Title :MGIMS Regional centre for Antibiotic resistance surveillance network

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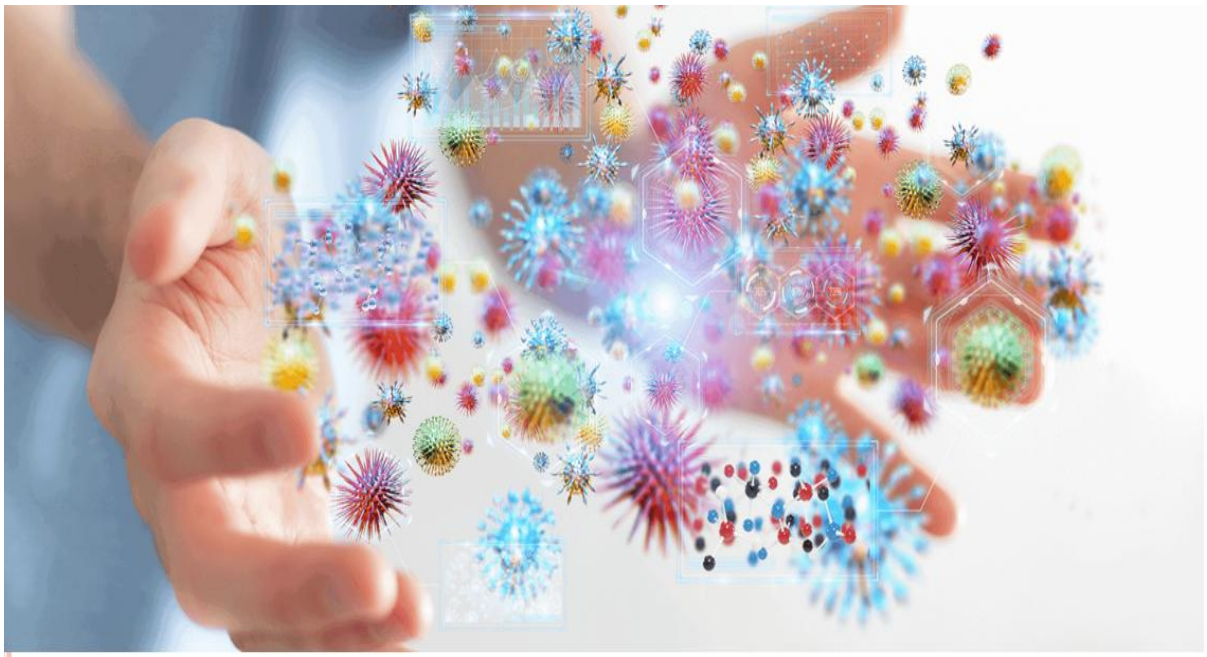
Introduction: Antimicrobial resistance is one of the major public health problems especially in developing countries where relatively easy availability and higher consumption of medicines have led to disproportionately higher incidence of inappropriate use of antibiotics and greater levels of resistance compared to developed countries.[1] In India the infectious disease burden is among the highest in the world and recent report showed the inappropriate and irrational use of antimicrobial agents against these diseases, which led to increase in development of antimicrobial resistance.[2] Besides, it has shown that health sector in India suffers from gross inadequacy of public finance which will result in the conditions favourable for development of drug resistance.[3] A study highlighted the importance of rationalizing antibiotic use to limit antibiotic resistance in India.[4] Antimicrobial resistance will result in difficulty in controlling the diseases in the community and ineffective delivery of the health care services. There is an urgent need for a national level monitoring of the extent of antibiotic resistance in the bacterial isolates in the hospital and the community. Similarly, during the past two decades, the frequency of opportunistic fungal infections has increased, and the spectrum of fungal pathogens has changed.

The change is largely contributed to antifungal drug pressure. The introduction of azoles more than two decades ago has had a profound impact on curtailing the rate of *Candida* infections, but a dramatic rise in azole resistant *Candida* spp.and mold infections has been documented in certain centres. The secondary drug resistance against azoles has been observed in 3-6% of *Candida* and *Aspergillus* spp., though resistance up to 15% has been reported at few centres. The recent evidence of agricultural use of fungicides leading to increase in population of azole resistant *A. fumigatus*is an additional problem. The epidemiological data of fungal infections in our country has certain differences from the data generated in developed countries. Therefore, it would be imperative to monitor nationally the antifungal resistance of the clinical strains isolated in India. Simultaneously the resistance data may be analysed with antifungal usage in the hospital. This would help in development antimicrobial policy of the hospital in particular and nationally in general.

Objectives:

- Strengthening of Surveillance Data
- Standard Operating Guidelines
- Improvement in antibiotic prescription practices
- Over the counter sale of antibiotics
- Poor sanitation, endemic infections, malnutrition
- Limited public awareness and government commitment Lack of coordination and Fragmentation of effort perverse incentives.

A critical issue at the regional level is the need for and difficulty in taking effective measures as the responsibility for health remains essentially a national problem.[32] National policy for containment of antimicrobial resistance 2011 is the recent development and welcome step by Ministry of Health and Family Welfare, Government of India which address the intervention strategies required and the steps for formulation and implementation of a standard antibiotic policy. Government health policies and the health care systems in which they are implemented play a crucial role in determining the efficacy of interventions to contain antimicrobial resistance. In the present context, national commitment to understand and address the problem and the designation of authority and responsibility are the major prerequisites. Effective action requires the introduction and enforcement of appropriate regulations and allocation of appropriate resources for education and surveillance.



HOSPITAL INFECTION CONTROL MANUAL

VERSION 4.0

JUNE 2022

Hospital Infection Control Committee

Kasturba Hospital ,MGIMS

Sevagram

HICC :KHS: MGIMS Manual

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KHS, Sevagram **Version 4.0** **2022-23**

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1. INTRODUCTION

Healthcare-associated infection (HCAI) is one of the most common complications of health care management. It is a serious health hazard as it leads to increased patients' morbidity and mortality, length of hospital stay and the costs associated with hospital stay.

Effective infection prevention and control is central to providing high quality health care for patients and a safe working environment for those that work in healthcare settings.

It is important to minimize the risk of spread of infection to patients and staff in hospital by implementing good infection control programm.

This document outlines the broad principles and practices of infection Control that are essential for the prevention and management of infection.

The following Hospital Infection Control Policies are needed to be framed and practiced and monitored by the Hospital Infection Control Committee (HICC).

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

The overall aim of this document is to provide evidence basedinformation in the prevention and control of infection. It is relevant to allstaff including doctors, nurses, other clinical professionals and managersworking in the hospital. This document will be updated as and whenrequired.

2.Hospital Infection Control Committee

2.1. INTRODUCTION

Effective infection prevention and control is central to providing high quality healthcare for patients and a safe working environment for those who work in healthcare setting .It is important to minimize the risk of spread of infection to patients and staff in hospital by implementing good infection control program .Healthcare-associated infection (HCAI) is one of the most common complications of healthcare management and is defined as *an infection occurring in a patient in a hospital or other healthcare facility in whom the infection was not present or incubating at the time of admission. This includes infection acquired in the hospital but appearing after discharge and also occupational infection among staff of the facility.*

This document outlines the broad Principles and Practices of Infection Control that are essential for the prevention and management of these infections.

2.2 COMPONENTS OF HOSPITAL INFECTION CONTROL PROGRAM

There are three main components of Hospital Infection Control Program

A. Preventive Measures
B. Surveillance
C. Training

A. Preventive Measures

a. Standard Precautions.
b. Isolation Precautions under certain special circumstances or outbreak situation .Ex., combating Swine Flu, MRSA outbreak in any unit etc.
c. Immunization of Healthcare Workers (HCWs).
d. Sterilization, disinfection and decontamination of medical instruments and environment.
e. Bundle care approach for certain procedures.
f. Appropriate use of Personal Protective Equipment (PPE).
g. Antimicrobial stewardship program.
h. Use of single use devices.
i. Spill management.
j. Reporting and Management of accidental injuries by sharps.
k. Use of blood and blood products.
l. Hospital Bio Medical Waste Management.
m. Environmental Management Practices.

B. Surveillance

A. ***Passive :-***Reporting by individual outside Infection Control Team

a. Laboratory based
b. Medical records (post discharge)
c. Reporting by physicians and nurses

B. ***Active :-***(To detect Prevalence of HCAI)

a. Prevalence of HCAI
b. Incidence of HCAI

C. Training of HCWs

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

2.3. Objectives of HICC

a. To minimize healthcare associated infections among patients, staff and visitors.
b. To minimize development of antimicrobial resistance and
c. To promote rational use of antimicrobials by antimicrobial stewardship program

2.4. The Committee is as in <u>Annexure I.</u>

2.5. Meetings of HICC:

The Hospital Infection Control Committee meets every quarterly or more if required in case of any outbreak. Documentation of meetings and recommendations are kept by the secretary. Minimum Quorum required: Chairperson, member-Secretary, Infection Control Team and 50% of other members. INFECTION CONTROL TEAM under HICC is responsible for day-to-day activities of infection control, establishing and maintaining infection prevention and control, its monitoring, surveillance, reporting, research and education.

2.6. Roles and Responsibilities of HICC

a. Developing and preparing various infection control policies and protocols.
b. Promote, implement and monitor optimum infection control practice at all levels of
c. the health facilities.
d. To review and approve an annual program for surveillance and prevention of HAI.
e. To review epidemiological surveillance data and identify the areas for interventions.
f. To ensure appropriate staff training in infection control and prevention.
g. Developing an effective and practical Antimicrobial Stewardship Program (AMSP) for the institute.
h. To review risks associated with new technologies and monitor infectious risks of new devices and products.
i. To provide expert advice, analysis and leadership in outbreak investigation and control.
j. Research for Infection Control (IC).
k. To communicate and cooperate with other committees of the hospital with common interest such as Biomedical Waste Management Committee, Hospital Blood Transfusion Committee, Antibiotic Policy Committee

2.7. Roles and Responsibilities of Member-Secretary, HICC

a. Co-ordinating between hospital administration, Chairperson, other members of HICC and ICT (Infection Control Team).

b. Developing recommendations of various Infection control policies with other member of HICC and ICT.

c. Making an Antimicrobial stewardship program (AMSP) for the institute. Proposing an AMSP team to the Chairperson of HICC.

d. Conducting regular meetings of HICC. Preparing minutes of the meeting and disseminating the same to all the stakeholders of healthcare facility.

e. Conducting emergency meetings in case of outbreak or any other alert situation.

f. Providing action plans in case of any outbreak or any other alert situation like isolation of MDRO from any patient of the hospital.

g. Procuring relevant data from various healthcare units (wards) and laboratories of the hospital for surveillance of HAIs, outbreak investigation and making policies/ recommendations for AMSP.

h. Coordinating the organization of various trainings and workshops for different cadres of HCWs on various aspects of Infection prevention and control.

2.8. Roles and Responsibilities of ICO

a. The ICO supervises the surveillance of healthcare associated infections.

b. He/she supervises the various infection control programs.

c. Co-ordinate with the HICC in planning Infection Control Program and Policies.

d. Develops SOPs for various Infection Control Practices.

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

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

g. Keep a track of any developing outbreaks. Plan and participate in appropriate management of an outbreak.

h. Participate, guide in research activities related to infection control practices and publish them.

i. Advise on the appropriate use of antibiotics.

j. Appropriate action to be planned in case of isolation of a MDRO/ Pan drug resistant bacteria in the laboratory. This information may be received regularly from the hospital bacteriology laboratory or from the clinician.

k. Ensuring safe laboratory practices to prevent laboratory acquired infections among staff.

l. After receiving antibiogram data from the laboratory the ICO compiles and provides summary reports of prevalence of resistance, bacteria-wise, syndrome-wise and/or unit-wise.

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

2.9. Responsibility of ICN

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

a. The ICN conducts daily Infection control rounds and records his observation. She maintain records and statistics regarding IC activities.(Annexure IV)

b. During the infection control rounds he does active surveillance for the four common HAIs namely, CLABSI (Central Line Associated Blood Stream Infection), CAUTI (Catheter Associated Urinary Tract Infection), VAP (Ventilator Associated Pneumonia) and SSI (Surgical Site Infection).

c. The ICN ensures that all relevant positive culture cases are traced inpatient unit, if it complies with the definition of a HAI, a hospital infection surveillance sheet or surgical site infection sheet is filled and recorded.(Annexure VI, VII, VIII, IX)

d. Work as a clinical supervisor by ensuring all the established policies and protocols are practiced like hand washing procedures, use of hand rubs, isolation policies, care of IV and vascular access, urinary catheters, universal precautions, housekeeping, cleaning and disinfection, PPE, equipment cleaning, etc.(Annexure X,XI,XIII, XIV)

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

f. Liaison between laboratory and ward staff: Informing head of department and giving advice on infection control issues.

g. Immediate attention in Needle Stick Injuries (NSIs) and other occupational exposures and facilitates post-exposure measures. Maintains registers and data of Sharps/NSIs and Post–exposure prophylaxis. (AnnexureXII)

h. Notification of communicable diseases and other notifiable disease to the IC O.

i. The ICN is involved in education of practices minimizing healthcare associated infections and hand hygiene among healthcare workers. (Figure 1-5)

j. Informs anomalous/irrational use of antibiotics to ICO that must be discussed in HICC meetings.

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

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

3.Surveillance of Healthcare Associated Infections

3.1 HAI SURVEILLANCE

Hospital Acquired Infection (HAI) surveillance is a system that monitors the HAIs in a hospital. The HAI surveillance cycle consists of 'data collection—data analysis—data interpretation—data dissemination'.

3.2. OBJECTIVES OF HAI SURVEILLANCE

a. To obtain endemic/ baseline HAI rate and information on type of HAI.
b. To compare HAI rates within different wards/ areas of the hospital and among other hospitals.
c. To identify the problem area, based on which root cause analysis is conducted to find out the breakdowns in infection control measures followed by which corrective measures will be implemented.
d. To identify impending outbreaks and to prevent them.
e. To monitor and evaluate the effect of infection control interventions.
f. To provide timely feedback to the clinicians; thus reinforcing them to adopt best practices.

3.3. HEALTHCARE ASSOCIATED INFECTIONS TARGETED FOR SURVEILLANCE

Surveillance is done for following major HAIs at our institute.

a. Catheter Associated Urinary Tract Infections (CAUTI)
b. Central Line Associated Blood Stream Infections (CLABSI)
c. Ventilator Associated Pneumonia (VAP)
d. Surgical Site Infections (SSI)
e. Microbiological surveillance of critical areas

3.4 AREAS OF SURVEILLANCE

The surveillance is currently being conducted in the following areas of the hospital and will be expanded further to cover newly developed areas of similar nature.

3.5. PROCEDURE FOR HAI SURVEILLANCE

The surveillance is currently done by Active surveillance/ Laboratory based Ward liaison surveillance method which is considered as the best method for surveillance. In this, patients/ cases admitted in the above targeted areas are prospectively monitored by the trained ICNs on daily basis. The ICNs collect information on all new admissions and existing admissions with device (urinary catheter, central line, ventilator) and/or those who underwent surgeries.

They also prospectively check the laboratory investigations to confirm a diagnosis. The definitions related to HAI surveillance and the protocol for data collection and analysis (including proformas for surveillance) are adopted from the National Health Safety Network (NHSN)-CDC guidelines for HAI surveillance.(Refer to Annexures II & III).

The data is collected on monthly basis from each area of surveillance under following heads:

a. Data collection for Identification of HAI
b. Data collection for calculation of denominator values

A. Identification of HAI :

The patients admitted in respective surveillance area are daily monitored for development of HAIs of interest. The demographic and clinical details are collected by the ICNs in the standardized proforma for data collection pre-approved by the HICC (Refer to Annexures II & III).

The ICNs also check Lab reports for these patients simultaneously and correlates with clinical findings. The surveillance is continued till 15 days of admission or till discharge/ death of the patients. The ICNs also monitor patients undergoing major surgeries on daily basis in their respective ward for the development of post-operative infection till their discharge/ death. The monitoring for SSI is done for 30/ 90 days depending upon the type of surgery the patient had undergone (Annexure V).

At the end of month, all the proforma are submitted to Infection Control Officer, who then analyze them to diagnose the HAIs as per case definitions given by CDC.

B. Calculation of Denominator Values :

ICNs also collect following data during their on their daily rounds to the hospital at the fixed time. The data is collected using Denominator Form (Daily Appraisal Form) as given in Annexure II.

- Patient days = Number of patients admitted daily in each area of surveillance.
- Device days = Number of patients with devices in the respective areas per day.
  - ✓ Monthly catheter (Foley's) days
  - ✓ Monthly central line days
  - ✓ Monthly ventilator days
- Number of surgeries performed in each OT.

This data is summed up at the end of each month so as to be used as denominator data for calculation of Device utilization ratios and Rates of HAIs. Similarly, total number of surgeries performed are calculated at the end of every month as a denominator data to enable calculation of SSI rates.

C. CALCULATION OF HAI RATES :

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

- CLA-BSI = number of CLA-BSI×1000 per number of central line-days.
- pVAP = number of pVAP×1000 per number of intubation-days
- CA-UTI = number of CA-UTI×1000 per number of urinary catheter-days.
- Device utilization ratio (DUR) = number of an invasive device days (CVC, intubation, urinary catheter) per number of patient days.

D. DATA ANALYSIS, DISSEMINATION AND PRESENTATION

Data Analysis:

The data is analyzed using Microsoft Excel to generate a monthly report of HAI rate. Monthly HAI Surveillance report is used for:

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

Data Dissemination

The monthly HAI surveillance report is shared with all clinical departments as well as with the Director, Medical Superintendent and the Nursing Coordinator via email and printed copy.

Data Presentation

The rates are presented in HICC meetings and discussed among the concerned members. The interventions are planned for each ICU/ward on the basis of the HAI rates. Further monitoring for any changes in the rates is done by ICT followed by feedback to the respective department.

3.6. MICROBIOLOGICAL SURVEILLANCE OF CRITICAL AREAS

- Do not perform routine environmental sampling in any hospital location except the operation theatres. Presence of an organism on a surface does not confirm it as the cause of infection in patients in that area even if it is the same strain •
- Routine environmental surface sampling (swabs) should not be done in areas like the ICU and/or wards.
- Take corrective actions if any growth of micro-organisms is found to be positive. Environmental sampling should be done for the following purposes only:
- Monitoring the effectiveness of the cleaning and disinfection procedures in certain situations as a part of quality assurance e.g., the operation theatre Evaluation of efficiency of an OT ventilation system (high efficiency particulate air {HEPA} filtered positive pressure air supply system)
- As a part of epidemiological investigation of an outbreak in which environmental sources/reservoirs or transmission routes are suspected •
- Monitoring the quality of water for drinking, cleaning, surgical scrub and after flooding. MICROBIOLOGIC MONITORING OF THE OT Since the OT is designed to function as a clean room and microbial burden control is the most important here, routine environmental surface and air sampling should be done in all OTs.

3.6.1 OT SWABS:

- Surface swabs need to be obtained from each OT for microbiological culture testing as per hospital

The sampling process should be as follows:

- Sampling should be done as soon as the OT is opened in the morning before any cleaning is done
- Obtain the required numbers of sterile swabs and media from the microbiology lab before taking samples; keep the swabs and media outside the refrigerator for at least 30 minutes (they should be at room temperature when sample is taken)
- Label the sampling media with the date, OT number, and sample site (e.g., table, trolley etc.)
- Change into OT dress, wear cap, mask, sterile gown and sterile gloves and enter the OT with the swabs and media
- The ventilation system/AC should be kept off. It may be turned on if air sampling is to be done at the same time
- Swabs should be collected from the following locations in each OT (different from sampling after new OT construction or OT renovation):

➢ OT table
➢ OT lights
➢ Sterile instruments trolley (If more than one trolley is present all should be sampled)
➢ The medication preparation surface of the anaesthesia machine

- Floor – one swab of the floor adjacent to the OT table
- Any one wall at waist to shoulder height

- Collect samples using aseptic technique
- The samples should be sent to the laboratory immediately after collection. Do not place collected samples in the refrigerator o Maintain a record of the samples sent
- The laboratory should test the swabs for presence of both aerobic and anaerobic bacteria (both spore forming and non-spore forming ones)
- Any growth in the swabs should immediately be communicated by the laboratory to the hospital authorities
- The test reports should be informed to the Chairperson, Infection Control Committee and filed for records.

Table : Suggested actions for OT swab culture

ORGANISM GROWN	REMARK ACTION	REMARK ACTION
No organisms grown	Acceptable	Use the OT
Skin commensals e.g., S epidermidis (sparse growth in any 1-2 swabs from the sample set)	Acceptable	Use the OT (unless the lab reports heavy growth or growth from multiple swabs). Re-clean positive growth locations before using the OT.
Known pathogen (S. aureus)	Unacceptable	Do not use the OT. Re-clean, re-fogg and repeat swab samples
Gram negative organisms (aerobic/ anaerobic) U	Unacceptable	Do not use the OT. Re-clean, re-fogg and repeat swab samples
Aerobic/anaerobic spore bearers	Unacceptable	Do not use the OT. Re-clean, re-fogg and repeat swab samples
Mixed growth	Unacceptable	Do not use the OT. Re-clean, re-fogg and repeat swab samples

CORRECTIVE AND PREVENTIVE ACTIONS IN CASE OF UNACCEPTABLE RESULTS

- Postpone elective cases. Repeat cleaning, disinfection and OT swabs. The procedure should be supervised by the OT in-charge
- All cases operated in the duration between sampling and reporting of unacceptable swab should be identified and followed up for surgical site infection
- Investigate for the causes of unacceptable results. Check the chemical dilution methods, cleaning techniques, cleanliness of mops and buckets, function of the fogger machine, etc. The lab should check the sample collection and processing methods used.

OT AIR SAMPLING

- Air sampling should be done regularly once a week for OTs with high efficiency particulate air (HEPA) filtered positive pressure ventilation system to monitor the efficacy of the system
- In OTs without a ventilation system it should be done once a month and whenever air is suspected as a source/transmission route of surgical site infection.
- The procedure for sampling by settle plate method is as follows:
    - Obtain the required numbers of culture media plates from the microbiology lab. Before taking samples, keep them outside the refrigerator for at least 30 minutes (they should be at room temperature when sample is taken)
    - Sampling should be done on an empty OT immediately after opening the OT in the morning
    - If OT swabs are to be taken at the same time, then air sampling should be done before taking swab samples
    - The ventilation system/air conditioner should be turned on and allowed to run for at least 10 minutes with the OT closed and empty before sampling
    - The person performing the sampling should wear sterile gown, sterile gloves, cap and mask and OT dress and footwear before entering the OT
    - The culture plate should be labelled with the date, OT number and sampling location before taking it into the OT
    - Expose one plate on the OT table for 40 minutes. This should be done aseptically without touching the culture media or contaminating the plate lid. The technique should be taught to the OT staff by the microbiology lab
    - After 40 minutes the plates should be closed, sealed and sent to the lab for further processing
- The lab should report the total colony counts after 24 hours of incubation at 37°C. The predominant type of growth, if any, should be identified and reported.
- The following results (both conditions together) will be considered satisfactory for an OT with a HEPA filtered positive pressure ventilation system:
    - No growth of any organism
    - No growth of any fungus, gram-negative organisms or known pathogens such as staphylococcus aureus
- If results are not satisfactory, investigation should be done and appropriate corrective actions are needed to be taken

- In case of unsatisfactory results,
  - Do not use the OT until the problem is resolved
  - Monitor the cases operated since the last acceptable result onwards
- Settle plate positivity rate pattern should be studied and used in interpretation of test results in an individual set-up
- Test reports should be informed to the hospital authorities and filed for records.

4.HOSPITAL OUTBREAK MANAGEMENT

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.

4.1 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

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

Step 2

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

Step 3

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

Step 4

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

4.2. Immediate Control Measures

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

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

4.3. 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.

4.4 Specific Control Measures

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

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

4.5 Evaluation of efficacy of control measures

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

5. Infection Control Processes

5.1 Standard Precautions
5.2 Hand Hygiene
5.3 PPE

5.1 Standard Precautions

- **Standard Precautions** are designed to reduce the risk of transmission of micro-organisms from both recognized and unrecognized sources of infection in the hospital.
- **Standard Precautions applies to all patients regardless of their diagnosis.** Standard Precautions shall be implemented when contact with any of the following are anticipated:

a. Blood
b. All body fluids, secretions and excretions**,** with the exception of sweat regardless of whether or not they contain visible blood.
c. Non-intact skin (this includes rashes)
d. Mucous membranes

5.1.1 Components of Standard Precautions

- Hand Hygiene
- Use of PPE—gloves, gown, mask, eye protection, or face shield, depending on the anticipated exposure
- Appropriate handling and disposal of sharps
- Decontamination of linen
- Sterilisation and disinfection of instruments and hospital environment
- Biomedical waste management

5.1.2 New Elements of Standard Precautions

While most of the standard precautions were evolved from universal precautions and are intended to protect healthcare workers, CDC have added few new elements to it mainly focusing on protection of the patients. They are:

- Respiratory hygiene and cough etiquettes
- Safe injection practices
- Use of masks for insertion of catheters or injection of material into spinal or epidural spaces via lumbar puncture procedures

Respiratory Hygiene and Cough Etiquettes:

The elements of Respiratory Hygiene/Cough Etiquette include:

1. Education of healthcare facility staff, patients, and visitors
2. Posted signs, in language(s) appropriate to the population served, with instructions to patients and accompanying family members or friends
3. Source control measures:

- Covering the mouth/nose with a tissue when coughing/Sneezing, wiping and blowing nose
- Prompt disposal of used tissues in the nearest receptacle or bin after use.
- If tissues are not available, cough or sneeze into the inner elbow rather than the hand.
- Using surgical masks on the coughing person when tolerated and appropriate

4. Hand hygiene after contact with respiratory secretions; and
5. Spatial separation, ideally >3 feet, of persons with respiratory infections in common waiting areas when possible.

5.2. TRANSMISSION BASED PRECAUTIONS

This refers to specific precautions which are to be followed in situations where standard precautions may not be sufficient to interrupt the specific transmission of diseases depending upon their mode of transmission. These precautions are taken in addition to standard precautions not as a replacement and are also known as additional precautions

5.2.1 Categories of Transmission based Precautions:

There are three categories of Transmission-Based Precautions:

- Contact Precautions
- Droplet Precautions
- Airborne Precautions

Contact Precautions:

- Contact transmission of microorganisms during patient care is responsible for the majority of HAIs in patients and healthcare staff.

- Can be direct or indirect.
- **Direct transmission**: This occurs when infectious agents are transferred from one person to another without a contaminated intermediate object or person. For example, blood or other body substances from an infectious person may come into contact with a mucous membrane or breaks in the skin of another person.
- **Indirect transmission**: This involves the transfer of an infectious agent through a contaminated intermediate object (fomite) or person. These include:
  - Clothing after care of a patient colonized or infected with an infectious agent, which can then be transmitted to subsequent patients;
  - patient-care devices that are shared between patients without cleaning and disinfection; and
  - environmental surfaces that are inadequately disinfected.
- **Diseases transmitted through contact**
  - colonization or infection with multidrug-resistant organisms (MDRO), enteric infections and skin infections
  - Hand hygiene is important since contact transmission can occur in respiratory viral infections when respiratory secretions or droplets contaminate surfaces, which can contaminate hands of HCWs

Droplet precautions:

- Droplet transmission occurs through large respiratory droplets >5 microns in size. Transmission occurs when infectious respiratory droplets are expelled by coughing, sneezing or talking, and come into contact with another person's mucosa (eyes, nose or mouth), either directly or via contaminated hands.
- Since these microorganisms do not travel over long distances, special air handling and ventilation are not required.
- **Infections transmitted through droplets include** pneumonia, meningitis, group A streptococcal disease, pertussis, diphtheria and influenza, mumps.
- During an influenza pandemic, the circulating human virus is expected to be transmitted in the same manner as seasonal influenza viruses. Hence droplet precautions should be applied in addition to standard precautions.
- **Droplet precautions include**: x
  - Patient placement: keep a minimum of 1–2 metre inter-bed distance.
  - Cough etiquette: explain the importance of respiratory hygiene and cough etiquette to patients.
  - Personal protective equipment: wear a triple-layered surgical mask within 1–2 metres of the patient.
  - For practical purposes, it is advisable to use the mask when entering the patient's room.
  - For aerosol-generating procedures, N95 masks should be used.
  - Patient transport: the patient should wear a triple-layered surgical mask.

Airborne precautions:

- The airborne route of infection occurs through droplet nuclei of 1–5 micron that are disseminated through the air.
- These droplet nuclei can remain suspended in the air for varying periods of time and can travel long distances (>1 metre) and from room to room.
- Droplet nuclei arise from the drying of suspended droplets carrying the infectious agent.
- **Diseases that spread by the airborne route include**: pulmonary or laryngeal tuberculosis, measles, chicken pox, pulmonary plague and viral haemorrhagic fever with pneumonia. Transmission of droplet nuclei at a short range may occur with SARS-CoV, human influenza, and other viral respiratory infections, during performance of aerosol-generating procedures.
- **Airborne precautions besides those related to patient placement and transport:**
    - Respiratory protection: persons entering the airborne infection isolation room should wear a particulate respirator, e.g. a N95 mask with a proper fit.
    - Restricted entry: susceptible healthcare personnel should be restricted from entering the room of patients known or suspected to have airborne infections.
    - Immunize susceptible persons: susceptible persons should be immunized as soon as possible following unprotected contact with vaccine-preventable infections.
    - Protection during aerosol-generating procedures: for aerosol-generating procedures associated with pathogen transmission, appropriate PPE should be used in an airborne infection isolation room.
    - N95 masks should be worn by persons performing aerosol-generating procedures (such as endotracheal suction and bronchoscopy) on patients with respiratory infections.

Combination of contact, droplet and airborne precautions:

Contact, droplet and airborne precautions may be combined for diseases that have multiple routes of transmission or in case of epidemiologically important organisms, risk group 4 organisms or where transmission routes are unknown. Combined precautions are recommended in case of Ebola and Nipah virus disease. They are always to be used in addition to standard precautions and should be applied to all suspects, probable and confirmed cases.

5.3 HAND HYGIENE :

For effective hand hygiene, the following criteria must be met:

- Using an *effective compound,*
- enough *amount of product* available to cover hands,
- use of *correct technique* to cover all areas, and
- performing hand hygiene at the *right moment*

The WHO guidelines on hand hygiene in healthcare (2009) suggest that hand hygiene is the single most important measure for prevention of infection. Hands can become contaminated with infectious agents through contact with a patient, patient surroundings, the environment, or other HCWs. Hand hygiene removes dust/soil, organic material and transient microorganisms from the skin and reduces the risk of cross-contamination. Evidence suggests that the hands of the HCWs are the most common vehicle for the transmission of healthcare-associated pathogens from patient to patient and within the healthcare environment

5.3.1 Five moments for hand hygiene:

The five moments are shown in Figure 5

1. ***Before touching a patient***: For eg.
   - Shaking hands, helping a patient to move around, get washed
   - Applying oxygen mask, giving physiotherapy, taking pulse, blood pressure, chest auscultation, abdominal palpation, recording ECG, etc.

2. ***Before clean/aseptic procedure*** : For eg.
   - Skin lesion care, wound dressing, subcutaneous injection, catheter insertion, opening a vascular access system or a draining system, secretion aspiration, preparation of food, giving medication, instilling eye drops, pharmaceutical products, sterile materials etc.
   - Befor***e*** handling an invasive device for patient care, regardless of whether or not gloves are used,
   - Before moving from a contaminated body site to another body site during care of the same patient

3. ***After body fluid exposure risk*** : For eg.
   - Skin lesion care, wound dressing, subcutaneous injection , drawing and manipulating any fluid sample, opening a draining system,
   - endotracheal tube insertion, removal and secretion aspiration, clearing up urines, feces, vomit, handling waste (bandages, napkins, incontinence pads),
   - cleaning of contaminated and visibly soiled material or areas (soiled bed linen, lavatories, urinal, bedpan, medical instruments) etc.
   - Before moving from a contaminated body site to another body site during care of the same patient

4. After touching a patient:

- For eg. mucous membrane, non-intact skin or wound dressing
- After removing sterile or non-sterile gloves.

5. After touching patient surroundings :For eg.

- After contact with inanimate surfaces and objects (including medical equipment) in the immediate vicinity of the patient,
- perfusion speed adjustment, monitoring alarm, holding a bed rail, learning against a bed,
- clearing the bedside table, changing be linen, with the patient out of the bed, etc.
- After removing sterile or non-sterile gloves

5.3.2 HAND WASHING:

Hand washing with soap and water Indications:

- when there is visibly heavy contamination, e.g. with proteinaceous material, blood or body fluids
- After attending to a patient with suspected/confirmed C. difficile infection
- After using toilet
- Before and after having food
- Adequate number of sinks with running water and soap should be available in the haemodialysis unit to facilitate hand washing

5.3.3 HAND RUB

Hand rubbing using alcohol-based preparation Use alcohol-based hand rubs (ABHR), when hands are not visibly soiled or tap and running water is not available.: Figure4

Advantages of ABHR

- Easily accessible at point of care
- Excellent antimicrobial activity against Gram-positive and Gram-negative vegetative bacteria, M. tuberculosis and a wide range of fungi
- Generally good antimicrobial activity against enveloped viruses

Disadvantages of ABHR :

- Lesser and/ or variable antimicrobial activity against non-enveloped viruses (such as norovirus)
- No activity against protozoan oocysts and bacterial spores (such as Clostridium difficile)

5.3.4 Observations of hand hygiene compliance:

- Hand hygiene compliance can be calculated using the following formula:

Compliance of hygiene = Number of hygiene action performed
Required hand hygiene action (opportunities)
X 100

- Direct observation to monitor hand hygiene compliance is ideal but it is time consuming and requires skill and training. It is subject to various bias and confounding.

5.3 Personal Protective Equipment (PPE)

Personal protective equipment (PPE) refers to physical barriers, which are used alone or in combination, to protect mucous membranes, airways, skin and clothing from contact with infectious agents.

5.3.1 PPE should be used by:

- HCWs who provide direct care to patients and who may come in contact with blood, body fluids, excretions, and secretions;
- Support staff including cleaners, and laundry staff in situations where they may have contact with blood, body fluids, secretions, and excretions.
- Laboratory staff, who handle patient specimens;
- Family members who provide care to patients and are in a situation where they may have contact with blood, body fluids, secretions and excretions;
- HCWs in a haemodialysis unit, because of the high risk of transmission of blood-borne infections during the various activities associated with haemodialysis and handling of equipment; and

Patients in a haemodialysis unit, in the form of a barrier over clothing during cannulation and decannulation, central line connection, disconnection/ dressing change.

5.3.2 PPE includes:

Gloves, aprons and gowns, facial protection, footwear and hair cover or cap.

Gloves:

- Gloves should be worn as an additional measure, not as a substitute for hand washing.
- Gloves are not required for routine care activities in which contact is limited to a patient's intact skin.
- Wear gloves when touching blood, body fluids, secretions, excretions, mucous membranes, non-intact skin.
- Change gloves between tasks and procedures on the same patient after contact with potentially infectious material.
- If gloves become torn or heavily soiled and additional patient care tasks must be performed, then change them before starting the next task.

- Remove gloves immediately after completion of care or a specified task, at point of use before touching non-contaminated items and clean environmental surfaces and before moving to another patient or using a mobile phone.
- Perform hand hygiene immediately after removing gloves.

Types and indications for wearing gloves

There are three types of gloves:

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

2. Sterile, single-use gloves should be used for aseptic procedures.
3. Heavy duty/ utility gloves should be used for decontamination of large equipment, cleaning of floors, walls, HCF furniture such as beds, etc.

These gloves can be reused after cleaning.

Gloves in haemodialysis units :

1. Clean disposable gloves should be available for routine use.
2. Gloves must be worn in haemodialysis facilities whenever caring for a patient or touching the patient's medical equipment, handling lab specimens or used dialysers, cleaning machines, cleaning stations, and wiping up blood or other body fluid spills.
3. They must be changed whenever moving from one patient or machine to another.
4. They must be changed after cannulation.
5. Sterile gloves must be available and used during procedures requiring aseptic technique such as central line insertion.
6. Remove gloves after caring for a patient. Do not wear the same gloves for the care of more than one patient, and do not wash gloves between use with different patients.
7. Perform hand hygiene after removing gloves.

6.Cleaning,Disinfection and Sterilizationof PatientCare Items

6.1. OBJECTIVES

● To maintain standards in infection control measures and minimize hospital acquired infections in patients and staff.

●To define policy and procedure regarding cleaning, disinfection, sterilization and decontamination of patient care items/ instruments/ equipment

●Disinfection removes micro-organisms without complete sterilization.

● Disinfection is used to destroy organisms present on delicate or heat-sensitive instruments which cannot be sterilized or when single use items are not available.

● Disinfection is not a sterilizing process and must not be used as a convenient substitute for sterilization.

● Thermal disinfection is not appropriate for instruments that will be used in critical sites as these instruments must be sterile.

6.2 DEFINITIONS:

Cleaning	***Cleaning*** is the removal of visible soil (e.g., organic and inorganic material) from objects and surfaces and normally is accomplished manually or mechanically using water with detergents or enzymatic products.
Disinfection	***Disinfection*** describes a process that eliminates many or all pathogenic microorganisms, except bacterial spores, on inanimate objects. In a health facility, there are a wide range of chemicals and disinfectants used for various clinical, nursing, laboratory and radiological procedures.
Asepsis	***Asepsis*** is a condition in which no living disease-causing microorganisms are present. Asepsis covers all those procedures designed to reduce the risk of bacterial, fungal or viral contamination, using sterile instruments, sterile draping and the gloved 'no touch'
Sterilization	***Sterilization*** describes a process that destroys or eliminates all forms of microbial life and is carried out in health-care facilities by physical or chemical methods.

6.3 Classification of medical devices :

Types of equipment	Definition	Recommended	Examples
Critical	Those which penetrate skin &mucous membrane	Sterilization (before & after use)	Surgical instruments, cardiac and urinary catheters, implants, eye and dental instruments
Semi critical	In contact with intact mucous membrane without penetration	High level disinfection before use & intermediate level disinfection	Respiratory therapy equipment, anaesthesia equipment, endoscopes, laryngoscope, Rectal/vaginal/oesophageal probes
Non-critical	In contact with intact skin	Intermediate/low level disinfection	BP cuff, ECG electrodes, bedpans, crutches, stethoscope, thermometer
Non-critical environment surfaces	Less direct contact with patient	Low-level disinfectant	Surfaces of medical equipment, examination table, computers

Whatever may be the method used for cleaning, an equipment/ instrument must undergodisinfection/ sterilization depending upon the intended use on patient

6.4 Methods for Sterilization of Patient Care Items :

Method of Sterilization	Sterilization Conditions	Uses
Autoclave	121^0C x 30 min OR 132^0C x 15 min/4min Temp and time varies with type of load and type of sterilization cycle (Gravity displacement/ pre vaccum) selected (Refer to SOPs for sterilization procedure at CSSD)	**Surgical instruments, dressing drums/trays/sets, metal endoscopes, glass syringes, needles, implants, rubber catheters, endotracheal tubes and airways.**
Dry heat (Hot air oven)	170^0C x 60 minutes 160^0C x 120 minutes 150^0C x 150 minutes	**Sterilization of materials that might be damaged by moist heat or that are impenetrable to moist heat (e.g., powders, petroleum products, sharp instruments)**
Ethylene oxide (ETO)	100% OR mixtures at various concentrations with inert gases	**Sterilize critical items (and sometimes semicritical items) that are moisture or heat sensitive and cannot be sterilized by steam sterilization.**
Plasma sterilization	Hydrogen peroxide	**Sterilization of materials and devices that cannot tolerate high temperatures and humidity, such as some plastics, electrical devices, and corrosion-susceptible metal alloys.**
Irradiation	Cobalt 60 Gamma rays	**Sterilization of medical products (e.g., tissue for transplantation, pharmaceuticals, medical devices) or disposable prepacked items.**

6.5 AUTOCLAVE AND PLASMA STERILISER QC INDICATORS:

Type of indicator	Usage	Use	Precautions
Biological Indicator tubes for Autoclave & Plasma sterilizers • Self-contained sporestrips of *B. stearothermophilus* with outer tube containing Modified tryptic soy broth (growth medium) andindicator (Bromocresol purple) • Could be incubated at56°C and be read at24 t0 48 hrs.	Weekly	For Autoclave & Plasma sterilizer QC	Must be provided with quality certificates and D value Incubator to read the tubes must be provided.
Biological Indicator tubes for ETO • Self-contained spore strips of *B. Atrophaeus* with outertube containing modified tryptic soybroth (growth medium) and indicator (Bromothymol blue) • Could be incubated at 37°C and be read24/48 hours	weekly		Must be provided with quality certificates and D value
Biological Indicator tubes for Autoclave (rapid read out biological indicator with rapid read out incubator)	Weekly	Indicator detects presence of viable spores by production of fluorescence in 1 to3 hours • Use for autoclaves with 121°C gravity steam autoclaves • 121°C to 132°C vacuum assisted autoclaves	• Do not use to monitor 132°C gravity steam autoclaves • Incubator to read the tubes must be available.
Chemical indicator tapes (type1)	With every load	Used with every load. They indicate whether the instrument has been fully exposed to sterilization cycle.	
Bowie Dick tests	With every load	Used for steam sterilizers with prevacuum cycle. Used to prove that air removal is effective.	

6.6 DO's AND DON'Ts FOR DECONTAMINATION OF PATIENT CARE ITEMS

DO's:

● Sterilize all items that are intended to penetrate sterile body sites

● Steam under pressure is the preferred method for sterilizing critical medical and surgical instruments that are not damaged by heat, steam, pressure, or moisture.

● Cool steam- or heat-sterilized items before they are handled or used in the operative setting.

● Use low-temperature sterilization technologies (e.g., EtO, hydrogen peroxide gas plasma) for reprocessing critical patient-care equipment that is heat or moisture sensitive.

● Completely aerate surgical and medical items that have been sterilized in the EtO sterilizer (e.g., polyvinylchloride tubing requires 12 hours at 50^0C, 8 hours at 60^0C)before using these items in patient care.

● Sterilization using the peracetic acid immersion system can be used to sterilize heatsensitive immersible medical and surgical items.

● Critical items that have been sterilized by the peracetic acid immersion process must be used immediately (i.e., items are not completely protected from contamination, making long-term storage unacceptable).

● Dry-heat sterilization (e.g. 170^0C for 60 minutes) can be used to sterilize items (e.g., powders, oils) that can sustain high temperatures.

● Ensure that the sterilant has direct contact with contaminated surfaces
(e.g., scopes processed in peracetic acid must be connected to channel irrigators).

● Before any instrument or equipment goes under the process of steam sterilization, the following should be checked:

a. Ensure that the instrument can withstand the process,

b. Ensure that the instrument has been adequately cleaned,

c. Ensure that the instrument does not require any special treatment,

d. Ensure that records of the sterilisation process and for the traceability of instruments are kept.

e. The object must be wrapped for sterilization. Only a wrapped sterilized object should be described as sterile.

DON'T'S

● Ultraviolet light units, incubators, microwave ovens and domestic ovens must not be used for sterilizing.

● Formalin fumes generated by formalin tablets **must not be used** for sterilization/ disinfection or even maintenance of sterilizing conditions of any patient care item as it releases formaldehyde gas which is a proven carcinogen.

● Boiling of medical devices for reuse is not recommended since it does not guarantee sterility

7. Prevention And Control of Healthcare Associated Infections

7.1 Introduction:-

Healthcare associated infections (HAIs) are a major cause of morbidity and mortality in hospitalized patients. The magnitude of the problem is significantly bigger in developing countries due to financial constraints, variability in healthcare standards, lack of awareness and proper training of healthcare
workers.

Common healthcare associated infection include

1. Central line associated bloodstream infection (CLABSI)
2. Ventilator associated pneumonia (VAP)
3. Catheter associated urinary tract infection (CAUTI)
4. Surgical site infection (SSI)

In order to combat the problem of HAIs, bundle approach is recommended by various healthcare quality improvement guidelines.

7.2 DEFINITION OF BUNDLE:

A small set of evidence-based intervention for a defined patient Segment/population and care setting that, when implemented together will result in significantly better outcomes than when implemented individually.

7.2.1 Salient features of Bundle Approach:

1. Bundle has 3 or 5 interventions with strong evidence.

2. Bundle is used in a specific patient population in a particular location.

3. Bundles are mostly descriptive and can be modulated according to local requirement of the unit.

4. Compliance of bundle is measured using all or none principle. Either the bundle is followed or it is not followed. There is nothing like “partially” followed or some points followed and others not.

7.3 Central Line Associated Bloodstream Infections (CLABSI):

7.3.1 Definition: CLABSI is defined as "Laboratory-confirmed bloodstream infection with a qualifying Central Line in place for >2calendar days on the date of event (DOE) AND the line was in place on the DOE or the day before = CLABSI"

7.3.2Etiology: Gram-positive organisms (coagulase-negative *Staphylococci)*, *Enterococci, Staphylococcus aureus*, Gram negative micro-organisms, *(Klebsiella, Enterobacter, Pseudomonas, E. coli ,Acinetobacter spp.)*, *Candida species*

7.3.3Sources of CLABSI:-Routes for contamination of catheters leading to blood stream infection

1. Migration of skin organisms at the insertion site into the cutaneous catheter tract and along the surface of the catheter with colonization of the catheter tip. This is the most common route of infection for short term catheters

2. Direct contamination of the catheter or catheter hub by contact with hands or contaminated fluids or devices

3. Contaminated infusate may lead to CLABSI though this is rare

7.3.4 Central Line Insertion Bundle components:

- Hand washing /hand hygiene
- Maximal Barrier Precautions Upon Insertion
- Chlorhexidine 2% w/v for Skin Antisepsis
- Optimal Catheter Site Selection
- Daily Review of Line Necessity with Prompt Removal of Unnecessary Lines

Check list for insertion bundle .

7.3.5 CLABSI Maintenance bundle

• Perform Hand hygiene.

• Bathe ICU patients >2 months of age with a chlorhexidine on a daily basis.

• Monitor the catheter sites visually or by palpation through an intact dressing on a regular basis.

• Scrub the access port or hub with friction immediately prior to each use with a single use application of 2% Chlorhexidine gluconate in 70% alcohol for 30 sec & allowed to dry (30-60 sec)prior to any manipulation.

• If not in continuous use catheter hubs and stopcocks should be covered with a sterile protective cap at all times.

• Change gauze dressings at least every 2 days & semi-permeable dressings at least every 7 days.

• Replace catheter site dressing if the dressing becomes damp, loosened, or visibly soiled OR patient complains of pain at the site.

Change administrations sets:

• For continuous infusions no more frequently than every 4 days, but at least every 7 days.

7.4 CATHETER-ASSOCIATED URINARY TRACT INFECTION

7.4.1 Introduction

Urinary tract infections (UTIs) are one of the commonest types of HCAIs.
One of the common reasons is the use of urinary catheters.

7.4.2 Indications for Catheterization-

Placement of an indwelling catheter should be performed only when indicated. It should be removed as soon as possible. The accepted indications for catheterization are:

1. Patient requiring prolonged immobilization, such as in the setting of unstable lumbar/thoracic spine injuries, or multiple traumatic injuries including pelvic fracture for short-term (days) management of incontinence (the inability to
control urination) needed to assist in healing of sacral or perineal wounds or for retention (the inability to pass urine) not helped by other methods.

2. To measure urine output over several days in critically ill patients

3. For treatment of bladder outlet obstruction

4. For post-operative management of surgical patients with
impaired bladder function.

7.4.3 Recommendations to Prevent Catheter-associated UTI-

1. Personnel:

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

2. Catheter Use:

Urinary catheters should be inserted only when necessary and left in place only for as long as it is required. They should not be used solely for the convenience of patient-care personnel. For selected patients, other methods of urinary drainage such as condom catheter drainage, suprapubic catheterization, and intermittent urethral catheterization may be more appropriate.

3. Hand hygiene:

Hand hygiene should be done immediately before and after any manipulation of the catheter site or apparatus.

4. Catheter Insertion:

Catheters should be inserted using aseptic technique and sterile equipment. Gloves, drapes, sponges, an appropriate antiseptic solution for peri-urethral cleaning, and a single-use packet of lubricant jelly should be used for insertion. As small a catheter as possible, consistent with good drainage, should be used to minimize bladder neck and urethral trauma. Indwelling catheters should be properly secured after insertion to prevent movement and urethral traction.

5. Closed Sterile Drainage

The catheter collection system should remain closed and not be opened unless absolutely necessary for diagnostic or therapeutic reasons. If breaks in aseptic technique, disconnection, or leakage occur, the catheter and collecting system should be replaced using aseptic technique and sterile equipment.

6. Specimen Collection

If small volumes of fresh urine are needed for examination, the distal end of the catheter, or preferably the sampling port if present, should be cleansed with a disinfectant, and urine then aspirated with a sterile needle and syringe. Larger volumes of urine for special analysis should be obtained aseptically from the drainage bag.

8. Urinary Flow

Unobstructed flow should be maintained. The catheter and collecting tube should be kept free from kinking. Collecting bags should always be kept below the level
of the bladder. Do not rest the collecting bag on the floor.

9. Catheter Change Interval

Indwelling catheters should not be changed at arbitrary fixed intervals.

7.5 Surgical Site Infection (SSI):

7.5.1 Definition & Classification:

The Centers for Disease Control and Prevention's (CDC's) & National Health care Safety Network(NHSN) definitions for SSI are widely used for public reporting, interfacility comparison, and for performance comparisons.

1. Superficial incisional SSI: Must meet the following criteria:

Date of event occurs within 30 days after any NHSN operative procedure (where day 1 = the procedure date) 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. Organism(s) identified from an aseptically-obtained specimen from the superficial incision or subcutaneous tissue by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment.

c. Superficial incision that is deliberately opened by a surgeon, attending physician* or other designee and culture or non-culture based testing of the superficial incision or subcutaneous

tissue is not performed AND patient has at least one of the following signs or symptoms: localized pain or tenderness;
localized swelling; erythema; or heat.

d. Diagnosis of a superficial incisional SSI by the surgeon, attending physician or other designee.

2. Deep incisional SSI must meet the following criteria:

The date of event occurs within 30 or 90 days after the NHSN operative procedure (where day 1 = the procedure date) according to the list .
AND
involves deep soft tissues of the incision (for example, fascial and muscle layers)
patient has at least one of the following:
a. Purulent drainage from the deep incision.
b. Deep incision that spontaneously dehisces, or is deliberately opened or aspirated by a surgeon, attending physician* or other designee AND organism(s) identified from the deep soft tissues of the incision by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment or culture or non-culture based microbiologic testing method is not performed.
AND
patient has at least one of the following signs or symptoms: fever (>38°C); localized pain or tenderness.
c. An abscess or other evidence of infection involving the deep incision that is detected on gross anatomical or histopathologic exam, or imaging test.

3. Organ/Space SSI Must meet the following criteria:

Date of event occurs within 30 or 90 days after the NHSN operative procedure (where day 1 = the procedure date) according to the list .
AND
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 (for example, closed suction drainage system, open drain, T-tube drain, CT-guided drainage).

b. Organism(s) identified from fluid or tissue in the organ/space by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment.

c. An abscess or other evidence of infection involving the organ/space that is detected on gross anatomical or histopathologic exam, or imaging test evidence suggestive of infection.

AND

meets at least one criterion for a specific organ/space infection site .
Surveillance Periods for SSI Following Selected NHSN Operative Procedure Categories. Day 1 = the date of the procedure.

7.5 Ventilator-associated pneumonia (VAP):

7.5.1 Definition: A pneumonia where the patient is on mechanical ventilation for >2 calendar days on the date of event, with day of ventilator placement being Day 1, AND ventilator was in place on the date of event or the day before.

7.5.2 Etiology:

Organisms of family Enterobacteriaceae, Staphylococcus aureus, Pseudomonas aeruginosa,Haemophilus influenza and Streptococci spp.

7.5.3 Pathogenesis

Exogenous source: Hands of health care worker, contaminated ventilator circuit

7.5.4 VAP PREVENTION BUNDLE COMPONENTS:-

• Hand hygiene

• Head-of-bed elevation must be at 30-45 degree

• Daily interruptions of sedative infusions and spontaneous breathing trials

• Oral care with chlorhexidine gluconate (0.12%- 0.2% w/v)

•Health-care worker should ear a mask and an apron or gownwhen anticipates soiling of respiratory secretions from a patient(e.g. intubation, tracheal suctioning, tracheostomy, and bronchoscopy) and change it after the procedure and before providing care to another patient.

• Control of endotracheal cuff pressure (must be at 20-30 cm water;)

• Subglottic secretion drainage (must be done every 2 hourly;)

•Remove devices such as endotracheal, tracheostomy, oro/nasogastric tubes from patients as soon as they are not indicated.

•Use non-invasive ventilation whenever possible.

•. Perform daily assessments of readiness to wean and use
weaning protocols.
.
• Avoid histamine receptor blocking agents and proton pump inhibitors for patients who are not at high risk for developing a stress ulcer or stress gastritis.

•Avoid gastric over distension.

•Remove condensate from ventilatory circuits. Keep the ventilatory circuit closed during condensate removal.

•Change the ventilatory circuit only when visibly soiled or malfunctioning.

•Store and disinfect respiratory therapy equipment properly.

•Educate healthcare workers who provide care for patients undergoing ventilation about VAP.

7.6 HAI Audit:

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

HAI Infection Rates Formulae

VAP Rate -= No. of VAP cases/ Total no. of ventilator days X 1000
CLABSI Rate = No. of CLABSI cases/ Total no. of central line days X 1000
CAUTI Rate = No. of CAUTI cases/ Total no. of catheter days X 1000
SSI Rate = No. of SSI/ No. of surgeries done X 100

8. Isolation Precaution

8.1 Introduction:

The 1996 CDC guidelines include recommendations designed to minimize the risk of occupational exposure (and subsequent transmission to others) to blood and body fluids of patients.

8.2 Standard precautions:

The new standard precautions consider all patients and their bodily fluids (except sweat) to be potentially infectious, thereby replacing the old universal precautions which applied only to blood and visibly bloody fluids.

1. Gloves are required when hand contact with any of these fluids is anticipated, and hands should be washed after the gloves are removed.

2. Impervious gowns must be worn by heath care workers to prevent soiling of clothes by splashes of blood or body fluids, and masks along with eye protection are mandated if splashes toward the face are anticipated.

8.3 Additional isolation categories:

In addition to the standard precautions, the guidelines include three isolation categories based upon the three modes of infection transmission:

- Contact,
- Respiratory droplets
- Airborne spread.

8.3.1 Contact may occur directly with the source of the microorganism, or indirectly via contamination of the inanimate environment. Direct contact includes touching, sexual contact, percutaneous or mucous membrane exposure, or exposure via an infectious vector (e.g., an insect). Organisms that can spread by direct contact include Clostridium difficile, herpes simplex virus (mucocutaneous), scabies, and multidrug-resistant organisms in the gastrointestinal tract, sputum, or wounds.

8.3.2 Respiratory droplets are large particles expelled during coughing, sneezing, talking, or singing.Transmission through droplets is less than six feet from the source patient . The major organisms spread as respiratory droplets are *Haemophilus influenzae* type b (invasive),

Neisseria meningitidis, *Mycoplasma pneumoniae*, *Bordetella pertussis*, **influenza virus,** and rubella virus.

8.3.3Airborne spread depends upon aerosolisation of small particles of the infectious agent that can then travel over long distances through the air. Mycobacterium tuberculosis, varicella-zoster virus, and measles are the most common nosocomial pathogens transmitted by this route.The specific infection control measures required to prevent spread through contact, droplet, and airborne route are outlined in

8.4 Recommended infection control measures from HICPAC guidelines:

8.4.1 Contact precautions

• Private room preferred; cohorting allowed if necessary.

• Gloves required upon entering room. Change gloves after contact with contaminated secretions.

• Wash hands after removing gloves.

• Gown required if clothing likely to come into contact with the patient or environmental surfaces, or if the patient has diarrhea.

• Wash hands with antimicrobial soap before leaving the patient's room.
Minimize risk of environmental contamination during patient transport (e.g., patient can be placed in a gown).Non-critical items should be dedicated for use of a single patient only, if possible.

8.4.2 Droplet precautions

• Private room preferred; cohorting allowed if necessary.

• Wear a mask when within 3 feet of the patient.

• Mask the patient during transport.

8.4.3 Airborne precaution

• Place the patient in a monitored negative pressure room with at least 6 -12 air exchanges per hour.

• Room exhaust must be appropriately discharged outdoors or passed through a HEPA (high efficiency particulate aerator) filter before recirculation within the hospital.

• A certified respirator must be worn when entering the room of a patient with diagnosed or suspected tuberculosis. Susceptible individuals should not enter the room of patients with confirmed or suspected measles or chickenpox.

• Transport of the patient should be minimized; the patient should be masked if transport within the hospital unavoidable.

8.4.4 Visitors Policy For In Patients:

• One attendant is a must for all patients.

• Different colour code (pink, yellow) be issued for different areas if feasible (intensive care, HDU vs. general ward)

• Two attendant passes will be issued for all admissions.

• Patient attendant waiting area to be made available outside of each HDU/ICU.

• One attendant will be allowed inside for each patient with a pink pass.

• One attendant will be allowed to be a reliever with a yellow pass.

• The general visiting hours for all patients should be displayed.

• Visiting hours for the ICU's will vary (as per the ICU in charge faculty) and only two attendants (but one by one)will be allowed during the visiting hours.

• Children are strictly prohibited from entering the ICU's.

8.4.5Visitor Information:

Written information to be provided in both Hindi and English at time of admission which should include the following instructions.

• The visiting hours are between 1 pm to 2 pm and 4 p.m. to 5 p.m. (Kindly keep the number of visitors to the barest minimum to avoid cross infections).

• Visiting hours for the ICU's are variable and only one attendant is allowed during the visiting hours.

• Please refrain from visiting patients if you have symptoms such as fever, cough or cold.

• Children of age 12 and under are not encouraged in visiting patients due to their relatively low immunity.

• To respect the privacy of our patients, visitors and staff, taking photographs, audio or videorecording using any devices (camera, video-camera, phone-camera, voice recorder) are not allowed within the hospital premises.

• Please wash your hands thoroughly with soap and water or use an alcohol-based hand rub after visiting patients in the hospital.

- **Do Not Tip:** As a service Organization, we wish to extend every courtesy to all ourpatients. All of our employees have been instructed not to accept any tip in kind or cash.

- **No Smoking:** The hospital is a No Smoking Zone. Smoking or Consumption of Alcohol is **Strictly Prohibited**.

- **No Chewing Tobacco in Hospital premises**

- Visitors to use Sulabh Shauchalaya only, available at various locations in hospital premise.If feasible the instructions be duly signed by the patients relatives or the patient himself, at the time of admission

8.4.6 Quality of security guards to be improved with regular training of guards for proper enforcement of rules

Hospital administration to make sure proper display of directions/locations of following, for the patient attendants :-

▪ Waiting area

▪ Canteen

▪ Toilets

▪ Blood bank

▪ Sample Collection centre

▪ ATM

▪ Police post

8.5 Special Instructions in Isolation Ward

• Non-essential staff and visitors should not enter

• Gloves and gowns should be worn. Surgical masks and eye protection (e.g., goggles) are mandatory when within three feet of the patient.

• HEPA respirators should be used if the patient is coughing, vomiting, or haemorrhaging, or has diarrhoea.

• Standard precautions should be followed to minimize the risk of injuries by sharps.

• Clinical laboratory specimens should be transported to and handled in the lab with special precautions. Consultation with experts in biosafety should be obtained.

• Environmental surfaces and contaminated objects should be cleaned and disinfected. Linen can be autoclaved or incinerated.

• Bodily wastes should be autoclaved or disinfected prior to disposal. Medical waste such as needles and syringes should be incinerated or disinfected.

• If the patient dies, the corpse should be placed in a sealed, leak proof material, and cremated or buried in a sealed casket.

• Exposed persons should be placed under close medical surveillance and receive appropriate follow-up.

9. LAUNDRY AND LINEN MANAGEMENT

9.1 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.

9.2Categories of Linen

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.

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.

9.3 Specific Items:

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 cover scan be purchased and may be used providing the mattress itself is not soiled stained or has a smell.

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.

9.4 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 in tored 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.

viii. 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”.

ix. No separate treatment for known HIV positive patient’s linen should be attempted and should be collected and transported as mentioned above.

9.5 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.

9.6 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 are first tied in a red bag.

9.7 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 reprocessing.

9.8 Infection control issues in the laundry

1. 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.

2. Personal protective clothing will be available and worn when handling linen.

3. 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.

4. Disposable items must not be re-used. Reusable gloves must be cleaned and dried at least daily.

5. A hand hygiene facility complete with soap and paper towels, must be available close to the working areas.

6. Staff must be aware of the possibility of extraneous items and sharps containers must be available.

7. Staff must be aware of actions to take in the event of a sharps injury.

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.

Thermal disinfection times and temperatures and environmental issues in the laundry

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:

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.

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.

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 shreded or cut in small pieces and then dispose off in yellow bag to bio-medical waste collector for final dispoosal.

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.

10. Antimicrobial Policy and Antimicrobial Stewardship

10.1 Introduction

The annual antibiogram should be prepared by microbiology department. Antibiotic susceptibility profile may be is analyzed regularly and the common resistance patterns of the bacterial isolates to be reported and discussed in the HICC meetings and the antibiotic policy to be reviewed accordingly. Antibiotic policy need to be prepared in consultation with respective clinical departments.

10.2 Antibiotic policy shall be prepared using following general principles:

1. Data is analyzed on a quarterly basis as per hospital records

(a) Common etiological agents as per
(i) site of infection
(ii) age groups
(iii) patient location – outdoor (OPD), indoor (wards & critical care areas) (

b) Antibiogram data as per
(i) site of infection
(ii) age groups
(iii) patient location – outdoor (OPD), indoor (wards & critical care areas)

(c) Unusually resistant organisms to be confirmed and submitted for further characterization to National Centre for Disease Control (NCDC)

2. Standard treatment guidelines [categorization of patients as 45 per age and Community acquired infections (CAI) / Health care associated infections (HCAI)]

(a) Guidelines for empirical antimicrobial therapy as per common clinical syndrome
(i) Adults & older children
1. Blood Stream Infections (BSI)
2. Meningitis
3. UTI
4. Pneumonia (a)Community Acquired Pneumonia (CAP)
(b)Ventilator Associated Pneumonia (VAP)
5. GIT Infections
6. Conjunctivitis

7. Otitis Media
8. Tonsilltitis / Pharyngitis
9. Skin and Soft Tissue Infection (SSTI)
10.Genital Infections
11.Osteomyelitis

(ii) Neonates (special conditions)

1. Sepsis
2. Meningitis

(iii) Infants & Small Children (special conditions)

1. Meningitis
2. Sepsis
3. Pneumonia

(b) Classification of Antimicrobials into first line, second line and reserve group of drugs

(c) Chemoprophylaxis

(i) Pre-operative antimicrobials
(ii) Other invasive procedures
(iii) Special high risk groups e.g. Prophylaxis for rheumatic fever, splenectomy patients, and immuno-compromised patients 46

(d) Special clinical syndromes (e.g. STIs)

4. Prescription auditing

5. Review of surveillance data generated from antibiograms & prescription auditing.

6. Education and training for all infection control activities in collaboration with the Hospital Infection Control Committee.

10.3 Measures to control spread of antibiotic resistance

10.3.1 Appropriate antimicrobial use

1. Each health care facility should have an antimicrobial use programme. The goal is to ensure effective economical prescribing to minimize the selection of resistant microorganisms.
2. Formulation of guidelines with a multidisciplinary approach using the local antibiogram.
3. Provide ongoing education on rational use of antibiotics to clinicians and ensure implementation of antibiotic policies.
4. Restricted antibiotic use
5. Use must be justifiable based on clinical diagnosis.
6. Before initiating antibiotic treatment, appropriate specimens for bacteriological examination must be submitted to laboratory and selection of an antibiotic must be based on the sensitivity pattern, patient tolerance, and cost
7. An agent with as narrow a spectrum as possible should be used with appropriate dosage and duration of antimicrobial therapy.
8. The correct dose must be used.
9. Control antibiotic use - Selected antibiotics may be restricted in use. -Cyclic rotation of antibiotics in a class - Discontinuation of antimicrobial therapy based on predefined criteria
10. Carry out periodic prescription audits.
11. Restriction of hospital formulary through pharmacy.
12. Standard and contact Precautions including rigorous adherence to hand hygiene, appropriate use of PPE.
13. Isolation and cohorting of patients infected or colonized with Multi-drug resistant organisms (MDROs).
14. Education and training of HCP.
15. Increased environmental cleaning and patient-dedicated equipment.
16. Proper sterilization and disinfection.
17. Surveillance for Multidrug resistant organisms especially in high risk areas.

10.4 Control of spread of specific organisms (MDROs)

a. Methicillin Resistant Staphylococcus aureus (MRSA)

- MRSA strains are resistant to the penicillin-resistant penicillins (methicillin) and cephalosporins and are often resistant to multiple classes of drugs and occasionally are sensitive only to Vancomycin and teicoplanin.
- MRSA are highly-transmissible strains and have a high potential to spread across hospitals. Since there are few therapeutic options available for treatment of this

resistant organism, the best strategy to control the spread are the preventive measures.

- Transient carriage of the organism on hands of HCWs accounts for major route of transmission from infected/colonized inpatients to other patients. Transmission from environmental surfaces and airborne routes is known to occur.
- The measures to control MRSA in hospitals are screening for MRSA carriage or infection in certain high risk patients or units at admission, standard and contact precautions, isolation and cohorting of patients, treatment of infected/colonized patients, environmental cleaning, education and training of staff.

b. Vancomycin – Resistant Enterococcus (VRE):

- Enterococcal infections are difficult to treat because of their intrinsic resistance to many antimicrobial agents and easily acquire resistance to almost all antimicrobials including Vancomycin.
- Transmission of VRE can occur by direct contact or indirectly via transient carriage on hands of HCW, contaminated surfaces or patient-care equipment.
- To prevent and control the nosocomial transmission of VRE, judicious use of antibiotics especially 48 Vancomycin, education of HCW, implementation of hospital infection control practices, equipment and environmental cleaning, using patient-dedicated or single-use non-critical patient-care equipment, isolation and cohorting of infected/colonized patients, use of PPE, and surveillance for VRE infection/colonization should be implemented.

c. MDR Gram negative (MDRGN) bacteria:

- MDRGN includes organisms producing ESBLs, plasmid-mediated AmpC and carbapenemases.
- Screening of patients in high risk units and those at high risk of carriage such as recent broad spectrum antibiotic therapy (carbapenem, quinolones, and 3rd and 4th generation cephalosporins), long duration of stay and severity of illness, chronic disease and impaired functional status and presence of invasive medical devices should be carried out for infection/colonization with MDRGN organisms.
- Multiple sites including rectal or perianal swabs, should be screened. Measures to prevent spread of MDRGN organisms include stringent hand hygiene, contact precautions (gloves and gown), isolating, and cohorting, increased environmental cleaning and dedicated patient equipment and judicious use of antibiotics.

In healthcare facilities:

Antibiotic usage rates in healthcare facilities are high for some classes of drugs, and there is considerable unexplained variation between hospitals in the use of certain antibiotics, particularly broad spectrum antibiotics.

Problems resulting from inappropriate use of antibiotics apply to both current and future healthcare facility patients due to changes in healthcare facility microbial ecology resulting from the resistance.

Additional costs of infections caused by resistant organisms include:

- The need for more expensive and broader spectrum antibiotics to treat the infections.
- The need to isolate patients colonized with resistant organisms in order to minimize cross-infection.
- In the community: Community antibiotic use is high and there is irrational use of antibiotics including the over the counter sales due to lack of monitoring mechanism in spite of the existing laws. Thus multi-resistant bacteria, such as community strains of MRSA(CA-MRSA) and extended-spectrum beta-lactamase producing Gram-negative bacteria are causing increasing human morbidity and there is concern that past excessive antibiotic use in the community or in animal production systems (or both) is responsible.

10.5 Antimicrobial Stewardship

10.5.1 Introduction: This aims to optimize antimicrobial use among patients in order to reduce antibiotic resistance, improve patient outcomes and safety, and ensure cost-effective therapy.

10.5.2 At the healthcare facility level, antibiotic stewardship involves:

- Implementing an antibiotic stewardship program; and
- Continuous monitoring and analysis of antibiotic usage, to track changes in antibiotic resistance and to monitor effects of containment strategies.

10.5.3 Key requirements of a healthcare facility antibiotic stewardship program:

1. A multidisciplinary antibiotic stewardship team with core membership of an infectious diseases physician (lead doctor) and a clinical pharmacist. Microbiologist, and infection control professional may also be included.
2. Antibiotic stewardship should be available within the healthcare facilities for quality improvement and patient safety governance structure. There should be collaboration

between the stewardship team and drug and therapeutics and infection prevention and control committees.

3. Implementation of clinical guidelines that comply with national treatment guidelines and incorporate changes regularly based on resistance patterns prevailing in the health facility as reported regularly by microbiology department.

4. Microbiology services reporting patient-specific culture and sensitivity results to optimize individual antibiotic management.

5. Review of antibiotic prescribing with intervention and direct feedback to the prescriber.

6. Activities according to local priorities and resources & Provision of effective & regular education of prescribers and pharmacists about antibiotic usage, development of resistance and judicious prescribing of the antibiotics.

7. Point of care interventions including: streamlining or de-escalation of therapy, dose optimization, parenteral to oral conversion.

8. Use of information technology such as electronic prescribing with clinical decision support, on-line approval systems.

9. Monitor antibiotic prescribing by measuring antibiotic consumption; drug use evaluations and using quality Use of Medicine indicators.

10. Support and collaboration of hospital administration including allocation of resources to provide education and measure and monitor antibiotic usage.

11. Antibiotic stewardship surveillance methods should be established at patient level as well as population or community level

11. Biomedical Waste Management

11.1 Introduction :

This section of these guidelines encompasses all the requirements which hospitals need to meet for proper management of bio medical and general waste in the hospital. These requirements are subdivided into following sections:

11.2 Implementation of BMW Rules, 2016 & 2018 (Amendment)

- Segregation, Collection and Transportation of BMW
- Sharp Management
- Storage of Bio Medical Waste
- Disposal of Bio Medical Waste
- Management of Hazardous Waste
- Solid General Waste Management
- Liquid Waste Management
- Equipment and Supplies for BMW Management
- Statutory Compliances

11.3 IMPLEMENTATION OF BIO MEDICAL WASTE RULES, 2016 & 2018

- (Amendment) BMW management rules were revised through a gazette notification by the Central Government in 2016 & 2018 (Amendment) and it has become mandatory for health facilities to manage bio medical waste generated from the health facilities as per the new rules.

- The bio medical waste as defined by the BMW Rules, 2016 is any waste which is generated during the activities of diagnosis, treatment and immunisation of human beings or any research activities pertaining thereto or in the production or testing of biological or in the health camps.

- For implementation of the BMW Rules, 2016 & 2018 (Amendment) the health facilities need to be aware of the key changes that are incorporated in the BMW Rules vis-a-vis BMW Rules, 1998.

- The health facilities need to ensure that it has a copy of new BMW Rules for ready reference and as a guiding document for BMW management.

- For implementation of the BMW Rules 2016 & 2018 (Amendment) the health facilities needs to ensure the following:

- Bio medical waste generated from the health facilities is segregated as per the new colour coding scheme specified in the BMW Rules, 2016 & 2018 (Amendment)

- All the health facilities which are situated within 75 km radius of Common Bio Medical Waste Treatment Facility (CBMWTF), need to have a formal agreement with the CBMWTF for final treatment and disposal of the bio medical waste

- Health facilities which do not lie within 75 km radius of CBMWTF need to have approval for deep burial pit, used for disposal of waste from the Pollution Control Board office

- Health facilities also need to ensure that the pre-treat the waste at the health facilities as per BMW Rules before handing over the same to CBMWTF or before the final disposal

- Each health facility also needs to ensure that only non-chlorinated bags (excluding blood bags) are used by the hospital for collection of waste in the hospital

- Health facilities also need to ensure that they monitor the activities of BMW management through a committee formed at the facility. This committee should meet at least once in six months and all the records related to the same need to be maintained by the health facility

11.3.1 SEGREGATION, COLLECTION & TRANSPORTATION OF BMW

The key activities that a hospital performs for the management of BMW include segregation of the waste at the point of generation, timely collection of waste and transportation of the waste from the interim storage areas of the hospital to the central storage area and transportation of the waste from the central storage area to the deep burial pits (in case of facilities not having agreement with CBMWTF).

SEGREGATION GENERAL REQUIREMENTS

- It is imperative for healthcare organizations to segregate the waste generated from the facilities at the point of generation only
- Segregation of the waste is the responsibility of the waste generator only
- The waste generated from different areas of the hospital needs to be segregated as per the colour coding provided in the BMW Rules, 2016 & 2018 (Amendment).
- The general waste generated should not to be mixed with the bio medical waste.
- The work instructions are displayed at appropriate areas of the hospital for proper segregation of the waste as per the colour coding.

COLLECTION OF WASTE GENERAL REQUIREMENTS

- All the bags used for waste collection need to be sealed once they are full to 3/4th of their capacity and transported to the central waste storage area or interim storage areas
- Collection of the waste needs to be done in closed covered containers which are sturdy preferably wheelbarrows
- Collection time needs to be fixed and size of the bins need to be appropriate to the quantity of waste produced in each area of the healthcare facility
- General waste should not be collected at the same time or in the same trolley as infectious or other hazardous wastes
- Collection of the waste should be done daily, with collection timed to match the pattern of waste generation during the day
- The collection timings should enable the HCF to minimize or nullify the use of interim storage of waste in the departments
- The collection of the waste should be done by the waste handlers only after downing of the appropriate PPE i.e. gum boots, heavy duty gloves, face masks and eye wear •
- All the bags needs to be labeled with biohazard or cytotoxic hazard symbol along with date of generation and area of generation for easy traceability.

TRANSPORTATION OF WASTE

- BMW generated from the health facilities should be transported in covered wheelbarrow based sturdy trolleys through a route which has low traffic flow of patients and visitors (whenever possible)

- The waste transportation trolleys should be dedicated for the purpose of waste transportation only

- The transportation trolleys need to be separate for general waste and for BMW • It is preferable that the trolleys used for transportation should be as per the colour coding, as provided in the New BMW Rules.

- All the trolleys used for the transportation of the waste should be labeled with bio hazard logo

- After every transportation cycle, ensure trolley should be washed, disinfected & dried up

- Route of transportation to the BMW holding/disposal area should preferably be planned in such a way that ensures:

- it does not include transportation through high risk areas
- supplies and waste are transported through separate routes.
- waste is not transported through areas having high traffic of patients and visitors
- central waste collection area can be easily accessed through this route
- provide safe transportation of waste to avoiding spillage and scattering of waste

11.4 STORAGE OF BIOMEDICAL WASTE

The BMW generated from the hospital needs to be stored in a dedicated central waste storage area, before handing over the same to the CBMWTF. The minimum requirements that are needed to be ensured by hospitals for central waste storage area as listed as follows:

- The location of central waste collection station should be away from the public/visitors access
- The planned space should also include space provisions for storage of waste collection trolleys
- Such centre should be roofed and manned through lock and key under the responsibility of designated person
- The entrance of this centre should be accessible through a concrete ramp for easy transportation of waste collection trolleys
- During construction it is to be ensured that the centre is kept ventilated through the use of exhaust fan or by use of wire meshes for ventilation
- There should also be provision of water supply adjacent to central waste storage area for cleaning and washing of this station, trolleys and also for hand washing for the staff
- The entrance of this station should be labeled with "ENTRY FOR AUTHORISED PERSONNELL ONLY" and logo of BMW Hazard.
- It is desirable that for new health facilities under construction, the drainage system of this central waste collection is attached to the Effluent Treatment System of the health facilities
- It is to be ensured that no general waste is stored in the central waste collection area
- The hospital should ensure that waste generated from the hospital should not be stored beyond a period of 48 hours
- To ensure there is no pilferage of recyclables, it is to be ensured that central storage area is under lock and key, guarded by a designated person
- Health facilities need to maintain the record of waste handed over to the CBMWTF and also for recyclable waste generated and handed over to the authorised recyclers
- To ensure protection from animals, it is to be ensured that there is no stray animal in the health facility premises and cattle traps have been installed at the entrance of the health facility.

11.4 DISPOSAL OF BIOMEDICAL WASTE

Hospitals need to ensure that they have adequate arrangements for the disposal of BMW generated from the health facility.
The final disposal of the BMW generated from the health facility can be taken up by the CBMWTF or through deep burial and sharp pits.

HOSPITALS UNDER CONTRACT WITH CBMWTF:

All the hospitals, which are situated within a distance of 75 km of CBMWTF, need to have a formal agreement/contract with the CBMWTF for transportation and disposal of BMW generated from the hospital. These hospitals have to hand over the waste to the CBMWTF for final disposal and should ensure that waste is not disposed of in the deep burial and sharp pits. Hospitals need to ensure that the disposal of the BMW generated from the hospital is disposed of as per Schedule I of the BMW Rules, 2016. & 2018 (Amendment)

12. Occupation Health and safety

12.1 Needle Stick Injury:

12.1.1 Procedure:

1. Do **not panic**.

2. Do **not squeeze** the finger to draw blood.

3. Place the finger **in running water** for few minutes. Wash it gently with plain soap andwater. And report to the nodal officer of your concerned department.

4.**Nodal officer** may refer you to the occupational hazard

12.1.2 FOR PERSONS WHO ARE UNVACCINATED

1. If source is **HBsAg positive** give **single dose of HepatitisB**Immunoglobulin (HBIG) and start vaccine series.
2. If source is HBsAg negative no HBIG to be given start vaccineseries
3. If source is unknown or not available for testing start vaccineseries without giving HBIG

12.1.3 FOR PERSONS WHO ARE VACCINATED

1. If the person exposed is a known responder no treatment required irrespective of the status of the patient (positive ,negative, unknown)
2. If the person is a known non responder- give one dose of HBIG and initiate revaccination if source is HBsAg positive, no trearment if source is negative,
3. If source is unknown but high risk consider it as HBsAg positive

12.1.4 FOR PERSONS WITH UNKNOWN ANTIBODY STATUS

1. Test exposed person for anti HBs antibody, if responder no treatment is needed
2. If inadequate give one dose of HBIG and vaccine booster dose
3. If source is negative no treatment is needed
4. When source is unknown or not available for testing check for antibody titre.
5. If responder- no treatment needed but if non-responder vaccine booster is needed along with rechecking titres 1-2 months later.

12.1.5 POST POSTEXPOSURE PROPHYLAXIS DOSE AND SCHEDULE.

1. The dose of HBIG is 0.06 ml/kg body weight single IM injection
2. Preferably should be given within 24 hours of exposure or at least within 7 days of needle stick injury
3. In cases of sexual contact with HBsAg positive patient HBIG can be given up to 2 weeks from day of exposure
4. Hepatitis B vaccine should be given in schedule of 0,1,4-6 month3 IM injections.
5. HBIG and Vaccine can be administered simultaneously at different IM sites

12.1.6 FOLLOW UP OF HBV EXPOSED PERSONS

• Perform follow up Anti HBs testing in persons exposed to HBVwho received hepatitis B vaccine

• Test for Anti HBs titer after1-2months of last dose of vaccine

• Anti HBs response cannot be ascertained if person has received HBIG in within previous 3-4 months

• If Acute HBV positive work up on the lines of HBV infection

12.2 Spill management

For infectious material spill with more 15 cm , isolate the area to

Avoid one from entering.

Take spill kit & wear gloves & protective clothing (Mask, Lab coat, Shoe- cover, Hair cover & gloves)

Cover the spill with disposable towels/paper/ absorbent material.

Saturate the towel with 6% Hypochlorite solution.

Place the disinfectant-soaked towels over the area for 30 minutes

Before removing and discarding them.

Discard the above material in Yellow bag with the help of forcep

or by hand pick. (if there are sharps – collect with forcep.)

Wipe the area again 6% Hypochlorite & allow it to air dry.

Handle the material in the same manner as other infectious waste.

Place all disposable materials used to decontaminate the spill as per waste disposable policy of lab.

Note this incidence in incidence register

13. FOOD SAFETY

13.1 Introduction:

Food safety is important because they are clinically serious and can result in the deaths of patients. Experience has shown that outbreaks of food poisoning in hospitals are notable. Hence steps in the processes are critical for food safety
Ensure that safety controls are in place, maintained and reviewed.

Aim: The aim is to ensure that food is provided to patients and staff in a safe and hygienic manner.

13.2 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

13.3 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.

D. Refrigerator and Freezer Use

The use of refrigerators/freezers must be carefully controlled by the dietician responsible.

13.4 Controls to ensure food safety include:

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 8oC 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.

13.5 Training&Standard of Food

Food handlers must be trained in food hygiene matters to a level appropriate to their job. 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.

13.6 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

13.7 Food borne diseases :-

Bacterial diseases Typhoid and paratyphoid fever, Salmonellosis, Staphylococcal

Food borne diseases

Bacterial diseases Typhoid and paratyphoid fever, Salmonellosis, Staphylococcal intoxication, *Cl.perfringens, B.cereus*food poisoning, *E.coli* diarrhoea, Streptococcal infection,Shigellosis, Brucella

Viral diseases Viral hepatitis, gastroenteritis

Parasites Taeniasis, Hydatidosis,Trichinosis, Ascariasis, amoebiasis, Oxyuriasis

13.8.Cleaning procedures for food service department facilities

1. A regular mopping with water after every use
2. Tilting pans after every use washed with water Cooks/ Kitchen Mates.
3. Sinks / Work Tables As often as required
4. Cold storage Daily mop/ Sweeping
5. Wet grinder After every use thorough cleaning with Water
6. Knife After every use. Cleaning with cold water
7. Work Table Sinks Twice a day cleaning with soap/water

14. CSSD Monitoring

14.1 Responsibilities of Main CSSD

1.The CSSD provides support to all patient care services and responsible for:

a. Collection.

b. Decontamination.

c. Disinfection.

d. Inspection.

e. Assembly

f. Packaging.

g. Sterilization.

h. Storing.

i. Distribution of all instruments and medical devices.

2. Providing Sterile supplies to all hospitals, clinics and polyclinics -ministry of Health.

3. PlanningandapprovalforthedesignofanyCSSDintheMinistry'sorprivate hospitals.

4. Providing policies / procedures and supervising the implementation of the same in MOH.

5.Technical Supervision on central sterile supply department (CSSD).

6.Communicate with the end users to improve the quality of the service.

7.Participating in committees to outline specifications of purchased equipment and raw materials.

8.Specifying criterion for quality control of all items produced by CSSD's.

9. Providing two years training program in the field of sterilization for the Public Authority for Applied Education .

10. Training technical staff prior to employment

14.2 Progress towards Quality Systems Accreditation

The Directorate of Infection Control is intending to obtain the Quality Systems Accreditation (ISO). On this regard and impressive progress was achieved to

1- Fulfill the requirements of the Quality Systems.

2- Continuous training programs are in progress to increase awareness of techni-cal staff about Quality Systems.

3- Quality Manual, Quality Procedures and Quality Control Records were prepared and implemented.

14.3 LAYOUT

1- The department should be designed so that it is physically separated from all other work areas.

2- The department should be designed to facilitate a unidirectional flow from the 'dirty' area to the 'clean'area

3- There should be a changing area for workers including toilet facilities and lockers in proximity to the decontamination area.

4- Access to the wash room and to the clean room should be through dedicated gowning rooms provided with hand hygiene facilities.

5- The wash room, clean room and sterilizer unloading area should be free from 'opening' windows, and unclean areas

6- All rooms in the department should be mechanically ventilated and controlled to provide a comfortable working environment, (typically temperatures should be controlled between 18-22ºCelsius and relative humidity should be controlled within the range35-60%).

7- Staff movement between dirty and clean areas should not be possible without passing through a clothing change and washup area

8- Storage facilities for bulk items should be provided external to the clean room and the wash room

14.4 CSSD Health & safety:

1-All personnel must follow traffic flow patterns.

2−Material Safety Data Sheets (MSDS)for all chemicals used in the sterile service department must be available

3−Allemployees must be trained inappropriate personnel protective equipment designated for each area

4−Employees must follow and practice hand washing guidelines (before and after each tasks)

5−Eating and drinking is prohibited in all workspaces including supply storage processing and decontamination sections

6−Workspaces must be free from clutter and have un-obstructed entrances and exits.

7−Visitors are not allowed to enter without permission. If visitors must enter restricted areas, appropriate attire is required and they should be escorted by CSSD staff

8- Safekeeping of all items by ensuring that storage areas are kept clean,

9- Prevent burn injuries when loading or unloading steam sterilizers and washer disinfectors by following procedure and wearing appropriate PPE.

10−Employees must use proper body mechanics when carrying or handling heavy items.

11-On entering the Sterile Service Department, all staff will change in to departmental uniform provided in the changing area including shoes.

12−Staffmoving into the wash area,who will be engaged in the handling and processing of incoming equipment, will put on an extra protection gown, gloves and protective goggles (when splashing is anticipated)

13−When leaving the wash area staff will remove and discard the gown and

Gloves and wash their hands.

14.5 Job descriptions:

14.5.1 Head of CSSD

1- Run CSSD according to the goals and objectives of infection control Directorate and ensuring its implementation and follow up.

2- Supervising, directing and follow up of CSSD staff ,suggesting the best motiva-tion approach.

3-Ensuring covering the hospital' requirements of sterile supply.4-

Yearly assessment of the employee.

5-Preparing & writing reports for infection control directorate.

6- Keep accurate records for all CSSD activities including the repair programs for CSSD equipments &machines

7-Taking part in emergency plan for CSSD and regular checkup.

8- participate in training the staff by giving lectures during courses or scientific days

9- Planning & consultation regard CSSD design & layout in government & private sector

10- Performing other tasks entrusted by infection control manager

14.5.2 Training supervisor

1-Ensuring that all CSSD workers have both the efficiency & the skill to perform their jobs according to their job descriptions.

2 -Participate in the implementation of continuous training programs, scientific activities, according to the selected program.

3- Observations of the CSSD supervisory inspection reports and suggest appropriate program to evaluate the outcomes. Participate in the evaluation of the technical performance of workers in the field of training and for new employees during the training period.

4-Follow developments in the field of sterilization to prepare the necessary re-

ports to discuss the possibility of their application.

5-Prepare operating instructions manuals for the CSSD equipments

6-Performing other tasks entrusted by infection control manager.

14.5.3 Senior sterilization technician

1- knowledge of CSSD tasks and participate in the training of new employees according to the plan and in evaluating their performance .

2-participation in the organization & distribution of working the assigned region in accordance with the approved program.

3- Ensure the availability of all raw materials and equipment needed to ensure the regularity of the workflow

4- Good planning to increase daily production in their group according to the operating instruction manual and contribute in solving problems relating to work.

5- Performing the assigned statistics according to planned program.

6-Ensuring the validity of the CSSD equipments in the assigned area, recording the results and contacting repair technicians .

7- ensure to follow the correct procedureof cleaning and disinfection of the sur-faces before handing the area to the following shift.

8- Committed to work in the holidays century duty according to planned time table .

9-Performing other tasks entrusted by head of CSSD.

14.5.4 Sterilization technician

1- Follow the correct procedure in the decontamination area of reception ,segregation and loading the soiled instruments in the trays

2- Assembly& packing of the instruments is performed according to operation manual.

3- Packaging of single use packages according to the planned program.4-Regularperformance of validation tests of the instruments

5- Operating all the equipments& devices in CSSD according to operating manual.

6- Arranging the packages in the sterile store according to the expiry date ,pre-paring the orders for hospital wards

7- Should have enough knowledge regard quality assurance in each area of the CSSD and participate in the statistics collection.

8- Using the electrical cutter to cut sterilization papers and gauze.

9- Committed to work in the holidays century duty according to planned time table .

10- Performing other tasks entrusted by head of CSSD.

14.5.5 Sterilization technician Assistant

1- Assisting the sterilization technician of following the correct procedure in the decontamination area in sorting ,segregation and loading the soiled instruments in the trays before cleaning and disinfection in additionen suring the validity of CSSD washer disinfectors.

2- After ensuring cleanliness and disinfection of the working surfaces assembly of the instruments is performed according to operation manual.

3- Packaging of single use packages according to the planned program.4-AssistinRegularperformanceofvalidationtestsoftheinstruments

5- Operating all the equipments& devices in CSSD according to operating Manual under supervision.

6- Arranging the packages in the sterile store according to the expiry date ,pre-

paring the orders for hospital wards

7- Should have enough knowledge regard quality assurance in each area of the CSSD and participate in the statistics collection.

8-Using the electrical cutter to cut sterilization papers and gauze.

9- Committed to work in the holidays century duty according to planned timetable

10- Performing other tasks entrusted by CSSD manager.

14.6 Cleaning of CSSD building

1- The CSSD must be cleaned on a daily basis at the beginning and at the end of each shift.

2- Cleaningequipmentmustbestoredinadesignatedareaforcssduseonly.3- Cleaning of the department must be undertaken by CSSD staff with the as-sistance of a cleaner

4- Daily cleaning of the area includes damp mopping floors, storage shelves and other work surfaces /empty trash containers. high cleaning is performed as required.

5- CSSD staff is responsible for ensuring that all surfaces are cleaned inaccordance with the cleaning schedule

6- All counter surfaces and floors must be disinfected at least daily

7- The disinfectant must be freshly prepared on a daily basis and discarded at the end of the work day .

8- Cleaning and disinfectants agent must be approved by ministry of health10- Storage of raw material in production areas must be minimal. only sufficient raw material for one days production must be kept.

11- Outer packaging must be removed from raw material before they enter the assembly and packaging area to avoid environmental contamination.

12- Vacuumingtheairventsandcleaningoutthelightfixturesisrecommend-edatleast twice per year to prevent build up of dust and lint .

14.6 Water Quality

1- water used for the cleaning of instruments should meet specific quality it should not cause damage to instruments and equipment.

2- Water hardness is determined by the amount of calcium and magnesium ions present. High levels of mineral content will result in surface staining and shorten surgical instruments life span.

3- Chlorides are the most corrosive of water contaminants.

4- Water with high mineral content is unsuitable for the final rinsing of instruments due to mineral deposits permanently damaging and shortening the life span of the item. High mineral content may also interfere with the efficacy of the cleaning agents.

5- Hardness can affect the activity of the detergent used for cleaning and may require increased concentrations of detergent

6- Water testing can either be conducted by bio-medical engineering department or by chemical distribution representative from the public health authority.

7- Ph levels ,water quality and chemical compatibility tests are carried out and recorded

8- Report any residue left on instruments to the supervisor and biomedical Engineering department .

14.7 Collection of soiled/contaminated equipment

1−Non-sterile gloves must be worn for the collection of soiled instruments

2−Wash hands in accordance with departmental procedures.

3−Wear protective clothing/attire in compliance with standard precaution guide-lines.

4−Useallocatedtrolleys.

5−Follow designated collection routine and timetable in accordance with depart-ment Guidelines

6– Linen and waste must be separated from reusable medical devices at the point of use.

7–Gross contaminants such as large amount of blood & body waste must be re-moved at the point of use before collection by CSSD staff

8–Collect used items in puncture resistant closed containers ;do not overload

.9–Place heavy instrument containers at the bottom of trolleys.

10–Secure contaminated items and cover prior to transportation.

11–Transport/Deliver used items and equipment to the cleaning area

12–Clean and disinfect collection trolleys and bins and store appropriately.

13-Use allocated vehicle for transport

14.8 Dealing with known infectious cases (soiled instrumentation with labeled infectious)

1- Consider every item collected and received to C.S.S.D infectious either labeled or not .(some pt. don't inform /virus incubation period with no symptoms)

2- Ensure proper handling for instruments with complete PPE

3- Avoid Manual wash or Ultrasonic.

4- Use washer disinfector with load/ recommendation to use lower shelf

5- 5-Runthecycleaccordingtotemperaturerecommended.(90Cor85C)

6- The specification of the washer includes self disinfection cycletherefore no need to run the washer twice .

7- Most viruses can be killed in the temperature selected .no need to run the wash-er twice.

8- Report any injury– incident report

10- Disinfect the transport container using washer disinfector or trolley washer if available(bottom shelf)

14.9 Instrument segregation & loading the trays

1−Handle contaminated devices as little as possible.

2−All equipment is transferred from the boxes to the work surface.

3−Identify if the process of cleaning & disinfection(manual/machinery)

4− Identify items requiring special attention and handle in accordance with docu-mented manufacturers' instructions

5−**Each instrument will be prepared for decontamination as follows:**

- Avoid contaminating hands wear PPE
- Separate baskets, container and instruments.
- Sort Cannulated and solid devices.
- Open all hinged instruments
- Flush all Cannulated instruments with the pressure jet gun
- Disassemble all multipart instruments
- Handle and process all devices in accordance with the manufacture instructions.
- If an instrument is broken ,any broken piece is reported immediately
- The missing instrument should be reported &recorded.

14.10 When loading the washer disinfector:

- Choose the relevant washer rack

−Place instruments into a washbasket and check to ensure all items and part s are present.

- Load items to be decontaminated in the correct position in baskets so that maxi-mum exposure to the decontamination process is achieved on all surfaces of the instrument

- Connectalltubestotheappropriateconnectoronthebasketunion.Andpositiontray into the chamber

- Place heavier items at the bottom making sure that all surfaces can be reached by the spray jets

- Do not pack too densely, all surfaces must be reached by the spray jets.
- Use detergents according to washer manufacturers 'instructions
- Maintain records of all items received and prepared for processing
-

14.11 Packing and wrapping

1- Instruments and other items that are prepared for sterilization must be packaged so that their sterility can be maintained to the point of use .

2- Access to CSSD sterile packaging are a must be restricted

3- All staff are responsible for keeping the preparation room entry / exit neat and tidy

4- Everybody entering the preparation area must be correctly dressed and conform to policy

5- No personal possessions other than locker keys are allowed to be taken into the preparation area

6- No jewelry is allowed other than stud like ear ring , and the must be completely covered with head wear

7- No food or drinks of any kind may be taken into any area of the department

8- Before entry to the preparation room area all personnel will put on suitable head covering and clean room gown

9- Personnel will wash and dry hand before entering the area

10- Head covering must be worn at all times and only discarded at the end of the shift

11- Quality of packing materials

12-Packaging materials should fulfill the following aspects:

- Effective barrier
- Easy to use
- Puncture resistance
- Resistant to tearing
- non-linting

- nonreactive
- heat compatible
- non toxic
- non odorous
- flexible sizing

Steam sterilizer

1–For an autoclave with a manual recording chart,replace chart identifying auto-clave ,date and initial in place provided

2–The first cycle will be a“warm up“cycle.

3–On the second cycle place a Bowie & Dick Test Pack ,Run the test according to manufacturers’ instructions

4–Once the cycle has run record the Bowie & Dick according to procedure

5–If the Bowie Dick result is a fail repeat the test with a new Bowie Dick Test pack. If the Bowie Dick is still a fail shut down the autoclave for repair and recall all sterile packs

6-after the last Positive Bowie Dick Test result Run a daily Biological, according to manufacturers’ instructions

7–Record contents of load, information must be detailed enough to allow for track-ing and recall if necessary.

8–LabelPackage according to policy

9–Packaging manufacturers must validate that the product contained can be satis-factorily sterilized within the wrap, pouch, container etc.

10–Process full loads–not overloaded-to limit the number of cycles you need to run

11– Load the autoclave according to manufacturers’ instructions ,make sure the door to the chamber is locked, and the appropriate cycle is selected based on the types of devices being processed.

12–Load baskets and carts so hands won’t touch packs when removing the hot trolley.

13-On completion of cycle, cycle complete indicator willappear,visually check the graph/ printer to determine that all parameters have been met.

14–In the event of a cycle failure/cycle aborted, the entire load will need to go

Through the full reprocessing cycle.

15−Put on heat resistant gloves and remove carrier from steam sterilizer

16− Allow to cool for 10–20 minutes before storage or dispensing.

17−Inspect packages to ensure integrity and external chemical indicators have changed.

I-Loading steam sterilizer:

1−Wear relevant protective clothing

2−Load instruments sets flat in single layer

3−Loads of packages on their sides with a hands width between items

4−Load soft packs onto shelf and large instrument trays on lowershelf

5−Load containers according to manufacturer's instructions some may be stacked

6−Do not allow packs to touch top, bottom or sides of autoclave

7−Do not compress packs

8−Position peel packs on sides

9−Donot overload

II- Unloading steam sterilizer

1−On completion of cycle record according to policy

2− Allow autoclave and packs to cool before handling

3−Do not touch packs until completely cooled

4−DO NOT TOUCH HOT RACKS WITHOUT HEATRESISTANT GLOVES

5−Once cooled check for wet packs ,tears, indicator changes etc.

Monitoring steams terilizer:

1−Monitoring includes all sterilizer components that track and record time,

temperature and pressure during each cycle, Printouts, gauges, round charts, etc.

2−Documentation of critical cycle parameters permits the earliest detection of

Equipment malfunctions since they can be evaluated when the cycle is in progress

Sterilization failure can be identified at a number of stages:

- Autoclave parameters are not met
- Biological Test shows growth
- Bowie Dick Test Failure
- Process Challenge Device or Load Contro lFailure
- External Process Indicator Failure
- Internal Chemical Test Failure

Wet Packs

-Chemical Indicators

-Chemical Indicators are used in combination with physical parameter to monitor the effectiveness of the sterilizer

- They monitor conditions in the sterilizer chamber or from within the load as part of a total system of sterilization monitoring.

The following main types of chemical indicators are available

- Process indicators
- In-Pack indicators

Ethylene Oxide Sterilization

Instructions

1. It is important that all staff members are aware of the policy and procedures that relate to EtO sterilization
2. Operators must know how to operate the ETO sterilizer safely as well as the importance of adequate aeration
3. Operators need to understand the environment requirements and safe work practices
4. Operators must know what the emergency procedures are in case of a leak or accident
5. The ETO sterilizer must be operated accordance with the manufacturer's instructions

6. The ETO sterilizer must be used in a well ventilated controlled room with dedicated exhausts, emission control, enclosed ETO sterilizer/aerator room, ventila-tion, air exchanges and environmental monitoring provided
7. Single-use cartridge delivers the appropriate volume/concentration of ETO
8. Check with gas manufacturer/supplier for storage recommendations and MSDS sheet.
9. ETO gas must be stored at the prescribed temperature in a well ventilated area in a cupboard marked with Hazardous materials label
10. The sterilizer operating temperature is usually preset by the sterilizer manufac-turer; there are usually two options:37C(cold cycle)55C(warm cycle)
11. The manufacturer of a device is responsible for providing validated information regarding proper sterilization and aeration of their products, depending on the concentration ,humidity, temperature parameters, and the type of sterilizer
12. The ETO cartridge must be discarded in a safe manner according gas manufac-turer/supplier and hospital policies

Packaging manufacturers must validate that the product contained can be satisfactorily sterilized within the wrap, pouch, container etc. and can release EO upon aeration in a reasonable amount of time; not only from the device but the packaging material too

Plasma Sterilizer :

1- Do not remove cassette from plastic wrapper if indicator strip is red (Sterrad) this indicates That the cassette might have been damaged

2- Use manufacturer approved biological indicators) biological monitoring is recommended to be performed with every load.

3- Place biological monitor into a Tyvek pouch then put it with load in sterilizer as per manufacturer's recommendation (Sterrad: Back of the chamber on the bottom shelf with the opening toward the back of the chamber).

4- Incubate Biological indicator at temperature as recommended bymanufacture

5--Preparing Items for loading &Loading sterilizer.

7-All items must be thoroughly cleaned and dried before packaging.

8- Use packaging and containers recommended by the manufacture.

9-Place chemical indicator in each packaged item.

10-Arrange items in such a way as to ensure sterilant will come into contact with all surfaces.

The Delivery and Distribution of Processed Items

1-All items will be checked for sterility before they are released

2–The following should be checked when deciding if the pack is still sterile:

- Holes or tears
- Wetness or stains
- Broken seals
- Dust

3–All damage items are returned to the CSSD

4–All items issued will be recorded so that at racking system is effected

5–Various methods can be used in the transport of sterile packaged items to their point of use.

6– Sterile supplies should be transported in covered or enclosed trolleys with a solid bottom shelf. The solid bottom shelf prevents microorganism on the floor being picked up by the wheels of the trolley and then spun upwards onto the sterile packs

7–If items are placed inside plastic or paperbags, they should be arranged to prevent them from being crushed or damaged during transport. They all protect medi-cal devices from damage

9–Items must be placed onto a clean trolley that can be covered

10–Trolleys must not be overloaded

11–Soiled items must NOT be loaded onto the same trolley

Equipment maintenance

1- Equipment must be maintained according to manufacturers specification .

2- Records of the repair made to each piece of equipment must be maintained within the CSSD and recorded in the maintenance log,

3- Copies of the maintenance log from the manufacturing company must be kept in biomedical department and CSSD respectively.

4- After any major repairs or modifications are made to satirizing equipment a validation test must take place before the equipment is placed back to service.

5- CSSD staff must inform the department manager when any maintenance has been performed.

Sterile Storage

1 All sterile must be cooled before storing and shall be stored in a secure location This maintains the Integrity of the sterile item.

2 All storage are as shall be clean, dry, protected from moisture.

3 Before storage, all sterile items shall be checked for the following:

- Items are completely dry
- Integrity of the outer wrap
- Coloring of sterile indicator tape, date prepared ,initialed
- Lot number labels.

4. Any sterile item that has been dropped on the floor is considered unsterile.

5. Stock sterile items on shelves 8-10 cm from the floor and 20 -25 cm from ceiling

6. Unauthorized personnel, patients, or visitors are prohibited to enter the sterile storage area .Ensure the proper signs and labels are posted in the storage shelves.

7. Items will be labeled (Sterile unless package is opened or damaged and checked Before use).

8- Damage of sterile items includes: Hole or torn wrapper, broken seal in peel Pouches, items dropped, securing tape or lock that shows sign of tempering or having been removed, exposure to contaminate of unsafe environment and expo-sureto any type of moisture will be considered unsterile.

9- Temperature should be controlled in range of relative humidity 35%-50% to prevent drying out or premature breakdown of material of seal.

15. List of Annexure

Annexure 1- HICC Members

Hospital Infection Control Committee Members

Chairperson	Dr S P Kalantri	Medical Superintendent
Convener	Dr Vijayshri Deotale	Head, Microbiology
Members		
	Dr. Jyoti Jain	Head, Medicine
	Dr. Manish Jain	Head, Paediatrics
	Dr. Dilip Gupta	Head, Surgery
	Dr. C M Badole	Head, Orthopaedics
	Dr. Poonam Verma	Head, Obs. & Gynae
	Dr. Suchita Tidke	Head, Anaesthesiology
	Dr. Ruchita S Lohiya	Dept. of Microbiology
Biomedical Waste Management	Dr. Subodh Gupta	Head, Community Medicine
Medical Store	Dr. Ramesh Pande	Incharge Medical Store
Matron	Mrs. Neeta Sheyte	
Infection Control Nurse	Mrs. Surekha Gawali, Mrs. Nilima Thakre	
OT Sister Incharge	Sr. Meena ,Sr. Vandana	
OT Sister Incharge	Sr. Padma	
ICU Sister Incharge	Sister InCharge Medicine ICU, PICU, NICU,SICU,Neuro ICU, Mat ICU,Cath Lab , Trauma ICU.	
CSSD	Mr. Damodar Hiware	
Pharmacist	Mr. Arun Chhangani	
('D' Group)	Mr. Gopal Navrathi Mr. Rameshwar Chavare	Attendant

Annexure 2- HICC Appraisal Forms

Hospital Infection Control Committee (HICC), MGIMS, Sevagram

DAILY APPRAISAL FORM FOR THE MONTH OF 2021..... Ward/ ICU:
Bed strength: 10

Date	Occup. Beds	Catheter		Central line		Ventilator		No. Of patients newly operated	No. Of Pts. On dialysis sheath	Newly Developed Bedsore
		No. Of newly inserted catheter	No. Of Pts. On catheter	No. Of newly inserted central line	No. Of Pts. On central line	No. Of new Pts. On ventilator	No. Of Pts. On ventilator			
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
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21										
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23										
24										
25										
26										
27										
28										
29										
30										
31										
Total										

Annexure 3- HAI Audit Forms

HOSPITAL ACQUIRED INFECTION SURVEILLANCE FORM (AUDIT)

Patient Name:	H. No.	Age:	Sex: M/ F	ICU/ Ward:
Department:	Admitting Unit:	Dt. Of Adm.		Dt. Of Adm. To ICU -
Provisional Diagnosis:		Final Diagnosis:		
Outcome:	Transfer out to ward/unit name & date	LAMA on:	Discharged on	Expired on:

Risk factor/C0-morbidities: (Circle features present at admission)

DM	HTN	CLD	CKD	HIV	TB	Transplantation	Immunosuppressant	any other

Type of Surgery- **Date of Surgery:**

Type of device used and Device Days

Intervention	Date of Insertion	Date of Removal	Re-insertion	Removal
Urinary Catheter				
Mechanical Ventilation/ET tube				
Tracheostomy				
CVC- Jugular/ Subclavian/Femoral/PICC				
Surgical Site Drainage tube				
Dialysis Sheath				

Daily Monitoring

		HD-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8	D-9	D-10	D-11	D-12	D-13	D-14	D-15
HAI	Date															
	Temperature															
CA-UTI	Catheter present															
	Suprapubic tenderness															
	Loin pain															
	*1.Urgency, 2.Frequency 3. Dysuria															
CLA BSI	CL (central line) present															
	Chills															
	Hypotension (SBP ≤ 90)															
VAE	MV (mechanical ventilator) present															
	$PEEP_{dm}$															
	$FiO2_{dm}$															
	WBC count															
	New antibiotics															
SSI	Purulent discharge at site															
	Clinician's diagnosis															
	Tenderness, swelling, erthema, heat															
	**Abscess at site															

- *To be reported only when urinary catheter is not in place
- **Detected by physical exam/histopathological exam/imagingdm-daily minimum

Microbiology Culture Report (Site specific culture and blood culture; to be filled even culture is negative)

Date of Sample collection	Sample	Organism isolated	Colony count	AST report

(S- sensitive, R- resistant, Ak- Amikacin, G- Gentamicin, CFS- Cefoperazone-sulbactum, Ci-Ceftriaxone, Ca-Ceftazidime, Cx-Cefoxitin, Ox-Oxacillin, M-Meropenem, PIT-Piperacillin-tazobactum, Cf-Ciprofloxacin, N-Nitrofurantoin, E-erythromycin, P-Penicillin, T-tetracycline)

BUNDLE CARE AUDIT		D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15
Urinary catheter care bundle																
Closed drainage system																
Urinary catheter secured																
Drainage bag above floor & Below bladder level																
Catheter care (aseptic)	hand hygiene															
	Vaginal/mental care															
	perineal care															
Single use glove while handling/emptying (No contact b/t jug and bag)																
Separate jug for collecting																
Assessment of readiness to remove – documented?																
Central line bundle																
Daily aseptic CL care during handling	Hand hygiene															
	Alcohol hub decontamination															
	CHG 2% for Dressing changes															
Any local signs of infection?																
Dressing changed?																
Assessment of readiness to remove – documented?																
Ventilator bundle																
Head and elevation 30°																
Adherence to hand hygiene																
Daily oral care (CHG 2%)																
Need of PUD prophylaxis assessed?																
DVT prophylaxis																
Assessment of readiness to remove – documented?																

ICN Name and Signature with date

HOSPITAL ACQUIRED INFECTION SURVEILLANCE FORM (ADULT) Page-2

CAUTI(CATHETER ASSOCIATED UTI) **Date of Event (DOE)-**

1.Urinary Catheter criteria	Patient has indwelling urinary catheter in place for >2 calendar day	Yes/No
	Or if removed: Urinary catheter was in place on the day of sample collection or the day before	Yes/No
2. Symptom criteria	At least one of the following Fever ☐ (>100.4°F) Suprapubic tenderness ☐ Loin Pain ☐ Urgency ☐ Frequency ☐ Dysuria ☐	Yes/No
3. Urine culture criteria	Positive urine culture (Not more than two organisms with at least one organism having ≥ 10^5 CFU/ml)	Yes/No
4. Blood culture criteria	No symptoms Positive blood culture (with one matching organism to urine culture)	Yes/No
Final diagnosis	Symptomatic CAUTI (criteria-1 + 2 + 3) ☐ ABUTI (Asymptomatic bacteremic UTI) (criteria- 1+4) ☐	

CLABSI (CENTRAL LINE ASSOCIATED BLOODSTREAM INFECTION) **Date of Event (DOE)-**

1. Central line criteria	Patient has central line in place for 2 days or more					Yes/No
	Or If removed: Central line was in place on the day of sample collection or the day before					Yes/No
2.Pathogen	Pathogen identified from one blood culture (Not related to infection at any other site)					Yes/No
3.Commensal (culture+ve & symptoms)	Commensal grown from two blood cultures (Not related to infection at other sites) and symptoms					Yes/No
	3a- (Adult) At least one:	Fever ☐ (>100.4°F)	Chills ☐	Hypotension (SBP ≤ 90) ☐		Yes/No
	3b- (<1 year) At least one:	Fever ☐ (>100.4°F)	Hypothermia ☐	Apnea ☐	Brady-cardia ☐	Yes/No
Final diagnosis		LCBI-2 ☐ (1+3a)	LCBI-2 ☐ (1+3a)	LCBI-3 ☐ (1+3b)	Date of onset	

VAE (VENTILLATOR ASSOCIATED EVENT): **Date of Event (DOE)-**

MV criteria	Patient has mechanical ventilator (MV) in place for 2 days or more		Yes/No
	Or If removed: MV was in place on the day of sample collection or the day before		Yes/No
Baseline	Patient has a baseline period of stability or improvement on the ventilator, defined by ≥ 2 days of Stable or decreasing daily minimum PEEP (5 or less) or FiO_2 (40% or less)		Yes/No
VAC	Increase in FiO_2dm by ≥ 20 % for ≥ 2 days ☐		Yes/No
	Or Increase in PEEPdm by ≥ 3 cm of H_2O for ≥ 2 days ☐		
i-VAC	Temperature >100.4°F or < 96.8 °F, OR WBC ≥ 12, 000 cells/mm or ≤ 4, 000 cells/mm ☐		Yes/No
	And A new antimicrobial agent is started within 5 days of DOE, and is continued for ≥ 4 days ☐		
P-VAP	Culture positive with significant growth (ET aspire- ≥ 10^5 CFU/ml), (BAL, lung tissue - ≥ 10^4) (brush - ≥ 10^3) ☐		Yes/No
	Direct smear-Purulent resp. secretions (PC>25/LPF, EC<10/LFP) **AND** Culture positive (any growth) (from sputum, ET aspirate, BAL, lung tissue or brush) ☐		
Final diagnosis	**VAC** (Ventilator associated condition) ☐	**i- VAC** (infection related ventilator associated complication) ☐	**P- VAP** (Possible ventilator Associated pneumonia) ☐

SSI (SURGICAL SITE INFECTION): **Date of Event (DOE)-**

1.	Patient had a surgery within past 30 days or Surgery within 90 days if implant in place or breast, cardiac surgery of herniorrhaphy		Yes/No
2.	Wound class (Tick appropriate)	Clean ☐ Clean contaminated ☐ Contaminated ☐ Dirt ☐	
3.	PATOS (Present At the Time of Surgery)- visible pus/abscess at operation site; documented in OT note		Yes/No
4.	Any one of the following		
	SI-SSI (Superficial Incisional)	Any one of the following: 1. Purulent drainage from superficial incision ☐ 2. Positive culture (pus/tissue) ☐ 3. Incision opened, culture not sent but patient has at least one symptoms: pain or Tenderness; localized swelling; erythema; or heat. ☐ 4. Clinician's diagnosis as S-SSI ☐	Yes/No
	DI- SSI (Deep Incisional)	Any one of the following: 1. Purulent drainage from deep incision ☐ 2. Positive culture (pus/tissue) ☐ 3. Incision dehisces spontaneously or opened deliberately, culture not sent but patient has at least one symptoms: fever (>100.4°F), pain or tenderness. ☐ 4. Abscess involving the deeper incision found at physical exam/histopath/imaging ☐	Yes/No
	Organ/space SSI	Any of the following: 1. Purulent drainage from drain through the organ or space ☐ 2. Positive culture (pus/tissue) from the discharge from drain/organ or space ☐ 3. Abscess involving the organ or space found at physical exam/histopath/imaging ☐	Yes/No

Annexure 4- Daily Round Checklist (ICN)

DAILY ICN ROUND FORMAT -ICU -
CHECKLIST FOR HOSPITAL INFECTION CONTROL ROUNDS, KHS Sevagram

Sign. Of Microbiologist	Sign. Of I/C	NSI	Cras h cart	Dressi ng Trolly	Spill Kit/Fr st aid box	Cleanlin ess	Disinfect ant solu.	BM W	PP E	Hand Hygie ne	Fever case s	ON CATH E.	ON CV C	ON VENT I.	Total Patie nt Days	Date

Annexure 5- Checklist For SSI

Kasturba Hospital, Sevagram

Checklist To Assess Surgical Site Infection (SSIs)

Name of Patient :
Age :
Sex :
Bed No.:
Cr. No:

Name Of Operation:
Date Of Operation:
Dept.:
Unit:
Ward:

SSIs Classification
- Incisional :
- Organ/Space :

Wound Classification
- Clean :
- Clean Contaminated :
- Contaminated open :
- Dirty Wound :

Post operative day	Clinical Criteria for defining SSIs						
	Purulent Discharge	Pain	Erythema	Swelling	Warmth	Culture Positive	Signature of Supervisor

Signature of Unit Head

Signature of Ward Incharge

Annexure 6- Checklist For Central Line

Daily Central Line Maintenance Checklist

Section A. General information		
Patient ID		Patient Name
Facility Name	Surveillance unit	Date of admission to surveillance unit (dd/mm/yyyy)

Date (dd/mm/yyyy)	Central line day	Was the Central line reviewed for necessity today	Signature of the shift nurse	Was the dressing checked for Soiling, dampening, and loosening today ?	Signature of the shift nurse	Was the access port scrubbed with an antiseptic each time before use: During the day shift?	Signature of the shift nurse	During the night shift?	Signature of night shift nurse
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No		□ Yes □ No		□ Yes □ No	

Annexure 7- Checklist For Urinary Catheter

Daily Catheter Maintenance Checklist

Section A. General information		
Patient ID	Patient Name	
Facility Name	Surveillance unit	Date of admission to surveillance unit (dd/mm/yyyy)

Section B. Daily check

Date (dd/mm/yyyy)	Catheter day	Was the Catheter reviewed for necessity today	Signature of the shift nurse	Was the Catheter checked for kinking, leakage and position of urine bag	Catheter care given	Signature of day shift nurse	During the day shift?	Signature of day shift nurse	During the night shift?	Signature of night shift nurse
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	
		□ Yes □ No		□ Yes □ No	□ Yes □ No		□ Yes □ No		□ Yes □ No	

Annexure 8- Checklist for General Ward

Appendix IV

HIC Checklist : General Wards

Name of Ward: **Date & Time visited:**

1. House Keeping (√ Tick the correct box):-

Floors are cleaned Twice a day	Yes	No
Walls are cleaned Once a week	Yes	No
Material used in cleaning floors and walls Detergent and water	Yes	No
Cupboards, shelves, beds, lockers, IV-stands, stools and other fixtures are cleaned Once a week	Yes	No
Curtains are to be changed once a month or whenever soiled	Yes	No
Patient's cot is cleaned every week with detergent and water. 1% hypochlorite to be used when soiled with blood or body fluids. If isolation ward, cleaning is done daily.	Yes Yes Yes	No No No
The floor of bathrooms is cleaned with a broom and detergent once a day and then disinfected.	Yes	No
Toilets are cleaned with a brush using a detergent twice a day (in the morning and evening)	Yes	No
Bed linen is changed daily and whenever soiled with blood or body fluids.	Yes	No
All linen used by patients diagnosed to have HIV, HBV, HCV and MRSA, is decontaminated by autoclaving before being sent to the laundry	Yes	No

2. Asepticpractices (√ Tick the correct box):-

Are gloves worn during, Whenever in contact with blood and body fluids? When specimens, soiled linen, body fluids, secretion as well as surfaces, materials or objects exposed to them have to be handled? Whenever the skin is not intact? Double gloves are recommended for high risk patients?	Yes Yes Yes Yes	No No No No
Are gloves worn during, Venepuncture, Annulation, Urinary catheterization, Nursing of immunocompromised patients, Suctioning (tracheal), Blood sampling, Vaginal delivery, Dental procedures?	Yes	No
What material is used for routine hand wash in the ward?		
Are injection syringe needles recapped?	Yes	No
How frequently IV sets are replaced?		

How frequently tubing used to administer blood/body products, fat emulsion are replaced?		
How frequently catheters are replaced routinely?		
Are catheters flushed on blockade?	Yes	No
Are Ambubags cleaned with detergent and water, dried and sterilized before reuse?	Yes	No
Are Arterial catheters reused?	Yes	No
Are baby bottles and teats 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?	Yes	No
Are bedpans and urinals cleaned and disinfected with 0.5% sodium hypochlorite or hot water and air dried before reuse?	Yes	No
Are cradles cleaned with detergent and water and dried?	Yes	No
Are reusable drainage bottles used?	Yes	No
If yes, are they rinsed and returned to CSSD before reuse?	Yes	No
Are Ear Pieces for autoscore, Earphones cleaned with detergent and water and dried before reuse?	Yes	No
Are Leads and monitors dismantled to smallest components and cleaned with detergent and water and dried?	Yes	No
Are sterilised instruments used?	Yes	No
Are instruments returned to CSSD after single use?	Yes	No
Are Sphygmomanometer calf After use in isolation, laundered in washing machine?	Yes	No
Are sputum pots Disposable with close fitting lid and discarded into clinical waste for incineration?	Yes	No
Are suction bottles sealed when 75% full and placed in yellow plastic bag? If Re-usable, cleaned with sodium hypochlorite and dried and changed daily and in between each patient?	Yes Yes	No No
Are dressing Trolleys cleaned daily with detergent and water? After each use wiped with 70% isopropyl alcohol?	Yes Yes	No No

3. Biowaste disposal management (√ Tick the correct box):-

Are color coded buckets available and being legibly used?	Yes	No
Are color code posters are displayed along with?	Yes	No
Are all duty staffs aware of color coding?	Yes	No
Are Buckets being emptied every day?	Yes	No
Are needle destroyers available and functioning?	Yes	No

Signature & Date :

Annexure 9- Checklist for ICU

Ward I/C, Staff Nurse I/C HIC Personnel

Intensive Care Unit

Name of Unit: **Date & Time visited:**

Does the Civil construction meets up basic criteria for ICU?	Yes	No
Is the internal setting (eg. Distance between beds, oxygen supply etc) and human resource (eg. Doctor patient ratio, nurse- patient ratio etc) are adequate?	Yes	No
Is AC functioning?	Yes	No
If not, what is the alternative method for air circulation?	Yes	No
Is there a written SOP for ICU?	Yes	No
Are all staffs and doctors are trained in Hospital Infection control?	Yes	No
Are all staffs are aware of PPE?	Yes	No
Are swabs sent on routine basis at Microbiology Dept. as a part of Active Hospital Infection Surveillance? If yes, how frequently?	Yes	No
Are all staffs aware of Hospital infection Committee?	Yes	No
Is there any denial in cooperating ICN at her routine visit?	Yes	No
What is the frequency of sweeping the floor?		
What is the frequency of changing linen?		
Are visiting hours being maintained?	Yes	No
What is the timing of visiting hours?		
Are invasive procedures done during visiting hours?	Yes	No
Are shoes available for visitors?	Yes	No
Are aprons available for visitors?	Yes	No
Is hospital infection register available?	Yes	No
Is CAUTI register available?	Yes	No
Is invasive procedure register available?	Yes	No
Are gloves worn during, Whenever in contact with blood and body fluids?	Yes	No
When specimens, soiled linen, body fluids, secretion as well as surfaces, materials or objects exposed to them have to be handled?	Yes	No
Whenever the skin is not intact?	Yes	No
Double gloves are recommended for high risk patients?	Yes	No
Are gloves worn during, Venepuncture, Annulation, Urinary catheterization, Nursing of immunocompromised patients, Suctioning (tracheal), Blood sampling, Vaginal delivery, Dental procedures?	Yes	No
What material is used for routine hand wash in the ward?		
Are injection syringe needles recapped?	Yes	No
How frequently IV sets are replaced?		
How frequently tubing used to administer blood/body products, fat emulsion are replaced?		
How frequently catheters are replaced routinely?		
Are catheters flushed on blockade?	Yes	No

Are Ambubags cleaned with detergent and water, dried and sterilized before reuse?	Yes	No
Are Arterial catheters reused?	Yes	No
Are baby bottles and teats 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?	Yes	No
Are bedpans and urinals cleaned and disinfected with 0.5% sodium hypochlorite or hot water and air dried before reuse?	Yes	No
Are cradles cleaned with detergent and water and dried?	Yes	No
Are reusable drainage bottles used?	Yes	No
If yes, are they rinsed and returned to CSSD before reuse?	Yes	No
Are Ear Pieces for autoscore, Earphones cleaned with detergent and water and dried before reuse?	Yes	No
Are Leads and monitors dismantled to smallest components and cleaned with detergent and water and dried?	Yes	No
Are sterilised instruments used?	Yes	No
Are instruments returned to CSSD after single use?	Yes	No
Are Sphygmomanometer calf After use in isolation, laundered in washing machine?	Yes	No
Are sputum pots Disposable with close fitting lid and discarded into clinical waste for incineration?	Yes	No
Are suction bottles sealed when 75% full and placed in yellow plastic bag? If Re-usable, cleaned with sodium hypochlorite and dried and changed daily and in between each patient?	Yes Yes	No No
Are dressing Trolleys cleaned daily with detergent and water? After each use wiped with 70% isopropyl alcohol?	Yes Yes	No No
Are color coded buckets available and being legibly used?	Yes	No
Are color code posters are displayed along with?	Yes	No
Are all duty staffs aware of color coding?	Yes	No
Are Buckets being emptied every day?	Yes	No
Are needle destroyers available and functioning?	Yes	No

Staff Nurse I/C

HIC Personnel

Annexure 10- Checklist for Dialysis Unit

CHECKLIST FOR INFECTION CONTROL ROUND IN DIALYSIS UNIT

HICC KHS, SEVAGRAM

Action Expected	Expected frequency	Date	Last 2 dates when complied	Overall compliance (yes /No /partial)
1. HAEMODIALYSIS MACHINE				
AV tubing completely immersed in disinfectant after use	After every use			
Disinfection of Haemodialysis machine with 5% Hypochlorite	Once in a day			
Disinfection of Haemodialysis machine surface area with 1% Hypochlorite	Once in a day			
Bleaching of machines with 5% chlorine	Once in a week			
Conductivity test of RO water	Once in a month Expected value:			
Daily sate sterility	Once in a month			
Calibration of machine	quarterly			
2. RO UNIT				
Conductivity test	Once in a day Expected value:			
RO maintenance by backwashes and regeneration of softener	Once in a week			
Hardness test	Once in a week			
Chloramines test	Once in a week			
Disinfection of RO unit including loop lines and storage tanks	Once in a month			
Culture of RO unit output water	Once in a month			
Endotoxin assay of RO water	Once in a month Expected value:			
Detailed examination of RO water under AAMI guidelines	Quarterly			
Sign of Observer				

Dr. Vijayashri Deotale
Prof. & Head
Dept. of Microbiology
MGIMS, Sevagram
WARDHA (M.S.) 442 102

Annexure 11- Checklist for OT- Housekeeping

Hospital Infection Control Committee

Mahatma Gandhi Institute of Medical Sciences, Sevagram

Hospital infection Control Manual	Date of Preparation: 01/02/2016

Housekeeping check list for OTs

Before start of OT daily cleaning of parts surroundings dates/month

Date																		
OT table																		
OT light																		
Boyle's APP/Anesthesia trolley																		
IV stand																		
Instrument trolley(especially trolley top)																		
Door handle																		
Suction machine																		
Hand washing area/scrubbing area																		
O2 Tubing																		
Floor cleaning																		
Preparation of bleach solution																		
Change of disinfection solution																		
During Surgery																		
Date																		
Any spillage																		
Management of spill																		

In between surgery

Date						
OT Table						
Patients Surroundings						
Cleaning of suction tubing and jar						

At the end of day

Date						
OT Table						
OT Light						
Boyle's app						
IV stand						
Cautery machine & cautery, paddle						
Instrument trolley/ specially trolley top						
Door handle						
Cleaning of suction jar fallowed by sterization						

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 surface by three bucket system				
Wash the OT floor with soap & water				
Clean AC filters / AC ducts				
Clean door, walls, windows				
Seal all crevices, holes before fumigation				
Replace all portable items back after cleaning				
All the AC point sealed				
Complete fumigation process as per protocol				

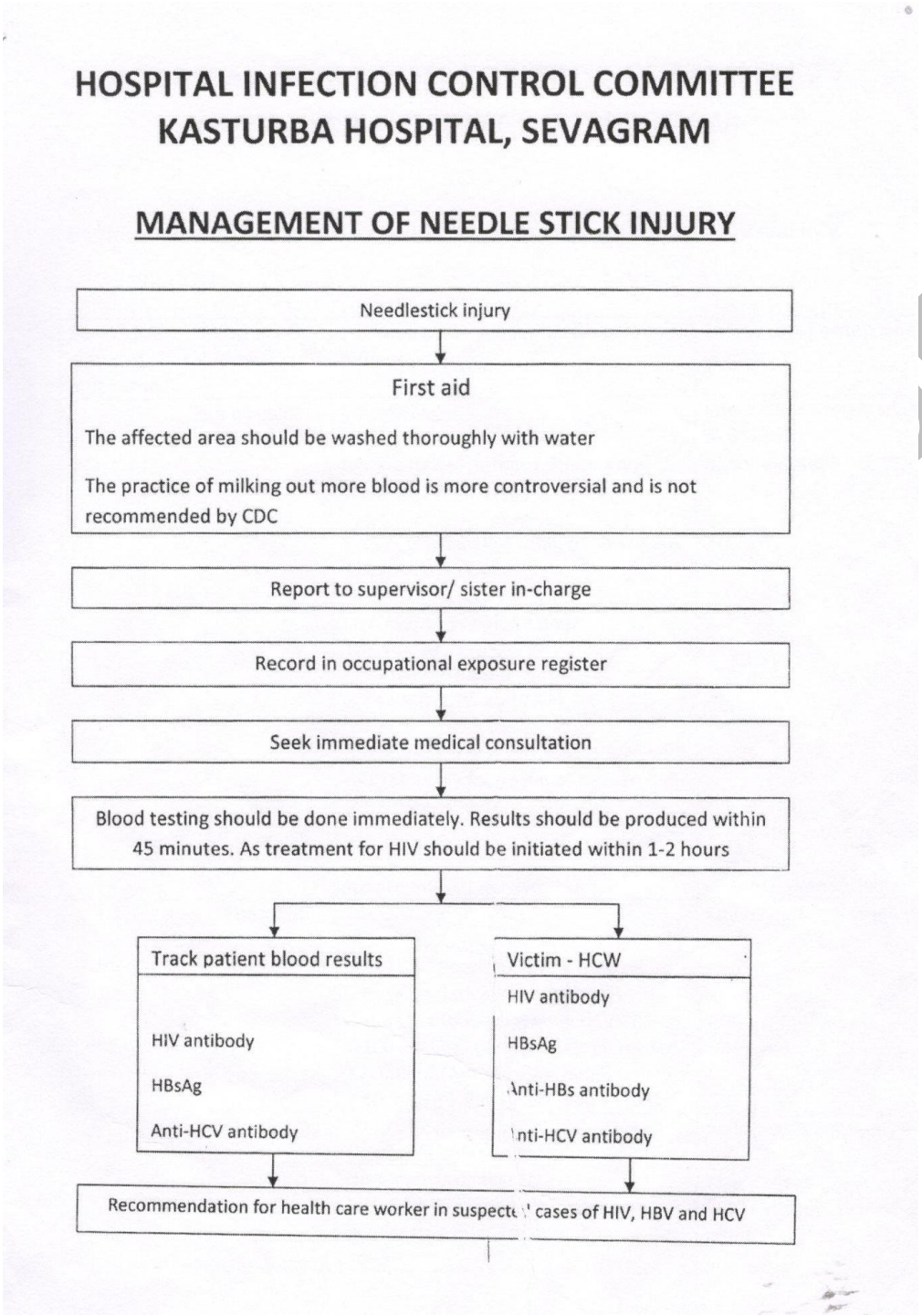
Prepared by :
Hospital Infection Control Committee, February, 2016
Kasturba Health Society.

Authorized by Medical Superintendent, KHS

3/7/18

Dr. **Vijayshri Deotale, Convener**
Professor & Head
Dept.of Microbiology,
MGIMS, Sevagram

Annexure 12- Needle stick Injury Reporting Form



HOSPITAL INFECTION CONTROL COMMITTEE
KASTURBA HOSPITAL, SEVAGRAM

MANAGEMENT OF NEEDLE STICK INJURY

Needlestick injury

First aid

The affected area should be washed thoroughly with water

The practice of milking out more blood is more controversial and is not recommended by CDC

Report to supervisor/ sister in-charge

Record in occupational exposure register

Seek immediate medical consultation

Blood testing should be done immediately. Results should be produced within 45 minutes. As treatment for HIV should be initiated within 1-2 hours

Track patient blood results

HIV antibody

HBsAg

Anti-HCV antibody

Victim - HCW

HIV antibody

HBsAg

Anti-HBs antibody

Anti-HCV antibody

Recommendation for health care worker in suspected cases of HIV, HBV and HCV

HOSPITAL INFECTION CONTROL COMMITTEE
KASTURBA HOSPITAL, SEVAGRAM

Recommendation for health care worker in suspected cases of HIV, HBV and HCV

Serological status of index case	Status of index case	Recommendations for health care worker	Follow up of health care worker
HIV	if positive	Counselling Initiate HAART within 1-2 hours and continue for 28 days HAART regimen is a combination of ATV/r+TDF/FTC or RAL+TDF/FTC or LPV/r (once or twice daily)+ TDF/FTC or EFV+ ABC/3TC (only for patients who are HLA-B*5701 negative) (Combination of ATV/r, RAL, LPV/r, with ABC/3TC only for patients who are HLA-B*5701 negative)	Check HIV antibody level at 6 weeks 3 months and 6 months
	if negative	Counselling No prophylaxis needed	Check HIV antibody level at 6 weeks 3 months and 6 months
HBV	if positive	Counselling Give HBIG prophylaxix (0.6 mIU/ml intramuscularly) within 24 hours Anti-HBs antibody levels in HCW > 100 mIU/ml – no vaccination needed 10-100 mIU/ml –Booster only < 10 mIU/ml- Full vaccination + HBIG	Follow up is not required
	if negative	Counselling No prophylaxis needed	Follow up is not required
HCV	if positive	No prophylaxis available Early identification of the disease by regular follow-up Treatment if disease occurs	Check anti-HCV antibody levels at 3 months and 6 months

Annexure 13- Spill Management Procedure

Hospital Infection Control Committee

Mahatma Gandhi Institute of Medical Sciences, Sevagram

Hospital infection Control Manual	Date of Preparation: 01/02/2016

SPILL CLEANING PROCEDURE

For infectious material spill with more 15 cm , isolate the area to prevent any one from entering.

↓

Take spill kit & wear gloves & protective clothing (Mask, Lab coat, Shoe- cover, Hair cover & gloves)

↓

Cover the spill with disposable towels/paper/ absorbent material.

↓

Saturate the towel with 6% Hypochlorite solution.

↓

Place the disinfectant-soaked towels over the area for 30 minutes

↓

Before removing and discarding them.

↓

Discard the above material in Yellow bag with the help of forcep or by hand pick. (if there are sharps – collect with forcep.)

↓

Wipe the area again 6% Hypochlorite & allow it to air dry.

↓

Handle the material in the same manner as other infectious waste.

↓

Place all disposable materials used to decontaminate the spill as per waste disposable policy of lab.

↓

Note this incidence in incidence register & inform Lab In-Charge

Annexure 14- Concentration of Disinfectant Solution

CONCENTRATION OF DISINFECTANT SOLUTION

Name of Disinfectant solution	Composition	Preparation	Uses
Sodium Hypochlorite Solution 6%	5 litre Sodium Hypochlorite Solution 6%itre	For 2 %-1:2(300 ml 6 % hypo. Solu + 600 ml water) For 1 %-1:5(100 ml 6 % hypo. Solu + 500 ml water	As a disinfectant solu. For infected plastic in red dust bin, and in puncture proof container. For floor cleaning
Cidex(2% glutaldehyde)	2 % conc. solution	200 ml activator in 5 litre distiled water	As a disinfectant For OT , Gynae. Instruments and Endoscope
Baccishield	11 % Hydrogen peroxide and 1 % silver nitrate)	20 % = 200 ml baccishield solu. In 800 ml water 10 %= 100ml baccishield solu. + 900 ml water	For fogging ICU, OT and high risk areas For surface cleaning
Savlon(Aseptic solu)		SAvlon A 1 %-- 10ml conc,. Savlon solu+1 lit water SAvlon B 3.5 %-- 35ml conc,. Savlon solu+1 lit water	Disinfectant for Cheatle forceps. For skin preparation and for dressing.
Bactorub	70 % Alcohol (chlorhexidine gluconate solu 2.5 %)	Readily available	Foe hand hygiene
Phenyl	Readily available	10 lit water + 250 ml phenyl	For toilet and bathroom cleaning

Figure 1 : BMW Chart

BIOMEDICAL WASTE MANAGEMENT

KASTURBA HOSPITAL, MGIMS, SEVAGRAM

BIOHAZARD

Yellow:

1. Human Anatomical Waste
2. Infected Cotton
3. Animal Anatomical Waste
4. Soiled Waste
5. Expired or Discarded Medicine
6. Chemical Waste
7. Discarded Linen & Beddings (Contaminated with Blood)
8. Microbiology & other Clinical Laboratory Waste

Blue:

1. Broken or discarded and Contaminated Waste
2. Contaminated Glass
3. Metallic Body Implant

Red:

. Recyclable Contaminated Waste
. Tubings, Catheters, IV Tubes & Set, Urine Bags, Gloves, Syringes (without Needles)

White Translucent:

(Puncture Proof Containers)

Needles, Syringes with fixed Needles, Scalpels, Blades or other Contaminated sharp object that may cause puncture

Black:

General Waste & Food Waste

Figure 2 : Donning of PPE

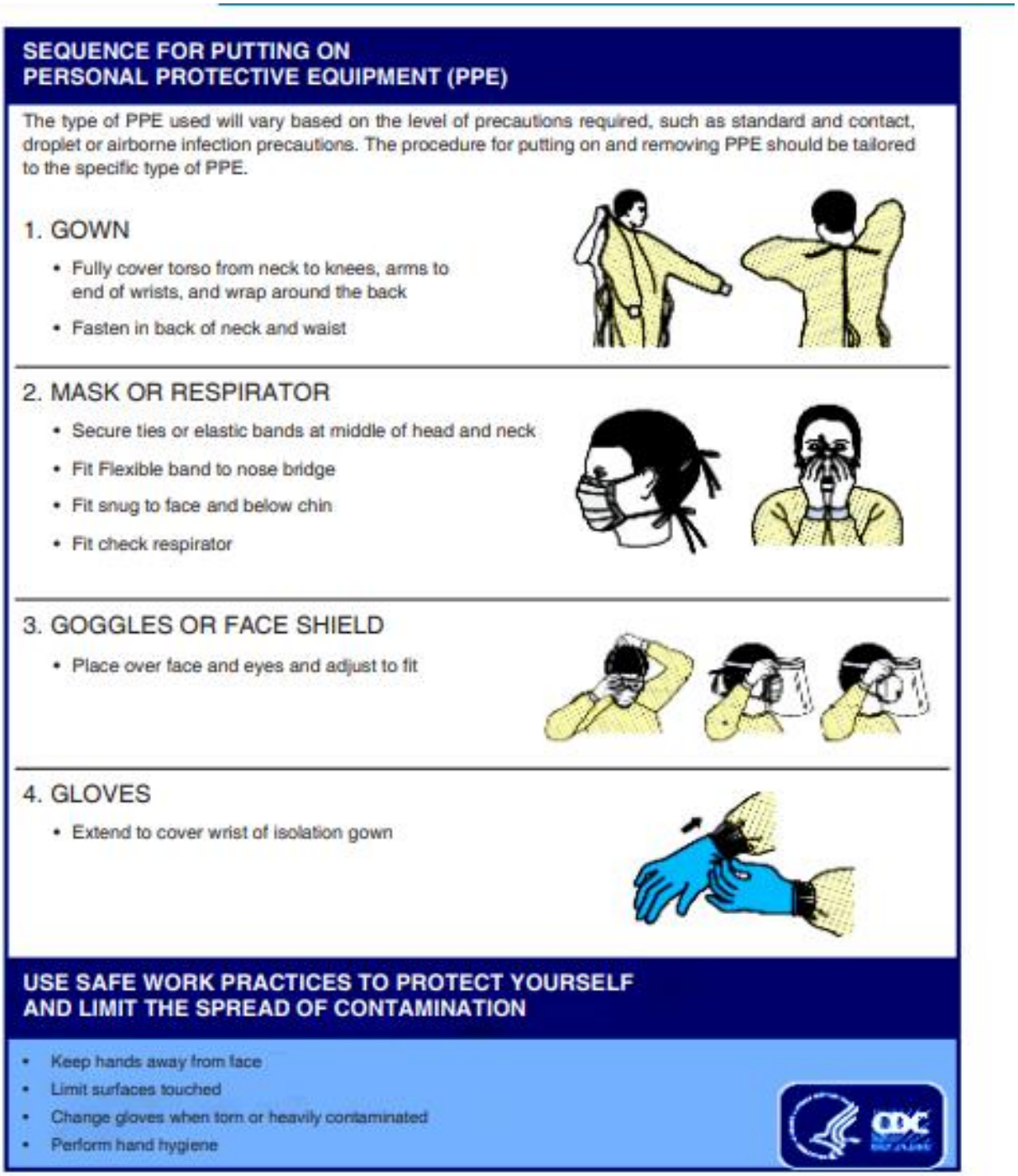


Figure 3 : Doffing of PPE

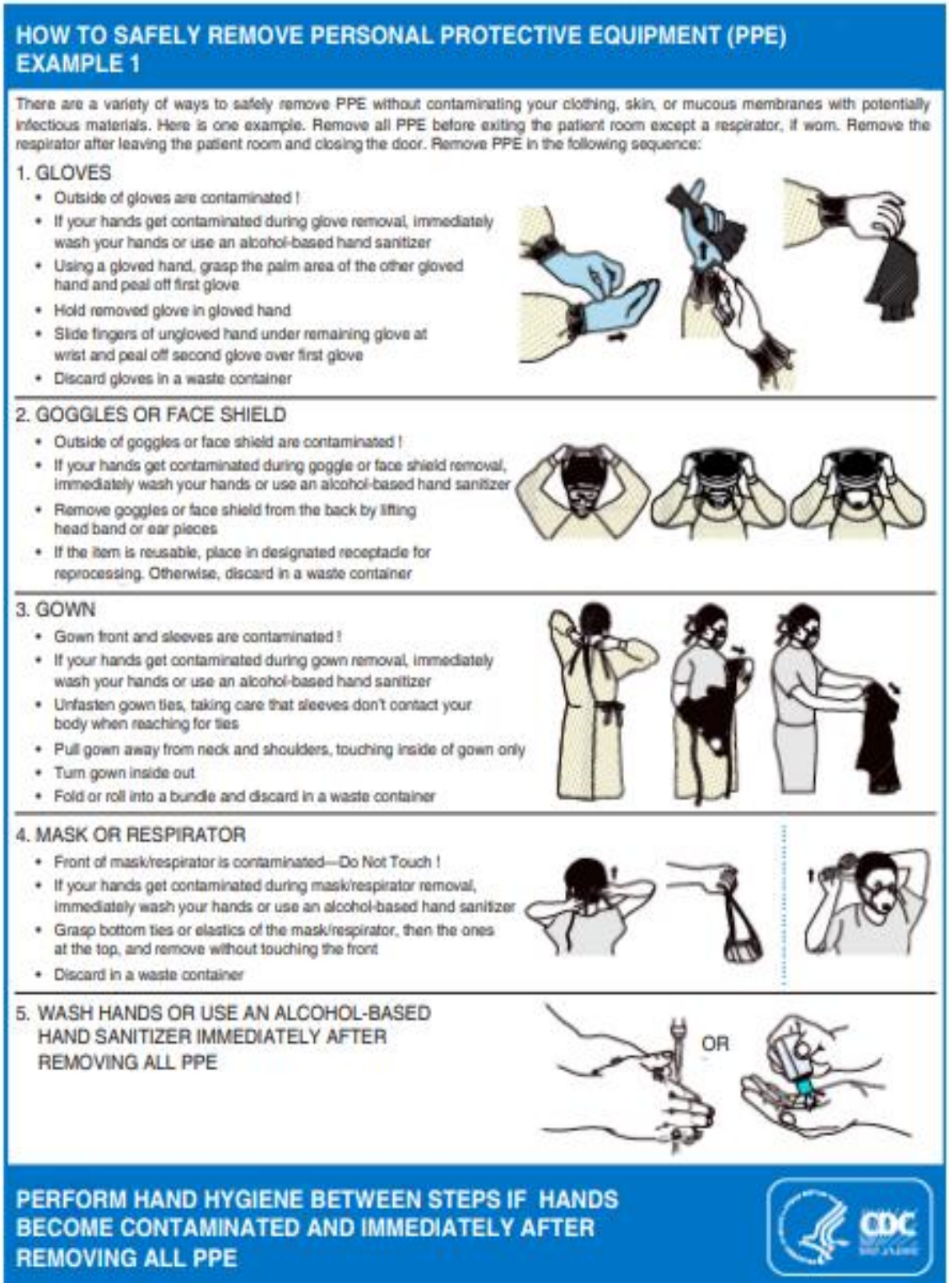


Fig 4: Hand Rub

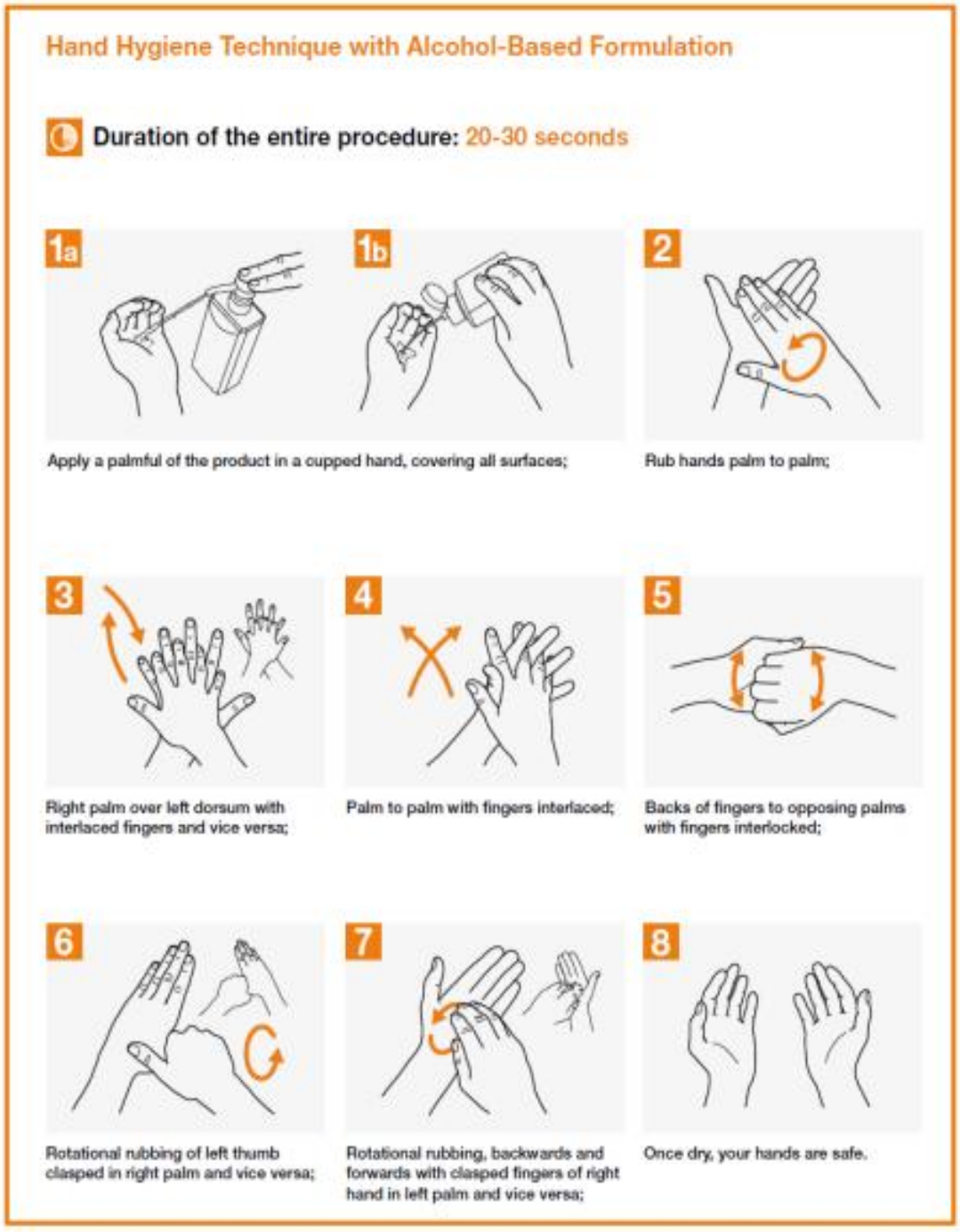


Fig 5 : FIVE MOMENTS OF HAND HYGIENE

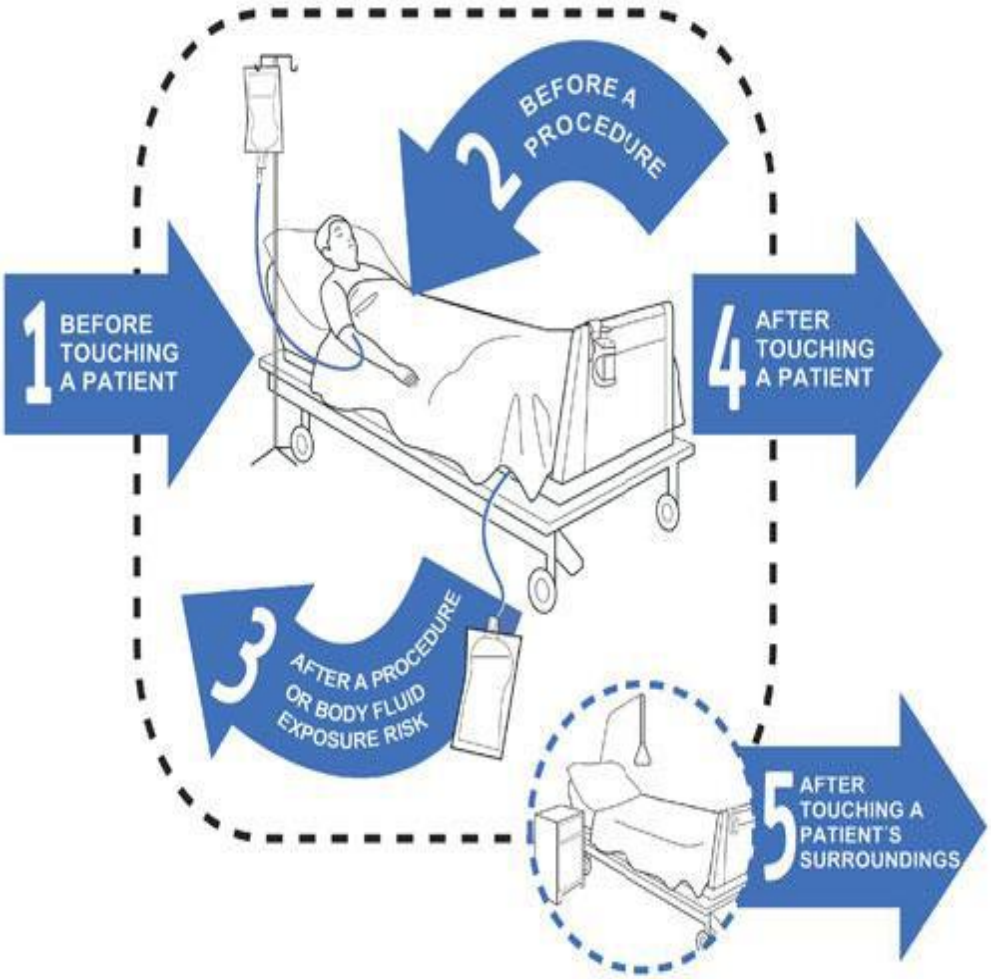
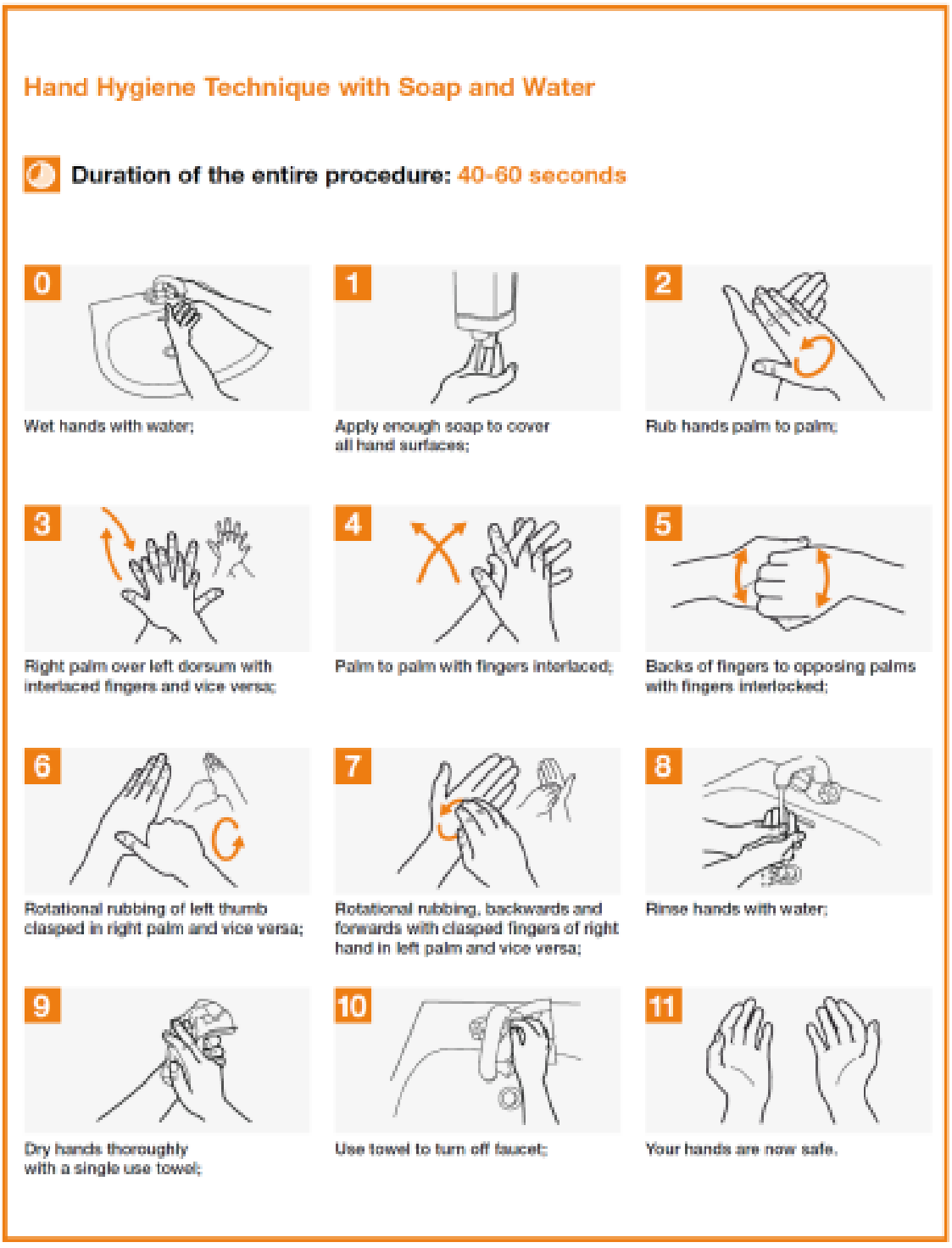


Figure 6: Hand Hygiene Technique with soap and water



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