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All India Institute of Medical Sciences, Bilaspur, H.P.

स्वास्थ्य एवं परिवार कल्याण मंत्रालय के तत्वावधान में एक वैधानिक निकाय

(A statutory body under the aegis of Ministry of Health and Family Welfare)

HOSPITAL INFECTION PREVENTION AND CONTROL MANUAL



HOSPITAL INFECTION CONTROL COMMITTEE
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CHANGAR PALASIYAN
H.P: - 174037

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Executive Director's Message

Dear Colleagues, Team Members, and Healthcare Professionals,

I am pleased to present the **Hospital Infection Control (HIC) Manual**. This comprehensive document is a reflection of our shared commitment to healing, a guide to keeping one another safe, and the ultimate expression of our care for our patients.

In healthcare, our primary vow is to "do no harm." Preventing healthcare-associated infections (HAIs) is not merely a regulatory requirement, it is a moral imperative and a collective responsibility. This manual translates complex standards into actionable, daily practices to protect both our patients and our workforce. This edition provides robust, evidence-based protocols across all critical domains of infection prevention, including Standard & Transmission-Based Precautions, Occupational Exposure & Management, Bio-Medical Waste (BMW) Management, Environmental Surveillance for infection prevention, Spill management and fogging protocols

Safety is a team sport, and every role is vital. Whether you are at the bedside, in the lab, or keeping our facilities running, your daily actions matter immensely. I encourage you to use this manual not just as a reference, but as a daily companion in your practice.

Thank you for your warmth, your vigilance, and your tireless dedication to our patients and to each other. It is an honour to work alongside you to build a safer, healthier tomorrow.

Sincerely,

Lt Gen (Retd) Dr Daljit Singh
Executive Director
All India Institute of Medical Sciences, Bilaspur, Himachal Pradesh



Medical Superintendent's Message

Dear Healthcare Teams,

It gives me great pleasure to present the Hospital Infection Prevention and Control Manual of AIIMS Bilaspur. Infection prevention and control is an important part of safe patient care.

Healthcare-associated infections can result in increased morbidity; prolonged hospital stay increased healthcare costs and the development of antimicrobial resistance. Many of these infections can be prevented by following simple practices like Hand hygiene, appropriate use of personal protective equipment, proper sterilization and disinfection, environmental cleaning, safe injection practices and rational use of antibiotics.

This manual has been prepared to provide a practical framework for infection prevention and control practices throughout the hospital. It brings together the relevant policies and standard operating procedures relating to hand hygiene, standard and transmission-based precautions, use of personal protective equipment, environmental cleaning and disinfection, biomedical waste management, safe injection and procedural practices.

The effectiveness of any infection control programme depends on how well these practices are followed in routine patient care. A manual can provide guidance, but it is the day-to-day practice of healthcare workers that ultimately determines its impact. Infection prevention requires the participation of doctors, nursing officers, technicians, pharmacists, housekeeping staff, students, support services and the hospital administration.

I would encourage all departments and staff members to familiarize themselves with the provisions of this manual and incorporate them into their routine work.

As an institution, our aim should be to make infection prevention a routine part of patient care rather than something undertaken only for the purpose of meeting a standard or completing an audit.

I appreciate the efforts of the Infection Control Team and all individuals who have contributed to the preparation of this manual.

Ultimately, the objective is simple: to provide every patient with safe care and to ensure a safe working environment for every healthcare worker.

Sincerely,



Dr Dinesh Verma
Medical Superintendent
All India Institute of Medical Sciences, Bilaspur, Himachal Pradesh



HICC Member Secretary's, Message

Dear Colleagues and Healthcare Teams,

It gives me immense pleasure to present this edition of the **Hospital Infection Control (HIC) Manual**. In the dynamic environment of healthcare, infection prevention remains the most critical baseline of quality healthcare. Infection prevention and control is about concrete actions. This manual simplifies complex procedures into clear, actionable workflows that every department must execute daily.

The Hospital Infection Control Team meticulously prepared this manual to align with the National standards with a goal to ensure that this manual does not sit on a shelf but functions as a practical, step-by-step tool that can be used during every shift to keep patients and healthcare providers safe. The document is structured to serve as an immediate, practical resource covering vital components of Infection Prevention and Control (IPC) strategies such as **Standard & Transmission-Based Precautions** including everyday practices, from hand hygiene, PPE to isolation protocols, that serve as a shield against infections by mastering the core pillars of defence, **Occupational Exposure Management** by navigating the exact, step-by-step reporting and post-exposure prophylaxis (PEP) protocols designed to protect healthcare providers in the event of an accidental needlestick or fluid exposure, **Bio-Medical Waste (BMW) Management by i**mplementing strict color-coded segregation and disposal workflows to ensure regulatory compliance and environmental safety, **Environmental Surveillance** through executing systematic need based sampling and testing, air/water quality checks, and microbial monitoring in case of outbreaks, **Spill Management f**or chemical or biological spills **and fogging Protocols**.

Infection control is not the responsibility of a single department—it is a continuous chain where every healthcare worker is a crucial link. I strongly urge all medical, nursing, paramedical, and support staff to utilize this manual as a definitive reference during your daily rounds and workflows.

I would like to extend my deepest gratitude to all HICC members, department heads, and link nurses for their cooperation and support which helped in shaping this document. Your feedback and active participation will remain the driving force behind our zero-tolerance approach to healthcare-associated infections.

Let us work together to translate these protocols into practice and ensure our hospital remains a sanctuary of healing.

Warm regards,

Priti Agarwal

Dr (Prof) Priti Agarwal
Member Secretary, Hospital Infection Control Committee (HICC)
Professor & Head, Department of Microbiology
All India Institute of Medical Sciences, Bilaspur, Himachal Pradesh

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Chapter – 01

Organization of Hospital Infection Control Programme at AIIMS Bilaspur, H.P.

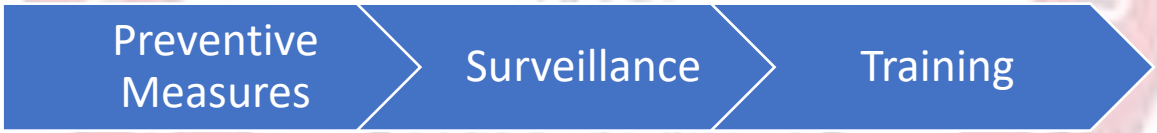
Introduction

An effective infection prevention and control is central to providing high-quality healthcare for patients and a safe working environment for those who work in healthcare settings. It is important to minimize the risk of the spread of infection to patients and staff in the hospital by implementing a good infection control programme**.** Effective IPC requires constant action at all levels of the health system, including policymakers, facility managers, health workers and those who access health services.

Components of Hospital Infection Control Program

There are three main components of the Hospital Infection Control Programme.

1. Preventive Measures
2. Surveillance
3. Training

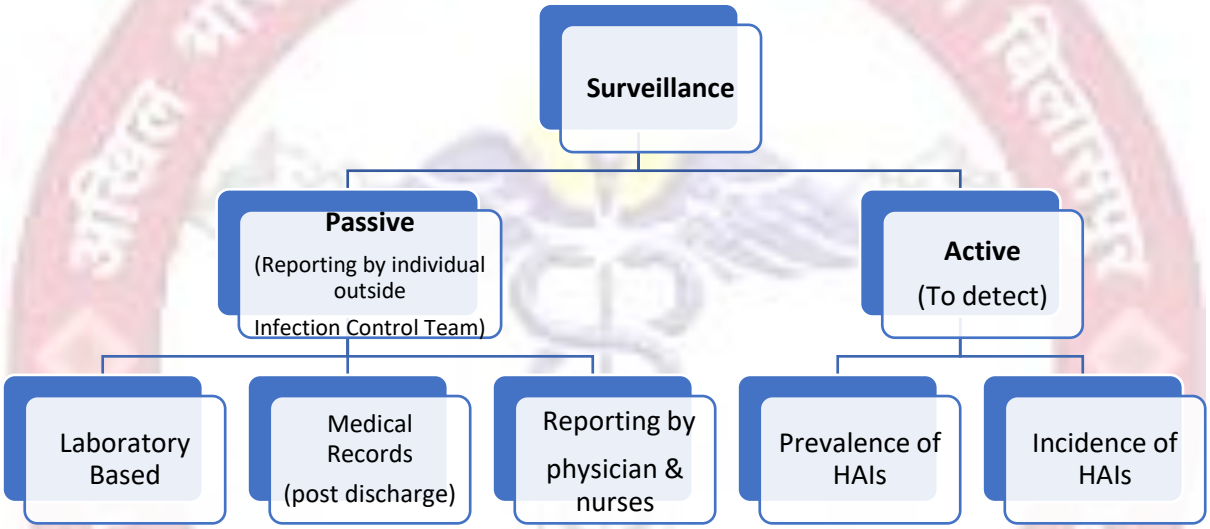


Preventive Measures

- Standard Precautions.
- Isolation Precautions under certain special circumstances or outbreak situation. E.g., COVID-19, combating Swine Flu, MRSA outbreak in any unit etc.
- Immunization of Healthcare Workers (HCWs).
- Sterilization, disinfection and decontamination of medical instruments and environment.
- Appropriate use of Personal Protective Equipment (PPE).
- Spill management.
- Reporting and Management of accidental injuries by sharps.
- Hospital Bio Medical Waste Management.
- Environmental Management Practices.

Surveillance

- Passive- Reported by individual outside the Hospital infection control team
- Active- Finding Incidence and prevalence of HAIs (Health Care Acquired/Associated Infections).
- Regular monitoring/audit and timely feedback of health care practices, according to IPC standards should be performed to prevent and control HAI and AMR at the health care facility level. Feedback should be provided to all audited persons and relevant staff.



Training

- Sensitization of infection control programme and practices to all cadres of HCWs.
- Organize and impart periodic in-house training to HCWs.
- Send members of the Hospital Infection Control Committee (HICC), Infection Control Team (ICT), Physicians and Nurses to apex institute for training and create master trainers.
- Organizing regular workshops, symposium, CME and conference on infection control for hospital staff.

Hospital Infection Control Committee (HICC) at AIIMS Bilaspur

Objectives of HICC:

- To minimize healthcare associated infections among patients, staffs, and visitors.
- To minimize development of antimicrobial resistance and promote rational use of antimicrobials by antimicrobial stewardship program.

The committee was reconstituted wide AIIMS-BLS/A/(04)/2025-4431 **dated** 13/10/2025.

S.No.	Name of Committee Member	Position
1.	Executive Director	Chairperson
2.	Dean (Academic)	Member
3.	Medical Superintendent	Member
4.	HoD/ Faculty I/C, Anaesthesia	Member
5.	HoD/ Faculty I/C, OBG	Member
6.	HoD/ Faculty I/C, Surgical Oncology	Member
7.	HoD/ Faculty I/C, Orthopaedics	Member
8.	HoD/ Faculty I/C, ENT	Member
9.	HoD/ Faculty I/C, Ophthalmology	Member
10.	HoD/ Faculty I/C, General Medicine	Member
11.	HoD/ Faculty I/C, Paediatrics	Member
12.	HoD/ Faculty I/C, Pharmacology	Member
13.	HoD/ Faculty I/C, Hospital Administration	Member
14.	HoD/ Faculty I/C, Microbiology	Member Secretary
15.	Dr. Neha Gautam, Additional Prof., Microbiology	Infection Control Officer
16.	Dr Megha Sharma, Assistant Prof., Microbiology	Member
17.	Superintendent Engineer (Civil) or nominee	Member
18.	HoD/ Faculty I/C, CSSD	Member
19.	HoD/ Faculty I/C, Swachhta	Member
20	HoD/ Faculty I/C, Procurement	Member
21	HoD/ Faculty I/C, Stores	Member
22.	Nursing Superintendent	Member
23.	Nursing Officer (ICN-1)	Member
24.	Nursing Officer (ICN-2)	Member
25.	Nursing Officer (ICN-3)	Member
26.	Sanitation Officer	Member

Meetings of HICC

- The Hospital Infection Control Committee meets 1st Wednesday of every month or more if required in case of any outbreak. Documentation of meetings and recommendations are kept by the Member Secretary.
- **Minimum Quorum required**: Chairperson, Member-Secretary, Infection Control Team and 50% of other members.

Responsibilities of HICC:

- To develop and prepare various infection control policies and protocols.
- To promote, implement, and monitor optimum infection control practice at all levels of the health facilities.
- To review and approve an annual programme for surveillance and prevention of HCAI.
- To review epidemiological surveillance data and identify the areas for interventions.
- To ensure appropriate staff training regarding infection control and prevention.
- To review risks associated with new technologies and monitor infectious risks of new devices and products.
- To provide expert advice, analysis, and leadership in outbreak investigation and control.
- To monitor employee health activities regarding matter related to needle stick injury prevention, hepatitis B vaccination, etc.
- To conduct research on Infection Control (IC).

Responsibilities of Member-Secretary, HICC:

- Co-coordinating between hospital administration, Chairperson, other members of HICC.
- Developing recommendations of various Infection control policies with other members of HICC and HIPC Team.
- Making an Antimicrobial stewardship program (AMSP) for the institute. Proposing an AMSP team to the Chairperson of HICC.
- Conducting regular meetings of HICC. Preparing minutes of the meeting and disseminating the same to all the stakeholders of healthcare facility.
- Conducting emergency meetings in case of outbreak or any other alert situation.
- Providing action plans in case of any outbreak or any other alert situation like isolation of MDRO from any patient of the hospital.
- 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.
- Coordinating the organization of various trainings and workshops for different cadres of HCWs on various aspects of Infection prevention and control.

Hospital Infection Prevention & Control Team at AIIMS Bilaspur:

Under the umbrella of HICC, there is an Hospital Infection Prevention & Control Team (HIPCT) responsible for day-to-day infection control activities.

Members of the Hospital Infection Prevention & Control Team (HIPCT) of AIIMS, Bilaspur.

S.NO.	Name of the Member	Designation
1.	Dr. Priti Agarwal	Prof. & HOD, Microbiology & Member Secretary HICC
2.	Dr. Puneet Kumar	Add. Prof., Microbiology
3.	Dr. Neha Gautam	Add. Prof, Microbiology & Infection Control Officer
4.	Dr. Megha Sharma	Associate Prof., Microbiology
5.	Mr. Kishan Chhikara	Infection Control Nursing Officer
6.	Mrs. Kanchan	Infection Control Nursing Officer

Responsibilities of Hospital Infection Prevention & Control Team (HIPCT):

- Advise staff on all aspects of infection control and maintain a safe environment for patients and staff.
- Advise on management of patients who are at risk.
- Carry out targeted surveillance of healthcare-associated infections and act upon data obtained e.g. investigates clusters of infection above expected levels.
- Provide a manual of policies and procedures for aseptic, isolation and antiseptic techniques.
- Investigate outbreaks of infection and take corrective measures.
- Provide relevant information on infection problems to management.
- Assist in training of all new employees as to the importance of infection control and the relevant policies and procedures.
- Have written procedures for maintenance of cleanliness.
- Surveillance of infection, data analyses, and implementation of corrective steps. This is based on reviews of lab reports, reports from nursing in charge etc.
- Surveillance of Biomedical Waste management.
- Supervision of isolation procedures.
- Monitors employee health program.
- Addresses all infection control and employee health requirements as specified by Central laws, State laws and NABH.

Infection Control Officer (ICO):

The microbiologist serves as the Infection Control Officer.

Responsibilities of Infection Control Officer (ICO):

- Supervise the surveillance of healthcare-associated infections as well as preventive and control programs.

- Co-ordinate with the chairperson and HICC in planning infection control programs and measures.
- Keep track of any developing outbreaks.
- Participate and guide in research activities related to infection control practices and publish them.
- Develop guidelines for appropriate collection, transport and handling of specimens.
- Ensure laboratory practices meet appropriate standards.
- Ensure safe laboratory practices to prevent infection among staff.
- Monitor sterilization, disinfection & the environment where necessary.

Responsibilities of Infection Control Nursing Officer (ICN):

The duties of the ICN are primarily associated with ensuring the practice of infection control measures by healthcare workers. Thus, the ICN is the link between the HICC and the wards/ICUs, etc. in identifying problems and implementing solutions.

- To conduct Infection control rounds and maintain the data.
- To impart education of practices, minimizing healthcare-associated infections, and hand hygiene among healthcare workers.
- To maintain data of Sharps/Needle stick injuries and Post–exposure prophylaxis.
- To initiate and ensure proper immunization for Hepatitis B Virus in consultation with a microbiologist (Member HICC) in case of suspected exposure to any hospital worker.
- To ensure that all positive culture cases are tracked and for each positive culture from the inpatient unit, a hospital infection information sheet or surgical site infection sheet is filled and keep record for each positive culture case.
- To track the indicators of infection control and present the data to the HICC meetings on a regular basis.
- To conduct special tasks given as per components and objectives of the hospital infection prevention and control.

Chapter - 02

Standard Precaution

Standard Precautions are a set of infection control practices that healthcare personnel use to reduce transmission of microorganisms in healthcare settings. These practices are designed to protect both the health care provider (HCP) and prevent HCP from spreading infections among patients.

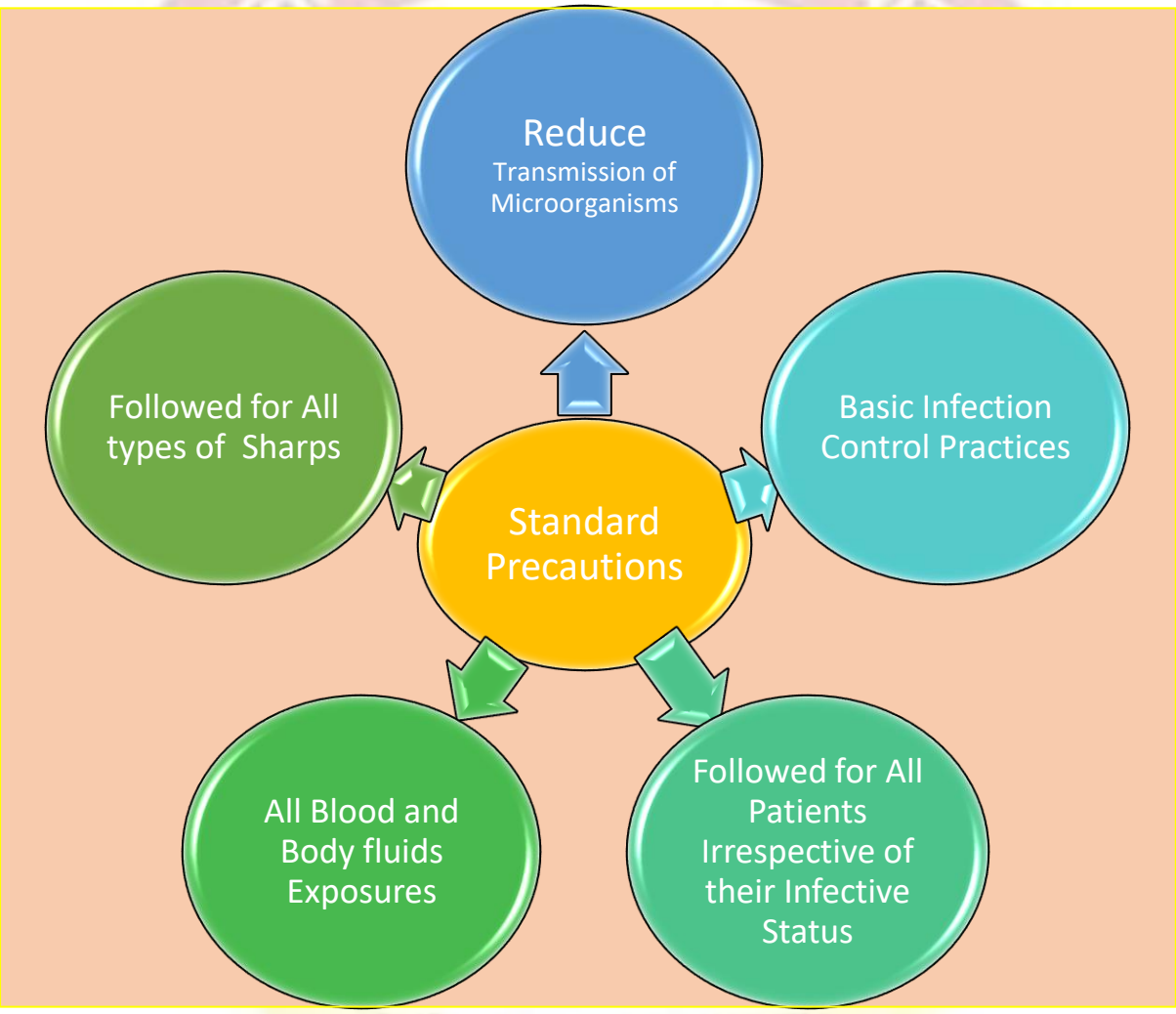


Fig. 2.1 Standard Precautions

Components of Standard Precautions are: -

A. Hand hygiene
B. Personal protective equipment (PPE)
C. Respiratory hygiene and cough etiquette
D. Prevention of injuries from sharp & Injection safety

E. Safe handling of patients care equipment
F. Environmental infection control

A. Hand Hygiene

Hands of HCW's remain common mode of transmission of HAIs. Therefore, effective hand hygiene (HH) is the cornerstone among all the measures of preventing HAIs.

Objective- To prevent transmission of health care associated infection by promoting hand hygiene among heath care workers.



Fig. 2.2 Hand Hygiene Recommended Duration

When To Perform Hand Hygiene?

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

- Before touching the patient
- Before any clean/aseptic procedures
- After body fluid exposure risk
- After touching the patient
- After touching the patient surroundings



Fig. 2.3 Five Moments of Hand Hygiene

How To Perform Hand Hygiene?

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

- Hand washing with plain/antimicrobial soap
- Hand rubbing with alcohol-based hand rubs
- 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 available.

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.
- Use clean, running water whenever possible.
- Avoid using hot water, as repeated exposure to hot water may increase the risk of dermatitis.
- Make sure towels are not used multiple times or by multiple people.



Fig. 2.4 Steps of Hand Washing

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 (H2O2) 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 Figure- **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. 2.5 Steps of Hand Rub

Surgical Hand Hygiene Objectives

● To eliminate the transient and to reduce the resident skin flora in contrast to the hygienic hand wash or hand rub.
● 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.
● 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.
- Surgical hand antisepsis should be performed using either a antimicrobial soap or alcohol-based hand rub, before donning sterile gloves.
- If quality of water is not assured in the operating theatre, surgical hand antisepsis using an alcohol-based hand rub is recommended before donning sterile gloves when performing surgical procedures.
- When performing surgical hand antisepsis using an antimicrobial soap, scrub hands and forearms for the length of time recommended by the manufacturer, typically 3–5 minutes. Long scrub times (e.g. 10 minutes) are not necessary.
- When using an alcohol-based surgical hand rub product, 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.

Surgical Handrubbing Technique

- Handwash with soap and water on arrival to OR, after having donned theatre clothing (cap/hat/bonnet and mask).
- Use an alcohol-based handrub (ABHR) product for surgical hand preparation, by carefully following the technique illustrated in Images 1 to 17, before every surgical procedure.
- If any residual talc or biological fluids are present when gloves are removed following the operation, handwash with soap and water.



Put approximately 5ml (3 doses) of ABHR in the palm of your left hand, using the elbow of your other arm to operate the dispenser.



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



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).



Images 8-10: Now repeat steps 1-7 for the left hand and forearm.

Put approximately 5ml (3 doses) of ABHR in the palm of your left hand as illustrated, to rub both hands at the same time up to the wrists, following all steps in images 12-17 (20-30 seconds).

Cover the whole surface of the hands up to the wrist with ABHR, rubbing palm against palm with a rotating movement.



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

Rub palm against palm back and forth with fingers interlinked.

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

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

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

Repeat this sequence (average 60 sec) the number of times that adds up to the total duration recommended by the ABHR manufacturer's instructions. This could be two or even three times.

World Health Organization

Fig. 2.6 Surgical Hand Rubbing Technique

Patient Hand Hygiene -

Patients must be encouraged for hand hygiene as it is equally as important in the prevention and control of infection. HCWs must ensure that patients are afforded an opportunity to hand wash prior to meals, after having used a bedpan/urinal or toilet or when hands are otherwise soiled.

Hand Hygiene Compliance: -

- It is the responsibility of **EVERY HEALTHCARE WORKER** for compliance of this policy.
- Hospital Infection Prevention & Control team along with departmental HODs & Link ICNO's shall ensure overall compliance and monitor the same.
- Departmental HODs & Link ICNO's shall be responsible for compliance of this Policy at their respective patient care areas.
- All HODs to become Role Model for HH Compliance.

B. Personal Protective Equipment

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.

1. Gloves

- **GLOVES SHOULD BE WORN AS AN ADDITIONAL MEASURE, NOT AS A SUBSTITUTE FOR HANDWASHING.**
- Gloves are not required for routine care activities in which contact is limited to a patient's intact skin.
- Wear gloves when touching blood, body fluids, secretions, excretions, mucous membranes, non-intact skin.
- Change gloves between tasks and procedures on the same patient after contact with potentially infectious material.
- If gloves become torn or heavily soiled and additional patient care tasks must be performed, then change them before starting the next task.
- Remove gloves immediately after completion of care or a specified task, at point of use before touching non-contaminated items like clean environmental surfaces, before moving to another patient or using a mobile phone.
- Perform hand hygiene immediately after removing gloves.

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

Indications for glove use

- Before a sterile procedure
- Anticipation of a contact with blood or body fluid, regardless of the existence of sterile conditions and including contact with non-intact skin and mucous membrane
- Contact with a patient (and his or her immediate surroundings) during contact precautions

Indication of glove removal

- As soon as gloves damaged (or non- integrity is suspected)
- After contact with blood, or body fluid, non- intact skin and mucus membrane
- After contact with a patient and their surroundings or a contaminated body site
- When there is an indication for hand hygiene

Dos and Don'ts while using gloves

- Don't touch your face or adjust PPE with contaminated gloves.
- Don't touch environmental surfaces except as necessary during patient care.
- 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 before putting gloves and after removing gloves.

HAND HYGIENE SHOULD NOT BE PERFORMED OVER GLOVES USING EITHER AN ALCOHOL-BASED HAND RUB OR SOAP AND WATER.

- Gloves are intended for single-patient, single-use only and should be changed between patients.
- If gloves are not indicated, it is preferable to perform proper hand hygiene and provide care without wearing gloves.

Risk assessment for using gloves: -

As with all PPE, the need for gloves is based on careful assessment of the task to be carried out, the related risk of transmission of micro-organisms to the patient; and the risk of contamination of the healthcare worker's clothing and skin by the patient's blood and body substances. Risk assessment include consideration of: -

- Who is at risk (whether it is the patient or health care worker)
- Whether sterile or non-sterile gloves are required, based on contact with susceptible sites or clinical devices and the aspect of care or treatment to be undertaken.
- The potential for exposure to blood or body substances

- Whether there will be contact with non-intact skin or mucous membranes during general care and invasive procedures.
- Whether contaminated instruments will be handled.
- When gloves are worn in combination with other PPE, they are put on last.

Types of gloves: - There are three types of gloves:

a. Clean, non-sterile gloves should be worn
   - For examinations and non-surgical procedures;
   - For handling items visibly soiled with blood, body fluids, secretions, or excretions when the HCW has open skin lesions on the hands; and
   - When the HCW has non-intact skin on the hands.

b. Sterile, single-use gloves should be used for aseptic procedures
c. Heavy duty/ utility gloves should be used for decontamination of large equipment, cleaning of floors, walls, HCF furniture such as beds, etc. These gloves can be reused after cleaning.

Glove pyramid: - The Glove Pyramid is a concept promoted by the WHO to reduce the **overuse and misuse of medical gloves**. It emphasizes that **hand hygiene is the primary measure for preventing healthcare-associated infections**, while gloves should only be worn when there is a clear indication**.**



Fig. 2.7 Indication for using and not using gloves

WHO Glove Pyramid (Key Message)

- ▲ **Wear gloves only when there is an indication:**
- Contact with blood or body fluids
- Contact with mucous membranes
- Contact with non-intact skin
- Handling contaminated instruments or waste
- During aseptic procedures (sterile gloves when required)

▼ Do NOT wear gloves for routine care when there is no risk of exposure:

- Measuring blood pressure, pulse, temperature
- Giving oral medications
- Transporting patients
- Documenting or using a computer
- Touching intact skin only

Golden Rules

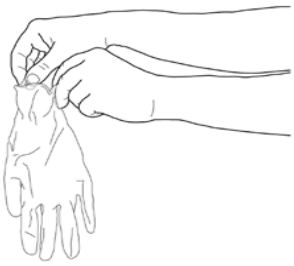
- Perform hand hygiene before putting on gloves.
- Do not perform hand hygiene on gloved hands.
- Remove gloves immediately after the task is complete.
- Perform hand hygiene immediately after removing gloves.
- Use one pair of gloves for one patient and one procedure.
- Change gloves between different body sites of the same patient (especially from dirty to clean sites).
- Perform hand hygiene after glove removal and before putting on a new pair, as indicated.

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)



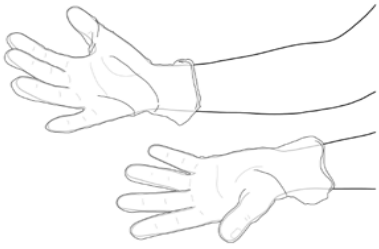
3. Don the first glove



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

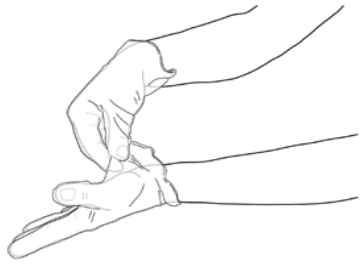


5. To avoid touching the skin of the forearm with the gloved hand, turn the external surface of the glove to be donned on the folded fingers of the gloved hand, thus permitting to glove the second hand

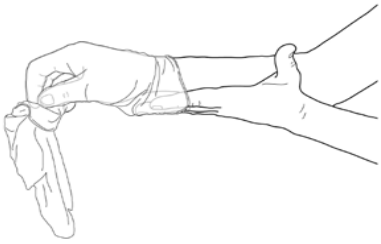


6. Once gloved, hands should not touch anything else that is not defined by indications and conditions for glove use

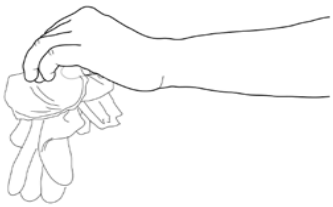
II. HOW TO REMOVE GLOVES:



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

Fig. 2.8 How to Don and Remove Gloves

Perform hand hygiene with soap and water after removal of gloves, if not feasible use ABHR (alcohol-based hand rub).

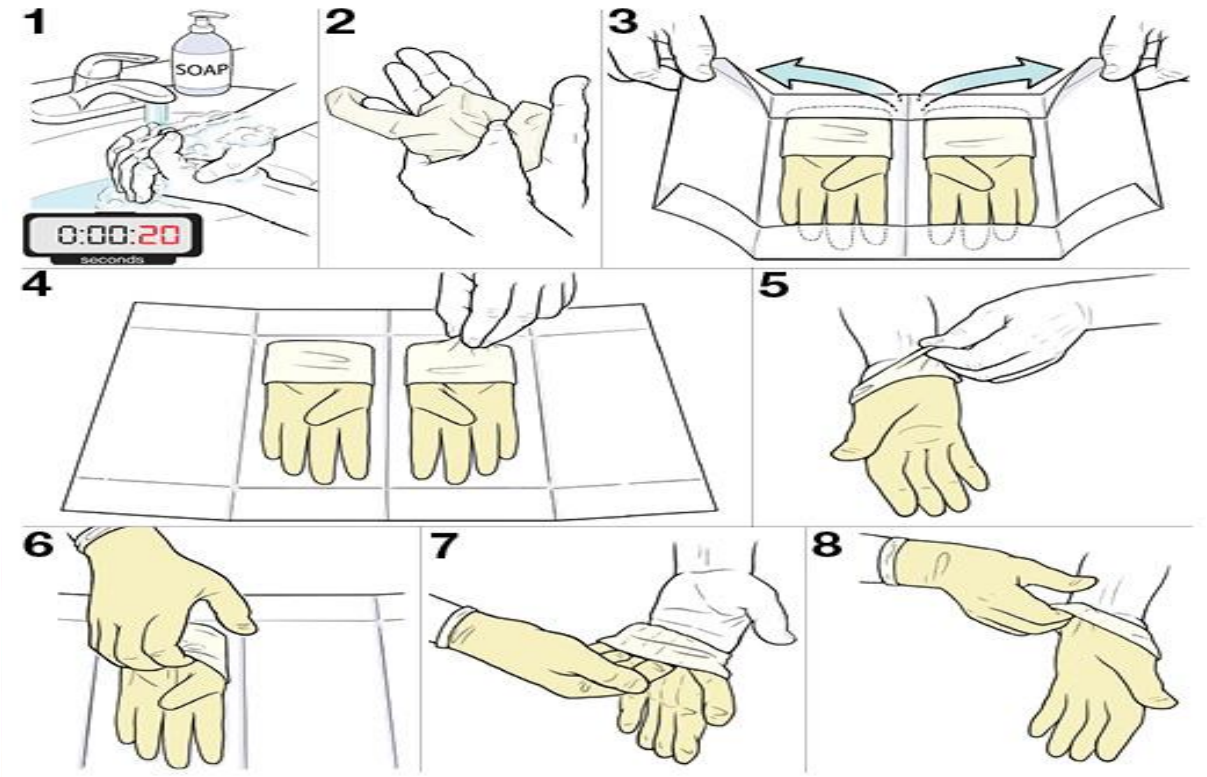


Fig-2.9 (Techniques of donning sterile gloves)

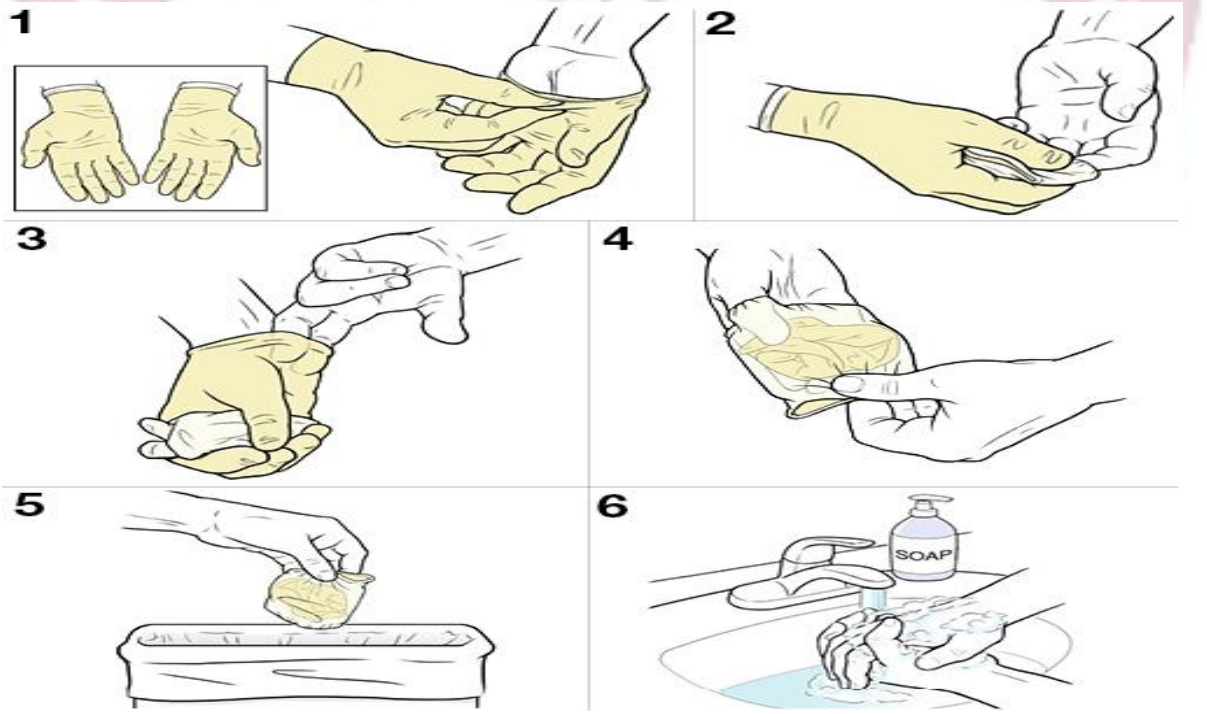


Fig. 2.10 Techniques of doffing sterile gloves

2. Gown

Gowns are used as specified by Standard and Transmission- based precaution, to protect the health care workers' arms and exposed body areas and prevent contamination of clothing with blood, body fluids, and other potentially infectious material. The need for and type of gown selected is based on the nature of the patient interaction, including the anticipated degree of contact with infectious material and potential for blood and body fluid penetration of the barrier.

The wearing of isolation gown and other protective apparel is mandate by the OSHA bloodborne pathogens standard (1991). Clinical and laboratory coats or jackets worn over personal clothing for comfort and/or purpose of identify are not considered PPE. When applying standard precaution, isolation gown is worn only if contact with blood or body fluid is anticipated.

However, when contact precaution are used (i.e., to prevent transmission of an infectious agent that is not interrupted by standard precaution alone and that is associated with environmental contamination), donning of both gown and gloves upon room entry is indicated to address unintentional contact with contaminated environmental surfaces.

Key points: - (WHO Infection Prevention and Control (IPC) guidance)

- Wear a gown only when there is an anticipated risk of exposure to blood, body fluids, secretions, excretions, or when transmission-based precautions require it.
- Put on the gown immediately before patient care or the procedure.
- Remove the gown promptly after the procedure or before leaving the patient's care area.
- Perform hand hygiene after removing the gown.
- Do not reuse disposable gowns. Reusable gowns to be laundered according to institute policy.

ICU/OT Scrubs and Gowns: -

- ICU gowns, OT gowns, and OT/ICU scrubs are restricted to their designated clinical areas.
- Do not wear ICU or OT attire outside the designated ICU/OT area (e.g., hospital corridors, cafeteria, administrative offices, or outside the hospital).

- Change into clean attire before leaving the restricted area.
- This practice helps prevent the transmission of healthcare-associated pathogens and maintains the integrity of the sterile or high-risk environment.

Restricted attire belongs in restricted areas. ICU/OT gowns and scrubs not to be worn outside their designated clinical areas. Remove PPE before leaving the patient care or restricted area and perform hand hygiene.

These recommendations are consistent with WHO IPC principles and are also reinforced in AIIMS Bilaspur.

Factors influencing the selection of a gown or apron as PPE:

- Isolation gowns are generally the preferred PPE for clothing but aprons occasionally are used where minimal contamination of arms is anticipated.
- Isolation gowns are made either of cotton or a spun synthetic material that dictate whether they can be laundered and reused or must be disposed.
- If fluid penetration is likely, a fluid resistant gown should be used. Clean gowns are generally used for isolation. Sterile gowns are only necessary for performing invasive procedures.

Note: - Reusable gowns to be laundered and sterilized before reuse. However, if handling risk group 4 *organisms*, then single-use gowns are necessary. Single-use gowns should be disposed appropriately in accordance with the Biomedical Waste Handling and Management Rules 2016, 2018

Procedure for donning a gown (illustrated below)

- Select appropriate type and size.
- The opening of the gown should be in the back; secure the gown at the neck and waist.
- If gown is too small, two gowns may be used; the first gown is worn with the opening in front and the second gown over the first with the opening in the back

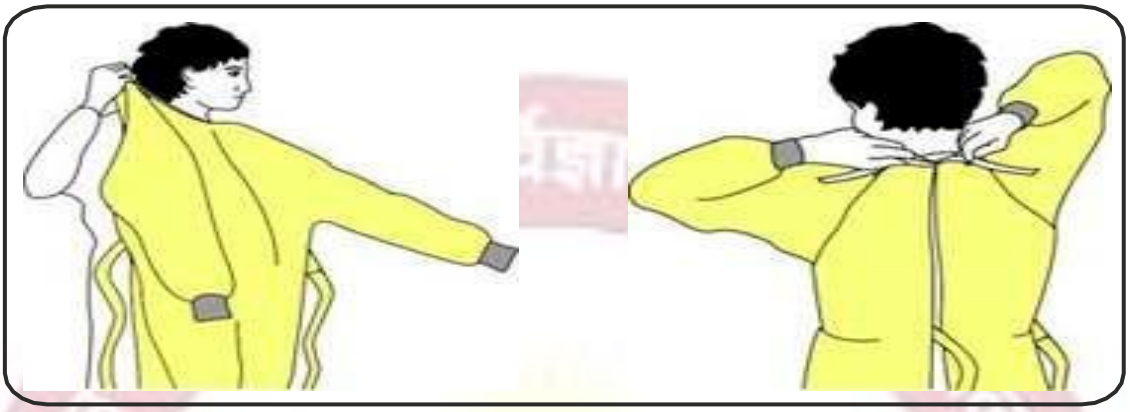


Fig.2.11 Donning of gown

Procedure for removing a gown (illustrated below)

The gown ties are unfastened with the ungloved hands. The hands should be slipped under the gown which is then peeled away at the shoulder, neck and arms turning the contaminated outside toward the inside and folding into a roll or bundle followed by discarding as appropriate.



Fig.2.12 Removing a gown

Characteristics of gowns and aprons:

Plastic apron	• Impervious/fluid-resistant. • Single-use, for one procedure or episode of patient care • Disposable • Worn when there is a risk that clothing may become exposed to blood or body substances (usually from the environment) during low-risk procedures and where there is low risk of contamination to the HCW's arms. • Worn when contact with the patient or the patient environment is likely to occur
Gown	• Single-use* • Disposable • Worn to protect skin and prevent soiling of clothing during procedures and/or patient-care activities that are likely to generate splashing or sprays of blood or body substances • Choice of sleeve length depends on the procedure being undertaken and the extent of risk of exposure of the HCW's arms
Full-body gown	• Fluid-resistant • Single-use* • Long-sleeved • Worn when there is a risk of contact of the HCW's skin with a patient's broken skin, extensive skin to skin contact (e.g. lifting a patient with scabies or non-intact skin), or a risk of contact with blood and body substances which are not contained (e.g. uncontrolled vomiting or passage of stools) • Worn when there is the possibility of extensive splashing of blood and body substances • Worn when there is a risk of exposure to large amounts of body substances, e.g. in some operative procedures
Sterile gown	• Pre-packaged • Used for procedures requiring an aseptic field

3. **Facial PPE: -** A combination of PPE types is available to protect all or parts of the face from contact with potentially infectious material. The selection of facial PPE is determined by the isolation precautions required for the patient and/or the nature of the patient contact.

a. **Face 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 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



Fig. 2.13 Types of masks

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 & it should fully cover nose and mouth and prevent fluid penetration.

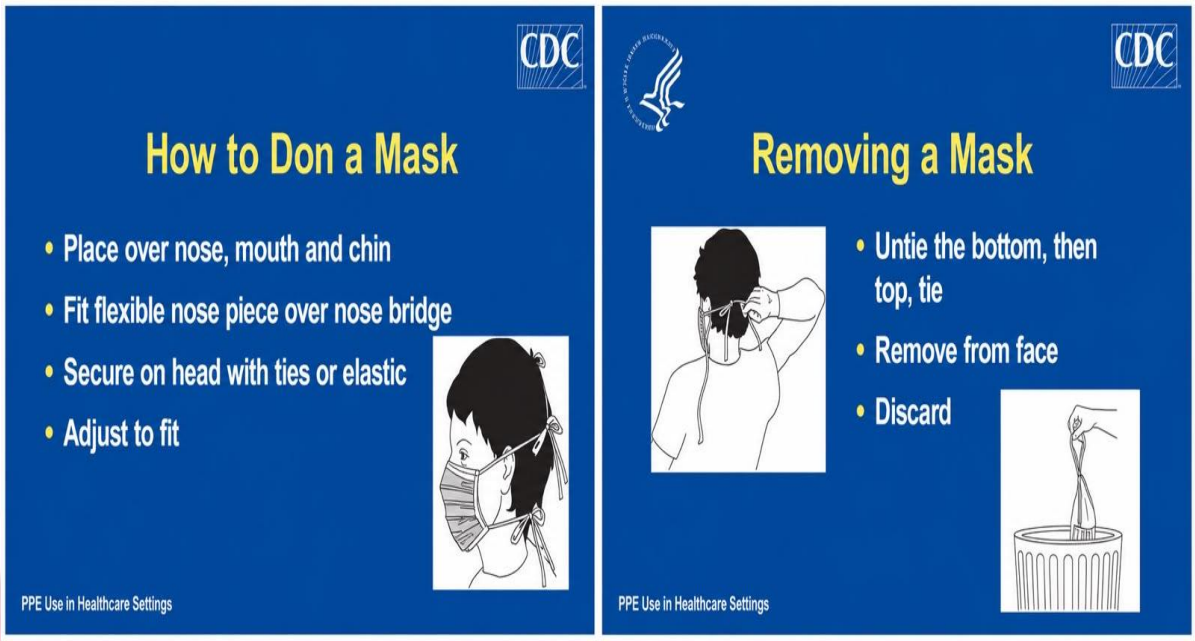


Fig. 2.14 Donning & Doffing of Surgical Mask

Using N95 Respirator / any Particulate Respirator

- These are used to protect healthcare workers from hazardous or infectious aerosols.
- Respirators that filter the air before it is inhaled should be used for respiratory protection.
- The most commonly used respirators in healthcare settings are the N95, N99, or N100 particulate respirators. The device has a sub-micron filter capable of excluding particles that are less than 5 microns in diameter. Like other PPE, the selection of a respirator type must consider the nature of the exposure and risk involved

Wearing the N-95 / Respirator: -

a. **Wash your hands. –** It is best to put on your N95 with clean, dry hands.

b. Put on N95 Respirator (Donning)

- Perform hand hygiene before handling the respirator.
- Inspect the respirator for damage or contamination.
- Cup the respirator in your hand with the nosepiece at fingertips.
- Position the respirator over the nose, mouth, and chin.

- Pull the top strap over the crown of the head.
- Place the bottom strap below the ears around the neck.
- Mold the nose clip firmly to the bridge of the nose using both hands.
- Ensure the respirator fits snugly with no gaps.
- Perform a user seal check before entering the patient care area.

c. Keep Your N95 Snug (Proper Fit)

- Cover the nose, mouth, and chin completely.
- Ensure both straps are correctly positioned.
- Do not cross or twist the straps.
- Adjust the nose clip using both hands.
- No gaps should be present around the face.
- Facial hair should not interfere with the seal.
- Perform a seal check every time the respirator is worn.
- Replace the respirator if the seal cannot be achieved.

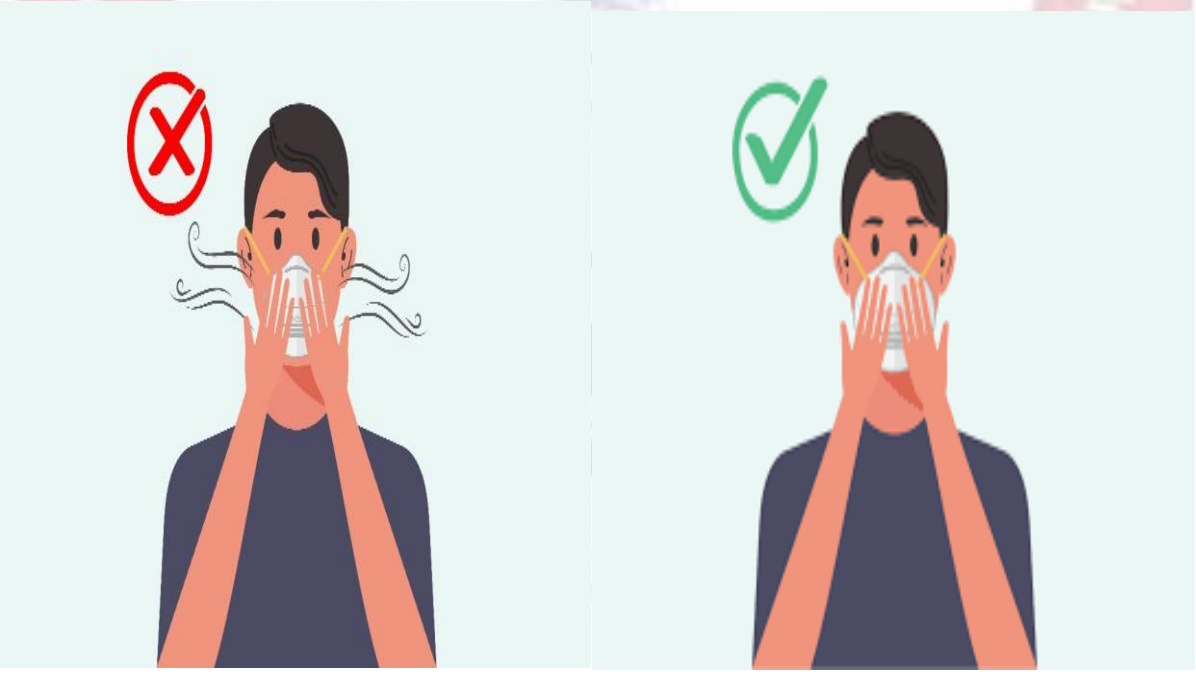


Fig. 2.14 Fit Check Test

d. User Seal Check

- Cover the respirator with both hands.
- Inhale gently—the respirator should collapse slightly.
- Exhale gently and check for air leakage around the nose and edges.
- Readjust the nose clip or straps if leakage is detected.
- Do not enter the patient care area until an adequate seal is achieved.



Fig.2.15 Wearing and Removing the Respirator



e. Remove the N95: - 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.

3.2 Eye wear and goggles: -

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

Do's and Don'ts

- Should fit snugly over and around eyes.
- Personal glasses/lenses are not a substitute for goggles.
- Antifog feature improves clarity
- Goggles should be used if blood or body fluid splashes are anticipated for e.g. during any surgery, endoscopic procedures, bone drilling or vascular injuries or laser surgeries, etc.

3.3 Face Shields: - When skin protection, in addition to mouth, nose, and eye protection, is needed or desired, for example, when irrigating a wound or suctioning copious secretions, a face shield can be used as a substitute to wearing goggles. The face shield should cover the forehead, extend below the chin, and wrap around the side of the face.

Procedure for wearing eye and face protection

- Goggles should be positioned over eyes (see illustration) and secured to the head using the ear pieces or headband and adjusted to fit comfortably.
- Face shield should be positioned over face and secured on brow with headband and adjusted to fit comfortably (see illustration).

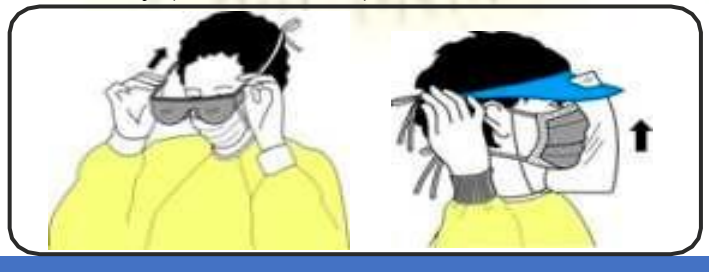


Fig.2.16 Eye protection/Face shield

Procedure for removing eye wears and face shield

- The ear or head pieces are grasped with ungloved hands and lifted away from face; these are then placed in designated receptacle for reprocessing or disposal.



Fig.2.17 Removing protection/Face shield

2. Foot wear: -

- Personal footwear should be changed when entering clean areas such as OTs, labour rooms, ICU, haemodialysis unit.
- Shoe covers may be used over street shoes to protect clean areas from soil and dirt brought in by shoes
- Do not reuse disposable caps/shoe covers. They should be discarded.

Boots:

- Boots should be used when handling biomedical waste as unnoticed cuts and wounds are quite common in the legs. Footwear is also essential to protect legs from 'sharps 'injury.
- Boots to be used to protect the wearer from splashes of blood, body fluids, secretions and excretions.
- Waterproof boots should be worn for heavily contaminated, wet flooring and floor cleaning.
- Remove your boots, before leaving the room.
- All the boots should be cleaned daily.

3. Hair cover: -

- Long hair must be secured with a rubber band and hair cover worn to protect the hair and to protect the patient from falling hair.
- Hair cover/cap should be use when entering clean areas such as OTs, labour rooms, ICU, haemodialysis unit.



Fig.2.18 PPE Donning



Fig.2.19 PPE Doffing

C. Respiratory hygiene and cough etiquettes

Respiratory hygiene and cough etiquette means the measures taken by a person having signs and symptoms of respiratory infection to contain respiratory secretions and prevent the transmission of the infection to other persons. The following measures are recommended:

- Cover mouth and nose with a tissue when coughing or sneezing.
- Dispose the tissue after use in the nearest waste container.
- Perform hand hygiene after contact with respiratory secretions and contaminated objects or materials.
- If resources permit, HCFs should ensure the availability of materials such as tissues and foot-operated waste bins for adhering to respiratory hygiene and cough etiquette in waiting areas for patients and visitors.
- In the absence of handkerchief or tissues, patients should be instructed to cover their nose and mouth with their arm during coughing and sneezing.
- Provide conveniently located dispensers of ABHR.
- Where sinks are available, ensure that water and soap for hand washing are available at all times.
- Posters elaborating cough etiquette and hand hygiene must be displayed at appropriate locations.

D. Prevention of injuries from sharp & Injection safety

E. Safe handling of patients care equipment

F. Environmental infection control

(Refer to chapter no.-4,5,6)

References:

- Centers for Disease Control and Prevention (CDC)
- Guidelines For Implementation Of “KAYAKALP” Initiative, 2024
- World Health organization Guidelines (WHO)

Chapter - 03

Transmission Based Precautions

Definition

Transmission based precautions are set of infection control practices which should be followed for the patients who are infected or likely to be infected with infectious agents having specific mode of transmissions such as contact, droplet and air borne. Accordingly, there are following three types of TBPs:

A. Contact precautions
B. Droplet precautions
C. Airborne precautions

The combination of infection control measures used in TBPs depend on the route(s) of transmission oof the infectious agent. The commonly used TBPs are as follows:

- Continued implementation of standard precautions.
- Appropriate use of personal protective equipment.
- Patient-dedicated equipment.
- Allocation of single rooms or Cohorting of patients.
- Appropriate air handling requirement.
- Enhanced cleaning and disinfection of the patient environment.
- Restricted transfer of patients within and between facilities.

For diseases that multiple routes of transmission, more than one TBP category are applied. **The duration of TBPs should be until signs and symptoms of the infection have resolved**.

A. Contact precaution:

Contact precaution is followed when there is a definitive or suspected evidence of certain infectious agents that are transmitted by direct or indirect contact during patient care. Agents or diseases transmitted through contact transmission include:

1. Methicillin Resistant *Staphylococcus aureus* (MRSA)
2. Carbapenem-resistant Enterobacteriaceae (CRE)
3. Vancomycin resistant Enterococci (VRE)
4. Multi drug Resistant (MDR) Non-fermenting gram-negative bacilli such as *Acinetobacter, Pseudomonas* etc.
5. Agents of Conjunctivitis (e.g. Adenovirus, Gonococcus, *Chlamydia*)
6. Any highly contagious skin lesions (Abscess, Impetigo, Infected ulcers) infected with Group A *Streptococcus, Staphylococcus* or HSV lesions.

7. Skin infections (e.g. Scabies)
8. Agents of diarrhea such as rotavirus, cholera, *Clostridioides difficile*.
9. Enterically transmitted hepatitis viruses (HAV and HEV)

Infection control measures:

For contact precaution, the following infection control measures should be applied in addition to stand precaution.

1. **Hand hygiene:**
   - Strict adherence to hand hygiene is an absolute requirement of contact precaution as the transmission via contaminated hands accounts for majority of contact transmission.
2. **Personal Protective Equipment (PPEs)**:
   - Gloves and gowns should be put on by the HCWs upon entry to the patient-care area and must be removal before leaving the patient-care area.
   - A surgical mask and protective eyewear must be worn if there is the potential risk for generation of splashes or sprays of blood and body substances into the face and eyes.
   - Hand hygiene must be performed before donning and after doffing PPEs.
   - After use, PPE must be appropriately discarded into the waste bin to contain the transmission of pathogens.
3. **Single-use Patient-dedicated Equipment**:
   - Single-use patient-dedicated equipment, (e.g. blood pressure cuffs, stethoscopes, thermometers, nebulizers etc). must be used.
   - If common use of equipment for multiple patients is unavoidable, then equipment should be cleaned with Bacillocid and allowed to dry before use on another patient.
4. **Patient Placement**:
   I. **Single isolation room** is recommended for patients on contact precaution.
      - Rooms with bathroom and anterooms are preferred.
      - Patient notes or bedside charts should be kept outside the rooms.
      - Donning and doffing should be done before entry and after exit from the room.
      - Door should be kept closed and door signs should be placed.

   II. **Cohorting:** When a single patient room is not available, cohorting is an acceptable patient placement strategy in resource-limited setting. Cohorting may be carried out be various ways:

- Patients with similar infections requiring contact precaution can be placed together, either in the **same isolation room,** or in the **same cubicle or corner** of a ward**.**
- Spatial separation**:** If it is not possible to separate infected and noninfected patients, then a spatial separation of minimum 3 feet distance between the beds with privacy curtains is recommended to reduce the possibility of sharing of items between infected patients and others.
- Visual cue such as color tape/mat placed on the floor or color-coded curtains, bed spreads or indicator boards or labelled patient case files can be used to identify areas of restricted access and use of additional precautions if needed.

5. **Transfer of patient**:
   Transfer of the patient on contact precautions outside of the room should be limited only to medically-necessary purposes.
   - When transport is necessary, the infected or colonized areas of patient body should be covered, so as to contain the infection.
   - Prior to transporting patients, the contaminated PPEs should be removed and hand hygiene must be performed.
   - Clean PPE should be put on before the patient is handled at the transport destination.
6. **Disinfection of the room**:
   Room of the patients on contact precautions must be frequently cleaned and adequately disinfected (e.g. at least once daily or prior to use by another patient, whenever is earlier) focusing on frequently-touched surfaces and equipment in the immediate vicinity of the patient.

B. Droplet Precautions:

Droplet precautions when used in addition to standard precautions, are intended to prevent the spread of infectious agents that are transmitted through respiratory droplets.

- The respiratory droplets are large particles (>5 micrometer in size) generated during coughing, sneezing, or talking.
- Transmission via large droplets requires close contact (<3 feet.), as the droplets do not remain suspended in the air and generally travel only for short distances.
- Along with droplet mode, there is also possibility of transmission of infections by contact.

Agents or diseases:

Droplet precautions are indicated for patients with following infectious agents:

1. Diphtheria, pharyngeal

2. *Hemophilus influenza* type B (epiglottitis, pneumonia, meningitis)
3. *Neisseria meningitides* – meningitis, sepsis, pneumonia
4. Pertussis (whooping cough)
5. Pneumonic plague
6. *Mycoplasma* pneumonia
7. Pharyngitis in infants and young children
8. Streptococcal (group A) diseases
9. Influenza virus, seasonal
10. Viral haemorrhagic fever due to Lassa, Ebola, Marburg, Crimean-Congo fever virus
11. Other viruses like Mumps, Parvovirus B19, rhinovirus, rubella, adenovirus.

Infection control measures:

For droplet precautions, the following infection control measures should be applied in additional to standard precaution.

1. **Hand Hygiene:**
   - Droplet transmission is technically a form of contact transmission and some infectious agents transmitted by the droplet route may also be transmitted by contact. Therefore, hand hygiene is an important component of droplet precautions and HCWs must adhere to the five moments of hand hygiene.

2. **Use of appropriate PPEs:**
   HCWs should wear a surgical mask when close contact (<3 feet) with the patient is anticipated and also upon room entry.
   - During transport, patient should wear a surgical mask and follow respiratory hygiene and cough etiquette.
   - HCWs should wear a protective eyewear or goggles if there is a risk of splashes or spray to the mucosa.

3. **Respiratory Hygiene and Cough Etiquette:**
   For droplet precautions, the following measures to contain respiratory secretions are recommended for all individuals with signs and symptoms of respiratory infection.
   - In outpatient settings, patients with respiratory symptoms should be segregated separated and attending the cases must be fast-tracked. Paramedical staff should be engaged in the waiting area to educate the patients on respiratory hygiene and to provide them with masks.

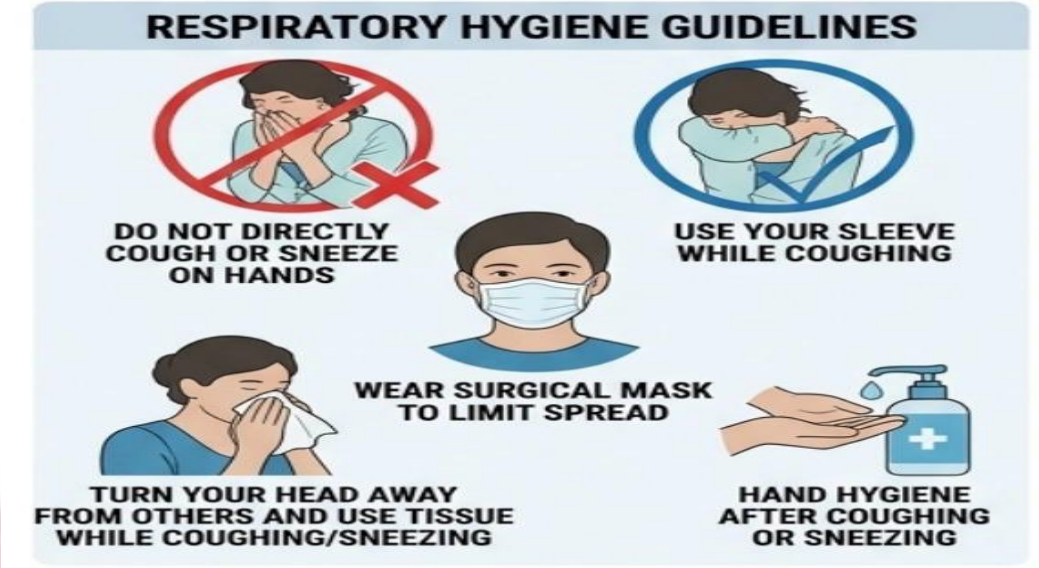


Fig3.1 Respiratory hygiene and cough etiquette

4. **Patient placement**:
   A single room is preferred for patients who require droplet precautions. If it is available, alternative placement options can be looked for similar to contact precaution such as Cohorting, spatial separation of >3 feet and drawing the curtain between patient beds.

5. **Transfer of patients:**
   Transfer of patients on droplet precautions should be limited, as there is a high-risk of transmission. If unavoidable, then the following precautions should be undertaken:
   - Patients should wear a surgical mask during while they are being transferred.
   - Patient should follow respiratory hygiene and cough etiquette.

6. **Disinfection of the Rooms:**
   Patient-care items, bedside equipment, frequently touched surfaces area and environmental surface should be cleaned daily with disinfectants (Baccishield or Bacillol solution).

C. Airborne precautions:

Airborne precaution when used in addition to standard precautions are intended to prevent the spread of infectious agents that are transmitted through respiratory aerosols.

Aerosols are small-particles (< 5 micrometer) generated by an infectious person during coughing, sneezing, talking or performing of certain aerosol generating procedures. These smaller droplets remain suspended in air for long period of time and may disperse to a distant place along the air current.

Agents: Infectious agents that cause aerosol transmissible disease (ATD) include:

1. *Mycobacterium tuberculosis*
2. Measles virus
3. Varicella (Chicken pox & Zoster)
4. Severe Acute Respiratory Syndrome associated Corona virus (SARS-CoV)
5. Smallpox & monkey pox virus
6. Aerosolizable spore-containing powder such as *Bacillus anthracis.*
7. *Aspergillus* (if massive soft tissue infection with copious drainage and repeated irrigations required).
8. Novel or emerging pathogens and any other diseases for which CDC or other public health guidelines recommend airborne infection isolation such as:
    - Middle East Respiratory Corona virus (MERS-CoV)
    - Pandemic Influenza

Aerosol-generating procedures:

Aerosol-generating or cough-inducing procedures (AGPs) are procedures that can generate much higher concentrations of airborne particles and ATD pathogens, as compared to coughing, sneezing, or speaking. AGPs are associated with higher risk of pathogen transmission.

- Therefore, it is recommended to follow airborne precautions such as performing these procedures in **negative pressure room wearing appropriate PPEs like N95 masks**.
- Once the task is complete, **the contaminated N95 mask should be disposed off immediately and hand hygiene should be performed**.

According to WHO, the following are classified as AGPs:

1. Endotracheal intubation
2. Open respiratory and airway suctioning
3. Tracheostomy care
4. Cardiopulmonary resuscitation
5. Sputum induction
6. Bronchoscopy
7. Aerosolized administration of pentamidine or other medications.
8. Pulmonary function test
9. Autopsy, clinical, surgical, and laboratory procedures that may aerosolize pathogens, such as Operating bone saws, centrifuges, blenders, aspiration equipment etc.

Infection Control Measures:

A prudent approach is to implement infection control measures at the earliest based on clinical suspicion, and discontinue it later if the patient is subsequently diagnosed with a disease that does not require airborne precaution.

Most of the airborne transmission from patient to HCW occurs due to lapses in administrative controls which include failure to identify infected patients early and lack of resources (e.g. respirators).

1. **Personal Protective Equipment (PPEs)**:
   While giving care to a patient with airborne precaution, the HCWs must wear N95 or higher-level respirator.
   - **Fit checking**: The HCW must perform fit checking every time before wearing the N95 mask to ensure if it is properly applied. No clinical activity should be undertaken until a satisfactory fit has been achieved.
2. **Patient Placement:**
   Patient on airborne precaution should be placed in an airborne infection isolation room (AIIR).
   - Adequate ventilation through mechanical ventilation (negative pressure room) or natural ventilation.

Ventilation: Ventilation can reduce the risk of infection through dilution and removal of room air containing infectious aerosols, by introduction of clean or fresh air into the room, either by natural or mechanical ventilation.

a) **Natural ventilation:** Natural ventilation refers to fresh air that enters and leaves a room though openings such as windows or doors.
The effect of natural ventilation is maximized:
   I. When the openings (e.g. doors and windows) are fixed and unrestricted (permanently kept open) to maintain air flow.
   II. When door and window are placed at opposite walls of the room.

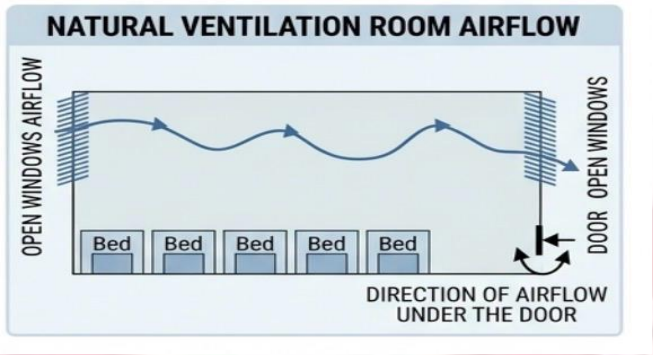


Fig 3.2 Schematic diagram of a room with natural ventilation

   III. Natural ventilation though less effective, can be considered as alternative when a negative-pressure room (mechanical ventilation) facility is not available.
   IV. In a consultation room with natural ventilation, the seating arrangement for patient and doctor should be made in such that doctor should sit away from the direction of natural airflow, thus has lesser risk of exposure.

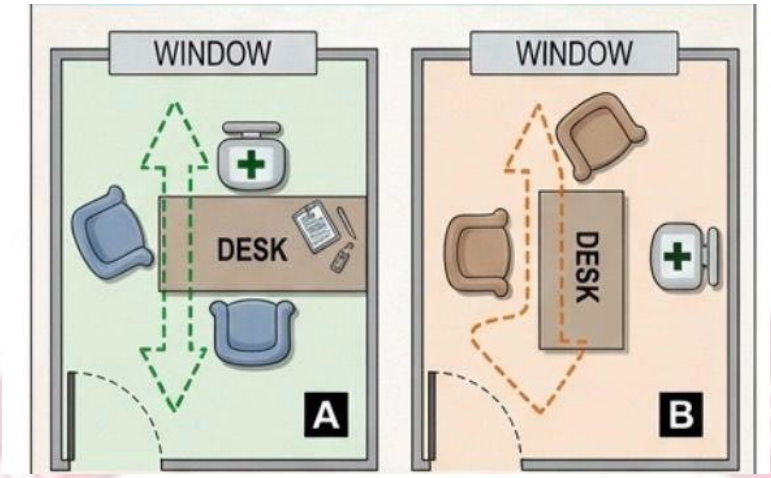


Fig 3.3 Schematic showing seating directions of patient and doctor in a consultation room

- In room (A), the seating arrangement is along with direct of natural ventilation of air flow, so that the doctor has higher risk of exposure to the potentially infected air.
- In room (B), doctor is sitting away from the direction of natural airflow, thus has lesser risk of exposure.

b) Mechanical ventilation (negative-pressure room):

1. Negative-pressure room includes a mechanical ventilation system which maintains the pressure of the room slightly lesser than then pressure of the entry area (i.e. creating a "negative pressure"). This allows air to flow into the isolation room but not escape from the room, as air naturally flows from areas with higher pressure to areas with lower pressure, thereby preventing contaminated air from escaping the room.
2. The negative pressure room should meet the following ventilation standards:

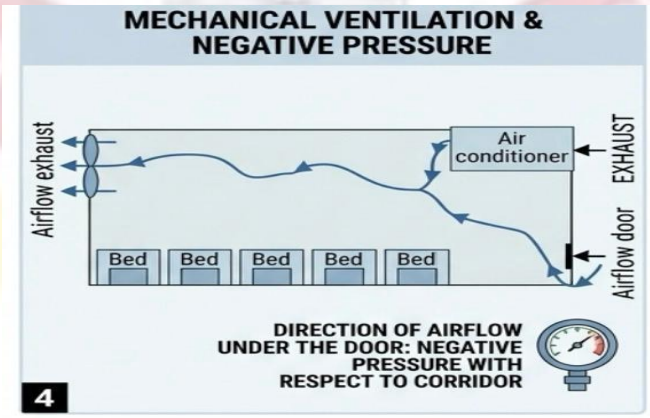


Fig 3.4 Schematic diagram of a room with mechanical ventilation

I. **Minimum 12 air changes per hour (ACH)** should take place in high-risk area for airborne transmission, compared to 6 ACH per hour in a low-risk area. High-risk areas include TB/chest department (outpatient and inpatient), Bronchoscopy procedure rooms, MDR-TB wards and clinics, airborne precaution rooms.

II. **Negative pressure differential** between airflow from adjacent spaces to the patient room should be > 2.5 Pascal.

III. **An airflow differential** >125-cfm (56l/sec) should be maintained between exhaust and supply.

IV. **Sealing of the room (entry)** should have provision of allowing approximately 0.5 square feet (0.046 m^2) leakage.

V. **Clean-to-dirty air flow**: Clean air entering into the room should flow first to the area of the room where staff or visitors are likely to be present, and then flow across the bed area to the exhaust.

VI. **Direction of airflow** and patient beds should not be in the same line. Beds can be arranged away from the direction of airflow.

VII. **Exhaust air** should be directed to outside or HEPA-filtered, if recirculated.

VIII. **Door** should always be kept closed when not required for entry and exit.

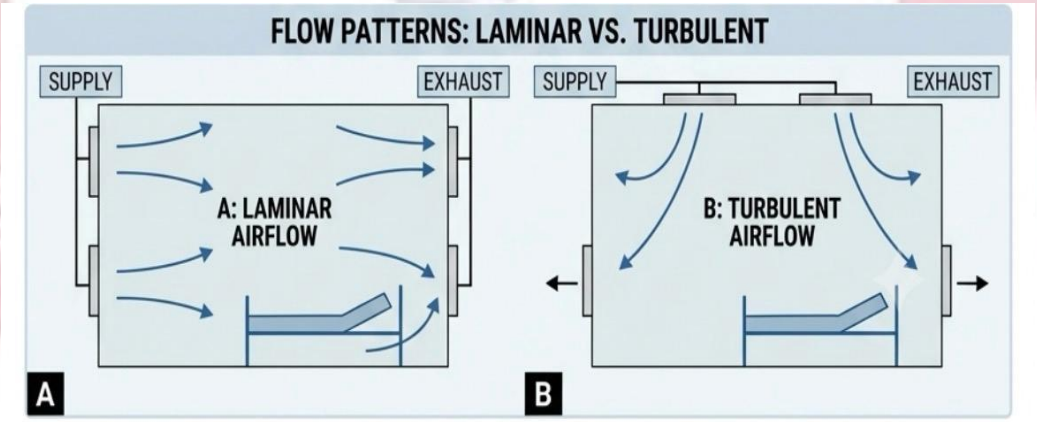


Fig 3.5 Schematic diagrams of mechanical ventilation, with optimal airflow in the room

A. Supply is on one side, exhaust from the other, so aerosols are not dispersed to other patients or staff.
B. Supply from the top, and again exhaust near the patient's head.

3. Transfer of Patient:

The patient on airborne precautions should be transferred outside the negative pressure room only when it is absolutely necessary. In such case, the following measures should be undertaken:

- Patient should wear a correctly fitted surgical mask while they are being transferred and they should also strictly adhere to respiratory hygiene and cough etiquette.
- Any skin lesions associated with the condition, (e.g. chickenpox) should be covered.

4. Visitors and staff:
Entry of the visitors and staff should be restricted or they should wear PPE before entry into the room. The HCW who is immune to the specific airborne disease should be posted for airborne precaution room whenever possible,

Table 3.1 Application of Standard and Transmission Based Precautions

Type	Isolation room or Cohorting	Hand hygiene	Gloves	Apron or gown	Mask	Eye protection	Handling of equipment	Visitors
Contact	Essential	Yes	Essential	Essential	As required[$]	As required[$]	Same as standard	Same precautions as for HCWs
Droplet	Essential	Yes	As required[*]	If soiled likely[#]	Surgical mask is essential	As required[$]	Same as standard	Restricted precautions same as for HCWs
Airborne	Essential (negative pressure)	Yes	As required[*]	If soiled likely[#]	N95 respirator is essential	As required[$]	Same as contact	Same as for droplet

*Gloves are used when there is likely exposure to blood, body fluids and contaminated items.
$Mask or eye protection is required during procedures likely to generate contaminated with aerosols.
#Soiled is likely to occur during procedure that are likely to generate contamination from blood and body fluids.
Environmental cleaning with an appropriate disinfectant is required for all type of precautions.

References:

1. Essential of Hospital infection control, Apurba S. Sastry and Deepashree R.

Chapter – 04

Occupational Exposure to Blood and Body fluids & Post Exposure Prophylaxis (PEP)

Introduction

Healthcare providers are prone to accidental exposure to blood and other body fluids or tissues while performing their work duties. Avoiding occupational exposure to blood, body fluids and blood-borne pathogens is the key to prevent transmission of HIV, Hepatitis B, Hepatitis C and other in healthcare settings using **Standard workplace precautions**. Thus, the post-exposure management protocols form an important element of workplace safety. NACO guidelines describe the risks of infection, the preventive measures and the steps to be followed to deal with accidental occupational exposure to HIV and other blood-borne pathogens.

The term **'healthcare personnel'** is defined as any person, paid or unpaid, working in healthcare settings who are potentially exposed to infectious materials (e.g., blood, tissue and specific body fluids and medical supplies, equipment or environmental surfaces contaminated with these substances). Healthcare personnel include emergency care providers, laboratory personnel, autopsy personnel, hospital employees, medical and nursing students and healthcare professionals at all levels.

'Exposure' that may place healthcare personnel at risk for blood-borne infection is defined as:

- percutaneous injury (e.g., needlestick or cut with a sharp instrument), where the risk of acquisition of HIV from a hollow-bore needle with blood from a known HIV seropositive source.
- Contact with the mucous membranes of the eye or mouth.
- Contact with non-intact skin (when the exposed skin is chapped skin or afflicted with dermatitis).

Occupational exposure refers Occupational exposure refers to exposure to potential blood-borne infections (HIV, HBV and HCV) that occur during performance of job duties.

Post exposure prophylaxis (PEP) refers to the comprehensive management instituted to minimize the risk of infection following potential occupational exposure to blood-borne pathogens (HIV, HBV and HCV). This includes first aid, counselling, risk assessment, relevant baseline laboratory investigations based on informed consent of the source person (when possible) and exposed person, depending on the risk assessment, the provision of short term (28 days) of antiretroviral drugs, with follow-up and support including maintaining confidentiality.

The term **'Needle Stick Injury'** is a broad term that includes injuries caused by needles or other sharp objects (e.g., glass vials, surgical blades and forceps) that accidentally puncture the skin.

An **'Exposed Person'** is a person who is potentially at risk for acquiring HIV infection due to exposure to blood or potentially infectious body fluids in his or her occupation.

A **'Source Person'** is the person who is (either identified or not identified as) the possible source of contamination through blood or potentially infectious body fluids. If the sero status of the source person is unknown, he/she may be counselled to get tested for HIV under informed consent.

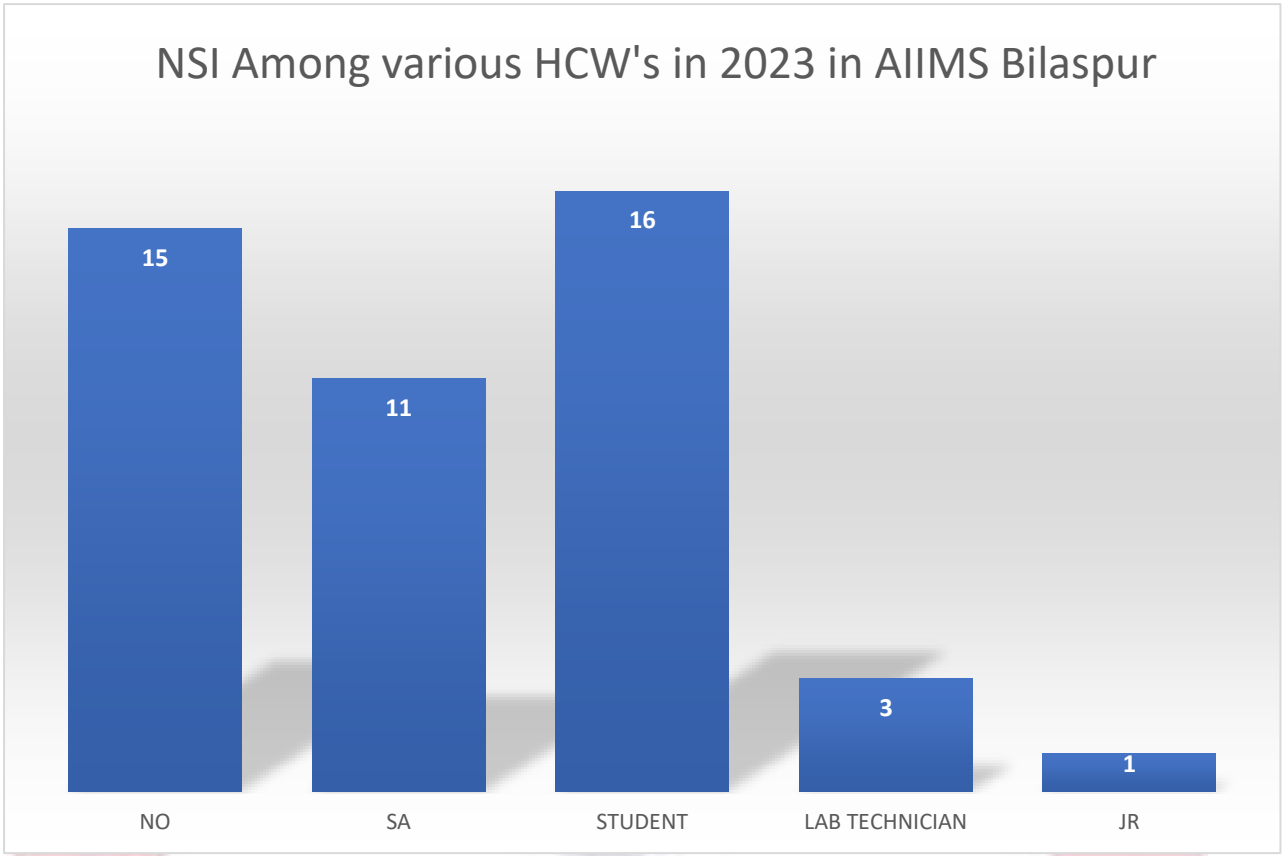
The decision regarding provision of PEP should be based on clinical consideration within 72 hours. Providers should give information, services and education without discrimination. The provision of information regarding PEP should be confidential including information about HIV testing, PEP provision and the reasons for seeking PEP.

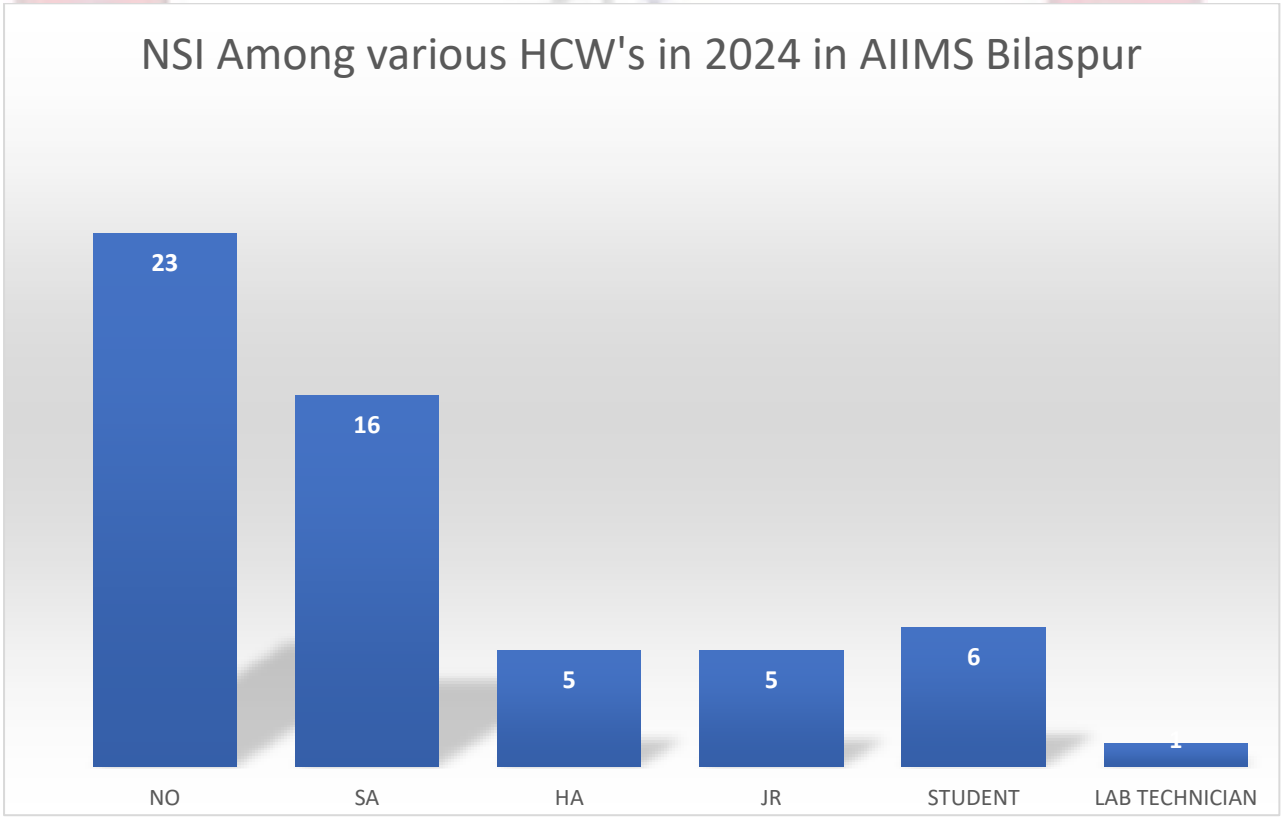
Written informed consent needs to be obtained while providing PEP. Consent for HIV testing of source/exposed person in the context of HIV exposure and/or taking PEP needs to be done in accordance with national HIV counselling and testing guidelines.

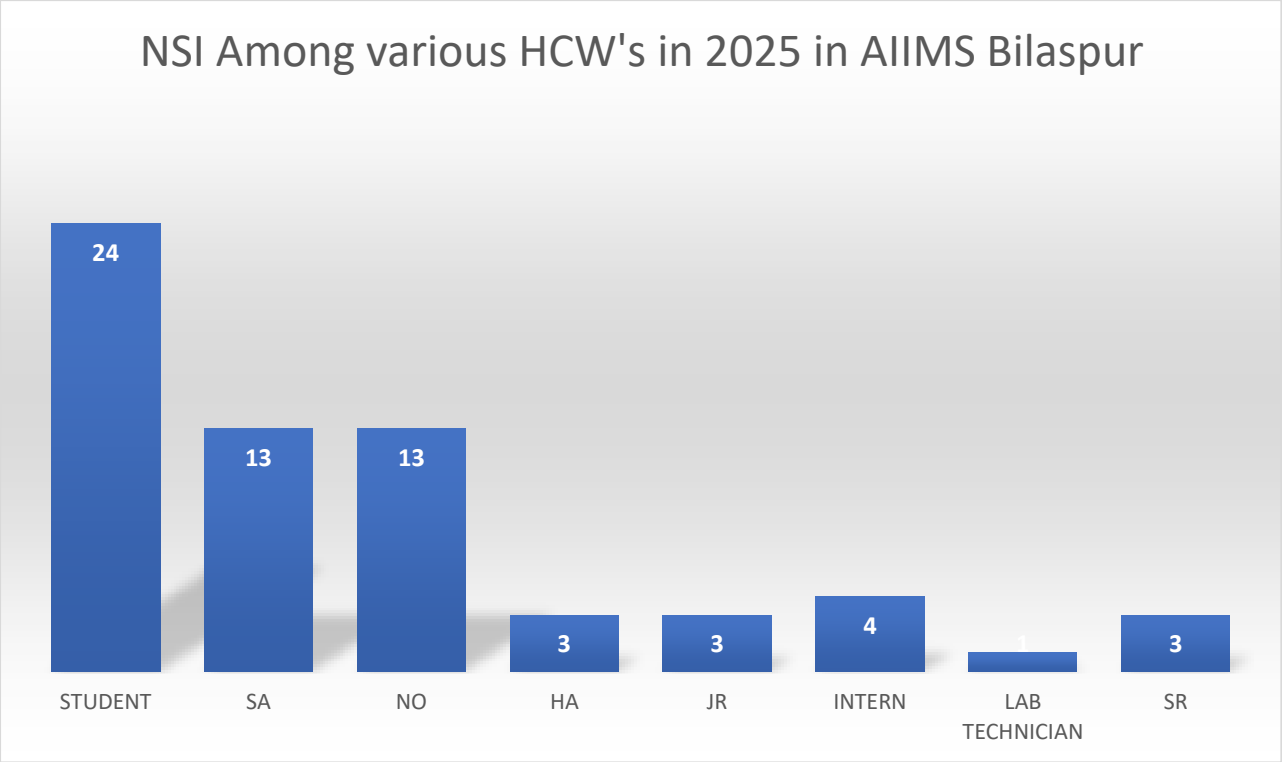
The risk of transmission following NSI is highest for HBV (9-30%) followed by HCV (11.8%) and HIV (0.3%)

Factors influence Risk of NSI

- Reuse of syringes.
- Recapping (Most common)
- Overuse of injections
- Unsafe sharp waste management


NSI Among various HCW's in 2023 in AIIMS Bilaspur
15
11
16
3
1
NO
SA
STUDENT
LAB TECHNICIAN
JR


NSI Among various HCW's in 2024 in AIIMS Bilaspur
23
16
5
5
6
NO
SA
HA
JR
STUDENT
LAB TECHNICIAN



Risk Factors:

- Take immediate First aid as early as possible.
- Hollow bore needle has a higher risk than solid needle (Suture/stylet)
- Viral load present in the blood/body fluid at the time of exposure.
- Volume of blood involved in the exposure
- Depth of injury- higher is the depth, more is the risk.

Don'ts	Do's
1. Do not panic. 2. Do not place the pricked finger into the mouth reflexively. 3. Do not squeeze/press blood from wound. 4. Do not use bleach, alcohol, iodine, antiseptic, detergent, etc.	1. Stay calm 2. Remove gloves, if worn. 3. Wash exposed site thoroughly with running water and soap. Irrigate thoroughly with water, if splashes have gone into the eyes or mouth 4. Consult the designated Doctor/ Nursing Officer immediately in Trauma & Emergency department, for management of the occupational exposure.

For Skin:

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.

For the Eye:

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.
4. Do not use soap or disinfectant on the eye.

For Mouth:

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.

Assessing Need for PEP and Prescribing PEP

Deciding on PEP Regimen

The decision on the need for PEP for HIV (following an occupational exposure in healthcare worker) will depend on the exposure, the source person's HIV status and the extent of disease if the source has been confirmed positive. It is decided based on exposure code and source code. Under NACP in India, following algorithms are followed:

Figure 2.10.6: HIV exposure codes

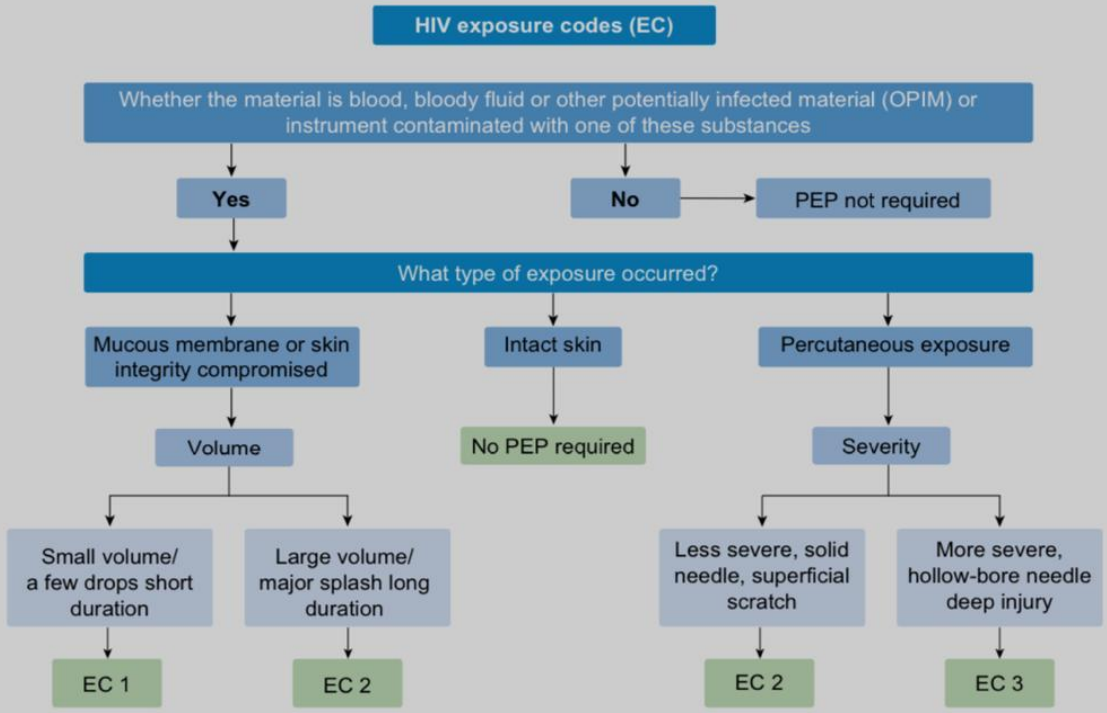
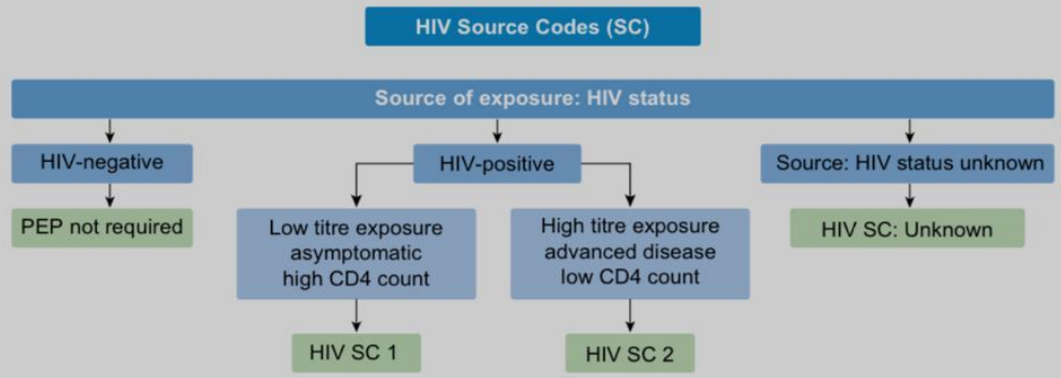


Figure 2.10.7: Source codes



Depending on the exposure and source codes, the decision to offer or defer PEP should be considered as provided in Table 2.10.7.

Table 2.10.7: NACO recommendations for PEP for healthcare personnel based on exposure and HIV source codes

Exposure Code	Source Code	Recommendation for PEP	Duration
1	1	Not warranted	
1	2	Recommended PEP	PEP is recommended for 28 Days
2	1		
2	2		
3	1 or 2		
2/3	Unknown	Consider PEP if HIV prevalence is high in given population in the region and risk categorization	28 days

Key Considerations while Prescribing PEP

- PEP should be started preferably within 72 hours of exposure.
- If healthcare personnel present after 72 hours of exposure, PEP can still be used after counselling about its effectiveness.
- PEP is available in the **Trauma & Emergency department**.
- The exposed person should go to the designated Doctor/Nursing officer, at the earliest in the Trauma & Emergency department, for a complete risk assessment, HIV counselling, testing and PEP.

Expert opinion may be obtained for the following situations:

- Delay in reporting exposure (>72 hours).
- Unknown source: Use of PEP to be decided on case-to-case basis after considering the severity of exposure and the epidemiologic likelihood of HIV transmission. Do not delay PEP initiation if indicated.
- Source patient is on ART or possibly has HIV drug resistance: Refer/consult as soon as possible.
- Major toxicity of PEP regimen: Minor side effects may be managed symptomatically. Refer to expert for non-tolerance or non-adherence.
- Refer/consult if in doubt or complicated cases (e.g., major psychological problem).

PEP must be initiated as soon as possible, preferably within 72 hours.

PEP regimen for HIV:

Exposed Person	Preferred Regimen for PEP Drugs and Dosages	Alternate Regimen (If the preferred Regimen is not available or contraindicated)
Adolescents and Adults (>10 years of age and >30 kg weight)	Tenofovir (300 mg) + Lamivudine (300 mg) + Dolutegravir (50 mg) (FDC: One tablet OD)	Tenofovir (300 mg) + Lamivudine (300 mg), (FDC: One tablet OD) + Lopinavir (200 mg)/ Ritonavir (50 mg) (two tablets BD), OR, Tenofovir (300 mg) + Lamivudine (300 mg) + Efavirenz (600 mg), (FDC: One tablet OD)
Children (>6 years of age or >20 kg weight)	Zidovudine + Lamivudine (Dosage as per weight band) + Dolutegravir (50 mg) (One tablet OD)	If Hb <9 g/dl: Abacavir + Lamivudine (dosage as per weight band) +, Dolutegravir (50 mg), (One tablet OD)
Children (<6 years of age or <20 kg weight)	Zidovudine + Lamivudine + Lopinavir/Ritonavir (Dosage as per weight band)	If Hb <9 g/dl: Abacavir + Lamivudine + Lopinavir/Ritonavir (dosage as per weight band)

- Duration of PEP is 28 days, regardless of PEP regimen.
- The first dose of PEP 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 & to avoid fatty food in dinner. The fixed dose combination tablet is available at emergency department for **First Dose** and ART Centre 2nd Floor C- Block (Behind Blood Bank) for **Subsequent Dose**.
- **In case the ART Centre closed on Sunday or holiday, the Emergency Department shall provide ART medication to the patient for the corresponding number of days.**
- Appropriate and adequate counselling must be provided regarding possible side effects (Table 2.10.9) adherence and follow up protocol.

Table 2.10.9: Management of minor ARV drug side effects

Sign or Symptom	Management at health facility
Nausea	Take with food; reassure that this is usually self-limited. Treat symptomatically.
Headache	Give paracetamol. If on Efavirenz, reassure that this is common and usually self-limited. If persists more than 2 weeks, call for advice or refer.
Diarrhoea	Hydrate. Follow diarrhoea guidelines. Reassure patient that if it is due to ARV, it will improve in a few weeks. Follow up in 2 weeks. If it does not improve, call for advice or refer.
Fatigue	This commonly lasts 4 to 6 weeks. Take 'sick leave' from work. If severe or longer than this, call for advice or refer.
CNS side effects: Anxiety, nightmares, psychosis, depression	This may be due to EFV. Take EFV at night before sleeping. Counsel and support (usually lasts <3 weeks). The initial difficult time can be managed with amitriptyline at bedtime. Call for advice or refer if severe depression or suicidal tendencies or psychosis (stop EFV)
Rash	If on EFV, assess carefully. Is it a dry or wet lesion? Call for advice. If generalized or peeling, stop drugs and refer for expert opinion
Fever	Assess clinically for Hepatitis; see if this could be primary (acute) HIV infection or other non–HIV-related infections, e.g., concurrent common cold. Call for advice or refer.
Jaundice, abdominal or flank pain	Stop drugs; call for advice or refer. If jaundice or liver tenderness is present, send for ALT test and stop ARVs; call for advice or refer.

- EFV**: Efavirenz**

Post Exposure Prophylaxis for exposure to HBV:

Health care worker status	Post exposure testing		Post exposure prophylaxis		Post vaccination serologic testing
	Source patient (HbsAg)	HCW testing (Anti-HBs)	HBIG	Vaccination	
Documented responder after complete series (≥3 doses)	No action needed				
Documented nonresponder after 6 doses	Positive / Unknown	—	HBIG * 2 doses, separated by 1 month	—	No
	Negative	No action needed			
Response unknown after 3 doses	Positive / Unknown	<10 mIU/ml	HBIG * 1 dose	Initiate revaccinated with second series	Yes
	Negative	<10 mIU/ml	None		
	Any result	≥10 mIU/ml	No action needed		
Unvaccinated/ incompletely vaccinated or vaccine refusers	Positive / Unknown	—	HBIG * 1 dose	Complete the vaccination	Yes
	Negative	—	None		

HBIG should be administered intramuscularly, as soon as possible after exposure; preferably within 24 hours and ideally within 48 hours when indicated. The effectiveness if HBIG when administer >7 days of exposure is unknown.

Dose: 0.06ml/kg (or 10-12 IU/kg)

When to check AntiHBsAg titer?

- Done after 1–2 months of the last dose of Hepatitis B vaccine.
- When immunoglobulin is received along with vaccination, post-vaccination serology is done after 4–6 months to avoid detection of passively administered anti-HBs.

A Responder is defined as a person with anti-HBs ≥ 10mIU/ml after ≥ 3 doses of hepatitis B vaccine.

A non-responder is defined as a person with anti-HBs ≤ 10mIU/ml after ≥ 6 doses (or two

series of 0, 1, 6) of hepatitis B vaccine.

Exposure Prone Procedure

According to the risk associated with HCW- to- patient transmission of HBV, CDC has categorized the EPPs into category-I (high-risk) and category-II (low-risk) procedures.

- When the HBV DNA load is more than 1000 mIU/ml, HCWs are restrained from doing category-I EPP.
- When the HBV DNA load is less than 1000 mIU/ml, they can perform both EPP category-I and II.
- **Frequency of testing**: HBV DNA has to be checked every 6 months; or more frequently when HBV DNA levels are beyond 1000 mIU/ml.

Category-I exposure prone procedure	Category-II exposure prone procedure
Procedures known or likely to pose an increased risk of NSI to a HCW that could result in HCW-to-patient transmission of HBV. These procedures are limited to: • Major abdominal, cardiothoracic and orthopedic surgery. • Repair of major traumatic injuries. • Abdominal and vaginal hysterectomy. • Caesarean section, vaginal deliveries, and • Major oral or maxillofacial surgery. Techniques that have been demonstrated to increase the risk for HCWs NSI and HCW-to-patient blood exposure include: • Digital palpation of a needle tip in a body cavity and or • Simultaneous presence of a HCW's fingers and a needle or other sharps instrument or object in a poorly visualized or highly confined anatomic site.	These procedures pose low or no risk for NSI to a HCW or, if a NSI occurs, it usually happens outside of a patient's body and generally does not pose a risk for HCW-to-patient blood exposure. These includes: • Surgical and obstetrical/ gynecologic procedures that do not involve the techniques listed for category-I. • Use of needles or other sharps devices when the HCW's hands are outside a body cavity (e.g. phlebotomy, placing and maintaining peripheral and central intravascular lines, administering medication by injection, performing needle biopsies, or lumber puncture). • Dental procedures other than major oral or maxillofacial surgery. • Insertion of tubes (e.g. NG, ET, rectal or urinary catheters) • Endoscopic or bronchoscopic procedures • Internal examination with a gloved hand that does not involve the use of sharp devices (e.g. vaginal, oral

	and rectal examination) • Procedures that involve external physical touch (e.g. general physical or eye examinations or blood pressure checks).

Post Exposure Prophylaxis for Exposure to 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.

There is presently no prophylaxis available against hepatitis C. Post exposure management for HCV is based on early identification of chronic HCV disease & referral to a specialist for management. In the absence of PEP for HCV, recommendations for post exposure management are intended to achieve early identification of chronic disease and, if present, referral for evaluation of treatment options.

Monitoring and follow up of HIV, HBV, and HCV status

Whether or not PEP prophylaxis has been started, follow up is indicated to monitor for possible infections and provide psychological support.

1) Laboratory follow-up:

Test	**Source**	**Exposed persons**			
	Baseline	**Baseline**	**6 weeks after exposure**	**3 months after exposure**	**6 months after exposure**
Anti-HIV antibody	✓	✓	✓	✓	✓
Hepatitis B surface antigen	✓	✓	-	-	✓
Anti-Hepatitis C antibody	✓	✓	-	-	✓

- **HBV (HbsAg) and HCV (Anti HCV Ab) testing follow-up is done**: at 6 months after exposure.
- **Liver function test at baseline i**.e. starts of PEP for HIV.
- **Complete blood count and hemoglobin estimation at baseline** (start of PEP for HIV) and then at end of 2nd and 4th week of PEP for HIV.

- **Weeks 2 and 4:** Complete blood count (for patients on zidovudine, this is particularly useful), Fasting blood sugar/Random blood sugar (for patients on Dolutegravir), Serum creatinine.

2) Clinical follow-up:

- The exposed person is advised to seek medical evaluation for any febrile illness that occurs within 12 weeks of exposure. In addition, in the weeks following an AEB (Accidental Exposure to Blood), the exposed person must be monitored for the eventual appearance of signs indicating an HIV seroconversion: **acute fever, generalized lymphadenopathy, cutaneous eruption, Pharyngitis, non-specific flu symptoms and ulcers of the mouth or genital area.**
- These symptoms appear in 50%-70% of individuals with an HIV primary (acute) infection and almost always within 3 to 6 weeks after exposure. When a primary (acute) infection is suspected, referral to an ART centre or for expert opinion should be arranged rapidly.
- Refraining from blood, semen, organ donation.
- Abstinence from sexual intercourse or use of latex condom.

References:

1. National Guidelines for HIV Care and Treatment 2024, NACO https://naco.gov.in/sites/default/files/National_Guidelines_for_HIV_Care_and_Treatment_2024.pdf
2. CDC Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Post Exposure Prophylaxis.
3. Essential of Hospital infection control, Apurba S. sastry and Deepashree R.

Chapter - 05

Biomedical Waste Management at AIIMS Bilaspur, H.P.

Appropriate management and disposal of hospital waste is one of the important ways of reducing hospital acquired infection. The bio medical waste management policy followed at AIIMS Bilaspur complies with the latest Bio medical management rules, framed by the ministry of Environment and Climate Change, Government of India.

The biomedical waste, as defined by the BMW Rules, 2016, is any waste that is generated during the activities of diagnosis, treatment and immunization of human beings or animals or any research activities pertaining thereto or in the production or testing of biological or health camps.

The biomedical waste disposal at AIIMS Bilaspur has been outsourced to a common biomedical waste management facility, duly authorized by the Himachal Pradesh Pollution Control Board and has been selected through an institutional tendering process. Bio-medical Waste Management rules apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle bio-medical waste in any form.

Classification of Healthcare Waste:

Health Care Facilities (HCFs) are primarily responsible for management of the healthcare waste generated within the facilities, including activities undertaken by them in the community. The health care facilities, while generating the waste are 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

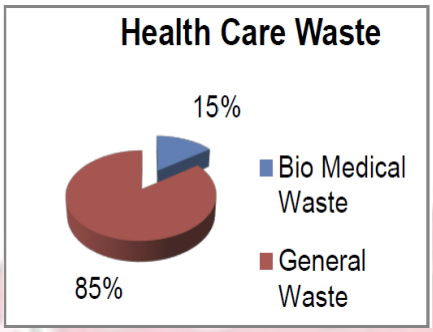


Fig.: 5.1 Percentage-wise classification of waste generated from the Health Care Facility

Bio Medical Waste:

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. All such waste which can adversely harm the environment or health of a person is considered as infectious and such waste has to be managed as per BMWM Rules, 2016**.**

The quantity of such waste is around **10% to 15% of total waste** generated from the Health Care Facility. This waste consists of the materials which have been in contact with the patient's blood, secretions, infected parts, biological liquids such as chemicals, medical supplies, medicines, lab discharge, sharps metallic and glassware, plastics etc.

Bio Medical Waste Management Rules, 2016 categorises the bio-medical waste generated from the health care facility into four categories based on the segregation pathway and colour code. Various types of bio medical 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

These categories are further divided as per the type of waste under each category as follows:
Table 1: Categories of Biomedical Waste

CATEGORY	TYPE OF WASTE	TREATMENT AND DISPOSABLE OPTIONS
	(a) Human Anatomical Waste Human tissues, organs, body parts and fetus below the viability period (as per the Medical Termination of Pregnancy Act 1971, amended from time to time).	Incineration through Common Biomedical Waste Treatment Facility Operator.
	(b) 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.	
	(c) Soiled Waste Items contaminated with blood, body fluids like dressings, plaster casts, cotton swabs and bags containing residual or discarded blood and blood components	Incineration through Common Biomedical Waste Treatment Facility Operator
	(d) 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.	Expired cytotoxic drugs and items contaminated with cytotoxic drugs to be handed over to common bio-medical waste treatment facility for incineration.
	(e) Chemical Waste Chemicals used in production of biological and used or discarded disinfectants.	Incineration through Common Biomedical Waste Treatment Facility Operator.
	(f) 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	After resource recovery, the chemical liquid waste shall be pre-treated before mixing with other wastewater.
	(g) Discarded linen, mattresses, beddings contaminated with blood or body fluid, routine mask & gown.	Incineration through Common Biomedical Waste Treatment Facility Operator.
	(h) 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.	Disinfection at site followed by Incineration through Common Biomedical Waste Treatment Facility Operator.

CATEGORY	TYPE OF WASTE	TREATMENT AND DISPOSABLE OPTIONS
	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	Microwaving followed by handing over to Common Biomedical Waste Treatment Facility Operator.
	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.	Handing over to Common Biomedical Waste Treatment Facility Operator.
	(a) Broken or discarded and contaminated glass including medicine vials and ampoules except those contaminated with cytotoxic wastes. (b) Metallic Body Implants	

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:

(i) News paper, paper and card boxes (dry waste)
(ii) Plastic water bottles (dry waste)
(iii) Aluminium cans of soft drinks (dry waste)
(iv) Packaging materials (dry waste)
(v) Food Containers after emptying residual food (dry waste)
(vi) Organic / Bio-degradable waste - mostly food waste (wet waste)
(vii) Construction and Demolition wastes
These general wastes are further classified as dry wastes and wet wastes and shall be collected separately.

This quantity of such waste is around **85 % to 90 % of total waste** generated from the facility. Such waste is required to be handled as per Solid Waste Management Rules, 2016 and Construction & Demolition Waste Management Rules, 2016, as applicable.

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.

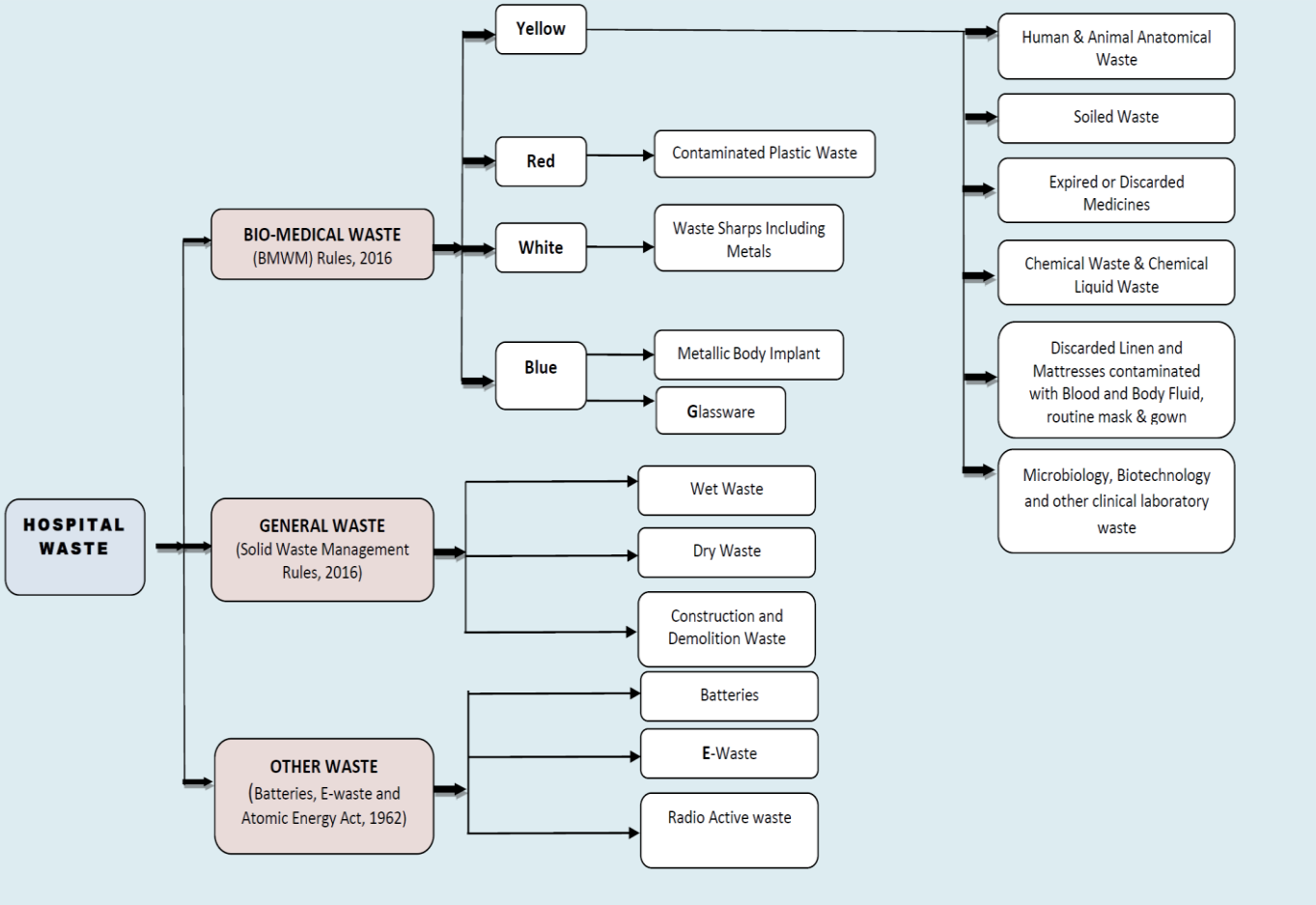


Fig.: 5.2 Categorization & Classification of Wastes in Health Care Facilities.

The process flow of biomedical waste management in AIIMS Bilaspur:

First five steps (Generation, Segregation, Collection, Central waste storage area and Final disposal) are the exclusive responsibility of Health Care Facility.

Bio Medical Waste Collection:

Bio-medical Waste is generated from different areas in the hospital, medical college, animal house, etc. Most part of biomedical waste is, however, produced in the laboratories, OTs and inpatient areas during dressings and other procedures. On an average approximately **3831 Kg** of biomedical waste is generated monthly. BMW supervisor & Designated Area In-charge maintains a daily checklist to ensure proper segregation of biomedical waste in all the hospital's generation points.

Bio Medical Waste Segregation:

This step is vital to a good biomedical waste management system. It may be defined as separating various categories of bio-medical waste, at the point of generation, into color-coded bins lined with plastic bags of appropriate color as recommended in the guidelines. Posters are displayed at the point of waste generation to guide the proper segregation of the generated biomedical waste in appropriate color-coded bins.



Fig.: 5.3 Biomedical Waste Segregation Bins in ward



Fig.: 5.4 Solid Waste Segregation Bins in ward



Fig.: 5.5 Posters of BMW displayed at site of segregation



Fig.: 5.6 Posters of Solid waste displayed at site of segregation

Bio Medical Waste Collection:

The biomedical waste generated in different areas is collected by trained personnel employed by an outsourced agency selected by the institute. The waste is collected on a daily basis (twice daily) depending on the pre-planned collection schedule from various collection points. No waste is allowed to be kept in the institute premises for more than 48 hours. The waste is collected in the color-coded bags, loaded on to the dedicated and covered trolleys and transported to the Central waste storage area.



Fig.: 5.7 Bio-medical waste Transportation Trolley Trolley Used in AIIMS Bilaspur



Fig.: 5.8 General Waste Transportation Used in AIIMS Bilaspur

Central waste storage area

The biomedical wastes collected from different areas are brought in to a common point where they are stored temporarily till it is handed over to the authorized common biomedical waste treatment facility selected by the institute. The Central waste storage area in the hospital is located behind the AYUSH building near Helipad area.



Fig.: 5.9 Central waste storage area

Final disposal

The biomedical waste collected is finally disposed of in covered vehicles of the designated common biomedical waste treatment facility operator selected by the institute. Before handing over, barcode labels are generated by logging in to the website of the common biomedical waste treatment facility operator. These barcode labels are stuck on the bags and weight of the bags is taken. The barcode label is scanned by logging into the mobile app designed by the common biomedical waste treatment facility operator. The record of the number of bags generated and the weight of the individual bags is maintained in the proper registers and finally the bags are transported in the covered vehicle of the common biomedical waste treatment facility operator.

Instructions for Biomedical waste handlers:

- All HCWs involved in the handling of biomedical waste are immunized against Hepatitis B and Tetanus.
- Occupational safety of all handlers of bio-medical waste is ensured by providing appropriate and adequate PPE.
- Health check-up of all HCWs involved in handling biomedical waste is conducted at the time of induction and at least once a year.

Maintenance of Records:

- A register is maintained for daily recording of the category-wise quantity of biomedical waste generated and handed over from the institute.
- Records related to the generation, collection, storage, transportation, treatment, disposal, or any other form of handling of biomedical waste must be maintained for a period of 5 years.
- All records must be available for inspection and verification by the prescribed authority or the Ministry of Environment, Forest and Climate Change at any time.
- The annual report of Bio-medical waste is uploaded to the institute website in the prescribed format.

Reporting of Accidents:

Any major accident at any institution or facility or any other site while handling biomedical waste must be intimated immediately to the prescribed authority and a report forwarded within 24 hours in writing regarding the remedial steps taken in Form I of the Biomedical Waste Management Rules 2016. The annual report shall provide information on all other accidents and remedial steps.

REFERENCES

- Bio Medical Waste Management Rules, 2016, as amended
- Guidelines for Barcode system for Effective Management of Bio-medical waste.
- Solid Waste Management Rules, 2016

Chapter - 06

Control of Environment for Infection Control & Prevention

Definitions:

Sterilization	• Process by which all living microorganisms, including viable spores, are either destroyed or removed from an article, body surface or medium. • It results in reduction of 106 log colony forming units of microorganisms and their spores. • It can be achieved by physical or a chemical method.
Disinfection	• It refers to a process that destroys or removes most of the pathogenic organisms except bacterial spores. • It leads to reduction of at least 103 log colony forming units of microorganisms, but not spores. • The primary goal in disinfection is to destroy potential pathogen, but it also substantially reduces the total microbial population.
Asepsis	• Asepsis is a condition in which no living disease causing microorganisms are present. • It prevents entry of the pathogens into sterile tissues and thus prevent infection or sepsis. • They are generally not as toxic as disinfectants as they must not destroy too much of host tissue.
Decontamination	• It refers to reduction of pathogenic microbial population to a level at which items are considered as safe to handle without protective attire. • It results in reduction of at least 1 log colony forming units of most microorganisms but not spores.

Classification of Patient Care Items & Equipment (Spaulding's Classification)

Earle H. Spaulding devised a rational approach to classify the patient-care items and equipment into four categories (refer table below) according to the degree of infection involved in use of the items.

Medical Device	Definition	Example	Recommended sterilization/ disinfection method
Critical device	Items that are involved with a break in the skin or mucous membrane or entering a sterile body cavity.	Surgical instruments, cardiac catheters, implants, eye & dental instruments, invasive rigid endoscopes, ultrasound probes used in sterile body cavity.	Physical sterilization Chemical sterilization.
Semi-critical device	Comes in contact with the mucous membranes or body fluids.	Respiratory therapy equipment, anesthesia equipment, non-invasive fitting Endoscopes, Laryngoscopes, rectal/vaginal/esophageal probes, cystoscopes, diaphragm fitting ring etc.	High level disinfection.
Non-critical device	Comes in contact with intact skin	Non-critical patient items: BP cuff, ECG electrodes, Bed pans, crutches, stethoscopes, thermometer etc. Non-critical environmental surfaces of medical equipment,	Low level disinfection.

		computers, bed rails, food utensils, bedside table, patient furniture and floors.	

Properties of an ideal disinfectant (Reference CDC):

- Broad spectrum: It should have a wide antimicrobial spectrum.
- Fast acting: It should produce a rapid kill.
- Not affected by environmental factors which means it should be active in the presence of organic matter (e.g., blood, sputum, feces, or any other body fluids)

Compatible with soaps, detergents, and other chemicals encountered in use.

- Non-toxic: It should not be harmful to the user or patient.
- Surface compatibility: It should not corrode instruments and metallic surfaces and should not cause the deterioration of cloth, rubber, plastics, and other materials
- Residual effect on treated surfaces: It should leave an antimicrobial film on the treated surface
- Easy to use with clear label directions.
- Odorless: It should have a pleasant odor or no odor to facilitate its routine use
- Economical: It must be in expensive and acceptable.
- Solubility: It should be soluble in water.
- Stability: It should be stable in concentrate and use-dilution.
- Cleaner: It should have good cleaning properties.
- Environment friendly: It should not damage the environment on its disposal.

Chemical Disinfectant – level of disinfection achieved

Agent	Chemical
High Level Disinfectant	• Aldehydes (glutaraldehyde, OPA) • Glutaraldehyde + Benzalkonium Chloride • Hydrogen Peroxide 11% W/V With 0.01%W/V Diluted Silver Nitrate Solution • H2O2 and Par-acetic acid.
Intermediate level Disinfectants	• Alcohol – ethyl alcohol and isopropyl alcohol • Phenolics – Phenol (carbolic acid) , cresol, Lysol (Commercially made of a mixture of phenolics) • Halogens – iodine and chlorine • D-125 (Quaternary ammonium compound QACs, 3rd and higher generations only)
Low level disinfectant	• Chlorhexidine

Table of Efficacy of disinfectants on microbes:

Level of disinfectant	Microbial Action				
	Bacterial spores	**Tubercle bacilli**	**Non enveloped viruses**	**Fungi**	**Enveloped viruses or vegetative bacteria**
Low level disinfectant	No	No	No	+/-	Yes
Intermediate level disinfectant	No	Yes	Yes	Yes	Yes
High level disinfectant	May be	Yes	Yes	Yes	Yes
Chemical sterilant	Yes	Yes	Yes	Yes	Yes

The decreasing order of resistance of microorganisms to disinfectant or sterilizing agents is as follows–

Prions **(**highest resistance) > Bacterial spores >Cryptosporidium oocysts > Mycobacteria >> Small non- enveloped viruses (polio) > Fungi >vegetative bacteria > Enveloped /medium to large-size viruses (HIV, HBV, herpes).

Common disinfectants and their spectrum of action.

Germicide & their concentrations	Level of disinfectant	Bacteria & enveloped viruses	Fungi	Un-enveloped viruses	M. tuberculosis	Spore	Inactivated by organic matter
Glutaraldehyde (2%)	High/CS	+	+	+	+	+	-
Formaldehyde (3-8%)	High/C S	+	+	+	+	+	-
H2O2 (3-25%)	High/C S	+	+	+	+	+	+/-
Chlorine (100 - 1000 ppm of free chlorine)	High	+	+	+	+	+ /-	+
Isopropyl alcohol (60-95%)	Intermediate	+	+	+/-	+	-	+/-
Phenol (0.45%)	Intermediate	+	+	+/-	+	-	-
Iodophor (30-50ppm of free iodine)	Intermediate	+	+	+	+ /-	-	+
Quaternary ammonium compounds (0.4-1.6%)	Low	+	+ /-	-	-	-	+

Please note: CS- Chemical Sterilant, + effectively kills, - Unable to kill, +/- variably kills, ppm-parts per million.

Composition of available Disinfectant in AIIMS Bilaspur

(For Information only)

*(This doesn't mean the promotion of products/Brand/Company)

1.) Bacillol® 25 (Aldehyde free)



Fig.: 6.1 Bacillol Solution

Composition: Each 100gms contain

Ethanol (10gms),

2-Propanol (9gms),

1-Propanol (6gms).

- **Use**: Alcohol-based, aldehyde-free, ready-to-use surface and equipment disinfectant for non-critical medical devices and environmental surfaces
- For medical equipment that comes under the medical device directive (acc. To MDD) and instant disinfection of high touch surface areas.
- Medical equipment (monitors, ventilators, imaging devices, dialysis machines, etc.)

- OT tables, lights, trolleys etc.

Method of Use: Ready-to-use Spray or wipe directly onto the cleaned surface ensuring complete wetting. Allow to air dry; do not wipe immediately.

Rapid disinfection of hard surfaces: **concentrated 30 seconds exposure time**.

Precautions:

- Flammable – keep away from heat, sparks, and open flames.
- Do not spray on hot surfaces.
- Ensure adequate ventilation after application.
- Store at room temperature.

2.) Glutaraldehyde Solution 2.45%



Fig.: 6.2 Glutaraldehyde Solution 2.45 %

Composition:

- Glutaraldehyde – 2.45% w/v

- Aqueous base – q.s.

Composition of Activator

- Potassium Nitrite 1.9% w/v

*** Intended Use**: High-Level Disinfectant (HLD) for heat-sensitive reusable medical devices.

Indications

Recommended for high-level disinfection of:

- Flexible endoscopes
- Respiratory therapy equipment
- Anaesthesia equipment
- Surgical and diagnostic instruments compatible with glutaraldehyde
- Other heat-sensitive reusable medical devices.

Method of Activation (Manufacturer's Instructions)

- Supplied as a 5 L Glutaraldehyde Solution with a 200 mL Activator Solution.
- Add the entire 200 mL activator to the 5 L glutaraldehyde solution and mix thoroughly.
- The solution changes colour after activation, indicating it is ready for use.
- Record the date of activation and expiry date on the container.

For activation of smaller quantities:

- 25 mL activator for every 500 mL of glutaraldehyde solution

Instructions for Use:

- Activate the glutaraldehyde solution by adding the activator.
- Clean instruments thoroughly with an instrument cleaning solution and rinse with clean water before immersion in activated glutaraldehyde.
- Ensure complete immersion of all instrument surfaces, including lumens and channels, in the activated solution.
- Maintain the recommended contact time to achieve high-level disinfection.
- After disinfection, rinse instruments thoroughly with sterile water and dry before use.
- Record the Date of Activation and Expiry Date on the container.

Shelf Life After Activation:

- Activated solution shelf life: 14–28 days (as per the manufacturer's instructions)
- Discard the solution earlier if it becomes visibly contaminated or fails the minimum effective concentration test.

Recommended Contact Time:

DEGREE OF DECONTAMINATION	DILUTION	Immersion Time
Emergency disinfection	2% - 2.45%	15- 20mins
HBV	2% - 2.45%	30mins
Total Sterilization	2% - 2.45%	10 hours

or (as per the manufacturer's instructions).

Precautions:

- Wear appropriate PPE (gloves, eye protection, mask/respirator if required).
- Avoid contact with eyes.
- In case of eye exposure, rinse immediately with plenty of water and seek medical advice.
- Keep the container tightly closed after use.

3.) Ortho-pthalaldehyde Solution 0.55% (OPA-5 litres)



Fig.: 6.3 Ortho-pthalaldehyde Solution 0.55%

Composition

* Ortho-Phthalaldehyde:0.55% w/v.

Indication

OPA is a ready-to-use High-Level Disinfectant (HLD) intended for reprocessing heat-sensitive, reusable semi-critical medical devices, including:

- Flexible endoscopes
- Bronchoscopes
- Laryngoscopes
- Anaesthesia equipment
- Respiratory therapy equipment
- Other compatible reusable medical instruments

Preparation

- Ready-to-use solution.
- No activation or dilution is required.

Instructions for Use

- Thoroughly clean instruments using an enzymatic/instrument cleaning solution before disinfection.
- Rinse instruments with clean water to remove all residues.
- Completely immerse the instrument, including all lumens and channels, in OPA solution.
- Ensure complete contact of the solution with all instrument surfaces.
- Maintain the recommended contact time.
- Following disinfection, rinse instruments thoroughly with sterile water.
- Dry the instrument before storage or reuse.

Recommended Contact Time

- High-Level Disinfection: 12 minutes at 20°C (Manual reprocessing) or (as per the manufacturer's instructions).

Shelf Life

Solution shelf life: 14 days or (as per the manufacturer's instructions).

Precautions

- Avoid direct contact with eyes, skin and clothing.
- Wear appropriate PPE (gloves, eye protection, mask/respirator if required)
- Do not mix with other disinfectants or chemicals.
- Keep container tightly closed when not in use.

4.) SODIUM HYPOCHLORITE SOLUTION



Fig.: 6.4 Sodium Hypochlorite Solution

Composition

Sodium Hypochlorite Solution (Available Chlorine 5%, 10%, 12.8%).

Preparation of Working Solutions

Calculation of Hypochlorite solution
हाइपोक्लोराइट □□□ की गणना

Available concentration उपलब्ध सांद्रता	Needed concentration सांद्रता की आवश्यकता	Total amount कुल मात्रा	Hypochlorite part हाइपोक्लोराइट भाग	Water part पानी का हिस्सा
5%	0.05%	100ml	1ml	99ml
	0.5 %	100ml	10ml	90ml
	1%	100ml	20ml	80ml

10 %	0.05%	100ml	0.5ml	99.5ml
	0.5 %	100ml	5ml	95ml
	1%	100ml	10ml	90ml
12.8 %	0.05%	100ml	0.4ml	99.6ml
	0.5 %	100ml	4ml	96ml
	1%	100ml	8ml	92ml

FORMULA फार्मूला :
A= D X Q / H
A= Amount of disinfectant कीटाणुनाशक की मात्रा
D= Desired strength आवश्यक मात्रा
H= Strength in hand **उपलब्ध** मात्रा
Q= Quantity मात्रा

Note- refer to manufacturer details also.
नोट- निर्माता विवरण भी देखें

EXAMPLE उदाहरण

D= 1%

H= 10%

Q= 1000ML

A= D X Q / H
1X 1000 /10 = 100ML

Hypochlorite solution **100ML** + Water **900ML** = 1 % Hypochlorite solution

Key points:

- Organic matter should be removed before disinfection.
- Prepare fresh daily.
- Label with:
  - Date & Time
  - Concentration
  - Prepared by
- Discard unused solution after 24 hours.
- **Contact time**:10 minutes

Hospital Uses According to National IPC Guidelines

- Spill management

- For disinfection of selected patient care equipment (non-metallic) such as suction jars, Mop cleaning etc.

Precautions

- Corrosive to metals
- Inactivated by organic material; for blood spills, blood should be removed prior to disinfection
- Do not use to disinfect surgical instruments
- Must be stored in closed containers away from ultraviolet light and heat to prevent deterioration

5) Hydrogen Peroxide 11 % w/v & Silver Nitrate 0.01 % w/v Disinfectant

Type: Surface disinfectant / environmental disinfectant / aerial fogging for high-level disinfection



Fig.6.5 Hydrogen Peroxide & Silver Nitrate Disinfectant

Active ingredients:

- Hydrogen Peroxide IP – 11% w/v
- Silver Nitrate IP – 0.01% w/v
- Purified water – q.s.

Precautions

- Corrosive to metals
- Inactivated by organic material; for blood spills, blood should be removed prior to disinfection
- Do not use to disinfect surgical instruments
- Must be stored in closed containers away from ultraviolet light and heat to prevent deterioration

Dilution and method of use:

A. Surface disinfection – 5% v/v

50 mL FEELPURE + 950 mL DM water = 1 litre of 5% working solution.

Final volume	Feelpure	water
1 L	50 mL	950 mL
5 L	250 mL	4.75 L
10 L	500 mL	9.5 L

Method:

- Clean the surface first if visibly soiled.
- Prepare the required dilution as specified.
- Apply by the approved method—mop/wipe/spray.
- Ensure complete wetting of the surface.
- Allow the surface to dry.

B. Aerial fogging – 20% v/v

200 mL FEELPURE + 800 mL DM water = 1 litre of 20% working solution.

Final volume	Feelpure	water
1 L	200 mL	800 mL
5 L	1 L	4 L
10 L	2 L	8 L

Fogging should be performed only when specifically indicated.
(Detailed fogging protocol in next chapter)

Other solutions available in AIIMS Bilaspur:

1.) Boric acid +Chlorine 400ml (EUSOL)
2.) Chlorhexidine Gluconate 0.3% + Cetrimide 0.6% (Savlon) (1 litres)
3.) Formaldehyde /Formalin (5litres)
4.) Povidine Iodine 5% ,10%, 7.5%- scrub (500 ml)
5.) Surgical spirit -70% Ethyl alcohol solution (1000ml)

Disposal:

Dispose of Every used disinfectant solution, only at the designated ETP points available in each area of AIIMS Bilaspur, in accordance with institutional Biomedical Waste Management and ETP guidelines.

Cleaning & Disinfection of Hospital Environment

Introduction:

All healthcare environments should pose minimal risk to patients, staff and visitors. However, different functional areas represent different degrees of risk and, therefore, require different cleaning frequencies, and levels of monitoring and evaluation.

Health care organisations are complex environments that contain a large diversity of microbial flora, many of which may constitute a risk to the patients, staff and visitors in the environment. Transmission of microorganisms within a health care organisation is complicated and very different from transmission outside health care settings; and hence the consequences of transmission may be more severe. High-touch environmental surfaces of the health care organisation hold a greater risk due to the nature of activity performed in the health care organisation and the transient behaviour of employees, patients and visitors within the health care organisation, which increases the likelihood of direct and indirect contact with contaminated surfaces.

Patients shed microorganisms into the health care environment, particularly if they are coughing, sneezing or having diarrhoea. Bacteria and viruses may survive for weeks or months on dry surfaces in the environment of the patient (the space around a patient that may be touched by the patient and may also be touched by the health care provider).

Keywords-

Cleaning: Removal of visible soil (e.g., organic and inorganic material) from objects and surfaces is normally accomplished manually or mechanically using water with detergents or enzymatic products.

Contact time: Time a disinfectant is in direct contact with the surface or items to be disinfected.

Fogging: The spraying or fogging of chemicals as a way to decontaminate environmental surfaces or disinfect the air in patient rooms.

Categorization of Hospital areas according to risk

High risk area: Consistently high cleaning standards must be maintained in these areas. Required outcomes will only be achieved through intensive and frequent cleaning.

Moderate risk area: Outcomes in these areas should be maintained by regular and frequent cleaning with ‘spot cleaning’ in-between.

Low risk area: In these areas, high standards are required for aesthetic and to a lesser extent, hygiene reasons. Outcomes should be maintained by regular and frequent cleaning with ‘spot cleaning’ in-between.

Classification of Housekeeping areas:

High Risk Areas	Moderate Risk Areas	Low Risk Areas
Operations theatre units including recovery area- Major & Minor	Medical and allied wards	Departmental areas/ Office areas
Intensive care units/ Cardiac care units/ Neonatal ICU etc.	Laboratory areas	Outpatient department
High dependency units	Blood bank	Non sterile supply areas
Trauma & Emergency department	Pharmacies	Libraries
Labour room	Dietary services	Meeting rooms
Post operative units	Laundry services	Medical records section
Surgical wards	Mortuary	Stores section
Central sterile supply department (CSSD)/ Theatre sterile supply units	Nursing officer/ Doctors' duty rooms	Manifold services/ room
Radiation treatment areas	Rehabilitation areas	Telephone rooms, electrical, mechanical, external surroundings
Chemotherapy ward/ room	Psychiatric wards	Staff areas
Renal dialysis facility	ART centre	
Burn unit	Integrated counselling and testing centre (ICTC)	
Isolation wards/ rooms and attached internal areas like bathrooms/ toilets	DOTS centre	

Environmental surface can be further divided into:

Low touch surfaces	High touch surfaces
Floor, ceiling, mirrors, window sills, walls.	Doorknobs, bedrails, light switches, elevator buttons, telephone, call bells, computer keyboards, monitors, hemodialysis machines, edges of privacy curtains, wall areas around the toilet in the patient's room.

- In general, high touch areas required more frequent and intensive cleaning (**once in two hours**) as compared to low touch areas.

Cleaning and disinfection frequency and level be followed in various areas of the hospital (A- Z list):

Location	Risk Classification	Routine cleaning frequency	Additional cleaning	Disinfection level required
All ICUs	High risk	At least thrice a day at fixed times	Yes	High
Burn ward	Medium risk	At least twice a day at fixed times	As required	High
CSSD	Medium risk	At least twice a day at fixed times	As required	High
Echocardiography (No patients with respiratory infection)	Low risk	At least twice a day at fixed times	As required	Only cleaning/ low level disinfection
General public areas	Low risk	At least twice a day at fixed times	As required	Only cleaning/ low level disinfection
General ward	Medium risk	At least twice a day at fixed times	As required	High
Hemodialysis unit	High risk	At times twice a day at fixed times	Yes	High
Laboratory	Medium risk	At least twice a day at fixed times	As required	High
Labour room	High risk	At times twice a day at fixed times	Yes	High
Offices	Low risk	At least twice a day at fixed times	As required	Only cleaning/ low level disinfection
Operation theatre	High risk	Start of the day Between cases End of the list Deep cleaning	Yes	High
Patient rooms (Patient not on isolation precaution)	Low risk	At least twice a day at fixed times	As required	Low
Patient rooms (Patient on isolation precaution)	Medium risk	At least twice a day at fixed times	Yes	High
Pharmacy	Low risk	At least twice a day at fixed times	As required	Low

Physiotherapy	Low risk	At least twice a day at fixed times	As required	Low
Procedure rooms	High risk	At least twice a day at fixed times	Yes	High
Radiology	Low risk	At least twice a day at fixed times	As required	Only cleaning/ low level disinfection
Reception area	Low risk	At least twice a day at fixed times	As required	Only cleaning/ low level disinfection
Respiratory therapy room/ area	High risk	At least twice a day at fixed times	Yes	High
Soiled linen collection area	Medium risk	At least twice a day at fixed times	As required	High
Trauma & Emergency area	High risk	At least twice a day at fixed times	Yes	High

Housekeeping policy for routine and scheduled cleaning of commonly used patient care item in hospital (A – Z list):

Area/ Surface/ Item	**Area wise frequency of cleaning**		
	High risk	**Moderate risk**	**Low risk**
Bed	Clean frame daily, Clean underneath weekly, Clean on discharge	Clean frame daily, Clean underneath weekly, Clean on discharge	N/A
Bed rails, bed side tables, lockers, surface in patient room	Clean daily and After discharge	Clean daily and After discharge	N/A
Chair	Clean twice daily	Clean daily	Clean weekly
Chapples	Wash once daily and dry	N/A	N/A
Commodes	Twice daily	Twice daily	Daily
Curtains/ Blinds with MDRO pt. (charge upon discharge) for all areas	Bed curtains-change or clean monthly	Bed curtains-change or clean 3 monthly	Bed curtains-change or clean Annually
Doormat	Weekly/ whenever it gets fully wet	Weekly/ whenever it gets fully wet	Weekly/ whenever it gets fully wet
Door knob/handle/fridge handle/general	Clean daily	Clean daily	Clean weekly
Elevators	Damp cleaning daily	Damp cleaning daily	Damp cleaning daily

Drip/intravenous stands	Clean contact points after use	Clean contact points after use	Clean contact points after use
Fan	Clean weekly	Clean weekly	Clean weekly
Floor, non-slip	Damp mop thrice daily	Damp mop twice daily	Damp mop daily
Floor, polished	Dust removes by dry mop, thrice daily.	Dust removes by dry mop, twice daily.	Dust removes by dry mop, daily.
Fridge(drug)	Clean weekly	Clean weekly	Clean weekly
Light switch	Clean daily	Clean weekly	Clean weekly
Mattress Preferable covered by rexin (every 6 months: check for durability, sagging)	Clean weekly and after discharge	Clean weekly and after discharge	Clean weekly and after discharge
Case sheet folder	Clean daily	Clean weekly	Clean weekly
Pillow (water proof cover)	Clean twice monthly and after discharge	Clean twice monthly and after discharge	Clean twice monthly and after discharge
Rubber sheet	Change when soiled and between patients and dry in sun light if reuseable.	Change when soiled and between patients and dry in sun light if reuseable.	Change when soiled and between patients and dry in sun light if reuseable.
Sink (hand washing)	2 hourly	Clean every shift	Clean daily
Telephone	Clean twice daily	Clean twice daily	Clean weekly
Toilet	Clean thrice daily	Clean thrice daily	Clean daily OPD- Frequent cleaning
Trolley dressing	Clean before and after use	Clean before and after use	Clean before and after use
TV	Clean weekly	Clean weekly	Clean weekly
Walls/window/door	Spot clean and regular cleaning once a month. ICU glass doors: Daily once.	Spot clean and regular cleaning once a month.	Spot clean and regular cleaning once a month.
Waste receptacle	Clean weekly and spot clean as required.	Clean weekly and spot clean as required.	Clean weekly and spot clean as required.
Wheel chair	Clean daily and after use	Clean weekly and after use	Clean weekly and after use

General Instruction for cleaning of Housekeeping Surfaces: General patient area include:

Three types of cleaning are required for these areas:

- Routine cleaning/ Concurrent cleaning
- Scheduled cleaning
- Terminal cleaning

Before Cleaning:

- Check for additional precaution and follow precaution as indicated like wearing PPEs, disconnection of electrical wires, switching off the equipment and placing the accessories carefully before cleaning.
- Follow the manufacturer's instruction for proper dilution and contact time for cleaning and disinfecting solutions.
- Gather materials required for cleaning before entering the room. (cleaning and disinfection solutions like 3-bucket, mops, brush, wiper, measuring cup).
- Wash your hand with soap and water before the cleaning procedure.

During Cleaning:

- Wear appropriate PPE (cap, mask, heavy duty gloves, reusable plastic apron, eye protection, shoes etc. if necessary).
- Progress from the least soiled area (low-touch) to the most soiled areas (high-touch) and from high surfaces to low surfaces.
- Remove gross soil (visible to naked eye) prior to cleaning and disinfection.
- If any needle or sharps are found on the floor, collect carefully and discard in puncture proof container.
- Check privacy curtains for visible soiling and replace, if required.
- Clean all furnishings and horizontal surfaces in the room including chairs, window sill, television, telephone, computer keypads, over bed table etc. Lift items to clean the table.
- Use dust control mop prior to wet mop. Do not lift dust mop off the floor, use swivel motions, avoid shaking the mop for minimizing turbulence.



Fig.: 6.6 High touched surfaces

Triple bucket mopping system:



Fig.: 6.7 3-Bucket System (Wringer Trolley)

3-Bucket System (Wringer Trolley)

A triple bucket cleaning method consists of three buckets, one dedicated bucket for sanitation, a second bucket for clean rinsing, and a third bucket for dirty rinsing. The sanitation bucket provides a clean disinfectant to use for mopping, the clean rinsing bucket contains a rinse

disinfectant solution to assist in removing dirt and residual contaminants, and the dirty rinsing bucket serves as a waste bucket to wring out either excess cleanser or wastewater in-between steps.

The proper steps for using **a triple bucket** system are as follows:

1. **Clean Solution/Sanitize Bucket** – Prepare your bucket by adding the appropriate level of water and adding the recommended amount of disinfectant. Saturate your mop in the solution.
2. **Waste Bucket** – Wring the excess disinfectant solution from your mop into the second bucket – the waste bucket. Ensuring that the level of pressure is appropriate to not remove too much or too little of the solution from the mop head.
3. **Mop the Surfaces** – Apply the disinfectant to the surface with even and overlapping strokes ensuring that the appropriate amount of solution is applied to the surface.
4. **Waste Bucket** – Wring the waste water into the waste bucket for the second time.
5. **Rinse/Wash Bucket** – Rinse the mop in the third bucket, filled with the clean water or detergent water or same disinfectant solution as in the clean solution bucket with the same ratio.
6. **Waste Bucket** – Remove excess water in waste bucket by wring the mop into the waste bucket.
7. **Repeat steps 1-6 again** every time until all surfaces are mopped.

Use separate color-coded mops for different areas (like red for patient area, green for circulating area and yellow for bathroom and toilets).

Patient Care Areas	Circulating Areas
Wards, OT, ICUs and all procedure rooms.	OPDs, corridors, stairs, lift, waiting room, offices, store rooms etc.

2 Bucket System:

1. **Clean Solution Bucket** – Add/Mix your cleaning solution to the first bucket and saturate your mop in the solution.
2. **Waste Bucket** – Wring excess cleaning solution from your mop into the second bucket – the waste bucket.
3. **Mop** – Apply the solution to the surface, using your preferred method of mopping, or you can find our mopping technique guide.
4. **Waste Bucket** – Wring the waste water into the waste bucket for the second time.

Important Points:

- Use clean and dry mop for each cleaning episode.
- Mop 120 square feet before re-dipping.
- Change solution after cleaning an area of 240 square feet.
- Mopping method:

- Place 'wet floor' caution sign outside of room or area being mopped.
- Divide the area into sections (e.g. corridors may be divided into two halves, lengthwise so that one side is available for movement of traffic while the other is being cleaned).
- Immerse mop in cleaning solution and wring (squeeze) out.
- Pust mop around skirting's (floor moulding- lowest part of an interior wall) focusing on removal of soil.
- **Follow unidirectional mopping**.
- While in small spaces start from the farthest corner of the room, drag the mop toward you then push it away, working in a straight overlapping lines and keeping the head in full contact with the floor.
- Repeat until entire floor cleaned is completed.

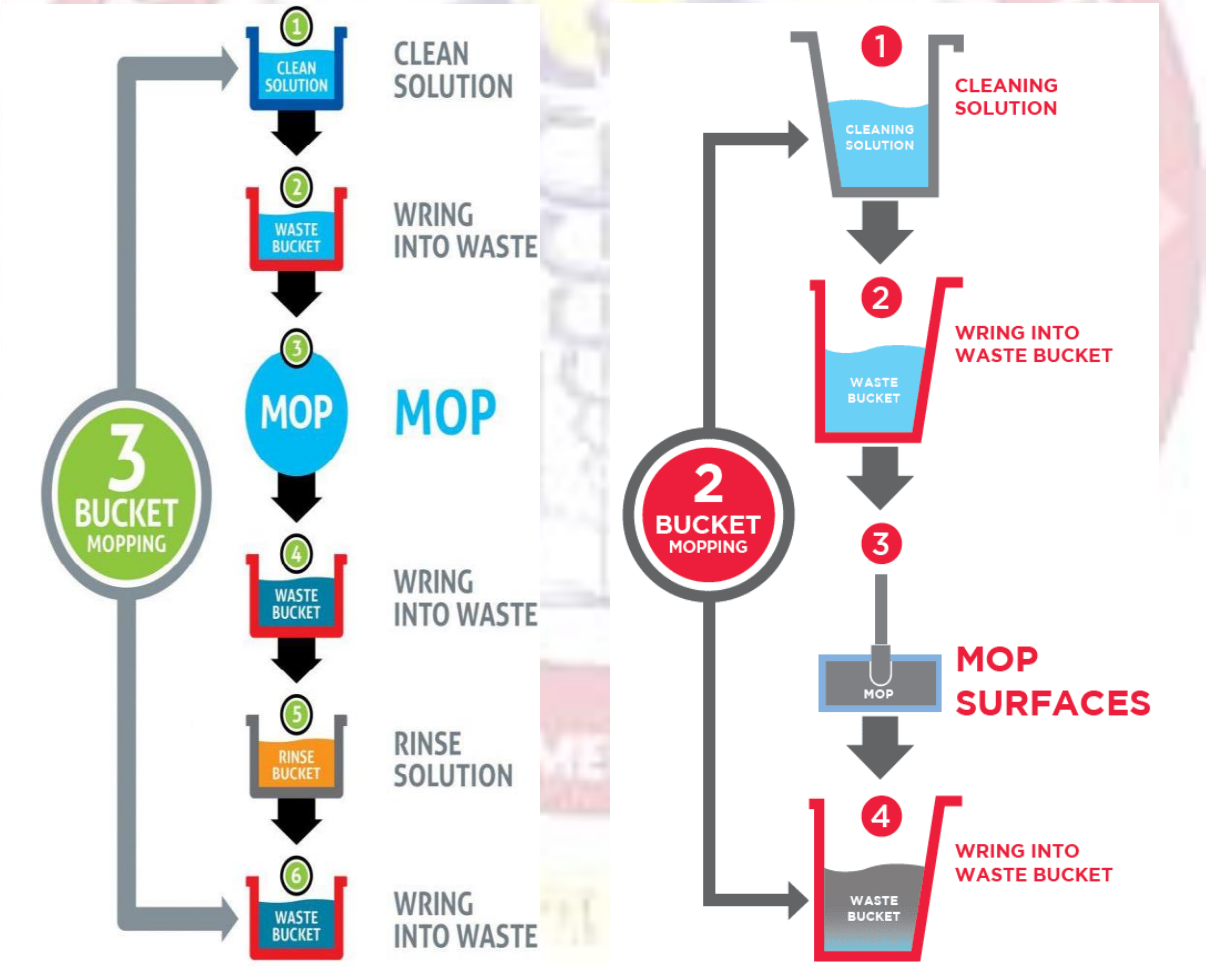


Fig.: 6.8 Steps of using 3-Bucket and 2-Bucket System

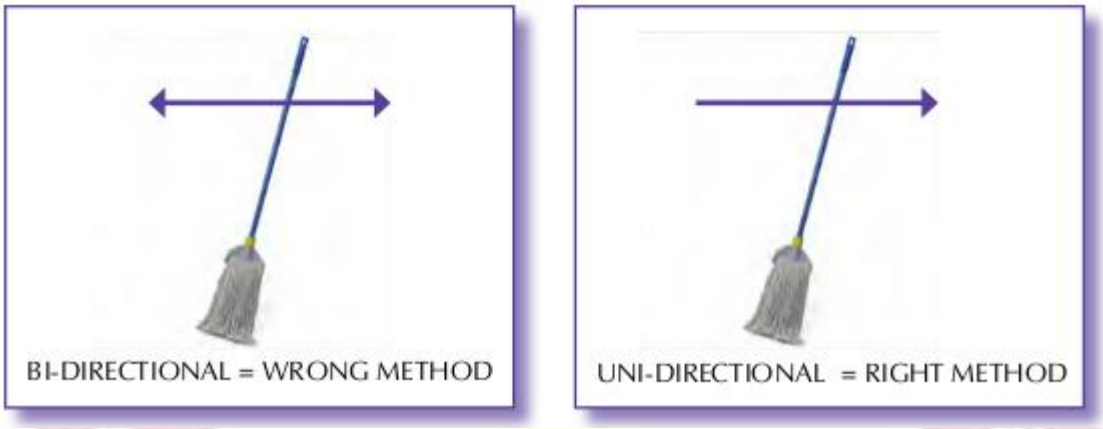


Fig.: 6.9 Method of using floor Mop

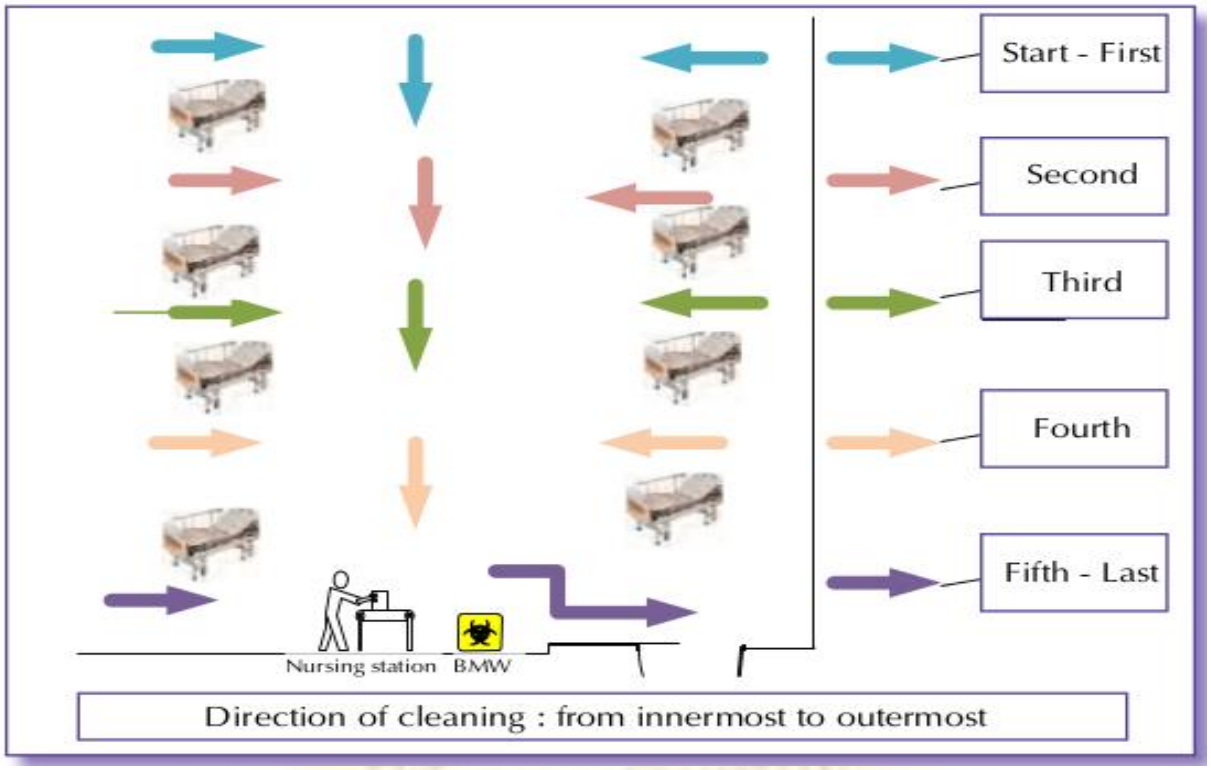


Fig.: 6.10 Direction of Cleaning

After cleaning:

- Disinfect the mop by immerse in **0.5 % hypochlorite solution for 30 minutes** and rinse with water immediately to remove all residue chlorine.

- Clean with detergent and water and dry under sunlight. Separate set of mops should be made available according to frequency of cleaning.
- **Used chemicals must be disposed of only at the designated ETP point**.
- Rinse the buckets with **0.5 % hypochlorite solution for 01 minutes** and rinse with water to remove all residue chlorine & keep it dry.

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

- High dusting using damp mop (weekly)
- Clean corners/ Mechanical cleaning (weekly).

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.

Equipment Cleaning

As per the disinfection policy all the equipment must be cleaned/disinfected. Non-critical medical equipment that is within the patient's environment and used between patients (e.g., imaging equipment, electronic monitoring equipment, Ventilators, infusion pump, wall mounted monitors etc.) requires cleaning and disinfection after each use.

- Prepare fresh disinfectant solution 20% Baccishield or Bacillol if indicated.
- Use separate dusting cloth for different areas.
- Clean from clean to dirty areas.
- When soiled, put the cloth in a separate container for disinfection followed by cleaning with soap and water and after cleaning, wash the cloth with detergent & dry it.
- Mattress to be surface cleaned & pillows to be covered with plastic covers for easy cleaning and disinfection in between patient use.
- Clean all equipment in the patient care areas including wires and accessories. **Disconnect the equipment from electricity before cleaning**.

Follow manufacturers' instructions for cleaning and maintaining medical equipment.

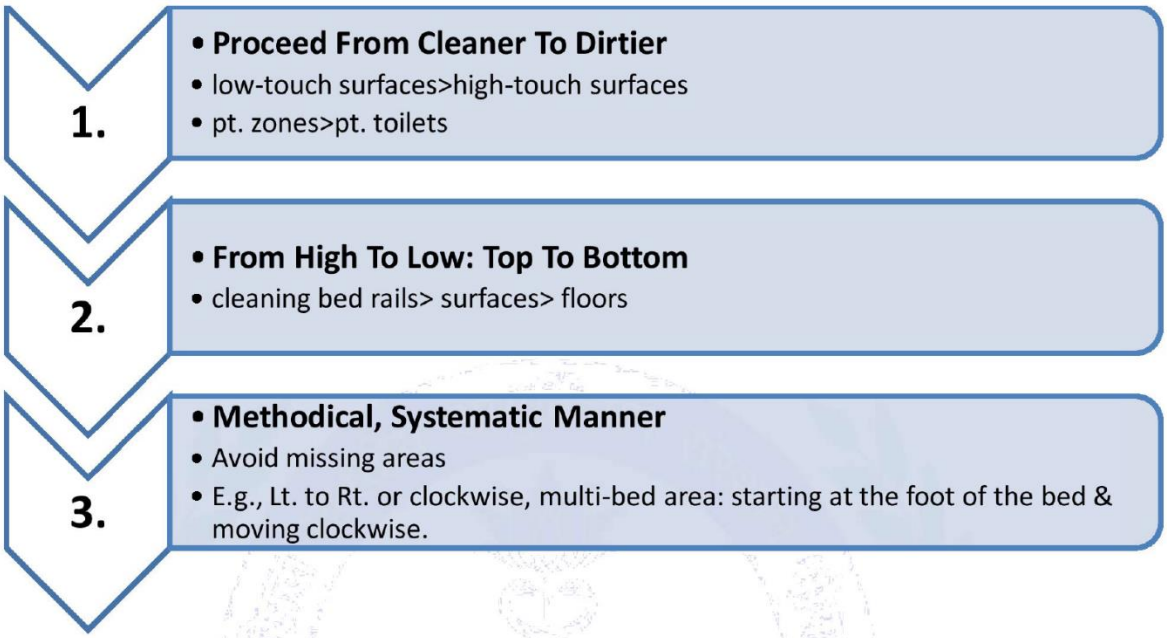


Fig.: 6.11 Equipment Cleaning Technique

Cleaning bathrooms and toilets:

- Clean from clean area to dirty area (high touch to low touch surface). Start from door handles, doors, light switches, mirror, tap, buckets and mugs, wash basin, side walls, flush handles with detergent by cloth or cleaning brush.
- Clean the commode or toilet basin with detergent and water and followed by disinfectant as indicated with toilet cleaning brush. (If soiled, decontaminate with 0.1% hypochlorite before cleaning)
- Clean the urinals, bedpan, measuring jug, after each use and each shift with detergent and Water, and followed by disinfection of the same. Keep it dry and in tilted down position.
- Clean the shelf in janitor room and toilet daily.
- Dry the floor with dry mop/ wiper.
- The doormats should be disinfected by soaking with 0.1%hypochlorite and later should be cleaned with detergent and water.

Cleaning/ Mopping General Instructions



Proceed from **cleaner to dirtier** areas to avoid spreading dirt and microorganisms. Examples include:

- During terminal cleaning, clean low-touch surfaces before high-touch surfaces.
- Clean patient areas (e.g., patient zones) before patient toilets.
- Within a specified patient room, terminal cleaning should start with **shared equipment and common surfaces**, then proceed **to surfaces and items touched during patient care** that are outside of the patient zone, and finally to **surfaces and items directly touched by the patient** inside the patient zone. In other words, high-touch surfaces outside the patient zone should be cleaned before the high-touch surfaces inside the patient zone.
- Clean general patient areas not under transmission-based precautions before those areas under transmission-based precautions.

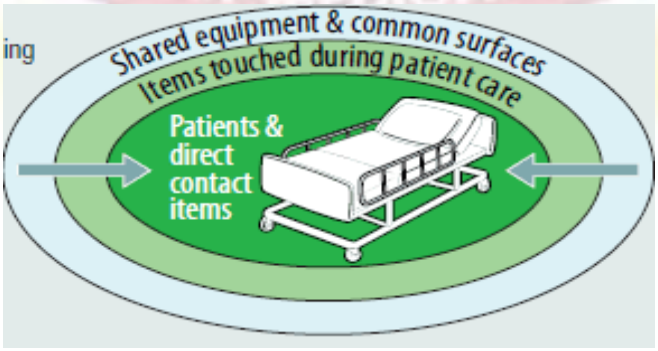


Fig.: 6.12 Direction of Cleaning

Proceeds from **High to Low (Top to Bottom)** to prevent dirt and microorganisms from dripping or falling and contaminating already cleaned areas. Examples include:

- Cleaning bed rails before bed legs.
- Cleaning environmental surfaces before cleaning floors.
- Cleaning floors last to allow collection of dirt and microorganisms that may have fallen
- Proceed in a **Methodical, Systematic Manner**:
  - Proceed in a systematic manner to avoid missing areas- for example, left to right or clockwise.
  - In a muti-bed, clean each patient zone in the same manner- for example, starting at the foot of the bed and moving clockwise.

Specialized patient areas

This vulnerable population is more prone to infection and the probability of contamination is high, making these areas higher risk than general patient areas.

Specialized patient areas include those wards or units that provide service to:

- High-dependency patients, (e.g., ICUs).
- Immunosuppressed patients (e.g., bone marrow transplant, chemotherapy).
- Patients undergoing invasive procedures (e.g., operating theatres rooms).
- Patients who are regularly exposed to blood or body fluids (e.g., labor and delivery ward, burn units).

- Ensure that there are enough cleaning cloths to complete the required cleaning session.
- Never double-dip cleaning cloths into portable containers (e.g., bottles, small buckets) used for storing environmental cleaning products (or solutions).
- Never shake mop heads and cleaning cloths—it disperses dust or droplets that could contain microorganisms.
- Never leave soiled mop heads and cleaning cloths soaking in buckets.

Floor Moping

Floors generally have low patient exposure (i.e., are low-touch surfaces) and pose a low risk for pathogen transmission. Therefore, under normal circumstances they should be cleaned daily, but the use of a disinfectant is not necessary.

This is the general mopping process:

- Use wet floor or caution signs to prevent injuries.
- Immerse the mop or floor cloth in the bucket with environmental cleaning solution and wring out.

- Mop in a figure-8 pattern with overlapping strokes, turning the mop head regularly (e.g., every 5-6 strokes).
- After cleaning a small area (e.g., 3m x 3m), immerse the mop or floor cloth in the bucket with rinse water and wring out.
- Repeat process from step 1.
- Mop from cleaner to dirtier areas.
- Mop in a systematic manner, proceeding from area farthest from the exit and working towards the exit
- Change mop heads/floor cloths and buckets of cleaning and disinfectant solutions as often as needed (e.g., when visibly soiled, after every isolation room, every 1-2 hours) and at the end of each cleaning session.
- Regardless of the risk-level of an area, spills or contamination from blood or body fluid (e.g., vomitus), must be cleaned and disinfected immediately.

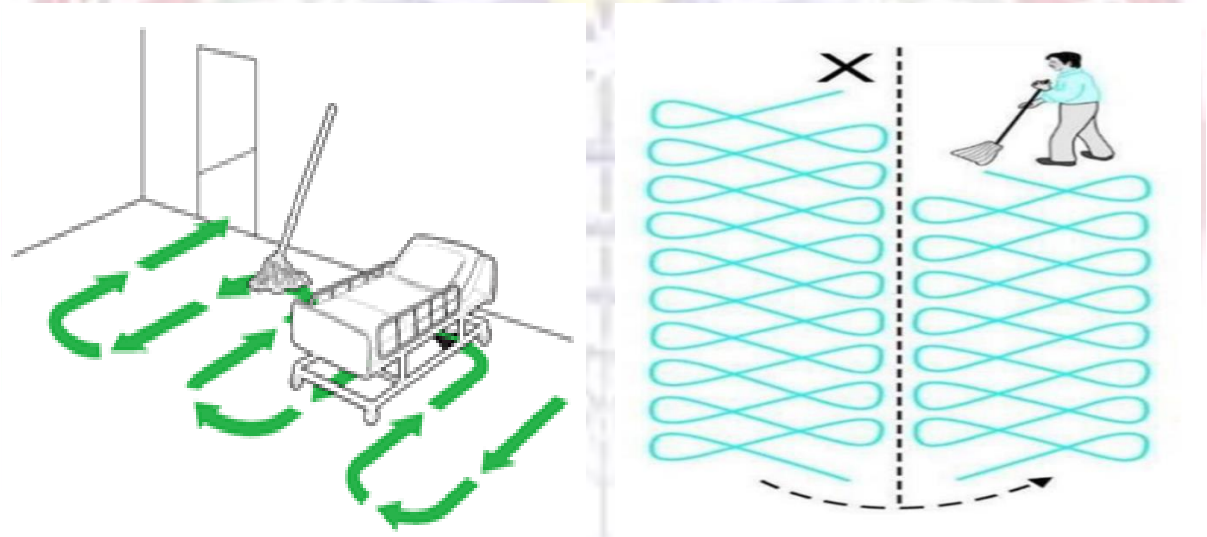


Fig.: 6.13 Floor Moping Process

Isolation Room Cleaning: Terminal Clean

Preparation and setup: Prepare equipment and material needed for the task.

- Available hospital disinfectant
- Microfiber cloths
- Microfiber mop
- Dusting mop
- Gloves
- Anti-microbial soap
- Hand sanitizer

Put on the appropriate attire and personal Protective Equipment (PPE)

- Eye protection (safety glasses, googles or face shield)
- Disposable gloves
- Disposable Gown, liquid-splash protective suit, or disposable suit.
- N95 Respirator (In case patient admitted with airborne disease).

Perform high dusting with microfiber flexible dusting wand

- Vents (supply & return)
- Light fixtures
- Sprinkler heads etc.

Preform terminal cleaning on all vertical surfaces, walls, wall mounted objects:

- Baseboards
- Light switches
- Thermostat (if present)
- Blinds (Curtains)
- Door/door frames/handles
- Vital machines
- Computers/mice/keyboards
- Dispensers
- Glove rack
- Cabinets and handles

Perform terminal cleaning on all horizontal surfaces:

- Exam bed/draws/base
- Cabinet and handles
- Countertops
- Hard surfaces
- Windows
- Wipe down chairs (non-porous)
- Mattress
- Bed frame/rails

Perform disinfecting procedure:

- Allow disinfectant to dwell, according to manufactures' instructions
- Complete the disinfecting process on all surfaces cleaned, spraying, and wiping down all areas with disinfectant spray cleaner.

Floor cleaning and disinfection:

- Put safety signs out indicating floor hazard.

- Dust mop floor, beginning in the far corner of the room away from exit.
- Damp mop floor.
- Dispose of used cloths and mops in facility-approved container.

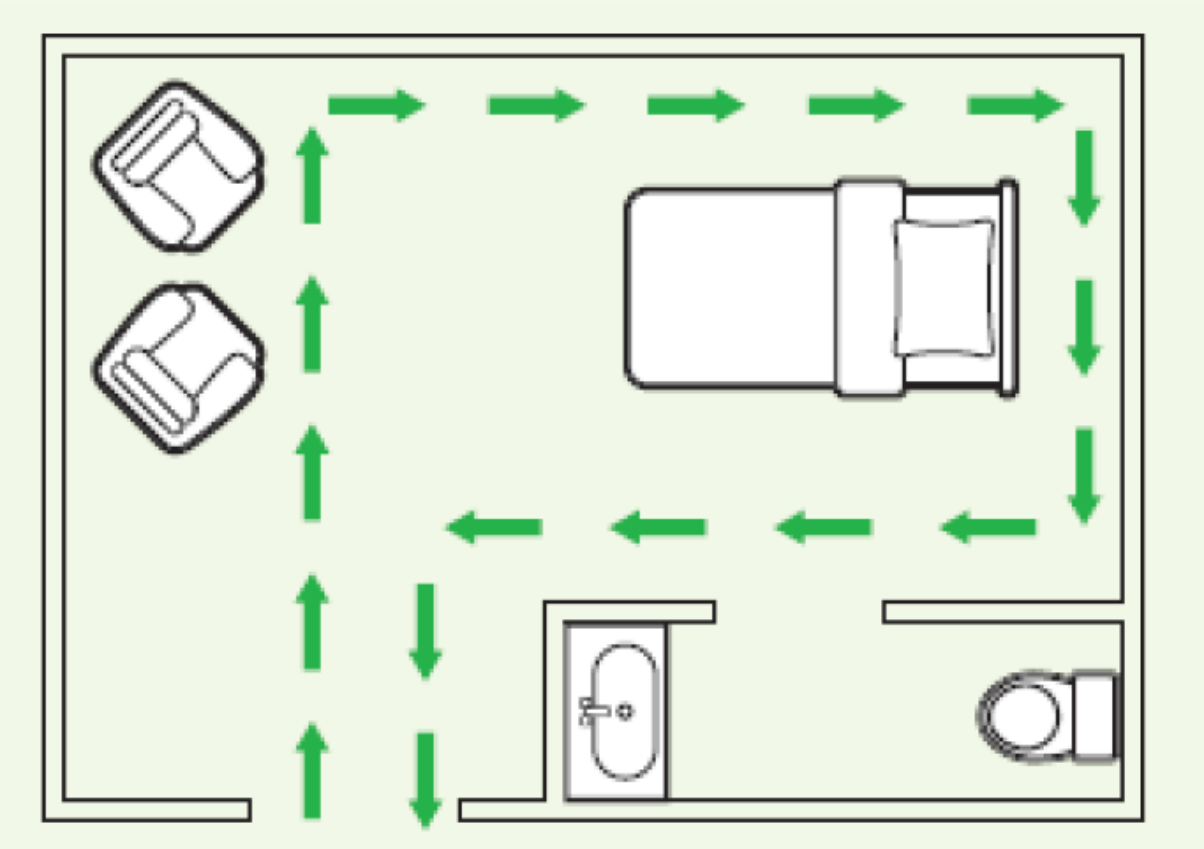


Fig.: 6.14 Floor cleaning and disinfection in Single Isolation Room

Isolation room bathroom cleaning:

- Clean the mirror using a Disposable Microfiber cloth.
- Clean the sink area, including the counter, faucet and handles, and sink basin with a clean Disposable Microfiber cloth.
- Clean other surfaces of the bathroom with a clean Disposable Microfiber cloth.
- Disinfect toilet.
- Restock consumable supplies.
- Empty and line waste containers.

Cleaning in Operation Theatres

Operating rooms are highly specialized areas with a mechanically controlled atmosphere where surgical procedures are performed. These require environmental cleaning at three distinct intervals throughout the day:

- At the beginning of the day.
- During surgery.
- Between surgery.
- At the end of the day.
- Deep cleaning should be carried out once a week/ whenever indicated.

Theatre complex should be absolutely clean; it minimizes patients and HCWs exposure to potentially infectious microorganism. Dust should not accumulate at any region in the theatre.

General points to consider:

- Standard precautions should be followed for all patients irrespective of their infection status. This will prevent the transmission of blood borne pathogens and those transmitted by contact.
- **Strict Hand hygiene to be followed.**
- Wear appropriate personal protective equipment (PPE).
- Clean bedsheets / drapes for the table should be available for each case.
- **Doors of the OT should always be kept closed and inside-out movements should be restricted. Bundling of activity should be done with preparing all the necessary arrangements prior of starting of surgery, this may decrease process of frequent door opening.**
- Restrict the number of personnel to the minimum during surgery.
- Personnel working in OT should have received vaccinations which would include TT and Hepatitis B.
- Brooms not to be used. Vacuum cleaning is ideal.
- The concentration of the stock solution of detergent and disinfectant should be known.
- The cleaning of horizontal surfaces including high hand touch surfaces should be with disinfectant mop.
- Follow manufacturers' instructions for proper use of disinfectants (or detergent) --- such as recommended use-dilution, material compatibility, storage, shelf-life, and safe use and disposal.
- The 'in-use' dilution of the disinfectant, whether for surface or for environment, should be freshly prepared for each use in a clean container on a daily basis.
- The left over should be discarded at the end of each use/day or recommended by

manufacturer.

- Allow surfaces to dry after disinfection.
- Decontaminate mop head, clean and dry cloths regularly to prevent contamination.
- For operating rooms, use fresh mop cloth every time for clinical contact surfaces.
- The floor mop should be changed weekly or whenever soiled whichever is earlier.
- Disinfectants Used: -
    - Hydrogen peroxide with silver nitrate solution i.e.-Baccishield (**For O.T disinfection** – To get 20% solution take 200ml of Baccishield and dilute it with 800ml water to make 1 litre for tiled walls, trolleys, operation tables & floors evenly.)
    - Bacillol (used for Carbolization of operation table, trolleys, equipments, O.T lights)
    - 0.1% to 1% Sodium hypochlorite **(Various concentrations for various purposes. Should not be used on epoxy floor).**

At the beginning of the day:

- Keep only essential equipment.
- Ensure color coded waste collection bags are placed in the wastebins.
- Wear appropriate personal protective equipment (PPE)–headcover, plastic full-length apron, mask, gloves in appropriate order.
- Damp wipes all horizontal 'clinical contact surfaces' using a new, clean, lint free cloth wetted with a disinfectant such as a freshly prepared solution The clinical contact surfaces include operating table, OT lights, doorhandle, medicine trolley, instrument trolley, anaesthetic trolley, monitors etc.
- Use a clean mop to wipe the floor with freshly prepared disinfectant solution Follow the sequence of cleaning as mentioned below (All flat surfaces - wipe from top to bottom, then from the Centre to outwards, disinfect the door handles/knobs.).
- Discard all used plastic items in red bag and non-plastic items in yellow bag.

Once the operating theatre is cleaned and disinfected, keep the door closed for 10-15 minutes with ventilation equipment turned on for the purpose of drying of floor.

During Surgery:

- Any major blood or body fluid spill should be immediately taken care of as per SOP for spill management.
- All instruments opened for a procedure are treated as contaminated whether used or not.

Cleaning in between surgeries:

- Damp wipes all horizontal surfaces such as operating table, trolleys, suction machine, monitors and OT lights with disinfectant solution and dry with a fresh, clean, lint free cloth.
    - High-touch areas e.g., control panels, switches, knobs, work areas, and Theatre table and horizontal surfaces in the immediate vicinity.
    - Trolleys used during surgery.
- Wet mop the area under the table and 3 feet or 1.5 meters around it with the above disinfectant.
- The sterilized trays should not be kept open at the start of the day but should be opened as and when new case arrives.
- Unwrapped items should be used on the same day.
- Collect and remove waste from the kick bucket and remove all other waste; replace all bin bags.
- Remove waste from equipment such as suction machines and clean, disinfect them, as appropriate.

Start cleaning the O.T table first and apply disinfectant, allow 15 minutes contact time, meanwhile clean the rest of the O.T to optimize workflow**.**

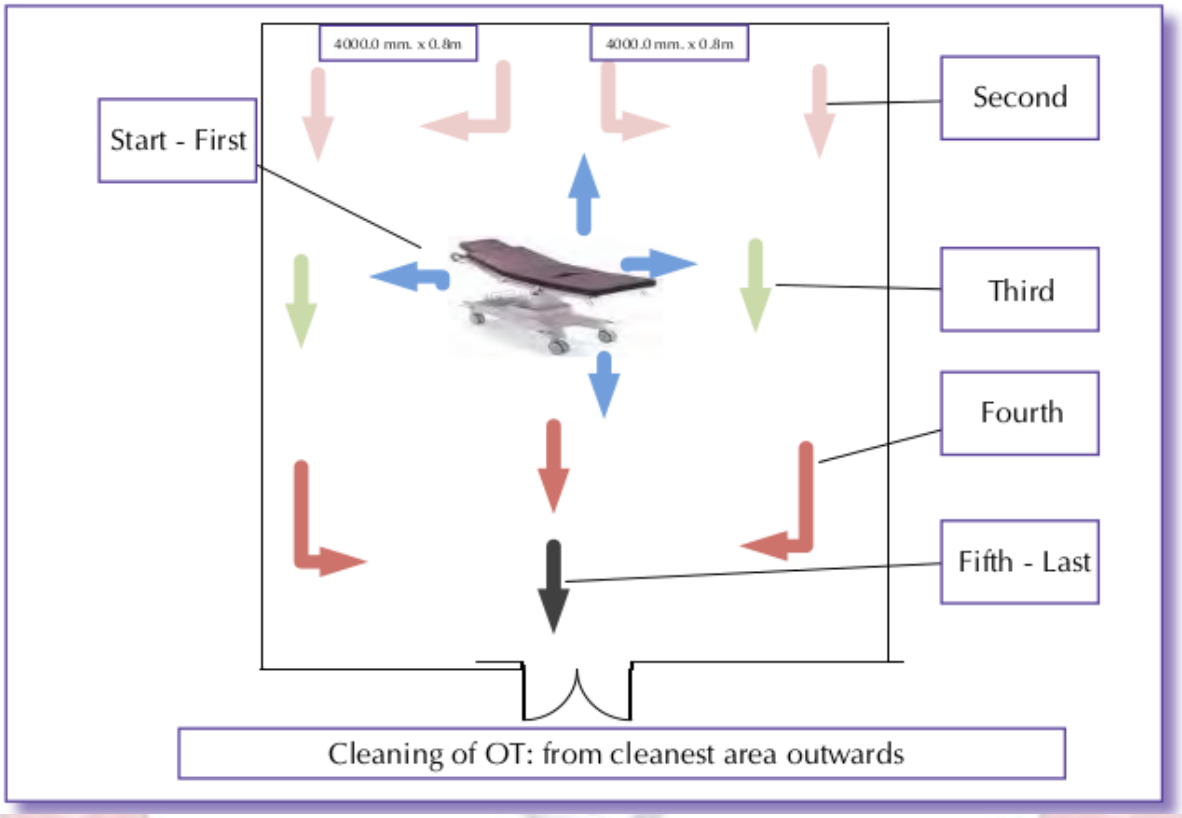


Fig.: 6.15 Direction of Cleaning in O.T



Fig.: 6.16 Cleaning of O.T.



Fig.: 6.17 Surface/Equipment Disinfection

End of the day:

- Appropriate segregation of biomedical waste to be done at the end of surgery, at point of generation by the person generating it or any team member for preventing NSI.
- Wet mop all horizontal surfaces with disinfectant.
- Clean liquid soap and hand scrub solution dispensers.
- Clean anaesthesia machines and crash carts, IV poles, and patient monitors.
- Clean all the table tops, sinks, door handles with low level disinfectant.
- Clean the floors with disinfectant.
- Keep the operation theatre dry for the next day's work.

Weekly general cleaning procedure:

- Remove all portable equipment. Clean lights and fixtures with disinfectant solution and cloth.
- Clean doors hinges and facings and rinse with solution.

- Wipe down the walls with a mop soaked in disinfectant solution.
- Scrub the floor with floor cleaning machine and disinfectant solution.
- Replace clean portable equipment, clean wheels and castors by rolling them across a towel saturated with disinfectant.
- Wash and dry all furniture and equipment including:
  - Operating room table
  - Suction holders
  - Foot and sitting stools
  - IV stands and all other stands
  - X-ray view boxes
  - All tables
  - Tubing to oxygen tanks
  - Waste containers and buckets
- Clean the air-conditioning grills.
- Empty all shelves, wipe with disinfectant and dry them before replacing the supplies.

Spill Management

Spill management is the planned and standardized procedure for the immediate identification, containment, cleaning, disinfection, and safe disposal of accidental spills of blood, body fluids, chemicals, or other potentially hazardous materials within the hospital, in order to prevent infection transmission, occupational exposure, environmental contamination, and ensure patient, staff, and visitor safety.

Type of Spills:

1. Based on Material:
    - Body fluid spill: Blood, urine, vomitus, faeces, sputum.
    - Chemical spill: Laboratory chemicals, disinfectants.
2. Based on Quantity:
    - Small spill: < 10 ml
    - Large spill: > 10 ml

Spill Kit Contents:

1. **Personal Protective Equipment (PPE):**
    - Plastic Apron- 1
    - Gloves- 2
    - Face Mask- 2
    - Goggles- 1
    - Head cover & shoe cover- 2
2. **Absorbent Material:**
    - Old cloth / newspaper
    - Blotting paper
    - Chemical absorbent
    - Cotton
    - Tissue paper
3. **Disinfectant:**
    - Sodium hypochlorite solution (use Phenol/ Lysol in case of spill clean-up of urine)
4. **Biomedical Waste Bags:**
    - Yellow bag – soiled waste
    - Red bag – contaminated plastic items.
5. **Cleaning Tools:**
    - Scoop
    - Scraper
    - Mop
6. **Forceps (use to pick up glass pieces or sharps)**
7. **Water-proof copy of SOP**
8. **Spill Alert signage**

Management of Spills of Blood and OPIM (Other Potential Infectious Material)

1. Blood and body fluid spillages should be dealt with immediately or as soon as it is safe to do so.
2. Care should be taken if there are sharps present and should first be disposed off appropriately into a sharp's container.
3. Chlorinating agents should be used in a well-ventilated area and are generally only recommended on a small spill.
4. Chlorinating agents should not be placed directly on spillages of urine.
5. Chlorinating agents are not suitable for use on soft furnishings.
6. Every patient care area must prepare the spill management kit.
7. The kit should be prominently labelled and placed at the most accessible site.
8. The kit contents should be reviewed daily to ensure completeness of the kit.
9. The spill kit must be immediately replenished after use and stored at the original location after every use.

Calculation of Hypochlorite solution (हाइपोक्लोराइट □□□ की गणना)

Available concentration उपलब्ध सांद्रता	Needed concentration सांद्रता की आवश्यकता	Total amount कुल मात्रा	Hypochlorite part हाइपोक्लोराइट भाग	Water part पानी का हिस्सा
5%	0.05%	100ml	1ml	99ml
	0.5 %	100ml	10ml	90ml
	1%	100ml	20ml	80ml
10 %	0.05%	100ml	0.5ml	99.5ml
	0.5 %	100ml	5ml	95ml
	1%	100ml	10ml	90ml
12.8 %	0.05%	100ml	0.4ml	99.6ml
	0.5 %	100ml	4ml	96ml
	1%	100ml	8ml	92ml

FORMULA (फार्मूला):

- A= D X Q / H
  - A= Amount of disinfectant (कीटाणुनाशक की मात्रा)
  - D= Desired strength (आवश्यक मात्रा)
  - H= Strength in hand (उपलब्ध मात्रा)
  - Q= Quantity (मात्रा)

Note- Refer to manufacturer details also. (नोट- निर्माता विवरण भी देखें)

EXAMPLE (उदाहरण)

D= 1%

H= 10%

Q= 1000ML

A= D X Q / H
1X 1000 /10 = 100ML

Hypochlorite solution **100ML** + Water **900ML** = 1 % Hypochlorite solution

Procedure of Spill Management:

1. Alert co-workers in the immediate area of the spill. Depending on the nature of the risk, everybody should be asked to leave the area till the spill is contained.
2. The Spill Kit is brought to the area.
3. The "Spill Alert" signage should be put up to restrict the activity around the spill until the area has been cleaned and disinfected and is completely dry.
4. Inspect the area around the spill thoroughly for splatters or splashes.
5. Promptly clean and decontaminate spills of blood and other potentially infectious materials. Discard blood-contaminated items.
6. Use **0.05% Sodium hypochlorite for small spills** and **0.5% hypochlorite solution for large spills. (**The detailed procedure is explained in the flow cart given below**)**
7. The disinfectant is allowed to act for **at least 10 minutes.**
8. The spill area is wiped outside inwards, starting at the edges and working towards the centre.

SPILL MANAGEMENT PROCEDURE (CDC Protocol)

Any spill, attend immediately, stop traffic, inform surrounding people

↓

Get the spill kit
Put Spill Alert signage board

↓

Wear gloves and other appropriate PPE from the spill kit

↓

Inspect the area around the spill thoroughly for splatters or splashes

↓

If spill contains broken glass material, collect the glass particles with the help of cardboard sheets and forceps and discard in sharps container.

↓

Confine the spill by placing absorbent cloth or paper

↓

Remove the absorbent cloth with help of scoop and scrapper and discard in yellow BMW bag

↓

Clean the area with minimal soap and water

↓

Pour hypochlorite solution over spill area and wait for 10 minutes

LARGE SPILL (>10 ML)	SMALL SPILL (<10 ML)
0.5% HYPOCHLORITE SOLUTION	**0.05%** HYPOCHLORITE SOLUTION

↓

Clean the area with plain water or regular disinfectant &
Remove signage board

↓

Clean the equipment with soap water Then disinfect with 0.5% hypochlorite solution

↓

Remove PPE and discard in appropriate bins

↓

Perform hand hygiene with soap and water

↓

Replace the items in the spill kit and keep ready

Management of Mercury Spill

Contents of a Mercury Spill kit:

- Gloves
- Mask
- Goggles
- Syringe 5 ml or dropper
- Plastic container with lid that seals
- Adhesive plaster strips
- Cardboard strips or chart paper pieces
- Thick plastic bag
- Torch Procedure
- Forceps (use to pick up glass pieces or sharps)

Don'ts:

- Do not vacuum mercury.
- Do not sweep with a broom.
- Do not pour mercury into sinks or drains.
- Do not wash contaminated items in a washing machine.
- Do not throw mercury or contaminated items in the garbage.
- Never continue Wearing shoes and clothing that might have been contaminated in the mercury spill.
- Never burn shoes, clothing, fabric or anything that has been contaminated with mercury.

Procedure of Mercury Spill Clean Up:

Mercury Spill Occurs

↓

Isolate Area
Remove nearby items
Switch OFF fan/exhaust

↓

Evacuate children & pregnant women

↓

Remove jewellery/watch
Wear PPE

↓

Locate mercury beads

↓

Gather beads using cardboard/chart sheet

↓

Collect beads using syringe/dropper

↓

Transfer mercury into water-filled airtight plastic container

↓

Use flashlight to find small beads

↓

Collect tiny beads using adhesive tape

↓

If mercury spills on linen,
cut contaminated portion & remove

↓

Place all contaminated materials in YELLOW bag
Label: 'CONTAMINATED WITH MERCURY'

↓

Disinfect the area with Detergent solution

↓

Hand over the bag to Biomedical Waste (BMW) management with Labeling

↓

Keep doors & windows open for 24 hours

↓

Complete documentation & incident reporting

↓

Replace the items in the spill kit and keep ready

Chemical Spill Management

Spill Prevention:

Chemical spills can be prevented in the workplace by:

- Ensuring appropriate chemical containers are used with seals that are in good condition (i.e. glass containers for corrosive chemicals).
- Ensuring all chemicals are stored appropriately.
- Provision of locked cupboards and storage areas.
- Provision of drip trays or purpose-built chemical storage cupboards/cabinets with inbuilt spill retention.
- Storage of chemicals as per their respective Material Safety Data Sheets (MSDSs).
- Ensuring appropriate equipment and procedures are in place for chemical spill management.
- For chemical spill management it is to be ensured by the hospital that it maintains and reviews the relevant MSDSs to ensure appropriate risk controls are in place for accidental spill. MSDSs should be no more than five years old from date of issue.

Chemical Spill Kit

Spill kits need to be provided and be readily accessible in relevant locations at the hospital. A chemical spill kit should include the following items:

1. **Absorbents:**
    - Universal Spill Absorbent: 1:1:1 mixture of Flor-Dri (or unscented kitty litter), sodium bicarbonate and sand. This all-purpose absorbent is good for most chemical spills including solvents, bases and acids (with the exception of hydrofluoric acid).
    - Absorbent pads and rolls: ‘HazMat’ absorbent pads.
    - Acid Spill Neutraliser: Sodium bicarbonate, sodium carbonate or calcium carbonate.
    - Alkali (Base) Neutraliser: Sodium bisulphate, boric acid or oxalic acid.
    - Solvents/Organic Liquid Absorbent: Inert absorbents such as clay and sand
2. **PPE**
    - Hand protection: Chemical resistant safety gloves (i.e. nitrile gloves).
    - Eye protection: Safety goggles.
    - Body protection: Laboratory coat/Corrosive apron.
    - Foot protection: Enclosed footwear, shoe covers.
    - Respiratory protection: Dust mask/Respirator (All personnel should be properly fit tested before using a respirator).
3. **Clean-up material for spills can be obtained from housekeeping; including:**
    - Brooms, plastic dustpan and square mouth shovel to sweep up the absorbent material.

- Paper towels for minor spills.
- Plastic tongs/scoops to pick up contaminated absorbent material.
- A chemical resistant bin with a close-fitting lid to hold the volume of spill and absorbent residue prior to disposal.
- Heavy duty plastic bags for wrapping contaminated PPE.

Spill Response

Dangerous goods or hazardous substance spills should be cleaned up immediately, taking appropriate precautions for hazards of the material.

- **STEP 1** - Assess Safety and Stop the Source of the Spill
  - Limit access to the immediate area where the spill has occurred and ensure that only personnel with appropriate training and equipment deal with the spill.
  - This may involve righting an overturned container or placing the source (e.g. cracked container) in a larger container to contain the spill.

- **STEP 2** - Review Safety Precautions and Risk Controls
  - Review relevant MSDS for the spilt chemical (MSDS should be located where the chemicals are used and stored). The MSDS will have specific instructions on how to deal with chemical spills as well as first aid information.

- **STEP 3** - Clean up the Spill
  - Using appropriate PPE promptly cover the spill with absorbent material taking care not to spread the spill further.
  - Using a dust pan, collect the absorbent material/waste and place into a thick walled, puncture-proof chemical resistant bag/bin which is suitably labelled.

- **STEP 4** - Notify the Appropriate Authority
  - Spill of dangerous chemicals should be reported to the appropriate authority.

- **STEP 5** - Restock the Chemical Spill Kit
  - Restock the spill kit and return it to its designated storage location.

Note: The chemicals should be treated as per manufacturer's instructions before disposing off the same into municipal drainage system

Specific Guidance for Chemical Spill Management

Neutralising Acid Spills

Acid spills can be neutralised with sodium bicarbonate, sodium carbonate, or calcium carbonate.

Process

- Contain the liquid first.
- Sprinkle powder over the spill slowly, starting from the outside.
- Acid is neutralised if effervescence ceases in the presence of excess bicarbonate.
- Avoid breathing in the fine powder and the gas evolved (carbon dioxide).

Neutralising Alkali Spills

Alkali spills can be neutralised with sodium bisulphite, boric acid or oxalic acid. Many alkalis can result in serious burns to skin and eyes, so it is necessary to proceed with extreme caution**.**

Process

- Ensure that there is adequate ventilation.
- Eliminate all sources of ignition as neutralisation of alkali can produce heat. This includes removing all combustible materials that are close to the spill.
- Right any overturned containers where the spill originated or stop leak at source only if safe to do so.
- Avoid handling fluid even with nitrile gloves.
- Liberally apply the alkali neutraliser around the perimeter of the spill to limit the extent of spreading and continue sprinkling it towards the centre. This should be done until the entire spill is covered and there is no free liquid or liquid migration. The neutralisation reactions should occur 1-5 minutes after application.
- Stand clear as splattering of reaction products might occur. The heat and vigour of the reaction will depend on the type and concentration of the alkali being neutralised
- The alkali will be neutralised when the reaction has stopped and there is no more fizzing from the liquid.

Caution

- Neutralised alkalis may produce heat. Wait until mixtures have cooled before sweeping up spilled material
- Avoid handling spilled material until absorption is complete
- Use non-metal, non-sparking tools such as a broom, scoop or scraper to clean up neutralised spill.
- Take care not to overly disturb the neutralised spill.

Solid Spills

Process:

- Sweep solid material into a plastic dust pan and place in a sealed container. Care should be taken so as to minimise dust or the contaminated powder becoming airborne.
- Use of a dust mask is advisable.
- Wipe the area down with a wet paper towel and dispose off the used paper towel in a strong polyethylene bag. Seal the bag and ensure all waste is collected for proper disposal.

Liquid Spills (Other than flammable liquids)

Process:

- Spread absorbent pads over the spill starting with the edges first. This will help to contain the spill to a smaller area. Enough pads should be used to completely cover the liquid.
- Pick up the contaminated pads with tongs or a scoop and place into a chemical resistant bin.
- If the chemical is water soluble, wipe the area down with a paper towel, followed by wet mop and detergent.
- Appropriately dispose off used paper towel.

Flammable Liquid Spills

Process:

- Control all sources of ignition - turn off all electrical and heat generating equipment.
- Spread the absorbent pads over the spill starting from the edge. Allow the pads to completely soak up the liquid.
- Pick up the contaminated pads with tongs or scoop and minimise direct contact
- Place the waste into the chemical resistant bin
- Wipe the area down with a paper towel and copious amounts of water
- Dispose off paper towel into a chemical resistant bin and seal the bin so it is airtight
- Never use wet vacuum cleaner on flammable solvents.

Reporting and follow-up:

The details of the incident should be entered into a controlled document and reported to a designated authority. The following needs to be recorded:

- Date & Time;
- Location of Spill;
- Type of spillage;

- Actions taken;
- Spill managed by;(Name & Designation).

The persons exposed in the incident should be followed up for potential transmission of any pathogen, depending on the nature of the spillage.

❖ **Spill kit must be immediately replenished after use and stored at the original location after every use.**

Display of Spill Management Protocol

- Spill management protocols need to be displayed at prominent locations in the hospital. Displayed protocols serve as a ready reference for the staff for management of spills.

Training of Staff on Spill Management

- All the staff in hospitals need to be trained in spill management protocols of the hospital. Staff must be trained by performing mock drills for spill management.

References:

- Centers for Disease Control and Prevention (CDC)
- Guidelines For Implementation Of "KAYAKALP" Initiative, 2024

Fogging Policy

The origin of fogging can be traced to the 19th century when Joseph Lister aerosolised carbolic acid to improve antisepsis in operative practice. CDC and HICPAC (Healthcare Infection Control Practices Advisory Committee) have recommendations in both 2003 Guidelines for Environmental Infection Control in Health-care Facilities and the 2008 Guideline for Disinfection and Sterilization in Healthcare Facilities that state that the **CDC does not support disinfectant fogging. Fumigation (fogging with Formalin) is no longer used**.

These recommendations refer to the spraying or fogging of chemicals (e.g., formaldehyde, phenol-based agents, or quaternary ammonium compounds) as a way to decontaminate environmental surfaces or disinfect the air in patient rooms. The recommendation against fogging was based on studies in the 1970s that reported a lack of microbicidal efficacy (e.g., use of quaternary ammonium compounds in mist applications) but also adverse effects on healthcare workers and others in facilities where these methods were utilized. Furthermore, some of these chemicals are not EPA-registered for use in fogging-type applications. These recommendations do not apply to newer technologies involving fogging for room decontamination (e.g., ozone mists, vaporized hydrogen peroxide) that have become available since the 2003 and 2008 recommendations were made.

HVAC (heat ventilation air conditioning) system maintains indoor air temperature and humidity, control odours, remove contaminated air and minimize the risk of transmission of airborne micro-organisms. An HVAC system with modern AHU helps to maintain positive air pressure in OT, and maintain 15-20 air changes/hour. Use of HEPA filters (to remove particles of size of > 0.3 micron) further helps in maintaining asepsis and infection control. Although, no studies demonstrate that fogging actually reduces the incidence of hospital-acquired infections (HAI), it seems to be the only alternative for health facilities not having HVAC system

Disinfection of O.T. with HVAC

Fogging is not required for an OT with a HEPA filtered positive pressure air supply system. However, the following should be ensured before deciding not to Fogg such an OT:

- The ventilation system design is appropriate and system performance is validated during installation and at least once a year. Records of validation should be available. All parameters in every validation testing should be within permissible limits.
- Maintenance of the ventilation system is done at least once a year HEPA filters are changed at the time intervals recommended by the manufacturer or based on results of the validation tests. Maintenance of the AHU is done as a part of yearly maintenance. Records of maintenance filter replacement to be available.
- Air count monitoring using settle plates/air sampler is done. Results are within acceptable limits and test reports are available.
- Surface cleaning protocols are implemented correctly with OT cleaning staff knowing clearly how they are supposed to perform the cleaning.

Fogging may be done in the following situations:

1. Commissioning of new critical areas such as OTs and ICUs.
2. After annual maintenance in the above-mentioned areas.
3. Fogging of OTs may be done on the basis of any microbiology surveillance reports and/or clinical procedures carried out in the operating areas. **Routine fogging is NOT recommended.**
4. Any civil or engineering work should invite fogging of OTs.
5. If there is a case of anthrax, gas gangrene, tetanus or an open septic wound with laboratory evidence of *Clostridium tetani* in any area where surgical procedure has been carried out.
6. Fogging in Wards/ Room: **wards and rooms need not be fogged on a routine basis**, only done after an isolation ward/ room is emptied at the end of an outbreak.

Methodology

Baccishield is a non-toxic, environment friendly disinfectant for critical area fogging and surface disinfection. It is a complex formulation of stabilized Hydrogen Peroxide (11% w/v) and Silver Nitrate solution (0.01% w/v), (Silver nitrate's role is to stabilize the H_2O_2).

Requirements

1. A fogger machine (fogger)
2. Fogging solution (quantity as per manufacturer recommendations).

Degree of contamination	Dilution of Baccishield	Contact time
Non- Critical Area	10% (100 ml in 900 ml water)	15 min
Critical Area (O.T./ ICU)	20% (200 ml in 800 ml water)	15 min
Fogging (1000 Cu. Ft.)	20% (200 ml in 800 ml water)	60 min

3. Water

Procedure

1. **General instructions before fogging**:
   - Remove all the dust from area where fogging has to be carried out.
   - Clean the room thoroughly and mop all the surfaces.
   - Before starting the fogging process in the room, all surfaces should be cleaned with disinfectant.
   - Cover electronic equipment's with drape sheet.
   - Labels should be put on the door with time of starting & expected time of opening.
   - Seal the room including windows and ventilators air tight.
   - Use adhesive tapes to close the gaps.
   - Switch off the fans.
   - Keep air conditioning switching off.

2. **Precautions to be taken during process of fogging:**
   - Do not use flammable/ non approved liquids in the fogging machine.
   - Do not use machine without timer device.
   - Never probe into front nozzle from where the mist comes out.
   - Use funnel to pour the liquid in the machine tank.
   - Measure the area of room to be fogged in cubic feet.
   - No neutralization with ammonia required.
   - Ensure appropriate use of PPE like gloves, masks and goggles etc. by staff.
   - Make sure that no person is present in the area or room of fogging apart from the person who is carrying out the fogging operation.

- The person who is carrying out the operation should be aware of the fogger machine mechanism and handling of the fogging disinfectant liquid.
- Once the fogger machine is ready to use for the fogging operation, then ensure and make the proper place for the machine. Keep the fogger machine on ground floor only; find out suitable location for the machine as per availability of power plug.
- Make sure that while placing the fogger machine, there should not be any barrier in front of the fogger machine nozzle (2 to 3 feet empty space must be there).
- Make sure that the fogger machine nozzle is kept at 45- degree angle to the floor.
- Switch on the machine & keep it for 60 minutes.

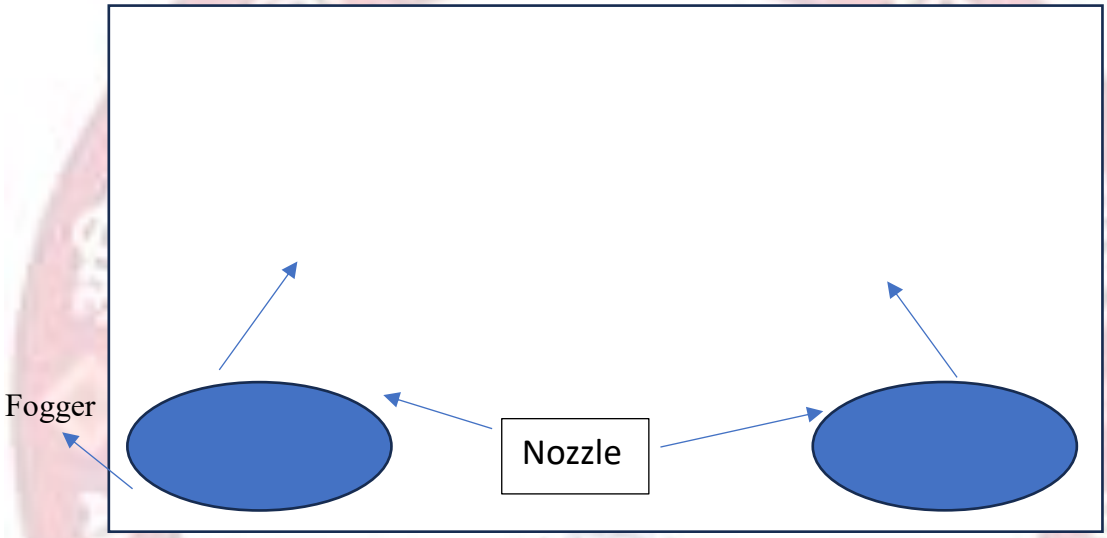


Fig.: 6.18 Placement of fogger in room

Calculation of the disinfectant to be used for fogging:

- **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.
- For fogging, make 20% solution with Baccishield in water.

Space in cubic feet L X B X H	**Dilution Baccishield + 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

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

3. Instruction for the post fogging of the O.T./ICU:

- After stopping the fogger machine, the fogged area must be isolated for one hour.
- Switch on exhaust for 15 minutes.
- Then, start the AC system for 10 minutes.
- After that the O.T./ ICU are ready for use.

Microbiological Surveillance after fogging

- Recommended only in case of fogging done after new construction/ renovation/ repair work or after procedure done on septic cases.
- Passive air sampling by open plate culture (settle plate)/ Active air sampling by active air sampler.
- Information regarding the same should be provided to Infection Control Team prior to fogging.
- The area/ room where fogging as performed should not be used until the microbiological surveillance cultures are reported as negative.
- Not indicated in case of fogging being done as a part of terminal cleaning. In such case the area/ room can be used immediately after fogging.

Action Plan in case of positive Microbiological Surveillance Report:

- In case of positive microbiological sampling report, the area/ room should be cleaned and scrubbed thoroughly with soap/ detergent and water followed by using disinfectant. This should be followed by repeat fogging and repeat microbiological testing.
- O.T./ room/ area can be used only after microbiological surveillance culture is reported as negative.

References:

- Essential of Hospital infection Control by Apurba S Sastry and Deepashree.
- Hospital infection Prevention and Control Guidelines on Ncdc.gov.in.
- Guidelines for implementation of "Kayakalp" Initiative.
- Guidelines for Disinfection and Sterilization in Healthcare Facilities, CDC Atlanta, 2008 updated in February 2019.
- **https://www.cdc.gov/hai/prevent/resourcee-limited/cleaning**
- Best practice for environmental cleaning for resource limited setting CDC guidelines.

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CLIP Toolkit Monitoring Form

Section A. General information

1. Facility ID **(Not to be filled)** ……

2. Surveillance ID (mention Name of ICU/Ward): ……

3a). Patient ID: ……

3 b) Patient Name……

4. Date of observation/Insertion:____/_____/_____(DD/MM/YYYY)

5. Event **(Not to be filled)**: ……

6.a) Name of **Inserter**……

6.b) Name of **observer**……

7. Occupation of inserter: □ Medical student □ Intern/resident □ Consultant physician □ Other medical staff designation ( )

8. Reason for insertion:

□ New indication for central line (e.g., hemodynamic monitoring, fluid/medication administration, etc.)

□ Replace malfunctioning central line □ Suspected central line-associated infection □ Other (specify): _____

Section B. Summary of insertion practices

9. Insertion site:□ Femoral □ Jugular □ Subclavian □ Umbilical □ Other

10. Insertion completed? □ Yes □ No

11. Inserter performed hand hygiene prior to central line insertion? □ Yes □ No

12. Which of the following barriers were used:

12a. Mask	12b. Sterile gown	12c. Sterile gloves	12d. Cap	12e. Full body sterile drape	12f. Site covered with Sterile drape instead of full body
□ Yes □ No	□ Yes □ No	□ Yes □ No	□ Yes □ No	□ Yes □ No	□ Yes □ No
13. Skin preparation agent was used (select & Tic, Yes or No based on patient age): □ Yes □ No If patient age < 60 days: was chlorhexidine gluconate used? If patient age > 60 days: was chlorhexidine gluconate, povidone iodine, or alcohol used?					
14. Was skin preparation agent completely dry at time of first skin puncture? □ Yes □ No					

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MAINTENANCE BUNDLE CHECKLIST

NAME:	CR No.	AGE/SEX:	WARD/ICU:	DIAGNOSIS:
D.O.A:	UNIT:	CONSULTANT NAME: SURGEON NAME:	SURGERY NAME: DATE OF SURGERY:	FINAL OUTCOME: DATE &TIME:

Brief Clinical History:
(On Admission)

CLINICAL FINDINGS	**DAILY ASSESSMENT**							
DATE:								
Temperature								
BP <90 or mean BP 65mm/hg								
Apnea / Bradycardia								
Dysuria/Suprapubic tenderness/urgency/frequency								
Purulent drainage from superficial / deep incision								
PEEP (daily minimum)								
FiO2 (daily minimum)								
WBC Count (>12000or<4000)								
Report of any specimen culture with collection date								
Blood culture (central /peripheral)								
Urine culture								
Respiratory secretion culture								
Pus/surgical site culture								
New antimicrobials Name &Day								
Hand hygiene/Aseptic Techniques followed								
All lines reviewed for necessity &assessed daily								

INDWELLING URINARY CATHETER (SILICON/FOLEYS)		**CAUTI MAINTENANCE BUNDLE**	**DATE**									
		Foley's Catheter Day	**DAY**									
Date of Insertion	Date of Removal	Assessed the catheter for early removal.										
		Clean the meatus with sterile water during daily care.										
		Foley's catheter secured properly.										
		Sterile closed drainage system intact.										
Date of Reinsertion		Foley's catheter and tubing free of obstruction and kinks. (**unobstructed urine flow)**										
		Drainage bag always secured below the level of the bladder.										
		Emptying of drainage bag if >75%full.										
CENTRAL VENOUS CATHTER (IJV,SCV,PICC,Femoral,Umblical)		**CENTRAL LINE MAINTENACE BUNDLE**	**DATE**									
Date of Insertion	Date of Removal	**Central line (CL) day**	**DAY**									
		Assess for early removal of CL.										
		Scrub the CL hub (access point) vigorously for 10-15sec before & after each manipulation.										
Date of Reinsertion		CL lumens with its connectors (e.g. Three way) covered with gauze or sterile pad.										
		Flush CL before & after giving Injectables (if not contraindicated)										
		CL site covered with transparent or gauze dressing checked for soiling ,dampening ,and loosening.										
		Change Gauze dressing every 2 days and transparent dressing every 7 days(more frequently if soiled ,damp,loose).										
MECHANICAL VENTILATION (ENDOTRACHEAL / TRACHEOSTOMY)		**VAP PREVENTION BUNDLE**	**DATE**									
Date of Insertion	Date of Removal	**Mechanical Ventilator Day**	DAY									
		Head elevation >30degree (if not contraindicated)										
		Oral care with Chlorhexidine (0.12%)										
Date of Reinsertion		Absence of condensate in ventilator circuit.										
		Aseptic techniques while doing closed /open suction										
		**Stress Ulcer Prophylaxis										
		**DVT Prophylaxis										
		Daily sedation Vacation & assessment of Readiness for Extubation.										
Name of Nursing officer												
Verified by Ward Incharge												
Verified by Resident/ Faculty												

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Insertion Bundle for Urinary Catheter Care

Patient Name: **CR No.:** **Age/Gender:** **ICU/Ward:**

Date & Time : **Indication for Catheterization:**

Allergy Status Confirmed (Latex/ Antiseptic): YES/NO **Consent Taken: YES/NO (Verbal/Written)** **Insertion Completed: YES/NO** (If **Yes**, then No. of attempts:)

1. HCW performed Hand hygiene prior to Urinary catheter Procedure.	☐ Yes	☐ No
2. Catheter inserted using strict aseptic.	☐ Yes	☐ No
3. Sterile items /equipment used.	☐ Yes	☐ No
4. Catheter of appropriate size (**Please specify size:** Fr.)	☐ Yes	☐ No
5. Which of the following barrier are used:		
A. **Mask** ☐ Yes ☐ No, **Sterile Gown** ☐ Yes ☐ No, **Sterile Gloves** ☐ Yes ☐ No, **Cap** ☐ Yes ☐ No.		
B. Site covered with sterile drape sheet	☐ Yes	☐ No
C. Site preparation agents are used. (**Please specify:**	☐ Yes	☐ No
6. Secured and checked proper positioning of tubing done.	☐ Yes	☐ No
7. Confirm urine draining freely.	☐ Yes	☐ No
8. Checked for leakage.	☐ Yes	☐ No
9. Checked for balloon not to be overinflate. (i.e. **Tension/ Pain**)	☐ Yes	☐ No
10. Closed drainage system:	☐ Yes	☐ No

Name & Sign of HCW: **Name & Sign of HCW assisted:**

World Health Organization

SURGICAL SAFETY CHECKLIST (FIRST EDITION)

Before induction of anaesthesia ▸▸▸▸▸▸▸▸▸ Before skin incision ▸▸▸▸▸▸▸▸▸▸▸▸▸ Before patient leaves operating room

SIGN IN

☐ **PATIENT HAS CONFIRMED**
- IDENTITY
- SITE
- PROCEDURE
- CONSENT

☐ **SITE MARKED/NOT APPLICABLE**

☐ **ANAESTHESIA SAFETY CHECK COMPLETED**

☐ **PULSE OXIMETER ON PATIENT AND FUNCTIONING**

DOES PATIENT HAVE A:

KNOWN ALLERGY?
☐ NO
☐ YES

DIFFICULT AIRWAY/ASPIRATION RISK?
☐ NO
☐ YES, AND EQUIPMENT/ASSISTANCE AVAILABLE

RISK OF >500ML BLOOD LOSS (7ML/KG IN CHILDREN)?
☐ NO
☐ YES, AND ADEQUATE INTRAVENOUS ACCESS AND FLUIDS PLANNED

TIME OUT

☐ **CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE**

☐ **SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE VERBALLY CONFIRM**
- PATIENT
- SITE
- PROCEDURE

ANTICIPATED CRITICAL EVENTS

☐ **SURGEON REVIEWS:** WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED BLOOD LOSS?

☐ **ANAESTHESIA TEAM REVIEWS:** ARE THERE ANY PATIENT-SPECIFIC CONCERNS?

☐ **NURSING TEAM REVIEWS:** HAS STERILITY (INCLUDING INDICATOR RESULTS) BEEN CONFIRMED? ARE THERE EQUIPMENT ISSUES OR ANY CONCERNS?

HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES?
☐ YES
☐ NOT APPLICABLE

IS ESSENTIAL IMAGING DISPLAYED?
☐ YES
☐ NOT APPLICABLE

SIGN OUT

NURSE VERBALLY CONFIRMS WITH THE TEAM:

☐ **THE NAME OF THE PROCEDURE RECORDED**

☐ **THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT** (OR NOT APPLICABLE)

☐ **HOW THE SPECIMEN IS LABELLED** (INCLUDING PATIENT NAME)

☐ **WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED**

☐ **SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT**

THIS CHECKLIST IS NOT INTENDED TO BE COMPREHENSIVE. ADDITIONS AND MODIFICATIONS TO FIT LOCAL PRACTICE ARE ENCOURAGED.

NAME OF FACILITY_____ Unit Number: _____
SURGICAL SAFETY CHECKLIST& SURVEILLANCE FORM

Date & Time:

Patient Name: _____ **Patient CR No.**: _____

Sex: □ Female □ Male **DOB**_____ **Age**: _____

Provisional Diagnosis: _____

Comorbid Condition: _____

Telephone: _____ **Birth Companion Name & mobile number:** _____

Surgeon/OG Team: _____

Procedure starting time: _____ **Procedure end time:**_____

Prior to procedure:

Surfaces and Environment cleaned: □ Yes □ No/Inadequate
Location of Procedure performed: □ O.T. 1 □ O.T. 2
Hand Hygiene Performed: □ Yes □ No/Inadequate
□ antimicrobial soap and water □ alcohol-based hand rub
Usage of Presonal Protective Equipments: □ Cap □ Mask □ Sterile Gown □ Sterile Gloves
Patient Skin Preparation: □ chlorhexidine □ betadine □ other
Adequate Contact Time of Skin preparatory agent used: □ Yes □ No
Antibiotic Prophylaxis □ Yes □ No □ NA
□ Cefazolin □ Cefuroxime □ Ceftriaxone □ Other _____

Procedure: □ C-Section □ Other _____ □ Elective □ Emergent

Wound Class: □ Clean □ Contaminated □ Dirty

Supply Problems:[1] □ No □ Yes: _____

[Infection Surveillance]	**First Check**	**Discharge**	**Final Check**
Days after procedure	_____Days	_____Days	_____Days
Purulent Drainage / Abscess	□ Yes □ No	□ Yes □ No	□ Yes □ No
Wound Reopened	□ Yes □ No	□ Yes □ No	□ Yes □ No
Fever & Wound Redness	□ Yes □ No	□ Yes □ No	□ Yes □ No
Fever & Wound Swelling	□ Yes □ No	□ Yes □ No	□ Yes □ No
Fever & Increased Wound Pain	□ Yes □ No	□ Yes □ No	□ Yes □ No
Infection was Diagnosed:	□ Yes □ No	□ Yes □ No	□ Yes □ No

[1] Supply problems may include equipment (IV pump, lighting,) or availability of needed sterile or clean supplies.

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SSI (Surgical Site Infection) Surveillance

Patient ID -	Date-
Patient Name-	Age/Gender-
Date of Admission -	Department-
Clinical Diagnosis-	OT No.-
Contact No.-	Alternate Contact No.-

H/O Smoking: ☐ Yes ☐ No H/O Alcohol: ☐ Yes ☐ No Diabetes Mellitus: ☐ Yes ☐ No

Other Comorbidities:

Prior to procedure:

Surface &Environment cleaned: ☐ YES ☐ No/Inadequate

Hand Hygiene Performed: ☐ YES ☐ No/Inadequate

☐ Antimicrobial soap &water ☐ Other……

Patient Skin Preparation: ☐ Chlorhexidine ☐ Betadine ☐ Other…….

Antibiotic Prophylaxis: Drug…… Dose……

Implant instruments sterilized by:

☐ Autoclave

☐ ETO

☐ Plasma Sterilization

☐ Other: _____

Procedure Details:

Infection present at the time of Surgery (PATOS): ☐ Yes ☐ No

Wound Class: ☐ Clean ☐ Clean-Contaminated ☐ Contaminated ☐ Dirty or Infected

Emergency: ☐ Yes ☐ No

General Anesthesia: ☐ Yes ☐ No

Name of Procedure:

Site:

Duration: …….. Hour……Minutes

Name of Operating Department & Unit:	Ward/ICU in which admitted Postoperatively:

All India Institute of Medical Sciences, Bilaspur H.P. 174001

SSI (Surgical Site Infection) Surveillance

[Infection Surveillance]	**First Check**	**Discharge**
Days after procedure	_____Days	_____Days
Purulent Drainage / Abscess	□ Yes □ No	□ Yes □ No
Wound Reopened	□ Yes □ No	□ Yes □ No
Fever & Wound Redness	□ Yes □ No	□ Yes □ No
Fever & Wound Swelling	□ Yes □ No	□ Yes □ No
Fever & Increased Wound Pain	□ Yes □ No	□ Yes □ No
Infection Diagnosed (culture positive from aseptically obtained fluid or tissue)	□ Yes □ No	□ Yes □ No
Date of Culture collection (aseptically obtained fluid or tissue)		
Name of Nursing Officer		

***LAMA/Discharge Date**	SSI Contributed to Death: ☐ Yes ☐ No
***Outcome at Discharge**:	***Died:** ☐ Yes ☐ No
Specific Event:	

To be filled by Infection Control Nursing Officer:-

Event Type: SSI *** Date of Event:**

	Any one of the following	
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 or (iv)heat ☐ 4. Diagnosis of a superficial incisional SSI by the 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 (> 100.4 F) localized pain or tenderness ☐ 3. Abscess 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 drain through the organ or space ☐ 2. Culture positive from an aseptically obtained fluid or tissure 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

Name & signature of ICNO: **Name & signature of ICO:**

All India Institute of Medical Sciences, Bilaspur

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NSI – MANAGEMENT FLOW

Needle Stick Injury/Splash Injury

↓

Inform the area Incharge/On duty Senior

↓

Immediately take First Aid

(Wash wound with soap & water, *do not scrub)

- Do not panic, don't put finger in mouth & don't squeeze the wound to bleed.
- Do not use bleach, chlorine, alcohol, betadine, iodine, antiseptic/ detergents, or any antibiotics on the wound.

For splash injury-

- Irrigate thoroughly the site with water
- If wearing contact lenses, leave them in place while irrigating
- Spit fluid out immediately if gone into mouth and rinse the mouth several times

↓

Report to Emergency department (D-Block 4th floor)

↓

Evaluation and risk assessment (Verify serological status of Source & vaccination status of HCW)

↓

Initiate 1st dose of PEP for HIV & HBV as per NACO guidelines (**within 2-hour**, maximum up to 72 hours)

↓

Baseline samples for both Source & HCW (After Written Informed Consent)

↓

Fill the NSI incident form

↓

Refer to ART Centre (ART extension number - 23039) for counselling & further management (C-Block ,2nd floor)

*Follow up at regular interval as advised

Helpline number-26193 (9am-5pm)

Appendix 5. Proforma for Occupational Exposure to Blood, body fluids and sharp injuries

<table>
<tr><td colspan="4">NATURE OF INJURY: PERCUTANEOUS INJURY (NSI)/ SHARP CUT/ LACERATION/ SPLASH OF BLOOD OR BODY FLUIDS</td></tr>
<tr><td colspan="2">Date of injury:</td><td>Time:</td><td>Location:</td></tr>
<tr><td colspan="2">Date of reporting:</td><td>Time:</td><td></td></tr>
<tr><td colspan="3">Description of the Event:</td><td>Nature of incident:
☐ Near miss ☐ No harm incident
Harmful event:
☐ Adverse event (preventable)
☐ Adverse event (non-preventable)
☐ Sentinel event
☐ Never event</td></tr>
<tr><td colspan="2">HEALTH CARE WORKER</td><td colspan="2">SOURCE PATIENT</td></tr>
<tr><td colspan="2">Name:</td><td colspan="2">Name:</td></tr>
<tr><td colspan="2">Age/ Sex:</td><td colspan="2">Age/ Sex:</td></tr>
<tr><td colspan="2">Designation:</td><td colspan="2">Diagnosis:</td></tr>
<tr><td colspan="2">H/P Blood transfusion:</td><td colspan="2">History:</td></tr>
<tr><td colspan="2">HBV Immunisation status
a) Complete
b) Partial
c) No</td><td colspan="2">Ward / ICU/ OT</td></tr>
<tr><td colspan="2">If yes, the D/M/Y:</td><td colspan="2"></td></tr>
<tr><td colspan="2">Categories of Exposure:
Mild: Mucous membrane/ non-intact skin with small volumes e.g. a superficial wound (erosion of the epidermis) with a low caliber needle, or contact with eye mucous membrane, subcutaneous injection following small- bore needle.
Moderate: mucous membrane/ non-intact skin with large volumes OR percutaneous superficial exposure with solid needle e.g. a cut or needle stick injury penetrating the gloves.
Severe: Percutaneous with large volume e.g.
a) an incident with a high caliber needle (>18 G) visibly contaminated with blood.
b) A deep wound.
c) Transmission of a significant volume of blood.</td><td colspan="2">Categories of Source:
HIV Negative
Low Risk
High Risk
Unknown</td></tr>
<tr><td colspan="2">Practice of standard precautions: yes/ no</td><td colspan="2">Whether on ART
Yes/ No</td></tr>
<tr><td colspan="2">First Aid measures:
(Wash/ Bleed/ Antiseptic/ TT</td><td colspan="2">Risk Factors for HIV/ STD:</td></tr>
<tr><td>Action taken in Casuality
Hepatitis B Vaccination
HBIG
Anti HBSAg Titer
If yes, level of antibody
PEP Advised / taken</td><td>
Yes/ no
Yes/no
Yes/ no
Responder/
Non-responder
Yes/no</td><td colspan="2"></td></tr>
<tr><td colspan="2">Consent/ signature:</td><td colspan="2">Consent/ signature:</td></tr>
<tr><td colspan="2">Contact No.</td><td colspan="2">Contact No.</td></tr>
<tr><td colspan="2">Address:</td><td colspan="2">Address:</td></tr>
</table>

Signature & stamp of unit In-Charge / CMO

Original form submitted to ICN:

Photocopy Submitted to Quality cell from ward through Nursing In-charge with date & time:……

Lab No.:…… DATE: ……..

(For Microbiology Lab Use Only)

HEALTH CARE WORKER					SOURCE PATIENT	
*Test	Day 0	06 weeks	03 month	06 month	Test	Day 0
HIV					HIV	
HBsAg					HBsAg	
HCV					HCV	

- Above tests done by Rapid testing methods only
- All Reactive / Positive results must be correlated clinically and confirmed by ELISA.

Technician: **Microbiologist**

Date / time:

Hospital Infection Prevention & Control Team
All India Institute of Medical Sciences,
Bilaspur, H.P.

POST EXPOSURE PROPHYLAXIS CARD

CR NO.		
Name of Exposed Person		
Age/Gender		
Designation and Department		
Phone. No		
Date and time of Injury		
Location of Injury (Ward/ICU/OT):		
Vaccinated for Hepatitis B		Partial / Complete/ unvaccinated
Anti HBsAg titre		

POST EXPOSURE PROPHYLAXIS CARD

Trauma and Emergency (3rd Floor, D-Block)	Hepatitis B Zero dose #		
	Date & Time of ART Zero dose		
	Hepatitis B Ig #		
Vaccination centre (Room no. 633, 3rd Floor, OPD)	Hepatitis B 1St dose (after 1 month)		
	Hepatitis B 2nd dose (after 6 month)		
	Hepatitis B Ig #		
ART centre (2nd Floor, C – Block)	Consent		
	Counselling		
	ART regimen and duration #		

POST EXPOSURE PROPHYLAXIS CARD

HEALTH CARE WORKER					SOURCE PATIENT	
***Test**	**Day 0**	**06 weeks**	**03 month**	**06 month**	**Test**	**Day 0**
HIV					**HIV**	
HBsAg		x			**HBsAg**	
HCV					**HCV**	
Anti-HBsAg titre						

Precautions during the follow-up period (12 weeks)

- Refraining from blood, semen, organ donation.
- Abstinence from sexual intercourse or use of latex condom till both baseline and 3 months HIV tests are found negative.
- The exposed person is advised to seek medical evaluation for any febrile illness that occurs within 12 weeks of exposure.
- Routine investigation (CBC, KFT & LFT) should be done after exposure and during PEP as advised.
- Completion of the Hepatitis B vaccination series as per the recommended schedule at vaccination clinic.
- The Exposed person must keep the PEP card safe and bring it during follow-up visits

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Department of Microbiology
All India Institute of Medical Sciences, Bilaspur, H.P. 174001

Hospital Infection control

Denominators form for HAI Surveillance

Facility ID **(Not to be filled)**:……Surveillance ID (mention Name of ICU/Ward):……
Month……Year…… Bed Strength of Area……..

Date	No. of Patients **(Occupied bed)**	No. of patient with ≥1 **Central Line**	No. of patient on **Indwelling Urinary catheter**	No. of patient on **Ventilator**
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
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20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				
31.				
Total				



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Department of Microbiology
All India Institute of Medical Sciences, Bilaspur, H.P. 174001

Instruction for filling Denominator data collection form for HAI surveillance

- This form should be completed at the **same time every day**. All relevant counts should be performed at the same time by visiting each patient and checking for the presence of any central lines or urinary catheter or ventilator before moving on to the next patient

- Count the total number of patients present in the area under surveillance and record the number under "Number of Patients."

- For BSI surveillance, count the number of patients with a central line and record the number under "Number of patients with ≥1 central line (CL)."
    - A central line is an intravascular catheter that terminate at or close to the heart or in one of the great vessels which is used for infusion of blood, or hemodynamic monitoring.
    - Following are considered great vessels for the purpose of reporting central line associated infection and counting CL days.
        - Aorta
        - Pulmonary artery
        - Superior or inferior vena cava
        - Brachiocephalic vein
        - Internal jugular vein
        - Subclavian vein
        - External and internal iliac vein
        - Femoral vein
        - Umbilical artery/ vein (in neonates)
    - The following devices are **not considered central lines**:
        - Extracorporeal membrane oxygenation (ECMO) catheters
        - Femoral arterial catheters
        - Intra-aortic balloon pump (IABP) devices
        - Hemodialysis reliable outflow (HeRO) Dialysis catheters
        - Impella heart devices

- For UTI surveillance, count the number of patients with an indwelling urinary catheter and record the number under "Number of patients with urinary catheter."
    - A drainage tube that is inserted into the urinary bladder **through the urethra, is left in place, and connected to a drainage bag is called indwelling urinary catheter** (Foley catheter).
    - Following are **not included in indwelling urinary catheter** unless a foley's catheter is also present:
        - Condom or straight in and out catheter
        - Nephrostomy tube
        - Suprapubic catheters

- For VAP surveillance, count the number of patients on ventilator and record the number under "Number of patients on ventilator."
    - Following are not considered for counting under ventilator day
        - Lung expansion devices such as intermittent positive pressure breathing (IPPB), Nasal positive end expiratory pressure (nasal PEEP), and continuous nasal positive airway pressure (CPAP, hypo CPAP) excluded unless delivered via tracheostomy or endotracheal intubation.
        - Patient on high frequency ventilation or extracorporeal life support or brain dead



AIIMS Bilaspur, Hospital Infection Control Committee Hand Hygiene Observation Form

Sheet No:

Date: Area: Observer name:

Start time: Availability of consumables: End time:

(HR☐ HW☐ TISSUE PAPER☐)

Category 1: Doctor			Category 2: Nursing officer			Category 3: Students			Category 4: Others (HA/HK)		
OPP	Indication	HH Action	OPP	Indication	HH Action	OPP	Indication	HH Action	OPP	Indication	HH Action
1 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	1 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	1 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	1 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves
2 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	2 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	2 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	2 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves
3 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	3 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	3 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	3 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves
4 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	4 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	4 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	4 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves
5 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	5 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	5 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	5 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves
6 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	6 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	6 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	6 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves
7 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	7 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	7 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	7 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves
8 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	8 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	8 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves	8 F/M	☐ Bef-pat ☐ Bef-Asept. ☐ Aft-Bf ☐ Aft-Pat. ☐ Aft-P. surr	☐ HR ☐ HW ☐ Missed ☐ C ☐ P ☐ Gloves
	Total			Total			Total			Total	
	Missed			Missed			Missed			Missed	
	Started			Started			Started			Started	
	HR-C			HR-C			HR-C			HR-C	
	HR-P			HR-P			HR-P			HR-P	
	HW-C			HW-C			HW-C			HW-C	
	HW-P			HW-P			HW-P			HW-P	
	Gloves			Gloves			Gloves			Gloves	

List of notifiable diseases

Diseases: -

1. **Anthrax**
2. **Chickenpox**
3. **Chikungunya**
4. **Crimean-Congo hemorrhagic fever**
5. **Dengue**
6. **Diphtheria**
7. **Human rabies**
8. **Kyasunur forest disease**
9. **Leptospirosis**
10. **Malaria**
11. **Measles**
12. **Meningitis**
13. **Mumps**
14. **Pertussis**
15. **Scrub typhus**
16. **Typhoid**

Syndromes: -

1. **Only fever >=7 days**
2. **Fever with rash**
3. **Fever with bleeding**
4. **Cough>2 weeks with fever**
5. **Jaundice of<4 weeks**
6. **Acute flaccid paralysis**
7. **Animal bite-snake bite**
8. **Animal bite-dog bite**
9. **Animal bite-others**
10. **Acute diarrhoeal disease**
11. **Acute encephalitic syndrome**
12. **ARI/Influenza like illness (ILI)**
13. **Severe Acute Respiratory Infection (SARI)**
14. **Dysentery**
15. **Hepatitis -A**
16. **Hepatitis -E**

***All such cases have to be reported to infection control team on daily basis on google sheet.**

https://docs.google.com/spreadsheets/d/1B5t8e8BiWpWqs_fNWJSWUAsMXyhfp6jM2W-rnZD19Fk/edit?usp=sharing