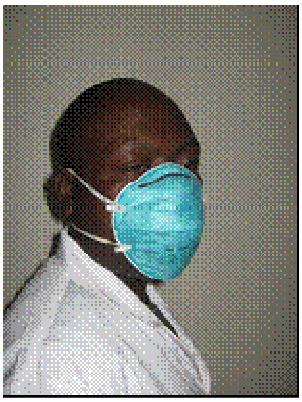
MINISTRY OF HEALTH

Uganda National Infection Prevention And Control Guidelines



2013

UGANDA NATIONAL INFECTION

PREVENTION AND CONTROL GUIDELINES

2013

Ministry of Health Plot 6 Lourdel Road

P.O. Box 7272 Kampala, Uganda
Tel: 256-414-340872 / 340873
Email: ps@health.go.ug
Web: www.health.go.ug

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FOREWORD

During the last ten years Uganda was affected by a wave of epidemics: Ebola, Marburg, Cholera, Influenza virus and others. Infectious diseases like HIV, TB, Multi drug resistance and blood pathogens like HBV and others are still of public health significance. Health Care Workers, Patients, and Visitors are at risk of acquiring such infections in health care settings, (out-patients, in-patient departments, HIV care clinics and operating theatres). Infection Prevention Control Practices (IPC) are critical to minimize the risk of transmission of infectious agents and causing unnecessary deaths.

Previously, there has been effort by different programs to develop program specific IPC guidelines. These isolated contributions needed to be galvanized to ensure integrated infection control practices, avoid duplication and wastage of resources. This particular guideline is comprehensive and includes among others the National Infection Prevention and Control Guidelines (MOH, 2004) and the Infection Control: Policies and Procedures (MOH, 2005). IPC guidelines will be used alongside with these and the other technical guidelines such as (1) PEP for HIV, Hepatitis B and C (2) Injection safety and Healthcare waste management (3) Tuberculosis Infection Control (TB-IC) guidelines etc. It has been prepared to ensure Prevention and Control of infectious diseases at health facilities through safe practices. The same guidelines can be used to provide guidance on infection prevention at household level. The harmonization of guidelines has been spearheaded by Quality Assurance department in the Ministry of Health, alongside the National Infection Control technical team which is expected to guide the implementation process.

At hospital level, infection control structures should be strengthened and formed where they are still missing. Health facilities should have infection control teams because they are the backbone of the IPC program to oversee the day to day infection control practices. Members of management and administration at all levels should plan and include infection control in their facility workplans and budgets in an integrated approach for all patient care services.

Lastly I would like to implore all Ministry of Health departments, the districts health managers, facility health workers, all our partners and the community to support the implementation of these guidelines to ensure safe delivery of health services.

Dr Aceng Jane Ruth
Director General of Health Services
Ministry of Health

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ACRONYMS/ABBREVIATIONS

AIDS	Acquired Immunodeficiency Virus
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
HLD	High-Level Disinfection
ICU	Intensive Care unit
IP	Infection Prevention
MOH	Ministry of Health
HID	Health Infrastructure Division
NACME	National Advisory Committee on Medical Equipment
PEP	Post Exposure Prophylaxis
POP	Plaster of Paris
PPE	Personal Protective Equipment
TB	Tuberculosis
UNICEF	United Nations Children's Fund
WHO	World Health Organization

GENERAL GUIDING STATEMENTS

The following statements will guide infection prevention and control practices

1. Comprehensive infection prevention and control practices shall be adhered to in each health care facility, whether government or private
2. All clients must be managed as if they are a potential source of infection
3. Proper final disposal methods for destruction of all Health Care Waste generated during health care delivery especially from sharps, laboratory, surgical and medical procedures will be installed.
4. To ensure adequate and full supply of infection control materials at all levels; adequate budgetary allocation shall be provided to the different levels
5. Infection prevention and control Standard Precautions shall be followed when contact with blood, all body fluids, non-intact skin and mucus membranes are anticipated
6. There shall be an active infection control committee at the national level, national and regional level referral hospitals, district hospital and at Health Centers Level IV
7. The infection control team must be instituted as the technical arm of the Infection Control Committee to operationalize infection control guidelines and practices.
8. There shall be an effective system of supervising, monitoring and evaluating infection control practices and waste management in public and private health care facilities
9. There shall be facility based in-service training programmes on infection control to support all categories of health workers at all levels adhere to ***infection Prevention and control guidelines***
10. ***Infection prevention and control guidelines*** shall be integrated into the curricula for pre-service education/training of all health care workers and will be periodically updated
11. There shall be a program of civic education for the community to create awareness on Hospital infection control

CHAPTER 1
BACKGROUND

Medical transmission of HIV, Hepatitis and other blood borne pathogens commonly occur through unsafe injections, sharps injury and other unsafe medical practices. Whenever clinical procedures are conducted, patients are at risk of Nosocomial infections either during, immediately or long after the procedure, unless precautions are taken to prevent transmission. Health care workers including support staff (e.g., cleaning, maintenance, etc) are at risk of exposure to potential life-threatening infections. For example, in the US, more than 800,000 needle stick injuries occur each year despite continuing education and vigorous efforts aimed at preventing such accidents (Rogers 1997). In Uganda like many developing countries, however, the risk of needle stick injuries and accidental exposure to blood or body fluids is even higher (Phipps et al 2002). According to the survey conducted by Uganda National Injection Safety Task Force (UNISTAF) in 2003 the prevalence of needle stick-injuries among health workers was 44%. Another research by Uganda Martyrs University, Nkozi also revealed a high rate (46%) of needle stick injury. According to a study done in Mulago Hospital Emergency medical ward (Seremba, 2004) 48% of the patients had HIV, 9% had HBV and 3% HCV.

Nosocomial infections add to functional disability and emotional stress, and may in some cases lead to disabling conditions that reduce quality of life. They also increase costs of medical care due to increased Average Length of Stay in health units, extra medicines and sundries, extra staff time and management of multi-drug resistant infections. Fortunately, medical transmission represents a distinctly avoidable risk in the context of service delivery because health workers virtually have the power to prevent medical transmission once they are motivated through training, provision of basic equipment and supplies, availability of adequate staff and appropriate infrastructure etc. Observing infection control practices, based on Standard Precautions, can minimize spread of infections especially in hospitals and human and animal health care facilities. These precautions have a great potential for a fast, significant impact on trends of infections.

Healthcare Associated infections (Nosocomial) are a significant global concern (Alvarado 2000). Nosocomial infection rates range from as low as 1% in Europe and the Americas to more than 40% in parts of Asia, Latin America and Sub-Saharan Africa (Lynch et al 1997). In Uganda, there is limited data on Nosocomial infections because few studies have been conducted in this area.

Good Infection Prevention and Control practice is the mainstay of preventing medical transmission of blood borne pathogens such as HIV, HBV, HCV and other infections because they ensure patient and provider safety. A central tenet of the right to health is that health care must be safe. An adequate health system should improve people's health and not create grave risks to health. Therefore, adherence to infection prevention and control practice is a critical to patient safety; and is an integral of Continuous Quality Improvement in a health care program. Good infection control practice is indicative of good quality health care for it reduces morbidity, mortality and costs of care.

To minimize the burden associated with nosocomial infection, it is paramount that every user of health care takes individual responsibility to prevent transmission of infections. Health Care Workers (HCWs) should make every effort to reduce transmission of infections to patients and to themselves. Infection control programmes are effective if they are comprehensive and include surveillance and staff training.

In the recent past there have been efforts by different programs to create specific guidelines e.g., Post-Exposure Prophylaxis (PEP), Tuberculosis Infection Control Guidelines (TB-IC), and so on. However this has led to duplication and waste of resources.

There has been need to harmonize all the guidelines into one comprehensive document for purposes of uniformity and consistence. To achieve this, the Ministry of Health and development partners has come up with the Uganda National Infection Prevention and Control Guidelines.

These guidelines, Uganda Infection Prevention and Control guidelines 2012 provide comprehensive information to health care workers and community health workers in the prevention and control of transmissible infections. They will act as a reference point to the

hospital/health center committee members and to all other health care providers during the day to day procedures they carry out in their various workplaces. The guidelines are in line with International recommended standards precaution (WHO 2002 and Titjen 2003).

It is vital that prevention and control of infection within our health units is practiced effectively and that all healthcare workers clearly understand the organization of infection control in their facilities, policies and procedures. These should be well documented and accessible to all health care workers. Continuous monitoring and evaluation of patient care practices will ensure continued performance of correct practices. All people who come in contact with patients in healthcare facilities and communities should adhere to infection prevention and control practices. It is imperative that facility administrators support implementation of the infection control programme through allocation of adequate resources, including human resource.

DEFINITIONS:

Nosocomial infections: Infections acquired through health care provision, health care seeking or visiting a health care facility. They are also called **Hospital Acquired Infection** (HAI) or **Health facility Acquired Infection** (HAI). It is also known that health care provision or seeking may be in other places other than the healthcare facility as in community based care. This has resulted into another nomenclature of nosocomial infections known as Healthcare Associated Infections (HAI). All these terms may be used interchangeably.

Cleaning: Process that physically removes all visible dust, soil, blood or other body fluids from inanimate objects as well as removing sufficient numbers of microorganisms to reduce risk for those who touch the skin or handle the object. (It consists of thoroughly washing with soap or detergent and water and drying)

Decontamination:

High-Level Disinfection (HLD): The process that eliminates all microorganisms **except some** bacterial endospores from inanimate objects by boiling, steaming or the use of chemical disinfectants.

Sterilization: Process that eliminates **all** microorganisms (bacteria, viruses, fungi and parasites) **including** bacterial endospores from inanimate objects by high-pressure steam (autoclave), dry heat (oven), chemical sterilants or radiation.

Exposure:

Non-occupational exposure: Non-occupational exposure to HIV occurs when one unintentionally gets in contact with potentially infectious body fluids as occurs in rape, defilement, accidents such as RTA or collapsing buildings and human bites.

Occupational exposure: An occupational exposure is defined as a percutaneous, mucous membrane, or non-intact skin exposure to potentially infectious blood or body fluids that occurs during the course of an individual's employment. This applies to health care workers (HCW) and non-health workers.

CHAPTER 2
INFECTION CONTROL PRACTICES

Transmission of infections in health care facilities can be prevented and controlled through the application of basic infection control precautions which can be grouped into standard precautions and transmission based precautions.

Definitions

Standard Precautions: Are basic infection control measures which must be applied to all patients at all times, regardless of diagnosis or infectious status. They are designed to reduce the risk of transmission of micro-organisms from both recognized and non recognized sources. They apply to 1) blood 2) all body fluids, secretions and excretions except sweat, regardless of whether they contain visible blood 3) non-intact skin and 4) mucus membranes.

Additional (transmission-based) precautions: are measures that are used for patients known or suspected to be infected or colonized with highly transmissible or epidemiological important pathogens for which additional precautions beyond Standard Precautions are needed to interrupt transmission in health care facilities.

2.1 Standard precautions

Treating all patients in the health care facility with the same basic level of "standard" precautions involves work practices that are essential to provide a high level of protection to patients, health care workers and visitors. These include: (i) Hygiene (personal hygiene and safety, hand hygiene, facility hygiene and hygiene in special areas) (ii) Use of Personal Protective Equipment (iii) care for patient equipment (iv) observing aseptic techniques (v) management of healthcare waste and

2.1.1 Hygiene

Hygiene is the single most important strategy in prevention of health facility acquired infections. It includes personal hygiene, facility hygiene and hygiene of equipment and sundries. The latter will be dealt with under the section of disinfection and sterilization. When carried out properly, it significantly reduces levels of contamination by 70% (*Prevention of hospital acquired infections, A practical guide 2nd Edition WHO 2002*)

2.1.1.1 Personal hygiene and safety

Personal Hygiene involves the general cleanliness of the whole body. This includes the hair, the hands, and clothing among other things. The hair should be kept short and well trimmed. Finger nails should be short and well trimmed. Artificial nails and nail vanish should not be applied. The clothes should be freshly laundered before putting them on.

Table 1: Key points of emphasis on general body care

Item	Recommendations
Nails	Keep short and clean. No wearing of artificial nails, no nail vanishwhile on duty
Hair	Keep it short or pinned up and should be regularly washed
Beards and moustache	Trimmed short and clean
Clothing	Freshly laundered uniforms should be put on daily. Street clothes should be covered by clinical coats or gowns In case of exposure to blood or body fluids, clothes should be decontaminated before washing Uniforms should be made of materials easy to be washed, and decontaminated. The material should not allow body fluids to seep through easily.

2.1.1.2 Hand hygiene

Hand washing is the most effective method of preventing the transfer of micro-organisms between personnel and patients within the health care facility. The purpose is to reduce resident and transient organisms. Appropriate hand washing is achieved through using soap, running water and friction. Patients, family members and health workers should be instructed in proper hand washing before eating, after toileting and when soiled.

Failure to perform appropriate hand hygiene is considered to be the leading cause of nosocomial (hospital-acquired) infections and the spread of multi-resistant microorganisms, and has been recognized as a significant contributor to outbreaks (Boyce and Pittet 2002).

Table 2: Principles for types of hand hygiene, recommended agents, their use and application:

Prior instructions to hand washing: *Remove all jewelry. Wet hands, apply enough detergent and use enough friction. Cover all areas of your hands*				
Hand Care: *Cover skin lesions and cuts on hands with water proof dressing. Keep finger nails short at all times*				
Method	**Agent**	**Purpose**	**Area**	**Duration**
Social/Routine hand washing	Soap (non-antimicrobial) and water	Remove soiling and transient microorganisms	All surfaces of fingers and hands	15 seconds
Hygiene/ Antiseptic hand washing	Water and chlorhexidine, iodine and providone iodine chlorproxylenol, triclosan	Remove transient micro-organism and reduce flora (persistent activity)	All surfaces of fingers and hands	15 secs
Antiseptic hand rub	Alcohol-based rub ethanol, iso-propyl, methanol	Remove transient micro-organisms and reduce flora (Persistent activity)	All surfaces of fingers and hands	Until dry
Surgical hand washing/scrub	Water and antimicrobial soap	Remove transient micro-organisms and reduce flora (Persistent activity)	Hands and forearms	2-5 min rigorous applications of antiseptic; brush not recommended routinely; clean nails and nail beds

HOW TO WASH HANDS?

Wash hands using the following procedure:

Figure 1: Hand Hygiene Technique [Adapted from WHO Guidelines on Hand Hygiene in Health Care, 2009

Preparation for scrub procedures

- Remove all jewellery e.g. rings, watches, bracelets
- Adjust headwear to ensure that hair is well covered and that the mask is comfortable
- Put on goggles or face shield
- There should be no open cuts or infected lesions. Cover open cuts with occlusive waterproof dressing
- Sleeves must be short to allow washing to the elbows
- Keep nails short, clean and without nail vanish
- Always hold hands above the level of the elbow so that water drips from clean area to unclean ones
- Once the procedure has commenced, taps and dispenser should only be manipulated using the elbows (foot or knee spray taps being the ideal choice)
- The procedure should not take less than 5 minutes
- Use disposable (single use) brush during scrubbing

Note:

- Soap and soap dispenser should be clean.
- If plain soap is used, care of soap and soap dispenser is very important as they may act as a reservoir for bacteria if they are not cleaned properly between uses

Surgical hand washing/scrubbing procedure:

- Wet hands and arms to a point 4 – 5 cm above the elbows
- Apply an appropriate antiseptic agent and rub vigorously to form lather
- Cover all surfaces of the fingers, arms and part of upper arms, ensuring that nails and nail beds are cleaned with single disposable scrubbing brush. The hands should not be scrubbed to avoid skin damage
- Rinse off the initial wash, starting from hands to elbows and then re-apply antiseptic
- Repeat the process of the fingers, arms and upper arms. The whole process should last for 2-5 minutes.
- Rinse off the lather starting from hands to elbows

- Give a final wash to the hands and rinse each hand individually, working from hand to elbow
- Hold the hands above the elbows
- Dry hands

Drying of hands and arms:

- Hand drying is an essential part of hand hygiene. Wet hands have higher bacterial counts and lead to dryness and cracked skin and increased latex allergies. Keep the hands higher than the elbows, and hold them away from the body and clothing
- Pick the towel ensuring that each hand comes in contact with one side of the towel. That side of the towel should dry the corresponding arm.
- Use the single-use re-usable towels for drying hands.
- Drop the towels in a laundry basket for processing

Note:

The principle of hand drying is to remove excess water and reduce the bacterial count of transient microorganisms.

- The communal towel has been recognized as a source of cross infection and should be eliminated from the clinical areas
- Disposable paper or single use re-usable cotton towel are recommended

Hot air hand dryers can only be used by one person at a time and take twice as long to dry the hands than paper towels. Contamination of the nozzles of hot air hand dryers has been demonstrated to be linked with increased bacterial counts on hands

2.1.1.3 Instrument Hygiene

Instrument hygiene is very important in patient safety. It involves cleaning of equipment, high level disinfection and sterilization and storage. **Cleaning** is the single most step in making a medical device ready for re-use. Further processing (disinfection and sterilization) of equipment that does not include cleaning can fail because microorganisms can be protected inside the residual organic matter. There is little published data on “How clean is clean?” In practice, cleanliness is based on visual inspection, whether the instrument is visibly clean.

Disinfection is the process destroying or inhibiting disease producing microorganisms outside the body. It is the first step in processing equipment that has been in contact with blood and body fluids but it is also used for items that cannot undergo the sterilization process. The process involves using various chemicals.

High-Level Disinfection (HLD): The process that eliminates all microorganisms **except some** bacterial endospores from inanimate objects by boiling, steaming or the use of chemical disinfectants.

Sterilization: Process that eliminates **all** microorganisms (bacteria, viruses, fungi and parasites) **including** bacterial endospores from inanimate objects by high-pressure steam (autoclave), dry heat (oven), chemical sterilants or radiation.

2.1.1.4 Facility hygiene

A clean environment forms the basis of sound infection prevention and control practices. This is because there is an important link between cleaning of health care facilities and persistence of nosocomial pathogens. The purpose of cleaning the environment is to remove visible dirt, reduce the level of microorganisms and to minimize the dissemination of infectious agents in the facility, thereby providing an aesthetically pleasing, sanitary and relatively contamination –free environment for patients, staff and visitors. Dust contains large numbers of skin scales, microorganisms such as bacilli and staphylococci, dried nuclei of Mycobacterium tuberculosis. These are dispersed during dry dusting, weeping or shaking patient bedding.

The cleaning services should be based on evidence and the Infection Control Team should provide information and support. Domestic supervisors, cleaners and managers should be aware of the schedules, materials and special requirements of the cleaning programme. Cleaning should be monitored against the expected standards and a checklist can be produced which ensures that cleaning of all areas in the health facility is carried out to optimal levels. Specialized areas should have additional cleaning requirements.

Table 3: Methods of decontaminating routinely used items -scan from Metha book page 312-319

Item	Recommended Method of Cleaning	Remarks
Surfaces, walls, trolley tops, windows, doors and ventilators, bed cradles, bed stead and furniture	• Dump dusting with water detergent • Leave surfaces clean and dry • Materials needed should be designated for this purpose	Use warm water where available Beds should not be wooden
Floors.	**Wet scrubbing**. Use 2 bucket system where available. One bucket contains soapy water. Another bucket contains clean water. Color code or label equipment/materials according to different areas to be cleaned e.g. blue buckets and blue rugs can be used for the general ward while red buckets and red rugs can be used to clean sluice rooms and treatment rooms. **Frequency:** Daily and whenever dirty	All materials used in cleaning should be properly washed and dried at the end of each cleaning session Cleaning rugs should be washed and boiled at the end of the day if separate boiling facilities can be arranged
Toilets, sluice rooms, drainages and sinks	• Scrub with vim, rinse with clean water • If these areas are contaminated with blood, decontaminate with hypochlorite **Frequency:** Daily or more often as needed	Use cleaning materials designated for these areas. Avoid materials that will cause blockages
Equipments, e.g. urinals, bedpan, bowels and basins • If contaminated with blood/body fluids • If stool is infected	• Wear heavy duty gloves • Disinfect with JIK • Scrub with detergent, rinse and boil • , disinfect with 2% soluble phenolic	Disinfecting before washing is meant to protect staff who will handle/clean this equipment
Commodes	• Wash seat daily with hot water and detergent and dry with disposable towel • Wipe the seat with the large alcohol wipe after each use	• If visibly contaminated, remove soil with tissue. Wash with warm water and detergent. Dry • In case of enteric viral disease: wipe the commode with hypochlorite (1000 ppm av cl) • In case of enteric bacterial disease, use 2% phenolic

Item	Recommended Method of Cleaning	Remarks
Dressing trolleys	• Remove all items daily and wipe surface with warm water and detergents. Dry. Wipe over with 70% isopropyl alcohol • Discard all previous contents of open jars and bottles. Replace with unopened containers	• If opened jars are used, keep the volumes so that containers can be heat disinfected when empty • **Do not top up open disinfectant containers**
Curtains	• Change curtains frequently • Isolation room curtains should be changed with each terminal cleaning	
Kitchen	• All areas cleaned with water and detergent • All drainages covered with wire mesh to prevent blockages	All food handlers should observe high level hygiene
kitchen Utensils	• Wash with warm water and detergent. Food surfaces should be wiped with 0.1% hypochlorite • Rinse thoroughly and leave to dry on rack	Kitchen staff should be screened for infectious diseases at recruitment and every 3 months All leftover food should be disposed off immediately to avoid vermin
Protective clothing	• All health care workers to put on uniforms in health care facilities • Reusable protective like plastic aprons and boots should be properly cleaned by the user at the end of the procedure or day • They should be wiped with Jik if blood spillages or spots have occurred	Protective clothes should be left in the workplaces
Safety cabinets in laboratories	Use high level containment safety cabinets when handling infectious agents (e.g. Brucellosis, TB and Plague)	Protect health workers from Aerosols
Ambulance	• Wash with water and detergent daily • If there is any blood or body fluids decontaminate with 0.5% hypochlorite, then wash and dry	
Outside environment	• The health facility should be fenced off • Grass should be cut short	

Item	Recommended Method of Cleaning	Remarks
	• Paving and glowing of glass to avoid bare ground should be done • Avoid littering of waste	
Bed and cots	• Wipe with warm water and detergent. Dry	Disinfectant unnecessary unless contaminated with blood and other body fluids
Bed frames	• Wipe with warm water and detergent. Dry	Disinfectant unnecessary unless contaminated with blood and other body fluids
Bed locker	• Wipe with warm water and detergent. Dry. Clean inside locker once patient has been discharged	

2.1.1.4 Hygiene in special areas

The following are some of the areas in healthcare settings that require special attention to achieve good hygiene. Operating theatres

- Intensive Care units (ICU)
- Premature units
- Labour suites
- Oncology units
- Burns units
- Isolation units
- Laboratory
- Dental units
- I.V. Manufacturing Units

Patients in these units are either immune compromised or vulnerable because of the nature of the procedures that are carried out in such areas. Therefore, a high level of hygiene should be achieved and maintained at all times.

General comments for Specialised Areas

Specialised areas should be treated as follows:-

- Cleaning equipment should be designated to particular areas. For example, in the operating theatre the cleaning equipment for the inner zone should be different from that of the outer zone.
- Floors should be cleaned after every procedure and at the end of the day.
- The walls should be cleaned from heights of 2.5 - 3 meters downwards.
- Cleaning should be done with water and detergent.
- Manage spillages by decontaminating with chlorine releasing agents 0.5 – 1% for 10 minutes and spot cleaning with water and detergent.
- Clean main ward before cubicles in special care units.

Table 4: Recommended methods of cleaning specialised areas

Theatre and Labor ward	**Method of Cleaning**	**Remarks**
All surfaces e.g. • Operating tables, trolleys and shelves • Ceiling	• Dump dust with water and detergent • Use a high broom weekly to avoid dust and cobwebs	
Walls, windows seals, and doors	Dump cleaning 2.5 – 3 m downwards daily with water and detergent	These should be washable materials
Floors Floors (where spillages of body fluids have occurred)	Scrub using a brush, with water and detergent and leave dry Apply 0.5 – 1% of chlorine releasing agent depending on amount of spillage for 10 minutes and spot clean Frequency: • After every operation • Weekly cleaning of all equipment and areas	
• Please note that the same method of cleaning applies to all the rest of special areas mentioned above • Designate cleaning materials to each patient area in intensive care unit • Air entering these units should be filtered where possible • Effective supervision of the cleaners is necessary • Flowers can be a source of infection and should not be allowed in special areas • Environmental sampling should only be done if a possible source of infection is suspected		

Terminal cleaning

Once the patient(s) is discharged or dead, the following cleaning procedures are recommended:

- The bed should be removed and cleaned
- Wear appropriate PPE before undertaking terminal cleaning
- In case of single rooms, all linen (including bed curtains and window covering) should be removed, bagged and sent for the laundry. It should be labeled clinical (infectious)
- All waste should be collected, closed and labeled appropriately
- Routine cleaning procedures must be performed
- Wipe all surfaces including walls to hand 2.5-3m with water and detergent. Allow to dry
- All surfaces of bed-frame, mattresses must be dump wiped approved detergent before the bed is made. Wipe the mattress with warm water and detergent. Wipe over with a chlorine releasing disinfectant where applicable.
- Complete the task, remove the PPE, wash and dry hands thoroughly
- Keep room empty as long as possible after terminal cleaning has been completed.

Post Mortem room and Mortuary

Hospital mortuaries can be a source of infections. The IPC team should ensure that the environment is safe for the mortuary health workers.

Risk of transmission

- Since post-mortem may be performed on infectious bodies, there is considerable risk of transmission of infection to the healthcare workers if they are not adequately protected. The following are ways in which infection can be transmitted during Post Mortem: Piercing injuries from sharp bony fragment and sharp instruments such as scalpels and saws
- Aerosols from cutting bones and opening cadaver to investigate cavities
- Respiratory aerosols from opening lungs
- Splashes from blood and body fluids

Precautions in Mortuary

- Wear protective like gloves, gowns, plastic aprons, boots and masks.
- Disinfect used instruments with Hypochlorite 1%.
- Wash equipment with detergents and water, rinse with warm water.
- Wash hands thoroughly with soap and water, and disinfect them with 70% alcohol.
- Disinfect rooms daily with phenolic compounds.
- Where possible UV light should be installed.
- Decontaminate surfaces where blood/ body fluids have occurred using chlorine releasing agent

Terms of reference for cleaning, contractors see Annex I

CHAPTER 3
DISINFECTION

Disinfection is a process which reduces the number of pathogenic microorganisms except spores. It is carried out to render objects and surfaces free of most organisms and safe to handle and use. This can be achieved with heat or chemicals. All objects and surfaces contaminated with blood and other body fluids must be treated with chlorine releasing agents before washing. They should then be boiled or sterilized. Disinfectants must be used for the right purpose, in the appropriate concentration, and for the prescribed length of time, the manufacturer's instructions should be followed. Disinfectants should be kept in their stock concentration, and used when freshly diluted.

While using disinfectants and antiseptics, it is vital that manufactures'' instruction are followed for maximum effectiveness.

- Always measure and never guess the amount of water and disinfectant to be mixed. Too high a concentration is wasteful and hazardous while too low a concentration is ineffective.
- Do not mix antiseptics or disinfectants as this reduces their effectiveness due to chemical interaction.
- Observe the minimum contact time for each disinfectant used.
- Disinfectants are not recommended for damp dusting unless there is spillage of blood or body secretions.
- Use freshly prepared disinfectants.

Choice of disinfectant

The choice of disinfectant will depend on the following:

1. **Patient susceptibility to infection**

   Immuno-compromised patients will need high level disinfection or sterilization for the devices used on them.

2. **Tolerance of device to heat, chemical, pressure, moisture.**

   Devices such as endoscopes and other fiber-optic equipment cannot withstand temperatures required to achieve high-level disinfection and therefore chemical are used.

3. **Nature of contamination/micro-organisms suspected.**

   More resistant organisms and spore forming organisms will require sterilization instead of chemical disinfection.

4. **Time available for processing**

   Chemical disinfection is quicker than heat method although heat is the preferred option. When choosing a chemical method, it should be effective (see table 7 and 8 on choices of disinfectant).

5. **Risks to processing staff**

   Some chemicals are highly toxic and can adversely affect the staff using them.

6. **Cost of processing**

7. **Availability of processing equipment**

Table 7: Disinfectants Uses Advantages and Disadvantages:

Disinfecting agents	Spectrum (level)	Uses	Advantages	Disadvantages
Alcohols (60-90%) including ethanol, isopropanol	Low to intermediate	• Semi-critical and on-critical • Thermometers, stethoscopes • Rubber stoppers on multi-dose vials • Spot cleaning on surfaces	• Fast acting • No residue • No staining • Low cost • Widely available	• Volatile flammable • Irritant to mucous membranes • Inactivated by organic matter • May harden rubber, cause glue detoriation or crack acrylic
Chlorine and related compounds Sodium hypochlorite (5.25% - 6.15%) house bleach at a concentration of 100-5000 ppm free chlorine	Low to high	• Tonometers • Spot disinfection of surfaces • Dental appliances • Hydrotherapy tanks • Water system in haemodialysis (high concentration or chlorine gas.	• Low cost • Fast acting • Readily available • Liquid, tablets, powder	• Corrosive to metal in high concentrations (>500 ppm) • Inactivated by organic matter • Discolouration / bleaching of fabrics • Releases toxic chlorine gas when mixed with ammonia. • Skin and mucous membrane irritant • Unstable if left uncovered, exposed to light or diluted
Aldehydes Glutaraldehyde > 2% aqueous solution buffered to pH 7, 5-8, 5 with sodium bicarbonate	High level to sterilant	• Endoscopes (20 min at 20 C)	Good material compatibility	• Allergenic, irritant to skin and respiratory tract. • Direct contact causes skin injury • Relatively slow activity against M. tuberculosis.

Disinfecting agents	Spectrum (level)	Uses	Advantages	Disadvantages
Other formulations available				• Requires monitoring for continuing efficacy levels UK maximum exposure levels: 0.05 ppm (0.2-3mg) Short-term exposure (8hour TWA*)
Peracetic acid 0.2 – 0.35% and other stabilised organic acids	High level to sterilant	• Automated endoscopic systems • Sterilisation of heat-sensitive items e.g. haemodialysers • Suitable for manual instrument processing	• Rapid sterilization cycle time at low temperature (20-45 min at 50-55^{0}C) • Active in the presence of organic matter • Environmentally friendly by products (water, oxygen, acetic acid)	• Corrosive to some metals • Unstable when activated • May irritate skin, conjunctivae, mucous membranes
Orthoflphthalal-dehyde, 0.55%	High level to sterilant	• Endoscopes	• Excellent stability over wide pH range • No need for activation • Superior mycobactericidal activity compared with glutaraldehyde	• More expensive • Stains skin and mucous membranes • Stains items not thoroughly cleaned • Eye irritation on contact • Hypersensitivity reactions • Slow sporocidal activity • Monitoring for continuing efficacy levels

Disinfecting agents	Spectrum (level)	Uses	Advantages	Disadvantages
Hydrogen peroxide 7.5%	High level to sterilant	• Cold sterilization for heat-sensitive items • 30 min at 20 ^{0} C.	• No activation • No odour • Ecofriendly	• Material compatibility concerns with metals such as brass, copper zinc etc.
Hydrogen peroxide 7.5% plus peracetic acid 0.23%	High level to sterilant	• Haemodialysis disinfection	• Fast acting (high level disinfection in 15 min) • No odour • No activation required	• Materials compatibility concerns with metals such as brass, copper, zinc etc • Damage to eye skin
Glucoprotamin	High level	Manual endoscope processing 15 min at 20 ^{0} C	• Good mycobactericidal activity • High cleansing performance • No odour	• Lack of activity against some spores and enteroviruses
Phenolics	Low to intermediate	Environmental decontamination and non-critical items. To be avoided	• Not inactivated by organic matter	• Leaves a residual film on surfaces • Harmful to the environment • No antiviral activity • Reported hyperbilirubinaemia in infants (avoid in nurseries)
Iodophores (30-50 ppm free chlorine)	Low level	• Disinfection of non-critical items, hydrotherapy tanks • Main use is as an antiseptic (2-3 ppm chlorine)	• Relatively non-irritating and non-toxic	• Inactivated by organic matter • Adverse reaction with silicone tubing • May stain fabric • Not commonly in use as a disinfectant.

Table 8: Item/object and recommended Method or Procedure for Disinfection/ Decontamination:

Item	Method/Procedure	Remarks
Respiratory Equipment; multiple use circuits	Heat disinfect for 20 minutes or 0.5 – 1% hypochlorite for 20 minutes, wash thoroughly and dry	Some may be autoclaved Check manufacturers' guidelines. Use of filters is recommended
Humidifiers	It is heat disinfected after each patient and when respiratory circuit is changed	Empty daily and refill with sterile water
• Ambu-bags • Neonatal respirators • Incubators • Resuscitators	Heat disinfection or use of 2% gluteraldehyde	Rinse thoroughly with sterile water after gluteraldehyde
• Suction catheters • Oxygen tubes	Are disposable, never share between patients Rinse with sterile water when in use Staff must disinfect their hands before and after use with alcohol	
Mucous membranes	0.1% Chlorohexidine	
Clean wounds	0.05 Chlorohexidine	
Contaminated Wounds	Irrigate with Povidone Iodine or Chlorohexidine with cetrimide	
Necrotic Wounds	Hydrogen Peroxide	Follow Instructions
Burns	Clean with sterile saline and apply sufratulle	Observe high level of hygiene especially hand hygiene
Environment: Smooth hard clean surface e.g. trolley tops, laboratory benches and Desks	Wipe with 70% Ethyl or Isopropyl alcohol	These surfaces must be clean and dry before disinfection
When hazard of viral infection is present in general ward, e.g. sinks, wash-basins, drainages and baths	Disinfect with 1% hypochlorite, then scrub with Scouring powder (VIM)	

Item	Method/Procedure	Remarks
Skin preparation before invasive procedures	• Use Povidone Iodine or • 70% ethyl or isopropyl alcohol Or • 0.5% Chlorohexidine gluconate in 70% alcohol	The alcohol disinfectants should be avoided if the diathermy machine is going to be used, to avoid sparking off a fire
Oxygen delivery masks	Wash thoroughly, dry and wipe with 70% Isopropyl alcohol	
Neonatal and pediatric Unit incubators	Wash with soap and water, dry and wipe with isopropyl alcohol all surfaces daily	• To avoid cross infection • Terminal cleaning after patient is discharge or dead
Humidifiers for Neonates	• Autoclave or boil for 20 minutes	• To avoid cross infection
Resuscitators	• Disconnect the different parts • Wash and autoclave	
Fibro scopes e.g. Endoscopes Laparoscopes Custoscopes Bronchoscopes	• They are heat sensitive • Wash with detergent and water • Use 2% gluteraldehyde for 20 minutes then rinse with distilled water	• If you suspect TB, 2% gluteraldehyde for 3 hours • Emphasis should be put on pre-cleaning • Ensure correct type of glutaraldehyde to avoid damage
Proctoscopes and Sigmoidoscopes	Cleaned, sterilized or disinfected with 2 % gluteraldehyde then rinse with sterile water	
Non heat sensitive equipment, e.g. bedpans, urinals, kidney dishes, heavy duty rubber tubes, floor mops, brushes for scrubbing, soiled linen, cheatle forceps, and bowls	• Wash thoroughly with soap and water, rinse and boil for 20 minutes. If contaminated with blood or other body fluids, first disinfect with hypochlorite, then wash and boil	• Decontamination before washing protects staffs who handle/clean these items
General environment (clean surface) • Body fluids spillage or heavy soiling	• 0.1 – 0.5% hypochlorite (1000 – 5000 PPM) chlorine • 0.5% - 1% hypochlorite (5,000 – 10,000), then wash with soap and water	• May be applicable for delivery beds and theatre operating table • Powder or granules may be used

Item	Method/procedure	Remarks
Terminal cleaning of rooms after outbreaks, e.g. • Tetanus • Cholera • Small Pox • Gas Gangrene • Ebola • Plague	• 8% Formaldehyde fumigation • Clean thoroughly before re-use of facility	• Place should be closed for 3 days Where space for new patients is a problem, fumigate, and close facility for 24 hours. Clean thoroughly with soap and water and re-occupy
Disinfection by ultra violet rays can be used in the laboratory, theatre, and mortuary. It clear most of the vegetative organisms but not spores		

Table 9: Methods of decontaminating routinely used items:

Item or site	Preferred method	Alternative methods / comments
Airways and endotracheal tubes	• Single-use disposal or • Head sterilized in SSD	• Use disposable for airborne diseases if heat sterilization not available.
Ambu bags	• Send to SSD for heat disinfection	• Ethylene oxide
Ampoules	• Wipe with 70% isopropyl alcohol and allow to dry before opening.	• **Do not** immerse in disinfectant
Bath water	• No addition of antiseptic routinely unless burns patient.	• Antiseptics increase GNB colonization.
Baths	• Clean with detergent and non-abrasive cream cleanser, Rinse and dry.	• Infected patients. As previous column. Wipe over with chlorine-based agent. Do not soak.
Bed and cots	• Wipe with warm water and detergent to remove all visible signs of dust and dirty. Dry.	• Disinfectant unnecessary
Bed frames	• Wipe with warm water and detergent. Dry.	-------
Bed locker	• Wipe with warm water and detergent. Dry. • Clean inside locker once patient has been discharged	-------
Bedpans and urinals	• Wear non-sterile gloves • Empty contents directly into ward washer disinfector (80% ^{0} C x 1min). Inspect for	• Macerators with paper-mache bedpans and urinals. • Manual cleaning: Empty into sluice. Clean bedpans

Item or site	Preferred method	Alternative methods / comments
	cleanliness after removal. Clean if necessary and store inverted to dry	thoroughly with a scrubbing brush and detergent. Rinse. Invert to dry. • **Never soak bedpans**
Blankets and bed covers	• Change after each patient has been discharged or when visibly soiled. Send to laundry to wash at 80^0C	• Do not allow bedding from home; these may be infected with bedbugs or carry scabies
Bowls (dressing, surgical)	• Return to SSD	• Disposable
Bowls (patient wash)	• Wash with detergent, rinse and store inverted to dry	• Modern ward washer – disinfectors can also wash bowls • Use fresh water and towels for each patient
Carpets	• Daily vacuum (vacuum cleaner fitted with a filter) • Shampoo periodically and extract	• Not recommended in clinical areas.
Commodes	• Wash seat daily with detergent and hot water and dry with a disposable paper towel. • Wipe the commode seat with a large alcohol wipe after each use	• If visibly contaminated, remove soil with tissue. Wash with warm water and detergent. Dry. • Enteric diseases: Viral – wipe hypochlorite (1000 ppm av Cl_2); bacterial – use 2% phenolic.
Computer and keyboards	• Damp dust daily • Wipe keyboard carefully to remove visible dirt	• Use a keyboard cover which is changed frequently
Crockery and cutlery	• Wash at 80^0C in dishwasher. • Manual cleaning. Wear gloves and hand wash in detergent and hot water (60^0C). Rinse and dry.	• Wear domestic gloves for manual cleaning • Infected patients; Unless instructed by IPC team treat as routine. • Disposable crockery is rarely used - e.g. Rabies
Curtains	• Change curtains frequently • Isolation room curtains should be changed with each terminal clean	• Blinds; both vertical and horizontal are difficult to clean and wash regularly.

Item or site	Preferred method	Alternative methods / comments
Drains	• Clean regularly	• Chemical disinfectants are not recommended
Dressing trolleys*	• Remove all items daily and wipe surface with warm water and detergent. Wipe over with 70% isopropyl alcohol. • Discard all previous contents of open jars and bottles. Replace with unopened containers	• If open jars are used, keep the volume small so that the containers can be heat disinfected when empty. • **Do not top up open disinfectant containers**
Duvets	• Washable duvet cover, which allows good circulation of air, should be used and changed after each patient	• Dry-clean hands after each patient use
Endotracheal suction catheters	• Disposable – can be used for 24 hours on the same patient • Flush with sterile water after each use. Bowl is washed and dried after each suction and filled with sterile water only before use	• Decontaminate hands thoroughly before carrying our suction • Do not share suction catheters between patients.
Feeding bottles (baby)	• Heat sterilized in SSD	• Wash thoroughly. Rinse and soak in a fresh hypochlorite solution (125 ppm available chlorine x 30 min). Remove, rinse and dry.
Floor cleaning • **Dry** • **Wet**	• Use dust-attracting mop • Use water and detergent only	• Sweeping not recommended • Disinfectants not recommended
Humidifiers	• Empty daily and heat disinfect after each patient use • Clean with warm water and detergent. Dry, Fill with sterile water only	• Not recommended. Use heat exchange filters.
Infant incubators	• Wash all removable parts and clean thoroughly with detergent. Dry with paper towel.	• Infected: After cleaning, wipe over with 70% isopropyl alcohol or hypochlorite (125 ppm ac CI_2). Leave incubator to stand unused for 6 hours (aeration).

Item or site	Preferred method	Alternative methods / comments
Instruments (surgical)	• To SSD	
Kitchen cloths	• Daily: Wash in detergent and dry	• Disposal preferable
Lamps (examination	• Wipe with detergent, rinse and dry. Wipe over with alcohol.	Disassemble before cleaning
Laryngoscopes	• Wash with detergent, rinse and dry. Wipe over with alcohol	Disassemble before cleaning
Linen (see section on Laundry)	• Automated methods	-------
Mattresses	• Use water if impermeable cover. Clean with warm water and detergent. Dry thoroughly	• Major source of cross-infection • Replace torn mattress covers immediately. Soggy mattresses should be discarded.
	• Never admit patients to soiled, stained or damaged mattress. • If rubber covers are uncomfortable, cover with absorbable paper which is frequently changed	• Horse-hair and cotton filled mattresses are not recommended.
Mop bucket	• Daily: Wash in warm water and detergent and store inverted to dry	• Disinfectant unnecessary
Mops	• Daily: Detachable head sent to laundry for heat disinfection and dried. • Manual cleaning: Wear rubber gloves. Rinse thoroughly under running water. Wash in hot water and detergent until clean. Store inverted to dry	• Colour-coding of mops is useful to reduce cross-contamination between clean and dirty areas and infectious isolation rooms • The sun can be used in warm countries.
Nail brushes	• Not recommended	• Single use and heat disinfection only
Nasogastric (feeding tubes)	• Disposable	• Cannot be recycled
Nebulisers	• Wash and dry the container and mask after each patient use. Store dry and protected from dust	• Head disinfection if necessary

Item or site	Preferred method	Alternative methods / comments
Oxygen masks	• Disposable	• If re-useable, Wash thoroughly until visibly clean or use heat disinfection (SSD). Dry. Wipe with alcohol
Patient toiletries	• Patients should bring their own soap, towels, shaving equipment and other personal items which should never be shared	-------
Pillows (see mattresses)	• Use waterproof cover	-------
Rectal thermometer	• Wash in detergent after each use. Wipe alcohol and store dry.	-------
Scissors	• Wipe over with 70% isopropyl alcohol before and after use	-------
Scrubbing machine	• Drain reservoir after use. Wipe with a damp cloth and store dry.	-------
Shaving brushes	• Not recommended	• Pre-operative skin shaving should only happen in the operating suite – never in the ward.
Sheepskin	• Synthetic: Launder in machine • Natural: Hand wash in detergent and dry.	• Not recommended for routine use unless clinically indicated. Restrict to one patient use only.
Soap (hand washing)	• Tablet: Store dry. • Liquid: Wall-mounted dispenser. Single-use sachets or send for thorough cleaning after it is empty and refilled under aseptic conditions.	• Tablet soaps are not recommended • **Never top up** – increases risk of GNB colonisation.
Shower head	• Should be removed and cleaned thoroughly each week • Soak in descaler if necessary	• Replace rubber washer with plastic ones to prevent legionnaires' disease

Item or site	Preferred method	Alternative methods / comments
Sputum container	• Disposable only	
Suction machines	• Empty the reservoir in the sluice after use, wash with warm water and detergent and store dry. • Send tubing to SSD for sterilisation or discard. • Clean the surface and cover after each use	• PPE: non-sterile gloves and apron • Never leave fluid (secretions or disinfectant) in the reservoir if not in use
Surfaces and ledges	• Damp dusting daily. Dry	-------
Thermometer (oral) **Electronic**	• Wash and dry after each patient use. Wipe with 70% isopropyl alcohol and store dry. • Change sleeve after each use	• ***Never*** soak thermometers in disinfectants. • Never use without sleeve
Taps	• Elbow operated • Clean daily and keep dry	• Replace rubber with plastic washers to prevent legionnaires' disease
Toilet seats	• Wash at least daily with detergent and dry	-------
Tooth mugs	• Disposable or send to SDD between patients	-------
Toys	• Soft: Machine wash, rinse and dry • Other: Wash with detergent, rinse and dry. Wipe with alcohol swab	• Do not share toys in an infected ward. Heavily soiled toys may have to be destroyed
Tubing	• Disposable • Reprocessed in SSD	• **Never** use gluteraldehyde to disinfect respiratory equipment
Ultrasound	• Disinfect with 70% isopropyl alcohol between each patient use • Intra-vaginal: Cover probe with a condom for each patient.	-------

Item or site	Preferred method	Alternative methods / comments
Ventilators	• These are complex and should be cleaned and disinfected according to manufacturer's instruction • Sometimes there are technicians in the facility who do the maintenance	• Remove tubing and send for heat disinfection to SSD (80^0C x 3 min) or chemical disinfection • Clean all inspiratory and expiratory connections • Change both sets of filters • Check efficiency of air movement • Reassemble • Clean the outside of ventilator • Register in logbook
Washbasins	• Clean with warm water and detergent, cream cleaner for stains. • Disinfectants not recommended	-------
Wound suction (closed drainage)	• Remove lid and carefully remove inner liner containing fluid. Dispose of in either infectious waste container or sluice. • Wash and clean the outer cover, dry and replace bag. Check that the valves and connectors are clean and functioning.	• Send for heat disinfection after each patient use
X-ray-equipment	• Damp dust only	• Wipe with 70% isopropyl alcohol if disinfection required.

CHAPTER 4
STERLIZATION

Sterilization is the process of destroying all organisms including spore forming organisms. It is indicated for instruments used in high-risk procedures and those that come in direct contact with the blood stream or normally sterile tissues (**Spaulding 1939**). It is important to remember that the success of sterilization process depends on proper cleaning, drying, and packing of equipment. The process requires time, contact, temperature and, with steam sterilization, high pressure. Sterilization can be achieved by physical agents, high-pressure steam (autoclave), dry heat (oven) or chemical sterilants.

4.1 Sterilization by Autoclaving

High-pressure steam sterilization is the most common and widely used method for processing re-usable heat stable medical devices. It is inexpensive and effective method of sterilization, but is also the most difficult to do correctly (Gruendemann and Mangum 2001).

- Double wrap instruments in freshly laundered cloth or paper using envelope or square wrap technique
- Arrange instrument packs on an autoclave cart or shelf. Place in autoclave chamber to allow free circulation and penetration of steam to all surfaces
- Wrapped items should be sterilized while observing the contact time, temperature and pressures as specified by the manufacturers
- Allow packs to dry completely before removal.
- Place sterilized packs on a surface padded with paper or fabric to prevent condensation.
- Allow packs to reach room temperature before storing
- Record sterilization conditions (time, temperature and pressure) in logbook
- Each load should be monitored with mechanical/automatic (time, temperature and pressure) and chemical (test strips) indicators
- Autoclaves should be tested daily with an air-removal test (Bowie-Dick Test) to ensure air removal

- Autoclaves should be tested every six months or when machine has been repaired using a commercially available biological indicator

4.2 Sterilization by Dry Heat Oven (harmonise with 2004 infection control guidelines)

- Place metal instruments or glass syringes in a metal container with a lid. Close the lid.
- Do not put plastic or rubber instruments or equipment in the dry heat oven unless the manufacturer's instructions say it is safe, as they will melt
- Place covered containers in oven and heat 160 degrees Celsius
- Begin timing after 160 degrees Celsius is reached and maintain temperature for 2 hours
- After cooling, remove containers and store

4.3 Chemical Sterilization

- Prepare fresh solution of chemical sterilant as prescribed by the manufacturer, or check to be sure solution is not out of date
- Submerge cleaned and dried items for at least 10 hours in 2 -4% glutaraldehyde solution or at least 24 hours in 8% formaldehyde solution, completely covering all items
- Cover container and soak for appropriate time (8-10 hours for glutaraldehyde or at least 24 hours for formaldehyde)
- Remove items from the chemical solution using sterile forceps/pickups
- Rinse items thoroughly with **sterile** water to remove **all** traces of chemical sterilant
- Use the item immediately or place it in a sterile, covered container

Handling and Storage of High-Level Disinfected instruments (HLD) and Sterile Instruments

High-Level Disinfected instruments:

- Must be handled with high-level disinfected or sterile instruments (e.g., when taken out of the boiler or chemicals)
- Must be stored in high-level disinfected or sterile containers
- High-level Disinfected instruments should be stored in a dry, high-level disinfected covered container for up to one week (the cover as well as the container must be HLD)
- Storage in a closed cabinet is preferred, in an area where dust and lint is minimized

- All stored instrument packs or containers must be clearly labeled with the date of processing and expiry

Sterile Instruments

- Wrapped sterilized packs should be stored in a dust and pest free environment (Storage in a closed cabinet is preferred)
- Wrapped sterilized packs of instruments, or instruments in a sterile container with a tight fitting lid, can be stored for
  - up to one week on an open shelf
  - up to one month if placed in a plastic dust cover or in a sealed plastic bag
- All stored instrument packs or containers must be clearly labeled with the date of processing and expiry

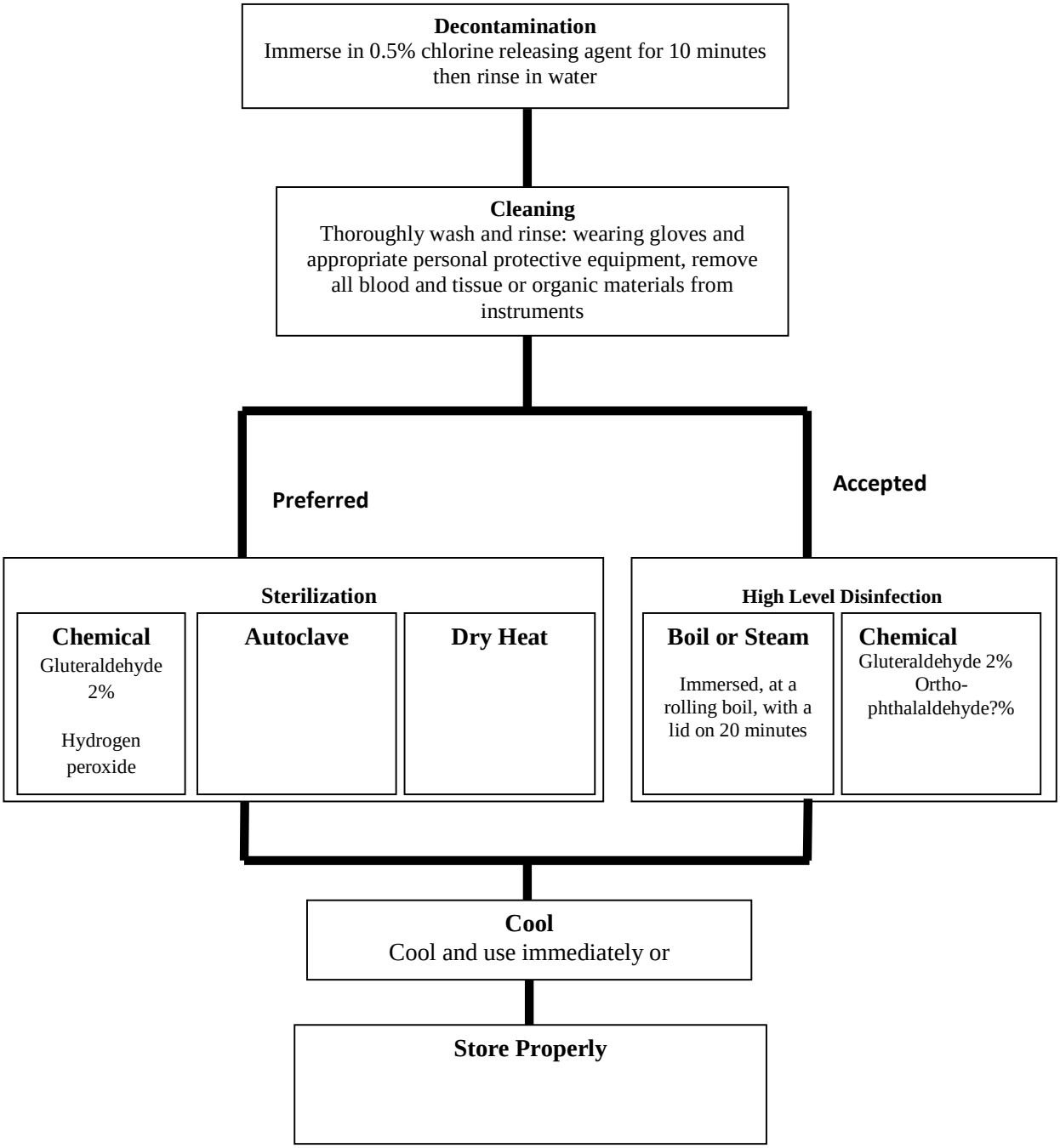
Table 10: Equipment or material and recommended method or procedure for sterilization:

Equipment/material	Method/Procedure	Remarks
1. Glass, powder, metals, creams, optic instruments, waxes, petroleum jelly	Dry heat using hot air oven	Observe temperature and holding time, according to manufacturer's instructions
1.Porous materials, e.g. wrapped surgical instruments, dressing. Surgical gowns, cotton mops, theatre linen and dental instruments	Moist heat (Autoclaving)	Regularly check for efficiency
2.Intravenous fluids preparation (I.V. fluids)	Should be autoclaved or bacterial filtered	Observe strict hygiene and test for pyrogens
3.Endo-tracheal tubes	Ethylene oxide gas	Sterilization is done in industries

Note:

Some equipment such as endo-tracheal tubes and other plastics are disposable and should be used once and discarded.

Figure 2: Key steps in Processing contaminated Instruments and other items



NB: While formaldehyde is acceptable for sterilization or HLD, it is not recommended due to its strong side effects (toxic vapours, skin/eye/respiratory tract irritation, carcinogenicity, etc.)

CHAPTER 5

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal Protective Equipment is specialised clothing or equipment worn to protect someone against a hazard or infection. PPE is indicated when health worker –patient interaction indicates that exposure to blood or body fluids is anticipated. They provide a physical barrier between micro-organism and the person. It is important for health service providers to wear personal protective equipment, such as gloves, masks/ respirators, eyewear (face shields, goggles or glasses), caps, gowns, mackintoshes, aprons and other items, whenever they are at risk of contact with contaminated materials. Health facility managers should ensure that the facilities have adequate protective equipment for the staff.

Types of Protective Equipment:

Gloves are the most commonly used PPE in healthcare to protect healthcare workers and patients. They should be well fitting, intact and of adequate length for the intended purpose. Gloves are often used as a substitute for hand hygiene. It should be noted that up to 20% of gloves have minute perforations and therefore hand hygiene after removing gloves is essential. Hand hygiene, coupled with the use of protective gloves, is a key component in minimizing the spread of disease and maintaining an infection-free environment (Garner and Favero 1986).

- The ideal glove would be
- Puncture resistant
- Allergen free
- A barrier to microbes
- Powder free
- Comfortable to wear
- Allow optimum sensitivity when carrying out a procedure.

For best practice the following applies:

For optimum protection the glove barrier must be intact throughout the procedure and if a breach occurs, new gloves should be donned. Hands should be washed and dried before wearing and after discarding gloves.

A pair of gloves should be used for a single procedure only. Ideally gloves should be changed between procedures even on the same patient. Not all procedures require gloves and the appropriate use is based on risk assessment. It is important to always wash hands before and after removing gloves

Types of gloves:

1. Sterile surgical single use gloves for invasive procedures
2. Examination disposable gloves
3. Heavy-duty utility gloves for decontamination and cleaning

Mackintosh or Plastic Apron

They should be won when performing all procedures where there is a potential of contamination from the splashing of blood and body fluids including the handling of soiled dressings and used linen from **ALL** patients.

Gowns

In operating theatres where a patient may bleed heavily or in labor suits where splashing of liquor is anticipated, staff should wear gowns. Water repellant gowns are preferred to cotton ones. Where they are lacking, cotton gowns should be used in conjunction with mackintosh or plastic aprons. Gowns should be worn to protect uncovered skin and to prevent soiling of clothing during procedures.

Eye/Face Protection:

Eye or face protective wear should be worn during any procedure that is likely to lead to splashing of blood or other body fluids. Protective eyewear and facemasks should be made fully available and worn where applicable. Alternatively a full-face visor may be used.

Masks/respirators

Masks could be disposable respirators or surgical masks and each type of mask has a different use.

Surgical masks

Surgical masks are usually used in operating rooms to prevent accidental splashes of blood and other infectious body fluids from entering the health worker's nasal or oral mucosa. They are worn so that they may contain health worker's moisture droplets that are produced as they talk, cough or sneeze so that the patient may be protected from health worker in case the latter is infectious. Unlike the respirators, surgical masks do not have a filter media and therefore, they do not protect wearer from airborne pathogens.

Masks can be made from a variety of materials ranging from cotton, to gauze, paper or synthetic materials. Cotton or paper masks are very comfortable but not fluid resistant or effective as a filter. Synthetic masks may provide some protection from large droplet nuclei such as those of Tuberculosis (> 5 micrometer) that are spread by coughs or sneezes from a health worker who is close (< 1 meter) to a patient. Surgical masks lack the face seal to prevent air leakage around the edges. They should be large enough to cover the nose, lower face, jaw and facial hair.

Respirators

These are specialized type of masks that are recommended for situations in which filtering inhaled air is important. They are disposable masks such as P2 OR N95. They have a filter media (multiple layers of filter material) and designed to fit the face of the wearer. Inhaled and exhaled air travels through the medium. Some respirators are fitted with exhalation valves to increase the wearer's comfort and reduce the build up moisture from exhaled breath in the filter medium. These masks are more difficult to breathe through than the surgical masks.

Health Care Workers who have to be in close contact (within 1 meter) with infectious patients, undertaking procedures related to examination, investigation or treatment should wear disposable masks (P2) or appropriate high filtration device. If P2 is not available, the patient should be provided with a surgical mask.

Use of respirators

- They are essential in aerosol generating procedures:
    - Intubations
    - Suction
    - Chest physiotherapy

- Bronchoscopy
- Nebulisation

- They may provide an increased level of safety and other close contact situations.

Caps

The caps are used to cover the hair and scalp so that flakes of skin and hair are not shed into the wound during surgery. They are also used to protect the wearer's hair from getting contaminated with blood and other body fluids during procedures. Caps should be large enough to cover all the hair.

Boots (Footwear):

Closed shoes/boots should be worn in places where spillage or splash of blood, body fluids, secretions and excretions are anticipated.

Note: *Boots/footwear should be cleaned with soap and water immediately after each use. In case of contamination with blood and body fluids, disinfect using Sodium hypochlorite (1% in-use dilution; 5% solution to be diluted 1:5 in clean water*

Table 11: Personal protective equipment and procedure where it must be used and it role:

Type of personal protective equipment	Must be used for	Primarily Protects
Mackintosh or Apron	Situations where splashing or spillage of blood, body fluids, secretions or excretions is likely	Service provider
Closed boots or shoes (open sandals are **not** acceptable)	Situations where there is the possibility of dropping sharp instruments or where spillage of blood, body fluids, secretions or excretions is likely (e.g., deliveries, surgical procedures)	Service provider
Caps, Gowns/Scrub Suits, Masks, Aprons, Drapes	Invasive procedures where tissue beneath the skin is exposed (e.g., surgical procedures)	Service provider & client both
Goggles or glasses, Masks, Apron or Mackintosh	Situations where splashing of blood, body fluids, secretions or excretions is likely	Service provider
Masks	Situations which call for airborne or droplet transmission precautions	Service provider and client
Sterile Drapes	Major or minor surgical procedures	Client (note: limited protection, as even sterile drapes do NOT create a sterile field)

Table 12: How Personal Protective Equipment Blocks the spread of Microorganisms:

Where Micro-organism are found	How Micro-organisms are spread	Barriers to stop the spread of Micro-organisms	Who the Barrier protects
Healthcare staff:			
Hair and scalp	Shedding skin or hair	Cap	Patient
Nose and mouth	Coughing, talking, splashes from patients as in Operation theatre and Labor Suits	Mask, respirators	Patient and Health worker
Body and skin	Shedding skin or hair contact	Scrub suit, cover gown	Patient and Health worker
Hands	contact	gloves	Patient and health worker
Patient's undraped skin:	Contact	drapes , gloves	Patients
Patient's blood and body fluids:	Splashing, contact	Gloves, eyewear, mask, drapes, apron	Staff
	Touching, contact	Gloves,	Patient Staff
	Accidental contact with contaminated needles and scalp blades Infectious waste	Protective footwear, Utility gloves,	Staff Staff Community
Clinic or hospital environment:	Touching	Gloves, hand washing Dressing	Staff and their family Staff & community

Table 13: Showing commonly used Personal Protective Equipment:

Part to protect	PPE to stop the spread of Micro-organisms	Method of spreading infection	Who the Barrier protects
Hair and scalp	Cap	Shedding skin or hair	Patient
Nose and mouth	Mask, respirators, visors	Coughing, talking, splashes from patients as in Operation theatre and Labor Suits	Patient and Health worker
Eyes	Goggles, visors	Splashes from patient blood and body fluids	Health worker
Body and arms	Scrub suit, cover gown, Mackintosh or water proof aprons	Shedding skin or hair Contact and splashes	Patient and Health worker
Hands	Gloves	Contact	Patient and health worker
Feet	Sturdy covered shoes, gumboots	Splashes, sharp injuries	Health worker

CHAPTER 6
HANDLING SHARP INSTRUMENTS DURING PROCEDURES

Definition:

- A sharp is defined as anything, which can puncture or pierce the skin allowing the hazard to contaminate the recipient with the body fluids in or on the sharp in question

- Sharps would include hypodermic needles, stitch needles, cutters, glass slides, intravenous lines or any other item, which has been used for an invasive procedure on another individual. This would also include any injury sustained from broken or sharp edged equipment, which has contained body fluids such as glass bottles, drain bottles, and tubing

4.1 Handling and Disposal of Sharps

The principle of sharps handling and disposal is to prevent potential injury and transmission of disease through the contaminated sharp object. Sharps should therefore be handled with extreme caution to avoid injuries during use, disposal or reprocessing. Where possible all sharps should be disposable.

Always use "hands-free" technique for passing sharp surgical instruments

- Always use a new needle and syringe from a sealed sterile pack
- Following use, the needle and syringe remain attached, and are disposed of into sharps container.
- If it is necessary to detach the needle following venepuncture, great care must be taken and the needle placed directly into a sharps container.
- Needles MUST NOT be re-sheathed, purposely bent or broken by hand, removed from disposable syringes or otherwise manipulated by hand.
- The user must dispose of sharps, needles and syringes promptly after use into the designated puncture resistant container, which are suitable for incineration.

Where the item is large or bulky a large "sharps container" should be used. All clinical areas where such items are used should have an extra size "sharps container" as standard stock

- All giving sets should be disposed of in the "sharps container".
- When carrying sharps such as needles and syringes, they should be carried in a suitable dish. They should NEVER be carried by hand OR passed from hand to hand.
- At no time should needles or other sharps be carried in pockets
- Used central venous pressure lines, cannulae etc. must also be placed immediately in a rigid sharps container. Sharp ends must **NEVER** be removed or the lines cut into pieces. Gloves must be worn when taking down these lines.
- All sharps containers/safety boxes should be disposed of when ¾ full to avoid any risk of injury by inoculation, when disposing of further needles, sharps and syringes.
- All containers/boxes should be clearly labeled with the date, time of sealing and the area they are from. The person sealing the sharps container/safety box bin is responsible for ensuring those details are on the container/box and that it is placed in the appropriate place for collection ready for transport to the incinerator.
- The ordering of "sharps containers/safety boxes" and the numbers ordered should ensure that the work area concerned is never without. Sufficient numbers should be ordered to meet the need of area
- When carried all "sharps containers/safety boxes" should be held away from the body to prevent potential sharps injuries
- Dispose of the entire sharps container together with sharps whenever possible:
  - Use a disposable sharps container (e.g., cardboard box)
- Final disposal of sharps must always be by incineration. Where there is no incinerator, sharps should be burnt and the residue buried in a deep pit

The “Hands-Free” Technique for Passing Surgical Instruments

A safer method of passing sharp instruments (scalpels, suture needles and sharp scissors) during surgery, called the “hands-free” technique, is recommended.

This technique for sharps is inexpensive, simple to use, and ensures that the surgeon, assistant or scrub nurse never touches the same instrument at the same time (Bessinger 1988; Fox 1992). Instruments passed with the hands-free technique (besides those listed above) include anything sharp enough to puncture a glove (e.g., trocars, sharp-tipped mosquito forceps and loaded needle holders). Using the hands-free technique, the assistant or scrub nurse places a sterile or high-level disinfected kidney basin, or other suitable small container, on the operative field between her/himself and the surgeon. The container is designated as the Safe or Neutral Zone in which sharps are placed before and immediately after use.1 For example, the assistant or scrub nurse alerts the surgeon that a sharp instrument has been placed in or on the Safe Zone, with the handle pointing toward the surgeon, by saying “scalpel” or “sharp” while placing it there. The surgeon then picks up the instrument and returns it to the container after use, this time with the handle pointing away from her/him.

Puncture-resistant containers can be made of easily available objects such as a heavy cardboard box, a tin can with lid, or a heavy plastic bottle with an opening that is small enough to prevent someone from trying to take out discarded sharp objects.

Figure 3: Sharp disposal containers and method of disposal of sharps

4.2 Safe Injection Practices

Safe injection practices protect the health worker, client and community from needless risks

- Use a sterile needle and syringe for every injection
- Never leave a needle inserted in a vial cap to withdraw multiple doses
- Gloves are not necessary for administering injections because there should be no direct contact with blood, body fluids, secretions or excretions
- Minimize handling of injection equipment
- Do not bend or break needles prior to disposal
- Do not manually remove the used needle from the syringe
- Do not re-cap used needles
- Dispose of used syringes and needles in a puncture-resistant container
- Decontaminate used needles and syringes before disposal:
- Hold the needle under surface of 0.5% chlorine solution
- Flush needle and syringe with solution three times
- Dispose assembled needle and syringe directly in puncture-resistant container
- Do not over-fill sharps containers – filling them more than three quarters full may cause needle sticks injuries.
- Needles should not be recapped routinely, but if necessary, a one-handed recap method should be used:
- First, place the cap on a hard, flat surface and remove hand from the cap.
- Next, hold the syringe with one hand and use the needle to “scoop-up” the cap.
- Finally, when the cap covers needle completely, use other hand to secure the cap on the needle.
- If using reusable syringes and needles, they must be properly decontaminated, cleaned, and sterilized or high level disinfected before reuse.

CHAPTER 7
HEALTH CARE WASTE MANAGEMENT

Definition of Health Care Waste: Health Care waste is defined as the total stream of waste from a health care or research facility that includes both potentially risk waste (hazardous) and non-risky waste (non-hazardous) materials (WHO, 1998). Such waste includes human or animal tissue or excretions, blood or other body fluids, drugs and medicinal products, swabs and dressings, instruments or similar substances, leftover food and stationery materials. Waste can be produced in solid and liquid forms. Of all the total stream of such waste, only 10-25% is potentially toxic to the body. It is therefore important to manage healthcare waste appropriately in order to reduce the risks and costs of handling waste. For example, waste should be segregated into color coded bins at the point of generation and according to the category of waste; whether it is non-infectious, infectious, highly infectious, or sharps.

Categories of Healthcare Waste

There are two broad categories of healthcare waste namely hazardous and non hazardous waste. Hazardous waste has potential to cause harm if an individual gets exposed to it. Hazardous waste accounts for 10-25% of all waste generated in a health care setting. Such waste is either infectious or potentially toxic to the body. 1% of hazardous waste is sharps waste.

Non hazardous waste has no potential to cause harm to the individual exposed to it. It is neither infectious nor potentially toxic to the body. Non-hazardous waste accounts for 75-90% of the total waste generated within the health care setting.

Table 14: Categories of Healthcare Waste and their characteristics:

Hazardous health Care Waste	
Infectious waste This category of waste has living organisms in it which are capable of causing disease.	• Blood, blood products and other body fluids • Items contaminated with blood, serum or plasma • Cultures and stocks of infectious agents

Hazardous health Care Waste	
	from diagnostic and research laboratories and items contaminated with such agents • Isolation wastes from highly infectious patients (including food residues) • Discarded live attenuated vaccines • Waste, bedding, bandages, surgical dressings and other contaminated material infected with human pathogens • Leftover food from highly infectious patients such as Ebola, Cholera, Shigellosis, Enteric fever
Anatomical waste	• Human tissues • Body parts • Fetus • Placenta • Wastes from surgery, biopsies, autopsies • Animal carcasses • Organs and tissues infected with human pathogens.
Sharps waste (used or unused) Sharps waste consists of objects that can penetrate the skin easily	• Needles • Scalpel blades • Suture needles • Razors • Infusion sets • Contaminated broken glass • Specimen tubes and other such materials.
Chemical waste Chemical waste has ability to undergo reaction that is harmful. It may be solid, liquid or gaseous chemicals such as:	• Formaldehyde • Photogenic material • Solvents • Organic chemicals • Inorganic chemicals
Pharmaceutical waste This is waste related to manufacturing,	• Expired medicines • Residual medicines • Items contaminated by or containing

Hazardous health Care Waste	
dispensing or disposing of drugs. It includes:	pharmaceutical bottles and boxes
Radioactive waste	• Any solid, liquid or pathological waste contaminated with radioactive isotopes of any kind.
Genotoxic waste	• Genotoxic waste is highly hazardous and may have mutagenic or carcinogenic properties. • Batteries • Broken thermometers • Broken blood pressure gauges
Pressurized containers	These containers can explode when punctured or incinerated, • Insecticide cans • Perfumes • Sprays
Heavy metals	• Batteries • Broken thermometers • Broken blood pressure gauges

Non-hazardous health Care Waste	
Communal waste/non infectious waste • Waste that is not hazardous	• Leftover food from non infectious patients/staff • Stationery • Office paper • News paper • Wrappings • Un contaminated beverage bottles • Boxes and packaging materials • Bouquets-not advised in health facility

RISKS AND HAZARDS ASSOCIATED WITH HEALTHCARE WASTE

There is a risk that the hazard of a substance will cause harm and the severity of the harm could be severe enough to result into death or to affect a large number of people unknowingly. Such hazards include:

- Needle stick injuries
- Transmission of infections or diseases such as Hepatitis B and C; HIV/AIDS
- Accidents
- Danger to animals
- Fire outbreak
- Tendency to re-use of some equipment such as needles and syringes
- Environmental pollution including water supply
- Public nuisance and ugly sites
- Exposure to radiation

Who is at risk?

- All health workers
- Patients
- Visitors to the health facility
- Community

KEY STEPS IN HEALTH CARE WASTE MANAGEMENT

The key steps in Health Care Waste Management are:

1. Waste Minimization
2. Segregation
3. Handling and storage of waste
4. Transportation
5. Treatment and destruction
6. Disposal

Minimizing Healthcare Waste

This is the first and best way to reduce healthcare waste quantities and costs, and to reduce environmental impact on air pollution and landfill capacity. Effective minimization requires that all purchases of material and supplies be made with waste reduction in mind. Purchases should

be done according to requirements. Compliment supplies should be proportional to each other. For example, 100 units of syringes and needles should be accompanied by one safety box. Medicines for reconstitution should be bundled with exact diluents when purchases are being made.

Segregation of waste

This is the deliberate separating of waste according to type of waste at the source of generation. Different types of waste are separated in different color coded containers. Waste should be separated by the person who generates it immediately. Health workers, particularly waste handlers, should never sort waste after it has been placed in the bin as this may cause injury and exposure to blood borne pathogens.

Why segregate waste

- Minimizes the spread of infections
- Reduces the risk of accidental injuries
- Reduces likelihood of environmental pollution
- Attracts fewer insects, rodents and animals
- Helps provide an aesthetically pleasing atmosphere
- Reduces costs of handling waste since only hazardous waste (10-25%) will require special handling
- Some waste such as plastics can be recycled into other useful products such as buckets, chairs and clothes

If different color coded bags are not available, a biohazard label may be placed on red bags to indicate their hazardous content.

Table 15: Showing segregation of Healthcare Waste:

Category of waste	Examples	
Non-infectious waste	Paper, packaging materials, plastic bottles, food, cartons	Black
Infectious waste	Gloves, dressing, blood, body fluids, POP, I/V giving sets	Yellow
Highly Infectious	Placenta, extracted teeth, biopsy specimens, blood and blood soaked materials, used specimen containers, extracted teeth	Red
Chemical	Pharmaceutical waste, formaldehyde, batteries photographic chemicals, solvents, organic and inorganic chemicals	Brown
Radioactive	Any solid or liquid or pathological waste contaminated with radioactive isotopes of any kind (such as urine and feaces of patients on radiotherapy)	Yellow with a radioactive label

Scan symbols for the radioactive and biohazard symbols.

Figure 4: Segregation of waste into color coded bins

Pedal operated bins

Non-pedal operated bins

7.2 Disposal of Health Care Waste

Table 16: Showing type of health care waste and method of disposal:

Type	Method of Disposal	Remarks
1. Non - infectious waste e.g. paper, food remains, wrappings of various items,	Municipal council skip/dumpster. Final disposal in a designated land fill (community dumping site)	
2. (a) Infectious/Clinical waste e.g. soiled dressings and any other waste which has come in contact with body fluids. (b) Laboratory waste	(a)Incinerate. Burnt ashes to be scraped into a nearby pit designated for this purpose. (b) Should be autoclaved before transporting it to the incinerator.	
3. Sharps e.g. used needles, scalpels and broken glass	Safety boxes or sharps containers should be incinerated or burnt at a medical pit. The burnt ashes should be scraped into a nearby designated pit	Safety boxes and other sharps containers should be of single use
4. Anatomical wastes: e.g. human tissue, amputee placentas, fetuses	Taken for burial in a designated area e.g. placenta or burial pits.	If any tissue is known to be infectious, treat with 8% formalin
5. Chemical waste: e.g. laboratory reagents film developer; disinfectants that are expired or no longer needed; solvents	Pharmaceutical waste may be collected with taken for incineration. (it should not be incinerated with infectious waste)	Consult with National Drug Authority

Type	Method of Disposal	Remarks
6. Cytotoxic waste: e.g. waste containing cytostatic drugs (used in cancer therapy); genotoxic chemicals.	• Collected in strong, leak-proof containers clearly labeled cytotoxic waste.	Health units generating these should consult with Uganda Cancer Institute regarding their disposal
7. Wastes with high content of heavy metals: e.g. Batteries; broken thermometers; blood pressure gauges, etc.	Encapsulation should be arranged. These should not be burnt and should not contaminate the water table.	
8. Pressurized containers: e.g. Gas cylinders; gas cartridges; aerosol cans.	Collected in a designated area away from fire	Gas cylinders and cans can be recycled
9 . Radioactive waste: e.g. unused liquids from radio-therapy or laboratory research; contaminated glassware; packages; or absorbent paper; urine and excreta from patients treated or tested with unsealed radio nucleotides; sealed sources (known as Low Level Waste –LLW)	Buried in a pit. To reduce the volume of waste It may be compacted or incinerated before burial	
Liquid wastes e.g. blood should not be poured in an open drainage, but a closed one If a closed sewerage system is lacking, a deep covered hole-should be used.		

7.3 Handling and storage of Waste

This process involves collecting, weighing and storing of waste. Protective clothing that includes aprons, heavy duty long gloves, footwear, goggles/glasses and masks should be worn by waste handlers when working with healthcare waste. This clothing should be taken off when work with waste is complete. Protective clothing must be cleaned after each use and kept at the facility in a good condition. Health workers **MUST NEVER** take home protective clothing.

The health worker should always wash hands with soap and running water after removal of gloves.

Collection of waste

This is removing waste bags from the service point and taking to storage or disposal area. Waste bags should be collected in rigid containers such as buckets or wheel barrows. Waste handlers should never collect bags by hand in case of failure to segregate or spillage.

Weighing

Weighing involves quantifying waste by volume or weight, labeling as to source, and recording. Full safety boxes should also be recorded. This information can be used to advocate for funds for waste management.

Storage

Storage is the placing of waste in a secure place until it can be disposed of. The ideal storage area should be designated for waste only and should be secure with no access to unauthorized persons, kept clean, dry and pest free. Healthcare waste should not be stored for more than 2-3 days, depending on weather conditions. However, organic waste should be disposed of daily.

Segregation (as opposed to sorting) must be maintained throughout the whole process of handling waste up to the final disposal. Same category of waste should be kept together at all times. Sorting, which is deliberate separation of waste from waste bins is not allowed.

Transport

This is the movement of waste from one place to another, either on site or off site for purposes of storage and or disposal.

On site transport

This is moving of waste from one point to another within the healthcare facility. Waste should be moved in a designated trolley or wheel barrow.

Off site transport

It involves transporting waste to outside the health facility. Bins/bags/safety boxes must be kept upright, secure and dry (protected against rain) and out of direct contact with medical supplies. It is preferable that the vehicle should be designated for waste transport only. It is also desirable that the vehicle for transporting waste should be covered. The vehicle must be decontaminated, cleaned and sanitized at the end of each day or as necessary. The person responsible for waste disposal must be aware of the schedule for pickup and delivery of waste.

Treatment and Disposal

Treatment

Healthcare waste is treated to render it less hazardous. Non infectious waste does not need to be treated.

Table 17: Showing treatment process of different categories of Healthcare waste:

Type of waste	Recommended Treatment	Recommended Procedure
Microbiological waste (cultures, specimens, vaccines)	Autoclave	As per instructions on machine
Pathological waste (tissue, organs, blood and body fluids)	Liming	Dig pit, place lime, add waste, more lime, add soil
Infectious fluid	Chemical	Add 0.5% Sodium Hypochlorite solution for 10 minutes

DISPOSAL OF HEALTHCARE WASTE

This is the process of eliminating healthcare waste from the facility. All disposal methods used must be agreed upon by key line ministries and stakeholders.

Disposal Methods

Three disposal methods are common namely burying, burning and incineration.

a) Burying

In this method of disposal, waste is placed in a pit and covered with soil. The site for the waste pit should be at least 50 meters away from any water source to avoid contamination of the source. The site located downhill from water sources and should have proper drainage, free of any standing water and be in an area that does not flood. The site should be located on land that will not be used for agriculture or development.

b) Burning

Waste is placed in a pit and burned on a regular basis (at least once a week, according to the volume of waste and the size of the pit). Waste must be burned thoroughly and ashes covered with earth.

Pits should be 1-2 meters wide and to the depth of 2-5 meters, but at least 1.5 meters above water table. It should be dug away from water shed areas. The pit should be fenced off to restrict unauthorized access and located away from public areas. Smoke from the burning waste should not affect the surrounding area. General waste should be burnt in the disposal site for domestic (general) waste. It will conserve both time and resources. The ash from general waste should be treated as general waste and may be buried or disposed of in a designated area. Medical waste is not burnt easily, especially if it is wet. Kerosene may be added to it to make the fire hot enough. Kerosene should be added to the waste before starting the fire to avoid explosions.

c) Incineration

Incineration is high temperature burning. This process reduces the volume of waste and eliminates pathogens. Large scale incinerators that can reach very high temperatures are preferred to small scale, lower temperature incinerators. Incineration produces fewer pollutants than open air burning and is preferable if a good quality incinerator is available together with a well trained operator.

d) Encapsulate

Encapsulation involves filling containers with waste and adding an immobilizing material (cement, sand or clay) and sealing the containers. This is the appropriate method for disposing of expired vaccines.

CHAPTER 8
ADDITIONAL (TRANSMISSION-BASED) PRECAUTIONS

On top of Standard Precautions, for all patients, Transmission-Based Precautions are for patients known or suspected to be infected or colonized with specific pathogens that are transmitted in whole or in part by airborne, droplet, or contact routes of transmission. Occasionally, a patient may require isolation practices involving more than one category.

The aim of the guidelines is to provide a structure of care, within the parameters of infection control. Health workers are advised to regard each and every patient as highly infectious until proved otherwise.

8.1 Airborne Precautions

These precautions reduce the risk of nosocomial transmission of pathogens transmitted in whole or in part by the airborne route (i.e., *M. tuberculosis*, V*aricella virus* [Chickenpox], *rubella virus* [measles]). Airborne Precautions are recommended for patients with either known or suspected infections involving these pathogens. For example, an HIV-infected patient admitted with cough, fever, and unexplained pulmonary infiltrates is a candidate for Airborne Precautions until TB is ruled out. Airborne Precautions are designed to reduce transmission of particles less than 5 microns in size. These particles may remain suspended in air for relatively long periods of time (i.e., several hours).

Airborne Precautions include the following:

- Placement of the patient in a well ventilated isolation room with the door closed
- Monitored negative air pressure in relation to the surrounding areas
    - Appropriately placed simple fans can create a simple negative pressure area that can reduce the concentration of airborne germs in a room where natural ventilation is not feasible or is inadequate.
- 6 to 12 air exchanges per hour

- Appropriate discharge of air outdoors or monitored high-efficiency filtration of room air before the air is circulated to other areas of the hospital
- Wearing of respiratory protection (i.e., particulate respirators that meet OSHA requirements) when entering the room of a patient with known or suspected pulmonary TB

Picture of a perforate respirator worn by this health care worker is recommended for use by those working in high-risk settings such as a room occupied by a patient suspected or known of having pulmonary tuberculosis. A respirator has tiny pores which block TB germs. It relies on air tight seal around the entire edge.

- Susceptible persons should not enter the room of patients known or suspected to have measles (*rubella*) or chickenpox (*Varicella*) if other immune caregivers are available
- Respiratory protection for susceptible persons if they must enter the room persons with suspected or confirmed measles or Varicella
- Placement of a surgical mask on the patient if he or she must leave the room

Additional Isolation Precautions for patients with TB include the following:

- Educate patients who are placed in TB isolation about the mechanisms of M tuberculosis transmission and the reason for their being placed in isolation.
- Teach patients to cover their mouth and nose with a tissue when coughing or sneezing, even while in the isolation room, to contain liquid droplets before they are expelled into the air.

- Facilitate patient adherence to isolation measures (e.g., staying in the TB isolation room with the door closed).
- Assure adequate ventilation of treatment and procedure rooms.
- Minimize the number of persons who enter the isolation room.
- Handle and transport disposable items in a manner that reduces the risk for transmitting other microorganisms to patients, health workers or caregivers, and visitors.
- Monitor negative pressure daily while the room is being used for TB isolation.
- Although not required, an anteroom may increase the effectiveness of the isolation room.
- Upper-room air ultraviolet germicidal irradiation (UVGI) may be used as an adjunct to general ventilation in the isolation room.
- Precautions may be discontinued when suspected TB is ruled out or when the patient is on effective therapy, when the patient is improving clinically, and when two consecutive sputum smears collected on the same day or separate days detect no acid-fast bacilli (AFB).
- Strongly consider continuing isolation throughout hospitalization for patients who have multidrug-resistant TB
- *Respiratory protection is recommended for:*
  - Persons entering rooms in which patients with known or suspected infectious TB are being isolated
  - HCWs when performing cough-inducing or aerosol-generating procedures on such patients
  - Persons in other settings where administrative and engineering controls are not likely to protect them from inhaling infectious airborne droplet nuclei
- *Cough-inducing procedures should:*
  - Not be performed on TB patients unless absolutely necessary
  - Be performed in areas that have local exhaust ventilation devices (e.g., booths or special enclosures) or, if this is not feasible, in a room that meets the ventilation requirements for TB isolation

- *After completion of cough-inducing procedures, TB patients should remain in the booth or special enclosure until their cough subsides*

A respiratory protection program is required at all facilities in which respiratory protection is used. In addition, appropriate measures for recognition and triage of patients with suspected TB are important since delayed diagnosis and resultant lack of appropriate isolation have been shown to be important factors in *M tuberculosis* transmission in healthcare facilities. Airborne Precautions are the last rather than the first defense in reducing the risk of transmission of airborne agents. For detailed measures on how to reduce transmission if TB refer to the Uganda National guidelines for Tuberculosis infection control in health Care Facilities, Congregate settings and Households (***Uganda National TB infection guidelines 2010***)

8.2 Droplets Precautions

These precautions reduce risks for nosocomial transmission of pathogens transmitted in whole or in part by droplets (e.g., *Haemophilus influenzae* [causing invasive disease]; *Neisseria meningitides*; *Mycoplasma pneumoniae*; adenovirus; parvovirus B19; and influenza, mumps, and rubella virus). Other conditions that require Droplet Precautions include pharyngeal diphtheria; Pertusis; pneumonic plague, and streptococcal pneumonia, pharyngitis, or scarlet fever in infants and young children. Droplet Precautions reduce risks for the transmission of organisms more than 5 microns in size. Talking, coughing, sneezing, and the performance of procedures release these organisms.

Droplets Precautions require the following actions:

- Place the patient in a well-ventilated private room or in a room with other patients with the same and no other infection (i.e., cohort)
- When neither option is available, maintain a spatial separation of at least 3 feet (1 meter) between the infected patient and others.
- Wear a mask when working within 3 feet of the patient (the recommendations state that logistically, some hospitals may want to implement the wearing of a mask to enter the room).

- If the patient must leave the room, have the patient wear a surgical mask if possible

In Droplet Precautions, special ventilation and air handling are not necessary, and the room door may be left open.

8.3 Contact Precautions

These precautions reduce the risk of transmission of organisms from an infected or colonized patient through direct or indirect contact. Contact Precautions are indicated for patients infected or colonized with viral infections such as HIV or Hepatitis B, multidrug-resistant bacteria (e.g., MRSA, VRE), *C difficile*, other enteric pathogens that have a low infectious dose or prolonged environmental survival, herpes simplex, Varicella, and hemorrhagic fever viruses. Among infants and young children, RSV, adenovirus, and Parainfluenza virus infection are included, as well as RSV infection among immune-compromised adults. Implement Contact Precautions for patients with skin or eye infections that may be contagious (e.g., draining abscesses, cellulites with uncontrolled drainage, herpes zoster, impetigo, conjunctivitis, scabies, lice, other wound infections).

Health workers should routinely use appropriate barrier methods, which will prevent contamination by blood/blood/body fluid.

Contact Precautions require the following actions:

- Place the patient in a private room or in a room with other patients with the same and no other infections (i.e. cohort)
- Dedicate noncritical patient-care equipment to a single patient when possible (otherwise, clean and disinfect equipment before use on another patient)
- Wear gloves when entering the patient room
- During the course of providing care to one patient, change gloves after contact with infective material that may contain high concentrations of microorganisms
- Remove gloves before leaving the patient's room and wash hands immediately with an antimicrobial agent or a waterless antiseptic agent (NB: Using waterless antiseptics do not replace hand washing)

- Wear a protective gown if direct contact with the patient, environmental surfaces or items in the patient's room is likely
- Precautions may need to be continued throughout the hospitalization
- Limit patient transport; if the patient must leave the room, maintain the precautions while the patient is out of the room.

Special precautions are necessary in the following cases:

1. Patients known to be positive for Hepatitis B, C, , HIV or Hemorrhagic fevers (Ebola).
2. Where diagnosis of acute viral hepatitis has been made or a recent history suggestive of viral hepatitis.
3. Known risk activities e.g. IV drug use, unsafe sexual practices
4. Jaundice occurring in a patient who has recently had a blood transfusion or receiving a blood product
5. Jaundice occurring in an immune-suppressed patient

Despite the fact that screening tests for hepatitis B prove to be negative, if the diagnosis is consistent with acute viral hepatitis it is recommended that precautions in the collection of specimens, disposal of excreta or any other material should continue to be taken.

Precautions in the management of patients:

In most circumstances the above mentioned patients may be nursed safely on the open ward. However, Hepatitis B surface antigen positive (HBeAg), or HIV patients who have uncontrolled bleeding or any other associated infectious disease must be isolated in a separate room.

a) Isolation

Isolation is the creation of a barrier - mechanical or spacial - to prevent transmission of an infectious disease (spread by contact or air bone) from one patient to another or health workers or visitors. Optimum spacing between beds is 1 – 2 meters.

When it is necessary to isolate a patient or take precautions different from those used on other patients, it should be made clear to him/her that such action is necessary to minimize the risk of infection to others.

The Infection Control Nurse should be informed. All Health units (from health centre III and above) should have isolation rooms or sections. Display a **"STOP"** sign clearly in the patient's isolation area. Appropriate barrier wear should be put on.

b) **Specimen Collection**

- Health workers are reminded to take each and every patient as infectious
- With suspected or confirmed cases of viral blood borne infections, both the specimen and request card should carry a recognizable hazard label, e.g. **"DANGER OF INFECTION"**. The specimen bottle and request card should be placed in separate compartments for transport to the laboratory.
- Specimen containers should be labeled, prior to use, with self- adhesive patient identification labels. All caps on containers must be secured and checked for fitting. No Blood or other specimens should contaminate either the specimen bottle or request card.
- Gloves must be worn at all times by ALL staff involved in the collection of 'specimens. Gloves should be changed between patients. While awaiting collection, specimens should be placed in a clearly identifiable designated area.
- The specimen should then be placed upright, if possible, in the transport box. Staff should be instructed about the potential danger and know how to deal with any blood spillage or broken tube.
- Inform the Pathology Laboratory of any specimens from suspected or confirmed infectious patients before these are sent.

c) Spillages

- 1f blood or body fluid is spilt either from a container or as a result of an operative procedure, the spillage should be dealt with immediately.
- The worker who deals with the spillage should wear appropriate protective clothing.
- The spilled blood or body fluid should be completely covered with 1% sodium hypochlorite solution or other chlorine-releasing agent in a towel for 10 minutes before cleaning.
- The area should then be thoroughly washed with detergent and water and finally dried.

- Dispose the used towel as clinical waste.

HYPOCHLORITE SOLUTION - used in decontamination

Body fluids:	Clean with 0.5% solution of sodium hypochlorite. (1,000 ppm available chlorine)
Blood visible:	Clean with 1.0% solution of sodium hypochlorite. (10,000 ppm available chlorine)

d) Disposal of clinical waste

- Materials contaminated with blood or other body fluids should be immediately discarded into labeled containers and incinerated. Where incineration is not available, the waste should be burned and buried in a deep pit
- Soiled sanitary towels are a potential source of infection; they must always be disposed of correctly. Where possible, patients should dispose of these towels themselves in labeled red containers for incineration
- Patients should be instructed to wash their hands thoroughly with soap and running water and soiled skin cleaned carefully.

e) Equipment

- **Disposable equipment** should be used. This equipment should NEVER be re-used
- **Re-usable equipment** following use should be placed in the autoclave drum with bio-hazard tape, labeled "For Disinfection" and returned to Central Sterilizing Department (CSD). CSD must always be notified of any equipment that is of 'potential infection risk.
- Any equipment returned to stores for service must always be cleaned, disinfected and accompanied by the appropriate documentation rendering it safe to handle.
- Equipment, which cannot be autoclaved, e.g. Fibreoptic instruments, should be cleaned in warm water and detergent rinsed well and then soaked in 2% glutaraldehyde solution for 20 minutes with a final rinse in sterile water prior to use.

  Cleaning and disinfection should be performed in a well-ventilated room. Protective clothing must be worn

  Prior washing in detergent ensures protein is removed and is not "fixed" to equipment.

Immerse washed equipment in freshly activated 2% glutaraldehyde in a designated closely covered container.

Length of immersion is dependent on the particular piece of equipment being disinfected.

Table 18: Current guidelines on length of immersion in disinfectant for the equipment outlined below

Equipment	Length of immersion in disinfectant
Endoscopes	20 minutes
Bronchoscopes	20 minutes (1 hour T.B)
Laparoscopes, arthroscopes	3 hours (Sterile)

- After soaking in glutaraldehyde, remove equipment from solution using an aseptic technique
- Rinse thoroughly in sterile water
- Always follow manufactures' guidelines when using glutaraldehyde solution

Laundry

Any linen heavily contaminated with blood/body fluids must be laundered as infected.

(a) Collection and handling

- Soiled linen shall be sluiced (washed with a lot of water)
- Soiled linen with blood, body fluids, secretions, or, excretions shall be handled in a manner that prevents skin or mucous membrane exposure, contamination of clothing, and transfer of micro-organisms to other patients and the environment
- Soiled linen is considered to be contaminated and shall be bagged at the point of origin and placed in a red coloured container
- Linen from persons with a diagnosis of viral hemorrhagic fevers (e.g. Lassa, Ebola, Marburg) requires special handling
- Tender procedures shall indicate special requirements for hospital laundry including the need to provide immunization against Hepatitis B (paid for by the employer)

(b) Bagging and containment:

- Soiled wet linen shall be placed in strong impervious plastic bags to prevent leakage
- Bags shall be tied securely when three-quarters full and transported to the laundry area
- Separate carts shall be used for dirty and clean linens. Carts used to, transport soiled linens shall be cleaned with the recommended cleaning product used in the health care facility after each use

(c) Washing and drying

- If low temperature water is used for laundry cycles, chemicals suitable for low temperature washing at the appropriate concentration shall be used
- High temperature washes (71.1 C) are necessary if cold water detergents are not used

(d) Sterile Linen

Surgical gowns and linens used in sterile procedures shall be sterilized by steam after the normal washing and drying cycle to destroy any residual spores. Disposable items for use in sterile procedures may be more cost-effective in some situations. The need for sterilizing linens for nurseries and other areas has not been substantiated.

e) Protection of laundry workers

- Workers shall protect themselves from potential cross-infection from soiled linen by wearing appropriate personal protective equipment, such as gloves and gowns or aprons, when handling soiled linens. Reusable gloves shall be washed after use, allowed to air dry, and discarded if punctured or torn.
- Personnel shall wash their hands whenever gloves are changed or removed
- All care givers and laundry workers shall be trained in procedures for handling of soiled linen
- Laundry workers, as other health care workers, shall be offered immunization against Hepatitis B

Last offices

- The dead body should be recognized as a potential source of infection for the medical and support staff, other patients, and relatives and / or any other persons handling the body.
- Precautions taken when the patient was alive should be continued during the laying out of the body.
- Special precautions must be taken and notification given for persons suspected to have died of highly infectious diseases such as viral hemorrhagic fever, and in case of epidemics.
- In deaths associated with hemorrhage or heavy blood contamination, a water repellant apron must be worn by all the nurses in addition to other protective wear such as gowns, boots and heavy-duty gloves. Water repellant disposable gowns are advised where possible.
- The body should be moved to a side-room or the bed screened off as the last offices' are being taken care of.
- Minimal cleaning of the body should be performed on the ward.
- Soiled clothing, bed and bedding, floor and walls must be handled as above
- Any open wounds including IV sites should be dressed with waterproof occlusive dressings.
- Bodies must be labeled by a mortuary tag.
- Death must be certified and mortuary staff be informed immediately and the body must be transferred to the mortuary accompanied by the case file.
- A request for an autopsy must be made for medico-legal cases or may be made for medical reasons. These should be done immediately.

The Mortuary:

- All hospitals and Health centers IVs must have a functional mortuary unit. It should at all times be prepared to receive bodies.
- The mortuary must have trained staff.

- Mortuaries must also have Infection Prevention and Control commodities and facilities such as protective gear, running water, soap, disinfectants, adequate ventilation, adequate lighting, cold storage rooms, relevant equipment and logistical support
- Procedures of disinfection, decontamination and waste-disposal where applicable, sterilization should be observed in the mortuary as in any other part of the hospital
- Body parts removed for histology must immediately be fixed in 10% formal saline solution
- In case a person dies of highly infectious diseases, the body and coffin should be sealed by trained persons and supervised burial conducted immediately

Empiric use of Airborne, Droplet, and Contact Precautions

Patients may be admitted or transferred to a facility without a known diagnosis. If there is a question of an infectious process based on the clinical presentation, consider implementing precautions until a definitive diagnosis is made. Examples of empiric use of the different types of precautions are outlined in the table 19.

Table 19: Clinical Scenarios and Empirical Use of Isolation Precautions:

Airborne Precautions	Droplet Precautions	Contact Precautions
Vesicular rash	Meningitides	Acute diarrhea with likely infectious cause in an incontinent or diapered patient.
Maculopapular rash with coryza and fever cough, fever, upper lobe pulmonary infiltrate .	Petechial or ecchymotic rash with fever.	Diarrhea in an adult with history of recent antibiotic use.
Cough, fever, pulmonary infiltrate in any lung location in an HIV-infected patient or patient at high risk for HIV infection	Paroxysmal or severe persistent cough during periods of Pertusis activity Generalized rash or exanthema, etiology unknown	Vesicular rash Respiratory infections, particularly bronchiolitis and croup, in infants and young children History of infection or colonization with multidrug-resistant organisms (except TB) Skin, wound, or urinary tract infection in patient with recent hospital or nursing home stay in facility where multidrug-resistant organisms are prevalent Abscess or draining wound that cannot be covered.

CHAPTER 9
POST-EXPOSURE PROPHYLAXIS FOR HIV, HEPATITIS B AND HEPATITIS C

Post-Exposure Prophylaxis (PEP) is an emergence medical response consisting of short-term disease-specific treatment to reduce the likelihood of a particular infection after exposure to potentially infectious blood or body fluids either through occupational or non-occupational contact. Avoiding blood exposures is the primary way to prevent transmission of human immunodeficiency virus (HIV) hepatitis B virus (HBV) and hepatitis C virus (HCV) in health-care settings (CDC, NIOSH alert 1999).

Evidence from biomedical studies has revealed that there may be a window of opportunity to abort HIV infection by inhibiting viral replication following an exposure. Research has further indicated that once HIV crosses a mucosal barrier, it takes 48 -72 hours before the virus can be detected in the regional lymph nodes; and up to five days before it can be detected in blood (Alexander Spiral et al 1996). Accidental exposure to HIV is predominantly via percutaneous and mucocutaneous routes. The risk of HIV sero-conversion after all types of work-related percutaneous (breaks in the skin) exposure is about 0.3% (Tokars et al 1993), and the risk for deep injuries (extends into the muscle), including deep need sticks is 15 times greater than for superficial injuries (CDC 1995; Cardo et al 1997). HIV Post-Exposure Prophylaxis (HIV-PEP) is used for healthcare providers accidentally exposed to HIV, usually after being unintentionally pricked by a sharp or needle used on someone likely to be HIV positive. HIV-PEP is used in many parts of the world as a potential method of preventing HIV infection.

Similarly, HBV infection is a well recognized occupational risk for healthcare workers (*Mast EE, Alter MJ 1993*) and providers in informal sector such as the saloon operators, barbers and traditional birth attendants (TBAs). The risk of HBV infection is primarily related to the degree of contact with blood in the work place and also to the hepatitis B e antigen (HBeAg) status of the source person. In studies of HCP who sustained injuries from needles contaminated with blood containing HBV, the risk of developing clinical hepatitis if the blood was both hepatitis B surface antigen (HBsAg)- and HBeAg-positive was 22%--31%; the risk of developing serologic evidence of HBV infection was 37%--62%.

By comparison, the risk of developing clinical hepatitis from a needle contaminated with HBsAg-positive, HBeAg-negative blood was 1%--6%, and the risk of developing serologic evidence of HBV infection, 23%--37% (*Werner BG, Grady GF 1982)*. HBV PEP is an established practice in many developed countries though not widely used in the developing world, including Uganda.

On the other hand, HCV is not transmitted efficiently through occupational exposure to blood. The average incidence of anti-HCV sero-conversion after accidental percutaneous exposure from an HCV-positive source is 1.8% (range: 0%--7%) *(Aler MJ 1997, Lanphear BP et al 1994, Puro V et al 1995, Mitsui T 1992)* with one study indicating that transmission occurred only from hollow-bore needles compared with other sharps (*Puro V et al 1995*). Transmission rarely occurs from mucous membrane exposures to blood, and no transmission in HCP has been documented from intact or nonintact skin exposures to blood *(Sartori M et al 1993, Ippolito G et al 1998)*. Data are limited on survival of HCV in the environment. In contrast to HBV, the epidemiologic data for HCV suggest that environmental contamination with blood containing HCV is not a significant risk for transmission in the health-care setting (*Davis GL 1994, Polish LB 1993)*, with the possible exception of the hemodialysis setting where HCV transmission related to environmental contamination and poor infection-control practices have been implicated (*Niu MT 1993, Hardy NM 1992, Niu MT 1993, Favero MS 1996)*. The risk for transmission from exposure to fluids or tissues other than HCV-infected blood also has not been quantified but is expected to be low.

Medical procedures are an important, yet largely overlooked route of HIV and HBV transmission, especially in resource poor countries. Inadequate adherence to standard precautions of infection prevention is common in health facilities in many developing countries. This exposes health providers to HIV, HBV and other blood borne infections. Great attention must be paid to standard precautions and infection prevention in order to prevent HIV and HBV transmission in healthcare settings.

9.1 Management of exposures

9.1.1 General considerations

Management of exposures to blood and body fluid borne viruses includes universal precautions, vaccination, and PEP. Upon occurrence of any incident, the HIV, HBV and HCV infection status for both the exposed person and exposure source should be established by relevant laboratory diagnostic tests. This should be carried out after informed consent has been obtained as required by existing laws and regulations. However, testing is not required for person or person (s) known to be infected with any one of the above viruses.

PEP should be initiated within 2 – 72 hours for HIV and 7 days for HBV. If an exposure is of such risk to warrant PEP, the recommended intervention should be commenced. While awaiting results of the diagnostic test (HIV, HBV and HCV), PEP should be started for the exposed person and stopped if the source is found not to be infected with HIV or HBV; or HBV; or if the exposed person is found to be positive for any of the above viruses. PEP should not be offered to exposed persons who decline the diagnostic test.

The availability of PEP is not an alternative to universal precautions against transmission of HIV and HBV. If PEP is to be used, clinicians trained in the provision of PEP should be consulted. A careful discussion of the risks and benefits of therapy guides the decision-making regarding PEP and allows for appropriate post exposure care and support.

In evaluating the need for PEP, the following factors should be considered:

- Duration since the potential exposure
- Likelihood of infection in the exposure source (where applicable) Risk of transmission given the source material and type of exposure
- The ser-status of the exposed person
- The circumstances in which sexual assault occurred such as gang-rape, defilement, rape by a known HIV-positive person or by a high risk person.

9.1.2 Guiding principles

Prevention of exposure through adherence to universal precautions takes priority as a measure to avoid infection. This should be through training and provision of the necessary materials and equipment. The following principles should apply when dealing with PEP:

1. Institutions should establish and avail a written PEP protocol (s). This should include a mechanism for its implementation
2. Training of HCW in universal precautions and management of PEP is mandatory
3. The actual process of PEP should involve the following
    a. Immediate First Aid
    b. Report of the incident
    c. Risk assessment
    d. Counseling and Testing
    e. Initiate PEP
        - The decision to initiate PEP is based on the premise of risk benefit ratio
        - Benefit should always outweigh the risk of initiation. This ratio will be based on several factors including risk assessment, consent, counseling and co-existing patient factors.
    f. Follow-up, counseling and support
    g. Access to PEP provider and PEP therapy at all times

9.1.3 PEP in sex exposure

Unprotected sex exposes individuals to infectious body fluids and is an important mode of transmission of HIV and HBV. Hence sexual assault (through rape or defilement) should be considered high risk since it is likely to involve exchange of semen/vaginal fluids and even blood. When a qualified clinician proves a case of sexual assault and that the perpetuator is a known or suspect to have HIV infection, HIV-PEP should be started within 2 – 72 hours. Clinicians considering use of HIV-PEP following sexual exposure should bear in mind that this type of exposure is of high risk ; and the intervention should be initiated promptly where adherence to the regimen is likely. In case of suspected hepatitis B exposure, the survivor should be investigated where possible and managed accordingly.

9.1.4 Drugs used in PEP

In exposures involving HIV infection, a minimum of two highly active anti-retroviral drugs is recommended in order to prevent drug failure as a result of primary resistance. It is recommended that first line drug combination used in the country be considered in case of HIV PEP. However, the decision on which combinations to use should be based on the degree of drug tolerance, contradictions, and availability. In case of female clients, assessment for pregnancy should be done, including a pregnancy test if indicated, before antiretroviral drugs are administered. If a female client is breastfeeding, she should continue breast feeding.

In exposures involving HBV use of immunoglobulin and vaccination is recommended depending on HBV immune status of the individual and risk of exposure. There is currently no therapy for HCV following exposure. Nevertheless other components of PEP need to be carried out in addition to the referral of the patient to relevant specialists. For further information about PEP refer to Ministry of Health, The national policy guidelines on post exposure prophylaxis for HIV, Hepatitis B and Hepatitis C, 2007.

CHAPTER 10
PHYSICAL INFRASTRUCTURE AND MAINTENANCE OF EQUIPMENT GUIDELINES

Health unit infrastructure should be well designed, built of good quality materials, and be well maintained to facilitate infection control practices. Selection of site, location of the different structures, spacing and utilities of medical building should be supportive of infection control specifications. Hospital management committees should always consult the Ministry of Health Infrastructure Division (MOHID) and the Infection Control Team, when planning to put up new buildings.

Guidelines on Medical Building and Services:

Design:

The Ministry of Health has standard plans for the different levels of health facilities as well as standard plans for theatre, wards, out-patient department (OPD) and others. The plans should always be referred to during development of new facilities.

Design includes: selection of site, detailed structural plan, provision of utility services (electricity, water, sewerage, medical waste disposal and access roads/paths). There should be close collaboration between designers, the health facility management and the infection control committee to ensure that infection control measures are taken into account.

Maintenance of Buildings

- Health unit buildings which are not well maintained are a common source of infection. It is critical to ensure that the maintenance budget is available and adequate.
- Walls should be kept clean and well painted
- Cracked floors should be repaired
- Carry out regular inspections of sewerage lines to avoid major blockages
- Storm water should be drained away from the buildings

Table 20: Guidelines to cater for infection prevention during the design of health facilities:

Item	Design	Remarks
• **Site Selection**	• Proper sitting in view of use of building • Ensure that waste disposal is possible • Swampy areas or sites with poor drainage are not good sites	• Consult Ministry of health for Guidance
• **Orientation of building**	• Take into account good cross ventilation • Location should be in common wind directions • Orientate building not to allow too much sunshine •	
• **Services**	• The health unit must have a provision for disposal of excreta (pit latrines or water borne system). Pit latrines should be constructed at least 20 meters away from medical building • Health unit must have a placenta pit • A water source should be available • Power source should be available in the health units • Provide water points at examination, treatment places, laboratories, theatres, maternity units, laundry, kitchen, toilets, and others • Provide facilities for waste management	• For hospitals running water should be available • Rain water harvesting should be done • Connections to mains where power is available • Every hospital should have an acceptable or alternative Environmental friendly final disposal method
• **Buildings**	• Provide complete design drawings • Provide material details and specifications	• Follow available design drawing from Ministry of Health • All room should be of washable materials

Guidelines on Medical Equipment

There is a National Medical Equipment Policy 2008. Procurement of Medical equipments should be in consultation with National Advisory Committee on Medical Equipment (NACME). Where there are issues on medical equipment refer to MOHID.

CHAPTER 11
STAFF TRAINING IN INFECTION PREVENTION

Staff training is a process of promoting the acquisition of knowledge, the development and improvement of specific skills, practices and the changing of attitudes. It should therefore be noted that the success of infection prevention and control partly depends upon all staff knowledge and understanding infection prevention and control concepts.

Pre- service training in infection control and induction at recruitment should be adhered to in order to ensure consistent practices. . On job training through mentoring, coaching and support supervision should be regular and should follow identified training needs.

The administration should ensure that all new employees are oriented on the subject in the training the following course content should be covered:-

- An introduction which include Historical background, what nosocomial infections are, how they are transmitted, the common causative agents and the infections caused
- The principles of control, which should emphasize the role of infection control committees, and the individual control measures
- Standard precautions
- Principles and practices of hygiene
- Management of health care wastes
- Principles and practices of disinfection and sterilization
- Appropriate use of Protective material
- Appropriate use of antibiotic chemotherapy
- The economics of infection prevention and control

CHAPTER 12
MONITORING OF INFECTION PREVENTION AND CONTROL PRACTICES

Good infection Prevention and Control practices are simple and routine, but they require diligence and attention to detail. Until they become habitual, they require behavioral change and reinforcement; and supportive supervision to implement initially.

12.1 Role of the facility management

Managers should ensure that at every facility the Infection Prevention and Control guidelines and appropriate commodities and supplies are readily available. Management should be part of the infection prevention committee to ensure that it works effectively. The following can be some of the roles of the facility managers.

- Procedures should be established to handle situations where clients and staff are exposed to risk of infection
- All staff should receive an orientation before new procedure or processes are started and follow up training conducted to reinforce new or difficult concepts
- A process of continuous quality improvement should be implemented within the facility
- Adequate facilities, supplies and logistic support should be provided for staff and clients to follow the infection prevention guidelines
- Regular reviews should be conducted to ensure the adequacy of the recommended infection prevention practices and staff concerns or any other aspects or infection about them

12.2 Role of every practitioner

Individual staff members are responsible for implementing infection prevention practices in the clinical areas at all times, and relaying any suspected problems to the appropriate authorities.

12.3 Monitoring of the environment

Internal:

Unless there is an outbreak of infection routine bacteriological sampling of floors, walls, surfaces and air is rarely indicated. Use the slit sampling technique ***(Slit sampling technique is where a sample is divided into two sub-samples at the laboratory. One sub-sample is analyzed at the site laboratory and the other is analyzed at an independent laboratory)***

Random swabbing of areas of unspecified size will give results, which are not comparable with each other or with previous results and are difficult to interpret.

Air sampling and inspection of ducts are suggested before opening new specializing areas such as operating theatre, areas intensive care, oncology, burns, units etc. or after repairs or maintenance.

External:

External health environment can act as a source of disease. It is therefore necessary to ensure that the environment is kept clean and free from pests and vermin. The following should be done:

- Gazette health unit compound
- Separate the facility from the community by fencing it off
- Minimize areas of bare soil planting grass and paving walk ways / tarmac roads in order to minimize dust
- To avoid breeding of vectors:
    - keep grass short and plants neat
    - Drain stagnant water and ensure proper drainage
- Ensure possible sources of vermin are cleared
- Educate patients on keeping the environment clean through correct waste disposal

CHAPTER 13
INFECTION PREVENTION IN THE HOME CARE SETTING

Due to the high prevalence of chronic diseases, such as TB and HIV/AIDS, many patients are cared for within the home. This practice can put families and care givers, as well as other community members, at risk. Health care workers and those in the community working with these families and caregivers have a responsibility to educate the community about these risks associated with home-based care and also infection prevention practices that can reduce those risks.

- Keep patients in rooms with fresh air and plenty of light
- Make sure that patients have clean clothing and that they have clean, dry bed sheets at all times
- Do not allow bedridden patients to lie in one position for more than two hours; encourage or help them to turn over or change positions every two hours to avoid the formation of bed sores
- For women, as much as possible promote single use sanitary pads for sick women. Dispose sanitary pads properly as you would other contaminated waste (see General Principles, below)
- If the patient has a cough, they should be encouraged to carefully cover their mouths with a handkerchief (preferably) or their hands when coughing
- If a patient has diarrhea, encourage him/her to use a toilet or latrine, and to carefully wash his/her hands with soap and clean, running water after every bowel movement and before eating or handling or preparing any food or drinks
- If a patient has skin conditions that have open lesions/sores (broken skin), the skin should be kept clean and dry, and the lesions/sores should be cleaned with mildly salty water and kept covered with a clean, dry dressing
- Ensure that patients take any medication completely, as prescribed by a competent clinician

Where highly contagious infectious diseases are present (e.g., cholera, TB), the family and caregivers need to be educated about ways to minimize the risk of contamination.

One of the benefits of home-based care is that it may be more comfortable and friendly for the chronically ill patient. The risks to caregivers and family must be weighed against the need for psychosocial support for the patient.

For any procedures where the skin may be broken, and there may be contact with an open wound or sore, or where there may be contact with blood or other bodily secretions, caregivers should use the following guidelines.

General Principles:

- Wear clean clothes and use clean surfaces, to prevent infection from dirty clothes or surfaces. Surfaces such as clothing, cloth or plastic sheets should be washed with soap or detergent and dried in full sunlight; cloth should be ironed with a hot iron
- Thoroughly wash hands before and after contact with any patient, blood or body fluid, using soap and clean running water (for example, from a tap or poured from a jug)
- When direct contact with tissue under the skin, blood, body fluids, secretions or excretions is expected the practitioner should wear gloves, which are properly disposed of after the procedure. Even when gloves are worn, hands should be properly washed before and after putting on and removing the gloves. If gloves are not available, even clean and dry plastic bags can afford some protection from infection
- When cutting of skin or tissue is required, it is strongly recommended to use only a new, unused razor blade, which is disposed off in a pit after the procedure
- Skin in the area where any cutting may be done should be cleaned with clean water to remove any visible dirt and allowed to air dry
- If any durable re-usable instruments are used (e.g., knife, horn for sucking blood, etc.), they should be decontaminated in 0.5% chlorine solution for 10 minutes, washed with soap and water to remove any blood or tissue and boiled for 20 minutes
- Any cloth or plastic sheets or clothing that gets in contact with blood, body fluids, secretions or excretions should be decontaminated in 0.5% chlorine solution for 10 minutes, washed with soap or detergent, and dried in full sunlight (and cloth should be ironed). If they are no longer needed, they should be disposed of appropriately by burying or thrown in a pit latrine in case of cloth. Plastic sheets should be burned.

- Wipe hard surfaces (e.g., mattresses or tables) that may have been in contact with blood, body fluids, secretions or excretions with a cloth that has been soaked in 0.5% chlorine solution
- Dispose of all materials that have come in contact with blood, body fluid, secretions or excretions carefully so that they do not pose a risk to members of the community
- Waste should be buried in a deep hole and completely covered with soil so that they are not accessible to community members or children – it can also be disposed of in a deep pit latrine
- Wear gloves when handling and disposing of contaminated waste products

CHAPTER 14
INFECTION PREVENTION IN TRADITIONAL PRACTICES

Traditional practices may put practitioners, their clients and community members at risk. Health workers and those in the community working with these practitioners have a responsibility to educate both practitioners and community members about these risks, and also about the infection prevention practices that can reduce those risks.

Various types of traditional practices may pose risks of infection, for example tattooing, circumcision, bloodletting, and childbirth. Here are some general guidelines that can be shared with Neighborhood Health Committees, community based agents and health workers, and other community based organizations and taught to members of your communities.

For any procedures where the skin may be broken, and there may be contact with tissue under the skin, or contact with blood or other bodily secretions, the following guidelines should be followed.

General Principles:

- Wear clean clothes and use clean surfaces, to prevent infection from dirty clothes or surfaces. Surfaces such as clothing, cloth or plastic sheets should be washed with soap or detergent and dried in full sunlight; cloth should be ironed with a hot iron
- Thoroughly wash hands before and after contact with any patient, blood or body fluid, using soap and clean running water (for example, from a tap or poured from a jug)
- When direct contact with tissue under the skin, blood, body fluids, secretions or excretions is expected the practitioner should wear gloves, which are disposed off in a pit after the procedure. Even when gloves are worn, hands should be properly washed before and after putting on and removing the gloves. If gloves are not available, even clean and dry plastic bags can afford some protection from infection.
- When cutting of skin or tissue is required, it is strongly recommended to use only a new, unused razor blade, which is properly disposed of after the procedure

- Skin in the area where any cutting may be done should be cleaned with clean water to remove any visible dirt and allowed to air dry
- If hair must be removed, do not shave with a razor – if necessary, clip the hair close to the skin with scissors, but do not break the skin
- If any durable instruments are used that will be re-used (e.g., knife, horn for sucking blood, etc.), they should be decontaminated in 0.5% chlorine solution for 10 minutes, washed with soap and water to remove any blood or tissue, and boiled for 20 minutes
- Cover mattresses and the like with plastic sheets which can be easily decontaminated and washed.
- Any cloth or plastic sheets that come in contact with blood, body fluids, secretions or excretions should be disposed of. If they are to be reused, they should be decontaminated in 0.5% chlorine solution for 10 minutes, washed with soap or detergent, and dried in full sunlight (and cloth should be ironed)
- Wipe hard surfaces (e.g., mattresses or tables) that may have been in contact with blood, body fluids, secretions or excretions with a cloth that has been soaked in 0.5% chlorine solution
- Dispose of all materials that have come in contact with blood, body fluid, secretions or excretions carefully so that they do not pose a risk to members of the community
- The best procedure is to burn and bury all materials that have come in contact with blood, body fluid, secretions or excretions (cloth or plastic sheets, razor blades, gloves, etc.). Waste should be buried in a 2 to 3 meters deep hole and completely covered with dirt so that they are not accessible to community members or children – it can also be disposed of in a deep pit latrine
- Wear gloves when handling and disposing of contaminated waste products.

Conducting Home Deliveries

Childbirth is a high risk procedure, not only because there can be complications that require medical attention but also because there are a lot of blood and body fluids involved. Women should be encouraged to deliver at a facility where proper infection prevention practices are followed, and where there is a skilled attendant on hand to manage complications if they arise. For women who do deliver at home, in addition to the above guidelines, there are some specific requirements for conducting a clean delivery.

In the preparation for delivery there should be the following available:

- New razor blade
- New cord ties (string to tie the umbilical cord)
- Clean delivery surface (a plastic sheet is recommended; a cloth that has been well washed and fully dried in sunlight, and ironed if possible, is the next best alternative)
- Gloves
- Soap
- Clean water
- Sanitary pads or pieces of cloth that have been washed and dried in full sunlight and ironed if possible
- New wrapping for the baby or a cloth that has been washed and dried in full sunlight and ironed if possible
- Clean protective clothing for the birth assistant

The general principles above should be followed, regarding hand washing, wearing gloves, using new razor blades and clean surfaces, avoiding shaving of hair, decontaminating, cleaning and boiling any reusable instruments, and properly disposing of any waste products. If there are large spills of blood, body fluids, secretions or excretions, pour 0.5% chlorine solution over the spill area and let it stand for 10 minutes before mopping it up.

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ANNEXES

ANNEX 1
Summary of infection prevention and control guidelines

1. Infection Prevention Principles

a. Infection prevention (IP) in health care facilities has 2 primary objectives:
   i. To prevent major infections when providing any type of service
   ii. To minimize the risk of transmitting serious infections such as hepatitis B and C, HIV and TB not only to clients but also to service providers and staff

b. **The recommended IP practices are based on the following principles:**
   i. Consider every person (client or staff) infectious
   ii. Wash hands
   iii. Wear gloves
   iv. Use barriers including personal protective equipment
   v. Use safe work practices – hands-free technique, sharps disposal
   vi. Process instruments – decontamination, cleaning, HLD/sterilization
   vii. Dispose contaminated instruments and waste thoroughly and properly
   viii. Employ Transmission-Based Precautions only as necessary

Infection Control Practices are grouped into two

a. Standard Precautions
b. Additional (Transmission-based) precautions

Standard Precautions

2. Hygiene

a. **Personal hygiene and safety**
   i. Nails, hair, beards and moustache kept either short or clean and tidy
   ii. Uniforms should be made of material easy to wash

b. **Hand Hygiene**
   i. Cover skin lesions and cuts on hands with water proof dressing
   ii. Wash hands before and after contact with any patient or any potentially contaminated materials (soiled instruments, contaminated waste, etc.)

iii. Wash hands before and after putting on gloves (gloves are not perfect barriers)
iv. Hand washing with a waterless alcohol-based preparation is more effective than washing with soap (even antimicrobial soap) and water
v. Using a waterless alcohol-based preparation for hand scrub and surgical hand scrub:
vi. Antiseptic Handrub: apply 5 ml (about one teaspoonful) and continue rubbing the solution over the hands, covering all surfaces, until dry
vii. Surgical Handscrub: after washing with soap and water, apply 5 ml (about one teaspoonful) of a waterless alcohol-based preparation to cover fingers, hands and forearms and rub until dry; repeat the application and rubbing 2 more times for a total of at least 2 minutes, using a total about 15 ml of the handrub.
viii. Hand washing must be done with soap and clean running water (from a tap, a bucket with a tap, or poured from a jug or pitcher)
ix. Do not use a common towel: Dry hands by air drying or use a clean, dry paper towel or personal towel

c. Facility hygiene

i. Dumb dusting with water detergent of surfaces, walls, trolley tops, windows, doors, bed cradles, bed stead and furniture
ii. Clean kitchen, utensils with warm water and detergent
iii. Scrub toilets, sluice rooms, drainages and sinks with vim and rinse with clean water
iv. Scrub equipments, e.g. urinals, bedpan, bowels and basins with detergent and rinse with water
v. Grass should be cut short
vi. Health facility should be fenced off

d. Hygiene in Special Areas (theatres, ICU, Labor suites, premature units, Burn units

i. Cleaning equipment should be dedicated to particular areas, e.g., in operating theatre
ii. Floors should be cleaned every after a procedure that visibly contaminates them with blood or body fluids
iii. Spillages should be decontaminated with hypochlorite 0.5 – 1% for 10 minutes and spot cleaning with water and detergent

Additional (Transmission-Based) Precautions

a. Use transmission-based precautions only for patients known or suspected to be infected with highly transmissible diseases, and only if secretions or excretions (urine or feces) cannot be contained.

b. Such highly transmissible diseases can be spread by:

   i. Airborne transmission (e.g., TB, measles, varicella)

   ii. Droplet transmission (e.g., influenza, mumps, rubella)

   iii. Contact transmission (e.g., hepatitis, herpes simplex, hemorrhagic fever, multidrug (antibiotic)-resistant bacteria, staphylococcal))

2. Personal Protective Equipment

Staff must wear appropriate protective equipment when there is a risk of spillage or splashing of blood, body fluids or other contaminated materials

Type of personal protective equipment	**Must be used for**	**Primarily Protects**
Mackintosh or Apron	Situations where splashing or spillage of blood, body fluids, secretions or excretions is likely	Service provider
Closed boots or shoes (open sandals are **not** acceptable)	Situations where there is the possibility of dropping sharp instruments or where spillage of blood, body fluids, secretions or excretions is likely (e.g., deliveries, surgical procedures)	Service provider
Caps, Gowns/Scrub Suits, Masks, Aprons	Invasive procedures where tissue beneath the skin is exposed (e.g., surgical procedures)	Service provider & client both
Goggles or glasses, Masks, Apron	Situations where splashing of blood, body fluids, secretions or excretions is likely	Service provider
Masks	Situations which call for airborne or droplet transmission precautions	Service provider and client
Sterile Drapes	Major or minor surgical procedures	Client (note: limited protection, as even sterile drapes do NOT create a sterile field)

3. Handling Sharp Instruments during Procedures

a. Always use “hands-free” technique for passing sharp surgical instruments

b. Always dispose of sharps in a puncture and water resistant sharps container

c. Use syringes with re-use prevention features and needles whenever possible

d. Do not remove, bend or break needles before disposing of it
e. Use a new sterile syringe and needle from a sealed pack for every injection
f. Minimize the handling of needles and syringes
g. Never leave a needle in the rubber cap of vial to draw up multiple doses

4. Disinfection and Sterilization

Instrument Processing

All instruments must be decontaminated, cleaned, sterilized or high-level disinfected, and stored properly:

Process	Procedure	Applies to
Decontamination	Soak in 0.5% chlorine solution for 10 minutes only	All contaminated instruments and other materials
Cleaning	Soap, scrub brush, clean water Scrub and remove all tissue, blood, and waste material	All instruments after decontamination and before further processing (sterilization or HLD) or dried and stored.
Sterilization	Steam (autoclave at 121℃, 106kPa, 30 minutes) Dry Heat (160°, 2 hours) Chemical (cidex - 2% gluteraldehyde – 10 hours; rinse with sterile water)	For all surgical instruments and equipment For reusable surgical gloves
High-level Disinfection	Boiling – 20 minutes (rolling boil) Steam – 20 minutes Chemical – 20 minutes; rinse with water that has been boiled for 20 minutes	The only acceptable alternative to sterilization

5. Health Care Waste Management

a. Intermediate handling of waste (within the health facility)

i. Waste should be segregated at source by putting it in different bins for specific type of waste
ii. **Yellow sharps container/safety box** for sharps such as surgical blades, needles and broken glass
iii. **Red bin** for highly infectious material such as used: swabs, dressing materials and gloves

iv. **Black bin** for non-infectious material such as paper, leftover food, flowers, Plaster of Paris (POP)
v. Use non-corrosive washable containers with covers for contaminated waste
vi. Wash all waste containers with 0.5% chlorine solution every time emptied
vii. Wear utility gloves when handling contaminated waste
viii. Avoid splashes when disposing of liquid contaminated waste

b. Disposal of Waste (incineration, burial)

i. Use heavy-duty (utility) gloves and personal protective equipment when handling wastes; decontaminate and clean gloves between uses.
ii. Always wash hands after handling contaminated wastes.
iii. Handle wastes carefully to avoid spills or splashes. Avoid transferring contaminated waste from one container to another.
iv. Incineration is the preferred method for waste that cannot be recycled, reused or disposed of in a sanitary landfill or dumpsite.
v. If incineration is not possible, then careful burial is the next best alternative for waste that cannot be recycled, reused or disposed of in a sanitary landfill or dumpsite. .
vi. Remaining waste after burning or incineration, should be buried in a deep pit and covered over with dirt; the pit should not be accessible to the public
vii. Only contaminated and hazardous waste needs to be buried

6. Monitoring Infection Prevention

a. Infection Prevention and Control requires routine monitoring of infection prevention practices

Observe staff practices:

i. Hand hygiene
ii. Use of personal protective equipment
iii. Use of appropriate gloves
iv. Decontamination
v. Cleaning, HLD and sterilization of instruments and equipment
vi. Handling and disposal of sharp instruments and needles
vii. Waste management practices – segregation according to recommended colour codes

Monitoring of the environment

Internal:

Unless there is an outbreak of infection routine bacteriological sampling of floors, walls, surfaces and air is rarely indicated. Use the slit sampling technique

Random swabbing of areas of unspecified size will give results, which are not comparable with each other or with previous results and are difficult to interpret.

Air sampling and inspection of ducts are suggested before opening new specializing areas such as operating theatre, areas intensive care, oncology, burns, units etc. or after repairs or maintenance.

External:

External health environment can act as a source of disease. It is therefore necessary to ensure that the environment is kept clean and free from pests and vermin. The following should be done:

- Gazette health unit compound
- Separate the facility from the community by fencing it off
- Minimize areas of bare soil planting grass and paving walk ways / tarmac roads in order to minimize dust
- To avoid breeding of vectors:
  - keep grass short and plants neat
  - Drain stagnant water and ensure proper drainage
- Ensure possible sources of vermin are cleared
- Educate patients on keeping the environment clean through correct waste disposal

7. Infection Prevention in the Home Care Setting

a. Educate families and caregivers about the usefulness or benefits appropriate and effective infection prevention measures, such as:
   i. Hand hygiene
   ii. Decontamination
   iii. Appropriate use of gloves and other protectives
   iv. Proper waste handling of waste and appropriate final disposal waste disposal
   v. Protection from transmissible diseases within the home

8. Infection Prevention in Traditional Practices

a. Health Care workers know the traditional practices as they are practiced in your communities, and identify potentially risky procedures

b. Educate traditional practitioners and communities about appropriate and effective infection prevention measures such as:

   i. Hand hygiene

   ii. Decontamination

   iii. Appropriate use of gloves

   iv. Use of new, unused instruments (e.g., razor blades) and safe disposal of used items

   v. Cleaning and High Level Disinfection of any instruments that are reused

ANNEX II
Infection control committees

The Ministry of Health requires that all health units should form Infection Control Committees whose composition shall be as follows

A. National Infection Control Committee

i. Director Health Services Clinical and Community Health – Chairperson
ii. Directors of National Referral Hospitals
iii. Commissioner Clinical Services
iv. Commissioner, National Disease Control
v. Commissioner Health Services Community Health
vi. Commissioner Health Services Nursing
vii. Assistant Commissioner Health Services Epidemiological Surveillance
viii. Assistant Commissioner Health Services Reproductive health
ix. Assistant Commissioner Health Services Human Resource
x. Principal – College of health Sciences
xi. NEMA Representative
xii. Commissioner Quality Assurance – **Secretary**

Functions of the national Infection Control Committee

The national infection Control Committee shall ensure that procedures for occupational health and safety of the health worker and patient are implemented. The committee will be responsible for the development and updating of policies and procedures, approval of chemicals used for disinfection and methods of sterilization, training, and supervision of all cadres.

The committees should establish achievable objectives for improvement of staff and patient safety. They should ensure adequate supplies to carry out satisfactory IPC practices it should set up and implement an IPC training program for all staff.

B. National Infection Control Technical Working Team

C. Hospital Infection Control Committees in Referral Hospitals

i. Surgeon/Pathologist/microbiologist – Chairman
ii. Hospital Administrator
iii. Nursing Officer I/C Infection Control – Secretary
iv. Pharmacist
v. Dental Surgeon
vi. In charge Nursing services
vii. Head Laboratory services
viii. Nursing officer – Maternity ward
ix. Contractor of cleaning services
x. In charge Theatre
xi. Representatives from wards
xii. In charge Outpatient Department

D. Hospital Infection Control Committee in General Hospitals

i. Medical Superintendent – Chairman
ii. Dental surgeon
iii. Hospital Administrator
iv. Infection Control Nurse – Secretary
v. Senior Nursing Officer in charge
vi. Laboratory Technician
vii. In charge Theatre
viii. In charge Maternity ward
ix. Contractor of cleaning services

E. Health Center IV (HSD)

i. Medical Officer In charge – Chairman
ii. Nursing Officer

iii. Infection Control Nurse – Secretary
iv. Clinical Officer
v. Laboratory Technician
vi. Health Inspector
vii. Theatre Assistant
viii. Member – Health Unit Management committee
ix. Public health Dental Officer
x. Health inspector
xi. Representative of Health Center II
xii. Representative of Health Center III

F. Health Center III and II

At health Center III and II there should be a working group of at least 3 people to oversee Infection Prevention and Control issues. Minutes of the working group should be submitted to the Infection control committee at the Health HC IV (Health sub-district).

Functions of the Committees

a. Rapidly identify and investigate outbreak of infection or potentially hazardous procedures
c. Monitor infections and methods of their control
d. Provide advice on the isolation of patients with known infectious diseases and preventive measures to stop the spread of disease
e. Advise on day-to-day decisions relating to infection control. Liaise with staff throughout the unit identifying potential risks for infection
f. Monitor, evaluate and implement policies for the prevention of nosocomial infection and its spread
g. Develop information, Education and Communication system for the Provision of information to all staff on measures of infection control and proper management of clinical waste
h. Recommend best practices on infection control to the national Committee for adoption
i. Conduct monthly meetings on infection Control practices in the health unit
j. Report to heath facility management

k. Compile and disseminate an annual Infection Control Performance Report

Functions of infection Control Nurse

i. Monitoring Infection prevention and control practices in health facility
ii. Establish existence of outbreak of infectious disease and take interim control measures
iii. Notify Consultants/Medical Officer in charge of patient
iv. Establish and enforce the appropriate measures of control of infection and for treatment of affected patient
v. Arrange for the follow up of patients and contacts
vi. Communicate to disease surveillance for epidemiological and management of such outbreak

ANNEX III
Terms of reference for cleaning, contractors

1. The Hospital Administration and Infection Control Committee members should have inputs during the process of selecting a cleaning contractor.
2. The following basic cleaning materials are recommended for every health facility to have at all times. (The health unit administration should ensure that the right materials are availed by the contractor.)
    - Mops made of absorbable material e.g. Cotton, colour-coded to clean different areas of health units
    - Buckets - colour coded just like the mops.
    - Scrubbing brushes
    - Detergents-liquid soap
    - Chlorine releasing agents e.g. Jik
    - Scouring powder e.g. Vim
    - Protective for cleaning staff e.g. heavy duty gloves, gumboots, plastic aprons
3. It should be made clear and documented whether the cleaning contractor provides the above mentioned cleaning materials or the hospital administration does.
4. The contractor should:-
    (a) Undergo training by designated Health care workers, on management and recommended methods of cleaning health care units.
    (b) Make sure any new recruits should undergo the same training.
5. The Health Unit managers should have a mechanism in place to ensure enforcement of proper hospital cleaning. The Supervision of cleaning should be done by ward/area managers in collaboration with the supervisor from the contractor. The roles should be clear in the documents.

The contracted company in collaboration with the hospital management should ensure that their workers comply with the occupational health and safety policy, when it is in place.

ANNEX 4: How to make a 0.5% chlorine solution for decontamination

A 0.5% chlorine solution can be made from readily available liquid or powder chlorine.

Liquid concentrate:

- Determine the concentration (% concentrate) of the chlorine solution you are using
- Determine total parts of water needed (use formula below)

Total parts water = $\frac{\%\ \text{Concentrate}}{\%\ \text{Dilute solution}} - 1$

Mix 1 part JIK with the total parts water.

Example: to make 0.5% chlorine solution from 3.5% concentrate JIK

Total parts water = $\frac{3.5\%\ \text{JIK}}{0.5\%\ \text{Dilute}} - 1 = 7 - 1 = 6$

Formula: Mix 6 parts water to 1 part 3.5% concentrate JIK to make a 0.5% chlorine solution

Powder concentrate:

- Determine the concentration (% concentrate) of the powder you are using.
- Determine grams bleach needed (use formula below)

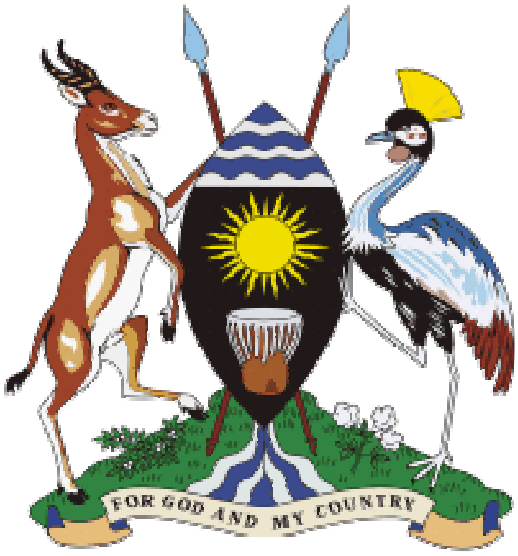
Grams/Litre water = $\frac{\%\ \text{Dilute solution}}{\%\ \text{Concentrate}} \times 1000$

Mix measured amount of bleach powder with 1 liter of water.

Example: to make 0.5% chlorine solution from 35% concentrated chlorine powder

Total parts water = $\frac{0.5\%\ \text{Dilute solution}}{35\%\ \text{Concentrated powder}} \times 1000 = 14.2$ grams/liter

Formula: Mix 14.2 grams of 35% concentrated chlorine powder with 1 liter of water to make a 0.5% chlorine solution



REPUBLIC OF UGANDA

Ministry of Health

Ministry of Health,
Plot 6 Lourdel Road,
P.O. Box 7272,
Kampala, Uganda
Tel: 256-414-340872 / 340873

Email: ps@health.go.ug

Web: www.health.go.ug