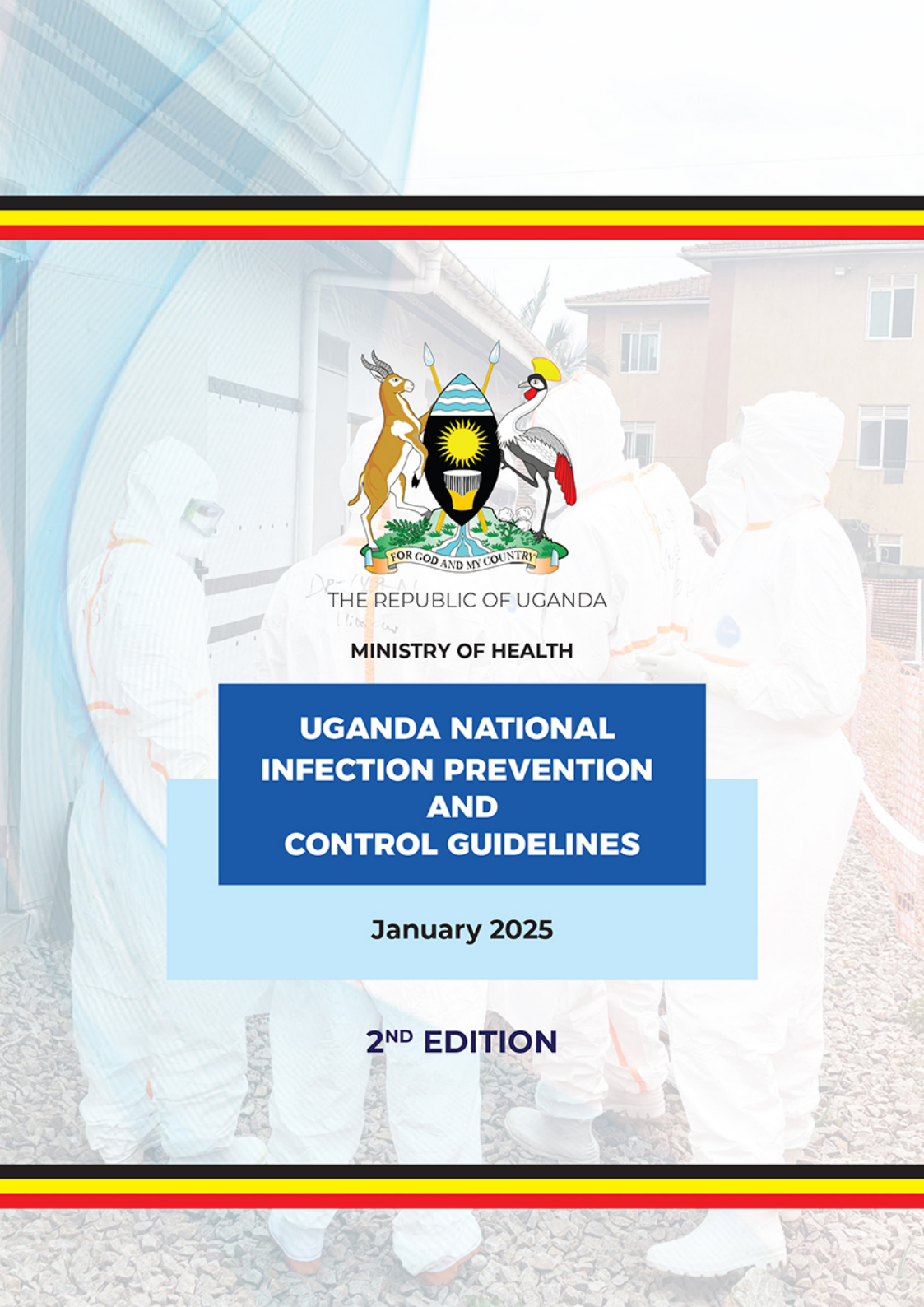

THE REPUBLIC OF UGANDA

MINISTRY OF HEALTH

UGANDA NATIONAL INFECTION PREVENTION AND CONTROL GUIDELINES

January 2025

2ND EDITION

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FOREWORD

It is with great pride that I introduce the second edition of the National Infection Prevention and Control (IPC) guidelines. This revised edition reflects our commitment and dedication to safeguarding public health and ensuring the safety and well-being of all individuals, including patients, healthcare workers, and communities at large.

Since the publication of the first edition, over a decade ago significant advancements have been made in the field of infection prevention and control. These advancements, coupled with lessons learned from emerging infectious diseases and the ongoing challenges posed by antimicrobial resistance, underscore the need for a robust and dynamic approach to IPC.

This edition of the guidelines addresses current gaps and recommends evidence-based practices necessary to meet present and future challenges across healthcare settings in the Ugandan context.

We recognize that the correct and consistent implementation of standard IPC measures is fundamental to achieving universal health coverage, reducing healthcare-associated infections, and mitigating the impact of infectious disease outbreaks. The IPC guidelines will serve as a critical resource for healthcare professionals, policymakers, and stakeholders as they work toward these shared goals.

The development of this edition has been a collaborative effort, bringing together experts from across various government Ministries, Departments and Agencies with additional technical support from various developing and implementing partners. Their dedication and insights have been invaluable in ensuring that these guidelines are both practical and comprehensive.

I urge all Ministry of Health departments, district health managers, healthcare facility leaders, health workers, partners, and communities to embrace and support the implementation of these guidelines. Together, we can create safer healthcare environments, protect lives, and build resilience against future threats.

Dr. Charles Olaro

DIRECTOR GENERAL HEALTH SERVICES

ACKNOWLEDGEMENT

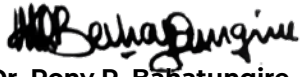
The Ministry of Health extends its sincere appreciation to the National Taskforce Committee, chaired by the Director of Curative Services and supported by the Clinical Services Department, for their leadership in updating the Infection Prevention and Control (IPC) guidelines. This revision underscores a national commitment to enhancing IPC practices, ensuring compliance, and improving patient safety across all levels of care.

We acknowledge the invaluable contributions of stakeholders from government ministries, departments, and agencies, alongside intergoverntmental organisations, non-governmental organisations, academic institutions, healthcare facilities, the private sector, and communities. Their collective expertise and dedication have been instrumental in shaping these guidelines to align with national health priorities and global best practices.

Special recognition is given to the Ministry of Health officers from Clinical Services, Nursing and Midwifery, Planning, Finance and Policy, Environmental Health, Community Health, Pharmaceuticals and Natural Medicines, Standards, Compliance, Accreditation and Patient Protection, Health Infrastructure, and Health Information. Their technical expertise and commitment have significantly enriched this revision, ensuring its relevance and effectiveness.

We also extend our profound gratitude to development partners and technical experts whose contributions were pivotal to this process. In particular, we appreciate the financial and technical support from the U.S. Centers for Disease Control and Prevention, the World Health Organisation, the United Nations Children's Fund, Resolve to Save Lives, the Africa Centers for Disease Control and Prevention, United Kingdom Foreign, Commonwealth & Development Office (FCDO) and European Union Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG ECHO).

Moving forward, the Ministry remains committed to strategic collaboration with government entities to drive the effective implementation of these guidelines. This collective effort will strengthen Uganda's IPC programme, enhance healthcare resilience, and safeguard public health.



Dr. Rony R. Banatungire

Ag. COMMISSIONER CLINICAL SERVICES.

ACRONYMS

ABHR	Alcohol Based Hand rub
AMR	Antimicrobial Resistance
CAUTI	Catheter-associated urinary tract infection
CBO	Community-based Organisation
CHW	Community Health Worker
DHT	District Health Team
HAIs/HCAI	Healthcare associated infections
HIV	Human immunodeficiency virus
HLD	High-level disinfection
IDSR	Integrated Disease Surveillance and Response
IEC	Information, Education and Communication
IPC	Infection Prevention and Control
IV	Intravenous line
JEE	Joint External Evaluation
MCH	Maternal Child Health
MDRO	Multi Drug Resistant Organism
MoH	Ministry of Health
NGO	Non-governmental Organisation
PEP	Post-exposure prophylaxis
RRH	Regional Referral Hospital

SOPs	Standard Operating Procedures
SSI	Surgical site infection
TOTs	Training of the trainers
VHF	Viral hemorrhagic fever
WASH	Water, Sanitation, and Hygiene
WHO	World Health Organisation

DEFINITIONS

Alcohol-based hand rub	A liquid, gel, or foam formulation of alcohol (e.g., ethanol, isopropanol), which is used to reduce the number of microorganisms on hands when the hands are not visibly soiled.
Antimicrobial	A general term referring to a group of drugs that includes antibiotics, antifungals, antiprotozoal drugs, and antivirals that inhibit the growth of microorganisms.
Antimicrobial resistance	A situation where microorganisms (bacteria, viruses, fungi and parasites) no longer respond to a drug which it was originally sensitive to. When the microorganisms become resistant to antimicrobials, they are often referred to as "superbugs".
Aseptic technique	Refers to practices that help reduce the risk of post-procedure infections in patients/clients by decreasing the likelihood of microorganisms 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.
Disinfection	Refers to the use of chemical or physical agents to eliminate virtually all disease- causing micro-organisms but not bacteria spores, prion, and some viruses on objects and surfaces to a level that is not normally harmful.
Detergents	Composed of a hydrophilic (water-seeking) component and a lipophilic (fat-seeking) component and can be divided into four types: anionic, cationic, amphoteric, and non- ionic detergents.
Healthcare associated infections	Also called hospital acquired infections. These are infections that are not present or incubating at the time the patient comes to the healthcare facility but the patient acquires them in the healthcare facility.

Healthcare facility	Includes all categories of hospitals (government, private, mission, mine, teaching), primary hospitals, clinics, health posts, mobile stops, home-based care, nursing home/care settings, outreaches, emergency medical services, dental clinics, rehabilitation services, and all other healthcare service delivery points.
Healthcare Worker	Any person who delivers healthcare and services directly or indirectly in a health facility to users. This includes healthcare professionals and support staff (cleaners, food service workers, laundry staff and administrative staff).
High-level disinfection	This kills all microorganisms except bacteria spores through the process of boiling, steaming, or using acids (e.g., peracetic acids) and halogens (e.g., chlorine).
Infection Prevention and Control	A scientific evidence-based approach and practical solution designed to prevent harm caused by infection to patients and healthcare workers. It is grounded in infectious diseases, epidemiology, social science, and health system strengthening. This is achieved by monitoring infections and implementing IPC measures through the education of patients, employees, visitors, and volunteers in the principles of IPC.
Infection Prevention and Control practitioner	Healthcare Worker that has a qualification equivalent to the minimum of postgraduate diploma/degree in IPC.
Infection Prevention and Control minimum requirements	Standards established by WHO and IPC stakeholders for National and Healthcare facility levels, ensuring minimum protection for patients, healthcare workers, and visitors based on WHO recommendations

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

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GENERAL GUIDING STATEMENTS

The following policy statements will guide the overall IPC practices.

1. The Ministry of Health (MoH) will have ultimate responsibility and authority for ensuring the institutionalization of IPC Practices in the country.

2. The health facility leadership shall establish and maintain an IPC committee with clear management and accountability structures to oversee implementation and continuous improvement of IPC practices, including ongoing education of all healthcare workers, and monitoring of IPC standards.

3. Hospitals and Lower-Level Health facilities shall prioritize budgeting for IPC to ensure adequate supply of IPC commodities at all levels of healthcare.

4. The Ministry of Health will oversee monitoring and evaluation of IPC implementation at all levels of healthcare service delivery, whereas Regional, District and Facility leadership will oversee regular monitoring and evaluation of IPC implementation at healthcare facilities within their respective jurisdictions.

5. Infection Prevention measures for communities shall be integrated within routine health promotion, communication, education and community engagement programmes to create awareness and a culture of IPC practice amongst the public.

6. The Ministry of Health will update the IPC guidelines periodically based on evidence generated from ongoing research and advancements in IPC science.

7. All Health Training Institutions are called upon to integrate Infection prevention and control modules into their curricula for preservice education and training of all health care workers, which shall periodically be reviewed and updated.

8. IPC principles shall be integrated into emergency response plans at all levels of the healthcare system, ensuring rapid scale-up of IPC measures during disease outbreaks and other public health emergencies.

Chapter 1
INTRODUCTION

1.1: BACKGROUND

Uganda is epidemic-prone and in the recent past, the country has experienced various outbreaks like COVID-19, Ebola, Marburg, plague, avian influenza, Rift Valley Fever (RVF), yellow fever and Crimean Congo Hemorrhagic Fever (CCHF), Cholera and Anthrax that highlight the increased need of standard IPC practices. Effective Infection prevention and control (IPC) protects healthcare workers, patients and communities with improved health outcomes and enables continuity of essential health services.

Good Infection Prevention and Control (IPC) practices are at the cornerstone of preventing healthcare associated infections (HAIs). IPC are evidenced based principles and practices aimed at reducing the transmission of infections in a healthcare setting. These principles include a wellstructured programme and a set of standard precautions such as hand hygiene, decontamination, environmental cleaning and proper waste management with other additional precautions to break the chain of transmission targeting prevention of Hospital Acquired infections (HAIs). HAIs are infections acquired during receipt of healthcare services by a person that had no evidence of infection or incubation of that infection.

The Ministry of Health has made significant progress towards the implementation of IPC at the National, district and health facility levels. The establishment of an IPC desk at the Clinical Services Department during the response to the COVID-19 pandemic has helped to streamline IPC implementation. Several IPC projects with mentorships, logistical support and performance management interventions have been implemented under the IPC sub-pillar. However, there remains a need to streamline IPC practices in routine healthcare delivery. Since the development of the 2013 national IPC guidelines, several changes have occurred during the novel SARS-CoV-2 and several other outbreaks like Ebola that have led to an evolution in both knowledge and practices of IPC which has necessitated the need to revise and update the 2013 guidelines.

The National IPC Strategy is developed in alignment with the National IPC Strategy 2024/5 -2029/30, the 2005 Joint External Evaluation (JEE) country capacity evaluation for International Health Regulations (IHR) core capacities and other national and international guidelines.

These guidelines aim to address the knowledge and practices in IPC with special attention to the Ugandan experience and context during disease outbreak and non-outbreak settings.

1.2: OVERALL GOAL AND OBJECTIVES

The overall goal of this guideline is to establish an environment that is safe from the risk of healthcare-associated infections for patients and healthcare workers in all healthcare settings through;

- Defining the framework within which IPC measures shall be practiced by all healthcare workers in all healthcare facilities and service delivery points.
- Providing acceptable standards for the practice of IPC.
- Outlining strategies that shall make IPC practices routine in all aspects of healthcare.
- Providing evidence-based measures to reduce infection risks and healthcare workers and protect patients and care givers

1.3: TARGET AUDIENCE

The Guidelines are to be used by all people involved in health service delivery, including healthcare workers, management, and support staff.

1.4: SITUATIONAL ANALYSIS

Several surveys have been conducted at national level and these have identified key critical areas that need improvement of the IPC programme at national and sub-national. The MoH 2023 IPC survey, conducted in 289 healthcare facilities, showed critical gaps in IPC implementation in Uganda according to the WHO minimum requirements for implementation of IPC at National and subnational levels. The identified gaps included

limited IPC programs at the national, subnational and healthcare facility levels; absence of a disseminated up-to-date National IPC guideline; lack of standardized IPC training programme to guide healthcare worker IPC capacity building; absence of national HAIs surveillance system to provide guidance for surveillance of AMR and inadequate monitoring of IPC practices at all levels.

1.5: REVIEW OF THE GUIDELINES

This document is subject to review every five years from the start of the year of implementation, or earlier if necessary.

Chapter 2
IPC STRUCTURE AND FUNCTION

2.1: INTRODUCTION

Infection Prevention and Control (IPC) is a critical component of safe, high-quality patient care and is essential for the wellbeing of both patients and healthcare workers. IPC should be embedded as a core function across all levels of care, with shared responsibility from administrative leadership to point-of-care providers.

Uganda's IPC approach is aligned with national efforts to strengthen integrated health systems. IPC responsibilities are coordinated across all tiers of the health system—national, regional, district, and facility levels—without establishing parallel or standalone programmes. Instead, IPC is institutionalized within existing health system governance and delivery frameworks.

The IPC function is aligned and coordinated with other priority areas such as Antimicrobial Resistance (AMR), Quality Improvement, Water, Sanitation and Hygiene (WASH), Occupational Health, Tuberculosis, HIV, and Maternal and Child Health. It also engages other ministries (e.g., MAAIF, Education, Water) and collaborates with professional regulatory bodies including UMDPC, Allied Health Professionals Council, the Uganda Nurses and Midwives Council, and civil society actors.

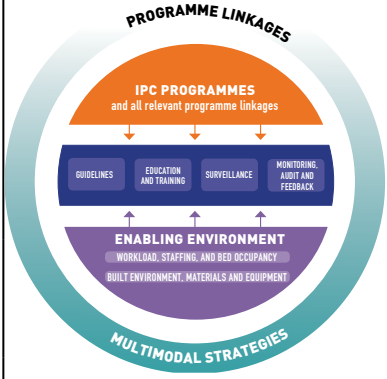
Each level of the health system is expected to designate an individual or team responsible for overseeing IPC-related responsibilities, integrated within the broader service delivery and quality improvement mechanisms.

Effective IPC implementation draws on the WHO's core components, ensuring alignment through integration with national standards, guidelines, training, surveillance, multimodal strategies, monitoring and feedback, and an enabling environment—including staffing,

infrastructure, and supply systems. These components are to be embedded and operationalized within routine facility and system-level functions

2.2: IPC CORE COMPONENTS

Table 1: *IPC Core Components*

	Core components 1 to 6 are applicable both to the IPC implementation framework at national and facility level.
	❖ **CC 1:** I IPC Programmes ❖ **CC 2:** IPC guidelines ❖ **CC 3:** IPC education and training ❖ **CC 4:** HAIs Surveillance ❖ **CC 5:** Multimodal strategies ❖ **CC 6:** Monitoring/audit and feedback
	Core component 7&8, Enabling environment, are applicable at facility level
	❖ **CC 7:** Workload, staffing and bed occupancy ❖ **CC 8:** Built environment, materials and equipment for IPC at the facility level

The IPC implementation framework is made of eight core components and these core components have been guided by the WHO guidelines and below are some of the recommendations per core component

Summary of WHO guidelines on core components of IPC implementation framework at the national and healthcare facility level

Table 2: *Recommendations of IPC Core Components at National and Healthcare Facility Level*

Core Components	Strength of recommendation	Summary of recommendation
CC1: **IPC Programmes**	Strong	An IPC implementation framework with a dedicated, trained team should be in place in each acute healthcare facility for the purpose of preventing HAIs and combating antimicrobial resistance (AMR) through good IPC practices
CC2: **Evidence based guidelines**	Strong	Evidence based guidelines should be developed and implemented for the purpose of reducing HAIs and AMR. Education and training of the relevant HCWs on guideline recommendations and monitoring of adherence with guideline recommendations should be undertaken to achieve successful implementation.
CC3: **Education and Training**	Strong	At the facility level, IPC education should be in place for all HCWs by utilizing team- and task-based strategies that are participatory and include bedside and simulation training to reduce the risk of HAIs and AMR.

Core Components	Strength of recommendation	Summary of recommendation
	Good practice statements	The national IPC implementation framework should support education and training of the health workforce as one of its core functions.
CC4: **Surveillance**	Strong	Facility-based HAIs surveillance should be performed to guide IPC interventions and detect outbreaks, including AMR surveillance, with timely feedback of results to HCWs and stakeholders and through national networks.
	Strong	National HAIs surveillance implementation frameworks that include mechanisms for timely data feedback and with the potential to be used for benchmarking purposes, should be established to reduce HAIs and AMR.
CC5: **Multimodal strategies**	Strong	At the facility level, IPC activities should be implemented using multimodal strategies to improve practices and reduce HAIs and AMR rates.
CC6: **Monitoring, evaluation and feedback**	Strong	Regular monitoring and timely feedback of healthcare practices should be undertaken according to IPC standards to prevent and control HAIs and AMR at the healthcare facility level. Feedback should be provided to all audited persons and relevant staff

Core Components	Strength of recommendation	Summary of recommendation
	Strong	A national IPC monitoring and evaluation framework should be established to assess the extent to which standards are being met and activities are being performed according to the goals and objectives. Hand hygiene monitoring with feedback should be considered as a key performance indicator at the national level.
CC7: **Workload, staffing and bed occupancy**	Strong	In order to reduce the risk of HAIs and the spread of AMR, the following should be addressed: bed occupancy should not exceed the standard capacity of the facility; HCW staffing levels should be adequate for patient ratios
CC8: **Built environment, materials and equipment**	Good practice statements	At the facility level, patient care activities should be undertaken in a clean and/or hygienic environment that facilitates practices related to the prevention and control of HAIs, as well as AMR, including all elements around the WASH (Water Supply, Sanitation and Hygiene) infrastructure and services and the availability of appropriate IPC materials and equipment

Core Components	Strength of recommendation	Summary of recommendation
	Strong	At the facility level, materials and equipment to perform appropriate hand hygiene should be readily available at the point of care.

2.3: IPC COORDINATION STRUCTURE AT THE DIFFERENT LEVELS OF THE HEALTHCARE SERVICE DELIVERY

Coordinating structures shall be at all levels, including the National and subnational levels (Regional, District and health facility) to facilitate the implementation of this guideline as illustrated in figure 1 below. The roles for each of the different levels are also highlighted.

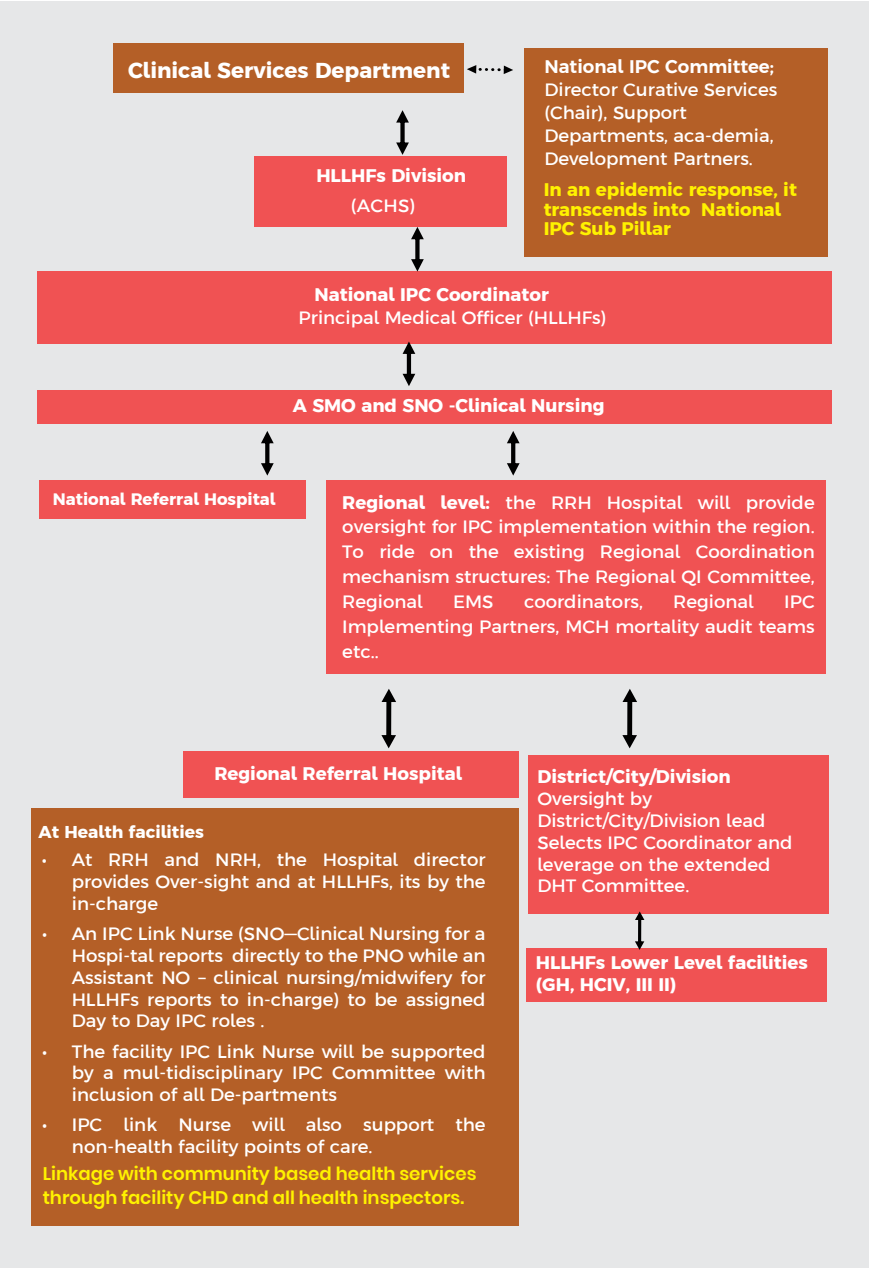
Coordination of IPC activities at the National level will be done by a dedicated National IPC Coordinator (PMO) supported by a Senior Medical Officer – Hospitals and Lower Level Health facilities division and Senior Nursing Officer (Clinical Nursing division).

A National IPC Committee composed of representatives from the MoH support departments will provide technical oversight of all critical activities and address the interdepartmental IPC issues.

At facility level, The Health facility in charge will provide oversight for IPC activities at the health facility level. For effective implementation of the Day to Day IPC roles an IPC Link Nurse will be assigned these roles. The facility IPC Link Nurse will be supported by a multidisciplinary IPC Committee with inclusion of all Departments including cleaners in the facility whose membership is assigned by the facility leadership.

The IPC link nurse must have dedicated time to carry out IPC activities.

Figure 1: *Organogram of the National IPC Coordination Structure at different levels of service delivery*



A. National level

The mandate of overseeing IPC implementation at national level shall lie with the IPC Section under the Clinical Services Department with support of the Nursing and Midwifery Department in the directorate of curative services. A dedicated National IPC Coordinator (Principal Medical Officer) will operate directly under the Assistant Commissioner in charge of Hospitals and Lower Health Facilities division to strengthen implementation and coordination of IPC strategies within the section. This Principal Medical Officer will be supported by a Senior Medical Officer and Senior Nursing Officer, Clinical Nursing, Nursing and Midwifery Department.

The roles and responsibilities of the National IPC Section will be to:

1. Oversee the implementation of the National IPC interventions utilizing multimodal strategies, in collaboration with multidisciplinary teams and other Ministries, Departments, and Agencies (MDAs) to institutionalize IPC standards across the country through;

    - ❖ Development and dissemination of IPC standards at all levels of the healthcare system.
    - ❖ Superintending standardised in-service IPC training in collaboration with relevant institutions and partners.
    - ❖ Ensuring periodic monitoring, documentation, and feedback of IPC interventions at all levels of healthcare service delivery for epidemic ready primary healthcare services.
    - ❖ Supporting and promoting operational research to inform evidence-based IPC practices.
    - ❖ Advocating for IPC prioritization at all levels of healthcare service delivery.

National IPC Committee

There will be a National IPC Committee composed of MoH IPC support Departments coordinated by the IPC section. For ease of continuity of coordination of the IPC aspects in these Department at the level of the Committee, each Department Head will nominate an IPC Focal point person (this can be a rotation basis on discretion of the Department to

allow for different members contribute in this area). We shall ride on existing organizational structures at the National level to functionalize this committee.

The overall responsibility of this committee is to provide technical oversight of all critical activities and address the interdepartmental IPC issues.

In the event of an epidemic response, this working group will transcend into the National IPC Sub Pillar and membership will be expanded to include all the key stakeholders to the particular IPC response.

We shall leverage the One Health Platform to coordinate the cross-cutting inter-ministerial IPC-related activities

The membership of the National IPC Committee will be;

1. Clinical Services Department
2. Nursing and Midwifery Services Department
3. Environmental Health Department
4. Pharmaceuticals and Natural Medicines Department
5. Standards, Compliance, Accreditation and Patient Protection
6. Communicable Disease Prevention and control Department
7. Health Infrastructure Department
8. Community Health Department
9. Reproductive, Maternal and Child Health Department
10. Health Education, Promotion and Communication
11. Emergency Medical Services Department
12. National Health Laboratory and Diagnostic Services
13. Integrated Epidemiology, Surveillance and Public Health Emergencies Department
14. National Referral Hospital IPC representative
15. Selected technical players in academia Private sector
16. Development Partners and Implementation Partners
17. Co-opt other members as and when required

B. At Regional level

The Regional Referral Hospital will provide oversight for IPC implementation within the region. We shall ride on the existing Regional Coordination mechanism structures to strengthen provision of strategic direction, oversight and coordination of service delivery at this level including the Regional Quality Improvement Teams, the Maternal Child Health mortality audit Teams and Others. The Terms of reference and composition of this mechanism will be improved to include/ emphasize IPC roles as a key component of service delivery that are provided by this mechanism.

IPC representation (IPC link Nurses from the RRH and Districts within the region, Regional EMS coordinators and IPC Regional Implementing Partners) will be included in this structure.

Responsibilities of planning, budgeting, implementing, and monitoring of all IPC interventions throughout the region will be done by this structure

The roles and Responsibilities of the Regional Coordination mechanism for IPC shall include to:

1. Oversee the implementation of the Regional IPC interventions utilizing multimodal strategies, in collaboration with multidisciplinary teams and other Ministries, Departments, and Agencies (MDAs) to institutionalize IPC standards across the region through;

    - ❖ Development and dissemination of IPC standards at all levels of the healthcare system within the region.
    - ❖ Superintending standardised in-service IPC training in collaboration with relevant institutions and partners.
    - ❖ Ensuring periodic monitoring, documentation, and feedback of IPC interventions at all levels of healthcare service delivery for epidemic ready primary healthcare services in the region.
    - ❖ Supporting and promoting operational research to inform evidence-based IPC practices.
    - ❖ Advocating for IPC prioritization at all levels of healthcare service delivery in the region.

B. District/ City/ Division level

The District/ City/ Division Health Officers will provide the overall oversight of district/ City/ Division-led IPC activities. They shall also designate an IPC focal person who shall coordinate IPC activities within the district. The focal person will be an individual with a clinical background preferably ADHO Maternal Child Health.

We shall leverage on the existing extended DHT Committee to support the District IPC Coordinator in planning, budgeting, implementing, and monitoring of all IPC interventions in the district. The District IPC Focal person shall be trained in fundamentals of IPC.

The roles and responsibilities of the District Coordination mechanism for IPC shall include to:

1. Oversee the implementation of the District IPC interventions utilizing multimodal strategies, in collaboration with multidisciplinary teams and other Ministries, Departments, and Agencies (MDAs) to institutionalize IPC standards across the District through;

    - ❖ Development and dissemination of IPC standards at all levels of the healthcare system in the District.
    - ❖ Superintending standardised in-service IPC training in collaboration with relevant institutions and partners.
    - ❖ Ensuring periodic monitoring, documentation, and feedback of IPC interventions at all levels of healthcare service delivery for epidemic ready primary healthcare services in the District.
    - ❖ Supporting and promoting operational research to inform evidence-based IPC practices.
    - ❖ Advocating for IPC prioritization at all levels of healthcare service delivery within the District.
    - ❖ Coordinate IPC interventions during outbreaks, pandemics, and other emergencies (e.g., COVID-19, Ebola and others) at District level.

B. Health facility level

Available evidence endorses the fact that the implementation of IPC interventions is not successful unless there is support of health facility leadership, management, administration and senior clinical staff.

As such, the health facility in charge will provide oversight for IPC interventions at the health facility level.

The roles and responsibilities of Hospital Management;

- The hospital's Director/ Medical superintendent/ facility In- charge/ administrator/ is ultimately responsible for the provision of IPC services.
- It is essential that adequate resources, both financial and human, and managerial support are available to the IPC team so that IPC interventions are implemented effectively.
- Managers of HCF must ensure that all HCWs are aware of the importance and principles of IPC. They should ensure and emphasize on the importance of mandatory continuing education and practical training for all HCWs. An orientation and induction training to increase awareness in understanding IPC practices should be offered.

For effective implementation of the Day to Day IPC roles the facility leadership will assign an IPC Link Nurse. This Officer will be trained in Fundamentals of Infection Prevention and Control to effectively execute this assignment.

National and Regional Referral Hospitals: The Day to Day IPC Roles in the healthcare facilities will be the responsibility of the Senior Nursing Officer- Nursing) who will report directly to the facility Principal Nursing Officer.

General Hospitals: The Day to Day IPC Roles in the Healthcare facilities will be the responsibility of the Senior Nursing Officer- Nursing/ Midwifery) who will report directly to the facility Principal Nursing Officer.

HC III & IV: The Day to Day IPC Roles in the Healthcare facilities will be the responsibility of the Assistant Nursing Officer- Nursing/ Midwifery) who will report directly to the facility in-charge.

The roles and responsibilities of the IPC link Nurse shall be to;

- Supervise the implementation of all infection prevention and control (IPC) interventions within the healthcare facility and use multimodal IPC strategies for sustainable improvement.
- Adapt national IPC guidelines, and protocols to suit the specific needs and context of the facility.
- Coordinate the delivery of comprehensive IPC education and training programs for all healthcare workers, including support staff.
- Conduct periodic monitoring, documentation, and feedback of IPC interventions at the healthcare facility for epidemic ready primary healthcare services.
- Coordinate facility surveillance of healthcare-associated infections and ensure reporting in collaboration with laboratory services.
- Collaborate with facility Public Health/ Community Health departments to strengthen disease preventive measures in the community.
- Conduct operational research to inform evidence-based IPC practices for improved patient outcomes.
- Advocate for IPC prioritization at health facility level.

C. Community Level

IPC Coordination will be through the facility Public Health Department for RRH and NRHs. For the General Hospital and Lower-Level Health Facilities the facility IPC link Nurse will work with the Health Assistant attached to the facility to ensure IPC compliance in community healthcare services. The relevant Community Health Worker (CHW) shall oversee IPC activities in CHW work under the supervision of the district coordinator and/ or the health facility IPC Link Nurse and health inspector at the different levels.

Chapter 3:
BASIC CONCEPTS IN INFECTION PREVENTION AND CONTROL

3.1: INTRODUCTION

Healthcare associated infections are a growing challenge in the health system, since the infections are influenced by a range of factors including immunity, microorganisms, extreme age, comorbidity and indwelling devices as well as administrative, environmental and other clinical factors that contribute to the occurrence of HAIs, in our healthcare settings.

The number of bacteria required to cause an infection is defined as the infective dose for each microorganism. Microorganisms with low infectious concentrations spread more quickly. Furthermore, if the person is immunocompromised, the infective dose required to cause infection is reduced.

Microorganism pathogenicity, also known as virulence, is the ability of a microbial strain to cause disease. To guard against viruses and prevent infections, the human body contains built-in defense systems. Infections can emerge, however, when these defense mechanisms are impaired.

Individuals with compromised immune systems, such as those on immunosuppressive therapy or suffering from chronic conditions such as diabetes, are especially prone to infections. Extreme age groups, such as premature infants and the elderly with underlying health conditions, are likewise more vulnerable to infection.

Until about six months of age, newborns' immune systems are immature and ageing is associated with a natural decline in immunological function. Patients undergoing chemotherapy, those living with HIV/AIDS,

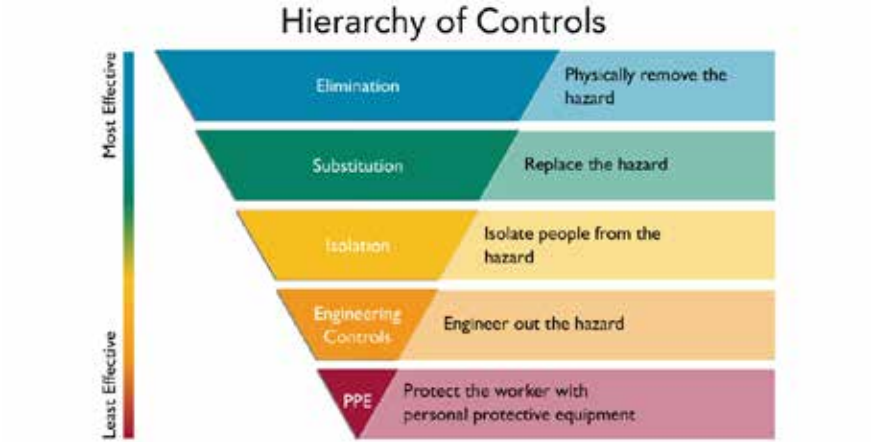
and transplant recipients on immunosuppressive medicines or high-dose steroids are more vulnerable to infections. Individuals with open wounds or medical devices such as IV lines, urine catheters, and surgical drains are also more susceptible to healthcare-associated infections.

It is crucial to remember that even a healthy person who has not previously been exposed to or immunized against vaccine-preventable diseases might contract infections, particularly from new and re-emerging pathogens such as viral hemorrhagic fevers like Ebola and Marburg. Changes in the properties of certain microorganisms, such as influenza and norovirus, can also make people more susceptible to infection. All healthcare facilities, with leadership support, should coordinate and take a multidisciplinary approach to ensuring IPC measures are applied to reduce and prevent the occurrence of HAIs.

3.2: HIERARCHY OF IPC CONTROLS

The hierarchy of infection prevention typically involves a multi-layered approach to minimize the spread of infections, especially in healthcare settings. The hierarchy of controls is a way of determining which actions will best control exposures. The hierarchy of controls has five levels of actions to reduce or remove hazards. The implementation of this system is very effective in substantially reducing cross infection and other hazards in healthcare facilities. The preferred order of action based on general effectiveness is as per the figure below:

Figure 2: Hierarchy of IPC Controls



ELIMINATION

Elimination removes the hazard at the source. This could include changing the work process to stop using a toxic chemical, heavy object, or sharp tool. It is the preferred solution to protect workers since no exposure can occur.

SUBSTITUTION

Substitution is using a safer alternative to the source of the hazard. An example is using plantbased printing inks as a substitute for solvent-based inks. This review should consider how the substitute will combine with other agents in the workplace. Effective substitutes reduce the potential for harmful effects and do not create new risks.

Elimination and substitution can be used at the design or development stage of a work process, place, or tool. Prevention through Design is an approach to proactively include prevention measures when designing work equipment, tools, operations, and spaces at all levels of healthcare.

ENGINEERING CONTROLS

Engineering controls reduce or prevent hazards from coming into contact with health workers. Engineering controls include modifying equipment or the workspace, using protective barriers, ventilation, and more.

The most effective engineering controls: are part of the original equipment design, remove or block the hazard at the source before it comes into contact with the worker, prevent users from modifying or interfering with the control, need minimal user input for the controls to work, operate correctly without interfering with the work process or making the work process more difficult. However, long-term operating costs tend to be lower, especially when protecting multiple workers. In addition, engineering controls can save money in other areas of the work process or facility operation.

ADMINISTRATIVE CONTROLS

Administrative controls establish work practices that reduce the duration, frequency, or intensity of exposure to hazards. This may include: work process training, job rotation, ensuring adequate rest breaks, limiting access to hazardous areas or machinery, adjusting line speeds.

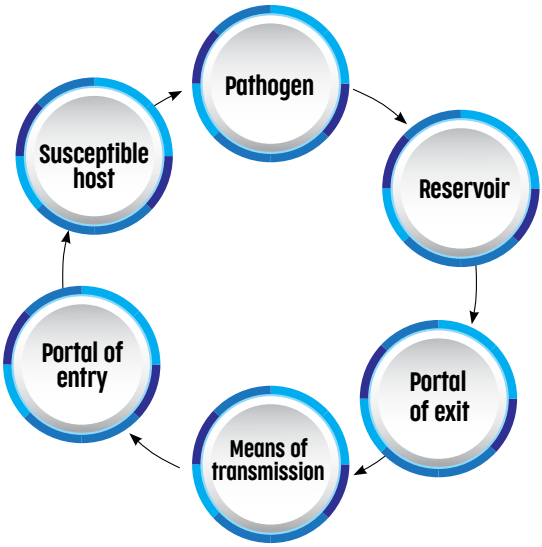
PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE are materials worn to minimize exposure to hazards. Examples of PPE include gloves, face protection, head covers, masks, coveralls, and gowns. While elements of the PPE programme depend on the risk assessment and the identified PPE, the programme should address: workplace hazards assessment, PPE selection and use, inspection and replacement of damaged or worn-out PPE, employee training and programme monitoring for continued effectiveness. Employers should not rely on PPE alone to control hazards when other effective control options are available. PPE can be effective, but only when health workers use it correctly and consistently.

Administrative controls and PPE are useful when employers are implementing other control methods from the hierarchy of controls. Additionally, administrative controls and PPE are often applied to existing processes where hazards are not always well controlled

3.3: TRANSMISSION CHAIN OF MICRO-ORGANISMS

It is necessary to understand the infectious-disease process in order to comprehend the spread of infections in healthcare facilities. The spread of infection requires three (3) elements: a source of infecting organisms, a susceptible host, and a means of transmitting the microorganism. For infections to be spread, the chain of infection has to be complete.



The term 'chain of infection' refers to the process through which infection spreads from one susceptible individual to another. For an infection to take place, all of the links in the chain must be intact and in the correct order. To break the chain, healthcare workers must understand how the various components of the chain interact and

aid in the transmission of illness.

INFECTIOUS AGENT

This could be bacteria, virus, fungus or protozoa; and the transmission depends on the type, virulence, and infective dose of the microorganisms.

RESERVOIR

The reservoir or source is where the organism generally lives or thrives and where it will find the nutrients and moisture it needs for growth and survival. This could be a person, an animal, inanimate object, food, or water. A person infected with an infectious agent during the disease's incubation period, or someone colonized by the infectious agent but with no visible disease (asymptomatic carrier), or other microorganisms such as the patient's own endogenous flora, which can be difficult to regulate. Inanimate objects; in surroundings that may be contaminated with the infectious microbes.

EXIT POINT

This is how the microorganism leaves the reservoir and maybe makes its way to a susceptible host. Taking an example of someone with a respiratory infection that is, coughing and sneezing.

THE POINT OF ENTRY

This is how the disease spreads to another individual, such as being inhaled in, entering through the mucous membrane, entering through a wound, or going through a tube such as a catheter etc.

THE HOST IS A SUSCEPTIBLE HOST

This characterizes the individual who is vulnerable to infection, e.g immunocompromised individual.

3.4: MODES OF TRANSMISSION

Microorganisms can be acquired through various routes, and some of them have the ability to use more than one route of transmission. The most common modes of microbial transmission in healthcare facilities are as follows:

A. CONTACT TRANSMISSION:

Contact transmission is the most frequent mode of transmission in any healthcare facility. This occurs either as direct contact when there is physical contact with a patient during medical examination, bathing, dressing changes etc.

Microorganisms can also spread by direct contact via contaminated hands and gloves. Thus, hand-hygiene is among the most important and effective methods of preventing cross infection and should also be performed immediately after removal of contaminated gloves.

Indirect contact transmission occurs when pathogens are transmitted through an intermediate object i.e. via contaminated items, equipment, and/or the environment. In healthcare settings, effective decontamination of items and medical equipment and cleaning and/or disinfections of environmental surfaces is essential to prevent transmission through this route.

B. DROPLET TRANSMISSION

Droplet transmission occurs when microorganisms come into direct contact with mucous membranes in the mouth, eyes, and nose. This occurs during talking, singing, coughing, sneezing and during certain medical procedures. Most of the aerosol particles generated during coughing can be found in the air in proximity of 1 meter (~ 3 feet). Within a few seconds, large-size particles (> 5 µm) fall quickly to the ground due to gravitational force, but some larger droplets may desiccate and become smaller while in the air due to loss of the moisture present in saliva. Direct transmission via this route can be prevented by wearing a facial protection (surgical mask and/or face shield) within 2 meters (~ 6 feet) of the patient or upon entry into the patient's room.

C. AIRBORNE TRANSMISSION

Airborne transmission differs from droplet transmission in that it relates to the presence of microbes within droplet nuclei, which are generally regarded to be <5µm in diameter particles that can linger in the air for long periods of time and be transmitted to others over distances larger than 1m. Airborne precautions can be strengthened through engineering

controls, Isolation precautions (contact ,droplet, airborne) standard precautions, limiting Aerosol Generating Procedures (AGP), surveillance monitoring , immunization and travel advisory continuous medicine.

D. VECTOR-BORNE TRANSMISSION

The transfer of microorganisms via vectors such as mosquitoes, flies, fleas, rats, and other vermin is referred to as vector-borne transmission precautions can be strengthened through implementing integrated approaches; Vector surveillance monitoring, vector control measures, environmental management, personal protection, sustainable practices as well as research innovation.

E. COMMON VEHICLE TRANSMISSION

The spread of infections to several hosts by infected goods (vehicles). This mode has the potential to cause huge outbreaks. Transmission vehicles include the following: Foods e.g., salmonellosis, Water, e.g., can spread shigellosis. Blood, e.g., HIV, viral infections such as hepatitis B (HBV), viral hepatitis C (HCV), Devices and apparatus medication and intravenous fluids. Common vehicle transmission controls can be strengthened through strict adherence to the protocols of the type of infection.

3.5: DIFFERENCE BETWEEN COLONIZATION AND INFECTION

Colonization: occurs once an organism has established contact with the host and adhered to the skin or mucosal surfaces, it frequently establishes and colonizes at that spot without generating any unwanted effects or injury. The time it takes for a place to be colonized varies depending on both host conditions and the features of the organism involved. The host may then build immunity to the pathogen by producing particular T cell or antibody responses (this is how immunity to Neisseria meningitides is obtained).

Infection: occurs when microbial invasion that causes tissue damage at the infection site or, in the most severe case, the host's death. Infection, unlike colonization, expresses itself both physically and physiologically. These symptoms might be isolated or systemic.

3.6: SCREENING AND PATIENT FLOW

A. SCREENING

Screening is a strategy used in a population to identify people who could potentially have a disease basing on specific signs or symptoms. It is based on a thorough interview and observation of the patient, including history of current symptoms, contact history and local epidemiology.

Screening is best performed at the first contact with the patient preferably at the entrance of the facility.

All persons accessing the facility including healthcare workers, patients, visitors, survivors, etc should go through systematic screening using screening tools such as screening forms and algorithms to ensure consistent screening. Despite a patient screening negative for a highly infectious disease, healthcare workers in the different department of the health facility e.g. Laboratory, radiology, antenatal, OPD, etc. are encouraged to continue screening all patients that access their departments as the condition of the patient may change and more signs and symptoms of these diseases manifest or more information made available by the patient that may make them a suspect. Inpatient screening for those admitted on the wards should be conducted on each shift i.e. 3 times a day (morning, afternoon and evening).

The physical setup for the screening area assures a 1 – 2-meter distance between the screener and the patient at all times. Whenever possible, impose a physical barrier such as glass, plexiglass or mesh between patient and healthcare worker to ensure that the 1 – 2-meter barrier is maintained at all times.

The healthcare worker side of the screening area should be set up with a table and chair, hand hygiene facilities, pens, screening tools e.g. screening forms or registers, screening algorithms, and infra-red thermometer. To reinforce practices, job aides such as posters on signs and symptoms, update case definitions and IPC should be placed within the screening area.

No PPE is required if the 1-2-meter distance between patient and healthcare worker is not breached.

For diseases spread through contact, however, for diseases spread through droplets like COVID 19, a face mask will be required.

The patient side of the screening area should be set up with hand washing facilities, waiting patient chairs placed at least 1 meter apart, waste bins with bin liners and digital thermometers If infrared thermometers are not available. The patient can use the digital thermometer to measures his or her own axillary temperature (or their child's) and reads it aloud or shows the reading to the screener. The thermometer can be cleaned and disinfected with 0.5% chlorine between uses with different patients in the screening area. Ensure that cleaning and disinfection the patient side of the screening area is done in between patients or when spills occur by someone putting on full PPE.

To reinforce precautionary measures including IPC measures, pin visual aids/ posters for IPC, risk communication and direction of flow of person being within the screening area on the patient side.

Signs and Symptoms of illness that should be screened for include acute respiratory infections (such as coughing, sneezing, sore throat, fever, headaches, fatigue, body aches, and runny nose), skin rashes, and acute gastrointestinal issues (like diarrhea, nausea, and vomiting).

Triage should be promptly implemented/ conducted to prioritize individuals with critical care needs and efficiently manage limited resources.

B. PATIENT FLOW

Efficient patient flow is integral to infection prevention and control efforts within healthcare facilities. By managing patient flow effectively, facilities can reduce the risk of cross-contamination and transmission of infectious agents.

Key considerations include:

- **Designated Pathways:** Establish clear pathways that minimize contact between patients with infectious conditions and those seeking routine care, reducing the risk of transmission.

- **Optimized Waiting Areas:** Design waiting areas to facilitate physical distancing, providing adequate space between individuals to mitigate the spread of respiratory pathogens.
- **Streamlined Processes:** Implement streamlined processes to expedite patient registration, triage, and screening for infectious symptoms, enabling prompt identification and isolation of potentially contagious individuals.
- **Staff Training:** Provide staff with training on IPC protocols, including proper use of personal protective equipment (PPE), hand hygiene practices, and respiratory etiquette, to minimize the risk of transmission during patient interactions.

Chapter 4
STANDARD PRECAUTIONS

The concept of Standard Precautions was first introduced as Universal Precautions by the Centre for Disease Control (CDC) in the United States of America in 1985 with the emergence of HIV/AIDS. They are work practices required for basic level IPC, and are based on the principle that all blood, body fluids, secretions, excretions including sweat, nonintact skin, and mucous membranes may contain transmissible infectious agents.

Standard precautions shall be applied during all patient-healthcare worker interactions that are likely to involve exposure to blood, body fluids, and pathogens. Standard precautions are recommended for the treatment and care of all patients/clients irrespective of their perceived infectious status. The components of standard precautions are:

1. Risk assessment
2. Patient placement
3. Hand Hygiene
4. Personal protective Equipment
5. Aseptic technique
6. Respiratory Hygiene
7. Linen management
8. Healthcare waste management
9. Safe injection and sharps safety
10. Decontamination of medical devices
11. Environmental cleaning

The guidelines on each of the components of the standard precautions are presented below.

4.1: RISK ASSESSMENT

Healthcare workers should conduct a thorough risk assessment at the point of care to determine their potential exposure to infectious diseases and choose appropriate precautions to minimize this risk.

During the risk assessment, consider factors such as:

- Symptoms exhibited by the patient (e.g., cough, fever, diarrhea)
- Previous and recent exposure to healthcare facilities
- History of infection with multi-drug resistant organisms (MDROs)
- Recent antimicrobial treatment
- Travel history, occupation, and hobbies

All patients entering healthcare facilities should be screened upon arrival, and this screening should be ongoing throughout their stay. Before attending to any patient, healthcare workers should assess their work environment to minimize transmission of infectious agents like blood, bodily fluids, and contaminated surfaces. Based on the risk assessment, appropriate PPE should be selected as illustrated in the table 4 in the appendix:

Risk is classified as high, medium, or low based on the severity of the consequences of any hazard.

Perform a risk assessment prior to patient placement using the formula below.

Risk = exposure x probability x severity

RISK - ASSESSMENT INFECTION CONTROL GRID			
	HIGH	MEDIUM	LOW
Transmission	High	Medium	Low
Severity	High	Medium	Low
Susceptibility	High	Medium	Low
Outbreak potential	High	Medium	Low
Consequences	Severe	Moderate	Minor
Intervention required	High	Moderate	Low

In this example: the grid evaluates the risk of infection based on various factors such as the likelihood of transmission, severity of the infection, susceptibility of individuals, potential for outbreak, consequences of the infection, and the level of intervention required.

- Each factor is assigned a level of risk: high, medium, or low. For example, if a specific infection has a high risk of transmission, high severity, high susceptibility, high potential for outbreak, severe consequences, and requires high intervention, it would be classified as high risk overall. Similarly, combinations of medium or low risk factors would be classified as medium or low risk, respectively.
- Keep in mind that the specific criteria and risk levels may vary depending on the context and the type of infection being assessed. This example serves as a general framework for understanding how a risk assessment grid can be used in infection prevention and control.

4.2: PATIENT PLACEMENT

Health facilities should establish effective systems to ensure appropriate placement of patients to prevent the spread of contagious pathogens. Upon entry into the healthcare setting, patients should undergo screening based on their clinical symptoms (syndromic surveillance) and be isolated if they show signs of infectious diseases. This screening process, coupled with the adoption of standard and transmission-based precautions, helps minimize the risk of transmission within the healthcare environment.

Adequate spacing of 1-2 metres (6 feet) distance between beds in wards, or utilizing single rooms (isolation rooms or wards) for patients with a potential risk of spreading infection is crucial. This includes patients who may contaminate the environment, are suspected of having a transmissible or known infectious disease, carry multi-drug resistant organisms (MDROs), or have an increased risk of transmitting the disease to others.

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

ISOLATION IN HEALTHCARE FACILITIES

Isolation is the process of separating patients with certain communicable diseases from uninfected persons. Isolate patients who pose a risk for transmission of infections to others (e.g., patients with infectious diseases like pulmonary T.B, viral hemorrhagic fevers, patients infected with multi drug resistant organisms, infants with suspected viral respiratory or gastrointestinal infections) in side rooms when available. If side rooms are not available, cohort patients with similar diseases in one ward.

Determine patient placement/ isolation based on the following principles:

- Route(s) of transmission of the known or suspected infectious agent i.e. Airborne, Droplet and Contact
- Risk factors for transmission in the infected patient.
- Risk factors for adverse outcomes resulting from health associated infections in other patients in the area or room being considered for patient placement.
- Availability of side rooms.

Table 3: *Requirements for protective (reverse) isolation*

REQUIREMENT	DETAILS
Patient Placement	❖ Place patient in single room with En suite bathroom. ❖ Patient must be accommodated in a room with positive pressure ventilation where available, or in a room with open windows if possible. ❖ Always keep doors closed. ❖ Put up isolation sign: protective precautions. ❖ Place clean, unused PPE outside patient room.
Hand Hygiene	❖ Perform Hand Hygiene according to the 5 Moments of hand hygiene. ❖ Hand Hygiene must be performed before donning and after removal of PPE.

REQUIREMENT	DETAILS
Personal Protective	These include: Non-sterile gloves or sterile (procedure indicated),
Equipment	Disposable aprons or gown, Head cover, Masks and Shoe covers
Environmental Cleaning	**FOR CONCURRENT CLEANING:** ❖ Wear appropriate PPE. ❖ Use dedicated cleaning equipment. ❖ Clean all surfaces daily with detergent and water and then disinfect using 70% alcohol or hypochlorite solution 0.5%. **TERMINAL CLEANING** ❖ Remove bed linen and all curtains, and place in yellow bag and send to the laundry. ❖ Clean and disinfect all specialized equipment which will not remain in the room prior to removal to the equipment storage area. ❖ Clean all surfaces including walls to hand height with detergent and water, and then disinfect using 70% alcohol or hypochlorite solution 0.1%. ❖ Remove PPE and perform hand hygiene after completion of the task.
Patient care equipment	❖ Dedicated equipment is preferred.
Usage of Linen	❖ Ensure prompt removal when soiled. ❖ Attach list of contents to outside of bag.
Catering	❖ No catering personnel may enter an isolation area. ❖ Meal orders, delivery, and removal of trays must be performed by nursing personnel.

REQUIREMENT	DETAILS
Patient transport	❖ Limit movement outside of the room. ❖ Inform the receiving department in advance of the infectious status of the patient and maintain precautions.
Visitors	❖ Inform visitors of the reason for isolation. ❖ Restrict visitors. ❖ Visitors should adhere to the prescribed PPE. ❖ Perform hand hygiene before and after leaving the room.
Discontinue Isolation	❖ According to diagnosis, immune status, and the clinical improvement of the patient.
Precautions	❖ Decision made in collaboration with the IPC Practitioner/team and clinical team.

To Note: *All persons accessing the isolation area shall observe the Standard Precautions and additional transmission- based guidelines.*

PROTECTIVE (REVERSE) ISOLATION

Severely immuno-compromised patients may require isolation from other patients and attendants to protect themselves against exogenous infection. Areas in a healthcare facility where protective isolation is often required are: Bone marrow transplant unit and Hematology/ cancer unit (severely neutropenic patients)

4.3: HAND HYGIENE

Hand Hygiene (HH) is the most effective and cost-friendly measure for preventing the transmission of infections within healthcare settings. Healthcare workers should perform proper HH the right way and the right time following the WHO's Five Moments of Hand Hygiene in order to prevent the transmission of HAIs.

Figure 4: *5 moments of Hand Hygiene*

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
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 carried on your hands
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
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
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

The five moments for Hand Hygiene are;

1. Before contacting a patient.
2. Before performing a clean/aseptic task, including touching invasive devices.
3. After performing a task involving the risk of exposure to a body fluid, including touching invasive devices.
4. After any type of patient contact.
5. After touching equipment in the patient's surrounding areas (see table below on WHO 5 moments for hand hygiene

The major types of hand hygiene are:

A. Hand washing with soap and water (plain or antimicrobial soap).

B. Alcohol-based hand rubs (or hand sanitizer).

C. Surgical hand wash/scrub.

A. Hand washing with soap and water

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

- ❖ When hands are visibly soiled.
- ❖ Before and after handling or eating food.
- ❖ After visiting the toilet.
- ❖ Before and after attending to patients in situations such as bathing and feeding;
- ❖ On arrival to work and after.

Figure 5: *Steps in Hand Washing*

How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

Duration of the entire procedure: 40-60 seconds

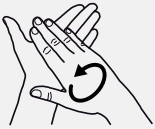
0

Wet hands with water;

1

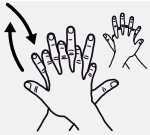
Apply enough soap to cover all hand surfaces;

2



Rub hands palm to palm;

3



Right palm over left dorsum with interlaced fingers and vice versa;

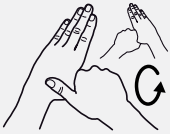
4

Palm to palm with fingers interlaced;

5

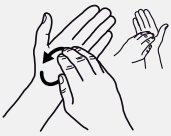
Backs of fingers to opposing palms with fingers interlocked;

6



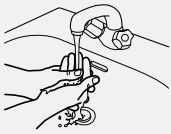
Rotational rubbing of left thumb clasped in right palm and vice versa;

7



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

8

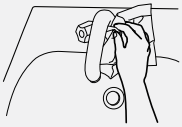


Rinse hands with water;

9

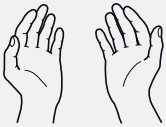
Dry hands thoroughly with a single use towel;

10



Use towel to turn off faucet;

11



Your hands are now safe.

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Note:

- Ensure the availability of clean flowing water (from a tap or a portable functioning hand washing station) and all necessary hand washing materials. (liquid soap, a dry paper towel, and a waste bin).
- Take off your wristwatch and hand jewels. (rings, wrist bracelets) and fold long-sleeved garments to the elbow.

B. Using Alcohol-Based Hand Rub (ABHR)/ (Hand rubbing)

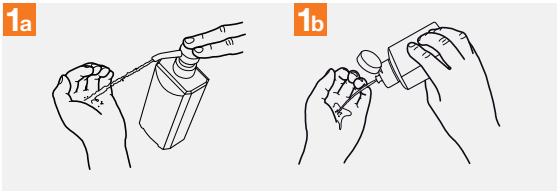
- Perform hand rubbing with an alcohol-based hand rub product (60%-80%) as the preferred method for hand hygiene in healthcare, if hands are not visibly soiled.
- Apply enough alcohol-based hand rub product to cover all areas of the hands; rub hands until dry (20–30 seconds) as shown in Figure 6.
- ABHR products should be stored safely in a tightly sealed dispenser, kept in a cool place to prevent evaporation, kept out of reach of children, and clearly labelled.

Figure 6: *Steps in Hand Rubbing*

How to Handrub?

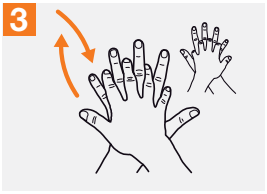
RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

Duration of the entire procedure: 20-30 seconds

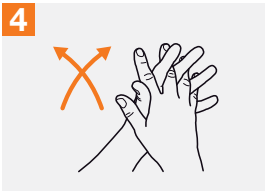


Apply a palmful of the product in a cupped hand, covering all surfaces;

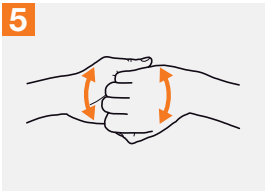
Rub hands palm to palm;



Right palm over left dorsum with interlaced fingers and vice versa;

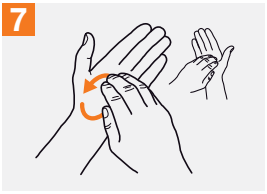


Palm to palm with fingers interlaced;

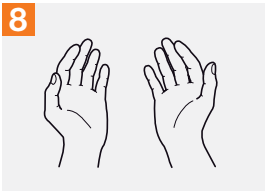


Backs of fingers to opposing palms with fingers interlocked;

Rotational rubbing of left thumb clasped in right palm and vice versa;



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;



Once dry, your hands are safe.

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C. Surgical Hand Technique

Preparation for Hand scrub procedures

- Remove all jewelry e.g. rings, watches, bracelets.
- Adjust headwear to ensure that hair is well covered and that the mask is comfortable
- Put on goggles or face shield
- There should be no open cuts or infected lesions. Cover open cuts with an occlusive waterproof dressing
- Sleeves must be short to allow washing to the elbows
- Keep nails short, clean and without nail varnish
- Always hold hands above the level of the elbow so that water drips from clean area to unclean ones
- Once the procedure has commenced, taps and dispenser should only be manipulated using the elbows (foot or knee spray taps being the ideal choice)
- Use a disposable (single-use) brush during scrubbing
- Hand hygiene using soap and water (Figure 5) is recommended when the hands are visibly soiled.

Note:

- Water and soap dispensers should be clean.
- If plain soap is used, care of soap and soap dispenser is very important as they may act as a reservoir for bacteria if they are not cleaned properly between uses
- Use of antimicrobial soap is recommended (4% chlorohexidine gluconate)

SURGICAL HAND WASHING/SCRUBBING TECHNIQUE:

- Wet hands and arms to a point 4 – 5 cm above the elbows
- Apply an appropriate antiseptic agent and rub vigorously to form lather

- Cover all surfaces of the fingers, arms and part of upper arms, ensuring that nails and nail beds are cleaned with single disposable scrubbing brush. The hands should not be scrubbed to avoid skin damage
- Rinse off the initial wash, starting from hands to elbows and then re-apply antiseptic · Repeat the process of the fingers, arms and upper arms. The whole process should last for 2-5 minutes.
- Rinse off the lather starting from hands to elbows
- Give a final wash to the hands and rinse each hand individually, working from hand to elbow
- Hold the hands above the elbows
- Dry hands

DRYING OF HANDS AND ARMS:

Hand drying is an essential part of hand hygiene. Wet hands have higher bacterial counts and lead to dryness and cracked skin and increased latex allergies. Keep the hands higher than the elbows, and hold them away from the body and clothing.

- Pick a sterile towel ensuring that each hand comes in contact with one side of the towel.
- That side of the towel should dry the corresponding arm.
- Use the single-use towels for drying hands.
- Drop the towels in a laundry basket for processing.

USE OF GLOVES

- The use of gloves does not eliminate the requirement for hand hygiene.
- Before and after using gloves, HH must be performed.
- To prevent the risk of skin irritation, hands must be properly dried before donning gloves.

D. Using Chlorine water if the two above are not available;

- When neither Soap and clean water nor alcohol-based hand rub is available, Handwashing with a 0.05% chlorine-based solution may also be used to perform HH, or during outbreaks.
- Chlorine can be a dangerous chemical so the preparation of chlorine must be done by trained personnel using the recommended personal protective clothing.
- When preparing chlorine, for handwashing also known as mild chlorine solution (0.05%), the following should be considered:

A. Sodium hypochlorite may be added to water achieving an end formulation of 0.05% sodium hypochlorite for temporary use in dispenser containers for hand hygiene and this should be well reconstituted.

B. Should be stored away from direct sunlight.

C. Utilized within 24 hours of reconstitution.

D. The container should be clearly labelled with the strength of the solution date and time the solution was reconstituted and dispensed from closed containers.

IMPROVING COMPLIANCE TO HAND HYGIENE

It is imperative to regularly monitor adherence to hand hygiene guidelines. IPC link Nurses and committees should use monitoring tools such as the WHO Hand Hygiene Self-Assessment Framework (HHSAF) 2010 and the Hand Hygiene observation tool; See Annex for a link to access these tools. Results of monitoring should be disseminated to all relevant stakeholders.

It is therefore important for:

1. Supervisors and managers to ensure that water and soap, single use towels hand sanitizer, and other consumables available when needed.
2. Supervisors and managers to support and model good hand hygiene behavior.

3. Health facilities to provide educational activities and aids to make sure all staff are aware of the importance of good hand hygiene practices.

4. Health facility managers to provide posters or signs listing the steps and times for hand hygiene at strategic points (sinks, rest rooms, eating areas, toilets) to help staff become aware of appropriate hand washing practices.

Hand hygiene for patients and family members

Patients, family members, and visitors should be educated on when and how to perform hand hygiene. Facilities for both hand washing with soap and water and alcohol-based hand rub should be made available in all wards/ units to facilitate hand hygiene behavior. Opportunities for hand hygiene by patients, family members, caretakers, and visitors include:

- Before and after patient care
- Before and after eating
- After using the toilet
- When hands are visibly soiled
- Entering and leaving health facility

4.4: PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal Protective Equipment (PPE) serves as specialized gear worn by both clinical and non-clinical healthcare workers to safeguard them from potential hazards or infections during interactions with patients. It acts as a physical barrier against microorganisms. PPE is recommended when there's a likelihood of exposure to blood or bodily fluids during healthcare activities.

Healthcare workers should utilize various PPE items like gloves, masks/ respirators, eyewear (such as facial shields, goggles), caps, gowns, and aprons when handling contaminated materials or surfaces. Healthcare facility managers need to ensure an adequate supply of PPE for their staff.

Principles for risk assessment to determine PPE to use include;

- Assess /Identify the threat, e.g. likelihood of exposure to blood, body fluid / infectious pathogen exposure.
- Evaluate the associated risks (such as exposure to blood borne viruses like Hepatitis B),
- Determine appropriate PPE needed to eliminate or control the risk (for instance, using face shields or goggles, aprons, and gloves to protect against splashes).

TYPES OF PERSONAL PROTECTIVE EQUIPMENT

1. GLOVES

Depending on the procedure, gloves should be well-fitting, intact, and of sufficient length. It should be noted that up to 20% of gloves have minute perforations, therefore hand hygiene is highly recommended after removing gloves.

The following are the best practices for glove use:

- For optimum safety, the glove barrier must remain intact throughout the procedure, and if a breach occurs, new gloves must be worn.
- A pair of gloves should only be worn for a single procedure.
- Gloves should be changed between procedures, even if the patient is the same.
- Not all tasks require the use of gloves, and the correct usage is determined by risk assessment.
- Wearing gloves does not substitute the need to perform hand hygiene
- After using non-powdered gloves hand hygiene should be performed.
- No reusing gloves after reprocessing or decontamination as this is not recommended.

Table 4: *Different types of gloves and their indications*

TYPES OF GLOVES	INDICATION FOR USE
	**Surgical gloves (Nitrile latex gloves):** Sterile surgical single use gloves for invasive procedures
	**Examination disposable gloves (non-sterile gloves):** Used For non-invasive procedures,
	**Gynecological (Maternity):** elbow length gloves used for gynecological procedures
	**Heavy-duty utility gloves:** Mid-arm length used for decontamination and cleaning procedures

2. HEAD COVERS (CAPS)

Head covers are not routinely required in clinical areas unless part of theatre attire or to prevent contamination of the environment such as in clean rooms. They are used to protect the hair and scalp so that skin and hair flakes do not fall out during medical and surgical procedures such as wound care. They are also used during procedures to keep the wearer's hair from becoming contaminated with blood and other bodily fluids. Caps should be large enough to cover the entire head of hair.

Head covers must be:

- Worn in theatre settings and clean rooms, e.g. central decontamination unit.

- ❖ Well-fitting and completely cover the hair.
- ❖ Changed or disposed of between clinical procedures/lists or tasks and if contaminated with blood and/or body fluids.
- ❖ Removed before leaving the theatre or clean room.
- ❖ Individuals with facial hair must also cover this in areas where headwear is required, e.g. wear a snood.

Table 5: *Different types of head cover and indications*

Types head cover protection	INDICATION FOR USE
	❖ Head covers offer head protection from contact transmissible pathogens. They also allow hair to be covered and avoid potential contamination of the surgical wound. ❖ Hood -Covers the head in the form of an over-hood cover; certain types can additionally cover the face, neck, and have built-in flanges to cover the shoulders and a visor to protect the face further, used when managing infections pathogens like VHF cases.

3. EYE/FACE PROTECTION

During any procedure that could result in the splashing of blood or other bodily fluids, eye or facial protection should be worn. Protective goggles and face shield should be readily available and worn as required. A full-face visor can also be employed.

Table 6: *Different types of eye protection and their indication for use*

Types Eye / Face protection	INDICATION FOR USE
Face shield  **Eye Goggles** 	❖ Wear a face shield or eye protection (eye visor, goggles) to protect the mucous membranes of the eyes during activities that are likely to generate splashes or sprays of blood, bodily fluids, secretions, and excrement. ❖ Make sure a face shield covers the forehead, extends below the chin, and wraps around the side of the face - notice that face shields are more comfortable to wear with eyeglasses. ❖ Ensure that goggles fit over and around the eyes or personal prescription lenses.

4. SURGICAL /MEDICAL MASKS AND RESPIRATORS

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

Respirators are specialized equipment worn on the face to cover the nose and mouth and are indicated in situations when filtering inhaled air is critical. The disposable respirators are of different nomenclature like FFP2, FFP3 or the N95.

- ❖ Respirators are harder to breathe through than surgical masks.
- ❖ Healthcare workers who must come into close contact (within 1 meter) with infectious patients while performing examination, investigation, or treatment procedures should use respirators (FFP2, N95) or an

appropriate high-filtration device. If respirators are not available, the patient should be provided with a surgical mask.

- ❖ They are essential in aerosol-generating procedures e.g.; Intubations, Suction, Chest Physiotherapy, Bronchoscopy, Nebulization, CPR and Dental Procedures
- ❖ They may provide an increased level of safety and other close contact situations.

Table 7: *Different types of masks and respirators as well their indication for use*

Types of Respirators and Face Mask	INDICATION FOR USE
   Recommended for use in healthcare settings	**Respirators** ❖ When performing aerosol-generating procedures, health personnel should use a respirator (e.g., N95, FFP2) to protect against inhalation of airborne particles (small particles that float in the air). ❖ Perform a positive and negative air seal check before using a respirator for the first time, and a seal check every time you use one. ❖ If the respirator is damaged, soiled, or damp, or if breathing becomes difficult, replace it. ❖ Respirators with valves should not be utilised in healthcare settings since the valves open and close based on the wearer's breathing pattern, allowing air flow in and out and are not appropriate for ensuring source control.
   NOT Recommended for use in healthcare setting	

Types of Respirators and Face Mask	INDICATION FOR USE
 Mask with elastic	❖ Surgical / medical Face mask ❖ Medical masks (also known as surgical or procedural masks) should be worn by healthcare professionals to protect the mucous membranes of the nose and mouth from splashes or sprays of body fluids, respiratory secretions, and chemicals. ❖ If the respirator is damaged, soiled, or damp, or if breathing becomes difficult, replace it. ❖ Wear a medical mask during aseptic procedures to protect the patient (e.g., during surgery or lumbar punctures). ❖ Medical mask should be changed discarded after 4 hours of continued use, perform hand hygiene and wear new mask if required.
 Mask with stings ear loops	
	**Fabric homemade Cloth mask** ❖ It isn't recommended that healthcare workers use this item in a healthcare setting. Because they result in greater infection rates due to droplet and airborne pathogens. These increased infection rates are mostly attributable to higher rates of particle penetration as compared to that to medical mask and respirator ❖ Cloth provides modest protection from droplet and airborne illnesses from asymptomatic people by limiting the number of respiratory droplets from them to others, and it may be advised in lowresource settings where community-based transmission has been documented

5. GOWNS AND COVERALLS

Staff should wear gowns in operating rooms where a patient may bleed heavily or in labour suits when a splash of liquor is anticipated. Cotton gowns are favored over water-repellent gowns. Cotton gowns should be worn in the presence of mackintosh or plastic aprons. Gowns should be worn during procedures to protect exposed skin and prevent soiling of clothes. The Coverall is also a type of water-resistant protective equipment that cover or replace personal clothing to protect the worker from chemical, biological, mechanical, thermal, electromagnetic and electrical hazards.

Table 8: *Different types of gowns and coveralls and their indicators for use.*

TYPES OF GOWNS AND COVERALL	INDICATION FOR USE
 1 2 3 **1.** Disposable non- woven gown **2.** Reusable cloth gown **3.** Coverall	❖ Gowns are worn to protect skin and prevent soiling of clothing during activities that are likely to generate splashes or sprays of blood, body fluids, secretions or excretions –note: if the gown is not fluid-resistant, and if splashing or spraying is anticipated, a waterproof apron should be worn over the gown ❖ Remove the soiled gown as soon as possible and perform hand hygiene ❖ Coveralls are disposable Tyvek suits worn to protect against highly contagious diseases as well as blood and bodily fluid exposure.

6. APRONS

Aprons should be worn when handling soiled dressings and used linen from ALL patients, as well as when handling soiled dressings and used linen. Aprons are constructed of plastic and can be reusable (washable plastic) or disposable (polyethylene and plasticized non-woven polypropylene material), both of which are water resistant but can become contaminated after use and spread infections if used between patients.

Table 9: *Different types of gowns and coveralls and their indicators for use.*

TYPES OF APRONS		
		
Disposable Apron	Reusable Apron	Cloth Apron

INDICATION FOR USE

- The apron provides an additional layer of protection to the front of the body against exposure to body fluids or excrement from the patient. There are different types of aprons which should be worn when handling soiled dressings and used linen from all patients.

7. BOOTS AND SHOE COVERS (FOOTWEAR)

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

Note:

- Boots/footwear should be cleaned with soap and water immediately after each use. In case of contamination with blood and body fluids, disinfect using Sodium hypochlorite (0.5% in- use dilution.

Table 10: *Different types of protective foot wear and indication for use*

Type of protective foot wear	INDICATION FOR USE
 Rubber boots	❖ Boots protect the feet and legs from falling or rolling objects, sharp objects, molten metal, hot surfaces, and damp slippery surfaces. Healthcare workers should wear proper footguards to reduce the danger of effected feet. ❖ Shoe cover protects the shoe from any liquid or solid materials and also stops any microbes or debris on the shoe from contaminating an area.
 Shoe covers	

DONNING AND DOFFING OF DIFFERENT PPE ITEMS

1. Principles for using Personal Protective Equipment (PPE)

- Always perform hand hygiene before and after wearing PPE
- PPE should be available where and when indicated; according to risk and in the correct size
- Always put PPE on before contact while handling a patient, patient environment /cleaning /waste management /decontamination procedure

- ❖ Remove PPE immediately after completing the task and/or leaving the patient care area
- ❖ Never reuse disposable PPE
- ❖ Clean and disinfect reusable PPE between each use
- ❖ Change PPE immediately if it becomes soiled/ contaminated or damaged
- ❖ PPE should not be adjusted or touched during patient care
- ❖ Never touch your face while wearing PPE
- ❖ If there is concern and/or breach of these practices; leave the service delivery area when safe to do so and properly remove and change the PPE.
- ❖ Always remove PPEs carefully to avoid self-contamination.

2. Steps in putting on Respirator

Table 11: *Steps in putting on a respirator mask*

	**Step 1.** Place respirator on palm of hand with the nose piece 9 metal band present) at the finder tips.
	**Step 2.** Position the respirator on face ensuring chin is covered and nosepiece is up over the nose and cheek.
	**Step 3.** Pull the strap over the head and position it above the ears and high at the back of the head . Pull the bottom strap and position it below the ears and lower than the top strap.
	**Step 4.** Positive seal Check : Exhale sharply , A positive pressure inside the respirator no leakage. If leakage, adjust position and /or tension straps. Repeat the steps until respirator is sealed properly.
	**Step 5.** Negative seal check: Inhale deeply, if on leakage negative pressure will make respirator cling to your face. Leakage will result in loss of negative pressure in the respirator due to air entering through gaps in the seal

3. Steps taken while donning and doffing off Gloves

Table 12: *Steps for donning and doffing of clean gloves*

	Perform hand hygiene with soap or water or ABHR before wearing gloves
	Take a glove from the box, being careful to pull it out by the cuff's edge.
	Continue to hold the glove by the top edge of the cuff only as you slip your fingers in to it. Do not touch the fingers or other areas of the glove's surface.
	Finish by gently pulling the first glove on, holding it by the top edge of the cuff.
	Take a second glove from the box with your bare hand, being careful to lift it out by the cuff's edge.
	Transfer the glove to your gloved hand by the edge of the cuff. Insert your bare fingers into the glove. To avoid touching the skin of the forearm while pulling the glove on, turn the external surface of the glove to be donned over slightly. Gently finish pulling the second glove up. Hands should not touch your face or other surfaces once they have been gloved. Gloved hands should only be used to care for patients or to undertake another healthcare-related task.
	Pinch one glove at the wrist level to remove it, without touching the skin of the forearm. Peel the glove downward and away from hand, allowing the glove to turn inside out
	Hold the removed glove on the gloved hand. Slide the fingers of the un-gloved hand inside between the glove and the wrist. Remove the second glove by rolling it down the hand and over top of the first glove.
	Discard the removed gloves in an appropriate waste bin
	Perform hand hygiene with soap or water before wearing gloves

4. Steps for donning and doffing gowns

(Go to appendix 7 & 8)

5. Steps for donning and doffing coverall

(Go to appendix 9&10)

4.5: ASEPTIC TECHNIQUE

INTRODUCTION

Aseptic technique is used to safeguard patients during invasive procedures such as IV cannula, Central Venous Catheter (CVC) line, and indwelling urine catheter insertion, blood culture, lumbar puncture, wound dressing, and so on.

- Aseptic method ensures asepsis by identifying and then safeguarding critical parts and key sites utilizing hand hygiene, non-touch approach, new sterilised equipment, and/or cleaning existing essential parts. Contaminated hands and surfaces, as well as the usage of non-sterile products, contaminated lubricants, and solutions, can all introduce break in aseptic into vulnerable regions.
- Healthcare workers should use sterile items and equipment for all aseptic procedures.
- They should use aseptic techniques for insertion and maintenance of all invasive devices and aseptic or clinical procedures for surgical procedures, wound dressing, and similar to prevent infections.

Essential Steps for achieving aseptic technique

- Before beginning the operation, proper hand hygiene must be performed using approved products and techniques.
- The individual carrying out the aseptic technique must be properly trained and competent.
- Sterile products must be used during the treatment.
- Single-use medical equipment, such as syringes, needles, central venous catheters, and indwelling urinary catheters, should never be reused.

- Use sterile gloves during aseptic technique and maintain the aseptic non-touch technique throughout the procedure.
- Apply single-use antiseptic solutions to properly disinfect key sites, (intravenous access sites, open or broken wounds etc).
- If the aseptic break occurs as a result of an emergency or uncontrolled environmental state, this should be documented and included in the handover, and infection risks should be minimised as quickly as possible.

Surgical Asepsis

The objective of surgical asepsis is to prevent Surgical site infections (SSI) during all operating room procedures. This is achieved by using sterile instruments, sutures, dressings, and other materials, wearing sterile gowns and gloves by the operating team, and performing surgery in an adequately ventilated operating theatre to reduce the microbial bio-load of the microorganisms generated by the theatre personnel. It is essential that all sterile operating room personnel utilize only sterile items.

4.6: RESPIRATORY HYGIENE AND COUGH ETIQUETTE

Respiratory hygiene and cough etiquette are infection prevention measures that should be practiced to minimize the risk of transmission of acute respiratory infections through the release of droplets and aerosols that may remain suspended in the air from a potentially infected person.

To reduce transmission, cough etiquette and respiratory hygiene must be implemented at the initial point of contact. It applies to both staff and patients, visitors, and carer givers.

Key practice points

- Ensure your mouth and nose are covered.
- Ensure disposal of used tissues into an appropriate waste bin immediately after use
- Perform hand hygiene after any contact with respiratory secretions
- Focus on a combination of a supportive infrastructure such as well ventilated rooms to ensure cough etiquette, the use of reminders

(e.g., posters), training and education, monitoring and evaluation and a safety culture, to make it more likely that respiratory hygiene will be performed in the right way at the right time.

When and how to perform respiratory hygiene and cough etiquette

When sneezing or coughing:

- Always face away from others.
- It is recommended to cover the nose and mouth with a disposable paper towel (tissue). If disposable tissue is not available cough / sneeze into bent elbow.
- Dispose of the used tissues into an appropriate waste bin, with a cover immediately after use
- Perform hand hygiene immediately after, handling tissues or after touching respiratory secretions, to avoid contaminating other objects and surfaces.

4.7 LINEN MANAGEMENT

Handling of linen should be done appropriately as this protects staff, patients, community members from unnecessary exposures to harmful microorganisms. Staff are at risk of exposure once there is an inappropriate PPE use and inappropriate sorting of linen.

Health workers should:

- Handle soiled linen and waste carefully (with minimal manipulation or agitation) to prevent personal contamination and transfer to other patients.
- Remove heavily soiled material (e.g. faces) from linen, while wearing appropriate PPE, before placing it in the laundry bag
- Linen should be removed when soiled, daily and after each patient use on discharge.
- Store clean linen in a manner that protects it from environmental contaminants

4.8 TRANSPORT

- Dirty linen bags should not exceed the weight of 20 kgs and should be securely tied or otherwise closed to prevent leakage.
- No rinsing or pre-disinfection of soiled linen at the point of generation is required. Soiled linen should be safely transported for laundering using a dedicated, labelled cart or container to avoid any accidents or spills along the way.
- No miscellaneous items (e.g., needles) should be collected with linen. Such items constitute a special hazard to laundry staff.
- Soiled linen should be placed into fluid resistant bags at the point of generation as soon as possible.

4.9 LAUNDERING

- Every healthcare facility should have a dedicated laundry area.
- Once the soiled linen arrives in the laundry, the individuals handling it must wear PPE and clean their hands upon removal of PPE.
- Staff in the laundry are required to wear house hold or heavy-duty gloves, a gown and/or apron and facial protection. Soiled linen should always be handled carefully, never shaking it.
- Carefully remove it from the bag or container onto the sorting table, watching for possible sharp objects or heavily soiled items.
- Sorting of dirty linen should be done separate from clean linen areas with limited traffic. Work surfaces are at or above the waist height. The sorting area needs to be equipped with disposable gloves, sink, soap and towels. The area should contain sharps containers.
- A washing machine is preferred for cleaning used linen over hand laundering. It is always important to follow instructions from the washer/dryer manufacturer.

Otherwise, best practices include:

- Using hot water (70–80°C × 10 min) [158–176°F]) and an approved laundry detergent.
- Disinfectants are generally not needed when soiling is at low levels.

- ❖ Drying linen completely in a commercial dryer.

Considerations for linen management in facilities with limited resources

If laundry services (with hot water) are not available, soiled linens will require manual laundering. Manual laundering steps include:

1. **Immerse in detergent solution and use mechanical action (e.g., scrubbing) to remove soil.**
2. **Disinfect by one of these methods**

- ❖ Immersing the linen in boiling water
- ❖ Immersing the linen in disinfectant solution for the required contact time and rinsing with clean water to remove residue

3. **Allowing it/them to fully dry, ideally in the sun.**

- ❖ Pre-soaking linen is not required, however, ensure any gross soiling of blood or body fluids is removed at the outset to reduce any risk and contamination.
- ❖ When performing manual laundering, be sure to use a large wooden stick or spoon to assist with creating mechanical action to help beat and remove soiling.
- ❖ Consider allowing laundry to dry in the sun as a 'natural disinfectant'.
- ❖ Educate patients and care givers on basic principles for appropriate laundering as often they play a critical role in maintaining a patient's environment and comfort.
- ❖ In settings where water access/quality is an issue, address annual water service plans.

To Note: Also see PPE, waste management and hand hygiene sections for additional considerations.

Additional considerations for linen & laundry management

- ❖ It is strongly recommended that staff in the laundry department are up to date with immunizations, including for hepatitis B.
- ❖ Linen for patients must be washed separately from the cloths and mops used for cleaning.

- Any linens that will be used in the operating theatre, such as surgical drapes and gowns, must go to the reprocessing or sterilization department after proper laundering to be sterilized.
- Mattresses and pillows (if used) should have a waterproof cover/ mackintosh that allows the cleaner to clean and disinfect them between patient uses. If they do not have this, they cannot be properly disinfected: the IPC focal point should therefore promote use of covers.
- If insecticide-treated bed nets are used, follow the manufacturer's instructions to maintain their effectiveness.
- At a minimum, launder and re-impregnate every six months, or sooner if visibly soiled or used for isolation.

4.10: HEALTHCARE WASTE MANAGEMENT

INTRODUCTION

Healthcare facility generates both hazardous and non-hazardous waste. Of the total waste generated 85% is general, non-hazardous waste and the remaining 15% is considered hazardous material that may be Infectious, Chemical or radioactive and pose risk to healthcare workers and others if not managed appropriately. As a result, it is critical to manage healthcare waste properly in order to minimize risks associated with inappropriate handling and disposal of waste. Waste should be segregated into color-coded bins and bin liners at the point of generation and according to waste category, such as general waste, infectious, sharps and pharmaceutical waste. This section highlights guidance for management of infectious waste.

Refer to the National Healthcare Waste Management guidelines for management of radioactive, cytotoxic and chemical waste.

Figure 7: *Estimates of infectious waste produced in a facility per day*

Facility	Infectious health care waster generation rate
Hospital	0.5 kg/bed per day
Clinic	0.07 kg/patient per day
Basic health unit	0.01 kg/patient per day

Source: UNEP 2012a.

Source: *UNEP, Compendium of Technologies for Treatment/Destruction of Healthcare Waste, 2012*

Risks and hazards associated with healthcare waste

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

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

Who is at risk?

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

Key steps in healthcare waste management

The key steps in Healthcare Waste Management are:

- Waste Minimization
- Segregation
- Handling and storage of waste
- Transportation
- Treatment and destruction
- Disposal

Figure 8: *Key steps in HCW management*

1. Minimizing Healthcare Waste

This is the first and best strategy to reduce the quantity and cost of healthcare waste, as well as the environmental impact on air pollution and landfill capacity. Effective waste reduction requires that all material and supply purchases be done with waste reduction in mind. Purchases must be made in accordance with the specifications. The complementary supply should be proportional to one another. One safety box should accompany 100 units of syringes and needles, for example. When purchasing medicines for reconstitution, equivalent diluents should be packed.

2. Segregation of waste

This is the deliberate separation of waste according to type of waste at point of generation. Different types of waste are separated in color-coded bins. Waste should be segregated as soon as it is generated. Health workers, particularly waste handlers, should never sort waste after it has been placed in the bin, as this may result in injury and exposure to blood-borne infections.

A. Why segregate waste

- Minimize the spread of infections;
- Reduces the risk of accidental injuries;
- Reduces the likelihood of environmental pollution;
- Attracts fewer insects, rodents, and animals;
- Aids in the creation of an aesthetically pleasing environment;
- Reduces waste handling costs because only hazardous waste (10-25%) requires special handling; and some waste, such as plastics, can be recycled into other useful products such as buckets, chairs, and clothes.
- If different color-coded bins are not available, color-coded bin liners can be used or a biohazard label may be placed on red bins to indicate their hazardous content.

B. Segregation of healthcare waste by color- code

The general categories of waste will include general (domestic), infectious, sharps waste and other categories that include cytotoxic, pharmaceutical and chemical waste as shown in table below.

Table 13: *Categories of Healthcare Waste*

Waste categories	Descriptions and examples	Method of Disposal
HAZARDOUS HEALTH-CARE WASTE		
Infectious waste	❖ Waste known or suspected to contain pathogens and pose a risk of disease transmission. **These include:** waste and waste water contaminated with blood and other body fluid, laboratory cultures and microbiological stocks, and waste including excreta and other materials that have been in contact with the patient's fluids ❖ This also includes amputations and other body tissues resulting from surgical operations, autopsy (post-mortem), or child delivery **These include;** organs or fluids; body parts; fetuses; and unused blood products.	Incinerate. Ash is scraped into a nearby pit designated for this purpose. Laboratory waste (excluding chemical waste) and soft waste (gauze/gloves) from patient care should be auto-cleared before transporting it to the incinerator
Pharmaceutical waste	Pharmaceuticals that are expired or no longer needed; items contaminated by, or containing, pharmaceuticals. **These include:** bottles/boxes of expired or unwanted medications, vaccine waste	Pharmaceutical waste is collected and taken for incineration. (it should not be incinerated with infectious waste) Contact NMS
Chemical waste	Waste containing purified chemical substances that are toxic, corrosive, flammable, reactive, and/or explosive **These include:** unwanted disinfectants, solvents, film developers, laboratory reagents, and waste with high content of heavy metals, e.g., batteries, broken thermometers and blood pressure gauges.	Disposed of in a separate drainage system connected to a soak pit Encapsulation should be arranged. These should not be burnt and should not contaminate the water table

Waste categories	Descriptions and examples	Method of Disposal
Cytotoxic waste (genotoxic or teratogenic)	Cytotoxic waste containing substances with genotoxic properties **These include:** waste containing cytotoxiccytostatic drugs (often used in cancer therapy); and genotoxic chemicals.	Health units generating the should consult with Uganda Cancer Institute regarding their disposal, but generally cytotoxic waste must be incinerated at 110°C in a facility approved by an environmental protection authority to the destruction of cytotoxic waste
Sharps	These are sharp-edged wastes that can cause cuts or puncture wounds and are hazardous whether or not they are contaminated with blood. **These include:** hypodermic, intravenous or other needles; auto disable syringes; syringes with attached needles; infusion sets; scalpels; pipettes; knives; blades; broken glass	Safety boxes or sharps containers should be incinerated or burnt in a pit. The burnt ashes should be scraped into a nearby designated pit
NON-HAZARDOUS HEALTH-CARE WASTE		
General/ domestic waste	Waste that does not pose any specific biological, chemical, radioactive or physical hazard.	Municipal council skip/dumpster. Final disposal in a designated landfill (community dumping site)

Table 14: *Waste Segregation according to Colour Code*

	Non-hazardous wastes bin **Black** for general wastes like packaging materials, paper, leftover food, plaster of Paris (POP), needle wrappings
	Sharps wastes bin **(white/ yellow)** for infectious wastes sharps such as surgical blades, needles, broken glass.
	Hazardous waste bin **Red** for all infectious waste like blood stained gauze, blood giving sets, pathological and anatomical waste
	Hazardous waste bin **Brown** filled pharmaceutical and cytotoxic waste or heavy metals. Include the effluents.

3. Disposal of Healthcare Waste

Waste should be stored, transported and disposed of safely. All waste in an infectious disease isolation area should be considered infectious and handled as such.

A. **Handling and storage of Waste:** This process involves collecting, weighing and storing waste. Protective clothing that includes aprons, heavy duty long gloves, footwear, goggles/ glasses and masks should be worn by waste handlers when working with healthcare waste. This clothing should be taken off when work with waste is complete. Protective clothing must be cleaned after each use and kept at the facility in a good condition. Health workers MUST NEVER take-home protective clothing. The health worker should always wash hands with soap and running water after removal of glove

B. **Collection of waste:** Taking waste from the service point and transporting them to a storage or disposal area. Bin liners with waste should be gathered in solid containers such as buckets or wheelbarrows. When managing medical waste, waste handlers should wear suitable PPE. In the event of a failure to segregate or spillage, do not gather bin liners by hand.

C. **Weighing:** Weighing waste entails quantifying it by volume or weight, labelling it with the source, and documenting it. Filled

safety boxes should also be recorded. This information can be used to advocate for waste management funding.

D. **Storage:** The placement of waste in a secure location until it can be disposed of is known as storage. The ideal waste storage location should be marked for waste exclusively, secure with no unauthorized entry, and kept clean, dry, and pest-free. Depending on the weather, healthcare waste should not be kept for more than 2-3 days. Organic waste, on the other hand, should be disposed of on a daily basis. Segregation (rather than sorting) must be maintained throughout the waste-handling process, from collection to disposal. The same waste type should be kept together at all times. Sorting, or the deliberate separating of rubbish from waste bins, is prohibited.

E. **Transportation:** The following guidelines should be followed during transportation of HCW to the central storage area:

- The waste collection trolley should be easy to load and unload. The trolley shall not be used for any other purpose. It shall be cleaned regularly and before any maintenance work is performed on it.
- Red bags of hazardous HCW and black bags of non-hazardous HCW shall be collected on separate trolleys that shall be painted and marked with the corresponding color codes. The trolleys shall be washed regularly using a disinfectant and soft brush.
- The collection route shall be the most direct one from the collection point to the central storage.
- The collected waste shall not be left temporarily anywhere along the way to the storage area other than at the designated central storage.
- Containers should be covered with lids during storage and transport. Carts should be used for transporting bags of infectious waste within the facility.

4. Transportation to Final Disposal Site

When the waste is to be moved to the final disposal site, special handling or packaging is necessary to keep bags intact and to ensure containment of the waste. The following procedures should be followed:

- Single-bagged waste and containers of sharps and liquids should be placed within a rigid or semi-rigid container such as a bucket, box, or carton lined with plastic bags.
- Containers should be covered with lids during transportation.
- When transporting plastic bags of infectious waste, care should be taken to prevent tearing the bags.
- Infectious waste should not be compacted before treatment. This process could damage the packaging and disperse the contents, or it could interfere with the effectiveness of treatment.
- Infectious waste should be transported in closed, leak-proof dumpsters or trucks when transported offsite.
- The waste should be placed in rigid or semi-rigid, leak-proof containers before being loaded onto trucks.
- In case off-site transportation is required to treat hazardous HCW at treatment facilities, NEMA through the local Government shall approve the off-site transportation plan before any transportation occurs.
- All yellow and red bags shall be collected and transported at least every second day.
- The transportation shall be properly documented, and all vehicles shall carry a consignment note from the point of collection to the treatment facility.
- Vehicles used for the carriage of yellow or red bags shall be disinfected prior to use for any further use. The vehicles shall be free of sharp edges, easy to load and unload by hand, easy to disinfect /clean, and fully enclosed to prevent any spillage in the HCF premises or on the road during transportation.
- All vehicles shall be cleaned and disinfected after use.
- The vehicles shall carry adequate supply of plastic bags, protective clothing, cleaning tools and disinfectants to clean and disinfect in case of any spillage.
- All staff handling yellow or red bags shall wear protective clothing.
- Staff shall be properly trained in the handling, loading and unloading, transportation and disposal of the yellow and red bags.
- Staff shall be fully aware of emergency procedures for dealing with accidents and spillage.

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

A. **On site Transport:** This is moving waste from point of waste generation to another point within the healthcare facility. Waste should be moved in a designated trolley or wheel barrow.

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

1. Drivers of vehicles carrying hazardous health-care waste should have appropriate training about risks and handling of hazardous waste.
2. Training on the following issues should be included:

   - relevant legal regulations
   - waste classifications and risks
   - safe handling of hazardous waste
   - labelling and documentation
   - emergency and spillage procedures.

3. In addition, drivers should be declared medically fit to drive vehicles.
4. In case of accident, contact numbers or details of the emergency services and other essential departments should be carried in the driver's cab. For safety reasons, vaccination against tetanus and hepatitis A and B is recommended, and vaccination and training details of staff should be recorded.

VEHICLE REQUIREMENTS

- A fundamental requirement is for the vehicles transporting hazardous waste to be roadworthy and labelled to indicate its load, and its

payload to be secured to minimize the risk of accidents and spillages

- Any vehicle used to transport health-care waste should fulfil several design criteria:

    1. The body of the vehicle should be of a suitable size commensurate with the design of the vehicle.
    2. There should be a bulkhead between the driver's cabin and the vehicle body, which is designed to retain the load
    3. If the vehicle is involved in a collision, there should be a suitable system for securing the load during transport.
    4. Empty plastic bags, with 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.

- The internal finish of the vehicle should allow it to be steam-cleaned and internal angles should be rounded to eliminate sharp edges to permit more thorough cleaning and prevent damage to waste containers.
- The vehicle should be marked with the name and address of the waste carrier.
- An international hazard sign should be displayed on the vehicle and containers, as well as an emergency telephone number.
- The driver should be provided with details of the waste being carried.
- Vehicles or containers used for transporting health-care waste should not be used for transporting any other material.
- Vehicles should be kept locked at all times, except when loading and unloading, and kept properly maintained.
- Articulated or demountable trailers (temperature-controlled if required) are particularly suitable, because they can easily be left at the site of waste production. Other systems may be used, such as specially designed large, closed containers or skips. Open-topped skips or containers are unsuitable because they fail to isolate waste from the general public during transportation, and should not be used for health-care waste.
- Where the use of a dedicated vehicle cannot be justified, a bulk container that can be lifted onto a vehicle chassis may be considered.

The container may be used for storage at the health-care facility and replaced with an empty one when collected. Refrigerated containers could be used if the storage time exceeds the recommended limits described previously, or if transportation times are long. The same safety measures should apply to the collection of hazardous health-care waste from scattered small sources, such as clinics and general practice surgeries.

CLEANING OF CONTAINER AND VEHICLE:

- Vehicles and transporting containers used for the transportation of waste should be cleaned and disinfected daily after use.
- Mechanical cleaning, combined with soaps and detergents, which act as solubility promoting agents, can be used.
- Cleaning and disinfection have to be carried out in a standardized manner or by automated means that will guarantee an adequate level of cleanliness.
- A standard operating procedure for cleaning should be prepared and explained to cleaning staff. In addition, a schedule for preventive maintenance should be set up for all equipment and vehicles used in the transportation process.

TRANSPORT DOCUMENTATION:

- Before sending hazardous health-care wastes offsite, transport documentation (commonly called a "consignment note" or "waste tracking note") should be prepared and carried by the driver.
- A consignment note should be designed to consider the control system for waste transportation in operation within a country.
- If a waste regulatory authority is sufficiently well established, it may be possible to pre-notify the agency about a planned offsite transport and disposal of hazardous health-care waste and to obtain the agency's approval.
- Anyone involved in the production, handling or disposal of health-care waste should recognize that they have a general "duty of care"– that is, an obligation to ensure that waste handling, treatment and disposal and the associated documentation comply with the national regulations.

The consignment notes for a vehicle carrying a hazardous health-care waste load should include the following information in case of accidents or official inspection:

- waste type and weight
- waste sources
- pick-up date
- destination
- driver name
- number of containers or volume
- receipt of load received from responsible person at pick-up areas.
- This information allows quick and effective countermeasures to be taken in the event of an accident or incident.
- Weight of waste is useful for commercial treatment and disposal operators who bill healthcare facilities for their waste services.
- On completion of a journey, the transporter should complete a consignment note and return it to the waste producer

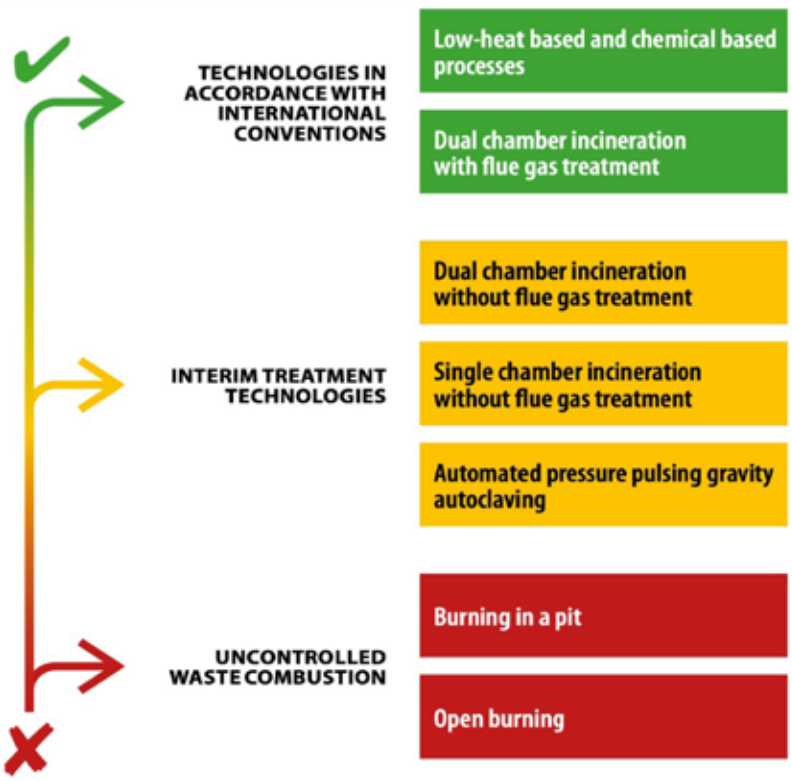
5. TREATMENT AND DISPOSAL

The waste treatment or disposal technique chosen must be among the currently available technologies and must have the following characteristics:

- National & international regulations
- Available budget (initial investment and ongoing maintenance)
- Infrastructure (space)
- Available energy (electricity, water, fuel etc.)
- Type & quantity of waste generated
- Available final disposal options (recycling, landfill, incineration)
- Reduces the immediate public health hazards connected with HCWM while having the least environmental impact.

Low-heat and chemical-based procedures, as well as dual chamber incineration with flue gas treatment, are technologies that adhere to international conventions. Dual chamber incineration with flue gas treatment, single chamber incineration without flue gas treatment, and automated pressure pulsing gravity autoclaving are interim treatment technologies.

Figure 9: *Hierarchy of waste treatment options*



RECOMMENDED TREATMENT AND DISPOSAL METHODS FOR HEALTHCARE WASTES.

In the Ugandan context, there are several commercially available health-care wastes-treatment systems to choose from. The selection of a technology depends on factors such as the characteristics of the waste produced by the healthcare facility, the level of care, the capabilities and

requirements of the technology, environmental and safety considerations, as well as cost.

Treatment technologies utilize different methods, including thermal, chemical, irradiative, biological, or mechanical processes. Below are treatment technologies approved for use:

6. THERMAL TECHNOLOGIES:

This method in healthcare waste management employs high temperatures, to effectively neutralize pathogens in medical waste, making them vital for ensuring the safe disposal of infectious or hazardous materials. These technologies reduce waste volume and guarantee its non-infectious, safe disposal. When integrated with other waste management practices like segregation, packaging, and proper disposal, they uphold the safety of healthcare workers and the public.

These methods include;

- Incineration, which burns waste at extreme temperatures
- Autoclaving
- Microwave disinfection for select items,
- Thermal inactivation,
- Infrared radiation treatment for targeted disinfection.

Incinerators: Incinerators, which vary in size from small batch units to larger treatment plants, are used for waste treatment. It's important for incinerators to have flue gas cleaning systems to minimize pollutant emissions and meet national or international emission standards. Smallscale incineration may be used as a transitional means of waste disposal for healthcare waste. However, it's essential for healthcare facilities to prioritize incinerators that do not produce dioxins or furans when investing in new technologies.

Primary measures for high heat thermal incinerators include two burning chambers (850 °C / 1100 °C) and operated by trained personnel at all times. This method can be used for all types of infectious waste and sharps.

Do not incinerate the following items;

- Pressurized gas containers
- Sealed ampoules or vials (explode in the chamber)
- Chemical waste (e.g., reactive chemicals, aldehydes)
- Halogenated materials (e.g., PVC plastics)
- Waste containing mercury, cadmium and other heavy metals
- Radioactive waste.

Autoclaves: Autoclaves are integral to healthcare waste management process and operate with an impressive precision when it comes to temperature.

These specialized devices use steam, heat, and pressure to eradicate pathogens from medical waste, ensuring its safe disposal at temperatures between 121°C to 134°C, coupled with pressures reaching 15 to 30 pounds per square inch (psi).

Renders waste non-hazardous, some may be recycled and has no hazardous emissions or ash. Can only be used for infectious / sharp waste including contaminated materials, ranging from surgical instruments to laboratory equipment.

Typical size ranges from 35-200 liters' treatment capacity and needs continuous water and power supply.

2. **Chemical Treatment Technologies:** Refer to a set of methods and processes used to treat various substances or materials, including wastewater, industrial chemicals, and contaminants in order to alter, remove, or mitigate their chemical properties or composition. These technologies typically involve the use of specific chemicals or chemical reactions to achieve the desired results. Chemical treatment technologies are employed in various fields, including environmental remediation, water and wastewater treatment, and industrial processes, to address issues such as pollution control, water purification, and chemical waste management. The choice of chemicals and treatment processes depends on the specific goals and requirements of the application, with the aim of improving the quality and safety of the treated materials or the environment.

3. Others

These include; safe burying and placenta pit of anatomical waste and municipal landfills for domestic waste.

Land fills

To enhance the disposal of waste in landfills, healthcare facilities need to collaborate with municipal authorities and other stakeholders.

Desirable features of a landfill include:

- **Restricted Access:** Landfills should have restricted access to prevent scavenging and unauthorized entry.
- **Daily Soil Cover:** Daily soil cover should be applied to prevent odors, and regular compaction of waste is necessary.
- **Organized Deposit of Wastes:** Waste should be deposited in small, organized work areas within the landfill.
- **Isolation of Waste:** Measures should be taken to prevent contamination of groundwater and the surrounding environment.
- **Trained Staff:** The landfill should employ trained staff to manage waste disposal effectively and safely.
- In cases where sanitary or engineered landfills are not available, healthcare facilities should explore various options to minimize the transmission of infections and reduce adverse environmental impacts associated with hazardous healthcare waste.

These treatment technologies can be supplemented with post-treatment equipment such as shredders, grinders, and compactors. For most technologies, except incinerators, validation testing is necessary to ensure that a minimum level of disinfection is achieved.

To note: Healthcare facilities should also allocate an annual budget for waste management supplies and periodic maintenance and repair of these waste management technologies.

Table 15: *Recommended treatment and disposal methods for healthcare waste.*

Types of infectious waste	Steam sterilization	Incinerator	Burning and low-temp incineration	Chemical disinfection	Location of treatment
Cultures and stocks of infectious agents and associated biologicals	X	X	X	X	one site
Human blood and its products	X	X		X	Onsite
Pathological Waste	X	X			Onsite
Contaminated Sharps	X	X	X		Onsite
Carcasses and parts	X	X			Onsite
Bedding		X	X		Onsite
Isolation wastes	X	X			on site

4.11: SAFE INJECTION AND SHARPS SAFETY

INTRODUCTION

A sharp is defined as any object that can puncture or pierce the skin, allowing the hazard to contaminate the recipient with body fluids contained in or on the sharp in question.

Sharps include hypodermic needles, stitching needles, cutters, glass slides, intravenous lines, and any other device utilised for an invasive treatment on another person. This includes any harm caused by shattered or sharp-edged equipment that contained bodily fluids, such as glass bottles, drain bottles, and tubing.

PRINCIPLES OF HANDLING AND DISPOSAL OF SHARPS

- Sharps should be handled and disposed of properly to avoid potential harm and disease transmission via the contaminated sharp object.
- Sharps should be handled with utmost caution in order to avoid injuries during usage, disposal, or reprocessing. All sharps should be disposable whenever possible. • Always use "hands-free" technique for passing sharp surgical instruments
- Always use a fresh needle and syringe from a sterile sealed pack.
- Following use, the needle and syringe are left attached and discarded in a sharp's receptacle.
- Needles MUST NOT be resheathed, purposefully twisted or broken by hand, withdrawn from disposable syringes, or otherwise manipulated by hand.
- Sharps, needles, and syringes must be disposed of promptly after use into the specified puncture proof container, which is suited for burning.
- Use the one needle one patient policy.
- If the item is huge or cumbersome, a large "sharps container" should be used. All clinical areas where such items are utilised should have an extra size "sharps container" as normal stock.
- Sharps, such as needles and syringes, should be carried in an appropriate dish. They should NEVER be carried or passed from hand to hand.
- Used central venous pressure lines, cannulas, and other sharps must also be stored promptly in a rigid sharp's container.
- All sharps containers/safety boxes should be disposed of when ¾ full to avoid any risk of injury by inoculation, when disposing of further needles, sharps and syringes.
- All containers/boxes should be carefully labelled with the date, time of sealing, and location and placed in the appropriate location for collection prior to transit to the incinerator.
- All work locations should have sufficient quantity of "sharps containers/ safety boxes" To avoid sharps injuries, all "sharps containers/safety boxes" should be transported away from the body.

- When practical, dispose of the full sharps' container along with the sharps:
- Sharps should be burned by incineration or burried where incinerators are not available.

The "Hands-Free" Technique for Passing Surgical Instruments

The "hands-free" technique is recommended for passing sharp instruments (scalpels, suture needles, and sharp scissors) during surgery. This sharps disposal method is low-cost and easy to use, and it assures that the surgeon, assistant, or scrub nurse never handles the same tool at the same time. Aside from the instruments described above, instruments passed using the handsfree technique include anything sharp enough to penetrate a glove (e.g., trocars, sharp-tipped mosquito forceps, and loaded needle holders).

- Using the hands-free technique, the assistant or scrub nurse sets a sterile or highly disinfected kidney basin, or other suitable small container, between herself/himself and the surgeon on the operation field.
- Sharps are stored in the container designated as the Safe or Neutral Zone and should be labelled.

For safe injections and sharps injury prevention.

Health workers should:

- Prepare injections in a clean environment with low risk of contamination from blood, body fluids, splashes, or sprays.
- Perform hand hygiene before preparing the drug and handling the patient
- Use a sterile, safety-engineered syringe; use a sterile medication vial and diluent; always use a sterile syringe and needle to withdraw and reconstitute medications, and never leave a needle in a vial's septum.
- Avoid using multi-dose vials or, if used, dedicate the vial to single-patient use.

- Label the multi-dose vial with the date opened and destroy it according to the manufacturer's instructions when sterility is compromised or after 28 days.
- Prior to the procedure, wipe the patient's skin with soap and water or disinfect with 60-70% alcohol.
- Provide a puncture-resistant sharps container for sharps disposal at the point of care
- Do not re-cap, bend, break, manipulate, or physically remove the needle from the syringe
- Discard the sharps container when it is three-quarters full, seal it, and store it in a safe place.

4.12: DECONTAMINATION OF MEDICAL DEVICES

INTRODUCTION

A Medical device refers to any instrument, apparatus, appliance, material or other article, whether 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. A major concern of utilizing medical devices is the introduction of disease-causing bacteria, which can lead to infection. Decontamination of medical devices plays a very important role in the prevention of healthcare-associated infections (HAIs).

Decontamination is the process of removing soil and pathogenic microorganisms from objects, such as medical devices, so they are safe to handle. This process includes three steps which are;

1. **Cleaning:** The physical removal of body materials, dust or foreign material. Cleaning will reduce the number of microorganisms as well as the soil, therefore allowing better contact with the surface being disinfected or sterilized and reducing the risk of soil being fixed to the surface.

Removal of soil will reduce also the risk of inactivation of a chemical disinfectant and the multiplication of microorganisms.

The removal of contamination from an item for further processing or for intended use.

Cleaning is the first and most essential step before any process of disinfection or sterilization can be carried out.

2. **Disinfection;** The destruction or removal of microorganisms at a level that is not harmful to health and safe to handle. This process does not necessarily include the destruction of bacterial spores, prions or some viruses.

3. **Sterilisation:** The complete destruction or removal of microorganisms, including bacterial spores.

ASSESSING RISK OF MEDICAL DEVICES

To assess the risk of reusing a medical device, consider the following four factors:

1. The type of item or device: critical, semi-critical or non-critical.
2. Type of microorganism: bacteria, spores, viruses or prions.
3. Presence of microorganisms in number (bio-load) and availability to cause infection.
4. Patient susceptibility (whether the type of procedure is invasive or non-invasive).

The Spaulding classification system developed in the 1950s helps healthcare workers to decide which method of decontamination was appropriate for different types of reusable devices, based on the potential risk of infection posed to a patient and disinfect entry point prior to drawing subsequent dose.

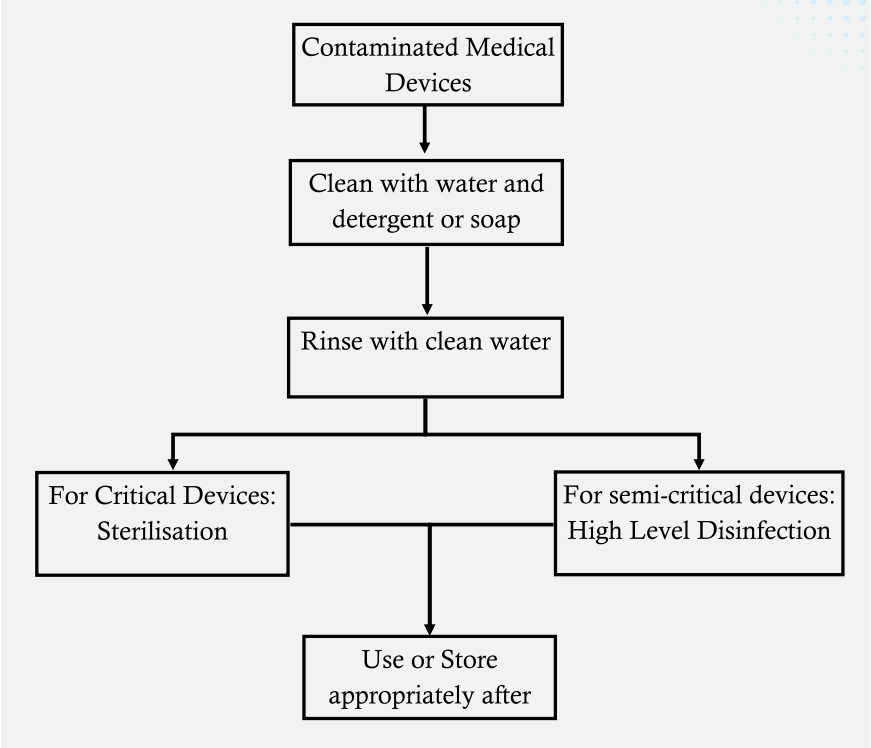
Spaulding divided medical devices into three risk categories:

- High risk (critical)
- Intermediate risk (semi-critical)
- Low risk (non-critical).

Table 16: *Spaulding Classification of Contaminated Medical Devices*

Risk category	Recommended level of decontamination	Examples of medical device
High (critical) Items that are involved with a break in the skin or mucous membrane or entering body cavity.	Sterilization	Surgical instruments, implants/prostheses, and devices, urinary catheters, cardiac catheters, needles and syringes, dressings, sutures, delivery sets, dental instruments, rigid bronchoscopes, cystoscopes.
Intermediate (Semi-Critical) Items in contact with mucous membranes or body fluids.	Disinfection (high – level)	Respiratory therapy and anesthetic equipment, flexible endoscopes, vaginal specula, non-invasive flexible endoscopes, bedpans, reusable bedpans and urinals, urine.
Low (non – critical) Items in contact with intact skin	Cleaning (visibly Clean)	Blood pressure cuffs, stethoscopes, electrocardiogram leads, occupational therapy tables and environmental surfaces.

Figure 10: *Steps of decontamination and disinfection of medical devices*



THE CLEANING PROCESSES

- The cleaning process for critical and semi critical medical devices should begin as soon as possible after use.
- Gross debris should be removed by wiping or irrigation as indicated by the instrument manufacturer's instructions for use.
- Removal of gross contamination prevents the drying of blood and tissue, reduces the bioburden and nutrient material on medical instruments, and reduces the possibility of spillage or aerosolizing of contaminants into the environment.
- Instruments opened but unused during a procedure should also be considered contaminated and reprocessed accordingly.
- Instruments should be kept moist after the initial removal of gross

contamination and prior to transport for additional cleaning, disinfection, and sterilization. This can be accomplished by using special containers, a pre-treatment product, or towels moistened with water (but not saline).

Recommended types of cleaning

Mechanical or automatic cleaning using cleaners like ultrasonic cleaners, washerdecontaminators, washer-disinfectors, and washer-sterilizers or **Manual cleaning** using appropriate techniques and PPE.

Manual cleaning

A. Ensure staff safety and protection and PPE goes a long way towards protecting healthcare workers from splashes and sprays when handling dirty medical devices. It is essential to protect the healthcare worker with:

- ❖ gloves (long domestic-style rubber gloves);
- ❖ aprons (plastic/waterproof);
- ❖ visors (eye covering); and
- ❖ closed-toe shoes or boots.

B. Main component is the use of friction with water and with neutral or near-neutral pH detergent solutions.

C. Equipment needed for cleaning

- ❖ disposable cloths
- ❖ brushes must have soft nylon bristles that will not damage the surface of the medical device; There should be at least two brushes available: one flat and one bottle brush.

D. Flushing devices like pressurized spray guns and use of big syringes.

E. Be sure that you have access to all surfaces on the device.

F. Hinged devices must be opened so that all surfaces are in contact with the detergent.

G. You should take apart more complex devices.

H. Clean lumens with a brush.

I. After thorough cleaning with an enzymatic detergent (to break down and help dislodge debris), the instruments should be rinsed with water.

Mechanical action: Mechanical action is essential to cleaning. This is best accomplished by using soft nylon brushes, which do not damage equipment surfaces. Use wiping, flushing, brushing and spraying actions.

NB: *You do not need to soak devices in a hypochlorite or any other disinfectant solution as part of the cleaning process; this is common practice but is not recommended*

Detergents

- Whenever possible, use an enzymatic detergent recommended by the instrument manufacturer.
- When this is not possible or practical, use a locally available detergent intended for washing items by hand.
- Take care that the detergent is fully dissolved before use and thoroughly removed from the instrument by rinsing afterwards.
- Detergent solutions should not stay in use for more than one day.
- Containers used for making up and using detergents should be rinsed after use and dried.
- Domestic-grade detergents, such as those you would use at home, are not recommended for healthcare instruments.
- This is to prevent corrosion of instruments.
- The proper detergents are based on pH and inhibit corrosion.
- Water hardness will determine the type and quantity of detergent used under manufacturer guidelines,
- be sure to use the correct amount.
- When only domestic-grade detergent is available, check during each cleaning for any signs of corrosion.
- To prepare the correct strength of detergent, use this formula

Volume of detergent required (ml) = (concentration required x capacity of the sink or bow/(ml)
Concentration supplied

Use of the Immersion Method while Cleaning

The following steps outline the immersion method for cleaning medical devices.

Step 1: Fill a sink or appropriate basin with enough warm water (27 °C to 44 °C or 80 °F to 110 °F) and detergent for complete immersion of the device.

Step 2: Fully immerse the opened or disassembled medical device.

Step 3: Keep the device below water level and scrub with a soft nylon brush. Thorough cleaning is crucial, especially with medical devices that have hollow lumens.

Step 4: Inspect the device frequently to ensure all surfaces are clean.

Step 5: In another sink or basin, completely immerse the device in clean, purified water and rinse thoroughly.

Step 6: **Mechanically dry;** if this is not available, or not recommended by the manufacturer, air-dry or hand-dry using a disposable clean, non-linting cloth.

CLEANING OF LUMEN DEVICES

- Soft brushes are needed when cleaning lumens to prevent damage to the instrument.
- You will need a brush that is long enough to pass through and exit the other side.
- If the brush is not long enough, the lumen should be rinsed thoroughly several times during cleaning.
- Make sure all lumen devices are well cleaned with a bottle brush and then flush through under pressure with either water or air.
- Be sure to wear appropriate PPE to protect against the risk of splashes (which create aerosols) during manual cleaning and flushing of a medical device.

Table 17: *Do's and Don'ts when cleaning medical devices*

DO'S	DONT'S
1. Wear appropriate PPE to protect against the risk of splashes (which create aerosols) during manual cleaning and flushing of a medical device; 2. ensure detergent is prepared at the correct concentration and temperature (see above), and is used for the recommended contact time; 3. keep soiled instruments moist, and clean as soon as possible after the procedure; 4. take apart instruments before cleaning; 5. open hinged/jointed instruments to ensure access to all surfaces; 6. use appropriately sized brushes to clean lumen devices; 7. use soft-bristle brushes to clean serrations and box locks; 8. inspect instruments after cleaning; magnifying glasses can be used for close inspection of clean instruments under the surface of the water to reduce the risk of aerosol production; 9. follow manufacturer instructions for the cleaning of all medical devices.	1. use water over 45 °C, as it coagulates protein, making devices difficult to clean; 2. use a hard or abrasive item; scrub under a running tap, because this produces aerosols

SOPS AND RECORD KEEPING

- ❖ It is important to develop standard operating procedures (SOPs) for the CSSD or decontamination unit and review them regularly.
- ❖ The SOPs must have a date of implementation and an expected review date.

- In addition to SOPs, the decontamination unit should also have:
- records of staff training (both induction and regular updates);
- a logbook for each occurrence of equipment testing and maintenance;
- a record of system failures and remedial action;
- records of stock control; and
- schemes for identifying the location of items (e.g., in storage, sterile service department/ decontamination unit).
- If there is a failure in the decontamination process, having these records will make it easy for you to track and trace equipment and recall patients for follow-up.

INSPECTION, ASSEMBLY & PACKAGING

In the decontamination unit, there should be an area for inspection, assembly and packaging. This area is used for inspecting and function-testing cleaned medical devices before reassembly and packaging for sterilization, and for maintaining quality/traceability records.

Figure 11: *Process of the decontamination cycle*

1. Inspection

- Before assembly, it is important to inspect all devices to ensure that all of them are present, visibly clean and functioning correctly.
- Be sure to inspect the integrity of the instrument or equipment for any issue that may hinder the medical device from functioning properly and/or undergoing decontamination.
- For this process, you will need: the original packaging checklist – to verify the presence of all devices in a tray;
- good lighting – to aid inspection;
- magnification – to aid inspection; and
- SOPs – for reference to ensure that the procedure is followed correctly.

2. Assembly

During assembly, you should make sure that all parts are present and correctly reassembled (when necessary).

3. Packaging

- The purpose of packaging medical devices is to:
- allow penetration of the sterilizing agent (e.g., steam, gas),
- maintain the sterility of the contents of the pack from the sterilization process,
- and allow removal of the contents using aseptic techniques.
- The wrapping should be strong, allow penetration of steam without becoming saturated, and not lint or shed onto the device.
- The wrapping must be double.
- Newspaper and brown paper cannot be used
- There are advantages and disadvantages to using cotton materials in packaging.
- The advantages are that cotton materials can be used as an inner wrapper or outer dust cover, and that it is strong, easy to work with and can be reused.
- The disadvantages are that it does not provide an adequate microbial barrier, and it can release particles and/or lint. The lint from cotton wraps can be introduced into wounds and cause infection or foreign body reaction in the patient.

DISINFECTION

- It is performed to make items and surfaces free of most organisms and safe to handle and use. This can be accomplished using either heat or chemicals. Prior to disinfection, all objects and surfaces contaminated with blood or other bodily fluids must be cleansed with soap and water. Disinfectants must be used for the intended purpose, in the proper concentration, and for the specified amount of time, according to the manufacturer's recommendations. Disinfectants should be kept in their stock concentration and only used when newly diluted.

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

CHOICE OF DISINFECTANT

The choice of disinfectant will depend on the following:

1. Patient susceptibility to infection

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

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

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

3. Nature of contamination/microorganisms suspected.

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

4. Time available for processing

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

5. Risks to processing staff

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

6. **Cost of processing**
7. **Availability of processing equipment**

Table 18: *Different classification of methods of disinfection recommended*

Classification	Definition	Level of Microbial Action	Method of Decontamination	Examples of Common Items
Critical Items	High risk for infection if contaminated	Requires sterilization	Steam, Alcohol, hydrogen peroxide, chemical sterilant	Surgical instruments, catheters, implants, ultrasound probes
Semi critical Items	Contact mucous membranes or nonintact skin	Requires high-level disinfection	Glutaraldehyde, hydrogen peroxide, orthophthalal dehyde, peracetic acid	Respiratory therapy equipment, endoscopes, catheters
Noncritical Items	Contact intact skin, low risk for infection	Requires low-level disinfection	Phenolic, iodophor, alcohol, chlorine	Bedpans, blood pressure cuffs, computers, patient furniture, floors

STERILIZATION

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

1. Sterilization by Autoclaving

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

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

2. Sterilization by Dry Heat Oven

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

- After cooling, remove containers and store

3. 3. Chemical Sterilization

- Prepare fresh solution of chemical sterilant as prescribed by the manufacturer.
- Submerge cleaned and dried items for at least 10 hours in 2-4% glutaraldehyde solution or at least 24 hours in 8% formaldehyde solution, completely covering all items. Always check manufacturer's instructions for recommended contact time and dilution instructions for sterilisation of different devices.
- Cover container and soak for appropriate time (8-10 hours for glutaraldehyde or at least 24 hours for formaldehyde)
- Remove items from the chemical solution using sterile forceps/ pickups
- Rinse items thoroughly with sterile water to remove all traces of chemical sterilant
- Use the item immediately or place it in a sterile, covered container

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

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

5. Sterile Instruments

- Wrapped sterilized packs should be stored in a dust and pest free environment (Storage in a closed cabinet is preferred)

- Wrapped sterilized packs of instruments, or instruments in a sterile container with a tightfitting lid, can be stored for

    1. up to one week on an open shelf
    2. up to one month if placed in a plastic dust cover or in a sealed plastic bag

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

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

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

CENTRAL STERILE SERVICES DEPARTMENT (CSSD)

The CSSD serves as a specialized unit dedicated to the decontamination, sterilization, and distribution of medical instruments and equipment, ensuring their safe and infection-free utilization.

POINT-OF-USE PREPARATION OF INSTRUMENTS AND OTHER DEVICES

For effective re-processing of instruments, used devices must be prepared at the point of use to ensure safe transportation and minimal risk to Central Sterile Supply Department (CSSD) staff. Pre-cleaning prevents soil from drying on devices and makes them easier to clean. Where resources permit, pre-cleaning should be done.

Immediately after use, medical devices shall be cleaned by following the guidelines listed below:

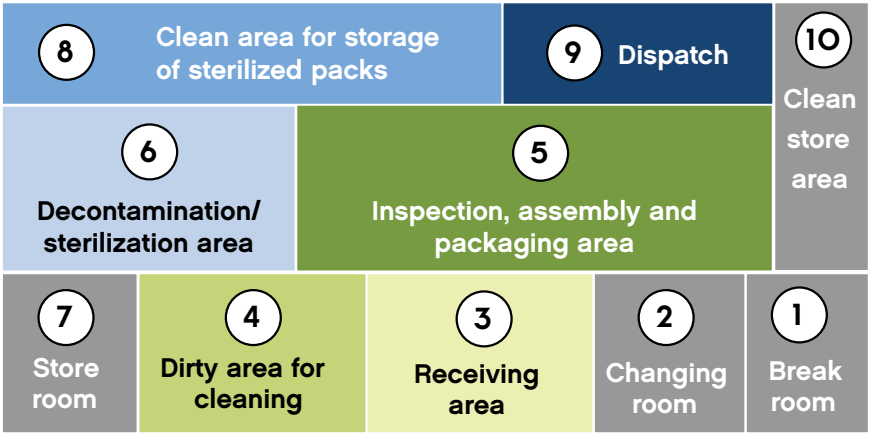
1. Wear appropriate PPE (Apron, utility/elbow gloves, face protection).
2. Separate contaminated devices and instruments from linen and disposable items and dispose of these items appropriately. Be sure to safely segregate sharps and dispose directly into sharps containers.
3. Remove gross soil from instruments by wiping with a damp, clean cloth.

4. Open soiled instruments and keep them moist by covering with a towel moistened with water.
5. Place in a dedicated, fully enclosed, leak-proof, and puncture-proof container prior to transporting for reprocessing.

Note:

1. Avoid prolonged soaking of devices
2. Do not use saline as it can damage medical equipment
3. Do not transport containers filled with water or other solutions as this can pose an occupational hazard

Figure 12: *The layout of medical devices through the CSSD unit*



Lay out of the CCSD

1. Break room for CSSD staff.
2. Changing room to put on PPE before entering specific work areas.
3. Receiving area of used instruments and medical devices that are to be cleaned.
4. Dirty area for cleaning used instruments and medical devices.
5. Inspection, assembly and packaging area for instruments and medical devices.

6. Decontamination/sterilization area where instruments are loaded for sterilization and unloaded after the sterilization cycle is completed.
7. Clean Store room for material used in CSSD.
8. Clean storage area where sterilized items are stored.
9. Dispatch area where items are dispatched to the wards/units and clinical areas.
10. Clean area for storage of linen, personal protective equipment (PPE) and other materials used in the CSSD.

The concept of flow of medical devices from dirty to clean must be maintained, even if only one room is available. Clear delineation between clean and dirty is required to avoid recontamination after decontamination of reusable medical devices. Changes can be made to improve overall flow, but when building or renovating a new CSSD, it is important to reference and use national/ international recommendations.

Medical Device processing at CSSD

The delivery of sterile materials in patient care is dependent on a number of elements, including sterilisation process effectiveness, unit design, decontamination, device disassembly, packing, sterilizer loading, monitoring, sterilant quality, and cycle appropriateness.

- To maintain quality control, healthcare workers should primarily execute cleaning, disinfection, and sterilisation in a central processing department, with the goal of systematically reprocessing medical devices to protect patients from infections, reduce staff dangers, and retain item value.
- All healthcare facilities must maintain consistent efficiency and safety requirements. This necessitates a comprehensive programme to assure operator competency, correct cleaning and instrument wrapping, sterilizer operation, and process monitoring, all while maintaining consistent infection prevention standards across all patient-care settings.

Verification of the Sterilization Cycle.

Sterilization methods in healthcare require rigorous verification using biological and chemical indicators before routine use to ensure their reliability. This involves testing various sterilizers during installation, relocation, redesign, major repairs, and after failures.

- Pre-vacuum steam sterilizers undergo three consecutive empty cycles, with each cycle type tested separately.
- The sterilizer is reintroduced for routine use when all biological indicators are negative, and chemical indicators show a correct end-point response.
- Ongoing quality assurance involves using these indicators to assess actual sterilized products, particularly after significant changes in packaging or load configuration.
- Products processed in three evaluation cycles are isolated until they produce negative test results. This process safeguards the safety and effectiveness of sterilization methods.

Layout of Central sterile service department (CSSD)

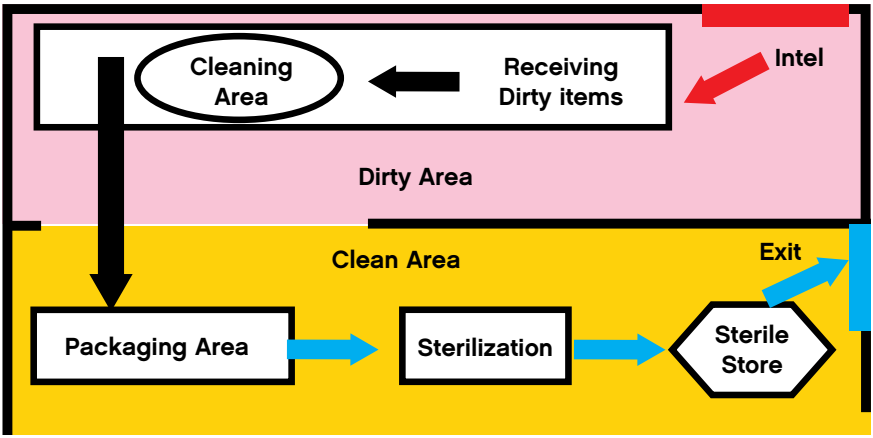
The multidisciplinary team in charge of healthcare facility infrastructure should carefully plan the layout of the central processing department. Taking into consideration the facility, department flow, cleaning consideration of machinery that withstands heat.

- Ministry of Health recommends health center IV, General and specialized hospitals RRHs (public, PNFP, PFPs) to have a functional CSSD.
- The CSSD in healthcare should ideally be divided into three distinct sections: disinfection, packaging, and sterilization, as well as storage. These sections should be physically isolated to prevent contamination from spreading to clean areas. In the decontamination section, reusable contaminated supplies and potentially reused disposable goods are received, sorted, and decontaminated.
- Adequate airflow patterns are recommended to isolate contaminants in the decontamination area negative pressure and no fewer than six air exchanges per hour in the decontamination area (MoHID 10 air changes per hour) and 10 air changes per hour with positive pressure

in the sterilizer equipment room, with specified air exchange rates defined, availability of adequate hand hygiene facilities, the doors and windows are kept closed in the reprocessing rooms in order to minimize dust contamination and to eliminate flies.

- The packing area is dedicated to examining, assembling, and packaging clean, but not sterile, products.
- The sterile storage facility should have restricted access, controlled temperature (may be as high as 75°F) and relative humidity (30-60% in all works areas except sterile storage, where the relative humidity should not exceed 70%) with limited access in this area, and severe material construction criteria. This ensures a safe and effective workflow in healthcare sterilization processes.

Figure 13: Ideal movement of processing instruments in a CSSD



Please see figure below illustrating ideal movement process in CSSD.

PACKING

After surgical instruments have been cleaned, dried, and inspected, those that require sterilization must be wrapped or stored in rigid containers according to CSSD recommendations.

- These suggestions emphasize specific processes, such as opening hinged instruments, disassembling things with removable parts unless contrary instructions or test results are provided, and sticking to device manufacturer instructions for complex instruments.

- Devices with concave surfaces should be placed to allow water drainage, and heavier things should be arranged to avoid damaging delicate ones. The weight of the instrument set should be determined by the instrument design and density.
- Sterility can be maintained using a variety of ways such as rigid containers, peel-open pouches, roll stock or reels, and sterilization wraps.
- These packing materials must allow sterilant penetration, prevent contact contamination, constitute an efficient microbiological barrier, and maintain sterility after sterilization.
- The perfect sterilization wrap should include a variety of aspects such as barrier efficiency, penetrability, aeration, convenience of usage, flexibility, puncture resistance, and more.
- Packaging materials that are unsuitable for ETO or hydrogen peroxide gas plasma should be avoided. Double wrapping in central processing can be done sequentially or non-sequentially, with the latter being more time efficient.
- Personnel should be able to easily obtain and follow written and illustrated procedures for packing things during packaging procedures.

When arranging items for sterilization, make sure that all surfaces are directly exposed to the sterilizing agent, allowing for unrestricted circulation of steam or another sterilant around each item.

STORAGE

Medical and surgical devices must be handled aseptically after sterilization to avoid contamination.

- Sterile supplies should be kept at precise distances from the floor, ceiling, and outside walls to provide for appropriate air circulation, ease of cleaning, and compliance with local fire rules, especially around sprinkler heads.
- Wet sterile objects are deemed contaminated due to the entrance of germs from the air and surfaces, hence they should not be stored in regions prone to dampness, such as under sinks. · Open shelves can be used in place of closed or covered cabinets for storage.

- Any product that falls or is dumped on the floor should be inspected for packaging and contents damage, particularly if the items are breakable.
- If the package is heat-sealed in impervious plastic and the seal is unbroken, it is not contaminated, and reprocessing may not be required if the products are not harmed.

MONITORING THE STERILISATION PROCESS

- The sterilization process should be routinely monitored by employing mechanical, chemical, and biological indicators to evaluate sterilization conditions and indirectly assess the microbiologic status of treated products. Mechanical monitoring methods for steam and ETO sterilization include measuring cycle time, temperature, and pressure.
- Chemical indicators are both convenient and cost-effective for indicating sterilization process exposure. They may, however, incorrectly imply sterilization, especially at marginal sterilization times. As a result, chemical indicators should be used in alongside biological indicators, which quantify the sterilization process's germ-killing ability.
- Biological indicators, particularly those harboring resistant spores such as Bacillus, are thought to be the best sterilization process monitors. They directly test sterilization effectiveness and are more resistant than common microbiological contaminants, indicating that additional possible pathogens have been destroyed. These should be done at least weekly.
- An ideal biological monitor should be simple to use, inexpensive, devoid of exogenous contamination, provide immediate results, and yield positive results only when sterilization conditions are insufficient to destroy microbiological pollutants.
- Spore-strip biological indicators have evolved to provide faster results, with some even offering quick-readout indicators for steam sterilization. These markers are capable of accurately predicting sterilization.
- Specialized biological indicators for flash sterilization monitoring are now available, ensuring consistent monitoring of these sterilization cycles.

- A single positive spore test does not always imply a sterilizer failure, and additional testing should be performed before ceasing use.
- False-positive biological indicators can occur as a result of poor testing, defective indicators, or external contamination. A careful examination of the complete sterilization procedure should reveal whether an indicator is truly false-positive.
- To comply with standards and regulations, sterilization records, including mechanical, chemical, and biological indicators, should be kept for a set length of time.

STERILIZATION QUALITY CONTROL

Quality control procedures with appropriate supporting documentation should be in place to ensure that only sterilized items are used for the treatment of patients. All quality control systems should include:

- Automatic and continuous display of the chamber temperature, pressure, and the time for each sterilized load.
- Daily bowie-dick test results.
- A system to differentiate between sterilized and unsterilized items.
- Monitoring the procedure with appropriate indicators.

4.13: ENVIRONMENTAL CLEANING

INTRODUCTION

There are many microorganisms in the health-care environment which are harmless, though a few of them can cause disease in susceptible hosts. Microorganism survival and persistence in the environment are influenced by a variety of parameters, including surface type, organic matter presence, bioburden, temperature, and humidity.

Because some common HAIs pathogens are known to remain on environmental surfaces for weeks or months (i.e., possible reservoirs), surfaces are expected to play a role in disease transmission, but this is not certain. Cleaning is the physical removal of foreign materials (such as dust and dirt) as well as organic materials (such as blood, fluids, excretions, and microbes). Cleaning removes microorganisms physically rather than destroying them. Water, detergents, and mechanical action are used to do this.

Key points to ensure for Effective Environmental Cleaning

Cleaning schedules and methods must be organized in such a way that cleaning progresses from the least soiled to the most soiled area, as well as from the top to the bottom of a room.

- To avoid missing areas, all areas must be cleaned in a systematic manner. Always clean from top to bottom and from the cleanest to the dirtiest areas, using only authorized detergents.
- Equipment used for cleaning (bucket and mop) should be kept clean and dry as wet equipment is more likely to promote growth of microorganisms.
- After cleaning, cleaning equipment and solutions must be removed from patient care and food preparation areas as soon as possible.
- Minimise contamination of cleaning solutions by not putting already used cloths back into the cleaning solution, which can result in contamination of the cleaning solution and transferring of bacteria from one surface to another through the cloth.
- Prior to usage, all cleaning and maintenance of equipment should be kept in an agreed place.
- All detergent solutions must be diluted in accordance with the manufacturer's recommendations. This is essential for the best effectiveness.

Principles for cleaning.

- Cleaning schedules and methods must be organized in such a way that cleaning progresses
- To avoid missing areas, all areas must be cleaned in a systematic manner. Always clean from top to bottom and from the cleanest to the dirtiest areas, using only authorised detergents.
- Regularly touched surfaces pose a significant danger of cross-transmission, they must be cleaned more frequently (i.e., door knobs, toilet handles, table tops, bed rails, bed light switches, walking frames, drip stands etc).
- All detergent solutions must be diluted in accordance with the manufacturer's recommendations. This is essential for the best effectiveness.

- To avoid the possibility of cross contamination in several areas, cleaning equipment should be color-coded. (i.e. Color-coded buckets, dusting cloths, brooms etc).

Cleaning of the environment

1. Proceed from cleaner to dirtier

- Clean high-touch surfaces outside the patient zone before high-touch surfaces inside the patient zone
- Clean patient beds before patient toilets
- Clean low-touch surfaces before high-touch surfaces (terminal clean)
- Clean general patient areas before isolation areas

2. Proceed from: high to low (top to bottom)

- Clean bed rails before bed legs
- Clean environmental surfaces before floors

3. Proceed in: a methodical, systematic manner

- Left to right
- Clockwise or counter clockwise so as to not miss areas.
- Display wet-floor sign
- Immerse mop in bucket with cleaning solution and wring out (top down bucket system with sleeves)
- Mop in a figure eight, overlapping stroke, turn the mop head regularly (e.g., every 5-6 strokes)
- Wash mop and bucket after use and store dry

Table 19: *Different methods of environmental cleaning*

CLEANING	DESCRIPTION
Wet Mopping (Common method to clean floors)	**Single-bucket technique:** Clean clothes or mops are wet with a cleaning solution that is contained in a bucket. Use just one bucket of cleaning solution. Change the solution when it becomes dirty. Due to inactivation, the killing power of the cleaning product decreases with the increasing contamination of soil and organic material. **Double-bucket technique:** Use two different buckets, one containing a cleaning solution and the other containing a rinsing solution. The double- bucket system minimises the contamination of the cleaning solution and extends the life of the cleaning solution (fewer changes are required), which saves both labour and material costs. **Triple-bucket technique:** On top of the double-bucket technique, use a third bucket for wringing out the mop before rinsing, which extends the life of the rinse water.
Dusting	❖ Damp dusting is most used for cleaning walls, ceiling, doors, windows, furniture, and other environmental surfaces (unless visibly soiled). ❖ Dry dusting should be avoided, and dust cloths and mops should never be shaken, shaking spreads microorganisms. ❖ Dusting should be performed in a systematic way, using a starting point as a reference to ensure that all surfaces have been reached. ❖ When dusting ceiling, tiles and walls, check for stains that may indicate possible leaks- leaks should be repaired as soon as possible, because moist ceiling tiles provide a reservoir for fungal growth
Sweeping	❖ Avoiding sweeping floors in health facilities

Increasing the potency of disinfectants does not always result in increased antibacterial activity. Reduced disinfectant strength may result in AMR.

PPE and hand hygiene action for safe cleaning

PPE (gloves, gowns, aprons, surgical masks and particulate respirators) should be available to all staff performing cleaning duties

- Gloves (generally heavy-duty utility gloves) are worn when handling hazardous materials or cleaning surfaces that are visibly soiled with blood or body fluids
- Face masks and eye protection (e.g., surgical mask or respirator and goggles/face shield) are worn when there is a risk of splashes or sprays of chemicals (e.g., chemical spill) including during preparation, or blood or other body fluids (e.g., emptying dirty buckets into latrine)
- Rubber boots are worn when using hazardous chemicals or to provide additional protection when working in wet environments. Closed shoes or Rubber boots should always be worn
- PPE is not indicated for cleaning non-patient care areas (e.g., offices).
- Perform hand hygiene immediately before putting on gloves and directly after taking them off (i.e. this should always be considered as a mandatory practice)

Recommendations for Routine use of gloves for cleaning

When cleaning patient areas.

- When there is risk of hand contact with blood or body fluids
- When there is prolonged contact with disinfectants (e.g., terminal cleaning)
- When use of gloves is indicated always change them between each cleaning session (e.g.
- routine cleaning of a patient zone under contact precautions, terminal cleaning)

Reusable/disposable supplies and their appropriate use (including disinfectants)

Environmental cleaning materials and equipment quickly become contaminated.

- Regular and routine reprocessing (clean, disinfect and dry) of cleaning materials and equipment is required, i.e., after each time they are used
- Regularly inspect and/or replace all reusable equipment when needed
- When preparing the disinfectant, be sure to follow the manufacturer's instructions. For chlorine mixing instruction see in the Annex.

Containers/buckets:

Portable cleaning containers for solutions should be clean, dry, appropriately-sized, labelled, and dated

- Squeeze bottles are preferred over spray bottles for applying cleaning or disinfectant solutions directly to cloths
- A two-bucket system (cleaning process) should be available: one bucket contains a detergent or cleaning solution and the other contains rinse water. This is known as the two-bucket (or step) process.
- A four-bucket system (for disinfection process) should also be available: one bucket contains the detergent or cleaning solution; one contains rinse water, one bucket with the disinfectant or disinfectant solution and another bucket with clean water to rinse food contact surfaces.

Floor cleaning supplies:

Floor cleaning supplies also include mop heads (cotton or microfibre). Never shake mop heads or clean clothes. See table for recommended methods for cleaning floors.

Cloths:

- Surface cleaning clothes should be cotton or microfibre, colour-coded to reinforce the twostep process
- Always use fresh cleaning cloths for each cleaning session.

- Change cleaning cloths when no longer saturated for a new cloth. Store soiled ones in a dedicated bucket for reprocessing.
- Change cleaning cloths between each patient zone (patient zone contains the patient and his/her immediate surroundings (i.e., use a new cloth for each patient bed).
- Never double dip cleaning cloths into portable containers (i.e., squeeze bottles or buckets) used for cleaning solutions/disinfectants
- Never leave environmental cleaning materials and equipment soaking in buckets.

How to perform environmental cleaning

Know and arrange the equipment to use before planning to clean. This includes the use of; cleaning and disinfection products, reusable/ disposable supplies, equipment and PPE and hand hygiene products. Subsequently, routine and terminal cleaning frequencies and steps should be adhered to.

Routine Cleaning

Routine cleaning must be performed in all clinical and non-clinical areas, this includes cleaning; the floors, surfaces and equipment, kitchenware, furniture, and empty trash bins.

- Hand hygiene should be performed before and after cleaning
- All cleaners must wear the recommended PPE.
- A routine cleaning schedule with a planned frequency for washing all horizontal surfaces and toilet areas is required to guarantee that the environment is kept as clean as possible. Follow the routine cleaning steps in the diagram (see below).
- The area between the bed and mattress is frequently overlooked and should be addressed in routine cleaning.
- A cleaning checklist needs to be displayed, and all areas need to be covered. Cleaners are required to sign after work and their supervisor should sign beside each day after performing checks.

Figure 14: *Recommended steps for routine environmental cleaning*

Terminal Cleaning

Terminal cleaning is cleaning and disinfection after the patient is discharged or transferred out or dead to ensure the removal of organic matter and elimination of microbial contamination from floors, surfaces and equipment, kitchenware, furniture, curtains, mosquito nets and empty trash bins, before reuse of the bed and equipment by another patient.

Terminal cleaning should follow the steps below;

- Perform a risk assessment, select appropriate PPE and cleaning material,
- Perform hand hygiene before donning PPE
- Wear appropriate PPE before undertaking terminal cleaning
- The bed should be removed and cleaned
- In case of single rooms, all linen (including bed curtains and window covering) should be removed, bagged and sent for the laundry. It should be labelled clinical (infectious)
- All waste should be collected, closed and labelled appropriately
- Routine cleaning procedures must be performed

- Wipe all surfaces including walls to hand 2.5-3m with water and detergent. Allow to dry
- All surfaces of bed-frame mattresses must be dump wiped with approved detergent before the bed is made. Wipe the mattress with warm water and detergent. Wipe over with a chlorine releasing disinfectant where applicable.
- Keep the room empty as long as possible after terminal cleaning has been completed.
- After completing the task, remove all the PPE. Reusable PPE should be handled as per guidance. Discard all disposable PPE and wash hands with soap and water and dry.

Figure 15: *Steps taken in Terminal Environmental Cleaning*

Chapter 5:
TRANSMISSION BASED PRECAUTIONS

5.1: INTRODUCTION

Transmission-based precautions (TBP) are used to reduce the risk of transmission of potentially infectious diseases and pathogens. These should ALWAYS be applied in ADDITION TO STANDARD PRECAUTIONS (SP). The type of transmission-based precaution will be determined by the microbe's route of transmission. There may be more than one transmission route, and measures must account for all possible routes, as this will alter the types of precautions implemented. Categories of TBS including Contact Precautions, Droplet Precautions, Airborne Precautions. Safe environment may be achieved by applying TBS plus SP along other hierarchies of controls (elimination, substitutional, engineering controls, administrative controls). For effective implementation of TBS healthcare workers are advised to contain highly transmissible and/or epidemiologically significant agents, based on the pathogen's mechanism of transmission.

The national level is in charge of producing comprehensive guidelines on transmissionbased precautions that are evidence-based, nationally and internationally recognized, and extensively used.

The facility level leadership is responsible for ensuring that the transmissionbased precautions are implemented, enforced, and monitored within healthcare facilities.

5.2: CONTACT PRECAUTIONS

Contact precautions are used to prevent the spread of infections transmitted by direct or indirect contact with the patient or their environment. Healthcare workers should routinely apply appropriate preventive measures, which will prevent contamination by blood and other body fluids.

Contact Precautions require the following actions:

- Admit the patient in a private room or in a room with other patients with the same and no other infections (i.e. cohort)
- Dedicate noncritical patient-care equipment to a single patient when possible (otherwise, clean and disinfect reusable equipment before use on another patient)
- Wear gloves when entering the patient room
- During the course of providing care to one patient, change gloves after contact with infective material that may contain high concentrations of microorganisms
- Remove gloves before leaving the patient's room and wash hands immediately with an antimicrobial agent or a waterless antiseptic agent (NB: Using waterless antiseptics do not replace hand washing)
- Wear a protective gown if direct contact with the patient, environmental surfaces or items in the patient's room is likely
- Precautions may need to be continued throughout the hospitalization
- Limit patient movement; if the patient must leave the room, maintain the precautions while the patient is out of the room.

Special precautions are necessary in the following cases:

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

Regardless of a negative Hepatitis B test result,, if the diagnosis is consistent with acute viral hepatitis, it is recommended that precautions in the collection of specimens, disposal of excreta or any other material should continue to be taken.

A. Patient placement:

Although a single room is recommended, patients with the same condition or organism may share one. In the event of a patient room scarcity, prioritize patient cohorts based on conditions that may promote transmission (e.g., uncontained drainage, stool incontinence), giving them priority for single patient room placement.

B. Personal protective equipment (PPE):

When entering the room, put on a gown and gloves. Even if both patients share a room and/or are on Contact Precautions, change the gown and gloves between them. Hand hygiene should always be practiced in between glove changes.

C. Patient transport:

Only move patients outside the room when absolutely required. Notify the receiving department about the Transmission-based precautions the patient is under. Before shipment, cover or encapsulate potentially contagious bodily fluids. Before transfer, the transporter should discard any contaminated PPE. Don clean PPE before assisting the patient at the destination.

D. Ambulatory setting

As quickly as possible, place patients in examination rooms on Contact Precautions. Patient placement in long-term care and rehabilitation facilities should be addressed on a case-by-case basis. Each facility should make decisions based on the risk of infection to other patients.

E. Environmental measures:

Clean daily, paying special attention to high-touch areas, patient toilets, and locations adjacent to the patient.

- Before entering the patient's room, environmental service staff should put on a gown and gloves. To reduce C. difficile transmission, meticulous environmental cleaning and the use of products with a C. difficile inactivation label claim, together with hand hygiene and proper washing practices, are recommended. Because some viruses and spore-forming organisms are resistant to conventional disinfectants, a 1:10 dilution of bleach solution is advised.
- Bleach may be used as an auxiliary to cleaning or as a final wash down of regularly handled surfaces in patients with organisms that are resistant to typical cleaning methods (e.g., C. difficile, norovirus), (e.g., C. difficile, norovirus), bleach may be used as an auxiliary to cleaning or as a final wipe down of regularly touched surfaces.
- It is critical to understand that controlling resistant bacteria requires a combination of techniques rather than simply one disinfection product. The use of no-touch systems, such as hydrogen peroxide vapor/mist and UV light, in conjunction with typical cleaning and disinfection methods lowers microorganisms on environmental surfaces. These methods are only to be used for terminal cleaning.
- We recommend copper alloy surfaces and the inclusion of silver into diverse materials have an antibacterial impact on microbes.
- Room disinfection processes should be audited, especially in outbreak conditions, to guarantee compliance.

F. Discontinuation of Contact Precautions:

Contact precautions are usually lifted once the infection's signs and symptoms have subsided or when pathogen-specific advice have been followed. Recommendations for MDROs such as carbapenem-resistant Gram-negative organisms (CRO) remain equivocal. The current recommendation is that any patient colonized or infected with CRO and MDR Ab continue on Contact Precautions for the duration of their stay in healthcare institutions.

Figure 16: *Contact precautions*

5.3: DROPLET PRECAUTIONS

Droplet precautions prevent disease transmission caused by large respiratory droplets produced by coughing, sneezing, or talking. Droplet-transmitted diseases include, but are not limited to, influenza, pertussis, and bacterial meningitis. These precautions reduce risks for nosocomial transmission of pathogens transmitted in whole or in part by droplets (e.g., Hemophilus influenzae [causing invasive disease]; Neisseria meningitidis; Mycoplasma pneumoniae; adenovirus; parvovirus B19; and influenza, mumps, and rubella virus). Other conditions that require Droplet Precautions include pharyngeal diphtheria; Pertussis; pneumonic plague,

and streptococcal pneumonia, pharyngitis, or scarlet fever in infants and young children. Droplet Precautions reduce risks for the transmission of organisms more than 5 microns in size. Talking, coughing, sneezing, and the performance of procedures release these organisms.

Healthcare workers should apply droplet precautions during examination / treatment to individuals with respiratory symptoms including: o Asking patients to wear and provide them a medical face masks or use of tissues to cover their nose and mouth if they presenting with cough symptoms or suspected with suspected COVID-19, TB, etc.) while they are in waiting/ public areas or cohorting in rooms is recommended in the healthcare facility

- Placing acute respiratory symptomatic patients at least 1 meter (3 feet) away from others in patient waiting areas
- Ensure there is good air ventilation in the waiting area
- Triage rapidly as part of risk assessment done on all patients during arrival to the healthcare facilities and fast track separation and consultation of patients with cough symptoms and eliminate the risk of an infectious disease.

Droplets Precautions require the following actions:

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

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

1. Patient placement:

Droplet Precautions that employ clinical respiratory symptoms to allow rapid isolation should be supported by facilities. Although single rooms

are recommended, patients with the same condition may share a room. When single-patient rooms are few, patients with high sputum production should be prioritized. Patients must be at least 6 feet apart in space. Draw drapes between patients for privacy. Avoid putting immunocompromised patients in the same room with patients on Droplet Precautions, especially if those patients are at risk of infection

2. Personal protective equipment:

When entering the room, put on a surgical mask. Wear gloves while handling things contaminated with respiratory secretions (e.g., tissues, handkerchiefs). Hand hygiene and changing PPE between patients.

3. Patient transport:

Only move patients outside the room when absolutely required. If the patient must leave the room, instruct him or her to wear a surgical mask and to practice proper respiratory hygiene and coughing. The patient transporter does not require to wear a surgical mask once the patient has been masked. Inform the receiving department of the status of the isolation precautions.

4. Ambulatory settings:

Patients who present with clinical respiratory syndromes should be taught proper respiratory hygiene and cough etiquette, as well as given surgical masks to wear until an examination room is available. Patients who require Droplet Precautions should be seen as soon as possible. HCPs should use surgical masks when entering the room.

5. Long-term care:

After examining all options, make case-by-case decisions about patient placement. In common places, ambulatory patients on Droplet Precautions should be instructed to wear a surgical mask. All patients should be taught good respiratory hygiene and cough etiquette.

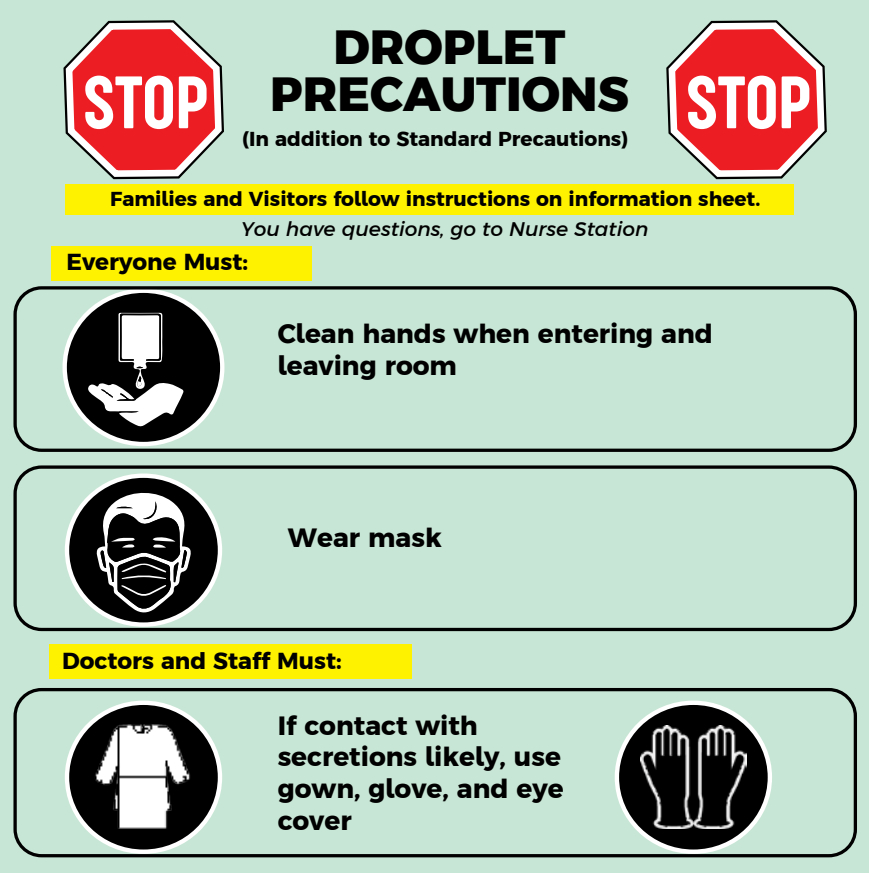
6. Environmental measures:

Daily cleaning with hospital-approved disinfectant of high-touch and horizontal surfaces. Environmental services personnel should don a surgical mask before room entry.

7. Discontinuation of Droplet Precautions:

Discontinue droplet precautions after signs and symptoms have resolved or according to pathogen-specific guidelines.

Figure 17: *Droplet precautions*



5.4: AIRBORNE PRECAUTIONS

Airborne precautions are implemented to prevent the spread of infectious organisms that, due to their small size (less than 5 & micro; m), remain suspended in the air and travel long distances. As a result, the most common source of disease transmission in healthcare settings is not faceto-face contact, but rather airflow patterns within the facility. Measles, smallpox, chickenpox, pulmonary tuberculosis, avian influenza, and possibly SARS-associated coronavirus are among these disorders.

1. Patient placement:

Place patients in an airborne infection isolation room (AIIR) with negative air pressure relative to the corridor in acute care and long-term care settings. There should be at least 6 to 12 air exchanges every hour, with air expelled straight to the outside. When possible, monitor the air pressure on a daily basis using visual indications (e.g., smoke tubes, flutter strips) and electronic methods (e.g., maintenance air exchange data). Keep the door closed.

2. Personal protective equipment:

Wear a well-fitting gown. N95 or higher-level respirator approved by the National Institute of Occupational Safety and Health (NIOSH) for respiratory protection when the patient has suspected or confirmed pulmonary tuberculosis or is undergoing procedures where infectious tuberculosis skin lesions would be aerosolized (e.g., wound irrigation, whirlpool treatment). Similarly, pathogenic particles may be aerosolized during operations such as endotracheal intubation; adequate protective equipment should be worn at all times. Because of the risk of genetically mutated smallpox virus, respiratory protection is now recommended for all HCP, whether vaccinated or unvaccinated against smallpox. There are no recommendations for HCP to use respiratory PPE if they are immune to measles and chickenpox (varicella). Similarly, there is no advise for vulnerable HCP to use a surgical mask instead of a N95 respirator when caring for patients with measles or chickenpox (varicella). The literature recently demonstrated droplet or even airborne spread of norovirus in healthcare facilities. When in close contact to a vomiting or stooling patient, HCP should consider using respiratory protection since

pathogenic virions can be aerosolized and then eaten. there is evidence to suggest that droplet and/or airborne transmission may play a role in the early onset of norovirus outbreaks in healthcare settings.

3. Patient transport:

Patients should only be transported for essential medical reasons. If the patient must be transported out of AII, put on a surgical mask and advise him or her on respiratory hygiene and cough etiquette. Do not use a N95 mask on the patient because it will impede their capacity to breathe more due to their weakened respiratory status. Cover any exposed skin lesions with clean bandages or linens. If the patient is masked and all skin lesions are covered, transport employees do not need to wear respiratory protection during transport.

4. Ambulatory settings:

Create strategies for identifying patients who have airborne infections that are known or suspected. As quickly as possible, admit the patient who requires Airborne Precautions to AII. If AII is unavailable, place the patient in a room equipped with a portable high-efficiency particulate air (HEPA) filter. If a portable HEPA filter is not accessible, the patient should use a surgical mask. Staff should always wear appropriate respiratory protection regardless of the sort of room the patient is in. Ambulatory care facilities, such as the emergency department, are frequently the first to evaluate a patient who has symptoms of an airborne transmissible infection. Effective communication between infection control and ambulatory care services is crucial for prompt identifying and isolating contagious patients, preventing multiple employee exposure.

5. Environmental measures:

High contact surfaces are cleaned on a regular basis. When entering a room, environmental services staff should put on a N95 respirator. After the patient has left the examination room or patient room, the room should be left empty for a sufficient amount of time to allow for complete air exchange. Depending on the facility's air handling capability, this time may be as little as one hour. This practice is applicable in both acute and ambulatory settings.

6. Personnel constraints:

Restriction susceptible HCP from entering rooms of patients with measles (rubeola), chickenpox or disseminated zoster (varicella zoster virus), and smallpox if alternative immune HCP are available. Immunocompromised and pregnant HCP should also be kept away from these patients.

7. Discontinuation of Airborne Precautions:

Discontinue Airborne Precautions in accordance with the guideline's pathogen-specific guidelines. Follow the MoH guidelines for isolation of patients with known or suspected pulmonary tuberculosiswith known or suspected pulmonary tuberculosis.

A perforate respirator is suggested for use by persons working in high-risk conditions, such as a room occupied by a patient suspected or known to have pulmonary tuberculosis. It is dependent on an airtight seal across the entire perimeter.

8. Additional Isolation Precautions for patients with TB include the following:

- Educate patients who are placed in TB isolation about the mechanisms of M. tuberculosis transmission and the reason for their being placed in isolation.
- Advise patients to cover their mouth and nose with a tissue when coughing or sneezing, even while in the isolation room, to contain liquid droplets before they are expelled into the air.
- Facilitate patient adherence to isolation measures (e.g., staying in the TB isolation room with the door closed).
- Ensure adequate ventilation of treatment and procedure rooms.
- Minimize the number of persons who enter the isolation room.
- Handle and transport disposable items in a manner that reduces the risk for transmitting other microorganisms to patients, health workers or caregivers, and visitors.
- Monitor negative pressure daily while the room is being used for TB isolation.

- Although not required, an anteroom may increase the effectiveness of the isolation room.
- Upper-room air ultraviolet germicidal irradiation (UVGI) may be used as an adjunct to general ventilation in the isolation room.
- Precautions may be discontinued when suspected TB is ruled out or when the patient is on effective therapy, when the patient is improving clinically, and when two consecutive sputum smears collected on the same day or separate days detect no acid-fast bacilli (AFB).
- Strongly consider continuing isolation throughout hospitalization for patients who have multidrug-resistant TB
- Respiratory protection is recommended for:

    1. Persons entering rooms in which patients with known or suspected infectious TB are being isolated
    2. HCWs when performing cough-inducing or aerosol-generating procedures on such patients
    3. Persons in other settings where administrative and engineering controls are not likely to protect them from inhaling infectious airborne droplet nuclei

- Cough-inducing procedures should:

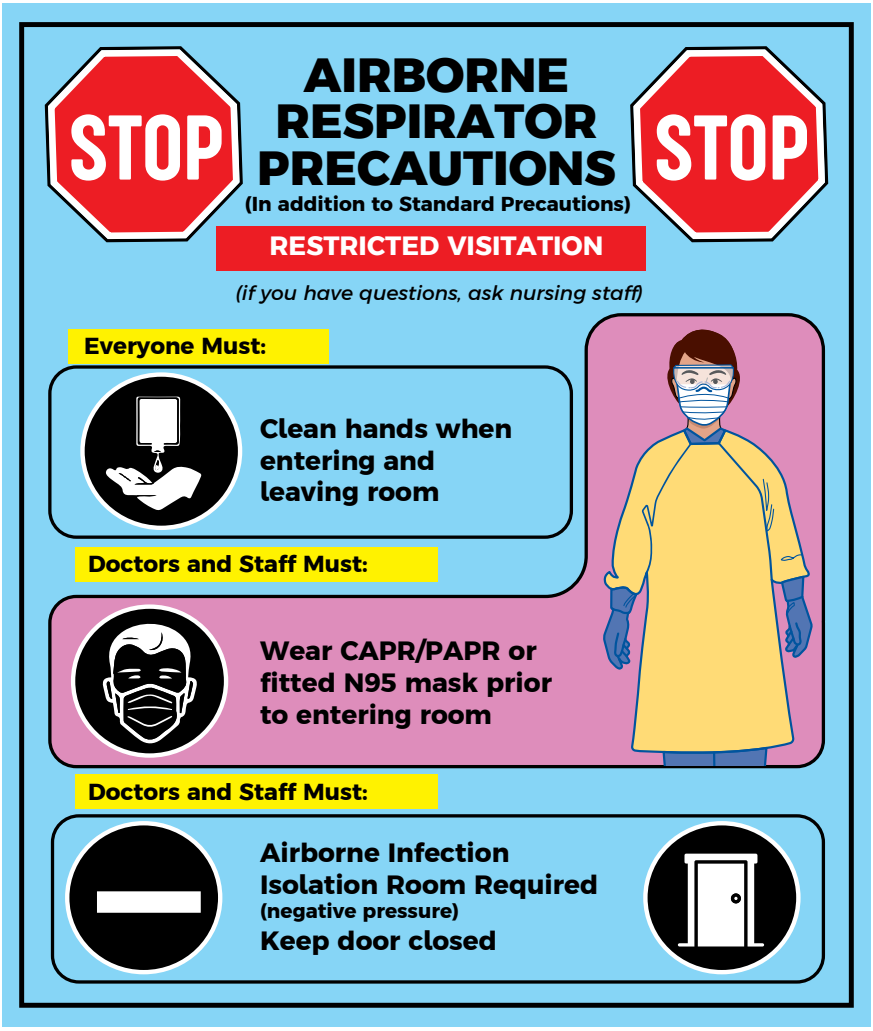
    1. Not be performed on TB patients unless absolutely necessary
    2. Be performed in areas that have local exhaust ventilation devices (e.g., booths or special enclosures) or, if this is not feasible, in a room that meets the ventilation requirements for TB isolation

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

All facilities that utilize respiratory protection must have a respiratory protection programme. Furthermore, appropriate measures for recognizing and triaging individuals with suspected tuberculosis are critical, as delayed identification and the resulting lack of suitable isolation have been found to be key contributors in M tuberculosis transmission in healthcare institutions. Airborne precautions are the last line of defense

in decreasing the danger of airborne agent transmission. For more information on how to minimize TB transmission, review the Uganda National Tuberculosis Infection Control Guidelines in Healthcare Facilities, Congregate Settings, and Households.

Figure 18: *Airborne precautions*



Chapter 6
HEALTHCARE ASSOCIATED INFECTIONS SURVEILLANCE

6.1: INTRODUCTION

Heathcare associated infections (HAIs), also known as nosocomial infections, are infections that patients acquire while receiving medical treatment in a healthcare setting, such as a hospital or clinic. These infections develop during the course of a patient's stay in the healthcare facility but are not present or in the incubation stage at the time of admission. HAIs can result from exposure to infectious agents within the healthcare environment, including bacteria, viruses, fungi, or other pathogens.

HAIs result in prolonged hospital stays, long-term disability, massive additional costs for health systems, high costs for patients and their family, and unnecessary deaths.

Good hand hygiene and other cost-effective infection prevention and control (IPC) practices have been found to prevent 70% of healthcare-acquired infections (HAIs).

HAIs surveillance involves systematic collection, analysis, interpretation, and dissemination of data related to healthcare-associated infections to inform improvement in IPC and healthcare delivery as a whole. The primary objectives of HAIs surveillance are to monitor and control the spread of infections, identify risk factors, and implement preventive measures.

It is recommended that all health facilities establish an active HAIs surveillance system that can monitor the incidence of HAIs and establish measures to prevent the same.

HAIs Surveillance implementation requires a multi-disciplinary team with different expertise such as data collection analysis and interpretation, facility management, Laboratory, clinical, IPC practitioners among others.

This chapter highlights the fundamental components of different HAIs. A more comprehensive guidance on the implementation of HAIs surveillance is found in the National HAIs Surveillance plan.

The National level shall establish a National HAIs surveillance programme and networks that include standard definitions of different types of HAIs to be monitored as well as related protocols and tools to allow for reporting of outbreaks of infection in health facilities so that appropriate interventions and support by national, regional, district and healthcare facility structures can be provided

All Healthcare facilities should perform facility-based HAIs surveillance to guide IPC interventions and detect outbreaks, including AMR surveillance, with timely feedback of results to HCWs and stakeholders and through national networks.

Regular reports of comparative data on the levels of HAIs and anti-microbial resistance should be made available to clinicians. This will enable them to make better empirical treatment choices, assess implications of their treatment choices and infection prevention and control practices.

Key interventions for the prevention of HAIs include:

- Establishing systems to track targeted HAIs in health facilities and sharing data with all relevant staff.
- Having dedicated IPC staff to track HAIs.
- Fully adhering to recommended general IPC practices.
- Implementing interventions targeting specific HAIs (IPC bundles)

6.2: TYPES OF HEALTHCARE ASSOCIATED INFECTIONS (HAIS)

A. Surgical Site Infections (SSI)

SSI is an infection related to a surgical procedure that occurs near the surgical site within 30 days following surgery (or up to 90 days following surgery where an implant is involved). SSIs are further divided into those involving only skin and subcutaneous tissues (superficial incisional SSI) and those involving deeper softer tissues of the incision (deep incisional SSI) organ/space infections include abscess, anastomotic leak for intra-abdominal operations, and implantassociated infections.

1. Superficial incisional SSI:

Infection only involves skin or subcutaneous tissue

- ❖ Drainage of pus from the superficial incision
- ❖ Pain, tenderness, localized swelling, redness, or heat
- ❖ Positive culture from an aseptically collected specimen

2. Deep incisional SSI:

Infection appears within 30 days of the procedure or within one year if there is an implant or foreign body, such as a prosthetic heart valve or joint prosthesis.

- ❖ Pus discharge from the deep incision (muscle and fascial layers)
- ❖ Spontaneous dehiscence or “gaping” of wound
- ❖ Fever >38 °C, localized pain, or tenderness
- ❖ Positive culture from aseptically collected specimen.

3. Organ/ space SSI:

Infection appears in an organ or space within 30 days of the procedure in the organ/ space that is opened or manipulated during the operative procedure.

- ❖ Purulent drainage from a drain that is placed into the organ/ space.

- Organisms are identified from fluid or tissue in the organ/ space by a culture.
- An abscess or other evidence of infection involving the organ/ space that is detected on gross anatomical or histopathological examination, or imaging test evidence suggestive of infection.

Risk factors of SSI

- **Host factors:** Extremes of age Concurrent disease, malnutrition with underlying clinical condition OR skin infections.
- **Surgical procedures:** Surgical category: clean, clean contaminated or dirty Implant or prosthesis, Poor surgical technique, Excessive use of diathermy, Duration of surgical procedure, Hemorrhage, necrosis, hematoma, Presence of drains
- **Preoperative preparations:** Inadequate skin preparation – e.g., inappropriate skin disinfectant, improper hair removal, Inappropriate antibiotic prophylaxis, inappropriate choice, inadequate dose, inappropriate timing (not within 60 minutes of incision)
- **Operating theatre design;** Increased movement of staff in and out, Inadequate ventilation, Inadequate sterilization and disinfection and Inadequate cleaning.

Prevention of SSIs

- Advise patients to shower or bathe (full body) with soap (antimicrobial or non-antimicrobial) or an antiseptic agent on at least the night before the operative day.
- Ensure timely administration of appropriate antimicrobial prophylaxis prior to surgical incision. We recommend the administration of antimicrobial prophylaxis within 120 minutes before incision, while considering the half-life of the antibiotic
- Perform intraoperative skin preparation with an alcohol-based antiseptic agent unless contraindicated
- For patients undergoing any surgical procedure, hair should either not be removed or, if absolutely necessary, it should be removed only with a clipper. Shaving is strongly discouraged at all times, whether preoperatively or in the operating room

- Surgical hand preparation should be performed by scrubbing with either a suitable antimicrobial soap and water or using a suitable alcohol-based hand rub before donning sterile gloves.
- Ensure that all patients undergoing surgery are educated on hygiene and wound care

B. Bloodstream infections

The patient has at least one positive culture of a recognized pathogen or patient has at least one of the following signs and symptoms;

- fever (>38^{o}C),
- hypotension or chills and
- two positive cultures of a common skin contaminant like Coagulase negative staphylococcus, micrococcus, bacillus sp, Corynebacterium sp.

In the absence of microbiology laboratory, the patient should have at least one of the following signs or symptoms with no other recognized cause;

- fever (>38^{o}C),
- hypotension or oliguria, and,
- for infants ≤1-year-old, fever, hypothermia (>360C), apnea or bradycardia.
- There is no apparent infection at another site. The physician should begin treatment for sepsis.

C. Central line-associated Bloodstream Infections (CLABSI)

Primary BSI can be further described as central line-associated BSI (CLABSI).

1. A **Central line** is an intravascular catheter that terminates at or close to the heart or in one of the great vessels which is used for infusion, withdrawal of blood, or hemodynamic monitoring. Central lines can be:

- **Temporary central line:** A non-tunneled, non-implanted catheter (e.g., peripherallyinserted central catheters [PICC lines], short term lines commonly in ICUs for acute management).
- **Permanent central line:** Includes: Tunneled catheters (including certain long-term dialysis catheters) or Implanted catheters (including ports such as port-a-Cath)

A CLABSI is defined as a primary BSI meeting the following criteria:

1. A central line in place for >2 calendar days on the date of event, with day of device placement being Day 1.

OR

2. A central line in place for >2 calendar days that had been removed on the date of event or the day before the date of event

Note: *If a central line is removed and reinserted on the same or following day, in the same or different site, it is considered as one continuous central line. Neither the insertion site nor the type of device may be used to determine if a line qualifies as a central line. The device must terminate in one of the great vessels or in or near the heart.*

The following are considered great vessels for the purpose of reporting central line association and counting central-line (device) days:

- Aorta, Pulmonary artery, Superior or inferior vena cava, Brachiocephalic vein, Internal jugular vein, Subclavian vein, External and common iliac vein, Femoral vein, Umbilical artery/vein (in neonates)

The following devices are not considered central lines:

- Extracorporeal membrane oxygenation (ECMO) catheters, Femoral arterial catheters, Intraaortic balloon pump (IABP) devices, Hemodialysis reliable outflow (HeRO) dialysis catheters, Impella heart devices.

PREVENTION OF BSI

Table 20: *Methods of Prevention of BSI*

PLACEMENT	MAINTENANCE & REMOVAL
❖ Cannulation only if clinically indicated (never for convenience)	❖ Review the need of IV cannula and remove if no longer required
❖ Prepare a tray of items required for catheter placement	❖ Keep the dressing clean and dry – can stay for up to 72 to 96 hrs.
❖ Perform hand hygiene (moment 2 and 3) and use sterile gloves when placing the cannula only.	❖ Use an aseptic technique for ongoing daily cannula care
❖ Use an aseptic non-touch technique following the procedure for insertion of a peripheral cannula	❖ Change the dressing if wet or soiled or immediately after administration of blood.
❖ Clean the site with an antiseptic and let dry before cannulation. ❖ If site is visibly dirty, wash with soap	❖ Replace the IV cannula whenever cannula related complications occur (occlusion, phlebitis or infection). If required, insert a new cannula.

D. Pneumonia (ventilator acquired pneumonia [VAP] and hospital acquired pneumonia (HAP).

If the patient is on mechanical ventilation and signs of infection appear after 2 days of stability/ improvement on ventilator, VAP is recognized by the following criteria:

Table 21: *Criteria for VAP or HAP*

<table>
<tr><th colspan="4">At least ONE of the general clinical criteria (can be different for children/infants)</th></tr>
<tr><td>Fever > 38^{0}C</td><td colspan="2">Leukopenia (<4000 WBC/mm3) or Leukocytosis (≥12,000 WBC/mm3)</td><td>Altered mental status ≥ 70 years</td></tr>
<tr><th colspan="4">And ONE pulmonary clinical criterion [can become TWO] (can be different for children/infants)</th></tr>
<tr><td>❖ New onset of purulent sputum, or
❖ change in character of sputum, or
❖ increased respiratory secretions, or
❖ Increase suctioning requirements</td><td>❖ Cough
❖ Dyspnea
❖ Tachypnoea</td><td>Rales or Bronchial breathing</td><td>Worsening gas exchange</td></tr>
<tr><th colspan="4">And ONE radiological criterion</th></tr>
<tr><td colspan="4">Patient with underlying diseases (pulmonary or cardiac) has two or more chest x-rays, patient without underlying diseases has one or more chest X-ray; With
❖ new or progressive and persistent infiltrates
❖ consolidation
❖ cavitation</td></tr>
<tr><th colspan="4">And ONE microbiologic criterion (Optional – is not necessary for confirmation of HAIs)</th></tr>
<tr><td colspan="4">❖ Positive quantitative cultures of lower respiratory tract specimen (e.g., broncho alveolar lavage or protected specimen brushing)
❖ Positive blood culture not related to other source of infections
❖ Positive pleural fluid culture
❖ Positive histopathologic exam</td></tr>
</table>

- Physician's diagnosis of pneumonia alone is not an acceptable criterion for nosocomial pneumonia.
- Important to distinguish between changes in clinical status due to other conditions, such as myocardial infarction, pulmonary embolism, respiratory distress syndrome, etc.

Healthcare-associated pneumonia can be characterized by:

- **Early onset pneumonia:** Occurs during first four days of hospitalization and often caused by strains of Moraxella catarrhalis, Hemophilus influenzae, and Streptococcus pneumoniae
- **Late onset pneumonia:** Emerges after 4 days of hospitalization and more likely caused by gram negative bacilli or Staphylococcus aureus.

Best practices for prevention of HAP & VAP

Table 22: Best practices for prevention of HAP & VAP

<table>
<tr><th colspan="2">HAP prevention best practices</th></tr>
<tr><td colspan="2">❖ Strict adherence to hand hygiene (sees Hand Hygiene chapter for more details).
❖ Performing routine oral care
❖ Early mobilization (i.e., post-surgery)
❖ Treatment of dysphagia
❖ Early diagnosis</td></tr>
<tr><th colspan="2">VAP (mechanically assisted) prevention best practices</th></tr>
<tr><th>PLACEMENT</th><th>MAINTENANCE</th></tr>
<tr><td>❖ Consider use of non-invasive ventilation when possible.
❖ Insert endotracheal tube (ET) only for appropriate indication.
❖ Perform hand hygiene (moment 2 and 3)</td><td>❖ Daily assessment of sedation with readiness to extubate.
❖ Perform hand hygiene (moment 2, 3, or 4) and aseptic technique
❖ Unless contraindicated, keep the head of the patient's bed elevated at 300-450 – avoid laying the patient completely flat.</td></tr>
<tr><th>PLACEMENT</th><th>MAINTENANCE</th></tr>
<tr><td>❖ Ensure appropriate size of ET is used.
❖ Ensure only properly trained HCWs perform the procedure.
❖ Use aseptic technique and sterile equipment for insertion.
❖ Set (and maintain) appropriate ET cuff pressure between 20-30 cm H2O (or 2 cm H2O above peak aspiratory pressure).</td><td>❖ Oral hygiene: Brush 12 hourly with standard toothpaste, and clean mouth with chlorhexidine gluconate (≥ 1– 2% gel or liquid) 6 hourly.
❖ Education and training of staff in appropriate airway management.
❖ Cuff pressure control and monitoring 6-hourly
❖ Avoid routine change of ventilator circuit, humidifiers and endotracheal.
❖ Use sterile water in the humidifier and maintain appropriate humidification of inspired gas.
❖ Perform subglottic suctioning of respiratory secretions.</td></tr>
</table>

E. Urinary Tract Infections (UTI)

Positive urine culture limited to one-two species of organisms with 105 CFU/ml, with or without clinical symptoms.

At least one of following factors with no other recognized cause:

- Fever (>38 °C)
- Suprapubic tenderness
- Urgency
- Frequency
- Dysuria

Catheter-associated urine tract infections (CAUTI).

Criteria for a CAUTI is:

- A UTI where an indwelling urinary catheter was in place for >2 calendar days on the date of event and an indwelling urinary catheter was in place on the date of event or the day before.
- If an indwelling urinary catheter was in place for > 2 calendar days and then removed, the date of event for the UTI must be the day of discontinuation or the next day for the UTI to be catheter-associated.

Prevention of CAUTI

Table 23: *Prevention of CAUTIs*

PREVENTION OF CAUTI	
During insertion	**During ongoing maintenance**
Catheterize only if clinically indicated (never for convenience)	Review urinary catheter necessity daily and remove promptly.
Use a closed urinary drainage system	Maintain a closed drainage system. If a urine specimen is required, take specimen aseptically via the sampling port - disinfect port by wiping with a 70% alcohol swab & perform hand hygiene (moments 2 & 3)
Use an aseptic non-touch technique (sterile gloves and equipment) following the	Use an aseptic technique for ongoing daily catheter care
procedure for insertion of a urinary catheter below	Do not change the catheter routinely if it is functioning properly
	Empty the drainage bag regularly into a clean receptacle used only on one patient and perform hand hygiene before and after (moments 2 & 3)
	Correctly position drainage bag below the level of the bladder (and never on the floor) to prevent back flushing In case of need e.g., during transportation, clamp the urinary bag tube to prevent backflow.
	Perform daily meatal hygiene with soap and water only ❖ involve the patient in their care

6.3: ANTIMICROBIAL RESISTANCE (AMR)

Antimicrobial resistance refers to the ability of microorganisms (such as bacteria, viruses, fungi, and parasites) to develop the ability to resist medications designed to kill them.

Strong IPC, including standard precautions and HAIs surveillance, is the most effective approach to controlling the spread of AMR. Robust IPC measures are cost-saving because AMR can thrive in healthcare facilities. Safer hospitals mean fewer infections and every infection prevented is an antibiotic avoided.

Improving IPC helps achieve quality care for all and is one of the five objectives in the AMR Global Action Plan.

HAIs surveillance is integral to understanding, preventing, and controlling infections within healthcare settings, which in turn is essential for mitigating the emergence and spread of antimicrobial resistance. It forms a crucial component of a multifaceted approach to combatting AMR in healthcare facilities.

Multi Drug Resistance (MDR) and Multi- Drug Resistant Organisms (MDROs)

Multi-Drug Resistant Organisms (MDROs) are of major concern in healthcare settings and should be targeted by rigorous infection prevention and control measures. MDR refers to the resistance of microorganisms, particularly bacteria, to multiple antibiotics, rendering traditional treatment approaches ineffective. Infections with MDROs increase morbidity and mortality, prolonged hospital stay and increase healthcare costs.

The most important MDROs targeted for prevention and control are listed below and the microbiology laboratory should notify the clinical and IPC team upon their identification;

- Methicillin-resistant Staphylococcus aureus (MRSA)

- Carbapenem-resistant gram-negative rods (Such as Carbapenem resistant Acinetobacter baumanii -CRAB, Carbapenem resistant Klebsiella pneumoniae)
- Third generation cephalosporin-resistant gram-negative rods (particularly those that produce extended spectrum beta-lactamases - ESBL)
- Vancomycin-resistant Enterococcus (VRE)
- MDR T.B (MDR T.B will be considered separately)
- Any other resistance types considered significant by the microbiologists /infectious disease specialists.

MDROs could occur as sporadic (a few cases seen once in a while), or endemic (where MDROs occur in large numbers most of the time) or in outbreaks (characterized by sudden surges in the numbers). MDROs could be transmitted by persons with active infections or those whose skin or mucous membranes are asymptomatically colonised by the MDRO.

HEALTH FACILITIES SHOULD IMPLEMENT THE FOLLOWING MEASURES TO CONTROL MDROS:

Administrative measures:

All facilities should make MDRO prevention and control an organizational patient safety priority.

The IPC team should sensitize management and the IPC committee about the importance of MDROs and the need to support MDRO interventions.

Education and Training: The IPC training and education programme should give special attention to MDROs. All personnel should know the important MDROs, measures to prevent their transmission and the facility's surveillance programme for MDROs.

Surveillance:

- The facility should have measures for timely identification of patients with MDROs. The laboratory should alert the clinical teams and IPC team upon recovery of any of the above listed pathogens from routine clinical specimens.

- Any facility or unit transferring a patient known to be infected with or colonized by one of the listed MDROs should alert the receiving facility
- Even in the absence of laboratory support, the facility should look out for patients at high risk of being infected and transmitting MDROs. These include; patients in intensive care, burns and oncology units; patients transferred from such units, roommates of colonized or infected persons, and patients known to have been previously infected or colonized with an MDRO.
- Laboratory staff should generate antibiograms regularly, highlighting the susceptibility patterns of target MDROs.
- Active surveillance cultures (ASC): These involve sampling of the skin, mucous membranes or skin lesions (like burns) for carriage of (colonisation with) MDROs to guide the need for enhanced precautions and possible decolonization treatment. It can be costly and could take up laboratory capacity and in some cases has not been proved to improve MDROs control. It may be considered under the following circumstances:
- Investigating and controlling an MDRO outbreak
- Supplemental measures as part of a campaign to control an endemic MDRO infection if other measures alone have proved inadequate
- High risk surgeries, including cardiothoracic, orthopedic and neurosurgery

Standard precautions: Standard precautions should be followed in all settings and for all patients in spite of their suspected MDRO status. For patients identified to be infected or colonized with the target MDROs, contact precautions should be instituted in addition to standard precautions.

- **Hand hygiene:** Rigorous hand hygiene is crucial for prevention of MDRO transmission even when the patient infection or colonization status is unknown. Hand hygiene should be enhanced for patients known or suspected to be infected or colonised and those in high risk areas for MDR including - ICU, burns unit and oncology unit patients. Requisite resources should be provided, staff continually sensitized, and compliance assessments regularly performed.

- **Use of appropriate PPE:** Gloves and aprons are part of the contact precautions required for all patients known to be infected or colonised with target MDROs. Masks should be used when performing splash-generating procedures (e.g., wound irrigation, oral suctioning, intubation); when caring for patients with open tracheostomies and the potential for projectile secretions
- **Environmental hygiene:** Surfaces and equipment in proximity with patients known or suspected to be infected/ colonised with target MDROs (e.g., bed rails, over bed tables) and frequently-touched surfaces in the patient care environment (e.g., door knobs, surfaces in and surrounding toilets in patients' rooms) should be cleaned and disinfected at least twice daily.
- **Reprocessing of reusable equipment:** As much as possible, noncritical equipment used in managing infected/colonized patients should be single use. Any non-single use items be dedicated to the patient and should be cleaned and disinfected in patient proximity prior to being transported away

Contact precautions: These should be employed for all patients with a targeted MDRO

- **Isolation/cohorting:** Patients with target MDROs should be isolated in single rooms with dedicated equipment. If isolation rooms are not available, patients with the same MDRO should be cohorted. If not possible to cohort patients with same MDRO, they should be placed with patients at lowest risk of acquiring the MDRO and its adverse effects and with short length of stay.
- **PPE:** Gowns and Gloves should be worn in the vicinity of the patient and a surgical mask when performing splash-generating procedures (e.g., wound irrigation, oral suctioning, intubation); when caring for patients with open tracheostomies and the potential for projectile secretions

Decolonization: It entails the use of antibiotics and antiseptics to eliminate carriage of MDROs and has been used mainly for MRSA. It could be considered as supplemental (additional) approach for controlling MRSA in high risk settings e.g. ICUs and in patients undergoing high risk surgery e.g. cardiothoracic, orthopedic and neural surgery.

Antimicrobial stewardship: The facility should have an active antimicrobial stewardship programme that optimises the use of antimicrobials. This is usually coordinated by the Medicines and Therapeutics Committee.

Healthcare facilities should develop local antibiograms every 6 months to guide anti biotic procurement planning and antibiotic prescribing practices to optimize antimicrobial use, enhance treatment effectiveness, and reduce antimicrobial resistance by ensuring that prescribing decisions are informed by up-to-date, evidence-based data on local pathogen susceptibilities.

ENVIRONMENTAL MEASURES

The potential role of environmental reservoirs, such as surfaces and medical equipment in transmission of MDROs has been observed in several MDRO outbreaks especially if there is lack of adherence to facility procedures for cleaning and disinfection.

Environmental measures in MDRO containment;

- Monitoring for adherence to recommended environmental cleaning practices is an important determinant for success in controlling transmission of MDROs and other pathogens in the environment.
- Use of dedicated noncritical medical equipment.
- Assignment of dedicated cleaning personnel to the affected patient care unit.
- Increased cleaning and disinfection of frequently-touched surfaces (e.g., bedrails, charts, bedside commodes, doorknobs).
- Appropriate microbiological environmental sampling.

Microbiological Environmental sampling in healthcare facilities Microbiologic sampling of air, water, and inanimate surfaces (i.e., environmental sampling) is an expensive and time-consuming process that is complicated by many variables in protocol, analysis, and interpretation.

While environmental cultures are not routinely recommended, environmental cultures offer valuable information in investigation of MDRO outbreaks.

When indicated, targeted microbiologic sampling for defined purposes and not routine sampling should be conducted in accordance with defined protocols that include:

A. A written, defined, multidisciplinary protocol for sample collection and culturing;

B. Analysis and interpretation of results using scientifically determined or anticipatory baseline values for comparison; and

C. Expected actions based on the results obtained.

Indications of environmental sampling

1. To support an investigation of an outbreak of disease or infections when environmental reservoirs or fomites are implicated epidemiologically in disease transmission.

    - ❖ It is important that such culturing be supported by epidemiologic data.
    - ❖ A clear plan for interpreting and acting on the results is obtained.
    - ❖ Linking microorganisms from environmental samples with clinical isolates by molecular epidemiology is crucial whenever it is possible to do so.

2. Quality assurance purposes:

- ❖ Biologic monitoring of sterilization processes
- ❖ Microbiologic air sampling after construction of critical care areas: operation theatre, intensive care unit, and protective isolation rooms for immune compromised patients
- ❖ Periodic culturing of water and dialysate in haemodialysis units (at least once a month and during outbreaks)
- ❖ Periodic culturing and during outbreaks of drinking water, tap water, dental unit, pharmacy, swimming and hydrotherapy pool water.

- ❖ Certain equipment in healthcare settings (e.g., biological safety cabinets) may also be monitored with airflow and particulate sampling as part of adherence to a certification programme.

3. For research purposes

- ❖ Well-designed and controlled experimental methods and approaches can provide new information about the spread of health–care associated diseases.

4. To monitor a potentially hazardous environmental condition, confirm the presence of a hazardous chemical or biological agent, and validate the successful containment of the hazard for example to detect the release of an agent of bioterrorism in an indoor environmental setting.

Chapter 7
SAFE ENABLING ENVIRONMENT FOR IPC

7.1: INTRODUCTION

Patient care activities should be undertaken in a safe environment that facilitates practices related to preventing and controlling HAIs. This includes appropriate infrastructure (WASH, screening and isolation areas), supplies and equipment for IPC, and standards for reducing overcrowding and optimizing staffing levels in healthcare facilities. The healthcare infrastructure should optimize IPC practices, requiring collaboration between the Ministry of Health Infrastructure Department, Standards, Compliance, Accreditation and Patient Protection (SCAPP) Department and the Infection Prevention Control Section to ensure these requirements are met.

This chapter highlights the Standards for Healthcare built environment, equipment and supplies for IPC.

The National level is responsible for developing guidelines for the built environment to enhance quality and safety for all patients and health and care workers.

All Healthcare facility leadership, including Public, PFP and PNFP, are required to coordinate with the national level to ensure that the built environment guidelines are followed during the construction, expansion, and renovation of healthcare facility infrastructure, ensuring a safe environment for both patients and health and care workers. HealthCare facility leaders must also keep track of material stockpiles and provide regular maintenance and repair services of IPC equipment and infrastructure as per the upto-date Ministry of Health Medical Equipment and Infrastructure Management Guidelines.

7.2: KEY BUILDING FEATURES FOR APPROPRIATE IPC

For all Health facility construction, there is need to consult with the IPC team at planning level to ensure that IPC standards for ventilation, patient flow, isolation facilities, hand washing facilities, waste management and medical equipment decontamination are put in place.

The Ministry of Health's standardized plans for different facility levels, as well as considerations for workflow and infection control, should guide the design process. This includes factors such as site selection, structural planning, and utility service provision. Collaboration among designers, health facility management, infection control programme heads, and IPC committees at healthcare institutions is critical for incorporating infection control measures into HCF layout and design during facility expansion or new HCF construction.

The following gives a highlight of the key infrastructure guidelines to consider while designing and laying out a healthcare facility:

Table 24: *Key Building features for IPC*

ITEM	RECOMMENDATIONS
Site selection	❖ Consider good cross ventilation ❖ Location should be in common wind directions ❖ Orient building not to allow too much sunshine ❖ Ensure that waste disposal is possible ***To note:*** *Avoid swampy areas or sites with poor drainage are not good sites and areas with plenty of air and noise pollution*
Floors	❖ Must be made of continuous and impervious material. ❖ Must be made of Terrazzo or cement or any other materials that fit this description ❖ Corners between walls and floors should be covered and with no cavities ❖ Any repairs for the floor should be done immediately ***To note:*** *Avoid slippery and easily damaged materials by wheel able materials, floor carpets, wooden floors and floor tiles in patient care areas.*
Walls	❖ Must be smooth and homogeneous ❖ Must be contracted with water resistant material ❖ Must be covered with water proof and washable paint ***To note:*** *Avoid wall tiles in patient care areas however can be used in sanitary facilities*
Surfaces Fixtures and	❖ Must be constructed with finishes which are durable, easy to clean, smooth, non-porous and water resistant. ***To note:*** *Avoid fixtures that cannot be easily cleaned regularly in the clinical areas.*
Ceilings	❖ Should be made of a cleanable durable, water-resistant surface material.
Doors	❖ Should swing to the inside and outside ***To note:*** *Doors with handles should be avoided in patient care areas*

ITEM	RECOMMENDATIONS
Windows and Window	❖ Must be wide enough to let in enough natural light and good ventilation
coverings / Curtains	❖ Window covering/ curtains should be made from light and washable materials
Storage	❖ Health facilities must have a storage place for major pieces of equipment such as beds, mattresses, hoists, wheelchairs, and trolleys that are not actively in use. ***To note:*** *Avoid storage of equipment not in use in patient care areas*
Central Sterile Supplies Department (CSSD)	❖ The CSSD should ideally be divided into three distinct sections: disinfection, packaging, and sterilization, as well as storage with a unidirectional flow. ❖ These sections should be physically separated to prevent contaminants from spreading to clean areas. ❖ Adequate airflow patterns are recommended to isolate contaminants in the decontamination area contaminants in the decontamination area ❖ Availability of adequate hand hygiene facilities in each section ***To Note:*** *A CSSD is to be installed at a General Hospital, Regional Referral Hospital and National Referral Hospitals*
Isolation facilities	❖ Each facility should have a designated isolation unit separate from other units ❖ Should be configured in a unidirectional flow for staff and patients. ❖ Should have adequate ventilation, particularly in locations such as burns units, theatres, and ICUs. ❖ Hand hygiene stations should be located at all points of care, entrances and exits. ❖ Surfaces must be easy to clean and crack-free.

7.3: SUFFICIENT ENERGY

- A consistent power supply is required to ensure patient safety and the seamless running of healthcare facilities. Water pumping, sterilization, illumination, and medical device operation all necessitate sufficient energy.
- Efficient lighting in every area of wards or departments permits cleaning workers to clean better.
- Clinical spaces should use light fixtures that are easy to clean and unlikely to collect dust e.g. open up-lights.
- The location and design of luminaires should permit easy changing of lamps and frequent cleaning.
- They should be designed so that there are no ledges or ridges and they allow ease of access for cleaning.

7.4: ADEQUATE VENTILATION

- Ensure that ventilation systems are designed to provide adequate air exchanges and control airflow patterns through the following measures;
- Ensure there is unidirectional flow of air to prevent the spread of droplet or airborne particles from contaminating the environment.
- Utilize natural ventilation where possible, considering the layout and architectural design of the facility.
- Balance natural ventilation with the need for controlled airflow in critical areas. The following areas typically have special ventilation requirements which can be obtained through consultation with relevant bodies as per specific standards:
- operating rooms
- Intensive care and high dependency units
- Microbiology containment laboratories
- Mortuaries
- Isolation rooms for airborne infectious diseases
- Rooms for highly immunocompromised patients
- Cardiac catheterization/interventional radiology units

- Bronchoscopy and sputum induction rooms (where a risk assessment has indicated a tuberculosis risk).

7.5: WATER SANITATION AND HYGIENE (WASH) INFRASTRUCTURE

Functional Water, Sanitation and Hygiene (WASH) services contribute to improved quality and safety of care leading to prevention, reduction and control of infectious diseases and associated mortality, improved occupational health, staff morale and performance, and increased trust in healthcare services.

WATER

- The health facility should have continuous access to quality, reliable, accessible and adequate water supply for use. Water should be piped into the healthcare service points and provided at all critical points of care for the purpose of hand washing.
- It is advised to maintain a 72-hour water reservoir for use during water outages. Having alternative water sources such as pump water and rainwater harvesting is recommended.
- Additionally, water for specialized areas such as dentistry, burns and dialysis units (chemical and microbiological quality) should be sufficient and conform to quality recommended standards. Specialized units connected to the main water must have backflow prevention devices that prevent water running back into reticulated water systems.
- Use the cleanest water possible, ideally from an improved source; piped water, boreholes, protected wells, protected springs, rainwater (from protected rainwater harvesting systems), or water vendors using one of these sources and these should be no more than 500 meters from the facility.
- The quality of water used at a HCF should be routinely monitored and tested by an accredited laboratory, National Water and Sewerage Corporation, District Environmental Health Officers at intervals not exceeding 3 months. Water quality testing is done at the National Reference Water Quality Laboratory under the Environmental Laboratories Section of the Ministry of Water and Environment.

NB: For more details on quality and amounts required per facility, refer to the WASH in healthcare facilities guideline, Uganda 2022.

HAND WASHING FACILITIES

Functional Hand washing facilities, including hand wash basins with running water and drainage systems (basins for holding grey water after hand hygiene), are essential at all points of care within the healthcare facility such as triage areas, medical examination rooms, delivery rooms, treatment rooms, patient wards, waiting areas, health facility entrances/ gate, at the sanitary facilities to uphold proper hygiene standards.

In instances where traditional handwashing facilities are impractical or unavailable, available, low-cost manual hand washing facility models such as improvised hand, foot or knee operated portable hand washing facilities can be utilized as alternatives.

To ensure accessibility and compliance with hygiene protocols it is recommended to have at least one functional Hand hygiene station per 10 beds in the wards. Additionally, one should be available in other patient care areas for example procedure rooms, consultation rooms, injection rooms and other areas of care like laboratory, mortuary, pharmacy among others. To prevent confusion between soap and alcohol hand rubs, alcohol hand rub dispensers should not be positioned next to sinks.

It is recommended that healthcare facilities prioritize the maintenance and repair of these facilities to ensure accessibility and availability of running water continuously.

Operation and Maintenance of Portable Hand **Washing Stations:**

- **Cleaning:** Portable handwashing stations should be cleaned regularly with soap and water to remove any dirt or residue. Disinfecting solutions can also be used to sanitize the surfaces effectively. It's crucial to pay special attention to high-touch areas such as faucet handles and soap dispensers.
- **Refills:** Adequate supplies of soap and water should be consistently available for users. Healthcare facilities should establish a system for monitoring soap and water levels in portable stations and ensure timely refills to prevent interruptions in hand hygiene practices.

- **Positioning:** Proper positioning of portable handwashing stations is essential to encourage their use and accessibility. Stations should be strategically placed in areas where they are easily visible and convenient for staff, patients, and visitors. Additionally, consider factors such as proximity to patient care areas and foot traffic patterns when determining placement.
- **Repair and Replacement:** Regular maintenance checks should be conducted to identify any issues with portable handwashing stations promptly using a checklist. Facilities should have protocols in place for repairing malfunctioning stations or replacing them if necessary. This ensures that hand hygiene facilities remain operational and effective in promoting infection control measures.

By implementing comprehensive operation and maintenance practices for portable handwashing stations, healthcare facilities can sustain a hygienic environment and support the overall wellbeing of patients, staff, and visitors.

Detailed guidance on these procedures can be found in the provided Annex.

CLEANING AND DISINFECTION OF ALCOHOL-BASED HAND RUB (ABHR) CONTAINERS:

It is imperative to establish protocols for the routine cleaning and disinfection of alcohol-based hand rub (ABHR) containers. These containers serve as essential tools in maintaining hand hygiene practices among healthcare workers, patients, and visitors. To ensure the integrity of ABHR solutions and minimize the risk of cross-contamination, facilities should implement a systematic approach to cleaning and disinfecting ABHR containers.

- **Routine Maintenance:** Healthcare facilities should establish a regular schedule for cleaning and disinfecting ABHR containers, with frequency determined by usage levels and environmental factors. This should include daily cleaning as well as periodic disinfection to remove any accumulated dirt, residue, or potentially harmful pathogens.
- **Cleaning Procedures:** Cleaning of ABHR containers should be conducted using appropriate disinfectants and cleaning agents

recommended by regulatory authorities or infection control experts. Facilities should provide guidance on proper cleaning techniques, ensuring thorough coverage of all surfaces, including the dispenser nozzle and exterior of the container.

- **Disinfection Protocols:** Following cleaning, ABHR containers should undergo disinfection using approved disinfectants with demonstrated efficacy against a broad spectrum of pathogens, including enveloped viruses, bacteria, and fungi. Disinfection procedures should be meticulously followed to achieve optimal results and minimize the risk of microbial contamination.
- **Documentation and Monitoring:** Facilities should maintain records documenting the cleaning and disinfection of ABHR containers, including dates, times, and personnel responsible for the task. Regular monitoring and audits should be conducted to assess compliance with cleaning protocols and identify areas for improvement.

Below is an SOP on the cleaning and disinfection of ABHR containers

Table 25: *Recommended specifications for Hand Hygiene facilities*

HAND WASHING FACILITY	SPECIFICATIONS
Hand washing basin	❖ Should be placed a distance away (atleast 2 metres) from patient beds and places for preparation of sterile equipment to minimise infection spread from splashes ❖ Should be made of non-porous material, oval shape inside with dimensions of 25cm by 35cm depth and without overflow ❖ It is recommended providing one sink to at least every ten beds, with soap available at every sink ❖ Should be of elbow, foot or automatic operating taps, PVC traps and plastic gadgets ❖ Should be a wall-mounted basin fixed at 120 cm above floor. ❖ Taps should be opened by using an elbow or foot operating system (2) ❖ Scrub sink - It should be provided a handwashing facility, with hands free device, that allows staff to wash hand and forearms, located in a dedicated area in the vicinities of: operating rooms (Surgical Dept.); resuscitation rooms (Emergency Dept.) and delivery rooms (Obstetrics Dept.) ***To Note:*** *For disabled people, Wheelchair accessible hand wash basin which is wall mounted with dimensions of 510mm (length) by 685mm (width).*
Soap / detergents dispenser	❖ Should be soap dispenser (manual or automatic)

HAND WASHING FACILITY	SPECIFICATIONS
Hand drying equipment materials	❖ Should be a centered feed hand towel dispenser ❖ Hand drying material should be a disposable paper towel
Water supply	❖ Both hot and cold water should be provided where possible
Hand Sanitizer dispenser	❖ Should be positioned at each point of care ❖ **Type:** Contactless ❖ **Capacity:** refillable. ❖ **Mount:** Wall mounted or on a stand with adjustable height. ❖ Dispensing volume: 1 – 1.5ml

SANITATION

Maintaining robust sanitation facilities is critical for infection prevention and control within healthcare facilities. Adherence to WASH principles is essential in constructing, rehabilitating, and maintaining these facilities to mitigate the risk of healthcare-associated infections (HAIs).

Key considerations for sanitation facilities include:

- **Infection Prevention Focus:** Ensure sanitation facilities are designed to prevent the transmission of pathogens, thereby reducing the risk of HAIs among patients, staff, and visitors.
- **Accessibility and Availability:** Provide convenient and accessible sanitation facilities that are fully functional and safe for use by all individuals accessing the healthcare facility.
- **Separate Facilities:** Allocate separate toilets or latrines for male and female patients and staff to minimize the risk of cross-contamination.
- **Toilet Requirements:** Ensure an adequate number of toilets per outpatient setting to prevent overcrowding and maintain hygiene standards, with facilities ideally connected to a sewerage system for safe waste disposal. Should have separate toilets or latrines for male and female patients and staff. One per 20 people.
- **Hand Hygiene Integration:** Install handwashing facilities in close proximity to sanitation facilities to promote proper hand hygiene practices, a cornerstone of infection prevention.
- **Waste Management:** Implement proper waste disposal measures, including the provision of sanitary waste bins in women's facilities, to minimize the risk of contamination and the spread of infectious agents.
- **Expert Consultation:** Engage with relevant authorities, such as the Ministry of Health's Department of Environmental Health, to ensure the selection of appropriate sanitation technologies and compliance with national infection control standards.

BATHROOM HYGIENE

Bathroom facilities play a crucial role in infection prevention and control efforts within healthcare settings. Ensure alignment with bed capacity and prioritize cleanliness and maintenance to reduce the transmission of pathogens:

- **Infection Control Design:** Design bathrooms to facilitate easy cleaning and disinfection, minimizing surfaces where pathogens can harbor and promoting a hygienic environment.
- **Drainage Systems:** Maintain well-functioning drainage systems to prevent standing water and potential breeding grounds for bacteria and other pathogens.
- **Fixture Materials:** Use materials for bathroom fixtures that are resistant to microbial growth, easy to clean, and maintain, reducing the risk of contamination.
- **Flooring and Accessibility:** Install smooth, non-porous flooring that is easy to clean and disinfect, and ensure accessibility for cleaning staff to maintain optimal hygiene standards.

Waste water Management

Wastewater in healthcare facilities is generated from various sources, including cleaning activities, handwashing, laundry, and medical procedures such as surgeries and dialysis. Proper management of wastewater is essential to minimize the risk of spreading pathogens and pollutants into the environment, as well as to comply with regulatory standards.

Key Considerations:

Treatment and Disposal:

- Wastewater generated in healthcare facilities should undergo treatment before final disposal to remove contaminants and pathogens.
- Treatment methods may include on-site systems such as septic tanks and soakage pits, or off-site treatment through wastewater treatment ponds.

- The level of treatment required depends on the types of contaminants present in the wastewater and local environmental regulations.

Connection to Sewer Systems:

- Healthcare facilities located in urban areas should ideally be connected to municipal sewer systems for the safe disposal of wastewater.
- Connecting to sewer systems ensures that wastewater is treated at centralized treatment plants before being released into the environment, minimizing the risk of contamination.

Disinfection Measures:

- In facilities where on-site wastewater treatment is necessary, contaminated liquids should be disinfectesd before final disposal.
- Chlorine-based disinfection is commonly used to kill pathogens and reduce the risk of transmission during wastewater disposal.

Drainage Systems:

- Proper drainage systems should be installed to manage wastewater from various sources within the healthcare facility.
- Ablution waste from patient care areas, lavatories, sluice rooms, and other locations where greywater is produced should be effectively managed to prevent cross-contamination.

Ground Seepage Systems:

- Wastewater from handwashing points and non-contaminated sources can often be disposed of using simple ground seepage systems.
- These systems allow wastewater to percolate through the soil, where natural processes help to filter out contaminants before reaching groundwater sources.

Fecal Sludge Management:

- Healthcare facilities with on-site sanitation facilities, such as pit latrines or septic tanks, should implement proper fecal sludge management practices.
- This involves regular emptying and safe disposal of sludge to prevent groundwater contamination and the spread of diseases.

Consultation and Compliance:

- Healthcare facilities should consult with relevant regulatory authorities and environmental health departments to ensure compliance with local regulations and guidelines.
- Regular monitoring and testing of wastewater quality may be required to assess the effectiveness of treatment measures and ensure public health protection.

To Note: *For more information on the ministry of health recommendation for WASH in HCFs, please refer to the National WASH Guidelines.*

Appropriate facilities for healthcare waste management

Healthcare facilities must establish a robust Healthcare Waste Management (HCWM) system to ensure the safe handling, storage, and disposal of various types of waste, including sharps, biohazardous, infectious, toxic, chemical, and radioactive waste. The aim is to minimize the risk of environmental contamination with infectious waste, safeguarding public health and safety.

Waste Storage:

- **Central Storage Facilities:** Designated central storage facilities should be provided for hazardous healthcare waste (HCW), with sufficient capacity to contain all hazardous waste produced weekly.
- **Location:** Central storage facilities should be situated within the healthcare facility premises, close to the treatment unit or transport off-site area but away from food storage or preparation areas.

- **Enclosure and Security:** Facilities must be totally enclosed and secured from unauthorized access by humans, animals, birds, and insects to prevent contamination or accidents.
- **Hygiene and Infrastructure:** Central storage facilities should be easy to clean and disinfect, equipped with impermeable hard-standing bases, adequate water supply, drainage, and ventilation systems.

Waste Treatment:

- **Incineration or Alternative Technologies:** Adequate incineration or alternative treatment technologies must be available, either on-site or off-site, and managed by authorized waste management services.
- **Incinerator Standards:** Healthcare facilities, particularly Health Centre IVs and above, should have incinerators that meet specific standards outlined in the Ministry of Health Comprehensive Standards Manual (2022).
- This includes considerations such as dual-chamber incinerator types, combustion efficiency, resident time of air, oxygen content, exhaust gas treatment, capacity matching facility size, and security measures.

Placenta Pit:

- **Availability:** Health Centre III facilities and above should have a functional placenta pit within the compound.
- **Specifications:** Placenta pits should adhere to construction specifications outlined in the WASH in Healthcare Facilities guidelines to ensure safe and hygienic disposal of placental waste.

NB: Details of Specifications for construction of the placenta pit and incinerator can be accessed in the WASH in healthcare facilitated guidelines.

7.6: IPC SUPPLIES

IPC supplies are essential to safeguard healthcare workers, patients, and visitors from the transmission of infectious agents within healthcare facilities.

Personal Protective Equipment (PPE):

- **Essential Equipment:** Medical non-sterile and surgical sterile gloves, surgical masks, goggles or face shields, gowns, respirators, and aprons should be readily available in adequate quantities at all healthcare facilities.
- **Storage and Accessibility:** PPE should be stored in a clean and dry area to prevent contamination and be easily accessible close to the point of use.
- **Single-Use Preference:** Preferably, PPE should be single-use to minimize the risk of cross-contamination. Clear policies and standard operating procedures should be in place for the placement and decontamination of reusable items.

Waste Management Supplies:

- **Color-Coded Bins:** Color-coded bins with liners should be provided at all waste generation points, including non-infectious waste, infectious waste, and pharmaceutical waste, to facilitate proper waste segregation and disposal.
- **Sharps Boxes:** Puncture-proof sharps boxes should be available at all generation points to safely dispose of sharps waste, minimizing the risk of needle-stick injuries.

Decontamination and Cleaning Supplies:

- **Disinfection Solutions:** Supplies for cleaning and decontaminating medical equipment and hospital environments should include disinfectant solutions such as chlorine solution, detergents, soap, buckets, mops, and squeegees.
- Regular and scheduled cleaning and decontamination of medical equipment and healthcare environments are essential to prevent the transmission of pathogens and maintain a safe and hygienic healthcare setting.

7.7: MEDICAL EQUIPMENT FOR IPC

Medical equipment include machinery used in healthcare facilities, such as autoclaves that necessitates calibration, maintenance, repair,

user training, and decommissioning. These devices may be employed independently or with accessories, excluding implantable or disposable items.

1. Autoclaves

Autoclave machines for steam sterilization are a standard measure in hospitals for the decontamination of used medical devices. Autoclaves are adaptable and are widely used in areas like healthcare, research, pharmaceutical manufacturing, and surgical preparation. The size and type of autoclave take workload into account, ensuring that each level of care has the capacity to use and maintain the equipment within the health facility (see table below for guidance on recommended autoclave for different levels of care).

- The IPC Programme suggests that the SOPs for using this technology be prominently displayed to guide users, and that health workers performing the sterilization be welltrained to avoid equipment damage. They are crucial in protecting public health because they serve as a cornerstone for preserving quality, assuring safety, and preventing healthcare-associated illnesses.
- To properly sterilize most materials and equipment, the recommended steam levels, pressure, and temperature settings for autoclaves normally entail steam at a pressure of 15-30 psi and a temperature range of 121°C to 132°C (250-270°F) for a duration of roughly 15-20 minutes.

7.8: STAFFING

Patient safety, infection prevention and control, and general wellbeing are all greatly impacted by appropriate staffing levels and training.

- Ministry of Health has provided clear guidelines on the proper staff-to-patient ratios at all care levels. These ratios have a direct impact on patient safety, infection control, and the caliber of healthcare services by ensuring that there are an adequate number of healthcare professionals and support workers in relation to the patient population.
- In addition to improving patient trust and satisfaction, maintaining ideal staffing levels helps to avoid a number of healthcare-related

problems, such as medical errors, patient damage, infections, neglect, deterioration, low satisfaction, burnout, resource waste, and legal challenges.

- Delivering timely, high-quality care, enhancing patient safety, and fostering a good healthcare environment all depend on having the proper staff-to-patient ratio.
- Effective healthcare systems must have adequate workforce in order to improve patient outcomes and the standard of treatment as a whole.

7.9: SPACING

The provision of sufficient space in clinical areas, particularly for each bed space (1.5 -2m between beds), is one of the most important considerations in the planning and design of inpatient accommodation.

- A risk-based approach should be taken to ensure that the environment is appropriate for carrying out clinical activities and undertaking manual handling operations while maintaining a good standard of infection control.
- For IPC reasons, it is imperative that staff are able to attend to one patient without impinging on the bed space or equipment of a neighboring patient.
- In the majority of cases, the dimensions in the health facility should be adequate (although bed spaces for critical care areas need to be greater for reasons of circulation space and the equipment used in these areas).
- It is also important that the physical environment complies with disability access requirements and does not compromise the privacy and dignity of patients.
- Spacing should consider the amount of and easy access to equipment around the bend area and access for staff to clinical wash-hand basins.

NB; Special considerations for spacing in special units e.g. burns, ICU and HDUs is required to provide for large medical care equipment

7.10: BED OCCUPANCY

Bed occupancy in all healthcare facilities, should ensure patient safety and reduce the risk of healthcare-associated infections. These recommendations encompass maintaining an appropriate ratio of beds to healthcare staff, allowing for efficient patient care and workload management. Adequate training and education for healthcare personnel are crucial to ensure the effective implementation of IPC protocol.

7.11: PEST, INSECT AND RODENT CONTROL

Pest control measures play a crucial role in infection prevention by minimizing the risk of vectorborne diseases and contamination of healthcare environments. Facilities should:

- **Regular Inspections:** Conduct regular inspections to identify and address pest infestations promptly, reducing the risk of vector-borne disease transmission.
- **Integrated Pest Management (IPM):** Implement IPM strategies that prioritize nonchemical control methods, minimizing the use of pesticides to reduce environmental impact and protect the health of patients and staff.
- **Safe Chemical Application:** When chemical pesticides are necessary, ensure their safe application by trained professionals following IPC guidelines and manufacturer's instructions to minimize exposure risks.
- **Monitoring and Surveillance:** Establish surveillance systems to monitor pest activity and evaluate the effectiveness of control measures, allowing for timely intervention and adjustments as needed to maintain a hygienic environment.

7.12: FOOD HYGIENE

Maintaining high standards of food hygiene is essential for preventing healthcare-associated infections and ensuring patient safety.

Facilities should:

- **Staff Hand Hygiene:** Promote proper hand hygiene practices among food handlers through education and training on IPC protocols, emphasizing the importance of handwashing before food handling and after contact with potentially contaminated surfaces.
- **Location of Hand-Washing Facilities:** Position hand-washing facilities strategically to ensure accessibility and encourage compliance with hand hygiene practices among food handlers, minimizing the risk of foodborne pathogen transmission.
- **Ward Kitchens:** Implement IPC measures in ward kitchens, including regular cleaning and disinfection of food preparation surfaces, equipment, and utensils to prevent crosscontamination and ensure food safety.
- **Training and Education:** Provide staff with IPC training specific to food hygiene, covering topics such as safe food handling techniques, proper sanitation practices, and measures to prevent foodborne illnesses in alignment with IPC guidelines.

For more information on structural and technological options for WASH at healthcare facilities, refer to the National sanitation and hygiene guidelines

7.13: IPC MATERIALS

Pharmacy leads at the facility, district, and regional levels are the custodians of drugs and materials at their respective levels, and they use various stock record methods, including paperbased bin cards to monitor stock (first in: first out) and electronic inventory database records. Furthermore, the Regional level oversees the district, whereas the district oversees the facility and reports and requisitions such as material replenishment requisitions. Monitoring and requesting supply restocking is typically the responsibility of facility managers at the facility level, with assistance from the pharmacy lead.

The IPC focal person should assist the pharmacy lead in identifying what material needs to be included in requisition to determine restocking and submits it to the district level who send it to the region and national level. WHO recommends that, in order to establish an efficient IPC programme at the facility level, the HCF leadership a dedicated budget that can be

utilized to refill urgently required materials as well as other costs associated with running the programme to avoid running out of necessary items/ supplies. It is critical to preserve a buffer stock of supplies for usage during emergencies, which can include epidemics or catastrophic events, in order to maintain a well-prepared healthcare environment.

The ideal time frame for requesting restocks varies based on the type of supplies, but it should correspond to usage patterns to avoid stockouts and ensure a seamless response to emergencies and potential outbreaks. Refer to the Ministry of health National Medical stores log as well as the Standards, Compliance, Accreditation and Patient Protection guidelines on the recommended national supplies and material catalogue and quantities to request according to level of care.

Other Enabling Environment Factors

Creating an enabling environment in healthcare facilities is essential for supporting infection prevention and control efforts and ensuring quality patient care.

Key components include:

- **Workload Management:** Proper workload management involves maintaining adequate staffing levels and providing ongoing training and education to healthcare personnel to effectively manage their responsibilities while preventing infection transmission. Efficient patient care systems, patient isolation areas, and rigorous environmental cleaning are essential components of workload management.
- **Staffing and Bed Occupancy:** Balancing staffing levels and bed occupancy rates is critical for ensuring patient safety and infection control. Facilities should establish standards and guidelines for workload, staffing ratios, and bed occupancy based on patient acuity, service demand, and available resources.
- **Infrastructure and Equipment:** The physical environment of healthcare facilities, including infrastructure, supplies, and equipment, plays a vital role in supporting infection prevention and control efforts. Facilities should ensure that infrastructure is up to date, adaptable, and adequately furnished to meet changing needs and IPC standards.

- **HAI Surveillance:** Implementing robust healthcare-associated infections (HAIs) surveillance systems and reporting mechanisms is crucial for monitoring and responding to infections promptly. Facilities should establish surveillance protocols to track infection rates, identify trends, and implement interventions to prevent transmission.

Chapter 8:
TRAINING AND EDUCATION

8.1: INTRODUCTION

Education and training are a critical component of effective IPC implementation at all levels of healthcare delivery. For an effective IPC Programme there is a need to have a systematic and well-coordinated training system with a well-structured curriculum to guide trainings at all levels. It is key that as country we have a critical mass of IPC professionals that can support key interventions at all healthcare levels towards reduction in hospital acquired infections. The WHO prescribes an IPC specialist as a health worker with professional training in IPC from a recognized institution.

OBJECTIVE

To create a critical mass of healthcare workers with the prerequisite knowledge and skills of IPC in the country.

The WHO identities three (3) groups requiring training:

- IPC Technical Staff
- Healthcare workers; Clinical
- Healthcare workers Non-clinical.

IPC Training Programmes

- Pre-service Training
- In-service training

8.2: PRE- SERVICE TRAINING

Pre-service training in infection prevention and control is a form of training for all healthcare professionals in higher educational institutions such as allied healthcare training institutions (Laboratory, Clinical Officers, Public health professional etc.), Nursing schools, medical schools (Doctors, dentists and pharmacists) in basic IPC knowledge and skills, during the tenure of the education programme.

Working with relevant stakeholders (MoH, Partners, and IPC accredited bodies), all higher health education institutions shall review and include basic IPC competencies in the training curricula as part of the training programme. Support will be provided to ensure that the curricula for the different educational institutions is standardized so that information is well streamlined across institutions.

8.3: IN-SERVICE TRAINING

In service training is a form of IPC training for healthcare offered during their tenure of service at their workplace. The training might be a professional qualification upgrade or elective with the primary objective of enhancing knowledge and skills required for professional development.

Training of different healthcare workers is instrumental in building continued capacity.

MOH will set up and operationalize routine IPC training for all HCWs to sustain the knowledge and skills through routine CMEs, on-site mentorship, coaching, and support supervision with didactics, practical sessions, simulations and mentorships. The in service training curricula will be tailored to cadre of HCWs and level of healthcare facilities. The administration should guarantee that all new health workers are instructed on the following competences and monthly sessions on standard precautions.

- Introduction to infection prevention and control
- Overview of Standard precautions; (Hand hygiene improvement strategy, Appropriate use of Personal protective equipment according to risk injection safety, environmental cleaning, healthcare waste

management, linen management, reprocessing of reusable material, respiratory hygiene/ cough etiquette)

- ❖ Prevention and management of blood and body fluid accidental exposure
- ❖ Transmission-based precautions
- ❖ HAIs prevention measures (prevention of surgical site infections, prevention of Ventilator- associated pneumonia, prevention of catheter- associated bloodstream infections, prevention of Central line – associated bloodstream infections)
- ❖ Infection prevention and control audit, monitoring and evaluation, and feedback
- ❖ Water Sanitation and Hygiene (WASH)

To Note: Other topics to consider including: Antimicrobial resistance, outbreak preparedness/ screening, isolation and notification, Cascading training, IPC advocacy, QI projects.

The national level shall work with the Ministry of Education to develop and revise IPC pre-service and in-service curricula, as well as establish communities of practice to serve as a platform for cascading IPC trainings in the country. The MoH shall conduct annual monitoring and evaluation of the effectiveness of national IPC education and training implementation, and map for stakeholders supporting IPC training and education.

The facility level is responsible for implementing the national curriculum, maintaining and improving educational quality, support HCWs to undergo professional training, ensuring the availability of necessary infrastructure and resources for effective learning, providing comprehensive support to health and care workers to address their needs, and ensuring training and education is as practical as possible and is tailored to the local context.

Chapter 9
MONITORING, EVALUATION & QUALITY IMPROVEMENT

9.1: INTRODUCTION

Monitoring and evaluation are an essential aspect of promoting best practices, and over time results in behaviour or systems change towards improved quality of care and patient safety. Infection Prevention and Control practices are simple and routine, but they require diligence and attention to detail. These practices should be made habitual to all healthcare providers and this calls for continuous monitoring and evaluation to identify progress, gaps and ultimately inform appropriate quality improvement measures.

This chapter offers guidance on conducting monitoring, evaluation and use of multi-modal improvement strategies for Infection prevention and Control. It provides a specific set of indicators and questions to monitor and evaluate, specifies the reporting & data collection tools at different levels as well as timelines and responsible persons.

9.2: MONITORING & REPORTING

A. Monitoring tools

Through the Health Management Information System (HMIS), routine data on relevant IPC practices shall be collected to determine the quality of healthcare, level of IPC measures in healthcare facility and, enable planning and decision making using validated IPC facility assessment tools.

B. Data collection, storage and reporting

Using validated IPC facility assessment tools, data on relevant IPC information shall be collected, hosted by the Ministry of Health database, and regularly shared or accessed through a dedicated IPC dashboard.

At national, regional, and district levels, designated IPC focal persons shall be required to conduct quarterly assessments in healthcare facilities. These assessments utilize a standardized and digitalized IPC healthcare facility assessment tool provided by the Ministry of Health.

The national IPC programme shall focus on analysing Surgical Site Infections (SSI) as a crucial indicator, done quarterly using data from the Ministry of Health's HMIS (dhis2).

The IPC Section shall create a database for healthcare workers equipped with IPC knowledge and skills to "champion" IPC practices in facilities. The database shall include; The IPC focal person, telephone contact, email and level / type of training and any other key information. Validation shall be done periodically for an up-to date database.

Key areas for routine monitoring

Table 26: *Key areas for routine monitoring*

No.	Key areas	Tools	Frequency	Data storage/ Shared platform	Person responsible
i.	Hand Hygiene Compliance	❖ The WHO Hand Hygiene Self Assessment F	Quarterly	IPC dashboard with access restrictions at each level.	IPC focal persons
ii.	Appropriate utilisation of personal protective equipment (PPE)	❖ MoH IPC Facility Assessment Tool.	Quarterly		
iii.	Environmental cleaning and disinfection.	❖ MoH IPC Facility Assessment Tool.	Quarterly		
iv.	Healthcare waste management	❖ MoH IPC Facility Assessment Tool.	Quarterly		
v.	Safe injection practices	❖ MoH IPC Facility Assessment Tool.	Quarterly		
vi.	Surgical Site Infection surveillance.	❖ MoH IPC Facility Assessment Tool.	Quarterly	Dhis2, IPC dashboard with access restrictions at each level.	
vii.	Compliance with isolation precautions	❖ MoH IPC Facility Assessment Tool.	Quarterly	IPC dashboard with access restrictions at each level.	

No.	Key areas	Tools	Frequency	Data storage/ Shared platform	Person responsible
viii.	Staff training	❖ No. of Health workers equipped with IPC skills.	Quarterly	IPC dashboard with access restrictions at each level.	IPC focal persons
ix.	Compliance with disinfection and sterilisation process.	❖ MoH IPC Facility Assessment Tool.			
x.	Screening capacity	❖ MoH IPC Facility Assessment Tool.			
xi.	Bed occupancy	❖ MoH IPC Facility Assessment Tool.			
xii.	Water supply and storage	❖ MoH IPC Facility Assessment Tool.			
xiii.	Up to date National guidelines.	❖ MoH IPC Facility Assessment Tool.			

9.3: EVALUATION

Evaluation is a systematic method for collecting, analyzing, and using data to examine the effectiveness and efficiency of programs and, as importantly, to contribute to continuous programme improvement[1]. IPC evaluations are used to inform the programme on the adherence to IPC policies and guidelines as well as identify areas that require urgent improvement.

Process evaluations will be conducted routinely to inform the country the status of IPC practices using standardized national IPC assessment tool (s). These will be conducted on a quarterly and annual basis. Quarterly evaluations will be conducted by the health facility teams while annual evaluations will be conducted by an external agency like DHT, regional referral teams and/or ministry of health headquarter team.

IPC evaluations will be conducted through routine health facility IPC assessment and audits conducted by the health facility team and external assessors from the district health office, regional referral hospital and/or Ministry of health head quarter. Routine IPC health facility audits/assessment will be conducted on quarterly basis using the IPC health facility assessment tool.

In line with WHO requirements, Joint External Evaluation (JEE) of IPC will be conducted by a team of IPC experts every four years. JEE will aim at ascertaining the status of the national IPC programme to prevent, detect and rapidly respond to public health threats as well as independently measure IPC status and progress in achieving the IPC strategic targets in case of an outbreak, the national IPC assessment tool will be used to conduct rapid assessment across the affected region. These rapid assessments should be conducted by both the national, regional and district teams and uploaded into the national database for easy access, analysis and use by the decision makers.

9.4: QUALITY IMPROVEMENT

The QI recommendations in this section are in line with the National Development Plan III (2020/21-2024/25), the National Quality Improvement framework and strategic plan 2020/21-2024/25 “to have effective implementation of QI interventions that meet expected health service

standards in Uganda."

Quality improvement (QI) is defined as a continuous, day to day process of identifying existing gaps/ problems in the system with the aim of finding opportunities for improvement and implementing solutions to them. It is an approach that applies scientific methods to the analysis of performance and implementing systematic improvement efforts.

What if a problem is identified?

To solve an IPC problem in a sustainable way, we use the principle of an iterative cycle of improvement (Plan, Do, Study, Act or PDSA Cycle). It involves testing a change in the real work setting by -planning it, trying it, observing the results and acting on what is learned.

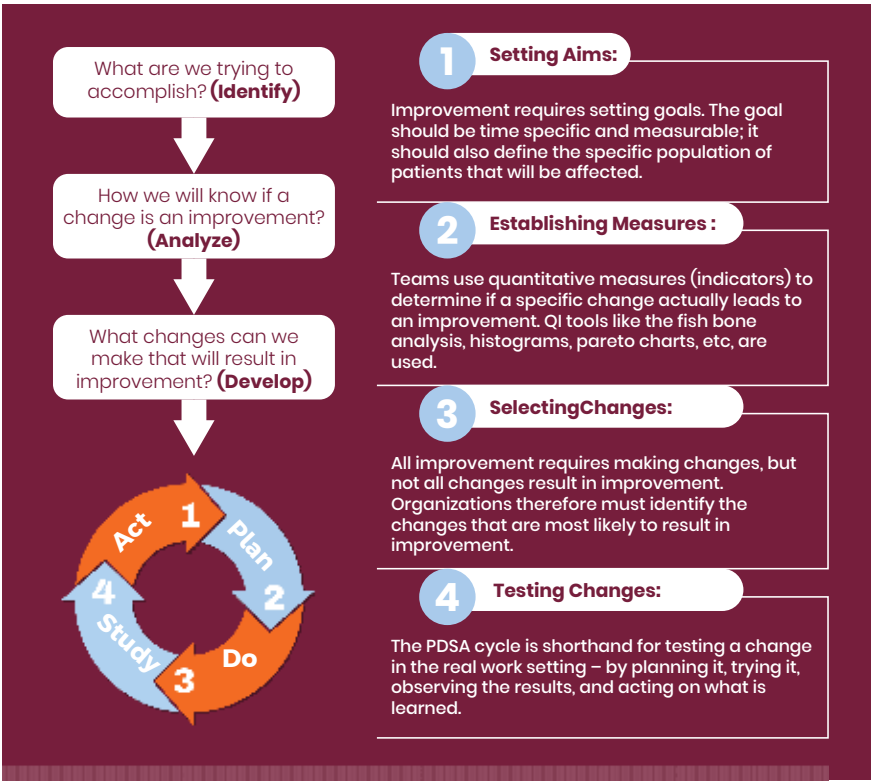


Figure 19: *Quality Improvement Model*

How do we select changes?

The WHO IPC multimodal improvement strategy (MMIS):

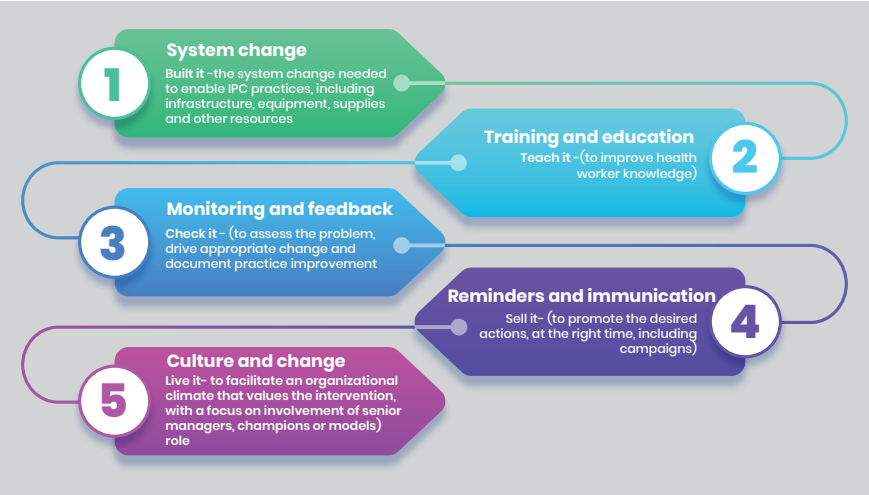
A multi-model strategy involves using multiple approaches in combination, to influence the behavior of health workers towards the necessary improvements that will impact patient outcome and contribute to organizational culture change.

A successful multi-modal improvement strategy for IPC requires ongoing commitment, adaptability and a culture of continuous learning and improvement within a healthcare facility.

FIVE KEY ELEMENTS OF MMIS:

The multimodal strategy consists of 5 elements implemented in an integrated way to guide action and provide a clear focus for the implementer. Targeting only one area (i.e. unimodal), is highly likely to result in failure. All five areas should be considered, and necessary action taken, based on the local context and situation informed by periodic assessments.

Figure 20: *five elements of the WHO's multi modal improvement strategy*



1. The system change needed to enable IPC practices, including infrastructure, equipment, supplies and other resources (Build it):

Questions to ask:

- What infrastructures, equipment, supplies and other resources (including human) are required to implement the intervention?
- Does the physical environment influence health worker behavior?
- How can ergonomics and human factors approaches facilitate adoption of the intervention?
- Are certain types of health workers needed to implement the intervention?

Practical example: when implementing hand hygiene interventions, ease of access to hand-rubs at the point of care and the availability of WASH infrastructures (including water and soap) are important considerations. Are these available, affordable and easily accessible in the workplace? If not, action is needed.

2. Training and education to improve health worker knowledge (teach it):

- Who needs to be trained?
- What type of training should be used to ensure that the intervention will be implemented in line with evidence-based policies and how frequently?
- Does the facility have trainers, training aids, and the necessary equipment?

Practical example: when implementing injection safety interventions, timely training of those responsible for administering safe injections, including carers and community workers, are important considerations, as well as adequate disposal methods.

3. Monitoring and feedback to assess the problem, drive appropriate change and document practice improvement. (Check it):

- How can you identify the gaps in IPC practices or other indicators in your setting to allow you to prioritize your intervention?
- How can you be sure that the intervention is being implemented correctly and safely, including at the bedside? For example, are there methods in place to observe or track practices?
- How and when will feedback be given to the target audience and managers?
- How can patients also be informed?

Practical example: when implementing surgical site infection interventions, the use of key tools are important considerations, such as surveillance data collection

4. Reminders and communications to promote the desired actions, at the right time, including campaigns (Sell it):

- How are you promoting an intervention to ensure that there are cues to action at the point of care and messages are reinforced to health workers and patients?
- Do you have capacity/funding to develop promotional messages and materials?

Practical example: when implementing interventions to reduce catheter-associated bloodstream infection, the use of visual cues to action, promotional/reinforcing messages, and planning for periodic campaigns are important considerations.

5. A culture of safety to facilitate an organizational climate that values intervention, with a focus on involvement of senior managers, champions or role models (Live it).

- Is there demonstrable support for the intervention at every level of the health system?

  For example, do senior managers provide funding for equipment and other resources?

- Are they willing to be champions and role models for IPC improvement?

- Are teams involved in co-developing or adapting the intervention?
- Are they empowered and do they feel ownership and the need for accountability?

Practical example: when implementing hand hygiene interventions, the way that a health facility approaches this as part of safety and quality improvement and the value placed on hand hygiene improvement as part of the clinical workflow are important considerations.

Note: The national IPC programme is responsible for ensuring that all healthcare facilities implement all PC interventions using multimodal strategies by ensuring the following elements are in place to facilitate the use:

- Expertise and necessary resources including policies, regulations and tools.
- Overall organizational culture changes to achieve an enhanced patient safety climate.
- Coordination and teamwork.
- Linkages with quality improvement initiatives and health facility accreditation.
- Healthcare facilities should adopt the national multimodal strategy framework developed by the IPC national level IPC team.
- The IPC focal point/team should be trained in the use of multimodal techniques.

Chapter 10
OCCUPATIONAL SAFETY & HEALTH IN HEALTHCARE FACILITIES

INTRODUCTION

Healthcare workers play a vital role in providing quality care to patients, but their work also exposes them to various occupational hazards. These hazards include exposure to infectious agents, hazardous chemicals, physical risks, and workplace violence. Among the most concerning risks are exposures to blood borne pathogens such as HIV, Hepatitis B, and Hepatitis C through needle stick injuries or mucous membrane contact, as well as airborne pathogens like tuberculosis, hazardous drugs, radiation, ergonomic strains from lifting patients.

Recognizing the importance of safeguarding the health and safety of healthcare workers, the World Health Organization-International Labour Organization (WHO–ILO) Global Framework for National Occupational Health Programmes for Health Workers emphasizes collaboration between ministries responsible for health, labor, social security, and other relevant organizations. This collaboration is essential for the development and implementation of comprehensive National Occupational Health Programmes tailored to protect and promote the well-being of healthcare workers across both public and private sectors.

In alignment with this framework, the following guidelines aim to address occupational health and exposure concerns within the context of National infection prevention strategies. By integrating measures to mitigate occupational hazards into infection prevention guidelines, healthcare institutions can create safer work environments for their workforce while simultaneously enhancing patient safety and quality of care.

Guidelines strive to tackle occupational health and exposure issues within the framework of national infection prevention strategies. By incorporating methods to alleviate workplace hazards into infection prevention protocols, healthcare facilities can foster safer environments for their staff, thereby bolstering patient safety and the overall quality of care provided.

This section outlines key OHS principles and practices within the realm of IPC to promote a safe working environment for all healthcare personnel.

1. **Risk Assessment:** Conduct a comprehensive risk assessment to identify potential hazards related to infectious agents within the healthcare facility. Consider factors such as the nature of the pathogens, modes of transmission, tasks performed by healthcare workers, and environmental conditions.

2. **Personal Protective Equipment (PPE):** Provide appropriate PPE to all healthcare workers based on their risk of exposure. This may include gloves, masks, gowns, and eye protection. Ensure proper training on the correct usage, disposal, and limitations of PPE.

3. **Engineering Controls:** Implement engineering controls to minimize the risk of exposure to infectious agents. This may involve installing ventilation systems, creating physical barriers, and utilizing equipment with built-in safety features.

4. **Administrative Controls:** Develop administrative controls to regulate healthcare practices and promote safe working environments. This includes establishing protocols for infection control, scheduling regular training sessions on IPC and OHS, and enforcing compliance with guidelines and regulations.

5. **Work Practices:** Encourage adherence to safe work practices among healthcare workers. Emphasize the importance of hand hygiene, proper waste management, and respiratory etiquette. Develop protocols for the safe handling and disposal of infectious materials.

6. **Immunization:** Promote immunization programs to protect healthcare workers from vaccine-preventable diseases. Offer vaccinations against influenza, hepatitis B, and other relevant pathogens. Maintain records of immunization status and encourage regular updates.

7. **Surveillance and Monitoring:** Implement surveillance systems to monitor healthcareassociated infections and occupational exposures. Promptly investigate any incidents or outbreaks and take corrective actions as necessary. Regularly review OHS protocols to identify areas for improvement.

8. **Psychological Support:** Recognize the psychological impact of working in environments with heightened risks of infection. Provide access to counseling services, peer support groups, and resources for managing stress and anxiety.

9. **Emergency Preparedness:** Develop contingency plans for managing emergencies such as outbreaks of infectious diseases or exposure incidents. Ensure that healthcare workers are trained to respond effectively to such situations while prioritizing their own safety.

10. **Collaboration and Communication:** Foster collaboration between healthcare workers, IPC teams, and OHS professionals to promote a culture of safety within the organisation. Encourage open communication channels for reporting concerns, sharing best practices, and implementing continuous improvement initiatives.

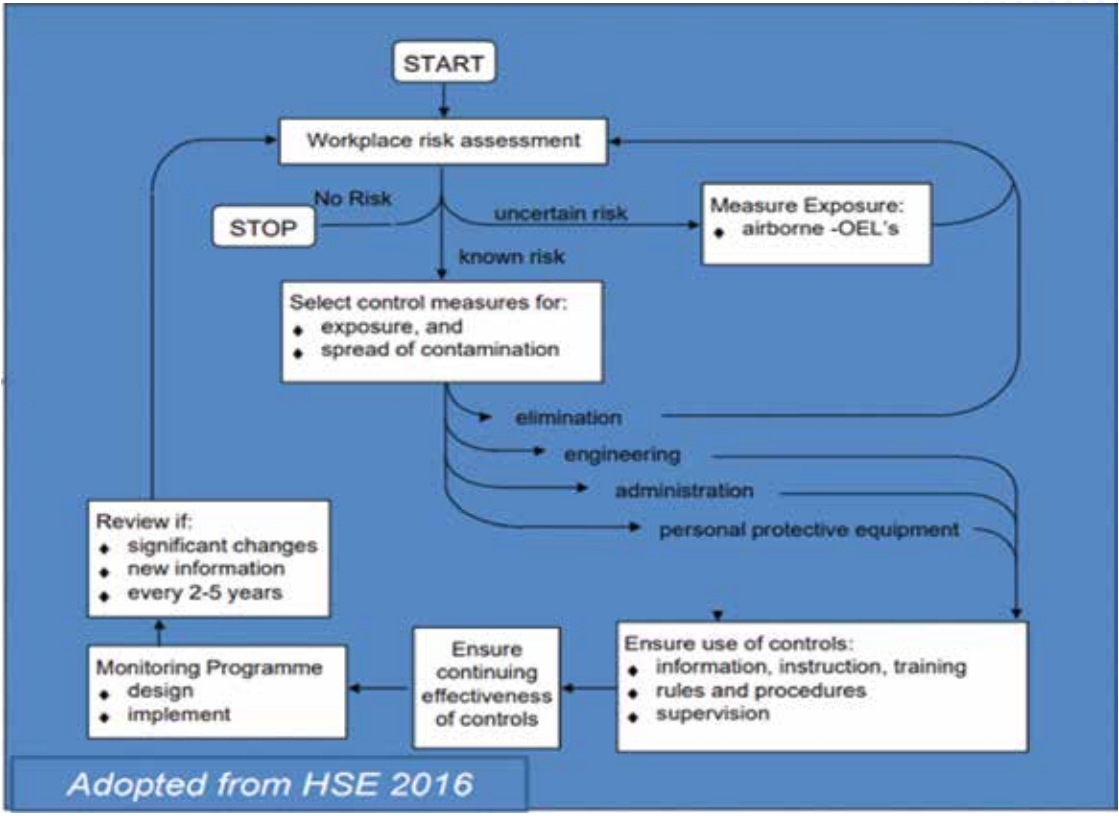
11. **Compliance and Evaluation:** Regularly assess compliance with OHS guidelines and IPC protocols through audits, inspections, and feedback mechanisms. Use performance indicators to measure the effectiveness of interventions and identify areas requiring further attention or resources.

By integrating occupational health and safety principles into infection prevention and control strategies, healthcare facilities can create environments that prioritize the well-being of both patients and healthcare workers, ultimately enhancing the quality of care and reducing the risk of healthcare-associated infections.

Consider occupational health surveillance if HCW are at risk of health hazards.

Health surveillance is required if there is an identifiable disease/adverse health effect and evidence of a link with workplace exposure and if it is likely the disease/health effect may occur Below are steps of occupational health surveillance.

Figure 21: *Steps of occupational health surveillance*



For more detailed guidance on post-exposure management, including counseling and prophylaxis, when necessary, as well as care and support in cases of illness refer to the National Guidelines for Occupational Safety and Health for the Health Workforce encompass

ANNEXES

UGANDA NATIONAL INFECTION PREVENTION AND CONTROL GUIDELINES

ANNEX 1: EXAMPLES OF DISINFECTANTS AND USES

DISINFECTANT	USES	COMMENTS
0.55% Orthophthalaldehyde (Cidex)	Used for high-level disinfection of medical devices e.g. respiratory and anesthetic equipment, flexible endoscopes, vaginal speculum	❖ The time required for high-level disinfection requires 10 to 12 minutes at 20^{0}C ❖ Once opened, the solution can be reused for 14 days.
2% Glutaraldehyde	Recommended for high-level disinfection of medical devices	❖ Immerse for 10 minutes for bactericidal activity, 20 minutes for tuberculocidal activity, and longer contact times (>3 hours) for sporicidal activity.
6-7.5% Hydrogen Peroxide	For high level disinfection	❖ For high-level disinfection, the immerse for 30 minutes. ❖ Once opened, the solution can be reused for 21 days
0.5-1% Chlorine Based Compounds	For environmental cleaning and low-level disinfection	❖ Objects should not be submerged for more than 30 minutes due to the element's corrosive activity
60-70% Alcohol	For disinfection and antisepsis	

ANNEX 2: TYPE OF MEDICAL DEVICE AND RECOMMENDED METHOD OF DISINFECTION

ITEM OR SITE	PREFERRED METHOD	ALTERNATIVE METHODS / COMMENTS
Airways and endotracheal tubes	❖ Single-use disposal or Heat sterilized in CSSD (CENTRAL STERILE SUPPLIES DEPARTMENT)	❖ Use disposable for airborne diseases if heat sterilization not available.
Ambu bags	❖ Send to CSSD for heat disinfection	❖ Ethylene oxide
Ampoules	❖ Wipe with 70% isopropyl alcohol and allow to dry before opening.	❖ Do not immerse in disinfectant
Bath water	❖ No addition of antiseptic routinely unless burns patient.	❖ Antiseptics increase GNB colonization.
Baths	❖ Clean with detergent and non- abrasive cream cleanser, Rinse and dry.	❖ Infected patients. As previous column. ❖ Wipe over with chlorine-based agent. Do not soak.
Bed and cots	❖ Wipe with warm water and detergent to remove all visible signs of dust and dirty. Dry.	❖ Disinfectant unnecessary
Bed frames	❖ Wipe with warm water and detergent. Dry.	-------
Bed locker	❖ Wipe with warm water and detergent. Dry. Clean inside locker once patient has been discharged	-------

ITEM OR SITE	PREFERRED METHOD	ALTERNATIVE METHODS / COMMENTS
Bedpans and urinals	❖ Wear non-sterile gloves ❖ Empty contents directly into ward washer disinfector (80% 0C x 1min). Inspect for cleanliness after removal	❖ Macerators with paper-Mache bedpans and urinals. ❖ Manual cleaning: Empty into sluice. Clean bedpans
Blankets and bed covers	❖ Change after each patient has been discharged or when visibly soiled. Send to laundry to wash at 800C	❖ Do not allow bedding from home; these may be infected with bedbugs or carry scabies
Bowls (dressing, surgical)	❖ Return to CSSD	❖ Disposable
Bowls (patient wash)	❖ Wash with detergent, rinse and store inverted to dry	❖ Modern ward washer – disinfectors can also wash bowls ❖ Use fresh water and towels for each patient
Carpets	❖ Daily vacuum (vacuum cleaner fitted with a filter) ❖ Shampoo periodically and extract	❖ Not recommended in clinical areas.
Commodes	❖ Wash seat daily with detergent and hot water and dry with a disposable paper towel. ❖ Wipe the commode seat with a large alcohol wipe after each use	❖ If visibly contaminated, remove soil with tissue. Wash with warm water and detergent. Dry. Enteric diseases: Viral – wipe hypochlorite (1000 ppm av Cl2); bacterial – use 2% phenolic.

ITEM OR SITE	PREFERRED METHOD	ALTERNATIVE METHODS / COMMENTS
Computer and keyboards	❖ Damp dust daily ❖ Wipe keyboard carefully to remove visible dirt	❖ Use a keyboard cover which is changed frequently
Crockery and cutlery	❖ Wash at 800C in the dishwasher. ❖ Manual cleaning. Wear gloves and hand wash in detergent and hot water (600C). Rinse and dry.	❖ Wear domestic gloves for manual cleaning ❖ Infected patients; Unless instructed by the IPC team treat as routine. ❖ Disposable crockery is rarely used - e.g. Rabies
Curtains	❖ Change curtains frequently ❖ Isolation room curtains should be changed with each terminal ❖ Clean cleanliness after removal. ❖ Clean if necessary and store inverted to dry	❖ Blinds; both vertical and horizontal are difficult to clean and wash regularly with a scrubbing brush and detergent. Rinse. Invert to dry. Never soak bedpans
Drains	❖ Clean regularly	❖ Chemical disinfectants are not recommended
Dressing trolleys	❖ Remove all items daily and wipe surface with warm water and detergent. Wipe over with 70% isopropyl alcohol. ❖ Discard all previous contents of open jars and bottles. Replace with unopened containers	❖ If open jars are used, keep the volume small so that the containers can be heat disinfected when empty. Do not top up open disinfectant containers

ITEM OR SITE	PREFERRED METHOD	ALTERNATIVE METHODS / COMMENTS
Duvets	❖ Washable duvet cover, which allows good ❖ circulation of air, should be used and changed after each patient	❖ Dry-clean hands after each patient use
Endotracheal suction catheters	❖ Disposable – can be used for 24 hours on the same patient ❖ Flush with sterile water after each use. Bowl is washed and dried after each suction and filled with sterile water only before use	❖ Decontaminate hands thoroughly before carrying our suction ❖ Do not share suction catheters between patients.
Feeding bottles (baby)	❖ Heat sterilized in SSD	❖ Wash thoroughly. Rinse and soak in a fresh hypochlorite solution (125 ppm available chlorine x 30 min). ❖ Remove, rinse and dry.
Floor cleaning	❖ Use dust-attracting mop ❖ Use water and detergent only	❖ Sweeping not recommended ❖ Disinfectants not recommended
Humidifiers	❖ Empty daily and heat disinfect after each patient use ❖ Clean with warm water and detergent. Dry, Fill with sterile water only	❖ Not recommended. ❖ Use heat exchange filters.

ITEM OR SITE	PREFERRED METHOD	ALTERNATIVE METHODS / COMMENTS
Infant incubators	❖ Wash all removable parts and clean thoroughly with detergent. Dry with paper towel.	❖ Infected: After cleaning, wipe over with 70% isopropyl alcohol or hypochlorite (125 ppm ac Cl2). ❖ Leave incubator to stand unused for 6 hours (aeration).
Instruments (surgical)	❖ To CSSD	
Kitchen cloths	❖ Daily: Wash in detergent and dry	❖ Disposal preferable
Lamps (examination	❖ Wipe with detergent, rinse and dry. Wipe over with alcohol.	❖ Disassemble before cleaning
Laryngoscopes	❖ Wash with detergent, rinse and dry. Wipe over with alcohol	❖ Disassemble before cleaning
Linen (see section on Laundry)	❖ Automated methods	-------
Mattresses	❖ Use water if impermeable cover. Clean with warm water and detergent. Dry thoroughly	❖ Major source of cross-infection ❖ Replace torn mattress covers immediately. Soggy mattresses should be discarded.

ITEM OR SITE	PREFERRED METHOD	ALTERNATIVE METHODS / COMMENTS
Mattresses	❖ Never admit patients to soiled, stained or damaged mattress. ❖ If rubber covers are uncomfortable, cover with absorbable paper which is frequently changed	❖ Horse-hair and cotton filled mattresses are not recommended.
Mop bucket	❖ **Daily:** Wash in warm water and detergent and store inverted to dry	❖ Disinfectant unnecessary
Mops	❖ **Daily:** Detachable head sent to laundry for heat disinfection and dried. ❖ Manual cleaning: Wear rubber gloves. Rinse thoroughly under running water. Wash in hot water and detergent until clean. Store inverted to dry	❖ Color-coding of mops is useful to reduce cross- contamination between clean and dirty areas and infectious isolation rooms ❖ The sun can be used in warm countries.
Nail brushes	❖ Not recommended	❖ Single use and heat disinfection only
Nasogastric (feeding tubes)	❖ Disposable	❖ Cannot be recycled
Nebulizers	❖ Wash and dry the container and mask after each patient use. Store dry and protected from Dust	❖ Head disinfection if necessary

ITEM OR SITE	PREFERRED METHOD	ALTERNATIVE METHODS / COMMENTS
Oxygen masks	❖ Disposable	❖ If reusable, wash thoroughly until visibly clean or use heat disinfection (CSSD). Dry. Wipe with alcohol
Patient toiletries	❖ Patients should bring their own soap, towels, shaving equipment and other personal items which should never be shared	-------
Pillows (see mattresses)	❖ Use waterproof cover	-------
Rectal thermometer	❖ Wash in detergent after each use. Wipe alcohol and store dry.	-------
Scissors	❖ Wipe over with 70% isopropyl alcohol before and after use	-------
Scrubbing machine	❖ Drain reservoir after use. Wipe with a damp cloth and store dry.	-------
Shaving brushes	❖ Not recommended	❖ Preoperative skin shaving should only happen in the operating suite – never in the ward.
Soap (hand washing)	❖ Tablet: Store dry. ❖ Liquid: Wall-mounted dispenser. Single-use sachets or send for thorough cleaning after it is empty and refilled under aseptic conditions.	❖ Tablet soaps are not recommended ❖ Never top up – increases risk of GNB colonization.

ITEM OR SITE	PREFERRED METHOD	ALTERNATIVE METHODS / COMMENTS
Shower head	❖ Should be removed and cleaned thoroughly each week ❖ Soak in descale if necessary	❖ Replace rubber washer with plastic ones to prevent legionnaires' disease
Sputum container	❖ Disposable only	
Suction machines	❖ Empty the reservoir in the sluice after use, wash with warm water and detergent and store dry. ❖ Send tubing to SSD for sterilization or discard. Clean the surface and cover after each use	❖ PPE: non-sterile gloves and apron ❖ Never leave fluid (secretions or disinfectant) in the reservoir if not in use
Surfaces and ledges	❖ Damp dusting daily. Dry	-------
Thermometer (oral) Electronic	❖ Wash and dry after each patient use. Wipe with 70% isopropyl alcohol and store dry. ❖ Change sleeve after each use	❖ Never soak thermometers in disinfectants. ❖ Never use without sleeve
Taps	❖ Elbow operated ❖ Clean daily and keep dry	❖ Replace rubber with plastic washers to prevent legionnaires' disease
Taps	❖ Elbow operated ❖ Clean daily and keep dry	❖ Replace rubber with plastic washers to prevent legionnaires' disease

ITEM OR SITE	PREFERRED METHOD	ALTERNATIVE METHODS / COMMENTS
Toilet seats	❖ Wash at least daily with detergent and dry	-------
Tooth mugs	❖ Disposable or send to SDD between patients	-------
Toys	❖ Soft: Machine wash, rinse and dry ❖ Other: Wash with detergent, rinse and dry. Wipe with alcohol swab	❖ Do not share toys in an infected ward. Heavily soiled toys may have to be destroyed
Tubing	❖ Disposable ❖ Reprocessed in SSD	❖ Never use glutaraldehyde to disinfect respiratory equipment
Tubing	❖ Disposable ❖ Reprocessed in SSD	❖ Never use glutaraldehyde to disinfect respiratory equipment
Ultrasound	❖ Disinfect with 70% isopropyl alcohol between each patient use ❖ Intra-vaginal: Cover probe with a condom for each patient.	-------
Ventilators	❖ These are complex and should be cleaned and disinfected according to manufacturer's instruction ❖ Sometimes there are technicians in the facility who do the maintenance	❖ Remove tubing and send for heat disinfection to ❖ CSSD (800C x 3 min) or chemical disinfection ❖ Clean all inspiratory and expiratory connections

ITEM OR SITE	PREFERRED METHOD	ALTERNATIVE METHODS / COMMENTS
Ventilators		❖ Change both sets of filters ❖ Check efficiency of air movement ❖ Reassemble ❖ Clean the outside of ventilator ❖ Register in logbook
Washbasins	❖ Clean with warm water and detergent, cream cleaner for stains. ❖ Disinfectants not recommended	-------
Wound suction (closed drainage)	❖ Remove the lid and carefully remove the inner liner containing fluid. Dispose of in either infectious waste container or sluice. ❖ Wash and clean the outer cover, dry and replace the bag. Check that the valves and connectors are clean and functioning.	❖ Send for heat disinfection after each patient use
X-ray-equipment	❖ Damp dust only	❖ Wipe with 70% isopropyl alcohol if disinfection required.

ANNEX 3: STEPS TO CLEAN AND DISINFECT CONTAINER BASED HANDWASHING STATIONS

How to Clean and Disinfect Container-Based Handwashing Stations for Community Settings

Handwashing stations should be cleaned and disinfected regularly to reduce risk of cross contamination. During outbreaks, handwashing stations may need to be cleaned and disinfected more frequently. **Cleaning** removes germs and dirt from surfaces. Clean by scrubbing with water and soap or detergent. **Disinfecting** kills germs by applying a chemical disinfectant such as a 0.1% chlorine solution or other nationally approved disinfectant. Always clean surfaces before disinfecting. **Never mix a disinfectant (such as chlorine) with any other cleaners or disinfectants;** this can release vapors that may be very dangerous to breathe in. Always dispose of used and leftover disinfection solutions in a safe location.

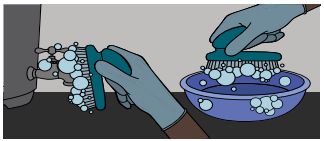
Steps for taps and catchment basins

Recommended frequency: at least once a day.

Step 1: Put on PPE

Put on personal protective equipment (PPE): rubber gloves, an apron, a face mask and googles or a face shield.

Step 2: Cleaning



Scrub the tap and catchment basin with soap/detergent and water or soapy water using a clean brush, sponge, or cloth. Be sure to thoroughly scrub the tap handle. Remove all visible dirt from the inside and outside of the tap and catchment basin.

Step 3: Cleaning

Rinse the inside and outside of the tap and catchment basin, using clean water. Drain the water.

Step 4: Disinfecting

Apply disinfectant[1] to the cleaned tap and the inside and outside of the cleaned catchment basin using a clean sponge or cloth. Leave all surfaces wet with disinfectant for at least one minute. Rinse with clean water and let air dry. Remove PPE and wash hands with soap and water.

Step 5

Monitor the cleanliness of the tap and basin throughout the day; repeat cleaning and disinfection if needed.

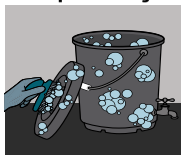
Steps for water containers

Recommended frequency: at least once a month.

Step 1: Cleaning

Put on PPE: rubber gloves, an apron, a face mask and googles or a face shield.

Step 2: Cleaning



Scrub[2] the water container with soap/detergent and water or soapy water using a clean brush or sponge. Remove all visible dirt from the inside and the outside of the container. Drain the soapy water through the tap.

Step 3: Cleaning

Rinse the inside and the outside of the water container using clean water. Drain the rinse water through the tap.

Step 4: Disinfecting

Apply disinfectant[2] to both the inside and outside of the cleaned water container using a clean sponge or cloth. Let some disinfectant drain through the tap. Leave all surfaces wet with disinfectant for at least one minute.

Step 5: Disinfecting

Rinse the water container with clean water. Drain the rinse water through the tap.

Step 6

Dry the container by placing it upside-down on a clean surface. Remove PPE and wash hands with soap and water.

Step 7

Fill the container with clean water. Monitor the cleanliness of the water container throughout the month; repeat cleaning and disinfection if needed.

[1] *Rinse chlorine solution off of metal surfaces with clean water after 1 minute as chlorine may corrode the metal. Chlorine disinfectant can be sprayed on small surfaces if done outdoors*

[2] *For large containers, a clean, long-handled brush or mop may be needed to scrub the interior with soap and apply disinfectant. For containers with narrow openings, soapy water (during cleaning) and disinfectant (during disinfection) can be poured in and shaken vigorously.*

ANNEX 4: PROCEDURE FOR DISINFECTING ALCOHOL BASED HAND RUB CONTAINERS

For Print Only

Clean and Disinfect Alcohol-Based Handrub Container

Clean and then disinfect empty, reusable ABHR containers before refilling with Alcohol-Based Handrub (ABHR) containers. There are two methods of disinfection: heat and chlorine. Heat disinfection is preferred over chlorine disinfection to minimize chemical hazards and water use. However, the size of containers, their materials, and the availability of equipment should guide the selection of the method.

Cleaning

Step 1

Clean the inside: Use a narrow bottle brush to scrub the inside of the container and the nozzle. Alternatively, open, pour in soapy water, close and then shake vigorously. Pump out soapy water through the nozzle.

Clean the outside: Scrub back and forth the outside of the container and the nozzle with soapy water to remove any visible dirt.

Step 2

Rinse the inside and the outside of the container fully, using clean water and pump out clean water through the nozzle. Make sure the water in rinsing bucket stays clean. Refill the rinsing bucket with clean water, as needed.

Step 3

Drain any rinse water from the container and nozzle.

Disinfection: Heat method

Step 1: Option A

Place cleaned container in an autoclave and follow the manufacturer's instructions. Some bottles, especially the nozzles, may not take high heat generated by the autoclave and need to be disinfected separately by boiling or using the chlorine method.

Step 1: Option B

Place cleaned container and nozzle in the boiler/pot and boil for 20 minutes, start counting time once the water is fully boiling.

Step 2

Remove the container and nozzle with clean tongs. If water has cooled, container may be removed with clean hands or clean gloves.

Step 3

Dry container by placing it on a clean surface in an upside down position. Pump out water from the nozzle. When items are completely dry, they should either be immediately refilled with new ABHR or be closed with a lid and stored, protected from dust, until use. Relabel containers if labels were destroyed.

Disinfection: Chlorine method

Make sure to wear PPE: rubber gloves, an apron, a face mask and googles or a face shield when cleaning and disinfecting ABHR containers. Make new 0.1% chlorine solution at least once a day. Dispose of used or left over solutions in a safe place.

Step 1: Option for small ABHR containers

Immerse the cleaned container and nozzle completely in 0.1% chlorine solution for 15 minutes. Make sure that the solution fills the entire container and nozzle.

Step 1: Option for large ABHR containers

Disinfect the inside: For large containers that cannot be immersed, fill with 0.1% chlorine solution to the top, close the lid, and let stand for 15 minutes.

Disinfect the outside: Wet all outside parts of container with 0.1% chlorine solution. The container needs to stay visibly wet for 15 minutes before rinsing.

Step 2

Rinse both the inside and the outside of the container fully with sterile/cool boiled water and pump out the water through the nozzle.

Step 3

Dry container by placing it on a clean surface in an upside down position. Pump out water from the nozzle. When items are completely dry, they should either be immediately refilled with new ABHR or be closed with a lid and stored, protected from dust, until use. Relabel containers if labels were destroyed.

ANNEX 5: HOW TO MAKE AND USE SOAPY WATER HAND WASHING STATIONS

For Print Only

How to Make and Use a Soapy Water Handwashing Solution

A soapy water handwashing solution can be made by mixing water with liquid or powdered soap. Soapy water can be used just like liquid soap.

How to make a soapy water handwashing solution

Step 1

Take a clean, empty plastic bottle and add powdered or liquid soap and clean water. Use 10 grams powdered soap or 10 mL liquid soap (2 teaspoons) for every 500 mL water.

Step 2

Make a small hole in the cap using a nail or other sharp object.

Step 3

Put on the cap and shake the bottle well until the soap is dissolved.

How to use a soapy water handwashing solution

When using the soapy water, make sure it creates a lather. If it does not lather, it does not have enough soap and may not be effective in removing germs.

Step 1

Apply soapy water to hands.

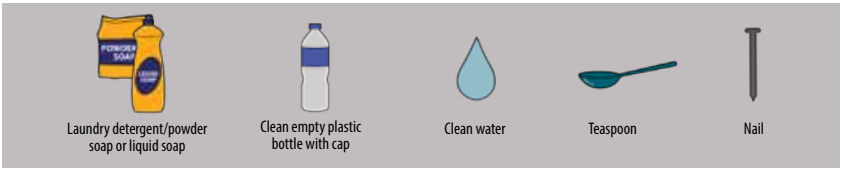
Step 2

Rub your hands together to create a lather and scrub for at least 20 seconds

Step 3

Rinse hands with clean water. Dry hands with a single-use towel or air dry.

Supplies Needed



ANNEX 6: PROCEDURE FOR DISINFECTING/STERLIZING ENDOSCOPES USING GLUTARALDEHYDE

Pre cleaning	❖ Wipe all exterior and interior surfaces of the endoscope using a damp sponge or soft cloth to remove gross contamination. ❖ Use enzymatic solution that is approved by the manufacturer for pre-cleaning. ❖ Completely disassemble the laparoscopic equipment; Remove suction valves, air water valves, and biopsy valves. ❖ Discard those parts designated as disposable
Leak test	❖ Conduct the leak test before immersing the scope in the disinfectant. ❖ Use clear water (no soap or detergent) for leak testing, following the manufacturer's instructions. If no leak is detected, continue further processing
Manual cleaning	❖ Use manufacturer-recommended cleaning products and water for cleaning the endoscope. At a minimum, the cleaning solution should be a medical-grade, low- foaming, and neutral pH detergent specially manufactured for endoscopes. ❖ Immerse the endoscope in the cleaning solution and perform all cleaning under the water to avoid splashes. ❖ Always use the tools and brushes provided or recommended by the manufacturer. ❖ Flush all the channels and tubing to ensure thorough removal of debris. ❖ Rinse all channels and parts with clean water to remove any debris or residual detergent Visually inspect the endoscope for conditions that could affect the disinfection or sterilization process, such as cracks, corrosion, discoloration, or retained debris. Magnification and adequate lighting assist with inspection.)

Manual cleaning	❖ Repeat the cleaning steps if the endoscope is not visibly clean and send for repair if damage is identified.
High-level disinfection	❖ Prepare the disinfectant following the manufacturer's instructions. ❖ Use a chemical indicator test strip to ensure that the HLD solution's minimum effective concentration is adequate. OPA 0.55% and glutaraldehyde 2–4% are the most commonly used disinfectants for reprocessing endoscopes. ❖ If using a manual approach to HLD, follow the steps below: Completely immerse the endoscope and all removable parts in a large basin of disinfectant. ❖ Ensure that all channels are filled with the chemical by flushing the channels and ensuring a steady flow out the other end. ❖ Cover the basin with a tight-fitting lid for the rest of the contact time and at the recommended temperature. Use a clock to verify the contact time; contact time will depend upon the solution used and whether HLD or sterilization is required. ❖ At the end of exposure time, purge all channels and tubes with air to ensure complete removal of the chemica ❖ Thoroughly rinse all surfaces, channels, and tubing with clean (if HLD) or sterile (if sterilization) water. Use fresh water for each rinse. Follow manufacturer's instructions for use. If using tap water, rinse with alcohol as a final step. ❖ Purge all channels with forced air to ensure complete drying of the inner tubes and channels. ❖ Store the endoscope in such a way that it promotes drying and prevents recontamination. Ideally, the endoscope should be hung vertically in a closed cabinet

ANNEX 7: STEPS FOR DONNING AND DOFFING A GOWN

Steps to **put on** personal protective equipment (PPE) including **gown**

1 Remove all personal items (jewelry, watches, cell phones, pens, etc.)

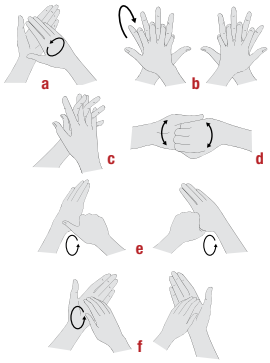
2 Put on scrub suit and rubber boots[1] in the changing room.

3 Move to the clean area at the entrance of the isolation unit.

4 By visual inspection, ensure that all sizes of the PPE set are correct and the quality is appropriate.

5 Undertake the procedure of putting on PPE under the guidance and supervision of a trained observer (colleague).

6 Perform hand hygiene.



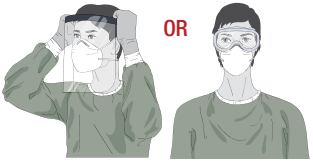
7 Put on gloves (examination, nitrile gloves).

8 Put on disposable gown

made of fabric that is tested for resistance to penetration by blood or body fluids OR to blood-borne pathogens.

9 Put on face mask.

10 Put on face shield OR goggles.



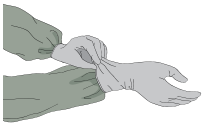
11 Put on head and neck covering

surgical bonnet covering neck and sides of the head (preferable with face shield) OR hood.

12 Put on disposable waterproof apron

(if not available, use heavy duty, reusable waterproof apron).

13 Put on second pair of (preferably long cuff) gloves over the cuff.



[1] If boots are not available, use closed shoes (slip-ons without shoelaces and fully covering the dorsum of the foot and ankles) and shoe covers (nonslip and preferably impermeable)

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ANNEX 8: STEPS FOR DOFFING OF PPE

Steps to **take off** personal protective equipment (PPE) including **gown**

1 Always remove PPE under the guidance and supervision of a trained observer (colleague). Ensure that infectious waste containers are available in the doffing area for safe disposal of PPE. Separate containers should be available for reusable items.

2 Perform hand hygiene on gloved hands.[1]

3 Remove apron leaning forward and taking care to avoid contaminating your hands. When removing disposable apron, tear it off at the neck and roll it down without touching the front area. Then untie the back and roll the apron forward.

4 Perform hand hygiene on gloved hands.

5 Remove outer pair of gloves and dispose of them safely.
Use the technique shown in Step 17

6 Perform hand hygiene on gloved hands.

7 Remove head and neck covering taking care to avoid contaminating your face by starting from the bottom of the hood in the back and rolling from back to front and from inside to outside, and dispose of it safely.

OR

8 Perform hand hygiene on gloved hands.

9 Remove the gown by untying the knot first, then pulling from back to front rolling it from inside to outside and dispose of it safely.

10 Perform hand hygiene on gloved hands.

11 Remove eye protection by pulling the string from behind the head and dispose of it safely.

OR

12 Perform hand hygiene on gloved hands.

13 Remove the mask from behind the head by first untying the bottom string above the head and leaving it hanging in front; and then the top string next from behind head and dispose of it safely.

14 Perform hand hygiene on gloved hands.

15 Remove rubber boots without touching them (or overshoes if wearing shoes). If the same boots are to be used outside of the high-risk zone, keep them on but clean and decontaminate appropriately before leaving the doffing area.[2]

16 Perform hand hygiene on gloved hands.

17 Remove gloves carefully with appropriate technique and dispose of them safely.

18 Perform hand hygiene.

1 While working in the patient care area, outer gloves should be changed between patients and prior to exiting (change after seeing the last patient)

2 Appropriate decontamination of boots includes stepping into a footbath with 0.5% chlorine solution (and removing dirt with toilet brush if heavily soiled with mud and/or organic materials) and then wiping all sides with 0.5% chlorine solution. At least once a day boots should be disinfected by soaking in a 0.5% chlorine solution for 30 min, then rinsed and dried.

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ANNEX 9: STEPS FOR DONNING OF PPE

Steps to **put on** personal protective equipment (PPE) including **coverall**

1 Remove all personal items (jewelry, watches, cell phones, pens, etc.)

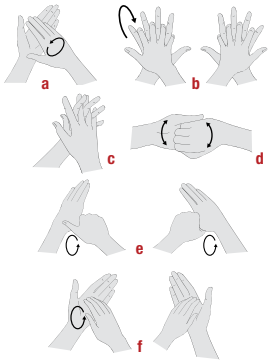
2 Put on scrub suit and rubber boots[1] in the changing room.

3 Move to the clean area at the entrance of the isolation unit.

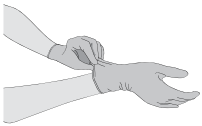
4 By visual inspection, ensure that all sizes of the PPE set are correct and the quality is appropriate.

5 Undertake the procedure of putting on PPE under the guidance and supervision of a trained observer (colleague).

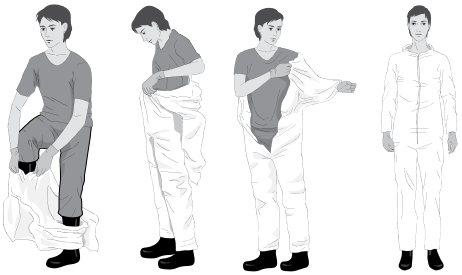
6 Perform hand hygiene.



7 Put on gloves (examination, nitrile gloves).



8 Put on coverall.[2]



9 Put on face mask.

10 Put on face shield OR goggles.

11 Put on head and neck covering surgical bonnet covering neck and sides of the head (preferable with face shield) OR hood.

12 Put on disposable waterproof apron (if not available, use heavy duty, reusable waterproof apron).

13 Put on second pair of (preferably long cuff)[2] gloves over the cuff.

1 If boots are not available, use closed shoes (slip-ons without shoelaces and fully covering the dorsum of the foot and ankles) and shoe covers (nonslip and preferably impermeable)

2 Do not use adhesive tape to attach the gloves. If the gloves or the coverall sleeves are not long enough, make a thumb (or middle finger) hole in the coverall sleeve to ensure that your forearm is not exposed when making wide movements. Some coverall models have finger loops attached to sleeves.

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ANNEX 10: STEPS FOR DOFFING PPE

Steps to **take off** personal protective equipment (PPE) including **coverall**

1 Always remove PPE under the guidance and supervision of a trained observer (colleague). Ensure that infectious waste containers are available in the doffing area for safe disposal of PPE. Separate containers should be available for reusable items.

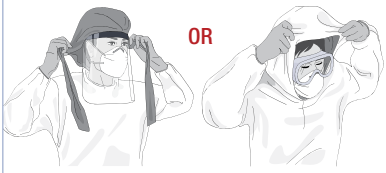
2 Perform hand hygiene on gloved hands.[1]

3 Remove apron leaning forward and taking care to avoid contaminating your hands.

When removing disposable apron, tear it off at the neck and roll it down without touching the front area. Then untie the back and roll the apron forward.

4 Perform hand hygiene on gloved hands.

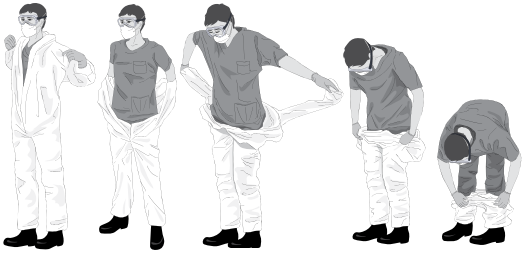
5 Remove head and neck covering taking care to avoid contaminating your face by starting from the bottom of the hood in the back and rolling from back to front and from inside to outside, and dispose of it safely.



6 Perform hand hygiene on gloved hands.

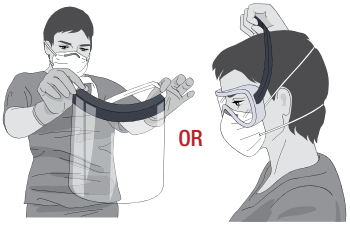
7 Remove coverall and outer pair of gloves:

Ideally, in front of a mirror, tilt head back to reach zipper, unzip completely without touching any skin or scrubs, and start removing coverall from top to bottom. After freeing shoulders, remove the outer gloves[2] while pulling the arms out of the sleeves. With inner gloves roll the coverall, from the waist down and from the inside of the coverall, down to the top of the boots. Use one boot to pull off coverall from other boot and vice versa, then step away from the coverall and dispose of it safely.



8 Perform hand hygiene on gloved hands.

9 Remove eye protection by pulling the string from behind the head and dispose of it safely.



10 Perform hand hygiene on gloved hands.

11 Remove the mask from behind the head by first untying the bottom string above the head and leaving it hanging in front; and then the top string next from behind head and dispose of it safely.

12 Perform hand hygiene on gloved hands.

13 Remove rubber boots without touching them (or overshoes if wearing shoes). If the same boots are to be used outside of the high-risk zone, keep them on but clean and decontaminate appropriately before leaving the doffing area.[3]

14 Perform hand hygiene on gloved hands.

15 Remove gloves carefully with appropriate technique and dispose of them safely.

16 Perform hand hygiene.

1 While working in the patient care area, outer gloves should be changed between patients and prior to exiting (change after seeing the last patient)

2 This technique requires properly fitted gloves. When outer gloves are too tight or inner gloves are too loose and/or hands are sweaty, the outer gloves may need to be removed separately, after removing the apron.

3 Appropriate decontamination of boots includes stepping into a footbath with 0.5% chlorine solution (and removing dirt with toilet brush if heavily soiled with mud and/or organic materials) and then wiping all sides with 0.5% chlorine solution. At least once a day boots should be disinfected by soaking in a 0.5% chlorine solution for 30 min, then rinsed and dried.

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ANNEX 11: STEPS FOR MIXING CHLORINE

Materials Needed.

- Chlorine (liquid chlorine or powdered chlorine)
- PPE (masks, Gloves, face shield and gumboots)
- A bucket of 20 liters
- Jerrycan of water
- A stir
- Labels and markers

1. How to dilute Liquid chlorine

Use the available concentration of chlorine to prepare the desired concentration.

Make a new chlorine solution every day. Discard any leftover solution from the day before.

Two concentrations can be mixed for different purposes (0.5% and 0.05%)

MIXING LIQUID CHLORINE SOLUTION

Step 1: To make the desired concentration, use this formula below

Check available concentration from the container of the chlorine available

$$\left[\frac{\text{Available Concentration (\%)}}{\text{Desired Concentration (\%)}}\right] - 1$$

1. For example, to prepare 0.5% Chlorine,

Using 6% to prepare 0.5%,

(6÷ 0.5)-1

= 11

1: 11

Interpretation: Using a container of the same size, Add 1 part of JIK to 11 parts of water.

2. **Example 2: to prepare 0.5% from 3.5 Hypochlorite solution**

= (3.5% / 0.5%) - 1
= 7 - 1
= 6

Interpretation: Add 6 parts of water to 1 part of chlorine

Alternatively

Using the already prepared 0.5% as available/original

(0.5÷0.05)-1=9

Implying: Mix 1 part of JIK to 9 parts of water to make 0.05%

Step 3: Pour the parts of bleach into the mixing bucket and add the required parts of water as per the calculated amounts; the container used to measure the parts of bleach should be the same container to measure the parts of water to be added. The amount needed will determine the amount of solution to be mixed.

Step 4: Stir well for 10s to mix

Step 5: Label the bucket with the concentration of chlorine prepared and cover

Step 6: Store in a cool dry place. Not under direct sunlight

Step 7: Perform a strength test

Warning: Do not drink Chlorine water, do not put in mouth or eyes

Mixing powder chlorine / Hypochlorite

- Use the available concentration of chlorine powder to prepare the desired concentration

- Make a new chlorine solution every day. Discard any solution from the day before
- Follow the chlorine mixing formula
- Wear extended PPE: Eye protection, face mask heavy duty gloves, apron and gumboots
- Calculate the weight of chlorine powder to be mixed in each liter of water
- Pour the liters of water needed into an empty bucket before adding chlorine powder
- Add the powder and mix gently
- Leave it to settle for 15-30 minutes before use
- Perform a strength test
- Label the bucket with the date and strength mixed

$$\left[\frac{\text{Available Concentration (\%)}}{\text{Desired Concentration (\%)}}\right] - 1$$

- Cover it firmly and store or use accordingly

= grams of chlorine powder for each liter of water

e.g. ***if you want to mix 0.5%*** concentration and you have 65 Hypochlorite powder

= (0.5% / 65%) X 1000

= 7.6g/liter of water

- one liter of water + add 7.6 grams of chlorine

One level tablespoon = 14.3grams

- Label the bucket with the concentration of chlorine prepared and cover.
- Store in a cool dry place. Not under direct sunlight

Supplies Needed: Measuring cup, Bucket with lid, water, liquid chlorine, stick for stirring, label

Warning: Do not drink Chlorine water, do not put in mouth or eyes

ANNEX 12: RECOMMENDATIONS FOR DIFFERENT BUILT ENVIRONMENTS

Health facility-areas	Recommendations for built environment
Entrance/Gate	The gate should be made of a metal, facility should be fenced with concrete and brick fence with at least 2 gates.
Screening area	The facility should have a structure for screening- at least 2 rooms, there should be a walkway with a roof and rails, an ambulance shade
General reception	2 meters barrier between client and receptionist, Wall mounted disinfectant, ceramic hand wash / hand hygiene station with automated, elbow/ foot/ operated taps. Ramp for the disabled
Walkways	Built of concrete / stone material, non-slippery, easy to clean, no cracks, with side-built drainages
Rails for walkways	Made of metal, easy to clean, painted, resistant material to disinfecting chemicals
Lavatories	Ceramic or stainless-steel squat toilet bowl, stainless steel, easy to clean, chemical resistant rails built for the disabled, Concrete built septic tank to collect waste. Piped flowing water, hand washing station.
Consultation rooms	Hand wash stations and hand hygiene, natural ventilation, water resistant walls, non-slippery floors, windows for daylight
General Admission wards	Hand wash and hand hygiene station for every 10 beds, toilet facilities for every 20 beds, space of 1 meter between beds, windows Ref MoHID guidelines, built concrete drainages, that are cleanable, and chemical resistant, water and chemical resistant door panels, unidirectional swing door with easy to clean, chemical resistant door handle inside ward.

Health facility-areas	Recommendations for built environment
Labor suites	Hand wash station and hand hygiene for every 10 beds, toilet facilities for every 20 beds, space of 1 meter between beds, windows Ref MoHID guidelines, built concrete drainages, that are cleanable, and chemical resistant, water and chemical resistant door panels, unidirectional swing door with easy to clean, chemical resistant door handle inside ward
Neonatal ward/ NICU	Hand wash station and hand hygiene for every ten beds, negative pressure ventilation, a room away from maternity, Air filters of 10 air changes, water, chemical resistant and cleanable drainages, floors, walls, ceiling, and door panels. Chemical resistant door handle inside ward. Uni-directional swing door
Dental unit	Hand wash station and hand hygiene for every 10 beds, toilet facilities for every 20 beds, space of 1 meter between beds, windows Ref MoHID guidelines, built concrete drainages, that are cleanable, and chemical resistant, water and chemical resistant door panels, unidirectional swing door with easy to clean, chemical resistant door handle inside ward. Valves on water pipes supplying the dental unit
Dialysis unit	Hand wash and hand hygiene station for every 10 beds, Air conditioned to 21.11 to 23 degrees Celsius, and 55 - 60 percent humidity, Ceiling height is 2.4 M-2.7 M, built concrete drainages, that are cleanable, and chemical resistant, water and chemical resistant door panels, unidirectional swing door with easy to clean, chemical resistant door handle inside ward. Floors smooth, no cracks or break, water and chemical resistant, Stable electrical supply with at least 6 sockets of recommended power. Minimum door width opening is 1.12Metres. At least 2Metres between beds. An isolation ward for patients with both dialysis needs and other conditions or infections

Health facility-areas	Recommendations for built environment
Burns	Hand washing and hand hygiene facilities, temperature-controlled theatre within 50 meters, built concrete drainages that are cleanable, and chemical resistant, water and chemical resistant door panels, unidirectional swing door with easy to clean, chemical resistant door handle inside ward. Must have a thermal regulator, negative pressure for ventilation
Treatment room	Ref. above. Formica or epoxy tabletops. Equipped with recommended work cabinet
Waste collection area / unit	Built near an incinerator. materials Refer above. Walls built with perforated bricks, and well roofed. With at least 4 separate units within, size is as recommended by IPC personnel at the site, restricted door access
Laboratory unit	Proper electrical wiring, restricted door access, an independent septic tank or lagoon for holding liquid waste before being released into the sewer. Sample collection or phlebotomy rooms. Fire grating on the doors. Ref to lab quality standards
Patient lounge	if located upstairs, they must have protective guard rails to protect patients from falling over, of stainless steel, must be fenced off to protect patients from intruders
Management offices	Adequate ventilation and lighting, spacious, must have own sanitary facilities, ref to lavatories above
Theatre	Proper electrical wiring, proper structure ref. theatre design, recovery room.
Nurses station, doctors' conference/ station, anesthesiologist station	located as close as possible to where the respective officers are required

Health facility-areas	Recommendations for built environment
Kitchen	Adequate hand wash basins, located near the ward, hot and coldwater supply. The storage for food should be cold and dry. Designated area for washing utensils, holding area for food trolley. Ceiling, walls, countertops and floors should be easy to clean. Serving tops should be concrete. The drainage system should be good. The chimney should be pointing upwards There should be a dedicated Cooking area with running water, proper waste management
Laundry	Proper electrical installation, drainage, running water. Terrazzo floor, sluice room
Ambulance shade	Running water, physical building,
Isolation unit	Located away from the main Hand wash station for every cubicle, lavatory in each cubicle, Lobby for preparation and storage of PPE,
Mortuary	Electrical installation, running water, drainage, UV light, Fire extinguishers
Storage areas	Built with screens on ventilators to keep out vermin, accesscontrolled burglar-proofed doors and windows
Key notes	Hand wash station / hand hygiene in a health setting refers to elbow operated, foot operated and or automatic taps, a wall mounted wash basin, that is steel or ceramic material, with corrosion proof drainage pipes. It should also have a wall mount for disinfectant. Attendants to hospitalized patients should be tailored to one per patient in general admission wards and none in special care units.
	Floors in a health and non-health setting should be made of terrazzo or cement screed and non- slippery

ANNEX 13: HAND HYGIENE OBSERVATION TOOL

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Observation Form

Facility:		**Period Number*:**		**Session Number*:**	
Service:		**Date:** (dd/mm/yy)	/ /	**Observer:** (initials)	
Ward:		**Start/End time:** (hh:mm)	: / :	**Page N°:**	
Department:		**Session duration:** (mm)		**City**:**	
Country:**					

Prof.cat		Prof.cat		Prof.cat		Prof.cat	
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 ○ missed ○ gloves	1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves
2	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	2	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	2	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	2	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves
3	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	3	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	3	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	3	☐ 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 ○ 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 ○ missed ○ gloves	4	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves
5	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	5	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	5	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	5	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves
6	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	6	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	6	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	6	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves
7	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	7	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	7	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	7	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves
8	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	8	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	8	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	8	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves

* To be completed by the data manager.
** **Optional**, to be used if appropriate, according to the local needs and regulations.

WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.
Revised August 2009

ANNEX 14: HAND HYGIENE SELF-ASSESSMENT FRAMEWORK

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Hand Hygiene Self-Assessment Framework 2010

Introduction and user instructions

The Hand Hygiene Self-Assessment Framework is a systematic tool with which to obtain a situation analysis of hand hygiene promotion and practices within an individual health-care facility.

What is its purpose?

While providing an opportunity to reflect on existing resources and achievements, the Hand Hygiene Self-Assessment Framework also helps to focus on future plans and challenges. In particular, it acts as a diagnostic tool, identifying key issues requiring attention and improvement. The results can be used to facilitate development of an action plan for the facility's hand hygiene promotion programme. Repeated use of the Hand Hygiene Self-Assessment Framework will also allow documentation of progress with time.

Overall, this tool should be a catalyst for implementing and sustaining a comprehensive hand hygiene programme within a health-care facility.

Who should use the Hand Hygiene Self-Assessment Framework?

This tool should be used by professionals in charge of implementing a strategy to improve hand hygiene within a health-care facility. If no strategy is being implemented yet, then it can also be used by professionals in charge of infection control or senior managers at the facility directorate. The framework can be used globally, by health-care facilities at any level of progress as far as hand hygiene promotion is concerned.

How is it structured?

The Hand Hygiene Self-Assessment Framework is divided into five components and 27 indicators. The five components reflect the five elements of the WHO Multimodal Hand Hygiene Improvement Strategy (http://www.who.int/gpsc/5may/tools/en/index.html) and the indicators have been selected to represent the key elements of each component. These indicators are based on evidence and expert consensus and have been framed as questions with defined answers (either "Yes/No" or multiple options) to facilitate self-assessment. Based on the score achieved for the five components, the facility is assigned to one of four levels of hand hygiene promotion and practice: Inadequate, Basic, Intermediate and Advanced.

Inadequate: hand hygiene practices and hand hygiene promotion are deficient. Significant improvement is required.

Basic: some measures are in place, but not to a satisfactory standard. Further improvement is required.

Intermediate: an appropriate hand hygiene promotion strategy is in place and hand hygiene practices have improved. It is now crucial to develop long-term plans to ensure that improvement is sustained and progresses.

Advanced: hand hygiene promotion and optimal hand hygiene practices have been sustained and/or improved, helping to embed a culture of safety in the health-care setting.

Leadership criteria have also been identified to recognise facilities that are considered a reference centre and contribute to the promotion of hand hygiene through research, innovation and information sharing. The assessment according to leadership criteria should only be undertaken by facilities having reached the Advanced level.

How does it work?

While completing each component of the Hand Hygiene Self-Assessment Framework, you should circle or highlight the answer appropriate to your facility for each question. Each answer is associated with a score. After completing a component, add up the scores for the answers you have selected to give a subtotal for that component. During the interpretation process these subtotals are then added up to calculate the overall score to identify the hand hygiene level to which your health-care facility is assigned.

The assessment should not take more than 30 minutes, provided that the information is easily available.

Within the Framework you will find a column called "WHO implementation tools" listing the tools made available from the WHO First Global Patient Safety Challenge to facilitate the implementation of the WHO Multimodal Hand Hygiene Improvement Strategy (http://www.who.int/gpsc/5may/tools/en/index.html). These tools are listed in relation to the relevant indicators included in the Framework and may be useful when developing an action plan to address areas identified as needing improvement.

Is the Hand Hygiene Self-Assessment Framework suitable for inter-facility comparison?

Health-care facilities or national bodies may consider adopting this tool for external comparison or benchmarking. However, this was not a primary aim during the development of this tool. In particular, we would draw attention to the risks inherent in using a self-reported evaluation tool for external benchmarking and also advise the use of caution if comparing facilities of different sizes and complexity, in different socioeconomic settings. It would be essential to consider these limitations if inter-facility comparison is to be undertaken.

WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.

Hand Hygiene Self-Assessment Framework 2010

1. System Change

Question	Answer	Score	WHO improvement tools
1.1 How easily available is alcohol-based handrub in your health-care facility? **Choose one answer**	Not available	0	→ Ward Infrastructure Survey → Protocol for Evaluation of Tolerability and Acceptability of Alcohol-based Handrub in Use or Planned to be Introduced:Method 1 → Guide to Implementation II.1
	Available, but efficacy[1] and tolerability[2] have not been proven	0	
	Available only in some wards or in discontinuous supply (with efficacy[1] and tolerability[2] proven)	5	
	Available facility-wide with continuous supply (with efficacy[1] and tolerability[2] proven)	10	
	Available facility-wide with continuous supply, and at the point of care[3] in the majority of wards (with efficacy[1] and tolerability[2] proven)	30	
	Available facility-wide with continuous supply at each point of care[3] (with efficacy[1] and tolerability[2] proven)	50	
1.2 What is the sink:bed ratio? **Choose one answer**	Less than 1:10	0	→ Ward Infrastructure Survey → Guide to Implementation II.1
	At least 1:10 in most wards	5	
	At least 1:10 facility-wide and 1:1 in isolation rooms and in intensive care units	10	
1.3 Is there a continuous supply of clean, running water[4]?	No	0	→ Ward Infrastructure Survey → Guide to Implementation II.1
	Yes	10	
1.4 Is soap[5] available at each sink?	No	0	→ Ward Infrastructure Survey → Guide to Implementation II.1
	Yes	10	
1.5 Are single-use towels available at each sink?	No	0	→ Ward Infrastructure Survey → Guide to Implementation II.1
	Yes	10	
1.6 Is there dedicated/available budget for the continuous procurement of hand hygiene products (e.g. alcohol-based handrubs)?	No	0	→ Guide to Implementation II.1
	Yes	10	

Extra Question: Action plan

Answer this question ONLY if you scored less than 100 for questions 1.1 to 1.6: Is there realistic plan in place to improve the infrastructure[6] in your health-care facility?	No	0	→ Alcohol-based Handrub Planning and Costing Tool → Guide to Local Production: WHO-recommended Handrub Formulations → Guide to Implementation II.1
	Yes	5	
	System Change subtotal	**/100**	

1. Efficacy: The alcohol-based handrub product used should meet recognised standards of antimicrobial efficacy for hand antisepsis (ASTM or EN standards). Alcohol-based handrubs with optimal antimicrobial efficacy usually contain 75 to 85% ethanol, isopropanol, or n-propanol, or a combination of these products. The WHO-recommended formulations contain either 75% v/v isopropanol, or 80% v/v ethanol.

2. Skin tolerability: The alcohol-based handrub product is well tolerated by health-care workers skin (i.e. it does not harm or irritate the skin) when used in clinical care, as demonstrated by reliable data. The WHO Protocol for Evaluation of Tolerability and Acceptability of Alcohol-based Handrub in Use or Planned to be Introduced can be used as a reference.

3. Point of care: The place where three elements come together: the patient, the health-care worker, and care or treatment involving contact with the patient or his/her surroundings (within the patient zone). Point-of-care products should be accessible without having to leave the patient zone (ideally within arms reach of the health-care worker or within 2 meters).

4. Clean, running water: A water supply that is either piped in (or where this is not available, from onsite storage with appropriate disinfection) that meets appropriate safety standards for microbial and chemical contamination. Further details can be found in Essential environmental health standards in health care (Geneva, World Health Organization, 2008, http://whqlibdoc.who.int/publications/2008/9789241547239_eng.pdf).

5. Soap: Detergent-based products that contain no added antimicrobial agents, or may contain these solely as preservatives. They are available in various forms including bar soap, tissue, leaf, and liquid preparations.

6. Infrastructure: The "infrastructure" here referred to includes facilities, equipment, and products that are required to achieve optimal hand hygiene practices within the facility. Specifically, it refers to the indicators included in questions 1.1-1.5 and detailed in the WHO Guidelines on Hand Hygiene in Health Care 2009, Part I, Chapter 23.5 (e.g. availability of alcohol based handrub at all points of care, a continuous supply of clean, running water and a sink:bed ratio of at least 1:10, with soap and single-use towels at each sink).

Hand Hygiene Self-Assessment Framework 2010

2. Training and Education

Question	Answer	Score	WHO improvement tools
2.1 Regarding training of health-care workers in your facility:			
2.1a How frequently do health-care workers receive training regarding hand hygiene[7] in your facility? **Choose one answer**	Never	0	→ Slides for Education Session for Trainers, Observers and Health-care Workers → Hand Hygiene Training Films → Slides Accompanying the Training Films → Slides for the Hand Hygiene Co-ordinator → Hand Hygiene Technical Reference Manual → Hand Hygiene Why, How and When Brochure → Guide to Implementation II.2
	At least once	5	
	Regular training for medical and nursing staff, or all professional categories (at least annually)	10	
	Mandatory training for all professional categories at commencement of employment, then ongoing regular training (at least annually)	20	
2.1b Is a process in place to confirm that all health-care workers complete this training?	No	0	
	Yes	20	
2.2 Are the following WHO documents (available at www.who.int/gpsc/5may/tools), or similar local adaptations, easily available to all health-care workers?			→ Guide to Implementation II.2
2.2a The 'WHO Guidelines on Hand Hygiene in Health-care: A Summary'	No	0	→ WHO Guidelines on Hand Hygiene in Health Care: A Summary
	Yes	5	
2.2b The WHO 'Hand Hygiene Technical Reference Manual'	No	0	→ Hand Hygiene Technical Reference Manual
	Yes	5	
2.2c The WHO 'Hand Hygiene: Why, How and When' Brochure	No	0	→ Hand Hygiene Why, How and When Brochure
	Yes	5	
2.2d The WHO 'Glove Use Information' Leaflet	No	0	→ Glove Use Information Leaflet
	Yes	5	
2.3 Is a professional with adequate skills[8] to serve as trainer for hand hygiene educational programmes active within the health-care facility?	No	0	→ WHO Guidelines on Hand Hygiene in Health Care → Hand Hygiene Technical Reference Manual → Hand Hygiene Training Films → Slides Accompanying the Training Films → Guide to Implementation II.2
	Yes	15	
2.4 Is a system in place for training and validation of hand hygiene compliance observers?	No	0	
	Yes	15	
2.5 Is there is a dedicated budget that allows for hand hygiene training?	No	0	→ Template Letter to Advocate Hand Hygiene to Managers → Template Letter to communicate Hand Hygiene Initiatives to Managers → Template Action Plan → Guide to Implementation II.2 and III.1 (page 33)
	Yes	10	
	Training and Education subtotal	**/100**	

7. Training in hand hygiene: This training can be done using different methods but the information conveyed should be based on the WHO multimodal hand hygiene improvement strategy or similar material. Training should include the following:

- The definition, impact and burden of health care-associated infection (HCAI)
- Major patterns of transmission of health care-associated pathogens
- Prevention of HCAI and the critical role of hand hygiene
- Indications for hand hygiene (based on the WHO 'My 5 Moments for Hand Hygiene' approach)
- Correct technique for hand hygiene (refer to 'How to Handrub' and 'How to Hand Wash')

8. A professional with adequate skills: Medical staff or nursing staff trained in Infection Control or Infectious Diseases, whose tasks formally include dedicated time for staff training. In some settings, this could also be medical or nursing staff involved in clinical work, with dedicated time to acquire thorough knowledge of the evidence for and correct practice of hand hygiene (the minimum required knowledge can be found in the WHO Guidelines on Hand Hygiene in Health Care and the Hand Hygiene Technical Reference Manual).

Hand Hygiene Self-Assessment Framework 2010

3. Evaluation and Feedback

Question	Answer	Score	WHO improvement tools
3.1 Are regular (at least annual) ward-based audits undertaken to assess the availability of handrub, soap, single use towels and other hand hygiene resources?	No	0	→ Ward Infrastructure Survey → Guide to Implementation II.3
	Yes	10	
3.2 Is health care worker knowledge of the following topics assessed at least annually (e.g. after education sessions)?			
3.2a. The indications for hand hygiene	No	0	→ Hand Hygiene Knowledge Questionnaire for Health-Care Workers → Guide to Implementation II.3
	Yes	5	
3.2b. The correct technique for hand hygiene	No	0	
	Yes	5	
3.3 Indirect Monitoring of Hand Hygiene Compliance			
3.3a Is consumption of alcohol-based handrub monitored regularly (at least every 3 months)?	No	0	→ Soap/Handrub Consumption Survey → Guide to Implementation II.3
	Yes	5	
3.3b Is consumption of soap monitored regularly (at least every 3 months)?	No	0	
	Yes	5	
3.3c Is alcohol based handrub consumption at least 20L per 1000 patient-days?	No (or not measured)	0	
	Yes	5	
3.4 Direct Monitoring of Hand Hygiene Compliance Only complete section 3.4 if hand hygiene compliance observers in your facility have been trained and validated and utilise the WHO 'My 5 Moments for Hand Hygiene' (or similar) methodology			
3.4a How frequently is direct observation of hand hygiene compliance performed using the WHO Hand Hygiene Observation tool (or similar technique)? **Choose one answer**	Never	0	→ WHO Hand Hygiene Observation form → Hand Hygiene Technical Reference Manual → Guide to Implementation II.3
	Irregularly	5	
	Annually	10	
	Every 3 months or more often	15	
3.4b What is the overall hand hygiene compliance rate according to the WHO Hand Hygiene Observation tool (or similar technique) in your facility? **Choose one answer**	≤ 30%	0	→ Guide to Implementation II.3 → Observation form → Data Entry Analysis tools → Instructions for Data Entry and Analysis → Epi Info™ software[9] → Data Summary Report Framework
	31 – 40%	5	
	41 – 50%	10	
	51 – 60%	15	
	61 – 70%	20	
	71 – 80%	25	
	≥ 81%	30	
3.5 Feedback			
3.5a **Immediate feedback** Is immediate feedback given to health-care workers at the end of each hand hygiene compliance observation session?	No	0	→ Guide to Implementation II.3 → Observation and Basic Compliance Calculation forms
	Yes	5	
3.5b **Systematic feedback** Is regular (at least 6 monthly) feedback of data related to hand hygiene indicators with demonstration of trends over time given to:			→ Data Summary Report Framework → Guide to Implementation II.3
3.5b.i Health-care workers?	No	0	
	Yes	7.5	
3.5b.ii Facility leadership?	No	0	
	Yes	7.5	
Evaluation and Feedback subtotal		/100	

9. **Epi InfoTM:** This software can be downloaded free of charge from the CDC website (http://www.cdc.gov/epiinfo/)

Hand Hygiene Self-Assessment Framework 2010

4. Reminders in the Workplace

Question	Answer	Score	WHO improvement tools
4.1 Are the following posters (or locally produced equivalent with similar content) displayed?			→ Guide to Implementation II.4
4.1a Poster explaining the indications for hand hygiene **Choose one answer**	Not displayed	0	→ Your 5 Moments for Hand Hygiene (Poster)
	Displayed in some wards/treatment areas	15	
	Displayed in most wards/treatment areas	20	
	Displayed in all wards/treatment areas	25	
4.1b Poster explaining the correct use of handrub **Choose one answer**	Not displayed	0	→ How to Handrub (Poster)
	Displayed in some wards/treatment areas	5	
	Displayed in most wards/treatment areas	10	
	Displayed in all wards/treatment areas	15	
4.1c Poster explaining correct hand-washing technique **Choose one answer**	Not displayed	0	→ How to Handwash (Poster)
	Displayed in some wards/treatment areas	5	
	Displayed in most wards/treatment areas	7.5	
	Displayed at every sink in all wards/treatment areas	10	
4.2 How frequently does a systematic audit of all posters for evidence of damage occur, with replacement as required? **Choose one answer**	Never	0	→ Guide to Implementation II.4
	At least annually	10	
	Every 2-3 months	15	
4.3 Is hand hygiene promotion undertaken by displaying and regularly updating posters other than those mentioned above?	No	0	→ Guide to Implementation II.4
	Yes	10	
4.4 Are hand hygiene information leaflets available on wards?	No	0	→ Hand Hygiene: When and How Leaflet
	Yes	10	→ Guide to Implementation II.4
4.5 Are other workplace reminders located throughout the facility? (e.g. hand hygiene campaign screensavers, badges, stickers, etc)	No	0	→ SAVE LIVES: Clean Your Hands Screensaver → Guide to Implementation II.4
	Yes	15	
	Reminders in the Workplace subtotal	**/100**	

Hand Hygiene Self-Assessment Framework 2010

5. Institutional Safety Climate for Hand Hygiene

Question	Answer	Score	WHO improvement tools
5.1 With regard to a hand hygiene team[10] that is dedicated to the promotion and implementation of optimal hand hygiene practice in your facility:			→ Guide to Implementation II.5
5.1a Is such a team established?	No	0	
	Yes	5	
5.1b Does this team meet on a regular basis (at least monthly)?	No	0	
	Yes	5	
5.1c Does this team have dedicated time to conduct active hand hygiene promotion? (e.g. teaching monitoring hand hygiene performance, organizing new activities)	No	0	
	Yes	5	
5.2 Have the following members of the facility leadership made a clear commitment to support hand hygiene improvement? (e.g. a written or verbal commitment to hand hygiene promotion received by the majority of health-care workers)			→ Template Letter to Advocate Hand Hygiene to Managers → Template Letter to communicate Hand Hygiene Initiatives to Managers → Guide to Implementation II.5
5.2a Chief executive officer	No	0	
	Yes	10	
5.2b Medical director	No	0	
	Yes	5	
5.2c Director of nursing	No	0	
	Yes	5	
5.3 Has a clear plan for the promotion of hand hygiene throughout the entire facility for the 5 May (Save Lives Clean Your Hands Annual Initiative) been established ?	No	0	→ Sustaining Improvement – Additional Activities for Consideration by Health-Care Facilities → Guide to Implementation II.5
	Yes	10	
5.4 Are systems for identification of Hand Hygiene Leaders from all disciplines in place?			
5.4a A system for designation of Hand Hygiene champions[11]	No	0	
	Yes	5	
5.4b A system for recognition and utilisation of Hand Hygiene role models[12]	No	0	
	Yes	5	
5.5 Regarding patient involvement in hand hygiene promotion:			→ Guidance on Engaging Patients and Patient Organizations in Hand Hygiene Initiatives → Guide to Implementation II.5
5.5a Are patients informed about the importance of hand hygiene? (e.g. with a leaflet)	No	0	
	Yes	5	
5.5b Has a formalised programme of patient engagement been undertaken?	No	0	
	Yes	10	
5.6 Are initiatives to support local continuous improvement being applied in your facility, for example:			→ Sustaining Improvement – Additional Activities for Consideration by Health-Care Facilities → Guide to Implementation II.5
5.6a Hand hygiene E-learning tools	No	0	
	Yes	5	
5.6b A hand hygiene institutional target to be achieved is established each year	No	0	
	Yes	5	
5.6c A system for intra-institutional sharing of reliable and tested local innovations	No	0	
	Yes	5	
5.6d Communications that regularly mention hand hygiene e.g. facility newsletter, clinical meetings	No	0	
	Yes	5	
5.6e System for personal accountability[13]	No	0	
	Yes	5	
5.6f A Buddy system[14] for new employees	No	0	
	Yes	5	
Institutional Safety Climate subtotal		**/100**	

10. Hand hygiene team: The make-up of this team will vary. It is likely to most frequently consist of an infection control unit, but may range (depending on resources available) from a single person with the role of managing the hand hygiene programme, to a group of staff members from various departments within the facility with meetings dedicated to the hand hygiene programme.

11. Hand hygiene champion: A person who is an advocate for the causes of patient safety and hand hygiene standards and takes on responsibility for publicizing a project in his/her ward and/or facility-wide.

12. Hand hygiene role model: A person who serves as an example, whose behaviour is emulated by others. In particular, a hand hygiene role model should have a hand hygiene compliance rate of at least 80%, be able to remind others to comply, and be able to teach practically about the WHO 5 Moments for Hand Hygiene concept.

13. System for personal accountability: explicit actions are in place to stimulate health-care workers to be accountable for their behaviour with regard to hand hygiene practices. Examples are notification by observers or infection control professionals, reproaches by peers, and reports to higher level facility authorities, with possible consequences on the individual evaluation.

14. Buddy system: A programme in which each new health-care worker is coupled with an established, trained health-care worker who takes responsibility for introducing them to the hand hygiene culture of the health-care setting (including practical training on indications and technique for performing hand hygiene, and explanation of hand hygiene promotion initiatives within the facility).

WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.

Hand Hygiene Self-Assessment Framework 2010

Interpretation: A Four Step Process

1.
Add up your points.

Score	
Component	**Subtotal**
1. System Change	
2. Education and Training	
3. Evaluation and Feedback	
4. Reminders in the Workplace	
5. Institutional Safety Climate	
Total	

2.
Determine the assigned 'Hand Hygiene Level' for your facility.

Total Score (range)	**Hand Hygiene Level**
0 - 125	Inadequate
126 - 250	Basic
251 - 375	Intermediate (or Consolidation)
376 - 500	Advanced (or Embedding)

3.
If your facility has reached the Advanced level, then complete the Leadership section overleaf.

(otherwise go to Step 4).

4.
Review the areas identified by this evaluation as requiring improvement in your facility and develop an action plan to address them (starting with the relevant WHO improvement tools listed). Keep a copy of this assessment to compare with repeated uses in the future.

Hand Hygiene Self-Assessment Framework 2010

Leadership Criteria	Answer (circle one)	
System Change		
Has a cost-benefit analysis of infrastructure changes required for the performance of optimal hand hygiene at the point of care been performed?	Yes	No
Does alcohol-based handrubbing account for at least 80% of hand hygiene actions performed in your facility?	Yes	No
Training and Education		
Has the hand hygiene team undertaken training of representatives from other facilities in the area of hand hygiene promotion?	Yes	No
Have hand hygiene principles been incorporated into local medical and nursing educational curricula?	Yes	No
Evaluation and Feedback		
Are specific healthcare associated infections (HCAIs) monitored? (eg. *Staphylococcus aureus* bacteremia, Gram negative bacteremia, device-related infections)	Yes	No
Is a system in place for monitoring of HCAI in high risk-settings? (e.g. intensive care and neonatal units)	Yes	No
Is a facility-wide prevalence survey of HCAI performed (at least) annually?	Yes	No
Are HCAI rates presented to facility leadership and to health-care workers in conjunction with hand hygiene compliance rates?	Yes	No
Is structured evaluation undertaken to understand the obstacles to optimal hand hygiene compliance and the causes of HCAI at the local level, and results reported to the facility leadership?	Yes	No
Reminders in the Workplace		
Is a system in place for creation of new posters designed by local health-care workers?	Yes	No
Are posters created in your facility used in other facilities?	Yes	No
Have innovative types of hand hygiene reminders been developed and tested at the facility?	Yes	No
Institutional Safety Climate		
Has a local hand hygiene research agenda addressing issues identified by the WHO Guidelines as requiring further investigation been developed?	Yes	No
Has your facility participated actively in publications or conference presentations (oral or poster) in the area of hand hygiene?	Yes	No
Are patients invited to remind health-care workers to perform hand hygiene?	Yes	No
Are patients and visitors educated to correctly perform hand hygiene?	Yes	No
Does your facility contribute to and support the national hand hygiene campaign (if existing)?	Yes	No
Is impact evaluation of the hand hygiene campaign incorporated into forward planning of the infection control programme?	Yes	No
Does your facility set an annual target for improvement of hand hygiene compliance facility-wide?	Yes	No
If the facility has such a target, was it achieved last year?	Yes	No
Total	**/20**	

Your facility has reached the Hand Hygiene Leadership level if you answered "yes" to at least one leadership criteria per category and its total leadership score is 12 or more. Congratulations and thank you!

ANNEX 15: IPC FACILITY ASSESSMENT TOOL

Instructions: This tool should be used to assess the IPC capacity at healthcare settings. This tool can be self-administered by the health facility IPC team or by an external assesor during support supervision. It should be administered quarterly by the facility IPC team.

SECTION A: General Information			
Region (drop down)			
District (drop down)			
Facility Name (Other)			
Facility Level (drop down)	Name of assesor		
Facility Type **(Public, Private)**	Phone contact of assessor		
Type of Assessment (Internal/External)			
Date of Assessment (Calender)	Day	Month	Year
Attain GPS Coordinates			
Institutional IPC Focal Person Name and Contact Details	Name:		
	Contact:		
	Email:		

SECTION B:			**Scoring**		**Comments**
1.	**IPC PROGRAMME**		**Yes**	**No**	
1.1	Is there at least one dedicated trained* IPC focal person in charge of IPC activities at the facility with clear TORs? ***General Hospital and above certified IPC training** ***Lower levels – MoH structured training eg IPC TTT**	Available			
		Trained			
		TORs are available			
1.2	Is IPC part of the quarterly facility management meeting agenda?	Yes, every meeting			**If no, IPC focal person to speak with HF leadership to add as an agenda item for next meeting**
		Yes, most or at least half of the meeting			
		Yes, but only once a year or rarely			

			Yes	No	
		No, IPC meetings are not part of the facility meetings Agenda			
		N/A- we don't have quarterly facility management meetings (if this response option is applicable)			look at the minutes to verify
		Minutes of last quarter available			look at the minutes to verify If No, How many times? Comment: Reason...
1.3	Does the Facility IPC Committee meet atleast Monthly?	Minutes for the last 3 meetings available			User feedback meeting during or after the pilot..
2.	**IPC Training**		**Yes**	**No**	
2.1	The facility has ongoing / Continous IPC education or training atleast annually	Yes, monthly			
		Yes, quarterly			
		No, have IPC education and training as needed (not on a regular basis)			
		No, none currently scheduled or planned			
2.2	Do all healthcare workers receive orientation on IPC SOPs/guidelines upon deployment?	Yes, Upon deployment			
		No			
2.3	Do all new cleaning staff receive orientation on IPC SOPs/guidelines upon deployment?	Yes, Upon deployment			
		No			
3.	**IPC Guidelines, SOPs and IEC Materials**		**Yes**	**No**	
3.1	Up to date National IPC guidelines	Available			**Ask to see guidelines**
3.2	Facility has locally adapted/developed standard operating procedures (SOPs)/ guidelines addressing the following IPC measures?	Hand hygiene			
		Decontamination of medical devices			
		Environmental cleaning			
		Healthcare waste management			
		Donning/doffing of PPE			
		Linen management			

			Yes	No	
3.2	Facility has locally adapted/developed standard operating procedures (SOPs)/ guidelines addressing the following IPC measures?	Injection safety			
		Healthcare worker protection and safety			
		Aseptic techniques			
		Isolation of patients with infectious Diseases including Multiple Drug Resistant Organisms, and outbreak prone diseases			
		Triage of infectious patients			
		Transmission-based precautions			
		Management for health staff who have had an infectious occupational exposure at the Health Facility			
3.3	Does facility have SOPs/ Guidelines for prevention of each Healthcare Assiciated Infection (HAI)	Surgical Site Infection (SSI)			
		Catheter Associated Urinary Tract Infection (CAUTI)			**Tailored to facility level - level IV and above**
		Ventilator Associated Pneumonia (VAP)			
		Blood Stream Infection (BSI)			
4	**Healthcare Associated Infections (HAIs)**		**Yes**	**No**	
4.1	Is facility conducting Healthcare Associated Infection	Surgical Site Infection (SSI)			
4.2	Surveillance for any of these according to National Plans?	Catheter Associated Urinary Tract Infection (CAUTI)			**Tailored to facility level - level IV and above**
		Ventilator Associated Pneumonia (VAP)			
		Blood Stream Infection (BSI)			

5	MULTI-MODAL STRATEGIES		Yes	No	
5.1	Do you use multimodal strategies* to implement IPC interventions to improve the following ***Multimodal strategies comprise measures to support the implementation of IPC improvement interventions and commonly focus on: 1) system change (infrastructure and human resources for IPC); 2) training and education; 3) monitoring and feedback; and***	Hand hygiene			**Assesor should review report on intervention done for verification**
		Safe injection practices			
		Decontamination of medical instruments and devices			
		Environmental cleaning?			
6	**Monitoring of IPC practices:**		**Yes**	**No**	
6.1	Does the HF monitor the implementation of staff IPC Practices atleast Quarterly?	Report of monitoring and feedback activities undertaken			
6.2	If Yes, what IPC Practices are monitored ***(if no above the system should automatically skip this question)***	Hand Hygiene			
		PPE donning and doffing demonstrations			
		Environmental cleaning			
6.3	If yes to above (Monitoring to Hand hygiene done), Is monitoring of hand hygiene compliance undertaken using the WHO handhygiene observation tool or equivalent? ***(if no above the system should automatically skip this question)***				
6.4	What's the hand hygiene compliance rate? ***(if no above the system should automatically skip this question)*** **Refer to the last Quarters facility HH compliance assesment done using the WHO HH observation tool**				
6.5	Do you provide timely and regular feedback of auditing reports (for example, feedback on hand hygiene compliance data or other processes) on the state of IPC activities/performance to key stakeholders, particularly to the hospital management and senior administration in order to lead to appropriate action?				**Verifier is feedback reports**

7.	WORKLOAD, STAFFING AND BED OCCUPANCY		Yes	No
7.1	Does the facility do screening and triage according to existing guidelines/SOPs to priotise care and isolation as needed?			
7.2	Does the HF have sufficient staff to provide clinical services safely? (*1 nurse per 4 patients with basic medical needs)			
7.3	Is bed occupancy in the facility kept to one patient per bed?			
7.4	Is adequate spacing of atleast one metre between patient beds ensured in your facility?			
8.	**BUILT ENVIRONMENT, MATERIALS AND EQUIPMENTS FOR IPC**		**Yes**	**No**
8.1	Is water available at all times and of sufficient quantity for all uses e,g Hand hygiene, environmemntal cleaning, laundry, patient usage and drinking?			
8.2	If No, highlight why			
8.3	Is there a reservoir to supply water for at least 48 hours to the facility?			
8.4	Are functional hand hygiene stations (Alcohol Based Hand Rub or soap and water, clean single use towels) available at all service points e.g OPD, Pharmacy, wards?	Number of functional HH stations		
		Number of service delivery points		
		If no, what resources are missing (i.e., soap, water, veronica buckets, etc.)		
8.5	Does the facility have continuous power?			
8.6	Is there a power back up?			
	Personal Protective Equipment		**Yes**	**No**
8.7	Has there been any stockouts of PPEs in the last quarter?			
8.8	Appropriate PPE is available for all health staff, including cleaners, at the HF (at time of this assessment)	Gloves		
		Surgical masks		
		Respirators/N-95		
		Eye protection		
		Gowns (delivery and theatre)		
		Plastic aprons		

			Yes	No	
8.8	Appropriate PPE is available for all health staff, including cleaners, at the HF (at time of this assessment)	Heavy duty gloves			
		Heavy duty aprons			
		Gum boots			
8.9	Has there been a stockout that lasted over 1 week, during the last quarter	Gloves			
		Surgical masks			
		Respirators/N-95			
		Eye protection			
		Gowns (delivery and theatre)			
		Plastic aprons			
		Heavy duty gloves			
		Heavy duty aprons			
		Gum boots			
	Waste management		**Yes**	**No**	
8.10	Colour coded Waste bins and liners for infectious, non infectious and puncture proof sharps boxes available at all waste generation service points	Number of service delivery points with available correctly colour coded bins, liners, sharps boxes			
		Number of service delivery points			
8.11	Is waste segregated appropriately ; infectious, non-infectious, sharps at generation point?				**Assessor needs to check for proper segregation practices**
8.12	Are waste segregation Job aides visible at all locations where bins are placed?				
8.13	How do you Dispose off infectious waste? (let selection be select all that apply)	Incinerator			
		Autoclave			
		Placenta pit			
		Burn pit			
		Waste transported offsite for disposal			
8.14	Secure waste storage area at the facility secured from animals and lockable available?				
8.15	Are sharps containers sealed and disposed when three quarter (¾) full?				

			Yes	No
8.16	Are sharps placed into sharps container, immediately after used to provide medication to patient?			
	Environmental cleaning		**Yes**	**No**
8.17	Are cleaning/disinfection supplies available at the HF?	At least 4 buckets		
		Mop/squeezer (1 per area)		
		Towels		
		Cleaning solution (detergent)		
		Stirring stick (for chlorine preparation)		
		Chlorine (either liquid and/or crystal form)		
8.18	Are the cleaning buckets clearly labelled and arranged in correct order for cleaning and disinfection?			
8.19	Are the cleaning staff (including the contracted clean staff) regularly trained about proper cleaning measures as per IPC guidelines i.e upon employement and atleast Quaretely?			
8.20	Is there an accessible up-to- date cleaning schedule/record, properly completed for all areas at the HF for general cleaning?	Yes, Available and up to date, properly completed		
		No, available and up to date but not properly completed		
		No, available but not up to date		
		No, not available, up to date nor completed.		
8.21	Is there an accessible up-to- date cleaning schedule/record, properly completed for all areas at the HF for High-touch cleaning? (Answer yes if this is included in the main cleaning schedule	Yes, Available and up to date, properly completed		
		No, available and up to date but not properly		
		No, available but not up to date		
		No, not available, up to date nor completed		
8.22	Does the health facility have a dedicated area (identified clean space for this purpose) for the decontamination and sterilization of medical devices and other items/equipment			

		Yes	No
8.23	Is there a functional sterilisation mechanism for medical instruments at the Health Facility		
8.24	Does the health facility use mechanical and or chemical indicators (e.g bowie dick test packs and chemical indicator strips) to monitor sterilization atleast daily?		
8.25	Does the facility use biological indicators to monitor sterilization atleast Weekly?		
8.26	Does the health facility have disinfected and sterile medical equipment readily available for use		
8.27	If No, highlight why and plan to avail these when needed		
	Isolation facilities	**Yes**	**No**
8.28	Does the facility have identified *safe isolation area where highly infectious disease patients can be kept **** District Hospital and Above, atleast 2 beds , with hand hygiene facility, dedicated sanitary facilities and space for donning and doffing PPE where patient can be admitted*** ***HCIV and below; identified space for temporary holding***		
	Medical device processing	**Yes**	**No**
	Check for working autoclave		

Check for working autoclave

Total score?
At the end summary scores for all the 8 thematic areas below?

1. IPC Programme
2. IPC Training
3. IPC Guidelines, SOPs and IEC materials
4. HAIs surveillance
5. Multimodal Strategies
6. Monitoring of IPC Practices
7. Workload, Staffing, and Bed occupancy
8. Built Environment, Materials and Equipment for IPC

Action Points for the next quarter : Period Day/Month/Year

ANNEX 16: CLEANING CHECKLIST

Healthcare Facility Environmental Cleaning Checklist																																	
Location:			**Month:**												**Year:**																		
Instructions			**Insert a tick on the appropriate date**																														
	Action	**Frequency**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	Cleaning of the floor	twice daily																															
2	Surface disinfection	As needed																															
3	Appropriate use of PPE (Heavy duty gloves, Aprons and gumboots)	At every cleaning moment																															
4	High dusting	once weekly																															
5	Cleaned toilets and are accessible	Daily																															
6	Dust bin cleaned and Emptied	Daily																															
7	Terminal cleaning completed	After patient discharge																															
8	Highly touched surfaces (door handles, tables, switches, sinks, Working tables, phones) cleaned and disinfected)	Twice daily Immediate spot cleaning																															
9	Cleaned less often touched surfaces (walls and curtain rails)	Once weekly																															
10	Ward linen cleaned	After every patient																															

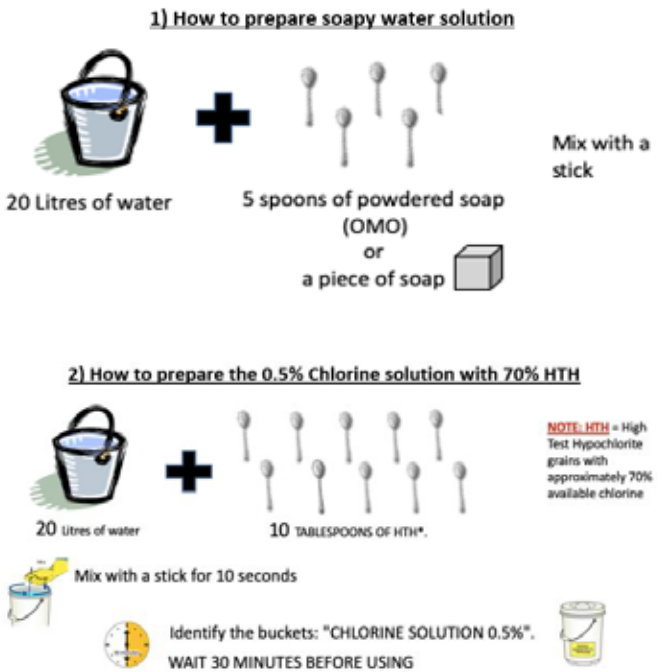
ANNEX 17: CLEANING AND DISINFECTION PROCEDURES FOR HEALTHCARE FACILITIES

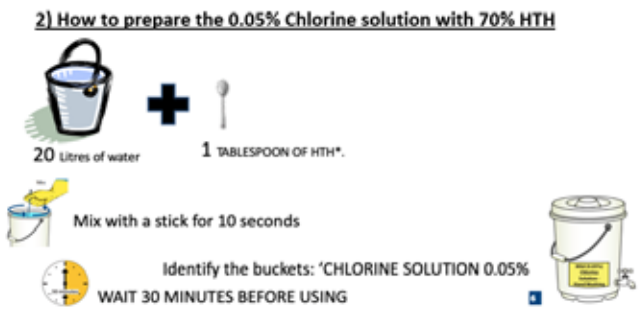
IPC Standard Operating Procedures Job Aides

CLEANING AND DISINFECTION PROCEDURES FOR HEALTHCARE FACILITIES JOB AIDE	
This document is a detailed step-by-step procedure for the environmental cleaning and disinfection process for at healthcare facilities. Basic principles: ❖ Cleaning is required before any disinfection process ❖ Always clean/disinfect from the cleanest to the dirtiest area (e.g., clean and disinfect screening and triage area before isolation area, clean and disinfect patient beds before patient toilets) ❖ Clean/disinfect from high to low to prevent dirt and microorganisms from dripping or falling and contaminating already cleaned areas (e.g., clean and disinfect surfaces before floors, clean and disinfect bed rails before bed legs) ❖ Always use clean equipment for each location (e.g., theatre, maternity, OPD, isolation area) and each patient (e.g. a new rag/cloth per bed) ❖ Different purpose buckets should be labelled and/or coloured differently **(One bucket = one task)** ❖ Cleaning materials for isolation areas should be kept and used only in those areas ❖ Never soak or dip a dirty rag/cloth into a soapy water or chlorinated water solution (i.e., don't double dip cloths during use)	
STEP 1: PREPARE EQUIPMENT	
PPE for each cleaner: ❖ Protective glasses or face shield ❖ Mask	**Cleaning and disinfection products:** ❖ Soap and drinking/clean water (for the soap solution)

❖ Gloves ❖ Cleaning gloves ❖ An apron ❖ Rubber boots ❖ A waterproof gown or overalls, Hair net/ Headgear/ Protective hood (highly infectious pathogens e.g Viral haemorrhagic fevers context)	❖ Strong chlorine solution (0.5%, labelled) ❖ Weak chlorine solution (0.05%, labelled) ❖ 4 buckets (1 = soapy water, 2 = clean water and ❖ 1 = 0.5% chlorinated water) ❖ Cleaning cloth (rags or towels) ❖ Squeegees with handles - not mops ❖ Biosafety box (if required) ❖ Infectious waste bag

STEP 2: PREPARE CHLORINATED WATER AND SOAPY WATER





- ❖ Organise all materials/equipment and prepare the chlorinated water and soapy water solutions:

STEP 3: PERFORM HAND HYGIENE AND PUT ON PPE

- ❖ Perform hand hygiene. Put on PPE according to WHO procedure (gloves, goggles or face
- ❖ shield, face mask, coveralls or gowns, apron, rubber boots). Heavy rubber gloves should
- ❖ be worn over latex/nitrile gloves. Ask the observer to review if there are breaches in the PPE.

STEP 4: REMOVE CONTAMINATED WASTE

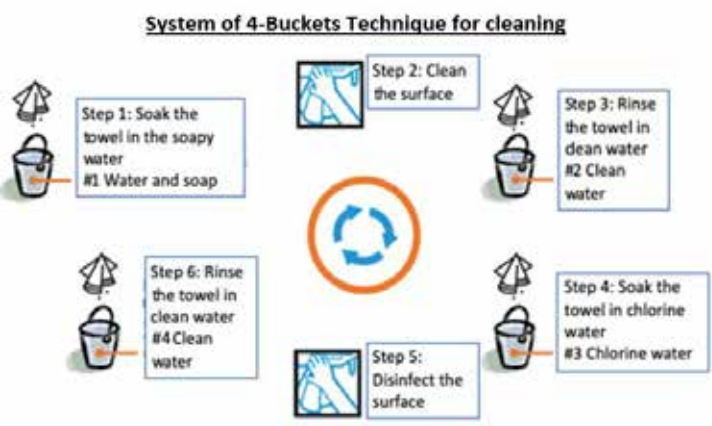
1. TAKE OUT the waste and dirty linen/laundry if applicable

- ❖ Remove and dispose of waste, clean and disinfect all waste containers
- ❖ Replace waste bag (if applicable)
- ❖ Remove dirty linen/laundry (if applicable)
- ❖ Check and replace sharps containers when they are ¾ full.
- ❖ Transport and dispose of the waste in the appropriate place according to the type of waste

STEP 5: PERFORM CLEANING AND DISINFECTION

- ❖ Perform cleaning and disinfection utilising the 4-bucket system:

Perform cleaning and disinfection utilising the 4-bucket system:



CLEAN: remove visible waste with soap or detergent and water

- Soak the clean towel in soapy water (bucket 1)
- Clean all surfaces. Always proceed from the cleanest to the dirtiest area. Always proceed from the highest to the lowest area
- Rinse the towel with clean water (bucket 2)
- Always clean before disinfecting, use of disinfectant on a surface containing debris will eliminate the effectiveness of the disinfectant.

DISINFECT: use a strong solution of chlorinated water (0.5%) (respect the contact time of 10 minutes)

- Soak the towel in chlorinated water (bucket 3)
- Disinfect the surface. Always proceed from the cleanest to the dirtiest area. Always proceed from the highest to the lowest area. Do not spray disinfectant in clinical care areas, whether occupied or not.
- Leave the surfaces with disinfectant for 10 minutes to ensure sufficient contact time with the disinfectant
- Rinse the towel with clean water (bucket 4)

DRY: Let the surfaces air dry

- Clean and disinfect walls in the same way as other surfaces (e.g. tables, supplies)

PROCEDURES FOR SURFACES CONTAINING BODY FLUIDS (FAECES, URINE, VOMIT OR BLOOD)

- Wipe up the area with a cloth or absorbent (paper) towel if available.
- Immediately dispose of the soiled cloth/towel in a plastic bag for infectious waste treatment
- ***Do not*** soak the dirty wipe/towel in chlorine solution or water after use as it is considered highly infectious waste. This only increases the handling of infectious waste and the risk of contamination.
- Clean and disinfect using the above 4-bucket technique
- Let the surface dry naturally

PROCEDURES FOR SURFACES CONTAINING BODY FLUIDS (FAECES, URINE, VOMIT OR BLOOD)

- Keep the container covered if possible
- Empty the contents into the latrine
- Clean with soap and water
- Apply a strong chlorine solution (0.5%), leave for 10 minutes.
- Dispose of the wastewater from the container in the latrine
- Allow to air dry, preferably in the sun.

PROCEDURE FOR CLEANING AND DISINFECTING TOWELS AND PATIENT CLOTHING

- Place soiled linen in a clearly labelled, leak-proof container at the point of release and disinfect the outside of the container before removal
- Always transport the linen/laundry in its container to the laundry room (washing area) where it will be washed and disinfected
- Take the dirty laundry and empty it into a drum containing water (hot if available) and soap, soak it completely in water and wash well
- Stir it with a stick, then discard the water and refill the drum with clean water to rinse
- Empty it into a drum containing a 0.05% chlorine solution, use a stick to stir the cloth, and then leave it to soak for up to 30 minutes
- Remove the cloth, rinse in clean water, squeeze out excess water and allow to air dry
- ***If washing and disinfection are not possible for any reason, it is prudent to incinerate the linen so as to avoid any risk of contamination for the persons in charge of their care.***

PROCEDURES FOR REUSABLE PPE

- ❖ Collect reusable PPE (boots, heavy-duty gloves, heavy-duty aprons, and goggles)
- ❖ Remove body fluids
- ❖ Wash with soapy water
- ❖ Soak PPE in a bucket of 0.5% chlorinated water for 10 minutes
- ❖ Rinse with clean water
- ❖ Hang it out to dry, allow to air dry
- ❖ Pour used chlorinated water and soapy water into patients' latrines

Note: Inspect and discard if breakages, tears in the re-usable PPE

STEP 8: DISPOSAL OF CONTAMINATED ITEMS

- ❖ Ensure that all soiled items and contaminated items are safely disposed of in an incinerator, burn pit, or designated waste disposal site.
- ❖ If found, dispose of syringes, needles, intravenous catheters, scalpel blades and other sharps in appropriate puncture-proof containers.

STEP 12: REMOVAL OF PPE

- ❖ Remove PPE according to the standard procedure. An observer should supervise doffing to ensure the safety of the procedure. Discard the PPE that is disposable on the waste bin/bag. Remove boots and reusable aprons and place them in appropriate plastic bag/bin to send to PPE decontamination area. Perform hand hygiene.

CLEANING FREQUENCY

ARTICLES	FREQUENCY
Surfaces (tables, chairs)	As specified based on location (see below)
Plates/eating utensils	After each patient
Reusable PPE: aprons, cleaning gloves, goggles, boots	After cleaning up a spill On leaving isolation
	❖ When visibly dirty ❖ At the end of each day

LOCATION	FREQUENCY
Screening and triage	At least twice a day, or as needed (e.g. EBOLA suspect case)
Isolation	At least once a day, after discharge or as required
Other places of patient care	At least once a day, after each patient or as needed
Latrines	At least twice a day, or as needed
Highly touched surfaces (door handles, tables, switches, sinks, Working tables, phones)	At least twice daily, or as needed
All other locations	Immediately after a spill of body fluids

ANNEX 18: IPC STANDARD OPERATING PROCEDURES JOB AIDES

IPC Standard Operating Procedures Job Aide

The Standard Operating Procedures (SOPs) for managing occupational exposures to blood and body fluids to ensure the safety and health of healthcare workers.

Occupational exposure is any exposure of a health worker who cares for, treats, and otherwise interacts with patients, their body fluids, or objects contaminated with their body fluids without wearing Personal Protective Equipment (PPE), or with a breach in PPE.

PURPOSE

The SOPs aim to guide the immediate assessment, management, and follow-up of individuals exposed to blood-borne viruses (BBVs) such as HIV, HBV, and HCV in occupational settings to ensure that all exposures are managed effectively and that healthcare workers receive the necessary support and treatment following an incident.

GENERAL REQUIREMENTS

- Establish local (health facility) systems for reporting and managing exposures including documentation.
- Ensure healthcare workers at risk provide evidence of vaccination against hepatitis B and other priority vaccinations as needed and keep a record.
- Provide education on standard precautions during induction and annually and keep a record.
- Implement an emergency management system for occupational and non-occupational exposures.

RESPONSIBILITIES

PERSON	RESPONSIBILITIES
Healthcare workers	❖ Apply standard precautions during the management of all patients at all times ❖ Ensure that they are vaccinated against Hep B and other relevant vaccinations
Injured employee	❖ Report event immediately ❖ Apply standard infection prevention and control precautions to all patients all the time
Occupational health practitioner/ designated person	❖ Provide the appropriate post exposure prophylactic (PEP) treatment ❖ Follow up employee's health for up to 6 months after the event and keep a record of all exposures ❖ Ensure that all employees receive Hepatitis B vaccination and other relevant vaccinations and keep a record ❖ Incident investigation and reporting
Unit manager	❖ Ensure that all employees are adequately vaccinated against Hepatitis B and other relevant vaccinations ❖ Ensure that employees have access to appropriate PEP treatment ❖ Ensure that there are adequate PPE (personal protective equipment) available at all times ❖ Ensure adherence to standard precautions at all times through the facility IPC team ❖ Ensures incident investigation and reporting

IMMEDIATE CARE AFTER THE EXPOSURE

Upon exposure, the following steps should be taken:

- Wash the area: Encourage free bleeding and cleanse the exposed area with clean water (Do not apply caustic agents or antiseptic agents into the wound, because they may injure the viable tissue and facilitate transmission).
- Report the incident: Notify a supervisor or designated person immediately.
- Seek medical evaluation: The exposed person should receive a medical assessment as soon as possible by the designated person.

RISK ASSESSMENT

A risk assessment must be conducted promptly after an exposure incident, documenting:

- Details of the exposure (date, time, type).
- Information about the source person (HIV, Hepatitis B status, demographics).
- Information about the exposed person (vaccination status, medical history).
- Exposure Classification (Percutaneous injuries (e.g., needle sticks), Mucous membrane contact with blood, High-volume blood exposure).

HIGH RISK EXPOSURE	LOW RISK EXPOSURE
Penetrating sharps injury	**Giving sets**
Physical contact of exposed HealthCare workers' mucous membranes (eyes, nose, or mouth) without wearing appropriate PPE or with a breach of PPE	Exposure of intact skin to fluids without appropriate PPE
Physical contact of exposed HealthCare workers' non-intact skin without wearing appropriate PPE or with a breach of PPE	
Physical contact of exposed HealthCare workers' intact skin without wearing appropriate PPE or with a breach of PPE	

THE UNKNOWN SOURCE

1.	Do a risk assessment on an individual basis if there has been a significant exposure and a source patient could not be identified.
2.	Give the exposed worker the opportunity to consider whether or not to continue PEP treatment if the for example HIV status of the source could not be established.

FOLLOW-UP

- Immediate identification of the source individual (if known).
- Baseline screening of the exposed person.
- Ongoing follow-up and treatment as necessary according to the risk assessment, including immediate post-exposure prophylaxis (PEP) for HIV, HBV, and HCV. ***Refer to current National disease specific guidelines for the detailed guidance on PEP to administer.***

- Counselling, ongoing psychosocial support
- Incident investigation and appropriate actions to minimise occurrence of similar risks in future
- Incident reporting: The designated occupational health officer/ any other designated person fills the incident reporting form and submits it to the facility manager finalization. If injury results in compensation claim, the supervisor (Facility Manager) reports to the designated Labour Officer and follows up with the appropriate offices as per the Worker man's compensation Act, 2000.

Note: *For occupational exposure in the context of highly infectious pathogens like Viral Haemorrhagic Fevers, COVID 19 etc, refer to current disease guidance for additional risk management actions including active monitoring for symptoms and restrictions from work.*

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