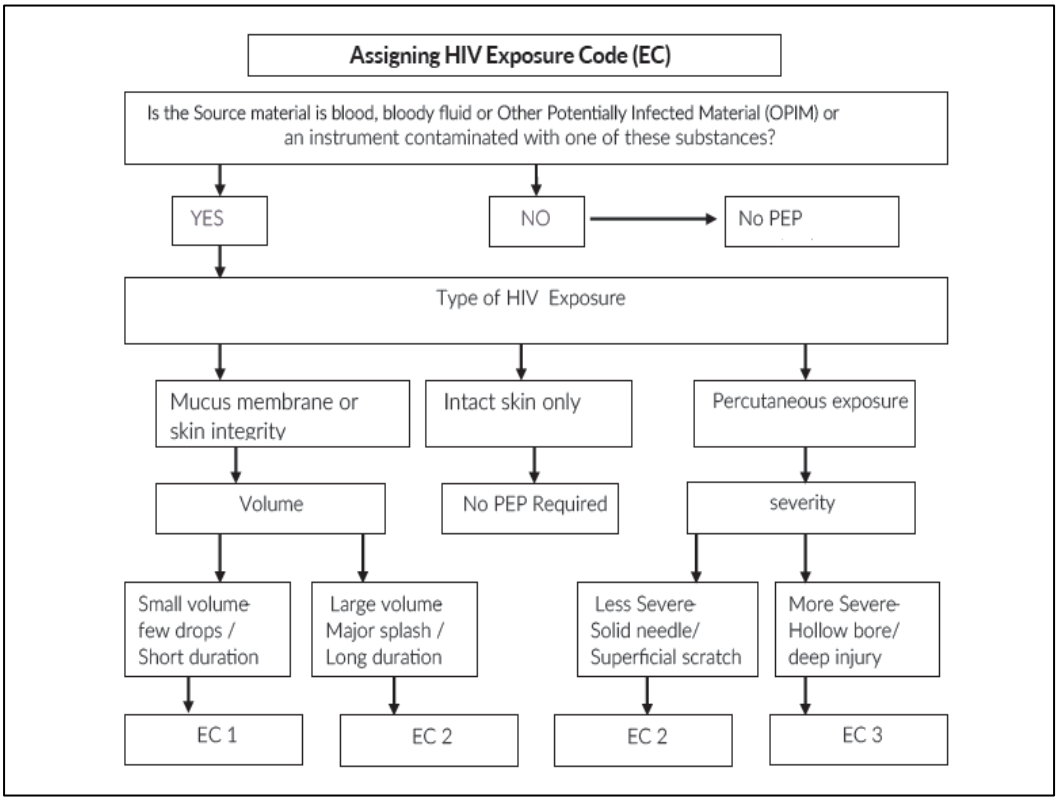

Fig 14.1: Decision on Prophylactic Treatment for HIV and HBV

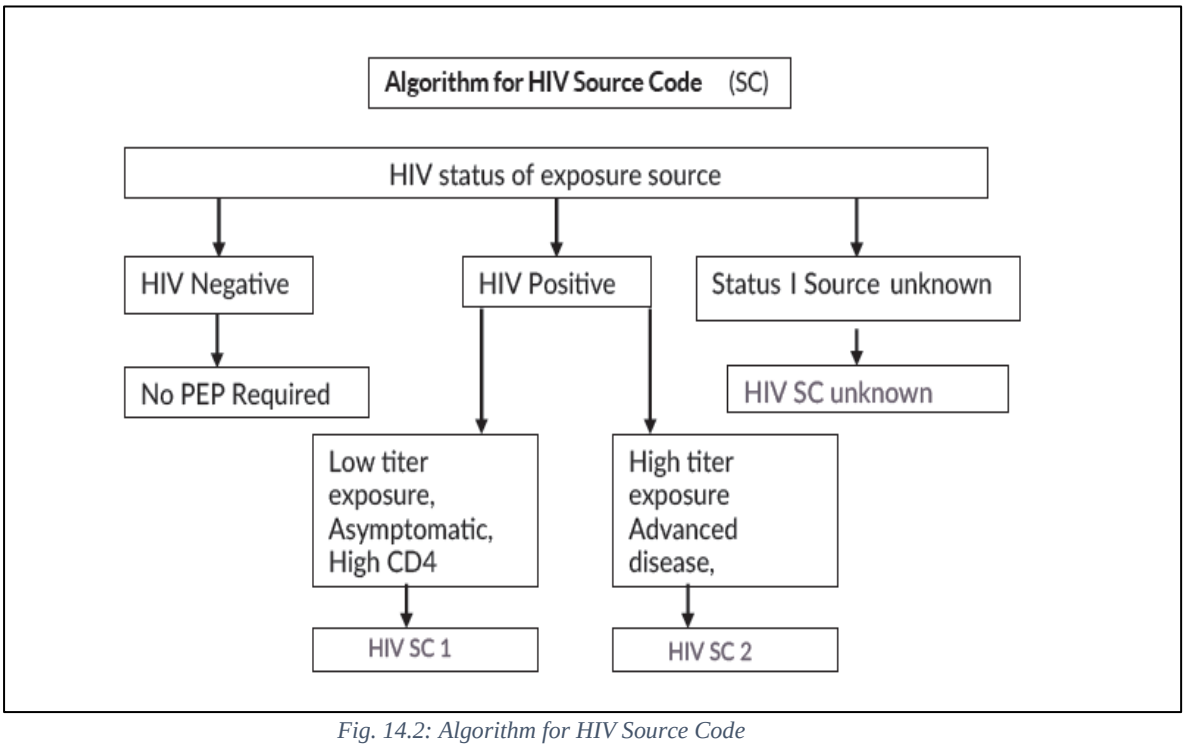

Fig. 14.2: Algorithm for HIV Source Code

Exposure Codes	HIV Source Codes	PEP Recommendations	Duration
EC 1	SC 1	Not Recommended	28 Days
EC 1	SC 2	Recommended	
EC 2	SC 1		
EC 2	SC 2		
EC 3	SC 1 or 2		
EC 2/3	SC Unknown	Consider PEP, if HIV prevalence is high in the given population and risk categorization	

Table 14.4: Algorithm for HIV Source Code

PEP Regimen for HIV

1. Wherever PEP is indicated and source is ART naive or unknown: recommended regimen is Tenofovir 300 mg + Lamivudine 300 mg + Efavirenz 600 mg once daily for 28 days. Wherever available, single pill containing these formulations should be used. Dual drug regimen should not be used any longer in any situation for PEP.
    a. The first dose of PEP regular should be administered as soon as possible, preferably within

2 hours of exposure and the subsequent dose should be given at bed time with clear instruction to take it 2-3 hours after dinner and to avoid fatty food in dinner

b. In case of intolerance to Efavirenz, regimen containing Tenofovir + Lamivudine + PI (ATV/r or LPV/r) can be used after expert consultation by an experienced physician.

2. In case of exposure where source is on ART, Tenofovir 300 mg + Lamivudine 300 mg + Efavirenz 600 mg should be started immediately. And an expert opinion should be sought urgently by phone/e-mail from CoE/ART Plus center.
3. Appropriate and adequate counseling must be provided regarding possible side effects, adherence and follow up protocol.
4. PEP is continued for 28 days in all source positive and source unidentified cases, regardless of the risk of exposure and CD4 count of the source.

PEP for Hepatitis B

1. Hepatitis B measures are as follows:
2. For vaccinated HCW with subsequent documented anti-HBs> 10 mIU/ml
3. No need to assess the source status. No post-exposure management is necessary.
4. For vaccinated HCW with anti HBs<10mIU/ml after two complete vaccination series (i.e., non-responders)
5. Assess the source status as soon as possible. If the source status is positive or unknown give 2 doses of HBIg, one month apart.

6. For vaccinated HCW whose antibody titres are unknown*:* Check the titres and assess the source risk as early as possible.

    a. If the titres are >10 mIU/ml, no action needed irrespective of the source status.
    b. If the titres are <10 mIU/ml and if the source is negative, give revaccination series of hepatitis B (0-1-6).
    c. If the titres are <10 mIU/ml and if the source is positive or unknown give one dose of HBIg and start revaccination series of hepatitis B.
    d. If the HCW is unvaccinated or incompletely vaccinated or vaccine refusers

7. If the source is positive or unknown

Do HBsAg and anti HBc for the HCWs and give HBsIg one dose and complete the vaccination series. If the source is negative complete the vaccination schedule.

When to check HBsAb titer?

a. Done after 1–2 months of the last dose of Hepatitis B vaccine.
b. When immunoglobulin is received along with vaccination, post-vaccination serology is done after 4–6 months to avoid detection of passively administered anti-HBs.

PEP for HCV

There is no known effective post-exposure prophylaxis for Hepatitis C. The risk of HCV infection after exposure is approximately 1.8%. Testing should occur within 48 hours of exposure, and the typical guidelines for management and treatment of Hepatitis C should be followed.

Monitoring and follow up of HIV, HBV, and HCV status

a) Whether or not PEP prophylaxis has been started, follow up is indicated to monitor for possible infections and provide psychological support.
b) HIV testing (HIV Ab) follow-up is done: at 6 weeks, 3 months and 6 months after exposure.
c) HBV (HbsAg) and HCV (Anti HCV Ab) testing follow-up is done: at 3 months and at 6 months after exposure.

Precautions during the follow up period:

During the follow up period, especially the first 6–12 weeks, the following measures are to be adopted by the HCW.

a. Refraining from blood, semen, organ donation
b. Abstinence from sexual intercourse or use of latex condom
c. Women should not breast-feed their infants.
d. The exposed person is advised to seek medical evaluation for any febrile illness that occurs within 12 weeks of exposure.

Fig. 14.3 Information Display on Prevention and Management of Occupational Exposures

Documentation and Recording of Exposure

A *structured proforma* should be used to collect the information related to exposure: Date, time, and place of exposure, type of procedure done, type of exposure: percutaneous, mucus membrane, etc., duration of exposure and exposure source and volume; type of specimen involved.

Consent form: For prophylactic treatment the exposed person must sign a consent form. If the individual refuse to initiate PEP, it should be documented. The designated officer for PEP should keep this document.

REFERENCES

1. NACO PEP Guidelines
2. CDC Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Post Exposure Prophylaxis.

Chapter 15
Immunization of Healthcare Workers

INTRODUCTION

Healthcare Workers / Healthcare Personnel (HCP) are the persons who provide healthcare to patients or who work in an institution that provides healthcare. Healthcare Personnel (HCP) refers to all people working in healthcare setting who have the potential for exposure to patients and/or to infectious materials, including body substances, contaminated medical supplies and equipment, contaminated environmental surfaces, or contaminated air. HCP include physicians, nurses, nursing assistants, therapists, technicians, emergency medical service personnel, dental personnel, pharmacists, laboratory personnel, autopsy personnel, students, trainees, contractual staff and people (e.g., clerical, dietary, housekeeping, laundry, security, maintenance, billing, administrators and volunteers) not directly involved in patient care but potentially exposed to infectious agents that can be transmitted to and from HCP and patients. Healthcare workers (HCW) are at risk for exposure to a number of diseases**.** Some of those are serious (because of high risk of complication), and sometimes deadly.

MEASURES ADOPTED TO MINIMIZE THE RISK OF DISEASE AMONG HC

- Adherence to standard precaution
- Isolation of patient with known communicable disease
- Proper use of Personal Protective Equipment
- Appropriate immunization of HCP
- Post exposure prophylaxis

BENEFITS OF IMMUNIZATION

1 Cost effective in comparison to treatment
2 Gives indirect protection to other staff
3 Family members of HCW
4 Patients
5 Visitors

IMMUNIZATION OF HCW

Active—Pre-exposure and Post exposure
Passive—Post-exposure

VACCINES RECOMMENDED FOR HCW (AS PER CDC GUIDELINE)

1 Hepatitis B*
2 Influenza
3 Measles
4 Mumps
5 Rubella
6 Tetanus, diphtheria, and acellular pertussis (Tdap)
7 Varicella

*for HCW potentially exposed to blood or body fluids

1. Biomedical waste management and handling rules (2016), of India mentions about Hepatitis B and Tetatus toxoid vaccination

Dosage Schedule of Vaccines

Vaccine	Dose	Schedule	Amount	Route	Effectiveness
Hepatitis B	Three doses	0,1m,6m Or 0,1m,2m* *Booster after 1yr	1ml	IM	90% in <40 yrs
Influenza	One dose annually	Inactivated Live attenuated	0.5ml 0.5ml	IM Intranasal 0.25 ml per nostril	Variable
MMR	Two doses -Measles -Mumps One dose -Rubella	4wks apart	0.5ml	SC	99% measles and rubella 75-95% mumps
Varicella **	Two doses	4-8wks apart	0.5ml	SC	80%
Tdap*	One dose		0.5ml	IM	92%

Table 15.1: Dosage Schedule of Vaccines

* booster dose of Td every 10yr revaccination during each pregnancy with one dose of Tdap

** Persons who have previously been infected with Chickenpox are immune to reinfection and do not require vaccination

PRE AND POST—EXPOSURE PROPHYLAXIS USING VARIOUS VACCINES

Hepatitis B Vaccine (Pre-Exposure Prophylaxis)

Dosage schedule: Three doses-1ml IM at 0,1m, 6m or 0,1m, 2m (with booster after 1yr)

Testing for immunity after vaccination:

- Newly vaccinated HCW should be tested for immunity 1–2 months after the completion of the 3-dose series
- Anti-HBs >10 mIU/ml -no action
- Anti-HBs <10 mIU/ml revaccinate
    - 3 doses followed by testing (1-2 months after third dose)
    - Anti-HBs <10 mIU/ml after revaccination test for HBsAg
- HBsAg positive -provide appropriate management
- HBsAg negative -**Non-responder—**susceptible to HBV infection
    - Counsel: precautions to prevent HBV infection (PEP etc)
    - HBIG post exposure prophylaxis for parenteral exposure to HBsAg-positive blood

Non-responders for Hepatitis B

- 10%–15% fail to respond to primary series of vaccine
- 30%–50% chance of responding to a second 3-dose series.
- risk of non-response
    - obesity
    - smoking
    - genetic factors
    - immune suppression
    - age >40 yrs
    - chronic illness
    - female sex

HCW previously Immunized with Hepatitis B

Measure Anti-HBs

a. Anti-HBs >10 mIU/ml -No action
b. Anti-HBs <10 mIU/ml-revaccinate with one dose of Vaccine

Measure Anti HBs after 1 month

- Anti-HBs >10 mIU/ml—No action
- Anti-HBs <10 mIU/ml
    - Administer two more doses (1 and 6 month) and measure Anti HBs
- Anti-HBs <10 mIU/ml--Evaluate for each exposure
- Anti-HBs >10 mIU/ml--No action

*If , it is not feasible to measure antibody titre after 1 month, one can go for 2nd 3-doses series of vaccine

Post Exposure Prophylaxis for Hepatitis B (Hep-B)

Vaccination and antibody response status of exposed workers*	Treatment		
	Source HBsAg positive	Source HBsAg negative	Source unknown or not available for testing
Unvaccinated	**HBIG[$] X 1 and initiate HB vaccine series**	**Initiate HB vaccine series**	**Initiate HB vaccine series**
Previously vaccinated Known responder Known non-responder Antibody response unknown	No treatment HBIG X 1 and initiate revaccination** or HBIG X 2[***] Test exposed person for anti-HBs 1. If adequate, no treatment is necessary 2. If inadequate, administer HBIG X 1 and vaccine booster	No treatment No treatment No treatment	No treatment If known high risk source, treat as if source were HBsAg positive Test exposed person for anti-HBs 1. If adequate, no treatment is necessary 2. If inadequate, administer vaccine booster and recheck titer in 1-2 months

Table 15.2 Post Exposure Prophylaxis for Hepatitis B (Hep-B)

- Persons who have previously been infected with Hepatitis B are immune to re-infection and do not require post exposure prophylaxis

Hepatitis B Immunoglobulin (HBIG)

- Persons exposed to HBsAg-positive blood or body fluids and not responded to a primary vaccine series
    - Single dose of HBIG and restart the hepatitis B vaccine series or should receive two doses of HBIG, one dose as soon as possible after exposure, and the second dose 1 month later.

- For persons who previously completed a second vaccine series but failed to respond
    - two doses of HBIG are preferred

Influenza Vaccine

- Live attenuated or Inactivated
    - Live Attenuated Influenza Vaccines (LAIV) o One dose vial (with 0.5 ml diluent) and five dose vials (with 2.5 ml diluent) are available
    - A dose of 0.5 ml is administered as 0.25 ml per nostril using 0.5 ml or 1 ml syringe and spray device. (One dose annually)
    - HCW who work with patient housed in protected environment like stem cell transplant unit, should avoid working for 7 days after receiving vaccine

- Inactivated Vaccine—o 0.5ml IM (One dose annually)

- If age>50 yrs-Inactivated vaccine
- If egg allergy-Inactivated vaccine (if, only hives one can give LAIV)

Tetanus Diphtheria Vaccine

- Pre exposure—3 doses (0,1m, 1yr)—0.5 ml-IM(if not immunized during childhood)
- Post-exposure (for clean minor wounds)—

Previously immunized -

- Last dose within 5 yr -No vaccine
- Last dose within 5–10yr -One dose of TD
- Last dose within >10yr -One dose of TD

Not immunized—Complete course—3 doses*(0,1m,1yr)

*If unclean wound (wound contaminated with saliva, deep puncture wound, etc—add ATS/Human Ig in above two categories)

Special Circumstances

Vaccine for HCW (Laboratory Personnel) in Special Situation

The following vaccines may be required based on the risk of exposure to the mentioned organisms/ infections.

1 Anthrax
2 Hepatitis A
3 Meningococcal*
4 Pneumococcal
5 Polio
6 Rabies
7 Typhoid
8 Vaccinia
9 Zoster

*Those who are routinely exposed to isolates of N. meningitidis should get one dose of Men ACWY and Men B (two vaccines can be given simultaneously but in two different anatomical sites)

ACTIVE IMMUNIZATION AND POST-EXPOSURE PROPHYLAXIS (Tdap)

1 Hepatitis B
2 Measles-within 3 days of exposure
3 Varicella-within 3-5 days of exposure

PASSIVE IMMUNIZATION AND POST-EXPOSURE PROPHYLAXIS

1 **Hepatitis B**-HBIg 0.06ml/kg IM within 7days

2 **Varicella**-VariZIg-12.5unit/kg(max 625U)-IM within 10 days(Pregnant and immune-compromised)
3 **Hepatitis A**-Ig-0.02ml/kg-IM within 14days (>40 yrs)
4 **Measles**-Ig-0.25ml/kg(max 15ml)-IM within 6 days
5 **Tetanus**-ATS(1500) or Human IG (250 units)-IM

INFORMATION RELATED TO VACCINATION

Immunization in Special Groups

- Pregnancy - Avoid live vaccine
- Immuno-compromisedo
    - Live vaccine contraindicated
    - Extra vaccines required -H.influenzae, pneumococcal ,meningococcal
    - Higher dose of routine vaccine in some cases

Some Basic Principles of Immunization

- Two live parenteral vaccines—either give simultaneously or keep 4wks interval
- MMR-avoid pregnancy for 1 month
- LAIV-avoid working with pregnant and immuno compromised persons for 7 days

Information to be kept while giving Vaccination

1 Name
2 Age
3 Date of immunization
4 Potential contraindication
5 Vaccine provided
6 Name of manufacturer
7 Lot number
8 Site and route of immunization
9 Date for next dose/additional vaccine
10 Complication (if any)

Contraindications for Vaccination

- Permanent—Severe allergic reaction to any component of vaccine—gelatin, neomycin, yeast, egg protein etc.
- Temporary (For live vaccine)
    - Pregnancy
    - Immunodeficiency

Precautions for Vaccination

1 Moderate or severe acute illness (all vaccines)
2 Recent receipt of an antibody—containing blood product (MMR and varicella only).
3 Tuberculin test in 4 weeks (MMR)

No Contraindications to Vaccination

1 Mild illness
2 Antimicrobial therapy*

3 Disease exposure or convalescence
4 Pregnant or immunosuppressed person in the household **
5 Breastfeeding
6 Preterm birth
7 Allergy to products not present in vaccine or allergy that is not anaphylactic
8 Family history of adverse events
9 Tuberculin skin test

* Except oral typhoid and live attenuated influenza vaccine

**Except live attenuated influenza vaccine

A contraindication is a condition that makes a particular treatment or procedure, such as vaccination with a particular vaccine, inadvisable.
Precautions are not contraindications, but are events or conditions to be considered in determining if the benefits of the vaccine outweigh the risks

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CHAPTER 16

Prevention of Sharp Injuries among HCW

Safe handling and disposal of sharps is a vital component of the Standard Precautions approach to reduce the risk of transmission of blood borne virus.

Following preventive measures should be considered and practiced at individual or team level to reduce the incidence of sharp injuries among HCWs.

GENERAL CONSIDERATIONS TO PREVENT SHARP INJURIES

1. Apply standard infection control precautions while working.
2. Consider All patients, all blood/ body fluids and All sharps should be considered infectious unless proved to be negative.
3. Use appropriate PPEs*:* Wear gloves, gowns/aprons, masks, and goggles, while handling all potentially infectious material.
4. Adhere to hand hygiene*:* Thoroughly wash hands with water and soap after removing gloves, handling infectious materials, before leaving the laboratory area, and immediately after any contamination of skin surfaces.
5. Avoid wearing open footwear in situations where blood may be spilt, or where sharp instruments or needles are handled.
6. For all clinical procedures, *cover existing wounds, skin lesions, and all breaks* in exposed skin with waterproof dressings or with gloves if hands extensively affected.
7. Work precaution*:* HCWs with chronic skin disease (e.g., eczema) should avoid invasive procedures, which involve sharp instruments or needles when their skin lesions are active, or if there are extensive breaks in the skin surface.
8. *Work surfaces disinfected:* with 0.1 percent sodium hypochlorite solution.
9. HCW should be aware of the first aid treatment & follow up of a needle-stick injury.

PRECAUTIONS WHILE HANDLING AND DISPOSING SHARP OBJECTS (LIKE NEEDLES, LANCETS, SCALPELS, ETC.)

1. Avoid unnecessary use of sharps and needles. Use of alternative instruments, cutting diathermy, and laser.
2. Disposable needles should be used.
3. Handle hollow bore needles with care as it may lead to deep injuries

4. Never recap needles: If unavoidable, use single hand-scoop technique
5. Never break/ bend needles by hand
6. Needles/ sharps should not be left on trolleys and bed side tables and must be disposed of immediately
7. Never pass used sharps from one person to another directly.
8. Dispose sharps directly in a puncture resistant container.
9. Ensure that an adequate number of sharps containers, are located and conveniently placed in clinical areas.
10. Ensure that the sharps containers have been assembled correctly.
11. Make sure the department's name is identified on the sharps bin.
12. Sharps containers should be sealed closed when two-thirds to three-quarters full.
13. Hold the sharps containers away from the body when being carried.

Fig. 16.1 Manual-Needle Cutter


Fig. 16.2 Electric-Needle Destroyer

14. Whenever possible, take a sharp container to the point of use.
15. It is the responsibility of the person using the sharp to dispose of it safely.
16. If it is necessary to disassemble a needle and syringe, such as before transferring blood from a syringe to a pathological specimen bottle, the needles are placed in the sharps container before transferring the blood.
17. Use needle safety devices where there are clear indications that they will provide a safer system of working.
18. Needle collection tray in needle destroyer must be emptied in the morning by the coming nursing staff or more frequently if required. It should never be overfilled.
19. Stray sharps should not be present anywhere in the hospital environment

PRECAUTIONS TO AVOID SHARPS INJURY DURING SURGICAL PROCEDURES

Confine and contain approach should be implemented for every procedure. Surgery lists should be scheduled on the basis of clinical urgency, and in such a way as to allow ample time for adequate infection control procedures to take place.

In addition to the standard infection control precautions, the patient known to have Blood Borne Virus (BBV) infections may require the following additional precautions for surgical operation: o The lead surgeon should ensure that all members of the team know of the infection hazards and appropriate measures should be followed such as use of double gloves.

a. The surgical team must be limited to essential members of *trained staff* only.
b. It may help theatre decontamination if *such cases are last on the list,* but this is not essential.
c. *Hair removal:* Depilatory creams should be used for essential hair removal.
d. Unnecessary equipment should be removed from the theatre.
e. Special surgical equipment reserved for these patients is not essential.
f. *Passing of sharp instruments*
    1. Before procedure, the surgeon and scrub nurse should decide on the route for passage of sharp instruments.
    2. This may entail the designation of a '*neutral zone*'.
    3. The surgeon must avoid placing his/ her *less dexterous hand* in potential danger.
    4. *Non-touch approach*—Sharp instruments *should not be passed by hand.*
    5. Only one sharp at a time should be passed.
    6. A specified *puncture-resistant sharps tray* must be used for the transfer of all sharp
    7. If two surgeons are operating—then each surgeon needs his/ her own sharps tray Diathermy and suction devices should be placed on the opposite side of the table to the surgeon, thereby ensuring the assistant does not reach across the table between the surgeon and nurse.
    8. Variations in operative technique may be adopted such as cutting (e.g. with lasers), or of wound closure that obviate the use of sharp instruments and lessen the risk of inoculation.

Suturing

1. Needles must never be picked up with the fingers. Forceps/needle holder is ideal.
2. Where practical, blunt needles should be used to close the abdomen.
3. Where practical, suture needles should be cut off before knots are tied to prevent NSI.

4. Surgeons may use a *sterile thimble* on the index finger of the less dexterous hand for protection.
5. Wire sutures should be avoided where possible because of the high risk of NSI.
6. After a surgical procedure, the skin should be *closed with staples* whenever possible.
7. Hand-held straight needles should not be used, curved needle is ideal.

Retraction

1. Hands of assisting HCWs must not be used to retract the wound on viscera during surgery.
2. Self-retaining retractors should be used, or a swab on a stick, instead of fingers.
3. Certain instruments should be avoided unless essential to the procedure, for example, sharp wound retractors such as rake retractors and skin hooks.

Drainage and Dressing

1. Closed wound drainage systems should be used, where appropriate.
2. Wound dressings with an impervious outer covering to contain wound exudates should be used.
3. Blood should be cleaned off the patient's skin as far as possible at the end of the operation.

Disinfection of surgical items after procedure

1. Disposable items should be used wherever possible.
2. Reusable items must be decontaminated by sending them to the CSSD

Cleaning of operating theatre and waste disposal

1. Adequate time must be provided at the end of each case to allow for thorough cleaning
2. Cleaning of the operating theatre and the appropriate disposal of clinical waste should be carried out as per hospital policy
3. Used linen and theatre clothing should be handled in accordance with local policy.

4. PREVENTION OF SPLASH INJURY

1. Appropriate use of PPE during surgeries, during labour (amniotic fluid exposure)
2. Certain high risk surgeries (cardiac surgeries) with anticipated risk of damaging great vessels require complete set of PPEs including face shield and goggles.
3. Laboratory personnel should refrain from mouth pipetting, eating, drinking, or smoking in the work area.
4. Spillage management should be done as per the guidelines.

5. ENGINEERING CONTROLS TO PREVENT NSI

Various engineering controls have been tried to prevent NSI, with mixed results in the studies. Few of them are being described below:

1. Safety lock syringes
2. Puncture Guard bluntable vacuum tube blood collection needles,
3. Needleless IV systems
4. Blunt suture needles
5. Safety engineered IV systems
6. Retractable lancets
7. Assistive devices

   Recapping guard—a plastic shield with a central hole that receives the capped end of the needle—helps to remove and replace the cap or sheath of the needle while keeping the non active hand protected
8. Disposal Boxes- location bedsides, box design to open top or letterbox, rigid disposal containers.
9. Use of double gloves

CHAPTER 17

Prevention of Device Associated Infections

Modern healthcare employs many types of invasive devices and procedures to treat patients and help them recover. Bacterial colonization of indwelling devices like catheters or ventilators leads to development of an infection as well as results in malfunctioning. Hence, Device Associated Healthcare Infections (DA-HAIs) are one of the most common causes for morbidity and mortality among hospitalized patients especially in intensive care units. The three most commonly occurring DA-HAIs are:

1. Catheter Associated Urinary Tract Infections (CAUTI)
2. Central Line Associated Blood Stream Infections (CLABSI)
3. Ventilator Associated Pneumonia (VAP)

PREVENTION OF CATHETER ASSOCIATED URINARY TRACT INFECTION (CAUTI)

CAUTI is defined as a urinary tract infection (significant bacteriuria plus symptoms and/ or signs attributable to the urinary tract with no other identifiable source) in a patient with current urinary tract catheterization or who has been catheterized in the past 48 hours.

a. The majority of cases are considered to be avoidable with the implementation of infection prevention 5 bundles of care.

b. There are a number of strategies with varying levels of evidence to prevent CAUTI before and after placement of urinary catheters.

c. These generally include appropriate use, aseptic insertion and maintenance, early removal, and hand hygiene.

The bundle is implementable in resource-poor settings, and should be accompanied by a multimodal approach of hand hygiene, healthcare worker education, and feedback of catheter use and CAUTI rates.

Bundle Component	Criteria for Compliance with Bundle
Check the clinical indication why the urinary catheter is in situ–is it still required?	• All urinary catheters are indicated. • If there is no clinical indication then the catheter should be removed. (Refer to the list of appropriate and inappropriate indications for catheterization given below)
Check the catheter has been continuously connected to the drainage system	• Urinary catheters must be continuously connected to the drainage bag.
The patient is aware of his/ her role in minimizing the risk of developing a urinary tract infection or ensure routine daily meatal hygiene is performed.	• Patients are involved in their urinary catheter care and educated as to how they can minimize complications. • Routine daily meatal hygiene is performed.
Regularly empty urinary drainage bags as separate procedures, each into a clean container.	• The urinary catheter bag should be emptied regularly, as a separate procedure, into a clean container. • The use of 'separately' here implies that the same container has not been used to empty more than one catheter bag—without appropriate decontamination of the container, change of personal protective equipment and performing hand hygiene. • If the container is for single use it must not be reused—with or without decontamination.
Perform hand hygiene and wear gloves and apron prior to each catheter care procedure; on procedure completion, remove gloves and apron and perform hand hygiene again.	Decontaminate hands (soap and water or alcohol hand rub/gel). • Before accessing the catheter drainage system. • After glove removal following access to the catheter drainage system. • On removal of gloves.

table

Appropriate Indications for using Indwelling Catheters

1. Anatomic/ physiologic obstruction to urine flow (acute urinary retention or bladder outlet obstruction)
2. Patients undergoing surgeries on genitourinary tract
3. Anticipated prolonged duration of surgeries (catheters should be removed after surgery)
4. When accurate urinary output measurements are required in critically ill patients.

5. Patients anticipated to receive large volume infusions or diuretics during the surgery.
6. Patients with sacral or perineal wounds suffering from incontinence
7. Patients requiring prolonged immobilization (eg. lumbar/ spinal fractures)
8. To improve comfort for the end of life care if needed

Inappropriate Indications for using Indwelling Catheters

1. As a substitute for nursing care of the patient or resident with incontinence.
2. For obtaining urine sample for culture or other diagnostic tests when patient can voluntarily void.
3. For prolonged postoperative duration without appropriate indications (e.g structural repair of urethra or contiguous structures, prolonged effect of epidural anaesthesia etc.

Not Recommended Procedures for Urinary Catheterization

1. Routine bladder irrigation with antimicrobials
2. Routine instillation of antiseptics or antimicrobials in drainage bags
3. Routine use of Antibiotic coated catheters (reserved for patients with highest risk of complications associated with bacteriuria)
4. Routine use of prophylactic antimicrobial agents before catheter insertion.
5. Clamping of catheters prior to removal.

PREVENTION BUNDLE STEPS - CAUTI

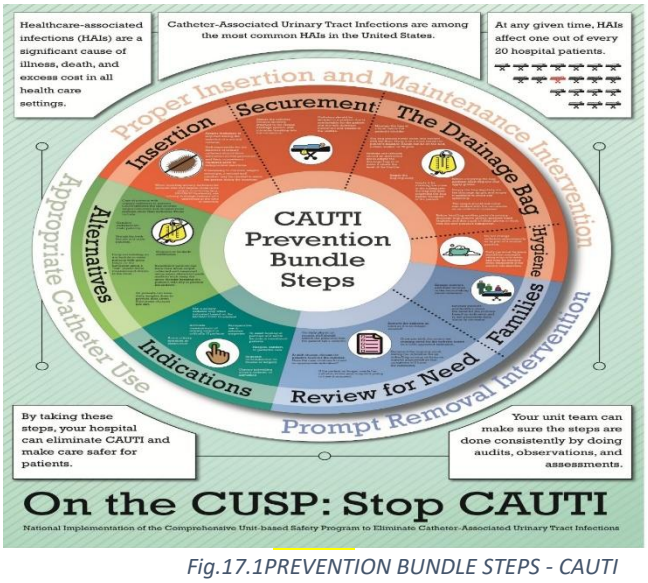


Fig.17.1PREVENTION BUNDLE STEPS - CAUTI

PREVENTION OF CENTRAL LINE ASSOCIATED BLOOD STREAM INFECTION(CLABSI**)**

CLABSI is defined as a LCBI (Laboratory confirmed blood stream infection) where central line was in place for greater than two calendar days on the date of the event, with day of device placement being day one, and the line was also in place on the date of the event or the day before. These central line associated bloodstream infections must be either laboratory confirmed or the patient must meet criteria for clinical sepsis. Clinical sepsis can be defined as a site of suspected infection and two or more generalized signs and symptoms of infection (formerly known as SIRS criteria). Clinical sepsis can be distinguished from the syndrome—severe sepsis, which adds organ dysfunction, such as hypotension or onset of renal failure. In general, the threshold to establish clinical sepsis is lower than that for severe sepsis.

The Central Line Bundle

The central line bundle is a group of evidence-based interventions for patients with intravascular central catheters that, when implemented together, result in better outcomes than when implemented individually. The science supporting each bundle component is sufficiently established to be considered the standard of care.

The Central Line Bundle: Five Key Components

1. Hand hygiene
2. Maximal barrier precautions
3. Chlorhexidine skin antisepsis
4. Optimal catheter site selection, with avoidance of using the femoral vein for central venous access in adult patients and
5. Daily review of line necessity, with prompt removal of unnecessary lines.

This is not intended to be a comprehensive list of all elements of care related to central lines; rather, the bundle approach to a small group of interventions promotes teamwork and collaboration. The approach has been most successful when all elements are executed together, an “all-or-none” strategy.

Preventing Central Line-Associated Bloodstream Infections: Five Components of Care

1. Hand Hygiene

One way to decrease the likelihood of central line infections is to use proper hand hygiene. Washing hands or using an alcohol-based waterless hand cleaner helps prevent contamination of central line sites and resultant bloodstream infections.

i. When caring for central lines, appropriate times for hand hygiene include:
ii. Before and after palpating catheter insertion sites (Note: Palpation of the insertion site should not be performed after the application of antiseptic, unless aseptic technique is maintained.)
iii. Before and after inserting, replacing, accessing, repairing, or dressing an intravascular catheter
iv. When hands are obviously soiled or if contamination is suspected
v. Before and after invasive procedures
vi. Between patients
vii. Before donning and after removing gloves
viii. After using the bathroom

2. Maximal Barrier Precautions

A key change to decrease the likelihood of central line infections is to apply maximal barrier precautions in preparation for line insertion.

i. For the operator placing the central line and for those assisting in the procedure, maximal barrier precautions mean strict compliance with hand hygiene and wearing a cap, mask, sterile gown, and sterile gloves. The cap should cover all hair and the mask should cover the nose and mouth tightly. These precautions are the same as for any other surgical procedure that carries a risk of infection.
ii. For the patient, applying maximal barrier precautions means covering the patient from head to toe with a sterile drape, with a small opening for the site of insertion.

3. Chlorhexidine Skin Antisepsis

Chlorhexidine skin antisepsis has been proven to provide better skin antisepsis than other antiseptic agents such as povidone-iodine solutions.

The technique, for most kits, is as follows:

a. Prepare skin with antiseptic/detergent chlorhexidine 2% in 70% isopropyl alcohol.

b. Hold the applicator down to allow the solution to saturate the pad.
c. Press sponge against skin, and apply chlorhexidine solution using a back-and-forth
d. Friction scrub for at least 30 seconds. Do not wipe or blot.
e. Allow antiseptic solution time to dry completely before puncturing the site (~ 2minutes).

4. Optimal Catheter Site Selection, with Avoidance of using the Femoral Vein for Central Venous

Access in Adult Patients

i. Percutaneously inserted catheters are the most commonly used central catheters.
ii. Subclavian vein site is associated with a lower risk of CLABSI than the internal jugular vein. However, the risk and benefit of infectious and non-infectious complications must be considered on an individual basis when determining which insertion site to use.
iii. The femoral site is associated with greater risk of infection in adults; however, this may be limited to overweight adult patients.
iv. Whenever possible the femoral site should be avoided and the subclavian line site may be preferred over the jugular site for non-tunneled catheters in adult patients. This recommendation is based solely on the likelihood of reducing infectious complications.
v. Subclavian placement may have other associated risks.

Note: The bundle requirement for optimal site selection suggests that other factors (e.g., the potential for mechanical complications, the risk of subclavian vein stenosis, and catheter-operator skill) should be considered when deciding where to place the catheter. In these instances, teams are considered compliant with the bundle element as long as they use a rationale construct to choose the site. The core aspect of site selection is the risk/benefit analysis by a physician as to which vein is most appropriate for the patient. The physician must determine the risks and benefits of using any vein. For the purposes of bundle compliance, if there is dialogue among the clinical team members as to the selection site and rationale, and there is documentation as to the reasons for selecting a specific vessel, this aspect of the bundle should be considered as in compliance. It is not the intent of the bundle to force a physician to take an action that he or she feels is not clinically appropriate.

5. Daily Review of Central Line Necessity with Prompt Removal of Unnecessary Lines

i. Review for the necessity of central lines on daily basis.
ii. This will prevent unnecessary delays in removing lines that are no longer clearly needed for the care of the patient.
iii. CDC recommendation on replacement of central lines are as follows:
iv. Catheter replacement at scheduled time intervals has no added advantage as a method to reduce CR-BSI.
v. Routine replacement of central lines is not necessary for catheters that are functioning and have no evidence of causing local or systemic complications.
vi. Replacement of temporary catheters over a guidewire in the presence of bacteremia is not an acceptable replacement strategy, because the source of infection is usually colonization of the skin tract from the insertion site to the vein.

Central Line Maintenance

1. Closed medication system and two-person process for all dressing change and tubing change
2. Perform hand hygiene with hospital-approved alcohol-based product or antiseptic containing soap before and after accessing a catheter or changing the dressing
3. Maintain aseptic technique when changing intravenous tubing and when entering the catheter including ‘scrub the hub’ for 5–15 seconds.
4. Evaluate the catheter insertion site daily for signs of infection and to assess dressing integrity. At a minimum, if the dressing is damp, soiled or loose, change it aseptically and disinfect the skin around the insertion site with an appropriate antiseptic
5. Daily review of catheter necessity with prompt removal when no longer essential
6. Minimizing the access points
7. Heparin in TPN (0.5 Units/mL)

DO's	DON'Ts
When disconnecting the IV from the patient, put the correct sterile cap on the end	Loop the end back up onto itself
Scrub the hub for 5-15 seconds	Just connect and push when in a rush
Change the IV tubing every 4 days	Pass it off to the next shift
Throw away NS flush after part of it has been used/given	Recap and keep in your pocket. This will harbor infections in the cap.

Table Do's and Don'ts

ACCESSING A CENTRAL VENOUS CATHETER

Understanding how to properly access a central venous catheter, so that it may be used to draw blood or to deliver of medications, fluids, or blood products, is an important aspect of caring for a critically ill patient.

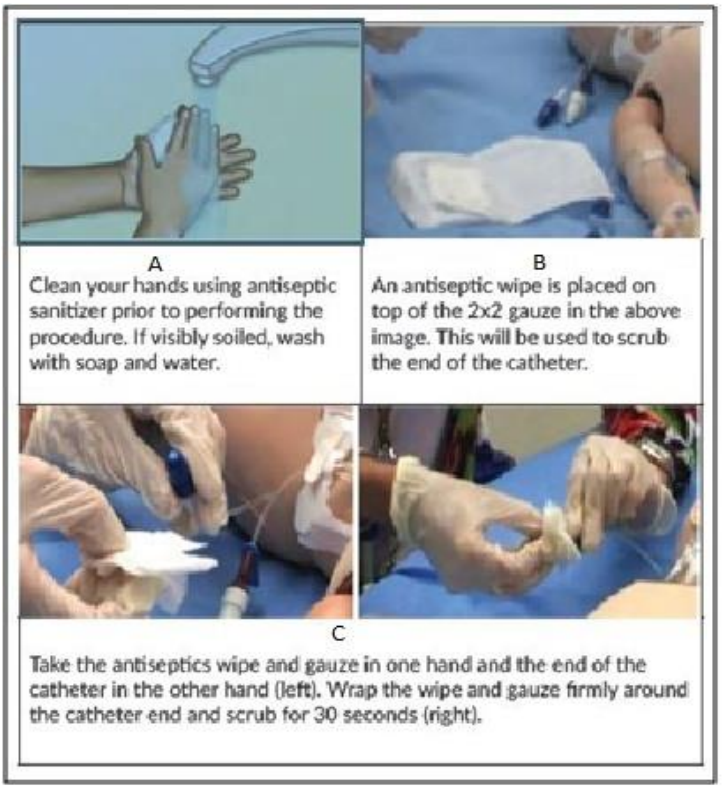
PATIENT SELECTION

Indications:

i. To draw blood from a patient
ii. To administer medications, fluids, or blood products in patient with a central venous catheter
iii. To provide access forlong-term infusion therapy when peripheral access is unavailable vesicant or hyperosmolar infusions complex infusion therapies
iv. To check the patency of a central venous catheter not in use Contraindications:
    a) Presence of a thrombus or infection in the CVL, which might manifest itself as:
    b) an excess amount of fluid
    c) discharge at the insertion site
    d) Fracture or disruption of the CVL

ACCESSING A CENTRAL VENOUS CATHETER

FIG 17.2 Accessing CVC



PROCEDURE

1.Explain the procedure to the patient:
Assuming that it is age appropriate, explain what you will be doing to the patient.

2.Wash your hands:
Use antiseptic sanitizer or soap and water to wash your hands before this procedure. If your hands are visibly soiled, wash with soap and water (FIG 17.2 A).

3.Prepare equipment:
Put on a clean pair of gloves (note that this is NOT a sterile procedure, so clean gloves are adequate, and no mask is necessary). Open 2x2 gauze and an antiseptic wipe, place the antiseptic wipe right on top of the 2x2 gauze (Fig17.2B).

4.Scrub the end of the catheter for 30 seconds:
Wrap the gauze and wipe firmly around the end of the catheter, and scrub for 30 seconds (Fig 12.2 C). Scrubbing for 30 seconds reduces the rate of central line infections. Allow to dry for 30 seconds after scrubbing to prevent stickiness from forming around the site

5. Check for a blood return:
Attach a normal saline-filled syringe to the line. Pull back and look for blood return (Fig17.3 D).

6. Flush catheter, if you are not drawing blood:
Flush the line with normal saline, ensuring you have cleansed all of the blood from the line. Now the line is ready for medication or fluid administration (Fig17.3E).

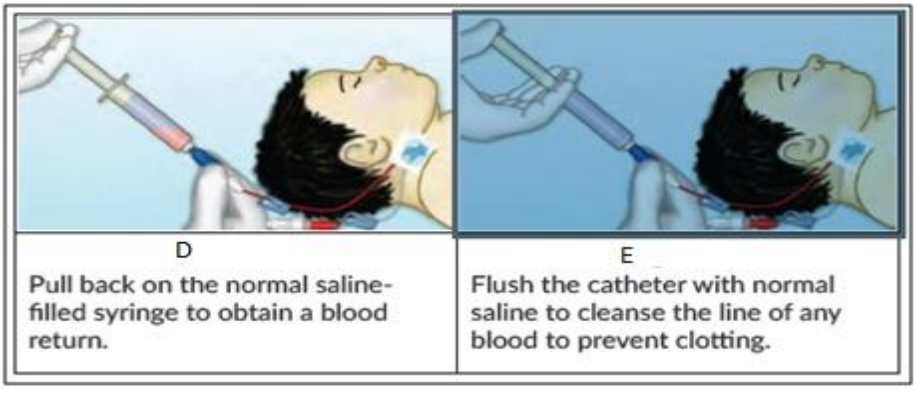


FIG-17.3 Accessing Central Venous Catheter

7. Draw blood:
After obtaining a blood return, skip the flush catheter step. Attach an appropriately sized syringe (based on the
amount of blood to be drawn) to the line. Pull back on the syringe to obtain the amount of blood needed for the tests to be performed. Place the collected blood into appropriate blood specimen containers.

8. Cleanse the line:
Prepare a second antiseptic wipe and cleanse the line by scrubbing for 10 seconds (scrubbing for 30 seconds isnot necessary here).

9. Flush the catheter again to prevent clotting:
Flush the catheter with sterile saline to cleanse the line of any blood to prevent clotting, assessing the ease or difficulty to flush the catheter.

If you meet resistance when flushing and cannot get a blood return, refer to appropriate personnel for identification and management of the central venous catheter dysfunction.

COMPLICATIONS

a. Infection
b. Dislodgement of a thrombus
c. Air embolism
d. Dislodgement of central venous catheter

ASSESSMENT AND MONITORING

a. Monitor ease or difficulty with obtaining a blood return
b. Assess ease or difficulty when flushing the catheter with normal saline
c. If placement is in or near the right atrium, monitor for any arrhythmias

*Note: It is advised that you assess and monitor these clinical features before, during and after the procedure.

DOCUMENTATION

• Indication for procedure
• Date and time of procedure
• Type, size and position of central venous catheter
• Appearance of insertion site
• Ease or difficulty with obtaining a blood return when flushing the catheter
• Medications administered through the central venous catheter
• Adverse outcomes

DRESSING A CENTRAL VENOUS CATHETER

Changing the dressing of a patient's central venous catheter is a sterile procedure that is performed on a regular basis as a vital component of preventing catheter—associated bloods stream infections.

Indications:

a. If the central venous catheter is:
b. visibly soiled
c. saturated with drainage
d. non-occlusive
e. Consider routinely changing transparent occlusive central line dressing every 7 days

Contra-indications:

• Patients with an allergy to the transport occlusive central line dressing

EQUIPMENT:

1 Clear adhesive dressing
2 Date label for dressing
3 Surface wipes
4 Sterile antiseptic sponge
5 2x 2 gauze
6 Antiseptic wipes
7 Tape
8 Clean and sterile gloves
9 Mask with a shield
10 Hand sanitizer

Fig 17.4

Figure 1
Clean your hands using antiseptic sanitizer prior to performing the procedure. If visibly soiled, wash with soap and water.

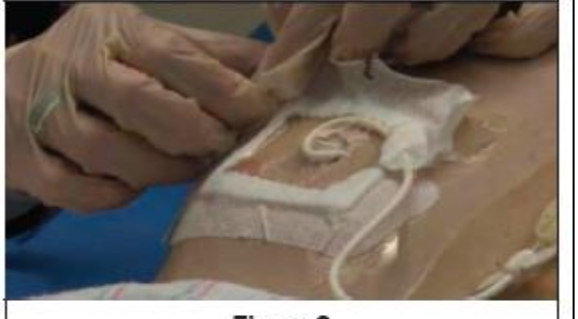


Figure 2
Remove the edges of the dressing first, to make it easier to lift the rest of the dressing from the skin.

PROCEDURE

Preparation

1. Wear a mask:
Put on a mask and provide masks to everybody in the room, including the patient's parents. Parents may be allowed to be present for this procedure if they are assisting in keeping the child still. Provide the patient with a mask if he or she is not intubated. If the child is intubated, there is no need for a mask.

2. Wash your hands:
Use antiseptic sanitizer or soap and water to wash your hands before this procedure. If your hands are visibly soiled, wash with soap and water (17.4 Figure 1).

3. Prepare your surface:

Wipe the surface where you will be placing your sterile equipment with an antiseptic wipe. Be sure to clean thoroughly, especially if you observe any visible soiling on this surface.

4. Place your sterile equipment safely on the surface, maintaining sterility.

5. Position the patient:
Have the patient positioned to allow for his or her comfort and your access to the dressing. Stand on the same side of the patient as the dressing.

Figure 3
Place a transparent dressing over the exit site of the catheter. Ensure you can visualize the skin at the exit site.

DRESSING A CENTRAL VENOUS CATHETER

Procedure

1. Remove the current central venous catheter dressing:
Carefully remove the edges of the central line dressing. This will make it easier to lift the rest of the dressing from the patient's skin (17.4 Figure 2).
Be careful not to dislodge the central venous catheter while removing the old dressing !!

2. Inspect for signs of infection:
After removing the dressing, inspect the skin surrounding the catheter for edema, redness or drainage.

3. Wash your hands:
Use antiseptic sanitizer or soap and water to wash your hands before tl Fig 17.5 are visibly soiled, wash with soap and water (Figure 1).

4. Put on sterile gloves:
As you will be potentially touching exposed areas of the skin and the central venous catheter, sterile gloves should be worn for this part of the procedure.

5. Scrub the skin surrounding the central venous catheter:
Scrub the skin surrounding the central venous catheter with an antiseptic sponge, starting from just around the catheter and working your way out to a 2-inch margin around the central venous catheter insertion site. Scrub for 1 minute, and allow the area to dry after scrubbing. For a femoral central venous catheter, scrub for 2 minutes.

6. Allow the skin to dry completely:
To avoid skin breakdown, ensure that the patient's skin is dry before proceeding with placing the new dressing.

7. If applicable in your hospital, place antiseptic sponge over the exit site of the central venous catheter:
This will help to prevent catheter-associated blood stream infections.

8. Place a transparent dressing over the catheter insertion site:
As you place the dressing over the insertion site, ensure that you can visualize the catheter exit site to monitor for signs of infection (Figure17.5- 3). Write the date and time of dressing change using a date label

COMPLICATIONS

a) Accidental dislodgement of the central line
b) Infection at the insertion site
c) Irritation or damage to the skin

ASSESSMENT AND MONITORING

1 Assess the patient's skin, looking for signs of infection including erythema, exudate, or rash
2 Note the following catheter-related information:
3 type and size
4 depth of **insertion**
5 changes in placement during the procedure

DOCUMENTATION

1 Indication for procedure
2 Date and time of procedure
3 Characteristics of the skin (including signs of erythema, exudate, and rash)
4 Depth of catheter insertion before and after dressing change
5 Patient comfort during the procedure
6 Any adverse outcomes.

PREVENTION OF VENTILATOR ASSOCIATED PNEUMONIA (VAP)

Ventilator-associated pneumonia (VAP) is a common healthcare-associated infection occurring in 10%–20% of patients mechanically ventilated in the ICU. VAP occurs because the obtunded, endotracheally intubated patient is at risk of inoculation of the lower respiratory tract with microorganisms. The source of the potential inoculate includes the oropharynx, subglottic area, sinuses and gastrointestinal (GI) tract. Access to the lower respiratory tract occurs around the endotracheal tube (ETT) cuff. Interventions to prevent VAP aim either to prevent repeated micro aspiration, colonization of upper airway and GI tract with potentially pathogenic organisms, or contamination of ventilator/respiratory equipment.

Bundles of care are evidenced-based practices that are grouped together to encourage the consistent delivery of these practices. These bundles are common in the ICU and have been developed for the prevention of VAP.

Recommended Bundle of Interventions for the Prevention of VAP

1.Elevation of Head of Bed (30°–45°)

Aspiration of oropharyngeal or gastric contents is implicated in the pathogenesis of VAP. Nursing the mechanically ventilated patient in a semi-recumbent position aims to prevent aspiration of gastric content.

2.Daily Sedation Interruption and Assessment of Readiness to Extubate

a. Minimizing the duration of mechanical ventilation can decrease the chances of developing VAP and should be practiced by Sedation interruption on daily basis.
b. Two strategies that have been used to reduce the duration of mechanical ventilation are daily sedation interruption (DSI) and daily spontaneous breathing trials (SBT).
c. Strategy of DSI to prevent over-sedation and liberation from mechanical ventilation through SBT has proved beneficial.
d. Assess daily the patient readiness to extubate.

3.Use of Subglottic Secretion Drainage

Secretions that pool above the ETT but below the vocal cords are a potential source of pathogens that could cause VAP. Since conventional suction methods cannot access this area, ETT tubes that have a designated suction catheter for this space allows this pool to be drained.

4.Avoidance of Scheduled Ventilator Circuit Changes

Humidified gases condense in the ventilator circuitry and are at risk of becoming contaminated. Frequent circuit changes are associated with an increased incidence of VAP, probably due to the excessive manipulation of the ventilator circuit. The circuits to be changed whenever visibly soiled

5.Oropharyngeal Decontamination

Recent evidence has called into question the widespread use of oral chlorhexidine to decontaminate the oropharynx. Oral chlorhexidine use has been associated with a reduction in respiratory tract infections in the ICU in high profile meta-analyses.

6.Gastrointestinal Stress Ulcer Prophylaxis (SUP)

Raising the pH of the stomach contents promotes colonisation with potentially pathogenic organisms and so SUP remains a balance of risk between GI bleeding and de veloping VAP.

7.Deep Venous Thrombosis Prophylaxis

Sedated ventilated patients are at significantly increased risk for DVT. Hence, DVT prophylaxis is an important component of standard care of these patients. Similar to stress ulcer prophylaxis, DVT prophylaxis has not been demonstrated to reduce the risk of VAP. It remains part of the Ventilator Bundle in order to prevent other serious complications that could increase the morbidity and mortality of these patients.

Initiate Safe Enteral Nutrition within 24–48 hours of ICU Admission

Pediatric VAP Bundle

1. Elevate the head of the bed
2. Properly position oral or nasal gastric tubes
3. Perform oral care
4. Eliminate the routine use of instill for suctioning

Additional evidence-based components of care:

a. Hand hygiene
b. Practices that promote patient mobility and autonomy
c. Avoiding invasive ventilation whenever possible

CHAPTER 18
Investigation of an Outbreak

Definition Of An Outbreak

An outbreak of infection is defined as:

i. An incident in which two / more people experiencing a similar illness are linked time or place or
ii. The situation where a greater than expected incidence of infection compared to the usual background rate for the particular location or
iii. A single case for certain rare diseases or a significant pathogen (e.g. diphtheria or viral haemorrhagic fever) or
iv. A suspected, anticipated or actual event involving microbial or chemical contamination of food / water An outbreak is epidemiologically linked to time, place and person.

CLASSIFICATION OF AN OUTBREAK

Classification I	
Confined	**Widespread**
Limited to some of the members of one family	Involve cases either locally, nationally or internationally
Classification II	
Obvious	**Insidious**
The suspected source can be easily identified. e.g. An episode of food poisoning that affects both HCWs and patients eating from the same source.	They are slow in onset. Source cannot be obviously defined They reach considerable proportions before they become apparent. These outbreaks are detected by laboratory.

Table 18.1Classification of an Outbreak

CASE DEFINITIONS

There are following three categories:

Confirmed Case	Probable Case	Possible/ Suspect Case
• Patients have clinical signs and symptoms of the disease and	• Patients have clinical signs and symptoms of the disease or	• Patients have clinical signs and symptoms of the disease or
• The diagnosis is confirmed by laboratory investigations of relevant specimen.	• The patients are epidemiologically linked to a confirmed case (exposed to a confirmed case, eaten the same food etc.)	• Patients with fewer typical clinical features

Table 18.2: Outbreak Case definition

PSEUDO-OUTBREAK:

- Real clustering of false cases
- Artefactual clustering of real infections

The Reasons for Pseudo-outbreak May be Several:

- Laboratory factors: False reporting due to new technology, new technician, or faulty interpretation.
- Ward-level factors: Incorrect diagnosis, sampling errors (collection, labelling and transportation).
- Environmental factors: Contamination due to environment. E.g., Contaminated tap water used for endoscope cleaning or contaminated tap water used for staining procedure.

OUTBREAK INVESTIGATION AND MANAGEMENT

A suspected outbreak may be identified by a physician or by laboratory personnel, or by ICT while conducting routine surveillance. When an outbreak is detected, the HICC/ ICT/ ICO/ ICN is immediately informed and an urgent meeting of HICC/ ICT is called depending on the size and seriousness of the outbreak.

FORMATION OF AN OUTBREAK CONTROL TEAM (OCT)

An Outbreak Control team (OCT) is immediately formed, relevant to the size and seriousness of the outbreak and the healthcare facility involved. If required the head of the institute and /or state/territory public health unit is also notified.

OCT comprises of:

a. Administrators (Medical and Nursing)
b. Clinicians/ In-charges/ Managers of implicated areas
c. Infection Control Officer
d. Clinical Microbiologists
e. Infectious disease physician
f. Clinical Epidemiologist—
g. Public relation Officer (PRO)
h. Others as defined by circumstances or as per policy of different hospitals

STEPS OF AN OUTBREAK INVESTIGATION

Immediately initiate relevant immediate infection prevention control measures to prevent further transmission and ensure minimum disruption to services.

Step 1:

i. Recognize Outbreak and Prepare to Investigate
ii. Ascertain the reliability of both clinical and laboratory information.
iii. Establish background rate of disease
iv. Consider if observed number of cases is in excess of the usual number
v. Examine HAI surveillance data
vi. Determine if immediate control measures are needed
    a. Reinforce standard precautions
    b. Apply appropriate transmission-based precautions
vii. Notify and communicate
    a. Healthcare workers and ancillary staff in immediate area
    b. Infection control professional
    c. Administration
    d. Microbiology Laboratory
    e. IDSP-Integrated disease surveillance program (if notifiable disease)
    f. Urgent meeting of HICC/ICT and
    g. Formation of an OCT

Step 2:

i. Verify the Diagnosis and Confirm that an Outbreak Exists
ii. Confirm that there are more than expected number of cases meeting the
iii. surveillance case definition of the disease of interest in the period under review:
iv. Confirm clinical diagnoses (symptoms and features of illness)
v. Review laboratory data and request additional laboratory tests, if necessary, e.g. molecular typing of organisms to confirm clonality
vi. Complete microbiological investigations
vii. Consider likely outbreak definition and whether criteria are met
    a. Are there more cases than expected compared to previous weeks/ months? o Review scientific literature
    b. Consider epidemiology of cases - are there two or more linked cases of the same illness?

Step 3:

Establish Case Definition and Find Cases

i. Establish a set of standard criteria to decide whether or not a person has the disease of concern. Case definition is based on:
ii. Clinical information about the disease
iii. Characteristics of the people who are affected
iv. Information about the location
v. Specification of time period for the outbreak
vi. Case definition can be refined later after collection of primary data
vii. Cases can be classified as Confirmed, Probable or Suspect/possible

Find cases: Gather critical information by:

a. Interview
b. Follow-up of disease notification
c. Health alerts
d. Identify and count cases: Collect the following types of information
e. identifying information
f. Demographic information
g. Clinical information
h. Risk factor information (including environmental tests)
i. Prepare line list of cases based on- o Time—date of onset of illness o Person—age, sex

j. Place—where did the exposure occur? o Other relevant information

Step 4 Characterize outbreak by person, place, and time

a. Review descriptive epidemiology of all cases:
b. Person: sex, age, occupation, residence
c. Place: information that provides indication on possible source of agent and nature of exposure
d. Time: date and time of onset; record relevant events in a timeline
e. Plot an epidemic curve to determine hypothesis and analyze the type of outbreak

Step 5 Determine who is at Risk

i. Identify groups at risk:
ii. Number of people ill
iii. Time and place of onset
iv. Personal characteristics
v. Initiate precautionary measures
    a. Use of standard precautions and appropriate transmission-based precautions
    b. Increase frequency and efficiency of environmental cleaning using appropriate products
    c. prophylactic treatment/immunization
    d. Antibiotic restrictions
    e. Exclusion of cases from high risk activities o Isolation and/or cohorting of patients
    f. Restricting movement of patients, staff and visitors
    g. Screening of patients with isolation of patients and cohorting of contacts;
    h. Provision of health information and advice

Step 6 Develop Hypothesis—the 'how' and 'why'

a. Develop hypotheses from the factual information gathered to date on potential source, vector, pathogen, route of transmission:
    a. Data collected by interview
    b. Common links
    c. Plausible exposures

d. Environmental test results where appropriate
e. Review literature

Step 7 Test Hypothesis with Established Facts

Perform epidemiologic study:

a. Retrospective Cohort study—for confined outbreaks
b. Case-control—for widespread outbreaks
c. Analyze the data
d. Compare risk factors among ill (cases) vs. not ill (controls)
e. Attack rates
f. Relative risk

Step 8 Carry out Further Studies if Necessary

i. To support the hypothesis or if analytic studies do not confirm the hypothesis:
Further study to refine case definition
ii. May involve testing of environmental samples, food samples or environmental screening in some situations (e.g. Legionella, Pseudomonas)
iii. HCW screening

Step 9 Implement Ongoing Control / prevention Measures

(This can be done at any time during the outbreak as deemed necessary)

i. Review measures initiated for immediate control (Before Step 1 and Step 5)
ii. Implement appropriate ongoing control measures and strategies to prevent further illness:
    a. Restrict spread from the case
    b. Interrupt chain of infection
    c. Interrupt transmission or reduce exposure o Reduce susceptibility to infection
    d. Assessment of policy, regulations, standards
iii. Monitor-HH Audit, PPE audit, Bundle care audit
iv. Analyze the trend of outbreak after implementing infection control measures to determine their effectiveness.

Step 10. Communicate Findings

i. Communicate and coordinate with all stakeholders (within the hospital):

a. Electronic flagging of medical records of contacts
b. Reinforcement of infection control precautions to staff, patients and visitors
c. Appropriate signages to limit access to the affected clinical unit/room
d. E-mails and multimedia to target all HCWs

ii. Prepare written report that evaluates methods used for the control of the outbreak
    a. Include discussion of factors leading to outbreak, comprehensive timelines, summary of investigation and documented actions
    b. Short and long -term recommendations for prevention of similar outbreak
    c. Disseminate to appropriate stakeholders including publication
    d. Guidelines for transparent reporting and intervention studies are available as The ORION Statement and should be referred when preparing report or an article for publication.

iii. Communicate outside the hospital
    a. PRO/ a designated person should do it. He/she should have a formal training to do it.
    b. This person must be attending all the OCT meetings.
    c. The OCT/any other HCW must not communicate directly to media

END OF OUTBREAK

i. OCT meeting at the end of the outbreak:
    a. Review the experience of all team members involved in the outbreak management.
    b. Identify gaps and particular difficulties that were encountered
    c. Revise the outbreak control plan according to the current experience.
    d. Recommend, if required, structural or procedural improvements that would reduce the chances of recurrences of such outbreak in future.

ii. Write the outbreak report
    a. Preliminary and final confidential outbreak reports
    b. The report must summarize full investigations, lessons learnt and recommendations.
    c. The report must be sent to the senior management and other appropriate personnel/authorities for action.

iii. Look back investigations

iv. Refer to the process of identifying, tracing, recalling, counselling and testing patients or HCWs who may have been exposed to an infection during an outbreak.

GENERAL OUTBREAK CONTROL MEASURES

i. Staff and patient movement will need to be restricted during an outbreak. If an outbreak has been declared, the rotation of staff or the discharge/ transfer of patients should be discussed with the IPCT/ Health Protection Duty Room.

ii. In outbreak situations it may be necessary to close a ward /unit / care home. This recommendation will be guided by a risk assessment carried out by the Infection Prevention Control Team in The Trust or the Health Protection Duty-room officer in the independent sector. In an acute Trust setting the IPC Team may immediately advise on the closure of a ward. If an outbreak control team is established it will decide on closures to admissions / transfers and staff movement restrictions.

iii. It is essential that communication with patients / residents, the public and staff are clear and that messages are consistent.

iv. Extra cleaning and domestic staff may be required during and immediately
    a. following the outbreak.

v. It may be necessary to order / purchase additional personal protective equipment. If specialist respiratory equipment is required, then access to fit-testing and training will also be necessary.

vi. It may also be necessary to purchase additional supplies of cleaning equipment to facilitate enhanced / terminal cleaning of the environment.

vii. Visiting may need to be restricted and visitors should receive information regarding any risks to them of being exposed to potentially pathogenic micro- organisms.

viii. It may be necessary to record the details of contacts of cases if advised to do so by the Infection Prevention and Control Team (Trust location) / Health Protection Duty-room officer (Independent Sector).

ix. Additional work is created during an outbreak and increased staff numbers will probably be necessary to cope with additional pressures.

ROLE OF OCT

1. Inform all suspect outbreaks to HICC and Microbiology lab.
2. Drawing of a detailed outbreak control plan, clearly addressing the areas of individual responsibilities. And action plans for all involved.
3. Isolate all the suspected cases.

4. Record all information of all the cases comprising of date of admission, clinical diagnosis, time of onset of symptoms, etc.
5. Relevant specimen to be sent to microbiology laboratory
6. Restrict movement of staff and patients
7. Closure of healthcare facility if required
8. Implement and monitor the appropriate infection control measures.
9. In case of a major incident the OCT should seek advice from experts at both regional and national levels.

FLOW CHART OF OUTBREAK INVESTIGATION

Step 1. Recognise outbreak and prepare to investigate
↓
Step 2. Verify the diagnosis and confirm that an outbreak exists
↓
Step 3. Establish case definition and find cases
↓
Step 4. Characterise outbreak by person, place, and time
↓
Step 5. Determine who is at risk
↓
Step 6. Develop hypothesis—the 'how' and 'why'
↓
Step 7. Test hypothesis with established facts
↓
Step 8. Carry out further studies if necessary
↓
Step 9. Implement ongoing control / prevention measures
(This can be done at any time during the outbreak as deemed necessary)
↓
Step 10. Communicate findings

ANNEXURES

ANNEXURE 1

MAINTENANCE CARE BUNDLE AUDIT FORM FOR DEVICES.

Device day		D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Urinary catheter care bundle											
Closed drainage system											
Urinary catheter secure											
Drainage bag above floor and below bladder level											
Catheter care	Hand hygiene										
	Meatal care										
Single use glove while emptying											
No contact between jug and bag											
Separate jug for collecting											
Assessment to readiness of removal-documented?											
Central line bundle											
Daily aseptic CL care during handling	Hand hygiene										
	Alcohol hub decontamination										
	Chlorhexidine 2% for dressing changes										
Any local signs of infection?											
Dressing changed?											
Assessment to readiness of removal-documented?											
Ventilator bundle											
Head end elevation 30°											
Adherence to hand hygiene											
Daily oral care (Chlorhexidine 2%)											
Need of PUD prophylaxis assessed?											
Deep vein thrombosis prophylaxis											
Assessment to readiness of removal-documented?											

HEALTHCARE-ASSOCIATED INFECTION SURVEILLANCE DATA COLLECTION FORM.

Patient Name:	Hospital number:	Age:	Sex:	ICU/Ward:
Department:		Date of admission:	Date of transfer to current location	
Provisional Diagnosis:		Final Diagnosis:		
Outcome:	Transfer out on:	Left against medical advice on:	Discharged on:	Expired on:
Type of Surgery-		Date of Surgery:		

Daily Monitoring		**D-1**	**D-2**	**D-3**	**D-4**	**D-5**	**D-6**	**D-7**	**D-8**	**D-9**	**D-10**
HAI	**Date**										
CA-UTI	Catheter present										
	Temperature										
	Suprapubic tenderness										
	Costovertebral angle pain/tenderness										
	*Urgency										
	*Frequency										
	*Dysuria										
	Apnea										
	Bradycardia										
	Vomiting										
	Lethargy										
CLABSI	CL (central line) present										
	Temperature Chills										
	Chills										
	Hypotension (SBPs 90)										
	Apnea										
	Bradycardia										
VAE	MV (mechanical ventilator) present										
	PEEP (daily minimum)										
	FIO, (daily minimum)										
	Mean airway pressure (MAP)										
	Temperature										
	WBC count										
	Qualified antimicrobial days (new antibiotics)										
SSI	Purulent drainage at site										
	Pain or tenderness (localized)										
	Localized swelling										
	Erythema										
	Increased local temperature (heat)										
	Abscess at site"										
	Surgeon's diagnosis (for superficial SSI)										

- *To be reported only when urinary catheter is not in place
- **"Detected by gross anatomical examination/ histopathological examination/imaging
- During data collection (daily monitoring)- blue-colored rows to be filled for adult patients, dark gray rows to be filled for patients <1 year age for CAUTI/CLABSI and for all paediatric locations for VAE: rest rows to be filled for all patients

Microbiology Culture Report (Site specific culture and blood culture)

Date of sample collection	**Sample**	**Organism isolated**	**Colony count**	**Antimicrobial susceptibility report**
	Blood			
	Site-specific sample			

Data collected by Infection control nurse

Name and Signature with date

Data verified by Infection control officer

Name and Signature with date

ANNEXURE 3

HEALTHCARE- ASSOCIATED INFECTION SURVEILLANCE REPORTING FORM							
CAUTI(CATHETER ASSOCIATED UTI)						**DATE OF EVENT(DOE)**	
1.URINARY CATHERTER CRITERIA	Patient has indwelling catheter in place for >2 consecutive days						Yes/No
	Atleast one of the following Following(any age)						
2.symptom criteria	Atleast one of the following (any age)						Yes/No
	Fever(>38°C)	Suprapubic tenderness	Costovertebral Pain	Urgency	Frequency	Dysuria	
	Atleast of the following (<_1 year age)						Yes/No
	Fever (>38°C)	Hypothermia (>36°C)	Apnea/Bradycardia	Vomiting	Suprapubic tenderness	Lethargy	
3.Urine culture criteria	Positive urine culture (not more than 2 organisms with atleast 1 organism having > 10^5 CFU						Yes/No
4.Blood culture criteria	No symptoms Positive blood culture(with one matching organism to urine culture)						Yes/No
Final diagnosis	Symptomatic CAUTI (criteria 1+2+3) ABUTI(Asymptomatic bacterimic UTI criteria – 1+4)						Yes/No
CLABSI(CENTRAL LINE ASSOCIATED BLOOD STREAM INFECTION)						**DATE OF EVENT(DOE)**	
1.Central line criteria	Patient has central line in place for 2 days or more						Yes/No
	Or if removed; central line was in place on the day of sample collection or the day before						
2.Pathogen	Pathogen identified from one blood culture(not related to infection at any other site)						
3.commensal (culture positive and symptoms)	Commensal grown from blood culture (not related to infection at other sites) and symptoms						Yes/No
	3a.(adult) atleast any one	Fever >38°C		Chills	Hypotension (SBP <90)		
	3b. (<1 year) atleast any one	Fever >38°C	Hypothermia <36°C	Apnea	Bradycardia		
Final diagnosis	LCBI-1 (1+2)	LCBI-2 (1+3a)	LCBI-2 (1+3b)	CLABSI			Yes/No

VAE (VENTILATOR ASSOCIATED EVENT)	DATE OF EVENT(DOE)				
MV Criteria	Patient has mechanical ventilator (MV) in place for 2 days or more				Yes/No
	Or if removed; MV was in place on the day of sample collection or day before				
Baseline	Patient has a baseline period of stability or improvement on the ventilator, defined by > 2 days of stable or decreasing daily minimum PEEP or FiO2				Yes/No
VAC	Increasing FiO2 dm >2 days Or increase in PEEP dm/> 3cm of H2O for > 2 days in adult location				Yes/No
i-VAC	Temperature>100.4 F or < 96.8 F or WBC > 12000 cells / mm^3 or <4000 cells/mm And a new antimicrobial agent is started within VAE window period DOE, and is continued for >4 days				Yes/No
P-VAP	Culture positive with significant growth (ET aspirate > 10^5 CFU/ml, BAL > 10^4 CFU/ml, Lung tissue >10^4 CFU/gm or PSB >10^3 CFU/ml				Yes/No
	Direct smear – purulent resp. secreations (PC>25/LPF) (EC>10/LPF) and culture positive (any growth) (from sputum , ET Aspirate, BAL, Lung tissue or protected specimen brush or PSB)				
Ped-VAE	Increase in FiO2 dm by >25% for more than 2 days (in paediatric locations)				Yes/No
	Or increase in MAPdm >4 cm of H2O for >2 days (in paediatric location)				
Final Diagnosis	VAC (Ventilator associated Condition)	VAC (Infection related Ventilator associated complication)	P-VAP (Possible Ventilator associated pneumonia)	Ped- VAE	

SSI (SURGICAL SITE INFECTION)			DATE OF EVENT(DOE)-		
1.Patient had a surgery within past 30 days or surgery within 90 days if implant in place or breast, cardiac surgery or herniorrhaphy					Yes/No
2. Wound class (tick appropriate)	Clean	Clean contaminated	Contaminated	Dirty	Yes/No
3.PATOS (Present At the time of surgery)- visible pus/abscess at operation site; documented in OT not					Yes/No
4.Any of the following					Yes/No

SI-SSI (Superficial Incisional)	Any one of the following: 1.Purulent drainage from Superficial incision 2.Positive culture in aseptically obtained specimen from superficial incisional site 3.Superficial incision that is deliberately opened by the surgeon and culture not performed But patient has at least one of the following :i)pain or tenderness; ii)localized swelling; iii)erythema; iv)heat 4.Diagnosis of a superficial incisional SSI by surgeon or attending physician	Yes/No
DI-SSI (Deep Incisional)	Any one of the following: 1.Purulent drainage from deep incision 2.A deep incision that spontaneously dehisces, or is deliberately opened or aspirated and Culture is positive or not performed and Patient has at least one of the following: Fever (>100.4ºF), localized pain or tenderness 3.Abcess or other evidence of infection involving the deep incision that is detected on gross anatomical or histopathologic exam, or imaging test	Yes/No
Organ/Space SSI	Any one of the following: 1.Purulent drainage from a drain that is placed into the organ/space 2.Culture positive from an aseptically obtained fluid or tissue in the organ/space 3.Abscess or other evidence of infection involving the organ/space that is detected on gross anatomical or histopathologic exam, or imaging test. And meets at least one criterion for a specific organ/space infection site listed in NHSN	Yes/No

Date Collected by Infection control nurse

Data verified by infection control Officer

Name and Signature with date

Name and Signature with date

ANNEXURE 4

HAND HYGIENE AUDIT FORM

Time	Opportunity	HCW profession	WHO's HH moment	HH act performed or not
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			

HCW type: health care worker type such as doctor, nurse or any other profession; HH: hand hygiene)

Source with permission: Form adapted and modified from World Health Organization.

ANNEXURE 5

CHECKLIST FOR WEEKLY AND MONTHLY ENVIRONMENTAL CLEANING

Sites	I Week	II Week	III Week	IV Week	Signature of Housekeeping supervisor	Signature of In-charge Nurse
Floor						
Door						
Window						
Wall						
Curtains						
Cup-board						
Open rack						
Dustbin						
Trolley						
Ceiling fan						
High dusting						
A/C Vent cleaning						

Source with permission: Form adapted and modified from Hospital infection control committee (HICC), JIPMER, Puducherry

ANNEXURE 6

CHECKLIST FOR EQUIPMENT CLEANING																			
Sl. No.	Date	Monday			Tuesday			Wednesday			Thursday			Friday			Saturday		
	Equipment/shift	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
1	Monitors																		
2	Monitors, cables																		
3	Ventilator																		
4	Defibrillator																		
5	ECG machine																		
6	Ultrasound machine																		
7	ABG machine																		
8	ECMO machine																		
9	Warmer and bed																		
10	Syringe/infusion pump																		
11	Clip board																		
12	Oxygen Flow meter																		
13	Wall suction																		
14	Case sheet folder																		
15	Work station (Nurses and Doctors)																		
16	IV stand																		
Signature of Housekeeping Supervisor																			
Signature of In-charge Nurse																			

(ECG: Electrocardiogram; ABG: Arterial blood gas; ECMO: Extracorporeal membrane oxygenation; IV: Intravenous)

Source with permission: Form adapted and modified from Hospital infection control committee (HICC), JIPMER, Puducherry.

Courtesy: Medical Superintendent, JIPMER, Puducherry.

ANNEXURE 7

CHECKLIST FOR HIGH-TOUCH SURFACE CLEANING																			
Sl. No.	Date	Monday			Tuesday			Wednesday			Thursday			Friday			Saturday		
	High-touch Area	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
1	Patient's cot side rails and control keys																		
2	Patient's bed side locker																		
3	Dressing Trolley																		
4	Injection Trolley																		
5	Diet Trolley																		
6	Telephone																		
7	Fridge Handle																		
8	Entrance Door																		
9	Computer and accessories																		
10	Cardiac table																		
11	BP cuff																		
12	Oxygen flow meter																		
13	Pulse oximeter-probe																		
14	Ventilator/knobs																		
15	Stethoscopes																		
Signature of Housekeeping Supervisor																			
Signature of In-charge Nurse																			

(BP: Blood pressure)

Source with permission: Form adapted and modified from Hospital infection control committee (HICC), JIPMER, Puducherry.

Courtesy: Medical Superintendent, JIPMER, Puducherry.

ANNEXURE 8

BIOMEDICAL WASTE SEGREGATION AUDIT FORM AT WARD (DIRECT OBSERVATION)

AVAILABILITY OF

LOCATION:_____

DATE & TIME:_____

YELLOW BAG ☐ RED BAG ☐ BLACK BAG ☐ SHARP BOX ☐ BLUE BOX ☐

HCW type	Item to be segregated	Bag used	Compliance to BMW 2016

Segregation bags	No. items appropriate to the bag/container	Total no. items	Compliance to BMW 2016(%)
Yellow bag			
Red bag			
Black bag			
Sharp white box			
Blue box			

Signature of BMWM Officer in-charge

Signature of BMWM-Nurse

ANNEXURE 9

FORMAT FOR BIO MEDICAL WASTE REGISTER										
Name And Address Of Health Care Facility **Bio Medical Waste Register/Record Format**										
S. no	**Date of generation**	**Quality of BMW generated(in kg)** **Colour coding and category**					**Date of collection by waste collection agency**	**Time (in AM/PM)**	**Name and signature of waste collector**	**Name and signature of HCF STAFF**
		Yellow (1)	Red (2)	White (3)	Blue (4)	Total				
1										
2										
3										
4										
5										

Source: Guidelines for management of health care waste as per Bio Medical Waste Management , India , 2016

Courtesy :Directorate General of Health Service ,Ministry of Health Welfare and Central Pollution Control Board

ANNEXURE 10

NEEDLESTICK INJURY REPORTING PROFORMA

Employment ID: **Date of exposure:** **time:** **date of reporting:** **time:**

Name: **Age:** **sex:** **Hospital no:**

Mobile no: **Intercom no:**

Category: Doctor ☐ Nurse ☐ Technician ☐ Attender ☐ Housekeeping Staff ☐

Student ☐ Others:……

Place of the incident:

Source/Patient: known ☐ unknown ☐ **Name:** Hospital Number:

Type of contact: Needle-stick ☐ Sharp: ☐ (or) Mucocutaneous Exposure ☐

Exposure involved needle stick and sharp object

1.Were you the original user of the sharp item? Yes no

2.Was there blood on the device? Yes no

3.Source patient status for blood borne viruses (BBVs) at the time of exposure/reporting:

Tests for BBVs done in last six months and report available ☐

-HIV: Positive: /Negative: ☐ Date:_____

-HBV:Positive: ☐ /Negative: ☐ Date:_____ _

-HCV-Positive: ☐ /Negative: ☐ Date:_____

-Test for BBVs is either not done in last six months, or done but report not available

4.For what purpose was the sharp item originally used?

a) Unknown ☐
b) Injection ☐ Intramuscular ☐ Subcutaneous ☐ Intradermal ☐
c) To draw blood sample -- Arterial ☐ venous ☐ subcutaneous ☐
d) To place IV line -- Arterial ☐ central line ☐
e) To obtain a body fluid or tissue sample -- Urine ☐ CSF ☐ Amniotic fluid ☐ Other fluids……
f) Suturing ☐ Biopsy ☐ During operation ☐
g) Others : specify ……

5. Did the injury occur?

☐ Before use of item (item broken/slipped, assembling devices etc)

☐ During use of item(item slipped,patient jarred item,etc)

☐ While recapping the used needle

Device left on floor, table, bed or other inappropriate place

While cleaning the item

From item left on or near disposal container

While putting item into disposal container

After disposal , stuck by item protruding from opening of disposal container

Other : specify

6 . Type of device caused the injury : Needle Hollow bore plane instrument glass unknown

7 . Specify the instrument that caused the injury :

8 . What was the site of the injury ?

9 . Was the injury ?

Superficial(little of no bleeding)

Moderate (skin puncture, some bleeding)

Severe (deep stick/cut, or profuse bleeding

10.Gloves used Single pair double pair no gloves not applicable

Describe the incidence in own words

The exposure (splashes) involved blood and body fluid:

1.Type of body fluid which was involved in the exposure?

2.Was the body fluid visibly contaminated with blood? Yes no unknown

3.What was the exposed part? (check all the apply)

Intact skin non-intact skin nose(mucosa) mouth conjunctiva ers:……

4.What were all barrier garments worn at the time of exposure?

Gloves Surgical mask Plastic aporn Google Surgical gown

Eyeglasses(Not a protective item) ab coat other……

5.Was the exposure the result of?

a. direct patient contact

b. specimen container leaked/spilled/broke

c. Touched contaminated drapes/sheets/gowns. Etc.

6.If equipment failure(device malfunction), specify: Equipment type and manufacturer

7.For how long was the blood or body fluid in contact with your skin or mucous membrane?

<5minutes ☐ 5-14minutes ☐ 15mins-1hr ☐ >1hr ☐

8.how much blood/body fluid came in contact with your skin or mucous membrane?

a. Small amount- Few drops

b.Large amount- Several drops or splashes

9.do you have an option that any other engineering control, administrative or work practice could have prevented the injury?

Yes ☐ No ☐ Unknown ☐ if yes,then specify

POST EXPOSURE FOLLOW-UP

SOURCE INFORMATION

1.Source known and tested:

2.Source known but not tested, reason: 3.Source not known

If the source patients was believed to be high- risk group for blood borne pathogens:

Blood product recipient ☐ Injection drug use ☐ sex worker ☐ hemophilia ☐ ysis ☐ er

INFORMATION OF THE HEALTHCARE WORKER:

First aid:

First dose of ART taken: Yes ☐ no ☐ if yes, Date: Time:

Vaccination status of HCW

1. Complete vaccination with anti HBs titer tested date…… protective ☐ not protective ☐
2. Complete vaccination with no titer testing date of last dose:
3. Incomplete vaccination date of last dose: no. of doses:
4. No vaccination

Whether HCW is pregnant: Yes ☐ No ☐ Not applicable: ☐ yes, trimester: first ☐ second ☐ third ☐

RESULTS OF BASELINE TESTS:

TEST	**SOURCE**	**HEALTHCARE WORKER**
HIV antibody	Positive ☐ Negative ☐	Positive ☐ Negative ☐
HBsAg	Positive ☐ Negative ☐	Positive ☐ Negative ☐
HCV Antibody	Positive ☐ Negative ☐	Positive ☐ Negative ☐
Anti-HBs antibody	Not Applicable	Protective ☐ Not protective ☐

<table>
<tr><th colspan="8">STANDARD CASE REPORT FORM DURING AN OUT-BREAK INVESTIGATION</th></tr>
<tr><td>Name</td><td>Age</td><td>Sex</td><td>Religion</td><td colspan="4">Address</td></tr>
<tr><td></td><td></td><td></td><td></td><td>Door</td><td>Street</td><td>City</td><td>District</td><td>State</td><td>country</td></tr>
<tr><td colspan="2">Epidemiologically linked</td><td rowspan="2">Possible Source
☐ Point
☐ Common continuous
☐ Common intermittent
☐ Propagative</td><td>Contact number:</td><td colspan="6" rowspan="2">DATE OF ONSET:</td></tr>
<tr><td>Exposure in
☐ Community
☐ Hospital
☐ Travel History</td><td>Exposure to
☐ Suspect case
☐ Probable case
☐ Confirmed case</td><td>Email ID:</td></tr>
<tr><td>Date</td><td>Symptoms/signs</td><td>Clinical diagnosis</td><td>Laboratory report</td><td colspan="6">Outcome</td></tr>
<tr><td>First visit</td><td></td><td></td><td></td><td colspan="6" rowspan="4">☐ Recovered
☐ Recovered with complications
☐ Loss to follow up
☐ Death</td></tr>
<tr><td>Follow Up-1</td><td></td><td></td><td></td></tr>
<tr><td>Follow Up-2</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="8">Verified by Investigator
(e.g. Infection control officer)

Signature of Data Collector
(e.g. Infection Control Nurse)</td></tr>
</table>

Source with permission: from adapted and modified from Hospital Infection Control Committee (HICC), JIPMER, Puducherry