Republic of Zambia

Ministry of Health

NATIONAL STANDARDS FOR WASH IN HEALTH CARE FACILITIES

Ministry of Health

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Developed in collaboration with

World Health Organization unicef World Vision SNV Food & Drug Laboratory Zambia Environmental Management Agency ZABS Zambia Bureau of Standards ZNPHI cmmb UNDP Ministry of General Education Ministry of Water Development, Sanitation and Environmental Protection

Table of Contents

Foreword....4
Acknowledgement....5
Abbreviations/Acronyms....6

1.0 INTRODUCTION....7
1.1 Background....7
1.2 Policy documents....7
1.3 Scope of the guidelines....8
1.4 Objective of the guidelines....8

2.0WATERSUPPLY....9
Watersupplyproposedstandards....9

3.0 SANITATION IN HEALTH CARE FACILITIES....11
Sanitary Standards....11

4.0HYGIENE....12
HygieneStandards....12

5.0 HEALTHCARE WASTE MANAGEMENT....13
HealthCare waste management standards....13

6.0 ENVIRONMENTAL CLEANING....16
Environmental Cleaning proposed standards....16

7.0INFRASTRUCTURE....17
7.1 Water supply....17
7.1.1 Water Quantity....17
7.1.2 Water AccessHealth Care Waste Management (HCWM)....18
7.1.3 Water Quality....18
7.2 Sanitation....18
7.2.1 Sanitation Quantity....18
7.2.2 Sanitary Fixtures....18
7.2.3 Waste Water Treatment....18
7.2.4 Waste Water Quality....18
7.2.5 Sanitation Access....18
7.3 Healthcare waste....19
7.3.1 Waste quantities....19
7.4 Environment....19
7.5 Hygiene....19

8.0 FINANCING MECHANISM OF WASH ACTIVITIESIN HCF....21
Financing of WASH standards....21

REFERENCES....22
ANNEX 1: WATER QUALITY STANDARDS....23
ANNEX 2: MAKING DIFFERENT CONCENTRATIONS OF CHLORINE....24
ANNEX 3: CLEANING PROTOCOL FOR WASH FACILITIES....24
ANNEX 4: SCHEDULE FOR DECONTAMINATION AND MAINTENANCE OF CLEANING EQUIPMENT....25
ANNEX 5: ROUTINE HAND HYGIENE....25
ANNEX 6: CODING & STORAGE OF HEALTH CARE WASTE....26
ANNEX 7: WASH AND DISEASES....26

Foreword

The provision of improved water, sanitation and hygiene (WASH) services in health care facilities (HCFs) has of late attracted the attention of governments, Development Partners (DPs) and the international public health institutions. This is due to the fact that, although HCFs provide essential medical care to the sick, most of them especially in developing countries lack basic WASH services and thus compromising their ability to provide quality health care and consequently posing serious health risks not only to people who seek treatment but also to health care workers (HCWs) and care givers There are numerous consequences of poor WASH services in HCFs. Several studies have revealed that, due toinadequate provision of WASH services, patients are potentially at higher risk of developing Health Care Associated Infections (HAIs).

The risk of infection is particularly high in new-borns leading to sepsis which in most cases is fatal. The risks associated with sepsis are reported to be 34 times greater in developing countries. Furthermore, lack of adequate WASH services may discourage women from giving birth in HCFs or causing delays in healthcare-seeking. Therefore, addressing the inadequate provision of WASH services in HCFs will not only improve the quality of care but also attract many people to seek healthcare including delivery services to pregnant women and most importantly contribute in the prevention of HAIs.

There are currently no uniform and nationally well-organized standards to support and guide these initiatives.

These standards are therefore, intended to provide a standardised approach to guide stakeholders in addressing WASH challenges in HCFs countrywide. Furthermore, adherence to these standards will provide a safer working environment for HCWs thus improving their performance and prevention for HAIs for patients and care givers.

Hon. Dr. Jonas Chanda, MP
MINISTER OF HEALTH

Acknowledgement

The process of developing these guidelines has been very involving and therefore needed people with an esteemed knowledge base and experience on WASH. The Ministry would like to appreciate the efforts of all those who participated in every step of developing these important standards which not only will help to improve the quality of health care services but also make the working environment conducive for service providers, patients and care givers.

The Ministry would like to give gratitude to Water Aid who have supported the development of these standards through financial support. This does not exclude other agencies such as UNICEF and the World Health Organisation for their material and technical support towards the development of this document.

It is hoped that these standards will be useful in implementing WASH in HCF, thereby and improving the quality of Health services and increasing access to health services for the achievement of the Vision 2030.

Dr. Kennedy Malama
Permanent Secretary-Technical Services

MINISTRY OF HEALTH

Abbreviations / Acronyms

CPVC	Chlorinated Polyvinyl Chloride
EMA	Environmental Management Act
GiZ	German International Aid in Zambia
HAI	Health Care Acquired Infections
HCF	Health Care Facilities
HCW	Health Care Worker
HCWM	Health Care Waste Management
IEC	Information Education and Communication
IPC	Infection Prevention and Control
IPD	Inpatient Department
ISO	International Standards Organisation
MoH	Ministry of Health
NGO	Non-Governmental Organisation
NHSP	National Health Strategic Plan
OPD	Outpatient Department
PVC	Polyvinyl Chloride
SDG	Sustainable Development Goals
uPVC	Unplasticised Polyvinyl Chloride
WASH	Water Sanitation and Hygiene
WHO	World Health Organisation
WVI	World Vision International
ZABS	Zambia Bureau of Standards
ZEMA	Zambia Environmental Management Agency

1.0 Introduction

1.1 Background

The term “WASH in health care facilities” refers to the provision of water, sanitation, health care waste management, hygiene and environmental cleaning infrastructure, and services across all parts of a facility. “Health care facilities” encompass all formally recognized facilities that provide health care, including primary (health posts and clinics), secondary, and tertiary (district or national hospitals), public and private (including faith-run), and temporary structures designed for emergency contexts (e.g., Cholera Treatment Centres).

The consequences of poor WASH in HCFs are many as shown from different studies conducted. Global estimates of the burden of endemic HealthCare Acquired Infections (HAIs) are responsible for up to 56% of all neonatal deaths among babies born in hospital in developing countries, with 75% of the deaths occurring in South-East Asia and sub-Saharan Africa. Likewise, the burden of infections related to poor WASH in HCFs is particularly high in newborns, for example, severe infections such as sepsis are major killers of newborns. The risks associated with sepsis are reported to be 34 times greater in low-resource settings. Lack of adequate WASH services may also discourage women from giving birth in HCFs or cause delays in health care-seeking (Velleman et al, 2014). However, with improved WASH services women can be attracted to seek antenatal care and deliver in HCFs, which can greatly reduce neonatal and maternal mortality.

Sepsis is a major cause of mortality in neonates in sub-Saharan Africa. Bloodstream infections (BSIs), the most common hospital-associated infections in neonates, occur more frequently in resource-limited countries than in industrialized countries and contribute to many in-hospital neonatal deaths. A study conducted on neonates in Zambia showed results that half of neonates had one or more episodes of sepsis, including 41% who had a positive blood culture (Hamer et al., 2018).

Water, sanitation and hygiene (WASH) in healthcare facilities are critical in the provision of basic health services. Inadequate or the lack of basic WASH has the potential to cause infections and spread diseases.The provision of adequate WASH in healthcare facilities promotes trust in the health facilities and encourages women to seek prenatal care and deliver in health facilities rather than at home (Russo et al., 2012).

The importance of WASH in health facilities has been recognized by stakeholders worldwide. The WHO, UNICEF and partners including WaterAid, committed to immediately address the situation with the aim to ensure that all health care facilities in all settings have adequate water, sanitation and hygiene services by 2030. The responsibility of WASH provision and compliance in HFCs lies primarily with health authorities and within health systems. However, both WASH and health actors play a critical role in ensuring that WASH services and practices in health care facilities are sustainably met and financed (WHO/UNICEF, 2015).

Therefore, ensuring adequate WASH at healthcare facilities minimizes the risk of infections for patients and their families, health workers and surrounding communities. Clean and safe healthcare facilities can increase demand for and trust in services, reinforce the role of healthcare services and staff in setting societal hygiene norms, increase the motivation and retention of health workers, and result in cost savings from infections averted and more efficient service delivery (WHO/UNICEF, 2015).

1.2 Policy documents

The main policy for sanitation in Zambia is the 2010 National Water Policy. However, the policy approaches sanitation very much within the context of the broader water sector. The “major outcome of [the] National Water Policy is to improve the management of water resources, institutional coordination and defined roles and responsibilities,”.

Another policy that addresses sanitation is the National Policy on Environment of 2007, which highlights

sanitation under measures for “Human settlements and health”. In addition to this, there is a National Water and Sanitation Policy, which describes sanitation.

Another key policy is the National Health Policy of 2012 that contains specific measures for sanitation provision as follows: “Promote and strengthen the provision of adequate and safe water and appropriate sanitary facilities in urban and rural areas,” in order to reduce the incidence of diseases related to the environment.

While the key legislation governing sanitation in Zambia is the National Water Supply and Sanitation Act No. 28 of 1997,. tThe Aact provides for the establishment of water supply and sanitation utilities as commercial entities under the local authorities to be able to provide water supply and sanitation services in their areas of jurisdiction. The National Water Supply and Sanitation Act defines sanitation services as “the disposal, onsite or offsite, of human excreta; the collection of sewerage, excluding untreated toxic waste and storm water, from residential, commercial or industrial sources and the treatment and disposal of waste water”.

Other legislation on sanitation are the Local Government Act Cap 281 of the Laws of Zambia which has conferred the responsibility for sanitation provision on the local authorities; the Environmental Management Act No.12 of 2011. Further, the Public Health Act Chapter 295 of the Laws of Zambia which provides for sanitary accommodation standards for public premises which includes health facilities. The act further also provides for the suppression and prevention of diseases through nuisances prohibition (GRZ 1995).

The regulation of onsite sanitation services is a multifaced area. The regulation of the final quality of treated faecal sludge and its possible re-use is done by Zambia Environmental Management Agency (ZEMA). While the regulation of the siting and building of onsite sanitation facilities is meant to be done by the Local Authorities (LAs), but this is not done in informal settlements including some planned settlements; LAs approve construction drawings but there is no adequate follow up on the actual construction.

1.3 Scope of the guidelines

These technical standards have been developed for key persons responsible for water, sanitation and hygiene at the health care facilities. The guidelines cover the following:

- National standards for different health care facilities with respect to water.
- National standards for different health care facilities with respect to sanitation.
- National standards in respect to Health care waste management.
- National standards for different health care facilities with respect to hygiene, hand washing facilities in healthcare facilities.
- National standards for different health care facilities with respect to Environmental cleaning and disinfection.
- National standards for the construction of WASH infrastructure in health care facilities.

1.4 Objective of the guidelines

The primary purpose of these standards is to give direction to health care personnel and clients in preventing and controlling infections within Healthcare settings for patient safety and the protection of health workers.

2.0 WATER SUPPLY

Goal
To achieve universal and equitable access to safe and affordable drinking water supply which meets national guidelines for quantity (ZABS, 2009), and quality (ZABS, 2010), supplied to all points of care within the health care premises and which is accessible to all people including those with disabilities.

Water is critical in health care settings because of the invaluable role in infection prevention and its multiple uses such as drinking, cleaning, food hygiene, personal hygiene, hand hygiene, laundry and medical services. Water therefore, needs to be available in sufficient quantity, acceptable quality and must be accessible to all patients, service providers, visitors and care givers.

Due to the critical role that water plays in health care settings, it must be supplied using affordable and recommended technologies such as safe piped water supplies that do not present a risk to health. Water must be supplied to healthcare facilities from an improved source such as a protected groundwater source (borehole, lined dug well, capped spring) or from a treated supply. Harvested rainwater shall be disinfected and stored in a safe storage tank or receptacle.

To mitigate impacts that may arise due to interrupted services, health care facilities must be able to store water in well managed water storage facilities.

Water supply proposed standards

Sr. No.	Standard	
1.	**Service ladders** 24hour water supply from a treated or safe source into the healthcare facility that meets national drinking water standards shall be accessible to all including people with disability.	
2.	**Water source** Water shall be accessed from an improved water source such as: 1. Protected ground water sources where water is obtained from beneath the sur-face in rocks and soil and accumulates underground in aquifers. Ground water can be from boreholes and protected spring depending on the method of water drilling and the depths of occurrence and bearing stratum with depth of 60 and above meters e.g. • Borehole. • Protected spring. • Piped water. 2. Treated surface water supply. 3. Harvested rainwater .	
3.	**Water sources per health care facilities level**	
	Health Centres /posts -	• Must be connected to existing piped water supply system, either public or any other water source approved by relevant authorities. • Drilled borehole fitted with a hand pump or mechanized with a storage tank and have a distribution system or • Pumped water from a protected spring with a distribution system.
	Hospitals 1st, 2nd & 3rd level hospi-tals	• Must be connected to existing piped water supply system, either public or any other water source approved by relevant authorities. • Installation of RWH system for newly constructed facilities shall be compulsory. • Drilled borehole mechanized with a storage tank and have a distribution system or • Pumped water from a protected spring with a distribution system.
4.	**Service duration** 24 hours service with back up storage of 72 hours water supply in cases of interrupted service .	

<table>
<tr><th>Sr. No.</th><th>Standard</th></tr>
<tr><td>5.</td><td>Distribution System
i) Piped water Systems

• Materials used in transmission and distribution of water such as pipes, fittings, storage and other devices must not leach hazardous agents into the water system e.g.
• PVC, uPVC, CPVC pipes in piped water systems are recommended.
• All plumbing materials (both metallic or non-metallic) including hand pumps and accessories, submersible pumps and accessories, pipes, connectors, joins, elbows and similar materials shall have the certification mark clearly labelled or engraved.
• All known corrosive materials used to manufacture pumps, spare parts, pipes, joints, elbow connectors e.t.c shall avoided in the procurement process from request to the delivery

ii) Boreholes
• PVC Pipes can be used for shallow boreholes of up to 30metres
• Stainless steel pipes recommended for both deep and shallow wells</td></tr>
<tr><td>6.</td><td>Accessibility
• Piped water inside building.
• Water dispensing points must be placed at all points of care.
• Water dispensing points must be at heights preferably between 700mm and 800mm and placed in locations easily accessible by people with disabilities.</td></tr>
<tr><td>7.</td><td>Water quantity
• The quantity of water must be adequate for the current and future demand of the HCF.
• The Mminimum quantity of water that is required for different situations points of care in the health-care settings (WHO, 2008):
<table>
<tr><td>Outpatients</td><td>5 litres/person/day</td></tr>
<tr><td>Inpatients</td><td>40–60 litres / person /day</td></tr>
<tr><td>Operating theatre or maternity unit</td><td>100 litres / intervention</td></tr>
<tr><td>Nutrition centres</td><td>30litres/person /day</td></tr>
<tr><td>Treatment centres</td><td>60litres/person/day</td></tr>
<tr><td>Isolation centres</td><td>300-400litres / person / day</td></tr>
</table></td></tr>
<tr><td>8.</td><td>Drinking water
• Provision of running water for drinking that is safe and accessible to all users.
• Drinking water points to be clearly labelled and separated from hand washing basins.</td></tr>
<tr><td>9.</td><td>Water Quality Monitoring
• Sampling and testing of water sources, distribution and points of care to be done for physical, biological and chemical characteristics).
• All health care facilities to collect water samples on a quarterly basis.</td></tr>
</table>

3.0 Sanitation in Health Care Facilities

Goal
To achieve access to adequate, environmentally friendly and equitable sanitation and hygiene for all health care facilities and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations such as people with disabilities, elderly and pregnant mothers

Sanitation includes construction and/or rehabilitation and management of sanitation facilities in HCFs, and maintenance of hygienic conditions through services such as waste water disposal and excreta management.

Sanitation facilities are important for prevention of diseases by breaking pathogen transmission pathway or disease-causing organisms found in human excreta and wastewater from entering the environment and posing a threat to people's health. Thus, adequate, safe and appropriate sanitation facilities/services prevent infections and minimize spread of diseases within the HCFs. The provision of sanitation in HCF is in line with the National Health Strategic Plan (NHSP,2017-2021), Seventh National Development Plan (7NDP 2017-2021) and Sustainable Development Goal (SDG) 6 which provides standards that every nation shall prioritize WASH in health care facilities.

Sanitary facilities standards

Sr. No.	Standard
1.	**Social and Cultural Consideration** There shall be separate toilets for male and female staff and clients in both OPD, IPD and other departments
2.	**Quantity** There shall be sufficient toilets available, one stance per 20 users for inpatients; at least four stance per outpatients settings (one for staff, one for patients and disabled, one for female, one for males and one for children (Refer to the Public Health Act and the Sanitary, Latrine Regulation and the Disability Act No. 6 of 2012). • There shall be urinals in all male toilets (one for people with disability and one for chil-dren in each of the facility's functional block or department). • Toilets (including urinals) must be water-borne with flushing system (No pit latrines). • Water closets (with sanitary bins for waste disposal) and bathing facilities shall be pro-vided specifically for delivery clients (1:10, toilet/shower client ratio). • In all female toilets, a foot operated receptacle bin lidded shall be provided for disposal of sanitary pads.
3.	**Quality** • Sanitary facilities shall have convenient hand washing facilities within 5metres with soap. • There shall be a cleaning and maintenance schedule. • Availability of toilet paper and/or bidet in all sanitary facilities. • Sanitary facilities shall at all times be in good state of repair and function.
4.	**Accessibility** • Sanitary facilities shall be conveniently located not more than 30 meters from all users. • Designated sanitary facilities for disability shall be designed according to the prescribed standards. • Routes to reach sanitary facilities shall be smooth and flat for easy access for people in wheelchair. • Sanitary facilities shall be open for use when needed by either staff or clients.
5.	**Privacy** • Sanitary facilities shall offer privacy and security at all times.
6.	**Waste Water disposal** • Water waste disposal shall be managed in accordance with the EMA No.12 of 2011. • Waste water drainage from health care settings shall be built and managed to prevent contamination of the environment. • Waste water shall be disposed of rapidly and safely. • Contaminated liquid shall be disinfected before final disposal. • Drainage systems shall be installed for management of ablution waste for health care delivery points such as toilets, sluice rooms, laundry and at any other point where grey water is produced. • Waste water from hand washing points shall be disposed in simple ground seepage system. • Waste water from delivery rooms, dressing rooms and other places shall be directed from appropriate soak away pits.

4.0 Hygiene

Goal
To address the conditions and practices at the health facility in order to maintain health and prevent diseases through cleanliness

Hygiene is essential in promoting good health and is critical in the care of patients in order to reduce cross infections. It also includes keeping of surfaces in health care facilities clean and pathogen free. To attain this, a series of practices are performed which includes maintaining of the body's cleanliness, sanitary facilities, handling of health care waste, food hygiene, cleaning and disinfection of the infrastructure and medical equipment and various tools at every level of health care.

Hygiene standards

Sr. No.	Standard
1.	**Hand Hygiene** • Functional hand washing facilities with safe and clean running water (both cold and hot), soap or alcohol-based hand rub at every point of care at all times including waiting rooms, food preparation rooms/areas and sanitary facilities. • Availability of hand sanitizer at all critical points of care. • Hand washing facilities and surrounding areas shall be cleanable nonporous surfaces. • Hand washing basin shall be of elbow, foot or automatic operating taps, uPVC traps and plastic gadgets. • Availability of hand drying facilities (paper towels or automated dyer). • Wheelchair accessible hand wash basin which is wall mounted with dimensions of 510mm (length) by 685mm (width)- 700mm and 800mm (height). • Hand hygiene promotion- IEC materials available, clearly visible and understandable at all points of care. • Hand washing guidelines (SOP) to be available and observed by staff. • HCF to have WHO hand hygiene steps available.
2.	**Food hygiene** • Provision of an inclusive washroom in a private setting for women (can be in a bathroom or water point in a toilet with adequate washing and drainage facilities). • Provision of a smooth, easy to clean bin for disposing of sanitary towels in all female toilets.
3.	**Food hygiene** • Water for cooking shall comply with drinking water quality standards (ZABS). • Food contact surfaces to be of a non-porous and easy to clean material. • Food preparations areas to be located away from sanitary facilities. • Food preparation areas shall be free from vermin. • Food handlers to maintain personal hygiene in accordance with the Food and Drugs Act Regulations and to be medically examined every six months.

5.0 HealthCare Waste Management

Goal
The Goal is to ensure safely managed healthcare waste to reduce healthcare related infections and prevent environmental pollution

Safely Healthcare Waste Management (HCWM) is fundamental for the provision of quality, people-centered care, protecting patient and staff safety as well as safeguarding the environment. This shall improve healthcare waste management systems,. eE.g. through improved classification, segregation, storage, transport and disposal. As part of broader water, sanitation and hygiene (WASH), infection prevention and control (IPC) efforts, safe management of healthcare waste reduces health-care-related infections, increases trust and uptake of services, increases efficiency and decreases cost of service delivery (WHO, 2017).

HealthCare waste management standards

Sr. No.	Standard
1.	**Generation/Segregation** • HCF shall have a minimum of three receptacles with bin liners at all points of generation, located away from patient areas to avoid cross infections in the following order: • HCF shall have a minimum of three appropriately colour coded bins i.e., o General waste- Black. o Infectious -Yellow. o Highly/infectious waste - Red. o Radioactive waste – Brown. o Pharmaceutical waste- Brown. • Healthcare providers and any other personnel shall not sort through waste by correcting errors of segregation
2.	**Labelling** • All waste receptacles shall be labelled with basic information on their content and the waste producer • This information shall be written directly on the receptacle or on pre-printed labels, securely attached • The Basic information shall be placed on receptacles as follows: *a) Waste type.* *b) Source of waste.* *c) Date and time of waste generation.* *d) Quantity of waste generated in weight (Kg).* • Healthcare waste receptacles used shall be of the recommended weight and sufficient strength. The minimum thickness of plastic based receptacles shall not be less than 60 microns and but not exceeding 100 microns. • The receptacles shall be fitted with handles for easy manipulation and designed to minimize physical contact. • They shall be smooth and rounded on the inside to allow effective and complete cleaning. • Receptacles for sharps shall be non-corrosive, puncture resistant (metal or high-density plastic), rigid, with fitted covers, and imperme-able to retain any residual liquids from syringes. • Reusable waste containers shall be decontaminated, triple washed and disinfected with an ideal disinfectant (Chlorine, bleach, Chlo-ramine) as recommended in the Zambia Infection Prevention and Control (IPC) guidelines document (IPC, 2018).
3.	**STORAGE (Internal and External)** • Internal storage shall not exceed 24 hours. • The temporary storage point shall be located away from patient areas (patients' immediate environment), for example in a sluice room or housekeeping room. • The storage area shall have safe water supply for cleaning purposes and hand hygiene. • The storage area shall have good lighting, ventilation and secured. • The Polythene bags used shall be placed in rigid containers with the opening folding outward over the rim to minimise contamination of the surrounding. • Plastic sealing tag shall be of the self-locking type and filled bags shall be closed off using a plastic strip which when fastened cannot be re-opened.

Sr. No.	Standard
	• Sharps shall be stored in puncture-resistant containers. • Sharps shall not be manipulated (breaking, bending) before disposal and shall not be recapped before discarding to avoid injury. • Ensure that waste bags are removed and sealed when they are not more than three-quarters full • Storage bins shall be placed in roofed built-in areas protected from water, rain, wind, animals and vermin. • Bio-hazard marks and other warning signs shall be conspicuously pasted on storage room doors • Healthcare waste shall be collected one way to central storage site without returning to the point of generation. • To ensure waste is kept separate, the colour coded bags shall be placed in similarly colour coded central storage receptacles.
4.	**External Storage** • The storage area shall be secured from scavenging and adverse environmental conditions. • There shall be a minimum of one external storage point for hazardous and non-hazardous waste depending on the layout and size of each Healthcare facility (HCF). • External storage facilities shall be sited at least 30m away from the kitchen, laundry, ward etc, on the leeward direction within the precincts of the healthcare facility. • Water from the storage area shall be drained into septic tanks, soak ways and municipal sewer system and shall not be allowed to drain off into storm water drainage or streams. • Wash-room facilities shall be made available to waste handlers. • Add labelling. • Adequate spill kit and protective clothing such as gloves, overall, nose mask etc. shall be provided to the waste handlers.
5.	**Transportation of Health Care Waste** • There shall be a fixed schedule for the collection of waste from each point of care. • No bags shall be removed without labelling indicating the point of generation (hospital and ward) and content. • Healthcare workers shall replace the bags or containers with new ones of the same type within 24 hours. • Separate trolleys shall be used for different types of waste. • Closed wheeled trolleys with lids shall be solely used for collection and transportation within the healthcare facility. • Trolleys and vehicles shall be decontaminated, cleaned and disinfected daily or at the end of each haulage with an appropriate disinfectant. • Healthcare facility shall ensure that healthcare waste is transported directly to the disposal or treatment site within 24 hours. • Vehicles transporting healthcare waste shall be licensed by the relevant authority/ies. • Healthcare waste shall not be compacted or subjected to any other treatment, when transporting, that could cause bags or containers to rapture. • Labels shall be firmly attached to containers so that they do not become detached during transportation and handling. • Specific routes shall be planned through the Healthcare facilities to minimize the passage of loaded carts through wards and other clean areas. • Radioactive waste material shall be managed in accordance with the Ionising Radiation Act number 16 of 2005, as read together with the Ionising Radiation Protection (General) Regulations 2011, Part IX and the Environmental Management Act No 12 of 2011. • Add transportation of general waste.
6.	**Treatment** The most common way of treating healthcare waste is by incineration. However, the following options shall be used to treat healthcare waste; • Autoclaving. • Microwave irradiation. • Chemical disinfection. • Mechanical and physical treatment.
7.	**Disposal options available (Refuse pit)** In a situation where healthcare waste is not managed by a municipality or licensed company. The HCFs shall apply any of the following; • Access to the disposal site shall be restricted.

Sr. No.	Standard
	• The burial site shall be lined with a material of low permeability (e.g. clay or impermeable membrane) if available. • The selected site shall be at least 50 metres away from any water source to prevent contamination of underground water table (aquifer). • The site shall have proper drainage and located downhill from any wells, free of standing water and not in an area liable to floods. • Use of a land for disposal shall only be practical for limited periods of time (1-2 years), and for relatively small quantities of healthcare waste.

6.0 Environmental Cleaning

Goal
The goal of environmental cleaning is to reduce the number of infectious agents that may be present on surfaces and minimise the risk of transfer of micro-organisms from one person/ object to another, thereby reducing the risk of infection.

Environmental cleaning includes decontamination, cleaning, disinfection and sterilization. Thorough cleaning is required before high-level disinfection and sterilization because inorganic and organic materials that remain on the surfaces of instruments interfere with the effectiveness of these processes (MoH, 2018). Also, if soiled materials dry or bake onto the instruments, the removal process becomes more difficult and the disinfection or sterilization process will be less effective or ineffective.

According to WHO, nosocomial (Healthcare associated) infections contribute to morbidity and mortality, and to a loss of health-sector and household resources worldwide. It is further highlighted that five to thirty per cent of patients develop one or more infections during a stay in health care facilities — a significant proportion of which could be avoided (WHO, 2008). Transmission from the environment to patients usually occurs through contact. Thus, cleaning the health care environment shall be a priority at all levels of care in order to reduce hospital acquired infections.

Environmental Cleaning standards

Sr. No.	Standard
1.	**Surface cleaning** • Contact surfaces shall be cleaned with a disinfectant (0.5% chlorine solution). • Each health facility shall have and adhere to a Cleaning Protocol. • All health care facilities shall have spill kits for microbial and chemical spillage including mercury. • Cleaning logs shall be pasted in easily accessible location.
2.	**Decontamination** • Chlorine and other recommended disinfectants shall be available at all times for all wards at the health facility. • 0.5% chlorine shall be used for cleaning floors, surfaces, blood spills. • 0.05% chlorine shall be used for decontamination of linen before laundry. • 0.5% chlorine shall be used for decontamination of instruments. • 0.1% chlorine shall be used for high level decontaminations and soak for 20 minutes. • Isolation ward, operating rooms shall be disinfected with 0.2% of chlorine daily. • All health facilities shall have a scheduled swabbing for microbial contamination monitoring. o once a week for theatres and maternity wards, isolation wards. o once a month for general wards. • All health facilities shall have SOPs on decontamination and sterilization.
3.	**Personal Protective Equipment (PPE)** • Appropriate PPE shall be available and used at all points of care in all health care institutions. • PPE made out of fabric shall be white or light coloured. • All staff shall be trained in the proper application of PPE. • All health facilities shall have SOPs for PPE.
4.	**Cleaning chemicals and equipment** • Chemicals and cleaning agents shall be well labelled. • Storage of chemicals and cleaning agents shall be in a secure and lockable room. • All cleaning materials shall be stored in appropriate areas.
5.	**Vaccinations and accidental exposure** • All workers in a health care setting shall be vaccinated against Hepatitis B and any other infectious agents as prescribed by the WHO. • All health facilities shall have written policies and procedures for exposed workers.

7.0 Infrastructure

7.1 Water supply

7.1.1 Water Quantity

Underground water.
Boreholes, Water Tanks and Stands.
Boreholes shall have the following specification as listed below.

Boreholes:

- Casing shall be done up to the bottom with steel or HPDPE casing and capped at the bottom.
- borehole casing shall be minimum 5" in diameter (IS 12818).
- Borehole shall be gravel packed up to the bottom. Gravel pack size ranging from 1-3mm.
- Screens shall be placed at appropriate sections where water is struck, Slots shall either be 0.3, 0.5, 0.8 mm.
- Estimated yield will be determined after 4-hour pumping test period is completed.
- The minimum borehole yield shall be 0.5l/s for HP, 1 l/s for HC, 2.3 l/s for 1st Level, for GH and above more than 3 l/s.
- For every borehole, water shall be tested according to Zambia Bureau Standards (ZABs)water quality standards.
- Water supply shall not exceed 60% of the boreholes permanent yield.
- Siting for water shall be done using an appropriate method to find an appropriate drilling spot.

Water Tanks:

- Minimum size for a water tank shall be 5000 l for a Health Post. The capacity shall then be determined based on demand projections.
- Tank shall be made from fiberglass, PVC or steel.
- Galvanised steel tank shall be mounted on a 6m high galvanised tower, manufactured of standard 1.22x1.22m steel plates.
- Supply and installation of prefabricated tank, including lockable and sealed roof cover with ventilation, internal and external ladder, float level indicator, Tank and all components shall be corrosion resistant, including all fittings for proper functioning. Erection of water tower stand (6 m high), suitable for above mentioned tank, including ladder, top walkways and safety hand railing.
- Water tower shall be heavy duty, corrosion protected and suitable to carry a water tank with the given capacity.

Tank stands (min. 5000 l capacity water tank):

- Shall be at least a minimum of 4m.
- The appropriate height shall be determined based on-site conditions and the following measurements shall apply;
    - o Supporting members 75 mm in dia. Or 80*80 mm angle bars.
    - o Bracing in 38mm dia. or 40*40 mm angle bars.
    - o Stiffeners in 38mm dia. or 40*40 mm angle bars.
    - o Concrete bases of 500*500 and 700 mm deep.

Water Network:

- Supply and installation of intake structure, pumps, and all necessary fittings.
- Supply and delivery of pipes for distribution network (HDPE,), including all fittings.
- Appropriate pumps shall be fitted to make the facility water borne.
- Force lift and conversion kits for the deep well pumps designed to deliver water up to the water tank.
- Supply and installation of submersible pump with discharge at 50m head with solar panels including 3"submersible pump, 75 m rising pipes, 100 m drop cables, with all safety devices and automatic on/off switch to stop pump when water tank is full, switch.

Surface water
Supply and installation of intake structure, submersible pump with solar panels, and all necessary fittings.

7.1.2 Water Access
- Potable water and electrical power shall be available 24 hours a day, seven days a week, through regular or alternative sources, to meet essential patient care needs. (Planning, Design and construction of Health care Facilities, 2009, p67).

7.1.3 Water Quality
- The facility or the district shall have portable water quality testing kit including portable incubator; and equipment and reagents for testing at least 6 key water quality parameters.
- First Level Hospitals shall have Laboratory kits and equipment for microbiological testing of Total Coli forms and E. coli and for testing 8 key water quality parameters.

7.2 Sanitation

7.2.1 Sanitation Quantity
- 1 toilet for every 20 users for inpatient settings.
- At least 4 toilets per outpatient settings.
- Separate toilets for patients and staff. (WHO 2008)

7.2.2 Sanitary Fixtures
Ablution Blocks
- Water borne sanitation is recommended for all health facilities for outpatient, inpatient, waiting areas and all service areas. The ablution block shall have hand washing basin and provide access for disabled persons.
- Where VIP latrines block are provided these shall be fitted with hand washing facilities and accessible for disabled persons.
- All plumbing installations shall be vandal proof.
- Floor Asian type toilets (squat pans) connections c/w concrete wash-basin, shower trough, taps, toilet roll holders, mirror, towel rails shall be vandal proof.

Sewer Network
- Size of pipe 110 mm sewerage pipes and appropriate fittings and manholes every 15 m.

7.2.3 Waste Water Treatment
Septic Tank
- An appropriately designed and sized septic shall be constructed. The septic tank shall treat the wastewater to appropriate levels before disposal into the soak away.

Soak Away
- Construction of soak away pit shall be lined with dry jointed brickwork surrounded by suitable granular backfill. Larger soaker away should take the form of trenches that follow convenient contours to increase the internal surface areas for infiltration. The designer must consider the particular conditions of soil type, available space, site layout and topography.
- Special disposal systems for Nuclear, Cancer waste water shall be considered.
- The soakaway shall be atleast 30m depending on the type of soil.
- The soakaway should be constructed on the downstream of the water source.

7.2.4 Waste Water Quality
- Waste water shall be pre treated before final disposal.
- The level of treatment shall conform to the Environmental Management Act and the Public Health Act provisions.

7.2.5 Sanitation Access
All facilities shall be accessible to all users including toilets for disabled persons.

7.3 Healthcare waste

7.3.1 Waste quantities

Descriptions for Healthcare Waste infrastructure has been adapted from Water Supply, Sanitation and Healthcare Waste Project for Public Health Facilities in Zambia (2014).

There are various forms of infrastructure available for the management and treatment of healthcare waste. However, this is dependent on the waste quantity generated. The amount and composition of HCW differs per HF, depending on facility size, type of health services offered, population catchment area, number of beds and how frequently it is used. In-patient and out-patient waste generation quantities are different.

Healthcare Waste Infrastructure Standards by Type of Facility

Service Area	Item	Type of Health Facility				
		Third Level Hospi-tal	Second Level Hospital	First Level Hospital	Health Cen-tres	Health Posts
Health Care Waste	Single Cham-ber Fired Brick In-cinerator (SSI).	Not applicable	Not applicable	Not applicable	Capacity 12-20 kg/hr	Capacity 12-20 kg/hr
	Protected Pla-centa Pits	Not applicable	Not applicable	Not applicable	Applicable if no other op-tions for pla-centa or tissue disposal is available	Applicable
	Safe Burial Pit	Not applicable	Not applicable	Not applicable	Not applicable	Applicable if no other op-tion is avail-able

Healthcare Waste Infrastructure Standards by Type of Facility

Service Area	Item	Type of Health Facility				
		Third Level Hospi-tal	Second Level Hospital	First Level Hospital	Health Cen-tres	Health Posts
Health Care Waste	Autoclave	Capacity <35 kg/hr	Capacity <35 kg/hr	Capacity <35 kg/hr	Capacity <35 kg/hr	Not Applicable
	Central Storage Ar-ea for autoclaved	Capacity: 1 month of storage	Capacity: 1 month of storage	Capacity: 1 month of storage	Capacity: 1 month of storage	Not Applicable

Fired Brick incinerator and protected pits

- All incineration equipment shall require regular service and preventative maintenance.
- The incinerator operator shall keep incinerator clean, check for cracks, ensure that the door closes properly.
- Repair shall be required in the event of any damage
- A service schedule shall be established and well-trained and qualified technicians shall regularly visit the incineration site to inspect and service the equipment.
- Incinerator shall be fenced and well secured.

Placenta pits

- Placenta pits shall not require any maintenance.
- When full the pits shall be closed and sealed and another unit is constructed.

Storage Areas

- Storage areas shall be cleaned on a daily basis and shall be kept tidy and free from vermin by the caretaker.
- The area shall be secure.

Double chamber incinerator- Small and advanced (20-30 kg/hr, 30-50kg/hr and 50-70 kg/hr)

- Only trained operators shall operate the more advanced double chamber incinerators.
- The maintenance of these units shall be done by Medical Equipment Technicians.

Small autoclaves (5kg/hr)

- Small autoclaves shall be installed into diagnostic laboratories to kill live viruses and bacteria.
- The staff in the laboratories shall be trained in the operation of the units by the supplier.

The maintenance of the autoclave shall shall be done by Medical Equipment Technicians Other equipment.
In addition to the above infrastructure specified above, all HFs shall be provided with equipment for correct segregation at source. These include:
Equipment at source

- Sharps containers (WHO standard or equivalent).
- Yellow bags (liners) for infectious waste.
- Black bags (liners) for general waste.
- Small infectious waste (pedal) bins (yellow).
- Small normal waste (pedal) bins (black).
- Collection bins for infectious waste (yellow).
- Collection bins for normal waste (black).

Personal Protective Equipment (PPE) for handlers of Health Care Waste shall include the following;

- Nitrile gloves.
- Safety shoes.
- Fire retardant apron (for incinerator operators).
- Fire retardant elbow length gloves (for incinerator operators).
- Fire retardant masks (for incinerator operators).

7.4 Environment

Factors that affect environment (planning, Design and construction of Health care Facilities, 2009 p2):

- Siting.
- Building materials.
- Waste disposal.
- Water usage.
- Energy usage.

7.5 Hygiene

- Increase bed spacing.
- Allownatural ventilation and lighting.
- Provide hand washing facilities.
- Disinfect wards and vehicles carrying patients (wash in Health facilities, Practical Steps, p3).

8.0 Financing mechanism of WASH activities in HCF

Goal
The goal of financing mechanism is to ensure sustainable operations of WASH activities

Financing of WASH activities is anchored on the health financing system which ensures that financing is mobilized in line with the principles of maximizing revenue and pooling of financial resources (Masiye, 2019). Thus, these standards highlight the importance of finding an amicable financing mechanism for WASH in HCFs in order implement WASH interviews that are geared towards improvement of health-care services.

Step-by-step guide on how to finance WASH activities at every level of HCF in the country with a view to maintain a sanitary healthcare environment that promotes good infection prevention control (IPC). However, bearing in mind that the main objective is to make optimal use of the allocated/available resources to minimum requirements of WASH activities at HCF.

Nevertheless, it should be emphasized that while financing and budgeting for WASH activities are vital. All Government & Partners guidelines on financial protocols & regulations shall be always upheld. Before allocating finances, it's imperative to conduct a situational analysis and/or needs assessment to determine WASH requirements and associated activities at the HCF (MoH, 2017). The findings should be discussed by IPC/WASH Committee and included into the annual workplans and budget of the HCF.

Financing of WASH Standards

Sr. No.	Standard
1.	**Needs assessment for WASH** • Assess WASH needs annually, • Discuss and agree (prioritizing) on all aspects of water, sanitation, Hygiene and healthcare waste management. • Review the planned technical options to determine, if they are socially acceptable, financially feasible and environmentally sound. • Categorize WASH needs as minor and/or major.
2.	**Classification of identified WASH needs:** • Immediate, • Intermediate or • Long term.
3.	**Costs for each identified need(s)** • Establish costs for each identified activity in collaboration with the Procurement department, before allocating funds. • Create an annual budget.
4.	**Funds allocation** • Allocate at least 15% of annual budget towards WASH infrastructure and activities as recommended by WHO. • Areas with highest demand for WASH services should be allocated the available funds (vulnerable groups).
5.	**Stakeholder involvement** • Involve the community and end-users or potential users at all phases of any WASH design process. • Involve strategic partners (UN agencies , NGOs, and other stakeholders).

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Appendices

Annex 1: Water Quality Standards

a) General physical characteristics at the outlet of treatment plant

PARAMETER	MAX. PERMISSIBLE LIMIT	METHOD OF TEST
Odour	Unobjectionable to most consumers	ZS 312 Part 1
Colour	15 true colour units (TCU)	ZS ISO 7887
Taste	Unobjectionable to most consumers	SM 2160B
pH	6.5 - 8.0	ZS ISO 10523
Turbidity	5 NTU	ZS ISO 7027
Conductivity	1500 µS/cm	ZS ISO 7888

b) Chemical substances at the outlet of treatment plant

PARAMETER	MAX. PERMISSIBLE LIMIT	METHOD OF TEST
Chlorine residue	0.2 - 0.5	ZS ISO 7393 Part 1
Aluminium	0.2	ZS ISO 10566
Nitrate as NO3--N	10	ZS ISO 7890
Dissolved solids (total)	1000 mg/L	ZS 312 Part 19

c) Chemical substances in drinking water

PARAMETER	MAX. PERMISSIBLE LIMIT	METHOD OF TEST
Calcium (Ca)	200	ZS ISO 6058
Chloride (Cl-)	250	ZS ISO 9297
Chlorine residue	0.2-0.5	ZS ISO 7393 Part 1
Copper (Cu)	1.0	ZS ISO 8288
Iron (Fe)	0.3	ZS ISO 11885
Magnesium (Mg)	150	ZS ISO 7980
Sulphate (SO42-)	400	ZS 312 Part 3
Zinc (Zn)	3	ZS ISO 8288
Phenolic compounds (as phenol)	0.002	ZS ISO 6439
Detergents (alkyl benzene sulphonate)	1.0	ZS 312 Part 20
Sodium	200	ZS ISO 9964 Part 1
Hardness (total) as calcium carbonate	500 mg/L	ZSASTM D1126
Nitrite as NO2-N	1	ZS 312: Part 13
Aluminium (Al)	0.2	ZS ISO 10566
Arsenic (As)	0.01	ZS ISO 11969
Cadmium	0.003	ZS ISO 5961
Barium	0.7	ZS ISO 11885
Chromium (Cr)	0.05	ZS ISO 9174
Cobalt(Co)	0.5	ZS ISO 8288
Cyanide (CN-)	0.01	ZS ISO 6703-1
Fluoride (F-)	1.5	ZS ISO 10359 Part 1
Lead (Pb)	0.01	ZS ISO 8288
Mercury (Hg)	0.001	ZS ISO 5666
Manganese (Mn)	0.1	ZS ISO 6333
Selenium (Se)	0.01	ZS ISO 9965
Silver (Ag)	0.05	ZS ISO 11885

c) Microbiological analyses

TYPE OF DRINKING WATER	MAXIMUM PERMISSIBLE LIMIT IN 100 ML		REMARKS
Piped water supplies	Faecal coliforms	Coliform organisms	
Treated water entering the distribution system Water from Boreholes, RWH and Springs	0	0	in any sample

Annex 2: Making Different Concentrations of Chlorine

Starting with	2% SOLUTION	0.2% SOLUTION	0.05% SOLUTION
Calcium hypochlorite 70% active chlorine ("highest hypochlorite", "HTH")	30 g/litre or 2 tablespoons/litre	30 g/litre or 2 tablespoons/ 10 litres	7 g/litre or 1/2 tablespoons/ 10 litres
Chloride of lime 30% active chlorine ("bleaching powder")	66 g/litre or 4 tablespoons/litre	66 g/litre or 4 tablespoons/ 10 litres	16 g/litre or 1 tablespoons/ 10 litres
Sodium hypochlorite solution at 6% active chlorine ("household bleach")	333 ml/litre or 22 tablespoons/litre	33 ml/litre or 22 tablespoons/l 10 litres	83 ml/10litre or 5 tablespoons/l 10 litres
USED FOR DISINFECTION OF	Excreta Corpses Shoes Footbath	Floor Utensils Beds	Hands Skin Clothes

Annex 3: Cleaning Protocol for WASH Facilities

Area / Surface	Frequency	Process
Floors	Twice daily or more as need-ed	Use a clean wet mop and fresh detergent solution. A disinfectant cleaning solution should be used when contamination is present.
Sinks	Daily or more often as needed	Scrub with a separated mop, cloth or brush and a disinfectant cleaning solution.
Toilets and la-trines	Daily or more often as needed	Scrub with a separated mop, cloth or brush and a disinfectant cleaning solution.
Lamps, chairs, tabletops and counters	Daily or when visibly dirty	Damp dusting – wipe with a cloth dampened in a fresh detergent solution.
Walls, windows, ceilings and doors	Weekly or when visibly dirty	Spot clean using a damp cloth – wipe with a cloth dampened in a fresh detergent solution.
Procedure and Examination Rooms	After every procedure, and whenever visibly soiled	Wipe horizontal surfaces, equipment, and furni-ture used for the procedures with a disinfectant cleaning solution. Linen or paper on the exami-nation table should be changed after each pa-tient.
Operating room	At the beginning of every day	All flat surfaces (table, chairs, etc.) should be wiped with a clean, lint-free moist cloth to re-move dust and lint that may have collected over-night .
	Between every case	• Wipe all surfaces and mattress pads with a disinfectant cleaning solution. • Wipe all flat surfaces that have come in immediate contact with a patient or body fluids with a disinfectant cleaning solution. • Clean blood or other body fluid spills.
	At the end of every day	Total cleaning or terminal cleaning (mopping floors and scrubbing all surfaces from top to bottom) of the operating room should be done at the end of each day.

Area / Surface	Frequency	Process
Cleaning equip-ment (mops, brushes, etc.)	Between each use	• If contaminated, decontaminate in 0.5% chlorine solution • Clean in soap or detergent and water • Sun dry until completely dry before next use
Waste containers	Each time emptied	Wash with 0.5% chlorine solution, and rinse well with clean water.

Annex 4: Schedule for decontamination and maintenance of cleaning equipment

Method	Effectiveness (Kill or remove micro-organisms)	End Point
Decontamination	Kills most micro-organisms	10 minte soak in chlorine solution
Cleaning (water only)	Up to 50%	Until visibily clean
Cleaning (soap & rinsing with water)	Up to 80%	Until visibily clean
Higher level disinfection	Up to 95%	Boiling, steaming or chemical for 20 minutes
Sterilization	Up to 100%	High pressure steam, dry heat or chemical for recommended time

Source: Ministry of Health IPC-WASH (2018) Standards

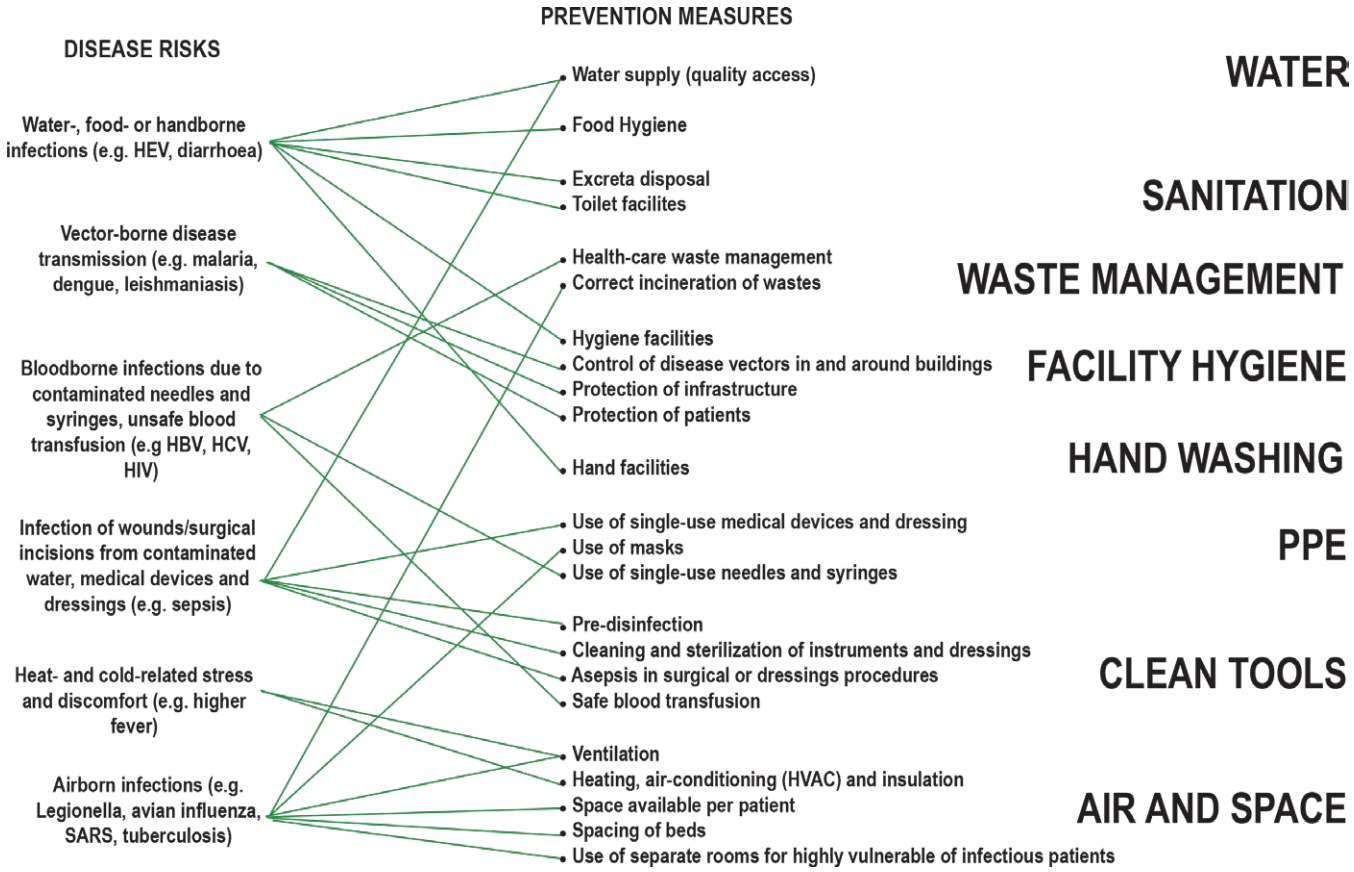
Annex 5: Routine Hand Hygiene

Source: WHO guidelines for hand hygiene in health care facilities

Annex 6: Coding & Storage of Health Care Waste

Colour coding	Type of storage container and category of waste	Treatment options
Black	Domestic waste	Deep burial
Yellow (anatomi-cal waste)	Plastic bag: Human anatomical waste ***(human tissues, organs, body parts)***	Incineration or deep burial
Yellow	Disinfected container or plastic bag: micro-biology and biotechnology waste ***(wastes from laboratory)***	Incineration
Brown	Plastic bag: Discarded medicines and cyto-toxic drugs, incineration ash	Secured landfill

Annex 7: WASH and diseases



Adapted from: WHO 2008[9]

Republic of Zambia

Ministry of Health