UTTAR PRADESH UNIVERSITY OF MEDICAL SCIENCES

STANDARD OPERATING PROCEDURES

INFECTION CONTROL UNIT

INDEX

Organization of Hospital Infection Control Programme

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

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. COMPONENTS OF HOSPITAL INFECTION CONTROL PROGRAM

There are three main components of Hospital Infection Control Program

- Preventive measures
- Surveillance
- Training

2.1. Preventive Measures

a. Standard Precautions.

b. Isolation Precautions under certain special circumstances or outbreak situation. Eg , 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.

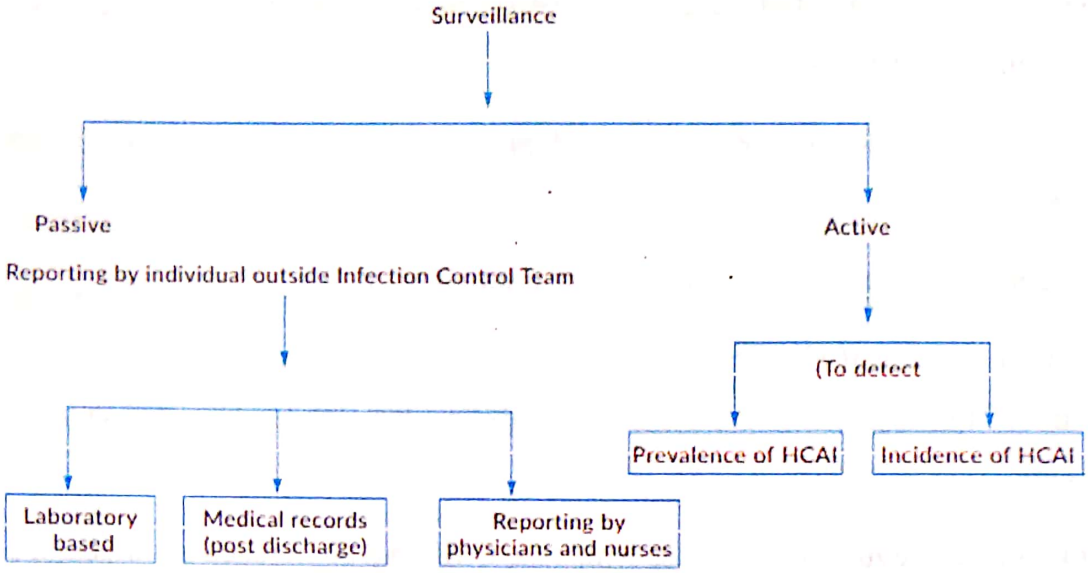
j. Reporting and Management of accidental injuries by sharps.

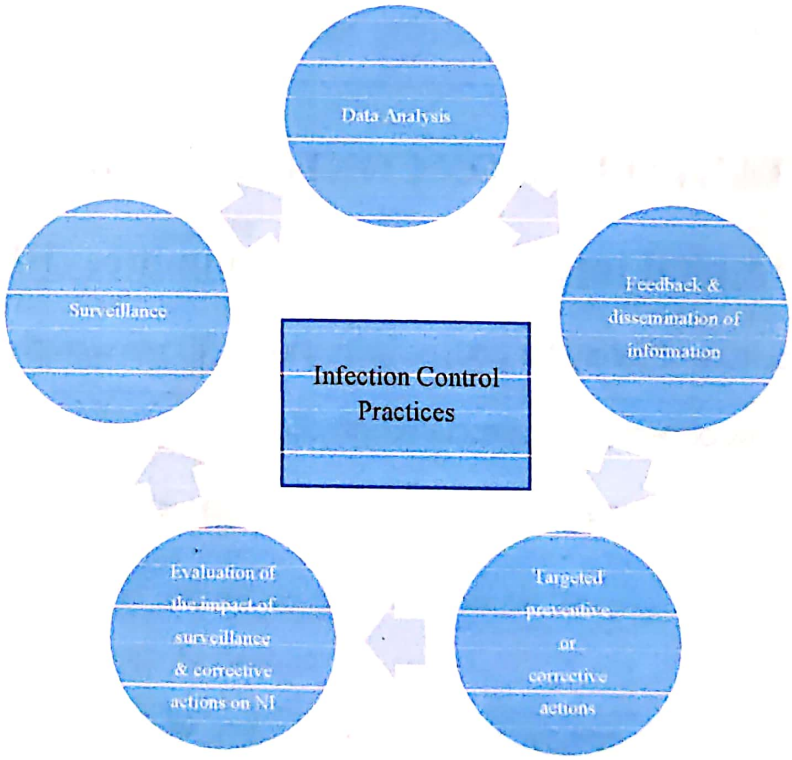
k. Use of blood and blood products.

l. Hospital Bio Medical Waste Management.

m. Environmental Management Practices.

2.2.Surveillance





2.3. Training of HCWs

One of the most important entities of HICC/HICP is training of healthcare workers. The main purposes it serves;

a. Sensitization about infection control programme 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.

3. HOSPITAL INFECTION CONTROL COMMITTEE

Goals of Hospital Infection Control Committee (HICC)

- Promote a culture of safety for both patients and healthcare workers
- Reduce the risk of healthcare associated infections
- Reduce the risk of spread of multi drug resistant organisms

Functions of HICC

- Develop and recommend written policies and procedures pertaining to infection prevention and control
- Update the policies based on evolving evidence
- Recognize and investigate outbreaks of infections in the hospital
- Educate and train health care workers, patients, and relatives as applicable
- Monitor practices regularly and periodically
- Conduct surveillance on HCAI by collecting data from respective departments, analyse and suggest appropriate measures
- Collect annual antibiogram data from microbiology department, analyse and provide feedback
- Develop, implement and monitor antibiotic policy with the antibiotic audit subcommittee
- Develop, implement and monitor infection prevention practices in operating rooms with the Theatre sub-committee
- Develop, implement and monitor airborne infection control plan with Airborne Infection Control sub-committee
- Develop and implement policies pertaining to isolation
- Implement and monitor biomedical waste management
- Provide guidance on setting up of infrastructure, engineering and ventilation that would minimize the risk of infection
- Communicate effectively with concerned staff / department
- Stay updated with the current developments

Composition of HICC

Sr No	Name & Designation	HICC Designation
1	Medical Superintendent	Chairperson
2	Designated Microbiologist	Member secretary
3	Asst./ Associate Professor Microbiology and Asst. Medical Officer	Infection Control Officers
4	Sister Tutors / Designated nursing staff	Infection Control Nurse
5	Heads of Departments / Authorised /Designated Staff Anaesthesia Chest Medicine Cardiology Community Medicine CVTS ENT GI surgery Medicine and MICU Microbiology Neonatology Neurosurgery Nephrology Orthopaedics	Members

	OBGY Ophthalmology Pediatrics & IPCU Pediatric surgery Pathology Pharmacology Surgery	
6	Pharmacy / CCSD in charge	Member
7	Matron	Member
8	OT sister in charge	Member
9	Civil Engineering	Member
10	Mechanical & Electrical Engineering	Member
11	Deputy Dean	Member and I/c in absence of Dean
12	Head Clerks (Stores) Timekeeper Security Officer	As required

There should be one infection control nurse for every 100 patients as per the revised criteria of WHO.

4. Duties and Responsibilities of HICC members

4.1 Administration (Dean / Medical Superintendent)

- Serve as the chairperson of the committee and nominate the convener / secretary
- Constitute sub-committees to oversee specific infection prevention plans
- Ensure that appropriate resources in terms of manpower, equipment and consumables are available at all times to prevent the risk of infection
- Ensure that effective arrangements are in place for infection prevention and control and that appropriate resources are made available to manage the risks of infection.
- Promote a culture of safety and accountability in all staff members
- Approve suggestions of the committee and authorise the committee to monitor compliance
- Approve the list of committee members and their role
- Review the data on HCAIs and approve suggested corrective measures
- In absentia, authorize Deputy Dean to chair the committee

4.2 Convener / Secretary

- Report directly to MS/Dean and is the personnel who executes all major accomplishments and directs all the meetings.
- Convene meetings after obtaining consent from the chairperson
- Identify the agenda / points of discussion for these meetings
- Oversee local infection control policy implementation with ICO and ICN

- Authorized by chairperson / Dean, to intervene when inappropriate practices are brought to notice by ICN
- Assess the impact of current practices, provide feedback to department/s and section /s and with HICC plan appropriate interventions if needed
- Prepare and communicate the annual report on HCAIs with feedbacks received from clinical department heads especially with reference to device associated infections and surgical site infections.
- Prepare and communicate the antibiogram of various clinical departments with feedback from Microbiology especially of multi-drug resistant organisms.
- Plan and conduct training of different healthcare workers with the respective heads of department, designated department co-ordinators and other members of HICC.
- Plan an annual surveillance program of healthcare workers with designated department and HICC members
- Any other activity as identified by Dean

4.3 Role of ICO and ICN

- Assist convener / secretary for all identified tasks / function
- Assist Convener / Secretary and HICC in implementing and monitoring practices on a regular basis as decided by HICC
- Provide appropriate feedback to convener / HICC on observations
- Identify and assist in investigating outbreaks
- Assist in investigating detection of unusual organisms or highly resistant organisms
- Assist with procurement (AMO)
- Troubleshoot issues pertaining to BMW management

4.4 Role of Members

- Promote a culture of safety in their own settings and in the hospital
- Participate actively to achieve the objectives
- Assist in investigating outbreaks as applicable
- Plan, implement and update Infection Control Manual
- Conduct training of their department staff on appropriate practices of infection prevention and control.
- Pharmacist to develop and ensure that the sterilization and disinfection practices are appropriate.
- Pharmacist to collect and review data periodically on antimicrobial indents from various departments.

Qualifications of Infection Control Officer (ICO)

- Should be a faculty / staff member of the hospital
- M.D (Microbiology) preferred / M.B.B.S with administrative designation / M.D or
- MS in any medical / surgical discipline / AMO willing to serve as ICO
- One year experience of working with the ICC / has undergone a certificate /
- fellowship course in IPC

Qualifications of Infection Control Nurse (ICN)

- Should be a faculty / staff member of the hospital
- Preferred - Has undergone a certificate / fellowship course in IPC
- Willing to perform the duties of ICN

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.

- Surface swabs need to be obtained from each OT for microbiological culture testing as per hospital infection control programme
- The sampling process should be as follows: o 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 anesthesia 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.

- 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.

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, o 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.

Infection Control Precautions

OBJECTIVE

To practice standard precautions while caring for all patients irrespective of their infective status and to identify the patients infected with highly transmissible or epidemiologically important pathogens and practice additional precautions for them so as to ensure safety of the uninfected patients, visitors as well as healthcare staff.

INTRODUCTION

Transmission of infectious agents within a healthcare setting can occur through humans, insects or the hospital environment directly or indirectly. Following modes of transmission are well known in healthcare settings for transmission of healthcare related infections.

Mode of Transmission	**Mechanism of Transmission**	**Examples**
CONTACT		
Direct	Microorganisms are transferred from one infected person to another person without a contaminated intermediate object or person.	• Direct skin to skin or skin to mucous membrane contact • Ingestion • Injection/ percutaneous injury/ splash on mucous membrane
Indirect	Transfer of an infectious agent through a contaminated intermediate object or person.	• Through Contaminated hands, • Touching contaminated inanimateenvironment or patient care devices

		• Inadequate sterilization or disinfection of instruments
Droplet	Transmission through respiratory droplets (particles >5 μm) carrying infectious pathogens directly from the respiratory tract of the infectious individual to susceptible mucosal surfaces of the recipient, generally over short distances (< 1 metre) May also get inhaled directly.	• Coughing, sneezing, talking by infected persons • during certain procedures like endotracheal intubation, suctioning etc. • Indirectly to mucosal surfaces via hands
Airborne	Transmission occurs by dissemination of either airborne droplet nuclei (≤5 μm) or small particles in the respirable size range containing infectious agents. The droplet nuclei remain infective over longer time and travel longer distance (>1 metre) and gets inhaled directly in the airway	• Aerosols created during coughing, sneezing, talking by infected person or by evaporation of larger droplets. (e.g., spores of *Aspergillus* spp, and Mycobacterium tuberculosis)

Successful infection prevention and control programmes involve implementation of work practices to prevent transmission of infectious agents. The most cost-effective, simple, and feasible way to prevent transmission of pathogens, consists in a two-tier approach as described in the CDC-HICPAC guidelines.

STANDARD PRECAUTIONS

Standard precautions are based on the principle that all blood, body fluids, secretions, excretions (except sweat), non intact skin, and mucous membranes may contain transmissible infectious agents.

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 sharp
- Decontamination of linen
- Sterilization and disinfection of instruments and hospital environment
- Biomedical waste management

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 (e.g., myelogram, spinal or epidural anesthesia)

Hand Hygiene

OBJECTIVE

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

WHEN TO PERFORM HAND HYGIENE?

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

a. Before touching the patient

b. Before any clean/aseptic procedures

c. After body fluid exposure risk

d. After touching the patient

e. After touching the patient surroundings

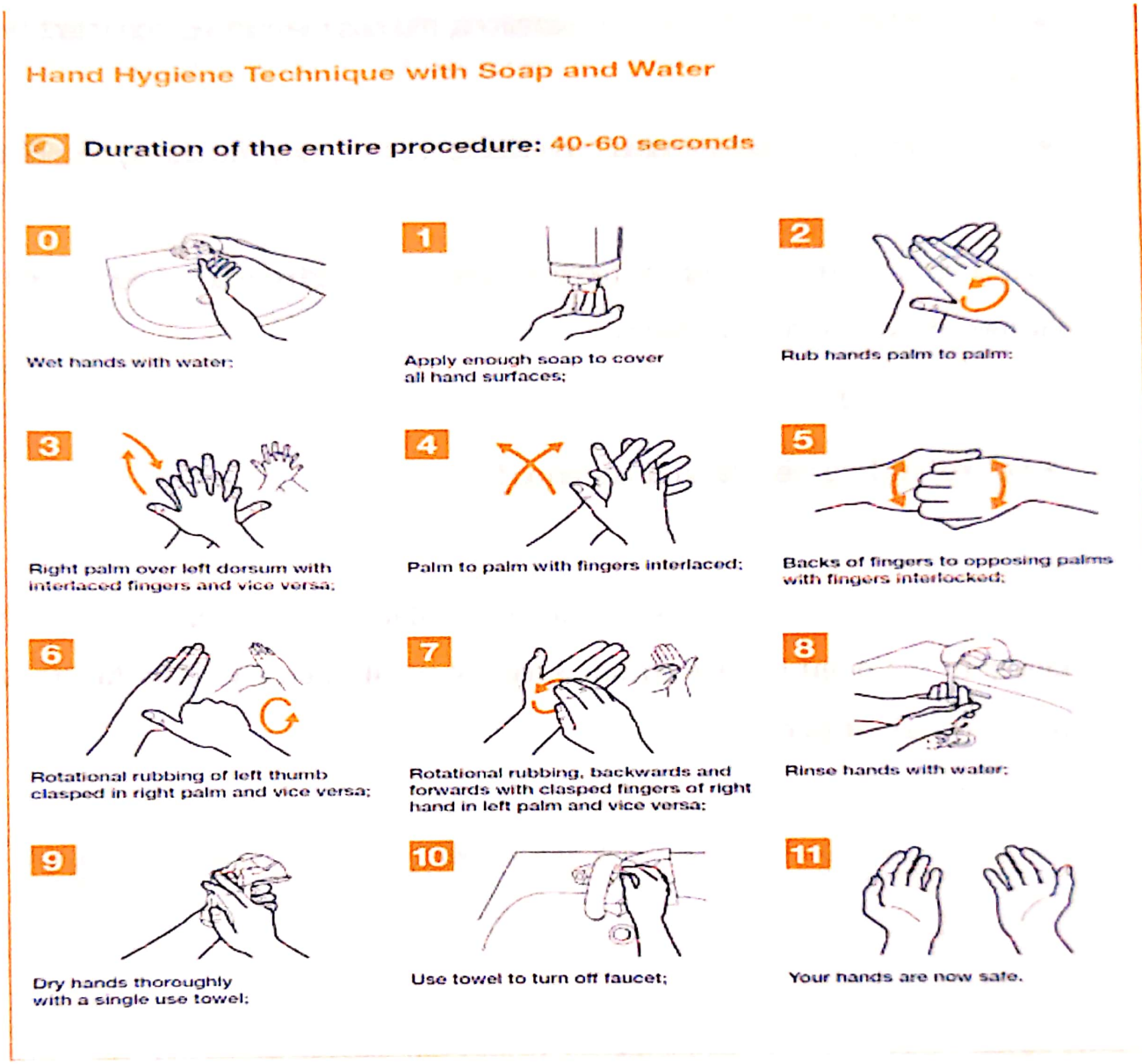
HOW TO PERFORM HAND HYGIENE?

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

a. Hand washing with plain/antimicrobial soap

b. Hand rubbing with alcohol based hand rubs

c. Surgical hand antisepsis



Hand Rubbing with Alcohol Based Hand Rubs

Indications for Hand Rubbing

- Before and after touching the patient
- Before handling an invasive device for patient care, regardless of whether or not gloves are used

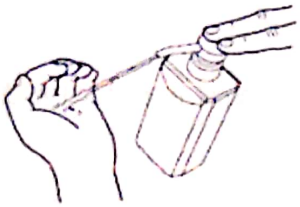
- After contact with body fluids or excretions, mucous membranes, non-intact skin, or wound dressings
- If moving from a contaminated body site to another body site during care of the same patient
- After contact with inanimate surfaces and objects (including medical equipment) in the immediate vicinity of the patient
- After removing sterile or non-sterile gloves
- Before handling medication or preparing food

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

Hand Hygiene Technique with Alcohol-Based Formulation

Duration of the entire procedure: 20-30 seconds

1a



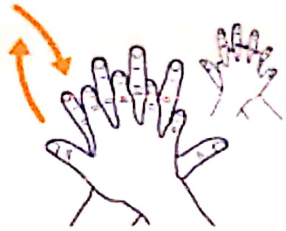
1b

Apply a palmful of the product in a cupped hand, covering all surfaces;

2

Rub hands palm to palm;

3



Right palm over left dorsum with interlaced fingers and vice versa;

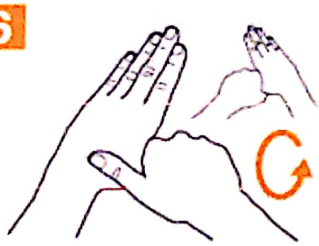
4

Palm to palm with fingers interlaced;

5

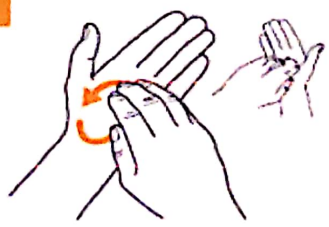
Backs of fingers to opposing palms with fingers interlocked;

6



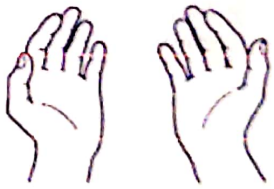
Rotational rubbing of left thumb clasped in right palm and vice versa;

7



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

8



Once dry, your hands are safe.

Surgical Hand Preparation

Objectives

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

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

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

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

1

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

2

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

3

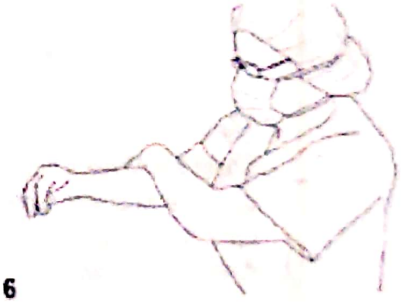
Images 3–7: Smear the handrub on the right forearm up to the elbow. Ensure that the whole skin area is covered by using circular movements around the forearm until the handrub has fully evaporated (10-15 seconds)

4

See legend for Image 3

5

See legend for Image 3



6

See legend for Image 3

7

See legend for Image 3

8

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

9

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

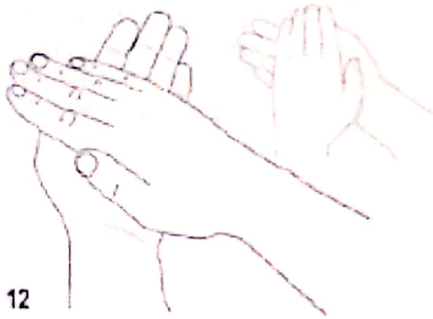
Figure 4: (a) Steps for Surgical Hand Preparation using Alcohol based Hand Rubs

10

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

11

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



12

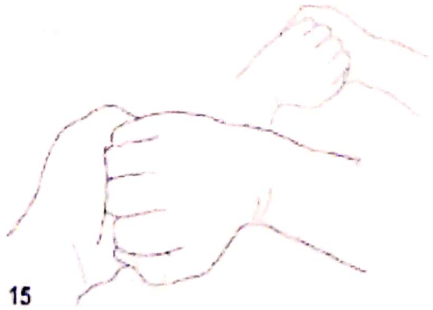
Cover the whole surface of the hands up to the wrist with alcohol-based handrub, rubbing palm against palm with a rotating movement

13

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

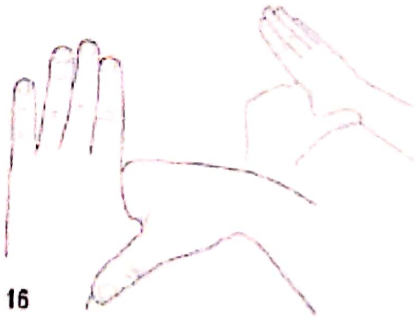
14

Rub palm against palm back and forth with fingers interlinked



15

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



16

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

17

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

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

(b) Steps for Surgical Hand Preparation using Alcohol based Hand Rubs

Cleaning, Disinfection and Sterilization of Patient Care Items

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

INTRODUCTION

Disinfection and sterilization are essential for ensuring that medical and surgical instruments do not transmit infectious pathogens to patients. Since, all patient-care items do not necessitate sterilization, therefore health-care policies must identify, primarily on the basis of the items' intended use, whether cleaning, disinfection, or sterilization is indicated.

Cleaning: 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: A process that eliminates many or all pathogenic microorganisms, except bacterial spores, on inanimate objects.

Sterilization: A process that destroys or eliminates all forms of microbial life and is carried out in health-care facilities by physical or chemical methods.

Decontamination: Refers to the use of physical or chemical means to remove, inactivate, or destroy all pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

CLASSIFICATION OF PATIENT CARE ITEMS

The risk of transferring infection from patient care items is dependent on the following factors:

1. The presence of microorganisms, the number and virulence of these organisms.

2. The type of procedure that is going to be performed (invasive or non-invasive).

3. The body site where the instrument/and or equipment will be used (penetrating the mucosal or skin tissue or used on intact skin).

Contact sites for instruments may be classified as critical, semi-critical or non-critical according to "Spaulding Classification" as given below. The level of reprocessing required is based on the classification and level of risk.

Table showing Spaulding's Classification of Items

Intended Use of Items	Class	Level of Risk	Level of Disinfection Required	Methods Used
• Into vascular system. • Into sterile body cavity. • Into sterile tissues. (e.g. Surgical procedures, instrumentation, arthroscopies, biopsies, etc.)	Critical	High	Sterilization or High level disinfection	• Steam under pressure (Autoclave) • Dry Heat (Hot air Oven) • Plasma sterilization • (H_2O_2 Plasma) • ETO gas • Chemical liquid sterliants: o Glutaraldehyde-based formulations (≥2.4%). o Glutaraldehyde (0.95%) with phenol/phenate (1.64%) o Stabilized hydrogen peroxide (7.5%). o Hydrogen peroxide (7.35%) with peracetic acid (0.23%). o Peracetic acid (0.2%).
• Contact with Mucous membrane, non intact skin. (e.g. gastroscopy etc.)	Semi-critical	Medium	High level disinfection	• Glutaraldehyde (as above). • Hydrogen peroxide (as above). • *ortho*-phthalaldehyde (0.55%). • Peracetic acid with hydrogen peroxide (as above)
• Contact with Intact skin or without contact with patient. (e.g. Stethoscopes, BP apparatus, sinks, beds etc.)	Non-critical patient care items	Low	Intermediate level Disinfection	• Ethyl or isopropyl alcohol (70%-90%) • Sodium hypochlorite (1%) • Phenolic compounds (Phenol, Phenyl, Lysol) • Iodophors (eg. Betadine) • Quaternary ammonium compounds (Chlorhexidine, Savlon)
	Non-critical environmental surfaces	Low	Low level Disinfection	• Cleaning and scrubbing with soaps/ detergent water • Intermediate/ low level disinfectants (as above)

REPROCESSING OF PATIENT CARE ITEMS

This is one of the most critical areas requiring stringent monitoring. It is essential that correct level of reprocessing of instruments and equipment is chosen according to its intended use.

General steps to be followed for reprocessing of patient care devices/instruments are as follows:

- Cleaning
- Disinfection/Sterilization

Cleaning of Instruments

After an instrument has been used, prior to its drying, it should be washed to remove any gross soiling. At this stage, detergent and water is appropriate to use. It is preferable to use multienzymatic cleaning solutions for this purpose if available.

- If not cleaned properly, organic matter may prevent the disinfectant or sterilant from having contact with the instrument/equipment and may also bind and inactivate the chemical activity of the disinfectant.
- If an instrument/equipment is unable to be cleaned then it is unable to be sterilized or disinfected.

Methods Used for Cleaning of Instruments and Equipments

Manual Cleaning

All surfaces of the instrument/equipment must be cleaned taking care to reach all channels and bores of the instrument. If instruments are being washed manually the following procedure should be followed:

- Wear personal protective equipment (plastic apron, thick rubber gloves, eye protection, surgical mask and/or face shield),
- Remove any gross soiling on the instrument by rinsing in tepid water (150C–180C),
- Take instrument apart fully and immerse all parts in warm water with a biodegradable, non-corrosive, non-abrasive, low foaming and free rinsing detergent or use an enzymatic cleaner if necessary.

- Ensure all visible soil is removed from the instrument—follow manufacturer's instructions.
- Rinse in hot water (unless contraindicated).
- Dry the instrument either in a drying cabinet, or hand dry with clean lint-free cloth.
- Inspect to ensure the instrument is clean.

Enzymatic Cleaners

Used for fibreoptic instruments and accessories, and other items that are difficult to clean. These products are hazardous and care should be taken when in contact with them. Follow manufacturer's recommendations for their use.

Ultrasonic Cleaners and Automated Washers

- Ultrasonic cleaners and automated washers are recommended for cleaning basic instruments that can withstand this process.
- Using a machine to wash the instruments will cut down on the handling of the instruments.
- Ultrasonic cleaners do not disinfect the instruments.
- By causing high frequency, high-energy sound waves to hit the instrument/ equipment, the soiling matter drops off the instrument, or becomes easy to remove during the rinsing process.
- These cleaners are not appropriate for cannulated instruments (they cannot clean inside the instrument), plastic materials, two or more different metals, or some glass instruments, syringes and lenses. Daily efficiency tests should be done.

Disinfection

Methods for Achieving Disinfection

1.Thermal Disinfection

This may be used for an instrument that is able to withstand the process of heat and moisture and is not required to be sterile. The level of disinfection depends on the water temperature and the duration the instrument is exposed to that temperature.

Minimum surface temperature and time required for thermal disinfection:

Surface Temperature (°C)	Minimum Disinfection Time Required (Minutes)
90	1
80	10
75	30
70	100

2.Chemical Disinfection

The performance of chemical disinfectants is dependent on a number of factors including: temperature, contact time, concentration, pH, presence of organic or inorganic matter and the numbers and resistance of the initial bioburden on a surface. Instrument grade disinfectants are classified as high, intermediate or low level. Some of the commonly used disinfectants are as follows:

Ethyl Alcohol/ Isopropyl Alcohol (60%-70%)	Intermediate level disinfectant	Alcohols/ alcohol impregnated wipes are used for disinfection of small, smooth, clean surfaces (eg trolley tops). Disinfection of rubbers stoppers of medication vials, thermometers, stethoscopes, scissors, manual ventilation bags, manikins, ultrasound instrument, and external surface of ventilators, electrical/electronic equipment, which can not be immersed in disinfectants and medication preparation areas.
Sodium hypochlorite	Intermediate level disinfectant High level disinfectant for selected semicritical devices	Dental equipment, CPR mannequins (500 ppm available chlorine x 10 minutes), disinfection of syringes used by drug addicts if sterile disposable needles unavailable (full strength bleach)
Quaternary ammonium compounds	Low level disinfectant	Can be used for non-critical items like BP cuffs and cleansing dirty wounds.

Name (Concentration)	Recommended Use	Examples
Glutaraldehyde (2%)	High level disinfection or sterilization of heat sensitive surgical instruments	Endoscopes, spirometry tubings, dialyzers, transducers, anesthetic and respiratory equipments, hemodialysis proportioning and dialysate delivery systems etc.
Orthophthalyl aldehyde (OPA) (0.55%)	For high level disinfection of heat sensitive surgical instruments	Same as above. Probably more useful than glutaraldehyde where resistant strains have emerged, non irritating to the eyes and nasal passages, does not require activation or exposure monitoring, and has a 12 min contact period.
Hydrogen peroxide (7.35%) with peracetic acid (0.23%)	Can be used as a sterilant	Disinfection/ sterilization of semi-critical/ critical medical or dental equipment.
Stabilized hydrogen peroxide (3%-7.5%)	For high level disinfection	Disinfection of ventilators, fabrics, endoscopes, foot care equipment.
Vapourized H_2O_2	For sterilization	Vaporized H_2O_2 is used for gas plasma sterilization.
Peracetic acid/ peroxyacetic acid (0.3%)	Can be used as sterilant	Low temperature sterilant for endoscopes, dental equipment. In combination with H_2O_2, it is used for disinfection of hemodialyzer.

Sterilization

It must be attempted for all critical care items by using the most suitable method according to the material involved.

Method of Sterilization	Sterilization Conditions	Uses
Autoclave	121°C x 30 min OR 132°C 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°C x 60 minutes 160°C x 120 minutes 150°C 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.

Decontamination Protocol for Routinely Used Patient Care Items (A–Z Listing)

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

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

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

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

Vomit bowls	Clean with detergent and water and disinfect with 0.1% hypochlorite for 30 minutes before reusing.
Wash bowls	Patients must have own dedicated bowl. After each patient's use, should be cleaned with detergent.
Wheel chairs	Patient's own–should be cleaned with detergent and water as necessary. Hospital–clean between patients with detergent and Water

SOP for making 1% Sodium Hypochlorite solution

I. **PROCEDURE** - Preparation of (1% sodium hypochlorite)

1. Prepare fresh daily.

2. Record the date prepared on the bottles.

3. After 24 h, pour unused solution down the drain and flush the drain with running water to prevent corrosion of pipes.

1. Preparation of Chiorine solution using Hypochlorite Solution

Concentration of commercially available hypochlorite solution	Required chlorine Concentration	To prepare 1000 ml	
		Solution in ml	Add water in ml
5%	2%	400	600
	1%	200	800
	0.50%	100	900
10%	0.50%	50	950
	1%	100	900
	2%	200	800

2. Preparation of Chlorine Soution using Bleaching powder Solution

PREPARATION OF DILUTE SOLUTIONS OF BLEACHING POWDERR			
Strength of SBP (stable bleaching powder)	Volume of water	Desired concentration	Bleaching powder in grams per litre
20%	1 litre	0.50%	25
		1%	50
		2%	100
		5%	250
		10%	500
25%	1 litre	0.50%	20
		1%	40
		2%	80
		5%	200
		10%	400
30%	1 litre	0.50%	17
		1%	33
		2%	67
		5%	167
		10%	333

SOP on Environmental cleaning and Disinfection

1. Purpose:

Cleaning and disinfecting environmental surfaces as appropriate is fundamental in reducing their potential contribution to the incidence of healthcare-associated infections. The principles of cleaning and disinfecting environmental surfaces take into account the intended use of the surface or item in patient care.

2. General Principles: Routine cleaning is necessary to ensure a hospital environment which is visibly clean and free from dust and soil. Methods must be appropriate for potential contamination, and the necessary level of decontamination. This may be achieved by classifying areas of hospital into following zones

- ✓ **Areas of No patient contact** -Normal domestic cleaning is recommended (for example, administration, and library).
- ✓ **Areas involved in patient care**-All patient care areas is assigned in one of the following three categories:

- High risk areas
- Moderate risk areas
- Low risk areas.

- ✓ **High risk areas** - High risk areas include operating theatres (OTs), ICUs, IIDUs, Emergency department, post-operative units, surgical ward, labour room, haemodialysis unit, Central sterile supply department(CSSD)/Theatre sterile supply unit (TSSU) and other facilities where invasive procedures are performed or where immuno-compromised patients are receiving care.
- ✓ **Moderate risk areas** - Moderate -risk areas include Medical wards, Laboratory areas, Blood bank, Pharmacies, Dietary serices, Laundry services, Mortuary, Nurses/ Doctors rest rooms, and Rehabilitation Areas and psychiatric wards.

- **Low risk areas-** Low -risk areas include administrative areas, faculty and doctors, offices, seminar rooms, stores, staff rooms, non- sterile supply areas, record storage and archives.

Classification of Hospital areas into risk categories

High risk areas	**Moderate risk areas**	**Low risk areas**
1. Operation threatre units including recovery area- Major & minor 2. Intensive care units/ Cardiac care Units /Neonatal ICU etc 3. High dependency units 4. Emergency department/casualty 5. Labour room 6. Post-operative units 7. Surgical wards 8. Central sterile supply Department/Theatre sterile supply unit 9. Radiation Treatrnent Areas 10. Chernotherapy ward/room 11. Dialysis facility 12. Burn Units 13. Isolation wards/ rooms & attached internal areas like bathrooms / toilets	1. Medical and allied wards 2. Laboratory areas 3. Blood bank 4. Pharmacies 5. Dietary services 6. Laundry services 7. Mortuary 8. Nurses/ Doctors rest rooms 9. Rehabilitation Areas 10. Psychiatric wards	1. Departmental areas/office areas 2. Outpatient department 3. Medical records section 4. Telephone rooms, electrical, mechanical, Extemal surroundings 5. Staff areas 6. Manifold services/room 7. Stores section

Frequency of cleaning

1. The frequency of cleani,g and disinfecting of areas depends on frequency of contact with surfaces.

2. **High touch surfaces** - those with freque,t hand-contact -e.g., doorknobs, bedrails, light switches, wall areas around the toilet in the patiert's room, and the edges of privacy

curtains should be cleaned and/or disinfected frequently.

3. **Low touch surfoces**- surfaces with infreqent hand contact - e.g., window sills, walls and hard-surface flooring in routine patient-care areas require cleaning on a regular basis,

when soiling or spills occur, and when a patient is discharged from the facility.

HIGH-TOUCH SURFACES IN PATIENT CARE AREAS ARE CLEANED AND DISINFECTED WITH A HOSPITALGRODE DISINFECTANT

+

NON-CRITICAL MEDICAL EQUIPMENT IS CLEANED AND DISINFECTED BETWEEN PATIENTS

+

CLEANING PRACTICES ARE PERIODICALLY MONITORED AND AUDITED WITH FEEDBACK AND EDUCATION

Table - Cleaning frequency, level of cleanjng/ disinfection and evaluation/auditing frequency according to the type of functional area risk category

Area risk Category	Frequency of cleaning	Level of cleaning/disinfection	Method of cleaning/Disinfection	Evaluation/ auditing frequency
High risk Areas	Once in two hours and spot cleaning as required	Cleaning and Intermediate level Disinfection	Cleaning with soap & detergent plus disinfection	Weekly
Moderate risk areas	Once in four hours and spot cleaning as required	Cleaning and Intermediate level Disinfection	Cleaning with soap & detergent plus disinfection	monthly
Low risk Areas	For areas working round the clock at least once in a shift or in areas having general shift at least twice in the shift & Spot cleaning as required	Only cleaning		

Cleaning agents and disinfectants

Spaulding three levels of disinfection for the treatment of devices and surfaces. These

disinfection levels are "high-level," "intermediate-level," and "low-level.

Dilution of Disinfectant

S.no	Cleaning activity in areas	Disinfectant	%	Dilution
1	Floor mopping low risk area	Microlyse	**1%**	20 ml in 1 litre of water
2	Floor mopping medium risk area	Sodium Hypochlorite	**1%**	200 ml of 5% hypochlorite in 800 ml of water or 100 ml of 10% hypochlorite in 900 ml of water
3	Floor mopping in high risk area	Bacillocid	**2%**	100 ml of bacillocid in 5 litres of water
4	Surface cleaning of high and medium risk area	Sodium Hypochlorite	**1%**	200 ml of 5% hypochlorite in 800 ml of water or 100 ml of 10% hypochlorite in 900 ml of water
5	Surface cleaning of low risk area	Microlyse	**1%**	10 ml in 1 litre of water
6	Terminal cleaning - isolation rooms - Fogging	Bacillocid	**2%**	100 ml of bacillocid in 5 litres of water

FLOOR MOPPING PROTOCOL

Method:

a. Using Microlyse
b. Using Sodium Hypochlorite

a) Using Microlyse

- Use the bucket of Microlyse solution prepared by pouring 200 ml of Microlyse into and then filling the bucket with water until it reaches 10litres mark.
- First dip the mop in the Microlyse solution. Squeeze the excess solution from the mop and mop the floor.
- After mopping the floor, rinse the mop in clean water in the blue bucket and squeeze the mop.
- Then dip the mop in the Microlyse solution, squeeze the excess solution from the mop and mop the floor.
- Empty both the buckets after floor mopping for each area

b) Using Sodium Hypochlorite

- Preparation of Solution: Freshly prepare the solution by first pouring 1 litres of Sodium Hypochlorite (10% stock) into the bucket and then filling the bucket with water until it reaches the 9 litres .This will achieve 1% concentration
- Warning: The 1% solution must be freshly constituted at the time of floor mopping.
- The solution needs to be used within 8 hours
- Process: (Accountability : Attendant on duty)
- Take 1% sodium hypochiorite solution in one bucket and plain water in another bucket.
- First dip the mop in the hypochlorite solution, squeeze the excess solution from the mop and mop the floor.

- After mopping the floor, rinse the mop in clean water in the blue bucket and squeeze the mop.
- Then dip the mop in Hypochlorite solution, squeeze the excess solution from the mop and mop the floor.
- Empty both the buckets after floor moping in one area.

Mops

- Wash the mop under the running water before doing wet mopping.
- An area of 120 square feet to be mopped before re-dipping the mop in the solution.
- Cleaning solution to be changed after cleaning an area of 240 square feet.
- Launder mop heads daily
- All washed mop heads must be dried thoroughly before re-use
- Where facility of laundering mops is not available, mops should be changed at following defined intervals.

❖ High risk areas - In each shift
❖ Moderate risk areas - Each day
❖ Low risk areas - Every week

DAILY CLEANING ACTIVITY IN OT (Process Accountability: Attendant on duty)

i. Surface cleaning
ii. Floor mopping

AREAS FOR DAILY CLEANING (Daily surface cleaning + daily floor mopping)

i. Operating rooms
ii. Scrub areas
iii. Sterile stores
iv. Sterile area corridors, clean area corridor, external corridor
v. Preop patient hold area
vi. Recovery room
vii. Clean utility
viii. Dirty utility
ix. Instrument wash area

x. O.T store

Only Daily floor mopping

- Ancillary areas including biomedical room, equipment room) anaesthesia office, billing office, nursing office, Doctors lounge Nurses lounge attendants lounge.
- When: - Every night at the end of the O T list
- Method: Using water and detergent followed by freshly prepared 1% hypochlorite.

OT Cleaning Protocol

Before Surgery:

Wipe all furniture, equipment, room lights, suction points, OR table, surgical light reflectors, other light fittings, slabs with **2 percent bacillocid solution**. This should be completed at least one hour before the surgery.

During Surgical Procedure:

a. In case of Accidental spillage in the area outside the surgical field should be promptly cleaned by placing tissue papers over it and then pouring 10% sodium hypochlorite over it.
b. Leave for 30 minutes then mop with a disinfectant (2 percent bacillocid solution). Discard the contaminated disposable items in yellow bag.

In between Surgical Procedure:

a. **Linen**: Gather all soiled linen and towels that are blood-stained, pack in a leak proof bag or closed bin, and transport to laundry suite for wash. Other linen should also be transported to the laundry suite. Appropriate PPE should be used while handling soiled linen. Disposable drapes should be disposed of in the Biomedical Yellow bag.
b. **Instruments**: All the instruments should first be decontaminated in 2% cidex solution for 20 minutes and then soaked in a multienzyme cleaner for 30 minutes followed by scrubbing with a brush using liquid soap in warm water and then dried. They should then be sent for sterilization to CSSD.
c. Reusable Suction bottles are emptied, and disinfected with 1% of sodium hypochlorite for 20min. All suction tubing, are replaced.
d. All respiratory tubings are single used disposable, and not reused.
e. Wipe used equipment, furniture, OR table with 2 percent bacillocid solution. If there is a blood spill, disinfect with 10% sodium hypochlorite for 30 minutes before wiping.

f. Floor cleaning is done with 2% Bacillocid.

g. Conduct a visible check to inspect cleanliness of the operation theatre.

End of the Day:

a. Terminal cleaning to be done with 2% bacillocid

b. All furniture, wall surfaces, fixed and ceiling mounted equipments, anaesthetic equipment / accessories, soap dispensers, handles of cabinet are to be disinfected with 2% bacillocid.

c. Floor Cleaning is done with2% bacillocid.

d. Bathrooms and toilets are cleaned with detergent powder.

e. Suction bottles are to be emptied, cleaned and disinfected by immersing into 1% sodium hypochlorite solution for 20 minutes.

f. Transport vehicles, including straps and attachments are cleaned with 1% hypochlorite.

Weekly Cleaning:

Weekly cleaning procedure

- Remove all portable equipment.
- Damp wipe lights and other fixtures with detergent.
- Clean doors, hinges, facings, glass inserts and rinse with a cloth moistened with detergent.
- Wipe down walls with clean cloth mop with detergent.
- Stainless steel surfaces - clean with detergent, rinse & clean with warm water.
- Moist wipe with water and followed by 2% bacillocid all furniture and equipment (OT table, suction holders, foot & sitting stools, Mayo stands, IV poles, basin stands , x-ray view boxes, hamper stands, all tables in the room, holes to oxygen tank, kick buckets and holder, and wall cupboards)
- CLEAN floor using detergent and water and then with 2% bacillocid.

- Air conditioners and suction points are checked, cleaned and repaired on a weekly basis.

❖ **All the cleaning processes in the OT must be documented and verified by the incharge of the respective OT.**

OT FOGGING PROTOCOL

(only to be done in outbreak of SSI or as advised by infection control committee)

Method:

Using 2 % Bacillocid Preparation of Solution in the fogging machine:

(Accountability: Staff Nurse on duty)

Prepare the 2 % Bacillocid solution by mixing (100ml in 5 liters of water).

Process (Accountability: Attendant on duty)

- After filling the fogger as mentioned above, one fogger is kept on floor in a OT in the comer closer to the OT door.
- Calibrate the knob at the minimum aperture so that 3 - 5 micron particles are generated.
- The fogger is placed with its fogging nozzle at 45 degrees facing upwardly at the diagonally opposite corner.
- Switch off the AHU and start fogging'
- Switch off the machine after ensuring that the entire solution has evaporated.
- Leave the room closed for another one hour after switching off the fogger.
- Switch on the AHU after one hour of contact time.
- Ensure that the AHU is on for at least 6hrs before taking first case.

EMERGENCY ROOMS AND THE INTENSIVE CARE UNITS AND WARDS

- Environmental cleaning to be done with 2 % Bacillocid
- Floor cleaning should be done using 2 % Bacillocid
- Change the curtains once in 7 days or earlier if soiled

- On discharge of patient; clear all the furniture from the room
- Remove the bed linen, curtains and put in the utility room
- Clean all the tabletops, window ledges, all fixtures, phones, chairs and other furniture in the room with 2% Bacillocid

ISOLATION ROOMS

- Change curtains every week and after patient discharge.
- Routine cleaning of the surfaces should be done with 2 % Bacillocid.
- Terminal cleaning should be carried out discharge of every patient.
- Admit a patient only after 1-2 hours after fogging.

DRESSING ROOM

- Routine cleaning of the surfaces should be done with 2% Bacillocid.
- Clean all the table top, dressing trolley with 2% Bacillocid after use.

OUT PATTENT DEPARTMENT

- Use Microlyse solution for floor mopping'
- Wipe all the tabletops, examination table, dressing trolleys with 1 % hypochlorite
- Change linen on examination table every day or as and when required.

CSSD (Central Sterile Supply Department)

AREA FOR CLEANING

- Sterile Area:
- Floor: 1 % hypochlorite twice a day { 1st & 2nd Shift}
- Walls, Furniture, Racks, Ducts, Panels - 1 % hypochlorite -twice a week.
- Ducts: -twice a week
- Assembly, Washing. Linen Room Area
- Floor: 1 % hypochlorite twice a day { 1st & 2nd Shift}
- Furniture, & Table: 1% hypochlorite - everyday

Spill Management

Management of spills of blood and other potentially infectious material (like pus, sputum, pleural fluid, CSF etc.)

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

- The kit contents should be reviewed daily to ensure completeness of the kit.
- The spill kit must be immediately replenished after use and stored at the original location after every use.

Contents of spill management kit

- Personal Protective Equipment

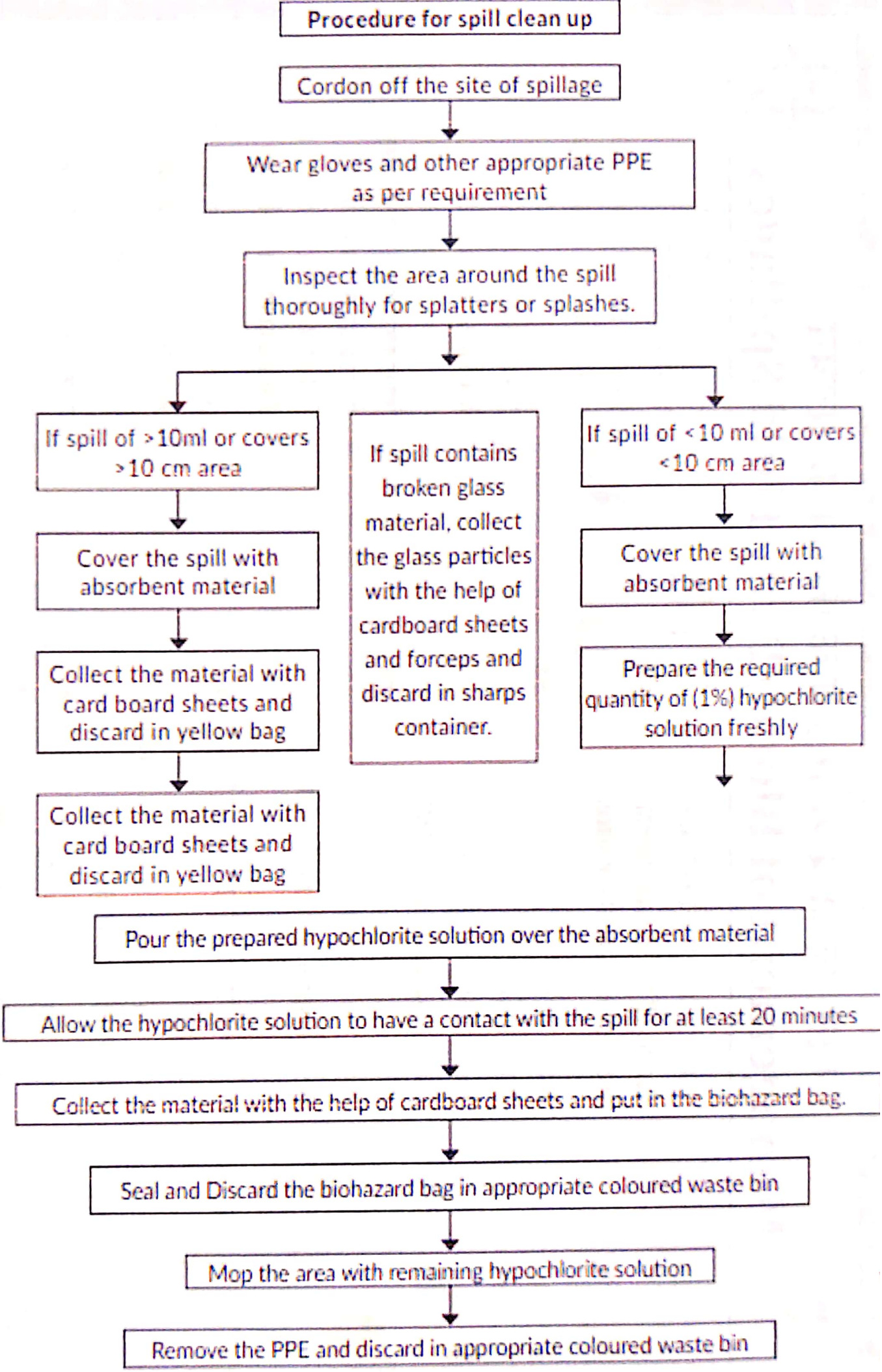
Gloves–2 pairs (single use), Plastic Apron–1, Face masks–2,Caps –2 ,Goggle–1,Shoe Covers–2 pairs, Forceps

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

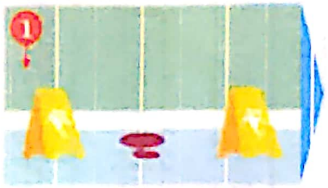
Procedure of Spill clean up

1. Assemble materials required for dealing with the spill prior to putting on PPE.
2. Inspect the area around the spill thoroughly for splatters or splashes.
3. Restrict the activity around the spill until the area has been cleaned and disinfected and is completely dry.
4. Promptly clean and decontaminate spills of blood and other potentially infectious materials. Discard blood-contaminated items.
5. Use 1% Sodium hypochlorite for small spills and 10% hypochlorite solution for large spills.

6. The detailed procedure is explained in the flow chart given.



रक्त एवं अन्य शरीर द्रव्य के फैलाव का प्रबंधन
Management of Blood/Body Fluid Spillages



जगह को घेरा बंद करें और अन्य कर्मचारियों को सूचित करें।
Cordon off the site and inform everyone working at the place.

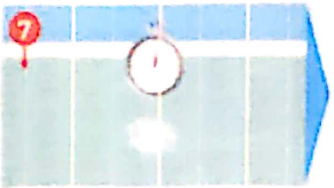
फैलाव के प्रकार का मूल्यांकन करें।
स्पिल मैनेजमेंट किट खोलें।
Assess the type of spillage.
Open the spill management kit.

व्यक्तिगत सुरक्षात्मक उपकरणों को पहनें।
Wear personal protective equipment.

किट में दिए गये निर्देशों के अनुसार हायपोक्लोराईट सोल्यूशन बनाएँ।
Prepare hypochlorite solution according to instructions given in the kit.

फैलाव को कॉटन/गाज/टिशू पेपर से ढँक दें।
Cover the spillage with absorbent material like cotton/tissue paper.

तैयार हायपोक्लोराईट सोल्यूशन, ढँके हुए फैलाव के ऊपर डालें।
Pour the prepared hypochlorite solution on covered spillage.



इसे २० मिनट तक रखें।
Keep it for 20 minutes.

भिगे हुए कॉटन/गाज/टिशू पेपर को उठाकर पीले रंग के बायोहज़ार्ड बेग में डालें।
Collect the soaked material and discard in yellow biohazard bag.

बचे हुए हायपोक्लोराईट सोल्यूशन से जगह पोंछ लें।
Mop the area with remaining hypochlorite solution.

दस्ताने एवं अन्य सुरक्षात्मक उपकरणों को लाल रंग के कुड़ेदान में डालें एवं हाथ स्वच्छ करें।
Discard the gloves and other PPE in red coloured bin and perform hand hygiene.

Hospital Infection Control Committee, All India Institute of Medical Sciences, Raipur

MERCURY SPILL MANAGEMENT

Contents of a Mercury Spill Kit

1. Gloves
2. Mask
3. Goggles
4. Syringe 5 ml or dropper
5. Plastic container with lid that seals
6. Adhesive plaster strips
7. Cardboard strips or chart paper pieces
8. Thick plastic bag
9. Torch

Procedure of Mercury Spill Clean Up

- Remove all items near the mercury spill area. Switch off the fan and Exhaust fan if in use
- Children and pregnant women to be evacuated from that space
- Wear face mask and goggles
- Remove the jewellery and watch from hands, then wear gloves
- Locate all Mercury beads, then carefully use the cardboard strips or Chart Sheet to gather them together
- Use the syringe or dropper to draw up the Mercury beads, transfer them into the water filled plastic container and close and seal airtight

- Small and hard-to-see beads can be located with the flashlight, after removing the larger beads, use adhesive tape to collect those beads
- If Mercury spilled on linen, that portion to be cut and removed
- All the materials used for Mercury spill to be placed in the plastic bag and to be labelled as "CONTAMINATED WITH MERCURY".
- Hand over the kit to BMWM.
- Doors and windows of the room to be kept open for 24 hours.

DONT's

- Never use broom to clean up mercury.
- Never use Vacuum cleaner to clean up mercury.
- Never use bare hands to touch Mercury.
- Never continue wearing shoes and clothing that are contaminated with Mercury.

CHEMICAL SPILLAGE MANAGEMENT

For Chemical spillage, follow the Manufacturer's Instruction as per the spilled chemical.

SHARP WASTE MANAGEMENT

Introduction

"Sharps" is a term used for all those sharp or pointed items such as broken glassware, scalpel and razor blades, lancets, hypodermic syringes with needles, suture needles, broken or unbroken vials, ampoules, tubes, pipettes and other items which can pierce and /or cause cuts or puncture injuries. These include both used and unused sharps. "Sharps waste" is that sharp which has been used in the diagnosis, treatment and immunization of humans and animals or those sharps that need to be disposed due to being expired or unusable for any reason. Injury with sharps poses the risk of transmission of infectious agents such as blood borne pathogens. If the sharps waste is not segregated appropriately, the injury can occur to the healthcare workers, waste handlers and public. It is the responsibility of every person handling and generating the sharp waste to handle appropriately and dispose safely. Sharps are of concern because of the risk of injury (especially needle stick injury) and reuse potential. The sharp waste is disposed off finally by autoclaving flowed by shredding / incineration.

Sharp waste management

- reduce any unnecessary injections.
- use needleless devices.
- use engineered needles that automatically retract, blunt, resheath, or disable the sharp.
- Disposal of sharps.
- All sharps should be disposed in the designated rigid, puncture and tamper proof containers.

- Sharp containers should be readily accessible (in the same injection / dressing trolley).

- Where possible, the needles and syringes should be mutilated prior to disposal (use the needle cutter if available) o The advantages of mutilation include - prevents reuse of syringe either inadvertently or illegally, it reduces volume of sharps wastes, potential for recycling of syringes after the waste has undergone adequate disinfection / sterilization.

- Do not try to disassemble used needle syringe assembly. They can be disposed off as a single unit.

- The container should be adequately labelled with the date and area of generation, should only be three fourths full and not more and should bear the biohazard sign.

- Before being sent to the temporary waste storage area, i.e., before handling the sharps waste container, check for any protruding sharp.

- Entry should be made in the log book by the concerned sister in charge of the ward / ICU / OT or designated laboratory staff.

- Ensure new container is available before removing the old one.

Don'ts

- Do not dispose sharps in containers other than the identified ones (never mix sharps with other categories of waste).

- Do not bend, break or recap needles.

- Do not overfill the sharps container .

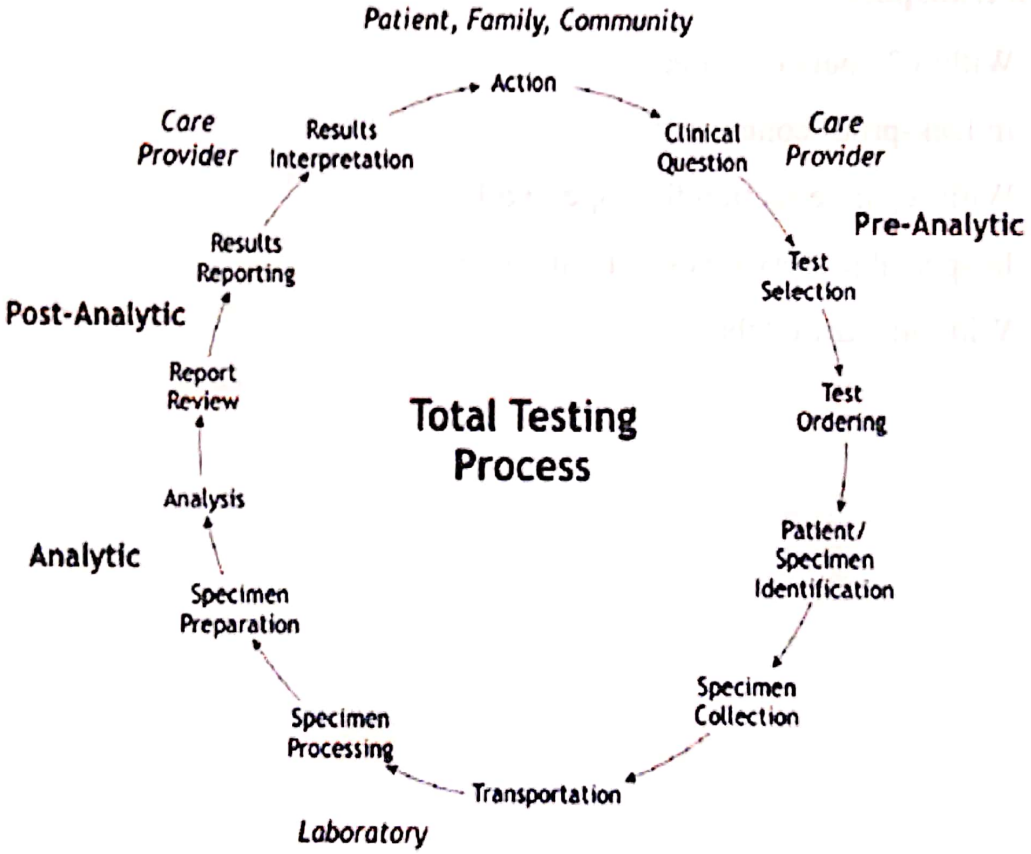
- Sharps should never be passed by hand.

- Do not leave sharps on beds, tables or drop on the floor, for others to dispose.

Specimen Collection and Transport

INTRODUCTION

- Specimen collection and transport are important procedure for better laboratory diagnosis.
- Results generated by laboratory depend on the quality and condition of specimen on arrival at laboratory.
- Good quality of collection means that right specimen collected from right patient at right time, in a right manner and transported in a right way to right laboratory.



GUIDELINES FOR SPECIMEN COLLECTION

- Collect specimen in acute stage of disease.
- Collect specimen for all cultures preferably before start of antibiotics.
- If patient have had antibiotics then stop antibiotics for 48-72 hours and then collect specimen.
- Avoid contamination with indigenous flora to ensure that the sample is representative of the infectious process.
- Collect adequate volume of sample.
- Prompt delivery to laboratory (preferably within 2 hrs of collection).

Specimen transport

- Within 2 hours of collection.
- In leak-proof container.
- With separate section for paper work.
- In special preservatives or holding media.
- With biohazard label.

CONTAINERS FOR SAMPLE COLLECTION

- Leak-proof
- Unbreakable
- Sterile and dry

Note - containers should be sterilized by moist heat, dry heat or by radiation but never by disinfectants or antiseptics.

REJECTION CRITERIA

- Unlabeled or mislabeled containers
- Use of improper transport medium
- Excessive transport time
- Improper temperature transport or storage
- Improper collection site for test requested
- Specimen leakage out of storage container
- Quantity not sufficient.

LABEL HIGH RISK SPECIMEN

- Sputum with suspected
- Tuberculosis
- Fecal samples suspected with Cholera/Typhoid
- Anthrax
- Serum when suspected with HIV/HBV/HCV, infections

STANDARD PRECAUTIONS FOR SELF PROTECTION

- All specimens should be considered to contain transmissible agents and therefore should be collected and handled with great precautions.
- Use of gloves, gown, mask and protective eye wear when there is a risk of coming in contact with the specimen.
- In most laboratories a special area is designed for processing clinical samples for culture.

- Specimen should be sent to the lab at the earliest possible.
- Contained in robust, leak-proof, sterile containers.
- All used disposable containers must be incinerated or sterilized before discarding.
- Must accompany the requisition form.

AN IDEAL SPECIMEN FORM

- Patient's name……..Age/sex……
- Address……IPD/OPD number……
- Date and time of collection……
- Ward……
- Specimen Type……
- Diagnosis and test requested……
- Nature of specimen……..
- Doctor/staff signature……

COMMONLY COLLECTED SPECIMENS

- Blood
- Urine
- Sputum
- CSF
- Body fluids as peritoneal fluid, pleural fluid, pericardial fluid, etc.
- Throat swab
- Vaginal swab
- Stool
- Rectal swab

Blood

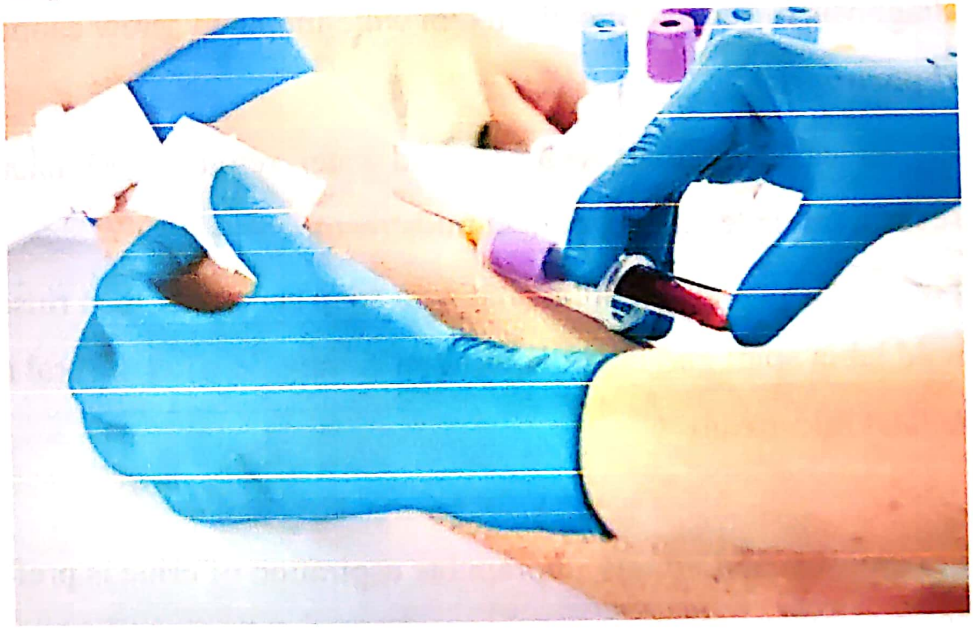
- For serological examination, special glass or plastic containers (w/o anticoagulant) with screw caps are used.
- Avoid flip-top lids (insecure d/t aerosols).
- Blood clot remaining after serum withdrawal can be cultured in selective liquid culture media. LIKE……

Container for other examinations:

- EDTA vials for parasitological examinations.
- Without anticoagulants for serological examinations.
- For microbiological culture, EDTA or citrate are not used instead, sodium polyanethol sulphonate(SPS) is used as anticoagulant.

COLLECTION OF BLOOD

- Disinfect the venipuncture site with alcohol and betadine.
- Take 1-5 ml of blood in children and 5-10 ml in adults.
- Transport within 2 hours at room temperature



Blood culture bottle

- Must be large enough to hold at least 50 ml liquid culture medium and 5 – 10 ml of blood sample.
- Net volume = 55 to 60 ml.

Urine

- Methods of collection
  - ➤ Suprapubic aspiration – gold standard
  - ➤ Midstream clean voided urine
  - ➤ Straight catheterization
  - ➤ Bladder Stimulation Technique

✓ For diagnosis of most UTIs, universal container is used for small quantities of urine.

✓ For larger quantities of sample, complete early morning specimens are needed for diagnosis of renal TB; collected in wide-mouthed screw capped bottles.

Patient preparation:

- For males: clean glans with soap and water, retract foreskin and when several ml have passed, collect midstream.
- For females : clean genital area with soap and water then rinse with water, hold labia apart and begin voiding in commode, after several ml have passed, collect midstream.

Urine

- For children and infants, suprapubic aspiration of urine is preferred.
- If tuberculosis of urinary tract is suspected, 3 complete early morning urine samples are taken.

- For urethritis and prostatitis, initial flow of urine or urethral swab is collected.

Transportation of urine

- Urine must be transported to the lab without delay and should be cultured within 2 to 4 hours of collection.
- If delay of more than 1-2 hr is unavoidable:
  - Refrigerate at 4 degree C and transport; or
  - Transport in 1.8% boric acid as preservative.
- Urine can be kept refrigerated at 4 degree C for 24 hrs.
- When sample is not treated by above methods and 5 hrs have passed, discard sample.

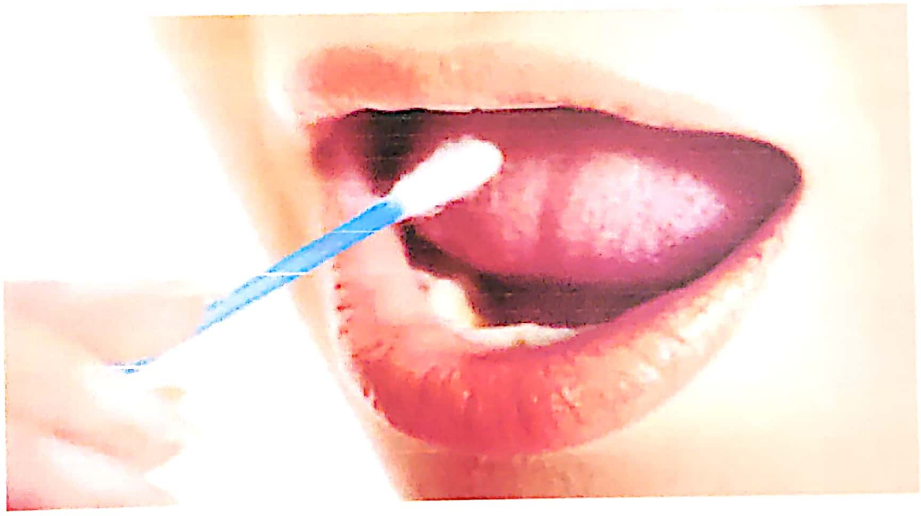
Sample collection of respiratory tract

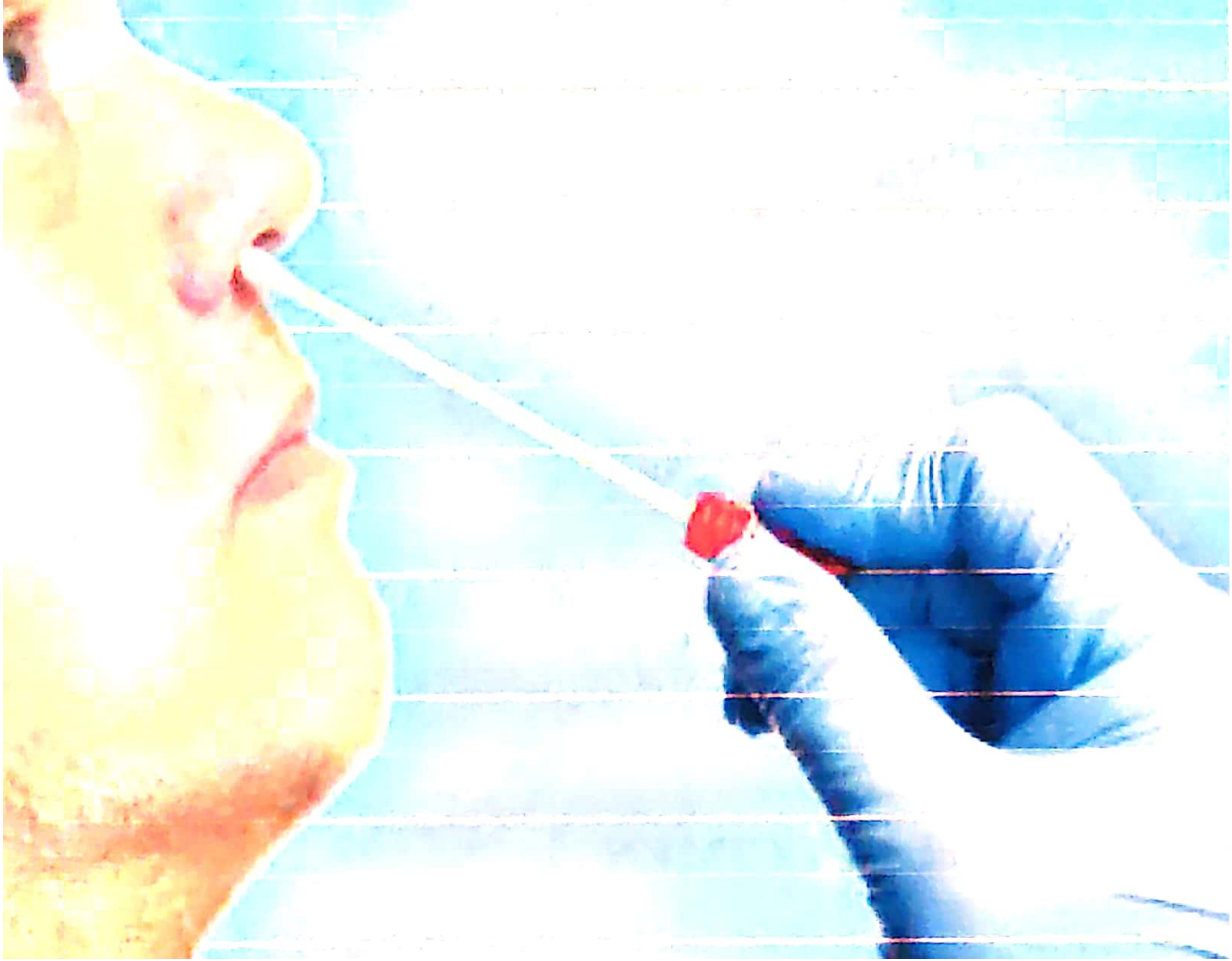
- Due to enormous commensal flora, collection of specimen of respiratory tract is very problematic.
- Thus in this specimen collection is very crucial in cases of viral infections.
- Avoidance of contamination is essential.

Upper respiratory tract

Oral swab:

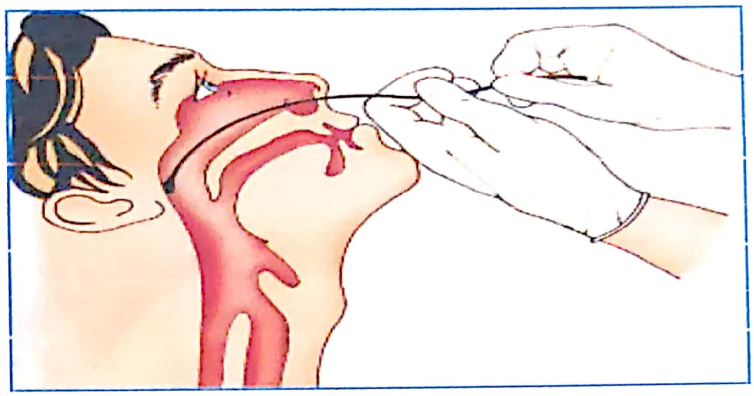
- Remove the oral secretions or debris from the surface lesions with first swab and discard.
- Using second swab vigorously, take the specimen avoiding any area of normal tissue.





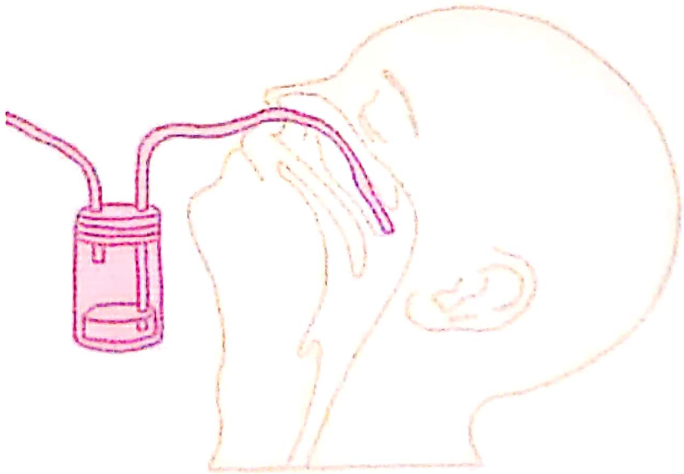
NASOPHARYNGEAL SPECIMEN

- **Swabs:**
  - ✔ Mucus and debris is removed.
  - ✔ Small flexible nasopharyngeal swab is inserted along the nasal septum to the posterior pharyngeal wall.
  - ✔ Rotate slowly for 5 seconds against the mucosa several times.



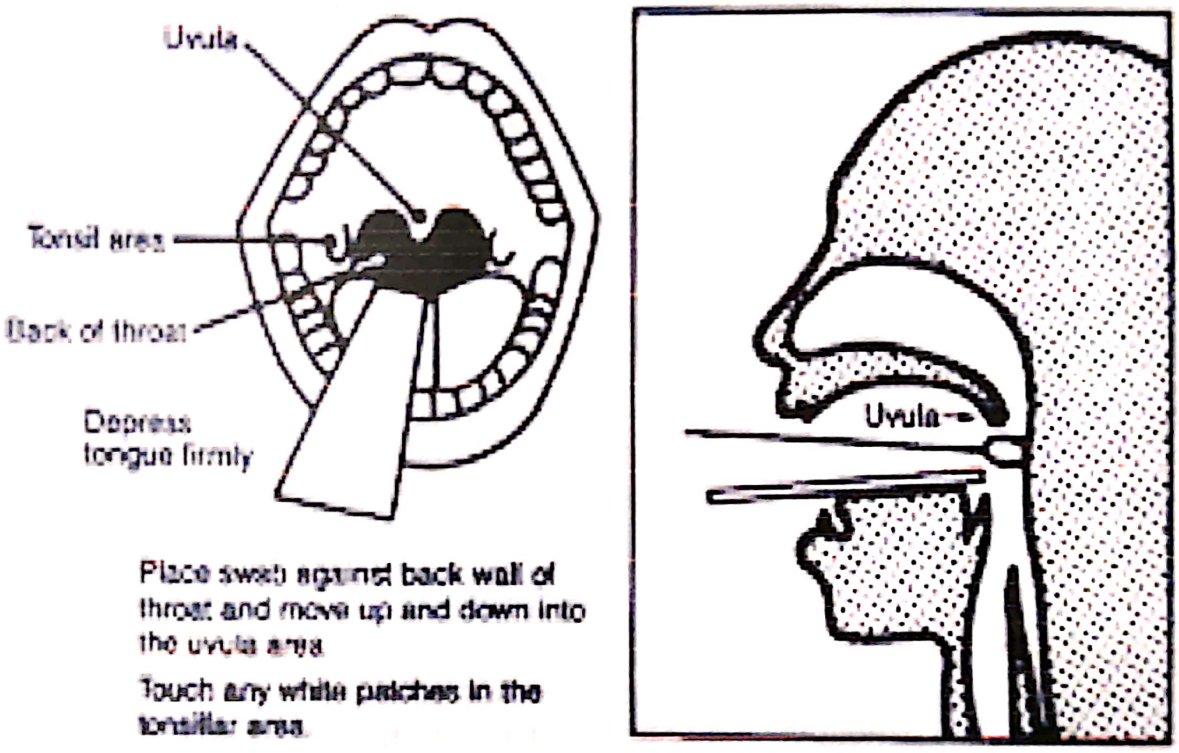
NASOPHARYNGEAL SPECIMEN

- Aspirate:
  - ➤ Is collected with a plastic tube attached to a10 ml of plastic syringe.
- Washings:
  - ➤ Is obtained with a rubber suction bulb by instilling and withdrawing 3-7 ml of sterile buffer saline.



THROAT SWAB

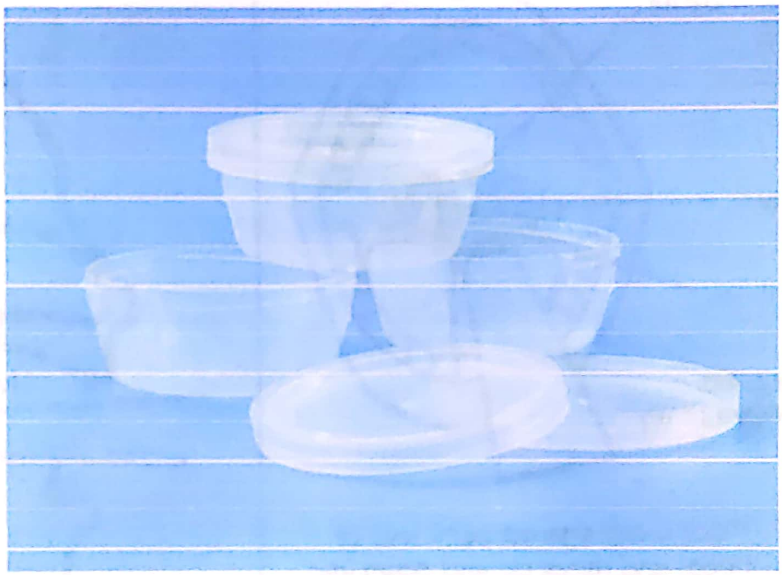
- Cotton darcon or calcium alginate tipped swabs are used.
- 8 hours before swabbing patient must not be treated with mouth gargles or antibiotics.
- In good light collect as much exudate as possible from tonsils, posterior pharyngeal wall and other inflamed sites.
- Contamination from oral flora to be avoided.



- If cannot be delivered within I hour or refrigerate at 4 degree C.
- Alternatively can be stored in tube with silica gel and transported.
- Group A Streptococci are highly resistant to dessication and can survive in dry swab for 48-72 hours.
- For virus detection specimen should be transported immediately in viral transport media in ice box.

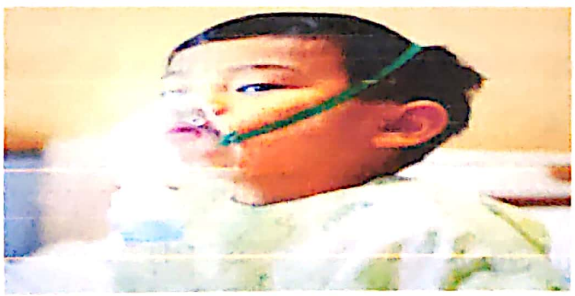
COLLECTION OF LOWER RESPIRATORY TRACT SPUTUM

- Collect in disposable clean, dry, leak-proof and wide mouthed, plastic container of about 100 ml capacity.
- Collect early in the morning before eating, after brushing teeth.
- Instruct the patient to deep cough, and ask the patient to spit directly into the container.
- Not in universal container coz of difficulty in expectorating.
- Use squat, wide mouthed disposable container.



INDUCED SPUTUM

- When patient is unable to produce sputum:
  - ➤ Patient is made to breath aerosolized droplets of a solution of 15% sodium chloride and 10% glycerin for about 10 minutes.
  - ➤ If patient is unable to cough, postural drainage and physiotherapy may help.



BRONCHOALVEOLAR LAVAGE (BAL)

- 30-50 ml of physiological saliva is injected through a fiber-optic bronchoscope.
- The saliva is then aspirated.
- Bronchial brush is done as a part of bronchoscsopy examination.

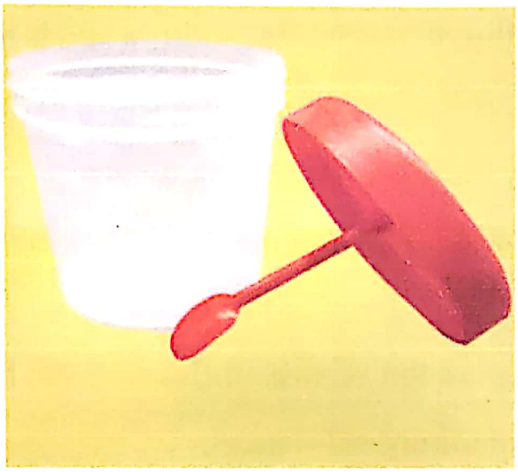
Swabs

- Exudate from throat, nostril, ear, skin, wounds and other accessible lesions consisting of sterile pledget of absorbent material.
- It's a relatively inefficient sampling device.
- It should be well loaded with the exudate to be sampled and transmitted promptly to lab.
- Nature and preparation of swab influence viability of pathogens.
- May contain inhibitory substances.
- To exclude or inactivate these inhibitors :
  - ➤ Boil swab in PO42- buffer.
  - ➤ Coat the swab with serum or albumin or charcoal.
- Baby Swabs very small as per orifices
- Per nasal swabs for whooping cough
- Post nasal swabs for meningococcal carriage – 45 degree
- Laryngeal swabs for bronchial secretions for TB
- High vaginal and cervical swabs for gonorrhoea and puerpueral fever.

GESTROINTESTINAL TRACT

Collection of stool:

- Collected in clean leak-proof container with a spoon attached to the inner side of cap.
- Pass the stool in clean and dry bed-pan and pick 1 spoonful and transfer it to the container.
- Stool should not be mixed with urine.



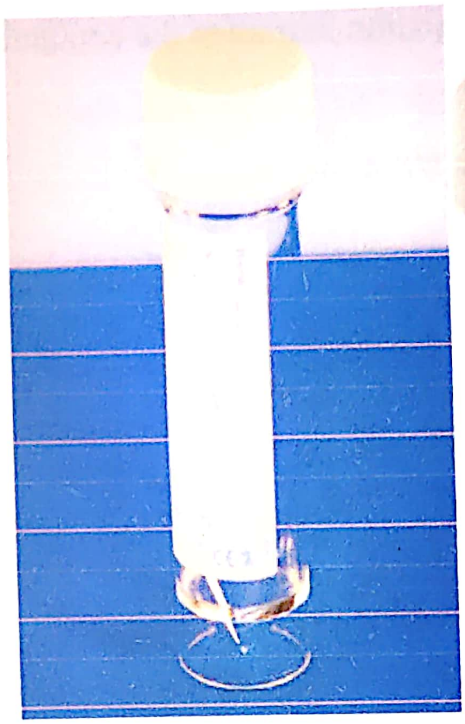
SEROUS / BODY FLUIDS

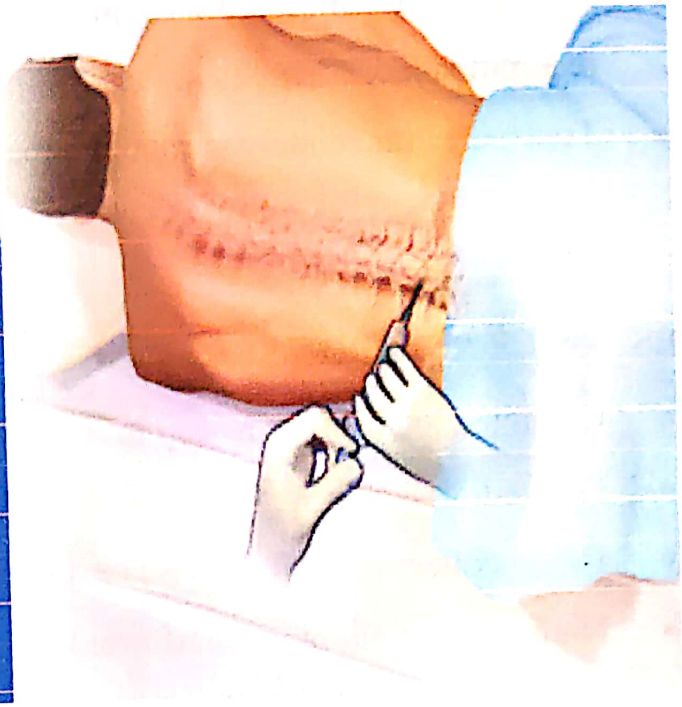
- Pleural fluid, Ascitic fluid, CSF, etc.
- Universal container is suitable.
- Add 0.3 ml of 20% solution of Sodium Citrate to the container prior to autoclaving (for fluids that may coagulate)

CEREBROSPINAL FLUID (CSF):

- Collected in a fresh sterile screw-capped container.
- Reusued containers should not be used
- Skin is disinfected by 70% alcohol and betadine.
- Then lumber puncture is done by physician trained in procedure with aseptic precautions to prevent introduction of infection.

- The trained physician will collect only 3-5 ml of CSF into a sterile container.
- The fluid to be collected at 4-5 drops/second.





PRESERVATION OF CSF

- When delay is anticipated in transport of CSF specimen to laboratory, it should not be kept in refrigerator, which tends to kill H. influenzae
- In case of delay it should be kept in room temperature.

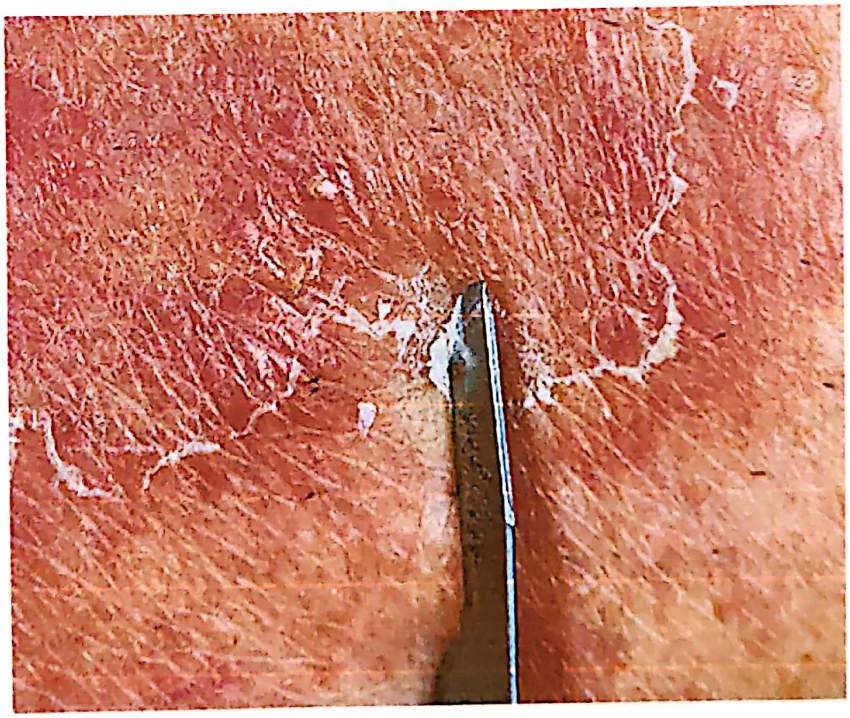
PLEURAL, PERITONEAL AND PERICARDIAL FLUIDS

- After taking full sterile precautions and disinfection of the skin, the needle is introduced between 3rd and 4th lumber vertebrae and CSF is collected.
- Collected specimen is transported to the laboratory promptly because delay in transport may cause death of delicate organisms as Meningococcus.
- Collected in sterile screw-capped universal container or anaerobic transporter.

- Skin should be disinfected then specimen is collected through percuteneous needle aspiration.
- Addition of 0.3 ml of 20% solution of sodium citrate to the container is recommended.
- Transport immediately at room temperature.

HAIRS, NAILS AND SKIN SCRAPINGS

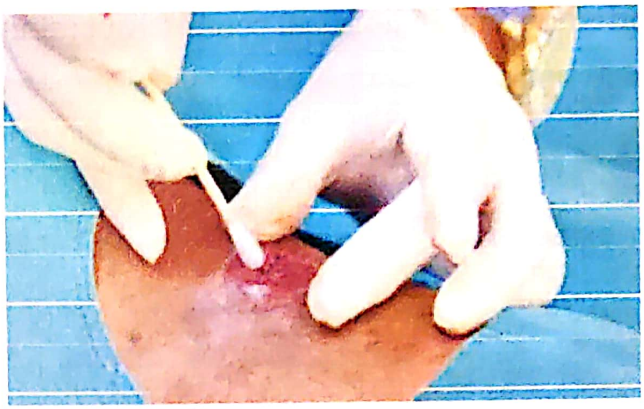
- Collected in clean screw-top tube.
- For nails and skin wipe with 70% alcohol.
- Hairs: collect the hair with intact 493×3 shaft.
- Nails: collect clippings of affected nails.
- Skin: scrape skin at the leading edge of lesion.



ABSCESSES, LESIONS, WOUNDS, PUSTULES AND ULCERS

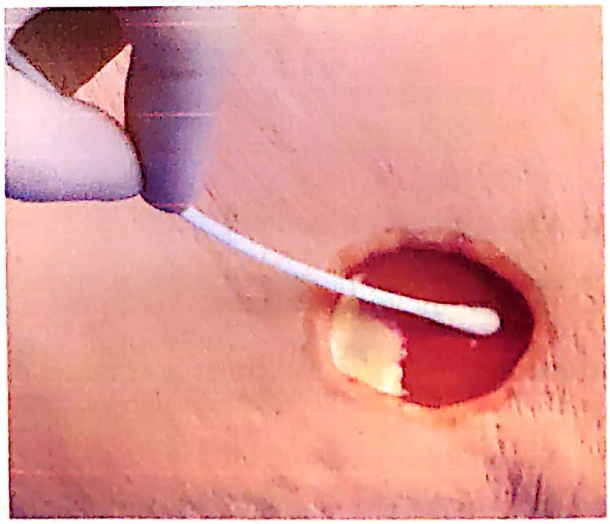
SUPERFICIAL:

- Collected from anaerobic swabs, moistened with Amie's or Stuart's medium.
- Wipe area with sterile saline or 70% alcohol.
- Swab along the leading edge of the wound.
- Transport within 24 hours at room temperature.



DEEP:

- Collect specimen in anaerobic transporter.
- Wipe area with sterile saline or 70% alcohol.
- Aspirate material from walls or excise tissue.
- Transport within 24 hours at room temperature.

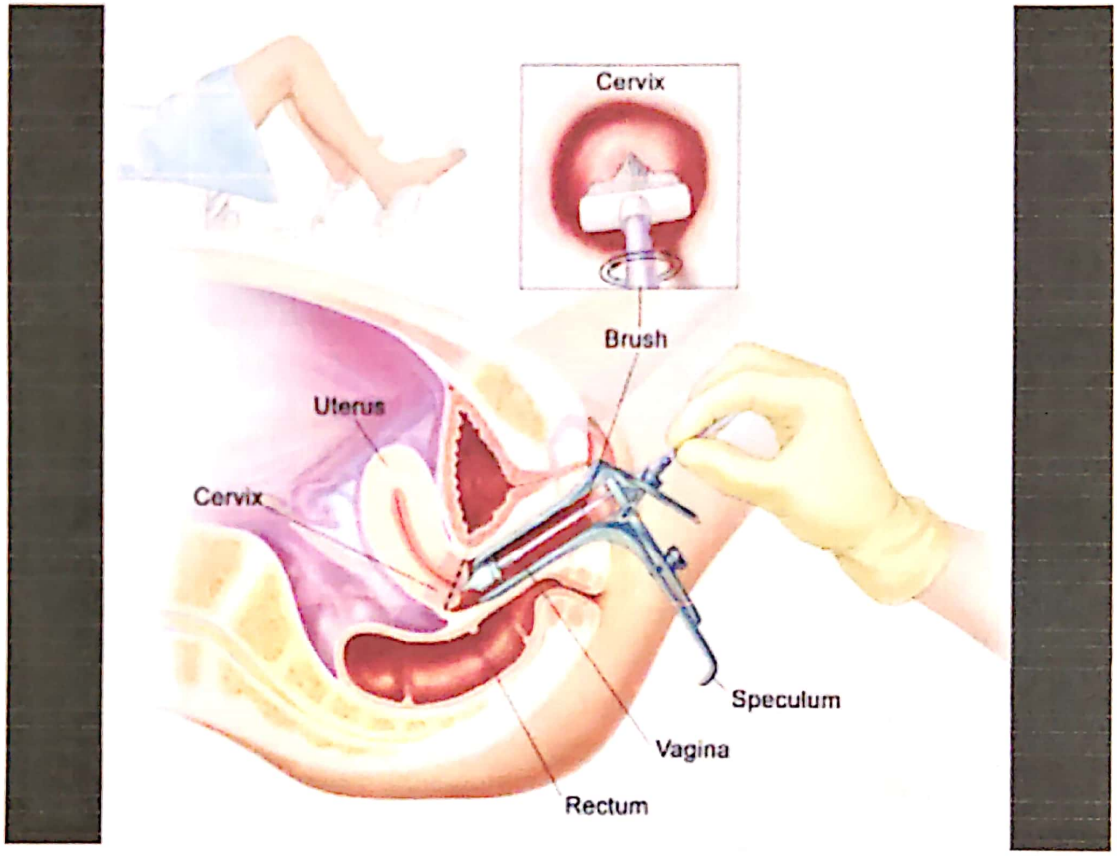


GENITAL TRACT SAMPLE IN MALES

- **FEMALES:**

CERVICAL SWAB:

- Remove mucus before collection of specimen.
- Swab moistened with Stuart's or Amie's medium is rotated deeply in the endocervical canal.
- Transported within 24 hours at room temperature.

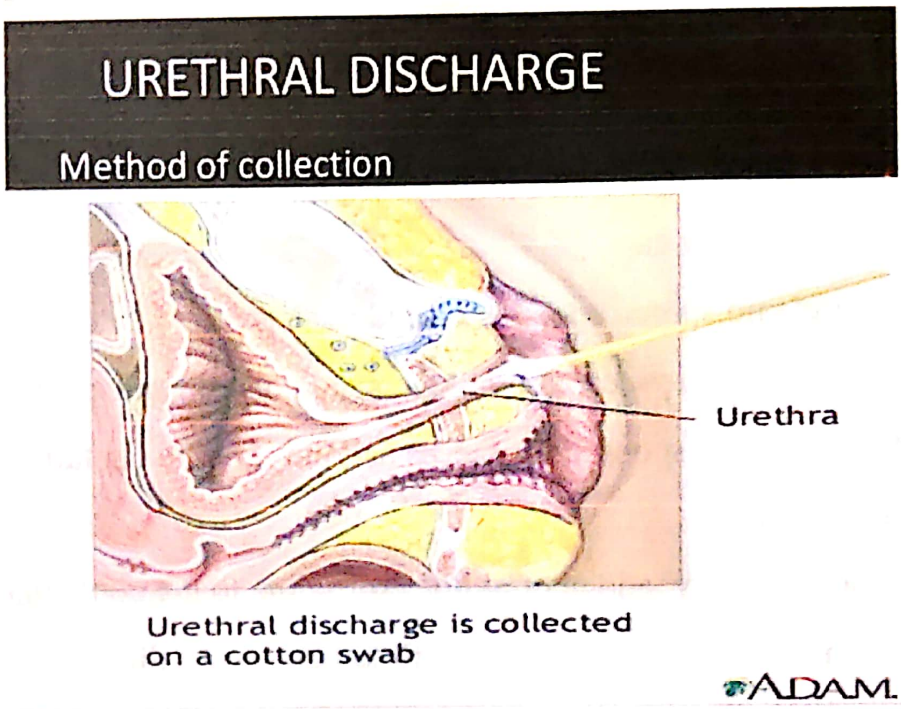


HIGH VAGINAL SWAB

- After removal of mucus and exudates, swab moistened with Stuart's or Amie's medium or JEMBEC medium is rotated over mucus membrane of vagina.
- The specimen is transported within 24 hours at room temperature.

URETHRAL SWAB

- Exudate is removed from urethral opening.
- Collect the discharge by massaging urethra against pubic symphysis.
- Or insert a swab moistened with Amie's or Stuart's medium into urethra and rotate for 2 seconds.
- Collect at least 1 hour after urination.
- Transport within 24 hours at room temperature.



GENITAL TRACT SAMPLES IN MALES

Prostate:

- Clean glans with soap and water.
- Collect the secretions on swab moistened with Amie's or Stuart's media or in a sterile screw- capped tubes.
- Transport within 24 hours at room temperature for swabs.
- Transport immediately for tubes.

Urethra:

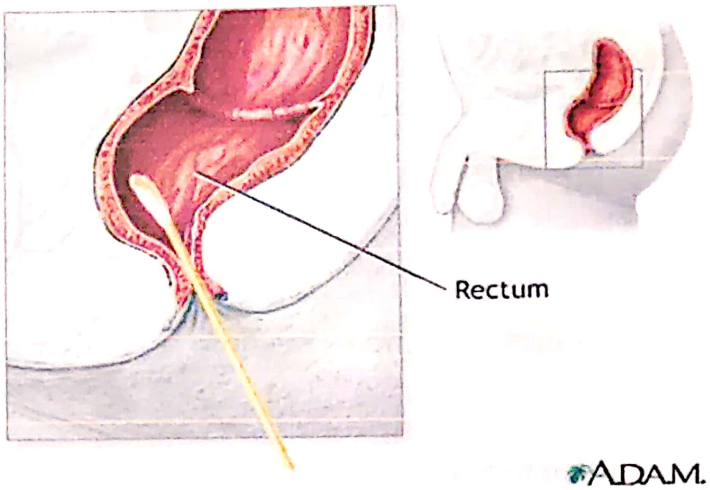
- Insert flexible swab moistened with Stuart's or Amie's medium, 2-4 cm into urethra and rotate for 2 seconds.
- Or collect discharge on JEMBEC transport system.
- Transport within 24 hours at room temperature for swab.
- Transport immediately for JEMBEC transport system.

Faeces

- Universal container with small metal or wooden or plastic spoon attached to inside of screw cap.
- If there's no spoon, spoon is placed in clean container and sterilized with it.
- Remove the screw cap, tip out the spoon handle and grasp it with fingers.
- Pick up single spoonful of faeces and put it in the container and replace the cap tightly.
- In case of delay, add neutral glycerol saline to the container.
- If transfer time > 1 hour, add buffered glycerol saline.
- Preserved stool – transferred to lab up to 24 hour at room temperature.
- Ova and parasites, preservative of choice: buffered formalin or polyvinyl alcohol.
- For bacteriological culture, transport in enteric transport media.

RECTAL SWAB

- Pass the tip of a sterile swab approximately 1 inch beyond anal sphincter.
- Carefully rotate the swab to take the sample and withdraw the swab.
- Place the swab in a container having enteric transport medium.
- Transport within 24 hour at 4 degree C.



Transport Media for stool

- Cary-Blair Medium - for all enteric organisms
- Stuart Medium - for all enteric organisms
- Amie's Medium - for all enteric organisms
- Buffered glycerol saline - for all enteric organisms except Vibrios
- Alkaline peptone water - for Vibrios
- V-R media - for Vibrios

Transport of stool sample

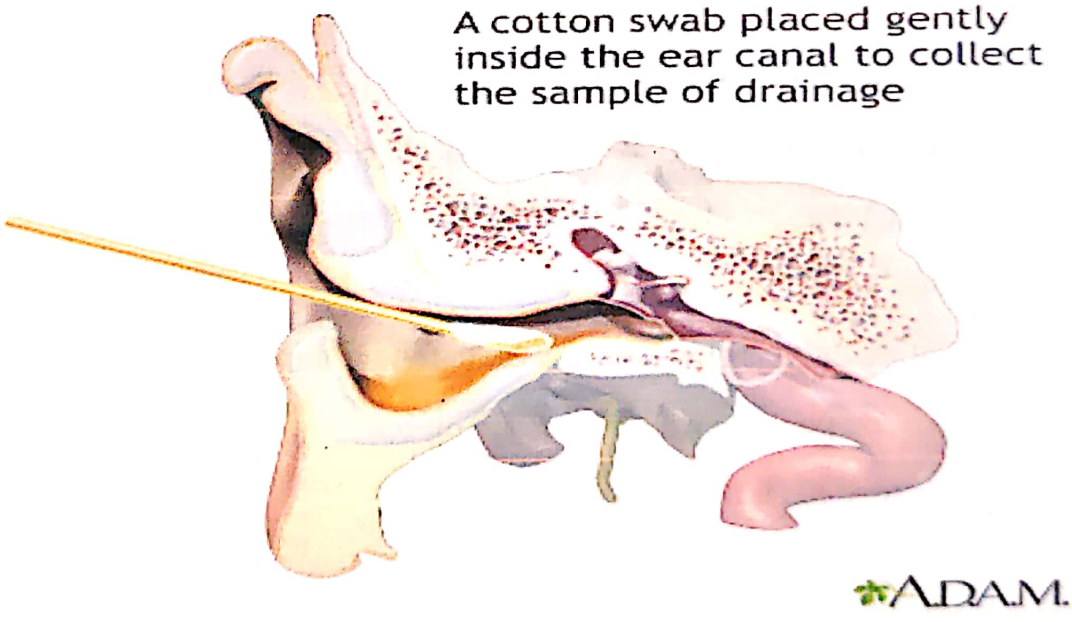
- Transport immediately to laboratory.
- If transfer time exceeds 1 hour then add buffered glycerol saline as preservative.

- For examination of ova and parasites, preservative of choice are buffered formalin or polyvinyl alcohol.
- Preserved stool sample can be transferred to laboratory up to 24 hour at room temperature.
- For bacteriological culture transport in enteric transport media.

EAR

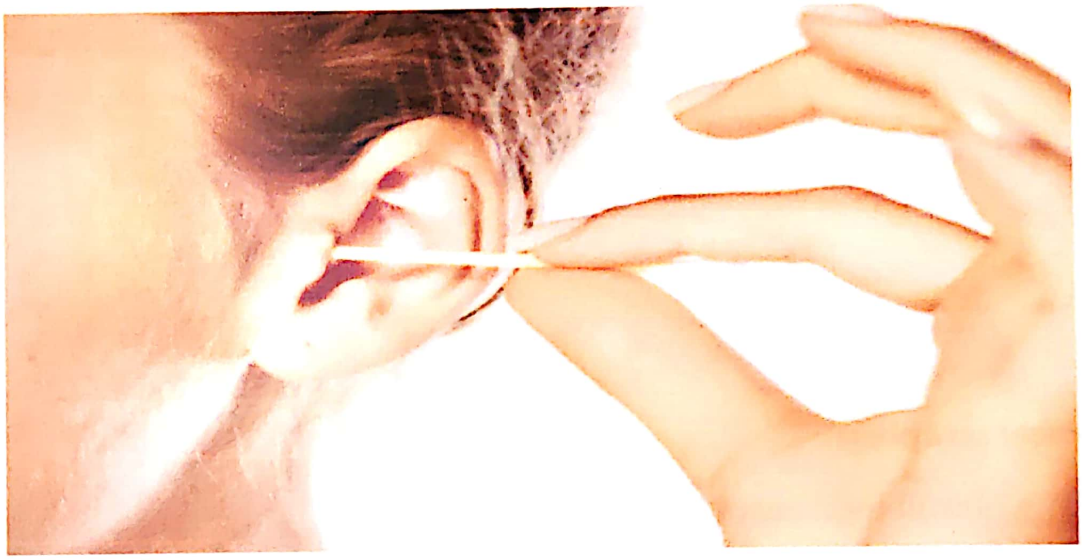
OUTER EAR:

- Wipe away crust with sterile saline.
- Aerobic swab moistened with Stuart's or Amie's medium is firmly rotated in outer ear canal.
- Transport within 24 hours at room temperature.



INNER EAR

- Clean ear canal with mild soap solution before puncture of the ear-drum.
- Aspirate material with syringe if ear-drum is intact.
- Use swab to collect material from ruptured ear-drum.
- Transport immediately at room temperature in sterile screw-capped tube or in anaerobic transporter.

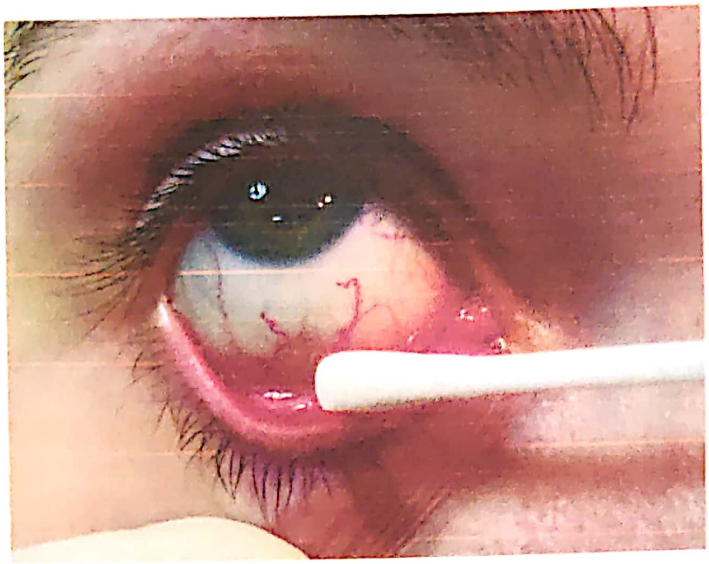


EYE SPECIMENS

Conjunctival:

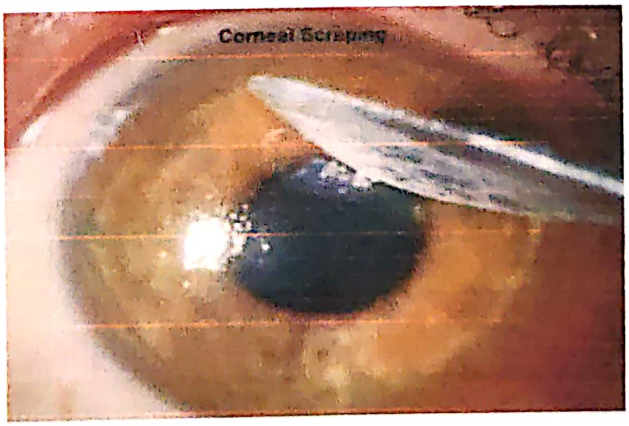
- Collected with aerobic swabs moistened with Stuart's or Amie's medium.
- Obtained from superior and inferior tarsal conjunctiva.
- Specimen both eyes by rolling swabs over each conjunctiva with separate swabs.
- If a viral culture is requested, a second sample is collected.
- For Chlamydia culture, dry calcium alginate swab is used.
- Transport within 24 hours at room temperature

- For viral culture transport in viral transport media and transported promptly to lab or refrigerated for short time.



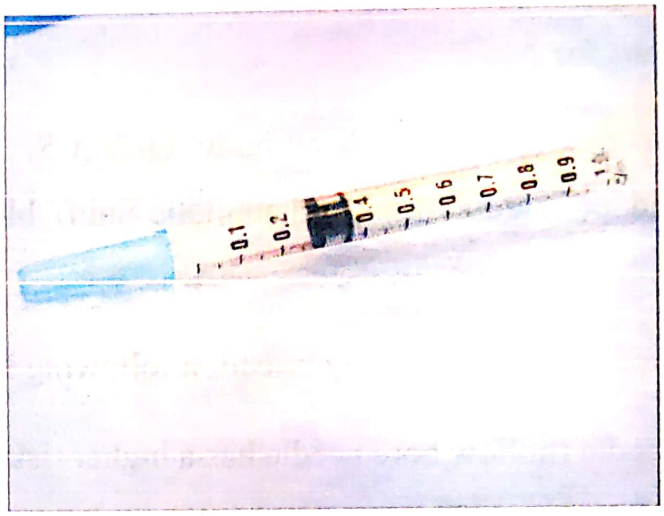
Corneal scrapings

- Instill local anaesthetic.
- Scrap by using heat sterilized platinum spatula, collect scrapings by calcium alginate tipped swabs dipped in sterile trypticase soya broath.
- Inoculate at bedside on BA, CA, SDA and thioglycolate media and transport immediately at room temperature.



Anterior chamber and vitreous collection

- Aspiration is carried out with a tuberculin syringe fitted with a 25-27 gauge needle for aqueous and 2021 gauge needle for vitreous aspiration.
- Transport immediately at room temperature.



Transport Media

- Stuart's medium
  - ➤ Non nutrient medium.
  - ➤ Preserves the viability.
- Deep semi solid Sodium Thioglycollate medium
  - ➤ For anaerobes

Needle Stick Injury (NSI)

Occupational injury is often loosely termed as needle stick injury though it includes injury through needle or other sharps and splashes. The risk of transmission is highest for HBV (30%) followed by HCV (3%) and HIV (0.3%).

Infectious specimens for NSI:

Potentially infectious Specimens include all body fluids (CSF, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, and amniotic fluid), blood and genital secretions.

Factors that influence risk of contracting infection following NSI:

- Type of needle (hollow bore needle has a higher risk than solid needle)
- Device visibly contaminated with blood
- Depth of injury (higher is the depth, more is the risk)
- Volume of blood involved in the exposure
- Viral load present in the blood at the time of exposure
- Timely performing first aid
- Timely start of appropriate post-exposure prophylaxis (PEP) for HBV and HIV

PREVENTION OF NEEDLE STICK INJURY

- Strict adherence to Standard infection control precautions
- Work surfaces must be disinfected with 1 % sodium hypochlorite solution
- Health care workers (HCWs) must be immunized against HBV
- Spillage of blood and other body fluids must be promptly cleaned and surface disinfected with 10% sodium hypochlorite solution
- Disposable needles should be used

- Needles should never be reused
- Never recap needles: If unavoidable, single hand-scoop technique may be followed
- Disposal after use

Precautions during Surgical Procedures

- Confine and contain approach should be implemented for every surgical procedure.
- Passing of sharp instruments during surgery must be according to the plan decided by surgeon and his assistant nurse.
- Sharp instruments should always be passed by non-touch approach, not directly by hands.
- Suturing: Needles must never be picked up with the fingers while suturing. Forceps or a needle holder is ideal for holding needle. Where practical, blunt needles should be used to close the abdomen.
- Preoperative testing of a patient for BBVs is not mandatory; should be performed if clinical indication present.
- Patient known to have BBV infections may require the following additional precautions for surgical operation:
  - The lead surgeon should ensure that all members of the team know about infection hazards and appropriate measures should be followed, such as use of double gloves
  - The surgical team must be limited to essential members of trained staff only

STEPS OF POST-EXPOSURE MANAGEMENTS
1. First aid 2. Report to designated nodal center 3. Take first dose of PEP for HIV 4. Testing for BBVs

5. Decision on PEP for HIV and HBV
6. Documentation and recording of exposure
7. Informed consent and counseling
8. Follow-up testing of HCWs
9. Precautions during the follow up period

FIRST AID MANAGEMENT OF EXPOSED SITE	
Do`s	Don`ts
• Earlier the first aid, lesser is the chance of transmission of BBVs • For splash injury: Irrigate thoroughly the site (e.g. eyes or mouth or other exposed area) vigorously with water at least for 5 minutes • Spit fluid out immediately if gone into mouth and rinse the mouth several times • If wearing contact lenses, leave them in place while irrigating. Once the eye is cleaned, remove the contact lens and clean them in a normal manner	• Do not panic • Do not place the pricked finger into the mouth reflexively • Do not squeeze blood from wound • Do not use antiseptics and detergents

Revised NACO Guidelines for post-exposure prophylaxis (PEP), 2015

Exposure code (EC)	HIV source code (SC)	PEP Recommendation.
1, 2 or 3	Negative	Not warranted
1	1	Not warranted
1	2	PEP is recommended Duration of PEP: 28 days Regimen (TLE): Single daily dose of • Tenofovir 300 mg plus • Lamivudine 300 mg plus • Efavirenz 600 mg
2	1	
2	2	
3	1 or 2	
2 or 3	Unknown (in area with high prevalence)	

Source material: Blood, body fluids or other potentially infectious material (CSF, synovial, pleural, pericardial a I and amniotic fluid, and pus) or an instrument contaminated with any of these substances

Exposure code:

1. EC-1 (Mild exposure): Mucous membrane/ non-intact skin exposure with small volumes, or less duration
2. EC-2 (Moderate exposure):

• Mucous membrane/ non-intact skin with large volumes/ splashes for several minutes or more duration OR

• Percutaneous superficial exposure with solid needle or superficial scratch

3. EC-3 (Severe exposure): Percutaneous exposure with:

• Large volume transfer

• By hollow needle, wide bore needle or deep puncture

• Visible blood on device

• Needle used in patient's artery or vein

Source HIV Status Code (SC):

1. SC-1: HIV positive, asymptomatic or low viral load (<400 copies/ml)
2. SC-2: HIV positive, symptomatic (advanced AIDS or primary HIV infection), high viral load
3. SC Unknown: Status of the patient is unknown and neither the patient nor his/ her blood is available for testing
4. HIV negative: Tested negative according to NACO strategy

The first dose of PEP

Should be started within 2 hours (for greater impact) and definitely within 72 hours. No need to provide PEP if exposure occurred > 72 hours

PEP not required in the following situations:

1. If exposure occurred > 72 hours before
2. If exposed person is HIV positive: Exposed individuals who are known or discovered to be HIV posit ive should not receive PEP. They should be referred to ART clinic for counseling and initiation of ART
3. If the skin is intact
4. If source is HIV negative
5. Exposure with low-risk specimens like tear, saliva, urine, stool, vomitus, nasal secretion, sweat, etc.
6. For exposures with EC-1 and SC-1
7. Source unknown if HIV prevalence is low

Side effects and compliance to PEP:

- Common side effects are:
- At the beginning: Nausea, diarrhea, muscular pain, headache or fatigue
- Later during the course: Anemia, leukopenia or thrombocytopenia

• Compliance of >95% to the PEP schedule is required to maximize the efficacy of PEP. Hence, the person should be counseled to continue the PEP and to take medication to minimize the side effects of PEP

Note-HIV testing follow-up is done at 6 weeks, 3 months and 6 months after exposure. HBV and HCV follow up testing is done at 6 months after exposure.

Post-exposure prophylaxis (PEP) for hepatitis B		
HCW status	**If source is positive or unknown for HBsAg**	**If source is negative for HBsAg**
If the exposed person is vaccinated and the antibody titer is protective (>10 mlU/mL)	No further treatment is required: **If source is negative for HBsAg** • Regardless of the HBV status of the source* • Regardless if the titer falls down later*	
If the exposed person is vaccinated and the titer is not protective (<10 mlU/mL)	HBIG-1 dose should be started immediately, given maximum within 7 days Vaccine: Start the second series (3 doses) Vaccine: Start the second series (3 doses)	Vaccine: Start the second series (3 doses)

If the exposed person is not vaccinated or partially Vaccinated	HBIG-1 dose should be started immediately maximum up to 7 days Vaccine: Complete the vaccine series from the last dose given (do not restart)	Vaccine: Complete the series of 3 doses from the last dose given (do not restart)
Non responders (If the exposed person is vaccinated for 2 series, i.e. 6 doses and the titer is not protective)	HBIG-2 doses at 1 month apart (0.06 ml/kg or 10-12 IU/kg)	

Note:

HCWs who are vaccinated but anti-HBs <10 mIU/mL, or who are unvaccinated or incompletely vaccinated must be checked for their HBsAg status at baseline and Follow-up testing 6 months later.

HBIG and HBV vaccine can be administered simultaneously but at different sites.

HBIG provides a temporary protection for 3-6 months.

Anti-HBs antibody titer should be checked only after 2 months of last dose of vaccine and 6 months after HBIG administration; otherwise, it will give erratic results.

Previous report of Anti-HBs titer is acceptable only if it is documented. Verbal reports should not be considered.

* In a previously protected person, the memory B cells will start producing antibodies soon after the antigenic challenge, hence revaccination by booster doses is not recommended even if the titer falls down later.

Surveillance and Reporting of Hospital Acquired Infections (HAIs)

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'.

2. OBJECTIVES OF HAI SURVEILLANCE

- To obtain endemic/ baseline HAI rate and information on type of HAI.
- To compare HAI rates within different wards/ areas of the hospital and among other hospitals.
- 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.
- To identify impending outbreaks and to prevent them.
- To monitor and evaluate the effect of infection control interventions.
- To provide timely feedback to the clinicians; thus reinforcing them to adopt best practices.

3. HEALTHCARE ASSOCIATED INFECTIONS TARGETED FOR SURVEILLANCE

Surveillance is done for following major HAIs at our institute.

1. Catheter Associated Urinary Tract Infections (CAUTI)
2. Central Line Associated Blood Stream Infections (CLABSI)
3. Ventilator Associated Pneumonia (VAP)
4. Surgical Site Infections (SSI)

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

1. High Dependency Units (HDU)/ Medical ICU
2. Surgical Intensive Care Unit (SICU)
3. Neonatal Intensive Care Unit (NICU)
4. Post Operative wards of each surgical department
5. All surgical OPDs (for follow up of post discharge surgical site infections)

HOSPITAL ACQUIRED INFECTION (HAI) SURVEILLANCE

The infection control nurses (ICNs) under the supervision of the officer in-charge of HICC will conduct HAI surveillance. (NHSN of CDC)

HAI surveillance will be conducted only for high-risk locations such as intensive care units (ICUs). Only major type of HAI will be monitored such as:

- Catheter-associated urinary tract infection (CAUTI)
- Central line-associated blood stream infection (CLABSI)
- Ventilator-associated event (VAE)
- Surgical site infection (SSI).

The infection control nurses (ICNs) will visit daily to the high-risk areas (ICUs) and collect the clinical data of patients on devices (urinary catheter, central line, and ventilator) and also patients admitted following surgeries. And also prospectively check the laboratory investigations to confirm a diagnosis.

The monthly HAI surveillance report will be shared with all clinical departments and administrators. It will also be presented during HICC meetings. Accordingly, the appropriate corrective actions will be taken.

NHSN/CDC diagnostic criteria for HAI surveillance will be followed:

Diagnostic Criteria for catheter associated urinary tract infection (CAUTI)	
Device Criteria	Presence of urinary catheter for >2 days
Clinical Criteria	Presence of any symptoms of UTI
Culture Criteria	Isolation of UTI pathogens (Significant Count)

DIAGNOSTIC CRITERIA FOR CLABSI (Central Line associated blood stream infection)				
	Age	Blood Culture Criteria		Clinical Criteria
		Organisms isolated	No. of culture positive	
LCBI-1	Any age	LCBI pathogen	1	Symptoms not required
LCBI-2	>1year	LCBI commensal	2	Fever, Chills or hypotension
LCBI-3	≤ 1 year	LCBI commensal	2	Fever, hypothermia or bradycardia or apnea

Diagnostic Criteria For VAE (Ventilator Associated Events)	
Stage-1:VAC (Ventilator associated Conditions)	
Device Criteria	Presence of a mechanical ventilator at least for two calendar days
Worsening oxygen criteria	• Baseline period during which daily minimum FiO2 (fraction of inspired oxygen) and PEEP (Positive End Expiratory Pressure) values are stable or decreasing for two days followed by • Period of worsening of oxygenation increased FiO2 (≥ 20%) or PEEP (≥ 3 cm water) for at least two days
Stage-2: IVAC(Infection related ventilator associated complications): VAC plus following criteria	
Clinical Criteria	Any One (fever or hypothermia or Leukocytosis or leukopenia
Antibiotic Criteria	New antimicrobial agents started and continued for ≤ 4 days
Stage-3: PVAP (Possible ventilator-associated pneumonia): IVAC plus culture criteria	
Culture Criteria	Isolation of significant count of pneumonia pathogen from respiratory specimens (tracheal aspirate BAL fluid)

Diagnostic criteria for surgical site infections (SSI)	
Clinical Criteria	1. Presence of purulent pus from corresponding level of surgical site 2. Presence of local signs of infections
Culture Criteria	Positive culture from discharge
Other Evidences	1. For superficial SSI- Surgeon diagnosis is taken as diagnostic criteria 2. For deep and organ space SSI-histopathological, imaging or gross anatomical evidence of abscess

Formula of HAI infection rates	
HAI Infection rates	Formulae
CA-UTI Rate	No. of CA-UTIcases/total no. of urinary catheter days x 1000
CLABSI Rate	No. of CLABSI cases/total no. of central line days x 1000
VAE Rate	No. of VAE caeses/total no. of ventilator days x1000
SSI Rate	No. of SSI/No. of surgeries done x 100

Following strict measures will be taken to prevent Device associated infections (DAIs):

Bundle care for Urinary Catheter	
Insertion bundle	Maintenance bundle
• Catheter should be inserted only when appropriate indication is present • Only sterile items are used for insertion of catheter • Inserted by non touch technique with strict asepsis • Closed drainage system must be used • Catheter of appropriate size must be used • Catheter must be properly secured after placement	• Daily catheter care (vaginal or meatal care) must be given by taking aseptic measures • Catheter is properly secured all the time • Drainage bag must be always above the floor and below the bladder level • Closed drainage system is used all the time • While collecting urine from bag, the following steps must be followed- hand hygiene, change in gloves between patients, use of separate jug for each bag, use of alcohol swabs for disinfection of outlet • Daily assessment of readiness for removal of catheter must be documented
Bundle care for central line	
Insertion bundle	Maintenance bundle

• Hand hygiene prior to insertion of central line • Use sterile PPE • Site of insertion-subclavian preferred, avoid femoral • Skin preparation-by antiseptic such as chlorhexidine • Skin must be completely dry after use of antiseptics • Use semi-permiable dressing • Hand wash after procedure must be performed • Document data and time of insertion	• Daily aseptic central line care during handling • Daily documentation of local signs of infections • Change the dressing with 2% chlorhexidine • Daily assessment of readiness for removal of central of central line must be documented

Maintenance bundle for mechanical ventilator
• Adherence to hand hygiene • Elevation of head of the bed to 30-45°C to prevent oropharyngeal aspiration to respiratory tract • Daily oral care with chlorhexidine 2% solution • Peptic ulcer disease prophylaxis should be assessed daily if needed sucralfate should be used • DVT should be provided if needed • Daily assessment of readiness to remove mechanical ventilator must be documented

Prevention of surgical site infection (SSI)
Preoperative measures

- Preoperative bathing-it should be performed using a plain soap or antimicrobial soap to reduce the bacterial load especially at the site of incision
- For MRSA carrier-decolonization with mupriocin ointment must be done for the patient undergoing surgery who are the nasal carrier of MRSA
- Hair removal-for patient undergoing any surgical procedure, hair removal should not be done or if absolutely necessary, it should be removed only with a clipper. Shaving is strongly discouraged at all times.

Intraoperative measures

- Surgical antimicrobial prophylaxis (SAP) must be provided for all except clean surgeries- must be administered within 60-120 min before incision which usually coincides with the induction of anesthesia, cefazolin or cefuroxime are usually preferred usually given as a single dose. Repeat dose may required only for surgery exceeds > 4 hours, cardiac surgeries, drug with lower half life and extensive blood loss during surgery
- Surgical hand disinfection-scrubbing with either antimicrobial soap or with alcohol based hand rub must be performed before donning sterile gloves before surgery and between surgeries
- Surgical site preparations-shold be performed with alcohol based chorhexidine antiseptic solution before the commencement of surgery
- Perioperative maintenance of oxygenation ,temperature, blood glucose level ,adequate circulating volume and nutritional support are necessary durig surgery and immediate 4-6 hours

Postoperative measures

- Wound dressing-daily dressing of surgical site and removal of any discharge present at the site must be performed, adehere to hand hygiene

during dressing

- OT disinfection-thorough post operative disinfection of operation theater must be performed with high level disinfectant in between cases and after the last case
- Periodic monitoring of the air quality of operation theater for various parameters must be performed such as no. of air exchanges, temperature, humidity, pressure and microbial contamination
- SAP prolongation is not recommended in any situation (e.g. presence of wound drain) for the purpose of preventing SSI as it promotes development of antimicrobial resistance

SOP on Care of Devices

General Guidelines to be followed for all procedures:

- Hand hygiene is mandatory before, after and in-between procedures and patients.
- Each health care worker should adhere to the Standard precautions required for each procedure.
- Follow proper waste segregation & disposal after each procedure.

Vascular care

A. PeripheralCatheters

- ✓ Establish the vein prior to disinfection.
- ✓ Perform procedural hand wash with antimicrobial soap or alternatively use hand rub, prior to insertion of the line.
- ✓ Wear sterile gloves.
- ✓ Apply antiseptics over the selected site with 70% isopropyl alcohol and 2% w/v chlorhexidine and wait till it dries. Beginning at the centre of the insertion site, use a circular motion and move outward. If using 10% povidone Iodine, it should have a contact time of at least 30 seconds prior to catheter insertion.
- ✓ Apply a sterile dressing.
- ✓ Strict aseptic techniques should be maintained when manipulating intravascular catheter systems.
    - Examples of such manipulations include the following:
        - ➤ Placing a heparin lock
        - ➤ Starting and stopping an infusion
        - ➤ Changing an intravascular catheter site dressing
        - ➤ Changing an intravascular administration set etc.
- ✓ Flushing: should be done after blood sampling, after administering fluids/medications, or every 8 hours if not in use when the device is not in

continuous use. Flushing to be done with minimum 2ml sterile normal saline using positive pressure. Heparin not needed.

- ✔ Monitor peripheral IV insertion date and Change peripheral line every 72 hours or earlier if signs of infection/ thrombophlebitis. (A new peripheral IV catheter, if required, may be inserted at a new site.
- ✔ In case of paediatric patients, do not change routinely unless any signs of phlebitis.

B. Central venous catheters (CVC)

General Guidelines

- Train staff in catheter insertion, maintenance and infection control measures
- Regularly assess compliance and knowledge about infection control practices

✔ **Insertion [USG guided insertion preferable, Avoid femoral line]**

- Practice surgical hand washing/Surgical Hand Rub prior to procedure
- Appropriate skin prep
  - 2 % w/v chlorhexidine (CHG) for patients > 60 days old unless there is a documented contra indication to CHG
  - Povidone iodine (10%), 70% Isopropyl alcohol specified for children < 60 days old.
  - Skin prep agent should completely dry before insertion
- Use maximum barrier precautions (all 5)
  - ❖ Sterile gloves
  - ❖ Sterile gown
  - ❖ cap
  - ❖ Mask
  - ❖ Sterile full body drape(for patient)

- Use either plain sterile gauze with opaque dressing or sterile transparent dressing (Do not use povidone iodine, mupirocin or any other antibiotic ointment).

✔ **Maintenance and Dressing Change**

- The day shift nurse is responsible for communicating with the treating physician whether the central line was reviewed for necessity and fill the bundle compliance form.
- The day shift nurse is responsible for checking whether the dressing for the central line is soiled, damped, or loosened
- If a multi lumen catheter is used, designate one port exclusively for TPN.
- The in charge nurse should ensure that strict aseptic techniques (Hand Hygiene, Sterile gloves) are maintained when manipulating central venous vascular catheter systems.
- Scrub the hub: The in charge nurse should ensure that an appropriate antiseptic (2 % w/v CHG/70%lsopropyl alcohol) is used to scrub the access port of the central line each time before use. (both during day shift and night shift). Rub for 10 to 15 seconds (unless directed other-wise by the manufacturer's instructions), generating friction by scrubbing in a twisting motion as juicing an orange. Make sure you scrub the top of the hub well not just the sides.
- **Regular dressing every 2 days for gauze and 7 days for transparent dressings.**
- Change dressing earlier if damp, loosened or soiled.
- Proper hand hygiene with sterile gloves before dressing change
- Inspect for purulence or any evidence of catheter site infection
- Affix date label after change of dressing.
- Replace transducers at 12 hows intervals along with other components of the system

- including the tubing, the flush solution and the continuous flush device'
- Keep all oomponents of the pressure monitoring system sterile'
- Minimize manipulations and ensure a closed flush system
- If the pressure monitoring system is accessed through a diaphragm, wipe the diaphragm with
- 70% alcohol Prior to access'
- Do not use any parenteral fluids or dextrose containing fluids through the system'
- Affix date label after change of dressing

✔ **Removal**

- Remove when no longer necessary
- No routine removal of catheters
- Do not routinely culture vascular line tips on removal

✔ **Send appropriate culture** (10 ml blood drawn in separate blood culture bottles through central line and Peripheral vein, simultaneously if CLABSI (central line associated blood stream infection) is suspected.

C. Arterial catheters

✔ The same principles for insertion, maintenance and removal as for CVC apply

✔ Preferably use disposable transducers. Use sterile reusable transducers in accordance with Manufacturer,s instructions, if disposable transducers are not available.

✔ Replace transducers at 72 hours intervals along with other components of the system including the tubing, the flush solution and the continuous flush device.

✔ Keep all components of the pressure monitoring system sterile.

✔ Minimize manipulations and ensure a closed flush system

✔ If the pressure monitoring system is accessed through a diaphragm, wipe the diaphragm with 70 % alcohol prior to access.

- ✔ Do not use any parenteral fluids or dextrose containing fluids through the system.

D. Administration sets, fluids, medication

- ✔ Replace administration sets with add on devices (tubings, stopcocks, needle less devices) every 72 hours.
- ✔ Replace sets used to administer blood, blood products, lipid emulsions every 24 hours.
- ✔ Replace tubings used to administer propofol every 6-11 hours.
- ✔ Complete infusions of lipids within 11 hours of initiation (max 24 hours), and blood products
- ✔ within 4 hours of initiation.
- ✔ Use collapsible bags for IV fluids whenever possibre (avoid using needles for air inlets).
- ✔ Preferably use single dose vials.
- ✔ If multidose vials are used. refiigerate after every use and wipe the access surface with 70% alcohol before inserling the needle.
- ✔ Line filters are not routinely required.

E. Respiratory Care

E1. Care of mechanically ventilated patients

- ✔ Elevate the head of the bed to 30-45^0 in patients without contraindications
- ✔ Interrupt sedation once a day (spontaneous awakening trials) for patients without
- ✔ contraindications
- ✔ Assess readiness to extubate once a day (spontaneous breathing trials) in patients without contraindications
- ✔ Provide endotracheal tubes with subglottic secretion drainage ports for patients likely to require greater than 48 or 72 hours of intubation.
- ✔ Perform oral care with chlorhexidine.
- ✔ Change the ventilator circuit only if visibly soiled or malfunctioning.

- ✔ Do not routinely sterilize or disinfect the internal machinery of mechanical ventilators.
- ✔ **Breathing circuits, humidifiers, and heat-and moisture exchangers (HMEs)**
  - ➤ **Do not change routinely**, on the basis of duration of use, the breathing circuit (ie, ventilator tubing and exhalation valve and the attached humidifier) that is in use on an individual patient. Change the circuit when it is visibly soiled or mechanically malfunctioning.
  - ➤ **Breathing-circuit-tubing condensate-** Periodically drain and discard any condensate that collects in the tubing of a mechanical ventilator, taking precautions not to allow condensate to drain toward the patient by wearing gloves.
  - ➤ **Change HME lilter every 48 hours** or earlier if malfunctions, mechanically soiled, or blocked.
- ✔ Use sterile water to fill humidifiers

E2. Care of patients with tracheostomy

- ✔ Aseptic technique to be used for care of fresh tracheostomies and for patients that are in critical care. Clean technique, using sterile supplies, will be used for care of nonestablished and established tracheostomies.
- ✔ Tracheostomy stoma should be cleaned with sterile normal saline.
- ✔ Securing of Tracheostomy tube
  - ➤ Fresh Tracheostomy Stoma: A tracheostomy securement device (twill tape or Velcro tube holder) will be used to secure fresh tracheostomy tubes for the first 24 hours post-operatively and should not be changed or adjusted without physicians order and supervision.
  - ➤ Established Stomas: Tracheostomy securement devices should be changed once a day (neonates/pediatrics) or once a week (adults).
- ✔ Tracheostomy Tube changes

- The initial tracheostomy tube change should be performed preferably the surgeon who performed the tracheostomy
- Tracheostomy tubes with inner cannula should be changed every thirty (30) days
- Tracheostomy tubes without inner cannula should be changed weekly to monthly, as per physician order and/or patient need.

E3. Suctioning

- ✓ The wall suction are set no higher than 120 mm Hg for adults and between 60 and 80 mm Hg for children.
- ✓ Perform Hand Hygiene
- ✓ Put on sterile gloves and a mask
- ✓ Use a catheter with a blunt tip.
- ✓ Attach the suction catheter to the suction tubing.
- ✓ Insert the catheter gently through the inner cannula until resistance is met. Do not apply suction during insertion.
- ✓ Withdraw the catheter approximately 1 cm and institute suctioning
- ✓ Carefully withdraw the catheter, rotating it gently between the thumb and forefinger applying intermittent suctioning.
- ✓ When suctioning is completed, clear the catheter and tubing of mucous and debris with sterile water or saline.
- ✓ Discard the catheter, water container, and gloves appropriately.
- ✓ Wash hands.
- ✓ **The tubing and suction canister are changed every 24 hours.** The canister are labeled with the date and time when they are changed. If debris adheres to the side of the tubing or the canister, either or both are changed. The tubing are secured between suctioning periods so that it will not fall to the bed, floor, etc.

E4. Care of other respiratory equipment

- ✔ Small-volume medication nebulizers: in-line and hand-held nebulizers
  - Between treatments on the same patient, disinfect, rinse with sterile water, or air-dry small-volume in-line or hand-held medication nebulizers (IB).
  - Use only sterile fluid for nebulization, and dispense the fluid into the nebulizer aseptically
  - Whenever possible, use aerosolized medications in single-dose vials. If multidose medication vials are used, follow manufacturers instructions for handling, storing, and dispensing the medications.
  - Between their uses or on different patients ambu bags are subjected to high-level disinfection.

F. Care of indwelling urinary catheter

- ✔ Proper Techniques for Urinary Catheter Insertion
  - ➤ Perform hand hygiene
  - ➤ Use sterile gloves, drape, sponges, clean the peri-urethral with sterile water followed by an appropriate antiseptic (10% Povidone Iodine) and a single-use packet of lubricant jelly for insertion.

Proper Techniques for Urinary Catheter Maintenance

- Maintain a closed drainage system
- Keep the catheter and collecting tube free from kinking.
- Keep the collecting bag below the level of the bladder at all times. Do not rest the bag on the floor.
- Empty the collecting bag regularly using a separate, clean collecting container for each patient; avoid splashing, and prevent contact of the drainage spigot with the nonsterile collecting container.

- Routine hygiene (e.g., cleansing of the meatal surface with sterile water) is appropriate. Do not clean the periurethral area with antiseptics to prevent CAUTI while the catheter is in place.
- Changing indwelling catheters or drainage bags at routine, fixed intervals is not recommended. Rather, it is suggested to change catheters and drainage bags based on clinical indications such as infection, obstruction, or when the closed system is compromised
- If a small volume of fresh urine is needed for examination (i.e., urinalysis or culture), aspirate the urine from the needleless sampling port with a sterile syringe/ cannula adapter after cleansing the port with a disinfectant.

ANTIBIOGRAM

Department of Microbiology,

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Release Date: 24th March 2022

ICU

COMMON MICROBIAL ISOLATES	ANTIBIOTIC SUSCEPTIBILITY PROFILE
BODY FLUIDS / PUS / SPUTUM / OTHERS	
***Klebsiella* spp.**	PB (80%), IPM (72.7%), MRP (58.3%), AK (54.5%), CFS (50%)
***Pseudomonas* spp.**	CL (95%), TOB (90%), AT (57.1%), AK (55%), CFS (50%),
***Citrobacter* spp.**	PB (98%), AK (71.4%), CTR (66.6%), CFS (60%), IPM (55.5%),
E.coli	TGC (87.1%), IPM (85.7%), CFS (71.4%) MRP (70%), AK (57.1%)
***Proteus* spp.**	NA (99%), TGC (66.6%), IPM (60%), MRP (55.5%), AK (33%)
URINE	
E.coli	CL (95%), FO (94%), NIT (91.3%), GEN (42.8%), MRP (36.8%)
***Enterococcus* spp.**	TEI (83.3%), FO (81.2%), VA (80%), NIT (82.3%),
***Klebsiella* spp.**	CL (92%), FO (90%), NIT (80%), GEN (80%)
***Citrobacter* spp.**	FO (95%), NIT (90%), MRP (75%), NX (75%), ETP (70%)
***Pseudomonas* spp.**	TOB (100%), NIT (90%), AT (82%), IPM (80%), MRP (75%)

INDOOR

COMMON MICROBIAL ISOLATES	ANTIBIOTIC SUSCEPTIBILITY PROFILE
BODY FLUIDS / PUS / SPUTUM / OTHERS	
Pseudomonas spp.	AT (76.7%), AK (76.8%), IMP (71.4%), MRP (37.7%), CFS (71.2%)
E.coli	CL (92%), MRP (83.3), AK (87.8%), IPM (76), CFS (52.3%)
Klebsiella spp.	MRP (67.4%), IPM (76.7%), AK (71%), CFS (65%), CIP (58%)
Citrobacter spp.	CL (94%), MRP (50%), IPM (58.8%), CFS (48%), AK (63.3%)
Acinetobacter spp.	CL (94%), MRP (50%), IPM (56.8%), CFS (45%), AK (63.3%)
URINE	
E.coli	NIT (88%), MRP (77%), IPM (78%), COT (72%), CIP (69%)
Enterococcus spp.	FO (98%), NIT (92%), VA (60.6%), TEI (59.1%), HLG (38.8%)
Klebsiella spp.	NIT (83%), MRP (81%), IMP (77%), COT (61%), CIP (60%)
Citrobacter spp.	FO (82%), ETP (80%), MRP (77.7%), NIT (66.6%), GEN (54.5%)
Pseudomonas spp.	CL (99%), AK (80%), AT (75%), IPM (72.5%), MRP (71%),

OUTDOOR

COMMON MICROBIAL ISOLATES	ANTIBIOTIC SUSCEPTIBILITY PROFILE
BODY FLUIDS / PUS / SPUTUM / OTHERS	
***Pseudomonas* spp.**	AT (80.6%), AK (76.9%), IMP (71.4%), MRP (66.6%), CFS (67.7%)
***Klebsiella* spp.**	MRP (75%), IPM (73.6%), AK (72.7%), CFS (66.6%), CIP (60%)
E.coli	FO (90%), AK (80.8%), MRP (52%), IPM (55%), CFS (52.3%)
***Citrobacter* spp.**	MRP (70.5%), IPM (68.1%), CFS (54.5%), AK (50%), CTR (42%)
***Proteus* spp.**	CFS (77.8%), MRP (76.9%), IPM (75%), ETP (73.2%), AK (55.5%),
***Staphylococcus* spp.**	CD (98%), VA (90%), TEI (88%), E (78%)
URINE	
E.coli	FO (94%), NIT (92.1%), GEN (85.3%), MRP (54.5%), IPM (56.2%)
***Klebsiella* spp.**	NIT (81%), GEN (80%), MRP (71%), IPM (77%), CIP (60%)
***Enterococcus* spp.**	VA (66.6%), FO (90%), TEI (66.1%), NIT (94.4%), HLG (38.8%)
***Citrobacter* spp.**	Gen (85.7%), COT (71.4%), MRP (42.8%), ETP (43.5%), CFS (85.7%)
***Pseudomonas* spp.**	AK (78%), IPM (75%), MRP(71%), NX(75%)

ABBREVIATIONS

AK – AMIKACIN	GEN – GENTAMYCIN
AT – AZTREONAM	HLG – HIGH LEVEL GENTAMYCIN
CD – CLINDAMYCIN	IPM – IMIPENEM
CFS – CEFOPERAZONE + SULBACTAM	MRP – MEROPENEM
CIP – CIPROFLOXACIN	NA – NALIDIX ACID
CL – COLISTIN	NIT – NITROFURANTOIN
COT – COTRIMOXAZOLE	NX – NORFLOXACIN
CTR – CEFTRIAXONE	PB – POLYMYXIN B
CX – CEFOXITIN	TEI – TEICOPLANIN
E – ERYTHROMYCIN	TGC – TIGECYCLIN
ETP – ERTAPENEM	TOB – TOBRAMYCIN
FO – FOSFOMYCIN	

Foot Notes

The choice of antimicrobial may be modified in the following situation

- Hypersensitivity to first choice antimicrobial
- Recent antimicrobial therapy or preceding cultures indicating presence of resistant organisms
- In pregnant or lactating patients
- In renal or Hepatic failure
- where chance of significant drug interactions

Microbiological samples must always be sent prior to initiating antimicrobial therapy. Rapid tests, such as Gram stain, can help
determine therapeutic choices when empiric therapy is required. Differentiation between contamination, colonization and infection is important to prevent overuse of antibiotics.

Choice of antibiotics: Use the most effective, least toxic and least expensive antibiotic for the precise duration of time needed to cure or prevent infection.

These antimicrobial agents are not the drug of choice and may not be effective for treating CSF infections.

- Agents administered by oral routes only
- 1st and 2nd generation cephalosporins and cephamycins
- Clindamycin
- Macrolides
- Tetracyclines

- Fluoroquinolones

For Salmonella spp. and Shigell spp., aminoglycosides, first and second generation cephalosporins and cephamycins may appear active in vitro, but not effective clinically.

Organisms that are susceptible to tetracycline are also considered susceptible to doxycycline and minocycline.

Methicillin-resistant Staphylococci (MRSA) are resistant to all currently available beta antimicrobials with the exception of ceftroline.

DOC- Vancomycin, alternative drugs-teicoplanin, linezolid, daptomycin.

VRSA (Vancomycin-resistant S.aureus)-DOC- Linezolid, Daptomycin

Enterococci susceptible to pencillin are predictably susceptible to ampicillin, amoxicillin, ampicillin-sulbactum, amoxicillin-clavulanate and piperacillin tazobactum. However, enterococci susceptible to ampicillin cannot be assumed to be susceptible to pencillins.

Enterococcus spp. cephalosporins, aminoglycosides (except for high level testing), clindamycin, and trimethoprim-sulfamethoxazole, may appear active in vitro but not effective clinically.

Enterobacterales susceptible to cefotaxim can be considered susceptible to ceftriaxone.

Organisms susceptible to Erythromycin are also considered susceptible to Azithromycin, Clarithromycin and Dirithromycin.

S. pneumoniae isolates susceptible to Levofloxacin are predictably susceptible to Gemifloxacin and moxifloxacin cannot be assumed to be susceptible to Levofloxacin.

Extended Spectrum beta lactamases (ESBL) organisms are resistant to all penicillins 1st, 2nd, and 3rd generation Cephalosporins and monobactum, however remain sensitive to carbapenems and cephamycins. Resistance can be overcome by use of beta lactam along with beta lactamase inhibitor combinations (Sulbactum or clavulanic acid).

AmpC beta lactamase producing organisms are resistant to all all those antibiotics to ESBL producers plus resistant cephamycins. But they are sensitive to carbapenems. Resistance cannot be overcome by use of beta lactam + beta lactamase inhibitor.

Metallo-betalactamase (MBL) producing organisms are resistant to all those antibiotics to which AmpC beta-lactamase producer are resistant. In addition, they are also resistant carbapenems. Resistance cannot be overcome by use of beta lactam + beta lactamase inhibitor.

Empiric Therapy:

Emperic therapy may be stared if there is urgency to initiate the antimicrobial therapy and delay in therapy would be life threatening or risky. In such cases empiric therapy may be started based on clinical diagnosis and in consonance with recently available antibiogram. However, following points should be taken into consideration.

- Must collect the necessary specimens before commencing therapy
- Cover all possible microbial causes
- Try to attain synergy
- Consider possible interaction with other drugs
- Accuracy of diagnosis should be reviewed regularly and treatment altered/stopped when microbial results become available

- Use drugs which are available in hospital if possible

The need for antimicrobial therapy should be reviewed on daily basis. For the most infections 5-7 days of of antimicrobial therapy is sufficient.

In critical cases, therapy should be started with injectable antibiotics if there is improvement in condition switch over to oral antimicrobial therapy or IV narrow spectrum alternative or cessation of antibiotics (no infection present)

Once culture reports are available, the physician should step down to narrowest spectrum, most efficacious and most cost effective option. If the there is no de-escalation, the reason shall be documented and subjected to clinical audit.

Treatment with antibiotics combinations

In order to avoid antagonism between drugs and undesirable side effects of severa antibiotics it is advisable to use single drug if possible. However there are some conditions where antibiotic combination is desirable such as

- During investigation of an obscure illness
- To prevent development of bacterial resistance in long term therapy (tuberculosis)
- To achieve synergistic effect (treating infective endocarditis)
- Mixed infections
- To permit a reduction of the dose of potentially toxic drug

The choice of synergistic combinations

- Aminoglycoside and beta-lactam antibiotic
- Beta-lactam antibiotic and beta-lactamase inhibitor
- Sulphamethoxazole and trimethoprim

- Beta –lactam antibiotic and cell wall inhibitor (Vancomycin)

Upper Respiratory Tract Infections				
Condition	Most likely organisms	Drug	Dose	Duration
Acute bacterial rhinosinusitis	Streptococcus pneumoniae H. influenzae M. catarrhalis	Amoxycillin-Clavulanate	875/125 mg PO q 12 hours	7 days
		Azithromycin (penicillin allergy)	500 mg PO q 24 hours	3 days
Acute pharyngitis	Streptococcus pyogenes Viruses [Antibiotic administration only for patients who are most likely to have S. pyogenes infection: fever, tonsillar exudates, no cough, & tender anterior cervical lymphadenopathy]	Penicilin V OR	500 mg PO q 12 hours	10 days
		Amoxycillin	500 mg PO q 8 hours	10 days
		Azithromycin	500 mg PO OD	5 days
Acute	Children:	Ceftriaxone	50 mg/kg IV 24	

epiglottitis	H influenzae Streptococcus pyogenes Streptococcus	OR	hourly	
		Cefotaxime OR	50 mg/kg IV 8 hourly	
Lower Respiratory Tract Infections				
Acute exacerbation of chronic bronchitis	S. pneumoniae H. influenzae M. catarrhalis Chlamydophila pneumoniae	OPD patient: Amoxicillin OR	500-1000 mg thrice a day	5-7 days
		Azithromycin	500 mg once a day	3 days
		Indoor patient: Amoxicillin-clavulanic acid OR	625 mg thrice a day	5-7 days
		Cefuroxime OR	500 mg BD	5-7 days
		Cefixime	200 mg BD	5-7 days
Bronchiectasis, acute exacerbation	H. influenzae, P. aeruginosa	Amoxicillin-clavulanic acid	625 mg thrice a day	5-7 days
		Long term (in case of repeated exacerbation): Azithromycin	500 mg thrice a week	1-2 months
Community-	No comorbidity	Azithromycin	500 mg OD	3 days

acquired pneumonia (CAP) [non-hospitalized patient]	M. pneumoniae, S. pneumoniae Viruses	OR		
		Amoxicillin	500-1000 mg thrice a day	5 days
CNS Infection				
Meningitis	S pneumoniae N meningitidis H influenzae	Ceftriaxone OR	2 gm IV q 12 hours	10-14 days
		Cefotaxime	2 gm IV q 4-6 hours	10-14 days
		Chloramphenicol (in case of Penicillin Allergy)		
Skin and Soft Tissue Infections				
Cellulitis	Streptococci	Amoxicillin-clavulanic acid OR	625 mg PO q 8 hours	5-7 days
		Amoxicillin-clavulanic acid OR	1.2 gm IV q 8 hours	5-7 days
		Ceftriaxone OR	2 gm IV q 24 hours	5-7 days
		Clindamycin	600-900 mg IV q 8 hours	5-7 days
	S aureus	Doxycycline OR	100 mg PO q 12 hours	5-7 days
		Clindamycin OR	300 mg PO q 8 hours	5-7 days

		Clindamycin OR	600 mg IV q 8 hours	5-7 days
		Vancomycin	1 gm IV q 12 hours	5-7 days
	P multocida	Amoxicillin-clavulanic acid	625 mg PO q 8 hours	5-7 days
Genitourinary Infections				
Pelvic Inflammatory Disease (PID), salpingitis, tubo-ovarian Abscess	N. gonorrhoeae, Chlamydia, Bacteroides, Enterobacteriaceae, Streptococci Gardenella vaginalis S. aureus	Doxycycline AND	100 mg PO BID	14 days
		Ceftriaxone CAN ADD	250 mg IM OR IV	Single dose
		Metronidazole	400 mg PO BID	14 days
Vaginal Candidiasis	Candida albicans C. glabrata, C. tropicalis	Oral azoles: Fluconazole	150 mg PO	Single dose
		Intravaginal azoles: Clotrimazole OR	200 mg vaginal tabs at bedtime	3 days
			1% cream (5 gm) at bedtime	7-14 days
			100 mg vaginal	7 days

			tab	
			500 mg vaginal tab	Single dose
		Miconazole	200 mg vaginal suppository at Bedtime	3 days
			100 mg vaginal suppository q 24 hours	7 days
			2% cream (5 gm) at bedtime	7 days
Recurrent candidiasis (4 or more episodes/ yr)		Fluconazole	150 mg PO q week	6 months
		Clotrimazole	Vaginal suppositories 500 mg q week	6 months
Bacterial vaginosis Malodorous vaginal discharge, pH >4.5 • Reported 50% ↑ in cure	Etiology unclear: Gardnerella vaginalis, Mobiluncus, Mycoplasma hominis, Prevotella sp., Atopobium vaginae etc.	Metronidazole OR	Metro 400 mg PO BID	7 days
			Metro vaginal gel 1 applicator intravaginally at bedtime	5 days
		Tinidazole OR	2 gm PO once daily	2 days
			1 gm PO once	5 days

rate if abstain from sex or use condoms • Treatment of male sex partner not indicated unless balanitis present.			daily	
		Clindamycin	300 mg PO bid	7 days
			2% vaginal cream 5 gm at Bedtime	7 days
Vaginal Trichomoniasis Copious foamy discharge, pH >4.5 Treat male sexual partners: Metronidazole 2 gm as single dose	Trichomonas vaginalis	Metronidazole OR	2 gm PO single dose	
			400 mg PO BID	7days
		Tinidazole	2 gm PO single dose For treatment failure: Metronidazole 400 mg PO BID	7 days
			2nd failure: Metronidazole 2 gm PO q 24 hours	3-5 days

Urethritis, cervicitis, proctitis (uncomplicated)	N. gonorrhoeae (50% of pts with urethritis, cervicitis have concomitant C. trachomatis).	Ceftriaxone AND	250 mg IM	Single dose
		Azithromycin OR	1 gm PO	Single dose
		Doxycycline	100 mg PO q 12 hours	7 days
Acute, uncomplicated cystitis/ urethritis in women	E. coli, other members of Enterobacteriaceae , Staphylococcus saprophyticus, Enterococci	Nitrofurantoin OR	100 mg PO BD	7 days
Infective Endocarditis				
Infective Endocarditis: Native valve(awaiting cultures) Indolent	Viridans Streptococci, other Streptococci Enterococci	Penicillin G OR	20 MU IV divided doses 4 hours	4-6 weeks
		Ampicillin AND Gentamicin	2 gm IV 4 hours 1 mg/kg IM or IV 8 hours	4-6 weeks
Infective Endocarditis: Navtive valve (awaiting	S.aureus (MSSA or MRSA) Risk for gram-negative bacilli	Vancomycin AND	25-30 mg/kg loading followed by 15-20 mg/kg IV	4-6 weeks

cultures) In Severe Sepsis			12 hourly (maximum 1gm 12) hourly)	
		Meropenem	1 gm IV 8 hours	4-6 weeks
Endocarditis(< 2 months); Prosthetic Valve	Staph Gram Negative Rods Diptheroids	Vancomycin AND	25-30 mg/kg loading followed by15-20 mg/kg IV 12 hourly(maximum 1 gm 12) hourly)	
		Meropenem OR	1 gm IV 8 hours	
		Imipenem	500 mg IV q 6 hours	
(> 2 months); Prosthetic Valve	CONS Enterococcus S.aureus	Vancomycin AND	25-30 mg/kg loading followed by 15-20 mg/kg IV 12 hourly (maximum 1 gm 12) hourly)	
		Gentamicin Endocarditis	1 mg/kg body weight IV 8 hourly, modified	

			according to renal function	

Gastrointestinal Infections				
Condition	Most likely organisms	Drug	Dose	Duration
Acute Gastroenteritis Food poisoning	Viral, Entero-toxigenic & Entero-pathogenic E. Coli S. aureus, B. cereus, C. botulinum	None	None	None
Cholera	V. cholerae	Doxycycline OR	300 mg Oral	Single dose
		Azithromycin OR	1 gm Oral	3 days
		Ciprofloxacin	500 mg BD	3 days
Bacterial dysentery	Shigella sp., Campylobacter, Non-	Ceftriaxone OR	2 gm IV OD	5 days
		Cefixime OR	10-15 mg/kg/day	5 days

	typhoidal Salmonellosis	Azithromycin (drug of choice for Campylobacter)	1 gm OD	3 days
Amoebic dysentery	E. histolytica	Metronidazole OR	400 mg Oral TDS	7-10 days
		Tinidazole	2 gm Oral OD	3 days
Giardiasis	Giardia lamblia	Metronidazole OR	250-500 mg Oral TDS	7-10 days
		Tinidazole	2 gm Oral	Single dose
Hospital acquired diarrhea	C. difficile	Metronidazole OR	400 mg Oral TDS	10 days
		Vancomycin	250 mg Oral QDS	10 days
Enteric fever (Outpatients)	S. Typhi, S. Paratyphi A	Cefixime OR	20 mg/kg/ day	14 days
		Azithromycin OR	500 mg BD	7 days
Enteric fever (Inpatients)	S. Thyphi, S. Paratyphi A	Ceftriaxone (Ceftriaxone to be changed to oral cefixime when patient is afebrile to finish total duration of 14	2 gm IV BD	2 weeks

		days) OR		
		Azithromycin	500 mg BD	7 days

Bone and Joint Infections				
Conditions	Likely causative organisms	Empiric antibiotics	Alternative antibiotics	Comments
Acute osteomyelitis or septic arthritis	S.aureus Streptococcus pyogenes Enterobacteriaceae	Ceftriaxone2gIV OD Followed by oral therapy by cloxacin 500 mg q 8 h Or Cephalexin500mg q6h No empiric therapy	Piperacillin tazobactum 4.5 gm Iv q6h or Cefoperazone-sulbactum 3gm IV q12h and clindamycin 600-900 mg IV TDS	Treat based on cuture of blood/bone biopsy orthopedic consultation is essential for surgical debridement
Chronic osteomyelitis or Chronic Synovitis		Ceftriaxone2gIV OD		Definitive treatment guided by bone/synovial biopsy culture Treat for 6weeks

				minimum Investigate for TB, Nocardia, Fungi, extensive surgical debridement Total duration of treatment depends on the joint and the organism and their sensitivity pattern

Antimicrobial Resistance (AMR)

AMR is a rising threat across the globe. The multidrug resistance organisms (MDROs) are prevalent in every country though the extent and the severity of the problem vary. Extensive use of antimicrobials is the single most important factor for the bacteria to undergo mutation to become resistant and then the resistant strain flourish exponentially in presence of selective pressure of antimicrobials. It is estimated that by the year 2050, **Asia will have 4.7 million deaths** that could be directly attributed to AMR.

The strategic objectives of the Indian National Action Plan -Antimicrobial resistance (NAP-AMR) are aligned to the Sustained Developmental goals (SDGs) and the Global action plan on antimicrobial resistance adopted by the World Health Assembly in 2015. The main objectives put forth by the World Health Assembly were

adopted and in addition, a 6th priority was identified - strengthening India's leadership on AMR.

1. Casual association between use of antimicrobials and emergence of antimicrobial resistance
    - Change in antimicrobial use are paralleled by prevalence of resistance
    - Antimicrobial resistance more prevalent in HA infection than CA infection
    - HA infections are more likely to be caused by resistant strains especially in those who are received prior antimicrobials
    - Hospitals that have the highest rates of antimicrobial resistance also have the highest rate of antimicrobial use
    - Patients exposed to longer duration of antimicrobials have an increased risk of colonization with resistant organisms
2. Mortality rate correlates with the presence multidrug resistant organisms
    - Association between development of antimicrobial resistance in Staphylococcus aureus, Enterococci, gram negative bacilli and mortality
    - Enterococcal infections have been associated with moratality rates exceeding 30%
    - A meta-analysis of published studies have found that patient with MRSA bacteremia had a increased risk of mortality compared with MSSA
3. Stop killing beneficial bacteria
    - Permanent changes to our protective flora have more serious consequences
4. Collateral damage
    - Average child receives 10-20 courses of antibiotics before 18 years of age
    - Antibiotic affect our resident microbiota and may not fully recover after a course of a course of antibiotic

- Over use of antibiotic may be contributing to obesity, DM, IBD, allergies and asthma

5. Why we need to improve antibiotic use
    - Antibiotic are the only drug where use in one patient can impact the effectiveness in another
    - Improving antibiotic use improves patient outcome saves money
    - Antibiotic misuse adversely impact patient outcome and saves money
    - Antibiotics are misused across the continuum of care
    - Inappropriate use of antibiotics in animals
    - Improving antibiotic use is a public health imperative- WHO considers AMR an emerging threat to global health

NAP-AMR set out five objectives:

- To improve awareness and antimicrobial resistance
- To strengthen surveillance and research
- To reduce incidence of infection
- To optimize the use of antimicrobials
- To ensure sustainable investment in countering antimicrobial resistance

Rational Antimicrobial Use

- Appropriate culture to Confirm final diagnosis
- Limiting empiric antibiotic therapy to genuine seriously ill patients
- Choose the appropriate antibiotic (dose, route and duration)
- De-escalation/modification on the basis antimicrobial susceptibility report and patient status

  -stop polymyxins and glycopeptides if No Carbapenem resistant organisms or MRSA identified on culture

  -avoid double gram negative coverage

-discontinue antibiotic if non-infectious etiology

-de-escalate combination therapy to single antibiotic

-change broad spectrum to narrow spectrum and IV to oral drug

- Stop antibiotics in following clinical conditions

  -Respiratory tract syndrome (Viral pharyngitis, rhinosinusitis and bhronchitis)

  -Asymptomatic bacteriuria and pyuria

- Duration of therapy should be optimized to minimum possible to reduce selection pressure

Prepared by	Approved by	
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Annexure 1

MONITORING

Monitoring Team

1. Monitoring team will be nominated by the HICC, who will look after the compliance of infection control measures of all the ICUs, Wards, OTs, etc.

2. As per the instructions of HICC, or as required to contain any suspected outbreak, surprise visits can be done by this Team anytime.
3. The specimen collection, disinfection of wards, rooms, surfaces and patient environment, segregation of wastes, isolation of patients (as required), etc., will be screened for satisfaction during such visits.
4. The findings and the reports thus received will be sent to the MS Office for record keeping.
5. Such visits will be performed on monthly basis or as decided by the HICC.

Operation Theatres, ICUs and Wards:

1. Prior information about the details and date(s) of the OT* to be sampled shall be sent by the HODs / dedicated personnel of the respective departments to the HICC, a week before the sample collection, i.e., by 3rd week.
2. The ICUs and wards will also be sampled.
3. The specimen collection (of air and surface samples) shall be done on the 4th Monday of every month by the Microbiology laboratory technician (LT).
4. After specimen collection, the reports thus received in due time shall be recorded and sent to the Medical Superintendent Office (HICC) for record keeping. And for the information to the HoDs of respective area.
5. It will be the sole responsibility of the Departments to follow sterilization and disinfection protocols against the contaminated objects, if reported. Detail guidelines in this regard will be circulated by HICC for compliance after due approval from competent authority.
6. This procedure shall be repeated on monthly basis.

Annexure 2

HICC MEETINGS

1. The meeting of the HICC will be held every three (3) monthly, or as required.
2. All the members should be present, and when not possible, a representative (not below the rank immediately below the permanent member of the HICC) of the Department should be present.
3. Important considerations and issues raised from time to time, mainly focused on the current condition of infection control in the premises of the Hospital shall be discussed, along with due consideration and directives of the Chairperson / Convener.
4. These meetings will be held on first Wednesdays of February, May, August and November months. If this day is a gazetted / local holiday, the same shall be held on Wednesday of the next week.

Annexure 3

HICC TRAINING

1. Training, in the direction of minimizing the nosocomial infections and infection control, and to restrict the suspected outbreaks, shall be held by the Department of Microbiology as per the pre-notified dates, from time-to-time.
2. Each department shall represent itself through two (2) representatives from the department as per the directions of their Head. Calendar to this will be prepared by microbiology department.
3. The representatives shall be trained about the respective infection control measures via workshops, and in turn they will act as resource person to train others in their area. Thus such resource person identified will act under the under the supervision of HICC and their programs report will be submitted to VC via MS.
4. It will be the responsibility of the departments to mandate and further train all their members and staff in the respective measures using their trained and certified representatives.
5. Besides, frequent seminars and presentations may be provided as training material to the training representatives.
6. The topics of training will be as follows:
    a. Hand Hygiene
    b. Standard Precautions
    c. Biomedical Waste Management
    d. Spill Management
    e. Needle prick injury
    f. Disinfectants and their uses
    g. Care of indwelling devices