

# Quality Improvement – Clinical Governance Initiative (QI-CGI)

## Impact Evaluation Baseline Report

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World Bank – Research Group  
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## Acknowledgements

This baseline report is based on an impact evaluation project which is a collaborative effort with the Saving One Million Lives Initiative of the Nigerian Federal Ministry of Health, the Nigerian National Primary Healthcare Development Agency, Johns Hopkins University, the World Bank's Africa Region, and the Development Impact Evaluation Unit (DECIE/DIME) of the World Bank's Research Group.

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## Introduction

This baseline report describes the impact evaluation (IE) of the Quality Improvement and Clinical Governance Initiative (QI-CGI; henceforth short “QE” as in “Quality Enhancement”) and summarizes baseline data from data collections conducted in 2013 at Nigerian primary healthcare centers (PHCs). The purpose of this report is to describe characteristics and quality of health care of 80 PHCs in six Nigerian states: Anambra, Kebbi, Ekiti, Cross River, Niger, and Bauchi.<sup>1</sup> The clinics in these states comprise the study universe for the QE IE.

The IE is a joint product of the World Bank’s Development Impact Evaluation (DIME) Unit, and the Saving One Million Lives Initiative (SOML) in the Nigerian Federal Ministry of Health, which is in charge of the implementation of the program. The IE is funded by the Bill & Melinda Gates Foundation, their funding is gratefully acknowledged.

Data used in this report stems from the Nigeria Service Delivery Indicators (SDI), the baseline of the IE of the Nigerian Subsidy Reinvestment & Empowerment Programme (SURE-P), and from the baseline assessments collected by PharmAccess-SafeCare, a private health care management consulting firm.

The report is divided in four main sections:

- (1) the description of the QE project and the embedded impact evaluation
- (2) the presentation of baseline characteristics;
- (3) baseline checks; and
- (4) a summary of the SafeCare baseline assessments.

The different data sources allow us to gain insights into whether the QE states are comparable to the other 30 states in Nigeria (394 clinics; via the SURE-P data) and whether the QE clinics are comparable to the (non-QE) clinics in the same state (ca. 1100 clinics; via the SDI data).

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<sup>1</sup> The 80 PHCs are part of the SURE-P Program. This group of PHCs therefore represents a census of all SURE-P clinics in the respective states.

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## Abbreviations and Acronyms

ACT	Artemisinin-based Combination Therapy
BCG	Bacillus Calmette-Guerin vaccine
DECIE	Development Impact Evaluation Unit – World Bank
DIME	Development Impact Evaluation Unit – World Bank
DPT	Diphtheria, Pertussis (or whooping cough), and Tetanus vaccine
EOI	Expression of Interest
FET	Fisher Exact Test
FC	Fully compliant (with SafeCare indicator)
HFDC	High Frequency Data Collection
HMIS	Health Management Information Systems
IE	Impact Evaluation
IPT	Intermittent Preventive Treatment
IV	Intravenous Therapy
MCH	Maternal and Child Health
MNCH	Maternal, Neonatal, and Child Health
NBS	National Bureau of Statistics
NC	Not compliant (with SafeCare indicator)
NPC	National Population Commission
ORS	Oral Rehydration Salts
PC	Partially compliant (with SafeCare indicator)
PHC	Primary Healthcare Center
QE	Quality Enhancement program (short for QI-CGI)
QI-CGI	Quality Improvement and Clinical Governance Initiative
QIFO	Quality Improvement Field Officer
QIP	Quality Improvement Plan
RCT	Randomized Controlled Trial
SDI	Service Delivery Indicators
SURE-P	Subsidy Reinvestment and Empowerment Programme
SOML	Saving One Million Lives Initiative
UNICEF	United Nations Children’s Fund
VCT	Voluntary Counseling and Testing
WB	World Bank
WHO	World Health Organization

## 1. Project description & Impact Evaluation

While maternal, neonatal, and child health (MNCH) outcomes are improving in Nigeria, the rate of improvement is not sufficient to meet the MDGs related to child and maternal health. Nigeria's under-5 mortality rate, estimated to be 124 deaths per 1000 live births in 2012 is one of the highest in the World. In fact UNICEF (2012) ranked Nigeria as the country with the 12th highest under 5-mortality rate in the world. The Nigerian Federal Ministry of Health (FMOH) is addressing these challenges by introducing important reforms and is committed to learning which of these are working and worth scaling up. Evidence on the causal impact of past and ongoing quality improvement programs is, however, lacking, and so the scope for using previous experience to reliably guide future policy and program design is limited. Assessing and improving the quality of health care delivery in developing countries has been recognized as a priority by the WHO and other health agencies.

In this context, the Nigerian Government has prioritized improving the quality of healthcare delivery throughout its health care facilities. There are multiple facets to implementing successful quality improvement processes, including providing a transparent system with quantifiable outcome measures and ensuring workforce engagement for healthcare providers.

In the framework of the **Quality Improvement and Clinical Governance Initiative (QI-CGI)**, the Ministry of Health is contracting an international healthcare management consulting firm to provide support to facilities to meet international health care standards. As a pilot, the firm performs the following activities in 48 PHCs in 6 states:

- Conducting Baseline Assessments and Gap Analyses in four key areas – health care organization management, patient care, specialized services and ancillary services;
- Introducing “Quality Improvement Plans” (QIPs) for PHCs;
- Monitor and provide feedback and support to the PHCs toward implementation of the plans and with the goal of building local capacity in Quality Facilitation and the implementation of the QIPs.

The Government of Nigeria and the World Bank agreed to conduct an experimental **impact evaluation** (IE) to assess the effect of this project which is funded by the [Bill & Melinda Gates Foundation](#). The IE was designed in a collaborative effort by a team of specialists from the Saving One Million Lives Initiative in the Nigerian Federal Ministry of Health, the World Bank, and Johns Hopkins Carey School of Business. The design process was started

at the **Impact Evidence and Action to Save Lives** DIME workshop held in Uyo, Nigeria, in May 2013.<sup>2</sup>

The IE design features two treatment arms to measure the relative effectiveness of the project:

- Treatment A will consist of the "full package" of consulting services, including the initial assessment, quality improvement action plans, and continuous feedback and support.
- Treatment B is "information only": The consulting firm will conduct the assessment and provide initial feedback on these indicators which will be presented to the PHC workers. The firm will not, however, provide hands-on tutelage throughout the quality improvement process.
- A control group receives neither treatment.

Treatment A tests the effectiveness of the full consulting program whereas Treatment B measures a lower cost and lower intensity intervention. This comparison will identify whether the main barriers to adopting quality improvement plans are information constraints (PHC staff not knowing *what* to improve) or implementation constraints (PHC staff knowing *what* to improve but not *how* to improve it). Dependent on access to relevant data sources, cost-effectiveness analysis will be performed in order to compare outcomes relative to their costs.

The effectiveness will be measured by means of a randomized controlled trial (RCT). The RCT involves a total of 80 PHCs, located in 20 hospital catchment areas in 6 states. 24 PHCs will be randomly assigned to Treatment A, 24 to Treatment B, and 32 will form the Control Group. The randomization and balance checks are being discussed in chapter 3.

The 48 treatment facilities within this study serve as pilot cases to evaluate the effectiveness and scalability of this quality improvement program. The IE is highly policy-relevant since it will directly inform the nationwide scale-up decision process.

## **Data**

### **Baseline data**

As data sources to measure and quantify the impact, the IE will use a combination of PHC administrative data, facility level survey data, the tools developed by the healthcare consulting firm, the SDI and SURE-P surveys, as well as additional instruments to assess the quality of care.

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<sup>2</sup> <http://tinyurl.com/nigeria-dime>

The baseline data discussed in this baseline report mainly stems from three sources:

1. Service Delivery Indicators (August 2013)
2. SURE-P baseline data (September/October 2013)
3. Data collected by SafeCare (“SafeCare indicators”)

### 1. SDI:

The Service Delivery Indicators (SDI) is an initiative by the World Bank, in partnership with the African Economic Research Consortium and the African Development Bank, that collects data on service delivery in schools and health facilities across Africa.<sup>3</sup>

For Nigeria, the data collection was carried out by the SDI team from June to August of 2013. The SDI tool in Nigeria encompasses 5 parts:

- **Facility questionnaire:** General facility information, infrastructure, availability of equipment, materials, drugs, and supplies
- **Staff roster:** Part A: List of all health workers by cadre type; Part B: Administered to 10 randomly selected health workers to measure absenteeism
- **Clinical knowledge assessment:** Clinical knowledge using 5 medical vignettes + 2 vignettes for maternal & newborn complications
- **Public expenditure module:** Collects receipts and spending (monetary and in-kind) by health facilities
- **Exit module:** User satisfaction, socio-demographic characteristics & payments

Overall, data from 1138 clinics was collected. The SDI data collection included 79 of the 80 QE clinics. One clinic in Anambra was omitted in the data collection.

### 2. SURE-P baseline data:

The SURE-P MCH Program is an ambitious initiative to tackle key supply and demand-side constraints to the effective delivery of maternal and child health services in order to improve Nigeria’s MCH outcomes. SURE-P MCH will incorporate a set of four IEs looking at various pre-identified supply and demand-side challenges. The SURE-P baseline data collection was carried out in September and October of 2013. All 80 clinics of the QE project were featured in this data collection. From this data, information on facility characteristics and staffing details are being reflected in this report.

### 3. SafeCare indicators:

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<sup>3</sup> More on the SDI can be found on the website: <http://www.sdindicators.org/>

As part of the quality improvement program, the healthcare management consulting firm PharmAccess-SafeCare conducted a baseline quality of care assessment in the 48 clinics that comprise treatment groups A and B. The baseline assessment included 829 indicators (of which not all are applicable to the QE context). For the 24 clinics of Treatment Group A (“full treatment”), the firm also created “Quality Improvement Plans” (QIPs). For the purpose of this report and subsequent analysis, this data is analyzed at an aggregated level.

### **Follow up – Survey implementation**

In order to track progress over time and in order to increase the statistical power of the study, the research team decided to conduct a monthly high-frequency data collection (HFDC) as a follow up instrument.<sup>4</sup> The data collection is being implemented electronically using Google Nexus 7 tablets. Questions were directly read from the devices and responses were recorded.

Initial pilot testing was conducted in all the six states that are part of the program. To avoid bias, the facilities that took part in the pilot were not on the sample list for the QIPs in PHC packages implementation in the states. The piloting started on 26<sup>th</sup> of May and ended on 30<sup>th</sup> of May, 2014 in 59 facilities. 134 patient exit forms were successfully interviewed during the pilot phase. After field-testing the questionnaires, all enumerators reassembled again in Abuja on 2 June 2014 for a debriefing where enumerators shared their experience from the pilot.

The HFDC started on 9 June 2014 and the data collection work is currently ongoing.

The team is planning a larger (one-shot) follow-up data collection in the first quarter of 2015.

### **Intervention timeline**

The international firm PharmAccess-SafeCare<sup>5</sup> was commissioned by the Nigerian government to implement the intervention for this project.

The intervention across the states started with the above-mentioned **baseline assessments**, which were carried out by SafeCare assessors between 11 November 2013 and 28 February 2014. These assessments took 1 day per clinic.<sup>6</sup>

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<sup>4</sup> The procurement of the survey firm was done through a competitive process where expression of interest (EOI) was advertised through the World Bank and interested parties took part in the competition. Expressions of interests were reviewed and short listed candidates were asked to submit technical and financial proposals. After the review period, [Hanovia Medical Ltd.](#) was awarded the contract to collect the high frequency follow up data.

<sup>5</sup> <http://www.safe-care.org/>

<sup>6</sup> It took 2 days for 2 clinics in Anambra.

After the completed assessments, SafeCare compiled the data and produced **baseline reports** which were presented to all the 48 PHCs in treatment groups A and B. Based on the baseline assessment, SafeCare developed “**Quality Improvement Plans**” (QIPs) for the 24 PHCs that were randomly assigned to Treatment group A. The QIPs were delivered between 12 of February 2014 and 5 May 2014.

For treatment group A, the individual in charge of quality improvement in each facility and the quality improvement field officer (QIFO) in each LGA meet every week to implement activities that are described in the QIP. Also, the facilitation teams of SafeCare pay visits to the treatment A facilities every six weeks. The facilitation visits are to provide technical support and monitoring on QIP progress. The facilitation visits started with the delivery of the QIPs across the facilities. This phase ends on 14 November 2014. At that point each facility will have been visited six times. After the implementation of QIP activities, the certification process will begin. This is supposed to be concluded by February 2015.

**Table 1: SafeCare facilitation time frame**

Activities		Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger
Baseline Assessment	Start	4-Nov-13	2-Dec-13	4-Nov-13	13-Feb-14	20-Jan-14	5-Nov-13
	End	4-Dec-13	20-Dec-13	15-Nov-13	26-Feb-14	5-Feb-14	22-Nov-13
Delivery of Baseline Assessment Report	Start	18-Feb-14	7-Apr-14	17-Feb-14	7-Apr-14	15-Apr-14	12-Feb-14
	End	26-Feb-14	5-May-14	25-Feb-14	15-Apr-14	21-Apr-14	24-Feb-14
Delivery of Quality Improvement Report	Start	18-Feb-14	7-Apr-14	17-Feb-14	7-Apr-14	15-Apr-14	12-Feb-14
	End	26-Feb-14	5-May-14	25-Feb-14	15-Apr-14	21-Apr-14	24-Feb-14
Follow Up Facilitation	Start	18-Feb-14	7-Apr-14	17-Feb-14	7-Apr-14	15-Apr-14	12-Feb-14
	End	On-going	On-going	On-going	On-going	On-going	On-going

Regional scope Figure 1 shows the 6 states the project is working in (highlighted in red). Treatment A facilities are marked with a green dot, Treatment B facilities are marked purple, and facilities in the control group are orange.<sup>7</sup>

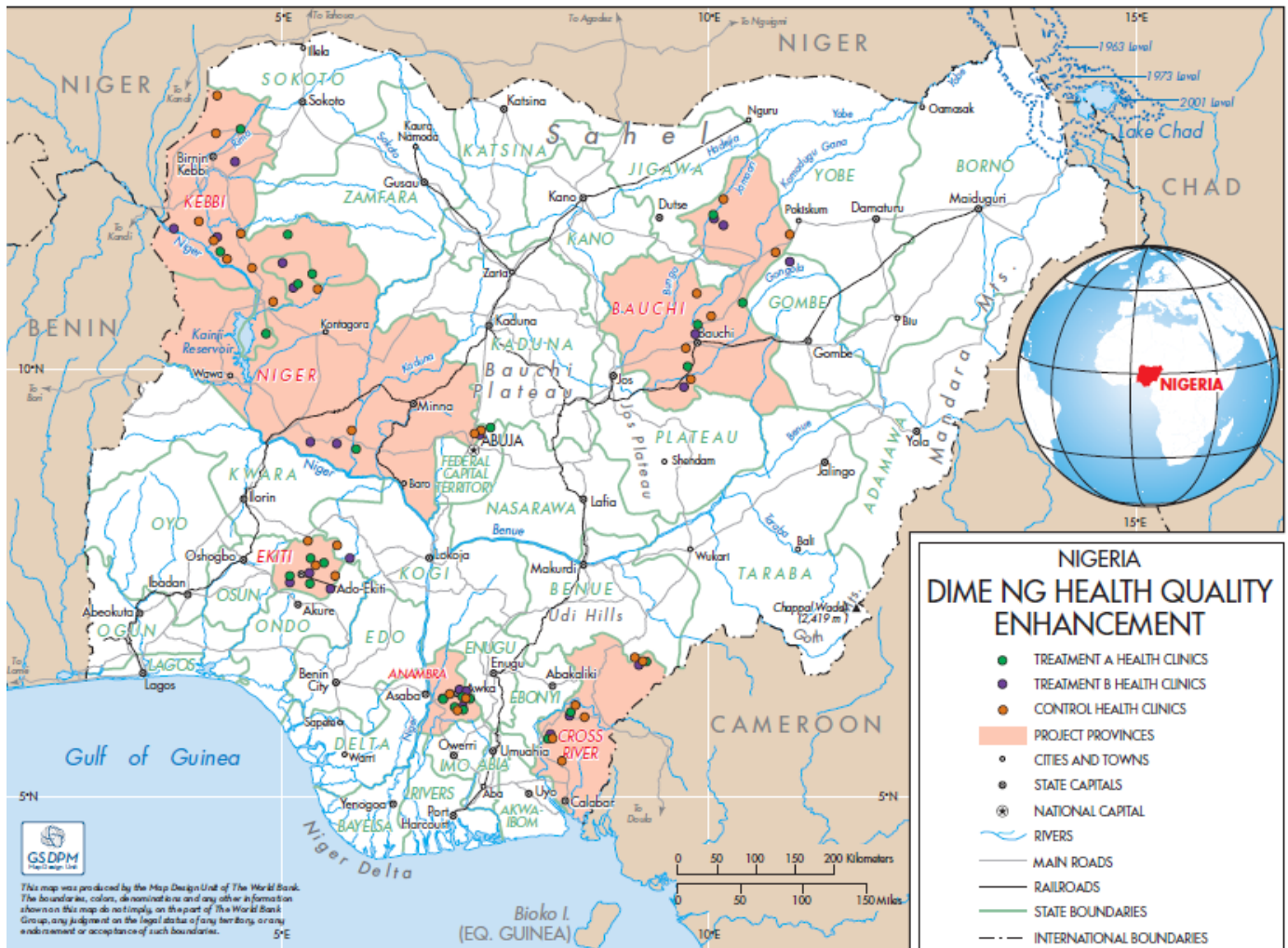


Figure 1: Map with Project Sites

<sup>7</sup> Click [here for a higher resolution map \(PDF\)](#).

## 2. Baseline Characteristics

The main focus of this chapter is to describe the baseline characteristics of the 80 PHCs in the 6 states that are part of the QE program. The chapter is divided into 5 sections.

1. The first section describes the **regional characteristics** of the 6 Nigerian states the project is anchored in.
2. The second section illustrates some statistics that describe the **physical facility infrastructure**, for example access to power and water.
3. The third section looks at **facility characteristics and processes**, i.e. *how* care is provided with the infrastructure and equipment that is available to these clinics.
4. The fourth section describes the **availability of drugs and medicine**.
5. The fifth section focuses on **provider knowledge**, drawing on data from the SDI survey.



## **2.1 Regional characteristics**

The 6 QE intervention states were chosen in respect to their diversity and representativeness of Nigeria as a whole. The following chart (Figure 2) illustrates this diversity. It displays the distribution of ethnicities (of the SURE-P survey respondents) across the 80 sampled clinics and the ethnic distribution of respondents in the other 30 states (SURE-P data). The graph shows that the QE states are comparable in ethnic composition when compared to the country as a whole. About a quarter of respondents identified themselves as Hausa, both in the QE (24%) and the SURE-P (26%) group. This is followed by Igbo (15% for each group) and Yoruba (13% for QE and 18% for SURE-P). The “other” category subsumes 37 percent of the QE respondents which further exemplifies the large ethnic diversity of Nigeria. Within and across states diversity is also large, as illustrated by

Table 2.

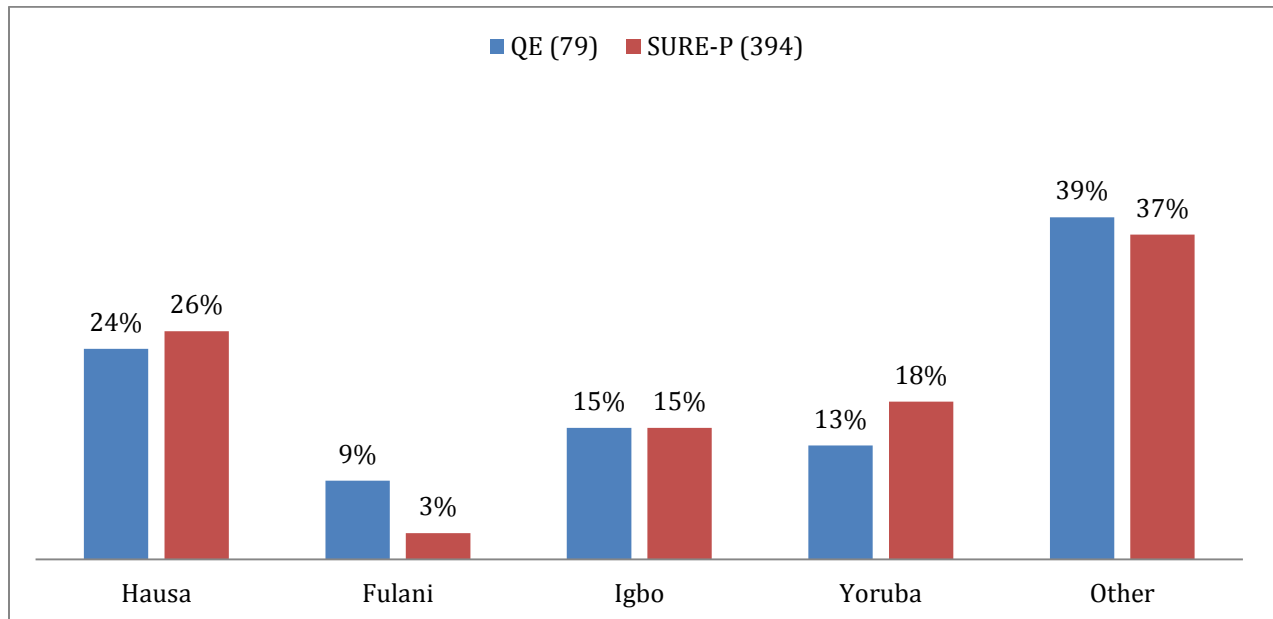


Figure 2: Ethnicity of respondents (Source: SURE-P, 2013)

**Table 2: Ethnicity of households**

	Anambra	Bauchi	Cross river	Ekiti	Kebbi	Niger	QE-(79)	SURE-P (394)
Hausa	0%	31%	0%	0%	80%	17%	24%	26%
Fulani	0%	31%	0%	0%	7%	8%	9%	3%
Igbo	100%	0%	0%	0%	0%	0%	15%	15%
Yoruba	0%	0%	0%	83%	0%	0%	13%	18%
Other	0%	38%	100%	17%	13%	75%	39%	37%

Table 3 shows population figures and welfare indicators for the QE states. These welfare indicators include absolute, relative and \$1-per-day measures of poverty and the Gini coefficient.<sup>89</sup> Poverty rates are very high for all states. With reference to all the poverty measures, Bauchi, with its high population, has the highest proportion of poor people followed by Kebbi, while Niger is inhabited by the least poor followed by Ekiti.

The Gini coefficient is a measure of inequality. It takes on values from 0 to 1. A value of 0 implies perfect equality while 1 would imply perfect inequality. We show that income inequality is lowest in the QE states of Bauchi and Kebbi where there are more poor people. Cross River and Ekiti feature the highest inequality with 0.44 and 0.48 respectively.

Bauchi has the largest population of 4.65 million and also shows the highest growth rate across the QE states (3.4, together with Niger state). Ekiti is the smallest state with 2.40 million people and Anambra has the smallest growth rate with 2.8<sup>10</sup>.

<sup>8</sup> Origin : Gini, C. (1912). Variabilità e mutabilità. *Reprinted in Memorie di metodologica statistica* (Ed. Pizetti E, Salvemini, T). Rome: Libreria Eredi Virgilio Veschi, 1.

<sup>9</sup> Absolute poverty is estimated by using basic requirements necessary to afford minimal standards of food, clothing, healthcare and shelter. It is estimated using per capita expenditure from household expenditure on food and non-food items. The estimation is done by obtaining food expenditure that can give the recommended 3000 calorie per day based on the national food basket for the poorest 40 percent. On the other hand, relative poverty is measured using the living standards of the majority in a society. Households with per capital expenditure below poverty line (two-third of the average of total households' per capital expenditure) are regarded as poor.

<sup>10</sup> This is average annual rate of change of population size during a specified period, in this case in 2006. It is in percentage.

**Table 3: Demographics and aggregate welfare of QE states (NPC<sup>11</sup>, 2006; and NBS<sup>12</sup>, 2010)**

	Population	Population Growth Rate (2006)	Absolute Poverty	Relative Poverty	Poverty rate (based on \$1 per day adjusted for PPP)	Inequality (Gini)
<b>Anambra</b>	4,177,828.00	2.8	57%	68%	57%	0.38
<b>Bauchi</b>	4,653,066.00	3.4	73%	84%	73%	0.33
<b>Cross River</b>	2,892,988.00	2.9	53%	60%	53%	0.44
<b>Ekiti</b>	2,398,957.00	3.1	52%	59%	53%	0.48
<b>Kebbi</b>	3,256,541.00	3.1	72%	81%	73%	0.33
<b>Niger</b>	3,954,772.00	3.4	34%	44%	34%	0.37
<b>QE States Average</b>	3,555,692.00	3.1	57%	66%	57%	0.39
<b>States Average</b>	3,795,453.78	3.2	61%	69%	61%	0.44

<sup>11</sup> National Population Commission, Nigeria (<http://www.population.gov.ng/index.php/publications/141-population-distribution-by-age-and-sex-2006-census-priority-tables-vol-4>)

<sup>12</sup> National Bureau of Statistics, Nigeria (<http://www.nigerianstat.gov.ng/nbslibrary>)

Table 4 and Figure 3 show the number of health facilities by state. Anambra and Niger show the highest density of primary care facilities, with 31 per 100,000 people for Anambra and 28 for Niger. Kebbi only has 412 health facilities for its population of 3.26 million people, which translates to a density of a meager 11 per 100,000 people. The average for the entire country is 22 per 100,000 people. The vast majority of health facilities are primary care facilities.

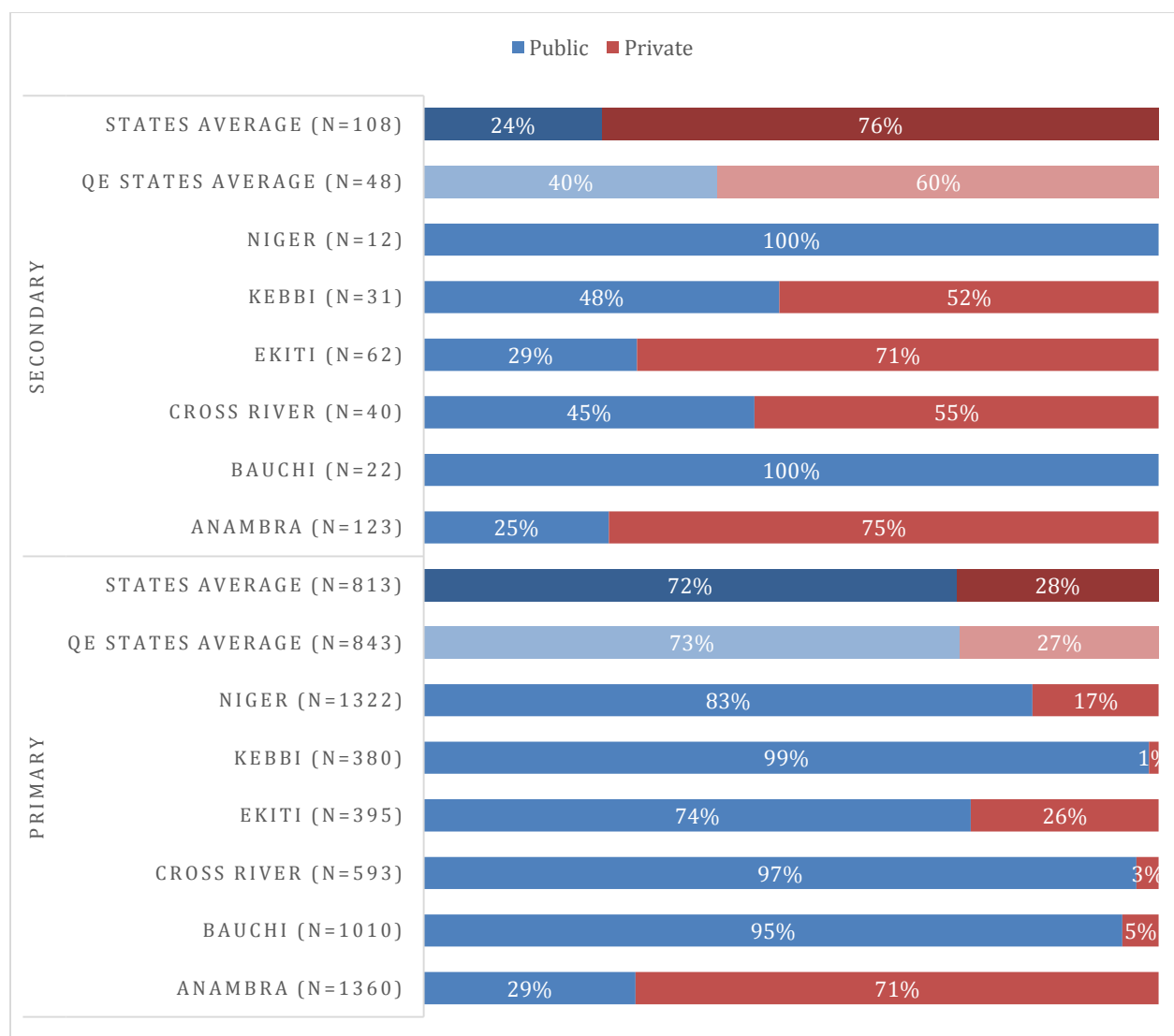
Anambra has the most secondary facilities with 123. Niger state comes in last from the QE group, with 12 secondary facilities, all of which are public facilities. The national average of secondary care facilities is 108 per state, which is only reached by Anambra in the QE group.

The private provision of health care is an important and growing market in Nigeria. This is especially visible in Anambra, where 968 of the 1360 primary facilities are private (71 percent). Ekiti also has a large share of private facilities with 26 percent. Kebbi features the fewest primary healthcare facilities, only 5 out of its 380 (1.3 percent). The national average is 28 percent, which closely matches the QE average of 27 percent. The private market is even more important for secondary healthcare.

The 6 states combine only 7 tertiary facilities, serving approximately 30 million people.

**Table 4: Numbers of health facilities across states in Nigeria (Source: FMOH, 2011)**

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE States Average	Country Average per state
Number of health facilities	1485	1034	734	459	412	1335	910	924
Facilities per 100,000 population	31	19	22	16	11	28	21	22
<b>Primary</b>	<b>1360</b>	<b>1010</b>	<b>593</b>	<b>395</b>	<b>380</b>	<b>1322</b>	<b>843</b>	<b>813</b>
<i>Public</i>	392	960	575	294	375	1095	615	589
<i>Private</i>	968	50	18	101	5	227	228	224
<b>Secondary</b>	<b>123</b>	<b>22</b>	<b>40</b>	<b>62</b>	<b>31</b>	<b>12</b>	<b>48</b>	<b>108</b>
<i>Public</i>	31	22	18	18	15	12	19	26
<i>Private</i>	92	0	22	44	16	0	29	82



**Figure 3: Percentage distribution of primary and secondary health facilities by ownership type (Source: FMOH<sup>13</sup>, 2011)**

The materials with which roof, floor, and walls are constructed can be utilized as a proxy indicator for the **socio-economic status of the population**<sup>14</sup>. Table 5 shows that bricks and mud are the major materials used for wall construction in Nigeria. Across QE states, bricks are mostly used for wall construction in Ekiti state (78 percent) and least used in Kebbi (11 percent), while mud is predominantly used in Kebbi (86 percent) and not used in Anambra. The QE and the country average for the wall building materials are comparable. Notable characteristics are that in Kebbi, walls are made out of earth and mud in 86 percent of the cases. High numbers are also observed for Niger (46 percent), Bauchi (45 per-

<sup>13</sup> FMOH (Federal Ministry of Health. 2011. Directory of Health Facilities in Nigeria. Publication of FMOH, Nigeria

<sup>14</sup> Sharif I. A. (2009). Building a Targeting System for Bangladesh based on Proxy Means Testing. SP Discussion Paper No. 0914. The World Bank.

cent) and Cross River (37 percent). In Anambra and Ekiti, almost all walls are built with bricks and concrete.

The statistics of roofing materials show a similar picture (Table 6). Corrugated iron sheet is the main roofing material and it accounts for 49 percent and 56 percent of what is being used in the QE states and across the country respectively. Other rooftop materials used include thatch, mud and asbestos. The better corrugated iron sheet is used in Anambra (95 percent), Ekiti (93 percent) and Niger (77 percent), while thatch is predominantly used in Bauchi (57 percent), mud is used in Kebbi (38 percent).

Table 7, shows that there is substantial variation in materials used for floor construction across QE states and that variation reflects similar patterns as for materials used for roof and wall construction. The differences in floor materials used in QE states are comparable to the countrywide average.

**Table 5: Percentage distribution of households having the following main materials used to construct walls**  
(Source: SURE-P, 2013)

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	SURE-P-Average
Bricks/blocks	59%	52%	58%	78%	11%	21%	45%	40%
Corrugated iron/metal	0%	0%	0%	0%	0%	2%	0%	0%
Thatch/grass	0%	2%	2%	0%	1%	2%	1%	1%
Wood/bamboo	0%	0%	0%	0%	1%	0%	0%	1%
Earth/mud	0%	45%	37%	2%	86%	46%	39%	44%
Concrete only	10%	0%	0%	2%	0%	14%	4%	9%
Covered concrete	31%	0%	2%	18%	0%	16%	10%	4%
Other	0%	0%	2%	0%	0%	0%	0%	1%



**Table 6: Percentage distribution of households having the following main materials used to construct the rooftop**  
(Source: SURE-P, 2013)

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	SURE-P-Average
Bricks/blocks	2%	1%	3%	0%	9%	4%	3%	1%
Asbestos	0%	0%	5%	2%	0%	0%	1%	7%
Corrugated iron/metal	95%	30%	10%	93%	9%	77%	49%	56%
Tiles/slates	0%	0%	0%	0%	0%	2%	0%	1%
Thatch/grass	0%	57%	5%	0%	33%	4%	19%	12%
Wood/bamboo	0%	7%	5%	2%	6%	0%	4%	4%
Earth/mud	0%	4%	7%	0%	38%	0%	9%	10%
Concrete only	3%	0%	0%	0%	1%	11%	2%	0%
Covered concrete	0%	0%	0%	3%	5%	4%	2%	1%
Cardboard	0%	0%	0%	0%	0%	0%	0%	1%
Other	0%	1%	64%	0%	0%	0%	10%	7%

**Table 7: Percent distribution of households having the following main materials used to construct the floor**  
(Source: SURE-P, 2013)

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	SURE-P-Average
Bricks/blocks	0%	0%	32%	0%	9%	2%	7%	5%
Tiles/slates	12%	0%	0%	2%	0%	4%	3%	2%
Thatch/grass	0%	1%	2%	0%	1%	5%	2%	0%
Wood/bamboo	0%	0%	0%	0%	1%	0%	0%	0%
Earth/mud	2%	22%	20%	3%	76%	21%	27%	38%
Concrete only	51%	49%	29%	10%	9%	60%	34%	33%
Covered concrete	36%	4%	17%	85%	4%	9%	23%	17%
Other	0%	23%	0%	0%	0%	0%	5%	4%

The energy sources used for cooking are shown in Table 8. It illustrates that firewood (73 percent) and kerosene/paraffin (23 percent) are the main sources of energy for cooking across Nigeria. Firewood is predominantly used in Bauchi, Cross Rivers, Kebbi and Niger while kerosene/paraffin are the main energy sources for cooking in Anambra and Ekiti. Households' source of energy for cooking is a good proxy of welfare. The distributions across households around QE and the rest of SURE-P facilities are very similar.

**Table 8: Percent of households with the following main sources of energy for cooking (Source: SURE-P, 2013)**

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	SURE-P-Average
Kerosene/paraffin/gas/oil lamp	63%	1%	5%	75%	0%	11%	23%	24%
Electricity	0%	0%	0%	3%	0%	0%	1%	1%
Charcoal	0%	4%	0%	5%	3%	4%	3%	4%
Open fire	2%	0%	0%	0%	1%	0%	1%	1%
Firewood	36%	94%	95%	17%	96%	86%	73%	70%
Other	0%	1%	0%	0%	0%	0%	0%	0%

## 2.2 Physical PHC infrastructure

This section provides information on physical infrastructure of QE facilities such as provision of water and sanitation, power, and equipment. The available infrastructure and equipment can be an important constraint to quality of care.

A majority of the PHCs is housed in relatively new buildings (67 percent were built after 2000). The rest of the SURE-P facilities are slightly older with average of 48% of clinics being built in this time span. Many PHCs also had major renovation work completed since 2006: 93 percent of QE facilities and 89 percent of SURE-P facilities were renovated, of which 55 percent and 57 percent respectively took place in the last 2 years before the survey (Table 9).

**Table 9: Percentage of facilities with year built and year of last major renovation (Source: SDI, 2013)**

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE (79)	SURE-P (394)
<i>Time range facilities were built</i>								
1930-1959	0%	0%	0%	33%	0%	0%	2%	6%
1960-1979	50%	0%	50%	0%	0%	22%	15%	13%
1980-1999	0%	45%	13%	33%	7%	0%	17%	32%
2000-2013	50%	55%	38%	33%	93%	78%	67%	48%
<i>Time range facilities physical building had the last major renovation</i>								
1970-2000	0%	25%	0%	0%	0%	0%	5%	4%
2001-2005	0%	0%	0%	0%	0%	25%	2%	7%
2006-2010	43%	25%	83%	71%	0%	25%	38%	32%
2011-2013	57%	50%	17%	29%	100%	50%	55%	57%

### Water & Sanitation

Functioning sanitation infrastructure and improved water sources are important in order to ensure patient safety and to prevent the spread of disease. Inadequate access to clean water or sanitation facilities can cause illnesses such as diarrhea.

However, about 19 percent of the QE clinics do not have a function toilet on the facility grounds (Table 10). Although this is a high number, it still compares favorably to the SDI average of 32 percent (which includes private clinics).

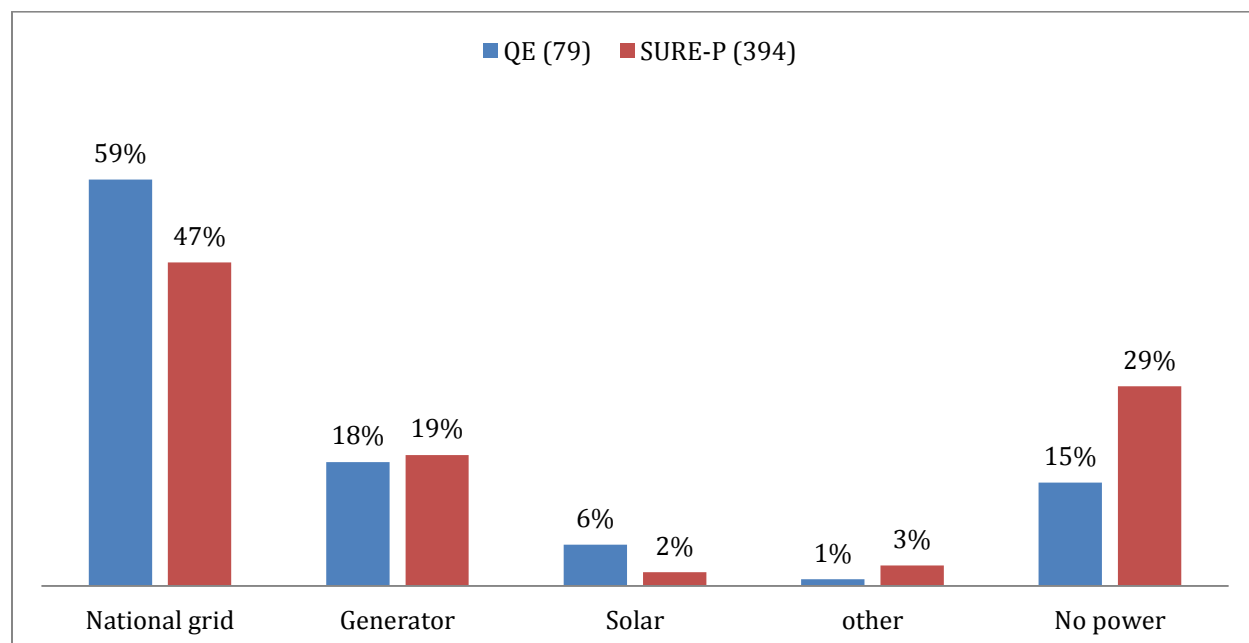
All of Anambra's clinics in the QE group have some sort of toilet on the facility grounds. All the other 5 states still exhibit fairly high percentages of lacking coverage. Worst of the group are Ekiti (33 percent of QE clinics without functioning toilets), Bauchi (25 percent), and Niger (25 percent).

**Table 10: Percentage of Facilities with Toilets/Latrines (Source: SDI, 2013)**

<i>Percent of facilities having the following types of toilets/latrines:</i>	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE Average	SDI Average
No functioning toilet	0%	25%	17%	33%	13%	25%	19%	32%
Bush	0%	6%	8%	25%	6%	25%	11%	20%
Flush toilet	64%	6%	8%	17%	13%	0%	16%	15%
Flush toilet (but no water)	9%	0%	33%	17%	19%	17%	15%	10%
VIP latrine	9%	13%	8%	0%	13%	8%	9%	3%
Covered pit latrine (no slab)	0%	0%	8%	0%	6%	8%	4%	4%
Covered pit latrine (with slab)	18%	44%	8%	8%	6%	0%	15%	11%
Uncovered pit latrine (no slab)	0%	0%	8%	0%	13%	8%	5%	2%
Uncovered pit latrine (with slab)	0%	6%	0%	0%	6%	8%	4%	2%
Other	0%	0%	0%	0%	6%	0%	1%	0%

## Power

About 15 percent of QE clinics and 29 percent of the larger group of SURE-P clinics have no access to power at all (Figure 4). This difference is mainly driven by the differential access to the national grid where the QE clinics have a connectivity rate of 59 percent, which still compares favorably to the rest of SURE-P facilities with only 47 percent. Some clinics that do not have access to the national grid rely on power provided by generators (18 percent for QE, 19 percent for the SURE-P group).



**Figure 4: Main source of power (Source: SURE-P, 2013)**

However, even those clinics that do have access to the national grid often experience black-outs and power shortages. In the QE group, 87 percent of the clinics that *do* have access to the grid did experience at least one day in the previous week without power. The figure for the rest of the SURE-P clinics is similar with 88 percent (Figure 5Error! Reference source not found.).

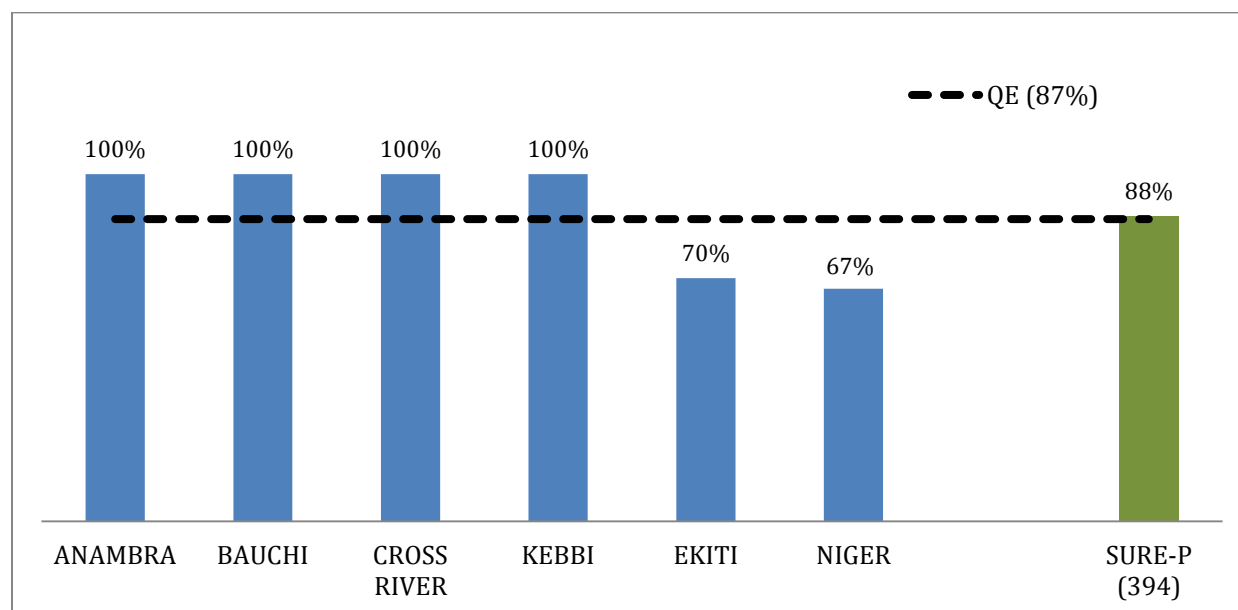


Figure 5: Percent of facilities with days of no electricity/light at all during last week (Source: SURE-P, 2013)

Figure 6, shows the differences of access to the national grid by state. Anambra, Ekiti, and Niger stand out with above-average access rates, whereas Bauchi and Cross River show rather meager rates of access. In Kebbi, only 20 percent of the sampled clinics have access to the grid.

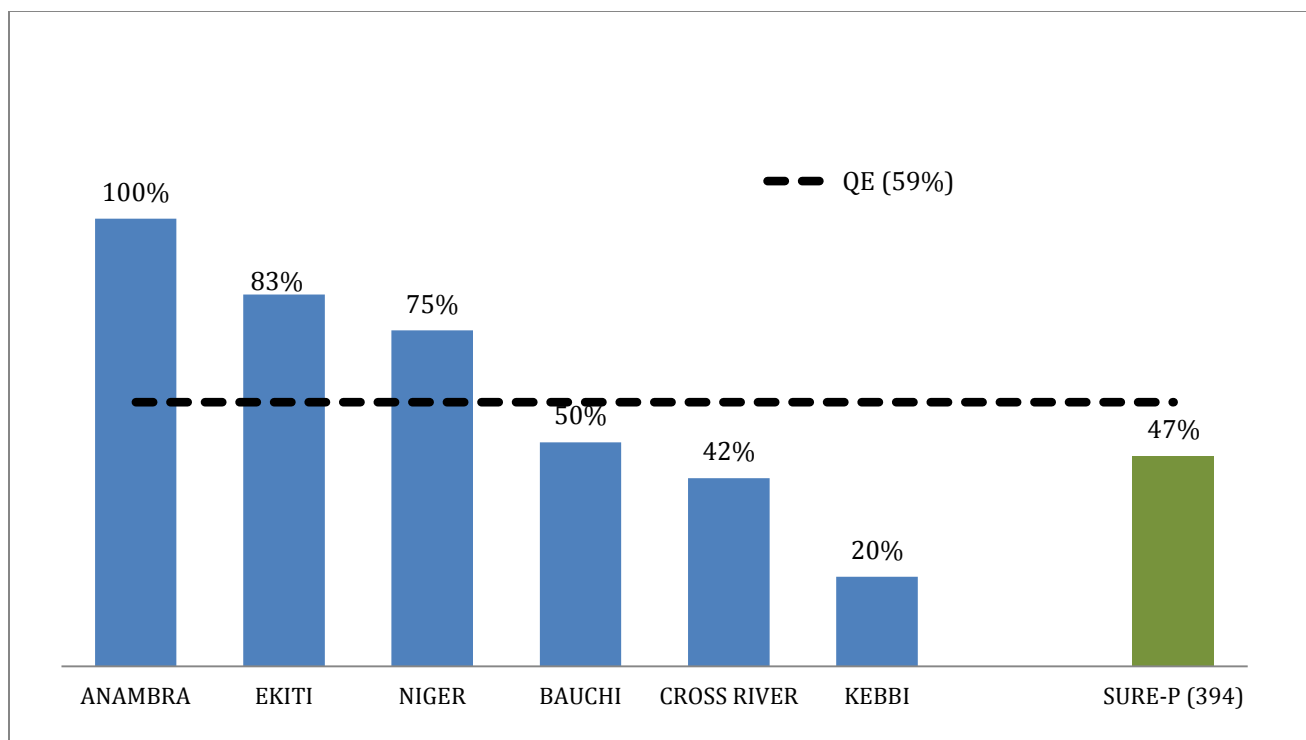
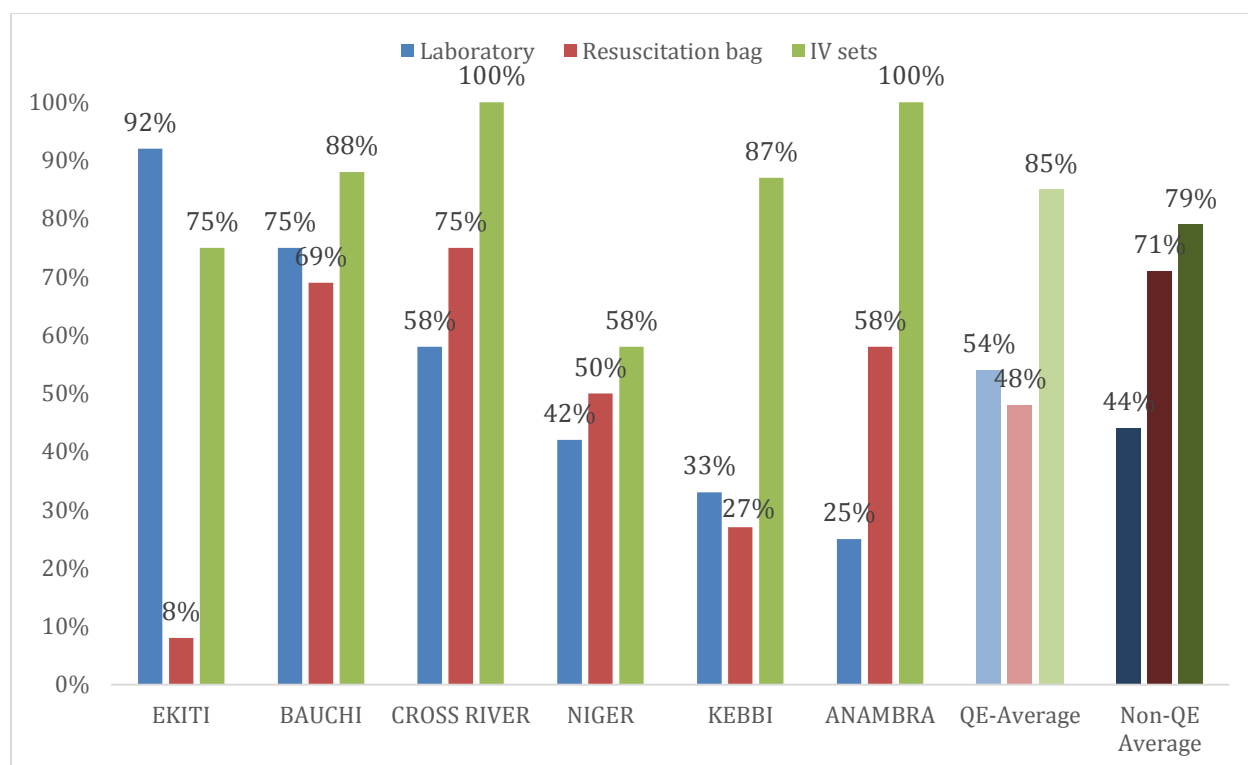


Figure 6: Percentage of facilities with access to the national power grid (Source: SURE-P, 2013)

### Equipment

One obstacle to quality of care is the availability of necessary medical equipment at the facilities so that the services that are required can be performed. A key piece of equipment are **IV sets**. Unfortunately, this equipment is not available in all clinics. From Figure 7, 85 percent of the QE clinics have this equipment at the clinic, which compares favorably to the non-QE average of 79 percent. Coverage levels are generally high in the QE states, only Niger is lagging behind with only 58 percent of clinics having IV sets at their availability.

The non-QE states perform better on the availability of a **resuscitation bag**. The Non-QE average here is 71 percent and the QE sample clinics perform worse with 48 percent. The states with the lowest rates are Ekiti (8 percent) and Kebbi (27 percent). The highest rates of available resuscitation equipment are found in Cross River (75 percent) and Bauchi (69 percent).



**Figure 7: Percentage Facilities having a laboratory, resuscitation equipment and IV sets (including sterilized needle and tube) available and functioning (Source: SURE-P, 2013)**

One function of the SURE-P PHCs is to provide educational material to patients. The following table, Table 11, lists the availability of some of these materials.

**Table 11: Percent of facilities having the following patient education materials clearly visible to patients in the facility (Source: SURE-P, 2013)**

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	Non-QE Average
Immunization schedule	83%	94%	100%	100%	93%	92%	94%	92%
Malaria diagnosis and treatment	100%	100%	100%	75%	87%	75%	90%	77%
IMCI chart book or wall chart	83%	88%	92%	67%	73%	75%	80%	67%
Health Management Information Systems (HMIS) data	42%	81%	100%	58%	80%	75%	73%	65%
Antenatal care national standards	83%	100%	83%	50%	87%	75%	81%	64%
Newborn care national standards	83%	94%	58%	33%	40%	58%	62%	56%
Tuberculosis diagnosis and treatment	58%	81%	50%	58%	47%	83%	63%	46%
Procedures manual for infection prevention and control	83%	75%	67%	58%	60%	58%	67%	46%
Post-partum care national standards	50%	75%	33%	42%	40%	58%	51%	42%

The below (Table 12), shows the availability of selected equipment per state. We see that the QE clinics are on average better equipped than the SDI clinics. 76 percent of the QE clinics have infant weighing scales for example. The coverage rate is much lower in the SDI clinics with 47 percent. This result is not unexpected since the SDI survey also covered private clinics, of which some are not sufficiently equipped. It is important to weigh infants after birth because low-birth weight is associated with fetal and perinatal mortality, inhibited cognitive development and growth and chronic diseases later in life.

Although availability rates are generally high, some states perform better than others. Kebbi, for example, scores slightly lower on these indicators than the other states. Anambra and Cross River on the other hand show higher rates of equipment availability. 100 percent of the SURE-P clinics have an adult weighing scale, a thermometer and a stethoscope in these states.

**Table 12: Percentage of facilities with basic equipment by state (Source: SDI, 2013)**

	<i>Adult weighing scale</i>	<i>Thermometer</i>	<i>Child weighing scale</i>	<i>Stethoscope</i>	<i>infant weighing scale</i>
<b>Anambra</b>	100%	100%	91%	100%	82%
<b>Bauchi</b>	94%	100%	81%	100%	88%
<b>Cross River</b>	100%	92%	92%	100%	75%
<b>Ekiti</b>	100%	83%	50%	100%	75%
<b>Kebbi</b>	88%	88%	88%	94%	69%
<b>Niger</b>	100%	83%	83%	100%	67%
<b>QE average</b>	<b>96%</b>	<b>91%</b>	<b>81%</b>	<b>99%</b>	<b>76%</b>
<b>SDI average</b>	<b>72%</b>	<b>70%</b>	<b>41%</b>	<b>77%</b>	<b>47%</b>

Another important piece of equipment refers to **refrigeration devices**. The following chart, Figure 8, shows the distribution of refrigerators at PHCs. There are other devices and mechanisms that Nigerian PHCs use to keep medication and vaccines cool, a fridge however (when functioning), is superior to these alternatives. We observe that around 59 percent of the PHCs in the QE group report to possess a refrigerator. Of these 59 percent, in 15 percent of the cases, the data collector could not verify the presence of the refrigerator.

In the rest of the SDI sample, 70 percent do not possess a working fridge. This illustrates the “inputs gap” between the SDI and the SURE-P group.



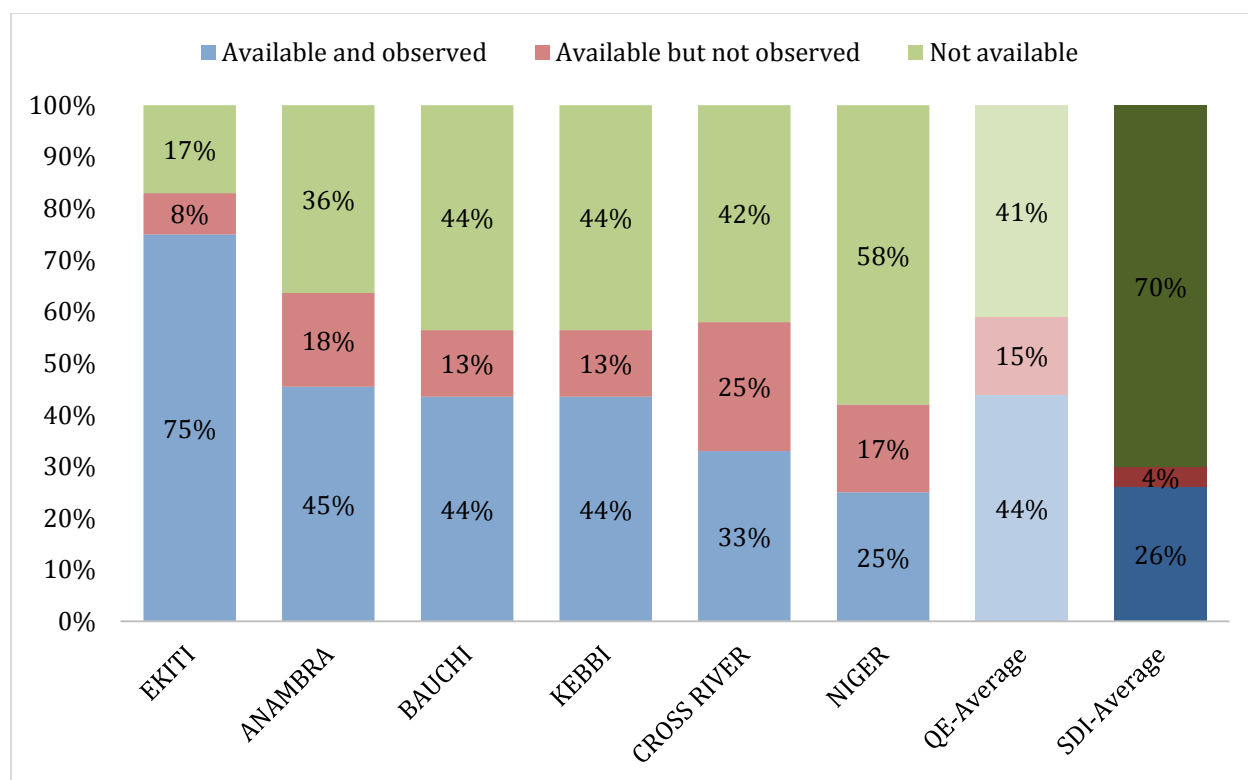


Figure 8: Percentage of facilities with a functional refrigerator (Source: SDI, 2013)

Table 13 illustrates the availability of selected sterilization equipment. A general trend is that the QE average is much higher than the

Table 13: Percentage of facilities with sterilization equipment (Source: SDI, 2013)

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	SDI-Average
Autoclave	36%	44%	25%	58%	19%	8%	32%	7%
Electric boiler/steamer	0%	38%	8%	17%	19%	17%	18%	5%
Electric dry heat sterilizer	18%	44%	8%	25%	13%	33%	24%	5%
Stove/Cooker	91%	44%	33%	83%	19%	17%	46%	38%
Incinerator	0%	25%	17%	8%	6%	0%	10%	2%

Most facilities have functioning **lines of communication** to the outside world, for example to be informed about emergencies or in order to make inform secondary institutions about referrals. However, in 5 percent of the QE clinics, no telephones are available. This com-

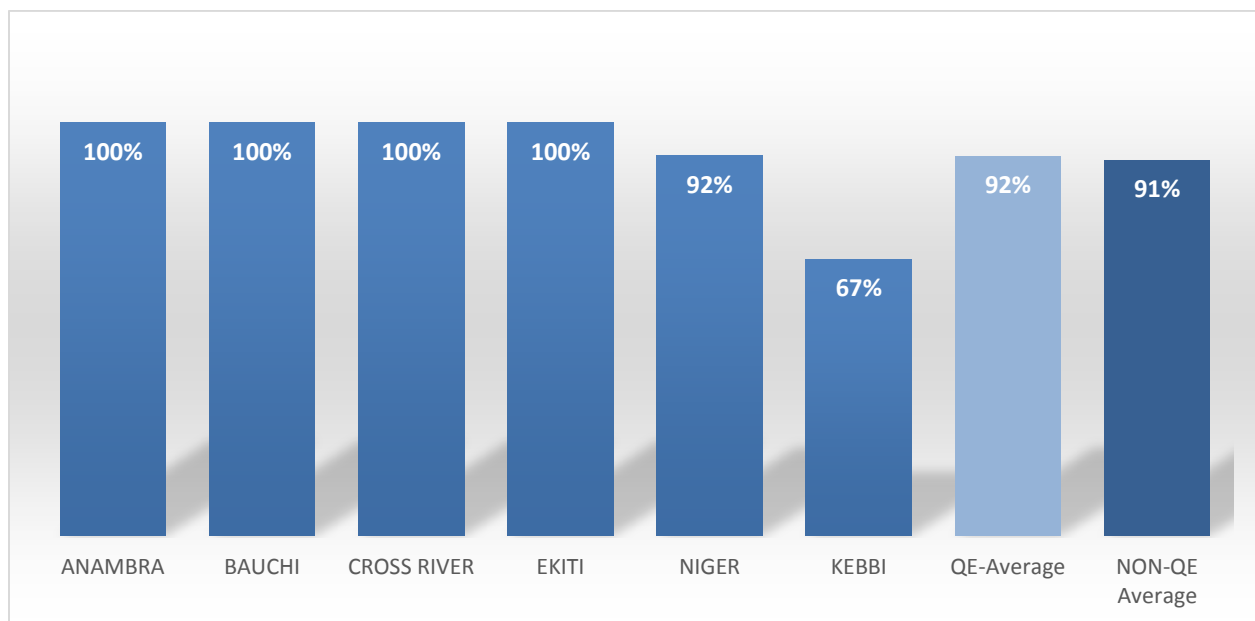
pares favorably to the SURE-P national average of 9 percent. For the QE subgroup, Bauchi, Ekiti, and Niger are the only states where some clinics do not have access to a phone.

## 2.3 Facility characteristics & processes

The quality enhancement project targets primary healthcare centers in Nigeria, which are the basic structural and functional units of the Nigerian public health services. This section provides general information on QE healthcare facilities and their staff.

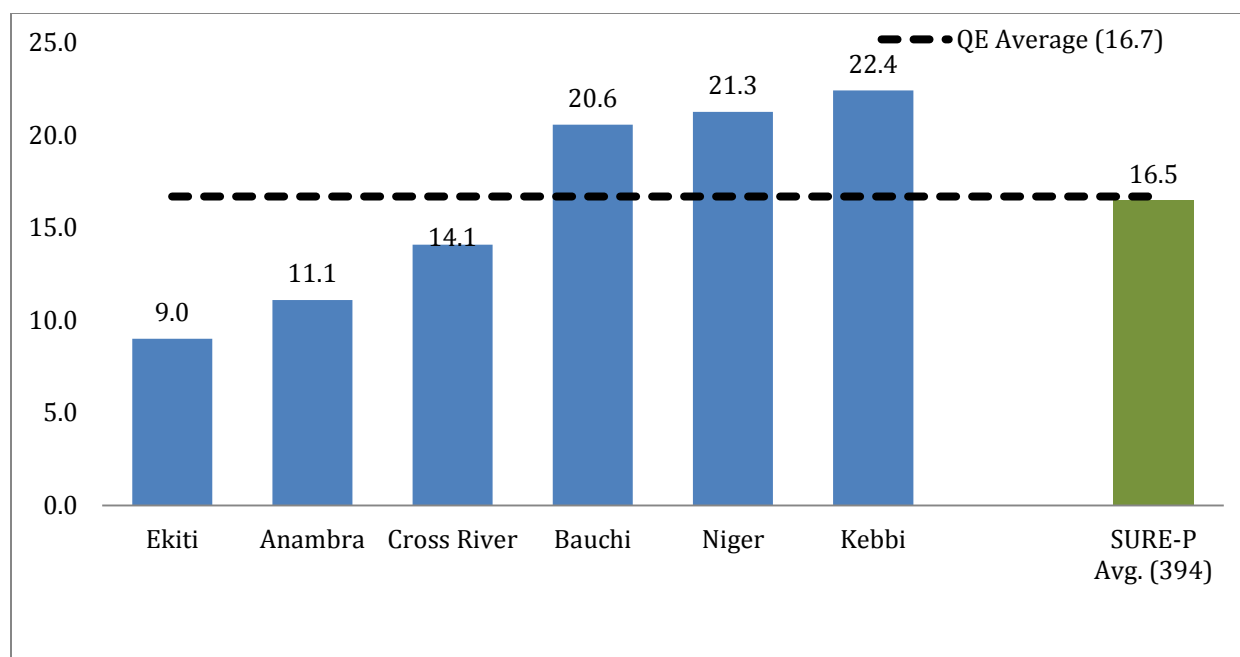
### Accessibility and provision of care

About 92 percent of facilities in the QE sample are open 7 all days of the week. This is comparable to the national average of 91 percent (Figure 9). In the majority of QE clinics, however, regular antenatal care is only provided on one (48 percent) or two days (28 percent) per week. Yet, 86 percent (QE) and 88 percent of clinics (SURE-P) have a midwife on shift at all times for emergency cases.



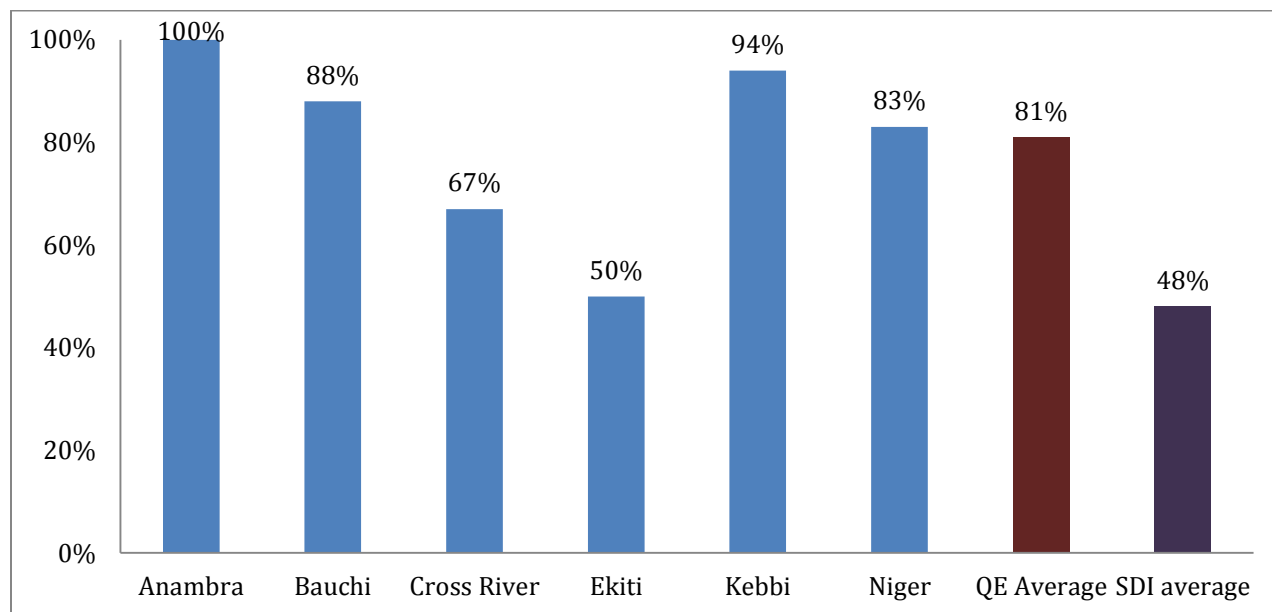
**Figure 9: Percentage clinics that are open 7 days in a week (Source: SURE-P, 2013)**

The average distance to the nearest referral hospital is 16.5 kilometers for the 30 other SURE-P states (Figure 10) and which is similar to the 16.7 kilometers for the QE states. In Bauchi, Kebbi, and Niger, the nearest hospital is more than 20 kilometers away. Anambra, Ekiti and Cross River more easily accessible support infrastructure. For the PHCs in Ekiti, the nearest clinic is just 9 kilometers away (on average).



**Figure 10: Average distance to referral hospital (in km; Source: SURE-P, 2013)**

The following chart (Figure 11) shows the share of clinics that provide basic emergency obstetric care. The QE average (79 clinics) is 81 percent. Underserved states are Cross River (67 percent) and Ekiti (50 percent). The SDI average (not including the 79 QE clinics) is much lower than the QE average with only 48 percent of the clinics providing basic emergency obstetric care.



**Figure 11: Provision of basic emergency obstetric care (Source: SDI, 2013)**

We observe some disparity in the provision of different services across the states. The Table 13, below illustrates this point. An encouraging sign is that almost all clinics provide **malaria treatment with ACTs**. Only 13 percent of clinics do not provide this service.

Services for **Tuberculosis** diagnosis and treatment, for example, differ vastly. On average, only 28 percent of the QE clinics offer diagnostics, and the non-QE average in the country is 21 percent. Bauchi is the most successful state in this category. 75 percent of clinics offer Tuberculosis and 81 percent offer treatment.

60 percent of the clinics in the QE group offer **voluntary counseling and testing (VCT) services for HIV/AIDS**, which is similar to the national non-QE average of 59 percent. Within state discrepancies are high for this services as well, although the national average (59 percent) is close to the QE average (60 percent). Anambra and Cross River offer this service in all QE clinics in their states. Niger has the worst coverage rate with only 8 percent of clinics offering VCT.

**Table 13: Percent of facilities providing specialized services (Source: SURE-P, 2013)**

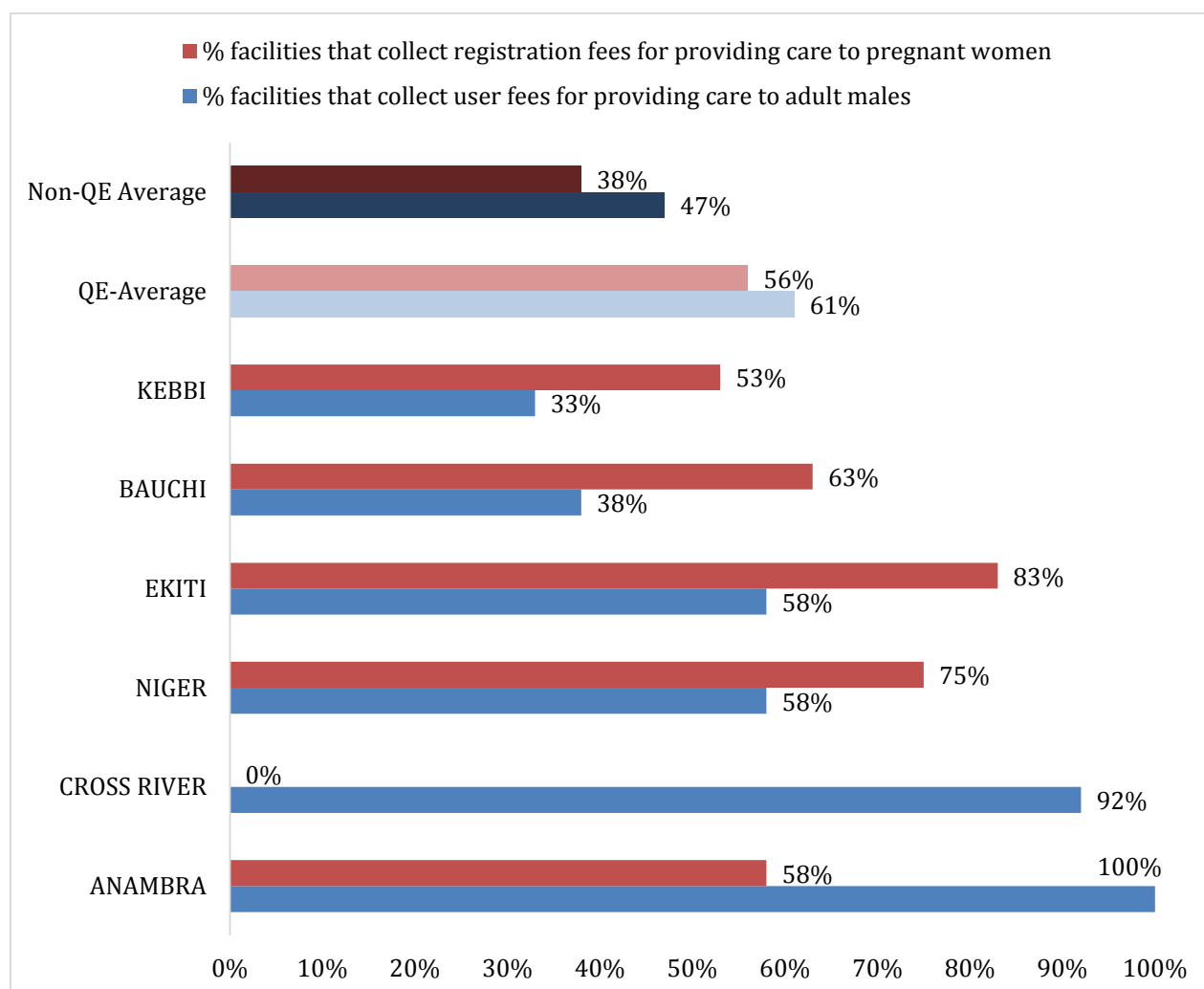
	Anambra	Bauchi	Cross river	Ekiti	Kebbi	Niger	QE-Average	Non-QE Average
Diagnosis (microscopy) (malaria)	18%	81%	67%	67%	20%	75%	55%	44%
Diagnosis (RDT) (malaria)	100%	94%	100%	50%	73%	91%	84%	78%
ACT (malaria)	100%	100%	100%	100%	87%	100%	97%	94%
Intermittent Preventive Treatment (IPT) (malaria)	100%	88%	100%	92%	73%	92%	90%	90%
Treatment for complicated malaria	9%	81%	25%	25%	47%	42%	41%	40%
Tuberculosis diagnosis	13%	75%	0%	33%	13%	8%	28%	21%
Tuberculosis treatment	13%	81%	0%	42%	27%	17%	35%	36%
VCT (HIV/AIDS services)	100%	50%	100%	67%	47%	8%	60%	59%

The next table (Table 14) shows that there are a couple of services that are almost universally provided by in SURE-P clinics, both in the QE sample and also the other SURE-P clinics in the country. This is true for immunization services like **BCG, DPT, Polio, Measles, and Tetanus Toxoid**. Almost all clinics also offer **antenatal care and assisted “normal” deliveries** at the PHCs.

**Table 14: Percent of facilities providing the following health services (Source: SURE-P, 2013)**

	Anambra	Bauchi	Cross river	Ekiti	Kebbi	Niger	QE-Average	Non-QE Average
BCG (immunization)	100%	94%	100%	100%	100%	100%	99%	99%
DPT (pentavalent 1, 2, 3) (immunization)	100%	100%	100%	100%	100%	100%	100%	99%
Polio (immunization)	100%	100%	100%	100%	100%	100%	100%	100%
Measles (immunization)	100%	100%	100%	100%	100%	100%	100%	99%
Tetanus Toxoid (immunization)	100%	100%	100%	100%	100%	100%	100%	100%
Antenatal care	100%	100%	100%	100%	93%	100%	99%	99%
Normal delivery	100%	100%	100%	100%	93%	100%	99%	97%
Caesarian delivery	0%	0%	0%	8%	0%	0%	1%	6%
Assisted delivery (forceps, vacuum)	33%	13%	17%	8%	47%	25%	24%	27%
Home delivery with skilled staff	86%	25%	25%	8%	100%	67%	50%	52%
Blood transfusion	0%	75%	0%	0%	13%	17%	21%	12%
Inpatient stay	83%	94%	92%	75%	86%	67%	83%	80%
Referral to another facility (ambulance ride)	17%	94%	50%	0%	40%	75%	51%	56%

Even if PHCs offer services, demand can be curtailed by the user fees that are being charged (Figure 12). In the QE sample we found that 56 percent of the clinics collect user fees from pregnant women for care services. About 61 percent charge user fees for care of adult males. These averages are lower for the rest of the country, with 38 percent of clinics charging fees from pregnant women and 47 percent charging fees from men. All clinics in Cross River provide free care to pregnant women but 92 percent of clinics charge men for services. Kebbi has the lowest charge rates of all the six states with 53 percent charging pregnant women and 33 percent charging fees for men.



**Figure 12: Percentage of facilities that collect fee for providing care (Source: SURE-P, 2013)**

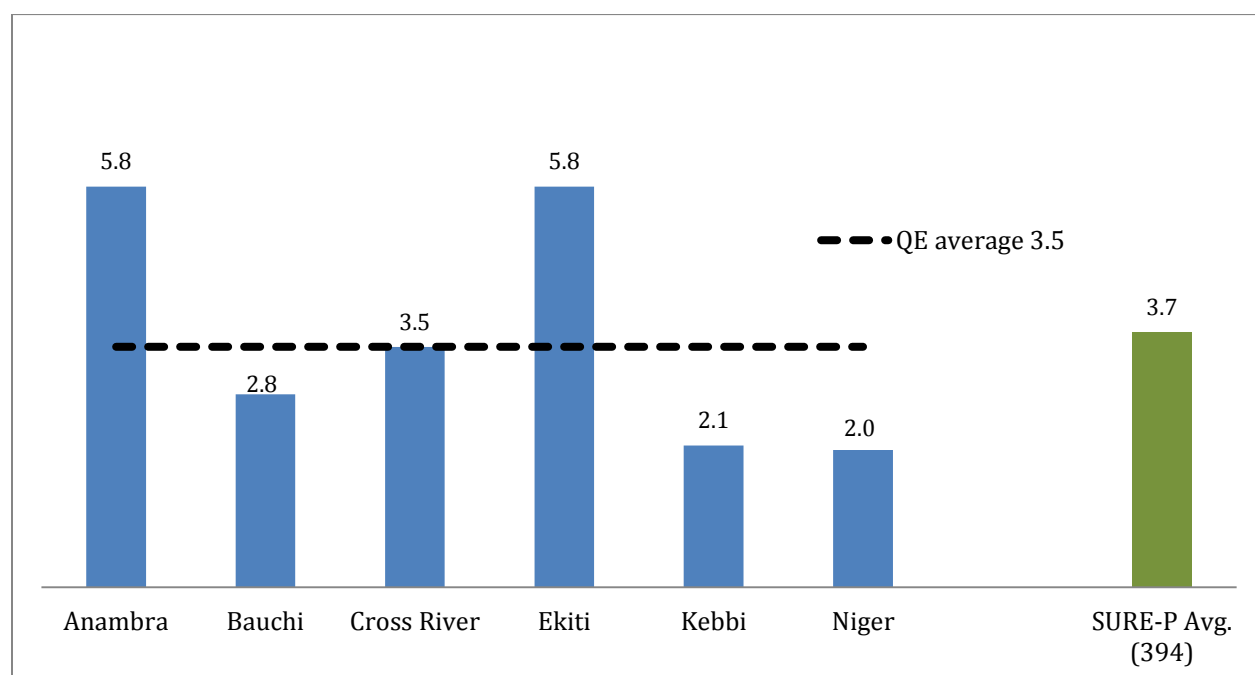
### Staffing information & patient load

Part of the rationale to put the SURE-P program into place is the fact midwife attrition<sup>15</sup> is a considerable problem in the Nigerian context. It is especially hard to retain midwives in more rural areas.

The SURE-P data, Figure 13, shows that, on average, 3.5 nurses and midwives work in the clinics that are comprised in the QE study. This is similar to the SURE-P average of 3.7. However, within the 6 states, the staffing situation differs significantly from state to state. Ekiti and Anambra show high staffing levels with 5.8 per nurses and midwives per clinic.

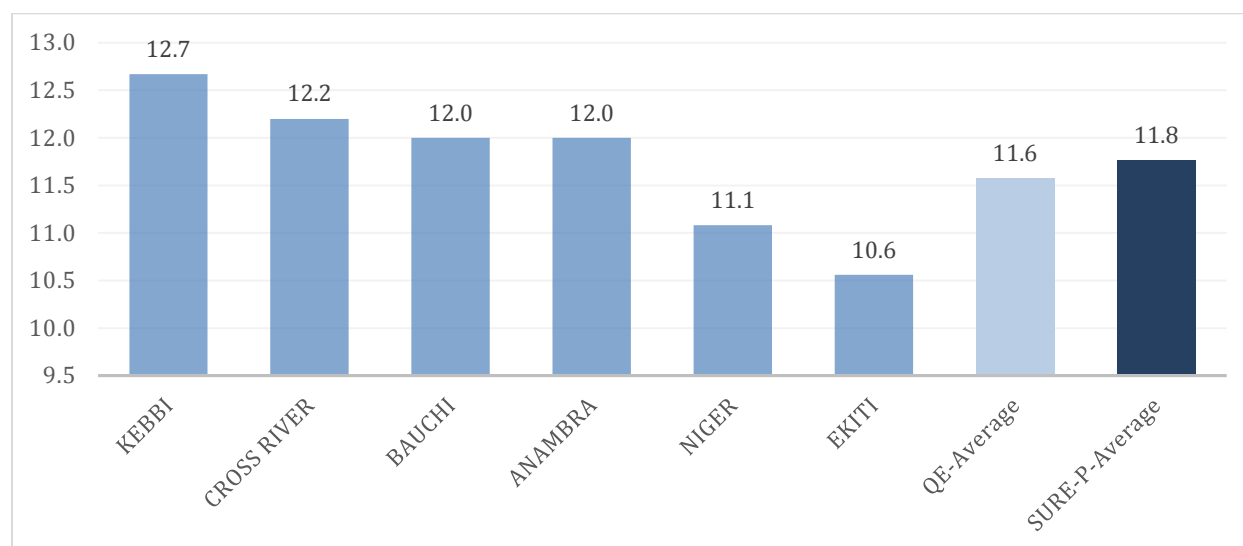
<sup>15</sup> See SURE-P 2012 Annual Report (2013). <http://goo.gl/NivPF5>

On the other hand, the assignment level of nurses and midwives is very low in Kebbi and Niger with 2.1 and 2.0, respectively. Bauchi (2.8) and Cross River (3.5) show staffing levels that are closer to the SURE-P average.



**Figure 13: Average number of Nurses and Midwives per facility (SURE-P, 2013)**

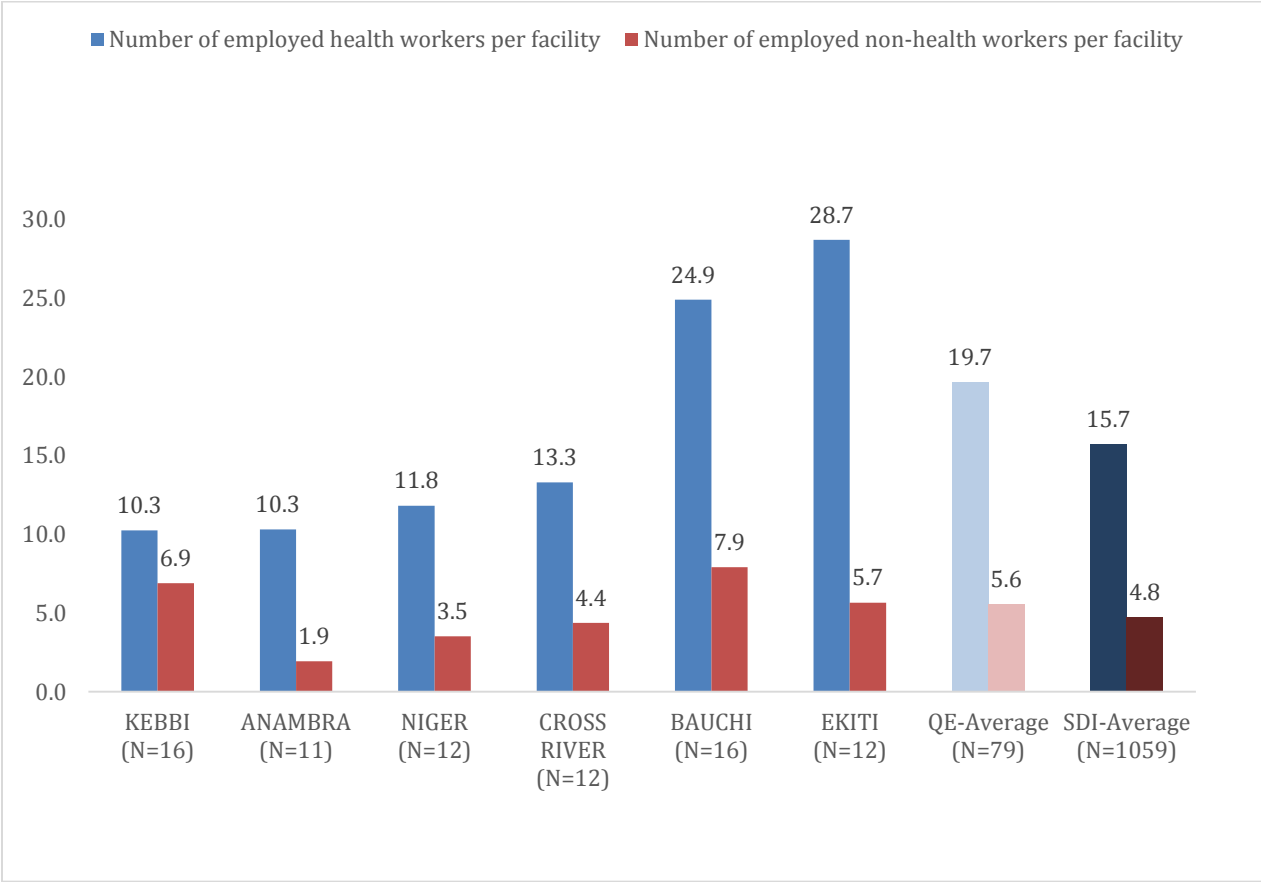
The following chart, Figure 14, shows the high turnover of midwives at Nigerian PHCs. The time that midwives spent working at PHCs is relatively short. The average is around 1 year, for both the QE group and the SURE-P clinics (11.6 and 11.8).



**Figure 14: Length of service of midwives at healthcare facilities (in months) (Source: SURE-P, 2013)**



Midwives and nurses are not the only medical personnel at PHCs. The workforce also includes community health extension workers, community health officers, lab technicians, pharmacists, dental technicians and others. The SDI survey provides statistics on the total number of health workers at the clinics. The data, Figure 15, shows that Ekiti and Bauchi have the most medical staff, with 28.7 and 24.9 respectively. Ekiti and Kebbi have the fewest staff, with 10.3 each.



**Figure 15: Average number of health and non-health workers per facility (Source: SDI, 2013)**

The SDI data, presented in

Table 15, contains information on the educational background of health workers. The data illustrates both the educational achievement, as well as medical degrees. Stark differences by state can be observed. The majority of health workers completed their schooling with a diploma or certificate (68 percent for QE; 70 percent for SDI). A significant portion of health workers possesses a secondary degree (24 percent and 22 percent respectively).

It appears that most health workers have the appropriate medical education for their assignment. However 14 percent of workers in the QE group and 16 percent in the SDI sample do not have any formal medical training. The level of medical education varies by state.

Almost everyone in Anambra and Kebbi underwent some kind of medical training. Yet, in Bauchi, 30 percent of medical professionals did not undergo training. This situation is also grim in Ekiti with ca. 16 percent of staff that has not been trained.

**Table 15: Education level and medical qualifications of health workers (Source: SDI, 2013)**

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	SDI-Average
<b>Educational level:</b>								
Primary	3%	5%	2%	5%	1%	1%	3%	3%
Secondary	26%	23%	7%	47%	2%	6%	24%	22%
Diploma/certificate	59%	70%	86%	43%	95%	90%	68%	70%
University and higher	12%	0%	5%	4%	1%	3%	3%	4%
Others	0%	3%	0%	2%	1%	0%	1%	1%
<b>Medical degrees:</b>								
Bachelor/Fellowship/General Practice/Certificate	5%	0%	0%	1%	0%	2%	1%	2%
Nursing/Midwife	57%	3%	19%	16%	11%	5%	16%	9%
Nurse/Midwife/Health educator	0%	3%	0%	0%	2%	1%	1%	1%
Junior CHEW/CHEW/CHO	36%	43%	60%	33%	49%	76%	46%	51%
Environment Health Officer/Assistant	1%	12%	1%	12%	24%	2%	10%	11%
Medical Laboratory Technician/Scientist/Bachelor of MLS	0%	7%	8%	2%	4%	5%	4%	3%
No formal medical training	0%	30%	7%	16%	2%	7%	14%	16%
Other	2%	2%	5%	19%	8%	3%	8%	8%

Next to lack of training and education, health worker absenteeism is another major challenge to achieve better human development outcomes in developing countries.<sup>16</sup> However, the SDI survey (see Table 16) shows that most absent workers had a good reason to be away from the clinic. About 3 percent of workers in both the QE group and the SDI sample were absent and not excused. This data is self-reported by the respondent, often the officer-in-charge of the clinic.

**Table 16: Distribution of reasons for absenteeism among health workers (Source: SDI, 2013)**

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	SDI-Average
Sick/maternity	8%	7%	13%	3%	9%	22%	8%	9%
In training/seminar	3%	20%	3%	4%	6%	11%	8%	8%

<sup>16</sup> See for example: Chaudhury et al., 2006.

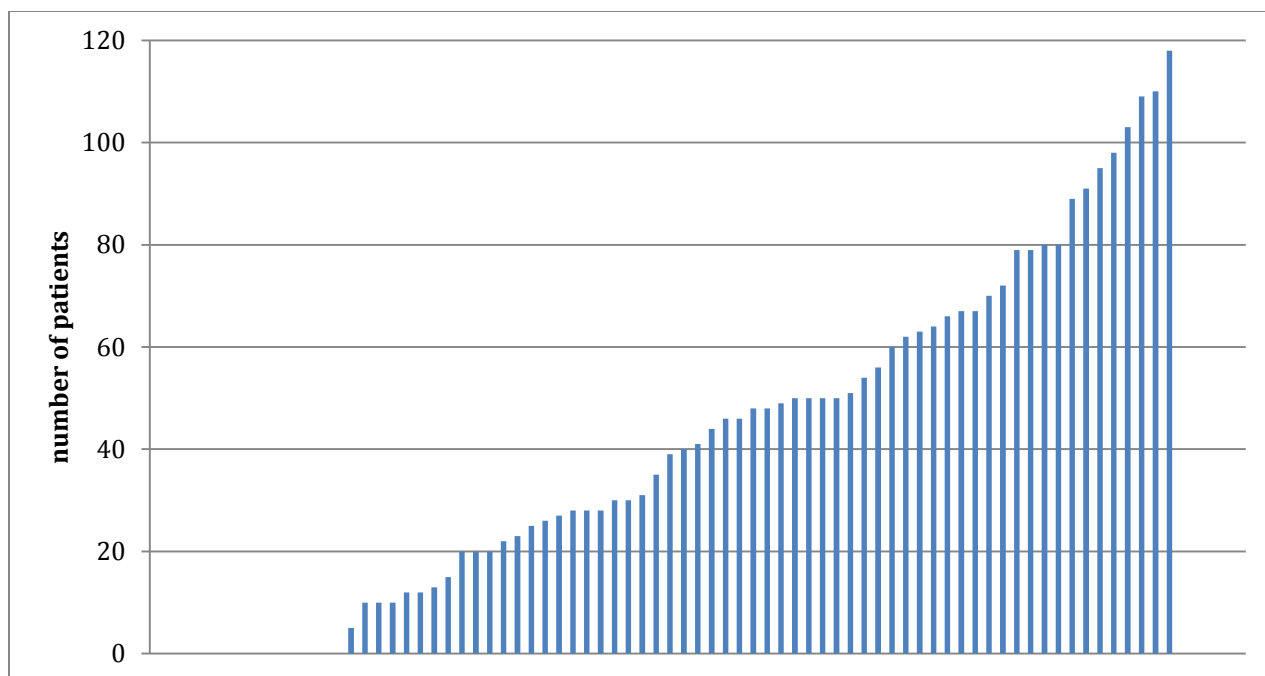
Official mission	9%	3%	7%	7%	12%	0%	6%	9%
Approved absence	6%	17%	16%	4%	30%	44%	15%	17%
Not his/her shift	74%	49%	45%	75%	27%	17%	56%	48%
Doing fieldwork or outreach work	0%	1%	5%	0%	3%	3%	2%	3%
Not approved absence	0%	4%	4%	2%	12%	0%	3%	3%
Gone to retrieve salary	0%	0%	3%	0%	0%	0%	0%	1%
On strike	0%	0%	0%	0%	0%	0%	0%	1%
Other	0%	0%	5%	4%	0%	3%	2%	1%

The following Table 17 describes the patient load for different services per state. Antenatal care services show some level of dispersion across states. Anambra has the highest case load with 58.4 cases in the month prior to the data collection. Bauchi has the least recorded cases, 20.0, while Niger and Kebbi have 28.5 and 36.3 ANC registered visits respectively that are below the QE average of 40.1 visits in the last month. The non-QE clinic average of 50.0 visits does not deviate greatly from the QE average. The number of delivered babies in QE facilities and non-QE facilities is comparable, too. Bauchi is in first place here, with 10.2 delivered babies in one month. In Niger state, on average only 3.4 babies were delivered in the PHCs. Also, the practice of delivering babies at home is more common in Bauchi, 10.0 deliveries in attendance of skilled staff were registered by the PHC in the month prior to the data collection. The non-QE national average for this indicator is only 2.7 and quite close to QE average of 3.4.

**Table 17: Number of patients listed in the register for the following services in the last month (whether treated in-facility or outside of facility) (Source: SURE-P, 2013)**

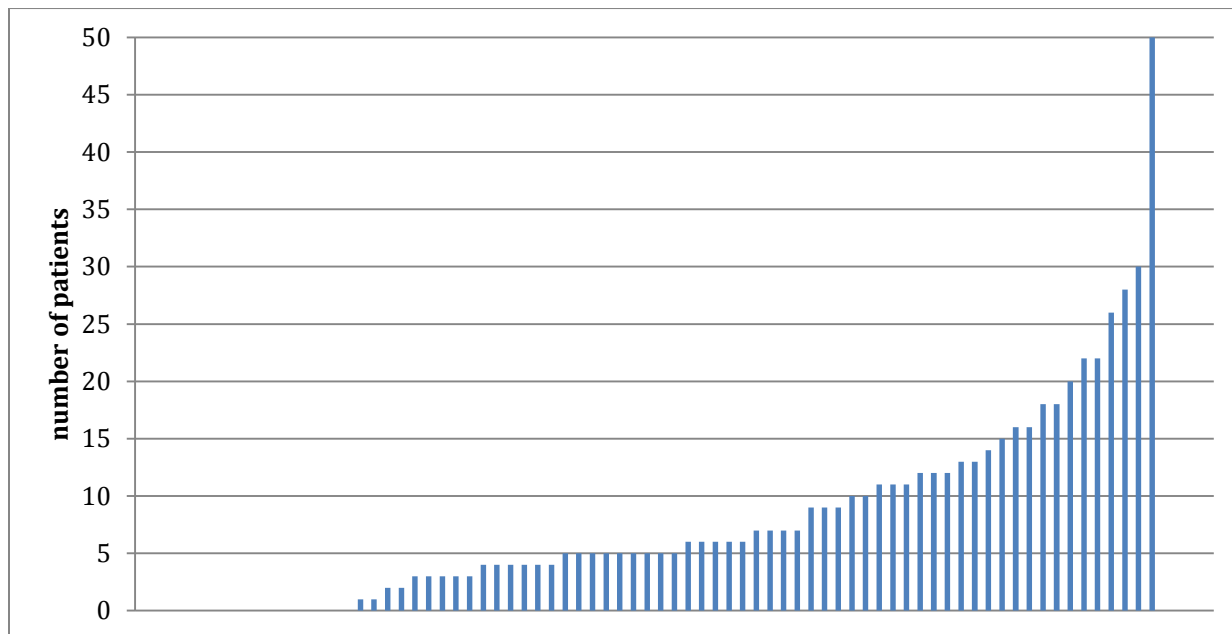
	Anambra	Bauchi	Cross river	Ekiti	Kebbi	Niger	QE-Average	Non-QE Average
Antenatal care	58.4	20.0	45.3	52.4	36.3	28.5	40.1	50.0
Delivery of babies in facility (any method)	8.8	10.2	8.7	5.3	7.1	3.4	7.2	8.6
Home delivery with skilled staff	0.5	10.0	0.0	0.0	3.9	4.14	3.4	2.7
Referral to another facility (ambulance ride)	0.0	2.2	1.4	0.0	3.8	0.1	1.7	1.7
Number of women discharged (sent home) last week after having given birth	4.1	5.8	1.9	4.4	3.8	3.5	4.0	3.6

The following two charts (Figure 16 and Figure 17) illustrate the patient load graphically. The four most frequented clinics see more than 100 patients each month for ANC visits.



**Figure 16: Number of patients listed in the register for antenatal care in the last month (Source: SURE-P, 2013)**

Delivery at the facility is much less common than the completion of ANC visits. While one clinic reaches 50 institutional births, most clinics record less than 20 births per month.



**Figure 17: Distribution of Number of Patients Listed in the Register for Delivery in Facility (Source: SURE-P, 2013)**

## Facility processes

One way to improve quality of care is to improve processes at the facility level or the way *how things are done*. Improving processes is one major component of the quality improvement exercise. The following sections illustrate some of these procedures at the facility level.

Some facilities conduct internal **staff assessments**. The average for all non-QE SURE-P facilities in Nigeria is 77 percent. The QE average is slightly lower with 68 percent. Ekiti (58 percent), Niger (58 percent), and Bauchi (44 percent) exhibit lower averages than the QE mean. Cross River shows exceptional results in this category with 100 percent of the clinics conducting these internal assessments.

Similarly, **patient feedback mechanisms** are available in 63 percent of the QE clinics and 68 percent of the SURE-P clinics. Bauchi and Cross River State perform poorly concerning this indicator with 19 percent and 33 percent respectively (Figure 18).

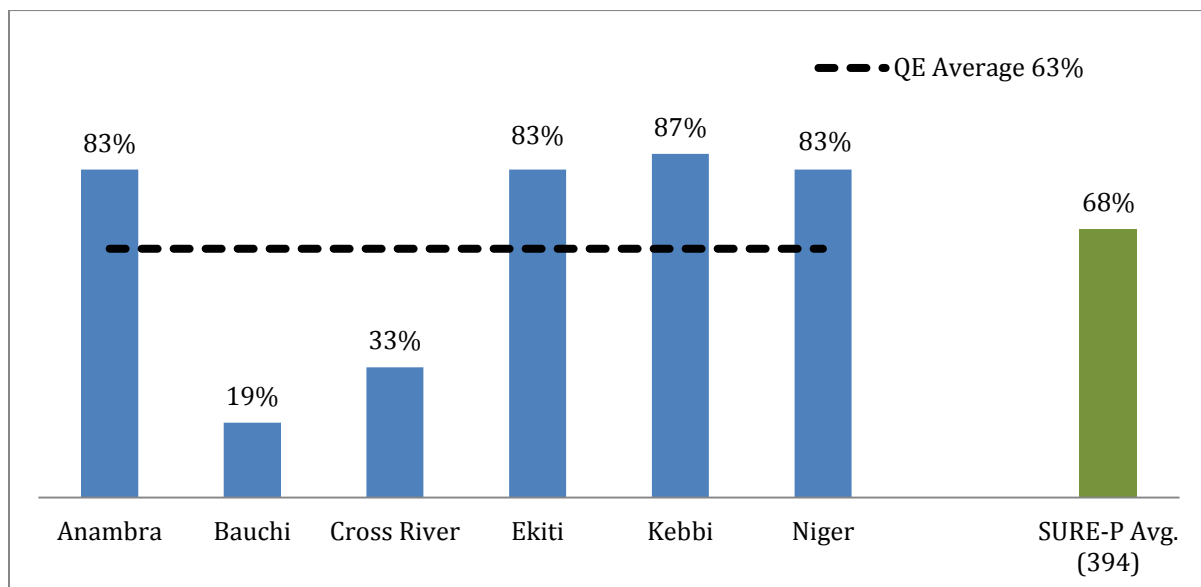
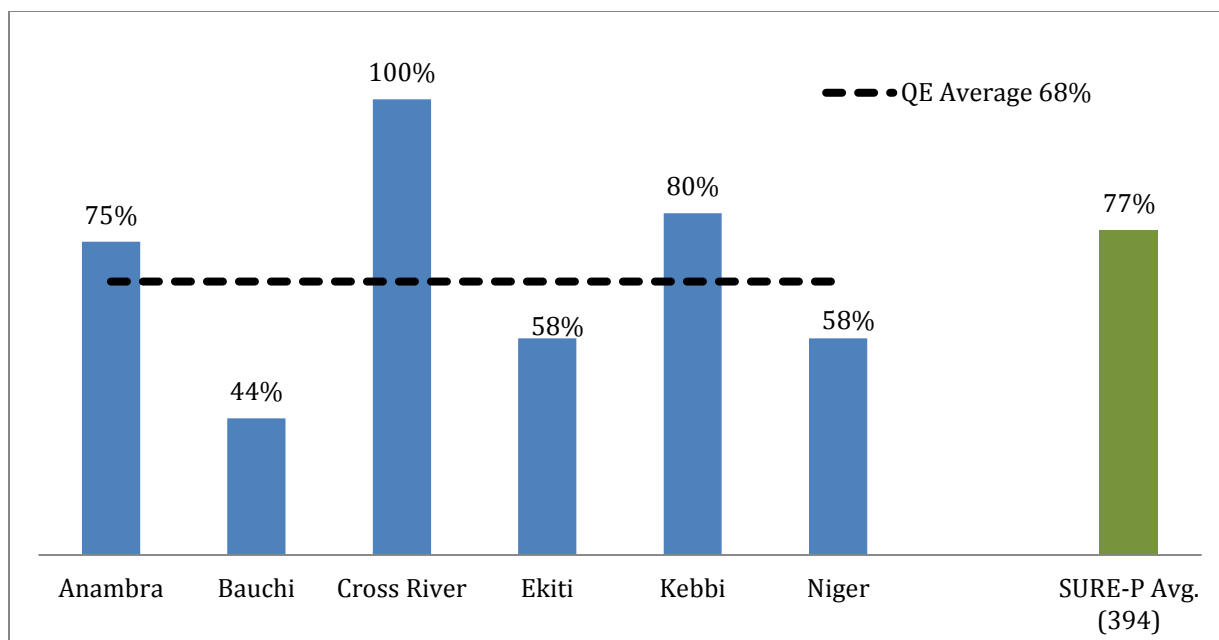
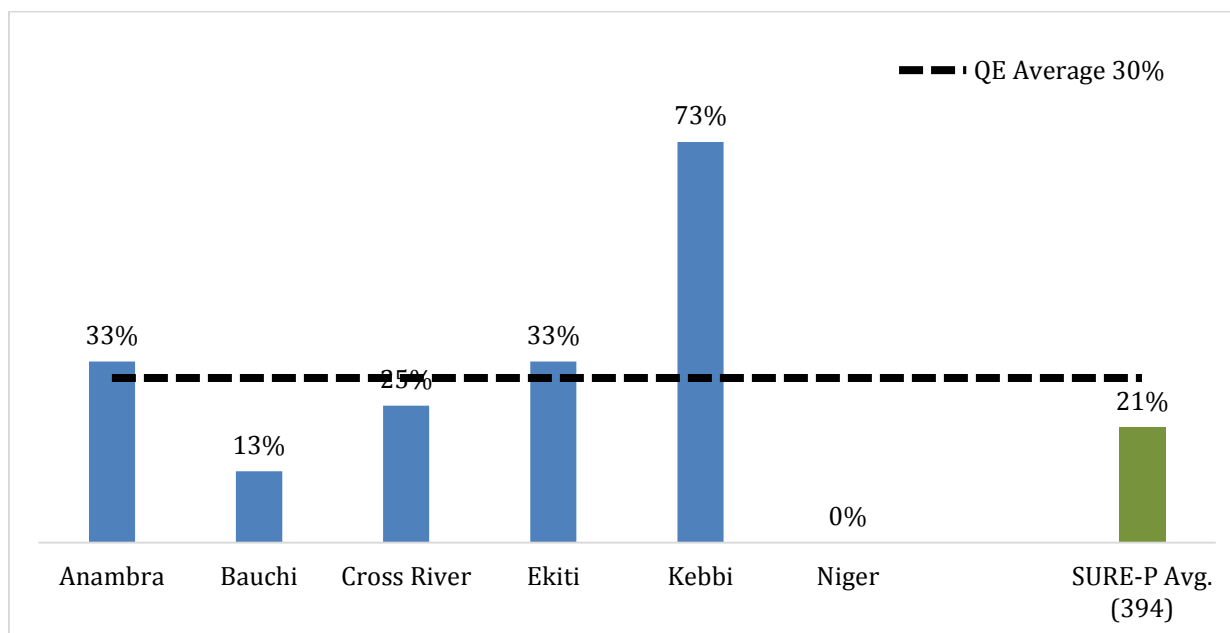


Figure 18: Percentage of facilities with patient feedback mechanisms (Source: SURE-P, 2013)



**Figure 19: Percentage of facilities with internal staff assessments in the past 12 months (Source: SURE-P, 2013)**

Figure 20, shows the percent of facilities that provide rewards for high performing staff. Kebbi is the highest performing state in regard to rewarding high performing staff. About 73 percent of the PHCs in Kebbi had such a system in place. This number is more than double than the QE average of 30 percent. In Niger, no clinic has such a system in place. The national non-QE average is 21 percent.



**Figure 20: Percent of facilities with rewards for staff who performed exceptionally well last year**

(Source: SURE-P, 2013)

The SURE-P survey also measured whether staff received training in critical skills like antenatal care, postnatal care, immunization and malaria ([Table 18](#)).

Kebbi is the state where the most facilities have staff that attended training on one or more of the topics mentioned above. For all four categories, Kebbi lies above both the QE and the SURE-P average. Bauchi has the poorest results with 56 percent for antenatal care, 44 percent for postnatal care, 63 percent for immunization, and 44 percent for malaria training. Facilities in Kebbi received the most training, 100 percent of the facilities held at least one training for immunization and malaria. 80 percent of the facilities received training in postnatal care and 87 percent in antenatal care. Figure 38, in the Annex illustrates this table graphically.

**Table 18: Percentage of facilities where staff received training in the past 12 months (Source: SURE-P, 2013)**

	Antenatal care	Postnatal care	Immunization	Malaria
<b>Anambra</b>	83%	75%	58%	33%
<b>Bauchi</b>	56%	44%	63%	44%
<b>Cross River</b>	83%	75%	67%	83%
<b>Ekiti</b>	58%	67%	92%	67%
<b>Kebbi</b>	87%	80%	100%	100%
<b>Niger</b>	75%	42%	83%	75%
<b>QE average</b>	73%	63%	77%	67%
<b>SURE-P average</b>	73%	63%	81%	78%

As shown in Figure 21, three quarters of clinics possess a separate area to store drugs (74 percent QE, 75 percent SURE-P). In Ekiti, 100 percent of the clinics have this distinct area, whereas in Bauchi only 50 percent of PHCs separate the drugs. In 97 percent of clinics this area can be locked to prohibit access by unauthorized persons. However, it is common that drug storage areas are locked by the in-charge in his/her absence, so that PHC staff does not have access to essential medication when it is needed.

In 97 percent of the clinics the drugs were protected from water and sunlight which is important to uphold the shelf-life of drugs. Stock cards or a stock register is kept for 82 percent of the clinics in the non-QE clinics and 68 percent of the clinics keep these records in the QE sample group.



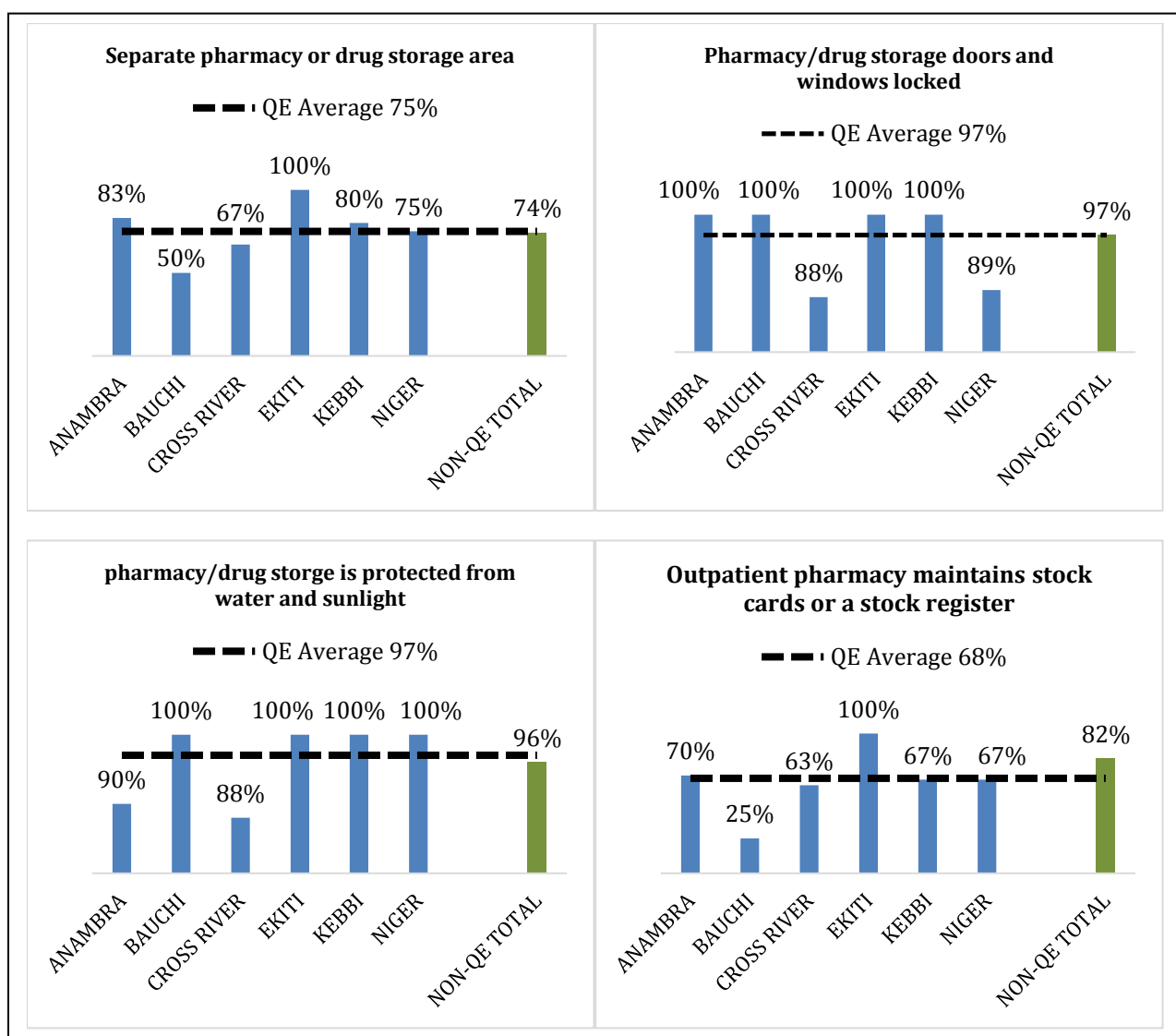
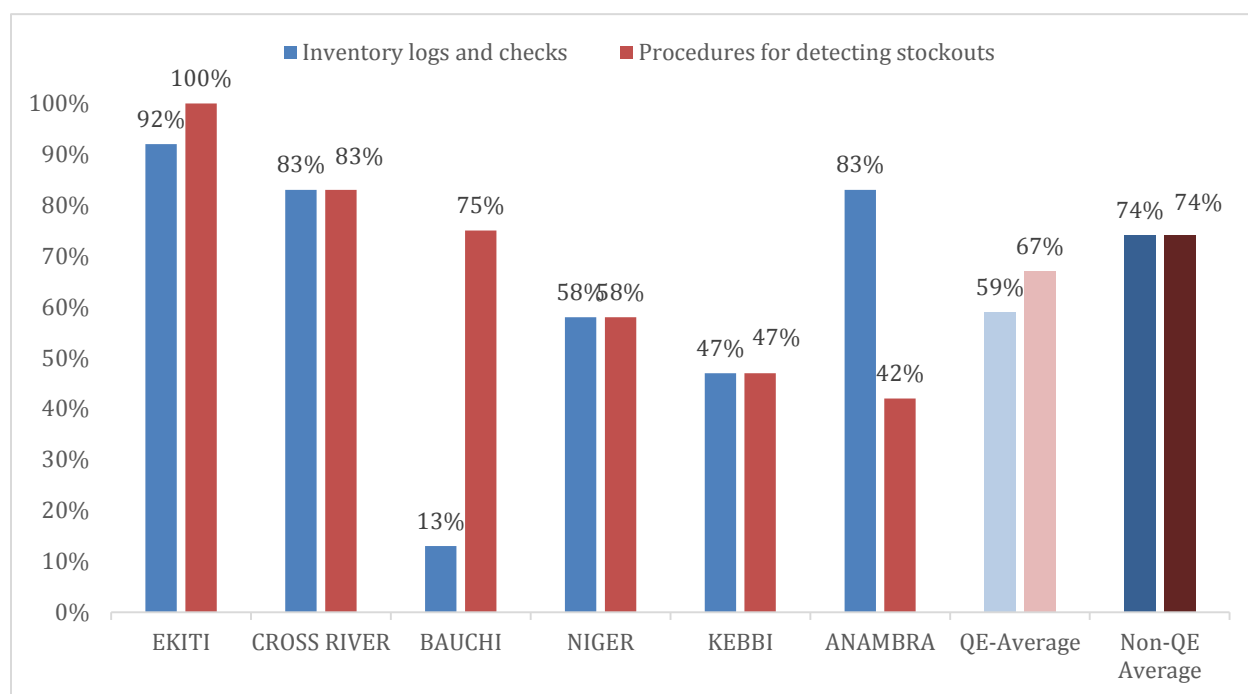


Figure 21: Percentage of facilities with pharmacy/drug storage characteristics (Source: SURE-P, 2013)

The prevalence of stockouts is a major problem for the delivery of high-quality health care in Africa. To prevent stockouts of essential drugs and vaccines, it is advisable to keep inventory logbooks and check and to institutionalize procedures for the timely detection of stockouts. The chart below, Figure 22, shows 74 percent of the non-QE group keeps inventory logs. The QE average is lower with 59 percent. In Bauchi, only 13 percent of the SURE-P clinics keep these logs. In Ekiti, on the contrary, 92 percent keep these logs. In Anambra and Cross River, inventory logs and checks are also common (83 percent respectively).



**Figure 22: Percentage of facilities with Inventory (Source: SURE-P, 2013)**

## 2.4 Availability of drugs

The SDI dataset also contains information on the availability of essential drugs for women (Figure 23) and children (Figure 24) at the PHC. A general pattern that can be observed is that the QE subgroup on average has more drugs available than other PHCs in the SDI sample (both public and private).

For Misoprostol, for example, a drug that is being used to induce labor, the availability for the QE group is 48 percent. In the SDI group excluding the SURE-P facilities, the average is only 9 percent. A similar pattern is visible for injectable Oxytocin, which is used for the same purpose. The SDI average is lower than the QE average with 33 percent compared to 52 percent. Kebbi is the only state with percentages that lie below the average for the QE group (38 percent for Misoprostol; 19 percent for Oxytocin).

Anambra and Ekiti reach a perfect score in providing folic acid and iron supplements. The QE average of availability is relatively high for these drugs with 75 and 82 percent respectively. Niger, Kebbi and Bauchi have averages below the QE average.

For drugs (Figure 24) primarily targeted to treat conditions of children, similar patterns emerge. For oral rehydration salts (ORS), Ekiti shows a perfect coverage of 100 percent availability. Kebbi (38 percent) and Cross River (17 percent) are at the bottom of the dis-

tribution. In Kebbi, only 6 percent of clinics have Amoxilin, an important antibiotic, in stock. This rate is 92 percent for clinics in Ekiti. The QE average is 56 percent which compares favorably to the SDI average of 36 percent.

Overall the data shows that Anambra and Ekiti have the highest rates of availability and Kebbi ranks at the bottom of the list. Cross River, Niger and Bauchi rank in the middle.

QE clinics are in all instances better equipped than their SDI counterparts. The gap between QE SURE-P clinics and SDI clinics is especially high for Misoprostol and Magnesium sulfate for mothers. The gap is smaller for drugs for children but this is mainly due to the rather disappointing levels of availability of these drugs also for the QE group.

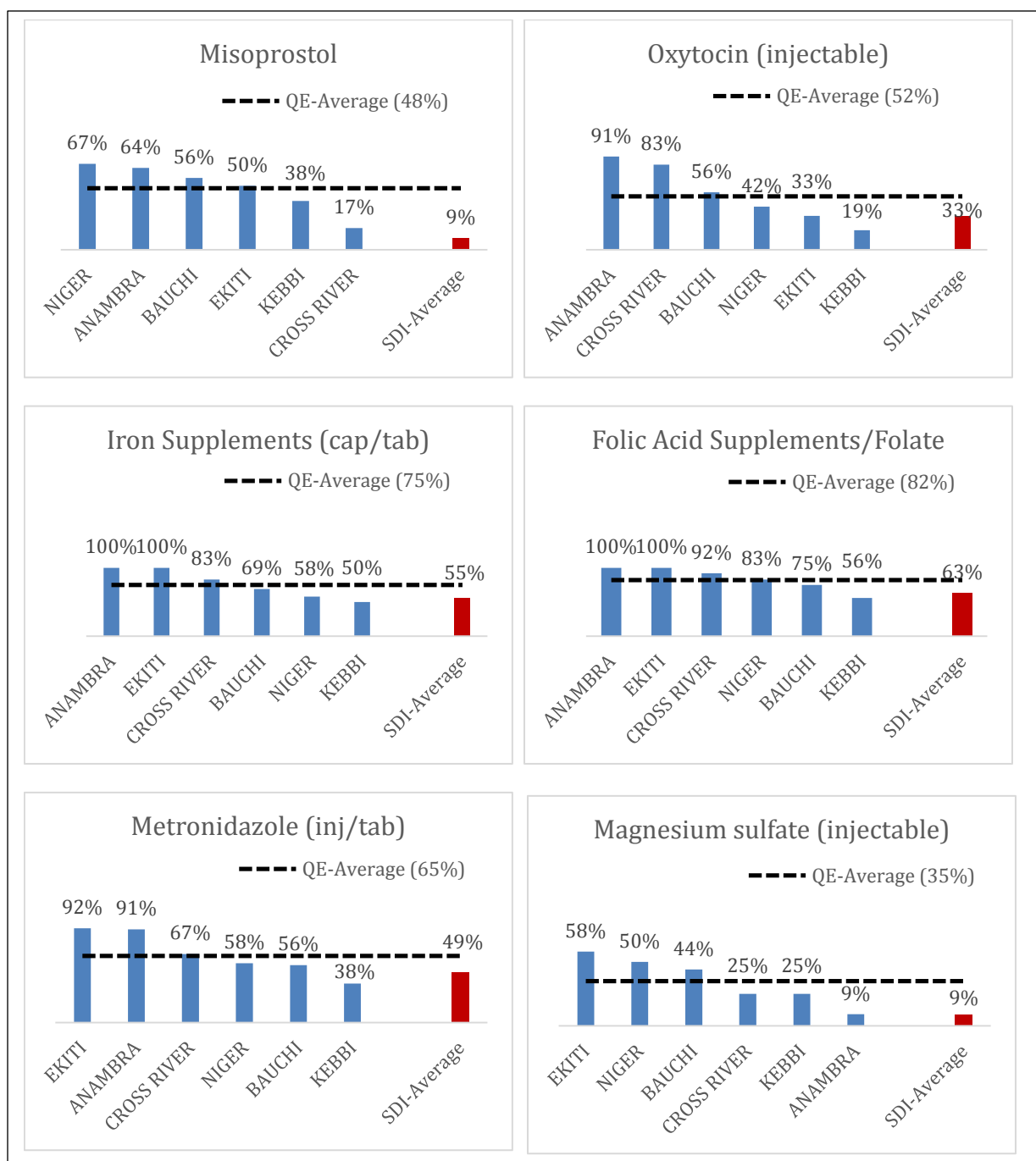
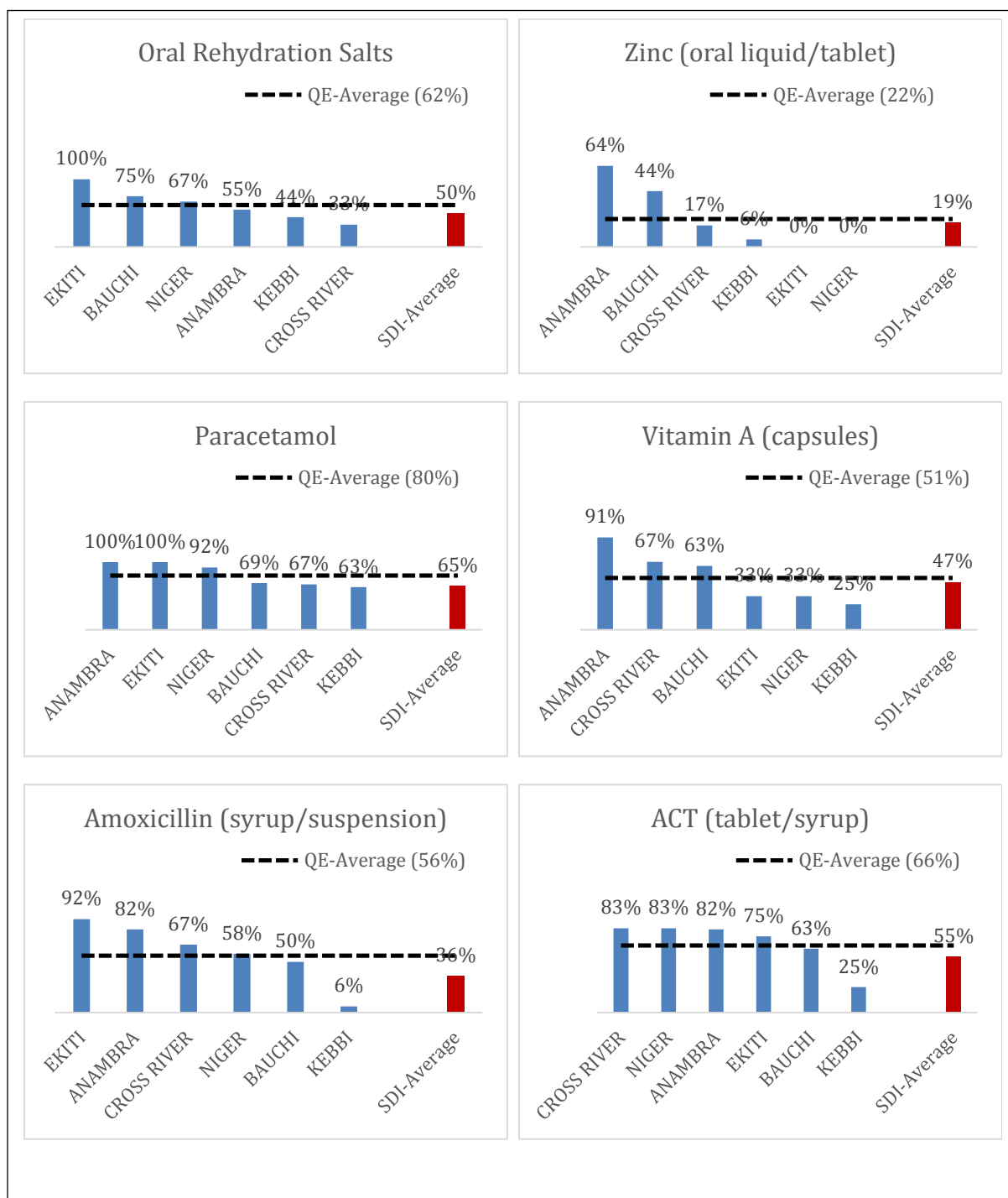


Figure 23: Availability of non-expired essential drugs for women (Source: SDI, 2013)



**Figure 24: Availability of non-expired essential drugs for children (Source: SDI, 2013)**

## 2.5 Provider knowledge

Provider knowledge is a key constraint for high quality healthcare in developing countries. The SDI tool tested provider knowledge by administering medical vignettes. Vignettes measure provider competence regarding particular medical cases. An enumerator is trained as a sick person and presents her case to the provider. The enumerator follows a script based on the questions of the provider. Afterwards, the enumerator takes notes on what happened during the interaction.

The SDI tested five hypothetical cases, which are common for the work of PHCs and clinics:<sup>17</sup>

- Malaria paired with anemia
- Diabetes mellitus (Type II)
- Pulmonary tuberculosis
- Pneumonia
- Acute Diarrhea with severe dehydration

The SDI summarizes the outcomes in three steps; (a) whether the caregiver asks questions about the medical history, (b) whether relevant examination questions were asked by the caregiver, and (c) whether the correct diagnosis was given. The Table 19, below shows the outcomes for the correctness of the diagnosis for the five cases. We see that the outcomes are dismal across the board. Providers had the most problems to diagnose pulmonary tuberculosis and acute diarrhea. For the QE group, tuberculosis was diagnosed correctly in only 30 percent of the presented cases and diarrhea in 31 percent of cases. This matches the SDI average, with 28 percent and 32 percent respectively.

Malaria with anemia was diagnosed most successfully. The SDI average is 74 percent and the QE average is 69 percent for the correct diagnosis. That means that 26 percent of the cases are still not correctly diagnosed, which is likely a contributing factor to the more than 300,000 annual deaths that the WHO links to malaria.<sup>18</sup>

**Table 19: Percentage of clinicians who gave correct diagnosis (Source: SDI, 2013)**

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	NON-QE-Average
Malaria with Anemia	77%	53%	62%	79%	69%	71%	69%	74%
Diabetes Mellitus (Type II)	70%	74%	40%	55%	80%	81%	66%	59%

<sup>17</sup> Numbers of assessed providers by state: Anambra (35), Bauchi (35), Cross River (47), Ekiti (53), Kebbi (61), Niger (31), QE sample (262), Other SDI clinics (2033).

<sup>18</sup> WHO 2013: [http://www.who.int/malaria/publications/country-profiles/profile\\_nga\\_en.pdf](http://www.who.int/malaria/publications/country-profiles/profile_nga_en.pdf)

Pneumonia	51%	62%	35%	30%	49%	68%	47%	39%
Acute Diarrhea with Severe Dehydration	26%	34%	30%	34%	36%	16%	31%	32%
Pulmonary Tuberculosis	40%	30%	28%	40%	25%	19%	30%	28%
<b>Number of clinicians tested</b>	<b>35</b>	<b>35</b>	<b>47</b>	<b>53</b>	<b>61</b>	<b>31</b>	<b>262</b>	<b>2033</b>

The chart, Figure 25, below shows summary statistics for all 5 cases. It is observable that caregivers arrive at the correct diagnosis approximately half the time. The QE average is 49 percent. However, the percentage of relevant questions asked on the patient's medical history and the percentage of relevant exams undertaken is much lower. Here, the average is 22 percent for questions on medical history and 20 percent for relevant exams. These numbers are comparable to the SDI group. This could indicate that the many of the diagnoses are guesses by the clinical personnel based on very few indications, guesswork, and not a full check of the patient.

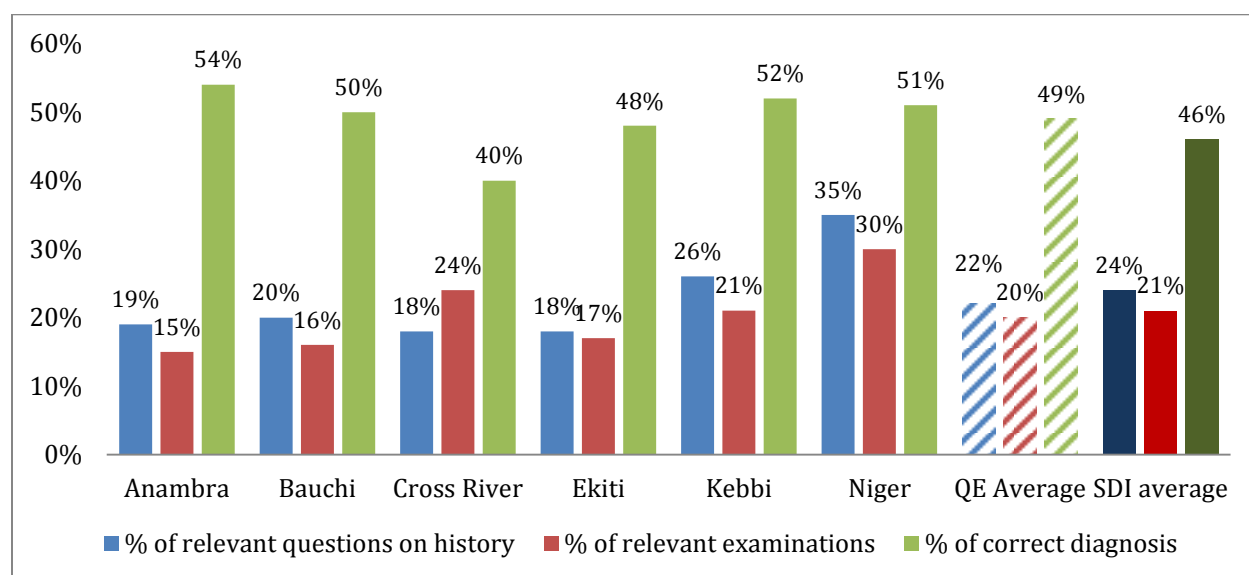


Figure 25: Information on vignettes (Source: SDI, 2013)

### 3. Baseline checks

#### Randomization results

The 80 SURE-P facilities that are part of this study were randomly allocated into three treatment arms: treatment arm A, treatment arm B, and the control group. Please see the Table 20, below for the results of the randomization process.

**Table 20: SURE-P facilities per state and random allocation into treatment groups**

	<b>Total # of facilities</b>	<b>Treatment A</b>	<b>Treatment B</b>	<b>Control</b>
<i>Anambra</i>	12	5	4	3
<i>Bauchi</i>	16	4	5	7
<i>Cross River</i>	12	3	3	6
<i>Ekiti</i>	12	4	4	4
<i>Kebbi</i>	16	4	4	8
<i>Niger</i>	12	4	4	4
<b>Total</b>	<b>80</b>	<b>24</b>	<b>24</b>	<b>32</b>

After completing the randomization, the statistical balance of treatment and control groups was tested. Since all available SURE-P PHCs in the 6 states are subject to this study (n=N), a permutation test (or “exact test”) was performed to check if balance between the groups has successfully been achieved through randomization (Butar and Park, 2008).

Tables 19-21 present PHC facilities’ basic characteristics including respondents, personnel shifts, infrastructure, working conditions, human resources and patient records. We compare the Treatment A with the control group (Table 21), Treatment B with the control group (

Table 22), and Treatment A and Treatment B respectively (

Table 23).

In a “census” like this it is incorrect to assume a normal distribution and simply use t-tests to check balance. In addition, due to the relatively small sample size the t-tests might reject the null less often than it should because of lack of power. Although results from a simple t-test are still reported, balance is also checked through two non-parametric tests: the Fisher’s Exact Test (p-values in column 4) and the Wilcoxon rank-sum test (p-value in column 5). Permutations of the three tests (p-values in column (6) – (8) are exploited by generating a reference distribution by recalculating p-values 1000 times. We observe that differences are not significant using t-tests, Fisher’s exact tests, and Wilcoxon Ranksum tests with 1000 permutations.





Table 21: Balance test between Treatment A and Control facilities (Source: SURE-P, 2013)

Treatment A vs. Control								
	(1) Mean	(2)	(3) non-Permutation	(4) Tests	(5)	(6)	(7)	(8)
	Control	Treatment A	T-test	Exact	Ranksum	T-test	Exact	Ranksum
<i>Panel A: Respondent</i>								
age	43.32	45.29	0.300	0.344	0.377	0.346	0.703	0.373
gender	0.48	0.63	0.306	0.414	0.302	0.298	0.700	0.298
<i>Panel B: Facility Characteristics</i>								
% having 24 hours shift rotation	0.77	0.92	0.162	0.271	0.160	0.142	0.815	0.145
% having at least one midwife per shift	0.65	0.83	0.125	0.141	0.124	0.126	0.886	0.127
% having a reception/registration room	0.61	0.71	0.470	0.571	0.465	0.452	0.539	0.466
number of observation beds	3.13	2.3	0.151	0.573	0.216	0.139	0.445	0.218
distance to the referral hospital (km)	5	4.96	0.955	0.489	0.805	0.962	0.498	0.809
number of days with no electricity/light at all during the last week	21.9	16.48	0.291	0.903	0.276	0.301	0.102	0.292
% having transportation for patients	0.1	0.13	0.745	1.000	0.741	0.773	0.323	0.792
<i>Panel C: Working Condition</i>								
number of staff meeting in the past 12 months	10.77	7.61	0.273	0.185	0.412	0.221	0.816	0.428
% having developed a facility work plan for this year	0.55	0.43	0.412	0.577	0.407	0.388	0.587	0.392
% having a WDC supervisor	0.97	0.88	0.196	0.307	0.193	0.188	0.782	0.237
% having a patients feedback mechanism	0.68	0.58	0.481	0.575	0.476	0.500	0.525	0.503
% having a staff reward system	0.42	0.21	0.102	0.148	0.101	0.098	0.881	0.105
<i>Panel D: Human Resources</i>								
number of staff qualified as midwife and nurse	1.97	3.08	0.070	0.254	0.069	0.098	0.759	0.068
number of staff qualified as midwife only	0.84	0.5	0.419	0.982	0.799	0.370	0.035	0.790
number of staff qualified as nurse only	0.45	0.38	0.745	0.312	0.945	0.707	0.702	0.936
number of health workers	14	12.17	0.340	0.087	0.112	0.283	0.925	0.106
<i>Panel E: Patients</i>								
number of women discharges last week after having given birth	3.94	3.61	0.719	0.058	1.000	0.754	0.939	1.000
number of registered cases of antenatal care	40.38	73.22	0.238	0.242	0.658	0.181	0.765	0.645
number of registered cases of deliveries	12.87	8.52	0.389	0.175	0.836	0.338	0.839	0.829

Note: Nigeria SURE-P MCH Survey Data

Column (1) and (2) present the mean of the indicated group.

Column (3) presents p-values from simple T-tests with null hypothesis Treatment A (mean) = Control (mean)

Column (4) and (5) present p-values from Fisher's Exact Tests (Exact) and Wilcoxon Ranksum Tests.

Column (6), (7) and (8) are p-values from permuted T-tests, Fisher's Exact Tests and Wilcoxon Ranksum Tests with 1000 times of repetition.

permutation p-value=number of cases with absolute difference value  $\geq$  |diff| (real observed one) / number of random permutations performed (reps(1000))

Table 22: Balance test between Treatment B and Control facilities (Source: SURE-P, 2013)

	(1) Mean <i>Control</i>	(2) <i>Treatment B</i>	(3) non-Permutation <i>T-test</i>	(4) Exact	(5) Tests <i>Ranksum</i>	(6) Permutation Tests <i>T-test</i>	(7) Exact	(8) Tests <i>Ranksum</i>
<i>Panel A: Respondent</i>								
age	43.32	43.26	0.977	0.812	0.680	0.972	0.224	0.673
gender	0.48	0.54	0.678	0.787	0.674	0.708	0.322	0.708
<i>Panel B: Facility Characteristics</i>								
% having 24 hours shift rotation	0.77	0.92	0.162	0.271	0.160	0.150	0.808	0.155
% having at least one midwife per shift	0.65	0.75	0.413	0.558	0.408	0.380	0.515	0.409
% having a reception/registration room	0.61	0.67	0.688	0.781	0.684	0.699	0.301	0.716
number of observation beds	3.13	2.74	0.526	0.317	0.619	0.475	0.692	0.590
distance to the referral hospital (km)	5	4.5	0.511	0.580	0.401	0.502	0.406	0.398
number of days with no electricity/light at all during the last week	21.9	18.35	0.512	0.903	0.369	0.487	0.115	0.384
% having transportation for patients	0.1	0.08	0.867	1.000	0.865	0.870	0.376	0.873
<i>Panel C: Working Condition</i>								
number of staff meeting in the past 12 months	10.77	5.33	0.053	0.656	0.029	0.023	0.349	0.031
% having developed a facility work plan for this year	0.55	0.5	0.714	0.786	0.710	0.732	0.266	0.732
% having a WDC supervisor	0.97	1	0.384	1.000	0.379	0.570	0.444	0.379
% having a patients feedback mechanism	0.68	0.63	0.692	0.778	0.688	0.706	0.379	0.712
% having a staff reward system	0.42	0.25	0.197	0.256	0.194	0.182	0.777	0.204
<i>Panel D: Human Resources</i>								
number of staff qualified as midwife and nurse	1.97	2.75	0.239	0.298	0.396	0.233	0.715	0.380
number of staff qualified as midwife only	0.84	0.5	0.404	0.574	0.983	0.389	0.444	0.985
number of staff qualified as nurse only	0.45	0.13	0.130	0.391	0.147	0.112	0.647	0.164
number of health workers	14	10.08	0.013	0.340	0.010	0.020	0.639	0.013
<i>Panel E: Patients</i>								
number of women discharges last week after having given birth	3.94	4.42	0.669	0.139	0.674	0.644	0.862	0.689
number of registered cases of antenatal care	40.38	36.04	0.625	0.489	0.331	0.887	0.520	0.353
number of registered cases of deliveries	12.87	5.35	0.131	0.987	0.222	0.055	0.014	0.216

Note: Nigeria SURE-P MCH Survey Data

Column (1) and (2) present the mean of the indicated group.

Column (3) presents p-values from simple T-tests with null hypothesis Treatment B (mean) = Control (mean)

Column (4) and (5) present p-values from Fisher's Exact Tests (Exact) and Wilcoxon Ranksum Tests.

Column (6), (7) and (8) are p-values from permuted T-tests, Fisher's Exact Tests and Wilcoxon Ranksum Tests with 1000 times of repetition.

permutation p-value=number of cases with absolute difference value  $\geq |\text{diff}|$  (real observed one) /number of random permutations performed (reps(1000))

Table 23: Balance test between Treatment A and Treatment B facilities (Source: SURE-P, 2013)

Treatment A vs. Treatment B								
	(1) Mean <i>Treatment A</i>	(2) <i>Treatment B</i>	(3) non-Permutation <i>T-test</i>	(4) <i>Exact</i>	(5) Tests <i>Ranksum</i>	(6) Permutation Tests <i>T-test</i>	(7) <i>Exact</i>	(8) Tests <i>Ranksum</i>
<i>Panel A: Respondent</i>								
age	45.29	43.26	0.391	0.941	0.741	0.370	0.071	0.751
gender	0.63	0.54	0.568	0.770	0.562	0.602	0.450	0.559
<i>Panel B: Facility Characteristics</i>								
% having 24 hours shift rotation	0.92	0.92	1.000	1.000	1.000	1.000	0.365	1.000
% having at least one midwife per shift	0.83	0.75	0.488	0.724	0.482	0.581	0.503	0.512
% having a reception/registration room	0.71	0.67	0.762	1.000	0.758	0.814	0.252	0.776
number of observation beds	2.3	2.74	0.394	0.933	0.391	0.498	0.075	0.410
distance to the referral hospital (km)	4.96	4.5	0.541	0.460	0.536	0.546	0.552	0.511
number of days with no electricity/light at all during the last week	16.48	18.35	0.702	0.338	0.956	0.720	0.709	0.961
% having transportation for patients	0.13	0.08	0.645	1.000	0.640	0.707	0.442	0.703
<i>Panel C: Working Condition</i>								
number of staff meeting in the past 12 months	7.61	5.33	0.124	0.194	0.162	0.415	0.807	0.150
% having developed a facility workplan for this year	0.43	0.5	0.663	0.772	0.658	0.674	0.321	0.652
% having a WDC supervisor	0.88	1	0.076	0.234	0.077	0.089	0.968	0.062
% having a patients feedback mechanism	0.58	0.63	0.774	1.000	0.770	0.812	0.299	0.804
% having a staff reward system	0.21	0.25	0.738	1.000	0.734	0.799	0.300	0.711
<i>Panel D: Human Resources</i>								
number of staff qualified as midwife and nurse	3.08	2.75	0.669	0.167	0.433	0.655	0.838	0.446
number of staff qualified as midwife only	0.5	0.5	1.000	0.836	0.782	1.000	0.206	0.771
number of staff qualified as nurse only	0.38	0.13	0.152	0.319	0.127	0.273	0.711	0.137
number of health workers	12.17	10.08	0.178	0.395	0.586	0.237	0.649	0.567
<i>Panel E: Patients</i>								
number of women discharges last week after having given birth	3.61	4.42	0.487	0.692	0.723	0.461	0.333	0.715
number of registered cases of antenatal care	73.22	36.04	0.240	0.504	0.295	0.135	0.576	0.308
number of registered cases of deliveries	8.52	5.35	0.109	0.295	0.127	0.567	0.692	0.135

Note: Nigeria SURE-P MCH Survey Data

Column (1) and (2) present the mean of the indicated group.

Column (3) presents p-values from simple T-tests with null hypothesis Treatment A (mean) = Treatment B (mean)

Column (4) and (5) present p-values from Fisher's Exact Tests (Exact) and Wilcoxon Ranksum Tests.

Column (6), (7) and (8) are p-values from permuted T-tests, Fisher's Exact Tests and Wilcoxon Ranksum Tests with 1000 times of repetition.

permutation p-value=number of cases with absolute difference value  $\geq$  |diff| (real observed one) /number of random permutations performed (reps(1000))

#### **4. SafeCare assessments**

As part of the QI-CGI, the private healthcare management consulting firm “SafeCare” assessed 48 clinics in the 6 project states along 823 indicators. The indicators are grouped in these 13 broad categories:

1. Management & Leadership
2. Human Resource Management
3. Patient Rights & Access to Care
4. Management of Information
5. Risk Management
6. Primary Health Care Services
7. In-patient Care
8. Operating Theatre & Anesthetics
9. Laboratory Services
10. Diagnostic Imaging services
11. Medication Management
12. Facility Management Services
13. Support Services

#### **Applicable indicators & overview**

During the initial SafeCare assessment, an assessor visits the clinic for a day in order to observe the compliance level with pre-defined indicators set out by SafeCare.

Not all indicators are applicable to all clinics. This is due to the fact that the indicators are standardized to be utilized for all kinds of clinics, larger and smaller. For all applicable indicators, a clinic receives a (subjective) score of either fully compliant (FC), partially compliant (PC), or not compliant (NC). SafeCare furthermore distinguishes the relative importance of indicators in different groups: very serious, serious, moderate, and mild.

Overall, 39,504 individual judgments were made by SafeCare assessors for the 48 clinics (823\*48).

Figure 27 shows the compliance status for all indicators across all clinics. Partial compliance is achieved in 23 percent of the cases. 35 percent of all indicators are not being complied with at the moment of the assessment. In only 9 percent of indicators were judged as fully compliant. The compliance rate for the most important indicators, the “critical indicators” is much lower than for the non-critical indicators.

We also see that 33 percent of the assessed items were not applicable to the respective clinics. A probable reason for this discrepancy is that the SafeCare assessment tool might be

more appropriate for further developed clinics at the secondary level (e.g. assessing operating theatres).

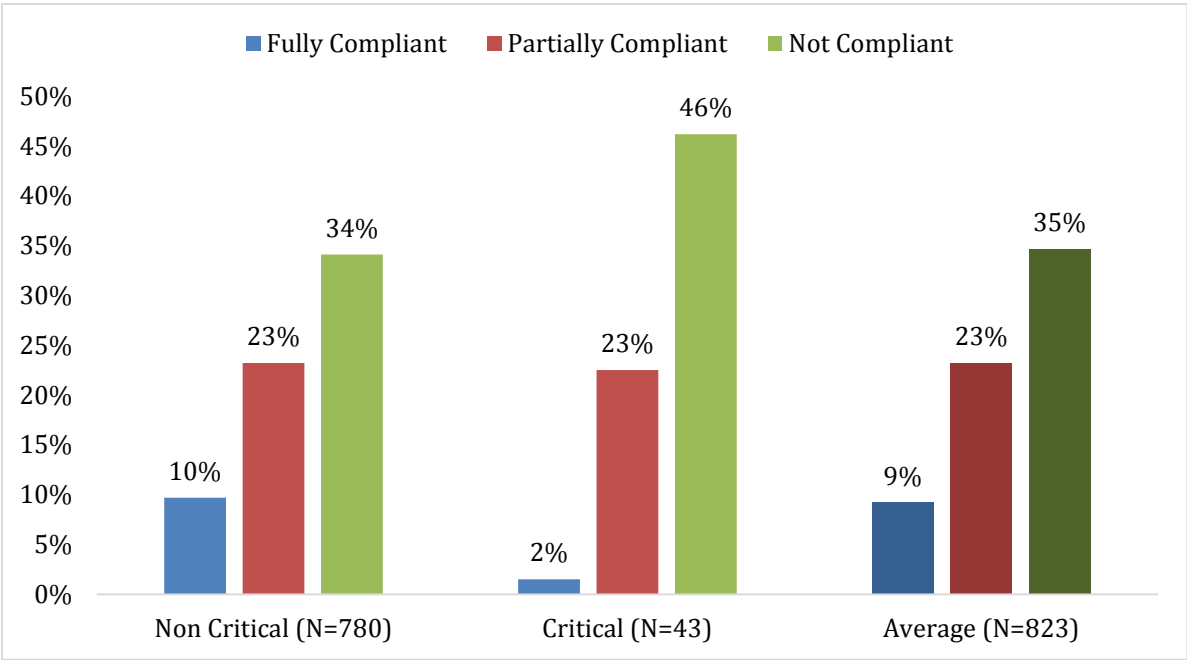


Figure 26: Distribution of SafeCare indicators by critical nature (Source: SafeCare Baseline Assessment, 2014)

The subsequent chart, Figure 27, illustrates the same data with the *exception* that the cases of “not applicable” were dropped from the analysis. This reduces the number of applicable judgments to 26,523. The result is that full compliance was reached in 14 percent of cases and partial compliance in 34 percent of cases. However, for the majority (52 percent) of indicators, compliance was not reached at all.

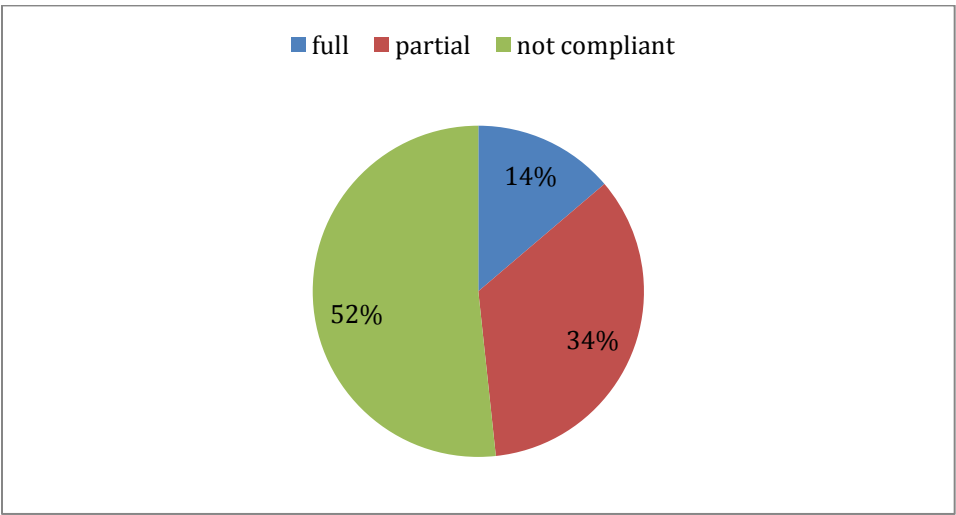
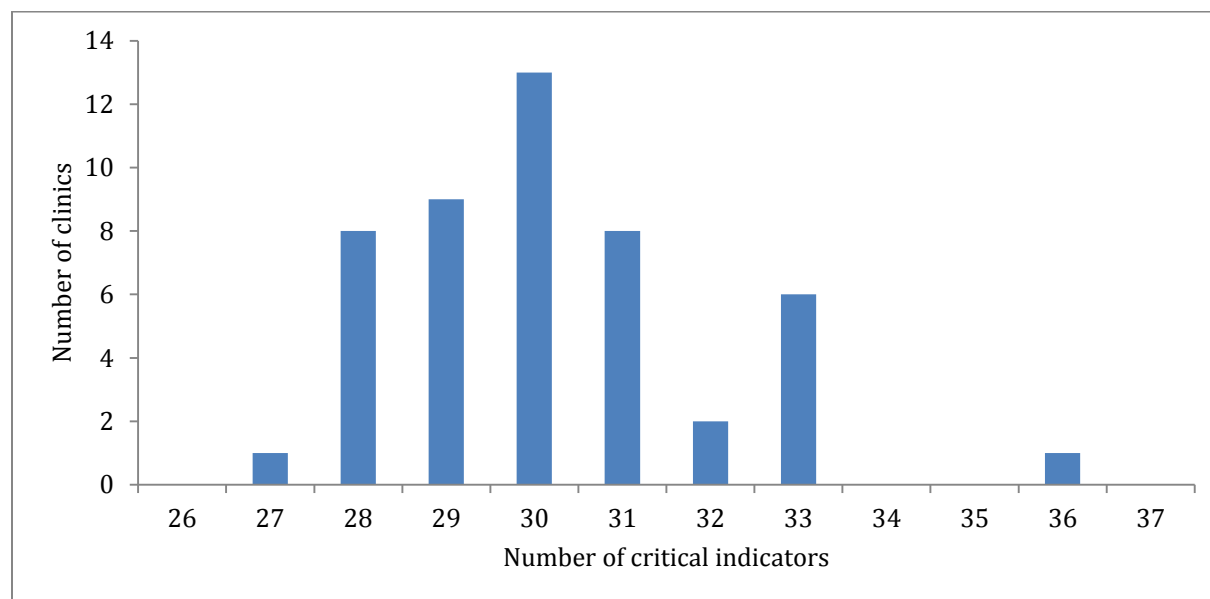


Figure 27: Percentage distribution of compliance with SafeCare applicable indicators (N=26523) (Source: SafeCare Baseline Assessment, 2014)

Of the 823 indicators that are being assessment during the SafeCare baseline assessment, 43 are being considered as “critical” by the management consulting firm. All these 43 variables also received the SafeCare rating “very serious”. However, as with the other non-critical indicators, not all of these indicators are applicable to all clinics. The chart (Figure 28), below illustrates the distribution of **applicable critical indicators** among the 48 clinics.



**Figure 28: Distribution of number of applicable critical indicators (Source: SafeCare Baseline Assessment, 2014)**

The modal value here is 30 out of 43 (70%) with a high of 36 applicable indicators and a low of 27 critical indicators. This shows that not all critical indicators are applicable across the facilities.

## SafeCare scores

SafeCare calculates its scores the following way: For each indicator the clinic receives a score based on “severity” of the indicator and their compliance status, following this scale in Table 24:

**Table 24: Safecare scoring rule (Source: Safecare, 2011<sup>19</sup>)**

Compliance status	Score
Fully compliant	1.00
Partially compliant (mild)	0.75
Partially compliant (moderate)	0.65
Partially compliant (serious)	0.55
Partially compliant (very serious)	0.45

<sup>19</sup> Safecare. 2011. Standards for *Clinics/Health Centres in Resource Restricted Settings in Africa, 1st Edition 2011*. <http://goo.gl/xkBsNF>

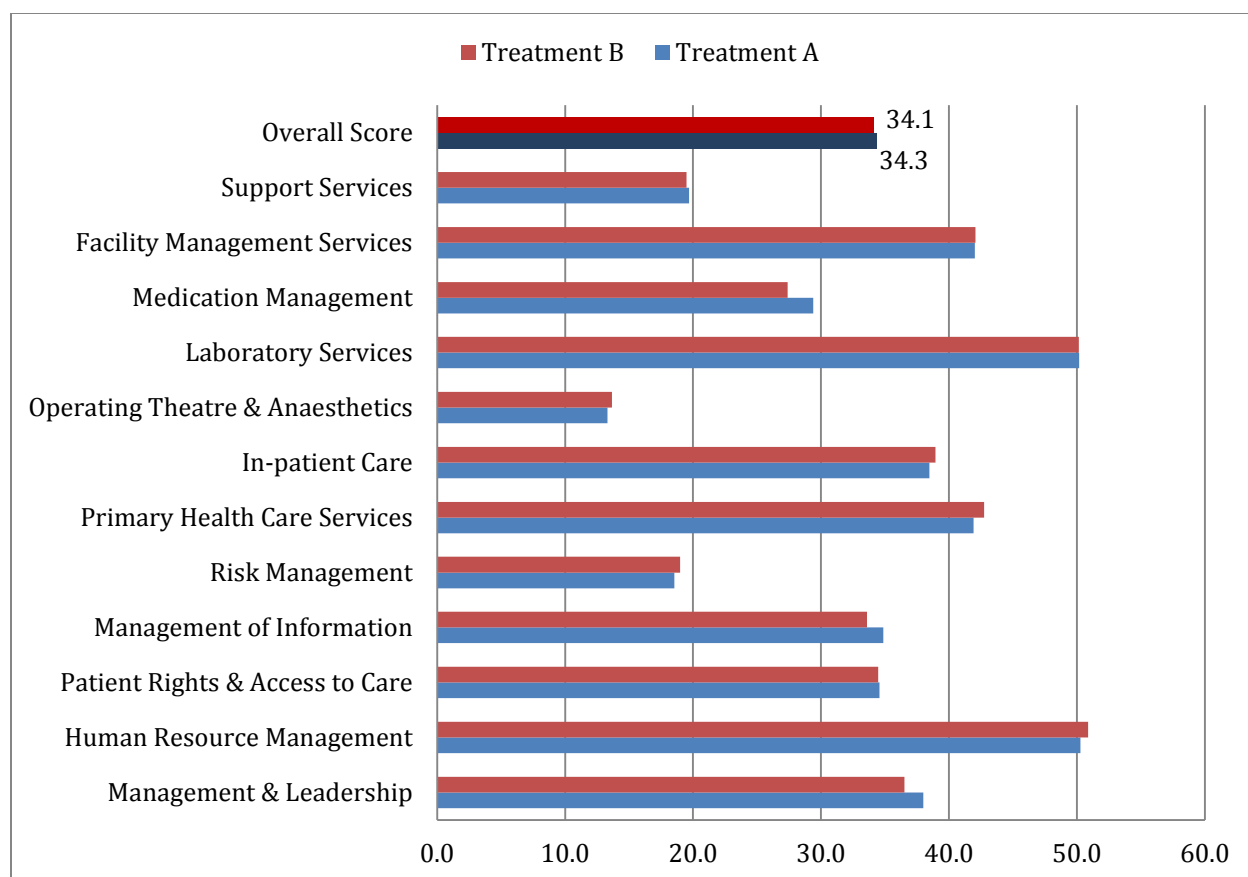
Not compliant (mild)	0.35
Not compliant (moderate)	0.25
Not compliant (serious)	0.15
Not compliant (very serious)	0.05
Not applicable	0.00

Those values are then first added up and later divided by the number of indicators for each category. That's how the category scores are calculated. The final overall score is then the average of the category scores. The "not applicables" are *included* for the calculation of the final score.

The chart, Figure 29, below compares the average scores for the 24 clinics in Treatment Group A and the 24 clinics in Treatment Group B. It shows that both groups are balanced concerning the overall score but also for the sub-categories that are measured by SafeCare. The firm calculates the overall score as the average of the 13 other categories. Since the vast majority of PHCs does not offer "Diagnostic Imaging Services", this category was excluded for the calculation of the overall score.

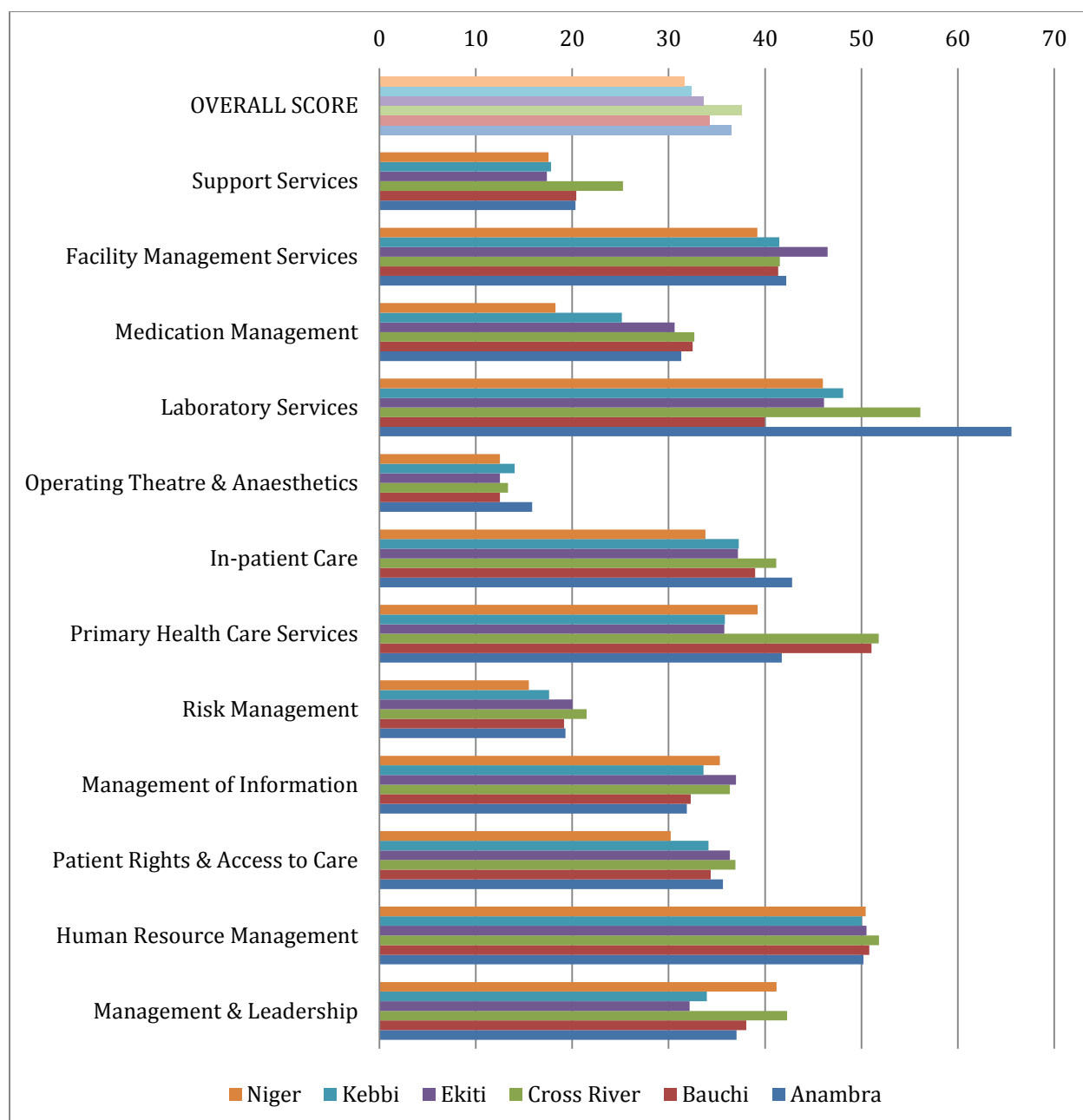
The clinics receive higher-than-average scores for "laboratory services" and "human resource management". "In-patient care" and "primary healthcare services" also receive scores that are higher than the overall average. Low scores can be observed for "support services", "operating theatre & anesthetics", and "risk management".





**Figure 29: SafeCare aggregate score by treatment group (Source: SafeCare Baseline Assessment, 2014)**

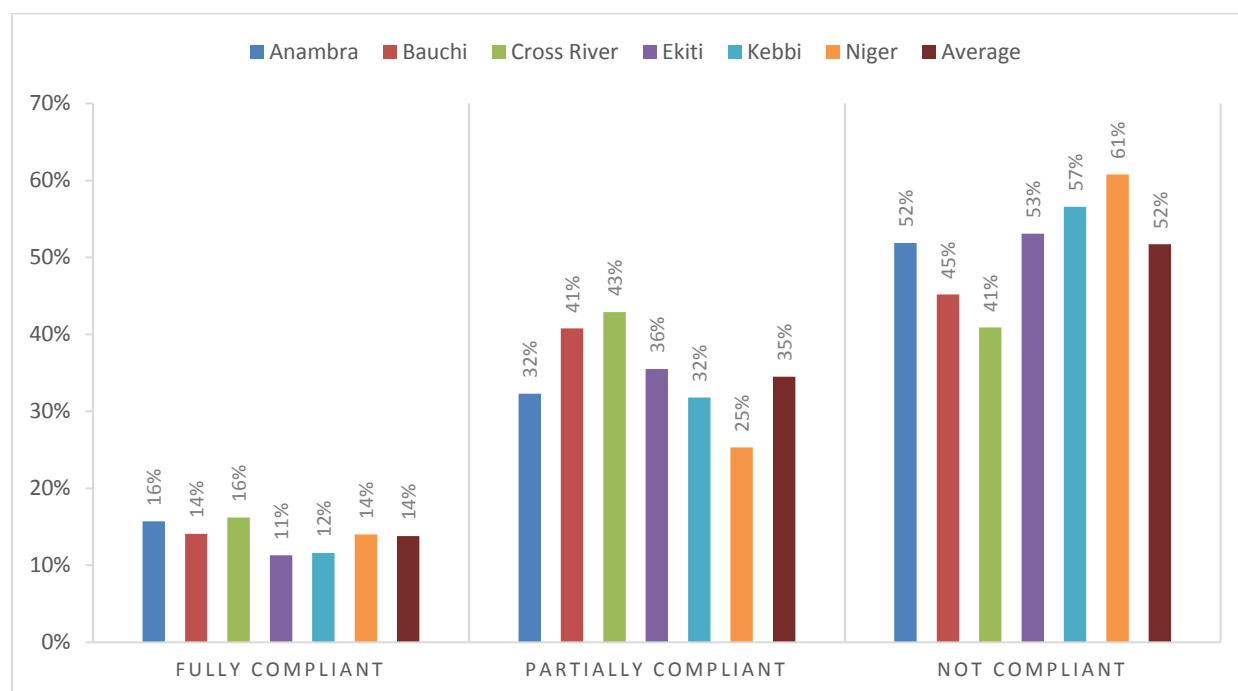
The following chart, Figure 30, displays the average SafeCare scores by state, both for the overall score and the sub-categories. It shows that Cross River's clinics were ranked No 1 overall (Score: 37.6) followed by Anambra (36.5). Niger comes in last with a SafeCare score of 31.7.



**Figure 30: SafeCare aggregate score by state (Source: SafeCare Baseline Assessment, 2014)**

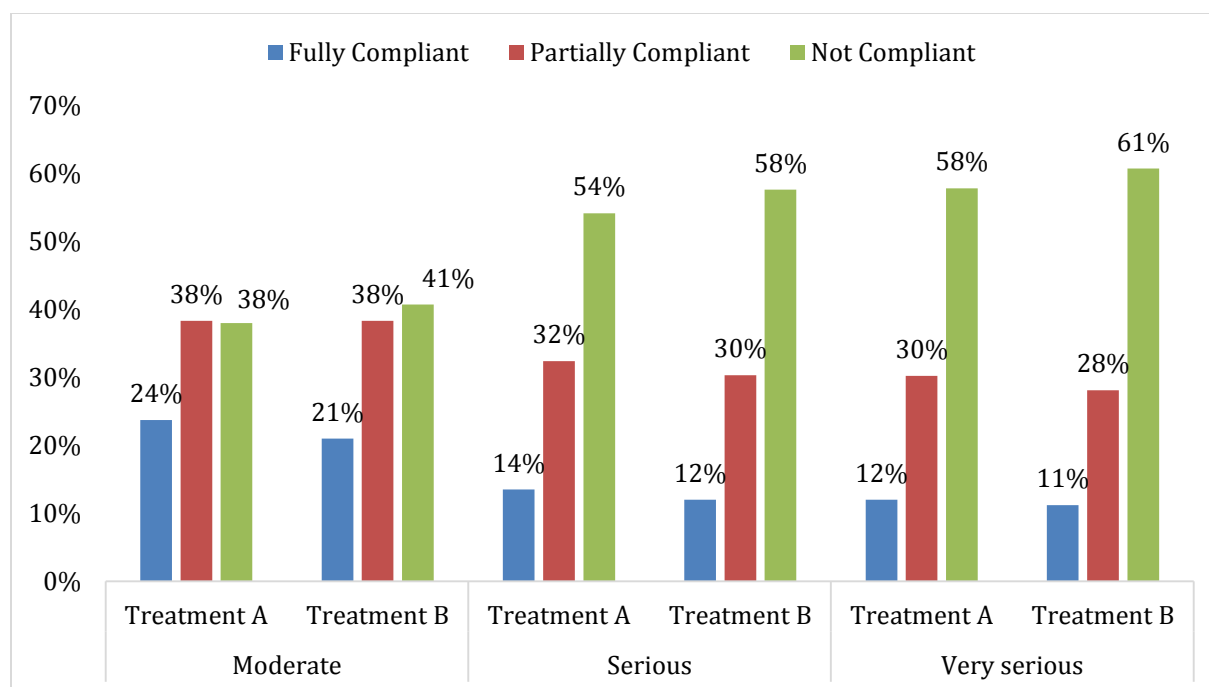
Most states exhibit similar scores for the main categories with a few notable exceptions. Cross River scores better than the field on “Support Services”, “Laboratory Services”, as well “Primary Health Care Services”, and “Management & Leadership”. Anambra’s clinics received extraordinary scores for “Laboratory Services” by SafeCare. Niger state scores lower than the average in almost all categories. One exception is the category “Management & Leadership”, where Niger state received a score of 41.2.

The following chart, Figure 31, shows the rates of compliance with SafeCare indicators by state. The rate of full compliance is relatively even across all 6 states. On average clinics are fully compliant with only 14 percent of applicable SafeCare indicators. The non-compliance rate is high, with 52 percent. Niger shows the highest rate of non-compliance with 61 percent. Cross River is best in this category with 41 percent non-compliance. Bauchii is second best, with 45 percent non-compliance.



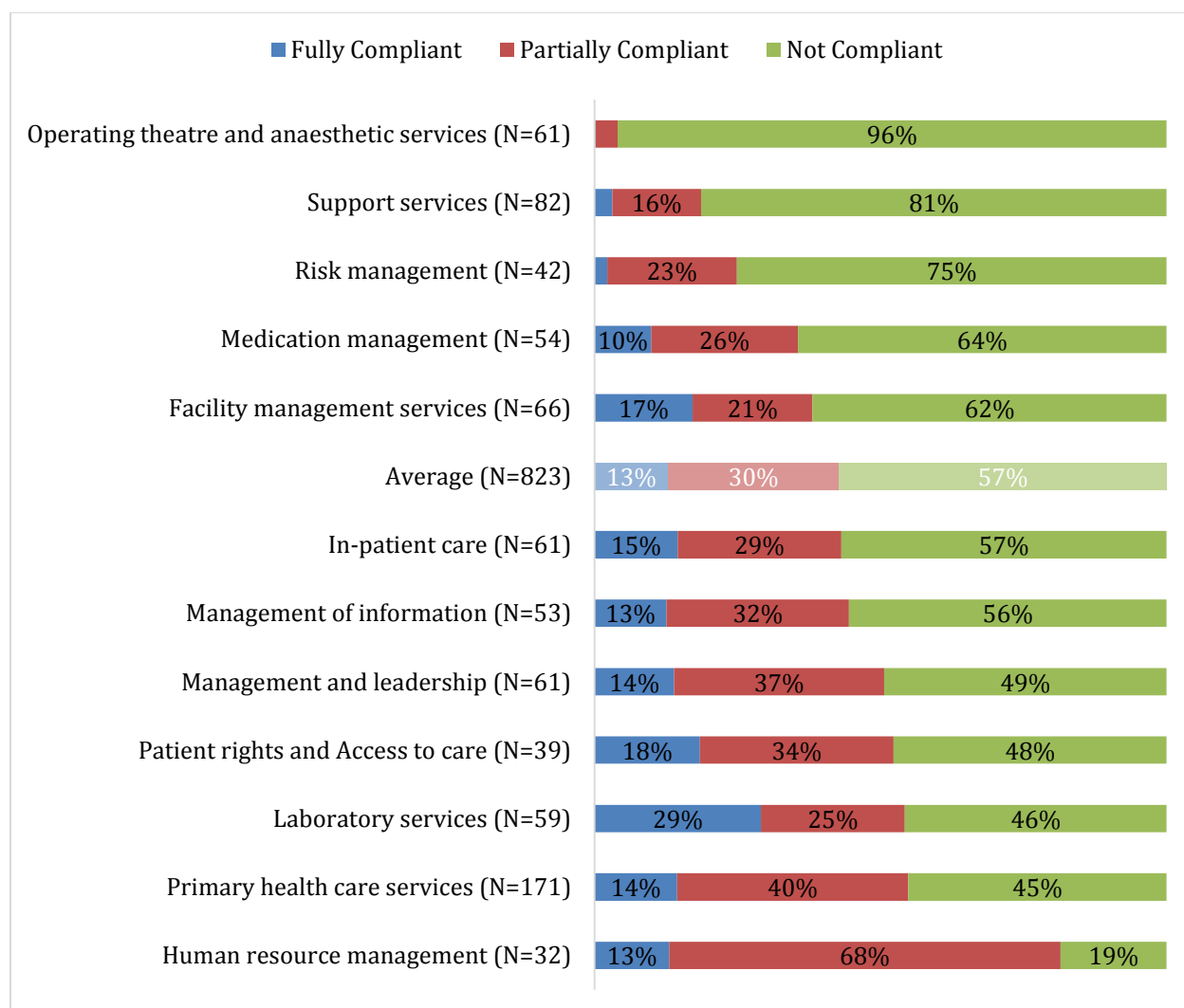
**Figure 31: Compliance with (applicable) SafeCare indicators across states (Source: SafeCare Baseline Assessment, 2014)**

This chart in Figure 32, describes the compliance with SafeCare indicators by severity of indicators and separated by treatment groups. The treatment groups seem to be balanced across all levels of “seriousness”. Compliance with these indicators seems to decline as they get more critical. This is to be expected since more severe or serious indicators are harder to comply with. Full compliance is very low in the “very serious” category for example with only 12 and 11 percent “full compliance” for groups A and B respectively. Conversely, non-compliance is high with around 60 percent. The “moderate” severity category exhibits higher “fully compliant” ratings for Treatment A (24 percent) and Treatment B (21 percent).



**Figure 32: Percentage distribution of compliance levels of facilities with SafeCare indicators by severity nature**  
(Source: SafeCare Baseline Assessment, 2014)

The chart in Figure 33, describes the compliance rate of QE PHCs with the 13 main SafeCare categories. It shows that compliance rates are generally low. Compliance below 50 percent are being observed for the categories of (i) *management of information*, (ii) *facility management services*, (iii) *medication management*, (iv) *risk management*, (v) *support services*, and (vi) *operating theatre and anesthetic services*. High levels of at least partial compliance can be observed in the category of *human resource management* with 68 percent. In the category *laboratory services* the highest rate of “full compliance” is observed with 29 percent.



**Figure 33: Compliance with SafeCare indicators by category (The N in brackets indicates the number of indicators that are comprised in each category; Source: SafeCare Baseline Assessment)**

## 5. References

- Butar, F. B., & Park, J. W. (2008). Permutation tests for comparing two populations. *Journal of Mathematical Science & Mathematics Education V3*, (2), 19-30.
- Chaudhury, N., Hammer, J., Kremer, M., Muralidharan, K., & Rogers, F. H. (2006). Missing in action: teacher and health worker absence in developing countries. *The Journal of Economic Perspectives*, 20(1), 91-116.
- FMOH - Federal Ministry of Health. (2011). Directory of Health Facilities in Nigeria. Publication of FMOH, Nigeria
- Gini, C. (1912). Variabilità e mutabilità. *Reprinted in Memorie di metodologica statistica (Ed. Pizetti E, Salvemini, T). Rome: Libreria Eredi Virgilio Veschi, 1.*
- Imbens, G. W., & Wooldridge, J. M. (2009). Recent Developments in the Econometrics of Program Evaluation. *Journal of Economic Literature*, 47(1), 5-86.
- National Population Commission, Nigeria.  
<http://www.population.gov.ng/index.php/publications/141-population-distribution-by-age-and-sex-2006-census-priority-tables-vol-4>
- National Bureau of Statistics, Nigeria. <http://www.nigerianstat.gov.ng/nbslibrary>
- National Bureau of Statistics, Nigeria (2010). Harmonized Nigeria Living Standard Survey 2009/10: Core Welfare Indicators. <http://goo.gl/SwcqC7>
- Safecare. 2011. Standards for *Clinics/Health Centres in Resource Restricted Settings in Africa*, 1st Edition 2011. <http://goo.gl/xkBsNF>
- Sharif I. A. (2009). Building a Targeting System for Bangladesh based on Proxy Means Testing. SP Discussion Paper No. 0914. The World Bank, Washington DC.
- UNICEF, 2012. Under five mortality rankings.  
<http://www.unicef.org/sowc2012/pdfs/UNDER-FIVE-MORTALITY-RANKINGS.pdf>

## 6. Annex

### Annex 1: List of “critical” SafeCare indicators

SN	Indicator	Category
1	The facility has a valid license, issued by an acknowledged healthcare licensing authority, to operate as a healthcare facility.	Management and leadership
2	Secure adequate storage facilities are available.	Management and leadership
3	The health centre's manager and personnel collaborate to plan and carry out the quality improvement and patient safety programme.	Management and leadership
4	There is a process for reviewing patient care.	Management and leadership
5	A copy of the local rules relating to the current Ionising Radiation regulations is available and the requirements are met.	Diagnostic imaging services
6	Medications controlled by law or organisational policy are accurately accounted for in a specific register.	Medication management
7	Medications are verified against the prescription or order, including the dosage and route of administration.	Medication management
8	Regular inspections of all buildings, plant, installations and machinery are documented.	Facility management services
9	Electrical power is available 24 hours a day, seven days a week, from regular or emergency sources.	Facility management services
10	Servicing and testing of the uninterrupted power supplies (UPS) and/or battery backup systems is documented.	Facility management services
11	Emergency generators are tested on full load in accordance with manufacturers' specifications and such tests are documented.	Facility management services
12	Regular and/or emergency water supplies, including drinkable water, are available 24 hours a day, seven days a week in all essential areas.	Facility management services
13	Where there is piped gas, the main oxygen supply system is fitted with an alarm, which operates automatically in the event of low pressure in the gas supplies and is regularly tested.	Facility management services
14	There are separate hand-washing facilities in the food preparation area, with soap and paper towels.	Support services
15	Fridges and freezers can be opened from the inside through a safety release mechanism.	Support services

<b>SN</b>	<b>Indicator</b>	<b>Category</b>
16	The laundry provides a clear flow of laundry from the soiled to the clean side with no crossover of these lines.	Support services
17	Chemicals for cleaning are safely stored out of the reach of patients, children and visitors.	Support services
18	Waste is segregated in accordance with policies, procedures and municipal by-laws.	Support services
19	Each personnel member signs their job description/performance agreement to show that that they accept it.	Human resource management
20	There is a process for evaluating and verifying the credentials (licence, education, training and experience) of physicians.	Human resource management
21	There is a process for evaluating and verifying the credentials (licence, education, training and experience) of nurses and other health professionals.	Human resource management
22	Policies and procedures to prevent the loss or misuse of patient information are implemented.	Patient rights and Access to care
23	There is a mechanism to allow complaints to be heard and acted upon.	Patient rights and Access to care
24	Policies and procedures guide the personnel in the process of gaining informed consent.	Patient rights and Access to care
25	The performance of the facility on identified priority indicators forms part of the discussions at regular staff meetings.	Management of information
26	Medication errors are reported through a process and within a time frame defined by the organisation.	Management of information
27	Policies and procedures relate to the safeguarding of information in the record against loss, damage, breach of confidentiality, or use by unauthorised persons.	Management of information
28	There are documented risk management processes for identifying all risks (physical, environmental, medico-legal, operational, etc) relating to organisational processes and systems, personnel, patients, visitors and physical facilities.	Risk management
29	There is a system for monitoring negative incidents/near misses/ adverse (sentinel) events and it includes the documentation of interventions and responses to recorded incidents.	Risk management
30	All patient, staff and visitor areas of the facility are included in the documented infection control pro-	Risk management



SN	Indicator	Category
	gramme.	
31	The system includes safe handling, storing and disposing of different types of waste.	Risk management
32	The availability of resuscitation equipment and medicines with clear instructions for use is specified in the organisation's policy on resuscitation.	Primary health care services
33	Records of these checks are kept, with reports on problems experienced, advice given, and any remedial action taken.	Primary health care services
34	There are established security systems for protecting newborn babies.	Primary health care services
35	Resuscitation equipment is available in accordance with the policies of the organisation.	In-patient care
36	Anaesthesia is administered only by qualified practitioners, who are privileged by the organisation to do so.	Operating theatre and anaesthetic services
37	There is either an uninterrupted power supply (UPS) or a battery backup system for the theatre lamp, which is regularly tested, with such tests being fully documented.	Operating theatre and anaesthetic services
38	Emergency resuscitation equipment shows evidence of regular checking.	Operating theatre and anaesthetic services
39	Where ethylene oxide is used as a sterilising agent, the installation complies with relevant safety standards and legislation.	Operating theatre and anaesthetic services
40	Autoclave sterility is tested daily and the test results are recorded.	Operating theatre and anaesthetic services
41	Policies and procedures are developed relating to the preparation of patients for surgery.	Operating theatre and anaesthetic services
42	During the post-anaesthetic recovery period, patients receive monitoring appropriate to their condition.	Operating theatre and anaesthetic services
43	Laboratory results are validated and include unique patient identity, date of testing/reporting, name and location of the requesting physician.	Laboratory services

## Annex 2: Randomization outcomes

### Randomization results

Control Group (32)		Treatment Group A (24)		Treatment Group B (24)	
PHC	State	PHC	State	PHC	State
Birni Yauri	Kebbi	BHC, OKE IKERE	Ekiti	Kwasara	Kebbi
MPHC JALAM	Bauchi	PHC EBENESI NNOBI	Anambra	GITAL HEALTH CLINIC	Bauchi
BHC Wariri	Niger	PHC Ofatura	Cross	PHC AKWAEZE	Anambra

			River		
PHC NKWELEZUNAKA	Anambra	MODEL PHC ODEAKPU	Anambra	Phc Alge Okikwo	Cross River
Bachaka	Kebbi	Agwagume	Cross River	Kambuwa	Kebbi
IKUN CHC	Ekiti	Masari	Kebbi	BHC Ja'agi	Niger
Zaria Kala Kala	Kebbi	IKOGOSI	Ekiti	OKE YIMI	Ekiti
GASUWO MATERNITY	Bauchi	SORO	Bauchi	ILASA BHC	Ekiti
Phc Ohong	Cross River	MPHCC Etsu Tasha	Niger	BHC Dukko	Niger
MCH Obubra Urban	Cross River	PHC UMUAUWULU	Anambra	BASIC HEALTH CENTRE	Anambra
PHC AWKA ETITE	Anambra	Ngaski	Kebbi	Y/KUNDUM MATERNITY	Bauchi
Lani	Kebbi	DURUM	Bauchi	Adim	Cross River
Abini	Cross River	Tuga	Kebbi	PHC OKPUNO	Anambra
Dabban PHC	Niger	Phc Bebuabie	Cross River	Basic H C Babban Tungan	Niger
OKE-AKO MHC	Ekiti	MASHEMA	Bauchi	MPHC PAPA	Bauchi
Dr Ma'azu Babangida PHC MAJE	Niger	IRE BHC	Ekiti	ODO EMURE BHC	Ekiti
ARE BHC	Ekiti	DAJIN HEALTH CLINIC	Bauchi	Kasati	Kebbi
ATAFOWA	Bauchi	Model H C Garam	Niger	PHC Ababena	Cross River
NASARAWA PHC	Bauchi	MHC Rijau	Niger	Gulumbe	Kebbi
PHC NISE	Anambra	Lailaba	Kebbi	CHANGANAWA	Bauchi
Basic H C. Dikko	Niger	PHC ORAERI	Anambra	CHC Enagi	Niger
PHC Ochon	Cross River	IFAKI CHC	Ekiti	PHC UKWULU	Anambra
Bui	Kebbi	PHC URUOGBO	Anambra	PHC D/JEJI	Bauchi
S/KARIYA MATERNITY	Bauchi	Tungan Bunu	Niger	OGOTUN BHC	Ekiti
AGBADO CHC	Ekiti				
PHC BUNUNU	Bauchi				
Raha	Kebbi				
Phc Utugwan	Cross River				
Iwuru	Cross River				
Khaliel	Kebbi				
Fana	Kebbi				
SADE	Bauchi				

### Annex 3: Housing ownership

Table 7 shows that majority of households in Nigeria live in self-owned dwellings. About 66 percent of households in QE states live in their own apartments compared to the country average of 74 percent. At large, while most households in other states live in their owned houses, households in Ekiti live in rented or free housing.

**Table 25: Percent distribution of households with the following type of ownership status (Source: SURE-P, 2013)**

*Percent of households with the following type of ownership status:*

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	SURE-P-Average
<b>Owner occupied dwelling</b>	47%	76%	69%	7%	100%	86%	66%	74%
<b>Rented from local govt (district council)</b>	3%	0%	0%	0%	0%	0%	1%	0%
<b>Rented from central govt</b>	3%	0%	0%	0%	0%	0%	1%	0%
<b>Rented from private company</b>	14%	0%	3%	2%	0%	4%	3%	1%
<b>Rented from individual</b>	25%	5%	17%	50%	0%	11%	16%	19%
<b>Borrowed dwelling</b>	5%	12%	0%	2%	0%	0%	4%	1%
<b>House owned and provided free by employer (private)</b>	0%	1%	0%	2%	0%	0%	1%	0%
<b>Other free housing</b>	2%	4%	7%	37%	0%	0%	8%	2%
<b>Other</b>	0%	2%	3%	2%	0%	0%	1%	2%
<b>Number of rooms occupied by the household</b>	3.4	3.0	3.4	1.8	2.6	5.5	3.2	3.2

#### Annex 4: Waste disposal

Table 11, shows ways wastes are being disposed across the states, which are either put in an open pit, bury (in a pit), dumping (in an open piece of land), burn (dump on an open piece of land and burn), or refuse collected (put in a container and regularly removed by waste contractors). Most households dump their wastes and the distribution of proportions is quite comparable between QE states and the rest of the states.

Table 26: Percent of households disposing their waste in the following ways (Source: SURE-P, 2013)

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	SURE-P-Average
<b>Refuse collected</b>	10%	15%	22%	8%	1%	5%	10%	10%
<b>Pit</b>	10%	4%	3%	2%	34%	7%	11%	4%
<b>Bury</b>	0%	4%	0%	0%	30%	0%	7%	6%
<b>Burn</b>	30%	21%	2%	22%	24%	0%	17%	26%
<b>Dumping</b>	58%	46%	72%	80%	59%	88%	65%	72%

#### Annex 5: Water sources

Table 8, shows that there are 11 main sources of drinking water across the country with borehole, protected and unprotected well and flowing waters as the predominant sources. On the whole, there are comparable proportions of sources used between the QE states and the country average.

**Table 27: Percent distribution of households having the following main source of drinking water in dry season (Source: SURE-P, 2013)**

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	SURE-P-Average
<b>Directly from the river/lake/stream/dam</b>	2%	4%	56%	3%	14%	7%	14%	12%
<b>Unprotected well</b>	0%	17%	3%	3%	5%	0%	6%	10%
<b>Pumped (piped) from the river/lake/stream/dam</b>	0%	0%	0%	0%	11%	2%	3%	2%
<b>Protected well</b>	0%	13%	7%	37%	15%	19%	15%	14%
<b>Borehole</b>	64%	38%	19%	30%	46%	53%	42%	43%
<b>Public tap</b>	0%	9%	7%	18%	6%	12%	9%	10%
<b>Own tap</b>	0%	1%	0%	5%	0%	4%	2%	1%
<b>Other tap (from nearby building)</b>	0%	0%	2%	0%	0%	0%	0%	0%
<b>Bought from water vendor</b>	8%	0%	2%	3%	0%	0%	2%	4%
<b>Mineral bottled water</b>	2%	0%	0%	0%	0%	0%	0%	0%
<b>Rain water</b>	12%	0%	3%	0%	0%	2%	3%	1%
<b>Other</b>	12%	18%	2%	0%	3%	2%	7%	1%

## Annex 6: Sanitation

Table 10, shows different types of toilet in households across the QE states and the proportion of household using them. There is a comparable distribution of toilet types used in households within QE states and the country. The mostly used toilet type across the states is own pit latrine. One out of four households in Anambra and Niger have access to own flush toilet inside house, and one out of two households have no access to toilet at all in Ekiti.

**Table 28: Percent distribution of households with the following type of toilet (Source: SURE-P, 2013)**

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	SURE-P-Average
<b>Own flush toilet inside house</b>	24%	0%	8%	15%	1%	20%	10%	10%
<b>Own flush toilet outside house</b>	15%	0%	7%	2%	1%	2%	4%	5%
<b>Communal/shared flush toilet</b>	10%	0%	0%	8%	0%	0%	3%	3%
<b>Own pit latrine</b>	44%	94%	66%	5%	96%	43%	62%	53%
<b>Communal/shared pit latrine</b>	2%	1%	7%	17%	1%	11%	6%	5%
<b>Neighbour/another household's pit latrine</b>	2%	0%	5%	0%	0%	2%	1%	0%
<b>VIP latrine</b>	0%	0%	0%	3%	0%	0%	1%	1%
<b>Communal/shared latrine</b>	0%	1%	0%	0%	0%	2%	1%	1%

None	2%	1%	5%	50%	0%	20%	12%	8%
Other	2%	2%	2%	0%	0%	2%	1%	13%

## Annex 7: Staff Characteristics

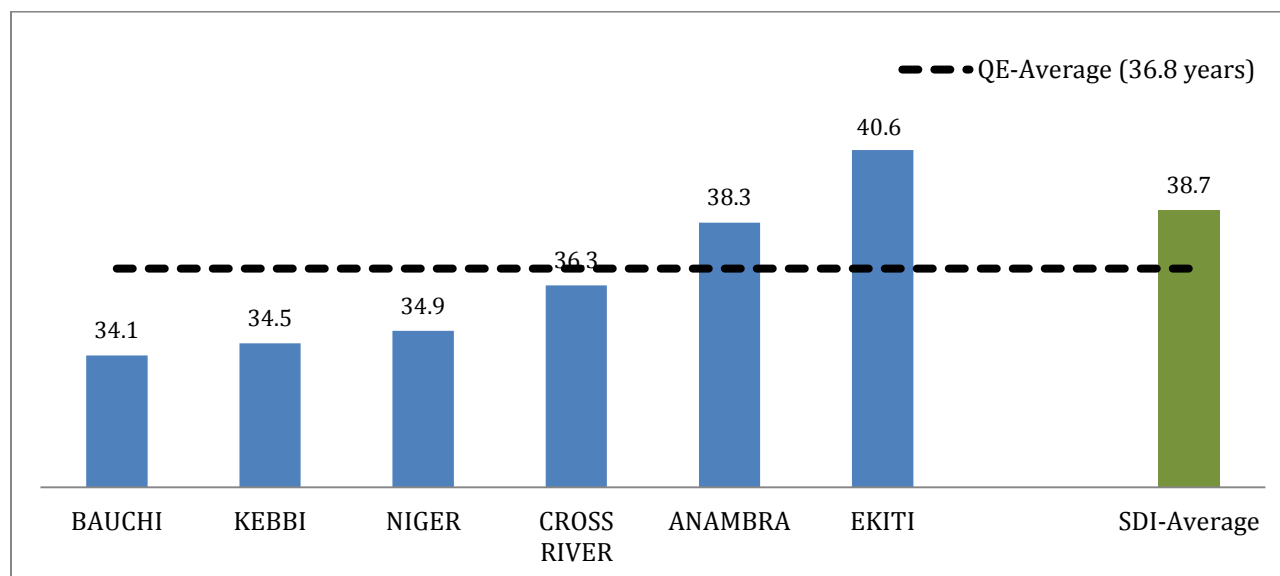


Figure 34: Average age of health workers by state (Source: SDI, 2013)

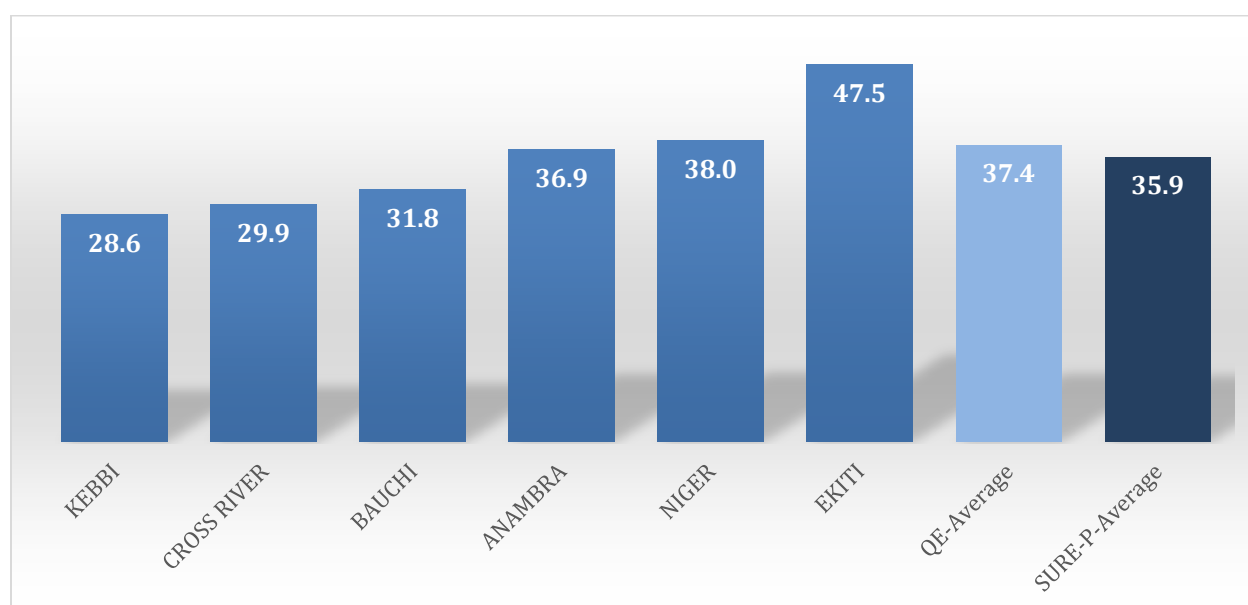
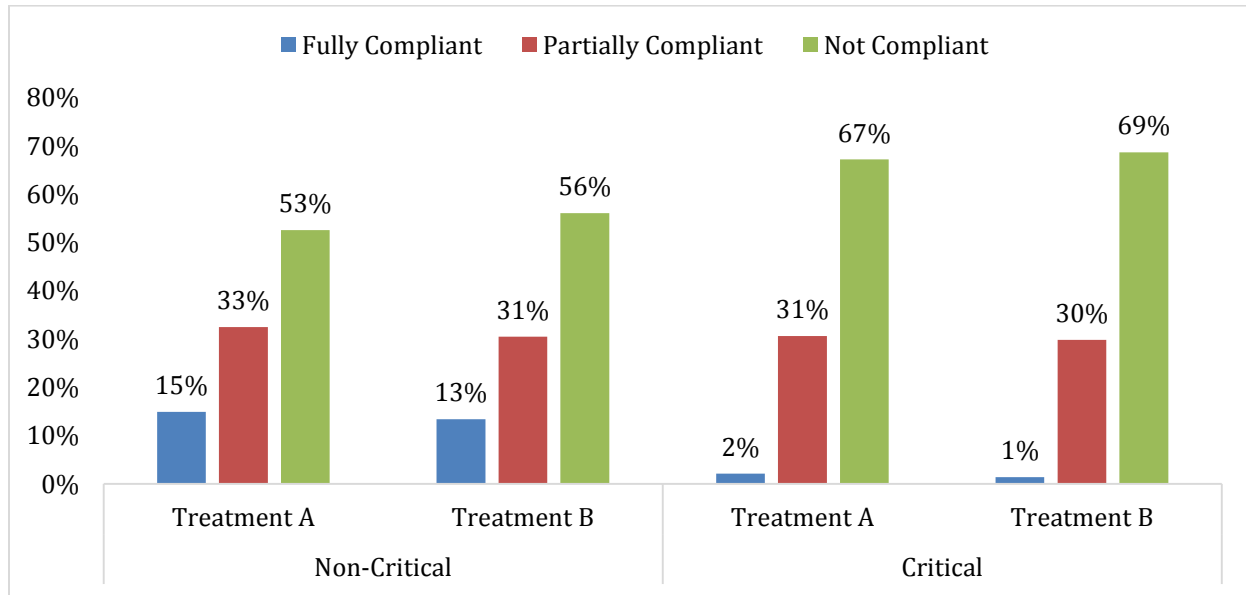
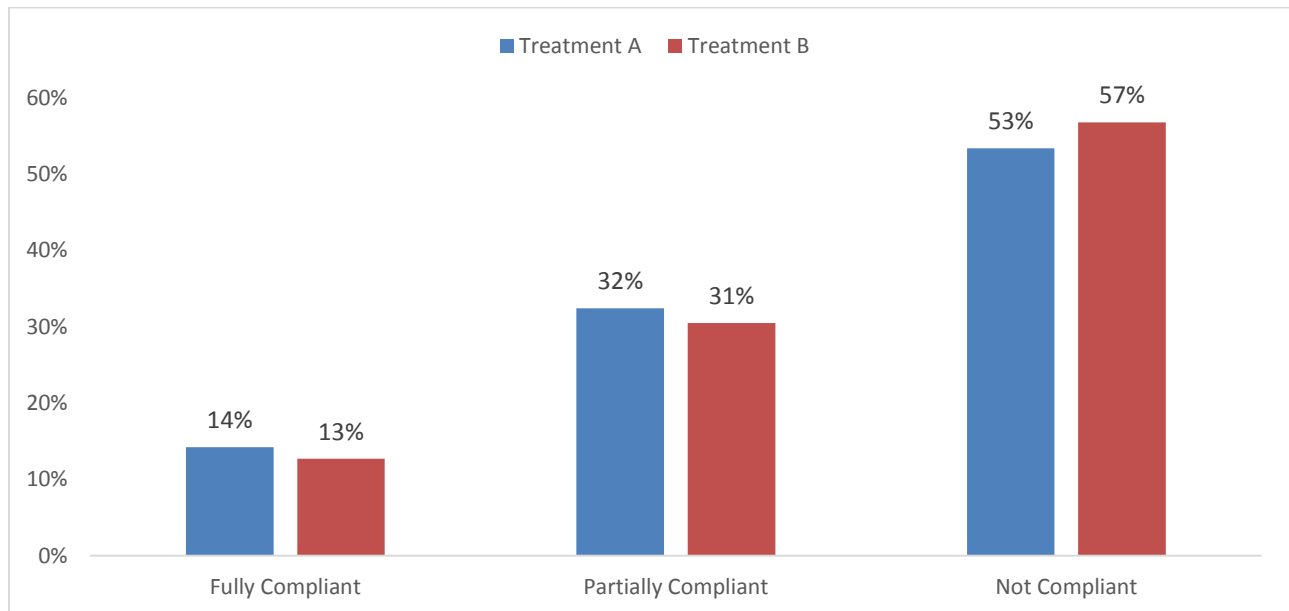


Figure 35: Age (years) of midwives at healthcare facilities (Source: SURE-P, 2013)

## Annex 8: SafeCare Indicators

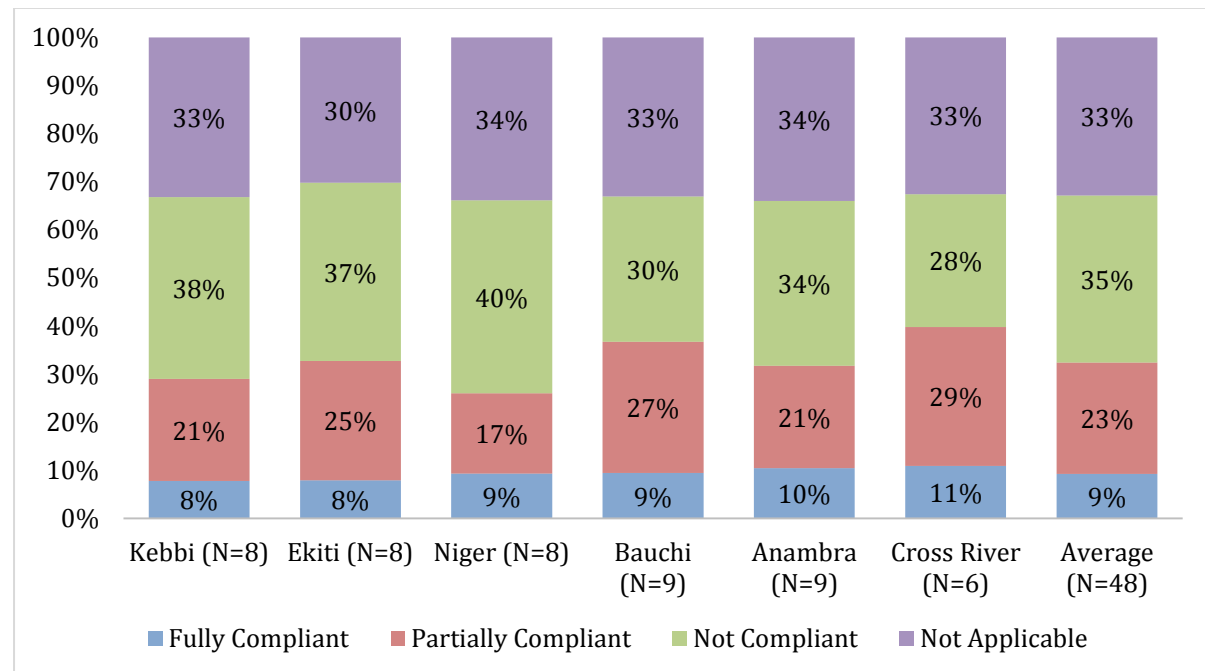
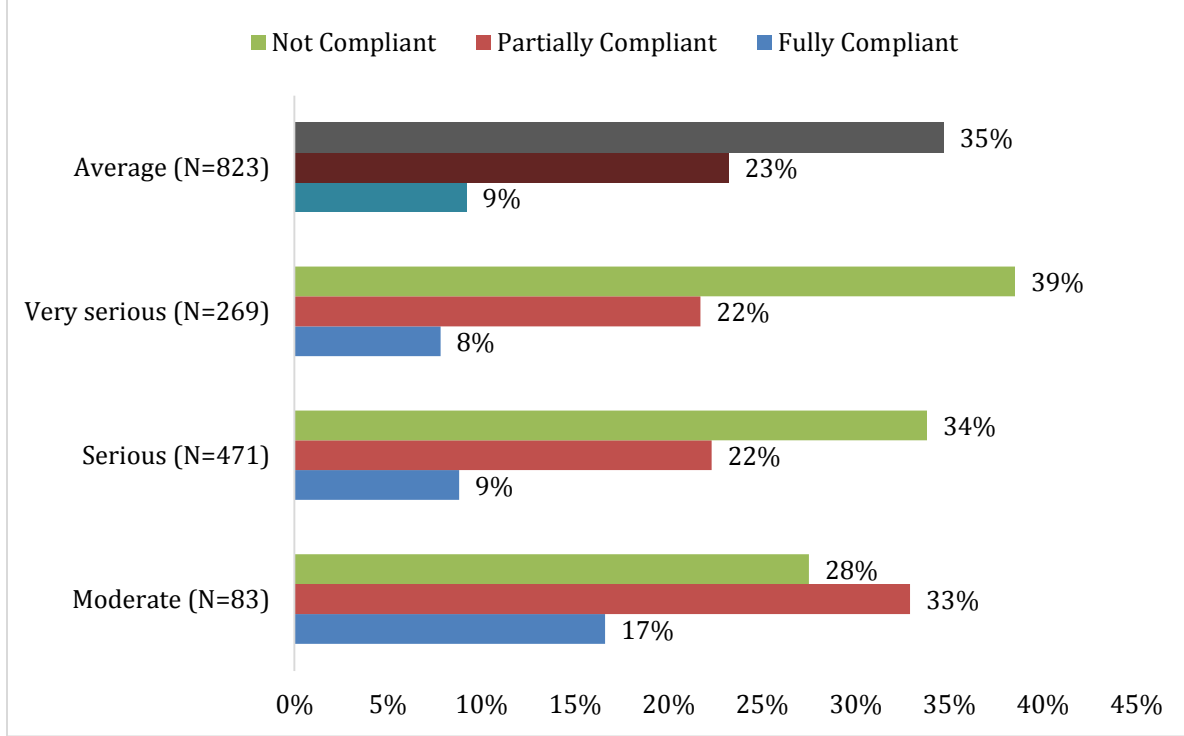


**Figure 36: Percentage distribution of compliance levels of facilities with SafeCare indicators by critical nature (Source: SafeCare Baseline Assessment, 2014)**



**Figure 37: Percentage distribution of compliance levels of facilities with SafeCare indicators across treatment groups (Source: SafeCare Baseline Assessment, 2014)**

### Distribution of SafeCare Indicators by Severity Nature



## Annex 9: Midwife characteristics

Table 29: Percent of midwives having the following degrees (Source: SURE-P, 2013)

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	SURE-P-Average
Registered midwife	96%	80%	83%	80%	79%	40%	84%	87%
Registered nurse	85%	93%	65%	95%	36%	60%	66%	62%
BSc nursing	2%	0%	0%	7%	0%	0%	2%	3%
Post-graduate degree	2%	2%	0%	2%	0%	0%	1%	2%
Other	0%	0%	0%	0%	0%	0%	2%	1%

Table 30: Percent distribution of health workers by cadres (Source: SDI, 2013)

	Anambra	Bauchi	Cross River	Ekiti	Kebbi	Niger	QE-Average	SDI-Average
Medical officer/physician	0%	0%	0%	1%	0%	3%	1%	1%
Community health officer/assistant	2%	2%	7%	5%	2%	3%	4%	5%
Community health extension worker (CHEW)	33%	41%	53%	32%	48%	71%	43%	48%
Environment health officer/assistant	0%	12%	0%	1%	24%	2%	6%	4%
Nursing officer	31%	3%	15%	11%	5%	4%	10%	8%
Laboratory scientist/pharmacist	0%	5%	3%	1%	6%	6%	3%	3%
Health attendants/auxiliary nurses	4%	30%	5%	20%	2%	6%	15%	19%
Other (Specify)	30%	7%	17%	29%	12%	6%	18%	12%

Figure 38: Percentage of facilities where staff received training in the past 12 months (Source: SURE-P, 2013)