Liaquat Institute of Medical and Health Sciences (LIMHS), Thatta
Infection Prevention and Control Standard Operating Procedure (SOPs/Guidelines)

INTRODUCTION

Liaquat Institute of Medical and Health Sciences (LIMHS) in Thatta is committed to prioritizing the safety and well-being of healthcare professionals within its institution and affiliated hospitals. This set of Standard Operating Procedures (SOPs) is specifically crafted for LIMHS Thatta and its affiliated Teaching Hospitals, ensuring that infection prevention and control measures are tailored to the unique needs of our community.

THE CONTEXT

At LIMHS Thatta, these SOPs aim to reinforce our dedication to safeguarding the health of Students, Faculty Members, Staff, healthcare professionals and patients alike. Developed in alignment with the national health policy, these guidelines reflect our commitment to maintaining the highest standards of infection control.

SECTION 1: THE INFECTION CONTROL PROGRAM

ORGANIZATION OF LIMHS THATTA'S INFECTION CONTROL PROGRAM;

The backbone of the infection control program at LIMHS Thatta is the Infection Control Committee, specifically constituted to oversee and enforce the infection control standards tailored for our institution. The committee ensures multidisciplinary input and cooperation and meets regularly to address the unique challenges and opportunities present at LIMHS Thatta.

THE LIMHS THATTA INFECTION CONTROL TEAM

Comprising dedicated professionals, the LIMHS Thatta Infection Control Team is entrusted with the day-to-day activities of the infection control program. This team has the authority to enforce infection control practices specific to the needs of LIMHS Thatta.

Responsibilities of the LIMHS Thatta Infection Control Team/Person

The team is responsible for surveillance, critical incident management, compiling periodic infection reports, developing and endorsing the LIMHS Thatta Infection Control Manual, coordinating training activities, and enforcing minimum infection control standards. Reporting directly to the medical superintendent/Principal or College/hospital administrator, the team ensures a focused approach to infection prevention.

THE LIMHS THATTA INFECTION CONTROL MANUAL

Tailored to the needs of LIMHS Thatta, this manual serves as a comprehensive guide for infection prevention. Developed and updated by the infection control team, it is ratified by the local Board of Studies to ensure its relevance to our unique healthcare environment.

EDUCATION AND TRAINING AT LIMHS THATTA

Acknowledging the specific needs of our healthcare professionals, LIMHS Thatta places a strong emphasis on orientation programs to familiarize staff with the importance of the infection control program. Regular training programs are organized, ensuring that our healthcare workers are equipped with the knowledge, skills, and attitudes essential for effective infection control practices.

SECTION 2: INFECTION CONTROL PRACTICES

STANDARD PRECAUTIONS FOR LIMHS THATTA

Reflecting the commitment to the safety of our healthcare community, standard precautions at LIMHS Thatta include tailored measures for hand hygiene, use of personal protective equipment, handling of patient care equipment and soiled linen, needle stick/sharps injury prevention, environmental cleaning, and waste management.

ADDITIONAL (TRANSMISSION-BASED) PRECAUTIONS SPECIFIC TO LIMHS THATTA

Recognizing the specific diseases prevalent in our community, additional precautions at LIMHS Thatta encompass airborne precautions, droplet precautions, and contact precautions. These precautions are meticulously outlined to address the unique challenges posed by the transmission modes of diseases in our locality.

PATIENT PLACEMENT AND MOVEMENT FOR LIMHS THATTA

Patient placement strategies at LIMHS Thatta consider the unique patient population and the prevalence of diseases. From spacing between beds to single rooms and cohorting, every strategy is adapted to the local context.

SECTION 3: ENVIRONMENTAL MANAGEMENT PRACTICES

AIR VENTILATION

Ventilation systems should be designed and maintained to minimize microbial contamination. The air conditioning filters should be cleaned periodically, and fans that can spread airborne pathogens should be avoided in high-risk areas.

High-risk areas such as operating rooms, critical care units, and transplant units require special ventilation systems. Filtration systems (air handling units) designed to provide clean air should have high-efficiency particulate air (HEPA) filters in high-risk areas. Unidirectional laminar airflow systems should be available in appropriate areas in the hospital construction. Ultra-clean air is valuable in some types of cardiac surgery/neurosurgery/implant surgery theatres and transplant units.

For the operating room, the critical parameters for air quality include:

- Frequent maintenance/validation of efficacy of filters (in accordance with manufacturer's requirements).
- Pressure gradient across the filter bed and in the operation theatre.
- Air changes per hour (minimum 15 air changes per hour).
- Temperature should be maintained between 20°C and 22°C, and humidity between 30% and 60% to inhibit bacterial multiplication.
- General areas should be well ventilated if they are not air-conditioned.

Special Air Handling for Airborne Precautions.

Negative air pressure vented to the air is recommended for contaminated areas and is required also for isolation of patients with infections spread by the airborne route. An air handling system

providing 6-12 air changes per hour with the air being discharged outside through a filtration mechanism is recommended. Systems must be checked by engineering services to ensure they are, in fact, offering negative pressure rooms.

An air-conditioned single room with an exhaust or a well-ventilated room is an adequate option for healthcare facilities without "negative pressure" rooms. If an air-conditioned single room is not available, as in many resource-poor settings, a fan can be placed in the room to direct airflow towards an outside window. The door/s to the aisle or other rooms should be kept closed at all times.

Protective Environment:

A protective environment may be required for some immunosuppressed patients. While details will depend on the specific form of immune suppression, some general principles apply. Ultra-clean unidirectional air may be required in some units such as hematology or intensive care due to the level of immune suppression of the patients. To minimize airborne particles, air must be circulated into the room with a velocity of at least 0.25m/sec through a high-efficiency particulate air (HEPA) filter. The HEPA filter removes particles to a certain defined size. If particles 0.3 microns in diameter are removed, the air entering the room can be classified as being clean and free of bacterial contamination.

Other important ways of protecting patients with severely lowered immune systems include:

Strict enforcement of standard precautions.

- Healthcare workers and visitors should avoid contact with the patient if they have any infections (for example, upper respiratory tract infections or herpes simplex blisters).
- Where appropriate, staff and visitors should wear personal protective equipment to protect the patient from microorganisms.
- Do not put flowers or plants in the room.
- Avoid decorative ponds (Pseudomonas colonization), waterfalls, and other sources of aerosolization in the vicinity of patients.
- Ensure a tidy environment.
- Environmental cleaning should be done twice daily and should consist of damp dusting only – do not create aerosols.
- Use strict aseptic techniques for all clinical procedures.

WATER

The healthcare facility should provide safe water. If it has water storage tanks, they should be cleaned regularly, and the quality of water should be sampled periodically to check for bacterial contamination.

Safe Drinking Water:

Where safe water is not available, water should be boiled for 5 minutes to render it safe. Alternatively, water purification units may be used. Water must be stored in a hygienic environment without allowing hands to enter the storage container. Water must be dispensed from the storage container by an outlet fitted with a closure device or tap. Storage containers and water coolers must be cleaned regularly.

CLEANING OF THE HOSPITAL ENVIRONMENT

Routine cleaning is important to ensure a clean and dust-free hospital environment. There are usually many micro-organisms present in "visible dirt," and routine cleaning helps to eliminate this dirt. Administrative and office areas with no patient contact require normal domestic cleaning. Most patient care areas should be cleaned by wet mopping. Dry sweeping is not recommended. The use of a neutral detergent solution improves the quality of cleaning. Hot water (80°C) is a useful and effective environmental cleaner. Bacteriological testing of the environment is not recommended unless seeking a potential source of an outbreak. Any areas visibly contaminated with blood or body fluids should be cleaned immediately with detergent and water. Isolation rooms and other areas that have patients with known transmissible infectious diseases should be cleaned with a detergent/disinfectant solution at least daily. All horizontal surfaces and all toilet areas should be cleaned daily.

WASTE MANAGEMENT

Hospital waste is a potential reservoir of pathogenic micro-organisms and requires appropriate, safe, and reliable handling. The main risk associated with infection is sharps contaminated with blood. There should be a person or persons responsible for the organization and management of waste collection, handling, storage, and disposal. Waste management should be conducted in coordination with the infection control team.

Steps in the management of hospital waste include:

1. Generation
2. Segregation/separation
3. Collection
4. Transportation
5. Storage
6. Treatment
7. Final disposal

Waste management practices must meet national and local requirements; the full detail in Annex 1

LAUNDRY

General Instructions:

Linen
The basic principles of linen management are as follows:

- Place used linen in appropriate bags at the point of generation.
- Contain linen soiled with body substances or other fluids within suitable impermeable bags and close the bags securely for transportation to avoid any spills or drips of blood, body fluids, secretions, or excretions.
- Do not rinse or sort linen in patient care areas (sort in appropriate areas).
- Handle all linen with minimum agitation to avoid aerosolization of pathogenic microorganisms.
- Separate clean from soiled linen and transport/store separately.
- Wash used linen (sheets, cotton blankets) in hot water (70°C to 80°C) and detergent, rinse and dry preferably in a dryer or in the sun. (Heavy-duty washers/dryers are recommended for the hospital laundry.) See table 7 for details.
- Autoclave linen before being supplied to the operating rooms/theatres.
- Wash woolen blankets in warm water and dry in the sun, in dryers at cool temperatures, or dry-clean.
- Mattresses and pillows with plastic covers should be wiped over with a neutral detergent.
- Mattresses without plastic covers should be steam cleaned if they have been contaminated with body fluids. If this is not possible, contaminations should be removed by manual washing, ensuring adequate personnel and environmental protection.
- Wash pillows either by using the standard laundering procedure described above or dry clean if contaminated with body fluids.

REPROCESSING OF INSTRUMENTS AND EQUIPMENT

Risk Assessment:

The risk of transmission of infection by instruments and equipment is assessed based on several factors:

1. Presence of Micro-organisms: Consideration of the type, number, and virulence of micro-organisms.
2. Type of Procedure: Distinguishing between invasive and non-invasive procedures.
3. Body Site: Identifying the body site where the instrument/equipment will be used (mucosal or skin tissue, or intact skin).

The "Spaulding Classification" is employed to categorize the risk of transmission based on the intended use site. Instruments may be classified as critical, semi-critical, or non-critical. The appropriate level of reprocessing is determined by this classification and the associated risk. Sterilization is required for instruments entering sterile body parts, while disinfection is adequate for instruments in contact with mucous membranes or non-intact skin. Instruments contacting intact skin should undergo either disinfection or cleaning.

Reprocessing Principles:

Staff Training: Personnel handling instrument reprocessing must undergo formal training in cleaning, disinfection, and sterilization. Training levels should match the staff member's responsibilities.

Appropriate Level of Reprocessing: Selecting the correct reprocessing level based on the intended use of the instrument. Steam sterilization is the most effective, but alternative methods like ethylene oxide may be used based on instrument compatibility.

Servicing of Instruments and Equipment: Instruments sent for service should be appropriately reprocessed before repair. Instruments that cannot be effectively sterilized or reprocessed should not be reused.

Storage: Proper storage is crucial for maintaining sterilization or disinfection levels. Sterile instruments should be stored in a clean, dry environment, protected from damage.

Patient Care Equipment: Equipment touching only intact skin should undergo cleaning or disinfection.

Cleaning, Disinfection, and Sterilization:

Cleaning:

Cleaning must precede disinfection or sterilization. Instruments should be cleaned immediately after use to remove all organic matter and chemicals. Four main cleaning methods are utilized:

1. **Manual Cleaning:** All surfaces, channels, and bores must be cleaned, following specific procedures, wearing personal protective equipment.
2. **Enzymatic Cleaners:** Used for difficult-to-clean items, these cleaners require careful handling.
3. **Ultrasonic Cleaners and Automated Washers**: Recommended for basic instruments that can withstand the process.
4. **Disinfection:** Removes micro-organisms without complete sterilization. Levels include high, intermediate, and low-level disinfection, achieved through thermal or chemical methods.

Sterilization:

Sterilization is crucial for instruments penetrating sterile body sites. Methods include steam under pressure, dry heat, ethylene oxide, automated chemical systems, and irradiation. Each method must adhere to manufacturers' guidelines for effective sterilization.

Special Consideration – Creutzfeldt-Jacob Disease (CJD):

Prions, responsible for CJD, require special treatment. Steam sterilization is recommended, but if unavailable, immersion in 1N sodium hydroxide followed by steam sterilization is an alternative. Special protocols exist for managing instruments contaminated with prions.

Quality Control Parameters:

Regular checks on load number, content, temperature, time exposure, and physical/chemical/biological testing are essential for quality control in the sterilization process.

CARE OF HEALTH CARE WORKERS

Occupational Health and Infection Prevention:

Health care workers (HCWs) are susceptible to infections through occupational exposure. In turn, infected HCWs may pose a transmission risk to patients and colleagues. An employee health program is vital to prevent and manage infections among hospital staff. Recruitment reviews should encompass immunization history, previous exposures to communicable diseases, and immune status. Serological tests may be required for assessing certain infections like varicella-zoster virus.

Immunization Recommendations:

Recommended immunizations for HCWs include hepatitis A and B, influenza, measles, mumps, rubella, tetanus, and diphtheria. Consideration may be given to immunization against varicella and rabies in specific cases. The PPD (Mantoux) skin test helps document previous tuberculosis (TB) exposure. Positive PPD tests are assumed to result from TB exposure rather than previous BCG vaccination. Specific post-exposure policies are necessary for diseases such as HIV, viral hepatitis, SARS, varicella, rubella, and tuberculosis.

Reporting of Infections:

Health care workers with infections should promptly report illnesses or incidents to staff clinics for evaluation and management.

Sharp Injuries:

Needle stick injuries are common and pose a risk of hepatitis B, hepatitis C, and HIV infection. Proper vaccination and assessment of the risk are essential. Immediate treatment for injuries involves thorough washing with running water and an antiseptic solution. An incident reporting system should be in place to encourage prompt and accurate reporting, supported by managers.

Key Recommendations:

1. **Basic Principles:**

- Standard Precautions: Adherence to standard precautions using personal protective equipment and safety devices.
- Immunizations: Recommended vaccinations include hepatitis A and B, influenza, measles, mumps, rubella, tetanus, and diphtheria.
- PPD: Mantoux skin test to document previous tuberculosis exposure.
- SOPs attached Annex 2.

2. **Disease-Specific Recommendations:**

- Exposure to HIV: Risk reduction measures, including standard precautions, use of personal protective equipment, and safety devices.
- Exposure to Hepatitis B and C: Emphasis on immunization for hepatitis B and assessing the risk of hepatitis C infection.
- Tuberculosis Exposure: Monitoring and reporting for health care workers in high-risk areas.
- Meningococcal Meningitis: Chemoprophylaxis for health care workers in close contact with patients.
- SARS: Clear guidelines for preventing staff exposure and monitoring for symptoms.
- Other Infections (Varicella, Influenza, Pertussis, Diphtheria, Rabies): Develop policies for managing staff exposure and recommend vaccinations where appropriate.

SPECIAL SITUATIONS

INFECTIONS WITH MULTI-DRUG RESISTANT ORGANISMS:

Antimicrobial Resistance Control Strategies:

The overuse and misuse of antimicrobials have led to the emergence of antimicrobial resistance globally. In healthcare settings, resistant organisms spread when hand hygiene, infection control

precautions, and equipment cleaning are inadequate. Strategies for controlling antimicrobial resistance include:

1. **Appropriate Antimicrobial Use:**

- Each healthcare facility should establish an antimicrobial use program, overseen by the Infection Control Committee or an Antimicrobial Use Committee.
- Antibiotic use should be justifiable based on clinical diagnosis and known or expected infecting micro-organisms.
- Obtain appropriate specimens for bacteriological examination before initiating antibiotic treatment.
- Antibiotic selection should consider disease nature, pathogenic agent(s), sensitivity patterns, patient tolerance, and cost.
- Routinely assess and communicate resistance patterns to practicing physicians.
- Prefer narrow-spectrum agents to avoid resistance development.
- Limit antibiotic combinations and consider restricting the use of selected antibiotics.
- Ensure appropriate antibiotic doses.

2. **Antimicrobial Use Committee:**

Recommends antibiotics for the formulary.

- Establishes prescribing policies and reviews and approves practice guidelines.
- Audits antibiotic use and oversees education.
- May be a subcommittee of the Hospital Infection Control Committee (HICC) or an independent committee liaising with HICC.

Key Resistant Bacteria:

The most significant antibiotic-resistant bacteria include:

- Methicillin-resistant Staphylococcus aureus (MRSA)
- Vancomycin-resistant Enterococcus faecium (VRE)
- Multidrug-resistant tuberculosis (MDR-TB)

Control of Endemic Antibiotic Resistance:

Ensure appropriate antibiotic use based on defined hospital antibiotic policy, monitor antibiotic resistance, and follow up-to-date antimicrobial guidelines. Implement protocols for intensive infection control procedures, focusing on hand hygiene, isolation, and environmental control measures. Improve antimicrobial prescribing practices through education and administration.

Specific Control Measures for Resistant Organisms:

MRSA:

- Minimize ward transfers.
- Ensure early case detection.
- Screen high-risk patients.
- Isolate infected or colonized patients.
- Reinforce hand hygiene and use of personal protective equipment.

VRE:

- Apply standard precautions with additional contact precautions.
- Ensure strict adherence to hand hygiene.
- Implement daily environmental cleaning.
- Use patient-specific care items.

MDR-TB:

- Rapid detection and immediate implementation of infection control precautions.
- Diagnosis and treatment of TB.
- Transport patients with a surgical mask.
- Apply standard and airborne precautions for healthcare workers.

INFECTIONS WITH VIRAL HEMORRHAGIC FEVERS:

Viral Hemorrhagic Fevers (VHF):

- Severe acute viral illnesses with sudden onset of fever, lethargy, weakness, headache, and potential hemorrhagic manifestations.
- Includes Ebola-Marburg viral diseases, African hemorrhagic fever, Marburg virus disease, Ebola virus, and Congo Crimean hemorrhagic fever (CCHF).

Mode of Transmission:

- Human-to-human transmission through direct contact with infected blood, secretions, organs, semen, with the highest risk in the late stages of illness.

Infection Control Precautions:

- Strict adherence to standard precautions.
- Isolation precautions for VHF.
- Proper cleaning and disinfection procedures.
- Safe disposal methods for supplies and waste.
- Education of healthcare workers, families, and the community.

Hand Washing:

- Crucial for minimizing microorganisms transmission.
- Compliance challenges include lack of equipment, low staff-patient ratios, allergies, insufficient knowledge, and time constraints.
- Effective hand washing is essential for breaking the chain of infection transmission.

Purpose of Hand Washing:

- Removal of disease-causing microorganisms.
- Killing transient microorganisms with soap and water.
- Inhibition of microorganisms in deep skin layers with antimicrobial products.

- Preferred method: alcohol-based gel.
- Effective hand hygiene practices are critical for maintaining a safe healthcare environment and preventing the spread of infections.

TYPES OF HAND WASHING:

Hand Washing:

Hand washing typically involves cleansing hands and wrists for a minimum of 10 – 15 seconds with plain or antimicrobial soap and water.

Hand Antisepsis/Decontamination:

- Hand antisepsis removes or destroys transient microorganisms, providing prolonged protection. It can be done through:
- Washing hands and forearms with antimicrobial soap and water for 15-30 seconds, following the manufacturer's instructions.
- Decontaminating hands with waterless, alcohol-based hand gel or hand rub for 15-30 seconds, suitable for hands not soiled with protein matter or fat.
- Immersion of hands in antiseptic bowls is not recommended.

Surgical Hand Antisepsis:

Surgical hand antisepsis removes or destroys transient microorganisms, requiring thorough washing of hands and forearms with antiseptic soap for a minimum of 2-3 minutes. Surgical hand antisepsis is essential before performing invasive procedures.

FACILITIES AND MATERIALS REQUIRED FOR HAND WASHING:

Running Water:

Access to clean, preferably running water, is crucial. Large washbasins with hand-free controls, anti-splash devices, or alternatives like buckets with taps are acceptable.

Materials for Hand Washing/Antisepsis:

Soap:

- Plain soap for routine hand washing (available in bar, powder, or liquid form).
- Antimicrobial soap for both hand washing and antisepsis.
- Ensure clean dispensers for liquid soap and discard empty containers properly.

Specific Antiseptics:

- Recommended for hand antisepsis include 2%-4% chlorhexidine, 5%-7.5% povidone iodine, 1% triclosan, or 70% alcoholic hand rubs.
- Place dispensers outside each patient room.

Facilities for Drying Hands:

- Provide disposable towels, reusable single-use towels, or roller towels, ensuring they are properly maintained. In the absence of clean, dry towels, air-dry hands.

Steps in Hand Washing:

Preparing for hand washing:

- Remove jewelry and watches, clip nails short, and roll sleeves up.
- Wet hands and wrists, applying soap (plain or antimicrobial).

Washing Procedure:

- Use firm, circular motions to wash hands and arms thoroughly.
- Cover all areas for a minimum of 10-15 seconds.
- Clean under fingernails.

Rinsing:

- Rinse hands thoroughly, keeping them lower than the forearms.
- If no running water, use a bucket and pitcher.

Drying:

- Dry hands thoroughly with disposable paper towel, clean dry towel, or air-dry.
- Use a paper towel or elbow/foot to turn off the faucet.

Using Antiseptics for Hand Antisepsis:

- Apply the product to the palm of one hand.
- Rub hands together until dry, covering all surfaces.
- Do not rinse.

Personal Protective Equipment (PPE) - Putting On and Taking Off:

Putting On PPE:

The order for putting on PPE is not critical, but for practicality:

- Wash hands.
- Wear scrub suit or thin clothes.
- Wear boots or shoe covers.
- Wear cap.
- Wear mask.
- Wear gown.
- Wear impermeable apron if needed.
- Wear protective eyewear/goggles.
- Wash hands and dry them.
- Wear gloves with gown sleeves tucked in.

Taking Off PPE:

Removing PPE is done in a specific order to avoid contamination:

- Untie gown string (if tied in front) and remove shoe covers.
- Remove gloves (with proper technique).
- Wash hands.
- Remove gown and apron without contaminating clothing underneath.
- Remove goggles, mask, and cap, placing in appropriate containers.
- Dispose of boots if worn.
- Wash hands thoroughly before leaving the facility.

Use of Full Personal Protective Equipment (PPE) - Boots/Shoe Covers:

Selecting Boots/Shoe Covers:

- Disposable, waterproof, or washable boots.

Wearing and Removing Boots/Shoe Covers:

- Wear waterproof boots or shoe covers as needed.
- Remove shoe covers first with gloved hands and discard.
- Remove boots before leaving the room and disinfect.
- Wash hands thoroughly.

Caps:

Selecting Caps:

Use a disposable, waterproof cap that completely covers the hair.

Wearing and Removing Caps:

- Wear the cap to cover the hair completely.
- Remove by holding the inside of the cap, folding it inside out, and discard.
- Wash hands immediately.

Masks:

Selecting Masks:

- Choose a surgical mask for protection against droplet transmission.
- Use an N95 respirator mask for airborne transmission.

Wearing and Removing Masks:

- Ensure proper fit and change masks after 4-6 hours of use.
- Remove by handling only the strings.
- Discard appropriately and wash hands.

Gown:

Selecting a Gown:

- Use clean, non-sterile, impervious, and water-repellent gowns.
- Prefer disposable gowns; reusable gowns can be used with a plastic apron.

Wearing and Removing Gowns:

- Wear the gown properly, securing ties at the neck and waist.
- Remove the gown after gloves, discarding it properly.
- Wash hands and decontaminate.

Apron:

Selecting Aprons:

- Choose water-repellent, disposable plastic aprons.

Wearing and Removing Aprons:

- Wear apron over the uniform and tie around the waist.
- Remove by touching only the inside, discard or decontaminate.
- Wash hands thoroughly.

Protective Eyewear/Goggles:

Selecting Protective Eyewear:

- Opt for clear polycarbonate goggles with side and forehead shields.

Wearing and Removing Protective Eyewear:

- Wear by securing over the bridge of the nose and mask.
- Remove and place in a container for cleaning and decontamination.
- Change eyewear after each shift, wash, and decontaminate.

Gloves:

Selecting Gloves:

- Use clean/non-sterile gloves for routine care and sterile gloves for invasive procedures.
- Choose gloves that fit properly and check for punctures.

Wearing and Removing Gloves:

- Wear gloves by picking up the first glove and easing fingers into it.
- Remove gloves first when taking off PPE, avoiding contamination.
- Wash hands and decontaminate after removal.

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