Subject: Standard Operating Procedures (SOPs) for Quality Assurance in Hospitals.

To

Medical Superintendents
All GNCTD Hospitals

Sir / Madam

Department of Health and Family Welfare is taking up various health sector reforms with an unprecedented urgency and energy for realization of the citizen's dream of equitable, accessible and affordable healthcare. Importance of Quality in healthcare services has become a top priority agenda as the ultimate outcomes in terms of morbidity, mortality and patient satisfaction are all inseparably linked with the quality in health care delivery.

In order to ensure quality in any process, the right way of doing it has to be defined, documented and disseminated to all stakeholders, simultaneously building their capacities by imparting the required knowledge and skills. Standard Operating Procedures (SOPs) are a mandatory pre-requisite for any Quality Assurance Program. Some departments in some hospitals have developed and documented these in their respective hospitals. The practice has to be universalized in all health institutions in a scientific and sustained manner.

In view of this, experts in different work domains were asked to draft SOPs for their specialties / work domains through formation of the Committees. These have been prepared and are being circulated for customization and adoption by all hospitals. These are by no means exhaustive or prescriptive. An effort has been made to document all dimensions / working aspects of common processes / procedures being implemented in provision of healthcare. The documents shall provide the background for the different departments in hospitals to takeout / adapt / adopt of what is applicable in their setting and resources. The customized final SOPs prepared by the respective Departments must be approved by the Medical Director / Medical Superintendent and issued by the Head of the concerned departments. The general SOPs shall be approved by Medical Director / and issued by Medical Superintendent. A scanned soft copy of the approved final SOPs must be forwarded to Dr. Monika Rana, Addl. Secretary (Health) & Nodal Officer (QA) at gag.dshm@gmail.com.
Development and updation of SOPs is a dynamic process. They shall be periodically reviewed and updated by the HODs every six months and all amendments if any must be recorded in the manner prescribed. Formulation of SOPs is the first step. This has to be followed up by dissemination of the same to all concerned stakeholders. Necessary trainings of the existing staff / inclusion of relevant SOPs dissemination in induction training of the new staff must be institutionalized and documented.

Quality is a journey and as we move along this path, the results shall become apparent in the form of better environments for the healthcare seekers as well as providers / increased outputs / better outcomes. Let us commit ourselves wholeheartedly to the provision of quality assured services in all our health institutions and achieve a high level of patient satisfaction and trust in public health facilities.

\[\text{\textit{\textit{\textit{13th September 2016}}}}\]

Dr. Tarun Seem
Secretary (H&FW), GNCTD

To

1. All Medical Superintendents (GNCTD Hospitals).
2. Director General, Directorate General of Health Services.
4. Director, Directorate of Family Welfare.
5. Dr. Monika Rana, Addl Secretary & Nodal Officer, QA Program.

Enclosures:

Preface

Healthcare associated infections are one of the major causes of morbidity and mortality in the patients receiving treatment in various healthcare units. It also increases treatment cost through increase usage of antimicrobials and prolong hospital stay of patients. To reduce these infection rates, strengthening and streamlining of hospital processes is required, therefore, the Quality Assurance Cell, under Delhi State Health Mission has taken an initiative to develop Manual for Infection Prevention and Control in Healthcare Settings for all hospitals under Government of NCT of Delhi. In addition, for ensuring affordable, accessible healthcare, it is imperative that the services provided conform to the mandated quality standards. A committee had been constituted to develop Standard Operating Procedures (SOPs) for Infection Prevention and Control in healthcare settings by the Government of NCT of Delhi. The Committee after detailed deliberations has developed a manual for infection prevention and control.

The manual provides recommendations supported by scientific evidence and best available options/alternatives. The manual is comprehensive and covers all aspects of infections from safe injection practices, antibiotic policy, and biomedical waste management to sanitation, housekeeping, laundry etc.

These SOPs shall serve as a template for the hospitals, Polyclinics, Dispensaries and Mohalla Clinics under the Government of NCT of Delhi and can be customized at the local level for adoption and implementation depending on the scope of services of the health facility. We would like to place on record the support we received from all members who lent their time and expertise towards the preparation of the manual.

Suggestions from readers will be welcome. Special thanks to Dr. Ravindra Aggarwal for hosting the meetings of the Committee in his office and the Staff at Quality Assurance Cell, Vikas Bhawan II, New Delhi.

(Dr. Sangeeta Sharma)
Chairperson & Professor & Head
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Institute of Human Behaviour & Allied Sciences, Delhi
Committee for Developing Standard Operating Procedures for Infection Control /Biomedical Waste
(vide order F-3-19/4/2014-SPMU/1/2097/2016 dated 26.5.16)

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The SOPs have been prepared by a Committee of Experts and are being circulated for customization and adoption by all hospitals. These are by no means exhaustive or prescriptive. An effort has been made to document all dimensions / working aspects of common processes / procedures being implemented in provision of healthcare in different departments. This document pertains to Infection Control. The individual hospital departments may customize / adapt / adopt the SOPs relevant to their settings and resources. The customized final SOPs prepared by the respective Departments must be approved by the Medical Director / Medical Superintendent and issued by the Head of the concerned department. HOD shall ensure that all stakeholders are trained and familiarized with the SOPs and the existing relevant technical guidelines / STGs / Manuals mentioned in the SOPs are made available to the stakeholders.

Acknowledgements:
The contents have been liberally adopted from Hospital infection Control Manual CNBC and Draft Manual of The Maulana Azad Medical College and associated Hospitals. Special Thanks to the Staff at Quality Assurance Cell, Vikas Bhawan II, New Delhi.

Developed By:

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<td>ABUTI</td>
<td>Asymptomatic bacteremic urinary tract infection</td>
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<tr>
<td>AE</td>
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<tr>
<td>AEB</td>
<td>Accidental blood</td>
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<tr>
<td>AIDS</td>
<td>Acquired immune deficiency syndrome</td>
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<td>AMT</td>
<td>Antibiotic Management Team</td>
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<tr>
<td>ANS</td>
<td>Assistant Nursing Superintendent</td>
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<td>ART</td>
<td>Anti retroviral therapy</td>
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<tr>
<td>ASP</td>
<td>Antimicrobial stewardship program</td>
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<td>AUR</td>
<td>Antibiotic usage and resistance monitoring</td>
</tr>
<tr>
<td>BL-BLI</td>
<td>Beta lactam-beta lactamase inhibitor</td>
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<td>BMW</td>
<td>Bio-medical waste management</td>
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<tr>
<td>CA-UTI</td>
<td>Catheter associated urinary tract infections</td>
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<tr>
<td>CBWTF</td>
<td>Common bio-medical waste treatment facility</td>
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<tr>
<td>CCDC</td>
<td>Consultant for communicable disease control</td>
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<tr>
<td>CCU</td>
<td>Critical care unit</td>
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<tr>
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<td>Centre for disease control and prevention</td>
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<tr>
<td>DPCC</td>
<td>Delhi pollution control committee</td>
</tr>
<tr>
<td>DTC</td>
<td>Drug and Therapeutics Committee</td>
</tr>
<tr>
<td>EC</td>
<td>Exposure code</td>
</tr>
<tr>
<td>EPA</td>
<td>Environment protection act</td>
</tr>
<tr>
<td>ESBL</td>
<td>Extended spectrum beta lactamase</td>
</tr>
<tr>
<td>ETO</td>
<td>Ethylene oxide</td>
</tr>
<tr>
<td>ETP</td>
<td>Effluent treatment plant</td>
</tr>
<tr>
<td>GOI</td>
<td>Government of India</td>
</tr>
<tr>
<td>HA-BSI</td>
<td>Hospital acquired blood stream infection</td>
</tr>
<tr>
<td>HBV</td>
<td>Hepatitis B virus</td>
</tr>
<tr>
<td>HCAI</td>
<td>Healthcare associated infection</td>
</tr>
<tr>
<td>HCV</td>
<td>Hepatitis C virus</td>
</tr>
<tr>
<td>HCW</td>
<td>Health care worker</td>
</tr>
<tr>
<td>HD</td>
<td>Haemodialysis</td>
</tr>
<tr>
<td>HDU</td>
<td>High dependency unit</td>
</tr>
<tr>
<td>HEPA</td>
<td>High efficiency particulate</td>
</tr>
<tr>
<td>HIC</td>
<td>Hospital infection control</td>
</tr>
<tr>
<td>HICCC</td>
<td>Hospital infection control committee</td>
</tr>
<tr>
<td>HICPAC</td>
<td>Healthcare Infection Control Practices Advisory Committee</td>
</tr>
<tr>
<td>HIV</td>
<td>Human immunodeficiency virus</td>
</tr>
<tr>
<td>HLD</td>
<td>High level disinfectant</td>
</tr>
<tr>
<td>HMEF</td>
<td>Heat and moisture exchanging filter</td>
</tr>
<tr>
<td>ICD</td>
<td>International classification of disease</td>
</tr>
<tr>
<td>ICN</td>
<td>Infection control nurse</td>
</tr>
<tr>
<td>ICOC</td>
<td>Infection control officer</td>
</tr>
<tr>
<td>ICT</td>
<td>Infection control team</td>
</tr>
<tr>
<td>ID</td>
<td>Infectious disease</td>
</tr>
<tr>
<td>IM</td>
<td>Intramuscular</td>
</tr>
<tr>
<td>IPD</td>
<td>In-patient department</td>
</tr>
<tr>
<td>IV</td>
<td>Intravenous</td>
</tr>
<tr>
<td>JE</td>
<td>Junior engineer</td>
</tr>
<tr>
<td>LCBSI</td>
<td>Laboratory confirmed blood stream infection</td>
</tr>
<tr>
<td>MBL</td>
<td>Metallo-beta lactamase</td>
</tr>
<tr>
<td>MDR</td>
<td>Multidrug resistant</td>
</tr>
<tr>
<td>MDRO</td>
<td>Multidrug resistant organism</td>
</tr>
<tr>
<td>MRSA</td>
<td>Methicillin resistant Staphylococcus aureus</td>
</tr>
<tr>
<td>MSSA</td>
<td>Methicillin sensitive Staphylococcus aureus</td>
</tr>
<tr>
<td>MTP</td>
<td>Medical termination of pregnancy</td>
</tr>
<tr>
<td>NACO</td>
<td>National AIDS control organisation</td>
</tr>
<tr>
<td>NHSN</td>
<td>National healthcare surveillance network</td>
</tr>
<tr>
<td>NICU</td>
<td>Neonatal intensive care unit</td>
</tr>
<tr>
<td>NS</td>
<td>Nursing superintendent</td>
</tr>
<tr>
<td>OPA</td>
<td>Orthophthaldehyde</td>
</tr>
<tr>
<td>OR</td>
<td>Operating room</td>
</tr>
<tr>
<td>OT</td>
<td>Operation theatre</td>
</tr>
<tr>
<td>PEP</td>
<td>Post exposure prophylaxis</td>
</tr>
<tr>
<td>PICU</td>
<td>Paediatric intensive care unit</td>
</tr>
<tr>
<td>PO</td>
<td>Per oral</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal protective equipment</td>
</tr>
<tr>
<td>PWD</td>
<td>Public work department</td>
</tr>
<tr>
<td>RCU</td>
<td>Respiratory care unit</td>
</tr>
<tr>
<td>RO</td>
<td>Reverse osmosis</td>
</tr>
<tr>
<td>SC</td>
<td>Source code</td>
</tr>
<tr>
<td>SSI</td>
<td>Surgical site infection</td>
</tr>
<tr>
<td>SUTI</td>
<td>Symptomatic urinary tract infection</td>
</tr>
<tr>
<td>VAP</td>
<td>Ventilator associated pneumonia</td>
</tr>
<tr>
<td>VRE</td>
<td>Vancomycin resistant enterococcus</td>
</tr>
<tr>
<td>VRSA</td>
<td>Vancomycin resistant Staphylococcus aureus</td>
</tr>
<tr>
<td>WHO</td>
<td>World health organisation</td>
</tr>
</tbody>
</table>
1. INTRODUCTION

1.1 Infections which arise in healthcare are termed Healthcare associated infection (HAI). HAI is 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 The hospital recognizes the control of hospital associated infections (HAI) as an essential part of patient care. The Hospital 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 HAI 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 the Hospital. 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 the hospital 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 of the hospital yearly.
2. ORGANIZATION OF INFECTION PREVENTION AND CONTROL PROGRAM

The hospital 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

- To establish standards in prevention, control measures and minimize HAIs in patients, staff and visitors.
- To define policies and procedures for implementing and monitoring of HAIs at the hospital.
- To establish antibiotic stewardship program with at least yearly updation of evidence based antibiotic policy with monitoring of its adherence by the prescribing authorities and monitoring antibiotic utilisation in various areas of the hospital.

2.2 Components of the The hospital Infection Prevention and Control Program

1. Establishing and regular updating of hospital infection control manual
2. Minimizing HAIs through continuous monitoring of healthcare associated infections
3. Surveillance
   a. Laboratory based surveillance of HAIs
   b. Ward based surveillance of HAIs
   c. Surveillance and regular feedback of device associated infections
   d. Surveillance and regular feedback of surgical site infections
4. Improvement of hand hygiene compliance
5. Investigation and control of outbreaks
6. Monitoring of emergence of antimicrobial resistance
7. To recommend antibiotic policy for the hospital based on local antiibiograms and evidence based published national/international guidelines.
8. Identify areas if irrational use of antibiotics and curb irrational use of antibiotics in hospital areas
9. Identification of high risk areas and establish steps to mitigate risk of HAIs to patients, staff and visitors
10. Establish sterilization and disinfection protocols and establish mechanisms to monitor the same.
11. Monitoring of staff health to prevent, staff to patient and patient to staff spread of infection.
12. Monitoring and promotion of bio-medical waste management as per government regulations
13. Training of staff in prevention and control of HAI.

2.3 Objectives and Terms of Reference

2.3.1 Objectives of the program

i. To minimize healthcare associated infections among patients, staff and visitors
ii. To establish antimicrobial stewardship program and promote rational use of antimicrobials
iii. To provide education and training to healthcare workers, patients and visitors regarding policies and procedures to minimise healthcare associated infections

2.3.2 Terms of reference of HICC
i. To develop a documented healthcare associated infections prevention and control program and review it at least annually.
ii. To identify and reduce risks of healthcare associated infections among patient, staff and visitors and implement risk mitigation strategies for the same
iii. To meet and monitor all statutory requirement related to healthcare associated infections asked by various government authorities from time to time
iv. To perform surveillance activities to capture and monitor infection prevention and control data
v. To take action to prevent and control healthcare associated infections in patient, visitors and healthcare workers
vi. To ensure adequate and appropriate resources for prevention and control of healthcare associated infections
vii. To identify and take appropriate action to control outbreaks of infection in the hospital
viii. To document policies and procedures and sterilization activities and ensure its implementation and monitoring
ix. To ensure appropriate and safe handling of Biomedical waste management in hospital premises
x. To plan, support and implement regular training of healthcare regarding infection control and prevention
xi. Prepare the program on the proper use of antibiotics, develop antibiotic policies and recommend remedial measures when antibiotic resistant strains are detected.
xii. Ensure that the data generated through surveillance activities is reviewed at least monthly by the HICC and generate action points based on data, hospital and community needs.

2.4 Constitution of Hospital Infection Control Committee (HICC)

2.4.1 HICC Members
Atleast following members shall be part of the program*:

<table>
<thead>
<tr>
<th>S. NO.</th>
<th>Designation /Departments</th>
<th>NAME</th>
<th>CommitteeOrganization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Director/Medical Superintendent</td>
<td>Chairperson</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Microbiologist</td>
<td>Infection Control Officer and Member Secretary</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Head of department of medical and surgical specialties</td>
<td>Members</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>MO I/C of Emergency Services</td>
<td>Member</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>M.O.I/C OT(s)</td>
<td>Member</td>
<td></td>
</tr>
</tbody>
</table>

* GNCTD/…………/SOP/IC/12
All senior doctor and nursing representations from high risk areas must be included as committee members and shall depend upon the services provided by the hospital. One of the member shall act as secretary of the HICC.

**At least one ICN per 100 beds must be identified. However if Hospital bed strength is more than 1000 beds, 1 ICN per additional 200 beds may be added**

### 2.4.2 Meetings of HICC

<table>
<thead>
<tr>
<th>No.</th>
<th>Position</th>
<th>Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.</td>
<td>M.O.I/C CSSD</td>
<td>Member</td>
</tr>
<tr>
<td>7.</td>
<td>M.O.I/C Laundry</td>
<td>Member</td>
</tr>
<tr>
<td>8.</td>
<td>M.O.I/C ICU(s)</td>
<td>Member</td>
</tr>
<tr>
<td>9.</td>
<td>M.O.I/C PICU</td>
<td>Member</td>
</tr>
<tr>
<td>10.</td>
<td>M.O.I/C Nursery</td>
<td>Member</td>
</tr>
<tr>
<td>11.</td>
<td>M.O.I/C Dialysis Unit(s)</td>
<td>Member</td>
</tr>
<tr>
<td>12.</td>
<td>M.O. I/C Housekeeping services</td>
<td>Member</td>
</tr>
<tr>
<td>13.</td>
<td>M.O. I/C Blood Bank/B.T.O</td>
<td>Member</td>
</tr>
<tr>
<td>14.</td>
<td>M.O. I/C Pharmacy</td>
<td>Member</td>
</tr>
<tr>
<td>15.</td>
<td>M.O. I/C Biomedical waste management</td>
<td>Member</td>
</tr>
<tr>
<td>16.</td>
<td>Nursing I/C Biomedical Waste management</td>
<td>Member</td>
</tr>
<tr>
<td>17.</td>
<td>All DNS</td>
<td>Members</td>
</tr>
<tr>
<td>18.</td>
<td>All A.N.S</td>
<td>Members</td>
</tr>
<tr>
<td>19.</td>
<td>Sister Incharge OT</td>
<td>Member</td>
</tr>
<tr>
<td>20.</td>
<td>Sister Incharge ICUs</td>
<td>Member</td>
</tr>
<tr>
<td>21.</td>
<td>Sister Incharge PICU</td>
<td>Member</td>
</tr>
<tr>
<td>22.</td>
<td>Sister Incharge Nursery</td>
<td>Member</td>
</tr>
<tr>
<td>23.</td>
<td>Sister Incharge Dialysis</td>
<td>Member</td>
</tr>
<tr>
<td>24.</td>
<td>Sister Incharge Labour Rooms</td>
<td>Member</td>
</tr>
<tr>
<td>25.</td>
<td>Sister Incharge OPD</td>
<td>Member</td>
</tr>
<tr>
<td>26.</td>
<td>Sister Incharges Wards</td>
<td>Member</td>
</tr>
<tr>
<td>27.</td>
<td>Infection Control Nurses**</td>
<td>Member</td>
</tr>
<tr>
<td>28.</td>
<td>Chief Dietician</td>
<td>Member</td>
</tr>
<tr>
<td>29.</td>
<td>Procurement Officer</td>
<td>Member</td>
</tr>
<tr>
<td>30.</td>
<td>M.O I/C PWD</td>
<td>Member</td>
</tr>
<tr>
<td>31.</td>
<td>M.O. I/C Hospital Stores</td>
<td>Member</td>
</tr>
<tr>
<td>32.</td>
<td>M.O I/C Stationary Store/Kitchen</td>
<td>Member</td>
</tr>
<tr>
<td>33.</td>
<td>J.E. Civil &amp; Electrical</td>
<td>Member</td>
</tr>
<tr>
<td>34.</td>
<td>Senior Pharmacist</td>
<td>Member</td>
</tr>
</tbody>
</table>

Co-Opted Members

<table>
<thead>
<tr>
<th>No.</th>
<th>Position</th>
<th>Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>29.</td>
<td>Procurement Officer</td>
<td>Member</td>
</tr>
<tr>
<td>30.</td>
<td>M.O I/C PWD</td>
<td>Member</td>
</tr>
<tr>
<td>31.</td>
<td>M.O. I/C Hospital Stores</td>
<td>Member</td>
</tr>
<tr>
<td>32.</td>
<td>M.O I/C Stationary Store/Kitchen</td>
<td>Member</td>
</tr>
<tr>
<td>33.</td>
<td>J.E. Civil &amp; Electrical</td>
<td>Member</td>
</tr>
<tr>
<td>34.</td>
<td>Senior Pharmacist</td>
<td>Member</td>
</tr>
</tbody>
</table>
i. The infection control committee meets at least monthly or more frequently as necessary. Documentation of meetings and recommendations are kept by the secretary.

ii. Minimum Quorum required: Chairperson, Infection Control Team [ICO and ICNs (atleast 50%)] and 50% of other members.

iii. The ICN (Infection Control Nurse) conduct rounds and report the findings to the ICO on daily basis. Registers are maintained by ICNs.

2.4.3 Hospital Infection control team (ICT)
The infection control team (at the minimum) consists of:
1. Microbiologist (Infection control officer)
2. Infection Control Nurses
   [Contact details of all members of ICT must be provided in the manual]

2.4.3.1 Responsibilities of the Infection Control Team
   i. Advise staff on all aspects of infection control and maintain a safe environment for patients and staff.
   ii. Advise management of at risk patients.
   iii. Carry out targeted surveillance of healthcare associated infections and act upon data obtained e.g. investigates clusters of infection above expected levels.
   iv. Recommend antibiotic policy for different areas of the hospital.
   v. Provide a manual of policies and procedures for aseptic, isolation and antisepctic techniques.
   vi. Investigate outbreaks of infection and take corrective measures.
   vii. Provide relevant information on infection problems to management.
   viii. Assist in induction training of all new employees as to the importance of infection control and the relevant policies and procedures.
   ix. Have written procedures for maintenance of cleanliness.
   x. Surveillance of infection, data analyses, and implementation of corrective steps. This is based on reviews of lab reports, reports from nursing in charge etc.
   xi. Surveillance of Biomedical Waste management activities
   xii. Supervision of isolation procedures.
   xiii. Monitors employee health programme.
   xiv. Addresses all requirements of infection control and employee health as specified by Central laws, State laws and NABH.

2.4.4 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.

2.4.4.1 Duties of infection Control Nurse includes:
i. The ICN conducts Infection control rounds daily and maintains the registers.
ii. The ICN is involved in education of practices minimising healthcare associated infections and hand hygiene among Healthcare workers.
iii. Maintains registers and data of Sharps/Needle stick injuries and Post–exposure prophylaxis.
iv. 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.

v. 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.

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

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

2.4.4.2 Selection of ICNs
ICNs can be selected through following process:-

i. Any staff nurse can volunteer to enrol for ICN provisionally.

ii. Nominated nursing staff can be enrolled for ICN provisionally.

iii. All staff nurses have to undergo written exam provided by surveillance and infection control division. Only staff nurses scoring more than 90% of marks shall be enrolled as ICN. Till the time provisional ICNs qualify the exam, they can work under supervision of qualified ICN. Provisional ICN shall not work independently or take independent rounds.

2.4.5 Infection Control Officer (ICO)
The microbiologist serves as Infection Control Officer. In the absence of a microbiologist, a trained physician or surgeon may serve as ICO.

2.4.5.1 Duties of Infection Control Officer:

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

ii. Co-ordinate with the chairperson and HICC in planning infection control programme and measures.

iii. Keeps a track of any developing outbreaks.

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

v. Developing guidelines for appropriate collection, transport & handling of specimens.

vi. Ensuring laboratory practices meet appropriate standards.

vii. Ensuring safe laboratory practices to prevent infection in staff.

viii. Performing antimicrobial susceptibility testing following internationally recognized method & providing summary reports of prevalence of resistance.

ix. Monitoring sterilization, disinfection & the environment where necessary.

2.5 Review and Revision of Infection Control Manual
Written policies and procedures shall be reviewed at least in a year. Signature of chairperson HICC, Secretary HICC, NS and Infection Control Nurses shall be affixed on controlled copies. There shall be atleast five controlled copies that shall be distributed to the following: MS, ICO, ICN, NS and Hospital Library. All department shall have atleast one printed copy of the manual. Digital version should 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 3.1.2 whether confirmed or suspected, must be notified by the attending doctor to the Consultant for Communicable Disease Control (CCDC) who is MO/Ic MRD.

3.1.1 Prompt notification and reporting of disease is essential.
The objectives of notification are:
   a. Regulatory obligation by Govt. of NCT of Delhi
   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.
      i. Any doctor who considers that a patient is suffering from a notifiable/reportable disease/ has a statutory duty to notify the Nodal officers (Medicine, Paediatrics and Dermatology).
      ii. Nodal Officers should provide weekly data to ICN.
      iii. ICN should monitor Infection control practices in wards for these diseases and should provide feedback to ICO, CCDC and nodal officer.

3.1.2 Notifiable/Reportable Diseases (ICD code)
   i. Measles (B05)
   ii. Cholera – (A00)
   iii. Smallpox (B03)
   iv. Plague (A20)
   v. Diphtheria (A36)
   vi. Dengue hemorrhagic fever/ Dengue (A90)
   vii. Acute flaccid paralysis (G82.0)
   viii. Swine flu
   ix. Malaria (B54)
   x. HIV/ AIDS (B24)

In case of an epidemic:
   i. Acute gastroenteritis (A09)
   ii. Viral hepatitis (B19)
   iii. Meningococcemia (A39.2)
   iv. Any other as notified by the relevant authorities

3.1.3 Procees of tracking of notifiable diseases
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:

3.2.2 Objective of Surveillance

i. Establish endemic baseline rate.

ii. Reducing infection rates in the hospital.

iii. Identifying and containing the outbreaks.

iv. Evaluating and monitoring infection control measures.

v. Monitoring antimicrobial susceptibility patterns

Surveillance is part of the routine infection control programme. 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 THE HOSPITAL. Telephonic follow up till the 90 days of surgery (if implant placed up to one year) are done to detect possible SSI.

3.2.3 Surveillance Policy describes following key points

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

2. Active methods of surveillance

3.2.3.1 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.
3.2.3.1.1 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.

3.2.3.1.2 Ward Based Surveillance (Alert Conditions)
Alert conditions are medical syndromes such as Acinetobacter bacteraemia 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 labelled, to the laboratory. Source isolation precautions must be instituted immediately that infection is suspected.

3.2.3.2 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 atleast 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.

3.2.3.3 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 atleast 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 Condition/s.

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

**BACTERIA**
1. Methicillin-resistant *Staphylococcus aureus*
2. Other resistant *Staphylococcus aureus*
3. Penicillin-resistant *Streptococcus pneumoniae*
4. *Haemophilus influenzae*
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 haemorrhagic fever
13. Swine flu

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

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

3.2.5.1 Active surveillance of High Risk Areas and other areas of significance.
   High risk areas of the hospital are identified includes:
   - Intensive care units (NICU, PICU, CCU/RCU, MSICU)
   - Operation theatres ( OT I, OT II, OT III, Urology OT, Burns and Plastic OT, Gynae OT, PPOT, Septic OT
   - HDU
   - Dialysis unit
   - Kitchen
   - 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:
1. To support an investigation of an outbreak of disease or infections.
2. For the purpose of research.
3. After any major construction periods to qualitatively detect breaks in environmental infection-control measures.
4. Surprise air checks can be undertaken to monitor general OT discipline at least once in a month.
5. Fogging of OTs will be done on the basis of these reports and/or clinical out of procedures carried out in the operating areas (For details see chapter 7).
6. Records are kept with nursing incharge 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 atleast 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 in defined time frame.
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 antimicrobial 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 atleas once in a month and presented in HICC meetings.

**IV. FOOD HANDLERS**
Screening of food handlers is done biannually. Samples include nasal swabs (for MRSA Carriage), urine and stool samples (for typhoid carriage; ova/cyst examination in stool). Records to be maintained by the dietician and ICN.

**V. DRINKING WATER**
Bacteriological surveillance is to be done at least once in 2 months in the microbiology laboratory for live bacterial contamination and once in six months in an accredited laboratory for detailed anaysis. Responsibility of sending the samples and records maintenance is of Dietary department. Copy of the ame must be send to infection control unit.

**VI. 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 criss-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 (double door window to contain contamination).
   ii. Cleaning Area
   iii. Decontamination Area

2. Clean Zone includes:-
   i. Drying Area
   ii. Assembling and Packaging Area
   iii. Autoclaving Area/ ETO /Glas plasma Area

3. Sterile Zone includes:-
   i. Assembling and Packaging Area
   ii. Sterile storage room
   iii. Issuing window.

For further details please refer to chapter on Sterilisation and disinfection.

3. 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, nebulisation chamber, airway etc. and other supplies are decontaminated with the help of gluteraldehyde 2%, enzyme solution(s) 1% etc.

4. Clean zone
   i. Drying Area: In this area all cleaned items are dried with the help of drying cabinet at a temperature of 45°C for 45 minutes.
   ii. 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. Indicators used for various sterilisation methods are ensured to be in place.
   iii. Packing Area: In this section Various types of dressings like gauge pieces; cotton pads and bandages etc. are also prepared in this area.
   iv. 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.

5. 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.

3.2.6 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.

3.2.7 Surveillance of Hand Hygiene Compliance
   i. 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.
   ii. 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.
   iii. This should be followed by awareness drives and educational activities.
   iv. Provision of accessible alcoholic rubs should preferably be made at each bedside.
   v. 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.

According to HICPAC and the CDC 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. Hand Hygiene

4.1.1 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.

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

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

4.1.4 When to wash hands
This is determined by actions – those completed and those about to be performed – social hand wash, aseptic /hygiene hand wash and surgical hand wash.

4.1.5 Routine washing (Social Hand Wash)
1. Before preparing, eating, drinking or handling food.
2. Before and after smoking.
3. After visiting the toilet.
4. Before starting work (remove jewellery, e.g. rings) and after leaving an occupational area. All jewellery and ornaments like bangles, watches, and rings must be removed before performing hand hygiene.
5. Before and after physical contact with each client in clinical situations, e.g bathing, assisting to move, toileting.
6. After handling contaminated items such as dressings, bedpans, urinals, urine drainage bags and nappies.
7. Before putting on gloves and after removing them.
8. Before and after removing any protective clothing.
9. After blowing your nose, covering a sneeze.
10. Whenever hands become visibly soiled.
11. When hands are visibly soiled,
12. Before starting work,
13. Handling food and following patient contact.

4.1.6 The “My 5 Moments for Hand Hygiene” approach
Fig 4.1: 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

4.1.7 Sequence of events
1. Wet hands under running water.
2. Dispense one dose of soap into cupped hand.
3. Hand wash for 40-60 seconds vigorously and thoroughly by following six step techniques, without adding more water. (See Figure 4.2)
4. Rinse hands thoroughly under running water.
5. Dry hands with single use brown paper.

4.1.8 Hand disinfection - Aseptic/hygiene hand wash
Hand disinfection with alcohol based hand rub (e.g., 70% alcohol, sterilium) preferably with chlorhexidine and alcohol are practice at least in following condition:
   1. Whenever touching any patient esp. in inpatient units and critical care areas.
   2. After handling any potentially infectious object
   3. Before putting on gloves and after removing them.
   4. Prior to invasive procedures
   5. Visibly clean hands
   6. 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.

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

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.

4.1.10 Hand-hygiene Technique
When decontaminating hands with an alcohol-based hand rub
1. Apply product to palm of one hand and rub hands together,
2. Cover all surfaces of hands and fingers by six step technique, until hands are dry.
3. Follow the manufacturer’s recommendations regarding the volume of product to use.

When washing hands with soap and water
1. Wet hands first with water
2. Apply an amount of product recommended by the manufacturer to hands
3. Rub hands together vigorously for atleast 40-60 seconds
4. Cover all surfaces of the hands and fingers by following six step technique
5. Rinse hands with water and,
6. Dry thoroughly with a disposable towel/Paper
7. Use sterile paper towel to turn off the faucet or elbow taps if available.

Fig 4.2. Steps of hand washing
4.1.11 Surgical hand preparation

The introduction of sterile gloves does not render surgical hand preparation unnecessary. Sterile gloves contribute to preventing surgical site contamination and reduce the risk of bloodborne pathogen transmission from patients to the surgical team. However, 18% (range: 5–82%) of gloves have tiny punctures after surgery, and more than 80% of cases go unnoticed by the surgeon. After two hours of surgery, 35% of all gloves demonstrate puncture, thus allowing water (hence also body fluids) to penetrate the gloves without using pressure. Double gloving decreases the risk of puncture during surgery, but punctures are still observed in 4% of cases after the procedure.

Objectives of surgical hand preparation:
Surgical hand preparation should reduce the release of skin bacteria from the hands of the surgical team for the duration of the procedure in case of an unnoticed puncture of the surgical glove releasing bacteria to the open wound. In contrast to the hygienic handwash or handrub, surgical hand preparation must eliminate the transient and reduce the resident flora. It should also inhibit growth of bacteria under the gloved hand.

Steps before starting surgical hand preparation:

i. Keep nails short and pay attention to them when washing your hands – most microbes on hands come from beneath the fingernails.

ii. Do not wear artificial nails or nail polish.
iii. Remove all jewellery (rings, watches, bracelets) before entering the operating theatre. Jewellery is a hazard in theatres; wrist watches and jewellery of any kind (including dress rings and bangles) must not be worn. Wedding rings harbour bacteria so should be removed when scrubbing wherever possible. Earrings are dangerous in that they may fall into a wound and therefore must not be worn at any time. All staff should adhere to “bare below the elbows” prior to any form of clinical contact with patients.

iv. Wash hands and arms with a non-medicated soap before entering the operating theatre area or if hands are visibly soiled.
   1. Clean subungual areas with a nail file. Nail brushes should not be used as they may damage the skin and encourage shedding of cells. If used, nail brushes must be sterile, once only (single use). Reusable autoclavable nail brushes are on the market.
   2. Hands and forearms must be free of open lesions and breaks in skin integrity.
   3. Wear complete operating room attire including mask, cap, and goggles if required.
   4. Keep clothing away from sink and splashes
   5. Keep arms level well away from body and hands up above elbows for duration of scrub.
   6. Turn on water and wet hands and forearms
   7. Apply antiseptic hand wash solutions
   8. Lather hands and forearms for at least one minute from fingertips to three inches above elbows starting with hands to forearm, forearm to elbow.
   9. Wash hands thoroughly, using the following six steps to facilitate eradication of all bacteria and 10 seconds/step.

   Steps to washing
   • Palm to palm
   • Palm over dorsum
   • Palm to palm, fingers interlaced
   • Back to fingers to opposing palms
   • Rotate thumbs in palm
   • Rotate fingers in palm
   • Rinse

Protocol for surgical scrub with a soap
   i. Start timing. Scrub each side of each finger, between the fingers, and the back and front of the hand for 2 minutes.
   ii. Proceed to scrub the arms, keeping the hand higher than the arm at all times. This helps to avoid recontamination of the hands by water from the elbows and prevents bacteria-laden soap and water from contaminating the hands.
   iii. Wash each side of the arm from wrist to the elbow for 1 minute.
   iv. Repeat the process on the other hand and arm, keeping hands above elbows at all times. If the hand touches anything at any time, the scrub must be lengthened by 1 minute for the area that has been contaminated.
   v. Rinse hands and arms by passing them through the water in one direction only, from fingertips to elbow. Do not move the arm back and forth through the water.
   vi. Apply antiseptic hand wash solution a second time.
vii. Lather hands and forearms for at least two minutes in the same manner.
viii. **Recommended scrub time is between 2-6 minutes, longer times are not necessary.**
ix. Rinse hands and forearms under running water.
x. Keep hands higher than the elbow at all times.
xii. Thoroughly dry hands and forearms with a sterile paper towel keeping hands raised.
xiii. Proceed to OT keeping hands above the elbow and out from scrub clothes. Allow hands and forearms to dry thoroughly before donning sterile gloves.
xiv. Between short cases only, hands may be disinfected by using 2 or more applications of an alcohol
xv. Proceed to the operating theatre holding hands above elbows.
xvi. At all times during the scrub procedure, care should be taken not to splash water onto surgical attire.
xvii. Once in the operating theatre, hands and arms should be dried using a sterile towel and aseptic technique before donning gown and gloves.

Please note that scrubbing areas other than the nails using the nail brush has shown to cause abrasions to the skin and should be avoided.
Moisten brush and work up a lather. Lather fingertips with sponge-side of brush; then, using bristle side of brush, scrub the spaces under the fingernails of the right or left hand (see Figure 5). Repeat for other hand. When scrubbing the hands must remain above the level of the elbows and away from theatre attire to avoid contamination from splashing.

Lather fingers. Wash on all four sides of the fingers using the sponge side only. (Figure 6)

The scrub procedure must follow the Trust policy for hand decontamination i.e.
1. Palm to palm
2. Right palm over left dorsum and left palm over right dorsum
3. Palm to palm fingers interlaced
4. Back of fingers to opposing palms with fingers interlocked
5. Rotational rubbing of right thumb clasped in left palm and vice versa
6. Rotational rubbing backwards and forwards with clasped fingers of right hand in left palm and vice versa.

Continue to wash the arms but encompassing only two thirds of the forearms to avoid compromising the cleanliness of the hands. Hands and arms must be rinsed thoroughly from fingertip to elbow without retracing, allowing the water to drip from the elbow before approaching the gown pack. (Figure 7-8)
Pick up one hand towel from the top of the gown pack and step back from the table (see Figure 9). Grasp the towel and open it fully. Do not allow the towel to touch any unsterile object or unsterile parts of your body. Hold your hands and arms above your elbow, and keep your arms away from your body. (Figure 9)

Holding one end of the towel with one hand dry the fingers of the opposite hand using a blotting rotational motion.

Move to the dry area of the towel and continue in this manner down the forearm to the elbow.

**DO NOT** retrace any areas. Discard this towel in an appropriate receptacle.

Repeat with the other towel from the pack for the other hand/arm.

(Figures 10-12)

4.1.12 Surgical hand preparation with alcohol-based handrubs
The hands of the surgical team should be clean upon entering the operating theatre by washing with a non-medicated soap. While this handwash may eliminate any risk of contamination with bacterial spores, experimental and epidemiological data failed to demonstrate an additional effect of washing hands before applying handrub in the overall reduction of the resident skin flora. The activity of the handrub formulation may even be impaired if hands are not completely dried before applying the handrub or by the washing phase itself. A simple handwash with soap and water before entering the operating theatre area is highly recommended to eliminate any risk of colonization with bacterial spores.
4.1.13 Technique for the application of surgical hand preparation using alcohol-based handrub

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

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

1. Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your left hand, using the elbow of your other arm to operate the dispenser.
2. Dip the fingertips of your right hand in the handrub to decontaminate under the nails (5 seconds).
3. Images 3–7: Smear the handrub on the right forearm up to the elbow. Ensure that the whole skin area is covered by using circular movements around the forearm until the handrub has fully evaporated (10-15 seconds).
4. See legend for Image 3.
5. See legend for Image 3.
7. See legend for Image 3.
8. Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your right hand, using the elbow of your other arm to operate the dispenser.
9. Dip the fingertips of your left hand in the handrub to decontaminate under the nails (5 seconds).
4.1.14 Re-use/reprocessing of gloves

- As medical gloves are single-use items, glove decontamination and reprocessing are not recommended and should be avoided, even if it is common practice in many health-care settings with low resources and where glove supply is limited.
• At present no standardized, validated and affordable procedure for safe glove reprocessing exists.
• Every possible effort should be made to prevent glove reuse
• in health-care settings, such as educational activities to reduce inappropriate glove use, purchasing good quality disposable gloves and replenishing stocks in a timely manner.

4.1.15 **Hand washing facilities at all clinical areas including consultation chambers, each floor & critical care**

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

i. Hand washing facilities appropriate to the area.

ii. Clear unobstructed access to the hand washing sink

iii. Hand washing sinks for that purpose only and clear of inappropriate items.

iv. Liquid soap and alcohol hand rubs available at every sink.

v. Hand washing posters are placed by each sink.

4.1.16 **Hand Hygiene Audit**

i. To ensure that the hand washing protocols are followed in the THE HOSPITAL Hospital.

ii. A monthly report is generated and analyzed and corrective actions taken by training.

iii. The audits are done in the prescribed format.

4.1.17 **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.

4.1.18 **Quality Assurance**

i. Completion of mandatory training on Hand Hygiene by all Healthcare Doctors, paramedical, housekeeping and Nurses.

ii. Monitor and record adherence to hand hygiene.

iii. Provide feedback to healthcare workers about their performance.

4.2 **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.
4.2.1 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.

4.2.2 Gloves
The use of disposable gloves is part of the Standard Precautions concept, which offers consistent guidelines for infection control programmes. 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.

Important points to remember regarding gloves and going procedures:
• Gloves should be used during all patient-care activities that may involve exposure to blood and all other body fluid (including contact with mucous membrane and non-intact skin), during contact precautions and outbreak situations.
• Gloves do not provide complete protection against hand contamination.
• Prolonged use of gloves for contact precautions in the absence of considering the need to perform hand hygiene can result in the transmission of germs.
• it is important that health-care workers are able to differentiate between specific clinical situations when gloves should be worn and changed and those where their use is not required (see The Glove Pyramid). Moreover, the health-care worker should be accurately informed on the moment (see Table below) for donning and removing gloves.

4.2.2.1 The Glove Pyramid
To aid decision making on when to wear (and not wear) gloves
Gloves must be worn according to STANDARD and CONTACT PRECAUTIONS. The pyramid details some clinical examples in which gloves are not indicated, and others in which examination or sterile gloves are indicated. Hand hygiene should be performed when appropriate regardless of indications for glove use.
### 4.2.2.2 Summary of the indications for gloving and for glove removal

<table>
<thead>
<tr>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gloves on</strong></td>
</tr>
<tr>
<td>1. Before a sterile procedure</td>
</tr>
<tr>
<td>2. When anticipating contact with blood or another body fluid, regardless</td>
</tr>
<tr>
<td>of the existence of sterile conditions and including contact with non-</td>
</tr>
<tr>
<td>intact skin and mucous membrane</td>
</tr>
<tr>
<td>3. Contact with a patient (and his/her immediate surroundings) during</td>
</tr>
<tr>
<td>contact precautions.</td>
</tr>
<tr>
<td><strong>Gloves off</strong></td>
</tr>
<tr>
<td>1. As soon as gloves are damaged (or non-integrity suspected)</td>
</tr>
<tr>
<td>2. When contact with blood, another body fluid, non-intact skin and</td>
</tr>
<tr>
<td>mucous membrane has occurred and has ended</td>
</tr>
<tr>
<td>3. When contact with a single patient and his/her surroundings, or a</td>
</tr>
<tr>
<td>contaminated body site on a patient has ended</td>
</tr>
<tr>
<td>4. When there is an indication for hand hygiene.</td>
</tr>
</tbody>
</table>

### 4.2.3 Technique for donning and removing non-sterile examination gloves
When the hand hygiene indication occurs before a contact requiring glove use, perform hand hygiene by rubbing with an alcohol-based handrub or by washing with soap and water.

I. HOW TO DON GLOVES:

1. Take out a glove from its original box
2. Touch only a restricted surface of the glove corresponding to the wrist (at the top edge of the cuff)
3. Don the first glove
4. Take the second glove with the bare hand and touch only a restricted surface of glove corresponding to the wrist
5. To avoid touching the skin of the forearm with the gloved hand, turn the external surface of the glove to be donned on the folded fingers of the gloved hand, thus permitting to glove the second hand
6. Once gloved, hands should not touch anything else that is not defined by indications and conditions for glove use

II. HOW TO REMOVE GLOVES:

1. Pinch one glove at the wrist level to remove it, without touching the skin of the forearm, and peel away from the hand, thus allowing the glove to turn inside out
2. Hold the removed glove in the gloved hand and slide the fingers of the ungloved hand inside between the glove and the wrist. Remove the second glove by rolling it down the hand and fold into the first glove
3. Discard the removed gloves
4. Then, perform hand hygiene by rubbing with an alcohol-based handrub or by washing with soap and water

Put on the sterile gloves
- **Opening the package:**
  Sterile gloves may be wrapped inside your sterile tray or packaged on their own.

- **Packaged inside the sterile tray on top of supplies:**
  - Wash your hands.
  - Open your sterile dressing tray.
  - Take the sterile gloves out of the tray by pinching the middle of the paper the gloves are wrapped in.
  - Put the paper on a clean dry surface. Do not put the paper on your sterile supply wrapper.

- **Packaged in a paper wrapper separate from the sterile tray:**
  - Wash your hands.
  - Open the outer wrap of the sterile glove pack.
  - Take out the inner wrap.
  - Put the wrapped sterile gloves on a clean, dry surface like a table or counter top. Do not put the wrapped gloves on the sterile supply wrapper.

- **Putting on the gloves:**

  Open the wrapper, so you can see both gloves. With the hand you usually write with, grasp the opposite glove at the folded edge of the cuff. Pick the glove up by the folded edge.

  Slip your hand into the glove. Keep your hand at and your thumb tucked in. Pull the glove on. Be careful not to touch the outside of the glove. Touch only the part of the glove that will be next to your skin. Leave the cuff on the glove folded.

  With your gloved hand, slip your fingers into the folded cuff of the other glove. Pick up the second glove.
Slip the glove over your fingers. Keep the hand that you are putting the glove on at. Keep the gloved thumb up and back to keep from touching your bare palm or wrist.

Pull the glove over your hand. Adjust each glove to get a snug fit. Reach under the cuffed part to pull up or adjust. Once you have your gloves on, keep your hands in front of you and above your waist. Do not touch anything outside the sterile field.

4.2.4 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. Gowning must be done before all invasive procedures like lumbar puncture, insertion of central lines etc.

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.

Surgical gowns are folded with the inside facing the scrub person. This method of folding facilitates picking up and donning the gown without touching the outside surface. If the scrub person touches the outside of the gown whilst donning it, the gown must be considered to be contaminated. If this occurs discard the gown.

The scrub person’s hands and arms are contaminated if they are allowed to fall below waist level or to touch the body therefore hands and arms should be kept above the waist and away from the body at an angle of about 20 to 30 degrees above the elbows.

After donning the surgical gown, the only parts of the gown that are considered sterile are the sleeves (except for the axillary area) and the front from waist level to a few inches below the neck opening. If the gown is touched or brushed by an un-sterile object the gown is then considered contaminated. The contaminated gown must be removed using the proper technique and then a new sterile gown should be donned.

4.2.4.1 Gowning Procedure
Infection Control Procedure and Practices

With one hand, pick up the entire folded gown from the wrapper by grasping the gown through all layers, being careful to touch only the inside top layer which is exposed (Figure 13). Step back from the trolley / shelf.

Hold the gown in the manner shown in Figure 14 near the gown’s neck and allow it to unfold being careful that it does not touch either the body or other un-sterile objects. Grasp the inside shoulder seams and open the gown with the armholes facing.

Slide arms part way into the sleeves of the gown keeping hands at shoulder level away from the body (Figure 15).

Slide arms further into the gown sleeves and when the fingertips are level with the proximal edge of the cuff, grasp the inside seam at the cuff hem using thumb and index finger. Be careful that no part of the hand protrudes from the sleeve cuff (Figure 16).
The circulating person should assist at this point to position the gown over the shoulders by grasping the inside surface of the gown at the shoulder seams. They can then adjust the gown over the scrub person's shoulders.
The circulating person's hands are only in contact with the inside surface of the gown.
The circulating person then prepares to secure the gown, the neck and back may be secured with a Velcro tab or ties. The circulating person then ties the gown at waist level at the back.
This technique prevents the contaminated surfaces at the back of the gown from coming into contact with the front of the gown.
(Figures 17-19)

4.2.4.2 Final Tie of gown
Once the sterile gloves are on the scrub practitioner is ready to secure their gown with assistance from the circulating person as follows:

The scrub person will take hold of the belt tab which is securing the belt ties. Keeping hold of the left side tie with the left hand pull the tab with the right hand ties still secured and hand the tab to the circulating person.
4.2.4.3 Removing the Gown and Gloves
On completion of a surgical case the outer part of the gown and gloves are considered to be contaminated by bacteria from the procedure and the scrub person must remove them very carefully to avoid contamination to their forearms and hands. The gloves should be removed after the gown. The procedure is as follows:
4.2.5 Procedure for changing gloves during the case

i. When gloves require changing intra-operatively due to a puncture or inadvertent contamination, the glove must be removed in a way that avoids further contamination.
   This can be achieved by pulling the gloves downwards by the fingers and palms (whilst also grasping the cuff of the gown), until the glove comes over the end of the hands / fingers. The glove may then be discarded into the appropriate receptacle.

ii. Hands must remain inside the sleeves of the gown and the closed glove technique is used to don a new glove as described in the gloving procedure.

iii. On occasions it may be preferable to don a second pair of gloves taking care not to contaminate them during the gloving procedure.

iv. Alternatively a new glove may be donned with the assistance of another member of the surgical team as described below:
On leaving the theatre remove mask only handling the ties and discard into a clinical waste receptacle. Decontaminate hand using soap and water or alcohol gel.

4.2.6 Face Protection: Masks
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.

4.2.6.1 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.

A surgical mask is worn primarily to protect the patient from bacteria exhaled by operating room personnel. All members of the scrub team should wear a mask, but the wearing of masks by other personnel should be at the discretion of the Consultant in charge. Every individual in the operating theatre should wear a mask when prosthesis / implant surgery is taking place. The mask must fit snugly to the face to prevent passage of air around the sides and fogging of glasses if worn. A fresh mask should be donned immediately before
beginning the scrub procedure and it is not considered sterile. If the mask becomes damp, droplets from the nose and mouth can easily pass through it and the mask no longer serves as a barrier to germs, therefore the mask should be changed after each procedure and more often if it becomes damp.

A mask should never be allowed to dangle around the neck, placed in a pocket or on a clean surface and should only be handled by the ties after it is removed. Careful handling of a used mask by the ties prevents the spread of microorganisms throughout the surgical suite. As soon as the mask is removed it should be placed in a designated receptacle and the hands should be washed.

4.2.7 Eye wear
Protection of the mucous membranes of the eyes, mouth and nose from procedures that involve splashing or spraying of blood, body fluids or bone chips is essential. Protective eye wear covering front and side of the eyes, or full face visors must be worn by the surgical scrub team and those performing invasive procedures. These should either be disposable or cleaned according to manufacturer’s instructions after use. Ordinary prescription spectacles do not provide sufficient protection. Visors cannot be used with magnifying loupes and should, therefore be fitted with side shields. Dust mist masks (FFP3) must be available in theatre for procedures where there is a risk of exposure to TB.

4.2.8 Shoe cover
Shoe cover must be worn before entering to the ICU, Operating Theatre, Dialysis, CSSD and HDU.
Dedicated personalised closed toe non-slip footwear must be available for all regular theatre staff in the theatre complex. Boots should be worn if there is a high risk of heavy blood/body fluid loss. Observers to theatre procedure within the operating theatre must be provided with spare theatre shoes.

4.2.8.1 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.

4.2.9 Head cap
Head cap covers the hairs of the health care provider in order to prevent the contamination of the sterile high risk areas.

4.2.10 Respiratory Hygiene and Cough Etiquette

4.2.10.1 The strategy is targeted at the patients and accompanying family members and friends with undiagnosed transmissible respiratory infections, and applies to any persons with signs of illness including cough, congestion, rhinorrhea, or increased production of respiratory secretions when entering a health care facilities.
4.2.10.1 The elements of respiratory hygiene/ cough etiquette include
3.1 Education of healthcare facility staff, patients and visitors
3.2 Source control measures (Covering the mouth/nose with tissue or a cloth when coughing or sneezing)
3.3 Hand hygiene after contact with respiratory secretions
3.4 Spatial separation, ideally >3 feet, of persons with respiratory infections in common waiting areas when possible
3.5 Masks should be provided to the coughing patients to contain dispersion of respiratory secretions into the air from infected patients
3.6 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.
3.7 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.

4.3 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.

4.3.1 Responsibilities

1. 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.
2. All staff has the responsibility for ensuring that they adhere to any policies and procedures to minimize the hazards resulting from any spillage.
3. 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”

4.3.2 Body Fluid Spillage

Body fluid spills are divided in to two categories, those which are visibly contaminated with blood and those which are not.

4.3.2.1 Blood Spillage or other body fluid visibly contaminated with blood.

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

4.3.2.2 Management blood spillage.

i. Make the people aware about spill
ii. Cordon off the area.
iii. Identify the spill kit.
iv. Wear PPE.
v. Put soaking paper (brown paper, newspaper and tissue paper) over the spill.
vi. Make fresh bleaching solution by using 0.75gm of bleaching powder in 100ml water) which equivalent to 0.5 to 1% strength.
vii. Pour this prepared solution over the recovered spill.
viii. Leave for contact time ideally 20 minutes but if the area where the spill is occurred is a very busy area then minimum 2-5 minutes.
ix. After contact time put another paper covering the soaked paper and then remove the soaked paper and put it in the RED bag.
x. Discard this red bag in main red bin the unit.
xi. Clean the area with soap and water.
xii. Remove the PPE & discard it in the red bag.
xiii. Do the hand washing.
xiv. Report the spill in incident reporting form.

4.3.2.3 Large Blood Spill management

In case of large spill Inform HIC dept. or ICN immediately. Immediate action has to be taken with the help of large spill kit available at the concern department. Procedure to manage large spill is as follows:
i. Cordon off the area and make the people aware about the spill.
ii. Put on the PPE.
iii. 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.
iv. Put large size gauze pad over the spill to soak large amount of spill and discard the pads in red bag.
v. Put soaking paper over the rest amount of spill.
vi. Make fresh bleaching solution by using 7.5gm bleaching powder in 1 Ltr. of water
vii. Put this bleaching solution over the spill and wait for contact time (20 min)
viii. Take another paper and with the help of this paper, remove the paper which is already put on the spill.
ix. Discard all the papers in red bag.
x. Wash the area with soap and water.
xi. Remove the PPE and discard in red bag.
xii. Do hand washing.
xiii. Fill the incident reporting form and send it to the HIC department.
xiv. 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 Incharge of the area where spill has occurred.

Role of ICN in the large spill management.

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

4.3.2.4 Urine Spills visibly contaminated with blood
Chlorine releasing agents are **NOT** to 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:

i. Wearing non-sterile, non-powdered latex gloves and plastic apron.
ii. Soak up with paper.
iii. Use detergent and water on area after soaking up the spill.
iv. A chlorine-releasing agent may now be used on the area if necessary.
v. Discard gloves, waste materials and apron in a Reg bag.
vi. Wash hands thoroughly

### 4.3.2.5 Spillages of Body Fluids not visibly contaminated with Blood

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

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

### 4.3.3 Mercury Spillages

As per the Delhi Govt. policy of mercury free hospital, every attempt has been made to make hospital mercury free. Mercury containing equipments are replaced and no mercury containing equipments are purchased by the Hospital.
5. STERILISATION, DISINFECTION AND DECONTAMINATION

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

5.1.1 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.

Recommended Practice:

5.1.2 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.

Textile pack should not exceed 5kg or exceed 30cm wide by 30cm high by 50cm long.
Proper loading of material inside sterilizer is very critical for efficient sterilization. Relative humidity in the processing area should be at least 35%.

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

5.1.3 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. Vials are removed from sterilizers and put in designated incubator in CSSD. Monthly report are sent to ICN.
- Chemical indicators as strips should be used with every batch.
- An expiry date is given for sterile articles based on the packing material used.

5.1.4 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 for each cycle.
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 (spores of *Bacillus stearothermophilus*) 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 integrator - 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 from sterile zone.
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 Equipments (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

**5.1.5 Recall policy:**

*Actions to be taken if any monitoring indicators fail:*

1. Recall the item immediately with the help of load number
2. CSSD supervisor are informed immediately.
3. CSSD personnel should try and discover the cause of the failure and arrange for corrective action.
4. The item are reprocessed and then supplied after confirmation of sterility.

**5.1.6 Record keeping:**

1. 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.
2. Inventory of sterile packs is checked so that they are not distributed directly to the user department.
3. Record of all the indicators tests and culture report is kept.
4. Result of load control, equipment control and glutaraldehyde solution monitoring results are submit to the HIC department on monthly basis.
5. Recall event should be documented and record should be maintained in a register.

**5.1.7 ETO monitoring**

1. Use to sterilize items that are moisture or heat sensitive.
2. Essential parameters of ETO sterilization includes:
   3. Temperature – Should be 40-55°C
   4. 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 37.5°C for 72 hours. A change in the color of the broth from blue to orange indicates growth of bacteria and therefore an unsterile load.

5.2 Disinfection
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 microganism and high number of bacterial spores.

5.2.1 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 equipments (those that are in contact with intact mucous membrane without penetration)
• For gastrointestinal endoscopes, endotracheal tubes, anesthesia breathing circuits, respiratory therapy equipments.

(b) Intermediate Level Disinfectants:
They destroy vegetative bacteria, Mycobacterium tuberculosis, most viruses e.g. entero viruses and fungi but not bacterial spores. E.g., Isopropyl alcohol (70%), ethyl alcohol, sodium hypochlorite (0.1%), Chlorhexidine, hydrogen peroxide, phenolic solutions.

(c) Low Level Disinfectents:
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. E.g., Quaternary ammonium compounds like benzylkonium chloride, some soaps.

5.2.2 Guidelines for Selection of Disinfectants:
There is no ideal disinfectant. Each application requires careful view of following:
1. Type and number of organisms.
2. Type and amount of organic matter
3. Contact time
4. Type of surface (Rough / Corrugated)
5. Type of water (hard / soft)
6. Manufacturers data on efficacy
7. Safety and environmental aspects (chlorine is not free from toxicity)
8. Cost, shelf life and convenience of use
9. Residual activity

5.2.3 Two Approaches for Selection of Disinfectants:
1. Accept the manufacturers data
2. Validate yourself

5.2.4 Guidelines for Use of Disinfectants

<table>
<thead>
<tr>
<th>Name of Disinfectant</th>
<th>Method of Dilution</th>
<th>Contact Time</th>
<th>In Use Span/ Use</th>
</tr>
</thead>
</table>

Delhi State Health Mission, Department of Health and Family Welfare, GNCTD
<table>
<thead>
<tr>
<th>Aldehyde Solutions:</th>
<th>Add activator powder / liquid to the liquid in 5 liter jar and use undiluted</th>
<th>Disinfection: 20-30 mins</th>
<th>14 days used for heat sensitive instruments e.g. Endoscopes</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Glutaraldehyde (2%)</td>
<td>Same as abovewater 1 part : 49 parts (20 ml + 980 ml)</td>
<td>Sterilization: 10 hours</td>
<td>Long acting (28 days)24 hoursUsed as surface disinfectant or 2% solution in operation theaters and 0.5% in wards, dressing room. Can be used in a low pressure sprayer.</td>
</tr>
<tr>
<td>b. OPA (orthophthalyl aldehyde)</td>
<td>Same as above</td>
<td>Same as above</td>
<td></td>
</tr>
<tr>
<td>c. Glutaraldehyde + Formaldehyde + Benzyl chloride</td>
<td>1 part : 49 parts (20 ml + 980 ml)</td>
<td>Disinfection: 15 minSterilization : 5 hours, 30 min</td>
<td></td>
</tr>
<tr>
<td>(Glutaraldehyde + formaldehyde)</td>
<td>1 part : 9 parts (10 ml + 990 ml)</td>
<td>6-8 minutes</td>
<td>14 days (used for instrument sterilization)</td>
</tr>
<tr>
<td>6% Hydrogen Peroxide (Available as 30% stabilized solution)</td>
<td>20 ml H₂O₂ + 80 ml normal saline = 6% H₂O₂ (use freshly prepared)</td>
<td>6-8 minutes</td>
<td>Use immediately after preparation for surgical dressings.</td>
</tr>
<tr>
<td>1% Sodium Hypochlorite Ex. : Polar Bleach 5% Polar Bleach 10%</td>
<td>5%: 80 ml water + 20 ml bleach to make it 1% solution. 10%: 90 ml water + 10 ml bleach</td>
<td>20-30 minutes</td>
<td>8 hoursUsed for blood spills and laboratory decontamination</td>
</tr>
<tr>
<td>Calcium hypochlorite Ex. : Bleaching powder (70% available chlorine)</td>
<td>1.4 gms / liter of water for visibly contaminated articles</td>
<td>20-30 min.</td>
<td>24 hoursDisinfection of toilets, bathrooms and may be used if liquid bleach not available</td>
</tr>
<tr>
<td>Formaldehyde (40%) Ex. : Formalin</td>
<td>Ready to use</td>
<td>30 minutes Then open the area after 6 hours</td>
<td>No longer recommended for fumigation.</td>
</tr>
<tr>
<td>70% Alcohol</td>
<td>Do not dilute</td>
<td>2-5 minutes</td>
<td>24 hours used for surface disinfection</td>
</tr>
<tr>
<td>Chlorhexidine (2%)w/v</td>
<td>Ready to use</td>
<td>2-3 minutes</td>
<td>2%:Upto 6-8 hours for disinfection of hands 4%: Used before a procedure.</td>
</tr>
<tr>
<td>4% Chlorhexidine w/v</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>Item Use</th>
<th>Goal</th>
<th>Appropriate Process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical item</strong></td>
<td>Items entering sterile tissue, the body cavity, the vascular system and non-intact mucous membranes Eg surgical instruments</td>
<td>Objects will be sterile (free of all microorganisms including bacterial spores)</td>
<td>Sterilization (or use of single use sterile products) (steam sterilization)</td>
</tr>
<tr>
<td><strong>Semi-Critical items</strong></td>
<td>Items that make contact, directly or indirectly, with intact mucous membranes or non-intact skin. Eg endoscopes, anaesthetic equipments, Respiratory therapy Equipment Endocavititory probes Tonometer Diaphragm</td>
<td>Objects will be free of all microorganisms, with the exception of high numbers of bacterial spores</td>
<td>High level disinfection · Thermal disinfection · Chemical disinfection (glutaraldehyde, OPA) It is always preferable to sterilize semi-critical items whenever they are</td>
</tr>
</tbody>
</table>

* *(Fogging is not routinely recommended, however, every institution may decide as per their local needs).*

### 5.2.5 General Guidelines For Disinfection

i. Critical instruments /equipments - (that are those penetrating skin or mucous membrane or enter sterile tissue or vascular system) should undergo sterilisation before and after use. e.g. surgical instruments and implants

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

iii. Non-critical instruments /equipments - (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

### Sterilization, Disinfection and Decontamination

GNCTD/…………/SOP/IC/12
5.2.6 Instrument cleaning process

**STEP 1 - Decontamination**

- Decontaminate instruments and other items by placing them in a plastic container of 0.5% Hypochloride 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 placed 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 haemostats 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.
5.2.7 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**
Soak or wipe with damp cloth at a point of use to prevent drying of bio-soil on instrument.

**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**
Allow 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.

5.2.8 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.

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

#### 5.3.1 Decontamination Procedure for Equipment
Pre-cleaning of any item / medical device is an essential step prior to disinfection

<table>
<thead>
<tr>
<th>Article</th>
<th>Standard Procedure</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airways and endotracheal tubes.</td>
<td>Clean with soap and water and Steam sterilization (CSSD) or use disposable.</td>
<td>For heat sensitive tubes use manufacturer’s instructions.</td>
</tr>
<tr>
<td>Ambu –masks</td>
<td>Single use – disposable or High Level Disinfection.</td>
<td></td>
</tr>
<tr>
<td>Ambubag</td>
<td>Should be cleaned with detergent and water, dried and sterilized.</td>
<td></td>
</tr>
<tr>
<td>Applinator (Tonometer Prisms)</td>
<td>Immersion in 0.05% hypochlorite (500 parts per million available chlorine) for 10 minutes.</td>
<td>A fresh solution should be prepared at the start of each clinic.</td>
</tr>
<tr>
<td>Arterial catheters</td>
<td>Sterile, single use only, must be discarded after use.</td>
<td></td>
</tr>
<tr>
<td>Baby equipment feeding bottles &amp; teats</td>
<td>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.</td>
<td>Should be soaked for a minimum of 1 hour.</td>
</tr>
<tr>
<td>Baby weighing scales</td>
<td>A fresh liner should be used for each baby. Clean tray as necessary with detergent and water.</td>
<td>If contaminated should be wiped with hypochlorite 1000ppm after washing.</td>
</tr>
<tr>
<td>Baby bath</td>
<td>Should be cleaned after each use with detergent</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Instruction</td>
<td>Notes</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------------------------</td>
<td>------------------------------------------------------------</td>
</tr>
<tr>
<td>Beds and couches Frame</td>
<td>Should be cleaned with detergent and water between patients and as required</td>
<td>If contaminated with body fluids, see spillage policy. If used in isolation room after cleaning, should be wiped with a disinfectant.</td>
</tr>
<tr>
<td>Bowls (Surgical)</td>
<td>Return to CSSD</td>
<td></td>
</tr>
<tr>
<td>Bowls (Washing)</td>
<td>Wash with detergent and water and decontaminate with 1% Hypochlorite solution/ bleaching solution, rinse and dry after each use. Store inverted and separated.</td>
<td></td>
</tr>
<tr>
<td>Mattresses and pillows</td>
<td>Should be cleaned with detergent and water between patients and as required</td>
<td>If contaminated with body fluids, the blood spills policy should be implemented. Should not be used if cover is damaged. Contaminated pillows must be discarded. Torn mattress covers must be replaced before mattress is re-used.</td>
</tr>
<tr>
<td>Bedpans and urinals</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>Buckets</td>
<td>Clean with detergent and water and use 0.5 % Bleaching solution for decontamination, rinse and store dry.</td>
<td></td>
</tr>
<tr>
<td>Breast pumps</td>
<td>Should be washed with detergent and water, immersed in sodium hypochlorite, freshly made up from tablets according to manufacturer's instructions.</td>
<td></td>
</tr>
<tr>
<td>Brushes Nail Toilet</td>
<td>1. Disposable – single use. 2. Re-usable-to be returned to CSSD after each use. Should be rinsed well in flush water and stored dry.</td>
<td>Should not be left on sink after use.</td>
</tr>
<tr>
<td>Carpets</td>
<td>Vacuum daily</td>
<td>Should be shampooed or</td>
</tr>
<tr>
<td>Item</td>
<td>Instructions</td>
<td>Notes</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Commodes</td>
<td>Seat and arms should be cleaned with detergent and water, and dried.</td>
<td>If soiled or used in isolation, should be wiped with sodium hypochlorite 2% and dried, after cleaning</td>
</tr>
<tr>
<td>Couches (examination)</td>
<td>Cover with rubber mat followed by draw sheet between patients. Send to laundry after each day session, and the mattresses are cleaned with soap and water.</td>
<td></td>
</tr>
<tr>
<td>Cradles</td>
<td>Should be cleaned with detergent and water and dried.</td>
<td></td>
</tr>
<tr>
<td>Crockery and cutlery</td>
<td>Should be heat disinfected in dishwasher.</td>
<td></td>
</tr>
<tr>
<td>Curtains</td>
<td>Should be changed as part of a rolling program by domestic services.</td>
<td>Should be changed as part of terminal clean</td>
</tr>
</tbody>
</table>
| 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                              | Wash with detergent and water, put jars in the disinfectant solution. Leave for contact time, rinse and store dry, or send to CSSD. Weekly autoclaving or HLD is highly recommended. |
<p>| Drip Stands                   | Should be cleaned with detergent and water and dried.                      | After use in isolation, should be wiped with sodium hypochlorite 2% and dried after cleaning. |
| Ear Pieces for auroscope      | Should be cleaned with detergent and water and dried.                      | To be returned to CSSD after use in isolation                          |
| Earphones                     | Should be cleaned with detergent and water and dried.                      | Foam should be replaced after use in isolation.                       |
| ECG leads and machines        | Wash with detergent and                                                  |                                                                      |</p>
<table>
<thead>
<tr>
<th>Item</th>
<th>Action 1</th>
<th>Action 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leads and monitors</td>
<td>Should be dismantled to smallest components and cleaned with detergent and water and dried.</td>
<td>For blood splashes blood spillage policy should be followed.</td>
</tr>
<tr>
<td>Eye protection</td>
<td>Should be cleaned with detergent and water and dried.</td>
<td>For blood splashes blood spillage policy should be followed.</td>
</tr>
<tr>
<td>Floors</td>
<td>A damp mop with detergent and water should be used.</td>
<td>For blood splashes blood spillage policy should be followed.</td>
</tr>
<tr>
<td>Flower vases</td>
<td>Should be cleaned with detergent and water and dried.</td>
<td>Should be stored inverted.</td>
</tr>
<tr>
<td>Furniture</td>
<td>Should be damp dusted with detergent and water.</td>
<td></td>
</tr>
<tr>
<td>Humidifiers</td>
<td>Should be cleaned and sterilized at low temperature.</td>
<td>Drain atleast once each day, clean with detergent and water</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Refill with sterile water and label the humidifiers or follow Manufacturer’s instructions. Humidifiers which are not in use should be cleaned and kept dry.</td>
</tr>
<tr>
<td>Incubators</td>
<td>Should be cleaned with detergent and water and switch on to dry.</td>
<td>Terminal sterilization with ethylene oxide gas may be required after some infections.</td>
</tr>
<tr>
<td>Intravenous monitoring pumps</td>
<td>Should be cleaned with detergent and water and dried.</td>
<td>After use in isolation wipe with sodium hypochlorite 2% and dry, after cleaning</td>
</tr>
<tr>
<td>and feed pumps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instruments</td>
<td>After single use to be returned to CSSD</td>
<td></td>
</tr>
<tr>
<td>Linen</td>
<td>Should be soaked in hot water, returned to laundry</td>
<td></td>
</tr>
<tr>
<td>Laryngoscope</td>
<td>Decontaminate with 0.5% bleaching solution if blood stained. Clean with detergent and water and HLD is done with glutaraldehyde 2%. Bulb of the laryngoscope should be removed and cleaning with</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Cleanliness and Disinfection Procedures</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Mops</td>
<td>Disposable use for one day. Re-usable to be laundered in washing machine. Mops must not be stored wet or cleaned in disinfectant solutions.</td>
<td></td>
</tr>
<tr>
<td>Peak flow</td>
<td>Disposable – single patient use.</td>
<td></td>
</tr>
<tr>
<td>Nebulizers</td>
<td>Cleaning and low temperature sterilization. Send for cleaning and reprocessing to CSSD.</td>
<td></td>
</tr>
<tr>
<td>Nebulizer Tubing</td>
<td>Send for cleaning and reprocessing to CSSD.</td>
<td></td>
</tr>
<tr>
<td>Pressure relieving devices</td>
<td>Should be clean with detergent and water and dried.</td>
<td></td>
</tr>
<tr>
<td>Proctoscopes</td>
<td>Disposable - single use, re-usable to be rinsed and returned to CSSD.</td>
<td></td>
</tr>
<tr>
<td>Raised toilet seats</td>
<td>Should be cleaned after each use with detergent.</td>
<td></td>
</tr>
<tr>
<td>Razors</td>
<td>Safety – single use disposable Electric – patients own. Razors should not be shared. Detachable head and clean with 70% isopropyl alcohol swab.</td>
<td></td>
</tr>
<tr>
<td>Shaving brush</td>
<td>Should not be used unless supplied by the patients for their own use.</td>
<td></td>
</tr>
<tr>
<td>Skin disinfection</td>
<td>Showers are preferred to bath or bed baths.</td>
<td></td>
</tr>
<tr>
<td>Soap dispensers</td>
<td>Should be cleaned weekly with detergent and water and dried.</td>
<td></td>
</tr>
<tr>
<td>Sphygmo-manometer cuffs</td>
<td>After use in isolation, should be laundered in washing machine.</td>
<td></td>
</tr>
<tr>
<td>Sputum pots</td>
<td>Disposable with close fitting lid. Should be discarded into clinical waste for incineration.</td>
<td></td>
</tr>
<tr>
<td>Stethoscopes</td>
<td>Should be cleaned with detergent and water and dried. Should be wiped with 70% alcohol.</td>
<td></td>
</tr>
<tr>
<td>Suction bottles</td>
<td>Disposal liners. Must be Atleast weekly autoclaving</td>
<td></td>
</tr>
</tbody>
</table>
Sealed when 75% full and placed in yellow plastic bag. Re-usable (jar and tubings), should be cleaned with 1% sodium hypochlorite and dried. Must be changed daily and in between each patient. To be stored dry when not in use.

<table>
<thead>
<tr>
<th>Item</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephones</td>
<td>To be wiped with 70% alcohol.</td>
</tr>
<tr>
<td>Thermometers</td>
<td>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 sleeve not used in between patients, should be washed in general purpose detergent and tepid water then wiped with 70% alcohol (swab). To be stored in individual holder inverted.</td>
</tr>
<tr>
<td>Toilet seats</td>
<td>To be cleaned at least twice daily with detergent.</td>
</tr>
<tr>
<td>Toys</td>
<td>Toys should be cleaned with detergent and water and dried.</td>
</tr>
<tr>
<td></td>
<td>For isolated patients, toys that cannot be decontaminated to be avoided. Heavily contaminated toys may have to be destroyed.</td>
</tr>
<tr>
<td>Trolleys (Dressing)</td>
<td>To be cleaned daily with detergent and water. After each use should be wiped with 70% isopropyl alcohol.</td>
</tr>
<tr>
<td>Urine measuring jugs</td>
<td>To be heat disinfected after each use in bed pan washer.</td>
</tr>
<tr>
<td>Ventilators</td>
<td>Daily cleaning and Heat and moisture</td>
</tr>
<tr>
<td><strong>Disinfection</strong></td>
<td><strong>Walls</strong></td>
</tr>
<tr>
<td>------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Disinfection of tubing must be done. After 72hrs of use autoclaving should be done for autoclavable tubings. Humidifier water must be changed at least every 8hrs. Daily autoclaving of humidifiers is recommended where autoclavable.</td>
<td>Should be cleaned with detergent and water as part of planned preventive maintenance program.</td>
</tr>
</tbody>
</table>
6. HOUSE KEEPING

6.1 House Keeping In Wards

6.1.1 Patient Care Environment Cleaning
A patient admitted to the hospital can develop infection due to bacteria that survive in the environment. Therefore, it is important to clean the environment thoroughly on a regular basis. This will reduce the bacterial load and make the environment unsuitable for growth of micro-organisms.

i. The floor is to be cleaned at least twice times in 24 hours. Detergent and copious amounts of water are used during cleaning.
ii. The walls are to be washed with a brush, using detergent and water once a week
iii. High dusting is to be done with a wet mop
iv. Fans and lights are cleaned with soap and water once a month.
v. All work surfaces are to be disinfected by wiping with appropriate disinfectant and then cleaned with detergent and water twice a day.
vi. Cupboards, shelves, beds, lockers, IV stands, stools and other fixtures are to be cleaned with detergent and water once a week.
vii. Curtains are to be changed once a month or whenever soiled. These curtains are to be sent for regular laundering. In certain areas, eg. Transplant units and ICUs, more frequent changes are required.
viii. Patient’s cot is to be cleaned every week with detergent and water. 1% hypochlorite to be used when soiled with blood or body fluids. In the isolation ward, cleaning is done daily.
ix. Store rooms are to be mopped once a day and high dusted once a week.
x. The floor of bathrooms is to be cleaned with a broom and detergent once a day and then disinfected.
xi. Toilets are cleaned with a brush using a detergent twice a day (in the morning and evening). Disinfection and stain removal solution may be used.
xii. Wash basins are to be cleaned every morning
xiii. Regular AC maintenance is required.

6.1.2 Patient linen

i. Bed linen is to be changed daily and whenever soiled with blood or body fluids.
ii. Patient’s gown is to be changed every day and whenever soiled with blood or body fluids.
iii. Dry dirty linen is to be sent to the laundry for regular wash.
iv. Linen soiled with blood or body fluids, and all linen used by patients diagnosed to have HIV, HBV, HCV and MRSA, are send in red bag to the laundry.

6.1.3 Miscellaneous items

i. Kidney basins, basins, bed pans, urinals, etc to be cleaned with detergent and water and disinfected with 0.5% hypochlorite solution.

6.2 House Keeping In The Operation Theatre

i. Theatre complex are absolutely clean at all items. Dust should not accumulate at any region in the theatre.
ii. Soap solution is recommended for cleaning floors and other surfaces. Operating rooms are cleaned daily and the entire theatre complex is cleaned thoroughly once a week.

6.2.1 Environment: STEPS to be followed for maintenance of the housekeeping in O.T.
6.2.1.1 Before the start of the 1st case
Wipe all equipment, furniture, room lights, suction points, OT table, surgical light reflectors, other light fittings, slabs etc with soap or disinfectant solution (2% Bacillocid). This are completed at least one hour before the start of surgery.

6.2.1.2 Between two surgeries
i. Spill - Clean spills with a 0.5% bleaching solution.
ii. Wipe OT table, surgical light reflectors, slabs etc. are disinfected with peroxide based disinfectant (1%) or with available disinfectant solution.
iii. Instrument tables (trolley Mayo stands & other flat surfaces. Wipe all flat surfaces that have come in immediate contact with a patient or body fluids with a disinfectant cleaning solution.
iv. Waste- Collect and remove all waste from the operating room in closed leak proof containers.
v. Sharps containers. Close and remove containers from the operating room when they are three quarters full.

6.2.1.3 After the last case
i. The same procedure as mentioned above is followed and in addition the following are carried out.
ii. Wipe over heads light, cabinets, waste receptables, equipments, furniture with ecoshield.
iii. Wash floor and wet mop with liquid soap and then remove water and wet mop with Bacilloflor solution.
iv. Clean the storage shelves scrub & clean sluice room.

6.2.2 Linen & gloves
Gather all soiled linen and towels in the receptacles provided. Take them to the service corridor (behind the theatre) and place them in trolleys to be taken for sorting. The dirty linen is then sent to the laundry. Use gloves while handling dirty linen.

6.2.3 Instruments
Used instruments are cleaned immediately by the scrub nurse and the Nursing Orderly. Reusable sharps are decontaminated in Lysol / hypochlorite and then washed in the room adjacent to the respective OR by scrubbing with a brush, liquid soap and vim. They are then sent for sterilization in the CSSD. After septic cases the instruments are sent in the instrument tray for autoclaving. Once disinfected, they are taken back to the same instrument cleaning area for a manual wash described earlier. They are then packed and re-autoclaved before use.

6.2.4 Weekly cleaning procedure
1. Remove all portable equipment.
2. Damp wipe lights and other fixtures with detergent.
3. Clean doors, hinges, facings, glass inserts and rinse with a cloth moistened with detergent.
4. Wipe down walls with clean cloth mop with detergent.
5. Scrub floor using detergent and water or Bacilloflor.
7. Replace portable equipment: Clean wheel castors by rolling across towelling saturated with detergent.
8. Wash (clean) and dry all furniture and equipment (OT table, suction holders, foot & sitting stools, Mayo stands, IV poles, basin stands, X-ray view boxes, hamper stands, all tables in the room, holes to oxygen tank, kick buckets and holder, and wall cupboards)
9. After washing floors, allow disinfectant solution to remain on the floor for 5 minutes to ensure destruction of bacteria (Bacilloflor)

6.2.5 Maintenance and Repairs
1. Machinery and equipment are checked, cleaned and repaired routinely
2. Urgent repairs are carried out at the end of the day’s list
3. Air conditioners and suction points are checked, cleaned and repaired on a weekly basis.
4. Preventive maintenance on all theatre equipment to be carried out weekly and major work to be done at least once every year.

6.3 Moping Schedule for Various Departments

6.3.1 ICU, Dialysis, HDU: Floors should be mopped in at least each shift with detergent and water.
6.3.2 OPD, LABS and Wards: Floor should be mopped at least thrice daily with soap and water. Continuous mopping may be required at places with heavy footfall.
6.3.3 CSSD: Floor should be mopped at least twice daily with soap and water.
6.3.4 OT: Floors should be mopped with soap and water after all surgeries are done. Triple bucket mopping between every case should also be done. The triple bucket mopping is as follows:
   1st Bucket with water: dirty mop is rinsed then 2nd Bucket with fresh water for rinsing; Mop rinsed again in this water followed by 3rd Bucket with low level disinfectant. Mop is immersed in the solution and the floor mopped liberally. Wash the used mop with disinfectant after use and dry thoroughly before reuse.
6.3.5 Toilets: In all areas must be clean regularly based on the footfall, should be pest free and free of any offensive odor. Urinal cakes must be available one the times. Liquid soap, preferably with foot dispensers must be available all the times. Floors should be kept dry all the times. Posters encouraging hand hygiene and personal hygiene should be available at all the hand washing station across the hospital. Housekeeping check list should be available in the toilets duly signed by housekeeping staff and supervisor.
   Note: (Carbolic acid (Phenyl) must NOT be used for mopping of floors.

6.4 Bio-Medical Waste collection schedule
1. Segregated BMW is collected at least twice daily from each department except laboratories.
2. In laboratories BMW is collected at least three times in a day.
7. BIOMEDICAL WASTE MANAGEMENT

**Biomedical Waste** management policy at the hospital has been implemented in accordance with the Biomedical Waste Management Rules 2016.

7.1 Environmental Protection Act, 1986
The Government of India (GOI) enacted the Environmental Protection Act, 1986, (EPA) under Article 253 of the Constitution. The purpose of this Act is to serve as an “umbrella” legislation designed to provide a framework for central government coordination for the activities of various established central and state authorities. As this is an “umbrella” and all-encompassing legislation, this is relevant to the health sector activities as well. There are rules/notifications that have been brought out under this Act, which are directly relevant to the health sector.

Under the Environmental Protection Act, the Bio-Medical Waste Management Rules were notified on 28th March 2016 by MOEF & CC. These Rules are directly relevant to the health sector. The salient features of these Rules are as follows:

a. **Bio-medical waste** means waste that is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological or in health camps, including the categories mentioned in schedule I appended to these rules.

b. **Application**: These rules are applicable to all the persons who generate, collect, receive, store, transport, treat, dispose or handle bio medical waste in any form including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood banks, Ayush hospitals, clinical establishments, research or educational institutes, health camps, medical or surgical camps, vaccination camps, blood donation camps, first aid rooms of schools, forensic laboratories and research labs.

c. These BMW Rules 2016 shall NOT apply to
   a) Radioactive waste
   b) Hazardous Chemicals
   c) Solid Wastes
   d) Lead acid batteries
   e) Hazardous waste
   f) E waste
   g) Hazardous microorganisms, genetically engineered microorganisms.

d. **Authorisation**: refers to permission granted by prescribed authority (DPCC) to generate, collect, receive, store, transport, treat, process, dispose or handle biomedical waste in accordance with these rules and the guidelines issued by the central government or Central Pollution Control Board as the case may be.

e. **Occupier**: refers to a person having administrative control over the institution and the premises.

f. It is the duty of every occupier of an institution generating bio-medical waste which includes a hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank by whatever name called to take all steps to ensure
that such waste is handled without any adverse effect to human health and the environment.

g. **Legal Aspects**: MO/IC Bio Medical waste Management shall be responsible for timely follow-up of legal compliance.

  - Consent to Establish (CTE): once, only, initially for 1 year, from DPCC
  - Consent to Operate (CTO): After CTE, every 5 years, from DPCC
  - Authorization: Every 3 years, Apply in FORM II, from DPCC
  - Noise Monitoring Certificate: for DG Sets, from DPCC approved labs
  - Flue Gas Analysis: for DG Sets, Boilers chimneys etc., from DPCC approved labs
  - Effluent Analysis: from DPCC approved labs

**7.3 Objectives**

1. To prevent infection by maintaining good hygiene and sanitation.
2. To protect the patient, patient attendants and all health care personnel from avoidable exposure to infection.
3. To prevent injuries and other health hazards from biomedical waste
4. To prevent environmental pollution.
5. To manage waste in a clean, healthy, economical and safe manner.
6. To minimize waste

**7.4 Steps in Waste Management**

1. Segregation
2. Pretreatment
3. Collection
4. On-site Transportation
5. Storage.
6. Off-site transport
7. Final disposal

**7.4.1 Segregation, & Pretreatment**

i. Segregation is done at source.

ii. Bio-Medical waste shall not be mixed with other wastes.

iii. A colour code as per schedule I of BMW Rules (detailed below) is followed.

iv. Appropriately colour coded waste bags are placed in colour coded bins in all patient care areas near the points of generation.

v. Bags and containers are marked with biohazard symbol as per schedule IV of BMWM Rules 2016.

vi. Liquid chemical waste shall be segregated at source and shall be pretreated or neutralised prior to mixing with other effluent generated from the hospital.

vii. Dead Fetus below the viability period (as per MTP Act 1971 and amendments) can be considered as anatomical waste. Such may be handed over to CBWTF in yellow bag
with a copy of official MTP Certificate from the Obstetrician or Medical
Superintendent of hospital.

viii. Microbiology waste & other clinical laboratory waste, blood samples & blood bags
shall be pretreated through non-chlorinated disinfection or sterilisation (autoclaving)
on-site, as per the WHO or NACO guidelines.

ix. Syringes shall be mutilated and needles shall be cut and then stored in tamper proof,
leakproof and puncture resistant sharp containers.

7.4.2 Collection
   i. Bags are packed when ¾ full.
   ii. Waste bags are tightly closed or sealed at neck when removed from the
containers for safe and easy handling by waste handlers.
   iii. Labelling of all the bags with predesigned labels specified in schedule IV with
information including hospital name, patient care unit name, date and weight is
done before usage of bags.
   iv. Bar code & Global Positioning System shall be added by the hospital as per the
directions of competent authorities as soon as available. When available,
centralized barcode printing can be done (viz.in the hospital stores) and issued
at the time of indenting of BMW bags to the patient care units. These are affixed
along with BMW labels described above. The arrangement for bar coding may
be modified as required as per instructions of the competent authority.
   v. Waste from various patient care areas is collected daily or more frequently as
required.
   vi. The staff is provided with personal protective equipment (PPE).

7.4.3 Storage
   i. A Biomedical waste storage location is designated inside the health care
establishment, away from patient care area & kitchen.
   ii. This temporary storage site shall be secured & locked, well ventilated, have a
biohazard sign visible from a distance and have access to transportation vehicle from
CBWTF.
   iii. The storage room shall have a pucca floor with its level above the ground level.
   iv. The waste bags should not be stored on the floor. There should be either trolleys or
shelves for this purpose.
   v. Red and Yellow bags should be stored separately.
   vi. There shall be provision of washing in the storage area and the waste trolleys to be
washed after each emptying.
   vii. Drainage of Storage area to be connected with ETP / STP
   viii. Untreated human anatomical waste, animal waste, soiled waste, Biotechnology
waste shall not be stored for more than 48 hours.

7.4.4 Transportation
7.4.4.1 On-site transportation
   i. The bags are transported by the housekeeping department at defined timings via
defined routes. (Avoid heavy footfall areas)
   ii. The bags are transported to the central waste receiving terminal in colour coded
covered trolleys with biohazard signage.
iii. The trolleys should be leakproof, without any sharp edges, easily washable with provision for drainage of washing water and wheels & handles for easy transportation by waste handler.

iv. Avoid the transport of too many bags at one time and contact of the bag with the body of personnel. The trolley should not be overfilled and trolley cover should snugly fit to cover the bags in trolley appropriately.

v. The personnel involved in handling and transporting the biomedical waste bag should wear appropriate PPE which includes atleast three ply surgical mask, heavy duty rubber gloves (NOT the surgical gloves), plastic gown with sleeves and shoes. When handling liquid waste goggles/face shield also should be worn.

vi. All patient care units shall record the weight of all categories of waste handed over to the waste collectors and should bear the name, signature, date and time of waste handover.

7.4.4.2 Off-site Transportation

i. The operator of common bio-medical waste treatment facility shall transport the biomedical from the premises of an occupier to the authorised off-site CBWTF.

ii. Only authorized vehicle shall be used to transport BMW from the premises of occupier to off-site CBWTF

iii. The vehicle shall have the label & information as specified in part ‘A’ & part ‘B’ of schedule IV

iv. The vehicle shall comply with the conditions stipulated by DPCC as well as requirements contained in Motor Vehicle Act, 1988, if any or the rules made thereunder for transportation of such infectious waste.

v. Waste shall be weighed and handed over under supervision of a designated hospital staff.

vi. A record of vehicle registration no., date & time and quantum of waste handed over shall be maintained

7.4.5 Final Treatment & Disposal

i. No final treatment or disposal of biomedical waste is done within the hospital premises.

ii. This is undertaken by an outsourcing agency (CBWTF) authorised by DPCC in accordance with schedule I of BMWM rules 2016

iii. In case of non collection of BMWM for final treatment & disposal by the operator within the intended time, Prescribed authority (DPCC & DGHS ) shall be informed immediately.

iv. Treatment and disposal of liquid waste shall be done in accordance with water treatment & disposal of liquid waste as per Water Act, 1974

v. For liquid chemical waste, occupier should ensure a separate collection system leading to Effluent Treatment Plant. The combined liquid discharge shall conform to the discharge norms given in schedule III.

vi. If liquid chemical waste can not be connected to ETP, then it should be handed over to CBWTF operator

vii. Residual or discarded chemical wastes, used or discarded disinfectants, chemical sludge to be sent to Hazardous Waste treatment, storage & disposal facility shall be sent through CBWTF only.
7.4.6 Disposal of Contaminated Needles and Syringes (Refer Injection safety Chapter 13) Contaminated needles are burnt in needle destroyer and the trays are emptied in sharps container when use of needle destroyer is possible. Contaminated needle are disposed of by placing them uncapped into a puncture resistant container. Containers are closed and are handed over to CBWTF.
### SCHEDULE I  (categories of waste)

**SCHEDULE I**

Biomedical wastes categories and their segregation, collection, treatment, processing and disposal options

Category Type of Waste Type of Bag or Container to be used Treatment and Disposal options (1) (2) (3) (4)

<table>
<thead>
<tr>
<th>Category</th>
<th>Type of Waste</th>
<th>Type of Bag or Container to be used</th>
<th>Treatment and Disposal options</th>
</tr>
</thead>
<tbody>
<tr>
<td>YELLOW</td>
<td>(a) Human Anatomical Waste: Human tissues, organs, body parts and fetus below the viability period (as per the Medical Termination of Pregnancy Act 1971, amended from time to time).</td>
<td>Yellow coloured non-chlorinated plastic bags</td>
<td>Incineration or Plasma Pyrolysis or deep burial*</td>
</tr>
<tr>
<td></td>
<td>(b) Animal Anatomical Waste: Experimental animal carcasses, body parts, organs, tissues, including the waste generated from animals used in experiments or testing in veterinary hospitals or colleges or animal houses.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(c) Soiled Waste: Items contaminated with blood, body fluids like dressings, plaster casts, cotton swabs and waste to be sent for energy recovery.</td>
<td></td>
<td>Incineration or Plasma Pyrolysis or deep burial* In absence of above facilities, autoclaving or micro-waving/ bags containing residual or discarded blood and blood</td>
</tr>
<tr>
<td>(d) Expired or Discarded Medicines:</td>
<td>Yellow coloured non-chlorinated plastic bags or containers</td>
<td>Expired cytotoxic drugs and items contaminated with cytotoxic drugs to be returned back to the manufacturer or supplier for incineration at temperature &gt;1200°C or to common biomedical waste treatment facility or hazardous waste treatment, storage and disposal facility for incineration at &gt;1200°C or Encapsulation or Plasma Pyrolysis at &gt;1200°C. All other discarded medicines shall be either sent back to manufacturer or disposed by incineration.</td>
<td></td>
</tr>
<tr>
<td>(e) Chemical Waste:</td>
<td>Yellow coloured containers or non-chlorinated plastic bags</td>
<td>Disposed of by incineration or Plasma Pyrolysis or Encapsulation in hazardous waste treatment, storage and disposal facility.</td>
<td></td>
</tr>
<tr>
<td>(f) Chemical Separate</td>
<td>After resource</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid Waste</td>
<td>collection system leading to effluent treatment system</td>
<td>recovery, the chemical liquid waste shall be pre-treated before mixing with other wastewater. The combined discharge shall conform to the discharge norms given in Schedule-III.</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>(g) Discarded linen, mattresses, beddings contaminated with blood or body fluid.</td>
<td>Non-chlorinated yellow plastic bags or suitable packing material</td>
<td>Non-chlorinated chemical disinfection followed by incineration or Plasma Pyrolysis or for energy recovery. In absence of above facilities, shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent for energy recovery or incineration or Plasma Pyrolysis.</td>
<td></td>
</tr>
<tr>
<td>(h) Microbiology, Biotechnology and other clinical laboratory waste: Blood bags, Laboratory cultures, stocks or specimens of microorganisms, live or attenuated vaccines, human</td>
<td>Autoclave safe plastic bags or containers</td>
<td>Pre-treat to sterilize with nonchlorinated chemicals on-site as per National AIDS Control Organisation or World Health Organisation guidelines thereafter for</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------</td>
<td>-------------------------------</td>
<td></td>
</tr>
<tr>
<td>Needles, syringes with fixed</td>
<td>Needles, syringes with fixed</td>
<td>(a) Wastes generated from</td>
<td></td>
</tr>
<tr>
<td>needles, needles from needle</td>
<td>needles, needles from needle</td>
<td>disposable items such as tubing,</td>
<td></td>
</tr>
<tr>
<td>tip cutter or burner,</td>
<td>tip cutter or burner,</td>
<td>bottles, intravenous tubes and sets,</td>
<td></td>
</tr>
<tr>
<td>scalpels, blades, or any</td>
<td>scalpels, blades, or any</td>
<td>catheters, urine bags, syringes</td>
<td></td>
</tr>
<tr>
<td>other contaminated</td>
<td>other contaminated</td>
<td>(without needles and fixed</td>
<td></td>
</tr>
<tr>
<td>sharp object that may</td>
<td>sharp object that may</td>
<td>needlesyringes) and vaccutainers</td>
<td></td>
</tr>
<tr>
<td>cause puncture and cuts.</td>
<td>cause puncture and cuts.</td>
<td>with their needles cut) and gloves.</td>
<td></td>
</tr>
<tr>
<td>This includes both used,</td>
<td>This includes both used,</td>
<td>Red coloured non-</td>
<td></td>
</tr>
<tr>
<td>discarded and contaminated</td>
<td>discarded and contaminated</td>
<td>chlorinated plastic bags or</td>
<td></td>
</tr>
<tr>
<td>metal sharps</td>
<td>metal sharps</td>
<td>containers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Incineration.</td>
<td></td>
</tr>
</tbody>
</table>

**RED**

** Contaminated Waste (Recyclable) **

- Wastes generated from disposable items such as tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles and fixed needlesyringes) and vaccutainers with their needles cut) and gloves.

- Red coloured non-chlorinated plastic bags or containers

- Autoclaving or micro-waving/hydroclaving followed by shredding or mutilation or combination of sterilization and shredding.

- Treated waste to be sent to registered or authorized recyclers or for energy recovery or plastics to diesel or fuel oil or for road making, whichever is possible.

- Plastic waste should not be sent to landfill sites.

**RED**

** WHITE (TRANSLUCENT)**

** Waste Sharps Including Metals:**

- Needles, syringes with fixed needles, needles from needle tip cutter or burner, scalpels, blades, or any other contaminated sharp object that may cause puncture and cuts. This includes both used, discarded and contaminated metal sharps

- Puncture proof, Leak proof, tamper proof containers

- Autoclaving or Dry Heat Sterilization followed by shredding or mutilation or encapsulation in metal container or cement concrete; combination of shredding cum autoclaving; and sent for final disposal to iron foundries (having consent to operate from the State Pollution

- Incineration.
Control Boards or Pollution Control Committees) or sanitary landfill or designated concrete waste sharp pit.

(a) Glassware: Broken or discarded and contaminated glass including medicine vials and ampoules except those contaminated with cytotoxic wastes. Cardboard boxes with blue colored marking. Disinfection (by soaking the washed glass waste after cleaning with detergent and Sodium Hypochlorite treatment) or through autoclaving or microwaving or hydroclaving and then sent for recycling.

(b) Metallic Body Implants. Cardboard boxes with blue colored marking.

Part -2

(1) All plastic bags shall be as per BIS standards as and when published, till then the prevailing Plastic Waste Management Rules shall be applicable.

(2) Chemical treatment using at least 10% Sodium Hypochlorite having 30% residual chlorine for twenty minutes or any other equivalent chemical reagent that should demonstrate Log104 reduction efficiency for microorganisms as given in Schedule- III.

(3) Mutilation or shredding must be to an extent to prevent unauthorized reuse.

(4) There will be no chemical pretreatment before incineration, except for microbiological, lab and highly infectious waste.

(5) Incineration ash (ash from incineration of any bio-medical waste) shall be disposed through hazardous waste treatment, storage and disposal facility, if toxic or hazardous constituents are present beyond the prescribed limits as given in the Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008 or as revised from time to time.

(6) Dead Fetus below the viability period (as per the Medical Termination of Pregnancy Act 1971, amended from time to time) can be considered as human anatomical waste. Such waste should be handed over to the operator of common bio-medical waste treatment and disposal facility in yellow bag with a copy of the official Medical Termination of Pregnancy certificate from the Obstetrician or the Medical Superintendent of hospital or healthcare establishment.

(7) Cytotoxic drug vials shall not be handed over to unauthorised person under any circumstances. These shall be sent back to the manufactures for necessary disposal at a single point. As a second option, these may be sent for incineration at common bio-medical waste treatment and disposal facility or TSDFs or plasma pyrolys is at
temperature >1200 °C.

8) Residual or discarded chemical wastes, used or discarded disinfectants and chemical sludge can be disposed at hazardous waste treatment, storage and disposal facility. In such case, the waste should be sent to hazardous waste treatment, storage and disposal facility through operator of common bio-medical waste treatment and disposal facility only.

9) On-site pre-treatment of laboratory waste, microbiological waste, blood samples, blood bags should be disinfected or sterilized as per the Guidelines of World Health Organisation or National AIDS Control Organisation and then given to the common bio-medical waste treatment and disposal facility.

10) Installation of in-house incinerator is not allowed. However in case there is no common biomedical facility nearby, the same may be installed by the occupier after taking authorisation from the State Pollution Control Board.

11) Syringes should be either mutilated or needles should be cut and or stored in tamper proof, leak proof and puncture proof containers for sharps storage. Wherever the occupier is not linked to a disposal facility it shall be the responsibility of the occupier to sterilize and dispose in the manner prescribed.

12) Bio-medical waste generated in households during healthcare activities shall be segregated as per these rules and handed over in separate bags or containers to municipal waste collectors. Urban Local Bodies shall have tie up with the common biomedical waste treatment and disposal facility to pickup this waste from the Material Recovery Facility (MRF) or from the household directly, for final disposal in the manner as prescribed in this Schedule.
7.6 SCHEDULE IV (Label)

Based on SCHEDULE IV
[See rule 8(3) and (5)]

Part A

LABEL FOR BIO-MEDICAL WASTE CONTAINERS or BAGS

Date of generation: Day ............ Month ............Year ............

Waste category Number ........

Waste quantity ........ Kg

Sender's Name and Address
Receiver's Name and Address:

Phone Number ........ Phone Number ........

Fax Number ........ Fax Number ........

Contact Person ........ Contact Person ........

In case of emergency please contact:

Name and Address :

Phone No

Note: Label shall be non-washable and prominently visible.
7.7 Equipments & Materials

i. Colour coded non-chlorinated plastic bags: Yellow and Red with biohazard symbol

ii. Colour coded non-chlorinated plastic bins: Yellow and Red with lids, with biohazard symbol

iii. Colour coded waste trolleys: Yellow and Red with lids and wheels (With bearings – noiseless), with biohazard symbol,

iv. Syringe and Needle mutilators.

v. Sharp Containers: Leak proof, Tamper proof, Puncture resistant, white translucent with biohazard symbol.

vi. Sharp Containers: Puncture proof Cardboard boxes with blue coloured markings, with biohazard symbol

vii. Autoclave for pretreatment of lab waste.

viii. PPE (caps, masks, heavy duty gloves, plastic aprons full sleeves, shoes/rubber boots, protective goggles).

ix. Disinfectants (Sodium hypochlorite others as per NACO/WHO guidelines)

x. Labels as per schedule IV, washproof, self adhesive.
7.8 Biomedical Waste Management Cell

7.8.1 Terms of Reference:
Biomedical Waste Management cell is responsible for handling all the procedural issues including legal aspects, correspondence, compilation and timely submission of monthly / quarterly / annual reports, timely submission of applications to prescribed authorities, replies to RTIs / PQs / Showcase notices (if any), compilation and analysis of data, internal correspondence, planning for regular inhouse trainings and its records, planning regular BMWM Committe meetings and to keep a record of the minutes, analysis and distribution of logistics etc.

7.8.2 Budget
There should be a separate budget head for BMW Management.
(the budget shall include consumables like BMW bags and bins, BMW trolleys, PPEs, Sharp containers, Needle destroyers, Hand rubs, Disinfectents etc.). Budgetary provisions for trainings including training materials, tools, IEC, resource persons must be allocated.

7.6.3 Composition :
   a. Nodal Officer BMWM (In-charge)
   b. BMWM Nurse (Liasion Nurse)
   c. Clerk
   d. Peon / Multitasking Worker

7.9 Biomedical Waste Management Committee
Waste Management committee is responsible for making Hospital specific action plan for hospital waste management and its implementation, supervision and monitoring.

7.9.1 Terms of Reference
   i. To seek a commitment from Management to comply with all relevant Legislation (Delhi State Pollution Control Board and Biomedical Waste Management Handling Rules)
   ii. To conduct a waste audit and prepare a comprehensive report of current waste generation, segregation, handling, storage and disposal practices and costs
   iii. To monitor use of appropriate Personal Protective equipment and offer staff vaccinations
   iv. To develop spill management strategies for all waste categories and provide regular training to the health care workers. Monthly mock drills should be conducted in different patient care units and records of the mock drills should be maintained by Nodal Officer BMWM.
   v. To implement an ongoing waste management training program which caters for all staff.
   vi. To promote waste management principles throughout hospital (signs, posters, notice boards, bulletins, etc.)
   vii. To monitor & improve waste segregation.
   viii. To liaise with the corporation authorities and private waste contractors with regard to the transport and disposal of waste external to the hospital.
   ix. To conduct a Waste Management Audit annually and review the Waste Management Plan
   x. To conduct on-going audits of waste.
   xi. The findings of drills and audits along with training details should be presented periodically during HICC meetings.
7.9.2 Composition of the Committee

i. Medical superintendent / Medical Director – Chairperson
ii. Nodal Officer BMWM – Member secretary
iii. Infection Control Officer (ICO)
iv. Clinical In-charges major clinical departments (Medicine, Surgery/Ortho., Obs & Gyn etc.)
v. Officer In-charge Housekeeping Services
vi. Officer In-charge Stores (Consumables, Nonconsumables, Drugs)
vii. Purchase Officer
viii. Officer In-charge PWD
ix. EE/AE/JE PWD(Electrical)
x. EE/AE/JE PWD(Civil)
xii. Nursing Director/NS/DNS/ANS (senior most)
xiii. Nurse Incharge BMWM ( Liason Nurse )
xiv. Safety/ sanitary Officer

The Biomedical Waste Committee is represented at the Hospital Risk Management and Safety Committee and/or Hospital infection Control Committee, where progress reports are reported at each meeting. Records of the minutes of the meeting are maintained.

7.9.3 Meetings
1. The Group or committee will meet at least six monthly or more frequently, if necessary.
2. This committee shall liaison & coordinate with HICC.
3. Minutes of meeting (at least 6 monthly) shall be submitted to DPCC along with Annual report

7.10 Record Keeping
7.10.1 Daily Record: Date, Time, Weight, Number of bags (Table 7.10)
   a. At the point of generation
   b. At the time of collecton
   c. At the time of handing over for transport to CBWTF

7.10.2 Monthly Report
1. To be compiled by Liasion Nurse in proforma provided by DPCC & DGHS

7.10.3 Quarterly Report
1. To be compiled by BMW Cell in proforma provided by DGHS

7.10.4 Annual report
1. Every occupier/operator shall submit an annual report to the prescribed authority (DPCC)
2. To be submitted in the prescribed format (FORM IV)
3. To be submitted by 30th June of next year
4. Details of trainings of staff, accidents, minutes of BMWM Committee meetings to be sent along with the annual report.
7.11 Trainings and IEC
All categories of staff & HCW handling BMW should be carried out at least:
1. At the time of induction and at least once a year - thereafter.
2. Record of the trainings to be maintained and submitted with Annual Report to DPCC.
3. IEC material / posters to be displayed at strategic points (nursing stations, treatment rooms, OTs, LRs, Labs, Injection rooms, OPDs, ICUs, HDUs etc.)

7.12 Safety Considerations
7.12.1 Accident Reporting
1. All the staff including housekeeping staff should be sensitized for prompt reporting of all the Accidents and incidents including near misses, spillages, damaged containers, torn bmw bags, inappropriate segregation, needle stick / sharps injury etc.
2. All the accidents should be reported in FORM I of BMWM rules.
3. A record of all the accidents / incidents shall be maintained by BMWM Nurse.
4. Accident record shall be submitted to DPCC alongwith the annual report.

7.12.2 Health Checkups & immunisation
1. At the time of joining & At least once a year thereafter including occupational safety.
2. Immunisation (Hepatitis B, Tetanus) of all the categories of staff.
3. Record to be maintained & submitted to DPCC with Annual report and regular updates must be provided to HIC Department.
4. Availability of Post Exposure Prophylaxis round the clock.

7.13.3 Waste Audits and Waste Tracking
1. Waste Audit to be conducted by BMWM Committee once in 3 months
2. Waste Tracking
   i. Tracking of the BMWM vehicle from the occupier facility till the CBWTF in an unidentified vehicle
   ii. Should be done by members of BMWM committee.
   iii. Should be done once in 3-6 months.
   iv. Records of Waste Tracking should be maintained and irregularity if found, should be immediately reported to DPCC and HIC department.

7.12.4 Good work Practices and PPE
FORM – I (Accident Reporting)
FORM – II (Application for authorisation)
FORM – IV (Annual Report)

**FORM – I**

<table>
<thead>
<tr>
<th>ACCIDENT REPORTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Date and time of accident :</td>
</tr>
<tr>
<td>2. Type of Accident :</td>
</tr>
<tr>
<td>3. Sequence of events leading to accident :</td>
</tr>
<tr>
<td>4. Has the Authority been informed immediately :</td>
</tr>
<tr>
<td>5. The type of waste involved in accident :</td>
</tr>
<tr>
<td>6. Assessment of the effects of the accidents on human health and the environment:</td>
</tr>
</tbody>
</table>
7. Emergency measures taken:

8. Steps taken to alleviate the effects of accidents:

9. Steps taken to prevent the recurrence of such an accident:

10. Does your facility have an Emergency Control policy? If yes give details:

   Date: ....................  Signature: ....................

   Place: .....................  Designation: .....................

**FORM - II**  
(See rule10)  
APPLICATION FOR AUTHORISATION OR RENEWAL OF AUTHORISATION  
(To be submitted by occupier of health care facility or common bio-medical waste treatment facility)

To  
The Prescribed Authority  
(Name of the State or UT Administration)  
Address.

1. Particulars of Applicant:  
   (i) Name of the Applicant:  
      (In block letters & in full)  
   (ii) Name of the health care facility (HCF) or common bio-medical waste treatment facility (CBWTF):  
   (iii) Address for correspondence:  
   (iv) Tele No., Fax No.:  
   (v) Email:  
   (vi) Website Address:

2. Activity for which authorisation is sought:  

   Activity Please tick  
   Generation, segregation  
   Collection,  
   Storage  
   Packaging  
   Reception  
   Transportation  
   Treatment or processing or conversion  
   Recycling  
   Disposal or destruction  
   use  
   offering for sale, transfer
Any other form of handling

3. Application for □ fresh or □ renewal of authorisation (please tick whatever is applicable):

(i) Applied for CTO/CTE Yes/No

(ii) In case of renewal previous authorisation number and date:

(iii) Status of Consents:

(a) under the Water (Prevention and Control of Pollution) Act, 1974

(b) under the Air (Prevention and Control of Pollution) Act, 1981:

4. (i) Address of the health care facility (HCF) or common bio-medical waste treatment facility (CBWTF):

(ii) GPS coordinates of health care facility (HCF) or common bio-medical waste treatment facility (CBWTF):

5. Details of health care facility (HCF) or common bio-medical waste treatment facility (CBWTF):

(i) Number of beds of HCF:

(ii) Number of patients treated per month by HCF:

(iii) Number healthcare facilities covered by CBMWTF: _____

(iv) No of beds covered by CBMWTF: _____

(v) Installed treatment and disposal capacity of CBMWTF:_______ Kg per day

(vi) Quantity of biomedical waste treated or disposed by CBMWTF:_______ Kg/ day

(vii) Area or distance covered by CBMWTF:______________

(pl. attach map a map with GPS locations of CBMWTF and area of coverage)

(viii) Quantity of Biomedical waste handled, treated or disposed:
### Table: Classification of Biomedical Waste

<table>
<thead>
<tr>
<th>Category</th>
<th>Type of Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>(a) Human Anatomical Waste:</td>
</tr>
<tr>
<td></td>
<td>(b) Animal Anatomical Waste:</td>
</tr>
<tr>
<td></td>
<td>(c) Soiled Waste:</td>
</tr>
<tr>
<td></td>
<td>(d) Expired or Discarded Medicines:</td>
</tr>
<tr>
<td></td>
<td>(e) Chemical Solid Waste:</td>
</tr>
<tr>
<td></td>
<td>(f) Chemical Liquid Waste:</td>
</tr>
<tr>
<td></td>
<td>(g) Discarded linen, mattresses, beddings contaminated with blood or body fluid</td>
</tr>
<tr>
<td></td>
<td>(h) Microbiology, Biotechnology and other clinical laboratory waste:</td>
</tr>
<tr>
<td>Red</td>
<td>Contaminated Waste (Recyclable)</td>
</tr>
<tr>
<td>White ( Translucent)</td>
<td>Waste sharps including Metals;</td>
</tr>
<tr>
<td>Blue</td>
<td>Glassware;</td>
</tr>
<tr>
<td></td>
<td>Metallic Body Implants</td>
</tr>
</tbody>
</table>

6. Brief description of arrangements for handling of biomedical waste (attach details):
   (i) Mode of transportation (if any) of bio-medical waste:

   (ii) Details of treatment equipment (please give details such as the number, type & capacity of each unit)

<table>
<thead>
<tr>
<th>Equipment</th>
<th>No of units</th>
<th>Capacity of each unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incinerators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plasma Pyrolysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autoclaves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microwave</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydroclave</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shredder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Needle tip cutter or destroyer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sharps encapsulation or concrete pit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep burial pits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical disinfection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any other treatment equipment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Contingency plan of common bio-medical waste treatment facility (CBWTF) (attach documents):
8. Details of directions or notices or legal actions if any during the period of earlier authorisation
9. Declaration

I do hereby declare that the statements made and information given above are true to the best of my knowledge and belief and that I have not concealed any information.

I do also hereby undertake to provide any further information sought by the prescribed authority in relation to these rules and to fulfill any conditions stipulated by the prescribed authority.

Date :

Signature of the Applicant

Place :

Designation of the Applicant
Form –IV
(See rule 13) ANNUAL REPORT

[To be submitted to the prescribed authority on or before 30th June every year for the period from January to December of the preceding year, by the occupier of health care facility (HCF) or common bio-medical waste treatment facility (CBWTF)]

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Particulars of the Occupier</td>
</tr>
<tr>
<td></td>
<td>(i) Name of the authorized peson (occupier or operator of facility)</td>
</tr>
<tr>
<td></td>
<td>(ii) Name of HCF or CBMWTF</td>
</tr>
<tr>
<td></td>
<td>(iii) Address for Correspondence</td>
</tr>
<tr>
<td></td>
<td>(iv) Address of Facility</td>
</tr>
<tr>
<td></td>
<td>(v) Tel. No, Fax. No</td>
</tr>
<tr>
<td></td>
<td>(vi) E-mail ID</td>
</tr>
<tr>
<td></td>
<td>(vii) URL of Website</td>
</tr>
<tr>
<td></td>
<td>(viii) GPS coordinates of HCF or CBMWTF</td>
</tr>
<tr>
<td></td>
<td>(ix) Ownership of HCF or CBMWTF</td>
</tr>
<tr>
<td></td>
<td>(State Government or Private or Semi Govt. or any other)</td>
</tr>
<tr>
<td></td>
<td>(x). Status of Authorisation under the Bio-Medical Waste (Management and Handling) Rules</td>
</tr>
<tr>
<td></td>
<td>Authorisation No.:</td>
</tr>
<tr>
<td></td>
<td>.................................................................</td>
</tr>
<tr>
<td></td>
<td>..............................................valid up to</td>
</tr>
<tr>
<td></td>
<td>.........................................................</td>
</tr>
<tr>
<td></td>
<td>(xi). Status of Consents under Water Act and Air Act</td>
</tr>
<tr>
<td></td>
<td>Valid up to:</td>
</tr>
<tr>
<td>2</td>
<td>Type of Health Care Facility</td>
</tr>
<tr>
<td></td>
<td>(i) Bedded Hospital</td>
</tr>
<tr>
<td></td>
<td>No. of Beds:......</td>
</tr>
<tr>
<td></td>
<td>(ii) Non-bedded hospital</td>
</tr>
<tr>
<td></td>
<td>(Clinic or Blood Bank or Clinical Laboratory or Research Institute or Veterinary Hospital or any other)</td>
</tr>
<tr>
<td></td>
<td>(iii) License number and its date of expiry</td>
</tr>
</tbody>
</table>
3. Details of CBMWTTF

| (i) Number healthcare facilities covered by CBMWTTF | : |
| (ii) No of beds covered by CBMWTTF | : |
| (iii) Installed treatment and disposal capacity of CBMWTTF | : _______ Kg per day |
| (iv) Quantity of biomedical waste treated or disposed by CBMWTTF | : _____ Kg/day |

4. Quantity of waste generated or disposed in Kg per annum (on monthly average basis)

| Yellow Category | : |
| Red Category | : |
| White: | |
| Blue Category : | |
| General Solid waste: | |

5. Details of the Storage, treatment, transportation, processing and Disposal Facility

| (i) Details of the on-site storage facility | : Size : |
| Capacity : | |
| Provision of on-site storage : (cold storage or any other provision) | |

<table>
<thead>
<tr>
<th>disposal facilities</th>
<th>Type of treatment equipment</th>
<th>No of unit capacity Kg/day</th>
<th>Quantity treated or disposed in kg per annum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incinerators</td>
<td>Plasma Pyrolysis</td>
<td>Autoclaves</td>
<td>Microwave</td>
</tr>
<tr>
<td>Hydroclave Shredder</td>
<td>Needle tip cutter or destroyer Sharps</td>
<td>encapsulation or concrete pit Deep burial pits: Chemical disinfection:</td>
<td>---</td>
</tr>
<tr>
<td>Any other treatment equipment:</td>
<td>Red Category (like plastic, glass etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) Quantity of recyclable wastes sold to authorized recyclers after treatment in kg per annum.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) No of vehicles used for collection and transportation of biomedical waste</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) Details of incineration ash and ETP sludge generated and disposed during the treatment of wastes in Kg per annum</td>
<td>Incineration Ash ETP Sludge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi) Name of the Common Bio-Medical Waste Treatment Facility Operator through which wastes are disposed of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vii) List of member HCF not handed over bio-medical waste.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Do you have bio-medical waste management committee? If yes, attach minutes of the meetings held during the reporting period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Details trainings conducted on BMW Management.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Number of trainings conducted on BMW Management.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) Number of personnel trained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) Number of personnel trained at the time of induction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) Number of personnel not undergone any training so far</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) Whether standard manual for training is available?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi) Any other information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Details of the accident occurred during the year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Number of Accidents occurred</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) Number of the persons affected</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) Remedial Action taken (Please attach details if any)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) Any Fatality occurred, details.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Are you meeting the standards of air Pollution from the incinerator? How many times in last year could not met the standards?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Details of Continuous online emission monitoring systems installed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid waste generated and treatment methods in place. How many times you have not met the standards in a year?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the disinfection method or sterilization meeting the log 4 standards? How many times you have not met the standards in a year?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any other relevant information</td>
<td>(Air Pollution Control Devices attached with the Incinerator)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Certified that the above report is for the period from
........................................................................................................................................................................
........................................................................................................................................................................
........................................................................................................................................................................
........................................................................................................................................................................

Name and Signature of the Head of the Institution

Date:
Place
Table 7.1. **WARD SISTER’S BMW RECORD SHEET**

WARD NO.________________________DEPARTMENT OF________________________________

<table>
<thead>
<tr>
<th>DATE &amp; TIME</th>
<th>RED</th>
<th>YELLOW</th>
<th>SHARP CONTAINER</th>
<th>BLACK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>White translucent</td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No. Wt.</td>
<td>No. Wt.</td>
</tr>
</tbody>
</table>

**IT IS MANDATORY TO DEPOSIT THIS DOCUMENT TO THE DEPARTMENT OF SANITATION, HK & BMWM AT THE END OF EVERY MONTH**

SIGN OF NURSING STAFF
7.13 DISPOSAL OF CYTOTOXIC WASTES

The proper identification and disposal of potentially infectious hazardous waste is essential to prevent infection and injury to patients, clinical and custodial staff and persons in the community.

Hazardous effect on health care workers during preparation and administration of cytotoxic drugs

**Acute Health Effects**
- Irritation to the skin, eyes & mucous membrane
- Light headedness
- Nausea

**Chronic Health Effects**
- Miscarriage in Pregnant Staff
- Birth defects
- Low birth weight

Handling and administration of cytotoxic drugs.

Handling and administration of cytotoxic drug should be done by trained staffs identified in designated departments where chemotherapy is administered.

**Use of PPE**
Proper PPE (Cap gloves, apron goggles, mask) should be worn while preparation and administration of cytotoxic drugs. Details given in section on PPE (section 4.6).

**Disposal of non infected cytotoxic drugs**
All the non infected cytotoxic wastes should be discarded separately in yellow bin with cytotoxic label.

**Disposal of infected Cytotoxic Wastes**
All the infected cytotoxic wastes (syringes and IV tubings and cannula) stained with blood should be discarded separately in yellow bin with cytotoxic label.

**Sharps disposal**
Sharps, needles contaminated with cytotoxic drugs should be discarded in separate sharp box with cytotoxic label.
8. **SHARPS MANAGEMENT, SHARP INJURIES AND POST EXPOSURE PROPHYLAXIS**

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.

### 8.1 Good practice involves

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

### 8.2 Disposal of Sharps

1. An adequate number of sharps containers, are located and conveniently placed in clinical areas.
2. Ensure that the sharps containers have been assembled correctly.
3. Make sure the department’s name is identified on the sharps bin.
4. It is the responsibility of the person using the sharp to dispose of it safely.
5. Sharps (needles, scalpel blades, razor blades and glass ampoules etc) are placed directly into a container.
6. Whenever possible, take a sharps bin to the point of use.
7. Needle must not to be recAPPED, bent or broken.
8. 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.
9. Sharps containers are sealed closed when two-thirds to three-quarters full.
10. Sharps containers when carried are held away from the body.
11. Use needle safety devices where there are clear indications that they will provide a safer system of working.
12. Needle collection tray in needle destroyer must be emptied in the morning by the coming nursing staff or more frequently if required. It should never be overfilled.
13. Stray sharps should not be present.

### 8.3 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%.

8.3.1 Main Risks From Needle-Stick Injury And Blood Contamination
The main concern is the transmission of bloodborne viruses, i.e.
• HEPATITIS B (HBV)
• HEPATITIS C (HCV)
• HUMAN IMMUNODEFICIENCY VIRUS (HIV)

8.4 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, eg saliva.
• Bleeding gums in association with bites.
• Unfixed tissues and organs, ie those which have not been preserved in formalin.

8.5 Risks from Injuries
The risk of transmission is higher (particularly for HIV) when there is:
1. A deep injury, i.e. when the injury is deeper than a superficial scratch drawing blood.
2. Visible blood on the device that caused the injury (including teeth).
3. Injury with a needle that had come from the source patient’s artery or vein.
4. Terminal HIV related illness in the source patient.

8.5.1 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  
Cryptococcosis  |  Herpes  |  Mycoplasmosis  |  Syphilis  
Diphtheria  |  HIV  |  Scrub typhus  |  Toxoplasmosis  
Ebola fever  |  Leptospirosis  |  Tuberculosis  |  Gonorrhoea  
Rocky mountain fever

8.6 Management of the exposed site

8.6.1 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, povidone iodine)

After a splash of blood or body fluid:
- Wash the affected 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 lense 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.

8.6.2 Summary of do's & dont's

<table>
<thead>
<tr>
<th>DO</th>
<th>DON'T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove gloves, if appropriate</td>
<td>• Do not panic</td>
</tr>
<tr>
<td>Wash the exposed site thoroughly with running water</td>
<td>• Do not put pricked finger in mouth</td>
</tr>
<tr>
<td>Irrigate with water or saline if eyes or mouth have been exposed</td>
<td>• Do not squeeze wound to bleed it</td>
</tr>
<tr>
<td>Wash the skin with soap and water</td>
<td>• Do not use bleach, chlorine, alcohol, povidone, iodine or any antiseptic or detergent</td>
</tr>
</tbody>
</table>
**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.

### 8.6.3 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).

1. 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).
2. 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.

### 8.7. Post-HIV exposure management / prophylaxis (PEP)

- Post exposure prophylaxis is available for HIV in the form of antiretroviral (ARV) 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:

  1. Determine the status of the exposure and the HIV status of the exposure source before starting post-exposure prophylaxis (PEP).
  2. Prompt reporting in accident/incident reporting forms
  3. Post-exposure treatment is begun as soon as possible preferably within two hours
  4. Not recommended after seventy -two hours
  5. PEP is not needed for all types of exposures

### 8.7.1. 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. Incase 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.

8.7.1.1 Determination of the Exposure Code (EC)

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

<table>
<thead>
<tr>
<th>Is source material blood – bloody fluid, semen/vaginal fluid or other normally sterile fluid or tissue?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

- What type of exposure occurred?
  - Mucous members or skin integrity compromised
  - Intact Skin
  - Percutaneous exposure: Severity
  - Severity
  - No PEP

- Volume
  - Small: Few Drops
  - Large: Major splash & / or long duration
  - Less severe: Solid needle, scratch
  - More severe: Large bore hollow needle deep puncture, visible blood, needle used in blood vessel

EC 1 | EC 2 | EC 3 | EC 4
8.7.1.2 Status Code (SC)

Determined as per flow chart below.

8.7.1.3. Determine Post-Exposure Prophylaxis (PEP) Recommendation

<table>
<thead>
<tr>
<th>EC</th>
<th>HIV SC</th>
<th>PEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Consider basic</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>Recommend basic regimen</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Recommend expanded regimen</td>
</tr>
<tr>
<td>3</td>
<td>1 or 2</td>
<td>Recommend expanded regimen</td>
</tr>
<tr>
<td>1,2,3</td>
<td>Unknown</td>
<td>If exposure setting suggests risks of HIV Exposure, consider basic regimen</td>
</tr>
</tbody>
</table>

8.7.1.4 Basic regimen (Three Drug Regimen):

1. Tenofovir 300 mg + Lamovudine 300 mg + Efavirenz 600 mg once daily for 28 days.

Expanded regimen: (Three drug regimen)

2. Basic regimen (+ Indinavir – 800 mg/thrice a day, or any other protease Inhibitor).

8.7.1.5 Testing and Counseling

The health care provider are tested for HIV as per the following schedule to monitor seroconversion:

1. Base-line HIV test - at time of exposure
2. Repeat HIV test - at six weeks following exposure
   - 2nd repeat HIV test - at twelve weeks following exposure
   - 3rd repeat HIV test - at 6 months following exposure
3. 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.
4. The HCW are advised to refrain from donating blood, semen or organs/tissues and abstain from sexual intercourse.
5. In case sexual intercourse is undertaken a latex condom be used consistently. In addition, women HCW should not breast-feed their infants.

8.7.1.6 Duration of PEP
1. 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.
2. The optimal course of PEP is not unknown, but 4 weeks of drug therapy appears to provide protection against HIV.
3. If the HIV test is found to be positive at anytime within 12 weeks, the HCW are referred to a physician for treatment.
4. 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.

8.8 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.

8.8.1 Categories of exposure

<table>
<thead>
<tr>
<th>Categories of exposure</th>
<th>Definition &amp; example</th>
</tr>
</thead>
</table>
| 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  
Eg: 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 (haemorrhagic wound and/or very painful);  
Transmission of a significant volume of blood;  
An accident with material that has previously been used intravenously or intra-arterially. |

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.

8.8.2 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.
Do not delay initiation of PEP where indicated 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.

### 8.8.3 Categories of situations depending on results of the source

<table>
<thead>
<tr>
<th>Source HIV status</th>
<th>Definition of risk in source</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV negative</td>
<td>Source is not HIV infected but consider HBV &amp; HCV</td>
</tr>
<tr>
<td>Low risk</td>
<td>HIV positive &amp; clinically asymptomatic</td>
</tr>
<tr>
<td>High risk</td>
<td>HIV positive &amp; clinically symptomatic</td>
</tr>
<tr>
<td>Unknown</td>
<td>Status of the patient is unknown &amp; neither the patient nor his/her blood is available for testing. The risk assessment will be based only upon the exposure</td>
</tr>
</tbody>
</table>

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.

### 8.9 Assessment of the exposed individual

1. 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.
2. 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.

### 8.10 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

<p>| 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%) |</p>
<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The risk in increased with large exposure eg:</td>
<td>- Needle stick from hollow bore needles with visible blood, from artery/vein &amp; from source patients with high viral load.</td>
</tr>
</tbody>
</table>
| 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 HIV infection based upon a | - Clients possibility of prior HIV infection should be assessed.  
- Counsel for HIV testing & follow-up psychosocial support- where possible rapid testing should be used based on national testing guidelines  
- Inform if the baseline test is positive, then the PEP will be discontinued  
- Arrange referral to ART centre for assessment if found HIV positive |
| The importance of being tested & receiving appropriate post  | - Discuss dosing of the PEP medicine eg: pill should be taken twice a day for 28 days  
- Depending on the nature & risk of exposure, 2 drugs or 3 drugs may be used  
- Side effects may be important with use of 3 drugs.  
- Expert opinion/consultation by phone or referral may be needed with a HIV specialist if 3rd drug is used.  
- Arrange for special leave from work (2 weeks initially). |
| post test counseling                                         | - That PEP medicines will be discontinued if their initial HIV test is positive |
| That PEP medicines will be discontinued if their initial    | - Discuss possible side effects of the PEP medicines eg: nausea, fatigue, headache  
- 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. |
| Duration of the course of medicine (4 weeks)                | - 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 4 weeks 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. |
| Common side effects that may be experienced                 | - Animal studies suggest that taking less than 4 weeks 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. |
| That they can stop at any time but will not get the benefit | - 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 4 weeks 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 breast feeding
- 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, pharangitis, 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 stick 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 haemoglobin** estimation should be available, especially when AZT is used in areas where anaemia 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.

### 8.11 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.

#### 8.11.1 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, pharangitis, 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 centre 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.

8.11.2 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.

<table>
<thead>
<tr>
<th>Timing</th>
<th>In persons taking PEP</th>
<th>In persons not taking PEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weeks 2 &amp; 4</td>
<td>Transaminases</td>
<td>Clinical monitoring for hepatitis</td>
</tr>
<tr>
<td></td>
<td>Complete blood count</td>
<td></td>
</tr>
<tr>
<td>Week 6</td>
<td>HIV Ab</td>
<td>HIV Ab</td>
</tr>
<tr>
<td>Month 3</td>
<td>HIV Ab, anti HCV, HBsAg Transaminases</td>
<td>HIV Ab, anti HCV, HBsAg</td>
</tr>
<tr>
<td>Month 6</td>
<td>HIV Ab, anti HCV, HBsAg Transaminases</td>
<td>HIV Ab, anti HCV, HBsAg</td>
</tr>
</tbody>
</table>

8.12. 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 nonoccupational exposures(1) to blood or body fluids that contain blood by exposure type and vaccination status

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unvaccinated person(2)</td>
</tr>
<tr>
<td>HBsAg(*) Positive source</td>
<td></td>
</tr>
<tr>
<td>Percutaneous (e.g., bite or needle stick) or mucosal exposure to HBsAg positive blood or body fluids</td>
<td>Administer hepatitis B vaccine series and hepatitis B immune globulin (HBIG).</td>
</tr>
<tr>
<td>Sex or needle sharing contact of an HBsAg</td>
<td>Administer hepatitis B vaccine series and HBIG</td>
</tr>
<tr>
<td>Positive Person</td>
<td>Action</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------</td>
</tr>
<tr>
<td>Victim of sexual assault/abuse by a perpetrator who is HBsAg positive</td>
<td>Administer hepatitis B vaccine series and HBIG</td>
</tr>
<tr>
<td>Victim of sexual assault/abuse by a perpetrator with unknown HBsAg status</td>
<td>Administer hepatitis B vaccine series.</td>
</tr>
<tr>
<td>Percutaneous (e.g., bite or needle stick) or mucosal exposure to potentially infectious blood or body fluids form a source with unknown HBsAg status.</td>
<td>Administer hepatitis B vaccine series.</td>
</tr>
<tr>
<td>Sex or needle sharing contact of person with unknown HBsAg status.</td>
<td>Administer hepatitis B vaccine series.</td>
</tr>
</tbody>
</table>

(*) 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 postexposure 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 nonoccupational exposures. Guidelines for management of occupational exposure have been published separately (1) and also can be used for management of nonoccupational 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.

### 8.12.1 Determination of HBIG (Immunoglobulin)

For percutaneous (needlestick), 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.
8.12.2 HBV prophylaxis for reported exposure incidents

<table>
<thead>
<tr>
<th>HBV status of person exposed</th>
<th>Significant exposure</th>
<th>Non-significant exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposed</td>
<td>HBsAg positive source</td>
<td>Accelerated course of HB vaccine†</td>
</tr>
<tr>
<td></td>
<td>HBsAg negative source</td>
<td>Initiate course of HB vaccine</td>
</tr>
<tr>
<td></td>
<td>Unknown source</td>
<td>Initiate course of HB vaccine</td>
</tr>
<tr>
<td></td>
<td>Continued risk</td>
<td>No further risk</td>
</tr>
<tr>
<td></td>
<td>No further risk</td>
<td>No further risk</td>
</tr>
</tbody>
</table>

≥2 doses HBV vaccine:   
pre-exposure (anti-HBs not known)

<table>
<thead>
<tr>
<th>Known responder to HB vaccine (anti-HBs &gt; 10 mIU/ml)</th>
<th>Consider booster dose of HB vaccine</th>
<th>Consider booster dose of HB vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Known non-responder to HB vaccine (anti-HBs &lt;10 mIU/ml)</td>
<td>HBcAg positive</td>
<td>HBcAg negative</td>
</tr>
<tr>
<td>2-4 months post-immunisation</td>
<td>Consider booster dose of HB vaccine</td>
<td>Consider booster dose of HB vaccine</td>
</tr>
</tbody>
</table>

8.13 Hepatitis C Virus

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

b. No data exist regarding the effect of treating patients with acute infection who have no evidence of disease,
c. 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
d. The appropriate regimen is unknown

8.14  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)
9. STAFF HEALTH PROGRAMME

9.1 Health evaluation at placement
1. A medical checkup is performed at placement according to protocol laid down by Govt of NCT of Delhi. After induction to the hospital services immunisation 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.
2. The data is collected in prescribed form.
3. 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 initiated by the staff member within one month of start of employment. All staff are encouraged to get their Anti-HBs titers done to ensure their safety after vaccination. **All students (medical, nursing, technical courses) students must be vaccinated within first year of their joining the course.**
4. Vaccination for Salmonellosis is mandatory for kitchen staff and must be vaccinated within three months of their employment.
5. 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.

9.2 Employee Health Programme
1. **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 employee are instructed to adhere to universal precautions, nursing barrier/isolation policies, hand washing protocols and waste management.
2. 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.
3. 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 MANDATORY to report all such kind of exposures on prescribed form. Work restrictions may be imposed in situations which call for such action.
4. 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.
10. ISOLATION POLICY AND TRANSMISSION BASED PRECAUTIONS

10.1 Isolation Policy

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

10.1.2 Measures for Reduction of Transmission
10.1.2.1 Hand Washing
   • Frequent hand washing is the most important measure.
   • Patient care Handwash
     • 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.

10.1.2.2 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.

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

10.1.2.4 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.

10.2 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).
10.2.1 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.

10.2.2 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.

10.2.3 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.

10.2.4 Eating Utensils

Routine cleaning with detergent and hot water is sufficient.

10.2.5 Terminal Cleaning

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

1. Bed should be cleaned properly including Bed frames, side rails and mattress initially with soap and water followed by disinfectant solution.
2. Other equipments like I/V stands, bed lockers etc should be cleaned with soap and water followed by disinfectant solution.
3. All metal items should me clean with bacillocid (0.5%) and non-metal items can be clean with superoxide water.
4. If any electrical items like infusion pumps etc. used should be clean with spirit twice.
5. All the used items like oxygen mask, O2 tubing’s, suction jars and tubing’s should be send to CSSD for HLD.
6. 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.
7. Ventilator switching from one patient to another is strongly discouraged.
8. All wall tiles and floor should be cleaned with soap and water.
9. Swine flu ward – when no patient of swine flu is admitted or in a single room at private wards.

10.2.6 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 coloniser 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: follow universal precautions.

10.3 Concept of Standard Precautions

They are a set of precautions designed to protect health care workers from exposure to blood borne pathogens. Since the majority of patients infected with HIV/HBsAg/ HCV are asymptomatic at the time of presentation all patients are approached as having potentially infectious blood and body fluids. Precautions may vary based on anticipated exposure.

Features of standard precautions

10.3.1 Precautions against Blood Borne Transmission

1. **Admission:** Patients with HIV / HBV / HCV disease but presenting with unrelated illnesses may be admitted in any ward as per existing rules. Confidentiality shall be maintained with appropriate precautions to prevent healthcare associated transmission.
2. **Preparation of patients:**
   • It is the responsibility of the attending physician to ensure that patients, testing positive are informed about the result and receive counseling.
   • The nursing staff will explain to patients, attendants and visitors (when necessary), the purpose and methods of hand washing, body substance and excreta precautions, and other relevant precautions.
3. **Red bag (Reusable non-sharp material):** The ward sister must ensure that the prescribed bag is obtained from CSSD when a patient with HIV, HBV or HCV infection is admitted. All contaminated items that are to be sent to CSSD for disinfection are placed in the bag and sent for autoclaving. Sharps are not to be discarded in the red bag. Linen and procedure trays to be sterilized separately.
4. **Specimens:** Adequate precautions are to be taken while collecting specimens. The specimens are to be transported in leak-proof containers placed inside a leak-proof plastic cover. Ensure that the cover and the outside of the container are not contaminated.
5. **Waste disposal**: A bin lined by a Red plastic bag is placed in the patient’s room for infectious waste. When the bag is 2/3rd full it is sent for disposal.

6. Non-infectious waste does not require special precautions and is disposed in a manner similar to non-infectious waste generated from any other patient.

7. **Death of a patient**: Those cleaning the body should use gloves and other protective gear. Before leaving the ward, the body is backed as for any case.

### 10.3.2 Precautions against Airborne Transmission

These precautions are designed to reduce the risk of airborne and droplet transmission of infectious agents, and apply to patients known or suspected to be infected with epidemiologically important pathogens that can be transmitted by these routes.

**Components of respiratory isolation:**

1. Place the patient in a single / private room with closed doors. Patients with same illness (but no other infection) can be co-horted in one room.
2. Masks to be worn by those who enter the patient’s room. Susceptible persons should not enter the room of patients known or suspected to have measles or varicella (chicken pox).
3. Gowns are not routinely necessary. Use gowns if soiling is likely.
4. Gloves are necessary while handling patients.
5. Hand must be washed after touching the patient or potentially contaminated articles and before taking care of another patient.
6. Articles contaminated with infective material must be discarded or bagged and labeled before being sent for decontamination and reprocessing.

### 10.3.3 Precautions against Contact Transmission

Contact isolation precautions are recommended for specified patients known or suspected to be infected or colonized with epidemiologically important microorganisms that can be transmitted by direct contact with the patient (hand or skin-to-skin contact that occurs when performing patient – care) or indirect contact (touching) with contaminated environmental surfaces or patient-care items.

**Components:**

1. Gowns are indicated if soiling is likely.
2. Gloves are indicated for touching infected material / area
3. Hands must be washed after touching the patient or potentially contaminated articles and before taking care of another patient.
4. When possible, dedicate the use of non critical patient – care equipment to a single patient (or cohort of patients infected or colonized with the pathogen requiring precautions) to avoid sharing between patients. If use of common equipment or items is unavoidable, then adequately clean and disinfect them before use for another patient.
5. Articles contaminated with infective material must be discarded or bagged and labeled before being sent for decontamination and reprocessing.

### 10.4. List of diseases which need isolation precautions

Table 10.1 List of diseases which needs isolation precautions
### Condition

<table>
<thead>
<tr>
<th>Condition</th>
<th>PPE REQUIRED</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken-Pox (Varicella)</td>
<td>Gloves, plastic apron for contact.</td>
<td>Preferably Single room. <strong>Staff who have not had Chicken-Pox should not nurse these patients.</strong></td>
</tr>
<tr>
<td>German Measles (Rubella)</td>
<td>Gloves/apron for direct contact</td>
<td>Single room. Check on any non-immune pregnant staff.</td>
</tr>
<tr>
<td><strong>Hepatitis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type A Infection</td>
<td>Gloves</td>
<td>None</td>
</tr>
<tr>
<td>Type B Serum</td>
<td>Gloves</td>
<td>Single room if bleeding.</td>
</tr>
<tr>
<td>Type C Serum</td>
<td>Gloves</td>
<td>Single room if bleeding</td>
</tr>
<tr>
<td><strong>HIV/AIDS</strong></td>
<td>Gloves/apron.</td>
<td>Single room if bleeding or has an opportunistic infection.</td>
</tr>
<tr>
<td><strong>Herpes Zoster</strong></td>
<td>Gloves/apron for direct contact</td>
<td>Single room. Staffs who have not had Chicken-Pox /vaccinated should not nurse these patients.</td>
</tr>
<tr>
<td>Impetigo</td>
<td>Gloves for direct contact.</td>
<td>Single room.</td>
</tr>
<tr>
<td>Measles (including encephalitis)</td>
<td>Gloves/apron in direct contact.</td>
<td>Isolation room.</td>
</tr>
<tr>
<td><strong>Infection with Multi-resistant organisms, including MRSA, VRE</strong></td>
<td>Gloves/Apron for direct contact</td>
<td>Strict hand washing is essential. Isolation room/cohort nursing</td>
</tr>
<tr>
<td>Scabies</td>
<td>Gloves for contact until treated. 24 hours after treatment not infectious.</td>
<td>All staff in contact need treatment also other patients.</td>
</tr>
<tr>
<td>Tuberculosis Pulmonary</td>
<td>Gloves/apron for direct contact.</td>
<td>Masks must be worn in open cases of tuberculosis. Transfer to infectious disease hospital</td>
</tr>
</tbody>
</table>

### 10.5. 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 10.5.1 Transmission based Precautions

<table>
<thead>
<tr>
<th>Precautions</th>
<th>Mode of Transmission is Contact (category I)</th>
<th>Mode of Transmission is Droplet (category II)</th>
<th>Mode of Transmission is Airborne (category III)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mask</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Gown</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Gloves</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Patient Transport</td>
<td>Receiving department to</td>
<td>• Mask</td>
<td>• Mask the</td>
</tr>
</tbody>
</table>

---

Delhi State Health Mission, Department of Health and Family Welfare, GNCTD
be informed of precautions

patient
  • Receiving department to be informed of precautions

• Inform the receiving department of precautions

Environment Cleaning
• Dedicate or change solutions and equipment after use
• Change privacy curtain when isolation is discontinued or patient is discharged

Routine
Routine

Patient Care Equipment (Special Handling)
Yes, dedicated equipments
No
No

Visitors
• Gown, gloves for patient care.
• Wash hands when entering/leaving room.
• Mask as directed

• Wear a mask
• Wash hand when entering or leaving room

• Wear respiratory protection
• Wash hands when entering or leaving room

Table 10.5.2. Standard and transmission based precautions for various diseases and conditions

<table>
<thead>
<tr>
<th>Diseases / Condition</th>
<th>Precaution Category</th>
<th>Infective Material</th>
<th>Duration for Precautions</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abscess Draining, major</td>
<td>Contact</td>
<td>Drainage</td>
<td>Until drainage contained</td>
<td>Major = drainage not contained by dressing</td>
</tr>
<tr>
<td>Acquired immunodeficiency syndrome (AIDS)</td>
<td>Standard</td>
<td>Blood and bloody body fluids</td>
<td>All patients all the times</td>
<td>AIDS is specified communicable disease.</td>
</tr>
<tr>
<td>Actinomycosis</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amebiasis (Dysentery) Adult</td>
<td>Standard</td>
<td>Faeces</td>
<td>All patients all the times</td>
<td>Consider Contact precautions for adults with poor hygiene and/or who contaminate the environment.</td>
</tr>
<tr>
<td>Pediatric</td>
<td>Contact</td>
<td>Faeces</td>
<td>Until formed or normal stools for 24 hours</td>
<td></td>
</tr>
<tr>
<td>Arthropod borne viral encephalitis</td>
<td>Standard</td>
<td>Blood and bloody body</td>
<td>All patients all the times</td>
<td></td>
</tr>
<tr>
<td>(Jap B)</td>
<td>fluids</td>
<td>Duration of symptoms</td>
<td>Etiologic agents</td>
<td></td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-------------------------------</td>
<td>----------------------</td>
<td>------------------</td>
<td></td>
</tr>
<tr>
<td>Arthropod borne viral fevers (Dengue)</td>
<td>Standard Blood and bloody body fluids</td>
<td>All patients all the times</td>
<td>Various etiologic agents, such as respiratory syncytial virus, parainfluenza viruses, adenoviruses have been associated with this condition</td>
<td></td>
</tr>
<tr>
<td>Aspergillosis</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bronchiolitis Adult</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bronchiolitis Pediatric</td>
<td>Contact Respiratory secretions</td>
<td>Duration of symptoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Candidiasis All forms, including mucocutaneous (moniliasis, thrush)</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cellulitis (Uncontrolled drainage)</td>
<td>Contact Drainage</td>
<td>Until drainage contained</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chancroid (Soft chancre)</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 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
<table>
<thead>
<tr>
<th>Disease</th>
<th>Contact Mode</th>
<th>Pathogen Route</th>
<th>Duration of Communicability</th>
<th>Isolation Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholera</td>
<td>Contact</td>
<td>Faeces</td>
<td>Until formed or normal stools × 24 hours</td>
<td>All patients all the times</td>
</tr>
<tr>
<td>Clostridium difficile diarrhea</td>
<td>Contact</td>
<td>Faeces</td>
<td>Until formed normal stools or no stools × 48 hours</td>
<td>All patients all the times</td>
</tr>
<tr>
<td>Clostridium perfringens (Gas gangrene)</td>
<td>Standard</td>
<td>All patients all the times</td>
<td>All patients all the times</td>
<td>All patients all the times</td>
</tr>
<tr>
<td>Congenital rubella</td>
<td>Contact and Droplet</td>
<td>Respiratory secretions and urine</td>
<td>During any admission for the 1st year after birth unless nasopharyngeal and urine cultures after 3 months of age are negative for rubella virus</td>
<td>All patients all the times</td>
</tr>
<tr>
<td>Conjunctivitis (Pink eye Acute bacterial Chlamydia,)</td>
<td>Standard</td>
<td>Eye Discharge</td>
<td>Duration of symptoms</td>
<td>All patients all the times</td>
</tr>
<tr>
<td>Gonococcal Acute Viral</td>
<td>contact</td>
<td>Duration of symptoms</td>
<td>All patients all the times</td>
<td>All patients all the times</td>
</tr>
<tr>
<td>Disease / Agent</td>
<td>Type</td>
<td>Contact</td>
<td>Site of Exposure</td>
<td>Duration of Symptoms</td>
</tr>
<tr>
<td>----------------</td>
<td>------</td>
<td>---------</td>
<td>-----------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Croup Pediatric</td>
<td>Contact</td>
<td>Respiratory secretions</td>
<td>All patients all the times</td>
<td>Viral Agents such as parainfluenza viruses and influenza A virus have been associated with this condition</td>
</tr>
<tr>
<td>Cryptosporidiosis Adult</td>
<td>Contact</td>
<td>Faeces</td>
<td>Until formed or normal stools for 24 hours</td>
<td>Consider contact precautions for adults with poor hygiene and/or who contaminate environment</td>
</tr>
<tr>
<td>Cytomegalovirus infection</td>
<td>Standard</td>
<td></td>
<td>All patients all the times</td>
<td></td>
</tr>
<tr>
<td>Decubitus ulcer major</td>
<td>Contact</td>
<td>Drainage</td>
<td>Until drainage contained</td>
<td>Major = drainage not contained by dressing.</td>
</tr>
<tr>
<td>Dengue</td>
<td>Standard</td>
<td></td>
<td>All patients all the times</td>
<td></td>
</tr>
<tr>
<td>Diarrhea, acute</td>
<td>Contact</td>
<td>Faeces</td>
<td>Until formed or normal stools for 24 hours</td>
<td></td>
</tr>
<tr>
<td>Diarrhea, acute</td>
<td>Contact</td>
<td>Faeces</td>
<td>Until formed or normal stools for 24 hours</td>
<td></td>
</tr>
<tr>
<td>Diphtheria (Corynebacterium diphtheriae Cutaneous)</td>
<td>Contact</td>
<td>Lesion secretions</td>
<td>Until 2 cultures from skin lesions taken at least 24 hours apart after cessation of antimicrobial therapy are negative</td>
<td></td>
</tr>
<tr>
<td>Diphtheria Pharyngeal</td>
<td>Droplet</td>
<td>Respiratory secretions</td>
<td>Until 2 cultures from both nose and throat taken at least 24 hours apart after cessation of antimicrobial therapy are negative</td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>Mode of Transmission</td>
<td>Duration of Isolation</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>----------------------</td>
<td>------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Epiglottitis</td>
<td>Droplet</td>
<td>For 24 hours after start of effective therapy.</td>
<td>negative for <em>corynebacterium diphtheriae</em></td>
<td></td>
</tr>
<tr>
<td>Epithelial virus</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food Poisoning</td>
<td>Contact</td>
<td>Until formed or normal stools for 24 hours.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Furunculosis</td>
<td>Contact</td>
<td>Until drainage stops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gonorrhea</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guillain-Barre' syndrome</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helicobacter pylori</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis Viral</td>
<td>Standard</td>
<td>All patients all the times</td>
<td>For Hepatitis A &amp; E consider contact precautions for adults with poor hygiene and/or who contaminate the environment. 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.</td>
<td></td>
</tr>
<tr>
<td>Hepatitis A, Hepatitis E Adult</td>
<td></td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disease</td>
<td>Contact</td>
<td>Faeces</td>
<td>Duration of symptoms</td>
<td>Isolation Policy &amp; Transmission Based Precautions</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>---------</td>
<td>-----------------------------</td>
<td>----------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Hepatitis Viral Pediatric</td>
<td></td>
<td>For 7 days after onset of symptoms</td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Hepatitis B (HBsAg +)</td>
<td>Contact</td>
<td>Blood and bloody fluids</td>
<td></td>
<td>Hepatitis B and C are specified communicable disease. For staff issues for all types of Hepatitis.</td>
</tr>
<tr>
<td>Hepatitis C and other specified non A, non B</td>
<td>Standard</td>
<td>All patients all the time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herpes simplex (Herpes virus hominis) Encephalitis</td>
<td>Contact</td>
<td>Lesion, secretions, possibly all body secretions and excretions.</td>
<td>Duration of symptoms</td>
<td>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.</td>
</tr>
<tr>
<td>Mucocutaneous, disseminated or primary severe</td>
<td>Contact</td>
<td>Lesion secretions.</td>
<td>Duration of symptoms</td>
<td></td>
</tr>
<tr>
<td>Mucocutaneous, recurrent skin,</td>
<td>Standard</td>
<td>Lesion secretions.</td>
<td>Duration of symptoms</td>
<td></td>
</tr>
<tr>
<td>Disease</td>
<td>Isolation Type</td>
<td>Route</td>
<td>Precautions</td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>----------------</td>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Oral or genital</td>
<td>Standard</td>
<td></td>
<td>All patients all the times. For localized lesions, try to contain with dressings. Roommates should not be susceptible to chickenpox.</td>
<td></td>
</tr>
<tr>
<td>Herpes Zoster Caused by Varicella zoster virus (shingles)</td>
<td>Standard</td>
<td></td>
<td>All patients all the times. For localized lesions, try to contain with dressings. Roommates should not be susceptible to chickenpox.</td>
<td></td>
</tr>
<tr>
<td>Herpes Zoster Localized in normal patient.</td>
<td>Standard</td>
<td></td>
<td>All patients all the times. For localized lesions, try to contain with dressings. Roommates should not be susceptible to chickenpox.</td>
<td></td>
</tr>
<tr>
<td>Human immunodeficiency virus (HIV)</td>
<td>Standard</td>
<td>Blood &amp; Bloody body fluids</td>
<td>All patients all the times. For localized lesions, try to contain with dressings. Roommates should not be susceptible to chickenpox.</td>
<td></td>
</tr>
<tr>
<td>Influenza</td>
<td>Droplet</td>
<td>Nasopharyngeal secretions.</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>Leprosy (Hansen’s disease)</td>
<td>Standard</td>
<td></td>
<td>All patients all the times. For localized lesions, try to contain with dressings. Roommates should not be susceptible to chickenpox.</td>
<td></td>
</tr>
<tr>
<td>Leptospirosis</td>
<td>Standard</td>
<td></td>
<td>All patients all the times. For localized lesions, try to contain with dressings. Roommates should not be susceptible to chickenpox.</td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td>Standard</td>
<td></td>
<td>All patients all the times. For localized lesions, try to contain with dressings. Roommates should not be susceptible to chickenpox.</td>
<td></td>
</tr>
<tr>
<td>Measles (Rubella)</td>
<td>Airborne</td>
<td>Respiratory secretions.</td>
<td>For 4 days after start of rash, except in immunocompromised patients for whom precautions should be maintained for duration of illness. If private room is unavailable, consider cohorting patients with measles.</td>
<td></td>
</tr>
<tr>
<td>Meningitis</td>
<td>Droplet</td>
<td>Possibly Respiratory Secretions</td>
<td>Until etiology Known Bacterial Meningitis is a specified communicable disease.</td>
<td></td>
</tr>
<tr>
<td>Neisseria meningitidis (meningococcal) known or</td>
<td>Droplet</td>
<td>Respiratory secretions</td>
<td>For 24 hours after start of effective therapy Bacterial Meningitis is a specified communicable disease.</td>
<td></td>
</tr>
<tr>
<td>Disease</td>
<td>Isolation Type</td>
<td>Transmission Route</td>
<td>Duration</td>
<td>Notes</td>
</tr>
<tr>
<td>----------------------------------------------</td>
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<td>---------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Suspected</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haemophilus influenzae Type b known or suspected</td>
<td>Droplet</td>
<td>Respiratory secretions</td>
<td>For 24 hours after start of effective therapy</td>
<td></td>
</tr>
<tr>
<td>Other Bacterial, Fungal</td>
<td>Standard</td>
<td></td>
<td>All patients at all times</td>
<td></td>
</tr>
<tr>
<td>Aseptic (Viral or non (bacterial)</td>
<td>Standard</td>
<td></td>
<td>All patients at all times</td>
<td></td>
</tr>
<tr>
<td>Meningococcemia (meningococcal sepsis)</td>
<td>Droplet</td>
<td>Respiratory secretions</td>
<td>For 24 hours after start of effective therapy</td>
<td>Meningococcemia is a specified communicable disease.</td>
</tr>
<tr>
<td>Methicillin Resistant Staphylococcus aureus (MRSA)</td>
<td>Contact</td>
<td>Any body fluid or site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mucormycosis</td>
<td>Standard</td>
<td></td>
<td>All patients all the times</td>
<td></td>
</tr>
<tr>
<td>Mumps (infectious parotitis)</td>
<td>Droplet</td>
<td>Respiratory secretions</td>
<td>For 9 days after onset of swelling</td>
<td></td>
</tr>
<tr>
<td>Mycobacterium (non-tuberculosis, atypical, non TB complex) Pulmonary</td>
<td>Standard</td>
<td></td>
<td>All patients all the times</td>
<td></td>
</tr>
<tr>
<td>Mycoplasma pneumonia (Primary atypical pneumonia)</td>
<td>Droplet</td>
<td>Respiratory secretions</td>
<td>Duration of symptoms</td>
<td></td>
</tr>
<tr>
<td>Nocardiosis</td>
<td>Standard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pertussis (Whooping cough)</td>
<td>Droplet</td>
<td>Respiratory secretions</td>
<td>For 5 days after start of effective therapy or 3 weeks after onset of paroxysms if not treated</td>
<td></td>
</tr>
<tr>
<td>Pharyngitis</td>
<td>Standard</td>
<td></td>
<td>All patients all the times</td>
<td></td>
</tr>
<tr>
<td>Disease</td>
<td>Isolation</td>
<td>Transmission</td>
<td>Duration</td>
<td>Notes</td>
</tr>
<tr>
<td>---------</td>
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<td>--------------</td>
<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td>Plague (Yersinia pestis) Bubonic</td>
<td>Standard</td>
<td></td>
<td>All patients all the times</td>
<td>Bubonic plague is a specified communicable disease.</td>
</tr>
<tr>
<td>Plague (Yersinia pestis) Pneumonic</td>
<td>Droplet</td>
<td>Respiratory</td>
<td>For 3 days after start of effective therapy</td>
<td></td>
</tr>
<tr>
<td>Pneumococcal Infections, Invasive</td>
<td>Standard</td>
<td></td>
<td>All patients all the times</td>
<td>Invasive (cultured from sterile site) pneumococcal infections are a specified communicable disease.</td>
</tr>
<tr>
<td>Pneumonia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em> Type b Adult</td>
<td>Standard</td>
<td></td>
<td>All patients at all times</td>
<td>Ensure roommate not immunocompromised</td>
</tr>
<tr>
<td>Haemophilus influenza Type b Pediatric</td>
<td>Droplet</td>
<td>Respiratory secretions</td>
<td>For 24 hours after start of effective therapy</td>
<td></td>
</tr>
<tr>
<td><em>Neisseria meningitidis</em> (meningococcal) known or suspected</td>
<td>Droplet</td>
<td>Respiratory secretions</td>
<td>For 24 hours after start of effective therapy</td>
<td></td>
</tr>
<tr>
<td>Mycoplasma (Primary atypical pneumonia) known or suspected.</td>
<td>Droplet</td>
<td>Respiratory secretions</td>
<td>Duration of symptoms</td>
<td></td>
</tr>
<tr>
<td><em>Pneumocystis carinii</em></td>
<td>Standard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>Standard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Streptococcus. Group A Adult</td>
<td>Standard</td>
<td>Respiratory secretions</td>
<td>For 24 hours after start of effective therapy</td>
<td></td>
</tr>
<tr>
<td>Streptococcus. Group A Pediatrics</td>
<td>Droplet</td>
<td>Respiratory secretions</td>
<td>For 24 hours after start of effective therapy</td>
<td></td>
</tr>
<tr>
<td>Other bacterial including gram – negative and etiology unknown</td>
<td>Standard</td>
<td>Respiratory secretions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fungal</td>
<td>Standard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viral Adult</td>
<td>Standard</td>
<td></td>
<td>All patients all the times</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type</td>
<td>Site</td>
<td>Isolation</td>
<td>Duration of symptoms</td>
</tr>
<tr>
<td>-----------</td>
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<td>------------</td>
<td>--------------------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Viral Pediatrics</strong></td>
<td>Droplet</td>
<td>Respiratory secretions</td>
<td>All patients all the times</td>
<td>Acute poliomyelitis is a specified communicable disease.</td>
</tr>
<tr>
<td><strong>Poliomyelitis</strong></td>
<td>Standard</td>
<td></td>
<td>All patients all the times</td>
<td>Rabies is a specified communicable disease.</td>
</tr>
<tr>
<td><strong>Pseudo membranous colitis</strong></td>
<td>Contact</td>
<td>Faeces</td>
<td>Until Clostridium difficile ruled out.</td>
<td>Rabies is a specified communicable disease.</td>
</tr>
<tr>
<td><strong>Rabies</strong></td>
<td>Standard</td>
<td></td>
<td>All patients all the times</td>
<td>Rabies is a specified communicable disease.</td>
</tr>
<tr>
<td><strong>Rheumatic fever</strong></td>
<td>Standard</td>
<td></td>
<td>All patients all the times</td>
<td>Rabies is a specified communicable disease.</td>
</tr>
<tr>
<td><strong>Ritter's disease (Staphylococcal scalded skin syndrome) Adult</strong></td>
<td>Standard</td>
<td></td>
<td>All patients all the times</td>
<td>Consider contact precautions for adults with poor hygiene and/or who contaminate the environment.</td>
</tr>
<tr>
<td><strong>Pediatric</strong></td>
<td>Contact</td>
<td>Faeces</td>
<td>Until formed or normal stools for 24 h</td>
<td>Exposed susceptible patients should be placed on Droplet isolation beginning 12 days after first contact through 26 days after last exposure.</td>
</tr>
<tr>
<td><strong>Rubella (German measles)</strong></td>
<td>Droplet</td>
<td>Respiratory Secretions</td>
<td>Until 7 days after onset of rash</td>
<td>Exposed susceptible patients should be placed on Droplet isolation beginning 12 days after first contact through 26 days after last exposure.</td>
</tr>
<tr>
<td><strong>Salmonellae Including Typhoid fever or Salmonella typhi (case/carrier) Adult</strong></td>
<td>Standard</td>
<td></td>
<td>All patients all the times</td>
<td>Consider contact precautions with poor hygiene and/or who contaminate the environment.</td>
</tr>
<tr>
<td><strong>Salmonellae Including Typhoid fever or Salmonella typhi (case/carrier) Pediatric</strong></td>
<td>Contact</td>
<td>Faeces</td>
<td>Until formed or normal stools for 24 hours</td>
<td>Typhoid fever is a specified communicable disease.</td>
</tr>
<tr>
<td>Condition</td>
<td>Precautions</td>
<td>Isolation</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
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<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Shigelllosis</td>
<td>Standard</td>
<td>All patients all the times</td>
<td>Consider Contact precautions for adults with poor hygiene and/or who contaminate the environment</td>
<td></td>
</tr>
<tr>
<td>Shigelllosis Pediatric</td>
<td>Contact</td>
<td>Faeces</td>
<td>Until formed or normal stools for 24 hours</td>
<td></td>
</tr>
<tr>
<td>Streptococcal infection (Group A Streptococcus)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin, wound or major burn</td>
<td>Contact</td>
<td>Drainage</td>
<td>For 24 hours after start of effective therapy</td>
<td></td>
</tr>
<tr>
<td>Necrotizing fascitis, myositis or other soft tissue necrosis.</td>
<td>Contact</td>
<td>Drainage</td>
<td>For 24 hours after start of effective therapy.</td>
<td></td>
</tr>
<tr>
<td>Pneumonia Adult</td>
<td>Standard</td>
<td>Respiratory secretions</td>
<td>For 24 hours after start of effective therapy.</td>
<td></td>
</tr>
<tr>
<td>Pneumonia Pediatric</td>
<td>Droplet</td>
<td>Respiratory secretions</td>
<td>For 24 hours after start of effective therapy.</td>
<td></td>
</tr>
<tr>
<td>Scarlet fever Pediatric</td>
<td>Droplet</td>
<td>Respiratory secretions</td>
<td>For 24 hours after start of effective therapy.</td>
<td></td>
</tr>
<tr>
<td>Toxic Shock Syndrome (TSS)</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syphilis</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetanus</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxoplasmosis</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trachoma</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuberculosis (Mycobacterium tuberculosis. M. africanum M. bovis) Confirmed or suspected pulmonary,</td>
<td>Airborne</td>
<td>Respiratory secretions.</td>
<td>Prior to discontinuing isolation Negative pressure isolation room is required</td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>Precaution</td>
<td>Frequency</td>
<td>Additional Measures</td>
<td></td>
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<tr>
<td>------------------------------------------------</td>
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<td>----------------------------------</td>
<td>---------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Laryngeal, or military</td>
<td>Standard</td>
<td>All patients all the time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin-test (mantoux), positive with no evidence</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>of current pulmonary disease.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Extra pulmonary, meningitis, and drainage</td>
<td>Standard</td>
<td>All patients all the time</td>
<td>Assess for pulmonary disease.</td>
<td></td>
</tr>
<tr>
<td>lesion (including scrofula).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UTI Including pyelonephritis with or without</td>
<td>Standard</td>
<td>All patients all the times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>urinary catheter</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*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 provided.*

*Standard precautions must be taken in all patients all the times. (See also Chapter 4)*
11. SPECIAL CARE UNITS

11.1 Intensive Care Units

11.1.1 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.

11.1.2 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.

11.1.3 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.

11.1.4 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.

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

11.2 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.

11.2.1 Haemodialysis machines:

i. Priming of kit (Haemodialyser and Arteriovenous tubing) should be done thoroughly with Normal saline without coming in contact with the floor surface and priming bucket surface area.

ii. Kit has to be kept in recirculation mode by connecting Hansen connectors to dialyzer and giving 2000 IU inj. Heparin.

iii. Machine should be disinfected with 4% sodium hypochlorite/citric acid on daily basis.
iv. Bleaching of machines should be done with 5% chlorine once a month
v. Conductivity of the haemodialysis machine shall be monitored by lab method on a weekly basis
vi. Dialysate sterility should be checked on a monthly basis
vii. Calibration of machines should be undertaken on a quarterly basis

11.2.2 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.

11.2.3 Reprocessor machine:
i. Reprocessing machine should be sanitized with sodium hypochlorite on a weekly basis
ii. Ends of dialyzer connectors should be dipped in disinfectant solution after every process
iii. Fibre Bundle Volume and number of times Haemodialyser was being used should be recorded
iv. Haemodialyser kits should be stored in separate boxes for multiple uses

11.2.4 Blood lines and multidose vials should not be re-used
11.2.5 Staff members shall be vaccinated properly and proper care needs to be taken reardin isolation to prevent cross infection
11.2.6 Log of disinfection activities should be maintained for verification.
11.2.7 Disinfection Schedule for Hemodialysis
i. Disinfection of HD machine with Hemoclean.
ii. Hot disinfection of HD machine with calfree: After every dialysis.
iii. Front cleaning of HD machine with Hemoclean:
iv. Disinfection/ washing of R.O. inlet filter of H.D. Machine with Hemoclean:
v. Disinfection of R.O tank with hemoclean: 1st week of every month.
vi. Charging of R.O system: as per the recommendations.
viii. Washing Biocarbonate container: After every dialysis.
x. Changing glutaraldehyde container : Every 14 Days.
xi. Washing of H.D. Room : 1st week every month.
xii. Fumigation of H.D. Room with (Hydrogen peroxide+ Silver nitrate) e.g. Ecoshield: 1st week every month.

11.2.8 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 CLABSI (Central line Associated Blood Stream Infection). Empirical antibiotic therapy is initiated after taking samples 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 complicated case of CLABSI.

11.2.9 Specimen Collection and Handling
1. Extreme caution must be employed when drawing blood for laboratory testing. Gloves and face shields will be worn while drawing specimens.
2. Blood spills will be cleaned immediately with solution of bleach. During cleaning, gloves will be worn.
3. Any specimen collected from a patient on Isolation is labelled according to Infection Control policy.
4. Bacterial monitoring of water for preparing dialysis fluids and dialysate fluid are collected and immediately sent to Microbiology department on a monthly basis.
5. Specimens are clearly labelled 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.

11.2.10 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.

11.3 Dental Units
11.3.1 Scope
Applies to what is the best practice in the infection control aspects of Dental Hand-pieces, Pre-procedural Mouth Rinses, Oral Surgical Procedures and Handling Biopsy Specimens.

Definitions
i. Handpiece is a small, high-speed drill used during dental procedures.
ii. Mouthwash or mouth rinse is a chemotherapeutic agent used as an effective home care system by the patient to enhance oral hygiene.
iii. Pre-procedural Mouth Rinse is a mouth rinse used by patients before a dental procedure.
iv. Oral Surgery is a specialty in dentistry. It includes the diagnosis, surgical and related treatment of diseases, injuries and defects involving both the functional and esthetic aspects of the hard and soft tissues of the head, mouth, teeth, gums, jaws and neck.
v. A biopsy is a medical test commonly performed by a surgeon or an interventional radiologist involving sampling of cells or tissues for examination.
vi. A specimen is a portion/quantity of material for use in testing, examination, or study.

Procedure
Dental Hand-pieces and Other Devices Attached to Air and Waterlines
i. Clean and heat-sterilize handpieces and other intraoral instruments that can be removed from the air and waterlines of dental units between patients.

ii. Follow the manufacturer's instructions for cleaning, lubrication, and sterilization of handpieces and other intraoral instruments that can be removed from the air and waterlines of dental units.

iii. Do not surface-disinfect, use liquid chemical sterilants on handpieces and other intraoral instruments that can be removed from the air and waterlines of dental units.

iv. Do not advise patients to close their lips tightly around the tip of the saliva ejector to evacuate oral fluids.

Pre-procedural Mouth Rinses

i. A pre-procedural antimicrobial rinse (e.g., chlorhexidine gluconate, essential oils, or povidone-iodine) can reduce the level of oral microorganisms in aerosols and spatter generated during routine dental procedures and can decrease the number of microorganisms introduced in the patient's bloodstream during invasive dental procedures. However, no recommendation is offered regarding use of pre-procedural antimicrobial mouth rinses to prevent clinical infections among DHCP or patients.

Oral Surgical Procedures

The following apply when performing oral surgical procedures:

i. Perform surgical hand antisepsis by using an antimicrobial product (e.g., antimicrobial soap and water, or soap and water followed by alcohol-based hand scrub with persistent activity) before donning sterile surgeon's gloves.

ii. Use sterile surgeon's gloves.

iii. Use sterile saline or sterile water as a coolant/irrigant when performing oral surgical procedures. Use devices specifically designed for delivering sterile irrigating fluids (e.g., bulb syringe, single-use disposable products, and sterilizable tubing).

11.3.3.4 Handling Biopsy Specimens

i. During transport, place biopsy specimens in a sturdy, leak-proof container labeled with the biohazard symbol.

ii. Care must be taken when collecting specimens to avoid contaminating the outside of the container and the laboratory form accompanying the specimen.

iii. If a biopsy specimen container is visibly contaminated, clean and disinfect the outside of a container or place it in an impervious bag labeled with the biohazard symbol.

11.3.4 Dental Waste Management

Apart from waste generated in any other healthcare facility following are points to remember:

i. Extracted teeth containing dental amalgam should not be placed in a medical waste container (e.g., a red bag, biohazard bag, or sharps container) or regular trash intended for incineration for final disposal.

ii. Extracted teeth containing amalgam restorations must not be heat-sterilized because of the potential health hazards associated with mercury vaporization and exposure.

iii. Extracted teeth containing amalgam restorations should be discarded in the regular waste container after cleaning and disinfection.
12. CARE OF SYSTEMS AND INDWELLING DEVICES

12.1 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.

12.2 Vascular Care
12.2.1 Hand washing
Wash hands before every attempted intravascular catheter insertion. Antimicrobial handwashing soaps are desirable, and are preferred before attempted insertions of central intravenous catheters, catheters requiring cut downs, and arterial catheters.

12.2.2 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 centre 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.

12.2.3 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.

12.2.4 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.

12.2.5 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

12.2.6 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. The saline bottle/ampule used to fill the syringe should be discarded immediately and should not be kept for reuse. The cost of treating one HAI is much more than cost of few hundreds of such bottles.

12.2.7 Peripheral IV sites (short term catheters)
12.2.7.1 Dressing changes .
• Peripheral IV site dressings should not usually require routine changes, since peripheral IV catheters, are removed within 72 hours.

12.2.7.2 Replacement of Peripheral IV Catheters
Peripheral IV catheters 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.

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

- **Dressing changes.**
- Central IV catheter dressings are changed every 72 hours.
- **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.

**Central line associated blood stream infections (CLABSI)**

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 catheters upto 5.7 cm, 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. These catheter segments should never be sent alone for culture. They must accompany atleast one blood culture specimen collected from peripheral vein of the patient.

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

**12.3 Respiratory Care**

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

ii. Mouth flora influences development of healthcare associated pneumonia in ventilated patients.

iii. Frequent chlorhexidine mouthwashes minimise the chances of pneumonia.

**12.3.1 Ventilator Care**

i. Sterile water is to be used in nebulizers and humidifiers. This are replaced once or twice a day.

ii. 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.

iii. 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.

iv. Do not change routinely, on the basis of duration of use, the breathing circuit (i.e., ventilator tubing and exhalation valve and the attached humidifier) that is in use on
an individual patient. Change the circuit when it is visibly soiled or mechanically malfunctioning.

v. Periodically drain and discard any condensate that collects in the tubing of a mechanical ventilator, taking precautions not to allow condensate to drain toward the patient. Gloves should be worn when performing this procedure or handling the fluid, decontaminate your hands with soap and water or an alcohol based hand rub.

vi. Use sterile (not distilled, non-sterile) water to fill bubbling humidifier.

vii. A heat-moisture exchanger (HME) should be changed when it malfunctions mechanically or becomes visibly soiled. An HME that is in use on a patient should not be routinely changed more often than every 48 hours.

viii. The breathing circuit attached to an HME while it is in use on a patient should not be changed routinely (in the absence of gross contamination or malfunction).

ix. The manufacturer’s instruction for the use of oxygen humidifiers should be followed. The humidifier tubing (including any nasal prongs or mask) should be changed when it malfunctions or becomes visibly contaminated.

x. Between treatments on the same patient, small-volume medication nebulizer (in-line and hand-held) should be cleaned, disinfected, rinsed with sterile water (if rinsing is needed), and dried. Use only sterile fluid for nebulization, and dispense the fluid into the nebulizer aseptically. Whenever possible, use aerosolized medications in single-dose vials.

xi. Oxygen masks, venture devices and nebulizer chambers are cleaned carefully and then send to CSSD for HLD.

xii. Humidifier domes are periodically send to CSSD. Ambu bags are cleaned thoroughly and periodically send to CSSD for HLD.

xiii. Microbiological surveillance of respiratory therapy equipment is practised in our hospital.

12.3.2 Tracheostomy Care / Endotracheal Tube

i. Careful attention to post-operative wound care is mandatory.

ii. The patient should receive aerosol therapy to prevent dessication of the tracheal and bronchial mucosa or the formation of crusts. The skin around the tracheostomy tube is cleaned with Povidone-iodine 5% every four hours or more frequently, if necessary.

iii. 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.

iv. The tracheostomy tape securing the tube are changed every 24 hours. This tape must be tied securely at all times.

v. 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.

vi. Clean technique is used to change the tracheostomy tube unless there is a medical indication for sterile technique.

vii. 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.
12.3.3 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.

12.3.3.1 Sterile Suctioning
i. Wash your hands.
ii. Use a catheter with a blunt tip.
iii. The wall suction are set no higher than 120 mm Hg for adults and between 60 and 80 mm Hg for children.
iv. Attach the suction catheter to the suction tubing; do not touch the catheter with bare hands (leave it in its protective covering).
v. Put on sterile gloves. The wearing of a mask is also strongly recommended.
vi. However, if saline does need to be instilled, ½ cc of sterile saline is put into the tracheostomy tube on inspiration only.
vii. 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.
viii. Insert the catheter gently through the inner cannula until resistance is met. Do not apply suction during insertion.
ix. Withdraw the catheter approximately 1 cm and institute suctioning.
x. Carefully withdraw the catheter, rotating it gently between the thumb and forefinger applying intermittent suctioning.
xii. Continuous suctioning for longer than 10 seconds may create an unacceptable level of hypoxia.
xii. The patient are given time to rest between suctioning episodes. If possible, this time 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.
xiii. Observe for unfavourable reactions such as increased heart rate, hypoxia, arrhythmia, hypotension, cardiac arrest, etc.
xiv. If oral suctioning is necessary, it are done after the tracheostomy is suctioned.
xv. When suctioning is completed, clear the catheter and tubing of mucous and debris with sterile water or saline.
xvi. Discard the catheter, water container, and gloves appropriately.
xvii. Wash hands.
xviii. The tubing and suction canister are changed every 24 hours. The canister 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.

12.4 Urinary Catheter
12.4.1 Urethral catheterization
12.4.1.1 Personnel
Only persons who know the correct technique of aseptic insertion and maintenance of catheters should handle catheters.

12.4.1.2 Catheter Use
Urinary catheters are inserted only when necessary and left in place only as long as medically necessary and are changed after 7 days.

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

12.4.1.4 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.

12.4.1.5 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.

12.4.1.6 Catheter associated urinary tract infections
In suspected urinary tract infections with the patients on indwelling urinary catheter urine specimen should be sent for culture. Under no circumstances catheter tips should be tips/segments should be sent for culture.

12.4.1.7 Specimen collection from patient with indwelling catheter
Specimen collection from patients with indwelling catheters requires strict aseptic technique. The catheter tubing should be clamped off above the port to allow the collection of freshly voided urine. The catheter port or wall of the tubing should then be cleaned vigorously with 70% ethanol, and urine aspirated via a needle and syringe; the integrity of the closed drainage system must be maintained to prevent the introduction of organisms into the bladder. Specimens obtained from the collection bag are inappropriate, because organisms can multiply there, obscuring the true relative numbers. Cultures should be obtained when patients are ill; routine monitoring does not yield clinically relevant data.

12.5 Wound Care

12.5.1 Surgical wound care
i. Surgical wounds after an elective surgery are inspected on the third post-operative day, or earlier if wound infection is suspected.

ii. 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.

iii. If two health care workers are not available, then, take off the dressing, wash hands again before applying a new dressing.

iv. A clean, dry wound may be left open without any dressing after inspection.

v. 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.

For perisurgical prophylaxis see chapter Antibiotic Stewardship Programme.
12.5.2.1. Surgical Wound Classification

**Class I**: An uninfected operative wound in which no inflammation is encountered and are closed primarily and if necessary, drained with closed drainage. Operative incision wound following non-penetrating blunt trauma should be included in this category.

**Class II**: An operative wound in which the respiratory, alimentary, genital or urinary tracts are entered under controlled conditions and without unusual spillage. Specifically, operation involving the biliary tract, appendix vagina, and oropharynx are included in this category, provided no evidence of infection or major break in technique is encountered.

**Class III**: Open, fresh, traumatic wounds. In addition, operation with major breaks in sterile technique or gross spillage from the gastrointestinal tract and incisions in which acute, non-purulent inflammation is encountered are included in this category.

**Class IV**: Old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscera. This category includes operations where acute bacterial inflammation is encountered or clean tissue must be transgressed for surgical access to a collection of pus.
Wound-classification algorithm

What wound class is it?

**Did you encounter:**
- Purulence/existing clinical infection?
- Perforated viscera?
- Open traumatic wounds > 4 hours?
- Retained devitalized tissue?
- Penetrating injuries > 4 hours?

**Yes** → **Class IV**
**Dirty/infected**

**No**

**Did you encounter:**
- Acute, nonpurulent inflammation?
- Gross (any) spillage from the GI tract (bile)?
- Infarcted or necrotic bowel?
- Other necrotic tissue?
- Major break in sterile technique?

**Yes** → **Class III**
**Contaminated**

**No**

**Did you encounter:**
- The respiratory, GI, or genitourinary tracts?

**Yes** → **Class II**
**Clean/contaminated**

**No**

**Class I**
**Clean**

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**Ref:** Quality-improvement initiative: Classifying and documenting surgical wounds: Jennifer Zinn, Vangela Swofford. Wound care advisor 32-38, 2014 vol 3

12.5.2.2 Antibiotic uses

1. To be given at the time of incision while complying to the surgical safety checklist.
2. The antibiotic should be administered by the anaesthetist and documented into the anaesthesia notes.
3. For details of antibiotic prophylaxis – General principles See section 14.15

12.5.2.3 Key Priorities – Before Surgery

1. Preoperative showering
   a. Advise patients to shower or have a bath (or help patients to shower, bath or bed bath) using soap, either the day before, or on the day of, surgery.
2. Hair removal
   a. Do not use hair removal routinely to reduce the risk of surgical site infection.
b. If hair has to be removed, use electric clippers with a single-use head on the day of surgery. Do not use razors for hair removal, because they increase the risk of surgical site infection.

3. Patient theatre wear
   a. Give patients specific theatre wear that is appropriate for the procedure and clinical setting, and that provides easy access to the operative site and areas for placing devices, such as intravenous cannulae. Consider also the patient’s comfort and dignity.

4. Staff theatre wear
   a. All staff should wear specific non-sterile theatre wear in all areas where operations are undertaken.

5. Staff leaving the operating area
   a. Staff wearing non-sterile theatre wear should keep their movements in and out of the operating area to a minimum.

6. Nasal decontamination
   a. Do not use nasal decontamination with topical antimicrobial agents aimed at eliminating *Staphylococcus aureus* routinely to reduce the risk of surgical site infection.

7. Mechanical bowel preparation
   a. Do not use mechanical bowel preparation routinely to reduce the risk of surgical site infection.

8. Hand jewelry, artificial nails and nail polish
   a. The operating team should remove hand jewelry before operations.
   b. The operating team should remove artificial nails and nail polish before operations.

12.5.2.5 Categories of Surgeries

**Clean Surgeries:**
   a) Uninfected, no inflammation
   b) Respiratory, Gastrointestinal and Genitourinary tracts not entered
   c) Closed primarily

*Examples:* Exploratory laparotomy, mastectomy, neck dissection, thyroid, vascular, hernia, splenectomy

**Clean-contaminated Surgeries:**
   a) Respiratory, Gastrointestinal and Genitourinary tracts entered, controlled, no spillage
   b) No unusual contamination

*Examples:* Cholecystectomy, small bowel resection - anastomosis, Whipple’s procedure, liver transplantation, gastric surgery, bronchoscopy, colon surgery

**Contaminated Surgeries:**
   a) Open, fresh, accidental wounds
   b) Major break in sterile technique
   c) Gross Spillage from GI tract
   d) Acute non-purulent inflammation

*Examples:* Inflamed appendectomy, bile spillage in cholecystectomy, diverticulitis, Rectal surgery, penetrating wounds

**Dirty Surgeries:**
a) Old traumatic wounds, devitalized tissue  
b) Existing infection or perforation  
c) Organisms present BEFORE procedure

*Examples: Abscess I&D, perforated bowel, peritonitis, wound debridement, positive cultures pre-operatively.*

### 12.812.5.2.6 Classification of major surgical procedures

<table>
<thead>
<tr>
<th>Type of Surgery</th>
<th>Examples of surgery</th>
</tr>
</thead>
</table>
| **Clean**       | Mastectomy  
Diagnostic laparoscopy  
Exploratory laparoscopy  
Thyroidectomy  
Parathyroidectomy  
Total hip replacement  
Total knee replacement  
Inguinal, femoral or incisional hernia repair  
Splenectomy  
Transverse rectus abdominis myocutaneous breast reconstruction  
Ventriculoperitoneal shunting  
Lumpectomy  
Axillary node dissection  
Carpal tunnel repair  
Open herniotomy  
Lipoma excision  
Lap. Orchidopexy  
Lap. Pyloromyotomy  
Lap. Herniotomy  
Subcutaneous cyst excision  
Orchidopexy  
Prepubial dilatation  
Penoscrotal transposition correction  
Thoracotomy  
Pyloromyotomy  
Umbilical hernia umbilical polypl mini lap  
CDH repair  
Umbilical polypl excision |
| **Clean contaminated** | Cholecystectomy with chronic inflammation  
Colectomy  
Colostomy reversal  
Bowel resection for ischemic bowel  
Laryngectomy  
Appendectomy with chronic inflammation  
Small bowel resection  
Vaginal hysterectomy  
Dental extractions  
Alveoloplasty  
Total abdominal hysterectomy  
LSCS  
Whipple pancreaticoduodenectomy  
Roux-en-Y gastric bypass  
Duhamel's pull through  
Fistula closure (U.C. fistula)  
Fundoplication (hiatus hernia)  
Genitoscopy  
Kasai's procedure  
Lap. Appendicetomy  
Lap. Cholecystectomy  
Lap. Nephrectomy  
Meatotomy  
Nephrectomy  
Oesophageal atresia repair  
Open appendicetomy  
Palate repair |
<table>
<thead>
<tr>
<th>Contaminated</th>
<th>Dirty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholecystectomy with acute inflammation</td>
<td>Incision or drainage of perirectal abscess</td>
</tr>
<tr>
<td>Appendectomy with acute inflammation</td>
<td>Perforated bowel repair</td>
</tr>
<tr>
<td>Bile spillage during cholecystectomy</td>
<td>Peritonitis</td>
</tr>
<tr>
<td>Bowel resection for infarcted or necrotic bowel</td>
<td>Appendectomy with perforation and/or pus</td>
</tr>
<tr>
<td>Limb amputation with dry gangrene</td>
<td>Perforated gastric ulcer</td>
</tr>
<tr>
<td></td>
<td>Open fracture with prolonged time in the field before treatment</td>
</tr>
<tr>
<td></td>
<td>Dental extraction with abscess</td>
</tr>
<tr>
<td></td>
<td>Limb amputation with wet gangrene</td>
</tr>
<tr>
<td></td>
<td>Ruptured appendectomy</td>
</tr>
<tr>
<td></td>
<td>Decortication</td>
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</tbody>
</table>

12.9
12.5.3 Collection of wound swabs (Levine’s Technique)

12.5.3.1 Indications for swabbing wound

Clinical infection may be indicated when the following symptoms are observed:
1. Swelling
2. Redness
3. Heat
4. Purulent discharge, or increase in level of exudate
5. Wound deterioration, or bridging
6. Change in appearance of tissue, e.g. normal granulation becomes dark and bleeds easily.
7. Systemic temperature

There is considerable evidence suggesting that, in the absence of clinical signs of infection, wound swabs will not provide any information useful for routine treatment, routine swabbing therefore is not justified.

12.5.3.2 Procedure of wound swab collection

i. Perform hand hygiene
ii. Wear gloves.
iii. Before collecting a swab remove all excessive debris and dressing product residue without unduly disturbing the wound with a gentle stream of sterile normal saline. (Stotts 2007)
iv. Remove excess saline with a sterile gauze.
v. Wait for 1-2 minutes to allow the organisms to rise to the surface of the wound.
vi. Depending on type of wound:
   a. **Exudating wound** - do not pre-moisten the swab.
   b. **Non-exudating wound** - pre-moisten the swab with sterile normal saline.
   c. *If fresh/active pus is coming out, this has to be collected on the swab.*
   d. **Levine technique** - It is the preferred technique for collecting the swab. A swab is rotated over a 1cm² area of the wound for 5 seconds (from center to outside of wound) with sufficient pressure to express fluid from within the wound tissue.

i. Collect two swabs: one for Gram staining and the other for culture and sensitivity.
ii. Correctly label the specimen(s).
iii. Ensure the following information is on the request form:
   - Area the swab was collected from.
   - Patient condition or diagnosis
   - If the patient is receiving antibiotics.

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13. INJECTION SAFETY & SAFE DRUG ADMINISTRATION (INCLUDING BLOOD AND BLOOD COMPONENTS)

WHO defines a safe injection as “A safe injection does no harm to recipient, does not expose the health care worker to any risk, and does not result in waste that is dangerous for the community.”

To achieve this, the injection need to be administered using a sterile gloves and needle and employing the correct techniques.

Anatomy and physiology of skin/vein/artery

The skin has three layers:

- **Epidermis** - The Epidermis is the superficial layer of the skin which consists of various openings for sweat glands and sebaceous glands. Sebaceous glands secrete “sebum” - an oily substance which keeps the skin soft. Epidermis also has hair and contains melanocytes which gives the skin its color.

- **Dermis** - Dermis lies below the epidermis, is thicker than epidermis and contains sweat glands, sebaceous glands and hair follicle. Dermis also has some blood vessels in it.

- **Subcutaneous tissue** - Subcutaneous tissue is the layer which lies beneath the dermis, contains fat tissue and areolar tissues and is the layer for subcutaneous injections.

Vein have three layers:

- **Tunica Adventitia** is the outer layer of the vein consists of connective tissue. This provides support & protection to the vein. Blood vessels to the vein are also present in this layer. A hematoma may be formed, if one of the vessels is penetrated.

- **Tunica media** is the middle layer of the vein consists of muscle & elastic tissue. Nerve fibers are present in this area and stimulation of this layer by cold infusions and irritating medications can cause Vasospasm. Patients may feel pain during venepuncture, when the needle penetrates this layer.

- **Tunica Intima** is the inner layer of the vein, consists of smooth, elastic endothelial lining. Damage to this lining or presence of foreign material induces an inflammatory response resulting complications - Phlebitis, Thrombus formation.

Veins are marked by structures within the lumen, formed by endothelial lining of the Tunica Intima, called valves. They are present as bumps along the course of the vein & also at bifurcations. They are predominantly found in large veins of the extremities.

The common veins used for cannulation include –

- Basilic veins
- Cephalic veins
- Metacarpal veins
- Median Cubital veins
- Veins in the foot
- Veins in the scalp
- Jugular, Subclavian and Femoral veins
The arteries on the other hand do not have valves. Pressure within the artery keeps blood moving in appropriate direction. Arterial flow is downward - with gravity and are located much deeper than veins & surrounded by nerve endings.

13.1 Risk Factors
The risk associated with unsafe injections is transmission of blood borne pathogens such as HBV, HCV and HIV. In addition, unsafe injection can cause local abscesses and can also lead to septicemia.

13.2 Safe Injection Practices
1. To make sure that entire process of administering an injection is safe, the equipment used, techniques applied and process involved should be in a most safe and hygienic member.
2. Hand Hygiene is one of the most important standard precautions for preventing the spread of diseases/infection. Hand must be decontaminated before and after every episode of care that involve direct contact with patients.
3. Medicines
   It is the nurse’s responsibility safely to prepare and give the drugs ordered by the doctor. If not given properly, medicines can be harmful or even fatal. Before giving any medication the nurse needs to know:
   i. The doses of the drug which are safe to administer
   ii. The dose of the drug which has been prescribed for the patient
   iii. The method of administration (route and rate of administration)
   iv. The drug's actions and expected effects
   v. Possible side effects (unintended effects).
   It is also important to know if a patient is allergic to a drug. Ask your patients about any bad reactions they have had to drugs in the past or any medicines forbidden for them. For safe administration of drugs: give the right dose of the right drug to the right patient in the right route at the right rate at the right time.
4. When giving medications, the nurse needs to be aware of possible interactions between the patient’s different drugs. Drug interactions can sometimes harm the patient.

Seven rights of drug administration are
1. Right Patient
2. Right Drug
3. Right Dose
4. Right time
5. Right route and rate of administration
6. Right documentation
7. Right disposal

It is the nurse’s responsibility to protect the patient from harm and give right drug and right dose. If in doubt check with the nurse or the doctor in-charge.

13.2.1 Right dose
The nurse needs to know the doses of the drug which are safe to administer. Sometimes the pharmacy gives out drugs in grams when the order specifies milligrams, or the other way around. You need to convert these. Remember that:
1000 mg (milligrams) = 1 g (gram)  
1000 g = 1 kg (kilogram)  
1000 ml (millilitre) = 1 l (litre)

**Liquid medicines**

Sometimes liquid medicines are given in a vial or an ampoule. A vial is a glass or plastic bottle that may hold one or more doses of a drug. An ampoule is a small sterile plastic or glass container that holds one dose of a drug. Usually it has a small neck with a coloured mark to show where the neck can easily be snapped off and the drug drawn out. Sometimes the vial may contain more than the dose you need to give. You need then to work out how much of the solution to give in order to have the correct dose. You can calculate using this formula:

\[
\text{Dose you want give (mg)} \div \text{Dose on hand (mg)} \times \text{volume on hand} = \text{amount (volume in ml) needed}
\]

(Dose in hand implies mg strength of the liquid medicine available)

Thus, if you need to give a dose of 500 mg of Ampicillin and it is in a solution containing 250 mg in 5 ml, you would work out this formula:

\[
\frac{500}{250} \times 5 \text{ ml} = 10 \text{ ml}
\]

The correct dose would be 10 ml.

**Pills or capsules**

If the drug is in pills or capsules, look at the container to see how much of the drug is in each pill. If the drug is not separately packaged in the amount you need, calculate the amount to use. The correct number of pills is the desired dose divided by the amount of drug in each pill. If you need to give 100 mg of the drug, and each pill in the bottle has 50 mg, then you need to give the patient two pills. Sometimes you have to calculate a fractional or smaller dose, particularly when giving a drug to a child. Adult dosages of most drugs are standard, but children’s doses are not standard. A child’s dose is normally based on his or her body weight in kilograms.

### 13.2.2 Right Route

There are several routes for administration of drugs:
- **By mouth** (orally), in pills, capsules or liquids
- **By injection** (parenterally), into the body tissues by a needle and syringe
- **On a certain area** (topically), applied to the skin or mucous membranes
- **In the eye or ear**
- **Into the rectum** (rectally), in suppositories or by inserting some fluid.

**Always make sure that you are using the right route.**

### 13.2.3 Right Drug

To make sure that you give the right patient the right drug, check what you are doing at every step.

**Guidelines for administering medication:**

1. Check the patient’s medication card or record against the doctor’s order. Make sure that what is on the card is what the doctor ordered.
2. Compare the label on the medicine bottle or package wrap with the patient’s medication card or record. Make sure that you have the right medicine.

3. After you have prepared the medication, recheck the label before taking the medicine to the patient’s room.

13.2.4 Right Patient
Make sure you give the right medication to the right patient. Many patients have similar last names. Therefore you must:

1. Check the medication card/record against the patient's name on the bed or other patient identification
2. Ask the patient to tell you his or her name.

13.2.5 Right Time
Many drugs are ordered for certain times of the day. Insulin, for example, is normally given before meals. Antibiotics are usually ordered every 6, 8 or 12 hours, throughout the day and night (around the clock), not just during waking hours. They must be given around the clock to maintain high enough levels of the drug in the patient’s body. Diuretics are usually given in the morning rather than the evening, so that the patient's sleep is not disturbed by frequent urination. Know the medication schedule of your hospital or institution uses and give drugs at the scheduled times.

13.3 Oral Medications
The easiest, safest and most convenient way to give medication is through the mouth. If you know that it is difficult for the patient to swallow, you can crush tablets into a powder. Then mix the powder with some soft food that the patient can swallow. Not all drugs can be crushed. For example, drugs with a protective coating (enteric coated) or those in a slow or modified release form should not be crushed. Wash your hands. Calculate the amount you need. Take the liquid or solid medicine to the patient’s room on a cart or tray, and make sure that you have the right patient. If you are giving any medicines that require you to assess the patient, do that first. If the vital signs indicate problems, check with the doctor or the nurse in charge before giving the drug.

Drugs that require you to check vital signs more frequently include:

<table>
<thead>
<tr>
<th>All high risk drugs (check the list available in your patient care unit). Examples:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digoxin--check pulse</td>
</tr>
<tr>
<td>Hypotensive drugs (drugs that reduce blood pressure)--check blood pressure</td>
</tr>
<tr>
<td>Narcotics--check breathing.</td>
</tr>
</tbody>
</table>

Fig 13.1: Images showing (a) sublingual, (b) transmucosal (buccal) routes of drug administration
If this is the first time the patient is getting a medication, explain what the drug is for. If it has side effects, tell the patient what to expect. Help the patient to sit up or lie on one side. This makes it easier to swallow the medicine.

If the patient says that this medicine is not the same as he or she was given before, check the order again to make sure that it is correct. Give liquid medicine in a cup to the patient to swallow. Give a glass of water to the patient with the pills. This will help the patient to swallow. If he or she cannot hold the cup, you should hold it, and give one pill at a time, followed by a sip of water. Always go back and check the patient for any adverse reactions or side effects from the medication. Note down the medication taken by the patient as well as those refused or withheld. Give the name of the drug, dose, method of administration, time of administration and any important patient information such as the pulse rate.

13.3.1 Oral medication for children
i. Check before administration if the medicine comes in suspension form, shake well before using.
ii. Check the strength of the formulation.
iii. Check that the dose calculation of mg/kg x weight of child matches the volume to be administered (compare to written information provided).
iv. Check the measuring device to ensure the units match the volume to be administered. Always use a proper measuring device for administering liquid preparations usually supplied with the medicine. Do NOT use household spoon for giving medication. They are not all the same size. A teaspoon could be as small as a half teaspoon or as large as 2 teaspoons and also spill easily.
v. Many medications are given to children in a dropper, a syringe or measuring cup. It is important to measure small amounts of medicine accurately. For volumes less than 1 ml, use a tuberculin syringe, if one is available, or other syringe, with no needle attached. You can put the medication directly into the child's mouth from the syringe, or pour it from a small cup.
vii. Young children and some older children have trouble swallowing pills. If a liquid preparation is not available, crush the tablets and mix them with soft food after checking in the product label/package insert. Also check manufacturer’s instructions before crushing tablets.

13.3.2 Other Liquid Medication Safety Tips
i. Never allow children/adults to drink directly from bottle.
ii. After administering the medicine, always wash the dosing device and dry well otherwise bacteria can grow and cause contamination with any future use and liquid residue on the device can interfere with dosing accuracy.
iii. If a cup or dosing syringe is overfilled while measuring, discard the excess medicine down the sink. Don’t try to pour any excess or unused medicine back into the container. Doing so will contaminate the medicine that is left in the container.
iv. To ensure accurate dosing, don’t combine more than one liquid medicine in a dosing device at the same time. The medicines may not be compatible.
v. Do not combine any medicine with foods or drinks unless specified in the product labelling.
vi. Monitor for adverse effects following administration of a medicine.
The safest and cheapest way to give medicine is by mouth.
Stay with the patient until he or she has swallowed all the medicines.
Give medication to children while they are sitting up, so that they do not choke on it.

13.3.3 Medication Administration through Enteral Feeding Tubes
While many medications may be given through a feeding tube, some drug formulations should not be altered for enteral administration e.g., Enteric-coated products should not be crushed. The enteric coating allows for medication to be released in the small intestine rather than the stomach. As a result, less GI irritation occurs, and the medication is protected from destruction by gastric acid. Adverse effects may occur or the drug's effectiveness may be reduced if it is crushed.

Buccal or sublingual preparations should also not be altered. These medications are not designed for absorption in the GI tract, and crushing them for administration via the enteral tube may result in reduced drug absorption and lack of efficacy. Also, excipients in some oral solutions and suspensions, such as sweeteners, gums, stabilizers, and suspension agents, can increase viscosity and osmolality, causing diarrhoea, clogged tubes, and/or undelivered medication left in the tube. Also crushing extended-release tablets is not recommended because crushing of extended release dosage forms.
Use another dosage form if the medication cannot be crushed.
Check before addition of medication directly to the enteral formula for physical incompatibilities, decreased drug absorption, increased risk of tube occlusions, and potential microbial contamination.

13.4 Injecting Medication
Medicine may be injected (given parenterally) into the skin, under the skin, into a muscle, or into a vein. Drugs given in any of these ways are absorbed more quickly than drugs taken by mouth. Therefore it is especially important to be sure that you give the right drug to the right person in the right amount. To give medicines parenterally, the nurse uses a vial or ampoule, a syringe and a needle.

Fig 13.2. Diagramatic representation of various types of intravenous, intramuscular and subcutaneous injection

The following recommendations apply to the use of needles, cannulas that replace needles, and, where applicable intravenous delivery systems:
i. Follow hand hygiene before preparing injections and wear gloves.

ii. Use aseptic technique to avoid contamination of sterile injection equipment.

iii. Use sterile hypodermic syringes for single use with a sharps injury protection feature (SIP devices) or auto disable or syringes with a reuse prevention feature (RUP devices).

iv. Ensure one needle, one syringe and one patients.

v. Do not administer medications from a syringe to multiple patients, even if the needle or cannula on the syringe is changed. Needles, cannulae and syringes are sterile, single-use items; they should not be reused for another patient nor to access a medication or solution that might be used for a subsequent patient.

vi. Do not enter a vial with a used syringe or needle HCV, HBV, and HIV can be spread from patient to patient when these simple precautions are not followed. Use fluid infusion and administration sets (i.e., intravenous bags, tubing and connectors) for one patient only and dispose appropriately after use. Consider a syringe or needle/cannula contaminated once it has been used to enter or connect to a patient’s intravenous infusion bag or administration set. **Once IV solution bags have been spiked; administration must begin within 1 hour.**

vii. Use single-dose vials for parenteral medications, whenever, possible.

viii. Do not administer medications from single-dose vials or ampoules to multiple patients or combine leftover contents for later use.

ix. Assign medications packaged as multi-use vials to a single patient whenever possible. If multidose vials must be used, both the needle or cannula and syringe used to access the multidose vial must be sterile. Do not leave needle in the septum. Mention date of opening of the multidose vial or mention use before date to demarcate the shelf life of the opened vial.

x. Do not keep multidose vials in the immediate patient treatment area. Store in accordance with the manufacturer's recommendations; discard if sterility is compromised or questionable.

xi. Do not use bags or bottles of intravenous solution as a common source of supply for multiple patients.

xii. Absolute adherence to proper infection control practices be maintained during the preparation and administration of injected medications.

xiii. Vials are discarded if sterility compromised, expired, not stored properly, is more than 28 days (unless specified by the manufacturer) or sooner after opening.

xiv. Discard, if not dated.

xv. Do not prepare medication in one syringe to transfer to another syringe.

xvi. Assess the patient to decide on the right size of the needle. Use of **correct needle is the key to delivering to correct area with max effect with least discomfort**

- Discard used syringes, needles and cannulas at the point of use in an approved sharps container immediately after use.
- Never leave a needle in the septum of a vial.

### 13.5 Giving Injections

i. Hand washing before and after injections.

ii. Use soap and water instead of an alcohol-based hand rub Wear gloves.
iii. The cleaning of injection site should be circular – from inwards to outwards. Wipe from the center of the injection site without going over the same area again.
iv. Apply single use alcohol solution swab and let it dry for 30 sec completely before administering injection. Avoid alcohol for vaccination
v. Avoid pre-soaked swabs in a container
vi. Take all precautions to avoid needle stick injury. Do not attempt to recap or bend needles. Where recapping of a needle is unavoidable, DO use the one-hand scoop technique.
vii. After giving injection, if using reuse Prevention syringe, break the plunger of syringe and needle through hub cutter. Discard syringe and needle as a single unit in a puncture resistant sharps container immediately after use and discard appropriately.
viii. If using multidose vial, do not keep the needle inserted in the rubber septum/stopper.

13.6 Safe Blood glucose monitoring practices
i. Always perform hand hygiene and use new gloves before conducting BGM and between each person tested.
ii. Restrict use of lancet/penlet devices to prick the skin to individuals only.
iii. NEVER share fingerprick devices/pens/cartridges between persons; they are for single-patient use only.
iv. Assign individual blood glucose monitors. If sharing, clean and disinfect the monitor after every use according to the manufacturer’s instructions. If the manufacturer does not specify, then do not share.
v. Dispose of used lancets in an approved sharps container and empty container appropriately.

13.7 Safe injection practices: do’s and don’ts

<table>
<thead>
<tr>
<th><strong>DOs</strong></th>
<th><strong>DON’TS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Maintain hand hygiene (use soap and water or alcohol rub)</td>
<td>• Don’t Forget to clean your hands</td>
</tr>
<tr>
<td>• Use fresh alcohol swab to clean the site for injections and plain sterile swab for vaccinations</td>
<td>• Don’t Pre Soak cotton wool in a container</td>
</tr>
<tr>
<td>• Use a single-use device for blood sampling and drawing</td>
<td>• Don’t Re use a syringe, needle or lancet for more than one patient</td>
</tr>
<tr>
<td>• After giving injection, if using ReUse Prevention syringe, break the plunger of syringe and needle through hub cutter</td>
<td>• Don’t Re use a syringe, needle or lancet for more than one patient</td>
</tr>
<tr>
<td>• Where recapping of a needle is unavoidable, DO use the one-hand scoop technique</td>
<td>• Don’t Use a single loaded syringe to administer medication to several patients</td>
</tr>
<tr>
<td>• Seal the sharps container with tamper-proof lid</td>
<td>• Don’t Touch the puncture site after disinfecting it.</td>
</tr>
<tr>
<td>• Ensure One needle, One syringe and One patient</td>
<td>• Don’t Change the needle in order to reuse the syringe</td>
</tr>
<tr>
<td>• Take post exposure prophylaxis in case of Needle Stick Injuries and Blood &amp; Body Fluid splash.</td>
<td>• Don’t use the same mixing syringe to reconstitute several vials</td>
</tr>
<tr>
<td></td>
<td>• Don’t Leave an unprotected needle lying outside anywhere</td>
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<tr>
<td></td>
<td>• Don’t Recap a needle using both hands</td>
</tr>
<tr>
<td></td>
<td>• Don’t Overfill or decant a sharps container</td>
</tr>
<tr>
<td></td>
<td>• Don’t Delay PEP beyond 72 hours, delayed PEP is NOT effective</td>
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</table>
13.8. Multidose Vial Policy
To establish a uniform policy on shelf life and handling of all multidose vials, bottles, droppers, unit dose ampoules/syringes, and single dose medications in use in the THE HOSPITAL.

13.8.1 Multidose vials
Multiple dose/multi-dose medication vials must be handled in accordance with the manufacturer's instructions to include:

i. Place the expiration date on the opened vial. The expiration date is 28 days after the vial is opened or the manufacturer's recommended expiration date (whichever comes first) and discard at time of expiration.

ii. Refrigerate multi-dose vials after they are opened if recommended by the manufacturer.

iii. Cleanse the access diaphragm of multi-dose vials with 70% alcohol (such as alcohol swabs) before inserting a device into the vial.

iv. Use a sterile device to access a multi-dose vial and avoid touch contamination of the device before penetrating the access diaphragm.

v. Discard the multi-dose vial if user suspects vial sterility has been compromised.

vi. Vials of saline or water may be used as multi-dose only if they contain a preservative.

vii. Visual inspection of the vial should be accomplished each time medication is withdrawn to determine that the stopper is intact and that no unusual particulate matter is in the vial.

viii. Check the vial for:
   a. Turbidity
   b. Discoloration
   c. Integrity of rubber stopper seal.

ix. Avoid opening more than one multidose vial of the same medication at the same time.

x. Refrigeration of opened multidose vials is product specific (i.e., insulin, heparin, etc., will be refrigerated). Routine refrigeration of opened multidose vials is not recommended.

xi. Read the label.

Components on labels include:
   a) Name of Drug:
   b) Drug dilution/concentration:
   c) Date and Time of Opening:
   d) Date and Time of Expiry (28 days of opening date or expiry by manufacturer whichever is earlier)
   e) Signature of the staff labelling the vial.

13.8.2 Single use vials
i. Single use parenteral drugs do not contain preservatives and should be immediately discarded by the original user after the dose is withdrawn. Those vials containing medications that have limited storage capability should be dated and initialed and disposed of in accordance with the manufacturer's recommended instructions.
ii. Single dose containers are preferred over multidose containers. If this is not possible, the smallest multidose container available should be used. This lessens the risk of contamination/cross contamination.

iii. A sterile needleless device or blunt syringe must be used to withdraw the required amount of medication from single dose vials.

iv. Unit dose glass ampoules/syringes are specifically designed for single dose only. Any unused portions of medications must be discarded immediately and not left on the unit for any period of time.

13.8.3 Precautions for maintaining drug integrity

i. All drugs will be clearly labeled. The identification of a drug shall not be assumed if unlabeled. When drugs are unlabeled or labels are defaced, these drugs will not be used.

ii. Instructions on drugs should be read carefully to determine the temperature range at which the drugs are to be kept.

iii. Some medications are clearly labeled: DO NOT REFRIGERATE. Thus the refrigerator should not be used arbitrarily as a storage place for drugs.

iv. All drugs will be checked prior to use and monthly for expiration to ensure that outdated drugs are not used. If drugs have only lot number but no expiration date, the lot number may be checked by pharmacy for expiration date.

v. A multidose vial labeled to expire in a given month will expire on the last day of that month.

vi. Label the opened vial appropriately, including date & time of opening or mention use before date etc.

13.8.4 Multidose Ophthalmic Drops

Multidose Ophthalmic Drops for inpatients may be ordered from unit dose and used only for that patient. Other multidose ophthalmic drops may be used for more than one patient provided the dropper surface is not contaminated by touching any part of the eye, eyeball, face, or eyelid. It must be remembered to do hand hygiene when using same eye drops bottle in multiple patients (e.g. Homatropine drops for pupil dilation). Also care must be taken that no part of vial touches the patient while administering eye drops. If this happens, this vial should not be used in other patients.

13.8.5 Ampoules

All ampoules formulations without preservative should be discarded immediately after use. Broken ampoules with drugs should not be kept for use at later times.

13.8.6 Responsibilities

a. Nursing Staff
   • Must follow the requirements of the policy.
   • It is the responsibility of each person using a multiple-dose vial to determine its safety for future use based on any suspected or known compromise to the solution’s sterility.

b. Unit incharges of all departments
   Must ensure employee compliance with the policy.

c. Surveillance and infection control Division
   • Will bring these policies to the HICC for review and approved
13.8.7 Multi dose Uses and Period of Storage

Multi-dose vials with limited shelf life – storage conditions and maximum permissible period of use.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Item</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Marking the date and time when opening vials.</td>
<td>Mark all injectables, ophthalmic, and reconstituted oral products with the date and time of first use or reconstitution. Discard all open products without a date.</td>
</tr>
<tr>
<td>2.</td>
<td>Ophthalmic products</td>
<td>Use within 28 days if stored properly, not contaminated, and manufacturer does not specify a shorter expiration date.</td>
</tr>
<tr>
<td>3.</td>
<td>Multidose vials with preservatives (not insulin or vaccines)</td>
<td>Use within 28 days if stored properly, not contaminated, and manufacturer does not specify a shorter expiration date. Most manufacturers only have data for 28 days. If the company has data, the vial may be used for a longer period of time. Haloperidol decanoate, if stored properly and not contaminated, may be used for up to 90 days after the first use based on data from the manufacturer.</td>
</tr>
<tr>
<td>4.</td>
<td>Insulin</td>
<td>Use opened vials of insulin within 28 days whether refrigerated or stored at room temperature. Most manufacturers have changed their storage limits for most products to 28 days, including regular insulin. Keep between 2-8°C in refrigerator</td>
</tr>
<tr>
<td>5.</td>
<td>Vaccines</td>
<td>Multidose vaccine vials may be used until the expiration date on the vial if stored properly, not contaminated, and the manufacturer does not specify a shorter expiration date. All manufacturers have data to support this practice. Use preservative-free single-dose vaccine vials immediately.</td>
</tr>
</tbody>
</table>

13.9. Needle selection criteria

<table>
<thead>
<tr>
<th>LOCATION OF INJECTION</th>
<th>MAXIMUM INJECTION VOLUME</th>
<th>NEEDLE LENGTH</th>
<th>NEEDLE GAUGE</th>
<th>NEEDLE ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRAMUSCULAR (IM)*</td>
<td>PEDiatric</td>
<td><strong>25 – 27 G</strong></td>
<td><strong>90°</strong></td>
<td></td>
</tr>
<tr>
<td>Infants &lt; 18 months</td>
<td>Deltoid</td>
<td>Not Recommended</td>
<td>7/8” – 1” (22 – 25 mm)</td>
<td></td>
</tr>
<tr>
<td>Rectus Femoris</td>
<td>0.5 ml</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vastus Lateralis</td>
<td>0.5 ml</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ventrogluteal</td>
<td>Not Recommended</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dorsogluteal</td>
<td>Not Recommended</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deltoid</td>
<td>0.5 ml</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rectus Femoris</td>
<td>1 ml</td>
<td><strong>7/8” – 1 ¼”</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vastus Lateralis</td>
<td>1 ml</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toddlers &lt; 3 years</td>
<td>Ventrogluteal</td>
<td>Not Recommended</td>
<td>(22 – 32 mm)</td>
<td>25 – 27 G</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------</td>
<td>-----------------</td>
<td>--------------</td>
<td>----------</td>
</tr>
<tr>
<td>Dorsogluteal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Preschoolers &lt; 6 years</th>
<th>Deltoid</th>
<th>0.5 ml</th>
<th>7/8” – 1 ¼ ” (22 – 32 mm)</th>
<th>22 – 25 G</th>
<th>90°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectus Femoris</td>
<td>1.5 ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vastus Lateralis</td>
<td>1.5 ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ventrogluteal</td>
<td>1.5 ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dorsogluteal</td>
<td>1.5 ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>School Age &lt; 13 years Old</th>
<th>Deltoid</th>
<th>1 ml</th>
<th>7/8” – 1 ¾ “ (22 – 32 mm)</th>
<th>22 – 25 G</th>
<th>90°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectus Femoris</td>
<td>1.5 ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vastus Lateralis</td>
<td>2 ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ventrogluteal</td>
<td>2 ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dorsogluteal</td>
<td>2 ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adolescence and Adult</th>
<th>Deltoid</th>
<th>2 ml</th>
<th>7/8” – 1 ½ ” (22 – 38 mm)</th>
<th>21 – 24 G</th>
<th>90°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectus Femoris</td>
<td>2 ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vastus Lateralis</td>
<td>5 ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ventrogluteal</td>
<td>5 ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dorsogluteal</td>
<td>5 ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ADULT**

<table>
<thead>
<tr>
<th>Injection Site</th>
<th>Needle Length</th>
<th>Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deltoide</td>
<td>2 ml</td>
<td>7/8” – 1 ½ ” (22 – 38 mm)</td>
</tr>
<tr>
<td>Rectus Femoris</td>
<td>2 ml</td>
<td>7/8” – 1 ¼ ” (22 – 32 mm)</td>
</tr>
<tr>
<td>Vastus Lateralis</td>
<td>5 ml</td>
<td>7/8” – 2” (22 – 51 mm)</td>
</tr>
<tr>
<td>Dorsogluteal</td>
<td>5 ml</td>
<td>7/8” – 3” (22 – 76 mm)</td>
</tr>
</tbody>
</table>

**INTRADERMAL (ID)**

<table>
<thead>
<tr>
<th>Injection Site</th>
<th>Needle Length</th>
<th>Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior aspect of forearm</td>
<td>0.5 ml</td>
<td>3/8” – 3/4” (10 – 19 mm)</td>
</tr>
<tr>
<td>Upper chest</td>
<td>0.5 ml</td>
<td>3/8” – 5/8” (10 – 16 mm)</td>
</tr>
<tr>
<td>Upper back</td>
<td>0.5 ml</td>
<td>3/8” – 5/8” (10 – 16 mm)</td>
</tr>
<tr>
<td>Back of upper arm</td>
<td>0.5 ml</td>
<td>3/8” – 5/8” (10 – 16 mm)</td>
</tr>
</tbody>
</table>

5 Prior to administering an IM injection, refer to your procedure manual to determine the injection site utilizing body landmarks.
6 Needle length dependant on age, physical condition and medication requirements.
13.10 Injections Into The Skin / Intradermal Injection

An intradermal injection is given in the dermal layer of the skin, just below the top layer, which is called the epidermis. Intradermal injections are used for allergy tests, tuberculin tests, and many immunizations. The most common site for this type of injection is the lower arm. Other sites include the upper chest and the back beneath the shoulder blade. BCG vaccination is also given intradermally. The most common sites are the upper arm, forearm and buttocks or upper thigh. To give a BCG injection or other intradermal injection:

i. Do hand hygiene before you begin.

ii. Check the name of the patient.

iii. Tell the patient that the injection will cause a small lump, like a mosquito bite or small blister, but it will disappear quickly. Select a site that has no discoloration or rash or broken skin.

iv. Clean the site with alcohol using a circular motion.

v. Pull the patient’s skin flat. Hold the syringe at about a 15° angle, and insert the needle through the epidermis into the dermis.

vi. Inject the fluid slowly until a lump appears. This indicates that the fluid is in the dermis.

vii. Take the needle out quickly and lightly wipe the site with an antiseptic swab.

- Do not massage the injection site because that might make the medication go into the tissue or out of the injection site.

13.11 Injections under the Skin/ Subcutaneous Injection

Subcutaneous injections go into the fatty tissue just below the skin. Many drugs are injected subcutaneously, including vaccines, preoperative medications, narcotics insulin and heparin. Common sites for subcutaneous injections are: the backs of the upper arms and the fronts of the thighs, the upper back, and the fat pads on the abdomen.
i. Do hand hygiene.
ii. Before giving the medicine, check the patient’s name and registration number.
iii. Draw the medication into the syringe.
iv. Get rid of any air bubbles in the syringe by tipping the syringe upside down and slowly pushing the plunger until you can see a drop of solution in the needle’s bevel or end.
v. Grasp the patient’s skin with the thumb and forefinger of your left hand (right if you are left-handed) to raise up the subcutaneous tissue and form a fat fold.
vi. With your right hand, put the needle in at a 45° or 90° angle (if you have subcutaneous needle gauze no-26 you can give at 90° angle otherwise with other needle give at 45° angle.) and pull slowly back on the plunger to see whether you have entered a blood vessel.
vii. If no blood comes into the syringe, give the injection by slowly and steadily pushing the plunger.
viii. Quickly take the needle out and press down on the skin.
ix. There is usually no bleeding from subcutaneous injections. However, if there is bleeding, press gently until it stops.

If blood comes into the syringe on pulling the plunger back means that vein has been hit. Then you must withdraw the needle, discard the syringe and prepare a new injection. That is because subcutaneous injections can be dangerous if they go directly into the bloodstream, where they are absorbed more quickly than from the fatty tissue.

13.11.1 Insulin Injection Technique
i. Insulin is given subcutaneously 30-45 min before meals. Use shortest possible needle length to avoid intramuscular injections which can result in hypoglycemia and glucose variability. Using short needles also causes less lipohypertrophy.
ii. Abdominal wall is common injection site. The back of arm, the outer side of the thigh and the upper buttocks are also used for injection.
iii. Rotate within injection site frequently to prevent lipohypertrophy and follow the same general location at the same time each day. There is no need to use spirit swab, if the skin is clean.
iv. Use thin needles i.e. with higher gauge numbers are recommended. Lipohypertrophy is less frequent with 32-gauge needles.
v. Use pen needles and syringes only once.
13.12 Injections into the muscle
Intramuscular injections (that is, injections into the muscle) are absorbed faster than subcutaneous injections. Large injections (up to 1-2 ml for a child and 3 ml for an adult) can be given this way because muscle can absorb more fluid than fatty tissues. The preferred sites for intramuscular injections are the dorsogluteal site in the gluteus medius muscle in the posterior hip or the ventrogluteal site in the gluteus medius muscle in the lateral hip (see below).

13.12.1 Selection of injection site
**Ventralgluteal site:** The ventrogluteal injection site is easy to identify and safe to use. It avoids major nerves and blood vessels.

**Dorsogluteal site:** If dorsogluteal site is selected, be careful to avoid the sciatic nerve, because accidental injection into this nerve can cause permanent or partial paralysis of the leg.

Never use the dorsogluteal site in the posterior hip for infants or children who have not yet begun to walk. Give the injection in the rectus femoris muscle or the vastus lateralis site in the middle third of the thigh.

**Intramuscular injection sites for infants and small children**
**Deltoid muscle:** The muscle of the upper arm, the deltoid muscle, can also be used for an older child or an adult. However, remember that you cannot inject as much fluid into the arm as into the muscles of the hip.

### 13.12.2 Procedure to give injections into the muscle

1. Do hand hygiene.
2. Protect the patient's privacy by putting a sheet over body parts that do not need to be exposed.
3. If you are giving an injection to a child, show the mother how to hold the child.
4. Choose a site for the injection that has no broken skin, swelling, hardness, tenderness, redness or warmth. Locate the exact site and clean it.
5. With an antiseptic swab or cotton ball using a circular motion and extending outward about 5 cm on each side or 10 cm in total.
6. Using your left hand, stretch the skin at the site. This makes it firmer so that it is easier to insert the needle.
7. Insert the needle quickly at a 90° angle through the skin and into the muscle.
8. Aspirate by pulling back on the plunger. If blood appears in the syringe, pull out the needle, throw away the syringe and prepare a new injection.
9. If blood does not appear, then slowly, steadily push the plunger to inject the medication.
10. Quickly remove the needle and apply firm pressure to the site using an antiseptic swab.
11. Wash your hands.

---

**Do not inject more than 1 ml into the arm of an adult or a child.**
Z-Track Method

- Discard needle after medication is drawn up, and use new needle for injection to minimize tissue staining or irritation by preventing back flow to subcutaneous tissue.
- Use this method when administering injection in ventrogluteal or dorsogluteal sites.
- Displace skin to one side (laterally) before inserting needle.
- Cleanse site and inject drug
- Wait 10 seconds, withdraw needle and allow skin to return to normal position

13.13 Steps of the cannula Insertion procedure

a. Preparation of equipment (Tray)
b. Preparation of environment.
c. Preparation of patient.
d. Preparation of equipments for inserting peripheral lines

13.13.1 Materials required

1. Examination Gloves
2. Sterile Drapes
3. Surgical Scissors
4. Cotton Swabs
5. Povidone iodine Betadine Swabs
6. Spirit Swabs
7. 5ml / 10ml Syringe
8. Bivalve
9. Normal saline flush (10ml)
10. I/V Cannula
11. Gauze pieces
12. Dressing
13. Site label (to record time & date of insertion)
14. IV sets (as required)
15. IV bottles (as required)

13.13.2 Procedure of intravenous cannulation

1. Assemble all articles at patient bedside
2. Thorough hand washing (Follow 6 steps)
3. Wear clean gloves
4. Support the chosen limb
5. Apply the tourniquet
6. Assess and select the vein by gently tapping the site.
7. Cleaning the site. Clean the chosen area covering about 2-3 inches in radius, with spirit /100% alcohol, and let it dry. Thereafter chlorhexidine / povidone iodinebetadine solution is used to clean the same area in circular motion and allow to dry. Do not repalpate or touch the site after cleaning.
8. I/V Cannula should be selected according to the purpose, vein size and fluid requirement.

13.13.3 Cannula Insertion
i. Disinfect the injection site as described above.
ii. Remove the catheter from the packaging and lower the wings
iii. Adopt your preferred grip and remove the needle cover.
iv. Insert the catheter at an angle
v. Upon primary flashback (back flow), lower the angle almost parallel to the skin. Withdraw the styllet slightly just sufficient to have bevel inside the catheter. Advance the catheter slightly, 2-3 millimetres, to ensure catheter tip is in vein.
vi. Consider stabilizing the catheter by holding one of the wings.
vii. Ease the needle back 2-3 millimetres.
viii. Check for secondary flashback between the needle & catheter will confirm correct placement of the catheter in the vein.
ix. Advance the catheter completely into the vein.
x. Remove the tourniquet
xi. Stabilize the catheter by holding one wing.
xii. Occlude the vein just above catheter tip & withdraw the needle holding the needle grip or grip plate
xiii. Recording – Upon insertion of the catheter one should always record the date and time of insertion

13.14 Intravenous line management
i. Use aseptic technique at all times
ii. All IV ports should be closed
iii. Verify patency of line by gently flushing with normal saline.
iv. Ensure that lines are labelled (date, time, signature)
v. Remove line on any sign of redness, swelling, pain.
vi. Change IV set after every 72 hrs.
vii. Cannula to be inspected in every shift.
viii. For giving antibiotics or bolus drugs SAS (Saline followed by Antibiotic followed by Saline) must be followed.

13.14.1 Dressings and after care of IV Line
The purpose of a dressing is:
i. to minimize the potential for micro-organisms to breed (change dressing immediate if soiled with blood)
ii. to protect the puncture site
iii. to secure the catheter in place
iv. to prevent catheter movement which could damage the vessel

13.14.2 After care of Catheter
Some of the procedures to be followed are –
1. Documentation
   a. Date and Time, when therapy is initiated
   b. Type and amount of solution
   c. Additives and dosages
   d. Flow rate
   e. Gauge, length and type of venipuncture device or catheter used
   f. Insertion site
2. Site Inspection - Assess site and surrounding area for signs of local complications and other complications like
   a. Infiltration
   b. Extravasations
   c. Phlebitis
   d. Haematoma
   e. Thrombosis
   f. Fragmented or broken cannula
   g. Occluded cannula
   h. Cannula site care and occlusiveness

3. Frequency of inspection
   a. In every shift

4. Termination of infusion therapy
   a. Assessment
   b. Determination
   c. Patient need
   d. Patient response to therapy
   e. Achievement of expected outcome
   f. Patient refuses to continue therapy
   g. Physician’s orders
   h. Order must be clearly written and signed
   i. Verbal orders to be signed within 24h

13.14.3 Complication of IV site and its management
Bacteria, viruses, fungus and parasites may infect and complicate the infusion site. It is essential to understand the complications and treat them as early as possible.

Some preventive measures include Hand Hygiene, Patient Placement, Transport of Infected Patient, Use of Personal Protective Equipment (PPE) - Gowns & other protective apparel, Gloves, Face Protection Masks/respiratory protection and Eye Protection.

Some of the IV related complications include:

1. Thrombophlebitis
   a. Infusion related
   b. Infection related
   c. Mechanical related

2. Other IV complications
   a. Transfixation
   b. Haematoma
   c. Infiltration
   d. Extravasation
   e. Occluded cannula

3. Systemic complications
   a. Septicaemia
   b. Embolism
   c. Speed shock

13.15 Intravenous Therapy (DRIP)
Intravenous therapy is putting a sterile fluid through a needle directly into the patient's vein. Usually the sterile fluid contains electrolytes (sodium, calcium, potassium), nutrients (usually
glucose), vitamins or drugs. Intravenous (IV) therapy is used to give fluids when the patient cannot swallow, is unconscious, is dehydrated or is in shock, to provide salts needed to maintain a balance of electrolytes, or glucose needed for metabolism, or to give medication. Drugs given intravenously enter the bloodstream directly and are absorbed faster than any other kind of medication. Therefore, drugs are given in this way when a rapid effect is needed, or when the drug is too irritating to body tissues to be given any other way. Drugs given in this way are usually put in (infused) slowly to prevent reactions.

**Guidelines for intravenous therapy**

1. Know the fluid or drug that is ordered, its actions and side effects
2. Know the amount of fluid or drug to be given over what period of time
3. Know the amount and type of solution in which drugs can be diluted
4. Know how long a drug can be safely administered
5. Know the compatibilities of all the drugs the patient is receiving
6. Monitor carefully both the patient and the rate of infusion

**13.14.1 How to give intravenous fluids and drugs safely**

You must take special care to avoid errors in calculating doses and in preparing drugs, because intravenous drugs take effect immediately. Double check the five "rights" of drug administration: right dose, right drug, right patient, right route, right time. You must also know the desired action and potential side effects of all the intravenous drugs you give.

- Most drugs require a minimum dilution and/or rate of flow.
- Many drugs are very irritating or damaging to tissues outside the veins.
- Only one antibiotic is given at a time intravenously. The IV line is washed out (flushed) between antibiotics.
- Never give medications, sterile water, or dextrose water with blood or blood products.
- You must carefully monitor all patients on IV therapy. Watch the patient for any signs of an adverse reaction, including a rash, trouble with breathing, increased pulse rate, vomiting, and signs of dehydration or fluid overload (for these last two signs see the chapter on caring for the patient who has problems with elimination).
- Check the insertion site for swelling, redness, hardness, pain or warmth.
- Check the IV flow rate to make sure it is correct. The flow rate must be monitored extremely carefully and frequently in infants, children, the elderly, acutely ill patients and patients with dehydration, heart or kidney disease or diabetes.

<table>
<thead>
<tr>
<th>How to determine how fast the IV fluid should be going in:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of Fluid to be given in ml X drops per 1 ml</td>
</tr>
<tr>
<td>Total time in minutes</td>
</tr>
<tr>
<td>Microdrip tubing delivers 60 drops per 1 ml and IV set deliver 15 drops per 1 ml</td>
</tr>
</tbody>
</table>

**13.14.2 Starting intravenous therapy**
The site for venepuncture (inserting the needle into the vein) is usually one of the veins of the forearm or hand. Patients requiring faster running infusions or blood transfusions require larger needles and therefore larger veins.

Starting IV therapy requires sterile technique. Pick a vein that is easy to feel and that is fairly straight. The vein should be full, soft, and easy to feel. It should not feel hard or rubbery. Avoid veins that are inflamed (red and warm), irritated or painful. Try not to use a vein that has been used before, because it may be damaged.

13.14.3 How to add medication to an IV line
The term “IV infusion” implies that a medication or fluid will be given in a slower pace, or for a large or indeterminate period of time. Intravenous medication can be given slowly from a bottle or bag containing a solution. This is called a continuous infusion and is similar to other intravenous therapy. Alternatively, the drug can be given all at once, and this is called an intravenous push or bolus. For a continuous infusion, the drug can be added to a new fluid container before it is hung or added to a container that is already running.

1. Carefully check the medication order against the patient’s medication card or record, just as you would for other routes of administration. Also make sure that the medication is compatible with the solution it is to be mixed with.
2. Put the patient’s name on the container with the name and amount of the drug, the flow rate, the time infusion begins, and your name or initials.
3. Always check the patient to be sure that there is no adverse reaction to the drug being infused. Look for a change in pulse rate, chills, nausea, vomiting, headache or trouble with breathing. If the patient has a reaction, stop or slow the infusion rate and tell the doctor or the nurse in charge immediately.
4. Record the name and amount of the drug, the solution to which it was added, and the time it was given.

13.14.4 Intravenous bolus
i. The term “intravenous bolus” is usually used to specify either 1) set volume or 2) a faster speed, or 3) both. However, sometimes “IV Push” is also used. Generally the term is used if the medication is less than 20ml
ii. A relatively large dose of medicine is administered into a vein in a short period usually within 1-30 minutes. E.g., “bolus” of a 1 or 2 liters (set volume) of IV fluids to be given rapidly (speed) to increase the patient’s blood pressure.
iii. The IV bolus is commonly used when rapid rate of administration is needed such as in emergency e.g., in patient presenting with shock; when drugs cannot be diluted or the therapeutic purpose is to achieve a peak drug level in the blood. E.g., during code blues most of the IV medications are given as boluses, contrast media.
iv. Check before administering drugs by IV bolus since some drugs should NEVER be given as IV bolus e.g., Potassium chloride where rapid administration may be life threatening.

v. IV bolus is usually not administered in patients with decreased cardiac output, decreased urinary output, pulmonary congestion and systemic oedema.

vi. Carefully monitor rate of administration per minutes while administering drugs by IV bolus using wrist watch. Before administering the check the appropriate amount of diluent required and its compatibility with the primary IV solution.

13.14.5 IV push
For an intravenous push, you give the medication all at once, injecting the drug into an existing continuous infusion IV line.

- After inserting the needle, draw back the plunger to withdraw blood (to be sure the needle is in a vein).
- Inject the drug at the rate ordered. Be careful not to inject the drug too fast.

13.15 Blood Transfusion
Timely access to safe and quality blood and blood components is an important component of patient management. Rational use involves using the right product, in the right dose and on the right time to reduce unnecessary and unsafe transfusions and to improve patient outcomes and safety along with minimizing the risk of adverse events including transfusion reactions and transmission of infections.

Before giving a blood transfusion, send a sample of the patient's blood to the laboratory for typing and cross matching, unless you already have clear information about this on the chart.

i. When the blood arrives, doubly verify and make sure the patient's name, blood type and Rh factor are the same as those on the blood to be transfused. Do not give the blood if the information is not exactly the same.

ii. To prevent bacterial growth, transfuse the blood within 30 minutes of its arrival on the ward.

iii. Check the patient's vital signs before beginning.

iv. Make sure the drip chamber has a filter to trap clots or debris.

v. Stay with the patient for at least 15 minutes and observe him or her carefully for signs of acute reaction. These signs include chills, nausea and vomiting, headache, muscle aches, difficulty with breathing, wheezing, fever, sweating, chest pain, tingling, numbness, and rapid pulse. The sooner a reaction occurs, the more severe it is likely to be. Transfusion reaction can occur in spite of all relevant laboratory tests. The severity of the reaction varies from being relatively mild to more severe, and at times can be fatal. Delayed reaction may present 5-10 days post-transfusion with fever, anaemia, jaundice, increased bleeding tendency, thrombocytopenia. Graft-vs-host disease and transfusion transmitted diseases can present late.

vi. If there are any signs of reaction, stop the transfusion and notify the doctor immediately.

vii. If the patient shows no signs of reaction, continue the infusion. Check the vital signs 15 minutes after beginning the infusion. Then check again every 30 minutes until 1 hour after the transfusion is complete. Tell the patient to call a nurse immediately if he or she notices anything unusual.

viii. Record the time, the type of blood, the amount, and drip rate.
ix. Fill transfusion reaction form and send it back to blood storage centre along with used blood bag and drip set in red bag. (Send form even if there is no reaction – Nil reporting is as important as transfusion reaction).

x. Dispose off blood transfusion set with tubing in yellow bag.

13.15.1 Transfusion reaction management

i. **In case of transfusion reaction stop transfusion immediately**

ii. Maintain venous access using normal saline. Any other solution is incompatible with blood products.

iii. Inform doctor on duty and seek help immediately from skilled anaesthetist or emergency team, if required. For reactions like itching, urticaria, rashes administer medications as per hospital protocol.

iv. Inform Blood Bank. Send the following to the blood bank: the implicated unit along with transfusion set, blood samples (post-transfusion sample in 2 ml EDTA vial and 5 ml PLAIN vial), along with completed Adverse Transfusion Reaction Report Form.

v. Send first void urine sample.

vi. Repeat all clerical and identity checks.

vii. Request for another unit after sending fresh sample from the patient to the blood bank.

viii. Documentation: Complete documentation of transfusion in the case file is essential and should include recipient consent for transfusion, name and type of blood/components, unit number, the blood transfusion compatibility report, date and time of transfusion, pre- and post-transfusion vital signs, volume transfused, any adverse event, identification of bedside transfusion staff. The records should be kept in the record for future reference.

13.15.2 Indications for use of blood and blood components and their storage requirements are given in table ....
### Indications for blood and blood components, storage requirements and shelf life of blood/components

<table>
<thead>
<tr>
<th>Blood/blood components</th>
<th>Indication</th>
<th>Volume/unit</th>
<th>Hb/haematocrit/platelet count/rise</th>
<th>Storage temperature</th>
<th>Average shelf life</th>
<th>Administration time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole blood*</td>
<td>Acute blood loss (&gt;30% of total blood volume); Exchange transfusion (reconstituted whole blood preferred) if PRBC not available.</td>
<td>350-450 ml</td>
<td>Hb rise 1 g/dl Haematocrit rise 3%; the increase may not be apparent until when patient blood volume adjusts to normal</td>
<td>2-6°C</td>
<td>35 days</td>
<td>Administer within 30 minutes of issue and complete within 4 hours</td>
</tr>
<tr>
<td>Packed red blood cells (PRBC)</td>
<td>Chronic anaemia &lt;6 g/dl; Preoperative Hb &lt;7 g/dl; in patients with cardiac disease the Hb trigger is around 10 g/dl</td>
<td>250-300 ml</td>
<td>as above</td>
<td>2-6°C</td>
<td>35 days</td>
<td>Administer within 30 minutes of issue and complete within 4 hours</td>
</tr>
<tr>
<td>Random donor platelets (RDP)**</td>
<td>Thrombocytopenia</td>
<td>50-60 ml</td>
<td>Platelet count rise 5,000-10,000 / microlitre</td>
<td>22-24°C with agitation</td>
<td>5 days</td>
<td>Immediately administer after issue and complete within 30 minutes</td>
</tr>
<tr>
<td>Single donor platelet (SDP)**</td>
<td>Thrombocytopenia</td>
<td>250-300 ml</td>
<td>Platelet count rise 30,000-40,000 / microlitre</td>
<td>20-24°C with agitation</td>
<td>3-5 days</td>
<td>As above</td>
</tr>
<tr>
<td>Fresh frozen plasma (FFP)</td>
<td>Coagulation factor deficiency</td>
<td>200-220 ml</td>
<td>20% increase in coagulation factors</td>
<td>-40°C</td>
<td>1 year</td>
<td>Administer within 30 minutes of issue and complete within 6 hours</td>
</tr>
<tr>
<td>Cryoprecipitate (CP)</td>
<td>Haemophilia A when there is non-availability of FVIII</td>
<td>One Cryo unit/10 kg</td>
<td>Rise of FVIII</td>
<td>-40°C</td>
<td>1 year</td>
<td>Immediately administer after issue and complete within 30 minutes</td>
</tr>
<tr>
<td>Cryopoor plasma (CPP)</td>
<td>Plasma exchange; in burns</td>
<td>200 ml</td>
<td>-</td>
<td>-40°C or below</td>
<td>1 year</td>
<td>Administer within 30 minutes of issue and complete within 4 hours</td>
</tr>
</tbody>
</table>

* Unrefrigerated whole blood, less than 24 hours old is labelled as fresh whole blood (FWB). Intracellular pathogens (CMV, HTLV), treponema and malarial parasite survive in fresh blood leucocytes, thus increased the risk of transfusion transmitted infections. Due to presence of viable lymphocytes, there are more chances of transfusion reaction (IA GVHD).

** In stable non-bleeding patients, platelets are withheld till counts of 10,000/microlitre. Do not use platelets in patients with autoimmune thrombocytopenia, thrombotic thrombocytopenic purpura except for life-threatening bleeding.

13.5.3 Do’s and Don’ts for achieving blood safety are given in Table 13.15
13.16 How To Give Eye Medication Or Irrigate The Eye

Sometimes the eye needs to be washed out, to clean it or to get rid of foreign particles. Also, medication may be given in the eye. Sterile technique should always be used to wash (irrigate) the eye or put in medication.

13.16.1 Irrigating the eye

i. Tell the patient what you are going to do and explain that it will not hurt.

ii. Ask the patient to tilt his or her head towards the side of the eye you are going to wash and place a small basin below the eye.

iii. Wash your hands. Using cotton balls moistened with sterile solution or saline, wipe the eyelids, working from the inner part to the outer side.

iv. Now separate the lids of the eye with your thumb and forefinger and gently press on the cheekbone beneath the eye to hold the eyelids apart and make a gutter.

v. Hold the irrigator above the eye and direct the solution to the gutter. Work from the inner to the outer part of the eye.

vi. Then tell the patient to close his or her eye and move the eyeball around from time to time, to make sure the solution reaches the entire eye.
13.16.2 Instilling liquid medication into the eye
i. Tell the patient what you are going to do. Explain that it will not hurt, though the medicine may sting briefly.
ii. As the patient looks up, with the head tilted backward, gently pull the lower eyelid downward to make a gutter.
iii. Stand to the side of the patient as you work. He or she is less likely to blink if you are not directly in front.
iv. Put the correct number of drops into the gutter in the lower part of the eye, not directly onto the cornea.

13.16.3 Instilling ointment into the eye
i. To put ointment into the eye, ask the patient to hold his or her head back and look up.
ii. Discard the first amount of ointment that comes out of the tube. It is considered to be contaminated.
iii. As the patient looks up, gently pull the lower eyelid downward to make a gutter.
iv. Hold the tube as close as possible above the eye, without touching it, and squeeze out 2 cm (about 1/4 the size of the fingertip) of the ointment into the gutter, working from the inner to the outer edge of the eyelid.
v. Tell the patient to close the eye for two minutes but not to squeeze it shut. When you have finished, give the patient a gauze sponge or cotton to wipe off the excess ointment on the eyelid.

13.17 How to give medication in the ear
The ear sometimes needs to be irrigated to soften earwax, remove pus, or take out a foreign object in the ear canal. If the ear is inflamed or the patient feels pain there, you may need to put medicine in the ear.

i. Have the patient lie on one side.
ii. Warm the medicine container in your hands so that the medicine will not feel cold to the patient. Then fill the ear dropper with the correct amount of medication.
iii. Pull the patient’s earlobe up and back. Put the correct number of drops along the side of the ear canal.

13.17.1 Medicine being put in the ear
Tell the patient to continue lying on one side for five minutes to keep the medication from going out of the ear. Put a small sterile cotton ball in the ear to keep the medicine inside when the patient is standing up.
14. ANTIMICROBIAL STEWARDSHIP PROGRAMME

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.

14.1 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.*

14.2 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.

14.3 Key components for implementing ASP

1. Assess the ground level situation
2. Ensure accountability and leadership
3. Set up structure and organization
4. Define priorities and how to measure progress and success
5. Identify effective interventions for your setting
6. Identify key measurements for improvement
7. Educate and Train
8. Communicate
Effective interventions for ASP - When establishing a new stewardship program, it is best to start with the core strategies and focus on achieving and maintaining them before adding some of the supplemental strategies.

14.4 Core Strategies
Front–end strategies where antimicrobials are made available through an approval process (e.g. formulary restrictions and preauthorization)
Back–end strategies are where antimicrobials are reviewed after antimicrobial therapy has been initiated (e.g. prospective audit with intervention and feedback)

14.5 Supplemental strategies
1. Streamlining / timely de-escalation of therapy
2. Dose optimization
3. Parenteral to oral conversion
4. Guidelines and clinical pathways
5. Antimicrobial order forms
6. Education
7. Computerized decision support,
8. Surveillance
9. Laboratory surveillance and feedback
10. Combination therapies
11. Antimicrobial cycling

14.6. Antimicrobial stewardship (ASP) committee
A Multidisciplinary inter professional antimicrobial stewardship (ASP) committee with multidisciplinary membership including clinicians, surgeons of major clinical departments, microbiologist (if available in the hospital or link hospital for microbiology services), pharmacists, nursing staff etc. The ASP Committee to assist the Drug and Therapeutics Committee (DTC) in finalizing the list of antibiotics in the hospital formulary.
There should be Antibiotic Management Team (AMT) for daily monitoring of antibiotic use. Team members include:
a) A clinical microbiologist.
b) An infection control nurse

14.7 Antibiotic policy
Antibiotic policy is to be prepared by the antimicrobial stewardship team in consultation with microbiology, pharmacologists, if available and physicians and surgeons from major departments. The policy is reviewed and updated annually.

14.8 Antimicrobial Stewardship Program
14.8.1 Antimicrobial Stewardship Program monitoring activities
1. Rational use of antibiotic is being monitored – On daily basis for restricted use indicator antibiotics (Vancomycin, Meropenam, Ofloxacin, Ciprofloxacin, Cefalosporin with Sulbactam combination, Colistin, Levofloxacin, Daptomycin,
**Tigecycline, Ceftaroline and non-TB use of rifampicin or 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, doses and duration prescribed. 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. The continued need for antimicrobial therapy should be reviewed at least daily. For most types of infection treatment should continue until the clinical signs and symptoms of infection have resolved – exceptions to this are indicated in the relevant sections. Parenteral therapy is normally used in seriously ill patients and those with gastrointestinal upset. Oral therapy can often be substituted as the patient improves.

2. Pre – surgical prophylaxis and post operative antibiotic therapy are also monitored on daily basis whether in line with perisurgical antimicrobial prophylaxis guidelines. In case of irrationality concerned department is informed and necessary actions are taken.

3. Defined Daily Dose (DDD) for antibiotics per thousand days are calculated and monitored for the antibiotic usage pattern.

4. No. of doses administered are also monitored per thousand patient days.

5. The data analysis is done and discussed periodically during HICC meetings and feedback provided to the users.

6. Adherence to antibiotic policy is also discussed in the HICC meeting.

7. Prescription audits of in patients and outpatients are conducted periodically.

8. ABC analysis of medicines done annually by drug stores and records are submitted to HICC atleast once in six months.

9. Antibiotic usage monitored particularly if any of the seven indicator antibiotics come in the top 10 medicines.

### 14.8.2 Aims of antimicrobial therapy

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

### 14.9 General antibiotic use guidelines

i. All antibiotic initiations are done after sending appropriate samples for cultures or any changes in antibiotic is done after receiving culture report.

ii. Rapid tests e.g. Gram stain, is done to determine therapeutic choices when decision on empiric therapy is required.

iii. Hospital has categorized usage of antibiotics for restricted use, limited access and under surveillance based on antibiogram, if available and/or in consultation with Drugs & Therapeutic Committee (DTC) of the Hospital.

iv. Hospital has a list of antibiotics available for OPD, IPD, emergency and respective ICUs in consultation with Drugs & Therapeutic Committee (DTC) of the Hospital.

v. List of all available antibiotics are communicated to the prescribers every month or from time-to-time if there is any change in the list or medicine is not available for some reasons.
Antimicrobials are chosen following hospital policy and National Standard Treatment guidelines for infectious diseases and Delhi State Standard Treatment Guidelines. If alternatives are chosen, reason for the same is documented in the case records.

Prescribe an antibiotic only when there is likely to be a clear clinical benefit.

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

Empiric Therapy is given where delay in initiating therapy awaiting microbiological results would be life threatening or risk serious morbidity, antimicrobial therapy based on a clinically defined infection is justified. Necessary specimens are drawn before commencing therapy. Where empiric therapy is used the accuracy of diagnosis is reviewed regularly and treatment altered/stopped when microbiological results become available.

Once culture / sensitivity report available:

a. Presumptive therapy antibiotic may require to be changed
b. Consult Microbiologist to decide the choice of antibiotic (based on narrowest spectrum antibiotic which covers the pathogen isolated).

Following factors affecting antimicrobial choices and route of administration are checked e.g., age, type and site of infection (respiratory, intra-abdominal, pneumonia, blood stream, urinary tract and skin and soft tissue), renal & hepatic function, interactions, allergy, if any.

A dose and duration of treatment is suggested but can be modified by consultants based on clinical scenarios.

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

Avoid widespread use of topical antibiotics (especially those agents also available as systemic preparations).

All allergies are recorded prominently in red ink in the allergy box on the patient’s case sheet. Drug chart is completed when a new prescription chart is written or transcribed. If no allergy - "No known allergy or allergic to name of the drug ......." is recorded. The box is signed and dated. If allergy history cannot be obtained, then "history not available" is specified. Under no circumstances allergy box is left blank. The allergy box is completed before prescribing a new drug, except in exceptional circumstances. If patients have a suspected drug allergy then the drug and suspected reaction is documented in the case sheet and the drug chart.

Check that the appropriate dose is prescribed. If uncertain, contact Infectious disease physician, Pharmacy, or check in the formulary.

The need for antimicrobial therapy is reviewed on a daily basis. For most types of infection treatment is continued until the clinical signs and symptoms of infection have resolved – exceptions to this are noted. For most infections 5 – 7 days of antimicrobial therapy is sufficient (simple UTIs can be adequately treated with 3 days of antibiotic).

Parenteral therapy is normally used in seriously ill patients and those with gastrointestinal upset. All IV antibiotics are initially given for 48 – 72 hours without review and switching over to oral alternatives is considered after 48 hours. Oral therapy can often be substituted as the patient improves. Switching to oral is
indicated by fever defervescence for at least 24h, marked clinical improvement; low CRP.

Antimicrobials are de-escalated or stepped down to the narrowest spectrum, most efficacious and most cost-effective option as per culture reports. If no step down availed, the reason is documented and is subjected to clinical audit.

Where treatment is apparently failing, advice from the microbiologist and ID Physician is sought rather than blindly changing to an alternative choice of antimicrobial agent.

14.10. Steps to follow the protocols

1. Identify the type of infection — bloodstream, respiratory, intra-abdominal or urinary tract
2. Define the location — OPD, ICU or floor patient
3. Identify the patient type based on described parameters — Type 1, Type 2 or Type 3.
4. Refer to the empiric/specific therapy for that patient type 1, 2 or with first second or third line antibiotic respectively.
5. Wait for at least 48h of antimicrobial therapy before labelling patient as non-responding to the therapy and to switch to the higher next line of therapy. Also consider if patient condition deteriorates.
6. Send respective cultures and or primary set of investigations before starting antibiotic therapy
7. Once culture / sensitivity report available initiate specific antimicrobial therapy. Antimicrobial may require to be changed/de-escalated.

14.11 Patients risk stratification

<table>
<thead>
<tr>
<th>PATIENT TYPE 1 (CAI)</th>
<th>PATIENT TYPE 2 (HAI)</th>
<th>PATIENT TYPE 3 (NI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No contact with health care system</td>
<td>Contact with health care system(eg. Recent hospital admission, nursing home, dialysis) without INVASIVE procedure</td>
<td>Long hospitalization and or invasive procedure</td>
</tr>
<tr>
<td>No prior antibiotic treatment</td>
<td>Recent antibiotic therapy</td>
<td>Recent &amp; multiple antibiotic therapies</td>
</tr>
<tr>
<td>Patient young with few co-morbid conditions</td>
<td>Patient old with multiple co-morbidities</td>
<td>Cystic fibrosis, structural lung disease, advanced AIDS, neutropenia, other severe immunodeficiency.</td>
</tr>
</tbody>
</table>

- **Patient Type 4.** Patients with suspected INVASIVE fungal infection.

14.12 Antibiotic Protocol

14.12.1 OPD

1. For treating the Indoor patients, the microbiology data should be considered mainly for patients belonging to Patient Types 2 and 3. Patient type 1 refers to the patients
reporting with community acquired infections, and for them the treatment options are based on the guidelines.

2. Avoid Antipseudomonal Fluoroquinolones (e.g., ciprofloxacin and levofloxacin) and Antipseudomonal 3rd generation cephalosporins (e.g., ceftazidime and cefoperazone) in Patients Type 1 and 2 since they have potent antipseudomonal activity.

3. Treatment of serious infections caused by ESBL +ve pathogens with BL-BLI combinations (e.g., Piperacillin-Tazobactam, Cefepime-Tazobactam and Cefoperazone-Sulbactam) should be avoided as there is limited clinical data and evidence available for the use of these drugs in such infections.

4. OPAT - Out Patient Parenteral Antibiotic Therapy allows patients requiring intravenous antibiotics to be treated outside hospital but is otherwise stable and well enough not to be in hospital. These patients may be discharged early to an OPAT service or may avoid hospital admission altogether. Early OPAT programs facilitate the discharge of stable inpatients with infections who, other than the requirement for prolonged intravenous antibiotic therapy, had no other need for inpatient care. OPAT are suitable for many infections, especially cellulitis, bone and joint infections, and infective endocarditis. Antibiotics can be administered in an outpatient unit, at home by a nurse, or at home by the patient or a carer, however, patients should be assessed by a doctor to determine medical and social suitability to minimise risk.

**14.12.2 Antibiotic Protocol: ICU**

i. For treating the Indoor patients, the microbiology data should be considered mainly for patients belonging to Patient Types 2, 3 and 4. Patient type 1 refers to the patients reporting with Community acquired infections, and for them the treatment options are based on the guidelines.

ii. Avoid Antipseudomonal Fluoroquinolones (e.g., Ciprofloxacin and Levofloxacin) and Antipseudomonal 3rd generation Cephalosporins (e.g., Ceftazidime and Cefoperazone) in Patients Type 1 and 2 since they have potent antipseudomonal activity.

iii. Treatment of serious infections caused by ESBL +ve pathogens with BL-BLI combinations (e.g., Piperacillin-Tazobactam, Cefepime-Tazobactam and Cefoperazone-Sulbactam) should be avoided as there is limited clinical data and evidence available for the use of these drugs in such infections.

iv. In infections with MDR Pseudomonas/ Acinetobacter, Carbapenems should be used as Extended Infusions e.g., Imipenem (2-3 hours infusion), Meropenem (3 hours infusion), Doripenem (4 hours infusion)

v. Linezolid and Daptomycin are reserved drugs for inpatients and should be used only in cases of Vancomycin Resistant S. aureus (VRSA) or Vancomycin Resistant Enterococci (VRE)

vi. # De-escalation to Fluconazole if: Isolates susceptible to Fluconazole (e.g., Candida albicans) + Patient clinically stable.

vii. Deescalation to Voriconazole if: C. krusei or Voriconazole susceptible C. glabrata + Patient clinically stable. De-escalation to fluconazole or voriconazole not recommended without confirmation of isolate susceptibility.

**14.12.3 Antibiotic Protocol: IPD**

i. For treating the Indoor patients, the Microbiology data should be considered mainly for patients belonging to Patient Types 2 and 3. Patient type 1 refers to the patients reporting
with Community acquired infections, and for them the treatment options are based on the guidelines.

ii. Avoid Antipseudomonal Fluoroquinolones (e.g., Ciprofloxacin and Levofloxacin) and Antipseudomonal 3rd generation Cephalosporins (e.g., Ceftazidime and Cefoperazone) in Patients Type 1 and 2 since they have potent antipseudomonal activity

iii. Treatment of serious infections caused by ESBL +ve pathogens with BL-BLI combinations (e.g., Piperacillin-Tazobactam, Cefepime-Tazobactam and Cefoperazone-Sulbactam) should be avoided as there is limited clinical data and evidence available for the use of these drugs in such infections.

iv. In infections with MDR Pseudomonas/ Acinetobacter, Carbapenems should be used as Extended Infusions e.g. Imipenem (2-3 hours infusion), Meropenem (3 hours infusion), Doripenem (4 hours infusion)

v. Linezolid and Daptomycin are reserved drugs for inpatients and should be used only in cases of Vancomycin Resistant S. aureus (VRSA) or Vancomycin Resistant Enterococci (VRE).

vi. The marker used in the laboratory to assess potential ESBL production among enterobacteriacae is resistance to Cefotaxime and Ceftazidime.

vii. The marker used in our laboratory to assess potential MRSA production is the resistance of S. aureus to cefoxitin.

14.13 Categorization of antibiotics

These needs to be defined by the Drugs and Therapeutic committee of the hospital. The categories should be revised/revised atleast once in six months. HICC should be informed of the same on periodic basis.

14.13.1 Restricted use

A pre use authorization from an ID Physician / Clinical Microbiologist needs to be taken before prescribing these antibiotics. A written documentation to be maintained which captures the request along with justification for use by the clinician and also captures the approval for use by the authority in charge

14.13.2 Limited access

Unrestricted use of these antibiotics may be allowed for empirical use for first 48-72 hours but after that a clinical justification by clinician and approval from authority in charge needs to be documented that why these antibiotics cannot be de-escalated and need to be continued further

14.13.3 Under Surveillance

A close monitoring to check their usage (indication, quantity and pattern) in OPD/Type 1 Patients/ Surgical prophylaxis. Audits to be done at regular intervals to assess their consumption.

14.13.4 Restricted Use Antibiotics

Colistin: It is the last resort for managing gram negative MDRs and its use, dose and duration needs to be rationalized. Liberal use should be restricted

Doripenem: It is the last carbapenem (at least in near future). If Imipenem and Meropenem are working, we need to conserve the use of Doripenem

Rifampicin: (For Non-TB use) - This is a valuable drug for TB. The use of rifampicin in MDR, Pseudomonas, Acinetobacter or MRSA should be restricted

Linezolid: Alternatives available e.g., Vancomycin/Teicoplanin. Linezolid is bacteriostatic and available as oral - more prone for misuse VRSA / VRE rare

Daptomycin: Alternatives are available for MRSA e.g., Vancomycin and Teicoplanin. Moreover VRSA and VRE are still not a major cause of concern.
Tigecycline: Bacteriostatic, one of the most broad spectrum drugs, has limited role in MDR infections like SSTI, IAI where ESBL/MRSA and or Acinetobacter are feared.

Sulbactam: Reserved for PDR Acinetobacter. Dose has to be correct (4-12 g/day for PDR Acinetobacter).

14.13.5 Limited Access Antibiotics

Imipenem/Meropenem: Use as empirical in sick patients is allowed looking at the antibiograms in most hospitals showing better sensitivity of these antibiotics over other classes, however after culture and sensitivity report is available, if it shows a susceptible pathogen to other classes of antibiotics plus if patient condition improves – then de-escalation should be advised.

Piperacillin-Tazobactam/Cefoperazone-Sulbactam: These are as broad spectrum as carbapenems (this fact is not appreciated generally). Use as empirical in sick patients is allowed looking at the antibiograms in most hospitals showing decent sensitivity of these antibiotics over other classes, however after culture and sensitivity report is available, if it shows a susceptible pathogen to other classes of antibiotics plus if patient condition improves - then de-escalation should be advised.

Vancomycin/Teicoplanin: Use as empirical in sick patients may be allowed specially in BSI, SSTI where MRSA is suspected but if after 48-72 h culture and sensitivity report shows no S. aureus or MSSA then Vancomycin/Teicoplanin have absolutely no role and should be discontinued.

14.13.6 Under Surveillance Antibiotics

3rd generation cephalosporins (both oral and IV) and Fluoroquinolones: One of the main reasons for widespread ESBLs in India in the community is due to overuse of 3rd generation cephalosporins and fluoroquinolones at OPD level-Type 1 patients, pediatric patients and surgical prophylaxis.

It is must to educate the clinicians about these antibiotics and the collateral damage they cause. Also it is imperative to exercise control on liberal usage of these antibiotics in a phased manner and perform regular audits on the rate of consumption of these antibiotics. This could be the single most valuable intervention to curb resistance in India in community.

14.13.7 Irrational combinations or less evidenced combinations

1. Amoxicillin - tazobactam
2. Cefadroxil-clavulanic acid
3. Cefepime + Amikacin
4. Cefepime-sulbactam
5. Cefepime-tazobactam
6. Cefixime + Ofloxacin
7. Cefixime + Ornidazole
8. Cefixime-clavulanic acid
9. Cefotaxime-sulbactam
10. Cefpodoxime-clavulanic
11. Ceftazidine-tazobactam
12. Ceftriaxone-sulbactam
13. Ceftriaxone-tazobactam
14. Cefuroxime-clavulanic acid
15. Cefuroxime-sulbactam
16. Meropenem-sulbactam
17. Vancomycin + Ceftriaxone
18. Cefoperazone –Tazobactam
19. Ampicillin-Amoxicillin-Cloxacillin
20. Ceftazidime-Sulbactam
21. Ofloxacin- Ornidazole/Tinidazole
22. Gatifloxacin-Ornidazole/Tinidazole
23. Fluconazole-Tinidazole
24. Doxycycline-Tinidazole
25. Tetracycline-Metronidazole
26. Cefixime/Cefadroxil + Ambroxol + Lactobacillus
27. Ciprofloxacin/Gatifloxacin + Ambroxol
28. Roxithromycin + Ambroxol
14.14 Diluents, storage conditions and methods of administration of common antimicrobial agents.(Appendix 9)

14.15 Perisurgical antibiotic use

Aim of surgical antibiotic prophylaxis is to:
- Prevent surgical site infection (SSI) & related morbidity and mortality
- Reduce the duration and cost of health care (when the costs associated with the management of SSI are considered, the cost effectiveness of prophylaxis become evident)
- Antibiotic chosen should not produce any adverse effects as well as no adverse consequences for the microbial flora of the patient or the hospital.

Surgical antibiotic prophylaxis is an adjunct to, not a substitute for, good surgical technique. Antibiotic prophylaxis should be regarded as one component of an effective policy for the control of hospital-acquired infection such as attention to basic infection-control strategies, the surgeon’s experience and technique, the duration of the procedure, hospital and operating-room environments, instrument sterilization issues, preoperative preparation (e.g., surgical scrub, skin antisepsis, appropriate hair removal), perioperative management (temperature and glycaemic control) and the underlying medical condition of the patient.

14.15.1 Perisurgical Antibiotic prophylaxis – General principles

i. Do not use antibiotic prophylaxis routinely for clean, non-prosthetic, uncomplicated surgery.

ii. Give antibiotic treatment (in addition to prophylaxis) to patients having surgery on a dirty or infected wound.

iii. No prophylaxis for class I patient, except
   a. Abdominal cases
   b. Surgery exceeding 2h
   c. Having three concomitant diagnosis

iv. No prophylaxis for urological procedures with sterile urine

v. Give antibiotic prophylaxis to patients before:

vi. Clean surgery involving the placement of a prosthesis or implant

vii. Clean-contaminated surgery

viii. Contaminated surgery

ix. Antibiotics should also be administered immediately after unexpected contamination of the tissues.

x. Consider giving a SINGLE DOSE of antibiotic prophylaxis intravenously on within 1 hour before incision to maximize tissue concentration. However, give prophylaxis earlier for operations in which a tourniquet is used. Two hours are allowed for the administration of vancomycin and fluoroquinolones.

xi. Before giving antibiotic prophylaxis, consider the timing and pharmacokinetics (for example, the serum half-life) and necessary infusion time of the antibiotic. Give a repeat dose of antibiotic prophylaxis at one to two half lives of the antibiotic when the
operation is longer than the half-life of the antibiotic given or if there is excessive blood loss (usually more than 1500 ml in adults) during the procedure, extensive burns.

xii. Therapeutic antibiotics to be given for all class III and class IV wounds.

xiii. **Post operative antibiotic administration is NOT required.**

xiv. There is no data to support the continuation of antimicrobial prophylaxis until all indwelling drains and intravascular catheters are removed.

xv. Antibiotic prophylaxis should be confined to the perioperative period (less than 24 hours for most procedures). The prophylaxis duration in cardiothoracic procedures may be up to 48 hours. Prolonged prophylaxis is associated with an increased risk of acquired antimicrobial resistance.

xvi. Discontinue antibiotics given for implantation of a pacemaker or defibrillator within 24 hours of surgery.

xvii. Select appropriate agents on the basis of the surgical procedure, the most common pathogens causing SSI for a specific procedure, and published recommendations (Details given below).

xviii. Inform patients before the operation, whenever possible, if they will need antibiotic prophylaxis, and afterwards if they have been given antibiotics during their operation.

xix. Studies with results showing a beneficial effect of supplemental oxygen included patients who underwent colorectal surgery. It has been observed that 30%-35% supplemental FiO₂ levels are useful in minimizing SSI. Higher/lower concentrations are less helpful.

xx. Maintaining normothermia (temperature higher than 36°C) immediately after colorectal surgery is helpful in reducing the incidence of SSI.

**14.15.2 Categories of Surgeries**

**Clean Surgeries:**
- a) Uninfected, no inflammation
- b) Respiratory, Gastrointestinal and Genitourinary tracts not entered
- c) Closed primarily Examples: Exploratory laparotomy, mastectomy, neck dissection, thyroid, vascular, hernia, splenectomy

**Clean-contaminated Surgeries:**
- a) Respiratory, Gastrointestinal and Genitourinary tracts entered, controlled, no spillage
- b) No unusual contamination Examples: Cholecystectomy, small bowel resection - anastomosis, Whipple’s procedure, liver transplantation, gastric surgery, bronchoscopy, colon surgery

**Contaminated Surgeries:**
- a) Open, fresh, accidental wounds
- b) Major break in sterile technique
- c) Gross Spillage from GI tract
- d) Acute non-purulent inflammation Examples: Inflamed appendectomy, bile spillage in cholecystectomy, diverticulitis, Rectal surgery, penetrating wounds

**Dirty Surgeries:**
- a) Old traumatic wounds, devitalized tissue
- b) Existing infection or perforation
c) Organisms present BEFORE procedure Examples: Abscess I&D, perforated bowel, peritonitis, wound debridement, positive cultures preoperatively

14.15.3. Antibiotic prophylaxis for surgical wounds
No prophylaxis for class I wounds patient, except
i. Abdominal cases
ii. Surgery exceeding 2 h
iii. Having three concomitant diagnosis
iv. No prophylaxis for urological procedures with sterile urine
v. Prophylaxis for 24 h to be given in all class II cases
vi. Bowel preparations in colorectal surgeries
vii. Therapeutic antibiotics to be given for all class III and class IV wounds

For details of surgical wound classification see wound care
For surgical site infections see appendix on case definitions

14.15.4 Choice of antibiotic for perisurgical prophylaxis
i. Antibiotic selection is influenced by the organism most commonly causing wound infection in the specific procedure, characteristics of the ideal agent, the comparative efficacy of the antimicrobial agent for the procedure, the safety profile, and the patient’s medication allergies and cost of the antibiotic agent. In certain gastrointestinal procedures, oral and intravenous administration of agents with activity against Gram-negative and anaerobic bacteria is warranted, as well as mechanical preparation of the bowel. Cefazolin provides adequate coverage for most types of procedures.
ii. Antimicrobial agents with the narrowest spectrum of activity are required for efficacy in preventing infection and the chosen antibiotics must reflect local, disease-specific information about the common pathogens and their antimicrobial susceptibility. A past history of a serious adverse event should preclude administration of a particular antibiotic like penicillin.
iii. Choice of antibiotic is influenced by the organism most commonly causing wound infection in the specific procedure, characteristics of the ideal agent, the comparative efficacy of the antimicrobial agent for the procedure, the safety profile, and the patient’s medication allergies and cost of the antibiotic agent.
iv. In certain gastrointestinal procedures, oral and intravenous administration of agents with activity against Gram-negative and anaerobic bacteria is warranted, along with mechanical preparation of the bowel. Cefazolin provides adequate coverage for most types of procedures.
v. Do not routinely use vancomycin prophylaxis for any procedure.
15. STORAGE, ADMINISTRATION AND DISPOSAL OF VACCINES

15.1 Persons responsible for vaccine procurement, storage and distribution

1. Sister and staff nurse posted in immunization room is responsible for procurement, storage and distribution.

2. Vaccines are stored in an ice-lined refrigerator (2°C - 8°C) in the immunization room. Distribution of vaccines is done by nursing staff posted at the immunization room.

15.2 Storage and dispensing of vaccines

- Vaccines are stored in the ice-lined refrigerator with temperature monitoring at least twice daily and preferably with a chart recorder.

15.3 Vaccination place, timings and schedule

- Vaccination is done at the immunisation room.
- Timings: (As per local healthcare unit policy)
- Room No.: (As per local healthcare unit policy)
- Catch up immunisation is also initiated.

15.4 List of vaccines available at Govt of NCT of Delhi Hospitals

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name of vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>BCG</td>
</tr>
<tr>
<td>2.</td>
<td>Hepatitis B Vaccine</td>
</tr>
<tr>
<td>3.</td>
<td>Oral polio vaccine (OPV), IPV</td>
</tr>
<tr>
<td>4.</td>
<td>Pentavalent Vaccine</td>
</tr>
<tr>
<td>5.</td>
<td>Measles</td>
</tr>
<tr>
<td>6.</td>
<td>Measles Mumps Rubella (MMR)</td>
</tr>
<tr>
<td>7.</td>
<td>Typhoid</td>
</tr>
<tr>
<td>8.</td>
<td>Tetanus Toxoid (TT)</td>
</tr>
<tr>
<td>9.</td>
<td>Anti-rabies vaccine (ARV)</td>
</tr>
<tr>
<td>10.</td>
<td>Other vaccines e.g. Menningococcal vaccine, influenza vaccine, for the healthcare care worker from time to time as per advisory issued by Delhi Govt.</td>
</tr>
</tbody>
</table>

15.5 Person to be contacted in case of adverse event in immunization room

In case of adverse event an adverse drug reaction form is filled and sent to the drug and therapeutic committee and must be reported through MRD to designate authorities in Govt of NCT of Delhi. MO I/C OPD should also be informed.
### 15.6 Immunization Schedule

**NATIONAL IMMUNISATION SCHEDULE FOR INFANTS, CHILDREN AND PREGNANT WOMEN**

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Due age</th>
<th>Max age</th>
<th>Dose</th>
<th>Diluent</th>
<th>Route</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FOR INFANTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCG</td>
<td>At birth</td>
<td>Till 1 year of age</td>
<td>(0.05 ml until 1 month)</td>
<td>YES Manufacturer supplied diluent (sodium chloride)</td>
<td>Intra-dermal</td>
<td>Upper Arm - LEFT</td>
</tr>
<tr>
<td>Hepatitis B- birth dose</td>
<td>At birth</td>
<td>Within 24 hours</td>
<td>0.5 ml</td>
<td>NO</td>
<td>Intra-muscular</td>
<td>Anterolateral side of mid-thigh LEFT</td>
</tr>
<tr>
<td>OPV-0</td>
<td>At birth</td>
<td>Within the first 15 days</td>
<td>2 drops</td>
<td>Oral</td>
<td>Oral</td>
<td></td>
</tr>
<tr>
<td>OPV 1,2 &amp; 3</td>
<td>At 6, 10, 14 weeks</td>
<td>Till 5 years of age</td>
<td>2 drops</td>
<td>Oral</td>
<td>Oral</td>
<td></td>
</tr>
<tr>
<td>DPT 1,2 &amp; 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pentavalent 1,2 &amp; 3^2 (Diphtheria + Pertussis + Tetanus + Hepatitis B + Hib)</td>
<td>At 6,10, 14 weeks</td>
<td>1 year of age</td>
<td>0.5 ml</td>
<td>NO</td>
<td>Intra-muscular</td>
<td>Anterolateral side of mid-thigh LEFT</td>
</tr>
<tr>
<td>IPV (Inactivated polio vaccine)</td>
<td>At 14 completed weeks</td>
<td>1 year of age</td>
<td>0.5 ml</td>
<td>NO</td>
<td>Intra-muscular</td>
<td>Anterolateral side of mid-thigh RIGHT</td>
</tr>
<tr>
<td>Rotavirus^1 (where applicable)</td>
<td>At 6,10, 14 weeks</td>
<td>1 year of age</td>
<td>5 drops</td>
<td>NO</td>
<td>Oral</td>
<td>Oral</td>
</tr>
<tr>
<td>Measles/MR 1^st dose^5</td>
<td>At 9 completed months</td>
<td>5 years of age</td>
<td>0.5 ml</td>
<td>YES Manufacturer supplied diluent (sterile water)</td>
<td>Sub-cutaneous</td>
<td>Upper Arm- RIGHT</td>
</tr>
<tr>
<td>Japanese Encephalitis-1^6 (where applicable)</td>
<td>At 9-12 months</td>
<td>15 years of age</td>
<td>0.5 ml</td>
<td>YES Manufacturer supplied diluent (Phosphate buffer solution)</td>
<td>Sub-cutaneous</td>
<td>Upper Arm- LEFT</td>
</tr>
<tr>
<td>Vitamin A (1st dose)</td>
<td>At 9 months</td>
<td>5 years of age (1 lakh IU)</td>
<td>1 ml</td>
<td>-</td>
<td>Oral</td>
<td>Oral</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Due age</th>
<th>Max age</th>
<th>Dose</th>
<th>Diluent</th>
<th>Route</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage, Administration and Disposal of Vaccines GNCTD/………../SOP/IC/12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### FOR CHILDREN

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Due age</th>
<th>Max age</th>
<th>Dose</th>
<th>Diluent</th>
<th>Route</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPT Booster 1</td>
<td>16-24 months</td>
<td>7 years of age</td>
<td>0.5 ml</td>
<td>NO</td>
<td>Intra-muscular</td>
<td>Antero-lateral side of mid-thigh LEFT</td>
</tr>
<tr>
<td>Measles/MR 2&lt;sup&gt;nd&lt;/sup&gt; dose 5</td>
<td>16-24 months</td>
<td>5 years of age</td>
<td>0.5 ml</td>
<td>YES Manufacturer supplied diluent (sterile water)</td>
<td>Sub-cutaneous</td>
<td>Antero-lateral side of mid-thigh LEFT</td>
</tr>
<tr>
<td>OPV Booster</td>
<td>16-24 months</td>
<td>5 years</td>
<td>2 drops</td>
<td>NO</td>
<td>Oral</td>
<td>Oral</td>
</tr>
<tr>
<td>Japanese Encephalitis-2&lt;sup&gt;nd&lt;/sup&gt; dose (where applicable)</td>
<td>16-24 months</td>
<td>Till 15 years of age</td>
<td>0.5 ml</td>
<td>YES Manufacturer supplied diluent (Phosphate buffer solution)</td>
<td>Sub-cutaneous</td>
<td></td>
</tr>
<tr>
<td>Vitamin A (2&lt;sup&gt;nd&lt;/sup&gt; – 9th dose)</td>
<td>At 16 months. Then 1 dose every 6 months</td>
<td>Up to the age of 5 years</td>
<td>2 ml (2 lakh IU)</td>
<td>-</td>
<td>Oral</td>
<td>Oral</td>
</tr>
<tr>
<td>DPT Booster 2</td>
<td>5-6 years</td>
<td>7 years of age</td>
<td>0.5 ml</td>
<td>NO</td>
<td>Intra-muscular</td>
<td>Upper Arm</td>
</tr>
<tr>
<td>TT</td>
<td>10 &amp; 16 years</td>
<td>16 years</td>
<td>0.5 ml</td>
<td>NO</td>
<td>Intra-muscular</td>
<td>Upper Arm</td>
</tr>
</tbody>
</table>

### FOR PREGNANT WOMEN

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Due age</th>
<th>Max age</th>
<th>Dose</th>
<th>Diluent</th>
<th>Route</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>TT-1</td>
<td>Early in pregnancy</td>
<td>Give as early as possible</td>
<td>0.5 ml</td>
<td>NO</td>
<td>Intra-muscular</td>
<td>Upper Arm</td>
</tr>
<tr>
<td>TT-2&lt;sup&gt;1&lt;/sup&gt;</td>
<td>4 weeks after TT-1&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td>0.5 ml</td>
<td>NO</td>
<td>Intra-muscular</td>
<td>Upper Arm</td>
</tr>
<tr>
<td>TT-Booster</td>
<td>If received 2 TT doses in a pregnancy within the last 3 years&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td>0.5 ml</td>
<td>NO</td>
<td>Intra-muscular</td>
<td>Upper Arm</td>
</tr>
</tbody>
</table>

1. Give TT 2 or Booster doses before 36 weeks of pregnancy. However give these even if more than 36 weeks have passed. Give TT to a woman in labour if she has not previously received TT.
2. Pentavalent vaccine is introduced in place of DPT and Hep 1, 2 and 3.
3. Rotavirus vaccine has been introduced in initially 4 states - Andhra Pradesh, Haryana, Himachal Pradesh and Odisha.
4. IPV-fractional dose (0.1 ml) intradermal at ages 6 weeks and 14 weeks introduced in select states.
5. MR vaccine has been recommended and approved for introduction in place of measles vaccine in the UIP schedule. If 1<sup>st</sup> dose delayed beyond 12 months, ensure minimum 1 month gap between 2 MR doses.
6. JE vaccines have been introduced in select endemic districts. If 1<sup>st</sup> dose delayed beyond 12 months, ensure minimum 3 months gap 3 months gap between 2 doses.
7. The 2<sup>nd</sup> to 9<sup>th</sup> doses of Vitamin A can be administered to children 1-5 years old during biannual rounds, in collaboration with ICD’s.
8. Pneumococcal conjugate vaccine (PCV)- recommended by NTAGI not yet in program- schedule 6 and 14 weeks with booster at 9 months.
9. Human Papilloma Virus (HPV) vaccine – presently not in schedule.
**Catch Up Immunization Schedule For Unimmunized Child**

**Category 1: 6 weeks to 9 months**
*Give Measles at 2\textsuperscript{nd} or 3\textsuperscript{rd} visit if age is more than 9 months*

<table>
<thead>
<tr>
<th>Visit</th>
<th>Suggested Vaccines</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>BCG</td>
</tr>
<tr>
<td></td>
<td>OPV1</td>
</tr>
<tr>
<td></td>
<td>Pentavalent Vaccine -1</td>
</tr>
<tr>
<td>Second visit (After 1 month of first visit)</td>
<td>Measles *</td>
</tr>
<tr>
<td></td>
<td>OPV2</td>
</tr>
<tr>
<td></td>
<td>Pentavalent Vaccine -2</td>
</tr>
<tr>
<td>Third visit (After 1 month of second visit)</td>
<td>OPV3</td>
</tr>
<tr>
<td></td>
<td>Pentavalent Vaccine -3</td>
</tr>
</tbody>
</table>

Subsequently immunize as per schedule

**Category 2: 9 months to 5 years**

Note: if age at 4\textsuperscript{th} visit < 4 y, give DPT-2\textsuperscript{nd} Booster and OPV 5 at 5 years also

**Category 3: Age more than 5 years**

<table>
<thead>
<tr>
<th>Visit</th>
<th>Suggested Vaccines</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>MMR</td>
</tr>
<tr>
<td></td>
<td>DPT1 (if less than 7 years) Or TT(if Age &gt; 7 years) Hep B1</td>
</tr>
<tr>
<td>Second (After 1 month of first visit)</td>
<td>DPT2 (if less than 7 years) ) Or TT(if Age &gt; 7 years) Hep B2</td>
</tr>
<tr>
<td>Third (After 6 months of first visit)</td>
<td>DPT3 (if less than 7 years) Or TT( if Age &gt; 7 years) Hep B3</td>
</tr>
</tbody>
</table>

Note: If child is partially immunized, resume the lapsed immunization as per the above schedule. There is no need to repeat the vaccines already received.
16. 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.

16.1 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.

Steps to be taken for investigation of an outbreak

**Step 1**

i. 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.

ii. 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.

iii. 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.

iv. Verification of the diagnosis. Each case are reviewed to meet the definition.

v. Confirmation that an outbreak exists by comparing the present rate of occurrence with the endemic rate are made.

**Step 2**

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

**Step 3**

i. Additional cases must be searched for by examining the clinical and microbiological records.

ii. Line listings for every case, patient details, place and time of occurrence and infection details are developed.

iii. 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.

iv. 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.

v. 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.
vi. The hypothesis is tested by reviewing additional cases in a case control study, cohort study, and microbiological study.

Step 4
i. Specific control measures are implemented as soon as the cause of outbreak of identified.
ii. Monitoring for further cases and effectiveness of control measures are done.
iii. A report are prepared for presentation to the HICC, departments involved in the outbreak and administration.

16.2 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:

   i. Strict hand washing
   ii. Intensification of environmental cleaning and hygiene.
   iii. Adherence to aseptic protocols, and
   iv. Strengthening of disinfection and sterilization.

16.3 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.

16.4 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:

   i. Identification and elimination of the contaminated product;
   ii. Modification of nursing procedures;
   iii. Identification and treatment of carriers, and
   iv. Rectification of lapse in technique or procedure

16.5 Evaluation of efficacy of control measures

i. 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.

ii. The outbreak should be documented.
17. VISITORS POLICY

17.1 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.

i. 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.

ii. 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.

iii. Hand washing after all contact with the patient will have to be stressed.

iv. No more than one adult visitor are allowed 'at a time' during the hospital visiting hours and the length of stay are governed by the needs of the patient.

v. 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.

vi. 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.

vii. Visitors are not allowed to sit on the patient's bed.

viii. Visitors should wash their hands well with soap and water before entering and when leaving the room.

ix. Active immunization of attendants and other follow up steps, where applicable must be conducted by the physician in-charge.

17.2 Number of visitors
To restrict foot falls to mitigate risk of transmission of infection from visitors to the patients.

i. No more than one person should accompany the patient at emergency.

ii. In Wards only one visitor is allowed “at a time”. During visiting hours no more than two visitors can be allowed. These additional vistors must visit the patient with “one at time” only.

iii. For ICUs, no vistors are allowed, except under exceptional circumstances as a part of end of life care.

iv. In outpatient department only one visitor is allowed with the patient. In case of child also, no siblings or other parents are allowed in OPD.

17.3 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.

i. Wash hands with soap and water before and after patient contact.

ii. 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.
ii. Wear masks for all situations where a splash is expected, and where infection that spreads through the respiratory route is possible diagnosis.

v. Wear plastic aprons, in addition to a mask if splash to the body area is expected.

v. Use disposal needles and discard them into the sharps container which is placed in all patient care areas. Dispose IV cannula, styllettes, scalpel blades and razor blades into the sharps containers immediately after use.

vi. Attendants and Sweepers are to wear gloves while handling lab samples and performing sanitation work.

17.4 Additional precautions for patients known to harbor blood borne pathogens

i. Use plastic aprons during procedures where body fluids may be spilt.

ii. 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.

18.4.1 Infectious Diseases

Refer to the chapter on Isolation Policies

17.4.2 Wound and Skin Infections

i. Hands are to be washed before and after handling the patient.

ii. Wear gloves while handling infected wounds.

iii. Cover the wounds (as far as possible) before transferring the patient

iv. Dispose waste as per hospital guidelines

17.4.3 Trauma

Use protective equipment such as gloves, mask, gown, apron and goggles under appropriate situations.

17.4.4 Housekeeping

i. The treatment rooms and trauma resuscitation room is cleaned with soap and water after every patient. Blood spills are disinfected by using 1% Sodium hypochlorite for a contact time of 10 minutes.

ii. Equipment and instruments that are to be reused are cleaned before sending it for sterilization.

iii. Discard medical waste as per the guidelines given in the chapter on Hospital Waste Management.
18. FOOD SAFETY

18.1 Background
Experience has shown that outbreaks of food poisoning in hospitals are notable not only because of the public interest that is generated, but because they are clinically serious and can result in the deaths of patients.

18.2 Aim
The aim is to ensure that food is provided to patients and staff in a safe and hygienic manner.

18.3 Principles of food safety
i. Within the hospital, any worker who handles food, or whose actions could affect its safety, must includes workers who clean articles or equipment that come into contact with food. Food and personal hygiene regulations are enforced by dietician of THE HOSPITAL who will make periodic visits to assess compliance.
ii. The Infection Control Team also performs an audit.
iii. The dietician incharge of an area that contains a kitchen is the person deemed to be responsible for all acts of omission and commission in Kitchen area.
iv. The dietician incharge must:
   • Make sure that food is supplied in a hygienic way
   • Identify food safety hazards
   • Know which steps in the processes are critical for food safety
   • Ensure that safety controls are in place, maintained and reviewed.

18.4 Basic Requirements
A. As a minimum kitchen should:
   i. be clean and maintained in good repair;
   ii. be designed and constructed to permit good hygiene practices;
   iii. have an adequate supply of drinking water;
   iv. be protected against pests;
   v. contain facilities for the disposal of kitchen waste;
   vi. have adequate hand washing facilities;
   vii. be provided with adequate drainage.
B. Food trolleys must be:
   i. Be adequate clean and maintained in good repair;
   ii. Are be reserved for food only;
   iii. Allow for separation of different products;
   iv. Are cleaned between loads.
C. Food handlers must:
   i. Staff must maintain a high degree of personal cleanliness and their practice must also be clean and hygienic. Food handlers must wear a clean uniform and protective over-clothes such as a plastic apron.
   ii. Routinely wash their hands when handling food;
   iii. Report any illness such as infected wounds, skin infections, diarrhoea or vomiting to their manager and occupational health immediately. If such illness is reported they
must be excluded from food handling areas. Such action is the responsibility of the dietician of THE HOSPITAL, his or her manager.

iv. It is the responsibility of staff to ensure that the equipment and facilities are clean and fit for use.

18.5 Refrigerator and Freezer Use
The use of refrigerators/freezers must be carefully controlled by the dietician responsible.
Controls to ensure food safety include:
   i. The removal of outer packaging when possible;
   ii. The immediate storage of chilled foods after delivery checks are completed;
   iii. Food will be stored at temperatures below 8°C refrigerator;
   iv. Food will be packaged, wrapped or covered as protection;
   v. Food must be labelled with:
      a. the name of the product;
      b. date before which it must be used;
      c. date of refrigeration;
   vi. Food is stored within the shelf life.

18.6 Microwave Ovens
Microwave Ovens are not to be used for the heating or re-heating of patient’s food. When used for the processing of food belonging to staff, the following applies:
   i. Only containers approved for use by the manufacturer are to be used.
   ii. A core temperature of 75°C must be achieved.

18.7 Training
Food handlers must be trained in food hygiene matters to a level appropriate to their job.

18.8 Standard of Food
Guidelines to ensure that food served to patients, visitors and employees is processed in a manner that avoids contamination:
1. All food is prepared and served into covered containers and set into trays in the main kitchen and then sent to wards. This activity is supervised by trained personnel.
   i. Cold storage temperatures are maintained appropriately and scrupulously.
   ii. Hot and cold food is transported in such a manner that appropriate temperatures will be maintained during transportation.
   iii. Food returned to the kitchen is discarded into black bags. Mouths of bags are tied before disposal.
   iv. Housekeeping is done according to the set procedures of the department
   v. The arrangement of work stations in the kitchen are such that there is no contamination of cooked food from raw food. There are no interchange of personnel working on raw food and those on cooked food.
   vi. Personnel handling and serving the food are trained to observe universal precautions to protect themselves.
   vii. Personnel are also trained to protect food consumers from body substances of handling personnel.
   viii. Cleaning of vegetables is done with 2% sodium chloride
2. Training should include the following aspects.
   i. Hand washing should cover exposed portions of arms and hands with special attention to fingernails and areas between fingers.
ii. Clothing is free from obvious dirt and food spills.

iii. Food should not be consumed in preparation or serving areas.

iv. Utensils are used to handle food.

v. Clean gloves may be used.

vi. Pest control of entire facility and thorough cleaning with disinfectants should be done at defined intervals to ensure pest free food operations and safe environment.

18.9 Screening of Kitchen Workers

i. Kitchen Workers must be screened for Nasal MRSA carriage, and stool parasite examination.

ii. Surveillance is conducted biannually for detection of carriage of *Salmonella* and MRSA. Stool samples and nasal swabs are submitted to the microbiology laboratory. Surveillance is also done after worker re-joins duty after period of leave more than two weeks.

iii. Records are maintained by in-charge of the department

19.9.1 Food borne diseases

<table>
<thead>
<tr>
<th>Bacterial diseases</th>
<th>Typhoid and paratyphoid fever, Salmonellosis, Staphylococcal intoxication, <em>Cl. perfringens, B. cereus</em> food poisoning, <em>E. coli</em> diarrhoea, Streptococcal infection, Shigellosis, Brucella</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viral diseases</td>
<td>Viral hepatitis, gastroenteritis</td>
</tr>
<tr>
<td>Parasites</td>
<td>Taeniasis, Hydatidosis, Trichinosis, Ascarisis, amoebiasis, Oxyuriasis</td>
</tr>
</tbody>
</table>

18.10 Cleaning procedures for food service department facilities

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Equipment/ Work area</th>
<th>Cleaning Procedure &amp; Frequency</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRODUCTION AREA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Cold storage</td>
<td>Daily mop/ Sweeping</td>
<td>Kitchen mates</td>
</tr>
<tr>
<td>2.</td>
<td>Wet grinder</td>
<td>After every use thorough cleaning with water</td>
<td>Cooks/ Mates</td>
</tr>
<tr>
<td>3.</td>
<td>Knife</td>
<td>After every use. Cleaning with cold water</td>
<td>Cooks/ Mates</td>
</tr>
<tr>
<td>4.</td>
<td>Work Table Sinks</td>
<td>Twice a day cleaning with soap/water. And regular mopping with water after every use.</td>
<td>Cooks / Kitchen mates</td>
</tr>
<tr>
<td><strong>PANTRY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Work Tables</td>
<td>Twice a day cleaning with soap/ water. And regular mopping with water after every use.</td>
<td>Kitchen mates</td>
</tr>
<tr>
<td><strong>HOT KITCHEN</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Tilting pans</td>
<td>After every use washed with water</td>
<td>Cooks/ Kitchen Mates.</td>
</tr>
<tr>
<td>2.</td>
<td>Sinks / Work Tables</td>
<td>As often as required</td>
<td>As often as required</td>
</tr>
<tr>
<td><strong>DISHWASH AREA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Tables &amp; Sinks</td>
<td>Twice a day with water and soap</td>
<td>Food Attendants.</td>
</tr>
</tbody>
</table>
19. LAUNDRY AND LINEN MANAGEMENT

19.1 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.

19.2 Categories of Linen
14.2.1 Dirty Linen
Dirty Linen is Used linen, but not visibly soiled with blood or blood tinged body secretions. Used linen, which may be slightly contaminated with excreta, blood and body fluids are not classed as infected.

19.2.2 Soiled Linen
Soiled linen is Known, or potentially, infected/infested linen. All linen which is:
- Grossly contaminated with excreta, blood or body fluids,
- Or contaminated linen from a patient who is known, or clinically suspected, to be infectious. For example salmonella, hepatitis A, B or C, open pulmonary tuberculosis, HIV.

19.3 Specific Items
19.3.1 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 from 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.

19.3.2 Staff uniforms
Must be sent to the laundry contained in the appropriate bags and labelled 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.

19.4 Handling and storage of used linen in ward/department
i. 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. Dirty linen must be collected into black bags and soiled linen into red bags.

ii. 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.

iii. All linen bags must be placed in the correct colour bag, securely tied, labelled as appropriate and stored in a room or area designated for the purpose, which is safe and separate from patient areas (dirty corridor).

iv. Bags must be less than 2/3 full.
v. All items that are sent to the laundry must be appropriately marked including mattress overlays, clothing.
vi. Gloves may also be required if linen is wet. Hands must be washed after handling soiled or infected linen.

vii. Linen are held away from the body to prevent contamination of clothing. While counting is done in front of laundry worker, full PPE must be worn. Laundry worker should transport the bagged linen in covered trolleys specifically designated for this purpose with clearly labeled as “Used linen”.

viii. No separate treatment for known HIV positive patient's linen should be attempted and should be collected and transported as mentioned above.

19.5 Transporting Used Linen from Ward / Department to Pick-Up Point
i. Laundry bags must be securely tied.
ii. The pick-up point must be dry and secure and separate from the clean linen area
iii. The frequency of collection will depend on the volume of laundry.
iv. Linen handlers must have heavy-duty rubber gloves available. Guidance on hand washing technique and frequency must be given.

19.6 Transporting Used Linen from the Pick-Up Point to the Laundry
i. Frequency of collection will be dependent on the volume of laundry and the predefined schedule.
ii. Laundry is responsible for cleaning and disinfection of their trolleys:
   a. After any spillage
   b. After transportation of dirty laundry
   c. Through cleaning with soap and water at least weekly
iii. Dedicated covered trolleys must be used for transporting the clean linen.
iv. 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 is first tied in a red bag.

19.7 Return of Clean Linen to the User
Contamination of clean linen must be prevented by:
   1. Storage in a clean, dry area or cage
   2. 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 re-processing.

19.8 Infection control issues in the laundry
i. 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.
ii. Personal protective clothing will be available and worn when handling linen.
iii. All personnel working in laundry must wear clean hospital clothes. All such clothing must be removed and changed each time the person leaves the department.
iv. Disposable items must not be re-used. Reusable gloves must be cleaned and dried at least daily.
v. A hand hygiene facility complete with soap and paper towels, must be available close to the working areas.
vi. Staff must be aware of the possibility of extraneous items and sharps containers must be available.
 vii. Staff must be aware of actions to take in the event of a sharps injury.
 viii. 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.
 ix.
x. All sharps obtained during sorting at laundry must be recorded in designated register, and respective unit and HICC should be provided with the at least monthly feedback.

19.9 Spillage of contaminated linen
 1. Wear gloves, replace the linen in an appropriate bag.
 2. Clean the surface as per spill management policy and wash the surface with detergent and water and dry. Wash hands thoroughly after removing gloves.

19.10 Thermal disinfection times and temperatures and environmental issues in the laundry
19.10.1 Disinfection of used (soiled and fouled) linen
  i. A sluice cycle is incorporated into washing machines for the removal of organic matter from fouled linen.
  ii. Put 200 g of bleaching powder (25 L water) in one sluice cycle to disinfect soiled linen.
  iii. Wash loads will have a mixing time of 8 minutes added to the temperature holding times.
  iv. The wash temperatures will be maintained:
19.10.2 Disinfection of suspected (or known) infected linen
  i. The temperatures described previously will adequately disinfect linen.
  ii. This linen must not be processed in a batch continuous washing machine, but are processed in a washer extractor.
19.10.3 Disinfection of heat-labile linen (Blanket)
  i. If soiled, than first dip the blanket in Bleaching powder (0.5%) for 20 minutes, than sluicing will be done to wash off any organic material stick to it.
  ii. Linen in this category must be laundered in a machine at 40°C and dried at 60°C using tumble dryers.
  iii. Bleaching powder (0.5%) may be used in the penultimate rinse.

19.11 Disposal of Linen
 The linen that required to be dispose off must be disinfected (for e.g. in sluicing machine) and duly washed as soiled linen described above. After drying this linen records are presented to the condemnation committee. After due certification from the committee such linen should be shredded or cut in small pieces and then dispose off in yellow bag to bio-medical waste collector for final disposal.

19.12 General measures to prevent infection
  i. 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.
ii. All washing machines will be kept clean and free from algae.

iii. 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.

References:
20. VEHICLE DISINFECTION

Patient care areas must be cleaned and disinfected after each patient use. Some general guidelines for vehicle disinfection while the vehicle is in use are outlined as below:

1. Cot linen and pillow will be changed between patient use. A separate bed sheet should be used for each patient.
2. The spill kit will be used for cleanup of body fluids.
3. All hard surfaces are wiped with disinfectant used for terminal cleaning as needed. It should also be done weekly routinely.
4. The floor is washed as needed and done each shift routinely.
5. Garbage bags will be emptied between calls.
6. Cab and patient care area are kept free of litter or expendable supplies used on a previous patient.
7. Entire vehicle are cleaned each shift as needed.
8. Sister Incharge (Emergency Ward) will be responsible for monitoring of cleaning & medical kit maintenance in each shift.
21. ENGINEERING CONTROL

21.1 Scope
Area in and around the hospital building.

21.2 Responsibility
PWD Engineers – Civil and Electrical are responsible for maintenance and engineering control of the facility.

The preventive maintenance of all equipment will ensure efficiency of all staff and reduce chances of contamination of air and water. The proper care and maintenance of the entire physical structure will also reduce accumulation of dust and spores in the environment. Thus the engineering dept and its personnel are important links in the chain of activities towards hospital infection control.

All personnel should apply universal precautions when in contact with patients or blood and body fluids.

21.2.1 General
1. Engineering personnel shall report to the ward sister prior to commencing work in a patient’s room or area, and follow her directions with regard to dressing, scrubbing etc. Engineering personnel shall check out with the ward sister upon completion of work.
2. Engineering employees shall maintain a neat, clean appearance at all times. All engineering personnel must be aware of universal precautions.
3. Prior to entering areas requiring sterile attire such as the OT, engineering employees shall wear the prescribed clothing. Engineering personnel shall check in and out with the permission of the supervisor.
4. Hand washing are followed before and after leaving the patient care area.

21.2.2 Plumbing Job Guidelines
1. Hospital water supply systems shall not be connected with any other piping system or fixtures that could allow contamination without the use of adequate air gaps or approved back flow preventers or vacuum breakers.
2. When using implements to unstop faulty drains, wear rubber gloves.
3. When robbing out main sewer lines, or when exposed to gross contaminated wastes, wear rubber boots and rubber gloves.
4. After exposure to sewer lines or gross contaminated waste, clean exposed areas of body with soap and water. Change uniform if necessary. Do not return to patient care areas before cleaning up.

21.2.3 Physical Barriers Between Repair Area And Patient Care Facility
i. When any construction or repair work is carried out in patient care areas the supervisors must inform the medical administrator, who will inform the heads of the concerned departments so that patient may be shifted if required.
ii. When work is carried out in areas where immune compromised patients or that requires a sterile atmosphere, adequate physical barriers must be present to prevent the spread of fungus and other such microbes, through dust and debris generated.
iii. All areas that require a sterile atmosphere must be fumigated before use following construction work.
iv. Ventilation Systems
v. Every six months cleaning of all AC ducts and AC filters must be carried out in a systematic manner throughout the hospital.

vi. AC filters are placed in water and soap solution for at least an hour at each cleaning.

vii. In areas such as the microbiology labs where handling of infected material is carried more frequent checks at least once in two months and cleaning of AC filters is required.

viii. In areas where central air-conditioning is used the moisture of the air and the ventilator air changes must be carefully monitored. All ducts must be clean thoroughly at every six months.

ix. The following parameters of the Air Conditioning system are monitored:

- **Temperature:** 21 ± 3°C
- **Humidity** – 40-60% with variation +/- 5%
- **HEPA Filter Monitoring** Air sampling is not routinely recommended for routine monitoring of ventilation system
- **Air sampling is required before commissioning of a new OT, after any repair or maintenance of ventilation system, any new construction or repair of hospital building.**
- **In case of suspected outbreak, fogging & Surveillance is initiated in OTs ICUs & Wards respectively.**
22. BODY HOLDING AREA PRACTICES

22.1 Scope
in case of death either the body is being handed over to the families, or unclaimed bodies and MLC cases are transferred to the Mortuary

22.2 Purpose
By taking into consideration the infection control issues and feelings of the family with the body and other patients and family present in the same ward.

22.3 Responsibility
Treating team of doctors and nurses

22.4 Policy
1. In case of death body can be kept maximum three hours in the ward, for the documentation and other formalities and handed over to the family.
2. If the family members are not available or due to some other circumstances unable to shift the body, than the body will be shifted to the designated Body Holding area of the ward, where it can be kept maximum six hours, after that body will be transferred to the Mortuary.
APPENDIX 1. HIC INDICATORS

Various indicators used for hospital associated infections include:
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 utilisation 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 100
   - 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 (DAIR):**

\[
\text{DAIR} = \frac{\text{No. of DAIR for a specific site}}{\text{Number of device days}} \times 1000
\]

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 (g)
   Defined drug Dose (g)

**Calculation of Hand Hygiene Compliance:**

Compliance (%) = \( \frac{\text{Actions}}{\text{Opportunities}} \times 100 \)
APPENDIX 2: 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 bacteria’s, viruses, fungi or spores.

A 2.1 BLOOD STREAM INFECTIONS

<table>
<thead>
<tr>
<th>Laboratory confirmed blood stream infection</th>
<th>Central line-associated blood stream infection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LCBI -1</strong></td>
<td><strong>LCBI -2</strong></td>
</tr>
<tr>
<td>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</td>
<td>Patient has at least one of the following signs or symptoms: fever (&gt;38.0°C), 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.</td>
</tr>
</tbody>
</table>

A2.2 SURGICAL SITE INFECTION (SSI)

Must meet the following criteria:

<table>
<thead>
<tr>
<th>Superficial SSI</th>
<th>Deep SSI</th>
<th>Organ/Space SSI</th>
</tr>
</thead>
</table>

Delhi State Health Mission, Department of Health and Family Welfare, GNCTD
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 under section A 2.3 (see below)

** 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 under section A 2.3 (see below)

** 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.
A 2.3. Surveillance period for deep incisional or organ/space SSI

Following list is of Selected NHSN Operative Procedure Categories.
Day 1 = the date of the procedure

30-day Surveillance
Operative Procedures
Limb amputation
Appendix surgery
Kidney surgery
Shunt for dialysis
Bile duct, liver or pancreatic surgery
All bladder surgery
Colon surgery
Caesarean section
Gastric surgery
Abdominal hysterectomy
Laminectomy
Neck surgery
Prostate surgery
Rectal surgery
Small bowel surgery
Spleen surgery
Thyroid and parathyroid surgery
Vaginal hysterectomy
Exploratory laparotomy

90-day Surveillance

Operative Procedure
Breast surgery
Craniotomy
Spinal fusion
Open reduction of fracture
Herniorrhaphy
Hip prosthesis
Knee prosthesis
## 2.4 Urinary Tract Infection

### Symptomatic UTI (SUTI)
Must meet at least one of the following criteria:

<table>
<thead>
<tr>
<th>SUTI 1a</th>
<th>SUTI 1b</th>
<th>SUTI 2</th>
<th>ABUTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catheter-associated Urinary Tract Infection (CAUTI)</td>
<td>Non-Catheter-associated Urinary Tract Infection (Non-CAUTI)</td>
<td>CAUTI or Non-CAUTI in patients 1 year of age or less</td>
<td>Patient must meet 1, 2, and 3 below:</td>
</tr>
</tbody>
</table>

| 1. Patient had an indwelling urinary catheter that had been in place for >2 days 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 • costovertebral 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 |

| 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 |

| 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 bacterium to the urine culture, or meets LCBI criterion 2 (without fever) and matching common commensal(s) in the urine. |
A 2.5 VENTILATOR ASSOCIATED PNEUMONIA (VAP)

<table>
<thead>
<tr>
<th>Patient with underlying diseases (^2) has 2 or more imaging test results with one of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>New or progressive and persistent infiltrate</td>
</tr>
<tr>
<td>Consolidation</td>
</tr>
<tr>
<td>Cavitation</td>
</tr>
<tr>
<td>Pneumatocoeles, in ≤1 y.o.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient without underlying disease (^1) has 1 or more imaging test results with one of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>New or progressive and persistent infiltrate</td>
</tr>
<tr>
<td>Consolidation</td>
</tr>
<tr>
<td>Cavitation</td>
</tr>
<tr>
<td>Pneumatocoeles, in ≤1 y.o.</td>
</tr>
</tbody>
</table>

Infants ≤1 y.o.
- Worsening gas exchange (e.g., \(O_2\) desats [e.g., pulse oximetry <94%], \(O_2\) req. or ↑ ventilation demand)
- and three of the following:
  - Temperature instability
  - Leukopenia (<4,000 WBC/mm\(^3\)) or leucocytosis (≥15,000 WBC/mm\(^3\)) and left shift (≥10% band forms)
  - New onset of purulent sputum \(^3\) or change in character of sputum \(^4\), or \(\uparrow\) respiratory secretions, or \(\uparrow\) suctioning requirements
  - Apnea, tachypnea \(^5\), nasal flaring with retraction of chest wall or grunting
  - Wheezing, rates \(^6\), or mernis
  - Cough
  - Bradycardia (<100 beats/min) or tachycardia (>170 beats/min)

Children >1 or ≤12 y.o.
- At least three of the following:
  - Fever (>38.0°C/100.4°F) or hypothermia (<36.0°C/96.8°F)
  - Leukopenia (<4,000 WBC/mm\(^3\)) or leucocytosis (≥15,000 WBC/mm\(^3\))
  - New onset of purulent sputum \(^2\) or change in character of sputum \(^2\), or \(\uparrow\) respiratory secretions, or \(\uparrow\) suctioning requirements
  - New onset of worsening cough, or dyspnea, sneeze, or tachypnea
  - Rates \(^5\) or bronchial breath sounds
  - Worsening gas exchange (e.g., \(O_2\) desats [e.g., pulse oximetry <94%], \(O_2\) req. or ↑ ventilation demand)

VENTILATOR ASSOCIATED PNEUMONIA
APPENDIX 3. List of disinfectants currently available in the hospital and their use.

(Representative table. Will vary from hospital to hospital depending on availability of agents)

<table>
<thead>
<tr>
<th>#</th>
<th>Department</th>
<th>70% ethyl alcohol or isopropyl alcohol</th>
<th>0.5%-1% Sodium Hypochlorite</th>
<th>2% Glutaraldehyde</th>
<th>(5% Glutaraldehyde + 11.2% chemically bound formaldehyde + 5% benzalkonium chloride) Currently available formulation - Sanillocid</th>
<th>Bleaching powder (70% available chlorine)</th>
<th>(0.5% chlorhexidine + 70% ethyl alcohol) Currently available formulation - Nanzilon</th>
<th>5% Povidone iodine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>O.T.</td>
<td>For skin disinfection, Trolley tops, cautery leads</td>
<td>Disinfection of infected plastics (syringes, cannula caps)</td>
<td>Disinfection of sharp instruments or heat labile instruments (scissors, laryngoscope)</td>
<td>(0.5%) Tables, trolleys, tiles, floor cleaning, surgery tables.</td>
<td>Spill management</td>
<td>Hand hygiene</td>
<td>Preoperative Skin preparation</td>
</tr>
<tr>
<td>2</td>
<td>ICU</td>
<td>For skin disinfection, Trolley tops, monitors leads, BP cuff</td>
<td>Surface disinfection (Bed frames, trolleys, tiles). Disinfection of infected plastics (syringes, cannula caps), for cleaning of patient’s furniture and fittings.</td>
<td>Disinfection of suction jars &amp; tubings, laryngoscope, ( \text{O}_2 ) Humidifiers</td>
<td>Terminal cleaning of furniture of patients on weekly basis (Bed frames, trolleys, tiles).</td>
<td>Spill management</td>
<td>Hand hygiene</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Lab</td>
<td>Surface cleaning (tables, Biosafety cabinets, work stations)</td>
<td>Disinfection of used syringes, slides, cover slips &amp; culture loops etc.</td>
<td>NR</td>
<td>NR</td>
<td>Hand hygiene</td>
<td>NR</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ward</td>
<td>For skin disinfection</td>
<td>Disinfection</td>
<td>Terminal</td>
<td>Hand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Location</td>
<td>Activity</td>
<td>Disinfectant of infected plastics (syringes, cannula caps, patient furniture and fixtures.)</td>
<td>Heat labile and other instruments (scissors etc)</td>
<td>Cleaning of furniture of patients on weekly basis (Bed frames, trolleys, tiles.)</td>
<td>Hygiene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>------------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Dressing room</td>
<td>For skin disinfection, Trolley tops etc</td>
<td>Disinfection of infected plastics (syringes etc)</td>
<td>Disinfection of instruments</td>
<td>NR</td>
<td>NR</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NR – Not required
APPENDIX 4. Housekeeping Check List for OTs

Before start of OT daily cleaning of parts surrounding

<table>
<thead>
<tr>
<th>Date</th>
<th>OT Table</th>
<th>OT Light</th>
<th>Boyle’s App/A</th>
<th>Anaesthesia trolley</th>
<th>IV Stand</th>
<th>Cautery Machine &amp; Cautery, Paddle</th>
<th>Instrument trolley (Especially trolley top)</th>
<th>Door Handle</th>
<th>Suction Machine</th>
<th>Hand Washing Area/Scrubbing Area</th>
<th>AC Point checking</th>
<th>Floor Cleaning</th>
<th>Prepare bleach solution</th>
</tr>
</thead>
</table>

During Surgery

<table>
<thead>
<tr>
<th>Date</th>
<th>Any Spillage</th>
<th>Management of Spill</th>
</tr>
</thead>
</table>

In between surgery

<table>
<thead>
<tr>
<th>Date</th>
<th>OT table</th>
<th>Patients</th>
</tr>
</thead>
</table>

Appendix 4: Housekeeping Check List for OTs GNCTD/…………/SOP/IC/12
| Surroundings               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Cleaning of suction tubing and jar |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

### At the end of day

<table>
<thead>
<tr>
<th>Date</th>
<th>OT Table</th>
<th>OT Light</th>
<th>Boyle’s App</th>
<th>IV Stand</th>
<th>Cautery Machine &amp; Cautery, Paddle</th>
<th>Instrument trolley/ Specially trolley top</th>
<th>Door Handle</th>
<th>Cleaning of suction jar followed by sterilization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Date

Cleaning done by
1. NO(M)
2. HK(M)

1. NO(E)
2. HK(E)

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
<table>
<thead>
<tr>
<th>Task</th>
<th>Completion Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wash the OT floor with soap &amp; water</td>
<td></td>
</tr>
<tr>
<td>Clean AC filters/ AC ducts</td>
<td></td>
</tr>
<tr>
<td>Clean doors, walls, windows</td>
<td></td>
</tr>
<tr>
<td>Seal all crevices, holes before fumigation</td>
<td></td>
</tr>
<tr>
<td>Replace all portable items back after cleaning</td>
<td></td>
</tr>
<tr>
<td>All the AC point sealed</td>
<td></td>
</tr>
<tr>
<td>Complete fumigation process as per protocol</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 5. Daily ICN round format

<table>
<thead>
<tr>
<th>Name of Unit:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Checklist/ Date</td>
<td></td>
</tr>
</tbody>
</table>

| BMW |  |
| Segregation |  |
| Sharps disposal |  |
| Patient bundle care |  |
| Intravascular device |  |
| Urinary bag |  |
| Ventilator |  |
| Bed sore |  |
| Dressing Trolley |  |
| Crash cart |  |
| Disinfection & sterilization |  |
| Suction apparatus |  |
| Reusable items |  |
| Others |  |
| Blood spillage Policy |  |
| Cleanliness |  |
| Personnel protec Equip |  |
| Usage |  |
| Availability |  |
| Hand Washing |  |
| Surveillance reports |  |
| Last report |  |
| Date sent |  |
| Who took sample |  |
| Sites for sampling |  |
| Before/ after cleaning |  |
| Remarks |  |
| Name of Sister incharge |  |
| Signature of Sister incharge |  |
| REMARKS |  |
| A: Appropriate; IA: Inappropriate |  |
### Appendix 6: 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

<table>
<thead>
<tr>
<th>Date of injury:</th>
<th>Time:</th>
<th>Location:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Date of reporting:</th>
<th>Time:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>HEALTH CARE WORKER</th>
<th>SOURCE PATIENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>Name:</td>
</tr>
<tr>
<td>Age/Sex:</td>
<td>Age/sex:</td>
</tr>
<tr>
<td>Designation:</td>
<td>Diagnosis:</td>
</tr>
<tr>
<td>H/O Blood transfusion:</td>
<td>History:</td>
</tr>
<tr>
<td>HBV Immunization status</td>
<td>a. Complete</td>
</tr>
<tr>
<td></td>
<td>b. Partial</td>
</tr>
<tr>
<td></td>
<td>c. No</td>
</tr>
<tr>
<td>Ward/ICU/OT:</td>
<td></td>
</tr>
</tbody>
</table>

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 calibre 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.:
  1. An accident with a high calibre needle (>18 G) visibly contaminated with blood.
  2. A deep wound.
  3. Transmission of a significant volume of blood.

**Practice of Standard Precautions:** Yes/No

**Whether on ART:** Yes/No

**Risk factors for HIV/STD:**

**First Aid measures:**
- Wash/Bleed/Antiseptic/TT

**Action taken in Casualty**
- Hepatitis B Vaccination: Yes/No
- HBIG: Yes/No
- Anti HBSAg Titre: Yes/No
- If yes; Level of antibody: Responder/Non-responder
- PEP advised/taken: Yes/No

**Consent/Signature:**
- Consent/Signature:

<table>
<thead>
<tr>
<th>Contact no.</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SIGNATURE AND STAMP OF UNIT INCHARGE/CMO**

---

FOR MICROBIOLOGY LAB USE ONLY

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Delhi State Health Mission, Department of Health and Family Welfare, GNCTD
**Appendix 6: Proforma for Occupational Exposure to Blood, body fluids & Sharp Injuries**

**GNCTD/…………/SOP/IC/12**

<table>
<thead>
<tr>
<th>HEALTH CARE WORKER</th>
<th>SOURCE PATIENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TEST</strong></td>
<td><strong>DAY 0</strong></td>
</tr>
<tr>
<td>HIV</td>
<td></td>
</tr>
<tr>
<td>HBsAg</td>
<td></td>
</tr>
<tr>
<td>HCV</td>
<td></td>
</tr>
</tbody>
</table>

*Above tests done by Rapid testing methods only*

**All Reactive / Positive results must be correlated clinically and confirmed by ELISA**

**TECHNICIAN:**

**DATE / TIME:**

**MICROBIOLOGIST**
# Appendix 7. Checklist for infection control round in dialysis unit

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

Date of round:
Appendix 8: EO₂ Gas Sterilizer Operation Reference Chart

**Warm up**

Make sure sterilizer is connected to power.
Sterilizer should come up to temperature in about 15 min (50ºC).

**PREPARATION OF ITEMS FOR STERILIZATION**

1. Disassemble and wash with detergent and water.
2. Air-dry; do not oven-dry.
3. Prehumidify items that cannot be washed.
4. Wrap in paper, cloth, or EO permeable film.

**LOAD STERILIZATION BAG**

1. Place wrapped items in medium (#5), or large (#6) sterilization bag.
2. Mark Dosimeter card with time/date of sterilization and place in the core of the load. Include biological control if appropriate.
3. Place fresh Humidichip in sterilization bag.
4. Match EO Gas cartridge size (#5, #6) with number on sterilization bag. Remove trigger safety and place EO Gas cartridge in sterilization bag.
5. Heat-seal sterilization bag.

**PREHEAT STERILIZER WARM UP**

**PREHUMIDIFICATION**

1. Wrap items to be prehumidified individually as for sterilization.
2. Place wrapped items in medium (#5), or large (#6) sterilization bag.
3. Mark Dosimeter card with time/date of sterilization and place in the core of the load. Include biological control if appropriate.
4. Match EO Gas cartridge (#5, #6) with number on sterilization bag. Remove trigger safety and place EO Gas cartridge in sterilization bag.
5. Heat-seal sterilization bag. DO NOT ACTIVATE EO Gas CARTRIDGE.
6. Place sterilization bag in sterilizer cabinet.
7. Humidify sterilization bag contents for 2 hours at 50ºC.
8. Remove sterilization bag from sterilizer and humidify for an additional 2 hours at room temperature before sterilization.

**LOAD LINER BAG**

**BIOLOGICAL CONTROLS**
Challenge the EO Gas procedure on the schedule recommended by your governing body or whenever changing packaging materials or techniques.
Use a Steritest or other appropriate biological control.
Position control in core of load.
1. Press Load button on sterilizer control panel.
2. When purge cycle is complete, the door is unlocked and the cabinet can be opened.
3. Activate EOGas cartridge within sterilization bag by depressing trigger button.
4. Immediately place sterilization bag into sterilizer cabinet and close door.

1. Leave sterilization bag undisturbed in the sterilizer for 16 hours.
2. Sterilization and aeration proceed simultaneously during the 16-hour cycle.
3. After 16 hours, remove the sterilization bag from the cabinet. Check the Dosimeter; make sure the blue line has progressed beyond the triangular mark.
4. Removed the sterile items from the sterilization bag. Discard the sterilization bag and used cartridge.
### Appendix 9. Antibiotic dosage forms, dose, storage & reconstitution

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Age group</th>
<th>Condition</th>
<th>Route of administration</th>
<th>Dose &amp; frequency</th>
<th>Duration of therapy</th>
<th>Storage &amp; Reconstitution</th>
<th>Dosage Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colistin methsulfate</td>
<td>Neonate&lt;sup&gt;3&lt;/sup&gt;</td>
<td>IV</td>
<td>IV 75,000 I.U. In three divided doses 8 h</td>
<td>-</td>
<td>Stored in refrigerator (4°C)</td>
<td>Reconstituted drug can be stored for 48 h IV preparation: 150mg vial to be reconstituted with 2ml sterile water for injection (SWI) to obtain a 75mg/ml solution.</td>
<td>Vial- 150 mg, Syrup 12.5 mg /25 mg per 5 ml</td>
</tr>
<tr>
<td></td>
<td>Infants &amp; Child</td>
<td>IV</td>
<td>IV 75,000 I.U. In three divided doses 8 h &lt; 12y-Safety &amp; efficacy not established</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Adult&lt;sup&gt;4&lt;/sup&gt;</td>
<td>IV</td>
<td>&lt;60kg: 75,000 units/kg daily. In 3 divided doses 8 h</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV</td>
<td>&gt;60kg: 2 million units In 3 divided doses 8 h</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ertapenem</td>
<td>Neonates: Less than 3 yrs safety and efficacy not established. In children prophylaxis not recommended</td>
<td>IV/IM</td>
<td>15 mg/kg/ 24 h (Max: 1 g /d ) By IV infusion over 30 minutes In two divided doses</td>
<td>3-14 days</td>
<td>Storage: Before reconstitution, store at &lt;25°C (77°F) Reconstituted IV solution may</td>
<td>Vial- 1g</td>
<td></td>
</tr>
<tr>
<td>Age Group</td>
<td>Condition</td>
<td>Route</td>
<td>Dose and Administration</td>
<td>Duration</td>
<td>Storage Instructions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>-----------</td>
<td>-------</td>
<td>--------------------------</td>
<td>----------</td>
<td>----------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;12 y</td>
<td>Community-Acquired Pneumonia, Complicated Urinary Tract Infections (Including Pyelonephritis)</td>
<td>IV/IM</td>
<td>1g /24 h Single dose daily, After ≥ 3 days of parenteral therapy, may be switched to appropriate PO regimen if patient improves clinically</td>
<td>Upto 14 days</td>
<td>be either (a) stored at room temperature and used within 6 h or (b) refrigerated, stored for upto 24 h and used within 4 h after removal from refrigerator.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-12 y</td>
<td>Acute Pelvic Infections:</td>
<td>IV/IM</td>
<td>1g /24 h Single dose daily</td>
<td>3-10 days</td>
<td>Do not freeze. IV preparation: Reconstitute 1g vial with 10 mL Sterile water for injection (SWI), Normal saline (NS) or Bacteriostatic water for injection (BWI); shake well; transfer to 50 mL Normal saline (NS). Complete the infusion within 6 hours of reconstitution. IM Preparation:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;12 y</td>
<td>Complicated intra-abdominal infections</td>
<td>IV/IM</td>
<td>1g /24 h Single dose daily</td>
<td>5-14 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-12 y</td>
<td>Complicated Skin/skin structure infections: (excludes diabetic foot infections with)</td>
<td>IV/IM</td>
<td>1g /24 h Single dose daily</td>
<td>7-14 days</td>
<td>May be continued upto 4 weeks for diabetic foot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;12 y</td>
<td></td>
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</tr>
<tr>
<td>Condition</td>
<td>Dosage Form</td>
<td>Route</td>
<td>Dose</td>
<td>Frequency</td>
<td>Duration</td>
<td>Reconstitution Details</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>Adult Community-Acquired Pneumonia, Complicated Urinary Tract Infections (Including Pyelonephritis)</td>
<td>IV/IM</td>
<td></td>
<td>1 g /24 h</td>
<td>Single dose daily</td>
<td>Upto 14 days</td>
<td>Reconstitute 1 g vial with 3.2 mL of 1% lidocaine injection (without epinephrine); shake well; use within 1 h after preparation.</td>
<td></td>
</tr>
<tr>
<td>Acute Pelvic Infections:</td>
<td>IV/IM</td>
<td></td>
<td>1 g /24 h</td>
<td>Single dose daily</td>
<td>3-10 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complicated intra-abdominal infections:</td>
<td>IV/IM</td>
<td></td>
<td>1 g /24 h</td>
<td>Single dose daily</td>
<td>5-14 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complicated Skin/skin structure infections (excludes diabetic foot infections with osteomyelitis)</td>
<td>IV/IM</td>
<td></td>
<td>1 g /24 h</td>
<td>Single dose daily</td>
<td>7-14 days</td>
<td>May be continued upto 4 weeks for diabetic foot</td>
<td></td>
</tr>
<tr>
<td>Advanced renal failure:</td>
<td>IV</td>
<td></td>
<td>500 mg /24 h</td>
<td>Single dose daily</td>
<td>-</td>
<td>By IV infusion over 30 minutes.</td>
<td></td>
</tr>
<tr>
<td>Surgical Prophylaxis:</td>
<td>IV infusion</td>
<td></td>
<td>1 g by IV infusion over 30</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Antibiotic</td>
<td>Indication</td>
<td>Dose</td>
<td></td>
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<tr>
<td>Meropenem</td>
<td>Sepsis:</td>
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<tr>
<td></td>
<td>IV, 20 mg/kg/dose, Twice daily, Every 12 h IV infusion over 30 min</td>
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<tr>
<td></td>
<td>Not recommended below 3 months</td>
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</tr>
<tr>
<td></td>
<td>Infants &amp; Child</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Meningitis and Infections caused by Pseudomonas species</td>
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<tr>
<td></td>
<td>IV, 40 mg/kg/dose, Thrice daily, Every 8 h IV infusion over 30 min</td>
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<td></td>
<td>3 months - 12 y</td>
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<tr>
<td></td>
<td>Cystic Fibrosis</td>
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<tr>
<td></td>
<td>IV, 25-40 mg/kg, Thrice daily, Every 8 h IV infusion over 30 min or IV Bolus inj. Over 5 min</td>
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<tr>
<td></td>
<td>4-18 y</td>
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<tr>
<td></td>
<td>Adult</td>
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<td></td>
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<tr>
<td></td>
<td>MRSA infections:</td>
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</tr>
<tr>
<td></td>
<td>PO/IV, 600 mg, Twice daily</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Vancomycin-resistant E. faecium</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PO/IV, 600 mg, Twice daily</td>
<td>14-28 days</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Community-acquired and nosocomial pneumonia; and bacteremia:</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>PO/IV, 600 mg, Twice daily</td>
<td>10-14 days</td>
<td></td>
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<tr>
<td></td>
<td>Uncomplicate</td>
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</tr>
<tr>
<td></td>
<td>PO/IV, 600 mg, Twice daily</td>
<td>10-14</td>
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</tr>
</tbody>
</table>

Notes:
- Reconstituted with Normal Saline, 5% Dextrose. Discarded immediately after use. Do not refrigerate.
- Powder for Inj. 500 mg, 1 g vial.
<table>
<thead>
<tr>
<th><strong>Cilastatin/Imipenem</strong></th>
<th><strong>Skin Infections:</strong></th>
<th><strong>Days</strong></th>
<th><strong>Dosages</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neonates</strong></td>
<td>IV/IM</td>
<td>50-75 mg/kg/24 h every 6-8 h</td>
<td>-</td>
</tr>
<tr>
<td><strong>Infants &amp; Child</strong></td>
<td>IV/IM</td>
<td>60-100 mg/kg daily (max. 4 g) in 4 divided doses</td>
<td>-</td>
</tr>
<tr>
<td><strong>Cystic Fibrosis</strong></td>
<td>IV/IM</td>
<td>90 mg/kg/24 h in 4 divided doses</td>
<td>-</td>
</tr>
</tbody>
</table>
| **Adult**               | IV/IM                | IV: 250-1000 mg/dose Every 6-8 h  
IV give slowly over 30-60 min  
**Max. dose:** 4 g/24 h or 50 mg/kg/24 h, whichever is less.  
**IM:** 500-750 mg/dose Twice daily - 12 h | - |
| **Infections due to susceptible organisms** | IV | 1-2 g daily in 3-4 divided doses | - |
| **Less sensitive organism:** | IV | Upto 50 mg/kg daily (max 4 g daily) | - |

The dry powder should be stored at a temperature below 25°C (77°F). Reconstituted solutions stored for 4 hours at room temperature or for 24 hours under refrigeration (5°C). Solutions should not be frozen. The I.M. preparation must not to be administered I.V.
<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Age Group</th>
<th>Route-administration</th>
<th>Dosage/Duration</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Piperacillin +</strong></td>
<td><strong>Neonates</strong></td>
<td>IV infusion</td>
<td>50-100 mg/kg/dose (as Piperacillin component) IV infusion over 30 min</td>
<td>Stored in refrigerator (refrigerate only)</td>
</tr>
<tr>
<td><strong>Tazobactam</strong></td>
<td></td>
<td></td>
<td></td>
<td>Reconstituted solutions can be stored for 48 h</td>
</tr>
<tr>
<td></td>
<td><strong>Infants &amp; Child</strong></td>
<td>IV/IV infusion</td>
<td>90 mg/kg By slow IV inj./ infusion 6h in combination with an aminoglycoside. Max. 4.5 g / 8h</td>
<td>Reconstituted with Normal saline.</td>
</tr>
<tr>
<td></td>
<td><strong>Child &gt; 50 kg</strong></td>
<td>IV</td>
<td>4.5 g Four times a day</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Child 2y -12 y</strong></td>
<td>Appendicitis</td>
<td>112.5 mg/kg By slow IV inj./ infusion every 8h Max. 4.5 g / 8h</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Adult</strong></td>
<td>Neutropenic adults</td>
<td>4.5 g Four times a day</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Nosocomial</strong></td>
<td>IV</td>
<td>4.5 g Four times a day May be given via bolus inj. Over 3-5 min or infusion over 20-30 min. 7-14 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Pneumonia</strong></td>
<td>IV</td>
<td>2/0.25 g Every 6-12 h May be given as bolus Inj. over 3-5 min or infusion over 20-30 min 7-10 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Susceptible</strong></td>
<td>IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>infections except nosocomial pneumonia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Mild:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**The Infusion preparation must not be administered I.M**
<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Severe:</th>
<th>IV</th>
<th>Dose &amp; Administration</th>
<th>Storage &amp; Reconstitution</th>
<th>Drug Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampicillin + Sulbactum</td>
<td>Neonates</td>
<td>IV/IM</td>
<td>IM/IV: 400-300 mg/kg/24 h in 4 divided doses-6h</td>
<td>Reconstituted with sterile water. Stored at or below 30°C</td>
<td>Inj: 1.5 g vial</td>
</tr>
<tr>
<td></td>
<td>Infants &amp; Child</td>
<td>IV/IM</td>
<td>IM/IV: 400-400 mg/kg/24 h in 4 divided doses-6h</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adult</td>
<td>IV/IM</td>
<td>IM/IV: 1.5 g-3 g in 4 divided doses-6h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cefoperazone + Sulbactam</td>
<td>Neonates</td>
<td>--</td>
<td>--</td>
<td>Store below 25°C</td>
<td>Vial 1 g</td>
</tr>
<tr>
<td></td>
<td>Infants &amp; Child</td>
<td>--</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adult</td>
<td>Severe Infections: IV</td>
<td>IV infusion: 2-4 g or 3-6 g thrice daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mild- Mod. Infections: IV</td>
<td>IV infusion: 1-2 g twice daily</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Impaired Renal Function: Moderate-IV</td>
<td>3 g IV twice daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Impaired Renal Function: Severe-IV</td>
<td>1.5 g IV twice daily plus Cefoperazone 1 g IV twice daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vancomycin</td>
<td>Neonates</td>
<td>Meningitis: IV</td>
<td>15 mg/kg/dose every 6-18 h</td>
<td>Stored at room temperature</td>
<td>Injection: 0.5, 1, 5, 1 g Caps: 125, 250 mg Oral solution: 1g, 10g</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bacteremia IV</td>
<td>10 mg/kg/dose every 6-18 h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Upto 1 week age)</td>
<td>Serious staphylococcal infections:</td>
<td>IV</td>
<td>15 mg/ kg initially, then 10 mg/kg Twice daily Every 12 h</td>
<td>-</td>
<td>re. Reconstituted solution can be stored for 8 h. Reconstituted solution can be stored for 8 h. Reconstituted solution can be stored for 8 h. Discard if color change</td>
</tr>
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<td>------------------------------------------------</td>
</tr>
<tr>
<td>Infants &amp; Child (1wk-4 wk)</td>
<td>Serious staphylococcal infections:</td>
<td>IV</td>
<td>15 mg/ kg initially, then 10 mg/kg Thrice daily Every 8 h</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>(&gt; 1 month)</td>
<td>Serious staphylococcal infections:</td>
<td>IV</td>
<td>10 mg/kg Four times a day Every 6 h</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>Serious staphylococcal infections:</td>
<td>IV</td>
<td>IV : 500 mg Over at least 60 minutes every 5 h Or 1 g Over at least 100 minutes every 12 h</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Endocarditis prophylaxis (for procedures under general anaesthesia)</td>
<td>IV infusion</td>
<td>1 g IV infusion over at least 100 minutes then Gentamicin 120 mg at induction or 15 minutes before procedure. Note: Plasma conc. Monitoring required; peak plasma conc. (measured 2 h after infusion) should not exceed 30 mg/l; pre dose (trough) conc. Should not exceed 10 mg/l</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elderly over 65 years</td>
<td>IV</td>
<td>IV: 500 mg twice daily / 1 g once daily</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amphotericin-B²</td>
<td>Neonates</td>
<td>----</td>
<td>-</td>
<td>Stored at room</td>
<td>50 mg vial; contains sucrose. Mix with 5% Dextrose to</td>
</tr>
<tr>
<td>(Liposomal)</td>
<td>Infants &amp; Child</td>
<td>Clinical sepsis</td>
<td>IV infusion</td>
<td>5-7mg/kg/dose/ 24 h IV infusion over 2h</td>
<td>5-7 days</td>
</tr>
<tr>
<td>Antibiotic</td>
<td>Dose/Condition</td>
<td>Route</td>
<td>Frequency</td>
<td>Duration</td>
<td>Storage</td>
</tr>
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</tr>
<tr>
<td>Amphotericin- B&lt;sup&gt;2&lt;/sup&gt; (lipid complex)</td>
<td>Neonates</td>
<td>-</td>
<td>-</td>
<td>Stored at room temperature.</td>
<td>Reconstituted drug can be stored for 24 h</td>
</tr>
<tr>
<td></td>
<td>Infants &amp; Child</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adult</td>
<td>IV</td>
<td>2.5 -5 mg/kg/24 h Once a day</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Visceral leishmaniasis (Resistant/Relapse)</td>
<td>IV</td>
<td>1-3 mg/kg/24 h Once a day</td>
<td>5 days</td>
<td>Mix with 5% dextrose to conc. 1 mg/mL or 2mg/mL for fluid restricted patients. <strong>Infusion Rate:</strong> 2.5 mg/kg/h; shake the infusion bag every 2h if total infusion time exceeds 2h. <strong>Do not use</strong> an in-</td>
</tr>
<tr>
<td>Antibiotic</td>
<td>Dosage Form</td>
<td>Neonates &amp; Infants</td>
<td>Children</td>
<td>Adults</td>
<td>Optimal test dose</td>
</tr>
<tr>
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</tr>
<tr>
<td>Amphotericin-B²</td>
<td>IV</td>
<td>0.1 mg/kg/dose IV upto max. dose of 1 mg followed by remaining initial dose</td>
<td>Infuse over 2–6 h</td>
<td>-</td>
<td>Reconstituted drug can be stored for 24 h</td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>0.5-1 mg/kg/ 24h; infuse first dose over 6 h</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>Increase as tolerated by 0.25-0.5 mg/kg/24h once a day or alternate day.</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>0.5-1 mg/kg/24 h. Once a day or 1.5 mg/kg/dose Alternate day max 1.5 mg/kg/24 h</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PO</td>
<td>12 mg/kg/24 h PO Single dose</td>
<td>5 days</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

*Line filter.*
<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Indications</th>
<th>Dosage Form</th>
<th>Dose</th>
<th>Storage</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>Infections of upper &amp; lower respiratory tract, skin &amp; soft tissue, Otitis media, Uncomplicated genital infections due to Chlamydia trachomatis</td>
<td>IV/PO</td>
<td>500 mg once daily for 3 days Single dose or 500 mg on first day than 250 mg once daily for 4 days At least 1 h before or 2 h after food</td>
<td>-</td>
<td>3-7 days</td>
</tr>
<tr>
<td>Sinusitis</td>
<td></td>
<td>PO</td>
<td>500 mg PO or 2 g PO Single dose (extended release tablet)</td>
<td>-</td>
<td>3 days</td>
</tr>
<tr>
<td>Uncomplicated Chlamydial cervicitis or urethritis</td>
<td></td>
<td>PO</td>
<td>1 g single dose PO</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Gonococcal cervicitis or urethritis</td>
<td></td>
<td></td>
<td>2 g single dose PO</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Netilmicin</td>
<td>Neonates</td>
<td>IV</td>
<td>4-5 mg/kg Single dose in 24-48 h IV infusion over 30 min</td>
<td>Stored at 2-30 °C Do not freeze</td>
<td>Tab-10 mg, 25 mg, 50 mg, 100 mg, 200 mg</td>
</tr>
<tr>
<td>Infants &amp; Child</td>
<td></td>
<td>IM/IV infusion</td>
<td>2.25 mg/kg Thrice daily every 8 h</td>
<td>-</td>
<td>Inj-50 mg, 100 mg, 200 mg, 300 mg</td>
</tr>
<tr>
<td>Adult</td>
<td>UTI/non life threatening Infections</td>
<td>IM/IV infusion</td>
<td>4-6 mg/kg once daily or In 2-3 divided doses</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Life</td>
<td></td>
<td>IM/IV</td>
<td>Upto 7.5 mg/kg In three</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Infection Type</td>
<td>Dosage Form</td>
<td>Dose</td>
<td>Storage &amp; Reconstitution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Severe infections</td>
<td>IM/IV infusion</td>
<td>2-4 g daily once a day</td>
<td>Reconstituted with Distilled water.</td>
<td>Vial 200,400 mg</td>
<td></td>
</tr>
<tr>
<td>Surgical prophylaxis</td>
<td>IM/IV infusion</td>
<td>1 g daily once a day</td>
<td>Reconstituted solution retained for 48 h at 25°C and for 7 days at 4°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncomplicated Gonorrhoea</td>
<td>IM</td>
<td>250 mg Single daily Dose Deep IM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colorectal surgery (with antibacterial active against anaerobes)</td>
<td>By deep IM/IV infusion</td>
<td>2 g Single daily dose By deep IM/IV (over at least 2-4 minutes) or IV infusion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teicoplanin</td>
<td>Neonates IV Infusion</td>
<td>16 mg/kg followed by 8 mg/kg/d Single daily dose by IV infusion over 30 mins on first day than single daily dose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate infections</td>
<td>IV/IM</td>
<td>10 mg/kg, Every 12 h for first three doses Then 6 mg/kg Single dose daily</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe infections</td>
<td>IV/IM</td>
<td>10 mg/kg, Every 12 h for first three doses Then 10 mg/kg Single dose daily</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infants &amp; Child</td>
<td>--</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>Moderate IV/IM</td>
<td>400 mg Single dose on first day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tigecycline</strong></td>
<td>Neonates</td>
<td>IV/IM</td>
<td>Not Recommended</td>
<td>Stored at 20-25°C before reconstitution</td>
<td>50 mg vial.</td>
</tr>
<tr>
<td>----------------</td>
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<td>-------</td>
<td>-----------------</td>
<td>----------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Infants &amp; Child</td>
<td></td>
<td></td>
<td>Not Recommended</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult &gt;18 yrs</td>
<td></td>
<td>IV</td>
<td>Initially 100 mg IV infusion over 30-60 mins then 50 mg twice daily Every 12 h 5-14 days</td>
<td>Reconstituted with Normal Saline/5% dextrose. Reconstituted solution should be yellow/orange in colour, if not solution is discarded</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Co Amoxiclav</strong></th>
<th>Neonates Upto 3 months</th>
<th>IV/IV infusion</th>
<th>30 mg/kg Every 8-12 h</th>
<th>14 days</th>
<th>Reconstituted with Normal saline, Ringer Lactate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants &amp; Child 3</td>
<td>IV/IV infusion</td>
<td>30 mg/kg Every 6-12 h</td>
<td>14 days</td>
<td></td>
<td>Inj: 1.2 g vial Tab: 625 mg, 1000 mg Powder for oral suspension:</td>
</tr>
<tr>
<td>Fluconazole</td>
<td>Neonates</td>
<td>IV/PO</td>
<td>12 mg/kg loading dose, than 6 mg/kg dose 24-72 h IV infusion over 30 min or PO</td>
<td>Reconstituted with Normal Saline</td>
<td>Discard immediately after</td>
</tr>
<tr>
<td>-------------</td>
<td>----------</td>
<td>-------</td>
<td>--------------------------------------------------------------------------------</td>
<td>---------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Infants &amp; Child</td>
<td>IV/PO</td>
<td>12 mg/kg loading dose, than 6 mg/kg dose 24-72 h IV infusion over 30 min or PO</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>Vaginal</td>
<td>PO</td>
<td>150 mg Single stat dose</td>
<td>Should be used immediately within 20 minutes. Do not store above 25°C. Dry vial also kept in refrigerator. Oral suspension stored at 2-8°C. Do not freeze. Keep the container tightly closed.</td>
<td>125/31.25mg/5ml</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>Neonates &amp; Child</td>
<td>Infants &amp; Child</td>
<td>Adult</td>
<td>Acute uncomplicated cystitis</td>
<td>Gonorrhoea, chancroid, shigellosis or cholera</td>
</tr>
<tr>
<td>--------------</td>
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<td>-----------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Candidiasis</td>
<td>---</td>
<td>PO</td>
<td>IV/PO</td>
<td>PO</td>
<td>PO</td>
</tr>
<tr>
<td>use</td>
<td>---</td>
<td>Upto 20 mg/kg Twice daily (max. 1.5 g daily)</td>
<td>Oral:250-750 mg Twice a day IV:400 mg Three times a day</td>
<td>100 mg PO Twice a day</td>
<td>PO 500mg Single dose</td>
</tr>
<tr>
<td>Do not</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>3 days</td>
<td>-</td>
</tr>
<tr>
<td>refrigerate</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Reconstituted with Normal saline/ 5% dextrose. Discarded immediately after use</td>
</tr>
<tr>
<td></td>
<td>Prophylaxis of meningococcal meningitis</td>
<td>500 mg Single dose</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------------------------</td>
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<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Ceftazidime</strong></td>
<td>Neongates</td>
<td>IV</td>
<td>25-60 mg/kg / 24 h In two divided doses</td>
<td>-</td>
<td>Stored in refrigerator</td>
</tr>
<tr>
<td></td>
<td>Upto 2 months¹</td>
<td>IV</td>
<td>30-100 mg/kg/24 h In 2-3 divided doses</td>
<td>-</td>
<td>Reconstituted drug can be stored for 24 h</td>
</tr>
<tr>
<td></td>
<td>&gt; 2 months¹</td>
<td>IV</td>
<td>2 g¹ Three times a day IM/IV or IV infusion 1 g every 8 h/2g every 12h¹ IM doses over 1 g divided between more than one site</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Adult</td>
<td>Deep IM/IV or IV infusion</td>
<td>2 g every 8-12 h (elderly max. 3 g daily)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Severe inc. (Immuno-compromised)</td>
<td>IV</td>
<td>100-150 mg/24 h In 3 divided doses- 8 h</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Pseudomonal lung infection</td>
<td>IV</td>
<td>50-150 mg/24 h or 25-50 mg/kg/ dose IM or by slow IV push every 8-12 h</td>
<td>-</td>
<td>If stored in refrigerator (5⁰C) can be stored for 48 h</td>
</tr>
<tr>
<td></td>
<td>Group B Streptococcal meningitis</td>
<td>IV</td>
<td>200–300 mg/kg/24h In divided doses: 8 h</td>
<td>≥7 days</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Infants &amp; Child</td>
<td>IM/IV</td>
<td>IM/IV: 100–200 mg/kg/24 h PO: 50–100 mg/kg/24 h In 4 divided doses every 6 h</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Ampicillin**

|                  | Neongates                             | IM/IV              | 50-150 mg/24 h or 25-50 mg/kg/ dose IM or by slow IV push every 8-12 h | - | - |
|                  | Group B Streptococcal meningitis       | IV                 | 200–300 mg/kg/24h In divided doses: 8 h | ≥7 days | - |
| Infants & Child  | Mild-moderate infections:              | IM/IV/PO           | IM/IV: 100–200 mg/kg/24 h PO: 50–100 mg/kg/24 h In 4 divided doses every 6 h | - | - |

1. If stored in refrigerator (5⁰C) can be stored for 48 h
2. If stored at room temperature can be stored for 8 h
3. Injection (Powder for solution for injection), ceftazidime (as penta-hydrate) 250 mg vial.
4. Ampicillin (as sodium salt) 500 mg vial.
5. Dry syrup/Oral suspension (125mg/5 ml)
6. Capsules 250 mg, 500 mg
<table>
<thead>
<tr>
<th>Condition</th>
<th>Route</th>
<th>Dosage Details</th>
<th>Storage &amp; Reconstitution Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Severe:</strong></td>
<td>IM/IV</td>
<td>200–400 mg/kg/24h EVERY 4-6 h</td>
<td>-</td>
</tr>
<tr>
<td><strong>Meningitis:</strong></td>
<td></td>
<td>150-200 mg/kg daily in divided doses 4-6 h</td>
<td>-</td>
</tr>
<tr>
<td><strong>Adult</strong></td>
<td>IM/IV</td>
<td>500- 3000 mg h In divided doses: 4-6 h</td>
<td>-</td>
</tr>
<tr>
<td><strong>Meningitis</strong></td>
<td>PO</td>
<td>250-500 mg In divided doses: 6 h</td>
<td>-</td>
</tr>
<tr>
<td><strong>Erythromycin</strong></td>
<td></td>
<td><strong>Neonates</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PO</td>
<td>50 mg/kg/day In four divided doses- 6h</td>
<td>Stored at room temperature.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Neonatal chlamydial conjunctivitis, Pneumonia</strong></td>
<td>Reconstituted oral suspension or injection stored in refrigerator (36-46°F) for 10 days.</td>
</tr>
<tr>
<td></td>
<td>PO</td>
<td>250 mg Twice a day</td>
<td>Tablets, erythromycin (as stearate) 250 mg; (as ethyl succinate) 500 mg, Gastro resistant tablets/ capsules- 250 mg; Syp 300mg/5ml Oral suspension,(as stearate) 125 mg/5ml; (ethyl succinate) 125 mg/ 5 ml Infusion (powder for solution for infusion), erythromycin (as lactobinate) 1 g vial Gastro resistant tablets and capsules should be swallowed whole.</td>
</tr>
<tr>
<td></td>
<td>PO</td>
<td>40-50 mg/kg/day In four divided doses-6h</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum dose: 2 g/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>(not preferred agent for infants less than 1 month of age).</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Pertussis</strong></td>
<td>PO</td>
<td>125 mg PO Every 6 h</td>
<td></td>
</tr>
<tr>
<td><strong>Infants &amp; Child</strong></td>
<td></td>
<td>Infections due to sensitive organisms: Child upto 2 years</td>
<td></td>
</tr>
<tr>
<td><strong>Child 2-8 years</strong></td>
<td>PO</td>
<td>250 mg PO Every 6 h</td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>Age Group</td>
<td>Route</td>
<td>Dosage</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>--------------------</td>
<td>-------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Child over 8 years</td>
<td>PO</td>
<td>250 -500mg PO; upto 4 g in severe infections Every 6 h</td>
<td></td>
</tr>
<tr>
<td>Severe infections</td>
<td>IV/PO</td>
<td>50 mg/kg daily By continuous infusion or in divided doses four times a day- 6hourly Dose doubled PO</td>
<td></td>
</tr>
<tr>
<td>Adult Infections due to sensitive organisms</td>
<td>PO</td>
<td>500 mg Four times a day</td>
<td></td>
</tr>
<tr>
<td>Severe infections:</td>
<td>IV</td>
<td>50 mg/kg daily By continuous infusion or in divided doses four times a day- 6hourly</td>
<td></td>
</tr>
<tr>
<td>Early syphilis:</td>
<td>PO</td>
<td>500 mg PO 4 times daily</td>
<td>14 days</td>
</tr>
<tr>
<td>Non Gonococcal urethritis:</td>
<td>PO</td>
<td>500 mg PO 4 times daily</td>
<td>7 days</td>
</tr>
<tr>
<td><strong>Azithromycin</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Neonates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neonate s</td>
<td>Upto 15kg</td>
<td>10mg/kg Single dose daily</td>
<td>3 days</td>
</tr>
<tr>
<td><strong>Infants &amp; Child</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infants &amp; Child Community acquired pneumonia(6 months):; 5 days</td>
<td>PO</td>
<td>10 mg/kg on day 1 than 5 mg/kg/24 h for next 4 days PO Single dose daily ( max. 250 mg/24 h)</td>
<td>5 days</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stored at room temperature</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ampoule</strong>: 500 mg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tablet</strong>: 250 mg ,500 mg, 600 mg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Syrup 100 mg /200 mg in 5 ml</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oral Suspension</strong>: 100mg/5ml</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>200mg/5ml</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Extended Release oral suspension</strong>: 2g reconstituted</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>Route</td>
<td>Dosage Details</td>
<td>Duration</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------</td>
<td>---------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Otitis media 3 days regimen</td>
<td>PO</td>
<td>10 mg/kg/24 h Single dose daily(max. 500 mg/24 h)</td>
<td>3 days</td>
</tr>
<tr>
<td>Pharyngitis/Tonsillitis (2-15 yr):</td>
<td>PO</td>
<td>12 mg/ kg/24 h Single dose daily(max. 500 mg/24 h)</td>
<td>5 days</td>
</tr>
<tr>
<td>Adult Infections of upper &amp; lower respiratory tract, skin &amp; soft tissue, Otitis media, Uncomplicated genital infections due to Chlamydia trachomatis</td>
<td>IV/PO</td>
<td>500 mg once daily for 3 days or 500mg on first day than 250 mg once daily for 4 days At least 1 h before or 2 h after food³</td>
<td>3-7 days</td>
</tr>
<tr>
<td>Sinusitis</td>
<td>PO</td>
<td>500 mg PO or 2 g PO (extended release tablet)</td>
<td>3 days</td>
</tr>
<tr>
<td>Uncomplicated Chlamydial cervicitis or urethritis</td>
<td>PO</td>
<td>1 g single dose PO</td>
<td>-</td>
</tr>
<tr>
<td>Gonococcal cervicitis or urethritis</td>
<td>PO</td>
<td>2 g single dose PO</td>
<td>-</td>
</tr>
<tr>
<td>Acute PID</td>
<td>IV/PO</td>
<td>500 mg IV once a day for 1-2 days followed by 250 mg PO once a day</td>
<td>7 days</td>
</tr>
</tbody>
</table>

With 60 mL of water
Oral Powder (Sachet): 1 g
Ophthalmic Solution: 1% (2.5 ml)
### Appendix 9: Antibiotic Dosage Forms, Dose, Storage & Reconstitution

<table>
<thead>
<tr>
<th>Clarithromycin</th>
<th>Neonates</th>
<th>PO</th>
<th>7.5 mg/kg Twice daily</th>
<th>Stored at room temperature (&lt;25°C)</th>
<th>Tab: 250 mg, 500 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants &amp; Child</td>
<td>Acute otitis media, pharyngitis/tonsillitis, pneumonia, acute maxillary sinusitis, or uncomplicated skin infections</td>
<td>PO</td>
<td>15 mg/kg/24 h Twice daily every 12 h</td>
<td>Reconstituted solution not to be stored above 25°C and used within 14 days. Not to be stored in refrigerator</td>
<td>Granules for oral suspension: 125, 250 mg/5 mL (50, 100 mL) Powder for Concentrate for solution for infusion-500 mg</td>
</tr>
<tr>
<td>M. avium complex</td>
<td>PO</td>
<td><strong>Prophylaxis (1st episode and recurrence):</strong>&lt;br&gt;P O: 15 mg/kg/24 h Twice daily every 12 h <strong>Treatment:</strong>&lt;br&gt;P O: 15 mg/kg/24 h Twice daily every 12 h with other antimycobacterial drugs</td>
<td>Max. dose: 1 g/24 h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>IV</td>
<td>IV Infusion: 1 g/24 h Twice daily every 12h</td>
<td>2-5 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharyngitis/tonsillitis</td>
<td>PO</td>
<td>500 mg Twice daily every</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Metronidazole</strong></td>
<td><strong>Neonates</strong></td>
<td><strong>PO</strong></td>
<td><strong>Prophylaxis (1st episode and recurrence):</strong></td>
<td><strong>PO:</strong></td>
<td>500 mg/dose Twice daily every 12 h <strong>Treatment:</strong></td>
</tr>
<tr>
<td>-------------------</td>
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<td>--------</td>
<td>---------------------------------------------</td>
<td>--------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>M. avium complex</td>
<td></td>
<td></td>
<td>12 h</td>
<td></td>
</tr>
<tr>
<td>Infants &amp; Child</td>
<td>Anaerobic infections, Surgical prophylaxis</td>
<td>PO/IV:</td>
<td>7.5 mg/kg In three divided doses</td>
<td></td>
<td>7 days</td>
</tr>
<tr>
<td></td>
<td>Acute ulcerative gingivitis</td>
<td></td>
<td>50 – 100 mg Two or three divided doses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>Anaerobic infections,</td>
<td>PO/IV</td>
<td>Oral: 800 mg initially then 400 mg Thrice a day IV infusion: 500 mg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>Dosage Form</td>
<td>Route</td>
<td>Dose and Duration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td>-------</td>
<td>-------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgical prophylaxis</td>
<td>PO</td>
<td>Oral: 400mg In three divided doses- 8h. Started 24 h before surgery than continued post op.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bacterial vaginosis</td>
<td>PO</td>
<td>PO: 2 g Single dose or 400-500 mg Twice a day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leg ulcers &amp; Pressure sores, Antibiotic associated colitis</td>
<td>PO</td>
<td>400 mg Thrice a day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute ulcerative Gingivitis, Acute dental infections</td>
<td>PO</td>
<td>PO: 200-250 mg Thrice daily</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrofurantoin</td>
<td>Neonates</td>
<td>----</td>
<td>----</td>
<td>Should be stored in air-tight containers at or below 25°C and protected from light</td>
<td>Tablet: 100 mg</td>
</tr>
<tr>
<td>Infants &amp; Child (Over 3 months)</td>
<td>PO</td>
<td>Oral: 3 mg/kg daily In 4 divided doses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prophylaxis of UTI: (Over 3 months)</td>
<td>PO</td>
<td>1 mg/kg at night</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>PO</td>
<td>Oral: 100 mg Twice daily with food</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute uncomplicate</td>
<td>PO</td>
<td>Oral: 100 mg Every 12 h with food</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td><strong>Urinary tract infection:</strong></td>
<td>Or 50 mg PO Every 6 h with food</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Severe recurrent urinary tract infection:</td>
<td>PO</td>
<td>Oral: 100 mg Every 6 h with food</td>
<td>7 days</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td><em>If nausea, dose reduced to 200 mg daily in divided doses</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prophylaxis of UTI:</td>
<td>PO</td>
<td>50-100 mg at night</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cefuroxime</strong></td>
<td>Neonates</td>
<td>Severe infections:</td>
<td>IV</td>
<td>IV: 30-100mg/kg In 2-3 divided doses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meningitis:</td>
<td>IV</td>
<td>100 mg/kg Daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infants &amp; Child</td>
<td>Severe infections:</td>
<td>IV</td>
<td>30-100mg/kg In 3-4 divided doses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>PO</td>
<td>250-500 mg Twice a day after food</td>
<td>10 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe infections:</td>
<td>IV</td>
<td>1.5 g Three or Four times a day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meningitis:</td>
<td>IV</td>
<td>200-240 mg/kg In 3-4 divided doses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gonorrhoea</td>
<td>1 g Single dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UTI</td>
<td>125mg Twice daily</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyelonephritis</td>
<td>250 mg Twice daily</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Cefepime</strong></td>
<td>Neonates</td>
<td>--</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Infants &amp; Child</td>
<td>--</td>
<td>--</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*At room temperature In refrigerator (2-8°C) for 10 days As sodium powder for Inj. 250 mg, 750 mg, 1.5 g vials as axetil; Tab 250 mg; Susp. 125 mg /5 ml (Cefuroxime Axetil)*
<table>
<thead>
<tr>
<th>Condition</th>
<th>Group</th>
<th>Formulation</th>
<th>Dose</th>
<th>Duration</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adult</strong></td>
<td></td>
<td>IV</td>
<td>1-2 g Twice a day</td>
<td>10 days</td>
<td>Refrigerator (2-8°C) for 7 days</td>
</tr>
<tr>
<td><strong>Moderate To Severe Pneumonia:</strong></td>
<td></td>
<td>IV</td>
<td>0.5-1 g Twice a day</td>
<td>7-10 days</td>
<td></td>
</tr>
<tr>
<td>Mild To Moderate Infections:</td>
<td>Ofloxacin</td>
<td>IV/IM</td>
<td>5-10 drops Twice a day</td>
<td>7-10 days</td>
<td></td>
</tr>
<tr>
<td>Otitis externa:</td>
<td>Neonates</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic suppurative otitis media, Otitis externa</td>
<td>Infants &amp; Child</td>
<td></td>
<td>10 drops Twice a day in affected ear</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adults</td>
<td>PO/IV</td>
<td>Oral: 200-400 mg Twice a day</td>
<td>5-10 days</td>
<td></td>
</tr>
<tr>
<td>LRTI</td>
<td></td>
<td></td>
<td>IV: 200 mg over at least 30 minutes once to twice daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LRTI/Septicemia</td>
<td></td>
<td></td>
<td>200 mg Twice a day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin &amp; Soft tissue infection</td>
<td></td>
<td></td>
<td>400 mg Twice a day</td>
<td></td>
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</tr>
<tr>
<td>UTI</td>
<td></td>
<td></td>
<td>200-800 mg/day</td>
<td></td>
<td></td>
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<tr>
<td>Complicated UTI</td>
<td></td>
<td></td>
<td>200 mg/day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gonorrhoea</td>
<td></td>
<td></td>
<td>400 mg/day Single dose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cefotaxime</td>
<td>Neonates</td>
<td>IV</td>
<td>50 mg/kg/ dose IV infusion over 30 min every 8-12 h</td>
<td>Reconstituted with Normal</td>
<td>Vial: 125mg, 250mg, 500mg, 1g, 2 g</td>
</tr>
</tbody>
</table>

**Appendix 9: Antibiotic Dosage Forms, Dose, Storage & Reconstitution**

GNCTD/………../SOP/IC/12
<table>
<thead>
<tr>
<th></th>
<th>Gonococcal</th>
<th>IV</th>
<th>25mg/kg/dose</th>
<th>saline</th>
<th>In refrigerator</th>
<th>Reconstituted drug can be stored for 24h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants &amp; Child</td>
<td>IV</td>
<td>50-180 mg/kg In 4-6 equally divided doses</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Adult</td>
<td>IM/IV</td>
<td>1-2 g Twice a day Max: 12g daily In 3-4 doses</td>
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<td></td>
</tr>
<tr>
<td>Gonorrhoea</td>
<td>1 g Single dose</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Oxacillin</td>
<td>Neonates</td>
<td>Usual dose:</td>
<td>IV</td>
<td>25 mg/kg/dose IV (over at least 10 min) 6-12h</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meningitis</td>
<td>IV</td>
<td>50mg/kg/dose I.V. (over at least 10 min) 6-12h</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infants &amp; Child</td>
<td>IM/IV/PO</td>
<td>Oral: 50–100 mg/kg/24 h In 4 divided doses- 6h IM/IV: 100–200 mg/kg/24 h In 4-6 divided doses-4-6h Max. dose: 12 g/24 h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>PO</td>
<td>Oral: 500–1000 mg/dose In 4-6 divided doses-4-6h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IM/IV</td>
<td>250–2000 mg/dose In 4-6 divided doses-4-6h</td>
<td></td>
<td></td>
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<tr>
<td>Moxifloxacin</td>
<td>Neonates</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>At room temperature</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Infants &amp; Child</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adult</td>
<td>Oral/IV</td>
<td>400 mg Orally or as an IV infusion once a day</td>
<td></td>
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</tr>
<tr>
<td>Levofloxacin</td>
<td>Neonates</td>
<td>--</td>
<td>---</td>
<td>At room temperature Tabs: 250, 500, 750 mg, Oral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antibiotic</td>
<td>Formulation</td>
<td>Infants &amp; Child</td>
<td>Adult</td>
<td>UTI</td>
<td>Prostatitis</td>
<td>Gonorrhea (uncomplicated)</td>
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</tr>
<tr>
<td>Norfloxacin</td>
<td>PO/IV</td>
<td>Oral: 500-750 mg/day Once a day IV: 750 mg/day</td>
<td>9-14 mg/kg/24h Twice a day</td>
<td>400 mg Twice a day</td>
<td>400 mg Twice a day</td>
<td>800 mg Single dose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>max. dose: 800 mg/24 h</td>
<td>max. dose: 80 mg/24 h</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 days</td>
<td>10-21 days</td>
<td>28 days</td>
<td>1 day</td>
<td>10 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prediluted injection in 5% dextrose</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Injection: 25 mg/mL (20, 30 mL)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Cefixime</td>
<td>PO</td>
<td>3.75 ml Daily</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>10 days</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>IM/IV</td>
<td>15-18 mg/kg/24-48 h IV infusion over 30 minutes</td>
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</tbody>
</table>
### Gentamicin

<table>
<thead>
<tr>
<th>Category</th>
<th>Dose Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infants &amp; Child</strong></td>
<td>15-22.5 mg/kg/24 h In 3 divided doses -8h</td>
</tr>
<tr>
<td><strong>Adult</strong></td>
<td>15-20 mg/kg/24 h Single dose or Divided doses: 8-12h</td>
</tr>
<tr>
<td><strong>Neonates</strong></td>
<td>4-5 mg/kg/24-48 h IV infusion over 30min</td>
</tr>
<tr>
<td><strong>Upto 2 wks</strong></td>
<td>3 mg/kg/24 h In two divided doses every 12 h</td>
</tr>
<tr>
<td><strong>2 wks-12 years</strong></td>
<td>2 mg/kg/24 h In three divided doses every 8 h</td>
</tr>
<tr>
<td><strong>Adult</strong></td>
<td>2-5 mg/kg/24 h In three divided doses every 8 h</td>
</tr>
<tr>
<td><strong>Streptococcal &amp; Entero-</strong></td>
<td>IV:(over 3 mins)80 mg Twice daily every 12 h</td>
</tr>
<tr>
<td><strong>Surgical prophylaxis:</strong></td>
<td>5 mg/kg as a single dose at induction (with clindamycin) Note: One hour(peak) conc. Should not exceed 10</td>
</tr>
</tbody>
</table>

- Reconstituted drug can be stored for 28 days
- Reconstituted with normal saline.
- Stored in refrigerator.

**Infections due to susceptible organisms:**
- IM/slow IV / IV infusion
- IM/slow IV(over at least 3 mins) / IV infusion

**Surgical prophylaxis:**
- 5 mg/kg as a single dose at induction (with clindamycin) Note: One hour(peak) conc. Should not exceed 10

**Eye drops 0.3%**

- Injection, gentamicin (as sulfate) 10 mg/ml, 2 ml vial; 40mg/ml, 2 ml vial

**Appendix 9: Antibiotic Dosage Forms, Dose, Storage & Reconstitution**

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**GNCTD/……….SOP/IC/12**
mg/litre; predose(trough) conc. should be less than 2 mg/litre.