FULL REPORT OF NATIONAL ASSESSMENT OF WATER, SANITATION AND HYGIENE IN PUBLIC HEALTH CARE FACILITIES IN CAMBODIA 2024

KOREA
Sharing Hope Sharing Future

PLAN INTERNATIONAL

unicef
for every child

Table of Contents

List of tables

List of figures

Acknowledgements

First of all, the study team would like to thank the National Ethics Committee for Health Research for its review and approval on the study protocol.

Our special thanks go to HE Dr Sok Srun, director of the Department of Hospital Services, Ministry of Health, for his support and guidance provided to our study team. We would also like to thank key personnel of UNICEF and Plan International in Cambodia for their valuable technical inputs in this study.

We would also like to sincerely thank the Provincial Health Directors and Operational District Directors in the study sites for their support and facilitation of the study in their relevant area, as well as health facility staff and managers for their collaboration and participation in this study.

Last but not least, our deep thanks go to UNICEF Cambodia and Plan International for their co-funding of this assessment, without which this report would not have been possible.

Author name: Dr. Ir Por
MD, MPH, PhD
Deputy Director
National Institute of Public Health

Contact : ipor@niph.org.kh

Abbreviations

ANC	: Antenatal Care
CI	: Confidence Interval
CPA	: Complementary Package of Activities
DHS	: Department of Hospital Services
DPHI	: Department of Planning and Health Information
HC	: Health Centre
HCF	: Health Care Facility
H-EQIP	: Health Equity and Quality Improvement Project
IPC	: Infection Prevention and Control
JMP	: WHO/UNICEF Joint Monitoring Programme for water supply, sanitation and hygiene
MOH	: Ministry of Health
MPA	: Minimum Package of Activities
NECHR	: National Ethics Committee for Health Research
NIPH	: National Institute of Public Health
OD	: Operational District
OPD	: Outpatient Department
PHD	: Provincial Health Department
RGC	: Royal Government of Cambodia
RH	: Referral Hospital
SDGs	: Sustainable Development Goals
UHC	: Universal Health Coverage
WASH	: Water, Sanitation and Hygiene
WHO	: World Health Organization

Executive summary

Introduction

Safe and quality water, sanitation, hygiene, health care waste management and environmental cleaning (WASH) in health care facilities (HCFs) is fundamental to preventing and controlling infection, tackling antimicrobial resistance and ensuring quality of care – a prerequisite for achieving universal health coverage and good health outcomes. However, access to basic WASH services in HCFs remains poor or absent in many low and middle-income countries. In Cambodia, an assessment of WASH in 117 public sector HCFs found that water supply was reasonably good but sanitation, hand hygiene, waste management, and environmental cleaning were relatively poor. Further improvement in WASH in HCFs in Cambodia requires reliable and updated data at national scale to compute national and global WASH indicators and to identify and prioritize areas for improvement. Therefore, a national assessment of WASH in public sector HCFs was conducted in late 2023 by the National Institute of Public Health with guidance from the Ministry of Health's Hospital Service Department and support from UNICEF and Plan International.

Objectives

The general objective of the assessment was not only to provide data for monitoring of WASH at national and global level and produce useful information and evidence for the Ministry of Health and related health partners to continue to improve WASH in HCFs in Cambodia. The data is intended to provide a basis for estimating financial gaps to meet WASH targets of sustainable development goals by 2030. More specifically, this study aimed to understand the situation of WASH in health centres and referral hospitals in Cambodia by computing the five WASH in HCF core indicators related to SDG6, two of which are national WASH indicators, and identifying gaps and constraints the HCFs were facing and to suggest potential solutions to bridge the gaps and address the constraints.

Background

The health system in Cambodia consists of a district-based public sector and a fast-growing private sector. The public sector is structured under operational health districts (OD) which may cover 100,000 – 200,000 people living in multiple administrative districts within a province/municipality. Each OD has a public referral hospital (RH) and some 10 – 20 health centres (HCs), each with a catchment area covering between 8,000 and 12,000 people. By 2022, there are 1,419 public sector HCFs, including 12 national hospitals, 20 level 3 RHs, 39 level 2 RHs, 60 level 1 RHs, and 1,288 HCs.

WASH in HCFs broadly refers to access to water, toilets/latrines, health care waste management, the cleanliness of the environment, availability of hand hygiene facilities, knowledge and practices of hand hygiene in all kinds of public and private sector HCFs and their surrounding environment and compound. WASH in HCFs also considers domains such as the functionality, operation, availability and quality of these services. Please see chapter 3.2 in the main report for further detail on the definitions of the five core WASH in HCF indicators.

Methodology

A facility-based cross-sectional survey of a national representative of 302 randomly selected public sector HCFs was conducted in late 2023. Data on HCF characteristics, staffing, electricity and water supply, sanitation, hand hygiene, health care waste management and environmental cleaning in the study HCFs were collected by 16 trained and experienced surveyors through staff interviews using a questionnaire (Annex 1) and direct observation during the facility walkthrough using checklists (Annex 2). The collected data were cleaned and analyzed by the principal investigator to computed WASH core indictors and other necessary variables. For each WASH core indicator, data were disaggregated: by HCs and RHs; service ladders (basic, limited and no service); urban and rural areas; and by areas of high and low risk to drought and floods. This study received approval from the National Ethics Committee for Health Research in Cambodia on 02 November 2023.

Results

Facility key characteristics

We assessed 302 HCFs, including 270 HCs and 32 RHs, as planned. Of them, 74% were located in rural area and 26% others in urban area. The risk of drought and riverine flood with risk score from 0 (very low risk) to 10 (very high risk) was assessed and found that 45% of the HCFs (45% of HCs and 50% of RHs) had high risk of drought, whereas 32% of them (30% of HCs and 47% of RHs) had high risk of riverine flood (with risk score 7 or above).

Staffing

On average, there were ten personnel, including four midwives and one cleaner per HC. All HCs had at least one midwife and 99% of them had at least secondary/bachelor midwife, but 85% of the HCs had only one cleaner and 13% others had no cleaner at all. The number of personnel at RHs greatly different depending on their level with an average of 53 for CPA1, 83 for CPA2 and 273 for CPA3. On average, there were three specialists, 21 medical doctors, 43 nurses, 23 midwives and nine cleaners per RH. On average, each HC served 32 clients per day each, whereas each RH had 122 clients per day.

Electricity supply

All the assessed HCFs had electricity supply from at least one functional main source, mostly national/community grid, except two HCs with solar panel and one HC with generator, with 91% of the RHs having a backup source, mostly generator, but only 49% of the HCs, mostly solar panel. In general, 93% of the HCFs (93% of HCs and 94% of RHs) reported that the electricity supply was enough to meet the facility's basic needs.

Water supply

Overall, 96% of the HCFs (96% of HCs and 94% of RHs) had basic water service (water was available from an improved source located on premises) and 4% had limited and no water service. The main sources of water at all HCFs were an improved source, except seven HCs and two RHs still relied on surface water as their main source. All of the main water sources were located on

premises and 99% (99% at HCs and 100% at RHs) were functional with water available at the time of assessment. While 38% of the assessed HCFs (37% of the HCs and 47% of the RHs) said that the available water sources provided enough water year-round for all purposes, including drinking, 60% others (61% of the HCs and 53% of the RHs) reported that the available sources provided enough water the whole year for only general purposes other than drinking.

Sanitation

Only 7% of the HCFs (5% of the HCs and 19% of the RHs) had basic sanitation service (improved and usable sanitation facilities, with at least one toilet dedicated for staff, one for sex-separated with menstrual hygiene facilities, and one accessible for users with limited mobility) while many others had limited sanitation service. Almost all (except one HC) had at least one improved and usable toilet on the HCF premises or in the block outpatient department of RHs, whereas 76% (74% of the HCs and 91% of RHs) had at least three. Half of the HCFs (47% of the HCs and 75% of the RHs) had at least one improved toilet which is dedicated for staff, and 31% of the HCFs (30% of the HCs and 38% of the RHs) had one improved toilet separated for use by women/girls with facilities for menstrual hygiene management and 22% of the HCFs (22 of the HCs and 28% of the RHs) had at least one improved toilet which is accessible for people with limited mobility. Over 12% of the assessed HCs and RHs, their sanitation containments were likely to have overflowed or discharged excreta directly to surface environment.

Hand hygiene

Overall, 82% of the HCFs (82% of the HCs and 84% of the RHs) had basic hand hygiene service (with functional hand hygiene facilities available at one or more points of care and within 5 meters of toilets). Of the assessed HCFs, 95% (95% of the HCs and 97% of the RHs) had functional hand hygiene facilities (functional handwashing station (sink) and/or ABHR station) in consultation room/outpatient department. In the delivery room/maternity department, 99% of the assessed HCFs (98% of the HCs and 100% of the RHs) had functional hand hygiene facilities. Hand hygiene facilities at or near toilets were mostly present with 83% of the HCFs (83% of HCs and 84% of RHs) having functional hand washing stations with soap and water at the time of assessment. Only 25% of the HCFs (23% of the HCs and 38% of the RHs) reported that all their clinical staff have been trained on five key moments and hand hygiene process at least once.

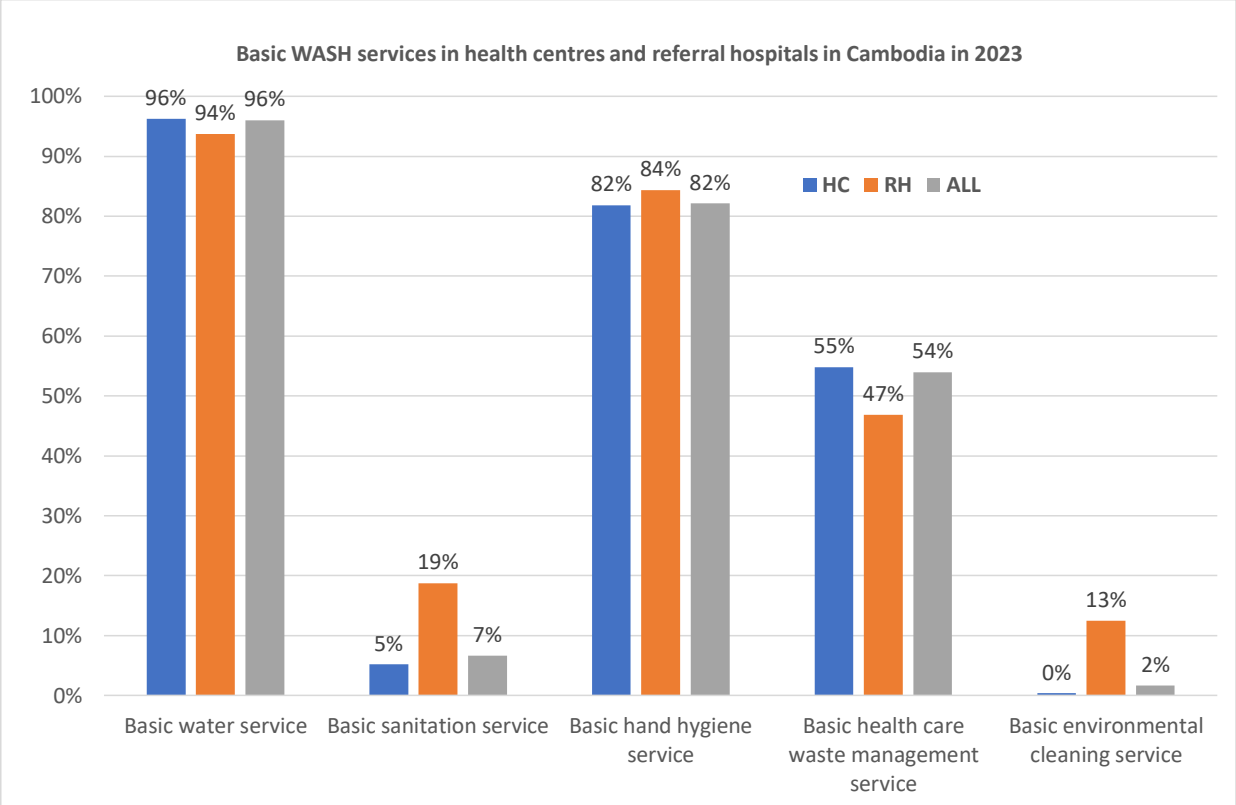
Health care waste management

Overall, 54% of the assessed HCFs (55% of the HCs and 47% of the RHs) had basic health care waste management service, while others had limited and no service. 76% of the HCFs (76% of the HCs and 74% of the RHs) had their waste correctly segregated at consultation room/area and 78% of them (82% of the HCs and 75% of the RHs) had correct waste segregation at delivery room/area. Overall, sharps waste at 99% of the HCFs (99% of HCs and 100% of RHs) was treated/disposed of safely, while infectious (non-sharps) waste was treated/disposed of safely at 90% of the HCFs (90% of HCs and 91% of RHs), and placenta was treated/disposed of safely at 83% of the HCFs (82% of HCs and 94% of RHs).

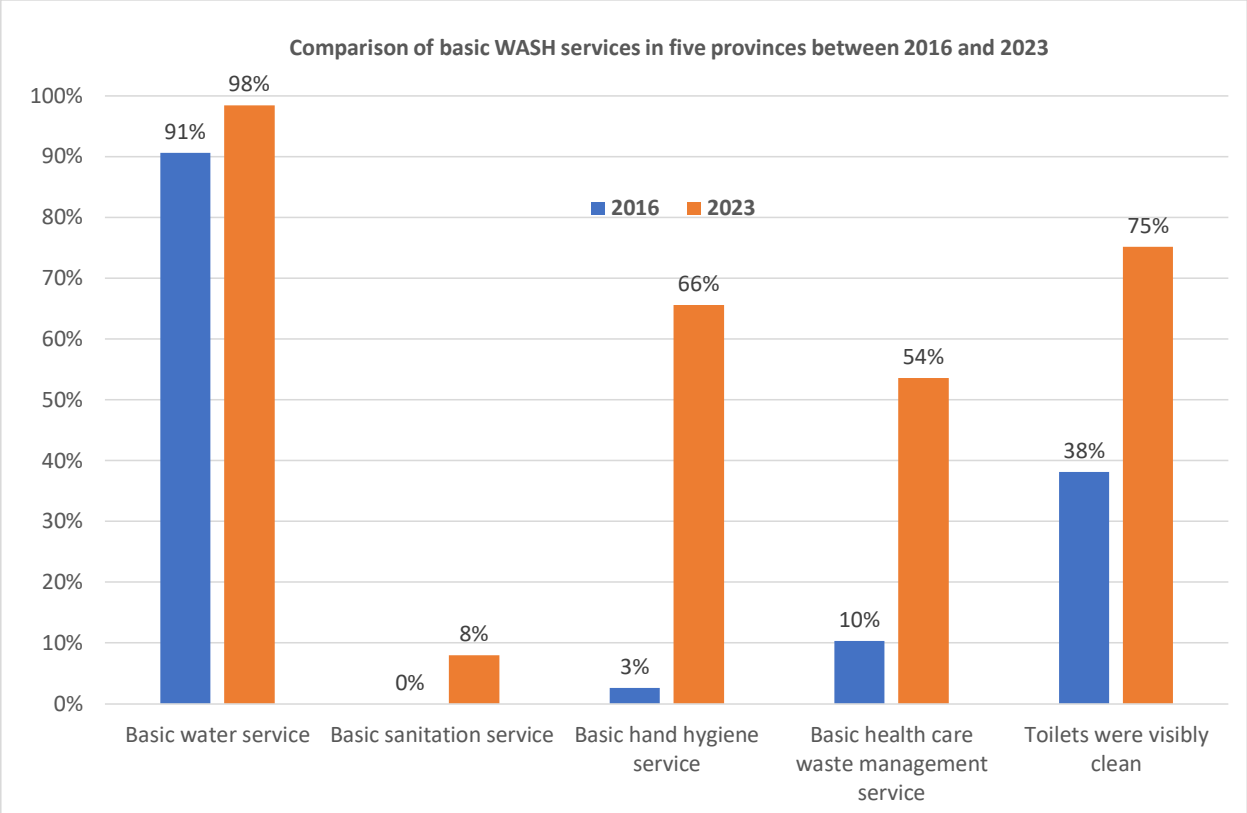
Environmental cleaning

Only 2% of the assessed HCFs (0.4% of the HCs and 13% of the RHs) had basic environmental cleaning service (having protocols for cleaning and staff with cleaning responsibility having all received training on cleaning procedures), while many others had limited or no service. Only 9% of the HCFs (7% of the HCs and 31% of the RHs) reported that all staff responsible for cleaning had received training on environmental cleaning at least once. Very few HCFs (six HCs and one RH) could present their cleaning protocols which include a cleaning roster/schedule and step-by-step technical guidance.

The chart below presents the basic WASH services, including water supply, sanitation, hand hygiene, health care waste management and environmental cleaning, in the assessed HCs and RHs in Cambodia in 2023.



Comparison of basic WASH services in five provinces in Cambodia between 2016 and 2023, as presented in the chart below, shows a significant improvement, especially for hand hygiene and health care waste management.



Reported major WASH-related constraints/challenges

Key informants at 69% of the assessed HCFs (70% of the HCs and 56% of the RHs) reported at least one major constraint/challenge in terms of WASH that their HCF was facing. The three most frequently reported WASH-related constraints were water supply; waste management and disposal; and lack of cleaners. Key informants in 35% of the assessed HCFs (35% of the HCs and 33% of the RHs) complained that their HCF had no clean water supply or the existing water supply was of poor quality. Moreover, 11 HCFs (including 10 HCs) reported insufficient water availability in the dry season and/or the well was flooded during rainy season. Seven HCs complained about lack of drinking water (or lack of money to buy the drinking water) for clients. Over 15% of the HCFs (16% of the HCs and 6% of the RHs) reported problems related to waste treatment/disposal, mainly due to the absence of appropriate incinerator or the existing incinerator was broken or located faraway or poor/irregular waste collection service. 13% of the assessed HCFs (13% of the HCs and 11% of the RHs) raised about lack of cleaners, as a result from having no/not enough budget to hire more cleaners with higher qualification while the allowed number of government-contracted cleaners is limited.

Discussion, conclusion and recommendations

This is a first national cross-sectional assessment of WASH in public sector HCFs in Cambodia. Although the study design and methodology ensured that quality assurance measures be applied throughout the assessment, this study has some potential limitations. These include possible seasonal biases due to this cross-sectional design of this study; that WASH indicators used focus on facilities and may not fully describe WASH services and practices; and challenges to aligning the study with both national and international definitions related to WASH indicators.

Despite these potential limitations, careful interpretation of the findings allows not only the generation of data for monitoring WASH at national and global level, but also useful information and evidence for the Ministry of Health and related health partners to further improve WASH in HCFs in Cambodia. The findings from this study could also be used as a basis for estimating financial gaps for achieving targets of sustainable development goals by 2030.

Despite considerable improvement being made since 2016, WASH in HCFs in Cambodia, especially sanitation, health care waste management and environmental cleaning service, requires further improvement to ensure safety and quality of care, thereby contributing to mitigating antimicrobial resistance and achieving quality universal health coverage and sustainable development goals. The following are some considerations for future national policies and actions to further improve WASH in Cambodia:

- Update the current national IPC and WASH guidelines incorporating necessary WASH-related norms, standards and definitions, with more elaborated sections on environmental cleaning and monitoring and evaluation for Cambodia, and widely introduce them to HCFs and other relevant stakeholders, including appropriate considerations related to climate risks;

- Necessary clean climate resilient water supply systems should be put in place in HCFs that still rely on surface water or the existing main water supply is of poor quality, along with further construction and maintenance of back up sources such as rainwater collection in areas where there is no underground water to address the shortage of water in dry season;

- Further effort in construction and management is needed to have at least one improved toilet meeting the needs of people with reduced mobility, and one toilet dedicated for use by women and girls with facilities to manage menstrual hygiene. Sanitation and hygiene systems shall be developed considering local climate/environment risks;

- Adequate supplies of appropriate waste bins and needle boxes, coupled with education, monitoring and coaching are necessary to improve waste segregation at key points of care. Ensuring safe treatment/disposal of sharps and infectious waste requires immediate repairment or preplacement of the broken incinerators and not functional or nearly full placenta pits. Longer term plans could consider having health care wastes collected and treated by professional firms in each province or region;

- All HCFs should develop and introduce cleaning protocols with step-by-step techniques for specific tasks and a cleaning roster or schedule specifying responsibilities for cleaning tasks and frequency, coupled with training on environmental cleaning to all staff responsible for cleaning. In addition, the problem of lack of cleaners in some HCFs should be addressed with more efficient use of the existing cleaners coupled with opportunity to have more cleaners as government contracted staff or hired by the HCFs;

- Staff motivation and commitment needs to be strengthened to ensure best practices of basic WASH in HCFs, including setting up a mechanism to incentivize best climate resilient WASH practices in HCFs with routine evaluation of WASH services in HCFs that is linked to incentives such as WASH-related investment, awarding certificates of appreciation, and financial incentives; and,

- Further assessments of this kind should consider addressing the potential limitations, including assessment of WASH in private HCFs and measurement of WASH practices in further detail.

1 Introduction

Water, sanitation and hygiene (WASH) in health care facilities (HCFs) broadly refers to access to water, toilets/latrines, waste management, the cleanliness of the environment, availability of hand hygiene facilities (basin with available water and soap or alcohol-based hand rubs), knowledge and practices of safe hand hygiene in all kinds of public and private sector HCFs and their surrounding environment or compound [1]. Achieving and maintaining safe and quality WASH services in HCFs is fundamental to infection prevention and control (IPC) and good health outcomes [2-4]. WASH is integrated in post-2015 Sustainable Development Goals (SDGs) in which targets 6.1 and 6.2 include WASH in HCFs as part of universal WASH access for all [5] and adequate WASH in HCFs is crucial for achieving quality universal health coverage (UHC) [6]. The global commitment to WASH in HCFs through the world health assembly resolution 72.7 stipulates that *every HCF has the necessary, functional and sustainable WASH services and practices in order to provide quality essential health services for everyone, everywhere.* As part of these, global WASH related indicators have been developed to track the progress. However, WASH services in HCFs in many low and middle-income countries remains poor or absent [7, 8], compromising the ability to provide safe care and presenting serious health risks to patients as well as health care providers.

In Cambodia, WASH in HCFs has been increasingly recognized and included in several health policy documents. Two national WASH in HCF-related indicators have been adapted from the global WASH in HCF indicators and included in the Health Strategic Plan 2016-2020 [9] and other national norms and standards for WASH in HCFs were developed as an integral part of the Guidelines for the Minimum Package of Activities [10] and the national health accreditation standards [11-13]. More specifically, National Standard Tools for Assessment of WASH in HCFs [14] and national Guidelines on WASH in HCFs [15] were developed and endorsed by the Ministry of Health.

Using the National Standard Tools for Assessment of WASH in HCFs, the National Institute of Public Health (NIPH) in collaboration with the Department of Hospital Services, Ministry of Health (MOH), WaterAid, WHO and UNICEF conducted an assessment of WASH in 117 public sector HCFs of five provinces in Cambodia in 2016 [16]. The assessment revealed that 90% of the assessed HCFs had access to an improved water supply on premises. However, only 49% reported sufficient water year-round. All the assessed HCFs had toilets, of which 86% were functional but not meeting or meeting some of the needs of specific groups, as only 39% had at least three improved and usable toilets. Therefore, none of the facilities met the international Joint Monitoring Program (JMP) requirements for WASH in HCFs. Only 15% of the HCFs had hand hygiene stations in key handwashing locations – outpatient department, delivery room, and toilets. In just 10% of the HCFs, health care waste was both properly segregated and safely disposed.

Further efforts to improve WASH in HCFs in Cambodia require reliable and updated data at national scale to compute national and global WASH indicators and identify areas for improvement.

Therefore, NIPH in collaboration with the Department of Hospital Services, MOH with support from UNICEF and Plan International, conducted a national assessment of WASH in 302 randomly selected public sector HCFs in Cambodia in late 2023.

This report is divided into seven main chapters:

- Chapter 1 provides an introduction to the assessment;
- Chapter 2 outlines objectives of the assessment;
- Chapter 3, the Background, includes a brief description of the health system context in Cambodia, and indicators, norms, standards and definitions;
- Chapter 4 covers the methodology of this assessment, including ethical considerations;
- Chapter 5 describes the assessment results on staffing, services, electricity supply, water supply, sanitation facilities and wastewater, hand hygiene, health care waste management, environmental cleaning as well as WASH-related constraints and suggested solutions to address the constraints;
- Chapter 6 discusses limitations of the study and key findings; and,
- Chapter 7 draws conclusions and outlines relevant recommendations for policy and actions.

2 Objectives

This study aimed to:

- understand the situation of WASH in health centres and referral hospitals in Cambodia by computing the five WASH core indicators, two of which are national WASH indicators, and
- identify gaps and constraints the HCFs were facing and potential solutions to address the gaps and constraints.

The study also aimed to provide data for monitoring WASH at national and global level and generate evidence for the Ministry of Health and related health partners to further improve WASH in HCFs in Cambodia, and a basis for estimating financial gaps for achieving WASH in HCF targets aligned with SDG6.

3 Background

3.1 Health system context in Cambodia

The health system in Cambodia consists of a district-based public sector and a fast growing private sector [17]. The public sector is structured under operational health districts (OD) which may cover 100,000 – 200,000 people living in several administrative districts within a province/municipality. Each OD has a public referral hospital (RH) and some 10 – 20 health centres (HCs), each with a catchment area ideally covering between 8,000 and 12,000 people. HCs provide primary care services, namely Minimum Package of Activities (MPA) [10, 18] whereas RHs deliver the so-called Complementary Package of Activities (CPA) [19]. The latter is classified into three categories of services: CPA1 for level 1 RHs, CPA2 for level 2 RHs and CPA3 for level 3 RHs. According to the National Health Congress report 2023 [20], there are 1,419 public sector HCFs, including 12 national hospitals, 20 CPA3 RHs[1], 39 CPA2 RHs, 60 CPA1 RHs, and 1,288 HCs.

Figure 1: The public sector health care system in Cambodia

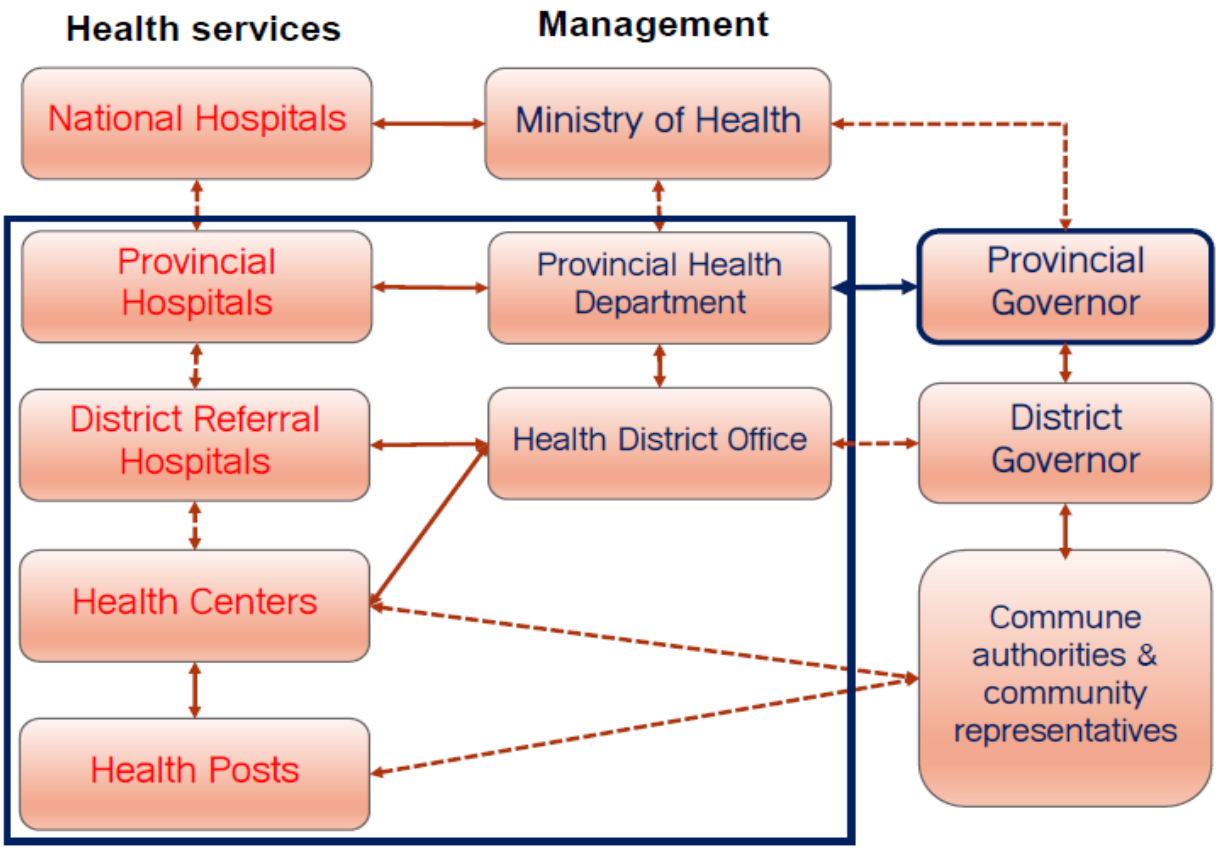


Figure 1 presents the public sector health services and management structure in Cambodia.

[1] This figure does not include 12 national hospitals which provide CPA3+ services.

Along with the public sector HCFs, there are growing and often loosely regulated private sector health care providers, including private hospitals, polyclinics, clinics, cabinets, pharmacies and non-medical practitioners. While the public sector HCFs are leading in the promotion and prevention activities for essential reproductive, maternal, neonatal and child health, and major communicable diseases control, the private sector providers remain predominantly used for curative care and care for noncommunicable diseases [21, 22].

3.2 Indicators, norms, standards and definitions

The core indicators for monitoring water, sanitation and hygiene (WASH) in health care facilities (HCFs) in the Sustainable Development Goals updated in 2018 by the WHO/UNICEF Joint Monitoring Programme for water supply, sanitation and hygiene (JMP) [23] proposed five core indicators. The five WASH core indicators are defined as follows:

- Indicator 1: % of HCFs where the main source of water is an **improved** source, located **on premises**, from which water is **available**.
- Indicator 2: % of HCFs with **improved** and **usable** sanitation facilities, with at least one toilet **dedicated for staff**, at least one **sex-separated toilet** with **menstrual hygiene facilities**, and at least one toilet **accessible for users with limited mobility**.
- Indicator 3: % of HCFs with **functional hand hygiene facilities** available at one or more **points of care** and **within 5 meters of toilets**.
- Indicator 4: % of HCFs where waste is **safely segregated** in consultation areas and sharps and infectious wastes are **treated and disposed of safely**.
- Indicator 5: % of HCFs which have **protocols for cleaning**, and **staff with cleaning responsibilities** have all received **training** on cleaning procedures.

Table 1: The five core indicators for water, sanitation and hygiene in health care facilities and monitoring definitions

Indicators	Monitoring definitions
Indicator 1	• Improved: Improved water sources include piped water, tube well or borehole, protected dug well and protected rainwater collection. • On premises: Water is accessed within the buildings, or within the facility grounds. • Available: Water from the main water source is available on the day of assessment.

Indicator 2	• Improved: Improved sanitation facilities include flush/pour-flush toilets, pit latrines with slap or ventilated improved pit latrines.
	• Usable: Toilets are available, functional, and private on the day of assessment.
	  ○ Available: on premises, doors unlocked or key available at all times;
	  ○ Functional: not broken, not blocked, no cracks or leaks in the structure, and water is available;
	  ○ Private: Doors can be locked from the inside and no large gaps or holes in the structure.
	• Dedicated for staff: There are separate toilet facilities dedicated for patient and staff
	• Sex separated toilet: At least one toilet is separated for use by women/girls.
	• Menstrual hygiene facilities: A bin with a lid on it and/or water and soap available in a private space for washing.
	• Accessible for users with limited mobility: Meeting national/international standards, e.g. accessible without stairs/steps, with handrails attached to the floor/sidewalls, a door with at least 80 cm wide, the door handle and seat within reach of people using wheelchairs or crutches/sticks.

Indicator 3	• Hand hygiene facilities: Sink with tap, water tank with tap, bucket with tap or other similar device and ABHR dispensers (fixed or portable). • Functional: Must have ABHR or soap and water, but hand hygiene facilities at toilets must have soap and water. • Points of care: Any location in the HCF where care or treatment is delivered.

Indicator 4	• Safely segregated (in consultation areas):
	  ○ At least 3[2] clearly labelled or colour-coded bins in place to separate infectious waste, sharps waste and non-infectious general waste (4 with one additional bin for placenta waste in delivery rooms);
	  ○ Bins should be no more than 75% full;
	  ○ Each bin should not contain waste other than that corresponding to its label.

[2] In Cambodia, according the Department of Hospital Services, Ministry of Health, safe box for sharps waste is not necessary for consultation room. Therefore, 2 bins, one for infectious waste and one for general waste are considered enough.

	• Consultation areas: Rooms or areas within the HCF where care or treatment is delivered. • Treated and disposed of safely: Autoclaved and/or incinerated with high capacity incinerator at over 800°C or buried in lined and protected pit, including collection and transportation off-site for medical waste treatment and disposal (by a professionally recognised agency).

Indicator 5	• Protocols for cleaning include:
	  ○ Step-by-step techniques for specific tasks, such as cleaning a floor, cleaning a sink, cleaning a spillage of blood or body fluids;
	  ○ A cleaning roster or schedule specifying the frequency at which cleaning tasks should be performed.
	• Staff with cleaning responsibilities: Non-health care providers, e.g. cleaners, and health care providers having additional cleaning responsibilities.
	• Training: Structured training on environmental cleaning provided by a qualified trainer (or group of trainers) recognised by the Ministry of Health.

Table 1 presents the details of monitoring definitions related to the five core indicators for water, sanitation and hygiene in HCFs.

In line with the above definitions, the JMP proposed to split the five WASH core indicators in three-level service ladders: basic, limited and no service for which the advanced service is to be defined at national level. Table 2 presents the service ladders for the five WASH core indicators.

Table 2: Service ladders for monitoring WASH in health care facilities

Water	Sanitation	Hand hygiene	Health care waste management	Environmental cleaning
Basic service				
Water is available from improved source located on premises	Improved sanitation facilities are usable with at least one toilet dedicated for staff, at least one sex-separated toilet with menstrual hygiene facilities, and at least one toilet accessible for people with limited mobility	Functional hand hygiene facilities (with water and soap and/or alcohol-based hand rub) are available at points of care and within 5 m of toilets	Waste is safely segregated into at least three bins (in consultation areas), and sharps and infectious waste are treated and disposed of safely	Basic protocols for cleaning available, and staff with cleaning responsibilities have all received training
Limited service				
An improved water source is within 500 m of the facility but not all requirements for basic service are met	At least one improved sanitation facility, but not all requirements for basic service are met	Functional hand hygiene facilities are available at either points of care or toilets, but not both	There is limited separation and/or treatment and disposal of sharps and infectious waste, but not all requirements for basic service are met	There are cleaning protocols or at least some staff have received training on cleaning
No service				
Water is taken from unprotected dug wells or springs, or surface water sources; or an improved source that is more than 500 m from the facility; or no water source	Toilet facilities are unimproved (pit latrines without a slab or platform, hanging latrines and bucket latrines); or there are no toilets or latrines at the facility	No functional hand hygiene facilities are available at either points of care or toilets	There are no separate bins for sharps or infectious waste, and sharps or infectious waste are not treated/disposed of	No cleaning protocols are available and no staff have received training on cleaning

Source: Adapted from WHO/UNICEF JMP [23].

4 Methodology

4.1 Study design and sampling

This is a facility-based cross-sectional study of 302 randomly selected public sector HCFs in Cambodia. We could not include private sector HCFs in this study because a sampling frame could not be developed due to limited data and access for data collection is limited.

We used the standard sample size calculation formula for a one-proportion cross-sectional survey:

$$n = Z^2 \times \frac{p \times (1-p)}{e^2}$$

where Z = z-score = 1.96 for a 95% confidence level; p = estimated proportion of the attribute present in the study population, arbitrarily set at 50% or 0.5 (as no information is available); and e = the level of precision or confidence interval = 0.05. The calculation resulted in a sample size of 384.

Since the number of our study population (public sector HCFs in Cambodia) was relatively small, the above obtained sample size was further refined to the final minimum sample size (n_{final}) using:

$$n_{final} = \frac{n}{1 + \frac{n-1}{N}}$$

where N is the number of total public sector HCFs in Cambodia = 1,419.

A national representative sample of all public sector HCFs in Cambodia (excluding national hospitals) with 95% confidence interval resulted from the calculation was 302. The sample size estimation followed steps recommended by the WHO Regional Office for Europe [24]. In order to have sufficient number of RHs for each type in the sample, we slightly increased the selected number of CPA2 and CPA3 RHs.

This national sample of HCFs were randomly selected through a two-stage stratified sampling approach. We first selected nine provinces and Phnom Penh municipality taking into consideration of geographical distribution, urban versus rural, and coastal, mountain, Mekong lowlands and central plains, as well as flood and drought-prone areas. We then selected a sample of HCFs for each type from the sampling frame. The list of public sector HCFs in the nine selected provinces and Phnom Penh municipality extracted from the Ministry of Health's web-based Health Management Information System (http://hismohcambodia.org/public/index.php) was used as a sampling frame. The list was further disaggregated by type of HCFs. For each type, we used simple random method to select the HCFs to be included in the study. Because there were only 10 CPA3 RHs in the study sites, we decided to include all of them into the study.

4.2 Data collection

Data on staffing, services, electricity supply, water supply, sanitation facilities, hand hygiene facilities, health care waste management, environmental cleaning as well as WASH related constraints and suggested solutions were collected from the selected HCFs through the administration of a questionnaire (Annex 1) adapted from the national standard tools for WASH assessment in HCs and RHs. The questionnaire incorporates the updated global indicators and definitions by the WHO/UNICEF Joint Monitoring Programme for water supply and sanitation [23, 25], as well as tools proposed by WHO Regional Office for Europe [24]. Data related to the location of the HCF and the level of risk for climate change (drought and flood), urban/rural and GPS coordinates was collected. The questionnaire was administered via interviews with relevant HCF staff, direct observation and a review of the facility reports and statistics. Direct observation was carried out via a walkthrough of the HCF using a checklist (Annex 2) and was conducted prior to the administration of the questionnaire at the HCFs.

The data collection was carried out by a team of 16 trained data collectors with previous experience on health facility assessment, including some involved in the previous round of WASH assessment in 2016. To ensure data quality, a three-day training of the data collectors and other research team members was provided by the senior researcher, followed by a field testing before the official data collection. The data collection was done under close supervision by field team leaders and an NIPH senior researcher, the principal investigator of this study. We used tablet-based Kobo form for data collection. The collected data was automatically or manually uploaded to the server in Phnom Penh. In addition to the field supervisions, distant monitoring by a data manager was carried out through regular checks of the data uploaded in the server.

4.3 Data management and analysis

The collected data was extracted, checked and cleaned by the data manager and senior researcher for accuracy and completeness prior to data analysis. The principal investigator analysed the data using STATA software to compute the five WASH core indicators presented in chapter 3.2 and disaggregated the data by service ladders as indicated in Table 2 . The logical formulae for calculating the five WASH in HCF core indicators, outlined in Annex 3, was applied to calculate the service ladders.

Where applicable, the core indicators were disaggregated by location (e.g. province), type of facilities (e.g. HC versus RH) and urban versus rural as well as climate-related considerations.

Additional WASH relevant variables and indicators were also calculated, including those in the extended list of global indicators, on health facility profile (e.g. staffing, services), electricity supply, water supply, water and sanitation facilities, general cleanliness and hygiene, and health care waste management. The collected qualitative data on WASH related constraints and suggested solutions to address the constraints were analysed manually and thematically.

4.4 Ethical considerations

Basic ethical procedures were strictly followed, including submission of the study protocol and related tools to the National Ethics Committee for Health Research in Cambodia for review. The committee approved the protocol on 02 November 2023 with reference number: 325 NECHR.

The NIPH research team contacted and informed related health authorities and facilities before the field data collection. Prior to the interview, verbal consent was sought from key informants. Confidentiality of the individual respondents and facilities was respected, and specific names are not identified in this report or further publications.

5 Results

5.1 Description of the sample

In total, data in 302 public sector HCFs was collected across the ten study sites (nine provinces and Phnom Penh municipality) as planned.

Table 3 shows the number of assessed HCFs (sample) by level/type and the ten study sites. Among them, there are 270 (89%) HCs, including 13 with beds, and 32 (11%) RHs, including 12 CPA1, 10 CPA2 and 10 CPA3. The 22 CPA1 & CPA2 are district RHs whereas the 10 CPA3 are provincial and municipal RHs.

Table 3: Sample health care facilities by level and study sites

Province/ Municipality	Number of referral hospitals			Number of health centres		Total
	CPA3	CPA2	CPA1	With beds	No bed	
Battambang	1	2	4	5	77	89
Siem Reap	1	4	0	3	90	98
Ratanakiri	1	1	0	7	23	32
Kampong Chhnang	1	0	2	3	42	48
Kampot	1	3	1	3	63	71
Kampong Thom	1	2	0	5	51	59
Kratie	1	1	3	0	39	44
Svay Rieng	1	2	4	0	48	55
Tboung Khmom	1	4	2	0	74	81
Phnom Penh	1	0	7	0	43	51
Selected Sample	*10*	*10*	*12*	*13*	*257*	*302*

Figure 2 presents the Cambodian map with the assessed HCFs distributed in the nine study provinces and Phnom Penh Municipality. Of these HCFs, 222 (74%) are located in rural areas and 80 (26%) remaining are located in urban areas.

The risk of drought and riverine flood for each HCF was assessed based on the commune where the HCF is located, using a scoring system ranging from 0 (very low risk) to 10 (very high risk). For those with the score 7 or above are considered as drought or flood prone. Only 282 (93.4%) of the assessed HCFs had a risk score. Table 4 shows the frequency distribution of HCFs by risk score of drought and riverine flood. The mean score (n=282) for drought was 6.6 (95% CI: 6.3-6.9) with 6.6 (95% CI: 6.2-6.9) for HCs and 7.1 (95% CI: 6.4-7.8) for RHs. The drought risk score for HCFs in urban area is 7.1 (95% CI: 6.8-7.5) and 6.4 (95% CI: 6.0-6.8) in rural area. 45.4% of the HCFs (44.8% of HCs and 50% of RHs) are prone to drought. The mean score (n=282) for riverine flood was 4.0 (95% CI: 3.5-4.5) with 3.8 (95% CI: 3.3-4.4) for HCs and 5.2 (95% CI: 3.5-6.9) for RHs. The flood risk score for HCFs in urban area is 6.0 (95% CI: 5.0-7.1) and 3.3 (95% CI: 2.7-3.8) in rural area. 32.3% of the HCFs (30.4% of HCs and 46.9% of RHs) are prone to riverine flood.

Figure 2: The map of Cambodia with the 302 assessed health care facilities

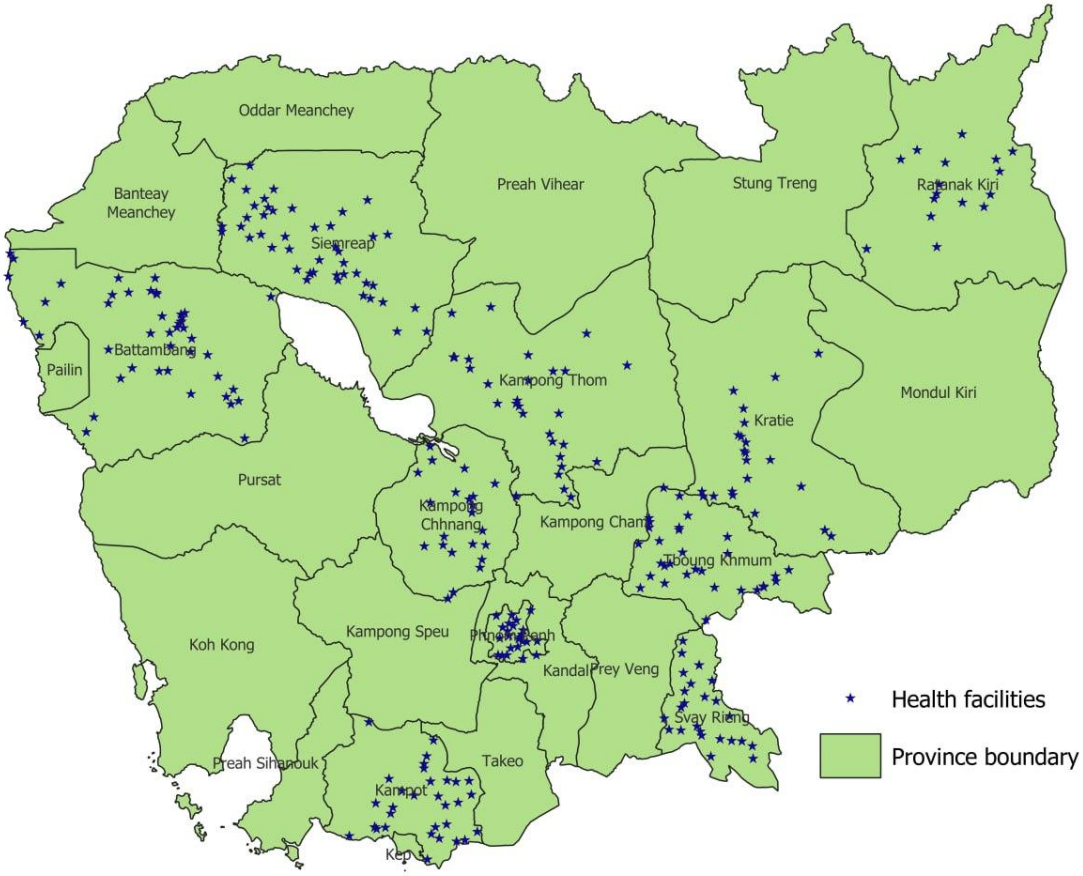


Table 4: Frequency distribution of health care facilities by risk score for water scarcity/ drought and riverine floods

Risk score	Water scarcity & drought		Riverine floods	
	Number	%	Number	%
0-0.9	25	8.9%	135	47.9%
1.0-1.9	4	1.4%	1	0.4%
2.0-2.9	2	0.7%	6	2.1%
3.0-3.9	5	1.8%	9	3.2%
4.0-4.9	5	1.8%	20	7.1%
5.0-5.9	17	6.0%	9	3.2%
6.0-6.9	96	34.0%	11	3.9%
7.0-7.9	*35*	*12.4%*	*9*	*3.2%*
8.0-8.9	*38*	*13.5%*	*8*	*2.8%*
9.0-10	*55*	*19.5%*	*74*	*26.2%*
≥7	*128*	*45.4%*	*91*	*32.3%*
All	282	100.0%	282	100.0%

Of the total 302 assessed HCFs, 146 (48.3%), including 129 HCs (47.8%) and 17 (53.1%) RHs, reported having received external support from at least one partner or externally-funded project to improve WASH.

Table 5 shows that 51.7% reported not receiving any WASH-related support from a partner or externally-funded project, whereas 31.8%, 14.6% and 2% of the HCFs reported having received WASH-related support from one, two and three or four partners and/or externally-funded projects respectively.

Table 5: Frequency distribution of health care facilities by number of WASH supporting partners/externally-funded projects

No. of supporting partners	Health center, number (%)	Referral hospital, number (%)	All, number (%)
0	141 (52.2)	15 (46.9)	156 (51.7)
1	87 (32.2)	9 (28.1)	96 (31.8)
2	37 (13.7)	7 (21.9)	44 (14.6)
3	4 (1.5)	1 (3.1)	5 (1.7)
4	1 (0.4)	0	1 (0.3)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 6 presents the list of WASH support by partners/externally funded projects. A very large proportion (84.5%) of the HCs with WASH support was reported to be for infrastructure, e.g. construction of water supply system, followed by support of WASH materials and equipment, e.g. materials for leaning, waste management, handwashing. Support for training and technical assistance was also provided for 32.7% and 14.7% of the HCs respectively. For RHs, 58.8% of WASH support was for WASH materials and equipment, 52.9% for infrastructure and 29.4% for training and technical assistance.

Table 6: List of the WASH support by partners/externally-funded projects

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
WASH related infrastructure	109 (84.5)	9 (52.9)	118 (80.8)
WASH materials and equipment	42 (32.7)	10 (58.8)	52 (35.6)
WASH training and TA	19 (14.7)	5 (29.4)	24 (16.4)
Other WASH support	7 (5.4)	2 (11.8)	9 (6.2)
Total	129 (100.0)	17 (100.0)	146 (100.0)

5.2 Staffing and services

On average, there were ten personnel, including four midwives (three secondary/bachelor midwives and one primary midwife) per HC. All HCs had at least one midwife, confirming the universal coverage of midwife at HCs, and 98.5% of the HCs had at least one secondary/bachelor midwife. Only 19% of the HCs had a medical doctor/medical assistant. Surprisingly, one HC in Phnom Penh had a medical specialist in dermatology. There was on average one cleaner per HC; 84.8% of the HCs reported to have only one cleaner, and 12.6% others had no cleaner at all.

The total number of personnel at RHs was greatly different depending on the hospital level, ranging from 23 personnel (the smallest) to 514 personnel (the largest) with an average of 53 personnel for CPA1, 83 personnel for CPA2 and 273 personnel for CPA3. The average of total personnel for all levels of RHs was 131 personnel per RH, including three specialists, 21 medical doctors/medical assistants, 43 nurses, 23 midwives and 9 cleaners (ranging from one to 27 with half of them having only 7 cleaners).

Table 7 summarizes health service statistics at HCs and RHs. On average, each HC served 32 clients per day. Taking into account the average number of personnel at HCs (10), the staff-to-client ratio is approximately three for HCs. Therefore, one HC staff takes care of approximately three clients every day. On average, there were 5,640 general consultations and 117 newborn deliveries per HC in the year preceding the assessment.

The number of inpatient beds varies greatly by levels of care among the 32 RHs, with an average of 41 beds for CPA1, 77 beds for CPA2 and for 202 beds CPA3. The volume of services provided by the RHs also significantly varies by their level, ranging from an average of 49 clients per day per RH for CPA1, 70 clients for CPA2, and 262 clients for CPA3. For all levels of RHs, on average each RH served 122 clients per day. Considering the average number of staff per RH (131), the staff-to-client ratio is approximately one for RHs, and thus, one RH staff takes care of approximately one client every day. On average, each RH had 14,793 general consultations (7,069 for CPA1, 6,098 for CPA2, and 32,356 for CPA3), 780 deliveries (425 for CPA1, 475 for CPA2, and 1,512 for CPA3), 5,071 inpatients (425 for CPA1, 475 for CPA2, and 1,512 for CPA3) and 242 C-sections (32 for CPA2 and 452 for CPA3) in the year preceding the assessment. Five CPA2 RHs had no C-section case in the year preceding the assessment, which suggests the absence of a functioning operation theatre in those hospitals.

Table 7: Summary of health service statistics at health centres and referral hospitals

Variables	Health centre (n=270)	Referral hospital (n=32)
Number of clients (for all services) on average per day	32	122
Number of general consultations in the year preceding the assessment	5,640	14,793
Number of newborn deliveries (excluding C-sections) in the year preceding the assessment	117	780
Number of inpatients in the year preceding the assessment	-	5,071
Number of C-sections in the year preceding the assessment (n= 20, excluding CPA1)	-	242

5.3 Electricity supply

All the 302 assessed HCFs had electricity supply from at least one main source. The electricity source was functional (had electricity) at the time of assessment in all the RHs but three HCs did not have electricity at the time of assessment. While the main source of electricity in all the RHs was national/community grid, as was for the most (98.9%) HCs – two HCs relied on solar panel and one on generator as their main source of electricity supply. Nearly 91% of the RHs had a secondary (back up) source of electricity supply, mostly (90%) with a generator, but only 49% of the HCs had an electricity back up source. 71% of the backup sources for HCs were solar power.

Table 8 shows that in 52.7% of the HCFs (52.2% of HCs and 56.3% of RHs) the electricity supply (from the main and back-up source) was always available and had no interruption in the past seven days, whereas in 42.1% (42.2% of HCs and 40.6% of RHs) the electricity supply electricity supply was 'often available with occasional interruptions' <2 hours/day. Only in 5.3% (5.6% of HCs and 3.1% of RHs) electricity supply was 'sometimes available with prolonged interruptions' >2 hours/day. In general, 93.4% of the HCFs (93.3% of HCs and 93.8% of RHs) reported that their electricity supply was enough to meet the facility's basic needs.

Table 8: Electricity supply in the past seven days at health centres and referral hospitals

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Always available, no interruption	141 (52.2)	18 (56.3)	159 (52.7)
Often available, interruptions <2h/day	114 (42.2)	13 (40.6)	127 (42.1)
Sometimes available, prolonged interruptions >2h/day	5 (5.6)	1 (3.1)	16 (5.3)
Total	270 (100.0)	32 (100.0)	302 (100.0)

5.4 Water supply

All the main water supplies were located on premises – the location where water is accessed for use was within the building or facility grounds.

The improved sources (piped water, tube well or borehole, protected dug well, protected rainwater collection and professional (protected) tanker truck) represented 97% of the main sources at all assessed HCFs (97.4% at HCs and 93.8% at RHs). Yet, seven HCs (2.6%) and two RHs relied on surface water, an unimproved water source, as their main water source. All the improved sources were on the premises and 99% of them (98.9% at HCs and 100% at RHs) were functional with water available (as confirmed by taps or pump delivering water) during the assessment. According to facility key informants, the main source of water (when it is fully functional) at 95% of the HCFs (94.8% for HCs and 96.7% for RHs) generally provided enough water all year (for general purposes), whereas it was enough only sometimes and seasonally at 4.6% of the HCFs (4.8% of HCs and 3.1% of RHs). One HC reported never having enough water supplied by their main source.

Table 9 shows that the most commonly used (main) sources of water at HCs were tube well or borehole (48.2%) and piped water (43.3%), followed by protected dug well (4.8%), protected rainwater collection (0.4%), professional (protected) tanker truck (0.7%), and surface water (2.6%). For RHs, the main sources of water were predominantly piped water (75%), followed by tube well or borehole (15.6%), and surface water (6.3%).

Table 9: Main sources of water at health centres and referral hospitals

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Piped water	117 (43.3)	24 (75.0)	141 (46.7)
Tube well or borehole	130 (48.2)	5 (15.6)	135 (44.7)
Protected dug well	13 (4.8)	1 (3.1)	14 (4.6)
Protected rainwater collection	1 (0.4)	0	1 (0.3)
Professional (protected) tanker truck	2 (0.7)	0	2 (0.7)
Surface water	7 (2.6)	2 (6.3)	9 (2.9)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Besides the main water source, 32.8% of the assessed HCFs (32.2% of HCs and 37.5% of RHs) had a secondary water source.

Table 10 presents the secondary sources of water at HCs and RHs. The most common secondary water source for HCs was tube well or borehole (38.1% of HCs) and protected rainwater collection (26.9% of HCs) and tube well or borehole for RHs (83.3% of RHs).

Table 10: Secondary sources of water at health centres and referral hospitals

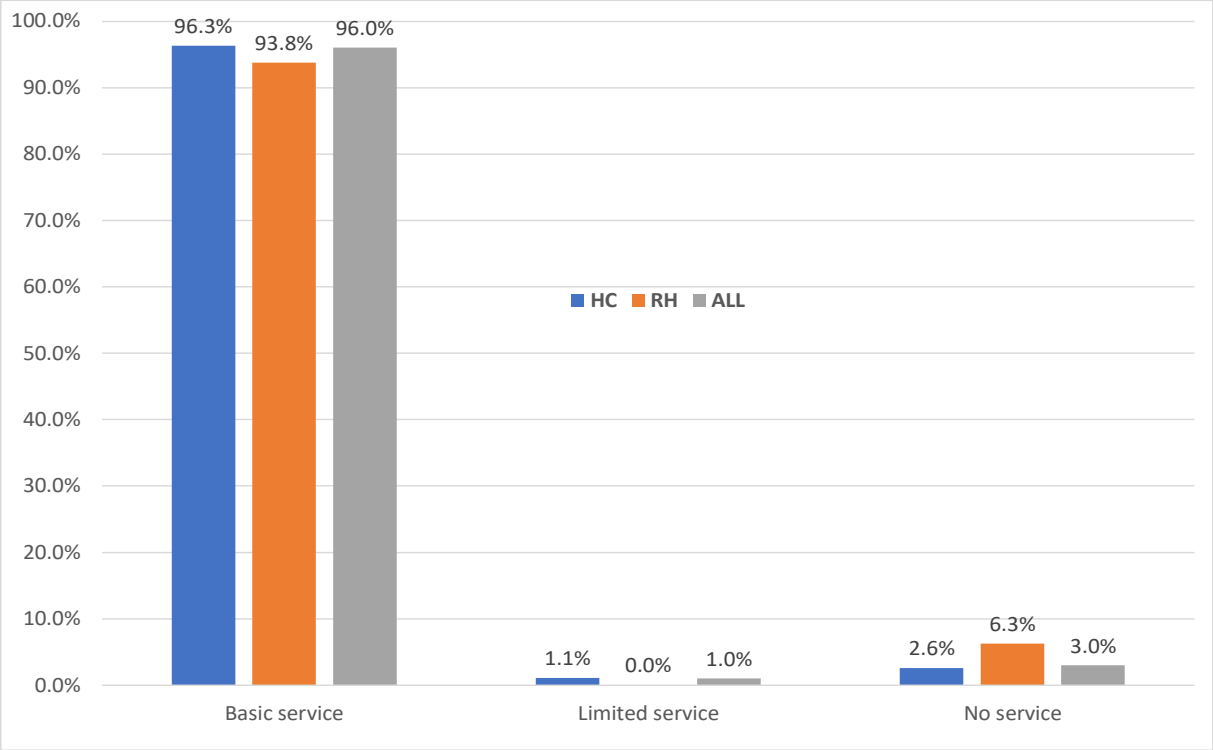
Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Piped water	3 (3.6)	0	3 (3.1)
Tube well or borehole	32 (38.1)	10 (83.3)	42 (43.8)
Protected dug well	3 (3.6)	0	3 (3.1)
Unprotected dug well	1 (1.2)	0	1 (1.0)
Protected rainwater collection	31 (36.9)	1 (8.3)	32 (33.3)
Unprotected rainwater collection	1 (1.2)	0	1 (1.0)
Professional (protected) tanker truck	6 (7.1)	0	6 (6.3)
Unprofessional (unprotected) tanker truck	2 (2.4)	1 (8.3)	3 (3.1)
Surface water	5 (5.9)	0	5 (5.2)
Total	84 (100.0)	12 (100.0)	96 (100.0)

For basic water service (indicator 1), there is no significant difference between HCFs in urban areas (97.5%) and those in rural areas (95.5%), or between HCFs in areas of high risk of flood (96.9%) and those in areas of low risk of flood (94.5%). The percentage of HCFs with basic water service in area of high risk of drought and in area of low risk of drought is almost the same (96.1%). In five provinces where there was WASH assessment in 2016, 98.4% of all assessed HCFs (98.2% of HCs and 100% of RHs) had basic water supply.

Of the assessed HCFs, 23.2% (21.5% for HCs and 37.5% for RHs) reported having used the available water from their main or secondary sources for drinking. Among those using the available sources for drinking water, 98.6% (100% for HCs and 91.7% for RHs) said they treated the water for drinking purpose. The most common water treatment method used by the HCFs was filtration (89.7%), followed by boiling (13%).

Figure 3 presents the percentage of HCs and RHs with basic, limited and no water service (water supply) as defined in Table 2. Of the assessed HCFs, 96% (96.3% of HCs and 93.8% of RHs) had basic water service. About 1% (all HCs) and 3% (2.6% of HCs and 6.3% of RHs) had limited and no water service, respectively.

Figure 3: Percentage of health centres and referral hospitals with basic, limited and no water service



Drinking water was provided for clients at 77.8% of the assessed HCFs (82.2% of HCs and 40.6% of RHs).

Table 11 presents the sources of drinking water provided for clients at HCs and RHs. The major sources include the sources available at the HCFs (25.9%) and bottled water bought by the facility (71.1%). Seven HCs said they received drinking water for clients from a private company/NGO.

Table 11: Sources of drinking water provided for clients at health centres and referral hospitals

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Available health facility water sources	53 (23.9)	8 (61.5)	61 (25.9)
Bottled water bought by the health facility	162 (72.9)	5 (38.5)	167 (71.1)
Drinking water supported by a private company/NGO	7 (3.2)	0	7 (3.0)
Total	222 (100.0)	13 (100.0)	235 (100.0)

Table 12 presents the sources of drinking water for staff at HCs and RHs. The major sources of drinking water for staff at HCs and RHs include bottled water bought by the HCF (48.3%), staff supplying their own bottled water (35.8%) and from the water sources available at the HCFs (13.9%). Six HCs also said health staff received drinking water from a private company/NGO.

Table 12: Sources of drinking water for staff at health centres and referral hospitals

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Available health facility water sources	39 (14.4)	3 (9.4)	42 (13.9)
Bottled water bought by the health facility	137 (50.7)	9 (28.1)	146 (48.3)
Staff bring their own bottled water	88 (32.6)	20 (62.5)	108 (35.8)
Drinking water supported by a private company/NGO	6 (2.2)	0	6 (2.0)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 13 shows the available water sources and needs at HCs and RHs. Of the assessed HCFs, 38.4% (37.4% of HCs and 46.9% of RHs) said that the available water sources provide enough water the whole year for all purposes, including general purposes (food preparation, personal hygiene, medical activities, cleaning and laundry) and drinking, whereas 60.3% others (61.1% of HCs and 53.1% of RHs) said that the available water sources provide enough water the whole year only for general purposes other than for drinking purposes. Four HCs reported that the available sources provide enough water only seasonally and no HCF reported that they had enough water.

Table 13: Available water sources and needs at health centres and referral hospitals

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Never enough water	0	0	0
Enough water sometimes (seasonally), even for general purposes	4 (1.5)	0	4 (1.3)
Enough water for whole year for general purposes, not for drinking	165 (61.1)	17 (53.1)	182 (60.3)
Enough water whole year for all purposes, including drinking	101 (37.4)	15 (46.9)	116 (38.4)
Total	270 (100.0)	32 (100.0)	302 (100.0)

5.5 Sanitation facilities and wastewater

There were on average four sanitation facilities/toilets (mean = 3.92) on the HCF premises or in the block of outpatient department of RHs. The average number of toilets was four (mean = 3.75) for HCs and five (mean = 5.34) for RHs.

Table 14 shows the frequency distribution of HCs and RHs by the number of sanitation facilities/toilets. Six HCs had one toilet on premises and one RH had 14 toilets in the block of outpatient department, while others had between two and ten toilets. While 75.9% of the HCs had at least three toilets, only 45.2% of them had four and 27.8% had five, compared with 96.9%, 90.6% and 62.5% respectively for RHs.

Table 14: Frequency distribution of health centres and referral hospitals by the number of sanitation facilities/toilets

Number of toilets	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
1	6 (2.2)	0	6 (2.0)
2	59 (21.9)	1 (3.1)	60 (19.9)
3	83 (30.7)	2 (6.3)	85 (28.2)
4	47 (17.4)	9 (28.1)	56 (18.5)
5	38 (14.1)	12 (37.5)	50 (16.6)
6	18 (6.7)	1 (3.1)	19 (6.3)
7	9 (3.3)	3 (9.4)	12 (4.0)
8	3 (1.1)	2 (6.3)	5 (1.7)
9	4 (1.5)	0	4 (1.3)
10	3 (1.1)	1 (3.1)	4 (1.3)
14	0	1 (3.1)	1 (0.3)
Total	270 (100.0)	32 (100.0)	302 (100.0)

All available toilets (with a maximum of five per HCF) were observed to check their cleanliness and other key characteristics, and if they were improved and/or usable toilets. Almost all (99.3%) of the observed toilets were improved toilets, except two. But only 89.7% of them (89.3% for those in HCs and 93.8% for those in the block of outpatient department of RHs were usable (available, functional and private) at the time of assessment.

Table 15 shows the frequency distribution of HCs and RHs by the number of improved toilets. Six HCs had one improved toilet, while others had at least two improved toilets on the premises or in the block of outpatient department.

Table 15: Frequency distribution of health centres and referral hospitals by the number of improved toilets

Number of improved toilets	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
1	6 (2.2)	0	6 (2.0)
2	59 (21.9)	1 (3.1)	60 (19.9)
3	83 (30.7)	3 (9.4)	86 (28.5)
4	50 (18.5)	8 (25.0)	58 (19.2)
5	72 (26.7)	20 (62.5)	92 (30.5)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 16 shows the frequency distribution of HCs and RHs by the number of improved and usable toilets. All HCFs (except one HC) had at least one improved and usable toilet on the HCF premises or in the block of outpatient department of RHs, whereas 75.5% of them (73.7% of the HCs and 90.7% of the RHs) had at least three.

Table 16: Frequency distribution health centres and referral hospitals by the number of improved and usable toilets

Number of improved toilets	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
0	1 (0.4)	0	1 (0.3)
1	8 (3.0)	1 (3.1)	9 (3.0)
2	62 (23.0)	2 (6.3)	64 (21.2)
3	90 (33.3)	2 (6.3)	92 (30.5)
4	49 (18.2)	7 (21.9)	56 (18.5)
5	60 (22.2)	20 (62.5)	80 (26.5)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 17 demonstrates key variables on sanitation services at HCs and RHs. All assessed HCFs had at least one improved toilet and almost all (except one HC) had at least one improved and usable toilet on the premises or in the block at the outpatient department. However, only half of the HCFs had at least one improved toilet dedicated for staff. While 70.5% of the HCFs (69.6% of HCs and 78.1% of RHs) had at least one improved toilet separated for use by women/girls only, only 31.1% of the HCFs (30.4% of HCs and 37.5% of RHs) had one improved toilet separated for use by women/girls with facilities for menstrual hygiene management (having a bin with a lid on it and/or water and soap available in a separate space for washing). Only 22.2% of the HCFs (21.5% of HCs and 28.1% of RHs) had at least one improved toilet accessible for people with limited mobility.

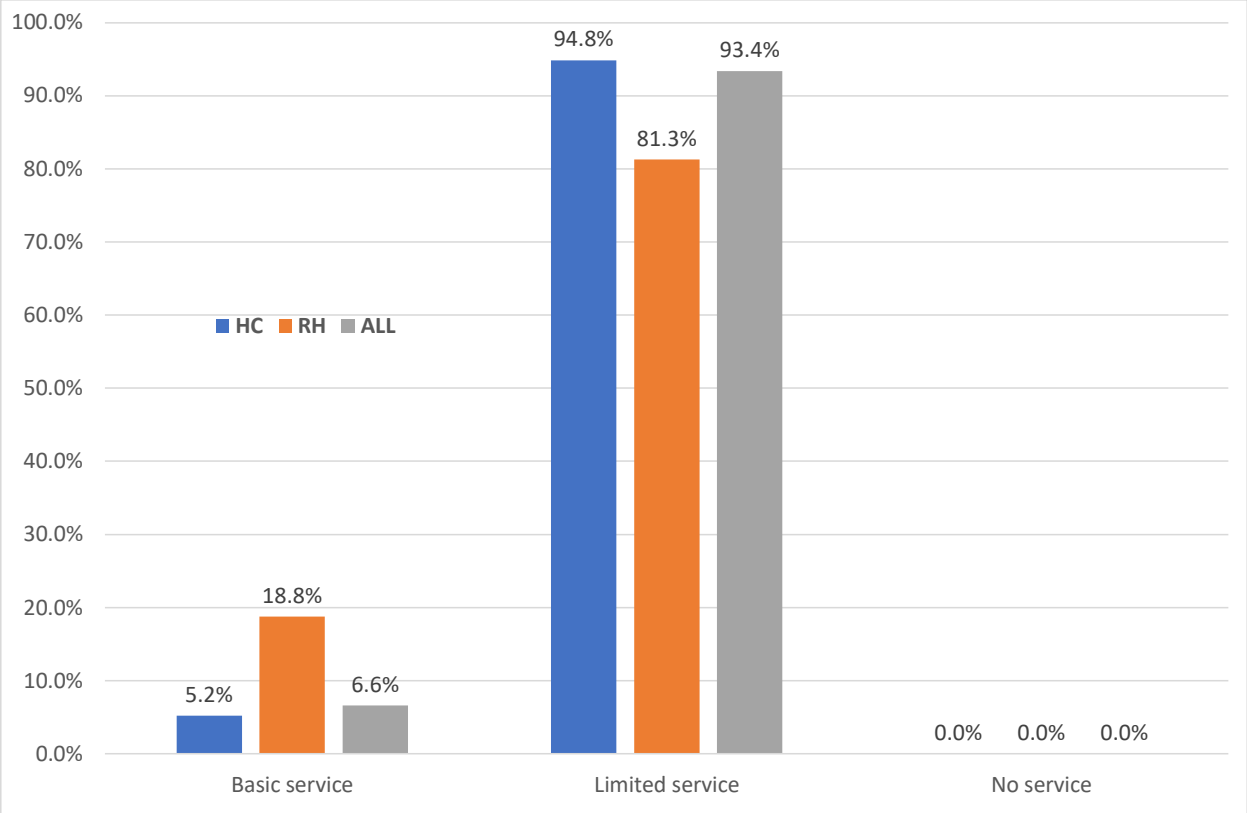
Table 17: Key variables of sanitation services at health centres and referral hospitals

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
HCFs with at least one improved toilet	270 (100.0)	32 (100.0)	302 (100.0)
HCFs with at least one improved and usable toilet	269 (99.6)	32 (100.0)	301 (99.7)
HCFs with at least one improved toilet dedicated for staff	127 (47.0)	24 (75.0)	151 (50.0)
HCFs with at least one improved toilet separated for use by women/girls only	188 (69.6)	25 (78.1)	213 (70.5)
HCFs with at least one improved toilet separated for use by women/girls which has facilities for menstrual hygiene management	82 (30.4)	12 (37.5)	94 (31.1)
% of HCFs with at least one improved toilet accessible for people with limited mobility	58 (21.5)	9 (28.1)	67 (22.2)

Figure 4 presents the percentage of HCs and RHs with basic, limited and no sanitation service as defined in Table 2. Of the assessed HCFs, only 6.6% (5.2% of HCs and 18.8% of RHs) had basic sanitation service, while a large majority (93.4%) of them had limited sanitation service.

The percentage of HCFs with basic sanitation service (indicator 2) is comparable between HCFs in urban area (6.3%) and those in rural areas (6.8%), and between HCFs in area of high risk of drought (7.1%) and area of low risk of drought (7.0%). However, the percentage of HCFs with basic sanitation service in area of low risk of flood (8.9%) appears to be higher than those in high risk of flood (3.3%) but the difference is not significant statistically ($p>0.05$). In five provinces where the WASH assessment in 2016 was conducted, 8% of all assessed HCFs (7.2% of HCs and 14.3% of RHs) had basic sanitation service.

Figure 4: Percentage of health centres and referral hospitals with basic, limited and no sanitation service



As presented in Table 18 faecal waste in the assessed HCFs were mostly managed with onsite storage either in septic tank (211 or 69.9%) or pit latrine (78 or 25.8%).

In 289 HCFs where faecal waste is managed with onsite storage in septic tank or pit latrine, only 75 (26%) of them (65 HCs or 24.8% and 10 RHs or 37%) had an outlet pipe for liquid waste. Such outlet pipe largely (85.3%) went/was connected to a sewer or closed drain. Only in six HCFs (five HCs and one RH) where the outlet pipe went to an open drain/water body/surface (Table 19). Other 31 HCFs (28 HCs and 3 RHs) reported that the waste water in the septic tank or pit latrine leaked out to the surface in the year preceding the assessment due to overflow, flooding, broken structure or a combination of them (Table 20). In total, 37 (12.3%) of the assessed HCFs, including 33 (12.2%) of the HCs and 4 (12.5%) of the RHs, their sanitation containments were likely to have overflowed or discharged excreta directly to surface environment.

Of the assessed HCFs, 44.5% (40.9% of HCs and 75% of RHs) had a functional system in place to adequately drain rainwater away from the HCF and facility grounds.

Table 18: Frequency distribution of health centres and referral hospitals by the way faecal wastes from the toilets/latrines are managed

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Flush to piped sewer system	7 (2.6)	5 (15.6)	12 (4.0)
Onsite storage in septic tank	187 (69.3)	24 (75.0)	211 (69.9)
Onsite storage in pit latrine	75 (27.8)	3 (9.4)	78 (25.8)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 19: Frequency distribution of health centres and referral hospitals by the way the outlet pipe goes/is connected to

The pipe goes to	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
To a leach field or soak pit	2 (3.1)	0	2 (2.7)
To a sewer or closed drain	55 (84.6)	9 (90.0)	64 (85.3)
To an open drain	2 (3.1)	1 (10.0)	3 (4.0)
To a water body or surface	3 (4.6)	0	3 (4.0)
Total	65 (100.0)	10 (100.0)	75 (100.0)

Table 20: Frequency distribution of health centres and referral hospitals with event causing waste water in the tank/pit spilled out to the surface in the year preceding the assessment

The pipe goes to	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Overflow	12 (4.4)	2 (6.3)	14 (4.6)
Flooding	6 (2.2)	1 (3.1)	7 (2.3)
Broken	5 (1.9)	0	5 (1.7)
Overflow & flooding	3 (1.1)	0	3 (1.0)
Overflow & broken	2 (0.7)	0	2 (0.7)
Total	270 (100.0)	32 (100.0)	302 (100.0)

5.6 Hand hygiene

Key points of care and toilets were observed to assess hand hygiene facilities. For health canters, observed key points of care include consultation room, small surgery/dressing room, vaccination/EPI room, anti-natal care/family planning room and delivery rooms. Observed key points of care for referral hospitals were outpatient department/ward, emergency department/ward, paediatric department/ward, general medicine department/ward, and maternity department/ward.

Table 21 shows the frequency distribution of HCs and RHs by the number of observed points of care with functional hand hygiene facilities (a functional hand hygiene station with soap and water and/or ABHR). All HCFs, except four HCs, had at least one point of care with functional hand hygiene facilities at the time of assessment. A large majority of the HCFs (78.2%) had at least four points of care with functional hand hygiene facilities; with at least four for 56.7% of the HCs and at least five for 71.9% of the RHs.

Table 21: Frequency distribution of health centres and referral hospitals by the number of observed points of care with functional hand hygiene facilities

Number of points of care	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
0	4 (1.5)	0	4 (1.3)
1	9 (3.3)	1 (3.1)	10 (3.3)
2	11 (4.1)	2 (6.3)	13 (4.3)
3	39 (14.4)	3 (9.4)	42 (13.9)
4	153 (56.7)	3 (9.4)	156 (51.7)
5	54 (20.0)	23 (71.9)	77 (25.5)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 22 presents other key variables of hand hygiene facilities at HCs and RHs. Of the assessed HCFs, 86.1% (86.7% of HCs and 81.3% of RHs) had a functional hand washing station (sink) in consultation room/outpatient department, but only 64.6% of the HCFs (65.6% of HCs and 56.3% of RHs) had a functional hand washing station (sink) with clean material for hand drying, while 84.1% of them (83% of HCs and 93.8% of RHs) had a functional ABHR station in consultation room/outpatient department. Overall, 95% of the assessed HCFs (94.8% of the HCs and 96.9% of the RHs) had functional hand hygiene facilities (functional handwashing station (sink) and/or ABHR station) in consultation room/outpatient department.

In delivery room/maternity department, 98.6% of the assessed HCFs (98.4% of the HCs and 100% of the RHs) had functional hand hygiene facilities.

Hand hygiene facilities at or near toilets (in the block of outpatient department of RHs) were also observed and the result shows that 82.8% of the HCFs (82.6% of HCs and 84.4% of RHs) had a functional hand washing station with soap and water at the time of assessment.

Table 22: Key variables of hand hygiene facilities at health centres and referral hospitals

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
HCFs with a functional hand washing station (sink) in consultation room/outpatient department	234 (86.7)	26 (81.3)	260 (86.1)
HCFs with a functional hand washing station (sink) and clean material for hand drying in consultation room/outpatient department	177 (65.6)	18 (56.3)	195 (64.6)
HCFs with a functional ABHR station in consultation room/outpatient department	224 (83.0)	30 (93.8)	254 (84.1)
HCFs with functional hand hygiene facilities (functional handwashing station (sink) and/or ABHR station) in consultation room/outpatient department	256 (94.8)	31 (96.9)	287 (95.0)
HCFs with a functional hand washing station (sink) in delivery room/maternity department	245 (90.7)	31 (96.9)	276 (91.4)
HCFs with a functional hand washing station (sink) and clean material for hand drying in delivery room/maternity department	195 (72.2)	24 (75.0)	219 (72.5)
HCFs with a functional ABHR station in delivery room/maternity department	214 (79.3)	30 (93.8)	244 (80.8)
HCFs with functional hand hygiene facilities (functional handwashing station (sink) and/or ABHR station) in delivery room/maternity department	250 (98.4)	32 (100.0)	282 (98.6)
HCFs with a functional hand washing station at or near (within 5 meters) one or more toilets/latrines (in the block of outpatient department/emergency ward for hospital)	223 (82.6)	27 (84.4)	250 (82.8)

Figure 5 presents the percentage of HCs and RHs basic, limited and no hand hygiene service as defined in Table 2. Of the assessed HCFs, 82.1% (81.9% of HCs and 84.4% of RHs) had basic hand hygiene service, while only a small proportion (17.2%) of them had limited hand hygiene service and two HCs had no hand hygiene service. The percentage of HCFs with basic hand hygiene service (indicator 3) is comparable between HCFs in urban area (82.5%) and those in rural area (82%). However, the percentage of HCFs with basic hand hygiene service is slightly different between HCFs in area of high risk of drought (84.4%) and area of low risk of drought (84.6%), but the difference is not significant statistically ($p>0.05$). In five provinces where there was WASH assessment in 2016, 65.6% of all assessed HCFs (64.9% of HCs and 71.4% of RHs) had functional hand hygiene facilities at all observed key points of care and within 5 meters of toilets.

Figure 5: Percentage of health centres and referral hospitals with basic, limited and no hand hygiene service

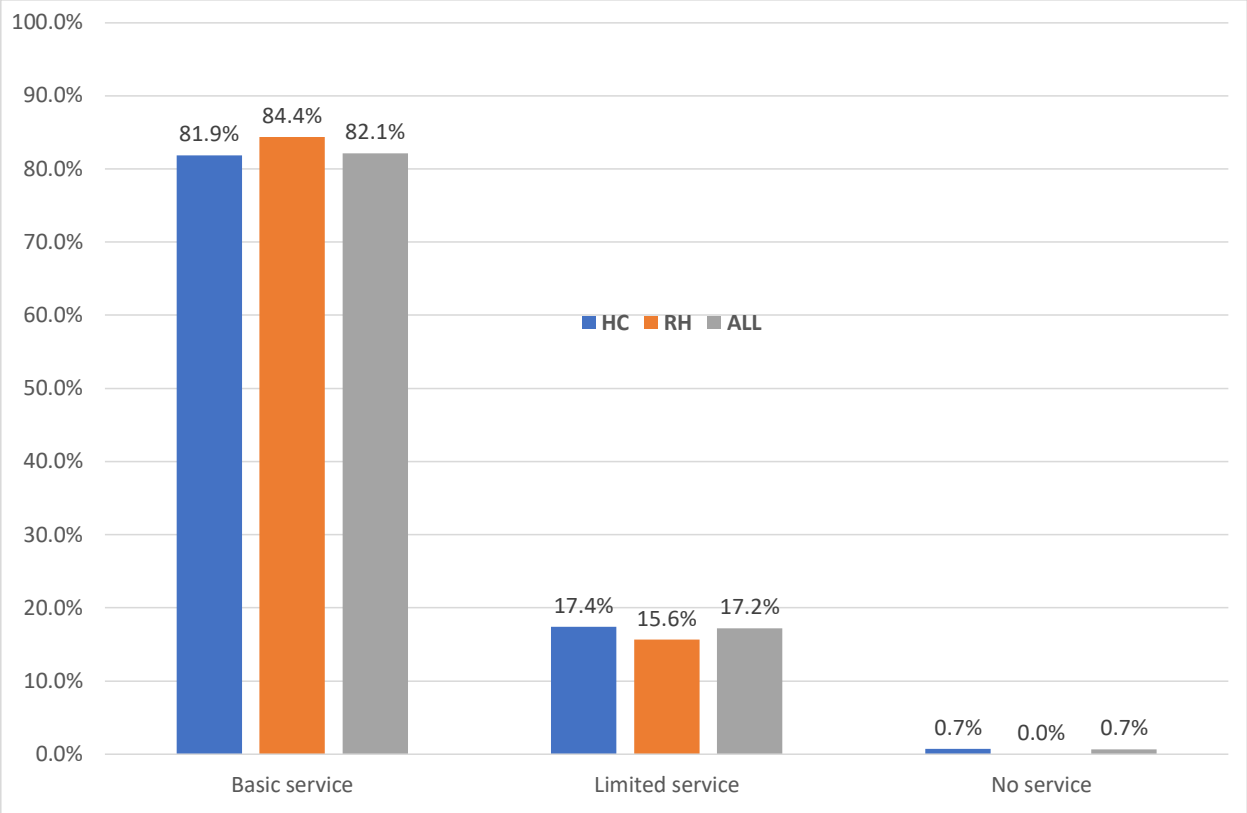


Table 23 shows that 48% of the HCFs (47.8% of HCs and 50% of RHs) had hand hygiene promotional posters displayed at all key places, whereas 51% others (51.1% of HCs and 50.1% of RHs) had posters displayed at most or some key places only. At three HCs, there was no hand hygiene promotional poster displayed at all.

Table 23: Frequency distribution of health centres and referral hospitals with hand hygiene promotional posters displayed at key places

The extent of posters displayed	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
No posters displayed anywhere	3 (1.1)	0	3 (1.0)
Posters displayed at only some key places	66 (24.4)	6 (18.8)	72 (23.8)
Posters displayed at most key places	72 (26.7)	10 (31.3)	82 (27.2)
Posters displayed at all key places	129 (47.8)	16 (50.0)	145 (48.0)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 24 shows that only 24.8% of the HCFs (23.3% of HCs and 37.5% of RHs) where all clinical staff had been trained at least once on the 5 key moments and appropriate hand hygiene process, whereas 66.3% others (66.7% of HCs and 62.5% of RHs) where most or some clinical staff had been trained. At 27 (10%) of the assessed HCs, none of the staff had been trained.

Table 24: Frequency distribution of health centres and referral hospitals with clinical staff been trained (at least once) on the 5 key moments and appropriate hand hygiene process

The extent of staff being trained	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
None has been trained	27 (10.0)	0	27 (8.9)
Only some of them have been trained	132 (48.9)	11 (34.4)	143 (47.4)
Most of them have been trained	48 (17.8)	9 (28.1)	57 (18.9)
All of them have been trained	63 (23.3)	12 (37.5)	75 (24.8)
Total	270 (100.0)	32 (100.0)	302 (100.0)

5.7 Health care waste management

Only 22.5% of the HCFs (19.6% of HCs and 46.9% of RHs) had a functional (not broken or full) and protected (lined and sealed with slap) needles pit on the HCF premises, whereas 81.5% of the HCFs (81.9% of HCs and 78.1% of RHs) had a functional and protected placenta pit.

Table 25 shows that almost all RHs (96.9%) had either a high-capacity incinerator (53.1%) or a sterilwave (43.8%), whereas 79.3% of the HCs had a low-capacity incinerator (a burner made from bricks) and 21.1% had an autoclave.

Table 25: Frequency distribution of health centres and referral hospitals with an incinerator or waste treatment equipment

Availability of incinerator or waste treatment equipment	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
None	49 (18.2)	3 (9.4)	52 (17.2)
A low capacity incinerator	214 (79.3)	10 (31.3)	224 (74.2)
A high capacity incinerator (+800^{o} C)	5 (1.9)	17 (53.1)	22 (7.3)
An autoclave	57 (21.1)	5 (15.6)	62 (20.5)
A sterilwave	0	14 (43.8)	14 (4.6)
Other	13 (4.8)	1 (3.1)	14 (4.6)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 26 shows the frequency distribution of HCFs by the number of observed points of care with one set of waste bins properly labelled. 91.7% of the HCFs (91.9% of HCs and 90.7% of RHs) had at least three points of care with a set of properly labelled waste bins, mainly for sharps waste, infectious (non-sharps) waste and general waste. In three HCs, there was no point of care with a full set of waste bins.

Table 26: Frequency distribution of health centres and referral hospitals by the number of observed points of care with one set of waste bins properly labelled

Number of points of care	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
0	3 (1.1)	0	3 (1.0)
1	2 (0.7)	2 (6.3)	4 (1.3)
2	17 (6.3)	1 (3.1)	18 (6.0)
3	44 (16.3)	6 (18.8)	50 (16.6)
4	152 (56.3)	9 (28.1)	161 (53.3)
5	52 (19.3)	14 (43.8)	66 (21.9)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 27 shows the frequency distribution of HCFs by the number of observed points of care with wastes correctly segregated – waste was put in designated and properly labelled bins and were not more than 75% full. 78.5% of the HCFs (78.6% of HCs and 78.1% of RHs) had at least three points of care with wastes correctly segregated. In twelve HCs and three RHs, there was no point of care where waste was correctly segregated.

Table 27: Frequency distribution of health centres and referral hospitals by the number of observed points of care with wastes correctly segregated

Number of points of care	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
0	12 (4.1)	3 (9.4)	15 (5.0)
1	18 (6.7)	2 (6.3)	20 (6.6)
2	28 (10.4)	2 (6.3)	30 (9.9)
3	42 (15.6)	5 (15.6)	47 (15.6)
4	125 (46.3)	8 (25.0)	133 (44.0)
5	45 (16.7)	12 (37.5)	57 (18.9)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 28 presents the availability of waste bins and waste segregation at consultation rooms/outpatient departments. At 67.4% of the HCFs (68.9% of HCs and 54.8% of RHs), there were properly labelled bins for sharps waste (safe box), infectious waste and general waste at the consultation room or outpatient department area. Six HCs and three RHs had no waste bin present in the consultation room or outpatient department area. At 75.7% of the HCFs (75.9% of HCs and 74.2% of RHs) there was a required set of properly labelled bins with waste correctly segregated at their consultation room or outpatient department area.

Table 28: Availability of waste bins and waste segregation at consultation room/area

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
There was no waste bin	6 (2.2)	3 (9.7)	9 (3.0)
Bins were present but not properly labelled/color-coded	18 (6.7)	2 6.5)	20 (6.6)
Bins were present for infectious waste and general waste and properly labelled/color-coded but safe box was missing	54 (20.0)	9 (29.0)	63 (20.9)
Bins were present for general waste and sharps waste (safe box)	6 (2.2)	0	6 (2.0)
Bins were present for infectious waste, sharps waste (safe box) and general waste and properly labelled/color-coded	186 (68.9)	17 (54.8)	203 (67.4)
There was a required set of properly labelled bins with wastes correctly segregated	205 (75.9)	23 (74.2)	228 (75.7)
Total	270 (100.0)	31 (100.0)	301 (100.0)

Table 29 presents the availability of waste bins and waste segregation in the delivery room/maternity department. At 92.7% of assessed HCFs (92.2% of HCs and 96.9% of RHs), there were properly labelled bins for sharps waste (safe box), infectious waste, placenta and general waste at their delivery room or maternity department area, and at 77.8% of the HCFs (81.9% of HCs and 75% of RHs) there was a required set of properly labelled bins with wastes correctly segregated in the delivery room or maternity department area. Only at two HCs where there was no bin present at their delivery room, whereas 15 others did not have delivery room.

Table 29: Availability of waste bins and waste segregation at delivery room/area

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
There was no waste bin	2 (0.7)	0	2 (0.7)
Bins were present but not properly labelled/color-coded	2 (0.7)	1 (3.1)	3 (1.0)
Bins were present for infectious waste, sharps waste (safe box), placenta and general waste and properly labelled/color-coded	249 (92.2)	31 (96.9)	280 (92.7)
There was no delivery room	15 (5.6)	0	15 (5.0)
There was a set of properly labelled bins with wastes correctly segregated	221 (81.9)	24 (75.0)	235 (77.8)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 30 shows how sharps waste at the assessed HCFs was treated and disposed of. For almost all HCs (96.7%), sharps waste was removed off site to be incinerated in high-capacity incinerators (+800^{o} C) with appropriate storage and transportation. Only five (1.9%) of the HCs had high-capacity incinerators (+800^{o} C) for treatment of sharps waste whereas three others where sharps waste was treated with low-capacity incinerators. Among the 32 assessed RHs, 8 (25%) had a Sterilwave for the treatment of sharps waste while 16 (50%) had a high-capacity incinerator (+800^{o} C) to treat sharps waste and 8 (25%) others had to remove the sharps waste to be incinerated off site in high-capacity incinerator (+800^{o} C) with appropriate storage and transportation. Overall, sharps waste at 98.8% of the HCFs (98.6% of HCs and 100% of RHs) was treated/disposed of safely.

Table 30: Treatment and final disposal of sharps waste

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Treated with Sterilwave	0	8 (25.0)	8 (2.7)
Incinerated with high-capacity incinerator (+800^{o} C) onsite	5 (1.9)	16 (50.0)	21 (7.0)
Removed off site to be incinerated with high-capacity incinerator (+800 o C) with appropriate storage and transportation	261 (96.7)	8 (25.0)	269 (89.1)
Removed off site with unprotected storage inappropriate disposal	1 (0.4)	0	1 (0.3)
Incinerated with low-capacity incinerator	3 (1.1)	0	3 (1.0)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 31 presents the treatment and final disposal of infectious (non-sharps) waste at the assessed HCFs. At the majority of HCs (66.3%), infectious waste was burned with low-capacity incinerator while 23% removed the infectious waste to be incinerated off site in high capacity incinerator (+800^{o} C) with appropriate storage and transportation. Half of the assessed RHs used Sterilwave and high-capacity incinerator, while four (12.5%) others removed the infectious waste to be incinerated off site in high-capacity incinerator (+800^{o} C) with appropriate storage and transportation. Yet, 9 (28.1%) of the RHs still used low-capacity incinerators for the treatment of infectious and three (9.4%) burned the infectious waste on facility grounds. Overall, infectious (non-sharps) waste at 90.2% of the HCFs (90% of the HCs and 90.6% of the RHs) was treated/disposed of safely.

Table 31: Treatment and final disposal of infectious (non-sharps) waste

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Treated with Sterilwave	0	8 (25.0)	8 (2.7)
Incinerated with high-capacity incinerator (+800^{o} C) onsite	2 (0.7)	8 (25.0)	10 (3.3)
Removed off site to be incinerated with high-capacity incinerator (+800^{o} C)	62 (23.0)	4 (12.5)	66 (21.9)
Removed off site with unprotected storage inappropriate disposal	7 (2.6)	0	7 (2.3)
Incinerated with low-capacity incinerator	179 (66.3)	9 (28.1)	188 (62.3)
Burn on the facility ground (+/- protection)	16 (5.9)	3 (9.4)	19 (6.3)
Dumped on flat ground/unprotected pits	2 (0.7)	0	2 (0.7)
Buried inside the facility grounds	2 (0.7)	0	2 (0.7)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 32 shows how placentas at the assessed HCFs were treated and disposed of. Among the assessed HCFs, 73.5% (72.6% of HCs and 81.3% of RHs) dumped/buried placenta in onsite designated and protected pits (pined and sealed) while 8.9% others (8.9% of HCs and 9.4% of RHs) removed placenta off site to be incinerated with high-capacity incinerators (+800^{o} C) with appropriate storage and transportation. However, 32 (11.9%) of the HCs and one (3.1%) of the RHs let mothers take the placenta home for religious reason, mainly for Muslim. 13 (4.8%) of the HCs had no delivery room or activity, mainly those located in the compound of RH. Overall, placenta at 82.7% of the HCFs (81.5% of HCs and 93.8% of RHs) was treated/disposed of safely.

Table 32: Treatment and final disposal of placenta

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Incinerated with high-capacity incinerator (+800 o C) onsite	0	1 (3.1)	1 (0.3)
Removed off site to be incinerated with high-capacity incinerator (+800^{o} C)	24 (8.9)	3 (9.4)	27 (8.9)
Removed off site with unprotected storage inappropriate disposal	1 (0.4)	0	1 (0.3)
Dumped/buried in onsite designated and protected pits (pined and sealed)	196 (72.6)	26 (81.3)	222 (73.5)
Buried inside the facility grounds (+/- protection)	4 (1.5)	0	4 (1.3)
Take home by mothers	32 (11.9)	1 (3.1)	33 (10.9)
There was no delivery room/activity	13 (4.8)	0	13 (4.3)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Figure 6 presents the percentage of HCs and RHs with basic, limited and no health care waste management service as defined in Table 2. Of the assessed HCFs, 54% (54.8% of HCs and 46.9% of RHs) had basic health care waste management service, while 31.5% of them (31.5% of HCs and 31.3% of RHs) had limited health care waste management service and 14.2% (13.7% of HCs and 18.8% of RHs) had no health care waste management service.

The percentage of HCFs with basic health care waste management service (indicator 4) is slightly lower in urban area (50%) than in rural areas (55.4%). However, the difference is not significant statistically ($p>0.05$). The percentage of HCFs with basic health care waste management service is comparable between those in area of high risk of drought (53.1%) and areas of low risk of drought (53.9%), while it is slightly different in areas of high risk of flood (58.2%) and areas of low risk of flood (51.3%), but the difference is not significant statistically. In five provinces where there was WASH assessment in 2016, 53.6% of all assessed HCFs (55.9% of HCs and 35.7% of RHs) had waste correctly segregated into at least three bins in consultation areas and sharps waste and infectious waste treated and disposed of safely (basic health care waste management service as defined in Table 2.

A large majority of RHs (75%) had their general waste regularly collected by designated authority to a public disposal site but only 23.7% of HCs did so. 15.6% of RHs and 61.1% of HCs burned their general waste in a low-capacity incinerator onsite. Twenty seven (10%) of the HCs reported to have openly burned the general waste onsite (Table 33).

Figure 6: Percentage of health centres and referral hospitals with basic, limited and no health care waste management service

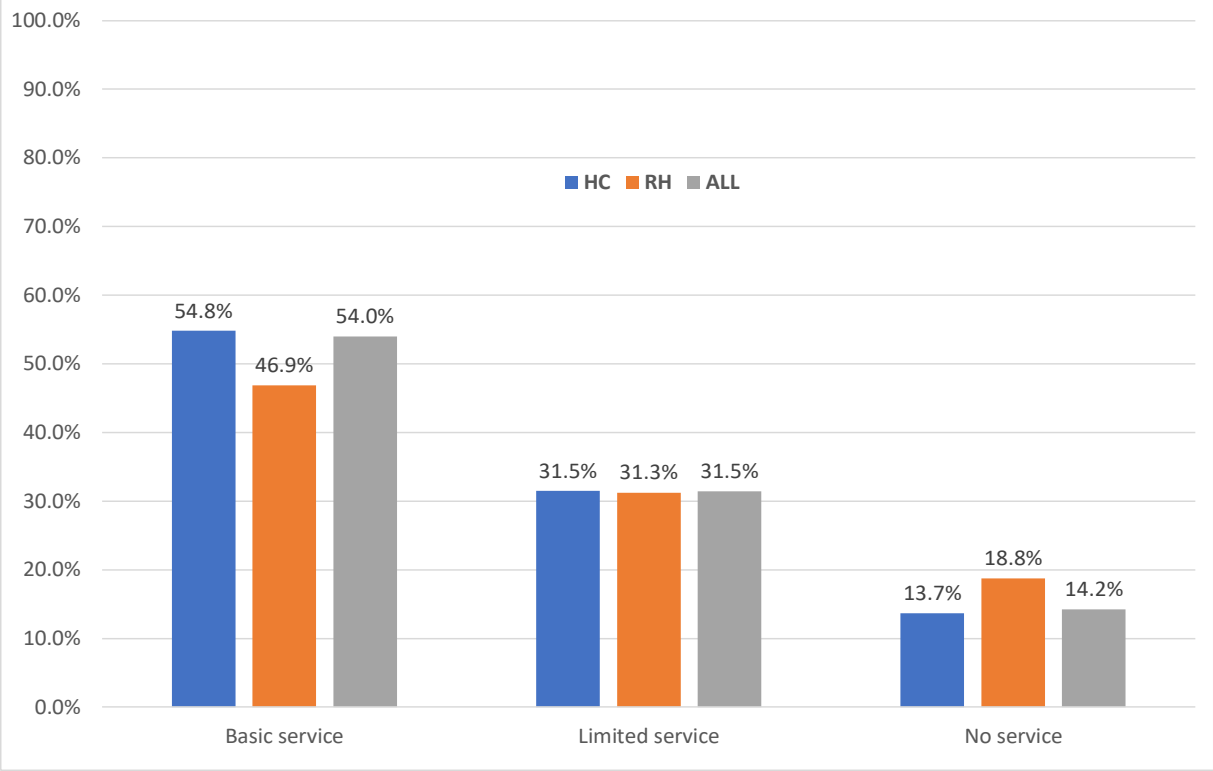


Table 33: Disposal of general (non-infectious) waste

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Regularly collected by designated authority/the HCF to a public disposal site	64 (23.7)	24 (75.0)	88 (29.1)
Irregularly collected by designated authority/the HCF to a public disposal site	12 (4.4)	3 (9.4)	15 (5.0)
Burned in a low capacity incinerator/ burner onsite	165 (61.1)	5 (15.6)	170 (56.3)
Piled but not buried at the HCF	2 (0.7)	0	2 (0.7)
Openly burned at the HCF	27 (10.0)	0	27 (8.9)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 34 shows how often general waste was regularly collected at HCFs. While 48.7% of the HCFs (46.7% of HCs and 65.6% of RHs) had their general waste collected once a day (daily), 46.4% others (49.3% of HCs and 21.9% of RHs) had their general waste collected less than once a day. Only 5% of the HCFs (4.1% of HCs and 12.5% of RHs) where general waste was collected more often than once a day.

While almost all of the assessed RHs (81.3%) had at least one dedicated trolley for safe collection and transportation of infectious and sharps wastes, 94.8% of the HCs had none.

A similar situation was found for waste storage. While 87.5% of the RHs had an appropriately fenced and protected waste storage (designated area where infectious waste is stored temporarily waiting for treatment/disposal in the HCF), only 38.9% of the HCs had such a waste storage.

Table 34: Frequency of general (non-infectious) waste collection

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
More often than once a day	11 (4.1)	4 (12.5)	15 (5.0)
Once a day (daily)	126 (46.7)	21 (65.6)	147 (48.7)
Less than once a day	133 (49.3)	7 (21.9)	140 (46.4)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 35 presents how long infectious waste (specifically non-sharps waste) is usually stored at the HCFs before treatment/disposal. The majority of the HCFs (57%), 55.6% of HCs and 68.8% of RHs, reported to store infectious waste for a period between 1-3 days, while 19.5% others (20.7% of HCs and 9.4% of RHs) did so between 4-7 days. Only 7.3% (6.3% of HCs and 15.6% of RHs) usually stored infectious waste less than one day before treatment/disposal.

Table 35: Duration of infectious waste storage

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Less than 1 day	17 (6.3)	5 (15.6)	22 (7.3)
1-3 days	150 (55.6)	22 (68.8)	172 (57.0)
4-7 days	56 (20.7)	3 (9.4)	59 (19.5)
More than 7 days	47 (17.4)	2 (6.3)	49 (16.2)
Total	270 (100.0)	32 (100.0)	302 (100.0)

5.8 Environmental cleaning

Environmental cleaning is a WASH component which focuses on general cleaning practices at HCFs determined by the availability of cleaning protocols and training of staff responsible for cleaning. This study also considered general cleanliness at key points of care and toilets as observed by data collectors.

Two key policy documents on WASH in HCFs that have been published and distributed in Cambodia include the Infection Prevention and Control Guidelines for Health Care Facilities (IPC Guidelines) [26] and the Guidelines for Water, Sanitation and Hygiene in Health Care Facilities (WASH Guidelines) [15]. This study assessed whether these documents were available at HCFs. In addition, we also investigated the availability of cleaning protocols or standard operating procedures, including a cleaning roster/schedule and step-by-step technical guidance, that are necessary to guide environmental cleaning practices in HCFs.

Table 36 summarizes the availability of the two WASH policy documents and environmental cleaning protocols and/or standard operating procedures (SOPs). While a large majority of HCFs (80.4% of HCs and 87.5% of RHs) could show IPC Guidelines in hard copy to the assessment team, only 27.2% of them (27.8% of HCs and 21.9% of RHs) could do so for WASH guidelines. Very few HCFs (six HCs and one RH) could present both cleaning rosters/schedules and step-by-step technical guidance in hard copy whereas 11.1% of HCs and 21.9% of RHs could only show a cleaning rosters/schedules without step-by-step technical guidance.

Table 36: Availability of key WASH policy documents and environmental cleaning protocols

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
WASH guidelines			
Not available	161 (59.6)	20 (62.5)	181 (59.9)
Available in electronic copy	4 (1.5)	2 (6.3)	6 (2.0)
Available in hard copy but not seen	30 (11.1)	3 (9.4)	33 (10.9)
Available in hard copy and seen	75 (27.8)	7 (21.9)	82 (27.2)
IPC guidelines			
Not available	17 (6.3)	1 (3.1)	18 (6.0)
Available in electronic copy	1 (0.4)	1 (3.1)	2 (0.7)
Available in hard copy but not seen	35 (13.0)	2 (6.3)	37 (12.3)
Available in hard copy and seen	217 (80.4)	28 (87.5)	245 (81.1)
Cleaning protocols/SOPs			
Not available	228 (84.4)	16 (50.0)	244 (80.8)
Only cleaning roster/schedule available but no step-by-step technical guidance	30 (11.1)	7 (21.9)	37 (12.3)
Cleaning roster/schedule and step-by-step technical guidance reported available but not seen	6 (2.2)	8 (25.0)	14 (4.6)
Cleaning roster/schedule and step-by-step technical guidance reported available and seen	6 (2.2)	1 (3.1)	7 (2.3)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 37 shows that only 9.3% of HCFs (6.7% of HCs and 31.3% of RHs) reported that all staff responsible for cleaning had received training on environmental cleaning at least once, whereas at 51% of other HCFs (51.9% of HCs and 43.8% of RHs) only some of the staff responsible for cleaning had received such training. At 92 (34.1%) of the assessed HCs and 5 (15.6%) of the assessed RHs, none of the staff responsible for cleaning had ever received any training on environmental cleaning.

Table 37: Training on environmental cleaning among staff responsible for cleaning

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
None	92 (34.1)	5 (15.6)	97 (32.1)
Only some of them	140 (51.9)	14 (43.8)	154 (51.0)
Most of them	20 (7.4)	3 (9.4)	23 (7.6)
All of them	18 (6.7)	10 (31.3)	28 (9.3)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 38 demonstrates the general cleanliness as observed by data collectors at key points of care and toilets in the HCFs. Consultation rooms/areas of outpatient department were found to be clean 90.1% (90% of HCs and 90.6% of RHs). Similarly, delivery rooms/areas of maternity department were found to be clean 91.1% (90.7% of HCs and 93.8% of RHs). All observed key points of care were visibly clean in 78.5% of the HCFs (77.8% of HCs and 84.4% of RHs) and 73.2% of all observed toilets (in outpatient areas) were found to be clean (74.1% of HCs and 65.6% of RHs).

Table 38: General cleanliness

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Consultation room of the HCF (of RH outpatient department) was visibly clean	243 (90.0)	29 (90.6)	272 (90.1)
Delivery room of the HCF (of RH maternity department) was visibly clean	245 (90.7)	30 (93.8)	275 (91.1)
Some of the observed points of care of the HCF were visibly clean	55 (20.4)	5 (15.6)	60 (19.9)
All observed points of care of the HCF were visibly clean	210 (77.8)	27 (84.4)	237 (78.5)
Some of the observed toilets of the HCF (in RH outpatient department) were visibly clean	44 (16.3)	6 (18.8)	50 (16.6)
All observed toilets of the HCF (in RH outpatient department) were visibly clean	200 (74.1)	21 (65.6)	221 (73.2)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Figure 7 presents the percentage of HCs and RHs with basic, limited and no environmental cleaning service as defined in Table 2. Of the assessed HCFs, only 1.7% (0.4% of HCs and 12.5% of RHs) had a basic environmental cleaning service, while 66.6% (65.9% of HCs and 71.9% of RHs) had a limited environmental cleaning service and 31.8% (33.7% of HCs and 15.6% of RHs) had no environmental cleaning service.

Since the percentage of HCFs with basic environmental cleaning service (indicator 5) is very low, the percentage of HCFs with no environmental cleaning service was compared between urban and rural areas as well as between areas with high and low risk of drought or flood. The percentage of HCFs with no environmental cleaning service is significantly larger ($p<0.01$) in rural area (37.4%) than in urban area (16.3%). The percentage of HCFs with no environmental cleaning service is comparable in areas of high risk of drought (30.5%) and areas of low risk of drought (33.7%). The percentage of HCFs with no environmental cleaning service is slightly larger in areas of low risk of flood (34.6%) than in areas of high risk of flood (27.5%) but the difference is not significant statistically ($p>0.05$).

Figure 7: Percentage of health centres and referral hospitals with basic, limited and no environmental cleaning service

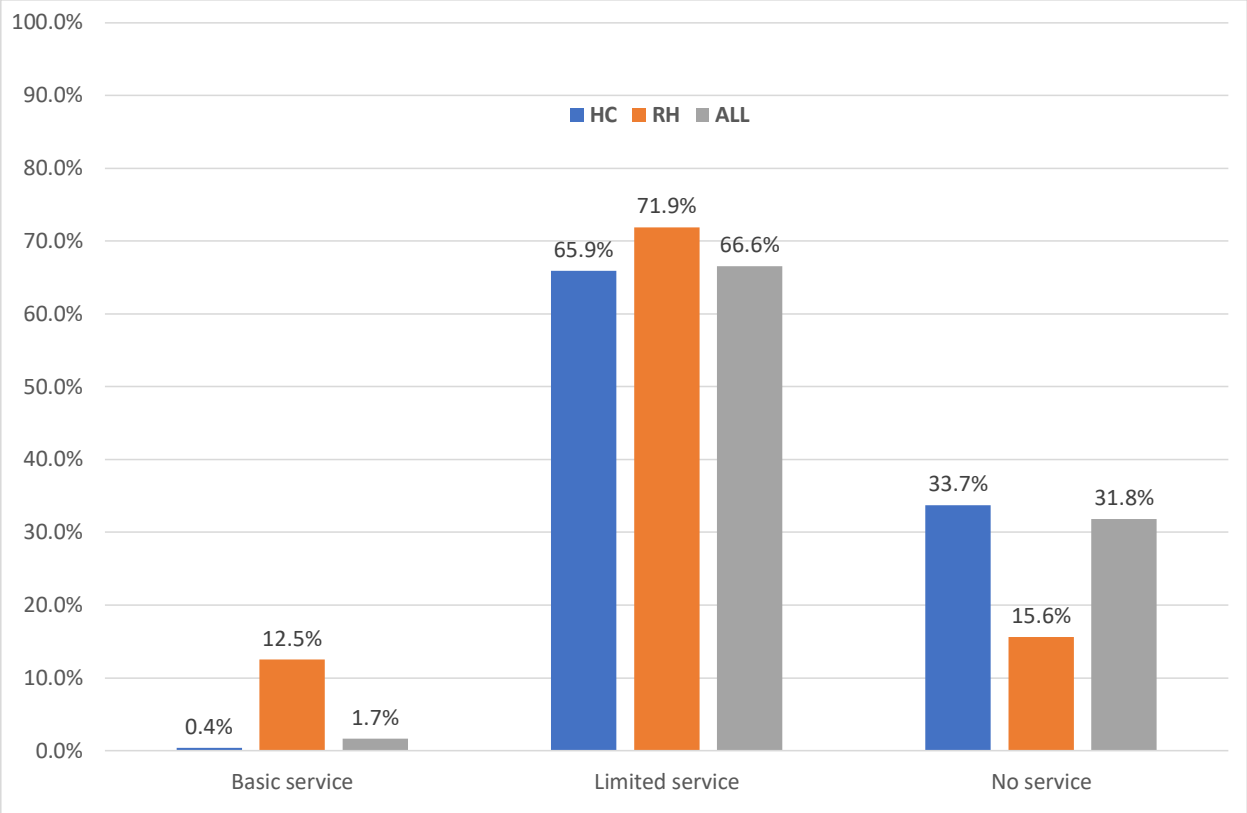


Table 39 shows the frequency that floors and toilets were cleaned. While 60.4% of the HCs reported to have cleaned the floors once a day regularly, 37.5% of the RHs (outpatient department) reported to have cleaned the floors twice a day regularly and 25% did so twice a day and when dirt. Similarly for cleaning of toilets, 60.4% of the HCs reported cleaning once a day regularly compared with 37.5% of the RHs reporting that cleaning was conducted twice a day regularly, and 21.9% others did so twice a day and when dirty.

Of the assessed HCFs, 91.7% (91.5% of HCs and 93.8% of RHs) cleaned the floors, surfaces and toilets with detergent/disinfectant (chlorine 0.05%) as demonstrated by staff reporting coupled with detergent/disinfectant availability observed by the data collector. The majority of the HCFs (53.6%), 51.9% of HCs and 68.8% of RHs reported that cleaning equiment (including gloves, detergent/disinfectant solution, cloths & towels, bickets, mops, non-infectious bags) is generally appropriate and sufficient, whereas 42.7% (44.1% of HCs and 31.3% of RHs) said it was appropriate but not sufficient, and 11 (4.1%) of the HCs reported that there was no appropriate equipment.

Table 39: Frequency of cleaning floors and toilets

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Frequency of cleaning floors			
Irregular and less than once a day	13 (4.8)	1 (3.1)	14 (4.6)
Once a day regularly (daily)	163 (60.4)	9 (28.1)	172 (57.0)
Once a day and when dirt	31 (11.5)	2 (6.3)	33 (10.9)
Twice a day regularly	48 (17.8)	12 (37.5)	60 (19.9)
Twice a day and when dirty	15 (5.6)	8 (25.0)	23 (7.6)
Frequency of cleaning toilets			
Irregular and less than once a day	20 (7.4)	0	20 (6.6)
Once a day regularly (daily)	163 (60.4)	10 (31.3)	173 (57.3)
Once a day and when dirt	33 (12.2)	3 (9.4)	36 (11.9)
Twice a day regularly	37 (13.7)	12 (37.5)	49 (16.2)
Twice a day and when dirty	16 (5.9)	7 (21.9)	23 (7.6)
Total	270 (100.0)	32 (100.0)	302 (100.0)

Table 40 shows that 96% of the assessed HCFs (95.9% of HCs and 96.9% of RHs) reported to have budget for buying cleaning equipment and materials, while 58.3% (54.8% of HCs and 87.5% of RHs) reported having a budget to pay for the cleaners' salaries. Only 5.6% of the HCFs (3.3% of HCs and 25% of RHs) had a budget for training for cleaning/enviromental hygiene/IPC. Six (2.2%) of the HCs reported that they had no budget for WASH related activities at all.

These WASH related expenses made use of HCF budget for operating cost from three main sources: 39% of user fee revenues; the government budget line item 62028, known as the fixed lumpsum grant directly transferred to HCFs, and government budget for general operating cost. While 89.2% of HCs and 93.8% of RHs reported using the 39% user fee revenues, 84.4% of HCs and RHs did so with the government budget line item 62028, and 1.9% of HCs and 6.3% of RHs reported using government budget for general operating cost. Surprisingly, none of the HCFs reported to have budget from partners for WASH related activities. This could be because some WASH related activities supported by partners were carried out through MOH departments/programs.

Table 40: Availability of budget for WASH specific activities

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
There is no budget for WASH related activities at all	6 (2.2)	0	6 (2.0)
There is budget for paying salary of cleaners	148 (54.8)	28 (87.5)	176 (58.3)
There is budget for cleaning/environmental hygiene/IPC training	9 (3.3)	8 (25.0)	17 (5.6)
There is budget for cleaning equipment/materials	259 (95.9)	31 (96.9)	290 (96.0)
There is budget for other WASH activities	6 (2.2)	3 (9.4)	9 (3.0)
Total	270 (100.0)	32 (100.0)	302 (100.0)

5.9 Reported major WASH-related constraints and suggested solutions

Key informants at 208 (68.9%) of the assessed HCFs (70.4% of the HCs and 56.3% of the RHs) reported at least one major constraint/challenge in terms of WASH that their HCF was facing.

Table 41 presents the reported major WASH related constraints/challenges that HCs and RHs were facing. The most frequently reported WASH related constraints/challenges relate to: water supply; waste management and disposal; and the lack of cleaners; lack of appropriate toilets; and a lack of knowledge of and commitment to good sanitation and hygiene among clients and their relatives, health staff and cleaners.

Table 41: Reported major constraints/challenges in terms of WASH that health centres and referral hospitals were facing

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Water supply problems due to no clean water supply or the existing water supply (by tube well or other sources) are of poor quality	66 (34.7)	6(33.3)	72 (34.6)
Waste treatment/disposal problems due to no appropriate incinerator or the existing incinerator was broken, and poor/irregular waste collection service	31 (16.3)	1 (5.6)	32 (15.4)
Lack of cleaners due to no/not enough budget to hire more and qualified cleaners or limited number of government contracted ones	24 (12.6)	2 (11.1)	26 (12.5)
Lack of toilets or existing toilets were not functional/too small and lack of toilets that meet the needs of people with reduced mobility	12 (6.3)	2 (11.1)	14 (6.7)
Patients and their relatives lack of knowledge of good sanitation and hygiene practices	13 (6.8)	1 (5.6)	14 (6.7)
Health staff and cleaners lack of knowledge of and commitment to sanitation and hygiene, including IPC	10 (5.3)	1 (5.6)	11 (5.3)
No acceptable or not enough (not enough money to buy) drinking water for staff and clients to drink	10 (5.3)	1 (5.6)	11 (5.3)
HCFs located in lowland area with no concrete footpath and flooded during rainy season	7 (3.7)	1 (5.6)	8 (3.8)
Lack of water in the dry season; the quantity of water is not enough for use	7 (3.7)	0	7 (3.4)
No or nearly full placenta pit	4 (2.1)	0	4 (1.9)
No/not well functional system to drain rainwater out of the ground/flood when heavy rain	2 (1.1)	2 (11.1)	4 (1.9)
Lack of cleaning materials	1 (0.5)	1 (5.6)	2 (1.0)
Other constraint/challenge	3 (1.6)	0	3 (1.5)
Total	270 (100.0)	32 (100.0)	302 (100.0)

While water supply was reasonably good as shown in results, key informants in 34.6% of the assessed HCFs (34.7% of the HCs and 33.3% of the RHs) reported that their HCF had no clean water supply or that the existing water supply (by tube well or other sources) was of poor quality due to concerns such as bad odour or arsenic or that the water caused rusting or calcification of equipment (most probably hard water containing high mineral content). Moreover, 11 other HCFs (including 10 HCs) reported a lack of water in the dry season or the well was flooded during rainy season. Seven HCs reported a lack of drinking water (or lack of money to buy the drinking water) for clients, partly due to the poor quality of the existing water supply.

In total, 15.4% of the HCFs (16.3% of HCs and 5.6% of RHs) reported problems related to waste treatment/disposal, mainly due to the absence of appropriate incinerators or the existing incinerator was broken or located faraway or there was a poor/irregular waste collection service. Some reported that the use of incinerators to treat waste onsite caused environmental pollution that may affect the health of the population living nearby the HCFs.

Of the assessed HCFs, 12.5% (12.6% of HCs and 11.1% of RHs) raised concerns about the lack of cleaners, as a result from having no/not enough budget to hire an adequate number of cleaners or that the prescribed number of government-contracted cleaners is limited.

In terms of suggested solutions, many reported to have reported concerns to higher levels and requested for solutions from operational district offices and supporting partners for help. For water supply, requests were mainly to have a clean water supply connected to the HCF or have an alternative clean water supply. For waste treatment/disposal, the main request was to have a reliable system to support waste treatment/disposal of offsite (predominantly for infectious and sharps waste) and budget to pay for such services. For cleaners, HCFs requested to have more cleaners either as government contracted staff or an increased budget for HCFs to hire locally.

6 Discussion

6.1 Key findings

Results show that electricity and water supply in the 302 assessed health care facilities (HCFs) were good. All of the assessed HCFs, except three health centres (HCs), had an electricity supply from a main source, mostly from a national/community grid, which was functional (had electricity) at the time of assessment. Over 93% reported that the electricity supply was enough to meet the facility's basic needs. Similarly, 96% of the HCFs had basic water supply (main source of water is an improved source, located on premises, from which water is available at the time of assessment). In five provinces where the first WASH assessment was conducted in 2016, this assessment shows that 98% of the HCFs (98% of HCs and 100% of RHs) had basic water supply compared with 91% of the HCFs (90% of HCs and 94% of RHs) found by the assessment in 2016 [16], suggesting an improvement in water services over time. Moreover, Cambodia's service levels are above the average in least developed countries (53%) and are better than the global average (78%) from global data in 2021 [8].

However, the quantity and quality of water remains a challenge in many HCFs. Only 60% of the assessed HCFs (61% of HCs and 53% of RHs) said that the water supply was enough for general purposes and 38% (37% of HCs and 47% of RHs) for both general and drinking purposes. Seven HCs and two RHs still relied on surface water as their main water source. Key informants in 35% of the HCFs (35% of the HCs and 33% of the RHs) reported that their HCF had no clean water supply or that the existing water supply (by tube well or other sources) was of poor quality. Eleven HCFs (including 10 HCs) reported a lack of water in the dry season or that the well was flooded during the rainy season, and seven HCs complained about a lack of drinking water (or lack of money to buy the drinking water) for clients, partly due to poor quality of the existing water supply being not suitable for drinking.

Unlike electricity and water supply, sanitation service at the HCFs needs further improvement. Only about 7% of the assessed HCFs (5% of HCs and 19% of RHs) had basic sanitation services (with improved and usable sanitation facilities, with at least one toilet dedicated for staff, one for sex-separated with menstrual hygiene facilities, and one accessible for users with limited mobility). Many met a limited sanitation service level. Many HCFs did not have any sex-separated toilets with menstrual hygiene facilities and toilets accessible for users with limited mobility. These two conditions were the main reason that basic service levels were not met for sanitation. Cambodia's figure is lower than the average in least developed countries (21%) [8] but better than the Cambodian situation in 2016 when none of the assessed HCFs had basic sanitation services [16]. Wastewater treatment is also a concern with over 12% of the assessed HCs and RHs reporting no containment for wastewater from toilets, which could lead to faecal contamination in the HCF environment.

Results show that hand hygiene services in the assessed HCFs were reasonably good with 82% of the HCFs (82% of HCs and 84% of RHs) having basic hand hygiene services. In five provinces where the first WASH assessment was conducted in 2016, this assessment shows that 66% of the HCFs

(65% of HCs and 71% of RHs) had functional hand hygiene facilities at all observed points of care and within 5 meters of toilets compared with only 3% of the HCFs (2% of HCs and 6% of RHs) found by the assessment in 2016 [16] demonstrating an improvement in hand hygiene services in the last eight years. The current access to basic hand hygiene service level in Cambodia is higher than the average in least developed countries (32%) and exceeds the global average (51%) as reported with 2021 data [8]. However, the basic hand hygiene service indicator does not fully reflect good hand hygiene compliance or quality of practising the five key moments of hand hygiene, as only 25% of the HCFs (23% of HCs and 38% of RHs) reported that all their clinical staff have been trained on five key moments and hand hygiene process at least once. Assessment of such hand hygiene compliance, a key determinant of infection prevention and control at HCFs [26], should be considered for the future studies.

Considerable improvement in health care waste management in consultation/outpatient areas has been made since 2016, from 10% of the assessed HCFs (10% of HCs and 13% of RHs) having basic health care waste management service in 2016 [16] to 54% of the assessed HCFs (55% of HCs and 47% of RHs) in 2023. The current figure also is higher than the average in least developed countries (34%). However, health care waste management in HCFs in Cambodia remains relatively poor as compared with global average (73% of primary health care facilities and 61% of hospitals) [8]. Both segregation and treatment/disposal of waste, especially infectious and sharps waste, require further improvement. Waste was correctly segregated at consultation room/area of 76% of HCFs (76% of HCs and 74% of RHs) and at delivery room/area of 78% of HCFs (82% of HCs and 75% of RHs) only. Infectious (non-sharps) waste was treated/disposed of safely at 90% of the HCFs (90% of HCs and 91% of RHs). Three HCs still incinerated sharps waste with low-capacity incinerators and 11% of the HCFs allowed mothers to take the placenta home for religious reasons, and four HCs reported burying the placenta in the facility grounds. Some (15%) reported challenges related to adequate waste treatment/disposal, mainly due to the absence of an appropriate incinerator or that the existing incinerator was broken or located faraway. HCFs also reported that poor/irregular waste collection services were also a challenge.

Environmental cleaning focuses on general cleaning practices at HCFs, determined in the global indicator for environmental cleaning as the availability of cleaning protocols at HCFs and the requirement that staff with responsibilities for cleaning are trained. General cleanliness was also assessed in this study at key points of care and toilets by data collectors. Results suggest that environmental cleaning service at the assessed HCFs remains relatively poor. Although consultation and delivery rooms/areas in over 90% of the assessed HCFs were visibly clean, as were key points of care (78% HCs and 84% RHs) and toilets (74% HCs and 66% RHs), less than 2% of the assessed HCFs (0.4% of HCs and 13% of RHs) met the target for basic environmental cleaning services. This could be partly explained by the absence of clear policy guidance on necessary conditions to ensure good environmental cleaning in HCFs, in particular the availability of cleaning protocols and the training of all staff with cleaning responsibilities. Other environmental cleaning related challenges reported by a number of key informants include the lack of cleaners, and the lack of knowledge of and commitment to good sanitation and hygiene practices among staff, cleaners, clients and their relatives.

6.2 Validity and limitations

Although the study design and methodology ensured that quality assurance measures be applied throughout the assessment, this study has some potential limitations.

Firstly, this study assessed the WASH situation in public HCFs at one point in time. While the study sample was randomly selected to have a national representativeness, it does not include private HCFs. Any use of findings from this study to claim for national representativeness should be made with caution. Moreover, like many other cross-sectional studies [27, 28], without repetitions, findings from this single snap-shot survey may not entirely reflect the WASH situation at HCFs throughout the year, especially the year-round functionality of the assessed WASH facilities. However, this was mitigated by including questions that addressed seasonal variation. Such questions included whether the water supply provided enough water for use throughout the year and request for HCFs to report three major challenges they were facing.

Secondly, the global WASH indicators mainly refer to the availability of WASH facilities rather than describing practices required to fully realize the WASH services. While this indicator for basic water service and basic hand hygiene service are mostly met, this does not fully indicate that the HCFs had water supply of sufficient quantity and quality and good hand hygiene compliance was conducted by health staff and cleaners. Hand hygiene requires direct observation of hand hygiene practices by trained data collectors using a pre-defined checklist. Nevertheless, when the basic service levels are poor, as is the case with sanitation, health care waste management, and environmental cleaning in Cambodia, this is a clear indication that the WASH situation is poor.

Finally, it is a challenge to align the study with both national and international definitions related to standardized WASH indicators. For example, it was agreed by the national WASH experts that at outpatient consultation areas at HCs in Cambodia where there is no expected use of needles, only two waste bins (one for general waste and one for infectious waste) are enough, whereas the global indicators for SDG6 recommends to have a set of at least three waste bins, one for sharps waste (safe box), one for infectious waste and one for general waste in such consultation rooms. Moreover, it is not entirely clear how to define the critical points of care for hand hygiene in Cambodian health care settings, especially in RHs.

7 Conclusion and recommendations

Despite the limitations, careful interpretation of the findings allows not only the generation of data for monitoring water, sanitation, hygiene, healthcare waste management, and environmental cleaning (WASH) in health care facilities (HCFs) at national and global level, and useful information and evidence for the Ministry of Health and related health partners to further improve WASH in HCFs in Cambodia. Moreover, the findings from this study provide a basis for estimating financial gaps for achieving SDG targets for WASH in HCFs by 2030.

The findings suggest that water supply and hand hygiene services in public HCFs were reasonably good, and better than the global average, with considerable improvement compared with the situation in 2016. However, water shortages persist, especially in the dry season, and the existing water supply, especially by tube or dug well or open sources was reported to be of poor quality. Moreover, the basic hand hygiene service indicator that refers to the availability of functional hand hygiene facilities does not necessarily reflect hand hygiene compliance to the five key moments and appropriate hand hygiene process at those times. Unlike water supply and hand hygiene, health care waste management at public HCFs remained relatively poor despite some improvement since 2016. The findings also suggest a poor level of sanitation services and environmental cleaning services at public HCFs. While all observed key points of care and toilets in a large majority of the assessed HCFs were visibly clean, less than 2% of the assessed HCFs had basic environmental cleaning service.

Despite considerable improvement since 2016, WASH in HCFs in Cambodia, especially sanitation, health care waste management and environmental cleaning services, requires further improvement to ensure the safety and quality of care, prevention and control of antimicrobial resistance, and achievement of quality UHC and SDG targets. The following are some considerations for future national policies and actions to further improve WASH in Cambodia.

- Update the current national IPC and WASH guidelines incorporating necessary WASH-related norms, standards and definitions with relevant considerations to mitigate climate risks, with more elaborated sections on environmental cleaning and monitoring and evaluation for Cambodia, and widely introduce them to HCFs and other relevant stakeholders.

- Clean, climate resilient and safe water supply systems should be put in place in HCFs that still rely on surface water as their main water source and the existing main water supply is of poor quality by connecting the available piped water to the HCFs or constructing tube wells or boreholes where possible. At the same time, further construction and maintenance of back up sources such as rainwater collection in areas where there is no underground water is necessary to address water shortages in the dry season. HCFs should be encouraged or provided means to make drinking water available for clients.

- For sanitation, further effort in construction and management is needed to have at least one improved toilet meeting the needs of people with reduced mobility, and one toilet dedicated for use by women and girls with facilities to manage menstrual hygiene. To meet the SDG6

WASH in HCF definition of basic sanitation, each health center needs to have at least three improved toilets per health center – one for men, one for women, and one for people with reduced mobility. The latter could be reserved also for staff while clients with no mobility problem should use the two others. Sanitation and hygiene systems shall be developed considering local climate/environment risks

- Along with adequate supplies of appropriate waste bins and needles boxes, education, monitoring and coaching are necessary to improve waste segregation at key points of care. Ensuring safe treatment/disposal of sharps and infectious waste requires immediate repair or preplacement of broken incinerators. A solution is also urgently needed for HCFs with no functional or nearly full placenta pits. In the long run, it is preferable to have a professional firm in each province or region responsible for collecting sharps and infectious health care wastes, including placenta, from HCFs and safely transporting them to be treated with a high-capacity incinerator like the system in place in Phnom Penh.

- In order to improve environmental cleaning, all HCFs should develop and introduce cleaning protocols or standard operating procedures with step-by-step techniques for specific tasks, such as cleaning a floor, sink, spillage of blood, or body fluids, and a cleaning roster or schedule specifying responsibilities for cleaning tasks and frequencies at which they should be performed, coupled with training on environmental cleaning provided to all staff responsible for cleaning. In addition, the problem of a lack of cleaners in some HCFs should be addressed by more efficient use of the existing cleaners coupled with opportunity to have more cleaners hired as government contracted staff or directly by the HCFs (e.g. one additional cleaner per HC).

- Along with improvements in knowledge, infrastructure and supplies, it also requires improvement in staff management, motivation and commitment to ensure best practices of basic climate resilient WASH in HCFs, including but not limited to setting up a mechanism to incentivize best WASH practices in HCFs with routine appreciation/evaluation of the WASH situation in HCFs that is linked with incentives such as giving priority for WASH-related investments, awarding certificates of appreciation, and financial incentives. The existing performance-based grant of the Health Equity and Quality Improvement Project phase 2 and the mechanism to select and award best public facilities should be better linked to basic WASH indictors.

- Last but not least, further assessment of this kind should consider addressing the potential limitations, as discussed in section 6.2 above. These include assessment of WASH in private HCFs and measurement of WASH practices rather than just WASH infrastructure and facilities such as observation of hand hygiene compliance.

Annexes

Annex 1: Questionnaire for Assessment of Water, Sanitation and Hygiene in Health Care Facilities

This questionnaire is to be completed by trained data collector after his/her walkthrough the health care facility (HCF), using a standard checklist, with what was observed during the walkthrough, coupled with key staff interview and other available information from the health care facility reports and statistics.

SECTION 0: IDENTIFICATION AND ASSESSMENT DATA	
I01	Province where HCF is located: _____ *(select one from the list)*
I02	Operational District where HCF is located: _____ *(select one from the list)*
I03	Code and name of HCF (as in HMIS): _____ *(select one from the list)*
I04	Administrative District where HCF is located: _____ *(select one from the list)*
I05	Commune where HCF is located: _____ *(select one from the list)*
I06	Type of the HCF: *1 = Health centre (with no bed)* *2 = Health centre with beds* *3 = OD referral hospital* *4 = Provincial hospital* *(automatic)*
I07	Level of HCF: *1 = CPA3;* *2 = CPA2;* *3 = CPA1* *4 = CPA+MPA* *5 = MPA* *(automatic)*
I08	Broad area where the HCF is located *1 = Urban* *2 = Rural* *(automatic)*
I09	Water scarcity & drought score of the commune where HCF is located (0-10): ____ *(automatic)*
I10	Riverine floods score of the commune where HCF is located (0-10): _____ *(automatic)*

I11	Has this HCF ever been flooded in the last 10 years? 0 = No 1 = Yes (If 0, skip to I16)	
I12	If yes (ever flooded), how often? 1 = Every year 2 = Between 2 – 5 years 3 = More than 5 years	
I13	What kind of flood often encountered? 1 = Flush food (a sudden local flood, typically due to heavy rain in a short period of time, generally less than 6 hours) 2 = River flood – when the water level in a river, lake or stream rises and overflows onto the surrounding land	
I14	For how long generally did the flood last? 1 = <1 day 2 = >1 day to <1 week 3 = <1 week to 1 month 4 = > 1 month	
I15	How strong was the biggest flood in the past 10 years? 1 = <0.5 meter 2 = Between 0.5 – 1 meter 3 = Between 1 – 1.5 meters 4 = Between 1.5 – 2 meters 5 = >2 meters	
I16	GPS coordinates of the HCF: I10a: Latitude: _____ I10b: Longitude: _____	
I17	Name of data collector: _____ (select one from the list)	
I18	Date of the assessment/visit	: [___ ___ /___ ___ /___ ___ ___ ___] (dd/mm/yyyy)
I19	Time of the assessment/visit	I19a: Start time (hh/mm): ____ ____ /____ ____ I19b: End time (hh/mm): ____ ____ /____ ____

SECTION 1: STAFFING AND SERVICES		
101.	Could you please tell me about the personnel currently assigned to, employed by or seconded to this HCF by category of their highest qualification as follows:	
	Qualification	Number (If no, record 0)
	a. Medical specialists	:_____
	b. Medical doctors/Medical assistants	:_____
	c. Pharmacists/Pharmacist assistants	: _____
	d. Dentists/Dentists assistants	: _____
	e. Secondary/bachelor midwives	: _____
	f. Primary midwives	: _____
	g. Secondary/bachelor nurses	: _____
	h. Primary nurses	: _____
	i. Lab technicians	: _____
	j. Others	: _____
102.	How many cleaners in total does your HCF have?	: _____
103.	Total number of general consultations (excluding specialised consultations for hospital) in the HCF in the year preceding the assessment (2022)	: _____ *(Extracted from HCF report)*
104.	Total number of deliveries (all kinds of deliveries excluding C-sections) in the HCF in the year preceding the assessment (2022)	: _____ *(Extracted from HCF report)*
105.	Total number of C-sections in the HCF in the year preceding the assessment (2022)	: _____ *(Extracted from HCF report)*
106.	Total number of inpatient beds (excluding TB beds) available in the HCF	: _____ *(Extracted from HCF report)*
107.	Total number of inpatients (discharges) in the HCF in the year preceding the assessment (2022)	: _____ *(Extracted from HCF report)*
108.	How many clients (for all services) does the HCF serve on average per day?	: _____

		(Perceived average in the last 5 working days by the respondent)	
109.	Has this HCF received any support from partners (e.g. WaterAid, UNICEF…) to improve WASH in the HCF?	0 = No 1 = Yes	
110.	If 1, specify about the support and supporting partner(s) by selecting the following answers: • Support on WASH related infrastructure, e.g. construction of water supply system, latrines • Supply of WASH materials and equipment e.g. materials for leaning, waste management, handwashing… • Support on training and TA • Others, specify:_____		
SECTION 2: ELECTRICITY SUPPLY			
201.	Does the HCF have electricity from any source?	0 = No 1 = Yes	If 0, skip to SECTION 3
202.	If yes, what is the HCF's main source of electricity?	1 = National/community grid 2 = Generator 3 = Solar panel 4 = Battery 88 = Other, specify: _____	
203.	Is this main source of electricity functioning at the time of assessment?	0 = No 1 = Yes *(Confirm by e.g. turning on the generator/connected light during the walkthrough)*	
204.	Other than the main source, does the HCF have a secondary or backup source of electricity?	0 = No secondary source 1 = National/community grid 2 = Generator 3 = Solar panel 4 = Battery 88 = Other, specify: _____	
205.	During the past 7 days, was electricity available at all times (from the main and backup sources) when the HCF was open for services?	1 = Always available, no interruption 2 = Often available, interruptions<2h/day	

		3 = Sometimes available, prolonged interruptions>2h/day 97 = Don't know	
206.	Is the electricity supply (from any source) generally enough to meet the basic electrical need of the HCF?	0 = No, not enough 1 = Yes, generally enough 97 = Don't know	
SECTION 3: WATER SUPPLY			
301.	What is the most commonly used (main) water supply (source) for the HCF (to be used for general purposes including washing, cleaning and drinking)? *(If there are many sources, choose the one that s closest to OPD department)*	0 = No water source *1 = Piped water* *2 = Tube well or borehole* *3 = Protected dug well* 4 = Unprotected dug well *5 = Protected rainwater collection* 6 = Unprotected rainwater collection *7 = Professional (protected) tanker truck* 8 = Unprofessional (unprotected) cart with small tank or drum/tanker truck 9 = Surface water 88 = Other source, specify: _____	If 0, skip to SECTION 4
302.	Where is the main water supply for the HCF located? *(In case of water being available at multiple points, report the response closest to the outpatient area)*	1 = On premises* 2 = < 500 m 3 = ≥ 500 m **On premises: within the building or facility grounds.* *Location is where water is accessed for use rather than the source where it originates!*	
303.	Is water available from the main water supply? *(Water available from this source at the time of assessment)*	0 = No 1 = Yes (*Confirm by e.g. checking that taps or pumps deliver water)*	
304.	Does the main source of water provide enough water for all the HCF's needs when it is fully functional?	0 = No, never enough water 1 = Yes, sometimes, only seasonally 2 = Yes, enough water all year 97 = Don't know	

305.	Does this HCF have a secondary source of water supply (besides the main one)?	0 = No 1 = Yes	If 0, skip to 307
306.	If 1, what is the secondary source of water supply for this HCF? *(Choose one answer besides the main source above)*	*1 = Piped water* *2 = Tube well or borehole* *3 = Protected dug well* 4 = Unprotected dug well *5 = Protected rainwater collection* 6 = Unprotected rainwater collection *7 = Professional (protected) tanker truck* 8 = Unprofessional (unprotected) cart with small tank or drum/tanker truck 9 = Surface water 88 = Other source, specify: _____	
307.	Are these water sources (main and secondary sources) used for drinking water at all?	0 = No 1 = Yes	If 0, skip to 311 If 1, continue to 308 & 309 but skip 310
308.	Does the HCF treat the water for drinking purpose?	0 = No 1 = Yes	If 0, skip to 310
309.	If 1, what treatment methods are used? ***(Multiple answers possible)***	• Filtration • Disinfection by boiling • Disinfection by using chlorine • Other, specify: _____	
310.	If 0, why? ***(Multiple answers possible)***	• The HCF uses only bottled drinking water • The source is considered safe • The HCF does not have treatment facilities/materials • None knows how to treat the water • No time to treat the water • Other, specify: _____	
311.	Is there any drinking water provided for clients at the HCF?	0 = No 1 = Yes	If 0, skip to 313

		(Confirm by observing if the drinking water for clients is available at the patient waiting areas, e.g. reception/triage)	
312.	If 1, what is the (usual/common) source of drinking water provided for clients?	1 = Available water supply of the HCF 2 = Bottled water bought by the HCF 88 = Other, specify: _____	
313.	What is the source of drinking water for staff?	1 = Available water supply of the HCF 2 = Bottled water bought by the HCF 3 = Staff bring their own bottled water 88 = Other, specify: _____	
314.	In total, do all above-mentioned water sources provide enough water for all the needs (drinking, food preparation, personal hygiene, medical activities, cleaning and laundry) of the HCF throughout the year?	0 = No, never enough water 1 = Yes, sometimes, only seasonally, even only used for general purposes other than drinking 2 = Yes, enough water all year only for general purposes other than drinking 3 = Yes, enough water all year for all purposes, including drinking 97 = Don't know	
SECTION 4: SANITATION FACILITIES			
401.	How many toilets/latrines are there on the HCF premises (in the block of outpatient department/emergency ward for hospital) at the time of assessment?	_____ (Record 0, if there is none) *(Verify with checklist 6.f.)*	If 0, skip to SECTION 5
402.	How many of them are IMPROVED toilets/latrines?	_____ (Record 0, if there is none) *(Verify with checklist 6.e. OR 7.a for all visited toilets)*	
403.	How many of them are USABLE toilets/latrines at this time?	_____(Record 0, if there is none) *(Verify with checklist 7.b for all visited toilets)*	
404.	Is there at least a toilet/latrine separated for use by staff only?	0 = No 1 = Yes	
405.	Is there a toilet/latrine separated for use by women/girls only?	0 = No 1 = Yes	If 0, skip to 407

406.	Does the women toilet have a bin with a lid on it and/or water and soap available in a private space for washing?	0 = No 1 = Yes *(Verify with checklist 7.f for all visited toilets)*	
407.	Is there a toilet/latrine meeting the needs of (designated for) people with reduced mobility?	0 = No 1 = Yes *(Verify with checklist 7.g for all visited toilets)*	
408.	How are faecal wastes from the toilets/latrines managed?	1 = Flush to piped sewer system 2 = Onsite storage in septic tank 3 = Onsite storage in pit latrine 97 = Don't know	If 1 OR 97, skip to 412
409.	If onside storage in septic tank or pit latrine, does it have an outlet pipe for liquid waste? *If there is only infiltration underground from the base/sides of the tank or pit, select "No". If the tank/pit has a pipe discharging liquid wastes, select "Yes"*	0 = No 1 = Yes 97 = Don't know	If 0 OR 97, skip to 411
410.	Where does this pipe go?	1 = To a leach field or soak pit 2 = To a sewer or closed drain 3 = To open drain 4 = To a waterbody or surface 88 = Other, specify:_____ 97 = Don't know	
411.	Over the last year, has wastewater in the tank/pit ever spilled out to the surface or surroundings due to the following event?	1 = Overflow 2 = Flooding 3 = Broken 4 = Other event, specify: _____	
412.	Is there a FUNCTIONING system in place to adequately drain rainwater away from the HCF and facility grounds? *(FUNCTIONING: no visible flooding of the HCF grounds and drainage canals free of debris and lead away from the facility)*	0 = No 1 = Yes 97 = Don't know	

SECTION 5: HAND HYGIENE FACILITIES			
501.	Is there a handwashing station available at a **consultation** room (in the outpatient department of hospital) on the day of the assessment?	0 = No 1 = Yes *(Verify with checklist 1.c)*	If 0, skip to 504
502.	Is the handwashing station available at a **consultation** room (in the outpatient department of hospital) FUNCTIONAL (with water and soap available for handwashing) on the day of the assessment?	0 = No 1 = Yes *(Verify with checklist 1.d)*	
503.	Is there clean material for hand drying (single-use tissue/clean tower, hand drying machine) near the functional handwashing station at a **consultation** room (in the outpatient department of hospital) on the day of the assessment?	0 = No 1 = Yes *(Verify with checklist 1.e)*	
504.	Is there an ABHR station available at a **consultation** room (in the outpatient department of hospital) on the day of the assessment?	0 = No 1 = Yes *(Verify with checklist 1.f)*	If 0, skip to 506
505.	Is the ABHR station available at a **consultation** room (in the outpatient department of hospital) FUNCTIONAL (with alcohol or gel for hand rub) on the day of the assessment?	0 = No 1 = Yes *(Verify with checklist 1.g)*	
506.	Is there a handwashing station available at a **delivery** room (in the maternity department of hospital) on the day of the assessment?	0 = No 1 = Yes *(Verify with checklist 5.c)*	If 0, skip to 509
507.	Is the handwashing station available at a **delivery** room (in the maternity department of hospital) FUNCTIONAL (with water and soap available for handwashing) on the day of the assessment?	0 = No 1 = Yes *(Verify with checklist 5.d)*	
508.	Is there clean material for hand drying (single-use tissue/clean tower, hand	0 = No	

	drying machine) near the functional handwashing station at a **delivery** room (in the maternity department of hospital) on the day of the assessment?	1 = Yes *(Verify with checklist 5.e)*	
509.	Is there an ABHR station available at a **delivery** room (in the maternity department of hospital) on the day of the assessment?	0 = No 1 = Yes *(Verify with checklist 5.f)*	If 0, skip to 511
510.	Is the ABHR station available at a **delivery** room (in the maternity department of hospital) FUNCTIONAL (with alcohol or gel for hand rub) on the day of the assessment?	0 = No 1 = Yes *(Verify with checklist 5.g)*	
511.	Are functional hand hygiene facilities (handwashing station with water and soap or ABHR with alcohol/gel) available at all points/units of care on the day of the assessment?	• 511a: Number of observed points/units of care (not more than 5): _____ *(Verify with checklist 1, 2, 3, 4, 5)* • 511b: Number of observed points/units of care with hand hygiene facilities: _____ *(Verify with checklist 1.c.f., 2.c.f., 3.c.f., 4.c.f., 5.c.f.)* • 511c: Number of observed points/units of care with FUNCTIONAL hand hygiene facilities with soap and water or ABHR: _____ *(Verify with checklist 1.c.d.f.g., 2.c.d.f.g., 3.c.d.f.g., 4.c.d.f.g., 5.c.d.f.g.)*	
512.	Is there a hand washing station at or near (within 5 meters) one or more **toilets/latrines** (in the block of outpatient department/emergency ward for hospital) on the day of the assessment?	0 = No 1 = Yes *(Verify with checklist 7.d. for all visited toilets)*	If 0, skip to 514
513.	Is the hand washing station at or near (within 5 meters) one or more **toilets/latrines** (in the block of outpatient	0 = No 1 = Yes	

	department/emergency ward for hospital) FUNCTIONAL on the day of the assessment?	*(Verify with checklist 7.e. for all visited toilets)*	
514.	Are hand hygiene promotional posters displayed (visible) at key places (near hand hygiene stations, patient waiting areas, points/units of care)?	0 = No posters anywhere 1 = Yes, but only at some key places 2 = Yes, visible at most key places 3 = Yes, visible at all key places *(Verify with what was observed during the walkthrough)*	
515.	Have all clinical staff of the HCF been trained (at least once) on the 5 key moments and appropriate hand hygiene? *(Show the pictures of the 5 key moments and appropriate hand hygiene process)*	0 = No, none 1 = Yes, but only some of them 2 = Yes, most of them 3 = Yes, all of them	
SECTION 6: HEALTH CARE WASTE MANAGEMENT			
601.	Is there a functional (not broken or full) and protected (lined and sealed with slap) needles pit on the HCF premises?	0 = No 1 = Yes *(Verify with checklist 8.b.)*	
602.	Is there a functional (not broken or full) and protected (lined and sealed with slap) placenta pit on the HCF premises?	0 = No 1 = Yes *(Verify with checklist 8.c.)*	
603.	Is there any incinerator on the HCF premises? ***(Multiple answers possible)***	• No • Yes, a low capacity one (burner-type usually made of bricks) • Yes, a high capacity one (+800°C) • Yes, an autoclave • Yes, a sterilwave • Yes, other, specify:_____ *(Verify with what was observed during the walkthrough)*	
604.	Is there one set of waste bins at a **consultation** room (in the outpatient department of	0 = No, bins are not present	If 0 or 1, skip to 606

	hospital) on the day of the assessment? *(Generally, there are 1 bin for infectious waste, 1 bin for general waste and 1 safe box for sharp waste in the consultation room, but usually at health centres, there is no safe box)*	1 = Bins are present but not properly labelled/colour coded 2 = Bins are present for infectious waste and general waste and properly labelled/colour coded, but safe box is missing 3 = Bins for infectious waste and general waste and safe box are present and properly labelled/colour coded 4 = Other, specify: _____ *(Verify with checklist 1.h.i.j.k.)*	
605.	If there is one set of properly labelled waste bins at a **consultation** room (in the outpatient department of hospital), were wastes correctly segregated into the relevant bins?	0 = No 1 = Yes *(Verify with checklist 1.l.)*	
606.	Is there one set of waste bins at a **delivery** room (in the maternity department of hospital) on the day of the assessment? *(Generally, there are 1 bin for infectious waste, 1 bin for general waste, 1 bin for placenta, 1 safe box for sharp waste in the delivery room)*	0 = No, bins are not present 1 = Bins are present but not properly labelled/colour coded 2 = Bins are present for infectious, general wastes and safe box for sharp waste and properly labelled/colour coded, but bin for placenta is missing 3 = Bins are present for infectious waste, general waste, placenta and safe box for sharp waste and properly labelled/colour coded 4 = Other, specify: _____ *(Verify with checklist 5.h.i.j.k.l.)*	If 0 or 1 or 2, skip to 608
607.	If there is one set of properly labelled waste bins at a **delivery** room (in the maternity department of hospital), were wastes correctly segregated into the relevant bins?	0 = No 1 = Yes *(Verify with checklist 5.m.)*	
608.	Are wastes correctly segregated at all points/units of care on the day of the assessment?	• 608a: Number of observed points/units of care (not more than 5): _____ *(Verify with checklist 1, 2, 3, 4, 5)*	

		• 608b: Number of observed points/units of care with one set of bins properly labelled: _____ *(Verify with checklist 1.h.i.j.k., 2. h.i.j.k., 3. h.i.j.k., 4. h.i.j.k., 5. h.i.j.k.l.)* • 608c: Number of observed points/units of care with one set of properly labelled and wastes are correctly segregated: _____ *(Verify with checklist 1.h.i.j.k.l., 2. h.i.j.k.l., 3. h.i.j.k.l., 4. h.i.j.k.l., 5. h.i.j.k.l.m.)*	
609.	How does the HCF usually treat/dispose of sharps waste (e.g. used syringes and needles)? *(If more than one applies, select the method used most often)*	1 = Autoclaved 2 = Treated with Sterilwave 3 = Incinerated with HIGH capacity incinerator +800°C onsite 4 = Removed off site to be incinerated with HIGH capacity incinerator +800°C with appropriate storage & transportation 5 = Removed off site with unprotected storage and inappropriate disposal (e.g. through a general waste collection agency) 6 = Incinerated with LOW capacity incinerator/burner onsite 7 = Dumped/buried in onsite designated & protected pits (lined and sealed) 8 = Burned on the facility ground (+/- protection) 9 = Dumped on flat ground or unprotected pits 10 = Buried inside the facility grounds (with/without treatment) 88 = Other, specify: _____	
610.	How does this HCF usually treat/dispose of infected medical (infectious) waste (e.g. bloody bandages)? *(If more than one applies, select the method used most often)*	1 = Autoclaved 2 = Treated with Sterilwave 3 = Incinerated with HIGH capacity incinerator +800°C onsite 4 = Removed off site to be incinerated with HIGH capacity incinerator +800°C with appropriate storage & transportation 5 = Removed off site with unprotected storage and inappropriate disposal (e.g. through a general waste collection agency) 6 = Incinerated with LOW capacity incinerator/burner onsite	

		7 = Dumped/buried in onsite designated & protected pits (lined and sealed) 8 = Burned on the facility ground (+/- protection) 9 = Dumped on flat ground or unprotected pits 10 = Buried inside the facility grounds (with/without treatment) 88 = Other, specify: _____
611.	How does this HCF usually treat/dispose of placenta? *(If more than one applies, select the method used most often)*	1 = Autoclaved 2 = Treated with Sterilwave 3 = Incinerated with HIGH capacity incinerator +800^{o}C onsite 4 = Removed off site to be incinerated with HIGH capacity incinerator +800^{o}C with appropriate storage & transportation 5 = Removed off site with unprotected storage and inappropriate disposal (e.g. through a general waste collection agency) 6 = Incinerated with LOW capacity incinerator/burner onsite 7 = Dumped/buried in onsite designated & protected pits (lined and sealed) 8 = Burned on the facility ground (+/- protection) 9 = Dumped on flat ground or unprotected pits 10 = Buried inside the facility grounds (with/without treatment) 11 = Taken home by mothers 88 = Other, specify: _____
612.	How is general (non-infectious) waste disposed of?	1 = Regular collection by a designated authority/the HCF to a public disposal site 2 = Irregular collection by a designated authority/the HCF to a public disposal site 3 = Burned in a low capacity incinerator/burner on site 4 = Piled but not buried at the HCF 5 = Buried and regularly covered with soil at the HCF 6 = Openly burned at the HCF 88 = Other, specify: _____
613.	How often is (non-sharp) infectious waste collected in this HCF?	1 = More often than once a day 2 = Once a day

		3 = Less than once a day	
614.	Are dedicated trolleys for safe collection and transportation of infectious and sharps waste available onsite?	0 = No, there is none 1 = Yes, there is at least one	
615.	Is there an appropriately fenced and protected waste storage (designated area where infectious waste is stored temporarily while awaiting for treatment/disposal) in the HCF?	0 = No, there is none 1 = No, there is but not appropriately fenced/protected 2 = Yes, there is an appropriately fenced and protected waste storage *(Verify with checklist 8.a.)*	
616.	How long is the infectious waste (especially non-sharp one) usually stored at the HCF (the waste storage if any) before treatment/disposal?	1 = Less than 1 day 2 = 1-3 days 3 = 4-7 days 4 = More than 7 days	
SECTION 7: ENVIRONMENTAL CLEANING AND OTHER WASH RELATED ISSUES			
701.	• Does the HCF have any Water, Sanitation and Hygiene (WASH) Guidelines? *(Show the cover page of the book)*	0 = No 1 = Yes, in electronic copy (pdf file) 2 = Yes, in hard copy but not seen 3 = Yes, in hard copy and seen	If Yes, ask to see it
702.	• Does the HCF have any Infection Prevention and Control (IPC) Guidelines? *(Show the cover page of the book)*	0 = No 1 = Yes, in electronic copy (pdf file) 2 = Yes, in hard copy but not seen 3 = Yes, in hard copy and seen	If Yes, ask to see it
703.	A part from IPC guidelines, are cleaning protocols/SOPs available? *(Protocols/SOPs should include:* • *step-by-step techniques for specific tasks, such as cleaning a floor, sink, spillage of blood, or body fluids, and* • *a cleaning roster or schedule specifying responsibility for cleaning tasks and frequency at which they should be performed)*	0 = No 1 = Yes, only a cleaning roster or schedule but no step-by-step technical guidance 2 = Yes, there are (both documents) reported but not seen 3 = Yes, there are (both documents) and seen	If Yes, ask to see it

704.	Have all staff responsible for cleaning received training on **environmental cleaning**? *(Staff responsible for cleaning includes cleaners and health care providers who have additional cleaning tasks.* *Training refers to structured training on **environmental cleaning** provided by MOH recognised/qualified trainers)*	0 = No, none 1 = Yes, but only some of them 2 = Yes, most of them 3 = Yes, all of them	
705.	Is the **consultation** room of the HCF (of hospital **OPD** department) visibly clean?	0 = No 1 = Yes *(Verify with checklist 1.a.b)*	
706.	Is the **delivery** room of the HCF (of hospital **maternity** department) visibly clean?	0 = No 1 = Yes *(Verify with checklist 5.a.b)*	
707.	Are **all points of care** of the HCF visibly clean?	0 = No 1 = Yes, but some are not visibly clean 2 = Yes, all are visibly clean *(Verify with checklist 1.a.b.; 2.a.b.; 3.a.b.; 4.a.b.; 5.a.b.)*	
708.	Are **toilets/latrines of the HCF** (in OPD department of hospital) visibly clean?	0 = No 1 = Yes, but some are not visibly clean 2 = Yes, all are visibly clean *(Verify with checklist 7.c. for all visited toilets)*	
709.	How often are floors of the HCF (in OPD department of hospital) cleaned?	1 = Irregular and less than once a day 2 = Once a day regularly 3 = Once a day and when dirt 4 = Twice a day regularly 5 = Twice a day and when dirt	
710.	How often are toilets/latrines of the HCF (in OPD department of hospital) cleaned?	1 = Irregular and less than once a day 2 = Once a day regularly 3 = Once a day and when dirt 4 = Twice a day regularly 5 = Twice a day and when dirt	

711.	Are facility floors, surfaces and toilets/latrines cleaned with detergent/disinfectant (Chlorine 0.05%)?	0 = No 1 = Yes *(Check at the store of cleaning materials if there is detergent/disinfectant available during the walkthrough)*	
712.	Is the cleaning equipment generally appropriate and sufficient? *(Cleaning equipment includes PPE (gloves), detergent/disinfectant solution, cloths & towels, buckets & mops, non-infectious bags)*	0 = No appropriate materials 1 = No, it is appropriate but not sufficient 2 = Yes, it is generally appropriate and sufficient	
713.	Does the HCF have budget for any of the following WASH related activities? ***(Multiple answers possible)***	• There is no budget for WASH related activities at all • There is budget for paying salary for cleaners • There is budget for cleaning/environmental hygiene/IPC training • There is budget for cleaning equipment/materials • Other, specify: _____	If no budget at all, skip to 715
714.	From which sources?	• 39% of user fee revenues • Government budget line 62028 (Fixed lumpsum grant) • Government budget for general operating cost • Budget from partner	
715.	Could you please tell me 3 major constraints/challenges in terms of water, sanitation, and hygiene that your facility has been facing?	715a: _____ (If no, put NA) 715b: _____ (If no, put NA) 715c: _____ (If no, put NA)	
716.	What are your suggested solutions to address/meet the above major constraints/challenges?	716a: _____ (If no, put NA) 716b: _____ (If no, put NA) 716c: _____ (If no, put NA)	

Annex 2: Checklists for Health Care Facility Walkthrough

A walkthrough the HCF is to be done prior to the completion of the questionnaire. There are two checklists, one for health centres and one for referral hospitals. This checklist includes inside the building and compounds outside the building. The former should focus on key points/units of care delivery (rooms/wards/departments), whereas the latter should concentrate on the main source of electricity, water, toilets/latrines, and waste storage or final waste disposal areas.

CHECKLIST FOR HEALTH CENTRES

I-KEY POINTS/UNITS OF CARE DELIVERY		
1.	**CONSULTATION ROOM IS OBSERVED**	**0 = No; 1 = Yes; 98 = NA**
	a. The floor and room space and surroundings (including waiting area, if any) are visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No; 1 = Yes; 98 = NA
	b. The consultation bed is visibly clean (covered by a clean, water proof mattress)	0 = No; 1 = Yes; 98 = NA
	c. There is a sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	d. The sink/handwashing station is functional with water and soap available for handwashing	0 = No; 1 = Yes; 98 = NA
	e. There is clean material for hand drying (single-use tissue/clean tower, hand drying machine) near the sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	f. There is an alcohol-based hand rub (ABHR) station available	0 = No; 1 = Yes; 98 = NA
	g. The ABHR station is functional with alcohol/gel available for hand hygiene	0 = No; 1 = Yes; 98 = NA
	h. There is a bin for sharps waste (safe box)	0 = No; 1 = Yes; 98 = NA
	i. There is a bin for infectious (non-sharps) waste	0 = No; 1 = Yes; 98 = NA
	j. There is a bin for general waste	0 = No; 1 = Yes; 98 = NA
	k. The bins are clearly labelled (yellow colour with danger sign for infectious waste and green colour for general waste	0 = No; 1 = Yes; 98 = NA
	l. Wastes are segregated into different bins according to their category (the bins are not more than 75% full and each bin should not contain waste other than that corresponding to their label)	0 = No; 1 = Yes; 98 = NA
2.	**DRESSING ROOM IS OBSERVED**	**0 = No; 1 = Yes; 98 = NA**
	a. The floor and room space and surroundings (including waiting area, if any) are visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No; 1 = Yes; 98 = NA
	b. The consultation bed is visibly clean (covered by a clean, water proof mattress)	0 = No; 1 = Yes; 98 = NA
	c. There is a sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	d. The sink/handwashing station is functional with water and soap available for handwashing	0 = No; 1 = Yes; 98 = NA
	e. There is clean material for hand drying (single-use tissue/clean tower, hand drying machine) near the sink/handwashing station	0 = No; 1 = Yes; 98 = NA

	f. There is an alcohol-based hand rub (ABHR) station available	0 = No; 1 = Yes; 98 = NA
	g. The ABHR station is functional with alcohol/gel available for hand hygiene	0 = No; 1 = Yes; 98 = NA
	h. There is a bin for sharps waste (safe box)	0 = No; 1 = Yes; 98 = NA
	i. There is a bin for infectious (non-sharps) waste	0 = No; 1 = Yes; 98 = NA
	j. There is a bin for general waste	0 = No; 1 = Yes; 98 = NA
	k. The bins are clearly labelled (yellow colour with danger sign for infectious waste and green colour for general waste	0 = No; 1 = Yes; 98 = NA
	l. Wastes are segregated into different bins according to their category (the bins are not more than 75% full and each bin should not contain waste other than that corresponding to their label)	0 = No; 1 = Yes; 98 = NA
3.	**VACCINATION/EPI ROOM IS OBSERVED**	**0 = No; 1 = Yes; 98 = NA**
	a. The floor and room space and surroundings (including waiting area, if any) are visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No; 1 = Yes; 98 = NA
	b. The consultation bed is visibly clean (covered by a clean, water proof mattress)	0 = No; 1 = Yes; 98 = NA
	c. There is a sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	d. The sink/handwashing station is functional with water and soap available for handwashing	0 = No; 1 = Yes; 98 = NA
	e. There is clean material for hand drying (single-use tissue/clean tower, hand drying machine) near the sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	f. There is an alcohol-based hand rub (ABHR) station available	0 = No; 1 = Yes; 98 = NA
	g. The ABHR station is functional with alcohol/gel available for hand hygiene	0 = No; 1 = Yes; 98 = NA
	h. There is a bin for sharps waste (safe box)	0 = No; 1 = Yes; 98 = NA
	i. There is a bin for infectious (non-sharps) waste	0 = No; 1 = Yes; 98 = NA
	j. There is a bin for general waste	0 = No; 1 = Yes; 98 = NA
	k. The bins are clearly labelled (yellow colour with danger sign for infectious waste and green colour for general waste	0 = No; 1 = Yes; 98 = NA
	l. Wastes are segregated into different bins according to their category (the bins are not more than 75% full and each bin should not contain waste other than that corresponding to their label)	0 = No; 1 = Yes; 98 = NA
4.	**ANTENATAL CARE/FAMILY PLANNING ROOM IS OBSERVED**	**0 = No; 1 = Yes; 98 = NA**
	a. The floor and room space and surroundings (including waiting area, if any) are visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No; 1 = Yes; 98 = NA
	b. The consultation bed is visibly clean (covered by a clean, water proof mattress)	0 = No; 1 = Yes; 98 = NA
	c. There is a sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	d. The sink/handwashing station is functional with water and soap available for handwashing	0 = No; 1 = Yes; 98 = NA

	e. There is clean material for hand drying (single-use tissue/clean tower, hand drying machine) near the sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	f. There is an alcohol-based hand rub (ABHR) station available	0 = No; 1 = Yes; 98 = NA
	g. The ABHR station is functional with alcohol/gel available for hand hygiene	0 = No; 1 = Yes; 98 = NA
	h. There is a bin for sharps waste (safe box)	0 = No; 1 = Yes; 98 = NA
	i. There is a bin for infectious (non-sharps) waste	0 = No; 1 = Yes; 98 = NA
	j. There is a bin for general waste	0 = No; 1 = Yes; 98 = NA
	k. The bins are clearly labelled (yellow colour with danger sign for infectious waste and green colour for general waste	0 = No; 1 = Yes; 98 = NA
	l. Wastes are segregated into different bins according to their category (the bins are not more than 75% full and each bin should not contain waste other than that corresponding to their label)	0 = No; 1 = Yes; 98 = NA
5.	**DELIVERY ROOM IS OBSERVED**	**0 = No; 1 = Yes; 98 = NA**
	a. The floor and room space and surroundings (including waiting area, if any) are visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No; 1 = Yes; 98 = NA
	b. The consultation bed is visibly clean (covered by a clean, water proof mattress)	0 = No; 1 = Yes; 98 = NA
	c. There is a sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	d. The sink/handwashing station is functional with water and soap available for handwashing	0 = No; 1 = Yes; 98 = NA
	e. There is clean material for hand drying (single-use tissue/clean tower, hand drying machine) near the sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	f. There is an alcohol-based hand rub (ABHR) station available	0 = No; 1 = Yes; 98 = NA
	g. The ABHR station is functional with alcohol/gel available for hand hygiene	0 = No; 1 = Yes; 98 = NA
	h. There is a bin for sharps waste (safe box)	0 = No; 1 = Yes; 98 = NA
	i. There is a bin for infectious (non-sharps) waste	0 = No; 1 = Yes; 98 = NA
	j. There is a bin for general waste	0 = No; 1 = Yes; 98 = NA
	k. There is a bin for placenta	0 = No; 1 = Yes; 98 = NA
	l. The bins are clearly labelled (yellow colour with danger sign for infectious waste and green colour for general waste	0 = No; 1 = Yes; 98 = NA
	m. Wastes are segregated into different bins according to their category (the bins are not more than 75% full and each bin should not contain waste other than that corresponding to their label)	0 = No; 1 = Yes; 98 = NA

II-TOILETS/LATRINES

6.	During the walkthrough, the assessor must count the **number** of toilets/latrines located inside the health centre premises and record the number by their type as follows:	
	Type of toilets/latrines	Number (If no, record 0)
	a. *Flush/pour flush toilets connected to public sewage or basin*	
	b. Pit latrines with slab	

	c. Pit latrines without slab/open pit	
	d. Others, specify: _____	
	e. IMPROVED toilets/latrines (a-b)	
	f. ALL TYPES of toilets/latrines (a-d)	
7.	Check all the toilets/latrines one-by-one (with a maximum 5), starting with the improved one (6a-b) as follows:	
	TOILET/LATRINE 1 IS OBSERVED	**0 = No; 1 = Yes; 98 = NA**
	a. is an improved toilet/latrine (6a-b)	0 = No; 1 = Yes; 98 = NA
	b. is usable (*has a door which is unlocked or for which a key is available at any time and can be closed from the inside, is not blocked, and has no major holes in the structure)*	0 = No; 1 = Yes; 98 = NA
	c. is visibly clean (no blood or body substances, scum, dust, lime scale, stains, deposit or smears) and free of unpleasant smell and flies or mosquitoes	0 = No; 1 = Yes; 98 = NA
	d. has a handwashing station available near the toilet/latrine (within 5m)	0 = No; 1 = Yes; 98 = NA
	e. the handwashing station has water and soap for handwashing	0 = No; 1 = Yes; 98 = NA
	f. is designated for women/girls with menstrual hygiene facilities (having a bin with a lid on it within the cubicle or water available in a private space for washing)	0 = No; 1 = Yes; 98 = NA
	g. is accessible by people with limited mobility: • accessible without stairs or steps, • having handrails for support attached to the floor or side walls, • the door with at least 80cm wide, • the door handle and seat within reach of people using wheelchairs or crutches/sticks)	0 = No; 1 = Yes; 98 = NA
	TOILET/LATRINE 2 IS OBSERVED	**0 = No; 1 = Yes; 98 = NA**
	a. is an improved toilet/latrine (6a-b)	0 = No; 1 = Yes; 98 = NA
	b. is usable (*has a door which is unlocked or for which a key is available at any time and can be closed from the inside, is not blocked, and has no major holes in the structure)*	0 = No; 1 = Yes; 98 = NA
	c. is visibly clean (no blood or body substances, scum, dust, lime scale, stains, deposit or smears) and free of unpleasant smell and flies or mosquitoes	0 = No; 1 = Yes; 98 = NA
	d. has a handwashing station available near the toilet (within 5m)	0 = No; 1 = Yes; 98 = NA
	e. the handwashing station has water and soap for handwashing	0 = No; 1 = Yes; 98 = NA
	f. is designated for women/girls with menstrual hygiene facilities (having a bin with a lid on it within the cubicle or water available in a private space for washing)	0 = No; 1 = Yes; 98 = NA
	g. is accessible by people with limited mobility: • accessible without stairs or steps,	0 = No; 1 = Yes; 98 = NA

	• having handrails for support attached to the floor or side walls, • the door with at least 80cm wide, • the door handle and seat within reach of people using wheelchairs or crutches/sticks)	
	TOILET/LATRINE 3 IS OBSERVED	**0 = No; 1 = Yes; 98 = NA**
	a. is an improved toilet/latrine (6a-b)	0 = No; 1 = Yes; 98 = NA
	b. is usable (*has a door which is unlocked or for which a key is available at any time and can be closed from the inside, is not blocked, and has no major holes in the structure)*	0 = No; 1 = Yes; 98 = NA
	c. is visibly clean (no blood or body substances, scum, dust, lime scale, stains, deposit or smears) and free of unpleasant smell and flies or mosquitoes	0 = No; 1 = Yes; 98 = NA
	d. has a handwashing station available near the toilet/latrine (within 5m)	0 = No; 1 = Yes; 98 = NA
	e. the handwashing station has water and soap for handwashing	0 = No; 1 = Yes; 98 = NA
	f. is designated for women/girls with menstrual hygiene facilities (having a bin with a lid on it within the cubicle or water available in a private space for washing)	0 = No; 1 = Yes; 98 = NA
	g. is accessible by people with limited mobility: • accessible without stairs or steps, • having handrails for support attached to the floor or side walls, • the door with at least 80cm wide, • the door handle and seat within reach of people using wheelchairs or crutches/sticks)	0 = No; 1 = Yes; 98 = NA
	TOILET/LATRINE 4 IS OBSERVED	**0 = No; 1 = Yes; 98 = NA**
	a. is an improved toilet/latrine (6a-b)	0 = No; 1 = Yes; 98 = NA
	b. is usable (*has a door which is unlocked or for which a key is available at any time and can be closed from the inside, is not blocked, and has no major holes in the structure)*	0 = No; 1 = Yes; 98 = NA
	c. is visibly clean (no blood or body substances, scum, dust, lime scale, stains, deposit or smears) and free of unpleasant smell and flies or mosquitoes	0 = No; 1 = Yes; 98 = NA
	d. has a handwashing station available near the toilet/latrine (within 5m)	0 = No; 1 = Yes; 98 = NA
	e. the handwashing station has water and soap for handwashing	0 = No; 1 = Yes; 98 = NA
	f. is designated for women/girls with menstrual hygiene facilities (having a bin with a lid on it within the cubicle or water available in a private space for washing)	0 = No; 1 = Yes; 98 = NA
	g. is accessible by people with limited mobility: • accessible without stairs or steps, • having handrails for support attached to the floor or side walls,	0 = No; 1 = Yes; 98 = NA

	• the door with at least 80cm wide, • the door handle and seat within reach of people using wheelchairs or crutches/sticks)	
	TOILET/LATRINE 5 IS OBSERVED	**0 = No; 1 = Yes; 98 = NA**
	a. is an improved toilet/latrine (6a-b)	0 = No; 1 = Yes; 98 = NA
	b. is usable (*has a door which is unlocked or for which a key is available at any time and can be closed from the inside, is not blocked, and has no major holes in the structure)*	0 = No; 1 = Yes; 98 = NA
	c. is visibly clean (no blood or body substances, scum, dust, lime scale, stains, deposit or smears) and free of unpleasant smell and flies or mosquitoes	0 = No; 1 = Yes; 98 = NA
	d. has a handwashing station available near the toilet/latrine (within 5m)	0 = No; 1 = Yes; 98 = NA
	e. the handwashing station has water and soap for handwashing	0 = No; 1 = Yes; 98 = NA
	f. is designated for women/girls with menstrual hygiene facilities (having a bin with a lid on it within the cubicle or water available in a private space for washing)	0 = No; 1 = Yes; 98 = NA
	g. is accessible by people with limited mobility (• accessible without stairs or steps, • having handrails for support attached to the floor or side walls, • the door with at least 80cm wide, • the door handle and seat within reach of people using wheelchairs or crutches/sticks)	0 = No; 1 = Yes; 98 = NA
III-WASTE STORAGE/FINAL WASTE DISPOSAL AREAS		
8.	a. Check if the waste storage awaiting for removal from the facility (or final disposal) is appropriately fenced and protected	0 = No; 1 = Yes; 98 = NA
	b. Check if the protected needles pit is functional (in use and not full)	0 = No; 1 = Yes; 98 = NA
	c. Check if the protected placenta pit is functional (in use and not full)	0 = No; 1 = Yes; 98 = NA
	d. Check if the incinerator is functional (in use)	0 = No; 1 = Yes; 98 = NA

CHECKLIST FOR REFERRAL HOSPITALS

I-KEY POINTS/UNITS OF CARE DELIVERY		
1.	**OUTPATIENT DEPARTMENT/WARD AND CONSULTATION ROOM IS OBSERVED (Randomly select one is there are many)**	**0 = No; 1 = Yes; 98 = NA**
	a. The floor and room space and surroundings in the department/ward (including waiting area, if any) are visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No; 1 = Yes; 98 = NA
	b. The consultation bed and patient beds are visibly clean (covered by a clean, water proof mattress)	0 = No; 1 = Yes; 98 = NA
	c. There is a sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	d. The sink/handwashing station is functional with water and soap available for handwashing	0 = No; 1 = Yes; 98 = NA
	e. There is clean material for hand drying (single-use tissue/clean tower, hand drying machine) near the sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	f. There is an alcohol-based hand rub (ABHR) station available	0 = No; 1 = Yes; 98 = NA
	g. The ABHR station is functional with alcohol/gel available for hand hygiene	0 = No; 1 = Yes; 98 = NA
	h. There is a bin for sharps waste (safe box)	0 = No; 1 = Yes; 98 = NA
	i. There is a bin for infectious (non-sharps) waste	0 = No; 1 = Yes; 98 = NA
	j. There is a bin for general waste	0 = No; 1 = Yes; 98 = NA
	k. The bins are clearly labelled (yellow colour with danger sign for infectious waste and green colour for general waste	0 = No; 1 = Yes; 98 = NA
	l. Wastes are segregated into different bins according to their category (the bins are not more than 75% full and each bin should not contain waste other than that corresponding to their label)	0 = No; 1 = Yes; 98 = NA
2.	**EMERGENCY DEPARTMENT/WARD AND INPATIENT ROOM IS OBSERVED (Randomly select one is there are many)**	**0 = No; 1 = Yes; 98 = NA**
	a. The floor and room space and surroundings in the department/ward (including waiting area, if any) are visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No; 1 = Yes; 98 = NA
	b. The consultation bed and patient beds are visibly clean (covered by a clean, water proof mattress)	0 = No; 1 = Yes; 98 = NA
	c. There is a sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	d. The sink/handwashing station is functional with water and soap available for handwashing	0 = No; 1 = Yes; 98 = NA
	e. There is clean material for hand drying (single-use tissue/clean tower, hand drying machine) near the sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	f. There is an alcohol-based hand rub (ABHR) station available	0 = No; 1 = Yes; 98 = NA
	g. The ABHR station is functional with alcohol/gel available for hand hygiene	0 = No; 1 = Yes; 98 = NA

	h. There is a bin for sharps waste (safe box)	0 = No; 1 = Yes; 98 = NA
	i. There is a bin for infectious (non-sharps) waste	0 = No; 1 = Yes; 98 = NA
	j. There is a bin for general waste	0 = No; 1 = Yes; 98 = NA
	k. The bins are clearly labelled (yellow colour with danger sign for infectious waste and green colour for general waste	0 = No; 1 = Yes; 98 = NA
	l. Wastes are segregated into different bins according to their category (the bins are not more than 75% full and each bin should not contain waste other than that corresponding to their label)	0 = No; 1 = Yes; 98 = NA
3.	**PEDIATRIC DEPARTMENT/WARD AND INPATIENT ROOM IS OBSERVED (Randomly select one is there are many)**	**0 = No; 1 = Yes; 98 = NA**
	a. The floor and room space and surroundings in the department/ward (including waiting area, if any) are visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No; 1 = Yes; 98 = NA
	b. The consultation bed and patient beds are visibly clean (covered by a clean, water proof mattress)	0 = No; 1 = Yes; 98 = NA
	c. There is a sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	d. The sink/handwashing station is functional with water and soap available for handwashing	0 = No; 1 = Yes; 98 = NA
	e. There is clean material for hand drying (single-use tissue/clean tower, hand drying machine) near the sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	f. There is an alcohol-based hand rub (ABHR) station available	0 = No; 1 = Yes; 98 = NA
	g. The ABHR station is functional with alcohol/gel available for hand hygiene	0 = No; 1 = Yes; 98 = NA
	h. There is a bin for sharps waste (safe box)	0 = No; 1 = Yes; 98 = NA
	i. There is a bin for infectious (non-sharps) waste	0 = No; 1 = Yes; 98 = NA
	j. There is a bin for general waste	0 = No; 1 = Yes; 98 = NA
	k. The bins are clearly labelled (yellow colour with danger sign for infectious waste and green colour for general waste	0 = No; 1 = Yes; 98 = NA
	l. Wastes are segregated into different bins according to their category (the bins are not more than 75% full and each bin should not contain waste other than that corresponding to their label)	0 = No; 1 = Yes; 98 = NA
4.	**MEDICINE DEPARTMENT/WARD AND INPATIENT ROOM IS OBSERVED (Randomly select one is there are many)**	**0 = No; 1 = Yes; 98 = NA**
	a. The floor and room space and surroundings in the department/ward (including waiting area, if any) are visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No; 1 = Yes; 98 = NA
	b. The consultation bed and patient beds are visibly clean (covered by a clean, water proof mattress)	0 = No; 1 = Yes; 98 = NA
	c. There is a sink/handwashing station	0 = No; 1 = Yes; 98 = NA

	d. The sink/handwashing station is functional with water and soap available for handwashing	0 = No; 1 = Yes; 98 = NA
	e. There is clean material for hand drying (single-use tissue/clean tower, hand drying machine) near the sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	f. There is an alcohol-based hand rub (ABHR) station available	0 = No; 1 = Yes; 98 = NA
	g. The ABHR station is functional with alcohol/gel available for hand hygiene	0 = No; 1 = Yes; 98 = NA
	h. There is a bin for sharps waste (safe box)	0 = No; 1 = Yes; 98 = NA
	i. There is a bin for infectious (non-sharps) waste	0 = No; 1 = Yes; 98 = NA
	j. There is a bin for general waste	0 = No; 1 = Yes; 98 = NA
	k. The bins are clearly labelled (yellow colour with danger sign for infectious waste and green colour for general waste	0 = No; 1 = Yes; 98 = NA
	l. Wastes are segregated into different bins according to their category (the bins are not more than 75% full and each bin should not contain waste other than that corresponding to their label)	0 = No; 1 = Yes; 98 = NA
5.	**MATERNITY DEPARTMENT/WARD AND DELIVERY ROOM IS OBSERVED (Randomly select one is there are many)**	**0 = No; 1 = Yes; 98 = NA**
	a. The floor and room space and surroundings in the department/ward (including waiting area, if any) are visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No; 1 = Yes; 98 = NA
	b. The consultation bed and patient beds are visibly clean (covered by a clean, water proof mattress)	0 = No; 1 = Yes; 98 = NA
	c. There is a sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	d. The sink/handwashing station is functional with water and soap available for handwashing	0 = No; 1 = Yes; 98 = NA
	e. There is clean material for hand drying (single-use tissue/clean tower, hand drying machine) near the sink/handwashing station	0 = No; 1 = Yes; 98 = NA
	f. There is an alcohol-based hand rub (ABHR) station available	0 = No; 1 = Yes; 98 = NA
	g. The ABHR station is functional with alcohol/gel available for hand hygiene	0 = No; 1 = Yes; 98 = NA
	h. There is a bin for sharps waste (safe box)	0 = No; 1 = Yes; 98 = NA
	i. There is a bin for infectious (non-sharps) waste	0 = No; 1 = Yes; 98 = NA
	j. There is a bin for general waste	0 = No; 1 = Yes; 98 = NA
	k. There is a bin for placenta	0 = No; 1 = Yes; 98 = NA
	l. The bins are clearly labelled (yellow colour with danger sign for infectious waste and green colour for general waste	0 = No; 1 = Yes; 98 = NA
	m. Wastes are segregated into different bins according to their category (the bins are not more than 75% full and each bin should not contain waste other than that corresponding to their label)	0 = No; 1 = Yes; 98 = NA

II-TOILETS/LATRINES		
6.	During the walkthrough, the assessor must count the **number** of toilets/latrines located inside the referral hospital premises (if there are toilets/latrines in many places, choose the ones in the compound of outpatient department/ward) and record the number by their type as follows:	
	Type of toilets/latrines	Number (If no, record 0)
	a. *Flush/pour flush toilets connected to public sewage or basin*	
	b. Pit latrines with slab	
	c. Pit latrines without slab/open pit	
	d. Others, specify: _____	
	e. IMPROVED toilets/latrines (a-b)	
	f. ALL TYPES of toilets/latrines (a-d)	
7.	Check all the toilets/latrines one-by-one (with a maximum 5), starting with the improved one (6a-b) as follows:	
	TOILET/LATRINE 1 IS OBSERVED	**0 = No; 1 = Yes; 98 = NA**
	a. is an improved toilet/latrine (6a-b)	0 = No; 1 = Yes; 98 = NA
	b. is usable (*has a door which is unlocked or for which a key is available at any time and can be closed from the inside, is not blocked, and has no major holes in the structure)*	0 = No; 1 = Yes; 98 = NA
	c. is visibly clean (no blood or body substances, scum, dust, lime scale, stains, deposit or smears) and free of unpleasant smell and flies or mosquitoes	0 = No; 1 = Yes; 98 = NA
	d. has a handwashing station available near the toilet/latrine (within 5m)	0 = No; 1 = Yes; 98 = NA
	e. the handwashing station has water and soap for handwashing	0 = No; 1 = Yes; 98 = NA
	f. is designated for women/girls with menstrual hygiene facilities (having a bin with a lid on it within the cubicle or water available in a private space for washing)	0 = No; 1 = Yes; 98 = NA
	g. is accessible by people with limited mobility: • accessible without stairs or steps, • having handrails for support attached to the floor or side walls, • the door with at least 80cm wide, • the door handle and seat within reach of people using wheelchairs or crutches/sticks)	0 = No; 1 = Yes; 98 = NA
	TOILET/LATRINE 2 IS OBSERVED	**0 = No; 1 = Yes; 98 = NA**
	a. is an improved toilet/latrine (6a-b)	0 = No; 1 = Yes; 98 = NA
	b. is usable (*has a door which is unlocked or for which a key is available at any time and can be closed from the inside, is not blocked, and has no major holes in the structure)*	0 = No; 1 = Yes; 98 = NA
	c. is visibly clean (no blood or body substances, scum, dust, lime scale, stains, deposit or smears) and free of unpleasant smell and flies or mosquitoes	0 = No; 1 = Yes; 98 = NA

	d. has a handwashing station available near the toilet (within 5m)	0 = No; 1 = Yes; 98 = NA
	e. the handwashing station has water and soap for handwashing	0 = No; 1 = Yes; 98 = NA
	f. is designated for women/girls with menstrual hygiene facilities (having a bin with a lid on it within the cubicle or water available in a private space for washing)	0 = No; 1 = Yes; 98 = NA
	g. is accessible by people with limited mobility: • accessible without stairs or steps, • having handrails for support attached to the floor or side walls, • the door with at least 80cm wide, • the door handle and seat within reach of people using wheelchairs or crutches/sticks)	0 = No; 1 = Yes; 98 = NA
	TOILET/LATRINE 3 IS OBSERVED	**0 = No; 1 = Yes; 98 = NA**
	a. is an improved toilet/latrine (6a-b)	0 = No; 1 = Yes; 98 = NA
	b. is usable (*has a door which is unlocked or for which a key is available at any time and can be closed from the inside, is not blocked, and has no major holes in the structure)*	0 = No; 1 = Yes; 98 = NA
	c. is visibly clean (no blood or body substances, scum, dust, lime scale, stains, deposit or smears) and free of unpleasant smell and flies or mosquitoes	0 = No; 1 = Yes; 98 = NA
	d. has a handwashing station available near the toilet/latrine (within 5m)	0 = No; 1 = Yes; 98 = NA
	e. the handwashing station has water and soap for handwashing	0 = No; 1 = Yes; 98 = NA
	f. is designated for women/girls with menstrual hygiene facilities (having a bin with a lid on it within the cubicle or water available in a private space for washing)	0 = No; 1 = Yes; 98 = NA
	g. is accessible by people with limited mobility: • accessible without stairs or steps, • having handrails for support attached to the floor or side walls, • the door with at least 80cm wide, • the door handle and seat within reach of people using wheelchairs or crutches/sticks)	0 = No; 1 = Yes; 98 = NA
	TOILET/LATRINE 4 IS OBSERVED	**0 = No; 1 = Yes; 98 = NA**
	a. is an improved toilet/latrine (6a-b)	0 = No; 1 = Yes; 98 = NA
	b. is usable (*has a door which is unlocked or for which a key is available at any time and can be closed from the inside, is not blocked, and has no major holes in the structure)*	0 = No; 1 = Yes; 98 = NA
	c. is visibly clean (no blood or body substances, scum, dust, lime scale, stains, deposit or smears) and free of unpleasant smell and flies or mosquitoes	0 = No; 1 = Yes; 98 = NA
	d. has a handwashing station available near the toilet/latrine (within 5m)	0 = No; 1 = Yes; 98 = NA

	e. the handwashing station has water and soap for handwashing	0 = No; 1 = Yes; 98 = NA
	f. is designated for women/girls with menstrual hygiene facilities (having a bin with a lid on it within the cubicle or water available in a private space for washing)	0 = No; 1 = Yes; 98 = NA
	g. is accessible by people with limited mobility: • accessible without stairs or steps, • having handrails for support attached to the floor or side walls, • the door with at least 80cm wide, • the door handle and seat within reach of people using wheelchairs or crutches/sticks)	0 = No; 1 = Yes; 98 = NA
	TOILET/LATRINE 5 IS OBSERVED	**0 = No; 1 = Yes; 98 = NA**
	a. is an improved toilet/latrine (6a-b)	0 = No; 1 = Yes; 98 = NA
	b. is usable (*has a door which is unlocked or for which a key is available at any time and can be closed from the inside, is not blocked, and has no major holes in the structure)*	0 = No; 1 = Yes; 98 = NA
	c. is visibly clean (no blood or body substances, scum, dust, lime scale, stains, deposit or smears) and free of unpleasant smell and flies or mosquitoes	0 = No; 1 = Yes; 98 = NA
	d. has a handwashing station available near the toilet/latrine (within 5m)	0 = No; 1 = Yes; 98 = NA
	e. the handwashing station has water and soap for handwashing	0 = No; 1 = Yes; 98 = NA
	f. is designated for women/girls with menstrual hygiene facilities (having a bin with a lid on it within the cubicle or water available in a private space for washing)	0 = No; 1 = Yes; 98 = NA
	g. is accessible by people with limited mobility (• accessible without stairs or steps, • having handrails for support attached to the floor or side walls, • the door with at least 80cm wide, • the door handle and seat within reach of people using wheelchairs or crutches/sticks)	0 = No; 1 = Yes; 98 = NA
III-WASTE STORAGE/FINAL WASTE DISPOSAL AREAS		
8.	a. Check if the waste storage awaiting for removal from the facility (or final disposal) is appropriately fenced and protected	0 = No; 1 = Yes; 98 = NA
	b. Check if the protected needles pit is functional (in use and not full)	0 = No; 1 = Yes; 98 = NA
	c. Check if the protected placenta pit is functional (in use and not full)	0 = No; 1 = Yes; 98 = NA
	d. Check if the incinerator is functional (in use)	0 = No; 1 = Yes; 98 = NA

Annex 3: Logical formulae to calculate WASH service for the five core indicators

WASH services	Calculation of WASH services and service ladders

Water services (W)	• WS = Water Sources:
	  ○ 1 = Improved sources {301 = 1,2,3,5,7}
	  ○ 0 = Unimproved sources {301 = 0,4,6,8,9}
	• WL = Water Location:
	  ○ 1 = On premises {302 = 1}
	  ○ 2 = Off premises within 500 m {302 = 2}
	  ○ 3 = Off premises over 500 m {303 = 3}
	• WA = Water Availability
	  ○ 1 = Water is available on the day of the assessment {303 = 1}
	  ○ 0 = Water is not available on the day of the assessment {303 = 0}
	• WQ = Water quantity enough for all year at least for general purposes
	  ○ 1 = {314 = 2,3}
	  ○ 0 = {314 = 0,1,97}
	• Service ladders:
	  ○ Basic water service (W_basic): {WS = 1 AND WL = 1 AND WA = 1}
	  ○ Limited water service (W_limited): {WS = 1 AND WL = 1 AND WA = 0} OR {WS = 1 AND WL = 2}
	  ○ No water service (W_no): {WS = 1 AND WL = 3} OR {WS = 0}

Sanitation facilities (S)	• ST = Total number of Toilets = 401
	• SO = Number of Observed toilets (max. 5) = 401a
	• SI = Number of Improved toilets = 402
	• SU = Number of Usable toilets = 403
	• SS = At least one improved toilet separated for use by Staff
	  ○ 1 = {404 = 1}
	  ○ 0 = {404 = 0}
	• SW = At least one improved toilet separated for use by Women/girls with menstrual hygiene facilities
	  ○ 1 = {405 =1 AND 406 = 1}
	  ○ 0 = {405 = 0} OR {405 = 1 AND 406 = 0}
	• SM = At least one improved toilet meeting the needs of people with reduced Mobility
	  ○ 1 = {407 = 1}
	  ○ 0 = {407 = 0}
	• Service ladders:
	  ○ Basic Sanitation service (S_basic): {SI > 3 AND SU > 1 AND SS = 1 AND SW = 1 AND SM = 1}
	  ○ Limited Sanitation service (S_limited): {SI > 1 AND SI < 3} OR {SI > 3 AND SU > 1 AND SS = 0|SW = 0|SM = 0} OR {SI > 3 AND SU = 0}

	○ No Sanitation service (S_no): {ST = 0} OR {ST > 1 AND SI = 0}
Hand hygiene facilities (H)	• HO = Number of observed points of care for hand hygiene facilities = 511a • HA = Number of observed points of care with Available hand hygiene facilities = 511b • HF = Number of observed points of care with Functional hand hygiene facilities = 511c • HF_Con = Functional hand hygiene facilities at Consultation room/area ○ 1 = {501 = 1 AND 502 = 1} OR {504 = 1 AND 505 = 1} ○ 0 = {501 = 0 | 501 = 1 AND 504 = 0} OR {504 = 0 | 504 = 1 AND 505 = 0} • HF_Del = Functional hand hygiene facilities at Delivery room/area ○ 1 = {506 = 1 AND 507 = 1} OR {509 = 1 AND 510 = 1} ○ 0 = {506 = 0 | 506 = 1 AND 507 = 0} AND {509 = 0 | 509 = 1 AND 510 = 0} • HF_Toi = Functional hand hygiene facilities within 500m of Toilets ○ 1 = {512 = 1 AND 513 = 1} ○ 0 = {512 = 0} OR {512 = 1 AND 513 = 0} • Service ladders: ○ Basic Hand hygiene service (H_basic): {HF > 1 AND HF_Toi = 1} ○ Limited Hand hygiene service (H_limited): {HF = 0 | HF_Toi = 0} ○ No Hand hygiene service (H_no): {HF = 0 AND HF_Toi = 0}
Health care waste management (M)	• MO = Number of observed points of care for waste management = 608a • MB = Number of observed points of care with one set of waste bins properly labelled (including safe box) = 608b • MS = Number of observed points of care with one set of waste bins properly labelled (including safe box) and wastes are correctly segregated = 608c • MS_Con = Waste correctly Segregated at consultation room/area ○ 1 = {604 = 3 AND 605 = 1} ○ 2 = {604 = 3 AND 605 = 0} OR {604 = 1,2,4} ○ 3 = {604 = 0} • MS_Del = Waste correctly Segregated at delivery room/area ○ 1 = {606 = 3 AND 607 = 1} ○ 2 = {606 = 3 AND 607 = 0} OR {606 = 1,2} ○ 3 = {606 = 0} • MT_Sha: Sharps waste are Treated and disposed of safely ○ 1 = {609 = 1,2,3,4,7} ○ 0 = {609 = 5,6,8,9,10,88} • MT_Inf: Infectious waste are Treated and disposed of safely ○ 1 = {610 = 1,2,3,4,6} ○ 0 = {610 = 5,7,8,9,10,88}

	• MT_Pla: Placenta waste are Treated and disposed of safely
	  ○ 1 = {611 = 1,2,3,4,7}
	  ○ 0 = {611 = 5,6,8,9,10,11,88}
	• Service ladders:
	  ○ Basic health care waste Management service (M_basic): {MS_Con = 1 AND MT_Sha = 1 AND MT_Inf = 1}
	  ○ Limited health care waste Management service (M_limited): {MS_Con = 2 AND MT_Sha = 1 AND MT_Inf = 1}
	  ○ No health care waste management service (M_no): {MS_Con = 3 |MT_Sha = 0 | MT_Inf = 0}

Basic environmental cleaning practices (C)	• CP = Cleaning protocols/SOPs available
	  ○ 1 = {703 = 2,3}
	  ○ 0 = {703 = 0,1}
	• CT = Staff responsible for cleaning received training on cleaning procedures (environmental cleaning)
	  ○ 1 = All received training {704 = 3}
	  ○ 2 = Some but not all received training {704 = 1,2}
	  ○ 3 = None received training {704 =0}
	• CC = All points of care of the HCF are visibly clean
	  ○ 1 = {707 = 2}
	  ○ 0 = {707 = 0,1}
	• Service ladders:
	  ○ Basic environmental Cleaning service (C_basic):
	  ○ Limited environmental Cleaning service (C_limited): {CP = 0} OR { CP = 1 AND CT = 2,3}
	  ○ No environmental Cleaning service (C_no): {CP = 0 AND CT = 3}

References

1. **Essential environmental standards in health care**. Geneva: World Health Organization; 2008.
2. **Report on the Burden of Endemic Health Care-Associated Infection Worldwide: A Systematic Review of the Literature**. In. Geneva: World Health Organization; 2011.
3. Allegranzi B, Bagheri Nejad S, Combescure C, Graafmans W, Attar H, Donaldson L, Pittet D: **Burden of endemic health-care-associated infection in developing countries: systematic review and meta-analysis**. *Lancet* 2011, **377**(9761):228-241.
4. Oza S, Lawn JE, Hogan DR, Mathers C, Cousens SN: **Neonatal cause-of-death estimates for the early and late neonatal periods for 194 countries: 2000-2013**. *Bulletin of the World Health Organization* 2015, **93**(1):19-28.
5. **WASH Post-2015: proposed targets and indicators for drinking-water, sanitation and hygiene**. In. Geneva: World Health Organization and UNICEF; 2014.
6. **Making health a right for all: Universal health coverage and water, sanitation and hygiene** In. (http://www.wateraid.org/uk/what-we-do/our-approach/research-and-publications/view-publication?id=63af2f8f-1a91-4b7a-b88d-e31175215f57, accessed 15 May 2015). Action for Global Health and WaterAid; 2014.
7. **Water, sanitation and hygiene in health care facilities. Status in low- and middle-income countries and way forward.** . In: *WASH in health care facilities for better health care services.* Geneva: World Health Organization and UNICEF; 2015.
8. **Water, sanitation, hygiene, waste and electricity services in health care facilities: progress on the fundamentals: 2023 global report**. In. Geneva: World Health Organization and the United Nations Children's Fund (UNICEF); 2023.
9. **Health Strategic Plan 2016-2020 Quality, Effective and Equitable Health Services**. Phnom Penh: Department of Planning and Health Information, Ministry of Health; 2016.
10. **Operational Giudelines on Minimum Package of Activities (in Khmer)**. Phnom Penh: Department of Hospital Services, Directorate General for Health; 2018.
11. **Cambodia Health Center Accreditation Standards (in Khmer)**. Phnom Penh: Ministry of Health; 2022.
12. **Cambodia Hospital Accreditation Standards (in Khmer)**. In. Phnom Penh: Ministry of Health; 2022.
13. **Minimum Standards for Private Health Care Facilities**. Phnom Penh: Department of Hospital Services, Ministry of Health; 2023.
14. **National Standard Tools for Assessment of Water, Sanitation and Hygiene in Public Health Facilities**. In. Phno Penh: National Institute of Public Health and Department of Hospital Services, Ministry of Health; World Health Organization; 2016.
15. **Guidelines for Water, Sanitation and Hygiene in Health Care Facilities**. Phnom Penh: Department of Hospital Services, Directorate General for Health, Ministry of Health; 2018.
16. Ir P: **Public Health Care Facilities Assessment on Water Sanitation and Hygiene of Five Provinces in Cambodia: Full Report**. In. Phnom Penh: National Institute of Public Health, Ministry of Health; 2017.
17. Annear PLG, J.; Ir, P.; Jacobs, B.; Men, C.; Nachtnebel, M.; Oum, S.; Robins, A.; Ros C.E. : **Chapter 7: Assessment of the health system**. In: *The Kingdom of Cambodia Health System Review.* edn. Edited by Annear PLJ, B.; Nachtnebel, M. Manila, Philippines: World Health Organization (on behalf of Asia Pacific Observatory on Public Health Systems and Policies); 2015.
18. **Clinical Guidelines on Minimum Package of Activities (Khmer)**. In. Phnom Penh: Department of Hospital Services, Ministry of Health; 2018.

19. **Guidelines on Complementary Package of Activities for Referral Hospitals**. Phnom Penh: Ministry of Health; 2014.
20. **Report on health sector achievements 2018-2022 and plan for 2023 and further (in Khmer)**. In. Phnom Penh: Department of PLanning and Health Information, Ministry of Health; 2023.
21. Annear PLG, G.; Ir, P.; Jacobs, B.; Men, C.; Nachtnebel, M.; Oum, S.; Robins, A.; Ros, C.E.: **The Kingdom of Cambodia Health System Review**, vol. 5: World Health Organization on behalf of Asia Pacific Observatory on Public Health Systems and Policies; 2015.
22. Chhim S, Te V, Buffel V, van Olmen J, Chham S, Long S, Yem S, Van Damme W, Wouters E, Por I: **Healthcare usage and expenditure among people with type 2 diabetes and/or hypertension in Cambodia: results from a cross-sectional survey**. *BMJ Open* 2023, **13**(1):e061959.
23. **Core questions and indicators for monitoring WASH in health care facilities in the Sustainable Development Goals**. Geneva: World Health Organization and the United Nations Children's Fund (UNICEF); 2018.
24. **Water, sanitation and hygiene in health-care facilities: a practical tool for situation assessment and improvement planning**. Copenhagen: WHO Regional Office for Europe; 2022.
25. **Expert Group Meeting on Monitoring WASH in Health Care Facilities in the Sustainable Developments: Meeting Report** In. Geneva: WHO/UNICEF Joint Monitoring Programme for water supply and sanitation; 2016.
26. **Infection Prevention and Control Guidelines for Health Care Facilities**. Phnom Penh: Ministry of Health; 2017.
27. Pandis N: **Cross-sectional studies**. *Am J Orthod Dentofacial Orthop* 2014, **146**(1):127-129.
28. Sedgwick P: **Bias in observational study designs: cross sectional studies**. *BMJ* 2015, **350**:h1286.