



Center for International
Water and Sustainability



WATER, SANITATION, AND HYGIENE IN HEALTH CARE FACILITIES

Assessment of WASH service delivery and sustainability in
Rumphi, Malawi

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Water, Sanitation, and Hygiene in Health Care Facilities
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Introduction	3
Background	4
Methods	5
Results	7
Discussion	23
Next Steps.....	25
Appendix A – Supplemental Data.....	27
Appendix B - Photos	29
References	33

Introduction

The importance of water, sanitation, and hygiene (WASH) in health care facilities has recently gained heightened global awareness, with a global call to action declared by the World Health Organization in March 2018, the publication of a global baseline report of WASH in health care facilities in early 2019 (*WASH in Health Care Facilities: Global Baseline Report 2019*, 2019), and commitments made by various types of organizations around the world in September 2019.

In 2018, the Desert Research Institute (DRI) and Transform International were requested by the Wallace Genetic Foundation to explore and develop a framework for sustainability in Monitoring, Evaluation, Resolution, and Learning, to help ensure that current and future initiatives to improve WASH are sustained in the long term. To begin this process, DRI and Transform conducted an assessment of the global landscape on sustainability in early 2019. This global landscape assessment report (herein called the “landscape report”) identified factors that were found to be associated with sustainability in WASH, and revealed that while there are many tools in place to help improve WASH in health care facilities, few focus on facilitating sustainability. As such, the goal of DRI and Transform’s work is to produce a set of tools that can be adapted and used in low-resource health care facility settings globally.

Rumphi district in northern Malawi was chosen as the pilot study area for the proposed framework because of Transform’s connections with local organizations, as well as the district's demonstrated engagement. In 2016, a team from Emory University School of Public Health had undertaken an assessment of the faith-based facilities using their WASHCon tool, revealing significant gaps in WASH services. A WASH FIT training was later conducted among a handful of the assessed facilities, in an effort to implement improvements to their WASH services. Government officials who attended this training indicated interest in becoming more engaged in future efforts toward improvement. With relevant experience in WASH, a clear need for improvement, and an engaged government and team members, Rumphi district is an appropriate site for the pilot of this project.

In November 2019, a team from Transform, DRI, and our local partner the Church of Central Africa Presbyterian (CCAP) Health Dept. and Development Dept. gathered research in northern Malawi. The team met with leadership in both the faith-based, and government departments responsible for healthcare facilities, and conducted a baseline assessment of the health care facilities in Rumphi. The purpose was to understand opportunities and challenges to sustainability. A total of eighteen public and faith-based health care facilities were assessed. The objectives of the assessment were to answer the following two main questions with regards to health care facilities in Rumphi district:

- What is the current level of water, sanitation, and hygiene services?
- What mechanisms are currently in place that can help or prevent the continued functionality of WASH services?

This report describes the brief background of the WASH and health landscape in Malawi, methods and findings of the assessment, and provides recommendations for moving forward.

Background

Health care delivery system in Malawi

Health services are provided by public, private for profit (PFP) and private not for profit (PFNP) sectors (*Health Care System*, 2016). In Rumphi district, facilities are operated primarily by the Ministry of Health (MOH) and the Christian Health Association of Malawi (CHAM). MOH facilities are free of charge, whereas CCAP facilities charge users a fee. While the MOH oversees CCAP facilities, they are mostly independent from each other with regards to funding and operations. A table listing the names, ownership, catchment population, and average number of patients seen per day in the 18 health care facilities in Rumphi district is available in the appendix. Health care financing and management in Malawi is decentralized, meaning that districts develop their own annual plans and budgets, and receive funds from the national government to cover their district health activities (Borghi et al., 2018).

Care is delivered through two branches: curative and preventive. Curative care is facility-based, and provided by clinicians at health centers, whereas preventive care is overseen by the environmental health department and is provided both at the health care facility and in communities. Preventative care includes outbreak management, immunization, and health promotion, and is undertaken primarily by Health Surveillance Assistants (Makwero, 2018).

WASH services and operations at health care facilities

District-level facilities have a maintenance department with plumbers and other maintenance staff. These staff are responsible for conducting maintenance at the district hospital as well as at health centers, who do not have their own maintenance personnel on staff. While daily operation of water and sanitation services would be done by facility staff, maintenance and repairs fall under the scope of these maintenance staff. This arrangement is the same for both MOH and CHAM facilities.

In order to help ensure that proper infection prevention and control activities are in place, each facility is meant to have an Infection Prevention and Control (IPC) Committee, made up of facility staff. In terms of WASH service delivery, the committee is responsible for enabling and encouraging proper IPC practices, such as ensuring that hygiene materials such as soap and handwashing stations are in place. Under the preventive branch of care run by Environmental Health officers, Health Surveillance Assistants (HSAs) also provide community hygiene promotion via door-to-door visitations and outreach clinics, but hygiene within the health care facility generally does not fall within their formal scope of work.

Various assessments have demonstrated that health care facilities in Malawi need improvements in the provision of WASH infrastructure, processes, and services. For example, according to the UNICEF/WHO Joint Monitoring Programme Report of 2015, most facilities in Malawi have adequate water supply, but limited sanitation and hygiene facilities.

Percent of facilities meeting JMP standards

	Malawi coverage	African region average
Water	94%	58%
Sanitation	37%	84%
Hygiene	55%	65%

(*Water, sanitation and hygiene in health care facilities: Status in low and middle income countries and way forward*, 2015)

This report will delve further into the levels of WASH service of health care facilities within Rumphu district, as found through the assessment, as well as insights into the issue of sustaining these services.

Methods

1. Assessment design

The DRI/Transform/CCAP team traveled over a two-week period in November 2019 to visit the 18 health care facilities in Rumphu district. Assessments at each facility consisted of two main components:

- 1) observations of the facilities, including WASH infrastructure and services at the facility as well as selected wards;
- 2) interviews with the facility director, a WASH service manager, staff, and visitors, which were administered through surveys comprised of closed and open-ended questions.

In addition to the facility assessments, open-ended interviews and group discussions were held with district-level staff. Data collection tools were designed with the intention of capturing existing service levels and practices, as well as the behaviors and attitudes of staff. Prior to the assessment, the tools were tested at Erukweni Hospital in the neighboring Mzimba district, and minor adjustments were made.

2. Data collection tools

Health care facility observations:

Observations were made of water services, sanitation facilities, hand hygiene facilities, waste management facilities, and environmental cleanliness for the facility overall. Data for each of these domains consisted of JMP indicators as well as more detail capturing usability, accessibility, functionality, and quality. Data were collected using the Solstice mobile application. Questions were compiled from existing sources including WASHCon, Emory's Safe Water Sustainability Metric, and the Soapbox Collaborative's WASH & CLEAN toolkit. In most facilities, both outpatient and maternity wards were observed. At larger facilities, more wards such as inpatient and pediatric wards were also observed, as well as guardian shelters. At all facilities, water quality samples from primary and secondary (where applicable) sources of water were collected and tested. Where chlorine had reportedly been applied to the water system supplying the facility, free residual chlorine (FRC) was measured. For all samples, pH, Total Dissolved Solids, Electrical Conductivity, temperature, and presence/absence of E.coli and Total Coliforms were measured. E.coli and total coliform tests were conducted using Aquagenx EC+TC P/A kits.

Staff surveys:

The director, or Medical Officer In Charge (MOIC) at each facility was administered a survey on WASH practices, perceived levels of WASH service, staffing, budgeting, availability of guidelines, and attitudes towards WASH. The survey consisted primarily of closed-ended questions, with a few open-ended questions for respondents to elaborate on certain topics. A separate WASH Service Manager survey was administered to a staff member whom the MOIC indicated was most knowledgeable about WASH practices at the facility. This survey included questions about managing each of the WASH domains and availability of relevant resources. The respondents were often Health Surveillance Assistants (HSA) or Environmental Health Officers (EHO); in some facilities with very few staff, it was the MOIC or another medical staff person. At district hospitals, it was a member of the maintenance team. Other staff, both medical and non-medical, were administered a general staff survey on attitudes toward their work and

WASH. This included questions on the perceived level of WASH services, attitudes toward their work and coworkers, past training experience, availability of guidelines, personal and general challenges to delivering WASH services, and day-to-day responsibilities. These were available in English and the regional language of Tumbuka, and administered by a Tumbuka-speaking member of the team to allow respondents to participate in whichever language was most comfortable.

Visitor surveys:

Where available, one to two visitors at each facility were asked to participate in a closed-ended survey assessing their attitudes and perceptions towards WASH services. Visitor surveys were available in English and Tumbuka, and administered by a Tumbuka-speaking member of the team to allow respondents to participate in whichever language was most comfortable.

District-level interviews:

In order to understand priorities, resources, and challenges at the district level, interviews were conducted with Rumphi district-level staff: District Environmental Health Officer (DEHO), District Water Officer (DWO), and Director of the health department at CCAP, which oversees 5 of the 18 facilities. All interviews were recorded with the consent of interviewees. Later, to conclude the assessment, a meeting was held with the Rumphi District Coordination Team (DCT) to share preliminary findings and conduct a facilitated discussion to gather further ideas on challenges and opportunities to WASH sustainability at health care facilities. Members of the DCT included staff from the departments of Water, Forestry, Community Development, Education, and a local NGO DAMRA (who has been involved in WASH improvements at some of the facilities). We attempted to interview the District Medical Officer individually as well as during the DCT meeting, but he was unavailable on both occasions.

3. Data Analysis

Data from the surveys and facility observations were reviewed on the Solstice web platform, then downloaded to Microsoft Excel to compile descriptive statistics. We calculated frequencies on the indicators for WASH service according to the WHO/UNICEF JMP indicators using data from facility observations, and the director and WASH service manager surveys. Although JMP indicators are not comprehensive, they offer a quantitative method to compare these results with national and global indicators. More in-depth indicators on quality and functionality for each domain were also analyzed. To analyze perceptions towards WASH service, qualitative responses from all surveys and interviews were compiled. Finally, both quantitative and qualitative data were compiled from all tools to analyze factors associated with sustainability of WASH. Those identified through the landscape report were: finances, leadership and management, on-site capacity, technical and administrative support, and attitudes and behavior.

Results

1. Facility and respondent characteristics

A total of 18 health care facilities were assessed. Most facilities provided outpatient services only, but did have maternity or labor/delivery wards. Piped water supplies, pit latrines, and incinerators were common throughout the facilities. Further details on the infrastructure are provided in section 2 of the results.

Table 1. Facility assessment snapshot

HCFs with inpatient department	28% (5)
HCFs with maternity ward	88% (15)
Primary water supply at HCF:	<i>Piped*</i> 78% (14)
	<i>Borehole</i> 11% (2)
	<i>Surface water</i> 11% (2)
Types of toilets observed:	<i>Flush/pour flush</i> 40% (17)
	<i>VIP or Pit latrines</i> 58% (25)
	<i>Composting toilet</i> 2% (1)
HCFs with incinerator available	61% (11)

**Of the 14 piped water systems, 7 were supplied by a local borehole and solar or electrical pump, 6 were surface water-supplied gravity systems, and 1 was a surface water pumped system.*

Due to a variety of factors including time constraints and health care facility staff availability, not every survey and observation tool was deployed at each facility. A total of 40 staff members across 16 facilities were administered the general staff survey, the types of staff and lengths of service of which are listed in Table 2. We surveyed 17 MOICs or acting MOICs (one in every facility but one) for the Facility Director survey. For the WASH Service manager survey, we surveyed 6 environmental officers, 5 medical staff, and 2 maintenance staff. Finally, eighteen visitors were surveyed across 11 health care facilities.

Table 2. General staff survey characteristics

Type of staff		Length of service	
Medical	45% (18)	6 months or less	12.5% (5)
Environmental	30% (12)	6 months + to under a year	25% (10)
Cleaning	5% (2)	1 year to under 5 years	15% (6)
Maintenance	5% (2)	5+ years	47.5% (19)
Security	5% (2)		
Administrative	10% (4)		

2. Baseline WASH service levels

Results for WASH service levels are presented below in accordance with the WHO/UNICEF JMP indicators, as well as additional indicators relating to functionality, quality, and accessibility.

2.1 Water service

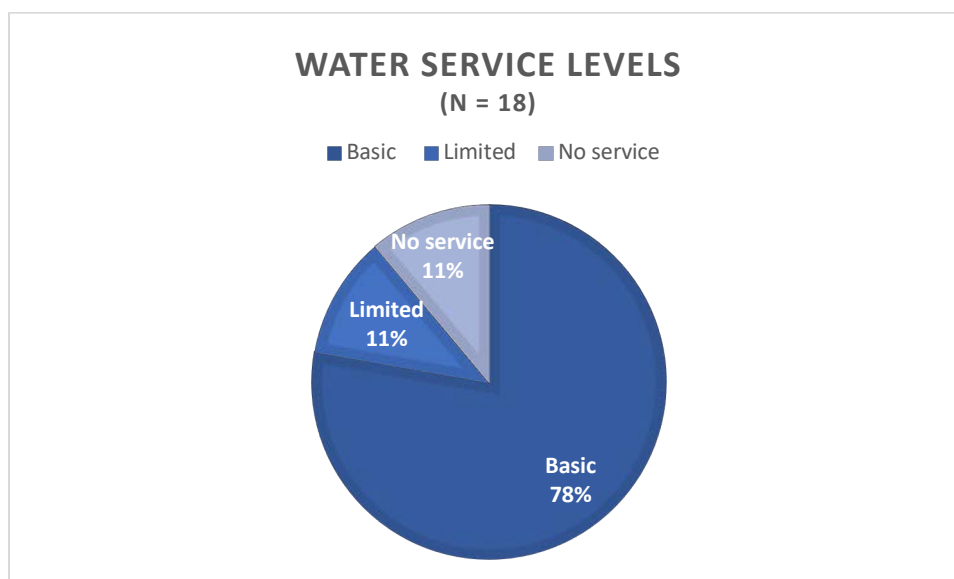


Figure 2.1 WASH service levels across health care facilities

Water service definitions by JMP

Term	Definition
Basic service	<ul style="list-style-type: none">Water is available from an improved source on the premises.
Limited service	<ul style="list-style-type: none">An improved water source is within 500 meters of the premises, but not all requirements for basic service are met.
No service	<ul style="list-style-type: none">Water is taken from unprotected dug wells or springs, or surface water sources, or:An improved source is more than 500 meters from the premises, or:There is no water source
Improved water source	<ul style="list-style-type: none">by nature of their design or construction have the potential to deliver safe water.these include: piped water, boreholes or tubewells, protected dug wells, protected springs, rainwater, and packaged or delivered water

The majority of health care facilities (78%) have basic water service in accordance with the JMP definitions. The two facilities (11%) defined to have no service had piped systems installed, but used surface water sources at the time of the assessment due to the extended disrepair of the piped system. Those defined as having limited service (11%, n=2) had pumped and piped systems that were not functioning at the time of the survey. A table indicating the specific type of water supply at each facility is shown in the appendix.

Table 3. Additional water service indicators – Proportion of HCFs (N=18)

Continuous service available	11% (2)
Alternative water supply available	83% (15)
Water chlorinated at facility	23% (3 of 13*)
Total coliforms present in primary water supply	94% (17)
E.coli present in primary water supply	56% (10)

Water available in Outpatient department	93% (13 of 14 observed)
Water available in Maternity or Labor/Delivery ward	91% (10 of 11 observed)
Water supply operation and maintenance guidelines available**	6% (1 of 17)
Water quality control/monitoring guidelines available**	24% (4 of 17)

*Data only available at 13 facilities where WASH service manager survey was conducted.

**Availability as reported by MOIC, not visually verified. It should be noted that none of the facilities tested water quality.

Additional indicators show gaps in reliability and quality. While water was available at most of the wards observed, through either taps or covered containers, most health care facilities lacked continuous service from the main water supply, reporting either daily disruptions, seasonal disruptions, or both. However, most facilities did have an alternative supply of water that is used in case the primary supply is unavailable.

Data on water treatment practices were obtained from 13 facilities where the WASH Service Manager surveys were conducted; of these, only 3 reported chlorinating their water, and another 3 reported that water is chlorinated prior to reaching the HCF. Among these, levels of Free Residual Chlorine were recorded at two facilities; at one, an acceptable residual of 0.2 mg/L was detected, but the other had zero. Three indicated that drinking water was treated using methods other than chlorination, including filtration and boiling. None of the facilities indicated that regular water quality testing was done. Water quality test results from our assessment show, with the presence of coliforms, that most water supplies are at risk for environmental and fecal contamination.

Table 4. Water quality

HCF Name	Water point name	Type	FRC (mg/L)	TC	E.coli	pH	TDS (ppm)	EC (uS/cm)	Temp (C)
Bolero	Bolero healthy centre borehole 1	Borehole or tubewell		Positive	Negative	6.83	655	1330	27
Bolero	Bolero Hospital borehole	Borehole or tubewell	0	Positive	Positive	6.93	697	1370	29
Chisimuka	Chisimuka main tap	Piped into dwelling		Positive	Negative				
Chisimuka	Chisimuka OPD sink	Piped into dwelling		Positive	Negative				
Chitimba	Chitimba opd tap	Piped into public tap or basin		Positive	Positive		202	404	33
DGM	Maternity ward tap	Piped into dwelling		Positive	Positive		46	92	27
Livingstonia	Jalawe OPD bucket	Other		Positive	Negative	7.76	79	158	27
Jalawe	Jalawe health center tap 2	Piped into yard/plot		Positive	Positive	6.8	147	294	29
Katowo	Kotowo hospital tap behind OPD	Piped into yard/plot		Positive	Negative	6.92	223	456	26
Katowo	Bongololo - Chawinga	Borehole or tubewell		Positive	Negative	6.62	157	310	25

HCF Name	Water point name	Type	FRC (mg/L)	TC	E.coli	pH	TDS (ppm)	EC (uS/cm)	Temp (C)
Lura	Lura health centre main tap	Piped into public tap or basin		Positive	Positive		5	10	24
Lura	Lura health centre water point	Borehole or tubewell		Positive	Negative		212	106	27
Luwuchi	Medical assistants office	Piped into dwelling		Positive	Positive		930	465	36
Mhuju	Mhuju HC Borehole	Borehole or tubewell		Negative	Negative		404	808	25
Mlowe	Rukuru river	Surface water		Positive	Positive		38	76	27
Mphompha	Mphompha	Piped into yard/plot		Positive	Positive				
Mzokoto	Mzokoto health centre tap	Piped into public tap or basin		Positive	Negative	7.45	535	1060	29
Ng'onga	Ng'onga HC main tap	Piped into yard/plot		Positive	Positive	8.02	31	62	29
Ng'onga	Ng'onga HC Borehole	Borehole or tubewell		Negative	Negative	7.12	854	1640	27
Nthenje	Nthenje hospital borehole	Borehole or tubewell		Positive	Negative	7.16	488	974	26
Rumphi District Hospital Tcharo	Rumphi hospital male ward tap	Piped into dwelling	0.2	Positive	Negative	7.7	24	46	27
	Tcharo filter	Surface water		Positive	Negative				
Zunga	Zunga health post indoor tap	Piped into dwelling		Positive	Positive		143	285	30

Few facilities had guidelines available for operation and maintenance of the water supply, or control and monitoring of water quality. Of those where water quality guidelines were reportedly available, chlorination instructions were seen, but no monitoring guidelines or guidelines for other treatment methods were seen.

2.2 Sanitation service

While all of the toilets observed were improved sanitation facilities, none of them met all of the criteria for basic service. All 18 health care facilities provide limited sanitation service according to the JMP indicators. A total of 41 toilet blocks were observed across all health care facilities. None of the toilets observed met all of the criteria for accessibility. Although a few had ramps, and most had sufficiently wide entrances, none had handrails or guides attached to floors or sidewalls. No toilets observed had any menstrual hygiene facilities, and only a third of toilets had a hand hygiene station within 5 meters. Further information on hand hygiene is in the following section on hand hygiene service.

Sanitation service definitions by JMP

Term	Definition
Basic service	<ul style="list-style-type: none"> • Improved sanitation facilities are usable, with at least one toilet dedicated for staff, at least one sex-separated toilet with menstrual hygiene facilities, and at least one toilet accessible for people with limited mobility. <ul style="list-style-type: none"> ○ in small facilities, a gender-neutral room with a single private toilet is also considered sex-separated ○ menstrual hygiene facilities include a bin with a lid for disposing of menstrual hygiene products, and water and soap in a private space for washing. ○ toilet is accessible to people with limited mobility if: <ul style="list-style-type: none"> ▪ toilets are accessible without stairs or steps ▪ door is at least 80cm wide ▪ handrails or guides are attached to floors or sidewalls ▪ door handle and seat are within reach of people using wheelchairs, crutches or sticks
Limited service	<ul style="list-style-type: none"> • At least one improved sanitation facility is available, but not all requirements for basic service are met.
No service	<ul style="list-style-type: none"> • Toilet facilities are unimproved, or there are no toilets
Improved sanitation facility	<ul style="list-style-type: none"> • designed to hygienically separate human excreta from human contact • these include: flush and pour flush toilets connecting to sewer or septic tanks, pit latrines, composting toilets
Usable condition	<ul style="list-style-type: none"> • door can be closed and locked from inside • if door is found to be locked, a key can be produced • no major holes or gaps in walls • pit, drain, or drop hole is not blocked or overflowing • water is available for flush toilets

A further examination into additional indicators on the functionality of sanitation services reveals that there are many gaps. Less than a third of toilet blocks are explicitly gender-separated, and while toilets could meet gender separation criteria by having a gender-neutral, private toilet, only at two-thirds of the observed toilets blocks were all doors functioning, and thus able to offer privacy to users at all times.

Table 5. Additional sanitation service indicators

Across all observed toilet blocks		
Gender-separated toilets		31% (12/39)
All doors on toilet block functional		65% (28/43)
Adequate lighting		31% (12/39)
Unpleasant smell		51% (22/43)
Visibly clean		48% (20/42)
At least one usable toilet on toilet block		83% (35/42)
Across all health care facilities		
Outpatient wards with patient toilets within 30 meters		100% (14/14)
Maternity wards with patient toilets within 30 meters		85% (11/13)

Total number of toilet blocks observed varies for each observation, as some data could not be obtained for certain sites.

2.3 Hand hygiene service

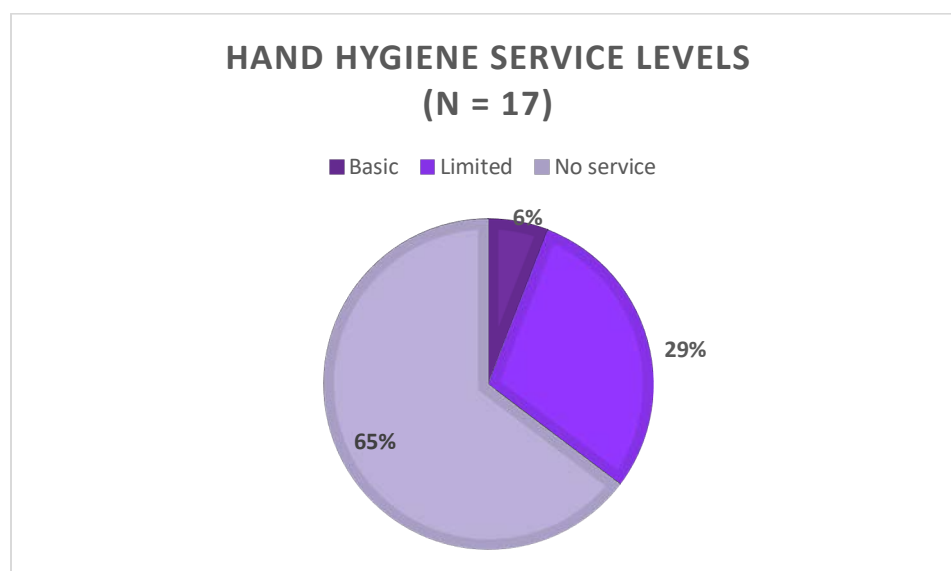


Figure 2.3 Hand hygiene service levels across health care facilities

Hand hygiene service definitions by JMP

Term	Definition
Basic service	<ul style="list-style-type: none"> Functional hand hygiene facilities are available at points of care, and within 5 meters of toilets
Limited service	<ul style="list-style-type: none"> Functional hand hygiene facilities are available either at points of care or toilets, but not both
No service	<ul style="list-style-type: none"> No functional hand hygiene facilities are available either at points of care or toilets.
Functional hand hygiene facilities	<ul style="list-style-type: none"> at points of care, must have either alcohol-based rub, or soap and water at toilets, must have soap and water within 5 meters of toilets. Alcohol-based hand rub is not considered adequate for hand hygiene at toilets.

While the definition for a basic level of hand hygiene service is not rigorous, only one facility met this criteria by having a functioning hand hygiene station both within 5 meters of all observed toilets **and** at all observed points of care, with all hand hygiene stations equipped with both soap and water. The 29% of facilities (n = 5) with limited service had functional hand hygiene facilities at all of the observed wards, but not within 5 meters of the toilets. The remaining 11 facilities, which made up the majority (65%), had no hand hygiene near the toilets, and hand hygiene facilities at points of care were incomplete. Table 6 below shows the availability of supplies. Finally, out of the 41 toilets observed across all health care facilities, only 33% (13 of 40) had a functional hand hygiene facility within 5 meters.

Table 6. Additional hand hygiene service indicators – Proportion of health care facilities (N=17)

Functional hand hygiene facility within 5 meters of all observed toilets at facility	6% (1)
Hand hygiene availability at points of care	35% (6) with water and soap, or alcohol-based hand rub
	59% (10) with only water
	6% (1) with neither water, nor alcohol-based hand rub
Hand hygiene promotion materials observed	29% (5 of 17)

Note: since not every ward and toilet was observed at each facility, these figures could be an overestimation.

2.4 Waste Management service

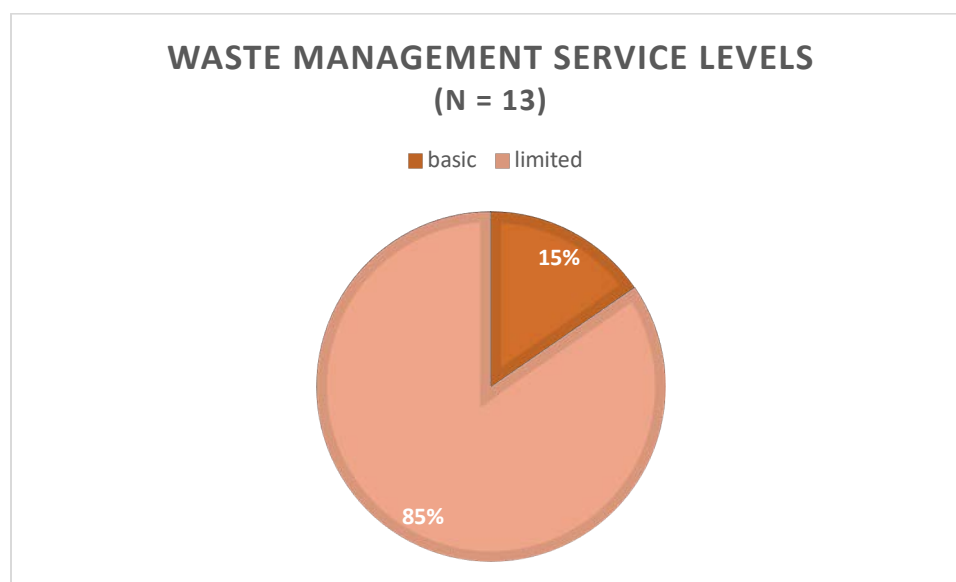


Figure 2.4 Waste management service levels across health care facilities

Waste management service definitions by JMP

Term	Definition
Basic service	<ul style="list-style-type: none"> Waste is safely segregated into at least three bins, Sharps and infectious waste are treated and disposed of safely. This includes burning in an incinerator, burial in a protected lined pit, or removal for treatment off site.
Limited service	<ul style="list-style-type: none"> There is limited separation and/or treatment and disposal of sharps and infectious waste, but not all requirements for basic service are met; eg. burning in an open pit.
No service	<ul style="list-style-type: none"> There are no separate bins for sharps or infectious waste, and sharps and/or infectious waste are not treated/disposed of.

All facilities had some level of waste management; of these, most facilities met a limited level of service. This was due to segregation and disposal practices being inconsistent. Infectious or sharps waste could be properly segregated but not properly disposed of, or vice versa. Waste management service levels are only available from 13 facilities where the WASH service manager was conducted.

Table 7. Additional waste management indicators – proportion of HCFs

Waste is properly segregated in all observed wards	24% (4/17)
Safe disposal¹ of:	
• Infectious waste	77% (10/13)
• Sharps waste	69% (9 /13)
• Placentas	100% (12 /12)
Functional incinerator available²	42% (11/26)
Non-infectious waste separated from incinerator	36% (4/11)
Waste management guidelines seen	24% (4/17)

¹ Safe disposal as reported by respondent of WASH Service Manager survey

² Since incinerators were never being operated at the time of the surveys, functionality was reported by staff.

While most facilities had sharps collection containers, most did not further separate other infectious waste from non-infectious waste for a total of at least three waste bins. Consequently, few facilities disposed of non-infectious waste separately from infectious waste, most often incinerating it all

together. Those that did separate out non-infectious waste disposed of it through open burning. While this is not an optimal disposal method either, it does prevent the incinerator from being overloaded and functioning poorly. Many waste management areas did not have barriers or walls to prevent access by people or animals. All health care facilities with a maternity or labor/delivery ward had lined pits to properly dispose of placentas.

Very few facilities displayed waste management instructions, and they were always observed inside offices, rather than in patient care or waste disposal areas. The lack of waste bins observed in patient or visitor areas could also lead to poor management of waste.

2.5 Environmental Cleaning service

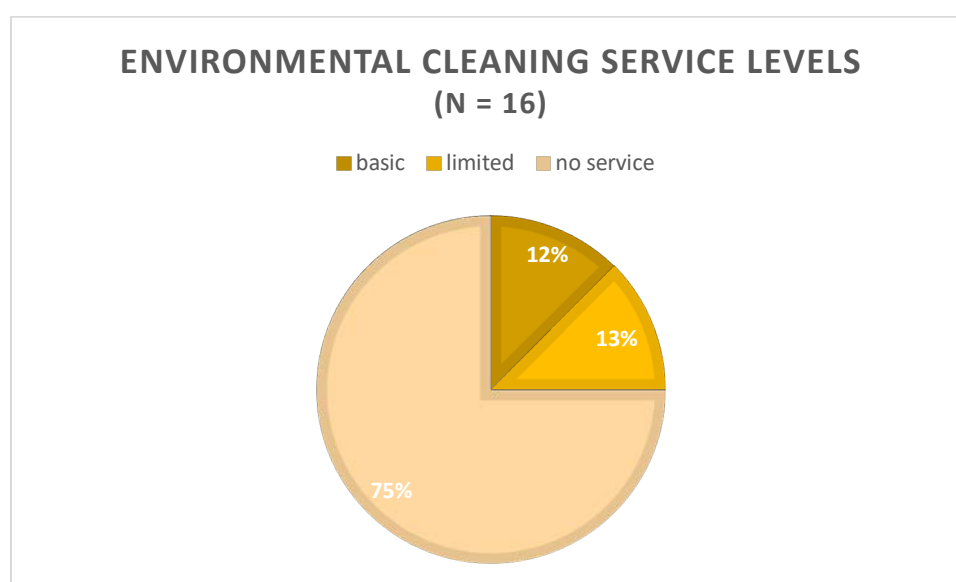


Figure 2.5 Environmental cleaning service levels across health care facilities

Environmental Cleaning service definitions by JMP

Term	Definition
Basic service	<ul style="list-style-type: none"> Basic protocols for cleaning are available, Staff with cleaning responsibilities have all received training.
Limited service	<ul style="list-style-type: none"> There are cleaning protocols and/or, at least some staff have received training on cleaning.
No service	<ul style="list-style-type: none"> No cleaning protocols are available No staff have received training on cleaning

Most health care facilities did not meet the criteria for any level of environmental cleaning service, lacking training and protocols. While a quarter of surveyed facilities reported having infection prevention and/or cleaning guidelines, not all staff received training in these facilities; thus, only a limited level of service was achieved. Further, no tracking of daily cleaning practices, such as sign-off sheets at toilets, was observed in any facilities.

Table 8. Additional environmental cleaning indicators

Cleaning guidelines observed	29% (5/17)
Staff trained at start of job	All staff - 12% (2/17) Some staff – 12% (2/17)

Cleanliness criteria met at all observed wards ¹	24% (4/17)
Cleaning frequency reported to be at least once per day	100% (12/12 ²)
Consistent supply of cleaning materials available	47% (7/15 ³)

¹Survey questions to calculate cleanliness criteria were: 1. Is the ward visibly clean and free from dust and soil? 2. Are there uncleaned spills from bodily fluids (blood, urine, feces, vomit, etc)? 3. Are the floors visibly clean? (As not all wards were observed at every HCF, this may be an overestimation.)

²Obtained from WASH service manager survey

³MOICs who reported that they have not had insufficient cleaning supplies in the past year.

3. Perception of WASH service levels

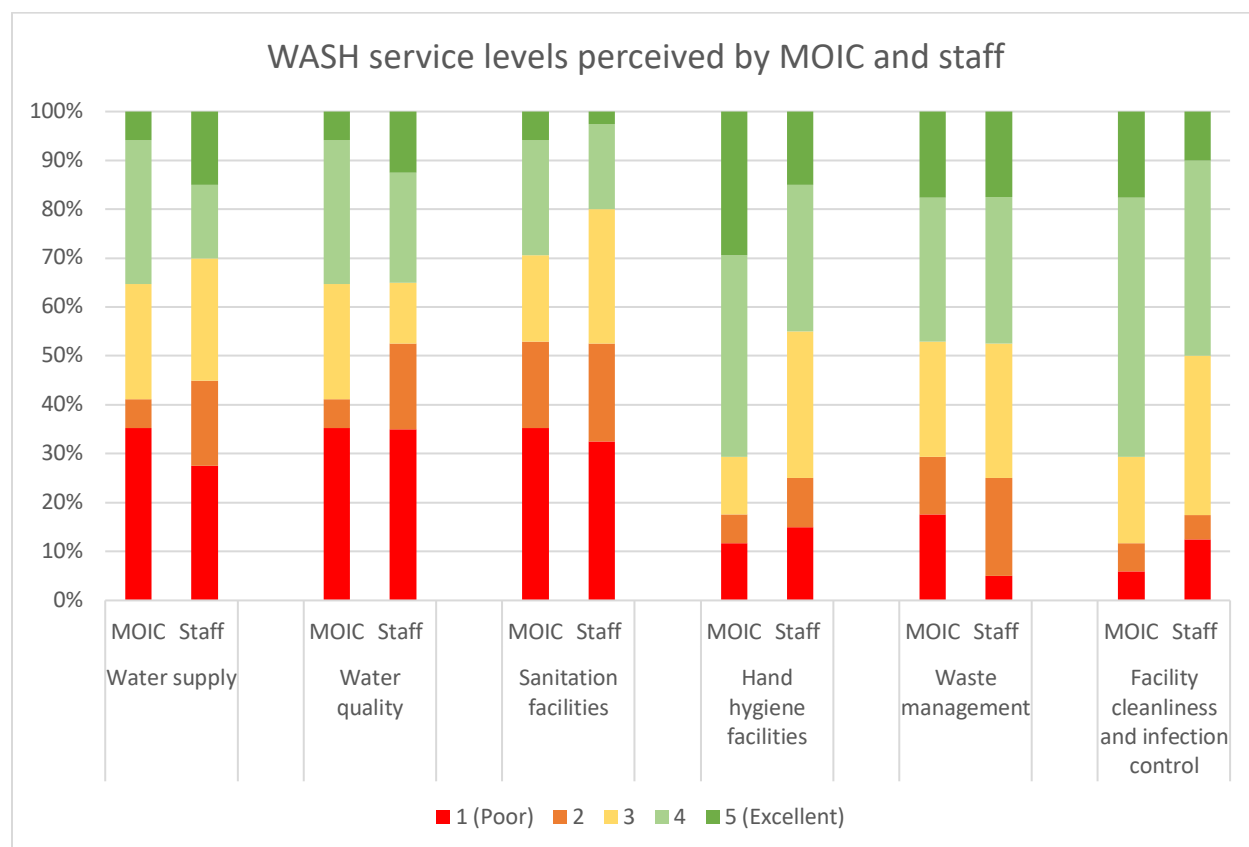


Figure 3.1 Staff perspectives on WASH services

MOICs and staff were asked to grade each of the WASH service levels on a scale of 1 to 5, with 1 being poor and 5 being excellent (in the MOIC survey, water supply and quality were combined into one metric; both of these are displayed for each of supply and quality in the graph above). These grades appear to be generally consistent between MOICs and other staff. It is evident that respondents perceive water supply, water quality, and toilets to be in relatively poor condition, with the majority assigning a grade of 3 or below, whereas waste management, hand hygiene, and cleanliness scored better overall. Through interviews, district-level staff shared their descriptions as “poor” or “somewhere in the middle”.

Staff and visitors were also asked a further series of questions on their perceptions of WASH service availability. Sixty-five percent of staff agreed that water is usually available at the facility, and 58% agreed that the amount of water provided on a daily basis is more than they need to do their job.

Among visitors, half agreed that the facility has the water supply needed to provide good health care. Fifty percent of staff agreed that the water is usually clean and safe to consume, compared to 56% among visitors.

Only 31% of staff and 39% of visitors were comfortable with the level of cleanliness of the toilets, although 70% of staff agreed that the facility is generally clean. Fifty-eight percent of staff agreed that hand washing or hand sanitizing stations are placed in convenient locations in the facility, whereas only 22% of visitors responded that they found it easy to wash hands after using the toilet. However, it is important to note that a few MOICs and staff admitted that they did not know what a high level of WASH service should look like, even if they reported that the existing level of service was insufficient. Some revealed at the end of the survey that only upon being asked the questions did they realize that there were certain gaps in WASH service at their facility.

In spite of these gaps, it is evident that visitors expect better WASH services, with an overwhelming majority of respondents assigning the highest grade in terms of how important it is for health care facilities to offer these services. Curiously, staff also mentioned anecdotally that soap at the facility can go missing because visitors take soap home. Clearly, visitors understand the importance of hygiene.

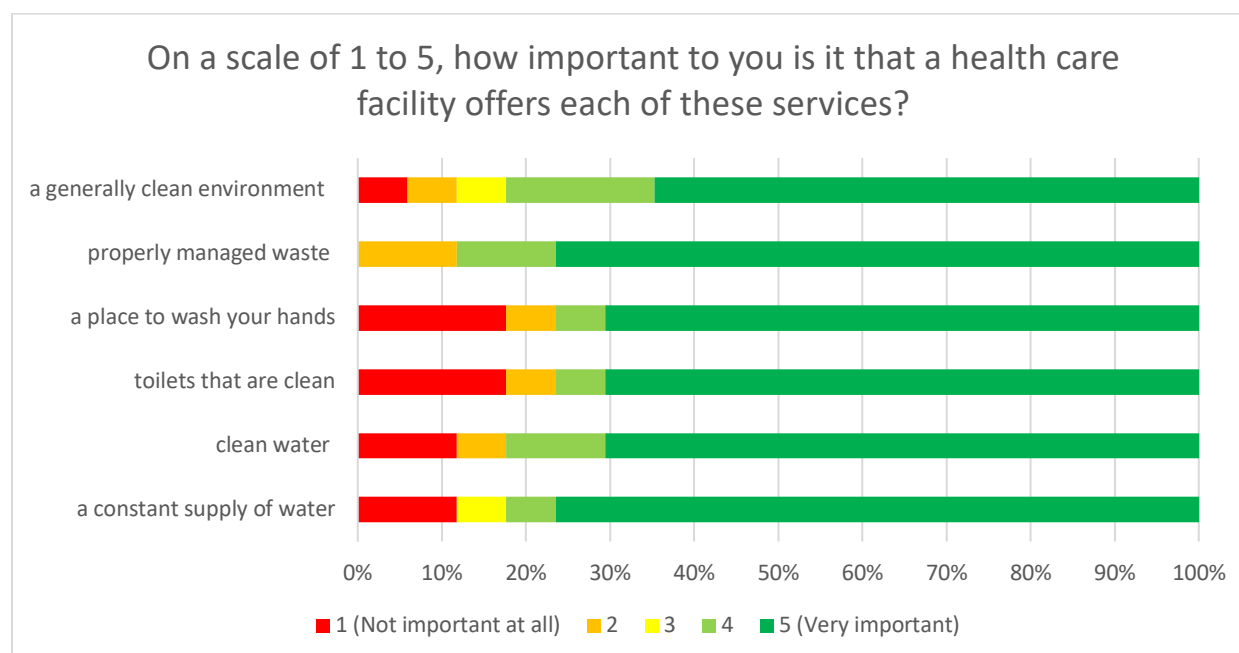


Figure 3.2 Patient perspectives on importance of WASH services

4. Sustainability factors

The landscape report that was completed prior to this assessment revealed key factors associated with sustainability, through a review of various literature on WASH services within and outside of the health care contexts. These factors were:

- **Hardware and infrastructure that are appropriate for the context**, considering their design, construction, operation, and maintenance, against the level of skills and resources available.

- **Adequate on-site capacity of staff** to properly use, operate, and maintain services, supported by ongoing training and supervision
- **Leadership and proper management** of staff and services in guiding WASH service delivery, staff behavior, and resource allocation
- **Ownership, demand, and behavior** of users, which leads to the proper use and maintenance of WASH services
- **Adequate support** from technicians or experts who may be needed to help solve problems that on-site staff cannot solve on their own, and to supervise the implementation of proper practices
- **Finances** to support recurrent costs of operating and maintaining hardware, and training staff.

The assessment was designed to capture data on these factors. Based on the results, they have been refined to the following factors:

- local capacity,
- training,
- guidelines, instructions and cues,
- staff attitudes and motivation,
- leadership, management, and supervision,
- resources, and,
- governance.

Presented below are our findings from the assessment pertaining to each of these factors.

Local capacity

All MOICs described the availability of WASH maintenance and cleaning staff as being insufficient, and 40% of staff mentioned personnel as a challenge to delivering WASH service. District-level staff mentioned that medical personnel are generally in short supply at the facilities; in some cases, cleaning staff were being tasked with work beyond their usual scope, such as updating patient registers, entering data into the Health Management Information System (HMIS), or administering malaria tests, tasks which prevented them from completing their core duties. Meanwhile, at the district level, a lack of personnel with the technical expertise was cited as a reason why routine water quality monitoring is not performed.

Only a quarter of MOICs said they could fix most of the WASH problems that they encounter; the remaining said they could fix some, or very few of them. As shown in the previous section on WASH service levels, such unresolved problems had a wide range, from missing or improperly functioning toilet doors, to dysfunctional incinerators. All facilities rely on their district/mission hospital for maintenance support, and their individual capacity to address WASH issues appears fairly low. Most reported that they do not have anyone contracted to help with repairs nor know where they could seek someone with the technical skills and knowledge to help, although a few mentioned community volunteers, plumbers, or carpenters who periodically assist with small issues. Furthermore, because budgets and materials are allocated at the district level, MOICs have no decision-making power over the resources they receive, severely limiting their ability to make the necessary adaptations to improve WASH service.

The presence of a dedicated and active Infection Prevention and Control (IPC) Committee could help improve the WASH capacity of a facility, but not all facilities have one. Fifty-three percent of facilities

reported having an IPC committee, and only 41% reported that they have been active within the past 6 months.

Training

The majority of MOICs said that new staff do not receive any IPC or WASH training as part of their orientation, and only 4 reported that their staff received any sort of WASH or IPC training in the past year. Similarly, only 37% (14) of staff reported receiving training when they began their positions, and most of those respondents have worked in their positions for five or more years. Only five staff reported receiving training between starting their job and now, and all of these individuals have worked for five or more years at their respective facilities. District-level staff confirmed that trainings are not conducted on a regular basis because of lack of funding, and past trainings have often been funded and implemented by external partners, citing World Vision, Save the Children, and JHPEIGO as examples. The lack of reported training among staff also suggests that formal training has not been conducted in recent years.

There also appears to be a gap in training after WASH infrastructure is implemented. While the District Water Development Office is responsible for overseeing construction, the training of staff to run these facilities (including toilets and waste management infrastructure) are left up to the District Health Office. At the time of the assessment, two health care facilities (Katowo and Lura) were undergoing new construction of WASH facilities. However, based on responses from health sector staff, it appears that a comprehensive handover and training may not be coordinated across stakeholders.

It is clear that staff at all levels think training is important; 100% of MOICs strongly agreed that WASH and IPC training should be mandatory for all staff including cleaners, and 30% of staff mentioned training as a factor that would help to overcome challenges in delivering WASH service. Most MOICs strongly agreed that it is their responsibility to educate staff about WASH, and some even mentioned that they run informal refresher trainings during staff meetings. Lack of knowledge was cited as a reason for poor adherence to existing WASH guidelines, suggesting that training would improve adherence.

Guidelines, Instructions and Cues

Formal guidelines, as well as day-to-day instructions and cues, together with appropriately placed facilities, are necessary to sustain local capacity, and for training to have a lasting effect. Guidelines indicate the standards and expectations of staff to fulfill their responsibilities and strengthen local capacity. Instructions and cues are necessary to encourage proper behavior of all users, including patients and visitors, and to help reinforce what staff have learned through their training. An example of an instruction would be posters that demonstrate proper handwashing, whereas cues would include placement of handwashing facilities close to the toilet along the path that a user would take – making it easy, and nudging proper behavior (Dreibelbis et al., 2016; Neal et al., 2016).

The following chart summarizes the availability of guidelines according to MOICs, which was also described in the previous section on baseline WASH service levels. It is clear that guidelines for water provision are generally not available at health care facilities, while those for hand hygiene, waste management, and cleaning do exist, although they were not all visually confirmed through the survey.

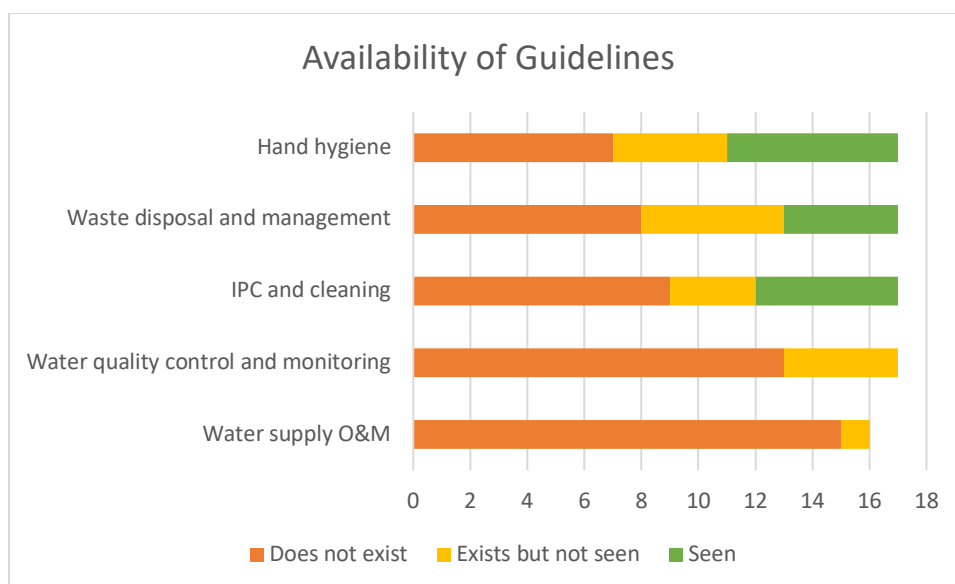


Figure 4.1 Availability of guidelines, as reported through MOIC survey

District-level staff reported that these guidelines do exist, but staff at health care facilities may not have been oriented on them. One health surveillance assistant corroborated this by expressing that guidelines are shared with management staff, but not with frontline workers such as himself. Awareness about the availability of guidelines was inconsistent across staff, with an equal split between those who reported that there were guidelines to help them perform WASH-related tasks and those who reported there were not. Even within the same health care facility, there were disparities in responses between staff regarding the availability of guidelines, indicating that guidelines are not widely known of or followed, and that staff are generally not held accountable for following guidelines.

Regarding the appearance of existing instructions that are intended to guide staff, one respondent said,

“Sometimes . . . those guidelines [instructions], which are well laminated and provided by the government, there are not enough, [so] people just write by hand. So people cannot even see [them]. Sometimes it fades off and the way it's also hung, it doesn't attract somebody to say, ‘Let me look at this, what is it saying?’ Just because of the way it's looking. Well, something should be attractive for people to look at it.”

Often, when any instructions were visible at health care facilities, they were posted within the offices of medical or environmental officers, and rarely in the vicinity of facilities that patients would also use (eg. hand washing instructions near a handwashing station, or waste separation instructions above waste bins). Staff mentioned that visual reminders and prompts would help them improve WASH service delivery; for instance, posters on hand washing techniques, or visible schedules for cleaning and inspections. Such instructions may also be beneficial for patients, whom staff mentioned sometimes do not know the proper usage of latrines, therefore leading to their unhygienic conditions.

Staff attitudes and motivation

Staff motivation appears to be generally high, and attitudes towards work are positive. When asked what motivated them in their jobs, 73% of staff mentioned helping to improve the well-being of patients. Eighty-four percent agree that they seek to understand the needs of their patients, and 95%

agreed that they would be comfortable explaining to patients why WASH is important to health. Further, there are high levels of cooperation and pride among staff: 95% strongly agree that they and their co-workers feel their work to be important, 87% agree that they understand the relevance of one another's jobs, and 92% agree that they take pride in their work. District-level staff recognize this too:

"They're hardworking people despite some problems... talking of [lack of] protective wear, ... running water... so they are motivated not because of maybe what we provide to them, but maybe they are just motivated. . . really, they are hardworking people."

Staff collaboration also appears to be high. Almost all MOICs thought their staff always do their best to address issues; meanwhile, few staff cited lack of support from co-workers and supervisors as a personal challenge to their jobs. Some health care facilities organize their staff to gather once a month to jointly clean the facility, a sign of staff's ability to work together to make up for being short staffed. District-level staff also mentioned that past competitions between health care facilities have incentivized staff to improve cleanliness, citing the importance of staff motivation and collaboration in achieving better provision of service.

Leadership, management and supervision

Communication among staff is key to effective leadership, strong management and supervision. Seventy percent of staff responded that they interact regularly with all types of staff at their facility, and the majority of MOICs (63%) reported always being aware of WASH issues that their staff is dealing with, with the remaining 35% being aware some of the time. However, this may not be the case at the district: in spite of the major role infrastructure plays in WASH and environmental health activities, the District Environmental Health Office is generally not aware of WASH maintenance issues that health care facilities face, because they are reported directly to the maintenance office. While the large size of the district hospital compared to health centers is likely a reason for this, this shows that there is room for improvement in cross-departmental coordination.

Further, formal management processes appear to have gaps: 70% of facilities do not conduct staff appraisals or performance reviews on a regular basis, nor do they address high performing staff by recognizing them or low performing staff by taking corrective actions. Only 3 of the 17 MOICs reported that WASH or IPC responsibilities were included in the job descriptions of all staff, but few staff appeared to even have job descriptions, further making it difficult to review the performance of staff.

There are no formal feedback processes on the facility level either, even though MOH facilities receive quarterly supervisory visits by the District Health Management Team (DHMT). If improvements need to be made, they are noted during visits and followed up on later, but no formal plans are made by the DHMT to guide their implementation. Respondents of all staff levels also expressed that these supervisory visits are insufficient to ensure that WASH services are being adequately delivered, suggesting a need to improve the frequency and depth of supervision. Record-keeping of WASH activities is also lacking - while some WASH-related metrics are collected and submitted to the district monthly for the Health Management Information System (HMIS), it is clear from staff surveys that at a facility level, no records are kept on routine activities such as water treatment, cleaning, or waste management. We could not confirm what specific WASH metrics are collected for HMIS, but staff did not know what is done with the data after it is submitted, indicating that few actions, if any, are taken based on the data collected.

Resources

Insufficient resources, particularly materials and supplies, pose a major challenge for all facilities, who have little control over the quantity they receive. The budget for each health care facility is allocated by the district/mission hospital, and supplies for cleaning, hygiene, and water treatment are pre-determined and delivered on a monthly basis. The table below shows that insufficiencies were experienced in all domains, according to MOIC responses.

Table 8. WASH domains in which health care facilities have experienced insufficiencies in the past year:

Maintaining a steady supply of water for the facility	67%
Water treatment	60%
Spare parts for the water supply	38%
Hygiene supplies such as soap and toilet paper	53%
Cleaning equipment	47%

The lack of sufficient resources poses a barrier to staff delivering WASH services. Among staff, 40% agreed that their work routine frequently gets disrupted because of lack of WASH services, and 76% mentioned insufficient materials as a challenge they personally face in their jobs. It also poses as a barrier to practicing the right behavior and following guidelines, even if staff are motivated and have the right attitudes. For instance, the lack of soap would prevent staff from practicing proper hand hygiene, and lack of water treatment supplies would prevent staff from treating water. As one respondent described:

“You have maybe one packet of gloves in your facility, which is supposed to last you forever. And then you are told that with every patient, you [have to] change if you want to still protect yourself. You’re not thinking of the rest of the patients and [you] say, okay, this one pair of gloves provided is not torn. I’ll use it for other patients.”

The lack of resources is not only experienced at the facility level, as district staff acknowledged too that stock-outs of supplies such as aprons and gloves do occur, leaving health facility staff without the required protective equipment. Apart from materials, however, shortage of funding also provides barriers to WASH service: a commonly found challenge was in maintaining a steady water supply due to lack of funds to power a facility’s submersible water pump. To make up for this gap, some health care facilities engage with their Health Advisory Committee (HAC), which is made up of local elected volunteers. At some facilities, the HAC has helped raise funds to purchase materials, pay for electricity, or hire a local technician. An HSA at one facility presented the worst-case scenario, sharing that in the past, lack of water due to lack of funds has caused the facility to temporarily close their maternity ward and refer maternity patients to the district hospital.

Funding at the district level influences these resource constraints at the facility level, not only in limiting facilities’ budget and resources, but also in the technical support that the district can provide. In particular, district-level staff confirmed that insufficient funding for infrastructural repairs was a cause of delay for their maintenance teams in responding to issues at health centers. Indeed, health care facility staff complained of slow response times, citing issues like broken pipes or poorly functioning incinerators that had been left unaddressed for several months to years.

As such, the health care facilities and their governing hospitals are heavily reliant on external funders to support WASH, but even these funders can eventually face limitations. Water testing kits, once provided by UNICEF to Rumphi hospital, are no longer available and thus routine water testing at facilities is not done. WASH infrastructure, overseen by the District Water Office, can only be implemented with an external partner as the district does not have any budget for projects. And, training from external partners is also dependent on the funding they have available, being described as:

“... on and off, active this time for a few months, [then] they are off. Don’t see them around and they come again when they have their funding.”

District level staff acknowledged that without the sufficient resources in place to sustain initiatives, any gains that were made would be lost. They described how 10 of 11 Traditional Authorities in Rumphi district had recently been declared open defecation-free, but worried that without funds to sustain the program, the communities would soon slip back down the sanitation ladder.

Governance

WASH services at health care facilities suffer from all the challenges mentioned above, perhaps most importantly because of its fairly weak governance. Primarily, as a preventive health measure and a cross-sector area, it fails to be prioritized highly as a health intervention. From the accounts of various respondents, the already-stretched budget prioritizes drugs and medical supplies over preventive measures under which WASH services fall. Budgets for environmental health departments frequently are re-allocated to the curative branch to meet urgent medical needs in spite of the knowledge that WASH has longer term benefits:

“You can have a good plan on sanitation, but you will not see somebody dying because of sanitation immediately, no. No, it may not be like that, but in the long term, people will die because of poor sanitation. But people may not see that. They will see somebody who die of pregnancy and [say] ‘Oh, let’s do this first. Sanitation can hold.’”

Relatedly, there are no life-cycle costing or long-term plans for WASH services in place. WASH issues at health facilities are addressed as they arise:

“We do as they come. They have this problem, [they] deal with it. Tomorrow will have another problem, deal with it.”

And naturally, without the financial resources or the urgency, there are no existing plans in place to make improvements to WASH services, from the facility to the district level. Environmental health falls under the health department of course, but this means that curative medicine is always seen as the priority.

5. Study Limitations

There are a few limitations to our assessment. We were only able to survey staff that were available at the time of the facility assessment, which may not have been a true representation of the staff at the facility. However, by surveying some staff in almost every facility, we aimed to obtain a fairly representative picture of staff across Rumphi. Meanwhile, data on infrastructure functionality has some gaps, due to time constraints, and because obtaining some information would have disrupted

operations at the health care facility. For instance, not every ward was observed, but at almost every facility the inpatient and maternity ward were observed, offering some level of comparison. As another example, the measure of functionality of incinerators was entirely based on staff reports, since incinerators were never being operated during the time of our visits. Finally, this assessment did not investigate the details of day-to-day WASH operations, as it aimed to capture the bigger picture of sustainability. A deeper investigation might reveal further challenges and nuances that could be addressed.

Discussion

The overall findings from this assessment are fairly consistent with what was previously identified in the landscape report through existing literature. Comparable to what was found in a study of Kenyan and Ethiopian health care facilities (Davis, 2018), in Rumphi district there are issues with availability of soap, cleanliness of toilets, water point functionality, and incinerator functionality. Our data also reflect the JMP 2015 statistics showing that sanitation and hygiene have the largest gaps compared to water service. However, it is very clear that all WASH domains need significant improvement.

Results on WASH service levels show that gaps in hardware and infrastructure pose significant barriers. These gaps are not only reflected in the absence of physical solutions, but also come about as result of software issues, including insufficient resources, knowledge, and behaviors. With water supply, for instance, some systems experienced disruptions due to inconsistent power supply for their submersible pump. This was not because the power source was unavailable, but rather because of insufficient funds to pay for electricity. Meanwhile, the overall lack of water treatment could be a result of the lack of knowledge by facility staff on how to properly treat water, in addition to the general lack of supplies.

Regarding toilets, while a small number observed were in poor structural condition, the conditions observed in most were often suboptimal because of insufficient cleaning practices and maintenance, as well as misuse by some patients and visitors, to the frustration of cleaning staff. And waste management practices offer a good example of the contrast between available hardware and insufficient knowledge: even when facilities had enough bins to separate waste at points of care, all waste was then often incinerated rather than treated separately, decreasing the effectiveness of the incinerator.

This is not to dismiss the absence of certain infrastructure that is necessary for a full-functioning health care facility. Many facilities indeed lack an appropriate water supply, have insufficient coverage of toilets and hand hygiene stations, and lack the proper waste treatment infrastructure. As new WASH facilities are implemented, the software factors mentioned above must be taken into consideration from the beginning, so that the aforementioned problems are not repeated.

Capacity, both at the facility level, and at the district level, leaves much to be improved. Inconsistent training and staffing mean that there is a lack of knowledge and behaviors pertaining to best WASH practices, whether related to individual behaviors such as hand hygiene and infection control, or system-wide practices like infrastructure maintenance and monitoring. These lead to the failures in WASH service provision that were observed across the health care facilities. Although health centers rely on their district/mission hospital's maintenance teams, increased technical capacity at the facility level is one aspect that could improve the functionality of their WASH infrastructure and decrease dependence on the district/mission hospital, enabling staff to address problems more quickly and have functioning WASH services more of the time. It is important that not only medical and environmental health staff,

but also support staff such as cleaners, patient attendants, and security guards are also trained, as they play an important role in WASH service delivery and patient safety (Cross et al., 2019). Meanwhile, increased capacity at the district level would mean that activities like routine water quality testing, and data collection and monitoring could be done without reliance on the central government. Strengthening local capacity by engaging the local community could also lead to the allocation of local resources and efforts to WASH activities and increased ownership over WASH, as was demonstrated in some of the health care facilities' Health Advisory Committees.

Gaps in resources act as significant barriers to WASH service through multiple channels. First, the lack of material resources prevents staff from practicing the correct WASH behavior, and prevents facilities from providing proper WASH services, even if staff have the right intentions, attitudes, and knowledge. On an individual basis, the lack of soap or protective equipment means that staff cannot practice proper hygiene and infection control, whereas on a facility basis, the lack of cleaning and water treatment supplies means that a safe environment cannot be provided to staff and patients. Further, the lack of proper infrastructure presents a missed opportunity in nudging users towards sustaining proper behavior – a study of school-based hygiene interventions in Bangladesh has demonstrated that environmental cues are as effective as education in leading to proper handwashing practices (Grover et al., 2018). Meanwhile, the lack of printed guidelines and instructions hinders the sharing of knowledge and the enforcement of correct WASH routines and behaviors.

The lack of financial resources to provide training prevents the development of staff capacity, which is itself a challenge. All levels of staff agree that training is essential in order for them to have the sufficient skills and knowledge to provide quality care and WASH services, but it appears that training is only conducted when external partners provide it, rather than at scheduled intervals by the government. Training is needed in all areas that are related to WASH, from infection prevention and control to infrastructure operation and maintenance. Capacity and resources play into a feedback cycle with one another: resources are needed in order to develop capacity, and capacity is needed in order to make use of any available resources.

While an influx of financial capital would certainly bolster the availability of resources, it alone is not enough to sustain improvements. Any available resources must be supported by strong governance and leadership who make WASH a priority and ensure that it is a core component of health care delivery. WASH cannot continue to be addressed through short-term solutions as it currently is, but instead requires longer term investments for which improvements will not be immediately apparent. This is currently a challenge certainly because of low resources, but also because of the way WASH is overseen by distinct departments in Rumphi: under preventive medicine, which is far out-prioritized by curative medicine. Prioritization of WASH is necessary to allocate sufficient financial and human resources, to implement long-term plans which include maintenance and reporting, and to set and reinforce guidelines. Bringing WASH more to the forefront of health care can be achieved through increased advocacy from the community and improved donor coordination, which will be elaborated upon in the next section.

In a 2019 study, similar barriers to the implementation of environmental health policies in Malawi were identified: insufficient financial support, lack of human resources, incomplete reporting, poor stakeholder coordination, and insufficient training of environmental health actors (McCord et al., 2019). Their findings and recommendations will be discussed as well, in the following section.

In the face of these challenges, Malawi's commitments, made in the global WASH in HCFs meeting in Zambia in September 2019, are promising, and signal that the topic is on the agenda for leadership at the national level (*Summary of country commitments made at the 2019 global meeting, 2019*). The following commitments were made:

- establish/enforce national guidelines for IPC/WASH for HCF
- participation and coordination on IPC/WASH by all stakeholders
- policy instruments must prioritize IPC/WASH as a critical component for improving quality of care
- QM policy has IPC/WASH with strategies for implementation
- popularize IPC/WASH to ensure accountability
- increase budget allocation for IPC/WASH

In summary, the following issues related to sustainability emerged from this research and would be important to address.

1. **Prioritization of WASH** at health care facilities, which requires:
 - a. Good leadership at all levels;
 - b. Allocation of responsibilities and accountability;
 - c. Ongoing monitoring and evaluation – sharing of information with respect to the status of infrastructure and behaviors;
 - d. Ongoing training and support for staff of all levels and disciplines;
2. **Developing capacity** through:
 - a. Ensuring that staff are motivated, able, and rewarded for good work;
 - b. Providing training continually;
 - c. Providing adequate resources, even if basic, to health care facilities;
 - d. Communicating what success would look like;
3. **Finding efficiencies** in WASH service delivery at health care facilities by:
 - a. Exploring integration with community and school WASH services;
 - b. Developing a preventative plan for operations and maintenance as opposed to reacting to breakdowns;
 - c. Examining the best ways to provide training;
 - d. Coordinating and collaborating across donors to avoid duplication and ensure all work fits within a masterplan and meets standards.

Next Steps

Moving forward, we propose to work collaboratively with Rumphi District leadership to discuss these findings and explore ways to implement actions. While these ideas are subject to discussion, the following are potential actions that incorporate those recommendations:

- Build a maintenance plan for WASH in health care facilities, considering coordination with existing community-based WASH programs and community WASH associations to build greater ownership by communities of their health facilities, and to achieve efficiencies of scale. The goal would be to increase the functionality of WASH infrastructure and reduce downtimes.

- Compile and prioritize clinic needs in order to build a long-term plan for infrastructure improvements. Coordinate and collaborate with the donor community to implement the plan.
- Expand the capacity of maintenance personnel beyond maintenance and repairs, to training of health care facility staff in WASH, IPC and QI as appropriate. Coordinate with any existing Quality Improvement or 5S type processes in place.
- Develop affordable, efficient plans for providing ongoing training in WASH and IPC to all staff, and mechanisms for rewarding good staff performance.
- Ensure all staff have access to their own job descriptions and have regular performance reviews, which may require training.
- Provide support materials including user instructions for patients and facility visitors, and clear guidelines for staff.
- Examine the existing monitoring program at health care facilities, and find ways to incorporate more WASH indicators, which would provide evidence of sustainability efforts and support future donor investments.

As we implement and evaluate this pilot program in Rumphi, we aim to compile a set of tools encompassing the process of assessment, planning, implementation, and MERL that can later be adapted to different contexts around the globe in sustaining WASH services in health care facilities.

Appendix A – Supplemental Data

Table A1. Rumphi district health care facilities at a glance

Ownership	Health care facility name	Catchment population	Average number of patients seen per day
MOH	Rumphi District Hospital*	332,668	800
	Bolero Rural Hospital	44,263	168
	Chisimuka Dispensary	not available	not available
	Chitimba Health Center	5,821	58
	Jalawe Health Center	not available	not available
	Katowo Rural Hospital	14,894	108
	Lura Health Center	8,022	37
	Mhuju Rural Hospital	14,755	98
	Mphompha Health Center	8,810	44
	Mwazisi Health Center	22,642	50
	Mzokoto Health Center	11,059	58
	Ng'onga Dispensary	8,639	71
CHAM – CCAP	David Gordon Memorial Hospital*	12,355	35
	Luwuchi Health Center	6,005	25
	Mlowe Health Center	9,089	13
	Tcharo Health Center	3,679	7
	Zunga Health Post	not available	not available
Private	Nthenje Health Center	6,238	7

Source: Rumphi HMIS 2018

*Hospitals oversee the HCFs listed below them.

Abbreviations: MOH – Ministry of Health; CHAM – Christian Health Association of Malawi; CCAP – Central Church of Africa Presbyterian

Table A2. Facility characteristics

	Facility	Inpatient Department	Primary Water Supply*	Toilets available**	Incinerator (yes/no)	Staff surveyed (N)	Visitors surveyed (N)
1	Bolero	Yes	Piped - borehole	Flush, VIP	Yes	2	2
2	Chisimuka	No	Piped - borehole	VIP	No	2	0
3	Chitimba	Yes	Piped - borehole	Pit latrine	No	0	2
4	DGM	Yes	Piped - GFS	Flush	Yes	5	0
5	Jalawe	No	Piped - borehole	Pit latrine	No	2	1
6	Katowo	Yes	Piped - borehole	Pit latrine	Yes	3	1
7	Lura	No	Piped - GFS	Pit latrine, Flush	Yes	2	1
8	Luwuchi	No	Piped - borehole	Pit latrine	Yes	2	2
9	Mhuju	No	Borehole	VIP, Pit latrine	Yes	1	0
10	Mlowe	No	Surface water	VIP, Compost	Yes	1	0
11	Mphompha	No	Piped - GFS	Pit latrine	No	2	1
12	Mwazisi	No	Piped - borehole	Pit latrine, flush	No	4	2
13	Mzokoto	No	Piped – surface water	Pit latrine	Yes	2	1
14	Ng'onga	No	Piped -GFS	Pit latrine	No	3	0
15	Nthenje	No	Borehole	Pit latrine	Yes	0	1
16	Rumphi	Yes	Piped - GFS	Flush	Yes	7	2
17	Tcharo	No	Surface water	VIP	Yes	1	0
18	Zunga	No	Piped - GFS	Pit latrine	Yes	1	0

*describes how water is accessed at the delivery point, followed by the type of water source. GFS: gravity-fed system.

**toilets that were observed to be in use; does not include toilets that were installed but not in use. All pit latrines had slabs (none were open pits)

Table A3. JMP Service Levels by facility

	Facility	Water	Sanitation	Hand hygiene	Waste management	Cleaning
1	Bolero	Basic	Limited	No service	limited	Basic
2	Chisimuka	Basic	Limited	No service	limited	
3	Chitimba	Basic	Limited	Limited	Basic	No service
4	DGM Livingstonia	Basic	Limited	Basic	limited	limited
5	Jalawe	Limited	Limited	No service		No service
6	Katowo	Basic	Limited	No service		
7	Lura	Basic	Limited	No service	limited	No service
8	Luwuchi	Basic	Limited	Limited	limited	No service
9	Mhuju	Basic	Limited		limited	No service
10	Mlowe	No service	Limited	No service	limited	limited
11	Mphompha	Basic	Limited	Limited	limited	No service
12	Mwazisi	Limited	Limited	No service		No service
13	Mzokoto	Basic	Limited	No service	limited	No service
14	Ng'onga	Basic	Limited	No service		No service
15	Nthenje	Basic	Limited	No service		No service
16	Rumphi	Basic	Limited	No service	limited	basic
17	Tcharo	No service	Limited	Limited	basic	No service
18	Zunga	Basic	Limited	Limited	limited	No service

Some service levels missing from facilities where not enough data was collected to make an assessment.

Table A4. Staff – type and length of service at facility

		6 months or less	6+ months to under a year	1 year to under 5 years	5+ years	Total staff surveyed
	Medical Officer in charge	3	3	10	1	17
	WASH Service manager	1		3	9	13
	Staff, all other (total)	5	10	6	19	40
	Medical	4	6	3	5	18
	Environmental	-	3	-	9	12
	Cleaning	-	-	-	2	2
	Maintenance	-	-	-	1	2
	Security	-	-	1	1	2
	Administrative	-	1	2	1	4
	Total – all staff surveyed	9	13	19	29	70

Appendix B - Photos



Photo 1. Water from a gravity-fed system is piped to the outside of the health care facility.



Photo 3. Groundwater is pumped electrically to this elevated tank, which then feeds taps within the HCF.



Photo 2. Many HCFs rely on hand pumps as a backup supply of water, some rely on it as their primary supply.

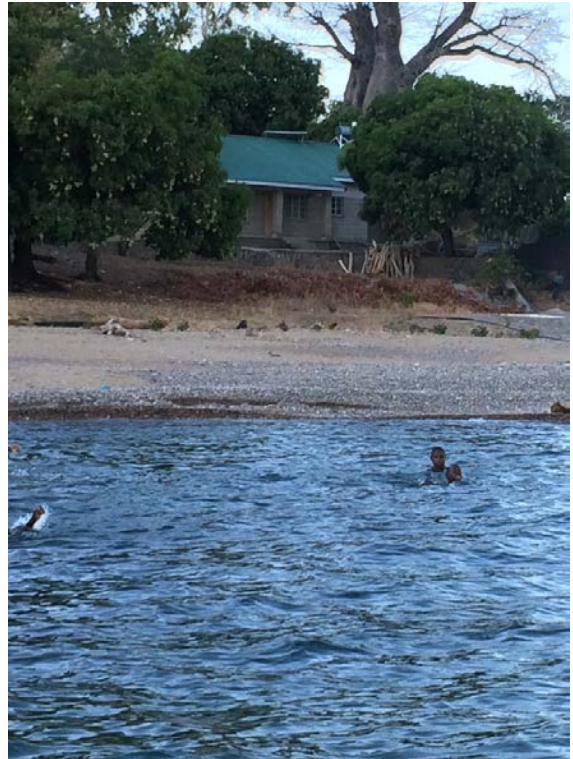


Photo 4. Tcharo health center relies on water from Lake Malawi.



Photo 5. In facilities where piped water is not available inside the buildings, water is stored in buckets.



Photo 7. Latrines often had steps at the entry way and lacked handrails.



Photo 6. While some HCFs had functional sinks, most lacked soap, like this one.



Photo 8. A simple, homemade solution for a toilet cover



Photo 9. Some toilets were out of service, in some cases because the plumbing was never completed. This toilet was being used as a storage room.



Photo 11. A rare example of a complete handwashing station, with water, soap, and handwashing instructions.



Photo 10. Patient toilets such as this one were often not as clean as staff toilets.



Photo 12. A rare example of a hand hygiene facility near latrines. However, this one lacked water at the time it was observed.



Photo 13. While sharps waste was always separated, the remaining waste (infectious, non-infectious) was not always separated.



Photo 14. An overstuffed and deteriorating incinerator.



Photo 15. Open burning pits were exposed and unprotected from access.

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