

Public Health Care Facilities Assessment on Water, Sanitation and Hygiene

of Five Provinces in
Cambodia



Full Report



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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 and sanitation
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 hospitals
SDGs	: Sustainable Development Goals
UHC	: Universal health coverage
WASH	: Water, sanitation and hygiene
WHO	: World Health Organization

Executive summary

01



Introduction

Safe and high quality water, sanitation and hygiene (WASH) is fundamental to preventing and controlling infection in health care facilities (HCFs), tackling antimicrobial resistance, and ensuring quality of care – a prerequisite for achieving universal health coverage. However, reliable data on WASH in HCFs in Cambodia, like in many other developing countries, is lacking and available data suggests the need for further improvement. Therefore, the National Institute of Public Health in collaboration with the Department of Hospital Services and health partners conducted an assessment of WASH in public HCFs in five provinces: Kampong Chhnang, Kampong Thom, Thbong Khmom, Kratie, and Ratanakiri.

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Objectives

The general objective of the assessment was to provide useful information and evidence to help improve WASH in HCFs in Cambodia. More specifically, this study aimed to assess the WASH situation in health centres (HCs) and referral hospitals (RHs) in the five study provinces, identify gaps, related constraints and potential solutions. This study also allowed for drawing lessons to improve the current national standard tools for assessment of WASH in HCFs and the indicators for monitoring WASH in HCFs proposed by the WHO/UNICEF Joint Monitoring Programme for water supply and sanitation (JMP).

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Background

The Cambodian health system consists of a district-based public sector and a fast-growing but loosely regulated private sector. By 2016, there were over 1,000 public HCFs, including 99 RHs and 1,141 HCs providing a fairly good coverage throughout the country. In the five study provinces, there were 202 HCs and 16 RHs.

WASH in HCFs broadly refers to the quantity and quality of, and access to, water, toilets, health care waste management, and hand hygiene facilities; the cleanliness of the environment; and, knowledge and practices of safe hand hygiene in all kinds of public and private sector HCFs and their compounds. (Please see the main report for the JMP definitions on WASH in HCFs (Box 1) and the four core indicators and sub-indicators for WASH in HCFs and their definitions proposed for this study (Table 2).

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Methodology

A cross-sectional survey of 101 HCs and 16 RHs was conducted in late 2016. Data on HCF characteristics, electricity and water supply, sanitation, general cleanliness and hygiene, and health care waste management in these HCFs were collected by trained and experienced surveyors through staff interviews and direct observation during facility walkthrough, using the national standard tools for assessing WASH in HCFs. The collected data were

entered into a database form by trained data processors. The dataset was then cleaned and analysed by the principal investigator to compute the four core indicators, sub-indicators and other necessary variables. For each core indicator, data

were disaggregated by service ladders, by HC and RH, by presence of external WASH support, and by province. This study received approval from the National Ethics Committee for Health Research in Cambodia on 21 September 2016.

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Results

WASH support

We assessed a total of 117 HCFs (101 HCs and 16 RHs) as planned. Among them, 64% (65% of HCs and 56% of RHs) received WASH support from at least one partner or externally funded project.

Staffing

On average, there were ten personnel (including four midwives and one cleaner) per HC and 33 clients (including 22 outpatients and nearly one baby delivery) per HC per day, compared with 63 personnel (including ten medical doctors/assistants) per RH and 65 clients (including 13 inpatients and two baby deliveries) per RH per day. The staff-to-client ratio was approximately three for HCs and one for RHs. All HCs had at least one midwife, but 12% of them had no secondary midwife and 24% had no cleaner.

Electricity

All the assessed HCs and RHs had electricity supply from at least one functioning main source, mostly national/community grid, except 19% of the HCs with solar panel. In addition, 68% of them (64% of HCs and 94% of RHs) had a secondary back-up source, mainly a generator for RHs and solar panels for HCs.

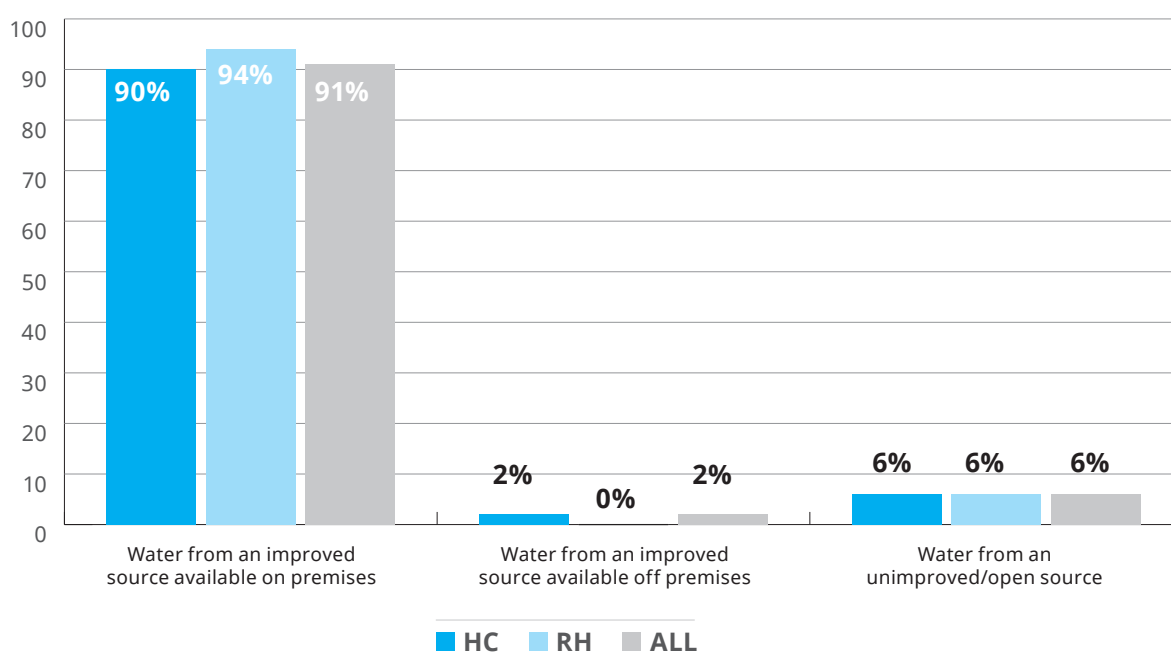
Water

Of the assessed HCFs, 89% (88% of HCs and 94% of RHs) had their water supply from an improved main source on the premises. Of these improved water sources on the premises, 97% (97% of HCs and 100% of RHs) were functioning, with water available at the time of assessment. In addition, 60% of them (62% of HCs and 44% of RHs) had a secondary water source, mainly rainwater collection for HCs and tube well/ borehole for RHs.

Following the JMP 'ladder' of water facility (see Table 1 in the main report). Figure 1 below shows that nearly 91% of the assessed HCFs (90% of HCs and 94% of RHs) had a basic water service (improved/ on the premises). 2% of the HCs had a limited service (improved/off the premises), and approximately 6% of the HCs and RHs had an unimproved service (unimproved/off the premises) at the time of assessment.

In general, only 49% of the assessed HCFs (48% of HCs and 56% of RHs) reported that the available water sources provided enough water for the whole year for all purposes (drinking, food preparation, personal hygiene, medical activities, cleaning and laundry) and only 46% of them (50% of HCs and 25% of RHs) had a drinking water source for clients.

Figure 1: Percentage of health centres and referral hospitals with basic water supply, limited water supply and water supply from an unimproved or open source

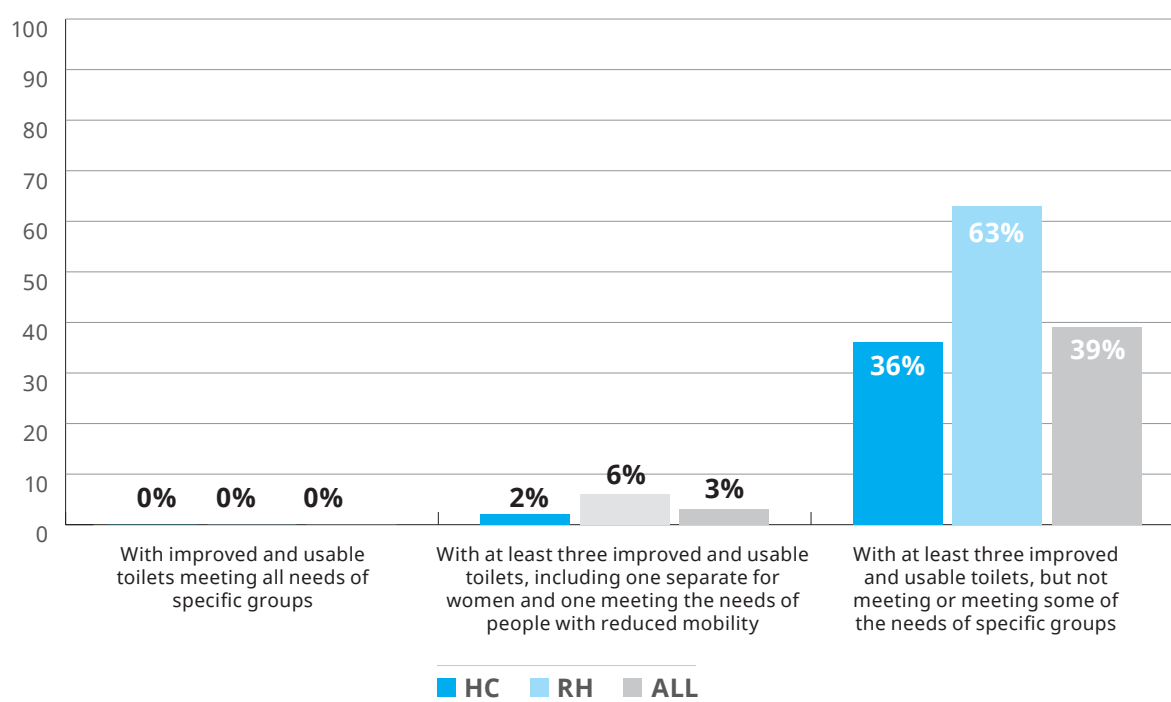


Sanitation

All toilets available at the assessed HCs and RH outpatient departments were improved toilets, mainly pour flush toilet to septic tanks, with a few flush toilets at RHs, and all were located on the premises. But only 86% of the available toilets were found to be usable during the facility walkthrough. All assessed HCs and RH outpatient departments had at least one improved and usable toilet (no HCF with unimproved or no toilet), 87% (86% of HCs and 94% of RHs) had at least two, but only 39% (36% of HCs and 63% of RHs) had at least three, and 20% (16% of HCs and 44% of RHs) had four or more. While 10% of the assessed HCFs (9% of HCs and 19% of RHs) had improved toilets separated for men and women, only one HC had a toilet with menstrual hygiene facilities. 74% of the assessed HCFs (72% of HCs and 88% of RHs) had improved toilets separated for health staff and clients, and only 11% of them (11% of HCs and 13% of RHs) had a toilet meeting the needs of people with limited mobility.

Figure 2 below shows the percentage of HCFs with basic and limited sanitation. None of the assessed HCFs had basic sanitation as defined by JMP, whereas nearly 3% of them (2% of HCs and 6% of RHs) had basic sanitation as defined based on the Cambodian standard (with at least three improved and usable toilets, including one separate for women and one meeting the needs of people with reduced mobility) and 39% (36% of HCs and 63% of RHs) had limited sanitation as defined based on the Cambodian standard (with at least three improved and usable toilets, but not meeting or meeting only some of the needs for people with reduced mobility).

Figure 2: Percentage of health centres and referral hospitals with basic and limited sanitation

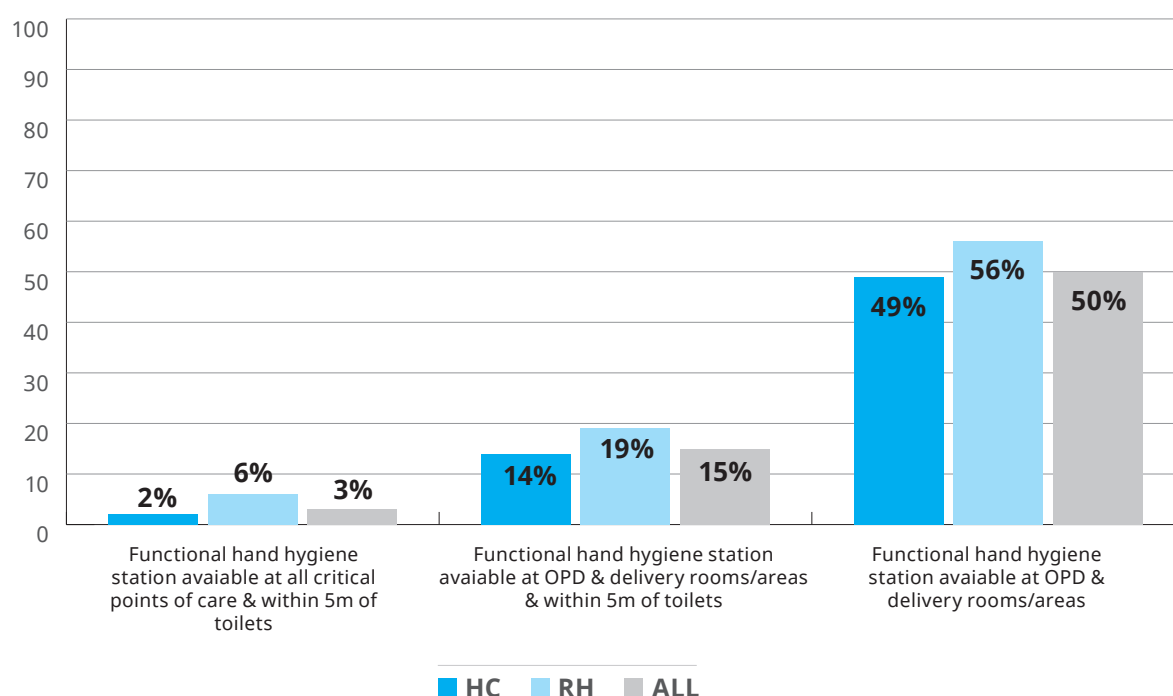


Hygiene

In 8% of the assessed HCFs, there was no functional hand hygiene station available at any point of care, whereas 92% others had a functional hand hygiene station available at at least one point of care, and only 6% of them had functional hand hygiene stations available at five points of care. In 68% of the assessed HCFs, there was no functional hand hygiene station available at any toilet, whereas 32% others had a functional hand hygiene station available at at least one toilet area. Only less than 1% of them had a functional hand hygiene station available at four toilet areas.

Figure 3 below shows the percentage of HCFs with basic and limited hand hygiene. Only 3% of the assessed HCFs (2% of HCs and 6% of RHs) had basic hand hygiene as defined by JMP, whereas 15% of them (14% of HCs and 19% of RHs) had basic hand hygiene as defined based on the Cambodian standard (a functional hand hygiene station available at outpatient area, delivery room, and within 5m of toilets) and nearly 50% of them (49% of HCs and 56% of RHs) had limited hand hygiene as defined based on the Cambodian standard (a functional hand hygiene station available at outpatient area and delivery room).

Figure 3: Percentage of health centres and referral hospitals with basic and limited hand hygiene



General cleanliness and health care waste management

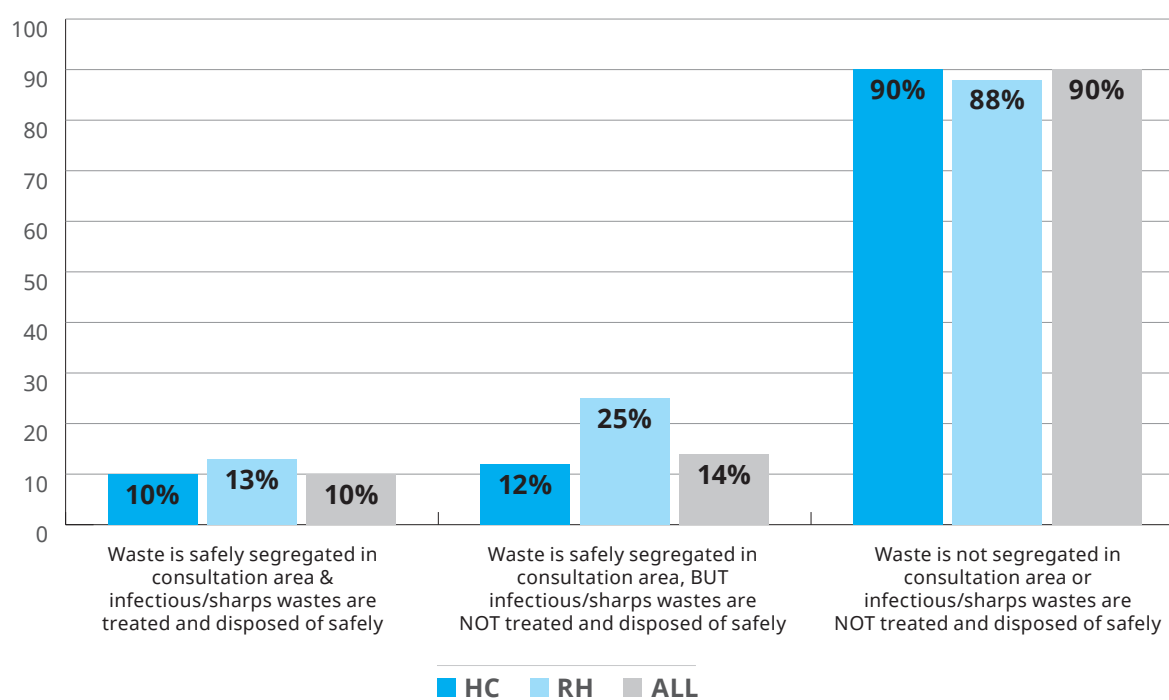
60% of the assessed HCFs (60% of HCs and 63% of RHs) reported having their floors, surfaces and toilets cleaned with water and detergent on a routine basis, with 53% (48% for HCs and 80% for RHs) doing this on a daily basis. Similarly for all the critical points of care at HCs and RHs, a large majority were found to be visibly clean, but toilets at HCs and RH outpatient areas were in general less clean. Only 38% of the assessed HCFs (38% of HCs and 40% of RHs) had toilets that looked visibly clean. 54% of the assessed HCFs (49% of HCs and 88% of RHs) reported that they had separate cleaning equipment/materials for floors, surfaces and points of care.

Only 14% of the assessed HCFs (12% of HCs and 25% of RHs) had their health care waste safely segregated (each in a separate and clearly-labelled container) at the consultation room/area, whereas 35% of them

(35% of HCs and 38% of RHs) had their sharps and infectious wastes, including placenta, treated/disposed of safely. It is noteworthy that nearly 20% of the assessed HCFs (21% of HCs and 13% of RHs) let the mother take the placenta home, mainly following the mother's request to do so according to their tradition, and 7% of HCs reported burying placenta in the facility grounds.

Following the JMP ladder of health care waste service (see Table 1 in the main report), figure 4 shows that over 10% of the assessed HCFs (10% of HCs and 13% of RHs) were practising basic health care waste management, whereas 14% of them (12% of HCs and 25% of RHs) had waste safely segregated in consultation area, but infectious and sharps wastes were not treated/disposed of safely. In nearly 90% of the assessed HCFs (90% of HCs and 88% of RHs) waste was not segregated in the consultation area and infectious and sharps wastes were not safely treated/disposed of.

Figure 4: Percentage of health centres and referral hospitals practising basic, limited and poor/no health care waste management



Summary

Comparisons of the assessed WASH core indicators between HCs and RHs (outpatient area) show that the WASH situation in RHs was generally better than that in HCs. But there was no significant difference between HCFs receiving WASH external support and those with no such support. Comparisons across the five study provinces show a great variation between them. The lowest percentage of HCFs with basic water supply was seen in Kampong Thom (79%), and the highest percentage (100%) was found in Kratie and Ratanakiri. The percentage of assessed HCFs with at least three improved and usable toilets in Ratanakiri was found to be the highest (70%), followed by Kratie (61%) compared with around 30% in other three provinces. The percentage of HCFs with a functional hand hygiene station available at outpatient area, delivery room and within 5m of toilets was comparably low across the five provinces. None of the assessed HCFs in Kratie was practising basic health care waste management, compared with 17% (the highest) in Kampong Thom.

Key informants reported a number of individual and institutional constraints related to a poor WASH situation, in particular sanitation, hygiene and health care waste management at their respective HCFs. Lack of knowledge of, and commitment to, sanitation and hygiene, including infection prevention and control (IPC), among health staff and cleaners as well as among clients was the most commonly reported WASH-related constraint. Poor knowledge among users and poor management, including maintenance, often causes the toilets to be obstructed/broken.

Poor knowledge, coupled with the regular absence or total lack of cleaners and cleaning materials, created a major problem for general cleanliness at HCFs, and this can be worsened by the absence of concrete footpaths or functioning systems for drainage of rainwater for health facilities located in lowland area. Poor hand hygiene was obviously linked to the lack of functioning hand hygiene stations (including alcohol-based hand rub dispensers) and the knowledge and commitment of health staff.

The latter, coupled with lack of appropriate materials, including waste bins, was the main reason for poor segregation of wastes. The lack of functioning high capacity incinerators (SICIM) to burn sharps waste, and regularly broken incinerators with inappropriately low capacity at HCs was reported as a major reason for unsafe treatment/disposal of sharps and infectious waste. The lack of a placenta pit combined with the cultural belief that taking placenta back home is necessary and gives good luck to the baby, mother and family was a barrier to the safe disposal of placenta in a number of facilities.

Discussion, conclusions and recommendations

This is a first large-scale assessment of WASH in HCFs in Cambodia. Applying the new national tools adapted from the JMP monitoring tools and indicators has a number of potential limitations. These include: the difficulty in defining core indicators to reflect the real WASH situation in assessed HCFs and aligning them with the JMP tools due to the unclear definitions of the JMP indicators and lack of national norms and standards for WASH in HCFs; the possible seasonal bias that cannot be addressed by this cross-sectional study; the focus on outpatient areas but not inpatient areas or both; the attention to measuring means or facilities rather than practices; the lack of national representation; and the mismatch between points of care defined in the questionnaires and real infrastructure at the assessed HCFs.

Despite these potential limitations, careful interpretation of the findings allows not only the generation of useful information and evidence for improving WASH in HCFs in Cambodia, in particular those in the five study provinces, but also the drawing of lessons for further improvement of the national standard tools for assessment of WASH in HCFs and the JMP indicators and tools for monitoring WASH in HCFs. Moreover, the findings from this study can be used as baseline data for the two national WASH indicators.

The findings suggest that water supply in assessed HCFs in Cambodia is reasonably good and much better than the situation a decade ago. However, shortage in water supply still exists, mainly in the dry season, with a general lack of drinking water sources. Sanitation in the assessed HCFs is relatively good if compared with the situation in other developing countries, but remains far from meeting the available national standards and JMP-defined basic sanitation. Hand hygiene and health care waste management in the assessed HCFs is poor compared to national and international standards, and is relatively poorer than in neighbouring countries. WASH in RHs appears to be generally better than in HC. In general, WASH in HCFs in Cambodia requires further improvement to ensure safety and quality of care, thereby contributing to achieving universal health coverage (UHC) and health Sustainable Development Goals (SDGs) as well as to mitigating antimicrobial resistance.

The following are some considerations for future national policies and actions to improve WASH in HCFs in Cambodia.

1. The first immediate action could be to clearly set up national norms and standards for WASH (including WASH-related infrastructure, sanitation and hygiene facilities, and practices) in HCFs in Cambodia, taking into account the country context and international norms and standards, and integrate them into various national policies and guidelines.
2. Along with the effort to develop WASH specific national policies, norms and standards, actions are needed to apply them to bridge the identified gaps of WASH in HCFs and address the related constraints as raised by key informants:
 - Further expand WASH and IPC training to HC and RH staff, not only the clinical staff, but also other staff, including cleaners to improve

their knowledge and awareness about the importance of WASH in HCFs.

- Improve WASH infrastructure and supplies: construction and maintenance of main and back up water sources to address the shortage of water supply in dry season, and making drinking water available for clients; construction of more toilets that meet the needs of people with reduced mobility, and necessary supplies to meet JMP-defined basic sanitation; making the existing hand hygiene stations functional by improving the supplies for hand washing and alcohol-based hand rubs, and appropriate cleaning materials and detergent for improving the general cleanliness; and adequate supplies of appropriate waste bins and needle boxes for waste segregation and immediately repair or replace the broken incinerators.
- Set up a mechanism to incentivise best WASH practices in HCFs, which includes a routine and systematic evaluation of the WASH situation in HCFs linked up with incentives such as giving priority for WASH-related investment, awarding certificates of appreciation, and financial incentives, by careful monitoring and assessing the current initiative of linking performance-based incentives to WASH practices in HCFs in Health Equity and Quality Improvement Project (H-EQIP) in order to draw lessons for further improvement and scaling-up.
- Further development and strengthening of WASH-related organizational structure and institutional arrangements for ensuring effective and sustainable implementation of the newly-developed policies, norms, and standards, including exploration of possibility

to link up WASH assessment with the national routine Health Information System and national program WASH monitoring.

3. The current national standard tools for assessment of WASH in HCFs should be simplified and revised to incorporate the newly developed national norms and standards as well as to align with the JMP WASH monitoring tools.
4. The JMP proposed WASH monitoring tools, indicators and their service ladders, as shown in the latest meeting report in 2016¹, are not clearly defined and should be improved.
5. Last but not least, future assessments of this kind should consider addressing the potential limitations, with consideration of seasonal variation, inpatient care settings, and measurement of WASH practices rather than just WASH infrastructure and facilities.

¹ Monitoring WASH in Health Care Facilities: Final core indicators and questions. World Health Organization/UNICEF; 2016

Introduction



Access to safe and quality water, sanitation and hygiene (WASH) services is fundamental to infection prevention and control (IPC) in health care facilities (HCFs) and good health outcomes [1-3]. Safe and quality WASH in HCFs is found to be vital for tackling antimicrobial resistance, and therefore, improving IPC and WASH is one of the five objectives of the WHO Global Action Plan on Antimicrobial Resistance [4]. Moreover, WASH is integrated in the Sustainable Development Goals (SDGs) [5] and adequate WASH in HCFs is crucial for achieving SDG3 on health, in particular universal health coverage (UHC) [6]. As part of these efforts, global WASH-related indicators have been developed to track the progress. However, WASH services in HCFs in many low and middle-income countries remain poor or absent [7], compromising the ability to provide safe and quality care and presenting serious health risks to patients, health care providers, and to a larger extent the wider community.

In Cambodia, a recent analysis shows that the WASH situation in HCFs requires further improvement to ensure safety and quality of care in HCFs, especially in health centres (HCs) [8]. There was no clear WASH specific leadership and effective coordination mechanism, no policy document which comprehensively describes national policies, planning and standards on WASH in HCFs, and no reliable national monitoring and evaluation mechanism, including a lack of standard national assessment tools and data on WASH in HCFs. The available data suggested that WASH in HCFs in Cambodia remained poor when compared to WHO standards.

As part of efforts to address this problem and improve WASH in HCFs in Cambodia, national standard tools for assessment of WASH in HCFs, including HCs and referral hospitals (RHs), were developed in late 2016 under the leadership of the Department of Hospital Services (DHS), in the Ministry of Health

(MOH). Other national norms and standards for WASH in HCFs, mainly in HCs, are also being developed as an integral part of the revised draft guidelines for the Minimum Package of Activities (MPA). Two national WASH-related indicators have been adapted from the global WASH indicators and included in the draft of new Health Strategic Plan 2016-2020. Along with these efforts, in early 2016, the National Institute of Public Health (NIPH), in collaboration with DHS and health partners, conducted a large scale assessment of WASH in public HCFs in five provinces, namely Kampong Chhnang, Kampong Thom, Thbong Khmom, Kratie, and Ratanakiri, using the recently-developed national standard tools. This report will describe the objectives, process and results of the assessment, and discuss key findings and draw conclusions and recommendations for policy considerations and actions.

This report is divided into seven main chapters. After this introduction (Chapter 1), we will describe the objectives of the assessment in Chapter 2, followed by a background in Chapter 3 which includes a brief description of the context in the study sites, norms, standards and definitions. The methodology of this assessment, including ethical considerations, will be presented in Chapter 4. Chapter 5 will describe the assessment results on staffing, services, electricity supply, water supply, wastewater and sanitation facilities, general cleanliness and hygiene, and health care waste management as well as WASH-related constraints and suggested solutions to address the constraints. We will discuss limitations of the study and key findings in Chapter 6. Based on the key findings, we will draw conclusions and make relevant recommendations for policy and actions in Chapter 7. Some necessary annexes and a list of key references will be provided at the end of this report.

Objectives

The general objective of the assessment was to provide useful information and evidence to help improve WASH in HCFs in Cambodia.

More specifically, this study aimed to assess the WASH situation in HCs and RHs in the five study provinces, identify WASH-related gaps and constraints the HCFs were facing, and potential solutions to bridge the gaps and address the constraints. The WASH situation in HCFs was assessed by applying the four core indicators and sub-indicators (as described in Table 2) adapted from those proposed by the WHO/UNICEF Joint Monitoring Programme (JMP) [9] and applying existing national norms and standards, which could be then used as baseline data for WASH in HCFs.

This assessment will also allow drawing lessons for improving the current national standard tools for assessment of WASH in HCFs and providing useful feedback for possible improvement of JMP proposed tools and indicators for global monitoring of WASH in HCFs.

Key findings from this study will be presented to key stakeholders in Phnom Penh and related provinces, and at national and international WASH-related events, including the Technical Working Group-Health and the Global Learning Event on WASH in HCFs in Nepal.

Concepts and definitions, including definitions of the WASH core indicators, will be discussed in Section 3.2 below.



3.1 Context in the study sites

The health system in Cambodia consists of a district-based public sector and a fast-growing but loosely regulated private sector [10]. The introduction of a new health coverage plan in 1996 divided the country into operational health districts (ODs); each of these usually has between 10 and 20 public HCs and an RH serving a population of 100,000 to 200,000. HCs are expected to provide a Minimum Package of Activities (MPA) that includes basic curative, preventive and promotional services both in the facility and through outreach activities [11]. RHs provide a Complementary Package of Activities (CPA), of which there are three levels: level 1 without surgical interventions, level 2 with emergency surgical interventions, and level 3 with a wide range of surgical interventions and specialised services [12].

According to the National Health Congress report 2016, there are over 1,000 public health facilities, including 99 RHs and 1,141 HCs in Cambodia providing a fairly good coverage throughout the country [13]. This study was conducted in five of the 25 provinces in Cambodia, namely Kampong Chhnang, Kampong

Thom, Thbong Khmom, Kratie, and Ratanakiri. In these provinces, there is a total of 202 HCs with and without beds, and 16 district and provincial RHs.

3.2 Norms, standards and definitions

According to the World Health Organization's (WHO's) Essential Environmental Standards in Health Care [14], WASH in HCFs broadly refers to the quantity and quality of, and access to, water, toilets, health care waste management, and hand hygiene facilities (basin with available water, soap or alcohol-based hand rubs); the cleanliness of the environment; and, knowledge and practices of safe hand hygiene in all kinds of public and private sector HCFs and their compounds. Key definitions of WASH in HCFs are described in Box 1.

In line with the key definitions of WASH in HCFs, the JMP proposed four core indicators for monitoring WASH in HCFs globally. According to the JMP's recent meeting report [9], the four WASH core indicators are defined as follows:

- **Indicator 1:** % of HCFs with basic water supply refer to % of HCFs where the main source of water is an improved source, located on the premises, from which water is available at the time of the assessment, or if not, water is available from an alternative improved source on the premises.
- **Indicator 2:** % of HCFs with basic sanitation refer to % of HCFs with improved toilets located on the premises that are functional at the time of visit, with at least one designated for women/girls with facilities to manage menstrual hygiene needs, one separated for staff, and one meeting the needs of people with limited mobility.
- **Indicator 3:** % of HCFs with basic hand hygiene refer to % of HCFs with functional hand hygiene stations available at critical points of care and within 5m of toilets on the day of assessment.
- **Indicator 4:** % of HCFs practising basic health care waste management refer to % of HCFs where waste is safely segregated in the consultation area and infectious and sharps wastes are treated and disposed of safely.

In line with the above definitions, the JMP proposed to split the four core indicators for monitoring WASH in HCFs into three-level service ladders: basic service, limited service, and unimproved/no facility or service. Table 1 summarizes the JMP core indicators in three-level service ladders and gives their respective definitions.

**BOX
01**
**WHO's key definitions of WASH
in health care facilities**

- Improved sources of water include: piped water, tube well or borehole, protected dug well and protected rainwater collection.
- Improved toilets include: flushed toilets, pit latrines with slab or ventilated improved pit latrines (VIP).
- Usable or functional toilet means that it 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.
- Menstrual hygiene facilities refer to a bin with a lid on it within the cubicle or water available in a private space for washing.
- Toilet meeting the needs of people with limited mobility should be accessible without stairs/steps, have handrails for support attached to the floor or side walls, the door is at least 80cm wide, the door handle and seat within reach of people using wheelchairs or crutches/sticks.
- Functional hand hygiene station may consist of a basin/pan with water and soap for washing hands, or an alcohol-based hand rub dispenser. If the latter is used, health staff may carry a dispenser around between points of care.
- Points of care are any location in the outpatient setting where care or treatment is delivered (e.g. consultation/examination room). For facilities with multiple consultation rooms, one is randomly selected from the area where most general outpatient services occur to check for hand hygiene stations.
- Waste safely segregated in the consultation area means there are at least three bins in place to separate sharp waste, infectious waste and non-infectious general waste and the bins should be clearly labelled (either in colour coded, written labels or signs), no more than three quarters (75%) full and each bin should not contain waste other than that corresponding to their label.
- Sharps waste is treated and/or disposed of safely when it is autoclaved and/or incinerated with high capacity incinerator at 850-1,000oC or buried in lined and protected pit.
- Infectious waste is treated and/or disposed of safely when is autoclaved and/or incinerated (with high or low capacity), buried in lined and protected pit, and appropriately collected for medical waste disposal.

Table1:**Joint Monitoring Programme core indicators for monitoring WASH in health care facilities in three-level service ladders**

Source: WHO/UNICEF, 2016 [9]

**Water****Sanitation****Hand hygiene****Health Care Waste**

Basic service	Basic service	Basic service	Basic service
Water from an improved sources ⁵ is available on premises	Improved Sanitation facilities ⁶ are available and usable, separated for patients and staff, separated for woman and allowing menstrual hygiene management, and meeting the needs of people with limited mobility.	Hand hygiene materials, either a basin with water and soap or alcohol hand rub, are available at points of care and toilets.	Waste is safely segregated into at least three bins in the consultation area and sharps and infectious wastes are treated and disposed of safely.
Limited service	Limited service	Limited service	Limited service
Water from an improved sources ⁵ is available off-premises or an improved water source is on site but water is not available.	Improved sanitation facilities are present but are not usable, or do not meet the needs of specific groups (staff, women, people with limited mobility).	Hand hygiene materials are available at some, but not all, points of care and toilets.	Waste is segregated but not disposed of safely, or bins are in place but not used effectively.
Unimproved/No facility	Unimproved/No facility	Unimproved/No facility	Unimproved/No facility
Unprotected dug well or spring, surface water source; or there is no water source at the facility.	Pit latrines without a slab or platform, hanging latrines and bucket latrines, or there are no toilets or latrines at the facility.	Hand hygiene stations are absent or present but without soap or water.	Waste is not segregate or safely treated and disposed.

In Cambodia, a recent analysis found few health policy documents and guidelines stipulating norms and standards related to the four WASH core indicators. The Building Brief for Health Centre 2007 [15] states that there should be at least three toilets: one for men, one for women/girls and one designated for people with reduced mobility. Ideally, the two separated for men and women/girls are on the first floor, whereas the one designated for people with reduced mobility is on the ground floor. In addition, the Building Brief recommends that each HC should have 6-8 rooms (six on the first floor and two on the ground floor) but only some (not all) of them should have a hand hygiene station.

The IPC Guidelines 2010 [16] and the IPC Training Manual 2012 [17] clearly describes the standards and procedures of hand hygiene and consider alcohol-based hand rubs as a best practice for hand hygiene and, if hands are not visibly dirty, an alternative to hand washing with improved water and soap. Practically, a health provider in a consultation area should wash their hands at the start and at the end of his/her consultations. During the consultation time, s/he can use alcohol-based hand rubs.

The IPC Guidelines [16] and the National Guideline on Health Care Waste Management 2012 [18] laid out some standard procedures for appropriate and safe segregation, storage, treatment and disposal for each waste category, including general waste,

sharps waste, infectious and pathological or organic wastes, which are commonly found in consultation areas. It is recommended that sharps, infectious and pathological wastes should be placed in separate, yellow containers, clearly labelled SHARPS, INFECTIOUS and PATHOLOGICAL respectively. Sharps waste should be placed in a puncture-resistant container, and safely transported to be finally incinerated in a high capacity incinerator (e.g. SICIM). As an alternative to the high capacity incinerator, infectious waste can also be burned in a relatively low capacity incinerator (made of bricks). Placenta (the most common organic waste) should be put in a designated placenta pit. There should be a set of waste bins (or containers) for waste segregation in critical points of care delivery: at least two bins (one for general waste and one for infectious waste) at HCs and at least three bins (including one for sharps waste) at RHs. For baby delivery rooms, there should be four bins (including one for placenta).

Considering the Cambodian health system context and the above-mentioned WASH-related national policies and guidelines, we adapted the JMP-proposed norms, standards and definitions to redefine water and sanitation core indicators to allow measurement of the WASH situation closer to the current practice in HCFs in Cambodia. We also simplified the definitions of the four core indicators. Table 2 summarizes the WASH core indicators and sub-indicators that are used throughout this study.

Table 2: Four WASH core indicators and sub-indicators and their definitions proposed for this study

Indicator	Definition
Indicator 1: % of HCFs with basic water supply	% of HCs and RHs where water from an improved (main or secondary) source, located on the premises, is available at the time of the assessment.
Indicator 2: % of HCFs with basic sanitation	% of HCs and RH outpatient departments (OPDs) with improved and functional toilets located on the premises, with at least one designated for women/girls with menstrual hygiene facilities, one separated for staff, and one meeting the needs of people with limited mobility.
Indicator 2a: % of HCFs with basic sanitation, defined based on the Cambodian standard	% of HCs and RH OPDs where there are at least three improved and usable toilets located on the premises, including one for women and one meeting the needs of people with limited mobility.
Indicator 2b: % of HCFs with limited sanitation, defined based on the Cambodian standard	% of HCs and RH OPDs where there are at least three improved and usable toilets located on the premises, but not meeting or meeting some of the needs of specific groups (staff, women and people with reduced mobility).
Indicator 3: % of HCFs with basic hand hygiene	% of HCs and RHs functional hand hygiene stations available at critical points of care and within 5m of toilets on the day of assessment.
Indicator 3a: % of HCFs with basic hand hygiene, defined based on the Cambodian standard	% of HCs and RHs where functional hand hygiene stations are available at outpatient consultation rooms/areas, delivery rooms/areas and within 5m of toilets.
Indicator 3b: % of HCFs with basic hand hygiene, defined based on the Cambodian standard	% of HCs and RHs where functional hand hygiene stations are available at outpatient consultation rooms/areas, delivery rooms/areas.
Indicator 4: % of HCFs practising basic health care waste management	% of HCs and RHs where waste is safely segregated in the consultation area and infectious and sharps wastes are treated and disposed of safely.

Methodology

4.1 Study design and sampling

This is a cross-sectional survey of 117 randomly selected HCFs, including 101 HCs and 16 RHs, at one point in time during the study period. Based on the list of the 202 HCs in the study sites (five study provinces), we randomly selected 101 (one in two) for this assessment, using the simple random sampling method. Since there were only 16 RHs, we decided to include all of them in this study.

4.2 Data collection

Data collection was carried out between October and November 2016 by a team of eight trained data collectors with previous experience of facility assessment from National Institute of Public Health (NIPH) and DHS, under close supervision of NIPH (Dr Ir Por) as the principal investigator of this study.

Data on staffing, services, electricity supply, water supply, water and sanitation facilities, general cleanliness and hygiene, in particular hand hygiene facilities, and health care waste management as well as WASH-related constraints and suggested solutions to address the constraints were collected from the 117 selected HCFs through interviews with a facility leader, mainly the chief/director, and direct observation during facility walkthroughs.

We used the national standard tools for WASH assessment in HCs and RHs to guide the data collection. The national tools have been recently adapted to the recent revision of the global indicators and definitions by the JMP [9] as described in section 3.2 above. The tools are presented in Annex 1 and 2 of this report. Basically, the tools consist of three modules: module 0 is about facility identification and assessment data; module 1 is for respondent interview; and module 2 is the checklist for facility walkthrough.

4.3 Data management and analysis

The collected data (all completed questionnaires) were gathered and checked by the supervisor for accuracy and completeness, and then processed for data entry. The data were then entered into a practical database form by two trained persons under supervision of an experienced database manager who developed and tested the database form. In order to minimize the errors, we used double data entry – each completed questionnaire was entered into the form twice by two persons separately. The entered data were then cross-checked (including matching the two sources of data), cleaned and a dataset in SPSS format was developed for analysis.

The principal investigator analysed the data using SPSS 16 to compute key variables/indicators, in particular the four WASH core indicators, which are defined based on the concepts and definitions described in Chapter 3.2 above, with and without adaptation to the Cambodian WASH-related policy/guidelines.

Where applicable, we disaggregated these indicators, location (e.g. province), type of facilities (e.g. HC versus RH) or those with and without WASH support by health partners and externally funded projects, etc. Chi-square tests were used to compare proportions between two sub-groups, and significance was determined at the 5% level ($p < 0.05$). In addition, we computed additional variables and indicators, including on health facility profile (e.g. staffing, services), electricity supply and extended list of JMP-proposed indicators on water supply, wastewater 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

We strictly followed the basic ethical procedures, 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 21 September 2016 (reference number: 331 NECHR).

In addition, the research team contacted and informed related health authorities and facilities prior to the field visit. Prior to the interview, verbal consent was asked of key informants. We respected the confidentiality of the individual respondents and facilities, and will not use their name in the reports or publications.

05

Results

5.1 Description of the sample

In total, we have collected data in 117 HCFs as planned. Table 3 presents the distribution of number of HCFs in the sample by province and operational district (OD). The largest number is in Tboung Khmum province with a total of 37 HCFs, whereas the smallest number is in Ratanakiri province with a total of 10 HCFs.

Table 3: Distribution of number of health care facilities in the sample by province and operational district

Province code and name	OD code and name	Number of health care facilities		
		Health centers	Referral hospitals	All
4 Kampong Chhnang	401 Baribo	8	1	9
	402 Kampong Tralach	6	1	7
	403 Kampong Chhnang	6	1	7
	Sub-total 1	20	3	23
6 Kampong Thom	601 Baray - Santuk	10	1	11
	602 Kampong Thom	11	1	12
	603 Stong	5	1	6
	Sub-total 2	26	3	29
10 Kratie	1001 Chhloung	6	1	7
	1002 Kratie	9	2	11
	Sub-total 3	15	3	18
16 Ratanak Kiri	1601 Ban Lung	5	1	6
	1602 Bar Kaev	3	1	4
	Sub-total 4	8	2	10
25 Tboung Khmum	304 Kroch Chhmar	5	1	6
	305 Memut	5	1	6
	306 O Reang Ov	4	1	5
	307 Ponhea Krek - Dambae	9	1	10
	310 Tboung Khmum	9	1	10
	Sub-total 5	32	5	37
TOTAL		101	16	117

Table 4 summarizes the distribution of the HCFs in the sample by their type. The large majority of the sample was normal HCs, which represents 79.5% of all the assessed HCFs in the sample. There were eight HCs with beds. Of the 16 RHs, there were three CPA3 (complementary package of activities) provincial RHs, seven CPA2 RHs, and six CPA1 RHs. (CPA1 offers care without surgical interventions, CPA2 includes emergency surgical interventions, and CPA3 includes a wide range of surgical interventions and specialised services).

Only 29 (28.9%) of the 101 HCs had an additional pre-/post-delivery building or a dedicated maternity ward. One of the eight HCs with beds surprisingly had no bed during the assessment, as it was in transition to become a normal HC. Seven others had 4 to 15 beds (excluding Tuberculosis). Only 12 (75%) of the 16 RHs had a dedicated maternity ward (excluding delivery room), and only six (37.5%) of them had a dedicated outpatient department/ward for general consultations. In the absence of a dedicated outpatient department/ward, the emergency ward was considered as an alternative to the RH walkthrough. The 16 assessed RHs had 66 beds (excluding Tuberculosis) on average, ranging from 14 to 130 beds.

Table 4: Distribution of health care facilities by their type

Type of HCFs	Frequency	Percent
Health centre (with no bed)	93	79.5%
Health centre with beds/former district hospital	8	6.8%
Referred hospital level 1 (CPA1)	6	5.1%
Referred hospital level 2 (CPA2)	7	6.0%
Referred hospital level 3 (CPA3)	3	2.6%
Total	117	100.0%

Of the total 117 assessed HCFs, 75 (64.1%) reported having received external support from at least one partner or externally-funded project to improve WASH in the facilities, and this figure is different between HCs (65.3%) and RHs (56.2%). Table 5 shows the frequency distribution of HCFs by number of WASH supporting partners/projects. Of the assessed HCFs, 35.9% have not received any WASH-related support from a partner or externally-funded project, whereas 48.7%, 12.8% and 2.6% of the HCFs reported having received WASH-related support from one, two and three partners and/or externally-funded projects respectively.

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

No. of supporting partners	Health center, number (%)	Referral hospital, number (%)	All, number (%)
0	35 (34.7)	7 (43.8)	42 (35.9)
1	50 (49.5)	7 (43.8)	57 (48.7)
2	14 (13.9)	1 (6.2)	15 (12.8)
3	2 (2.0)	1 (6.2)	3 (2.6)
Total	101 (100.0)	16 (100.0)	117 (100.0)

There were 23 different partners or externally-funded projects supporting WASH-related activities in the 117 assessed HCFs. Table 6 lists the WASH supporting partners or externally-funded projects by frequency of their supported facilities, regardless of their scope of support. The top five includes Social Capital Venture, URC, GIZ, World Vision, and RHAC.

Social Capital Venture provided support mainly on water supply, including water filter system and water container. URC focused on training health centre staff on WASH, including IPC. GIZ, World Vision and RHAC mainly support WASH infrastructure, including construction of placenta pits and ash pits or pits for glass vials (of vaccines and medicines), water pump and drill well. The list also includes HSP2-pooled funds co-funded by donors and the Royal Government of Cambodia (RGC) also supporting the construction of WASH infrastructure, mainly the construction and repair of water supply systems and placenta pits.

Besides these partners and externally-funded projects, the RGC also finances activities to continuously improve WASH infrastructure in these public HCFs, mainly through MOH and Ministry of Rural Development.

Table 6: List of WASH supporting partners/externally-funded projects by frequency of supported health facilities

No.	Name of supporting partners	No. of supported facilities	% of all assessed facilities
1	Social Capital Venture	18	15.4%
2	URC	17	14.5%
3	GIZ	12	10.3%
4	World Vision	10	8.5%
5	RHAC	10	8.5%
6	Save the Children	8	6.8%
7	HSSP2-Pooled Fund	7	6.0%
8	WaterAid and its NGO partners (Emory and GE)	6	5.1%
9	Plan International	5	4.3%
10	Samaritan's Purse	5	4.3%
11	Save Children	3	2.6%
12	ADB	3	2.6%
13	Canadian fund	3	2.6%
14	Handicap International	3	2.6%
15	People in Needs	3	2.6%
16	Child Right	2	1.7%
17	RainWater Cambodia	1	0.9%
18	UNICEF	1	0.9%
19	Denmark Red Cross + CRC	1	0.9%
20	US Military Commission	1	0.9%
21	Clear Cambodia	1	0.9%
22	CZECH	1	0.9%
23	Oxfam	1	0.9%

5.2 Staffing and services

On average, there were ten personnel, including four midwives, per HC. All HCs had at least one midwife, confirming the universal coverage of midwife at HCs. However, 12 (11.9%) of the HCs had no secondary midwife. Over 70% of the assessed HCs had just one cleaner (personnel or contracted), while 23.8% of them had no cleaner at all.

There were 63 personnel, including ten medical doctors/medical assistants, per RH on average. It is noteworthy that only one of the 16 RHs had just one medical doctor, whereas others had at least five medical doctors/medical assistants.

Table 7 summarizes health service statistics at HCs and RHs. HCs had on average 33 clients per day, compared with 65 clients per day for RHs. Taking into account the average number of personnel at HCs (10) and at RHs (63), the staff-to-client ratio is approximately three for HCs and one for RHs. Therefore, one HC staff takes care of approximately three clients and one RH staff takes care of approximately one client every day.

There were 8,152 general consultation cases on average per HC in the year preceding the assessment (or 679 cases per month or 22 cases per day), compared with 8,289 cases on average per RH in the year preceding the survey (or 691 cases per month or 23 cases per day). There were 180 baby deliveries on average per HC in the year preceding the assessment (or 15 cases per month or less than one case per day), compared with 876 deliveries on average per RH in the year preceding the assessment (or 73 cases per month or two cases per day).

There were 4,896 inpatients in the year preceding the assessment (or 408 cases per month or 13 cases per day), and 150 C-sections in the year preceding the assessment (or 13 cases per month or less than one case per day) on average per RH. One CPA2 RH surprisingly had no C-section case in the year preceding the assessment, which suggests the absence of a functioning operation theatre in that hospital.

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

Variables	Health centre	Referral hospital
Number of clients (for all services) on average per day	33	65
Number of general consultations in the year preceding the assessment	8,151	8,289
Number of baby deliveries (excluding C-sections) in the year preceding the assessment	180	876
Number of inpatients in the year preceding the assessment	-	4,896
Number of C-sections in the year preceding the assessment	-	150

5.3 Electricity supply

All the 101 assessed HCs and 16 RHs had electricity supply from at least one main source and such main source was functioning (had electricity) at the time of assessment. While the main source of electricity in all the RHs was national/community grid, only 81.2% of the assessed HCs had electricity from such a source and 18.8% had solar panels. Of the assessed HCFs, 68.4% (64.4% for HCs and 93.8% for RHs) had a secondary (back-up) source of electricity. While the secondary source at RHs was exclusively a generator, the secondary sources at HCs were variously solar panels (55.4%), generator (23.1%), lamp with battery charge (12.3%) and national/community grid (9.2%).

Table 8 shows that in the majority of the HCFs (51.5% of HCs and 50% of RHs) the electricity supply (from the main and back-up source) was always available and had had no interruption in the past seven days. Whereas electricity supply was 'often available with occasional interruptions' <2 hours/day for about one third of them, and 'sometimes available with prolonged interruptions' >2 hours/day for less than one fifth of them. In general, 77.8% of the HCFs (77.2% of HCs and 81.2% of RHs) reported that the 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	52 (51.5)	8 (50.0)	60 (51.3)
Often available, interruptions <2h/day	32 (31.7)	5 (31.2)	37 (31.6)
Sometimes available, prolonged interruptions >2h/day	17 (16.8)	3 (18.8)	20 (17.1)
Total	101 (100.0)	16 (100.0)	117 (100.0)

5.4 Water supply

Table 9 shows that the most commonly used (main) sources of water at HCs were tube well or borehole on the premises (47.5%), piped water on the premises (20.8%), protected dug well on the premises (12.9%), unprotected dug well (8.9%), protected rainwater collection on the premises (6.9%), improved sources off the premises within 500 m (2%) and surface water (1%). For RHs, the main sources of water were tube well or borehole on the premises (43.8%), piped water on the premises (37.5%), protected dug well on the premises (12.5%) and surface water (6.2%).

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

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Piped water on the premises	21 (20.8)	6 (37.5)	27 (23.1)
Tube well or borehole on the premises	48 (47.5)	7 (43.8)	55 (47.0)
Protected dug well on the premises	13 (12.9)	2 (12.6)	15 (12.8)
Protected rainwater collection on the premises	7 (6.9)	0	7 (6.0)
Improved source off the premises within 500m	2 (2.0)	0	2 (1.7)
Unprotected dug well	9 (8.9)	0	9 (7.7)
Surface water	1 (1.0)	1 (6.2)	2 (1.7)
Total	101 (100.0)	16 (100.0)	117 (100.0)

The improved sources on the premises (piped water on the premises, tube well or borehole on the premises, protected dug well on the premises, and protected rainwater collection on the premises) represented 88.9% of the main sources at all assessed HCFs (88.1% at HCs and 93.8% at RHs); and the difference is not significant statistically. Still, 10 HCs and one RH had unprotected dug well and surface water as their main water source. Of the improved sources on the premises, 97.1% were functioning with water available (as confirmed by taps or pump delivering water) during the assessment (100% at RHs, compared with only 96.6% at HCs).

Percentage of HCFs with basic water supply (indicator 1) refers to the percentage of HCs and RHs where water from an improved source (primary or secondary) located on the premises is available at the time of assessment. The result shows that 90.6% of the assessed HCFs (90.1% of HCs and 93.8% of RHs) had basic water supply. 93.3% of the HCFs receiving WASH support from at least one partner had basic water supply, compared with only 85.7% of those with no such support, but the difference is not significant statistically. Only 1.7% of them (2% of HCs, and none of the RHs) had water available from an improved source off the premises. 6% of the HCFs (5.9% of HCs and 6.2% of RHs) relied solely on water from an unimproved/open source at the time of assessment.

It is noteworthy that four HCs which reported unprotected dug well and surface water as their main water source had water available from a secondary improved source (mainly protected rainwater collection). Figure 1 shows the percentage of HCFs with water from an improved source available on the premises (basic water supply), with water from an improved source available off the premises (limited water supply), and with water supply from an unimproved or open source.

Figure 1: Percentage of health centres and referral hospitals with basic water supply, limited water supply and water supply from an unimproved or open source

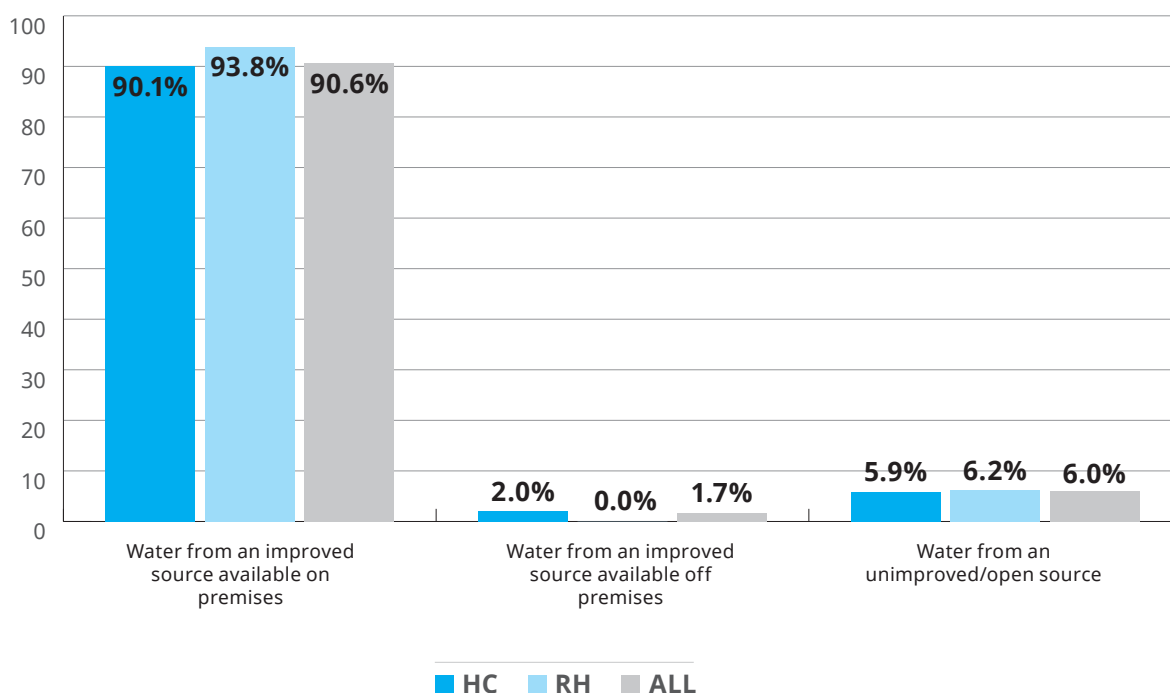


Figure 2: Percentage distribution of health facilities with basic water supply by province

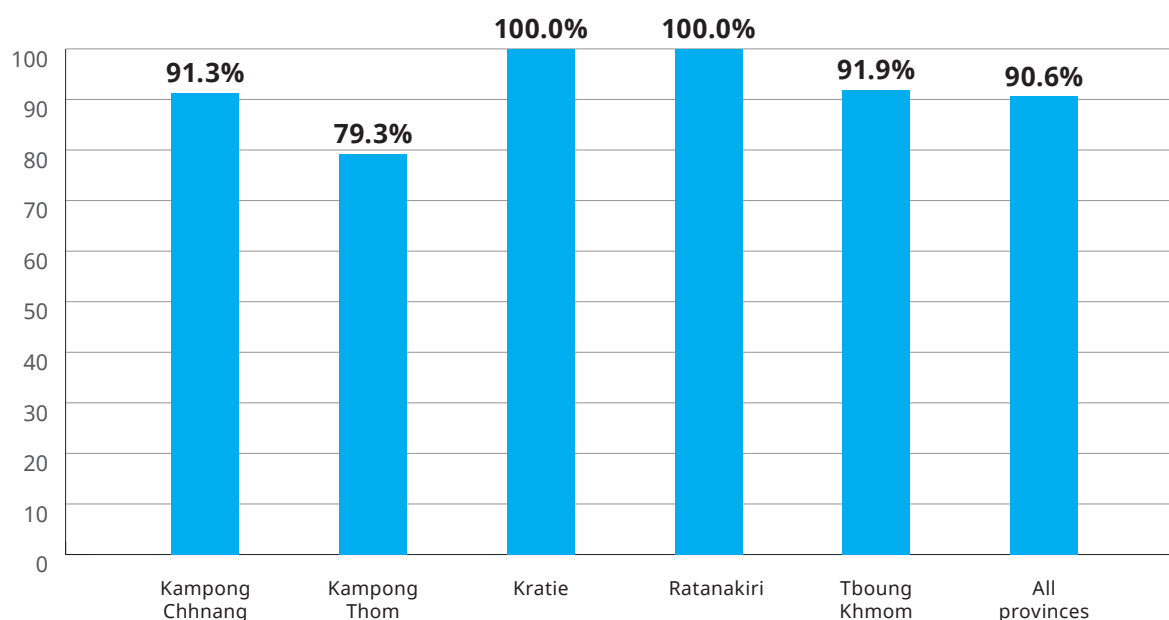


Figure 2 shows the percentage distribution of HCFs with basic water supply by province. Surprisingly, all the assessed HCFs in remote provinces (Kratie and Ratanakiri) had basic water supply at the time of assessment, compared with 91.3% and 91.9% in Kampong Chhnang and Tboung Khmom respectively. The percentage of HCFs with basic water supply in Kampong Thom was only 79.3%, which is below the average of the five provinces (90.6%).

According to facility key informants, the main source of water (when it is fully functioning) at 74.4% of the HCFs (73.3% for HCs and 81.2% for RHs) generally provided enough water the whole year (for general purposes), whereas it was enough only sometimes and seasonally at 21.4% of the HCFs (21.8% and 18.8% of the HCs and RHs respectively). 5% of the HCs reported never having enough water supplied by their main source.

Besides the main water source, 59.8% of the assessed HCFs (62.4% of HCs and 43.8% of RHs) had a secondary water source. The most common secondary water source was protected rainwater collection on the premises for HCs and tube well/borehole on the premises for RHs (Table 10).

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

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Tube well or borehole on the premises	9 (14.3)	4 (57.1)	13 (18.6)
Protected dug well on the premises	5 (7.9)	1 (14.3)	6 (8.6)
Protected rainwater collection on the premises	25 (39.7)	0	25 (35.7)
Improved source off the premises within 500m	2 (3.2)	0	2 (2.9)
Unprotected dug well	2 (3.2)	0	2 (2.9)
Cart with small tank or drum/tanker truck	13 (20.6)	1 (14.3)	14 (20.0)
Surface water	7 (11.1)	1 (14.3)	8 (11.4)
Total	63 (100.0)	7 (100.0)	70 (100.0)

Of the assessed HCFs, 66.7% (66.3% for HCs and 68.8% for RHs) reported having used the available sources water for drinking. Among those using the available sources for drinking water, 74.4% (73.1% for HCs and 81.8% for RHs) said they treated the water for drinking purpose. The most common water treatment method used by HCFs was filtration (65.2%), followed by boiling (30.3%). A few facilities (4.5%) said they used chlorine to treat water.

The reasons why HCFs did not treat water for drinking purpose include the fact that HCF staff prefer to drink bottled water, which is easy and cheap (48.3%), rather than treat the water for which many of them did not have filter or purification materials (37.9%) and a few of them had no time to do so (3.4%). Some of them considered the available water sources safe (10.3%). It is noteworthy that many HCFs with piped water did not consider it safe and still treat it for drinking purposes.

Source of drinking water was provided for clients at 46.2% of the assessed HCFs (49.5% of HCs and 25% 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 and bottled water bought by the facility. Two HCs said they received drinking water for clients from a private company.

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	26 (52.0)	4 (100.0)	30 (55.6)
Bottled water bought by the health facility	22 (44.0)	0	22 (40.7)
Pure water supported by private company	2 (4.0)	0	2 (3.7)
Total	50 (100.0)	4 (100.0)	54 (100.0)

The major sources of drinking water for staff at HCs and RHs include bottled water bought by staff (44%), bottled water bought by the health facility (34.2%) and the sources available at the HCFs (20.7%). Two HCs also said health staff received drinking water from private company.

Table 12 shows the situation of available water sources and needs at HCs and RHs. 48.7% of the assessed HCFs (47.5% of HCs and 56.2% 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. 39.3% of the assessed HCFs (38.6% of HCs and 43.8% of RHs) said that the available water sources provide enough water the whole year only for general purposes other than for drinking purpose. Ten HCs (9.9%) reported that the available sources provide enough water only seasonally, whereas four HCs (4%) complained that the available sources never provide enough water.

Table 12: Available water sources and needs at health centres and referral hospitals

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Never enough water	4 (4.0)	0	4 (3.4)
Enough water sometimes (seasonally), even for general purposes	10 (9.9)	0	10 (8.5)
Enough water for whole year for general purposes, not for drinking	39 (38.6)	7 (43.8)	46 (39.3)
Enough water whole year for all purposes, including drinking	48 (47.5)	9 (56.2)	57 (48.7)
Total	101 (100.0)	16 (100.0)	117 (100.0)

5.5 Sanitation facilities and waste water

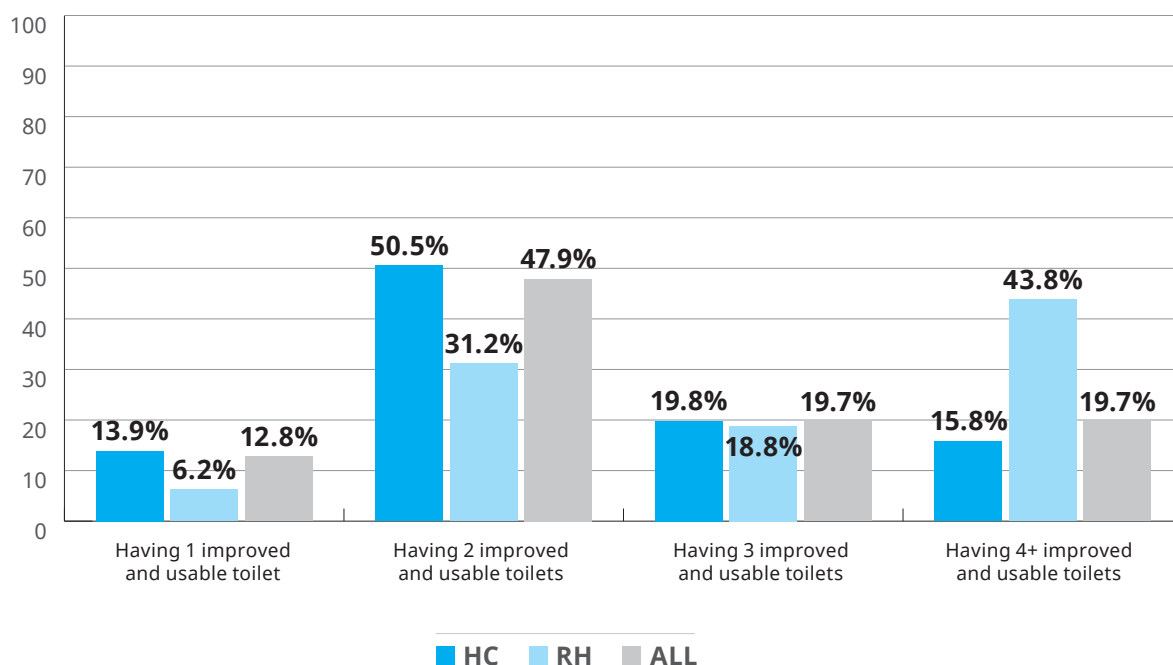
All toilets HCFs had on average three sanitation facilities or toilets (mean = 2.85), ranging from a minimum of one to a maximum of eight. All of them (100%) were improved toilets, of which a large majority are pour flush toilet connected to septic tanks and a few of them (at RHs) are flushed toilets. All assessed HCs had on average three toilets (mean = 2.81), ranging from a minimum of one to a maximum of eight, whereas RH (outpatient department) also had on average three improved toilets (mean = 3.12), ranging from a minimum of one to a maximum of eight.

While 10.3% of the assessed HCFs (8.9% of HCs and 18.8% of RHs) had improved toilets separately for men and women², only one HC had a toilet with menstrual hygiene facilities for women/girls (having a bin with a lid on it within the cubicle or water available in a private space for washing). 74.4% of the assessed HCFs (72.3% of HCs and 87.5% of RHs) had improved toilets separately for health staff and clients, and only 11.1% of them (10.9% of HCs and 12.5% of RHs) had a toilet meeting the needs of people with limited mobility.

Only 86% of the available toilets were found to be usable (having 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) during the facility walkthrough. However, the average number of improved and usable toilets remains approximately three with a relatively smaller mean (2.50 for all; 2.42 for HCs and 3.0 for RH OPD).

Figure 3 shows the percentage distribution of assessed HCs and RHs having one, two, three and four or more improved and usable toilets. Where the largest proportion of HCs (50.5%) had two improved and usable toilets, the largest proportion of RH OPDs (48.3%) had four or more improved and usable toilets.

² It is noteworthy that among the assessed HCFs only one HC had a toilet with facilities to manage menstrual hygiene needs for women/girls.

Figure 3: Frequency distribution of improved and usable toilets

If we accumulate the above figures, all of the assessed HCFs had at least one improved and usable toilet, 87.2% (86.1% of HCs and 93.8% of RHs) had at least two, but only 39.3% (35.6% of HCs and 62.5% of referral hospitals) had at least three, and 19.7% (15.8% of HCs and 43.8% of RHs) them had four or more improved and usable toilets.

Percentage of HCFs with basic sanitation (indicator 2) refers to the percentage of HCs and RHs (outpatient department) where there are improved and usable toilets located on the premises, with one separate for staff, one designated for women/girls with menstrual hygiene facilities, and one meeting the needs of people with limited mobility. The result shows that none of the HCFs meet this JMP definition of basic sanitation, however all HCFs have limited sanitation (as defined in Table 1) and thus, there is no HCF with unimproved or no toilets.

The adapted indicator for basic sanitation (indicator 2a) refers to the percentage of HCs and RHs (outpatient department) where there are at least three improved and usable sanitation facilities, including one for women/girls and one meeting the needs of people with limited mobility. The result shows that 2.6% of the assessed HCFs (2% of HCs and 6.2% of RHs) had basic sanitation as defined above. While 4% of the HCFs receiving WASH support from at least one partner had basic sanitation, none of the facilities with no partner support had basic sanitation. The difference is not significant statistically.

If we further lower the standard to percentage of HCs and RHs with at least three improved and usable toilets, but not meeting or meeting some of the needs of specific groups (indicator 2b), the results shows that 39.3% of the assessed HCFs (35.6% of HCs and 62.5% of RHs) had limited sanitation. Figure 4 presents the results of indicator 2, 2a and 2b.

Figure 4: Percentage of health centres and referral hospitals with basic and limited sanitation

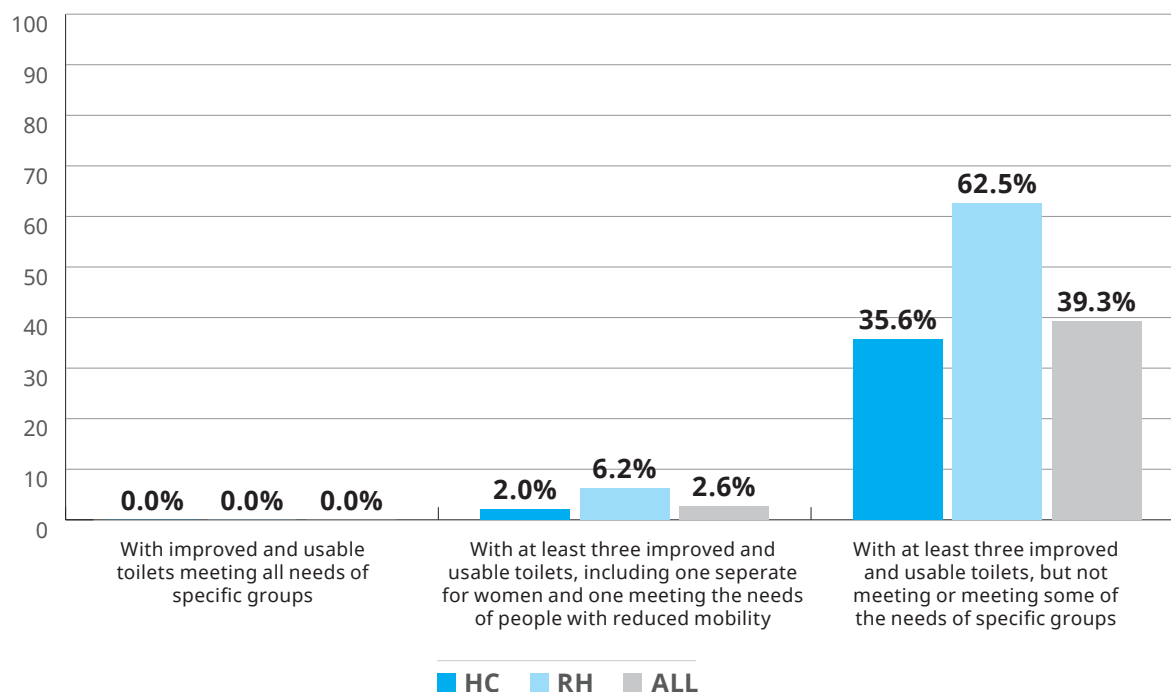
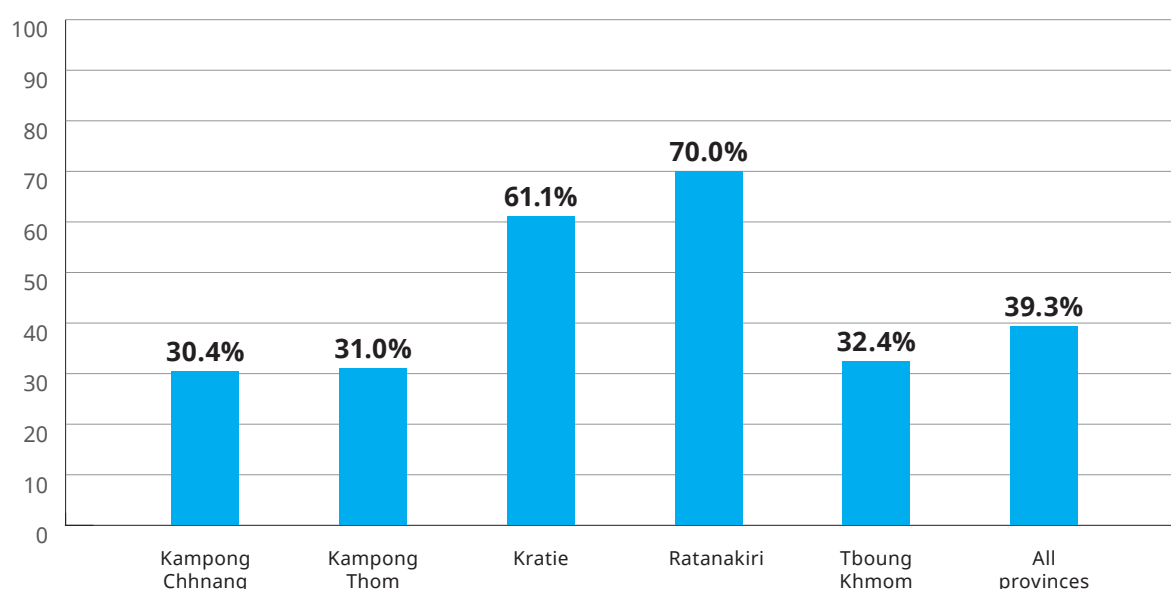


Figure 5 shows the percentage distribution of HCFs with limited sanitation (as defined by indicator 2b above) by province. The figure in Ratanakiri was the highest, followed by Kratie. Kampong Cham, Kampong Thom and Tboung Khmom are similarly low, and lower than the average of the five provinces.

Almost all the HCFs reported that faecal wastes from their improved and usable sanitation facilities were stored onsite in septic tank, and 45.3% of them (41.6% of HCs and 68.8% of RHs) had a functioning system in place to adequately drain rainwater away from the facility and facility grounds.

Figure 5: Percentage distribution of HCFs with limited sanitation (indicator 2b) by province



5.6 General cleanliness and hygiene

During the HCF walkthrough, the assessors observed the availability and functionality (having water and soap for hand washing or alcohol-based hand rubs at the time of assessment) of hand hygiene stations at five critical points of (outpatient) care. These include consultation, dressing/minor surgery, vaccination/EPI, antenatal care/family planning, and delivery rooms for HCs; and outpatient, emergency, paediatric, medicine, and maternity/delivery wards/rooms for RHs. The availability and functionality of hand hygiene stations were also observed at a maximum of four toilet areas.

The results show that in 7.7% of the assessed HCFs, there was no functional hand hygiene station available at any point of care, whereas 92.3% others had a functional hand hygiene station available at least at one point of care. 6% of the assessed HCFs had functional hand hygiene stations available at five points of care. In 67.5% of the assessed HCFs, there was no functional hand hygiene station available at any toilet, whereas 32.5% others had a functional hand hygiene station available at at least one toilet area. Only 0.9% of the assessed HCFs had a functional hand hygiene station available at four toilets.

Percentage of HCFs with basic hand hygiene (indicator 3) refers to the percentage of HCs and RHs where functional hand hygiene stations (with water and soap for washing hands or an alcohol-based hand rub dispenser) are available at critical points of care and within 5m of toilets. The result shows that 2.6% of the assessed HCFs (2% of HCs and 6.2% of RHs) had basic hand hygiene.

14.5% of the assessed HCFs (13.9% of HCs and 18.8% of RHs) had functional hand hygiene stations available at outpatient and delivery rooms/areas and within 5m of toilets (indicator 3a). 13.3% of the HCFs receiving WASH support from at least one partner had basic hand hygiene, compared with 16.7% of those with no partner support. The difference is not significant statistically. If we further lower the standard, the result shows that 49.6% of the assessed HCFs (48.5% of HCs and 56.2% of RHs) had functional hand hygiene stations available at outpatient and delivery rooms/areas. Figure 6 shows that percentage of HCs and RHs with basic and limited hand hygiene as defined above.

Figure 6: Percentage of health centres and referral hospitals with basic and limited hand hygiene

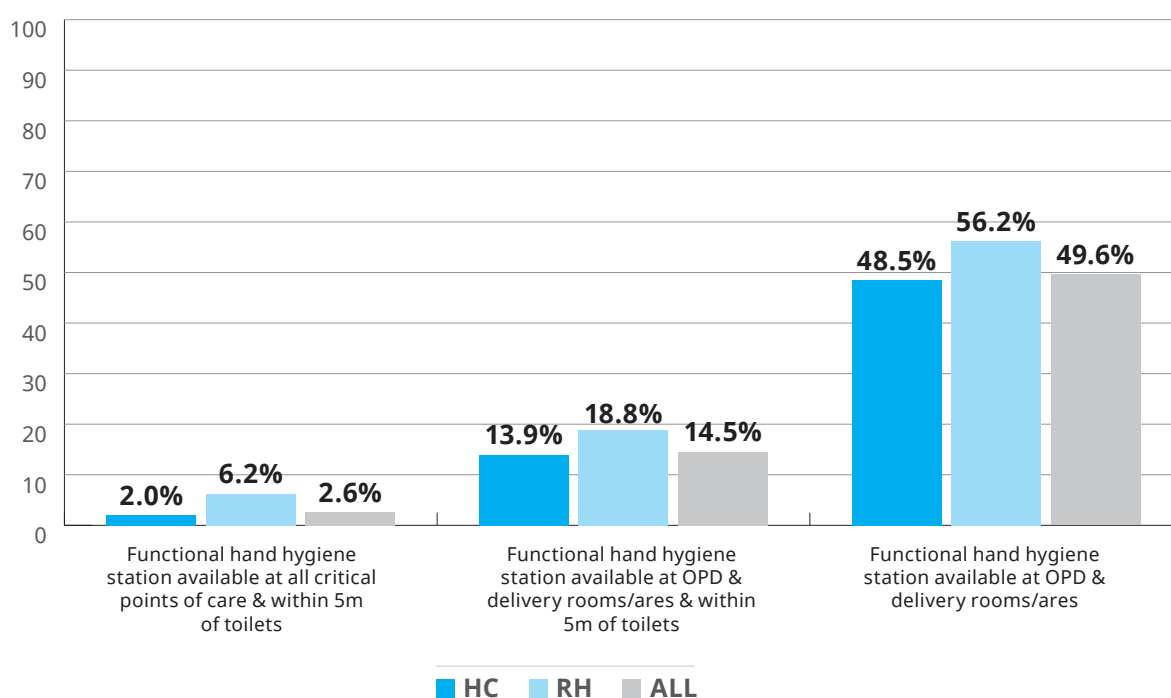


Figure 7: Percentage distribution of HCFs with limited hand hygiene by province

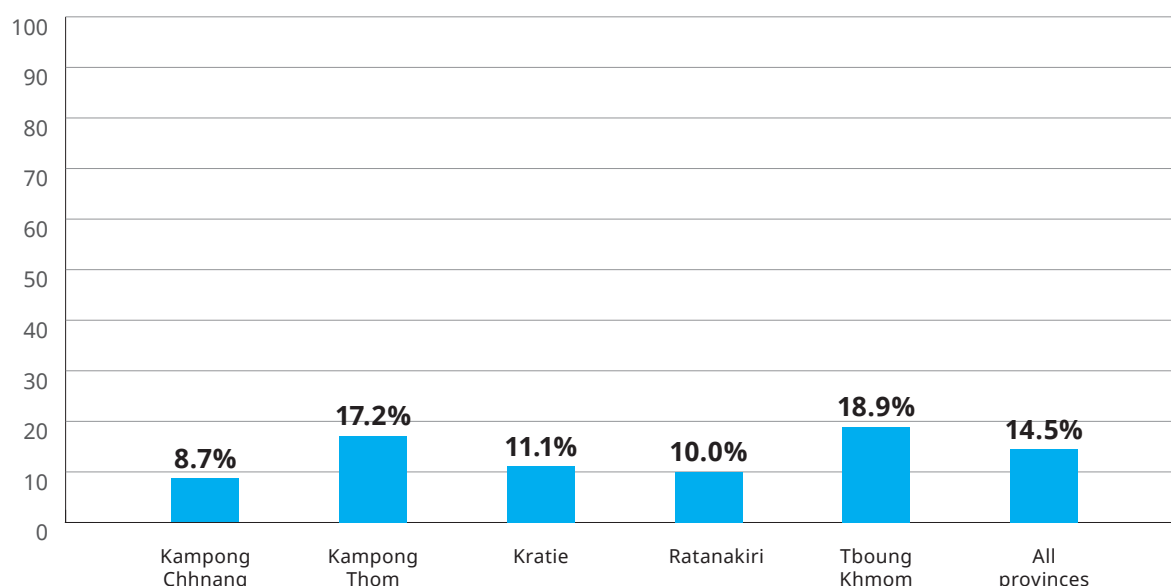


Figure 7 shows the percentage distribution of HCFs with limited hand hygiene by province. It shows a comparably low picture across the five provinces, with Kampong Thom and Tboung Khmom higher than the average of the five provinces, and three other provinces below the average.

All the assessed HCFs, except one HC, reported that facility floors, surfaces and toilets were cleaned on a routine basis. Table 13 shows that 79.3% of the assessed HCFs (78% of HCs and 87.5% of RHs) had their floors, surfaces, toilets cleaned on a daily basis, whereas 12.9% of them (13% of HCs and 12.5% of RHs) did this once every two days, and 7% of the HCs did it once every three to four days and 2% did it only once a week.

Table 13: Frequency of routine cleaning at health centres and referral hospitals

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
At least once a day	78 (78.0)	14 (87.5)	92 (79.3)
Every two days	13 (13.0)	2 (12.5)	15 (12.9)
Once every three to four days or twice a week	7 (7.0)	0	7 (6.0)
Once a week (weekly)	2 (2.0)	0	2 (1.7)
Total	100 (100.0)	16 (100.0)	116 (100.0)

However, only 60.3% of the assessed HCFs (60% of HCs and 62.5% of RHs) reported that facility floors, surfaces and toilets were cleaned with water and detergent/disinfectant (e.g. chlorine 0.05%) on a routine basis. Table 14 shows that 52.9% of the assessed HCFs (48.3% of HCs and 80% of RHs) had their floors, surfaces, toilets cleaned with water and detergent/disinfectant on a daily basis, whereas a few others did this only once every two days. It is noteworthy that 25% of the HCs did this once every three to four days and 11.7% did this only once a week.

Table 14: Frequency of routine cleaning with detergent at health centres and referral hospitals

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
At least once a day	29 (48.3)	8 (80.0)	37 (52.9)
Every two days	9 (15.0)	2 (20.0)	11 (15.7)
Once every three to four days or twice a week	15 (25.0)	0	15 (21.4)
Once a week (weekly)	7 (11.7)	0	7 (10.0)
Total	60 (100.0)	10 (100.0)	70 (100.0)

Table 15 shows the general cleanliness at critical points of care delivery (outpatient consultation room/ward, antenatal care consultation/family planning room/ward, delivery room/maternity ward) of HCs and RHs as observed by the assessors during the facility walkthrough. Similarly for all the critical points of care delivery of HCs and RHs, a large majority (over two thirds) were found to be visibly cleaned. Surprisingly, the cleanliness at RHs (in particular at antenatal care/family planning room which were often non-existing at RHs) appears to be generally less than at HCs. Toilets at HCs and the outpatient area of RHs were in general less cleaned than points of care. Only 38.1% of the assessed HCFs (37.8% of HCs and 40% of RHs) had toilets that looked visibly clean (no blood or body substances, scum, dust, lime scale, stains, deposit or smears) and were free of unpleasant smells and flies. 54.3% of the assessed HCFs (49% of HCs and 87.5% of RHs) reported that they had separate cleaning equipment/materials for floors, surfaces, and points of care delivery.

Table 15: General cleanliness at critical points of care delivery at health centres and referral hospitals

Variables	Health centre (n=101)	Referral hospital (n=16)	All (n=117)
Outpatient consultation room/area			
% of HCFs where the floor is visibly clean, free from dust and soil, and no unnecessary or unused equipment or furniture	74.0%	78.6%	74.6%
% of HCFs where the consultation bed is visibly clean (covered by a clean, waterproof mattress)	74.0%	66.7%	73.1%
Antenatal care/family planning room/ward			
% of HCFs where the floor is visibly clean, free from dust and soil, and no unnecessary or unused equipment or furniture	72.3%	56.2%	70.1%
% of HCFs where the consultation bed is visibly clean (covered by a clean, waterproof mattress)	83.2%	62.5%	80.3%
Delivery room/maternity ward			
% of HCFs where the floor is visibly clean, free from dust and soil, and no unnecessary or unused equipment or furniture	72.9%	81.2%	74.1%
% of HCFs where the consultation bed is visibly clean (covered by a clean, waterproof mattress)	80.2%	87.5%	81.2%

All the assessed HCs and RHs reported having appliances available for sterilizing medical equipment. The most common type of sterilizer used was non-electric autoclave or pressure cooker (66.7%), followed by electric autoclave (28.2%) and electric dry heat sterilizer (5.1%).

Only 37.6% of all the assessed HCFs had the latest version (2010) of IPC Guidelines for HCFs available at the time of assessment. The availability of these guidelines was significantly lower at HCs (31.7%) than at RHs (75%). The percentage of HCFs which reported having received IPC training was 81.2%, much higher than their possession of IPC Guidelines. Such percentage of IPC training offered appears to be also lower at HCs (79.2%) than at RHs (93.8%), but the difference is not significant statistically. 89.5% of the assessed HCFs (91.2% of HCs and 80% of RHs) reported that only some of their clinical staff had received training at least once on the five key moments and appropriate steps/procedures of hand hygiene. Only 10.5% of them (8.8% of HCs and 20% of RHs) reported that all of their clinical staff had received such training at least once.

The percentage of HCFs that had hand hygiene promotion posters displayed near hand hygiene stations and/or patient waiting area during the assessment was relatively low at 35.9% (33.7% for HCs and 50% for RHs). While 62.5% of the RHs reported having an IPC Committee, none of the HCs did so. It was understood that such committees have never been created at HC level.

5.7 Health care waste management

Table 16 shows that only 17.1% of the assessed HCFs (15.8% of HCs and 25% of RHs) had one set of bins clearly labelled (colour coded or written labels/signs) and available at consultation room/area for safely segregation of sharps³, infectious non-sharps and general wastes, and 21.4% of them (20.8% of HCs and 25% of RHs) had their health care wastes segregated into different bins according to their category.⁴ Combining the two variables above, only 13.7% of the HCFs (11.9% of HCs and 25% of RHs) had their health wastes safely segregated.

Table 16: Waste segregation at consultation room/area

Variables	Health centre (n=101)	Referral hospital (n=16)	All (n=117)
% of HCFs where there is a set of three separate and clearly labelled bins for general, infectious and sharps wastes in consultation area	15.8%	25.0%	17.1%
% of HCFs where health care wastes are segregated into different bins according to their category	20.8%	25.0%	21.4%
% of HCFs where wastes are safely segregated (a set of three bins available with well segregated wastes) in consultation area	11.9%	25.0%	13.7%

Table 17 summarizes how sharps waste was treated and finally disposed of by HCFs. 64.1% of them (64.4% of HCs and 62.5% of RHs) reported having treated and finally disposed of their sharps waste by removing them off the facilities with appropriate storage (in a protected container) to be burned in a high capacity incinerator, while 16.2% of them (15.8% of HCs and 18.8% of RHs) burned it in an onsite low capacity incinerator. 10.9%

³ For HCs, since injections are not supposed to be done at consultation, bin for sharps waste was not considered

⁴ The bins are not more than 75% full and each should not contain waste other than that corresponding to their label

of the HCs dumped it in onsite protected pits, whereas 12.5% of the RHs dumped it on open ground or unprotected pits.

Table 17: Treatment and final disposal of sharps waste

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Burn in onsite low capacity incinerator	16 (15.8)	3 (18.8)	19 (16.2)
Burn on the facility grounds (+/- protection)	5 (5.0)	0	5 (4.3)
Dump in onsite designated and protected pits (lined and sealed)	11 (10.9)	1 (6.2)	12 (10.3)
Dump on flat ground or unprotected pits	3 (3.0)	2 (12.5)	5 (4.3)
Bury inside the facility grounds (+/- treatment)	1 (1.0)	0	1 (0.9)
Remove offsite in protected container to be burned in a high capacity incinerator	65 (64.4)	10 (62.5)	75 (64.1)
Total	101 (100.0)	16 (100.0)	117 (100.0)

Table 18 summarizes how infectious waste was treated and finally disposed of by HCFs. 57.3% of them (58.4% of HCs and 50% of RHs) reported having treated and finally disposed of their infectious waste by burning it in onsite low capacity incinerator, while 22.2% of them (23.8% of HCs and 12.5% of RHs) burned it on the facility grounds with or without protection. 10.3% of the HCFs (8.9% of HCs and 18.8% of RHs) dumped it on flat grounds or unprotected pits. It is noteworthy that 12.5% of the RHs reported having removed infectious waste in unprotected storage and using inappropriate disposal, usually through general waste collection system.

Table 18: Treatment and final disposal of infectious waste

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Burn in onsite low capacity incinerator	59 (58.4)	8 (50.0)	67 (57.3)
Burn on the facility grounds (+/- protection)	24 (23.8)	2 (12.5)	26 (22.2)
Dump in onsite designated and protected pits (lined and sealed)	2 (2.0)	1 (6.2)	3 (2.6)
Dump on flat ground or unprotected pits	9 (8.9)	3 (18.8)	12 (10.3)
Bury inside the facility grounds (+/- treatment)	2 (2.0)	0	2 (1.7)
Remove offsite in protected container to be burned in a high capacity incinerator	4 (4.0)	0	4 (3.4)
Remove offsite in unprotected storage and use inappropriate treatment and disposal	1 (1.0)	2 (12.5)	3 (2.6)
Total	101 (100.0)	16 (100.0)	117 (100.0)

Table 19 summarizes how placenta waste was finally disposed of by HCFs. 69.2% of them (66.3% of HCs and 87.5% of RHs) reported having finally disposed of their placenta waste by dumping them in designated and protected placenta pits onsite, while 19.7% others (20.8% of HCs and 12.5% of RHs) let the mother take the placenta home, following the mother's request to do so according to their tradition. There were 6.9% of HCs reporting burying the placenta in the facility grounds with/without treatment.

Table 19: Final disposal of placenta waste

Variables	Health centre, number (%)	Referral hospital, number (%)	All, number (%)
Dump in onsite designated and protected pits (lined and sealed)	67 (66.3)	14 (87.5)	81 (69.2)
Bury inside the facility grounds (+/- treatment)	7 (6.9)	0	7 (6.0)
Mother takes home	21 (20.8)	2 (12.5)	23 (19.7)
Not applicable (no delivery)	6 (5.9)	0	6 (5.1)
Total	101 (100.0)	16 (100.0)	117 (100.0)

According to the national IPC and Waste Management Guidelines as described in Chapter 3.2 above, sharps waste treatment/disposal is considered safe when it was reported to be placed in puncture-resistant containers and transported to be incinerated in a high capacity incinerator (e.g. SICIM). Safe infectious waste that was reported to be appropriately segregated and burned in a relatively low capacity incinerator (made of bricks) is considered as treated/disposed of safely. The recommended safe disposal of placenta is to put them in a protected placenta pit.

Table 20, which summarizes Table 16, Table 17, Table 18 and Table 19, shows that 74.4% of assessed HCFs (75.2% of HCs and 68.8% of RHs) reported having their sharps waste treated/disposed of safely, compared with 63.2% (64.4% for HCs and 56.2% for RHs) for safe treatment/disposal of infectious waste, and 69.2% (66.3% for HCs and 87.5% for RHs) for safe disposal of placenta waste. Overall, there were only 35% of the assessed HCFs (34.7% of HCs and 37.5% of RHs) where all the above health care wastes are treated/disposed of safely.

Table 20: Safe treatment and disposal of health care wastes

Variables	Health centre (n=101)	Referral hospital (n=16)	All (n=117)
% of HCFs where sharps wastes are treated/ disposed of safely	75.2%	68.8%	74.4%
% of HCFs where infectious wastes are treated/ disposed of safely	64.4%	56.2%	63.2%
% of HCFs where placenta are treated/ disposed of safely	66.3%	87.5%	69.2%
% of HCFs where all the above health care wastes are treated/disposed of safely	34.7%	37.5%	35%

Percentage of HCFs practising basic health care waste management (indicator 4) refers to the percentage of HCs and RHs where wastes are safely segregated in consultation area and infectious and sharps wastes are treated and disposed of safely. The result shows that 10.3% of the assessed HCFs (9.9% of HCs and 12.5% of RHs) were practising basic health care waste management as defined above. 12% of the HCFs receiving WASH support from at least one partner were practising basic health care waste management, compared with 7.1% of those with no partner support. The difference is not significant statistically. 13.7% of the assessed HCFs (11.9% of HCs and 25% of RHs) had waste safely segregated in consultation area, but infectious and sharps wastes were not treated/disposed of safely. 89.7% of the assessed HCFs (90.1% of HCs and 87.5% of RHs) did not have waste safely segregated in consultation areas or infectious and sharps wastes were not treated and disposed of safely (Figure 8).

Figure 8: Percentage of health centres and referral hospitals practising basic, limited and poor/no health care waste management

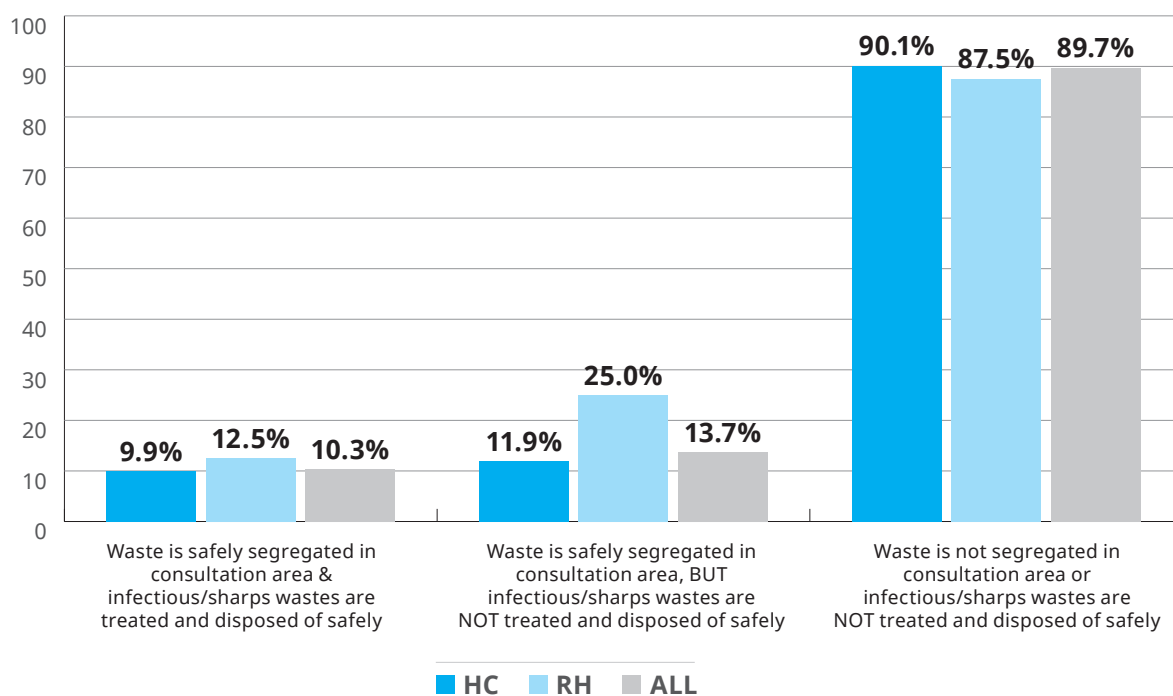


Figure 9: Percentage distribution of HCFs practising basic health care waste management by province

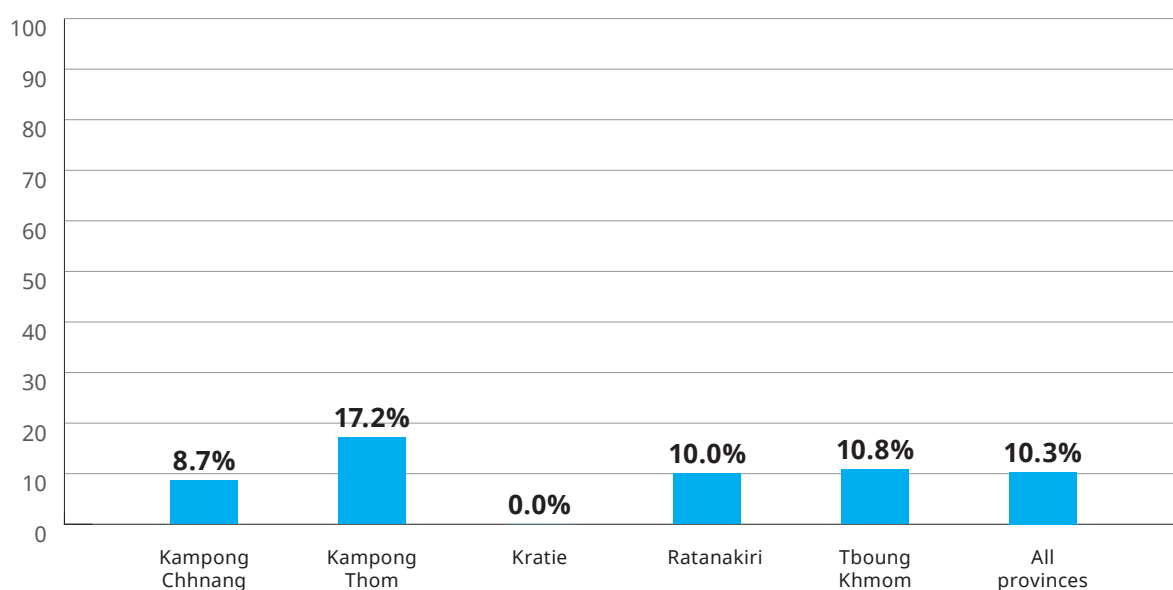


Figure 9 shows the percentage distribution of HCFs practising basic health care waste management by province. This highest figure was in Kampong Thom, followed by Tboung Khmom, Ratanakiri and Kampong Chhnang. None of the facilities in Kratie were practising basic health care waste management.

Only 32.5% of the assessed HCFs (33.7% of HCs and 25% of RHs) had a protected needles pit (lined and sealed with slab) on the facility premises. It was further understood that many of such needles pits were actually built for putting glass in, e.g. used and unburned vials, but HCFs used them as needles pit too. They did not have the appropriate connection for safely pouring needles from the needle boxes.

72.6% of the HCFs (71.3% for HCs and 81.2% for RHs) had a protected placenta pit (lined and sealed with slab) on the facility premises. While all the RHs had an incinerator (43.8% had a high capacity one burning at +800oC and 56.2% had a low capacity one – a burner-type of incinerator made of bricks), 77.2% of the HCs had the low capacity kind and 22.8% of them did not have any incinerator.

5.8 Reported major WASH-related constraints and suggested solutions

Table 21 summarizes the major WASH-related constraints reported by facility key informants. The most commonly reported was the lack of knowledge of (and, to a larger extent, commitment to) sanitation and hygiene, including IPC, among health staff and cleaners, as well as among clients. This, coupled with often absence or lack of cleaners and cleaning materials, created a major problem for general cleanliness, sanitation and hygiene at HCFs. The general cleanliness could be even worse for HCFs located in lowland areas with no concrete footpath or functioning system for drainage of rainwater.

A problem with the incinerator (e.g. the lack of functioning high capacity incinerator to burn sharps waste; the usually existing low capacity incinerator at HCs is sometimes broken or difficult to burn or located in inappropriate place) was one of the major reasons for inappropriate or unsafe treatment/disposal of sharps and infectious wastes. In general, auto-disable syringes and needles used for vaccination at HCs are put into protected needles boxes and transported to be burned in a high capacity incinerator at RHs or ODs. The problem was related to transportation of the needle boxes and the functionality of the high capacity incinerator, and sometimes related to the needles and other sharps wastes used for purposes other than vaccination.

While water supply was relatively good as shown by the indicator 1 above, some key informants reported a problem with their water supply system (e.g. the main or secondary sources were broken; no/too small concrete rainwater collection or protected dug well as a secondary source). Some key informants reported the insufficient quality of water supply to be used for general purposes, mainly during the dry season, which could be partly as a result of the lack of functioning secondary water source. Some complained about no drinking water of acceptable quality (no colour, no smell and acceptable taste) available for staff and clients.

Table 21: Major WASH-related constraints reported by health facility key informants

Major WASH-related constraints raised by health facility key informants	Responses number (%)
Health staff and cleaners lack of knowledge of and commitment to sanitation and hygiene, including IPC	59 (18.6)
Incinerator problem: no high capacity incinerator; incinerator exists but broken or with difficulty burning	49 (15.4)
Patients' lack of knowledge about sanitation and hygiene	26 (8.2)
Water supply system problem: the system is broken, no/too small concrete rainwater collection; no protected dug well	26 (8.2)
No/lack of cleaners or staff responsible for sanitation and general cleaning	21 (6.6)
No acceptable (pure) drinking water for staff and clients to drink	19 (6.0)
Lack of cleaning materials, including detergent	15 (4.7)
Health facilities are located in lowland area but have no concrete footpath	15 (4.7)
Lack of toilets/available toilets are not functional, e.g. obstructed	13 (4.1)
No electric network or the existing network (e.g. solar panel) is broken	13 (4.1)
Lack of water in dry season; the quantity of water is not enough for general purposes	11 (3.5)
No pre-/post-delivery room; no maternity room	10 (3.1)
No placenta pit	8 (2.5)
No/lack of hand hygiene stations, or existing but no running water	7 (2.2)
Lack of water pump motor/water pump machine was broken	7 (2.2)
Health facility compound is narrow/no budget to build fences	7 (2.2)
No/lack of bathroom for laundry/patients	5 (1.6)
No ways (company) to take general waste out of the facility	4 (1.3)
No/not well functioning system to drain rainwater out of the facility grounds	2 (0.6)
No needle pit	1 (0.3)
Total	318 (100.0)

Some facility key informants complained about the lack of toilets or poor quality of toilets. Some toilets soon after construction were full or frequently obstructed. With the absence of an effective maintenance system, functioning toilets were often not available. Some reported the lack of toilets designated for, or meeting the needs of, people with reduced mobility. While many HCFs had a toilet for women/girls, none of them had appropriate facilities for menstrual hygiene needs (a bin with a lid on it within the cubicle or water available in a private space for washing) as recommended by JMP.

A few key informants said that they had no electric network or the existing network or supply system (e.g. solar panel) is broken, whereas a few others reported the lack of a placenta pit. The latter, coupled with the cultural belief that taking the placenta back home gives good luck to the baby, mother and family, placenta disposal remains a problem in a number of facilities.

A few key informants reported the lack of hand hygiene stations at their facilities or that the hand hygiene existed, but there was no running water. Ten key informants considered the absence of a pre-/post-delivery room at their HCFs as a major WASH constraint. While domestic or general waste is not a major problem in most HCFs, a few RCs still found the poor performance or absence of effective (general) waste collection system/company in their area to be a major WASH constraint.

Key informants suggested a number of solutions to address the reported WASH-related constraints above. In line with the type and magnitude of the constraints, provision of training on WASH, in particular IPC (including five key moments and key steps of appropriate of hand hygiene) to health staff, and perhaps also to cleaners, as well as training on general cleanliness, sanitation and hygiene to the patients and relatives while attending the HCFs and in the communities was considered an immediate and priority solution. Some suggested allocating state budget to rent cleaners or MOH recruiting sufficient cleaners for HCFs, as using income from user fees to pay for this is not sufficient.

Another important solution suggested by a number of key informants was to find a reliable source of funding (state budget and/or donors) for WASH improvement activities, mainly for major lines of expenditures such as construction and/or maintenance of water supply system, incinerators, placenta pits, toilets and other materials routinely needed, such as needle boxes. The purchase of other small items can be covered by the health facility revenues from user fees.

Last but not least, some key informants believe that further strengthening the facility's management structure, and rules and regulations related to WASH and IPC (e.g. the IPC Committee at referral hospitals), could help address the constraints.

Discussion



6.1 Validity and limitations

This is the first-ever large scale assessment of WASH in HCFs in Cambodia applying the new national tools adapted from the JMP monitoring tools and indicators for WASH in HCFs [9], which require further field testing and refinement. This, coupled with the lack of national norms and standards for WASH in HCFs, created a big challenge to appropriately define core indicators which reflect the real WASH situation in the assessed HCFs and are aligned with the JMP tools.

For basic sanitation, the JMP-defined indicator is different to the design in Building Brief for Health Centre 2007 [15] which recommends for three improved toilets, with male and female separation and one meeting the needs of people with reduced mobility, and does not reflect the situation in many HCs in Cambodia built before 2007 with only one or two toilets.

For hand hygiene, the challenge is to define the critical points of care where hand hygiene station is necessary and this is not entirely clear in Cambodian health care settings.

To define safe waste segregation, and safe treatment and disposal of infectious and sharps waste is also challenging. While the JMP recommends having a set of at least three bins for waste (one for general waste, one for infectious and one for sharps waste) at outpatient consultation areas, it was agreed by the national WASH experts that at HCs in Cambodia, two bins (one for general waste and one for infectious waste) are enough, as HCs are not supposed to use needles at outpatient consultation areas.

According to the national IPC and Waste Management Guidelines as described in Chapter 3.2 above, sharps waste treatment/disposal is considered safe when it was reported to be placed in puncture-resistant containers and transported to be incinerated in a high capacity incinerator (e.g. SICIM). Safe infectious waste that was reported to be appropriately segregated and burned in a relatively low capacity

incinerator (made of bricks) is considered as treated/disposed of safely. The recommended safe disposal of placenta is to put them in a protected placenta pit.

This study assessed the WASH situation in public HCFs at one point in time. Like many other cross-sectional studies [19, 20], without repetitions, findings from this single snap-shot assessment may not entirely reflect the actual WASH situation at the facilities throughout the year. In Cambodia, the WASH situation, mainly water supply and general cleanliness, can be significantly different between dry and rainy seasons. This assessment was carried out late in the rainy season, but it was still raining heavily, even flooding in some places of the study sites (e.g. in Kampong Thom) just a few days before the field data collection. Yet, some questions allow us to capture the seasonal variation for some key indicators and variables. For example, for water supply, we also asked if the supply system/source(s) provided enough water for general purposes throughout the year.

Another limitation is related to the fact that the tools, in particular the core indicators, tend to measure means or facilities for WASH practices rather than WASH practices themselves. For example, indicator 3 measures the availability of functional hand hygiene stations at critical points of care delivery and toilets, a necessary condition for hand hygiene practices, but not hand hygiene practices. Meeting such a necessary condition may not necessarily lead to appropriate practices. But we cannot expect good hand hygiene practices when the necessary condition for such practices, as shown by the results, was poor.

Moreover, the tools, in particular the core indicators, tend to assess the WASH situation in outpatient care areas rather than inpatient care areas or both. Therefore, this study fits relatively well with HCFs, but not with RHs. Many points of care delivery, as defined in the questionnaires, do not entirely reflect the infrastructure at the assessed HCFs. Some RHs did not have OPDs or general consultation rooms. In any event, the relatively large number of HCFs in the sample dominates the weight for the computed indicators.

This assessment was conducted in five selected provinces and included about one fifth of the public HCFs in the country. Although such a relatively large sample makes us believe that the findings from this study somehow reflect the current WASH situation in other public HCFs in Cambodia, it is not a nationally sampled survey and it does not include private HCFs. Any use of the findings from this study to claim for national representativeness should be made with caution.

Despite these potential limitations, careful interpretation of the findings from this study will allow the generation of reliable information and evidence, useful for future policy development and actions to improve WASH in HCFs in Cambodia.

6.2 Key findings

Results show that electricity and water supply in the 117 assessed HCFs were reasonably good. All the assessed HCFs and RHs had electricity supply from at least one functioning main source, mostly from the national/community grid and solar panel, and 68% of them (64% of HCFs and 94% of RHs) had a secondary (back-up) source. Similarly, 91% of the assessed HCFs (90% of HCFs and 94% of RHs) had basic water supply (water from an improved source was available on the premises at the time of assessment), and only 6% of them relied on an unimproved or open source. This is much better than the situation found by the Health Impact Evaluation Consortium Survey in 2008 that only 67% of HCFs in Cambodia had an improved running water source within 500m [21], and far better than the average situation found by a recent WHO study in 54 developing countries where 38% of the assessed HCFs did not have an improved water source [7]. However, results from this study indicate that shortage in water supply in the assessed HCFs remains, mainly during dry season. In general, only 49% of the assessed HCFs (48% of HCFs and 56% of RHs) reported that the available water sources provide enough water for the whole year for all purposes, including drinking, food preparation, personal hygiene, medical activities, cleaning and laundry. The majority of the HCFs did not have a drinking water source for clients.

Results also show that sanitation in the assessed HCFs was relatively good as compared to other developing countries. All assessed HCs and RHs had at least one improved and usable toilet, and 87% of them (86% of HCs and 94% of RHs) had at least two improved and usable toilets. This is far better than the situation in developing countries where 19% of HCFs did not have improved toilets [7]. However, compared with the available national and JMP standards, the sanitation in the assessed HCFs remained poor and required further improvement. The Building Brief for Health Centre 2007 [15] recommended that each HC should have three improved toilets, including one separate for women/girls and one meeting the needs for people with reduced mobility. The results show that only 3% of the assessed HCFs (2% of HCs and 6% of RH OPDs) met these criteria. None of the assessed HCFs had basic sanitation as defined by the JMP. It is noteworthy that just 10% of the assessed HCFs had separate toilets for men and women/girls with only one having menstrual hygiene facilities, and only 11% of them had a toilet meeting the needs of people with reduced mobility.

Unlike water supply and sanitation, results show that only 3% of the assessed HCFs (2% of HCs and 6% of RHs) had basic hand hygiene (a functional hand hygiene station with water and soap or alcohol-based hand rub for hand washing available at all assessed critical points of care and within 5m of toilets as defined by the JMP indicator). If we lower the standard to be closer to the Cambodian context, we found that 15% of the assessed HCFs (14% of HCs and 19% of RHs) had a functional hand hygiene stations available at outpatient consultation room/areas, delivery rooms and within 5m of toilets. If we assess such conditions only at consultation room/areas and delivery rooms (but not toilets), the figure increases to approximately 50% (49% for HCs and 56% for RHs). However, it remained relatively lower than the figure shown by the WHO study in 54 developing countries where 65% of the assessed HCFs had water and soap or alcohol-based hand rub

for hand washing [7]. Moreover, the availability of water, soap or alcohol-based hand rub does not necessarily reflect hand hygiene practices, which could be much lower, as shown by the WHO study that while only 35% of the assessed HCFs had no water and soap or alcohol-based hand rub for hand washing, up to 90% of health care workers do not adhere to recommended hand hygiene practices. In addition to hand hygiene, this study results show that the general cleanliness at the assessed HCFs in Cambodia was not good either. Only 60% of them (60% of HCs and 63% of RHs) reported having their floors, surfaces and sanitation facilities cleaned with water and detergent on a routine basis, with 53% (48% for HCs and 80% for RHs) doing this on a daily basis. This strongly suggests that hygiene, in particular hand hygiene, in the assessed HCFs in Cambodia remained relatively poor as compared to other developing countries, and to national and international standards, and further improvement is needed.

According to the results, only 14% of the assessed HCFs (12% of HCs and 25% of RHs) had their sharps, infectious and general wastes safely segregated (each in a separate and clearly labelled container) at consultation room/areas, whereas 35% of them (35% of HCs and 38% of RHs) had their sharps and infectious waste, including placenta treated and disposed of safely. In general, only 10% of the assessed HCFs (10% of HCs and 13% of RHs) were practising basic health care waste management (indicator 4) –having their health care wastes segregated and treated/disposed of safely. This finding is in line with a recent WHO study on the status of health care waste management in selected Western Pacific countries [22], which found that despite some improvement in the past decade, in particular in legal frameworks, health care waste management in Cambodia remains poor. Most health care wastes are still simply dumped on vacant land outside of towns, and the dumpsites usually lack control and are poorly managed, which may pose a significant risk to the environment and

possibly to public health. Although some hazardous health care wastes are disposed of in basic incinerators, such incinerators have no emission control systems. Among the five health care waste aspects (health care waste management, training, regulation, technology and financing) assessed and scored from one point (as insufficient) to five points (as excellent), Cambodia receives four points only for regulation, and two points for four other aspects, compared with two points for management and financing and three points for training, regulation and technology in Lao PDR, whereas Vietnam similarly receives two points for technology and financing, and three points for three other aspects. This strongly suggests that health care waste management in the assessed HCFs in Cambodia is poor as compared to national and international standards, and relatively poorer than in neighbouring countries.

Comparisons of the assessed core indicators between HCs and RHs (focusing on outpatient area) show that the WASH situation in RHs was generally better than that in HCs. But there is no significant difference between HCFs receiving WASH support from at least one partner or externally-funded project and those with no such support. Comparisons across the five study provinces suggest a great variation of WASH situation between them. The lowest percentage of HCFs with basic water supply (indicator 1) was seen in Kampong Thom (79%), and the highest percentage (100%) was found in Kratie and Ratanakiri. The percentage of assessed HCFs with at least three improved and usable toilets (indicator 2b) in Ratanakiri was found to be the highest (70%), followed by Kratie (61%) compared with around 30% in the other three provinces. The percentage of HCFs with a functional hand hygiene station available at OPD area/room, delivery room and within 5m of toilets (indicator 3a) was comparably low across the five provinces. None of the assessed HCFs in Kratie was practising basic health care waste management (indicator 4), compared with the highest 17% in Kampong Thom. However, such comparisons should be made with caution, as there were few observed cases for each province.

As reported by facility key informants, the relatively poor WASH situation, in particular sanitation, hygiene and health care waste management, at HCFs were related to a number of individual and institutional constraints. Lack of knowledge of (and commitment to) sanitation and hygiene, including IPC, among health staff and cleaners as well as among clients was the most commonly reported WASH-related constraint. Poor knowledge among users and poor management, including maintenance that often makes the toilets obstructed/broken. Poor knowledge, coupled with the regular absence or lack of cleaners and cleaning materials, created a major problem for general cleanliness at HCFs, and this can be worsened by the absence of a concrete footpath or functioning system for drainage of rainwater for health facilities located in lowland areas. Poor hand hygiene was obviously linked to the lack of functioning hand hygiene stations (including alcohol-based hand rub dispensers) and the knowledge and commitment of health staff. The latter, coupled with lack of appropriate materials, including waste bins/containers, was the main reason for poor segregation of wastes. The lack of functioning high capacity incinerators to burn sharps waste and usually broken or inappropriate low capacity incinerator at HCs was reported as a major reason for unsafe treatment/disposal of sharps and infectious waste. The lack of placenta pit combined with the cultural belief (that taking placenta back home is necessary and gives good luck to the baby, mother and family) was a barrier to the safe disposal of placentas in a number of facilities. In addition, a recent WASH situation analysis [8] suggests that the absence of clear national WASH specific policies, norms and standards, which makes this study challenging, could be also a reason for the currently poor WASH situation.

Conclusions and recommendations

Despite some limitations, this study provides useful information and evidence for further improvement of WASH in HCFs in Cambodia, in particular those in the five study provinces. It assessed the WASH situation in the study HCs and RHs, identified gaps and related constraints, and suggested potential solutions to bridge the gaps and address the constraints. In addition, this study allows drawing lessons for improving the national standard tools for assessment of WASH in HCFs and the JMP global indicators and tools for monitoring WASH in HCFs. Moreover, the findings from this study can be used as baseline data for the two national WASH indicators.

The findings suggest that water supply in the assessed HCFs in Cambodia is reasonably good and much better than the situation a decade ago. However, shortage of water supply still exists, mainly in the dry season, as does a lack of drinking water source in a large proportion of HCFs. Sanitation in the assessed HCFs is relatively good if compared with the situation in other developing countries, but remains far from meeting the available national standards and JMP-defined criteria for basic sanitation. Unlike water supply and sanitation, the hygiene situation, in particular hand hygiene, and health care

waste management in the assessed HCFs is poor compared with national and international standards, and is relatively poorer than in neighbouring countries. WASH in RHs appears to be generally better than in HCs. In general, WASH in HCFs in Cambodia requires further improvement to ensure safety and quality of care, thereby contributing to achieving quality UHC and health SDGs as well as to mitigating antimicrobial resistance.

The following are some considerations for future national policies and actions to further improve WASH in HCFs:

- The first immediate action could be to clearly set up national norms and standards for WASH in HCFs (including norms and standards for WASH-related infrastructure, facilities, supplies and practices), taking into account the country context and international norms and standards. Particular attention should be made to the number of toilets and their specifications (e.g. separation between clients and staff, between for men and women, with facilities to manage menstrual hygiene, and meeting the needs of people with reduced mobility), the number of hand hygiene stations and where they should be located, the number and type of waste bins at

each point of care, how sharps and infectious wastes should be safely treated and disposed in each HC or RH or RH department. Such norms and standards should then be integrated into various national policies and guidelines (e.g. the currently under revision MPA guidelines for HCs, the future revision of the current IPC guidelines [16], National Guideline for Health Care Waste Management [18] and Building Brief for Health Centres [15] and Referral Hospitals [23]) and be incorporated in the newly-developed manuals and tools for quality of care assessment as part of the manuals and tools for National Quality Enhancement Monitoring (NQEM) of the Health Equity and Quality Improvement Project (H-EQIP);

Along with the effort to develop WASH-specific national policies, norms and standards, actions are needed to apply them to bridge the identified gaps of WASH in HCFs and address the related constraints as raised by key informants:

- Further expand WASH and IPC training to HC and RH staff; not only the clinical staff, but other staff including cleaners to improve their knowledge and awareness about the importance of WASH in HCFs. The current IPC training curriculum for clinical staff can be adapted to meet the needs for cleaners. Such training can be provided as training of trainers to OD/PHD staff who will in turn train HC and RH cleaners and coach them as an integral part of their NQEM-related field coaching.
- In addition to the improvement in knowledge and awareness, other necessary conditions, including basic WASH infrastructure and supplies, should be met to ensure basic WASH in HCFs.
- For water supply, along with further improvement in main water sources, further construction and maintenance of back up sources such as rainwater collection (particularly for areas where there is no underground water) and protected dug well or borehole (for areas where there is safe underground water) is necessary to address the shortage of water supply in the dry season. In addition, HCFs should consider making drinking water available for clients.
- For sanitation, further effort in construction is needed to have at least one improved toilet meeting the needs of people with reduced mobility in all HCs and RH departments. In addition, HCFs should have separate toilets for men and women/ girls with facilities to manage menstrual hygiene needs. Separation of toilets between clients and staff could also be considered to meet the JMP definition of basic sanitation, though this is not recommended in the national policy yet.
- For hygiene and general cleanliness, it is crucial to have a functional hand hygiene station available in all critical points of care, including a basin/pan with water and soap for washing hands (at least in birthing care settings and dressing/minor surgery room for HCs) or an alcohol-based hand rub dispenser. While some construction and maintenance work is still needed to make necessary water basins/pans available in some HCFs, the main priority is to make the existing ones functional by improving the supplies to ensure the availability of water and soap for hand washing, and alcohol-based hand rubs. In addition to training and coaching, adequate supplies of appropriate cleaning materials and detergent is also vital for improving the general cleanliness of floors, surfaces and toilets.
- For health care waste management, adequate supplies of appropriate waste bins/containers and needle boxes are essential for safe waste segregation at HCFs. For RHs and HCs with beds, in addition to needle boxes provided by the National Immunization Program, trolleys with larger needle boxes are needed for sharps waste management. In addition, broken incinerators (both high capacity at RHs and low capacity incinerators at HCs) should be immediately repaired or replaced by new ones. Functional and protected pits for glasses or ashes of infectious and sharps wastes and placenta pits are necessary, but many HCFs do not have one.
- Improving knowledge, infrastructure and supplies is necessary, but may not be sufficient to ensure best practices of basic WASH in HCFs. It also requires improvement in staff motivation and commitment. Therefore, a mechanism to incentivise best WASH practices in HCFs should be set up. This includes a routine and systematic appreciation

(evaluation) of the WASH situation in HCFs that is linked up with incentives such as giving priority for WASH-related investment, awarding certificates of appreciation, and financial incentives. The current initiative of linking part of the performance-based incentives to WASH practices in HCFs as part of NQEM of H-EQIP is a good starting point, and should be carefully monitored and assessed to draw lessons for further improvement and scaling-up.

- Further development and strengthening of WASH-related organizational structure and institutional arrangements (e.g. a sub-technical working group for IPC or WASH in HCFs and a national WASH monitoring and evaluation framework as recommended by the recent situation analysis [8]) is crucial for ensuring effective and sustainable implementation of the newly-developed policies, norms, and standards. Link up this kind of WASH assessment with the national routine Health Information System and national program WASH monitoring, in particular Maternal and Child Health Program, should be explored.
- The current national standard tools for assessment of WASH in HCFs should be revised to align with the newly-developed national norms and standards as well as the JMP WASH monitoring tools. The current tools can also be further simplified, e.g. many sections of the module 1 (respondent interviews) and module 2 (health facility walkthrough) of the questionnaires can be merged to facilitate data analysis. A simpler check list for facility walkthroughs can be adapted from the current one to serve for confirmation of the interview, taking into account the actual infrastructure of the public HCFs in Cambodia.
- The JMP-proposed WASH monitoring tools and indicators and their three-level service ladders, as shown in the latest meeting report in 2016 [9], are not clearly defined, and should be improved. Such a problem is particularly related to the service level of 'limited service' for hand hygiene and health care waste management. While the service

ladders aim to present grading levels of a WASH situation, two service levels (basic service and unimproved or no facility/service) appear to contradict each other. For example, the basic water supply which refers to water available from improved source opposes the water supply from an unimproved source. Moreover, the defined indicators do not necessarily reflect the reality in HCFs, especially complex hospitals, in developing countries like Cambodia.

Last but not least, future assessments of this kind should consider addressing the potential limitations, as discussed in section 6.1 above. These include consideration of seasonal variation, inpatient care settings, measurement of WASH practices rather than just WASH infrastructure and facilities.

Annexes



Annex 1

National standard tools for assessment of water, sanitation and hygiene in health centres

Module 0: Identification and assessment data

This module is to be completed before and after the visit to health centre, with possible confirmation by staff interview during the visit to the health centre.

01	Health centre name: _____	
02	Health centre code: _____ (as in MOH's HIS)	
03	Operational District name: _____	
04	Operational District code: _____ (as in MOH's HIS)	
05	Province: _____	
06	District: _____	
07	Commune: _____	
08	Village: _____	
09	GPS code if possible: _____	
10	Type of health facility	1 = Health centre (with no bed) 2 = Health centre with beds/former district hospital
11	Date of the assessment/visit	: [____ / ____ / ____] (dd/mm/yyyy)
12	Total duration of the assessment	: _____ (hours)

Module 1: Respondent interview and document review

This section is to be completed by interview with health centre chief or relevant personnel coupled with review of health centre reports and relevant documents.

Section 1: Staffing and services																					
101	<p>Could you please tell me about the personnel currently assigned to, employed by or seconded to this health centre by category of their highest qualification as follows:</p> <table border="1"> <thead> <tr> <th>Qualification</th> <th>Number (If no, record 0)</th> </tr> </thead> <tbody> <tr> <td>a. Medical doctors/Medical assistants</td> <td>: _____</td> </tr> <tr> <td>b. Pharmacists/Pharmacist assistants</td> <td>: _____</td> </tr> <tr> <td>c. Dentists/Dentists assistants</td> <td>: _____</td> </tr> <tr> <td>d. Secondary midwives</td> <td>: _____</td> </tr> <tr> <td>e. Primary midwives</td> <td>: _____</td> </tr> <tr> <td>f. Secondary nurses</td> <td>: _____</td> </tr> <tr> <td>g. Primary nurses</td> <td>: _____</td> </tr> <tr> <td>h. Lab technicians</td> <td>: _____</td> </tr> <tr> <td>i. Others</td> <td>: _____</td> </tr> </tbody> </table>	Qualification	Number (If no, record 0)	a. Medical doctors/Medical assistants	: _____	b. Pharmacists/Pharmacist assistants	: _____	c. Dentists/Dentists assistants	: _____	d. Secondary midwives	: _____	e. Primary midwives	: _____	f. Secondary nurses	: _____	g. Primary nurses	: _____	h. Lab technicians	: _____	i. Others	: _____
Qualification	Number (If no, record 0)																				
a. Medical doctors/Medical assistants	: _____																				
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e. Primary midwives	: _____																				
f. Secondary nurses	: _____																				
g. Primary nurses	: _____																				
h. Lab technicians	: _____																				
i. Others	: _____																				
102	How many cleaners (health centre personnel and contracted cleaners) does this health centre have? : _____																				
103	How many clients (for all services) does the health centre serve on average per day? : _____ (Perceived average in the last five working days by the respondent)																				
104	What is the total number of general consultations in the health centre in the year preceding the assessment? : _____ (Review health centre statistics)																				
105	What is the total number of deliveries in the health centre in the year preceding the assessment? : _____ (Review health centre statistics)																				
106	Is there any additional pre-/post-delivery building or a dedicated maternity ward (excl. delivery room)? 0 = No 1 = Yes																				
107	For health centre with beds, how many inpatient beds are there (excl. TB beds)? _____																				
108	Has this health centre received any support from partners (e.g. WaterAid, UNICEF...) to improve WASH in the health centre? 0 = No 1 = Yes																				
109	If Yes, specify about the support and supporting partner(s):																				

Section 2: Electricity supply			
201	Does the health centre have electricity from any source?	0 = No 1 = Yes	If No, skip to Section 3
202	What is the health centre's main source of electricity?	1 = National/community grid 2 = Generator (fuel or battery) 3 = Solar panel 4 = 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 health centre walkthrough)	
204	Other than the main source, does the health centre have a secondary or backup source of electricity?	0 = No secondary source 1 = National/community grid 2 = Generator (fuel or battery) 3 = Solar panel 4 = Other, specify: _____	
205	During the past seven days, was electricity available at all times (from the main and backup sources) when the health centre was open for services?	1 = Always available, no interruption 2 = Often available, interruptions<2h/day 3 = Sometimes available, prolonged interruptions>2h/day	
206	Is the electricity supply (from any source) generally enough to meet the basic electrical need of the health centre?	0 = No, not enough 1 = Yes, generally enough	

Section 3: Water supply

301	<p>What is the most commonly used (main) source of water for the health centre (to use for general purposes, including drinking, washing and cleaning)?</p> <p>(Choose one answer. In case of water being available at multiple points, report the response closest to the outpatient area)</p>	<p>0 = No water source 1 = Piped water on the premises 2 = Tube well or borehole on the premises 3 = Protected dug well on the premises 4 = Protected rainwater collection on the premises 5 = Improved source (1-4) off-premises within 500m 6 = Improved source (1-4) off-premises over 500m 7 = Unprotected dug well 8 = Cart with small tank or drum/tanker truck 9 = Surface water 10 = Other source, specify: _____</p>	=> If No, skip to Section 4
302	<p>If the main source is one of the improved sources on the premises (answer 1-4 to Q301), is it functioning now? ('Functioning': water available from this source at the time of assessment)</p>	<p>0 = No 1 = Yes (Confirm by e.g. checking that taps or pumps deliver water during health centre walkthrough)</p>	
303	<p>Does the main source of water provide enough water for all the health centre's needs when it is fully functional?</p>	<p>0 = No, never enough water 1 = Yes, sometimes, only seasonally 2 = Yes, enough water all year 99 = Don't know</p>	
304	<p>Does this health centre have a secondary source of water (besides the main one)?</p>	<p>0 = No 1 = Yes</p>	=> If No, skip to Q306
305	<p>If Yes, what is the secondary source of water for this health centre?</p> <p>(Choose one answer besides the main source above)</p>	<p>1 = Piped water on the premises 2 = Tube well or borehole on the premises 3 = Protected dug well on the premises 4 = Protected rainwater collection on the premises 5 = Improved source (1-4) off-premises within 500m 6 = Improved source (1-4) off-premises over 500m 7 = Unprotected dug well, 8 = Cart with small tank or drum/tanker truck 9 = Surface water 10 = Other source, specify: _____</p>	

Section 3: Water supply			
306	Are these water sources (main and secondary sources) used for drinking water at all?	0 = No 1 = Yes	=> If No, skip to Q310
307	Does the health centre treat the water for drinking purpose?	0 = No 1 = Yes	=> If No, skip to Q309
308	If Yes, what treatment methods are used? (Multiple answers possible)	1 = Filtration 2 = Disinfection by boiling 3 = Disinfection by using chlorine 4 = Other, specify: _____	
309	If No, why? (Multiple answers possible)	1 = The drinking water source is considered safe (e.g. Answer 1-6 to Q301 and Q305) 2 = Health Centre does not have filter or purification materials 3 = None of the staff know how to do it 4 = No time to treat the water 5 = Other, specify: _____	
310	Is there any drinking water provided for clients at the health centre?	0 = No 1 = Yes (Confirm by observing if the drinking water for clients is available at the patient waiting areas, e.g. reception/triage, during the health centre walkthrough)	If No, skip to Q312
311	If yes, what is the source of drinking water provided for clients?	1 = Available health centre water sources 2 = Bottled water bought by the health centre 3 = Other, specify: _____	
312	What is the source of drinking water for staff? (Multiple answers possible)	1 = Available health centre water sources 2 = Bottled water bought by the health centre 3 = Staff bring their own bottled water 4 = Other, specify: _____	
313	In total, do all water sources provide enough water for all the needs (drinking, food preparation, personal hygiene, medical activities, cleaning and laundry) of the health centre 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 99 = Don't know	

Section 4: Wastewater and sanitation facilities

401	How many toilets/latrines are there on the health centre premises at this time?	_____ (Record 0, if there is none) (Verify by the counted number during health centre walkthrough – 7.f)	If 0, skip to Q407
402	How many of them are improved toilets/latrines? (‘Improved’: flushed toilets, pit latrines with slab or VIP)	_____ (Record 0, if there is none) (Verify by health centre walkthrough – 7.e)	If 0, skip to Q407
403	Are there separate improved toilets/latrines for men and for women/girls (at least one for each group)?	0 = No 1 = Yes	
404	Are there separate improved toilets/latrines for staff and for clients (at least one for each group)?	0 = No 1 = Yes	
405	Does at least one of these improved toilets/latrines meet the needs of (designated for) people with reduced mobility? (‘Meeting the needs of people with reduced 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	
406	How are faecal wastes from the improved, usable toilets/latrines managed?	1 = Flush to sewer 2 = Onsite storage in septic tank 3 = Onsite storage in latrine 99 = Don’t know	
407	Is there a functioning system in place to adequately drain rainwater away from the health centre and health centre grounds? (‘Functioning’: no visible flooding of the health facility grounds and drainage canals free of debris and lead away from the facility)	0 = No 1 = Yes 99 = Don’t know	

Section 5: General cleanliness and hygiene

501	Are floors, surfaces and toilets/latrines of the health centre cleaned on the routine basis (routinely)?	0 = No 1 = Yes	If No, skip to Q506
502	If Yes, how often (at which frequency) are floors, surfaces and toilets/latrines cleaned?	1 = At least once a day 2 = Every 2 days 3 = Once every 3-4 days or twice per week 4 = Once a week (weekly)	
503	Are floors, surfaces and toilets/latrines cleaned with water and detergent/disinfectant (e.g. chlorine 0.05%)?	0 = No 1 = Yes (Check at the store of cleaning equipment/materials if there is detergent/disinfectant available during health centre walkthrough)	If No, skip to Q505
504	If Yes, how often (at which frequency) are floors, surfaces and toilets/latrines cleaned with water and detergent/disinfectant?	1 = At least once a day 2 = Every 2 days 3 = Once every 3-4 days or twice per week 4 = Once a week (weekly)	
505	Are there cleaning equipment/materials separately for floors, points of care delivery and toilets/latrines?	0 = No 1 = Yes (Check at the store of cleaning materials if there are separate for floors, points of care delivery and toilets/latrines available during health centre walkthrough)	
506	Does the health centre have any appliances available for sterilizing medical equipment?	0 = No, there is none or a broken one 1 = Yes (Check at the sterilisation room if there is a functioning steriliser during health centre walkthrough)	If No, skip to Q508
507	If Yes, what type of appliances does your health centre use to sterilize medical equipment? (Multiple answers possible)	1 = Electric autoclave 2 = Non-electric autoclave/Pressure cooker 3 = Electric dry heat sterilizer 4 = Electric boiler or steamer 5 = Other, specify: _____	

Section 5: General cleanliness and hygiene

508	Does the health centre have any infection prevention and control (IPC) guidelines for health care facilities?	0 = No 1 = Yes	If Yes, ask to see it
509	Has there been any IPC training offered to health centre staff?	0 = No 1 = Yes	If No, skip to Q511
510	Have all clinical staff of the health centre 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, some 2 = Yes, all	
511	Does your health centre display hygiene promotion posters near hand hygiene stations and/or patient waiting areas?	0 = No 1 = Yes (Confirm by observing during the health centre walkthrough)	
512	Does this health centre have an IPC committee?	0 = No 1 = Yes	

Section 6: Health care water management

Section 6: Health care water management		
601	Is there a protected needles pit (lined and sealed with slab) on the health centre premises?	0 = No 1 = Yes
602	Is there a protected (lined and sealed with slab) placenta pit on the health centre premises?	0 = No 1 = Yes
603	Is there an incinerator on the health centre premises?	0 = No 1 = Yes, a low capacity one (burner-type usually made of bricks) 2 = Yes, a high capacity one (+800oC)
604	How does the health centre finally dispose of sharps waste (e.g. used syringes and needles)?	1 = Burn in onsite low capacity incinerator 2 = Burn on the facility grounds (+/- protection) 3 = Dump in onsite designated and protected pits (lined and sealed) 4 = Dump on flat ground or unprotected pits 5 = Bury inside the facility grounds (with/without treatment) 6 = Remove offsite with appropriate storage (in protected container) and disposal (burned in a high capacity incinerator) 7 = Remove offsite with unprotected storage and inappropriate disposal (e.g. through a general waste collection agency) 8 = Other, specify: _____
605	How does this health centre finally dispose of infected medical waste (e.g. bloody bandages)?	1 = Burn in onsite low capacity incinerator 2 = Burn on the facility grounds (+/- protection) 3 = Dump in onsite designated and protected pits (lined and sealed) 4 = Dump on flat ground or unprotected pits 5 = Bury inside the facility grounds 6 = Remove offsite with appropriate storage (in protected container) and disposal (burned in an incinerator) 7 = Remove offsite with unprotected storage and inappropriate disposal (e.g. through a general waste collection agency) 8 = Other, specify: _____
606	How does this health centre finally dispose of placenta?	1 = Burn in onsite low capacity incinerator 2 = Burn on the facility grounds (+/- protection) 3 = Dump in onsite designated and protected pits (lined and sealed) 4 = Dump on flat ground or unprotected pits 5 = Bury inside the facility grounds (with/without treatment) 6 = Remove offsite with appropriate storage (in protected container) and disposal (burned in a high capacity incinerator) 7 = Remove offsite with unprotected storage and inappropriate disposal (e.g. through a general waste collection agency) 8 = Mother takes home 9 = Other, specify: _____

Section 7: Constraints and suggested solutions

701	Could you please tell me what are the major constraints/challenges in terms of water, sanitation, and hygiene that your facility has been facing?	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
702	What are your suggested solutions to address/meet the above major constraints/challenges?	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Module 2: Checklist for health centre walkthrough

In addition to the respondent interview (module 1), the assessment requires a health centre walkthrough. This walkthrough includes inside the health centre building and the health centre compounds outside the building. The former should focus on key points/units of care delivery, whereas the latter should concentrate on the main source of electricity, water, toilets/latrines, and waste storage or final waste disposal areas.

Checklist for key points/units of care delivery			
1.	Consultation room		
	a. The floor is visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No;	1 = Yes; 99 = NA
	b. There is a hand hygiene station available (with available water and soap OR alcohol-based hand rub)	0 = No;	1 = Yes; 99 = NA
	c. The consultation bed is visibly clean (covered by a clean, waterproof mattress)	0 = No;	1 = Yes; 99 = NA
	d. There is one set of bins (infectious non-sharps and general) clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes; 99 = NA
	e. There is only a bin for infectious non-sharp waste but no bin for general waste clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes; 99 = NA
	f. 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; 99 = NA
	g. There is appropriate personal protection equipment (gloves, masks)	0 = No;	1 = Yes; 99 = NA
	h. Consultation equipment/materials (stethoscope, sphygmomanometer, thermometer, tongue depressors...) are visibly clean	0 = No;	1 = Yes; 99 = NA
2.	Dressing/minor surgery room		
	a. The floor is visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No;	1 = Yes; 99 = NA
	b. There is a hand hygiene station available (with available water and soap OR alcohol-based hand rub)	0 = No;	1 = Yes; 99 = NA
	c. The dressing bed is visibly clean (covered by a clean, waterproof mattress)	0 = No;	1 = Yes; 99 = NA
	d. There is one set of bins (sharps, infectious non-sharps, and general) clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes; 99 = NA
	e. There are only bins for sharp waste and for infectious non-sharp waste but no bin for general waste clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes; 99 = NA

Checklist for key points/units of care delivery

	f. 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;	99 = NA
	g. There is appropriate personal protection equipment (gloves, masks)	0 = No;	1 = Yes;	99 = NA
	h. A sterile dressing set (sterile blades and other equipment stored in a sterile package with sterilization mark...) is available	0 = No;	1 = Yes;	99 = NA
3.	<u>Vaccination/EPI room</u>			
	a. The floor is visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No;	1 = Yes;	99 = NA
	b. There is a hand hygiene station available (with available water and soap OR alcohol-based hand rub)	0 = No;	1 = Yes;	99 = NA
	c. The vaccination bed is visibly clean (covered by a clean, waterproof mattress)	0 = No;	1 = Yes;	99 = NA
	d. There is one set of bins (sharps, infectious non-sharps, and general) clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes;	99 = NA
	e. There are only bins for sharp waste and for infectious non-sharp waste but no bin for general waste clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes;	99 = NA
	f. 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;	99 = NA
	g. There is appropriate personal protection equipment (gloves, masks)	0 = No;	1 = Yes;	99 = NA
	h. Vaccination equipment/materials (vaccine storage, vaccines boxes...) are visibly clean	0 = No;	1 = Yes;	99 = NA
4.	<u>Antenatal care/family planning room</u>			
	a. The floor is visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No;	1 = Yes;	99 = NA
	b. There is a hand hygiene station available (with available water and soap OR alcohol-based hand rub)	0 = No;	1 = Yes;	99 = NA
	c. The ANC/FP consultation bed is visibly clean (covered by a clean, waterproof mattress)	0 = No;	1 = Yes;	99 = NA
	d. There is one set of bins (sharps, infectious non-sharps, and general) clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes;	99 = NA

Checklist for key points/units of care delivery				
	e. There are only bins for sharp waste and for infectious non-sharp waste but no bin for general waste clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes;	99 = NA
	f. 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;	99 = NA
	g. There is appropriate personal protection equipment (gloves, masks)	0 = No;	1 = Yes;	99 = NA
	h. ANC/FP consultation equipment/materials (fetoscope, Doppler, speculum...) are visibly clean	0 = No;	1 = Yes;	99 = NA
5.	<u>Delivery room</u>			
	a. The floor is visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No;	1 = Yes;	99 = NA
	b. There is a hand hygiene station available (with available water and soap OR alcohol-based hand rub)	0 = No;	1 = Yes;	99 = NA
	c. The delivery beds are visibly clean (covered by a clean, waterproof mattress)	0 = No;	1 = Yes;	99 = NA
	d. There is one set of bins (sharps, infectious non-sharps, placenta and general) clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes;	99 = NA
	e. There are only bins for sharp waste, for infectious non-sharp waste and for placenta, but no bin for general waste clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes;	99 = NA
	f. 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;	99 = NA
	g. There is appropriate personal protection equipment (gloves, masks, eye protection equipment...)	0 = No;	1 = Yes;	99 = NA
	h. Sterile delivery sets (Disposable/sterile reusable scissors/blades for cutting the umbilical cord, disposable/sterile reusable cord clamps... appropriately stored) are available	0 = No;	1 = Yes;	99 = NA
6.	<u>Pre-/post-delivery room</u>			
	a. Is there any baby bathing facility in the pre-/post-delivery room of this health centre?	0 = No;	1 = Yes;	99 = NA
	b. Is the baby bathing facility functioning (reasonably clean with water and soap available for baby bathing)?	0 = No;	1 = Yes;	99 = NA

Checklist for toilets/latrines

7.	During the health centre 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. Flushed toilets			
	b. Pit latrines with slab or VIP			
	c. Pit latrines without slab/open pit			
	d. Others, specify: _____			
	e. Improved toilets/latrines (a-b)			
	f. All types of toilets/latrines (a-d)			
8.	Check all the toilets/latrines one-by-one (with a max. 4), starting with the improved one (6a-b) as follows:			
	Toilet/latrine 1			
	a. is an improved toilet/latrine (6a-b)	0 = No;	1 = Yes;	99 = 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;	99 = 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	0 = No;	1 = Yes;	99 = NA
	d. has a hand hygiene station available (with water and soap OR alcohol-based hand rub) within 5m	0 = No;	1 = Yes;	99 = NA
	e. is designated for women/girls and has a bin with a lid on it within the cubicle or water available in a private space for washing	0 = No;	1 = Yes;	99 = NA
	f. 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;	99 = NA
	Toilet/latrine 2			
	a. is an improved toilet/latrine (6a-b)	0 = No;	1 = Yes;	99 = 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;	99 = 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	0 = No;	1 = Yes;	99 = NA
	d. has a hand hygiene station available (with water and soap OR alcohol-based hand rub) within 5m	0 = No;	1 = Yes;	99 = NA

Checklist for toilets/latrines

e.	is designated for women/girls and has a bin with a lid on it within the cubicle or water available in a private space for washing	0 = No;	1 = Yes;	99 = NA
f.	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;	99 = NA
Toilet/latrine 3				
a.	is an improved toilet/latrine (6a-b)	0 = No;	1 = Yes;	99 = 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;	99 = 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	0 = No;	1 = Yes;	99 = NA
d.	has a hand hygiene station available (with water and soap OR alcohol-based hand rub) within 5m	0 = No;	1 = Yes;	99 = NA
e.	is designated for women/girls and has a bin with a lid on it within the cubicle or water available in a private space for washing	0 = No;	1 = Yes;	99 = NA
f.	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;	99 = NA
Toilet/latrine 4				
a.	is an improved toilet/latrine (6a-b)	0 = No;	1 = Yes;	99 = 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;	99 = 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	0 = No;	1 = Yes;	99 = NA
d.	has a hand hygiene station available (with water and soap OR alcohol-based hand rub) within 5m	0 = No;	1 = Yes;	99 = NA
e.	is designated for women/girls and has a bin with a lid on it within the cubicle or water available in a private space for washing	0 = No;	1 = Yes;	99 = NA
f.	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;	99 = NA

Checklist for waste storage/final waste disposal areas

9.	a. Check if the waste storage awaiting for removal from the facility (or final disposal) is appropriately fenced and protected	0 = No;	1 = Yes;	99 = NA
	b. Check if the protected needles pit is functioning (in use and not full)	0 = No;	1 = Yes;	99 = NA
	c. Check if the protected placenta pit is functioning (in use and not full)	0 = No;	1 = Yes;	99 = NA
	d. Check if the incinerator is functioning (in use)	0 = No;	1 = Yes;	99 = NA

Annex 2

National standard tools for assessment of water, sanitation and hygiene in referral hospitals

Module 0: Identification and assessment data

This module is to be completed before and after the visit to the referral hospital, with possible confirmation by staff interview during the visit to the referral hospital.

01	Referral hospital name: _____	
02	Referral hospital code: _____ (as in MOH's HIS)	
03	Operational District name: _____	
04	Operational District code: _____ (as in MOH's HIS)	
05	Province: _____	
06	District: _____	
07	Commune: _____	
08	Village: _____	
09	GPS code if possible: _____	
10	Type of health facility	1 = Referral hospital level 1 (CPA1) 2 = Referral hospital level 2 (CPA2) 3 = Referral hospital level 3 (CPA3)
11	Date of the assessment/visit	: [____ / ____ / ____] (dd/mm/yyyy)
12	Total duration of the assessment	: _____ (hours)

Module 1: Respondent interview

This section is to be completed by interview with health centre chief or relevant personnel.

Section 1: Staffing and services		
101	Could you please tell me about the personnel currently assigned to, employed by or seconded to this referral hospital by category of their highest qualification as follows:	
	Qualification a. Specialists b. Medical doctors/Medical assistants c. Pharmacists/Pharmacist assistants d. Dentists/Dentists assistants e. Secondary midwives f. Primary midwives g. Secondary nurses h. Primary nurses i. Lab technicians j. Others	Number (If no, record 0) : _____ : _____ : _____ : _____ : _____ : _____ : _____ : _____ : _____
102	How many cleaners (health centre personnel and contracted cleaners) does this referral hospital have?	: _____
103	How many clients (for all services) does the referral hospital serve on average per day?	: _____ (Perceived average in the last 5 working days by the respondent)
104	What is the total number of general consultations (excluding specialized consultations) in the referral hospital in the year preceding the assessment?	: _____ (Review referral hospital statistics)
105	What is the total number of inpatients (discharges) in the referral hospital in the year preceding the assessment?	: _____ (Review referral hospital statistics)
106	What is the total number of deliveries (all kinds of deliveries, excluding C-section) in the referral hospital in the year preceding the assessment?	: _____ (Review referral hospital statistics)
107	What is the total number of C-sections in the referral hospital in the year preceding the assessment?	: _____ (Review referral hospital statistics)
108	Is there a dedicated maternity ward (excl. delivery room) in the referral hospital?	0 = No 1 = Yes

Section 1: Staffing and services		
109	Is there a dedicated outpatient department/ward in the referral hospital?	0 = No 1 = Yes
110	How many inpatient beds (excl. TB beds) are there in this referral hospital?	_____
111	Has this hospital received any support from partners (e.g. WaterAid, UNICEF...) to improve WASH in the hospital?	0 = No 1 = Yes
112	If Yes, specify about the support and supporting partner:	

Section 2: Electricity supply			
201	Does the referral hospital have electricity from any source?	0 = No 1 = Yes	If No, skip to Section 3
202	What is the referral hospital's main source of electricity?	1 = National/community grid 2 = Generator (fuel or battery) 3 = Solar panel 4 = 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 referral hospital walkthrough)	
204	Other than the main source, does the referral hospital have a secondary or backup source of electricity?	0 = No secondary source 1 = National/community grid 2 = Generator (fuel or battery) 3 = Solar panel 4 = Other, specify: _____	
205	During the past 7 days, was electricity available at all times (from the main and backup sources) when the referral hospital was open for services?	1 = Always available, no interruption 2 = Often available, interruptions<2h/day 3 = Sometimes available, prolonged interruptions>2h/day	
206	Is the electricity supply (from any source) generally enough to meet the basic electrical need of the referral hospital?	0 = No, not enough 1 = Yes, generally enough	

Section 3: Water supply

301	<p>What is the most commonly used (main) source of water for the referral hospital to use for general purposes, including drinking, washing and cleaning?</p> <p>(Choose one answer. In case of water being available at multiple points, report the response closest to the outpatient area)</p>	<p>0 = No water source 1 = Piped water on the premises 2 = Tube well or borehole on the premises 3 = Protected dug well on the premises 4 = Rainwater collection on the premises 5 = Improved source (1-4) off-premises within 500m 6 = Improved source (1-4) off-premises over 500m 7 = Unprotected dug well 8 = Cart with small tank or drum/tanker truck 9 = Surface water 10 = Other source, specify: _____</p>	=> If No, skip to Section 4
302	<p>If the main source is one of the improved sources on the premises (answer 1-4 to Q301), is it FUNCTIONING now? (FUNCTIONING: water available from this source at the time of assessment)</p>	<p>0 = No 1 = Yes (Confirm by e.g. checking that taps or pumps deliver water during referral hospital walkthrough)</p>	
303	<p>Does the main source of water provide enough water for all the referral hospital's needs when it is fully functional</p>	<p>0 = No, never enough water 1 = Yes, sometimes, only seasonally 2 = Yes, enough water all year 99 = Don't know</p>	
304	<p>Does this referral hospital have a secondary source of water (besides the main one)?</p>	<p>0 = No 1 = Yes</p>	=> If No, skip to Q306
305	<p>If Yes, what is the secondary source of water for this referral hospital?</p> <p>(Choose one answer besides the main source above)</p>	<p>1 = Piped water on the premises 2 = Tube well or borehole on the premises 3 = Protected dug well on the premises 4 = Rainwater collection on the premises 5 = Improved source (1-4) off-premises within 500m 6 = Improved source (1-4) off-premises over 500m 7 = Unprotected dug well, 8 = Cart with small tank or drum/tanker truck 9 = Surface water 10 = Other source, specify: _____</p>	

Section 3: Water supply			
306	Are these water sources (main and secondary sources) used for drinking water at all?	0 = No 1 = Yes	=> If No, skip to Q310
307	Does the referral hospital treat the water for drinking purpose?	0 = No 1 = Yes	If No, skip to Q309
308	If Yes, what treatment methods are used? (Multiple answers possible)	1 = Filtration 2 = Disinfection by boiling 3 = Disinfection by using chlorine 4 = Other, specify: _____	
309	If No, why? (Multiple answers possible)	1 = The drinking water source is considered safe 2 = Referral hospital does not have filter or purification materials 3 = None of the staff know how to do it 4 = No time to treat the water 5 = Other, specify: _____	
310	Is there any source of drinking water provided for clients?	0 = No 1 = Yes (Confirm by observing if drinking water for clients is available at the patient waiting areas, e.g. of the outpatient department/triage, during referral hospital walkthrough)	If No, skip to Q312
311	If Yes, what is the source of drinking water provided for clients?	1 = Available referral hospital water sources 2 = Bottled water bought by the referral hospital 3 = Other, specify: _____	
312	What is the source of drinking water for staff? (Multiple answers possible)	1 = Available referral hospital water sources 2 = Bottled water bought by the referral hospital 3 = Staff bring their own bottled water 4 = Other, specify: _____	
313	In total, do all water sources provide enough water for all the needs (drinking, food preparation, personal hygiene, medical activities, cleaning and laundry) of the referral hospital 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 99 = Don't know	

Section 4: Wastewater and sanitation facilities (for outpatient department or emergency ward)

401	How many toilets/latrines are there in the block of outpatient department (or emergency ward) of the referral hospital at this time?	_____ (Record 0 if there is none) (Verify by the counted number during referral hospital walkthrough – 7.f)	If 0, skip to Q407
402	How many of them are improved toilets/latrines? (Improved : flushed toilets, ventilated improved pit latrines, pit latrines with slab, composting toilets)	_____ (Record 0 if there is none) (Verify by referral hospital walkthrough – 7.e)	If 0, skip to Q407
403	Are there separate improved toilets/latrines for men and for women/girls (at least one for each group)?	0 = No 1 = Yes	
404	Are there separate improved sanitation facilities for staff and for clients (at least one for each group)?	0 = No 1 = Yes	
405	Does at least one of these improved toilets/latrines meet the needs of (designated for) people with reduced mobility? (Meeting the needs of people with reduced mobility : Improved toilets/latrines that are 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	
406	How are faecal wastes from the improved, usable toilets/latrines managed?	1 = Flush to sewer 2 = Onsite storage in septic tank 3 = Onsite storage in latrine 99 = Don't know	
407	Is there a functioning system in place to adequately drain rainwater away from the facility and facility grounds? (Functioning : no visible flooding of the health facility grounds and drainage canals free of debris and lead away from the facility)	0 = No 1 = Yes 99 = Don't know	

Section 5: General cleanliness and hygiene

501	Are floors, surfaces and toilets/latrines of the referral hospital cleaned on the routine basis (routinely)?	0 = No 1 = Yes	If No, skip to Q506
502	If Yes, how often (at which frequency) are floors, surfaces and toilets/latrines of the referral hospital cleaned?	1 = At least once a day 2 = Every 2 days 3 = Once every 3-4 days or twice per week 4 = Once a week (weekly)	
503	Are floors, surfaces and toilets/latrines cleaned with water and detergent/disinfectant (e.g. chlorine 0.05%)?	0 = No 1 = Yes (Check at the store of cleaning materials if there is detergent/disinfectant available during referral hospital walkthrough)	If No, skip to Q505
504	If Yes, how often (at which frequency) are floors, surfaces and toilets/latrines of the referral hospital cleaned with water and detergent/disinfectant?	1 = At least once a day 2 = Every 2 days 3 = Once every 3-4 days or twice per week 4 = Once a week (weekly)	
505	Are there cleaning equipment/materials separately for floors, points of care delivery and toilets/latrines?	0 = No 1 = Yes (Check at the store of cleaning materials if there are separate for floors, points of care delivery and toilets/latrines available during referral hospital walkthrough)	
506	Does the referral hospital have any appliances available for sterilizing medical equipment?	0 = No, there is none or a broken one 1 = Yes (Check at the sterilisation room if there are functioning sterilizers available during referral hospital walkthrough)	If No, skip to Q508
507	If Yes, what type of appliances does your referral hospital use to sterilize medical equipment? (Multiple answers possible)	1 = Electric autoclave 2 = Non-electric autoclave/pressure cooker 3 = Electric dry heat sterilizer 4 = Electric boiler or steamer 5 = Other, specify: _____	
508	Does the referral hospital have any infection prevention and control (IPC) guidelines for health care facilities?	0 = No 1 = Yes	If Yes, ask to see it
509	Has there been any IPC training offered to referral hospital staff?	0 = No 1 = Yes	If No, skip to Q511

Section 5: General cleanliness and hygiene

510	Have all clinical staff of the referral hospital been trained (at least once) on the 5 key moments and appropriate hand hygiene? (Show pictures of the 5 key moments and appropriate hand hygiene process)	0 = No, none 1 = Yes, some 2 = Yes, all	
511	Does your referral hospital display hygiene promotion posters near hand hygiene stations and/or patient waiting areas?	0 = No 1 = Yes (Confirm by observing during referral hospital walkthrough)	
512	Does this referral hospital have an IPC committee?	0 = No 1 = Yes	

Section 6: Health care waste management

601	Is there a protected needles pit (lined and sealed with slab) on the referral hospital premises?	0 = No 1 = Yes
602	Is there a protected (lined and sealed with slab) placenta pit on the referral hospital premises?	0 = No 1 = Yes
603	Is there an incinerator on the referral hospital premises?	0 = No 1 = Yes, a low capacity one (burner-type usually made of bricks) 2 = Yes, a high capacity one (+800oC)
604	How does the referral hospital finally dispose of sharps waste (e.g. used syringes and needles)?	1 = Burn in onsite low capacity incinerator 2 = Burn on the facility ground (+/- protection) 3 = Dump in onsite designated and protected pits (lined and sealed) 4 = Dump on flat ground or unprotected pits 5 = Bury inside the facility grounds (with/without treatment) 6 = Remove offsite with appropriate storage (in protected container) and disposal (burned in a high capacity incinerator) 7 = Remove offsite with unprotected storage and inappropriate disposal (e.g. through a general waste collection agency) 8 = Other, specify: _____
605	How does this referral hospital finally dispose of infected medical waste (e.g. bloody bandages)?	1 = Burn in onsite low capacity incinerator 2 = Burn on the facility ground (+/- protection) 3 = Dump in onsite designated and protected pits (lined and sealed) 4 = Dump on flat ground or unprotected pits 5 = Bury inside the facility grounds (with/without treatment) 6 = Remove offsite with appropriate storage (in protected container) and disposal (burned in an incinerator) 7 = Remove offsite with unprotected storage and inappropriate disposal (e.g. through a general waste collection agency) 8 = Other, specify: _____
606	How does this referral hospital finally dispose of placenta?	1 = Burn in onsite low capacity incinerator 2 = Burn on the facility ground (+/- protection) 3 = Dump in onsite designated and protected pits (lined and sealed) 4 = Dump on flat ground or unprotected pits 5 = Bury inside the facility grounds (with/without treatment) 6 = Remove offsite with appropriate storage (in protected container) and disposal (burned in a high capacity incinerator) 7 = Remove offsite with unprotected storage and inappropriate disposal (e.g. through a general waste collection agency) 8 = Other, specify: _____

Section 7: Constraints and suggested solutions

701	Could you please tell me what are the major constraints/challenges in terms of water, sanitation and hygiene that your facility has been facing?	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
702	What are your suggested solutions to address/ meet the above major constraints/challenges?	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Module 2: Checklist for referral hospital walkthrough

In addition to the respondent interview (Module 1), the assessment requires a referral hospital walkthrough. This walkthrough includes inside the hospital building and the hospital compounds outside the building. The former should focus on key points of care delivery or departments, whereas the latter should concentrate on the main source of electricity, water, sanitation facilities, and waste storage or final waste disposal areas.

Checklist for key points of care delivery/departments				
1.	Outpatient department/ward			
	a. The floors of the department and in consultation rooms are visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No;	1 = Yes;	99 = NA
	b. There is a hand hygiene station available (with available water and soap OR alcohol-based hand rub) in all consultation rooms	0 = No;	1 = Yes;	99 = NA
	c. The consultation beds are visibly clean (covered by clean, waterproof mattresses)	0 = No;	1 = Yes;	99 = NA
	d. There is one set of bins (sharps, infectious non-sharps and general) clearly labelled (colour coded or written labels/signs) for safely segregation health care waste in each consultation room	0 = No;	1 = Yes;	99 = NA
	e. There are only bins for sharp waste and for infectious non-sharp waste but no bin for general waste clearly labelled (colour coded or written labels/signs) for safely segregation health care waste in each consultation room	0 = No;	1 = Yes;	99 = NA
	f. 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;	99 = NA
	g. There is appropriate personal protection equipment (gloves, masks) in all consultation rooms	0 = No;	1 = Yes;	99 = NA
	h. Consultation equipment/materials (stethoscope, sphygmomanometer, thermometer, tongue depressors...) are visibly clean in all consultation rooms	0 = No;	1 = Yes;	99 = NA
2.	Emergency ward			
	a. The floor is visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No;	1 = Yes;	99 = NA
	b. There is a hand hygiene station available (with available water and soap OR alcohol-based hand rub)	0 = No;	1 = Yes;	99 = NA
	c. The beds are visibly clean (covered by a clean, waterproof mattresses)	0 = No;	1 = Yes;	99 = NA
	d. There is one set of bins (sharps, infectious non-sharps, and general) clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes;	99 = NA

Checklist for key points of care delivery/departments

	e. There are only bins for sharp waste and for infectious non-sharp waste but no bin for general waste clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes;	99 = NA
	f. 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;	99 = NA
	g. There is appropriate personal protection equipment (gloves, masks)	0 = No;	1 = Yes;	99 = NA
	h. Equipment/materials (monitoring, sterile intubation and other resuscitation sets ...) are visibly clean	0 = No;	1 = Yes;	99 = NA
3.	Paediatric ward			
	a. The floor is visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No;	1 = Yes;	99 = NA
	b. There is a hand hygiene station available (with available water and soap OR alcohol-based hand rub)	0 = No;	1 = Yes;	99 = NA
	c. The beds are visibly clean (covered by a clean, waterproof mattresses)	0 = No;	1 = Yes;	99 = NA
	d. There is one set of bins (sharps, infectious non-sharps, and general) clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes;	99 = NA
	e. There are only bins for sharp waste and for infectious non-sharp waste but no bin for general waste clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes;	99 = NA
	f. 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;	99 = NA
	g. There is appropriate personal protection equipment (gloves, masks)	0 = No;	1 = Yes;	99 = NA
	h. Necessary equipment/materials are visibly clean	0 = No;	1 = Yes;	99 = NA
4.	Medicine ward			
	a. The floor is visibly clean, free from dust and soil, and free of clutter (unnecessary or unused equipment or furniture)	0 = No;	1 = Yes;	99 = NA
	b. There is a hand hygiene station available (with available water and soap OR alcohol-based hand rub)	0 = No;	1 = Yes;	99 = NA
	c. The beds are visibly clean (covered by a clean, waterproof mattresses)	0 = No;	1 = Yes;	99 = NA
	d. There is one set of bins (sharps, infectious non-sharps, and general) clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes;	99 = NA

Checklist for key points of care delivery/departments				
	e. There are only bins for sharp waste and for infectious non-sharp waste but no bin for general waste clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes;	99 = NA
	f. 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;	99 = NA
	g. There is appropriate personal protection equipment (gloves, masks)	0 = No;	1 = Yes;	99 = NA
	h. Necessary equipment/materials are visibly clean	0 = No;	1 = Yes;	99 = NA
5.	<u>Maternity ward and delivery room</u>			
	a. The floors of the ward and delivery room are visibly clean, free from dust and soil, and free of clutter (unnecessary/unused equipment)	0 = No;	1 = Yes;	99 = NA
	b. There is a hand hygiene station available (with available water and soap OR alcohol-based hand rub)	0 = No;	1 = Yes;	99 = NA
	c. The beds, including delivery beds, are visibly clean (covered by a clean, waterproof mattresses)	0 = No;	1 = Yes;	99 = NA
	d. There is one set of bins (sharps, infectious non-sharps, placenta and general) clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes;	99 = NA
	e. There are only bins for sharp waste, for infectious non-sharp waste and for placenta but no bin for general waste clearly labelled (colour coded or written labels/signs) for safely segregation health care waste	0 = No;	1 = Yes;	99 = NA
	f. 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;	99 = NA
	g. There is appropriate personal protection equipment (gloves, masks, eye protection equipment...)	0 = No;	1 = Yes;	99 = NA
	h. Sterile delivery sets (Disposable/sterile reusable scissors/blades for cutting the umbilical cord, disposable/sterile reusable cord clamps... appropriately stored) are available	0 = No;	1 = Yes;	99 = NA
6.	<u>Pre-/Post/Delivery Room</u>			
	a. Is there baby bathing facility in the pre-/post-delivery room of this referral hospital?	0 = No;	1 = Yes;	99 = NA
	b. Is the baby bathing facility functioning (reasonably clean with water and soap available for baby bathing)?	0 = No;	1 = Yes;	99 = NA

Checklist for sanitation facilities/toilets

7.	During the referral hospital walkthrough, the assessor must count the number of toilets/latrines located in a block dedicated for outpatient department/ward (or emergency ward if there is no dedicated outpatient department/ward) and record the number by their type as follows:			
	Type of toilets/latrines	Number (If no, record 0)		
	a. Flushed toilets			
	b. Pit latrines with slab or VIP			
	c. Pit latrines without slab/open pit			
	d. Others, specify: _____			
	e. Improved toilets/latrines (a-b)			
	f. All types of toilets/latrines (a-d)			
8.	Check all the toilets/latrines one-by-one (with a max. 4), starting with the improved one (a-b) as follows:			
	Toilet/latrine 1			
	a. is an improved toilet/latrine (6a-b)	0 = No;	1 = Yes;	99 = 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;	99 = 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	0 = No;	1 = Yes;	99 = NA
	d. has a hand hygiene station available (with water and soap OR alcohol-based hand rub) within 5m	0 = No;	1 = Yes;	99 = NA
	e. is designated for women/girls and has a bin with a lid on it within the cubicle or water available in a private space for washing	0 = No;	1 = Yes;	99 = NA
	f. 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;	99 = NA
	Toilet/latrine 2			
	a. is an improved toilet/latrine (6a-b)	0 = No;	1 = Yes;	99 = 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;	99 = 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	0 = No;	1 = Yes;	99 = NA
	d. has a hand hygiene station available (with water and soap OR alcohol-based hand rub) within 5m	0 = No;	1 = Yes;	99 = NA

Checklist for sanitation facilities/toilets

e.	is designated for women/girls and has a bin with a lid on it within the cubicle or water available in a private space for washing	0 = No;	1 = Yes;	99 = NA
f.	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;	99 = NA
Toilet/latrine 3				
a.	is an improved toilet/latrine (6a-b)	0 = No;	1 = Yes;	99 = 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;	99 = 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	0 = No;	1 = Yes;	99 = NA
d.	has a hand hygiene station available (with water and soap OR alcohol-based hand rub) within 5m	0 = No;	1 = Yes;	99 = NA
e.	is designated for women/girls and has a bin with a lid on it within the cubicle or water available in a private space for washing	0 = No;	1 = Yes;	99 = NA
f.	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;	99 = NA
Toilet/latrine 4				
a.	is an improved toilet/latrine (6a-b)	0 = No;	1 = Yes;	99 = 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;	99 = 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	0 = No;	1 = Yes;	99 = NA
d.	has a hand hygiene station available (with water and soap OR alcohol-based hand rub) within 5m	0 = No;	1 = Yes;	99 = NA
e.	is designated for women/girls and has a bin with a lid on it within the cubicle or water available in a private space for washing	0 = No;	1 = Yes;	99 = NA
f.	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;	99 = NA

Checklist for waste storage/final waste disposal areas

9.	a. Check if the waste storage awaiting for removal from the facility (or final disposal) is appropriately fenced and protected	0 = No;	1 = Yes;	99 = NA
	b. Check if the protected needles pit is functioning (in use and not full)	0 = No;	1 = Yes;	99 = NA
	c. Check if the protected placenta pit is functioning (in use and not full)	0 = No;	1 = Yes;	99 = NA
	d. Check if the incinerator is functioning (in use)	0 = No;	1 = Yes;	99 = NA

References

1. World Health Organization (WHO).(2011). Report on the Burden of Endemic Health Care-Associated Infection Worldwide: A Systematic Review of the Literature. Geneva, Swezerland: WHO Press.
2. Allegranzi et al. (2010).Burden of endemic health-care-associated infection in developing countries: systematic review and meta-analysis. Lancet 2011(377), 228-241. doi: 10.1016/S0140-6736(10)62005-3.
3. Oza et al. (2015). Neonatal cause-of-death estimates for the early and late neonatal periods for 194 countries: 2000-2013. Bull World Health Organ 93(1), 19-28. doi: 10.2471/BTL.14.139790.
4. World Health Organization (WHO). (2015). Global Action Plan on Antimicrobial Resistance. Geneva, Swezerland: WHO Document Production Services.
5. World Health Organization (WHO) & UNICEF. (2014). WASH Post-2015: proposed targets and indicators for drinking-water, sanitation and hygiene. Geneva, Swizeland.
6. Action for Global Health & WaterAid. (2014). Making health a right for all: Universal health coverage and water, sanitation and hygiene. Retrieved from <http://www.wateraid.org/uk/what-we-do/our-approach/research-and-publications/view-publication?id=63af2f8f-1a91-4b7a-b88d-e31175215f57>
7. World Health Organization (WHO) & UNICEF. (2015). Water, sanitation and hygiene in health care facilities. Status in low- and middle-income countries and way forward.
8. Por, Ir (2015). Towards Safer and Better Quality Health Care Services in Cambodia: A Situation Analysis of Water, Sanitation and Hygiene in Health Care Facilities. Phnom Penh, Cambodia: WaterAid.
9. WHO & UNICEF. (2016). Meeting Report: Expert Group Meeting on Monitoring WASH in Health Care Facilities in the Sustainable Developments Goals. Geneva, Swezerland: WHO/UNICEF Joint Monitoring Programme for water supply and sanitation.
10. Annear et al. (2015). The Kingdom of Cambodia Health System Review. Asia Pacific Observatory on Public Health Systems and Policies 5(22015), 1-214.
11. Ministry of Health (2007). Guidelines on Minimum Package of Activities for Health Center Development 2008-2015 (Khmer version). Phnom Penh, Cambodia: Ministry of Health.
12. Ministry of Health (2014). Guidelines on Complementary Package of Activities for Referral Hospital Development (Khmer version). Phnom Penh, Cambodia: Ministry of Health.

13. Ministry of Health. (2016). Report on Health Achievements in 2015 and Plan of Activities for 2016: The 37th National Health Congress (Khmer Version). Phnom Penh, Cambodia: Ministry of Health.
14. Essential environmental standards in health care. Geneva: World Health Organization; 2008.
15. Ministry of Health. (2007). Building Brief for Health Center Minimum Package of Activities. Phnom Penh: Health Sector Support Program. Phnom Penh, Cambodia: Ministry of Health.
16. Ministry of Health. (2010). Infection Prevention and Control Guidelines for Health Care Facilities. Phnom Penh, Cambodia: Ministry of Health.
17. Ministry of Health. (2012). Training Curriculum on Infection Prevention and Control in Health Care facilities. Phnom Penh, Cambodia: Ministry of Health.
18. Ministry of Health. (2012). National Guideline on Health Care Waste Management Phnom Penh: Department of Hospital Services and Working Group on Health Care Waste Management. Phnom Penh, Cambodia: Ministry of Health.
19. Sedgwick P. (2015): Bias in observational study designs: cross sectional studies. BMJ Publishing Group 350:h1286.
20. Pandis N. (2014): Cross-sectional studies. Am J Orthod Dentofacial Orthop 146:127-129.
21. Macro International Inc. (2009). Cambodia Health Impact Evaluation 2008. Calverton, Maryland: National Center for HIV/AIDS Dermatology and STD, National TB.
22. World Health Organization (WHO). (2015). Status of health-care waste management in selected countries of the Western Pacific Region. Geneva, Switzerland: Regional Office for the Western Pacific.
23. Ministry of Health. (2003). Building Brief - Referral Hospitals - Complementary Package of Activities. vol. 1 & 2. Phnom Penh, Cambodia: Health Infrastructure Working Group, Ministry of Health.

