



BERKHIDMAT PENUH KEIKHLASAN

HOSPITAL SUNGAI SIPUT

Infection Control Policies

PERSONAL PROTECTIVE EQUIPMENT (PPE)

For Infectious Diseases Requiring Airborne Infection Isolation & Contact Precautions

PROCEDURE FOR DONNING PPE:

- ✓ Decontaminate hands with an alcohol-based hand rub or wash with antimicrobial soap/water
- ✓ Put on gown
- ✓ Put on approved respirator (N-95 or higher)
- ✓ Put on a face shield or goggles (wear goggles for aerosol-generating procedures)
- ✓ Put on hair cover (if recommended or required)
- ✓ Put on gloves

PROCEDURE FOR REMOVING PPE:

Avoid contaminating your hands while removing PPE. If hands do become contaminated during the procedure at any time, DECONTAMINATE immediately with alcohol-based hand rub or antimicrobial soap. Never touch face gear without first decontaminating hands or re-gloving with a clean pair of gloves. Use biohazardous trash container for used PPE.

- 1. Remove gloves**
Peel off one glove by turning inside out. Place fingers inside cuff of other glove and pull off, inside out.
- 2. Remove gown**
Be careful not to touch the front, contaminated area. Untie all strings or back of gown, slide hands under inside back edges at the neck and pull off, turning inside out and rolling gown as it is removed. Discard in appropriate receptacle.
- 3. Decontaminate hands**
Use an alcohol-based hand rub or antimicrobial soap.
- 4. Put on clean pair of gloves**
- 5. Remove face shield and/or goggles**
Avoid touching front and contact with eyes.
- 6. Remove head cover**
Remove by inserting fingers under elastic to lift off head.
- 7. Remove respirator**
Remove by straps. Avoid touching front and contact with eyes.
- 8. Remove gloves and decontaminate hands**

MESSAGE FROM THE CHAIRMAN INFECTION CONTROL (HOSPITAL DIRECTOR) HOSPITAL SUNGAI SIPUT (U) PERAK

Efforts at preventing healthcare associated infections in hospitals remain an ongoing and difficult challenge in the medical care setting. Practising good infection control measures can significantly reduce patient morbidity and mortality in hospitals and has been proven to be cost-effective as well.

The need to have one common policy and procedure on infection control guideline, to be adopted and practised by Hospital Sungai Siput under the auspices of the Ministry of Health (MOH), is of utmost importance. It will not only ensure standardization of infection control activities in hospitals, but the MOH will also facilitate the future monitoring and audit system on infection control.

To ensure successful implementation of the guideline's recommendation, all training on infection control for our healthcare providers in will need to utilise the guideline, as it will serve as a valuable technical resource on infection control activities.

It is my hope that the implementation of this guideline by our healthcare providers, will enhance the quality of healthcare provided to our patients in Hospital Sungai Siput in our noble efforts to ensure patient-centred care.

(DR.LIAW KOK TOON AMP.MBBS)
No. MMC 46686
PENGARAH HOSPITAL
HOSPITAL SUNGAI SIPUT

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1. HEALTHCARE ASSOCIATED INFECTION SURVEILLANCE

1.1 Introduction

Surveillance is one of the most important components of an effective infection control program. It is defined as the systematic collection, analysis, interpretation, and dissemination of data about the occurrence of HCAs in a definite patient population.

1.2 Purpose of Surveillance

1. To establish and maintain a database describing endemic rates of HCAs. Once endemic rates are known then the occurrence of an epidemic can be detected when infection rates exceed baseline values.
2. To identify trends manifested over a finite period, such as shifts in microbial pathogen spectrum, infection rates, etc.
3. To provide continuous observation of HCAs cases for the purpose of prevention and control.
4. To obtain useful information for establishing priorities for infection control activities.
5. To quantitatively evaluate control measures effectiveness for a definite hospital population.
6. To enhance the role and authority of the infection control team in the hospital through participation in ward rounds, consultations and education of healthcare workers.

1.3 Main components of Surveillance system

1. Definition of HCAI

Infections that occur more than 24 hours after admission (It must be taken into account that different infections have different incubation periods, so that each occurrence must be evaluated individually to determine the relationship between its occurrence and hospitalization).

2. Case Definition

Each case definition must be standardized and consistent. The case definition used nationwide will be that of CDC definitions. (Refer to Appendix A for '*Definitions of HCAI*' developed by CDC.)

- i. Daily review of all positive culture results
(Manually / Lab information system / Automated disc reader)
- ii. Informed by infection control link nurse when diagnosed by clinician.
- iii. Identified during ward rounds / antibiotic rounds / Infectious disease rounds / ICU rounds.
- iv. Actively looking for cases in targeted surveillance and follow-up these cases.

2. ISOLATION PRECAUTION

2.1 Standard Precautions

The purpose of isolating patients is to prevent the transmission of micro-organisms from infected or colonized patients to other patients, hospital visitors and health care workers (who may subsequently transmit to other patients or become infected or colonized themselves).

Two-tier approach is currently employed. This includes **STANDARD PRECAUTIONS** (which applies to all patients) and **TRANSMISSION-BASED PRECAUTIONS** (which apply to patients with documented or suspected infection or colonization with certain micro-organisms).

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

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

2.1.1 Standard Precautions Requirements

1. **Hand hygiene:** (*see section on hand hygiene*) must be practiced promptly after touching blood, body fluids, secretions or excretions whether or not gloves were worn. In addition, hand hygiene must be practiced after gloves are removed and between patient contacts. Finally, hand hygiene must be practiced when tasks or procedures on the same patient involve different body sites in order to prevent crosscontamination between body sites.

2. **Gloves:** (*see section on PPE*) clean gloves must be worn when touching blood, body fluids, excretions, secretions and contaminated items and when performing venipuncture.

3. **Mask, eye protection & face shield** (*see section on PPE*): must be worn during procedures or patient care activities that are expected to generate splashes or sprays of blood, body fluids, secretions and excretions. For example, suctioning, irrigating a wound, performing certain laboratory tests, etc.

4. **Gown or Apron** (*see section on PPE*): must be worn to protect skin and to prevent soiling of clothing during procedures or patient care activities that are expected to generate splashes or sprays of blood, body fluid, secretions and excretions.

5. Patient care equipment: (see chapter on *Disinfectants & Sterilisation*) must be cleaned according to protocol with MOH-approved disinfectant before being used for another patient.

6. Linen: Place contaminated linen directly into a laundry bag in the isolation room/ area with minimal manipulation or agitation to avoid contamination of air, surfaces, and persons.

7. Waste management:

7.1 Clinical waste includes:

- Discarded sharps;
- Laboratory and associated waste directly associated with specimen processing;
- Human tissues, including material or solutions containing free-flowing blood; and
- Animal tissue or carcasses used in research.

7.2 Related waste includes:

- Cytotoxic waste
- Pharmaceutical waste
- Chemical waste
- Radioactive waste.
- General waste includes other wastes that do not fall into the above categories

7.3 Waste segregation:

- Domestic waste – Bin lined with black bag.
- Clinical waste (non sharp) – Bin lined with yellow bag.
- Clinical waste (sharps) – Sharps bin

8. Management of spills

Small spills - Remove with absorbent material, wipe with Sodium hypochlorite 1:10.

Large spills - Cover spillage with absorbent material, pour Sodium hypochlorite 1:10 and leave for 5-10 min. Wipe up with absorbent material and place in yellow bin.
OR

Sprinkle chloride granules leave for 5-10 min. Scoop with brush and dust pan and discard into clinical waste bin. Mop the area with Sodium hypochlorite 1:100.

9. Needles and other sharps: Sharps must not be passed directly from hand to hand and handling should be kept to a minimum. Do not recap, bend, break, or handmanipulate used needles. Place used sharps in puncture-resistant container.

10. Respiratory hygiene/cough etiquette: Instruct symptomatic persons and health care workers to cover their mouths/noses when coughing or sneezing, use and dispose of tissues, perform hand hygiene after hands have been in contact with respiratory secretions and wear surgical mask if tolerated or maintain spatial separation, >3 feet if possible.

2.2 Transmission-based

These precautions apply to selected patients, based on a suspected or confirmed clinical syndrome, a specific diagnosis, or colonization or infection with epidemiologically important organisms. These precautions are to be implemented in conjunction with standard precautions.

Three types of transmission-based precautions have been developed; airborne, droplet and contact. Few diseases (e.g. varicella, influenza) may require more than one isolation category.

(See table below). Essential elements of each isolation category are outlined below;

Airborne Precautions	
Designed to prevent the transmission of diseases by droplet nuclei (particles <5 µm) or dust particles containing the infectious agent. These particles can remain suspended in the air and travel long distances. If the particles are inhaled, a susceptible host may develop infection. Airborne precautions are indicated for patients with documented or suspected tuberculosis (pulmonary or laryngeal), measles, varicella, or disseminated zoster.	
Patient Placement	In descending order of preference; 1. Negative pressure room en-suite bath 2. Single room (nursed with door closed) and en-suite bath 3. Single room 4. Cohort (not recommended unless absolutely necessary) – consult Physicians /microbiologists
Respiratory protection	Wear respiratory protection when entering the room of a patient with known or suspected infectious pulmonary tuberculosis. Susceptible persons should not enter the room of patients known or suspected to have measles or (rubeola) or varicella (chickenpox) if other immune caregivers are available. If susceptible persons must enter the room of a patient known or suspected to have measles (rubeola) or varicella, they should wear respiratory protection. Persons immune to measles (rubeola) or varicella need not wear respiratory protection
Face shield/eye protection	As per standard precautions <i>(For procedures/activities likely to generate splashes/sprays of blood, body fluids, secretions and excretions)</i>
Gloves and Hand washing	As per standard precautions <i>(When touching blood, body fluids secretions, excretions, contaminated items, mucous membranes, non intact skin)</i>

Gown	As per standard precautions <i>(For procedures/activities likely to generate splashes/sprays of blood, body fluids, secretions and excretions)</i>
Patient Transport	Limit the movement and transport of the patient from the room to essential purposes only. If transport or movement is necessary, minimize patient dispersal of droplet nuclei by placing a surgical mask on the patient.

Droplet Precautions	
Designed to prevent the transmission of diseases by large particle (droplet) (particles > 5 µm) or dust particles containing the infectious agent. Unlike droplet nuclei, droplets are larger, do not remain suspended in the air, and do not travel long distances. They are produced when the infected patient talks, coughs, or sneezes, and during some procedures (e.g., suctioning and bronchoscopy). A susceptible host may become infected if the infectious droplets land on the mucosal surfaces of the nose, mouth, or eye.	
Patient Placement	No special air handling or ventilation required In descending order of preference; 1. Single room with en-suite bath 2. Single room 3. Cohort – place the patient in a room with a patient(s) who has active infection with the same microorganism but with no other infection. 4. In the general ward, but maintain a spatial separation of at least 3 feet between infected patient and other patients and visitors. Place an isolation trolley/tray* at the entrance of the isolation zone.
Respiratory protection	Wear mask when working within 3 feet of the patient. If placed in a single room, wear mask before entering the room.
Face shield/eye protection	As per standard precautions <i>(For procedures/activities likely to generate splashes/sprays of blood, body fluids, secretions and excretions)</i>
Gloves and Hand washing	As per standard precautions <i>(When touching blood, body fluids secretions, excretions, contaminated items, mucous membranes, non intact skin)</i>

Gown	As per standard precautions <i>(For procedures/activities likely to generate splashes/sprays of blood, body fluids, secretions and excretions)</i>
Patient Transport	Limit the movement and transport of the patient from the room to essential purposes only. If transport or movement is necessary, minimize patient dispersal of droplet nuclei by placing a surgical mask on the patient.

Contact Precautions	
Used to prevent the transmission of epidemiologically important organisms from an infected or colonized patient through direct (touching the patient) or indirect (touching contaminated objects or surfaces in the patient's environment) contact.	
Patient Placement	In descending order of preference; <ol style="list-style-type: none"> 1. Single room with en-suite bath 2. Single room 3. Cohort – place the patient in a room with a patient(s) who has active infection with the same micro organism but with no other infection. 4. In the general ward with an isolation tray/trolley* beside the bed.
Respiratory protection	As per standard precautions <i>(For procedures/activities likely to generate splashes/sprays of blood, body fluids, secretions and excretions)</i>
Face shield/eye protection	As per standard precautions <i>(For procedures/activities likely to generate splashes/sprays of blood, body fluids, secretions and excretions)</i>
Gloves and Hand washing	In addition to Standard Precautions, wear gloves (clean, non-sterile gloves are adequate) when entering the room. During the course of providing care for a patient, change gloves after having contact with infective material that may contain high concentrations of microorganisms (fecal material and wound drainage). Remove gloves before leaving the patient's environment and wash hands immediately with soap or a waterless antiseptic agent.

	After glove removal and hand washing, ensure that hands do not touch potentially contaminated environmental surfaces or items in the patient's room to avoid transfer of microorganisms to other patients or environments.
Gown	<p>In addition to Standard Precautions, wear a gown/apron (a clean, non-sterile gown/apron is adequate) when entering the room if you anticipate that your clothing will have substantial contact with the patient, environmental surfaces, or items in the patient's room, or if the patient is incontinent or has diarrhea, an ileostomy, a colostomy, or wound drainage not contained by a dressing.</p> <p>Remove the gown before leaving the patient's environment.</p> <p>After gown removal, ensure that clothing does not contact potentially contaminated environmental surfaces to avoid transfer of microorganisms to other patients or environments</p>
Patient-Care Equipment	<p>Dedicate the use of noncritical patient-care equipment such as thermometer, stethoscope, BP set to a single patient (or cohort of patients infected or colonized with the pathogen requiring precautions).</p> <p>If these items must be shared, they should be cleaned and disinfected before reuse.</p>
Patient Transport	Limit the movement and transport of the patient from the room to essential purposes only. If transport or movement is necessary, use clean linen. Cover all open wounds before transport.

* Isolation tray/trolley must contain the following items: nonsterile gloves, nonsterile gowns, surgical masks, thermometer, BP set, stethoscope, alcohol hand rub.

Table: 1 Isolation Precautions For Various Infections

Diseases	Isolation Precautions	Duration of Isolation
Abscess <ul style="list-style-type: none"> Dressing covers and contains discharge adequately. No dressing or dressing does not contain discharge adequately. 	Standard	
	Contact	

Diseases	Isolation Precautions	Duration of Isolation
HIV / AIDS	Standard	
Amoebiasis	Standard	
Dengue	Standard	
Candidiasis	Standard	
Cryptococcosis	Standard	
Diphtheria – Pharyngeal	Droplet	Until off antibiotics and 2 cultures taken at least 24 hours apart are negative
Endometritis	Standard	
Enteroviral infections	Standard	
Epiglottitis, due to Haemophilus influenzae	Droplet	Until 24 hours after starting effective therapy
Clostridium difficile enterocolitis	Contact	Duration of illness
Gastroenteritis • If incontinent or diapered	Standard	Duration of illness
	Contact	
Hepatitis A • If incontinent or diapered	Standard	In children 3 to 14 years of age maintain precautions until 2 weeks after onset of symptoms; and in others, until 1 week after onset of symptoms.
	Contact	
Hepatitis B, HbsAg Positive	Standard	
Hepatitis C, E, and other unspecified non-A, non-B	Standard	
Herpes simplex • Encephalitis • Mucocutaneous, Primary or disseminated • Mucocutaneous, Recurrent (skin, genital, oral)	Standard	
	Contact	Duration of illness
	Standard	
Herpes Zoster (Varicella-Zoster) • Localised in normal host • Disseminated • Localised in Immunocompromised patient	Contact	Duration of illness. Persons susceptible to varicella(chicken pox)are also at risk for developing varicella when exposed to patients with herpes zoster lesions; therefore, susceptibles should not enter the room if other immune caregivers are available.
	Airborne & Contact	

Diseases	Isolation Precautions	Duration of Isolation
Histoplasmosis	Standard	
Impetigo	Contact	Until 24 hours after starting effective therapy
Infectious Mononucleosis	Standard	
Influenza	Droplet	Duration of illness
Legionnaires' disease	Standard	
Leptospirosis	Standard	
Lice (Pediculosis)	Contact	
Malaria	Standard	
Measles	Airborne	Duration of illness
Melioidosis	Standard	
Meningitis <ul style="list-style-type: none"> • Haemophilus influenzae, known or suspected • Meningococcal, known or suspected • Other bacterial • Aseptic • Fungal 	Droplet	Until 24 hours after starting effective therapy
Meningococcemia	Droplet	Until 24 hours after starting effective therapy
Mumps	Droplet	For 9 days after onset of swelling
Mycobacteria, Atypical <ul style="list-style-type: none"> • Pneumonia • Wound 	Standard	
Mycobacterium tuberculosis	Airborne & Droplet	2 weeks after start of treatment
MRO/MRSA <ul style="list-style-type: none"> • Wound bacteremia • Pneumonia 	Contact Droplet	Until eradicated Cover wound with adequate dressing Wear mask
Nocardia	Standard	
Pertusis (Whooping cough)	Droplet	Maintain precautions until 5 days after patient is placed on effective therapy
Pneumonia <ul style="list-style-type: none"> • Atypical Myoplasma Pneumonia • Pneumocystis carinii 	Droplet Standard	Duration of illness Avoid placement in the same room with an immunocompromised patient

Diseases	Isolation Precautions	Duration of Isolation
<ul style="list-style-type: none"> •Adenovirus/RSV/Influenza •Chlamydia •Other Bacterial 	Droplet & Contact Standard Standard	Duration of illness
Poliomyelitis	Standard	
Rabies	Standard	
Rheumatic fever	Standard	
Rubella (German measles)	Droplet	Until 7 days after the onset of rash
Scabies	Contact	
Streptococcal disease (Group A streptococcus) Skin, wound, burns <ul style="list-style-type: none"> •No dressing or dressing does not contain discharge adequately •Dressing covers and contains discharge adequately 	Contact	Until 24 hours after starting effective therapy
Syphilis	Standard	
Tetanus	Standard	
Toxic shock syndrome (Staph)	Standard	
Toxoplasmosis	Standard	
Typhoid (Salmonella Typhi) <ul style="list-style-type: none"> •If incontinent or diapered 	Standard Contact	
Typhus	Standard	
Urinary tract infection including pyelonephritis	Standard	
Varicella (chicken pox)	Airborne & Contact	Maintain precautions until all lesions are crusted. The average incubation period for varicella is 10 to 21 days. Discharge exposed but susceptible patients if possible. Place exposed susceptible patients on Airborne Precautions beginning 10 days after exposure and continuing until 21 days after last exposure (up to 28 days if VZIG has been given). Susceptible persons should not enter the room of patients on precautions if other immune caregivers are available.

2.3 Practice of isolation

2.3.1. Patient placement

- Appropriate patient placement is a significant component of isolation precautions.
- Determine patient placement based on the following principles:
 - Route(s) of transmission of the infectious agent
 - Risk factors for transmission in the infected patient
 - Risk factors for adverse outcomes resulting from healthcare-associated infection in other patients in the area.
- Availability of single-patient rooms
- Give priority to the following types of patients /infections when single rooms are scarce
- Source patient has poor hygienic habits, contaminates the environment, or cannot be expected to assist in maintaining infection control precautions to limit transmission of microorganisms (i.e., infants, children, and patients with altered mental status).
- Source patient has uncontained secretions, excretions or wound drainage. For patients with obligate or preferential airborne infections which include pulmonary tuberculosis, measles and chickenpox.
- Cohorting: When single rooms are scarce patients with epidemiological and clinical information suggestive of a similar diagnosis may be allowed to share a room, but with a spatial separation of ≥ 1 m.
- In cohorted areas minimize patient mingling.
- For airborne/droplet transmission ask patients to wear surgical mask and ensure room is well ventilated
- Increase the cleaning of common areas including bath / toilet facilities (e.g. 4–6 hourly).
- Place alcohol hand rubs beside each patient bed.
- Avoid sharing of equipment, but if unavoidable, ensure that reusable equipment is appropriately disinfected between patients
- Isolation trolley/tray with all the necessary PPE must be available at the entrance of the cohorted area.
- Assigning or cohorting healthcare personnel to care only for patients infected or colonized with a single target pathogen limits further transmission of infectious agents to uninfected patients but is difficult to achieve in the face of current staffing shortages in hospitals and in non-hospital healthcare sites.
- For critical / seriously ill patients: patients who will require close monitoring, isolation requirements should not compromise clinical care. For such patients the options are
 - Arrange for intensive monitoring (equipment / personnel with appropriate PPEs) to be placed in the isolation facility or
 - Bring patients out into open area with cohorting requirements (only if the mode of potential spread is contact / droplet)

2.3.2. Signs, BHT, Isolation tray/trolley

- Place appropriate signs on the door/ patient screen/bed stand to indicate the type of isolation precaution required for the patient.
- The case records, X-rays and observation charts must not be taken into the isolation room or cohorted areas.
- An isolation tray/trolley is required to be placed outside each isolation room/ area, unless an ante room with adequate storage facilities is available.

2.3.3. Equipment /Supplies

- As far as possible, dedicate the use of non-critical patient care equipments such as thermometer, BP set, stethoscope to a single patient.
- Non-critical items, such as commodes, intravenous pumps, and BP sets, must be thoroughly cleaned and disinfected prior to use on another patient
- All disposable supplies or items that cannot be cleaned must be discarded when the patient is discharged from the isolation rooms.

2.3.4. Visitor Policy for Infection Control

The support offered to patients by visitors is of great importance in their recovery and well being. A few simple principles will ensure the visitor's and the patient's safety from exposure to communicable diseases.

- Visitors are discouraged from entering isolation rooms of patients in airborne and droplet isolation. They are expected to wear the same PPE that a health care worker would wear performing the same activity.
- All visitors who are involved in caring of patients should be educated on standard precaution, which include use of PPE and hand hygiene. This applies to activities such as such as changing bed linen, bathing or toileting.
- Patients and family member/guardian must be counseled and given emotional support.
- In outbreak situations unnecessary visits should be discouraged. Those who choose to visit should wash their hands as they enter and leave the area and comply with all other hygiene practices in place. Alternative ways of communicating with the patient during this time include telephone and written notes.
- Visitors with uncontrolled symptoms of coughing, sneezing, or diarrhea should refrain from visiting.

2.3.5. Dishes, Glasses, Cups, Eating Utensils and Medications

- No special precautions are needed for dishes, glasses, cups, or eating utensils. The combination of hot water and detergents used in hospital dishwashers is sufficient to decontaminate dishes, glasses, cups, and eating utensils. If hot water or adequate conditions for cleaning utensils and dishes are not available, disposable products should be used.
- Any medications/IV solutions, tube feedings or baby formula taken into an isolation room that is not used must be discarded when patient is discharged.

2.3.6. Transportation of patients

- Limit the movement and transport of patients who require isolation and ensure that such patients leave their rooms/isolated areas only for essential purposes.
- When patient transport is necessary, it is important that, appropriate barriers (e.g., masks, impervious dressings) are worn or used by the patient to reduce the opportunity for transmission of pertinent microorganisms to other patients, personnel, and visitors and to reduce contamination of the environment.
- Any patient with a draining wound or skin lesions should be dressed with a clean hospital gown before leaving the room. Cover all open wounds before transport.
- Personnel in the area to which the patient is to be taken must be notified of the impending arrival of the patient and of the precautions to be used to reduce the risk of transmission of infectious micro-organisms.
- Procedures for these patients should be scheduled at times when they can be performed rapidly and when waiting areas are less crowded
- Use routes of transport that minimize exposures of staff, other patients and visitors

2.3.7. Cleaning

- Isolation rooms are to be cleaned daily.
- Cleaning **MUST** precede disinfection. Items and surfaces cannot be disinfected if they are not first cleaned of organic matter (patient excretions, secretions, dirt, soil, etc).
- To avoid possible aerosolization of ARD pathogens, damp cleaning (moistened cloth) rather than dry dusting or sweeping should be performed
- Horizontal surfaces and dust collecting areas, sites in the immediate patient environment, sites HCWs often contact should be cleaned regularly and on discharge
- To facilitate daily cleaning, keep areas around the patient free of unnecessary supplies and equipment.
- Do not spray (i.e. fog) occupied or unoccupied rooms with disinfectant. This is a potentially dangerous practice that has no proven disease control benefit
- To facilitate cleaning, and to reduce the potential for aerosolization caused by use of a vacuum cleaner, isolate patients in uncarpeted rooms/areas,
- Upon discharge of the patient, isolation rooms will receive terminal cleaning

3. Hand Hygiene

3.1 Performing Hand Hygiene

- ❖ Soap and water is as effective as hand washing preparations containing antimicrobial agents for decontaminating hands and removing transient microorganisms.
- ❖ However, water and preparations containing antimicrobial agents are more effective in removing resident microorganisms than those without an antimicrobial agent. Kill residents only for surgery.
- ❖ Alcohol-based hand rubs are more effective in destroying transient microorganisms than antimicrobial hand washing agents or soap and water, and give a greater initial reduction in hand flora. Alcohol-based hand rubs with emollients added will cause less skin irritation and drying to hands (1-3% glycerol). However hand rubs containing alcohol alone as the active ingredient have no residual effect. Hands that are visibly soiled or potentially grossly contaminated with dirt or organic material must be washed with liquid soap and water.
- ❖ Liquid products should be stored in closed containers and dispensed from disposable containers or containers which can be thoroughly washed and dried before refilling. Do not add soap to a partially empty soap dispenser.
- ❖ When bar soaps are used, they should be changed frequently. Small bars and soap racks (to promote drying) are recommended.
- ❖ Gloves should not be regarded as a substitute for hand hygiene. A glove is not always a complete impermeable barrier (20-30% of surgical gloves are punctured during surgery). An alcoholic rub or hand wash should be performed after removing gloves and before sterile gloves are worn.
- ❖ Proper technique for decontamination of hands is probably of greater importance than the agent used. See figures for the technique of hand washing and antisepsis

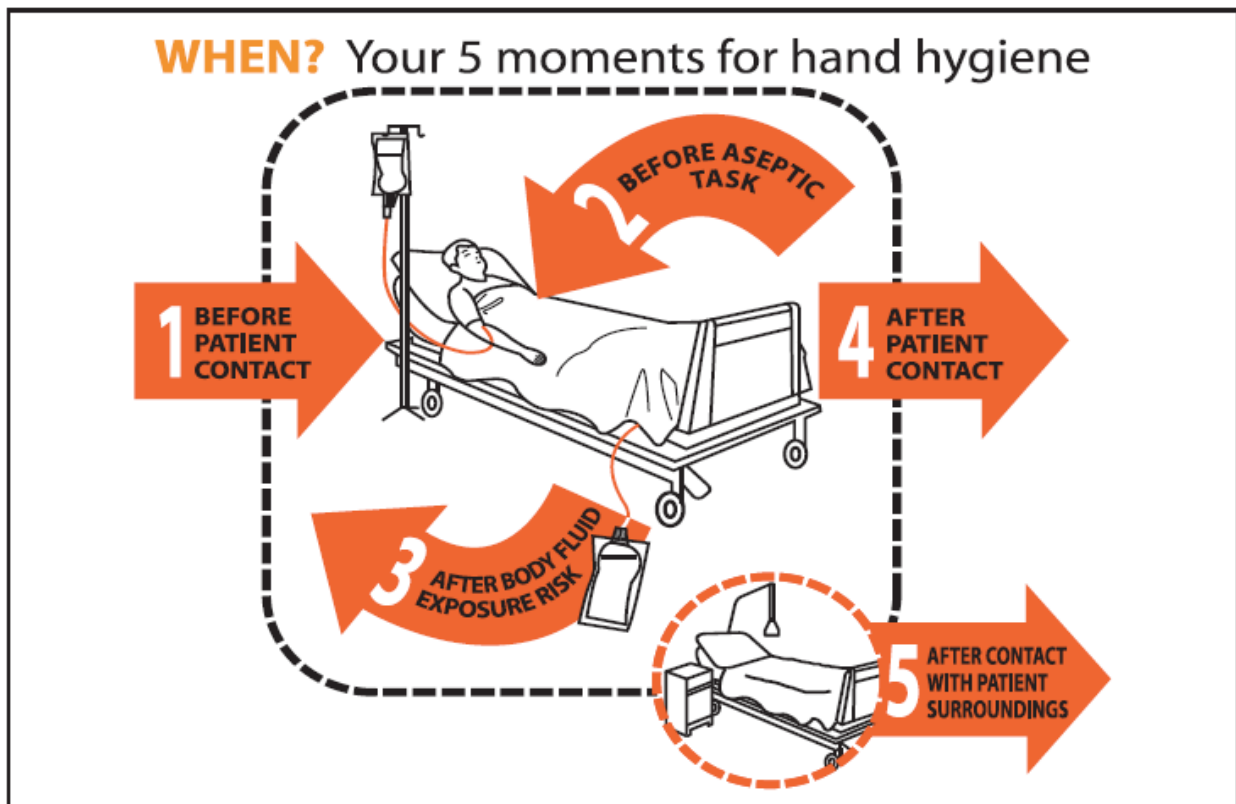
3.2 Five (5) Moments in Hand Hygiene

1. Before and after having direct contact with patients: A single act of hand hygiene (with an alcohol hand-rub or an antimicrobial soap) after one patient and before the next patient suffices to decontaminate your hands if you are not re-contaminating your hands in-between patients (as in talking on the telephone, handling objects, etc.). A good rule of thumb is that if you apply an alcohol hand-rub as you leave one patient and are still rubbing your hands together as you arrive at the next patient then there is no need to repeat hand antisepsis.
2. Before handling an invasive device for patient care, regardless of whether or not gloves are used.
3. After contact with body fluids or excretions, mucous membranes, non-intact skin, or wound dressings.
4. If moving from a contaminated body site to a clean body site during patient.
5. After contact with inanimate objects (including medical equipment) in the immediate vicinity of the patient.

Perform hand wash when hands are visibly dirty.

Wash hands with plain or antimicrobial soap and water or rub hands with an alcohol based formulation before handling medication or preparing food.

The 5 Moments in Hand Hygiene



How to handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS ONLY WHEN VISIBLY SOILED!



Duration of the entire procedure : 20-30 sec.



1 Dip all fingers of right hand into left palm filled with hand rub solution, pour hand rub solution over to right palm and dip all fingers of left hand into handrub solution,



2 rub hands palm to palm,



3 right palm over left dorsum with interlaced fingers and vice versa,



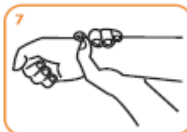
4 palm to palm with fingers interlaced,



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 of right wrist clasped in left palm and vice versa



8 once dry, your hands are safe

How to handwash?

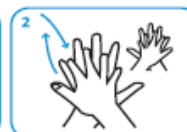
WASH HANDS ONLY WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB!



Duration of the entire procedure : 40-60 sec.



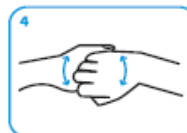
1 Rub hands palm to palm,



2 right palm over left dorsum with interlaced fingers and vice versa,



3 palm to palm with fingers interlaced,



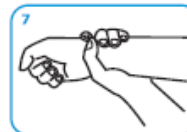
4 backs of fingers to opposing palms with fingers interlocked,



5 rotational rubbing of left thumb clasped in right palm and vice versa,



6 rotational rubbing of right thumb clasped in left palm and vice versa,



7 rotational rubbing of right wrist clasped in left palm and vice versa

3.3 Surgical Scrub

1. Remove rings, wrist-watch, and bracelets before beginning the surgical hand preparation
2. When performing surgical hand antisepsis using an antimicrobial soap, long scrub times are not necessary. Recommended duration is 2-3 minutes but not exceeding 5 minutes and should include wrists and forearms.
3. If hands are visibly soiled, wash hands with plain soap before surgical hand scrub. Sterile disposable or auto clavable nailbrushes may be used to clean the fingernails only, but not to scrub the hands. A brush should only be used for the first scrub of the day

3.4 Institutional Responsibilities

1. Make improved hand-hygiene an institutional priority and provide administrative and financial support.
 2. Provide an alcohol-based hand-rub at the entrance to the patient's room and/or at the bedside, as well as other convenient locations. Placing alcohol-based hand rub dispensers near the point of care has been associated with increased compliance by health care workers with recommended hand hygiene procedures.
 3. To provide an alternative to alcohol-based hand-rubs for decontaminating hands, provide antimicrobial soap in all patient care areas where soap is provided (i.e. all sinks with a soap dispenser).
 4. Solicit input from health care workers regarding the feel, fragrance, and skin tolerance of products, such as soap, alcohol hand-rub and gloves.
- Monitor health care workers' adherence to hand-hygiene practices and provide information regarding the workers' performance.

The 5 Moments in Hand Hygiene

Primary uses of PPE are to protect staff and reduce opportunities for transmission of microorganisms in hospital. Select protective equipment on the basis of an assessment of the risk of transmission of microorganisms to the patient, and the risk of contamination of health care practitioners' clothing and skin by patients' blood, body fluids, secretions and excretions.

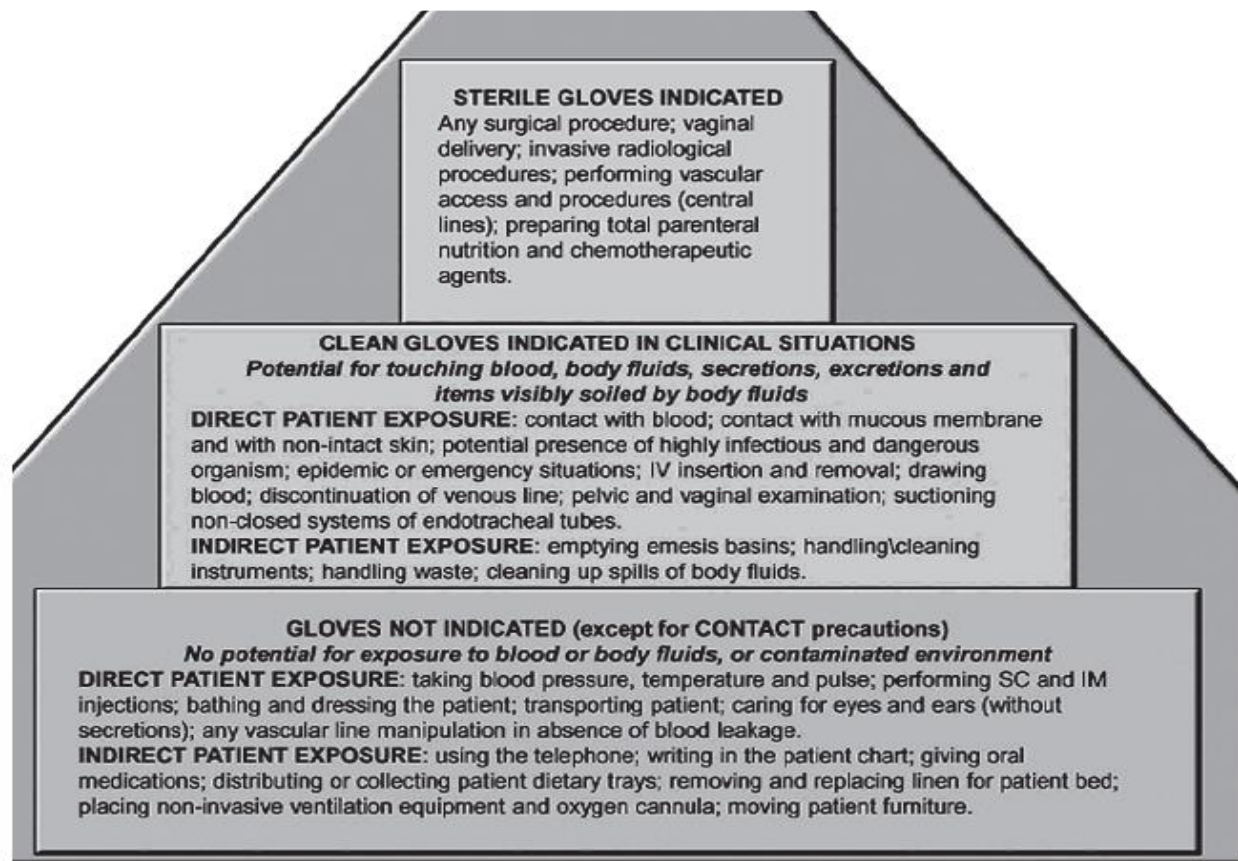
3.5 Gloves

Glove wearing by HCWs is recommended for two main reasons:

1. To prevent microorganisms which may be infecting, commensally carried, or transiently present on HCWs' hands

4. Personal Protective Equipment (PPE)

Primary uses of PPE are to protect staff and reduce opportunities for transmission of microorganisms in hospital. Select protective equipment on the basis of an assessment of the risk of transmission of microorganisms to the patient, and the risk of contamination of health care practitioners' clothing and skin by patients' blood, body fluids, secretions and excretions.



4.1 Gloves

Glove wearing by HCWs is recommended for two main reasons:

1. To prevent microorganisms which may be infecting, commensally carried, or transiently present on HCWs' hands from being transmitted to patients and from one patient to another;
2. To reduce the risk of HCWs acquiring infections from patients.

4.2 Personal Protective Equipment (PPE)

Gloves **do not** replace the need for hand washing. Contamination of the hands may occur when gloves are removed and some gloves have small perforations that may allow contamination of the hands. Gloves must be discarded after each care activity for which they were worn in order to prevent the transmission of microorganisms to other sites in that individual or to other patients. Wear gloves only when indicated – otherwise they become a major risk for germ transmission.

4.3 Isolation Gowns and Aprons

1. Clinical and laboratory coats or jackets worn over personal clothing for comfort and/or purposes of identity are not considered PPE.
2. Disposable plastic aprons should be worn when there is a risk that clothing or uniform may become exposed to blood, body fluids, secretions and excretions, with the exception of sweat.
3. Full body gowns need only be used where there is the possibility of extensive splashing of blood, body fluids, secretions or excretions and should be fluid repellent.
4. However, when contact precautions are used to prevent transmission of an MDRO, donning of both gown and gloves prior to room entry, regardless of the anticipated level of contact, may reduce unanticipated contact with an MDRO in the environment.
5. The practice of routine gowning upon entrance into an intensive care or other highrisk area does not prevent colonization or infection of patients.
6. Removal of isolation gowns before leaving the patient care area is advised to prevent opportunities for possible contamination outside the patient's room.

4.4 Face Protection: Masks, Goggles, Face Shields

1. Masks are used for three primary purposes in healthcare settings:
 - to protect health care workers from contact with infectious material from patients e.g: respiratory secretions and sprays of blood or body fluids as defined in standard and droplet precautions.
 - placed on healthcare workers when engaged in procedures requiring sterile technique to protect patients from exposure to infectious agents carried in a healthcare worker's mouth or nose, placed on coughing patients to limit potential dissemination of infectious respiratory secretions from the patient to others (i.e: Respiratory Hygiene/Cough Etiquette).
2. Procedures that generate splashes or sprays of blood, body fluids, secretions, or excretions (e.g., endotracheal suctioning, bronchoscopy, invasive vascular procedures) require either a face shield (disposable or reusable) or mask and goggles
3. Two types of mask available, the surgical and particulate respirator (N95) used to prevent inhalation of small particles that may contain infectious agents transmitted via the airborne route.
4. Personal eyeglasses and contact lenses are NOT considered adequate eye protection.
5. Disposable or non-disposable face shields may be used as an alternative to goggles. As compared with goggles, a face shield can provide protection to other facial areas in addition to the eyes.
6. Removal of a face shield, goggles and mask can be performed safely after gloves have been removed, and hand hygiene performed.

4.5 Respiratory Protection

1. Personal respiratory protection is required when dealing with micro-organisms that spread by airborne route. Respirators are also currently recommended to be worn during the performance of aerosol-generating procedures (e.g: intubation, bronchoscopy, suctioning) patients with SARS Co-V infection, avian influenza, pandemic influenza and other unknown respiratory syndromes. In these instances, surgical masks are not effective protection.

5. CLINICAL PRACTICE

5.1 Aseptic Technique

The aseptic technique is a method to prevent transmission of microorganisms from various sources to a patient by creating a microorganism-free environment, maintaining sterility of instruments and preventing microbial contamination during various clinical procedures performed on a patient.

The components of the aseptic technique are as follows;

5.1.1 Non-touch technique

1. Non-touch technique is the most essential part of the aseptic technique.
2. The most effective way of maintaining sterility of sterilized instruments and other items
3. Contact with the ungloved hand and any other non-sterilized object renders the instrument or item non-sterile.
4. Work processes need to be coordinated so that the sterile or disinfected item or instrument does not come into contact with non-sterile items.

5.1.2 Minimizing Microorganisms on Hands By Hand Hygiene

(Refer section on hand hygiene)

1. Hand hygiene is a must before and after performing any clinical procedure. This practice maintains the cleanliness of the HCW hands, at all times, by reducing the quantity of bacteria on them.

5.1.3 Rendering The Hand Sterile by Wearing Sterile Gloves

1. Sterilized gloves are worn to render the hand sterile since hand hygiene alone will only reduce the number of bacteria on it.
2. During the gloving process, touch only the inside surface of the glove with the nongloved hand. The outside of the glove can be touched with the gloved hand.
3. Once gloved, do not touch non-sterile areas or articles with the gloved hand. Remember that the patient's skin is non-sterile.
4. If the glove is punctured or torn, replace it.
5. When working alone, perform tasks that do not require a sterile hand first before gloving. For example, when preparing sets / instruments for a procedure, open the set and put in additional items or lotions first. Open the outer envelope of the gloves packet before washing the hand.
6. In most instances it is better for an assistant / partner to perform tasks that do not require a sterile hand.
7. When one hand is required to perform a task requiring contact with a non-sterile object or surface, consciously identify the contaminated hand and perform procedures with the other hand. These situations include:

- When performing urinary catheterization hold the labia minora or prepuce of penis with the non-dominant hand (usually left).
- Cleanse the urethra and insert the catheter with the dominant sterile hand (usually right).
- When performing laryngeal suction (e.g. in a patient with a tracheostomy) hold the non-sterile sucker tubing with the left hand and the sterile suction catheter with the right hand.
- When performing tracheo-bronchial suction on a ventilated patient, the aseptic technique is possible only if two care providers perform the task.
- One person disconnects and reconnects the ventilator tubing to the endotracheal /tracheostomy tube. The other person performs the suction with a sterile catheter.

5.2 Urinary Catheter Care

General principles of urinary catheter insertion

5.2.1. Personnel

Only personnel trained on the correct technique of insertion can perform aseptic catheter insertion. Hospital personnel and others who take care of catheters should be given periodic in-service training stressing the correct technique of insertion, care and potential complications of urinary catheterization.

5.2.2. Catheter use

Urinary catheter should be inserted only when necessary and left in place only when as long as necessary. For selected patients other method of urinary drainage such as condom catheter drainage, suprapubic catheterization and intermittent urethral catheterization, can be useful alternatives to indwelling urethral catheterization.

5.2.3. Hand hygiene

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

5.2.4. Catheter insertion

Catheter should be inserted using aseptic technique and sterile equipments glove, drape, sponges, an appropriate antiseptic solution for peri-urethral cleaning, a single used packet of lubricant jelly should be use for insertion. Non-touch technique should be practice.

Use as small a catheter as possible, consistent with good drainage should be use to minimized urethral trauma. Indwelling catheter should be properly secured after insertion to prevent movement and urethral traction. Use of silicone type catheter may be considered in long term indwelling catheter. After insertion the date of insertion should be documented.

5.2.5. Close sterile drainage

A sterile continuously closed drainage system should be maintained. The catheter and drainage tube should not be disconnected unless the catheter must be irrigated. If breaks occur in aseptic technique, disconnection, or leakage occur, the collecting system should be replaced using aseptic technique after disinfecting the catheter tubing junction.

5.2.6. Irrigation

Irrigation should be avoided unless obstruction is anticipated, as might occur with bleeding with prostatic or bladder surgery, closed continuous irrigation may be used to prevent obstruction. To relieve obstruction due to clots, mucous or other causes, an intermittent method of flushing may be used. Continuous irrigation of the bladder with antimicrobials has not proven to be useful and should not be performed as a routine infection prevention measure. The catheter tubing junction should be disinfected before disconnection.

A large volume and a sterile syringe and sterile irrigant should be used and then discarded. The person performing irrigation should use aseptic technique.

If the catheter becomes obstructed and can be kept open only by frequent irrigation, the catheter should be changed since it is likely that the catheter itself is contributing to the obstruction.

5.2.7. Specimen collection

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

5.2.8. Urinary flow

Unobstructed flow should be maintained. Occasionally, it is necessary to temporarily obstruct the catheter for specimen collection or other medical purposes.

To achieve free flow of urine;

- ❖ The catheter and collecting tube should be kept from kinking.
- ❖ The collecting bag should be emptied regularly using a separate clean collecting container for each patient. (Change glove for each patient).
- Poorly functioning or obstructed catheters should be irrigated or if necessary, replaced.
- Collecting bag should always be kept below the level of the bladder. Always hang drainage bag at bedside below groin level to allow gravity drainage and maintain unobstructed urine flow. Do not allow urine to flow from bag or tube back into bladder as the flow of urine may be contaminated and can cause urinary tract infection.

5.2.9. Meatal care

Catheter care should consist of good personal hygiene around the meatal area carried out on a regular basis. Wiping after bowel cleaning should be carried out from front to back to avoid infection.

5.2.10. Catheter change interval

Do not change catheters at arbitrary fixed intervals. However to prevent encrustation, non silicone catheter may need to be change 2 or 3 weeks. Change only when necessary, such as when tube is obstructed, discolored etc.

5.3 Wound Care

need for dressing or wound care depends on the type of wound, which includes incision wound, abrasions, bedsores, ulcers, wound at site of drains and others.

The attending physician may require different wound technique for each type of wound. However the choice of wound dressing should be large enough to cover and protect the wound site and tissue around it. It should allow circulation of air to the skin, secured to prevent slippage and is comfortable for the patient.

5.3.1 General principles of wound care

1. Hand hygiene

Proper hand hygiene before and after attending to a wound is mandatory. Sterile gloves should be worn after performing hand hygiene before starting the procedure.

5.3.2. Technique

- Practice a 'non-touch' technique. All instruments used during wound dressing must be sterile or autoclaved.
- Use sterile water as a cleaning liquid unless some other solution is recommended by doctor.
- Cover the entire wound and do not exposed the wound to prevent bacterial contamination. Use non adhesive gauze that promotes wound healing.
- Used gloves and soiled dressing must be properly disposed off into the clinical waste plastic bag.

5.3.3. Environment

- Maintain a clean environment to minimize dust. High dusting or vacuum cleaning should finish an hour before dressing round begins.
- Infected wound must be detected early. To prevent spread, precautions such as cohorting the patient may be required.
- Wound care in the ward should begin with the uninfected wound first, then followed by the infected or dirty ones.

6. Disinfections of Endoscopes

6.1 Introduction

Understanding of infection control in its application to GI endoscopy is important as to prevent the possibility of transmission of infection. Thus compliance with the disinfection guidelines is the key factor in determining endoscopic safety, and posed virtually no risk of patient-borne transmission (Hepatitis C, Hepatitis B, HIV, *Salmonella*, *Pseudomonas aeruginosa*, *Enterobacteriaceae*) or environmental organisms (SARS-CoV, Avian influenza A virus [H5N1]).

Glutaryldehyde has been most commonly used disinfection in endoscopy previously, but other newer products such as Succine-diadehyde (Gigasept 4%) and Paracetic Acid &

Hydrogen Peroxide (Perascope) has been in the market recently.

The ideal choice of disinfection should be based on the following factors:-

- Effective against a wide range of organisms including blood-borne viruses
- Compatible with endoscopes, accessories and endoscope re-processors
- Non-irritant and safe for users
- Environmentally friendly for disposal
- Stability of the solution for the specified duration of use
- Able to be reused for the specified period
- Cost-effective (include costs of the appropriate automatic endoscopic re-processors)

(AER), storage space, conditions required for use, and staff protection measures)

It is of utmost important to protect against chemical used during cleaning and disinfection in order to avoid from toxic and allergic reactions. Separate purpose-designed rooms for cleaning and disinfection must be well ventilated and disinfections should be used within a closed system.

Diseases may also be transmitted from patient to endoscopic personnel. Therefore, protection from direct contact with the endoscopes and accessories is essential.

For the protection of the staff during the disinfection procedure the following apparel or equipment has been recommended:-

- Gloves long enough to cover the forearms, preferably sterile gloves to protect arms from splashes
- Long sleeves waterproof gowns. Preferably should be changed between patients or when it gets contaminated
- Goggles to prevent conjunctiva irritation and protect the splashes
- Face masks to reduce inhalation of vapour

In local circumstances, training and resources may vary but high standards of disinfection must always be maintained.

6.2 Definitions

Cleaning: Removal of blood, secretions and debris from endoscopes and accessories

Disinfection: Reduction of number of viable micro-organisms on a device to a level that is appropriate to be used safely on a patient where sterilisation of the device is not necessary. Disinfection may also be undertaken as a preliminary step to sterilisation, if necessary. Disinfection should be carried out immediately after cleaning and immediately prior to use.

Sterilization: Validated process used to render a device free from all forms of viable micro-organisms.

Endoscopic accessories: All devices used in conjunction with an endoscope to perform diagnosis and therapy, excluding peripheral equipment.

6.3 Single-Use Accessories

Also called “disposable”, these are provided in a sterile state ready for use. The opening of a sterile package implies immediate use, as is routine in surgery. After a single-use device has been used, all materials should be properly disposed of. Under no circumstances should a single-use device be reused.

6.4 Reusable Accessories

All reusable accessories should be sterilised. The sterilisation should be carried out after meters (dilution, temperature and time) for cleaning, disinfection and sterilisation.

6.4.1 Cleaning – Rinsing – Disinfection – Sterilisation Sequence

Non-compliance with guideline is the chief factor compromising the safety of endoscope reprocessing. The consequence of failure to follow recommendation may not be only transmission of pathogens (due to pathological material from one patient being produced into the next patient), but also misdiagnosis instrument malfunction, and a shortened instrument lifespan.

6.4.2 Preliminary-cleaning

Preliminary-cleaning starts before the endoscope is detached from the light source/videoprocessor and the reprocessing begins as soon as the endoscope is removed from the patient.

1. Wipe down insertion tube with a detergent-soaked gauze
2. Place the distal end of the endoscope into the enzymatic detergent solution which is diluted according to the manufacturer's instruction.
3. Aspirate enzymatic detergent solution alternating with air several times through the biopsy/suction channel. Finished by suction of air.
4. Irrigate the water/air channel with water, then air, checking for blockage.
(Flushing the biopsy/suction and air/water channels will expel secretion, preclude drying of organic and inorganic debris on lumen surfaces, and may also remove large numbers of micro-organisms).
5. Check for bite marks or other surface irregularities.
6. Detach the endoscope from the light source/video-processor pump
7. Attach protective video cap (water resistant cap).
8. Transfer the endoscope to the reprocessing room.

6.4.3 Leakage Testing

Conduct leakage testing according to manufacturer's instruction before immerse the endoscope in a disinfectant. This test will detect any damage to the interior or exterior of the endoscope as to prevent expensive repairs later.

1. Attach leakage tester and turn on the pump to pressurize the scope.
2. Remove all the detachable parts of the endoscope.
3. Prior to immersion, confirm the bending section has expanded.
4. Immerse entire endoscope in clean water.
5. Perform leakage test. Observe at the insertion tube, distal bending section and the universal cord, looking for bubbles coming from the interior of the scope
6. Angulate the tip in all directions during test
7. Remove endoscope from water.
8. Detach tester after tip has deflated.

6.4.4 Cleaning

1. Immerse the endoscope and valves in a sink/basin filled with low-foaming enzymatic detergent solution of proven efficacy, at the appropriate dilution and specific time according to the manufacturer's instructions.
2. Wash all debris from the outer surface of endoscope by brushing and wiping the instrument under the detergent as to prevent from splashing of contaminated fluid.
3. Brush the distal end with a soft toothbrush. Special attention is paid to the air/water outlet nozzle and the bridge/elevator where fitted.
4. Brush all accessible channels (insertion tube, universal cord and cylinder portions of the suction channel, and instrument channel port) with a brush-tipped wire designed for this purpose, to remove all organic (eg. blood, tissue) and other residues. Brush at least three times through each channels, cleaning the brush between each brush. Clean in detergent with a soft toothbrush each time it emerges.
5. For endoscopes with elevators, brush the elevator-wire channel.
6. Attach all cleaning adapters to suction, biopsy, air and water channels.
7. Using a syringe, flush all channels with detergent which is diluted according to the manufacturer's instruction to remove the debris.
8. For endoscopes with elevators or auxiliary-water feeding, flush detergent solution into elevator-wire channel/auxiliary-water channel.
9. Rinse all channels (including elevator-wire/auxiliary-water channels, if applicable) and removable parts under running clean water thoroughly as to remove residual debris and detergent.
10. Expel the water as much as possible by forced air through all channels.
11. Dry the exterior of the endoscope with gauze to prevent dilution of the liquid chemical.

6.4.5 Manual Disinfection

1. Immerse the endoscope in a basin of high-level disinfection (HLD), prepared according to the manufacturer's instructions in term of dilution and temperature.
2. Using a syringe, irrigate all channels (including elevator-wire/auxiliary-water channels, if applicable) with disinfection. For complete microbial destruction, make sure there is no air pockets remain within the channels.
3. Soaked the endoscope in the HLD according to the disinfectant manufacturer's recommended time and temperature.
4. Flush each channel (including elevator-wire/auxiliary-water channels, if applicable) with air before removing the endoscope from the HLD.

6.4.6 Rinsing After Manual Procedure

1. Rinse the endoscope internally and externally with clean water as to prevent exposure and potential injury of skin/mucous membrane from chemical residue.
2. For endoscopes with elevators or auxiliary-water feeding, flush water into elevatorwire channel/auxiliary-water channel.
3. Rinse all the removal parts of the endoscope with water.

6.4.7 Drying

1. Use syringe to inject air through air, water and suction channels, expelling the rinse water.
2. For endoscopes with elevators or auxiliary-water feeding, inject air to flush water from elevator-wire channel/auxiliary-water channel.
3. Flushed the channels (including auxiliary-water/elevator-wire channels, if applicable) with 70-90% alcohol to assist in drying the interior channel surfaces.
4. Purge again all channels (including auxiliary-water/elevator-wire channels, if applicable) with air. Air assists alcohol in evaporating any retained moisture.
5. Wipe the exterior surface of endoscope, eye, light guide connector, plugs and all removal parts before connecting the endoscope to the light source.
6. The endoscope is ready to use after fitting back the valves and active air/suction channels as well as the suction channel.
7. Disinfection should be done after every procedure.
8. Do not attach the removal parts to the endoscope for storage.

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6.5 Automatic Reprocessing

1. When using the automated re-processor the staff must be ensured to follow the manufacturer's instructions.
2. In automatic endoscope reprocessing (AER) the endoscope and endoscope components are placed in the re-processor, and all the channel connectors attached according to AER and endoscopic instructions.
3. Reprocessing programmer is about 20-30 minutes, depending on the disinfection used.
4. This is followed by cleaning and drying procedures, as drescribed in manual description.

6.6 Storage

1. Ensure proper drying prior to storage.
2. Hang vertically preferably in a vertical position to facilitate drying.
3. Remove all removal parts according to manufacturer's instructions.
4. Uncoil insertion tubes.
5. Use a well ventilated room or special storage cabinet for reprocessed endoscopes only. This will encourage continued air drying of the surfaces and prevent undue moisture build up, thereby discouraging any microbial contamination of the cabinet surfaces.

6.7 Endoscopic Accessories

1. Rinse all the endoscopic accessories with water.
2. Clean by brushing with detergent.
3. Immerged all the endoscopic accessories into the disinfectant diluted according to manufacturer's instruction.
4. Rinse the clean accessories with clean water.
5. Dry the accessories with a non-shedding cloth.

6.8 Endoscopies for Patients With Hepatitis B and C, HIV and Other Immunocompromised States

1. All cases should be scheduled as the last cases for the session.
2. The endoscope should be disinfected according to the manufacture instruction before the procedure as to ensure the eradication of all opportunistic pathogens.
3. The instrument should be immersed in the disinfectant diluted according to manufacturer's instructions.

7. Surgical Site Infections

7.1 Microbiology of Surgical Site Infections

The pathogens isolated from SSIs have not changed markedly. The common source of pathogens is the endogenous flora of the patient's skin, mucous membranes, or hollow viscera (Table X). Therefore, the pathogens isolated from infection differ, primarily depending on the type of surgical procedure. In clean surgical procedures, in which the gastrointestinal, gynecologic, and respiratory tracts have not been entered, *Staphylococcus aureus* from the exogenous environment or patient's skin flora is the usual cause of infection. In other categories of surgical procedures, including clean contaminated, contaminated, and dirty, the polymicrobial aerobic and anaerobic flora closely resembling the normal endogenous microflora of the surgically excised organ are the most frequently isolated pathogens. Other sources of SSI pathogens are from distance focus such as in patients with prosthesis or implant place during the surgery, surgical personnel, operating environment, surgical tools, instruments, and materials brought to the field during an operation.

7.2. Surgical Site Infection Prevention Guidelines

An SSI prevention measure can be defined as an action or set of actions intentionally taken to reduce the risk of an SSI. Many measures are directed at reducing opportunities for microbial contamination of the patient's tissues or sterile surgical instruments; others are considered as adjunctive, such as using antibiotics prophylaxis or avoiding unnecessary traumatic tissue dissection.

7.2.1 Preoperative Measures

Preparation of the patient:

1. Whenever possible, identify and treat all infection remote to the surgical site before elective operation and postpone elective surgeries on patients with remote site infections until the infection has resolved.
2. As far as possible, shorten the pre-operation hospital stays.
3. Do not remove hair preoperatively unless the hair at or around the incision site will interfere with the operation.
4. If hair needs to be removed, it is done immediately before operation, preferably using electric clippers and not razor blade.
5. Adequate control of blood glucose levels in all diabetic patients.
6. Encourage stop smoking cigarettes, cigars, pipes, or any other form of tobacco consumption (minimum at least 30 days prior to the surgery).
7. Do not withhold necessary blood products transfusion.
8. Encourage patients to shower or bathe at least the night before the operative day. Gross contamination around and at the incision site should be thoroughly cleaned.
9. Although it is not recommended, but it is preferably and advisable to:
 - Taper or discontinue systemic steroid use (when medically permissible).
 - Improve patients' nutrition status prior to the surgery.
10. Each individual surgical discipline should come out with discipline specific and procedures specific pre-operative preparation, e.g., bowel prep in colorectal surgery.

7.2.2 Intra-Operative Measures

Operating room (OR) environment

1. The OR should be maintained under positive pressure ventilation (2.5 Pa in relation to corridors and adjacent areas).
2. Maintained adequate air exchanges (minimum of 15/hour, of which at least 3 should be fresh air).
3. Filter all air, re-circulated and fresh air, through the appropriate recommended filters.
4. Optimum room temperature (around 21° C).
5. Keep OR room doors closed except as needed for passage of equipment, personnel, and the patient.
6. Limit the number of personnel entering and also the movement of personnel in the OR.
7. Consider performing implant operations in OR supplied with ultraclean air (laminar flow).

7.2.3 Cleaning and disinfection of environmental surfaces

1. When visible soiling or contamination with blood or other body fluids of surfaces or equipment occurs during an operation, use approved hospital disinfectant to clean the affected areas before the next operation.
2. Do not perform special cleaning or closing of OR after contaminated or dirty operation.
3. Do not use tacky mats at the entrance to the OR suite or individual ORs for disinfection control.
4. Wet vacuum the OR floor after the last operation of the day or night with an approved hospital disinfectant.

7.2.4 Post-operative care measures

1. Protect with sterile dressing for 24 to 48 hours postoperatively an incision that has been closed primarily.
2. Separate post-operation clean surgical wound patients from infected patients, assigned delicate separate areas for them.
3. Maintain post-op glucose control.
4. Wash hand before and after dressing changes and any contact with the surgical site.
5. Do not unnecessarily open the wound or change dressing.
6. When an incision dressing must be changed, use sterile technique.
7. Educate patient and family members regarding proper incision care, symptoms of SSI, and the need to report such symptom.
8. Discharge post-operation patient early, as soon as they are fit to be discharged.

7.2.5 Developed a good surveillance system to study the incident of SSI.

1. Use CDC definitions of SSI for identifying SSI among surgical inpatients and outpatients.
2. Use method that accommodates available resources and data needs for the surveillance.
3. Periodically calculate operation specific SSI rates stratified by variables shown to be associated with increased SSI risk
4. Report appropriately stratified operation specific SSI rates to surgical team members. The frequency and format for such rate computations will be determined by the surgical load, the objectives of the local and national, continuous quality improvement initiatives.

8 . Operation Theatre

This policy deals principally with all operating theatre procedures in MOH. All staff must practice 'standard precaution' when handling blood and body. When a patient is known to have an 'inoculation risk' such as hepatitis B or HIV, additional measures may be taken for certain surgical procedures.

8.1 Maintaining A Safer Environment In The Surgical Procedure Area

1. Specific rooms should be designated for performing surgical/clinical procedures and for processing instruments and other items.
2. It is important to control traffic and activities in these areas since the number of people and the amount of activity influence the number of microorganisms that are present and therefore influence the risk of infection.

8.2. Location of the Operating Theatre Suites

1. Operating theatres may be located in either purpose-built units or in converted hospital accommodation.
2. Separated from the main flow of hospital traffic and from the main corridors; however, it should be easily accessible from surgical wards and emergency rooms.
3. The floor should be covered with antistatic material, and the walls should be painted with impervious, antistatic paint e.g: polyurethane paint, epoxy paint to reduce dust levels and allows for frequent cleaning. The surfaces must withstand frequent cleaning and decontamination with disinfectant.

8.3. Layout of the Operating Theatre

1. The operating theatre should be zoned and access to these zones should be under control of OT personnel.
2. Aseptic and clean areas should be separated from the outer areas.
3. Physical barriers are needed in order to restrict access and to maintain unidirectional movement of air in converted theatre units.
 - **Outer zone:** This zone should contain:
 - A main access door
 - An accessible area for the removal of waste
 - A sluice
 - Storage for medical and surgical supplies
 - An entrance to the changing facilities.
 - **Clean or semi-restricted zone:** This zone should contain:
 - The sterile supplies store
 - An anesthetic room
 - A recovery area
 - A scrub-up area
 - A clean corridor
 - Rest rooms for the staff.

Staff must change into theatre clothes and shoes before entering this area, but there is no need for a mask, gloves, or a gown. There should be unidirectional access from the above area to the aseptic area i.e. the operating theater, preferably via the scrub-up area. The OT should be restricted to just the personnel involved in the actual operation.

- **Aseptic or restricted zone:**

This zone should be restricted to the working team.

It includes:

- The operating theatre.
- The sterile preparation room (preparation of sterile surgical instruments and equipment)

Staff working in this area should change into theatre clothes, should wear masks and gowns, and, where necessary, should wear sterile gloves.

8.4 Doors

1. The doors to the OT should be kept closed except as necessary for passage of the patient, personnel, supplies and equipment. If the door is left open, the positive air pressure in the hallway should be operational.
2. Disrupted pressurization mixes the clean air of the OT with the corridor air, which has a higher microbial count. Cabinet doors should remain closed.

8.5. Temperature and Humidity

1. The temperature and the humidity play a very important role in maintaining staff and patient comfort. It must be carefully regulated and monitored continuously.
2. Room temperature must be maintained between 18°C to 21°C at all times.
3. Humidity should be maintained at 50% to 60%.
4. The operating room should be 1°C cooler than the outer area. This aids in the outward movement of air because the warmer air in the outer area rises and the cooler air from within the operating theatre moves to replace it.

8.6. Standard Ventilator for Conventional Operating Theatres

1. The air flow and microbiological air quality should be assessed on commissioning, after renovation/repair or outbreak of an infectious disease in the theatre or elsewhere within the theatre suite.
2. For non-emergency repairs, the Infection Control Team must be notified by the manager in charge of the theatre, at least a week in advance, so that microbiological air sampling and tests for positive pressure ventilation can be performed if deemed necessary by the team.

3. The minimum standard for microbiological air counts for conventional operating rooms is 35 CFU (colony-forming unit)/m³ when the theatre is empty. There should be less than 35 CFU colony-forming unit/m³ of *Aspergillus*'s spp when empty.
4. Airflow from ceiling to floor and directed under positive pressure; higher in operating room than in the corridor.
5. The air within the operating room should be at a positive pressure compared with other theatre suites and with the external corridors, and there should be at a range of 15 -25 ACH (air changes per hour).
6. Ideal set-up for the air exchanges is at minimum of 15 times per hour at least 3 exchange of fresh air.
7. The theatre ventilator must be checked regularly, and maintained by an appropriately qualified engineer. Written records of all work on the ventilation system must be kept by the Engineering Department.
8. Coarse and fine air filters must be replaced regularly according to the manufacturer's instruction or when the pressure differential across the filter indicates that a change is required.
9. There must be adequate control of temperature and humidity within the theatre to prevent infection and also to provide a comfortable working environment.
10. Additional ventilation units must be not be introduced into the theatre without consultation with the Infection Control Team.
11. Frequency of monitoring temperature, ACH and humidity according to the HSIP of the hospital.

9. HAEMODIALYSIS UNIT

9.1 Haemodialysis Unit Water Supply And Air Conditioning

1. The water supply to the dialysis machines must be supplied separately, and include standard filtration and reverse osmosis units (RO) to minimize the risk of exposure to pyrogens and endotoxins. The water used for haemodialysis should comply with the requirement of the Association of the Advancement Medical Instrumentation (AAMI) or the European Pharmacopoeia standards.
2. For high flux haemodialysis or haemodiafiltration, ultrapure water should be used.
3. The water treatment system should be designed to allow routine disinfection of the entire system, including the distribution system and the connections to the dialysis machine. The entire system should be disinfected at least once a month.
4. Microbial testing of the water samples (including endotoxin level) should ideally be carried out at least once a month. The water samples should be taken before the reverse osmosis unit (RO), immediately after the RO and at the first, middle and final distribution point.
5. Taps and sinks must be adjusted to avoid excessive splashing and spray.

9.2 Staff Health

1. All staff working in the unit should have immunisation to hepatitis B if not already immune.
2. Any staff that develops hepatitis must avoid direct patient care until serological markers and liver function tests indicate that they are no longer infective.
3. All staff must practice standard precautions to minimize percutaneous and mucous membrane exposure to the inoculation-risk viruses (Standard Precautions)

9.3 Hand Hygiene

1. Hand hygiene is the single most important measure for the prevention of the spread of infection.
2. At the beginning of each day, staff should wash their hands thoroughly with soap and water.
3. Disposable gloves should be worn when caring for the patient or touching the patient's equipment at the dialysis station.
4. Gloves should be removed and hand hygiene should be performed between each patient or station.

10 . CENTRAL STERILE SUPPLY UNIT

10.1 Introduction

The objective of the CSSU is to provide efficient and effective central sterilization service and supply sterile items required by the wards, theatre and clinical departments in hospital so as to efficiently prevent and control infection. It is responsible for the processing, sterilization and quality control of all sterile supplies and equipment used in the hospital.

10.2 Physical Layout of CSSU

Central Service are divided into two 2 areas, designated as clean and dirty. These two areas are to be physically divided, and the integrity of each area to be maintained.

- The clean area is use for processing and sterilization of clean items, to include the preparation and packaging of instrument and sets. The sterilizers are located in this area.
- The dirty area is use for decontamination of all soiled items, including the washing and drying of contaminated items.

Only clean items will be taken into the processing area, and traffic will be strictly controlled. Only properly attired personnel will enter the clean processing area and decontamination area. Central Service personnel are responsible for maintaining each area as designated.

10.3 Operational Policies

1. General

- Sterilizations of all instruments and material shall take place in the CSSU, except
 - Pharmaceutical products
 - Specimen container and media
- All returned items shall be treated as potentially infectious /contaminated regardless whether they have been used or not.
- Sterile supplies shall be issued from the sterile issuing area according to schedule.
- All commercially packed items should have the outer cover eg. 'soft good' remove before placing in the vicinity of packing / sterile area.
- All work and materials must follow the specific direction to prevent contamination.

2. Personnel

- Staff should be trained in the field of sterilization and operating autoclave machine.
- Staff should change to standard attire, including cap and foot wear.
- Staff / personnel should follow the disinfection and sterilization policy and practice and standard precaution guideline practice.
- Staff with skin ailments should not work in CSSU.
- Long finger nails, inclusive of artificial nail and heavy make-up are not allowed in CSSU.

3. Safety

- The department shall identify safety precaution and measures for their work areas.
- Personal Protective Equipment (PPE) must always be worn accordingly.
- Equipment operating instruction shall be available at the site of the equipment.
- Staff handling chemical should follow the manufacturer's guideline.

10.4 Instruments

1. Contaminated instrument following manufactures guideline.
2. Instrument used on Biohazard case must be double bagged, labeled biohazard and sent to CSSU as soon as possible after informing CSSU staff.
3. When the CSSU is closed, decontamination is carried out at users place following the guidelines 'disinfection and sterilization policy and practice'.

10.5 Packing

All packing methods and wrapping procedures must allow for removal of air and direct contact of the sterilant with the contents of the package. Sterilization wrapping paper should be use instead of linen as packaging material.

10.6 Sterilization

1. Heat sensitive items should be sterilized by low temperature sterilizer
2. All sterilized items shall have name of item, date of sterilization, code number of packer and load number of sterilizer on the package.
3. Sterility will be determined by inspecting the integrity of the package for sign of damage or contamination, handling and storage condition. Sterility is event-related; it is not time-related unless the package contains unstable components such as drug or chemical.
4. Re-processing of single used devices should be discouraged.

10.7 Storage and preparation rooms

1. Sterile store is used for storage of sterile items only
2. Only authorized personnel shall be allowed to enter the sterile store
3. Bulk store is used for storage raw materials with non-sterile consumables
4. Linen room is use for preparation and storage of linen only.

10.8 Maintainance

Ensure that all machines/equipment are maintained in good condition and planned preventive maintenances (PPM) carried out according to the schedule.

- Safety check for autoclave accordingly (refer to checklist or log for items)
- Breakdown shall be reported immediately and ensure that action is taken within the time stipulated.

10.9 Movement of instruments

- Update record of inventory
- Document movements of supplies

10.10 Waste Management

- Follow

11 . Mortuary

11.1 Introduction

With cessation of life, there is neither the reticulo-endothelial system nor the blood brain barrier presence to restrict the translocation of microorganisms within the dead human remains. Therefore, these microorganisms and bacteria pose serious threat to forensic pathology personnel working in mortuary.

The post mortem room is a source of potential hazards and risk, not only to pathologist and anatomical pathology technician, but also to visitors to the mortuary and those handling the body after necropsy. Post mortem staffs have legal responsibilities to be aware of and to minimize these changes.

Safety and infection control policy in mortuary is an issue not only relevant to the team performing the autopsy, but also has direct implications regarding the protection of environment.

For the purpose of infection control, the mortuary complex may be seen operationally as comprising of;

1. **Clean areas** – reception areas, offices, consultation and viewing room.
2. **Transitional areas** – vehicle bay, areas of body freezers, specimen preparation room and changing room.
3. **Dirty areas** – post mortem rooms.

The principal biological risks faced by mortuary workers are the infection caused by *Mycobacterium tuberculosis*, the blood borne hepatitis, HIV and agents responsible for Transmissible Spongiform Encephalopathy (TSE) such as variant Creutzfeldt Jacob Disease (vCJD). All of these pathogens retain their infectivity after death. The presence of such pathogen may not become known until the gross examination.

Risks of health during post mortem examinations are primarily related to airborne and blood borne infection routes. Autopsy transmitted infections may occur via several routes such as:

- Percutaneous injury leading to direct cutaneous inoculation
- Contact with droplets via preexisting breaks in skin and mucosal surfaces (eyes, mouth and nose)
- Aerosol exposure
- Ingestion

In mortuary setting there are ten areas to be covered in order to achieve the safety level as explained below.

11.2 Collection Of Body From Ward

In performing the duty to collect body from ward, medical attendants are at risk of in contact **with infectious material. The following precautions must be taken:**

1. When handling bodies never smoke, eat, chew, drink or take any other actions that will bring hands into contact with the mouth, eyes or nose.
2. Make sure that any open wounds, particularly on the hands, are covered with waterproof dressing.
3. Gloves and apron must be worn due to possibility of either hands or clothing being contaminated with blood or body fluids.
4. When there is serious risk of infection, bodies will normally be enclosed in a leakproof body bag which under no circumstances should be opened before reaching the mortuary and instruction given by the pathologist/medical officer performing the autopsy.
5. Do not touch any spillage of body fluid outside the body bag until proper decontamination done in the mortuary setting.
6. Any special clothing put on work in the mortuary must be removed before leaving and hands must be thoroughly washed with proper hand washing technique after handling the body.

11.3 Receiving Body From Outside (BID Cases)

The precaution measures taken in collecting and handling body from wards must be exercised in receiving BID cases.

11.4 Body Storage

1. All bodies must be identified and correctly labeled. Any that cannot be properly identified, and particularly those for which there is no satisfactory medical record, must be labeled and treated as 'danger of infection' cases unless additional information becomes available.
2. All bodies labeled as 'danger of infection' should be totally enclosed in a leak-proof bag.
3. Bodies are stored temporarily before post mortem examination or when examination not required in cases where cause of death has been given by clinician and therefore not medico-legal cases in a body freezer with temperature maintained at 4oC.

11.5 Post Mortem Procedure

The post mortem procedures are divided into:

- routine case autopsy
- high risk case autopsy

All tools must be kept sharp, clean and ready to use.

12. Laboratory

12.1 General Principles

In this topic, references are made to the relative hazards of infective microorganisms by risk group (WHO Risk Groups 1, 2, 3 and 4). This risk group classification is to be used for laboratory work only. This risk group classification is to be used for laboratory work only.

12.2 Guidance And Recommendations

Diagnostic and health-care laboratories (public health, clinical or hospital-based) must all be designed for Biosafety Level 2 or above. As no laboratory has complete control over the specimen it receives, laboratory workers may be exposed to “high risk group” organisms. Therefore, standard precautions should always be adopted and practiced, as well as to promote good (i.e. safe) microbiological techniques (GMT).

12.3 Code of Practice

This code is a listing of the most essential laboratory practices and procedures that are basic to GMT. Each laboratory should adopt a safety or operation manual that identifies known and potential hazards, and specifies practices and procedures to eliminate or minimize such hazards. The most important concepts are listed below.

12.3.1 Access

1. The international biohazard warning symbol and sign must be displayed on the doors of the rooms where microorganisms of Risk Group 2 or higher risk groups are handled. (Table 1)
2. Only authorized persons should be allowed to enter the laboratory working areas.
3. Laboratory doors should be kept closed.
4. Children should not be authorized or allowed to enter laboratory working areas.

12.3.2 Personal Protection

1. Laboratory coveralls, gowns or uniforms must be worn at all times. The coat/gown should be removed before leaving the laboratory and placed on the area provided.
2. Appropriate gloves must be worn for all procedures that may involve direct or accidental contact with blood, body fluids and other potentially infectious materials. After use, gloves should be removed aseptically and hands must then be washed.
3. Personnel must wash their hands after handling infectious materials and before leaving the laboratory working areas.
4. Protective devices must be worn whenever necessary to protect the eyes and face from splashes, impacting objects and sources of artificial ultraviolet radiation.
5. Any cuts, abrasions or other skin lesions must be properly covered to protect them against contamination before starting work.
6. Eating, drinking, smoking, applying cosmetics and handling contact lenses is prohibited in the laboratory working areas.
7. Storing human foods or drinks anywhere in the laboratory working areas is prohibited.

13 . HOSPITAL OUTBREAK MANAGEMENT

13.1 Introduction

All health care facilities especially major hospitals would have an on going surveillance activities for healthcare associated infection (HCAI). The usual level of occurrence or incidence of an infection within the facility is usually known and this would be considered as the mean control limit. However, an upper control limit of the occurrence of the infection should be identified in order to serve as an alert line for the Infection Control Team (ICT) to investigate for a probable outbreak.

13.2 Definition Of Healthcare Associated Infection Outbreak (Either One)

1. Two or more associated cases occurs at the same time within same locality/ department
2. Greater than expected rate of infection compared with the usual background case for the place and time
3. In certain newly emerging disease e.g. Legionnaires infection or anthrax, will only require 1 single case. In HCAI outbreak, clinical findings of reported cases should be reviewed closely. It is important to directly examine the patients, reviewing of the medical records and have a discussion with the doctor in-charge. A discrepancy between the clinical and laboratory findings may occur if an outbreak is factitious, for example due to laboratory error. An outbreak maybe judged minor or major after consideration of its complexity, number of person affected, pathogenicity of the organism involved, potential transmission and any unusual features.

13.3 Steps in Outbreak Investigation and Management

NO	PROCEDURES	RESPONSIBILITES
1.	A probable diagnosis of an outbreak arises from laboratory based surveillance or clinical report from a unit/department	ICN
2.	Investigate and gather information on the probable outbreak, both from microbiological data, environmental investigation and patient's placement and movement. Carry out mapping of cases.	ICN
3.	Suspect a true outbreak if cases appear to be linked in time, space or persons. Produce a preliminary report and hold the discussion.	ICCT

4.	Alert all parties involved of probable outbreak and carry out further investigations such as screening of involved patients, contacts and an environment microbiological samples to identify source, reservoir and mode of transmission.	ICN
5.	Produce report on the outcome of the investigations (possible primary source, microorganism, magnitude of an outbreak) and recommendation immediate actions to contain the outbreak and prevent further transmission.	ICCT
6.	Discussion at the ICCT level only if it is a minor outbreak. HIACC chairman will then inform Hospital Director if it is a major outbreak. Declare outbreak. Recommend closure of unit/ward if indicated.	ICCT/HIACC/ Hospital Director
7.	Check if infection control policies and procedures are breached.	ICN
8.	Administer outbreak control measures according to the known modes of transmission (airborne, droplet or contact) of the organisms and appropriate source control. (contaminated TPN, chlorhexidine).	ICCT
9.	Re-evaluate the outbreak situation and effectiveness of interventions. Take remedial action if the outbreak is still not contained.	ICCT
10.	Announce end of outbreak when no more new cases or the number of cases has reduced to usual mean control limit. (arbitrarily within 1 month)	HIACC
11.	A final report is produced at the end of the outbreak. Recommend on change of infection control policies or procedures if indicated	ICCT/HIACC
12.	Disseminate report to all relevant departments.	ICCT

For community outbreak involving other healthcare facilities consult 'SOP for potential infectious disease MOH 2004'Public Health Division

14 . OCCUPATIONAL HEALTH AND SAFETY

14.1 Introduction

This policy applies to **all facilities within the Ministry of Health Malaysia**. This document outlines the prevention, reporting and management of sharps injuries, needlestick injuries and other percutaneous exposures to blood and body fluids which may potentially expose an employee to the risk of blood-borne viruses.

14.2 Policy Statement

The Ministry of Health aims to create awareness, reduce sharps injury and mucosal exposure to a reasonably practical level. Should an exposure occur, ensure timely and appropriate management of the exposure to reduce the risk of blood-borne pathogens to the affected employee.

Needlestick and sharps injuries will be managed by the Infectious Disease Unit /Infection Control Unit. There should be a clear designation of responsibilities in each facilities. All information must be made known to all staff.

14.3 Definitions Of Sharp Injury

Sharps injury can be defined as injury from needle or other sharp device contaminated with blood or a body fluid and penetrates the skin percutaneously mucosal/ cutaneous exposure.

Blood borne pathogens are viruses that some people carry in their blood and which may cause severe disease in certain people and few or no symptoms in others. The virus can spread to another person even if the carrier is asymptomatic.

The main blood borne viruses of concern are:

- Hepatitis B virus (HBV)
- Hepatitis C virus (HCV)
- Human Immunodeficiency Virus (HIV)

Source patient is the person whose blood is present on the item that caused the sharps injury.

14.4 Responsibilities

1. **All head of facilities** are responsible for implementing this policy in their respective hospital. They must ensure that all employees are aware of this policy and of their responsibilities contained therein.

2. **Doctor in-charge (other than the affected HCW)** will be responsible for:
- Obtaining informed consent from the source patient for HBV and HCV blood/ HIV tests
 - Taking a 5ml blood sample from the source patient and sending it to the serology laboratory in microbiology for HBV, HCV and HIV.
 - Ensure immediate first aid has been administered to healthcare workers.
 - To make doctor in-charge/ infectious disease physician/ infection control unit aware as soon as possible if the source person is at risk or has been diagnosed with Hepatitis B, Hepatitis C or HIV.
3. The role of the **Infection Control /Occupational Health Unit** are:
- To disseminate information throughout the hospital regarding the prevention and immediate management of sharps and needlestick incidents.
 - To ensure the timely and appropriate management of sharps and needlesticks incidents as and when they are reported to the Infection Control Unit.
 - To notify all sharps injury in reference to
4. The role of the **Infectious Disease / General Physician** are:
- To assess the blood-borne viruses pathogen exposure risk to healthcare workers.
 - To assess Hepatitis B immunisation status of healthcare workers.
 - To support injured staff by counselling affected employees and by co-ordinating longer term follow-up as necessary.
 - To provide all necessary vaccinations and treatment, blood tests or referrals as appropriate.
5. **Employees** have an individual responsibility to ensure that sharps are always handled safely, disposed off correctly and safely and should be aware that it is an offence (under OSHA) to discard an item in such a way as to cause injury to others.

They should:

- Follow the sharps injury management guidelines and reporting arrangements found in Ministry Of Health “**Guidelines On Occupational Exposures 2007**”.
- Report all needlestick incidents/ percutaneous exposures to the Occupational Health/ Infection Control Unit and ensure that they complete needlestick injury forms

14.5 Training

All new employees must attend an infection control briefing which includes

- the risk associated with blood and body-fluid exposure.
- the correct use and disposal of sharps
- the use of medical devices incorporating sharps protection mechanisms.

14.6 Arrangements

All staff upon entry to a health organisation should be screened and offered immunisation against Hepatitis B. This should be under jurisdiction of occupational health unit / staff clinic. For the safe use and disposal of sharps, the following practices for the prevention and avoidance of needlestick and sharps injuries should be fully adopted by all health care workers who handle sharps.

They should ensure that:

- Sharps are not passed from hand to hand.
- Handling of sharps is kept to a minimum
- Needles are not broken or bent before use or disposal
- Syringes or needles are not dismantled by hand and are disposed of as a single unit. (special setting -dental)
- Needles are never re-sheathed by hand.
- Staff takes personal responsibility for any sharps they use and dispose of them in a designated container at the point of use. (You Use, You Throw)
- Sharps container are not filled by more than three quarter and are stored in an area away from the public (especially out of reach of children)
- Sharps container must be adequate and strategically placed. It should be consistent with work process. As far as possible it should be as close to point of use.
- Safety devices should be considered whenever possible.
- Staff should be aware of this sharps injury policy.

14.7 Monitoring

The Occupational Health / Infection Control Unit will generate incident statistics relating to sharps and needlestick incidents, and investigate trends or specific incidents as appropriate. Further details are available in Sharps Injury Surveillance Manual, MOH 2007.

15. SPECIFIC ORGANISM RELATED INFORMATION

15.1 Multi-Resistant Organism

15.1.1 Introduction

Multi-resistant organisms are bacteria that have developed resistance to more than 2 different groups of any used antibiotics. Development of multi-drug resistance has been associated with inappropriate and over use of antibiotics

Resistant organisms of significance in healthcare settings include *Pseudomonas aeruginosa*, *Acinetobacter* and Extended-spectrum beta lactamase (ESBL)-producing bacteria which are most commonly produced among *Escherichia coli* (*E. coli*), *Klebsiella* and *Proteus*.

15.1.1.1 ESBLs and ESBL Infection

- ❖ ESBL are bacterial enzymes that have conferred resistance to second and third generation cephalosporins antibiotics. ESBLs are the cause of multidrug resistant gram negative bacteria around the world.
 - Treatment of choice includes carbapenems and tigecycline

15.1.1.2 *Pseudomonas aeruginosa*

- ❖ *Pseudomonas aeruginosa* is a gram-negative bacterium normally found in soil and water. It rarely affects healthy people, but can cause serious illness in immunocompromised people (HIV or cancer patients).
- ❖ In healthcare settings it contaminates wet reservoirs e.g. indwelling catheters and can cause serious bloodstream infections.

15.1.1.3 *Acinetobacter*

- ❖ *Acinetobacter* is a gram-negative bacterium, normally lives in soil and water and can sometimes be found on the skin, posing no risk to healthy people.
 - It can live in the environment for several days. There are several species and a few can cause infections in people who are already unwell.

15.1.2 Transmission

- ❖ The transmission of multi-resistant organisms in hospital and community is by person to person spread either directly via staff, patient or visitor unwashed hands that have been contaminated by contact with colonised or infected patient or indirectly from contaminated equipment and surfaces.
- ❖ ESBLs can also be transmitted via the faecal oral route.

15.1.3 Prevention of Colonization And Infection With Multi-Resistant Organisms

15.1.3.1 Special units

The Infection Control Team should, in collaboration with the relevant clinical

team, be proactive in assessing the risks and routes of transmission of gram-negative organisms. Hospital areas of particular concern include:

- neonatal, pediatric and adult intensive care units
- units caring for neutropenic patients
- ophthalmology department and ophthalmic surgery
- burns units and hydrotherapy pool

15.1.3.2 Antibiotic policies

1. Excessive use of broad-spectrum antimicrobials will encourage the emergence of multiply-resistant coliforms and non-fermentatives.
2. Antimicrobial prophylaxis for surgery should be as narrow-spectrum as possible, and restricted to a maximum of 24 hours duration

15.1.3.3 Disinfection of equipment and medical instruments

1. Moist respiratory equipment, such as ventilator tubing, nebulizers and humidifiers that come into direct contact with the patient, are easily contaminated with gram-negative organisms and can cause cross-infection.
2. It is therefore important that the correct procedures for decontamination are followed and that the equipment is thoroughly dried before use for other patients.
3. Heat disinfection should be used wherever possible for equipment used on the ward.
4. Disinfectors such as bedpan washers must be maintained and checked regularly to ensure that adequate temperatures are reached (normally 80°C for 1 min), and written records of maintenance must be kept.
5. Disinfection procedures should, where necessary, be checked with the Infection Control Team.
6. All creams, gels and liquids used with such equipment must be stored in such a way as to prevent contamination and patient-to-patient spread of Gram-negative organisms. Single-use disposable sachets are preferred.

15.1.3.4 Hand hygiene

1. All staff who have contact with patients must be trained in hand washing practices, and use disposable gloves and plastic aprons when hand contamination is likely, for example, when emptying bedpans, changing catheter bags, etc.
2. Heavy microbial contamination of hands may not be adequately cleaned by simple washing and, when anticipated, disposable gloves should be used.

15.1.3.5 Ward environment

1. All shared communal services such as lavatories, bathrooms, etc. should be cleaned daily and kept dry.
2. In general, environment disinfectants are not required; detergent and hot

water are adequate.

3. Sink traps inevitably harbor organisms, which cannot be removed by disinfectants.
4. The taps and sinks should be designed so that there is minimal splashing from the sink area.

15.2 Methicillin Resistant Staphylococcus Aureus

15.2.1 Introduction

Methicillin Resistant Staphylococcus Aureus (MRSA) have been a major cause of health care-associated infections (HCAI) worldwide. Detection of MRSA within hospitals and long term care facilities has increased dramatically and a great deal has been written regarding its management and control.

Concern about MRSA is related to the potential for health care and community transmission and the limited number of antibiotics available to treat infections caused by this organism.

15.2.2 Epidemiology

The current prevalence rate of MRSA in United States hospitals is now believed to exceed 50%. Canada reported a 6% rate, while Japan's rate exceeded 80%. Most European countries had a greater than 6% rate of *S. aureus* strains be MRSA in 1999, but the Netherlands reported less than 1%. In Malaysia, the rate of MRSA isolate was 0.5% per 100 admissions in 2005 and 0.3% 2007. The epidemiology of MRSA has changed with the apparent emergence of MRSA in the community with clinical, epidemiologic and bacteriologic characteristics distinct from health care-associated MRSA.

15.2.3 Methicillin-Resistant Staphylococcus Aureus

- Staphylococcus aureus is a facultative anaerobe, non-motile, catalase positive, grampositive cocci which predominantly arranged in grape-like clusters.
- It is the most important human pathogen among the staphylococci.
- *S. aureus* that is resistant to the synthetic penicillins (methicillin, oxacillin, nafcillin) is referred to as MRSA.
- They colonise the skin, particularly the anterior nares, skin folds, hairline, axillae, perineum and umbilicus. They may also colonise chronic wounds, for example in eczema, varicose and decubitus ulcer.
- MRSA is transmitted primarily through direct person-to-person contact, commonly through the hands of health care workers. However, It can also be transmitted through contact with inanimate objects such as linen, clothing and dust, although these do not represent significant sources for transmission.
- Nasal carriage of MRSA is very common and due to hand to nose transmission.
- A nasal carrier often contaminates his/her own hands by hand to nose contact, then transmits the organism in the course of routine activities.
- Since skin to skin contact is the most significant mode of transmission, hand hygiene is of primary importance in preventing its spread.

16. STERILIZATION

16.1 Introduction

The sterilization process provides the highest level of assurances that an item can be expected to be free of known viable pathogens and non pathogenic microorganisms, including

spore. Bacteria spores are the most resistant of all living organisms due to the capacity to withstand external destruction agents.

16.2 Purpose

To monitor and enforce controls necessary to prevent cross infection according to infection control policies.

16.3 Definition

Sterilization - Is a process which achieves the complete killing or removal of all type of microorganism including spore

16.4 Methods of Sterilization

Selection of the agent used to achieve sterility depends primarily on the nature of the item to be sterilized. Sterilization process either physical or chemical and each method have its advantages and disadvantages. The following are available sterilizing agent:-

16.4.1 Thermal (physical)

☐ Steam under pressure/moist heat:-

Steam sterilizer in an autoclave is one of the most common form of sterilization.

☐ Hot air /dry heat:- Rarely use in CSSU.

16.4.2 Chemical / cold sterilizers

Chemical sterilization is used for instruments and other items that are heatsensitive or

when methods that require heat are unavailable.

- Ethylene oxide gas – its use should be discouraged.

- Hydrogen peroxide plasma/vapor/low Temperature Gas Plasma Sterilizers

- It is use to sterilize metal and nonmetal surgical devices at low temperatures in a dry environment.

16.5 Monitoring The Sterilization Cycle

To ensure that instruments and supplies are sterile when used, it is essential that the sterilization process be monitored by.

16.5.1 Administrative monitoring

- Work practices must be supervised.

- Written policy and procedures are strictly followed by all personnel responsible for sterilizing and handling sterile supplies.

- Policies and procedures pertain to the following:

- Decontaminating, cleaning and terminally sterilizing.

- Packaging and labeling

- Loading and unloading the sterilizer

- Operating the sterilizer

- Monitoring and maintaining the record of each cycle

- Adhering to safety precaution and preventive maintenance protocol

- Transporting sterile packages to the sterile storage room.

- Cart should be enclosed.
- Storage of sterile items
- Handling of sterile items
- Tracking and recalling items if an item in a particular load is not safe for use.

16.5.2 Mechanical Monitoring

Routine maintenance to check efficiency and accuracy of autoclave consist of the following:-

• Dummy Run

A complete sterilizing cycle carried out with an empty chamber to get rid of the remaining air in the chamber.

• Recording Gauge

In the form of charts, printouts, or gauges, this reflects the current status of cycle parameters (pressure, temperature and duration) during sterilization. Gauge should be calibrated at regular intervals against standard instruments by autoclave operator.

• Leak Rate Test

Pre vacuum steam sterilizer must be tested at least once a week for the rate of air leakage into the chamber during air removal and drying stages.

• Thermocouple Test

To detect temperature achieved and maintained during sterilization stage. This procedure should be done during commissioning, after major repair and validation.

• Bowie-Dick Test

Test packs are run daily, to monitor the function pre-vacuum sterilizers and check the efficacy of vacuum system.

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16.5.3 Chemical Monitoring

To show that items have been exposed to sterilization process. The indicators (internal and external) help to monitor the physical conditions within the sterilizer and alert personnel to detect malfunction and improper packaging/loading. Indicators do not establish sterility of an item.

16.5.4 Biological Monitoring

Positive assurance that sterilization conditions have been achieved can be obtained only through a biologic control test. Items should not be use if they do not pass the biological test.

Consecutive biologic monitors should be run:

- Each time the sterilizer is calibrated
- After repairs
- During installation of sterilizer
- Relocated
- Preferably daily or at least once a week, and with each load of implants
- 3 hours test by CSSU or 48 hour by lab

16.6 Pre-Sterilization Process

To achieve the sterilization process, the items to be sterilized should be pre-cleaned to lower the bio-burden to the lowest possible level. Decontaminate and cleaning of items

should follow according to CSSU SOP.

16.7 Preparation for Sterilization

Surgical instruments, supplies and most medical devices must be prepared and packed so that their sterility can be maintained to the point of use.

16.7.1 Individual inspection and examination of instruments including

- Cleanliness
- Function of any instruments
- Integrity of instruments
- Lubricate and test for proper functioning

16.7.2 Packaging and wrapping of used items prior to sterilization

The packaging material chosen for sterile products must be non toxic and conform with the following basic principles:-

- It must allow sterilant contact
- Allow sterile presentation of the package contents.
- Permeability to air, steam and gaseous
- Able to stand heat / high temp.
- Resistance to penetration by microorganism
- Resistance to puncture and tear
- Good draping quality
- Free from loose fibers & particles
- Readily available

16.7.3 Type of packaging materials

- Sterilisation wrapping paper
- Sterilisation wrapping bag/pouches
- Linen wraps should be discourage

16.7.4 Sealing of Packs and Bags

The purpose of sealing is to maintain pack integrity. It is achieved by the use of heat sealers or sterilizing indicator tape.

16.8 Labeling

- Use sterilisation non toxic marker pen for labelling
- Objective of labeling is to identify the contents, quality assurance, inventory control and stock-rotating purposes.
- Labeling should be done before sterilization process. Labeling shall indicate name of pack, code number of packer and date of sterilization.

16.9 Loading the Load

- The items should be arranged and placed on sterilizer rack leaving space for air and steam circulation.
- No items should touch the chamber walls.

16.10 Unloading and Inspecting Sterile Items

- The sterilizer rack to be placed in a cooling room until the load is cool.
- The chemical indicator tape on each package should be checked for color changes.
- Check for the integrity of the pack
- The sterilized items must be cooled before storage

11.11 Sterile Storage

- Sterile items should be stored and handle in a manner that maintain the integrity of

packs and prevent contamination from any source.

- The storage area shall be free of dust, insects and vermin.

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- All items shall be stored above floor level by at least 250mm and from ceiling fixtures by at least 440mm, 60 mm from the wall and protected by direct sun light.
- Temperature within the storage area should range from 18°C - 22°C with relative humidity from 35% - 70%.
- The sterile items should be arranged according to the size (big sets singly, and small set not more than 3 stacks)
- 'First in, First out' (FIFO) is the principle to follow in the removal and replacement of sterile items in sterile storage.

11.12 Collection of Used Items

- Where ever possible all decontamination must be performed in CSSU. In situation where it is not possible e.g. after office hours, the items should only be pre-rinsed to remove debris and then pack.
- Procedure for the collection of used reusable items from wards, operating room and other user department shall adhere to hospital guidelines.
- Personnel involved in collection and receiving should practice standard precaution when handling used instruments and devices.
- Instruments should be contained during transport from point of used to the area where they will be cleaned and decontaminated.
- Use a separate trolley for the collection of used items and the delivery of sterile items.
- The container or trolley shall be cleaned with disinfectant e.g. 70% alcohol at the end of each collection round.

11.13 Distribution of sterile items

Distribution trolley should be covered or closed to ensure the sterile chain is

16. REFERENCES

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