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Niger Service Delivery Indicators

Health 2015

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Executive summary

Service Delivery Indicators (SDI) provide a set of metrics to benchmark service delivery performance. In sub-Saharan Africa, the overall objective of SDI is to gauge the quality of service delivery in primary education and basic health services. The SDI enable governments and service providers to identify gaps and track progress over time and across countries in a region. This report presents the findings from the implementation of the first round of SDI surveys for the health sector in Niger.

From October to November 2015, surveys were conducted in 256 health facilities, which included district hospitals, health centers, and health posts. Information was gathered from 1,355 health providers who were representative of facilities across different settings of care, ranging from public and private facilities, and facilities located in rural and urban settings.

The SDI survey provides information on four broad categories of information: provider effort (what providers do); provider knowledge and ability (what providers know); inputs (what providers have to work with); and management, supervision, and community engagement. The findings are summarized below.

What providers do

Absence rate: during an unannounced visit, on average, 33 percent of health workers are observed to be absent per day (of which 82 percent are approved), with higher absence rates recorded in public facilities than private ones. Staff in health centers are 1.8 times more likely to be absent than those in health posts. Absence is found to be positively correlated with remoteness, facility type (a hospital has greater absence than a clinic than a post) controlling for staff size and staff composition. Management feedback is related to absence as well (reduces when negative, increases when positive).

Caseload: adjusting for provider absence, health providers in Niger see 9.8 outpatients per provider-day. Public facilities (10.1) have higher volumes than private facilities (4.6). Hospitals have significantly less (1.0) patients per provider-day than health posts (6.1) or clinics (17.2). A verification with the 2014 annual report confirms the caseload rates for the majority of the hospitals in the sample.

What service providers know

Diagnostic accuracy: on average, providers successfully diagnosed 31.5 percent of the five tracer conditions (malaria with anemia, acute diarrhea with severe dehydration, pneumonia, pulmonary tuberculosis, and diabetes mellitus). These pathologies are commonly seen by providers. There is no statistically significant difference across public/private and rural/urban within public facilities. Examining the individual conditions, private providers did more than twice as well (46.2 percent) as public providers (20.7 percent) at identifying diabetes mellitus, but failed entirely to diagnose acute diarrhea with severe dehydration (3 percent in public). Among facility types, health posts were uniformly the worst, often by significant margins and at statistically significant levels from hospitals and clinics.

Adherence to clinical guidelines: on average, for the five tracer cases, providers asked less two in five of the medically-necessary questions to diagnose the case according to the national guidelines. In many cases, essential questions related to danger signs were not asked.

Management of maternal and neonatal complications: on average, 12 percent of the necessary clinical actions to manage immediate post-partum hemorrhage and neonatal asphyxia were taken by providers. Whether analyzed by ownership or by location within the public sector, rural public providers have the highest rate, but only provide 12.2 percent of the necessary treatment actions. Public providers diagnose immediate post-partum hemorrhage 70 percent better than private providers. Among public providers, rural providers treat this condition 46.5 percent better than urban ones.

First ante-natal care visit: providers were presented with a patient who was pregnant and moderately anemic, yet 0.8 percent diagnosed both elements while 91.7 percent diagnosed only the pregnancy. Public providers do better than private providers for danger signs, key questions, physical examinations, and care. However, public providers are more likely to diagnose a pregnancy without anemia than private providers. Regionally, providers in Tahoua are 9.5 percentage points more likely than those in Niamey to identify only the pregnancy. Consistent with the child case simulations, providers neglected relevant elements such as palmar pallor (14 percent of providers) and hemoglobin examinations (4.8 percent when constrained by their routine environment, 6.5 percent unconstrained by their environment).

Severe pre-eclampsia: providers were presented with a patient who had clear signs of pre-eclampsia and were expected to recognize the condition, its severity, and to take appropriate action. Overall, 10.9 percent of providers diagnosed the pre-eclampsia as being severe, although 50.2 percent diagnosed the pre-eclampsia. Public providers do better than private providers for physical and clinical examinations, and care. Relative to Niamey, the rate of correct diagnosis is 14.8 percent in Maradi, 6.4 percent in Tahoua, and 11.6 percent in Zinder. Overall, the recognition of pre-eclampsia without consideration of the severity, is still significantly different from Niamey in Maradi (42.3 percent), Tahoua (44.9 percent), and Zinder (45.8 percent).

What service providers have to work with

Drug availability: on average, facilities had 50 percent of tracer drugs available, with urban public facilities having 22 percent greater availability than rural public ones. There were no significant differences across public and private. Controlling for which drugs were to be found at what levels, hospitals averaged higher tracer drug availability than health posts. Tracer medications for children (54 percent) were generally more available than those for mothers (44 percent). Urban public facilities had greater average availability of drugs for mothers and children than rural public facilities.

Equipment availability: Approximately one in two facilities had functional basic equipment,[1] with the lowest levels observed in health posts. Averaging across facility types, urban public facilities were 86 percent more likely to have all equipment than rural public facilities. There are differences in equipment types, with public facilities 5.5 times more likely to have infant scales than private facilities.

[1] Defined as a scale, thermometer, stethoscope, sphygmomanometer in all facilities and sterilization and refrigeration in clinics and hospitals. Annex A has detailed definitions of the indicators.

Infrastructure availability: 13.3 percent of facilities in Niger had safe drinking water, functional sanitation, and power available on the day of the survey. Private providers were 2.3 times more likely to have safe drinking water, functional sanitation, and power available on the day of the survey, particularly power (1.8 times) than public ones. Similarly, urban public facilities are 6.5 times more likely to simultaneously have all three elements than rural public facilities. All elements are more present in urban than in rural facilities, although sanitation is more equally available (43 percentage points less likely) than sanitation (50.7) or power (69.7).

Management, supervision, and community engagement

Leadership and management: facility heads are the ministry's first supervision agents and are most directly able to monitor service delivery. However, most facility heads do not report using incentive methods, whether positive (33.5 percent use them) or negative (17.9 percent). More broadly, private facility heads are more than twice as likely to cite or use positive incentives and 3.8 times as likely to cite negative incentives.

Supervision: providers receive a visit per quarter on average, with larger teams in urban public than in rural public facilities (three versus two people). There is greater use of supervision worksheets in private versus public facilities (62.6 percent) and in urban relative to rural among public facilities (40.2 percent more prevalent). Among supervision teams, disease focal points were most likely to use supervision tools, to review staff presence, and to examine medical stocks, but not more likely to leave written comments. The focus on quality of care decreases rapidly as the facility level decreases from all at the hospital level to 54.8 percent in health centers and 18.6 percent in health posts. More generally, quality of care is a greater focus for private facilities (87.4 percent) than public ones (38 percent).

Community engagement: while 96.5 percent of public facilities had a facility management committee in 2014, only 6.8 percent of private facilities had one ($p<0.01$). By 2015, this had become basically universal. However, the functioning of the COGES, as measured by the presence of meeting minutes varied significantly; nearly 40 percent of public facilities did not have minutes compared to none among private facilities. Rural public facilities are more than twice as likely as urban public facilities to not have minutes of the last meeting.

Key findings and proposed actions

Table 1 summarizes key concerns, possible ways to address them, responsible parties, and the timeline to address them.

Table 1. Key findings and proposed actions

Concern	Way(s) to address it	Responsible	Timeframe
Lack of diagnostic guidelines (52 percent of facilities had treatment guidelines with urban public facilities 1.65 as likely to have them as rural public facilities ($p<0.05$) with a global average publication date of 2009).	Print the latest IMCI and other guidelines (in finalization in 2015) and distribute them widely with training on key aspects as part of supportive supervision (or other methods).	Ministry (Organization of Care Directorate)	September 2017
Low workload in hospitals, potential misallocation of qualified staff away from centers and posts	Evaluate human resource allocation versus needs in light of low hospital utilization rates. Transfer excess staff based on needs. Revise staffing norms as necessary.	Ministry (Human Resource Directorate)	December 2017
Weakness of diagnostic performance and adherence to guidelines: supervision response	Evaluate supervision plans and content (e.g. quality of care, absence, team composition) relative to needs. *July 2017* Reflect changes in the supervision worksheet and make its use mandatory *December 2017* Quarterly monitoring of supervision trends and conclusions (via DHIS2?) *March 2018 and quarterly thereafter*	Ministry (Permanent Secretary)	March 2018 and quarterly thereafter
Weakness of diagnostic performance and adherence to guidelines: training response	Test graduates of medical training schools and assess curriculum quality and delivery. *September 2017* Revise curriculum and training methods to improve quality of training. *March 2018* Certification of diplomas to integrate the profession and authorization to practice (WHO and OOAS). *June 2019*	Ministry (Human Resource Directorate)	June 2019
Health facility management committees (HFMC) are insufficiently active (measured by minutes) and information-sharing (e.g. financials) is far from universal.	Evaluate existing support provided to HFMC organization and functionality including guidelines and tools. *September 2017* Evaluate community constraints. *September 2017* Develop strengthening options and initiate the pilot one region. *March 2018.* Evaluate the pilot and revise tools accordingly for a broader rollout. *May 2019*	Ministry (Organization of Care Directorate)	May 2019

Public facility heads neither cite nor use incentives, despite their latitude.	Evaluate functionality of institutional arrangements, including training provided to facility heads on facility and human resource management in ISP and elsewhere. *September 2017* Revise or develop curriculum and initiate the pilot with a cadre of new and experienced facility heads in one region. *March 2018* Evaluate pilot and revise tools for a broader rollout. *March 2019*	Ministry (Human Resource Directorate)	March 2019

Table 2. SDI at a glance

	Niger	Public	Private	Rural public	Urban public
Caseload (per provider per day)	9.8	9.9	5.7**	10.1	8.2
Absence from facility (% providers)	33.1	33.3	30.7	31.1	33.8
Diagnostic accuracy (% clinical cases)	31.5	31.1	38.7	27.5	38.8***
Adherence to clinical guidelines (% clinical cases)	17.5	17.5	18.3	17.3	17.9
Management of maternal and neonatal complications (% clinical cases)	12.0	12.1	9.9*	12.1	12.1
Drug availability (% drugs)	50.4	50.4	50.6	49.5	60.5**
Equipment availability (% facilities)	35.9	35.9	34.3	33.2	77.2***
Infrastructure Availability (% facilities)	13.3	10.7	65.8***	7.9	51.9***

Note: level of significance: *** p<0.01, ** p<0.05, * p<0.1. Comparisons are public with private and rural public with urban public.

I. Introduction

As the Country Status Report (2014) notes, there is variation among the key outcome indicators. Mortality for neonates (27 percent over 2006-12), infants (60 percent over 1998-2012), and mothers (14.5 percent over 2006-2012; 21 percent over 1990-2010) declined significantly, mortality rates remain high and Niger's maternal mortality (554/100,000 live births) exceeded that of most West African Economic and Monetary Union states in 2010. The sharp declines in neonatal and infant mortality raised Niger's life expectancy at birth from 37 years (1960) to 58.4 years (2010), slightly above the Sub-Saharan Africa average of 54 years and nearly at the low-income average of 59 years.

Provision of care is hindered by a very high centration of doctors (1 per 5,642 people) and nurses (1 IDE per 1,789 people) in Niamey to the detriment of highly-populated areas such as Zinder, Maradi, Tahoua, and Tillabéri which have between eight and12 times less doctors per capita and roughly 3.6 times less IDE per capita than Niamey. The skill imbalances are one problem, as is the overall level of ability to properly handle the various cases remains a concern. In addition, the gap between those formally trained and trained on the job, particularly for adult care, is a further cause for concern. The overall level of skills in the management of maternal and neonatal complications is in line with the burden of mortality (535 deaths per 100,000 pregnancies; DHS 2012). Niger's performance in diagnostic accuracy, adherence to guidelines, and the management of maternal and child health complications places it near the bottom of the table for SDI countries.

Human resource availability is a challenge, with a 33 percent national absence rate. This is 2.23 times higher than in primary education, where teachers are absent from school 14.8 percent of the time using the same methodology.

The SDI program (see Boxes 1 and 2) aims to document what results are obtained through public spending in the health and education sector. The focus is on the individual dimensions, whether effort (presence and workload) or knowledge (diagnostic accuracy, adherence to clinical guidelines, and case management). These dimensions are not routinely measured and reported publicly in a comparable fashion, yet are among the factors that influence policy outcomes in health.

The remainder of this document is organized into three major sections: methodology and implementation; results; and implications for Niger. Annexes present details of the sampling strategy, definitions of the indicators, and additional results. A final section presents the references consulted or cited.

Box 1. The Service Delivery Indicators (SDI) Program

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

To date, there is no robust, standardized set of indicators to measure the quality of services available to citizens 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 SDI can be used to track progress within and across countries over time, and aim to enhance active monitoring of service delivery to increase public accountability and good governance. Ultimately, the goal of this effort is to help policymakers, citizens, service providers, donors, and other stakeholders enhance the quality of services and improve development outcomes.

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

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

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 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

In 2015, the Niger SDI survey collected information from 256 lower-level health facilities and 1,355 health providers (see Table 4). The survey was preceded by consultation with government on survey design, sampling, and the adaptation of survey instruments. Pre-testing of the survey instruments, enumerator training, and fieldwork took place between 2013 and 2015 in waves.

In the Niger health system, multiple types of facilities exist; of these the Health posts (*case de santé*), clinics (*centres de santé intégré*) and district hospitals (*hôpital de district*) were included in the survey population. These facilities account for the nearly 87 percent of the health service utilization as reported in the 2014 household survey undertaken by the National Statistical Office (*Institut National de la Statistique*). Annex A provides additional details on the sampling.

The results provide an assessment of the quality of service delivery and the environment in which the services are delivered in rural and urban locations, in public and private health facilities. While the term "private" largely include facilities owned by faith-based organizations, there are also some facilities that are owned by nongovernmental organizations or for-profit entities.

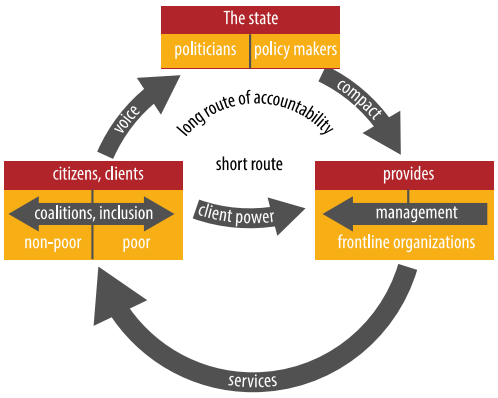
The surveyed population comprised three types: Health posts (*poste de santé*), health centers (*centre de santé intégré*), and district hospitals (*hôpital de district*). The survey used a two-stage sampling strategy that allowed for disaggregation by geographic location (rural and urban), by provider type (public and private), and by facility type (see Table 4). Since there were 28 first-level district hospitals, a decision was made to sample 16 of them, which represents a 57 percent sampling fraction.

There were 8 facilities where second visits were not undertaken in accordance with the SDI methodology. These facilities, and their staff, are excluded from the absence rate calculations. The visits in question were done during weekends instead of normal working hours.

Box 2. Analytical underpinnings

Service delivery outcomes are determined by the relationships of accountability between policymakers, service providers, and citizens, as documented in the 2004 World Development Report. 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 on 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: World Development Report, 2004.

Service delivery production function

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

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

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

Indicator categories and the selection criteria

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

Box 2. Analytical underpinnings (continued)

The proposed choice of indicators takes its starting point from the recent literature on the economics of service delivery. Overall, this literature emphasizes 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 SDI. Additional considerations in the selection of indicators are (i) quantitative (to avoid problems of perception biases that limit both cross-country and longitudinal comparisons), (ii) ordinal in nature (to allow within and cross-country comparisons); (iii) robust (in the sense that the methodology used to construct the indicators can be verified and replicated); (iv) actionable; and (v) cost effective to collect.

Table 3. Health SDI indicators

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

The indicators listed here are not the only metrics collected in SDI surveys. For example, here are some examples of management and governance data included in the instrument: roles and responsibilities in facilities, government supervision, time use, leadership, people management practices, user fees, financial (cash) support to facilities by source, community involvement etc.

B. Sampling

Table 4. Survey sample

Variable	Sample	
	Total	Share of total
Facilities	256	100
Health post	143	55.9
Health center	97	37.9
Hospital (first level)	16	6.3
Ownership	256	100
Public	220	85.9
Private (nonprofit)	36	14.1
Location	256	100
Rural	192	75.0
Urban	64	25.0
Rural public	188	85.4
Urban public	32	14.6
Healthcare workers	1,355	100
Doctors	104	2.0
Medical officers	107	1.3
Nurses	327	13.3
Midwives	202	4.1
Birth attendants	361	56.3
Para-professionals	247	23.0

Note: eight providers are categorized as "other" without sufficient information to classify them per the groupings above.

The survey covered the entire country, with the exception of a few areas. The region of Diffa was in a state of emergency declared by the Government of Niger during the survey and was excluded as were the areas of Tesker, Tilia, Tassara (localized risks), and Bilma (few facilities, very great distances).

The survey used a sector-specific questionnaire with several modules (Table A1), all of which were administered at the facility level. The questionnaires built on previous similar questionnaires based on international good practice for Public Expenditure Tracking Surveys, Quality of Service Delivery Surveys, and observational surveys. The SDI team carried out a pre-test of the instrument with staff from the Ministry of Health in February and June 2015, and two additional pilots were carried out in September 2015. Table 5 provides a breakdown of the sample used for absence and competency rates by health worker cadre.

Table 5. Sample for indicators of absence and competence

Cadre	Total Sample		Absence rate		Knowledge indicators	
	Total	Percent	Total	Percent	Total	Percent
Doctors	101	7.5	80	10.0	36	6.0
Clinical (medical) officers	104	7.7	54	6.7	38	6.3
Nurses and midwives	751	55.4	406	50.6	318	52.9
Other medical staff	352	26.0	249	31.1	207	34.4
Para-professionals	47	3.5	13	1.6	2	0.3
Total	1,355	100	802	100	601	100

Notes: all medical staff were included in the absenteeism sample frame, but only staff present on the day of the first visit and who regularly led consultations were to be included for the competence sample frame.

III. Results

A. Delivering health services

Most facilities are open nearly every day, with slight variation among lower-level facilities, primarily in favor of urban residents and users of public facilities. Information is provided in Table 6 below.

Table 6. Hours and days of service delivery

Facilities	Niger	Public	Private (nonprofit)	Difference (%)[a]	Rural Public	Urban Public	Difference (%)[a]
Number of days per week facility was open							
All facilities	6.9	6.9	6.8	-1.6	6.9	7.0**	0.9
Health posts	6.9	6.9			6.9		
Health centers	6.9	7.0	6.7*	4.3	7.0	7.0	0.0
Hospitals	7.0	7.0				7.0	
Hours outpatient consultations offered per day							
All facilities	13.5	13.5	13.9	3.0	13.3	16.9	27.0
Health posts	13.3	13.4			13.4		
Health centers	13.8	13.7	14.2	3.7	13.0	17.2	32.3
Hospitals	15.9	15.9				15.9	

Notes: a. Level of significance: *** p<0.01, ** p<0.05, * p<0.1. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.

The availability of basic and comprehensive emergency obstetric and neonatal care (Table 7) shows that access to a hospital is an important requirement, even for basic emergency obstetric care. Leaving out the higher-level hospitals that were not part of this study, almost all hospitals offered comprehensive emergency obstetric care, although a negligible proportion of health facilities offer it. The most limiting factor is the instrumented births with forceps or suction devices, which is offered by 15 percent of posts, 60 percent of clinics, and 98 percent of hospitals. Of the two signal functions of the CEmOC, blood transfusion is offered in four percent overall, in all hospitals and 22 percent of clinics, and 90 percent of hospitals and eight percent of clinics offered cesarean sections.

Table 7. Availability of emergency obstetric care (percent)

Facilities	Niger	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
Share of facilities offering full basic emergency obstetric care (%)							
All facilities	7.9	8.1	4.9	-39.5	6.5	31.6***	386.2
Health post	0.4	0.4			0.4		
Health center	18.9	21.2	5.2**	-75.5	22.8	12.9	-43.4
Hospital	98.4	98.4				98.4	
Share of facilities offering full comprehensive emergency obstetric care (%)							
All facilities	1.2	1.2	1.1	-8.3	0	19.6***	..
Health post	0.0						
Health center	0.2	0.0	1.2	..	0	0	0
Hospital	89.7	89.7				89.7	

Notes: in many countries comprehensive emergency obstetric and neonatal care is only supposed to be offered at hospital level. Differences are in percentage points of the public and rural public values, respectively. Level of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 8 shows that the allocation of providers is uneven across rural and urban areas. Better-trained public providers are concentrated in urban areas. There are 1.8 nurses per doctor in private facilities compared to 13.6 in public ones.

Table 8. Distribution of health cadres by ownership and location

Cadres (%)	Niger	Public	Private	Difference (%)	Rural Public	Urban Public	Difference (%)
All medical staff	100.0	93.2	6.8	-92.7	53.5	46.5	-13.1
Doctors	4.0	2.8	1.2	-57.1	0.8	2.2	175.0
Clinical officers	4.7	3.8	0.9	-76.3	0.5	3.5	600.0
Nurses	40.1	38.0	2.1	-94.5	19.1	21.7	13.6
Para-professionals and other	0.2	0.2	0.0	-100.0	0.3	0.0	-100.0
Total	100	93.2	6.8		53.5	46.5	

Note: 1,355 providers are in the sample. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.

B. Caseload (external consultations)

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 three-month period and the number of health workers who conduct patient consultations (paramedical health staff such as laboratory technicians or pharmacists' assistants are excluded from the denominator). In hospitals, the caseload indicator was measured using outpatient consultation records; only providers doing outpatient 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.

Table 9. Health services utilization (outpatient visits) as percent of total caseload

Outpatient visits (%)	Niger	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
Health post	23.7***	23.7	.	.	23.7	.	.
Health center	74.7***	69.5	5.1***	-92.3	48.5	21.0*	-56.7
Hospital	1.6	1.6	.	.	1.6	.	.
Total	100.0	94.9	5.1	0.0	73.9	21.0	0.0

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Totals are relative to Niger, public/private and rural/urban within public. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Health centers provide the majority of care in Niger (Table 8). Consistent with a rural population, more care if provided in rural than in urban areas. The public sector provides the majority of its care in the rural areas, consistent with the population distribution. Very little care is recorded as being provided in hospitals. Cross-verification with the 2014 health management information system annual report shows that 10 of the 14 hospitals that may be compared have quarterly rates that are within 10 percent of the implied quarterly rate from the 2014 annual consultation rates.[2]

Table 10. Caseload by facility level

Facilities (%)	Niger	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All facilities	9.8	10.0	4.6***	-54.0	10.1	8.6	-14.9
Health post	6.1	6.1	..	..	6.1	..	..
Health center	17.2	18.6	5.0***	-73.1	20.2	10.7**	-47.0
Hospital	1.0.	1.0	..	..	..	1.0	..

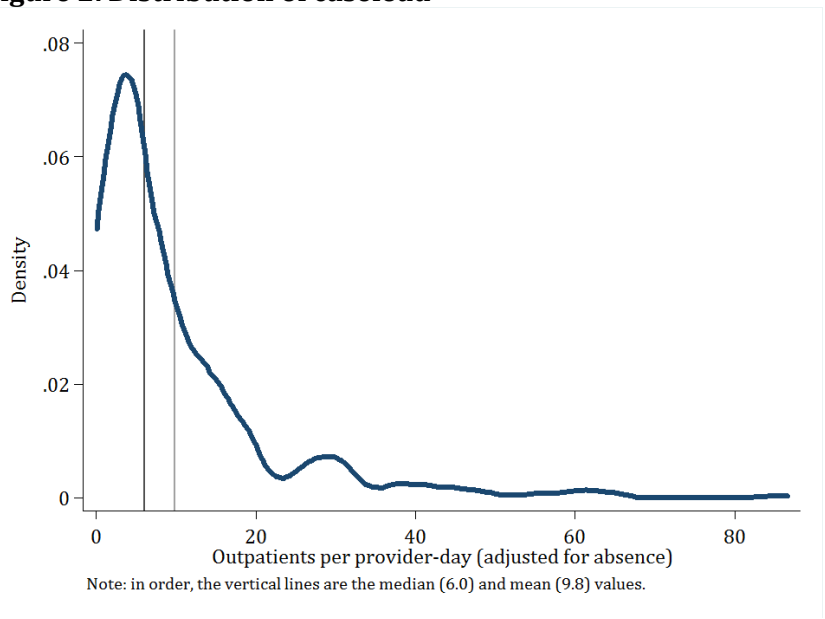
Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

The average absence-adjusted caseload was 9.8 patients per provider per day (Table 10). The overall distribution was skewed left—in fact, 50 percent of the providers had fewer than 6 patients per provider-day (Figure 2). A few facilities show adjusted caseloads that seem extremely high. Some of

[2] This rises to 11/14 within 25 percent and 12/14 in 50 percent. Two hospitals have rates for 2015Q3 that are well above the implied quarterly rates from the 2014 annual report. Two hospitals were missing data either in at least one of the sources and could therefore not be compared. The 2014 annual report was the latest available.

this is due to the adjustment, as when half the staff are absent on a day, that means that the adjusted caseload is double. However, some may be data quality concerns, either from the survey data work or the HMIS reporting. For example, a small health center with between three and five people and nearly 9,700 consultations over the past three months effectively has roughly three consultations per provider per hour before considering absences. Applying an absence rate of 20 percent (the facility's) results in an average caseload of 3.6 outpatients per hour each hour and day of the week for the entire three-month period (eight hours per day).

Figure 2. Distribution of caseload



C. Absence rate

Methodological note

The average rate of provider absence is measured by assessing the presence of at most 10 randomly selected clinical health staff at a facility during an unannounced visit. Only workers who are supposed to be on duty are considered in the denominator. The approach of using unannounced visits is regarded best practice in the service delivery literature. Health workers doing fieldwork (mainly community and public health workers) were counted as present. The absence indicator was not estimated for hospitals because of the complex off-duty arrangements, interdepartmental shifts etc.

In Niger, 33 percent of health workers were absent on a given day (Table 11).[3] The providers least likely to be absent are the public providers in Health posts (18.9 percent). There is little variation across rural and urban or public and private. When comparing across regions, there is no statistically-significant difference.

[3] Table 38 in Annex C provides more detailed results.

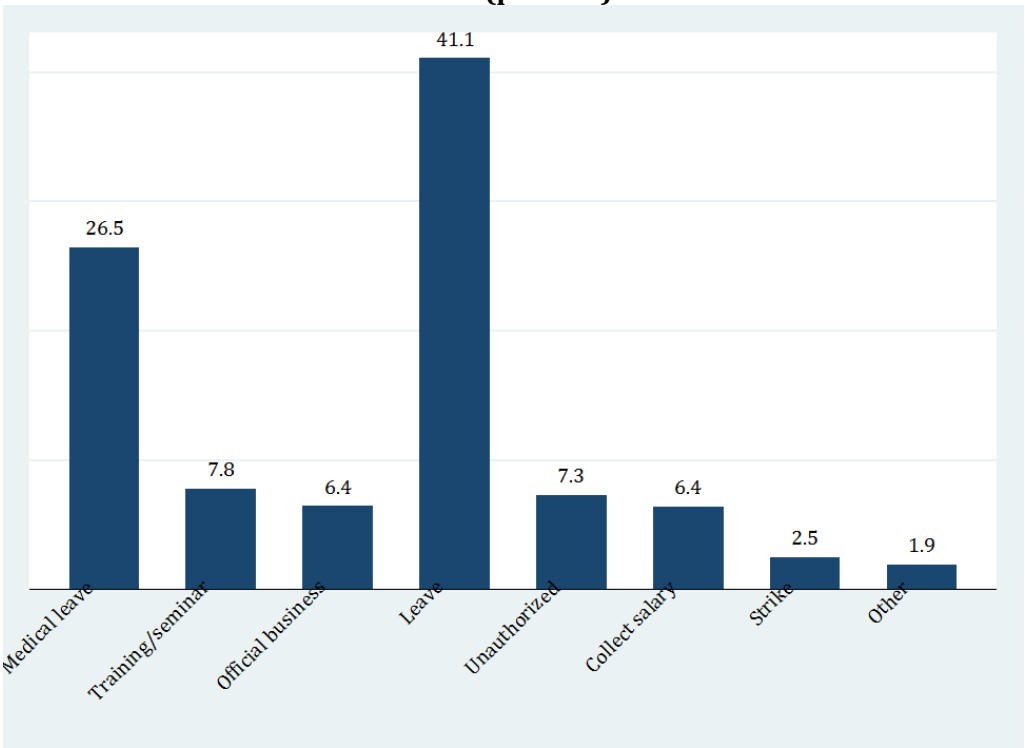
Table 11. Provider absence by level of facility, percent

Facilities	Niger	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All facilities	33.1	33.3	30.7	-7.8	31.1	34.0	9.3
Health post	18.9	18.9	..	..	18.9	..	..
Health center	34.1	34.2	32.5	-5.0	35.0	33.9	-3.1

Notes: hospitals are excluded from the absence rate tabulations. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

The overwhelming majority—nearly 82 percent—of all absences were approved. The reasons for absence are multiple, some excused and some unexcused (Figure 3). Beyond annual leave (41.1 percent), providers were on medical leave (26.5 percent) or in training (7.8 percent). Among the unexcused absences, reasons not authorized were first (9.2 percent) followed by collecting salaries because they are not paid directly to staff accounts.

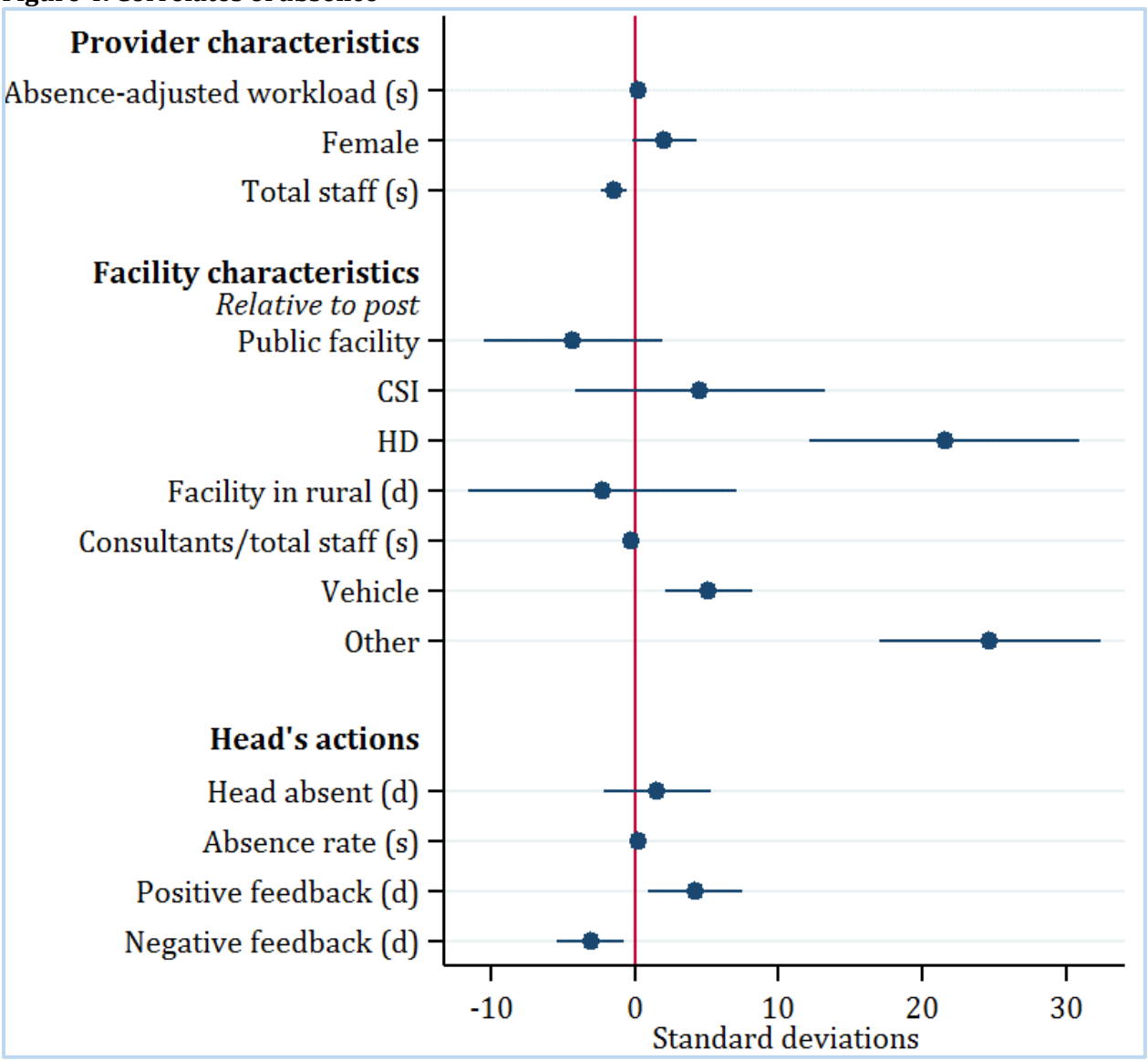
Figure 3. Breakdown of reasons for absence (percent)



Notes: medical leave includes both sick and maternity leave. Totals may not add to 100 due to rounding.

Figure 4 shows the marginal effects for the correlates of absence, which are detailed in Table 37. The correlations suggest a few key factors: remoteness, facility type and total staff, workload and peers, and managerial influence play a role. Facilities that are more remote, whether requiring means of transport such as boats/animals (+24.7 z-scores of absence; p<0.01) or vehicles (+5.1; p<0.01) are more associated with absence. Hospitals (+21.5; p<0.01), despite a control for total facility staff (-1.5; p<0.01) have a considerably higher correlation with absence than health posts. Caseload-adjusted workload (0.2; p<0.01) and peer absence (0.2; p<0.01) have the same effects. Finally, when the manager provides negative (-3.1; p<0.05) or positive (4.2; p<0.05) feedback, it has an impact. Interestingly, in light of experiences in other SDI surveys, the absence of the head is not significantly related to the absence of staff. In other cases, including education in Niger, the head's absence has a major impact on staff absence.

Figure 4. Correlates of absence



Note: summary statistics for the variables are in Table 36 and the marginal effects are in Table 37. Variables with an "(s)" are standardized and those with a "(d)" are dummy.

D. Diagnostic accuracy

Provider ability and knowledge. Having health professionals present in facilities is a necessary but insufficient condition for delivering quality health services. For this reason, quality was also assessed using two process quality indicators (the adherence to clinical guidelines in five tracer conditions and the management of maternal and newborn complications) and an outcome quality indicator, diagnostic accuracy, in five tracer conditions.

In Niger, these conditions are important, both for morbidity and mortality. Key burdens of disease cited by the World Health Organization for children under the age of five include malaria (19 percent), acute respiratory infections (18 percent), diarrheal diseases (12 percent), and birth

asphyxia (8 percent). Overall, in Niger, the first three causes of death in 2012 were lower respiratory infections (15.1 percent), malaria (10.4 percent), and diarrheal diseases (9.6 percent). Two of the most important causes of death in Niger are preterm birth complications (5.2 percent) and maternal conditions (3.1 percent). [4]

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 anaemia; diarrhoea with severe dehydration, and pneumonia), and two conditions were adult conditions (pulmonary tuberculosis and diabetes). Two other conditions were included: post-partum haemorrhage and neonatal asphyxia. The former is the most common cause of maternal death during child 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 and 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 into 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 records the interaction. The clinician, who is informed of the case simulation, is asked to proceed as if the interviewer is a real patient. For each facility, the case simulations are presented to up to 10 randomly selected health workers who conduct outpatient consultations. If there are fewer than 10 health workers who provide clinical care, all the providers are interviewed.

For more information on the methodology, see www.SDIndicators.org. 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 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.

In this section, two process quality measures (adherence to clinical guidelines and managing maternal and neonatal complications) and two intermediate outcome measures (diagnostic accuracy and treatment accuracy relative to guidelines) are used. The results of the measures used to assess provider knowledge and ability are presented below.

Providers made the correct diagnosis in approximately one-quarter (26.9 percent) of the tracer conditions (Table 12), with doctors performing the best (51.5 percent). Private providers are better than public ones, as are urban public relative to rural public providers. Disease-specific diagnostic accuracy is captured in Table 43 in Annex C and diagnostic accuracy by region is in Table 47 in Annex C.

[4] Niger Country Profile (http://www.who.int/gho/countries/ner.pdf?ua=1) accessed online 21 November 2016.

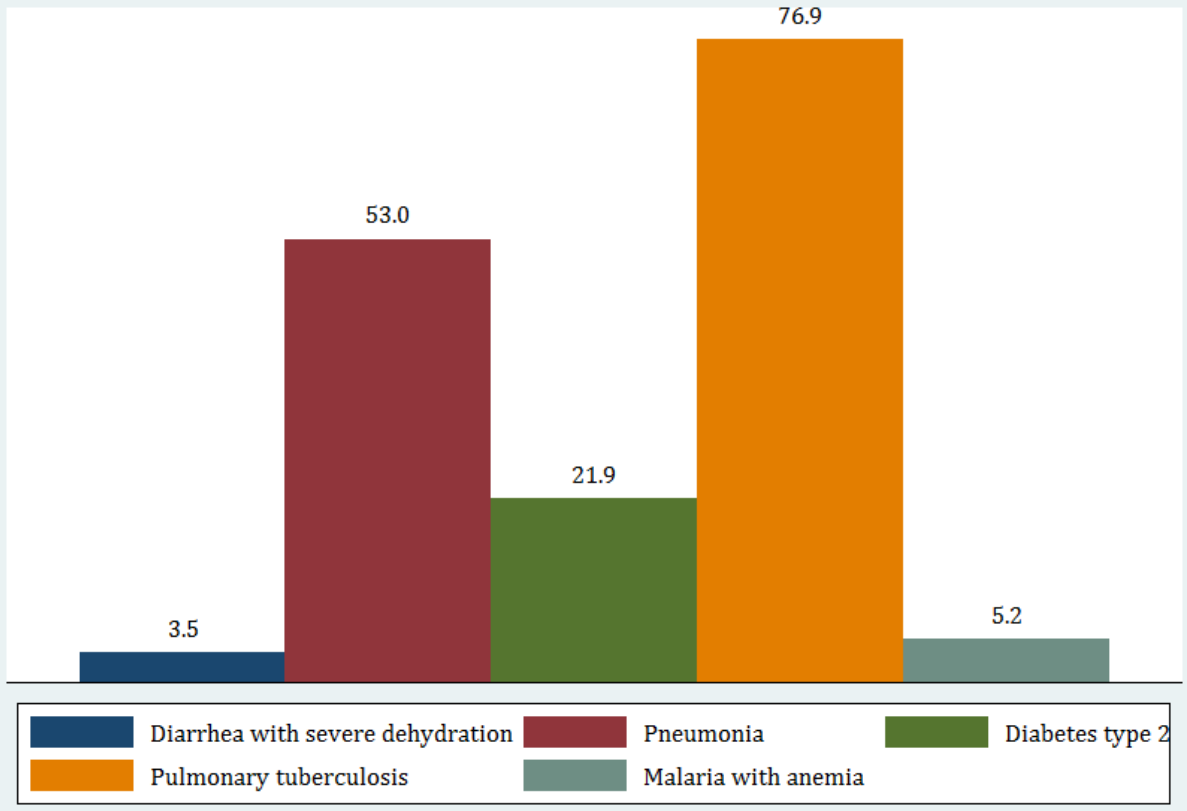
Table 12. Diagnostic accuracy for the five tracer conditions, by broad cadre type

Cadre (%)	Niger	Public	Private	Diff. (%)	Rural public	Urban public	Diff. (%)
All cadres	31.5	31.4	34.8	24.4	27.9	38.6***	40.9
Doctors	51.5						
Medical assistants	28.2***	28.5	25.7	-9.8	30.5	28.3	-7.2
Nurses and midwives	36.3***	36.6	32.0	-12.6	33.2	41.1**	23.8

Notes: There are 35 doctors, so disaggregations are not meaningful. For purposes of comparison with other countries, a "technicien supérieur" is treated as a medical assistant. Comparisons within facility type are relative to public and rural public; comparisons across cadre types are relative to doctors. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Using as a proxy the ability to correctly diagnose the five tracer cases, Figure 5 and Figure 6 highlight the wide spectrum of competencies in the Nigérien health system. Common conditions such as diarrhea with severe dehydration and malaria with anemia are not well-diagnosed (Figure 5). Some of this is due to the providers missing the co-prevalent condition, for example, the level of dehydration with the diarrhea (severe) and the anemia with malaria. Consistent with medical practice, the failure to identify these is defined as a failure to properly diagnose.

Figure 5. Tracer conditions diagnostic accuracy (percent)

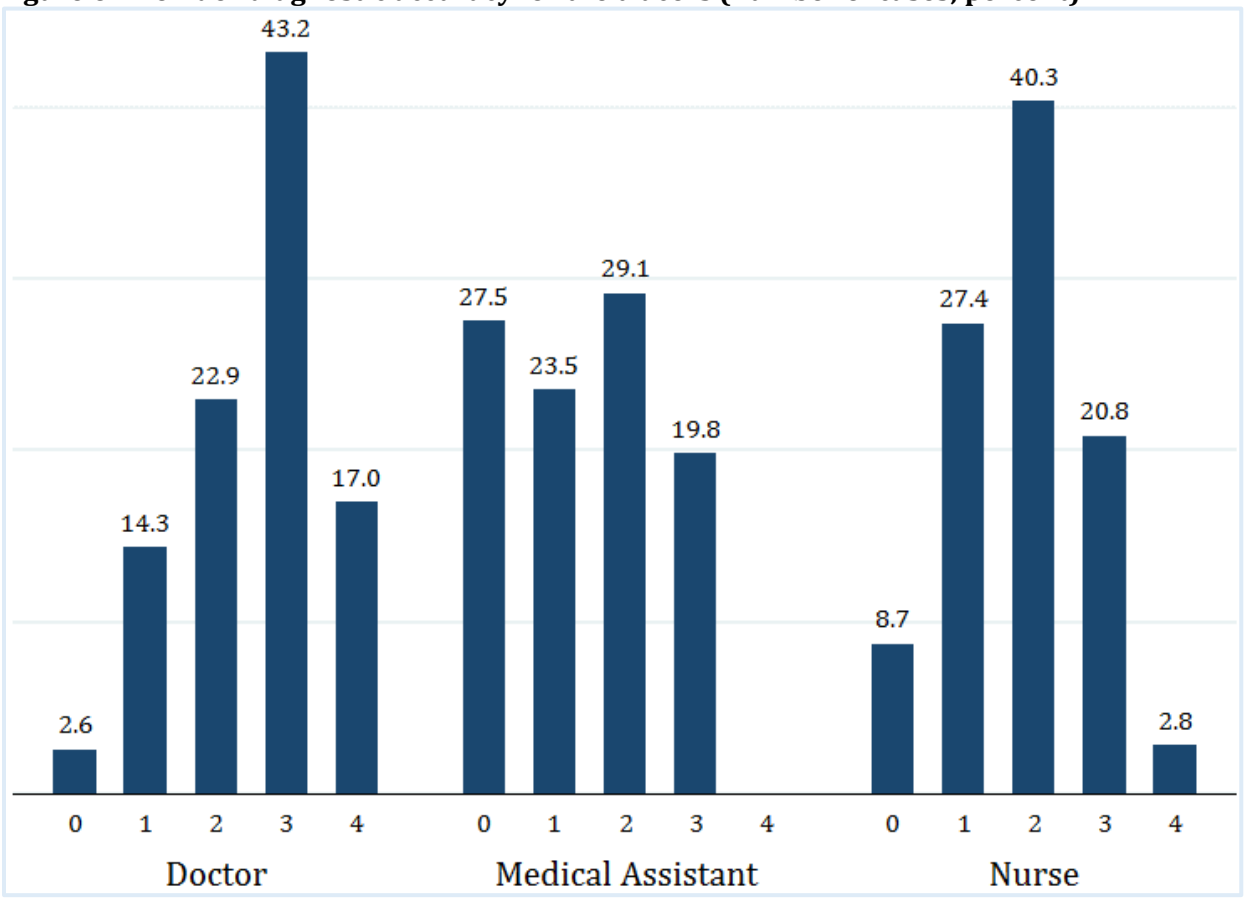


Note: for doctors, medical assistants, and nurses only. Weighted estimates.

As there are few doctors at the levels studied, the focus is primarily on medical assistants and nurses, who comprise the majority of the personnel (Figure 6). Medical assistants do worse than nurses and have higher variation than the latter. Nurses tend to correctly diagnose two conditions, and this is

consistent whether or not nurses are split into sub-categories.[5] Table 43 and Table 44 in Annex C present additional information for disease-specific diagnostic accuracy by facility type.

Figure 6. Provider diagnostic accuracy for the tracers (number of cases; percent)



Note: data are weighted. Categories on the horizontal axis are the number of cases correctly diagnosed.

When comparing among facility levels, Table 44 shows a similar pattern: higher-level facilities handle more complicated pathologies better. A striking case is that of malaria with anemia, where staff in health posts and clinics are 40 percent ($p<0.01$) and 21 percent ($p<0.05$) more likely to identify only simple malaria relative to hospitals. However, health posts provide 45.7 percent of the national guidelines' information on malaria compared with 17.7 percent in hospitals ($p<0.01$). More broadly, the pattern of diagnosis of the various tracers is consistent with the desired one in a health system: the most prevalent and simple conditions are treated at the bottom of the health pyramid, while more complicated ones are treated at a higher level, with the caveat that that the diagnostic rates for diarrhea with severe dehydration (3.0 percent) and malaria with anemia (5.2 percent) are very low.

[5] In order, pulmonary tuberculosis and pneumonia are the simulations with the highest diagnostic accuracy rates for nurses.

E. Adherence to clinical guidelines

Methodological note

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

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

Adherence to guidelines was positively correlated with levels of training: doctors do better than medical assistants who in turn perform better than nurses (see Table 41 in Annex C). Among nurses, there is generally no statistically-significant difference between the two types most found in the data, the "Infirmier Diplômé d'Etat" and the "Infirmier certifié" even though the former complete three years of secondary and three years of training while the latter complete primary then have two years of training. The disease-specific results are shown in Table 43 and Table 44 in Annex C.[6]

Table 13. Adherence to clinical guidelines by cadre type

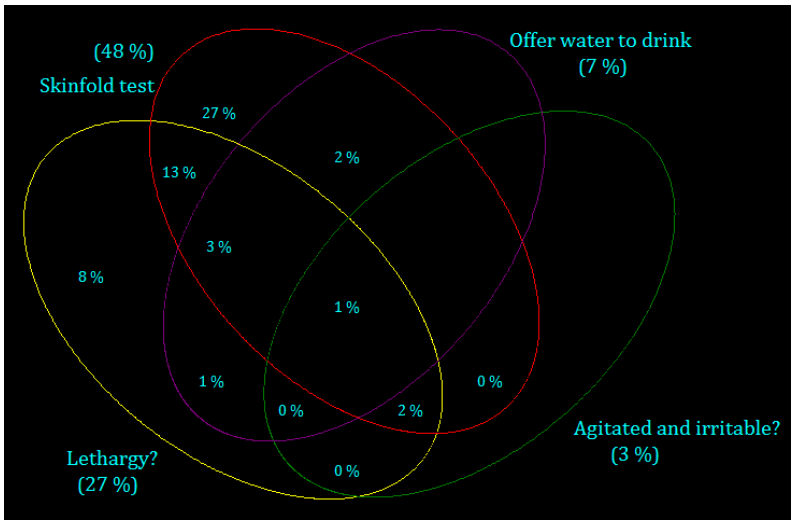
Cadre (%)	Niger	Public	Private	Difference (%)	Rural public	Urban Public	Difference (%)
All cadres	17.4	17.3	19.8	14.5	17.2	17.4	1.2
Doctors	26.9						
Medical assistants	18.5	19.0	13.9	-26.8	22.9	18.5	-19.2
Nurses and midwives	17.5	17.7	14.2**	-19.8	18.5	16.8	-9.2

Notes: there are 35 doctors, so disaggregations are not meaningful. For purposes of comparison with other countries, a "technicien supérieur" is treated as a medical assistant. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Figure 7 shows an example of results for one of five cases that was used to construct the adherence to clinical guidelines indicator. Among the key signs to check according to the Guidelines for Integrated Management of Childhood Illnesses are the four shown in the figure. The diagram shows that none of these signs are checked by more than half of the providers. The skinfold pinch is done by 48 percent, whether or not the child is lethargic or unconscious is asked by 27%, and while less than 10 percent offer water to drink (7 percent) or ask if the child is agitated or irritable (3 percent). The diagnostic performance is, therefore, not surprising in light of the relatively low adherence to the guidelines. In the case of dehydration, the evaluation of severity requires multiple positive answers, which are not possible if providers rarely ask more than one question. Among the questions that identify severity, two percent of providers asked about the skinfold test, the agitation or irritability, and lethargy.

[6] The survey showed that 52 percent of facilities had treatment guidelines with urban public facilities 1.65 as likely to have them as rural public facilities (p<0.05) with a global average publication date of 2009.

Figure 7. Adherence to clinical guidelines for diarrhea with severe dehydration



Data presented are for those providers who correctly identified the clinical case, diarrhea with severe dehydration. The percentage after a question indicates the rate at which it was asked (e.g. 3 percent for "agitated and irritable?"). The percentages in the circles are the percentage of providers who asked two or more questions (e.g. zero percent offered a performed a skinfold test and checked if the child was agitated or irritable).

Figure 7 highlights those who succeeded. Since the child presented with diarrhea, the challenge was the dehydration. The key questions in Panel A of Table 14, show that providers often failed to ask all the key questions and then to interpret the responses. Nearly half of the providers asked for the results of the skinfold test ("asked" column), but far fewer asked about sunken eyes (33 percent) or if the child could drink when offered water (6.7 percent). However, two severity signs (identified with an "(S)" in the table) are required to classify the child as severely dehydrated according to the IMCI guidelines. Providers did better when asking at least two of the questions than when they did not ask them, although the overall rates remain low.

Comparing pneumonia and diarrhea shows how the key questions can help. Severity questions were asked more often and better-used as there were statistically-significant differences in interpretation of the information relative to those who did not ask the questions. Nurses were the largest beneficiaries of asking the right questions. Corroborating what appears in panel B of the table, those who asked more of the key severity questions were more likely to correctly diagnose the pneumonia case.

Table 14. IMCI key questions and diagnostic performance (percentage)

Item	Asked	Correct diagnosis with item	Doctor	Medical Officers	Nurse	Correct diagnosis without item
A. Diarrhea with severe dehydration						
Duration of diarrhea	78.0	4.4**	15.0	5.2	5.6	0.5**
Blood in stool	43.0	4.9	23.3	0.0	6.9	2.6
Lethargic or unconscious	26.5	8.2**	33.8*	14.5*	10.4	1.9**
Agitated or irritable (S)	2.7	22.5***	86.1***	0.0	14.4	3.0***
Sunken eyes (S)	33.0	8.2***	19.7	12.2	10.5***	1.3***
Can the child drink (S)	6.7	0.0	0.0	0.0	0.0	3.8
Skinfold test (S)	47.7	6.9***	18.6	7.9	8.1***	0.6***
Any two severity questions (S)	23.9	9.0***	22.7	12.8*	12.4***	1.1***
All severity questions (S)	0.0	0.0	0.0	0.0	0.0	3.0
Observations (sample)	**524**	**15**	**35**	**40**	**239**	**524**
B. Pneumonia						
Able to drink	3.2	68.8	0.0	100.0	100.0	52.5
Duration of cough	80.6	53.8	79.1*	52.3***	59.4*	49.6
Fever	69.6	55.5	86.1	32.0	63.5	47.5
Breathing problems (S)	22.1	79.8***	100.0	27.2	93.2***	45.4***
Lethargic or unconscious	8.9	79.6***	100.0	38.5	87.6***	50.4***
Respiratory rate (S)	35.2	73.4***	70.1	55.1	81.9***	41.9***
Weight	20.1	73.9***	90.0	39.7	83.1**	47.8***
Sub-costal in-drawing (S)	39.7	70.3***	94.1***	57.9*	73.5***	41.6***
Stridor (S)	8.6	69.4**	36.0*	0.0	68.0	51.5**
Malaria test	34.5	50.8	98.7***	47.8	66.1	54.2
All severity questions asked (S)	3.5	85.3**	100.0	0.0	89.2	51.8**
Observations (sample)	**519**	**273**	**35**	**36**	**238**	**519**

Notes: significance levels are from a Pearson test of a two-way tabulation of the item (asked/not asked) and the diagnostic outcome (correct/incorrect). The significance levels are *** (p<0.01), ** (p<0.05), and * (p<0.1); estimates and standard errors are weighted to account for the complex survey design. Items with an "(S)" are those identified in the IMCI as the questions to classify the severity of the dehydration or pneumonia. The observations under "correct diagnosis with item" refer to the total number who correctly diagnosed.

Similar analyses were done in Togo for diarrhea and show different results (Table 15). Providers were generally both more likely to ask important questions and to produce the correct diagnosis once they received the information. The severity questions are particularly important and providers were generally better-able to use that information. Providers were also far more likely to ask all four severity questions, although only half of the providers who asked all four questions reached the correct diagnosis, which is troubling for Niger.

Table 15. IMCI key questions and diagnostic performance for Togo (percentages)

Item	Asked	Correct diagnosis with item	Doctor	Clinical Officers	Nurse	Correct diagnosis without item
Duration of diarrhoea	87.6	27.7	46.6	58.7***	19.6	12.8
Blood in stool	32.3	25.0	18.6	44.9	16.8	26.3
Lethargic or unconscious	39.6	38.9***	41.3	62.7***	24.1	17.4***
Agitated or irritable (S)	4.9	97.7***	29.9	96.6***	100.0***	22.2***
Sunken eyes (S)	45.2	33.8	28.5	51.5	23.8	19.4
Can the child drink (S)	31.8	50.0***	34.0	58.9	44.5***	14.6***
Skinfold test (S)	76.7	29.9	45.5**	50.1	22.0	13.1
All severity questions (4)	21.1	52.0***	30.3	64.1*	37.5*	18.8***

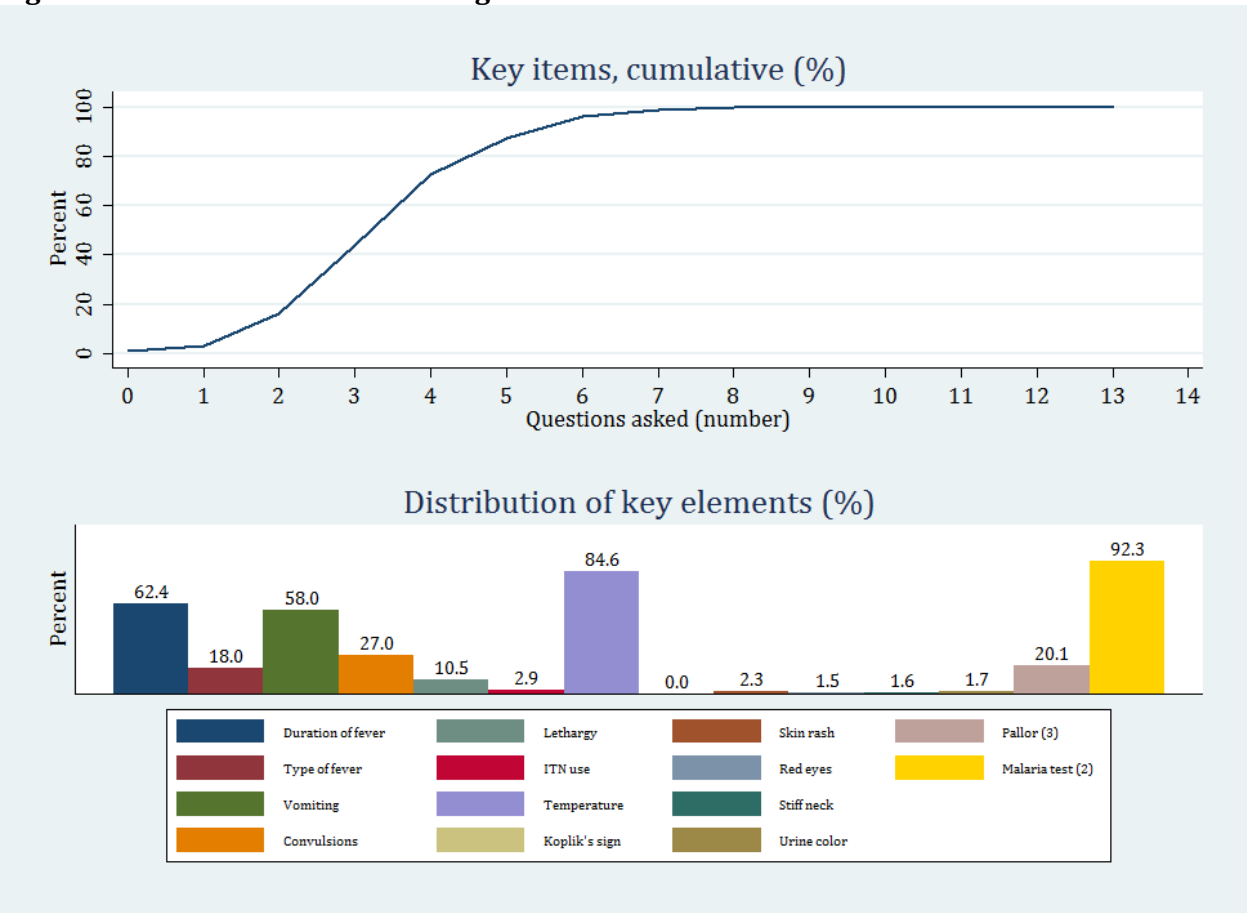
Notes: The significance levels are from a Pearson test of a two-way tabulation of the item (asked/not asked) and the diagnostic outcome (correct/incorrect). The significance levels are *** (p<0.01), ** (p<0.05), and * (p<0.1); estimates and standard errors are weighted to account for the complex survey design. Items with an "(S)" are those identified in the Togo IMCI as the questions to classify the severity of the dehydration.

The link between guidelines and diagnosis is generally positive. However, the questions, physical examinations, and lab work ordered by providers varies across the different simulations. Providers generally ask questions about diarrhea, diabetes mellitus, and tuberculosis. However, where they do quite well in using the tuberculosis information to diagnose the case, they do quite poorly on diarrhea, missing the severity of the dehydration. Providers do not ask many questions about pneumonia nor malaria. Although 92 percent of the evaluated providers test for malaria (either microscopy or rapid diagnostic test), only 87.5 percent of those who test treat with antimalarial drugs and 4.5 percent of those who do not test still provide antimalarial drugs. Providers generally diagnose better when they follow the guidelines, but research in other countries suggests that they may find adhering to guidelines to be tedious. [7] Given the caseload rates observed in Niger from the HMIS reports, this should not be a major hindrance. Rather, as shown in Table 14, a significant proportion of the providers seem to neither ask the key questions nor to correctly interpret the answers they receive for a number of cases.

Problems linked to key questions are also addressed Figure 9 and Figure 10 in Annex C; roughly 10 percent of providers most of the key questions in the five tracer conditions. However, this is counterbalanced by the finding that 71.8 percent of providers do not ask half of the key guideline questions in any of the tracers and that 85.4 percent of providers do not ask three-quarters of the key guideline questions in any of the tracer cases. Figure 8 explores this further in the context of malaria with anemia through details related to the key questions, physical, and laboratory elements. Among the questions which identify danger signs and rule out other pathologies, 40 percent of clinicians look at three items or less, over 70 percent ask no more than four questions, and approximately none ask more than eight questions. The distribution of questions in the lower panel shows that roughly one in five clinicians asks about pallor (palmar, nail bed, or conjunctiva), which makes it difficult to identify anemia and results in the observed diagnostic success rates. Even when they ask about the pallor, only 21.4 percent of providers correctly diagnose the case (compared to 1.1 percent otherwise; p<0.01).

[7] Lange, Mwisongo, et Mæstad (2014), « "Why don't clinicians adhere more consistently to guidelines for the Integrated Management of Childhood Illness (IMCI)? »

Figure 8. Elements of malaria management



After the diagnosis, there are concerns with care, as shown in Table 16, which shows the prescriptions delivered by the clinicians who correctly identified the case as a simple malaria with anemia. Proceeding as they normally would in their work environment, only 49.6 percent of providers gave a prescription for artemether-lumefantrine (Coartem; for malaria) and 59.5 percent gave a prescription for a source of iron (iron or iron and folic acid; for anemia). Interestingly, although all providers claim that they would prescribe antimalarial artemether-lumefantrine if they had it (best-case prescription column), fully 43.2 percent of providers did not prescribe it when it was in stock. Iron prescriptions follow a similar trend with 100 percent saying they would prescribe, but 39.9 percent not prescribing despite having at least one non-expired dose observed in the pharmacy Since the sample is limited to those who correctly diagnosed the pathology, it suggests that adherence to guidelines is insufficient.

Table 16. Management of simple malaria with anemia among those who diagnosed correctly

		Prescription		Prescription and pharmacy availability			
Percent	**Availability**	**Current**	**Best-case**	**No/No**	**Yes/No**	**No/Yes**	**Yes/Yes**
Coartem	85.2	49.6	100	7.3	7.6	43.2	42.1
Paracetamol	85.8	63.5	87.9	2.6	11.6	33.9	51.9
Iron	87.3	59.5	100	0.6	12.1	39.9	47.4***
Iron and folic acid	83.7	18.6	39.3	13.8	2.5	67.6	16.1
Iron	71.9	45.7	72.0	11.5	16.7	42.8	29.0
Deworming	91.1	0.0	0.0	8.9	0	91.1	0
Albendazole	87.9	0.0	0.0	12.1	0	87.9	0
Mebendazole	86.5	0.0	0.0	13.5	0	86.5	0

Note: pharmacy availability means that there is at least one non-expired dose that is seen by the survey team in the pharmacy. Deworming is specified as either Albendazole or Mebendazole in the questionnaire, so the prescription information is repeated for each drug. The best-case for prescription is if providers had access to anything they might need. In the sample, 34 clinicians correctly diagnosed the case. The significance levels are *** (p<0.01), ** (p<0.05), and * (p<0.1); estimates and standard errors are weighted to account for the complex survey design.

F. Management of life-threatening maternal and neonatal complications

The second process quality indicator is clinicians' ability to manage maternal and neonatal complications (Table 17). This indicator reflects the unweighted share of relevant treatment actions proposed by the clinician. Except for medical officers in rural public facilities, provider adherence to guidelines is always lower than those of the tracer conditions. Midwives, who are specialized in family planning and obstetric-related care, almost always perform at the level of doctors or better. The only exception is examinations in the case of neonatal asphyxia, however midwives' diagnostic rate (91.4 percent) is 10.9 percentage points higher than doctors (closest second, p<0.05) and generally more than 20 percentage points better than other provider categories. Although adherence is generally low by facility type, it is 27.6 percent lower in health posts than in hospitals (p<0.01) as shown in Table 46.

Table 17. Management of maternal and neonatal complications by cadre (percent)

% cadre	**Niger**	**Public**	**Private**	**Difference (%)**	**Rural public**	**Urban public**	**Difference (%)**
All cadres	12.0	12.1	10.9	-9.9	12.2	11.9	-2.5
Doctors	16.1						
Medical officers	16.1	17.1	7.9***	-53.8	25.5	16.1*	-36.9
Nurses and midwives	12.7	12.9	9.4**	-27.1	13.9	11.7	-15.8

Notes: there are 35 doctors in the sample, so a disaggregation is not meaningful. For purposes of comparison with other countries, a "technicien supérieur" is treated as a medical assistant. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Looking at the breakdowns of the two cases (Table 45), there are high diagnostic rates and yet low treatment levels. For immediate post-partum hemorrhage (IPPH), public providers diagnose 70 percent better (p<0.01), but treat worse that private providers. Among public providers, urban providers perform 3.7 times as many tests (p<0.01), but do not diagnose as well, and treat 28.7 percent worse (p<0.01). Among facility types for IPPH (Table 45), health posts 62.5 percent worse on key physical examinations for (p<0.01) and 92.2 percent worse on key tests (p<0.01) than hospitals, but provide 47.9 percent more treatment, as measured by actions, than hospitals (p<0.01). Health centers also do worse than hospitals on key tests (72.6 percent; p<0.01), but diagnose nearly 25 percent better (p<0.05) and provide 57 percent more treatment, as measured by actions (p<0.01).

This result on the different rate of laboratory tests is interesting in that urban providers are more likely to request them, but do not treat better overall. The survey did not include questions relative to the equipment that was available to evaluate blood compatibility or hemoglobin levels, so the hypothesis that equipment is a limiting factor must be addressed by taking advantage of the questions asked of the providers once they had finished treating the case as they would normally do in their facility. The following paragraph describes how this was done.

During the survey, providers were first asked to treat as they normally would in their facility. Thereafter, the interview team asked them what else they might do if they had all necessary resources. All those who either indicated the use of equipment or medications in their current environment or still did not indicate the use of equipment or medications are grouped as "no". Those who added items are coded as "yes". This allows an analysis of constraints to provider competence from equipment, which differs from the rest of the analysis that focuses on the current context.

In this context, Table 18 summarizes what providers said they would have done had they the necessary resources for the two laboratory examinations that were necessary for the post-partum hemorrhage case. Overall, 2.5 percent of providers would have drawn blood for typing and compatibility analysis and 9.4 percent would have done the hemoglobin levels. The differences are primarily between public and private facilities, because private facilities do not ask for what they do not use in their current practice.

Table 18. Lab exams that providers would have ordered if resources were available in the case of post-partum hemorrhage

Pour-cent	Niger	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
			Blood for typing and compatibility analysis				
All facilities	2.5	2.5	0.0***	-100.0	2.0	3.7	85.0
Health posts	0.3	0.3	..	..	0.3	..	..
Health clinics	4.4	4.6	0.0**	-100.0	4.2	5.1	21.4
Hospitals	1.0	1.0	..	..	..	1.0	..
			Hemoglobin levels				
All facilities	9.4	9.6	0.0***	-100.0	8.2	12.5	52.4
Health posts	4.7	4.7	..	..	4.7	..	..
Health clinics	13.5	13.9	0.0***	-100.0	12.7	15.5	22.0
Hospitals	6.9	6.9	..	..	..	6.9	..

Notes: there are 16 hospitals in the sample, all in urban areas. Comparisons within facility type are relative to public and public rural. Comparisons across facility types are relative to hospitals. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

In the case of neonatal asphyxia, management is generally worse than of IPPH. Public providers do diagnose better (p<0.10), but are otherwise statistically indistinguishable from private providers. Among public providers, the only difference is that rural providers perform 1.6 times as many examinations as their urban counterparts (p<0.10), but the public rural providers, on average, slightly less than one-half of one treatment action. This is still insufficient. The presence or absence of equipment to unblock the upper respiratory passages or of a bag and mask do not seem to be a factor, as very few providers say they would use them if they had access to all necessary equipment.

G. Special topics: first ante-natal care visit and severe pre-eclampsia

At the request of the Ministry of Health, two modules were developed specifically for Niger with the participation of the Brigham and Women's Hospital and Ariadne Labs. These vignettes were further refined during the pilot testing phases to reflect the guidelines for Niger and were subsequently used in the survey. The choice of vignettes was guided by the very high total fertility rate in Niger (7.6 births per woman) and an assisted birth rate of 83 percent.[8] Information is provided below about each vignette. Broad results by region are presented in Table 47.

First ante-natal care visit

This vignette simulated the initial visit by a woman who was pregnant for the first time. Providers had to undertake the necessary screening and evaluation steps, diagnose a pregnancy complicated by moderate anemia, and estimate the gestational age. The questionnaire was based the revised ANC protocol developed based on the latest WHO guidance. Given the number of elements, an aggregate presentation is made in Table 19. Public providers do better ($p<0.05$) than private providers for danger signs, key questions, physical examinations, and care. However, public providers are more likely to diagnose a pregnancy without anemia than private providers ($p<0.10$ individually for all three). From a regional perspective (Table 47 in Annex C), there is no statistically-significant variation in the correct diagnosis. However, providers in Tahoua are 9.5 percentage points more likely than those in Niamey to identify only the pregnancy ($p<0.05$).

Table 19. Broad categories of first ante-natal care visit (%)

Category	Niger	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
Danger signs	7.9	8.1	4.4**	-45.7	8.9	6.3	-29.2
Key questions	8.8	9.0	6.0*	-33.3	9.0	8.8	-2.2
Physical examinations	8.3	8.5	3.9*	-54.1	7.5	10.7	42.7
Clinical examinations	0.0	0.0	0.0	.	0.0	0.0	.
Diagnosis, full	0.8	0.7	1.5	114.3	1.0	0.2	-80.0
Diagnosis, pregnancy	91.7	92.1	84.6*	-8.1	92.9	90.3	-2.8
Care	10.6	10.9	4.9*	-55.0	12.5	7.4	-40.8
Patient education	5.2	5.4	2.3	-57.4	6.1	3.8	-37.7
Risks explained	9.0	9.0	9.6	6.7	10.3	5.9	-42.7

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Anemia, whether combined with pregnancy or not, was diagnosed only by 0.9 percent of providers (0.8 percent of which diagnosed pregnancy with anemia). There was no statistically-significant variation among provider types. As highlighted elsewhere in this report, part of the problem may stem from providers' approach to care: both palmar pallor (14 percent of providers) and hemoglobin examinations (4.8 percent constrained, 6.5 percent unconstrained) were not frequently requested, so it would have been hard to detect anemia. However, 15 percent of providers gave the patient a prescription for a three-month supply of iron and folic acid. Providers who tested for anemia, regardless of method and regardless of whether in the current or ideal situation, were more likely to prescribe folic acid regardless of situation ($p<0.01$).

[8] Demographic and Health Survey 2012.

Severe pre-eclampsia

This vignette simulated the visit by a woman in the final weeks of pregnancy with signs of hypertension. Providers were expected to recognize the urgency of the condition, to provide immediate care and referral if they could not manage the case in their facility. Given the number of elements, an aggregate presentation is made in Table 20. Public providers do better than private providers for physical and clinical examinations, and care (all p<0.01). Among public providers, urban ones do better than their rural counterparts on physical and clinical examinations, and diagnoses in general (p<0.01 for all). Overall, the recognition of the problem remains low. As Table 47 in Annex C shows, providers in other regions do worse than Niamey. For example, the rate of correct diagnosis is 14.8 percent in Maradi (p<0.10), 6.4 percent in Tahoua (p<0.01), and 11.6 percent in Zinder (p<0.05). Overall, the recognition of pre-eclampsia without consideration of the severity, is still significantly different from Niamey in Maradi (42.3 percent; p<0.01), Tahoua (44.9 percent; p<0.10), and Zinder (45.8 percent; p<0.01).

Table 20. Broad categories of severe pre-eclampsia simulation (%)

Category	Niger	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
Danger signs	6.6	6.6	7.1	7.6	7.7	4.2	-45.5
Key questions	11.8	11.9	10.2	-14.3	12.2	11.3	-7.4
Physical examinations	1.0	1.1	0.0***	-100.0	0.0	3.5***	.
Clinical examinations	1.6	1.7	0.0***	-100.0	0.0	5.4***	.
Diagnosis, full	10.9	11.1	8.5	-23.4	5.7	23.0***	303.5
Diagnosis, eclampsia	50.2	49.7	59.6	19.9	41.9	67.2***	60.4
Care	5.6	5.8	2.2***	-62.1	6.0	5.1	-15.0

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

H. 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 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 (Table 50). **Error! Reference source not found.**

On average, health facilities in Niger had 50.4 percent of tracer drugs available (Table 21). Rural public facilities have 22 percent less WHO tracer drugs available (p<0.05) than urban public facilities, which is driven by the different for health centers (17 percent, p<0.05). Health posts have 41.7% less drug availability (p<0.01) than first-level hospitals, but health centers and hospitals have the same availability statistically-speaking. When looking at specific beneficiary populations, there are more drugs for mothers (19.7 percent; p<0.05) and children (19.3 percent; p<0.05) in urban public than in rural public facilities. However, there is no significant difference among public and private facilities.

Table 21. Drug availability by facility type (percent)

Percent	Niger	Public	Private	Difference (%)	Rural Public	Urban Public	Difference (%)
			All drugs				
All facilities	50.4	50.4	51.3	1.98	49.5	60.5**	22.2
Health post	40.9***	40.9	..	..	40.9	..	..
Health center	67.8	68.2	56.5	-17.2	70.7	58.6**	-17.1
First level hospitals	70.2	70.2	..	..	..	70.2	..
			Drugs for mothers				
All facilities	44.3	44.2	46.8	5.9	43.4	54.0**	24.4
			Drugs for children				
All facilities	54.0	54.0	56.4	4.4	53.0	65.7**	24.0

Notes: there are no hospitals in rural locations. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Availability of vaccines is presented in Annex C, in Table 53, Table 54, and Table 55. Generally, vaccine availability, estimated at 44.6 percent nationally, is hindered by the lack of PCV10 and tuberculosis (BCG) vaccines, which are available in 54.6 and 72.4 percent of facilities, respectively. Gaps are felt in PCV10 across rural and urban public facilities (49.1 percent more in rural; p<0.05) and across facility levels, with the health posts generally having fewer vaccines than the health centers and hospitals.

The Ministry of Health monitors a set of drugs by level, some of which are available in the SDI dataset. At the health post, the drugs were artemisinin-based combination therapy, paracetamol, ORS in sachets (not tracked in the survey; N/A), Cotrimoxazole tablets, amoxicillin, and chlortetracycline (N/A). At the health center, the drugs were artemisinin-based combination therapy, quinine salts (N/A), Cotrimoxazole tablets, paracetamol, injectable Diazepam, ORS in sachets (N/A), oxytocin, and injectable ampicillin. At the hospital level, the drugs were injectable ampicillin, Ringer's solution (N/A), pethidine chlorhydrate (N/A), salbutamol, HIV test reagents (N/A), and 10% glucose serum (N/A). The results are in Table 22 and are lower than the rates for the fourth quarter of 2015, which had availability at 97.69 percent for health posts, 97.32 percent for health centers, and 98.01 percent for district hospitals.[9]

Table 22. Drug availability by facility type using Ministry of Health drugs (percent)

Percent	Niger	Public	Private	Difference (%)	Rural Public	Urban Public	Difference (%)
All facilities	75.1	75.9	60.6***	-20.2	75.5	81.8	8.3
Health post	73.6	73.6		.	73.6		.
Health center	77.5	80.3	60.6***	-24.5	80.6	78.5	-2.6
First level hospitals	93.6***	93.6		.	.	93.6	.

Notes: there are no hospitals in rural locations. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

[9] Rates for the third quarter were not available.

I. 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. Table 56 shows the availability of each of these types of equipment.

Table 23 presents availability of minimum equipment adjusted by level of facility, and Table 58 shows the availability of each of these items of equipment across public and private and rural and urban while Table 59 shows equipment availability by region. Nationally, equipment was available at percent of facilities. Hospitals have more than other facility types, whether it be health posts (36,8 percent; p<0.01) or health centers (34,2 percent; p<0.01).

Table 23. Medical equipment availability (adjusted for facility level)

Percent	Niger	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All facilities	35.9	35.9	34.3	-4.6	33.2	77.2***	132.6
Health post	34.2***	34.2			34.2		
Health center	36.8***	37.2	34.3	-8.0	30.5	72.3***	137.0
Hospital	94.8	94.8				94.8	

Notes: there are no hospitals in rural locations. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Even without considering refrigerators or sterilizing equipment, there are gaps in the availability of basic items such as a scale (81 percent of facilities; 74 percent of health posts), sphygmomanometers (58 percent of facilities, 44.1 percent of health posts, 83.2 percent of health centers), and stethoscopes (69 percent of facilities, 56.4 percent of health posts, 92 percent of health centers). Only thermometers (91.7 percent of facilities, 89.1 percent of health posts, 96.5 percent of health centers) are in relatively high supply.

Comparisons across public and private and within public suggest that there is an urban bias. The major public-private distinction is in sterilizing equipment; private facilities are nearly four times as likely to have sterilizing equipment (p<0.01). When looking within public facilities, urban ones are 1.9 times as likely to have a scale (p<0.01), 1.6 times as likely to have a sphygmomanometer (p<0.01), and 1.4 times as likely to have a stethoscope (p<0.01). However, among health centers, urban facilities are less likely to have a refrigerator (0.7 times; p<0.05) and 2.2 times more likely to have a sterilization device (p<0.01).

J. Infrastructure availability

Methodological note

The infrastructure indicator captures the availability of three inputs: water, sanitation, and electricity. The indicator is an unweighted average of these three components. Eligible sources are:

Electricity sources: Electric power grid, a fuel-operated generator, a battery-operated generator or a solar-powered system as their main source of electricity.
Water sources: Piped into the facility, piped onto facility grounds or comes from a public tap/standpipe, tube well/borehole, a protected dug well, a protected spring, bottled water or a tanker truck.
Sanitation sources: Functioning flush toilet, ventilated and improved pit (VIP) latrine, or covered pit latrine (with slab).

Table 24 shows that on average, 13.3 percent of facilities had all three infrastructure items (electricity, water, and sanitation). There are disparities across public-private and rural-urban breakdowns. Private facilities are 3.8 times as likely to have the three elements ($p<0.10$), which is because 2.5 percent of health posts have the three items. Among health centers, where the comparison is most direct, all private facilities have electricity, while 56.7 percent of public ones have it ($p<0.01$). Among public facilities, urban ones have far more infrastructure than rural ones ($p<0.01$), even among health centers. Public health centers are approximately 82 percent more likely to have electricity ($p<0.01$) and 22.5 percent more likely to have clean water ($p<0.10$) than their rural comparators. Comparing across facility levels, the gap is evident ($p<0.01$ for comparisons with the hospital).

Table 24. Infrastructure availability (percent)

Facilities (%)	Niger	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All facilities	13.3	10.7	65.8***	515.0	7.9	51.9***	472.0
Health post	2.5***	2.5	.	.	2.5	.	.
Health center	31.7***	26.2	65.8***	95.1	22.6	44.2	95.6
Hospital	79.1	79.1	.	.	.	79.1	.

Notes: there are no hospitals in rural locations. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Communications elements also matter in the health system. The survey assessed phone, computer, and internet access. Phones were defined to be landlines or cell phones, broken down into three categories: those owned and whose communication was financed by the facility, those privately owned but whose communication was financed by the facility, and those privately owned whose communication was not financed by the facility. Computers belonged to the facility or to individuals. Internet access was not broken down by source of financing.

Almost all facilities had a phone available (95.2 percent) and that was functional (93.0 percent), with no significant differences across public and private facilities or public facilities in rural and urban. There were differences in availability of functional phones by level: 94 percent of health posts had a functional phone ($p<0.05$), 90.9 percent of health centers ($p<0.05$), and 100 percent of hospitals had one. Private facilities were 13 times more likely (30.8 percent; $p<0.01$) to provide phone credit to a private phone but 2.5 times less likely to have a cellular phone owned by the facility ($p<0.05$). The same tendencies applied for functional cellular phones.

Computers were generally not available, with 16.9 percent of facilities reporting a computer and 15.3 percent reporting a functional computer. There were no significant differences among public and private facilities in the availability of computers in general, although facility-owned computers were 10.3 times as likely to be functional in private facilities ($p<0.10$). Across facility levels, the patterns are consistent for presence or functionality: 4.9 percent of health posts ($p<0.01$), 32.1 percent of health centers ($p<0.01$) and 98.4 percent of hospitals, respectively, had functional computers.

Internet access was generally unavailable (4.3 percent) and non-functional when available (2.6 percent). There is no significant difference in functional internet across public and private facilities. Public urban facilities (20.8 percent) were 20 times as likely to have functional internet as rural public facilities ($p<0.01$). Functioning internet access varied strongly by facility level: 0 percent of health posts ($p<0.01$), 4.0 percent of health centers ($p<0.01$), and 95 percent of hospitals, respectively, had such service.

K. Incentives, leadership, and management

The Niger SDI survey tested a module on incentives, leadership, and management. The goal of the module was to provide additional information on observed service delivery strengths and weaknesses in the facilities. Work in Mozambique showed that directors' knowledge of teacher absenteeism seemed unrelated to what was observed in practice. However, work in a number of SDI surveys showed that the most significant correlate of absenteeism, whether correlation or size, was the absence of the head of the school or health facility. Therefore, this module was designed to gain additional knowledge on the interplay of the formal institutional rules and the realities of the service delivery units.

Leadership, management, and incentives

Heads of facilities were asked, among other topics, about their major constraints, the incentive tools they have, and their experience in the sector. There are some differences across levels and ownership structures. Globally, the most important constraint is drug availability, which is consistent with the finding that facilities have 50.4 percent of drugs expected at their level. However, private facilities cite medical equipment (nearly three times more; $p<0.05$) and, surprisingly, autonomy (35 times more; $p<0.05$) as their primary constraints. Among public facilities, rural has greater constraints from drugs (68 percent; $p<0.05$) and infrastructure (71.3 percent; $p<0.05$), while urban cites cost recovery (123.7 percent more; $p<0.1$) as its primary constraint. As the section on Community engagement below shows, the most-covered topics in the last health facility committee meeting is the availability of drugs (82.5 percent of respondents), then infrastructure (56.6 percent) and free health care (*gratuité*; 50.8 percent).

Table 25. Constraints to service delivery (percent)

Primary constraint	Niger	Public	Private	Difference (%)	Rural Public	Urban Public	Difference (%)
Drugs	29.4	30.2	13.2	-56.3	31.5	10.1**	-67.9
Staff	13.9	14.3	4.9*	-65.7	13.5	27.4	103.0
Infrastructure	8.3	8.3	7.3	-12.0	8.7	2.5**	-71.3
Medical equipment	15.7	14.2	44.7**	214.8	14.0	17.5	25.0
Management and leadership	3.1	3.3	0.0*	.	3.5	0.0*	-100.0
Autonomy	1.0	0.4	14.1**	3425.0	0.4	0.0	-100.0
No constraints	10.9	11.4	2.0*	.	11.7	6.3	-46.2
Free public care	0.5	0.5	0.0	-100.0	0.5	0.0	-100.0
Cost recovery	17.3	17.5	13.8	-21.1	16.2	36.3*	124.1

Notes: there are no hospitals in rural locations. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Another aspect of leadership is knowing the available incentives and using them. Managers were asked about a set of standard incentives, both positive and negative.[10] Table 26 compares use of incentives in the health centers, because these are both public and private. The knowledge and use of incentives varies significantly across public and private. Unsurprisingly, private sector facilities think of promotion ($p<0.01$) and use it ($p<0.05$), but they also are more likely to cite verbal warnings ($p<0.05$) than their public counterparts. More broadly, private facility heads are more than twice as likely to cite ($p<0.05$) or use ($p<0.01$) positive incentives and 3.8 times as likely to cite negative incentives ($p<0.05$).

Finally, experience is often considered important. Nationally, heads of facilities have 9.5 years of experience in health and 7.5 years as heads of facilities. Private heads have declared 80 percent more experience than public ones ($p<0.10$) and urban public heads have 74 percent more experience than rural ones ($p<0.01$). Among heads of public facilities, this is also driven by facility level: heads of health posts average 8.2 years of experience ($p<0.01$), heads of health centers average 11.7 years, and heads of hospitals average 13.4 years.

10. Positive incentives were promotion or raise, written congratulations from outside leaders (e.g. provincial head), formal congratulations (e.g. at an annual meeting), and verbal encouragement. Negative incentives were dismissal, suspension, written warning, and verbal warning.

Table 26. Use of incentives by facility heads, by ownership in health centers (percent)

Incentive	Niger	Public	Private	Difference (%)	Rural Public	Urban Public	Difference (%)
Any positive incentive cited	33.5	28.7	61.7**	115.0	22.4	62.3*	178.1
Any positive incentive used	24.0	20.1	47.8*	-61.2	19.0	25.8	35.8
Promotion cited	7.2	0.0	50.2***	.	0.0	0.0	.
Promotion used	5.7	0.0	39.9**	.	0.0	0.0	.
External encouragement cited	8.1	8.2	7.1	-13.4	4.6	27.3**	493.5
External encouragement used	4.0	4.7	0.0	-100.0	3.8	9.3	144.7
Congratulations cited	15.6	12.1	36.6	202.5	9.1	27.6	203.3
Congratulations used	7.2	4.1	25.9	531.7	2.6	12.1	365.4
Encouragements cited	24.9	21.9	42.5	94.1	21.2	25.8	21.7
Encouragements used	19.7	17.6	31.8	80.7	19.0	10.6	-44.2
Any negative incentive cited	17.9	12.8	48.3**	277.3	6.8	44.6***	555.9
Any negative incentive used	8.2	4.8	28.7	497.9	2.6	16.6	538.5
Dismissal cited	2.5	0.9	11.9	1,222.2	0.0	5.9	.
Dismissal used	0.2	0.0	1.2	.	0.0	0.0	.
Suspension cited	2.3	0.9	10.7	1,088.9	0.0	5.9	.
Suspension used	0.0	0.0	0.0	.	0.0	0.0	.
Written warning cited	8.0	7.2	12.7	76.4	3.0	29.1**	870.0
Written warning used	2.0	2.0	2.0	0.0	0.0	12.2*	.
Verbal warning cited	13.8	8.2	47.1**	474.4	6.0	19.8	230.0
Verbal warning used	6.4	2.9	27.5	848.3	2.6	4.4	69.2

Notes: data are for 2014. Comparisons across ownership are relative to public and within public are relative to rural. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Supervision

Supportive supervision is an important element of a well-functioning health care system. This module focused on certain aspects of supervision, particularly the frequency, the type of supervision, the team composition, what the supervision team examined, and what feedback they provided.

As shown in Table 27, providers receive slightly more than one visit per quarter, generally by two team members, although urban public facilities have three-person teams on average compared to two-person teams for rural public facilities ($p<0.01$). Interestingly, use of supervision worksheets seems to be concentrated among private rather than public facilities (62.6 percent more prevalent; $p<0.01$) and urban within public (40.2 percent more prevalent; $p<0.05$).

Table 27. Basic supervision information

Item	Niger	Public	Private	Difference (%)	Rural Public	Urban Public	Difference (%)
Visits in 2014	4.5	4.6	3.0	-34.8	4.7	3.8	-19.1
Visits in 2015	3.2	3.3	1.6**	-51.5	3.3	2.4	-27.3
Days since last supervision	181.3	184.8	96.3	-47.9	193.2	76.4	-60.5
Supervision team size	2.4	2.4	2.9	20.8	2.3	3.6***	56.5
Supervision worksheet	62.0	60.2	98.0***	62.8	58.6	82.2**	40.3

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Three kinds of supervision were identified: by the district health team (DHT), by disease focal points (DFP), and other. Table 28 shows some key facts about these visits. Disease focal points were most likely to use supervision tools ($p<0.05$), to review staff presence ($p<0.01$), and to examine medical stocks ($p<0.01$), but not more likely to leave written comments. The "other" supervisions were least likely to leave written comments (45.4 percent less likely than the DHT; $p<0.01$). The general focus on medical stocks is reflected in the written comments left as they were commented upon in 70.3 percent of facilities. Differentiation by supervision is visible; HMIS reporting is not a focus of disease focal points ($p<0.1$), perhaps because they maintain parallel systems? Quality of care was always a focus in hospitals, a focus in health centers 54.8 percent of the time ($p<0.01$) and a focus in health posts 18.6 percent of the time ($p<0.01$). Private facilities (87.4 percent) were 2.3 times more likely to show quality of care as a concern than public facilities (38 percent; $p<0.01$). The same patterns and statistical significance by facility type and across public and private were observed for the performance of providers and of the facility manager. To increase performance, there must be feedback; although there is little variation across supervision types, the disease focal points were most likely to provide comments or suggestions ($p<0.05$) and to share their comments with the staff.

Table 28. Supervision by team

		Average rate			Difference (%)	
Item	**Niger**	**DHT**	**DFP**	**Other**	**DPF**	**Other**
Supervision worksheet	62.0	73.8	100.0**	43.0**	35.5	-41.7
Documents reviewed						
Staff presence	54.7	64.0	98.8***	36.7**	54.4	-42.7
Medical stocks	90.0	88.7	100.0***	90.2	12.7	1.7
HMIS reporting	86.7	89.2	66.3	86.4	-25.7	-3.1
Financial reporting	55.9	62.9	53.1	47.9	-15.6	-23.8
Written comments left	49.2	61.3	59.9	33.5***	-2.3	-45.4
Areas commented (selection)						
Financials	49.6	51.0	26.6	52.2	-47.8	2.4
Equipment	53.2	62.1	67.8	30.5*	9.2	-50.9
Infrastructure	41.6	46.1	13.8*	38.4	-70.1	-16.7
Consumables	68.7	75.5	57.5	56.4	-23.8	-25.3
Medical stocks	70.3	72.4	67.7	66.2	-6.5	-8.6
Epidemiology	33.9	37.0	55.5	22.1	50.0	-40.3
HMIS reporting	79.2	82.7	43.7*	80.1	-47.2	-3.1
Financials	49.6	51.0	26.6	52.2	-47.8	2.4
Feedback for improvement						
Met providers	89.2	87.1	90.4	91.6	3.8	5.2
Made comments/suggestions	84.7	76.6	100.0**	92.3	30.5	20.5
Comments shared	75.5	75.9	93.9	72.6	23.7	-4.3

Notes: "DHT" is the "District Health Team" and "DFP" is "Disease Focal Point(s)". Comparisons within supervision type are relative to the DHT. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Community engagement

Facilities exist to serve patients, who are generally organized in communities. Part of the governance mechanism of the health sector is the engagement of the health facilities with their communities through various planning and oversight bodies. Table 29 presents some key metrics of community engagement and oversight. There is a striking change in COGES organization in the private sector between 2014 and 2015, going from less than seven percent to 100 percent in one year, while the public sector also reached nearly 100 percent, but from a far higher base. The duration since the last COGES meeting in 2015 is at variance with the announced 2014 meeting numbers, unless they are not distributed uniformly in the year. Rural public facilities are more than twice as likely as urban public facilities ($p<0.05$) to not have minutes of the last meeting. On average, one public facility in two informs its community about its finances, one in eight seeks community feedback (more than three times as frequent in urban relative to rural areas; $p<0.05$), and roughly one in fifty made changes in 2014 based upon user feedback (among those that had solicited feedback). When comparing among health centers, which are both public and private, the duration since the last COGES meeting worsens (210.6 days for public, 216.5 in rural public, and 174.6 in urban public). Private facilities have larger average COGES sizes (6.5 vs. 4.4; $p<0.05$) and are more likely to have a COSAN (2.0 percent vs. 1.2 percent; $p<0.01$), with meetings every trimester in both cases.

Table 29. Community engagement, all facility types

Item	Niger	Public	Private	Difference (%)	Rural Public	Urban Public	Difference (%)
COGES in 2014	92.1	96.5	6.8***	-93.0	97.2	85.9	-11.6
COGES meetings in 2014 (N)	7.5	7.5	5.3*	-29.3	7.4	7.7	4.1
Days since last COGES	164.2	164.7	34.6***	-79.0	165.2	157.0	-5.0
Minutes seen	29.0	28.8	70.6	145.1	27.9	44.8	60.6
Minutes not seen	31.4	31.4	29.4	-6.4	31.1	36.5	17.4
No minutes	39.7	39.8	0.0***	-100.0	41.0	18.7**	-54.4
COGES in 2015	99.4	99.4	100.0	0.6	99.3	100.0	0.7
COGES size	5.2	5.2	6.5	25.0	5.2	5.1	-1.9
COSAN in 2015	1.7	1.7	2.0***	17.6	1.7	1.3***	-23.5
COSAN meeting frequency	3.1	3.1	3.0	-3.2	2.9	3.8	31.0
Facility shares financials	53.7	56.2	3.6***	-93.6	55.8	63.6	14.0
Facility solicits feedback	12.9	12.8	14.5	13.3	11.2	36.5**	225.9
Provider feedback loop	47.0	45.1	78.0**	72.9	41.2	61.9	50.2
Changes from feedback loop	1.5	1.5	1.1**	-26.7	1.5	1.4	-6.7

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1. The COSAN meeting frequency is the number of months between meetings.

IV. WHAT DOES THIS MEAN FOR NIGER?

As the Country Status Report (2014) notes, there is variation among the key outcome indicators. Mortality for neonates (27 percent over 2006-12), infants (60 percent over 1998-2012), and mothers (14.5 percent over 2006-2012; 21 percent over 1990-2010) declined significantly, mortality rates remain high and Niger's maternal mortality (554/100,000 live births) exceeded that of most West African Economic and Monetary Union states in 2010. The sharp declines in neonatal and infant mortality raised Niger's life expectancy at birth from 37 years (1960) to 58.4 years (2010), slightly above the Sub-Saharan Africa average of 54 years and nearly at the low-income average of 59 years.

This is undertaken in a context of variable resources. The Creditor Reporting System of the OECD/DAC allows the disaggregation of funds by sector.[11] External financing expanded from a low base (below 10 percent of total net flows in 2001-5), but had consecutive years above 10 percent only in 2013 and 2014. Health has faced higher net aid volatility (standard deviation is 120 percent of the median) than all sectors (32 percent of the median). According to the annual health system reports, presented in Table 30, government has executed relatively well on all categories of expenditure except investment, which forces the ministry to rely more on volatile resources from partners. This is corroborated by the publicly-available BOOST data, which show that the Ministry of Health ranks in the middle of the execution table for public investment (ranging from 14th in 2010 to 37th in 2014), functional expenses (seventh in 2014, 40th in 2013), and transfers (11th in 2012, 28th in 2014).

Table 30. Domestic resources for health 2011-14

	Execution rate (%)					National budget share (%)
Year	Personnel	Operations & maintenance	Subsidies	Investment	Overall	
2014	120.2	86.9	91.4	55.7	82.0	5.4
2013	100.4	93.2	90.1	71.5	91.8	5.6
2012	113.3	88.7	93.2	64.4	85.9	5.4
2011	85.23	94.7	97.6	17.3	67.9	6.5

Source: Ministry of Health Statistical yearbooks.

Provision of care is hindered by a very high centration of doctors (1 per 5,642 people) and nurses (1 IDE per 1,789 people) in Niamey to the detriment of highly-populated areas such as Zinder, Maradi, Tahoua, and Tillabéri which have between eight and12 times less doctors per capita and roughly 3.6 times less IDE per capita than Niamey. The skill imbalances are one problem, as is the overall level of ability to properly handle the various cases remains a concern. In addition, the gap between those formally trained and trained on the job, particularly for adult care, is a further cause for concern. The overall level of skills in the management of maternal and neonatal complications is in line with the burden of mortality (535 deaths per 100,000 pregnancies; DHS 2012). Niger's performance in diagnostic accuracy, adherence to guidelines, and the management of maternal and child health complications places it near the bottom of the table for SDI countries.

Human resource availability is a challenge, with a 33 percent national absence rate. This is 2.23 times higher than in primary education, where teachers are absent from school 14.8 percent of the time using the same methodology.

[11] According to the same source, primary education received three times less funding.

Input availability is relatively low for infrastructure and equipment. This may, in part reflect resource execution variability which ranges from 28 to 90 percent in the 2003-2014 period. Regardless of the cause, the lack of basic inputs, such as refrigerators and sterilization equipment, and the lack of electricity (may also cause refrigerators to not function) make it difficult for health personnel to provide appropriate care.

The situation in Niger is generally worse than in other countries that have done SDI as is shown in Table 31. Niger ranks in the top half of the table for caseload (third) and drug availability (fourth). Niger ranks seventh for equipment availability, eighth for diagnostic accuracy and management of maternal and neonatal complications, and ninth (last) for adherence to clinical guidelines and infrastructure availability. While there are concerns across the board, drug availability, which is such a concern for providers and communities is apparently relatively well-handled in Niger. There is perhaps more to be done in other areas such as adherence to guidelines, diagnostics, and provider absence.

Table 31. SDI comparator table

	Niger (2015)	SDI average	Madagascar (2016)	Mozambique (2015)	Tanzania (2014)	Nigeria (2013)	Togo (2013)	Uganda (2013)	Kenya (2013)	Senegal (2010)
Caseload (per provider per day)	9,8	**8.8**	5.2	**17.4**	7.3	5.2	5.2	6.0	**15.2**	-
Absence from facility (% providers)	33,1	**28.6**	27.4	23.9	14.3	31.7	**37.6**	**46.7**	27.5	20
Diagnostic accuracy (% clinical cases)	31,5	**50.1**	30	**58.3**	**60.2**	39.6	48.5	**58.1**	**72.2**	34
Adherence to clinical guidelines (% clinical guidelines)	17,5	**35.9**	31	37.4	**43.8**	31.9	35.6	**41.4**	**43.7**	22
Management of maternal and neonatal complications (% clinical guidelines)	12,0	**27.4**	21.9	**29.9**	**30.4**	19.8	26.0	19.3	**44.6**	-
Drug availability (% drugs)	50,4	**54.4**	48	42.7	**60.3**	49.2	49.2	47.2	**54.2**	**78**
Equipment availability (% facilities)	35,9	**61.3**	62	**79.5**	**83.5**	21.7	**92.6**	21.9	**76.4**	53
Infrastructure Availability (% facilities)	13,3	**40.6**	28.4	34	**50**	23.8	39.2	**63.5**	46.8	39

Note: data for Nigeria cover 12 states, not the entire country.

V. ANNEXES

ANNEX A. SAMPLING STRATEGY

The sample frame was constituted from administrative data (health management information system; two sources) and survey data (Service Availability and Readiness Assessment sample frame) on facilities provided by the Ministry of Health and census data provided by the National Statistical Institute (*Institut National de la Statistique*; INS). The team de-duplicated facilities in the administrative data and worked to properly identify their locations within administrative boundaries to define the sample frame.

The sample frame is the set of health posts, health centers, and hospitals that could be geographically identified, that met certain comparability and inclusion criteria set with the Ministry of Health, and that were in areas that were feasible. For reasons of comparability the ministry excluded all private facilities that offered surgery and all hospitals that were not normal district hospitals. The feasibility constraints excluded the region of Diffa, where the government had declared a state of emergency, and Tassara, Tesker, and Tillia (security) and Bilma (geographic isolation).

The sample frame was stratified along rural/urban (per the INS definitions), ownership (public/private), and facility type (Health post/Health center/District hospital) to maximize intragroup homogeneity. The sample was designed based upon the request of the ministry to include health posts, which represent the overwhelming majority of health facilities, and the need to have sufficient sample sizes for health centers and hospitals. Selection was done with probability proportional to the population served by the facilities.

For indicators related to individuals, two further samples were independently drawn among providers. The overall weight of these indicators, defined below, is the product of the facility weight and the individual weight for the concept (absence rate or knowledge).

For absence rate, a secondary sampling frame of all health providers who work at the facility is prepared (Module 2A). The methodology requires 10 providers, or all those in the facility if it has less than 10 providers. If a facility has more than 10 providers, a random selection without replacement is undertaken where each provider has equal probability of being selected. In addition, the head of the facility was always selected for absence monitoring. This gives the inflation factor, or weight, for provider absence rate, defined as the product of the probability of selecting the facility and the probability of selecting a given provider in the facility.

For knowledge, the secondary sampling frame of all health providers who work at the facility is used in conjunction with information on whether the provider is the lead caregiver for an outpatient consultation at least once per week (Module 2A). The methodology requires 10 providers, or all those in the facility if it has less than 10 providers. If a facility has more than 10 providers, a random selection without replacement is undertaken where each provider has equal probability of being selected. This gives the inflation factor, or weight, for provider knowledge, defined as the product of the probability of selecting the facility and the probability of selecting a given provider in the facility.

Once Module 3 had been entered and passed clean, a medical doctor with knowledge of the SDI instruments and experience in training and supervising SDI field staff reviewed all the cases to ensure that the information on diagnostic accuracy was not compromised by incorrect recording. A decision was made based upon the comments recorded and the treatment ordered. For example, a provider who failed to cite diarrhea with severe dehydration but implemented the appropriate treatment plan was judged to have correctly diagnosed the case. If anything, this will have biased upwards the diagnostic accuracy rate of providers in Niger.

Table A1. Health survey instrument

Module	Description
Module 1: Facility questionnaire Section A: General information Section B: General information Section C: Infrastructure Section D: Equipment, materials, and supplies Section E: Drugs	Administered to the in-charge or the most senior medical staff at the facility. Self-reported and administrative data on health facility characteristics, staffing, and resources flows.
Module 2: Staff Roster 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) 10 medical staff randomly selected from the list of all medical staff. Second visit is administered to the same 10 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 H: Introduction Section I: Clinical case Patient 1 Acute diarrhea and severe dehydration Section J: Clinical case Patient 2 Pneumonia Section K: Clinical case Patient 3 Diabetes mellitus Section L: Clinical case Patient 4 Pulmonary tuberculosis Section M: Clinical case Patient 5 Malaria and anemia Section N: Clinical case Patient 6 Post-partum hemorrhage Section O: Clinical case Patient 7 Neonatal asphyxia Section P: Frequency of different types of consultations	Administered to medical staff in facility to assess clinical knowledge.
Module 4: Health facility financing Section Q: General information Section R: User fees Section S: Government resources Section T: Receipt of medical consumables	Administered to the in-charge or the most senior medical staff at the facility.

ANNEX B. DEFINITION OF INDICATORS

Table B 1. Indicator definition and method of calculation

Caseload per health provider	
Number of outpatient visits per clinician per day.	The number of outpatient visits recorded in outpatient records in the three months prior to the survey, divided by the number of days the facility was open during the three-month period and the number of health professionals who conduct patient consultations (i.e. excluding cadre types such as public health nurses and outreach 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 10 randomly sampled workers. Health professionals doing fieldwork (mainly community and public health professionals) were counted as present. The absence indicator was not estimated for hospitals because of the complex arrangements of off-duty, interdepartmental shifts etc.
Adherence to clinical guidelines	
Unweighted average of the share of relevant history-taking questions, the share of relevant examinations performed.	For each of the following five clinical cases: (i) acute diarrhea with severe dehydration; (ii) pneumonia; (iii) diabetes mellitus; (iv) pulmonary tuberculosis; (v) malaria with anemia. History-taking questions: Assign a score of one if a relevant history-taking question is asked. The number of relevant history-taking questions asked by the clinician during consultation is expressed as a percentage of the total number of relevant history questions included in the questionnaire. Relevant examination questions: Assign a score of one if a relevant examination question is asked. The number of relevant examination questions asked by the clinician during consultation is expressed as a percentage of the total number of relevant examination questions included in the questionnaire. For each clinical case: unweighted average of the relevant history-taking questions asked, and the percentage of physical examination questions asked. The history-taking and examination questions considered are based on the Nigerlese clinical guidelines, the guidelines for Integrated Management of Childhood Illnesses (IMCI), and consultation with appropriate staff in the Ministry of Health.
Management of maternal and neonatal complications	
Share of relevant treatment actions proposed by the clinician.	For each of the following two clinical cases: (i) post-partum hemorrhage; and (ii) neonatal asphyxia. Assign a score of one if a relevant action is proposed. The number of relevant treatment actions proposed by the clinician during consultation is expressed as a percentage of the total number of relevant treatment actions included in the questionnaire.
Diagnostic accuracy	
Average share of correct diagnoses provided in the five clinical cases.	For each of the following five clinical cases: (i) acute diarrhea; (ii) pneumonia; (iii) diabetes mellitus; (iv) pulmonary tuberculosis; (v) malaria with anemia. For each clinical case, assign a score of one as correct diagnosis for each clinical case if diagnosis is mentioned. Sum the total number of correct diagnoses identified. Divide by the total number of clinical cases. Where multiple diagnoses were provided by the clinician, the diagnosis is coded as correct as long as it is mentioned, irrespective of what other alternative diagnoses were given.
Drug availability	
Share of basic drugs that 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 unexpired on the day of visit for the following medicines: oxytocin (injectable), misoprostol (cap/tab), sodium chloride (saline solution) (injectable solution), azithromycin (cap/tab or oral liquid), calcium gluconate (injectable), cefixime (cap/tab), magnesium sulfate (injectable), benzathine benzylpenicillin powder (for injection), ampicillin powder (for injection), betamethasone or dexamethasone (injectable), gentamicin (injectable), nifedipine (cap/tab), metronidazole (injectable), medroxyprogesterone acetate (Depo-Provera) (injectable), iron supplements (cap/tab), and folic acid supplements (cap/tab). Priority medicines for children: Assign score of one if facility reports and enumerator confirms after observing that the facility has the drug available and unexpired on the day of visit for the following medicines: amoxicillin (syrup/suspension), oral rehydration salts (ORS sachets), zinc (tablets), ceftriaxone (powder for injection),

	artemisinin combination therapy (ACT), artesunate (rectal or injectable), benzylpenicillin (powder for injection), and vitamin A (capsules). We take out of analysis of the child tracer medicines two medicines (gentamicin and ampicillin powder) that are included in the mother and in the child tracer medicine list to avoid double counting. The aggregate is adjusted by facility type to accommodate the fact that not all drugs (injectables) are expected to be at the lowest level facility, Health posts/Health posts where health workers are not expected to offer injections.
Equipment availability	
Share of facilities with thermometer, stethoscope and weighing scale, refrigerator and sterilization equipment.	Medical equipment aggregate: Assign score of one if enumerator confirms the facility has one or more functioning of each of the following: thermometers, stethoscopes, sphygmomanometers, 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. Sphygmomanometer: Assign score of one if facility reports and enumerator confirms facility has one or more functioning sphygmomanometers. Weighing scale: Assign score of one if facility reports and enumerator confirms facility has one or more functioning adult, 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, 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 its main source of electricity. Water: Assign score of one if facility reports its main source of water is piped into the facility, piped onto facility grounds or comes from a public tap/standpipe, tube well/borehole, a protected dug well, a protected spring, bottled water or a tanker truck. Sanitation: Assign score of one if facility reports and enumerator confirms facility has one or more functioning flush toilets or VIP latrines, or covered pit latrine (with slab).

ANNEX C. ADDITIONAL RESULTS

Table 32. Distribution of health personnel by provider type (percent)

	All	Public	Private	Rural public	Urban public
Specialist	0.86	0.51	0.34	0.00	0.55
Doctor	3.12	2.08	1.05	0.80	1.41
Medical assistant, nursing	4.01	3.40	0.61	0.54	3.08
Medical assistant, surgery	0.26	0.26	0.00	0.00	0.28
Medical assistant, anesthesiology	0.25	0.25	0.00	0.00	0.27
Nurse (diploma)	20.75	19.15	1.59	8.53	11.87
Midwife	12.74	12.14	0.60	2.42	10.52
Laboratory technician	1.16	1.09	0.06	0.00	1.17
Hygiene technician	0.09	0.09	0.00	0.00	0.10
Social assistant	0.38	0.38	0.00	0.00	0.40
Basic health workers	15.44	14.28	1.16	9.20	6.02
Delivery nurse	0.25	0.25	0.00	0.26	0.00
Certified nurse	18.88	18.27	0.61	10.54	8.92
Hygiene worker	0.07	0.07	0.00	0.00	0.07
Deputy social assistant	0.04	0.04	0.00	0.00	0.04
Deputy nurse	0.40	0.38	0.02	0.00	0.41
Community health worker	20.71	20.61	0.10	21.00	0.96
Other	0.58	0.58	0.00	0.00	0.62
Total	99.99	93.83	6.14	53.29	46.70

Note: totals may not add due to rounding.

Table 33. Distribution of health personnel by facility type (percent)

	All	Post	Clinic	Hospital
Specialist	0.00	0.49	0.36	0.00
Doctor	0.00	2.37	0.76	0.00
Medical assistant, nursing	0.02	2.88	1.11	0.02
Medical assistant, surgery	1.42	14.64	4.69	1.42
Medical assistant, anesthesiology	0.09	9.58	3.07	0.09
Nurse (diploma)	0.00	0.13	1.03	0.00
Midwife	0.00	0.09	0.00	0.00
Laboratory technician	0.00	0.25	0.12	0.00
Hygiene technician	2.95	9.46	3.04	2.95
Social assistant	0.00	0.25	0.00	0.00
Basic health workers	4.28	11.71	2.89	4.28
Delivery nurse	0.00	0.07	0.00	0.00
Certified nurse	0.00	0.00	0.04	0.00
Hygiene worker	0.00	0.36	0.05	0.00
Deputy social assistant	0.00	0.00	0.26	0.00
Deputy nurse	0.00	0.00	0.25	0.00
Community health worker	18.27	2.42	0.03	18.27
Other	0.00	0.21	0.37	0.00
Total	100.0	27.04	54.91	18.07

Table 34. Distribution of health personnel by gender (percent)

	All	Male	Female
Specialist	0.84	0.46	0.38
Doctor	3.11	2.03	1.08
Medical assistant, nursing	4.01	2.04	1.97
Medical assistant, surgery	20.76	7.34	13.42
Medical assistant, anesthesiology	12.73	0.5	12.23
Nurse (diploma)	1.16	0.32	0.84
Midwife	0.094	0.094	0
Laboratory technician	0.38	0.095	0.28
Hygiene technician	15.45	4.51	10.94
Social assistant	0.25	0.25	0
Basic health workers	18.88	5.87	13
Delivery nurse	0.07	0.07	0
Certified nurse	0.039	0	0.039
Hygiene worker	0.4	0.11	0.29
Deputy social assistant	0.26	0.21	0.048
Deputy nurse	0.25	0.2	0.048
Community health worker	20.73	13.37	7.36
Other	0.58	0.43	0.16
Total	100.0	37.9	62.1

Table 35. Caseload per provider, adjusted for absence, by level of facility

	All	Public	Private	Difference (%)	Rural Public	Urban Public	Difference (%)
All facilities	9.8	9.9	5.7	-42.4	10.0	8.2	-18.0
	(1.1)	(1.1)	(1.3)	(1.7)	(1.2)	(1.6)	(2.0)
Health post	6.0	6.0	.	.	.	6.0	.
	(1.2)	(1.2)	.	.	.	(1.2)	.
Health center	17.2	18.5	5.7	-69.2	20.2	10.1	-50.0
	(1.7)	(1.9)	(1.3)	(2.1)	(2.2)	(2.0)	(3.0)
First-level hospitals	1.0	.		.	.	1.0	.
	(0.2)	.		.	.	(0.2)	.

Table 36. Variables used in the health absence rate regressions

	All	Public	Private	Difference (%)
Provider demographics				
Absence rate (s)	0.0	0.0	-0.2	.
Absence-adjusted workload (s)	0.0	0.2	-3.4	-1,800.0
Male	24.6	23.7	40.6***	71.3
Female	75.4	76.3	59.4***	-22.1
Facility information				
Head absent (d)	42.7	42.5	47.0	10.6
Absence rate (s)	0.0	0.3	-4.8***	-1700.0
Total staff (s)	0.0	0.2	-3.8***	-2000.0
Public facility	94.7	100.0	0.0	-100.0
Health center	65.6	63.7	100.0***	57.0
District hospital	30.0	31.7	0.0***	-100.0
Facility in rural (d)	19.7	20.7	2.2***	-89.4
Consultants/total staff (s)	0.0	-0.1	1.6	-1700.0
Drive to district office	54.0	52.4	82.1**	56.7
Other means to district office	16.9	17.5	5.5	-68.6
At district office	29.1	30.1	12.3	-59.1
Head's actions				
Positive feedback (d)	1.6	1.6	1.6	0.0
Negative feedback (d)	1.5	1.5	1.8	20.0

Notes: Weighted means using sampling weights for absence rate for individual characteristics and sampling weights for facilities for the rest, based upon 618. The difference is defined as the difference of the means of public and private facilities and is measured in percentage points. Superscript (*) denotes that the difference is significant at the 1 percent (***), 5 percent (**), or 10 percent (*) significance level. Variables with "(s)" have been standardized, variables with "(d)" are binary.

Table 37. Correlates of absence results

Variables	Coefficient	Standard error
Provider characteristics		
Caseload-adjusted workload (S)	0.234***	(0.0666)
Female	2.047*	(1.065)
Facility information (relative to a post at the district headquarters)		
Total staff (s)	-1.469***	(0.446)
Public facility (d)	-4.336	(2.989)
Health center	4.520	(4.197)
District Hospital	21.54***	(4.533)
Facility in rural (d)	-2.280	(4.488)
Consultants/total staff (s)	-0.305	(0.225)
Drive to district headquarters		
Other means of transport to district headquarters	24.72***	(3.711)
Head absent (d)	1.519	(1.800)
Absence rate (s)	0.232***	(0.0680)
Head's actions		
Positive feedback (d)	4.232**	(1.577)
Negative feedback (d)	-3.096**	(1.117)
Constant	-16.30**	(7.229)
Observations	618	
R-squared	0.093	
F	2897	
df_m	14	
df_r	22	
p	0	

Notes: Standard errors in parentheses. Results are from a linear regression model with sample weights and jackknifed standard errors that account for the complex survey design. Significance levels are *** p<0.01, ** p<0.05, * p<0.1, respectively.

Table 38. Absence by level of facility (adjusted for shift breaks; percentage)

	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All facilities	33.1	33.2	32.5	-2.1	31.1	33.8	8.7
	(2.4)	(2.5)	(4.8)	(5.4)	(4.9)	(3.1)	(5.8)
Health post	18.9	.	0.0	.	.	18.9	.
	(5.0)	.	0.0	.	.	(5.0)	.
Health center	34.1	34.2	32.5	-5.0	35.0	33.9	-3.1
	(2.8)	(3.0)	(4.8)	(5.6)	(6.2)	(3.7)	(7.2)
First-level hospitals	33.6					33.6	
	(5.3)					(5.3)	

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.

Table 39. Caseload measures adjusted and unadjusted for absence rate

	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All providers	7.5	7.3	11.3	54.8	7.5	4.5	-40.0
Adjusted for absence rate and off-duty	9.8	9.9	5.7	-42.4	10.0	8.2	-18.0

Notes: adjusted caseload is defined as caseload / (1- absence rate – off duty). Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.

Table 40. Absence by level of facility (not adjusted for shift breaks)

	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All facilities	47.0	46.8	52.0	11.1	36.9	49.3	33.6
	(2.6)	(2.7)	(4.3)	(5.0)	(7.4)	(3.3)	(8.1)
Health post	18.9	18.9	.	.	18.9	18.9	.
	(5.0)	(5.0)	.	.	(5.0)	(0.0)	.
Health center	46.4	45.9	52.0	13.3	42.1	47.1	11.9
	(3.4)	(3.6)	(4.3)	(5.5)	(8.9)	(4.3)	(9.8)
First-level hospitals	52.7	.	.	.	.	52.7	.
	(4.3)	.	.	.	.	(4.3)	.

Notes: There is one private (nonprofit) hospital in the sample. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. Standard errors are not rescaled from the underlying proportions.

Table 41. Diagnostic accuracy in the tracer conditions, by broad cadre type (percent)

	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All cadres	31.5	31.1	38.7	24.4	27.5	38.8***	41.1
Doctors	51.5						
Medical assistants	28.2***	28.5	25.7	-9.6	30.5	28.3	-7.1
Nurse/BA/Midwife	36.3***	36.6	32.0	-12.4	33.2	41.1**	24.0

Note: There are 36 doctors in the competence sample. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.

Table 42. Adherence to clinical guidelines by facility type (percent)

	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All facilities	36.0	34.8	37.4	7.5	34.7	34.8	0.3
	(0.02)	(0.01)	(0.05)	(0.05)	(0.01)	(0.02)	(0.02)
Health post	34.5	35.0			35.0		
	(0.01)	(0.01)			(0.01)		
Health center	36.9	34.9	38.0	8.8	32.1	38.6	20.2
	(0.03)	(0.02)	(0.05)	(0.05)	(0.02)	(0.02)	(0.03)
First-level hospitals	33.8						
	(0.02)						

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.
Standard errors are not rescaled from the underlying proportions

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Table 43. Tracer condition treatment details (percent)

	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
Diarrhea with severe dehydration							
Danger signs	12.0	12.0	11.8	1.8	13.0	10.4***	20.3
Key questions	16.3	16.3	14.5	11.0	18.4	13.1***	28.5
Key physical exams	10.2	10.2	10.9	-7.1	10.6	9.6	9.1
Diagnostic accuracy	3.0	3.0	0.0***	100.0	1.7	5.1**	-200.0
Key treatments	29.0	29.1	23.2	20.2	34.0	21.7***	36.0
Key education	11.7	11.8	9.2	21.6	13.9	8.6**	37.6
Pneumonia							
Danger signs	6.5	6.5	8.1	-24.0	6.6	6.4	3.3
Key questions	19.6	19.7	15.7**	20.6	23.2	14.4***	37.9
Key physical exams	12.7	12.7	10.5	17.2	13.6	11.4*	16.4
Diagnostic accuracy	53.0	53.0	52.3	1.4	48.4	62.7**	-29.7
Key treatments	27.4	27.4	27.7	-1.4	32.0	20.2***	36.8
Key education	5.6	5.7	0.0***	100.0	7.7	2.7***	64.7
Diabetes type 2							
Danger signs	8.0	8.0	8.5	-6.3	7.7	8.5	-10.2
Key questions	10.3	10.3	9.6	6.9	11.5	8.4**	27.5
Key physical exams	16.4	16.3	17.2	-5.3	14.5	19.2**	-32.7
Diagnostic accuracy	21.9	21.7	36.0	-66.3	14.8	36.1***	-144.4
Key treatments	8.6	8.5	11.5	-35.2	5.2	13.5**	-160.4
Key education	2.8	2.8	2.3	16.7	2.1	3.9**	-86.6
Pulmonary tuberculosis							
Danger signs	17.7	17.7	16.1	9.3	19.0	15.7**	17.4
Key questions	31.7	31.7	30.7	3.2	35.9	25.3**	29.6
Key physical exams	0.0	0.0	0.0	.	0.0	0.0	.
Diagnostic accuracy	76.9	76.8	79.3	-3.2	71.8	87.2***	-21.5
Key treatments	12.9	13.1	5.2*	60.3	13.7	12.1	12.2
Key education	4.7	4.8	3.1	34.6	5.4	3.8	28.6
Malaria with anemia							
Danger signs	7.9	7.9	7.3	8.7	7.1	9.2	-30.2
Key questions	15.0	15.0	11.9**	20.8	17.9	10.7***	40.2
Key physical exams	8.3	8.3	8.2	1.1	9.1	6.9**	23.9
Key tests	11.9	12.0	9.4	21.8	12.4	11.4	8.1
Diagnostic accuracy	5.2	5.2	6.1	-18.8	3.5	8.6**	-142.5
Diagnosis of malaria	79.9	80.1	75.7	5.5	83.5	72.6**	13.2
Key treatments	27.9	28.1	18.6	33.7	35.1	17.4***	50.6
Key education	7.6	7.5	8.9	-18.5	10.2	3.5***	66.2

Notes: *** p<0.01, ** p<0.05, * p<0.1. Key actions are based upon the Integrated Management of Childhood Illnesses guidelines or relevant disease-specific guidelines as adapted for use in Niger. The "diagnosis of malaria" means that the anemia was not identified and that "simple" malaria was specified. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.

Table 44. Tracer condition treatment details, by facility type (percent)

	Estimates			Differences (relative to district hospital; %)	
	Health post	Health center	District hospital	Health post	Health center
Diarrhea with severe dehydration					
Danger signs	12.6	11.4	13.1	3.8	13.3
Key questions	17.4	15.7	15.8	-9.8	0.6
Key physical exams	8.9	10.8	11.1	19.7	2.7
Diagnostic accuracy	0.8**	3.5	6.7	88.5	48.4
Key treatments	33.9***	26.6	26.9	-25.8	1.1
Key education	13.9	10.7	10.6	-31.8	-1.7
Pneumonia					
Danger signs	6.5*	6.1**	8.6	24.4	28.5
Key questions	22.2***	19.1**	15.0	-48.5	-27.9
Key physical exams	11.1	13.7	12.2	9.4	-12.1
Diagnostic accuracy	40.9**	60.6	59.8	31.6	-1.4
Key treatments	33.0***	24.8	24.2	-36.3	-2.5
Key education	4.5	6.7**	3.3	-37.7	-104.0
Diabetes type 2					
Key questions	6.1***	8.4***	11.3	-46.4	-25.8
Key physical exams	10.8	9.7	11.4	-5.5	-14.7
Key tests	13.5***	16.8***	22.0	-38.4	-23.7
Diagnostic accuracy	4.9***	32.5	31.5	-84.3	3.3
Key treatments	1.4***	8.5***	28.5	-95.0	-70.3
Key education	0.6***	3.3***	6.6	-90.8	-50.8
Pulmonary tuberculosis					
Key questions	16.1***	18.0	20.2	20.2	10.5
Key physical exams	32.6	31.8	28.5	-14.5	-11.8
Key tests	0.0	0.0	0.0	.	.
Diagnostic accuracy	64.8***	84.0	85.0	23.8	1.2
Key treatments	5.3***	16.3	17.7	70.1	7.9
Key education	4.0*	4.6	7.3	45.6	36.4
Malaria with anemia					
Danger signs	5.6***	7.0***	18.6	-69.9	-62.4
Key questions	19.4***	13.3**	11.0	76.4	20.9
Key physical exams	7.3	8.9	7.9	-7.6	12.7
Key tests	11.9**	11.3***	15.4	-22.7	-26.6
Diagnostic accuracy	0.4**	7.7	10.1	-96.0	-23.8
Diagnosis of malaria	45.7***	19.9	17.7	158.2	12.4
Key treatments	11.8*	5.3	6.8	73.5	-22.1
Key education	5.6***	7.0***	18.6	-69.9	-62.4

Note: *** p<0.01, ** p<0.05, * p<0.1. The "diagnosis of malaria" means that the anemia was not identified and that "simple" malaria was specified. Differences are expressed in percentage points. The row elements are based upon the national guidelines.

Table 45. Management of maternal and neonatal complications treatment details (percent)

	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
Post-partum hemorrhage							
Key questions	0.0	0.0	0.0	.	0.0	0.0	.
Key physical exams	15.9	15.9	13.4	16.0	15.8	16.1	-1.3
Key tests	17.3	17.3	18.7	-7.8	17.0	18.0	-6.1
Diagnostic accuracy	61.6	62.0	43.3***	30.1	64.4	57.0	11.6
Key treatments	66.6	66.8	57.6	13.8	78.7	42.1***	46.5
Neonatal asphyxia							
Key questions	17.3	17.4	14.1	-19.0	17.3	17.5	1.2
Key physical exams	8.1	8.1	6.7	-17.3	9.2	5.9*	-35.9
Diagnostic accuracy	59.5	59.9	38.9*	-35.1	59.2	61.3	3.5
Key treatments	20.7	20.8	17.7	-14.9	20.3	21.9	7.9

Notes: *** p<0.01, ** p<0.05, * p<0.1. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. The row elements are based upon the national guidelines.

Table 46. Management of maternal and neonatal complications by facility type (percent)

	Estimates			Differences (rel. to district hospital)	
	Health post	Health center	District hospital	Health post	Health center
Post-partum hemorrhage					
Key questions	15.2	16.2	16.4	-7.3	-1.2
Key physical exams	8.2***	20.2	21.8	-62.4	-7.3
Key tests	0.0	0.0	0.0	.	.
Diagnostic accuracy	52.9	69.5**	55.6	-4.9	25.0
Key treatments	99.9***	50.4***	27.5	263.3	83.3
Neonatal asphyxia					
Key questions	12.6***	20.2	20.2	-37.6	0.0
Key physical exams	8.1	8.1	8.0	1.3	1.3
Diagnostic accuracy	48.4	66.6	65.0	-25.5	2.5
Key treatments	13.7***	25.0	25.2	-45.6	-0.8

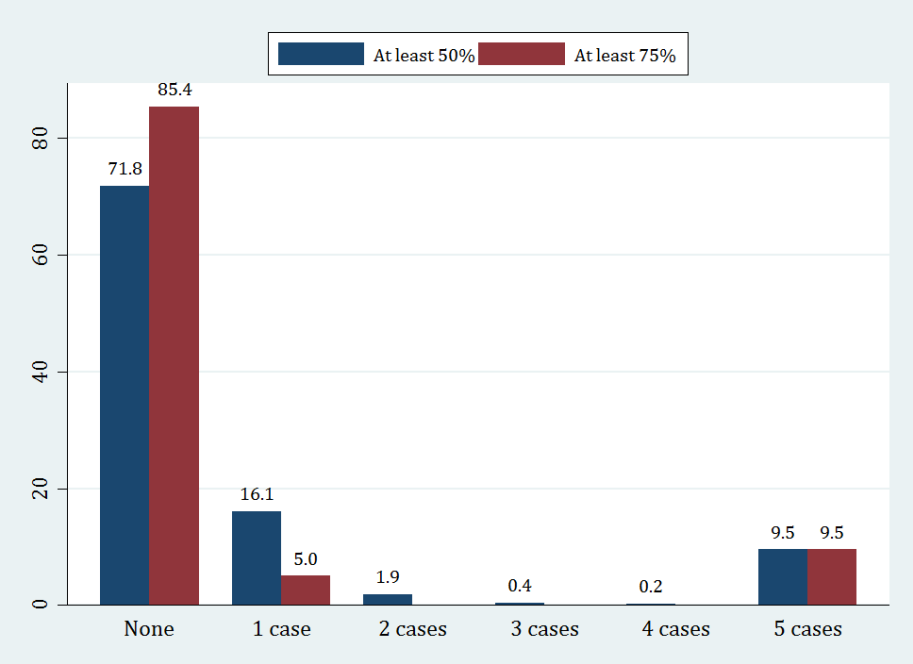
Notes: *** p<0.01, ** p<0.05, * p<0.1. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals. The row elements are based upon the national guidelines.

Table 47. Diagnostic accuracy and management of complications by region (percent)

Element	All	Agadez	Dosso	Maradi	Tahoua	Tillabéri	Zinder	Niamey
Diagnostic accuracy	31.5	22.5***	31.4**	29.8**	31.3**	30.8	27.9***	40.5
Diarrhea diagnosis	3.5	0.0***	0.0***	1.8**	3.4	9.2	5.4	8.6
Pneumonia diagnosis	53.0	48.9*	50.1	57.3	51.2	46.9	42.9**	64.8
Diabetes T2 diagnosis	21.9	7.9***	19.7***	15.8***	22.8**	19.9**	12.9***	48.8
TB diagnosis	76.9	55.5***	85.2	69.4**	76.6*	83.2	72.5**	89.2
Malaria/anemia diagnosis	5.2	0.0***	1.8***	5.7*	2.6***	7.1	6.0*	14.4
Malaria only diagnosis	79.9	93.0***	91.0**	75.6	81.6	80.8	75.7	70.6
Observations	**518**	**29**	**62**	**133**	**89**	**34**	**113**	**58**
Management of complications (PPH/NNA)	12.2	13.0	15.5	12.6	9.4**	7.9***	13.2	12.6
PPH diagnosis	62.3	40.8***	59.7	63.0	66.7	54.1	66.5	60.4
NNA diagnosis	62.8	35.1***	88.5	56.2***	37.8***	65.1	72.0	80.0
Observations	**601**	**32**	**72**	**154**	**106**	**36**	**121**	**80**
Pregnancy care simulations								
Pregnancy and anemia diagnosis	0.9	0.0	3.0	0.9	0.0	0.0	0.0	1.0
Pregnancy-only diagnosis	91.0	96.2*	90.7	89.3	97.4**	80.0	87.6	87.9
Severe pre-eclampsia diagnosis	12.9	1.9***	12.0**	14.8*	6.4***	0.0***	11.6**	24.9
Pre-eclampsia diagnosis	54.5	43.3***	72.9	42.3***	44.9*	41.7***	45.8***	75.4
Observations	**601**	**32**	**72**	**154**	**106**	**36**	**121**	**80**

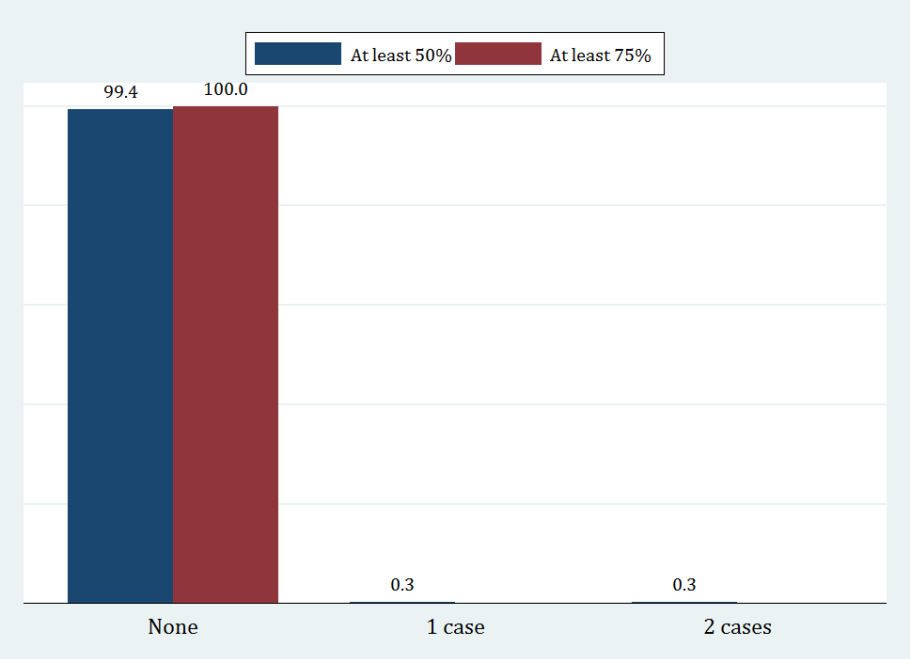
Notes: comparisons are relative to Niamey. The observations for diagnostic accuracy, which covers the first five simulations, are the minimum number across the five simulations. The abbreviation "PPH" refers to "post-partum hemorrhage" and "NNA" refers to "neo-natal asphyxia". Levels of significance are *** p<0.01, ** p<0.05, * p<0.1.

Figure 9. Adherence to guidelines in the tracer vignettes



Notes: The horizontal axis presents the number of cases on which a certain adherence to guidelines was achieved. For example, seven in ten providers (71.8 percent) failed to adhere to at least 50 percent of the guidelines in all cases.

Figure 10. Adherence to guidelines in the maternal and neonatal vignettes



Note: The horizontal axis presents the number of cases on which a certain adherence to guidelines was achieved. For example, approximately three providers in 1000 (0.3 percent) adhered to 50 percent of the guidelines in both cases.

Table 48. Adherence to clinical guidelines by broad cadre type

	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All cadres	17.5	17.5	18.3	4.6	17.3	17.9	3.5
	(0.6)	(0.6)	(2.9)	(3.1)	(0.8)	(0.6)	(1.1)
Doctors	27.5						
	(1.8)						
Medical assistants	18.7	18.8	17.4	-7.4	23.0	18.3	-20.4
	(1.0)	(1.3)	(1.9)	(2.1)	(9.1)	(1.1)	(9.1)
Nurse	17.7	17.9	13.6	-24.0	18.5	17.0	-8.1
	(0.6)	(0.6)	(1.5)	(1.7)	(0.9)	(0.6)	(1.1)
Community health worker	14.8	14.8	13.5	-8.8	14.9	9.4	-36.9
	(0.8)	(0.8)	(0.8)	(1.1)	(0.8)	(0.6)	(1.0)

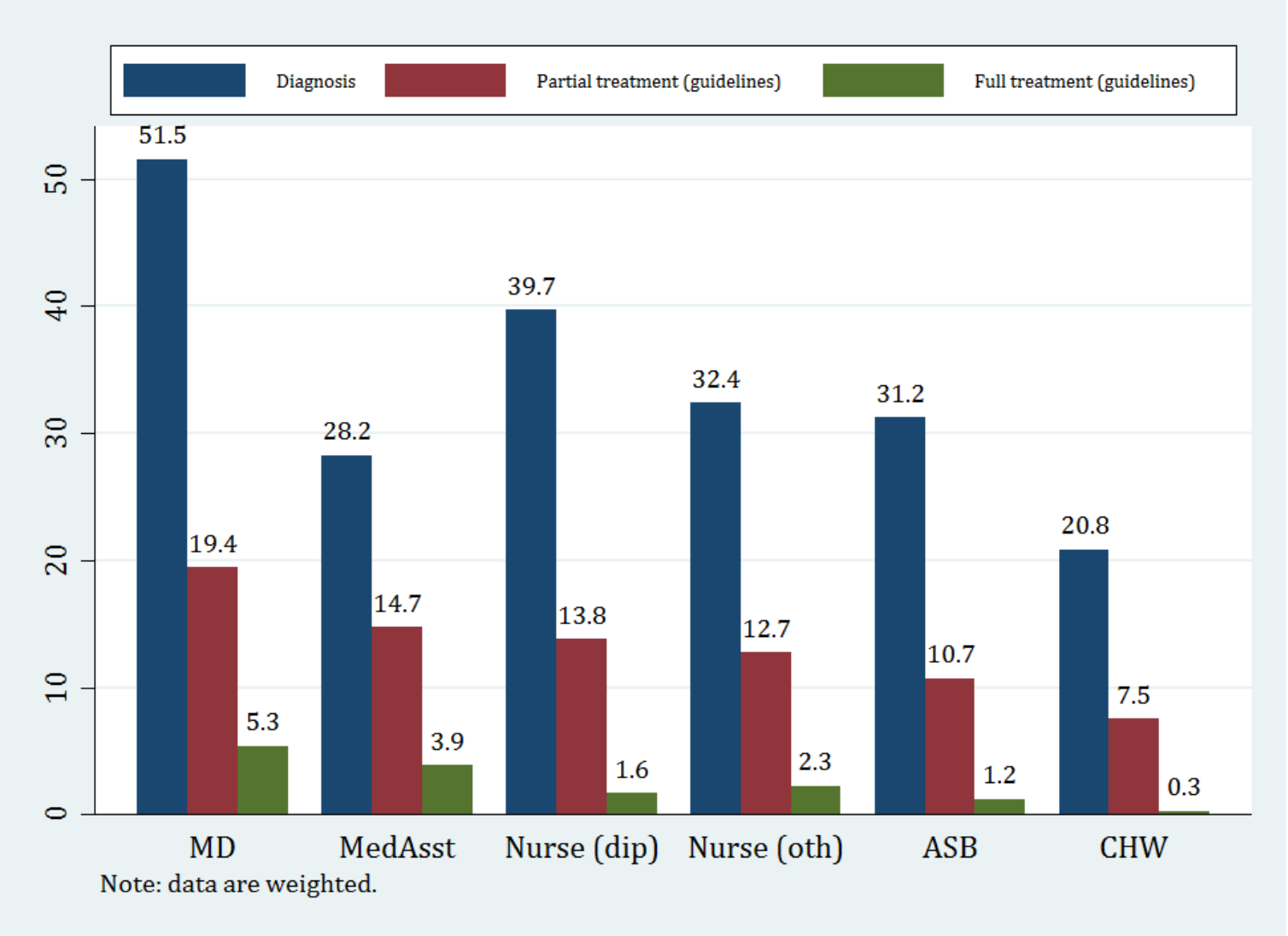
Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.

Table 49. Management of maternal and neonatal complications by broad cadre type

	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All cadres	12.0	12.1	9.8	-19.0	12.1	12.1	0.0
	(0.7)	(0.7)	(1.2)	(1.6)	(1.0)	(0.8)	(1.2)
Doctors	16.1	.	.	.	.	.	.
	(1.6)	.	.	.	.	.	.
Medical assistants	16.1	16.9	8.6	-49.1	25.5	15.8	-38.0
	(1.6)	(1.6)	(1.3)	(1.5)	(3.8)	(1.7)	(4.2)
Nurse	10.8	11.1	6.4	-42.3	12.6	8.3	-34.1
	(0.9)	(0.9)	(1.0)	(1.6)	(1.4)	(0.7)	(1.5)
Midwife	19.1	19.3	15.7	-18.7	22.8	18.0	-21.1
	(1.0)	(1.0)	(2.9)	(3.1)	(2.2)	(0.8)	(2.4)
Community health worker	9.1	9.1	13.5	48.4	9.2	3.8	-58.7
	(0.6)	(0.6)	(4.0)	(4.0)	(0.6)	(0.9)	(1.1)

Note: There are 36 doctors in the competence sample. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.

Figure 11. Treatment actions prescribed by cadre among the tracers (percent)



Note: an "MD" is a doctor, "MedAsst" is a medical assistant, "Nurse (dip)" is a nurse with a diploma, "Nurse (oth)" is other nurse categories, "ASB" is a health worker (*agent de santé de base*), and "CHW " is a community health worker.

Table 50. Drugs in the Service Availability and Readiness Assessment assessed in this report

Drug (form)	Overall	Mothers	Children
Amoxicilline (drinkable; 125 mg/5 ml)	1	0	1
Ampicillin powder (for injection; 500 mg and 1g)	1	1	1
Artemisinin-based combination therapy (artemether-lumefantrine or artesunate-amodiaquine; cap., drinkable)	1	0	1
Artesunate [60 mg (anhydrous artesunic acid) ; + separate sodium bicarbonate ampule 5 percent)/artemether (oily injectable solution: 20 mg/ml and 40 mg/ml and 80 mg/ml ; 1 ml)	1	0	1
Azithromycin (250 or 500 mg capsule or drinkable form: 200 mg/5ml)	1	1	0
Betamethasone (injectable ; 4 mg or 8 mg) or Dexamethasone (injectable ; 4mg)	1	1	0
Calcium gluconate (injectable ; 100 mg/ml, 10 ml)	1	1	0
Cefixime (200 mg capsule)	1	0	1
Cefixime (400 mg capsule)	1	1	0
Ceftriaxone (powder for injection ; 250 and 500 mg, 1 g)	1	0	1
Folic acid supplements (capsule ; 5 or 10 mg)	1	1	0
Gentamicin (injectable; 10 and 40 mg/ml, 2ml)	1	1	1
Iron salts (injectable; 50 mg/ml)	1	1	0
Iron supplements (iron salts in capsule form; 200 mg; powder 100mg; injectable 50mg/ml)	1	1	0
Iron/folic acid supplements (FAF) (capsule ; 200 mg + 25 µg)	1	1	0
Magnesium sulfate (injectable; 500 mg/ml, 2 ml and 10 ml)	1	1	0
Medroxyprogesterone acetate (Depo-Provera) (injectable; 150 mg, 3 ml)	1	1	0
Metronidazole (injectable ; 500 mg, volumes of 100 ml)	1	1	0
Misoprostol (mifepristone in 200 µg capsules)	1	1	0
Nifedipine (gel/capsule ; 10 mg rapid release)	1	1	0
Oral rehydration salts (ORS sachets to dilute)	1	0	1
Oxytocin (Syntocinon) (injectable)	1	1	0
Paracetamol (cp: 500mg)	1	0	1
Procaïne benzylpenicillin (powder for injection)	1	1	1
Sodium chloride (Saline solution/NaCl) (injectable solution : 0,9% isotonic; 250 and 500 ml)	1	1	0
Vitamine A (cap.: 50 000 et 200 000 UI)	1	0	1
Zinc sulfate (cap. or gel. : 10 mg or 20 mg)	1	0	1
Total	**27**	**16**	**11**

Table 51. Drug availability (adjusted for level of facility)

	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All essential drugs	50.8	50.9	47.1	-7.5	50.6	54.6	7.9
	(2.2)	(2.2)	(6.3)	(6.5)	(2.4)	(3.6)	(4.4)
Essential drugs for mothers	50.4	50.4	51.3	1.8	49.5	60.5	22.2
	(2.9)	(3.0)	(7.0)	(7.3)	(3.2)	(3.2)	(4.5)
Essential drugs for children	44.3	44.2	46.7	5.7	43.3	54.0	24.7
	(3.2)	(3.2)	(4.4)	(5.2)	(3.5)	(2.3)	(4.2)
Tracer drugs (adjusted)	54.0	54.0	56.4	4.4	53.0	65.7	24.0
	(3.2)	(3.2)	(10.7)	(10.8)	(3.4)	(3.8)	(5.1)

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.
Significance levels are *** p<0.01, ** p<0.05, * p<0.1.

Table 52. Drug availability by level of facility (adjusted for level of facility)

	All	Public	Private	Difference (%)	Rural Public	Urban Public	Difference (%)
National	50.4	50.4	51.3	1.8	49.5	60.5	22.2
	(2.9)	(3.0)	(7.0)	(7.3)	(3.2)	(3.2)	(4.5)
Health post	40.9	41.0	30.8	-24.9	.	41.0	..
	(2.9)	(3.0)	0.0	(96.9)	..	(3.0)	..
Health center	67.8	68.2	56.5	-17.2	70.7	58.6	-17.1
	(2.8)	(2.9)	(7.9)	1021.6	(3.5)	(3.9)	(5.2)
First-level hospitals	70.2	.	70.2	..	.	70.2	..
	(2.2)	..	(2.2)	..	..	(2.2)	..

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.
Significance levels are *** p<0.01, ** p<0.05, * p<0.1.

Table 53. Vaccine availability by level of facility (percent)

Facility level	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All facilities	44.6	49.3	22.6	-54.2	49.3	24.5	-50.3
	(8.8)	(10.4)	(7.7)	(13.0)	(10.4)	(9.2)	(13.9)
Health posts	26.4	.	26.4	.	.	26.4	.
	(15.4)	.	(15.4)	.	.	(15.4)	.
Health centers	48.1	54.4	17.5	-67.8	54.4	19.4	-64.3
	(10.0)	(11.7)	(9.6)	(15.1)	(11.7)	(11.5)	(16.4)
First level hospitals	41.1	.	41.1	.	.	41.1	.
	(10.2)	.	(10.2)	.	.	(10.2)	.

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.
Vaccines are measles, oral polio, pentavalent DPT-Hib+HepB, BCG, PCV10, and PCV23. Significance levels are *** p<0.01, ** p<0.05, * p<0.1.

Table 54. Vaccine availability by level of facility (excluding pneumo-23; percent)

Facility level	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All facilities	16.4	16.2	18.0	11.1	16.2	20.5	26.5
	(3.9)	(4.3)	(4.6)	(6.3)	(4.3)	(5.5)	(7.0)
Health posts	1.9	1.9			1.9		
	(1.1)	(1.1)			(1.1)		
Health centers	43.8	53.4	13.3	-75.1	53.4	15.5	-71.0
	(7.8)	(10.0)	(5.2)	(11.3)	(10.0)	(6.2)	(11.8)
First level hospitals	46.8	.	46.8	.	.	46.8	.
	(10.1)	.	(10.1)	.	.	(10.1)	.

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.
Vaccines are measles, oral polio, pentavalent DPT-Hib-HepB, BCG, and PCv10. Significance levels are *** p<0.01, ** p<0.05, * p<0.1.

Table 55. Vaccine availability details (percent)

Facility level	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
Measles	90.7	91.0	63.9	-29.8	91.1	90.4	-0.8
Oral polio	92.3	92.3	86.4	-6.4	91.1	98.9	8.6
DTP-Hib+HepB (pentavalent)	91.2	91.1	100.0	9.8	89.8	98.3	9.5
Tuberculosis (BCG)	72.4	72.5	63.9	-11.9	69.8	87.2	24.9
PCV10	54.6	55.0	22.5	-59.1	59.6	30.3**	-49.2
Pneumo23	0.6	0.7	-1.3	-285.7	0.6	0.9*	50.0
Anti-tetanus	92.6	92.5	100.0	8.1	91.1	100.0	9.8

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.
Significance levels are *** p<0.01, ** p<0.05, * p<0.1.

Table 56. Equipment availability (adjusted for level of facility; percent)

	All	Public	Private	Difference (%)	Rural Public	Urban Public	Difference (%)
All facilities	35,9	35,5	60,5	(25,0)	32,7	66,7	(33,9)
	(4,0)	(4,1)	(15,7)	(15,7)	(4,5)	(4,0)	(6,0)
Health post	34,2	34,4			34,4		
	(5,3)	(5,4)			(5,4)		
Health center	36,8	35,5	75,7	(40,2)	28,7	61,3	(32,6)
	(6,1)	(6,3)	(13,6)	(15,2)	(8,0)	(4,4)	(9,1)
First level hospitals	94,8	94,8				94,8	
	(2,7)	(2,7)				(2,7)	

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.
Significance levels are *** p<0.01, ** p<0.05, * p<0.1.

Table 57. Equipment availability (unadjusted for level of facility; percent)

	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All facilities	19.6	19.1	60.5	216.8	14.8	66.7	350.7
	(3.5)	(3.5)	(15.7)	(16.4)	(3.9)	(4.0)	(5.6)
Health post	9.3	9.3			9.3		
	(4.6)	(4.6)			(4.6)		
Health center	36.8	35.5	75.7	113.2	28.7	61.3	113.6
	(6.1)	(6.3)	(13.6)	(15.2)	(8.0)	(4.4)	(9.1)
First level hospitals	94.8	94.8				94.8	
	(2.7)	(2.7)				(2.7)	

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.
Significance levels are *** p<0.01, ** p<0.05, * p<0.1.

Table 58. Availability of individual items of equipment

	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
Any scale	81.5	81.6	73.0	-10.5	80.3	96.7	20.4
	(4.4)	(4.5)	(16.3)	(16.3)	(4.8)	(2.1)	(5.3)
Adult scale	53.0	52.7	73.0	38.5	49.3	91.1	84.8
	(5.6)	(5.7)	(16.3)	(16.8)	(6.0)	(4.0)	(7.2)
Child scale	65.3	66.0	11.1	-83.2	66.0	66.4	0.6
	(5.9)	(6.0)	(7.8)	(9.6)	(6.5)	(7.5)	(9.9)
Infant scale	53.7	53.6	60.5	12.9	50.9	84.3	65.6
	(6.0)	(6.1)	(15.7)	(16.2)	(6.5)	(3.7)	(7.5)
Thermometer	91.7	91.6	100.0	9.2	91.4	94.3	3.2
	(2.3)	(2.3)	0.0	(2.3)	(2.5)	(3.7)	(4.4)
Stethoscope	69.0	68.8	80.0	16.3	66.6	94.3	41.6
	(4.8)	(4.9)	(15.6)	(15.6)	(5.2)	(3.7)	(6.4)
Sphygmomanometer	58.0	57.4	100.0	74.2	54.9	85.6	55.9
	(4.1)	(4.1)	0.0	(4.1)	(4.4)	(3.6)	(5.7)
Any sterilizing equipment (all facilities)	23.6	22.7	87.5	285.5	18.1	75.5	317.1
	(3.3)	(3.4)	(11.1)	(11.7)	(3.7)	(5.9)	(7.0)
Autoclave	3.1	2.8	26.6	850.0	1.5	17.9	1,093.3
	(1.0)	(1.0)	(17.4)	(17.4)	(0.9)	(5.2)	(5.3)
Boiler	1.2	0.9	21.4	2,277.8	0.0	11.2	.
	(0.5)	(0.4)	(11.8)	(12.0)	0.0	(5.3)	(5.3)
Dry heat sterilizer (Poupinel)	6.2	5.4	60.5	1,020.4	0.8	57.4	7,075.0
	(1.1)	(1.1)	(15.7)	(15.7)	(0.8)	(5.4)	(5.4)
Pot for boiling	18.6	18.4	38.1	107.1	17.4	29.7	70.7
	(3.4)	(3.5)	(18.1)	(18.4)	(3.7)	(9.6)	(10.3)
Incinerator	25.5	25.1	50.2	100.0	22.4	55.5	147.8
	(5.0)	(5.0)	(16.6)	(17.0)	(5.4)	(6.7)	(8.6)
Refrigerator (all facilities)	31.3	31.3	30.9	-1.3	28.4	63.6	123.9
	(4.6)	(4.7)	(19.8)	(20.1)	(5.0)	(4.7)	(6.9)
Oxygen mask	14.9	15.0	6.9	-54.0	13.9	27.9	100.7
	(4.3)	(4.3)	(7.0)	(8.3)	(4.7)	(4.8)	(6.7)
Airway clearer	13.2	13.3	6.9	-48.1	12.1	27.1	124.0
	(3.9)	(4.0)	(7.0)	(8.2)	(4.3)	(5.4)	(6.9)
Refrigerator (Health center/HD1 only)	76.0	77.2	38.6	-50.0	81.4	63.6	-21.9
	(4.5)	(4.5)	(23.2)	(23.4)	(5.6)	(4.7)	(7.3)
Any sterilizing equipment (Health center/HD1 only)	44.0	42.7	84.4	-97.7	32.4	75.5	133.0
	(5.7)	(5.9)	(13.3)	(14.8)	(7.4)	(5.9)	(9.4)

Notes: Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.

Table 59. Equipment availability by region (percent)

Item	All	Agadez	Dosso	Maradi	Tahoua	Tillabéri	Zinder	Niamey
Any scale	35.9	53.6*	23.0***	33.7***	45.5**	21.1***	33.2***	66.7
Adult scale	81.5	88.3	69.6***	80.9	82.4	91.1	94.2	95.4
Child scale	53.0	47.3***	47.1***	54.0***	47.9**	74.3	52.8***	95.4
Infant scale	65.3	72.2	49.7	67.4	72.5	64.5	77.4	55.0
Thermometer	53.7	72.4*	27.1***	53.9***	63.6	51.5***	68.4**	83.9
Stethoscope	91.7	94.3	84.6	91.3	96.4	92.8	95.7	93.1
Sphygmomanometer	58.0	66.5**	44.5***	55.4***	65.5	48.0**	67.2	82.8
Any sterilizing equipment	69.0	71.9**	45.9***	81.6	65.5*	75.5	79.3	93.1
Autoclave	31.3	12.7***	17.1***	24.3***	33.3	66.5	59.0	59.7
Boiler	23.6	11.7***	6.3***	20.4***	37.1***	18.7***	21.9***	86.2
Dry heat sterilizer (Poupinel)	3.2	0.0***	3.5***	1.7***	3.0***	0.0***	1.5***	22.9
Pot for boiling	1.2	0.0*	0.4*	0.8*	0.0*	0.0*	0.7*	19.6
Incinerator	6.2	0.0***	0.8***	4.4***	8.4***	3.6***	2.1***	55.2
Refrigerator	18.7	11.7	2.7**	17.0	32.8	15.1	20.5	41.5
Oxygen bag and mask	25.5	11.7***	0.0***	26.8	32.4	28.7	55.4	49.4
Airway cleaner	35.9	53.6*	23.0***	33.7***	45.5**	21.1***	33.2***	66.7
Number of facilities	**256**	**17**	**42**	**60**	**28**	**25**	**59**	**25**

Notes: comparisons are relative to Niamey. Significance levels are *** p<0.01, ** p<0.05, * p<0.1. Analyses are most appropriate for Dosso, Maradi, and Zinder.

Table 60. Purpose of last trip that vehicle or ambulance made by facility level (percent)

	All	Public	Private	Rural public	Urban public
Don't know	2.5	2.3	0.1	2.4	0.0
Transport a patient	91.5	88.6	2.9	83.6	8.4
Pick up drugs/supplies	2.3	2.1	0.1	2.2	0.0
Transport staff to another post	1.0	1.0	0.0	1.1	0.0
Supervision	0.4	0.4	0.0	0.0	0.5
Vaccination	1.3	1.2	0.1	1.2	0.0
Other	1.0	0.5	0.4	0.5	0.0

Table 61. Availability of specific elements used in the infrastructure indicator (percent)

	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
Clean water	54.4	52.5	92.5***	76.2	49.3	100.0***	102.8
	(7.6)	(7.8)	(4.5)	(9.4)	(8.2)	0.0	(8.2)
Toilet for outpatients	25.5	23.3	69.8***	199.6	20.6	63.7***	209.2
	(5.6)	(5.4)	(11.3)	(13.5)	(5.5)	(12.6)	(13.7)
Electricity	26.4	22.7	98.0***	331.7	18.4	88.2***	379.3
	(4.4)	(4.2)	(1.9)	(4.9)	(4.0)	(6.5)	(7.6)
Electricity with no regular outages	21.3	18.4	79.4***	331.5	14.3	80.3***	461.5
	(3.7)	(3.4)	(5.9)	(7.2)	(3.2)	(6.5)	(7.2)

Notes: regular outages are defined as 15 or more outages lasting at least two hours each over the three months prior to the survey. Comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.

Table 62. Infrastructure availability (percent)

	All	Public	Private	Difference (%)	Rural public	Urban public	Difference (%)
All facilities	13.3	10.7	65.8	515.0	7.9	51.8	555.7
	(3.1)	(2.6)	(11.0)	(12.3)	(2.5)	(10.0)	(10.3)
Health posts	2.5	2.5			2.5		
	(1.6)	(1.6)			(1.6)		
Health centers	31.7	26.0	65.8	153.1	22.6	44.2	95.6
	(6.1)	(5.4)	(11.0)	(14.5)	(6.0)	(12.8)	(14.1)
District hospitals	79.1	79.1				79.1	
	(7.6)	(7.6)				(7.6)	

Notes: comparisons within facility type are relative to public and rural public; comparisons across facility types are relative to hospitals.

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