Kingdom of Eswatini
Ministry of Health

ESWATINI NATIONAL INFECTION PREVENTION & CONTROL GUIDELINES

VERSION 3 - 2023



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Cognizant of the fact that any attempt to mention all those who have contributed carries the risk of unknowingly omitting important names, the Ministry of Health wishes to take this opportunity to express special appreciation to the National IPC Technical Working Team (IPC Core Team inclusive) for their tireless effort and involvement throughout the review of the guidelines.

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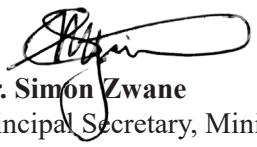

Dr. Simon Zwane
Principal Secretary, Ministry of Health

FOREWORD

In 2016, the Kingdom of Eswatini conducted an assessment for the Principal Secretary's Efficiencies Initiative. The findings showed that health facilities are lacking essential resources to practice adequate basic IPC, which include hand hygiene soap, soap dispenser, paper towels, paper towel dispenser, functioning sink, gloves, N95 masks, infectious waste bags, general waste bags, sharps bins, to name but a few.

There is compelling evidence for the cost-effectiveness, and the patient benefit, of a well-resourced IPC function. Data from multiple studies, multiple countries, across multiple facility types consistently demonstrate a positive impact on economic and patient outcomes.

Reducing the incidence of Healthcare Acquired Infections (HAIs), reducing the length of hospital stay, first line of defense against disease outbreaks, and reducing the use of antimicrobials are some of the benefits of a well-resourced IPC function.

The Joint External Evaluation (JEE) of IHR Core Capacities of the Kingdom of Eswatini Executive Summary April 2018, recommended (among other recommendations), the review and update the IPC guidelines (2014) according to the WHO guidelines published in 2016, update the Standard Treatment Guidelines (2012) to include a multisectoral approach (the One-Health approach) and engage the relevant stakeholders to enforce legislation for the requirement of prescriptions for antibiotics in both the public health and veterinary sectors, upgrade existing isolation units in tertiary hospitals and put in place isolation units in regional public health hospitals, at least one per region. Reviewing the IPC guidelines (2014), therefore, will address some of these recommendations.

These guidelines, which were developed jointly by the Ministry of Health and its strategic partners, will serve as a resource and reference document for all health care facilities, health care workers, regulatory bodies and training institutions where it relates to training, implementation and monitoring of IPC practices.

The Ministry of Health is hopeful that this document, when rolled out to health care workers across the length and breadth of this country, will lead to establishing a sustainable IPC culture in the Kingdom of Eswatini and that the catastrophic effects of outbreaks will not repeat itself.

Senator Lizzie Nkosi
Hon. Ministry for Health

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ACRONYMS

AMR	Anti-Microbial Resistance
ART	Anti-Retroviral Therapy
ARV	Anti-Retroviral
EPR	Emergency Preparedness Response
HAI	Healthcare-Associated Infections
HBC	Home-Based Care
HEPA	High-Efficiency Particulate Air
HIRA	Hazard Identification and Risk Assessment
HIV	Human Immunodeficiency Virus
HBV	Hepatitis B Vaccine
HCF	Healthcare Facility
HCV	Hepatitis C Vaccine
HCW	Healthcare worker
HCWM	Healthcare Waste Management
HMIS	Health Management Information Systems
IC	Infection Control
IPC	Infection Prevention and Control
IPCC	Infection Prevention Control Committee
MDR	Multi Drug-Resistant
MOH	Ministry of Health
MRSA	Methicillin Resistant Staphylococcus Aureus
MGIT	Mycobacterium Growth Indicator Tube
OHS	Occupational Health and Safety
PEP	Post Exposure Prophylaxis
PPE	Personal Protective Equipment
PTC	Pharmacy Therapeutic Committee
QA	Quality Assurance
QI	Quality Improvement
QM	Quality Management
RHMT	Regional Health Management Team
SOP	Standard Operations Procedures
TB	Tuberculosis
TWG	Technical Working Group
UP	Universal Precaution
URC	University Research Corporation.
VHF	Viral Haemorrhagic Fever
WHO	World Health Organisation
XDR	Extensively Drug-Resistant

CHAPTER 1

1.0 Introduction

Infection, prevention and control (IPC) is a process of developing and implementing safe, evidence-based practice towards improving quality healthcare. IPC is an on-going process, encompassing all aspects of prevention and control mainly in healthcare settings.

Healthcare-associated infections (HAIS) are one of the most common adverse events in care delivery and a major public health problem with an impact on morbidity, mortality and quality of life. At any one time, up to 7% of patients in developed and 10% in developing countries will acquire at least one HAI. These infections also present a significant economic burden at the societal level. However, a large percentage of HAI are preventable through effective infection prevention and control (IPC) measures.

The aim of the guidelines is to provide a framework for Administration and healthcare personnel which will enable them to implement the infection control program in order to protect themselves and others from the transmission of infections. Comprehensive IPC practices are required to **effectively** and **efficiently** prevent, identify, monitor, and control the spread of infection in all healthcare facilities (HCFs). IPC program should be proactive than reactive, with processes and structures in place that reduce the risk of acquiring infection for patients, staff/healthcare workers, family, significant others and the general public. These processes and structures include, but are not limited to:

1. Adequate and appropriate infrastructure; for example, suitable health facility designs such as proper and adequate ventilation, correct placement of taps in the facility, etc.
2. Consistency in the use of IPC policies and guidelines
3. Scientific sound measures used for prevention, and control of infections
4. Coordination and Management levels
5. Educating/training staff, patients, families, significant others and members of the community on IPC practices
6. Availability of Personal Protective Equipment
7. Monitoring and evaluation

1.1 Background

IPC programs are one component of safe, high-quality health service delivery. HAI are one of the most common complications or adverse events affecting patients and healthcare workers. They result in increased morbidity and mortality and impact on the capacity of health systems to function effectively. HAI also increase healthcare costs and can result in the increased usage of antimicrobial agents, thereby fueling the problem of AMR. In 2011, WHO reported that 7% of patients in developed and 10% in developing countries will acquire at least one HAI at any given time. Limited data are available from Low- and Medium-Income Countries (LMICs), but the prevalence of HAI is estimated to be between 5.7% and 19.1%. There is no available data in Eswatini.

In 2018, an evaluation on the implementation of the 2014 national IPC guideline in 14 health facilities (9 hospitals and 5 Health centres) in ESwatini was conducted. The core IPC components evaluated were the IPC programme, IPC practices / Standard Precautions (Hand Hygiene, Personal Protective Equipment (PPE), Healthcare Waste management, Injection safety, Decontamination of re-useable items) and TB IPC practices.

Aspects evaluated on the above domains were:

a) Knowledge
b) Provision /Supplies
c) Practice

Findings on the evaluation revealed that, facilities having functional IPC programmes - 64.7% (163/252); Hand Hygiene - 63.7% (107/168); Health care waste management - 83.5 % (187/224); Personal Protective Equipment -79.2% (244/308); Injection safety - 54.3% (76/140); Decontamination of re-useable items - 60.7% (102/168); and TB IPC - 73% (143/196) 72%.

1.2 Rationale

According to the Second National Health Sector Strategic Plan (NHSSP: 2014-2018), Health Services Priorities (Chapter 3), the health sector intends to move towards universal health coverage with critical interventions addressing communicable and non-communicable conditions in the Kingdom of Eswatini.

Therefore, this document will provide the necessary standard references for all healthcare facilities as they engage in efforts to minimize infection risks associated with the provision of healthcare. The reduction of infection risks depends on the actual guided performance of correct patient care practices. Infection Prevention and Control policies, guidelines and procedures are required in the implementation, monitoring, surveillance and control of infections in healthcare facilities.

The threats posed by epidemics, pandemics and antimicrobial resistance (AMR) have become increasingly evident as ongoing universal challenges and they are now recognized as a top priority for action on the global health agenda. Effective IPC is the cornerstone of such action.

1.3 Objectives

The objectives of the guidelines are:

- To provide evidence-based guidance on the core components of IPC programmes that are required to be in place at the national, regional and health facility levels to prevent HAI and to combat AMR through IPC good practices;
- To support healthcare facilities to develop or strengthen IPC programmes and strategies through the provision of evidence- and consensus-based guidance that can be adapted to the local context, while taking account of available resources and public health needs.

1.4 Target audience

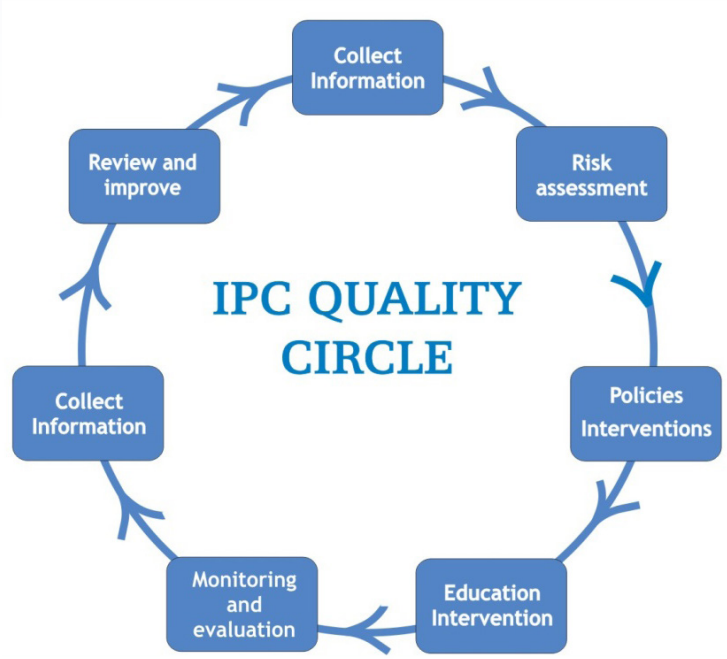
These guidelines are intended to support IPC improvement at the national, regional, facility level and the regulatory body, both in public services and private sector.

- At the national level: policy-makers responsible for the establishment and monitoring of national IPC programmes and the delivery of AMR national action plans within the ministry of health.
- At Regional level: management and those in charge of planning, developing and coordinating the implementation of IPC programmes at the facility level and act as a liaising body between national and facility level
- At facility level: management and those in charge of planning, developing and implementing local IPC programmes including primary care, long-term care and congregate settings.
- Regulatory bodies and allied organizations, including academia, national IPC professional bodies, non-governmental organizations involved in IPC activity and civil society groups; and water, sanitation & hygiene (WASH) forum in the country.

1.5 The IPC Quality Cycle

The IPC Quality Cycle also known as Quality Circle shown below provides key steps to enhance effective IPC interventions in health facilities.

Figure 1: IPC Quality Cycle.



Infection Prevention and Control is achievable through collaborative efforts with other programs, partners (technical or financial), public and private sectors. It is of paramount importance that Healthcare facilities execute Infection Prevention and Control policies supported by institutional management. An overall approach to an IPC policy at healthcare facility level is based upon:

- Co-ordination;
- Management;
- Information, Education and Communication (IEC);
- Continuous availability of essential equipment and supplies;
- and Surveillance.

CHAPTER 2

2.0 Basic Epidemiology

2.1 Epidemiology

Epidemiology is the study of the dynamic occurrence, distribution, and determinants of health-related events in specified populations. Epidemiology defines the relation of a disease to the population at risk and involves the determination, analysis, and interpretation of rates. The epidemiology of Healthcare-Associated Infections (HAIs) explains the occurrence of HAIs among patients cared for in a healthcare facility and the magnitude of the problem in these settings.

A comprehension of the infectious disease process is necessary for the understanding of the spread of infections in healthcare facilities. The spread of infection requires three elements: the source of infecting organisms, a susceptible host, and a means of transmission for the micro-organism.

2.2 The Epidemiological Triangle/Infectious Disease Process

2.2.1 Source

The source of the infecting agent may be patients, staff or visitors. It may include persons with the active disease those in the incubation period of the disease or those who are colonized by the infectious agent but have no apparent disease (carriers). Other sources could be the patient's own endogenous flora which may be difficult to control, and inanimate environmental objects that have become contaminated, including equipment and medications.

2.2.2 Host

The susceptible host is the second element in the spread of infection. Persons lacking effective resistance to a particular micro-organism are susceptible to those micro-organisms. Some patients may be immune or able to resist colonization by an infectious agent. Others exposed to the same agent may establish a commensal relationship with the infecting micro-organism and become asymptomatic carriers and still, others can develop clinical disease.

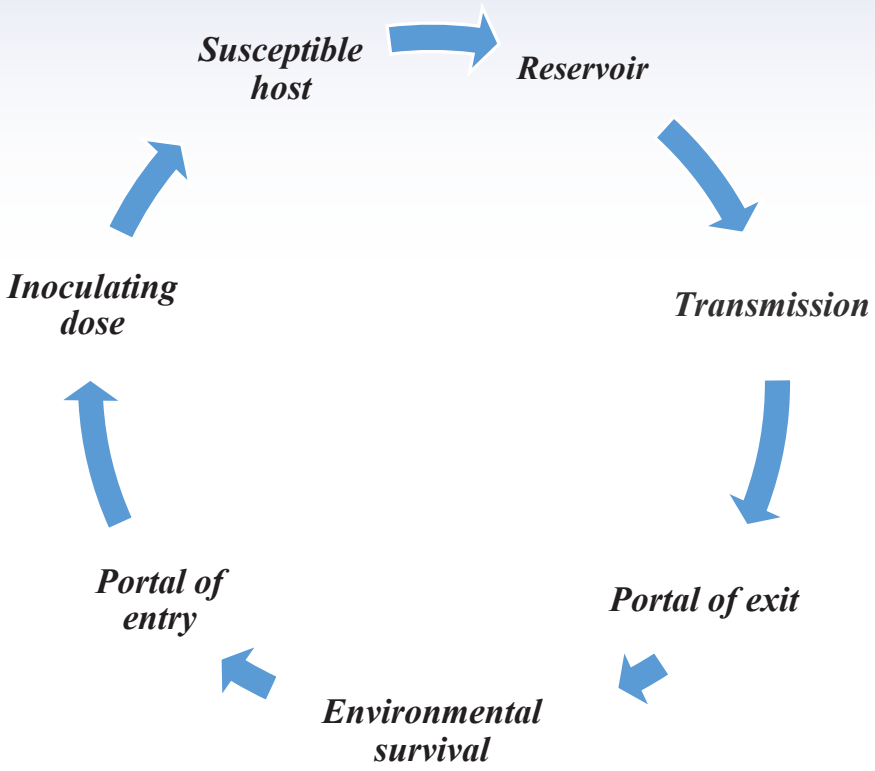
Host features such as age, underlying diseases (such as diabetes), and certain treatment with microbial, corticosteroids, or other immunosuppressive agents; irradiation and breaks in the first line of defence mechanisms caused by factors as surgical operations, anaesthesia and indwelling catheters may render patients more susceptible to infection.

2.2.3 Transmission

Micro-organisms are transmitted in healthcare facilities by several routes and the same micro-organisms may be transmitted by more than one route. There are four main modes of transmission.

- Contact
- Droplet
- Airborne
- Vector-borne

Figure 2: The Chain of Infection.



CHAPTER 3

3.0 IPC Organisational Structures and Human Resources

3.1 Core IPC components

It is important to institutionalise effective IPC structures with clearly defined roles and responsibility at all levels of the health system to plan and implement IPC as well as respond to disease outbreaks and other public health emergencies. The World Health Organization recommends the following as the core IPC components:

1. IPC programme.
2. Development, dissemination and implementation of evidence-based guidelines.
3. IPC education and training.
4. HAI Surveillance, including microbiological laboratory support.
5. Multimodal strategies for implementing IPC activities.
6. Monitoring, audit, and feedback of IPC practices.
7. Workload, staffing and bed occupancy.
8. Promotion of water, sanitation, and hygiene (WASH) infrastructure, equipment and services.

3.1.1 IPC programme

An IPC programme is a set of coordinated activities that seek to prevent or minimize the risk of infections among healthcare workers, patients, visitors and communities. Successful IPC programmes are based on understanding the facility's problems and needs, prioritizing activities, and using available resources effectively. The principal activities of the IPC programme include but are not limited to:

1. Ensuring the practice of basic IPC measures such as standard and expanded precautions.
2. Educating and training of healthcare workers.
3. Educating patients and their relatives on IPC related to their condition.
4. Protecting healthcare workers, e.g. medical screening and immunization.
5. Identifying hazards and minimizing risks.
6. Promoting routine practices such as aseptic techniques in clinical procedures.
7. Promoting the rational use of antimicrobials.
8. Ensuring effective work practices and procedures, such as environmental management practices including management of hospital/clinical waste, support services (e.g., food, linen) and use of therapeutic devices.
9. Surveillance of healthcare-associated infections.
10. Incident monitoring and outbreak investigation.
11. Ensuring infection prevention and control in specific disease situations and conditions.
12. Advocacy, communication, social and resource mobilisation.
13. Research.

3.1.2. Multimodal strategies for implementing IPC activities

The evidence shows that using a multimodal strategy, an approach that comprises implementing a set of three or more IPC components (e.g. instituting an IPC programme; education and training of service providers; surveillance, monitoring and evaluation) collectively and continuously maximizes outcomes and behaviour change.

The IPC programme at all levels should assess and working with key stakeholders, design a practical and implementable multi-modal strategy that can achieve sustainable behaviour change in the health workforce, patients and community.

A summary of the WHO multimodal improvement strategy can be found in Annex 1. A brief explanation of the other core components is provided in Chapter 3.1.

3.2 IPC Governance Structure

3.2.1 Responsibilities and Authority

There are various levels of responsibility and authority for Infection Prevention and Control in healthcare facilities and other settings, including communities.

3.2.2 Levels of Responsibility

3.2.2.1 Ministry of Health

The National IPC team is responsible for monitoring, reviewing and updating of the IPC policies and guidelines. The team is also responsible for the integration of the IPC program at a pre-service level in collaboration with partners and learning health institutions.

The regulatory bodies (allied health professionals e.g. Medical, Dental and Nursing councils), Education/ Training Institutions have the responsibilities for ensuring that the respective pre-service curriculum reflects adequate and appropriate content of IPC.

The roles and responsibilities of the IPC programme management unit shall be to:

1. Lead the formulation of policies, strategies and standards for IPC.
2. Advise the MOH on issues relating to IPC.
3. Provide technical support to IPC teams in the respective regions.
4. Ensure that standards are adhered to, in the design and construction of health facilities.
5. Liaise with procurement unit and end-users in the purchasing of equipment and supplies for IPC.
6. Liaise with Human Resource Department on training programmes for IPC.
7. Provide information, education and communication on IPC.
8. Institute systems to monitor and evaluate the implementation of IPC activities at all levels of service delivery.
9. Conduct and coordinate research relevant to IPC.
10. Ensure healthcare facilities budget for IPC in their annual plans.
11. Play advocacy and resource mobilisation roles for IPC activities.
12. Perform any other functions related to IPC.

Membership of the National Technical Working Group or Committee shall include:

1. National Referral Laboratory Representative
2. Clinician/Medical Officer.
3. Public Health Specialist.
4. IPC Focal person representing regions.
5. Bio-Medical Engineer / Officer.
6. Pharmacist.
7. The IPC National Coordinator.
8. Occupational Health and safety
9. Representatives from National Referral Hospitals.
10. Representative from regulatory agencies (EEA, SWASA)
11. Representative from health training institutions and other MOH programmes (NTCP, SNAP, Health Promotion, Epidemiology, EPR, Environmental health, WASH forum, National Quality Assurance, Research unit, M&E) and Development/Implementing partners

3.2.2.2 Regional Health Management Team (RHMT)

RHMT is responsible for monitoring its facilities under its control in all health-related activities including monitoring implementation and compliance to IPC standards and ensuring that adequate and appropriate resources are available.

The Regional IPC committee shall:

1. Ensure the implementation of IPC programmes and policies.
2. Provide technical support to IPC teams in their respective regions.
3. Collaborate with relevant bodies in training on IPC.
4. Conduct research.
5. Monitor and evaluate IPC activities at the regional levels.
6. Disseminate information on IPC programmes.
7. Advise on procurement of equipment and consumables for IPC.
8. Encourage healthcare facilities to budget for IPC in their annual plans.
9. Play advocacy and resource mobilisation roles for IPC activities.
10. Perform any other function(s) related to IPC.

Membership of the team shall include:

1. Regional IPC focal person from a regional hospital.
2. Biomed / Maintenance officer.
3. Clinician / Medical Officer.
4. Representative from Administration and Finance (Principal Health Administrator (PHA) Office)
5. Principal Pharmacist.
6. Laboratory technologist/technician.
7. Development / Implementing partners based in the region
8. Other members that may be co-opted (e.g. IPC focal person from hospitals)
9. Environmental Health Officer

3.2.2.3 Healthcare Facility

Healthcare facilities and settings are responsible for effective and efficient implementation of IPC standards, policies and guidelines. The IPC Committee is responsible for coordination, monitoring implementation and evaluation.

3.2.2.4 Hospitals and Health Centres

IPC programme will oversee all IPC activities. The Senior Medical Officer of each facility shall be responsible for IPC and shall establish a Team or Committees for IPC. IPC programmes shall be an integral part of the facility Quality Management Department. The IPC programme should be integrated into other relevant programmes under Public Health such as Environmental and Occupational Health, the TB and HIV programmes and Communicable Disease Control.

The roles and responsibilities of the team shall be to:

1. Ensure the implementation of policies on IPC.
2. Advise on procurement of equipment and consumables for IPC.
3. Ensure the maintenance of IPC equipment.
4. Monitor, supervise and evaluate IPC activities.
5. Liaise with in-service training coordinators on training programme(s) in IPC at the facility.
6. Provide advice on IPC and related matters.

7. Disseminate information on IPC.
8. Play advocacy and resource mobilisation roles for IPC activities.
9. Encourage the healthcare facility to budget for IPC in annual plans.
10. Perform any other functions related to IPC.

The composition of the IPC team may vary but shall include the following:
1. Senior Medical Officer / Head of hospital or representative.
2. Hospital Administrator or representative.
3. Hospital Matron.
4. IPC Focal Person.
5. Representative from departments (e.g. TB, ART, MNCH, senior orderly, mortuary, laundry, incinerator, kitchen, etc.).
6. Pharmacist / Pharmacy personnel.
7. Laboratory technologist/technician.
8. Biomedical representative.
9. Co-opt other member as necessary.
10. Environmental Health Officer

The hospital IPC focal person should oversee the day-to-day IPC activities, including the coordination and organisation of agreed plans. The focal person should have dedicated time to carry out IPC activities. The World Health Organization (WHO) recommends that there must be a full-time IPC nurse to oversee every 250 beds in a health facility.

IPC focal person duties are to:
1. Provide guidance and facilitating the surveillance of health activities at health facility level
2. Advising on the management of at-risk patient and healthcare workers to isolation categories and prevention as well as control measures.
3. Advise and be involved in the supply and usage of IPC supplies
4. Monitor the level of quality standards of practices and prompt reporting
5. Serve as secretariat/coordinator for the IPC team in each health facility
6. Conduct institutional trainings and coordinate the facility IPC activities
7. Participate and advise the PTCs on IPC activities, particularly selection, use of antimicrobials, disinfectants and antiseptics
8. Participate and advise in the procurement of IPC commodities and PPE.

3.2.2.5 Clinics

The multidisciplinary teams (MDTs) of Clinics are responsible for IPC and should nominate a Focal Person for IPC. The roles and responsibilities of the team or Focal Person shall be to:
1. Ensure the implementation of guidelines on IPC.
2. Advise on procurement of equipment and consumables for IPC.
3. Ensure the maintenance of IPC equipment.
4. Monitor, supervise and evaluate IPC activities.
5. Liaise with relevant in-service training coordinators on training programme(s) in IPC at the health facility.
6. Provide advice on IPC and related matters.
7. Disseminate information on IPC.
8. Perform any other functions related to IPC.

3.2.2.6 Healthcare Personnel

All categories of healthcare personnel at the individual level are responsible and accountable for effective and efficient implementation of the IPC policies and guidelines.

3.2.3 Community /Community Representative

Community representatives– Community Volunteers, Non-Governmental Organisations (NGOs) and Community Based Organisations (CBOs) have a role to play in IPC. The relevant Community Health Worker (CHW) shall be in charge of IPC activities under the supervision of the health facility/clinic head.

3.2.4 General Hospitals and Health Centres Standard (SZNS 008: 2012)

3.2.4.1. The hospital will implement a hospital-wide infection control program, with quality management and improvement programme. The programs will then be integrated with the organisation's overall programme for quality management and improvement. It should include at least the following:

1. Definitions of healthcare-associated infections, a system for reporting, monitoring, evaluating, and investigating infections;
2. Review and evaluation of aseptic, isolation, and sanitation techniques;
3. Methods for isolation in relation to the medical condition involved;
4. Preventive, surveillance, and control procedures;
5. Review, monitoring and evaluating of antimicrobial use in infection prevention and control;
6. Laboratory services;
7. An employee health program;
8. The orientation of all new employees; and
9. Documented in-service training and education for all departments and services related to infection prevention and control.

3.2.4.2. The organisation should establish those epidemiologically important infections, infection sites, and associated devices that will provide the focus of efforts to prevent and reduce the incidence of healthcare-associated infections.

3.2.4.3. The organisation should identify the procedures and processes associated with the risk of infection and should identify and implement reduction strategies.

3.2.4.4. Personal Protective Equipment, disinfectants and barrier techniques should be available and used correctly.

3.2.4.5 The organisation should provide education on IPC practices to staff, doctors, patients, and, as appropriate, family and other caregivers.

3.2.4.6 IPC reporting data should be incorporated into the hospital quality improvement process.

3.2.4.7 There should be written IPC policies and procedures for each area of the hospital, including requirements dictated by the physical layout, personnel and equipment involved.

3.2.4.8. There should be written policies and SOPs for the selection, storage, handling, use, and disposition of disposable or reusable items.

1. Reusable items should have specific policies and procedures for each type of reuse item.
2. Data on reusable items should be incorporated into the quality improvement process.

3. Data on reusable items should be incorporated in the hospital infection control identification and reporting process.

3.2.4.9. The organization should direct and control risk management programmes which include health and safety programme that comply with legislation.

3.2.4.10. There should be a comprehensive IPC programme focusing on the health of both patient and healthcare workers.

The IPC program should integrate with occupational health and safety program which have the following key components:

1. Occupational Health and safety policy
2. Conducting risk assessment and developing risk management plan
3. Delegation of responsibilities (Safety health representative/committee)

3.2.5 Safety Health Environment program:

3.2.5.1. Comprehensive IPC practices should be adhered to in each healthcare facility and community

3.2.5.2. IPC in the healthcare facility and community should be effectively and efficiently supervised and supported by appropriate and adequate resources

3.2.5.3. Standard Precautions and post-exposure prophylaxis should be implemented when there is potential contact with the following:

1. Blood
2. All body fluids, secretion and excretions
3. Non – intact skin
4. Mucous membrane

3.2.5.4. Co–ordination of IPC will be ensured at the National, Regional, facility, and community level. Committees should be formed such that there is representation from all disciplines.

3.2.5.5. All IPC Policies, SOPs and guidelines formulated at other levels should be in line with the National IPC Policies and Guidelines

3.2.5.6. Healthcare workers should report the following to the IPC Committee/ focal person:

1. Situations where the nurse feels that the patient should be isolated but there is no written order for patient isolation.
2. Suspected or confirmed cases of the country's notifiable diseases
3. When there is poor Waste management

3.2.5.7. The Department Supervisor should ensure that all staff, patients and visitors are aware of, and comply with the requirements of Standard Precautions

3.2.5.8. All new staff members should be oriented on IPC policies, SOPs and guidelines

3.2.5.9. Investigating the spread of outbreaks in collaboration with all relevant stakeholders.

3.2.5.10. Information on IPC challenges should be presented to management and other relevant structures.

3.2.5.11. There should be routine inspection of the healthcare facilities and the frequency and checklist should be defined at the facility level.

3.2.5.12. Recording and reporting are essential for ensuring information flow and for verifying the status of IPC as well as the status of infections, such as the outbreak of specified diseases in the healthcare facility.

3.2.5.13. Monitoring and surveillance should be conducted to ensure compliance by HCWs with the IPC policies, SOPs and guidelines throughout the Health facility. This is accomplished through a series of audits and quality control activities.

3.2.5.14. The IPC policy guidelines should be integrated with the occupational health and safety programme (OHS) and quality assurance programme (QA), at national, regional and implementation level with clearly defined activities.

3.3 Human resource development for infection prevention and control

3.3.1 Pre-service, in-service and post-basic training/education

To enable appropriate human resource development for IPC, there shall be continuous education and training on IPC for all categories of healthcare staff in the health sector. Training shall be designed to meet the needs of the different categories of health staff and shall be done through:

1. *Pre-service:* The MoH shall ensure that health training institutions, the Statutory Bodies and other Agencies develop and/or update their curriculum on IPC to reflect current evidence.
2. *In-service training:* IPC shall be included in the structured in-service training programme of all facilities.
3. *Post-basic:* The MoH should liaise with post-basic health training institutions (local and international) to explore training IPC specialist.

The MoH shall:

1. Train a pool of health workers to champion the implementation of IPC at the various levels of service delivery.
2. Ensure that all new staff and students on attachment undergo orientation on IPC practices when they are recruited. (Refer to Annex 2 for categories of healthcare worker groups and proposed IPC education and training requirement).
3. Ensure that educational programmes are organised for the staff and patients/clients to sensitize and create awareness on IPC issues.
4. Identify healthcare facilities and set them up as centres of excellence for IPC.

3.3.2 Learning and training materials on IPC

The MOH shall develop training and learning materials as well as flyers, brochures and posters on IPC for all categories of health workers.

3.3.3 Workload analysis and staffing

Understaffing and overcrowding are recognized as major challenges that promote disease transmission. Hospital management should act to ensure appropriate staffing levels that meet patient demand.

3.3.4 Staff dressing or uniform

To ensure effective infection prevention and control and also protect the community, all HCWs should:

1. Change their street clothes or uniform on arrival to the health facility.
2. Wear scrub suits while on duty in the health facility.

CHAPTER 4

4.0 Standard Precautions

Transmission of infections in health facilities can be controlled through the application of basic infection control precautions which can be grouped into Standard Precautions previously known as Universal Precautions. These precautions are designed to reduce the risk of micro-organisms from both recognized and unrecognized sources of infections in health facilities.

These are routine work practices that are essential to provide the highest level of protection to patients, healthcare workers and visitors. These practices should be applied to all patients at all times regardless of diagnosis or infectious status.

These include the following:

1. Hand hygiene
2. Use of appropriate protective clothing/equipment
3. Proper linen management
4. Decontamination (cleaning), Disinfection and sterilization of medical devices between each patient use.
5. Injection safety and handling of sharps
6. Environmental cleaning, disinfection and spills management
7. Proper waste management
8. Collection, handling and transportation of clinical specimen

4.1 Hand hygiene

Eighty percent of pathogen transmission both inside and outside healthcare facilities occurs through hands. Hand cleansing is an effective risk reduction procedure and has become the primary measure of reducing transmission in healthcare facilities.

Hand hygiene is a general term that includes hand washing, use of hand sanitiser, alcohol-based hand wipes or hand rub and surgical hand preparation.

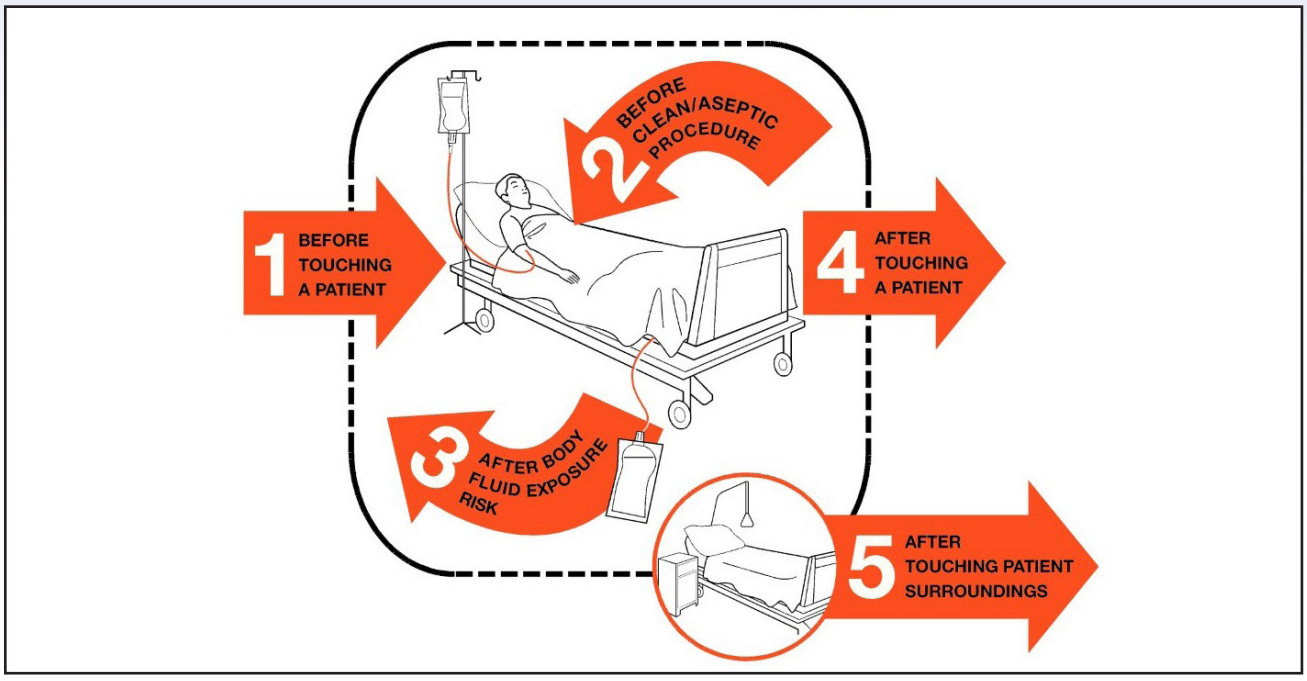
To improve the effectiveness of hand hygiene, the following is recommended:

1. Nails should be short, clean and polish-free, artificial nails/nail extensions are not acceptable;
2. Watches and jewellery should be removed;
3. Sleeves should be short or rolled up;
4. Cuts or abrasions should be covered with waterproof dressings;
5. Be aware of potential skin allergy to hand hygiene products.

General indications for hand hygiene

The World Health Organization has five recommended points in time when hand hygiene should be performed to prevent transmission of HAIs. These recommendations are called “The 5 Critical Moments for Hand Hygiene”.

Figure 3: The five critical moments of hand hygiene.



See also annex 3: Five critical moments hand wash definitions

Table 1: Types of Hand Wash and their Principles

Method	Agent	Purpose	Area	Duration
Routine hand wash	Soap & water	Remove soiling & transient micro-organisms	All surfaces of fingers & hands	40-60seconds
Antiseptic hand wash	Anti-microbial soap & running water	Remove transient micro-organisms & reduce flora	All surfaces of fingers & hands	40-60 seconds
Antiseptic hand rub	Alcohol-based rub, isopropyl, methanol	Remove transient micro-organisms & reduce flora	All surfaces of fingers & hands	20-30 seconds (Until dry)
Surgical hand wash	Water and antimicrobial soap + alcohol-based hand rub	As above	Hands & forearms	2-5 minutes (Brush not recommended routinely)

4.1.1 Types of hand hygiene

The major types of hand hygiene are:

1. Social/routine hand washing.
2. Hygienic hand washing.
3. Alcohol-based and non-alcohol-based hand rubs/wipes (or hand sanitizer).
4. Surgical hand wash/scrub.

4.1.1.1 Routine (Social) hand washing

This is handwashing with plain soap and running water for at least 40-60 seconds to remove most transient germs *(e.g. E. coli)* and soil from the hands. Social handwashing shall be done:

1. Before and after handling or eating food.
2. After visiting the toilet.
3. Before and after attending to patients in situations such as bathing and feeding;

4. When hands are soiled.
5. On arrival to work and after.

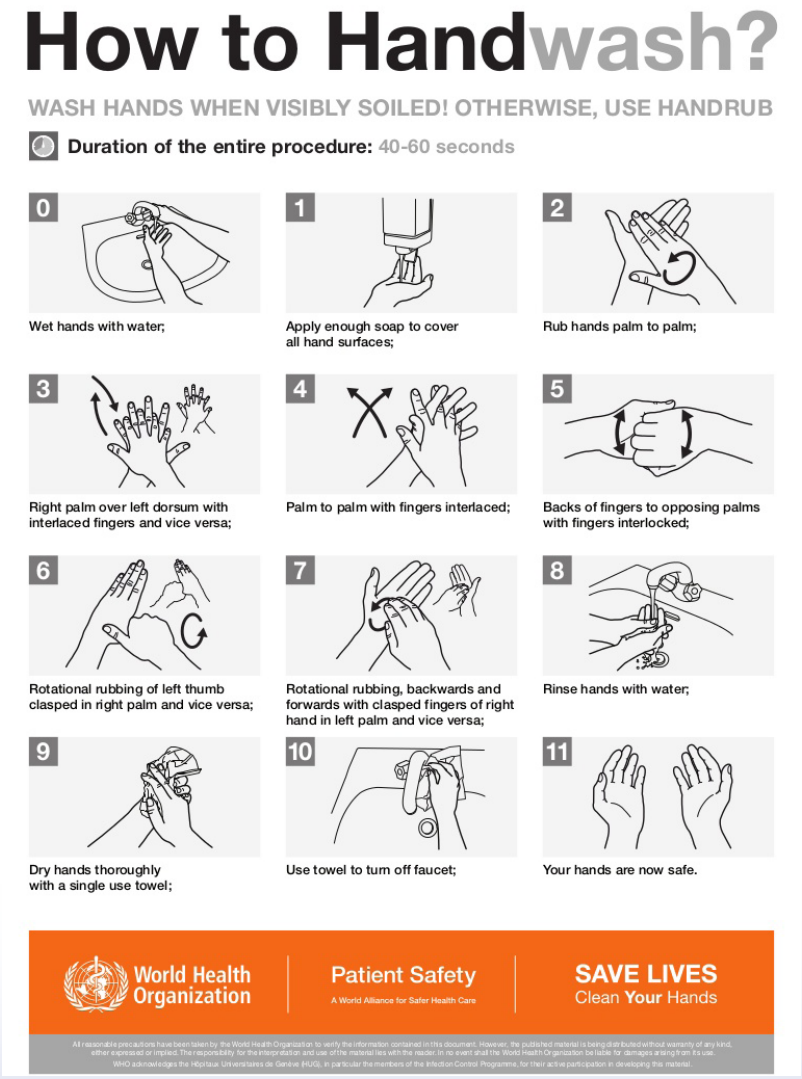
Liquid, bar/cake, leaflet or powdered forms of plain soap are acceptable. When bar/cake soap is used, cut it into smaller pieces and keep in a rack that facilitates drainage of water.

Note: Avoid using hot water as repeated exposure to hot water may increase the risk of dermatitis.

4.1.2 Hands Wash Guidelines

1. Routine hand wash is accomplished by vigorous rubbing together all surfaces of lathered hands followed by thorough rinsing under running water. This should take 40-60 seconds to complete. Hands should be dried with a paper towel.
2. Immediate re-contamination of the hands by touching hand wash basin fixtures may be avoided by using a paper towel to turn off the taps.
3. When running tap water is not available, use a bucket with a tap which can be turned on to wet hands, then off to lather hands and turned on again for rinsing.
4. If a bucket with a tap is not available, a bucket/basin and pitcher can be used to enable running water. A helper can pour water from the pitcher over the hands being washed.
5. Similarly, a bucket /basin and a tea kettle may be used.

Figure 4: Hand Washing Procedure



Hygienic hand washing or hand antisepsis

This involves the use of antiseptic detergents to wash hands for about 40-60 seconds or the use of alcohol-based agents to disinfect hands. Hygienic hand washing or hand antisepsis removes transient micro-organisms and soil and kills or inhibits the growth of resident micro-organisms.

This type of hand hygiene is required:

1. Before performing invasive procedures such as setting intravenous lines, lumbar puncture, and catheterisation.
2. Before and after wearing sterile gloves.
3. After contact with blood, body secretions or following situations in which microbial contamination is likely to occur.
4. Before caring for susceptible (immunocompromised) patients.

When piped water is not available, use one of the following:

1. A bucket with a tap or other tap fitted water storage containers or an overhead water storage tank.
2. A pitcher or a jug to pour water over hands with the help of an assistant.
3. A foot-operated device or "tippy tap".

Figure 5: Bucket with a tap system

Figure 6: Hand washing using a pitcher/jug

Figure 7: Tippy Tap

Note: *Germs grow and multiply in standing water. It is recommended to:*

- *Change water 24 hourly*
- *Clean and if possible, disinfect (high-level disinfection) water storage containers daily*
- *Avoid dipping or washing your hands in a basin that contains standing water, even if an antiseptic solution is added.*

Hand washing using plain soap and water removes microorganisms on the hands. It does not kill them.

4.1.1.2. Alcohol-based and non-alcohol-based hand rubs/wipes (or hand sanitizer)

Alcohol hand rub is only one kind of antiseptic hand rub/wipes. It kills or inhibits the growth of transient and resident germs but does not remove germs or soil. This method can be used when hand washing with antiseptic and running water is not possible or practical as long as hands are not visibly soiled with dirt, blood or other organic materials. If hands are dirty, wash with soap and running water. To reduce the build-up of emollients on hands after repeated use, it is recommended to perform routine (social) hand wash after 6-10 applications of alcohol rub/wipe.

Figure 8: How to apply alcohol-based hand rub.

Note: Alcohol hand rub should be used only when hands are not physically dirty or soiled.

Preparation of alcohol hand rub

Table 2 outlines the recommended procedures for making alcohol-based hand rub in health facility pharmacies

Table 2: Preparing Alcohol-Based Hand rub

Formula 1: **To produce final concentrations of ethanol 80% v/v, glycerol 1.45% v/v, hydrogen peroxide (H2O2) 0.125% v/v: Pour into a 1,000-mL graduated flask:** • **Ethanol 96% v/v,** • **833.0 mL** • **H2O2 3%, 41.7 mL** • **Glycerol 98%, 14.5 mL** **Top up the flask to 1,000 mL with distilled water or water that has been boiled and cooled; shake the flask gently to mix the contents. Formulation**
Formula 2: **To produce final concentrations of isopropyl alcohol 75% v/v, glycerol 1.45 v/v, hydrogen peroxide 0.125% v/v: Pour into a 1,000-mL graduated flask:** • **Isopropyl alcohol (with a purity of 99.8%), 751.5 mL** • **H2O2 3%, 41.7 mL** • **Glycerol 98%, 14.5 mL** **Top up the flask to 1,000 mL with distilled water or water that has been boiled and cooled; shake the flask gently to mix the contents. v/v=volume percent, meaning 80 parts absolute alcohol in volume and 20 parts water measured as volume, not as weight**
In low-resource settings: **Add 2mls glycerine to 100mls 60-90% of alcohol solution**
NB: All dilutions should be made in the pharmacy

Note: Do not "top up" alcohol-based dispensers as this practice may lead to bacterial contamination.

4.1.3 Guidelines on the use of other non-alcoholic based hand rubs

There are other agents that are non-alcohol based that are useful in the prevention of diseases. The active agents used in these agents such as Chloroxylenol (also known as para-choro-meta-xylenol -PCMX) and Triclosan. These agents are in the form of rinses, foams, wipes and towellettes. Examples are Hibistat, Steri 7. They are useful where hand washing facilities are inadequate, impractical or inaccessible (e.g. ambulances, home care, mass immunization, OPD, antenatal clinic, etc.) and also in situations where water supply is often interrupted (e.g. planned disruptions, natural disasters).

Benefits include:

1. Fragrance-free
2. Non-flammable
3. Do not irritate the skin
4. Do no damage surfaces
5. Break through dirt
6. Can be applied to wounds
7. Contain organic compounds
8. Have moisturizer
9. More cost-effective
10. Leave no residue with use

They are not effective if hands are soiled with dirt or heavily contaminated with blood or other organic material. They should be used according to the manufacturer's recommendations.

Surgical hand wash/scrub

This involves the use of antiseptic detergents to wash hands for 3-5 minutes. Hands must be washed from the fingers to the elbows. If an alcoholic preparation is used, two applications are recommended. Surgical hand washing should be done before all surgical procedures. The procedures for surgical hand wash/scrub is as follows: (See figure 9).

Step 1: Remove all jewellery on your hands and wrists.

Step 2: Wet your hands and forearms thoroughly.

Step 3: Holding your hands up above the level of your elbow, apply the antiseptic.

Step 4: Clean under each fingernail with a nail brush. It is important for all surgical staff to keep their fingernails short. Using a circular motion, begin at the fingertips of one hand and lather and wash between the fingers, continuing from fingertip to elbow. Repeat this for the second hand and arm. Continue washing in this way for 3-5 minutes.

Step 5: Rinse each arm separately, fingertips first, holding your hands above the level of your elbow.

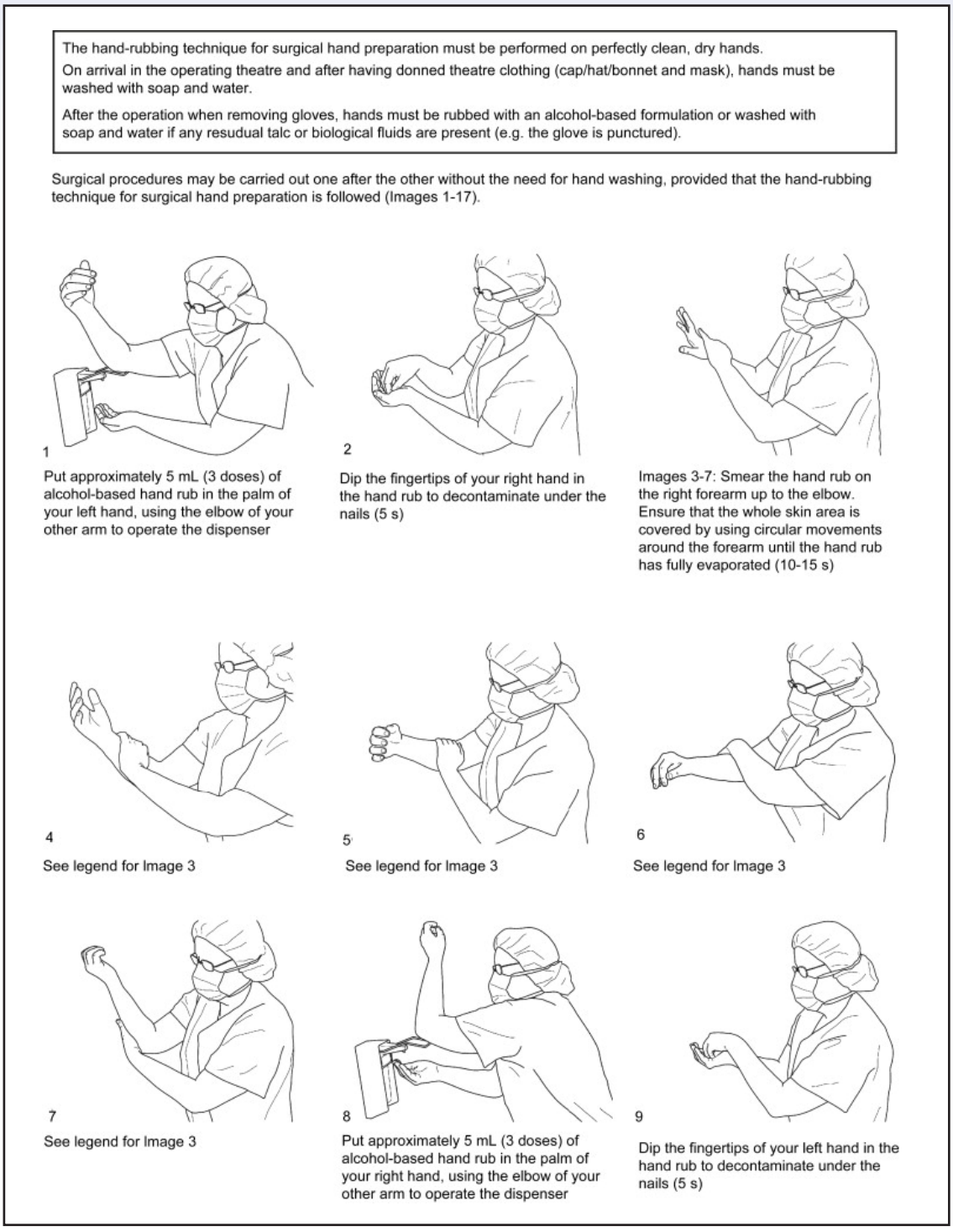
Step 6: Using a sterile towel, dry your arms – from fingertips to elbow – using a different side of the towel on each arm.

Step 7: Keep your hands above the level of your waist and do not touch anything before putting on sterile surgical gloves.

Hand scrubbing technique for a surgical procedure

1. Routine hand wash is accomplished by vigorous rubbing together all surfaces of lathered hands followed by thorough rinsing under running water. This should take 40-60 seconds to complete. Hands should be dried with a paper towel, a single-use cotton towel. (In case there is no material to dry the hands, leave your hands to air dry)
2. Immediate re-contamination of the hands by touching hand wash basin fixtures may be avoided by using a paper towel to turn off the taps.
3. When running tap water is not available, use a bucket with a tap which can be turned on to wet hands, then off to lather hands and turned on again for rinsing.
4. If a bucket with a tap is not available, a bucket/basin and pitcher can be used to enable running water. A helper can pour water from the pitcher over the hands being washed.
5. Similarly, a bucket /basin and a tea kettle may be used.

Figure: 9 Hand scrubbing technique for surgical procedure



NB: SKINCARE

1. Frequent handwashing and gloving can irritate the skin.
2. Lotions can ease the dryness resulting from frequent hand washing. It also helps prevent dermatitis from frequent glove use.
3. Staff responsible for processing instruments who have open sores or cuts on their hands or forearms should not clean instruments until the lesions are healed.

Alcohol hands rub or Hand sanitizer

1. Alcohol hand rub should have 70% alcohol (2% chlorhexidine and 70% isopropyl alcohol). Explore other alcohol alternatives.
2. Can be used when handwashing with soap and running water is not possible, as long as hands are not soiled with visible dirt, blood, and other organic material.

Hand wash products /commodities

1. The use of bar soap in healthcare settings is highly discouraged, but if need be, provide soap racks, for drainage and keeping the soap dry
2. Liquid hand wash products should be stored in closed containers and dispensed from either disposable containers, or containers that are washed and dried thoroughly before refilling
3. All dilutions should be done in the pharmacy
4. The antimicrobial soaps must be periodically changed if used to prevent the development of resistance from organisms
5. The hand wash basin should be dedicated only for washing hands and be deep enough to avoid splashing
6. The elbow taps should be placed in such a way that the operator can manipulate them easily and there should be clearly displayed steps on carrying out handwash
7. Ordinary taps (still found in the facilities) can be turned off with a paper towel used for hand drying before discarding
8. Handwash liquid soap should be wall-mounted and hand drying facilities should be provided close by with ample supply of paper towels (or similar) for drying hands
9. There should be no topping up of liquid soap at ward level

4.2 Personal Protective Equipment

These include:

Gloves Guidelines

There are different types of gloves, namely:

1. *Sterile Surgical* (single use) - for sterilized procedures such as surgical operation
2. *Examination Disposable* gloves - for a single use e.g. latex gloves
3. *Domestic* gloves (light utility) - for washing patient's used items, contaminated surfaces, cleaning instruments, handling linen, wiping up blood and body fluid spillage
4. *Heavy-duty/Utility* gloves - reusable gloves for decontamination of large equipment, removal of healthcare waste including sharps container cleaning of floors, walls, healthcare facility furniture such as beds.

1. Gloves are worn as an additional protective measure, not as substitutes for hand wash.
2. Gloves are not required for routine activities, where contact is limited to a patient's intact skin.
3. Gloves should be changed between activities and procedures with the same patient after contact with materials that may contain high concentration of micro-organisms. For example, after handling an indwelling catheter or suctioning an endo-tracheal tube to prevent cross-contamination of body sites.

4. Clean non-sterile gloves are to be worn
    i. For examinations and non-surgical procedures
    ii. For contact with blood, body fluid, secretions, and excretions, mucous membrane, draining wounds or non-intact skin (open skin lesions or exudative rash)
    iii. For handling items visibly soiled with blood, body fluid, secretions or excretions when the healthcare worker has open skin lesions on the hands.
    iv. When the healthcare worker has no-intact skin on his/her hand
    v. For surgical procedures, invasive procedures
5. Gloves should be removed before moving to another patient.
6. Gloves should be removed immediately after the completion of care or a specified task, at the point of use and before touching clean environmental surfaces.
7. Hands should be washed and dried immediately before and after removing gloves.
8. Always check gloves for damage, expiry date before using them and use correct size which is appropriate for the particular procedure.

NB: All Gloves require to be well-fitting to enhance protection.

Protective Eye Wear (Goggles) Guidelines

1. Protective eyewear, goggles, face shields should be worn to protect the service provider, where exposure to fluid is anticipated, such as delivery, suctioning an unconscious patient, etc.

Protective Eye Wear

2. Eye wear that is appropriate for the procedure should be worn and discarded according to the manufacturers' instructions.

Mask Guidelines

There are two types of masks, namely: Recommended surgical Mask -

1. *Surgical masks* - surgical masks have large pores and lack an airtight seal around edges. Some are fluid resistant and are effective for short periods of time after which the microbial barriers are broken when the mask becomes moist from the user' breathe. Surgical masks are indicated in preventing the transmission of respiratory infections and minor splashes. Surgical masks have been designed to resist fluids to varying degrees depending on the design of the material in the mask.

Recommended Surgical Masks

2. *Paper mask* - very thin and porous and offer no protection to the user. NB: These are strongly discouraged because they give a false sense of security.
   Masks should be worn where appropriate to protect the mucous membranes of the nose and mouth during the procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions and excretions.

Apron Guidelines

The plastic aprons are widely used in healthcare facilities to prevent contamination of clothing from splashes

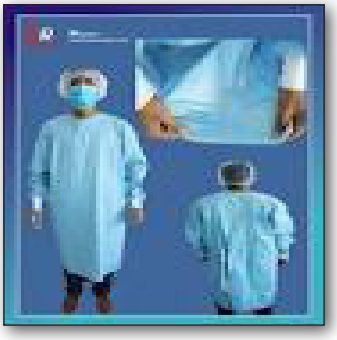
Disposable Plastic Aprons

1. Each apron should be worn and secured before patient contact. After using the apron should be ripped off, reel inside out and discarded.
2. If circumstance calls for re-use, the apron should be wiped with alcohol after each use, and allowed to dry thoroughly for the next use.

Over coats that also offer a certain level of protection among HCWs. (E.g. Doctors and laboratory staff)

Cotton or Disposable Gowns Guidelines

The use of gowns is usually restricted to Operating Theatres since they offer little protection in the general wards and healthcare areas. They are not recommended for IPC practices unless they are worn in combination with a plastic apron on the inside.



Disposable Cotton Gowns

1. Gowns should be worn to protect the skin and prevent soiling of clothing during procedures that are likely to generate splashes of blood, body fluid secretions and excretions.
2. Gowns should be used for protective isolation.
3. Gowns should be worn within the area for which they are intended.
4. Disposable gowns and aprons should be used once and discarded in an appropriate receptacle.
5. Generally, if both gloves and gown are worn, the gown should be worn first.

Safety Boots/Clogs Guidelines

1. Clean and disinfect reusable boots regularly after every splash.

Overshoes/ Disposable Shoe Covers Guidelines

1. Do not reuse disposable shoe covers. They should be discarded in the appropriate receptacle.

Overshoes are not the best protection unless water resistant.

NB: If personal footwear requires protection it is best to change into safety boots or clogs. If circumstances call for use of overshoes it should be water-resistant.

Head covering/ Headgear Guidelines

1. Caps or headgear should be worn to prevent hair from:
    i. Falling into the patients' wound
    ii. Falling into food for food handlers
    iii. During the processing of sterile equipment
    iv. For sterile fluid production units in pharmacy
    v. For protection from splashes of contaminated fluids

Respirators Guidelines

N95 Respirators *(Healthcare particulate respirators)* are made out of multiple layers of paper with sheets of porous plastic in between. N95 are one of the commonly available kinds of respirators, which reduce chemical, vapour and microbial aerosol inhalation. Some may have filtration rate of 99.7% and prevents particles of 03 microns from being inhaled.

Respirators used to protect spread of disease through inhalation

1. Commonly used for diseases which spread through inhalation, which include open/active pulmonary tuberculosis (TB), measles, chicken pox, pulmonary plague and haemorrhagic fever with pneumonia.

Fit testing:

i. The respirator should ideally be fit tested on each healthcare worker's facial contours.
ii. In the absence of the fit testing systems, the healthcare worker should make sure the respirator is moulded to fit the facial contours which minimize air leaks.
iii. Ensure the respirator is fitted properly by inspiration and check that air does not escape between the face and the respirator every time it is worn.
iv. A well-fitted respirator can be used by the HCW for up to four weeks or until it is damaged.
v. When removing the N95, the HCW should use a disposable paper towel and hold the respirator while the elastic holders are carefully removed.
vi. Respirators should never be stored in a plastic bag.

NB: A well-fitting respirator is uncomfortable to use over prolonged periods of time and should be used when undertaking risk-prone procedures and should never be used by patients.

Guidelines on wearing a respirator:

1. Remove the respirator from the container holding it by its ties
2. Place on face over the nose
3. Tie or hinge the top and mould the bridge of the nose
4. Pull to cover the lower part of the face under the skin
5. Securely tie the lower ties

NB: Follow manufacturer's instructions on wearing a respirator.

4.2.1 Guidelines for Personal Protective Equipment (PPE)

The use of PPE provides a physical barrier between micro-organisms and the one wearing it. It reduces the chances of exposure, but not completely eliminating the risk of acquiring infection.

Availability of PPE and adequate training for its proper usage are essential. The following principles guide the use of PPE:

1. PPE should be chosen according to the risk of exposure. IPC focal person in collaboration with relevant officers should assess and address areas that could expose others to contaminated air, blood, body fluids, excretions or secretion and choose the items of PPE according to the risk of infection.
2. Avoid any contact with contaminated (used) PPE, surfaces, clothing or people outside the patient care area.
3. Discard the used PPE in appropriate disposal bags and dispose of as per the policy of the facility.
4. Do not share the PPE, use it effectively, correctly and at the right time.
5. Use PPE within restricted areas to avoid harbouring of more infections and change PPE after use.
6. PPE does not replace the need to follow Standard Precautions. E.g. hand hygiene before and after the use of gloves.

4.3 Patient placement

Place patients who pose a risk for transmission of infections to others (e.g. patients with uncontained secretions, excretions or wound drainage; infants with suspected viral respiratory or gastrointestinal infections) in a single-patient room when available. If single-patient rooms are not available, place patients with similar diseases in the same room.

Determine patient placement based on the following principles:

1. Route(s) of transmission of the known or suspected infectious agent.
2. Risk factors for transmission in the infected patient.
3. Risk factors for adverse outcomes resulting from health-associated infections in other patients in the area or room being considered for patient placement.
4. Availability of single-patient rooms.
5. Patient options for room-sharing (e.g. cohorting patients with the same infection).

The standard for bed occupancy is one patient per bed with adequate spacing (1 - 2 meters) between patients.

4.4 Decontamination (Cleaning, Disinfection and Sterilisation)

The goals of safe reprocessing of medical devices include:

1. Protecting patients, visitors, caretakers and staff from infection risks via medical devices and equipment;
2. Eradicating or significantly reducing the number of microorganisms on medical devices and equipment;
3. Minimizing damage to medical devices from foreign material (e.g. blood, body fluids, saline and medications) or inappropriate handling;
4. Ensure the healthcare facility meets the Ministry of Health requirements and fulfills its responsibility to provide a safe environment for patients, visitors and staff.

To minimize this risk, there are certain principles and processes that must be applied to ensure that all instruments and/or equipment have been properly reprocessed and rendered safe for re-use

Table 3: Levels of reprocessing of medical devices.

Key term	Definition
Cleaning	The step required to physically remove contamination by foreign material (e.g. dust, soil) to prepare a medical device for disinfection or sterilization. Pre-cleaning occurs prior to clean if medical devices are grossly contaminated.
Contamination	The soiling of inanimate objects or living material with harmful, potential infectious or unwanted matter.
Disinfectant	A chemical agent that is capable of killing most pathogenic microorganisms under defined conditions, but not necessarily bacterial spores. It is a substance that is recommended for application to inanimate surfaces to kill a range of microorganisms. The equivalent agent, which kills microorganisms present on skin and mucous membrane, is called an antiseptic.
Disinfection	A process to reduce the number of viable microorganisms to a less harmful level. This process may not inactivate bacterial spores and some viruses.
Medical device	Any instrument, apparatus, appliance, material or other article, where used alone or in combination, intended by the manufacturer to be used in humans for the purpose of the diagnosis, prevention, monitoring, treatment or alleviation of – or compensation for – an injury or handicap.
Pre-cleaning	This is cleaning at the point of use; rinsing gross organic material (e.g. blood clot, vomitus, stool) off and placing in a container.
Reprocessing	All steps that are necessary to make a contaminated reusable medical device ready for its intended use. These steps may include cleaning, functional testing, packaging, labelling, disinfection and sterilization.
Sterilization	A validated process used to render an object free from viable microorganisms, including viruses and bacterial spores

4.4.1 Cleaning

Cleanliness forms the basis of sound IPC. The main purpose of cleaning is to remove visible dirt, reduce the level of micro-organisms and to minimize the dissemination of infectious agents.

1. Cleaning, disinfection, and sterilisation are the backbone of Infection Prevention and Control.
2. Proper cleaning is essential before any disinfection or sterilization process.
3. Failure to sterilise or disinfect reusable medical devices properly may spread infections.
4. The type and level of device decontamination depend upon the nature of the item and its intended use.
5. Thermal decontamination is safer and more effective than chemical decontamination.
6. Steam sterilization is effective only when preceded by thorough pre-cleaning, proper packaging/loading, and careful monitoring of autoclaves. All reusable devices must go through a rigorous processing system. Each step should be clearly laid out in a standard operating procedure (SOP).
7. Decontamination includes both cleaning and disinfection of medical devices before sterilization

Cleaning Steps

1. Wear heavy-duty rubber gloves, a plastic apron, eye protection, and mask during cleaning.
2. Soak the instruments in normal tap water containing a detergent.
3. Scrub instruments and other items vigorously to completely remove all foreign material using a soft brush, and water. Hold items under the surface of the water while scrubbing and cleaning to avoid splashing. Disassemble instruments and other items with multiple parts, and be sure to brush in the grooves, teeth, and joints on items where organic material can collect and stick.

4. Flush through lumens thoroughly and with an adapted water jet if possible.
5. Rinse items thoroughly with clean water to remove all detergent. Any detergent left on the items can reduce the effectiveness of further processing.
6. Inspect items to confirm that they are clean.
7. Allow items to air dry or dry them with a clean towel if chemical disinfection is going to be used. This is to avoid diluting the chemical solutions used after cleaning. Items that will be high-level disinfected by boiling or steaming do not need to be dried.

Cleaning area must:

1. Have a wide sink dedicated to cleaning devices, with proper fittings
2. Running hot and cold water must be available
3. Have an available clear surface to allow items to dry
4. Have correct detergent and chemicals – clearly labelled with contents and expiry dates
5. Have good ventilation
6. Have storage area
7. Have doors leading to cleaning area labelled with a biohazard sign in place

Clean instruments with soap and water before disinfection because:

1. Organic matter such as blood, faeces and body fluid are difficult to remove after exposure to chemicals or heat.
2. Organic matter may inactivate certain disinfectants.
3. Organic material allows micro-organisms to thrive and also protect them during sterilization and disinfection process.
4. It prevents organic matter and chemicals damaging equipment.
5. It renders safety to handle for inspection before further processes.

Cleaning Guidelines

1. Healthcare workers should receive adequate training and periodic refresher trainings.
2. Healthcare workers should wear appropriate personal protective equipment (PPE).
3. Healthcare workers should receive adequate prophylactic vaccinations.
4. Effective cleaning and pre-cleaning of devices should be done through the use of chemicals, combined with mechanical action and heat. It can be performed manually or with machines.
5. Equipment should be regularly checked and maintained.
6. Reusable items should be disassembled safely and cleaned as soon as possible to prevent any contaminants from drying.
7. After cleaning or disinfection, items should be rinsed and flushed thoroughly to remove any chemical residues and then dried.
8. All reprocessed items should be stored properly to prevent damage or recontamination.

Cleaning of instruments and other medical devices

A thorough cleaning should always precede disinfection and sterilization of instruments and other medical devices. There are two methods of cleaning. These are:

1. Manual cleaning
2. Mechanical cleaning

Manual cleaning

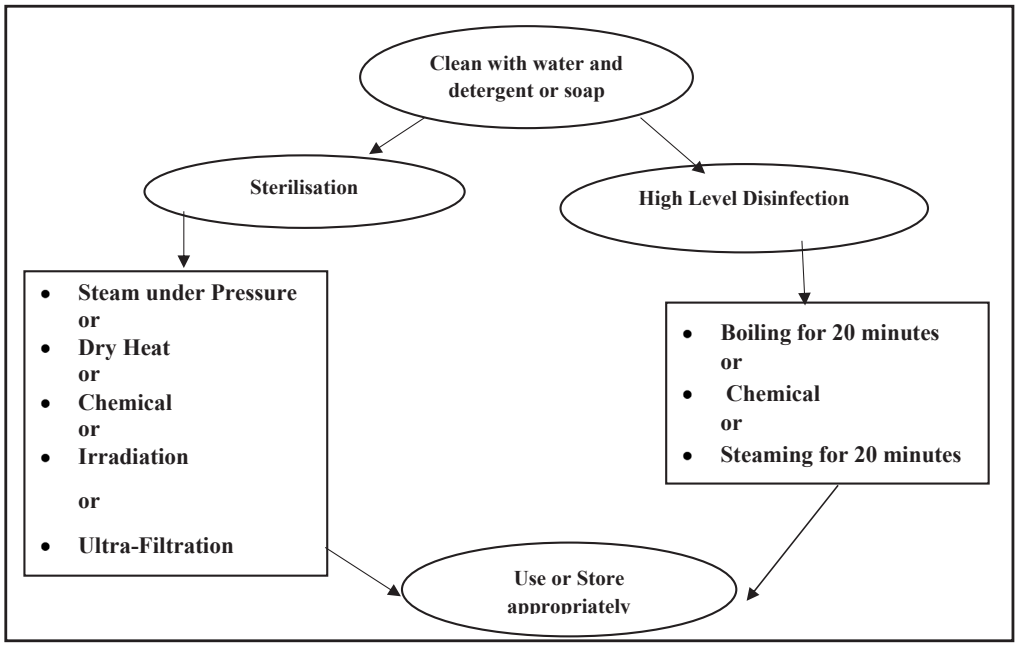
This refers to the cleaning of devices with the hands. It must be done with extreme caution by adhering to the following steps:

1. Wear the appropriate utility gloves, plastic apron, face and eye protection when necessary and dismantle all items requiring disinfection or sterilisation before cleaning. Use tap water for the initial washing.
2. Using a soft brush, detergent (preferably, the liquid form) and water, firmly brush off all debris, keeping the brush below the surface of the water. Be sure to brush the grooves, teeth and joints of the items where organic materials can collect.
3. Rinse items finally in clean, water to remove all detergent. Any detergent left on the items can reduce the effectiveness of further chemical processing. Allow to air dry or dry them with clean towel before disinfection or sterilisation.

Instruments that will be further processed with chemical solutions must dry completely to avoid diluting the chemicals. Items that will be boiled or steamed do not need to be dried first.
0.5% CHLOROX FOR DECONTAMINATION IS NO MORE RECOMMENDED

Clean and disinfect brush after use by soaking, fully submerged in 0.5% chlorine solution, for 10 minutes. Then rinse clean and dry.

Figure 10: Steps on processing used medical devices.



4.4.2 Disinfection

It is a process which reduces the numbers of pathogenic microbes except spores to a level that is not harmful to human health

Disinfectants

'Disinfection' means to reduce the number of pathogens on an inanimate surface or object using heat, chemicals, or both. Most disinfection procedures have little activity against bacterial spores, any reduction in the spore load is mainly achieved by mechanical action and flushing.

Three Types of Disinfectants

1. **High-level disinfectants**
   i. Kill bacteria, viruses, fungi, mycobacterium tuberculosis, but not necessarily all bacterial endospores. Some high-level disinfectants are also chemical sterilant and given enough time, will destroy bacterial endospores.
   ii. Are used for processing instruments and other items that are semi critical.

2. **Intermediate level of disinfectants**
   i. Kill mycobacteria, most virus and bacteria
   ii. Recommended for use on blood and other potentially infectious materials
   iii. Small non-lipid virus (e.g. enterovirus) may be resistant
   iv. Used for some non-critical items and devices or environmental surfaces

3. **Low-level disinfectants**
   i. Kill some bacteria and some viruses and fungi, but do not kill Tuberculosis – causing micro-organisms and bacterial endospores.
   ii. Are used for cleaning surfaces, such as floors and countertops

The effectiveness of the disinfectants is when:
   i. Used in proper concentration
   ii. Used within stipulated lifetime after dilution
   iii. Used on clean, rinsed, and dried instruments/equipment. Protein material detergents and soap will inhibit some disinfectants
   iv. Not harmful to the instrument/equipment on which it is used
   v. Kills or inhibit the growth of the undesirable micro-organism

Table 4: Spaulding's classification of equipment decontamination

CATEGORY	DEFINITION	LEVEL OF MICROBICIDAL ACTION	METHOD OF DECONTAMINATION	EXAMPLE OF COMMON ITEMS/ EQUIPMENT
High (Critical)	Critical objects enter normally sterile tissue or vascular system, or through which blood flows.	Kills all microorganisms.	Sterilization by heat or chemical sterilants. (Steam, ethylene oxide, gas hydrogen peroxide plasma, etc. or using ≥2.4%, glutaraldehyde-based formulation 7.5% stabilized hydrogen peroxide, 0.2% peracetic acid).	Surgical instruments and devices, urinary catheters, cardiac catheters, implants, needles and syringes, dressing, sutures, delivery sets, dental instruments, rigid bronchoscopes, cystoscopies, etc.

CATEGORY	DEFINITION	LEVEL OF MICROBICIDAL ACTION	METHOD OF DECONTAMINATION	EXAMPLE OF COMMON ITEMS/ EQUIPMENT
Intermediate (Semi-critical)	Semi-critical objects come in contact with mucous membranes or non-intact skin.	Kills all microorganisms except high numbers of bacterial spores.	High-level disinfection by heat or chemicals.	Respiratory therapy & anaesthesia equipment, flexible endoscopes, vaginal specula, laryngoscope blades and airways, reusable bedpans and urinals, equipment, etc.
Low (Non-critical)	Non-critical objects will come in contact with intact skin only.	Kill vegetative bacteria, fungi and lipid viruses.	Low level disinfection (cleaning). (Ethyl or Isopropyl alcohol (70-90%); Chlorine (0,01-0,05%); Phenolic and Quaternary Ammonium germicidal detergent solutions).	Crutches, beds, ECG leads; bedside tables, walls, floors and furniture, toilet seats, baths, basins, theatre table, etc. Blood pressure cuff, crutches, stethoscopes, Bed side commode.

In summary, any patient care item can be categorised into one of three levels, low, intermediate or high based on the risk of the item transmitting micro-organisms, this informs the level of decontamination required; cleaning, disinfection (low, intermediate or high level) and sterilisation.

For the effective reprocessing of medical devices and equipment cleaning must precede both disinfection and sterilisation.

The effectiveness of the disinfectants is when:

1. Used in proper concentration
2. Used within stipulated lifetime after dilution
3. Used on clean, rinsed, and dried instruments/equipment. Protein material detergents and soap will inhibit some disinfectants
4. Not harmful to the instrument/equipment on which it is used
5. It Kills or inhibits the growth of the undesirable micro-organism

KEY LEARNING POINT: Do not soak instruments in disinfectants prior to cleaning

Soaking instruments in disinfectants such as 0.5% chlorine prior to cleaning equipment is not recommended as it damages the instruments, is ineffective at removing the soil, and may contribute to development of antimicrobial resistance to disinfectants.

Table 5: Bleach Dilutions

Hypochlorite solution of 0.5%, 1% and 2% available chlorine				
Product	**Chlorine Available**	**How to dilute to 0.5%**	**How to dilute to 1%**	**How to dilute to 2%**
Sodium hypochlorite (liquid bleach)	3.5%	1-part bleach to 6 parts of water	1-part bleach to 2.5 parts of water	1-part bleach to 0.7 parts of water
Sodium hypochlorite (liquid)	5%	1 part bleach to 9 parts water	1 part bleach to 4 parts water	1 part bleach to 1.5 parts water

Note: Bleach solution becomes unstable rapidly, hence it needs to be freshly prepared daily or changed on becoming dirty/turbid. Chlorine bleach can be corrosive. Protect metal instruments by thoroughly rinsing them with water after soaking for 10minutes.

Figure 11: The Cycle of Reprocessing of Instruments

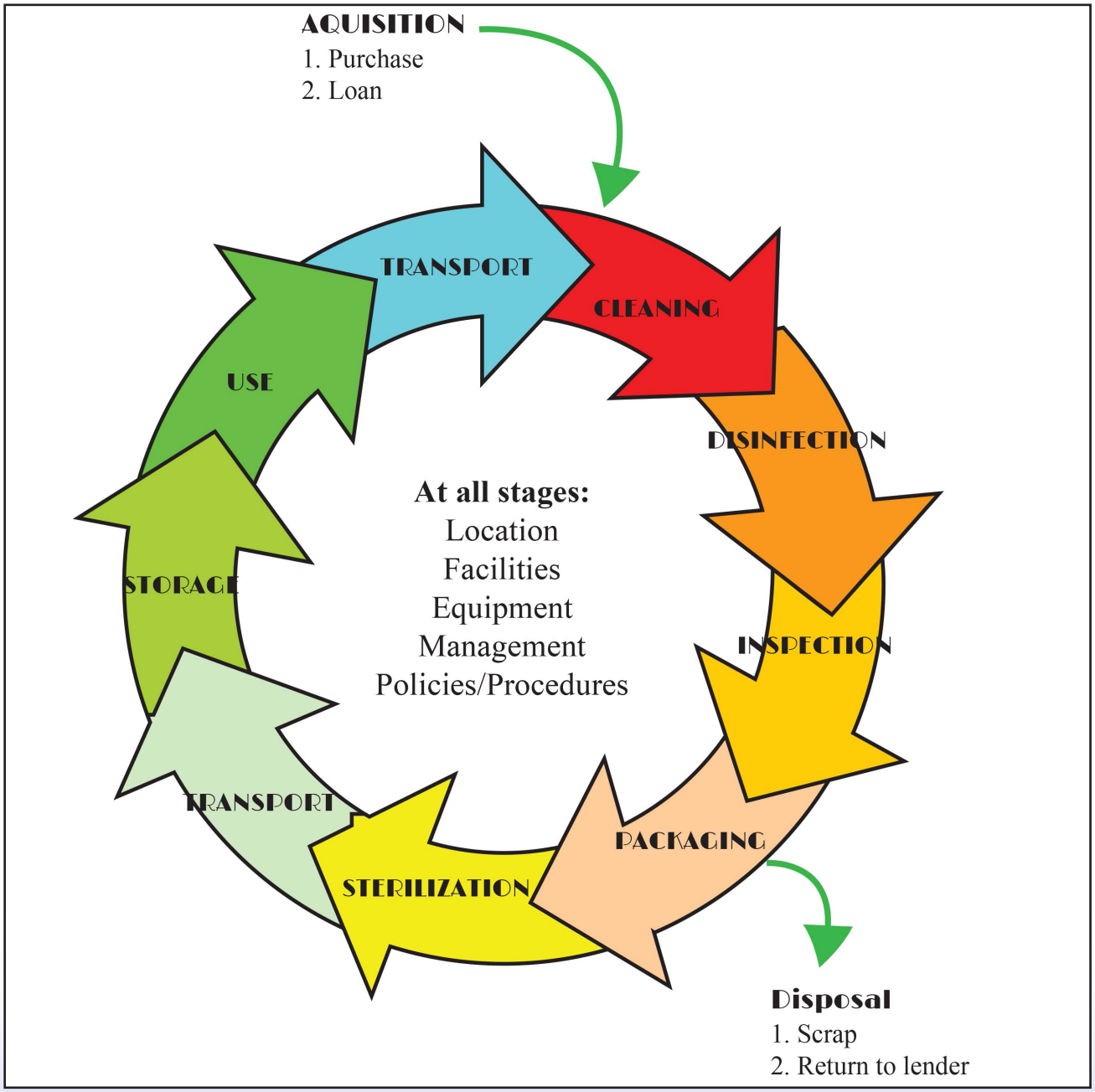
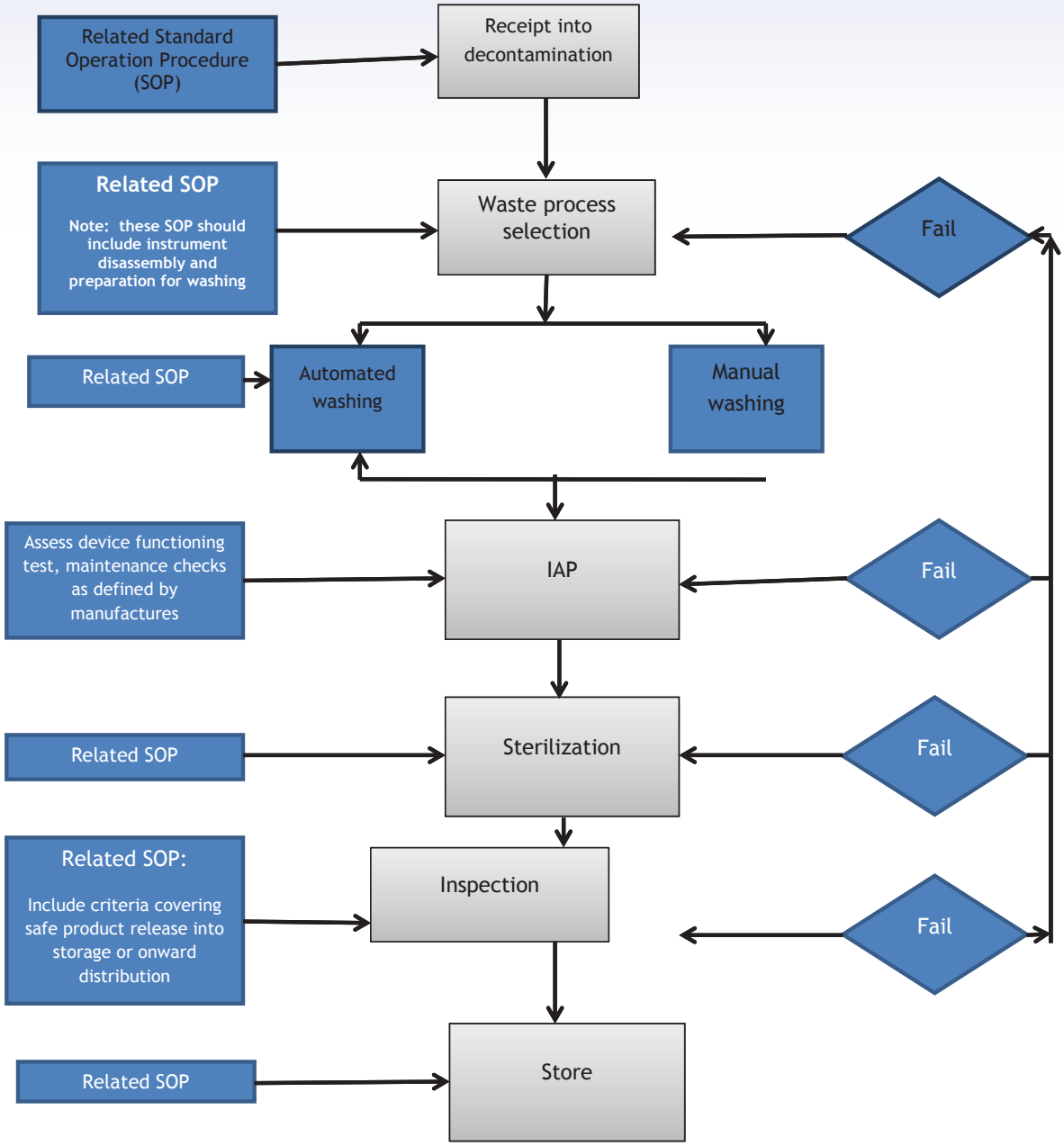


Figure 12: The Diagram of Reprocessing of Instruments in the CSSD.



4.4.3 Sterilisation

The destruction of all micro–organisms can be achieved by either physical or chemical methods. Sterilisation is any process that can inactivate all microorganisms on an object. Heat is the most reliable sterilant, most surgical instruments are heat-resistant.

i. Moist heat, when used as steam under pressure in an autoclave, kills microbes by denaturing their proteins.
ii. Dry heat in an oven kills by oxidation, which is a much slower process.

1. Dry heat is used to sterilise moisture-sensitive materials (powders) or items which steam cannot penetrate (oils and waxes).
2. Heat-sensitive items require low temperature sterilisation; ethylene oxide (EO) gas, hydrogen peroxide gas plasma and steam-formaldehyde are often used for this purpose.
3. All Sterilised items must be stored in a clean, dust-free, and dry place and the integrity of the wrapping must be protected.

Steam Sterilisation

Steam is the most reliable means of sterilisation. It is non-toxic (when generated from water free of volatile chemicals). It also has a broad-spectrum microbicidal activity and good penetrating ability, while being cheap and easy to monitor for efficacy.

Autoclaves are specially designed chambers in which steam under pressure produces high temperatures. They are based on the same principle as pressure-cookers.

There are two main types of steam sterilisers:

i. *In gravity (downward) displacement autoclaves* - steam is introduced at the top of the chamber to purge out the cooler and denser air
ii. *Steam mixture* - steam is introduced from the bottom of the chamber.

Sterilisation precautions

1. Ensure the instrument can withstand the process (e.g. steam under pressure)
2. Ensure that the instrument has been adequately cleaned.
3. Ensure that the instrument does not require any special treatment.
4. Ensure that records of the sterilisation process and for the traceability of instruments are kept.

Instruments and equipment will only be sterile if one of the following sterilizing processes is used:

1. Steam under pressure (moist heat)
2. Dry heat
3. Ethylene oxide
4. Automated environmentally sealed low-temperature Peracetic acid.
5. Hydrogen peroxide plasma and other chemical sterilant systems or sterilant.
6. Irradiation sterilizing method is designed to give a sterility assurance level of at least one in a million or 10-6 (see glossary) as long as the process is validated and is according to the manufacturers' guidelines.

Mechanical cleaning

1. Washing machines, washer-disinfectants and ultrasonicators could be used if they are available.
2. Staff must have adequate training on the use of the machines and must follow manufacturer's instructions strictly in operating them.
3. If in doubt, seek advice on how to use the machine.

4.4.4 Disinfectants and disinfecting instruments

Disinfection can be achieved by the use of disinfectants and antiseptics.

1. Disinfectant - is a chemical agent used to kill or destroy most disease-causing microorganisms on non-living objects such as instruments and surfaces.
2. Antiseptic - is a chemical agent safe enough to be used on the skin and mucous membrane to kill or destroy microorganisms.

Disinfectants and antiseptics shall always be used as specified by the manufacturer's instructions to obtain maximum effect. Suggested areas/items and samples of disinfectants and antiseptics that could be used are outlined in Table 6.

Table 6: Areas/items and sample of disinfectants and antiseptics that could be used.

Area or Item	Disinfectant	Antiseptic
Dirty wound (wound dressing)		Normal saline Potassium permanganate
Surgical scrub, skin disinfection		Povidone, Chlorhexidine (Hibiscrub), Chlorhexidine + Cetrimide (Savlon) 70% Alcohol rub(ethyl and isopropyl)
Cleaning blood spillage, utensils, equipment	Hypochlorite (Chlorine) 0.5%	
Skin		Diguanides, 70% Alcohol rub, Chloroxylenol (Dettol) Non-alcohol based preparations
Working surfaces	Alcohol, Chlorine + Detergent	
Floors	Phenols, Hypochlorite (Chlorine) 0.5%	
Chemical sterilisation of endoscopes	Glutaraldehyde, peracetic	
Hand washing		Detergents/soap Antiseptic hand wash e.g. hibiscrub Quaternary ammonium compounds
Serum, antibiotics preparation, culture media	Ultrafiltration	

4.5 Injection safety

Safe injection practices are part of Standard Precautions and are aimed at maintaining basic levels of patient safety and provider protection. As defined by the World Health Organization, a safe injection does not harm the recipient, does not expose the provider to any avoidable risks and does not result in waste that is dangerous for the community.

4.5.1 Basic Principles of Injection Safety

Patient Safety

1. Prevention of reuse of injection equipment
2. Reduction of unnecessary injections

Health Workers' Safety

1. Needle Stick Injuries (NSI) prevention (training, safety engineered devices, sharps boxes)
2. Hepatitis B vaccination,
3. Provision of Post Exposure Prophylaxis (PEP) in case of needle stick injury

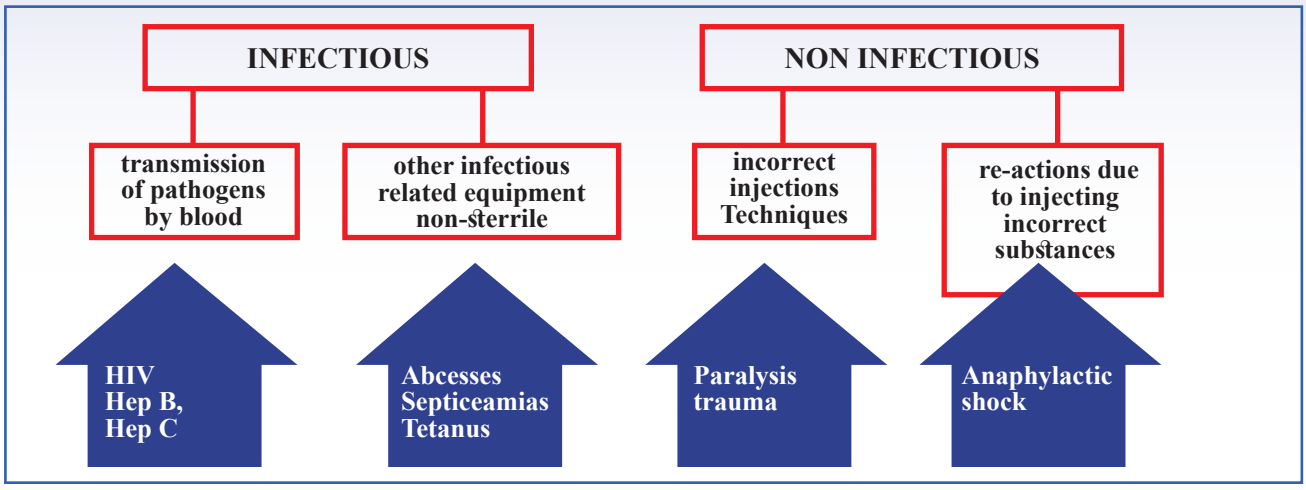
Community Safety

1. Proper healthcare waste management

Safe injection is an injection that should:

1. not harm the person who receives it
2. not expose the provider to any avoidable risk
3. not result to hazardous waste for the community

Figure 13: Consequences of Injection Risk



4.5.2 Injection Safety Recommendations (SIGN – Safe Injection Global Network)

1. Never use medication packaged as a single used vial for more than one patient
2. Assign medications packaged as multi-use vials to a single patient whenever possible
3. Do not use bags or bottles of intravenous solutions as a common source of supply for more than one patient
4. Follow proper infection control practices during the preparation and administration of injected medications
5. For syringes and needles use once and discard
6. Consider a syringe or needle contaminated, after it has been used to enter or connect to a patient's intravenous infusion bag or administration set
7. Do not puncture a vial with a used syringe or needle
8. The surgical mask should be worn when placing a catheter or injecting material into the spinal canal or subdural space
9. Avoid recapping needles, but if a needle must be recapped, use a single-handed scoop technique

Steps of Safe Injection

There are 7 general principles to consider when providing safe injections.

Table 7: General principles for safe injections

No.	General principle	Key points
1.	Clean workspace	• A clean and organized work station is vital in preventing contamination and necessary for safe preparation
2.	Hand hygiene	• Healthcare workers must always perform hand hygiene before preparing injections and after giving an injection
3.	Sterile injection material	• Carefully inspect the packaging before opening – discard the syringe and needle if the packaging has been damaged or is moist.
4.	Sterile medications and diluent	• Carefully inspect the packaging before opening – discard the syringe and needle if the packaging has been damaged or is moist. • Always use a syringe and needle from a new and sealed package (sterile). • Use of auto-retracting syringes is highly recommended.
5.	Skin cleaning/ preparation	• Use appropriate skin disinfection when performing injections and drawing blood draw: a) Routine (70% alcohol) b) For cultures or donation (2% Chlorhexidine in 70% alcohol)

No.	General principle	Key points
6.	Sharps collection	• Never re-cap or remove needles from syringes. • Sharps containers should be located at the point of care for easy access. • Always place sharps directly into sharps containers; once ¾ full, close and seal shut. • Store sharps container in a secure place until final disposal/treatment. • Do not recycle disposable needles and syringes. • Sharps must be segregated at the source of generation.
7.	Waste management	• Eliminate sharps by an effective, safe and environmentally appropriate manner and ensure that all persons are protected against possible exposure.

All waste management practices shall comply with Eswatini Policy and Guidelines on Healthcare waste management.

4.5.3 General guidelines for giving parenteral medication

1. Perform hand hygiene prior to handling all parenteral material.
2. Follow manufacturer's guidelines for the expiration date, storage, use, and disposal of pharmaceuticals
3. Use aseptic technique to avoid contamination of sterile injection equipment and medication.
4. DO NOT administer medications from a syringe to multiple patients.
5. Inspect the syringe and needle package for breaks. Discard syringe and needle if the package has been punctured, torn, damaged by exposure to moisture, or if it has expired
6. Check the vial to be sure there are no leaks or cracks if so discard.
7. Check the diluent to be sure it is not cloudy and that there is no particle in it if so discard.
8. Wipe the top of the vial with a fresh cotton swab soaked with 60-70% alcohol and allow it to dry.
9. Use a sterile, single-use disposable syringe and needle for each injection and discard whilst intact in a puncture-resistant, leak-proof sharps container immediately after use
10. Prepare each injection in a designated clean area where blood and body fluid contamination is unlikely.
11. Use single-dose medication vials, pre-filled syringes, and ampoules when possible.
12. DO NOT administer medications from single-dose vials to multiple patients or combine leftover contents for later use.
13. Never leave one needle inserted in the vial cap or infusion bag for multiple uses as this increases the risk of contamination of the fluid between each use.
14. Most medicines especially, antibiotics are unstable when constituted and should not be stored for more than 24 hours.
15. Use fluid infusion, and administration sets (giving sets) i.e., intravenous bags, tubing and connectors for one patient only and dispose of appropriately after use.
16. Consider a syringe or needle/cannula contaminated once found opened.
17. If using an ampoule that requires a metal file to open, protect fingers with a clean barrier (e.g., small gauze pad) when opening the ampoule.
18. Not more than one vial of a multi-dose medication should be opened at a time in each patient care area.
19. NEVER re-enter a vial or infusion bag with a needle or syringe used on a patient even if for the same patient.
20. As much as possible, DO NOT use bags or bottles of intravenous solution as a common source of supply for multiple patients.
21. For medications requiring reconstitution, add a label, which must include:
    i. Date and time of preparation.
    ii. Type and volume of diluent (if applicable).
    iii. Final concentration.
    iv. Expiry date and time.
    v. Name and signature of the person reconstituting the drug.

22. For medications that DO NOT require reconstitution, add a label, which must include:
    i. Date and time of first piercing the vial;
    ii. Name and signature of the person first piercing the vial.
23. Discard multi-dose vials:
    i. If sterility or content is compromised;
    ii. At expiry date/time;
    iii. Without antimicrobial preservatives within 24 hours of opening;
    iv. With antimicrobial preservatives according to the manufacturer's recommended expiration date on the vial;
    v. All undated, improperly stored multi-dose vials inadvertently contaminated are perceived as contaminated immediately upon discovery regardless of the expiration date.

Multi-dose ampoules

Use of multi-dose ampoules poses a serious risk of infection. As much as possible use single-dose ampoules or where practicable discard multi-dose ampoules after a single use.

When giving injections:

24. Unexpected client motion at the time of injection can lead to accidental needle sticks. Therefore, always alert patients/clients when you are about to give them an injection.
25. To protect patients/clients, always use proper client preparation when giving an injection.
26. Use appropriate PPEs for insertion of catheters or injection of material into spinal or epidural spaces via lumbar puncture procedures e.g. myelogram, spinal or epidural anaesthesia.

4.6 Handling linen and textile

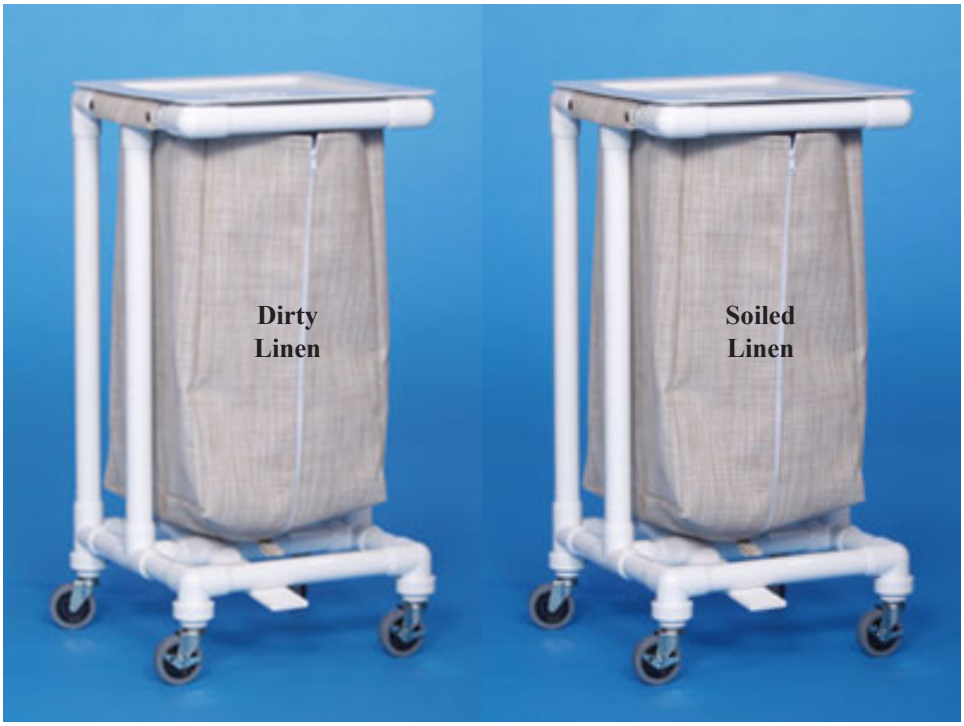
Processing linen consists of all the steps required to collect, transport, sort, launder (wash, dry and fold or pack), store and deliver clean linen for client care. Healthcare facilities may launder their soiled or dirty linen in-house or contract it out to companies that have specialized in this work. Regardless of where the soiled/dirty linen is processed, the following infection prevention and control recommendations must be applied. Updated guidelines for handling, transporting and processing exposed linen should be considered in a manner that prevents skin and mucous membrane exposures and contamination of clothing and avoids the transfer of pathogens to other people and the environment. The principles of linen handling and storage are based on **"clean management"** as opposed to sterile.

In handling linen, the following must be observed:

1. All laundry units must have:
    i. Separate areas for sorting dirty/soiled linen, folding and storing clean linen.
    ii. Adequate ventilation (6 to 10 air change per hour) and physical barriers (walls) between the clean and soiled linen areas.
    iii. Sufficient tubs, preferably stainless steel, for the separation and soaking of used and soiled linen
2. Laundry staff must be trained and should follow the manufacturer's recommendation with regard to the use of equipment and products.
3. All laundry staff should be trained on guidelines for handling linen and how to use laundry equipment and logistics.
4. Healthcare facility managers and supervisors should ensure that there are adequate numbers of linen for use in the different Chapters. Remember that all used linen are potentially infectious and must be handled with care.

5. Standard Precautions should be observed when handling all laundry. Always wear utility gloves and appropriate protective clothing (minimum heavy-duty utility/household gloves, goggles, apron and boots) when handling used linen.
6. Linen should be handled as little as possible and with minimum shaking to prevent the spread of micro-organisms in the environment.
7. All units/wards should have separate linen bags for "used" and "soiled" linen for laundry.
8. The bags should be appropriately labelled. See Figure 14.

Figure 14: Linen Bags



4.6.1 Laundry procedures

Collecting and sorting of linen

1. Place soiled linen in impervious (leak-proof) bags immediately in the unit/ward and transport to the laundry unit on an appropriate laundry cart.

> ***Note: The storage time for soiled linen before washing is related to practical issues, such as available storage space and aesthetics and not necessarily to infection prevention and control concerns.***

2. Soiled linen in a linen bag or containers with lids or covered carts should be marked
3. "soiled" and well secured. Transportation of soiled linen should be done using an appropriate laundry cart and should not come into contact with the carrier's body during transportation.
4. Sorting of soiled linen must be done at the laundry unit and not in the ward or patient care areas, with personnel wearing all appropriate protective clothing.
5. Soiled linen should not come into contact with health worker's clothes even if they are wearing plastic aprons.

Laundering (washing) linen

The laundering process is designed to remove organic soil and render the linen incapable of causing disease. No microbiology standards exist to define "safe" levels of bacteria in textiles because of the variability in microbial survival, degree of soiling, specific laundering techniques, fabric content, and ability of various organisms to adhere to certain fabrics. Guidelines for the different methods of washing linen are provided in Table 8. Hand washing of all hospital linen is discouraged. Where this is done, specific guidelines shall be followed.

Table 8: Guidelines for washing linen

Machine Washing
Step 1:
• **Wash heavily-soiled linen separately from non-soiled linen.**
Step 2:
• **Adjust the temperature and time cycle of the machine according to manufacturer's instructions and the type of soap or other washing product being used.**
• **Both cold and hot water washing cycles that include bleach reduce bacterial counts in the linen.**
Step 3:
• **When the wash cycle is complete, check the linen for cleanliness.**
• **Rewash if it is dirty or stained. (Heavily soiled linen may require two wash cycles.)**
Hand Washing
Step 1: Wash soiled linen separately from dirty linen.
Step 2:
• **Wash the entire linen in water with liquid/cake/powered soap to remove soiled materials.**
• **Use warm water if available.**
• **Add bleach (e.g. 30–60 ml, about 2–3 tablespoons, of a 0.05% chlorine solution) to washing solution to aid cleaning and bactericidal action.**
Step 3: Check the item for cleanliness. Rewash if it is dirty or stained.
Step 4: Rinse the item with clean water.

NOTE: Decontamination of linen is impractical and often ineffective and so must be avoided because:

i. The 0.5% chlorine is too strong for most fabrics.

ii. Repeated soaking of linen in chlorine, even if diluted, will cause the fabric to deteriorate more quickly.

iii. If required, heavily soiled linen could be pre-soaked in soap, water and Chlorine solution (0.05%) before hand washing. The best protection for health workers responsible for hand washing linen is the use of the appropriate PPE.

4.6.2 Collection and Handling of Linen

1. *Clean linen* - Wash your hands before handling linen and should be transported in an enclosed container/ in a manner that prevents its contamination and ensures its cleanliness. Linen should be stored in a clean room and not easily accessed by unauthorized persons other than health workers.
2. *Sterile linen* - Sterile linen should be handled aseptically and kept at room temperature.
3. *Used Linen/Soiled Linen* - Linen should be handled with a minimum shake-up to avoid aerosolization of pathogenic micro-organism.

4. *Infected linen* - This category of linen is from patients with a specific infection which can potentially infect staff and other patients (linen from isolation rooms).

NB: Place linen at the point of generation in appropriate bags

Table 9: Linen Coding (Colour coded linen bags)

NO.	COLOUR	NATURE
1	Red	**Infectious conditions**
2	Yellow	**Soiled linen**
3	White	**Clean linen**
4	Green	**Dirty linen from special departments (operating theatre, labour and delivery ward)**
5	Blue	**Dirty/unsoiled linen**

Sterile linen

Surgical gowns and linen used in sterile procedures shall be sterilized by steam after the normal washing and drying cycle to destroy any residual spores.

4.6.3 Protection of laundry workers

1. Workers shall protect themselves from potential cross-infection from soiled linen by wearing appropriate personal protective equipment, such as elbow utility gloves and gowns or rubber aprons when handling soiled linens.
2. Utility gloves shall be washed after use, allowed to air dry, and discarded if punctured or torn.
3. Handwashing facilities should be readily available.
4. Personnel should wash their hands whenever gloves are changed or removed.
5. Staff in care areas need to be aware of sharps when placing soiled linen in bags.
6. Workers are at risk of contaminated sharps, instruments or broken glass that may be contained with linen in the laundry bags.
7. All staff, including laundry workers, shall be trained in procedures for the handling of soiled linen.
8. Laundry workers, like other healthcare workers, shall be offered immunization against Hepatitis B periodically.

4.6.4 Linen Transportation

1. Clean linen should be transported and stored in a manner that prevents contamination and ensures its cleanliness.
2. Carts used to transport clean linen should be cleaned with soap and water as well as the recommended disinfectant product in the health facility after each use.
3. Separate carts should be used for clean and dirty linen.

4. Collect soiled linen from the treatment area daily or as needed in waterproof bags, containers with closed lids or covered carts;
5. Dirty/unsoiled linen should be transported in closed containers around the hospital.
6. Separate entry & exit route at laundry, linear flow working area.

4.7 Environmental Cleaning

A clean environment forms the basis of sound IPC practices. Cleaning and maintenance prevent the build-up of soil, dust or other foreign material that can harbour pathogens and support their growth. Environmental cleaning refers to general cleaning of baths, sinks, wash basins, beds, tables, floors, walls, and other surfaces. The use of soap, water and friction is effective, cheap and simple. It can be considered as the first step in the cleaning process.

NB: Develop a cleaning schedule with frequency

4.7.1 General cleaning guidelines

Although certain areas of the facility require special cleaning, the following guidelines generally apply to health facilities. Health facilities shall provide a clean environment by following these procedures and using approved agents for cleaning:

1. Cleaning could be manual or mechanical.
2. Clean and disinfect surfaces that are likely to be contaminated with pathogens that are touched frequently such as bed rails, bed tables, doorknobs, light switches
3. All housekeeping staff shall have structured in-service training once quarterly.
4. Ward/Unit Supervisors and Housekeeping supervisors shall draw up cleaning schedules for the different areas of the ward/unit. These shall be posted at vantage points where all staff responsible for housekeeping can see and closely follow.
5. Housekeeping staff shall wear gloves, (heavy duty/domestic utility gloves) plastic aprons, masks (where applicable) and protective shoes when cleaning.
6. Use a damp or wet mop or cloth for walls, floors and surfaces instead of dry dusting or sweeping to reduce the spread of dust and germs.



7. Scrubbing should be applied in areas such as the bathrooms, toilets, floors, gutters. Scrubbing is the most effective way to remove dirt and germs.
8. Wash surfaces from top to bottom so that debris falls to the floor and is cleaned up last. Clean the highest fixtures first and work downwards. For example, clean ceiling lamps, then shelves, then tables and then the floor.
9. Change disinfectant cleaning solutions whenever they appear dirty. A solution is less likely to kill infectious germs if it is heavily contaminated.
10. Use separate cleaning items (brushes, mops and duster) for high-risk areas which are likely to be contaminated example, toilets.

Thorough cleaning and drying will remove most organisms from a surface. Cleaning is normally accomplished by the use of water, mechanical action and detergent. It may be manual or mechanical (e.g. vacuum cleaner).

4.7.2 Types of cleaning solutions

1. Detergent or plain soap and water

Detergent (term is used interchangeably with soap) is a cleaning product (e.g., bar, liquid, leaflet, or powder) that lowers the surface tension of water, thereby helping to remove dirt and debris. Plain soaps do not claim to be antimicrobial on their label and require friction (i.e., scrubbing) to mechanically remove microorganisms. Antiseptic (antimicrobial) soaps do kill or inhibit growth of some microorganisms, but not all. Detergents are used for low-risk areas (non-patient care areas) and general cleaning tasks. Detergent removes dirt and organic material and dissolves or suspends grease, oils and other matter so it can easily be removed by scrubbing.

2. Disinfectant solution (0.5% hypochlorite solution)

Disinfectants rapidly kill or inactivate infectious germs during the cleaning process. Disinfectants are also used to decontaminate an area (flooding) so that it is safer to clean with a disinfectant cleaning solution. In most settings, a 0.5% hypochlorite solution made from locally available Chlorine is the cheapest disinfectant, but alternatives include commercial disinfectants that contain 5% carbolic acids such as Phenol or Lysol or quaternary ammonium compounds.

Note:

Chlorine solution should never be mixed with cleaning products containing ammonia, ammonium chloride or phosphoric acid. Combining these chemicals will result in the release of a chlorine gas which can cause nausea, eye irritation, tearing, headache and shortness of breath. These symptoms may last for several hours.

4.7.3 Cleaning Patient-Care areas

These areas include operating theatres, procedure rooms, laboratories, wards, OPD such as injection rooms, emergency rooms, toilets and sluice rooms. In these areas, there is a greater potential for contamination with infectious materials for clients, staff and visitors. Such areas must be cleaned with special care using a disinfectant cleaning solution.

PPEs recommendations for cleaning staff:

i. Reusable/disposable plastic aprons (preferably made from thick, liquid-resistant materials)
ii. Impermeable gloves (e.g., heavy duty utility gloves for handling waste or cleaning highly contaminated surfaces
iii. Household utility gloves for other cleaning procedures.
iv. Protective footwear (e.g., rubber boots)
v. In addition, the following may be required in certain circumstances:
vi. Eye and face protection (e.g., face shield, procedure/isolation mask, and eye protection) if splashes are anticipated (such as cleaning up a blood spill or diluting cleaning products)
vii. Long-sleeved, fluid-resistant gown for contact isolation
viii. Long-sleeved, fluid-resistant gown and eye and face protection for droplet isolation (e.g., face shield, procedure/isolation mask, and eye protection)
ix. N95 respirator for Airborne Precautions or if the clean-up procedure is expected to generate infectious aerosols
x. PPE for highly infectious diseases in special circumstances

General guidelines for cleaning

1. Always use appropriate PPE when cleaning.
2. Damp-wipe countertops, tables, drip stands, beds, and trolleys with water and detergent to remove dust that has accumulated at the beginning of each workday.
3. Mop floors thoroughly and clean with disinfectant solution daily and as required
4. Clean operating and procedure rooms, examination tables, trolleys, countertops and any other potentially contaminated surface with a cloth dampened with a disinfectant cleaning solution in-between client.
5. Clean spills of blood or other body fluids immediately.

Special Cleaning

1. Always put on rubber cleaning gloves, boots and plastic apron when cleaning
2. Always start with equipment and clean the floors later
3. Always begin with the least soiled equipment or surfaces
4. Always clean and rinse before disinfecting.
5. Clean systematically which allows cleaning all surfaces without crossing or doubling back over cleaned areas (clean from low to high risks using colour coding materials specific to appropriate areas).

Cleaning Methods

1. *Damp dusting* - wiping of surfaces must always be done with a damp cloth that is dampened in water that contains a detergent.
2. *Mopping* - when a double bucket is used, the solution should be changed more frequently because of increased bio-load.

NB: *Dry dusting* is not recommended in healthcare facilities and it is ineffectual since it only displaces dust from one area to another and increases the dispersal of skin scales.

Toilets and sluice rooms

These areas are usually heavily contaminated and should be cleaned as often as possible with a disinfectant cleaning solution and in accordance with a cleaning schedule. Use a separate set of cleaning items to clean these areas.

Cleaning spills of blood and body fluids on surfaces.

1. Clean up spills of potentially infectious materials immediately. Besides preventing the spread of infections, prompt removal also prevents accidents.
2. Staff cleaning spills must wear appropriate protective clothing.
3. Standard cleaning equipment including a mop and cleaning bucket plus cleaning agents should be readily available for spills and should be stored and sign-posted in an area known to all staff.
4. Procedure for spill management will depend on the following:
    i. Nature of the spill, e.g. blood, urine and faeces.
    ii. Possible pathogens that may be involved.
    iii. Size of the spill i.e. spot, splash, puddle, large spill.
    iv. Type of surface involved i.e. linoleum, carpet, wood, laminated, etc.
    v. The area involved i.e. preparatory laboratory, teaching areas, common access areas, etc.
    vi. Likelihood of bare skin contact with the soiled area.

Small spills: For a small spill, disinfect using a disinfectant cleaning solution and clean.

Large spills: First, remove the visible organic matter with absorbent material e.g. disposable towel or paper and discard into an appropriate leak-proof bin. Disinfect with 1-5% sodium hypochlorite disinfectant, mop and clean the area and allow to air dry.

Large spills of cultures

1. If the spill is a large spill of cultures or concentrated infectious materials, flood with (5% chlorine) solution or available stock strength of chlorine. If feasible, allow the disinfectant to sit for 10 minutes before cleaning. *Protect this area so that it does not create a hazard where someone could slip on the wet floor and get hurt.*
2. Disinfect it again with fresh disinfectant, clean and allow to air dry. A suggested technique when flooding

the spill with germicide is to lay absorbent material down on the spill and apply sufficient germicide to thoroughly wet both the spill and the absorbent material.

3. Do not place a rag over the spill for cleaning up later, someone could easily slip and fall on it.
4. Items used for cleaning must be cleaned. Items such as mops, buckets, and dusters should be decontaminated with a disinfectant (0.5% chlorine) solution, cleaned with detergent and water, rinsed in clean water and dried before reuse.
5. Hands shall be thoroughly washed and dried after gloves are removed.

Cleaning Surgical settings

Surgical settings include operating theatres, ambulatory surgical units, physicians' offices where invasive procedures are done, intravascular catheterization laboratories, endoscopy rooms and all other areas where invasive procedures may be performed.

1. Cleaning procedures shall be completed on a scheduled basis, usually daily.
2. Areas outside the sterile field contaminated by organic debris shall be cleaned as spills or splashes occur.
3. Surgical lights and horizontal surfaces, equipment, furniture and patient transport vehicles shall be cleaned between patients/clients with a clean duster and a low-level disinfectant.
4. Floors shall be cleaned with a low-level disinfectant/detergent, between patients/clients or, depending on the type of procedures carried out, at the end of the day.
5. Counter tops and surfaces that have been contaminated with blood or body fluids capable of transmitting infection shall be cleaned with disposable towels, using an appropriate cleaning agent and water as necessary, (e.g. after each procedure, end of the day, etc.), the surfaces then disinfected with a low-level chemical disinfectant or sodium hypochlorite. Loose or cracked work surfaces should be replaced.
6. All other areas and equipment in the surgical practice setting (e.g. air conditioning grills and/or filters, cabinets, shelves, walls, ceilings, lounges and locker rooms) shall be cleaned according to an established routine.
7. Before any piece of portable equipment enters or leaves the operating theatre, it shall be wiped with the approved disinfectant.

IMPORTANT POINTS TO REMEMBER!

Always use frictional cleaning/scrubbing, the most important way to remove dirt and microbes, for all environmental cleaning procedures. In order to avoid soiling clean areas in the process of cleaning dirty ones, always:

i. Treat the cleaning material as per recommendations.
ii. Change cleaning disinfectant solution after 24 hours **OR** *as per manufacturer's direction whichever is the sooner* **OR** *when obviously dirty.*
iii. Use separate equipment for cleaning contaminated areas, e.g. toilets, isolation rooms.
iv. Wash walls from top to bottom.
v. Change the cleaning solution and wash the equipment between areas or cubicles or when dirty.
vi. Dilute the disinfectant to the correct, prescribed concentration.
vii. Prepare and display simple clear routine housekeeping schedules for all personnel

4.7.4 Cleaning non-patient-care areas

In areas of the facility where clinical services are not provided and processing of instruments and other items does not occur such as the kitchen and administrative spaces, the risk of infections is generally minimal. Routine domestic cleaning is usually satisfactory. These areas shall be cleaned with a duster or mop dampened with detergent and water daily, or when visibly dirty. Avoid the use of carpets in these areas. Routine users of these areas should adhere to strict guidelines to prevent contamination of these areas. Should contamination occur, appropriate cleaning practices shall be done as for patient /client care areas.

4.7.5 Terminal cleaning/cleaning after discharge

Terminal cleaning

Upon discharge of a patient, the room, cubicle or bed-space, bed, bedside equipment and environmental surfaces shall be thoroughly cleaned before another patient is admitted.

1. Terminal cleaning shall primarily be directed toward those items that have been in direct contact with the patient or in contact with the patient's excretions, secretions, blood, or body fluids.
2. Housekeeping personnel shall use the same precautions to protect themselves during terminal cleaning that they would use for routine cleaning. Masks are not needed unless the room was occupied by a patient for whom there were airborne precautions and insufficient time has elapsed to allow clearing of the air of potential airborne organisms.
3. All disposable items shall be discarded immediately in the appropriate receptacle *(see figure 15 – waste containers).*
4. Reusable items that have been in direct contact with the patient or with the patient's excretions, secretions, blood, or body fluids shall be reprocessed as appropriate to the item *(see Chapter 4: 4.7.1).*
5. Bedside tables, bed rails, commodes, mattress covers, and all horizontal surfaces in the room shall be cleaned *(see Annex 8 for guidelines on environmental cleaning and disinfection).*
6. Routine washing of walls, blinds, and curtains is not indicated. These shall be cleaned if visibly soiled *(see Annex 8).*
7. Cubicle/wards curtains should be changed when visibly dirty or when there is contamination.
8. Disinfectant fogging is not a satisfactory method of decontaminating air and surfaces and shall not be used.
9. If VHD is suspected, disinfect and burn all materials used in patient care.

In general, no special cleaning techniques are required for rooms that have housed patients for whom additional precautions were in place.

Special terminal cleaning procedures may be indicated for certain organisms, e.g. Clostridium difficile or diarrhoeal outbreaks. In such cases, thorough cleaning and disinfection with a disinfectant known to be effective against the micro-organism in question should be performed. Attention should be paid to frequently touched surfaces such as doorknobs, call bell pulls, taps, and wall surfaces, which have been frequently touched by the patient.

Terminal disinfection

1. *Walls:* clean with disinfectant cleaning solution.
2. *Beds, lockers and tables and other items in the room:* disinfect using low-level disinfectant.
3. Utensils: clean and wash in soapy water, rinse and dry.
4. *Linen:* change all linen, place in the appropriate bag. If soiled, rinse to remove soiled material and place in an appropriate linen bag.
5. Disinfect plastic covering of pillows and mattresses and air-dry for at least an hour before the next admission.
6. *Equipment:* contaminated, reusable critical items or patient care equipment should be sterilized. Semi-critical patient care equipment shall be sterilized or disinfected after use to reduce the risk of transmission of micro-organisms to other patients. The article and its intended use, the manufacturer's recommendations, the healthcare facility policy, and any applicable guidelines and regulations will determine the type of disinfection. Non-critical equipment contaminated with blood, body fluids, secretions or excretions shall be cleaned and disinfected after using a low-level disinfectant. Contaminated disposable (single-use) patient care equipment shall be handled and transported in a manner that reduces the risk of transmission of micro-organisms and environmental contamination in the healthcare facility. The equipment shall be disposed of according to the institutions' policy and applicable regulations.

4.7.6 Cleaning soiled and contaminated cleaning equipment:

Wet clothes and mop heads are highly contaminated with microorganisms.

1. Sock cleaning equipment, especially mops, that has been contaminated with blood or body fluids by soaking for 10 minutes in a 0.5% chlorine solution. If mops are not available, clean thick towels are preferable.
2. Wash cleaning buckets, rags, brushes and brooms with detergent and water daily or as needed if visibly soiled.
3. Rinse with clean water.
4. Dry thoroughly before replacing them upside down.

4.7.7 Pest control

Cockroaches, flies and maggots, ants, mosquitoes, spiders, mites and mice are among the typical arthropod and vertebrate pest populations found in health-care facilities. Insects can serve as agents for the mechanical transmission of microorganisms, or as active participants in the disease transmission process by serving as a vector. Although insects carry a wide variety of pathogenic microorganisms on their surfaces and in their gut, the direct association of insects with disease transmission (apart from vector transmission) is limited. Apply the following guidelines:

1. Arthropod and vertebrate pests should be eradicated from all indoor environments in health-care facilities.
2. Eliminate food sources, indoor habitats, and other conditions that attract pests.
3. Use pesticides as needed.
4. Seal windows in health-care facilities help to minimize insect intrusion. When windows need to be opened for ventilation, ensure that screens are in good condition.
5. A pest-control specialist with appropriate credentials can provide a regular insect-control program that is tailored to the needs of the facility and uses approved chemicals and/or physical methods.

Table 10: Mop Coding

NO.	COLOUR	SERVICE AREAS
1.	Red	Ablution arears
2.	Blue	Wards and treatment room
3.	White	Ward Kitchen
4.	Yellow	Isolation rooms
5.	Green	Offices

Cleaning Equipment:

1. Change cleaning cloths and mops heads and dry daily
2. Used cloths and mop heads should be washed with warm water and detergent before re-use
3. All equipment carts and accessories used by cleaners should be cleaned at the end of each shift
4. Cleaning equipment must be stored dry in a designated storage area or cleaning closet
5. The closets must be kept neat, clean and free of clutter
6. The equipment must be routinely maintained and kept in good condition or replaced
7. Scrubbing and floor polishing machines should be emptied and cleaned daily and stored

4.8 Healthcare Waste Management (HCWM)

Healthcare Waste is all waste that is generated from healthcare establishments, research and laboratories facilities. Healthcare waste is a potential reservoir of pathogenic micro-organisms and requires appropriate, safe, and reliable handling. There should be a person responsible for healthcare waste management in the organization. Waste management should be conducted in coordination with the infection control team.

All individuals exposed to hazardous healthcare waste are potentially at risk, including those within the healthcare institutions that generate hazardous waste. Healthcare waste handlers outside are also exposed as a consequence of careless management.

Health and Safety Practices in Healthcare Waste Management

Health and safety practices should be guided by the provisions of the Occupational Safety & Health Act of 2001 and the National Healthcare Waste Management Guidelines, (February 2013).

4.8.1 Categories of Healthcare Waste

1. **General Waste**

   Comparable to domestic waste, this type of waste does not pose special handling problem or hazard to human health or to the environment. It comes mostly from the administrative and housekeeping functions of healthcare institutions and may also include waste generated during maintenance of healthcare premises.

2. **Infectious Waste**

   This type of waste is suspected to contain pathogens (bacteria, viruses, parasites, or fungi) in sufficient concentration or quantity to cause disease in susceptible hosts.

Figure15: Biohazard symbol

International Infectious Substance Symbol

1. **Pathological Waste**

   Pathological Waste consists of tissues, organs, body parts, human foetus and animal carcasses, blood and body fluids. Within this category, recognizable human or animal body parts are also called anatomical waste. This category should be considered as a subcategory of infectious waste, even though it may also include healthy body parts.

2. **Sharps**

   This type of waste includes needles, syringes, scalpels, saws, blades, broken glass, infusion sets, knives, nails and any other items that can cause a cut or puncture wounds. Whether or not they are infected, such items are usually considered as highly hazardous healthcare waste.

3. **Pharmaceutical Waste**

It includes expired, unused, spilled, and contaminated pharmaceutical products, drugs, vaccines, and sera that are no longer required and need to be disposed of appropriately. This category also includes discarded items used in the handling of pharmaceuticals such as bottles or boxes with residues, gloves, masks, connecting tubing and drug vials. (All to be disposed in the green containers for expired medication)

4. **Genotoxic /Cytotoxic Waste**

Genotoxic waste may include certain cytostatic drugs, vomit, urine or faeces from patients treated with cytostatic drugs, chemicals, and radioactive materials. This type of waste is highly hazardous and may have mutagenic, teratogenic or carcinogenic properties.

5. **Chemical Waste**

Chemical waste consists of discarded solid, liquid, and gaseous chemicals, for example from diagnostic and experimental work and from cleaning, housekeeping, and disinfecting procedures. Chemical waste from healthcare may be hazardous or non-hazardous.

6. **Waste with High Content of Heavy Metals**

Wastes with a high heavy-metal content represent a subcategory of hazardous chemical waste and are usually highly toxic. Mercury wastes are typically generated by spillage from broken clinical equipment (thermometer, blood pressure gauges, etc.). Whenever possible, spilled drops of mercury should be recovered. Residues from dentistry have high mercury content. Cadmium waste comes mainly from discarded batteries. Certain 'reinforced wood panels' containing lead is still being used in radiation proofing of x-ray and diagnostic departments. A number of drugs contain arsenic, but these are treated here as pharmaceutical waste.

7. **Pressurized Containers**

Many types of gas are used in healthcare facilities and are often stored in pressurized cylinders, cartridges, and aerosol cans. Many of these, once empty or of no further use (although they may still contain residues), are reusable, but certain types notably aerosol cans, must be disposed of. Whether inert or potentially harmful, gases in pressurized containers should always be handled with care. Containers may explode if incinerated or accidentally punctured.

8. **Heavy metals**

Waste with high heavy-metal content represents a subcategory of hazardous chemical waste and is usually highly toxic. Some examples include, but are not limited to:

a. *Mercury (Hg)* - waste is typically generated by spillage from broken mercury-containing devices (thermometer, blood pressure gauges, etc.) or broken fluorescent tubes. Whenever possible, spilled drops of mercury should be recovered. Residues from dentistry can also have high mercury content.
b. *Batteries* - there are several kinds of battery containing different metals or combinations of metals, including alkaline, Ni-Cd (nickel-cadmium), lithium-ion, silver-oxide and lead-acid batteries. Some of these battery types are considered hazardous waste and require specialized handling, recovery and/or disposal procedures. Refer to your facility-specific SOP to know how to package and dispose of your batteries.
c. *Lead* - certain 'reinforced wood panels' containing lead are still being used in radiation proofing of x-ray and diagnostic departments.

9. **Radioactive waste**
   Includes disused sealed radiation sources, liquid and gaseous materials contaminated with radioactivity, excreta of patients who underwent radionuclide diagnostic and therapeutic applications, paper cups, straws, needles, and syringes, test tubes, and tap water washings of such paraphernalia. It is produced as a result of procedures such as in vitro analysis of body tissues and fluids, in vivo organ imaging, tumour localization ad treatment, and various clinical studies involving the use of radioisotopes. Radioactive healthcare wastes generally contain radionuclides with short half-lives, which lose their activity in a shorter time. However, certain radionuclides e.g., C-14 contaminated wastes have much longer half-life, more than a thousand years, which need to be specially managed in a centralized treatment facility for radioactive waste. The same is required for the management of disused sealed radiation sources used for cancer treatment.

4.8.2 Principles of Healthcare Waste Management

The principles are:

1. The **"Polluter Pays"** principle
   This implies that all generators of waste are legally and financially responsible for the safe and environmentally sound disposal of the waste they produce;

2. The **"Precautionary"** principle
   This is concerned with the adaptation of measures to protect health and safety when the magnitude of the particular risk posed by the waste is uncertain;

3. The **"proximity"** principle
   This principle demands that waste be disposed of at the closest possible location to its source in order to minimize the risks involved in transportation;

4. The **"Duty of Care"** principle
   This stipulates that any person handling or managing hazardous substances or related equipment is ethically responsible for applying the utmost care; and

5. **Prior informed consent principle** (cradle to grave control): All parties in healthcare settings involved in the generation, storage, transportation, treatment and disposal of hazardous waste should be licensed or registered to do so. Only licensed organisations and sites must be allowed to receive and handle these wastes.

The ultimate responsibility for ensuring that waste is disposed of lies with the person or institution that generates the waste. Healthcare institutions are therefore responsible for the waste that is generated by their activities and are required to take practical steps to ensure their separation, storage, treatment and safe disposal.

Waste Segregation and Storage

The effective management of healthcare waste considers the basic elements of waste minimization, segregation and proper identification of the waste. In the past, there were no incentives to separate, recycle, or reduce waste. Appropriate handling, treatment and disposal of waste by type reduce costs and do much to protect public health.

Basic elements include:

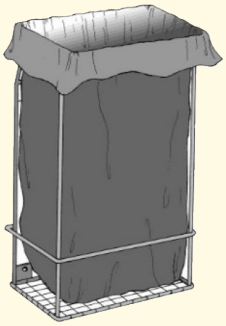
i. Segregation at source should always be the responsibility of the waste producer.
ii. Segregation should take place as close as possible to where the waste is generated and should be maintained in storage areas and during transportation.

iii. Medical waste should be placed in clearly marked containers that are appropriately labelled for the type and weight of the waste. Except for sharps and fluids, Medical Waste is generally put in plastic bags, receptacles or leaked proofed containers that meet specific performance standards.

iv. To improve segregation efficiency and minimize incorrect use of containers, proper placement and labelling of containers must be carefully determined. General waste containers placed beside infectious waste containers could result in better segregation.

Figure 16: Waste containers

Infectious Waste Container



General/ Domestic Waste Container

Sharp Container

Colour Coding Scheme for Healthcare Waste

The most appropriate way of identifying the categories of healthcare waste is by sorting the waste into colour-coded plastic bags or containers. Recommended colour-code scheme for healthcare waste is shown in the table below:

Table 11: Waste colour coding

TYPE OF WASTE	COLOURS OF CONTAINER & MARKING	TYPE OF CONTAINER
Infectious Waste	Red	Heavy-Duty, leak Proof Plastic Bag
Sharps	Red & yellow marked "Clinical Waste Sharps	"Puncture Proof Container"
Chemical & Pharmaceutical Waste	Dark Green	Puncture Proof Rigid Container
Radioactive Waste	None	Lead Box, Labelled with a Radioactive Symbol
Cytotoxic	Dark Green	Puncture Proof Rigid Container
Food Waste	Transparent	Heavy Duty Plastic Bag with a strong seam
General Waste	Black	Heavy Duty Plastic Bag

Hospital Waste Storage Requirements
All healthcare waste should be collected and stored in the waste storage area until transported to a designated treatment and disposal facility. This area should be marked with a warning sign written:

"CAUTION – BIOHAZARDOUS WASTE STORAGE – NO UNAUTHORIZED PERSONS"

"CAPHELA KUGCINWA TIBI LETIYINGOTI, AKUNGENWA".
All healthcare institutions should designate a temporal Healthcare Waste holding/storage area. Waste generated from the different units should be collected daily and transported to the designated storage site.

Requirements for storage facilities:
1. The storage area should have an impermeable, hard-standing floor with good drainage, it should be easy to clean and disinfect.
2. There should be adequate water supply for cleaning purposes.
3. The storage area should allow easy access for staff in charge of handling the waste.
4. It should be possible to lock the storage area to prevent access by unauthorized persons.
5. Easy access for waste collection vehicle is essential.
6. There should be protection from sun, rain, strong winds, floods, etc.
7. The storage area should be inaccessible to animals, insects and birds.
8. There should be good lighting and adequate ventilation.
9. The storage area should not be situated in the proximity of fresh food stores or food preparation areas.
10. A supply of cleaning equipment, protective clothing and waste bags or containers should be located conveniently close to the storage area.
11. Floors, walls and ceilings of the storage area must be kept clean in accordance to the established cleaning procedure, which at a minimum should include daily cleaning of floors.
12. Biodegradable general and HCW should not be stored longer than 2 days to minimize microbial growth, putrefaction, and odours. If the waste must be stored longer than 2 days, application of treatment like chemical disinfection is recommended.
13. The waste streams should also be observed accordingly in the central holding area.

4.8.3 Collection and Transportation of Healthcare Waste
Proper collection and transportation is an important component in healthcare waste management. Its implementation requires direct involvement of the healthcare institution's maintenance services, housekeeping services, motor pool service personnel and cooperation of all the healthcare personnel.

Healthcare waste collection and transportation practices should be designed to achieve an efficient movement of waste from points of generation to storage or treatment while minimizing the risk to personnel.

4.8.3.1 On-Site Collection and Transportation
Waste should not be allowed to accumulate at the point of production.
1. A program for their collection and transportation should be established as part of the healthcare waste management plan.
2. Health workers and other clinical staff should ensure that waste bags are tightly closed or sealed once the bag is about three-quarters full.
3. Light-gauge bags can be closed by tying the neck, but heavier gauge bags probably require a plastic sealing tag, the self-locking type.
4. Bags should not be closed by stapling.
5. Sealed sharp containers should not be placed in a labelled, red infectious healthcare waste bag.

The following are **recommendations** that should be followed by healthcare personnel directly involved in waste handling and collection:

1. Waste should be collected daily (or as frequently as required) and transported to the designated central storage site or waste transfer station.
2. No bags should be removed unless they are labelled with their point of production (hospital ward or department) and contents.
3. The bags or containers should be replaced immediately with new ones of the same type.
4. A supply of fresh collection bags or containers should be readily available at all locations where waste is produced.

4.8.3.2 On-Site Transportation

Transportation of waste within the establishment could utilize wheeled trolleys, containers, or carts that are dedicated solely for the purpose.

1. Workers transporting the waste should be equipped with appropriate personal protective equipment including heavy-duty gloves, overalls and thick-soled boots.

2. On-site transportation vehicle should meet the following specifications:
   i. Easy to load and unload
   ii. No sharp edges that could damage waste bags or containers during loading and unloading
   iii. Easy to clean
   iv. Lined with impervious durable material
   v. Vehicle should be labelled with healthcare waste sign

4.8.3.3 On-site Collection

1. On-site collection vehicle should be cleaned and disinfected daily with an appropriate disinfectant like chlorine compounds, formaldehyde, phenolic compounds and acids. All waste bag seals should be in-place and intact at the end of transportation.
2. Workers transporting the waste should be equipped with appropriate personal protective equipment including heavy-duty gloves, overalls, and thick-soled boots.

NB: There is a need for an on-site waste treatment and disposal site (waste treatment & disposal zone) get the specifications from Eswatini Environmental Authority (SEA).

4.8.3.4 Off-site Transportation

The healthcare waste generator is responsible for the safe packaging and adequate labelling of waste to be transported off-site for treatment and disposal.

1. Packaging and labelling should comply with the national regulation governing the transport of special wastes (Waste Regulations (2000), Part 6, Chapter 14) and maintaining that it presents no danger to the public during transportation.
2. The waste generators are ultimately responsible for ensuring that their wastes are properly treated and disposed of in an approved disposal facility. Tracking of wastes could be done with the implementation of the consignment system.
3. The transporter or generator transporting the waste should have the consignment note as stated in Waste Regulations (2000), Part 7, Chapter 15.

NB: Each vehicle should be provided with spillage kits.

4.8.3.5 Transboundary Transportation

Hazardous waste that includes healthcare risk waste may also be transported to another country for treatment and disposal, provided the receiving country has such facilities to deal with that kind of waste.

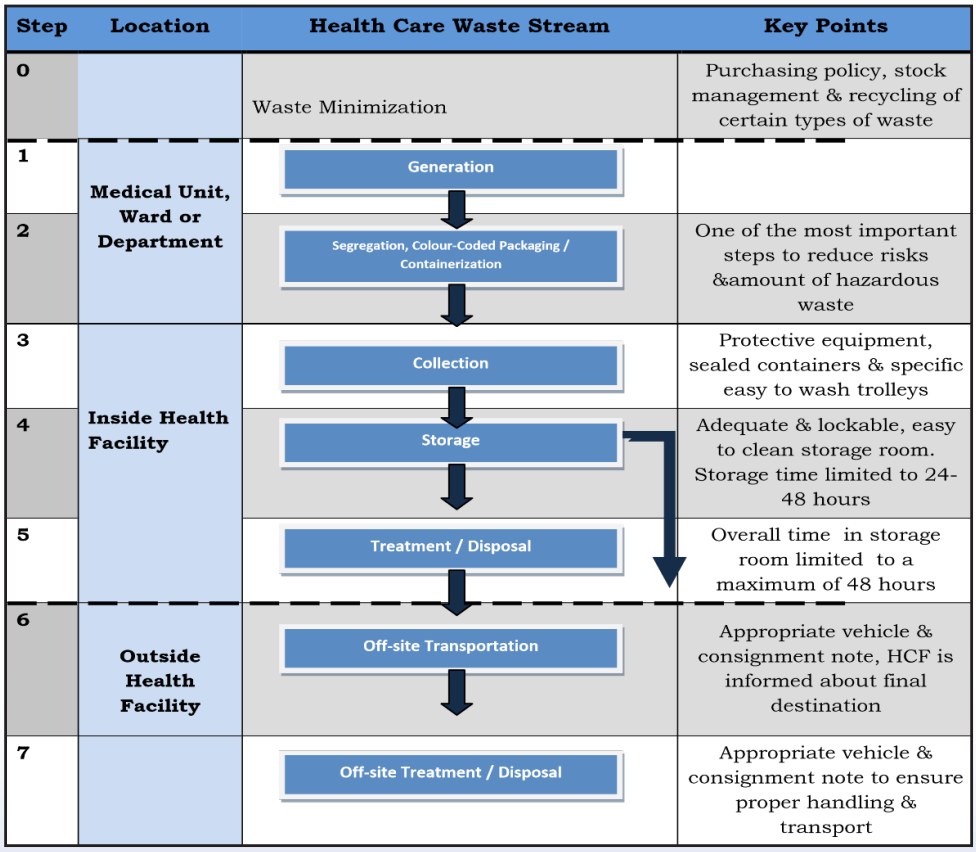
Requirements for Packaging and Labelling for Off-site Collection:

1. Waste should be packaged in sealed bags or containers to prevent spilling during handling and transportation.
2. The bags or containers should be robust for their content (for example puncture proof for sharps and resistant to aggressive chemicals) and for normal conditions of handling and transportation, such as vibration or changes in temperature, humidity or atmospheric pressure.
3. All waste bags or containers should be labelled with the basic information about their content and about the waste generator. This information may be written directly on the bag, container or on pre-printed labels, securely attached. Basic information should include but not limited to the following:
   i. Type of healthcare waste
   ii. Form of waste and waste category
   iii. Date of collection
   iv. Volume/quantity of waste
   v. Precautions to be taken while handling
   vi. Emergency procedures in the event of accident or spillage - Producer and destination of the waste

4.8.3.6 Routing

1. Healthcare waste should be transported through the quickest or shortest possible route and should be planned before the trip begins.
2. After departure from the source, every effort should be made to avoid further handling. If handling cannot be avoided, it should be pre-arranged and take place in adequately designed and authorized premises.
3. Handling requirements can be specified in the contract established between the waste generator and the transporter.
4. An efficient and effective collection system route should consider the following:
   i. Collection schedule either by route or zone
   ii. Assignment of personnel responsible for the zone or area.
   iii. Logical planning of the route (should avoid passing the collected package of waste on congested area)
   iv. Utilize off-peak hours for transporting waste

Figure 17: Key Steps to Waste Management



4.8.3.7 Sources and Composition of Healthcare Waste

NB: General waste are generated in all the following sources, (e.g. food remains and packaging.

1. **Source: Health**	**Healthcare Institutions (hospitals, centres, clinics & veterinary clinics):**
Composition	*Blood soaked dressing, bandages, plaster, gloves, packaging, hypodermic needles, intravenous sets, body fluids, anatomical wastes and sharps, chemicals, radioactive waste, heab2.2vy metals.*
2. **Source:**	**Laboratories and Research Centres:**
Composition:	*Microbiological cultures & stock, tissue samples, pathological wastes, blood and body fluids, contaminated gloves, tubing and containers, sharps, radioactive materials and chemicals.*
3. **Source:**	**Drug Manufacturers (Pharmacies and stores):**
Composition	*Expired Drugs, Factory fault drugs, and spoiled drugs.*
4. **Source:**	**Mortuary and Autopsy Centres:**
Composition	*Human tissues, waste water and body fluids.*
5. **Source:**	**Ambulances & emergency care:**
Composition:	*Body fluids, blood-soaked dressings, sharps, and gloves.*
6. **Source:**	**Home-Based Care Treatment:**
Composition:	*Body fluids, expired drugs, disposable napkins, Sharps, gloves, and blood-soaked dressings.*
7. **Source:**	**Cosmetic Body Piercing & Tattoo Sites:**
Composition:	*Body fluids and sharps*
8. **Source:**	**Traditional and Religious Healing Sites:**
Composition:	*Sharps, body fluids, and gloves*
9. **Source:**	**Family Planning Activity:**
Composition:	*condoms, expired contraceptives*

4.8.3.8 The 6 Steps of Waste Management Plan

Segregation

This entails the identification and separation of waste by type at a point of generation. The waste after generation should be segregated into three waste streams:

1. *Low-risk waste* (general/domestic waste) e.g. Papers, tins, fruits peels packaging material.
2. *Medium risk waste* (infections waste exclusive sharps) e.g. gauze, used dressing, sanitary pads, disposable gloves, anatomical waste, etc.
3. *High-risk waste* (sharps) e.g. used syringes and needles, surgical blades, scalpels, etc.

Containerization

1. Low risk waste should be contained in a black lined waste pedal bin
2. Medium risk waste should be contained in a red-lined waste pedal bin
3. High-risk waste should be contained in a puncture proofed yellow sharp container.
4. All the plastic bags/colour coded liners should be closed and replace when they are ¾ full.
5. The sharp container should be sealed when ¾ full and replaced.

Storage

1. Intermediate/temporal holding point should be identified.
2. Only waste handlers should have access to the waste holding point and no unauthorized person should be allowed into the area.
3. The temporal waste holding areas should be cleaned and disinfected on a regular basis.

Transportation

1. Wheelie bins should be used for the transportation of waste from one point to another within the facility premises.
2. The transporter of HCW should always put on personal protective clothing whenever she/he is handling the waste.
3. The waste wheelie bins should be cleaned and disinfected on a regular basis.

Treatment

1. All waste contained in a red liner/plastic bag should be subjected to thermal treatment.
2. All high-risk waste (sharps)/full sharp containers should be incinerated before disposal.
3. The incinerator should be operated effectively and efficiently to destroy all infectious agent in the waste.
4. The incinerator operator should always wear protective clothing when operating the incinerator.
5. The incinerator operator should also keep records of healthcare risk waste quantities treated on a daily basis.
6. Ash from the incinerator should be cooled and put into a heavy-duty black plastic bag for municipality collection.

Treatment options for healthcare risk waste

1. The incinerator should be fenced with a lockable gate
2. Autoclave
3. Microwave

Final Disposal

Urban Disposal

1. The general waste or low-risk waste in black sealed plastic bags should be collected by municipality for disposal.
2. The municipality should collect ash from the incinerator contained in a black heavy-duty plastic bag.
3. All the Healthcare Waste in an urban area should be disposed of in a sanitary landfill /controlled dumping sites.
4. In facilities where there is no treatment facility, and/or the incinerator is down, Healthcare Risk waste should be collected by the municipality on special collection days, arranged by the Health facility and the local authority.
5. Non-clinical waste is taken by local municipality for disposal in land fill.

4.8.4 Impacts of Healthcare Waste to Public Health and the Environment

Apart from the risk to the patients and healthcare personnel, consideration must be given to the impact of healthcare waste to the general public and the environment. In particular, attention should be paid to the possible pollution of the air, water and soil including the aesthetic aspects. Minimizing the risk to public health and the environment will require actions to deal with healthcare waste within the healthcare institution such as proper waste segregation and minimizations that it does not enter the waste stream requiring disposal.

While the hospital personnel are at greater risk of infection through injuries from contaminated sharps, other hospital workers and waste management operators outside of the healthcare institution are also at risk. Certain infections, however, spread through other media or caused by more resilient agents, may pose a significant risk to the public. For example, the uncontrolled discharges of sewage from field hospitals treating cholera patients are a potential source of cholera epidemic.

Precautions

1. Faeces and urine from patients in isolation wards should be disinfected before disposal in the sewer. However, the use of strong disinfectants should be minimized when there are alternatives.
2. Any hazardous chemical waste generated should be dealt with by a proper chemical waste management system.
3. Central storage area for healthcare waste should be located within the healthcare institution; however, the storage should be away from patients' rooms, carbonations, hospital function or operation rooms or any public access area.
4. Daily collection and disposal of waste should be enforced. The intermediate storage area should be designated in all the components or units in the healthcare institutions.
5. In a home setting where healthcare risk waste is generated a safe holding point should be marked for safe storage of the waste.

NB: The present culture in the country do not accept the disposal of anatomical waste inappropriately, such as on a landfill.

Figure 18: Storage Area Warning Sign

All healthcare facilities should designate a MEDICAL WASTE central storage area. Waste generated from different units should be collected daily and transported to the designated storage site.

The central storage area for MEDICAL WASTE should be located within the healthcare facility and situated so as to minimize the risk of contamination to other operations in the area, and to medicines, foodstuffs, textiles, employees, patients and visitors. The facility's waste management plan should indicate the times and routes for the collection of MEDICAL WASTE from each temporary waste storage area. Collection frequency should be determined relative to the waste streams generated the quantity thereof and recommended storage times.

An intermediate storage area should be designated in each ward, department or unit of the healthcare facility. In a home setting where MEDICAL WASTE is generated, a safe holding point should be identified for safe storage of the waste.

4.8.4.1 Requirements for Medical Waste Storage Facilities

1. The storage area should be clearly demarcated as such.
2. The storage area should have an impermeable, hard-standing, slip resistant floor with good drainage. It should be easy to clean and disinfect as needed.
3. There should be a proximal water supply for cleaning purposes.
4. The storage area should allow easy access for staff in charge of handling the waste.
5. It should be possible to lock the storage area to prevent access by unauthorized persons.
6. Easy access for a waste collection vehicle is essential.
7. The storage area must be protected from sun, rain, strong winds, floods, etc.
8. The storage area should be inaccessible to animals, insects and birds.
9. There should be good lighting and adequate ventilation.
10. The storage area should not be situated in the proximity of fresh food stores or food preparation areas.
11. A supply of cleaning equipment, protective clothing and waste bags or containers should be located conveniently close to the storage area.
12. Floors, walls and ceilings of the storage area must be kept clean in accordance with established cleaning procedures that, at a minimum, should include the daily cleaning of floors.
13. The storage area should have sufficient capacity to accommodate the volume of waste to be stored in accordance with the facility's unique generation profile and the collection frequency.
14. For recommended waste storage times for the relevant streams of waste, refer to the table below. Depending on the nature of the waste, one should prevent the proliferation of microorganisms and concomitant odour.
15. The storage area should be checked on a daily basis to ensure it is secure, clean and organized, i.e. waste receptacles/containers are not overflowing or leaking.

4.8.5 Requirements for Off-site Collection Vehicles:

1. Collection vehicles used for the transport of healthcare wastes should not be used for the transport of any other materials that should be seriously affected by contamination such as food, livestock, and people or retail goods.
2. The vehicle should have an enclosed leak-proof body and capable of being locked to secure the waste. Waste can be loaded directly to especially designed vehicle, but it is safer to place them first in containers (example wheeled, rigid, lidded plastic or galvanized bins).
3. All waste should be bagged in appropriate colour-coded bags or other special containers when transported.
4. Each package should be marked or coded for easy identification.
5. Containers should be lead-proofed and be fitted with self-sealing lid and be tight enough to withstand being spilled in the vehicle. The design of the collection vehicle must conform to the following:
   i. The body of the vehicle should be of suitable size commensurate with the design of the vehicle.
   ii. The vehicle should have a totally enclosed car body with the driver seat separated from the loader to prevent coming into contact with the waste in the event of collision/accident.

iii. There should be a suitable system for securing the load during transport.
iv. The vehicle should be easy to clean and the internal surface of the body should be smooth enough that allows it to be steam cleaned and with all corners/angles rounded. The vehicle should be cleaned at the end of each working day and in the event of any spillage.
v. The vehicle should be marked with the name and address of the waste carrier.
vi. The international hazard sign should be displayed on the vehicle or container, as well as the emergency telephone number.
vii. Empty plastic bags, suitable protective clothing, cleaning equipment, tools and disinfectant, together with special kits for dealing with liquid spills, should be carried in a separate compartment in the vehicle.
viii. The vehicle should have an emergency light

Table 12: Recommended Waste Storage Time Limits as per SANS 10248

Waste	Time Limits
Anatomical / Pathological	24 hours
Infectious	72 hours
Sharps Container	30 days
Pharmaceutical	90 days

Containers should be sealed. The waste may be stored at -2°C for 90 days.

4.8.5.1 For Staff Who Transport the Waste

In carrying out the responsibility of waste transportation, the drivers and the waste handlers should be aware of the nature and risk of the transported waste. Transport staff should be able to carry out procedures for:

1. Handling, loading and unloading of waste bags and containers.
2. Dealing with spillage or accidents.
3. The use of PPE.
4. Documentation and recording of healthcare waste for example by means of consignment note which will allow waste to be traced from the point of collection to the final place of disposal

The need to promote appropriate handling and disposal of healthcare waste in home base care is important for the homesteads involved as well as community members have the right to be informed about the potential health hazards associated to healthcare waste.

Public education plays an important role in healthcare waste management. The three objectives of public education related to healthcare waste are to:

1. Inform the public about the risk linked to healthcare waste, focusing on people either living or working in close proximity to, or visiting healthcare institutions, home-based care, traditional healers, family of patients being treated at home and the scavengers on waste dumps.
2. Create awareness and foster responsibility among hospital patients and visitors to healthcare institution regarding hygiene and healthcare waste management.
3. Prevent exposure to healthcare waste and related health hazards. This exposure may be voluntary, in the case of scavengers and accidental, as a consequence of unsafe disposal methods.

In communicating the hazards of healthcare waste to the public, the following methods can be considered:

1. Information, education and communication (IEC) campaign materials development, reproduction and dissemination. Poster exhibitions of healthcare waste issues, including the risk involved in scavenging discarded syringes and hypodermic needles.
2. Policy dissemination-responsible staff of the healthcare institution should be able to explain to incoming patients and visitors the healthcare waste management policy.
3. Information poster exhibitions in healthcare institutions, at strategic points such as waste bin location that provides instructions on waste segregation. Posters should be explicit, using diagrams and illustrations to convey the message to a large number of audiences as possible, including illiterate people.

4.8.6 Exposure to Hazardous Healthcare Waste Hazards from Infectious Waste and Sharps:

Infectious waste may contain any of a great variety of pathogenic organisms. Pathogens in infectious waste may enter the human body by a number of routes:

1. Through a puncture, abrasion, or cut in the skin;
2. Through the mucous membrane
3. By inhalation; and
4. By ingestion

The principal concerns are infections that may be transmitted by the subcutaneous introduction of the causative agent, for example, viral blood infections. Hypodermic needles constitute an important part of the sharps waste category and are particularly hazardous because they are often contaminated with patients' blood. Sharps may not only cause cuts and punctures but also infect the wounds if they are contaminated with pathogens. Because of this double risk of injury and disease transmission, sharps are considered as a very hazardous class.

The consequences of improper handling and disposal of medical waste are serious. For example, the reuse of improperly discarded needles by IV users or accidental needle sticks injuries as recyclers sifting through waste dumps could lead to the spread of hepatitis, AIDS and other blood-borne diseases. Epidemiological studies show that exposure to pollutants from medical waste incinerators increases the risk of various types of cancers and heart diseases.

The elements required for infection in the context of medical waste are:

1. Some components of medical waste are potential reservoirs of disease-causing micro-organisms (culture, dishes, liquid blood, pathological waste, etc.).
2. The infective dose depends on the virulence of the microorganisms, the portal of entry, and the susceptibility of the host.
3. Modes of transmission may involve contact (example, contaminated needles or blood splatter), vehicle-borne (example, contaminated wastewater), airborne (example, aerosolized pathogens from broken culture or the rupture of yellow bags), and vector-borne transmission (example, rodents in a medical waste storage area).
4. Portals of entry include breaks in the skin and mucous membranes (example, needle-stick injuries or blood splashes into the mucous membranes), the respiratory tract (inhalation of pathogenic aerosols).
5. Potential susceptible host includes healthcare workers, waste handlers, patients and visitors in the healthcare facility, landfill operators, scavengers, and the public in general.

4.8.6.1 Capacity building for Healthcare Personnel

1. The training course should provide an overview of the healthcare waste management policy and underlying rationale and information on practices relevant to the trainee's responsibilities. Waste segregation is a key element for this training in waste management.
2. All staff that produces healthcare waste should be responsible for its segregation and should, therefore, receive training in the basic principles and practical applications of segregation.

The training course should include:

a) Information on the risks associated with the handling of healthcare waste.
b) Procedures for dealing with spillage and other accidents.
c) Correct use of protective clothing

Community/home-based care

1. Hand washes - Always wash hands before and after each activity.
2. Dressing change - Always ensure that before dressing the patients' wounds you have got:
3. a plastic bag to put used dressings into.
4. Clean dressing packs and solutions e.g. savlon.
5. disposable gloves
6. Wearing of PPE
7. Gloves: Wear gloves when you are cleaning the wound, applying new dressing and disposing of the used dressing.
8. Care of soiled/infected waste:
9. Burn or bury the soiled dressings.
10. Safe disposal of sputum

Sputum care

1. Encourage the patient to spit into a container with a lid.
2. Always keep the lid of the container closed when it contains sputum.
3. When the container needs emptying, carefully empty the contents in a pit latrine or in a hole and cover it.
4. Wash the container thoroughly with soap, detergent or clean with boiled water ready for the next use.

When changing bed linen for an incontinent patient:

If possible, pad the patient with pads/pampers/ diapers and throw soiled ones in a pit latrine or in a hole and cover it. If these are not available, use clean old clothes, which should be washed thoroughly and dried before reuse.

Rural Pit Latrine

1. An open HCW pit should be used for disposing of Healthcare Waste
2. Under high-risk waste are Needles which can be used by diabetic clients at the community level
3. Only high-risk waste should be put into the waste pit with a cover slab.
4. Only Healthcare Waste handlers should have access to the waste disposal facility.
5. Both HCW pits should be fenced and a gate with a lock-key fitted.
6. Technical assistance from E.H.Os should be solicited for the sitting, dimensions and management of the pits.

Figure 19: Home-based care (HBC) waste disposal option

Figure 20: Healthcare waste secured pits.

4.9 Respiratory hygiene/ cough etiquette

Respiratory hygiene is a practice encouraged to reduce the spread of microbes (droplets) from coughing, sneezing and nose-blowing through the use of a barrier such as a handkerchief /tissue paper to contain the microbes.

Healthcare personnel should be educated on the importance of source control measures to contain respiratory secretions to prevent droplet and fomite transmission of respiratory pathogens, especially during seasonal outbreaks of viral respiratory tract infections from organisms (e.g., influenza virus, adenovirus, para-influenza virus) in communities.

The following measures to contain respiratory secretions are recommended for all individuals with signs and symptoms of a respiratory infection:

1. Cover the mouth and nose with a handkerchief or tissue when coughing or sneezing. In the absence of that use the inner part of your forearm to cover the mouth.
2. Use disposable tissue to contain respiratory secretions and dispose of it in the nearest waste receptacle after use.
3. Perform hand hygiene-handwashing with soap and water, alcohol-based hand rub or antiseptic hand wash, after having contact with respiratory secretions or contaminated objects/articles.
4. Healthcare facilities should ensure the availability of materials for adhering to respiratory hygiene in waiting areas for patients and visitors by:
    i. Providing tissues and non-touch receptacles for used tissue disposal.
    ii. Providing conveniently-located dispensers of alcohol-based hand rub.
    iii. Putting notices in the facility to facilitate cough etiquette, including not spitting on the floor.
    iv. Ensuring that supplies for hand washing (i.e., water, soap, disposable towels) are available.

Measures to contain respiratory secretions in patients and accompanying individuals who have signs and symptoms of respiratory infection should:

1. Begin with TB screening in all healthcare settings (e.g. triage, reception and waiting areas in emergency departments, outpatient clinics and physician offices).
2. Use IEC materials at entrances and in strategic places (e.g., corridors, lift (elevators), canteens) within OPD and inpatient settings with instructions to patients and other persons with symptoms of a respiratory

infection to cover their mouths/noses when coughing or sneezing, use and dispose of tissues, and perform hand hygiene after hands have been in contact with respiratory secretions.

3. Continue with community sensitization during periods of increased prevalence of respiratory infections (e.g., as indicated by the increased number of patients seeking care for a respiratory infection). For example:

i. Offer appropriate masks to coughing patients and other symptomatic persons (e.g., persons who accompany ill patients) upon entry into the facility or medical office.

ii. Encourage them to maintain special separation, ideally a distance of at least 1 metre from others in common waiting areas.

4.10 Food and drinks

Proper food handling is necessary for the prevention of foodborne illnesses. Food and drinks should be handled in such a manner as to prevent contamination and infections. All food service staff should comply with guidelines on Standard Precautions and follow established dress codes and use appropriate barriers when preparing, transporting and serving food.

4.10.1 Food Safety Guidelines

Hand Washing

1. Contaminants found in soil, water, animals, and people can be carried on hands, wiping cloths, equipment, and utensils and can be transferred from these items to food:
   i. Hand washing is mandatory before and after handling food and equipment, and after going to the toilet.

Environmental Cleaning

1. Thoroughly wash and sanitize all surfaces and equipment used for food preparation immediately after use. Food preparation surfaces should be cleaned with sanitizers or disinfectants.
2. Protect the kitchen and food from insects, pests, and animals.
3. Cleaning, dishwashing and disinfection procedures should be strictly followed and monitored.
4. Public eating areas should be maintained in a sanitary condition.
5. Vending companies should clean their machines and ensure the safety of food products. These machines must be monitored for cleanliness and reports of compliance provided to the appropriate authority.

Raw and cooked food

Keep raw and cooked food separate

Raw foods and their juices may contain dangerous microorganisms that can be transferred to other food during preparation and storage:

1. Separate raw meat, poultry, and seafood from other foods.
2. Use separate equipment and utensils, including knives and cutting boards, for raw foods.
3. Store prepared food in containers with sealed lids and position prepared food to avoid contact with raw food, such as drippings from raw foods onto prepared food.
4. A log should be maintained to monitor daily temperatures, cleaning schedule and routine inspection of contents of food storage fridges.
   UNDER NO CIRCUMSTANCE SHOULD FOOD AND MEDICINES BE STORED IN THE SAME REFRIGERATOR.

Cooking

Proper cooking can kill almost all dangerous organisms; a temperature of 70°C (158°F) will reduce or kill harmful bacteria in 30 seconds. Foods that require special attention include minced or ground meats, large pieces of meat, rolled roasts, and whole poultry. Harmful bacteria can be found on the inside as well as on the surface of these foods. It is therefore important to cook food thoroughly, especially meat, poultry, eggs, and seafood.

Reheating Food

1. Contaminants can multiply quickly in food stored at room temperature. Do not leave cooked food at room temperature for more than 2 hours.
2. To help prevent foodborne illnesses, keep food at temperatures below 5°C (41°F) or above 60°C (140°F):
3. Refrigerate promptly all cooked and perishable food (below 5°C [41°F]).
4. Keep cooked food hot (> 60°C [140°F]) before serving.
5. Do not store food for longer than 3 days in the refrigerator.

Safe water and raw ingredients.

Germs may be present in raw ingredients, including in water and ice, and may grow in food during storage and preparation, causing food-related illness when eaten:

1. Use safe water or treat water to make it safe.
2. Select fresh, undamaged, best-quality foods.
3. Choose foods processed for safety such as pasteurized milk and cheese.
4. Wash fruits and vegetables thoroughly with clean water.
5. Do not use old (expired) food, food stored for more than 2 hours at the danger zone, or food stored for more than 3 days in the refrigerator

Additional precautions

1. No eating, drinking or smoking is permitted in the food preparation area.
2. Staff with communicable diseases- skin infections, respiratory infections and or gastrointestinal infections should not work in food handling units until they are cleared by a physician to resume work.
3. Food borne or suspected food-related illness in employees or client should be reported to the IPC Focal Person for it to be investigated.
4. Commercially prepared foods should be inspected for expiry dates and for other signs of deterioration and if found to be unwholesome, be discarded.
5. Health facility managers must ensure that all food vendors (sellers) in and around the health facility comply with the guidelines on handling of food by the Local Authorities
6. Ensure six monthly routine medical check-ups for food service staff.

CHAPTER 5

5.0 Expanded or additional or transmission-based precautions

Definition of expanded/ additional/ transmission-based precautions
Expanded or transmission-based precautions are used when the route(s) of transmission is (are) not completely interrupted using Standard Precautions alone. These precautions are for patients who are known or suspected to be infected or colonized with those infectious agents in health facilities. For some diseases with multiple routes of transmission e.g. SARS, more than one transmission-based precautions category may be used. When used either singly or in combination, they should always be applied in addition to Standard Precautions.

There are three categories of transmission-based precautions which are:
1. Contact
2. Droplet
3. Airborne

5.1 Contact Precautions (Direct and Indirect contact)
Diseases which are transmitted this way include colonization or infection with multiple antibiotic-resistant organisms, enteric infections and skin infections.

Beyond the use of Standard Precautions are the following:
1. Placing a patient in an isolated room or with a patient infected by the same pathogen/single room
2. Limiting the movement and transportation of the patient from the isolation room.
3. Patients wearing surgical masks if transportation is necessary
4. Wearing clean non-sterile gown when entering the room if substantial contact with the patient, environmental surfaces or items in the patient's room is anticipated

Adequate spacing between beds, 1-2 meters to reduce risk of cross-transmission

5.1.1 Guidelines to ensure contact precautions
Contact precautions are intended to prevent transmission of infectious agents which are spread by direct or indirect contact with the patient or the patient's environment. Excessive wound drainage, faecal incontinence and other discharges from the body all lead to extensive environmental contamination. In addition to Standard

Precautions:
1. Patients shall be nursed in a single room if available. If unavailable, share with another patient who has an active infection with the same organism.
2. Ensure that patients are physically separated from each other. Distance should be between 1 – 2 metres with droplets infections.
3. Healthcare personnel caring for patients on contact precautions shall wear a gown, gloves, goggles (face shield), rubber aprons, footwear and headgear for all interactions that may involve contact with the patient or patient's contaminated environment.
4. After completing procedures, gloves should be removed before leaving the patient's room and hand hygiene performed.
5. Personnel shall ensure that their hands do not touch potentially contaminated environmental surfaces after gloves are removed.

6. Patient movement shall be limited to that which is absolutely necessary. Care shall be taken during transport to minimize contact with other patients or environmental surfaces.
7. When transport is necessary to ensure that infected or colonised areas of the patients' body are contained and covered.
8. Remove and dispose off non-reusable PPE and perform hand hygiene prior to transporting patients.
9. Wear clean PPE to handle the patient at the transport destination.
10. Non-critical patient care equipment (e.g. thermometers, rubber aprons, etc.) shall be used only for a single patient.
11. If sharing of common equipment is absolutely necessary, the equipment shall be adequately cleaned and disinfected before using it for another patient.

5.2 Droplet precautions

Droplet transmission occurs when there is adequate contact between the mucous membrane of the nose and mouth or conjunctivae of a susceptible person and large-particle droplets (>5microns) mainly for paediatric patients with a variety of paediatric respiratory diseases or meningitis. Droplets are generated during coughing, sneezing and talking during the performance of certain procedures, such as suctioning and bronchoscopy. For the transmission to occur, the source and the susceptible host need to be within one meter (3 feet) from one another.

Guidelines to ensure droplet precautions

Droplets are usually generated from coughing, sneezing, talking, as well as during procedures such as bronchoscopy or suctioning. Droplet precautions are intended to prevent transmission of pathogens spread through close respiratory or mucous membrane contact with respiratory secretions. Examples of organisms in this category include Influenza and Mumps viruses, Mycoplasma, Streptococcus pneumonia, and Bordetella pertussis.

In addition to Standard Precautions, the following shall be observed:

1. Patients shall be placed in a single room or, if not available, they may be cared for in isolation or in a corner of the ward.
2. A sign indicating precautions to be taken shall be placed on the door of the patient's room and on the patient's chart.
3. The appropriate mask shall be worn when working within one metre of the patient.
4. Patient movement shall be limited to that which is absolutely necessary.
5. Relatives shall wear appropriate PPEs.
6. Patients shall be encouraged to use face masks at all times
7. Instruct patients to follow Respiratory hygiene/ cough etiquette.
8. With regards to patient transport instruct patient to wear mask and follow respiratory hygiene.
9. No mask is required for a person transporting patients in open spaces.

5.3 Airborne Precautions

Airborne transmission occurs through the dissemination of either airborne droplet nuclei (small particle residue -<5 microns) of an evaporated droplet containing micro-organisms that remain suspended in the air for long periods of time or dust particles that contain the infectious agent. For example, *Mycobacterium tuberculosis, Rubella, Influenza and Varicella viruses.*

i. The contaminated hand of the caregiver must come into direct contact with another patient, or with an inanimate object that will come into direct contact with the patient.

5.3.1 Guidelines to ensure airborne precautions

Airborne precautions are designed for infections that are transmitted by airborne droplets that can remain suspended in the air. Airborne precautions prevent transmission of infectious agents that remain infectious over long distances and period when suspended in the air. Examples include tuberculosis, rubella (German measles), varicella (chickenpox), and possibly SARS.

In addition to Standard Precautions, the following shall be observed in airborne precautions:

1. Patients shall be isolated (refer to Category "A" isolation) or in an airborne infection isolation room. An airborne infection isolation room is a single patient room that is equipped with special air handling and ventilation capacity (6 to 12 air exchanges per hour).
2. Respiratory protection programme that includes education about the use of respirators, fit testing and user seal checks is required in any facility for airborne precaution.
3. Patients must practice respiratory hygiene/cough etiquette
4. In settings where airborne precautions (mechanical ventilation systems) cannot be implemented, masking the patient, placing the patient in a single room with the door closed and providing N95 or FFP2 or higher-level respirator for healthcare personnel will reduce airborne transmission.
5. A sign indicating precautions to be taken shall be placed on the door of the client's room and on the client's chart.
6. All relatives must wear the appropriate protective clothing before entering the room.
7. Patient movement shall be limited to that which is absolutely necessary.
8. Patients shall wear masks when being transported outside the room.

Precautions for aerosol-generating procedures when airborne precautions are indicated

The performance of procedures that can generate aerosol, such as bronchoscopy, endotracheal intubation, and open suctioning of the respiratory tract have been associated with the transmission of infections such as tuberculosis, SARS and meningitis to healthcare personnel.

Protection of the eyes, nose and mouth in addition to gown and gloves is recommended during the performance of these procedures in accordance with Standard Precautions. A respirator is recommended during procedures likely to contain TB, SARS, Avian or Pandemic Influenza viruses.

Note: When additional precautions are indicated, appropriate education and counselling must be given to patients and relations to counteract possible adverse effects on patients (e.g. anxiety, depression, perception of stigma, reduced contact with clinical staff) in order to improve compliance by patients

5.4 Isolation Precautions for Healthcare Settings

Isolation is the creation of barrier-mechanical or space to prevent the transmission of infectious diseases (contact and airborne routes) to or from a patient. It is also to reduce the risk of transmission to other patients, healthcare workers and visitors.

1. Healthcare workers should collaborate in effecting timely and appropriate application of isolation.
2. The nursing personnel or Medical officer should report the patient's condition that warrants isolation.
3. A full explanation should be afforded to the patient and family for the need of isolating the patient.
4. A well-ventilated area/room with all necessary equipment will be prepared for the patient.
5. The medical officer or nurse in charge should report on the appropriate form, all infectious cases suspected or confirmed by the Ministry of Health.
6. The patient's chart should be kept outside the patient's room.
7. The patients should leave the isolation rooms for essential purposes only.
8. When patient transportation is required/ necessary, use precautions to minimize the risk of transmission.

Appropriate or selective placement of patients is important in preventing the transmission of infections in the hospital setting. General principles in relation to the placement of patients including the following:

1. **Bed Spacing**
   There should be adequate spacing between each bed to reduce the risk of cross-contamination. The optimum spacing is 1-2 meters between beds.

2. **Single rooms**
   The single rooms reduce the risk of transmission of infection from the source patient to others by reducing direct or indirect contact transmission. Ideally, single rooms should have the following:
   a) Hand wash facilities
   b) Toilet and bathroom facilities

3. **Cohorting**
   If there is a shortage of a single room, patients colonized by the same organism can be cohorted in a well-designated area. The area can be clearly segregated from other patient care areas in the healthcare facility used for non-infected/ colonized patients.

Categories of isolation
There are three main categories of isolation. These are categories A, B and C.

1. **Category A**
   This applies to infections spread by direct contact with contaminated equipment, faeces, body fluids and airborne infections.

2. **Category B**
   This applies to patients that require Strict Isolation. They are specialized units for patients with highly contagious diseases like rabies, anthrax, diphtheria and haemorrhagic fevers.

3. **Category C**
   This is also referred to as Protective (reverse) Isolation. It applies to immunocompromised patients who must be protected from other patients and attending staff, e.g. patients on cancer treatment.

5.4.1 Category 'A' isolation:

Examples of diseases in this category are cholera, enteric fever and severely ill pulmonary tuberculosis.

The requirements for category "A" isolation are:
1. Cubicle
2. Protective clothing – gloves and aprons are essential (Masks shall be used if indicated).

In addition to Standard Precautions, the following measures shall be adhered to in category "A" isolations:
1. All health staff and visitors shall abide by IPC protocols and wear protective clothing as indicated.
2. Protective clothing shall be disposed of immediately after use.
3. Patients in this category shall be attended to last, i.e. after dealing with all non-infected patients.
4. All health staff who are inadvertently exposed to an infected person(s) shall be thoroughly investigated.
5. Body fluids and faeces shall be disposed of immediately.
6. Reliable item reprocessing method shall be used where separate equipment is not available for different patients before reusing the equipment on other patients.
7. *Airborne Precautions shall be applied when indicated*

5.4.2 Category 'B'- Isolation (Strict isolation)

These are specialized units and apply to patients with highly contagious diseases like; rabies, anthrax, diphtheria, Haemorrhagic fevers, etc.

The requirements for category B isolation shall include:

1. Cubicle.
2. Protective clothing, such as plastic aprons, masks, gloves, eye goggles, gowns.
3. Disposable plates, cups and cutlery.

In addition to Standard Precautions, the following measures shall apply:

1. Use disposable non-clinical items and do not recycle items like plates, cups and cutlery.
2. Keep airborne contamination and patient handling to a minimum.
3. Educate healthcare facility staff and visitors on the risk involved when looking after such patients.
4. There shall be restricted access to the patient.
5. All waste produced in this unit shall be handled as highly infectious.

NB: Airborne precautions and other precautions to be taken by visitors also apply. Dead bodies from isolation "B' diseases should be put in body bags before removal from the wards.

5.4.3 Category 'C' isolation (Protective isolation)

This shall apply to patients who must be protected from other patients and attending staff such as immunosuppressed patients (e.g. patients on cancer treatment).

The requirements shall be:

1. Cubicle.
2. Protective clothing, plastic aprons, masks, gloves, eye goggles and gowns.

In addition to Standard Precautions, the following measures shall be observed:

1. Patients in this category must be attended to first before attending to all other patients.
2. Hygienic hand wash, sterile aprons, gloves and head gear/cap, mask, etc. must be worn.
3. All protective clothing shall be discarded after attending to patients.

5.4.4 Visitors

1. Shall be restricted to two persons at a time during visiting hours.
2. Shall observe the **'NO VISITORS'** sign and report to the Nurse-In-Charge prior to entering the isolation ward/room.
3. Shall be requested **not** to bring items, which may harbour potentially harmful microorganisms.
4. Shall be educated on the necessary precautions to be taken to prevent the spread of infection to the family, friends and community.
5. If required, shall wear personal protective equipment (e.g., gloves, masks, gowns).
6. Practice hand hygiene before and after visiting the isolation ward.

CHAPTER 6

6.0 Environmental and engineering considerations in health facility design

IPC environmental and engineering considerations in health facility designs are to render the healthcare facility environment safe from infections or reduce infections to the barest minimum. The layout of physical structures and the installation of equipment have an influence on the implementation of infection prevention and control guidelines in health facilities. There is, therefore, the need to ensure compliance with IPC requirements in the design of health facilities. Regardless of the size of the facility or the complexity of the procedure, it is critical to ensure that there is no cross-contamination during the handling, transporting, processing, and storage of instruments. The layout of physical structures and installation of equipment shall conform to set Healthcare standards. It is therefore essential to have the following premises and practices:

They include the following:

1. Work areas
2. Ventilation
3. Surfaces
4. Traffic pattern in the facility
5. Positioning/siting of the sink
6. Storage facilities for supplies and equipment
7. Storage facilities for food and drinks
8. Water supply system
9. Electricity supply.
10. Changing rooms, toilets and washrooms
11. Operating and sterilizing Room
12. Laundry Room
13. Waste Holding Area
14. Incinerator room

6.1 Work Areas

Work areas shall correspond to the standards set by the MoH and shall:

1. Have adequate lighting.
2. Have easy access and space for equipment and persons.
3. Be designed to allow thorough cleaning and disinfection of all surfaces
4. Have designated facilities for storing outer garments and personal items and for eating and drinking.
5. Have adequate and easily accessible hand hygiene facilities.
6. Have restrooms for staff.
7. Be of adequate size to accommodate the workload

6.2 Ventilation

Ventilation refers to the movement of outdoor air into a building or a room and its distribution within the building or room. The main purpose of ventilation in buildings is to provide fresh air for breathing through the process of diluting the pollutants originating in the building and removing the pollutants from the inside of a building.

Methods of Ventilation

1. **Natural ventilation**
   i. Health facilities ventilation systems should be designed to use natural ventilation and maintained to minimize microbial contamination.
   ii. The simplest and least expensive technique is to remove and dilute the air from highly microbial contaminated areas; (e.g. TB rooms) and in all health facilities by maximizing natural ventilation through open windows.

2. **Mechanical ventilation**
   i. General areas should be well ventilated. Only certain specialized areas of the hospital, such as operation theatres and patient isolation wards ideally should have controlled ventilation. For the operating room, the critical parameters for the air quality include temperatures between 20 and 22 degrees Celsius and humidity between 30 -60% to inhibit bacterial multiplication.
   ii. Negative air pressure vented to the air is recommended for contaminated areas and is required also for isolation of patients with infections spread by the airborne route, by preventing contaminated air from escaping into hallways and other surrounding areas.
      a) A well-ventilated room is adequate options for healthcare facilities without "negative pressure" rooms.
      b) A fan can be placed in the room to direct flow towards the outside window, however, the door to the aisle or other rooms should be kept closed at all times.
   iii. The ventilation system should be cleaned periodically and fans that can spread airborne pathogens should be avoided in high-risk areas.
   iv. Additional complex and costly methods include air filtration to remove infectious particles and Ultraviolet Germicidal Irradiation (UVGI) to kill M. Tuberculosis organisms.

3. **Facility Design and Planning**
   Building ventilation has three basic elements:
   i. *Ventilation rate* - the amount of outdoor air that is provided into the space and the quality of the outdoor air. Ventilation can be measured using a vanometer.
   ii. *Airflow direction* - the overall airflow direction in a building should be from clean zones to dirty zones. Once the system has been designed by an Infection Control (IC) architect, the use of the rooms should not be modified.
   iii. *Air distribution or airflow pattern* - the external air should be delivered to each part of the space in an efficient manner, and the airborne pollutants generated in each part of the space should also be removed in an efficient manner.

6.3 Surfaces

Surfaces should be such that they can easily be cleaned with disinfectant cleaning solution. Surfaces should, therefore:

1. Be level and smooth, as well as have minimum joints where bacteria can accumulate.
2. Be unaffected by spilled liquids.
3. Be durable enough to withstand repeated cleaning with disinfectant solution.

All surfaces including the surfaces of furniture and equipment should be made of materials that will facilitate effective cleaning and disinfection.

With regard to woollen carpets for floors, there are usually problems with staining and odours. Woollen carpets are therefore not advisable in all patient care and other areas where spillage or soiling is likely to occur (e.g. kitchen)

6.4 Traffic Pattern in the Facility

To prevent cross-infection, the design of the facility will need to take into consideration the following:

i. Patient movement should cause minimal exposure of patients to each other and to visitors
ii. Visitors' traffic routes should minimize contact with patients (e.g. elevators for visitors should be separated from that of the patients)
iii. Staff who are required to wear protective clothing should have ready access to locker space without entering protected areas
iv. Movement of all supplies and equipment whether clean, sterile or contaminated should be done in closed containers that will not allow supplies to fall from the container to the floor
v. The design should put special areas like operating room, labour and delivery, waste storage, nursery, clinical laboratories out of the major traffic routes
vi. The design should provide area for emptying bedpans without leaving the patient's room

6.5 Positioning/Siting of Sinks for hand washing

IPC policy states that hand washing should be done before and after each patient contact. To support this, attention should be paid to the following:

1. Sinks should be placed in areas that are convenient and easily accessible such that they can easily be used for hand washing before and after patient contact.
2. Adequate number of sinks should be provided for use by health workers, patients and their relatives. There should be at least two hand washing basins in wards with more than 20 beds.
3. Adequate space should be provided around the sinks for hand dryers, soap dispensers and garbage bins.
4. Sinks should be large enough (hygienic hand wash sinks) to prevent splashing.
5. Sinks should be operated by hand, elbow, foot or knee. Elbow, foot and knee-controlled sinks are preferred in areas where there is an increased risk of touch-contamination (e.g. isolation rooms).

6.6 Storage of Supplies and Equipment

Storage areas for medical supplies and equipment should:

1. Be clean and pests-free
2. Be away from sinks and drains to avoid splashing and high humidity
3. Have adequate space between equipment to facilitate cleaning of equipment and staff movement as well as to eliminate pests' hiding places
4. Be well ventilated and lighted
5. In addition to the above, special attention should be paid to the following:
6. Contaminated equipment and supplies should be kept away from clean/sterile equipment and supplies
7. Contaminated equipment and supplies should not be stored for long periods
8. Dust covers or other protective coverings should be used to avoid contamination by dust and moisture

6.7 Storage of food and drinks

Adequate storerooms should be provided in the kitchen premises for storage of food and drinks. In addition, attention should be paid to the following:

1. The storerooms should be well lit, ventilated, dry and have appropriate temperature.
2. Walls and floors should be tiled. Floors could either be granolithic or terrazzo in order that they can easily be cleaned.

3. Stores should be fixed with shelves. These could be built with wooden shelving slate or marble-topped benching or easily movable and adjustable metal racking with stainless-steel-topped tables. These could be fixed with castors so that they can be moved easily.
4. Cold storage facilities should be provided and should include a refrigerator, deep freezer, and cold room walk-ins and chill room walk-ins. The temperatures should be monitored.
5. There should be separate fridges for the storage of food and drinks
6. Food and drinks must never be stored in the same fridge as medicines, vaccines and patient specimens.
7. It should also be noted that under no circumstance should food be kept on the floor. Food should be stored away from cleaning items, strong-smelling and poisonous chemicals. Finally, food preparation/production areas should always be away from mortuary and incinerators.

6.8 Water Supply System

Contaminated water constitutes one of the most effective pathways for mass transmission of pathogens to a large population. Working with key persons in the health facility and community to provide and maintain safe water for patient and healthcare use is an important part of IPC.

1. To prevent the spread of infection, wholesome and potable water should be easily available for drinking, food preparation, hand washing, patient bathing and cleaning, disinfection and sterilization. Water quality:
   i. Water has zero E. coli per 100 mls.
   ii. Water is filtered and treated with disinfectants to ensure adequate concentration (e.g., chlorine 2 parts per million [ppm]) at point of use to eliminate disease-causing microorganisms.
   iii. There are no tastes, odours, or colours that would discourage consumption of the drinking water.

2. Water quantity: Minimum water requirements in a health facility (on average): >5 litres of water per outpatient >40–60 litres/patient/day per admission > 100 litres/procedure in operating theatres and maternity units

3. Water facilities and access to water: Sufficient water-collection points and water-use facilities are available in a healthcare facility to allow convenient access to, and use of, water for medical activities. Where water tanks are installed for storage:
   i. The tanks should have tight covers to prevent dust, animal droppings as well as sunlight from entering, as these accelerate the growth of algae and other microorganisms.
   ii. Routine emptying and cleaning of tanks is recommended.
   iii. The tank should be made from rust free material.
   iv. Schedule routine monitoring of water quality in the tank

6.9 Electricity

Adequate, accessible, appropriate and safe electric supply should be provided:

1. There should be a 24 hours of electrical supply.
2. There should be a back-up source like a generator or solar plant and should be monitored accordingly.
3. There should be regular maintenance

6.10 Changing rooms, toilets and washrooms

An appropriate changing room facility shall be provided for all health staff to promote the wearing of scrubs within the health facility.

Toilets and washroom

Adequate, accessible, and appropriate toilets are provided for patients, staff, and caregivers:

1. There is at least one toilet per 20 inpatients.
2. There are separate toilets for males and females.
3. Toilets are built according to local resources, cultures, and practices.
4. There is at least one shower for every 40 users in inpatient areas.
5. Adequate water supply and proper drainage system.

6.11 Operating and Sterilisation room

Where feasible, all health facilities should aim to process all instruments in a central location. Large facilities where a high number of procedures are performed should have a Central Sterile Supply Department (CSSD) that is dedicated to cleaning, disinfection, and sterilization of the instruments and other medical devices. A CSSD should at least have the following demarcated areas:

1. Soiled areas – for receiving and cleaning of soiled instruments/items.
2. A room for handling textiles (the linens used as drapes and wraps, gauze and cotton) in order to protect the sterile instruments from lint, which can cause inflammation and infection if deposited into surgical wounds.
3. Clean/sterile areas for high-level disinfection, sterilization.
4. Area for storage of disinfected and sterile instrument/clothes.

The following are recommended:

1. Two sinks in the soiled area, one for removing gross contaminants and the other for rinsing instruments. A sink dedicated to hand hygiene.
2. Covered bins or cabinets for storage of sterile and disinfected items to protect them from dust and contamination.
3. Good ventilation (e.g. airflow from the clean/sterile storage area to dirty area with exhaust to outside to prevent contaminants from flowing into the clean area). If an air-conditioned room with an exhaust is not available, as in many resource-poor settings, local exhaust can be achieved by placing a fan in the window to assist airflow.

Instrument processing areas in small health facilities

Ideally, all of the areas where instrument processing takes place should have the design and space described above for the CSSD. The following are alternatives:

Where feasible, instrument processing areas should be separated from procedure rooms and the Operating Theatre (OT) room. Ensure that the workflow (i.e., the physical flow of instruments from one place to another) prevents cross-contamination.

If only a single room is available:

1. Physical separation of clean and contaminated work areas is required.
2. Soiled equipment should be received and cleaned in an area of the room well away from where instruments are high-level disinfected or sterilized and stored. These functions should be at least 1.2 meters (4 feet) consider the size of the room from one another.
3. Where needed, physical barriers such as screens or makeshift walls could be installed to prevent splashing from the cleaning area to the preparation and packaging or sterilization areas.

The flow of instruments should always be from dirty to clean. Clearly, mark the "dirty" and "clean" areas with signs and/or painted lines on the floor to delineate the clean and dirty areas.

Surgical operating theatre/room

The following areas should be clearly designated to help ensure recommended traffic flow in the operating suites:

1. Changing room and work station for staff.
2. Staff toilets and bathroom.
3. Area for surgical hand scrub and putting on PPE.
4. Designated instrument processing area/room (with separate clean and dirty areas).
5. Space with cabinets for storing sterile and high-level disinfected items.
6. Preoperative examination room/holding room.
7. Theatres large enough to allow movement of staff in the room without contaminating the staff performing surgery or the sterile field.
8. Recovery area for patient observation after surgery (may be combined with the preoperative area).

Operating theatre ventilation

The following shall apply in operating room ventilation:

1. Operating theatre air should ideally be filtered to reduce the concentration of airborne pathogens generated by staff. If windows have to be left open, they should be covered with fly or insect-proof netting.
2. When resources are available, the best practice is to design the OT with mechanically ventilated clean air and positive pressure to ensure that air from the OT flows into the corridor and other adjacent areas. Air conditioning systems should ensure that a minimum of 12 air changes per hour of filtered air is delivered.
3. Routine bacteriological testing of operating room air is unnecessary. It should be performed when commissioning a new theatre and may be useful when investigating an outbreak.
4. Regular planned preventive maintenance of the air conditioner.

6.12 Hospital Laundry Room

Laundry is an integral part of hospital service and a regular clean supply is essential. Linen and patient clothing is a potential source of infection to staff during handling, transportation, processing and storage of laundry. The design should facilitate the flow of linen from all departments to the laundry to avoid cross-contamination.

The laundry facility should be partitioned into 2 separate areas, namely;

1. Dirty area for receiving and handling the soiled and dirty laundry
2. Clean area for processing clean linen

6.13 Waste Holding Area

Ensure the availability of waste holding area in which its design meets the Waste Regulations of 2000.

6.14 Incinerator Room

The incinerator room should meet the Waste Regulations of 2000. Every hospital and health centre should have an incinerator room.

CHAPTER 7

7.0 OCCUPATIONAL HEALTH AND SAFETY

Healthcare workers stand at greater risk due to their exposure to blood and other body fluids during the course of their work. Therefore, they are at an increased risk of infection by viruses transmitted by blood or other biological fluids, such as HIV, hepatitis B, Ebola and other viruses and bacteria. They are also at risk of contracting diseases transmitted by direct or indirect contact or by inhalation of large and small droplets (e.g. TB, H1N1). The risk of infection to healthcare workers depends on the prevalence of the disease in the population, frequency of exposure and susceptibility. Also, staff working with imaging tools such as x-ray machines, CT scanners, and medical wastes are exposed to various substances that put their health at risk.

The main objectives of OHS are to:

1. Minimize the possibilities Hospital Acquired Infections among health workers
2. Help address the issue of safety among health workers

Ensure that suitable trained or qualified individuals direct the planning and implementation of the occupational health and safety or workplace management programme in terms of current legislation to effectively eliminate or reduce the risk of infection, healthcare facilities should establish good health and safety measures.

EMPLOYER DUTIES AND RESPONSIBILITIES SHOULD INCLUDE: (REFER TO THE OCCUPATIONAL HEALTH AND SAFETY ACT OF 2001, PART3 CHAPTER 8 AND 9)

Induction and Routine Medical Examination

1. Healthcare workers should undergo induction on recruitment or on new appointment and be reviewed periodically through formal care structures.
2. Screening of healthcare workers should also be done every year/ periodically. E.g. Immunization and medical surveillance, TB screening every six months, respirator (N95 mask) fit testing, etc.
3. The risk to the health and safety to staff, patients or visitors should be assessed and control measures should be introduced in order to minimize or eliminate risk and access to information on safe practices.
4. Appropriate and consistent supply of PPE
5. All hospitals should provide personal protective clothing for anyone who is performing a task that might put them at risk from blood or body fluid exposure or anything else.
6. Healthcare workers should undergo induction on recruitment or on new appointment and be reviewed periodically through formal care structures.
7. Screening of healthcare workers should also be done every year/ periodically. E.g. Immunization and medical surveillance, TB screening every six months, respirator (N95 mask) fit testing, etc.
8. The risk to the health and safety to staff, patients or visitors should be assessed and control measures should be introduced in order to minimize or eliminate risk and access to information on safe practices.
9. Appropriate and consistent supply of PPE
10. All hospitals should provide personal protective clothing for anyone who is performing a task that might put them at risk from blood or body fluid exposure or anything else.

Healthcare workers roles and responsibilities should include:

1. Following safe work practices at all times, including adhering to IPC best practices
2. Be familiar with the employer's written departmental policies
3. Know the potential health and safety hazards of the job and protective measures by participating in appropriate safety training programs

4. Know how to report unsafe working conditions
5. Report any work-related injury or illness to supervisor
6. Participate in accident and injury investigations
7. Know what to do in an emergency
8. Take reasonable care of their own safety and that of other people who might be affected by the things that they do and things that they fail to do

7.1 Reporting of Accidents and Incidents

Accidents or incidents, including near –misses, spillage, damaged containers, inappropriate segregation, and any incidents involving sharps should be reported to the IPC committee or to another designated person. The report should include the following details:

1. The nature of the accident or incident.
2. The place and time of the accident.
3. The staff who are directly involved.
4. Any other relevant circumstances.

IPC focal person, OHS officer or other responsible officers:

Should also take all possible action to prevent recurrence should investigate the cause of the accident or incident and the records of the investigation subsequent remedial measures should be kept and communicated to the employees and feedback be given to workers. Healthcare workers should be given immunization against the potential infection from virus causing hepatitis B and tetanus infection. Routine medical examinations should be conducted in relation to the above conditions in order to ensure adequate and continuous protection. Vaccinations such as diphtheria, measles and any emerging influenza/disease during outbreaks are recommended as the need arise.

Risk Assessment for Occupational Exposure

7.2 Risk assessment and management

A health facility-wide IPC risk assessment is the cornerstone for designing, developing, and implementing specific IPC activities at healthcare facilities. The IPC risk assessment helps identify and prioritize surveillance and infection prevention activities at the health facility and assists to focus interventions on high-risk, high-volume, or problem-prone procedures. Infection prevention and control risk assessments should be carried out in each health facility. The information should be communicated to all relevant people who have the responsibility to act on findings.

In assessing risk, the following shall be done:

1. Identify the hazard (e.g. infection) and its likely mode(s) of contact;
2. Determine the likelihood (probability) of its occurrence;
3. Ascertain the likely severity of its effect;
4. Determine the level of priority
5. Recommend level of action or control measures to be taken.

In instituting control measures, apply the hierarchy of controls in the following order:

1. Engineering and environmental controls – e.g. provision of appropriate physical structures, adequate ventilation, proper environmental cleaning;
2. Administrative controls – e.g. provision of adequate staff and supplies, education of health workers, patients and visitors); and
3. Personal protective measures.

Health personnel should be made aware that although blood secretions from patients may be infectious, simple contamination of unbroken skin does not comprise a significant risk, but contamination of intact mucous surfaces of the mouth and eye does. The exposure should be classified as "low risk" or "high risk" for bloodborne pathogens as described in the table below:

The risk of exposure to bloodborne pathogens should be assessed by a Medical officer or health worker trained in PEP and the individual should be given PEP drugs according to the assumed risk.
Administration of PEP drugs should be initiated as soon as possible after the counselling and testing. Preferably within the first hour after exposure. Since it is known that the sooner the drugs are initiated the higher the efficacy of PEP in preventing transmission.

1. According to the severity of exposure, it is still acceptable to start prophylaxis within 72 hours (3 days) from time of exposure to contaminated fluids.
2. All exposures seen after 72hrs are to be referred to the Doctor for assessment and further management
3. The optimal duration for PEP drug administration is 4 weeks (28 days)
4. In Eswatini especially rural settings where access to laboratory facilities might be limited, a two-drug regimen is recommended for PEP.
5. Monotherapy is not recommended for PEP
6. A triple-drug regimen should be used in the case of the highest risk, such as source person with signs and symptoms of AIDS advanced diseases.

See annex:

- 10 TB IPC risk assessment tool
- 11 IPC facility assessment tool
- 12 IPC hygiene checklist
- 13 IPC inspection tool
- 14 IPC risk rating matrix
- 15 IPC assessment National level
- 16 IPC assessment Regional level

Table 13: Levels of risk

Risk Classification	Examples of Exposure
Low Risk	Solid Needle
	Splash of body on intact skin
	Drops Volume on mucous membrane
	Asymptomatic Source Viral load <1500 cm/l or WHO stage 1 &2
High Risk	Large Bore Needle
	Deep needle injury
	Visible blood on device
	Needle from patient artery or vein
	Large volume splashes on mucous membrane of non- intact skin
	Symptomatic source, acute seroconversion, high viral load
	Defaulter from ARV drugs (possible resistant strains)

7.3 Hepatitis B (HBV) and C (HCV) Recommendations

As stated earlier, the risk of transmission of Hepatitis B and C is far more likely than HIV for an exposure. A very effective vaccine against Hepatitis B is currently available in Eswatini; it is recommended that all HCWs complete the series of Hepatitis vaccine.

The following are recommendations for all eligible people and HCW who had a significant exposure should have:

1. Baseline testing for Hepatitis B and C for the HCW at the time of exposure.
2. Testing for Hepatitis B and C for the source of exposure where available.

Administration of HBIG (Hepatitis Immunoglobulin) 0.06ml/kg

The vaccine is administered intramuscularly as soon as possible after exposure and up to 7 days post-exposure and to all the individuals who have never been vaccinated or have not completed the Hepatitis B vaccine series. Follow up is a very important component of care for the exposed health worker. During the follow-up period of 6 months, the health worker should be advised:

1. To abstain from sexual intercourse or use condoms to prevent sexual transmission of HIV
2. To avoid unwanted pregnancy
3. To avoid donating blood
4. To consult for advice if breastfeeding
5. To seek medical evaluation for any acute illness that occurs during the follow-up period

7.4 Training of Healthcare Personnel

1. All personnel should receive appropriate training.
2. Training should be tailored to the different needs at various levels or functions in the health Facilities.
3. Separate training activities should be designed for each category of health personnel
4. Healthcare facility managers and administrative staff should be responsible for implementing regulations on IPC

Basic education for healthcare staff should include:

1. Information on, and justification for, all aspects of Infection Prevention and Control
2. Information on the role and responsibilities of each healthcare staff member in implementing the IPC policy guideline;
3. Technical instructions, relevant for the target group, on the application of universal precaution practices
4. The instructors should have experience in IPC basic skills.
5. The Assessment /M&E tools will be attached as the last Chapter

Audits in Infection Prevention and Control

Audit tools are commonly referred to as “quality improvement tools”. They are templates developed for Infection Control Teams (ICT) to evaluate the implementation of standard procedures, such as hand hygiene, risk management, environmental cleaning. The audit can be performed by the QA and Infection Control Team (ICT) or other designated staff. The audit tool must match the recommended practices and resources of the healthcare setting. Initially, it is probably worth selecting a few areas to audit, preferably those that are most important to the organisation. These may include high-risk areas highlighted through surveillance results or the occurrence of outbreaks.

1. The audit should take place over a defined time. E.g. A rapid audit cycle plan can be completed in a few days and the results provided very quickly.
2. Weekly reports should Provide rapid feedback on incidental issues while they are still fresh (e.g., during outbreaks or after occupational sharp injuries).
3. Monthly reports: A monthly report should include Chapters about surveillance, audit results, education, training, and consultations.
4. Quarterly reports: These are formal reports including recommendations and management of issues.
5. Annual reports: A summary of audits carried out during the year and the resulting improvement or changes during the rapid and annual audit plans, illustrated as appropriate with graphs.
6. A key person must be identified in each area to help facilitate the implementation of any recommendations within a specified time.

NB: Staff must learn to appreciate that the intent of audits is to promote good practice, improve patient care, and ensure safety.

CHAPTER 8

8.0 Laboratory and Blood Bank Biosafety

The primary goal of this Chapter is to outline the role of the clinical laboratory and provide basic information on laboratory bio-safety. More in-depth information can be found in standard operating procedures (SOPs) for laboratory services.

8.1 Role of the Clinical Laboratory in Infection Prevention and Control

The following are examples of how the IPC team can collaborate with the clinical microbiology laboratory:

8.1.1 Surveillance

The clinical microbiology laboratory is an important partner for the IPC team for surveillance of HAIs. Good-quality samples and reliable results are critical to ensure that surveillance results are accurate. Positive cultures from the source of interest can identify HAIs, and knowing the organisms causing HAIs at the facility can assist with prevention strategies.

8.1.2 Outbreak identification and investigation

The clinical microbiology laboratory can alert the IPC team about new or unusual organisms, clusters, or new antimicrobial resistance patterns that may indicate an outbreak may be taking place. The laboratory can also provide vital assistance when investigating an HAI outbreak. Depending on the capacity, the role of the clinical laboratory in outbreak investigation can include confirming the organism's identity, confirming from the records normal or background rates of the organism in question, and determining the relatedness of isolates.

8.1.3 Environmental sampling

Although environmental sampling is not routinely recommended, it may be used in limited circumstances with careful consideration when indicated by an epidemiological investigation. Most clinical laboratories do not have the capacity to process samples from the environment, but if the laboratory does, the staff can assist with developing consistent, specific, and systematic collection of samples and analysis of results.

8.1.4 Reporting

The laboratory can assist with identifying and providing details for reporting of diseases (such as polio, viral haemorrhagic fevers, cholera) as required by the Ministry of Health or other entities.

8.2 General laboratory guidelines

1. All laboratory personnel and others whose work require them to enter the laboratory shall be knowledgeable about the chemical and biological hazards with which they will come into contact through their normal work in the laboratory, and be trained in appropriate safety precautions and procedures
2. Access to the laboratory shall be severely restricted to only authorized persons
3. All laboratories shall have clear written procedures for dealing with spillages or other accidental contamination.
4. The laboratory shall be kept neat, orderly and clean, and storage of materials not pertinent to the work shall be minimized.
5. Protective laboratory clothing (e.g. uniforms, coats, gowns) shall be made available and worn properly by all personnel including visitors, trainees, and others entering or working in the laboratory.
6. Protective laboratory clothing shall not be worn in non-laboratory areas.
7. Suitable footwear with closed toes and heels and preferably with non-slip soles shall be worn in all laboratory areas.

8. Safety face and eyewear, (e.g., glasses, goggles, face shields, or other protective devices) shall be worn when necessary to protect the face and eyes from splashes, impacting objects, harmful substances, UV light, or other rays
9. Eating, drinking, smoking, storing food or utensils, and applying cosmetics, shall not be permitted in any laboratory work area
10. Long hair shall be tied back or restrained.
11. Oral (MOUTH) pipetting is prohibited in any laboratory
12. Ideally, vacutainers should be used, where this is not possible, hypodermic needles and syringes shall be used. These must be disposed of appropriately.
13. Extreme caution shall be used when handling needles and syringes to avoid auto-inoculation and the generation of aerosols during use and disposal. Needles shall not be bent or re-capped and shall be promptly placed in a puncture-resistant container for disposal
14. Gloves shall be worn for all procedures that might involve direct skin contact with toxins, blood or infectious materials
15. Gloves should be changed, in-between patients/clients
16. Reusable utility gloves shall be appropriately decontaminated.
17. Hands shall be washed before leaving the laboratory and at any time after handling materials known or suspected to be contaminated and after removal of gloves
18. Disinfect work surfaces before and after procedures are completed and at the end of each working day with an effective all-purpose disinfectant such as hypochlorite (bleach) solution with a concentration of 0.5% available chlorine.
19. Loose or cracked work surfaces should be replaced by management as soon as possible.
    i. All technical procedures shall be performed in a manner that minimises the creation of aerosols.
    ii. All contaminated or infectious liquid or solid materials shall be treated before disposal.
    iii. Contaminated materials that are to be autoclaved or incinerated at a site away from the laboratory shall have the outside disinfected chemically or be double-bagged and then transported to the autoclave or incinerator in durable leak-proof containers which are closed and wiped on the outside with disinfectant before being removed from the laboratory.
    iv. Hazard warning signs with the relevant information shall be posted outside laboratory entrances where the infectious agent(s) used in the laboratory require special provisions for entry.
    v. All spills, accidents/incidents and overt or potential exposures shall be reported in written form to the supervisor.
    vi. The Accident/Incident Form should be completed and appropriate medical evaluation, surveillance and treatment shall be provided as required.
    vii. The infectious specimen should be worked upon in the right environment by laboratory personnel e.g. inside biological safety cabinets where necessary.
    viii. Laboratory personnel shall be protected against relevant infection by immunisation where possible and be tested for immunity.

Note: Refer to Laboratory Safety Guidelines

See annex 17, IPC Medical Microbiology audit tool

8.3 Handling clinical specimen

Clinical specimen includes excreta, secretions, blood and its components, body fluids, tissue and tissue fluid from human and animal origin. The proper handling (selection, collection, storage and transportation) of the clinical specimen is an essential component of IPC and the quality assurance system of the microbiological laboratory.

The rationale for proper handling of specimen

Proper handling of specimen ensures:

1. Their integrity.
2. Their timely receipt in the laboratory.
3. Reduction of wastage of resources.
4. Reduction in an incorrect diagnosis.
5. Reduction in the risk of infections to the client and health staff

Types of clinical specimen

There are several types of clinical specimen some of which are:

1. Stool and urine.
2. Blood and body fluids.
3. Body tissues.
4. Sputum.

The correct type of specimen to collect depends on the type of infection and symptoms. For example, if one suspects septicaemia, a blood specimen is required; if it is a urinary tract infection, a urine sample is required; and for respiratory tract infections, sputum and not saliva is required

.

8.4 General principles for the collection of specimen

8.4.1 Time for collection

The time for collection of most specimen depends on the condition of the patient, the type of disease being investigated, and times agreed between the clinician, nursing and laboratory staff for the delivery of specimen to the laboratory. For example, sputum and urine are best collected in the morning soon after the patient wakes up, when the organisms have had the opportunity to multiply over several hours. In cases of septicaemia, blood is best collected at the peak of the patient's temperature. The specimen must be collected before antimicrobial treatment is started. If antimicrobial treatment has started, indicate on the form, time and type of antimicrobial administered.

8.4.2 Precautions for the collection of microbiological specimen.

1. Laboratories should provide wards and outpatient clinics with appropriate specimen containers and instructions to ensure that specimen are safely kept and transported. ***Under no circumstance should patients be allowed to use their own specimen containers.***
2. Use aseptic techniques to prevent contamination of the specimen, especially during collection from sites that are normally sterile e.g. blood, cerebrospinal fluid or effusions. This ensures that the specimen contains microorganisms from the site where it was actually collected.
3. Swabs used to collect discharges and wound materials must be sterile and free from antibacterial agents. Avoid contaminating discharges and wound with skin commensals (normal flora). Collect specimen in sterile leak-proof, dry containers, free from traces of disinfectants.
4. The containers must be autoclavable plastic to avoid breakages.
5. Sterile containers are not necessarily required for collection of faeces and sputum. Containers must however be clean.
6. Instruct patients on how to aseptically collect specimen to avoid contaminating the outside of the containers. Wipe the outside of the container with a paper tissue or cloth soaked in disinfectant if contamination occurs before the specimen is sent to the laboratory.

7. Specimen should be collected in the appropriate place to avoid transmission of infections. For example, all facilities should be encouraged to provide separate toilets for collection of urine and faecal specimen and properly ventilated areas for collection of sputum.
8. Upon receipt, the specimen must be evaluated for abnormal features such as cloudiness, abnormal coloration or presence of pus, blood, mucus, or parasites.
9. As a routine, the appearance of urine, pus, vaginal discharge, faeces, effusion and cerebrospinal fluid should be evaluated and reported.

Sputum collection:

This high-risk procedure should be done either at the patients' home (outside, at a distance from other people), or in the healthcare centre (outside, or in a specially designated, extremely well ventilated 'sputum collection area'). This is because heavy coughing generates large numbers of infectious droplet nuclei;

1. Sputum should be collected in labelled, hermetically-sealed, non-sterile, screw-top, single-use plastic containers designed for this purpose. Cost approx. 0,07 Euros/unit;

Figure 21: Sputum collection containers

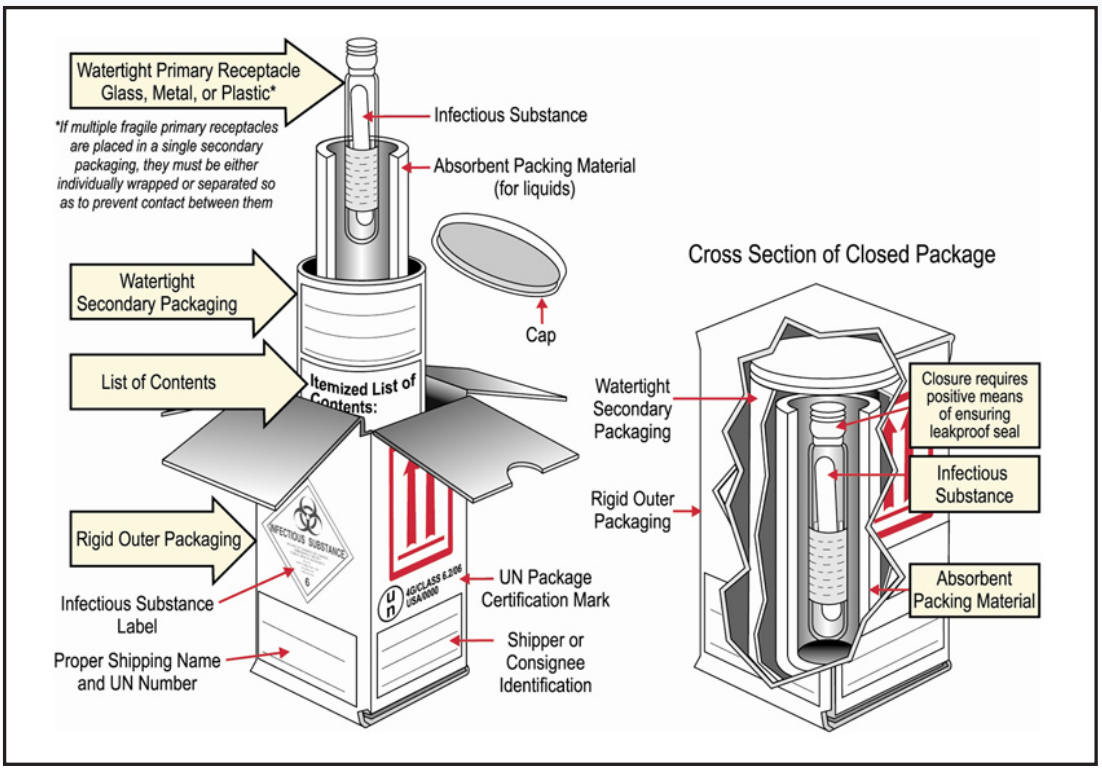
2. HCWs assisting sputum collection should wear respirators FFP2/N95 and avoid standing in front of the patient while they are coughing;
3. Check that the sputum container is securely closed after collection, clean the outside if necessary with a 1% active chlorine solution and label the container (not the lid) clearly;
4. In case of accidental splashing or sputum spills on the floor or working surfaces, immediately cover the area with a paper towel, saturate this with a 1% active chlorine solution and leave for contact time of 10 minutes. Wipe up the spill then clean the surface with detergent, rinse and allow to air dry. Wear rubber-cleaning gloves, apron, an FFP2/N95 respirator and protective glasses throughout the procedure.
5. If a nebulizer is used for sputum induction (for patients who find it hard to produce a good sample), the nebulizer mask and tube should be replaced/disinfected in a steam autoclave between patients, depending on the model.

Sputum transport: Samples should reach the laboratory as soon as possible but within **1 week** maximum.

1. From patient home to a healthcare centre, sputum containers can be transported in a sealed plastic bag but must be protected from sunlight;
2. If the laboratory is not in the same location as the health facility, sputum containers should be shipped between +2 and +8ºC in a plastic cool box;

Figure 22: Packaging of Infectious substances

Packaging and Labelling of Category A Infectious Substance
(See Packing Instruction 602)



NB: Ensure that the appropriate container is used for the collection of specimen.

The Request form and Labelling of Specimen

The clinician or health provider must label the specimen container correctly and fill the request form appropriately. Incorrect patient identification or incorrect labelling of either specimen or request form may lead to incorrect diagnosis, hence inappropriate treatment. Each specimen must be accompanied by a request form which gives the following information:

1. Patient's name.
2. Name of health facility.
3. Ward / unit / department.
4. Identification number or insurance number.
5. Date of birth or age.
6. Sex
7. Specimen type and source.
8. Date and time of collection.
9. Main clinical signs and symptoms and most likely diagnosis.
10. The physician to whom results are to be sent.
11. Any antimicrobial agent the patient is receiving or has received.
12. Clinician requesting for laboratory investigation
13. Clinician's signature
14. Clinician's telephone number
15. Test requested

The specimen container must be properly labelled with the following information:

1. Patient's name
2. Age and sex
3. Ward/unit/department
4. Identification number
5. Source of specimen
6. Date and time of collection.

8.4.3 Transportation of specimen

To ensure that pathogens survive during transportation to the laboratory, specimen should be delivered to the laboratory as soon as possible after collection. When delay is unavoidable suitable preservatives, transport media and appropriate temperature must be used to prevent the organisms from dying due to enzyme action, change of pH or lack of essential nutrients. Anaerobes usually require transport medium.

8.4.4 Mailing /dispatch of clinical specimen

Special precautions must be taken when transporting or mailing specimen as the carriage of infectious specimen over long distances, whether by hand, motor transport, or by inland mail or external mail is more hazardous if the organisms are in Risk Group III or IV (Refer to Table 13) (e.g. sputum for acid fast bacilli and blood for brucella).

Regulations governing the carriage of such materials by mail should be applied. Guidelines may be obtained from the courier and health authorities. For carriage of specimen by air across international boundaries, obtain the regulations from the health and aviation or airline authorities. Specimen for dispatch must be packed well and safely. All specimen should be considered potentially hazardous and must bear Biohazard labels as shown in Figure xx below.

8.4.5 Storage of microbiological specimen

The following guidelines should be applied for storage of specimen:

1. Refrigeration at 4-10ºC can help to preserve and reduce the multiplication (overgrowth) of normal flora in unpreserved specimen. However, specimen for the isolation of *Haemophilus influenzae, S. pneumoniae or Neisseria gonorrhoeae* must be sent immediately to the laboratory. They must never be refrigerated because these pathogens die under cold condition.
2. Infectious materials and agents that require low temperature should be stored in deep-freeze cabinets or on dry ice. The outer surfaces of ampoules stored in these ways should be disinfected when the ampoules are removed from storage.

8.5 Standard Precautions and dangers involved in handling specimen

All specimen are to be treated with Standard Precautions at all times because it is often impossible to know which specimen might be infectious. The primary dangers are contamination of hands, parenteral exposure through accidental needle sticks, cuts from contaminated equipment, exposure of mucous membranes (e.g. eye, nose) to aerosolized droplets, and exposure of broken skin, wounds and scratches to the contaminated specimen. The handling, transfer and shipment of the improperly packed specimen also carry a risk of infection to all people directly engaged in or in contact with any part of the process. It also endangers personnel who are indirectly involved e.g. the administrators, secretarial and other support personnel. It also poses a risk to the public and to personnel of the transport and postal services.

It is always important that infectious specimen should be worked upon in the right environment by laboratory personnel e.g. inside biological safety cabinets where necessary.

Always practice Standard Precautions with all specimen at all times

8.6 Classification of biological agents

The inherent risks of a pathogen are judged according to:

1. The severity of the disease it causes
2. Routes of infection
3. Its virulence and infectivity
4. Existence of effective therapies
5. Immunisation
6. Presence or absence of vectors.

Biological agents are classified into four (4) risk groups, which primarily reflect the judgments made on their inherent risk. There are four (4) corresponding levels of containment. Table 10 summarizes the risk groups and levels of containment.

Table 14: Risk groups and levels of containment

Risk Group	Containment Level
1 - Agents most unlikely to cause human disease.	• Good microbiological practice recommended for all work with microorganisms. • This should minimise risks for inadvertently culturing pathogenic organisms or non-pathogenic organisms proving harmful.
2 - Agents that may cause human disease and may be a hazard to laboratory workers but unlikely to spread to the community. Laboratory exposure rarely produces infection. Effective prophylaxis or treatments are usually available.	• Good microbiological practice mandatory. • Most work can take place on the open bench but safety cabinets are required for operations generating significant aerosols.
3 - Agents that may cause serious human disease and may be a hazard to laboratory workers may be of high risk of spread to community. Effective prophylaxis is usually available.	• Risks of airborne contamination reduced by working in safety cabinets (usually open fronted).
4 - Agents that cause severe human disease and are a serious hazard to laboratory workers may be of high risk of spread to the community. Usually no effective prophylaxis or treatment available.	• Work performed in closed cabinets in maximum containment laboratories.

Source: * http://www.soton.ac.uk/~safety/GuidelinesforHandlingMicroorganisms.html

8.7 Biohazard spills

Biological spills outside biological safety cabinets will generate aerosols that can be dispersed in the air throughout the laboratory. These spills can be very serious if they involve micro-organisms that require Level 3 Containment since most of these agents have the potential for transmitting disease by infectious aerosols. To reduce the risk of inhalation exposure in such an accident, occupants should leave the laboratory immediately. The laboratory should not be re-entered to decontaminate or clean up the spill for at least 30 minutes. During this time the aerosol may be removed from the laboratory via the exhaust ventilation systems, such as biological safety cabinets or chemical fume hoods if present.

1. **Spills on the Body**
   i. Remove contaminated clothing.
   ii. Wash exposed area with soap and running water for one minute. Mucous membrane should be washed with water only.
   iii. Obtain medical attention (if necessary).
   iv. Report the incident to the laboratory supervisor.
   v. Record in the incident/accident form

2. **Biosafety Level 1 Organism Spill**
   i. Wear disposable gloves.
   ii. Soak paper towels in disinfectant and place overspill.
   iii. Place towels in a plastic bag for disposal.
   iv. Clean up spill area with fresh towels soaked in disinfectant.

3. **Biosafety Level 2 Organism Spill**
   i. Alert people in immediate area of spill.
   ii. Put on personal protective equipment. This may include a laboratory coat with long sleeves; back fastening gown or jumpsuit, disposable gloves, disposable shoe covers, safety goggles, mask or full-face shield.
   iii. Cover spill with paper towels or other absorbent materials. Pour a freshly prepared 0.5% dilution of household Chlorine around the edges of the spill and then into the spill. Avoid splashing *(see Chapter 4 Environmental cleaning)*.
   iv. Allow a 20-minute contact period. Clean up the spill area with fresh towels soaked in disinfectant, after the spill has been absorbed.
   v. Place towels in a plastic bag and incinerate or burn.

4. **Biosafety Level 3 and 4 Organism Spills**
   i. Attend to injured or contaminated persons and remove them from exposure.
   ii. Alert people in the laboratory to evacuate. Close doors to the affected area.
   iii. Call appropriate emergency number for emergency response.
   iv. Have a person knowledgeable of the incident/accident and laboratory assist emergency personnel on arrival.
   v. In special situations with spills of micro-organisms such as anthrax and Viral Haemorrhagic Fever (VHF), the Ministry of Health shall develop specific guidelines to deal with these.

8.8 Cytotoxic/antineoplastic spills

1. **General Procedures**
   i. Follow appropriate guidelines established by the laboratory.
   ii. Clean up immediately spills and breakages of cytotoxic/antineoplastic drugs.
   iii. Remove broken glass carefully.
   iv. Identify spill with a warning sign so that other persons in the area will not be contaminated.

2. **Personnel Contamination**
   i. Remove the gloves or gown immediately.
   ii. Wash the affected skin area immediately with soap (not germicidal cleanser) and running water. For eye exposure, immediately flood the affected eye with water or normal saline designated for the purpose for at least five minutes.
   iii. Obtain medical attention immediately.

3. Clean-up of Small Spills

i. Clean immediately spills of less than 5 ml. or 5 gm. outside a hood.
ii. Wear gowns, double surgical latex gloves and eye protection for the procedure.
iii. Wipe up the liquid with absorbent gauze pads. Wipe solids with wet absorbent gauze. Then clean the spill areas (three times) using a detergent solution followed by clean water.
iv. Place broken glass fragments in a small cardboard or plastic container and then into a disposal bag, along with the used absorbent pads and any non-cleanable contaminated items.
v. Place reusable glassware or other contaminated items in a plastic bag and wash in a sink with detergent by a trained employee wearing double surgical latex gloves.

4. Clean-up of Large Spills

For spills of amounts larger than 5 ml. or 5 gm. the spread should be limited by gently covering with absorbent sheets of spills-control pads or pillows or, if a powder is involved, with damp cloths or towels. Be sure not to generate aerosols.

i. Access to the spill areas should be restricted.
ii. Wear personal protective equipment with the addition of a respirator when there is any danger of airborne powder or an aerosol being generated. The dispersal of particles into surrounding air and the possibility of inhalation is a serious matter and should be treated as such.
iii. Chemical inactivators, with the exception of sodium thiosulfate, which can be used safely to inactivate nitrogen mustard, may produce hazardous by-products and should not be applied to the spilled drug.
iv. Clean all contaminated surfaces with a detergent solution and then wipe with clean water. All contaminated absorbents and other materials should be disposed of in the disposal bag.

5. Spills in Hoods

If the spill occurred in a glove box, clean bench or biological safety cabinet, the filter contained in the cabinet is more than likely contaminated. Label the unit **"Do Not Use – Contaminated with (name of substance)".** The filter and filter cabinet must be decontaminated, and the filter changed and properly disposed of. This procedure may require the services of an outside contractor trained in the use of specialised personal protective equipment.

6. Waste Disposal

(See Chapter 4: 4.8 on healthcare waste management).

7. Blood spills

(Chapter 4: 4.7 Environmental cleaning).

CHAPTER 9

9.0 ASEPSIS AND ASEPTIC TECHNIQUE IN CLINICAL PROCEDURES

Asepsis literally means without microbes, and aseptic technique refers to practices that help reduce the risk of post-procedure infections in patients/clients by decreasing the likelihood of microbes entering the body during clinical procedures. It also reduces the service provider's risk of exposure to potentially infectious blood and blood products, other body fluids and tissues during clinical procedures.

9.1 Components of aseptic technique include

1. Hand hygiene.
2. Use of personal protective equipment (PPE).
3. Skin and mucous membrane preparation for clinical procedures.
4. Maintaining a sterile field during sterile procedures.
5. Maintaining a clinically safe environment in the surgical/procedure area.

Guidelines on hand hygiene and use of protective clothing are in Chapter 4

9.2 Skin and mucous membrane preparation for clinical procedures

Although skin cannot be sterilised, washing the area or applying an antiseptic solution minimises the number of microbes around the site that may contaminate and cause infection. See Table 15 for guidelines on skin preparation for different types of procedures. Additionally, for surgical incisions

1. Avoid shaving the hair around the operation site. Where necessary, remove/ trim hair with clippers/scissors. If the area is heavily soiled, wash with soap and water and dry before applying antiseptic.
2. Ask patients about allergic reactions so as to inform the selection of antiseptics.
3. Apply antiseptic to operating site before incision.

Table 15: Summary of skin preparation recommendations

Procedure	Skin preparation
Patient's skin visibly dirty	Wash with soap and water
Patient's skin clean	-
Intramuscular, subcutaneous, intradermal	Nil required
Immunizations	Nil required
Venous or arterial access (not for blood culture or donation)	Disinfect with 70% alcohol (see technique below)
Venous access for blood cultures or blood donation	Disinfect with alcohol-containing 2% Chlorhexidine
Skin prep in children under 2 months old	Alcohol only. Do not use Chlorhexidine (See technique below)

9.3 Maintaining asepsis in specific clinical procedures

9.3.1 Peripheral intravascular device insertion

Intravenous procedures are the most common invasive procedures performed in clinical settings and are administered either by the peripheral or central routes. Infections associated with devices used are common and, in some countries, tend to be the commonest source of HAIs.

Principles for the prevention of intravascular infection.

In ensuring prevention of intravascular infection, the following measures should be taken:

1. IV therapy must be ordered by an authorised health practitioner. The order must include the type of solution or medication, rate of infusion, duration, date, and time.
2. Ensure that infusion fluid is free from contamination – no cloudiness, no sediments and not expired.
3. Thoroughly disinfect the insertion site with recommended antiseptic, preferably, alcohol.
4. Use sterile equipment for all invasive procedures e.g. cannula, needle, etc.
5. Use aseptic technique during insertion of catheters (hand disinfection, non-touch technique and use of sterile gloves).
6. Cover site with sterile dressing as soon as possible.
7. Change dressing only when soiled, loosened or wet/damp, using aseptic technique.
8. Change infusion sets after 72 to 96 hours and, consider re-siting the cannula after the same period. Routine change of intravascular catheters more frequently than every 72-96 hours is not necessary provided that there is no evidence of infection and there is no resistance to injection or fluid administration.
9. Keep site dry, free from contamination and secure.
10. Inspect site daily and remove device immediately if signs of infection are noticed.
11. Close injection ports that are not needed with sterile stopcocks.
12. Change blood and blood products giving set within 24 hours
13. Dispose IV line and any remaining fluid when infusion is replaced or discontinued.
14. Needle and catheter should be disposed in a similar manner as sharps.

In some situations, an order may be given for IV fluid to be administered at a very slow rate, just enough to keep the vein open for quick access during emergencies and/or for the administration of some medicines. This may be called KO (keep open), TKO (to keep open), KVO (keep vein open)

Figure 23: Intravenous fluids

See Annex 26 for procedure in setting, maintenance and removal peripheral IV lines.

9.3.2 Urinary tract catheterization

Majority of urinary tract infections (UTIs) in patients are associated with the use of urinary drainage devices such as bladder catheters. Normal urethral flora which migrates to the bladder is flushed out during urination. When a catheter is inserted, this flushing mechanism is altered and thus facilitates the passing of both urethral and perineal flora into the bladder causing infections. Urinary catheters should, therefore, be inserted only when there are clear medical indications. These include, but are not limited to:

1. Relief of urinary tract obstructions.
2. Urinary drainage in patients with neurogenic bladder dysfunction and urinary retention.
3. Urologic surgery or other surgeries on contiguous/surrounding structures.
4. Accurate measurement of output in critically ill patients.
5. Radiological investigations.

DO NOT INSERT URINARY CATHETER BASED ON ONLY THE PATIENTS' REQUEST

Principles for IPC in urinary catheterisation

Use sterile disposable catheters.

1. Have an assistant available (if possible)
2. Ensure you have sterile materials at the point of care:
    i. sterile indwelling urinary catheter (single-use).
    ii. sterile drape.
    iii. sterile syringe filled with sterile water.
    iv. clean examination gloves and sterile gloves.
    v. sterile gauze or sponge-holding forceps.
    vi. single use lubricant.
    vii. Urine bags
3. Wash hand and wear sterile gloves.
4. Clean peri-urethral area preferably with antiseptic such as 2% aqueous chlorhexidine gluconate or 10 % povidone-iodine)
5. Secure catheter to avoid movement in the urethra.
6. If urine sample is required, collect with sterile syringe and needle from sampling area of the tubing after cleaning the area with alcohol.
7. If irrigation is required to remove clots, aseptic technique must be used.
8. Empty drainage bag into a receptacle used for that patient only.
9. Urine collection bag should not be allowed to stand on the floor or rise above waist height.
10. Avoid changing catheters routinely to reduce risk of infection and trauma.
11. Perform hand hygiene before and after emptying draining bags.
12. Maintain closed drainage system as much as possible.
13. Document all procedures involving the catheter and drainage system in the medical or nursing notes. At the minimum, these should include:
    i. The date.
    ii. The type.
    iii. The size of catheter.
    iv. The volume of water in the balloon.
14. Use sterile disposable catheters.
15. Have an assistant available (if possible)
16. Ensure you have sterile materials at the point of care:

i. sterile indwelling urinary catheter (single-use).
ii. sterile drape.
iii. sterile syringe filled with sterile water.
iv. clean examination gloves and sterile gloves.
v. sterile gauze or sponge-holding forceps.
vi. single-use lubricant.
vii. Urine bags

17. Wash hand and wear sterile gloves.
18. Clean peri-urethral area preferably with an antiseptic such as 2% aqueous chlorhexidine gluconate or 10 % povidone-iodine)
19. Secure catheter to avoid movement in the urethra.
20. If a urine sample is required, collect with sterile syringe and needle from sampling area of the tubing after cleaning the area with alcohol.
21. If irrigation is required to remove clots, aseptic technique must be used.
22. Empty drainage bag into a receptacle used for that patient only.
23. Urine collection bag should not be allowed to stand on the floor or rise above waist height.
24. Avoid changing catheters routinely to reduce risk of infection and trauma.
25. Perform hand hygiene before and after emptying draining bags.
26. Maintain closed drainage system as much as possible.
27. Document all procedures involving the catheter and drainage system in the medical or nursing notes. At the minimum, these should include:
    i. The date.
    ii. The type.
    iii. The size of catheter.
    iv. The volume of water in the balloon.

For catheter maintenance refer to Annex 25: UTI checklist.

9.3.3 Maintaining a safer environment in the surgical/procedure area

Principles for the prevention of infections in post-operative wound.

Post-operative wound infections or surgical site infections delay recovery, increase length of stay, cost of services and are also associated with increased morbidity and mortality.

There are risk factors that increase vulnerability, and these include:

1. Patient conditions such as the age (e.g. elderly and neonates), diseases (e.g. diabetes) and nutritional status (e.g. malnutrition/).
2. Surgical categories as in contaminated or dirty surgical procedures and transplant or implants.
3. Surgical operations of long duration, haemorrhage and haematomas, degree of tissue trauma and location and types of drains used.
4. Inappropriate antibiotic prophylaxis, inadequate skin preparation and care, unsuitable theatre environment and excessive movement of staff/visitors.
5. Inadequate sterilization and re-use of processed invasive devices.
6. Prolonged post-operative stay in the surgical ward and the use of inappropriate dressing techniques.

Pre-operative care

The under-mentioned measures should be observed:

1. If antibiotic prophylaxis is required, it should conform to the antibiotic guidelines of the facility abiding by the national standards.
2. Concurrent diseases should be attended to or stabilized before operations.
3. Adequate surgical training and experience are required to prevent surgical site infections (SSI).
4. Closed system of wound drainage is preferable to open wound drains which increase SSI.
5. Control excessive numbers and movements of staff in the operating room since they contribute to an increase in airborne infections.
6. Staff should change into clean theatre clothing prior to an operation to avoid the transfer of pathogens into the operating rooms. Clothes intended for work in the suite should not be worn in patient care areas or outside the suite.
7. Surgical hand hygiene should be maintained.
8. Before a new patient is brought into the operation theatre, clean and disinfect all surfaces such as the surgery tables, trolleys that may have been contaminated during the last procedure.

Surgical ward

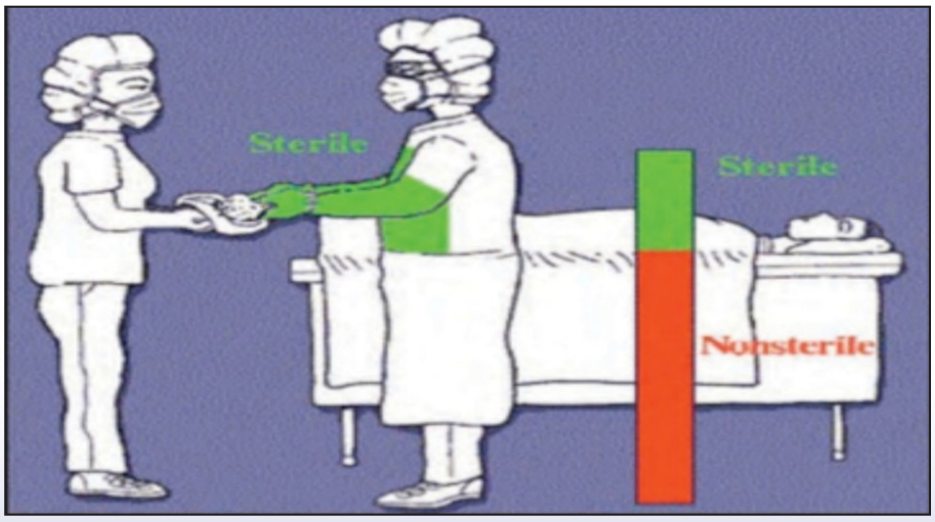
The following shall be observed in surgical wards:

1. Avoid prolonged pre-operative stay on the ward.
2. Ensure proper prophylactic antibiotic use.
3. Ensure sterilization or high-level disinfection of instruments before use.
4. Surgical hand disinfection should be maintained.
5. Use sterile gloves.
6. Ensure clean environment and adequate ventilation.

Creating a sterile field

A sterile field is an area created by placing sterile towels or surgical drapes around the procedure site. It can also be created on a stand that will hold sterile instruments and other items needed during the procedure. It is enhanced when a service provider is properly dressed in sterile surgical attire. Items below the level of the draped patient are outside the field and are not sterile. A properly gowned and gloved provider's sterile area extends from the chest to the level of the sterile field (See figure 23). Sleeves are sterile from 5cm above the elbow to the cuff.

Figure 24: Sterile field in a properly gowned and gloved healthcare provider



Maintaining the sterile field

Once a sterile object comes in contact with a non-sterile object or person or with dust or other air-borne particles, the object is no longer sterile. Maintaining the sterile field is therefore imperative. The following measures should be practiced:

1. Do not place sterile items near open windows or doors.
2. Place only sterile items within the sterile field.
3. Do not contaminate sterile items when opening, dispensing or transferring them.
4. Do not allow sterile personnel to reach across the unsterile areas or touch unsterile items.
5. Recognise and maintain the provider's sterile area.
6. Recognise that the edges of a package containing sterile items are considered unsterile.

Be conscious of where your body is at all times, and move within or around the sterile or HLD field in a way that maintains sterility or HLD status.

See Annex 23 for key interventions for prevention of specific HAIs.

CHAPTER 10

10.0 Infection Control Precautions for Selected Diseases

The following infectious diseases present special challenges to IPC practice in healthcare settings, hence the following guidance.

10.1 Human Immuno deficiency Virus (HIV)

10.1.1 Introduction

Occupational transmission could be prevented by the use of post-exposure prophylaxis (PEP) and it is recommended that every healthcare facility puts in place a programme to provide PEP to all health workers who are exposed to the virus in the line of duty, not due to their lifestyle and behaviours.

10.1.2 HIV Post Exposure Prophylaxis (PEP)

PEP gives a brief window of protection opportunity to those who are exposed to blood-borne pathogens, which minimizes their risk of acquiring infection. It is therefore important that all people who are susceptible to the risk of blood-borne pathogen exposure to take appropriate precautions, vaccinations where applicable, and access to prophylaxis medication.

Basic First Aid steps to be followed immediately after an exposure incident

1. Immediately wash the exposed area or skin with soap and water, mucous membranes should be flushed with water only.
2. Topical antiseptics for example alcohol or Dettol may be used, although there is no evidence of further risk reduction. Alcohol is recommended for skin exposures.
3. The application of caustic agents such as bleach (jik) is not recommended.
4. There is no evidence that squeezing the wound will reduce the risk of HIV transmission.
5. A healthcare worker that has had an exposure to blood and body fluids should report the incident to his/her supervisor on duty immediately, as per the protocol for the particular health facilities.
6. The health worker should be referred to a 24hrs PEP centre (hospitals) if services are not available in the same health facility.

Assessment of exposure to risk

Exposure to HIV can be classified into three stages:

1. **Very low-risk exposure:** Splash of body fluid on intact skin.
2. **Low-risk exposure:** Exposure to small volume of blood or body fluid from asymptomatic HIV positive patient with low viral load.
    i. An injury with a soiled needle. NB (non- hollow, suturing needles)
    ii. Any superficial injury or mucocutaneous exposure.
3. **High-risk exposure:**
    i. Exposure to large volume of blood or potentially infectious fluid.
    ii. Exposure to blood or blood-contaminated fluid from a patient with a high viral titre (i.e. in AIDS phase or early seroconversion phase of HIV).
    iii. Injury with soiled hollow bore needle.
    iv. Deep and extensive injury.
    v. Resistance to ART in source patient.

Actions to be taken in the event of possible exposure to HIV

In the event of possible exposure to HIV the following actions should be taken:

Very low risk

1. Wash exposed/wound area immediately with soap and water.
2. In the case of mucous membranes, the exposed area should be flushed with water.
3. Eyes should be flushed with water or saline.

NB: For low and high-risk drug management refer to Eswatini National HIV guidelines (PEP section).

Table 16: Recommended laboratory investigations after HIV exposure

Baseline tests:	1. Full blood count. 2. Liver and renal function tests. 3. HIV serology & Polymerase Chain Reaction (PCR)
Two weeks:	4. Full blood count 5. Liver and renal function tests
Six weeks	6. HIV serology
Three months	7. HIV serology
Six months	8. HIV serology

All exposed persons should receive counselling from trained counsellors throughout the period and thereafter if necessary.

10.2 Tuberculosis

TB is an infectious disease caused by Mycobacterium tuberculosis complex (MTB). Micro-organisms usually enter the body by inhalation of small diameter infected aerosols of droplet nuclei through the lungs (airborne transmission). For more information refer to National TB and TB/IPC guidelines.

Transmission

Transmission of TB is through airborne route. Persons with untreated smear-positive TB are an overwhelming source of infection. The infection decreases with the initiation of treatment. Environmental contamination e.g. from blankets or linen is not a source of infection. Patients with extra-pulmonary TB are generally not contagious (e.g. Military TB,).

Risks of transmission

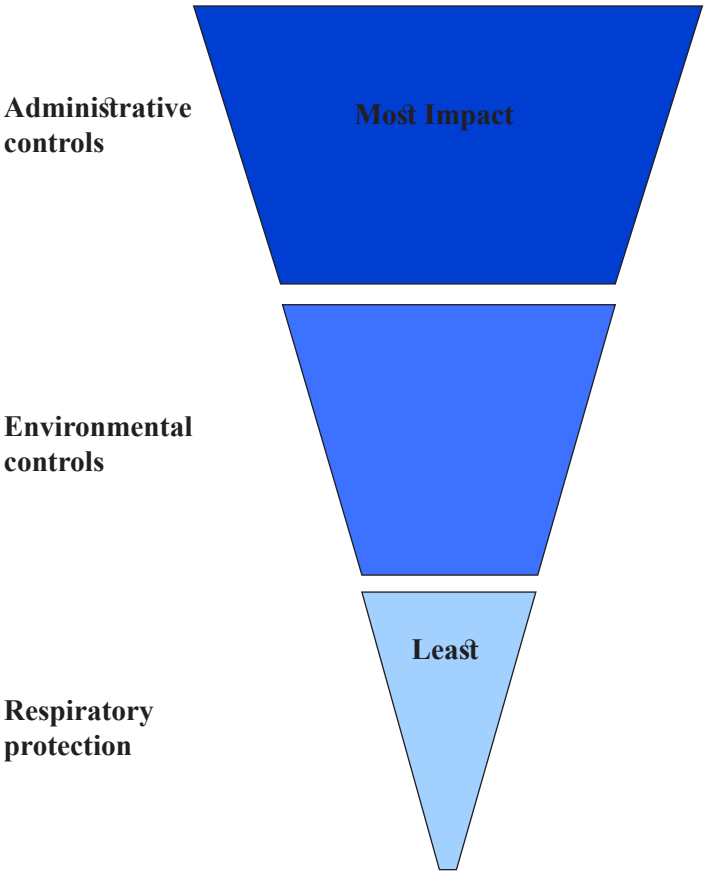
HCW are particularly at risk when performing sputum collection (especially cough-inducing procedures), intubations, laboratory manipulations (centrifugation, preparation of slides, etc.) handling of contaminated waste or autopsy. The risks of transmission also depend on the duration and frequency of contacts with a sick patient. TB infection is also more likely in crowded public settings and gatherings.

The highest risk of transmission occurs when a smear-positive patient is coughing or sneezing. Environmental factors that enhance transmission include:

1. Exposure in relatively small, enclosed spaces
2. Lack of adequate ventilation to "clean" air through dilution or removal of infectious droplet nuclei
3. Re-circulation of air containing infectious droplet nuclei

10.2.1 TB Infection Control Measures

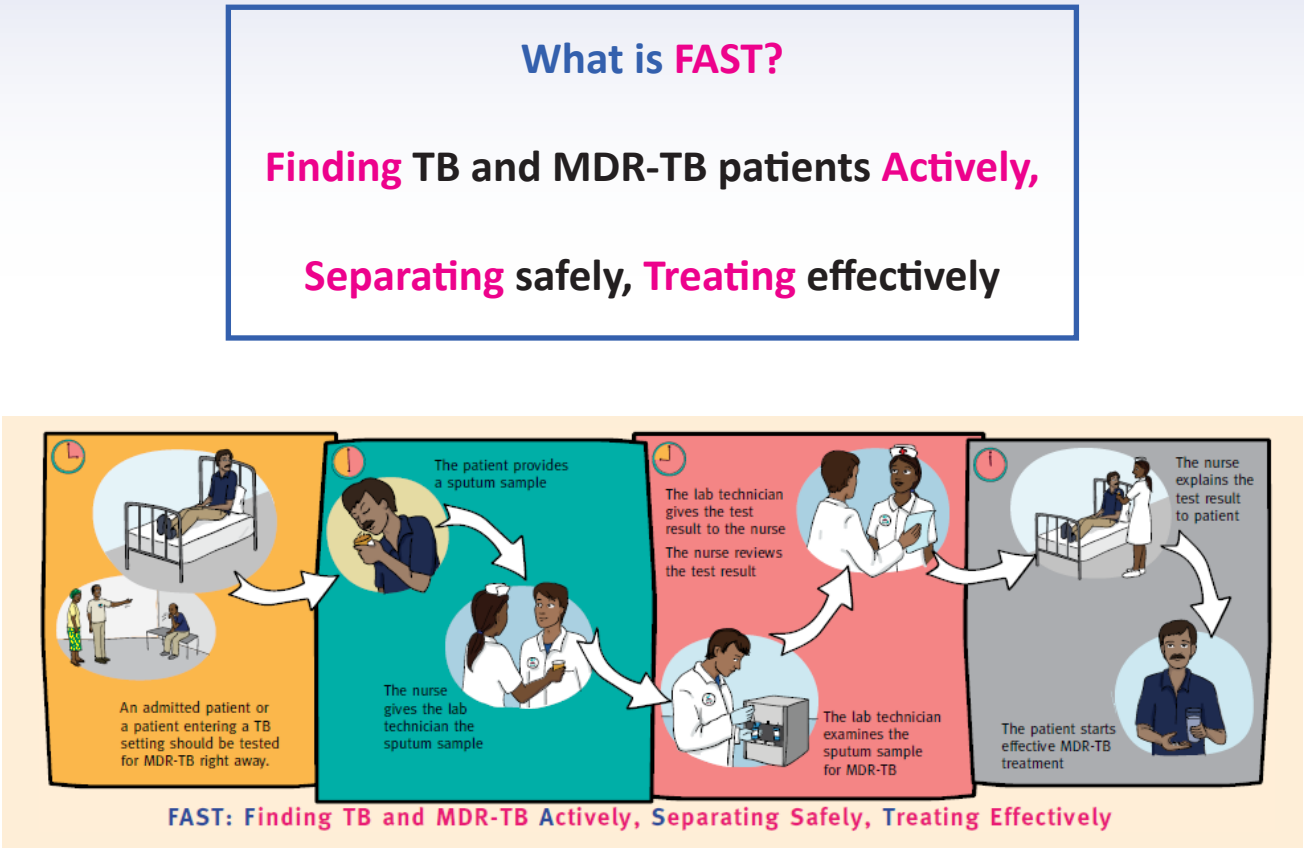
Three levels of IPC measures are recognized in these guidelines for implementation in healthcare settings, congregate settings, and households depending on the circumstances. These are:



10.2.1.1 Administrative control

1. Promptly identifying people with TB symptoms,
2. Prompt diagnosis and timely treatment of TB patients (use rapid diagnostic methods where available, and use appropriate diagnostic algorithms)
3. Prompt separation or isolation of infectious TB patients
4. Education on hygiene and cough etiquette
5. Minimizing patient's time in the facility.
6. Health workers should ensure the provision of quality clinical care to infectious patients, and minimize the time spent with such patients in areas that are overcrowded or poorly ventilated.
7. Healthcare workers should be screened for TB every six months

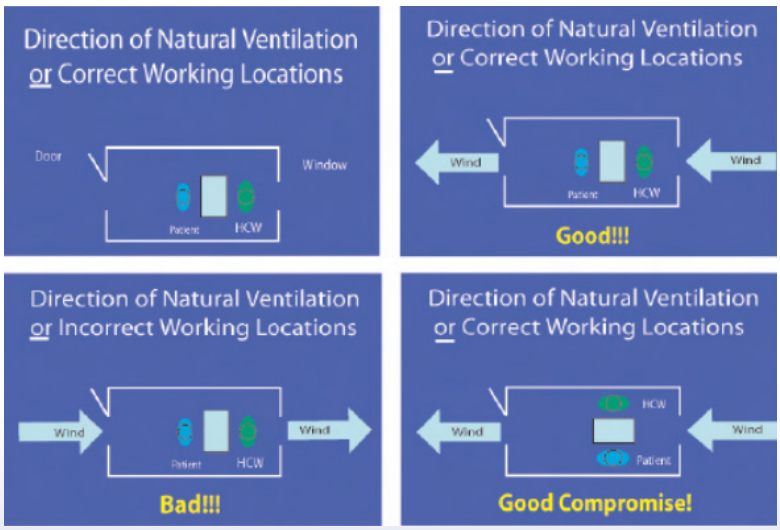
Figure 25: FAST Strategy



10.2.1.2 Environmental

1. Isolation of patients - TB wards must be separated from other wards.
2. Ventilation - Natural ventilation is a simple and effective way of diffusing the concentration of aerosolized infectious bacteria. Where possible mechanical ventilation can be added.
3. Non-isolation rooms should have ventilation rates of at least 12 ACH in line with WHO recommendations or an equivalent of 80 l/s/patient for a room of 24 m^3.
4. For ventilated health-care facilities, it is important to use airflow direction to minimize the risk of transmission to those susceptible to infection, although directional airflow may not be achievable with most simple natural ventilation designs.

Figure 26: Directional air flow diagram



10.2.1.3 Personal Respiratory Protection

The third recommended control measure aims at protecting the HCW (and, ideally, visitors) from inhaling infectious droplets. This can be achieved through the use of high filtration respirator masks (N95/FFP2).
A surgical mask made of cloth or paper does not filter out infectious droplet nuclei and are not protective to the wearer.

They are useful, however, if worn by patients to prevent the release of infectious aerosol particles into the air.
In particular, health workers should use particulate respirators:

1. During high-risk aerosol-generating procedures associated with a high risk of TB transmission (e.g. bronchoscopy, intubation, sputum induction procedures, aspiration of respiratory secretions, and autopsy or lung surgery with high-speed devices)
2. When providing care to infectious TB patients or people suspected of having infectious TB.

10.3 Viral Hepatitis

10.3.1 Hepatitis B and C

Transmission of Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) occurs in the following ways:

1. Accidental exposure to blood: Any contact with blood or body fluids as a result of injury with a needle or any other sharp instruments, or via mucous membrane (eye, mouth), or contact via damaged skin (eczema, wounds).
2. Percutaneous exposure: Exposure to blood or body fluids through broken skin.
3. Needle stick or sharps injury: Puncture with a needle or sharp instrument that is contaminated or potentially contaminated with blood or body fluids.
4. Blood splash: Skin visibly contaminated with blood or body fluids.
5. Exposure of intact normal skin to a large volume of blood; and
6. Human bites.

Preventing the transmission of HBV in the workplace, therefore, means:

1. Preventing the occurrence of exposure.
2. Complying with Standard Precautions.

10.3.2 Procedure for post-hepatitis B exposure prophylaxis

A person exposed to blood or body fluids by needle stick, cuts or bites should do the following:

1. Wash the area with soap and water immediately.
2. Should be tested for Hepatitis B surface antigen and Hepatitis B antibody.
3. If the antibody titre level is low or negative, start immunisation or give booster dose of Hepatitis B immunisation.
4. Repeat tests after 1 month and then 6 months after the first test.
5. If the titre is still low, repeat the Hepatitis B immunisation.
6. Those who do not respond to Hepatitis B immunisation after a 3rd dose should not be assigned to high-risk areas (e.g. area where blood specimens are handled, fevers units, obstetric and gynaecological units, etc.).

Administration of the Hepatitis B vaccine (HBV)

The administration of the hepatitis vaccine to HCWs who has not previously completed a Hepatitis B vaccination series is timing ideally within 7 days of exposure:

1. 1st dose at presentation.
2. 2nd dose 4 weeks after the first dose.
3. 3rd dose 16 weeks after the first dose (at least 8 weeks after the 2nd dose)

Administration and Storage

1. All injections are Intramuscular.
2. Keep refrigerated.
3. After agitation, appearance should be a slightly opaque white suspension.

NB: The Hepatitis B vaccine is one of the most widely used vaccines, as it is considered safe to use.

Treatment for HBV

Treatment for HBV is available, and several methods exist. A few are listed here for easy reference.

i. Tab. Lamivudine 150 mg twice daily or 300mg daily.
ii. Tab. Tenofovir 300 mg daily.

CAUTION: Not all people infected with HBV will require treatment; any treatment for Hepatitis must, therefore, be initiated by a qualified professional and must be monitored by laboratory investigations.

10.4 Viral Haemorrhagic Fever

10.4.1 Introduction

Viral Haemorrhagic Fever (VHF) may be caused by different viruses; e.g. Lassa, Marburg, Ebola, Crimean-Congo. VHF:

1. Is associated with high mortality.
2. Has limited or no treatment options.
3. Has potential for person to person and specimen to person spread.

VHF is not endemic in Eswatini but should be suspected in:

1. Persons who have been in an endemic area within 21 days of the onset of their febrile illness.
2. Persons who have had unprotected contact with blood, other body fluids, secretions or excretions of a person or animal with VHF.
3. Persons with possible exposure when working in a laboratory that handles haemorrhagic fever viruses.
4. Persons who have come into contact with unconfirmed suspected cases of VHF that resulted in death.

10.4.2 Infection Prevention and Control Precautions for VHF

The following precautions are recommended when VHF has been diagnosed:

1. Patients should be cared for in isolation.
2. All workers should practice Standard Precautions.
3. Caretakers should use barrier precautions to prevent skin or mucous membrane exposure.
4. All persons entering the patient's room should wear appropriate PPE.
5. Prior to leaving the room of a patient with suspected VHF, safely remove and dispose of all protective gear, and clean and disinfect shoes that are soiled with body fluids.
6. Access to the room should be restricted to only authorized persons. Maintain a log of all people (both clinical and non-clinical) who enter the room.
7. The importance of Standard Precautions in the management of blood, other body fluids, secretions, or excretions, handling of soiled linen and wastes cannot be overemphasised.

10.4.3 Other special consideration in VHF

1. **Laboratory specimens**
   Laboratory investigations should be reduced to the barest minimum that allows for patient care and essential diagnostic evaluation. This is because of the potential risks associated with handling infectious material.

2. **Wastes Management**
   Highly infectious wastes such as personal clothing's from patients with viral Haemorhagic fevers, used gloves and gauze from such patients should be put into a biohazard bag sprayed with 0.5% chlorine and re-inserted into another biohazard bag re-sprayed with 0.5% chlorine and made ready for treatment (incineration) and final disposal
   NB: Highly infectious wastes should not have external transit but should be sent directly for treatment (incineration) and the final disposal site.

3. **Deaths**
   When patients die, handling of the body should be minimized. Bodies should be kept in a leak-proof material and promptly buried.

4. Exposure management for VHF
   The following shall apply in exposure to VHF:
   i. Persons with percutaneous or mucocutaneous exposures to blood, body fluids, secretions, or excretions from a patient with suspected VHF should immediately wash the affected skin surfaces with soap and water.
   ii. Mucous membranes (e.g. conjunctiva) should be irrigated with copious amounts of water or eyewash solution.
   iii. Exposed persons should receive medical evaluation and follow-up care, including fever monitoring twice daily for 21 days after exposure.
   iv. Consultation with an infectious diseases expert is recommended for exposed persons who develop fever within 21 days of exposure.

10.4.4 Recommended safety precautions for contact tracing teams

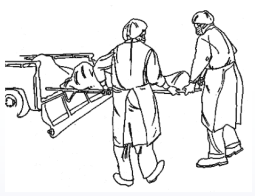
Since Ebola Virus Disease (EVD) cases are more likely to be discovered during contact follow-up, contact tracing teams should take precautionary measures to protect themselves during home visits. The teams should abide by the following:

1. Avoid direct physical contact like shaking hands or hugging.
2. Maintain a comfortable distance (more than 1metre) from the person.
3. Avoid entering the residence.
4. Avoid sitting on chairs offered to you.
5. Avoid touching or leaning against potentially contaminated objects.
6. Always have a good breakfast before home visits to resist the temptation of eating or drinking while visiting contacts.
7. Do not conduct home visits wearing personal protective equipment like masks, gloves, or gowns.
8. If you must take the contact's temperature:
   i. Put on disposable gloves.
   ii. Avoid touching the patient and step back for about 1 metre.
   iii. Use the infrared thermometer to take their temperature.
   iv. If using the mercury thermometer take the temperature from the back of the patient.

9. If the contact is visibly ill, do not attempt to take their temperature, but notify your supervisor.
10. As part of the overall safety of the response team, all members of the contact tracing team should monitor their own temperature every morning.

See figures below for key isolation precautions.

Figure 27: Isolation Precautions

• Wash hands as needed	
• Isolate the patient	
• Wear protective clothing	
• Dispose of needles and syringes safely	
• Dispose of waste safely	
• Use safe burial practices.	

NB: See annexes 21 for SARS and Avian Flu.

10.5 Pandemic Influenza H1N1

Definition: Pandemic influenza also known as flue is a viral disease that attacks the mucous membranes of the respiratory tract (nose, throat and lungs) in humans. Although mild cases may be similar to a viral "cold" influenza, it is typically much more severe, usually comes suddenly and may include fever headache, tiredness, dry cough, sore throat, nasal congestion, body aches and more often results in complications such as pneumonia.

10.5.1 Risk of transmission

Seasonal influenza is a yearly occurrence that kills primarily persons aged 65 and older, children under 5 and those with chronic health conditions. Those who are exposed to it, but do not succumb to death, develop immunity to the strain circulating.

Healthcare workers are at high risk of contracting infection when treating such patients.

10.5.2 Infection control precautions for pandemic Influenza

Infection control precautions involve a two-level approach. Standard Precautions which apply to all patients at all times and Additional precautions which should include:

1. Droplet precautions,
2. Contact precautions,
3. Air-borne precautions.

A combination of these precautions will give the appropriate infection control.
Strict adherence to these precautions is required to break the chain of infection transmission.

The essential steps include:

1. Screen suspected patient by taking oro-pharyngeal (throat) swabs to diagnose other influenza
2. Placing the patient in a single room – isolation, and avoiding unnecessary contact;
3. Use of personal protective equipment for all in close proximity to the patient or the patient's environment;
4. Strict personal hygiene of staff (e.g. not touching face or mask, eyes or hair when in the patient's room, ensuring hands are washed after leaving the patients' room);
5. All suspects should be given a surgical mask.
6. If transport of the patient is required, the patient should wear a surgical mask.

Isolation precautions

1. Admit suspected patient and place in a well-ventilated isolation room
2. N95 respirator, disposable gown, gloves and goggles worn by the HCW when in contact with the patient
3. Promote hand hygiene
4. Within the first 7 days of onset of disease, the patient should be allowed only one visitor
5. Limit unnecessary visits to the isolated patient
6. Outpatients with mild symptoms should remain at home for the stipulated dates

10.5.3 Vaccination

1. Should be given to HCW and risk groups (pregnant women, immigration workers)
2. Vaccination should not be given to already confirmed patients
3. Vaccination offers protection against the virus for only 12 months and must be repeated
4. The public must be advised to avoid handshakes, hugging and kissing during outbreaks

10.6 Extensive Burns and Surgical Wounds

Burn wounds can provide optimal conditions for colonization, infection, and transmission of pathogens; infection acquired by burnt patients is a frequent cause of morbidity and mortality

Patients with severe burns are amongst those at highest risk of developing HCAIs. The loss of skin barrier, electrolytes and the stress induced by severe burns (wounds), results in immuno-suppression.

10.6.1 Infection transmission

The infection may be endogenous (autoinfection due to immunocompromised state) or exogenous (direct / indirect/ airborne contact) In healthcare settings, the risk of infection in patients with burns exists mainly because of:

1. Lack of asepsis during dressing procedures,
2. Poor patient hygiene,
3. Use of non - sterile medical devices,
4. Inadequate hygiene of staff (poor hand hygiene)
5. Incorrect environmental hygiene and sanitation.

10.6.2 Infection Control Measures

Isolation of patients

1. If it is feasible, place the patient under protective precautions in a single room with the door closed. If not possible, separate the patient's bed from other patients (e.g. use of screen)
2. Wound dressing requires strict aseptic technique, use sterile gloves, instruments and dressings.
3. When changing dressings inspect the wound and check for exudates, smell, swelling, discolouration, haemorrhage or green staining on the dressing which indicates an infection is developing.
4. Monitor the patient's temperature and pulse
5. Limit the number of visitors and duration of visits. Patient's visitors should be given masks.
6. Surveillance for wounds may include carrying out wound assessment, if infection suspected take a culture and sensitivity sample and monitor incidence.

10.7 Cholera

It is a severe diarrheal disease caused by the infection of small bowels of humans with vibrio cholera, anaerobic, gram-negative, rod-shaped bacterium.

10.7.1 Transmission

Occurs by faecal oral- route either by person -to- person transmission via direct contact with contaminated hands or through ingestion of contaminated water or food.

In healthcare settings, the risks of transmission are mainly due to:

1. Incorrect hygiene and disinfection procedures
2. Improper personal protection during medical care and contact with dead bodies
3. Insufficient water supply
4. Poor food hygiene
5. Inadequate contact isolation measures for severe cases

10.7.2 Infection Control (IC) measure

1. Access to safe water

Ensure all drinking water is from a running tap or is covered and has been treated

2. **Food hygiene**

Contaminated food is a significant route of transmission.

i. Wash hands upon entering the kitchen and before preparing or handling food
ii. Only kitchen staff should be allowed inside the kitchen
iii. Keep clean
iv. Separate the raw and cooked food
v. Temperatures to be observed for storage cold room below 5 °C Freezer not less than - 10°C
vi. Use safe water and raw food material (e.g. pasteurized milk)

3. **Disinfection**

i. Hygiene and disinfection are key elements in interrupting transmission of cholera and chlorine kills the bacteria.
ii. Hand hygiene is one of the most effective ways to prevent the transmission of Vibrio cholerae amongst patients, caregivers and staff.
iii. In a cholera epidemic staff, caregivers must wash hands and disinfect them with 0.05% active chlorine.

4. **Waste management**

i. Faeces and vomit from cholera patients are highly infectious and must be disposed of in a VIP Latrine or flushing toilet.
ii. In communities and household with no latrines ensure burial of faeces at a site distant and downstream from the source of drinking water.
iii. Most hospitalized patients will not be able to use a latrine
iv. Place plastic buckets (10-15Ltr) under the whole of the cholera bed for stools and at the bedside for vomit. Raise the bucket on a block to prevent splashing of the surrounding area.
v. Before placement, pour about 1cm of 2% active chlorine into the bucket to reduce the microbial load of the Vibrio cholera
vi. The specimen should be disposed in the toilet/pit latrine

10.8 Disease Surveillance

It is a systemic, active, ongoing observation of the occurrence and distribution of diseases within a population and of the event that increases or decreases the risk of disease occurrence. (If the incidence, distribution and associations of the diseases unknown, then resources can be targeted, and the incidence reduced).

10.8.1 Types of disease surveillance

10.8.1.1 Passive surveillance:

Involves the collection of data as part of routine provision of health services. These data are periodically transmitted to the next level according to frequency that has been defined by national authorities without any request or intervention from services in charge of disease surveillance. With passive surveillance,

i. Data should be transmitted without delay with timely analysis for decision making in regards to control measures to be implemented. IPC should be involved in disease surveillance activities
ii. Managers and IPC health facility team should be capacitated to fully understand and correctly interpret trends and patterns of infectious diseases.

10.8.1.2 Active surveillance

Data is collected through periodically and regularly visits to health facilities or community. The frequency of visits, that can be weekly, monthly or quarterly e.g. it could be Spot checks (Unannounced visits), is defined according to the nature of the disease under surveillance and pursued objectives.

CHAPTER 11

11.0 Use of Antibiotics and Antivirals

Rational use of antibiotics and antiviral agents are important for the prevention and control of the development of resistant strains of micro-organisms and the spread of infections.

The following shall be followed in the use of antibiotics:

1. Antibiotics and antivirals shall be prescribed rationally.
2. Prescribers must follow national guidelines on the use and choice of antibiotics and antivirals for treatment and prophylaxis (refer to the current editions of the Essential Drug List and Standard Treatment Guidelines of the Ministry of Health).
3. Pharmaceutics and Therapeutic Committees (PTCs) in conjunction with IPC teams shall develop operational policies on antibiotics and antivirals use and monitor the rational use of antibiotics in all health facilities. This policy shall contain information on the use of antibiotics and antivirals for prophylaxis and the choice of these for empirical and targeted therapy of major infections.
4. Data shall be routinely collected at all levels of health delivery on antibiotic use for any pharmacovigilance surveillance.
5. Operational policies on the use of antibiotics and antivirals at the facility level shall be based on the national policy on the use of antibiotics and antivirals.

11.1 Antibiotic resistance

Antibiotics (antimicrobial) resistance may principally be due to irrational use of antibiotics (e.g. excessive, non-compliance and under usage) and the use of counterfeit antibiotics. To ensure that information is obtained on bacteria resistance and used to improve services the following shall be done:

1. All microbiological methods shall be standardized to ensure uniformity and comparability of results in all healthcare facilities.
2. All requests to microbiological laboratories shall state clearly whether it is a suspected healthcare associated infection or not.
3. There shall be routine collection of data on antibiotic sensitivity and resistance in all healthcare associated infections and these shall be reviewed, analysed and disseminated regularly.

CHAPTER 12

12.0 Care of the Deceased

The transmission of deadly infectious diseases resulting from mortuary care sometimes occurs among healthcare workers. In handling dead bodies all healthcare workers shall adhere to Standard Precautions at all times and appropriate PPE shall be used. Training shall be organized for all people who handle dead bodies including mortuary staff and undertakers.

12.1 Recommended PPE for healthcare workers (HCWs) handling dead bodies

The recommended PPE for handling dead bodies are:

1. Reusable long-sleeved, cuffed gown.
2. Waterproof apron.
3. Non-sterile gloves/utility gloves (elbow level).
4. Wellington boots
5. Mask
6. Goggles
7. Headgear

Note: Perform hand hygiene after removing all PPE. Appropriately disinfect reusable PPE.

12.2 Packing and transport of dead body to mortuary, crematorium and burial

Apply the following when packing and transporting dead bodies:

1. Use the appropriate PPE when performing the last offices.
2. The body should be fully sealed in an impermeable body bag before removal from the room/ward and before transfer to the pathology department or the mortuary to avoid leakage of body fluid.
3. Transfer to the mortuary should occur as soon as possible after death (at least one hour after death).
4. If an autopsy is being considered, the body may be held under refrigeration in the mortuary and be conducted only when a safe environment can be provided for the autopsy.
5. The deceased's family members should be educated on Standard Precautions to take if they wish to view or touch the body.

12.3 Mortuary care

Mortuary staff and the burial team should apply Standard Precautions. Embalming must be conducted according to local regulation or legislation. Hygienic preparation of the deceased such as cleaning the body, tidying of hair, trimming of nails shall be conducted with the application of Standard Precautions.

12.3.1 Post mortem examination

Post mortem examinations and collection of samples are essential to ascertain the cause of death. These procedures are associated with the risk of transmitting infections and should be performed only when necessary and if safety measures are in place. The following are some safety precautions:

1. Minimum number of staff should be involved in the procedure.
2. A well-ventilated room should be available for the procedure.
3. Appropriate PPE should be used.

Recommended PPE that shall be used when performing autopsy are:

1. Scrub suit: tops and trousers or equivalent garments.
2. Impermeable long-sleeved gowns.

3. Surgical masks, but if small particle aerosols might be generated during autopsy procedures, particulate respirator or its equivalent should be used.
4. Face shield or goggles.
5. Autopsy gloves or 2 pairs of non-sterile gloves.
6. Knee- high boots.

Healthcare workers shall put on PPE in the dressing room before proceeding to the autopsy room where the body is located.

When removing PPE:
1. Exit the autopsy room to the dress out room.
2. Remove PPE in designated dress out room.
3. Dispose of PPE in accordance with recommendations and perform hand hygiene.

12.3.2 Suggested methods to reduce aerosol generation during autopsy

To reduce aerosol generation during autopsy:
1. Containment devices should be used whenever possible e.g. bio-safety cabinets for the handling and examination of smaller specimens
2. Vacuum shrouds should be used for oscillating saws.
3. High-pressure water sprays should NOT be used
4. Do not open intestines under water.

In instances where death is due to a highly infectious organism, the corpses may not be released to the family for burial.

CHAPTER 13

13.0 SURVEILLANCE OF HEALTHCARE ASSOCIATED INFECTIONS

Surveillance is key in IPC and is important in evaluating the effectiveness of IPC measures in healthcare settings. It aims at reducing Healthcare Associated Infections (HAIs) and associated cost. It is an approach of systematically identifying, collecting, analysing, reporting, disseminating and utilizing information related to HAIs.

The specific objectives are to:

1. Increase awareness of healthcare workers about healthcare associated infections and antimicrobial-resistance so that they appreciate the need for preventive actions.
2. Monitor trends: incidence and distribution of healthcare associated infections and their prevalence.
3. Identify possible areas for improvement in patient care and for further epidemiological studies.
4. Identify the need for strengthening infection prevention and control activities, and also evaluate the impact of preventive measures.
5. Disseminate the information gathered to stakeholders.

13.1 Types of HAIs Surveillance

There are two types of HAIs surveillance, active and passive. Active surveillance is the identification of HAIs by trained personnel who proactively look for HAIs using multiple data sources. Passive surveillance of HAIs refers to the identification of HAIs by patient care providers, such as physicians or nurses, who may not be formally trained in surveillance and may not consistently use standardized surveillance case definitions to identify HAIs.

Surveillance activities are outcome or process-oriented. **Outcome surveillance** focuses on specific HAIs (e.g., Surgical Site Infections (SSIs) and catheter-associated urinary tract infections), while **Process surveillance** tends to focus on monitoring patient care practices (e.g., compliance with hand hygiene, timing of prophylactic antibiotics during surgery, use of the aseptic technique for central line insertion).

Surveillance can be continuous or periodic. Continuous refers to when data are collected continuously on a routine basis and periodic surveillance is done at specific intervals, such as weekly, monthly, quarterly or yearly.

13.2 HAIs of public health concern

Surveillance should generally include most relevant HAIs to the local context and should be preventable. These include:

1. Infections that may become epidemic (e.g. measles, cholera).
2. Infections in vulnerable populations such as neonates, immunocompromised and patients with burns.
3. Infections associated with commonly used invasive devices, such as intravascular or indwelling urinary catheters, or common surgical procedures.
4. Infections caused by resistant microorganisms like multidrug-resistant pathogens (e.g., MDR-TB).

The following are some common HAIs of public health concern:

1. Urinary tract infection (UTI), including catheter-associated urinary tract infection (CAUTI).
2. Bloodstream infection, including central line-associated bloodstream infection (CLABSI).
3. Surgical site infection (SSI).
4. Pneumonia, including ventilator-associated pneumonia (VAP).
5. Multidrug-resistant infections.
6. Infectious diarrhoea and Clostridium difficile infections.

13.3 General guidelines on collection, analysis and dissemination of surveillance information

The national IPC programme management unit, in collaboration with the relevant key stakeholders should develop a national HAI surveillance system. This should comprise definition of which types of HAIs to monitor as well as related protocols and tools. The surveillance system will allow for reporting of outbreaks of infection in health facilities so that appropriate interventions and support by national, regional and facility structures can be provided when necessary. A nationally standardized reporting system should be developed in line with global guidance to enable the extraction of data on HAIs and anti-microbial resistance for local use.

At the health facility level, regular reports of comparative data on the levels of HAIs and anti-microbial resistance should be made available to clinicians to enable them to make better empirical treatment choices; as well as to assess implications of their treatment choices, and infection prevention and control practices.

Key interventions for the prevention of HAIs include:

1. Establishing systems to track targeted HAIs in health facilities and sharing data with all relevant staff.
2. Having dedicated IPC staff to track HAIs.
3. Fully adhering to recommended general IPC practices.
4. Implementing interventions targeting specific HAIs. See also Annex 20 for WHO surgical safety checklist.

13.3.1 Data collection, analysis and dissemination

There must be routine collection of data on selected infections by the clinical staff and the IPC Team. These should be reviewed and analysed weekly and disseminated to all stakeholders.

Infection rate and isolates should be monitored by:

1. Daily report from the microbiology laboratories.
2. Prevalence studies on infections in the hospital.
3. Notification of infections to and from the facilities, regions and national surveillance centres.

13.3.2 Outbreak

An outbreak is defined as an unusual or unexpected increase of cases of a known HAI or the emergence of cases of a new infection.

An outbreak must be suspected when:

1. Laboratory report of a specimen yields an alert organism and/or a notifiable disease (Refer to Eswatini weekly notifiable disease reporting form).
2. Two or more patients are found to have an infection attributable to pathogen not previously reported, particularly, when it happens after a surgical procedure.
3. Several people report infections caused by the same organism.
4. Clinicians or ward staff report multiple infections of a similar nature.

13.3.3 Investigation and response to surveillance reports on infections

13.3.3.1 Single case of HAI

1. When a single case of HAI is observed, the IPC Team shall investigate and establish whether the cause has been a breakdown of procedures or whether it is a new admission. When the cause has been established the IPC Team shall review the steps in the process with the unit staff to ensure that the policy is understood and properly implemented.
2. The IPC Team shall contact the clinical care team to discuss and advise on the possible implication of the outbreak. The patient shall be managed according to established IPC policy.

13.3.3.2 Two or more cases of HAI

In the case of two or more cases of HAI (potential or actual outbreak), full investigation shall be conducted. If an outbreak is confirmed, it shall be communicated to all staff and specific actions to be taken should be stated.

1. A unit may have to be closed down to prevent further spread or to allow the outbreak to be investigated fully and/or to establish the source of the outbreak. If closure of unit(s) is necessary, the staff shall be made fully aware of the consequences and the unit(s) shall be re-opened as soon as possible.
2. The IPC Committee/team should critically review all aspects of investigations in order to identify problems so that future errors can be prevented. On conclusion of the investigations, a formal written report shall be distributed to all departments.

13.3.4 Procedure for Investigating Outbreaks in health facilities

An increase in the isolation of an infectious organism or any clustering of clinical cases should form the basis for investigating outbreaks in the facility. The aim of the investigation shall be to:

1. Determine how the outbreak occurred.
2. Treat the infected patients/persons.
3. Prevent the spread of the infection with minimum disruption to activities of patients and staff.
4. Recommend appropriate measures to prevent future occurrences.
5. Conduct contact tracing if it is proven to be external to the health facility.

The steps may vary depending on the nature of the problem. However, the following steps must be done before proceeding:

Step 1: Establish or verify that an outbreak exists:

i. Verify diagnosis and/or causative agent of the reported case(s).
ii. Characterize the nature of the disease e.g. signs and symptoms, laboratory findings
iii. Obtain the appropriate laboratory specimens to identify specific disease agent.

Step 2: Confirm the existence of an outbreak:

i. Define or estimate the extent and magnitude of the problem, keeping within the range of a specific time period appropriate to the nature of the infection.
ii. Compare current rates with the usual or baseline rate for the time frame.
iii. Determine the need for outside assistance/consultation.
iv. Institute early and appropriate prevention or control measures.
v. Obtain and preserve cultures.

Step 3: Continue surveillance for additional cases.

Step 4: Characterize cases by person, place and time to determine if the outbreak is from a common or propagated source.

Step 5: Institute and evaluate other control measures, update and educate the staff as to findings, etc.

Step 6: Provide and disseminate reports as required and maintain pertinent records.

13.4 Notifiable Communicable Diseases

A notifiable disease is any disease that is required by law to be reported to government authorities and WHO. The collection of information allows the authorities to prevent, control and monitor the disease, and provides early warning of possible outbreaks. In the case of livestock diseases especially those that have a bearing on humans, there may also be the legal obligation to destroy the infected livestock upon notification.

13.5 Immediate Disease Notification System

In line with the International Health Regulations (IHR) (2005), the Ministry of Health introduced the active/ Immediate Disease Notification System (IDNS), where-by all Health Facilities dial the toll-free line (977) upon suspicion or confirmation of any notifiable or priority condition/disease. The Ministry of Health's Immediate Disease Notification surveillance system (IDNS) captures any condition with the potential to result in serious public health consequences and any disease as spelled out in the IHR. The IDNS has been designed to assist the MOH health professionals to report all notifiable and priority conditions they encounter by calling the Toll Free number (977) from any network in the Kingdom. The IDNS forms are made available to all health facilities in the Kingdom.

13.5.1 The IDNS process:

1. If a case is suspected as a notifiable condition/disease, the person suspecting must check the definition of that condition on the back of this notification form to see if it should be notified.
2. If it is notifiable, collect information as required from the form. Information can be obtained from either the patient or relatives as well as from all the results of any tests done towards proper diagnosis to the condition. The case can be notified as either a suspected or confirmed case.
3. After completing the form, the person who identified the case must immediately telephone the Health toll-free line 977 to report the case. Notification - Calling 977 can be done from any network which puts the caller through to the EPR call centre for free.
4. Follow the additional instruction for each specific condition e.g. completion of surveillance forms, isolation of cases, transfer to the next level where necessary, etc.
5. The EPR call centre agent records all the information from the healthcare worker about the case onto a web-based system and then a Short Message Service (SMS) is sent to the relevant response teams immediately informing them of the case. As per the program's protocol, the case is responded to and the infection is curbed before it overwhelms the populations.
6. During response and post-outbreak, all the key players are expected to implement the Standard Infection Prevention and Control protocols.

13.6 Ports of Entry Emergency Re-Orientation

Through the IHR, the MOH is also responsible for controlling the transit of infectious disease such as H1N1, SARS, EBOLI, Yellow fever, Tuberculosis and Norovirus which can be spread by visitors and passengers into the country. By virtue of their nature, infectious diseases spread from person to person and can, if not dealt with expediently, infect large populations quickly.

Therefore, it is the Ministry of Health's responsibility through the Regional Epidemic Task Force (RETF) to:

1. Investigate suspected cases on any notifiable and infectious conditions;
2. Isolate and treat cases identified from points of entry;
3. Enforce implementation of the principal legislation – the Public Health Act 1969 which partly reflects the provision of the IHR 2005 that involves port health arriving from outside the country.
4. Call for extensive integration of efforts from all key stakeholders in the points of entry reorientation for disease prevention and control.

CHAPTER 14

14.0 IPC Monitoring, Evaluation and Research

In this context, monitoring in IPC is an organized method of systematically identifying, collecting, analysing, reporting, disseminating and utilizing information related to IPC activities. Evaluation, on the other hand, is the process of determining the effectiveness of a programme or a project and tends to examine issues such as the relevance, efficiency, effectiveness, impact and sustainability of the intervention. Evaluation attempts to determine as systematically and objectively as possible, the worth or significance of an IPC intervention, strategy, policy and so on. Generally, the main aim of monitoring and evaluation is to assess the extent to which standards are being met and activities are being performed according to the set objectives. IPC monitoring in health facilities focuses on inputs, processes, outputs, and outcomes. These components are briefly described below:

Inputs (structures)

Inputs are IPC resources that are necessary for effective performance. Inputs include qualified personnel, policies, guidelines and protocols, funds, supplies and equipment.

Process/ activities

These are actions necessary to transform given inputs into planned outputs within a specified period of time. Processes comprise the step-by-step activities that are performed. Examples of IPC processes are performing hand hygiene, environmental cleaning, use of protective equipment/clothing and performance of aseptic procedures.

Output

Output refers to the amount of work done. Examples are the number of staff trained on IPC and number of IPC supervisory visits.

Outcome

This is the end result of an activity or set of activities that provide value to the client. It is dependent on the quality of inputs, process and outputs. Examples are client satisfaction with the cleanliness of health facility, wound infection rate and prevalence of other healthcare associated infections, change in IPC knowledge and skills, attitude and behaviour.

Monitoring can be both **internal** and **external**. Internal monitoring involves a system set up by the health facility/wards/units and uses people within the health facility/ward/unit to undertake the exercise. External monitoring is one that is conducted by people from outside the health facility and could be from the National Quality Management Programme at the Ministry of Health or outside the country. In both types of monitoring, agreed standards will be used.

Annexes 3 and 27 provide some sample IPC standards and criteria for measurement, as well as some indicators. A sample rapid health facility assessment tool is in Annex 11.

14.1 Monitoring and evaluation responsibilities

14.1.1 National Level

The purpose of monitoring at the national level will be to assess the overall performance of IPC to identify and implement relevant interventions as well as improve the quality of service. The Quality assurance unit in

conjunction with the IPC programme are responsible for designing national IPC monitoring systems. The IPC programme should periodically perform evaluations to assess the extent to which the objectives of the IPC programme are met.

14.1.2 Regional Level

The Regional IPC focal persons are responsible for monitoring IPC in the regions. The purpose of monitoring at this level is to identify gaps in IPC performance at the various health facilities and to implement relevant interventions to improve the quality of service.

14.1.3 Health facility/community level

The overall responsibility for IPC monitoring at the health facility lies with the facility management, though the IPC committee/team and the IPC Focal Person(s) are expected to carry out this activity. They should ensure that the appropriate structures, policies and procedures for monitoring are instituted and functioning.

14.2 Research on IPC

There are a number of issues and challenges in IPC in Eswatini that require investigation to guide implementation. Periodic studies should be conducted at all levels of healthcare delivery not only to determine the status of implementation but to also guide decisions on technological and equipment choices as well as a demonstration of cost-effectiveness of interventions. A better understanding of the cultural and social context within which IPC is practiced is required. The MOH research agenda should include priority areas on IPC.

ANNEXES

Annex 1: WHO Multimodal Improvement Strategy

WHO acknowledges S3 Global (Julie Storr and Claire Kilpatrick) for its contribution to the development of this material.

Annex 2: Category of health worker groups and proposed IPC education and training requirement

1. **IPC focal person at all levels:** Doctors, nurses, or other professionals who are responsible for implementing national IPC guidelines should gain basic knowledge in all areas relevant to IPC, including, patient safety, Antimicrobial resistance, quality improvement, epidemiology and statistics. Training programmes should include such topics as:
   - o Basic microbiology and modes of disease transmission.
   - o Organisation and management of IPC programme.
   - o Support supervision, monitoring, and evaluation of IPC.
   - o All components of standard and additional precautions.
   - o Surveillance, including risk identification, assessment and control.
   - o Occupational Health and safety issues.
   - o Antibiotic policy and practice.
   - o Legal and ethical issues.
   - o Information management and operational research.

2. **All healthcare workers involved in direct patient/client service delivery:** These should receive tailored IPC training based on their job description. The training must include at least the following concepts:
   - o IPC programme.
   - o All components of standard and additional precautions.
   - o Occupational health and safety.

3. **Other personnel that support health service delivery:** these staff (e.g. cleaning staff) should receive tailored training, including:
   - Standard Precautions.
   - Occupational health and safety.

4. **Senior facility management:** administrative and managerial staff (e.g. hospital directors) should appreciate the importance of supporting IPC infrastructure, implementation and monitoring of IPC guidelines and practices that mitigate harm to patients and HCWs. IPC orientation training must include the following:
   - IPC programme.
   - Leadership.
   - Standard Precautions.
   - Occupational health and safety.

5. **Client education:** The importance of the facility and community IPC measures should be explained to patients, their families, caretakers and visitors. This includes basic IPC principles and measures that apply to them:
   - Hand hygiene.
   - Respiratory hygiene (e.g. wearing a mask, sneezing and coughing into the elbow).
   - Waste management (e.g. proper disposal of home care medical waste).
   - Additional precautions as required (i.e. when initiating isolation at facility or at home).

Annex 3: IPC standards and criteria

Standards	Criteria
Standard 1: Structures, systems and processes are in place to effectively govern, manage and implement the IPC programme.	• Organisational structure of MoH outlines clear roles, responsibilities for IPC at all levels • Functioning IPC committee **(applicable to only hospitals) & health centres** • Functioning IPC team/focal person • Health facility/ward/unit annual action plan for IPC • Availability of IPC policy/guidelines/manual • Resources (financial and material) are allocated for IPC activities
Standard 2: Human resources are effectively and efficiently managed in order to prevent and control the spread of HAI.	• Staff-patient ratio is appropriate for effective IPC • Availability of IPC training programme/plan • Staff have relevant IPC skills, experiences and competencies • All staff receive theoretical and practical training in IPC • There is access to IPC training and learning materials
Standard 3: Hand hygiene practices that prevent, control and reduce the risk of the spread of HAI are in place	• The number and location of hand-washing basins are adequate for workload • The appropriate hand hygiene frequency and technique is used for the selected procedure • Effective hand hygiene products are accessible in all areas • Service users, their relatives, carers, and visitors are informed of the importance of practising hand hygiene. • Hand hygiene practices and policies are regularly monitored and audited. The results of any audit are fed back to the relevant staff and are used to improve the service provided.
Standard 4: Invasive medical device related infections are prevented or reduced	• Invasive medical devices are managed in line with evidence-based best practice including but not limited to strict adherence to asepsis and hand hygiene before and after any invasive procedure, manipulation of the invasive medical device and dressing changes. • Systems in place to track the management of the medical device from the date of insertion • Single use invasive medical devices are not reused. • Relevant staff are competently trained in invasive medical device insertion, maintenance, replacement and care. • The IPC team are consulted regarding the introduction of all new invasive medical devices • The use and management of invasive medical devices is regularly audited, with quality improvement actions undertaken to improve care.
Standard 5: The physical environment, facilities and resources are developed and managed to minimise the risk of service users, staff and visitors acquiring a Healthcare Associated Infection (HAI).	• The design and layout of health facilities complies with relevant policies and evidence-based best practice for IPC and addresses: - Bed spacing (at least 1 meter) - Ventilation and lighting - Proper isolation - Water supply - Provision of hand washing sinks, toilet and sluice - Surfaces, smooth and polished - Healthcare waste management; - IPC recommendations on construction and renovation • Cleaning is effectively managed according to IPC guidelines • Availability of functional laundry facilities

Standards	Criteria
Standard 6: Staff health and safety is effectively managed	• Availability of structures, policies and procedures which include the prevention and management of communicable/transmissible diseases/ organisms and a comprehensive staff screening and immunisation. Include: - procedures and policies for the management of an occupational exposure to blood or body fluids - access to an occupational health service.
Standard 7: Microbiological services are available in a timely and effective manner to prevent and control HAI.	• There is access to an accredited clinical microbiology laboratory, with appropriately trained and qualified staff, on a 24-hour basis. • Timely access to laboratory results is available to relevant staff. • There are systems in place for the rapid and safe transport of microbiological specimens and relevant clinical samples within the service and between external sites. • There are systems in place for the rapid reporting of epidemiologically important organisms to the treating clinician and the IPC team. • Clinicians and laboratory staff should notify individual cases of notifiable disease and outbreaks/unusual patterns of illness of infectious diseases to the relevant authorities. • Microbiological services are reviewed on a regular basis and all findings are reported to senior management with prompt actions taken to address the outcomes of the review. The review includes but is not limited to: - needs analysis of the microbiological service requirement, - turnaround times, efficiency and safety of transportation services, - applicability of new technologies.
Standard 8: HAI and communicable/transmissible disease outbreaks are managed and controlled in a timely, efficient and effective manner in order to reduce and control their spread.	• Outbreak policies and procedures which are in line with evidence- based best practice are in place. • Outbreaks are managed according to policies and procedures which include but are not limited to: - the roles and responsibilities of management of the health facility, the IPC team, other clinical managers and any other relevant staff are clearly outlined in the outbreak policies and procedures. • All service users, visitors and staff impacted by an outbreak are communicated with regarding the outbreak in a timely and effective manner. During an outbreak of HAI, an analysis, including a root cause analysis, is initiated by the IPC team. The findings of the analysis are presented and used to improve the service(s) provided.
Standard 9: There are systems in place to reduce and control antimicrobial resistance	• There are policies, procedures, systems and outcomes for the evidence-based best usage of antimicrobials and the reduction of antimicrobial resistance. This includes but is not limited to: - implementation of a the MoH Antimicrobial Guidelines for Management of infections. - annual review of antimicrobial prescription and usage - information regarding the prevalence of resistance to antimicrobial agents There is a multidisciplinary drug and therapeutics committee or an antimicrobial stewardship committee/team in place. The committee is responsible for the development and advising on the implementation and the monitoring of the antimicrobial stewardship programme. • Overall antimicrobial use and specific target areas are audited annually and reported to the MoH. This data collected is circulated to clinicians and management team of the health facility and is used to improve the quality of the service provided

Standards	Criteria
Standard 10: A communication strategy is in place which ensures information relating to HAI is communicated and responded to in an efficient, timely, effective and accurate manner.	A communication strategy is in place to ensure all service users, relatives, carers, visitors and staff are made aware of the importance of the prevention, control and reduction of HAIs. This includes but is not limited to: - clear, understandable, easy to read written information and/or other educational material provided to every service user and their carers at the point of contact with the service. - clear, easy to understand and effective signage relating to the prevention and control of HAIs - ongoing education campaigns on the prevention and control of HAIs and the reduction of antimicrobial resistance - The service works in partnership with other services and stakeholders, including: service-user groups and members of the public to improve the service to prevent and control HAIs. • Mechanisms, for example a service-user survey, are in place for service users and the public to provide feedback regarding the prevention and control of HAIs. The information collected is reported to the IPCC and is used to improve the service(s) provided.

Annex 4: The 5 critical moments of hand washing definitions

1 BEFORE PATIENT CONTACT	WHEN? Clean your hands before touching a patient when approaching him or her WHY? To protect the patient against harmful germs carried on your hands
2 BEFORE AN ASEPTIC TASK	WHEN? Clean your hands immediately before any aseptic task WHY? To protect the patient against harmful germs, including the patient's own germs, entering his or her body
3 AFTER BODY FLUID EXPOSURE RISK	WHEN? Clean your hands immediately after an exposure risk to body fluids (and after glove removal) WHY? To protect yourself and the health-care environment from harmful patient germs
4 AFTER PATIENT CONTACT	WHEN? Clean your hands after touching a patient and his or her immediate surroundings when leaving WHY? To protect yourself and the health-care environment from harmful patient germs
5 AFTER CONTACT WITH PATIENT SURROUNDINGS	WHEN? Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving - even without touching the patient WHY? To protect yourself and the health-care environment from harmful patient germs

Annex 5: Hand Hygiene Observation Form

Facility:		Type of assessment		Session Number*:	
Location:		Date: (dd/mm/yy)	/ /	Observer: (initials)	
Department:		Start/End time:(hh:mm)	: / :	Cadre:	
Service area:		Session duration: (mm)			
Region					

Cadre			Cadre			Cadre			Cadre		
Code			Code			Code			Code		
N°			N°			N°			N°		
Opp.	**Indication**	**HH Action**	**Opp.**	**Indication**	**HH Action**	**Opp.**	**Indication**	**HH Action**	**Opp.**	**Indication**	**HH Action**
1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves
2	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	2	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	2	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	2	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves
3	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	3	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	3	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	3	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves
4	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	4	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	4	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	4	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves
5	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	5	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	5	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	5	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves
6	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	6	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	6	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	6	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves
7	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	7	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	7	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	7	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves
8	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	8	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	8	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves	8	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ compro ○ Missed ○ gloves

* To be completed by the IPC focal person / representative

General Recommendations

1. In the context of open and direct observations, the observer introduces him/herself to the health-care worker and to the patient when appropriate, explains his/her task and proposes immediate informal feedback.

2. The health-care worker, belonging to one of the main four following professional categories (see below), is observed during the delivery of health-care activities to patients.

3. Detected and observed data should be recorded with a pencil in order to be immediately corrected if needed.

4. The session should last not more than 20 minutes in one service area (± 10 minutes according to the observed activity); the end time and the session duration are to be completed at the end of the observation session.

5. The observer may observe up to three health-care workers simultaneously, if the density of hand hygiene opportunities permits.

6. Each column of the grid to record hand hygiene practices is intended to be dedicated to a specific professional category. Therefore numerous health-care workers may be sequentially included during one session in the column dedicated to their category. Alternatively each column may be dedicated to a single health-care worker only of whom the professional category should be indicated.

7. As soon as you detect an indication for hand hygiene, count an opportunity in the appropriate column and cross the square corresponding to the indication(s) you detected. Then complete all the indications that apply and the related hand hygiene actions observed or missed.

8. Each opportunity refers to one line in each column; each line is independent from one column to another.

9. Cross items in squares (several may apply for one opportunity) or circles (only a single item may apply at one moment).

10. When several indications fall in one opportunity, each one must be recorded by crossing the squares.

11. Performed or missed actions must always be registered within the context of an opportunity.

12. Glove use may be recorded only when the hand hygiene action is missed while the health-care worker is wearing gloves.

Short description of items

Name of the Facility:		
Observer:	observer's initials (the observer is responsible for the data collection and for checking their accuracy before submitting the form for analysis.	
Department:	e.g.Obstetrics	
Service area	Delivery room	
	Post natal ward	
	Labour ward	
	Preterm nursery unit	
Type of asssessment	1) pre- baseline and 2) post-intervention - continuous;	
Date:		
Start/end time:		
Session duration:	difference between start and end time, resulting in minutes of observation.	
Session N°:	attributed at the moment of data entry for analysis.	
Service/Cadre	According to the following classification (Circle)	
	1. nurse / midwife	1.1 nurse, 1.2 midwife, 1.3 student.
	2. auxiliary	2.1 Drivers, 2.2 orderlies, 2.3. cleaners and 2.4 other support staff.ect
	3. medical doctor	3.1 in internal medicine, 3.2 surgeon, 3.3 anaesthetist / resuscitator / emergency physician, 3.4 paediatrician, 3.5 gynaecologist, 3.6 consultant, 3.7 medical student.
	4. other health-care worker	4.1 therapist (physiotherapist, occupational therapist, audiologist, speech therapist), 4.2 technician (radiologist, cardiology technician, operating room technician, laboratory technician, etc), 4.3 other (dietician, dentist, social worker and any other health-related professional involved in patient care), 4.4 student.
Number:	Number of observed health-care workers belonging to the same professional category (same code) as they enter the field of observation and you detect opportunities.	
Opp(ortunity):	defined by one indication at least	
Indication:	reason(s) that motivate(s) hand hygiene action; all indications that apply at one moment must be recorded	
	bef.pat: before touching a patient	aft.b.f: after body fluid exposure risk
	bef.asept: before clean/aseptic procedure	aft.pat: after touching a patient
		aft.p.surr: after touching patient surroundings
HH action:	response to the hand hygiene indication(s); it can be either a positive action by performing handrub or handwash, or a negative action by missing handrub or handwash.	
	HR: hand hygiene action by hand rubbing with an alcohol-based formula HW: hand hygiene action by hand washing with soap and water	Missed: no hand hygiene action Gloves: missed HHaction while HCW wearing gloves Compromise – HH action not appropriate (either, no soap, or no towel or procedure not followed)

Observation Form – Basic Compliance Calculation

	Facility:						Period			Settings:					
	Prof.cat.			Prof.cat.			Prof.cat.			Prof.cat.			Total per session		
Session N°	Opp (n)	HW (n)	HR (n)	Opp (n)	HW (n)	HR (n)	Opp (n)	HW (n)	HR (n)	Opp (n)	HW (n)	HR (n)	Opp (n)	HW (n)	HR (n)
1															
2															
3															
4															
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14															
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16															
17															
18															
19															
20															
Total															
Calculation	Act (n) = Opp (n) =			Act (n) = Opp (n) =			Act (n) = Opp (n) =			Act (n) = Opp (n) =			Act (n) = Opp (n) =		
Compliance															

Compliance (%) = Actions x 100

Instructions for use

1. Define the setting outlining the scope for analysis and report related data according to the chosen setting.

2. Check data in the observation form. Hand hygiene actions not related to an indication should not be taken into account and vice versa.

3. Report the session number and the related observation data in the same line. This attribution of session number validates the fact that data has been taken into count for compliance calculation.

4. Results per professional category and per session (vertical):

    4.1 Sum up recorded opportunities (opp) in the case report form per professional category: report the sum in the corresponding cell in the calculation form.

    4.2 Sum up the positive hand hygiene actions related to the total of opportunities above, making difference between hand wash (HW) and hand rub (HR): report the sum in the corresponding cell in the calculation form.

    4.3 Proceed in the same way for each session (data record form).

    4.4 Add up all sums per each professional category and put the calculation to calculate the compliance rate (given in %)

The addition of results of each line permits to get the global compliance at the end of the last right column.

Observation Form – Optional Calculation Form
(Indication-related compliance with hand hygiene)

	Facility:						Period				Settings:				
	Before touching a patient			Before clean/ aseptic procedure			After body fluid exposure risk			After touching a patient			After touching patient surroundings		
Session N°	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)
1															
2															
3															
4															
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14															
15															
16															
17															
18															
19															
20															
Total															
Calculation	**Act (n) =** **Indic1 (n) =**			**Act (n) =** **Indic2 (n) =**			**Act (n) =** **Indic3 (n) =**			**Act (n) =** **Indic4 (n) =**			**Act (n) =** **Indic5 (n) =**		
Ratio act / indic*															

Compliance (%) = Actions x 100

Instructions for use

1. Define the setting outlining the scope for analysis and report related data according to the chosen setting.

2. Check data in the observation form. Hand hygiene actions not related to an indication should not be taken into account and vice versa.

3. If several indications occur within the same opportunity, each one should be considered separately as well as the related action.

4. Report the session number and the related observation data in the same line. This attribution of session number validates the fact that data has been taken into count for compliance calculation.

5. Results per indication (indication) and per session (vertical):
   5.1 Sum up indications per indication in the observation form: report the sum in the corresponding cell in the calculation form.

   5.2 Sum up positive hand hygiene actions related to the total of indications above, making the difference between hand wash (HW) and hand rub (HR): report the sum in the corresponding cell in the calculation form.

   5.3 Proceed in the same way for each session (observation form).

   5.4 Add up all sums per each indication and put the calculation to calculate the ratio (given in %)

***Note:** This calculation is not exactly a compliance result, as the denominator of the calculation is an indication instead of an opportunity. Action is artificially overestimated according to each indication. However, the result gives an overall idea of health-care worker's behaviour towards each type of indication.

Service Area infrastructure Survey Tool

Assessment intervals (tick)

Q1	Q2	Q3	Q4

- The survey should be completed by the IPC focal person or departmental/unit IPC representative / informed health-care worker working within the ward (e.g. a senior nurse who can complete the survey while walking around the ward).

- This questionnaire is in two parts: 1)questions on hand washing and hand rub facilities and resources available in the ward; 2) a grid to assess the exact number of hand hygiene resources and products in place, to be completed by walking to each room or area where patient care/treatment takes place (i.e. the point of care).

- Short Glossary:
  Facility: health-care setting where the survey is being carried out (e.g. hospital, Health centre, Clinic, workplace settings).

Ward/Unit: a division, floor, or room of a healthcare facility for a particular category or group of patients (it corresponds to the smallest segmentation of the health-care facility; one service can include multiple wards).

Hand washing: washing hands with plain or antimicrobial soap and water.

Hand rubbing: treatment of hands with an antiseptic hand rub (alcohol-based formulation) or

Alcohol-based hand rub formulation: an alcohol-containing preparation (liquid, gel or foam) designed for application to the hands to kill germs.

Service: a cadre of person assessed e.g. Support staff, Doctor ect.

6. Date: 7. Facility:

8. Ward: 9. Service:

10. Location 11. Region

12. Department (please select the department which best represents yours):

☐ Laboratory ☐ Op Theatre ☐ Intensive care unit ☐ medical/surgical

☐ Emergency unit ☐ Obstetric ☐ Paediatrics ☐ Rehabilitation

☐ Outpatient clinic ☐ Surgical ☐ Medical ☐ other _____

13. Position of the person completing this questionnaire:

☐ Nurse Manager ☐ Departmental IPC Representative ☐ IPC focal person

☐ SMO/Matron ☐ Other infection control team member ☐ Other

14. Number of HCWs in the service area ☐ **Nurse** ☐ **Doctors** ☐ **Auxiliary** ☐ **Other**

15. Is water regularly available? ☐ **Always** ☐ **Intermittently** ☐ **Rarely** ☐ **Never**

16. Is running water available? ☐ **Yes** ☐ **No**

17. Is water visibly clean? ☐ **Yes** ☐ **No** ☐ **Don't know**

18. What kind of taps is available? ☐ **Hand-operated** ☐ **Elbow/wrist-operated**

☐ **Foot-operated** ☐ **Automatic**

19. Are disposable towels available at all sinks? ☐ **Always** ☐ **Intermittently** ☐ **Rarely** ☐ **Never**

20. Is soap available at all sinks? ☐ **Always** ☐ **Intermittently** ☐ **Rarely** ☐ **Never**

21. Is an alcohol-based handrub available? ☐ **Always** ☐ **Intermittently** ☐ **Rarely** ☐ **Never**

22. If yes, what type of handrub dispensers are available? (select all applicable answers)

☐ Pocket bottle ☐ Bottle affixed to trolley/tray 0Bottle affixed to bed

☐ Wall dispenser ☐ Dispenser located on bedside table /working area

23. If wall dispensers are available, are they placed at the point of care*?

☐ Yes ☐ Yes but not at each point of care ☐ No

24. Does every health-care worker have easy access to handrub pocket bottles?

☐ **Always** ☐ **Intermittently** ☐ **Rarely** ☐ **Never** ☐ **Not applicable**

25. Is there an assigned person responsible for the refilling or replacement of empty dispensers?

☐ **Yes** ☐ **No**

26. Are hand rub dispensers replaced when empty?

☐ **Always** ☐ **Intermittently** ☐ **Rarely** ☐ **Never** ☐ **Not applicable**

27. Are posters illustrating hand wash technique displayed beside each hand wash area? 0Yes 0No

28. Are posters illustrating hand rub technique displayed close to the dispensers and in multiple areas of the service area? ☐ **Yes** ☐ **No**

29. Are posters illustrating indications for hand hygiene displayed in multiple areas of the service area? (e.g. keeping short nails and the five critical moments) ☐ **Yes** ☐ **No**

30. Is any other type of reminder on hand hygiene displayed/available on this service area? ☐ **Yes** ☐ **No**

31. Are examination gloves available on the service area? ☐ **Always** ☐ **Intermittently**

☐ **Rarely** ☐ **Never**

32. Are audits on hand hygiene compliance periodically performed in this service area? ☐ **Yes** ☐ **No**

33. If yes, how frequently? ☐ **At least once a year** ☐ **At least quarterly** ☐ **Less frequent**

Annex 6: Drying, checking, folding, storage and transportation of linen

The procedure is the same for both hand and machine washed linens.

1. Completely air or machine dry before further processing.

2. Air-dry in direct sunlight, if possible, keeping the fabric off the ground, away from dust and moisture.

3. After linen are totally dry, check for holes and threadbare areas. If these are present, the item must be discarded or repaired before reuse or storage.

4. Clean and dry linen should be ironed as needed and folded. If sterile linen is required, prepare and sterilize wrapped packs.

5. Once processing is complete, the clean linen should be handled as little as possible, wrapped with wrapping paper or cloth to prevent contamination and stored in a covered area.

6. Clean linen should be transported in carts that are used for clean linen only and should be covered in a manner which will prevent contamination.

7. Wrapped linen that has been opened should be placed on the front of the shelf and used first. Wrapped linen that has been opened should be sterilized before putting back on the shelf.

8. Linen which has been stored for long periods should be inspected and when found to be dirty must be reprocessed before using.

Annex 7: IPC – Sterilizing Service Department Audit Tool

Name of the facility being assessed			
Name of assessor			
Date of this IPC assessment			
Departments/services assessed			
AREA OF ASSESSMENT	**C**	**NC**	**COMMENTS**
A. Decontamination			
Applicable standards:			
- **ISO 13485:2003 (Medical devices-Quality Management system** - **Requirements for regulatory purposes** - **Washer Disinfectors Part 1: General Requirements, terms and definitions and Tests; ISO 15883**			
Sorting of items prior to cleaning 1. Is there a (SOP) standard operative procedure on decontamination of instruments or sorting of items prior to cleaning			
2. Are there staff training records?			
3. Is there a designated dirty area?			
4. Is there dedicated staff every shift or do staff remain in the designated area?			
5. Availability of PPE and is it appropriately worn			
6. Is staff immunized or any care of health care workers (against Hepatitis, Tetanus)			
7. Is there any sorting of instruments on receipt, according to cleaning method			
8. Are instruments checked for defects			

AREA OF ASSESSMENT	C	NC	Comments
Manual Cleaning			
9. Do staff remain in their designated work station			
10. Are clean and dirty areas separated			
11. Are there staff training records?			
12. Is there a (SOP) standard operative procedure on manual cleaning of instruments?			
13. Are single used items discarded appropriately			
14. Availability of PPE and is it appropriately worn (plastic apron, pair of heavy gloves, eye wear , mask or visor)			
15. Is care taken to ensure the cleaning process does not add to bio- burden			
16. Available dedicated deep double sink for cleaning instruments			
17. Availability of elbow sinks			
18. Correct amount of water measured (sink marked)			
19. Detergent used correctly, correct dilution			
20. Is correct water temperature used			
21 Are instruments washed under the surface			
22. Are instruments rinsed			
23. Is water clean and changed when necessary			
24. Are all items dismantled or opened prior to placing in cleaning solution			
25. Is a non- abrasive cleaning equipment / soft brush used and properly maintained			
26. Is there an after care of the cleaning apparatus			
27. Are instruments rinsed under water to limit generation of aerosols			
28. Are non linting drying cloths used to dry instruments (using cotton cloth)			
29. Are instruments inspected during cleaning			
30. Are work surfaces clean			
31. Are cleaning records signed and dated			

AREA OF ASSESSMENT		C	NC	Comments
B.	**Inspection assembly and packaging (IAP)** **Applicable standards:** **- ISO 11228-2:2007 (Ergonomics - Manual handling** **- ISO 11607-1:2006 (Packaging for terminally sterilized medical devices - Requirements for materials, sterile barrier systems and packaging systems).**			
1.	Are clean and dirty areas separated			
2.	Do staff remain in their designated areas			
3.	Is there a written and displayed SOP			
4.	Are there staff training records			
5.	Availability of appropriate PPE (robust foot wear, head gear, gloves)			
6.	Is there a store area for raw materials			
7.	Is there a storage area for replacement equipment			
8.	Is there a register for log of discarded items or those sent for repairs			
9.	Is there an inspection table for processed items prior to packaging			
10.	Any hand wash basin or washing up area (there should be none)			
11.	Is there adequate space for work stations; - receiving area for washed and disinfected items - Inspection of instruments prior to replacement, packing - Easy passage of trolleys from work stations to sterilisers - Loading area for trolleys			
12.	Is there a separate textile packaging station or area			
13.	Are packing materials appropriate with items being packed and sterilizing method			
14.	Are all textile used laundered before use			
15.	Are single wraps used once and discarded			
16.	Are all items labelled with expiry date & tracking number			

AREA OF ASSESSMENT	C	NC	Comments
C. Sterilization process			
Standards: - **ISO 9001:2008 (Quality management Systems Model for quality assurance in production, installation and servicing**			
- **ISO 11140-1:2009 (Sterilization of health care products. Chemical indicators. General requirements)**			
- **ISO 11140-3: 2007 (Sterilization of health care products. Chemical indicators – Part 3: Class 2 indicator systems for use in the Bowie and Dick – type steam penetration test)**			
- **ISO 11140-4:2007 (Sterilization of health care products. Chemical indicators – Part 4: Class 2 indicators as an alternative to the Bowie and Dick – type test for detection of steam penetration)**			
- **ISO 11140-5: 2007 (Sterilization of health care products. Chemical indicators – Part 5: Class 2 indicators for Bowie and Dick – type air removal tests)**			
- **ISO 112281-1:2003 Ergonomics, Manual handling (Part 1: Lifting and carrying)**			
- **ISO 11737-2 : 2009 (Sterilization of medical devices – Microbiological methods – Part 2: Tests of sterility performed in the definition, validation and maintenance of a sterilization process**			
- **ISO 13408-1 : 2008 Aseptic processing of health care products – Part 1 : General requirements**			
- **ISO 13408-5: 2006 Aseptic processing of health care products – Part 5 : Sterilization in place ISO 13485 : 2003 Medical Devices - Quality Management systems – Requirements for regulatory purposes**			
- **ISO 14644-2 : 2000 Cleanrooms and associated controlled environments – Part 2:Specifications for testing and monitoring to prove continued compliance with ISO 14644-1**			
- **ISO 15882 :2008 Sterilization of health care products- Chemical indicators-Sterilization of health care products-Guidance for selection, use and interpretation of results**			
- **ISO 17664 Sterilization of medical devices – Information to be provided by the manufacturer for the processing of re-sterilizable medical devices**			

AREA OF ASSESSMENT		C	NC	Comments
1.	Are clean and dirty area separated			
2.	Do staff remain in their designated work area			
3.	Is there a written procedure available / displayed			
4.	Are there operating manuals available for the machinery			
5.	Are there staff training records available			
6.	Is there a daily cleaning record			
7.	Is there a vacuum leakage test carried out at least once a weak			
8.	Is a Bowie Dick Test done at least daily			
9.	Are biological tests done daily			
10.	Are load control or class 6 indicator used			
11.	Is manual checking of gauges/ computer print outs done			
12.	Is the autoclave or sterilizer validated			
13.	Is there regular maintenance on the autoclaves (If yes, any documentation?)			
14.	Is PPE available and used (heat resistant gloves)			
15.	Is the autoclave correctly loaded/ hand to easily pass through/ packs not on top of each other			
16.	Is there easy access to sterilizer for testing and maintenance			
17.	Is there storage area for trolleys used for unloading the sterilizer			
18.	Is there a separate area for keeping items following failure of sterilizing cycle			
19.	Is there a designated area for keeping records from each of the sterilizers and quality, traceability records			
20.	Is there a sterilizer log book containing information on its quality records, maintenance and repairs			

D: Sterile Storage and transportation of clean and used instruments		C	CN	Comments
Applicable standards:				
-ISO 11228-2:2007 Manual handling - --Part 2: Pushing and pulling				
1.	Do staff remain in their designated work area			
2.	Is there a written procedure available / displayed			
3.	Are there staff training records available			
4.	Are the storage shelves easy to clean			
5.	Is the cleaning frequency and method of the shelves documented			
6.	Is the area clean and dry			
7.	Is there adequate space for storing sterile items with easy movements of trolleys			
8.	Is there an area for documentation, registration and stock taking			
9.	Is the temperature ideal i.e. not exceeding 22-24^{0}C			
10.	Are racks clearly labelled with type of pack or item & a list of how many of each are currently stored (list should be updated each time a pack is removed or added)			
11.	Is each name of the pack, date of processing visible			
12.	Is a daily check of stock carried out and any discrepancies with dispatch log recorded			
13.	Is stock rotated on a " first in/first out basis"			
14.	Is there one dispatch station to allow control of movement			
15.	Are all items that leave storage area logged and signed for by the person receiving the items			
16.	Is there a robust tracking system in place			
17.	Are there designated trolleys to transport used instruments			
Total score				

Key: C – compliant, NC –Non-Compliant

Annex 8: Environmental cleaning and disinfection guidelines in health facilities

Item/task and location	Frequency of cleaning/ disinfection	Agent, equipment, and supplies needed	Procedure/Remarks
CLEANING EQUIPMENT			
Cleaning cloths	• Daily after use.	• Liquid detergent and water. • Clean water and bucket.	• Wash with detergent, rinse, and dry. • Store dry. • Incinerate if heavily contaminated.
Mops, brooms, brushes	• Clean and disinfect after use.	• Liquid detergent and water. • Sodium hypochlorite 0.5%.	• Decontaminate, wash thoroughly with detergent, rinse in water, and dry. • Always comply with colour-code and confine use of each mop to its designated room, e.g., kitchen, toilet, ward, etc. • **DO NOT MIX MOPS** • Mops should be stored dry and upright with head up.
Plastic buckets for use during cleaning	• Daily after use or as required.	• Liquid detergent and water. **Isolation areas:** • Sodium hypochlorite 0.5%.	• Each area to have own bucket. **Isolation areas:** • Decontaminate, clean, and dry.
ABLUTION FACILITIES			
Ablution blocks: • Toilets • Toilet seats • Toilet cistern • Urinal	• Thorough daily cleaning or as per cleaning schedule	• Liquid detergent and water. • Sodium hypochlorite 0.5%. • Deodoriser.	• Use a low-level disinfectant. • Use deodorizer if necessary as per manufacturer's instructions. • Soak in sodium hypochlorite (de-contaminate if possible) clean and dry.
Jugs (for measuring urine, emptying catheter bags)	• Between use and daily.	• Sodium hypochlorite 0.5%. • Store dry and inverted.	• Decontaminate, clean, and dry.
Bedpans/urinals Sputum mugs Disposable sputum mugs	• Scrub with vim, soap, and water daily. Discard after use	• Detergent and water. **In case of diarrhoeal disease:** • Sodium hypochlorite 0.5%.	**Regardless of patient's status of infection:** • Empty bedpan/ urinal/ washing bowl down sewer. Decontaminate, clean, and dry. Use bed pan washer if available. • Extra bedpans/ urinals/ sputum mugs not in use should be stored in cupboards. • Sputum mugs must be decontaminated and cleaned before dispatching to patients. • Used toilet brushes: Soak in decontaminant, wash in warm soapy water, rinse, and hang to dry.

Environmental cleaning and disinfection guidelines in health facilities(cont.)

Item/task and location	Frequency of cleaning/ disinfection	Agent, equipment, and supplies needed	Procedure/Remarks
ABLUTION FACILITIES (cont.)			
Floors Walls	• Scrub with disinfectant cleaning solution, rinse, and allow to air-dry. • Clean spills as per policy. • Clean walls once a week or as necessary.	• Liquid detergent and warm water. **Spills:** • Sodium hypochlorite 0.5%.	Comply with cleaning schedule.
Sluice rooms	• Once a day and as required. • Disinfect after contamination.	• Liquid detergent and warm water. • Sodium hypochlorite 0.5%.	• Avoid splashing and spills on walls and surrounding area. • Pour contents of urinals and bedpans GENTLY down the sluice. • Disinfect surfaces after use and as necessary.
Bathrooms: • Enamel baths and basins (bathtubs and sinks) • Washing bowls	• Clean once a day as required. • Clean spills as per policy. • Clean and disinfect between patients.	• Liquid detergent and warm water. • Sodium hypochlorite 0.5%. **Disinfect with:** • Sodium hypochlorite 0.5%.	• Scrub floors and walls to remove any residues. • Clean and dry drainage hole. • Clean walls from top to bottom. • **Do not** use ammonia detergent and chlorine-based compound together because of the release of toxic compounds. • Rinse thoroughly to remove disinfectant. • **Do not** use abrasive material to clean bath and sink, as it will damage their surface.
Pedal bin and container: • Without liner • With liner	• Empty daily or when 2/3 full. • Decontaminate, wash daily and as required • Discard	• Liquid detergent and water. • Sodium hypochlorite 0.5%.	• Decontaminate and clean thoroughly daily and anytime it is dirty. • Dispose of liner when ¾ full, and clean once per week.
Drains	• Once per week and as necessary.	• Liquid detergent and water. • Drain cleaner for unblocking.	• Pour hot soapy water down the drain. If blocked use plunger (colour-coded). • Use drain cleaner only if necessary.
Beds (including frames)	• Daily damp cleaning. • Disinfect on discharge or for spills.	• Liquid detergent and water. • Spills and terminal disinfection with 0.5% sodium hypochlorite/ disinfectant cleaning solution.	• Clean the bed with detergent and water. • Disinfect mattress and the pillow(s) and air-dry for at least 1 hour in- between patients. ***Never admit a patient into a bed that has not been disinfected.***
Bedside lockers (General Ward)	• Daily damp cleaning. • Thorough cleaning once per week and on discharge of patient	• Liquid detergent and water. • 0.5% sodium hypochlorite/ disinfectant cleaning solution.	• Check lockers for pest control requirements. If splashed with blood and body fluids, wipe with 0.5% sodium hypochlorite/ disinfectant cleaning solution and wash with water.

Environmental cleaning and disinfection guidelines in health facilities (cont.)

Item/task and location	Frequency of cleaning/ disinfection	Agent, equipment, and supplies needed	Procedure/Remarks
FURNITURE, FITTINGS AND EQUIPMENT			
Bowls (dressing, surgical, vomit, kidney)	• After each use.	• Clean with detergent. • Autoclave at CSSD. • Store dry and inverted. • Individual bowl for each patient preferred. • For communal use, after thorough cleaning.	For infected patients use individual bowls. • Clean with phenolics for bacterial and hypochlorite for viral infections. • On discharge, autoclave or disinfect For non-infected patients, treat as for washing bowls: • Decontaminate, wash with detergent and water. • Rinse and dry.
Couches	• Wipe daily or as necessary.	• Liquid detergent and warm water.	
Carpets	• Vacuum daily. • Wash quarterly.	• Carpet shampoo or warm soapy water.	• Vacuum clean routinely and wash thoroughly quarterly. • Not recommended for patient areas.
Bed curtains Window curtains	• Every 6 months or after infectious cases.	• Laundry detergent and water.	• For infectious cases avoid use of curtains. • 1% hypochlorite is used for laundering after disinfection, if necessary.
Electronic equipment	• Follow manufacturer's instruction and/or disinfect surfaces between patients.	• 70%–95 % Methylated spirit.	
Fans	• Routinely and on discharge of patient.	• Liquid detergent and soapy warm water.	• Damp wipe with clean cloth. • Dismantle the fan for terminal cleaning and when visibly dirty.
Hydrotherapy pool	• Clean after each use.	Water: • Chlorine-based compound. • Chlorine level in pool 1.4 to 2.0 ppm. Tiled areas and floor area surrounding pool: • Sodium hypochlorite 0.5%.	• Check chlorine levels and pH of pool daily. • Bacteriological investigations of pool water to ensure level of disinfection is sufficient to cope with level of use.
Linen	• Collect as per health-care facility policy	• Laundry detergent and water.	• If not soiled, put into laundry bin and send to laundry. • If soiled, remove solid soil and discard into sluice for flushing; wring, rinse, put into colour-coded container, and send to laundry.
Mattress, pillows: • With plastic covering	• Wipe and disinfect when necessary and after each patient.	• Laundry detergent and water. • Sodium hypochlorite 0.5% / disinfectant cleaning solution if contaminated.	• All mattresses should be covered with soft impervious plastic.

Environmental cleaning and disinfection guidelines in health facilities (cont.)

Item/task and location	Frequency of cleaning/ disinfection	Agent, equipment, and supplies needed	Procedure/Remarks
FURNITURE, FITTINGS AND EQUIPMENT (cont.)			
• Mackintosh	• Wash mackintosh with liquid detergent and disinfect after each patient.	• Detergent and water.	
Stands for: • IV sets • Gas tanks • Bed screen	• Damp clean daily and as necessary.	• Detergent and water. • Disinfect spills. • Wipe with methylated spirit	• Use disinfectant cleaning solution and wash with water.
Sinks: • Kitchen, other	• Daily or as necessary.	• Detergent and warm water.	
Safety cabinet (Pharmacy)	• Wipe at end of each procedure.	• Sodium hypochlorite 0.5% / disinfectant cleaning solution. • Treat spills as per policy.	• Clean airflow and change filters as per manufacturer's instructions.
Trolleys and Trays: • Procedures • Food	• Daily damp cleaning and as required. • Disinfect before and after every use.	• Liquid detergent and water. **Disinfectants:** • Methylated spirit – 70%. • 0.5% chlorhexidine in alcohol. • Sodium hypochlorite 0.5%.	**Procedure trolleys and trays:** • Wipe with methylated spirit or chlorhexidine before • and after every use. **Food trolley:** • Wipe daily with sodium hypochlorite.
Glassware and other equipment: • Pharmacy	• As per requirements of Pharmacy.	• Liquid detergent and warm water.	• Routinely damp dust. • Allow to dry before use
Image Intensifier	• Daily and after each use.	• Liquid detergent and warm water. OR • 70% - 95 % Methylated spirit.	• Routinely damp dust. • Wipe with alcohol.
X-ray equipment	• Daily and after each use.	• Liquid detergent and warm water.	• Routinely damp dust. • Allow to dry before use.
Tooth mugs	• Wash daily or use disposable.	• Detergent and hot water if reusable.	• For infected patients, use individual mugs or disposables. • Disinfect with sodium hypochlorite 0.5%.
Toys	• After discharge or as required.	• Wash, rinse, and dry thoroughly. • **Do not** soak in disinfectant if contaminated; heat disinfect. OR • Wipe surface with 0.5% sodium hypochlorite or 70% methylated spirit.	• For patients with infections, **do not** use communal toys which cannot be easily disinfected. • Heavily contaminated toys should be destroyed

Environmental cleaning and disinfection guidelines in health facilities (cont.)

Item/task and location	Frequency of cleaning/ disinfection	Agent, equipment, and supplies needed	Procedure/Remarks
FLOORS, WALLS, AND WINDOWS, etc.			
Floors: • General wards/ areas • Laundry • Pharmacy • Occupational, • Physiotherapy, Radiotherapy, and Dental Departments	• Thorough damp cleaning daily. • Cleaning when soiled. • Cleaning between patients and after discharge (if single room accommodation). • Damp mop. • Clean spills as per policy.	• Liquid detergent and warm water. **Spills:** • Sodium hypochlorite 0.5%. • Liquid detergent and warm water.	• See section on floor mops, brooms, for care. • Use colour-coded mops to prevent cross-contamination between areas. • Switch off fans while cleaning.
SPECIAL PROCEDURES AND SURFACES			
Ambulance: • Delicate equipment, e.g., radios, cardiac monitors • Oxygen masks, nebulizers	• After each patient and daily. • After each patient and daily.	• Liquid detergent and water. **Disinfectant:** • Sodium hypochlorite 0.5%. • Liquid detergent and water. **Disinfectant**: • Sodium hypochlorite 0.5%. **For any suspect TB patients:** • 0.55% ortho-phthalaldehyde	• Wipe with soap and water. • Wipe with disinfectant if contaminated. • Wash in warm water with detergent. • Rinse and dry. • Decontaminate, clean, and high-level disinfect. • Soak in OPA for 5 minutes.
Inside Ambulance: • Walls, windows, floors, slats	• Weekly or after spills. • Wash daily and as necessary.	• Liquid detergent and water. • Treat spills as per policy.	• •Wash daily and as necessary. • See Section on floors and walls.
Mortuary: • Trays • Floors	• Disinfect trays after every removal of body. • Wash floors daily and as required.	**Routine disinfection:** • Sodium hypochlorite 0.5%. OR • Liquid detergent and water. • Deodorizer.	• Wipe trays thoroughly and mop floor. • If there are excessive smells, use deodorizer. • Sweep first, then mop with detergent soap solution. • Wipe and deodorize.

Source: The Zimbabwe Essential Drugs Action Program. Disinfection in Healthcare Facilities in Zimbabwe, Harare: Ministry of Health and Child Welfare, 2001, pp. 33-51, (modified).

Annex 9: Disinfectants, the spectrum, uses, advantages and disadvantages

Disinfecting Agents	Spectrum	Uses	Advantages	Disadvantages
Alcohol (60-90%) including ethanol, isopropanol	Low to intermediate	- Semi - critical &non-critical - Thermometers, stethoscopes - Rubber stoppers on multidose vials	- Fast acting - No residue - No staining - Low cost - Wildly available	- Volatile, flammable - Irritant to mucous membranes - Inactivated by organic matter - May harden rubber, cause glue deterioration 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	- tonometer - Spot disinfection of surfaces - Dental appliances - Hydrotherapy tanks - Water system in haemodialysis (high concentrations 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 & mucous membrane irritant - Unstable if left uncovered exposed to light & 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 & respiratory tract - Direct contact causes skin injury - Relatively slow activity against MTB
Peracetic acid (0.2-3mg) and other stabilized 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 (30 - 45min at 50 -55%) - Active in the presence of organic matter - Environmentally friendly by products (water, oxygen, acetic acid)	- Corrosive to some meals - Unstable when activated - May irritate skin, conjunctivae, mucous membranes

Disinfecting Agents	Spectrum	Uses	Advantages	Disadvantages
Ortholfiphthalaldehyde	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 & mucous membranes - Stains items not thoroughly cleaned - Eye irritation on contact - Hypersensitivity reactions - Slow sporocidal activity - Monitoring for continuing efficacy levels
Hydrogen peroxide 7.5%	High level to sterilant	- Cold sterilization for heat sensitive items	- No activation - No odour eco-friendly	- 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 15min) - No odour - No activation required	- Material compatibility concerns with metals such as brass, copper, zinc, etc. - Damage to eye, skin
Glucoprotamin	High level	- Manual endoscope, processing 15 min and 20°c	- Good mycobactericidal activity - High cleansing performance - No odour	- Lack of activity against some spores and entero viruses
Phenolics	Low to intermediate	- Environmental decontamination & non - critical items to be avoided	- Not in activated by organic matter	
Iodophores (30-50ppm free chlorine)	Low level	- Disinfection of non-critical items, hydrotherapy tanks - Main use is as an antiseptic (2-3 ppm chlorine)	- Relatively non Irritating & non-toxic	- Inactivated by organic matter - Adverse reaction with silicone tubing - May stain fabric - Not commonly in use as a disinfectants
Quaternary ammonium compounds	Low level narrow spectrum	- Environmental surfaces - Skin antiseptic	- Stable - Non - irritating - Good cationic detergent	- Not recommended unless combined with other disinfectants.

Annex 10: TB Infection Risk Assessment Form

Facility: _____

Date: _____

Region: _____

Scoring should be the total of the entire YES (1) and not the unknown (999) in each group (A, B, C, D, E and F)

A. Administrative Controls

		No	Yes	Unknown
1_CHA	**Is there someone in charge of TB infection control in the healthcare facility?**	**0**	**1**	**999**
		No	**Yes**	**Unknown**
2_ICP	**Is there a written infection control plan in place?**	**0**	**1**	**999**
		No	**Yes**	**Unknown**
3_IMP	**Is there someone in charge of the implementation of the TB infection control plan in the healthcare facility?**	**0**	**1**	**999**

In the Opinion of the staff member being interviewed does the infection control plan or standard clinic procedures if no specific infection control plan is in place, allow for?

		No	Yes	Unknown
4_1_OPICP	**Early detection of TB as evidenced by time between taking of sputum and receiving of results? (i.e. within 48 hours)**	**0**	**1**	**999**
		No	**Yes**	**Unknown**
4_2_OPICP	**Separation of Infectious patients?**	**0**	**1**	**999**
		No	**Yes**	**Unknown**
4_3_OPICP	**Early treatment of infectious TB patients? (i.e. treatment started within 5 days of receiving positive sputum results)?**	**0**	**1**	**999**
		No	**Yes**	**Unknown**
4_4_OPICP	**With reference to MDR-TB patients: Are patients separated in the clinic whilst they are awaiting transport to a MDR-TB treatment facility?**	**0**	**1**	**999**

		No	Yes	Unknown
5_	**What TB indicators do you use to determine problems in your TB infection control programme? Mark all that apply. (No prompting)**	**0**	**1**	**999**
5_COR	**Conversion Rates**			**Yes**
5_CUR	**Cure Rates**			**Yes**
5_TCR	**Treatment Completion Rates**			**Yes**
5_TDR	**Initial Treatment Defaulter Rates**			**Yes**
5_TFR	**Treatment Failure Rates**			**Yes**
5_TD	**Died**			**Yes**
5_TOR	**Transferred Out Rates**			**Yes**
5_MOR	**Moved Out Rates**			**Yes**
5_OTH	**Other**			**Yes**
5_1_SP	**Specify**			
5_NON	**None**			**0**

6_	**What mechanisms are in place to overcome TB infection control problems? Mark all that apply. (No prompting)**	
6_ICO	**Infection control officer or committee review indicators on a regular basis**	**Yes**
6_AC	**Awareness campaigns**	**Yes**
6_ICL	**Involvement of community leaders**	**Yes**
6_RNM	**Reports to Nursing Managers/Healthcare Officials or CDC**	**Yes**
6_IAI	**Increased attempts to implement infection control plan**	**Yes**
6_MAE	**Monitoring and evaluation of high risk areas**	**Yes**
6_OTH	**Other**	**Yes**
6_1_SP	**Specify**	
6_NON	**None**	**0**
7_	**Are there any routine quality control measurements for TB infection control in place? Mark all that apply. (No prompting)**	
7_ICC	**Infection control committee meetings with minutes recorded**	**Yes**
7_RCD	**Routine checking and documentation of infection control practices**	**Yes**
7_TOS	**Training of staff and documentation thereof**	**Yes**
7_NON	**None**	**0**
7_OTH	**Other**	**Yes**
7_1_SP	**Specify**	

		No	Yes	Unknown
8_HTRA	**Are healthcare workers being routinely trained on TB infection control practices? transport to a MDR-TB treatment facility?**	**0**	**1**	**999**

If yes continue, otherwise go to question 9

On what topics are they trained?

Mark all that apply.

8_1_ADM	**Administrative Controls**	**Yes**
8_2_ENV	**Environmental Controls**	**Yes**
8_3_PEP	**Personal Respiratory Protection Controls**	**Yes**
8_4_OTH	**Other**	**Yes**
8_4_1_SP	**Specify**	
8_5_NON	**Unknown**	**999**

		No	Yes	Unknown
9_PTRA	**Are patients and their families being routinely educated on TB infection control practices?**	**0**	**1**	**999**

On what topics are they trained?

Mark all that apply.

9_1_ADM	**Administrative Controls**	**Yes**
9_2_ENV	**Environmental Controls**	**Yes**
9_3_PEP	**Personal Respiratory Protection Controls**	**Yes**
9_4_OTH	**Other**	**Yes**

9_4_OTH	**Other**		**Yes**
9_4_1_SP	**Specify**		
9_5_NON	**Unknown**		**999**
10	**Has there been a Healthcare Worker/s diagnosed with TB / DR TB in the past 2 years?**		
	# =	**Category/ies =**	

Total score: (%) (Maximum = 36)

B. Environmental Controls

What environmental controls are used in the healthcare facility?

1_ **Mark all that apply. (Need to prompt)**

		No	Yes	Unknown
1_1_NV	**Natural Ventilation**	**0**	**1**	**999**
1_2_OW	**Open Windows**	**0**	**1**	**999**
1_3_CV	**Cross Ventilation**	**0**	**1**	**999**
1_4_EF	**Propeller Fans**	**0**	**1**	**999**
1_5_EVS	**Exhaust Ventilation Systems**	**0**	**1**	**999**
1_6_HF	**HEPA Filters**	**0**	**1**	**999**
1_7_UL	**UVGI Lights**	**0**	**1**	**999**

		No	Yes	Unknown
1_8_SOS	**Separation of suspected infectious TB patients**	**0**	**1**	**999**

		No	Yes	Unknown
1_9_IOC	**Isolation of confirmed TB and MDR-TB patients**	**0**	**1**	**999**

2_ **Are the windows clear of any obstruction?**

Need to prompt.

		No	Yes	Unknown
2_1_RA	**Reception Area**	**0**	**1**	**999**

		No	Yes	Unknown
2_2_WA	**Waiting Area**	**0**	**1**	**999**

		No	Yes	Unknown
2_3_HW	**Passages**	**0**	**1**	**999**

		No	Yes	Unknown
2_4_CR	**Consulting Rooms**	**0**	**1**	**999**

		No	Yes	Unknown
2_5_SR	**Sputum Room**	**0**	**1**	**999**

		No	Yes	Unknown
2_6_TR	**Treatment Room**	**0**	**1**	**999**

		No	Yes	Unknown
2_7_SR	**Staff Rooms**	**0**	**1**	**999**

		No	Yes	Unknown
2_8_MCR	**Mobile Consulting Rooms / Park homes**	**0**	**1**	**999**

		No	Yes	Unknown
2_9_OTH	**Other**	**0**	**1**	**999**
2_9_1_SP	**Specify**			

		No	Yes	Unknown
3_AES	**Do you have air exhaust systems?**	**0**	**1**	**999**

If yes continue, otherwise go to question 4

3_1_EES **From the following types of air exhaust systems, which ones are used in the healthcare e facility? Mark all that apply. (Need to prompt)**

	No	Yes	Unknown
Extractors located in enclosed spaces (e.g. HEPA filters, UVGI Lights)	**0**	**1**	**999**

		No	Yes	Unknown
3_2_EO	**Extractors with exhaust to the outdoors**	**0**	**1**	**999**

		No	Yes	Unknown
4_MVS	**Do you have mechanical exhaust systems?**	**0**	**1**	**999**

If yes continue, otherwise go to question 5

What types of mechanical ventilation systems are used?

4_1_AES	**Air Extraction System**	**Yes**
4_2_ARS	**Air Recirculation System eg air conditioners**	**Yes**

		No	Yes	Unknown
5_IRA	**Are there isolation rooms available?**	**0**	**1**	**999**

If yes continue, otherwise go to question 7

5_1_TB	**How many isolation rooms are available for TB patients?**	**Yes**
5_2_MDR	**How many isolation rooms are available for MDR-TB patients**	**Yes**

6_VEN	**Do you use ventilation in the isolation rooms?**	**0**	**1**	**999**

If yes continue, otherwise go to question 7

What type of ventilation is used in the isolation rooms?

Need to prompt

6_2_ACE	**Natural Ventilation**	**Yes**
6_3_ACR	**Air conditioning or central heating with a recirculation system**	**Yes**
6_4_HF	**HEPA Filters**	**Yes**
6_5_UL	**UVGI Lights**	**Yes**
6_6_OTH	**Other**	**Yes**
6_6_1_SP	**Specify**	**Yes**

		No	Yes	Unknown
7_ADS	**Are there any areas designed to separate MDR-TB suspected or confirmed cases?**	**0**	**1**	**999**

		No	Yes	Unknown
8_ENG	**Does the facility have access to an engineer or other professional for assistance on design, installation, maintenance and assessment of environmental controls?**	**0**	**1**	**999**

		No	Yes	Unknown
9_EC	**Are environmental controls periodically maintained with results written down on registers?**	**0**	**1**	**999**

		No	Yes	Unknown
10_NPS	**Are there rooms with negative pressure systems installed?**	**0**	**1**	**999**

If yes continue, otherwise go to Chapter C

		No	Yes	Unknown
10_1_NPCH	**Is negative pressure in isolation rooms checked everyday?**	**0**	**1**	**999**

		No	Yes	Unknown
10_2_FLO	**Is the direction of the flow of air in isolation rooms checked daily with incense, paper or a measuring device?**	**0**	**1**	**999**

		No	Yes	Unknown
10_3_FRES	**Are the results of the flow of air exercise available at the isolation room?**	**0**	**1**	**999**

10_4_ **What procedures are used at isolation rooms if the isolation room is without negative pressure? Mark all that apply. (No prompting)**

10_4_1_FMI	**Facility manager informed**	**Yes**
10_4_2_EI	**Engineer informed**	**Yes**
10_4_3_PTR	**Patients in isolation room transferred immediately**	**Yes**
10_4_4_WO	**Windows opened**	**Yes**
10_4_5_NON	None	**Yes**

Total score: (%) (Maximum = 43)

C. Respiratory Protection Program

		No	Yes	Unknown
1_WRP	**Is there a written respiratory protection plan in the healthcare facility?**	0	1	999

If yes continue, otherwise go to question 3

Which staff members are included in the plan?

2_ Need to prompt.

		No	Yes	Unknown
2_DOC	**Doctors**	0	1	999
2_NUR	**Nurses**	0	1	999
2_NA	**Nurse Assistants**	0	1	999
2_LS	**Lab Staff**	0	1	999
2_AD	**Administrators**	0	1	999
2_NUT	**Nutritionists**	0	1	999
2_CMS	**Cleaning and maintenance staff**	0	1	999
2_OTH	**Other**	0	1	999

2_1_SP	**Specify**	

		No	Yes	Unknown
3_RAS	**Are there respirators available for staff to use**	**0**	**1**	**999**

If yes continue, otherwise go to question 4

		3M	Kimberley Clarke	Unknown
3_1_BRAN	**What brands of respirators are being used by staff who works with TB and MDR-TB patients?**	**Yes**	**Yes**	**999**

		CDC	CEN	Unknown
3_2_MOD	**What models of respirators are being used by staff who works with TB and MDR-TB patients?**	**0**	**1**	**999**

Where are they used?

3_3 **Mark all that apply. (No prompting)**

3_3_CR	**Consulting rooms**	**Yes**
3_3_PR	**Procedure rooms**	**Yes**
3_3_TBR	**TB rooms**	**Yes**
3_3_WR	**Waiting rooms**	**Yes**
3_3_TRA	**During transportation of patients**	**Yes**
3_3_OTH	**Other**	**Yes**
3_3_1_SP	**Specify**	

		No	Yes	Unknown
4_TRP	**Is training provided to staff on respiratory protection on at least an annual basis?**			

If yes continue, otherwise go to question 6

		No	Yes	Unknown
5_REC	**Is there a record of the training?**			

	No	Yes	Unknown
Does the staff perform the fit testing exercise when using respirators? If yes continue, otherwise go to Chapter D	0	1	999

	No	Yes	Unknown
Is there a record of the training?	Yes	Yes	999

	No	Yes	Unknown
Is the testing performed at baseline	0	1	999

	No	Yes	Unknown
Is the testing repeated?	0	1	999

If yes, then how often? ____ Weeks

Total score: **(%) (maximum = 24)**

D. Sputum, Test and Result Processing

		No	Yes	Unknown
1_MIC	**Is the healthcare facility able to send sputum for microscopy?**	0	1	999

		HOURS	DAYS	WEEKS
1_1_MTAT	**If yes what is the average turnaround time to receive results?**			

		No	Yes	Unknown
2_CULT	**Is the healthcare facility able to send sputum for culture?**	0	1	999

		No	Yes	Unknown
2_1_CTAT	**If yes what is the average turnaround time to receive results?**	0	1	999

		No	Yes	Unknown
3_DST	**Is the healthcare facility able to send sputum for drug sensitivity tests?**	**0**	**1**	**999**

		No	Yes	Unknown
3_1_DTAT	**If yes what is the average turnaround time to receive results?**	**0**	**1**	**999**

Total score: (%) (Maximum = 3)

E. TB risk assessment in the healthcare facility

		No	Yes	Unknown
1_TBRA	**Has a TB risk assessment been performed at the healthcare facility?**	**0**	**1**	**999**

If yes continue, otherwise go to question 5

1_1_RAP	**How often is the risk assessment performed?**	Weeks

		DD	MM	YYYY
1_2_LRAP	**When was the last risk assessment performed?**			

3_3 **What were the main problems identified during the last risk assessment?**

Mark all that apply. (No prompting)

1_3_PRAD	**Administrative**	**Yes**
1_3_PREN	**Environmental**	**Yes**
1_3_PRPE	**Personal**	**Yes**
1_3_PROT	**Other**	**Yes**
1_3_1_SP	**Specify**	
1_3_NON	**None**	**No**

If none go to Chapter F

1_3_1_	**What corrective actions were taken to address the stated problems? Mark all that apply. (No prompting)**	
1_3_1_ICO	**Infection control officer or committee instated**	**Yes**
1_3_1_ICP	**Infection control plan implemented**	**Yes**
1_3_1_AUDIC	**Audit of infection control (baseline, monthly, biannual, annual)**	**Yes**
1_3_1_AUDTB	**Monitoring and evaluation and documentation of high risk areas**	**Yes**
1_3_1_MAE	**During transportation of patients**	**Yes**
1_3_1_IMP	**Improvement of high risk areas documented**	**Yes**
1_3_1_ESC	**Escalation of reports when resources needed**	**Yes**
1_3_1_OTH	**Other**	**Yes**
1_3_1_NON	**None**	**Yes**

Total score: (%) (Maximum = 13)

F. To be completed by the interviewer

1_	**Based on a review of the clinic as well as the TB sputum and treatment registers is there evidence of:**			
		No	**Yes**	**Unknown**
1_1_OPICP	**Early detection of TB as evidenced by time between taking of sputum and receiving of results? (i.e. within 48 hours)**	**0**	**1**	**999**
		No	**Yes**	**Unknown**
1_2_OPICP	**Separation of Infectious patients?**	**0**	**1**	**999**
		No	**Yes**	**Unknown**
1_3_OPICP	**Early treatment of infectious TB patients? (i.e. treatment started within 5 days of receiving positive sputum results)?**	**0**	**1**	**999**
		No	**Yes**	**Unknown**
1_4_OPICP	**With reference to MDR-TB patients: Are patients separated in the clinic whilst they are awaiting transport to a MDR-TB treatment facility?**	**0**	**1**	**999**
2_	**What environmental controls are used in the healthcare facility?**			
2_1_NV	**Natural Ventilation**			**Yes**
2_2_OW	**Open Windows**			**Yes**
2_3_CV	**Cross Ventilation**			**Yes**
2_4_EF	**Exhaust Fans**			**Yes**
2_5_EVS	**Exhaust Ventilation Systems**			**Yes**
2_6_HF	**HEPA Filters**			**Yes**
2_7_UL	**UVGI Lights**			**Yes**
2_8_SOS	**Separation of suspected infectious TB patients**			**Yes**

		No	Yes	Unknown
2_9_IOC	**Isolation of confirmed TB and MDR-TB patients**	0	1	999

		No	Yes	Unknown
3_	**Are the windows clear of any obstruction?**	0	1	999

		No	Yes	Unknown
3_1_RA	**Reception Area**	0	1	999

		No	Yes	Unknown
3_2_WA	**Waiting Area**	0	1	999

		No	Yes	Unknown
3_3_HW	**Hallways**	0	1	999

		No	Yes	Unknown
3_4_CR	**Consulting Rooms**	0	1	999

		No	Yes	Unknown
3_5_SR	**Sputum Room**	0	1	999

		No	Yes	Unknown
3_6_TR	**Treatment Room**	0	1	999

		No	Yes	Unknown
3_7_SR	**Staff Rooms**			

		No	Yes	Unknown
3_8_MCR	**Mobile Consulting Rooms**			

		No	Yes	Unknown
3_9_OTH	**Other**	0	1	999
3_9_1_SP	**Specify**			

		No	Yes	Unknown
	Are there respirators available for staff to use	**0**	**1**	**999**

If yes continue, otherwise finish

No	Kimberley Clarke	Unknown
Yes	**Yes**	**999**

	CDC	CEN	Unknown
	0	**1**	**999**

Where are they used?

4_3 **Mark all that apply.**

4_3_CR	**Consulting rooms**	**Yes**
4_3_PR	**Procedure rooms**	**Yes**
4_3_TBR	**TB rooms**	**Yes**
4_3_WR	**Waiting rooms**	**Yes**
4_3_TRA	**During transportation of patients**	**Yes**
4_3_OTH	**Other**	**Yes**
4_3_1_SP	**Specify**	

Total score: (%) (Maximum = 31)

Strengths:

Challenges:

Recommendations:

Signed by:

1. **Name and surname:** _____ **Signature:** _____
2. **Name and surname:** _____ **Signature:** _____
3. **Name and surname (Interviewee):** _____ **Signature:** _____
4. **Date:** _____

Date of next follow up: _____

Annex 11: Isolation and specific precautions per disease

Disease	Routes of transmission	Infective material	IPC Measure (Type of isolation)	Additional comments		
HIV	Muco cutaneous, percutaneous exposure	Blood, body fluids	No isolation needed, except HIV+TB co infected patients	Prevent opportunistic infections to the patient (pneumococcal and diarrhoeal diseases)		
Meningitis	Droplet	Respiratory secretions	Airborne precautions	Transmission of meningococci to healthcare staff is most likely within 24 hours of admission of the patient, prior to the patient receiving appropriate antibiotic/chemoprophylaxis. Healthcare workers in close respiratory contact with such cases should receive chemoprophylaxis with ciprofloxacin or an effective alternative agent. Post-exposure chemoprophylaxis for household contacts.		
Hepatitis B	Muco - cutaneous, percutaneous	Blood, body fluids	None	Staff immunization		
Malaria	Mosquito-borne	Blood	None, long lasting insecticide treated nets (LLIN) in endemic regions (Lubombo)	Residual spraying of walls in the wards, homes		
Measles	Airborne (droplets)	Respiratory sections	Airborne	Susceptible HCWs should not enter room if immune care providers are available; no recommendation for face protection for immune HCW; no recommendation for type of face protection for susceptible HCWs, i.e. mask or respirator. For exposed susceptible, post-exposure vaccine within 72 hrs or immune globulin within 6 days when available. Place exposed susceptible patients on Airborne Precautions and exclude susceptible healthcare personnel		

Disease	Routes of transmission	Infective material	IPC Measure (Type of isolation)	Additional comments		
Typhoid fever	Contact	Blood, body fluids (excreta, urine vomitus)	When contact with the patient, material, or products infected			
Rabies	Mucosal or percutaneous exposure to saliva	Saliva		If patient has bitten another individual or saliva has contaminated an open wound or mucous membrane, wash exposed area thoroughly and administer post exposure prophylaxis.		
Hepatitis A	Contact (faecal /oral)	faeces	Contact: Individual room			
Severe acute respiratory syndrome (SARS)	Airborne (droplets)	Respiratory sections	Airborne	Airborne Precautions preferred; N95 or higher respiratory protection; surgical mask if N95 unavailable; eye protection (goggles, face shield); aerosol-generating procedures and "super shedders" highest risk for transmission via small droplet nuclei and large droplets .Vigilant environmental disinfection		
Varicella Zoster	Airborne, Contact		Use Airborne Precautions, contact	Susceptible HCWs should not enter room if immune caregivers are available; no recommendation for face protection of immune HCWs; no recommendation for type of protection, i.e. surgical mask or respirator for susceptible HCWs. In immuno compromised host with varicella pneumonia, prolong duration of precautions for duration of illness. Post-exposure prophylaxis: provide post-exposure vaccine ASAP but within 120 hours; for susceptible exposed persons for whom vaccine is contraindicated (immuno compromised persons, pregnant women, new-borns whose mother's varicella onset is <5days before delivery or within 48 hrs after delivery)		

Disease	Routes of transmission	Infective material	IPC Measure (Type of isolation)	Additional comments		
Varicella Zoster	Airborne, Contact		Use Airborne Precautions, contact	provide VZIG, when available, within 96 hours; if unavailable, use IVIG, Use Airborne Precautions for exposed susceptible persons and exclude exposed susceptible healthcare workers beginning 8 days after first exposure until 21 days after last exposure or 28 if received VZIG, regardless of post exposure vaccination.		
HIV	Muco cutaneous, percutaneous exposure	Blood, body fluids	No isolation needed, except HIV+TB co infected patients	Prevent opportunistic infections to the patient (pneumococcal and diarrhoeal diseases)		
Meningitis	Droplet	Respiratory secretions	Airborne precautions	Transmission of meningococci to healthcare staff is most likely within 24 hours of admission of the patient, prior to the patient receiving appropriate antibiotic/ chemoprophylaxis. Healthcare workers in close respiratory contact with such cases should receive chemoprophylaxis with ciprofloxacin or an effective alternative agent. Post-exposure chemoprophylaxis for household contacts.		
Hepatitis B	Muco-cutaneous, percutaneous	Blood, body fluids	None	Staff immunization		
Malaria	Mosquito-borne	Blood	None, long lasting insecticide treated nets (LLIN) in endemic regions (Lubombo)	Residual spraying of walls in the wards, homes		
Airborne	Airborne (droplets)	Respiratory sections	Airborne	For exposed susceptible, post-exposure vaccine within 72 hrs or immune globulin within 6 days when available. Place exposed susceptible patients on Airborne Precautions and exclude susceptible healthcare personnel		

Disease	Routes of transmission	Infective material	IPC Measure (Type of isolation)	Additional comments
Measles	Airborne (droplets)	Respiratory sections	Airborne	Susceptible HCWs should not enter room if immune care providers are available; no recommendation for face protection for immune HCW; no recommendation for type of face protection for susceptible HCWs, i.e. mask or respirator.
Typhoid fever	Contact	Blood, body fluids (excreta, urine vomitus)	When contact with the patient, material, or products infected	
Rabies	Mucosal or percutaneous exposure to saliva	Saliva		If patient has bitten another individual or saliva has contaminated an open wound or mucous membrane, wash exposed area thoroughly and administer post exposure prophylaxis.
Hepatitis A	Contact (faecal /oral)	faeces	Contact: Individual room	
Severe acute respiratory syndrome (SARS)	Airborne (droplets)	Respiratory sections	Airborne	Airborne Precautions preferred; N95 or higher respiratory protection; surgical mask if N95 unavailable; eye protection (goggles, face shield); aerosol-generating procedures and "super shedders" highest risk for transmission via small droplet nuclei and large droplets .Vigilant environmental disinfection
Varicella Zoster	Airborne, Contact		Use Airborne Precautions, contact	Susceptible HCWs should not enter room if immune caregivers are available; no recommendation for face protection of immune HCWs; no recommendation for type of protection, i.e. surgical mask or respirator for susceptible HCWs. In immuno compromised host with varicella pneumonia, prolong duration of precautions for duration of illness. Post-exposure prophylaxis: provide post-exposure vaccine ASAP but within 120 hours; for susceptible exposed persons for whom vaccine is contraindicated (immuno compromised persons, pregnant women, new-borns whose mother's varicella onset is <5days before delivery or within 48 hrs after delivery) provide VZIG, when available, within 96 hours; if unavailable, use IVIG, Use Airborne Precautions for exposed susceptible persons and exclude exposed susceptible healthcare workers beginning 8 days after first exposure until 21 days after last exposure or 28 if received VZIG, regardless of post exposure vaccination.

Annex 12: Infection Prevention & Control Facility Assessment Tool

Name of the facility being assessed	
Location of the facility	
Name of assessor	
Name of facility manager	
Date of this IPC assessment	
Departments/services assessed	

Infection control management				
1. Infection Prevention and Control Focal Person appointed with clear roles and responsibilities?				Roles and responsibility ( ) • Ensure the planning implementation of the IPC program • Act as a liaison between OH, health and safety committee and the IPC committee • Spearhead the planning meetings and development of policies/SOPs, Risk assessment plan • Report to management breakdown or lack of implementation in IPC policies/report audit results to all • Spearhead the IPC program in the Facility • Compile monthly/Quarterly and year reports • Conduct IPC in-service trainings as need arises Support IPC and OH audits and assist with appropriate procurement
2. IPC focal person formally trained?				Scope of IPC Hand hygiene, Standard Precautions, transmission based precautions Decontamination and sterilization, risk-prone procedures Appropriate use of PPE, Environmental cleaning and hygiene Waste management and Laundry

Infection control management				
3. Functional IPC program with committee and their roles				Functional Meetings, plans, projects, risk assessment (Keeping records). **Roles and responsibilities** - To establish achievable objectives for improved pt care - To ensure medical supply are adequate to carry out satisfactory IPC practices - To identify areas of risk and priorities and implement systems - To eliminate or reduce them - To monitor antibiotic usage and related antibiotic resistance - To produce IPC manual containing relevant policies and update them regularly - To promote the appropriate use of disinfectants - To set up and implement an IPC training programme for all hospital staff on IPC matters & conduct in service training - To respond to surveillance and audit results by instituting improvements
4. Coordination of IPC activities involves medical, nursing, allied healthcare workers?				Representation
5. When last was Risk assessment conducted?				Risk assessment - **Patient safety** - **Health provider's safety (Immune status of HCWs and vaccinations)** ✓ Environmental Assessment ✓ Transmission routes and levels of risks ✓ Equipment and PPE Capacity building
6. Risk management plan with interventions in place				**Risk management plan** - Identified infection risks - Targeted interventions - Determined management priorities Controls in existence - Immune status (Employee health immunization) - Reprocessing of reusable medical/surgical equipment - Equipment / product purchases - Building and refurbishment - Means for monitoring and review

Infection control management				
7. IPC policies/procedures developed				Policies/SOP s - Standard Precautions - Hand washing - Waste management protocol - Additional transmission based precautions protocol - Decontamination and sterilization - PEP protocol - Food handling procedures
8. IPC policies/procedures approved & authorized				Name the SOPs done
9. Training of staff implemented?				On any of the above IPC scope
10. Monitoring of projects/ Records available				
11. Processes for tracking infection risks, infection rates and trends in healthcare associated infections in place				Processes –surveillance Screening of a random sampled cluster
12. Focal persons in each department available? Name and surname + Department				
13. Projects implemented to reduce the risk of healthcare associated infections to patients & health workers (hand washing etc.)				
14. Does the HIS unit form part of the IPC program committee?				
Disinfectants and barrier techniques /observe and verification any staff member				
15. Is PPE Available and Correctly worn by all staff				
16. Gloves available? (specify)				- Specifications - Availability and used always - Appropriate - Trainings - (FOR ALL PPE)

Infection control management				
17. Masks and respirators available				Which type of mask? Which department?
18. Gowns and aprons or Overalls available				Any Change rooms? When used or discarded
19. Goggles and eye protection				
20. Clean running water supply				
21. Soap and disinfectant located appropriately for use at all times				
22. Disposable paper towels				
23. Soiled linen bin available				
Routine Hand hygiene, Hand washing practices: Observe				
24. Wet hands under water and soap applied to all surfaces				
25. Hand washing procedure to last for at least 40 – 60 seconds covering all areas				
26. Hands rinsed under clean running water				
27. Liquid soap (or bar soap)				
28. soap dispenser (or soap rack)				
29. All surfaces of hands dried with a clean paper towel				
30. Tap turned off with the used towel				
31. Alcohol rub 20 – 30 seconds				
Processes to address prevention of Respiratory infections (masks, ventilation, HE etc in place)				
32. Do patients regularly practice Cough Hygiene (cover their cough)?				
33. Are patients asked to practice Cough Hygiene by HCW if they are not doing it?				
34. Are there pedal waste bins available to dispose of tissues?				

Infection control management				
35. Is there literature on display regarding Cough Hygiene?				
36. Are all patients screened for TB? Using the standard TB screening tool				
37. Are suspect or confirmed TB patients separated in any way from other patients (e.g. coughing triage)?				
38. Are patients given educational talks about TB while they wait?				
39. Is sputum collection performed in a designated, well-ventilated area?				Sputum collection guidelines Well-ventilated area
40. If you have a nebulizer, are the mask & tube replaced between patients?				
41. Do you screen the HCW in this facility for TB every 6 months?				Bed spacing and the OPD
42. The facility should not be overly crowded at any time. Is this indeed the case?				
43. Are there cross-ventilation (windows/doors in opposite sides) in all consultation rooms				
44. If there are mechanical ventilation systems, are they maintained correctly? (The facility should be able to show up to date, professional maintenance reports).				
45. Are there masks for patients and N95 respirators available in sufficient quantities for all HCW?				
46. Do HCW wear respiratory protection (FFP2/ N95 respirators where necessary?				

Infection control management				
Processes to address prevention of the spread of infection during surgical wound dressings				
47. Hand hygiene practiced before procedures				
48. Site care and dressings procedures followed				
49. Aseptic method used in the dressing of wounds				
50. System for cleaning, disinfect, and sterilize reusable equipment				Disinfectants available
51. Sterilizers functional and well Maintained				Maintenance plan in place
52. Sterile packs checked and records in place				
53. Staff orientation on autoclave				
Processes to address prevention of the spread of infection through intravascular devices and injectables				
54. Are auto-disable needles available?				
55. When drawing medications or vaccines from a vial, is the top of the vial swabbed with alcohol or alcohol - contained swabs e.g.(with tincture of iodine) disinfectant before puncturing with a needle				
56. Are needle left sticking into multi-dose vials so that the solution can be withdrawn easily for multiple patients?				
57. Are same syringes used in multiple patients without formal reprocessing?				
58. Are glass ampoules that must be cracked open by hand used?				

Infection control management				
59. Are ampoules cracked using sterile gauze to protect the hands and to keep the contents sterile?				
60. Provider discards the needle without recapping.				
61. All sharps are disposed in a sharps container immediately after the injection.				
63. Are the WHO's SIGN (Safe Injection Global network) guidelines for safe use of needles followed?				
Processes on proper handling of blood, blood products and other body fluids				
1. Orientation on Standard Precautions				Hand hygiene Use of appropriate PPE Safe injection Disposal of sharps/waste Linen management Cleaning decontamination and sterilization Use of Gloves Management of inoculation injuries
2. Does the facility have a written policy for Standard Precautions				
3. Immunization for staff (e.g. HBV) How many of the department staff have received full dosages?				Proof by the card received / register
4. Post exposure prophylaxis, how many of yr staff exposed/received PEP-ARVs this past quarter				
5. Is the PEP service available and PEP protocols in place				
6. Processes on management of viral haemorrhagic fevers				

Infection control management				
Availability of isolation policies and precaution				
7. Does the facility have a formal written policy for placing patients with potentially contagious infections in isolation or for instituting specific procedures (often called "precautions") to prevent spread to other people?				
8. Does the hospital have a written policy regarding cleaning of an isolation room after discharge of an infectious case				
9. Does the facility have the following isolation precautions?				(Mark all that apply) - using an isolation system based on the route of transmission of - pathogens - Special precautions for immunocompromised patients (including HIV/AIDS) - Airborne precautions (droplet nuclei that travel long distances in the air, as with - tuberculosis [TB] and measles) - Droplet precautions (large droplets that travel only several meters in the air, as with meningococcus, pertussis, and Group A streptococcus) - Contact precautions (direct contact with the patient, excretions, or contaminated objects, as with salmonella, formerly known as "enteric precautions") - Special precautions for multidrug-resistant organisms (bacteria resistant to multiple antibiotics, as with methicillin-resistant staphylococcus
10. Do the isolation precaution guidelines include instructions about the following?				- Handling of linen - Handling of equipment and supplies - Disposal of waste and corpses - Cleaning - Patient placement in specific rooms according to their disease or mode of transmission - Transport of isolated patients to other location in facility (X-ray)

Infection control management				
11. Who is responsible for placing a patient on isolation precautions?				
12. Is there a policy for screening and restricting family/visitors with illnesses?				
Healthcare Waste Management				
13. Is the project available and known by all				Management of high risk and non infectious waste(clinical and non-clinical) Waste containers available, Ward storage Collection , transportation and the final disposal of waste(incinerator) Any other method of disposal used?(shredding through heat sterilization)
14. Is there any staff training done on Healthcare Waste management done this past quarter to which cadre				Seek for records
15. Show Policies and guidelines or protocols in place				
16. Protective clothing defined				Question for the persons responsible for Transportation and treatable waste disposal
17. Standard equipment/ material for waste disposal available?				Equipment – bins/incinerator Colour coded plastics/containers
18. Central holding area				
19. Incinerator meets required standard (gauge for temperature/pressure				
20. Incinerator attendant trained/ oriented on the use of incinerator				
21. Proper waste disposal system implemented				Checklist from the point of generation to disposal area
22. Mortuary operations meet required processes				Cleanliness, Mortuary attendant conduct/ training on IPC Corpse segregation, management of waste water from corpse

Infection control management				
23. Safe food handling procedures followed				The purchasing of the food produce - Storage area before preparation (below 6 degrees C. - Food preparation - Food delivery in the wards
24. Safe food storage				
25. Safe food preparation				
26. Safe food practices in compliance with laws & regulations				- Kitchens location and ablution area - Cleanliness - Equipment and commodities (Cold storage and Water supply) - Ventilation -Right temperature
Healthcare Associated Infections surveillance				
27. Procedures define where and how specimens are collected, taken and sent to laboratory				
28. Laboratory cultures are obtained from designated sites				
29. Reporting system in case of outbreaks				
30. Comparison of infection control rates with other organizations through data bases				
31. Structured system for giving feedback to medical, nursing and other HCWs				
32. Reporting system to other external agencies				
Infection control Education/Training				
33. System to educate patients and families on IPC precautions in place				
34. On-going In-service training on IPC for all staff & evidence available				Reports

Infection control management				
HOUSE KEEPING				
35. Are cleaning programmes followed according to recommendations				
36. Is regular inspection of premises conducted				Pest control General hygiene

Annex 13: Infection prevention and control inspection (hygiene checklist)

LOCATION: _____ DATE: _____

Cleanliness/Infection Control	Exception	Description
Rooms are clean No visible dust on surfaces		
Nothing should be stored on floors		
Room doors close securely/tightly		
Vents are clean with no visible dust		
Holes, dings in the wall have been repaired		
Curtains/blinds on windows are clean		
Floors are clean		
Toilets flush		
Adequate amount of soap and paper towels at each sink		
Waste bins are available in all rooms		
Refrigerators clean/items dated		
Refrigerator Temperature charts up-to-date		
Sharps containers are ready for use		
Red hazardous waste bins are available on every unit		
Hazardous waste bins are located in soiled utility room and are covered appropriately Soiled linen is disposed of properly		
No food items in patient rooms		
Showers have been activated and the shower head is in place with no visible mould		
Janitor closet and trash chute area are clean		

Annex 14: Infection Prevention and Control Risk Rating Matrix

IPC Risk Rating Criteria

RISK FACTOR	SAFETY	HEALTH	ENVIRONMENT	SCORE
High	Disabling effects	Irreversible effects	Severe impact	3
Medium	Non disabling effects	Reversible effects	Medium impact	2
Low	First aid effects	Discomfort with little or no health effects	Temporary effects	1

PROBABILITY	SAFETY, HEALTH AND ENVIRONMENT	SCORE
	Could happen daily	5
	Could happen weekly	4
	Could happen monthly	3
	Could happen annually	2
	Could happen once in a life time	1

LEGISLATION	SAFETY, HEALTH AND ENVIRONMENT	SCORE
	Legislation available	5
	No legislation	1

FREQUENCY	SAFETY, HEALTH AND ENVIRONMENT	SCORE
	Continuous exposure	4
	Frequent exposure	3
	Infrequent exposure	2
	Low level exposure	1

- (Risk factor + Probability + Legal compliance) x Frequency = Risk rate
- 30 – 52 High risk (requires immediate action) Review @ three months
- 11 – 29 Medium risk (Review @ six months)
- 0– 10 Low risk (Review @ twelve months)

Annex 15: Infection Control Assessment- National Level

	Question	Response or Code	Additional Comments
1.	**Country:** **Name of Respondent:** **Respondent Title:** **Program:** **Date Form Completed (dd/mm/yyyy):**		
2.	Is there a designated IPC National Officer?		
3.	Is there a designated national IPC coordinating committee/ TWG ?***(0=No, 1=Yes)***		
4.	Does the IPC programme have a national policy guidelines and an operational plan? ***(0=No, 1=Yes)***		
5.	Has this IPC national policy been disseminated? ***(0=No, 1=Yes)***		
6.	Has training on implementation of this IPC national policy been conducted? ***(0=No, 1=Yes)***		
7.	Does the implementation of this IPC national policy has a M&E system ***(0=No, 1=Yes)***		
8.	Request copy of most recent annual report/ statistical profile.		

Annex 16: Infection Control Assessment: Regional Level

Region	Question	Response or Code	Additional Comments
1.	**Regional** **Name of Respondent:** **Respondent Title:** **Date Form Completed (dd/mm/yyyy):**		
2.	What is the total number of health facilities with a focal person in the region (###)		
3.	How many of the focal persons received IPC training?		
4.	Have the HCWS been sensitized on the IPC guidelines		
5.	How many Health facilities has the IPC policy guidelines		
6.	Has training on infection prevention and control been provided to the regional IPC teams ***(0=no, 1=yes)***		
7.	Is there a Regional IPC policy known to the IPC team and ***(0=No, 1=Yes)*** ***If yes, request a copy.***		
8.	Does the region has quarterly report on the number of (Occupational) modifiable diseases among HCWs and the public in the region? ***(0=No, 1=Yes)*** ***If yes, request a copy.***		

Annex 17: Infection prevention and control medical microbiology audit tool

Focus: TB and HIV diagnostic facilities

CENTRAL/REFERENCE LABORATORIES

Serves as a guide to:

a) Staff competencies, levels of application and identifies professional academic/training courses to improve performance; staff wellbeing.

b) Infrastructure.

c) Standard operating procedures and practices.

d) Co-ordinated approaches for improved diagnostics for advancing informed community health programmes.

Under Chapters indicated determine whether there are SOPs and if they are readily available.

View each SOP taking into consideration Biosafety/IPC aspects.

Key: Y –Yes N –No PC – partial compliance

Name of assessor	
Facility name	
Region	
Name of Officer	
Interviewed	
Date of visit (yyyy/mm/dd)	

STAFF FOCUS: BIOSAFETY, TB AND HIV DIAGNOSTICS

Laboratory officer			
Training			
Have you attended any courses/congresses on TB diagnostics?			
Have you attended any courses/congresses on HIV diagnostics?			
Have you attended any courses/congresses on Infection Prevention Control?			
Are you registered with a professional board?			
If yes:			
a) What professional board and country?			

Laboratory officer			
b) Do you have to conform to continued professional development requirements?			
Are you comfortable with your professional training in order to conduct your laboratory commitments?			
If no, what further academic/training would you like to undertake. a) Higher degree in medical microbiology b) Specialised course training in IPC or TB/HIV diagnostics c) Managerial course			
What is your current level of training?			
With the levels of your academic achievements/competencies do you feel you are underperforming and not realising your full potential?			
Do you feel the qualifications/training/competences of your staff are appropriate for their job descriptions?			
If no, should staff: a) study a formal qualification b) attend a training programme			
Do staff have sufficient time apportioned daily to: a) Complete TB/HIV screening b) Ensure safe laboratory practice is conducted c) Ensure all records are complete and forwarded			
Does laboratory have a designated Safety Officer?			
Is there an accident report book? **If yes**, request to view the book records.			
On employment were you and laboratory staff interviewed by a health specialist?			
Were any of the following offered? Chest X-ray Pre-employment baseline serum samples taken and stored Vaccinations			
Is your and laboratory staff's health reviewed annually?			
Are you aware if you are protected by occupational health policies?			
If yes, do you know how to access the policies?			
Have any staff presented for occupational health consideration and outcome?			

POLICIES

Does the laboratory have a Containment/Biosafety- Level 3 area?			
If yes, has it been commissioned?			
By whom and when?			
How often will the facility be recertified?			
Is the laboratory accredited?			
If yes, name of certification authority:			
If no, is accreditation being considered?			
On what format/reference have the SOPs been constructed?			
a) Developed in house			
b) Developed in house and forwarded to an accredited assessment laboratory for verification.			
c) Provided by an accredited laboratory			
Have any International Organisation for Standardisation criteria been implemented? E.g. Laboratory quality management or specific laboratory requirements emphasising patients care.			

SPECIMEN RECEPTION AREA

Are laboratory personnel required to collect sputa or blood from patients?			
If yes, where are samples taken?			
Is specimen reception area separate from the laboratory?			
Is the room adequately ventilated?			
Are work surfaces constructed with impervious material?			
Is the area on which specimens are received clean and devoid of clutter?			
Does the person receiving specimens wear protective clothing?			
Are protective gloves provided?			
Is there a container with decontamination solution present?			
If yes, what is the solution?			
Is there sufficient cupboard space/separate area to accommodate clean sample collection containers from specimens?			
Is there a sink and disinfectant hand wash situated near exit?			

LABORATORY

Are there any SOPs concerning hand wash/disinfectant solutions to be used with working/final dilutions clearly defined?			
What is laboratory throughput concerning TB/HIV specimens? Approximate number of TB sputa requests per week: % positive: Approximate number of blood samples for HIV per week: % positive:			
Is the laboratory an isolated building?			
If yes, is the laboratory adequately ventilated?			
If no, is there a well-designed ventilation system that provides for negative pressure in the laboratory with good air change that does not enter the air system of the general facility?			
Is there a sink and disinfectant hand wash situated near exit?			
Is there an eye wash applicator in the laboratory?			
Laboratory coats Where are laboratory coats placed after hours?			
How often are laboratory coats/gowns washed?			
Are laboratory coats/gowns autoclaved before washing?			
Work surfaces: Are all work surfaces constructed with impervious material?			
Do all work stations have protective gloves present?			
Are the work stations clean and devoid of clutter?			
BENCH DISINFECTION Are there any SOPs concerning bench disinfection?			

What solution and at what working dilution is used to disinfect bench surfaces?			
Is a container with solution at each work station?			
How is a spillage contained?			
Storage and supplies Are there adequate cupboards/areas/store room to accommodate reagents and consumables?			
Are there any hazardous chemicals present in the laboratory that require storage in safety cabinets?			
Ordering and maintaining stocks disposable items/kits/stains/reagents Have you encountered problems with ordering/delivery?			
If yes, what items are more often subject to delay and for what reasons?			
Are there contingency plans/SOPs in place for alternatives, e.g. no phenol available in the country?			
ADDITIONAL OBSERVATIONS OR COMMENTS **E.g. if specimens are taken at/near specimen reception area are patient facilities adequate?**			

EQUIPMENT

BIOLOGICAL SAFETY CABINET					
Are there any SOPs concerning cabinet operation?					
Is the cabinet situated in a separate room?					
Make and Class:					
When purchased:					
Is there a service maintenance log book?					
If yes, view how regularly serviced and if HEPA filters replaced and when?					
Type of loop sterilisation:	Busen	Electronic	Infrared		
Is there a HEPA filter gauge?					
If yes is this checked by laboratory staff and how often?					
How often is airflow checked and by what means?					
How often is UV light output measured?					
BIOLOGICAL SAFETY CABINET DISINFECTION					
Are there any SOPs concerning cabinet clean-up?					
What solution and working dilution is used to disinfect the cabinet?					
Is a container with solution at each cabinet?					
Are there instructions if there is a major spill/contamination?					

BIOLOGICAL SAFETY CABINET DISINFECTION					
Is a UV light used as an adjunct?					
If yes, for what duration?					
MICROSCOPES					
Are microscopes clean and free from immersion oil?					
What solution is used to clean lenses and stage?					
CENTRIFUGES					
Are there any SOPs?					
Are centrifuges clean both outside and inside?					
Are centrifuges fitted with safety carriers/rotor shield?					
Are tubes/containers securely capped?					
Are there instructions if there is a breakage?					
AUTOCLAVES					
Are there any SOPs?					
Is there an operating manual near by?					
Is the autoclave and are door seals clean?					
Is there a log book to monitor daily autoclave performance?					
What tests are performed to ensure sterility and how often?					
Is there a maintenance log book?					
If yes, view log book. Are the autoclaves serviced and how often?					

ADDITIONAL OBSERVATIONS OR COMMENTS

E.g. location and positioning of equipment

View other equipment and accessories, e.g. vortex mixer and racks. Are they also clean and well maintained

PATIENT SPECIMEN REQUEST FORMS, RESULT REPORTING PROCESSES, RECORDS

SPECIMEN REQUEST FORMS			
Are there any SOPs as to formatting/requirements on specimen request forms?			
Patient information			
Is a hospital/clinic reference number assigned to a patient?			
Do you assign a laboratory reference number?			
Patient full name?			
Patient date of birth?			
Patient gender?			
Diagnostic information			
Is TB/HIV status OR New patient noted on the form?			
Is space provided as to whether TB/ARV treatment is being received?			
Is space provided for date of treatment initiation?			
Is data entry: Manual			
Electronic			
If the information above is not available on specimen request forms what information is actually recorded in laboratory records?			

REPORTING RESULTS				
Is result data entry:	Manual			
	Electronic			
Do you provide a complete laboratory patient history when reporting?				
TB results reported:	Nurse			
	Doctor			
	District laboratory			
HIV results reported:	Nurse			
	Doctor			
	District laboratory			
FILING, DATA STORAGE AND RECALL				
Is there patient information security?		**YES**	**NO**	
For future TB/HIV specimens from a patient how is the Central Laboratory number linked to District Laboratory number and/or POC Testing Centre and tothe patient?				
How many sputum specimens are screened before a new or a treated patient is considered uninfected and how is this monitored?				
For TB tests how is patient recall co-ordinated to obtain further specimens if new patient sputa negative or to monitor treatment outcome?				

For HIV testing how is patient recall co-ordinated to obtain a further specimen if results are inconclusive or negative?			
CROSS REFERENCING AND PROVIDING COMMUNITY IPC STATISTICS			
Is a separate record maintained as to whether a patient is TB positive?			
Is a separate record maintained as to whether a patient is HIV positive?			
Are TB and HIV results cross referenced?			

TB/HIVTECHNIQUES

ZN STAINING				
Are there any SOPs concerning preparing/staining sputum specimens?				
How are smears heat fixed?	**Electronic hot plate**	**Flamed**		
How are slides disposed of?				
Is staining perform once a day or more frequently to provide information whilst a patient is still at the clinic?				
MYCOBACTERIA CONFIRMATORY TESTING				
Are confirmatory tests performed?				
If yes, approximate number of weekly requests:				

Technique(s) employed:				
Conventional culture techniques				
Gene probe				
PCR				
Other:				
Are any SOPs in place?				
What biosafety precautions are taken eg PPE, containment?				
TB SUSCEPTIBILITY TESTING				
Is susceptibility testing performed?				
If yes, approximate number of weekly requests: % MDR: % XDR:				
Conventional culture techniques				
MGIT susceptibility profiling?				
Resistance gene amplification and sequencing				
Other:				
Are any SOPs in place?				
What biosafety precautions are taken e.g. PPE, containment?				
Where are sputum decontamination and cell concentration steps performed?				
Is a patient's treatment regimen and progression/regression provided on subsequent request forms?				

HIV DIAGNOSTICS				
Are rapid diagnostic kits employed?				
If yes, are there any SOPs concerning specimen preparation and testing?				
What detection kit(s) are employed?				
If rapid HIV tests are only performed by the laboratory are they done once a day or more frequently to provide information whilst patient is still at the clinic?				
Are you aware of any limitations of the kit(s)?				
How are inconclusive results handled?				
HIV CONFIRMATORY TESTING				
Is confirmatory testing performed?				
If yes, approximate number of weekly requests: Immunoassay: PCR: Other:				
Are any SOPs in place?				
What biosafety precautions are taken? E.g. PPE, containment				
HIV TREATMENT MONITORING				
Is ARV therapy monitored?				
If yes, approximate number of weekly requests:				

How often is treatment monitored? Viral load:			
CD4 counts:			
Other:			
What biosafety precautions are taken? E.g. PPE, containment.			
Is a patient's treatment progression/regression provided on subsequent request forms?			

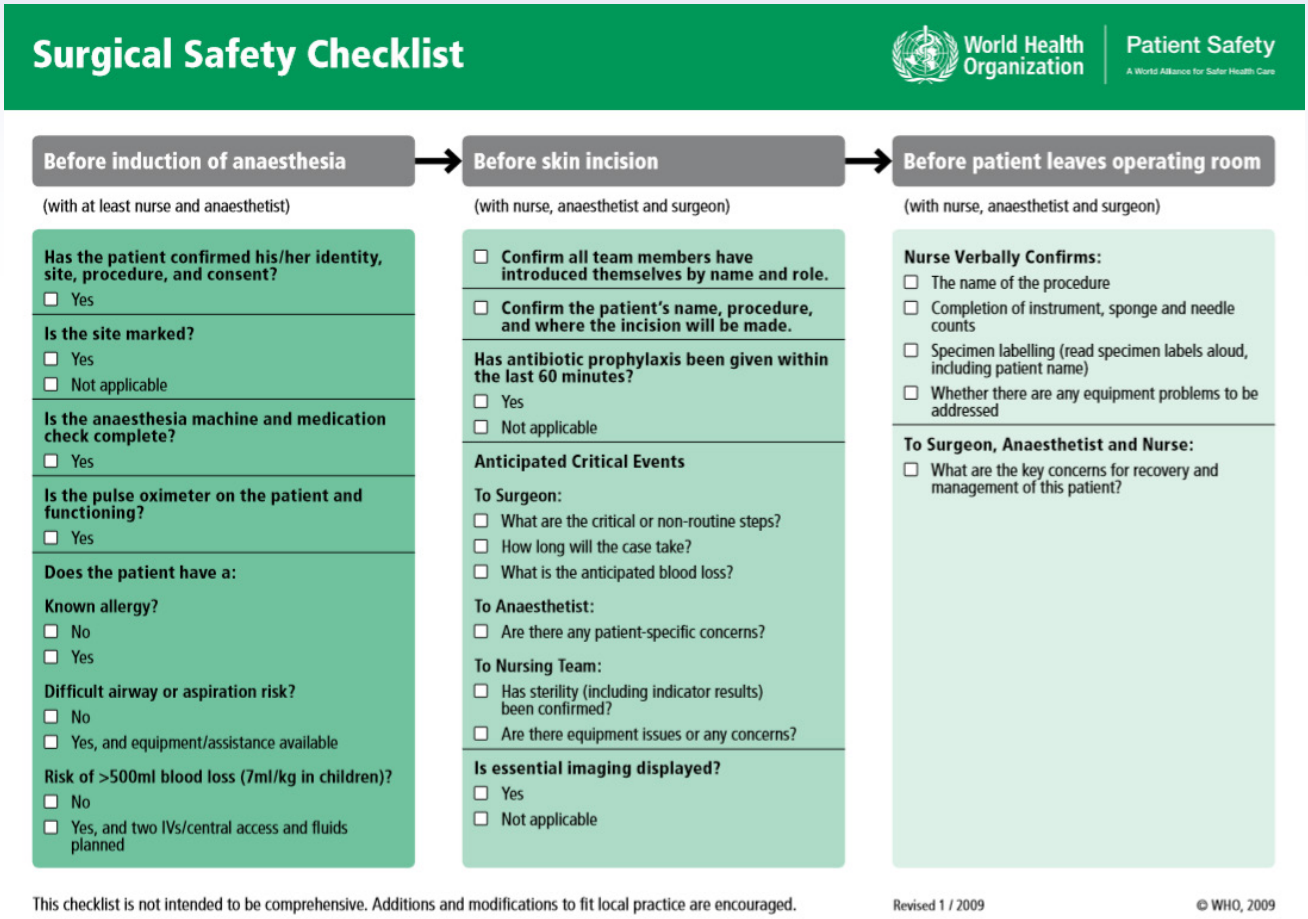
FORWARDING SPECIMENS TO A REFERENCE LABORATORY IN ANOTHER COUNTRY

Are there any SOPs concerning transportation of specimens?			
How and where are samples stored?			
How are samples packaged for transport?			
How are samples transported?			

DISPOSAL OF SPECIMENS AND INFECTED MATERIAL

Are there any SOPs concerning disposal of specimens and contaminated waste?			
What types of contaminated dry waste containers/bins are present?			
Are contaminated dry waste containers/bins lined with plastic bags? **If yes**, what type of bag?			
Are there any containers with decontaminating solutions for discarding e.g. contaminated solutions/pipettes/slides present?			
If yes, what decontaminating solution is used?			
How are specimens and infected materials disposed of? Liquid/clinical specimens:			
Dry/slides/glass/plastics:			
Apart from specimens to be forwarded for further analysis is clinical and infected material disposed of daily?			
Who collects or transports material to point of disposal?			
Are personnel that collect biohazard waste trained?			
Who is responsible for ensuring that autoclave/incineration procedures are correctly conducted?			
Are cleaning staff specifically trained to undertake laboratory cleaning tasks?			
ADDITIONAL OBSERVATIONS OR COMMENTS:			

Annex 18: WHO surgical safety checklist



Surgical Safety Checklist

World Health Organization | Patient Safety
A World Alliance for Safer Health Care

Before induction of anaesthesia
(with at least nurse and anaesthetist)

Has the patient confirmed his/her identity, site, procedure, and consent?
- ☐ Yes

Is the site marked?
- ☐ Yes
- ☐ Not applicable

Is the anaesthesia machine and medication check complete?
- ☐ Yes

Is the pulse oximeter on the patient and functioning?
- ☐ Yes

Does the patient have a:

Known allergy?
- ☐ No
- ☐ Yes

Difficult airway or aspiration risk?
- ☐ No
- ☐ Yes, and equipment/assistance available

Risk of >500ml blood loss (7ml/kg in children)?
- ☐ No
- ☐ Yes, and two IVs/central access and fluids planned

Before skin incision
(with nurse, anaesthetist and surgeon)

- ☐ **Confirm all team members have introduced themselves by name and role.**
- ☐ **Confirm the patient's name, procedure, and where the incision will be made.**

Has antibiotic prophylaxis been given within the last 60 minutes?
- ☐ Yes
- ☐ Not applicable

Anticipated Critical Events

To Surgeon:
- ☐ What are the critical or non-routine steps?
- ☐ How long will the case take?
- ☐ What is the anticipated blood loss?

To Anaesthetist:
- ☐ Are there any patient-specific concerns?

To Nursing Team:
- ☐ Has sterility (including indicator results) been confirmed?
- ☐ Are there equipment issues or any concerns?

Is essential imaging displayed?
- ☐ Yes
- ☐ Not applicable

Before patient leaves operating room
(with nurse, anaesthetist and surgeon)

Nurse Verbally Confirms:
- ☐ The name of the procedure
- ☐ Completion of instrument, sponge and needle counts
- ☐ Specimen labelling (read specimen labels aloud, including patient name)
- ☐ Whether there are any equipment problems to be addressed

To Surgeon, Anaesthetist and Nurse:
- ☐ What are the key concerns for recovery and management of this patient?

This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

Revised 1 / 2009

Annex 19: Hospital acquired infection code

SERIAL No.	NAME OF HOSPITAL ASSOCIATED INFECTION	CODE
1.	Surgical site infection **SSI (Skin)**	**SSI - CIRC Newborn circumcision**
2.	General wound infection **SSI (Skin)**	**BRST - Breast abscess or mastitis,** **BURNS**
3.	Infected pressure sore (Skin and soft tissue infection- SSI)	**SST - DECU Decubitus ulcer**
4.	Pneumonia (due to oxygen supplement device)	**PNEU**
5.	Aspiration Pneumonia	**AP**
6.	Urinary tract infection (Due to catheterization)	**OUTI**
7.	Intra vascular infection (due to catheter)	**BSI, CSEP(clinical sepsis)** **LCBI-laboratory confirmed**
8.	Gastro intestinal system infection(Hepatitis, GI tract, Gastroenteritis)	**GI**
9.	Ventilation Associated Pneumonia	**BSI, LCBI**
10.	Blood stream infection	**BSI**
11.	Catheter related	**UTI, ASB**
12.	Needle stick prick injury	**NSP**
13.	Occupational acquired TB	**ATB**
14.	Antibiotic resistance patterns of pathogens	**ARP**
15.	Other (Specify e.g.Patient has both erythema and purulence at the umbilicus.	**Omphalitis CODE - SST-UMB**

ESWATINI HOSPITAL ACQUIRED INFECTION CODES

Annex 20: Surveillance of healthcare -associated infections associated with devices

SERIAL No.	NAME OF HAI	CODE
1.	SURGICAL WOUND INFECTION	SWI
2.	GENERAL WOUND INFECTION	GWI
3.	INFECTED PRESSURE SORE	IPS
4.	PNEUMONIA (DUE TO OXYGEN SUPPLEMENT DEVICE)	POS
5.	ASPIRATION PNEUMONIA	AP
6.	URINARY TRACT INFECTION (DUE TO CATHERIZATION)	UTI-C
7.	INTRA VASCULAR INFECTION (DUE TO IV CATHETER)	IVI-C
8.	GASTRO ENTERITIS	GE
9.	VENTILATION ASSOCIATED PNEUMONIA	VAP
10.	BLOOD STREAM INFECTION	BSI
11.	OTHER (SPECIFY)	(SPECIFY CODE)
12.		
13.		
14.		
15.		

PATIENT BED NO.	D.O.A	DEVICE		ORGANISM PRESENT TYPE OF DEVICE			ANTIBIOTIC INITIATED		NAMES OF ANTIBIOTIC							ORGANISM PRESENT		MRSA PRESENT		TYPE OF SPECIMEN	
		Yes	No	IV Therapy	Urinary Catheter	OTHER (Specify)	Yes	No								YES	NO	YES	NO	URINE	BLOOD

DEPARTMENT/WARD/UNIT: .....

MONTH: .....

DATE	AVAILABILITY OF HAI?	PATIENT NAME & BED NO.	SEX	AGE	LAST DATE OF DISCHARGE	D.O. A	INITIAL DIAGNOSIS	CURRENT DIAGNOSIS	PREDIS-POSING FACTORS	HAI CODE	NAME OF ISOLATED ORGANISM	OPERATION ROOM NO.	SIGNATURE

Annex 21: Monthly Hospital Acquired Infection (HAI) reporting tool

DEPARTMENT/WARD/UNIT: …… **MONTH: ……**

DATE	AVAILABILITY OF HAI?		PATIENT NAME & BED NO	SEX	AGE	LAST DATE OF DISCHARGE	D.O. A	INITIAL DIAGNOSIS	CURRENT DIAGNOSIS	PREDISPOS-ING FACTORS	HAI CODE	NAME OF ISOLATED ORGANISM	OPERATION ROOM NO.	SIGNATURE
	Yes	No												

Annex 22: Laboratory Bacteriology worksheet for investigating HAIs

LABORATORY BACTERIOLOGY																					
DATE	LAB NO.	WARD	AGE	SEX	NATURE OF SPECIMEN						TEST REQUIRED			AFB		ORGANISMS ISOLATED		ANTIBIOGRAM		
					URINE	BLOOD	PUS	SPUTUM	CSF	STOOL	GRAM STAIN	C	S	POS	NEG	*Staph. Arears*	Klebseilla	*Ampi*	Doxycy-cline	*cipro*

Annex 23: Key Interventions for Prevention of Specific HAIs

Type of HAI	Key interventions for prevention
Surgical site infection	*Before surgery:* i. Use antimicrobial prophylaxis in accordance with evidence-based standards and guidelines. ii. Treat existing infections whenever possible before elective operations. iii. Avoid removing hair at the operative site unless it will interfere with the operation; do not use razors. iv. Use appropriate antiseptic agent and technique for skin preparation. v. Consider also: − Screening and decolonization of the nose for S. aureus carriers for selected procedures (i.e., cardiac, orthopaedic, neurosurgery procedures with implants) − Screening of pre-operative blood glucose levels and maintaining tight glucose control *During surgery:* • Keep operating-theatre doors closed during surgery, except as needed for passage of equipment, personnel, and the patient. • Follow strict procedures to maintain sterility. • Maintain normothermia. • Consider also: − Adjusting the antimicrobial prophylaxis dose for obese patients (body mass index > 30) − Using at least a 50% fraction of inspired oxygen intraoperatively and immediately postoperatively in selected procedures *After surgery:* • Protect primary closure of incision with a sterile dressing. • Control blood glucose levels during the immediate postoperative period (for cardiac surgery). • Discontinue antibiotics after surgery according to evidence-based standards and guidelines. • Maintain staff and patient hand hygiene.
Catheter associated urinary tract infection	vi. Consider alternatives to indwelling urinary catheterization. vii. Insert catheter only for appropriate indications. viii. Remove catheter as soon as possible. ix. Ensure that only properly trained persons insert and maintain catheters. x. Insert catheters using aseptic technique and sterile equipment. xi. Maintain a closed drainage system. xii. Maintain unobstructed urine flow. xiii. Comply with Standard Precautions.
Central line associated bloodstream infection	• Comply with Standard Precautions, including with recommended hand hygiene practices. • Choose proper central line insertion sites. • Provide staff education on central line maintenance and insertion. • Follow and monitor proper insertion practices. • Use appropriate agents for skin antisepsis. • Follow and monitor proper central line maintenance practices. • Perform adequate hub/access port disinfection. • Remove unnecessary central lines. • Also consider: − Daily chlorhexidine bathing

Type of HAI	Key interventions for prevention
Pneumonia	*When caring for all patients:* • Comply with Standard Precautions, including recommended hand hygiene practices. • Teach patients and staff to follow respiratory etiquette/hygiene. • Apply recommended Transmission-Based Precautions for patients with signs and symptoms of respiratory illness. • Exclude staff with respiratory illness from contact with patients. • Avoid crowding patients in wards and waiting areas. • Provide or recommend appropriate vaccinations for staff and patients. • Teach caregivers to recognize danger signs of pneumonia and treat appropriately. • Clean, disinfect/sterilize, and maintain respiratory care equipment properly. *Teach patients to:* • Use deep-breathing techniques. • Move frequently, even while in bed. • Cough frequently. • Optimize pain medication to keep the patient comfortable but able to cough. *When caring for ventilated patients:* • Avoid intubation if possible and use oro-tracheal rather than naso-tracheal tubes in patients who receive mechanically assisted ventilation. • Use aseptic technique for intubation, suctioning, and other procedures that involve entering the endotracheal tube • Minimize sedation. • Minimize pooling of secretions above the endotracheal tube cuff • Use single-use suction catheters and other respiratory care items appropriately. • Prevent condensed fluids in ventilator tubing from flowing back toward the patient. • Elevate the head of the bed. • Provide oral-hygiene care.
Diarrhoea (including C. difficile diarrhoea)	• Apply Standard Precautions including gloves use for patient care. • Comply with recommended hand hygiene practices. • Use Contact Precautions for the duration of diarrhoea, include isolating symptomatic patients presumptively. • Clean and disinfect patient care equipment. • Carry out environmental cleaning using a disinfectant as per the healthcare facility protocol. • Educate HCWs, housekeeping, administration, patients, and families about prevention of healthcare-associated diarrhoea, including diarrhoea caused by C. difficile infection (if relevant in the setting). *For settings with C. difficile consider also:* • Extending use of Contact Precautions beyond the duration of diarrhoea. • Conducting laboratory tests to isolate C. difficile, if the capacity to perform laboratory testing is available. • Isolating symptomatic patients presumptively, pending confirmation of C. difficile infection. • Cleaning and disinfecting patient-care equipment with disinfectants effective against spores. • Carrying out environmental cleaning using a disinfectant effective against spores as per the healthcare facility protocol • Implementing an antimicrobial stewardship program.

Type of HAI	Key interventions for prevention
Diarrhoea (including C. difficile diarrhoea)	• Carrying out active surveillance for healthcare-associated diarrhoea particularly caused by C. difficile. • Making soap and water available for HCWs' hand hygiene after contact with a patient with C. difficile infection in case of an outbreak of C. difficile diarrhoea
Multi-drug resistant organisms (MDROs)	• Adhere to Standard Precautions, most importantly hand hygiene and Transmission Based Precautions (e.g., Contact Precautions) and cohorting patients with MDRO. • Clean environment thoroughly. • Develop/adapt guidelines for reporting and managing MDRO infections. • Train HCWs in IPC including prevention of MDRO infections. • Improve compliance with hand hygiene in healthcare facilities. • Strengthen implementation of an antibiotic stewardship program. • Monitor antibiotic susceptibility patterns for key targeted MDROs (e.g., carbapenem resistant Entero-bacteriacae (CRE), methicillin-resistant S. aureus, vancomycin-resistant Enterococcus (VRE), multidrug-resistant extended-spectrum beta-lactamase-producing organisms). • Conduct active surveillance to identify MDRO infections in the facility. • Consider chlorhexidine bathing for patients in ICUs.
Mycobacterium tuberculosis (TB)	• Adhere to Standard Precautions, most importantly hand hygiene and cough etiquette. • Apply Transmission-Based Precautions (e.g., Airborne Precautions) for patients suspected of having TB. • Ensure IPC measures for TB, including respiratory hygiene, cough etiquette, and appropriately ventilated rooms. • Screen patients for TB. • Adhere to the wearing of appropriate respiratory protection for staff, N-95 mask, when interacting for patients with suspected or confirmed TB. • Conduct routine screening for staff.

Annex 24: Procedure for inserting urinary catheters

Female patient

1. Greet patient, explain the procedure and gain verbal consent. Answer any questions that patient may have.
2. Assemble all the necessary equipment.
3. Ensure a good light source is available
   - o Prior to starting the procedure have patient separate her labia and gently wash the urethral area and inner labia with soap and water, if they are able to.
4. Assist patient into the supine position with knees bent, hips flexed, and feet resting apart
5. Perform hand hygiene
6. Put on clean examination gloves on both hands
7. Place the sterile drape to cover both thighs and one with the opening revealing the area around the urethral opening. Use catheter with diameter as small as possible to ensure good drainage
8. For HCWs who are right-handed (dominant hand), stand on the patient's right side (and on the left side if left-handed).
9. Prepare urethra and surrounding area using antiseptic by:
   i. Separating and holding the labia apart with the non-dominant hand to expose urethral opening.
   ii. Using cotton applicators or a gauze swab held with forceps clean the urethral opening and surrounding area, including labia minora, with an antiseptic solution.
   iii. Apply antiseptic by moving from above downwards on one side then discarding the swab.
   iv. Repeat on the other side and lastly apply antiseptic at the center to clean the urethral opening.
9. Remove the examination gloves.
10. Perform hand hygiene and put on sterile gloves.
11. Insert the catheter;
    i. apply lubricant jelly on the outer surface of the catheter
    ii. Gently insert the catheter for about 5–8 cm (2–3 inches) or until urine flows (For children insert only about 3 cm [1.5 inches]).
12. Push another 5 cm (2 inches) after urine appears and have another trained HCW wearing sterile gloves connect catheter to the urine collection tube if not using a closed system. Always ensure urine is flowing before inflating the balloon.
13. Inflate the balloon
    i. For an indwelling catheter inflate the balloon as per manufacturer's instructions,
    ii. pull out gently to feel resistance
14. Secure the catheter to the patient's thigh.
15. Place soiled items, including the straight catheter in a plastic bag or leak proof, covered contaminated waste container.
16. Ensure the patient is left dry and comfortable.
17. Remove gloves by inverting and place them either in a plastic contaminated bag or waste container.
18. Proper documentation and reporting.
19. Ensure patient privacy at all times during procedure.

Removal:

Indwelling urinary catheters should be removed as soon as possible to reduce the risk of UTI.

i. Before removing the catheter, ensure that all necessary materials are available at the point of care:
   a. Clean examination gloves

b. Sterile syringe
c. Antiseptic solution (2 % aqueous chlorhexidine gluconate or 10 % povidone iodine)
d. Sponge forceps
e. Sterile gauze

ii. Perform hand hygiene and put on clean gloves
iii. Empty the catheter balloon using a syringe, compare the volume removed to that inserted. It should be the same volume.
iv. Swab the urethra two times with an antiseptic solution using forceps with sterile gauze
v. Gently remove the catheter
vi. Dispose of all waste appropriately
vii. Remove gloves and perform hand hygiene
viii. Proper documentation and reporting.

Male patient

1. Greet patient, explain the procedure and gain verbal consent. Answer any questions that patient may have.
2. Assemble all the necessary equipment.
3. Ensure a good light source is available
4. Prior to starting the procedure have the patient retract his foreskin (if uncircumcised) and gently washes the head of the penis and foreskin with soap and water, if they are able to.
5. Assist patient into the supine position with knees bent, hips flexed, and feet resting apart
6. Perform hand hygiene
7. Put on clean examination gloves on both hands
8. Place the sterile drape to cover both thighs with the opening revealing the area around the urethral opening.
9. Uses catheter with diameter as small as possible to ensure good drainage
10. For HCWs who are right-handed (dominant hand), stand on the patient's right side (and on the left side if left-handed).
11. Prepare urethra and surrounding area using aqueous antiseptic:
    i. Push back the foreskin (if uncircumcised) and hold the head of the penis with the non-dominant hand.
    ii. Using cotton applicators or a gauze swab held with forceps, clean the head of the penis and urethral opening by applying antiseptic solution.
    iii. Apply antiseptic using circular fashion moving away from urethral opening.
    iv. Apply antiseptic solution two times
12. Remove examination gloves
13. Perform hand hygiene and put on sterile gloves
14. Insert the catheter;
    i. Apply lubricant jelly on the outer surface of the catheter.
    ii. Using non-dominant hand hold the penis with slight upward tension and perpendicular to patient's body;
    iii. Gently insert the lubricated catheter with your dominant hand about 18-22 cm (7-9 inches),
    iv. Lower the penis 90 degrees towards patient's toes,
    v. Advance catheter little more and rotate catheter until urine flows (For children insert only about 5-8 cm [2-3 inches])
15. Push another 5 cm (2 inches) after urine appears and have another trained HCW wearing sterile gloves connect catheter to the urine collection tube if not using a closed system. Always ensure urine is freely flowing before inflating the balloon.

16. Inflate the balloon
    i. Inflate balloon as per manufacturer's instruction,
    ii. pull out gently to feels resistance
17. Secure the indwelling catheter properly to the patient's lower abdomen
20. Place soiled items, including the straight catheter in a plastic bag or leak proof, covered contaminated waste container
21. Ensure the patient is left dry and comfortable
22. Remove gloves by inverting and place them either in a plastic contaminated bag or waste container.
23. Ensure patient privacy at all times during the procedure.
24. Proper documentation and reporting.

Annex 25: UTI checklist

PATIENT NUMBER

INTENSIVE CARE UNITS / WARDS
Maintenance checklist: Urinary catheter (urethral, indwelling catheter
AIM: To prevent catherer - associated urinary tract infections

Ministry of Health

Unit/Ward_____

Month:_____

Date urinary catheter was inserted:_____

Type:	Rubber	Latex	Silicone
	Polyvinyl chloride		

Date																														
***Only** for Audit purpose*																														
Assessment must be done by the morning and night shift	7:00	19:00	7:00	19:00	7:00	19:00	7:00	19:00	7:00	19:00	7:00	19:00	7:00	19:00	7:00	19:00	7:00	19:00	7:00	19:00	7:00	19:00	7:00	19:00	7:00	19:00	7:00	19:00	7:00	19:00
Review necessity of catheter daily																														
Bag outlet kept off the floor																														
The bag is less than 2/3 full																														
Is there obstructed flow																														
Empty bag 12 hourly																														
Communal jug not used to empty bag																														
The cash is secured appropriately (tight) to prevent friction to the urethra																														
Maintain close system																														
Peri-urethral care has been done daily or after bowel movements with soap and water																														
Extract specimens from specimen port only																														
Record keeping is done and signed legibly																														
Have you change Urine bag																														
Have you change Urine catherer **If yes start with new Procedure check list**																														
Is the catheter insertion time still in line with the hospital policy																														
Comment																														
Signature																														

Indicate Yes / No / N/A to answer a statement

Change urine bag: 10th day. Catheter, Latex / Rubber-short term, up to 10 days; Polyvinyl chloride-up to 6 weeks; silicone rubber-long term up to 6 months
FOR RE-INSERTION OF URINE CATHETER START WITH ANEW PROCEDURE CHECKLIST

Annex 26: Procedure for inserting, maintenance and removal of peripheral intravenous lines

Steps for inserting peripheral lines

1. Explain the procedure to the patient.
2. Prior to starting the procedure, identify the best vein for inserting the IV catheter.
3. If the insertion site is visibly soiled, first wash it with soap and clean water and dry it with a clean cloth.
4. Perform hand hygiene.
5. Open the infusion set and assemble the parts, if necessary, using aseptic technique (i.e., do not touch the ends of the IV tubing).
6. Insert the infusion set into the solution bottle or bag using the following technique:
7. Remove the protective cover from the solution bottle or bag without touching the opening.
8. Wipe the entry site on the bag or bottle with an alcohol swab and allow it to dry. Do not touch the entry site once it has been disinfected with alcohol.
9. Remove the protective cap covering the insertion spike without touching the spike and insert the spike into the stopper of the IV bottle or opening of the IV bag.
10. Fill the infusion tubing using the following technique:
11. Compress the drip chamber and release.
12. Remove the protective cover from the end of the IV tubing (do not let the opening touch any surface or item) and release the roller clamp to allow fluid to fill the tubing, close the roller clamp, and replace the protective cover. Check to be sure the tubing is clear of air bubbles.
13. With the patient's forearm and hand hanging down, place the tourniquet 10–12 cm (5–6 inches) above the insertion site. (Ask the patient to open and close her/his fist and/or tap lightly over the vein to make it easier to see or feel.)
14. With the tourniquet in place and vein filled, place the patient's hand and arm on the clean towel on the bed or the arm board.
15. Put new, clean, non-sterile gloves on both hands.
16. Cleanse the insertion site with antiseptic solution using the appropriate technique for the type of solution (e.g., a circular motion moving outward from the insertion site for iodine, a back-and-forth motion for 2 minutes for chlorhexidine). Allow the antiseptic to dry completely before puncturing the skin. Do not fan or blow on it.
17. Fix the vein by placing the thumb over the vein and gently pulling against the direction of insertion. Never place your fingers or thumbs above the insertion site (i.e., above the sharp point of the needle). You could accidently stick yourself.
18. Using the dominant hand, insert the IV catheter with the bevel facing up. Look for blood return in the tubing and carefully advance the needle or butterfly until the hub rests at the venipuncture site.
19. When using peripheral IV catheters, after getting blood return, advance the needle about 1 cm (.5 inch), withdraw the inner insertion needle (place it directly in the sharps container), and at the same time, advance the plastic catheter to the hub.
20. While stabilizing the catheter or needle, release the tourniquet. Apply gentle pressure on the tip of the IV catheter to stop blood from flowing out and gently connect the syringe if collecting blood for laboratory test. Otherwise, connect the tip of the IV line to the catheter and open the roller clamp to permit a rate of flow sufficient to keep the IV line open.
21. Secure the IV catheter by placing a narrow piece of tape (1 cm, or .5 inch) under the hub with the adhesive side up and cross tape it over the hub. Then place a second piece of narrow tape directly across the hub of the IV catheter.

22. Place a transparent dressing over the point where the IV catheter enters the skin, for easy viewing of the insertion site and detection of any related issues. Alternatively, place a sterile gauze square (2 x 2 inches) over the venipuncture site and secure it with two pieces of tape.
23. Secure the patient's wrist or forearm to the arm board by applying two strips of tape directly and snuggly (but not tightly) across the wrist or forearm. To minimize the patient's discomfort when removing the arm board, attach a shorter piece of tape to the longer piece (adhesive side to adhesive side) that will cover the wrist or arm.
24. Adjust the flow rate to the correct number of drops per minute.
25. Prior to removing gloves, place any contaminated-waste items, including cotton or gauze squares, in a plastic bag or leak-proof, covered, contaminated-waste container. Place any sharps (needles or sharp materials) in a hard, puncture-proof container with a lid immediately after placement of the IV.
26. Remove gloves and place them in a waste container.
27. Perform hand hygiene.

Removal of peripheral IV line

1. Make sure all items are available:
2. A new, clean pair of non-sterile gloves;
3. Gauze squares (2 x 2 inches) and surgical tape or a sterile, wide (2 cm/1 inch) bandage
4. A puncture-resistant sharps container within arm's reach, if a straight or butterfly needle was used.
5. A plastic bag or leak-proof, covered, contaminated-waste container for disposing of the contaminated items.
6. Perform hand hygiene.
7. Put on new, clean, non-sterile gloves.
8. Stop the infusion.
9. Remove the arm board and dressing and discard the dressing in a plastic bag or leak-proof, covered, contaminated-waste container.
10. Check the patient's hand or wrist for phlebitis or evidence of an infection.
11. Carefully remove the needle or the plastic catheter with one hand and with the other hand apply light pressure to the insertion site with a sterile gauze square (2 x 2 inches).
12. Press firmly for about a minute or place two pieces of narrow tape, about 1 cm (½ inch) wide, directly across the gauze square. Alternatively, after pressing on the gauze square, remove it and cover the insertion site with a sterile bandage.
13. Discard the needle in a sharps container and if using a plastic catheter, place the plastic catheter with IV tubing and any blood-contaminated-waste items (cotton or gauze squares) in a leak-proof, covered, contaminated-waste container.
14. Remove gloves and place them in either a plastic bag or a leak-proof, covered, contaminated waste container.
15. Perform hand hygiene.

Changing IV lines

1. Perform hand hygiene.
2. Check the patient's identity, confirm the clinician's order, and ensure that the replacement solution is according to the clinician's order and is free from any particles and within the expiry date.
3. Prepare the new solution. If using a plastic IV bag, remove the protective cover from the entry site. If using a glass bottle, remove the metal cap and metal and rubber disks.
4. Wipe the entry site on the bag or bottle with an alcohol swab and allow it to dry. Do not touch the entry site once it has been disinfected with alcohol.
5. Remove the spike from the old IV solution bag or bottle and, without touching the tip, insert the spike into the new IV solution bag or bottle.
6. Adjust the flow rate.
7. Discard waste
8. Perform hand hygiene.

Annex 27: Frequency of monitoring IPC indicators

Broad area	Indicator	Freq.	Level(s) to monitor
IPC structures	Proportion of health facilities with trained IPC Foal Person.		
	Proportion of health facilities that had action plan for IPC for the current year.		
	Proportion of health facilities that had copies of the IPC policy and guidelines.		
	Proportion of health facilities that had quarterly IPC monitoring report		
	Proportion of health facilities that had IPC annual report		
Infection prevalence	Healthcare associated infections point prevalence rate		
Training	Proportion of Clinical Support Staff (physiotherapists, occupational therapists, respiratory therapists & radiology technologists) trained on IPC in the last 24 months		
	Proportion of nurses/midwives/nurse associates trained on IPC in the last 24 months		
	Proportion of medical officers trained on IPC in the last 24 months		
	Proportion of ancillary staff trained on IPC in the last 24 months		
Hand hygiene	Proportion of staff observed performing the appropriate hand hygiene before attending to patients		
	Proportion of health facilities that had appropriate social hand washing facilities at all hand wash stations		
Personal protective equipment	Percentage tracer personal protective equipment (PPEs) availability per specified period		
	Proportion of staff that used non-touch technique to wear sterile surgical gloves		

Broad area	Indicator	Freq.	Level(s) to monitor
Aseptic technique	Proportion of peripheral intravenous lines inserted using aseptic technique		
	Proportion of staff that used aseptic technique in wound dressing		
Environmental cleaning and disinfection	Proportion of ancillary staff that wore the appropriate protective equipment during environmental cleaning activities		
	Proportion of ancillary staff knowledgeable about preparation of disinfectant cleaning solution		
	Proportion of selected areas in the health facilities that were clean (no dust, trash, dirt, spider webs)		
Waste management	Proportion of health facilities that segregated healthcare waste appropriately		
Processing of instruments and other medical items	Proportion of staff that described the process of high-level disinfection correctly		
	Proportion of health facilities with autoclave that ascertained the sterility of items with autoclave test strips/tape within a given period		
	Proportion of wards/units that stored sterile supplies in closed cabinets/ containers		
	Proportion of health facilities that had planned preventive maintenance schedule for autoclave		
Antibiotic use	Proportion of prescriptions including an antibiotic in health facilities		
Staff health and safety	Proportion of staff able to verbalize correct response to management of exposure to blood and body fluid pathogens		
	Proportion of health facilities that had poster on managing exposure to blood and body fluid borne pathogens.		
	Proportion of health workers exposed to HIV that were given PEP.		

Broad area	Indicator	Freq.	Level(s) to monitor
IPC tracer supplies	Percentage IPC tracer supplies availability (see list of tracer supplies in the indicator definition)		
Managing wound infection	Surgery site infection rate		
	Proportion of client's who had surgery that were given antibiotic prophylaxis		
	Proportion of pre-operative surgical antibiotics prophylaxis that were given at the appropriate time		
	Proportion of pre-operative surgical cases that hair was not removed/had hair removed appropriately at the operative site		
Medication management	Proportion of health facility medication refrigerator thermometer registering 2-80C at a specified period		
Linen	Proportion of health facilities with appropriate laundry facilities (to be defined)		

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7. ISO 9001: 2015 Requirements - Quality Management System (QMS)

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ESWATINI HEALTHCARE
EHQMP
QUALITY MANANGEMENT PROGRAM


SWAZIS AND AMERICANS
IN PARTNERSHIPS TO FIGHT HIV/AIDS
PEPFAR


URC


NTCP
National Tuberculosis
Control Programme


World Health
Organization