Health Quality of Care Survey
Sierra Leone

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EXECUTIVE SUMMARY

Building on to the Sierra Leone Service Delivery Indicators survey of 2018, the quality of care (QoC) survey ascertains the quality of service delivery in basic health services. This would in turn enable governments and service providers alike to identify gaps and bottlenecks, as well as track progress over time. The QoC survey visited a sample of 150 health facilities across the country in April 2021. The survey team assessed 270 health workers for competence using patient case simulation. The data collected are representative at the national level. The health workers were broken down into three categories: (i) doctors (specialist and general medical doctors), (ii) community health officers and assistants, and (iii) nurses/midwives. A unique feature of the QoC survey is that it examines the production of health services at the frontline from the perspective of beneficiaries accessing services. The production of health services requires two dimensions of service delivery: (i) the availability of key inputs such as drugs, equipment and infrastructure; and (ii) providers that are skilled.

What service providers know?

- Health providers in Sierra Leone could correctly diagnose half (50.4 percent) of the five tracer conditions.[1]
- Diagnostic accuracy rate varied across case conditions, ranging from 97 percent accuracy for pulmonary tuberculosis to 14 percent for malaria and anemia.
- Doctors correctly diagnosed two thirds (67.1 percent) of all the tracer conditions and CHO/CHA 59.7 percent. Nurses correctly diagnosed only 44.5 percent.
- There were substantially large discrepancies between diagnosis and treatment across the board revealing a critical disconnect in provider knowledge and practice gap. With pulmonary tuberculosis, even though 97 percent got the diagnosis correct, only 5 percent provided the correct treatment.
- Higher level facilities (hospitals) correctly diagnosed more of the tracer conditions with a score of 61.7 percent. This was followed by health centers (49.4 percent) and health posts (46.3 percent).
- Adherence to clinical guidelines in the management of the five tracer conditions was at 34.5 percent. The lowest was in health posts (29.7 percent), followed by health posts (32.1 percent) and hospitals (46.3 percent).
- Doctors adhered to more of the clinical guidelines (53.3 percent) followed by CHO/CHA (39.3 percent) and nurses/midwives (29.8 percent).

What service providers have to work with?

- 63.9 percent of priority drugs were available in Sierra Leonean facilities. Urban facilities had a slightly higher availability of priority drugs (69.4 percent) compared to rural facilities (62.4 percent).
- Priority drugs for mothers were more available than drugs for children with average scores of 84 percent and 67.6 percent respectively.
- About half (52.1 percent) of health facilities in Sierra Leone met the minimum medical equipment requirements. Health centers were typically better endowed in equipment (54.5 percent), followed by health posts (51.6 percent), and then hospitals (38.1 percent).

[1] Tracer conditions include malaria with anemia, diarrhea with severe dehydration, pneumonia, pulmonary tuberculosis and diabetes.

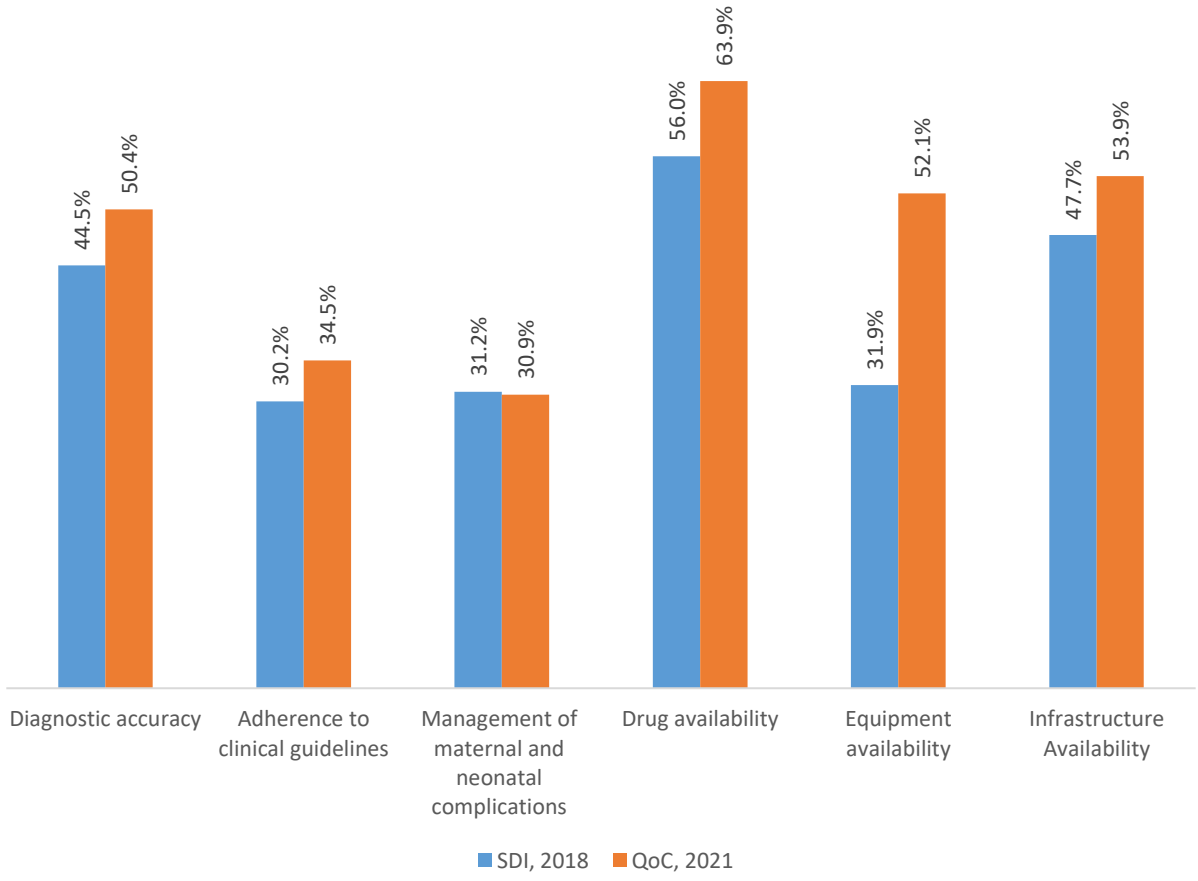
- More than half (53.9 percent) of the health facilities had access to all three types of basic infrastructure such as toilets, clean water and access to electricity. There was also a huge difference between health posts (52.3 percent) and hospitals (95.2 percent).

Comparing QoC survey, 2021 with SDI survey, 2018

The QoC survey utilized the same instruments and methodology as the SDI survey of 2018. However, there are a few important differences between these two surveys. First, SDI survey was representative at the national as well as district levels, and by urban-rural location whereas QOC survey is only a nationally representative survey. Second, SDI survey included both public and private facilities, whereas QoC survey consisted of only public facilities. Finally, SDI survey had components that are not fielded during the QoC such as absenteeism, facility finances, autonomy and staff supervision.

Figure 1 shows the comparative picture of both surveys. Except for management of maternal and neonatal complications, all indicators show improvements over their SDI survey values. The biggest jump is seen for availability of equipment (20 percentage points).

Figure 1: Comparing QoC survey with SDI survey



What does this mean for Sierra Leone?

Sierra Leone emerged from a civil war (2002) and Ebola outbreak (2014) and since then, a lot of progress has been made in the health sector, but much remains to be done. The country has achieved significant progress on the quality dimension in a relatively short time as we can see when comparing with the SDI 2018. Almost all of the key indicators show remarkable improvements. To continue this momentum of progress and further accelerate the achievements, the follow recommendations may be suggested.

Ensuring availability of skilled human resources for health. In addition to increasing the volume of health workers to address the shortage of providers this issue, improvements in management, supervision and training are critical to ensure quality health service delivery by a skilled HRH base. The survey found that provider knowledge and abilities are very low to deliver quality services. Training needs to be better focused with the main objective of capacitating health workers to accurately diagnose and treat the main causes of illness as well as to have the skills to refer complicated cases up to higher levels of care. There should also be a concerted emphasis on adhering to the national guidelines as far as managing critical health conditions is concerned.

Making minimum functional medical equipment and infrastructure in facilities available. Basic equipment as mandated by the Government, is not available at most primary health facilities. This is alarming given the fact that most of the population accesses care at a public primary health facility. There are also major challenges around infrastructure and drug availability. Just about a half of the facilities in Sierra Leone have the required components for medical equipment and infrastructure.

I. INTRODUCTION

After the end of civil war and the devastating effects of the Ebola outbreak, Sierra Leone has made remarkable progresses in achieving population health outcomes. Mortality and fertility rates have come down in recent times. Between 2000 and 20019, under-five mortality rate fell from 267 to 122, infant mortality from 142 to 75, and neonatal mortality from 50.6 to 31 (SLDHS 2019). Maternal mortality ratio also dropped from 1,800 to 717 per 100, 0000 live births during the same period (SLDHS 2019). The total fertility rate decreased from 6.7 to 4.2 between 1990 and 2019, and the adolescent birth rate decreased from 184 to 102 between 1990 to 2019 (Statistics Sierra Leone, 2019). The life expectancy at birth increased from 39 to 54 years between 1990 to 2017 (Statistics Sierra Leone, 2019).

Similarly, the country has shown tremendous improvements in reducing the burden of diseases and increasing utilization of key services. The HIV prevalence rate has been controlled at 1.5% since 2005 (World Bank, 2018), and the Prevention of Mother-to-Child Transmission (PMTCT) through Option B+ has been scaled up to 88.5% as of 2017 (UNAIDS, 2018). Malaria related deaths have declined from a peak of 8,000 deaths in 2010 to 1,800 deaths in 2018 (WHO, 2018). Births attended by skilled health personnel have gone up from 37 percent in 2000 to 87 percent in 2019 (Statistics Sierra Leone, 2019). The prevalence of stunting (29.5 percent) and wasting (5 percent) among children under age five years decreased since 2005 (45.0 percent and 10 percent, respectively). These improvements in health outcomes have been attributed to huge investments in expanding coverage and improving access to health care services through the introduction of the Free Health Care Initiative (FHCI) for pregnant women, lactating mothers and under-five children, free HIV, TB and Malaria testing and treatment; training of additional health workers; and improvements in the availability of essential medicines, medical supplies and equipment in public health facilities.

Despite these significant achievements, there are still areas of improvement specifically on quality of health care. According to the Service Delivery Indicators survey (SDI) of 2018, health providers in Sierra Leone could correctly diagnose less than half of the five tracer conditions – malaria with anemia, diarrhea with severe dehydration, pneumonia, pulmonary tuberculosis and diabetes. Adherence to clinical guidelines in the management of the five tracer conditions was only 30 percent. In terms of availability of equipment, less than a third of health facilities had the minimum necessary medical equipment. Less than half of facilities had access to all three types of basic infrastructure such as toilets, clean water and access to electricity.

Organization of Health Sector in Sierra Leone

As shown in Figure 2, the basic package of essential health services (BPEHS) in the country is delivered through both primary and secondary levels of healthcare.

Primary healthcare

Primary healthcare services are provided at four levels i.e. at three types of facilities and at community level. Primary health care facilities are referred to as Peripheral Health Units (PHUs). There are three levels of PHUs with clearly defined functions: 1) Maternal and Child Health Post (MCHP); 2) Community Health Post (CHP); and 3) Community Health Center (CHC). While MCHPs and

CHPs have beds only used for observation, patients requiring further supervised care are referred to the CHC or hospital. CHCs, where a wider range of more complex services are offered, admit cases referred from the lower levels. A limited range of preventive and basic curative services are also available directly at community level (outside of health facilities but with linkage to PHUs through supervision, reporting, and supply chain management) by community health workers (CHW).

Maternal and Child Health Post - MCPH is the most peripheral level of PHU, serving a population of 500 to 5,000 within a 5 km (3 miles) of the facility. Staffed by MCH Aides, MCHPs are often the first facility level of contact for patients and serve as a link between community and CHWs. MCHP typically focuses on antenatal care, safe and skilled deliveries (without complications), post-natal care, and child health services including EPI, nutrition, and IMNCI.

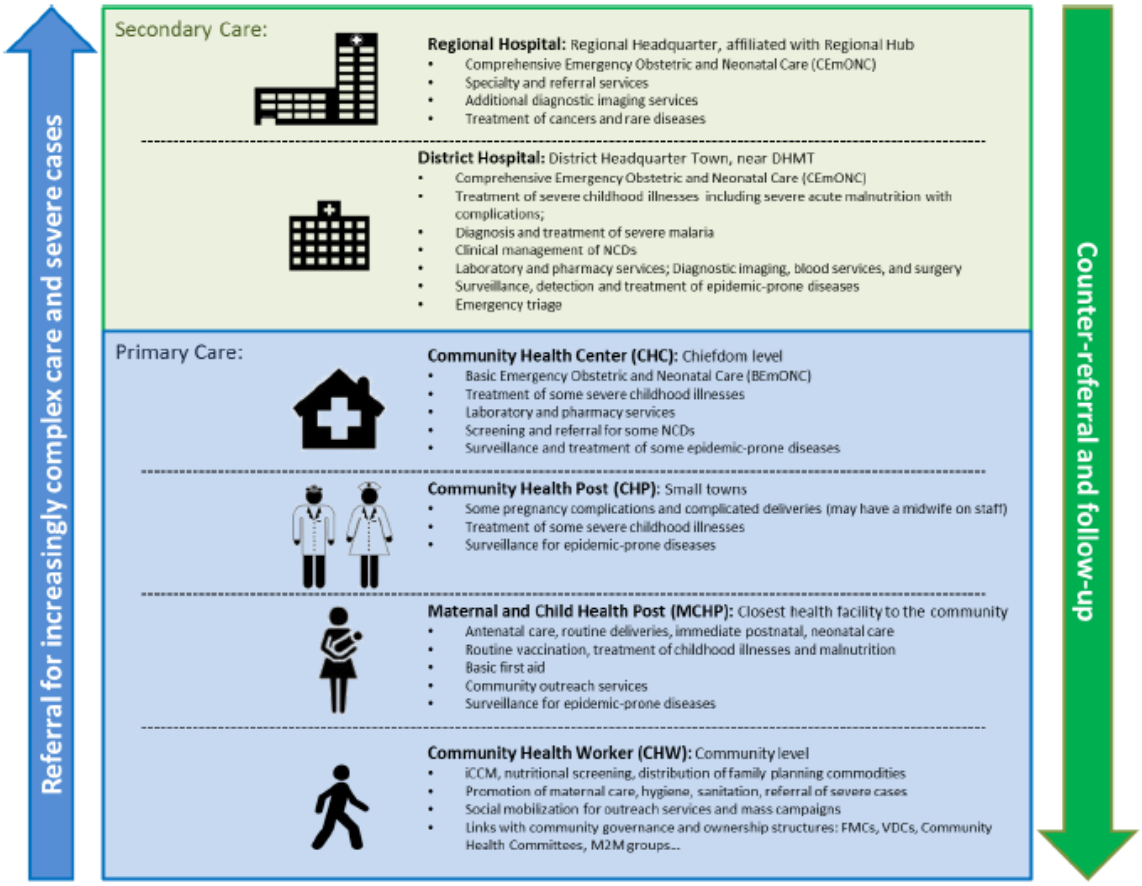
Community Health Post – CHPs are usually situated in a smaller town and serve a population of 5,000 to 10,000 or more within 8 km (5 miles) of the facility. These posts have similar functions to the MCHP with added curative functions. An SECHN or Community Health Assistant (CHA) typically serves as the in-charge in CHPs.

Community Health Center - CHCs are usually situated in the chiefdom headquarter town or in a well-populated area with a catchment population of 10,000 to 30,000 or more within 15 km (10 miles) of the facility. The CHC has preventive and curative functions. It offers the most complex and skilled services within the primary care level of the health system. The in-charge in a CHC is a Community Health Officer (CHO), supported by a team consisting of a CHA, SECHNs, Midwives, MCH Aides, and other clinical and support staff. The CHC supervises the lower levels of care, including CHWs, MCHPs, and CHPs within its catchment area.

Secondary care

Secondary care is delivered in district hospitals. District hospitals receive referrals from primary care facilities and accept walk-in patients directly. Although these hospitals are intended for secondary care institutions, they also provide many primary care services to the population in their immediate surroundings, including ANC services and under-5's clinics. District hospitals are open 24 hours, and serve the whole district, with a catchment population of about 500,000.

Figure 2: Levels of service delivery in Sierra Leone



Source: Sierra Leone Basic Package of Essential Health Services, Report 2015

The foundation for delivering on health and healthcare goals depends on whether service delivery fundamentals are in place: Are health providers knowledgeable and skilled? Are they present at work? Are basic inputs available such as equipment and drugs? The QoC survey is essentially a return to the basics by shining light on these fundamentals.

II. METHODOLOGY AND IMPLEMENTATION

A. Implementation

The QoC survey interviewed 150 heath facilities across Sierra Leone during April 2021 that included 270 health workers for clinical case simulations. There were 20 hospitals, 32 health centers and 98 health posts. Within the sample, there were 102 rural and 48 urban facilities across Sierra Leone.

B. QoC survey instruments

As shown in Table 1, QoC utilized similar data collection instruments to the pervious SDI survey undertaken in 2018. The instrument consists of three modules each of which captures specific information and is directed to the person(s) in the facility who is best informed and able to provide the relevant information.

Table 1: QoC Health survey instrument description

Module of Instrument	Module Title	Main respondent	Description
Module 1	Facility information	Head of facility	Information about the facility's: functioning, infrastructure, equipment, materials, supplies, and tracer drugs.
Module 2	Health Worker Roster	2A: Head of facility	2A: Administered to head of facility to obtain a list of all health workers.
Module 3	Clinical knowledge assessment	Medical staff	Administered to medical personnel who regularly treat patients to evaluate their competency in the diagnosis and treatment of routine pathologies. Done using vignettes.

Module 1 captures general information about the facility such as the availability of equipment or infrastructure. The module is also the vehicle to check for the availability of commodities, check whether the cold chain is in place and working, among others. An important aspect to note is that the information collected is verified by the enumerator. For instance, the infant scale must be seen and tested, a specific drug must be seen, and the expiration date verified. Module 2 collects information about the staff such as the total number, how many are clinical and non-clinical workers, etc. Module 3 provides the information on provider's knowledge which is measured through Patient Case Simulations (also called "vignettes"). With this methodology, one of the surveyors acts as a case study patient with some specific symptoms. The clinician who is informed of the simulation is asked to proceed as if the enumerator is a real patient, while another enumerator acts as an observer. High quality performance in outpatient consultations entails at least the following: (i) to systematically arrive at a correct diagnosis (or preliminary diagnosis); (ii) to provide an appropriate treatment (or referral); and (iii) to reveal important information to the patient about which actions to take (e.g., how to take the medicine, what to do if the patient does not get better, etc.). The methodology presents several advantages: (a) all clinicians are presented with the same case study patients, thus making it

easier to compare performance across clinicians; (b) the method is quick to implement, and does not require waiting for patients with particular diagnoses; (c) it is not intrusive and eschews ethical issues that arise with real patients. The method also has its drawbacks. The most important one is that the situation is a not a real one and that this may bias the results.[2]

C. Sampling

The overall objective of the QoC survey is to produce representative indicators at the national level. The main units of analysis are health facilities as well as health workers. The sampling has been undertaken by DPPI, Ministry of Health and Sanitation (MoHS). The original sample frame contained 1,209 health facilities with geographic identifier variables such as region, district, and chiefdom. The estimated sample size calculated using confidence interval of 95% and error margin of 5%, with health worker population of 8,189 was 367. This sample size was considered sufficient given that it was a nationally representative survey. Assuming an average of 3 people per health facility, the estimated number of health facilities to be visited for this exercise will be about 123. Adjusting for a staff absentee rate of 30% (from previous SDI) the overall sample size will be 152.

A multi-stage clustered sampling strategy is adopted. The first stage cluster selection is carried out independently within each stratum. The primary cluster considered is the district which is therefore the primary sampling unit (PSU). All 16 districts have been sampled. Except for the hospitals, other health facilities were randomly drawn with equal probability as a secondary sampling unit (SSU). As there was only one hospital in each district, the selection was automatic. At the third stage, health workers were selected.

[2] Comparisons of Patient Case Simulations with Direct Observation of real patients in low income contexts have revealed that performance scores typically are higher with Patient Case Simulations, but that the correlation between the two measures is substantial (e.g., Das, Hammer, and Leonard, 2008). Some authors have interpreted the score of Patient Case Simulations as a measure of competence or ability rather than actual performance (Das and Hammer, 2005, Leonard et al., 2007). There is reason to believe that Patient Case Simulations measure a blend of competence and actual performance, and that the blend depends on the actual design and framing of the tool. The Patient Case Simulations used in QoC were framed to resemble actual performance as closely as possible. Nevertheless, one should be aware of a potential upward bias of the *absolute* performance levels. As a measure of *relative* performance, though, Patient Case Simulations have considerable merit.

III. RESULTS

This section presents the results from the QoC survey. First, it presents the results from the clinical simulations followed by structural quality on drugs, equipment and infrastructure.

A. Diagnostic Accuracy

Methodological Note

The choice of tracer conditions was guided by the burden of disease among children and adults, and whether the condition is amenable to use with a simulation tool, i.e., the condition has a presentation of symptoms that makes it suitable for assessing provider ability to reach correct diagnosis with the simulation tool. Three of the conditions were childhood conditions (malaria with anemia; diarrhea with severe dehydration, and pneumonia), and two conditions were adult conditions (pulmonary tuberculosis and diabetes). Two other conditions were included: post-partum hemorrhage and neonatal asphyxia. The former is the most common cause of maternal death during birth, and neonatal asphyxia is the most common cause of neonatal death during birth. The successful diagnosis and management of these seven conditions can avert a large share of child an adult morbidity and mortality.

These indicators were measured using the patient case simulation methodology, also called clinical cases. Clinical cases are a widely used teaching method used primarily to measure clinicians (or trainee clinicians) knowledge and clinical reasoning. A vignette can be designed to measure knowledge about a specific diagnosis or clinical situation at the same time gaining insight as to the skills in performing the tasks necessary to diagnose and care for a patient. According to this methodology, one of the fieldworkers acts as a case study patient and he/she presents to the clinician specific symptoms from a carefully constructed script while another acts as an enumerator. The clinician, who is informed of the case simulation, is asked to proceed as if the fieldworker is a real patient. For each facility, the case simulations are presented to up to ten randomly selected health workers who conduct outpatient consultations. If there are fewer than ten health workers who provide clinical care, all the providers are interviewed.

There are two other commonly used methods to measure provider knowledge and ability, and each has pros and cons. The most important drawback in the patient case simulations is that the situation is a not a real one and that this may bias the results. The direction of this potential bias makes this issue less of a concern—the literature suggests that the direction of the bias is likely to be upward, suggesting that our estimates can be regarded as upper bound estimates of true clinical ability. The patient case simulation approach offers key advantages given the scope and scale of the Service Delivery Indicators methodology: (i) a relatively simple ethical approval process is required given that no patients are observed; (ii) there is standardization of the case mix and the severity of the conditions presented to the clinician; and (iii) the choice of tracer conditions is not constrained by the fact that a dummy patient cannot mimic some symptoms.

The QoC survey assessed provider ability and knowledge using two process quality indicators (the adherence to clinical guidelines in five tracer conditions, and the management of two maternal and

newborn (MN) complications), and an outcome quality indicator (diagnostic accuracy in five tracer conditions).

Results from the QoC survey reveal that provider ability and knowledge is quite low. Providers only correctly diagnosed about half (50.4 percent) of the tracer conditions (Table). Accuracy was higher for urban (56.8 percent) than rural (45.7 percent). Doctors correctly diagnosed more of the tracer conditions (67.1 percent) than CHO/CHA (59.7 percent) and nurses (44.5 percent). Similarly, higher level facilities correctly diagnosed (hospitals – 61.7 percent) more of the tracer conditions than lower levels (health center – 49.4 percent and health post – 46.3 percent).

Table 2. Diagnostic accuracy by cadre

% clinical cases	Sierra Leone	Urban	Rural
All	50.4	56.8	45.7
	Cadre		
Doctors	67.1	67.1	.
CHO/CHA	59.7	61.1	57.1
Nurses/midwives	44.5	46.2	44.0
	Facilities		
Hospital	61.7	61.7	.
Health Center	49.4	49.4	.
Health Post	46.3	54.8	44.6

Source: Author's calculations using Sierra Leone 2021 QOC data

Table shows that only 2.2 percent of the health providers correctly diagnosed all five tracer conditions. Most, 37.4 percent, could only diagnose two of the five cases.

Table 3. Number of cases correctly diagnosed

# cases	All	Doctors	CHO/CHA	Nurses/midwives
5 cases	2.2	3.2	5.2	1.1
4 cases	14.4	41.9	15.5	9.4
3 cases	32.2	41.9	56.9	22.7
2 cases	37.4	12.9	17.2	48.1
1 case	11.5	0	5.2	15.5
No case	2.2	0	0	3.3

Source: Author's calculations using Sierra Leone 2021 QOC data

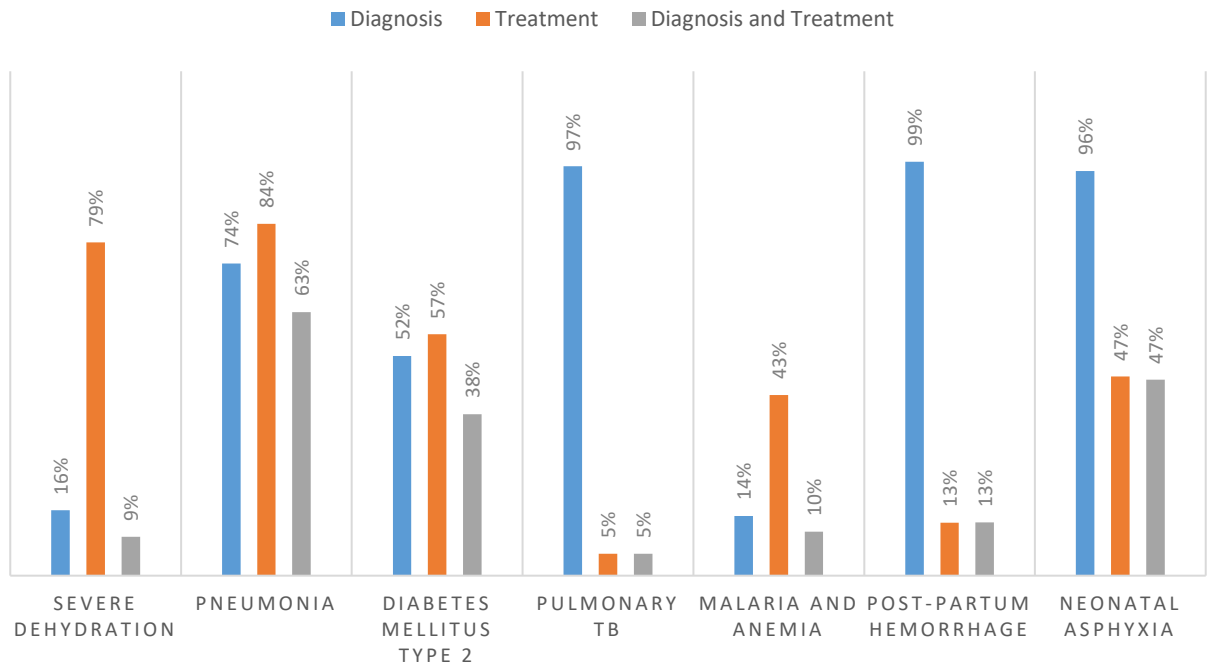
Diagnostic accuracy rate varied across case conditions, ranging from 99 percent accuracy for post-partum hemorrhage to 14 percent for malaria and anemia (see Figure 3).

An accurate diagnosis, however, is unfortunately not a guarantee for providing the correct treatment. There were substantially large discrepancies between diagnosis and treatment across the board revealing a critical disconnect in provider knowledge and follow-up. Among conditions excluding pulmonary tuberculosis, PPH, and neonatal asphyxia, interestingly more providers offered correct

treatment actions even though they had lower diagnostic accuracy. With pulmonary tuberculosis, even though 97 percent got the diagnosis correct, only 5 percent provided the correct treatment.

Only 16 percent of health providers got the diagnosis of acute diarrhea with severe dehydration correct. Among those who correctly diagnosed the condition 79 percent got the correct treatment. Overall, only 9 percent of all health got both diagnosis and treatment correct. The results of the other conditions equally show a knowledge gap in clinical diagnosis as well as patient management.

Figure 3: Diagnostic accuracy and correct treatment by clinical case



B. Adherence to Clinical Guidelines

Methodological Note

The assessment of process quality is based on two indicators: (i) clinicians' adherence to clinical guidelines in five tracer conditions and (ii) clinicians' management of maternal and neonatal complications. The former indicator is an unweighted average of the share of relevant history taking questions, and the share of relevant examinations performed for the five tracer conditions. The set of questions is restricted to core or important questions as expressed in the Integrated Management of Childhood Illnesses (IMCI).

The second process quality indicator is clinicians' ability to manage maternal and neonatal complications, i.e. post-partum hemorrhage and neonatal asphyxia. This indicator reflects the unweighted share of relevant treatment actions proposed by the clinician. The set of questions is restricted to core or important questions as expressed in the Integrated Management of Childhood Illnesses (IMCI) Guidelines for the tracer conditions.

Sierra Leonean health providers adhered to 34.5 percent of the clinical guidelines in the management of the five tracer conditions (Table). Overall, urban providers were more adherent to the guidelines. Doctors adhered to more of the clinical guidelines (53.3 percent) followed by CHO/CHA (39.3 percent) and nurses/midwives (29.8 percent). Adherence to clinical guidelines was lowest in health posts (32.1 percent) followed by health centers (29.7 percent) and hospitals (46.3 percent). For the most part, clinical guidelines are not followed in primary care health facilities, which is usually the first point of entry for most beneficiaries.

Table 4. Adherence to clinical guidelines by health provider type

% clinical cases	Sierra Leone	Urban	Rural
All	34.5	39.7	30.8
	Cadre		
Doctors	53.3	53.3	.
CHO/CHA	39.3	40.9	36.4
Nurses/midwives	29.8	29.3	29.9
	Facilities		
Hospital	46.3	46.3	.
Health Center	29.7	29.8	.
Health Post	32.1	37.3	31.1

Source: Author's calculations using Sierra Leone 2021 QOC data

The survey assessed the availability of Standard Treatment Guidelines (STG) in facilities. As shown in Table , above half (58.4 percent) of the facilities had STG on the premises. STG were less likely to be available in the health centers (55.8 percent). Urban facilities were less likely to have the availability of STG (56.5 percent) comparable to rural facilities (58.9 percent).

Table 5: Availability of Standard Treatment Guidelines

% facilities	Sierra Leone	Urban	Rural
All	58.4	56.5	58.9
Hospital	66.7	66.7	NA
Health Center	55.8	60.1	51.8
Health Post	59.1	50.2	60.4
# Facilities	150	48	102

Source: Author's calculations using Sierra Leone 2021 QOC data

IMCI general danger signs and referral for sick children

According to the IMCI guidelines, there are four general danger signs that a provider must always ask or identify when presented with a sick child: (i) unable to drink or breastfeed; (ii) lethargic or unconscious; (iii) vomiting; and (iv) having or had convulsions.[3] Overall, about one of the four danger signs were identified across the three child clinical cases with the least recognized in the pneumonia vignette. Doctors and CHO/CHA performed better than nurses, but overall recognition of danger signs was very low (Figure 4). For example, as shown in Figure 5, 57 percent of providers did not identify a single danger sign in the pneumonia vignette.

Figure 4: Average number of danger signs identified by vignette

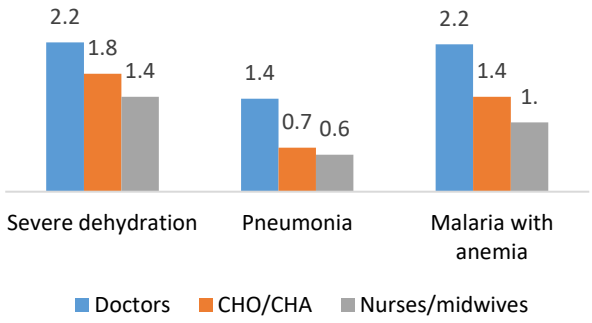
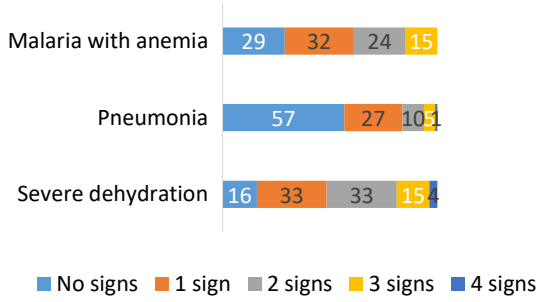


Figure 5: Distribution of each danger sign identified by vignette



[3] Three child clinical cases were administered to providers. Firstly, acute diarrhea with severe dehydration, where the child presented with diarrhea. Secondly, pneumonia, where the child presented with a cough. Lastly, malaria with anemia, where the child presented with fever symptoms

C. Management of Maternal and Neonatal Complications

The second process quality indicator is clinicians' ability to manage maternal and neonatal complications. This indicator reflects the unweighted share of relevant treatment actions proposed by the clinician. The set of questions is restricted to core or important questions as expressed in the Integrated Management of Childhood Illnesses (IMCI) and the Standard Treatment Guidelines.

Overall, providers adhered to only 30.9 percent of the clinical guidelines for managing maternal and neonatal complications (Table). Doctors adhered to a marginally larger share of guidelines (45.5 percent of guidelines) compared to CHO/CHA (33 percent) and nurses/ midwives (27.8 percent). There was very little variation across facilities in managing maternal and neonatal complications.

Table 6. Management of maternal and neonatal complications by cadre

% clinical cases	Sierra Leone	Urban	Rural
All	30.9	35.2	27.9
	Cadre		
Doctors	45.5	45.5	0.0
CHO/CHA	33.0	35.2	29.0
Nurses/midwives	27.8	28.0	27.7
	Facilities		
Hospital	42.1	42.1	.
Health Center	24.8	24.9	.
Health Post	29.3	32.3	28.8

Source: Author's calculations using Sierra Leone 2021 QOC data

D. Drug Availability

Methodological Note

This indicator is defined as the number of drugs of which a facility has one or more available, as a proportion of all the drugs on the list. The drugs have to be unexpired and have to be observed by the enumerator. The drug list contains tracer medicines for children and mothers identified by the World Health Organization (WHO) following a global consultation on facility-based surveys. The list of drugs has been adjusted to the level of facility as mentioned in the 2015 Sierra Leone Basic Package of Essential Health Services (BPEHS).

On average, 63.9 percent of priority drugs were available in Sierra Leonean facilities (Table). Urban facilities had higher availability of priority drugs (69.4 percent) compared to rural facilities (62.4 percent). Priority drugs for mothers and children were available with average scores of 84 percent and 67.6 percent respectively. Although 72.7 percent of the tracer drugs surveyed were available in Sierra Leone only 40.3 percent of facilities had all tracer drugs available. Looking across the districts (

% drugs	Sierra Leone	Urban	Rural	Hospital	Health Center	Health Post
All priority drugs	63.9	69.4	62.4	74.9	70.7	61.4
Priority drugs for Mothers	84.0	82.0	84.6	80.3	83.0	84.4
Priority drugs for children	67.6	71.3	66.5	75.1	71.8	66.0
All tracer drugs	72.7	62.0	75.8	61.6	49.5	80.8
Have all tracers (% facility)	40.3	18.4	46.7	4.8	4.4	53.2

Source: Author's calculations using Sierra Leone 2021 QOC data

Table), Falaba (73.6 percent) had the highest availability with Pujehun being the lowest (23.4 percent).[4] The detailed availability of drugs are given in the appendix (table C1).

Table 7. Availability of priority drugs by facility type

[4] World Health Organization (WHO) guidelines stated that priority drugs are for adults and children. For QoC, tracer drugs are those considered markers of drug availability according to the SARA 2017. QoC looked at 14 out of the 20 drugs for hospitals, 6 for health centers and 3 for health posts.

% drugs	Sierra Leone	Urban	Rural	Hospital	Health Center	Health Post
All priority drugs	63.9	69.4	62.4	74.9	70.7	61.4
Priority drugs for Mothers	84.0	82.0	84.6	80.3	83.0	84.4
Priority drugs for children	67.6	71.3	66.5	75.1	71.8	66.0
All tracer drugs	72.7	62.0	75.8	61.6	49.5	80.8
Have all tracers (% facility)	40.3	18.4	46.7	4.8	4.4	53.2

Source: Author's calculations using Sierra Leone 2021 QOC data

Table 8: Availability of priority drugs by district

	All priority drugs	Priority drugs for Mothers (local)	Priority drugs for children (local)	All tracer drugs	Have all tracers (% facility)
Bo	70.3	92.5	81.8	90.8	79.1
Bombali	70.1	96.3	78.2	84.7	64.9
Bonthe	67.2	84.3	71.6	57.4	9.0
Kailahun	69.7	89.8	72.8	70.5	40.8
Kambia	69.9	89.9	82.7	84.7	64.7
Kenema	66.8	89.6	64.7	69.6	25.1
Koinadugu	66.6	93.5	72.4	86.4	63.8
Kono	54.8	83.6	50.6	63.7	11.3
Moyamba	63.0	86.1	65.5	83.7	60.6
Port Loko	72.3	93.1	82.9	83.7	57.1
Pujehun	23.4	26.7	22.7	32.1	26.7
Tonkolili	62.7	85.1	60.7	77.4	40.4
Western Rural	56.0	67.5	63.8	67.2	25.4
Western Urban	69.9	75.7	77.4	63.5	14.6
Falaba	73.6	100.0	67.4	76.4	29.3
Karene	63.7	92.0	59.1	70.4	20.2

Source: Author's calculations using Sierra Leone 2021 QOC data

E. Availability of Vaccines Related Equipment and Supplies

Data from UNICEF and WHO in 2019 indicates immunization coverage is around 86 percent for BCG, 95 for DTP3 and 73.5 for the measles vaccine.[5]

Table shows that 87.5 percent of all vaccines were available in Sierra Leonean facilities that store vaccines. Urban facilities (91.6 percent) had higher availability than rural (86.1 percent). Health centers (88.8 percent) and health posts (87 percent) had higher availability than hospitals (75 percent).

Table 9. Availability of vaccines by facility type

% vaccines	Sierra Leone	Urban	Rural
All	87.5	91.6	86.1
Hospital	75.0	75.0	NA
Health Center	88.8	91.4	85.8
Health Post	87.0	96.0	86.2
# Facilities	90	29	61

Source: Author's calculations using Sierra Leone 2021 QOC data; denominator consists of facilities that store vaccines

Kenema had all vaccines available with Karene being the lowest (49.2 percent) as compared to the average for all of Sierra Leone (Table).

Table 10: Availability of vaccines by facility type across districts

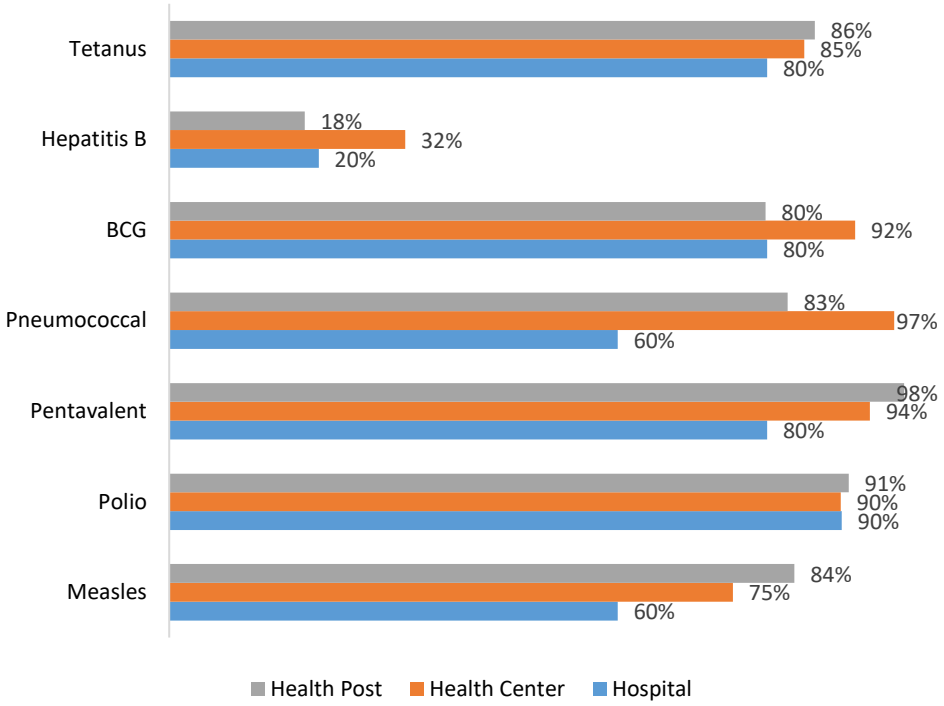
% vaccines	All	Hospital	Health Center	Health Post
Bo	89.0	NA	83.3	90.5
Bombali	94.9	66.7	100.0	94.4
Bonthe	79.8	NA	91.7	66.7
Kailahun	92.5	83.3	91.7	93.3
Kambia	72.6	NA	66.7	75.0
Kenema	100.0	NA	100.0	100.0
Koinadugu	74.7	83.3	100.0	66.7
Kono	92.0	100.0	83.3	94.4
Moyamba	91.7	NA	91.7	91.7
Port Loko	81.3	66.7	75.0	83.3
Pujehun	97.3	NA	91.7	100.0
Tonkolili	93.1	NA	100.0	91.7
Western Urban	92.0	66.7	91.7	100.0
Falaba	83.3	NA	83.3	NA
Karene	49.2	NA	66.7	41.7

Source: Author's calculations using Sierra Leone 2021 QOC data; NA – not applicable as these facilities reported of either not providing vaccinations or not storing; all sampled Western Rural facilities reported of not storing the vaccines in their premises

[5] Sierra Leone: WHO and UNICEF estimates of immunization coverage: 2019 revision. https://www.who.int/immunization/monitoring_surveillance/data/sle.pdf

Considering only facilities that store vaccines (n=90), individual vaccines were usually available with the exception of Hepatitis B (
Figure 2). However, hepatitis B is included in the pentavalent vaccine that is administered to children.

Figure 2: Availability of individual vaccines by facility type



F. Equipment Availability

Methodological Note
The equipment indicator focuses on the availability (observed and functioning by the enumerator) of minimum equipment expected at a facility. The pieces of equipment expected in all facilities are a weighing scale (adult, child or infant), a stethoscope, a sphygmomanometer and a thermometer and a refrigerator, and additionally sterilization equipment at health center and hospital levels.

The survey found that more than a half (52.1 percent) of health facilities in Sierra Leone met the minimum medical equipment requirements (Table). Urban facilities had better availability of equipment (60.5 percent) compared to rural facilities (49.7 percent). In general, hospitals had the lowest level of basic equipment available (38.1 percent). However, a higher share of health centers (54.5 percent) had the minimum basic equipment available than the health posts (51.6 percent).

Table 11. Availability of basic equipment by facility type, ownership and location

% facilities	Sierra Leone	Urban	Rural
All	52.1	60.5	49.7

Hospital	38.1	38.1	NA
Health Center	54.5	51.1	57.6
Health Post	51.6	76.1	48.1
# Facilities	150	48	102

Source: Author's calculations using Sierra Leone 2021 QOC data

Table shows the availability of specific types of medical equipment in Sierra Leonean facilities. Most facilities had a scale. Over three-quarters of facilities had a thermometer and sphygmomanometer. However, only 59.2 percent had a functional refrigerator.

Table 12. Availability of equipment items in the equipment indicator

% facilities	Sierra Leone	Urban	Rural	Hospital	Health Center	Health Post
Any scale	96.0	100.0	94.8	100.0	100.0	94.6
Thermometer	75.1	81.5	73.3	95.2	83.3	72.0
Stethoscope	89.4	90.4	89.1	100.0	97.2	86.5
Sphygmomanometer	75.8	82.4	73.8	100.0	81.3	73.4
Refrigerator	59.2	61.8	58.5	42.9	80.3	52.4
Sterilization	77.0	83.9	75.0	100.0	91.8	71.5

Source: Author's calculations using Sierra Leone 2021 QOC data

Table shows the availability of other supplies. Male and female condoms were available across most facilities. Only 87.9 percent of facilities had male condoms and 56.9 percent of health facilities had female condoms. Rapid diagnostic tests for malaria were available in 98.8 percent of all facilities and only 61 percent facilities had HIV test kits. A major share of facilities (95.6 percent) had insecticide treated nets (ITNs). Test kits for tuberculosis and glucometers for potential diabetes patients were only available in 12.3 percent and 11.5 percent of the facilities respectively. Instruments for child growth monitoring were for the most apart available but to varying degrees. Most facilities (96.2 percent) had a tape measure and 94.6 percent had a length board. There was not much variation across the different strata for the availability of selected medical supplies except that more urban facilities had the availability for some medical supplies such as glucometer, HIV and TB test kits.

Table 13: Availability of selected medical supplies

% facilities	Sierra Leone	Urban	Rural	Hospital	Health Center	Health Post
Bag and mask	89.2	90.3	88.9	100.0	92.9	87.7
Upper airways	90.7	90.2	90.9	100.0	87.2	91.7
Male condoms	96.9	96.3	97.0	100.0	100.0	95.7
Female condoms	81.5	87.3	79.8	95.2	86.0	79.7
RDT	98.8	99.7	98.6	95.2	95.6	100.0
HIV kit	78.9	86.4	76.7	95.2	100.0	71.4
Glucometer	9.7	12.9	8.8	76.2	22.2	4.1
TB kit	11.9	27.8	7.2	66.7	30.5	4.4
ITN	93.3	86.7	95.2	71.4	95.6	93.0
Tape measure	95.6	93.3	96.3	100.0	97.2	95.0

Length board	98.4	100.0	98.0	100.0	100.0	97.8
MUAC tape	100.0	100.0	100.0	100.0	100.0	100.0
RUTF	59.3	71.8	55.6	76.2	89.2	48.8
F100	11.6	18.5	9.6	57.1	9.9	11.2
F75	11.6	18.5	9.6	57.1	9.9	11.2

Source: Author's calculations using Sierra Leone 2021 QOC data

G. Infrastructure Availability

Methodological Note

The infrastructure indicator captures the availability of three inputs: water, sanitation and electricity. The indicator is an unweighted average of these three components. Eligible sources are:
Electricity sources-electric power grid, a fuel operated generator, a battery-operated generator or a solar powered system as their main source of electricity.
Water sources-piped into the facility, piped onto facility grounds or comes from a public tap/standpipe, tube well/borehole, a protected dug well, a protected spring, bottled water or a tanker truck.
Sanitation sources-functioning flush toilets or Ventilated and Improved (VIP) latrines, or covered pit latrine (with slab).

Slightly above a half (53.9 percent) of the health facilities had access to all three types of basic infrastructure (Table). There was a small difference between the urban (55.3 percent) and rural facilities (53.4 percent). The infrastructure indicator improved with the level of the facility, from 52.3 percent in health posts to 55.9 percent in health center and 95.2 percent in hospitals.

Table 14. Availability of infrastructure by facility type

% facilities	Sierra Leone	Urban	Rural
All	53.9	55.3	53.4
Hospital	95.2	95.2	NA
Health Center	55.9	54.4	57.2
Health Post	52.3	49.9	52.7
# Facilities	150	48	102

Source: Author's calculations using Sierra Leone 2021 QOC data

Table shows the availability of specific types of infrastructure in Sierra Leonean health facilities. When considered alone, 75.1 percent had access to clean water, 79.6 percent to toilets and 81 percent had access to electricity. The urban-rural gaps for electricity were very large.

Table 15. Availability of specific types of infrastructure

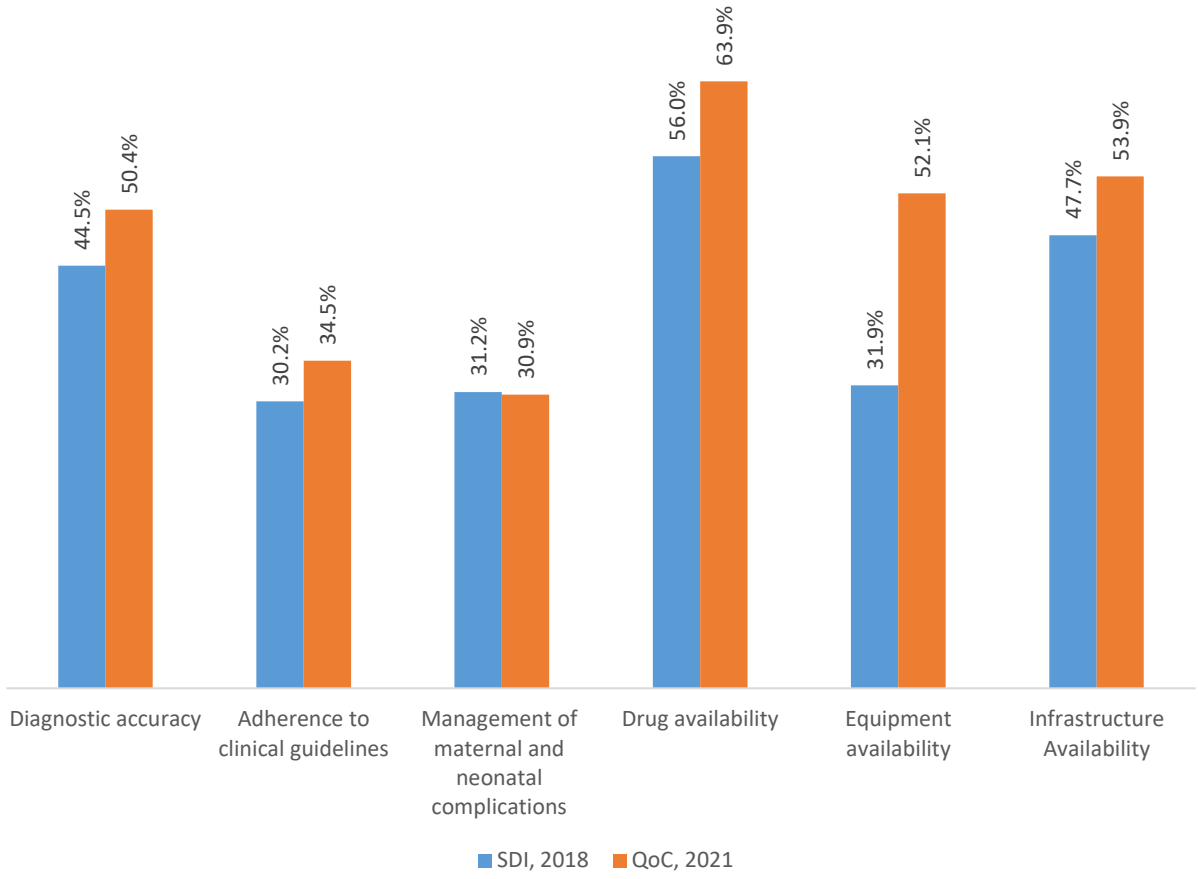
% facilities	Sierra Leone	Urban	Rural	Hospital	Health Center	Health Post
Infrastructure Indicator	53.9	55.3	53.4	95.2	55.9	52.3
Clean water	75.1	71.0	76.3	100.0	63.7	78.4
Toilet	79.6	79.9	79.5	100.0	83.8	77.7
Electricity	81.0	90.4	78.2	95.2	95.1	75.9

IV. COMPARING QOC SURVEY, 2021 WITH SDI SURVEY, 2018

As mentioned earlier, the QoC survey utilized the same instruments and methodology as the SDI survey of 2018. However, there are a few differences between these two surveys. First, SDI survey was representative at the national as well as district levels, and by urban-rural location whereas QOC survey is only a nationally representative survey. Second, SDI survey included both public and private facilities, whereas QoC survey consisted of only public facilities. Finally, SDI survey had components that are not fielded during the QoC such as absenteeism, facility finances, autonomy and staff supervision.

Figure 7 shows the comparative picture of both surveys. Except for management of maternal and neonatal complications, all indicators show improvements over their SDI survey values. The biggest jump is seen for availability of equipment (20 percentage points).

Figure 7: Comparing QoC survey with SDI survey



V. WHAT DOES THIS MEAN FOR SIERRA LEONE?

Sierra Leone emerged from a civil war (2002) and Ebola outbreak (2014) and since then, a lot of progress has been made in the health sector, but much remains to be done. The country has achieved significant progress on the quality dimension in a relatively short time as we can see when comparing with the SDI 2018. Almost all of the key indicators show remarkable improvements. To continue this momentum of progress and further accelerate the achievements, the follow recommendations may be suggested.

Ensuring availability of skilled human resources for health. In addition to increasing the volume of health workers to address the shortage of providers this issue, improvements in management, supervision and training are critical to ensure quality health service delivery by a skilled HRH base. The survey found that provider knowledge and abilities are very low to deliver quality services. Training needs to be better focused with the main objective of capacitating health workers to accurately diagnose and treat the main causes of illness as well as to have the skills to refer complicated cases up to higher levels of care. There should also be a concerted emphasis on adhering to the national guidelines as far as managing critical health conditions is concerned.

Making minimum functional medical equipment and infrastructure in facilities available. Basic equipment as mandated by the Government, is not available at most primary health facilities. This is alarming given the fact that most of the population accesses care at a public primary health facility. There are also major challenges around infrastructure and drug availability. Just about a half of the facilities in Sierra Leone have the required components for medical equipment and infrastructure.

VI. REFERENCES

Ameh C, Msuya S, Hofman J, Raven J, Mathai M, et al. (2012) Status of Emergency Obstetric Care in Six Developing Countries Five Years before the MDG Targets for Maternal and Newborn Health. PLoS ONE 7(12): e49938. doi:10.1371/journal.pone.0049938

Banerjee, Abhijit, Angus Deaton and Esther Duflo (2004). "Wealth, Health, and Health Service Delivery in Rural Rajasthan", *American Economic Review Papers and Proceedings* 94 (2): 326–30.

Banerjee, A., and E., Duflo (2005). "Addressing Absence", *Journal of Economic Perspectives* 20 (1): 117–32.

Das, J., and J., Hammer, (2005) "Which Doctor? Combining Clinical cases and Item-Response to Measure Doctor Quality," *Journal of Development Economics*, 78:348–383.

Das J, Hammer J, and Leonard K (2008). "The Quality of Medical Advice in Low-Income Countries". *Journal of Economic Perspectives*, 22(2):93–114.

Gauthier, B. and W., Wane (2009) "Leakage of Public Resources in the Health Sector: An Empirical Investigation of Chad", *Journal of African Economies* (18): 52–83.

Ministry of Health and Sanitation; Government of Sierra Leone. Sierra Leone National Nutrition Survey (SLNNS), 2017

Ministry of Health and Sanitation; Government of Sierra Leone. Sierra Leone Basic Package of Essential Health Services, Report 2015

Ministry of Health and Sanitation; Government of Sierra Leone. National Community Health Worker Policy 2016-2020

Sierra Leone: WHO and UNICEF estimates of immunization coverage: 2019 revision. https://data.unicef.org/wp-content/uploads/country_profiles/Sierra%20Leone/immunization_country_profiles/immunization_sle.pdf

Statistics Sierra Leone; Sierra Leone Integrated Household Survey, 2011

Statistics Sierra Leone (SSL) and ICF International. 2019. Sierra Leone Demographic and Health Survey 2019. Freetown, Sierra Leone and Rockville, Maryland, USA: SSL and ICF International.

VII. ANNEXES

ANNEX A. HEALTH SURVEY INSTRUMENTS

Table A1: Health survey instrument

Module	Description
Module 1: Facility Questionnaire Section A: General Information Section B: General Information Section C: Infrastructure Section D: Equipment, Materials and Supplies Section E: Drugs	Administered to the in-charge or the most senior medical staff at the facility. Self-reported and administrative data on health facility characteristics, staffing, and resources flows.
Module 2: Staff Roster	Administered to the in-charge or the most senior medical staff at the facility.
Module 3: Clinical case Simulations Section B: Introduction Section C: Example Section D: Clinical case 1 Acute Diarrhea + Dehydration Section E: Clinical case Patient 2 Pneumonia Section F: Clinical case Patient 3 Diabetes Mellitus Section G: Clinical case Patient 4 Pulmonary Tuberculosis Section H: Clinical case Patient 5 Malaria + Anemia Section I: Clinical case Patient 6 Post-partum hemorrhage Section J: Clinical case Patient 7 Neonatal Asphyxia Section K: Frequency of different types of consultations	Administered to medical staff in facility to assess clinical performance.

ANNEX B. DEFINITION OF INDICATORS

Table B1: Indicator definition and method of calculation

Adherence to clinical guidelines	
Unweighted average of the share of relevant history taking questions, the share of relevant examinations performed.	For each of the following five clinical cases: (i) acute diarrhea; (ii) pneumonia; (iii) diabetes mellitus; (iv) pulmonary tuberculosis; (v) malaria with anemia. History Taking Questions: Assign a score of one if a relevant history taking question is asked. The number of relevant history-taking questions asked by the clinician during consultation is expressed as a percentage of the total number of relevant history questions included in the questionnaire. Relevant Examination Questions: Assign a score of one if a relevant examination question is asked. The number of relevant examination questions asked by the clinician during consultation is expressed as a percentage of the total number of relevant examination questions included in the questionnaire. For each clinical case: Unweighted average of the: relevant history questions asked, and the percentage of physical examination questions asked. The history and examination questions considered are based on the Sierra Leone Standard National Guidelines and the guidelines for Integrated Management of Childhood Illnesses (IMCI).
Management of maternal and neonatal complications	
Share of relevant treatment actions proposed by the clinician.	For each of the following two clinical cases: (i) post-partum hemorrhage; and (ii) neonatal asphyxia. Assign a score of one if a relevant action is proposed. The number of relevant treatment actions proposed by the clinician during consultation is expressed as a percentage of the total number of relevant treatment actions included in the questionnaire.
Diagnostic accuracy	
Average share of correct diagnoses provided in the five clinical cases.	For each of the following five clinical cases: (i) acute diarrhea; (ii) pneumonia; (iii) diabetes mellitus; (iv) pulmonary tuberculosis; (v) malaria with anemia. For each clinical case, assign a score of one as correct diagnosis for each clinical case if diagnosis is mentioned. Sum the total number of correct diagnoses identified. Divide by the total number of clinical cases. Where multiple diagnoses were provided by the clinician, the diagnosis is coded as correct as long as it is mentioned, irrespective of what other alternative diagnoses were given.
Drug availability	
Share of basic drugs which at the time of the survey were available at the health facilities.	Priority medicines for mothers: Assign score of one if facility reports and enumerator confirms/observes the facility has the drug available and non-expired on the day of visit for the following medicines: Oxytocin (injectable), misoprostol (cap/tab), sodium chloride (saline solution) (injectable solution), azithromycin (cap/tab or oral liquid), calcium gluconate (injectable), cefixime (cap/tab), magnesium sulfate (injectable), benzathine benzylpenicillin powder (for injection), ampicillin powder (for injection), betamethasone or dexamethasone (injectable), gentamicin (injectable) nifedipine (cap/tab), metronidazole (injectable), medroxyprogesterone acetate (Depo-Provera) (injectable), iron supplements (cap/tab) and folic acid supplements (cap/tab). Priority medicines for children: Assign score of one if facility reports and enumerator confirms after observing that the facility has the drug available and non-expired on the day of visit for the following medicines: Amoxicillin (syrup/suspension), oral rehydration salts (ORS sachets), zinc (tablets), ceftriaxone (powder for injection), artemisinin combination therapy (ACT), artesunate (rectal or injectable), benzylpenicillin (powder for injection), vitamin A (capsules) We take out of analysis of the child tracer medicines two medicines (Gentamicin and ampicillin powder) that are included in the mother and in the child tracer medicine list to avoid double counting.

	The aggregate is adjusted by facility type to accommodate the fact that not all drugs (injectables) are expected to be at the lowest level facility, CSB1, where health workers are not expected to offer injections.
Equipment availability	
Share of facilities with thermometer, stethoscope and weighing scale, refrigerator and sterilization equipment.	Medical Equipment aggregate: Assign score of one if enumerator confirms the facility has one or more functioning of each of the following: thermometers, stethoscopes, sphygmomanometers and a weighing scale (adult or child or infant weighing scale) as defined below. CSB2 and CHRD are expected to include two additional pieces of equipment: a refrigerator and sterilization device/equipment. Thermometer: Assign score of one if facility reports and enumerator observes facility has one or more functioning thermometers. Stethoscope: Assign score of one if facility reports and enumerator confirms facility has one or more functioning stethoscopes. Sphygmomanometer: Assign score of one if facility reports and enumerator confirms facility has one or more functioning sphygmomanometers. Weighing Scale: Assign score of one if facility reports and enumerator confirms facility has one or more functioning Adult, or Child or Infant weighing scale. Refrigerator: Assign score of one if facility reports and enumerator confirms facility has one or more functioning refrigerator. Sterilization equipment: Assign score of one if facility reports and enumerator confirms facility has one or more functioning Sterilization device/equipment.
Infrastructure availability	
Share of facilities with electricity, clean water and improved sanitation.	Infrastructure aggregate: Assign score of one if facility reports and enumerator confirms facility has electricity and water and sanitation as defined. Electricity: Assign score of one if facility reports having the electric power grid, a fuel operated generator, a battery-operated generator or a solar powered system as their main source of electricity. Water: Assign score of one if facility reports their main source of water is piped into the facility, piped onto facility grounds or comes from a public tap/standpipe, tubewell/borehole, a protected dug well, a protected spring, bottled water or a tanker truck. Sanitation: Assign score of one if facility reports and enumerator confirms facility has one or more functioning flush toilets or VIP latrines, or covered pit latrine (with slab).

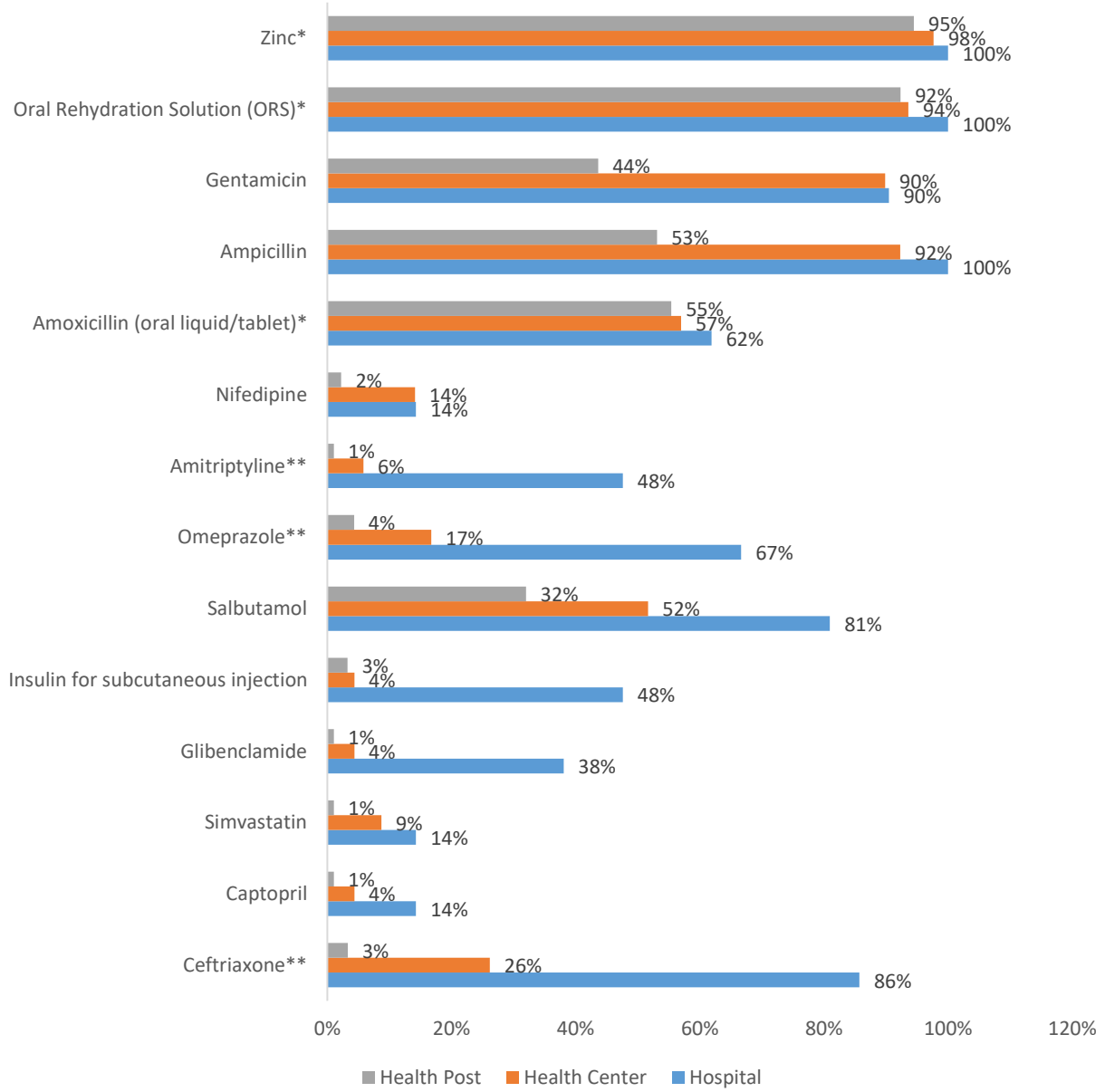
ANNEX C. ADDITIONAL RESULTS

Table C1: Drug availability

% facilities	Sierra Leone	Urban	Rural	Hospital	Health Center	Health Post
Core Medications						
Amoxicillin*	91.0	88.6	91.7	100.0	82.5	93.7
Ceftriaxone***	10.3	26.0	5.6	85.7	26.2	3.3
Ciprofloxacin**	85.6	88.3	84.9	100.0	85.5	85.4
Diclofenac*	6.7	11.6	5.2	57.1	11.1	4.1
Atenolol*	5.3	15.1	2.4	52.4	11.4	2.2
Captopril***	2.1	5.7	1.0	14.3	4.4	1.0
Simvastatin***	3.2	5.7	2.4	14.3	8.7	1.0
Glibenclamide***	2.4	7.3	1.0	38.1	4.4	1.0
Oral hypoglycaemic ***	4.6	8.9	3.4	61.9	8.7	2.1
Insulin for injection***	4.2	11.8	2.0	47.6	4.4	3.3
Salbutamol***	37.7	45.1	35.5	81.0	51.7	32.0
Omeprazole***	8.4	21.9	4.4	66.7	16.7	4.3
Diazepam*	65.0	61.6	66.1	81.0	55.8	67.8
Amitriptyline***	2.9	8.0	1.5	47.6	5.8	1.0
Rifampicin*	14.3	41.1	6.5	76.2	36.9	5.4
Isoniazid*	15.0	44.1	6.5	81.0	39.4	5.4
Pyrazinamide*	14.5	41.7	6.5	85.7	36.9	5.4
Ethambutol*	14.5	42.0	6.5	90.5	36.9	5.4
Essential Medications for mothers						
Oxytocin (Syntocinon)*	92.7	87.3	94.3	100.0	92.6	92.6
Calcium Gluconate***	57.0	69.0	53.4	81.0	73.1	51.0
Magnesium sulphate**	83.2	90.6	81.0	90.5	85.8	82.1
Sodium Chloride*	87.5	88.1	87.3	95.2	87.5	87.3
Misoprostol (Mifepristone)*	24.9	52.0	16.9	95.2	66.1	9.4
Ampicillin***	63.6	81.2	58.4	100.0	92.3	53.1
Gentamicin*	55.9	77.3	49.6	90.5	89.8	43.6
Metronidazole*	38.4	41.9	37.3	90.5	28.3	40.7
Azithromycin***	6.8	9.9	5.9	28.6	8.7	5.7
Cefixime****	4.2	10.5	2.4	28.6	8.7	2.2
Benzathine benzyl penicillin**	76.6	90.2	72.6	90.5	82.2	74.5
Betamethasone****	11.2	24.2	7.4	100.0	20.9	6.1
Nifedipine***	5.4	15.5	2.4	14.3	14.1	2.2
Methyldopa	81.0	85.1	79.8	90.5	86.6	78.9
Hydralazine	5.3	8.6	4.3	57.1	8.7	3.0
Oral contraceptive pill (OCP)*	93.8	92.1	94.3	95.2	95.6	93.2
Medroxyprogesterone acetate*	93.6	88.8	95.0	90.5	94.9	93.2
Ferrous salt*	87.0	87.4	86.8	85.7	90.6	85.8
Ferrous salt and foclic acid*	86.6	92.1	85.0	95.2	97.7	82.7
Folic Acid*	55.3	51.7	56.3	81.0	56.7	54.2
Sulfadoxine/pyrimethamine*	86.8	82.9	87.9	95.2	88.3	86.1
Essential Medications for children						
Paracetamol*	60.7	56.9	61.8	52.4	58.4	61.6
Morphine***	4.5	12.7	2.1	61.9	4.4	3.3
Amoxicillin*	55.9	51.0	57.3	61.9	57.0	55.4
Cotrimoxazole*	44.1	59.3	39.6	57.1	36.9	46.3
Benzylpenicillin*	21.9	31.2	19.1	42.9	35.8	16.7
Oral Rehydration Solution*	92.8	85.9	94.8	100.0	93.6	92.3
Vitamin A*	84.0	83.2	84.2	61.9	93.3	81.3
Zinc*	95.4	97.5	94.8	100.0	97.7	94.5
ACT or ALU*	95.5	97.1	95.0	95.2	95.4	95.5
Artesunate***	47.5	63.6	42.7	100.0	74.1	37.3
Albendazole*	94.8	97.5	94.1	100.0	95.4	94.6
Mebendazole*	8.3	10.1	7.8	23.8	13.1	6.4
Artesunate Suppository	26.9	30.7	25.8	23.8	30.3	25.9
Chlorhexidine	52.4	66.5	48.3	81.0	52.6	51.8
Tetracycline eye ointment	12.1	21.7	9.3	61.9	19.5	8.5

Note: Should be carried by * Health posts and above, ** Health Centers and above, *** Hospitals and above according to the 2015 Basic Package of Essential Health Services (BPEHS)

Figure C1: Availability of individual tracer drugs (14) by type of facility



Note: * Tracer drugs for both HC and HP. ** Tracer drugs specific to HC. The rest of the drugs are tracers for Hospitals according to the 2015 BPHS

Table C2. Availability of priority drugs

% drugs	Bo	Bombali	Bonthe	Kailahun	Kambia	Kenema	Koinadugu	Kono	Moyamba	Port Loko	Pujehun	Tonkolili	Western Rural	Western Urban	Falaba	Karene
All priority drugs	70.3	70.1	67.2	69.7	69.9	66.8	66.6	54.8	63.0	72.3	23.4	62.7	56.0	69.9	73.6	63.7
Priority drugs for Mothers (local)	92.5	96.3	84.3	89.8	89.9	89.6	93.5	83.6	86.0	93.1	26.7	85.1	67.5	75.7	100.0	92.0
Priority drugs for Mothers (WHO)	62.0	69.5	48.8	70.8	69.7	61.4	59.2	54.2	48.9	61.5	10.0	41.1	61.4	77.8	68.3	65.9
Priority drugs for children (local)	81.8	78.2	71.6	72.8	82.7	64.7	72.4	50.6	65.5	82.9	22.7	60.7	63.8	77.4	67.4	59.1
Priority drugs for children (WHO)	44.8	41.6	39.7	46.1	38.4	32.9	36.9	22.8	32.4	42.5	11.1	32.1	32.7	59.7	49.6	31.4
All tracer drugs	90.8	84.7	57.4	70.5	84.7	69.6	86.4	63.7	83.7	83.7	32.1	77.4	67.1	63.5	76.4	70.4
Have all tracers (% facility)	79.1	64.9	9.0	40.8	64.7	25.1	63.8	11.2	60.6	57.1	26.7	40.4	25.4	14.6	29.3	20.2

Table C3. Availability of individual vaccines

% facilities	Bo	Bombali	Bonthe	Kailahun	Kambia	Kenema	Koinadugu	Kono	Moyamba	Port Loko	Pujehun	Tonkolili	Western Urban	Falaba	Karene
Measles	78.2	97.4	57.9	100.0	17.8	100.0	59.3	100.0	85.0	85.9	84.0	100.0	98.7	0.0	0.0
Polio	100.0	100.0	84.2	57.5	100.0	100.0	63.0	100.0	82.5	100.0	100.0	100.0	78.7	100.0	100.0
Pentavalent	89.5	100.0	84.2	100.0	100.0	100.0	100.0	100.0	100.0	88.7	100.0	100.0	98.7	100.0	100.0
Pneumococcal	77.4	71.8	84.2	98.7	100.0	100.0	63.0	100.0	100.0	62.9	100.0	100.0	98.7	100.0	30.3
BCG	88.7	100.0	84.2	98.7	17.8	100.0	100.0	75.9	82.5	74.2	100.0	79.2	98.7	100.0	65.2
Hepatitis B	21.8	0.0	0.0	18.9	0.0	0.0	59.3	1.2	17.5	0.0	100.0	20.8	76.0	0.0	34.8
Tetanus	100.0	100.0	84.2	100.0	100.0	100.0	63.0	75.9	100.0	75.8	100.0	79.2	78.7	100.0	0.0

Table C4. Availability of specific types of infrastructure

% facilities	Bo	Bombali	Bonthe	Kailahun	Kambia	Kenema	Koinadugu	Kono	Moyamba	Port Loko	Pujehun	Tonkolili	Western Rural	Western Urban	Falaba	Karene
Infrastructure Indicator	86.1	74.0	73.0	36.1	100.0	42.8	2.1	44.9	40.9	69.6	60.0	41.4	74.6	18.4	41.5	39.5
Clean water	93.3	87.0	73.0	56.0	100.0	75.6	44.7	89.9	69.7	91.1	100.0	71.7	100.0	18.4	41.5	79.8
Toilet	92.8	74.0	91.0	56.0	100.0	67.2	57.4	66.3	61.1	79.6	100.0	79.8	100.0	73.8	100.0	100.0
Electricity	100.0	87.0	82.0	100.0	100.0	74.9	57.4	77.5	100.0	81.1	60.0	49.5	74.6	100.0	70.7	39.5

Table C5. Availability of equipment

facilities	Bo	Bombali	Bonthe	Kailahun	Kambia	Kenema	Koinadugu	Kono	Moyamba	Port Loko	Pujehun	Tonkolili	Western Rural	Western Urban	Falaba	Karene
Any scale	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.9	100.0	73.3	89.9	100.0	100.0	100.0	79.8
Thermometer	57.3	51.9	82.0	100.0	100.0	75.6	100.0	77.5	89.9	65.7	50.6	69.7	74.6	100.0	87.8	21.9
Stethoscope	100.0	87.0	82.0	80.1	100.0	91.6	78.7	89.9	100.0	100.0	86.7	100.0	74.6	100.0	100.0	19.3
Sphygmomanometer	100.0	74.0	16.0	80.1	100.0	83.2	78.7	89.9	79.8	88.6	73.3	79.8	74.6	85.4	41.5	21.9
Bag and mask	100.0	100.0	73.0	100.0	87.1	100.0	100.0	78.6	89.9	88.6	46.7	100.0	100.0	73.8	100.0	100.0
Upper airways	100.0	100.0	91.0	100.0	100.0	91.6	100.0	89.9	69.7	79.6	73.3	100.0	76.1	85.4	100.0	100.0
Sterilizing equipment	71.7	100.0	91.0	100.0	100.0	84.0	78.7	44.9	29.3	88.6	33.3	89.9	100.0	88.3	41.5	100.0
Adult scale	43.4	76.6	91.0	26.1	35.3	74.9	78.7	66.3	39.4	88.6	46.7	59.6	100.0	99.0	70.7	42.1
Child scale	92.8	76.6	100.0	100.0	100.0	84.0	100.0	100.0	89.9	88.6	45.5	79.8	49.3	100.0	100.0	79.8
Infant scale	92.8	63.6	40.0	21.9	100.0	51.2	66.0	66.3	71.2	77.1	13.3	71.7	49.3	58.3	100.0	21.9
Refrigerator	63.8	50.6	57.0	80.1	72.6	48.1	57.4	78.6	57.7	88.6	45.5	48.5	0.0	71.8	12.2	57.9

Table C6. Outpatient caseload

% facilities	Bo	Bombali	Bonthe	Kailahun	Kambia	Kenema	Koinadugu	Kono	Moyamba	Port Loko	Pujehun	Tonkolili	Western Rural	Western Urban
All	6.0	5.3	3.0	27.5	2.3	8.4	24.6	7.6	18.8	5.4	7.5	10.1	6.7	5.7
Hospital	6.7	6.3	1.0	4.0	1.4	8.1	2.1	0.6	1.4	6.7	1.0	1.7	.	6.7
Health Center	5.0	6.7	2.6	18.4	2.5	8.2	31.6	7.9	23.4	3.0	4.6	7.7	3.5	10.2
Health Post	6.4	4.7	3.2	30.0	2.2	8.4	23.8	7.7	17.8	5.7	8.1	10.5	7.9	3.4

Table C7. Diagnostic accuracy

% clinical cases	Bo	Bombali	Bonthe	Kailahun	Kambia	Kenema	Koinadugu	Kono	Moyamba	Port Loko	Pujehun	Tonkolili	Western Rural	Western Urban
Severe dehydration	10.5	9.9	3.1	6.8	2.3	41.6	17.6	3.4	37.7	6.7	22.8	51.8	14.2	18.1
Pneumonia	56.2	43.9	73.9	61.6	77.8	77.6	61.1	38.7	75.1	42.2	63.1	70.1	47.9	84.0
Diabetes	6.4	26.7	8.7	58.4	60.1	32.1	41.6	30.5	41.9	33.5	15.5	22.8	37.4	57.6
TB	44.4	86.2	67.2	98.7	93.2	96.6	95.4	95.7	96.7	91.7	92.3	98.8	100.0	99.0
Malaria & anemia	4.2	10.7	2.3	54.1	5.3	17.1	7.0	2.3	19.1	19.5	5.1	54.8	7.9	14.2
Malaria	98.6	99.2	94.2	99.0	100.0	66.7	81.1	100.0	98.3	99.3	98.6	88.8	93.9	98.0
PPH	86.8	83.6	95.3	93.4	96.7	97.7	86.5	100.0	100.0	96.1	90.6	100.0	94.4	86.0
Neonatal asphyxia	88.6	71.3	82.5	93.9	97.0	92.0	91.6	85.0	98.3	94.1	60.7	100.0	85.1	94.3
All 5	24.3	35.5	30.2	55.7	47.7	53.0	44.5	34.1	54.1	38.7	39.8	59.6	41.5	54.6
All 7	**42.4**	**47.5**	**46.3**	**66.4**	**61.7**	**65.0**	57.3	50.8	67.0	54.8	50.0	71.2	55.3	64.7

Table C8. Treatment accuracy

% clinical cases	Bo	Bombali	Bonthe	Kailahun	Kambia	Kenema	Koinadugu	Kono	Moyamba	Port Loko	Pujehun	Tonkolili	Western Rural	Western Urban
Severe dehydration	87.7	63.5	97.3	65.9	67.6	85.7	92.4	77.7	78.4	63.8	59.4	71.3	94.7	51.5
Pneumonia	67.1	74.7	75.9	94.1	95.5	62.6	76.0	53.4	89.2	87.9	69.0	74.5	83.7	68.8
Diabetes	59.4	62.1	14.4	85.5	57.8	60.6	77.0	63.3	71.8	77.0	60.9	88.6	59.7	72.7
TB	0.0	3.4	0.0	4.0	0.0	4.5	12.2	0.0	1.7	3.3	20.1	0.0	0.0	1.9
Malaria & anemia	40.4	63.4	44.1	83.0	36.4	56.8	59.7	32.8	56.0	44.4	34.5	87.4	45.9	66.6
Malaria	96.2	83.5	97.3	95.7	93.2	78.2	84.9	100.0	86.7	90.0	95.5	96.3	97.4	83.5
PPH	15.4	11.7	17.5	37.0	0.0	35.0	51.3	7.8	34.4	11.5	11.1	55.2	12.2	22.2
Neonatal asphyxia	23.7	32.2	24.4	79.3	31.8	55.2	70.0	15.5	41.8	23.4	40.4	87.0	21.9	34.4

Table C9. Management of maternal and neonatal complications

% clinical cases	Bo	Bombali	Bonthe	Kailahun	Kambia	Kenema	Koinadugu	Kono	Moyamba	Port Loko	Pujehun	Tonkolili	Western Rural	Western Urban
PPH	16.7	18.4	11.3	41.5	14.8	30.7	38.1	15.6	25.2	17.4	20.0	48.2	23.0	26.3
Neonatal asphyxia	25.2	26.9	18.7	52.8	31.0	43.9	43.4	22.1	32.5	33.6	30.5	71.0	40.1	43.7
Both	20.9	22.7	15.0	47.1	22.9	37.3	40.8	18.9	28.9	25.5	25.2	59.6	31.5	35.0

Table C10. Adherence to clinical guidelines

% clinical cases	Bo	Bombali	Bonthe	Kailahun	Kambia	Kenema	Koinadugu	Kono	Moyamba	Port Loko	Pujehun	Tonkolili	Western Rural	Western Urban
history and examination	12.6	16.2	7.6	36.0	18.3	22.9	29.7	11.0	16.2	14.4	20.8	38.5	21.1	21.4
important history and examination	21.2	26.2	15.0	44.8	27.7	33.0	39.4	18.3	25.7	23.9	31.2	49.8	31.3	31.9
history, examination and test	20.2	27.4	16.4	46.2	27.4	34.0	40.6	21.9	27.3	25.9	28.9	46.6	31.6	35.2