अखिल भारतीय आयुर्विज्ञान संस्थान (एम्स, जोधपुर)
ALL INDIA INSTITUTE OF MEDICAL SCIENCES, JODHPUR

MANUAL
PREVENTION AND CONTROL OF HEALTHCARE ASSOCIATED INFECTIONS
2017

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1. INTRODUCTION

1.1 Infections which arise in healthcare are termed Healthcare associated infection' (HAI). HAIs are those infections that were neither present nor incubating at the time the patient was admitted to health care facility. The majority of HAI become evident 48 hours or more following admission. However, it may not become clinically evident until after discharge.

1.2 AIIMS, JODHPUR recognizes the control of hospital associated infections (HAI) as an essential part of patient care. AIIMS, JODHPUR is committed to fulfilling its responsibility by ensuring that proper safeguards are instituted to identify and prevent HAI. All aspects of hospital functions are included in this activity.

1.3 Infection Control includes the prevention and management of HAIs through the application of research based knowledge to practices that include: standard precautions, decontamination, waste management, surveillance and audit.

1.4 The overall aim of this document is to provide evidence based information in the prevention and control of infection at AIIMS, JODHPUR to fulfill this aim hospital infection control committee has been formed that looks after the infection control needs of the hospital. It is relevant to all staff including doctors, nurses, other clinical professionals and managers working at AIIMS, JODHPUR to help to fulfill their legal and professional obligations with regard to both communicable diseases and infection control.

1.5 This document will be reviewed and updated by the HICC, AIIMS Jodhpur yearly.

2. ORGANIZATION OF INFECTION PREVENTION AND CONTROL PROGRAM

AIIMS, JODHPUR recognizes the prevention and control of hospital associated infections (HAI) as an important issue and is committed to fulfilling its responsibility by ensuring that proper safeguards are instituted to identify and prevent HAI. All aspects of hospital function are included in this activity.

2.1 Purpose:

2.1.1 To establish standards in prevention, control measures and minimize HAIs in patients, staff and visitors.

2.1.2 To define policies and procedures for implementing and monitoring of HAIs at AIIMS Jodhpur

2.1.3 To establish antibiotic stewardship program with at least yearly updating of evidence based antibiotic policy with monitoring of its adherence by the prescribing authorities and monitoring antibiotic utilization in various areas of the hospital.

2.2 Components of the AIIMS, JODHPUR Infection Prevention and Control Program

2.2.1 Establishing and regular updating of hospital infection control manual

2.2.2 Minimizing HAIs through continuous monitoring of healthcare associated infection

2.2.3 Surveillance

2.2.3.1 Laboratory based surveillance of HAIs

2.2.3.2 Ward based surveillance of HAIs

2.2.3.3 Surveillance and regular feedback of device associated infection

2.2.3.4 Surveillance and regular feedback of surgical site infection

2.2.4 Improvement of hand hygiene compliance

2.2.5 Investigation and control of outbreaks

2.2.6 Monitoring of emergence of antimicrobial resistance

2.2.7 To recommend antibiotic policy for the hospital based on local anti-biograms and evidence based published national/international guidelines.

2.2.8 Identify areas if irrational use of antibiotics and curb irrational use of antibiotics in hospital areas

2.2.9 Identification of high risk areas and establish steps to mitigate risk of HAIs to patients, staff and visitors

2.2.10 Establish sterilization and disinfection protocols and establish mechanisms to monitor the same.

2.2.11 Monitoring of staff health to prevent, staff to patient and patient to staff spread of infection.

2.2.12 Monitoring and promotion of bio-medical waste management as per government regulations

2.2.13 Training of staff in prevention and control of HAI.

2.3 Objectives and Terms of Reference

2.3.1 Objectives of the program

2.3.1.1 To minimize healthcare associated infections among patients, staff and visitors

2.3.1.2 To establish antimicrobial stewardship program and promote rational use of antimicrobials

2.3.1.3 To provide education and training to healthcare workers, patients and visitors regarding policies and procedures to minimize healthcare associated infections

2.3.2 Terms of reference

2.3.2.1 To develop a documented healthcare associated infections prevention and control program

2.3.2.2 To identify and reduce risks of healthcare associated infections among patient, staff and visitors and implement risk mitigation strategies for the same

2.3.2.3 To meet and monitor all statutory requirements related to healthcare associated infections asked by various government authorities from time to time

2.3.2.4 To perform surveillance activities to capture and monitor infection prevention and control data

2.3.2.5 To take action to prevent and control healthcare associated infections in patient, visitors and healthcare workers

2.3.2.6 To ensure adequate and appropriate resources for prevention and control of healthcare associated infections

2.3.2.7 To identify and take appropriate action to control outbreaks of infection in the hospital

2.3.2.8 To document policies and procedures and sterilization activities and ensure its implementation and monitoring

2.3.2.9 To ensure appropriate and safe handling of biomedical waste management in hospital premises

2.3.2.10 To plan, support and implement regular training of healthcare regarding infection control and prevention

2.4 Constitution of Hospital Infection Control Committee (HICC)

2.4.1 Members

S.NO	NAME	Designation	Committee Organization
1	Prof. Sanjeev Mishra	Director	
2	Prof. Vijaya Lakshmi Nag	HOD, Microbiology (Chairperson)	
3	Prof. Arvind Sinha	Medical Superintendent (Member)	
4	Dr. Anuradha Sharma	Ad. Prof. Microbiology (Member, Secretary)	
5	Prof. Surajit Ghatak	HOD, Anatomy (Member)	
6	Prof. Pradeep Bhatia	HOD, Anesthesiology (Member)	
7	Prof. Kuldeep Singh	HOD, Pediatrics (Member)	
8	Prof. Pratibha Singh	HOD, Gynecology (Member)	
9	Prof. Sneha Ambwani	HOD, Pharmacology (Member)	
10	Prof. Pankaja R Raghav	HOD, CM & FM (Member)	
11	Prof. Abhay Elhence	HOD, Orthopedics (Member)	
12	Prof. Raj Rani	Principal, College of Nursing (Member)	
13	Dr. Neeraj Gupta	Asso. Prof. Pediatrics (Member)	
14	Prof. Ashok Kumar Puranik	Asso. Prof. General Surgery (Member)	
15	Dr. Vibhor Tak	Asst. Prof. Microbiology (Member)	
16	Mr. Ashok Kumar	Asst. Prof. College of Nursing (Member)	
17	Dr. Ankita Chugh	Asst. Prof. Dentistry (Member)	
18	Dr. Gautam Ram Choudhary	Asst. Prof. Urology (Member)	
19	Mr. Dharmendra Choudhary	Infection Control Nursing Officer (Member)	
20	Mr. Raju Ram	Infection Control Nursing Officer (Member)	

2.4.2 Meetings of HICC

2.4.2.1 The infection control team meets at least quarterly or more frequently as necessary. Documentation of meetings and recommendations are kept by the secretary.

2.4.2.2 Minimum Quorum required: Chairperson, Infection Control Team [ICO and ICNs (at least 5)] and 50% of other members

2.4.2.3 The ICN (Infection Control Nurse) conduct rounds and report the findings to the ICO/Senior Resident infection control on daily basis. Registers are maintained by ICNs.

2.4.3 Hospital Infection control team (ICT)

The infection control team consists of:

1. Microbiologist (Infection control officer)
2. Senior Resident (Infection Control)
3. Infection Control Nurses

2.4.4 Responsibilities of the Infection Control Team

2.4.4.1 Advise staff on all aspects of infection control and maintain a safe environment for patients and staff.

2.4.4.2 Advise management of at risk patients.

2.4.4.3 Carry out targeted surveillance of healthcare associated infections and act upon data obtained e.g. investigates clusters of infection above expected levels.

2.4.4.4 Recommend antibiotic policy for different areas of the hospital.

2.4.4.5 Provide a manual of policies and procedures for aseptic, isolation and antiseptic techniques.

2.4.4.6 Investigate outbreaks of infection and take corrective measures.

2.4.4.7 Provide relevant information on infection problems to management.

2.4.4.8 Assist in training of all new employees as to the importance of infection control and the relevant policies and procedures.

2.4.4.9 Have written procedures for maintenance of cleanliness.

2.4.4.10 Surveillance of infection, data analyses, and implementation of corrective steps. This is based on reviews of lab reports, reports from nursing in charge etc.

2.4.4.11 Surveillance of Biomedical Waste management

2.4.4.12 Supervision of isolation procedures.

2.4.4.13 Monitors employee health program.

2.4.4.14 addresses all requirements of infection control and employee health as specified by Central laws, State laws and NABH.

2.4.5 Infection Control Nurse (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.

2.4.5.1 Duties of infection Control Nurse includes:

2.4.5.1.1 The ICN conducts Infection control rounds daily and maintains the registers.

2.4.5.1.2 The ICN is involved in education of practices minimizing healthcare associated infections and hand hygiene among Healthcare workers.

2.4.5.1.3 Maintains registers and data of Sharps/Needle stick injuries and Post–exposure prophylaxis.

2.4.5.1.4 Initiates and ensure proper immunization for Hepatitis B Virus Immunoglobulin and HBsAg vaccine, in consultation with microbiologist (Member HICC) in case of suspected exposure to any hospital worker.

2.4.5.1.5 Ensures that all positive culture cases are been tracked and for each positive culture from inpatient unit a hospital infection information sheet or surgical site infection Sheet is filled and keep record for each positive culture case. All probable cases of healthcare associated infections and anomalous/irrational use of antibiotics must be discussed in HICC meetings.

2.4.5.1.6 Track the indicators of infection control and present the data to the HICC meetings on regular basis.

2.4.5.1.7 Conducts special tasks given to him/her as per components and objectives of the hospital infection prevention and control.

2.4.6 Infection Control Officer (ICO):

The microbiologist serves as Infection Control Officer.

2.4.6.1 Duties of Infection Control Officer:

2.4.6.1.1 The ICO supervises the surveillance of healthcare associated infections as well as preventive and control programs.

2.4.6.1.2 Co-ordinate with the chairperson and HICC in planning infection control program and measures.

2.4.6.1.3 Keeps a track of any developing outbreaks.

2.4.6.1.4 Participate, guides in research activities related to infection control practices and publish them.

2.4.6.1.5 Developing guidelines for appropriate collection, transport & handling of specimens.
2.4.6.1.6 Ensuring laboratory practices meet appropriate standards.
2.4.6.1.7 Ensuring safe laboratory practices to prevent infection in staff.
2.4.6.1.8 Performing antimicrobial susceptibly testing following internationally recognized method & providing summary reports of prevalence of resistance.
2.4.6.1.9 Monitoring sterilization, disinfection & the environment where necessary.

2.5 Review and Revision of Infection Control Manual

2.5.1 Written policies and procedures shall be reviewed at least in a year. Signature of chairperson HICC, Secretary HICC, ANS and Infection Control Nurses shall be affixed on controlled copies. There shall be at least five controlled copies that shall be distributed to the following: MS, ICO, ICN, NS and Hospital Library. All departments shall have at least one copy of the manual. Digital version shall be available through hospital website to all.

3. SURVEILLANCE AND REPORTING OF HOSPITAL ACQUIRED INFECTIONS.

3.1 Statutory Notifications

Infectious diseases, which are listed in section

3.1.1 Whether confirmed or suspected, must be notified by the attending resident to In-Charge Faculty for **Communicable Disease Control**.

3.1.2 Prompt notification and reporting of disease is essential. The objectives of notification are:

a. Regulatory obligation by Govt. of Rajasthan.
b. To collect accurate and complete epidemiological information on the disease.
c. To ensure prompt and appropriate control measures to prevent the spread of infection.

Any doctor who considers that a patient is suffering from a noticeable / reportable disease/ has a statutory duty to **notify Medical Superintendent Office regularly on weekly basis on every Saturday.**

3.1.3 Notifiable Diseases (I.D.S.P.)

HIV	Shigella dysentery
TB	Hepatitis A
Leprosy	Hepatitis E
Dengue	Leptospirosis
Chikungunya	Malaria
Japanese encephalitis	Plague
Meningococcal meningitis	Rabies
Typhoid fever	Scarlett fever
Diphtheria	Tetanus
Cholera	Small Pox

3.2 Healthcare associated Infection Surveillance

Surveillance of health care associated infections means recording and counting of infections arising in the hospital. It is done so that we know the extent of any problems that exist.

3.2.1 Aims

The main objectives of surveillance of hospital acquired infections are:

Objective of Surveillance

- Establish endemic baseline rate.
- Reducing infection rates in the hospital.
- Identifying and containing the outbreaks.
- Evaluating and monitoring infection control measures.
- Monitoring antimicrobial susceptibility patterns

Surveillance is part of the routine infection control program. It helps to identify risks of infection and reinforces the need for good practices. Preventing outbreaks depends on prompt recognition of one or more infections with alert organisms and instituting special control measures to reduce the risk of spread of the organism. Collection of accurate data allows comparison with other units and measurement of response to changes in practice. All patients which are diagnosed with HAI are followed up till separation (discharge, death, LAMA, Abscond) for monitoring of ALOS, outcome of HAI. All bed side X-Rays of IPD are monitored on daily basis to detect hospital acquired pneumonia. Efforts will be made to contact all patient undergoing surgery at AIIMS, JODHPUR Telephonic follow up till the 90 days of surgery (if implant placed up to one year) are done to detect possible SSI.

Policy describes following key points

1. Passive methods of surveillance
   a. Methods
   b. Action plan
   c. Response statement
2. Active methods of surveillance

3.2.2 Passive Surveillance

Passive surveillance shall be done laboratory based-ward surveillance in conjunction with "Alert organism/Alert condition" surveillance. The system is managed by the Infection Control Team and details are reported back to the Infection Control Committee.

3.2.2.1 Laboratory-Based Ward Liaison Surveillance (Alert Organisms).

All positive microbiology reports from in patient will be screened and may result in a case review, a search for other carriers or infected patients and ward visits by the Infection Control Nurse. Approximately 70% of infections and alert organisms can be detected in this way. A patient may be placed in source isolation if considered to be a source of infection to other patients.

3.2.2.2 Ward Based Surveillance (Alert Conditions)

Alert conditions are medical syndromes such as *Acinetobacter* bacteremia or *Pseudomonas* pneumonia which immediately suspected healthcare associated infection. It is the responsibility of the ward staff to notify the infection control team if they suspect an infection which may be a risk to others. Appropriate specimens must be taken and sent promptly, properly labeled, to the laboratory. Source isolation precautions must be instituted immediately that infection is suspected.

3.2.2.3 Action Plan

When organism/s is/are detected by the laboratory based surveillance or ward based surveillance, microbiologist and the treating clinician will discuss the possibility of healthcare associated infections and action will be recorded in Hospital acquired infection assessment form. Every effort will be made to evaluate critically each and every positive culture report from the in-patient units including critical care areas. The record will be maintained by ICN and the data will be presented at least once a month at HICC meeting to review the case critically for possible HAI infections and the feedback will be provided to the concerned unit head.

3.2.2.4 Response

Appropriate measures will be taken in case of suspected outbreak or sudden increase in rates of suspected healthcare associated infections. Control measures to prevent spread of infection and decrease the incidence of healthcare associated infections may be suggested in feedback report to the concern units. The report will be prepared at least biannually and will be submitted to the unit heads. In case urgent intervention is required the response may be communicated more frequently.

- **Clinicians must tell the Infection Control Team about any Alert Conditions.**

List of ALERT ORGANISMS (suggested list but NOT limited to)

BACTERIA

1. Methicillin-resistant *Staphylococcus aureus*
2. Other (Vancomycin) resistant *Staphylococcus aureus*
3. Penicillin-resistant *Streptococcus pneumoniae*
4. *Haemophilus influenzae*
5. *Legionella* spp.
6. Glycopeptide-resistant enterococci
7. *Neisseria meningitidis*
8. Pan-resistant Gram negative bacilli
9. *Mycobacterium tuberculosis*
10. Any unusual bacteria

VIRUSES

1. Hepatitis B
2. Hepatitis C
3. HIV
4. Rotavirus
5. Small round structured virus (Norovirus)
6. Respiratory syncytial virus
7. Varicella zoster
8. Influenza virus

9. Parvovirus
10. Measles
11. Novel H1N1
12. Dengue

Examples of **ALERT CONDITIONS**

1. Post-surgical sepsis
2. Exanthemata (acute rash illness)
3. Chicken pox or shingles
4. Mumps, measles, rubella, parvovirus
5. Whooping cough
6. Poliomyelitis
7. Diphtheria
8. Meningococcal Meningitis
9. Hepatitis B and Hepatitis C Viral Infection)
10. Pyrexia of unknown origin
11. Typhoid and paratyphoid fevers
12. Viral hemorrhagic fever
13. Swine flu

3.2.3 TARGETED SURVEILLANCE

Detailed targeted surveillance in specific areas is performed. An example would be surgical site infection (SSI) surveillance. Results are feedback to HICC.

3.2.4 Active Surveillance

3.2.4.1 Active surveillance of HAI

ICN collects positive culture reports from the microbiology. The ICN in consultation with ICO may proceed for investigation of HAI.

3.2.4.2 Active surveillance of High Risk Areas and other areas of significance High risk areas of the hospital are identified includes:

High risk areas of hospital include:

- Operation theatres
- Intensive care units
- HDU
- Dialysis unit
- CSSD
- Blood bank
- Drinking water facilities

I. Operation Theatres

As per guidelines for Environmental Infection Control in health care facilities recommended by the Centers for Disease Control (CDC) and the Healthcare Infection Control Practices Advisory Committee (HICPAC), 2003, Microbial Sampling of Air and inanimate surfaces (i.e. Environmental Sampling including surface swabs) is not recommended.

The air quality testing shall be done only under following conditions:-

- To support an investigation of an outbreak of disease or infections.
- For the purpose of research.
- After any major construction periods to qualitatively detect breaks in environmental infection control measures.

Regular air checks will be undertaken to monitor general OT discipline once a week on Mondays.

Fogging of OTs will be done on the basis of these reports and/or clinical out of procedures carried out in the operating areas.

Records are kept with nursing in charge OT and the results must be produced in HICC meetings biannually or more frequently. In case of unacceptable results decision on corrective measures are taken by HICC.

Monitoring of disinfectants (Glutaraldehyde 2%)
The efficacy of the Glutaraldehyde shall be tested by surprise check at least once in a month and records are to be kept with ICN. The data shall be presented in HICC meeting at least once in 3 months.

II. Intensive care units
Surveillance samples to be taken when there is suspected outbreak or same isolate irrespective of their antibiotic sensitivity are isolated from 3 or more patients.
Surveillance samples include but not limited to:
- Clinical Material
  - Central line tips
  - ET tube secretions
  - Urine samples from catheterized patients
  - Nasogastric tube materials

Environmental Sampling
  - Water samples from humidifiers
  - Sampling of drugs prepared for patients
  - Ventilators
  - Walls
  - Floors
  - Suction tubing
  - Disinfectants on dressing trolleys

Surveillance clinical samples are sent per patient on basis of clinical data or microbiological reports. Any positive sample will be analyzed critically to detect healthcare associated infections. The data will be maintained by ICN and presented in subsequent HICC meeting.
Colonization swabs (nasal and rectal) will be collected from time to time to monitor anti-microbial resistance and multi drug resistant organism.

III. Transfusion services unit
The blood samples from bags must be sent for culture periodically. Blood component FFP and platelets shall be screened for contamination, as and when required. The record will be maintained by blood bank officer and chairman/Secretary HICC must be updated about the data at least once in a month and presented in HICC meetings.

IV. Drinking Water
Bacteriological surveillance is to be done at least once in 2 month in the microbiology laboratory for live bacterial contamination and once in six months in an accredited laboratory. Responsibility of sending the samples and records maintenance is of Dietary department.

V. CSSD

Cleaning protocols of CSSD:
Environmental surveillance is done monthly basis to check the Air quality of the sterile zone.
- Floor is mopped daily with soap and water.
- Fogging of sterile storage room may be done based on air surveillance reports or as per needs.
- Trolleys, shelves and tables are wiped with disinfectant every day.

Structure:-
The different Standard Operating Procedures in the CSSD are followed. CSSD has been divided into 3 zones. There should not be cris-crossing of processes within CSSD. The three zones are:
1. Protective zone
2. Clean zone
3. Sterile zone

1. **Protective Zone includes:-**
i) Receiving Window
ii) Cleaning Area
iii) Decontamination Area
iv) Drying Area
v) Assembling and Packaging Area

2. **Clean Zone includes:-**
i) Autoclaving Area

3. **Sterile Zone includes:-**
i) Sterile storage room
ii) Issuing window.

1. Protective Zone

i. **Receiving Area**: Items are brought to CSSD from respective wards, ICU's, O.T.'s & casualty by nursing orderly. The CSSD assistant receives them & checks the status of items.
ii. **Cleaning Area**: In this area all instruments are primarily cleaned and rinsed with plain water to remove visible particles.
iii. **Decontamination Area**: In this area soiled instruments including heat sensitive items like oxytubings, nebulization chamber, airway etc. and other supplies are decontaminated with the help of glutaraldehyde 2%, enzyme solution(s) 1% .
iv. **Drying Area**: In this area all cleaned items are dried with the help of drying cabinet at a temperature of 45^0 C for 45 minutes.
v. **Assembling & Packaging Area**:
Here all the instruments are assembled and packed for sterilization after cleaning & drying.
Labels and autoclave indicator tapes are pasted on all the packs.
vi. **Packing Area**: In this section various types of dressings like gauge pieces; cotton pads and bandages etc. are also prepared in this area.

2. Clean Zone

i) **Autoclaving Area**: In this area sterilization process is carried out by autoclaves. Before that autoclave indicators are pasted on the packs. Then technician places the packs in the autoclave machine and starts the machine as per cycle of appropriate temperature and pressure recommended by the manufacturer for 30 minutes.

3. Sterile Zone

i) Sterile storage Area: In this area sterile items are placed in racks after completion of autoclave before that adequacy of sterilization is confirmed by indicators.
ii) Issuing Window: All the sterile instruments and other supplies are distributed to concerned departments at a separate window after entry of all the items in the appropriate issuing register.
Quality Indicators (Before use & after use).

Monitoring protocol of Autoclave:
1). Temperature, Pressure and time of each cycle is recorded is followed according to manufacturer's recommendations. Records should be maintained
2). Various **quality indicators** are used to check the efficacy of sterilization:
a) **Exposure control**: Autoclave indicators tape is pasted on all packs to be kept in autoclave.
b) **Load Control**: Biological indicators are used once a week (Monday) in all autoclave machines in first load and with every load which contain any implant. This indicator gives us rapid results, i.e. positive

result in one hour and negative result in 3 hours. If result is positive means sterilization is not adequate that whole load is recalled & re-autoclaved.

c) **Pack control**: Class 5 chemical indicators - It is used in every pack.
d) **Equipment control**: Bowie-dick test pack – It is used once daily in each machine.

3). Air cultures are taken once in a month

4). Wet pack is not accepted as sterile. These are repacked and resterilized (even if the indicators show the appropriate changes.

5). There are **different trolleys** for carrying sterile and unsterile instruments White & Red respectively.

6). No person is allowed to enter in sterile room without **Personal Protective Equipment (PPE)** (i.e. Cap, mask, gown, & slippers etc.)

7). All sterile items must be used within 72 hours after 72 hours items should send to CSSD for re autoclaving

Recall policy:

Actions to be taken if any monitoring indicators fail:

a) Recall the item immediately with the help of load number
b) CSSD supervisor are informed immediately.
c) CSSD personnel should try and discover the cause of the failure and arrange for corrective action.
d) The item are reprocessed and then supplied after confirmation of sterility.

Record keeping:

a) Entry of all the items made in CSSD receipt register including date, time, type of instruments in the pack, name of department, procedure used for, case infected not, name and signature of person receiving the items.
b) Inventory of sterile packs is checked so that they are not distributed directly to the user department.
c) Record of all the indicators tests and culture report is kept.
d) Result of load control, equipment control and glutaraldehyde solution monitoring results are submit to the HIC department on monthly basis.
e) Recall event should be documented and record should be maintained in a register.

3.2.5 Special Studies

Special studies will be conducted as needed. These may include:
The investigation of clusters of infections above expected levels.

a. The investigation of single cases of unusual or epidemiologically significant HA infections.
b. Prevalence and incidence studies, collection of routine or special data as needed and sampling of personnel or the environment as needed.

3.2.6 Surveillance of Hand Hygiene Compliance

3.2.6.1 Direct observations can be made by any of the infection control team members. This can usually be accomplished well through regular observations, especially at odd hours.
3.2.6.2 Data for all categories of staff should be gathered including faculty, residents, nursing, ward boys and other health care workers involved in direct patient care.
3.2.6.3 This should be followed by awareness drives and educational activities.
3.2.6.4 Provision of accessible alcoholic rubs should preferably be made at each bedside.
3.2.6.5 Data generated should be presented in HICC meeting regularly.

4. INFECTION CONTROL PROCEDURES AND PRACTICES

Since it is impossible to identify some infectious patients (especially those infected with HIV, Hepatitis B or C) a system of standard precautions MUST be adopted in all health care work.

4.1 According to HICPAC and the CDC, "Standard Precautions combine the major features of Universal Precautions and Body Substance Isolation and are based on the principle that all blood, body fluids, secretions, excretions except sweat, non-intact skin, and mucous membranes may contain transmissible infectious agents." Standard Precautions are a group of infection prevention practices that apply to all patients and residents, regardless of suspected or confirmed infection status, in any setting in which healthcare is delivered and include:

1) Hand hygiene
2) Use of personal protective equipment (e.g., gloves, gowns, facemasks), depending on the anticipated exposure
3) Respiratory hygiene and cough etiquette
4) Management of spillage
5) Safe injection practices

4.1.1 Hand Hygiene

4.1.1.1 Purpose

Hand washing is THE SINGLE most important measure in reducing the spread of infection. Hands are the principle route of cross infection. The level of hand hygiene will be determined by the activity or area of practice.

4.1.1.2 Scope

All procedures that require hand hygiene should be done through appropriate hand hygiene.

4.1.1.3 Responsibilities

All hospital staff including Nurses, Doctors, O.T. Technicians, Lab Technicians, Nursing orderlies, ward boys, food handlers and housekeeping staff.

4.1.1.4 When to wash hands

This is determined by actions – those completed and those about to be performed. A list is given below.

4.1.1.5 Routine washing (Social Hand Wash)

- Before preparing, eating, drinking or handling food.
- Before and after smoking.
- After visiting the toilet.
- Before starting work (remove jewelry, e.g. rings) and after leaving an occupational area.
- Before and after physical contact with each client in clinical situations, eg bathing, assisting to move, toileting.
- After handling contaminated items such as dressings, bedpans, urinals, urine drainage bags and nappies.
- Before putting on gloves and after removing them.
- Before and after removing any protective clothing.
- After blowing your nose, covering a sneeze.
- Whenever hands become visibly soiled.
- When hands are visibly soiled.
- Handling food and following patient contact.

4.1.1.6 The “My 5 Moments for Hand Hygiene” approach

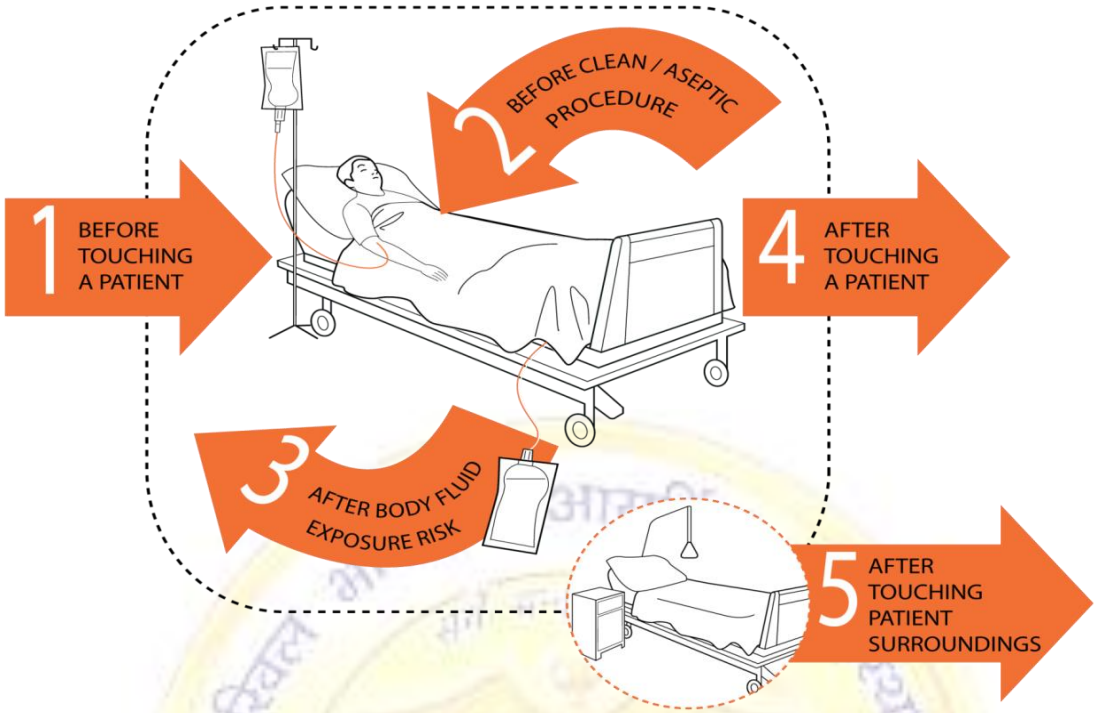


Fig: A world alliance for safer Healthcare. World Health Organization

1. Before touching a patient
2. Before clean/ aseptic procedure
3. After body fluid exposure risk
4. After touching a patient
5. After touching patient surroundings

4.1.1.7 Hand washing

- Wet hands under running water.
- Dispense one dose of soap into cupped hand.
- Hand wash for 40-60 seconds vigorously and thoroughly by following six step techniques, without adding more water. (See Figure 1)
- Rinse hands thoroughly under running water.
- Dry hands with single use brown paper.

4.1.1.8 Hand disinfection - Aseptic/hygiene hand wash

Hand disinfection with alcohol based hand rub (e.g. sterilium, 70%alcohol) preferably with chlorhexidine and alcohol are practice at least in following condition:

- Whenever touching any patient esp. in Inpatient units and critical care areas.
- After handling any potentially infectious object
- Before putting on gloves and after removing them.
- Prior to invasive procedures
- Visibly clean hands
- In high dependency areas and after attending patients in isolation or with known transmissible condition.

Broken skin, cuts and abrasions in any area of exposed skin, particularly the hands and forearms, are covered with a waterproof dressing. Wear gloves if hands are extensively affected. Wrist watches/bracelets are removed.

Alcohol is an effective decontamination agent but should only be used on visibly clean hands. It is also a valuable agent for use, but should only be used 2-3 times consecutively before a hand wash as build up can occur.

- Dispense the required amount of solution onto the hands.
- Ensure solution covers all hand surfaces.
- Rub vigorously, using hand washing technique, until dry.

It is recommended that everyone involved in providing healthcare in the community must be trained in hand decontamination, the use of protective clothing and safe disposal of sharps, and this includes patients and healthcare personnel.

4.1.1.9 Hand Care

- Keep nails clean and short.
- Remove rings with stones or ridges.
- Do not wear artificial or gel nails or nail polish.
- When washing hands, wrist watches are removed.
- Sleeves are rolled up to the elbow.
- Nailbrushes should not be used for routine hand washing as they damage the skin and encourage shedding of cells.
- Nailbrushes, where used, must be single use disposable or single use autoclavable.

Gloves are worn before:

• Before inserting a central intravascular catheter.
• Before inserting indwelling urinary catheters, peripheral vascular catheters, or other invasive devices that do not require a surgical procedure.
• For cleaning up any spillage of body fluids.

The physical action of washing and rinsing hands under such circumstances is recommended because alcohols, chlorhexidine, iodophors, and other antiseptic agents have poor activity against spores.

4.1.1.10 Hand-hygiene Technique

When decontaminating hands with an alcohol-based hand rub

- Apply product to palm of one hand and rub hands together,
- Cover all surfaces of hands and fingers by six step technique, **until hands are dry**.
- Follow the manufacturer's recommendations regarding the volume of product to use.

Surgical hand antisepsis

- Remove rings, watches, and bracelets before beginning the surgical hand scrub.
- Finger nails are kept short and well maintained.
- Hands and forearms must be free of open lesions and breaks in skin integrity.
- Wear complete operating room attire including mask, cap, and goggles if required.
- Keep clothing away from sink and splashes
- Turn on water.
- Keep arms level well away from body and hands up above elbows for duration of scrub.
- Wet hands and forearms
- Apply antiseptic hand wash solutions
- Lather hands and forearms for at least **one minute** from fingertips to three inches above elbows starting with hands to forearm, forearm to elbow.
- Wash hands thoroughly, using the following six steps to facilitate eradication of all bacteria and 10 seconds/step.

1. Palm to palm
2. Palm over dorsum
3. Palm to palm, fingers interlaced
4. Back to fingers to opposing palms
5. Rotate thumbs in palm
6. Rotate fingers in palm
7. Rinse

Steps of hand washing

- Apply antiseptic hand wash solution a second time.
- Lather hands and forearms for at least two minutes in the same manner.
- **Recommended scrub time is between 2-6 minutes, longer times are not necessary.**
- Rinse hands and forearms under running water.
- Keep hands higher than the elbow at all times.
- Thoroughly dry hands and forearms with a sterile paper towel keeping hands raised.
- Proceed to OT keeping hands above the elbow and out from scrub clothes. Allow hands and forearms to dry thoroughly before donning sterile gloves.
- Between short cases only, hands may be disinfected by using 2 or more applications of an alcohol Hand rub.
- Before applying the alcohol solution, pre wash hands & forearms with a non-antiseptic soap & dry hands & forearms completely.

All clinical areas including consultation chambers, each floor & critical care areas should have:

- Hand washing facilities appropriate to the area.
- Clear unobstructed access to the hand washing sink
- Hand washing sinks for that purpose only and clear of inappropriate items.
- Liquid soap and alcohol hand rubs available at every sink.
- Hand washing posters are placed by each sink.

4.1.1.11 Hand Hygiene Audit

- To ensure that the hand washing protocols are followed in the AIIMS, JODHPUR Hospital.
- A monthly report is generated and analyzed and corrective actions taken by training.
- The audits are done in the prescribed format.

4.1.1.12 Patient Hand Hygiene

Hand hygiene for patients must be encouraged as it is equally as important in the prevention and control of infection. Staff 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.

4.1.1.13 Quality Assurance

- Completion of mandatory training on Hand Hygiene by all Healthcare Doctors, paramedical, housekeeping and Nurses.
- Monitor and record adherence to hand hygiene.
- Provide feedback to healthcare workers about their performance.

4.1.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

In determining the type of personal protective equipment to use for a given procedure, HCWs should consider the following factors:

• Probability of exposure to blood and body substances;
• Amount likely to be encountered;
• Type of body substance involved; and
• Probable route of transmission of infectious agents

Full protective wear, including double gloves, protective eye/face-shields, protective footwear and impermeable gowns or aprons, is recommended for operating room or mortuary procedures.

4.1.2.1 Risk assessment

The risk assessment should take account of various factors that include:

- Nature of the task to be undertaken.
- Risk of contamination to either patient or user.
- Barrier efficacy of gloves, both surgical and examination gloves can fail.
- Sterile or non-sterile gloves required.
- Patient/user sensitization.

A. Gloves

The use of disposable gloves is part of the Standard Precautions concept, which offers consistent guidelines for infection control programs. As part of personal protective equipment, gloves prevent contact with blood, body fluids, and mucous membranes. They also protect the patient from contamination by the micro-organisms from the wearer's hands; **gloves are single use items** and are changed after each procedure to further minimize the risk of infection.

Gloves are worn when dealing with:

Any blood or other body fluids, such as synovial fluid, peritoneal fluid, amniotic fluid, pleural fluid.

- Any wound or broken skin.
- Handling chemicals or disinfectants, which could cause skin irritation

As a general rule, if the risk is to the patient then '**Sterile'** gloves are required. If the risk is to the user then '**Non-sterile'** gloves will probably be sufficient. When handling chemical disinfectants you may need to wear industrial or domestic gloves.

B. Gowns and aprons

The purpose of wearing gowns and aprons is to protect susceptible patients from infection and protect the wearer from contamination as well as maintaining the uniform or clothes worn under the apron in a clean and dry state.

Gowns and aprons should not be worn outside the area they are intended to be used. Remove your gowns/aprons when moving out of area they are intended to be used.

C. Face Protection
Protective eye or face wear are considered where risk of blood or other bodily fluids splashing into eyes is a possibility, including the preparation of some cytotoxic chemotherapy and during the physical decontamination or cleaning of instruments.

D. Masks
There is no clear guidance available for the efficacy of masks in the prevention of airborne infections. However, they may offer protection against potential splashing of the mouth and face during certain procedures such as minor operations, physical decontamination or cleaning instruments with a brush. The type of mask best suited to a particular situation depends on the body substances likely to be encountered and the nature of the activity.
There are two main types of masks used in health care:
- ***Surgical masks*** — fluid-repellent paper filter masks worn during surgical and dental procedures
- ***Particulate filter personal respiratory protection devices (P2 respiratory protection devices)*** — close fitting masks capable of filtering 0.3-µm particles and worn when attending patients with active pulmonary tuberculosis

Mask must:
- be fitted and worn according to the manufacturer's instructions;
- Not be touched by hand while being worn;
- cover both mouth and nose while worn;
- be removed as soon as practicable after they become moist or visibly soiled;
- be removed by touching the strings and loops only; and not be worn loosely around the neck, but be removed and discarded as soon as practicable after use.

E. Shoe cover
Shoe cover must be worn before entering to the ICU, Operating Theatre, Dialysis, CSSD and HDU.

F. Protective foot wear:
Protective foot wear 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.
G. Head cap:
Head cap covers the hairs of the health care provider in order to prevent the contamination of the sterile high risk areas.

4.1.3 RESPIRATORY HYGIENE AND COUGH ETIQUETTE

4.1.3.1 The strategy is targeted at the patients and accompanying family members and friends with undiagnosed transmissible respiratory infections, and applies to any persons with sins of illness including cough, congestion, rhinorrhea, or increased production of respiratory secretions when entering health care facilities.

4.1.3.2 The elements of respiratory hygiene/ cough etiquette include:-

1. Education of healthcare facility staff, patients and visitors
2. Source control measures (Covering the mouth/nose with tissue or a cloth when coughing or sneezing)
3. Hand hygiene after contact with respiratory secretions
4. Spatial separation, ideally >3 feet, of persons with respiratory infections in common waiting areas when possible
5. Masks should be provided to the coughing patients to contain dispersion of respiratory secretions into the air from infected patients
6. Healthcare personnel are advised to observe Droplet precautions (i.e. wear a mask) and hand hygiene when examining and caring for patients with signs and symptoms of a respiratory infections.

7. Healthcare personnel who have a respiratory infection are advised to avoid direct patient contact, especially with high risk patients. If this is not possible then a mask should be worn before providing patient care.

4.1.4 MANAGEMENT OF SPILLAGE

It is vital that any spillage must be attended to as soon as possible. Assessment of hazards and associated risks to health must be undertaken to ensure the health and safety of employees, patients and other visitors to the primary health care premises.

4.1.4.1 Responsibilities

Department Heads are responsible for the development and implementation of a policy that deals with spillages, and should exposure occur, they are also required to ensure that any risks to staff, patients and visitors are minimized.
All staff has the responsibility for ensuring that they adhere to any policies and procedures to minimize the hazards resulting from any spillage.
All staff involved in the clinical care of patients or the safe handling of waste are aware of how to deal safely with any spillage should it occur.

"ALL SPILLS LARGE (>30ml) OR SMALL (<30ml) MUST BE REPORTED TO HOSPITAL INFECTION CONTROL NURSE (ICN) IMMEDIATELY"

4.1.4.2 **Body Fluid Spillage**
Body fluid spills are divided in to two categories, those which are visibly contaminated with blood and those which are not.
Blood Spillage or other Body Fluid visibly contaminated with Blood.

- Spillages of blood are dealt with as soon as possible.
- Splashes of blood (or anybody fluid) on the skin are washed off immediately with soap and water.
- If there is broken glass do not touch even with gloved hands- use a paper or plastic scoop and dispose in the sharps box.

4.1.4.3 **Management blood spillage.**
1. Make the people aware about spill
2. Cordon off the area.
3. Identify the spill kit.
4. Wear PPE.
5. Put soaking paper (brown paper, newspaper and tissue paper) over the spill.
6. Make fresh Hypochlorite solution which is equivalent to 1% strength.
7. Pour this prepared solution over to cover the spill.
8. Put another paper covering the soaked paper and then remove the soaked paper and put it in the Yellow bag.
9. Clean the area with soap and water.
10. Remove the PPE & discard according to biomedical waste management policy.
11. Do the hand washing.
12. Report the spill in incident reporting form.

4.1.4.4 Large Spill
In case of large spill Inform to **HIC dept. or ICN**
Immediate action has to be taken with the help of large spill kit available at the concern department. The recommended practice is:
Procedure to manage large spill
1. Cordon off the area and make the people aware about the spill.
2. Put on the PPE.
3. If there is any sharp material present along with the spill, then first remove it with the help of plastic scoop or with x-ray film.
4. Put large size gauze pad over the spill to soak large amount of spill and discard the pads in yellow bag.
5. Put soaking paper over the rest amount of spill.

6. Make fresh 1% Hypochlorite solution in 1 Liter of water
7. Put this solution over the spill.
8. Take another paper and with the help of this paper, remove the paper which is already put on the spill.
9. Discard all the papers in yellow bag.
10. Wash the area with soap and water.
11. Remove the PPE & discard according to biomedical waste management policy.
12. Do hand washing.
13. Fill the incident reporting form and send it to the HIC department or ICN. .
14. **It is the responsibility of person who had done the spill to manage it. For anonymous spills nursing staff posted in the area shall be responsible to get it managed. Ultimate responsibility of implementation of the policy lies with Nursing In charge of the area where spill has occurred.**

4.1.4.5 Role of ICN in the large spill management.

- To ensure proper spill management
- Ensure incident reporting form is filled with proper details.
- Root cause analysis of incident and ensure that preventive action is taken.

4.1.4.6 **Urine Spills visibly contaminated with Blood**

Chlorine releasing agents are **not** be used for urine spillages even if it contains visible blood. If a chlorine releasing agent is used with urine the resulting fumes are considered a hazard. The recommended practice is:

- Wearing non-sterile, non-powdered latex gloves and plastic apron.
- Soak up with paper.
- Use detergent and water on area after soaking up the spill.
- A Hypochlorite agent may now be used on the area if necessary.
- Waste materials discard in a Yellow bag
- Discard gloves & Disposable plastic Apron in Red bag.
- Wash hands thoroughly**.**

4.1.4.7 Spillages of Body Fluids not visibly contaminated with Blood

These spillages will include faeces, vomitus, urine and sputum.

- Always wear protective clothing, i.e. plastic disposable apron, disposable powder-free, non-sterile latex or similar.
- Use paper towels to soak up the spill.
- If there is broken glass do not use hands even if gloved - use a paper or plastic scoop and dispose in the sharps box.
- Discard paper towels and any other waste from the spillage into clinical waste bags.
- Clean the contaminated area with water and detergent.
- Discard gloves and apron into a red bag
- Wash hands.

4.1.4.8 Mercury Spillages

As per the Govt. of India policy of mercury free hospital, every attempt has been made to make hospital mercury free. Mercury containing equipment are replaced and no mercury containing equipment are purchased by the Hospital.

5. SHARPS MANAGEMENT, SHARP INJURIES AND POST EXPOSURE PROPHYLAXIS

5.1 Sharp Management

5.1.1 Introduction

Safe handling and disposal of sharps is a vital component of the Standard Precautions approach to reduce the risk of transmission of blood borne virus.

Good practice involves:

- Correct assembly of the sharps container with proper size opening.
- Labeling of the container upon assembly as "SHARP CONTAINER "with Biohazard symbol and department name.
- Sharps container should not be more than two thirds full.
- Sharps containers are properly sealed before sending it for final segregation.
- Being aware of the first aid treatment following a needle-stick injury.
- Being aware of the follow up treatment after a used needle-stick injury.

5.1.2 Disposal of Sharps

- An adequate number of sharps containers, are located and conveniently placed in clinical areas.
- Ensure that the sharps containers have been assembled correctly.
- Make sure the department's name is identified on the sharps bin.
- It is the responsibility of the person using the sharp to dispose of it safely.
- Sharps (needles, scalpel blades, razor blades and glass ampoules etc) are placed directly into a container.
- Whenever possible, take a sharps bin to the point of use.
- Needle must not to be recapped, bent or broken.
- If it is necessary to disassemble a needle and syringe, such as before transferring blood from a syringe to a pathological specimen bottle, the needles are placed in the sharps container before transferring the blood.
- Sharps containers are sealed closed when two-thirds to three-quarters full.
- Sharps containers when carried are held away from the body.
- Use needle safety devices where there are clear indications that they will provide a safer system of working.

5.2 Sharp injuries

This part is designed as guidance for all Health Care Workers in handling needle-stick injuries and exposure to blood and body fluids. An exposure that might place HCW at risk for HBV, HCV, or HIV infection is defined as:

- **Sharp Injury-**a percutaneous injury {e.g , a needle stick injury (NSI) or cut with a sharp object}
- **Blood and body fluid exposure (BBF)-**Contact of mucous membrane or non-intact skin (e.g, exposed skin that is chapped, abraded or affected with dermatitis) – Contact with blood, tissue, or other body fluids that are potentially infectious
- **Contamination, from an Infected Known or Highly Suspected Person to another Recipient the Risks are:**
  - Hepatitis B virus 1:3
  - Hepatitis C virus 1:30
  - Human Immunodeficiency Virus 1:300

It has been estimated that the risk of acquiring HIV through mucous membrane exposure splashed with contaminated body fluids is much less (probably 1 per 1000 injuries) 0.1%.

5.2.1 Main Risks from Needle-Stick Injury and Blood Contamination

The main concern is the transmission of blood borne viruses, i.e.

- HEPATITIS B (HBV)
- HEPATITIS C (HCV)
- HUMAN IMMUNODEFICIENCY VIRUS (HIV)

5.2.2 Body Fluids Likely To Be Infectious

There is more experience of occupational exposure in the health care situation and in these circumstances the **highest risk** of transmission is from exposure to **liquid blood**. The risk is lower for other body fluids or body tissues from an infected patient.

Those, which represent a lower risk, are:

• Cerebrospinal Fluid.
• Peritoneal Fluid, Pleural Fluid, Pericardial Fluid, Synovial Fluid, Amniotic Fluid • Semen.
• Vaginal Secretions.
• Breast Milk.
• Any other body fluid containing visible blood, e.g. saliva.
• Bleeding gums in association with bites.
• Unfixed tissues and organs, i.e. those which have not been preserved in formalin.

5.2.3 Risks from Injuries

The risk of transmission is higher (particularly for HIV) when there is:

• A deep injury, i.e. when the injury is deeper than a superficial scratch drawing blood.
• Visible blood on the device that caused the injury (including teeth).
• Injury with a needle that had come from the source patient's artery or vein.
• Terminal HIV related illness in the source patient.

When does NSI Occur?

• Recapping needles (Most important)
• Performing activities involving needles and sharps in a hurry
• Handling and passing needles or sharp after use
• Failing to dispose of used needles properly in puncture-resistant sharps containers
• Poor healthcare waste management practices
• Ignoring Universal Work Precautions

Infections transmitted by NSI / BBF

Blastomycosis	Hepatitis B	Malaria	*S. aureus*
Brucellosis	Hepatitis C	Mycobacteriosis	*S.pyogenes*
Diphtheria	Herpes	Mycoplasmosis	Syphilis
Ebola fever	HIV	Scrub typhus	Toxoplasmosis
Rocky mountain fever	Leptospirosis	Tuberculosis	Gonorrhea

5.3 Management of the exposed site:-

5.3.1 First Aid

For skin – if the skin is broken after a needle stick or sharp instrument:

- Immediately wash the wound & surrounding skin with water & soap and rinse.
- Do not scrub.
- Do not use antiseptics or skin scrub (bleach, chlorine, alcohol, betadine)

After a splash of blood or body fluid:

- To unbroken skin:
- Wash the area immediately
- Do not use antiseptics.

For the eye:

- Irrigate the exposed eye immediately with water or normal saline.
- Sit in a chair, tilt head back and ask a colleague to gently pour water or normal saline over the eye.

- If wearing contact lenses, leave them in place while irrigating, as they form a barrier over the eye and will help to protect it. Once the eyes cleaned, remove the contact lenses and clean them in normal manner. This will make them to wear again.
- Do not use soap or disinfectant on the eye.

For Mouth:

- Spit fluid out immediately
- Rinse the mouth thoroughly, using water or saline and split again. Repeat this process several times.
- Do not use soap or disinfectant in the mouth.

Consult the designated physician of the institution for management of the exposure immediately.

5.3.2 SUMMARY OF DO'S & DONT'S	
DO	**DON'T**
Remove gloves, if appropriate	Do not panic
Wash the exposed site thoroughly with running water	Do not put pricked finger in mouth
Irrigate with water or saline if eyes or mouth have been exposed	Do not squeeze wound to bleed it
Wash the skin with soap and water	Do not use bleach, chlorine, alcohol, betadine, iodine or any antiseptic or detergent
Note: Do consult the designated physician immediately as per institutional guidelines for management of the occupational exposure. Report all needle stick injuries to unit head / casualty medical officer. Fill the requisite proforma and send blood sample to microbiology laboratory for testing of HIV / HBsAg / HCV after pre-test counseling and consent of both patient and health care worker. .	

5.3.3 Establish eligibility for PEP

The HIV sero-conversion rate after an AEB (accidental exposure to blood) for percutaneous exposure is 0.3%. The risk of infection transmission is proportional to the amount of HIV transmitted (=amount of the contaminated fluid and the viral load)
Healthcare worker must inform ICN of the injury in designated form. After routine duty hours CMO on duty should be informed in designated form. The designate person shall assess the risk of HIV and HCV transmission following an AEB. This evaluation **must be made rapidly**, so as to start any treatment as soon as possible after the accident (ideally within 2 hours but certainly within 72 hours). This assessment must be made thoroughly (because not every AEB requires prophylactic treatment).
The first dose of PEP should be administered within the first 72 hours of exposure and the risk evaluated as soon as possible. If the risk is insignificant, PEP could be discontinued, if already commenced.

PEP must be initiated as soon as possible, preferably within 2 hours

Two main factors determine the risk of infection: the nature of exposure and the status of the source patient. Availability of PEP needs to be ensured at emergency Department for round-the-clock availability of PEP. The utilization data should be prepared on monthly basis as per NACO/DSACS guidelines.

Post Exposure Prophylaxis

- Post exposure prophylaxis is available for HIV in the form of antiretroviral drugs which are prescribed on the basis of NACO guidelines. HBV vaccine is available in routine hours and anti HBV immunoglobulin will be made available to the exposed worker as soon as possible after consulting with Microbiologist. For HBV PEP following criteria will act as guideline:

Post-HIV exposure management / prophylaxis (PEP)

- It is necessary to determine the status of the exposure and the HIV status of the exposure source before starting post-exposure prophylaxis(PEP)

Immediate measures:

- wash with soap and water
- No added advantage with antiseptic/bleach

Next step:

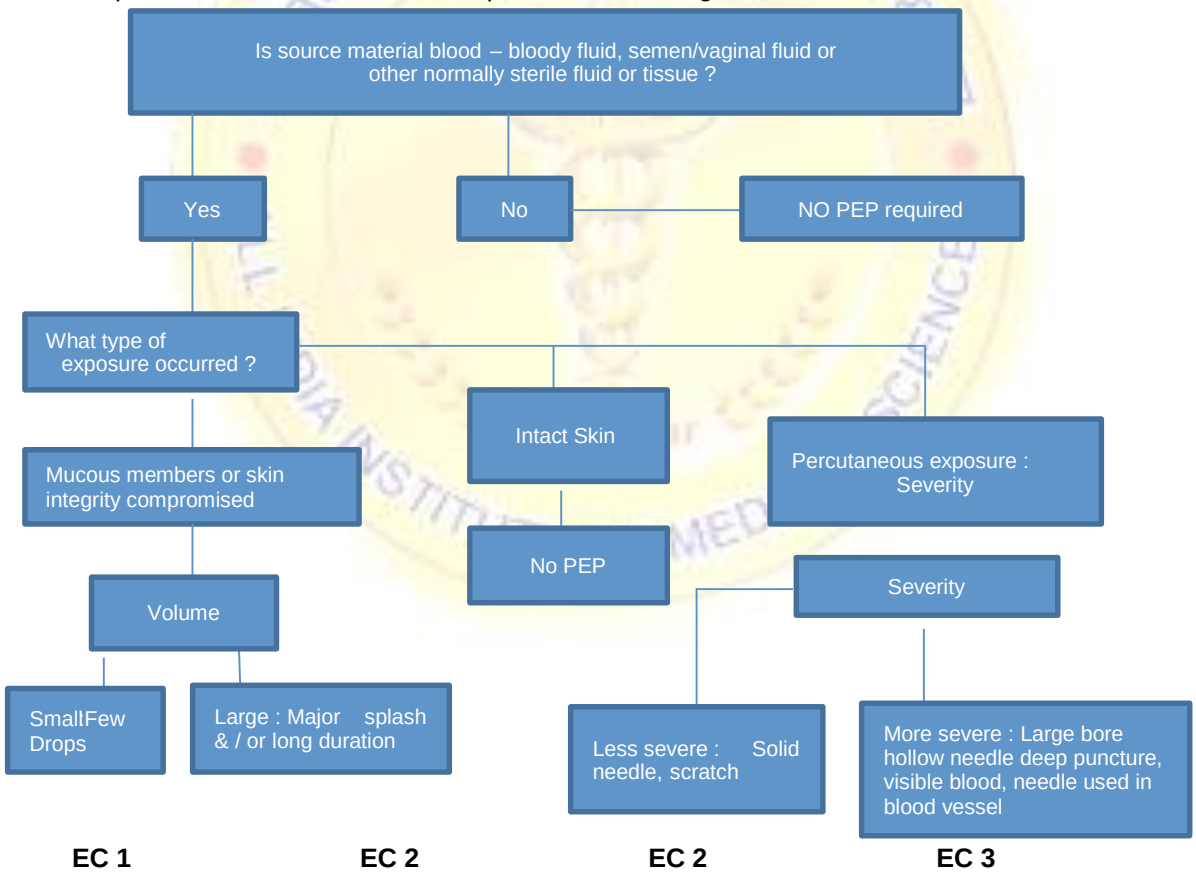
- Prompt reporting in accident/incident reporting forms
- Post-exposure treatment is begin as soon as possible
- Preferably within two hours
- Not recommended after seventy -two hours
- Late PEP? May be yes
- Is PEP needed for all types of exposures? No

5.3.3.1 Post exposure Prophylaxis:

The decision to start PEP is made on the basis of degree of exposure to HIV and the HIV status of the source from whom the exposure/infection has occurred. PEP is started, as early as possible, after an exposure. In case PEP is **initiated** after 72 hours of exposure is of limited use and hence is not recommended. In case of anticipated delay of serology reports one dose of PEP may be given.

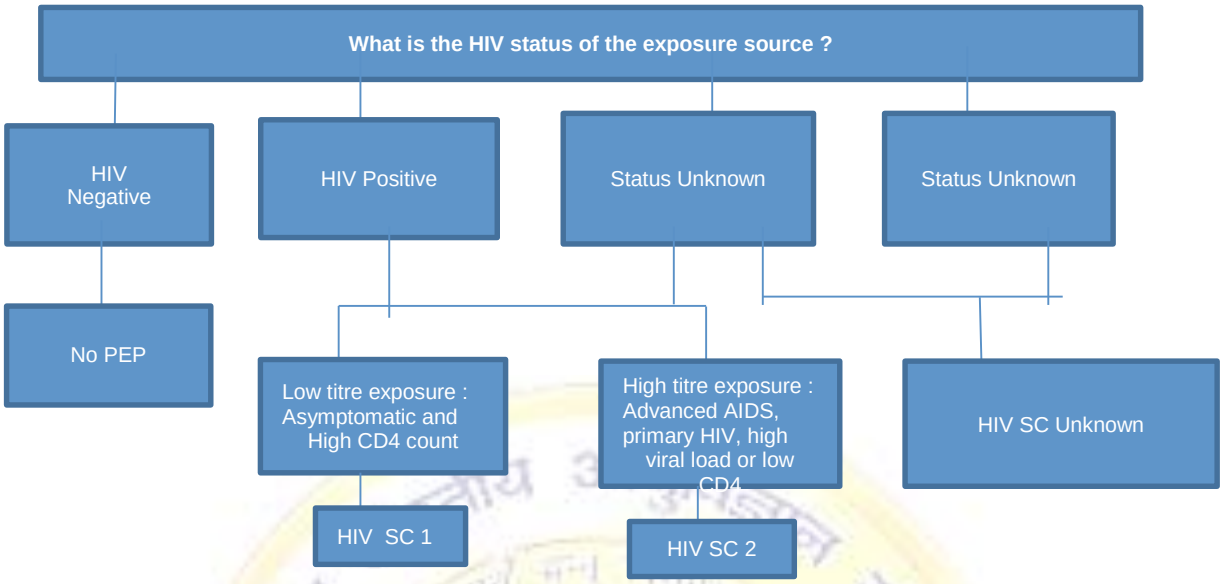
5.3.3.1.1 Determination of the Exposure Code (EC)

- Exposure code can be defined as per the flow chart given below



5.3.3.1.2 **Status Code (SC)**

Determined as per flow chart below.



5.3.3.1.3 Determine Post-Exposure Prophylaxis (PEP) Recommendation

EC	HIV SC	PEP
1	1	Consider basic
1	2	Recommend basic regimen
2	1	Recommend expanded regimen
3	1 or 2	Recommend expanded regimen
1,2,3	Unknown	If exposure setting suggests risks of HIV Exposure, consider basic regimen

Basic regimen (Three Drug Regimen):

- Tenofovir 300 mg + Lamivudine 300 mg+ Efavirenz 600 mg once daily for 28 days. **Expanded regimen: (Three drug regimen)**
- Basic regimen (+ Indinavir – 800 mg/thrice a day, or any other protease Inhibitor.

5.3.3.2 **Testing and Counseling**

The health care provider are tested for HIV as per the following schedule) t**o** monitor seroconversion.

- Base-line HIV test - at time of exposure
- Repeat HIV test - at **six weeks** following exposure
- 2nd repeat HIV test - **at twelve weeks** following exposure
  - 3rd repeat HIV test - **at six months** following exposure
- On all four occasions, HCW must be provided with a pre-test and post-test counseling. HIV testing are carried out on three ERS (Elisa/ Rapid/ Simple) test kits or antigen preparations as per NACO guidelines.
- The HCW are advised to refrain from donating blood, semen or organs/tissues and abstain from sexual intercourse.
- In case sexual intercourse is undertaken a latex condom be used consistently. In addition, women HCW should not breast -feed their infants.

5.3.3.3 Duration of PEP:

- PEP is started, as early as possible, after an exposure. It has been seen that PEP started after 72 hours of exposure is of no use and hence is not recommended.
- The optimal course of PEP is not unknown, but 4 weeks of drug therapy appears to provide protection against HIV.
- If the HIV test is found to be positive at any time within 12 weeks, the HCW are referred to a physician for treatment.
- **In case, exposed worker refuses PEP or refuses to get the laboratory testing done for monitoring of PEP, the same is documented on PEP refusal form.**

5.3.4 Assessing the nature of exposure and risk of transmission

Three categories of exposure can be described based on the amount of blood/fluid involved and the entry port. These categories are intended to help in assessing the severity of the exposure but may not cover all possibilities.

5.3.4.1 Categories of exposure

Category	Definition & example
Mild exposure	Mucous membrane/non-intact skin with small volumes Eg: a superficial wound with a plain or low caliber needle, Or contact with the eyes or mucous membranes, subcutaneous injections following small-bore needles
Moderate exposure	Mucous membrane/non intact skin with large volumes or percutaneous Superficial exposure with solid needle E.g.: a cut or needle stick injury penetrating gloves
Severe exposure	Percutaneous with large volume. Eg: An accident with a high caliber needle (>18G)visibly contaminated with blood; A deep wound(hemorrhagic wound and/or very painful); Transmission of a significant volume of blood; An accident with material that has previously been used intravenously or intra-arterial.
The wearing of gloves during any of these accidents constitutes a protective factor. **Note:** in case of an AEB with material such as discarded sharps/ needles, contaminated for over 48 hours, the risk of infection becomes negligible for HIV, but still remains significant for HBV. HBV survives longer than HIV outside the body.	

5.3.5 Assessing the HIV status of the source of exposure

PEP needs to be started as soon as possible after the exposure and within 72 hours. In animal studies, initiating PEP within 12, 24 or 36 hours of exposure was more effective than initiating PEP 48 hours or 72 hours following exposure. PEP is not effective when given more than 72 hours after exposure. A baseline rapid HIV testing should be done before starting PEP.
Initiating of PEP where indicated should not be delayed while waiting for the results of HIV testing of the source of exposure. Informed consent should be taken before testing of the source as per national HIV testing guidelines.

5.3.5.1 Categories of situations depending on results of the source	
Source HIV status	**Definition of risk in source**
HIV negative	Source is not HIV infected but consider HBV & HCV
Low risk	HIV positive & clinically asymptomatic
High risk	HIV positive & clinically symptomatic
Unknown	Status of the patient is unknown & neither the patient nor his/her blood is available for testing. The risk assessment will be based only upon the exposure

HIV infection is not detected during the primary infection period by routine use HIV tests. During the window period which lasts for approximately 6 weeks, the antibody level is still too low for detection, but infected persons can still have a high viral load. This implies that a positive HIV test result can help in taking the decision to start the PEP, but a negative test result does not exclude HIV infection. In districts or some population groups with a high HIV prevalence, a higher proportion of HIV infected individuals are found in the window period. In these situations, a negative result has even less value for decision making on PEP.

5.3.5.2 Assessment of the exposed individual

The exposed individual should have confidential counseling & assessment by an experienced physician. The exposed individual should be assessed for pre-existing HIV infection, intended for people who are HIV negative at the time of their potential exposure to HIV. Exposed individuals who are known or discovered to be HIV positive should not receive PEP
. They should be offered counseling & information on prevention of transmission of & referred to clinical & laboratory assessment to determine eligibility for antiretroviral therapy (ART). Besides the medical assessment, counseling exposed HCP is essential to allay fear & start PEP (if required) at the earliest.

5.3.5.3 Counseling for PEP

Exposed persons should receive appropriate information about what PEP is about & the risk & benefits of PEP in order to provide informed consent. It should be clear that PEP is not mandatory.

Key information to provide informed consent to the client after occupational exposure	
The risk of acquiring HIV infection from the specific exposure	• Ask client for understanding of HIV transmission risk after exposure • The risk of getting HIV infection from a person known to be HIV positive is estimated to be • Sharps injury: 3 in 1000 exposures (0.3%) • Mucous membrane splash: 1 in 1000 exposures (0.1%) • The risk in increased with large exposure eg: needle stick from hollow bore needles with visible blood, from artery/vein & from source patients with high viral load
What is known about PEP efficacy	• Ask clients understanding of PEP • PEP is provided to prevent potential transmission of the HIV virus • PEP is not 100%effective & should be given within 72 hours • Balance risk & benefits of PEP:PEP may prevent HIV transmission, versus possible risk of side effects
• Information about clients risk of • The importance of being tested • receiving appropriate posttest counseling • That PEP medicines will be discontinued if their initial HIV test is positive.	• Clients' possibility of prior HIV infection should be HIV infection based upon a risk assessed. • Counsel for HIV testing & follow-up psychosocial • where possible rapid testing should be • & used • Inform if the baseline test is positive, then the PEP counseling will be discontinued. • Arrange referral to ART Centre for assessment if found HIV positive.
• Importance of adhering to medication once Started • Duration of the course of medicine (4weeks)	• Discuss dosing of the PEP medicine eg:pill should be taken twice a day for 28 days • Depending on the nature & risk of exposure, 3 drugs may be used • Side effects may be important with use of 3 drugs.
Common side effects that may be experienced	• Discuss possible side effects of the PEP medicines eg: nausea, fatigue, headache etc. • Side effects often improve over time. It is often minor & do not need specialized supervision. • Symptomatic relief can also be given by using other drugs.
That they can stop at any time but will not get the benefit of PEP – if the source is HIV positive.	• Animal studies suggest that taking less than 4weeks of PEP does not work. • If client decides to stop at any time, he needs to contact the physician before stopping the medication. • Arrange for follow up visit & decide further course of action.
Prevention during the PEP period	• After any AEB, the exposed person should not have unprotected intercourse until it is

	confirmed,3 months after the exposure, that he is not HIV infected. • It is also advised to avoid pregnancy. • Use of condoms is essential.
If client is pregnant – she can still take PEP during pregnancy	• The PEP drugs used are safe for pregnancy. • If the client gets HIV during the pregnancy due to the exposure, the baby will have some risk of becoming HIV infected.
Safety of PEP if the client is breastfeeding	• The PEP drugs used are safe during breast feeding. • May consider stopping breast feeding if PEP is indicated
Educate client on the possible signs & symptoms of early HIV seroconversion	• Signs & symptoms of early HIV seroconversion: fever, rash, oral ulcer, pharyngitis, malaise, fatigue, joint pains, weight loss, myalgia, headache(similar to flu like symptoms)
Risk of acquiring Hepatitis B & C from a specific exposure & availability of prophylaxis for this	• Risk of Hepatitis B is 9-30% from a needle sticks exposure – client can be given vaccinations. • Risk of Hepatitis C is 1-10% after a needle stick exposure – there is no vaccination for this.

HIV RNA testing by Reverse transcriptase polymerase chain reaction (RT-PCR) during PEP has a very poor positive predictive value & should be strongly discouraged.

Pregnancy testing should also be available, but its unavailability should not prevent the provision of PEP.

Other laboratory testing such as hemoglobin estimation should be available, especially when AZT is used in areas where anemia is common.

Testing of other blood borne diseases such as syphilis, malaria & kala azar may also be useful, depending on the nature of risk, symptoms of the source patient, local prevalence & laboratory capacity.

Follow up of an Exposed Person

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

Clinical follow up

In addition, in the weeks following an AEB, the exposed person must be monitored for the eventual appearance of signs indicating an HIV seroconversion: acute fever, generalized lymphadenopathy, cutaneous eruptions, pharyngitis, non-specific flu symptoms & ulcers of the mouth & genital area. These symptoms appear in 50-70% of individuals with an primary infection & almost always within 3-6 weeks after exposure. When a primary infection is suspected, referral to an ART center or for expert opinion should be arranged rapidly.

An exposed person should be advised to use precautions (eg- avoid blood/ tissue donations, breastfeeding, unprotected sexual relations or pregnancy. Condom use is essential.

Adherence and side effect counseling should be provided & reinforced at every follow-up visit. Psychological support & mental health counseling is often required.

Laboratory follow up

Follow up HIV testing: exposed persons should have post PEP HIV tests. Testing at the completion of PEP may give an initial indication of seroconversion outcome if the available antibody test is very sensitive. However, testing at 4-6 weeks may not be enough as use of PEP may prolong the time of seroconversion; & there is not enough time to diagnose all persons who seroconvert. Therefore testing at 3 months & 6 months is recommended. Very few cases of seroconversion after 6 months has been reported. Hence, no further testing is recommended if the HIV test at 6 months is negative.

Recommended follow up laboratory tests		
Timing	**In persons taking PEP**	**In persons not taking PEP**
Weeks 2 & 4	Transaminases Complete blood count	Clinical monitoring for hepatitis
Week 6	HIV Ab	HIV Ab
Month 3	HIV Ab, anti HCV, HBsAg Transaminases	HIV Ab, anti HCV, HBsAg
Month 6	HIV Ab, anti HCV, HBsAg Transaminases	HIV Ab, anti HCV, HBsAg

Hepatitis B

All health staff should be vaccinated against hepatitis B. the vaccination for Hepatitis B consists of 3 doses: initial, 1 month & 6 months. Sero conversion after completing the full course is 99%.

If the exposed person is unvaccinated or unclear vaccination status give complete hepatitis B vaccine series.

Guidelines for Post exposure prophylaxis (*) of persons with non-occupational exposures(1) to blood or body fluids that contain blood by exposure type and vaccination status

Exposure	**Treatment**	
	Unvaccinated person(2)	**Previously vaccinated person(3)**
HBsAg (**)Positive source		
Percutaneous (e.g. bite or needle stick) or mucosal exposure to HBsAg positive blood or body fluids	Administer hepatitis B vaccine series and hepatitis B immune globulin (HBIG).	Administer hepatitis B vaccine booster dose.
Sex or needle sharing contact of an HBsAg positive person	Administer hepatitis B vaccine series and hepatitis B immune globulin (HBIG).	Administer hepatitis B vaccine booster dose.
Victim of sexual assault/abuse perpetrator who is HBsAg positive	Administer hepatitis B vaccine series and hepatitis B immune globulin (HBIG).	Administer hepatitis B vaccine booster dose.
Source with unknown HBsAg status		
Victim of sexual assault/abuse perpetrator with unknown HBsAg status	Administer hepatitis B vaccine series	No treatment
Percutaneous (e.g. bite or needle	Administer hepatitis B vaccine	No treatment

stick) or mucosal exposure to potentially infectious blood or body fluids forms a source with unknown HBsAg status.	series	
Sex or needle sharing contact of person with unknown HBsAg status	Administer hepatitis B vaccine series	No treatment

(*)When indicated immunoprophylaxis should be initiated as soon as possible, preferably within 24 hours Studies are limited on the maximum interval after exposure during which post exposure prophylaxis is effective , but the interval is unlikely to exceed 7 days for Percutaneous exposures or 14 days for sexual exposures . The hepatitis B vaccine series should be completed.

(**) Hepatitis B surface antigen.

(1) These guidelines apply to non-occupational exposures .Guidelines for management of occupational exposure have been published separately [(1)] and also can be used for management of non-occupational exposure, if feasible.

(2) A person who is in the process of being vaccinated but who has not completed the vaccine series should complete the series and receive treatment as indicated.

(3) A person who has written documentation of a complete hepatitis B vaccine series and who did not receive post vaccination testing.

HBV PROPHYLAXIS FOR REPORTED EXPOSURE INCIDENTS

HBV status of person Exposed	Significant exposure			Non-significant exposure	
	HBsAg positive source	Unknown source	HBsAg negative source .	Continued risk	No further risk
≥1 dose HB vaccine pre-exposure	Accelerated course of HB vaccine* HBIG x 1	Accelerated course of HB vaccine*	Initiate course of HB vaccine	Initiate course of HB vaccine	No HBV prophylaxis Reassure
≥ 2 doses HB vaccine pre-exposure (anti-HBs not known)	One dose of HB vaccine followed by second dose one month later	One dose of HB vaccine	Finish course of HB.vaccine	Finish course of HB vaccine	No HBV prophylaxis Reassure
Known responder to HB vaccine (anti-HBs > 10 miU/ml)	Consider booster dose of HB vaccine	Consider booster dose of HB vaccine	Consider booster dose of HB vaccine	Consider booster dose of HB vaccine	No HBV prophylaxis Reassure
Known non-responder to HB vaccine (anti-HBs <10 miU/ml 2-4 months post-immunisation)	HBIG x 1 Consider booster dose of HB vaccine!	HBIG x 1 Consider booster dose of HB vaccine	No HBIG Consider booster dose of HB vaccine	No HBIG Consider booster dose of HB vaccine	No prophylaxis Reassure

Determination of HBIG (Immunoglobulin):-

For percutaneous (needle stick), ocular, or mucous-membrane exposure to blood known to contain HBsAg and for human bites from HBsAg carriers that penetrate the skin, a single dose of HBIG (0.06 ml/kg or 5.0 ml for adults) should be given as soon as possible after exposure and within 24 hours if possible. HB vaccine 1 ml (20 ug) should be given IM at a separate site as soon as possible, but within 7 days of exposure , with the second and third doses given after one month and 6 month, respectively , If HBIG is unavailable , immunoglobulin may be given in an equivalent dosage (0/06 ml/kg or 5.0 ml for adults). If an individual has received at least two doses of HB vaccine before an accidental exposure, no treatment is necessary if serologic tests show adequate levels (> 10MIU/DL) of anti-HBs. For persons who choose not to receive HB vaccine, the previously recommended two doses HBIG regimen may be used

Hepatitis C

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. However, a theoretical argument is that intervention with antivirals when HCV RNA first becomes detectable might prevent the development of chronic infection. Data from studies conducted outside the United States suggest that a short course of interferon started early in the course of acute hepatitis C is associated with a higher rate of resolved infection than that achieved when therapy is begun after chronic hepatitis C has been well established. These studies used various treatment regimens and included persons with acute disease whose peak ALT levels were 500–1,000 IU/L at the time therapy was initiated (2.6–4 months after exposure).

No studies have evaluated the treatment of acute infection in persons with no evidence of liver disease (i.e., HCV RNA-positive <6 months duration with normal ALT levels); among patients with chronic HCV infection, the efficacy of antivirals has been demonstrated only among patients who also had evidence of chronic liver disease (i.e. Abnormal ALT levels). In addition, treatment started early in the course of chronic HCV infection (i.e., 6 months after onset of infection) might be as effective as treatment started during acute infection. Because 15%–25% of patients with acute HCV infection spontaneously resolve their infection, treatment of these patients during the acute phase could expose them unnecessarily to the discomfort and side effects of antiviral therapy.

Data upon which to base a recommendation for therapy of acute infection are insufficient because

a) No data exist regarding the effect of treating patients with acute infection who have no evidence of disease,
b) Treatment started early in the course of chronic infection might be just as effective and would eliminate the need to treat persons who will spontaneously resolve their infection, and
c) The appropriate regimen is unknown

Pregnancy and PEP:

- Based on limited information, anti-retroviral therapy taken during 2nd and 3rd trimester of pregnancy has not caused serious side effects in mothers or infants. There is very little information on the safety in the 1st trimester. If the HCW is pregnant at the time of exposure to HIV, the designated authority/physician must be consulted about the use of the drugs for PEP.

Side-effects of these drugs:

- Most of the drugs used for PEP have usually been tolerated well except for nausea, vomiting, tiredness, or headache.

Follow-Up of HCW with Sharps Injury or BBF for HBV & HCV Seroconversion.

- SGOT and SGPT test - at **six weeks** following exposure and **at twelve weeks** following exposure
- In case above mentioned parameters are found deranged then HCW should be screened for seroconversion. If found positive, HCW should be referred to Hepatologist.

References: -

- NACO PEP Guidelines
- CDC Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Post exposure Prophylaxis
- MMWR. DEC 8, 2006/55(RR16)

6. ISOLATION POLICY AND TRANSMISSION BASED PRECAUTIONS

6.1 Isolation Policy

Criteria for isolation and procedures

6.1.1 Aim

- To prevent the transmission of pathogenic microorganisms within the hospital.
- To recognize the importance of all body fluids, secretions and excretions in the transmission of healthcare associated pathogens
- To practice adequate precautions for infections transmitted by airborne Droplet & contact

6.1.2 Measures for Reduction of Transmission

6.1.2.1 Hand washing

- Frequent hand washing is the most important measure.

6.1.2.2 Patient care Hand wash

- Wash hands after touching blood, body fluids, secretions, excretions and contaminated items, whether gloves are worn or not.
- Wash hands immediately after gloves are removed.
- Wash hands between tasks and procedures on the same patient to prevent cross contamination of different body sites.
- Use a plain soap for routine hand washing.
- Use antiseptic soap or an alcohol based disinfectant followed by thorough hand washing for accidental skin contamination. Antimicrobial hand washing products are used for hand washing before personnel care for newborns and when otherwise indicated during their care, between patients in high-risk units, and before personnel take care of severely immunocompromised patients.

6.1.2.3 Surgical Hand Wash

- Procedural hand hygiene includes a full surgical scrub using running water and 4% chlorhexidine scrub solution from the fingertips to the elbow. The scrub is performed for a minimum of 2 to 3 minutes.

6.1.2.4 Gloves

- Clean, unsterile gloves may be worn as a protective barrier during procedures. Sterile gloves are worn when sterile procedures are undertaken

6.1.2.5 Personal Protective Equipment: (PPE)

- Gowns: A clean, no sterile, gown is worn to prevent contamination of clothing and skin of personnel from exposure to blood and body fluids. When gowns are worn to attend to a patient requiring barrier nursing, they are removed before leaving the patients environment and hand washing is done.
- Masks and goggles: This equipment is worn to provide barrier protection. Mask should cover both the nose and the mouth.

6.2 Patient Isolation

Patients are isolated when suffering from highly transmissible diseases e.g. chicken pox. These patients are provided with isolation through designated isolation areas (e.g. isolation room in swine flu ward – when no patient of swine flu is admitted or in a single room at private wards).

6.2.1 Barrier Nursing

Barrier nursing: The aim is to erect a barrier to the passage of infectious pathogenic organisms between the contagious patient and other patients and staff in the hospital, and hence to the outside world. Preferably, all contagious patients are isolated in separate rooms, but when such patients must be nursed in a ward with others, screens are placed around the bed or beds they occupy.

Cohort nursing may be practiced as re-infection with the same organism is unlikely. The nurses, attending consultants as also any visitors must wear gowns, masks, and sometimes rubber gloves and they observe strict rules that minimize the risk of passing on infectious agents. Surgical standards of cleanliness in hand washing are observed after they have been attending the patient.

- Bedding is carefully moved in order to minimize the transmission of airborne particles, such as dust or droplets that could carry contagious material.
- Barrier nursing must be continued until subsequent cultures give a negative report Infected with epidemiologically important microorganisms such as MRSA, Pan- resistant gram-negative bacteria are kept in their patient care unit with alert of zero tolerance barrier nursing.

6.2.2 Cleaning of Equipment and articles

Contaminated disposable articles are bagged appropriately in leak proof bags and disposed. Critical reusable medical equipment is disinfected or sterilized after use. Non-critical equipment is cleaned, disinfected after use.

6.2.3 Laundry

Soiled linen are handled as little as possible and with minimum agitation to prevent gross microbial contamination of the air and of persons handling the linen. All soiled linen are bagged in red bag with proper labels and put into small carts at the location where it was used than transferred into the big carts; it should not be sorted or pre-rinsed in patient-care areas and transported to the laundry from the pre-defined corridors.

6.2.4 Eating Utensils

Routine cleaning with detergent and hot water is sufficient.

6.2.5 Terminal Cleaning

Terminal cleaning of patient unit should be done with appropriate disinfectant solution.

- Bed should be cleaned properly including Bed frames, side rails and mattress initially with soap and water followed by disinfectant solution.
- Other equipment like I/V stands, bed lockers etc. should be cleaned with soap and water followed by disinfectant solution.
- All metal items should me clean with bacillocid (0.5%) and non-metal items can be clean with superoxide water.
- If any electrical items like infusion pumps etc. used should be clean with spirit twice.
- All the used items like oxygen mask, O2 tubing's, suction jars and tubing's should be send to CSSD for HLD.
- If ventilator is used for the patient then whole ventilator tubing's should be send to CSSD for autoclaving after primary cleaning. Ventilator surface also should be disinfected.
- Ventilator switching from one patient to another is strongly discouraged.
- All wall tiles and floor should clean with soap and water.
- Swine flu ward – when no patient–of swine flu are admitted or in a single room at private wards).

6.2.6 Isolation policy for certain groups of organism

1. MRSA: When MRSA is isolated in the lab the microbiologist will inform the sister-in charge/duty doctor/head of unit. Patient is isolated and barrier nursed. Hand washing is strictly adhered to by all concerned. Linen is changed on a daily basis. Dirty linen is carefully packed in red bag with proper label and sent to laundry.

2. Multi-resistant bacteria e.g. Imipenem resistant Acinetobacter, multi-resistant *Pseudomonas aeruginosa*: The aim is to curtail the spread of such bacteria. Hence patient is to be placed on strict barrier nursing precautions irrespective of whether the organism is a colonizer or the cause of infection

3. Pulmonary tuberculosis: Masks are used during the care of all patients with sputum positive pulmonary tuberculosis.
Note: Isolation precautions are to be followed until all previous culture sites are negative.

4. **HIV/HBsAg/ HCV** infected patients: Universal precautions.

6.2.7 List of diseases which need isolation precautions

Condition	PPE required	Comment
Chicken-Pox (Varicella)	Gloves, plastic apron for contact.	Preferably Single room. **Staffs who have not had Chicken-Pox should not nurse these patients.**
German Measles (Rubella)	Gloves/apron for direct contact	Single room. Check on any non- immune Pregnant staff.
Hepatitis Type A Infection Type B Serum Type C Serum	Gloves Gloves Gloves	Single room if bleeding. Single room if bleeding. Single room if bleeding.
HIV/AIDS	Gloves/apron.	Single room if bleeding or has an opportunistic infection.
Herpes Zoster	Gloves/apron for direct contact	Single room. Staffs who have not Chickenpox /vaccinated should not nurse these patients
Impetigo	Gloves for direct contact.	Single room.
Measles (including encephalitis)	Gloves/apron for direct contact	Isolation room
Infection with Multi resistant organisms, including MRSA ,VRE	Gloves/apron for direct contact	Strict hand washing is essential. Isolation room/cohort nursing
Scabies	Gloves for contact until treated. 24 hours after treatment not infectious	All staff in contact need treatment also other patients.
Pulmonary Tuberculosis	Gloves/apron for direct contact. Masks to be worn by staff for 2 weeks after patient starting treatment.	Masks must be worn in open cases of tuberculosis. Transfer to infectious disease hospital
Diphtheria	PPE to prevent Droplet infection	Isolation room

6.3 Transmission Based Precautions

Besides standard precautions, specific transmission based precautions are observed according to the mode of transmission of the various conditions to protect health care workers and other patients from cross infections.

Table:1. Transmission based Precautions

Precautions	Mode of Transmission is Contact (category I)	Mode of Transmission is Droplet (category II)	Mode of Transmission is Airborne (category III)
Mask	No	Yes	Yes
Gown	Yes	No	No
Gloves	Yes	No	No
Patient Transport	Receiving department to be informed of precautions	1. Mask the patient 2. Receiving Department to be informed of precautions	3. Mask the patient 4. Inform the receiving department of precautions
Environment Cleaning	5. Dedicate or change solutions and equipment after use 6. Change privacy curtain when isolation is discontinued or patient is discharged	Routine	Routine
Patient Care Equipment (Special Handling)	7. Yes, dedicated equipment	No	No
Visitors	8. Gown, gloves for patient care. 9. Wash hands when Entering/leaving room. 10. Mask as directed	11. Wear a mask 12. Wash hand when entering or leaving room	13. Wear respiratory protection 14. Wash hands when entering or leaving

Table: 2. Reference Table of Standard and Transmission based precautions for Various Diseases and Conditions

Diseases / Condition	Precaution Category	Infective Material	Duration for Precautions	Comments
Abscess Draining, major	Contact	Drainage	Until drainage contained	Major = drainage not contained by dressing
Acid Fast Bacillus Positive	See Tuberculosis			
Acquired immunodeficiency syndrome (AIDS)	Standard	Blood & bloody body fluids		AIDS is specified Communicable disease.
Actinomycosis	Standard			
Amebiasis (Dysentery) Adult	Standard	Faeces		Consider Contact Precautions for adults with poor hygiene and/or who contaminate the environment.
Pediatric	Contact	Faeces	Until formed or	

			normal stools × 24 hours	
Arthropod borne viral encephalitis (Jap.B)	Standard	Blood & bloody body fluids		
Arthropod borne viral fevers (Dengue)	Standard	Blood & bloody body fluids		Arthropod borne viral fever is a specified communicable disease.
Aspergillosis	Standard			
Bronchiolitis Adult	Standard			
Pediatric	Contact	Respiratory secretions	Duration of symptoms	Various etiologic agents, such as respiratory syncytial virus ,parainfluenza viruses, adenoviruses have been associated with this condition.
Candidiasis All forms, including mucocutaneous (moniliasis, thrush)	Standard			
Cellulitis (Uncontrolled drainage)	Contact	Drainage	Until drainage contained	
Chancroid (Soft chancre)	Standard			
Chickenpox (Varicella) Caused by Varicella zoster virus.	Airborne AND Contact	Respiratory Secretion and Lesions	Until all lesions are crusted	Negative pressure room is required. Neonates born to mothers with active Varicella should be placed on Airborne and Contact isolation at birth. Exposed susceptible patients should be placed on Airborne and contact isolation beginning 10 days after first exposure and continuing until 21 days after last exposure (up to 28 days if VZIG given). First exposure is

				defined as day one. Consult attending physician to assess need for VZIG Period of communicability beings 2 days before onset of rash until all lesions are rusted
Cholera	Contact	Faeces	Until formed or normal stools × 24hours	
Clostridium difficile diarrhea	Contact	Faeces	Until formed normal stools or no stools × 48 hours.	
Clostridium perfringens (Gas gangrene)	Standard			
Congenital rubella	Contact and Droplet	Respiratory secretions and urine	During any admission for the 1st year after birth unless nasopharyngeal and urine cultures after 3 months of age are negative for rubella virus	Susceptible persons should stay out of room
Conjunctivitis (Pink eye Acute bacterial Chlamydia, Gonococcal Acute Viral	Standard Standard contact	Eye Discharge	Duration of symptoms	
Croup Pediatric	Contact	Respiratory secretions	Duration of symptoms	Viral Agents such as Para influenza viruses and influenza A virus have been associated with this condition
Cryptosporidiosis	Standard			
Cryptosporidiosis Adult	Standard			Consider contact precautions for adults with poor hygiene and/or who contaminate environment
Pediatric	Contact	Faeces	Until formed or normal stools 24	

			hours	
Cytomegalovirus infection	Standard			
Decubitus ulcer major	Contact	Drainage	Until drainage contained	Major = drainage not contained by dressing
Dengue	Standard			
Diarrhea, acute	Contact	Faeces	Until formed or normal stools × 24 hours	
Diphtheria (Corynebacterium Diphtheriae Cutaneous	Contact	Lesion Secretions.	Until 2 cultures from skin lesions taken at least 24 hours apart after cessation of antimicrobial therapy are negative	
Diphtheria Pharyngeal	Droplet	Respiratory secretions	Until 2 cultures from both nose and throat taken at least 24 hours apart after cessation of antimicrobial therapy are negative for *Corynebacterium diphtheriae*.	
Epiglottitis *Haemophilus influenzae* Type B	Droplet	Respiratory secretions	For 24 hours after start of effective therapy.	
Epstein-Barr virus infection (including infectious mononucleosis)	Standard			
Food Poisoning (Botulism,/clostridium perfringens or Staphylococcus)	Contact	Faeces	Until formed or normal stools × 24 hours	
Furunculosis, staphylococcal (Pediatric)	Contact	Drainage	Until drainage stops	
Gonorrhea	Standard			
Guillain-Barre' syndrome	Standard			
Helicobacter pylori	Standard			
Hepatitis Viral Hepatitis A, Hepatitis E Adult Pediatric	Standard Contact	 Faeces	For 7 days after onset of symptoms	For Hepatitis A & E consider contact precautions for adults with poor

				hygiene and/or who contaminate the environment.
Hepatitis B (HBsAg +) Hepatitis C and other specified non A, non B Herpes simplex (Herpes virus hominis) Encephalitis Neonatal Mucocutaneous, disseminated or primary severe Mucocutaneous, recurrent skin, oral or genital	Standard Standard Contact Contact Standard	Blood and bloody fluids Lesion, secretions, possibly all body secretions and Excretions. Lesion secretions	Duration of symptoms. Duration of symptoms.	Hepatitis B and C are specified communicable disease. For staff issues for all types of Hepatitis. Precautions are indicated for infants delivered either vaginally or by caesarean section (if membranes have been ruptured more than 4-6 hrs) to women with active genital herpes simplex infections, until neonatal HSV infection has been ruled out.
Herpes Zoster Caused by Varicella zoster virus (shingles) Localized in normal patient. Localized in immunocompromised patient, and/or disseminated in any patient.	Standard Airborne and Contact	Lesion secretions and possibly respiratory secretions.	For 72 hours after start of effective anti viral therapy or if untreated until all lesions are crusted.	For localized lesions, try to contain with dressings. Roommates should not be susceptible to chickenpox. Negative pressure isolation room required. Exposed susceptible patients should be placed on Airborne and contact isolation beginning 10 days after first exposure and continuing until 21 days after last

				exposure (up to 28 days if VZIG given). First exposure is defined as day one.
Human immunodeficiency virus (HIV)	Standard	Blood & Bloody body fluids		
Influenza	Droplet	Nasopharyngeal al secretions	For 7 days after onset of symptoms. Viral shedding may occur longer in young children	If private room is unavailable, consider cohorting patients with influenza.
Leprosy (Hansen's disease)	Standard			
Leptospirosis	Standard			
Malaria	Standard			
Measles (Rubella)	Airborne	Respiratory Secretions.	For 4 days after start of rash, except in immunocompromised patients for whom precautions should be maintained for duration of illness.	Negative pressure room is required .Exposed susceptible patients should be placed on Airborne isolation beginning 5days after first exposure through 21days after last exposure.
Meningitis Unknown etiology *Neisseria meningitidis* (meningococcal) known or suspected *Haemophilus influenzae* Type b known or suspected Other Bacterial, Fungal Aseptic (Viral or non (bacterial)	Droplet Droplet Droplet Standard Standard	Possibly Respiratory Secretions Respiratory secretions Respiratory secretions	Until etiology Known For 24 hours after start of effective Therapy For 24 hours after start of effective therapy	Bacterial Meningitis is a specified communicable disease
Meningococcemia (meningococcal sepsis)	Droplet	Respiratory secretions	For 24 hours after start of effective therapy	Meningococcemia is a specified communicable

				disease.
Methicillin Resistant *Staphylococcus aureus* (MRSA)	Contact	Any body fluid or site		
Mucormycosis	Standard			
Mumps (infectious parotitis)	Droplet	Respiratory secretions	For 9 days after onset of swelling	Exposed susceptible patients should be placed on Droplet isolation beginning 12 days after first contact through 26 days after last exposure.
Mycobacterium (nontuberculous, atypical, non TB complex) Pulmonary	Standard			
Mycoplasma pneumonia (Primary atypical pneumonia	Droplet	Respiratory secretions	Duration of symptoms	
Nocardiosis	Standard			
Pertussis (Whooping cough)	Droplet	Respiratory secretions	For 5 days after start of effective therapy or 3 weeks after onset of paroxysms if not treated	
Pharyngitis	Standard			
Plague (*Yersinia pestis*) Bubonic Pneumonic	Standard Droplet	Respiratory	For 3 days after start of effective therapy	Bubonic plague is a Specified communicable disease.
Pneumococcal Infections, Invasive	Standard			Invasive (cultured from sterile site) pneumococcal infections are a specified communicable disease.
Pneumonia *Haemophilus influenzae* Type b Adult Pediatric *Neisseria meningitidis* (meningococcal) known or suspected	 Standard Droplet Droplet	 Respiratory secretions Respiratory secretions	For 24 hours after start of effective therapy For 24 hours after start of effective	

Mycoplasma (Primary atypical pneumonia) known or suspected. *Pneumocystis carinii* *Staphylococcus aureus* *Streptococcus*. Group A Adult Pediatrics Other bacterial including gram – negative and etiology unknown. Fungal Viral Adult Pediatrics	Droplet Standard Standard Standard Droplet Standard Standard Standard Droplet	Respiratory secretions Respiratory secretions	therapy Duration of symptoms. For 24 hours after start of effective therapy Duration of symptoms	Ensure roommate not Immuno-compromised
Poliomyelitis	Standard			Acute poliomyelitis is a specified communicable disease.
Pseudo membranous colitis	Contact	Faeces	Until Clostridium difficile ruled out.	
Rabies	Standard			Rabies is a specified communicable disease.
Rheumatic fever	Standard			
Ritter's disease (Staphylococcal scalded skin syndrome) Adult Pediatric	Standard Contact	Faeces	Until formed or normal stools × 24 hrs.	Consider contact precautions for adults with poor hygiene and/or who contaminate the environment
Rubella (German measles)	Droplet	Respiratory Secretions	Until 7 days after onset of rash	Exposed susceptible patients should be placed on Droplet isolation beginning 12 days after first

				contact through 26 days after last exposure.
Salmonellae Including Typhoid fever or *Salmonella* Typhi (case/carrier) Pediatric	Standard Contact	Faeces	Until formed or normal stools x 24 hours	Consider contact precautions with poor hygiene and/or who contaminate the environment. Typhoid fever is a specified communicable disease.
Shigellosis Adult Pediatric	Standard Contact	Faeces	Until formed or normal stools × 24 hours	Consider Contact precautions for adults with poor hygiene and/or who contaminate the environment
Streptococcal infection (Group A *Streptococcus*) Skin, wound or major burn	Standard Contact	 Drainage	For 24 hours after start of effective therapy	Major = drainage not contained by dressing.
Necrotizing fasciitis, myositis or other soft tissue necrosis. Pneumonia Adult Pediatric Scarlet fever Pediatric Toxic Shock Syndrome (TSS)	Contact Standard Droplet Droplet Droplet Standard	Drainage Respiratory secretions Respiratory secretions Respiratory secretions	For 24 hours after start of effective therapy. For 24 hours after start of effective therapy. For 24 hours after start of effective therapy. For 24 hours after start of effective therapy.	
Syphilis	Standard			
Tetanus	Standard			
Toxoplasmosis	Standard			
Trachoma	Standard			
Tuberculosis (*Mycobacterium Tuberculosis. M. africanum M. bovis*) Confirmed or suspected pulmonary, Laryngeal or military.	Airborne	Respiratory Secretions.	Prior to discontinuing isolation	Negative pressure isolation room is required.

Skin-test (mantoux), Positive with no evidence of current Pulmonary disease. **Extra pulmonary**, meningitis, and drainage lesion (Including scrofula).	Standard Standard			Assess for Pulmonary Disease.
UTI Including pyelonephritis with or without urinary catheter	Standard			

7. STERILISATION, DISINFECTION AND DECONTAMINATION

7.1 STERILISATION

Definition

Sterilization is defined as a process where all microbes are removed from a defined object, inclusive of bacterial endospores**.**

7.1.1 Methods:

i. Heat Sterilization:

- **Moist Heat:** Exposure to saturated steam at 121ºC for 15-20 min OR 134ºC for 4 min in any autoclave.
- **Dry Heat:** Exposure to dry heat at 160ºC for 120 min.

ii. Chemical Sterilization: (for heat sensitive items)

- Ethylene oxide

iii. Low temperature Sterilization

- Plasma sterilizer using Per acetic acid or hydrogen peroxide.

7.1.2 **Packing & Loading**

For effective sterilization, selection of packaging material plays important role apart from sterilization parameters. The following are keys in selecting a suitable packaging material.

1. The packaging material must be permeable to sterilizing agent.
2. The packaging material must be impermeable to bacteria and other contaminants.
3. The packaging material must resist tears and punctures.
4. It should facilitate aseptic presentation of packaged content.

Proper loading of material inside sterilizer is very critical for efficient sterilization. Relative humidity in the processing area should be at least 35%.

- When loading sterilizer there should be space between item to facilitate circulation and penetration of sterilant.
- There should be no contact between items and chamber wall.
- In mixed load linen should be kept on top racks and metal on bottom
- Peel pouches should be kept on the edge facing same direction
- Textile should be kept on the edge
- Instrument sets should be placed flat

7.1.3 Monitoring:

- Mechanical, chemical and biological monitors can be used to evaluate the effectiveness of the sterilization process.
- Each load is monitored with mechanical (time, temperature, pressure) and chemical (internal and external) indicators.
- Biological indicators (spores) should be used weekly to monitor the effectiveness of sterilization.
- Chemical indicators as strips should be used with every batch.

7.1.4 ETO monitoring

- Use to sterilize items that are moisture or heat sensitive.
- Essential parameters of ETO sterilization includes:
- Temperature – Should be 40-55°C
- Exposure time – 16 hours

AN1087 Dosimeters are placed with every run. They change color from yellow to blue when exposed to Ethylene oxide. They integrate the effects of time, temperature and the concentration of Ethylene oxide in contact with the crystals in the capillary tube.

For a load to be considered sterile, the color change from yellow to blue must extend past the triangular mark on the label. No laboratory testing is required. The information is available immediately at the end of a sterilization cycle.

Biological Indicators – Done weekly

Each **AN1080** Biological and Chemical Sterilizer Control pouch is a complete sterility control. Steritest eliminates the possibility of a false positive by including both a spore strip and an ampoule of sterile culture broth sealed in a transparent, gas permeable, waterproof, plastic pouch.

Place the unopened Steritest with the items to be sterilized. At the end of the cycle, remove the Steritest and look at the Dosimeter. A color change from yellow to blue that extends to the triangular mark on the Dosimeter label indicates that a dose of Ethylene oxide sufficient for sterilization has been delivered. Without opening the Steritest pouch, manipulate the ampoule of culture broth inside of its break shield so that the neck of the ampoule is broken.

Gently shake the broth down to cover the spore disk. Incubate the Steritest at 37.5ºC for 72 hours. A change in the color of the broth from blue to orange indicates growth of bacteria and therefore an unsterile load.

7.2 Disinfection

7.2.1 Disinfection is a process where most microbes are removed from defined object or surface, expect bacterial spores**.**

High level disinfection is that which kills all microorganism and high number of bacterial spores.

7.2.2 Classification of Disinfectants

(a) High Level Disinfectants:-

- They destroy all microorganisms including vegetative bacteria, most bacterial spores, fungi, viruses including enteroviruses and mycobacterium tuberculosis except some bacterial spores. Ex.: 2% Glutaraldehyde, Ethylene Oxide, 1%Sodium Hypochlorite (10,000ppm of chlorine)
- Used for semi critical instruments and equipment's (those that are in contact with intact mucous membrane without penetration)
- For gastrointestinal endoscopes, endotracheal tubes, anesthesia breathing circuits, respiratory therapy equipment's.

(b) Intermediate Level Disinfectants:-

They destroy vegetative bacteria, Mycobacterium tuberculosis, most viruses e.g. enteroviruses and fungi but not bacterial spores.

Ex.: Isopropyl alcohol (70%), ethyl alcohol, sodium hypochlorite (0.1%), Chlorhexidine, hydrogen peroxide, phenolic solutions.

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(c) Low Level Disinfectants:-

They destroy most vegetative bacteria, fungi and enveloped virus e.g. HIV but will not kill bacterial spores, Mycobacteria and non-enveloped viruses like enterovirus.

Ex: Quaternary ammonium compounds like benzylkonium chloride, some soaps.

7.2.3 Guidelines for Selection of Disinfectants:-

There is no ideal disinfectant. Each application requires careful view of following:

- Type and number of organisms.
- Type and amount of organic matter
- Contact time
- Type of surface (Rough / Corrugated)
- Type of water (hard / soft)
- Manufacturers data on efficacy
- Safety and environmental aspects (chlorine is not free from toxicity)
- Cost, shelf life and convenience of use
- Residual activity

7.2.4 Two Approaches for Selection of Disinfectants:

1. Accept the manufacturers data
2. Validate yourself

7.2.5 Guidelines for Use of Disinfectants

Name of Disinfectant	Method of Dilution	Contact Time	In Use Span/ Use
1. Aldehyde Solutions: a. Glutaraldehyde (2%) b. OPA(orthophthaldehyde) c. Glutaraldehyde+ Benzyl chloride	Add activator powder / liquid in 5 liter jar and use undiluted Same as above Water 1 part : 49 parts (20 ml + 980 ml)	Disinfection: 20-30 mints Sterilization : 10 hours Same as above Disinfection : 15 min Sterilization : 5 hours30 min	14 days used for heat sensitive instruments e.g. Endoscopes Long acting (28 days) 24 hours Used as surface disinfectant or 2% solution in operation theaters and 0.5% in wards, dressing room. Can be used in a low pressure sprayer.
2. Glutaraldehyde+ Benzyl chloride	Water 1 part : 9 parts (10 ml+990 ml)	Disinfection : 15 min Sterilization : 5 hours30 min	14days(used for instrument sterilization)
3. 6% Hydrogen Peroxide 20 ml H_2O_2(Available as30% stabilized solution)	20 ml H_2O_2 + 80 ml normal saline = 6% H_2O_2 (use freshly prepared)	6-8 minutes	Use immediately after preparation for surgical dressings.
4. 1% Sodium Hypochlorite Ex. : Polar Bleach 5% Polar Bleach 10%	**5%:** 80 ml water + 20 ml bleach to make it1% solution **10%:** 90 ml water +10 ml bleach	20-30 minutes	8 hours Used for blood spills. And laboratory decontamination
5. Calcium hypochlorite Ex. : Bleaching powder(70% available chlorine)	1.4 gms / liter of water for visibly contaminated articles	20-30 min	24 hours Disinfection of toilets, bathrooms and may be used if liquid bleach not available.
6. 11% H_2O_2 + 0.01% diluted silver nitrate (Baccishield/Ecoshield) solution	In 1ltr of water add 200ml Baccishield/ Ecoshield to get 20%solution 10 % w/v solution	60 minutes Then open the area after 3-6 hours 60 minutes	For fogging Surface disinfection
7. 70% Alcohol	Do not dilute	2-5 min.	24 hrs. used for surface disinfectant.
8. Chlorhexidine (2%)w/v 4% Chlorhexidine w/v	Ready to use	2-3 minutes	2%:Upto 6-8 hours for disinfection of hands
9. Povidine Iodine 10%	Ready to use	Allowed to dry	For skin preparation before surgery
10. 1% Triclosan	Ready to use	Antiseptic soap or bathing liquid	For MRSA (Methicillin resistant staphylococcus aureus)
11. (2 propanol- 1 propanol, macetronium ethyl sulfate)	Ready to use	30 seconds	Hand Rub

7.2.6 General Guidelines for Disinfection

7.2.6.1 Critical instruments /equipment's - (that are those penetrating skin or mucous membrane or enter sterile tissue or vascular system) should undergo sterilization before and after use. e.g. surgical instruments and implants

7.2.6.2 Semi-critical instruments /equipment's - (that are those in contact with intact mucous membrane without penetration or skin that is not intact) should undergo high level . e.g laryngoscopes, Anesthesia equipment.

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

Classification	Item Use	Goal	Appropriate Process
Critical item	Items entering sterile tissue, the body cavity, the vascular system and non-intact mucous membranes eg surgical instruments	Objects will be sterile (free of all microorganisms including bacterial spores)	Sterilization (or use of single use sterile products) steam sterilization
Semi-Critical items	Items that make contact, directly or indirectly, with intact · mucous membranes or non-intact skin. E.g. endoscopes, anaesthetic equipment, Respiratory therapy Equipment, Endocavitory probes ,Tonometer Diaphragm	Objects will be free of all microorganisms with the exception of high numbers of bacterial spores.	High level disinfection· Thermal disinfection Chemical disinfection (glutaraldehyde, OPA) It is always preferable to sterilize semi-critical items whenever they are compatible with available sterilization process.
Non-Critical	Objects that come into contact with intact skin but not mucous membranes E.g. crutches, BP cuffs, Tabletops Bed pans, bed rail, bedside table, ECG leads etc.	Objects will be clean	Low level disinfection Cleaning (manual or mechanical)

7.2.7 Instrument cleaning process

STEP 1 -Decontamination

- Decontaminate instruments and other items by placing them in a plastic container of 0.5% hypochlorite solution/Bleaching Solution. Let them soak for 10 minutes. A container of this solution should be kept in every operating theatre and procedure room, so that used items can be place directly into the bucket.
- Users should put instruments and other items into the solution as soon as they are finished using each item. Open or unlock jointed instruments, such as hemostats and scissors. Disassemble those instruments with sliding or multiple parts.
- After 10 minutes, remove the items from the Hypochlorite solution/Bleaching Solution and either rinse with water or clean immediately. Do not leave items in the solution for more than 10 minutes, since excessive soaking in the solution can damage instruments and other items. Always wear gloves when removing instruments and other items from a chlorine solution. Dried out instruments then can be taken for further processing.

STEP 1 has to be performed at User area. All other steps to be performed at CSSD.

STEP 2- Primary Cleaning

- Cleaning is the removal of foreign material (e.g., soil, and organic material) from objects and is normally accomplished using water with detergents or enzymatic products.
- Thorough cleaning is required before high- level disinfection and sterilization because inorganic and organic materials that remain on the surfaces of instruments interfere with the effectiveness of these processes.
- If soiled materials dry or bake onto the instruments, the removal process becomes more difficult and the disinfection or sterilization process less effective or ineffective.
- Surgical instruments should be pre-soaked or rinsed to prevent drying of blood and to soften or remove blood from the instruments.

7.2.8 Steps of Cleaning

Always wear utility gloves, a mask, and protective eyewear when cleaning instruments and other items. Avoid using steel wool or abrasive cleansers. These products can scratch or pit metal or stainless steel, resulting in grooves that can become a nesting place for microorganisms. This also increases the potential for corrosion of the instruments and other items.

Step 1

Decontamination

Step 2

Using a soft brush or old toothbrush, detergent, and water, scrub instruments and other items vigorously to completely remove all blood, other body fluids, tissue, and other foreign matter. Hold items under the surface of the water while scrubbing and cleaning to avoid splashing. Disassemble instruments and other items with multiple parts, and be sure to brush in the grooves, teeth, and joints of items, where organic material can collect and stick.

Step 3

Rinse items thoroughly with clean running water to remove all detergent. Any detergent left on the items can reduce the effectiveness of further chemical processing.

Step 4

Allo**w** items to air-dry (or dry them with a clean towel).

Note: Instruments that will be further processed with chemical solutions must dry completely to avoid diluting the chemicals; items that will be high-level disinfected by boiling do not need to be dried first.

7.2.9 Endoscopes - cleaning and disinfection

1. *Mechanical cleaning:* This is the most important step. Flush the air/water channel for 10-15 seconds to eject any blood or mucus. Aspirate detergent through the biopsy/suction channel to remove gross debris. Use a cleaning brush suitable for the instrument and channel size to brush through the suction channel.
2. *Disinfection:* The endoscope and all internal channels are soaked in 2% Glutaraldehyde for 20 minutes.
3. *Rinsing:* Following disinfection, rinse the instrument internally and externally to remove all traces of disinfectant.
4. *Drying:* Dry the endoscope externally. Flush air through each channel.
5. Store: store the endoscope in a way that prevents recontamination and promotes drying (e.g., hung vertically).
6. *Monitoring: Monitoring* of disinfection procedure of endoscope is done on regular basics (through round sheet) and disinfectant is checked on regular basic.

7.3 Decontamination

This encompasses cleaning, disinfecting and sterilizing of equipment/device:

7.3.1 Decontamination Procedure for Equipment

Pre-cleaning of any item / medical device is an essential step prior to disinfection.

Article	Standard Procedure	Comments
Ambu bag	Should be cleaned with detergent and water, dried and sterilized. be cleaned with	
Applinator (Tonometer Prisms)	Immersion in 0.05% hypochlorite (500 parts per million available chlorine) for 10 min.	A fresh solution should be prepared at the start of each clinic.
Arterial catheters	Sterile, single use only, must be discarded after use.	
Baby equipment feeding a bottles & teats	1. Disposable – single use. 2. Re-usable – should be returned to CSSD or washed in hot detergent and water, rinsed and immersed in Milton fluid, freshly made up from tablets according to manufacturer's instructions.	Should be soaked for minimum of 1 hour.
Baby weighing scales	A fresh liner should be used for each baby. Clean tray as necessary with detergent and water.	If contaminated should be wiped with hypochlorite 1000ppm after washing.
Baby bath	Should be cleaned after each use with detergent and water	
Beds and couches Frame	Should be cleaned with detergent and water between patients and as required	If contaminated with body fluids, see spillage policy If used in isolation room after cleaning should be wiped with a disinfectant.
Mattresses and pillows	Should be cleaned with detergent and water between patients and as required.	If contaminated with body fluids, see spillage policy. Should not be used if cover is damaged Contaminated pillows must be discarded. Torn mattress covers must be replaced before mattress is re-used.
Bedpans and urinals	Should be cleaned and Disinfected with 0.5% sodium hypochlorite or hot water It must be ensured that the item is dry before re-use	
Breast pumps	Should be washed with detergent and in sodium hypochlorite, freshly made up from tablets according to manufacturer's instructions.	
Brushes Nail Toilet	Disposable – single use. Re-usable-to be returned to CSSD after each use Should be rinsed well in flush water and stored dry.	Should not be left on sink after use
Carpets	Vacuum daily	Should be shampooed or steam cleaned in isolation rooms as part of terminal cleans
Commodes	Seat and arms should be cleaned with detergent, water and dried.	If soiled or used in isolation should be wiped with sodium hypochlorite 2% and dried,

		after cleaning.
Cradles	Should be cleaned with detergent, water and dried.	
Crockery and cutlery	Should be heat disinfected in dishwasher. If washed in sync with water and detergent.	
Curtains	Should be changed as part of a rolling program by domestic services.	Should be changed as part of terminal clean.
Denture pots	1. To be cleaned by patients themselves with detergent and water. 2. Disposable with lid-single use.	
Drainage bottles	1. Disposable – single use 2.reusable- rinse and return to CSSD	
Drip Stands	Should be cleaned with detergent, water and dried	After use in isolation wipe with sodium hypochlorite 2% & dried after cleaning.
Ear Pieces for auroscope	Should be cleaned with detergent, water and dried	To be returned to CSSD after use in isolation.
Earphones	Should be cleaned with detergent, water and dried	Foam should be replaced after use in isolation.
Leads and monitors	Should be dismantled to smallest components cleaned with detergent, water and dried a	
Eye protection	Should be cleaned with detergent, water and dried	For bloodsplashes blood spillage policy should be followed.
Floors	Should be vacuumed daily. A damp mop with detergent and water should be used.	For bloodsplashes blood spillage policy should be followed.
Flower vases	Should be cleaned with detergent, water and dried Should be stored inverted.	
Furniture	Should be damp dusted with detergent and water.	
Humidifiers	Should becleaned and sterilized at low temperature.	
Incubators	Should be cleaned with detergent, water and dried. And switch on to dry	Terminal sterilization with ethylene oxide gas may be required after some infections.
Intravenous monitoring pumps (and feed pumps)	Should be cleaned with detergent, water and dried	After use in isolation wipe with sodium hypochlorite 2% and dry, after cleaning
Instruments	After single use to be returned to CSSD	
Linen	Should be soaked in hot water, returned to laundry	
Mops	Disposable use for one day, usable to be laundered in washing machine	Mops must not be stored wet cleaned in disinfectant solutions.
Peak flow	Disposable – single patient use.	

Nebulizers	Cleaning and low temperature sterilization.	
Pressure relieving devices	Should be clean with detergent and water and dried.	
Proctoscopes	Disposable - single use, re- usable to be rinsed and returned to CSSD	
Raised toilet seats	Should be cleaned after each use with detergent	
Razors	Safety – single use disposable Electric–patients own. Razors should not be shared. Detachable head and clean with 70% isopropyl alcohol swab	
Shaving brush	Should not be used unless Supplied by the patients for their own use.	
Skin disinfection	Showers are preferred to bath or bed baths.	
Soap dispensers	Should be cleaned weekly with detergent and	
Sphygmomanometer cuffs	After use in isolation, should be laundered in washing machine.	
Spillages	Should be cleaned with detergent.	
Sputum pots	Disposable with close fitting lid. Should be discarded into clinical waste for incineration.	
Stethoscopes	Should be cleaned with detergent water and dried. Should be wiped with 70% alcohol.	
Suction bottles	Disposal liners. Must be sealed when 75% full and placed in yellow plastic bag. Re-usable, should be cleaned with sodium hypochlorite and dried. Must be changed daily and in between each patient. To be stored dry when not in use.	
Telephones	To be wiped with 70% alcohol	
Thermometers	To be covered with disposable Sleeve before use and stored dry in individual holder. In between patients, should be cleaned and wiped with 70% isopropyl alcohol (swab).if disposable sleeves not used in between patients, should be washed in general purpose. Detergent and tepid water than wiped with 70% alcohol (swab). To be stored in individual holder inverted.	
Toilet seat	To be cleaned at least twice a day with detergent.	
Toys	Toys should be cleaned with detergent, water and dried.	For isolated patients, toys that cannot be decontaminated to be avoided. Heavily contaminated toys may have to be destroyed.
Trolleys (dressing)	To be cleaned daily with detergent water and dried. After each use should be wiped with 70% isopropyl alcohol.	

Urine measuring flask (jug)	To be Heat disinfected after each use in bed pan washer.	
Ventilators	To be sent to respiratory therapy unit.	
Vomit bowel	Contents must be emptied into sluice than rinsed and washed and disinfected with hot water and detergent.	
Walls	Should be cleaned with detergent & water as part of planned preventive maintenance program.	
Wash bowls	Patients must have own dedicated bowel. After each patients use should be cleaned with detergent.	
Wheel Chairs	Patients own – should be cleaned with detergent & water as necessary. Hospital – Clean between patients with detergent & water.	
As a surface disinfectant	**(**2 propanol- 1 propanol, didecy dimethyl ammonium chloride, polyhexa methylene biguinide hydrochloride) used for surface disinfection	Available as spray

8. CARE OF SYSTEMS AND INDWELLING DEVICES

8.1 General Guidelines

To be followed for all procedures:

1. Hand washing is mandatory before, after and in-between procedures and patients.
2. Each health care worker are familiar with the personal protection (Universal precautions) required for each procedure. These precautions are strictly adhered to.
3. Follow proper waste segregation & disposal after each procedure.

8.2 Vascular Care

8.2.1 **Hand washing**

Wash hands before every attempted intravascular catheter insertion. Antimicrobial hand washing soaps are desirable, and are preferred before attempted insertions of central intravenous catheters, catheters requiring cut downs, and arterial catheters.

8.2.2 **Preparation of skin**

Povidone-iodine (PVP) or 70% alcohol may be used for cleaning the skin. Insertion sites are scrubbed with a generous amount of antiseptic. Beginning at the center of the insertion site, use a circular motion and move outward. Antiseptics should have a contact time of at least 30 seconds prior to catheter insertion. Antiseptics should not be wiped off with alcohol prior to catheter insertion.

8.2.3 **Applying dressings**

Sterile dressings are applied to cover catheter insertion sites. Unsterile adhesive tape should not be placed in direct contact with the catheter-skin interface.

8.2.4 **Inspecting catheter insertion sites** intravascular catheters are inspected daily and whenever patients have unexplained fever or complaints of pain, tenderness, or drainage at the site for evidence of catheter related complications. Inspect for signs of infection (redness, swelling, drainage, tenderness) or phlebitis and also palpate gently through intact dressings.

8.2.5 **Manipulation of intravascular catheter systems**

Strict aseptic techniques are maintained when manipulating intravascular catheter systems. Examples of such manipulations include the following:

- Placing a heparin lock
- Starting and stopping an infusion
- Changing an intravascular catheter site dressing
- Changing an intravascular administration set

8.2.6 **Flushing IV lines**

Solutions used for flushing IV lines should not contain glucose which can support the growth of microorganisms. Do not reuse syringes used for flushing. One syringe is used for flushing only one IV line once.

8.2.7 **Peripheral IV sites (short term catheters)**

Dressing changes

Peripheral IV site dressings should not usually require routine changes, since peripheral IV catheters, are removed within 72 hours.

Replacement of Peripheral IV Catheters

Peripheral I.V. lines or catheter are removed 72 hours after insertion, provided no IV-related complications, requiring catheter removal are encountered earlier. A new peripheral IV catheter, if required, may be inserted at a new site.

8.2.8 **Central intravascular catheters (long term catheters)**

Dressing changes

Central IV catheter dressings are changed every 72 hours (or earlier as per required).

Replacement of central IV catheters

Central IV catheters do not require routine removal and reinsertion. The catheter can be kept for a maximum of 3 months, provided there is no sign of catheter related infection or other complications.

8.2.9 **Catheter related Infection**

At the time of catheter removal, the site is examined for the presence of swelling, erythema, lymphangitis, increased tenderness and palpable venous thrombosis. Any antimicrobial ointment or blood present on the skin around the catheter is first removed with alcohol. The catheter is withdrawn with sterile forceps, the externalized portion being kept directed upward and away from the skin surface.

(If infection is suspected, after removal, the wound is milked in an attempt to express purulence. For 5.7 cm catheters, the entire length, beginning several millimeters inside the former skin surface catheter interface, is aseptically cut and sent for culture. With longer catheter, (20.3 cm and 60.9 cm in length), two 5-7 cm segments are cultured a proximal one beginning several millimeters inside the former skin catheter interface and the tip. Catheter segments are transported to the laboratory in a sterile container.)

Three way with extension is used only when multiple simultaneous infuscate or Central Venous Pressure monitoring are required.

8.3 Respiratory Care

In addition to the general guidelines that are to be adhered to, the following should also be noted with regard to respiratory care:

Mouth flora influences development of healthcare associated pneumonia in ventilated patients. Frequent chlorhexidine mouthwashes minimize the chances of pneumonia.

8.3.1 **Ventilator Care**

- Sterile water is to be used in nebulizers and humidifiers. This are replaced once or twice a day.
- Pneumatic circuits (masks, Y connection and tubes) are to be changed every 24-48 hours. Condensate in tubing should not be drained into the humidifier or airway as they contain large numbers of pathogenic organisms. This are drained only into water traps. Use disposable circuits if cost permits.
- Use heat and moisture exchanging filter (HMEF) at Y connection for all patients if feasible and cost permits. Heat and moisture exchanging filter (HMEF) is to be changed every 24- 48 hours. It should not be removed from circuit except at the time of changing.
- Oxygen masks, venture devices and nebulizer chambers are cleaned carefully and then send to CSSD for HLD.
- Humidifier domes are periodically send to CSSD. Ambu bags are cleaned thoroughly and periodically send to CSSD for HLD.
- Microbiological surveillance of respiratory therapy equipment is practiced in our hospital.

8.3.2 **Tracheostomy Care / Endotracheal Tube**

- Careful attention to post-operative wound care is mandatory.
- The patient should receive aerosol therapy to prevent desiccation of the tracheal and bronchial mucosa or the formation of crusts. The skin around the tracheostomy tube is cleaned with beta dine (Povidone-iodine 5%) every four hours or more frequently, if necessary.
- In case of metal tracheostomy tubes, the inner cannula is cleaned every four hours and more often if necessary to prevent the formation of crusts. The inner cannula is cleaned with water, immersed in hydrogen peroxide for 15 minutes and then rinsed with fresh & sterile normal saline. The plastic tracheostomy tubes are removed, another plastic tube is inserted, and the tube is cleaned, with hydrogen peroxide, and rinsed well before reuse.
- The tracheostomy tapes securing the tube are changed every 24 hours. This tape must be tied securely at all times.
- The first complete tube change are performed no earlier than 4-5 days to allow time for the tract to be formed. Subsequent changes are done weekly or as necessary.
- Clean technique is used to change the tracheostomy tube unless there is a medical indication for sterile technique.
- The obturator are at the bedside (preferably taped to the head of the bed) to be used if the tracheostomy tube accidently is dislodged or is removed for any reason.

8.3.3 **Suctioning of endotracheal / tracheostomy tube**

Employees are instructed and supervised by trained personnel in proper technique before performing this procedure on their own. Assess the patient using auscultation and vital signs prior to suctioning.

8.3.3.1 **Sterile Suctioning**

1. Wash your hands.
2. Use a catheter with a blunt tip.
3. The wall suction is set no higher than 120 mm Hg for adults and between 60 and 80 mm Hg for children.
4. Attach the suction catheter to the suction tubing; do not touch the catheter with bare hands (leave it in its protective covering).
5. Put on sterile gloves. The wearing of a mask is also strongly recommended.
6. However, if saline does need to be instilled, ½ cc of sterile saline is put into the tracheostomy tube on inspiration only.
7. If on a respirator, pre-oxygenate the patient by connecting the resuscitation bag to the artificial airway and ventilating the patient with three or four deep breaths. A mechanical ventilator on 100% oxygen may also be used by depressing the manual ventilation button three or four times.
8. Insert the catheter gently through the inner cannula until resistance is met. Do not apply suction during insertion.
9. Withdraw the catheter approximately 1 cm and institute suctioning.
10. Carefully withdraw the catheter, rotating it gently between the thumb and forefinger applying intermittent suctioning.
11. Continuous suctioning for longer than 10 seconds may create an unacceptable level of hypoxia.
12. The patient are given time to rest between suctioning episodes. If possible, these times are from two to three minutes. If the patient is receiving oxygen or ventilatory support, reapply the oxygen or ventilator for at least two minutes before re-suctioning.
13. Observe for unfavorable reactions such as increased heart rate, hypoxia, arrhythmia, hypotension, cardiac arrest, etc.
14. If oral suctioning is necessary, it are done after the tracheostomy is suctioned.
15. When suctioning is completed, clear the catheter and tubing of mucous and debris with sterile water or saline.
16. Discard the catheter, water container, and gloves appropriately.
17. Wash hands.
18. The tubing and suction canister are changed every 24 hours. The canisters are labeled with the date and time when they are changed. If debris adheres to the side of the tubing or the canister, either or both are changed. The tubing are secured between suctioning periods so that it will not fall to the bed, floor, etc.

8.4 Urinary Catheter

8.4.1 Urethral catheterization

Personnel

Only persons who know the correct technique of aseptic insertion and maintenance of catheters should handle catheters.

Catheter Use

Urinary catheters are inserted only when necessary and left in place only as long as medically necessary and are changed if CA-UTI develops or obstruction is inevitable.

Hand hygiene

Hand hygiene is performed immediately before and after any manipulation of the catheter site or apparatus.

Catheter Insertion

Catheters are inserted using aseptic technique and sterile equipment. Use an appropriate antiseptic solution for periurethral cleaning. As small a catheter as possible, consistent with good drainage, are used to minimize urethral trauma. Indwelling catheters are properly secured after insertion to prevent movement and urethral traction.

Anchoring the catheter

Strapping of the catheter is done to the lower anterior abdominal wall in male patients. This is to prevent direct transmission of the weight of the bag on the catheter, so that pulling and inadvertent dislodgment of the catheter does not occur. This also helps to prevent stricture of the penile urethra if the patient is on a catheter for a long duration.

8.5 Wound Care:-

Surgical wounds

- Surgical wounds after an elective surgery are inspected on the third post-operative day, or earlier if wound infection is suspected.
- All personnel doing dressings should wash their hands before the procedure. Ideally, a two member technique is followed. One to open the wound, and one to do the dressing.
- If two health care workers are not available, then, take off the dressing, wash hands again before applying a new dressing.
- A clean, dry wound may be left open without any dressing after inspection.
- If there is any evidence of wound infection, or purulent discharge, then dressings are done daily, using povidone-iodine to clean the wound and applying dry absorbent dressings.

8.5.1 Collection of wound swabs –

The superficial wound site:

- Wound site should be gently washed with sterile saline. This process helps removing the colonizers from the wound.
- Sampling should be done from the margin and floor of the wound to maximize the microbiological yield.
- Paired wound swab (one for gram staining and another for culture) should be sent.

8.5.2 In deep wound site with pus discharge/ooze

- Wound site should be gently washed with sterile saline. This process helps removing the colonizers from the wound.
- The pus/discharge should be actively expressed and collected on the cotton swab.
- Paired wound swab (one for gram staining and another for culture) should be sent.
- All specimens should be send immediately with the laboratory request clearly mentioning of wound site, body side (in case of limbs/face), diagnosis and surgical procedure (if any) undertaken.

9. SPECIAL CARE UNITS

9.1 Intensive Care Units

9.1.1 Design of the Unit

- Space around and between beds are adequate for placement and easy access to equipment and to patients.(6-8 feet)
- A single, closed cubicle is used only for patients needing isolation; e.g open tuberculosis, anthrax, enteric fever, cholera, MRSA colonization or infection with other multi-drug resistant organisms.
- Good housekeeping practices are followed. This includes regular cleaning of all areas, maintenance, linen and curtain changes etc. Clean floor at least four times a day.

9.1.2 Procedures to be followed by health care personnel

- Hand washing: Importance of this need not be over-emphasized in the ICU setting. Five moments of hand hygiene must be complied with hand hygiene actions. Appropriate steps must be performed while doing hand hygiene.
- Standard Precautions: as appropriate, are followed by all staff while handling patients or samples.
- Wear plastic aprons and gloves for all procedures.
- Remove and discard them immediately after each patient. Use gloves for / all patient contact.
- Wear masks while examining patients with 'uncertain' diagnosis.

9.1.3 Instruments

Although disposable *items* are ideal, reusable items are often used, for reducing the cost. Separate thermometers are used for each patient or must be disinfected before reuse in other patients. Separate AMBU bag and mask are used for each patient. These must be reused after proper disinfection procedures in CSSD. Trolleys are to be adequately loaded and are used for bedside procedures.

9.1.4 Microbiological monitoring

Environmental surveillance will be done as per guidelines for high risk areas mentioned in chapter 3
Passive surveillance will be used to detect healthcare associated outbreaks.

9.1.5 Visitors policy

Minimum Visitors are allowed inside intensive units for control of infections.

9.2 Dialysis Unit

The purpose of this policy is to optimize the treatment and minimize the risk of the transmission of infections from patient to patient and between patients and employees.

To prevent cross infection following disinfection and equipment maintenance should be done as per provisions in Schedules.

9.2.1 Hemodialysis machines:

- Priming of kit (Hemo-dialyzer and Arteriovenous tubing) should be done thoroughly with Normal saline without coming in contact with the floor surface and priming bucket surface area.
- Kit has to be kept in recirculation mode by connecting Hansen connectors to dialyzer and giving 2000 IU inj. Heparin.
- Machine should be disinfected with 4% sodium hypochlorite/ citric acid on daily basis. Bleaching of machines should be done with 5% chlorine once a month
- Conductivity of the hemodialysis machine shall be monitored by lab method on a weekly basis
- Dialysate sterility should be checked on a monthly basis Calibration of machines should be undertaken on a quarterly basis

9.2.2 RO Unit

RO maintenance should be done on weekly basis by regeneration of softener and giving backwashes
Disinfection of RO unit including loop lines and storage tanks should be done using 1% sodium hypochlorite solution on a monthly basis
The following tests on the RO unit output water should be undertaken

- Conductivity: Daily
- Hardness test: Once/week
- Chloramine test: Once/week

- Culture: Once/month
- Endotoxin Assay: Once/month

A detailed examination of RO water should be undertaken on quarterly basis as per AAMI guidelines.

9.2.3 **Reprocess or machine:**

- ❖ Reprocessing machine should be sanitized with sodium hypochlorite on a weekly basis
- ❖ Ends of dialyzer connectors should be dipped in disinfectant solution after every process Fiber Bundle Volume and number of times Hemodialyser was being used should be recorded
- ❖ Hemodialyser kits should be stored in separate boxes for multiple uses
- ❖ Blood lines and multidose vials should not be re-used
- ❖ Staff members shall be vaccinated properly and proper care needs to be taken regarding isolation to prevent cross infection
- ❖ Log of disinfection activities should be maintained for verification.

9.2.4 **Disinfection Schedule for Hemodialysis**

- ➢ Disinfection of HD machine with Hemoclean.
- ➢ Hot disinfection of HD machine with Cal free: After every dialysis.
- ➢ Front cleaning of HD machine with Hemoclean:
- ➢ Disinfection/ washing of R.O. inlet filter of H.D. Machine with Hemoclean:
- ➢ Disinfection of R.O tank with hemoclean: 1st week of every month.
- ➢ Charging of R.O system: as per the recommendations.
- ➢ Culture of dialysate & R.O water: 1st week every month.
- ➢ Washing Bicarbonate container: After every dialysis.
- ➢ Carbolization of Hemodialysis room: Daily.
- ➢ Changing glutaraldehyde container: Every 14 Days.
- ➢ Washing of H.D. Room: 1st week every month.
- ➢ Fumigation of H.D. Room with (Hydrogen peroxide+ Silver nitrate) e.g. Eco shield: 1st week every month.

9.2.5 **Catheter Infection on Treatment**

a) Localized Exit Site Infection:

Erythema or crust but no purulent discharge, it can be treated with local applicator of antibiotics.

b) Septicemia Infection: Fever with chills at the initiation of the dialysis. Two set of blood samples with culture, with at least one drawn percutaneous site and other through the catheter are obtained in the case of CRBSI (Catheter related Blood Stream Infection). Prophylactic antibiotic (Ceftazidime and Amikacin) are started and also take a sample for Blood culture. Antibiotics will be discontinued if the blood culture has no growth and antibiotic regimen adjusted only when bacterial sensitivity is available. Antibiotics are continued in uncomplicated case of catheter related bacteria.

9.2.6 **Specimen Collection and Handling**

- ➢ Extreme caution must be employed when drawing blood for laboratory testing. Gloves and face shields will be worn while drawing specimens.
- ➢ Blood spills will be cleaned immediately with solution of bleach. During cleaning, gloves will be worn.
- ➢ Any specimen collected from a patient on Isolation is labeled according to Infection Control policy.
- ➢ Bacterial monitoring of water for preparing dialysis fluids and dialysate fluid are collected and immediately sent to Microbiology department on a monthly basis.
- ➢ Specimens are clearly labeled and should include the following information: initials of person collecting specimen, date, time, specimen source (*i.e.,* dialysate fluid or dialysis water), and the machine from which the source was collected.

9.2.7 **Environment**

The environment shall be thoroughly cleaned between each treatment and as necessary for spills of blood and body fluids.

Terminal cleaning procedures must be used between the patients.

10. HOUSE KEEPING

- **Refer to Housekeeping SOP.**

11. INVESTIGATION OF AN OUTBREAK

The occurrence of two or more similar cases relating to place and time is identified as a cluster or an outbreak and needs investigation to discover the route of transmission of infection, and possible sources of infection in order to apply measures to prevent further spread. If the cases occur in steadily increasing numbers and are separated by an interval approximating the incubation period, the spread of the disease is probably due to person to person spread. On the other hand if a large number of cases occur following a shared exposure e.g. an operation, it is termed a common source outbreak, implying a common source for the occurrence of the disease.

11.1 Epidemiological Methods

The investigation of an outbreak may require expert epidemiological advice on procedures. Formulation of a hypothesis regarding source and spread is made before undertaking microbiological investigations in order that the most appropriate specimens are collected.

32.15.1.1 Steps to be taken for investigation of an outbreak

Step 1

- Recognition of the outbreak. Is there an increase in the number of cases of a particular infection or a rise in prevalence of an organism? Such findings indicate a possible outbreak.
- Preliminary investigation must be begun by developing a case definition, identifying the site, pathogen and affected population. Define the outbreak in time person and place.
- Determination of the magnitude of the problem and if immediate control measures are required. If so general control measures such as isolation or cohorting of infected cases; strict hand washing and asepsis are immediately applied.
- Verification of the diagnosis. Each case are reviewed to meet the definition.
- Confirmation that an outbreak exists by comparing the present rate of occurrence with the endemic rate are made.

Step 2

- The appropriate departments and personnel and the hospital administration are notified and involved.

Step 3

- Additional cases must be searched for by examining the clinical and microbiological records.
- Line listings for every case, patient details, place and time of occurrence and infection details are developed.
- An epidemic curve based on place and time of occurrence are developed, the date analyzed, the common features of the cases e.g age, sex, exposure to various risk factors, underlying diseases etc. are identified.
- A hypothesis based on literature search and the features common to the cases; are formulated to arrive at a hypothesis about suspected causes of the outbreak.
- Microbiological investigations depending upon the suspected epidemiology of the causative organism are carried out. This will include (a) microbial culture of cases, carriers and environments (b) epidemiological typing of the isolates to identify clonal relatedness.
- The hypothesis is tested by reviewing additional cases in a case control study, cohort study, and microbiological study.

Step 4

- Specific control measures are implemented as soon as the cause of outbreak of identified.

- Monitoring for further cases and effectiveness of control measures are done.
- A report is prepared for presentation to the HICC, departments involved in the outbreak and administration.

11.2 Immediate Control Measures

Control measures are initiated during the process of investigation. An intensive review of infection control measures is made and general control measures initiated at once. General measures include:

- Strict hand washing ;
- Intensification of environmental cleaning and hygiene.
- Adherence to aseptic protocols, and
- Strengthening of disinfection and sterilization.

11.3 Microbiological Study

Microbiological study is planned depending upon the known epidemiology of the infection problem. The study is carried out to identify possible sources and routes of transmission. The investigation may include cultures from other body sites of the patient, other patients, staff and environment. Careful selection of specimens to be cultured is essential to obtain meaningful data.

11.4 Specific Control Measures

Specific control measures are instituted on the basis of nature of agent and characteristics of the high-risk group and the possible sources. These measures may include:

- Identification and elimination of the contaminated product ;
- Modification of nursing procedures ;
- Identification and treatment of carriers, and
- Rectification of lapse in technique or procedure

11.5 Evaluation of Efficacy Of Control Measures

The efficacy of control measures are evaluated by a continued followed-up of cases after the outbreak clinically as well as microbiologically. Control measures are effective if cases cease to occur or return to the endemic level.

The outbreak should be documented.

12. VISITORS POLICY

12.1 Introduction

Although instructing and preparing visitors for patients in isolation is time consuming and often frustrating, their presence is valuable to the emotional well-being of the patient.

- The ward sisters and the doctors concerned shall have the responsibility of informing the patients' relatives of the measures to be taken and the importance of restriction of visitors. This is done at admission of the patient.
- The patient and the relatives must be given health education about the cause, spread and prevention of the infection, in detail. The need for isolation and restriction of visitors are discussed with them.
- Hand washing after all contact with the patient will have to be stressed.
- No more than two adult visitors are allowed 'at a time' during the hospital visiting hours and the length of stay are governed by the needs of the patient.
- Children below 12 years are not allowed into the isolation areas. The policy of our hospital is to allow one female attendant to stay in the ward with the patient. The attendants are individually trained to avoid infection.
- Before entering the room, visitors must enquire at the nurses' station for instructions and for gown and mask if indicated. Visitor's footwear, bags etc., are left outside the room. Only articles that can be discarded, disinfected or sterilized are taken into the room.
- Visitors are not allowed to sit on the patient's bed.
- Visitors should wash their hands well with soap and water before entering and when leaving the room.
- Active immunization of attendants and other follow up steps, where applicable must be conducted by the physician in-charge.

12.2 Emergency Service

Standard precautions are to be strictly adhered and all patients are to be treated as potentially infected with blood – borne pathogens. Importance of this cannot be over emphasizes in this area.

1. Wash hands with soap and water before and after patient contact.
2. Wear gloves preferably for all patient contact. It is a must for all invasive procedures, however minor. Examination gloves are placed in the shelves in all patient care areas.
3. Wear masks for all situations where a splash is expected, and where infection that spreads through the respiratory route is possible diagnosis.
4. Wear plastic aprons, in addition to a mask if splash to the body area is expected.
5. Use disposal needles and discard them into the sharps container which is placed in al patient care areas. Dispose IV cannula, stellates, scalpel blades and razor blades into the sharps containers immediately after use.
6. Attendants and Sweepers are to wear gloves while handling lab samples and performing sanitation work.

12.3 Additional Precautions for Patients known to harbor Blood Borne Pathogens

• Use plastic aprons during procedures where body fluids may be split.
• Disinfect all items following discharge, transfer or death of the patient (as per hospital protocol refer to the chapter on housekeeping). Mattress, pillow and mackintosh are to be disinfected with 1% sodium hypochlorite solution and dried in sunlight.

12.3.1 Infectious Diseases

Refer to the chapter on Isolation Policies

12.3.2 Wound and Skin Infections

• Hands are to be washed before and after handling the patient.
• Wear gloves while handling infected wounds.
• Cover the wounds (as far as possible) before transferring the patient
• Dispose waste as per hospital guidelines

13. LAUNDRY AND LINEN MANAGEMENT

13.1 Introduction

The purpose of this policy is the prevention of infection or injury in patients and health care staff involved in the use, handling or laundering of hospital linen.

Contaminated laundry:

Occupational safety and health administration defines contaminated laundry as laundry that has been soiled with blood or other potentially infectious materials or may contain sharp.

13.2 Categories of Linen

According to National Health Service executive, linen is divided into the following categories:

13.2.1 **Infected linen**: pertains to linen from patient suspected of having enteric fever, other Salmonella infections, Dysentery, hepatitis A,B or C, open pulmonary T.B, HIV infection or any notifiable infection in Hazard group 3 &4. These maybe sealed in water soluble bags and then placed in an outer bag. The outer bag should be impervious with a color code of red and a prominent label. The outer bag should be washed and the water soluble bag placed unopened in a machine known to have an efficient heat disinfection cycle.

13.2.2 Heat labile linen: Includes fabrics damaged by heat. They are disinfected by H2O2 (color code white with an orange stripe).

13.2.3 Used linen: Includes all linen not covered by the aforementioned categories. They may be transported in a white, labeled bag. Individual hospitals may decide the color coding and choice of bags.

13.3 Specific Items

13.3.1 Mattress overlays

These must be protected by waterproof covers, which are cleaned with soap and water between patients. Alcohol wipes **MUST NOT** be used to clean these items as alcohol damages the cover which may allow fluid to pass through to the mattress foam, the life of the mattress and its ability to protect patients form cross infection is then reduced. If the cover is damaged or punctured, and the article itself is contaminated it must be condemned and disposed of as clinical waste. Replacement covers can be purchased and may be used providing the mattress itself is not soiled stained or has a smell.

13.*3.2* Staff uniforms

Must be sent to the laundry contained in the appropriate bags and labeled with the name of the individual, ward and hospital to ensure it is returned. After washing, uniforms are protected from contamination with dust during storage.

13.4 Handling and Storage of Used Linen in Ward/ Department

- Used linen must be handled with care to prevent environmental contamination with excretion or secretions, skin scales or bacteria. Linen must be bagged at the bedside, never shaken or allowed to touch the floor.
- No extraneous items must be placed in the laundry bags, especially sharp objects. This may contribute to a health & safety risk for the laundry workers.
- All linen bags must be placed in the correct color bag, securely tied, labeled as appropriate and stored in a room or area designated for the purpose, which is safe and separate from patient areas.
- Bags must be less than 2/3 full.
- All items that are sent to the laundry must be appropriately marked including mattress overlays, clothing.
- Gloves may also be required if linen is wet. Hands must be washed after handling soiled or infected linen
- Linen are held away from the body to prevent contamination of clothing.

13.5 Transporting Used Linen from Ward / Department to Pick-Up Point

- The pick-up point must be dry and secure and separate from the clean linen area
- Laundry bags must be securely tied.
- The frequency of collection will depend on the volume of laundry.
- Linen handlers must have heavy-duty rubber gloves available. Guidance on hand washing technique and frequency must be given.

13.6 Transporting Used Linen from the Pick-Up Point to the Laundry

- Frequency of collection will be dependent on the volume of laundry and the predefined schedule.
- Laundry is responsible for cleaning and disinfection of the Trolley in order to prevent contamination of clean linen:
  - i.) After any spillage
  - ii.) After transportation of dirty laundry, if it is to be used for clean laundry next
  - iii.) at least weekly
- There must be no contact between clean and soiled linen at any time. So, clean and dirty/ soiled linen are transported separately from separate corridors, clean linen are transported in white trolleys while dirty linen are transported in a red trolley, if the linen is soiled it are first tied in a red bag.

13.7 Return of Clean Linen TO THE USER

Contamination of clean linen must be prevented by:

- Storage in a clean, dry area or cage
- Transport in a white trolley which is cleaned and disinfected prior to loading with clean linen. Linen that is (or thought to be) contaminated must be returned to the laundry for reprocessing.

13.8 Infection Control Issues In The Laundry

- No person shall be permitted to work in or about the processing or handling of any article to be supplied to the hospital while suffering from an infection or skin disease. All contractors' staff must report such conditions to the contractor.
- Personal protective clothing will be available and worn when handling linen.
- All such clothing must be removed and changed each time the person leaves the department.
  - a) Heavy duty rubber gloves b) Apron
- Disposable items must not be re-used. Reusable gloves must be cleaned and dried at least daily.
- A hand hygiene facility complete with soap and paper towels, must be available close to the working areas.
- Staff must be aware of the possibility of extraneous items and sharps containers must be available.
- Staff must be aware of actions to take in the event of a sharps injury.
- Systems and machinery will be designed and operated so as to reduce the risk of re-infection of linen during the course of the laundering process and, to prevent articles being re-infected after laundering and prior to re issue to the hospital.

13.9 Spillage of Contaminated Linen

Wearing gloves, replace the linen in an appropriate bag. Clean the surface as per spill management policy and wash the surface with detergent and water and dry. Wash hands thoroughly after removing gloves.

13.10 APPENDIX - Thermal disinfection times and temperatures and environmental issues in the laundry

13.10.1 Disinfection of used (soiled and fouled) linen

- A sluice cycle is incorporated into washing machines for the removal of organic matter from fouled linen.
- H_2O_2 10-30% Used to disinfect soiled linen.
- The wash temperatures will be maintained:

13.10.2 Disinfection of suspected (or known) infected linen

- The temperatures described previously will adequately disinfect linen.
- This linen must not be processed in a batch continuous washing machine, but are processed in a washer extractor.

13.10.3 Disinfection of heat-labile linen (Blanket)

- If soiled, than first dip the blanket in H2O2 (10-30%) for 3-6 hrs. then sluicing will be done to wash off any organic material stick to it.
- Linen in this category must be laundered in a machine at 40°C and dried at 60°C using tumble dryers.

13.11 General measures to prevent infection

- All surfaces will be kept free from dust, debris and pests. There will be a system for regular cleaning of the environment including high level surfaces.
- All washing machines will be kept clean and free from algae.
- All washing machines are fitted with accurate heat sensors that are correctly positioned. These must be tested at predefined interval and calibrated. Records must be kept of this and of regular monitoring of wash temperatures.

14. STAFF HEALTH PROGRAM

14.1 Health Evaluation at Placement

- A medical checkup is performed at placement according to protocol laid down by Govt. of India. After induction to the hospital services immunization and health appraisal is conducted by preventive health clinic medical officer in conjunction with HICC nominated member. Data is maintained by Preventive Health Clinic Medical Officer and monthly presented in HICC meeting. The data is collected in prescribed form.
- Vaccination for Hepatitis B is provided to all staff members who are not vaccinated or those vaccinated but do not have protective anti-HBs levels. These schedules are completed by the staff member within three months of start of employment. All staff are encouraged to get their Anti-HBs titers done to ensure their safety after vaccination.
- Vaccination for Salmonellosis is mandatory for kitchen staff and must be vaccinated within three months of their employment.
- Vaccination Varicella, Meningococcal Disease etc. will be carried out in staff exposed during the outbreak or as and when required as decided by HICC time to time.

14.2 Employee Health Program

- **Employee health education:** Periodic education programs are conducted for paramedical staff by the **ICN**. All employees MUST attend the program within month of their induction to the hospital and then at least twice a year. The attendance record is kept by **ICN**. All employees are instructed to adhere to universal precautions, nursing barrier/ isolation policies, hand washing protocols and waste management.
- All infections including contagious and other diagnosed communicable diseases e.g. hepatitis, mumps, rubella, measles, chicken pox, diarrhea, productive cough more than three weeks, rashes etc., MUST to be reported by staff to their immediate supervisor and thereby to **ICN** at which time appropriate action to protect the patients/ staff in the hospital will be taken. Work restrictions may be imposed in situations which call for such action.
- All staff is informed that they should report exposure to potentially infectious body fluid to their immediate supervisor who in turn informs the ICN or secretary HICC in absence of ICN. Action is taken after assessment of risk at each situation (refer PEP guidelines). It is MANDATROY to report all such kind of exposures on prescribed form. Work restrictions may be imposed in situations which call for such action.
- Personnel shall adhere to policies and practices to minimize the potential spread of diseases and /or infection. Personnel shall adhere to existing employee health requirements**.**

15. BIOMEDICAL WASTE MANAGEMENT

- **Refer to Biomedical waste management SOP.**

16. ANTIMICROBIAL STEWARDSHIP PROGRAM

16.1 The past 30 years have brought multidrug-resistant pneumococcal, gonococci, and *Salmonella* spp. and extremely drug-resistant tuberculosis to patients in the community. Vancomycin-resistant enterococci and vancomycin-resistant *S. aureus* have also emerged. Extremely drug resistant gram-negative bacteria, such as carbapenemase-producing *Klebsiella pneumoniae* and other carbapenem-resistant *Enterobacteriaceae* spp., extended spectrum beta-lactamase-producing *Enterobacteriaceae*, *P. aeruginosa*, and *Acinetobacter baumannii* have spread widely among patients in healthcare settings; in some cases these pathogens have been pan resistant, that is, resistant to all available antibiotics.

Unfortunately, during the last decade there has also been a dramatic drop in the development and approval of new antibacterial agents. The antimicrobial armamentarium has been depleted and our ability to treat infectious diseases has been severely compromised. Resistant infections not only result in increased morbidity and mortality but also dramatically increase healthcare costs. It is ironic that in the twenty-first century we are encountering bacterial infections for which we have no treatment. A multifaceted approach is necessary to prevent, detect, and control the emergence of antimicrobial-resistant organisms. This includes ensuring the availability of adequate and appropriate therapeutic agents, the existence of diagnostic capacity to rapidly and reliably detect specific pathogens and their antimicrobial susceptibilities, and the promotion of robust infection prevention, control, and antimicrobial stewardship programs. This document focuses on issues relating to antimicrobial stewardship. Other issues important to the emergence, transmission, and management of antimicrobial resistance are addressed else.

16.2 Definition

Antimicrobial stewardship refers to coordinated interventions designed to improve and measure the appropriate use of antimicrobial agents by promoting the selection of the optimal antimicrobial drug regimen including dosing, duration of therapy, and route of administration.

16.3 Objectives

The major objectives of antimicrobial stewardship are to achieve best clinical outcomes related to antimicrobial use while minimizing toxicity and other adverse events, thereby limiting the selective pressure on bacterial populations that drives the emergence of antimicrobial-resistant strains. Antimicrobial stewardship may also reduce excessive costs attributable to suboptimal antimicrobial use.

A Multidisciplinary inter professional **antimicrobial stewardship committee** [Drug and therapeutics committee (DTC)] should be in place which is physician directed or supervised.

There should be Antibiotic Management Team (AMT).

Team members include:

a) A clinical microbiologist.

b) An infection control nurse

16.4 Antibiotic policy

Antibiotic policy is to be prepared by the antimicrobial stewardship team in consultation with microbiology departments and physicians and surgeons from various departments. The policy is reviewed and updated annually.

16.5 Antimicrobial Stewardship Program

16.5.1 Antimicrobial Stewardship Program included Monitoring of following activities at AIIMS, JODHPUR:

1. Rational use of antibiotic are been monitored – On daily basis for seven indicator antibiotics ***(Vancomycin, Meropenam, Ofloxacin, Ciprofloxacin, Cefoperazone + Sulbactam , Colistin and Levofloxacin, Daptomycin, Tigecycline, Ceftaroline and any other antibiotic outside hospital formulary***) by ICNs on daily rounds and details recorded on preformatted template. Other antibiotics are also checked for rational combinations and doses.Treating doctors are asked to explain the reasons for initiating these antibiotics in writing. These patients are the discussed for rationality with Clinical Microbiologists. Irrational antibiotic therapy, if identified is communicated to treating physician or surgeon for immediate discontinuation/modification. Irrational combination of antibiotics or doses is also monitored.

2. Pre – surgical prophylaxis and post-operative antibiotic therapy are also monitored on daily basis. In case of irrationality it is been informed to the concerned department and necessary actions are taken.
3. Defined Daily Dose (DDD) for antibiotics are monitoring for the usage pattern.
4. No. of doses administered are also monitored per thousand patient days.
5. The data analysis is done and discussed during periodic HICC meetings.
6. Adherence to antibiotic policy is also discussed in the HICC meeting.
7. Prescription audits of in patients and outpatients are conducted periodically.
8. Antibiotic costing and savings thus done is being monitored.

Appendix 1. HIC Indicators

Various indicators used for hospital associated infections include:

1. Healthcare associated infections.
2. Catheter related blood stream infections (CRBSI)
3. Surgical site infections (SSI)
4. Catheter associated urinary tract infections (CAUTI)
5. Ventilator associated pneumonia (VAP)
6. Hospital acquired blood stream infections (HA BSI)
7. Device utilization rates for central line catheters, Foley's catheter and ventilators.
8. Antibiotic usage and resistance monitoring (AUR)

1. To calculate **Hospital acquired infections** in various units:
Data to be calculated include:

No. of patients with healthcare associated infections in particular unit X 1000 No. of patient days in that particular unit

2.To calculate **CRBSI**, data to be collected include:

No. of patients developed CRBSI X 1000
Total no. of catheter days

3. To calculate **SSI** in surgical unit, data to be collected include: - No. of patients with SSI in surgical department X 1000
No. of patient undergoing surgery in the department

4. To calculate CAUTI, data to be collected include ;-

No. of patients developed CAUTI X 1000
Total no. of urinary catheter days

5.To calculate **VAP**, data to be collected include:

No. of patients developed VAP X 1000
Total no. of Ventilator days

6. To Calculate **Hospital acquired BSI**

No. of patients developed BSI (HAI) X 1000
Total No.of patient days

7. To calculate **Device (**Ventilator, central line, Foley's Catheter**) Utilization Rate:**

No. of Device days
No. of Patient days

Device-days are the total number of days of exposure to the device (ventilator, urinary catheter or central line) by all of the patients during the selected time period.
Patient-days are the total number of days that patients are in a particular unit during the specified time period
Calculation of device associated infection rate:

Device- associated Infection Rate= No. of device –associated infections for a specific site X 1000
Number of device days

This is done for 3 devices namely.

1. Central line- Sample from CVP tip
2. Ventilator -Sample from endotracheal tube secretions
3. Foley's Catheter - Urine sample

Data is collected in a prescribed format.

8. **Antibiotic Utilization rate:** Antibiotic used (gms)
Defined drug Dose (gms)

Calculation of Hand Hygiene Compliance:

Compliance (%) = Actions x 100
Opportunities

➢ CASE DEFINITIONS USED FOR DIAGNOSIS OF HCAIs

Case definitions as described by National Healthcare Safety Network (NHSN), CDC are being used. The summary diagrams of the common HCAIs are summarized below:
Healthcare associated infection (HAI) is acquired in a hospital by a patient, that is, it was not present or incubating at the time of admission. This also includes infection acquired in the hospital but appearing after discharge. These infections can occur from inadvertent exposure to pathogenic bacterias, viruses, fungi or spores.

Blood Stream Infections

Laboratory Confirmed Blood Stream Infection			**Central line associated Blood stream Infection**
LCBI -1	LCBI -2	LCBI -3	CLABSI
Patient has a recognized pathogen cultured from one or more blood cultures AND organism cultured from blood is not related to an infection at another site	Patient has at least one of the following signs or symptoms: fever (>38.0oC), chills, or hypotension AND organism cultured from blood is not related to an infection at another site AND the same common commensal (i.e., diphtheroids [Corynebacterium spp. not C. diphtheriae], Bacillus spp. [not B. anthracis], Propionibacterium spp., coagulase-negative staphylococci [including S. epidermidis], viridans group streptococci, Aerococcus spp., and Micrococcus spp.) is Cultured from two or more blood cultures drawn on separate occasions.	Patient ≤ 1 year of age has at least one of the following signs or symptoms: fever (>38.0oC), hypothermia (<36.0oC), apnea, or bradycardia AND organism cultured from blood is not related to an infection at another site AND the same common commensal (i.e., diphtheroids [Corynebacterium spp. not C. diphtheriae], Bacillus spp. [not B. anthracis], Propionibacterium spp., coagulase-negative staphylococci [including S. epidermidis], viridans group streptococci, Aerococcus spp., AND Micrococcus spp.) is cultured from two or more blood cultures drawn on separate occasions.	A laboratory confirmed bloodstream infection (LCBI) where central line (CL) or umbilical catheter (UC) was in place for >2 calendar days on the date of event, with day of device placement being Day 1, AND a CL or UC was in place on the date of event or the day before. If a CL or UC was in place for >2 calendar days and then removed, the date of event of the LCBI must be the day of discontinuation or the next day. <2days before to >2days after.

Surgical Site Infection

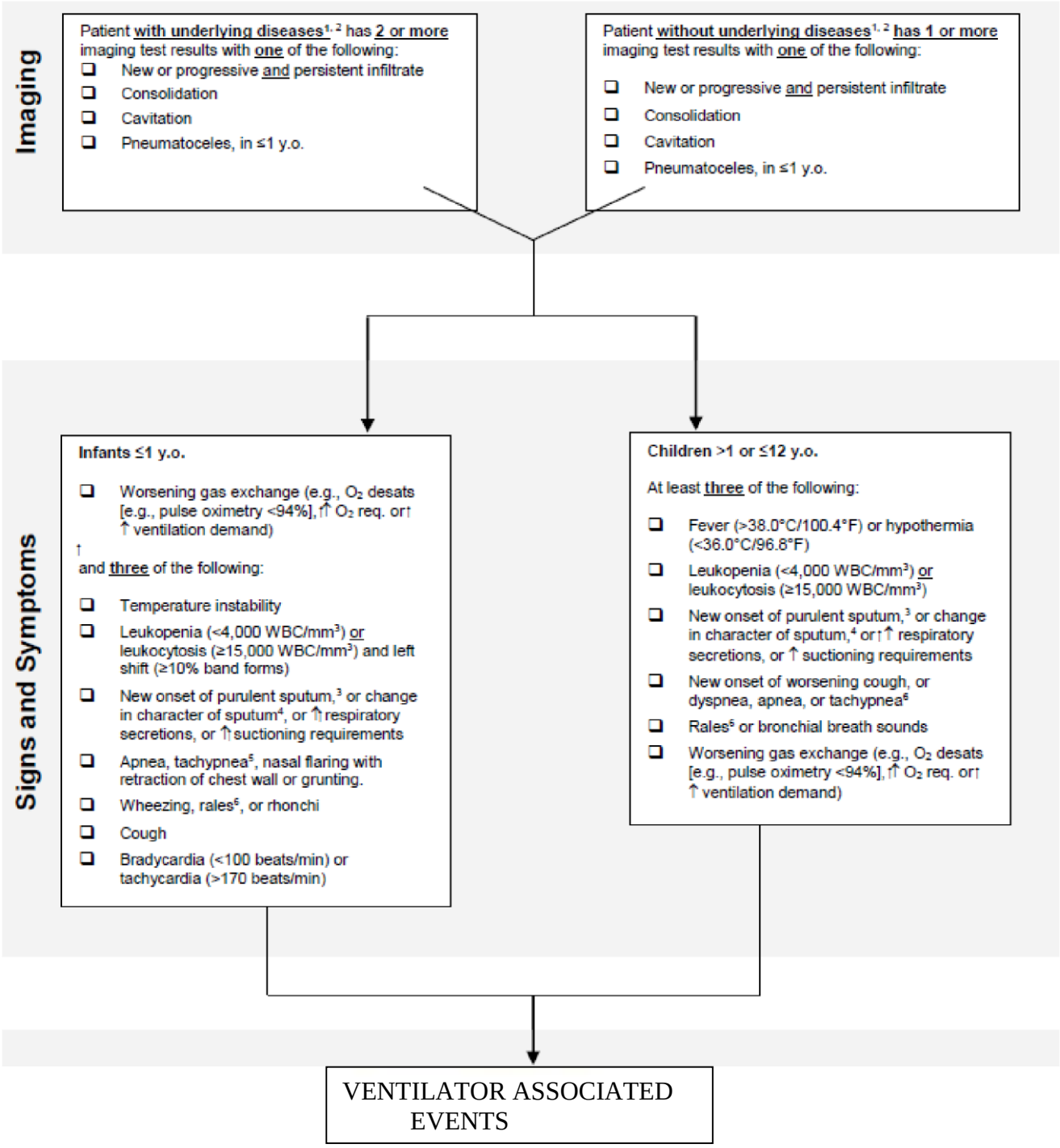
Must meet the following criteria:

Superficial SSI	Deep SSI	Organ/Space SSI
Infection occurs within 30 days after any NHSN operative procedure (where day 1 = the procedure date), including those coded as 'OTH'***** **AND** involves only skin and subcutaneous tissue of the incision **AND** patient has at least ***one*** of the following: **(a.)** purulent drainage from the superficial incision. **(b.)**organisms isolated from an aseptically-obtained culture from the superficial incision or subcutaneous tissue. **(c.)**superficial incision that is deliberately opened by a surgeon, attending physician** or other designee and is culture positive or not cultured AND patient has at least ***one*** of the following signs or symptoms: pain or tenderness; localized swelling; erythema; or heat. A culture negative finding does not meet this criterion. **(d.)**diagnosis of a superficial incisional SSI by the surgeon or attending physician** or other designee.	Infection occurs within 30 or 90 days after the NHSN operative procedure (where day 1 = the procedure date) according to the list in Table 3 **AND** involves deep soft tissues of the incision (e.g., fascial and muscle layers) **AND** patient has at least ***one*** of the following: **(a.)** purulent drainage from the deep incision. **(b.)** a deep incision that spontaneously dehisces, or is deliberately opened or aspirated by a surgeon, attending physician** or other designee and is culture positive or not cultured AND patient has at least ***one*** of the following signs or symptoms: fever (>38°C); localized pain or tenderness. A culture negative finding does not meet this criterion. **(c.)** an abscess or other evidence of infection involving the deep incision that is detected on gross anatomical or histopathologic exam, or imaging test. ** The term attending physician for the purposes of application of the NHSN SSI criteria may be interpreted to mean the surgeon(s), infectious disease, other physician on the case, emergency physician or physician's designee (nurse practitioner or Physician's assistant).	Infection occurs within 30 or 90 days after the NHSN operative procedure (where day 1 = the procedure date) according to the list in Table 3 **AND** infection involves any part of the body deeper than the fascial/muscle layers, that is opened or manipulated during the operative procedure **AND** patient has at least ***one*** of the following: **(a.)** purulent drainage from a drain that is placed into the organ/space (e.g., closed suction drainage system, open drain, T-tube drain, CT guided drainage) **(b.)** organisms isolated from an aseptically-obtained culture of fluid or tissue in the organ/space **(c.)** an 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 Table 4. These criteria are in the Surveillance Definitions for Specific Types of Infections chapter.

URINARY TRACT INFECTION

Symptomatic UTI (SUTI) Must meet at least *one* of the following criteria			**Asymptomatic bacteremic UTI (ABUTI)** Must meet the following criteria
SUTI 1a Catheter-associated Urinary Tract Infection (CAUTI)	SUTI 1b Non Catheter associated Urinary Tract Infection (Non- CAUTI)	SUTI 2 CAUTI or Non-CAUTI in patients 1 year of age or less	ABUTI
Patient must meet 1, 2, and 3 below: **(1.)**Patient had an indwelling urinary catheter that had been in place for > 2days on the date of event (day of device placement = Day 1) AND was either: Still present on the date of event†, OR Removed the day before the date of event‡ **(2.)**Patient has at least ***one*** of the following signs or symptoms: •fever (>38.0°C) •suprapubic tenderness* •cost vertebral angle pain or tenderness* •urinary urgency* •urinary frequency* •dysuria* **(3.)**Patient has a urine culture with no more than two species of organisms, at least one of which is a bacteria of ≥105 CFU/ml	Patient must meet 1, 2, and 3 below: **(1.)**One of the following is true: Patient has/had an indwelling urinary catheter but it has/had not been in place >2 calendar days on the date of event† **OR** Patient did not have a urinary catheter in place on the date of event or the day before the date of event **(2.)**Patient has at least ***one*** of the following signs or symptoms: •fever (>38°C) in a patient that is ≤ 65 years of age •suprapubic tenderness* •cost vertebral angle pain or tenderness* •urinary frequency* •urinary urgency* •dysuria* **(3.)** Patient has a urine culture with no more than two species of organisms, at least one of which is a bacteria of ≥105 CFU/ml.	Patient must meet 1, 2, and 3 below: **(1.)**Patient is ≤1 year of age (with or without an indwelling urinary catheter) **(2.)**Patient has at least ***one*** of the following signs or symptoms: •fever (>38.0°C) •hypothermia (<36.0°C) •apnea* •bradycardia* •lethargy* •vomiting* •suprapubic tenderness* **(3.)**Patient has a urine culture with no more than two species of organisms, at least one of which is a bacteria of ≥105 CFU/ml	Patient must meet 1, 2, and 3 below: **(1.)**Patient with or without an indwelling urinary catheter has no signs or symptoms of SUTI 1 or 2 according to age **(2.)**Patient has a urine culture with no more than two species of organisms, at least one of which is a bacteria of ≥105 CFU/ml (see Comment section below) **(3.)**Patient has a positive blood culture with at least ***one*** matching bacteria to the urine culture, or meets LCBI criterion 2 (without fever) and matching common commensal(s) in the Urine.

VENTILATOR ASSOCIATED PNEUMONIA (VAP)



➢ Care bundles to prevent HCAIs:

Care of bundles to prevent infections associated with peripheral IV Cannula

Insertion Care Bundle	Maintenance Care Bundle
➢ **Avoid unnecessary cannulation** ➢ Insert I.V. Catheter using **strict aseptic** technique & used sterile items ➢ Disinfect skin with 2% chlorhexidine gluconate in 70% isopropyl alcohol & allow to dry ➢ Use a sterile , semipermeable, transparent dressing to allow observation of insertion site ➢ Record date of insertion in medical notes	➢ **Review need for catheter DAILY** ➢ Inspect cannula on a daily basis for sign of infection ➢ Use aseptic technique for daily care(e.g. Hand Hygiene before accessing the device & disinfect catheter hubs) ➢ Replace cannula in a new site after 72-96 hrs. or earlier if clinically indicated ➢ Replace cannula immediately after administration of blood /blood product & 72 hr. after other fluids

Care bundle to prevent central venous catheter (CVC) infections

Insertion Care Bundle	Maintenance Care Bundle
➢ Use single lumen unless indicated otherwise ➢ Use maximal sterile barrier precautions during insertion ➢ Avoid femoral site, subclavian vein is the preferred site ➢ Disinfect skin with 2% chlorhexidine gluconate in 70% isopropyl alcohol & allow to dry ➢ Use a sterile , semipermeable, transparent dressing (with sustained release chlorhexidine gluconate- impregnated sponge)	➢ Review need for central venous catheter on daily basis & remove promptly if not required ➢ Inspect CVC site on a daily basis for sign of infection ➢ Use aseptic technique for daily care(e.g. Hand Hygiene before accessing the device, use of sterile single use gloves & disinfect hubs)

Care bundle to prevent catheter associated Urinary tract infections

Insertion Care Bundle	Maintenance Care Bundle
➢ **Avoid unnecessary catheterization** ➢ Use sterile items/ equipment ➢ Insert Catheter using strict aseptic non touch technique ➢ Use closed drainage system ➢ Choose catheters of appropriate size ➢ Consider use of antimicrobial impregnated catheters in High risk patients requiring short term catheterization(2-10days)	➢ **Review need for catheter on daily basis** ➢ Use aseptic technique for daily catheter care(e.g. Hand Hygiene before accessing the catheter & sterile items/ equipment) ➢ Don't break the closed drainage system, if urine specimen required, take specimen aseptically ➢ Keep the drainage bag above the floor but below bladder level to prevent reflux/ contamination ➢ Remove catheter promptly when no longer necessary.

Care bundle to prevent ventilator associated Pneumonia

Regular observation	Ongoing care
➢ Elevation of the head of the bed to 30-45 degree ➢ Daily assessment of sedation with readiness to extubate ➢ Gastric ulcer prophylaxis ➢ Management of ventilator tubing ➢ Appropriate humidification of inspired gas ➢ Deep vein thrombosis prophylaxis	➢ Adherence to hand hygiene and aseptic technique ➢ Oral hygiene ➢ Subglottic suctioning of respiratory secretions

Care bundle to prevent surgical site infection

- Appropriate use of antibiotics.
- Appropriate hair removal.
- Post-operative glucose control (Major cardiac surgery patients).
- Post-operative normothermia (colorectal surgery patients).

Appendix2. List of disinfectants currently available in the hospital and their use

Sr. No.	Department	(70% ethyl alcohol or Isopropyl alcohol	0.5%-1% Sodium Hypochlorite	2% Glutaraldehyde	Refer to Housekeeping SOP	(0.5% chlorhexidine + 70% ethyl alcohol) Currently available formulation- Nanzilon	5% Povidone iodine
1.	O.T.	For skin disinfection, Trolley tops, cautery leads	Disinfection of infected plastics (syringes, cannula caps)	Disinfection of Sharp instruments or heat labile instruments (scissors, laryngoscope)	(0.5%) Tables, trolleys, tiles, floor cleaning, surgery tables	Hand hygiene	Preoperative Skin preparation
2.	ICU's	For skin disinfection, Trolley tops, monitors leads, BP cuff	Surface disinfection (Bed frames, trolleys, tiles). Disinfection of infected plastics (syringes, cannula caps), for cleaning of patient's furniture and fittings.	Disinfection of suction jars & tubings, laryngoscope, O2 Humidifiers	Terminal cleaning of furniture of patients on weekly basis (Bed frames, trolleys, tiles).	Hand hygiene	
3.	Laboratory	Surface cleaning(tables, Biosafety cabinets, work stations	Disinfection of used syringes, slides, cover slips and culture loops etc.	Not required	Not required	Hand hygiene	Not required
4.	Wards	For skin disinfection,& Surface cleaning (Trolley tops etc.)	Disinfection of infected plastics (syringes, cannula caps, patient furniture and fixtures.)	Disinfection Heat labile and other instruments(scissors etc.)	Terminal cleaning of furniture of patients on weekly basis (Bed frames, trolleys, tiles).	Hand hygiene	
5.	Dressing room	For skin disinfection, Trolley tops etc.	Disinfection of infected plastics (syringes etc.)	Disinfection of instruments	Not required	Hand hygiene	

Appendix3. HOUSEKEEPING CHECK LIST FOR OTS

Before start of OT daily cleaning of parts surrounding

Date									
OT Table									
OT Light									
Boyle's App/ Anesthesia trolley									
IV Stand									
Cautery Machine & Cautery, Paddle									
Instrument trolley(Especially trolley top)									
Door Handle									
Suction Machine									
Hand Washing Area/ Scrubbing Area									
AC Point checking									
Floor Cleaning									
Prepare bleach solution									

During Surgery

Date									
Any Spillage									
Management of Spill									

In between surgery

Date									
OT table									
Patients Surroundings									
Cleaning of suction tubing and jar									

At the end of day

Date									
OT Table									
OT Light									
Boyle's App/ Anaesthesia trolley									
Instrument trolley/ Specially trolley									

top									
Door Handle									
Cleaning of suction jar followed by sterilization									

Date									
Cleaning done by 1.NO(M) 2.HK(M)									
Supervised by Sister incharge									

Weekly cleaning

Date										
Check all suction and ac points working										
Remove all portable items.										
Remove dust from inaccessible area with wet mop										
Thorough cleaning of surfaces by three bucket system										
Wash the OT floor with soap & water										
Clean AC filters/ AC ducts										
Clean doors, walls, windows										
Seal all crevices, holes before fumigation										
Replace all portable items back after cleaning										
All the AC point sealed										
Complete fumigation process as per protocol										

Appendix 4. DAILY ROUND FORMAT

CHECK LIST FOR HOSPITAL INFECTION CONTROL ROUNDS

Checklist / Date												
BMW												
Segregation												
Sharp Disposal												
Patient Bundle Care												
Intra vascular device												
Urinary bag												
Ventilator												
Bed sore												
Dressing Trolley												
Crash cart												
Disinfection & Sterilization												
Suction apparatus												
Reusable items												
Blood spillage policy												
Cleanliness												
Personnel Protective Equipment												
Usage												
Availability												
Hand washing												
Surveillance reports												
Last report												
Date sent												
Who took sample												
Site for sampling												
Before / after cleaning												
Remarks												
Name of sister In charge												
Signature of sister In charge												
Remarks Appropriate/ Inappropriate												

Appendix5. PROFORMA FOR OCCUPATIONAL EXPOSURE TO BLOOD, BODY FLUIDS AND SHARP INJURIES

NATURE OF INJURY : PERCUTANEOUS INJURY (NSI)/SHARP CUT/ LACERATION / SPLASH OF BLOOD OR BODY FLUIDS		
Date of injury:	Time:	Location:
Date of reporting:	Time:	

HEALTH CARE WORKER	**SOURCE PATIENT**
Name:	Name:
Age/sex:	Age/sex:
Designation:	Diagnosis:
H/O Blood transfusion:	History:
HBV Immunization status a. Complete b. Partial c. No	Ward/ICU/OT:
If yes then D/M/Y:	
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 eyes 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 accident with a high caliber needle(>18 G) visibly contaminated with blood. (b)- a deep wound. (c)- Transmission of a significant volume of blood.	**Categories of Source:** HIV Negative Low risk High risk Unknown
Practice of Standard Precautions: Yes/No	Whether on ART: Yes/No
First Aid measures: (Wash / Bleed / Antiseptic / TT)	Risk factors for HIV/STD :
Action taken in Causality Hepatitis B Vaccination HBIG Anti HBSAg Titer If yes; Level of antibody PEP advised/taken	 Yes/No Yes/No Yes/No Responder/ Noresponder Yes/No
Consent/Signature:	Consent/ Signature:
Contact no. :	Contact no.
Address:	Address:

Signature &Stamp of unit In charge/CMO

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 EL ISA

Technician: **Microbiologist:**

Date / Time:

Appendix 6. CHECKLIST FOR INFECTION CONTROL ROUND IN DIALYSIS UNIT

Date of round:

Action Expected	**Expected Frequency**	**Last 2 dates when complied**	**Overall compliance (Yes/No/Partial)**
1. HAEMODIALYSIS MACHINE			
AV tubing completely immersed in disinfectant after use	After every use		
Disinfection of Hemodialysis machine with 4% Hypochlorite	Once in a day		
Disinfection of Hemodialysis machine surface area with 1% Hypochlorite	Once in a day		
Bleaching of machines with 5% chlorine	Once in a week		
Conductivity test of RO water	Once in a month Expected value:		
Dialysate sterility	Once in a month		
Calibration of machine	Quarterly		
2. RO UNIT			
Conductivity test	Once in a day Expected value:		
RO maintenance by backwashes and regeneration of softener	Once in a week		
Hardness test	Once in a week		
Chloramine test	Once in a week		
Disinfection of RO unit including Loop lines and Storage tanks	Once in a month		
Culture of RO unit output water	Once in a month		
Endotoxin assay of RO water	Once in a month Expected value:		
Detailed examination of RO water under AAMI guidelines	Quarterly		
3.REPROCESSOR MACHINE			
Ends of dialyzer connectors dipped in disinfectant	After every use		
Number of times haemodialyser used	Expected frequency:		
Disinfection of reprocessor machine with 1% hypochlorite	Once in a week		

REFERENCES:-

1. **Infection Control Guidelines. Indian Council of Medical Research (ICMR), New Delhi, India;1-96.**

2. **Prevention and control of healthcare associated infections. Lok Nayak Hospital, New Delhi, India. 2016;1-99.**
3. **Manual of Infection prevention and control; 3rd edition; Nizam Damani**