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Health Service Delivery in Mozambique
Results of 2014 Service Delivery Indicator Survey

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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.

This technical report presents the findings from the implementation of the SDIs in the health sector in Mozambique in 2014. Survey implementation took place following extensive consultations with the government and key stakeholders on survey design, sampling and adaptation of survey instruments. Pre-testing of the survey instruments, training of enumerators and field-work took place between February and June 2014.

The health facility survey in Mozambique covered 204 facilities across all three sub-regions of the country (north, central, and south). The survey also included 1,111 health providers assessed for absence, and 618 providers assessed for clinical knowledge. The results provide a representative picture of the quality of service delivery in the country, as well as the physical environment within which services are delivered. The survey covers three dimensions of service delivery: (i) two measures of provider effort; (iii) three measures of provider knowledge/ability; and (ii) five measures of the availability of key inputs, such as drugs, equipment and infrastructure.

The results reveal that the country did relatively well on the availability of medical equipment, with 79.5 percent of the facilities surveyed meeting minimum equipment requirements.[2] However, facilities performed relatively poorer on the availability of priority drugs and minimum infrastructure. Facilities surveyed were found to have 42.7 percent of all priority drugs in-stock (and non-expired). Only a third (34.0 percent) of the facilities surveyed was found to meet minimum infrastructure requirements (simultaneous availability of clean water, improved sanitation and electricity). Average caseloads at health facilities were 17.4 patients per provider per day. The country also performed poorly with regards to its absence rates of 23.9 percent. Provider competence was also weak, with 58.3 percent of the five tracer cases being correctly diagnosed by health providers. [3] Providers adhered to 37.4 percent of clinical guidelines for the five tracer conditions, and 29.9 percent of guidelines pertaining to the management of maternal and neonatal complications. These results indicate that the key issue plaguing the country appears to be inadequate provider knowledge. The results also suggest that a more refined emphasis on management, incentives, and accountability is needed, together with renewed attention to increasing the amount of inputs available at facilities.

[2] These include weighing scales (adult, infant and child), stethoscopes, thermometers, and sphygmomanometers at all facilities, and refrigerators and sterilization equipment at health centers and first-level hospitals.
[3] These included diarrhea with severe dehydration, pneumonia, pulmonary tuberculosis, diabetes, and malaria with anemia.

What do service providers know?

The data suggests that crucial gaps in provider knowledge and ability exist.

- Health providers were able to correctly diagnose 58.3 percent of the five tracer cases presented to them (diarrhea with dehydration, malaria with anemia, pulmonary tuberculosis, pneumonia, and diabetes). Health providers in rural and urban areas demonstrated relatively similar levels of diagnostic accuracy at 58.5 percent and 57.1 percent respectively. Diagnostic accuracy also differed strongly by level of health facility, with providers at health centers correctly diagnosing 57.5 percent of the tracer cases compared to 66.0 percent among providers at first-level hospitals. These results point towards relatively wide knowledge gaps among providers at lower tier facilities. Diagnostic accuracy also varied by provider type, with doctors displaying the highest accuracy rates of 72.5 percent of the tracer cases, compared to 61.1 percent accuracy among clinical officers, and 54.0 percent amongst nurses.
- Adherence to clinical guidelines was also found to be relatively low, with providers following only 37.4 percent of clinical guidelines for the five tracer conditions, and only 29.9 percent of guidelines pertaining to the management of maternal and neonatal complications. Adherence to clinical guidelines were similar in urban and rural facilities (37.2 and 37.4 percent respectively), and better in higher tier facilities (48.3 percent of guidelines being adhered to in hospitals, versus 36.4 percent in health centers). With respect to the management of maternal and neonatal complications, rural facilities performed slightly better, adhering to 30.5 percent of guidelines compared to 27.5 percent among urban facilities. Again, higher tier facilities performed relatively better with respect to this indicator, albeit still weak: 38.4 percent of guidelines adhered to at hospitals compared to 29.1 percent at health centers.

What do service providers do?

- The outpatient caseload (including prevention visits such as immunization, antenatal care visits and other preventive care), adjusted for absence, was a moderate 17.4 patients per health worker per day. Caseloads were reportedly similar in urban and rural facilities at 17.3 and 17.4 patients per health worker per day respectively. Caseloads, however, differed strongly by level of health facility, with health centers having the highest caseloads at 17.6 patients per health worker per day, compared to only 8.9 patients per provider per day at hospitals.
- Approximately one in four (23.9 percent) of the randomly selected health providers were absent during unannounced visits, with higher absence rates observed in urban facilities at 28.3 percent. Health workers were also more likely to be absent in the northern region (30.5 percent), as opposed to 22.9 percent and 19.4 percent in the Southern and Central regions respectively. Nurses were most likely to be absent (27.7 percent), compared to doctors and clinical officers (19.4 percent and 18.9 respectively). The overwhelming majority of absence was sanctioned, indicating a sub-optimal allocation of paid staff time.

Problems in sub-optimal provider effort and the misallocation of time is largely a reflection of the inadequate management of human resources.

What do service providers have to work with?

Significant gaps existed in the availability of inputs at the frontline in the health sector.

- The health sector performed strongly, with 79.5 percent of health facilities meeting the minimum equipment requirements. Rural facilities performed slightly poorer, with 78.8 percent meeting minimum equipment requirements compared to 82.8 percent of urban facilities. Interestingly, hospitals had lower equipment availability at 74.6 percent meeting minimum equipment requirements, compared to 79.3 percent of health centers.

- Health facilities performed relatively well on the availability of infrastructure, with 73.4 percent having available electricity, 80.0 percent having clean water, and 56.8 percent having functional, improved sanitation. However, for effective service delivery it is the simultaneous availability of these items that matter: only 34.0 percent of facilities had all three infrastructure elements available. Among health centers only 32.1 percent met the infrastructure requirements, versus 63.2 percent of hospitals.
- Only 42.7 percent of all priority drugs were available (and non-expired) at the facilities. Rural facilities had 42.6 percent of priority drugs available compared to urban facilities (43.9 percent). Lower tier facilities had lower levels of drug availability, with 41.0 percent of priority drugs available at health centers compared to 66.2 percent at first-level hospitals. On average only 39.4 percent of tracer drugs for mothers, and 49.4 percent of drugs for children were available in health facilities.

What does this mean for Mozambique?

Successful service delivery requires that all the elements of service delivery be present at a facility at the same time: a competent provider, a provider that is present, and available inputs. For instance, while the average estimates of the individual components of the infrastructure indicator might appear relatively high (e.g. 73.4 percent having electricity, 80.0 percent having clean water) the picture worsens when the availability of all three components are assessed simultaneously at the same facility with only 34.0 percent of facilities meeting the infrastructure requirements. Even more disconcerting is the finding that health facilities had just 39.4 percent of priority drugs for mothers in stock and non-expired. More optimistically, however, 79.5 percent of facilities met minimum equipment requirements.

The results suggest that the bottlenecks pertaining to the provision of health services are not necessarily the result of under-staffed facilities as they had decent number of personnel. However, the available staff seemed to lack basic knowledge for assessing common conditions. In addition, it appears that inadequate management of available personnel leads to high absenteeism and low productivity. Poor management of human resources was a key factor in influencing the productivity of health care workers. Lower cadre health professionals demonstrated both lower levels of diagnostic accuracy and lower levels of adherence to clinical guidelines. In addition, health facilities demonstrate gaps in input availability, particularly basic infrastructure and drugs. It is imperative that in conjunction with developing better capacity for the management of human resources (both their knowledge and productivity), health facilities are also equipped with the vital inputs to provide quality services. Without quality service provision, proximity and presence of facilities do not translate into improved access and ultimately health outcomes.

Sub-optimal levels of provider knowledge and absence rates in the health sector seem to point towards the need for a sharper focus on management, incentives, and accountability. Enhancing the availability of inputs at facilities is key but will not ultimately succeed in improving health outcomes when not accompanied by measures to address gaps in knowledge and productivity. A greater attention to all aspects of service provision is critical to yielding the desired improvement in health outcomes.

Table 1. SDI At-A-Glance

	Mozam-bique	Rural	Urban	South	Central	North	Health center	Hospital
Caseload (per provider per day)	17.4	17.4	17.3	17.2	17.7	17.1	17.6	8.9
Absence from facility (% providers)	23.9	23.1	28.3	22.9	19.4	30.5	23.2	33.2
Diagnostic accuracy (% clinical cases)	58.3	58.5	57.1	54.6	59.7	60.4	57.5	66.0
Adherence to clinical guidelines (% clinical guidelines)	37.4	37.4	37.2	38.4	37.2	36.8	36.4	48.3
Management of maternal and neonatal complications (% clinical guidelines)	29.9	30.5	27.5	28.9	31.0	29.8	29.1	38.4
Drug availability (% drugs)	42.7	42.6	43.9	44.5	41.1	43.3	41.0	66.2
Equipment availability (% facilities)	79.5	78.8	82.8	79.3	82.9	74.1	79.3	74.6
Infrastructure Availability (% facilities)	34.0	32.1	54.3	36.7	46.0	15.7	32.1	63.2

Table 2. SDI Country Comparisons

	Mozambique (2014)	Kenya (2013)	Senegal (2012)	Tanzania (2012)	Uganda (2013)	Tanzania (2014)	Togo (2014)	Nigeria (2014)
Caseload (per provider per day)	17.4	15.2	-	-	6.0	7.3	5.2	5.2
Absence from facility (% providers)	23.9	27.5	20	21	46.7	14.3	37.6	31.7
Diagnostic accuracy (% clinical cases)	58.3	72.2	34	57	58.1	60.2	48.5	39.6
Adherence to clinical guidelines (% clinical guidelines)	37.4	43.7	22	35	41.4	43.8	35.6	31.9
Management of maternal and neonatal complications (% clinical guidelines)	29.9	44.6	-	-	19.3	30.4	26.0	19.8
Drug availability (% drugs)	42.7	54.2	78	76	47.2	60.3	49.2	49.2
Equipment availability (% facilities)	79.5	76.4	53	78	21.9	83.5	92.6	21.7
Infrastructure Availability (% facilities)	34.0	46.8	39	19	63.5	50.0	39.2	23.8

I. INTRODUCTION[4]

In 2011 the Government of Mozambique outlined its medium-term development objectives in its third Poverty Reduction Action Plan or PARPA III. The strategy outlines the implementation of the government's Five-year program (2010–15) aimed at combating poverty and promoting a culture of work with a view to achieving inclusive economic growth and reducing poverty and vulnerability in the country. This medium-term instrument is part of the National Planning System (SNP) and is aligned with the government's commitment to the vision of Agenda 2025. To achieve the objective of inclusive economic growth for poverty reduction, the government has outlined several priorities, including the fostering of human and social development.

Mozambique has made significant strides in economic development due to the combined impact of macroeconomic stability and faster economic growth, with annual growth averaging 7.6 percent of gross domestic product (GDP) over the period 2005–09. In terms of human development indicators, the percentage of the population with access to a health facility within 45 minutes' travel by foot increased from 55 percent to 65 percent between 2002 and 2008. However, the country still faces significant health care challenges. Historically, Mozambique has had high infant, child mortality and maternal mortality rates relative to its neighbors. However, in recent years there have been noteworthy improvements. For example, child mortality decreased from 245 deaths per 1,000 live births in 1997 to 138 deaths in 2008, one of the faster reductions in Sub-Saharan Africa. Infant mortality also declined from 143.7 deaths per 1,000 live births to 93 infant deaths over the same interval. The maternal mortality ratio also declined from 692 to 500 deaths per 100,000 live births between 1997 and 2007.

Total health expenditure was 7 percent of GDP in 2013, of which 46 percent comprised government expenditure on health, and 48 percent external resources for health. While funding gaps still exist, poor human development outcomes are partly a reflection of weak links between health expenditure and outcomes. Increased funding by itself is not the ultimate solution, and it is clear that a more effective use of existing health resources could achieve more favorable outcomes. Without improved efficiency and effectiveness in service delivery, Mozambique will be constrained in its ability to achieve the objectives outlined in its Poverty Reduction Action Plan.

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.

[4] Data presented here are from the World Development Indicators database maintained by the World Bank.

The foundation for delivering on health and healthcare goals, such as the SDGs, Universal Health Coverage, and PARPA III 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]

This report presents the results from the implementation of the first SDI survey in the health sector in Mozambique. 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.

5 Spence and Lewis (2009).

6 Swanson et al. (2012).

7 Spence and Lewis (2009).

Box 2. The Service Delivery Indicators (SDI) Program

A significant share of public spending on health is transformed to produce good health outcomes at health facilities. 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 providers have to work with (e.g. basic equipment), or how much work effort is exerted by health workers (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 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 methodology[8] was used in Mozambique to assess the quality of service delivery, and provide insights on the challenges facing health service provision in the country's frontline health facilities: health centers and hospitals. The SDI surveys were conducted in all states across the three sub-regions of the country, North, Central, and South, using enumerator administered interviews and provider assessments. Survey implementation was preceded by extensive consultation with Government and key stakeholders on survey design, sampling, and the adaptation of survey instruments. Pre-testing of the survey instruments, enumerator training and fieldwork took place between February and June 2014.

B. Sampling

The survey used a multi-stage, cluster sampling strategy which allowed for disaggregation by geographic location (rural and urban), and facility type (health centers; and first level hospitals). A total of 204 randomly selected health facilities comprising 166 health centers and 38 hospitals were included. In the process 618 and 1,111 health professionals were assessed for competence and effort, respectively. The results are representative of Mozambique as a whole as well as by level of facility and location (rural/urban). Annex A provides details of the methodology and sample for the Mozambique SDI survey. The modules of the survey instrument are also shown in Table A3 (Annex A).

Table 3. Survey sample

	Total	Share of total (%)
Facilities	204	100
Health centers	166	81
Hospitals	38	19
Rural	179	88
Urban	25	12
South	77	38
Central	70	34
North	57	29

[8] See Annex A for more detailed description of the methodology and sampling strategy.

Table 4. Sample for indicators of absence and competence

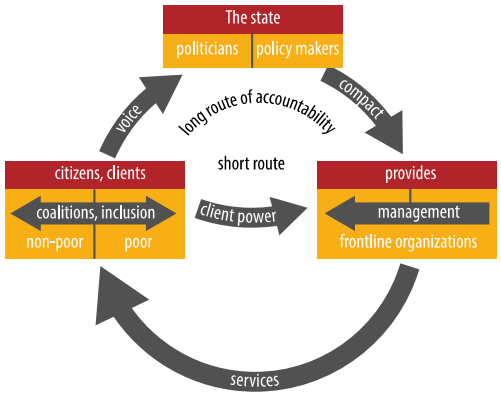
Cadre	Absence rate[a]		Caseload[b]		Competence indicators	
	Total	Percent (%)	Total	Percent (%)	Total	Percent (%)
Doctors	108	10	65	11	65	11
Clinical Officers	294	26	244	39	244	39
Nurses	471	42	309	50	309	50
Para-Professionals	30	3	-		-	
Other	208	19	-		-	
Total	1,111	100	618	100	618	100

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).

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 among other factors. We capture all these outside facility factors in the error term 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 5. Health SDI indicators

Provider Effort
Absence rate
Caseload per provider
Provider Competence
Diagnostic accuracy
Adherence to clinical guidelines
Management of maternal and neonatal complications
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.

Management and Governance
Roles and Responsibilities in Facilities
Government Supervision
Time Use
Leadership
People Management Practices
User Fees
Financial (cash) support to facilities by source
Community Involvement

III. RESULTS

C. Delivering Health Services

The number of days health facilities offer services and the number of hours per day they operate was amongst the most basic indicators for measuring health service delivery. The SDI survey found that health facilities were open on average 6.3 days per week (Table 6). Lower level facilities such as health centers were also open for patients 6.3 days per week, whereas hospitals were open for 6.7 days a week. Rural facilities were open more often than urban facilities, (6.3 days versus 5.9 days per week respectively). In the North of the country, health facilities were open 6.5 days, in the Center 6.3 days and in the South 6.2 days. According to Mozambique's 3rd Poverty Assessment report (2010) the Center was the poorest region with a headcount poverty rate of 59.7 percent, closely followed by the South with 56.9 percent and the North which is significantly less poor with 46.5 percent of people living below the poverty line, a high rate in absolute terms. Focusing on access to health care as measured by the share of population within a 45-minute walk of a health facility, the report shows that in 2008/09 roughly 75 percent of the urban population was within that distance in all three sub-region. The main difference was in the rural areas, where 69.7 percent of the population in the North being within that distance compared to only 53.6 percent and 47.6 percent in the South and Center respectively.

Table 6 also shows that facilities on average were open for 8.7 hours a day for outpatient consultations. Health centers were open 8.7 hours per day and hospitals 8.9 hours per day. The table also shows that there was some geographic variation in the hours health facilities were open. In the south of the country, all facilities were open for 9.4 hours, in the center for 8.6 hours, and in the north for 8.1 hours per day. Further information on the distribution of health personnel and clinicians conducting outpatient consultations by provider type, gender and level of facility are provided in Table C 1, Table C 2, and Table C 3 (Annex C).

Table 6. Hours and days of service delivery

	Mozambique	Rural	Urban	Percent difference (%)	South	Central	North
Number of days per week facility was open (days)							
All facilities	6.3	6.3	5.9	6.3	6.2	6.3	6.5
Health center	6.3	6.3	5.9	6.3	6.1	6.3	6.5
First level hospital	6.7	6.7	6.6	1.5	6.4	6.7	6.8
Hours outpatient consultations offered per day (hours)							
All facilities	8.7	8.7	8.2	5.7	9.4	8.6	8.1
Health center	8.7	8.7	8.1	6.8	9.4	8.6	8.1
First level hospital	8.9	8.7	9.5	-9.2	8.5	8.7	9.6

Notes: Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 7 reports the percentage of facilities offering basic (BEmOC) and comprehensive emergency obstetric care (CEmOC). Overall, 21.5 percent of facilities offered BEmOC. The percentage was higher for hospitals (83.7 percent), compared to health centers (19.6 percent). There was also considerable geographic variation with 45.8 percent of urban facilities and 19.4 percent of rural facilities offering BEmOC. Almost half (46.6 percent) of hospitals offered CEmOC.

Table 7. Availability of basic and comprehensive emergency obstetric care

% facilities	Mozambique	Rural	Urban	Percent difference (%)[a]	South	Central	North
Share of facilities offering full basic emergency obstetric care (%)							
All facilities	21.5	19.4	45.8	-136.1	25.2	16.1	26.1
Health center	19.6	17.5	44.9	-156.6	24.2	13.1	25.0
First level hospital	83.7	90	57.1	36.6**	71.4	95.0	70.0
Share of facilities offering full comprehensive emergency obstetric care (%)							
First level hospital[b]	46.6	83.3	42.9	48.5**	71.4	85.0	60.0

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.

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.

Caseloads are usually of concern because a shortage of health workers may cause caseloads to rise and potentially compromise service quality. The data for Mozambique suggests that a large share of health providers, across all facility sizes, had very high caseload levels. It is worth noting that the caseload indicator takes into account the staff absence rates, which therefore considers the true workload of health staff members.

The average caseload in the health sector was 17.4 patients per provider per day (Table 8). There was observed no rural-urban difference in caseload levels. Case mix across facility types may vary, so it is worth looking at comparisons by facility level. The highest caseloads were found in health centers at 17.6 patients per provider per day, and 8.9 patients per day at hospitals. The caseload for health workers in hospitals appeared to vary particularly by geographic area. Health providers in hospitals in the north had a caseload of 11.3, 7.8 in the south, and 7.9 in the center of the country.

Table 8. Outpatient caseload

Outpatient visits per provider per day	Mozambique	Rural	Urban	Percent difference (%)	South	Central	North
All facilities	17.4	17.4	17.3	0.6	17.2	17.7	17.1
Health center	17.6	17.5	18.1	-3.4	17.4	18.1	17.2
First level hospital	8.9	9.9	5.3	46.5	7.8	7.9	11.3

Notes: Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

Variations in caseloads by facility type are shown Figure 2. The distribution for health centers was much wider compared to hospitals. This shows that the majority of hospitals are concentrated on the low end of the caseload. The little hump on the right, however, shows that there are few hospitals where providers have large caseloads. This contrasts with the health centers who are distributed across the spectrum with a close to a Normal distribution i.e. few facilities with very low or very large caseloads. Figure 3 shows caseloads by facility type and location. For health centers, the variation in caseloads was higher in urban areas (18.1) compared to rural areas (17.5). The caseload for rural hospitals was 9.9, which was considerably higher than the caseload for urban health centers (5.3).

Figure 2. Distribution of caseload by facility type

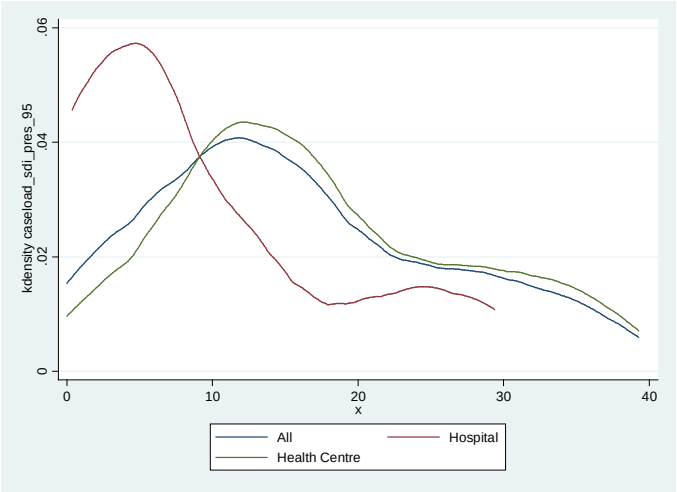
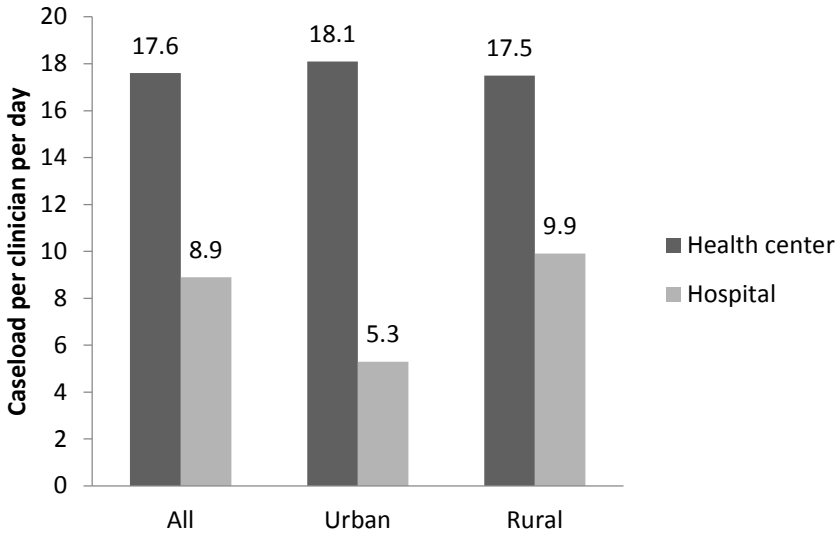


Figure 3. Caseload by facility type



Caseloads were highest in health facilities with between 3 and 5 health workers at 18.8 patients per provider per day. Larger health facilities with at least 20 health workers had a slightly lower caseload of 16.5 (Figure 4).

Figure 4. Caseload by health facility 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.

Close to a quarter (23.9 percent) of providers in health facilities were found to be absent during an unannounced visit. Absence was particularly high in urban facilities where 28.3 percent were absent, compared to 23.1 percent in rural facilities, although the difference was not statistically significant (Table 9). Absence rates at health centers were 23.2 percent. Annex C presents disaggregation of absence rates by health provider cadre type (see Figure C 1 and Figure C2). Figure 5 shows that nurses had a higher absence rate of 27.7 percent, followed by doctors (19.4 percent) and clinical officers (18.9 percent).

The caseload of health workers is to some degree influenced by demand-side factors, which may contribute to lower caseloads in rural areas and lower level facilities. The absence rate in rural health centers was 22.3 percent compared to 27.7 percent in urban health centers. Absence rates were lower in the south (22.9 percent) and the center (19.4 percent). In the north, however, absence rates were higher (30.5 percent). For the three different regions, the same pattern emerged: health workers in health centers were less likely to be absent compared to health workers in hospitals.

In any workplace setting, absence may be approved or not approved. The survey found that 23 percent of absence was approved.[9] It is possible that absence can be improved by more prudent sanctioning of absence. Improvements in the organization and management of staff can potentially improve the availability of staff for service delivery. The multivariate regression analysis presented in Table C 4 (Annex C), identifying which cadre types were most likely to be absent, confirmed these findings.

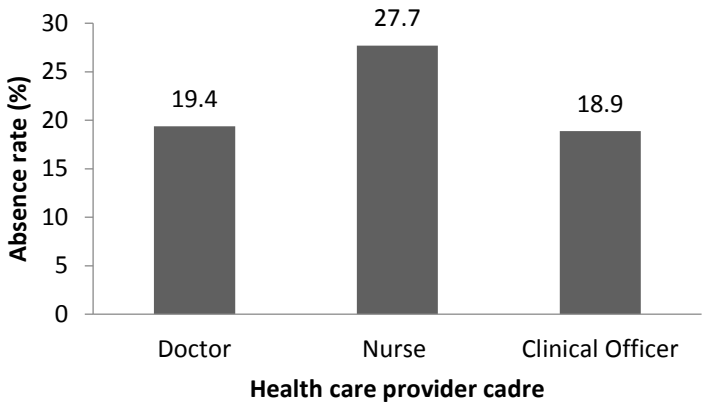
[9] This comprised health workers on sick and maternity leave, in training and seminars, on official missions, and out to retrieve salary; it excludes off-duty workers, and those conducting outreach or fieldwork.

Table 9. Absence rate by facility type

% providers	Mozambique	Rural	Urban	Percent difference (%)	South	Central	North
			Facility Type				
All facilities	23.9	23.1	28.3	-22.8	22.9	19.4	30.5

Notes: Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

Figure 5. Absence rate by cadre type



F. Diagnostic Accuracy

The SDI survey assessed provider ability and knowledge using two process quality indicators (the adherence to clinical guidelines in the tracer conditions, and the management of maternal and newborn complications, and an outcome quality indicator, diagnostic accuracy in five tracer conditions.

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 vignettes. Clinical vignettes 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.

Providers correctly diagnosed 58.3 percent of the five tracer conditions (Table 10). Diagnostic accuracy did not differ between rural and urban providers with statistical significance. Rural providers correctly diagnosed 58.5 percent of the tracer conditions compared to 57.1 percent by urban providers. Diagnostic accuracy rates varied by cadre and facility type. Doctors correctly diagnosed 72.5 percent of the tracer conditions, followed by clinical officers (61.1 percent), and nurses (54.0 percent). Providers at lower level facilities had lower diagnostic accuracy, at 57.5 percent in health centers compared to hospitals (66.0 percent). Diagnostic accuracy was highest among urban doctors and rural nurses compared to their counterparts, with statistical significance. Health providers in northern and central parts of Mozambique performed better than their southern counterparts. The highest diagnostic accuracy among doctors was found in the north (74.2 percent) and the lowest in the south (71.2 percent).

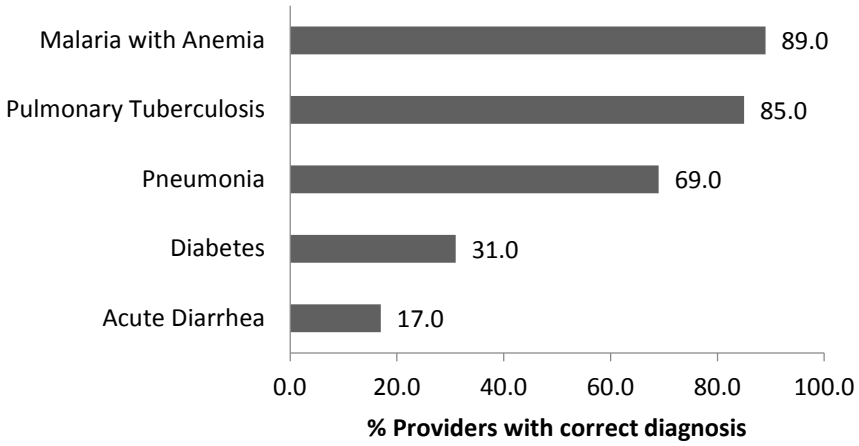
Table 10. Diagnostic accuracy by cadre type

% clinical cases	Mozambique	Health center	First level hospital	Rural	Urban	Percent difference (%)	South	Central	North
All	58.3	57.5	66.0	58.5	57.1	2.4	54.6	59.7	60.4
				Cadre					
Doctors	72.5	72.0	74.1	71.6	74.6	-4.2*	71.2	73.1	74.2
Clinical officers	61.1	60.5	66.6	61.3	59.0	43.8	56.3	61.1	63.7
Nurses	54.0	53.7	59.8	54.9	49.9	9.1**	51.3	55.1	55.7

Notes: Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

The diagnostic accuracy rate varied across specific conditions: 89 percent of providers were able to correctly diagnose malaria with anemia, while only 17 diagnosed diarrhea with acute dehydration (Figure 6). Further breakdowns on the ability to reach a correct diagnosis based on individual questions asked for each of the five tracer conditions are presented in Figures C3 to Figure C7 (Annex C).

Figure 6. Diagnostic accuracy by tracer condition



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 hemorrhage and neonatal asphyxia. This indicator reflects the unweighted share of relevant treatment actions proposed by the clinician. The set of questions is restricted to core or important questions as expressed in the Integrated Management of Childhood Illnesses (IMCI).

Providers adhered to 37.4 percent of the clinical guidelines in the management of the five tracer conditions (Table 11). There were not any significant differences between rural and urban providers except in the case of doctors. This measure of process quality was significantly higher for doctors (44.2 percent), compared to nurses (34.4 percent), and clinical officers (40.0 percent). Adherence to clinical guidelines declined by facility type, with providers in hospitals adhering to 48 percent of guidelines, and 36 percent in health centers. Adherence was highest among urban doctors, who followed more than half of clinical guidelines (57.9 percent). Adherence was lowest among urban nurses (30.9 percent). There were considerable geographic differences in the adherence to clinical guidelines among doctors: 55.5 percent of doctors in the south adhered to guidelines compared to 34.8 percent in the center and 41.3 percent in the north. For nurses and clinical officers, by contrast, the differences were less pronounced. Further breakdowns of adherence to clinical guidelines are found in Annex C.

Table 11. Adherence to clinical guidelines by cadre type

% clinical guidelines	Mozambique	Health center	First level hospital	Rural	Urban	Percent difference (%)	South	Central	North
All cadres	37.4	36.4	48.3	37.4	37.2	0.5	38.4	37.2	36.8
Doctors	44.2	40.6	57.6	38.6	57.9	-50.0***	55.5	34.8	41.3
Clinical officers	40.0	39.0	47.3	40.0	38.3	4.3	39.4	41.5	38.5
Nurses	34.4	33.7	43.9	35.1	30.9	12.0	34.8	31.9	36.1

Notes: Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

H. Management of Maternal and Neonatal Complications

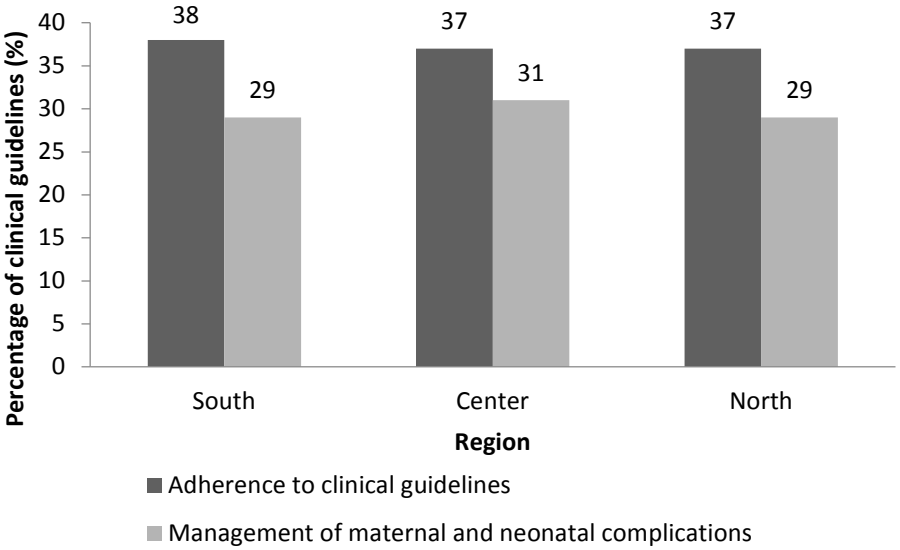
On average 29.9 percent of providers adhered to the clinical guidelines related to the management maternal and neonatal complications (Table 12). Rural providers adhered to 30.5 percent of the clinical guidelines, while urban providers adhered to 27.5 percent of guidelines, which was not statistically significant. Adherence declined by cadre type and facility level. Doctors had the highest adhered to the guidelines (36.5 percent), followed by nurses (31.1 percent), and clinical officers (26.3 percent). Rural nurses adhered to 32.4 percent of the guidelines compared to 25.1 percent among urban nurses, a difference which was statistically significant (p<0.01). Providers in health centers adhered to only 29.1 percent of guidelines compared to those in hospitals (38.4 percent). Geographic variations in both adherence measures (clinical guidelines and management of maternal and neonatal complications) are illustrated in Figure 7. Figure C8 and Figure C9 in Annex C displays the correct treatment actions for the two maternal and neonatal conditions by the questions asked, and physical examination and clinical management actions undertaken.

Table 12. Management of maternal and neonatal complications by cadre type

% clinical guidelines	Mozambique	Health center	First level hospital	Rural	Urban	Percent difference (%)	South	Central	North
All cadres	29.9	29.1	38.4	30.5	27.5	9.8	28.9	31.0	29.8
Doctors	36.5	32.8	49.6	34.5	41.4	-20.0	41.7	30.8	39.2
Clinical officers	26.3	25.5	34.0	26.5	24.7	6.8	25.2	26.3	27.1
Nurses	31.1	30.7	37.9	32.4	25.1	22.5***	28.4	34.9	30.4

Notes: Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

Figure 7. Process Quality Regional differences (North, South, Center)



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.[10]

Health facilities had close to half (42.7 percent) of priority drugs available. The availability of priority drugs for mothers was lower than for children at 39.4 percent and 49.4 percent respectively (Table 13). Table B 1 (Annex B) provides the complete list of all priority, maternal and child drugs included in the survey. Given the concern about maternal mortality, as well as efforts to improve maternal health outcomes, the availability of priority drugs for mothers was lower than ideal.

Availability of priority drugs also varied by facility type. Hospitals had a higher proportion of all priority drugs (66.2 percent) compared to health centers (41.0 percent). Similarly, hospitals had a higher proportion of priority drugs for women and children. Although the results show some geographic differences in the availability of priority drugs, these differences are not significant. Southern Mozambique had the highest availability of all priority drugs (44.5 percent). Southern Mozambique also had the highest availability of priority drugs for mothers (42.3 percent). In contrast, central Mozambique had the highest availability of priority drugs for children (49.7 percent).

Table 13. Availability of priority drugs by facility type

% drugs	Mozambique	Rural	Urban	Percent difference (%)	South	Central	North
			All drugs				
All facilities	42.7	42.6	43.9	-3.1	44.5	41.1	43.3
Health center	41.0	41.0	41.2	-0.5	44.0	40.2	42.7
First level hospital	66.2	66.2	66.1	0.2	67.9	65.2	66.7
			Drugs for mothers				
All facilities	39.4	38.1	42.2	-10.8	42.3	36.7	40.3
Health center	38.5	38.4	40.7	-6.0	41.7	35.6	39.6
First level hospital	66.9	67.4	65.2	3.3	68.8	66.1	67.1
			Drugs for children				
All facilities	49.4	49.6	46.8	5.6	49.0	49.7	49.1
Health Center	48.9	49.2	45.2	8.1	48.7	49.2	48.7
First level hospital	64.7	63.8	67.9	-6.4	66.1	63.6	65.7

Notes: Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

[10] WHO (2011). Priority medicines for mothers and children 20122. Geneva World Health Organization. www.who.int/medicinces/publications/A4prioritymedicines.pdf.

Health facilities in general were stocked with around three-quarters (75.1 percent) of priority vaccines (Table 14). Urban health facilities were better stocked with priority vaccines (76.6 percent) compared to rural facilities (74.9 percent). Health centers had higher stocks of vaccines, (75.2 percent), compared to hospitals (74.0 percent). Hospitals in rural areas had larger stocks of vaccines (77.6 percent) compared to hospitals in urban locations (60.7 percent).

Table 14. Availability of vaccines by facility type

% of facilities	Mozambique	Rural	Urban	Percent difference (%)	South	Central	North
All facilities	75.1	74.9	76.6	-2.3	78.2	72.9	74.9
Health center	75.2	74.8	77.8	-4.0	78.4	73.2	74.6
First level hospital	74.0	77.6	60.7	21.8	69.6	67.9	90.0

Notes: Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

Facilities were relatively well stocked with individual vaccines (Figure 8), with the exception of the Hepatitis B vaccine. Vaccine-related commodities were also relatively well stocked, including disposable syringes, sharps containers, vaccine carriers and packs (Figure 9). Hospitals, however, were not stocked with functional refrigerators and vaccine packs. Table 15 shows the availability of functional refrigerators (with temperatures measured between 2 and 8 degrees). 71.9 percent of facilities were found to have functional refrigerators.

Figure 8. Availability of individual vaccines by facility type

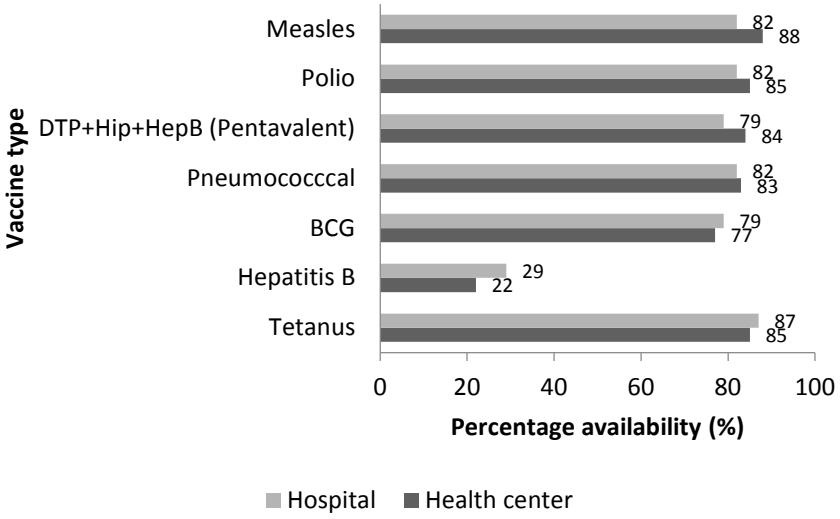


Figure 9: Availability of equipment and vaccine related supplies by facility type

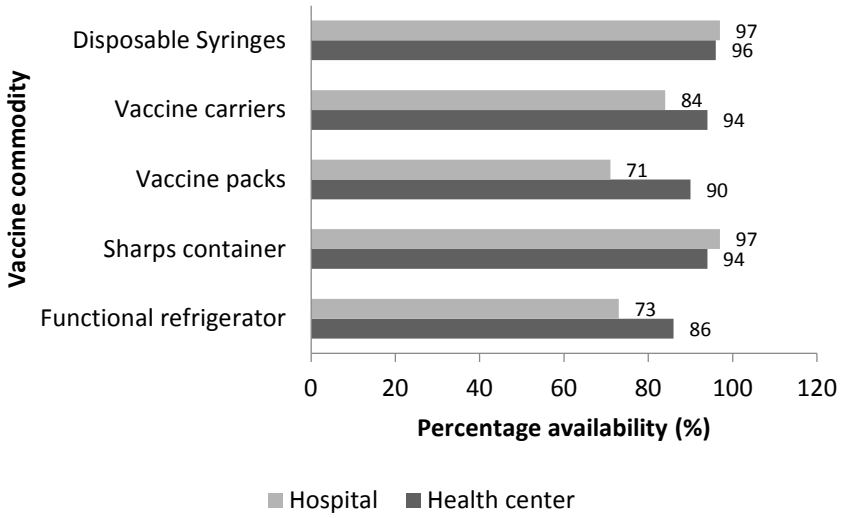


Table 15. Safe vaccines storage

% of refrigerators with temperature 2 – 8 C	Mozambique	Rural	Urban	Percent difference (%)	South	Central	North
All facilities	71.9	74.5	45.3	39.2	65.2	74.1	75.0
Health center	71.9	74.6	43.6	41.6*	64.8	73.9	75.7
First level hospital	71.4	79.9	80.0	-0.1	83.3	83.3	50.0

Notes: Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

J. 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.

More than three quarters of all health facilities (79.5 percent) met the requirements that make up the equipment indicator, adjusted for health facility level (Table 16). Equipment availability varied by facility type, with 79.3 percent of health centers and 74.6 percent of hospitals meeting the minimum equipment requirements. Equipment availability varied considerably across Mozambique's three regions. In the center of the country, 82.9 percent of facilities met the minimum requirements, followed by the south (79.3 percent), and the north, (74.1 percent). All hospitals in the north met the minimum requirements.

Table 16. Availability of basic equipment by facility type

% facilities	Mozambique	Rural	Urban	Percent difference (%)	South	Central	North
All facilities	79.5	78.8	82.8	-5.1	79.3	82.9	74.1
Health center	79.3	78.9	84.4	-7.0	79.4	83.7	73.5
First level hospital	74.6	76.7	62.5	18.5	75.0	60.0	100

Notes: Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 17 shows the availability of the specific types of medical equipment included in the equipment indicator. Almost all facilities had a scale (which included infant, child or adult scales), thermometers or sterilization equipment. The availability of these types of equipment did not vary considerably by geographic area or health facility type. Sphygmomanometers were available in 81.7 percent of facilities and almost three quarters (73.6 percent) had refrigerators. Almost all hospitals had a sphygmomanometer (97.4 percent) compared to 81.2 percent of health centers. Refrigerators were more available in rural areas compared to urban areas. Further information on the availability of inputs such as communication equipment, and the availability of emergency transport (such as ambulances) is available in Annex C.

Table 17. Availability of basic equipment by equipment type

% of facilities	Mozambique	Health center	First level hospital	Rural	Urban	Percent difference (%)	South	Central	North
Any scale	99.6	99.6	100	99.6	100	-0.4	100	100	98.7
Sphygmomanometer	81.7	81.2	97.4	81.4	85.5	-5.0	83.8	85.1	75.4
Thermometer	95.2	95.1	97.4	95.2	95.2	0	94.6	97.8	92.1
Refrigerator	73.6	-	73.7	76.7	62.5	18.5	75.0	60.0	100
Sterilization equipment	100	-	100	100	100	0	100	100	100

Notes: Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

K. 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.

A third of all facilities (34.0 percent) met the minimum infrastructure requirements (Table 18). The figure was considerably higher for hospitals (63.2 percent) compared to health centers (32.1 percent). There were also considerable differences between rural and urban facilities. Approximately 54.3 percent of facilities in urban areas met the minimum infrastructure requirements compared to 32.1 percent of rural facilities (p<0.05). A little over half (52.7 percent) of urban health centers met infrastructure requirements compared to 31.4 percent of rural health centers. Infrastructure availability also varied by Mozambique's three regions. The center had the highest infrastructure availability (46.0 percent).

Table 18. Availability of infrastructure by facility type

% of facilities	Mozambique	Rural	Urban	Percent difference (%)	South	Central	North
All facilities	34.0	32.1	54.3	-69.2**	36.7	46.0	15.7
Health center	32.1	31.4	52.7	-67.8	36.2	44.8	15.4
Hospital	63.2	60.0	75.0	-25.0	62.5	80.0	30.0

Notes: Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

The average estimates of individual components of infrastructure availability were relatively high (80.0 percent of facilities had clean water, 73.4 percent had access to electricity, and 56.8 percent had an improved toilet). However, when the simultaneous availability of all three infrastructure components was assessed, only 34.0 percent of facilities had clean water *and* sanitation *and* electricity (Table 19).

Table 19. Availability of specific types of infrastructure

% of facilities	Mozambique	Health center	First level hospital	Rural	Urban	Percent difference (%)	South	Central	North
Electricity	73.4	72.8	94.7	71.9	90.2	-25.5	92.2	72.5	58.4
Clean water	80.0	79.6	94.7	78.3	99.1	-26.6	88.3	80.8	71.8
Toilet	56.8	56.5	68.4	56.9	55.2	3.0	45.9	81.9	33.2

Notes: Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

L. User Fees

The vast majority of health facilities (96.7 percent) charged user fees. (Table 20). There were, however, many groups who were exempt from user fees (Table 21). The most frequently exempt groups from user fees were individuals with chronic disease (84.0 percent), the elderly (69.6 percent), and children under 5 years (67.1 percent). Almost half of all facilities (47.4 percent) waived user fees for poor individuals. Overall, hospitals appeared to exempt more groups from user fees compared to health centers.

Table 20. Facilities that charge user fees

% of facilities	Mozambique	Rural	Urban	Percent difference (%)	South	Central	North
All facilities	96.7	96.4	100	-3.7	95.7	94.9	100
Health center	96.7	96.4	100	-3.7	95.6	94.9	100
Hospital	97.4	96.7	100	-3.4	100	95.0	100

Notes: Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 21. Facilities that implement user fees exemptions for specific groups

% of facilities	Mozambique	Health center	First level hospital	Rural	Urban	South	Central	North
Exemption category								
Chronic disease patients	84.0	83.7	94.7	79.7	84.4	77.3	83.5	90.3
Elderly	69.6	68.7	100	75.7	69.0	65.8	77.8	62.1
Very poor	47.4	47.1	55.3	39.0	48.1	51.8	54.1	34.6
Staff	28.6	28.6	28.9	28.0	28.6	24.8	30.4	29.6
Relatives of staff	9.2	9.0	15.8	7.1	9.3	6.8	8.2	12.5
Civil servants	16.4	16.4	15.8	15.6	16.5	10.5	15.3	23.1
Politicians	18.0	18.2	13.2	1.8	19.5	5.0	18.9	28.1
Children under 5 years	67.1	66.4	94.7	69.9	66.9	58.4	67.0	74.9

Only 10.0 percent of facilities in Mozambique shared financial information with the community, (Table 22). The share of these was higher in urban areas (12.0 percent), compared to rural areas (9.9 percent). Facilities in Mozambique showed considerable delays in paying salaries (see Table C14 in Annex C for more details).

Table 22. Facilities that share financial information with community

% of facilities	Mozambique	Rural	Urban	South	Central	North
All facilities	10.0	12.0	9.9	8.9	3.1	20.1
Health center	10.0	11.0	9.9	8.8	3.0	20.0
First level hospital	10.5	25.0	6.7	12.5	5.0	21.0

M. Organization and Governance

The questionnaire asked managers of health facilities about their views on a variety of governance and organization issues. Managers were asked what they believed to be important obstacles in the functioning of their health facility (Table 23). Shortage of equipment (18.8 percent), personnel (15.9 percent), and medicines (13.4 percent) were the most frequently cited reasons. Health center managers cited shortage of equipment as the primary reason, while hospital managers cited shortage of personnel.

Table 23. Most important obstacle for good functioning

% of facilities	Mozambique	Health center	First level hospital	Rural	Urban	South	Central	North
Shortage of								
Personnel	15.9	15.7	23.7	17.2	15.8	16.8	14.5	16.9
Medicines	13.4	13.6	5.3	10.2	13.7	13.1	15.1	11.6
Equipment	18.8	19.2	7.9	25.5	18.2	27.1	12.4	20.1
Infrastructure	8.9	8.7	15.8	28.7	7.1	4.6	12.4	8.1
Other	20.0	27.9	31.6	12.8	29.4	40.8	45.7	43.1

The questionnaire also inquired about the perception of autonomy of health facilities (Table 24). Facility managers cited the district government as the main authority for the majority of day to day decisions. Around 77.3 percent of managers stated that they were the primary decision maker in requests for medicines. Overall, more than half of the managers felt that they could not significantly influence the main decision maker, which is the district government.

Table 24. Autonomy and decision making in health facilities

% of facilities	Main decision maker	Percent (%)	Degree of influence over decision maker	Percent (%)
Decision autonomy over				
Request more drugs	Director	77.3	Some	39.1
Recruit health workers	District government	78.9	No	58.1
Promote health workers	District government	80.6	No	75.0
Take disciplinary actions	District government	64.8	No	52.7
Repairs in facility	District government	71.8	No	39.5
Approve absences	District government	58.0	No	51.1
Decide who receives training	District government	78.1	No	71.4
Establish user fees	District government	70.3	No	89.0
Decide on user fee revenue	District government	87.2	No	85.5

Health facilities fall under the purview of various levels of administration and usually receive supervision visits from the district or the central level. Supervision visits may be technical, operational, or financial. Table 25 shows the number of total supervision visits health facilities in Mozambique received from higher levels of the administration. Health facilities in Mozambique are quite frequently visited as the average facility received 5.6 visits the past year. During these visits, the supervisors provided feedback on a number of matters pertaining to the efficient functioning of the health facility. Commonly cited aspects during feedback were the quality of care (67.1 percent), equipment (65.6 percent) and medical supply (59.4 percent). The least mentioned aspects were health worker training (5.6 percent), budget and financial matters (7.5 percent) and health worker competence (19.7 percent).

Table 25. Frequency and quality of supervision visits

Frequency of supervision visits (number in past year)	5.6
Actions during supervision visits Feedback on:	% providers
Budget and financial matters	7.5
Equipment	65.6
Infrastructure	36.0
Medical supply	59.4
Medicine stocks	22.5
Epidemiological reporting	19.8
Administrative reporting	37.7
Quality of care	67.1
Director performance	33.6
Health worker performance	36.4
Health worker attendance record	31.4
Health worker competence	19.7

IV. WHAT DOES THIS MEAN FOR MOZAMBIQUE?

Successful service delivery requires that all the elements of service delivery be present at a facility at the same time: a competent provider, a provider that is present, and available inputs. For instance, while the average estimates of the individual components of the infrastructure indicator might appear relatively high (e.g. 73.4 percent having electricity, 80.0 percent having clean water) the picture worsens when the availability of all three components are assessed simultaneously at the same facility with only 34.0 percent of facilities meeting the infrastructure requirements. Even more disconcerting is the finding that health facilities had just 39.4 percent of priority drugs for mothers in stock and non-expired. More optimistically, however, 79.5 percent of facilities met minimum equipment requirements.

The results suggest that the bottlenecks pertaining to the provision of health services are not necessarily the result of under-staffed facilities as they had decent number of personnel. However, the available staff seemed to lack basic knowledge for assessing common conditions. In addition, it appears that inadequate management of available personnel leads to high absenteeism and low productivity. Poor management of human resources was a key factor in influencing the productivity of health care workers. Lower cadre health professionals demonstrated both lower levels of diagnostic accuracy and lower levels of adherence to clinical guidelines. In addition, health facilities demonstrate gaps in input availability, particularly basic infrastructure and drugs. It is imperative that in conjunction with developing better capacity for the management of human resources (both their knowledge and productivity), health facilities are also equipped with the vital inputs to provide quality services. Without quality service provision, proximity and presence of facilities do not translate into improved access and ultimately health outcomes.

Sub-optimal levels of provider knowledge and absence rates in the health sector seem to point towards the need for a sharper focus on management, incentives, and accountability. Enhancing the availability of inputs at facilities is key but will not ultimately succeed in improving health outcomes when not accompanied by measures to address gaps in knowledge and productivity. A greater attention to all aspects of service provision is critical to yielding the desired improvement in health outcomes.

V. ANNEXES

ANNEX A. SAMPLING STRATEGY

Summary

The sampling strategy was designed with the dual aims of producing nationally representative estimates and having a minimum power of 80 percent with 0.05 significance level for comparison of key service delivery indicators. The sample strategy also allowed for disaggregation by geographic location (rural/urban) and facility level (see **Table A1**).

Table A1. Survey sample

	Total	Share of total (%)
Facilities	204	100
Health centers	166	81
First level **hospital**	38	19
Rural	179	88
Urban	25	12
South	77	38
Central	70	34
North	57	29
Health workers[a]	1,111	100
Doctors	108	10
Clinical officers	294	27
Nurses and midwives	471	42
Paraprofessionals and other	238	21

Table A2. Sample for indicators of absence and competence

Cadre	Absence[a]		Caseload[b]		Competence[c]	
	Total	Share of total (%)	Total	Share of total (%)	Total	Share of total (%)
Doctors	108	10	65	11	65	11
Clinical Officers	294	26	244	39	244	39
Nurses	471	42	309	50	309	50
Para-Professionals	30	3	-		-	
Other	208	19	-		-	
Total	1,111	100	618	100	618	100

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).

We conducted a census of facilities, leaving 166 primary facilities to be sampled. A total of 204 health facilities have been sampled and the distribution per region by facility type is shown in Table 19. The sample was reduced from originally 300 facilities due to logistical and financial problems, and provide a representative snapshot of the health services environment in public facilities in Mozambique.

The sampling strategy was a simple random sample using the stratification detailed above. However, during fieldwork, the sample was reduced from originally 300 facilities to 204 health facilities due to logistical and financial problems. The sample was originally drawn for those 300 facilities and the necessary sample reduction was done after a third of the sample had already been surveyed. To decide which additional facilities were to be sampled, we used the following decision criteria: For each open stratum, we decided to close the stratum if the resulting standard error was lower than the resulting standard error from randomly sampling using the above mentioned methodology.

$$\text{SE(Close Open Stratums)} < \text{SE(Sample Randomly)}$$

$$\frac{K^2}{N^2}\frac{1}{S_K} + \frac{(N-K)^2}{N^2}\frac{1}{27-(S_k-V_k)} < \frac{1}{27}$$

where K was the population in the stratum, N was the sum of total population in remaining open strata, S_K was the sample for the strata k, and V_k was the number of visited facilities in the strata k.

Replacement facilities were drawn from each location in case the sampling frame included health facilities that no longer existed, were not functional, or were inaccessible due to security concerns. Note, these back-up facilities were not to be used for logistical ease. Replacement health facilities were selected in keeping with the probability sampling approach.

Sampling Strategy in Detail[11]

This section explains in detail the methodology used to select which health facilities to choose from once we reduced the sample size from 300 to 204 facilities, as well as how to re-construct the weights.

Definitions

Basic variable definitions:

Total population:		N_{total}
Population in one of the strata:		K *(or K_i)*
Sampled number in one of the strata:	S	*(or S_i)*
Outcome in facility *j* within stratum *i*:	X_{ij}	
Variance of X_{ij} (ignoring stratum effects):	□²	

After initial fieldwork, some strata were "closed," meaning that all S_i of K_i had been visited. Others were "open," meaning that some had been visited, and some had not. In this setting, we made three further definitions:

Number visited during initial fieldwork in one of the strata:	V	*(or V_i)*	
Total population across all "open" strata:		N	*(or N_i)*
Additional ("top-up") number to visit in one of the strata:	t	(or t_i)	

[11] This section was written by Owen Ozier, DECRG.

In-field sampling problems

The scenario we faced was that the budget constraint became tighter during field work, so fewer facilities were able to be visited than originally envisioned. We sampled 300 facilities, but could only go to 204. We learned this after visiting 177 and closing 8 out of the 22 strata. Based on this, we needed to visit 27 more facilities. The question was: which ones? The decision had to be made very quickly, so we made simplifying assumptions in order to rapidly develop a strategy.

A stark view of the situation held that any sub-sample that had been visited already was subject to potential bias towards "easy-to-visit" facilities that might have different observable and unobservable characteristics from others. The options, in each stratum, were then to re-sample afresh, or to "close" the stratum by completing the visits to the originally sampled facilities.

If we re-sampled all "open" strata afresh, *completely ignoring work that had been done*, we would need to visit 27 facilities, and these facilities would be drawn in a way that would represent the total "open" population. Simplifying away stratum-fixed effects, then, in relation to the variance, $\square^2$, of the underlying random variables of interest, X_{ij}, the variance of the resulting estimator would be:

$$Var\left(\frac{1}{28}\sum_{j=1}^{28} X_{ij}\right) = \frac{1}{28}\sigma^2$$

If, instead, a single stratum under consideration were "closed," visiting the remaining sampled facilities, leaving the rest of the open strata to be randomly re-sampled in this way, we would have the following estimator:

$$\frac{K_1}{N}\cdot\frac{1}{S_1}\sum_{j=1}^{S_1} X_{1j} + \frac{N-K_1}{N}\left(\frac{1}{28-(S_1-V_1)}\sum_{j=1;i\neq 1}^{28-S_1} X_{ij}\right)$$

The variance here was:

$$\left(\frac{K_1^2}{N^2}\frac{1}{S_1} + \frac{(N-K_1)^2}{N^2}\frac{1}{28-(S_1-V_1)}\right)\sigma^2$$

The decision was over which variance was greater. Dividing out by the common variance term, in an earlier write-up with slightly different notation, this decision was given by the following equation:

$$\text{SE(Close Open Stratum)} < \text{SE(Sample Randomly)}$$

$$\frac{K^2}{N^2}\frac{1}{S_K} + \frac{(N-K)^2}{N^2}\frac{1}{28-(S_k-V_k)} < \frac{1}{28}$$

For large S and small V, this clearly favoured closing the open stratum. In the opposite

conditions, it did not. Once the decision was made for one stratum to be closed, the problem could be re-optimized for the remaining strata. We did not check whether this algorithm was globally optimal, but it would lead to a local optimum. Three strata were closed containing 5 facilities, leaving 19 randomly sampled from the remaining open strata (11).

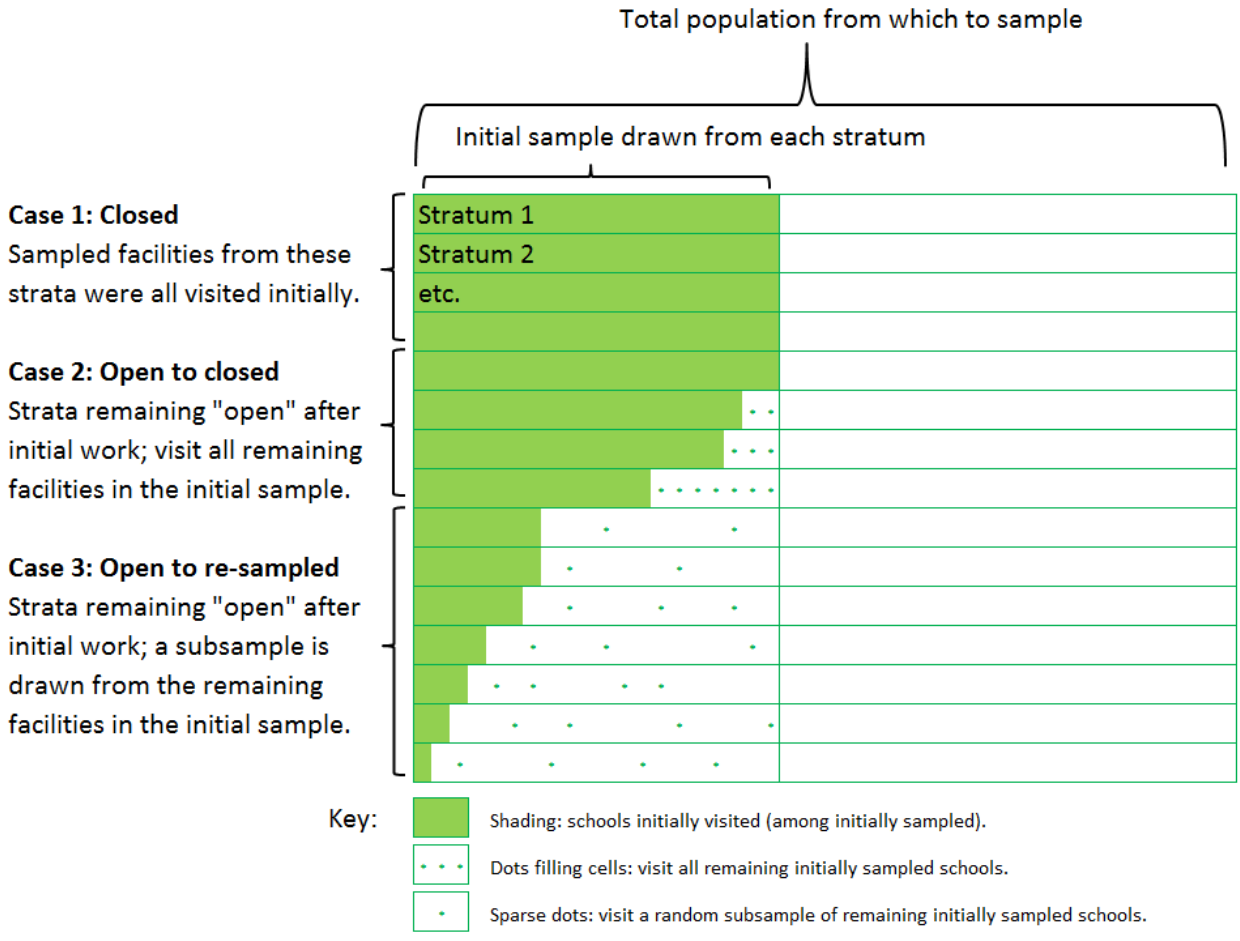
How to weight observations in the analysis.

A simplifying assumption we made was that for open strata that we didn't close, we would re-sample afresh, ignoring work done previously. Procedurally, this meant that we didn't need to revisit those re-sampled facilities that *happened* to have already been visited. However, we would have to visit the rest of the re-sampled health facilities and could discard the observations of the others. The "top-up" number of new visits needed in a given stratum would then fall between 0 and all the remaining facilities:

$0 < t_i \leq (S_i - V_i)$.

In reality, we intended to use the data already collected, and to re-sample only from the $(S_i - V_i)$ facilities that had been originally sampled but not yet visited in each stratum *i*. See Figure A1 below:

Figure A1: Understanding the Sampling Strategy



The next question we faced was how to weight the resulting facilities in the estimation process.

The goal was to weight each observation by the inverse of the probability that it was included in the ultimate sample. This meant that the original plan called for weighting each observation by the stratum size over the sampled number in that stratum:

$$\text{Original weights: } (K_i / S_i)$$

In clinical cases 1 and 2 shown in Figure A1, the original strategy and weights still held. The question was what to do in Clinical case 3.

The simple approach to Clinical case 3, though it was not preferred, was to take the probability to be fixed at the stratum level. Had the initial visits been randomized within each stratum sample, this would be true. The new inverse probability weight would then be:

$$(K_i / V_i + t_i)$$

We suspected that the initially visited facilities were systematically different – they were easy to visit, and may have been different in both econometrically observable and unobservable ways. They were likely not representative of the strata. However, we proposed this approximation that we believed handled Clinical case 3 more accurately:

The initially visited V_i of the initially sampled S_i facilities in a stratum of total size K_i were representative of a fraction of the stratum: in particular, they were representative of a fraction approximately equal to V_i/S_i of the stratum. As such, for those facilities that were initially visited, the V_i initially visited facilities retain their original weights, (K_i / S_i).

The top-up sample in each stratum, totaling t_i, represented (approximately) the rest of the stratum: a fraction of approximately $(S_i - V_i)/S_i$ of the stratum. Since the stratum was of total size K_i, the right weight – the inverse of the probability that one of the newly re-sampled t_i facilities was ultimately visited – was given by:

$$((S_i - V_i) \cdot K_i) / (S_i \cdot t_i)$$

In practice, the two weighting schemes described above may or may not yield very different estimated means or standard errors, depending on the actual numbers in the sample and the extent and nature of heteroskedasticity in the observations. One check to ask whether those facilities visited earlier were not representative along observables, was simply to estimate the following equation using OLS:

$$Y_{ij} = \alpha \text{Early}_{ij} + \sum_i \beta_i \text{Stratum}_i + \varepsilon_{ij}$$

Here, Early_i was an indicator for whether a facility was visited before (1) or after (0) the fieldwork was halted for re-sampling; the set of indicators Stratum_i were used to estimate fixed effects for strata; and Y_i was any outcome or observable of interest.

Survey Instrument

The survey instrument consists of the six modules composed as follows:

Table A3. 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 Diarrhea + Dehydration Section E: Clinical case Patient 2 Pneumonia Section F: Clinical case Patient 3 Diabetes Mellitus Section G: Clinical case Patient 4 Pulmonary Tuberculosis Section H: Clinical case Patient 5 Malaria + 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

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.
Adherence to clinical guidelines	
Unweighted average of the share of relevant history taking questions, the share of relevant examinations performed.	For each of the following five clinical cases: (i) acute diarrhea; (ii) pneumonia; (iii) diabetes mellitus; (iv) pulmonary tuberculosis; (v) malaria with 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 diarrhea; (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 the health facilities.	Priority medicines for mothers: Assign score of one if facility reports and enumerator confirms/observes the facility has the drug available and non-expired on the day of visit for the following medicines: Oxytocin (injectable), misoprostol (cap/tab), sodium chloride (saline solution) (injectable solution), azithromycin (cap/tab or oral liquid), calcium gluconate (injectable), cefixime (cap/tab), magnesium sulfate (injectable), benzathinebenzylpenicillin powder (for injection), ampicillin powder (for injection), betamethasone or dexamethasone (injectable), gentamicin (injectable) nifedipine (cap/tab), metronidazole (injectable), medroxyprogesterone acetate (Depo-Provera) (injectable), iron supplements (cap/tab) and folic acid supplements (cap/tab).

	Priority medicines for children: Assign score of one if facility reports and enumerator confirms after observing that the facility has the drug available and non-expired on the day of visit for the following medicines: Amoxicillin (syrup/suspension), oral rehydration salts (ORS sachets), zinc (tablets), ceftriaxone (powder for injection), artemisinin combination therapy (ACT), 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, dispensaries./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 1. Drugs identified in the Service Availability and Readiness Assessment and drugs assessed in the Mozambique SDI survey

Drug	Mozambique SDI (all)	Mozambique SDI (mothers)	Mozambique 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

% of sample	Mozam-bique	Health center	South	Central	North	First level hospital	Urban	Rural	Women	Men
Director	2.9	3.3	2.8	3.4	2.5	1.3	2.0	3.1	1.0	4.9
Doctor (specialist)	0.7	0.6	2.4	0	0.1	1.4	3.1	0.1	0.8	0.6
Doctor (generalist)	2.1	1.0	2.2	1.5	0.8	6.6	5.8	1.1	1.9	2.3
Nurse	42.5	43.8	43.5	41.0	43.5	37.3	40.6	43.1	54.1	30.4
Clinical officer	24.1	22.5	14.2	25.2	34.3	30.6	14.7	26.9	16.4	33.1
Assistant clinical officer	2.1	1.6	0.9	2.6	0.3	4.2	0.6	2.5	1.6	2.7
Midwife	1.2	1.7	0.3	1.9	1.3	0.4	3.1	0.6	2.4	0.1
Laboratory technician	3.4	3.0	3.2	3.9	2.9	5.0	3.5	3.4	1.3	5.6
Health worker	0.4	0.5	-	1.2	-	-	1.1	0.2	0.5	0.4
Other	19.9	21.5	29.8	21.1	14.1	13.1	24.4	18.6	19.7	20.1

Table C 2. Distribution of women

% of women	Mozam-bique	Health Central	First level hospital	Urban	Rural	South	Central	North
Director	1.0	1.1	0.9	1.6	0.7	1.6	0.8	0.5
Doctor (specialist)	0.8	0.7	2.0	2.6	0.2	2.1	-	0.1
Doctor (generalist)	1.9	0.9	7.3	5.3	0.7	3.3	0.9	1.3
Nurse	54.1	55.1	48.6	44.7	57.5	50.9	55.8	56.3
Clinical officer	16.4	15.1	23.7	12.1	17.1	10.1	16.8	25.8
Assistant clinical officer	1.6	1.1	4.2	0.4	2.1	1.1	1.7	0.5
Midwife	2.4	2.7 percent	0.7	4.9	2.4	0.5	4.1	3.1
Laboratory technician	1.3	1.1	2.0	2.0	1.0	1.9	1.7	0.5
Health worker	0.5	0.6	-	1.3	0.2	-	1.4	-
Other	19.7	21.5	10.2	24.9	17.8	27.8	18.8	15.2

Table C 3. Distribution of men

% of men	Mozam-bique	Health center	First level hospital	Urban	Rural	South	Central	North
Director	4.9	5.8	1.7	2.2	5.4	4.9	5.7	4.1
Doctor (specialist)	0.6	0.5	0.9	3.9	-	2.8	-	0.4
Doctor (generalist)	2.3	1.1	6.1	6.7	1.4	5.9	2.0	0.4
Clinical officer	33.1	31.1	35.7	22.2	35.2	22.3	33.6	39.4
Assistant clinical officer	2.7	2.3	4.1	1.0	3.0	0.6	4.1	2.4
Nurse	30.4	30.9	28.8	33.3	29.8	30.2	27.5	33.6
Midwife	0.1	-	0.1	-	-	-	-	0.1
Laboratory technician	5.6	5.1	7.3	6.2	5.5	5.7	6.1	5.1
Health worker	0.4	0.5	-	0.8	0.3		1.0	-
Other	20.1	21.5	15.4	23.6	19.4	28.3	20.3	15.1

Figure C 1. Staff absenteeism in public sector by cadre and location

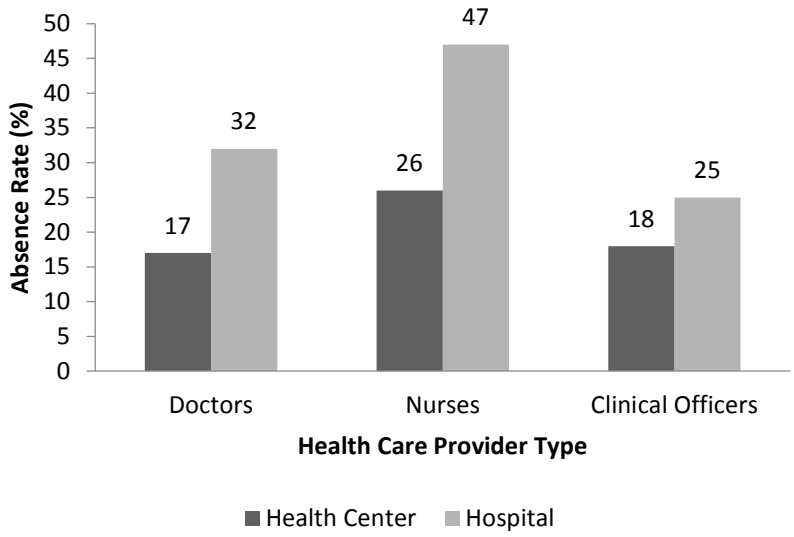


Figure C2. Absence by reason and cadre

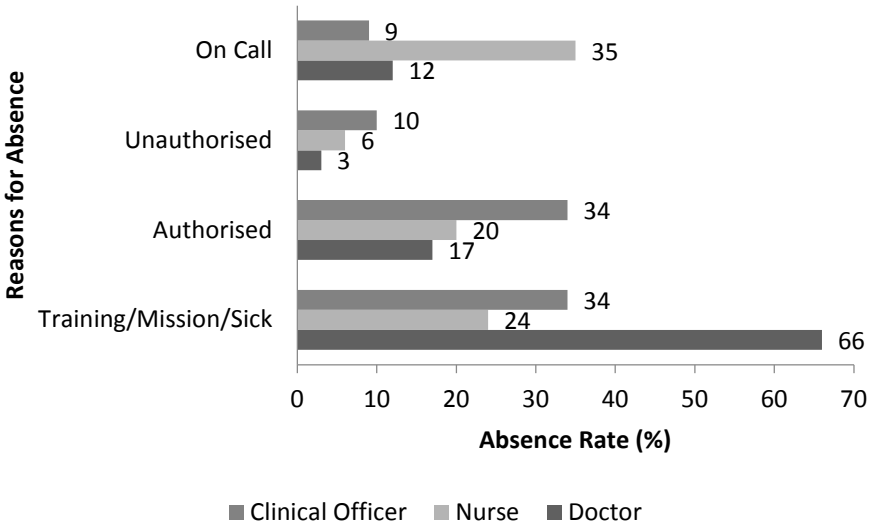


Table C 4. Absenteeism linear probability regressions

	Dependent variable: Absence dummy variable			
	[1]	[2]	[3]	[4]
Male is reference group				
Female	-0.047	-0.084**	-0.090***	-0.091***
	(0.03)	(0.04)	(0.03)	(0.03)
Age	-0.005***	-0.006***	-0.007***	-0.007***
	(0.00)	(0.00)	(0.00)	(0.00)
Nurse is reference group				
Doctor		-0.141**	-0.198***	-0.197***
		(0.06)	(0.06)	(0.06)
Clinical officer		-0.095**	-0.113***	-0.113***
		(0.04)	(0.04)	(0.04)
Facility with 1-2 workers is reference group				
2 - 5 health workers			0.172***	0.171***
			(0.05)	(0.05)
5 - 10 health workers			0.138***	0.138***
			(0.05)	(0.05)
11 - 20 health workers			0.200***	0.200***
			(0.07)	(0.07)
More than 20 health workers			0.304***	0.308***
			(0.05)	(0.05)
Health center is reference group				
Hospital				-0.014
				(0.07)
Constant	0.515***	0.599***	0.491***	0.491***
	(0.06)	(0.07)	(0.08)	(0.08)
Observations	781	781	781	781
R squared	0.013	0.025	0.077	0.077

Note: Robust standard errors in parentheses. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1. The regression controls for additional provider- and facility level variables such location, experience, etc.

Figure C3. Diagnostic accuracy by questions asked: Acute diarrhea with severe dehydration

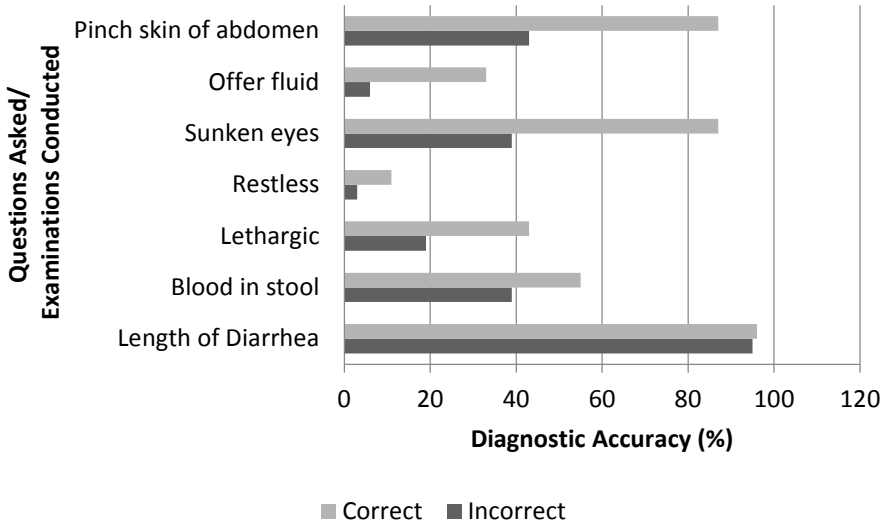


Figure C4. Diagnostic accuracy by questions asked: Pneumonia

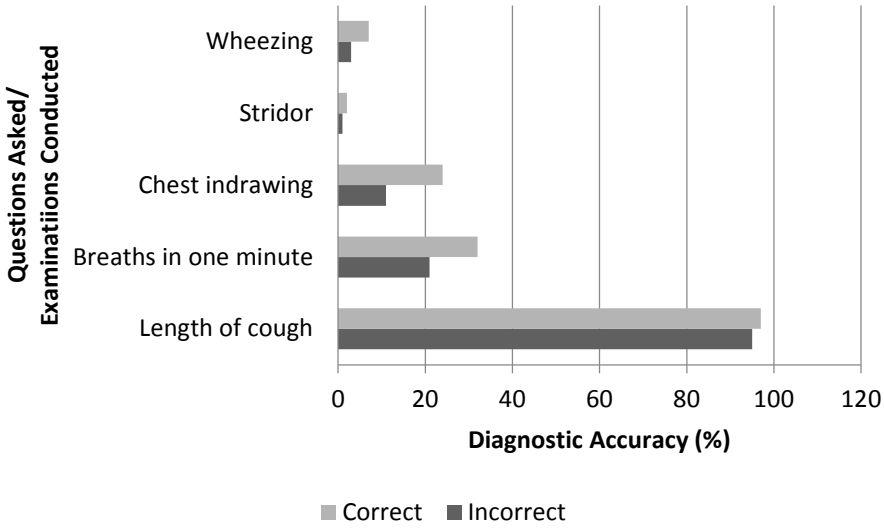


Figure C5. Diagnostic accuracy by questions asked: Diabetes type II

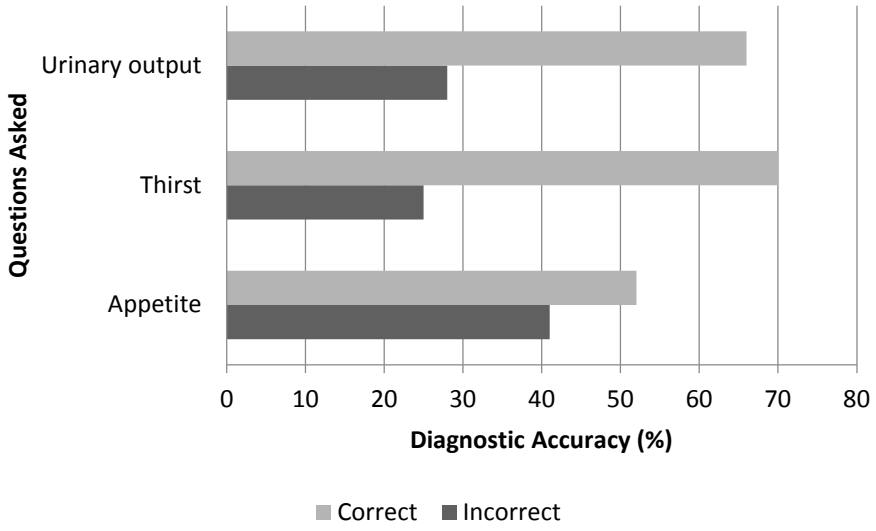


Figure C6. Diagnostic accuracy by questions asked: Tuberculosis

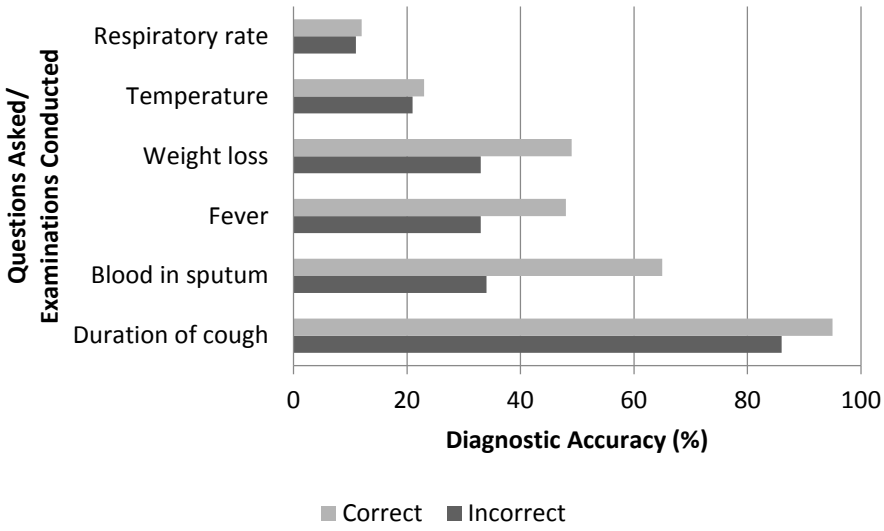


Figure C7. Diagnostic accuracy by questions asked: Malaria

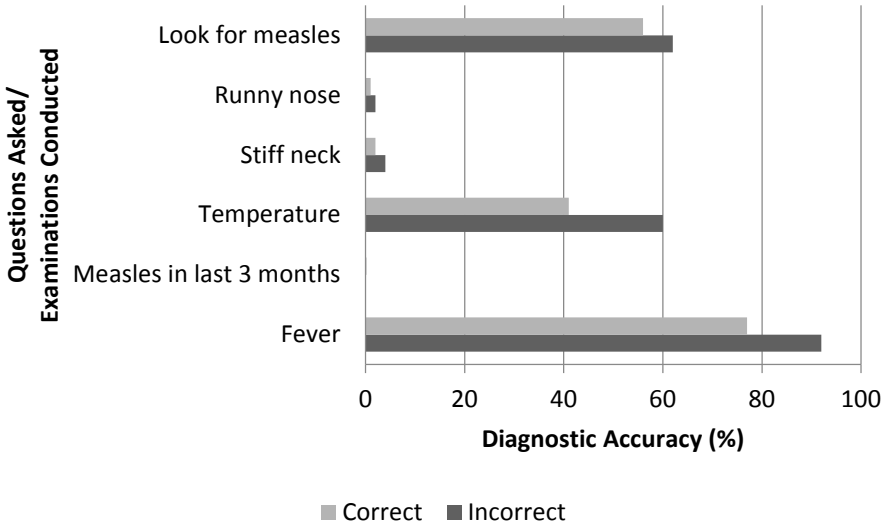


Figure C8. Correct treatment actions: Post-partum hemorrhage

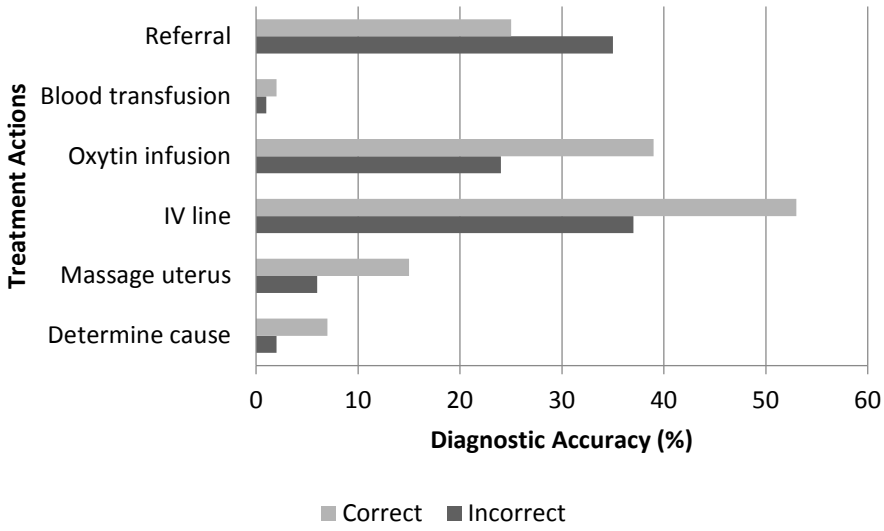


Figure C9. Correct treatment actions: Neonatal Asphyxia

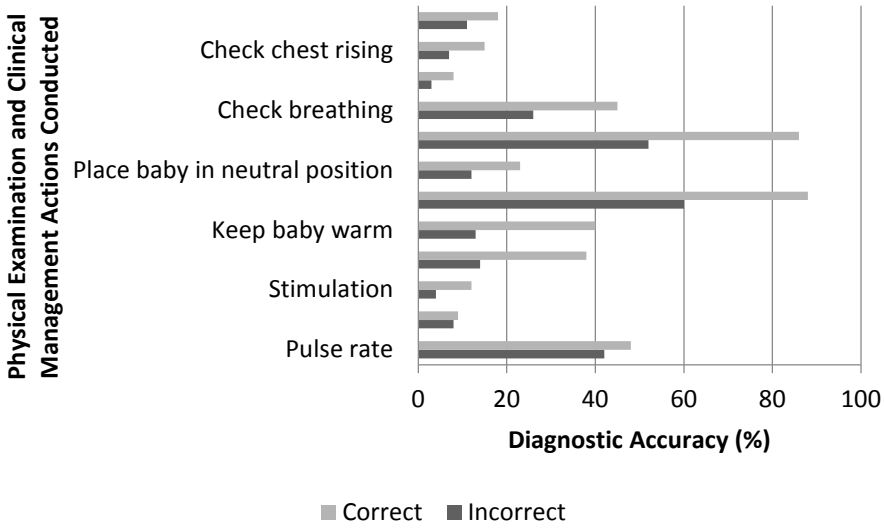


Table C5. Number of cases correctly diagnosed by cadre

% clinical cases	Mozam-bique	Health center	First level hospital	Urban	Rural	South	Central	North
All cadres	2.9	2.9	3.3	2.9	2.9	2.7	3.0	3.0
Doctors	3.6	3.6	3.7	3.7	3.6	3.6	3.7	3.7
Clinical officers	3.1	3.0	3.3	2.9	3.1	2..8	3.1	3.2
Nurses	2.7	2.7	3.0	2.5	2.7	2.6	2.8	2.8

Table C6. Determinants of diagnostic accuracy: regression results

	Dependent variable: Diagnostic accuracy			
	[1]	[2]	[3]	[4]
				(0.06)
Maternal complications				0.022
				(0.05)
Clinical guidelines				0.470***
				(0.06)
Ambulance owned				0.035
				(0.02)
Infrastructure				-0.048***
				(0.01)
Equipment				0.031
				(0.02)
Doctor is reference group				
Nurse	-0.185***	-0.171***	-0.166***	-0.127***
	(0.03)	(0.03)	(0.03)	(0.02)
Clinical officer	-0.114***	-0.097***	-0.095***	-0.075***
	(0.03)	(0.03)	(0.03)	(0.02)
Facility with 1-2 workers is reference group				
2 - 5 health workers		0.079***	0.079***	0.084***
		(0.02)	(0.02)	(0.02)
5 - 10 health workers		0.033	0.033	0.011
		(0.02)	(0.02)	(0.02)
11 - 20 health workers		0.003	0.003	0.026
		(0.03)	(0.03)	(0.03)
More than 20 health workers		0.056***	0.042**	0.006
		(0.02)	(0.02)	(0.03)
Health center is reference group				
Hospital			0.045	0.022
			(0.03)	(0.03)
Constant	0.725***	0.675***	0.671***	0.472***
	(0.02)	(0.03)	(0.03)	(0.04)
Observations	591	591	591	590
R squared	0.092	0.118	0.122	0.265

Figure C10. Technical constraints and successful diagnosis: the case of Pulmonary TB

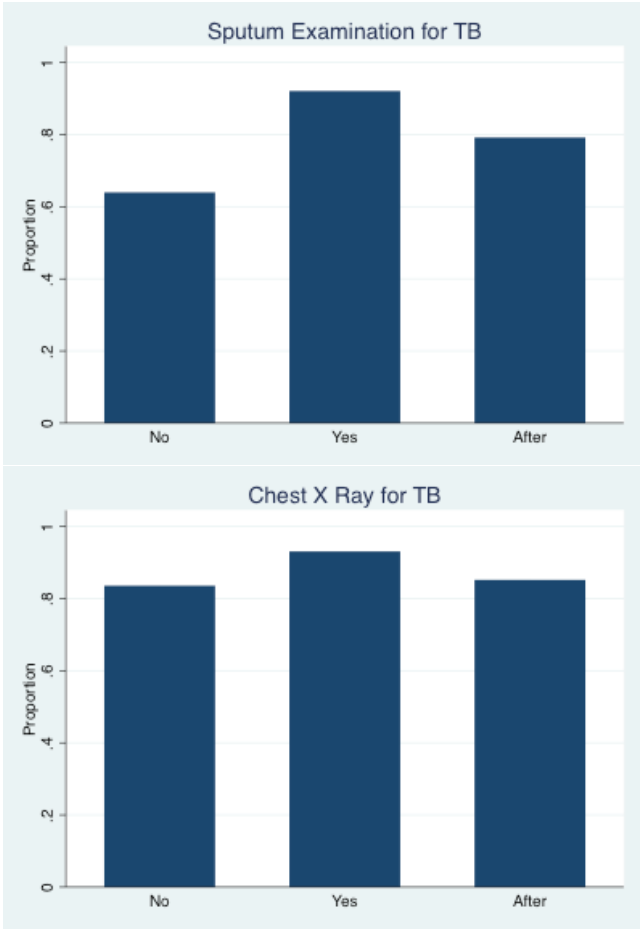


Figure C11. Average and distribution of number of danger signs asked by clinical case

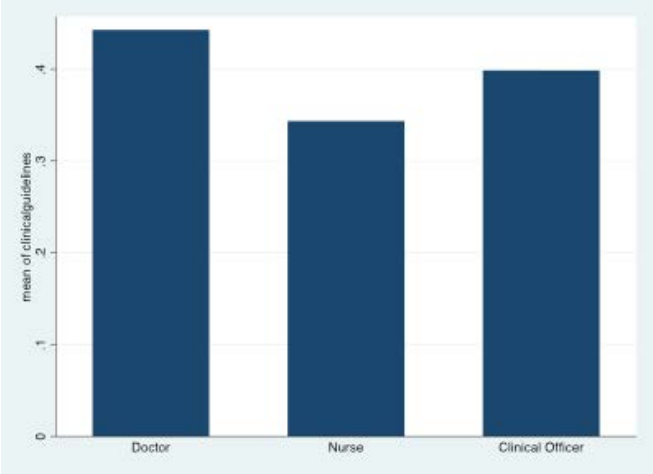


Table C7. Adherence to clinical guidelines by clinical case

% providers	Doctor	Clinical officer	Nurse	Health center	First level hospital	All
Severe dehydration	11	6.8	10.3	12	1.7	11.1
Pneumonia	4.1	11.3	10.1	11.7	1.4	10.8
Diabetes type II	51.7	34.1	29.6	34.4	15.1	32.7
Tuberculosis	40.8	19.7	20.1	21.9	4	20.4
Malaria	4.1	2.6	2	2.9	0.7	2.7

Table C8. Adherence to clinical guidelines by level of facility

	Mozambique	Urban	Rural	South	Central	North
All facilities	37.4	37.2	37.4	38.4	37.2	36.8
Health center	36.3	34.6	36.7	37.5	35.6	36.1
First level hospital	48.3	55.0	46.2	49.5	49.1	45.6

Table C9. Management of maternal and neonatal complications by level of facility

% providers	Mozambique	Urban	Rural	South	Central	North
All facilities	29.9	20.2	16.4	28.9	31.0	29.8
Health center	16.6	25.5	29.8	28.1	30.0	29.2
First level hospital	19.4	40.5	37.8	39.1	38.4	37.9

Table C10. Availability of other types of equipment

% facilities	Mozam-bique	Health center	First level hospital	Urban	Rural	South	Central	North
Gloves	92.7	92.5	94.7	85.8	93.2	90.1	91.4	96.2
Condoms	77.5	77.1	89.5	95.8	75.8	82.1	77.3	73.6
Malaria RDT	91.0	90.9	92.1	90.1	91.1	89.9	85.7	98.7
Bed nets	80.3	80.1	89.5	82.8	80.1	86.4	83.2	71.4

Table C11. Availability of communications equipment availability

% facilities	Mozambique	Rural	Urban	South	Central	North
All facilities	11.7	11.0	19.2	18.5	5.6	13.7
Health center	10.5	10.0	15.7	17.4	4.2	12.6
First level hospital	54.2	51.3	65	70.0	45.0	60.0

Table C12. Availability of specific types of communication equipment

% facilities	Mozam-bique	Health center	First level hospital	Urban	Rural	South	Central	North
Communication	11.7	10.5	52.2	19.2	11.0	18.5	5.6	13.7
Communication+	22.1	21.2	56.5	28.3	21.6	26.4	20.7	20.4
Land line	7.3	5.9	55.3	28.7	5.4	9.4	4.3	9.3
Cellular phone fac	22.1	20.8	65.8	24.0	21.9	29.4	5.6	37.4
Cellular phone pers	15.5	15.6	13.2	7.1	16.3	31.0	13.1	5.3
Computer	9.9	7.6	31.1	26.3	8.4	13.9	3.8	14.3
Internet	3.8	2.5	47.4	9.8	3.2	8.8	1.4	2.4

Table C13. Availability of ambulances

% facilities	Mozam-bique	Health center	First level hospital	Urban	Rural	South	Central	North
Own ambulance	13.1	10.9	86.8	16.5	12.8	9.7	12.1	17.3
Access to ambulance	82.7	84.0	39.5	76.3	83.3	77.6	89.0	79.0
Access to other vehicle	18.7	17.4	65.8	30.6	17.6	29.3	18.4	9.8

Table C14. Delays in salaries

% providers	Mozambique	Urban	Rural	South	Central	North
All facilities	39.4	44.3	37.2	36.1	40.3	37.9
Health center	38.4	45.1	37.2	47.6	43.4	51.0
First level hospital	36.3	36.8	36.1	68.1	65.3	68.8

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