



Infection Control Management Project

Volume 12: Guidelines of Infection Control for Hospital Administrators

1. Protocols for Administrative Staff
(Medical Superintendents, Chiefs of Nursing and Auxiliary Services).
2. Reference Text
3. Tool for Monitoring

January 2011



Infection Control Management Project

Volume 13: Guidelines of Infection Control for Hospital Administrators

Adapted by AAA team from:

1. The National Infection Control Guidelines, 2006. The National AIDS Control Program, Ministry of Health, Pakistan
2. Manual of National Standards for Family Planning, Prepared by FALAH Project – MOPW, Population Council, Jhpiego, USAID Islamabad
3. Performance Standards for Primary Health Care At Rural Health Care At Rural Health Centers/Basic Health Units, Prepared by Pride Project, USAID, JHPIEGO, International Rescue Committee, Management Sciences for Health
4. Safe management of wastes from health-care activities (1999): http://www.who.int/water_sanitation_health/medicalwaste/wastemanag/en/. WHO, 1999.
5. Infection Prevention Guidelines for Healthcare Facilities with Limited Resources. JHPIEGO and USAID. Linda Tietjen, Débora Bossemeyer, Noel McIntosh.
6. Infection Prevention Guidelines for Healthcare Facilities in Ethiopia. Federal Ministry of Health Ethiopia. Disease Prevention and Control Department. Addis Ababa, Ethiopia. July 2004
7. Participants Handbook. Injection Safety in the Context of Infection Prevention and Control. Ministry of Health and John Snow, Inc. Research and Training (MMIS – Kenya Program). October 2006.
8. Final Guideline. Infection Control. Prevention of healthcare-associated infections in primary and community care. National Institute of Health and Clinical Excellence, UK. 2003.



Protocols for Administrators

Infection Prevention in Hospitals

All administrative and management staff MUST:

1. Ensure safe **water supply for drinking and medical purposes.**
2. Ensure adequate infrastructure.
3. Ensure proper sanitation and sewerage system.
4. Ensure **adequate spatial separation of patients, including adequate inter-bed space.**
5. Regulate **traffic flow and activity** in different areas of the hospital.
6. Regulate **traffic and activity within the Surgical Unit.**
7. Check and maintain **ventilation and air quality** as per requirement of the site
8. Ensure guidelines for maintaining standards for **providing safe food**
9. Ensure **appropriate housekeeping practices, with use of PPE**
10. Observe **Linen Processing Guidelines**
11. Ensure that **Laundry is appropriately managed**
12. Ensure **appropriate equipment reprocessing for reuse.**
13. Ensure **appropriate management of different kinds of waste.**
14. Ensure availability and maintenance of **adequate handwashing facilities and supplies.**
15. Ensure availability of adequate number and type of **isolation rooms.**
16. Institute a **program to control rodents, pests and other vectors.**

Reference Text

1. Ensure safe water supply for drinking and medical purposes

Ensure cleaning of storage tanks, both under and over-ground every 6 months and check for bacterial contamination.



Drinking Water

Make sure that water is safe for drinking for patients, attendants and staff.

- A water filtration and treatment unit to conform to drinking water standards must be installed.
- Chlorination of water by making a separate underground water tank is another option.
- If water is being chlorinated on site, then test every day with the use of Iodometer (Chlorine testing through Iodometry) for maintaining standards. "Chlorine testing" probes are easily available in the market at cheap prices.
- Check water quality on monthly basis for biological testing.
- Chemical testing should be done every year.
- Hot and cold water will require different testing methods.
- Where safe drinking water is not available, it should be purified.
- Check water storage areas, containers and coolers to ensure a hygienic environment.
- Do not allow hands to enter storage containers. A tap should serve as a dispensing and closing device.



- Use disposable glasses for drinking, and keep separate glasses for each patient.

Water for medical use

- Contaminated water must NOT be used in operation theaters, preparation areas (for 'scrubbing') and ICUs. It is necessary to install filtration plant to provide safe water, alternatively, use appropriately treated water.
- Use appropriately treated water for instruments such as endoscopes (which may require rinsing after disinfection).

2. Ensure adequate infrastructure

It is imperative to have the **proper infrastructure** in place, along with its **proper maintenance**. It is important for the administrator of the hospital to ensure that these conditions must be met as they are extremely important for infection control.

This is important for both old and new hospitals. Older buildings pose a challenge, but these can be maintained or slowly modified to incorporate best practices.

Consideration must be given to **appropriate refurbishment, replacement and new construction work**, as inappropriate practices can lead to further problems. E.g. in one of the Pakistan's public sector hospitals, during refurbishment of the Operation Theater, false ceilings were installed. This is against infection control principles.

Floors, walls and roof

- Floors must have no cracks or crevices. Microorganisms and even pests can lodge in these cracks. This is especially important for Patient Care Areas (PCAs).
- Operation Theaters, labor rooms, and procedure areas will require better flooring with materials that can withstand chemical and physical treatment for decontamination and cleaning.
- Proper chemicals used in the cleaning of procedure areas must be carefully selected and used so that flooring and walls are not damaged.
- Walls of the storage areas, operations theatres, wards, etc. should not have any seepage
- Roofs must be protected and checked against any leaks.

3. Ensure proper sanitation and sewerage system.

Sanitation facilities are essential, with a properly maintained sewage collection system within the hospital, and a carrying system linked to a disposal site or sewerage system.

In case there is no sewerage system available in the region, waste water must be treated and should not be left flowing out in the open. This can be a serious concern and cause of infections in communities. A 2 stage septic tank, treating and neutralizing wastes is the bare minimum for hospitals.

Baths and toilets

- Educate patients and attendants in the use of common baths and toilets.
- Designate trained sanitary worker to be present on site round the clock, for guiding patients on the use of the toilet, as they may come from remote areas, not familiar to toileting and bathing facilities at the health facility.
- Display signs outside and inside the toilet in local language, with images, to prevent them from attempting to take off catheters, cannulae, IV drip sets, or leaving these inside.
- Educate patients on not throwing any pharmacologic agents, syringes or other medical/surgical devices and instruments into the toilet or leaving them in the baths.
- Patients with percutaneous devices (cannulae, central venous lines, catheters, etc) should be checked for appropriate waterproof occlusive dressings to protect potential entry points for organisms, before going for bathing, or using the toilet.
- Proper hand washing facilities should be available, with supplies for soap for patients, attendants and staff.
- Staff toilets also need close vigilance for cleanliness, and appropriate facilities.

4. Ensure adequate space for services, including adequate inter-bed space.

Adequate space arrangements must be made in the hospital according to the services provided. Crowding and congestion can also promote transmission of infections.

It is important to stratify areas in hospitals by degrees of risks for infections to staff and patients.

- A – Low-risk areas: e.g. administrative sections
- B – Moderate-risk areas: e.g. regular patient units
- C – High-risk-areas: e.g. isolation unit, intensive care units
- D – Very-high-risk areas: e.g. operating rooms, procedure rooms

General principles in relation to the placement of patients include the following:

Spacing between beds: In open plan wards there should be adequate spacing between each bed to reduce the risk of cross contamination/infection occurring from direct or indirect contact or droplet transmission. Optimum spacing between beds is 1-2m.

Isolation rooms: Single isolation rooms reduce the risk of transmission of infection from the source patient to others by reducing direct or indirect contact transmission. Where possible, single rooms should have hand washing and toileting facilities.

5. Regulate Traffic flow and Activity Pattern

Bacterial contamination is minimized by reducing the number of people permitted into an area and by defining the activities that take place there.

Ensure adherence to the 1 bed, 1 patient and 1 attendant principle. There should not be more than 1 person on the bed, and besides the patient, unless need is identified by the doctor.



Limit the number of visitors, by patient and attendant education and having security personnel.

Make a flowchart showing the flow of patients, visitors, staff (physicians, nurses and paramedics), supplies (expendable, sterile, catering, clothing, etc.) as well as the flow of air, liquids and wastes.

Consider general services (food and laundry, sterile equipment, and pharmaceutical distribution), specialized services (anesthesiology, medical imaging, medical or surgical intensive care) and other services or areas that are important in this aspect.

Strictly limit traffic flow in Procedure, and Instrument processing areas.

6. Regulate traffic and activity within the Surgical Unit.

OT Area Requirements include:

- Changing room and scrub area for clinic staff
- Preoperative area where clients are examined and evaluated prior to surgery;
- Operating room
- Recovery area for patient observation after surgery (may be combined with the preoperative area)
- Processing area for cleaning and sterilizing or high-level disinfecting instruments and other items
- Space for storing sterile packs and/or high-level disinfected containers of instruments and other items.

Procedure Area

- Limit traffic to authorized staff and patients at all times.
- Permit only the patient and staff performing and assisting with procedures in the procedure room. The number of trainees should be kept to a minimum.
- Provide hospital clothes for the patients undergoing surgical procedures.
- Staff should wear clothing and personal protective equipment according to the procedure performed.
- Have a covered container filled with a 0.5% solution for immediate decontamination of instrument and other items once they are no longer needed.
- Have a leakproof, covered waste container for disposal of contaminated waste items.
- Have a puncture-resistant container for safe disposal of sharps at point of use.
- Have storage space in procedure rooms for clean, high-level disinfected and sterile supplies.

Surgical Unit

- The surgical unit is divided into four designated areas
- **Unrestricted area** (a point through which staff, patients and materials enter the surgical unit)
- **Transition zone** (where staff put on surgical clothing)
- **Semi-restricted area** (a peripheral area of surgical unit and includes preoperative and recovery rooms)
- **Storage space** for sterile and HLD items, and corridors leading to the restricted area) and restricted area (consists of the operating room and scrub sinks).

Environmental controls and use of surgical clothing increase as one moves from unrestricted to restricted area. Staff with respiratory or skin infection and uncovered open sores should not be allowed to work in the surgical unit.

Unrestricted area needs no special traffic flow, whereas **transition zone** should allow only the authorized staff (Staff who perform or assist procedures in the procedure rooms). Display signs in local language limiting the entry of unauthorized persons, as applicable.

Semi-restricted Area

- Limit traffic to authorized staff and patients at all times.
- Have a work area for processing of clean instruments.
- Have storage space for clean and sterile or HLD supplies with enclosed shelves.
- Have door limiting access to the restricted area of the surgical units.
- Staff who work in this area should wear surgical clothing and a cap.

Restricted Area

- Limit traffic to authorized staff (staff who perform and assist procedures) and patients at all times.
- Keep the door closed at all times, except during movement of staff, patients, supplies and equipment.
- Scrubbed staff must wear full surgical clothing and cover head and facial hair with a cap and mask.
- Staff should wear clean, closed shoes.
- Masks are required when sterile supplies are opened and scrubbed staff are operating.
- Patients entering the surgical unit should wear clean gowns or be covered with clean linen, and have hair covered.

Operating Rooms

- Enclose the operating room to minimize dust and eliminate flies.
- The operating room should be located away from areas of the hospital or healthcare facility that are heavily traveled by staff and patients.

Before Surgery

- Place a clean, covered container filled with 0.5% chlorine solution for immediate decontamination of used instruments.
- Place a plastic bag or leakproof, covered waste container for contaminated waste items.
- Place a puncture-resistant container for the safe disposal of sharps at the point of use but without contaminating the sterile field.
- Place leakproof, covered waste container for soiled linen away from sterile items.
- Organize tables, both Mayo and ring stand side by side in an area away from the traffic pattern and at least 45 cm from walls, cabinets and other non-sterile surfaces.
- Place a clean sheet, a lift sheet and arm board covers on the operating room bed.
- Check and set up suction, oxygen and anesthesia equipment.
- Place supplies and packages that are ready to open on the tables, not on the floor.
- Mayo stand and other non-sterile surfaces that are to be used during the procedure should be covered with a sterile towel or cloth.

During Surgical Procedures

- Keep the number of people and their movements to a minimum by limiting the number of staff entering the operating room to only those necessary to perform the procedure. Minimize outside help during the procedure.
- Keep talking to a minimum.
- Keep doors closed at all times.
- **Scrubbed staff should wear full surgical clothing**—scrub suits, plastic apron, clean cap and mask protective eyewear, clean closed shoes, and sterile surgical gloves.
- Scrubbed staff should keep their arms and hands within the operative field at all times.
- **Non-scrubbed staff should wear surgical clothing**—cap, clean closed shoes, mask, and protective eyewear.
- Non-scrubbed staff should stay at the periphery of the operating room.

Clean accidental spills or contaminated debris in areas outside the surgical field with a 1% chlorine solution as promptly as possible.

After Surgery

Staff wearing utility gloves must:

- Collect all waste and remove it from the room in closed leakproof container.
- Close and remove puncture resistant container when they are three quarter full.
- Remove covered container with a 0.5% chlorine solution, with instruments and surgical gloves in it, from operating room.
- Remove soiled linen.
- Remove waste, soiled linen, soiled instruments and equipment, and supplies that have been opened but not used, in an enclosed cart for reprocessing.

Work Area for Instrument Processing

Work area consists of four areas—“dirty” receiving/cleanup area, clean work area, the cleaned equipment storage area, and sterile or HLD storage area.

- **Dirty receiving/cleanup area** should have: a receiving counter; 2 sinks if possible with a clean water supply; and a clean equipment counter for drying.
- **Clean work area** should have: a large work table; Shelves for holding clean and packaged items; and a high-pressure autoclave, a dry-heat oven, a steamer or a boiler.
- **Clean equipment storage area** should have: Shelves for storing clean equipment; and desk for record keeping.

Sterile or HLD Storage Area

This area should be separated from the sterilization area. Dispense sterile and high-level disinfected articles from this area

- Limit access to the storage area and/or store items in closed cabinets or shelves.
- Touch or handle sterile packages as little as possible.
- Keep storage area clean, dry, dust-free and lint-free by regular housekeeping
- Packs and containers with sterile or HLD should be stored 20–25 cm off the floor, 45–50 cm from the ceiling and 15–20 cm from an outside wall.
- Do not use cardboard boxes for storage.
- Date and rotate the supplies.
- Ensure adherence to the **First In-First Out Principle**, and the **First Expiry, First Out Principle**.
- Before dispensing any item that has been stored, check the package to be sure it is not dirty, wet, or damaged.

The packs will remain sterile as long as the integrity of the package is maintained. Sterile or HLD containers will remain so until they are opened.

7. Check and maintain ventilation and air quality as per requirement of the site

Airborne infections are important to be controlled, for which regular cleaning, ventilation and special air cleaning systems are required. General guidelines are below.

- Use wet cleaning methods for sweeping, dusting and cleaning.
- All infectious disease should wear masks to prevent against spread of infections.
- Do not sweep floor and dust any surfaces (as infection may be transmitted over short distances by large droplets, and at longer distances by droplet nuclei).
- Do not shake out linen (as it aerosolizes particles containing microorganisms).
- Keep air conditioning towers, ducts and outlets clean

- Keep bath areas clean and dry.
 - Keep numbers of patients and their attendants in strict check.
 - Ensure that all spaces are well ventilated to keep the amount of microorganisms down.
 - Inspect and maintain the ventilation systems, which can be simple fly covered windows by keeping them clean.
 - Install exhaust fans where applicable.
 - Air flow from fans inside rooms, should be directed outside, so that dilution of air occurs, bringing down the number of microorganisms.
 - Document maintenance, and review on a monthly basis.
- **Do not allow smoking by staff and public. It is a federal offence. Display appropriate signs in local language throughout the hospital.**

Ultra-clean air for OT, Laboratory, Labor Rooms

- Install high-efficiency particulate air (HEPA) filters if possible in sensitive areas especially OT, Labor Room and Laboratory.
- HEPA filters are available as fixed or mobile units, the mobile units being far more affordable.
- Maintain HEPA filters according to manufacturer's instructions.
- HEPA filters can also be used as a dual filtration and exhaust mechanism in OTs.
- For **operating theatres**, a unidirectional clean airflow system with a minimum size of 9m² (3m x 3m), and with an air speed of at least 0.25 m/s, protects the operating field and the instrument table. This ensures instrument sterility throughout the procedure.
- As a second choice, good quality air conditioners with Ozone and other filtration mechanisms can be installed.
- Maintain air conditioning at least every 4 months, or more in dusty environments.
- Avoid direct current flow of air from wards and corridors into the OT.
- Take care of ventilation to keep numbers of microorganisms from building up.
- Minimize inflow of air from the surrounding rooms and corridors. Use and install exhaust fans with care, so as to dilute air using fresh air from outside.
- In **laboratories**, use special unidirectional airflow hoods to handle microbial cultures (particularly for certain highly infectious cultures for protecting workers and environment from contamination).
- Use similar hoods in pharmacies and NICUs to prevent airborne contamination of sterile fluids. For example, when adding an antibiotic to a container of sterile glucose solution for intravenous use, or when preparing fluids for parenteral hyperalimentation.
- Instruct all personnel to observe standard procedures including wearing appropriate clothing, caps and masks to limit amount of microorganisms from skin, mouth and nose.

8. Ensure guidelines for maintaining standards for providing safe food

Ensure safe food for patients, caregivers, visitors and staff members.

- Check water, milk, and solid foods - all potential vehicles for transmission.
- Check that hospital kitchen supplies, waste and operations do not overlap with infectious or hazardous materials.

For food preparation and storage, check that:

- Hand hygiene facilities are available to food handlers and cooking staff.
- Food is appropriately cooked.
- Food is not prepared for more than half-day in advance of needs, is not stored at room temperature, and is refrigerated or frozen at the right temperatures.
- If reheated, it is adequately heated.
- Raw and cooked food is stored separately to avoid cross-contamination.
- Clean work areas are maintained.
- Food handlers and cooks observe strict personal hygiene standards, such as wearing appropriate clothing, maintaining nails, handwashing, caps and masks.
- Stool Routine Examination should be done in routine for people handling and cooking food.
- Staff vaccination must be complete. Follow guidelines for Healthcare Worker Safety.
- Staff avoids handling raw and cooked food in the presence of an infectious disease (cold, influenza, diarrhea, vomiting, throat and skin infections), and all infections are reported to the supervisor incharge.
- Outbreaks of food poisoning, even suspected incidents are investigated and reported.
- Periodic hygiene checks are maintained, throughout the chain from acquisition of raw materials to final disposal of all items.
- The refrigerator must be maintained and its temperature recorded maintenance recorded on a daily basis.
- Staff incharge should check food for quality and taste.
- Keep separate cutting equipment and boards for meats and salads/vegetables.
- Check for cold chain maintenance.
- Use properly covered trolleys for transporting food. Check for leakages in the trolley. Also disinfect trolley every week.

9. Ensure appropriate housekeeping practices, with use of PPE

Housekeeping refers to the general cleaning of hospitals and clinics, including the floors, walls, certain types of equipment, tables, and other surfaces. The purpose of general housekeeping is to: reduce the number of microorganisms that may come in contact with patients, visitors, staff and the community; and provide a clean and pleasant atmosphere for patients and staff.

General Principles

- **Scrubbing (frictional cleaning)** is the best way to physically remove dirt, debris and microorganisms.
- **Cleaning** is required prior to any disinfection process because dirt, debris and other materials can decrease the effectiveness of many chemical disinfectants.
- Always progress **from the least soiled areas to the most soiled areas** and from **high to low areas**, so that the dirtiest areas and debris that fall on the floor will be cleaned up last.
- **Dry sweeping, mopping and dusting should be avoided** to prevent dust, debris and microorganisms from getting into the air and landing on clean surfaces.
- **Follow mixing (dilution) instructions** for disinfectants. Too much or too little water may reduce the effectiveness.
- Make and follow **written cleaning schedules**.
- Each ward or area must be thoroughly cleaned (all surfaces, walls, ceilings washed) once a week. This is popularly referred to as "wash day."

Use of PPE in Housekeeping

PPE Equipment	When to wear
Gloves (preferably household utility gloves)	Handling disinfectant cleaning solutions Cleaning patient care areas
Shoes that protect feet from accidentally dropped items (sharps) and blood and body fluids	Cleaning heavily contaminated areas Handling soiled linen Handling soiled items and instruments Handling or disposing of waste
Plastic or rubber apron Protective eyewear	When splashes and spills are expected

Cleaning Methods

Make sure that the staff is educated about the frequency of cleaning, with the type of cleaning method used at each site, and for each type of equipment and surface.

Start cleaning with the least soiled area, moving to the most soiled area and from high to low surfaces.

Use wet mopping with:

Single-bucket (basin) technique: One bucket of cleaning solution is used. The solution must be changed when dirty. The killing power decreases with the increased load of soil and organic material present.



Double-bucket technique: Two different buckets are used, one containing a cleaning solution and the other containing rinse water. The mop is always rinsed and wrung out before it is dipped into the cleaning solution. The double-bucket technique extends the life of the cleaning solution (fewer changes required), saving both labor and material costs.

Do Not Use Formaldehyde/Formalin

- Do not use disinfectant fogging (e.g., fumigation with dilute formaldehyde (formalin) solutions) to reduce microbial contamination of environmental surfaces such as walls, ceilings and floors.
- It is not effective, is time-consuming (requires 24 hours) and the fumes are toxic (irritating to mucous membranes of the nose and eyes).
- Scrubbing with a disinfectant and cleaning is a safer, quicker and more effective way to reduce microbial contamination on these surfaces.

Cleaning Schedule and Procedures for the Operating Room

AVOID: Dry mopping or sweeping.

BEGINNING of the Day: all flat (horizontal) surfaces (table, chairs, etc.) should be wiped with a clean, lint-free moist cloth to remove dust and lint that may have collected overnight. These will also require cleaning with hypochlorite solution.

Total cleaning is not necessary between each case for surgical procedures.

END of the day: Perform **Total Cleaning or Terminal Cleaning** (mopping floors and scrubbing all surfaces from top to bottom) of the operating room.

CLEANING THE OT

- Use **flooding** followed by mopping. If possible, use **wet vacuuming**, if possible (eliminates mopping, minimizing the spread of microorganisms). This

method increases the contact time of disinfectants with the surface to be cleaned.

- Leave floor wet for several minutes before cleaning (best done at night or when foot traffic is minimal).
- Wet vacuuming must be done at least once a week.

Dusting

- Most commonly used for cleaning walls, ceilings, doors, windows, furniture and other environmental surfaces.
- Avoid dry dusting.
- Perform dusting in a systematic way, using a starting point as a reference to ensure that all surfaces are reached.
- Make sure that clean cloths or mops are wetted with cleaning solution contained in a basin or bucket (double-bucket system minimizes the contamination of the cleaning solution).
- During high dusting (ceiling and walls), check for stains that may indicate possible leaks. Repair leaks without delay, as moisture provides a reservoir for fungal growth.
- NEVER SHAKE DUST CLOTHS AND MOPS.
- Do not use any carpets in any area of the hospital, especially in any areas of the OT including recovery and doctor's rooms.



Cleaning Surfaces and Equipment in the OT

Walls and ceilings	Wipe with a damp cloth, detergent and water as needed for visible soil.
Chairs, lamps, sinks, tabletops and counters	Wipe with a damp cloth and disinfectant cleaning solution.
Operating room lamp	
Operating room table	Wipe with a 0.5% chlorine solution (or other approved disinfectant) to decontaminate. Then clean top, sides, base, legs and any accessories (e.g., leg stirrups) with a damp cloth and disinfectant cleaning solution.

Floors	Clean with a wet mop using a disinfectant cleaning solution. Use double or triple-bucket method for the cleaning of the operating room and other areas of the surgical suite.
Vents (heating or air conditioning)	Wipe with a damp cloth, soap and water.
Fans, ACs	Cover with khaki paper during winters. Electrician should check functioning and servicing before the start of the summer season.



Cleaning the Operating Room Before Each Surgical Procedure

Spills	Clean spills with a 0.5% chlorine solution or other locally available and approved disinfectant.
Operating room bed	Wipe all surfaces and mattress pads with a disinfectant cleaning solution.
Instrument tables (trolley and Mayo stand) and other flat surfaces	Wipe all flat surfaces that have come in immediate contact with a patient or body fluids with a disinfectant cleaning solution.
Center of operating room surrounding the operating room bed	Mop with a disinfectant cleaning solution (if visibly soiled).
Waste	Collect and remove all waste from the operating room in closed leakproof containers.
Sharps containers	Close and remove containers from the operating room when they are three quarters full.
Containers with a 0.5% chlorine solution for decontamination	Remove covered containers with instruments from the operating room and replace them with clean containers with a fresh 0.5% chlorine solution.
Soiled linen	Remove soiled linen in leakproof, covered waste containers.

Cleaning Soiled and Contaminated Cleaning Equipment

- Decontaminate cleaning equipment that has been contaminated with blood or body fluids by soaking it for 10 minutes in a 0.5% chlorine solution or other locally available and approved disinfectants.
- Wash cleaning buckets, cloths, brushes and mops with detergent and water daily, or sooner if visibly dirty.
- Rinse in clean water.
- Dry completely before reuse. (Wet cloths and mop heads are heavily contaminated with microorganisms.)

Cleaning Spills of Blood and other Body Fluids

Ensure that cleaning of spills of blood, body fluids and other potentially infectious fluids is IMMEDIATE, with trained personnel. Any incident involving patients that need or needed potential isolation measures, or suspected outbreak should be efficiently reported.

In the event of a spill, the following spill clean-up procedure should be used:

For small spills

- Wear utility or examination gloves
- Remove visible material using a cloth soaked in a 0.5% chlorine solution
- Wipe clean with a disinfectant cleaning solution.

For large spills

- Cordon off the area so that staff do not accidentally step on the spill.
- Wear utility gloves and protective clothing, including face and eye protection.
- Contain the spill with cloth or paper towels or any absorbent material. Use an appropriate disinfectant (0.5% Chlorine solution) over the paper towels (absorbent material) and the immediate surrounding area.
- Apply disinfectant concentrically beginning at the outer margin of the spill area, working toward the centre.
- Mop up the solution.
- After the appropriate amount of time (e.g. 30 min), clear away the materials.
- Do not use hands for collection of glass and other materials. If there is broken glass or other sharps involved, use a dustpan or a piece of stiff cardboard to collect the material and deposit it into a puncture-resistant container for disposal.
- Disinfect the area of the spillage.
- Clean as usual with detergent and water.

Schedule and Procedures for Different Areas

Write up schedules and follow them closely. Detailed guideline is below.

Site, Areas, Equipment	Cleaning schedule and procedure
Patient rooms	Clean daily and after patient discharge. Same cleaning process applies to rooms used for isolation. Keep SEPARATE cleaning equipment for isolation rooms, and disinfect and clean on a routine basis, if possible. If same equipment is to be used, clean and disinfect equipment used in isolation rooms, before being used in another room.
Walls, windows, ceilings and doors, including door handles	Spot clean when visibly dirty with a damp cloth, detergent and water. Usually, routine damp dusting is adequate; disinfection not required.
Chairs, lamps, tables, tabletops, beds, handrails, grab bars, lights, tops of doors and counters	Wipe daily and whenever visibly soiled with a damp cloth, containing disinfectant cleaning solution. Disinfectant necessary when contaminated, such as blood, body fluid spills.
Noncritical equipment (e.g., stethoscopes and blood pressure cuffs)	Wipe daily and whenever visibly soiled with a damp cloth, detergent and water. If equipment visibly soiled with blood or other body fluids or the patient is under contact precautions, it should be cleaned AND disinfected before reuse.
Floors	Daily and as needed with a wet mop, detergent and water. Disinfectant needed, when contaminated.
Sinks	Scrub daily or more often as needed. Use SEPARATE mop, cloth, brush and disinfectant cleaning solution. Rinse with water.
Toilets	Scrub daily or more often as needed. Use SEPARATE mop, cloth, brush and disinfectant cleaning solution.
Curtains	Change and clean curtains according to the routine schedule and when visibly soiled.
Carpets	As a principle, do NOT use carpets in any area of the hospital.
Soiled linen	Collect soiled linen daily (or more often as needed) in closed, leakproof containers.
Procedure rooms	After each procedure and whenever visibly soiled, wipe horizontal surfaces, equipment and furniture with disinfectant cleaning solution. Clean blood or other body fluid spills.
Examination rooms	After each procedure and whenever visibly soiled, wipe horizontal surfaces, equipment and furniture with disinfectant cleaning solution. Ideally, linen on the examination table should be changed after each patient. Clean blood or other body fluid spills.
Laboratory	Wipe countertops with a disinfectant cleaning solution after each shift and whenever visibly soiled.

Site, Areas, Equipment	Cleaning schedule and procedure
	Clean blood or other body fluid spills.
Operation Theater (OT)	Perform Terminal Cleaning with hypochlorite and detergent solution, once every week. This can be done on a Sunday when routine surgery is not being performed. Terminal Cleaning includes cleaning of walls, ceiling, floor, all horizontal surfaces, all cabinets and storage areas.
Waste	Collect waste from all areas at least daily, or more frequently as needed. Avoid overflowing.
Waste containers	Clean contaminated waste containers after emptying each time. Clean non-contaminated waste containers when visibly soiled and at least once a week. Use a disinfectant cleaning solution and scrub to remove soil and organic material.
Kitchen	Terminal cleaning must be done every week. Defrost and clean refrigerators and freezers every week. Perform pest control, including use of sprays, physical traps, etc. Thoroughly clean all drains. Clean all food savers, containers of spices, cabinets, and all storage areas and equipment. Clean the exhaust fans, and exhaust piping and surrounding walls. Use hot water washing for the entire kitchen.
Labor Room Tables and Procedure Tables in OT	Rotate table to clean surfaces that are usually not cleaned. Blood and body fluids quietly seep under the table base, and have to be appropriately decontaminated and cleaned.

10. Observe Linen Processing Guidelines

Wear gloves and other PPE when collecting, handling, transporting, sorting and washing soiled linen.

PPE use for handling linen

PPE Equipment	When to wear
Gloves (preferably household utility gloves) and closed shoes that protect feet from dropped items (sharps) and spilled blood and body fluids	<ul style="list-style-type: none"> • Handling disinfectant solutions • Collecting and handling soiled linen • Transporting soiled linen • Sorting soiled linen • Hand washing soiled linen • Loading automatic washers

Plastic or rubber apron and protective eyewear	<ul style="list-style-type: none"> • Sorting soiled linen • Hand washing soiled linen • Loading automatic washers
--	--

YOU MUST:

- Consider all cloth items (e.g., surgical drapes, gowns, wrappers) used during a procedure as infectious. EVEN IF THERE IS NO VISIBLE CONTAMINATION, THE ITEM MUST BE WASHED.
- During collection and transporting soiled linen, handle it as little as possible and with minimum contact to avoid accidental injury and spreading of microorganisms.
- Do not put soiled linen on the floor during collection or carriage.
- For transport, use big trolleys that are covered.
- Alternately collect in a big plastic bag that can be sealed from the top during transport.
- Carry soiled linen in covered containers or plastic bags to prevent spills and splashes, and confine the soiled linen to designated areas (interim storage area) until transported to the laundry.
- Check all trolleys, carts and containers for collection and transport of linen for leakage.
- CAREFULLY SORT ALL LINEN IN THE LAUNDRY AREA BEFORE WASHING.
- DO NOT PRESORT OR WASH LINEN AT THE POINT OF USE.

Guidelines for blankets

- Blankets are to be washed after each patient's use.
- Do not allow sharing of blankets between patients and attendants.
- Appropriate number of blankets should be made available.
- Acrylic and thick cotton blankets, or of appropriate materials are preferable that can withstand washing on a regular basis.
- Blanket covers must also be used, but both should be washed. The cover should be made of a material that can be decontaminated.
- All blankets are to be washed at least once every week.

Linen from OT, Procedure Areas

- All Linen from OT and Procedure areas must be washed.
- This must be kept separate and washed separately.
- Alternately, a day once a week can be designated for washing all linen from these sites to avoid mixed washing with other linen.

Collecting, Transporting Soiled Linen

Check the following after each and every invasive medical or surgical procedure or when changing linen in patient rooms, which is usually once daily:

- Collect used linen in cloth or plastic bags or covered containers. If linen is heavily contaminated with blood or body fluids, carefully roll the contaminated area into the center of the linen and place in a leakproof bag or container with a lid.
- Cloth bags are adequate for the majority of the patient care linen. They require the same processing as their contents.
- DO NOT SHAKE LINEN. This helps prevent spreading microorganisms to the environment, personnel and other patients.
- It is not necessary to double-bag or use additional precautions for used linen from patients in isolation.
- DO NOT SORT AND WASH SOILED LINENS IN PATIENT CARE AREAS.
- Transport collected soiled linen in closed leakproof bags, containers with lids or covered carts to the processing area daily or more often as needed.
- Transport soiled linen and clean linen separately. Label carts or containers for soiled and clean linen accordingly.



Safe Sorting of Linen

- **For protecting against Sharps**, take extreme care as large drapes and towel drapes from the operating room or other procedure areas frequently contain sharps (scalpels, sharp-tipped scissors, hypodermic and suture needles and sharp-tipped towel clips).
- The processing area for soiled linen must be separate from other areas, such as those used for folding and storing clean linen, patient care areas and food preparation areas.
- Maintain adequate ventilation and physical barriers (walls) between the clean and soiled linen areas.
- Dispose all sharps in sharps containers, located close at hand.
- Wash PPE after sorting. Wash hands at the end.

11. Ensure that Laundry is appropriately managed

- Thoroughly wash all linen items (e.g., bed sheets, surgical drapes, gowns) used in the direct care of a patient, before reuse.
- **Both heavily soiled linen and linen that needs to be hand washed must be decontaminated.** This is important for the safety of the workers.
- Remember that repeated soaking of linen in chlorine, even dilute solutions, will cause the fabric to deteriorate more quickly.
- Use appropriate PPE for hand washing linen.
- Do not carry wet, soiled linen close to the body even if wearing a plastic or rubber apron.

Hand Washing Linen

- Wash heavily soiled linen separately from non-soiled linen.
- Wash the entire item in water with liquid soap to remove all soilage, even if not visible.
- Use tap water, or warm water if available.
- Add bleach (e.g., 30–60 mL, about 2–3 tablespoons, of a 5% chlorine solution) to aid cleaning and bactericidal action.
- Add sour (a mild acid agent) to prevent yellowing of linen, if desirable.
- Check the item for cleanliness. Rewash if it is dirty or stained.
- Rinse item with clean water.

Storing Clean Linen

- Keep clean linen in clean, closed storage areas.
- Use physical barriers to separate folding and storage rooms from soiled areas.
- Keep shelves clean.
- Handle stored linen as little as possible.

Transporting Clean Linen

- Wrap or cover during transport to avoid contamination.
- Clean containers or carts once every day in routine.
- Label clean and soiled linen containers and transport cars.

Distributing Clean Linen

- Protect clean linen until it is distributed for use.
- Do not leave extra linen in patient's rooms and wards.
- Handle clean linen as little as possible.
- Clean soiled mattresses before putting clean linen on them.

Consider the option of installing a laundry plant at bigger hospital sites, where patient loads are high.

12. Ensure appropriate equipment reprocessing

Educate all healthcare staff, including cleaning, medical and paramedical staff on the importance and rationale for each of the recommended infection prevention processes and their limitations.

DECONTAMINATION

Decontamination is the first step in handling used instruments and gloves.

Immediately after use, all instruments should be placed in 0.5% chlorine solution for 10 minutes to inactivate most organisms, including HBV and HIV.

For achieving satisfactory decontamination:

- Make fresh solution every morning, or more often if the solution becomes cloudy.
- Use plastic, non-corrosive container. This prevents sharp instruments from getting dull due to contact with metal containers. It also prevents instruments from getting rusted due to chemical reaction that can occur between two different metals when placed in water.

- Do not soak metal instruments in water for more than one hour, even if they are electroplated, to prevent rusting.
- Do not mix chlorine solutions with either formaldehyde or with ammonia-based solutions as toxic gas may be produced.
- Do not mix chlorine with soapy solutions.

Decontaminating Hypodermic Needles, Syringes, and Large Surfaces

- Decontaminate used hypodermic needles and syringes, and place in a puncture-resistant sharp container.
- Large surfaces, such as pelvic examination or operating tables, or tables for delivery, should be decontaminated using 0.5% chlorine solution.

Decontaminating Used Instruments and Other Items

- Keep surgical or examination gloves after completing the procedure.
- Place all instruments in 0.5% chlorine solution for 10 minutes immediately after completing the procedure.
- Decontaminate any surface contaminated during the procedure by wiping them with a cloth soaked in 0.5% chlorine solution.
- Immerse gloved hands in 0.5% chlorine solution.
- Remove gloves by turning inside out. If disposing of gloves, place them in a leak proof plastic container.
- If reusing gloves, soak in 0.5% chlorine solution for 10 minutes for decontamination.
- Remove instruments from 0.5% chlorine solution after 10 minutes and immediately rinse them with cool water to remove residual chlorine before being thoroughly cleaned.
- Two buckets can be used in the procedure areas or operating rooms, one filled with 0.5% chlorine solution and one with water, so instruments can be placed in the water after 10 minutes to help prevent corrosion.

Remember: Leaving instruments in plain water for more than one hour can lead to rusting.

Steps for Making a 0.5% Chlorine Solution for Decontamination

Various common methods of making a 0.5% Chlorine solution are given below. However, follow the manufacturer's guidelines for making the appropriate strength.

- Bleach 32%: 1 part bleach + 63 parts water
- Bleach 5%: 1 part bleach + 9 parts water
- Calcium hypochlorite 35%: 14g bleach powder in 1 litre water
- Calcium hypochlorite 70%: 7g bleach powder in 1 litre water
- **Bleach powder is preferable over liquid chlorine**, since the liquid loses its strength over time.
- Liquid chlorine should be stored as little as possible, while do not order over a week's supply.

- **Strength is checked subjectively** – chlorine active in solution smells it, while it bleaches coming into contact with soiled materials.

CLEANING

- After decontamination of soiled instruments or gloves in 0.5% chlorine solution for 10 minutes, they must be cleaned to remove organic materials or chemical residue.
- Use liquid soap, if available. Liquid soap removes grease, oil, and other foreign matters so that they can be removed easily by cleaning.
- AVOID Abrasive cleaners used for household cleaning, including steel wool, as they scratch the instruments, are potential sites for harboring microorganisms.

Effectiveness of Methods for Processing Instruments

METHOD	EFFECTIVENESS in killing or removing microorganisms	END POINT
Decontamination	Kills HBV and HIV and most microorganisms	10 minute soak
Cleaning (water only)	Up to 50%	Until visibly clean
Cleaning (soap and rinsing with water)	Up to 80%	Until visibly clean
High-Level Disinfection	95% (does not inactivate some endospores)	Boiling, steaming or chemical for 20 minutes
Sterilization	100%	High-pressure steam, dry heat or chemical for recommended time

Important Precautions in Cleaning

- Wear thick household or utility gloves while cleaning instruments and equipment. Discard if torn or damaged.
- Wear protective eyewear (plastic visors, face shields, goggles or glasses, protective shoes) and a plastic apron (to minimize the risk of splashing contaminated fluids into the eyes and onto the body).
- Keep items being washed under the surface of the water, to prevent splashing.
- Instruments should be washed with a soft brush in soapy water.
- Pay particular attention to instruments with teeth, joints, or screws where organic material can collect.
- After cleaning, rinse thoroughly with clean water to remove soap residue that can interfere with chemical disinfectants used for HLD or sterilization.

REMEMBER: DISCARD ITEMS THAT CANNOT BE CLEANED THOROUGHLY.

STERILIZATION

Sterilization should be used for instruments, surgical gloves and other items that come in direct contact with the blood stream or normally sterile tissues. Sterilization can be achieved by physical agents such as high-pressure steam (autoclaving), dry heat, or appropriate chemical sterilants.

Autoclaving

- Do not put plastic or rubber instruments or equipment in the autoclave unless the manufacturer's instructions say it is safe, as they will melt. Where electricity is a problem, sterilize in a nonelectric steam sterilizer using kerosene or other fuel as a heat source.



- Make sure that instruments and items to be sterilized have been decontaminated, cleaned and dried.
- Open or unlock all jointed instruments.
- Disassemble instruments composed of more than one part or sliding parts.
- Check that instruments are not held tightly together by

rubber bands or any other means that will prevent steam contact with all surfaces.

- Wrap sharp edges and needle points in gauze before sterilizing to help prevent dulling of sharp instruments. Repair or replace instruments as needed.
- Do not allow to boil dry. Steam should always be escaping from the pressure valve.
- If using a pressure cooker or kerosene-powered gravity displacement steam sterilizer, bring the water to a boil and let steam escape from the pressure valve; then turn down heat, but keep steam coming out of the pressure valve.
- Sterilize at 121C (250F) for 30 minutes for wrapped items, 20 minutes for unwrapped items; time with a clock. Start counting time after the pressure has reached 15 Lbs/in² or 106 kPa.
- Wait 20–30 minutes (or until the pressure gauge reads zero) to permit the sterilizer to cool sufficiently. Then open the lid or door to allow steam to escape.
- Allow instrument packs to dry completely before removal, which may take up to 30 minutes. (Wet packs act like a wick drawing in bacteria, viruses and fungi from the environment). Wrapped instrument packs are considered unacceptable if there are water droplets or visible moisture on the outer surfaces of the packages when they are removed from the steam sterilizer chamber. If using rigid containers, close the lids tightly.
- To prevent condensation, when removing the packs from the chamber, place sterile trays and packs on a surface padded with paper or fabric.

- After sterilizing, items wrapped in cloth or paper are considered sterile as long as the pack remains clean, dry and intact. Unwrapped items must be used immediately or stored in covered sterile containers.
- Do not store trays or packs until they reach room temperature. This usually takes about an hour.
- Maintain a steam sterilizer log including, heat begun, correct temperature and pressure achieved, heat turned down, and heat turned off.
- Each load should be monitored with mechanical (time, temperature and pressure) and chemical (internal and external chemical test strips) indicators.
- Test autoclave daily with an air-removal test to ensure proper air removal.

Guidelines for Operating and Maintaining Autoclave Machines

- To ensure proper steam contact:
- Decontaminate, clean and dry objects being sterilized as per guidelines.
- Keep instruments opened, and unlocked.
- Do not stack the instruments.
- Do not wrap the packages too tightly.
- Do not arrange the packs in the sterilizer too close to each other.
- Position the containers in a way that air can easily be displaced and steam can have enough contact with all surfaces.
- Ensure that the small drain strainer at the bottom of the sterilizer is not clogged. This may result in trapping air inside the sterilizer.
- Follow the manufacturer's manual for maintenance of the sterilizer. In some cases, however, a weekly flush of hot liquid soap through the exhaust line will keep it cleaned out.
- Appropriate Temperature (121C all throughout the process), Timing (20 minutes for unwrapped and 30 minutes for wrapped), and adequate moisture (100% moisture in the steam) should be ensured during any autoclaving cycle.
- To ensure correct operation, when available, consult specific operating instructions from the manual supplied by the manufacturer.

Sterilization by Dry Heat

When available, dry heat is a practical way to sterilize needles and other sharp instruments. Dry-heat sterilization can be achieved with a simple oven as long as a thermometer is used to verify the temperature inside the oven.

Instructions for Using Dry Heat for Sterilization

- Use dry heat only for items that can withstand a temperature of 170C/340F.
- Decontaminate, clean, and dry all instruments and other items to be sterilized.
- If desired, wrap instruments in aluminum foil or place in a metal container with a tight-fitting, closed lid. (Wrapping helps prevent recontamination prior to use).
- Suture needles should be placed in glass tubes with cotton stoppers. When



using dry heat to sterilize items wrapped in cloth, be sure that temperature does not exceed 170C/340F.

- Needles and instruments with cutting edges should be sterilized at lower temperatures (160C [320F]), because higher temperatures can destroy the sharpness of cutting edges.
- Place loose instruments in metal containers or on trays in the oven and heat to the desired temperature.
- After the desired temperature is reached, begin timing. Temperature and time guidelines are below:

170C (340F) 60 minutes

160C (320F) 120 minutes

150C (300F) 150 minutes

140C (285F) 180 minutes

121C (250F) overnight

- Depending upon the temperature selected, the total cycle time (preheating, sterilization time and cool down) will range from 2.5 hours at 170C to more than 8 hours at 121C.
- After cooling, remove packs and/or metal containers and store in a cool dry area. Loose items should be removed with sterile forceps and used immediately or placed in a sterile container with a tight-fitting lid.

Chemical Sterilization

Chemical sterilization is useful for those items, which would be damaged by high-pressure steam or dry heat. There are various precautions to be observed depending on the chemical being used. Follow manufacturer's guidelines, while also observing safety aspects. Glutaraldehyde and Formalin/Formaldehyde are extremely dangerous chemicals which are not to be used, and should be replaced with alternates. Also while their use is being phased out, proper usage is also necessary.

Remember:

- **Glutaraldehyde** (common tradename: Cidex) is carcinogenic, causes respiratory and skin irritation, and so it should not be used. Alternates are available, which should be explored for use for specific needs. Glutaraldehyde works best at room temperature, and will NOT WORK IN COLD ENVIRONMENTS (temperatures less than 20C/68F), even with prolonged soaking.
- FORMALDEHYDE IS NOT TO BE USED BECAUSE OF ITS DANGERS. IT SHOULD ALSO NEVER BE MIXED WITH CHLORINE OR CHLORINATED WATER because a dangerous gas (bis-chloromethyle-ether) is produced.
- Decontaminate, clean and dry all instruments and other items to be sterilized.
- Completely submerge items in a clean container filled with the chemical solution and place the lid on the container.
- Remove objects from the solution with sterile forceps; rinse all surfaces three times in sterile water and air dry. Ideally, three separate (sequential) rinse containers should be used.

Monitoring Sterilization: Methods, their Advantages and Disadvantages

- **Biological Indicators** are recommended for use at regular intervals. For steam sterilizers, *Bacillus stearothermophilus*, weekly and as needed and for dry-heat sterilizers, *Bacillus subtilis*, weekly and as needed.
- **Chemical Indicators** (tape or labels) monitor time, temperature and pressure for steam sterilization, and time and temperature for dry-heat sterilization.
 - Chemical indicators, such as heat sensitive tape or glass vials containing pellets that melt at certain temperatures for a given time, do not guarantee that sterilization has been achieved. They only indicate whether mechanical or procedural problems in the sterilization process have occurred.
- **External indicators** should be used to verify that items have been exposed to the correct conditions of the sterilization process and that the specific pack has been sterilized.
- **Internal indicators** are placed inside a pack or container in the area most difficult for the sterilization agent (steam or heat) to reach (i.e., the middle of the linen pack).
- **Mechanical indicators** for sterilization provide a visible record of the time, temperature and pressure for that sterilization cycle. This is usually a printout or graph from the sterilizer, or it can be a log of time, temperature and pressure kept by the person responsible for the sterilization process that day. This is most inexpensive way to make sure that sterilization process was carried out as per the guidelines.

Storing sterile items

All sterile items should be stored appropriately to protect them from dust, dirt, and moisture. The storage area should be located next to or connected to where sterilization occurs, in a separate enclosed area with limited access that is used just to store sterile and clean patient care supplies.

- Keep the storage area clean, dry, dust-free and lint-free.
- Control temperature and humidity (approximate temperature 24C and relative humidity <70%) when possible.
- Packs and containers with sterile (or high-level disinfected) items should be stored 1 foot off the floor, 2 feet from the ceiling and 0.5 to 1 feet from an outside wall.
- Do not use cardboard boxes for storage. Cardboard boxes shed dust and debris and may harbor insects.
- Date and rotate the supplies (first in/first out). This process serves as a reminder, but does not guarantee sterility of the packs.
- Distribute sterile and high-level disinfected items from this area.

Shelf Life

The shelf life of an item after sterilization is event-related. The item remains sterile until something causes the package or container to become contaminated—time elapsed since sterilization is not the determining factor.

- To make sure items remain sterile until you need them, prevent events that can contaminate sterile packs, and protect them by placing them in plastic covers (thick polyethylene bags).
- Before using any sterile item, look at the package to make sure the wrapper is intact, the seal unbroken and is clean and dry (as well as having not water stains).
- If the quality of wrapping cloth is poor and plastic bags are not available, limiting the shelf life is a reasonable option to ensure the sterility of the instruments.

HIGH-LEVEL DISINFECTION

HLD is the alternative if sterilization equipment is either not available or not suitable. This method may be used when resources are constrained, for example in emergency situations when electricity or gas supply may be compromised. Also this may be the only method possible in remote locations.

How to Prepare a HLD Container

- For small containers, boil water in the covered container for 20 minutes, then pour out the water, which can be used for other purposes, replace the cover and allow container to dry.
- Alternatively, and for large containers, fill a plastic container with 0.5% chlorine solution and immerse the cover in chlorine solution as well. Soak both for 20 minutes. Rinse the cover and the inside of the container three times with boiled water and allow to air dry. Large metal containers cannot be used for HLD using chemicals.

HLD by Boiling

Although boiling instruments in water for 20 minutes will kill all vegetative forms of bacteria, viruses, yeast and fungi, boiling will not kill all endospores reliably.

- Decontaminate, clean and dry all instruments and items to be high-level disinfected.
- Completely immerse all items in the water. For plastic items that float on the surface of boiling water, it is not necessary that they be fully covered by the water to achieve HLD if the pot is covered with lid. Make sure all bowls and containers to be boiled are full of water.
- Close lid over pan and bring water to a gentle, rolling boil. Boiling water too vigorously wastes fuel, rapidly evaporates the water and may damage delicate instruments or other items.
- Start timer. In the HLD log, note time on the clock and record the time when rolling boil begins.
- Boil all items for 20 minutes.

- After boiling for 20 minutes, remove objects with previously high-level disinfected forceps. Never leave boiled instruments in the water that has stopped boiling.
- Use instruments and other items immediately or, with high-level disinfected forceps or gloves, place objects in a HLD container with a tight-fitting cover. Once the instruments are dry, if any pooled water remains at the bottom of the container, remove the dry items and place them in another HLD container that is dry and can be tightly covered.

For protecting the life of instruments that are frequently boiled:

- Boil the water for 10 minutes at the beginning of each day before use.
- Use the same water throughout the day, adding only enough to keep the surface at least 1 inch above the instruments to be HLD.
- Drain and clean the boiler or pot at the end of each day to remove lime deposits.

HLD by Steaming

Steaming surgical gloves has been used as the final step in processing gloves. Any locally available instrument for steaming can be used for this purpose.

- Place instruments in one of the steamer pans with holes in its bottom. To make removal from the pan easier, do not overfill the pan.
- Repeat this process until up to three steamer pans have been filled. Stack the filled steamer pans on the top of a bottom pan containing water for boiling. Place a second empty pan without hole on the counter next to the heat source.
- Place lid on the top pan and bring the water to a full rolling boil.
- When steam begins to come out between the pans and the lid, start the timer or note the time on the clock and record the time in the HLD log.
- Steam items for 20 minutes.
- Remove the top steamer pan and put the lid on the pan that was below it. Gently shake excess water from the pan just removed.
- Put the pan just removed onto the empty pan. Repeat until all pans are restacked on this empty pan and the top pan is covered with the lid.
- Allow items to air dry in the steamer pan before using.
- Using HLD forceps, transfer the dry items to a dry, HLD container with a tight fitting cover. Instruments and other items can also be stored in the stacked and covered steamer pans as long as a bottom pan (one with no holes) is used.

HLD using Chemicals

Although commonly used chemicals are chlorine, glutaraldehyde, formaldehyde and hydrogen peroxide, **glutaraldehyde and formaldehyde use is to be limited only in exceptional circumstances** when no other method is available or feasible.

- Decontaminate, clean and dry all instruments.
- Completely immerse all items in the high-level disinfectant.
- Soak for 20 minutes (for 0.1% chlorine prepared using boiled water, 2–4% glutaraldehyde, 8% formaldehyde, and 6% hydrogen peroxide).

- Remove items using HLD or sterile forceps or gloves.
- Rinse well with boiled and filtered water three times and air dry.
- Use promptly or store in a dry, HLD container with tight fitting lid.

IMPORTANT: Chemical HLD Storage, Container Reuse

- Chemical disinfectants should be stored in a cool, dark area.
- The glass containers, used for storing chemicals, should be washed with soap, rinsed, dried and reused. Alternatively, thoroughly rinse glass containers with water and dispose of by burying.
- Plastic containers used for toxic substances such as formaldehyde should be rinsed with water and disposed of by burning or burying. **THEY SHOULD NEVER BE REUSED.** To further prevent them from being reused, put a hole in each container before disposal so that water or other liquids cannot be carried in it.
- The used chemicals should be carefully poured down a utility sink drain or into a flushable toilet and rinse or flush with water. Liquid waste can also be poured into a latrine. Avoid splashing.

IMPORTANT:

USE CHEMICALS, INCLUDING ANTISEPTICS AND DISINFECTANTS APPROPRIATELY.

- **Antiseptics** are used on skin and mucous membranes (living surfaces).
- Water based antiseptics are used on mucosal membranes, while alcohol based are for skin.
- **Disinfectants** are meant to be used on instruments and surfaces (inanimate objects).
- **Antiseptics should not be used as disinfectants, and vice versa.**
- Disinfectants should never be used on skin, or on mucous membranes.
- There is a difference between disinfectants and High Level Disinfectants. Use both appropriately.

These products are NOT Disinfectants, and are only antiseptics. Do NOT use for disinfection:

- Acridine derivatives
- Cetrимide (Cetavlaon®)
- Chlorohexedine gluconate and cetrимide in various concentration (Savlon®),
- Chlorinated Lime and boric acid (Eusol®)
- Chloroxynelol in alcohol (Dettol®)
- Mercury compounds are not in common use now, and should be actively discouraged.
- **Alcohols and iodophors are disinfectants and NOT high-level disinfectants and should not be used for HLD purposes.**

Guidelines for Processing Instruments, Surgical Gloves, and Other Items

INSTRUMENTS/ITEMS	DECONTAMINATION First step in handling used items; it reduces risk of HBV, HCV and HIV viruses.	CLEANING Removes all visible blood, body fluids and dirt.	STERILIZATION^a Destroys all microorganisms, including endospores.	HIGH-LEVEL DISINFECTION^b Destroys all viruses, bacteria, parasites, fungi and some endospores.
Airways (plastic)	Soak in a 0.5% chlorine solution for 10 minutes prior to cleaning. Rinse and wash immediately.	Wash with soap and water. Rinse with clean water, air or towel dry.	Not necessary	Not necessary
Ambu bags and CPR face masks	Wipe exposed surfaces with gauze pad soaked in 60B90% alcohol or 0.5% chlorine; rinse immediately.	Wash with soap and water. Rinse with clean water, air or towel dry.	Not necessary	Not necessary
Aprons (heavy plastic or rubber)	Wipe with 0.5% chlorine solution. Rinse with clean water. Between each procedure or each time they are taken off.	Wash with liquid soap and water. Rinse with clean water, air or towel dry at the end of the day or when visibly soiled.	Not necessary	Not necessary
Bed pans, urinals or emesis basins	Not necessary.	Using a brush, wash with disinfectant solution (soap and 0.5% chlorine). Rinse with clean water.	Not necessary	Not necessary

INSTRUMENTS/ITEMS	DECONTAMINATION First step in handling used items; it reduces risk of HBV, HCV and HIV viruses.	CLEANING Removes all visible blood, body fluids and dirt.	STERILIZATION^a Destroys all microorganisms, including endospores.	HIGH-LEVEL DISINFECTION^b Destroys all viruses, bacteria, parasites, fungi and some endospores.
Blood pressure cuff	If contaminated with blood or body fluids, wipe with gauze pad or cloth soaked with 0.5% chlorine solution.	If soiled, wash with soap and water. Rinse with clean water, air or towel dry.	Not necessary	Not necessary
Exam or operating room tables or other large surface areas (carts and stretchers)	Wipe off with 0.5% chlorine solution.	Wash with soap and water if organic material remains after decontamination.	Not necessary	Not necessary
Footwear (rubber shoes or boots)	Wipe with 0.5% chlorine solution. Rinse with clean water. At the end of the day or when visibly soiled.	Wash with liquid soap and water. Rinse with clean water, air or towel dry at the end of the day or when visibly soiled.	Not necessary	Not necessary
IUDs and inserters (never reuse)	Not appropriate	Not appropriate	Not recommended. Most IUDs and inserters come in sterile packages. Discard if package seal is broken.	Not recommended

INSTRUMENTS/ITEMS	DECONTAMINATION First step in handling used items; it reduces risk of HBV, HCV and HIV viruses.	CLEANING Removes all visible blood, body fluids and dirt.	STERILIZATION^a Destroys all microorganisms, including endospores.	HIGH-LEVEL DISINFECTION^b Destroys all viruses, bacteria, parasites, fungi and some endospores.
Laparoscopes	Wipe exposed surfaces with gauze pad soaked in 60-90% alcohol; rinse immediately.	Disassemble, then using a brush wash with soap and water. Rinse with clean water, towel dry.	Sterilize daily using chemical sterilization. Replace glutaraldehyde and formaldehyde use with appropriate chemicals. Follow manufacturer's instructions.	Between cases, perform HLD as per manufacturer's guidelines.
PPE (caps, masks, covergowns) ^d	Not necessary. (Laundry staff should wear plastic aprons, gloves and protective foot and eyewear when handling soiled linen.)	Wash with soap and hot water. Rinse with clean water, air or machine dry. Wrap for reuse.	Not necessary	Not necessary
Stethoscopes	Wipe with gauze pad soaked in 60-90% alcohol.	If soiled, wash with soap and water. Rinse with clean water, air or towel dry.	Not necessary	Not necessary

INSTRUMENTS/ITEMS	DECONTAMINATION	CLEANING	STERILIZATION^a	HIGH-LEVEL DISINFECTION^b
	First step in handling used items; it reduces risk of HBV, HCV and HIV viruses.	Removes all visible blood, body fluids and dirt.	Destroys all microorganisms, including endospores.	Destroys all viruses, bacteria, parasites, fungi and some endospores.
Storage containers for instruments (metal or plastic)	Soak in 0.5% chlorine solution for 10 minutes prior to cleaning. Rinse or wash immediately.	Wash with soap and water. Rinse with clean water, air or towel dry.	<ul style="list-style-type: none"> • Dry heat for 1 hour after reaching 170°C (340°F), or • Autoclave at 121°C (250°F) and 106 kPa (15 lbs/in²) for 20 minutes (30 minutes if wrapped). 	Boil container and lid for 20 minutes. If container is too large: <ul style="list-style-type: none"> • Fill container with 0.5% chlorine solution and soak for 20 minutes. • Rinse with water that has been boiled for 20 minutes and air dry before use.
Suction bulbs (rubber)	Soak in a 0.5% chlorine solution for 10 minutes prior to cleaning. Rinse and wash immediately.	Wash with soap and water. Rinse with clean water, air or towel dry.	Not necessary	Not necessary
Suction cannulae (plastic) for manual vacuum aspiration (MVA)	Soak in 0.5% chlorine solution for 10 minutes prior to cleaning. Rinse or wash immediately.	Pass soapy water through cannulae three times, removing all particles.	Not recommended. (Heat from autoclaving or dry-heat ovens will damage cannulae.)	Steam or boil for 20 minutes.

INSTRUMENTS/ITEMS	DECONTAMINATION	CLEANING	STERILIZATION^a	HIGH-LEVEL DISINFECTION^b
	First step in handling used items; it reduces risk of HBV, HCV and HIV viruses.	Removes all visible blood, body fluids and dirt.	Destroys all microorganisms, including endospores.	Destroys all viruses, bacteria, parasites, fungi and some endospores.
Suction catheters (rubber or plastic)	Soak in 0.5% chlorine solution for 10 minutes prior to cleaning. Rinse or wash immediately.	Pass soapy water through catheter three times. Rinse three times with clean water (inside and outside).	Not recommended. (Heat from autoclaving or dry-heat ovens will damage plastic catheters; rubber catheters can be autoclaved.)	<ul style="list-style-type: none"> • Steam or boil for 20 minutes. (Chemical HLD is not recommended because chemical residue may remain even after repeated rinsing with boiled water.)
Surgical gloves	Soak in 0.5% chlorine solution for 10 minutes prior to cleaning. Rinse or wash immediately.	Wash with soap and water. Rinse with clean water and check for holes. If to be sterilized, dry inside and out (air or towel dry) and package.	If used for surgery: <ul style="list-style-type: none"> • Autoclave at 121°C (250°F), and 106 kPa (15 lbs/in²) for 20 minutes. • Do not use for 24-48 hours. 	<ul style="list-style-type: none"> • Steam for 20 minutes and allow to dry in steamer.
Surgical gowns, linen drapes and wrappers ^d	Not necessary. (Laundry staff should wear plastic aprons, gloves and protective foot and eyewear, when handling soiled linen.)	Wash with soap and hot water. Rinse with clean water, air or machine dry.	Autoclave at 120°C/250°F and 106 kPa (15 lbs/in ²) for 30 minutes.	Not practical

INSTRUMENTS/ITEMS	DECONTAMINATION First step in handling used items; it reduces risk of HBV, HCV and HIV viruses.	CLEANING Removes all visible blood, body fluids and dirt.	STERILIZATION^a Destroys all microorganisms, including endospores.	HIGH-LEVEL DISINFECTION^b Destroys all viruses, bacteria, parasites, fungi and some endospores.
Surgical instruments (metal)	Soak in 0.5% chlorine solution for 10 minutes prior to cleaning. Rinse or wash immediately. ^c	Using a brush, wash with soap and water. Rinse with clean water. If to be sterilized, air or towel dry and wrap in packs or individually.	Preferable: <ul style="list-style-type: none"> • Dry heat for 1 hour after reaching 170C (340F), or • Autoclave at 121C (250F) and 106 kPa (15 lbs/in²) for 20 minutes (30 minutes if wrapped). For sharp instruments: Dry heat for 2 hours after reaching 160C (320F). ^e	Acceptable: <ul style="list-style-type: none"> • Steam or boil for 20 minutes. • Chemically high-level disinfect by soaking for 20 minutes. Rinse well with boiled water and air dry before use or storage.
Thermometers (glass)	Not necessary	Wipe with disinfectant solution (soap and 0.5% chlorine). Rinse with clean water, air or towel dry.	Not necessary	Not necessary

INSTRUMENTS/ITEMS	DECONTAMINATION	CLEANING	STERILIZATION^a	HIGH-LEVEL DISINFECTION^b
	First step in handling used items; it reduces risk of HBV, HCV and HIV viruses.	Removes all visible blood, body fluids and dirt.	Destroys all microorganisms, including endospores.	Destroys all viruses, bacteria, parasites, fungi and some endospores.
Transfer forceps (chittle) and container (metal)	Soak in 0.5% chlorine solution for 10 minutes prior to cleaning. Rinse or wash immediately. ^c (Reprocess per shift or when contaminated.)	Using a brush, wash with soap and water. Rinse with clean water. If to be sterilized, air or towel dry.	Preferable: <ul style="list-style-type: none"> • Dry heat for 1 hour after reaching 170C (340F)^e, or • Autoclave at 121C (250F) and 106 kPa (15 lbs/ in²) for 20 minutes (30 minutes if wrapped). 	Acceptable: <ul style="list-style-type: none"> • Steam or boil for 20 minutes. Chemically high-level disinfect by soaking for 20 minutes. Rinse well with boiled water and air dry before use.
Ventilator tubing or circuits	Not necessary	Using a brush, wash with soap and water. Rinse with clean water and air dry.	Not possible using an autoclave or dry heat oven.	Acceptable <ul style="list-style-type: none"> • Steam or boil for 20 minutes. • Air dry before use.

^a If unwrapped, use immediately; if wrapped, reprocess if package becomes damaged or contaminated.

^b If sterilization (dry-heat or autoclave) is not available, these items can be high-level disinfected either by boiling, steaming or soaking in a chemical disinfectant.

- c Avoid prolonged exposure (> 20 minutes) to chlorine solution (> 0.5%) to minimize corrosion (rusting) of instruments and deterioration of rubber or cloth products.
- d Paper or plastic gowns, caps or masks. Place in a plastic bag or leakproof, covered waste container for disposal.
- e Instruments with cutting edges or needles should not be sterilized at temperatures above 160< C to avoid dulling.



13. Ensure appropriate management of different kinds of waste

GENERAL GUIDELINES ON WASTE DISPOSAL

- **Educate all staff on waste management practices and procedures, and the effects of hospital waste.**
- A common practice in Pakistan is the reuse of disposable syringes. Many drug addicts also reuse the syringes that can cause AIDS and other dangerous diseases.
- When waste containing plastics is burnt, Dioxin is produced, which can cause cancer, birth defects, decreased psychomotor ability, hearing defects, cognitive defects and behavioral alternations in infants.
- Pests such as flies, mosquitoes and other vectors promote mechanical transmissions of diseases. A high tendency of contracting intestinal, parasitic and skin diseases is found in workers engaged in collecting refuse.

Guide to Incinerators and its alternates

There is a growing tendency towards the use of incinerators for burning hospital waste, which is now an outdated method, because of the dangerous chemicals it produces.

Incinerators for medical and municipal waste have been linked to severe public health threats and pollution. Waste is burnt at very high temperatures, that produces acidic gases, heavy metals, and dioxins, besides a significant amount of ash. Dioxin and related chlorinated organic compounds are extremely potent toxic substances that produce a variety of adverse effects in human and animals, even at extremely low doses. Accumulative poisons such as mercury are toxic to the kidneys and nervous system. Mercury is readily converted to its organic form that interferes with normal brain development and functioning.

Intense public opposition and pollution regulation has forced closure of many incinerators, as industrialized countries are fast moving towards safer, economical alternatives. However, incinerator companies are selling outdated technology where people are not yet aware of the serious health threats.

Alternates to Incineration

Steam Autoclaving with pre-vacuum autoclaves

Steam Autoclaving is the most widely used and most efficient alternative medical-waste-treatment technology. Most available autoclaves are designed to handle both biohazard and normal hospital wastes simultaneously.

Medical waste autoclaves usually operate with a shredder, and a compactor (to minimize the waste volume). In autoclaves, the effects of heat from saturated steam and increased pressure decontaminates medical waste.

Chemical Treatment

In chemical treatment systems, an anti-microbial chemical, such as sodium hypochlorite, chlorine dioxide, or peracetic acid, decontaminates the medical waste. Most chemical treatment systems, currently in use, operate at ambient temperature. This method can be very cost efficient since the chemicals used are easily available.

Microwave Radiation

In Microwave Radiation, medical waste enters the system by batch or continuous mode, where it is wetted with steam or water and heated by microwave radiation at de-contaminating temperatures.

Other Thermal Systems

Some systems use a combination of infrared radiation and forced hot-air convection to treat the waste. The waste then is compacted, preparing it for landfill. Other systems use gamma radiation to heat the waste to disinfecting temperatures. A portion of the solid residue obtained is recycled, while the remainder is disposed. Several other thermal systems currently under development use steam, oil, electricity or some form of radiation as their source of heat.

General PPE Guidelines for all Health Care Personnel handling Waste

During handling, remember that barriers in the form of PPE should not be compromised. Injuries from sharps, spills and splashes are concerns to be proactively avoided.

- Latex Gloves for health care providers.
- Utility Gloves for sanitary workers.
- Face mask/glasses, closed toe shoes, impermeable apron or gown.
- Remove gloves promptly after use, before touching non-contaminated items and any other environmental surfaces.
- Remove the soiled gown, clothing and equipment as promptly as possible.

Clean equipment as per instructions and do not forget hand hygiene.

Manage General Waste

Reduce the amount of waste

The first priority is to reduce the amount of waste, for which various policies and checks must be introduced. This is especially important in reducing general waste that comprises about 80% of the waste generated at any health facility.

- Not allowing extra packaging, food cartons and medicines in plastic bags, which can be otherwise carried by hand, or in paper or reusable bags.
- On discharge, personnel must ensure that all waste (wrappers, plastic bags, packaging and organic waste) is carried back by the patient.
- Avoid mixing and dumping of recyclable items (paper, packaging, plastic containers) alongside infectious waste.

Segregation: Options and Importance

- **The most important aspect** of managing general waste is to **keep it separate from infectious waste.**

Mixing leads to contamination of general waste, that will then be treated as infectious leading to significant rise in costs of disposal.

- **Dry or Recyclable waste:** plastic cups, water bottles, food containers, paper including newspapers and magazines should be collected separately in a large BLUE bin, that can be placed at an appropriate place within the ward or other areas. Food cups, such as for yogurt should be rinsed before disposal to prevent bad odor.
- This waste can be handed over to Rag pickers or sold directly to recyclers.
- **SAFE Recycling** is easy given proper segregation of waste, however, if mixing is suspected, then decontamination with 0.5% Chlorine solution is mandatory.
- **Household or Wet waste** consisting of kitchen refuse, vegetable peels, foodstuff, fruits and seeds, should be collected in a WHITE bin, lined with a **WHITE Plastic Bag**. This can be either composted or sent to the Municipal site for disposal.
- Compost can also be sold to generate income. It can be done in containers, or by simply digging a deep hole in the ground, and covering with dry earth each day after disposal. The depth and width of the hole will depend on the volume of waste. Usually compost forms in 6 months.
- **Waste to be disposed at municipal sites** should not be openly stored in or near the hospital premises to control pests, and spread of infections.
- The municipal site/waste unit, should be located away from the hospital. Also refer to the section on pest control.
- Even if no recycling mechanism is available, it is better to keep both wet and dry general waste separate, as it reduces the volume of waste considerably, significantly bringing down disposal costs.
- **DO NOT BURN GENERAL WASTE!**

Decontamination of Waste

- Decontamination is important for health care personnel safety, while in resource constrained settings, it might be the only solution, even the cornerstone of infection prevention from health care related waste.
- Waste decontamination with the use of 0.5% chlorine solution is a cheap means for preventing spread of infections.

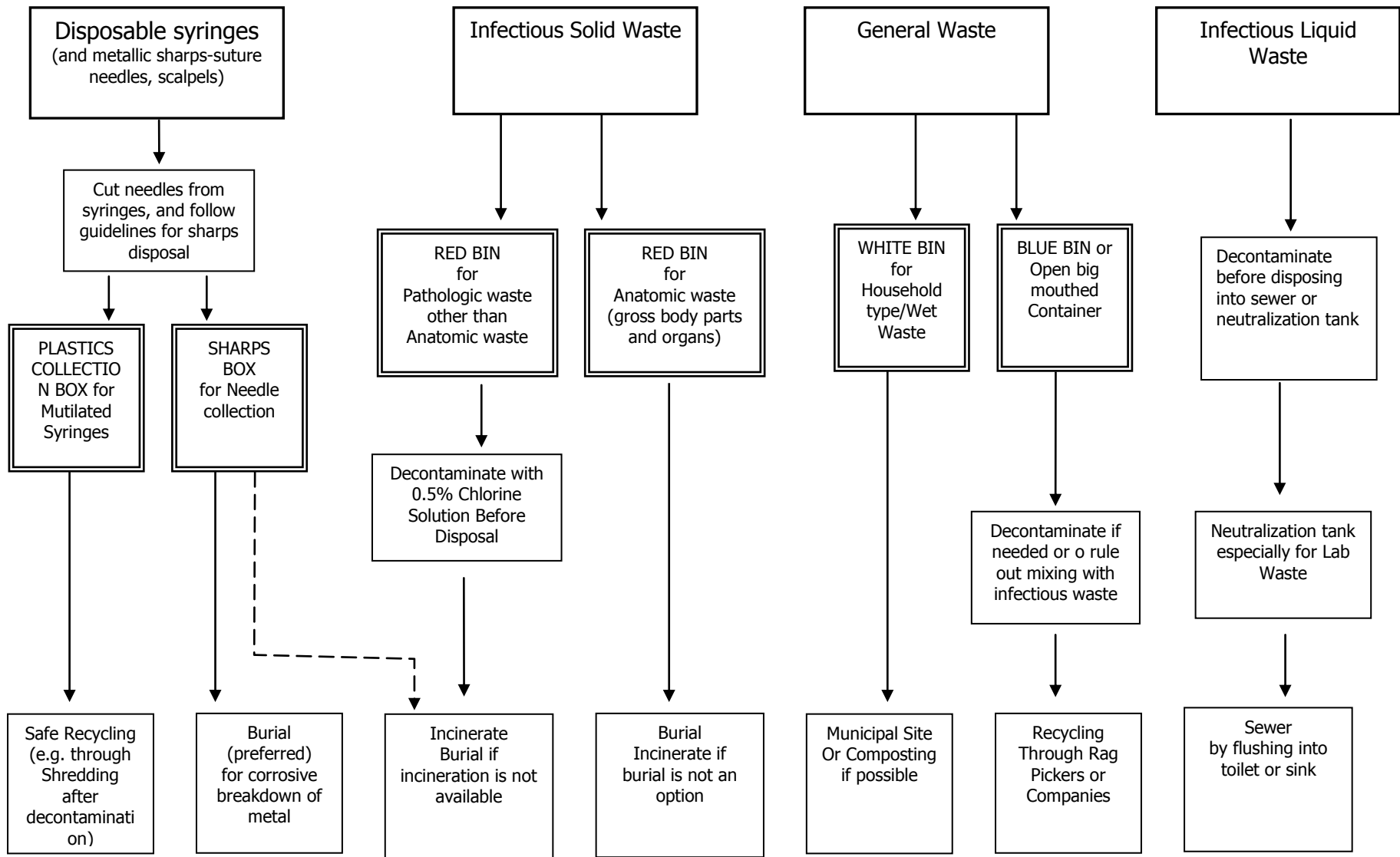
Segregate Solid Waste for Appropriate Final Disposal

Segregation of wastes is the most important step that will lead towards effective waste management throughout its chain. Segregation into different streams will depend on resources and the end disposal mechanism.

The guideline is based on current practices at different hospitals across Pakistan, and about which experts' opinion is that these are practical within the current resources.

- Different colored bins and bags are proposed here, which can be changed according to needs and availability.
- **Infectious Solid Waste** is considered of two types with different final disposal techniques. Hence it is to be collected in **2 separate RED BINS**, one for **Anatomic Waste** (with body parts, placenta, organs), and **Pathologic Waste** (small tissues, bandages, cotton, gauze, etc.).
- Anatomic waste is to be buried for ethical reasons. The other alternative is incineration, but this should only be undertaken taking into consideration cultural and religious practices, and sensitivities.
- Pathologic waste is to be either incinerated or buried.
- **General Waste**, if possible should be collected in a **WHITE BIN for wet waste**, and a **BLUE bin for recyclable dry waste**.
- **Sharps Waste consisting of metallic sharps**, including needles are to be collected in a **SHARPS CONTAINER**, which can be buried, with the addition of 0.5% Chlorine Solution serving both as a decontaminant, and a corrosive to break down the metal over the next few years.
- **Other sharps** such as glass vials are to be disposed off with pathologic waste.

Waste Segregation and Disposal Overview



Safe recycling of disposable syringes and plastics

Recycling generates funds and helps in lowering the amount of waste generated. Safe recycling is a new concept that is being increasingly taken up for environmental health reasons.

Decontamination

- Treat the health care related waste with 0.5% of sodium hypochlorite solution.
- Keep the waste in solution for 30 minutes.
- Do not put hands in the solution.
- After treatment, dry the waste completely.
- Collect waste in a separate bag after treatment, ensuring that there is no mixing of waste.
- **Ensure decontamination of syringes** before disposal. Point-of-use decontamination protects health workers, and should be explored as an option.
- Needles should be cut and separately disposed. Although needle cutting or disassembly is not accepted practice, it is seen as a lesser evil to discourage reuse of syringes.

Storage

- NEVER STORE WITH INFECTIOUS WASTE.
- DO NOT Store with general plastic waste.
- Store the waste near or inside the shredder room marked clearly, so that there is no mixing of infected and disinfected waste.
- Store in a dry place at room temperature.

Shredding for recycling

- Send for shredding immediately.
- Shredding creates smaller bits of plastic that can be used to make small items.
- Rag pickers and commercial companies can also help in recycling plastics.

Manage Sharps Waste

All staff must be educated about standard principles and trained in hand decontamination, the use of protective clothing and the safe disposal of sharps. Adequate supplies of liquid soap, handrub, towels and sharps containers should be made available.

Sharps are defined as comprising of needles, syringes, scalpels, blades, glass i.e. anything that may cause puncture or cuts. Take care to prevent injuries when using sharps.



- Use needle and syringe only once.
- Keep handling to a minimum. DO NOT pass directly from hand to hand.
- **Do not recap or bend needles** prior to disposal.
- Do not disassemble the needle and syringe after use.
- **Mutilate** prior to disposal to prevent any unauthorized reuse by using needle cutters/destroyers.
- Dispose off the used mutilated disposable syringes and needles, scalpel blades and other sharp items in a **puncture-resistant container with a lid that closes.**

The puncture proof sharp containers can be made from cardboard box, used tin box, or hard plastic bottles that are closed.

Make only a small opening in the box for disposing off sharps. These sharp containers should be available in dressing/injection rooms, EPI vaccination rooms, examination rooms, labor and birth rooms, wards and laboratories, i.e. such containers must be located in ALL patient care and laboratory areas where they are very easily accessible to personnel working in these locations. They should be closed and immediately replaced when $\frac{3}{4}$ full.

Collection

- Wear GLOVES. Sharps injuries during handling needles are common!
- Take EXTREME CARE in emptying the needle cutter into the cardboard sharps box.
- The sharps box (cardboard or other) should be clearly labeled.
- Empty box when $\frac{3}{4}$ th full. The $\frac{3}{4}$ th mark should indicate that the box is "full."

Sharps box

- Used hard plastic bleach bottles, that can be safely closed.
- Ensure containers are located in a safe place and position, and must NOT BE ON THE FLOOR.



Collection, Transport and Disposal

- **Sharps Waste consisting of metallic sharps**, including needles are to be collected in a **SHARPS CONTAINER**, which can be buried, with the addition of 0.5% Chlorine Solution serving both as a decontaminant, and a corrosive to break down the metal over the next few years.
- Can also be Incinerated at 800 Celsius.

Recycling of Sharps and Instruments: Blades, Scalpel, Scissors, Forceps, Towel Clips, etc.

These are commonly recycled as they are made of high quality metals.

- Disinfect immediately after use.
- If being discarded, decontamination and cleaning is the minimum procedure before sending for recycling. If possible, this should be followed by sterilization.

Broken Glass

- Collect carefully without using hands. Make use of brushes and collection instruments.
- Disinfect and send for safe recycling if possible.
- If infected, and cannot be handled safely, e.g. smaller pieces or crushed glass, then bury with pathological waste.
- DO NOT INCINERATE!

WASTE COLLECTION AND DISPOSAL AT THE LABORATORY

Guiding principles

- The foremost guiding principle for waste disposal from the laboratory is to remember that **microorganisms are grown or tested** at the laboratory. This waste carries much higher loads of known and unknown organisms.
- **Decontamination and Neutralization** are hence the first priority in disposal, the final disposal depending on the availability of facilities such as burial and incineration.
- **Appropriate PPE** must be observed by **ALL Laboratory Personnel**. Barriers in the form of PPE should not be compromised. Injuries from sharps, spills and splashes are concerns to be proactively avoided.
- Laboratory waste must be **clearly marked with the biohazard labels**, displayed on waste containers and bags **in local language**.
- **Containers and collection:** Waste should be collected in leak proof containers and waste should be collected when the container is $\frac{3}{4}$ full.
- The person collecting waste must wash hands with soap and water after removing gloves and other personal protective equipment.
- Also, the waste collection areas must be kept clean and free of spills.

Handling and Disposal Guidelines at the Laboratory

Sharps

- Sharps disposal containers must be puncture-proof/-resistant and must not be filled to capacity. When they are three-quarters full they should be placed in "infectious waste" containers and incinerated, with prior autoclaving if possible and/or laboratory practice requires it.
- Sharps disposal containers must not be discarded in community waste sites or landfills.

Contaminated (potentially infectious) materials for autoclaving and reuse

- No pre-cleaning should be attempted of any contaminated (potentially infectious) materials to be autoclaved and reused. Any necessary cleaning or repair must be done only after autoclaving or disinfection.

Contaminated (potentially infectious) materials for disposal

- All contaminated (potentially infectious) materials should be autoclaved in leakproof containers, e.g. autoclavable, colour-coded plastic bags, before disposal. After autoclaving, the material may be placed in transfer containers for transport to the incinerator.
- If possible, materials should not be discarded in landfills even after decontamination.
- If an incinerator is available, autoclaving may be omitted: the contaminated waste should be placed in red bins, and transported directly to the incinerator.
- Reusable transfer containers should be leakproof and have tight-fitting covers. They should be disinfected and cleaned before using again.
- When disinfectants are used, waste materials should remain in intimate contact with the disinfectant (i.e. not protected by air bubbles) for the appropriate time, according to the disinfectant used. The discard containers should be decontaminated and washed before reuse.

Decontamination at the Laboratory

- Steam autoclaving is the preferred method for all decontamination processes at the laboratory.
- Materials for decontamination and disposal should be placed in containers, e.g. autoclavable plastic bags, that are colour-coded according to whether the contents are to be autoclaved and/or incinerated.
- Alternative methods such as with Chlorine may be envisaged, with efficacy testing.

Specific Waste Disposal Guidelines at the Laboratory

- The person in charge of waste disposal must wear utility gloves and eye protection. The waste should be disposed of in the following manner:

Liquid Waste

- Contaminated Liquid Waste from samples (blood, urine, faeces and other body fluids) must be decontaminated before being emptied in a toilet or sink.
- Decontaminate waste by adding bleach 5% and holding for 30 minutes.
- The toilet/sink should be rinsed with water after the waste has been emptied.
- If possible, the waste should drain into a **Neutralization Tank**, where appropriate time should be allowed to decontaminate and neutralize the waste, before being drained into a sewer system. The tank may contain limestone or other appropriate materials.

Solid Waste: Body parts and Organs

- **Anatomic waste** in the form of gross body parts or organs, after tissue harvesting are to be collected in a large RED bin. The bin should ideally have a self-closing mechanism. Line the bin with an opaque, RED plastic bag.
- Label the Red bag with the name of the body part and sex of the person.
- Tie the red plastic bag when 3/4th full, and send for collection and final disposal.
- Final disposal of this waste is by burial for ethical reasons, or incineration if burial is not an option.

Solid Waste: Pathologic Waste other than Body Parts and Organs

- Small tissues, bandages, cotton, gauze, glass bottles or any other container used for samples should be decontaminated with 0.5% Chlorine Solution, before disposal.
- These should be then collected in a **separate RED Bin**, lined with an opaque Red bag.
- The Red bin must clearly indicate the kind of waste to be collected in local language, and also warn against putting any anatomic waste.
- Potential mixing with any other kind of waste, especially anatomic waste is to be carefully avoided, as anatomic waste has to be preferably buried on ethical grounds.
- Tie the red plastic bag when 3/4th full, and send for collection and final disposal.

- Final disposal of this waste is preferably by incineration, or burial as a second option.
- **Sharps, including syringes, glass bottles, vials, broken glass,** should be collected in appropriate containers, which are to be incinerated.

Safe Recycling of Plastic and Glass Bottles

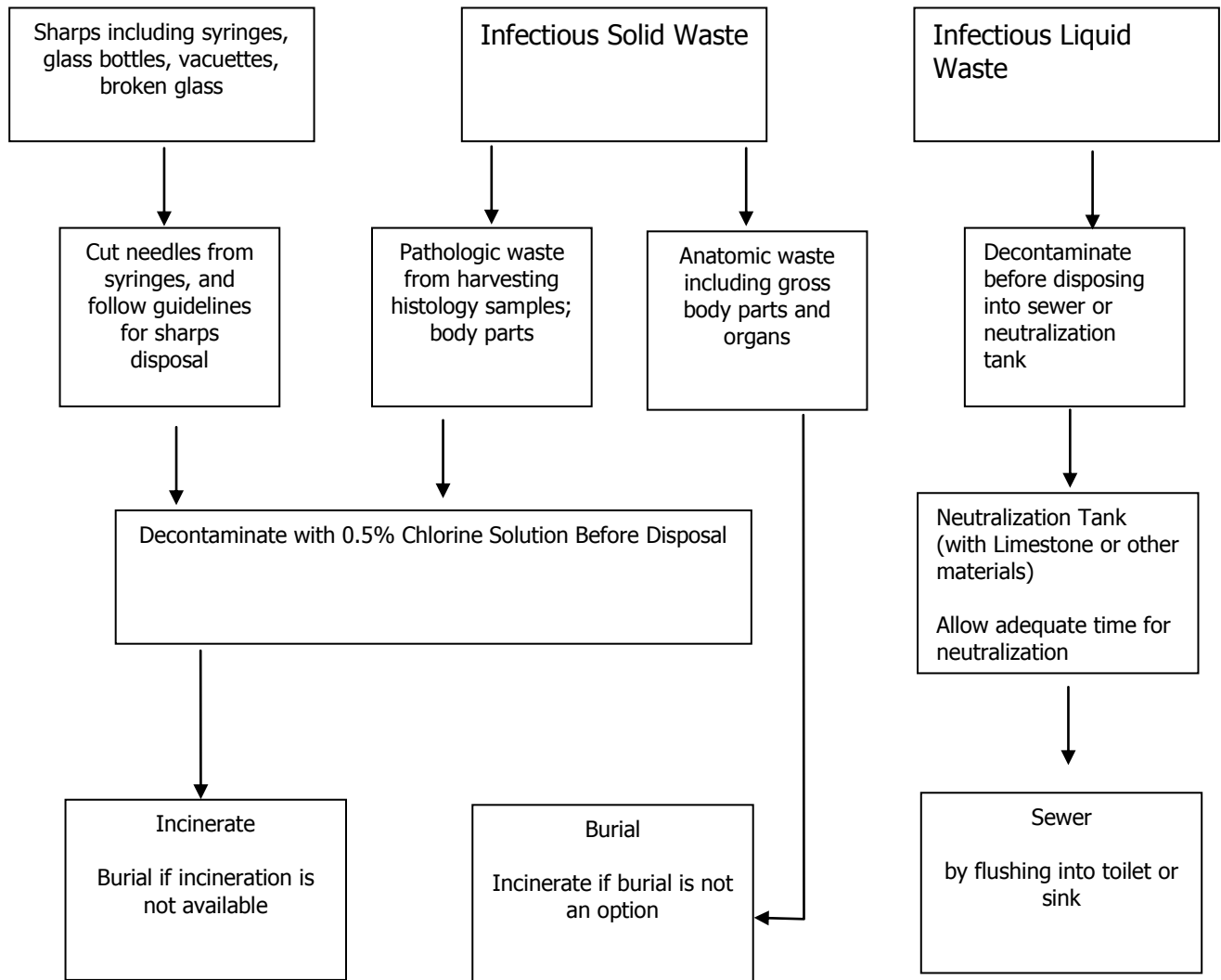
- Bottles containing samples of tissues and body fluids generated as waste may be safely recycled, although the risks must be assessed before this exercise.
- Decontaminate bottles by washing with 0.5% Chlorine solution, detergent and water.
- Bottles must never be re-used, and both glass and plastic bottles can be safely recycled.

General Waste

- Collect general waste in a White bin lined with White Plastic bag.
- Do not mix laboratory waste with general waste consisting of non-infectious materials such as packaging.
- Collect Recyclable Materials (Packaging, plastic sheets and bags, foam, vial careers, cardboard boxes, glass, etc) in a big BLUE bin, for recycling through rag pickers, taking care that these are kept separate from infectious or potentially infectious material.

After Disposal, remember that: cleaning and disinfection of all equipment and its maintenance (PPE, Utensils, carts, trolleys, storage site).

Laboratory Waste Disposal Schematic



WASTE COLLECTION AND DISPOSAL AT THE WARD, ER, NICU, ICU, OPD

The following protocol applies to various patient care areas (PCAs) of the hospital, while it will need adaptation according to the resources and infrastructure.

For solid wastes, bedside area of each patient should have:

- 1 White Bin (or plain bucket) with White (or Green) liner
- 1 Red Bin (or plain bucket) with Red liner and lid
- An adequately sized puncture resistant sharp container (yellow if possible) should be available in the PCA (at the nursing station).

For liquid wastes, bedside area of each patient should have (as needed):

- 1 disinfected urine jug/urinal
- 1 sputum cup

Counseling of patient as to the purpose of these buckets and containers is essential to run the system of segregation effectively. Without the cooperation of patients and attendant, this simple system will not work.

Each PCA should have

- 1 big BLUE container, (which does not need to be lined with a bag) for collection of recyclable dry waste materials (glass, packaging, card board, paper, etc).
- 1 YELLOW sharps box at the nursing station.
- 1 Needle cutter at the nursing station.

Segregation of Waste into Infectious and Non-Infectious at the Bedside

General waste should be preferably separated into 2 streams, if possible. Or else, it can all be collected as mentioned below in White/Green bags.

a. White/Green Bucket with White/Green Bag for General Waste (Non-Infectious)

- Foods, fruits and vegetables
- Tea bags

Contents can be recycled or composted.

b. Blue Bin for recyclable waste

- Paper and packaging
- Glass bottles (but not broken glass)
- Plastic drips
- Injectables
- Paper and packaging
- Juice and Food Boxes

b. Red Bucket with Lid with Red Bag for Infectious Waste

- Human tissues
- Blood bags and all blood products
- Soiled bandages, gauze
- Urinary catheter tubing and bag, IV tubing
- Surgical drains and bags, NGT, ET tube
- Used IV and arterial catheters
- Diapers

Bag should be incinerated as it is.

c. Sharps Waste

- Needles
- Scalpels
- Knives
- Blades
- Broken Glass

Sharps waste should be either packaged in a container with Chlorine solution added that acts as a corrosive and decontaminant, and then buried.

Alternately, the whole sharps box should be incinerated.

General principles

- Easy access to supply of color-coded bags and containers
- Fill bags to maximum of 3/4 capacity.
- Do not put hands inside the bags/containers.
- Avoid the pressing of filled bag.
- The bags to be tied and handled by neck only while transportation.
- Staff must wear protective clothing, gloves, mask, aprons etc while handling infected waste.
- Never allow any person to put their hands inside the bags.
- If bags tear, they should be replaced/re-bagged in new clean bags

Primary Transportation of Buckets and Containers from the Bedside

- Primary transportation starts from patient bedside to primary storage area in the PCA. However in some hospitals, there is only one general storage area for the entire hospital. Some hospitals do not have any storage area and the waste is directly taken to the disposal point (incinerator or burial site).
- Small wheeled trolley should be used for primary transportation.
- Trolley should be dedicated only to transportation of waste.
- Trolley should be decontaminated and cleaned at the end of the day, and at least once daily.

Primary storage area:

- Primary storage area is available in the premises of PCA and can be a small room in a corner with good ventilation, if possible, and a door to the outside.
- Primary storage area should contain large bins with color coded liners.
- Bin with red liner and lid for infectious waste.
- Bin with white/green liner for general and non-recyclable waste.
- Blue bin (with liner, if needed) for recyclable waste

Bins may be of any color, but bags/liners should exhibit proper color coding as per policy decided. Bags must be used to maintain the segregation.

The waste of the white/green bin can be sorted into two categories in the primary storage area.

- Recyclable waste goes into the bin with the white liner.
- Non-recyclable waste goes into the big blue bin (with or without a liner)

The waste of the red buckets or sharps container must NEVER be sorted.

Secondary Storage area:

From the primary storage area, waste should be transported in a dedicated trolley to the main secondary storage area of the facility from where waste is taken for final disposal.



Management of liquid waste

Drain liquid wastes (body fluids, etc) into the toilet. Decontaminate instruments such as bed pans after each use by using 0.5% Chlorine solution for at least 10 minutes.

Managing Anatomic Waste at OT, LR, ER

- Anatomical wastes are typically distinguished as recognizable human organs, tissue and body parts such as amputated parts, organs, placenta, fetus, etc.
- For ethical reasons, anatomic waste has to be treated separately from pathologic waste.
- Anatomical wastes are generated when removed by trauma, during surgery including autopsies.

During handling and collection, Medical and paramedical staff must:

- Use closed handling trays for collection as part is dissected or removed from the body during surgery. In case closed trays are not available, use a cloth-lined tray for collecting and covering the body part.
- Keep the body part in a safe place during surgery.
- The nurse/OTA will dispose the anatomic waste safely in the large RED bin. The bin should ideally have a self closing mechanism, lined with an opaque, red plastic bag.

- Cover appropriately the waste if it has to be transported to another location for disposal.
- Tag the bag (with sex of the patient, and name of the body parts or organs), before being collected by the sanitary worker.
- Tie the red plastic bag when 3/4th full.

During transport, the sanitary worker must:

- Wear PPE including gloves, face mask, goggles, boots.
- Empty the Red bin when 3/4th full. This is important so to avoid spillage avoided.
- Remove carefully from the bin, checking for any signs of leakage.
- If leakage is detected, then seek help from another worker to carefully remove the bag in a place where spills can be handled properly.
- A bigger bag should be used for putting the punctured bag into either a single or double bag for transport.
- Use a proper closed trolley for transporting waste.
- Use trolley with compartments for transporting different kinds of waste. Check for leaks in the trolley.
- Do not open the trolley before reaching the storage, or final disposal site.

Ensure daily cleaning of the collection instruments, including trays and bins. Cleaning and disinfection will be required in case of spillages.

Storage before disposal

- Do not delay anatomic waste disposal.
- In case there is a lag time, refrigerate anatomic waste at 4C or below for a maximum of 3-4 hours.
- Do not store any food items with anatomic waste.

Disposal

- Final disposal is by burial.
- Burial should be at least 50 meters from the nearest water source, located downhill from any wells, free of standing water, and in an area that does not flood.
- Burial pit should be 1-2 meters wide and 2-5 meters deep.
- The bottom of the pit should be at least 1.8 meters above the water table.
- Erect a fence or a wall around the site to keep out animals.
- Every time solid medical waste is added to the pit, cover it with 10-30 cm of dirt.
- When the level of waste reaches within 30-50 cm of ground level, fill the pit with dirt, seal with concrete, and dig a new pit.

After Disposal, remember that:

- Cleaning and disinfection of all equipment and its maintenance (PPE, Utensils, carts, trolleys, storage site).

Staff Responsibilities for Managing Waste

Staff	Handling	Segregation	Collection	Transport	Storage	Treatment	Disposal
Surgeon	+	+					
Nurses	+	+					
OTAs		+	+				
Sanitary Workers			+	++	+	+	+

14. Ensure availability and maintenance of adequate handwashing facilities and supplies.

Handwashing facilities are needed at all places where patient contact is expected. In addition, appropriately managed facilities are essential for all toileting and other needs.

- Handwashing stations must have deep, appropriately sized sinks, and elbow, or foot operated taps.
- Supplies of simple soap is preferable over antiseptic and medicated soaps which cost more and are of no proven extra benefit.
- Antiseptic hand rub stations can be installed next to hand washing facilities, or as appropriate.
- ALL Handwashing facilities sites should be Wheelchair ACCESSIBLE for both staff and patients.

15. Ensure availability of adequate number and type of isolation rooms.

In a 30 bedded unit, there are usually 4 isolation rooms allocated for patients with specific infections. Seasonal variations are also common, as in case of dengue and malaria, while outbreaks such as that of Congo Crimean Fever require immediate availability of such rooms.

16. Institute Pest Control Program

Pest control at the hospital for preventing infections has to be at multiple levels, with control of insect vectors such as mosquitoes, cockroaches and fleas, to animals such as rats, mice, cats and dogs.

Control has to be both inside patient areas, and in the overall vicinity of the hospital.

The administrators must:

-



- Ensure cleanliness of the overall environment of the hospital, that includes around the boundary walls, gates, parking areas etc.
- Cleaning and maintenance of the sewerage system where vectors and rodents are common.
- Proper waste collection bins should be installed, while administration and security staff must ensure that there is no left over edibles, wrappers, and refuse being dumped by attendants and patients in the vicinity of the hospital.
- If possible, designate covered eating areas, which are kept clean, so as to not attract insects, rodents and scavengers.
- No refuse of any kind should be openly dumped.
- Municipal sites for disposal of general waste should be at a safe distance that does not attract scavengers to the hospital.
- For scavenger and rodent control, physical traps are preferable over dangerous poisons (such as strychnine) that can be dangerous to human and other animal life.
- Do not leave animal carcasses in the open. Take urgent action for burial, which can be at a site similar to anatomic and pathologic waste. Even smaller animals such as rats and mice should not be disposed off with municipal waste, the preferred action being burial in a small pit.
- If the carcass needs transporting to a municipal or other appropriate site, personnel while observing FULL PPE should handle it. It should be placed in a big plastic or gunny bag is possible, or covered appropriately.
- Eliminate pools of water, however small. Mosquitoes only need a 1/4 inch or more of water to transform from egg to adult.
- Municipal authorities must be engaged for the control of dog and cat populations around the vicinity of the hospital.

Cleaning Up Rodent Infested Areas, Using Safety Precautions

- Put on utility gloves before cleaning up.
- Do not stir up dust by sweeping up or vacuuming up droppings, urine or nesting materials.
- Wet contaminated areas with 1% chlorine solution for decontamination.

- Take care in using the chlorine solution, avoiding any spilling on clothing or other items that can be damaged. This solution is stronger than the usual 0.5% Chlorine solution used for decontamination.
- Take up contaminated materials with a damp towel, then mop or sponge the area with disinfectant.
- Spray dead rodents with disinfectant, then double-bag along with all cleaning materials and bury.
- Finally, disinfect gloves before taking them off.
- After taking off the clean gloves, thoroughly wash hands with soap and warm water.
- When going into work areas that have been closed for a while, open them up and air out before cleaning.

Infection Control and Environmental Management Monitoring Tool

Performance Standard	Verification Criteria	Yes, No	Comments
1. Ensure safe water supply for drinking and medical purposes	Observe the provision of water		
	• Tap water available		
	• Overhead and underground water tanks are cleaned every 6 months		
	• Water dispensers and containers are clean		
	• Drinking water is purified and kept properly		
	• Last water testing done on		
	• Sanitation facilities are appropriate with a functioning sewerage collection and disposal system		
	• Communal baths are not being used by suspected or diagnosed infectious patients.		
	• Percutaneous devices are covered with occlusive dressing before sending patient for a bath		
	• Water for medical uses conforms to standards defined		
	• Water treatment and filtration plant installed		
	• Water treatment and filtration plant is		

	maintained as per requirements		
	<ul style="list-style-type: none"> Chlorinated water is tested daily for appropriate content 		
	<ul style="list-style-type: none"> Sterilized water available for medical purposes such as washing laparoscopes etc 		
	Patients and attendants being educated on the use of water and toileting facilities.		
	Trained sanitary worker present in toilets round the clock		
	Signs outside and inside the toilet in local language, with images displayed to prevent from attempting to take off catheters, cannulae, IV drip sets, or leaving these inside		
	patients educated on not throwing any pharmacologic agents, syringes or other medical/surgical devices and instruments into the toilet or leaving them in the baths.		
	Patients with percutaneous devices (cannulae, central venous lines, catheters, etc) checked for appropriate waterproof occlusive dressings before going for bathing, or using the toilet.		
	Proper hand washing facilities available, with supplies for soap for patients, attendants and staff in side toilets		
	Staff toilets properly maintained with hand washing facilities and supplies		

2. Ensure adequate infrastructure	Floors have no cracks or crevices.		
	Operation Theaters, labor rooms, and procedure areas have appropriate flooring with materials that can withstand chemical and physical treatment for decontamination and cleaning.		
	Proper chemicals used in the cleaning of procedure areas must be carefully selected and used so that flooring and walls are not damaged.		
	Walls of the storage areas, operations theatres, wards, etc. do not have any seepage/moisture		
	Roofs not leaking.		
	Roofs protected and checked against any leaks according to a schedule .		
3. Ensure proper sanitation and sewerage system	Proper drainage within the hospital		
	Drainage systems are maintained		
	2 stage septic tank available and maintained		
	Hospital linked to a proper sewerage system		
4. Ensure adequate spatial separation of patients, including adequate inter-bed space	There is 1-2 m space between beds		
	No more than one attendant is allowed in wards, that too at the time of need		
	The defined number of beds in a ward is not exceeded		

5. Regulate Traffic flow and Activity Pattern	Traffic flow patterns are defined and adhered to		
	Traffic flow patterns are adhered to by waste transport personnel		
	Principle of 1 bed, 1 patient, 1 attendant adhered to.		
	Traffic to procedure and instrument processing areas is strictly limited to concerned staff only		
6. Regulate traffic and activity within the Surgical Unit	Only required staff is present at OT during elective surgery		
	Only required staff is present at OT during emergency surgery		
	Signs in Urdu (and/or local language) displayed within and outside the surgical suite		
	Semirestricted Area: Traffic is limited to authorized staff and patients at all times. Staff wears appropriate surgical attire.		
	Restricted Area Traffic limited to authorized staff (staff who perform and assist procedures) and patients at all times.		
	Scrubbed staff wears full surgical attire and cover head and facial hair with a cap and mask.		
	Patient is properly covered and wears the correct attire covering hair.		
	Cleaning of the surgical suite is according to defined		

	schedule and with appropriate techniques applicable to the facility.		
	Principle of First In-First Out Principle, and the First Expiry, First Out Principle being adhered to in HLD areas.		
7. Check and maintain ventilation and air quality as per requirement of the site	Floors and facility is not dry mopped.		
	Wet cleaning methods used for all dusting, cleaning and mopping.		
	Ventilation is adequate in patient areas.		
	Maintenance of ventilation systems is as per schedule.		
	Ultraclean air cycles are met; HEPA filters maintained as per guidelines of the manufacturer.		
	No flowers, pots and plants in sensitive areas with neutropenic patients		
	HEPA filters installed or mobile available for use in OT		
	Airflow conforms to appropriate standards		
	Uni-directional hoods available in laboratories and being used		
	Uni-directional hoods available in NICU, and under use while preparing medicines		
8. Ensure guidelines for maintaining standards for providing safe food	There are defined pathways for acquisition and use of food materials without any overlap with other supplies that could be potentially infectious		

	Food is appropriately cooked, stored and discarded as per guideline.		
	Clean work areas maintained.		
	Personal cleanliness standards maintained.		
	System to report infections/illnesses amongst food handling staff is working with reporting thresholds in place		
	Hand hygiene facilities available		
	Staff routinely checked for Stool DR		
	Cold chain is maintained.		
	Refrigerators and freezers being cleaned every month.		
9. Ensure appropriate housekeeping practices, with use of PPE	Verify absence of visible dust, cobwebs, blood, trash, used needles and syringes ALL areas applicable.		
	<ul style="list-style-type: none"> Wet mopping is standard practice. 		
	<ul style="list-style-type: none"> Formalin is not being used. 		
	<ul style="list-style-type: none"> Surgical suite cleaning is maintained as per guidelines. 		
	<ul style="list-style-type: none"> PPE is being propagated and maintained amongst all staff members involved 		
	<ul style="list-style-type: none"> Spills are reported and cleaned as per 		

	guidelines		
	<ul style="list-style-type: none"> Guidelines for frequency of cleaning are adhered to, with appropriate techniques 		
	Wash day being observed for all wards once per week.		
	Double bucket technique being observed for general cleaning		
	Corridors not being dry swept.		
	OT Cleaning: Terminal cleaning every day, at the end of the day. Terminal cleaning from top to bottom once a week being observed. Flooding not being done with formalin.		
	Spills being appropriately managed under the right time span		
10. Observe Linen Processing Guidelines	PPE guidelines for handling linen are adhered to.		
	Linen handling is minimal and is not shaken during collection and transport.		
	Soiled is carried separately and appropriately		
	From procedure areas is handled carefully to protect against sharps		
	Separate soiled and clean linen areas are marked and maintained.		
	Hand washing and PPE decontamination and cleaning is observed		

11. Ensure that Laundry is appropriately managed	Heavily soiled linen and items and those requiring hand washing are decontaminated prior to being laundered.		
	Storage, transport and clean linen guidelines are adhered to.		
	PPE is adhered to.		
12. Ensure appropriate equipment reprocessing	Decontamination solutions are made, used and disposed as per guidelines.		
	Instruments are not soaked overnight, or over the time limit defined		
	Sharp instruments are appropriately handled, soaked, cleaned and stored		
	Appropriate PPE is observed by all concerned.		
	Autoclaving instructions are followed as per technical guidelines by the manufacturer		
	Dry heat is used only for instruments applicable.		
	chemical disinfectants are used appropriately.		
	Shelf life system is developed and followed.		
	HLD guidelines as per requirements are followed.		
	Glutaraldehyde and formalin are preferably not used.		
	Glutaraldehyde and formalin are being phased used.		
13. Ensure appropriate management of different	Segregation of wastes		
	Segregation of general waste into 2 streams		

kinds of waste	Segregation of infectious and non-infectious solid wastes is appropriate		
	Segregation bins are available according to the color codes defined		
	Separate RED bins for pathologic and anatomic waste		
	Separate big BLUE bin for recyclable waste is available at each PCA		
	Appropriate bags available for each type of waste		
	Bags being sealed when $\frac{3}{4}$ th full.		
	Bags being collected according to the defined schedule		
	Collection schedule displayed in local language at all sites including PCAs		
14. Type and use of Containers for Sharps	Verify whether:		
	<ul style="list-style-type: none"> The sharps containers are puncture-proof (cardboard box, hard plastic containers or cans that are closed) with only small opening for disposing of syringes with needle 		
	<ul style="list-style-type: none"> Sharp containers are all less than $\frac{3}{4}$ full 		
	<ul style="list-style-type: none"> Empty and new containers are nearby and ready for use with 0.5% chlorine solution in all applicable areas 		
	General waste guidelines are being followed.		

General waste does not mix with infectious and other wastes		
Plastic waste is being decontaminated for safe recycling		
Anatomic waste guidelines are adhered to.		
Transport of anatomic waste is as per guidelines		
Transport of pathologic waste is as per guidelines		
Burial site is being appropriately managed.		
PPE is being observed in collection, transport and disposal of waste.		
Waste at the laboratory is being appropriately managed.		
Verify whether the person collecting waste complies with the following steps:		
<ul style="list-style-type: none"> • Wears: <ul style="list-style-type: none"> ○ Utility gloves ○ Eye protection ○ Gumboots or enclosed shoes • Collects waste in leak proof containers • Collects waste the container is $\frac{3}{4}$ full • Assures all tissue samples or placentas are double bagged in leak-proof containers 		

	<ul style="list-style-type: none"> • Sufficient dustbins outside the facility (in the grounds) exist for general waste to avoid littering 		
	<ul style="list-style-type: none"> • The grounds (outside of the facility) are free of hospital waste 		
	<ul style="list-style-type: none"> • Maintains waste collection area clean and free of spills (walls, tables, floors) 		
	<ul style="list-style-type: none"> • Collection person washes hands with soap and water after removing gloves and other personal protective equipment 		
	Verify whether:		
	<ul style="list-style-type: none"> • Contaminated liquid waste (blood, urine, faeces and other body fluids) are disposed of in the following manner: 		
	<ul style="list-style-type: none"> ○ Emptied into a toilet or sink from which water can be drained into a sewer system 		
	<ul style="list-style-type: none"> ○ The sink is decontaminated and rinsed with water after the waste has been emptied 		
	<ul style="list-style-type: none"> • Containers with sharps are incinerated 		
	<ul style="list-style-type: none"> • Solid waste (used dressings and other materials contaminated with blood and organic matter) are incinerated/buried 		
	<ul style="list-style-type: none"> • The person in charge of waster wears eye 		

	protection and utility gloves		
	If the waste is incinerated, verify whether:		
	<ul style="list-style-type: none"> The waste is burned in a small designated area 		
	<ul style="list-style-type: none"> The waste is transported to the area just before burning 		
	<ul style="list-style-type: none"> During incineration, visible flames occur and last until ashes are seen 		
	<ul style="list-style-type: none"> Ash from incinerated material is disposed off by burying 		
	<ul style="list-style-type: none"> That no waste is lying around the grounds 		
	OR		
	If the waste is buried in a pit, verify whether		
	<ul style="list-style-type: none"> The area is not accessible to other staff, the community and domestic animals 		
	<ul style="list-style-type: none"> The burial site is lined with a material of low permeability (e.g. clay) 		
	<ul style="list-style-type: none"> The burial site is at least 50 meters away from any water source and it is located in an area free of floods 		
	<ul style="list-style-type: none"> The pit is about 1 meter square and 2 meters deep 		

	<ul style="list-style-type: none"> The disposed waste is covered with 10-15 cm of dirt each day 		
	<ul style="list-style-type: none"> The final layer of dirt is 50-60 cm 		
	<ul style="list-style-type: none"> The burial pit lasts for 30-60 days maximum 		
	<ul style="list-style-type: none"> There is no waste lying around the grounds 		
	Sharps waste is buried, verify whether		
	<ul style="list-style-type: none"> The sharps are collected in puncture resistant and leak proof container 		
	<ul style="list-style-type: none"> When the box is $\frac{3}{4}$ full, chlorine solution is poured for decontaminating and allowing rusting of needles 		
	<ul style="list-style-type: none"> The container is buried 		
15. Ensure availability and maintenance of adequate handwashing facilities and supplies	Verify and observe		
	<ul style="list-style-type: none"> Facilities are available and maintained at all applicable sites. 		
	<ul style="list-style-type: none"> Elbow operated taps and deep sink available 		
	<ul style="list-style-type: none"> Supplies are regularly available at all sites 		
16. Ensure availability of adequate number and type of isolation rooms	<ul style="list-style-type: none"> Facilities are wheelchair accessible 		
	<ul style="list-style-type: none"> Isolation rooms are available for any potential infectious patient admission 		
	<ul style="list-style-type: none"> Isolation rooms are maintained as per guidelines. 		

17. Institute a program to control pests including animals, rodents and other vectors	• Animal and rodent control personnel are trained		
	• Wastes are not being openly dumped		
	• Patient visitation areas have proper disposal bins		
	• Water collection areas and pools are dewatered effectively and efficiently		
	• Municipal authorities are actively involved for control of dog and cat populations.		
	• Animal carcasses are decontaminated and disposed off properly		
	• Rodent infested areas are decontaminated and appropriately cleaned		