SERVICE DELIVERY INDICATORS

Education | Health

Health Service Delivery in TANZANIA

WORLD BANK GROUP

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Tanzania 2014 Service Delivery Indicators

Health Technical Report

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EXECUTIVE SUMMARY

The Service Delivery Indicators (SDIs) provides a set of key indicators serving as a benchmark for service delivery performance in the health and education sectors in Sub-Saharan Africa. The overarching objective of the SDIs is to ascertain the quality of service delivery in primary education and 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, and across countries. It is envisaged that the broad availability, high public awareness, and a persistent focus on the indicators tracked in the SDIs, will help mobilize policymakers, citizens, service providers, donors and other stakeholders alike to undertake the necessary steps to accelerate improvements in the quality of service delivery, and thereby improve development outcomes.

The SDI survey interviewed 403 heath providers across Tanzania between May 2014 and July 2014. 2,093 workers were observed for absenteeism and 563 health workers were assessed with clinical cases. Public and private (for- and nonprofit) providers have been visited as well as providers at different levels of services such as health posts, health centers, and district or first-level hospitals. The data collected are also representative of the traditional strata i.e. Dar es Salaam, other urban areas, and rural areas.

This technical report presents the findings from the implementation of the SDI in the health sector in Tanzania in 2014. Survey implementation activities took place following extensive consultations with the government and key stakeholders on survey design, sampling, and adaptation of survey instruments.

What service providers know?

- Health providers could correctly diagnose 60.2 percent of the five tracer conditions. Urban providers (66.0 percent) as a whole significantly outperformed their rural counterparts (66.0 percent versus 50.0 percent of tracer conditions). Clinical officers correctly diagnosed more of the tracer conditions (67.0 percent) than doctors (64.4 percent), while nurses diagnosed only 37.3 percent of tracer conditions.
- 22.3 percent of providers correctly diagnosed all five tracer conditions while 38.6 percent could correctly diagnose at most two of the cases. Clinical officers correctly diagnosed 30.7 percent of the cases compared to doctors (19.9 percent of tracer conditions).
- Tanzanian health providers adhered to 43.8 percent of the clinical guidelines in the management of the five tracer conditions.
- Providers adhered to only 30.4 percent of the clinical guidelines for managing maternal and neonatal complications. Doctors adhered to a larger share of guidelines (35.7 percent of guidelines) compared to clinical officers (30.3 percent) and nurses (24.8 percent).

What service providers do?

- Caseload was very low with the average health worker seeing on average 7.3 patients per day. Private for-profit facilities had the highest daily caseload at 10.8 patients per provider per day. The outpatient caseload decreased by facility type with first-level hospitals seeing 3.8 patients per provider per day compared to health posts (7.7 patients per provider per day)
- Although on average 14.3 percent of health providers were absent from the facility, absence was more prevalent in Dar es Salaam where 1 out of 5 (21 percent) could not be found in the facility.

- 90 percent of absence was approved and doctors are three times more likely to be absent without approval (31 percent) compared to other staff (2 percent).

What service providers have to work with?

- 60.3 percent of priority drugs were available in Tanzanian facilities. Urban facilities had a higher availability of priority drugs (69.4 percent) compared to rural facilities (56.2 percent). Facilities in Dar es Salaam had the highest availability of all priority drugs (71.9 percent). Neither priority drugs for children nor mothers were widely available with average scores of 58.8 percent and 49.1 percent respectively.
- Vaccines were available in 80.1 percent of facilities and virtually all the facilities that store vaccines had a refrigerator in working condition
- 83.5 percent of health facilities in Tanzania met the minimum medical equipment requirements. Private nonprofit facilities had better availability of equipment (92.5 percent) compared to public facilities (81.7 percent). First-level hospitals typically had the best availability of equipment, while private for profit Health centers had the lowest (24.9 percent).
- 36.3 percent of health facilities had at least one of the three forms of communication equipment (phone, radio or computer). Personal cell phones were the most widely available piece of equipment, followed by cell phones paid by the facility and computers. There was a large gap in the availability of computers in rural and urban facilities. Only 9.4 percent of rural facilities had computers compared to 43 percent of urban facilities.
- 88.8 percent of facilities had access to toilets, 70 percent had access to clean water and 66.7 percent had access to electricity.
- Half (50 percent) of the health facilities had access to all three types of basic infrastructure There was a large difference, however, between the private sector (66.9 percent for nonprofit and 91.2 percent for-profit) and the public sector (40.6 percent).

What does this mean for Tanzania?

Progress has been made in Tanzania's health sector, however, more can be done to improve service delivery. Perception of quality at facilities is often a deciding factor in service utilization. Like many countries, Tanzania faces an inequitable geographic distribution of service quality. Quality and provider availability is often best in urban areas, particularly in Dar es Salaam. While Dar es Salaam is home to about 10 percent of the population, about 45 percent of the country's doctors are concentrated in Dar es Salaam.[1] The availability of medical equipment and diagnostic accuracy are also higher in urban areas than rural areas. Attention needs to be paid to improving the geographic availability of quality services.

Tanzania performs relatively well in the availability of medical equipment in facilities. Infrastructure and drug availability, however, are major challenges. Only half the facilities in Tanzania had the required components for infrastructure. Drug availability, particularly for mothers and children were also poor.

[1] World Bank. 2015. *Tanzania - Strengthening Primary Health Care for Results Program Project*. Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/2015/05/24481589/tanzania-strengthening-primary-health-care-results-program-project

A major challenge for Tanzania's health sector is the shortage of skilled human resources for health (HRH). This survey found that provider knowledge and abilities were not adequate to deliver quality services. Caseload per provider and absenteeism are relatively low, so the issue is not over burdened providers. There seems to be ample room for a significant increase in the caseload of Tanzanian providers, i.e. the level of productivity in health service delivery, without jeopardizing quality. In addition to increasing the volume of skilled HRH to address the shortage of providers, improvements in management, supervision and training is important to improving service delivery. Health for all in Tanzania will mean the simultaneous availability of widely accessible inputs and skilled providers.

Table 1. SDI At-A-Glance

	Tanzania	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Rural Public**	**Urban Public**
Caseload (per provider per day)	7.3	7.1	5.7	10.8	6.4	9.5	6.9	7.8
Absence from facility (% providers)	14.3	13.9	17.0	12.8	14.4	16.4	15.1	13.4
Diagnostic accuracy (% clinical cases)	60.2	59.9	65.9	54.2	50.0	62.3	43.9	70
Adherence to clinical guidelines (% clinical cases)	43.8	43.7	45.5	42.1	37.7	46.7	34.1	49.6
Management of maternal and neonatal complications (% clinical cases)	30.4	31.3	30.1	26.4	25.7	32.0	24.1	35.7
Drug availability (% drugs)	60.3	58.9	66.0	62.8	56.2	69.4	55.3	71.6
Equipment availability (% facilities)	83.5	81.7	92.5	84.5	80.7	87.6	79.8	88.5
Infrastructure Availability (% facilities)	50.0	40.6	66.9	91.2	36.0	79.2	33.5	65.8

Table 2. SDI Country Comparisons

	Tanzania (2014)	Kenya (2013)	Senegal (2010)	Tanzania (2010)	Uganda (2013)	Togo (2013)	Nigeria (2013)	Mozambique (2014)
Caseload (per provider per day)	7.3	15.2	-	-	6.0	5.2	5.2	17.4
Absence from facility (% providers)	14.3	27.5	20	21	46.7	37.6	31.7	23.9
Diagnostic accuracy (% clinical cases)	60.2	72.2	34	57	58.1	48.5	39.6	58.3
Adherence to clinical guidelines (% clinical guidelines)	43.8	43.7	22	35	41.4	35.6	31.9	37.4
Management of maternal and neonatal complications (% clinical guidelines)	30.4	44.6	-	-	19.3	26.0	19.8	29.9
Drug availability (% drugs)	60.3	54.2	78	76	47.2	49.2	49.2	42.7
Equipment availability (% facilities)	83.5	76.4	53	78	21.9	92.6	21.7	79.5
Infrastructure Availability (% facilities)	50.0	46.8	39	19	63.5	39.2	23.8	34.0

I. INTRODUCTION[2]

Although Tanzania is set to achieve the Millennium Development Goals (MDGs) for infant and under-5 mortality rates if it maintains the pace of decline in mortality levels. Neonatal mortality, however, will not contribute to this achievement. Indeed, under-five mortality decreased from 143 per 1,000 live births to 81 per 1,000 live births between 1996 and 2010, while neonatal mortality went from 31 to a mere 26 per 1000 live births. Between 2006 and 1000 one third of the Tanzanian children who did not live to celebrate their fifth birthday actually died within a month after birth.[3] As with neonatal mortality, maternal mortality rate is not improving fast enough if at all[4] and Tanzania is unlikely to meet the MDG related to maternal mortality. Maternal and neonatal mortality are therefore two critical areas where the Tanzanian health system needs to register some progress.

Box 1. Why focus on Service Delivery?

Health service delivery—unlike other services such as water and sanitation or housing in which service delivery models are technology or infrastructure intensive—is fundamentally different. Specifically, health and education service delivery have human resource intensive service delivery models. SDI therefore focuses on frontline service delivery and provider behavior because of the unique aspects of service delivery in these sectors:

- The labor intensive and transaction intensive nature of the health sector's service delivery model.
- The highly discretionary nature of work effort determining whether a nurse presents for work 24/7, often in tough working conditions.
- Nurses and doctors are intrinsically motivated, but that institutional incentives attenuate or undermine this motivation.
- The asymmetry of information—between policymakers and providers, as well as between communities and providers—is particularly acute in the health sector.
- A second order result of how planning takes place is the dominance of the "WHAT" rather than the "HOW" of service delivery.

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 SDI survey is essentially a return to the basics by shining light on these fundamentals.

Service delivery literature points towards the importance of functional health facilities, and more generally, the quality of service delivery.[5] Nurses and doctors are an invaluable resource in determining the quality of health services. The literature has not always drawn links between systems investments and the performance of providers, arguably the ultimate test of the effectiveness of investments in systems.[6] The literature is, however, clear that conditional on providers being appropriately skilled and exerting the necessary effort, increased resource flows for health can have beneficial health and education outcomes (see Box 1).[7]

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[2] Data presented here are from the World Development Indicators database maintained by the World Bank.
[3] "The proportion of infant deaths occurring in the first month of life is 55 percent in the period 0 to 4 years preceding the survey. Furthermore, […]; 72 percent of neonatal deaths were early neonatal deaths." [2010 TDHS report]
[4] Maternal mortality decreased from 578 in 2004-05 to 454 in 2010 according to the 2010 DHS but that decrease was not statistically significant although it suggest a declining trend has started.
[5] Spence and Lewis (2009).
[6] Swanson et al. (2012).
[7] Spence and Lewis (2009).

This report presents the results from the implementation of the first SDI survey in the health sector in Tanzania. A unique feature of the SDI surveys is that it examines the production of health services at the frontline. The production of health services requires three dimensions of service delivery: (i) the availability of key inputs such as drugs, equipment and infrastructure; (ii) providers who are skilled; and (iii) providers who exert the necessary effort in applying their knowledge and skills. Successful service delivery requires that all these elements be present in the same facility at the same time. While many data sources provide information on the average availability of these elements across the health sector, the SDI surveys allow for the assessment of how these elements come together to produce quality health services in the same facility simultaneously.

The objective of SDI is to provide a set of metrics for benchmarking service delivery performance in education and health in Africa. SDI set out to provide information to track progress across and within countries over time. SDI started in 2010 with 2 pilot surveys in Senegal and Tanzania. The Tanzania 2014 SDI is the follow up and will provide information to evaluate whether Tanzania has improved the quality of its health and education services between 2010 and 2014. It will also enable to compare Tanzania not only with its immediate neighbors such as Kenya and Uganda but also with countries in West Africa such as Nigeria and Togo where the SDI was implemented in 2013.

Box 2. The Service Delivery Indicators (SDI) Program

A significant share of public spending on education is transformed to produce good schooling outcomes at schools. Understanding what takes place at these frontline service provision centers is the starting point in establishing where the relationship between public expenditure and outcomes is weak within the service delivery chain. Knowing whether spending is translating into inputs that teachers have to work with (e.g. textbooks in schools), or how much work effort is exerted by teachers (e.g. how likely are they to come to work), and their competency would reveal the weak links in the service delivery chain. Reliable and complete information on these measures is lacking, in general.

To date, there is no robust, standardized set of indicators to measure the quality of services as experienced by the citizen in Africa. Existing indicators tend to be fragmented and focus either on final outcomes or inputs, rather than on the underlying systems that help generate the outcomes or make use of the inputs. In fact, no set of indicators is available for measuring constraints associated with service delivery and the behavior of frontline providers, both of which have a direct impact on the quality of services that citizens are able to access. Without consistent and accurate information on the quality of services, it is difficult for citizens or politicians (the principal) to assess how service providers (the agent) are performing and to take corrective action.

The SDI provides a set of metrics to benchmark the performance of schools and health clinics in Africa. The Indicators can be used to track progress within and across countries over time, and aim to enhance active monitoring of service delivery to increase public accountability and good governance. Ultimately, the goal of this effort is to help policymakers, citizens, service providers, donors, and other stakeholders enhance the quality of services and improve development outcomes.

The perspective adopted by the Indicators is that of citizens accessing a service. The Indicators can thus be viewed as a service delivery report card on education and health care. However, instead of using citizens' perceptions to assess performance, the Indicators assemble objective and quantitative information from a survey of frontline service delivery units, using modules from the Public Expenditure Tracking Survey (PETS), Quantitative Service Delivery Survey (QSDS), and Staff Absence Survey (SAS).

The literature points to the importance of the functioning of schools and more generally, the quality of service delivery. The service delivery literature is, however, clear that, conditional on providers being appropriately skilled and exerting the necessary effort, increased resource flows for health can indeed have beneficial education outcomes.

The SDI initiative is a partnership of the World Bank, the African Economic Research Consortium (AERC), and the African Development Bank to develop and institutionalize the collection of a set of indicators that would gauge the quality of service delivery within and across countries and over time. The ultimate goal is to sharply increase accountability for service delivery across Africa, by offering important advocacy tools for citizens, governments, and donors alike; to work toward the end goal of achieving rapid improvements in the responsiveness and effectiveness of service delivery.

More information on the SDI survey instruments and data, and more generally on the SDI initiative can be found at: www.SDIndicators.org and www.worldbank.org/sdi, or by contacting sdi@worldbank.org.

II. METHODOLOGY AND IMPLEMENTATION

A. Implementation

The SDI survey interviewed 403 heath providers across Tanzania between May 2014 and July 2014. 2,093 workers were observed for absenteeism and 563 health workers were assessed with clinical cases. Public and private (for- and non-profit) providers have been visited as well as providers at different levels of services such as health posts, health centers, and district or first-level hospitals. The data collected are also representative of Dar es Salaam, other urban areas, and rural areas strata.

B. Sampling

The overall objective of the SDI is to produce accurate and representative indicators at the national, urban and rural levels. In some countries, like Tanzania, it may be required that the indicators be representative at a sub-national level e.g. region or province. The main units of analysis are facilities (schools and health centers) as well as providers (teachers and health workers). For the health survey, the SDI also aims to produce accurate information on providers at varying levels in the pyramid i.e. health posts, health centers, and the first-level hospitals as well as ownership status e.g. public versus private.

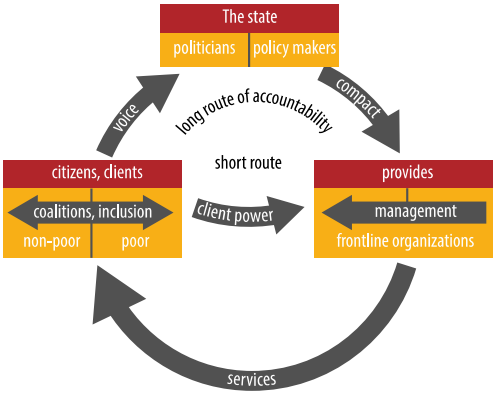
The sampling frame, the Tanzania health SDI used, was the 2012 list of health facilities obtained from the services of the Ministry of Health and Social Welfare (MoHSW) before the start of the fieldwork. The original sample frame contained 7,472 health facilities with geographic identifier variables such as region, the division, the ward and even the street. This sample frame was merged with the list of wards from the most recent 2012 census to obtain the size of the population a specific facility is serving which will be later used as a weight for selecting facilities. The sample frame was then purged of 899 facilities, which were not functional because they were either closed, or under construction. A further 91 facilities were deleted from the frame because they were not eligible for the SDI i.e. regional hospitals, dental clinics, specialized clinics, etc. Two more facilities were suppressed because they served prison's population. This process left us with a final sample frame of 6,480 health facilities.

A multi-stage clustered sampling strategy is adopted for the 2014 Tanzania SDI. The first stage cluster selection is carried out independently within each explicit stratum. The primary cluster considered is the district which is therefore the primary sampling unit (PSU). At the second stage health facilities will be selected and at the third stage providers (teachers or health workers) and standard 4 pupils in the case of education. It was decided than within each stratum, except Dar es Salaam, 25 districts would be chosen with probability proportional to size (population). Note that this implies that this stage each person in each stratum has an equal probability that her district will be selected.

Box 3. Analytical underpinnings

Service delivery outcomes are determined by the relationships of accountability between policymakers, service providers and citizens.[a] Human development outcomes are the result of the interaction between various actors in the multi-step service delivery system, and depend on the characteristics and behavior of individuals and households. The delivery of quality healthcare is contingent foremost on what happens in health facilities, where a combination of several basic elements have to be present in order for quality services to be accessible and produced at the frontline. This in turn depends on the overall service delivery system, and these institutions and governance structures provide incentives for the service providers to perform.

Figure 1. Relationships of accountability: citizens, service providers and policymakers



Source: a. World Development Report, 2004.

Service Delivery Production Function

Consider a service delivery production function, f, which maps physical inputs, x, the effort put in by the service provider, e, as well as his/her type (or knowledge), θ, to deliver quality services into individual level outcomes, *y*. The effort variable, *e,* could be thought of as multidimensional and, thus, include effort (broadly defined) of other actors in the service delivery system. We can think of this type as the characteristic (knowledge) of the individuals who are selected for a specific task. Of course, as noted above, outcomes of this production process are not just affected by the service delivery unit, but also by the actions and behaviors of households, which we denote by ε. We can therefore write:

$$y = f(x,e,\theta) + \varepsilon$$

To assess the quality of services provided, one should ideally measure $f(x,e,\theta)$. Of course, it is notoriously difficult to measure all the arguments that enter the production, and would involve a huge data collection effort. A more feasible approach is, therefore, to focus instead on proxies of the arguments which, to a first-order approximation, have the largest effects.

Indicator Categories and the Selection Criteria

There are a host of data sets available in education. To a large extent, these data sets measure inputs and outcomes/outputs in the service delivery process, mostly from a household perspective. While providing a wealth of information, existing data sources (like Living Standards Measurement Survey (LSMS), Welfare Monitoring Surveys (WMS), and Core Welfare Indicators Questionnaire Survey (CWIQ)) cover only a sub-sample of countries and are, in many cases, outdated.

Notes: a. World Development Report, 2004.

Box 3. Analytical Underpinnings (cont'd)

The proposed choice of indicators takes its starting point from the recent literature on the economics of service delivery. Overall, this literature stresses the importance of provider behavior and competence in the delivery of health and education services (as opposed to water and sanitation services and housing that rely on very different service delivery models). Conditional on service providers exerting effort, there is also some evidence that the provision of physical resources and infrastructure has important effects on the quality of service delivery.

The somewhat weak relationship between resources and outcomes documented in the literature has been associated with deficiencies in the incentive structure of health systems. Indeed, most service delivery systems in developing countries present frontline providers with a set of incentives that negate the impact of pure resource-based policies. Therefore, while resources alone appear to have a limited impact on the quality of education and health in developing countries, it is possible inputs are complementary to changes in incentives, so coupling improvements in both may have large and significant impacts (Hanushek, 2006). While budgets have not kept up with the expansion in access in recent times, simply increasing the level of resources might not address the quality deficit in education and health without also taking providers' incentives into account.

SDI proposes three sets of indicators: (i) provider effort; (ii) competence of service providers and (iii) availability of key infrastructure and inputs at the frontline service provider level. Providing countries with detailed and comparable data on these important dimensions of service delivery is one of the main innovations of the Service Delivery Indicators. Additional considerations in the selection of indicators are (i) quantitative (to avoid problems of perception biases that limit both cross-country and longitudinal comparisons), (ii) ordinal in nature (to allow within and cross-country comparisons); (iii) robust (in the sense that the methodology used to construct the indicators can be verified and replicated); (iv) actionable; and (v) cost effective to collect.

Table 3. Health SDI indicators

Provider Effort
Absence rate
Caseload per provider
Provider Competence
Diagnostic accuracy
Adherence to clinical guidelines
Management of maternal and neonatal complications
Availability of Inputs
Drug availability
Medical equipment availability
Infrastructure availability

Notes: a. The indicators listed here are not the only metrics collected in SDI surveys. For example, below are some example of management and governance data included the instrument. Examples: Roles and Responsibilities in Facilities, Government Supervision, Time Use, Leadership, People Management Practices, User Fees, Financial (cash) support to facilities by source, Community Involvement etc.

Table 4. Survey sample

	Total	Share of total sample (Unweighted, %)	Share of total population (Weighted, %)
Facilities	**403**	**100**	**100**
Health posts	272	67.5	82.9
Health centers	84	20.8	11.6
Hospitals (district or first-level)	47	11.7	5.5
Ownership			
Public	269	66.7	75.1
Private (for profit and non-profit)	134	33.3	24.9
Location			
Dar es Salaam	85	21.1	9.1
Other Urban	95	23.6	24.9
Rural	223	55.3	66.0
Within Public Sector	*269*	*66.7*	*75.1*
Urban public	82	30.5	22.0
Rural public	187	69.5	78.0
Healthcare workers	**5,267**	**100**	**100**
Doctors	430	8.2	11.0
Clinical officers	999	19.0	18.1
Nurses	2,989	56.7	54.7
Paraprofessionals	849	16.1	16.2

Table 5. Sample for indicators of absence and competence

Cadre	Absence rate[a]			Competence indicators[b]		
	Total	Percent[c] (%)	Percent[d] (%)	Total	Percent[c] (%)	Percent[d] (%)
Doctors	121	5.8	11.2	94	16.7	32.7
Clinical Officers	465	21.2	21.2	339	60.2	46.5
Nurses	1,204	57.5	51.2	130	23.1	20.8
Para-Professionals	303	14.5	16.4	–	–	–
Total	2,093	100	100	563	100	100

Source: Author's calculations using Tanzania 2014 SDI data

Notes: a. Absence rate is calculated using all health workers (i.e. whether clinician or not, e.g. pharmacist, laboratory technician).

b. The competence indicators (e.g. diagnostic accuracy, adherence to clinical guidelines and management of maternal and neonatal complications) are measured using only those health workers who interact with patients or users). Note also that the provider must be present during the first visit to be interviewed for competence.

c. Unweighted share i.e. share of the sample

d. Weighted share i.e. share of population

III. RESULTS

C. Delivering Health Services

The number of days health facilities offer services and the number of hours per day they operate are amongst the most basic indicators for measuring health service delivery. In Tanzania, health facilities were open on average 6.1 days per week (Table 6). Health posts where 80 percent of health providers work were open 6.0 days per week. Health centers and first-level (district and council) hospitals[8] were open 6.9 days a week. Public health posts were open least often at 5.8 days per week compared to private health posts which were open 6.6 days per week. Hospitals were open close to seven days a week. Facilities were open for 13.1 hours per day. Rural public health posts had the shortest hours of operations at 9.8 hours per day. Health centers were open 19.6 hours per day compared to 23.1 hours at hospitals.

Table 6. Hours and days of service delivery

	Tanzania	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Percent difference (%)**	**Rural Public**	**Urban Public**	**Percent difference (%)**
				Number of days per week facility was open (days)				
All facilities	6.1	6.0	6.3	6.9	9.4***	5.9	6.3	6.1
Health posts	6.0	5.8	6.2	6.8	10.4***	5.8	5.9	0.8
Health centers	6.9	6.9	6.4	6.8	-2.1	6.9	6.9	0.8
First-level Hospitals	6.9	6.9	7.0	7	1.8	–	6.9	–
				Hours outpatient consultations offered per day (hours)				
All facilities	13.1	11.7	14.8	20.4	47.7***	10.6	15.7	48.1***
Health posts	11.6	10.2	12.6	20.7	56.8***	9.8	12.2	24.2***
Health centers	19.6	19.8	20.0	17.9	4.7	19.5	20.1	2.9
First-level Hospitals	23.1	23.0	24.0	21.9	0.5	-	23.0	-

Source: Author's calculations using Tanzania 2014 SDI data

Note: Level of significance: *** p<0.01, ** p<0.05, * p<0.1. The percent difference is between public and "all" private.

Tanzania is facing a severe human resources for health (HRH) shortage. According to Tanzania's Health Sector Strategy Paper 2009-2015 (HSSP III), human resources for health are a priority to improving accessibility and quality of health services.[9] Table 7 shows the distribution of health workers across ownership and location. Facilities on average were staffed with 13.1 health workers.[10] Urban facilities had more staff (24.5 providers) compared to rural facilities (6.0 providers). Public facilities had fewer staff members than their private counterparts.

[8] Throughout this report district and council hospitals are referred to as First-level hospitalfirst-level hospitals.

[9] "White, James; O'Hanlon, Barbara; Chee, Grace; Malangalila, Emmanuel; Kimambo, Adeline; Coarasa, Jorge; Callahan, Sean; Levey, Ilana Ron; McKeon, Kim. 2013. *Private health sector assessment in Tanzania*. Washington DC : World Bank. http://documents.worldbank.org/curated/en/2013/09/18273242/private-health-sector-assessment-tanzania

[10] Administrative or other support personnel are not included.

Over half (54.7 percent) of health workers are nurses. Although Dar es Salaam comprises 10 percent of Tanzania's population it is home to 44.7 percent of its doctors.[11,12] On the other hand, rural areas are home to 70 percent of the population and 85 percent of the poor.[13] However, only 28.0 percent of the country's health workforce is found in rural areas, and only 9.1 percent of doctors. These distributions are likely to reinforce service delivery and income inequalities.

Table 7. Distribution of health cadre by ownership and location

	Tanzania	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other Urban**
All health staff (#)	13.1	11.7	16.8	17.7	6.0	24.5	24.6	24.4
Doctors (%)	11.0	68.1	13.5	18.4	9.1	45.5	44.7	46.2
Clinical officers (%)	18.1	72.5	15.7	11.8	34.6	32.7	18.3	47.1
Nurses (%)	54.7	66.1	19.6	14.3	31.7	34.2	15.7	52.6
Para-professionals and others (%)	16.2	59.5	20.8	19.6	21.1	39.5	15.7	63.2
Total	100.0	66.4	18.4	15.1	28.0	72.0	19.4	52.6

Source: Author's calculations using Tanzania 2014 SDI data

In high-fertility rate countries such as Tanzania, the provision of accessible and quality obstetric care (basic and comprehensive) is critical for the health system. Access to a health care facility has sharply improved in recent years with more people being within 2 hours of a health facility. Moreover, 3 out of 4 (74.8 percent) facilities offered basic obstetric care. All the first-level hospitals provided these services, compared to 85 percent of Health centers, and 72 percent of health posts. It is mainly in Dar es Salaam that the fewest health posts (26 percent) offered these services.

Although women give birth in most facilities, 8.1 percent of those health facilities offer BEmOC (

[11] 2012 Tanzania Census

[12] Notwithstanding that the SDI does not include higher level hospitals which themselves are concentrated in Dar es Salaam and are the facilities that have the highest number of doctors.

[13] See 2015 Tanzania Poverty Assessment

Table 8). Only 2.7 percent of health posts offered BEmOC compared to 18.5 percent at Health centers and 48.6 percent at first-level hospitals.

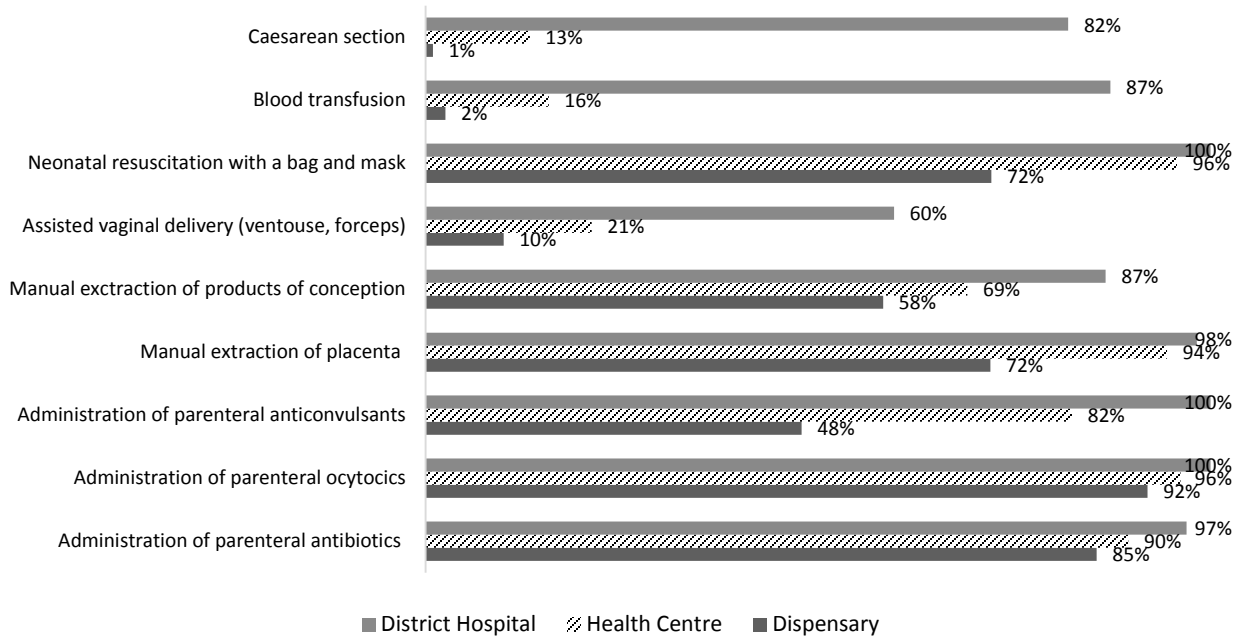
Figure 2 shows the components of a BEmOC and CEmOC package (which in addition comprises caesarean sections and blood transfusions). The administration of parenteral anticonvulsants and assisted vaginal delivery were the main constraints to improving overall BEmOC provision. Only 48 percent of the health posts and 82 percent of health centers had the capacity to administer parenteral anticonvulsants. Assisted vaginal deliveries were offered at 21 percent of health centers and 10 percent of health posts.

Table 8. Availability of basic and comprehensive emergency obstetric care

% facilities	Tanzania	Rural	Urban	Percent difference (%)[a]	Rural Public	Urban Public	Percent difference (%)a
Share of facilities offering full basic emergency obstetric care (%)							
All facilities	8.1	4.4	20.1	358.1***	3.9	14.0	260
Health posts	2.7	2.6	3.4	24.3	2.9	4.6	62.2
Health centers	18.5	14.8	21.8	32.0	14.4	14.7	1.9
First-level hospitals	48.6	53.4	47.7	12.1	–	36.9	–
Share of facilities offering full comprehensive emergency obstetric care (%)							
First-level hospitals[b]	48.6	53.4	47.7	12.1	–	36.9	–

Source: Author's calculations using Tanzania 2014 SDI data
Notes: a. Level of significance: *** p<0.01, ** p<0.05, * p<0.1.
b. In many countries CEmOC is only supposed to be offered at hospital level.

Figure 2. Availability of elements that comprise BEmOC and CEmOC



D. Caseload

Methodological Note

The caseload indicator is defined as the number of outpatient visits (recorded in outpatient records) in the three months prior to the survey, divided by the number of days the facility was open during the 3-month period and the number of health workers who conduct patient consultations (i.e. paramedical health staff such as laboratory technicians or pharmacists assistants are excluded from the denominator). In hospitals, the caseload indicator was measured using out-patient consultation records; only providers doing out-patient consultations were included in the denominator. The term caseload rather than workload is used to acknowledge the fact that the full workload of a health provider includes work that is not captured in the numerator, notably administrative work and other non-clinical activities. From the perspective of a patient or a parent coming to a health facility, caseload—while not the only measure of workload—is arguably a critically important measure.

Caseload is usually of concern because a shortage of health workers may cause caseload to rise and potentially compromise service quality. The average caseload in Tanzania was fairly low at 7.3 patients per provider per day (Table 9). Private for-profit facilities had the highest daily caseload at 10.8 patients per provider per day. The outpatient caseload decreased by facility type with first-level hospitals seeing 3.8 patients per provider per day compared to health posts (7.7 patients per provider per day). Urban health posts (Dar es Salaam and other urban areas) were busiest, seeing 11.5 patients per provider per day. In the public sector, first-level urban hospitals had the lowest caseload (3.4 patients per provider per day) while urban health posts had the highest caseload (11.5 patients).

Large urban facilities (11 or more staff) had very low caseload levels with fewer than 5 patients a day. Medium-sized facilities (6 to 10 staff), comprising primarily health posts, had the highest caseload (10.2 patients per day).

Table 9. Outpatient caseload

Outpatient visits per provider per day	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other Urban**	**Rural Public**	**Urban Public**
All facilities	7.3	7.1	5.7	10.8	6.4	9.5	10.6	8.3	6.9	7.8
Health posts	7.7	7.3	5.7	12.9	6.4	11.5	12.3	10.6	6.8	10.4
Health centers	6.1	5.9	7.8	5.7	7.6	5.8	7.0	4.5	7.7	3.8
First-level Hospitals	3.8	3.4	4.0	4.2	3.0	4.5	5.9	3.1	.	3.4

Source: Author's calculations using Tanzania 2014 SDI data

Figure 3. Distribution of caseload

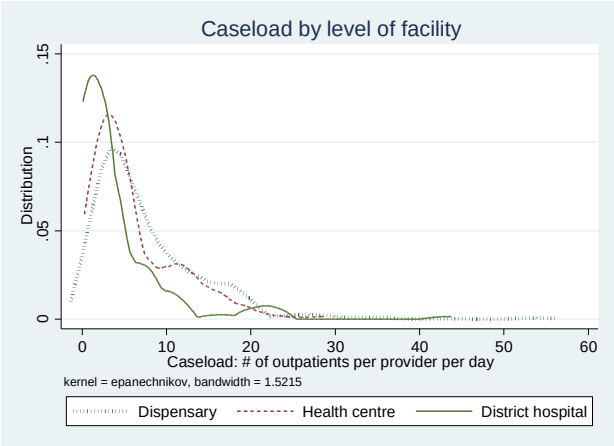
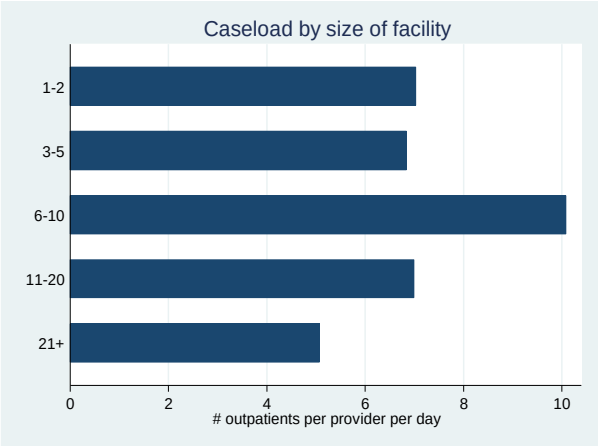


Figure 4. Caseload by Health center size



E. Absence Rate

Methodological Note

The average rate of absence at a facility is measured by assessing the presence of at most ten randomly selected clinical health staff at a facility during an unannounced visit. Only workers who are supposed to be on duty are considered in the denominator. The approach of using unannounced visits is regarded best practice in the service delivery literature. Health workers doing fieldwork (mainly community and public health workers) were counted as present. The absence indicator was not estimated for hospitals because of the complex off-duty arrangements, interdepartmental shifts etc.

The absence rate in Tanzania's health sector was fairly low with 14.3 percent absent during an unannounced visit (Table 10). This is an improvement from the 2010 pilot SDI survey, where the absence rate was 21 percent. The absence rate was significantly higher in Dar es Salaam than rural and other urban areas where 20.7 percent of health providers were absent. Absence is particularly high in Dar es Salaam's Health centers (22.3 percent) and hospitals (25.0 percent).

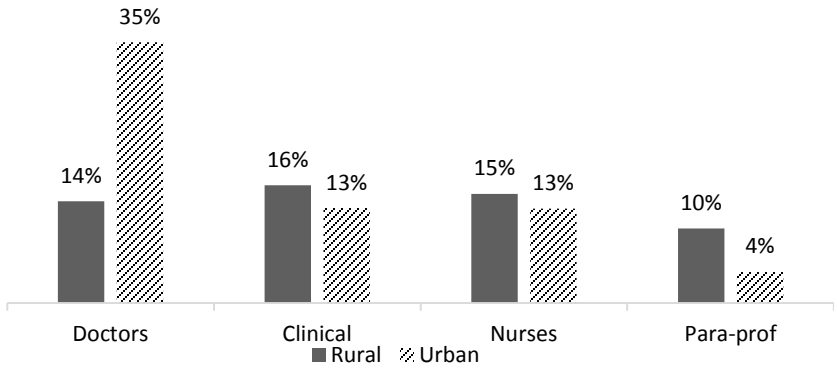
Doctors had higher absence rates (32.6 percent) compared to other cadre. (Figure 5) Doctors were also more likely to be absent, as confirmed in a multivariate analysis in Table C 5 (Annex C). Clinical officers and nurses were equally likely to be absent, but they were also more likely to be absent than para-professionals. Figure 5 shows than urban doctors are significantly more likely to be absent than doctors in rural areas. This is possibly explained by opportunities for "moonlighting" or other income generating activities. A consistent result in the regression is also that very small facilities with 1 or 2 health workers had a much lower absence rate. Finally, providers in private for-profit facilities were significantly less likely to be absent. In terms of health providers' characteristics, age is mildly negatively correlated with absence.

Table 10. Absence rate by cadre and facility type

	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
All facilities	14.3	13.9	17.0	12.6	14.4	16.4	20.7	12.0	15.1	13.4
				Facility type						
Health posts	13.7	15.6	11.4	7.7	14.9	11.4	9.1	13.7	15.1	17.2
Health centers	14.3	16.0	6.1	8.3	15.1	17.2	22.3	12.0	15.2	16.3
First-level Hospital	14.8	11.5	21.8	17.7	12.5	18.2	25.0	11.4	.	11.5
				Cadre						
Doctors	32.6	33.0	44.0	20.7	13.7	35.0	44.2	25.3	29.9	33.1
Clinical officers	13.8	12.5	23.1	8.8	15.8	12.7	10.1	13.8	15.8	10.7
Nurses	13.4	13.6	11.6	14.4	14.7	12.7	14.7	12.1	15.8	12.3
Para-professionals	5.4	5.4	8.1	0.9	10.0	4.1	4.8	4.0	6.9	5.0

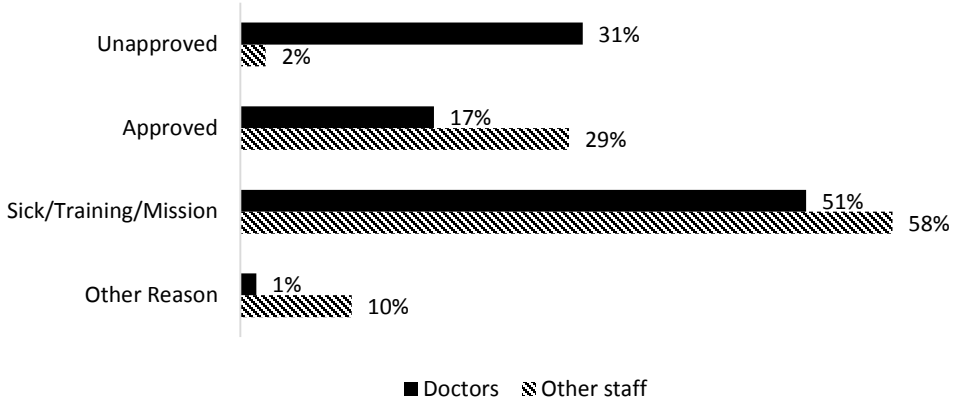
Source: Author's calculations using Tanzania 2014 SDI data

Figure 5. Absence rate by cadre type



In any workplace setting, absence may be sanctioned or not sanctioned. From a consumer's perspective, however, these providers are not available to deliver services—whether sanctioned or not. The survey found that over 90 percent of absence was approved (Figure 6). Doctors are three times more likely to be absent without approval (31 percent) compared to other staff (2 percent). Better organization and management of HRH can potentially improve the availability of staff for service delivery.

Figure 6. Reasons for absence



F. 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 clinical cases. Clinical 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 SDI 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).

Providers correctly diagnosed 60.2 percent of the tracer conditions.[14] Urban providers (66.0 percent) as a whole significantly outperformed their rural counterparts (66.0 percent versus 50.0

[14] Figure C 2to Figure C 8 in Appendix C show the history taking and examination questions asked.

percent of tracer conditions). Clinical officers correctly diagnosed more of the tracer conditions (67.0 percent) than doctors (64.4 percent), while nurses diagnosed only 37.3 percent of tracer conditions. Private-for-profit providers performed worse (54.2 percent) than providers in both the public (59.9 percent) and nonprofit sectors (65.9 percent). Doctors in rural facilities (85.4 percent) and doctors in private (non-profit) facilities (83.3 percent) had the highest diagnostic accuracy. Nurses in private (not-profit) facilities had the lowest diagnostic accuracy rate (21.9 percent).

Table 11. Diagnostic accuracy by cadre

% clinical cases	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other Urban**	**Rural Public**	**Urban Public**
All	60.2	59.9	65.9	54.2	50.0	66.0	53.9	70.6	43.9	69.7
					Cadre					
Doctors	64.4	60.1	83.3	58.7	85.4	60.3	52.3	65.7	66.8	59.7
Clinical officers	67.0	69.7	64.3	51.9	55.5	72.5	58.3	76.6	52.2	78.1
Nurses	37.3	38.4	21.9	40.2	33.6	45.8	28.6	48.9	34.7	48.3
					Facilities					
Health posts	45.4	43.7	50.2	51.1	43.6	49.8	49.4	49.9	42.8	47.9
Health centers	64.7	65.8	65.5	56.6	50.9	68.8	66.5	69.4	51.6	71.1
First-level hospitals	70.7	73.0	74.1	55.6	76.5	69.8	52.4	76.5		73.0

Table 12 shows that 22.3 percent of providers correctly diagnosed all five tracer conditions while 38.6 percent could correctly diagnose at most two of the cases. Clinical officers correctly diagnosed 30.7 percent of the cases compared to doctors (19.9 percent of tracer conditions).

The diagnostic accuracy rate varied across case conditions, ranging from 39 percent accuracy for acute diarrhea with severe dehydration to 92 percent for pulmonary tuberculosis (Source: Author's calculations using Tanzania 2014 SDI data

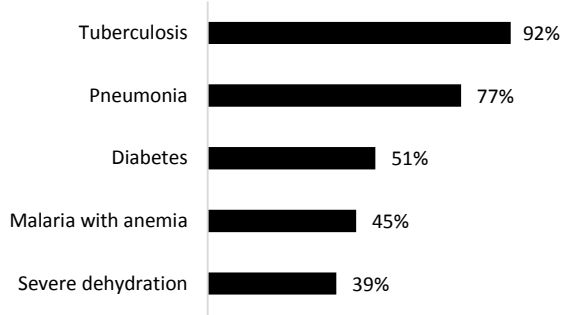
Figure 7). Almost half of the providers could not diagnose diabetes. While the majority of providers could correctly diagnose malaria on its own (88.7 percent), 45 percent of providers were unable to diagnose malaria with anemia.

Table 12. Number of cases correctly diagnosed

# cases	All	Doctors	Clinical officers	Nurses
All cases	22.3	19.9	30.7	2.8
4 cases	16.6	23.4	18.0	5.0
3 cases	22.5	32.1	18.9	21.1
2 cases	19.9	9.6	21.6	27.0
1 case	15.6	13.7	9.3	34.5
No case	3.1	1.4	1.5	9.6

Source: Author's calculations using Tanzania 2014 SDI data

Figure 7. Diagnostic accuracy by clinical case



G. 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 haemorrhage 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) and the Tanzania's Standard Treatment Guidelines for the tracer conditions.

Tanzanian health providers adhered to 43.8 percent of the clinical guidelines in the management of the five tracer conditions (Table 13). Doctors adhered to more of the clinical guidelines (49.1 percent) followed by clinical officers (45.7 percent) and nurses (32.8 percent)

The lowest adherence is found among nurses in rural public (28.7 percent of guideline) and nonprofit facilities (29.3 percent of guidelines). In contrast, doctors in rural and private nonprofit facilities had the highest adherence to guidelines (58.6 percent of guidelines).

Table 13. Adherence to clinical guidelines by cadre type

% clinical cases	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other Urban**	**Rural Public**	**Urban Public**
All	43.8	43.7	45.5	42.1	37.7	47.2	45.3	48.0	34.1	49.6
					Cadre					
Doctors	49.1	48.8	58.6	42.4	58.6	47.2	46.0	48.0	43.4	49.1
Clinical officers	45.7	47.3	41.8	41.4	40.3	48.3	45.6	49.0	39.1	51.2
Nurses	32.8	32.4	29.3	43.2	29.0	41.4	37.6	42.1	28.7	42.3
					Facilities					
Health posts	35.2	33.9	38.4	39.9	33.8	38.5	38.5	38.5	33.5	35.6
Health centers	47.7	46.7	57.5	46.7	37.6	50.7	55.5	49.3	38.0	50.0
First-level hospitals	49.5	51.9	47.4	42.2	54.5	48.7	45.2	50.0	–	51.9
# Cadres	563	372	103	88	268	295	131	164	215	157

Source: Author's calculations using Tanzania 2014 SDI data

The survey assessed the availability of Standard Treatment Guidelines (STG) in facilities. As shown in Table 14, 60.7 percent of the facilities had STG on the premises. STGs were less likely to be available in health posts (57.1 percent) compared to health centers (71.7 percent) and first-level hospitals (92.7 percent). Public facilities were less likely to be available STGs (57.0 percent) comparable to private facilities (72.0 percent). Even when available, 72 percent of the STGs were outdated.

Table 14: Availability of Standard Treatment Guidelines

% facilities	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other Urban**	**Rural Public**	**Urban Public**
All	60.7	57.0	72.0	71.3	53.3	71.5	64.0	78.9	51.3	77.2
Health posts	57.1	53.0	66.6	76.0	51.2	68.4	59.5	77.2	49.8	69.9
Health centers	71.7	77.0	83.5	32.7	69.6	68.4	54.5	77.2	69.0	85.9
First-level Hospitals	92.7	93.7	95.0	88.0	100	91.8	93.1	90.5	.	93.7
# Facilities	402	267	72	63	222	180	84	96	186	81

Source: Author's calculations using Tanzania 2014 SDI data

IMCI general danger signs and referral for sick children

According to the ICMI 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. [15]. Overall, less than half of the four danger signs were identified across the three child clinical cases Doctors and clinical officers performed better than nurses, with the clinical officers performing marginally better than the doctors with regard to fever. Figure 9 shows that for the pneumonia case, 37 percent of the providers did not identify a single danger sign.

Figure 8 Average number of danger signs identified by vignette

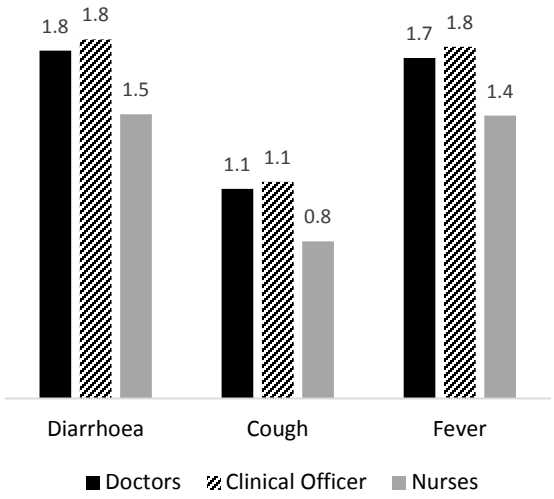
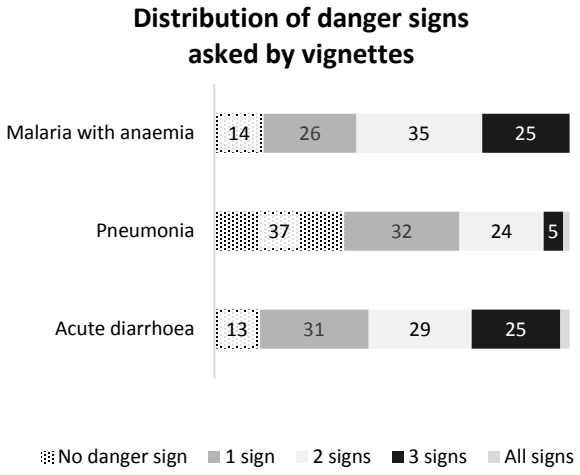


Figure 9 Distribution of each danger sign identified by vignette



[15] 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

Table 15 (see also Table C 9) shows for each tracer condition the share of providers by cadre and facility level who said they would refer the patient. The prevalence of referral dropped with the level of facility for each condition. Referral rates were highest at health posts for post partum hemorrhage (70.3 percent). In the case of diabetes, 36.3 percent of cases at first-level hospitals were referred. Referral rates decline by cadre level, with doctors referring less than clinical officers and nurses, except in the case of acute diarrhea. According to the IMCI guidelines an urgent referral is required whenever a danger sign is detected. [16]Referral is least likely in the case of acute diarrhea. In this case, even when a child exhibited a danger sign and suffered severe dehydration, only 7.5 percent of the providers at health posts recommended referral. Attention needs to be paid to identifying all danger signs, and referring cases when appropriate.

[16] JSI, Rapid Referral Assessment report

Table 15: Referral rates and diagnostic accuracy by cadre and facility level by clinical case[17]

% clinical cases	Acute Diarrhea	Pneumonia	Diabetes	Pulmonary TB	Malaria with anemia	PPH
	5.0	2.9	41.5	30.6	2.2	41.9
			Cadre			
Doctors	9.1	1.2	41.2	15.5	0.2	11.4
Clinical Officer	3.9	2.0	41.6	29.8	2.6	49.4
Nurses	3.0	7.2	41.7	49.7	3.4	56.6
			Facilities			
Health posts	7.5	6.6	47.7	62.0	5.3	70.3
Health centers	0.5	2.2	42.0	19.0	0.6	50.8
First-level Hospital	4.3	0.2	36.3	8.8	0.2	15.7

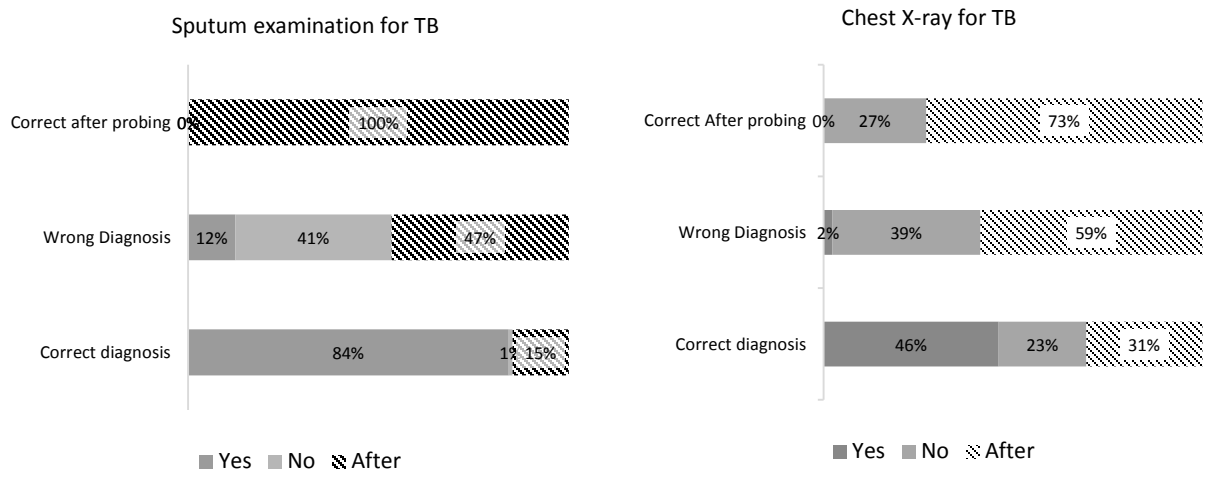
Source: Author's calculations using Tanzania 2014 SDI data

What would providers do differently without input constraints?

Following implementation of the first SDI surveys, it was recognized that providers are constrained by the inputs at their disposal (e.g lack of resuscitation bag). In round 2 after the administration of each vignette, the provider was asked what they would do differently under ideal circumstances when diagnosing and treating a patient.

Figure 10 illustrates the impact that input constraints can have in the case of pulmonary tuberculosis. Two important laboratory examinations recommend are sputum examination and a chest X-ray, which is usually done in case of a smear negative TB test or at the end of outpatient treatment. All the providers who correctly diagnosed TB requested a sputum examination, and 73 percent requested a chest X-ray. For those who still did not get the correct diagnosis 47 percent would have requested a sputum examination and 59 percent a chest X-ray. Even among those who correctly diagnosed the condition from the start 15 percent of providers said they would do a sputum examination and twice as many would ask for the X-ray. This result suggests that providers face technical constraints that hamper their ability to reach the correct diagnosis. However, very few providers arrived at the right diagnosis (true for all 5 clinical cases), even after probing.

Figure 10. Technical constraints and successful diagnosis: the case of Pulmonary TB



[17] Referral is not an option for neonatal asphyxia because it would be fatal for the newborn and it has thus not been included.

H. 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 30.4 percent of the clinical guidelines for managing maternal and neonatal complications (Table 16). Doctors adhered to a larger share of guidelines (35.7 percent of guidelines) compared to clinical officers (30.3 percent) and nurses (24.8 percent).

Table 16. Management of maternal and neonatal complications by cadre

% clinical cases	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other Urban**	**Rural Public**	**Urban Public**
All	30.4	31.3	30.1	26.4	25.7	33.1	29.3	34.6	24.1	35.7
					Cadre					
Doctors	35.7	36.6	39.0	31.5	43.3	34.2	33.0	35.1	51.1	35.9
Clinical officers	30.3	32.6	28.0	18.1	24.9	32.9	26.6	34.8	24.4	36.5
Nurses	24.8	24.8	16.1	35.3	22.0	31.0	22.0	32.6	22.6	30.8
					Facilities					
Health posts	22.6	22.9	25.4	17.7	23.1	21.6	21.4	21.7	23.1	21.7
Health centers	34.1	33.9	36.5	33.3	30.8	35.1	36.1	34.8	31.2	35.0
First-level hospitals	35.6	38.2	31.6	30.0	34.1	35.8	30.2	38.0	–	38.2

Source: Author's calculations using Tanzania 2014 SDI data

I. 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.

On average, 60.3 percent of priority drugs were available in Tanzanian facilities (Table 16). Urban facilities had a higher availability of priority drugs (69.4 percent) compared to rural facilities (56.2 percent). Facilities in Dar es Salaam had the highest availability of all priority drugs (71.9 percent). Neither priority drugs for children nor mothers were widely available with average scores of 58.8 percent and 49.1 percent respectively. Less than a tenth of facilities (8.4 percent) had all 14 tracer

drugs available. Virtually no rural public facility (1.2 percent) had all the tracer drugs on stock and unexpired.

Table 17. Availability of priority drugs by facility type

% drugs	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
All priority drugs	60.3	58.9	66.0	62.8	56.2	68.0	71.9	66.8	55.3	71.6
Priority drugs for Mothers	49.1	45.7	55.6	63.4	44.3	58.7	61.9	57.4	42.3	57.7
Priority drugs for children	58.8	57.1	65.7	61.3	53.6	68.8	69.5	68.6	52.5	73.2
14 tracer drugs	59.9	53.2	76.3	84.1	51.8	75.4	80.6	73.6	49.3	67.0
Have all tracers (% facility)	8.4	3.2	16.9	31.7	2.4	19.7	35.1	14.3	1.2	10.4

Source: Author's calculations using Tanzania 2014 SDI data

J. Availability of Vaccines Related Equipment and Supplies

Table 18 shows that vaccines were available in 80.1 percent of Tanzanian facilities. There was little variation in vaccine availability across facility level, location, or ownership. Figure 11 shows the availability of individual vaccines, and Figure 12 shows the availability of vaccine-related equipment and supplies. Virtually all the facilities that store vaccines had a refrigerator in working condition. A third of the refrigerators were powered by with electricity whereas the remaining two thirds were gas refrigerators. There was near universal availability of all necessary material and equipment for vaccination such as vaccine packs, vaccines carriers, sharps containers, and safe syringes (Figure 12)

Individual vaccines were almost always available with the exception of Hepatitis B and DPT-HiB+HepB. While Hepatitis B receives little attention a number of studies[18] show that Hepatitis is an increasingly important health issue in Tanzania, particularly given its 5.1 percent HIV co-infection rate.

Table 18. Availability of vaccines by facility type

% facilities	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
All	80.1	80.1	80.3	81.4	79	83.8	85	82.5	78.7	85.1
Health posts	79.4	79.4	79	79.3	78.4	83.6	83.8	83.3	78.2	86.5
Health centers	82.1	82.9	81.4	67.9	85.1	79.6	80	79.2	84.3	81.4
First-level Hospital	86.6	86.6	84.9	88.8	85.6	87.9	90.8	85	.	86.6
# Facilities	346	257	55	34	209	147	61	76	180	77

Source: Author's calculations using Tanzania 2014 SDI data

[18] Franzeck, F. C. et al. (2013). "Viral Hepatitis and Rapid Diagnostic Test Based Screening for HBsAg in HIV-infected Patients in Rural Tanzania.". *PLoS ONE* 8(3) http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0058468. See also Muro, F. J., et al. (2013) "Seroprevalence of Hepatitis B and C Viruses Among Children in Kilimanjaro Region, Tanzania" *Journal of the Pediatric Infectious Diseases Society"* http://jpids.oxfordjournals.org/content/early/2013/04/12/jpids.pit018 See also Rashid, S. (2011) "Hepatitis b virus infection among antenatal clinic attendees at the Muhimbili national hospital, seroprevalence and associated factors".

Figure 11. Availability of individual vaccines by facility type

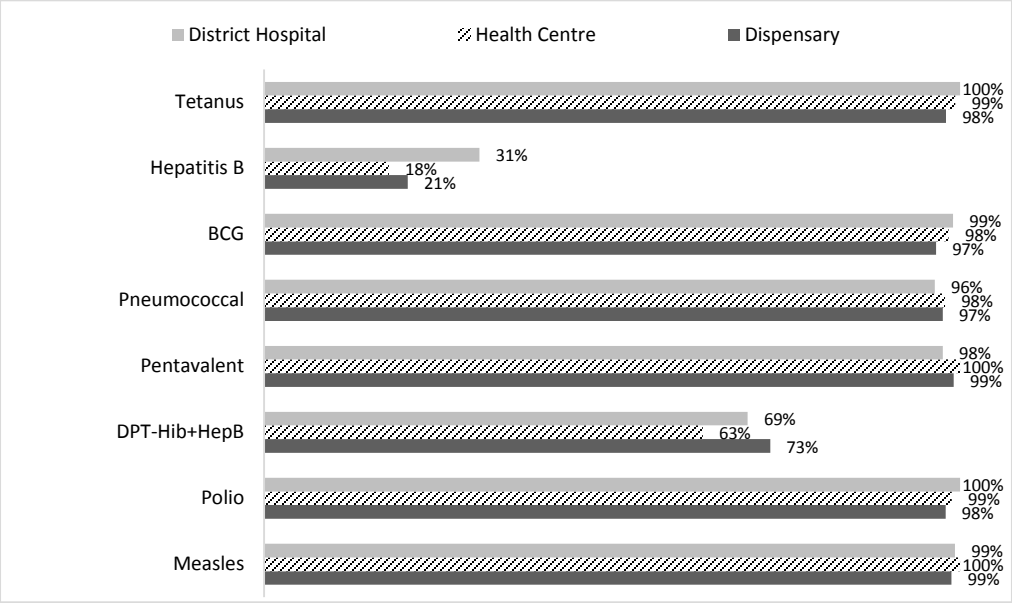


Figure 12. Availability of equipment and vaccines-related supplies by facility type

Vaccine storage conditions

Methodological Note
The main indicator to assess vaccines storage conditions is the temperature of the refrigerators. In order to independently and consistently measure fridges' temperature, each team was provided with a thermometer. The enumerator asked the permission to put the thermometer in the refrigerator where vaccines are stored during the time of the survey. At the end of the survey, after anywhere between 3 to 6 hours, the enumerator returned to note the temperature.

Vaccines need optimal storage conditions in order to maintain their potency and it is thus important to evaluate the storage conditions of vaccines across the country. This issue seems legitimate when ones is faced with the following quote:

> "In spite of the very high levels of measles vaccination coverage, outbreaks and isolated cases and deaths continue to be reported through the Integrated Disease Surveillance Reporting System (IDSR). In 2012, 2690 cases were reported and 22 deaths. In 2011, nearly 5000 cases were reported and 46 deaths"[19]

Only 38.6 percent refrigerators with vaccines had a temperature within the recommended 2 to 8 degrees Celsius (Table 19). Private-for-profit facilities had the lowest rate of compliance. Only 16.9 percent of refrigerators were compliant with the regulations. Interestingly, health posts were more likely to comply than higher-level Health centers and first-level hospitals. Enumerators were also asked to check for any signs of temperature monitoring in the facility, and for almost 10 percent of the refrigerators, they found no such sign. This finding is consistent with, a recent study (Makuru, 2012),[20] of the cold chain in the Coast region also found that 40 percent of facilities were not compliant with the temperature range.

Table 19: Vaccines storage - Refrigerators with temperature between 2°C and 8°C

% facilities	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other Urban**	**Rural Public**	**Urban Public**
All	38.6	39.2	42.7	16.9	40.0	33.8	31.2	36.4	40.5	34.3
Health posts	42.2	42.8	41.2	29.5	41.2	33.8	33.5	50.9	41.8	48.6
Health centers	23.8	23.5	33.4	0.0	27.7	34.2	52.8	15.5	28.0	18.5
First-level Hospital	24.3	11.2	54.8	5.4	40.4	19.6	15.5	23.7	–	11.2
# Facilities	324	240	51	33	196	128	58	70	167	73

Source: Author's calculations using Tanzania 2014 SDI data

K. 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. In addition, it is expected that the following pieces of equipment be available at health centers and hospitals: sterilizing equipment and a refrigerator.

The survey found that 83.5 percent of health facilities in Tanzania met the minimum medical equipment requirements (

Table 20). Private nonprofit facilities had better availability of equipment (92.5 percent) compared to public facilities (81.7 percent). First-level hospitals typically had the best availability of equipment, while private for profit health centers had the lowest (24.9 percent).

[19] Midterm analytical review of performance of the Health Sector Strategic Plan III 2009–2015.
[20] Makuru, M. (2012). "Assessment of vaccines distribution system in public healthcare facilities in coast region, Tanzania". Master Dissertation Muhimbili University of Health and Allied Sciences.

Table 20. Availability of basic equipment by facility type, ownership and location

% facilities	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
All Facilities	83.5	81.7	92.5	84.5		87.6	84.7	90.4	79.8	88.5
Health posts	83.4	80.4	91.9	95.1		92.4	89.7	95.0	78.8	89.3
Health centers	78.0	86.4	87.2	24.9		61.5	52.2	70.8	92.0	80.2
First-level hospital	97.4	100	100	89.4		94.9	89.7	100	–	100
# Facilities	403	269	72	62	227	176	85	95	187	82

Source: Author's calculations using Tanzania 2014 SDI data

Table 21 shows the availability of specific types of medical equipment in Tanzanian facilities. Over 90 percent of facilities had a scale, thermometer, stethoscope, sphygmomanometer, and refrigerator. Sterilization equipment, however, was available in 85.5 percent of facilities. .

Table 21. Availability of equipment items in the equipment indicator

% facilities	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
Any scale	97.9	97.8	98.1	98.6	98.0	97.6	97.1	98.0	98.2	96.3
Thermometer	91.5	89.0	98.1	99.8	87.1	99.9	99.8	100	86.0	100
Stethoscope	97.8	97.4	98.1	100	96.6	100	100	100	96.7	100
Sphygmomanometer	95.3	94.9	95.7	97.3	94.0	96.8	94.8	98.8	94.2	97.1
Refrigerator (HCs and first-level hospitals only)	99.0	98.8	100	100	99.6	98.3	99.4	97.1	99.5	96.5
Sterilization (HCs and first-level hospitals only)	85.5	81.6	97.3	96	83.6	90.4	93.4	87.4	82.5	78.7

Source: Author's calculations using Tanzania 2014 SDI data

Table 22 shows the availability of other supplies. The survey found that availability of bag and a mask for resuscitation as well as an instrument to clear upper airways for neonates were not as widespread as they should be. Only 42.1 percent of the rural public facilities where women give birth had an instrument to clear the upper airways of a newborn, and 1 out of 3 do not have a bag and mask for neonate resuscitation. Female condoms had the highest prevalence in Dar es Salaam where 25.3 percent facilities had them in stock. Male condoms were not as available as expected, with them being available in 72.7 percent of facilities. Test kits for tuberculosis and glucometers for potential diabetes patients were only available in 19.5 percent and 38.1 percent of the facilities respectively. Instruments for child growth monitoring – a tape measure and a length board- were also missing in many Tanzanian health facilities.

Table 22: Availability of selected medical supplies

% facilities	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
Bag and mask[a]	57.8	62.3	54.9	32	59.7	51.2	44.5	57.8	60.0	70.4
Clear airways	45.8	47.1	50.8	31	43.4	48.7	45.2	52.1	42.1	64.9
Female condoms	14.1	15.8	7.4	11	13.2	19.0	25.3	12.6	14.3	20.9
Malaria RDT	81.4	82.1	81.3	77	80.8	84.1	87.6	80.6	81.3	85.0
HIV kit test	84.0	86.2	80.7	74	84.2	81.7	77.4	86.0	85.0	90.1
Glucometer	38.1	25.7	62.6	90	21.5	71.8	76.1	67.5	18.4	51.7
TB kit test	19.5	17.1	26.9	26	11.4	33.9	31.7	36.1	10.4	40.8
ITN	42.0	39.8	58.4	36	40.7	47.1	52.2	41.9	37.6	47.5
Tape measure	78.6	82.6	80.9	50	77.6	79.7	77.8	81.6	78.6	96.8
Length board	46.0	46.3	51.5	37	45.6	47.7	49.7	45.7	44.5	52.9

Source: Author's calculations using Tanzania 2014 SDI data

Communications equipment

Table 23 shows the availability of communications equipment (radio, phone, computer) in Tanzanian health facilities. The study found that only 36.3 percent of health facilities had at least one of the three forms of communication equipment.[21] Private for-profit facilities were twice more likely than both public (31 percent) and private nonprofit (36.9 percent) to have any communication instrument. Rural public facilities were the least likely to have any communications equipment (23.2 percent) while nearly all first-level hospitals had some form of communications equipment. .

Table 23. Communication equipment availability

% facilities	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
All Facilities	36.3	31.0	36.9	71	23.3	61.2	60.6	61.7	23.2	58.7
Health posts	27.5	24.1	20.9	62	20.5	45.6	45.8	45.4	21.7	37.0
Health centers	69.6	64.3	76.9	92	42.5	91.2	94.1	88.2	42	89.1
First-level hospital	100	100	100	100	100	100	100	100	.	100
# Facilities	404	269	72	63	223	181	85	96	187	82

Source: Author's calculations using Tanzania 2014 SDI data

The availability of specific types of communication equipment was also assessed (Table 24). Personal cell phones were the most widely available piece of equipment, followed by cell phones paid by the facility and computers. Short-wave radios and landline phones were almost non-existent except in urban settings. There was a large gap in the availability of computers in rural and urban facilities. Only 9.4 percent of rural facilities had computers compared to 43 percent of urban facilities. Access to internet, however, was more limited with only 6.5 percent of the facilities with that capacity. Public facilities were about 6 times less likely to have access to internet (3.2 percent) than their private for-profit counterparts (19.8 percent).

[21] Note that phone cellular phones, the indicator only accepts cell phone which belongs to the facility itself or a personal cell phone but the facility supports the cost of its calls. Cell phones which belong to a staff of the facility, paid for by the staff of the facility but used also by the facility are not included in computing the indicator.

Table 24. Access to various forms of communication

% facilities	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
Communication	36.3	31.0	36.9	71	23.3	61	60.6	61.7	23.2	58.7
Communication+	82.9	83.1	72.7	95	79.2	89	86.3	91.4	81.9	87.0
Land line	8.5	5.6	12.1	24	0.7	23	22.6	23.8	0.0	25.4
Cellular Phone[1]	26.3	22.0	27.0	54	18.2	45	51.4	38.4	18.1	35.6
Cellular Phone[2]	65.1	66.0	53.7	73	64.9	60	49.3	71.3	67.0	62.5
Computer	20.4	14.8	25.0	52.6	9.4	43	44.7	40.4	8.2	38.1
Shortwave Radio	2.4	2.5	2.3	1.6	1.5	5	6.9	3.1	1.6	5.9

Source: Author's calculations using Tanzania 2014 SDI data
Note: 1 cell phone costs are paid for by the facility. 2 personal cell phone and costs are paid for by staff

Ambulance services

An effective referral system requires the availability of ambulance services. This need not be ownership of a dedicated emergency vehicle, but rather that the facility has access to an emergency vehicle. Although ownership of an ambulance is low (14 percent), more than half (53.2 percent) of health facilities had access to a vehicle to transport their patients. While few health posts (4.2 percent) own an ambulance, ownership of an ambulance was much higher than expected for Health centers (55.4 percent) and first-level hospitals (74.8 percent).

L. 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, tubewell/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).

Half (50 percent) of the health facilities had access to all three types of basic infrastructure (Table 25). There was a large difference, however, between the private sector (66.9 percent for nonprofit and 91.2 percent for-profit) and the public sector (40.6 percent). The infrastructure indicator steadily improved with the level of the facility, from 44 percent in health posts to 75.3 percent in health centers and 86.9 percent in first-level hospitals.

Table 25. Availability of infrastructure by facility type

% facilities	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
All Facilities	50.0	73.9	36.0	40.6	66.9	91.2	33.5	65.8	50.0	50

Dispensary	44.0	63.4	34.3	34.7	60.6	93.7	32.1	48.5	44.0	44.0
Health center	75.3	93.0	51.5	68.9	86.5	100.0	49.5	90.4	75.3	75.3
First-level hospital	86.9	95.5	66.7	98.0	88.7	65.5	.	98.0	86.9	86.9
# Facilities	404	96	223	269	72	63	187	82	404	404

Source: Author's calculations using Tanzania 2014 SDI data

Table 26 shows the availability of specific types of infrastructure in Tanzanian health facilities. 88.8 percent of facilities had access to toilets, 70.0 percent had access to clean water and 66.7 percent had access to electricity. [22] The public sector lagged behind the private sector for all three types of infrastructure. The gap was mostly driven by the rural public sector which itself was far behind the urban public sector.

Table 26. Availability of specific types of infrastructure

% facilities	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other Urban**	**Rural Public**	**Urban Public**
Infrastructure Indicator	50.0	40.6	66.9	91.2	36.0	79.2	84.5	73.9	33.5	65.8
Clean water	70.0	61.1	90.6	99.1	60.5	89.3	91.8	86.8	56.2	81.3
Toilet	88.8	61.7	96.1	97.6	85.4	96.1	97.4	94.7	84.3	92.7
Electricity	66.7	86.2	75.5	93.6	57.9	86.1	91.2	81.0	56.8	76.1

M. Waste Management

Health care waste is a product of health care activities and a potential source of infection if not disposed properly. In order to protect the public health from hazardous waste either directly or through vectors, health care waste must be destroyed or isolated from people, animals and disease vectors. This serves to avoid the recycling of pathogens in the community (WHO, 2005, p. 15). In 2003, through a collaboration between the government of Tanzania and the World Bank, a situation analysis was done on health care waste management (HCMW) practices in Tanzania (Ministry of Health and Social Welfare Tanzania, 2009, p. 7). Several gaps were identified and a national action plan developed to address these gaps and improve health care waste management. Using questionnaire and observation methods, the survey narrowed its scope to assessment of final disposal of medical waste and sharps, presence of guidelines and history of training in health care waste management.

Acceptable waste disposal.[23]

Almost 3-in-4 (72.3 percent) facilities carried out safe health care waste disposal (Table 27). These findings are much more optimistic than those found in the 2012 SARA report that found 11 percent of facilities had safe final disposal of sharps. However, only 28 percent of facilities were observed to have guidelines on health care waste management and 28 percent had training. Of these 28 percent just under half (48 percent) had both the guidelines and history of training.

[22] Note that access to solar power is an important contributor especially in rural areas where half of the facilities which have access to electricity get it from a solar source.

[23] Protected ground/pit/incineration. These include incinerator burning, protected dumping and covered storage for off-site disposal. The actual safety of the method is debatable even if though it is accepted. The pits may have access to the water table and therefore potentially unsafe (WHO, 2005, p. 17). Burning of waste using a 1-chamber brick incinerator still have the risk of hazardous gases especially as their temperatures are not high enough to achieve complete combustion. Open burning, dumping on flat/unprotected ground are considered environmentally unacceptable and are discouraged (WHO, 2005, p. 41) (WHO, 1999, p. 120).

Table 27. Total proportion of facilities carrying out safe health care waste disposal

% facilities	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other Urban**	**Rural Public**	**Urban Public**
All Facilities	72.3	77.4	63.6	48.8	78.2	62.8	66.5	59.0	78.9	72.4
Dispensary	73.5	78.2	68.8	43.6	79.5	59.6	63.4	55.8	79.8	69.7
Health center	62.7	68.6	45.9	46.3	67.9	62.1	66.8	57.3	67.5	69.8
First-level hospital	73.4	88.9	46.7	83.3	45.0	79.5	80.6	78.3	.	88.9
# Facilities	404	269	72	63	223	181	85	96	187	82

Source: Author's calculations using Tanzania 2014 SDI data

N. Health Financing

The objective of this section is to analyze the financing of frontline health providers by level type, location, and other important dimensions. Providers' resources (financial and non-financial) originate from 3 broad sources i) households through user fees i.e. facilities charge patients for the services they provide, ii) direct transfers from government sources, and iii) transfers from non-government entities such as private donors. The survey collected financial information from the head of facility or the staff designated as the most knowledgeable when it comes to finances. To have a complete picture of providers' resources, it was decided to collect information on a full fiscal year and for that reason most of this section focuses on year 2012/13 unless explicitly stated.

Table 28 presents evidence on the receipt of financial resources from a variety of sources. Only 16.8 percent of facilities reported that they received financial resources. The three most common sources of financial resources were user fees (40 percent), the Community Health Fund (CHF) (33.2 percent), and the National Health Insurance Fund (NHIF) (27.5 percent). The NHIF is a mandatory health insurance scheme for civil servants. All government facilities are automatically accredited as NHIF providers, while individual contracts are signed with private providers. It reimburses its service providers on a fee-for-service basis for a standard list of services. The CHF is an insurance scheme targeted to rural residents whereas it's counterpart "Tiba kwa Kadi" (TIKA), is targeted to urbanites.[24] Only 7.3 percent of health providers received direct financial support from the central government and even fewer (4.5 percent) received any such support from their local government. First-level hospitals were more likely to receive finances from the central government (46.9 percent) than health centers (8.8 percent, or health posts (4.5 percent).

Table 28. Facilities that received financial resources from different sources

% facilities	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
Local Government	4.5	5.6	0.0	2.3	8.3	4.2	4.2	4.2	4.8	8.6
NHIF[a]	27.5	28.4	30.8	17.4	71.3	31.7	22.7	40.7	24.4	42.4
CHF[b]	33.2	41.4	13.6	3.1	27.5	32.0	34.0	30.0	42.9	36.2
TIKA[c]	4.2	5.0	0.0	4.1	13.5	8.7	2.0	15.3	1.6	17.2
MSD	1.9	2.3	0.0	1.3	3.1	5.8	0.5	11.0	1.8	4.0
User Fees (not drugs)	40.0	33.0	49.4	74.3	60.4	41.9	37.7	46.1	30.7	41.4
Donor Projects	5.0	5.0	6.2	4.1	22.8	8.4	2.6	14.1	4.2	7.6
NGOs	2.3	1.1	3.4	8.6	25.9	2.9	0.2	5.6	0.3	3.9
Any other source	42.2	44.9	37.2	30.2	58.4	36.5	42.8	30.1	47.7	35.0
Total	16.8	17.4	15.0	14.8	33.8		15.1	20.6	16.4	21.2

Source: Author's calculations using Tanzania 2014 SDI data

Table 29 shows receipt of in-kind resources. 4.5 percent of the facilities acknowledge receipts of resources from any source. Rural facilities were more likely to receive in-kind resources (8.3 percent) aid than urban ones (4.2 percent). A third of health posts (33.2 percent) received in-kind resources followed by health centers (4.2 percent) and first-level hospitals (1.9 percent). The analysis of

[24] For more information on these insurance schemes see "Private health sector assessment in Tanzania" World Bank (2013)

providers response show that majority of in-kind resources is in the form of medicines. Most of it comes from the MSD as 80 percent of the in-kind receipts in each quarter are from a governmental source.

Table 29: Facilities that received in-kind resources from any source in 2012/13

% facilities	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other Urban**	**Rural Public**	**Urban Public**
All Facilities	4.5	5.6	0	2.3	8.3	4.2	4.2	4.2	4.8	8.6
Dispensary	33.2	41.4	14	3.1	27.5	32.0	34.0	30.0	42.9	36.2
Health center	4.2	5.0	0	4.1	13.5	8.7	2.0	15.3	1.6	17.2
First-level hospital	1.9	2.3	0	1.3	3.1	5.8	0.5	11.0	1.8	4.0

Source: Author's calculations using Tanzania 2014 SDI data.

User Fees Policy and Practice

Nearly all facilities charger user fees for care (95.4 percent of facilities) (Table 30). Health posts (96.4 percent) and hospitals (100 percent) tended to charge user fees more than Health centers (86.6 percent) While overall, 95.4 percent of public sector facilities charged user fees, the share was higher in urban areas.

Table 30: Share of facilities that charge users for care

% facilities	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other Urban**	**Rural Public**	**Urban Public**
All Facilities	95.4	95.4	95.2	93	100	97.7	92.0	93.8	90.2	98.7
Dispensary	96.4	96.4	96.8	91	100	97.5	92.9	91.3	94.4	98.6
Health center	86.6	86.6	81.8	100	100	100	86.0	100	71.9	100
First-level hospital	100	100	100	100	100	100	100	100	100	.
# Facilities	402	402	267	72	63	222	180	84	96	186

Source: Author's calculations using Tanzania 2014 SDI data

It is considered good practice for facilities to post the prices of their services in a manner it is accessible to all patients they serve. In Tanzania, 38.6 percent of the facilities visibly display user fees in a place all can see (Table C12, Annex C). Only 19.2 percent of private for-profit health posts post their prices. In the public sector, rural facilities were less likely to post their prices compared to their urban counterparts.

Although almost all facilities charge fees, many facilities provide exemptions to a number of categories of patients (Table 31). For instance, 73.9 percent of facilities said that they exempted patients with chronic diseases from paying fees. It is not, however, entirely clear whether the facility has a specific group like HIV patients in mind or whether it is a blanket policy for all chronic diseases.

Pregnant women, children under-five, elderly and very poor people (although it is not clear how it is defined or which criteria the facilities use) were also beneficiaries of a generous exemption policy.[25]

Table 31: Exemption of user fees for specific groups

% facilities	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
Chronic disease	73.9	90.1	39.3	12.0	64.7	72.3	75.2	69.3	89.5	92.7
Elderly	74.8	90.1	44.8	13.0	71.6	73.7	75.3	72.1	89.0	94.5
Very poor	46.9	53.5	34.1	20.3	63.1	47.7	45.4	50.0	53.3	54.3
Facility staff	19.2	16.8	34.6	17.0	10.3	19.9	19.8	19.9	18	11.5
Staff Relatives	15.9	16.2	24.0	4.4	5.3	14.2	17.3	11.0	17.3	11.7
Civil servants	5	6	3	1	4	4	5	3	6	3
Board mbrs	3.5	3.5	5.6	1.2	1.5	3.5	3.7	3.3	4.1	0.9
Politicians	3.8	4.6	2.1	0.6	1.9	3.6	3.9	3.3	5.4	1.1
Under 5s	75.3	93.2	31.9	13.1	73.8	73.4	76.0	70.8	92.4	96.4
Pregnant Wmn	78	91	36	42	77	76	79	72	90	95
Est. exempt (mil. TZS)	2.7	2.7	3.7	1.7	10.7	2.9	2.1	3.7	2.5	3.5

Source: Author's calculations using Tanzania 2014 SDI data

O. Governance in Health Service Delivery

Governance in Finance

The SDI survey also looked at financial planning, financial management instruments and reporting. The survey found that only 35.7 percent of facilities in Tanzania had a work plan for the current fiscal Year (Table 32) and only 19.2 percent had an annual implementation plan (AIP) and quarterly implementation plan (QIP) (Table 33). Of the facilities that produced an annual implementation plan, 1 out of 4 (24.3 percent) did not submit it for approval, 57.5 percent submitted it to the Council Health Management Team (CHMT), 17.1 percent to the regional secretariat, and 1 percent submitted straight to the MoHSW. Roughly 1 out 8 (12.3 percent) of the facilities that submitted their AIP/QIP received a formal written approval from the MoSHW or HD.

Table 32: Facilities that had a work plan for the current fiscal year

% facilities	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
All Facilities	35.7	39.3	29.9	19.7	34.9	36.7	35.1	38.3	34.5	56.3
Dispensary	31.5	35.8	22.4	10.0	33.6	25.7	25.1	26.2	33.8	46.3
Health center	48.4	49.4	33.4	56.7	42.0	55.1	58.2	52.0	42.1	57.5
First-level hospital	73.5	98.0	70.9	35.4	79.0	69.4	61.6	77.1	.	98.0
# Facilities	402	267	72	63	222	180	84	96	186	81

Source: Author's calculations using Tanzania 2014 SDI data

[25] This is in large part confirmed by the Tanzania National Panel Survey where roughly 60 percent of under-fives' caretakers who visited a government facility for care claimed to have received free treatment vs 20 percent for non-profit facilities, and 10 percent for private ones.

Table 33: Facilities that had an annual/quarterly implementation plan (AIP/QIP)

% facilities	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
All Facilities	19.2	20.5	18.6	10.9	17.8	21.7	21.4	21.9	16.7	34.0
Dispensary	14.6	16.6	11.2	3.5	16.5	11.5	15.7	7.2	16.4	17.5
Health center	26.3	30.2	3.6	26.2	20.3	19.7	2.7	36.7	20.7	40.7
First-level hospital	73.7	94.5	73.7	38.3	94.1	67.9	63.2	72.5	.	94.5
# Facilities	402	267	72	63	222	180	84	96	186	81

Source: Author's calculations using Tanzania 2014 SDI data

Table 34: Receipt of financial management instruments by public providers

% facilities	Dispensary	Health center	First-level hospital	Rural	Urban	Total
Receipt books	90	97	98	91	91	91
Payment vouchers	27	64	55	27	49	32
Cash books	28	49	71	30	40	32

Source: Author's calculations using Tanzania 2014 SDI data

Only 45.6 percent of the facilities could show that they submitted their financial report for the previous quarter (Table 35). An additional 23.2 percent of the facilities claimed to have submitted the report but could not produce evidence before the enumerators. Of those who reported not to have submitted their report, the main reasons for failure of doing so were 1) the report was not ready (53 percent), and 2) bank reconciliation was not done (21 percent).

Table 35: Facilities that submitted a financial report for previous quarter

% facilities	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
All Facilities	45.6	50.6	46.1	11.4	46.8	38.4	28.3	48.5	46.5	65.1
Dispensary	42.8	47.2	41.7	10.3	44.8	35.3	29.9	40.7	44.8	60.4
Health center	64	75	62	13	69	46	23	69	68	82
First-level hospital	47.6	55.9	60.2	16.5	61.7	39.3	25.1	53.5	.	55.9
# Facilities	402	267	72	63	222	180	84	96	186	81

Source: Author's calculations using Tanzania 2014 SDI data
Notes: Only facilities with proof of having submitted the financial report are considered in these results.

Accountability and information sharing with the community:

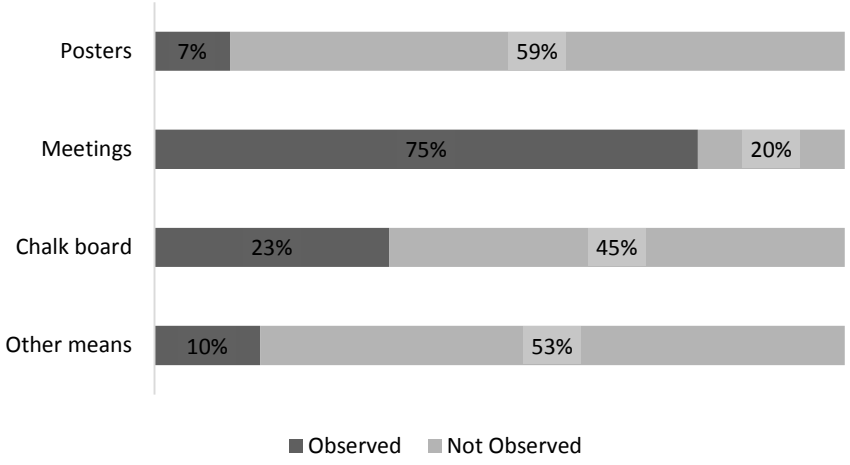
A third of facilities (32.9 percent) in Tanzania shared financial information with the community (Table 36). The difference is greatest between the public (41. 6 percent) and private sectors (9.8 percent nonprofit and 4.5 percent for profit). Rural facilities tended to share financial information with the community more than urban facilities (41.1 percent compared to 17.1 percent, respectively). Three quarters of facilities (75 percent) communicated financial information through meetings (Figure 13).

Table 36: Facilities that share financial information with community

% facilities	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
All Facilities	32.9	41.6	9.8	4.5	41.1	17.1	16.6	17.6	44	31.4
Dispensary	33.3	41.8	8.9	0.0	40.1	17.3	20.9	13.6	43.2	34.2
Health center	32.8	39.4	0.0	26.2	54.2	11.5	2.7	20.2	58.5	18.2
First-level hospital	27.2	42.5	23.0	6.8	31.2	21.3	8.3	34.2	.	42.5
# Facilities	402	267	72	63	222	180	84	96	186	81

Source: Author's calculations using Tanzania 2014 SDI data

Figure 13: Means by which facilities communicate with their community



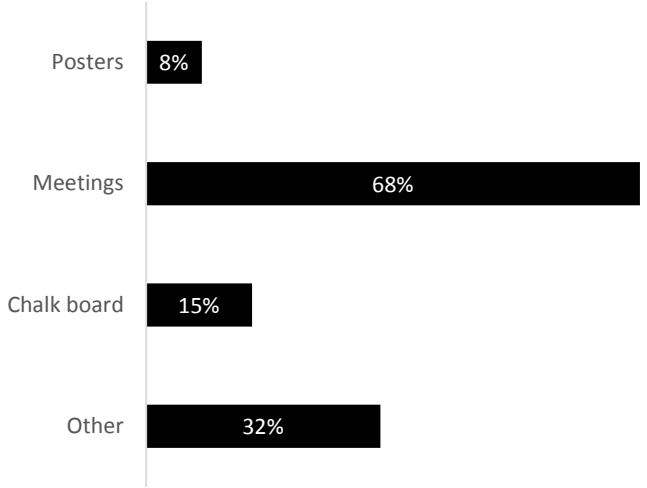
The display of essential medicines and health supplies (EMHS) was generally very low. Only 39.3 percent of facilities displayed this information (Table 37). Rural facilities however do much better than all the urban, the best performing being the Health centers (64.5 percent). Private facilities do not share delivery information, as they do their own procurement. Figure 14 shows that 68 percent of facilities shared information of essential medicines through meetings.

Table 37: Facilities that share EMHS delivery information with community

% facilities	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
All Facilities	39.3	50.9	9.3	0.0	50.7	16.4	13.9	18.9	55.5	34.8
Dispensary	42.2	53.5	7.9	0.0	50.0	19.9	15.5	24.3	54.5	47.7
Health center	33.3	43.5	9.5	0.0	64.5	12.4	15.0	9.7	66.5	17.7
First-level hospital	9.5	8.6	17.7	0.0	25.3	6.2	5.5	6.8	.	8.6
# Facilities	402	267	72	63	222	180	84	96	186	81

Source: Author's calculations using Tanzania 2014 SDI data

Figure 14: Means by which facilities communicate with their community on EMHS



Supervision:

Technical supervision is a key factor in human resource appraisal and an important part of accountability for both the provider and the supervising body. This survey addressed supervision by the health management and EMHS teams. Three quarters of facilities (76.5 percent) received a supervision visit from the CHMT/ Regional Health Management Team (RHMT) in 2012/2013 (Table 38). Supervision was highest at first-level hospitals (89.4 percent), followed by Health centers (85.4 percent) and health posts (74.4 percent). It is interesting to note that Dar es Salaam and rural facilities had similar supervision rates. Facilities also received supervision on EMHS. 91.1 percent of facilities received this kind of supervision in 2012/2013 (Source: Author's calculations using Tanzania 2014 SDI data

Table 39). These figures show facilities that received at least one visit in the FY 2012/2013. About half (51 percent) of these facilities had at least one visit each quarter, and 81 percent had at least 2 visits in a year.

Table 38: Facilities that received supervision visit from CHMT/RHMT in 2012/2013

% facilities	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other Urban**	**Rural Public**	**Urban Public**
All Facilities	76.5	77.5	67.9	80.4	71.5	82.1	73.5	90.6	72.7	94.4
Dispensary	74.4	74.8	65.9	82.1	70.4	80.3	70.1	90.5	71.6	92.0
Health center	85.4	91.8	69.1	65.5	85.5	83.3	80.2	86.4	86.4	97.9
First-level hospital	89.4	98.8	79.0	87.6	68.3	90.6	83.2	98.0	.	98.8
# Facilities	402	267	72	63	222	180	84	96	186	81

Source: Author's calculations using Tanzania 2014 SDI data

Table 39: Facilities that received supervision on EMHS in 2012/2013

% facilities	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other Urban**	**Rural Public**	**Urban Public**
All Facilities	91.1	93.3	82.7	87.7	92.7	87.0	84.6	89.4	94.1	90.3
Dispensary	90.7	92.7	82.0	86.8	92.3	85.0	81.3	88.6	93.6	87.7
Health center	90.9	96.3	68.9	81.7	97.4	86.9	88.0	85.8	100	92.1
First-level hospital	98.3	98.3	97.0	100	93.9	98.7	97.3	100	.	98.3
# Facilities	402	267	72	63	222	180	84	96	186	81

Source: Author's calculations using Tanzania 2014 SDI data

Presence and activity of Health Facility Governing Committees.

Most facilities (79.9 percent) reported that they had a health facility governing committee (Table 40). Of these 80 percent met quarterly, 10 percent biannually 7 percent met monthly while 4 percent met annually, and 72 percent of facilities showed evidence of minutes of meeting.

Table 40: Facilities with governing committees

% facilities	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other Urban**	**Rural Public**	**Urban Public**
All Facilities	79.9	89.8	70.2	26.4	87.2	63.8	59.2	68.3	89.6	90.7
Dispensary	77.2	88.6	62.3	9.6	86.3	52.1	48.4	55.7	88.7	87.9
Health center	92.5	96.4	100.0	65.3	100.0	85.9	84.0	87.8	100.0	92.3
First-level hospital	93.8	100	93.7	83.5	81.2	93.9	87.8	100	.	100
# Facilities	402	267	72	63	222	180	84	96	186	81

Source: Author's calculations using Tanzania 2014 SDI data

IV. WHAT DOES THIS MEAN FOR TANZANIA?

Progress has been made in Tanzania's health sector, however, more can be done to improve service delivery. Perception of quality at facilities is often a deciding factor in service utilization. Like many countries, Tanzania faces an inequitable geographic distribution of service quality. Quality and provider availability is often best in urban areas, particularly in Dar es Salaam. While Dar es Salaam is home to about 10 percent of the population, about 45 percent of the country's doctors are concentrated in Dar es Salaam.[26] The availability of medical equipment and diagnostic accuracy are also higher in urban areas than rural areas. Attention needs to be paid to improving the geographic availability of quality services.

Tanzania performs relatively well in the availability of medical equipment in facilities. Infrastructure and drug availability, however, are major challenges. Only half the facilities in Tanzania had the required components for infrastructure. Drug availability, particularly for mothers and children were also poor.

A major challenge for Tanzania's health sector is the shortage of skilled human resources for health (HRH). This survey found that provider knowledge and abilities were not adequate to deliver quality services. Caseload per provider and absenteeism are relatively low, so the issue is not over burdened providers. There seems to be ample room for a significant increase in the caseload of Tanzanian providers, i.e. the level of productivity in health service delivery, without jeopardizing quality. In addition to increasing the volume of skilled HRH to address the shortage of providers, improvements in management, supervision and training is important to improving service delivery. Health for all in Tanzania will mean the simultaneous availability of widely accessible inputs and skilled providers.

[26] World Bank. 2015. *Tanzania - Strengthening Primary Health Care for Results Program Project*. Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/2015/05/24481589/tanzania-strengthening-primary-health-care-results-program-project

V. ANNEXES

ANNEX A. SAMPLING STRATEGY

The overall objective of the SDI is to produce accurate and representative indicators at the national, urban and rural levels. In some countries, like Tanzania, it may be required that the indicators be representative at a sub-national level e.g. region or province. The main units of analysis are facilities (schools and Health centers) as well as providers (teachers and health workers). For the health survey, the SDI also aims to produce accurate information on providers at varying levels in the pyramid i.e. health posts, Health centers, and the First-level hospitals as well as ownership status e.g. public versus private.

A. Sampling Frame for the 2014 Tanzania SDI

The sampling frame, the Tanzania health SDI used, was the 2012 list of health facilities obtained from the services of the MoHSW before the start of the field work. The original sample frame contained 7,472 health facilities with geographic identifier variables such as region, the division, the ward and even the street. This sample frame was merged with the list of wards from the most recent 2012 census to obtain the size of the population a specific facility is serving which will be later used as a weight for selecting facilities. The sample frame was then purged of 899 facilities which were not functional because they were either closed or under construction. A further 91 facilities were deleted from the frame because they were not eligible for the SDI i.e. regional hospitals, dental clinics, specialized clinics, etc. Two more facilities were suppressed because they served prison's population. This process left us with a final sample frame of 6,480 health facilities.

With 995 (15 percent) of health facilities with missing information on ownership (i.e. public/private), the sample frame had an important challenge to offer. Because there was no way to determine the ownership status of those health facilities before going to the field, the facilities were left in the frame but categorized as unknown for ownership. During the data collection the head of facility was asked whether their facility's ownership status and the data collected. This new information will be used for post-stratification adjustment.

Although the SDI is usually representative at the national and urban and rural areas, in Tanzania it was requested that the survey be also representative of the traditional strata in household surveys which are (1) Dar es Salaam, (2) other urban areas, and (3) rural areas. Table B1 shows the overall sample frame with the number of administrative units such as councils, the number of standard 2 pupils (our final variable used for weights), and the total number of primary pupils within each stratum.

Table A1. 2012 Health Sample Frame by Stratum

	# Districts	# First-Level Hospitals	# Health Centers	# Health posts	Total # of Health Facilities
Dar es Salaam	3	37	30	545	612
Other Urban	26	115	234	1,204	1,553
Rural	98	82	341	3,892	4,315
Total	160	234	605	5,641	6,480

Source: Author's calculations using MoHSW 2012 list of health facilities database

The stratification variables provide the domains (strata) and reporting levels (the analysis tables will follow these levels) of the survey. The stratification also depends on the most important indicators to be measured in the survey (input availability, absence rates, and diagnostic accuracy). Finally, it is advisable to order the clusters within each stratum by variables that are correlated with key survey variables for further implicit stratification when systematic selection is used. The ownership of the facility is one such key variable.

A multi-stage clustered sampling strategy is adopted for the 2014 Tanzania SDI. The first stage cluster selection is carried out independently within each explicit stratum. The primary cluster considered is the district which is therefore the primary sampling unit (PSU). At the second stage health facilities will be selected and at the third stage providers (teachers or health workers) and standard 4 pupils[27] in the case of education. It was decided than within each stratum, except Dar es Salaam, 25 districts would be chosen with probability proportional to size (population). Note that this implies that this stage each person in each stratum has an equal probability that her district will be selected.

B. Sample Size and Sample allocation for the 2014 Tanzania SDI

The optimal sample size of any survey depends on the precision required for the main estimates and resource constraints. The precision of survey estimates depends on the sampling and non-sampling errors. Whereas the sampling error can be measured within a survey this is not the case for the non-sampling error. The sampling error is smaller the larger the sample but the non-sampling error grows with the size of the survey. It is thus highly advisable to carry out a survey of reasonable sample size that can be managed with effective quality controls to help contain the non-sampling error.

To estimate the precision of the estimate a previous similar survey or a survey measuring the same indicator is very useful. For Tanzania, a pilot 180-health facilities SDI survey was carried out in 2010. The pilot SDI collects almost identical data than the present survey therefore providing us with a very strong advantage for a good measure of design effect and standard errors as basis for the current survey sampling strategy. The design effect is critical for determining the optimal sample size. It is the ratio of the variance of an estimate based on the actual multi-stage sample design and the same variance if the sample was a simple random one of the same size. The design effect is a measure of the relative efficiency of the sample design.

[27] Note that the selection of teachers and standard 4 pupils is done once the enumerator is in the school premises. For the purpose of sampling schools, the number of standard 2 pupils will be used as the weight variable with the (reasonable) assumption that the ratio between standard 2 and standard 4 pupils is constant.

Table A2. Health workers' absence and performance: average, standard errors, and design effect SDI 2010

	Mean	Std. Err.	[95% Conf. Interval]		Design Effect	Sample Size (Facilities)	Sample Size (HWs)
Health worker absence							
Rural	0.228	0.029	0.166	0.291	2.398	134	498
Urban	0.332	0.034	0.261	0.403	1.767	40	327
Tanzania	0.271	0.027	0.213	0.328	3.107	174	825
Diagnostic accuracy							
Rural	0.526	0.031	0.461	0.592	2.72	134	167
Urban	0.682	0.037	0.604	0.759	2.71	40	57
Tanzania	0.570	0.031	0.506	0.635	3.82	174	224

Source: Author's calculations using 2010 SDI data

Error! Reference source not found. provides information on health workers' absence and performance as measured by diagnostic accuracy in the 2010 SDI which are estimated at 27.1 percent and 57.0 percent respectively. There was also a lot of variation across the urban and rural strata in the 2010 survey. The design effect for absence is around 3.3 and that for performance at 3.8 which indicates an average efficiency for sampling strategy (it is indeed not uncommon to have design effect above 3 for cluster sampling). The standard errors are however relatively large, especially for urban areas, as shown by the wide confidence intervals. The 2014 SDI aimed at a national standard error around 1.5 – 2.0 percent for absence and 2.0 – 2.5 percent for performance[28]. Using the 2010 SDI as our basis it is possible to estimate the necessary sample size, for any given standard error, using the following formula:

$$se_{SDI14}(\bar{a}) \cdot \sqrt{N_{SDI14}} \approx se_{SDI10}(\bar{a}) \cdot \sqrt{N_{SDI10}} \cdot \sqrt{DEFF_{SDI10}/DEFF_{SDI14}}$$

Because the design effect for the 2010 SDI is already at 3.0 for absence ant the current SDI plans to add Dar es Salaam as a stratum, it was decided to try and maintain the design effect around the same level i.e. the last item on the right hand side of the above equation is equal to 1. It is then easy to compute the necessary sample size given the objective of a standard error in the 1.5-2.0 range for absence. For that standard error the estimated sample size is between 318 and 527 health facilities. It was decided that 400 schools would strike the right balance between the budget and the desired precision with an expected standard error of 1.8 for absence and 2.1 for diagnostic accuracy.

After determining the sample size, it remains to decide on the sample allocation across strata. Because the number of strata in the 2014 SDI is larger than in the previous survey we did not use information from 2010 for allocating the 400 schools across the 3 strata. There are several allocation mechanisms possible for efficient sampling. For the Tanzania 2014 SDI an adjusted-proportional allocation is used whereby the share of schools in the stratum is similar to the share of population in the stratum compared to the overall population. Adjustments are then made if for instance in a given strata the number of facilities allocated is too small due to the small population in the stratum. The final sample allocation is given in Table A3.

[28] The expected standard error for performance is higher than for absence since it is expected that the sample size for health workers who are going to take the clinical cases will be much smaller precisely because of absence.

Table A3. 2012 Health Sample Frame by Stratum

	# Health Facilities	# First-level Hospitals	# Health centers	# of Health posts	Sample allocation
Dar es Salaam	612	10	15	60	85
Other Urban	1,553	13	25	80	118
Rural	4,315	17	40	140	197
Total	6,480	40	80	280	400

Source: Author's calculations using MoHSW 2012 list of health facilities database

C. Sampling Health Facilities and Health Workers

Now the total sample size and its allocation across strata have been decided, it remains to sample the actual health facilities that will be included in the final sample and within each facility the health workers to be followed for absence or selected for the knowledge test. This is done using a two-stage sampling method. First, in each stratum districts are drawn with probability proportional to size (PPS). Then the allocated number of health facilities are drawn using PPS again within the set of selected districts in the stratum. Once at a selected health facility, the enumerator will select health workers from the staff roster filled with the head of facility. The facilities were chosen using PPS, where size is the population served by the facility as provided by the 2012 census database. As for the selection of the cluster, the use of PPS implies that each individual within a stratum has an equal probability for her facility to be selected.

Finally within each health facility, up to 10 health workers are selected. There are 2 different procedures for measuring absenteeism or assessing knowledge. For absence, 10 health workers are selected in the staff roster using a random numbers table and the whereabouts of those health workers is ascertained in a return surprise visit. For the assessment, however, only health workers who actually see patients i.e. provide a diagnostic and treatment are eligible. These procedures imply that facilities across strata as well as health workers across strata and within facility (for assessment) do not all have the same probability of selection. It is therefore warranted to compute weights for reporting the survey results.

D. Weights for health facilities and providers

To be representative of the population of interest, sample estimates from the 2014 Tanzania SDI have to be properly weighted using a sampling weight, or expansion factor. Note that different weights will need to be applied depending on the relevant level for the variable which can be the facility or the staff. The basic weight for each entity is equal to the inverse of its probability of selection which is computed by multiplying the probabilities of selection at each sampling stage. All the weights have been computed and included in the dataset.

Table A4. 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 Section A: Facility First Visit Section B: Facility Second Visit	Administered to the in-charge or the most senior medical staff at the facility. Administered to (a maximum of) ten medical staff randomly selected from the list of all medical staff. Second visit is administered to the same ten medical staff as in module 4. An unannounced visit about a week after the initial survey to measure the absence rates.
Module 3: Clinical case Simulations Section B: Introduction Section C: Example Section D: Clinical case 1 Acute Diarrhoea + 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 + Anaemia Section I: Clinical case Patient 6 Post-partum haemorrhage Section J: Clinical case Patient 7 Neonatal Asphyxia Section K: Frequency of different types of consultations Section L: Management	Administered to medical staff in facility to assess clinical performance.
Module 4: Health Facility Financing Section A: Management Section B: Financial (Cash) Support Section C: Community Involvement	Administered to the in- charge or the most senior medical staff at the facility.

ANNEX B. DEFINITION OF INDICATORS

Table B 1. Indicator definition and method of calculation

Caseload per health provider	
Number of outpatient visits per clinician per day.	The number of outpatient visits recorded in outpatient records in the three months prior to the survey, divided by the number of days the facility was open during the three month period and the number of health professionals who conduct patient consultations (i.e. excluding cadre-types such as public health nurses and out-reach workers).
Absence rate	
Share of a maximum of 10 randomly selected providers absent from the facility during an unannounced visit.	Number of health professionals that are not off duty who are absent from the facility on an unannounced visit as a share of ten randomly sampled workers. Health professionals doing fieldwork (mainly community and public health professionals) were counted as present. The absence indicator was not estimated for hospitals because of the complex arrangements of off duty, interdepartmental shifts etc.
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 diarrhoea; (ii) pneumonia; (iii) diabetes mellitus; (iv) pulmonary tuberculosis; (v) malaria with anaemia. 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 taking 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 Nigeria National Clinical 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 case: (i) acute diarrhoea; (ii) pneumonia; (iii) diabetes mellitus; (iv) pulmonary tuberculosis; (v) malaria with anaemia. 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 case. 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	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), benzathinebenzylpenicillin powder (for injection), ampicillin powder (for injection), betamethasone or dexamethasone (injectable), gentamicin

the health facilities.	(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), artusunate (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, health posts./health posts 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, sphygmonometers and a weighing scale (adult or child or infant weighing scale) as defined below. Health centers and first-level hospitals 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. Sphygmonometer: Assign score of one if facility reports and enumerator confirms facility has one or more functioning sphygmonometers. 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).

Table B 2. Drugs identified in the SARA survey and drugs assessed in the Tanzania SDI survey

Drug	TZ SDI (all)	TZ SDI (mothers)	TZ SDI (children)	SARA (all)	SARA (mothers)	SARA (children)
Albendazole cap/tab	X		X	X		
Amoxicillin syrup/suspension	X			X		X
Ampicillin powder for injection	X	X	X	X	X	
Artemisinin combination therapy tab	X		X	X		
Azithromycin inj/cap/tab or oral liquid	X	X		X	X	
Benzathine benzylpenicillin powder (injection)	X	X		X	X	X
Betamethasone/Dexamethasone injectable	X	X		X	X	
Calcium gluconate tablets	X	X		X	X	
Ceftriaxone powder for injection	X		X	X		
Chloraphenicol	X		X			
Cotrimoxazole	X	X		X		X
Diazepam	X		X	X		
Ergometrine injection	X	X				
Gentamicin injectable	X	X		X	X	X
Magnesium sulfate inj/tab/cap	X	X		X	X	
Metronidazole inj/tab	X	X		X	X	
Misoprostol cap/tab	X	X		X	X	
Nifedipine cap/tab	X	X		X	X	
Oral rehydratation salts (satchets)	X		X	X		X
Oxytocin injectable	X	X		X	X	
Paracetamol	X		X	X		X
Sodium chloride injectable solution	X	X		X	X	
Zinc oral liquid	X		X	X		X
Vitamin A capsule	X		X	X		X
Folic acid supplements cap/tab	X	X		X	X	
Iron supplements cap/tab	X	X		X	X	
Medroxyprogesterone acetate injectable	X	X		X	X	

ANNEX C. ADDITIONAL RESULTS

Table C 1. Distribution of health personnel by facility type and ownership

	Tanzania	Dispen-sary	Health center	First-level hospital	Public	Private (non-profit)	Private (for-profit)
Medical Doctor (Specialist)	2.1	0.4	0.3	3.9	2.3	1.0	2.5
Medical Doctor (Generalist)	6.6	1.3	2.7	11.6	6.6	6.0	7.2
Medical Officer	2.4	0.4	1.0	4.2	2.4	1.1	3.6
Assistant Medical Officer	2.9	1.2	3.5	3.7	3.5	2.0	1.2
Clinical Officer	12.9	17.8	9.8	11.2	13.7	11.3	11.4
Assistant Clinical Officer	2.3	5.1	1.7	0.9	2.5	2.2	1.5
Nurse/Nurse Midwife	28.7	22.4	32.2	31.1	28.1	31.7	27.9
Lab/Pharmacy	9.9	9.1	10.4	10.2	7.6	12.0	17.5
Public Health Worker (Officer)	1.2	0.6	1.3	1.6	1.7	0.3	0.4
Medical Att./Nurse Assistant	26.0	37.7	30.5	16.7	26.3	26.6	23.6
MCH Aide	2.3	3.1	4.0	1.1	2.6	1.9	1.8
Rural Medical Aides	0.2	0.5	0.3	0.1	0.3	0.0	0.1
Other	2.5	0.5	2.5	3.7	2.4	4.1	1.1
Total	100	100	100	100	100	100	100

Table C 2. Distribution of health personnel by location

	Tanzania	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public
Medical Doctor (Specialist)	2.1	0.8	4.35	8.2	0.5	0.2	3.1
Medical Doctor (Generalist)	6.6	1.3	8.8	9.1	8.5	0.8	8.9
Medical Officer	2.4	1.6	4.35	8.1	0.6	0.5	3.2
Assistant Medical Officer	2.9	2.4	3.55	4.5	2.6	1.8	4.2
Clinical Officer	12.9	14.3	12.25	11.9	12.6	17	12.5
Assistant Clinical Officer	2.3	5.6	0.95	0.8	1.1	6.5	1
Nurse/Nurse Midwife	28.7	29.8	27.65	26.2	29.1	25.6	29.1
Lab/Pharmacy	9.9	7.7	10.65	10.3	11	5.2	8.5
Public Health Worker (Officer)	1.2	0.8	1	0.2	1.8	1	1.9
Medical Att./Nurse Assistant	26	32.1	21.85	18.1	25.6	36.7	22.2
MCH Aide	2.3	2.4	2.15	1.9	2.4	3.2	2.3
Rural Medical Aides	0.2	0.5	0.1	0	0.2	0.7	0.2
Other	2.5	0.9	2.35	0.7	4	0.7	3
Total	100	100	100	100	100	100	100

Table C 3. Distribution of health personnel by gender

	Tanzania	Female	Male
Medical Doctor (Specialist)	2.1	1.4	3.3
Medical Doctor (Generalist)	6.6	2.6	13.7
Medical Officer	2.4	1.4	4.0
Assistant Medical Officer	2.9	1.2	6.0
Clinical Officer	12.9	6.3	24.8
Assistant Clinical Officer	2.3	1.7	3.4
Nurse/Nurse Midwife	28.7	37.8	12.4
Lab/Pharmacy	9.9	7.8	13.6
Public Health Worker (Officer)	1.2	0.5	2.5
Medical Att./Nurse Assistant	26	35.1	9.7
MCH Aide	2.3	2.6	1.8
Rural Medical Aides	0.2	0.2	0.3
Other	2.5	1.3	4.6
Total	100	100	100

Table C 4. Distribution of health personnel

	Tanzania	Public	Private (non-profit)	Private (for-profit)	Rural	Urban	Dar es Salaam	Other Urban	Rural Public	Urban Public	Female	Male
Medical Doctor (Specialist)	2.1	2.3	1.0	2.5	0.8	4.4	8.2	0.5	0.2	3.1	1.4	3.3
Medical Doctor (Generalist)	6.6	6.6	6.0	7.2	1.3	8.8	9.1	8.5	0.8	8.9	2.6	13.7
Medical Officer	2.4	2.4	1.1	3.6	1.6	4.4	8.1	0.6	0.5	3.2	1.4	4.0
Assistant Medical Officer	2.9	3.5	2.0	1.2	2.4	3.6	4.5	2.6	1.8	4.2	1.2	6.0
Clinical Officer	12.9	13.7	11.3	11.4	14.3	12.3	11.9	12.6	17.0	12.5	6.3	24.8
Assistant Clinical Officer	2.3	2.5	2.2	1.5	5.6	1.0	0.8	1.1	6.5	1.0	1.7	3.4
Nurse/Nurse Midwife	28.7	28.1	31.7	27.9	29.8	27.7	26.2	29.1	25.6	29.1	37.8	12.4
Lab/Pharmacy	9.9	7.6	12.0	17.5	7.7	10.7	10.3	11.0	5.2	8.5	7.8	13.6
Public Health Worker (Officer)	1.2	1.7	0.3	0.4	0.8	1.0	0.2	1.8	1.0	1.9	0.5	2.5
Medical Att./Nurse Assistant	26.0	26.3	26.6	23.6	32.1	21.9	18.1	25.6	36.7	22.2	35.1	9.7
MCH Aide	2.3	2.6	1.9	1.8	2.4	2.2	1.9	2.4	3.2	2.3	2.6	1.8
Rural Medical Aides	0.2	0.3	0.0	0.1	0.5	0.1	0.0	0.2	0.7	0.2	0.2	0.3
Other	2.5	2.4	4.1	1.1	0.9	2.4	0.7	4.0	0.7	3.0	1.3	4.6
Total	100	100	100	100	100	100	100	100	100	100	100	100

Figure C 1. Absence rates in public sector by cadre and location

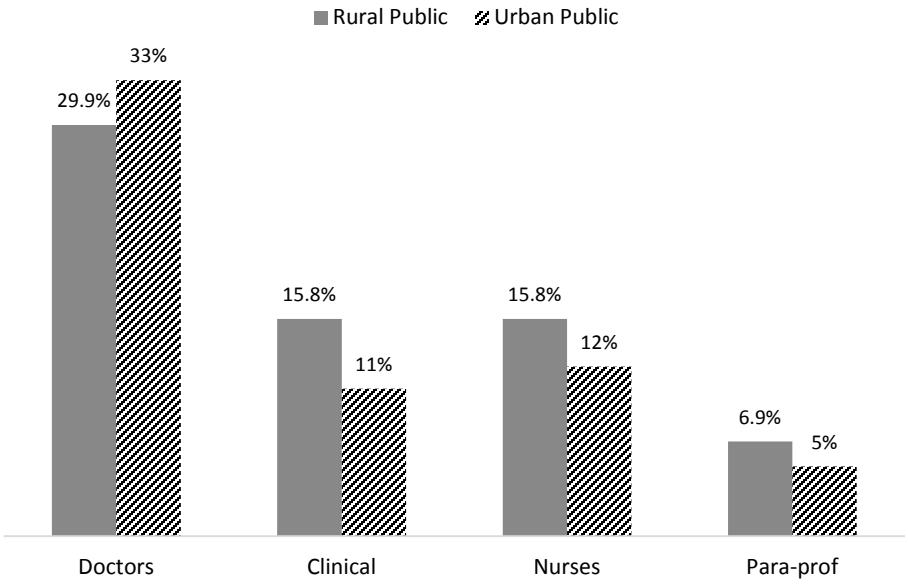


Table C 5. Determinants of Absenteeism: regression results

	Dependent variable: Absence rate					
	(1)	(2)	(3)	(4)	(5)	(6)
Dares Salaam is reference group						
Other Urban	0.0191	0.0206	0.0195	0.0209	0.0120	0.0150
	(0.0228)	(0.0225)	(0.0225)	(0.0227)	(0.0234)	(0.0234)
Rural	0.0487**	0.0533**	0.0655***	0.0666***	0.0474*	0.0499*
	(0.0216)	(0.0212)	(0.0229)	(0.0231)	(0.0274)	(0.0274)
Nurse is reference group						
Doctor		0.115***	0.101**	0.104**	0.107***	0.118***
		(0.0424)	(0.0405)	(0.0406)	(0.0404)	(0.0419)
Clinical Officer		0.00479	0.00299	0.00290	0.000780	0.00998
		(0.0187)	(0.0185)	(0.0185)	(0.0187)	(0.0217)
Para-professional		-0.0351*	-0.0347*	-0.0333*	-0.0303	-0.0270
		(0.0184)	(0.0185)	(0.0189)	(0.0188)	(0.0209)
Facility with 1-2 health workers is reference group						
Size 3 to 5 HWs			0.0341	0.0367*	0.0376*	0.0363*
			(0.0207)	(0.0214)	(0.0211)	(0.0210)
Size 6 to 10 HWs			0.0355	0.0481	0.0395	0.0403
			(0.0317)	(0.0393)	(0.0400)	(0.0400)
Size 11 to 20 HWs			0.0573*	0.0776*	0.0620	0.0599
			(0.0321)	(0.0415)	(0.0447)	(0.0447)
Size: 20+ HWs			0.0809	0.100	0.0817	0.0803
			(0.0538)	(0.0617)	(0.0604)	(0.0602)
Dispensary is reference group						
Health center				-0.0135	-0.0106	-0.0117
				(0.0239)	(0.0240)	(0.0239)
Hospital				-0.0266	-0.0110	-0.0129
				(0.0340)	(0.0358)	(0.0358)
Public sector is reference group						
NGO/Faith Based					-0.0204	-0.0182
					(0.0224)	(0.0226)
Private for profit					-0.0468*	-0.0492**
					(0.0244)	(0.0243)
Health Worker Characteristics						
Female						0.0106
						(0.0185)
Age						-0.00122*
						(0.000696)
Constant	0.109***	0.104***	0.0753***	0.0772***	0.101***	0.128**
	(0.0163)	(0.0172)	(0.0226)	(0.0225)	(0.0292)	(0.0548)
Observations	2,093	2,093	2,093	2,093	2,093	2,093
R-squared	0.004	0.012	0.015	0.016	0.018	0.020

Notes. a. Robust standard errors in parentheses.
b. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table C 6. Determinants of diagnostic accuracy: regression results

	Dependent variable: Diagnostic accuracy						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Process quality							0.944***
							(0.0688)
Minimum equipment						0.0788***	0.0646***
						(0.0269)	(0.0234)
Infrastructure						0.0656**	0.0604**
						(0.0306)	(0.0241)
Communication						0.0615**	0.0421*
						(0.0264)	(0.0219)
Access to ambulance						0.00116	-0.0148
						(0.0240)	(0.0216)
Drug availability						0.0819	0.0128
						(0.0619)	(0.0506)
Dar es Salaam is reference							
Other urban	0.0580*	0.0400	0.0431	0.0653**	0.0611**	0.0713**	0.0655***
	(0.0326)	(0.0299)	(0.0295)	(0.0282)	(0.0286)	(0.0290)	(0.0235)
Rural	-0.0736**	-0.0206	-0.0153	0.0370	0.0341	0.0865**	0.0841***
	(0.0291)	(0.0271)	(0.0284)	(0.0268)	(0.0271)	(0.0334)	(0.0244)
Dispensary is reference							
Health center		0.124***	0.124***	0.0746***	0.0751***	0.0395	0.00149
		(0.0283)	(0.0284)	(0.0264)	(0.0262)	(0.0281)	(0.0233)
First-level hospital		0.204***	0.199***	0.127***	0.133***	0.0514	0.0264
		(0.0326)	(0.0316)	(0.0310)	(0.0317)	(0.0373)	(0.0320)
Public facility is reference							
Private NFP			0.0484	0.0253	0.0185	-0.0176	-0.00976
			(0.0339)	(0.0318)	(0.0319)	(0.0319)	(0.0264)
Private FP			0.0181	-0.00351	-0.0119	-0.0250	-0.0137
			(0.0292)	(0.0280)	(0.0296)	(0.0323)	(0.0279)
Doctor is reference							
Clinical Officer				-0.0525	-0.0510	-0.0433	-0.0130
				(0.0342)	(0.0342)	(0.0327)	(0.0269)
Nurse				-0.258***	-0.246***	-0.218***	-0.113***
				(0.0413)	(0.0431)	(0.0420)	(0.0346)
Female provider					-0.0170	-0.0272	-0.0113
					(0.0240)	(0.0236)	(0.0190)
Age of provider					0.00127	0.000899	0.00111
					(0.000935)	(0.000944)	(0.000736)
Constant	0.556***	0.462***	0.448***	0.542***	0.512***	0.350***	-0.0133
	(0.0217)	(0.0237)	(0.0265)	(0.0408)	(0.0643)	(0.0729)	(0.0666)
Observations	563	563	563	563	563	563	563
R-squared	0.045	0.133	0.138	0.228	0.232	0.271	0.499

Notes: a. Robust standard errors in parentheses.
b. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Figure C 2. Diagnostic accuracy by questions asked: Acute diarrhea with severe diarrhea

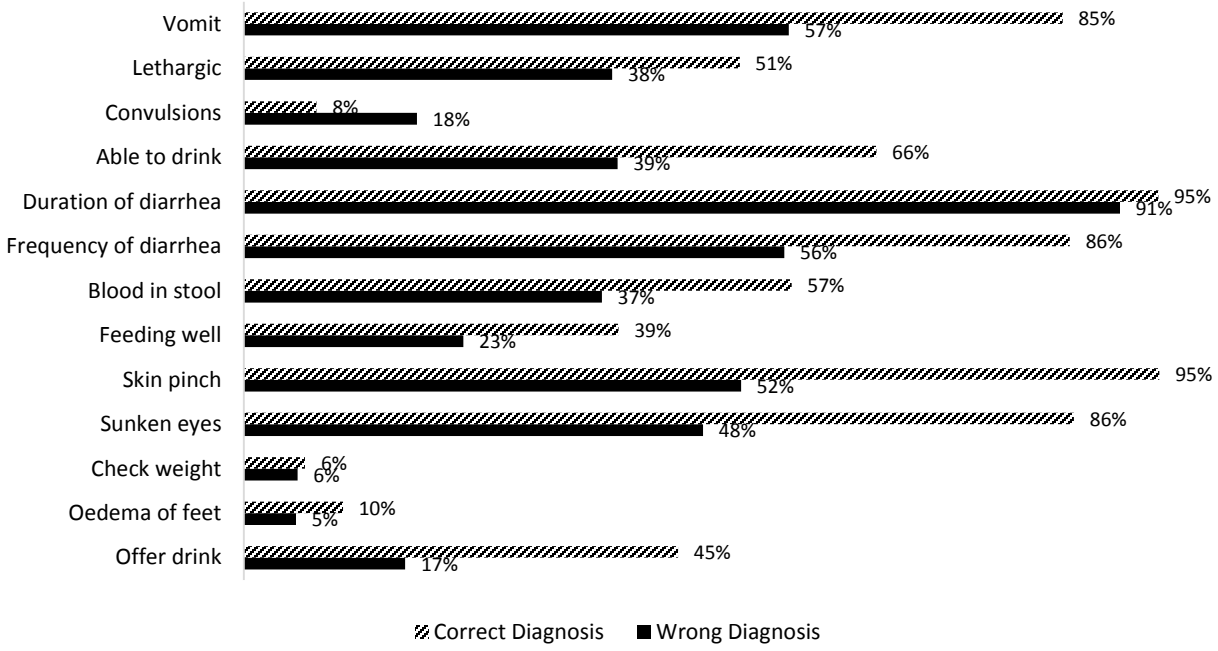


Figure C 3. Diagnostic accuracy by questions asked: Pneumonia

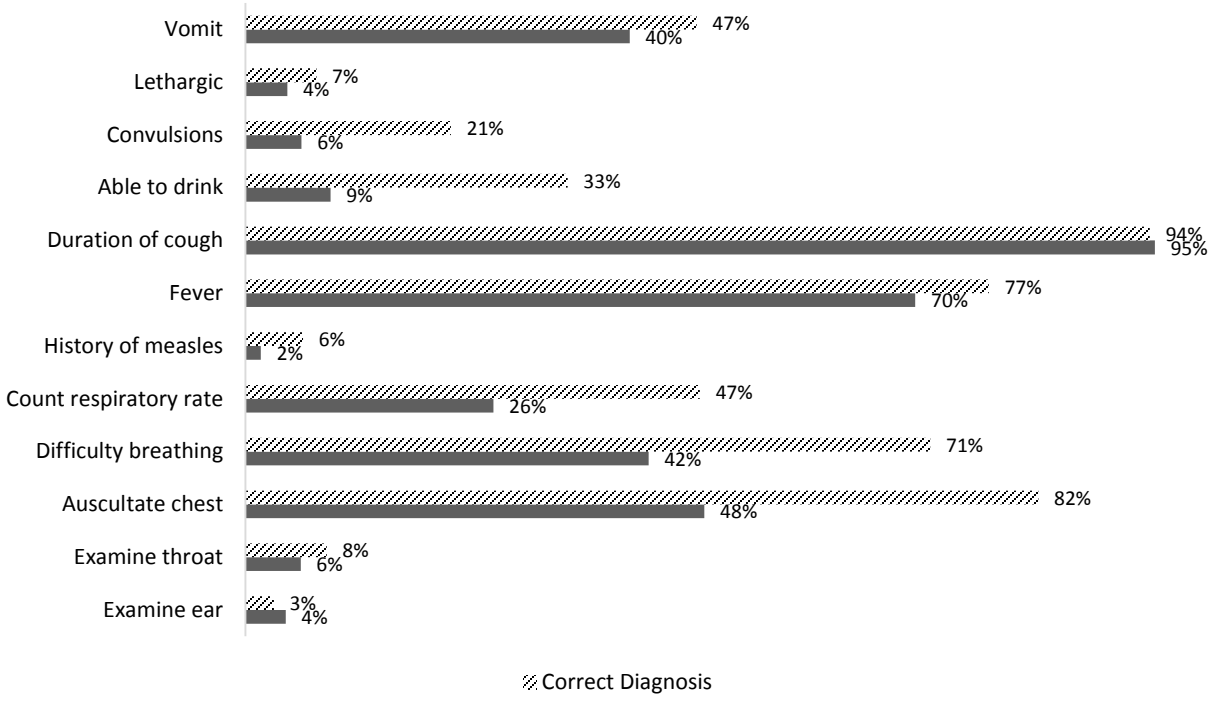


Figure C 4. Diagnostic accuracy by questions asked: Malaria with anemia

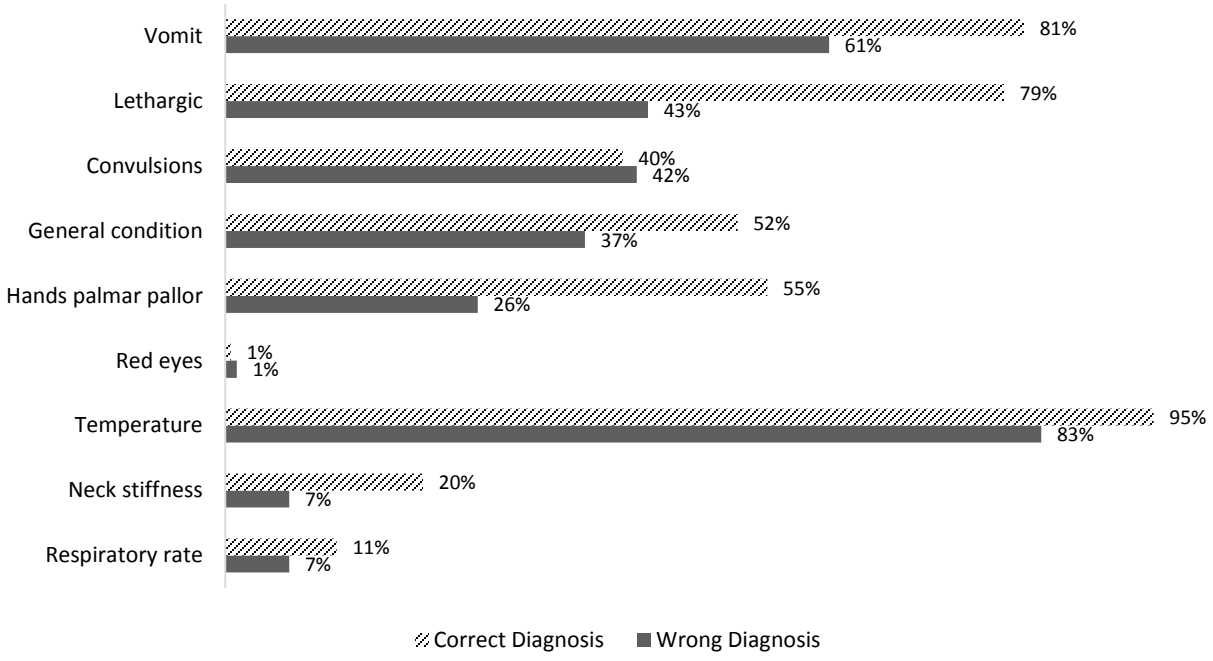


Figure C 5. Diagnostic accuracy by questions asked: Diabetes Mellitus

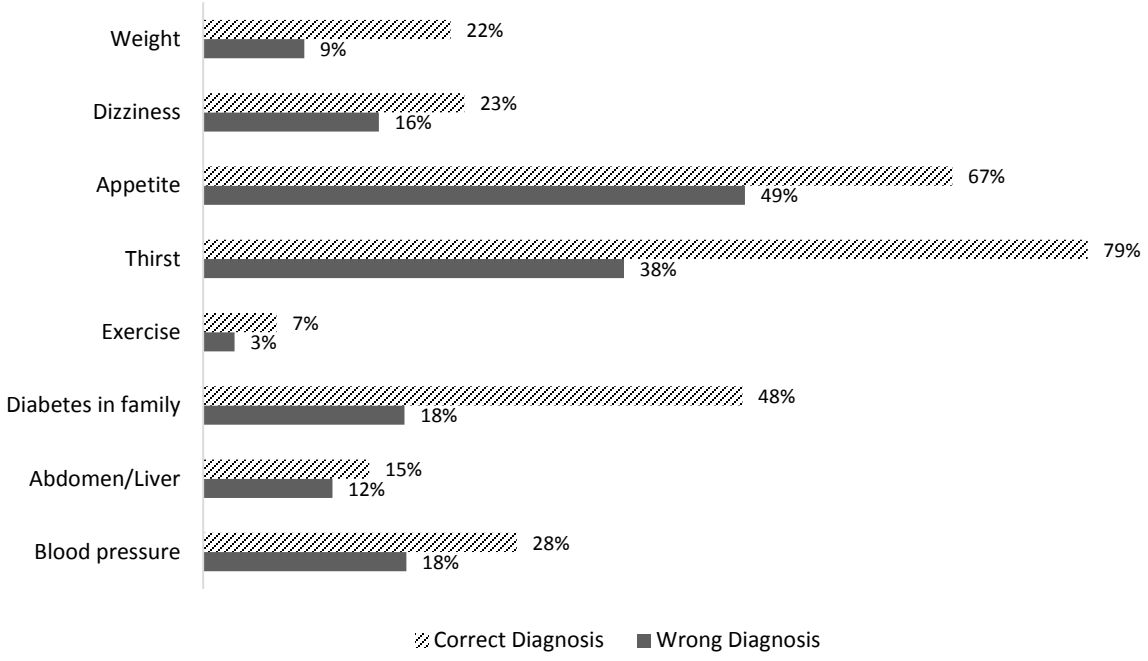


Figure C 6. Diagnostic accuracy by questions asked: Pulmonary Tuberculosis

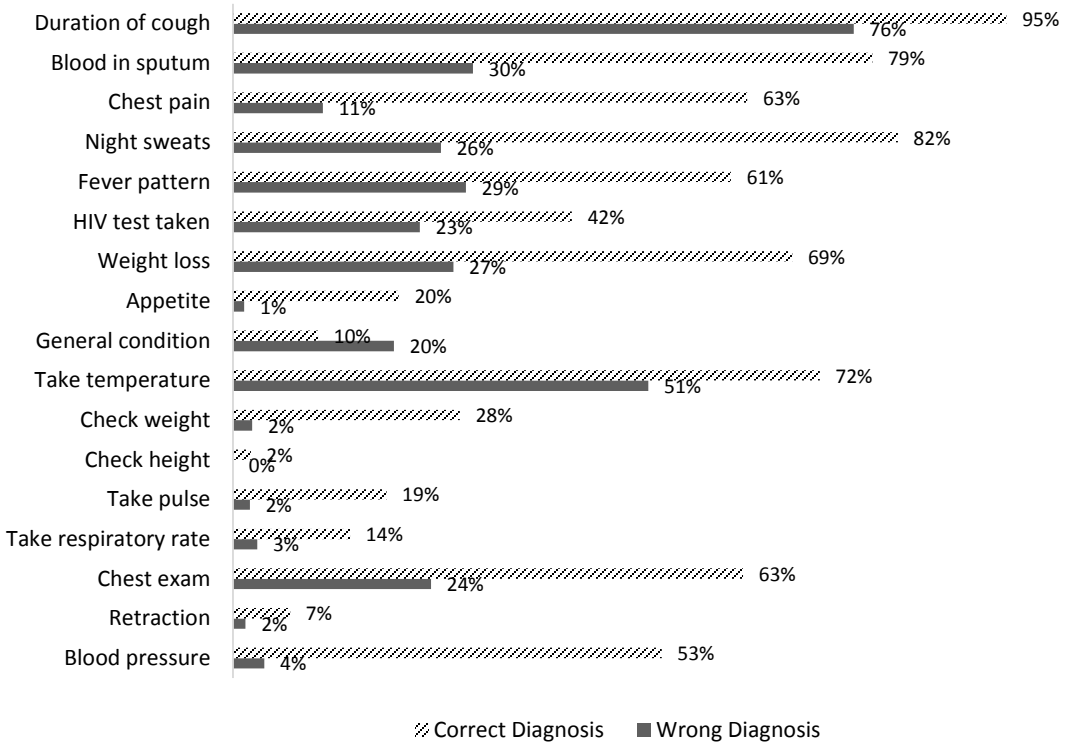


Figure C 7. Correct treatment actions: Post-partum Hemorrhage

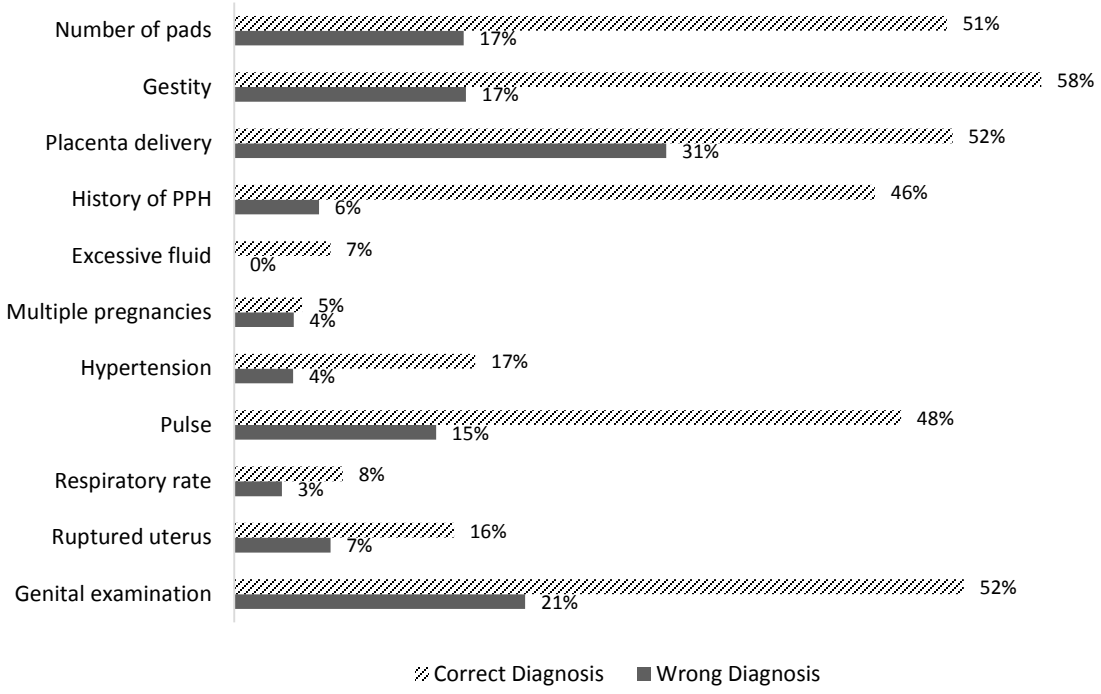


Figure C 8. Correct treatment actions: Neonatal Asphyxia

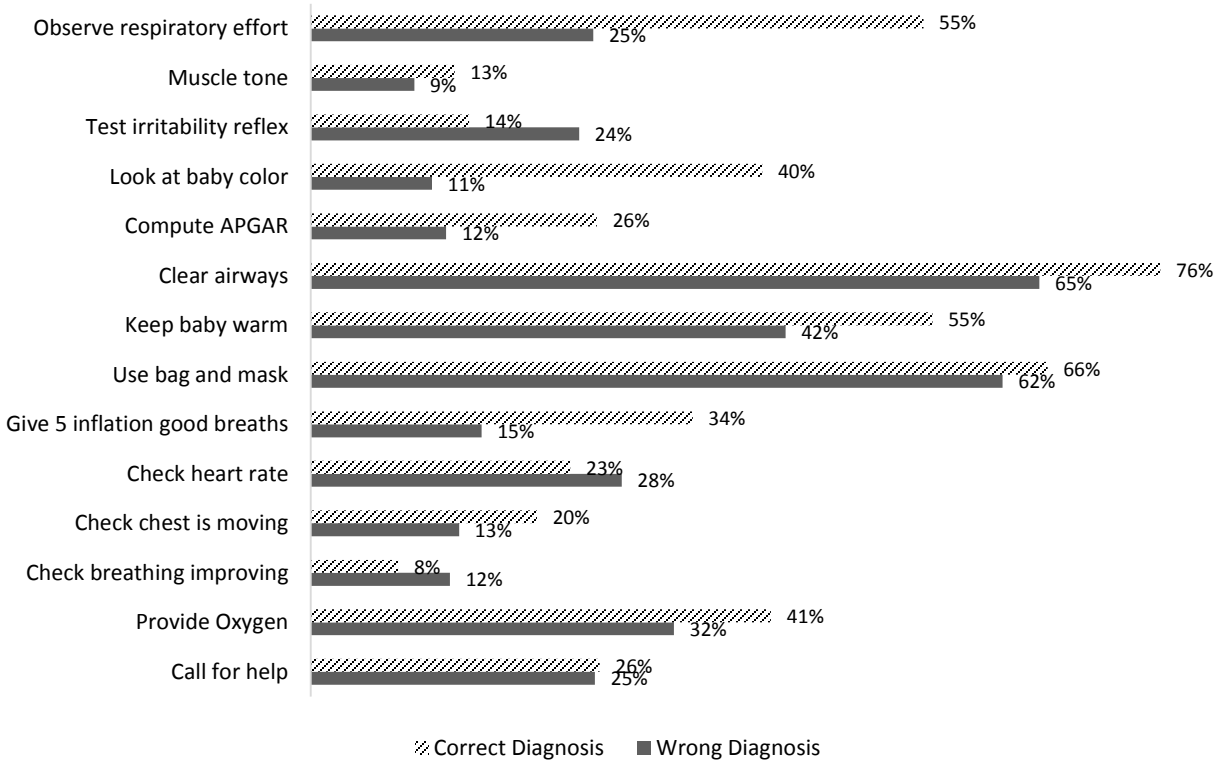


Table C 7. Determinants of diagnostic accuracy: regression results

	Dependent variable: Diagnostic accuracy						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Process quality							0.944***
							(0.0688)
Minimum equipment						0.0788***	0.0646***
						(0.0269)	(0.0234)
Infrastructure						0.0656**	0.0604**
						(0.0306)	(0.0241)
Communication						0.0615**	0.0421*
						(0.0264)	(0.0219)
Access to ambulance						0.00116	-0.0148
						(0.0240)	(0.0216)
Drug availability						0.0819	0.0128
						(0.0619)	(0.0506)
Dar es Salaam is reference							
Other urban	0.0580*	0.0400	0.0431	0.0653**	0.0611**	0.0713**	0.0655***
	(0.0326)	(0.0299)	(0.0295)	(0.0282)	(0.0286)	(0.0290)	(0.0235)
Rural	-0.0736**	-0.0206	-0.0153	0.0370	0.0341	0.0865**	0.0841***
	(0.0291)	(0.0271)	(0.0284)	(0.0268)	(0.0271)	(0.0334)	(0.0244)
Dispensary is reference							
Health center		0.124***	0.124***	0.0746***	0.0751***	0.0395	0.00149
		(0.0283)	(0.0284)	(0.0264)	(0.0262)	(0.0281)	(0.0233)
First-level hospital		0.204***	0.199***	0.127***	0.133***	0.0514	0.0264
		(0.0326)	(0.0316)	(0.0310)	(0.0317)	(0.0373)	(0.0320)
Public facility is reference							
Private NFP			0.0484	0.0253	0.0185	-0.0176	-0.00976
			(0.0339)	(0.0318)	(0.0319)	(0.0319)	(0.0264)
Private FP			0.0181	-0.00351	-0.0119	-0.0250	-0.0137
			(0.0292)	(0.0280)	(0.0296)	(0.0323)	(0.0279)
Doctor is reference							
Clinical Officer				-0.0525	-0.0510	-0.0433	-0.0130
				(0.0342)	(0.0342)	(0.0327)	(0.0269)
Nurse				-0.258***	-0.246***	-0.218***	-0.113***
				(0.0413)	(0.0431)	(0.0420)	(0.0346)
Female provider					-0.0170	-0.0272	-0.0113
					(0.0240)	(0.0236)	(0.0190)
Age of provider					0.00127	0.000899	0.00111
					(0.000935)	(0.000944)	(0.000736)
Constant	0.556***	0.462***	0.448***	0.542***	0.512***	0.350***	-0.0133
	(0.0217)	(0.0237)	(0.0265)	(0.0408)	(0.0643)	(0.0729)	(0.0666)
Observations	563	563	563	563	563	563	563
R-squared	0.045	0.133	0.138	0.228	0.232	0.271	0.499

Notes: a. Robust standard errors in parentheses.
b. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table C 8. Clinical cases validity test –Probability of successful diagnostic by clinicians

	Dependent variable:			Dependent variable:			Dependent variable:		
	Diarrhea with dehydration			Pneumonia			Malaria with anemia		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Able to drink	0.0871**	0.0647	0.0764*	0.131***	0.116***	0.0873**			
	(0.0400)	(0.0429)	(0.0434)	(0.0349)	(0.0357)	(0.0358)			
Convulsions	-0.0198	-0.0818	-0.0822	0.117***	0.0829	0.0725	-0.0680	-0.141***	-0.136***
	(0.0581)	(0.0552)	(0.0519)	(0.0456)	(0.0506)	(0.0488)	(0.0441)	(0.0451)	(0.0440)
Lethargic	0.0655*	-0.0426	-0.0360	0.0677	-0.0337	-0.0417	0.184***	0.128***	0.113**
	(0.0396)	(0.0406)	(0.0410)	(0.0568)	(0.0823)	(0.0867)	(0.0436)	(0.0456)	(0.0451)
Vomit	0.139***	0.0866**	0.0611	-0.00418	-0.0328	-0.0204	0.0848*	0.0402	0.0432
	(0.0389)	(0.0405)	(0.0407)	(0.0392)	(0.0398)	(0.0380)	(0.0436)	(0.0454)	(0.0452)
Coughing		0.0407	0.00926		-0.0328	-0.0712		0.0462	0.0426
		(0.0506)	(0.0473)		(0.0635)	(0.0517)		(0.0433)	(0.0437)
Agitated		-0.00882	-0.0369						
		(0.0702)	(0.0678)						
Sunken eyes		0.0994**	0.0771*						
		(0.0460)	(0.0444)						
Offer child drink		0.191***	0.184***						
		(0.0526)	(0.0536)						
Skin pinch		0.309***	0.262***						
		(0.0430)	(0.0439)						
Bloody stool		0.0229	0.0187						
		(0.0420)	(0.0409)						
Breathing					0.198***	0.170***			
					(0.0371)	(0.0385)			
Chest In-drawing					0.0723*	0.0562			
					(0.0378)	(0.0381)			
Fever duration								0.0332	0.0160
								(0.0732)	(0.0784)
Measles								0.169	0.158
								(0.110)	(0.126)
Temperature								0.149***	0.131***
								(0.0467)	(0.0470)
Palmar pallor								0.286***	0.293***
								(0.0495)	(0.0524)
Neck stiffness								0.139	0.154*
								(0.0907)	(0.0898)
Clinical Officer			-0.0871*			0.0953			0.000921
			(0.0484)			(0.0609)			(0.0647)
Nurse			-0.278***			-0.108			-0.142**
			(0.0366)			(0.0827)			(0.0718)
Private NFP			0.0479			-0.0313			0.0724
			(0.0525)			(0.0498)			(0.0588)
Private FP			-0.109**			0.1000**			-0.0411
			(0.0429)			(0.0414)			(0.0559)
Other Urban			0.179***			-0.0592			0.251***
			(0.0601)			(0.0549)			(0.0643)
Rural			0.176***			-0.00297			0.131**
			(0.0542)			(0.0522)			(0.0610)
Health center			0.0209			0.0784**			0.00573
			(0.0481)			(0.0380)			(0.0563)
First-level hosp.			0.146***			0.112**			-0.0502
			(0.0560)			(0.0436)			(0.0590)
Observations	563	563	563	563	563	563	563	563	563

Notes: a. Wheezing for pneumonia, runny nose, rash, and eyes redness for malaria with anemia are included in the regressions but are not significant. Clinician characteristics such as sex and age were also included as control variables.
b. Robust standard errors in parentheses. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1

Figure C 9. Referral rates and diagnostic accuracy by clinical cases

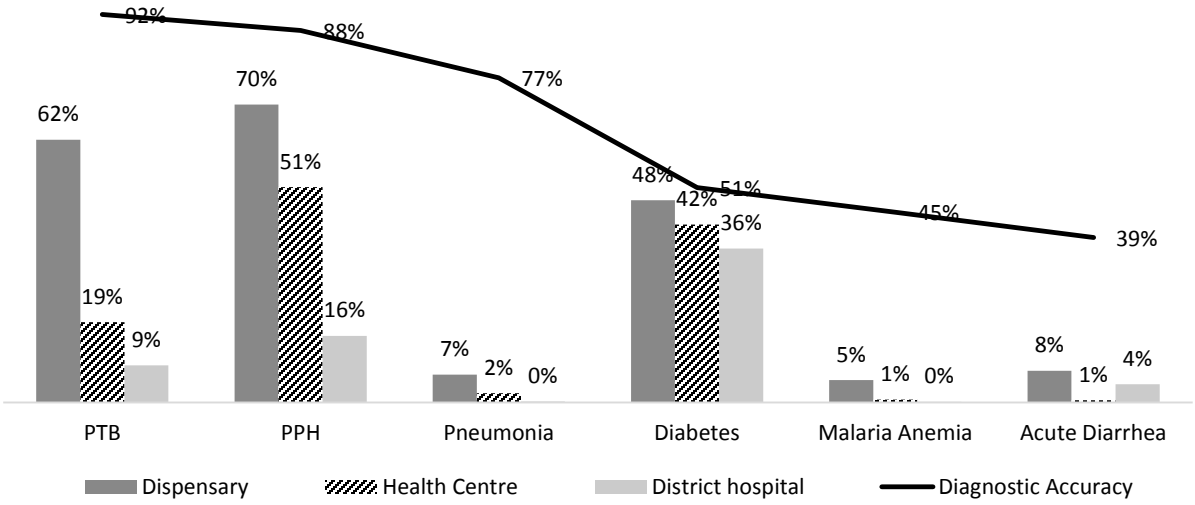


Table C 9. Danger signs for sick child vignette and cadre type

	Acute Diarrhea (Diarrhea)				Pneumonia (Cough)				Malaria with anemia (Fever)			
	Vomit	Conv.	Lethar-gic	Drink	Vomit	Conv.	Lethar-gic	Drink	Vomit	Conv.	Lethar-gic	Drink
Doctors	69.1	19.8	44.2	44.4	48.7	15.9	10.6	23.0	77.6	30.5	65.5	98.4
Clinical officers	71.1	14.7	44.9	52.5	45.8	23.1	5.6	29.4	69.9	45.4	64.2	96.3
Nurses	56.2	5.2	38.0	45.6	40.0	5.2	4.9	28.1	63.2	42.5	38.6	87.0
Total	67.5	13.9	43.3	49.1	45.2	17.7	6.6	27.6	70.3	41.2	59.2	94.9

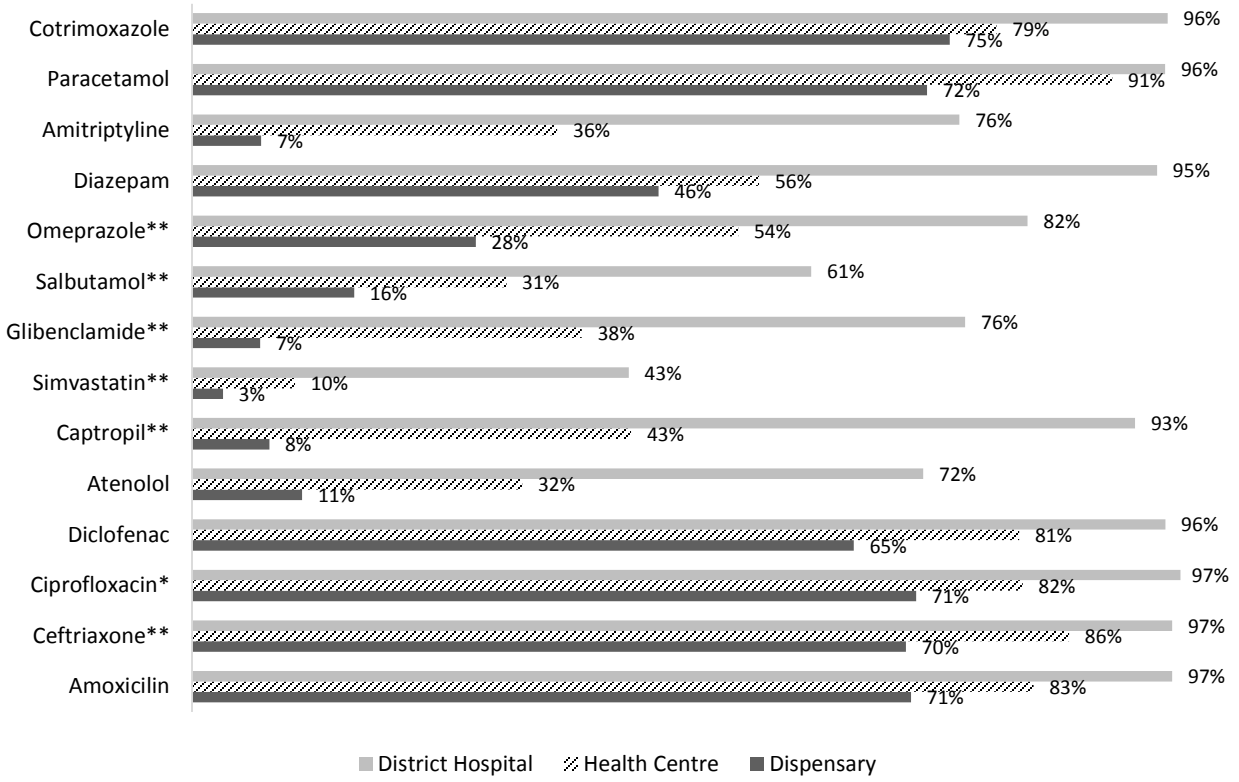
Table C 10. Drug availability for the full SDI list

% facilities	Disp.	HC	DH	Pub.	PNFP	PFP	Dar	Urban	Rural	All
Core Medications										
Amoxicillin*	70.8	82.9	96.5	67.1	88.7	98.1	98.1	90.7	63.7	73.6
Ceftriaxone***	70.3	86.4	96.5	75.1	49.4	93.5	86.0	78.3	70.1	73.6
Ciprofloxacin**	71.3	81.8	97.3	69.3	84.0	91.9	94.3	85.3	66.8	73.9
Diclofenac*	65.2	81.4	95.8	63.8	77.7	90.1	89.4	74.4	63.7	68.7
Atenolol*	10.8	32.5	72.0	7.6	38.0	50.3	50.5	30.6	6.7	16.7
Captopril***	7.6	43.2	92.9	9.0	35.8	41.7	51.3	34.7	4.6	16.4
Simvastatin***	3.0	10.1	43.0	4.0	10.2	14.4	13.6	10.0	3.5	6.0
Glibenclamide***	6.7	38.4	76.1	7.2	35.3	34.3	37.6	32.5	3.9	14.2
Oral hypoglycaemic ***	10.0	46.5	95.2	11.2	40.3	43.9	53.1	37.1	7.3	18.9
Insulin for injection***	5.1	12.3	76.6	4.0	15.2	42.6	24.0	25.6	1.9	9.9
Salbutamol***	16.0	30.9	61.0	15.0	33.9	37.4	60.6	24.4	13.0	20.2
Omeprazole***	27.9	53.8	82.3	20.8	58.2	90.5	78.5	60.7	17.5	33.9
Diazepam*	45.9	55.8	95.0	38.0	80.8	89.0	75.6	71.4	37.9	49.8
Amitriptyline***	6.8	36.0	75.6	10.2	25.6	24.4	27.6	30.3	5.8	13.9
Rifampicin*	24.1	71.8	95.8	37.7	25.1	16.5	35.6	42.4	29.9	33.6
Isoniazid*	23.7	72.0	95.8	37.5	25.7	14.6	34.2	41.6	30.0	33.3
Pyrazinamide*	23.3	71.4	95.8	37.1	25.1	14.1	34.2	41.7	29.2	32.8
Ethambutol*	23.3	72.4	95.8	37.1	26.0	14.1	34.2	41.7	29.4	33.0
Essential Medications for mothers										
Oxytocin(Syntocinon)*	67.9	84.1	89.9	77.6	67.6	31.1	56.7	55.4	78.9	71.0
Calcium Gluconate***	4.1	20.9	50.1	8.5	9.7	7.6	17.0	13.0	5.8	8.6
Magnesium sulphate**	23.0	67.2	99.2	34.6	30.8	18.8	42.6	43.4	26.6	32.3
Sodium Chlorid*e	73.8	80.1	91.6	72.7	75.7	93.6	86.1	86.6	69.7	75.5
Misoprostol (Mifepristone)*	6.3	24.9	63.1	9.4	14.4	22.7	29.0	15.6	7.7	11.6
Ampicillin***	19.9	53.6	73.6	20.4	36.7	57.0	50.6	39.7	18.5	26.8
Gentamicin*	43.3	78.7	94.0	39.5	69.7	96.7	79.9	75.4	36.4	50.2
Metronidazole*	31.2	51.4	94.1	27.1	54.5	80.3	64.1	54.3	26.6	37.0
Azithromycin***	21.8	45.1	55.4	19.2	30.7	68.5	54.3	37.7	18.2	26.4
Cefixime****	1.8	10.6	42.3	3.4	4.9	15.9	25.6	6.7	1.5	5.0
Benzathine benzyl penicillin**	65.1	81.7	88.9	65.4	71.8	83.5	79.1	77.7	63.2	68.3
Betamethasone****	7.5	14.2	60.5	7.9	19.0	23.2	32.1	16.8	6.1	11.2
Nifedipine***	14.7	54.5	94.1	13.2	49.8	60.1	61.0	43.5	10.9	23.6
Oral contraceptive pill (OCP)*	75.6	78.1	80.9	86.2	54.0	37.6	66.7	68.9	80.3	76.2
Medroxyprogesterone acetate*	64.0	73.1	76.5	73.0	53.8	32.6	65.3	58.3	68.6	65.7
Ferrous salt*	63.2	75.7	84.7	67.6	73.6	44.4	73.0	71.7	62.6	65.8
Ferrous salt and foclic acid*	80.1	82.2	98.8	86.8	82.7	43.8	87.0	66.4	86.3	81.4
Folic Acid*	81.3	88.5	90.2	87.9	77.0	54.8	75.9	75.4	86.3	82.6
Sulfadoxine/pyrimetha mine*	68.8	66.1	66.0	64.8	78.7	79.3	88.8	70.3	64.8	68.4
Essential Medications for children										
Paracetamol *	72.4	90.6	95.8	71.0	85.2	95.9	87.4	87.9	69.5	75.8
Morphine***	1.2	6.6	41.7	3.5	5.6	5.9	9.8	7.9	1.8	4.0
Amoxicillin*	58.5	63.7	94.5	49.7	94.3	95.5	88.3	76.0	51.6	61.1
Cotrimoxazole*	74.6	79.2	96.1	71.1	95.0	87.5	88.3	89.8	69.5	76.3
Benzylpenicillin*	79.8	87.4	98.5	78.9	88.2	92.1	89.1	94.8	75.6	81.7
Oral Rehydration Solution*	73.0	89.5	96.4	71.6	91.8	87.4	88.4	84.0	71.5	76.2
Vitamin A*	79.2	87.8	85.3	86.0	81.9	43.0	77.4	75.7	82.9	80.6
Zinc *	34.8	67.0	89.1	36.2	57.7	56.9	73.9	52.0	33.1	41.5
ACT or ALU*	90.8	90.1	99.2	90.4	95.6	91.0	98.1	96.5	88.2	91.2
Artesunate***	9.5	25.9	66.5	11.2	18.5	31.9	47.3	18.3	8.6	14.5
Albendazole*	71.1	74.4	77.9	67.2	79.2	93.9	92.9	84.7	64.1	71.9
Mebendazole*	71.8	78.5	86.6	69.6	78.8	91.7	91.4	80.8	68.0	73.4

Notes: Should be carried by * health posts and above, ** Health centers and above, *** first-level hospitals and above, **** regional hospitals and above according to the 2013 National Essential Medicines List (NEMLIT).

Drugs in green are the 2012 SARA tracers

Figure C 10. Availability of individual tracer drugs (14) by type of facility



Note: Should be carried by * Health centers and above, ** first-level hospitals and above, *** regional hospitals and above according to the 2013 National Essential Medicines List (NEMLIT)

Table C 11. Drug availability for 14 tracer drugs

% facilities	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other urban**	**Rural Public**	**Urban Public**
All Facilities	59.9	53.2	76.3	84.1	51.8	77.1	80.6	73.6	49.3	67
Dispensary	56.6	50.6	73	81.5	50.6	73.7	76.9	70.5	48.4	62.4
Health center	72	65	90.6	93.1	61	84.9	92.4	77.4	59.9	70.7
First-level hospital	84	80.4	84.6	89.2	83.2	85.05	87.4	82.7	.	80.4
# Facilities	404	269	72	63	223	181	85	96	187	82

Notes: a. Estimates have been adjusted with facility level because not all drugs are expected at all facility types..

Table C 12. Share of facilities where user fees are visibly displayed

% facilities	**Tanzania**	**Public**	**Private** (non-profit)	**Private** (for-profit)	**Rural**	**Urban**	**Dar es Salaam**	**Other urban**	**Rural Public**	**Urban Public**
All Facilities	38.6	39.0	44.8	29.3	38.6	43.3	53.2	33.3	36.4	49.7
Dispensary	35.7	36.9	42.2	19.2	37.3	38.0	52.6	23.4	35.7	44.7
Health center	54.1	52.4	49.8	65.3	49.2	55.3	49.1	61.5	45.3	65.4
First-level hospital	52.2	51.9	55.3	48.7	63.1	52.6	59.0	46.2	.	51.9
# Facilities	385	255	67	63	215	170	80	90	182	73

Notes: a. Estimates have been adjusted with facility level because not all drugs are expected at all facility types..

Table C 13. Financial resources received from various sources (in mil TZS)

		Central Govt	NHIF	TIKA	CHF	Local Govt	MSD	User Fees Other	Donor Projects	NGOs	Other	Total
Dispensary	Public	0.4	0.4	0.0	0.31	0.2	0.1	0.6	1.5	0.0	0.8	0.4
	PNFP	0.0	0.6	0.0	0.07	0.0	0.1	9.8	0.0	0.0	6.2	1.7
	PFP	0.0	1.8	0.0	0.01	0.0	0.0	27.6	2.3	0.0	3.6	3.5
	All	0.3	0.6	0.0	0.25	0.1	0.1	4.5	1.4	0.0	1.8	0.9
Health center	Public	2.6	2.5	6.5	1.40	3.5	1.4	3.4	5.5	9.5	25.3	6.2
	PNFP	1.0	16.9	0.0	0.34	0.0	0.0	51.1	3.1	0.0	9.2	8.3
	PFP	0.0	12.9	0.0	11.93	1.3	1.5	16.7	2.3	4.0	25.6	7.6
	All	2.0	5.7	4.8	2.73	2.7	1.3	11.1	4.8	7.6	23.4	6.6
First-level hospital	Public	59.0	116.3	1.3	70.64	20.2	16.4	20.8	9.6	1.1	33.0	34.2
	PNFP	170.1	33.9	0.0	20.58	0.0	0.0	40.1	15.9	65.5	64.7	41.1
	PFP	151.3	189.5	76.3	10.79	4.4	0.0	246.5	124.8	16.2	245.7	106.0
	All	118.9	105.5	19.4	39.13	9.5	6.9	81.0	40.1	26.3	96.1	54.1
All facilities	*Public*	2.5	4.0	0.8	2.6	1.2	0.7	1.5	2.2	1.1	4.6	2.1
	PNFP	22.3	6.6	0.0	2.8	0.0	0.1	18.0	2.4	8.6	14.2	7.5
	PFP	19.0	25.2	9.2	3.0	0.7	0.2	51.4	17.1	2.5	36.2	16.4
	All	7.1	6.7	1.6	2.7	1.0	0.6	9.4	3.9	2.3	9.5	4.5

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