Characterisation of the Health Information System in Nigeria

REPORT OF FINDINGS
Swiss TPH: Xavier Bosch-Capblanch, Christian Auer, Ngozi Njepuome, Jasmina Saric, Caitlin Jarrett
gavitytank/Salesforce: Amy Guterman, Michelle Curry, David O’Donnell
University of Calabar: Angela Oyo-Ita
NPHCDA, Abuja: Eric Nwaze, Phyllis Ogah, AB Garba

(*) Analyses of HMIS meta-data is included in a separate report.
CONTACT

Dr. Xavier Bosch-Capblanch
Swiss Tropical and Public Health Institute
Swiss Centre for International Health
Group Leader, Systems Support Unit
Socinstrasse 57, PO Box 4002 Basel, Switzerland
Telephone direct: +41 (0)61 284 83 19
Fax: +41 (0)61 284 81 03
E-mail: x.bosch@unibas.ch
Website: http://www.swisstph.ch

Acknowledgements

Our gratitude to health care providers in the health facilities we have visited, for their welcoming, patience and availability to spend time with the research team. Thanks, as well, to the patients who patiently accepted to suffer some delay in receiving health care services. We thank the National Primary Health Care Development Agency, particularly Dr. Garba and Dr. Nwaze for their open collaboration and extremely useful facilitation of our activities in the field. Thanks to Dr. Ben Ugi for useful inputs, especially for sharing his knowledge on the DHIS2 system.
Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANC</td>
<td>Antenatal Care</td>
</tr>
<tr>
<td>BMGF</td>
<td>Bill and Melinda Gates Foundation</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control</td>
</tr>
<tr>
<td>CHAI</td>
<td>Clinton Health Access Initiative</td>
</tr>
<tr>
<td>CHEW</td>
<td>Community Health Extension Worker</td>
</tr>
<tr>
<td>DFID</td>
<td>Department for International Development</td>
</tr>
<tr>
<td>DHIS2</td>
<td>District Health Information Software 2</td>
</tr>
<tr>
<td>DHSS</td>
<td>Demographic and Health Surveillance System</td>
</tr>
<tr>
<td>DPT</td>
<td>Diphtheria, pertussis, tetanus vaccine</td>
</tr>
<tr>
<td>DPRS</td>
<td>Department of Planning, Research and Statistics</td>
</tr>
<tr>
<td>DQA</td>
<td>Data Quality Audit</td>
</tr>
<tr>
<td>EPI</td>
<td>Expanded Programme on Immunisation</td>
</tr>
<tr>
<td>FMOH</td>
<td>Federal Ministry of Health</td>
</tr>
<tr>
<td>Global Fund / GF</td>
<td>Global Fund to Fight AIDS, Tuberculosis and Malaria</td>
</tr>
<tr>
<td>HF</td>
<td>Health Facility</td>
</tr>
<tr>
<td>HIS</td>
<td>Health Information System</td>
</tr>
<tr>
<td>HIUS</td>
<td>Health Information Use System</td>
</tr>
<tr>
<td>HMIS</td>
<td>Health Management Information System</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
</tr>
<tr>
<td>LGA</td>
<td>Local Government Area</td>
</tr>
<tr>
<td>IMCI</td>
<td>Integrated Management of Childhood Illnesses</td>
</tr>
<tr>
<td>LLIN</td>
<td>Long-lasting insecticide-treated nets</td>
</tr>
<tr>
<td>LMIC</td>
<td>Low- and middle-income countries</td>
</tr>
<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
</tr>
<tr>
<td>MSF</td>
<td>Monthly Summary Form (in the DHIS2 system)</td>
</tr>
<tr>
<td>NMCH</td>
<td>Maternal Newborn and Child Health</td>
</tr>
<tr>
<td>NMCH2</td>
<td>A DFID-supported initiative to improve the quality and delivery of MNCH services in northern Nigeria</td>
</tr>
<tr>
<td>NNHS</td>
<td>National Health and Nutrition Survey Maternal Newborn and Child Health</td>
</tr>
<tr>
<td>NNRIMS</td>
<td>Nigerian National Response Information Management System (on HIV/AIDS)</td>
</tr>
<tr>
<td>NPHCDA</td>
<td>National Primary Health Care Development Agency</td>
</tr>
<tr>
<td>NPopC</td>
<td>National Population Commission</td>
</tr>
<tr>
<td>NRI</td>
<td>National Research Institution</td>
</tr>
<tr>
<td>ODK</td>
<td>Open Data Kit</td>
</tr>
<tr>
<td>OPD</td>
<td>Outpatient department</td>
</tr>
<tr>
<td>ORT</td>
<td>Oral rehydration therapy</td>
</tr>
<tr>
<td>PEPFAR</td>
<td>President’s Emergency Plan for AIDS Relief</td>
</tr>
<tr>
<td>PHC</td>
<td>Primary Health Care</td>
</tr>
<tr>
<td>PMTCT</td>
<td>Prevention of mother-to-child transmission (of HIV)</td>
</tr>
<tr>
<td>RCT</td>
<td>Randomised Controlled Trial</td>
</tr>
<tr>
<td>SCIH</td>
<td>Swiss Centre for International Health</td>
</tr>
<tr>
<td>SFH</td>
<td>Society for Family Health</td>
</tr>
<tr>
<td>SMART</td>
<td>Standardized Monitoring and Assessment of Relief and Transition</td>
</tr>
<tr>
<td>SMO</td>
<td>State Ministry of Health</td>
</tr>
<tr>
<td>SPHCDPA</td>
<td>State Primary Health Care Development Agency</td>
</tr>
<tr>
<td>Swiss TPH</td>
<td>Swiss Tropical and Public Health Institute</td>
</tr>
<tr>
<td>SWOT</td>
<td>Strengths, Weaknesses, Opportunities and Threats</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
</tr>
<tr>
<td>USD</td>
<td>US Dollar</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
Table of contents

Executive summary 1
1 Project background 3
2 Approaches and methods 4
  2.1 Documents and forms review 4
  2.2 Stakeholders engagement and workshops 5
  2.3 Visits to sites 6
  2.4 Human-centred design approach 6
  2.5 Data management and clearances 7
  2.6 Limitations 8
3 Findings 9
  3.1 Country profile 9
  3.2 Outline of the health sector and HMIS from the documents review 9
  3.3 HMIS metadata 13
  3.4 Stakeholders interactions 16
  3.5 Visits to sites 21
  3.6 The human experience with the HMIS 40
4 Synthesis and implications 46
  4.1 The 10 key findings 46
  4.2 Implications for WS4 (interventions design) 47
  4.3 Implications for WS5 (experimental studies) 47

Annexes

Annex 1. Interviews questionnaires A-1
Annex 2. Chronogram of activities A-8
Annex 3. A situational analysis on monitoring the health sector A-10
Annex 4. List of persons met A-13
Annex 5. Health worker and stakeholder feedback on intervention designs A-14

List of tables

Table 1. Key health indicators of Nigeria. 9
Table 2. SWOT analysis of the NHMIS. 12
Table 3. List of paper-based tools and DHIS2 templates. 13
Table 4. Health facilities visited. 22
Table 5. Health workers responsibilities and decision-support tools. 24
Table 6. Verification exercises with perfect concordance. 38
Table 7. List of persons met. A-13
List of figures

Figure 1. Stakeholders positioning, based on workshop attendants views. 19
Figure 2. Stakeholders perceptions on the data quality criteria. 20
Figure 3. Workshops (1 and 2) evaluations by participants. 21
Figure 4. Map of Cross River State with localisation of sites visited. 23
Figure 5. The overall flow of paper-based HIS in health facilities. 26
Figure 6. Antenatal health care flow. 27
Figure 7. OPD care flow. 29
Figure 8. Immunisation flow. 31
Figure 9. Tuberculosis treatment flow. 33
Figure 10. Monthly reporting flow overview. 34
Figure 11. Data verification exercises that yielded over-reporting. 36
Figure 12. Data verification exercises that yielded under-reporting. 37
Figure 13. Summary of gaps on data sources. A-12
Figure 14. Summary of gaps in analytical capacities. A-12
Figure 15. Summary of gaps in the mechanisms for review and action. A-12

List of boxes

Box 1. Registers and reporting. 40
Box 2. Complementary tools when registers are not available. 41
Box 3. Tallying in immunisation. 41
Box 4. Paper tools are not integrated. 42
Box 5. Clinical care can be challenging. 42
Box 6. Tools do not include clinical guidelines. 43
Box 7. Care is mobile; registers are not. 43
Box 8. Tracking lost to follow up is not straightforward. 44
Box 9. Registers are not practical for transporting. 44
Box 10. Finding children lost to follow up is difficult. 45
Executive summary

Population health is directly affected by decisions taken by policy makers, managers, health care providers and by the population itself. Therefore, actions for improving the soundness of decisions need to embrace all decision making processes, starting at health facility level. The PHISICC project (Paper-Based Health Information System in Child Care) focuses on the paper components of the information system in three African countries (Côte d’Ivoire, Mozambique and Nigeria). Our research question is: what are the effects of paper-based information systems interventions on the quality and use of data and on health related outcomes in Primary Health Care (PHC) of Low- and Middle-Income Countries (LMIC)?

To this end, the PHISICC project assessed the status of the Health Management Information System (HMIS) in order to understand how data are produced, stored and transmitted and what is the human experience around data and decision making. Then, in creative partnership with country partners, we will engage in co-creative, collaborative and intentional design activities to innovate on the tools and processes to improve paper-based systems. We will then test these innovations using randomised controlled trials. This report refers to the first part of the project: the assessment of the HMIS in Nigeria.

We used a mixed methods approach from several perspectives: public health, health systems and Human Centred Design. Methods included: review of key Nigerian health policy documents and ten days of field work in Abuja and in Cross River State to carry out interviews and workshops with key stakeholders, stakeholders analyses, interviews with health workers, health facility data verification exercises and health workers shadowing. (observation). We did not aim to obtain generalizable findings, but rather to acquire an in-depth knowledge of the status of the HMIS, synthesising several types of evidence from several sources. Although we cannot rule out some degree of bias in our findings, we took all care to adhere to the widely accepted research standards. This research was cleared by the competent Nigerian ethical review board.

There are three levels of health care delivery in Nigeria: (i) the Federal level with teaching hospitals, specialist hospitals and 22 Federal Medical Centres, (ii) the State level, with general hospitals; and (iii) the Local Government Authority level (LGA), the primary level with where Primary Health Care (PHC) takes place. Accordingly, the National Health Management Information System (NHMIS), last reviewed in 2014, is organised following the same hierarchy of levels.

Common challenges of the HMIS in Nigeria included: (i) limited funding and inadequate human resources; (ii) irregular supply of data tools; (iii) lateral data collection by partners; (iv) lack of data analysis at the level of the data collection; and (v) lack of data use in decision making.

Our field work identified 24 paper-based forms used at health facility level and 43 templates / datasets from the DHIS2 system. Paper-forms include tools used at community level, tools used at the time of patient care (i.e. usually ‘registers’) and tools to report aggregated data to higher levels of the system. The monthly report form has 233 data entries. At the LGA (Local Government Area) health office, the information from monthly reports is entered into the DHIS2 system.

Fifty stakeholders were approached in the field work and participated in the different activities (interviews and workshops. Stakeholders,
together with governmental entities, are organised into several working groups to address HMIS issues. Some degree of donor pressure to shape the HMIS to donors’ preferences was reported. In the area of HIV/AIDS, the influence of PEPFAR to determine the current configuration of the HMIS in the area of HIV/AIDS was considerable. However, over the past few years, the leadership role of the FMOH (Federal Ministry of Health) has become stronger. The FMOH, particularly the DPRS (Department of Planning, Research and Statistics) and the NPHCDA are the leading agents in issues concerning the HMIS. The general perception is that the paper-based information system will continue to remain a source of data for the foreseeable future.

The HMIS was seen as the main source of evidence for decision-making. Other sources were not generally considered as part of the decision-making processes.

Stakeholders’ perceptions around PHISICC were unanimously positive. Stakeholders, championed by the NPHCDA, were supportive and expectant on the next steps of PHISICC.

The workshop participants were asked on their views regarding data quality criteria. Most considered ‘accuracy’ (concordance) as the most essential criteria, followed by completeness and timeliness. Interestingly, ‘user friendliness’ was less highly ranked. The least valued criteria was ‘responsiveness to donors’.

A striking finding from the visits at the health facilities was that data was mainly seen as something to keep track of what has been done, regardless whether it was actually used for decision making or not; and to report to the next higher level.

Health facilities had a general register where everyone entering a health facility would have his/her name noted down. Additionally, users would also be registered in the specific service register, e.g. the general consultation, antenatal care, or vaccination. Paper tools had numerous problematic issues related to the amount of information, quality of data and formats.

Data verification exercises were performed in six health facilities. Of the 52 data verification exercises, 21 had perfect concordance. The other 31 showed over-reporting (i.e. the figure found in the monthly report was larger than the figure found through the re-counting in the register) and under-reporting (i.e. the figure found in the monthly report was smaller than the figure found through the re-counting in the register).

Health facilities and LGAs receive support from several entities. For example, in some LGAs, the Ward Health Committees are involved in the production of ‘score cards’ to monitor health related activities, they also mobilise in order to print paper tools which may have been exhausted.

The presented findings and abundant details collected in field notes and conversations, are a promising base to support the development of innovative interventions to improve paper-based systems and tools in Nigeria. They confirm the need to focus on decision making at health facility level. Team and partners also acknowledged challenges related to those who do not use health facilities since the impact of any improvement in the systems will not reach them unless a new HMIS directly or indirectly promotes the use of health services. Our findings also confirm the need to put health workers at the centre of the innovations design process in order to make their work more efficient, less heavy, more satisfactory and, through these means, more accurate and responsive to populations health care needs.
1 Project background

Population health is directly affected by decisions made by policy makers, managers, health care providers and by the population itself. Decisions are made by applying judgements to evidence describing problems or suggesting solutions. However, judgments are influenced by personal, organisational and political factors; besides, evidence always has some degree of bias. Therefore, actions for improving the soundness of decisions need to embrace all the decision-making processes, from the production of better quality evidence up to the development of more transparent and systematic evidence informed judgements.

One of the sources used for decision making in health care is the information routinely produced in health facilities in the course of clinical, public health and management activities, which is sequentially aggregated and sent to the higher levels of the system up to the national level (Health Management Information Systems – HMIS).

While some or most of processes involved in data* production, transmission and use can and have been digitalised in many countries, paper tools continue and will continue to be used especially at the point of care, in Primary Health Care (PHC) and in remote areas, where technical requirements for digital systems are not fully available.

In an era of increasing digitalisation, paper based information components have been neglected. However, they are essential because they are often the primary source of data and, therefore, errors at this level may be transmitted and amplified to the highest levels of the information systems.

* We use the terms ‘data’ and ‘information’ indistinctly, although we acknowledge that in information theory these terms have different meanings.

In the current project (Paper-Based Health Information Systems in Child Care – PHISICC) we focus on the paper components of the information system in three African countries. The project is organised in a partnership between the Swiss TPH (Switzerland), gravitytank/Salesforce (the USA), the University of Calabar, the National Primary Health Care Development Agency (NPHCDA) of Nigeria and the Federal Ministry of Health of Nigeria.

Our overall project research question is: what are the effects of paper-based information systems interventions on the quality and use of data and on health-related outcomes in PHC of Low- and Middle-Income Countries (LMIC)?

To this end, we will assess the status of health information systems in the country, in order to understand how data are produced, stored and transmitted and what the human experience is around data and decision making. Then, in creative partnership with the country, we will engage in co-creative, collaborative and intentional design activities to redesign the tools and processes to improve paper-based systems (work stream 4 –WS4). Finally, we will design and implement three cluster randomised controlled trials to test the effects of the interventions designed (work stream 5 –WS5).

This report refers to the first part of the project: the assessment of the HMIS in the country through an observational, mixed-methods approach. The fieldwork of this assessment in Nigeria took place in December 2016. The objectives of the assessment were to:

1. understand the Health Information System (HIS) within the national health sector;
2. describe how the HMIS is used in the country;
3. identify strengths and weaknesses of the HMIS;
4. outline the implications of these findings for WS4 and WS5.
2 Approaches and methods

We summarise in this section the approaches and methods used in WS3 in Nigeria. For a full description of methods, see the WS3 protocol.

2.1 Documents and forms review

The National Primary Health Care Development Agency (NPHCDA) was asked to provide key strategic documents from the governmental health sector to understand the overall health policy context, strategies and priorities, especially in relation to the HMIS. Documents were scrutinised and relevant statements related to HMIS, decision making, evidence and use of evidence were searched and extracted. Information on HMIS guidelines, flow of data and processes was especially searched and extracted to provide a synthesis to inform the field work. Documents included:

- Strategic Health Development Plan 2010-2015
- HMIS System Strategic Plan 2014 - 2018
- HMIS Standard Operating Procedures

We acknowledge that in this context, the following two documents were also important: the National Health Policy of 2004 and the National HIS Policy of 2014. The document review was supported by a series of informal interviews with experts knowledgeable of the health sector and HMIS in Nigeria.

The NPHCDA was also requested to provide a set of all forms used in PHC in the governmental health sector. Besides, the visits to health facilities, snapshots of available forms were taken. With this material, we compiled a list of forms used and data items in each form that were analysed and tabulated. Each data item was classified according to its function (e.g. health data, context data, such as date or health facility name, instructions to enter the data), structure (e.g. single item, list, table), the data entry mask, the codes used for values if any, the type of contents (e.g. health status, demographic data) and recorded any detected issue, such as redundancy of data items, spelling errors or abbreviations not explained. Data items across different sources and forms were mapped using a line graphic in order to describe the flow and use of each data item. We also downloaded templates and variables names from the DHIS2 system to include in the analyses of metadata items and flow.

---

2 Strategic Health Development Plan (2010-2015)
5 These forms are available for consultation on request to the Swiss TPH.
2.2 Stakeholders engagement and workshops

Stakeholders in the country with direct or indirect interests and contributions to the HMIS were identified with the help of NPHCDA officials, the PHISICC focal person of the University of Calabar and the national PHISICC Coordinator. Stakeholders were invited to two workshops: one at the beginning of the country visit to learn about the HMIS in the country and to present the project, plan and rationale of the fieldwork; and another one at the end, to share preliminary findings and facilitate discussions. Both workshops also served to gather information from the participants. Short questionnaires were used to gather some of the information.

The first workshop consisted of a mix of plenary sessions and discussion parts. It was structured in three parts:

(a) project background and introductions;
(b) discussion on the current state of PHC and HMIS;
(c) discussion on several aspects of PHISICC.

The second workshop consisted of a mix of plenary sessions and discussion sessions and was structured as follows:

(a) welcoming;
(b) review of initial findings;
(c) discussion, based on questions to participants;
(d) feedback session; using scenarios, brainstorm solutions to improve the HIS.

In the first stakeholders workshop we carried out a ‘stakeholder positioning’ exercise. Attendants to the workshop were asked to rate stakeholders in the country in relation to the following criteria:

(a) Influential: its opinions on HIS are usually strong and followed by most of the stakeholders
(b) Prepared: has the technical capacity to identify problems and propose solutions on HIS.
(c) Active: is present, contributes, participates in meetings, events and activities related to HIS.
(d) Effective: is able to propose and implement good solutions to problems identified in HIS.
(e) Reliable: is very knowledgeable and able to provide advice when required, on HIS.
(f) Renowned: has good reputation among stakeholders, is often invited to participate and contribute to events related to HIS.
(g) Problematic: it is usually against change and innovation on HIS.

Stakeholders in the proposed list were: the FMOH, the NPHCDA, the WHO, the UNICEF, the World Bank, the CDC, MEASURE Evaluation, PEPFAR, Pathfinder, the Global Fund, USAID, DFID, the BMGF, the EU-SIGN, SFH and CHAI. Attendants could also add other stakeholders if they felt to do so.

The same exercise was repeated, but this time asking how would they wish each stakeholder to be positioned against the same criteria, in order to capture potentially relevant differences between the current status and the ‘wished’ status for each stakeholder.

Finally, workshop participants were also asked to rate (in order if possible) data quality criteria according to their overall importance in the context of HMIS. These included:

(a) Accuracy (Concordance): ability to convey results which are close to the ‘real’ values
(b) Completeness: absence of missing information
(c) Responsiveness to donors: ability to comply with donors’ data needs
(d) Timeliness: capacity to produce information to inform decisions
(e) User friendliness: easiness and positive experience in handling data

A subset of stakeholders which were identified as active contributors to the HMIS in the country were individually interviewed in order to gather additional, first-hand information on the functioning of the HMIS, challenges, opportunities and, overall, on how stakeholders would see the future of the HMIS and the paper components of it. We held semi-structured interviews with stakeholders. The experience in Côte d’Ivoire suggested that too tight interview guides could jeopardise the richness of issues raised by interviewees. We decided, therefore, to have a more open approach in Nigeria, even if this could partially compromise the capacity to synthesise the information gathered from different stakeholders.

2.3 Visits to sites

A purposive sample of health facilities was agreed with project partners. The sample included rural and urban, good and poor performing, as perceived by country project partners, as well as remote health facilities.

The activities carried out in health facilities were:

1) interviews with the facility main staff, typically with the head of the health facility. Interviews were meant to understand the general functioning of health facilities and the staff experience with data and data use. The generic questionnaire can be found in Annex 1.

2) verification of primary filled forms against reports containing aggregated data in order to estimate concordance (accuracy) between the aggregated figures in reports sent by the health facilities to the district health office and the figures obtained by re-counting of the number of health care events as seen in the recording forms (registers) of the visited health facility. This allows the calculation a verification ratio for each verified item (e.g. number of deliveries in a given month); this ratio is the reported number versus the re-aggregated (or re-counted) number. We also compared primary forms with actual events, which could be easily done where pharmacies were keeping stock card or any equivalent records. We used standard Data Quality Audits (DQA)* methods to guide the data verification activities.

3) Shadowing of health workers activities (see below, section Error! Reference source not found.).

Data collection was supported as well by the Open Data Kit (ODK) system. Quantitative data were analysed using R.

2.4 Human-centred design approach

We employed a human-centred design approach to understand information use and decision-making by health workers and stakeholders. With this approach, we view the activities through the perspective of

the health workers at the primary health care facilities. The relevance and appropriateness of health care activities are assessed in terms of the health workers’ views and perspectives, and not only in terms of efficacy or efficiency.

At the primary health care facilities, we engaged health workers in three different human-centred design research activities:

1. Observation: We watched as health workers cared for their patients.
2. Demonstration: When no patients were present, health workers showed us how they use the forms and registers while caring for patients and preparing the monthly reports.
3. Stimulation: We showed health workers early intervention prototypes to elicit feedback on the impact of potential changes to the paper-based system.

Regarding the human-centred design approach, we visited seven primary health care centres over three days in December 2016:

1. Ikot Ansa PHC; Calabar Municipality - urban; Tuberculosis service
2. Mma Effa PHC; Akampa LGA – rural; Mother & Child Immunization service
3. Abini PHC; Biase LGA – rural; Ante-natal and Out Patient service
4. Akim Qua PHC; Calabar Municipality – urban; Ante-natal service and nutrition intervention
5. Kasuk PHC; Calabar Municipality – urban; Immunization and Out Patient services
6. Ekpo Abasi PHC; Calabar South – urban
7. Nelson Mandela PHC; Calabar South – urban

No outreach sites were visited, despite that outreach may challenges recording practices when large books or form have to be safely transported and taken care of.

2.5 Data management and clearances

Visits to health facilities were partially video recorded and photographs were taken using standard equipment by gravitytank/Salesforce, after asking for permission. In any case, care was taken not to record patients and when this was accidentally done, these parts of the recording or the whole recording were securely destroyed.

Qualitative and quantitative information from workshops and informal meetings were recorded into text based applications and safely stored in the Swiss TPH server.

Qualitative information from stakeholder interviews and site visits and quantitative data from site visits were entered into a tablet-based data collection tool (ODK), which uploaded the data to a server database that was retrievable in csv format. Qualitative information was revised and rewritten to be included in this report. No specific qualitative data management techniques were used.

Quantitative data were imported and analysed using R\(^2\) to produce estimates and graphs.

The research protocol was submitted in order to obtain administrative and research ethical clearances. Documentation was submitted by the University of Calabar before the appropriate authorities in the

\(^1\) ODK. Open Data Kit. https://opendatakit.org/.

country to approve the research, provide clearances to national research partners and to allow visiting of health facilities.

Verbal and written authorisation was obtained by the heads of health facilities to allow videotaping of interviews and activities in the health facilities. Care was taken not to photograph or videotape patients.

2.6 Limitations

The methods of this research do not allow the generalisation of findings. Our aim was not to describe specific health facilities or events, but rather to gain an in-depth understanding of emerging issues when dealing with HMIS in settings with constrained resources. By producing a synthesis from several perspectives (i.e. public health, health systems and HCD) and sources of information (e.g. stakeholders, health workers, partners), we have been able to offer a landscape of the main issues related to HMIS in PHC. Some of these issues are well known and already reported in the literature; some others are not so prominent but have shown worth to take into account, and others are relatively new and specific to the country setting.

Our findings are indeed subject to bias. We have tried to minimise bias by taking care the questionnaires are built in a ‘neutral’ manner, but minimising interventions during the shadowing processes and by using standard methods and approaches (e.g. DQA).
3 Findings

The work presented in this report took place in the following sites in Nigeria in December 2016: Abuja, Calabar and in urban and rural areas of Cross River State. Some other work took place with specific teams in Basel (Switzerland) and in Chicago (USA) from some weeks before the fieldwork and subsequently. See the chronogram of the fieldwork in Annex 2.

3.1 Country profile

Nigeria is one of the three countries involved in PHISICC. Nigeria, inhabited by over 500 ethnic groups, is the largest populated country in the African continent and the world’s 20th largest economy. It has 36 states plus the Federal Capital Territory. Table 1 provides an overview of key indicators of Nigeria related to health for the year 2015 unless it is otherwise indicated.

Table 1. Key health indicators of Nigeria.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (in 2015)</td>
<td>182.2 million</td>
</tr>
<tr>
<td>Life expectancy at birth</td>
<td>55 years in 2013</td>
</tr>
<tr>
<td>Maternal mortality ratio (in 2015)</td>
<td>814 per 100’000 live births</td>
</tr>
<tr>
<td>(the fourth-highest maternal mortality ratio in the world)</td>
<td></td>
</tr>
<tr>
<td>Infant mortality rate (in 2015)</td>
<td>69 per 1000 live births</td>
</tr>
<tr>
<td>General government expenditure on health as a % of total government expenditure</td>
<td>6.5% in 2013</td>
</tr>
<tr>
<td>General government expenditure on health as a % of total expenditure on health</td>
<td>23.9% in 2013</td>
</tr>
<tr>
<td>Out-of-pocket expenditure as a % of total expenditure on health</td>
<td>72.9% in 2013</td>
</tr>
<tr>
<td>Distribution of years of life lost by major cause group (%) in 2012</td>
<td>Communicable diseases 73%</td>
</tr>
<tr>
<td></td>
<td>Non-communicable diseases 16%</td>
</tr>
<tr>
<td></td>
<td>Injuries 10%</td>
</tr>
<tr>
<td>Prevalence of HIV (% of ages 15-24 years)</td>
<td>3.2%</td>
</tr>
</tbody>
</table>


3.2 Outline of the health sector and HMIS from the documents review

3.2.1 General aspects

There are three levels of health care delivery in Nigeria:

1. Federal level, the tertiary level with teaching hospitals, specialist hospitals and Federal Medical Centres (there are 22 of them in Nigeria)
2. State level, the secondary level with general hospitals
3. Local Government level (LGA), the primary level with Primary Health Care (PHC) centres. The primary level has three sub-levels: primary health centres, health clinics and (most peripheral) health posts.
In Cross River State, there are (as of early 2017) 1195 health facilities; 1012 of them are public (among them, 23 are general hospitals) and 183 of them are private. The DHIS2 system has captured 1057 facilities (919 public and 138 private health facilities). However, only 969 facilities reported to the DHIS2 system (919 public and 50 private health facilities).

The National Health Management Information System (NHMIS) was operationalised in 1999, reviewed in 2004 and then again in 2014. The NHMIS is organised into three levels where data are produced:

1. the primary level: at the periphery, data are produced by health facilities: Village Health Workers (VHW) and Community Health Extension Workers (CHEW) report monthly to the PHC centres. The PHC centres in turn submit a monthly report to the LGA. In addition, the PHC centres report quarterly to the State.

2. at the LGA level, digitalisation of data takes place. According to guidelines, Nokia phones or android devices are used to enter data into the DHIS2 platform by the LGA M&E officer. However, in reality, commonly computers are used for data entry (see also section 3.5.6). Entered data are saved on a server, with FMOH and NPHCDA having administrative access rights for all levels. The State has administrative access to all the data from the LGAs under it and the LGA has access to its own data in the server.

3. the DHIS2 focal person at the SMOH (State Ministry of Health) sends twice a year reports to the Federal level, the DPRS (Department of Planning, Research and Statistics) receives summary data from the LGAs.

In Cross River State, there were monthly LGA M&E validation/feedback meetings, meeting for reviewing all health indicators and feedback. However, currently there is gross irregularity in the hosting of this meeting. Regarding immunisation, there is still a regular and active monthly validation/feedback meeting of the Local Immunisation Officers, sponsored by World Health Organization.

Additionally, the National Population Commission (NPopC) was established in 1989 to conduct regular censuses in Nigeria. This was followed by the ‘births, deaths, and related issues (compulsory) registration’ amendment three years later, although we did not assess the level of implementation of these practices. The latest figures available are from the 2006 census. The NPopC also has the mandate to conduct surveys and other studies.

* For updating the denominators, it is currently discussed to have a census in 2018. Other options are also being discussed.
Based on the review of documents, common challenges affecting the HMIS of Nigeria were extracted by the project team and are listed below:

- limited funding;
- inadequate human resources;
- irregular supply of data tools;
- lateral data collection by partners;
- lack of data analysis at the level of the data collection;
- lack of data use in decision making;

And in relation to data digitalization, the following challenges were reported in the documents:

- Frequent occurrence of power cuts
- Inadequate numbers of ICT devices
- Limited internet access
- Limited ICT skills.

Additionally, Annex 3 presents the key challenges affecting the health system monitoring and evaluation. It draws from a document that as of March 2017 existed only in the draft form.

### 3.2.2 Paper-based HMIS

Paper has a prominent role in the HMIS in Nigeria. This does not only apply to health facilities, but also to other instances, such as the maintenance of the paper-based registers of health facilities at the LGA level (National Health Facility List). We saw several recent versions of forms in the health facilities, predominantly issues by the government but also from stakeholders and NGOs.

There are SOPs/guidelines at facilities for service provision for every intervention but not for archival of paper forms.

Responsibilities in relation to the paper tools are shared between different entities: FMOH is responsible for the specifications of the tools, the final acceptance of indicators definitions proposed by partners and their inclusion into forms and the physical specifications of the tools (e.g. size of paper); the Health Data Governance Council and the Health Data Consultative Committee are in charge of mobilising resources for the printing and distribution of tools.

The last version of the paper tools is from 2013 and there is an explicit mandate to keep ‘unified templates’ and the description of paper for printing.

There is a recommendation for community service units, PHCs, public and private health facilities within the LGAs which use mobile java-enabled phone technology or internet-ready computers to upload their data by electronic systems. The HMIS SOP adds that “all the paper-trail will be kept safe as described above in the paper-based method, basically for easy follow up during data validation and data quality assessment by the LGA IHDMT members”. Interestingly, this statement could be interpreted in the sense

---

1 We did not assess the supply systems of the HMIS. However, this will be studied in the course of the upcoming months as required in work stream 5 (randomised controlled trials).
that health sector officials still give more credibility to paper systems and may feel more at ease in handling it.

3.2.3 SWOT of the HIS

The SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) to the HIS was based on a desk review of the document “National Health Information System Strategic Plan, 2014-2018” of the DPRS. Table 2 presents the findings.

Table 2. SWOT analysis of the NHMIS.

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The DPRS of the FMOH has harmonised all data collection and reporting tools for the different programmes being implemented in the country.</td>
<td>- Serious capacity challenges within the FMOH, partly based on emigration of skilled health care providers, hamper all areas of health care, including management of the health information system.</td>
</tr>
<tr>
<td>- Every five years NPopC conducts the Demographic and Health Surveys in Nigeria; and other surveys are carried out more frequently.</td>
<td>- Lack of sense of ownership of data (production and usage), especially at peripheral level.</td>
</tr>
<tr>
<td>- In 2015, the National Health and Nutrition Survey (NNHS) was carried out by the National Bureau of Statistics and the report is available. NNHS used the SMART methodology (Standardized Monitoring and Assessment of Relief and Transition) and are performed annually.</td>
<td>- While the NPHCDA is responsible for coordination and leadership related to the NHMIS, the LGAs are responsible for implementation and most LGAs lack the political will and funding capacity to deliver quality services which also affects the NHMIS.</td>
</tr>
<tr>
<td>- The FMOH assigned a so-called National Provider Identifier to each health facility to enhance the information system.</td>
<td>- The creation of special agencies such as the NPHCDA combined with the emergence of vertical disease control programs and numerous vertical donor-funded programmes may have weakened overall health information system.</td>
</tr>
<tr>
<td>- Existence of national HMIS stakeholders and their working groups that meet regularly</td>
<td>- Research based on the HMIS or carrying out specific studies were neglected. Consequently, there is a paucity of local or contextual evidence to support policy and planning.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Stakeholders’ consensus to strengthen the HIS.</td>
<td>- Although national policies formulated by the FMOH provide some level of standardization, each level of government is largely autonomous in the financing and management of services under its jurisdiction.</td>
</tr>
<tr>
<td>- Funds within vertical programmes that can be leveraged to strengthen the HIS.</td>
<td>- Disease-focused demands driven by heavily funded donor projects and international reporting obligations towards specific diseases like HIV/AIDS, tuberculosis and malaria have compromised the overall running of the health information system.</td>
</tr>
<tr>
<td>- Availability of a National Strategic Health Development Plan and an M&amp;E Framework which provides overall policy guidance for the HIS.</td>
<td>- Parallel donor-supported data collection at facility level</td>
</tr>
<tr>
<td>- There is a new policy that provides a framework for inter-sectoral integration and addresses the HIS as an enterprise governed by a council chaired by the Minister of Health.</td>
<td>- Inadequate financial resources</td>
</tr>
</tbody>
</table>

3.3 HMIS metadata

3.3.1 Overview of forms

We were provided, or identified, 24 paper-based forms used at health facility level and 43 templates/data sets from the DHIS2 system. Paper-forms include tools used at community level (e.g. the child health card –level 0), tools used at the time of patient care (i.e. usually ‘registers’ –level 1) and tools to report aggregated data to higher levels of the system (level 2). DHIS2 templates have been assigned level 3.

There are 16 level 1 tools for health facilities, for specific programmes, and there is generally at least one tool per programme. An exception is the immunisation programme for which there are two different tools: one to tally the immunisations as they are provided and another to register the children as they access the health facility. In the ideal situation, each child’s information is entered into the register at the time of their first visit to the facility and then the register is supposed to be searched every time a child comes for subsequent vaccination to avoid multiple recording of the same child.

There are three level 2 reporting tools: two monthly and one quarterly. We could not substantiate the use of the latter. Interestingly, there is one monthly report for all areas, including immunisation and then an additional monthly report for immunisation alone, using another format.

Monthly data are sent from community and health facility to the LGA and these are entered into the DHIS2 database: monthly summary tools for community / village data this), monthly facility summary tool, quarterly LGA HMIS data tool, and biannual State HMIS data tools. The LGA summarises data quarterly to the State using the quarterly summary form. The State does so biannually to the Federal using the biannual summary form.

In order to produce a first impression of the volume of data that may be involved in the HMIS, we have searched, identified and listed paper-based tools as well as DHIS2 datasets (see table below), showing 24 of the former and 43 of the latter.

<table>
<thead>
<tr>
<th>Tools</th>
<th>Form label</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper printed forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Child health card (the home-based record)</td>
<td>Child health card</td>
<td>0</td>
</tr>
<tr>
<td>2. OPD card</td>
<td>OPD</td>
<td>0</td>
</tr>
<tr>
<td>3. Pregnant woman TT vaccination card</td>
<td>TT</td>
<td>0</td>
</tr>
<tr>
<td>4. Ante-natal care appointment card</td>
<td>ANC-PNC</td>
<td>0</td>
</tr>
<tr>
<td>5. Tuberculosis patient treatment support card</td>
<td>TB</td>
<td>0</td>
</tr>
<tr>
<td>6. Daily general attendance register</td>
<td>Attendance</td>
<td>1</td>
</tr>
<tr>
<td>7. Health facility inpatient daily register</td>
<td>Inpatients</td>
<td>1</td>
</tr>
<tr>
<td>8. Children treatment card</td>
<td>OPD</td>
<td>1</td>
</tr>
<tr>
<td>9. OPD treatment card</td>
<td>OPD</td>
<td>1</td>
</tr>
<tr>
<td>10. Health Facility daily OPD register</td>
<td>OPD</td>
<td>1</td>
</tr>
</tbody>
</table>

*The quarterly reporting tool was meant to be used in the LGA to generate a quarterly summary of data already reported monthly to the State. However, this worked until the emergence of the DHIS were even though monthly data is reported, one can use the system Pivot table to generate both quarterly and bi-annually reports at both State and LGA levels.
### Findings

<table>
<thead>
<tr>
<th>Tools</th>
<th>Form label</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Health facility daily immunisation tally sheet</td>
<td>IMM tally</td>
<td>1</td>
</tr>
<tr>
<td>12. Child Immunisation register</td>
<td>IMM register</td>
<td>1</td>
</tr>
<tr>
<td>13. Health facility GMP daily register</td>
<td>Nutrition</td>
<td>1</td>
</tr>
<tr>
<td>14. Tetanus Toxoid register for women of child bearing age</td>
<td>TT</td>
<td>1</td>
</tr>
<tr>
<td>15. Health Family Planning Daily Register</td>
<td>FP</td>
<td>1</td>
</tr>
<tr>
<td>16. Daily labour and delivery register</td>
<td>Delivery</td>
<td>1</td>
</tr>
<tr>
<td>17. Ante-natal care card</td>
<td>ANC-PNC</td>
<td>1</td>
</tr>
<tr>
<td>18. Health Facility ANC daily register</td>
<td>ANM-PNC</td>
<td>1</td>
</tr>
<tr>
<td>19. PMTCT/ARV register</td>
<td>PMTCT/ARV</td>
<td>1</td>
</tr>
<tr>
<td>20. Tuberculosis patient treatment card</td>
<td>TB</td>
<td>1</td>
</tr>
<tr>
<td>21. Tuberculosis stock card</td>
<td>TB</td>
<td>1</td>
</tr>
<tr>
<td>22. Monthly summary form</td>
<td>Monthly summary</td>
<td>2</td>
</tr>
<tr>
<td>23. Health Facility monthly immunisation summary*</td>
<td>IMM monthly</td>
<td>2</td>
</tr>
<tr>
<td>24. Quarterly summary</td>
<td>Quarterly summary</td>
<td>2</td>
</tr>
</tbody>
</table>

### DHIS2 datasets

1. Adverse Drug Reaction A                                            | Adverse Drug Reaction       | 3     |
2. Adverse Drug Reaction B                                            | Adverse Drug Reaction       | 3     |
3. Commodity Availability                                             | Commodity Availability      | 3     |
4. Facility Attendance - A                                            | Facility Attendance         | 3     |
5. Facility Attendance - B                                            | Facility Attendance         | 3     |
6. Family Planning A                                                  | Family Planning             | 3     |
7. Family Planning B                                                  | Family Planning             | 3     |
8. HIV care & treatment                                               | HIV care & treatment        | 3     |
9. HIV Counselling & Testing A                                        | HIV Counselling & Testing   | 3     |
10. HIV Counselling & Testing B                                       | HIV Counselling & Testing   | 3     |
11. IMCI                                                               | IMCI                        | 3     |
12. Immunization                                                      | Immunization                | 3     |
13. Inpatient                                                         | Inpatient                   | 3     |
14. Inpatient Admissions                                              | Inpatient Admissions        | 3     |
15. Laboratory                                                        | Laboratory                  | 3     |
16. Malaria Cases                                                     | Malaria Cases               | 3     |
17. Malaria in Pregnancy                                              | Malaria in Pregnancy        | 3     |
18. Malaria Prevention (LLIN)                                          | Malaria Prevention (LLIN)   | 3     |
19. Malaria Testing                                                   | Malaria Testing             | 3     |
20. Malaria Treatment                                                 | Malaria Treatment           | 3     |
22. Maternal Health(Labour and Delivery(                               | Delivery                    | 3     |
23. Maternal Mortality A                                              | Maternal Mortality          | 3     |
24. Maternal Mortality B                                              | Maternal Mortality          | 3     |
25. Mortality                                                         | Mortality                   | 3     |
27. Non Communicable Disease                                          | NCD                         | 3     |
28. Nutrition                                                         | Nutrition                   | 3     |
29. Obstetric Fistula A                                               | Obstetric Fistula           | 3     |
30. Obstetric Fistula B                                               | Obstetric Fistula           | 3     |
31. Pharmaceutical Service                                            | Pharmaceutical Service      | 3     |
32. PMTCT - Infant                                                   | PMTCT - Infant             | 3     |
33. PMTCT - Mother                                                   | PMTCT - Mother              | 3     |

*In 2017, a monthly health facility vaccine utilization summary form was introduced as supplementary form.*
34. Pregnancy Outcome – Complication | Pregnancy complication | 3
35. Pregnancy Outcome - Live births | Live births | 3
36. Pregnancy Outcome - Still birth | Still births | 3
37. Referrals | Referrals | 3
38. Sexually Transmitted Infections | STI | 3
39. SRH-HIV Integration | SRH-HIV Integration | 3
40. TBHIV | TB-HIV | 3
41. TBLP | TB-LP | 3
42. Tetanus Toxoid (Women of child-bearing age) | TT | 3
43. Under 5 Mortality | Under 5 Mortality | 3

Levels: 0 community; 1 health facility daily; 2: health facility monthly; 3: DHIS2.
Note: Table 3 may wrongly give the impression that "paper-based" forms are different from DHIS2 forms. However, DHIS2 is the application for the HMIS. Data generated using the HMIS are summarized monthly and entered into the DHIS2 platform (the monthly summarized form).

In contrast, DHIS2 contains 43 templates/data sets, almost double the number of paper forms filled in the health facilities. The reasons for this include: (a) split of information received from the health facilities (e.g. a single form is used for PMTCT (Prevention of mother-to-child transmission of HIV) at health facilities, the reporting of which is entered using two DHIS2 templates: one for infants and another one for mothers) (b) modules of the data of which are not necessarily reported in health facilities (see metadata analyses below); and (c) DHIS2 modules which are inactive. See section 3.5.6 for comments on the practical implementation of DHIS2.

3.3.2 The Monthly report

The monthly report is called “NHMIS Monthly Summary Form for Health Facilities”. The current version used is from the year 2013. It existed first in an A4-size format, containing 7 pages; later on an A3-size format of two pages was introduced. In some facilities, both formats seem to co-exist. It has 233 data entries apart from a few variables regarding the identification of the health facility. The sections of the monthly report are:

1. Identification
2. Health Facility Attendance
3. Maternal Health (Ante & Post-natal Care)
4. Maternal Health (Labour and Delivery)
5. Tetanus Toxoid (Women of child bearing age)
6. Pregnancy Outcome – Live Births
7. Pregnancy Outcome – Still Births
8. Pregnancy Outcome – Complications
9. Immunization
10. Nutrition
11. Malaria Prevention (LLIN)
12. IMCI
13. Family Planning
14. Referrals  
15. Non-communicable diseases  
16. Sexually transmitted infections  
17. Laboratory  
18. Inpatient  
19. Inpatient Admissions  
20. Pharmaceutical service  
21. Adverse Drug Reaction  
22. Mortality  
23. Maternal Mortality  
24. Neonatal Deaths (Causes)  
25. Under 5 Mortality (Causes)  
26. HIV, TB, Malaria and Integrated Services (with many sub-sections)  
27. Commodity Availability

The monthly report is filled in by the M&E Focal person of the health facility, which can be a Community Health Extension Worker (CHEW) (due to a general lack of Health Information Managers). The deadline for the submission of the monthly report is the 7th day of the next month. At the LGA health office, the information from the monthly reports needs to be entered into the DHIS2 system by the 14th day of the next month (done by the M&E Focal person).

### 3.4 Stakeholders interactions

We contacted a considerable number of stakeholders which have key roles related to the HMIS in the country. Stakeholders contacted included: the NPHCDA, Planning Research and Statistics FMOH, the local offices of BMGF, UNICEF, WHO, Marie Stopes (FH+), USAID, the World Bank, Measure Evaluation, FHI 360, PEPFAR, AFNET, Cross River SMOH, Cross River SMOH PRS, CDC, CHAI, and Cross River SPHCD A.

Stakeholders participated in interviews or workshops and some of them in both events. A complete list of persons met is in Annex 3.

#### 3.4.1 Stakeholders interviews

We held semi-structured interviews with stakeholders. They were asked what would be the ideal and the actual sources of evidence to support decision making in the governmental health sector in the country. We considered any type of decision, whether at high policy level (e.g. introducing or removing user fees), strategic level (e.g. decisions on supply mechanisms at national or state levels) or managerial level (e.g. staff redistribution). We also considered clinical decisions (although these were mostly not applicable to stakeholders), public health decisions and management decisions. Ideal evidence sources consistently included HMIS and less frequently mentioned were surveys and M&E reports; other sources occasionally mentioned were reports issued by the FMOH, published research and ‘other’ reports. Stakeholders equally mentioned HMIS as the main source for actual decision-making and occasionally surveys and M&E reports.

Stakeholders were also requested to rank which data quality criteria among a list of criteria provided would be considered the most important for the HMIS in general and for data based on paper tools. Criteria included: Relevance, Comprehensiveness, Completeness, Accuracy (Concordance), Precision,
Timeliness, Simplicity and Presentation. Interestingly, in both domains, no stakeholders seemed prepared to compromise any criteria (i.e. all criteria were perceived to be important) although minimal variations could be observed. Data quality criteria were also discussed during the workshop (see Section 3.4.3).

Stakeholders unanimously reported concerns about data quality. Data inaccuracies happen at all levels and a stakeholder even mentioned that quality deteriorates as data reach, or are produced at, secondary and tertiary levels of the health system.

The stakeholders landscape seemed to be better coordinated than in Côte d’Ivoire; however, like in Côte d’Ivoire, it has been reported that there is some degree of donor pressure to shape the HMIS to donors’ preferences. Part of the stakeholders’ support is structured around ‘donor consultation’ processes for the HMIS and the three big diseases (HIV/AIDS, tuberculosis and malaria). Other support is dependent on each stakeholder, as shown in the following paragraphs. Stakeholders, together with governmental entities, are organised into several working groups/committees, which may address HMIS issues (the first three Working groups are all under the NPHCDA):

- Monitoring and Evaluation Working Group
- Routine Immunisation Working Group (RIWG)
- Operations Research Advisory group*
- The Health Data Consultative Committee (it provides technical advice)
- The Health Data Governance Council (the highest health data governance body)

Several stakeholders pointed at the predominant role of the PEPFAR in determining the current configuration of the HMIS in the area of HIV/AIDS, suggesting that the FMOH could be more proactive to exert leadership. However, it was reported that in the last years the FMOH was gaining leadership. For example, high level organisations have the responsibility to endorse changes in the HMIS (e.g. the National Council on Health, which endorses the adoption of the DHIS2 systems).

MEASURE Evaluation helped the HMIS in supporting the development of national master health facilities list and in incorporating core indicators promoted by the WHO and health programmes, making all that data available into the national DHIS2 instance at all levels. Support extended as well to the development of Standard Operating Procedures, strengthening of the Department of Health Planning, Research and Statistics (DHPRS) of the FMOH in reactivating the HMIS governance structures and the implementation of data quality review. CDC has provided support to data analytics (e.g. dashboards development) on the DHIS2 and there has also been a review of HIV data collection tools’ used at health facilities."

### 3.4.2 Stakeholders positioning

Opinions of workshop attendants on the current and ‘ideal’ or ‘desired’ stakeholders positioning of several criteria (see methods section 2.2) have been plotted in Figure 1: ‘influential’, ‘active’, ‘effective’ and ‘renowned’. It is worthwhile to mention that this graphic is not meant to be an accurate representation of the real stakeholders positioning, but rather a representation of workshop participants’ views in order to

---

*Reported by Phyllis Ogah.

† At secondary and tertiary levels HIV data are channelled directly through the DHIS2 (e.g. eNNRIMS form).
stimulate the thinking and dialogue on how to better understand and engage with stakeholders which may have different perspectives and roles to play in relation to the HMIS. This can also be used to inform the reflections on the positioning of stakeholders in relation to changes and innovations in the HMIS operated through PHISICC.

The graph (Figure 1) plots the four variables using bubbles (one bubble represents one stakeholder). 'Influential' in the horizontal X axis, 'Active' in the vertical Y axis, ‘Effective’ is represented with the size of the bubble and ‘Renowned’ categories follow a traffic like code for ‘average’, ‘good’ and ‘very good’. There are also two colour intensities: solid colours represent participants’ perspectives on the current situation; and semi-transparent colours represent participant ‘wishes’ on the ideal stakeholders’ positioning.

We can observe in the graph a tendency to correlate ‘influential’ and ‘active’ and, similarly with some exceptions, with ‘effective’ (larger bubbles towards the upper-right quadrant) and ‘renowned’ (more ‘green’ towards the upper-right quadrant).

The current positioning (solid coloured bubbles) suggests that the FMOH, the WHO and the NPHCDA seem to be the leading stakeholders. However, the NPHCDA would be rated as less renowned (yellow bubble) compared to the others. In contrast, in the lower end we can find some donors and NGOs: Pathfinder, AFENET and PEPFAR among others. AFENET, though, is rated as highly effective (large size bubble). A cluster of WB, CHAI, DFID and MEASURE Evaluation are placed in the middle of the graphic, and slightly above a cluster with the BMGF, CDC, UNICEF and USAID.
Figure 1. Stakholders positioning, based on workshop attendants views.

Notes:
Each bubble represents one stakeholder. Solid colours represent assessments of the ‘current’ situation; semi-transparent bubbles represent the ‘ideal’ positioning envisioned by attendants (‘wish’).

The position of bubbles is relative and the left-lower corner does not mean ‘zero’ but just less than bubbles situated in higher positions. This is the reason why we have omitted numeric scales.

Some ‘current’ and ‘desired’ bubbles may overlap if assessments were similar.

There were some changes in terms of what would be considered as the ‘ideal’ positioning of stakeholders. Interestingly, the views were more diversified and tended, in general, to slightly downgrade the positioning of stakeholders in most of the criteria. In relative positions between stakeholders (which is how the graphic should be read), workshop attendants would keep a relatively high position of the FMOH but downgrade the one of the NPHCDA and even more WHO. A new cluster appears in the bottom-left corner of the graphic exclusively occupied by donors, NGOs and multilateral agencies (UNICEF and the WHO). In summary:

- governmental bodies are envisaged to remain, in relevant positions;
- relatively, more relevance is assigned, in an ‘desired’ situation, to the FMOH than to the NPHCDA;
- there is a general tendency to see as a ‘desired’ situation less prominence of donors, NGOs, WHO and UNICEF.
We cannot overemphasise that these findings have to be interpreted with extreme care as they only reflect particular opinions on a non-validated scale. We insist that the utility of this analysis is to generate and inform constructive debate on the HMIS-related stakeholders landscape in Nigeria.

3.4.3 Stakeholders’ perceptions on data quality

Both workshops had elements to gather information from the participants. Among other issues, participants were asked about features of data quality they would consider important, in a scale going from ‘essential’ to ‘not really important’ (represented in colour tonalities in the figure). Figure 2 summarises the ranking of importance attributed by workshop participants to data quality criteria. Most of the participants considered ‘accuracy’ as the most essential criteria, followed by completeness and timeliness. Interestingly, ‘user friendliness’ was considered with several degrees of importance in similar numbers of participants distributed along all categories of the scale from ‘essential’ to ‘not really’ important; only some participants considered that it had ‘some’ importance. Certainly, the least valued criteria was ‘responsiveness to donors’, which could be seen as a consistent finding with the role desired for donors as influencers of the HMIS (see above).

![Figure 2. Stakeholders perceptions on the data quality criteria.](image)

It is worth mentioning that this exercise was preceded by an intense discussion on the quality criteria. The main issue was that some participants did not feel adequate to rank quality criteria on the basis that all of them are extremely important. However, in the logic of PHISICC, we may be facing situations where not all quality criteria can be fulfilled at their maximum and some compromises may be needed. For example, while completeness is desirable, more data may contribute at some point to lower levels of accuracy. Hence, this rating exercise.

3.4.4 Stakeholders’ views on early design concepts

In the second workshop, stakeholders were also prompted with a series of design initial ideas to address some of the problems detected in Côte d’Ivoire and also in Nigeria. The ideas presented and stakeholders’ reactions are exemplified in Annex 5.

3.4.5 Workshops evaluations

At the end of both workshops, the participants were asked to evaluate the quality of the workshop. Twelve statements were rated in terms of their degree of agreement. Figure 3, first part presents the
findings at the end of workshop 1. The findings suggest that some areas require special attention by the PHISICC team; namely: (i) the overall PHISICC presentation; (ii) clarifying how PHISICC will provide evidence; (iii) aspects of the logistics and iv) facilitation of fruitful interactions.

The findings on the quality of the second workshop (second part of Figure 3) suggest that more time in general and a better facilitation of exchanges and interactions would be beneficial. It seemed, in general, to show better ratings than in the first workshop, which could be due to the learning of the PHISICC team and more familiarity with PHISICC among participants.

Figure 3. Workshops (1 and 2) evaluations by participants.

3.5 Visits to sites

3.5.1 Health facilities profile

Besides the governmental Cross Rives State and LGA levels, we visited the following health facilities in Cross River State (Table 4).
Table 4. Health facilities visited.

<table>
<thead>
<tr>
<th>LGA</th>
<th>Locality</th>
<th>Urban / Rural</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calabar Municipality</td>
<td>Ikot Ansa Health Centre</td>
<td>Urban</td>
<td></td>
</tr>
<tr>
<td>Calabar South</td>
<td>Ekpo Abasi Health Centre</td>
<td>Urban</td>
<td></td>
</tr>
<tr>
<td>Calabar South</td>
<td>Nelson Mandela Health Centre</td>
<td>Urban</td>
<td>Located within a school</td>
</tr>
<tr>
<td>Akamkpa</td>
<td>Mma Effa Health Centre</td>
<td>Rural</td>
<td></td>
</tr>
<tr>
<td>Biase</td>
<td>Abini Health Centre</td>
<td>Rural</td>
<td></td>
</tr>
<tr>
<td>Calabar Municipality</td>
<td>Kasuk Health Centre</td>
<td>Urban</td>
<td></td>
</tr>
<tr>
<td>Calabar Municipality</td>
<td>Akim Qua Health Centre</td>
<td>Urban</td>
<td></td>
</tr>
</tbody>
</table>

Note that all these are health facilities and do not include any outreach site.

We aimed at having some samples of different health facilities, including urban and rural, commonly known as well and poor performing, and also health facilities considered to be in remote areas. This was largely achieved, despite security concerns which relatively limited the mobility of the PHISICC team in Cross River State (see map in Figure 4). All the visited facilities were so-called fixed stations, i.e. no outreach sites were visited. Data generated and obtained from outreach sites are fed into the facility data.

*As perceived by local PHISICC staff, also based on their discussions with local health authorities.
In field visits, we inspected health facilities, shadowed health workers, held interviews with the staff and also gathered data to carry out data quality verifications.

Health workers’ main responsibilities include caring for patients, tracking lost to follow up users and handling data. ‘Caring for Patients’ includes the activities when health workers interact with patients in their presence. ‘Tracking lost to follow up users’ involves encouraging patients to show up for follow up care and/or referral, encouraging people who never visit health centres to seek care and finding lost to follow up patients. ‘Handling Data’ includes recording, aggregating and counting data for use at the national level.
Table 5. Health workers responsibilities and decision-support tools.

<table>
<thead>
<tr>
<th>CARING FOR PATIENTS</th>
<th>TRACKING MISSING PATIENTS</th>
<th>HANDLING DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Listening to complaints</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Taking vital signs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Examining patients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Educating mothers about the importance of immunizations for their children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Giving instructions about taking medication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Referrals and follow up</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Calling patients who have not come on tuberculosis treatment day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Visiting patient’s home when phone calls are not received</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Calling mothers who have missed the immunization day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Organizing outreach to the community</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Copying data from treatment cards to registers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Counting data in registers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Creating draft reports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Recounting data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Creating final monthly reports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Delivering the monthly report to the local government</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Taking registers to the local government to verify data</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DECISION SUPPORT TOOL

<table>
<thead>
<tr>
<th>DECISION SUPPORT TOOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Standing orders</td>
</tr>
<tr>
<td>● View of patient history in treatment cards (i.e. home-based child health card, ANC treatment card, OPD treatment card)</td>
</tr>
<tr>
<td>● Appointment cards (support patient’s decision to return)</td>
</tr>
</tbody>
</table>

No decisions are made by health workers based on the reported data

Note: We have only qualitative data regarding the question of how much time the handling of data requires. We estimated that health workers spend 4 to 5 hours per week on average for data handling.

3.5.2 Data use for decision making

We set out to understand how the health workers in Nigeria make clinical, public health and managerial decisions in Primary Health Care (PHC) facilities. Specifically, we wanted to understand the role the paper-based health information system (HIS) plays in the decisions health workers make.

Some of the services (e.g. antenatal, outpatient, immunization) at PHC level in Nigeria use a system with several paper tools:

Appointment cards kept by the patient

Treatment cards for each patient within a single service stored at the facility

Large format registers with a single row for each patient filled in chronologically

The appointment card supports patients in deciding when to return to the health facility. The treatment cards offer the health worker a continuous view of the patient’s relevant vitals, diagnoses and treatments which support more informed clinical decisions. The registers seem only to support data aggregation and verification for decision-making at the LGAs and higher levels. Currently, health workers did not seem to be making decisions based on the data recorded in the registers or in the monthly reports.
Rather than talking about the decisions they make, health workers describe their work as being comprised of three main responsibilities, which roughly align with the three types of decisions:

1. caring for patients that come to their facility;
2. tracking missing patients who fail to show up for follow up care;
3. reporting to the LGA.

The team also prompted clinicians and managers with several questions regarding decision making: which types of decisions were routinely made, how were they made or the information used to make them. This question was not easily answered or the answers were hardly clearly related to data use. For example, health workers would mention that they may decide to carry out outreach activities but did not point at a clear set of data that would inform this decision. To some extent, the concept of making decisions based on the use of existing data was weak. Examples on health care decisions (e.g. referral) were of similar nature: health workers seemed to acknowledge that these decisions require some information but decisions seemed to be taken based on an ‘overall impression’ of the cases rather than on what was actually recorded. More strategic decisions were almost everywhere limited to vague statements about supervision or social mobilisation. Another source for decision making was instructions received from levels above, without necessarily any particular need to justify them on the grounds of information on the current situation.

Data was mainly seen as something to keep track of what has been done (regardless whether this was actually used or not; and often it was not) and to report to the LGAs. This was seen remarkably ‘normal’ as if reporting would by itself justify all efforts to collect, transform and transmit data.

3.5.3 Flow of users and flow of data in health facilities

In Nigeria, we observed health workers administering tuberculosis treatment, antenatal care, immunizations and outpatient care. Their main responsibility, and the one they feel more identified with, is caring for patients. They also talk about tracking patients lost to follow up and reporting data to the LGA every month.

Each service unit has different forms and registers. Overall, regardless of the specific service unit, Nigeria’s paper-based HIS follows a similar structure and process. Figure 5 presents an overview of the activities of the health workers related to HIS. Figure 6, Figure 7, Figure 8 and Figure 9 present examples from four programmes. Figure 10 presents the flow regarding the monthly reporting.
Figure 5. The overall flow of paper-based HIS in health facilities.

- **Tracking:** Asks patient for appointment card.
- **Caring:** Finds patient’s treatment card by surname.
- **Reporting:** Copies demographic information in general attendance register.
- **Caring:** Reviews history. Takes complaint, vitals and examines. Writes in treatment card.
- **Caring:** Treats, tests and/or refers patient. Writes in treatment card.
- **Tracking:** Writes the date for the next visit in the patient’s appointment card.
- **Reporting:** Copies demographic information and visit outcomes in the general attendance register.
- **Reporting:** Aggregates data from all the registers into 7-page monthly report with 233 variables (some split out by gender and/or age categories).

Repeats process for next patient.
Health workers mentioned that they spend a lot of time reporting data to the district for data aggregation; and they themselves are hard pressed to describe any utility of this information to their own decisions or responsibilities. However, health workers do make decisions about caring for patients. While some of their paper-based tools support those decisions, like the treatment history captured on treatment cards, the paper-based tools could do much more to inform those decisions.

Health workers also make decisions about tracking lost to follow up patients, such as the decision to call a TB patient who has not come for their medication following their TB test. The current paper-based HIS requires data to be captured chronologically by date of visit. This undermines the ability to make decisions as time passes by referencing past data relative to present information. This capability is critical to the task of tracking missing patients.

**Antenatal consultation**
Expectant mothers keep an appointment card to remind them when to return for their next visit. At the health facility, midwives record the results of ANC consultations in a bi-fold antenatal treatment card for each woman. The treatment card allows midwives to easily follow the progression of the pregnancy. Health workers spend a great deal of time copying information from the woman’s ANC treatment card to both the general attendance register and the ANC register. The sole purpose of the registers is to facilitate data aggregation and verification at the federal level, not for use at the facility.

*Figure 6. Antenatal health care flow.*
Outpatient consultation
Returning patients keep an appointment card to remind them when to return for their next visit. CHEWs record the results of the consultations in a bi-fold OPD treatment card for each patient. The treatment card allows CHEWs to easily review the patient’s history. If the patient is returning with the same conditions, the CHEW may decide to refer the patient to a hospital. Health workers spend a great deal of time copying information from the OPD treatment card to both the general attendance register and the OPD register. The sole purpose of the registers is to facilitate data aggregation and verification at the federal level, not for use at the health facility.
Immunization in Nigeria

Mothers bring their child health card with them to the health facility on immunization day. The first health worker writes the date of the vaccines due in the child health card. She then gets child’s date of birth, finds the child’s information in the immunisation register organized by month of birth and writes the date of the vaccines due that day in the immunization register. She passes the child card to the second health worker who writes the child’s information in the general attendance register. She hands the child health card to the third health worker who writes the demographic information into the growth monitoring...
register. This third health worker calls the mother and child to the scale to weigh and measure the child. She then writes the weight and length in both the growth monitoring register and the child health card. She then passes the child health card to the fourth health worker who prepares the vaccines, calls the mother and child, marks the tally sheet and administers the vaccines. At the end of the day, the first health worker will count the tallies and write the number of vaccines given in the immunization summary register.
Figure 8. Immunisation flow.
Tuberculosis treatment consultation

The Chief Health Officer counsels the mother and patient on the results of the TB test, then fills out the health facility-based treatment card and patient-based treatment card on the information in the referral papers. He opens the TB drug kit and explains the contents along with the how to take the first treatment regimen, gives nutrition advice and explains when to return. Then he writes information from the facility-based treatment card into the tuberculosis register.
Figure 9. Tuberculosis treatment flow.
3.5.4 Additional issues

Data in health facilities may not be portraying the health status of populations, not only because of inherent errors in HMIS practices, but also because some communities may believe that certain conditions need direct care from secondary health facilities, bypassing the primary health care level. Some extreme cases were cited where communities would believe that primary health care sites were mainly or even exclusively devoted to vaccinations.

Health facilities received support for handling data issues. For example, it was often reported that there are regular data quality checks at LGA levels; however, it was not possible to elucidate the exact procedures that are followed or whether these checks are carried out systematically or not.

Registers were the main type of paper tool used in health facilities. Health facilities had a general register where everyone entering the health facilities, regardless the service required, would have his/her name noted down. Then, additionally, users would also be registered in the specific service register, be it the general consultation, antenatal care, or vaccination, to give some examples.

An issue was raised in relation to the consultation register in several health facilities. The patients’ information is registered on the OPD treatment card as they are seen. It often happens that more than one line in the register is used to accommodate additional information on treatments, for example. This creates lots of empty space (i.e. in other columns of the register which do not require so much information, as is the rule) and rapidly increases the volume of paper that needs to be handled while doing consultations. Treatment cards are used in health facilities; these tend to generate duplicate information since the contents of treatment cards need to be transcribed to the consultation register.
An interesting finding was the description of how infants were registered on their first attendance to health facilities and how they were searched in subsequent visits. The rule was that infants are registered in the section corresponding to their month and year of birth, in a register which is ordered by dates. To this end, blank lines are spared at the end of each month section to enter infants or children who are seen for the first time at the health facility any of the following months or years after their birth date. This is a practice which certainly helped to locate children attending the health facility by their month of birth, provided that this information was known. However, it challenges data verification to the extent that monthly reports account for the number of infants and children registered in the previous calendar month while future verifications would count, as well, those other infants which register to that same month but later on, when the report would have already been sent out to the LGA level.

Health facilities and LGAs receive support from several entities. For example, in some LGAs, the Ward Health Committees are also involved in the production of ‘score cards’ to monitor health related activities, they also mobilise in order to print paper tools which may have been exhausted. Some Wards may organise themselves in ‘Ward Health Alliance’ gathering local partners and supporting health related activities.

At the SPHCDA office in Calabar, it was mentioned that all PHC facilities would soon go under the umbrella of the SPHCDA. This was seen as a promising venture because it was acknowledged that the more peripheral in the system, the more challenging data quality was. This stressed the requirement to work under a ‘systems’ perspective, which is precisely the approach of PHISICC.

In the past, there have also been attempts to support health facilities with computers. Incidentally, we found at least one health facility with a desktop computer and printer, apparently both out of order. They were provided by an NGO supporting HIV/AIDS reporting and were not replaced once the NGO stopped its support.

3.5.5 Data verification

Data verification exercises were performed in six health facilities (represented by the six colours in the figured below). Of the 52 data verification exercises, 21 had perfect concordance (for instance, we found in the monthly report 43 pregnant women who received iron and Folic Acid supplements in October 2016 and also re-counted 43 in the register). Twenty of the 21 exercises that found perfect concordance were comparisons of reported versus recorded figures and one was checking an existing physical stock. The other 31 data verification exercises revealed 20 over-reporting cases (i.e. the figure found in the monthly report was larger than the figure found through the re-counting in the register) and 11 under-reporting cases (i.e. the figure found in the monthly report was smaller than the figure found through the re-counting in the register). Figure 11 and Figure 12 present the findings. Note that these two graphs do not present those findings that have 100% concordance: Table 6 presents the 21 items that have full concordance.
Figure 11. Data verification exercises that yielded over-reporting.

Notes:

1) Two comparisons presented in Figure 11 were checking of stocks (stock cards versus physical count): ARV in general and the specific ARV TDF/3TC/EPV.

2) Substantial over-reporting was not shown in the figure because values were too extreme to keep the readability of the graphic. The following four items had large discordances:

- 25/12: Individuals HIV counselled, tested and received results
- 33/1: IPT 1 given
- 26/0: Pregnant women who received LLIN (in July 2016)
- 11/0: Pregnant women who received LLIN (in September 2016)

3) Size of samples: the smallest verification exercise comparing monthly report with re-count in the register was 4/3 (TT1); the largest was 62/58 (males aged 0 to 59 months weighed).
**Figure 12. Data verification exercises that yielded under-reporting.**

Notes:

1. Four comparisons found in Figure 12 were checking of stocks (stock cards versus physical count): Paracetamol syrup, Artesunate-Amodiaquine 25 mg / 67.5 mg, Artemether-Lumefantrine for children at least 6 months old (20 mg / 120 mg) and LLIN.

2. Under-reporting with a value of 0 was found for three data verification exercises: note that this either means that the report had 0 or that no report could be found in the health facility.

3. Size of samples: the smallest verification exercise comparing monthly report with re-count in the register was 0/3 (Measles 1); the largest was 71/78 (individuals given an HIV test).
Table 6. Verification exercises with perfect concordance.

<table>
<thead>
<tr>
<th>Indicator verified</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Deliveries in September 2016:</td>
<td>6/6</td>
</tr>
<tr>
<td>2. Deliveries in October 2016:</td>
<td>6/6</td>
</tr>
<tr>
<td>3. TT1 to women of child bearing age</td>
<td>9/9</td>
</tr>
<tr>
<td>4. Pregnant women who received IPT1 (malaria)</td>
<td>3/3</td>
</tr>
<tr>
<td>5. Injectable (Family Planning)</td>
<td>9/9</td>
</tr>
<tr>
<td>6. Injectable (Family Planning) *</td>
<td>20/20</td>
</tr>
<tr>
<td>7. Iron and Folic Acid</td>
<td>70/70</td>
</tr>
<tr>
<td>8. Iron and Folic Acid</td>
<td>36/36</td>
</tr>
<tr>
<td>9. Iron and Folic Acid</td>
<td>43/43</td>
</tr>
<tr>
<td>10. Fever and rapid diagnostic test (malaria)</td>
<td>10/10</td>
</tr>
<tr>
<td>11. Antenatal attendance</td>
<td>16/16</td>
</tr>
<tr>
<td>12. Antenatal attendance</td>
<td>22/22</td>
</tr>
<tr>
<td>13. Antenatal attendance</td>
<td>32/32</td>
</tr>
<tr>
<td>14. Antenatal first visit 20 weeks or later</td>
<td>4/4</td>
</tr>
<tr>
<td>15. Antenatal first visit 20 weeks or later</td>
<td>11/11</td>
</tr>
<tr>
<td>16. Antenatal first visit 20 weeks or later</td>
<td>0/0</td>
</tr>
<tr>
<td>17. Antenatal first visit 20 weeks or later</td>
<td>7/7</td>
</tr>
<tr>
<td>18. Pregnant women who received LLIN</td>
<td>8/8</td>
</tr>
<tr>
<td>19. Individuals with HIV test</td>
<td>13/13</td>
</tr>
<tr>
<td>20. Individuals HIV counselled, tested and received results</td>
<td>14/14</td>
</tr>
<tr>
<td>21. Stock of AZT/3TC/NVP 30mg 50mg 60mg</td>
<td>4/4</td>
</tr>
</tbody>
</table>

* When an item appears more than once, then this means that the verification was done for more than just one month.

3.5.6 DHIS2 at LGA level

DHIS2 is a national policy. However, in the HMIS SOP document it was mentioned that other datasets exist at national level which capture additional data from various levels of the health system (e.g. primary, secondary and tertiary health care facilities). Some of these datasets are being reported electronically via separate DHIS2 databases to government agencies or development partners, while some are still based on paper systems or Microsoft Excel (Microsoft Corporation, Redmond, Washington) templates.

Data at LGA level is generally processed with the DHIS2 software. Due to planning constraints, we could only check the system from a location outside the LGA main office; this was possible thanks to its capacity to be accessed online from any location. This was, though, useful to check the functionality of the DHIS remote access system.

It seemed that DHIS2 was not fully deployed. For example, the ART Monthly Summary Form (MSF), the HCT (HIV Counselling and Testing)MSF, the PMTCT MSF and the Nigerian National Response Information Management System (NNRIMS) were not integrated into the DHIS2, yet; although integration is planned.

* The ART MSF, HCT MSF and the PMTCT MSF are the backbone to the NNRIMS platform which (NNRIMS) is the DHIS 2 platform that captures data with regarding only HIV response, just like the NHMIS MSF is the backbone to the NHMIS DHIS2 platform. Hence integration involves the NNRIMS and NHMIS and not DHIS2 (personal communication, DHIS2 responsible staff at State level).
Other modules were not used at all, such as the Community Monthly Summary Form from VHW and TBA, the Health Facility Immunisation Microplan, the Health Facility Vaccines Utilization Summary or the Integrated Disease Surveillance and Response (IDSR). Other modules were in use in the past but have been abandoned; this is the case of the Routine Immunization Supplementary Dataset (NHMIS) or the Tertiary Facility Monthly Summary Form. All population data were missing.

In terms of equipment, in the Calabar Municipal, the computer broke down approximately 3 years ago so the person in charge of the data entry does data entry at home on the laptop of her husband. She mentioned that FMOM gave laptops but that these did not last long (they also broke down). Although guidelines point that phones or android devices are used to enter data into the DHIS2 platform by the LGAs, we could not substantiate this in our visit. The tertiary hospitals currently (as of March 2017) do not report directly to DHIS2; they report to the LGA. In many states, tertiary data go direct from the facility to the national (bypassing the State level); some tertiary/secondary health facilities are under a State’s Hospital Management Board, others not.

### 3.5.7 The UniCal Demographic and Health Surveillance site

We paid a special visit to the University of Calabar to interact with the responsible person of the Calabar DHSS, as a potential study site for the randomised controlled trial (WS5).

The Calabar DHSS consists of two cohorts, with a total of 8,500 households and 33,400 habitants, approximately. 52% are in an urban setting (Calabar municipality, total 186,000 habitants) and the other 48% in rural settings. The geographical areas encompasses 4 wards with 3 to 4 health facilities.

Data collected includes, apart from basic demographics, pregnancy observation, pregnancy outcome (births), deaths, verbal autopsies results, the under5 form (i.e. malaria, pneumonia, diarrhoea, vaccination, cough, fever), hand washing habits, education variables, and non-communicable diseases data e.g. blood pressure, Body Mass Index.

The DHSS operates in two rounds per year, usually close to April and November, with six full-time health workers who receive training every time before starting a round. The training of DHSS staff is very solid since DHSS rely on very rigorous process, from data collection up to analyses and reporting. Additionally, the DHSS may draw upon CHEW working part time. The DHSS provides motorcycles to move around rural areas and pay for regular transport in urban areas.

The DHSS can contribute to the collection of data to measure outcomes in WS5 of PHISICC. This includes training for additional fieldwork (two weeks) and a preparation period of six to eight weeks. Eventually, the team could also organise temporary data collection initiatives in Northern States, especially in Jigawa and Sokoto.

---

Several options to support the trials in PHISICC were discussed with the responsible officer, involving the adaptation of DHSS activities to the needs of the trial; for example:

- extend the surveillance for one or two rounds, with the possibility to keep the extended area for future uses. This option would involve: cartography, numbering and the initial census;
- surveys without extending the surveillance area can be done but will need a sampling frame to be provided by statistical authorities. This option will probably be more feasible and less time consuming.

3.6 The human experience with the HMIS

Following the three responsibilities of health workers in health facilities as described above, we detail here the main challenges posed by the paper-based information system.

3.6.1 Challenges with Handling Data

Copying data to registers takes time and detracts from patient care

Health workers record and use the information they need to care for patients in the provided treatment cards. For immunization, the treatment card is the child health card that mothers bring to the facilities. All other services, such as outpatient care, antenatal care and tuberculosis are recorded in patient cards that remain in the facility. Each of these services also has a register that stays in the facility. Copying the information from the treatment card to the registers takes time. The process of copying serves only the need to eventually tabulate and aggregate the data for monthly reporting.

Box 1. Registers and reporting.

“Registers don’t help me do my work. They are for reporting to the local government.”

Verifying data doubles workloads without informing decisions

Sometimes, the chief health officer will take some of the registers, as requested by the local government, to the office when delivering the monthly report. Patients still arrive at the health facility, so health workers will use composition notebooks to record visit information. Later when the health officer returns with the registers, health workers are required to copy the information from their temporal composition notebooks to the register.
Box 2. Complementary tools when registers are not available.

“When the CHO [Chief Health Officer] takes the registers to the local government for data verification, we write the information in these composition notebooks.”

Tallying in the moment of care is more accurate, but is formalized only for immunization
Health workers realize the benefit of tallying each vaccine as they administer it for a more accurate data count and eventual reporting. However, immunization is the only service with a formalized tally register in the facilities we visited.

Box 3. Tallying in immunisation.

“It’s important to tally as you give the vaccines, so you don’t forget.”

Care is integrated, but the registers are not
For mother and child immunization day, children get vaccinations and are weighed to monitor growth, while expectant mothers get a tetanus toxoid shot. All of this happens in the hall with the help of four health workers. The same demographic information for each child is copied into the immunization register, general attendance register and the nutrition and growth monitoring register.
Box 4. Paper tools are not integrated.

“From the child health card, Veronica writes in the immunization register. Fatima writes in the general register and I write in the nutrition and growth monitoring register.”

3.6.2 Challenges with caring for patients

Standing orders guide clinical decisions, but takes time to find the answer
Several health workers explained the usefulness of the standing orders to guide their decisions when they come across a condition with which they are not familiar. The standing orders are, however, not typically at hand and the relatively few protocols referenced are ‘buried’ within many other irrelevant protocols.

Box 5. Clinical care can be challenging.

“Last week, I used the Standing Orders to treat a patient with a rash I had never seen before.”

Patient history may inform decisions, but provides no clinical guidance
Patient histories are helpful for choosing treatment if an effective analysis can be arrived at, however, the outpatient treatment card is an open field offering no clinical guidance.
Box 6. Tools do not include clinical guidelines.

“*It’s good to see what happened at the patient’s last visit. If they come back with the same symptoms, then the treatment hasn’t worked. I have to refer them.*”

“*With the ANC treatment card, I can see if she is gaining weight properly and monitor her blood pressure. Then I check her protein levels.*”

Care is mobile, registers are not
At the facility, patients and health workers move from room to room during a single consultation. Typically, patients will arrive in the hall where health workers take their vitals and complaints, then move to the lab for tests, consultation room for a physical exam and/or to the pharmacy for their medication. The compact treatment cards travel easily from place to place, the large-format registers do not.

Box 7. Care is mobile; registers are not.

“*After taking her weight and blood pressure in the waiting room, I draw her blood in the lab. Next, I examine her in the consultation room. Then we go to the pharmacy for her medication.*”

3.6.3 Challenges with tracking missing patients

Appointment cards are helpful reminders, but health workers do not know how many to expect
Patients keep appointment cards, so they know when to return for follow up care, however there is no mechanism in the system for the health worker to anticipate who is expected to come and when.
Box 8. Tracking lost to follow up is not straightforward.

“I look at the calendar on my phone to determine when she has to come back for her next toxoid vaccination. Then I write the date on her appointment card.”

Outreach requires lap-sized forms, but registers are large

When health workers go to the village for outreach, the large format registers are awkward to handle.

Box 9. Registers are not practical for transporting.

“When they go to the village for outreach, they may not have tables. They sit with the forms in their lap. The size of the forms should be lapable like this one you’ve created.”

Registers are static, but tracking missing patients is dynamic

Health workers fill in registers chronologically. For example, the immunization register is filled in by the month the child is born. However, not all children born in the same month are on the same immunization schedule. To find children who are overdue for immunization, the health worker has to flip through many pages in the register and scan through the dates of the last vaccination for each child. It is not an easy exercise.
Box 10. Finding children lost to follow up is difficult.

“We record children’s vaccinations by their birth month. All the children on this page were born in October 2016. To find those who have missed their vaccinations, I have to flip through all of these pages. It’s like doing aerobics.”
4 Synthesis and implications

4.1 The 10 key findings

The system

1) The HMIS is unanimously recognised as a key component of the governmental health care delivery system in Nigeria. It is well mentioned in key documents and raises the commitment of all stakeholders. Proof of this is the complex and dynamic web of stakeholders which are involved and become active when HMIS issues are dealt with in the country; PHISICC was not an exception.

2) The FMOH, particularly the DPRS, and the NPHCDA are the leading agents in issues concerning the HMIS. They are knowledgeable of the issues affecting the HMIS and take active roles in addressing them. This is a general perception of stakeholders and partners.

3) Stakeholders, though, look at the HMIS from their own perspectives. This is a guaranty of enriching the HMIS but is also a source of dysfunction when (a) priorities are not necessarily aligned; (b) there is no consensus on the approaches to adapt the HMIS to the needs of stakeholders; and (c) the coordinating role of the NPHCDA and FMOH is challenged.

4) Paper-based components of the information system gather a lot of attention and are seen as essential component of the HMIS as being the source of data and the repository of health care events which, may need to be accessed to address data quality issues or for administrative purposes. The general perception is that the paper-based information system will continue to remain a source of data for the foreseeable future.

Decision making

5) It was striking the pre-eminence of the HMIS as being considered the main source of evidence for decision-making, at all levels of the systems, particularly at health facility and LGA levels. Other sources, some of which do exist and are used, are not explicitly considered as part of the decision-making processes; for example, clinical guidelines, evaluation reports, data coming from peers, contextual information (e.g. referral mechanisms available, contact details of referral centres), research and informal or colloquial evidence.

6) This suggests a real disconnect between data and decisions. Despite that everyone acknowledges this connection when prompted, the concept of data or information is heavily restricted to the HMIS; and decisions are mainly restricted to ‘community’ actions (e.g. outreach, social mobilisation) and not in other managerial areas (e.g. when and how to request for more medicines), or in the clinical area (e.g. when to refer and what to do if referral is not possible).

7) One of the issues that might explain this disconnect is the fact that, based on all analyses, the HMIS is designed for reporting rather than for supporting primary decisions: those decisions taken at the health care event with the users of health facilities.

Challenges

8) The HMIS in Nigeria poses numerous challenges, which are generally recognized by most or all partners and stakeholders in the country; the most commonly reported ones were (a) financial constraints and (b) limited human capacity on data management issues. Despite that there have been attempts in the past to address those challenges (see above the issue of stakeholders commitment), some remain persistently unaddressed.

9) Other challenges are also reported, which may not address the critical HMIS financing issues, but which could overcome equally important issues, such as the complexity, inconsistencies and lack of understanding of the HMIS.

PHISICC

10) Stakeholders ‘perceptions around PHISICC were unanimously positive, not without recognition of the challenges the project will need to deal with. However, stakeholders, championed by the NPHCDA, were supportive and expectant on the next steps of PHISICC.
4.2 Implications for WS4 (interventions design)

- This work emphasised and fully confirmed the need to approach WS4 from a systemic perspective, looking at tools and processes across the whole spectrum of activities which take place at primary health care levels. This was explicitly suggested both in Abuja and in Calabar and confirmed the views of project partners and the TAG.
- The work in Nigeria allowed the PHISICC team to advance on the theoretical framework which support the project developments. The theoretical framework will be part of the WS4 protocol.
- Key to the theoretical framework is the advance on the ‘functions’ of the HMIS which will need to be deployed in the new interventions. The functions define those areas that the HMIS should ideally support, in the understanding that not all functions will be equally deployed everywhere. The functions highlight as well an interesting consequence of this WS3: that the HMIS is much more than a reporting tool, but that it could actually impact on key activities and events which take place in the processes of providing health care. At this stage, these functions have been identified:
  - Facilitating assessments; for example, reaching diagnosis, detecting epidemic situations, analysing trend in coverage data.
  - Assisting in recommending best courses of action; for example, vaccinating, treating, referring.
  - Allowing tracking of lost to follow-up; for example, missed children due for vaccination (the HMIS should also be able to “detect” newborn children who have not yet received any immunisation at all), interruptions of tuberculosis treatment.
  - Providing knowledge on solutions; for example, hints on how to treat a condition, instructions on when to discard a vaccine.
  - Guiding periodical reporting; for example, guiding the calculations required for the monthly reports.
  - Helping users of the HMIS; for example, noting where data are required, or how to fill a particular table.

The HIS functions will inform the development of WS4 (i.e. design of interventions packages). In summary, intervention designs should be responsive to the functions, under the assumption that better supporting the decision making components through improved paper-based tools will lead to better decision. This issue will be fully developed in the WS4 protocol.

4.3 Implications for WS5 (experimental studies)

- Cross River seems to be a promising location as study area. The team in Cross River, partners and stakeholders, are motivated and maintain the required expertise. The main challenge to be
considered in selecting this site is the security situation which may limit the mobility of teams, an essential capacity required to successfully carry out the RCT.

- The Cross River DHSS seems to be prepared to collaborate in the project as one of the study areas which will allow to measure hard outcomes, such as those related to health status. However, the small number of health facilities included in the DHSS may challenge the analytical approach of data on outcome gathered in this particular area.

- Some potential problems with the transitions from the old to the new system and vice-versa in the intervention study areas were raised and discussed, although not completely solved. Critical care will need to be exerted on the following:
  - keeping past information related to the continuum of care available in intervention health facilities (e.g. children due for vaccination, follow-up of chronic conditions, such as tuberculosis and HIV/AIDS);
  - reverting the information systems to the current practices in intervention health facilities,
  - harmonising reporting mechanisms not to compromise data entry into the DHIS2 at LGA level.

- Some consideration was given to the idea of including a Northern State as a secondary study area. This is challenging given that most of the setup for the RCT would have to take place from scratch creating difficult situations in terms of budget, timing and logistics. A potential solution could be to carry out an observational, non-comparative study in a small part of a Northern State to gather evidence on secondary outcomes and as a proof of concept of the scalability of the intervention.
ANNEXES
Annex 1. Interviews questionnaires

Stakeholders questionnaire

Stakeholder
Let me tell you a little about what we’re doing and what we’d like to learn from you.
Project goals and approach
Our focus is to design interventions to improve the accuracy of information in paper-based systems. While we are not focused on computers, mobile phones/devices or software, we believe a better designed paper-based system will result in more accurate information making its way into the digital tools and information system overall.
Design research approach
Our focus for this conversation
Start of data collection
Today’s date
Identification of the device
Location
Enter the time you start the interview
Please select your initials
If other initials doesn’t appear, enter here
Select the country
City / town
Record your location:
If record is not working, please enter the following coordinates later:
Enter Latitude
Enter Longitude
Identification
Select the institution the responder is working for
If other institution doesn’t appear, please enter the institution name here
Department
Respondent family name
Respondent first name
Respondent gender
Respondent age
Respondent position
Time in institution
Respondent email
Respondent phone
Do you have any reservation in being quoted in our website, reports or publications?
Do you have any reservation if we audio record this conversation and take pictures to publish in our website, reports or publications?
Comments on responder
1 PERCEPTIONS AND KNOWLEDGE
1a OPINIONS DATA AND DECISION MAKING
Comments on how different types of data are used for different types of decisions in the governmental health sector
1b SOURCES OF DATA FOR DECISION MAKING
What sources of information SHOULD BE used for decision making in health? [DO NOT PROMPT but aim at a complete list]
If other sources doesn’t appear, enter name of the other source here
What sources of information are ACTUALLY used in the public health sector [DO NOT PROMPT]
If other sources doesn't appear, enter name of the other source here

EXPLAIN IF THERE ARE DISCREPANCIES

How important SHOULD BE the role of the HMIS IN COMPARISON to other sources of data (e.g. evaluations, research) in decision making?

Comments on data sources for decision making

1c OPINIONS QUALITY parameters for decision making

Can you rate the following criteria related to data according to their importance for decision making?

Relevance
Comprehensiveness
Completeness
Accuracy (Concordance)
Precision
Timeliness
Simplicity
Presentation

Comments on quality parameters

1d OPINIONS HMIS

How would you qualify the overall [good] performance or quality of the HMIS in the country?

Comments on quality of HMIS

What are the main problems of HMIS in the country?

Which one of these problems should be prioritised to take action?

What would you do to address the priority problem(s)?

What is the best thing of the data system in the country?

1e OPINIONS PAPER AND QUALITY

Paper components of the information system

How likely do you think that paper tools will remain as the main source of data in primary health care in 2025 in the country?

Comments on replacement of paper

Data importance

How important are the PHC tools as compared with the higher levels of the HMIS in terms of...?

Relevance
Comprehensiveness
Completeness
Accuracy (Concordance)
Precision
Timeliness
Simplicity
Presentation

Comments on quality criteria

1f IMPORTANCE OF DATA (USE) IN THE MOH

How important are MOH data issues/challenges in your institution?

Comments on importance of MOH data issues

Are there problems with the use of data in your daily work? Please explain why?

Which sources do YOU (not the MOH) mainly use to take decisions?

Enter other sources if field other doesn't appear

Comments on sources

2. TECHNICAL CAPACITY

Number of staff in your institution
Number of staff mainly dedicated to data issues
Support to MOH
How many data specialists are supporting the MOH in your institution?
How many specialist communicators are supporting the MOH?
Comments on staff supporting the MOH
How many publications on data or related to data has your institution produced in the last calendar year?
Comments on publications or data produced
How many subscription to sources, portals... of research or evidence has your institution?
Comments on subscriptions

3a EFFECTIVENESS Perception influence of other stakeholders
Stakeholder
Enter other stakeholder here, if the other field doesn't appear.
To which extent (this stakeholder) influence data issues (mainly HMIS) in the MOH:
To which extent (this stakeholder) prepared to address data issues (mainly HMIS) in the MOH:
To which extent (this stakeholder) is active in addressing data issues (mainly HMIS) in the MOH:
To which extent (this stakeholder) is effective in addressing data issues (mainly HMIS) in the MOH:
To which extent (this stakeholder) should advice on data issues (mainly HMIS) in the MOH:
To which extent (this stakeholder) has reputation to address data issues (mainly HMIS) in the MOH:
To which extent (this stakeholder) is an obstacle for data issues (mainly HMIS) in the MOH:
Comments on other stakeholders influence

3b EFFECTIVENESS
Can you give examples of high level meetings or other activityes in which your institution has clearly influenced MOH strategy on data?

4 SUSTAINABLE DATA PROJECTS IN THE COUNTRY
What is needed for an intervention to be sustainable overtime?
Give us examples of non-sustainable interventions and the source of their downfall.

5 Your business and engagement with PHISICC
How could the project PHISICC contribute to the objectives of your institution, in relation to data?
How could the project PHISICC obstruct the objectives of your institution, in relation to data?
Is there any person, group, institution... who may feel threatened by the project PHISICC or may be reluctant to collaborate? If so, please explain why.
Possible involvement in the project
How would you like to participate in our project?
If other type of involvement doesn't appear.
Comments on involvement in the project
End
We are nearly at the end of our conversation.
Do you have any information we missed and you would like to share with us?
Do you have any concerns if we use the name of your institution for dissemination?
Please enter the time you finished the questionnaire
Thank you very much for your time and collaboration. Next steps:
Final
Health facility questionnaire

PHISICC3 Assessment of the quality of the Health Information System (HIS) SITES

Meta data start of data collection
Meta data today's date
Meta data identification of the device

Location
Enter a date and a time:
Record your location:
If location can not be recorded automatical, please enter your coordinates later in the fields "latitude" and "longitude"
Latitude
Longitude

Identification
Please select your initials
Enter other initials
Select the country
City / town
Select the site
Enter other site
If 'District Office': Please select the place
Enter other place
Take a picture of the health facility (if possible)
Family name of responder
First name of responder
Gender of responder
Age of responder
Qualification of responder
Position of responder
Phone number of responder
Site characteristics
Type of site
Number of staff at the site
Number of medical doctors
Number of clinical staff
Number of midwifes
Number of nurses
Calculation total number of technical staff
Total number of technical staff $\text{calc\_staff\_technical}$
Number of additional staff
Number of administrative staff
Number of supporting staff
Number of other staff
Calculation total number of staff
Comments on staff
Total number of staff $\text{calc\_staff\_total}$

Direct observation of researcher

Infrastructure of the site
**Rooms at the site**
Number of rooms at the site
Consultation
Delivery
Vaccination
Observation
Pharmacy
Laboratory
Cold chain
Storage
Toilette
Waiting room
Multifunction or 'Other'
Calculation number of rooms
Comments on rooms at the site
Total number of rooms $(\text{calc\_rooms\_total})$
Comments on rooms at the site

**Infrastructure 2**
Water installation from the net
Electricity from the net
Generator
Solar
Incinerator
Toilette
Windows with nets

**Available medication and devices**
Soap
Refrigerator
Freezer
Microscope
Blood pressure device
Thermometer
Paracetamol
Antimalarials
Co-Trimozazole
Oxitocine
DTP
Frozen-ice packs
Comments on medication and devices
Additional comments on your observation

**Inputs: forms....**
Within this section, information on obtaining, recording, transforming or analysing data will be captured.
How many staff have received training specific to data issues in the last 2 years
Comments on training of staff in data management
Are there designated staff responsible for reviewing the quality of data
Comments on review of data quality
The source documents and reporting forms/tools specified in the guidelines are available?
Comment to use of sources
Can you explain how (and when) you get further supplies of forms and tools (indicate whether there are guidelines)
How many hours a week do you spend on data recording or reporting or checking...?  
Do you have a phone with data access?  
Please explain whether and how you use it for work.

**Process: data management**
The guidelines or instructions that you use contain the following:  
... procedure to address late reporting  
... procedure to address incomplete reporting  
... procedure to address inaccurate data or reports  
... procedure to address missing reports  
... deadlines are harmonized with the relevant timelines of the National Program

Comments on guidelines
Quality control
Do you receive feed-back on your data from upper levels?  
Comments on feedback on quality of reporting  
Are there quality controls for data entry?  
Comments on quality controls
The reporting system enables the identification and recording of a "drop out", a person "lost to follow-up" and a person who died  
Comments on the reporting of drop-outs or lost to follow-ups etc.
Relevant personal data are maintained according to national or international confidentiality guidelines.  
Comments on the confidentiality of data maintenance

Database
For automated (computerized) systems, there is a clearly documented and actively implemented:
... database administration procedures  
... backup procedures  
... security and user procedures

Comments on database administration
Is the last back up older than 1 month?  
Comments on the appropriateness of the latest back-up
Any other comments regarding the management of data (transcribing, cleaning, transmission, storage) at the health facility?  
When was the last supervision visit where there were data issues discussed (we need proof of this in a letter or report)
Where do you get data for denominator from?  
Submission and use of data
Data are reported through a single channel of the national information systems.  
Comments on use of the national information system for reporting
What is your main challenge regarding data management and reporting?  
Any other comments regarding the production, management or use of data at the facility?

**OUTPUTS. Do you have any of the following (need to be seen)**

Human resources list
Duty roster
Inventory of equipment
Accounting forms
Stock cards for the pharmacy
Graphics or tables on clinical cases
Graphics or tables on vaccination
Cold chain temperature monitoring

Decisions and sources (try 3 decisions)
Can you give examples of decision you have taken with data sources?
Decision
Source for decision
Enter other source for decision
Comment on decisions or sources
FINAL
Enter the additional information
Thank you very much for your time and collaboration.
End of survey
### Annex 2. Chronogram of activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Place</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1 Arrival international</td>
<td></td>
<td>Sun 04/12</td>
</tr>
<tr>
<td>1-2 Meeting with authorities and partners</td>
<td>Abuja</td>
<td>Mon 05/12</td>
</tr>
<tr>
<td>1-3 Planning and management set up</td>
<td>Abuja</td>
<td>Mon 05/12</td>
</tr>
<tr>
<td>Overall plan, logistics, security</td>
<td></td>
<td>Mon 05/12</td>
</tr>
<tr>
<td>Protocol and guides</td>
<td></td>
<td>Mon 05/12</td>
</tr>
<tr>
<td>Workshops (1 &amp; 2) and presentations</td>
<td></td>
<td>Mon 05/12</td>
</tr>
<tr>
<td>Sites and verification</td>
<td>Milton</td>
<td>Mon 05/12</td>
</tr>
<tr>
<td>Venues and AV equipment</td>
<td></td>
<td>Mon 05/12</td>
</tr>
<tr>
<td>Preparation and inspection of facilitators</td>
<td></td>
<td>Mon 05/12</td>
</tr>
<tr>
<td>Piloting</td>
<td></td>
<td>Mon 05/12</td>
</tr>
<tr>
<td>2-1 Workshop 1</td>
<td>Abuja</td>
<td>Tue 06/12</td>
</tr>
<tr>
<td>Set up</td>
<td></td>
<td>Tue 06/12</td>
</tr>
<tr>
<td>Official welcoming and Opening Remarks</td>
<td></td>
<td>Tue 06/12</td>
</tr>
<tr>
<td>Review of the agenda</td>
<td></td>
<td>Tue 06/12</td>
</tr>
<tr>
<td>Stakeholders questionnaire - 1</td>
<td>Tue 06/12</td>
<td></td>
</tr>
<tr>
<td>PHISICC - general</td>
<td>Tue 06/12</td>
<td></td>
</tr>
<tr>
<td>Coffee break</td>
<td></td>
<td>Tue 06/12</td>
</tr>
<tr>
<td>PHISICC - WS3</td>
<td></td>
<td>Tue 06/12</td>
</tr>
<tr>
<td>Discussion</td>
<td></td>
<td>Tue 06/12</td>
</tr>
<tr>
<td>Overview HMIS</td>
<td></td>
<td>Tue 06/12</td>
</tr>
<tr>
<td>Discussion: PHISICC focus and expectations from stakeholders</td>
<td></td>
<td>Tue 06/12</td>
</tr>
<tr>
<td>Stakeholders questionnaire - 2</td>
<td></td>
<td>Tue 06/12</td>
</tr>
<tr>
<td>Workshop evaluation</td>
<td></td>
<td>Tue 06/12</td>
</tr>
<tr>
<td>Closing remarks</td>
<td></td>
<td>Tue 06/12</td>
</tr>
<tr>
<td>Group photo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lunch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-2 Stakeholders interviews</td>
<td>Abuja</td>
<td>Wed 07/12</td>
</tr>
<tr>
<td>FMOH: Dr Oye Makinde</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPHCDA: ED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPHCDA: Dr Emmanuel Ordu, Dr Nnenna Ihebuzor, Dr A.B. Garba, Dr Bassey Okposen, Dr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mahmud</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bureau of Statistics: Dr. Kale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHO: Dr Tenin Gakuru, Dr Fiona Braka</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNICEF: Dr John Agbor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEASURE Evaluation: Ade Ogu Olutobi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEPFAR: Shirley Dady</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FHI 360</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NACA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>****MNCH-2 project (DFID)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>****Society for Family Health: Clara Oguji</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel to Calabar</td>
<td>Calabar</td>
<td>Thu 08/12</td>
</tr>
<tr>
<td>3-1 Meeting with authorities and partners</td>
<td>Calabar</td>
<td></td>
</tr>
<tr>
<td>Commissioner of Health (Honourable)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DG SPHCD (Director)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Place</td>
<td>Date</td>
</tr>
<tr>
<td>----------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>Chief Medical Director of Teaching Hospital Calabar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-2 Planning and management set up Calabar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-3 Stakeholders interviews</td>
<td>Calabar Fri 09/12</td>
<td></td>
</tr>
<tr>
<td>PHC coordinators Calabar municipality and Calabar South Local Government</td>
<td>Same location Fri 09/12</td>
<td></td>
</tr>
<tr>
<td>LGA M&amp;E officers for Calabar m and C S</td>
<td>Same location Fri 09/12</td>
<td></td>
</tr>
<tr>
<td>Commissioner Calabar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Coordinator NPHCDA Calabar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State DHIS2 focal persons Calabar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Immunisation Officer - NOT AVAILABLE (TRL) - Calabar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrival in Calabar (gt team)</td>
<td>Sun 11/12</td>
<td></td>
</tr>
<tr>
<td>3-4 Sites visits Calabar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discussion with responsible of HMIS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health information flow, use &amp; challenges</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepare data verification exercise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Next steps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observation of care in key focus areas + stimulus discussion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction &amp; video permission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tour of Health Information + Monthly reporting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Needs &amp; Challenges</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stimulus activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrap Up</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data verification exercise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odukpani Central PHC + Interview with PHC coordinator TBD</td>
<td>Mon 12/12</td>
<td></td>
</tr>
<tr>
<td>Annigehe - Akamkpa LGA TBD</td>
<td>Mon 12/12</td>
<td></td>
</tr>
<tr>
<td>Idomi (Antenatal Clinic) - Ugep LGA TBD</td>
<td>Mon 12/12</td>
<td></td>
</tr>
<tr>
<td>Lokpo - Yakurr LGA TBD</td>
<td>Mon 12/12</td>
<td></td>
</tr>
<tr>
<td>Mma Effa - Akamkpa LGA TBD</td>
<td>Tue 13/12</td>
<td></td>
</tr>
<tr>
<td>School Health clinic in Calabar South TBD</td>
<td>Tue 13/12</td>
<td></td>
</tr>
<tr>
<td>Kasuk PHC - Calabar TBD</td>
<td>Wed 14/12</td>
<td></td>
</tr>
<tr>
<td>Ikot Ansa PHC - Calabar TBD</td>
<td>Wed 14/12</td>
<td></td>
</tr>
<tr>
<td>DHSS - Iwara TBD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-5 Debriefing session Calabar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel to Abuja</td>
<td>Thu 15/12</td>
<td></td>
</tr>
<tr>
<td>4-1 Preliminary analyses</td>
<td>Thu 15/12</td>
<td></td>
</tr>
<tr>
<td>Dinner team</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interview PEPFAR Otse Ogory Abuja</td>
<td>Fri 16/12</td>
<td></td>
</tr>
<tr>
<td>4-2 Restitution workshop Abuja</td>
<td>Fri 16/12</td>
<td></td>
</tr>
<tr>
<td>Welcome</td>
<td>Fri 16/12</td>
<td></td>
</tr>
<tr>
<td>Introductions &amp; Project Background</td>
<td>Fri 16/12</td>
<td></td>
</tr>
<tr>
<td>Data Verification Findings</td>
<td>Fri 16/12</td>
<td></td>
</tr>
<tr>
<td>Fieldwork Immersion</td>
<td>Fri 16/12</td>
<td></td>
</tr>
<tr>
<td>Stimulus Discussion</td>
<td>Fri 16/12</td>
<td></td>
</tr>
<tr>
<td>Questionnaire criteria WS4</td>
<td>Fri 16/12</td>
<td></td>
</tr>
<tr>
<td>Workshop evaluation</td>
<td>Fri 16/12</td>
<td></td>
</tr>
<tr>
<td>Wrap Up</td>
<td>Fri 16/12</td>
<td></td>
</tr>
<tr>
<td>4-3 Final meeting with partners Abuja</td>
<td>Fri 16/12</td>
<td></td>
</tr>
<tr>
<td>4-4 Departure Abuja</td>
<td>Sat 17/12</td>
<td></td>
</tr>
</tbody>
</table>

Note: Advocacy visits to the Director General, State PHCDA and the Permanent Secretary SMOH were also done.
Annex 3.  **A situational analysis on monitoring the health sector**

This annex presents the key findings from the document “Situational analyses – Monitoring and Evaluation Framework for the Nigerian Health Sector 2016” (draft, March 2017). This document is largely based on a two-day workshop held in October 2016 and facilitated by WHO.

The document states: “A well-functioning Health Information System (HIS) will ensure that there is in place a range of data sources needed to generate a critical data set. The use of existing data from all data sources is required to assess progress and performance. The summary indicators required for the M&E component of the health sector plan should draw from multiple data sources and levels of the health system to serve the needs of different users”.

Five sources of health sector data were considered:

1. Civil Registration and Vital Statistics (CRVS)
2. Health Facility and Community Information systems
3. Population-based surveys and census
4. Surveillance
5. Health system

The findings, focusing on items 2. and 5. of the list above, were extracted from the summary section:

- There is availability of a National HIS policy document and harmonized NHMIS tools as unifying architecture and standards for health data. However, the use of the NHMIS tools is limited to primary health facilities, a few private hospitals and only some secondary and tertiary hospitals.
- Specific disease- and programme-harmonized tools compounds availability of facility-based health data. Community-based and facility-based health programmes are established parallel to each other in disease programs and linkage of data is often cumbersome and resource intensive.
- The presently existing health facility list is not comprehensive and the facility naming is not standardized.
- A mechanism for supervision of these health facilities is in place but not effective because of the irregularity of supervisory visits. Also, the current Integrated Supportive Supervision (ISS) checklist needs to be reviewed and updated. Related to ISS is independent data quality assessments which is institutionalized but not regular and feedback on performance is not routinely provided in a timely manner.
- Regular and transparent system of reviews of progress and performance against national and locally defined priorities with broad involvement of key stakeholders is not in place. Independent reviews of data in strategically important programs, such as maternal, child and perinatal deaths are not documented and periodicity of conduct is unknown. Not all diseases and programmes are conducting periodic reviews (e.g. quarterly or semi-annual) and findings from specific reviews are not routinely incorporated into the health sector review. Use of results from reviews for planning and budgeting is established but needs to be improved. Feedback mechanisms at all levels are
activated but evidence of how the feedback has improved services or programmes at local levels is not strong.

- Human resources for a functional health facility and community information system is inadequate at the State and LGA levels, capacities of staff at these levels are not strong in most states. In addition, high staff attrition and rotatory nature of civil service jobs underscores need for regular trainings and retraining.
- ICT infrastructure and support are not well developed at the sub-national level particularly at the health facilities.
- DHIS is decentralized and use at the LGA level is dependent upon having functional computers, internet and human resource support.
- Disease- and programme-specific data elements and indicators are integrated into the national common data repository however reporting rates from programmes are low as a result of parallel program specific systems at play. Fragmentation of data systems due to parallel government and non-government supported programs has been a major impediment towards establishing a robust national and sub-national health data repository.
- Use of data generated in the health facilities and communities by the producers to improve patient management and decision making is weak.
- Electronic patient management and monitoring exist in some tertiary facilities; limited programmes such as the HIV treatment programme are supported by partners to implement patient-level data management but widespread use at deserving health facilities is limited by adequate resources for its establishment and management. Lack of interoperability of various types of patient management software used by different partners even on a specific programme is a big challenge to its utilization for decision making on health care.
- The National Bureau of Statistics will need a lot of strengthening to be able to publish timely and reliable annual population estimates for various demographic and geographic groups.
- Disease surveillance systems are not totally integrated in the HMIS and event management system needs to be strengthened.
- The logistics information system is weak at the LGA level; the system for tracking budgets, disbursements and expenditures at all levels is unreliable; human resources system for tracking availability of human resources by cadre and by health facility needs updating as ghost workers are still been discovered; electronic registry of health workers is not updated regularly.
- Quality assurance system for private laboratory is still a challenge that will have to be surmounted to improve the functionality of the laboratory information system. Finally, the Information sub-system of the health systems is not harmonized, interoperability is an issue.
- Institutional capacity for synthesis of data for analysis is limited due to decentralization of data institutions (such as the National Bureau of Statistics).
- The Health Data Consultative Committee is not functional at the sub-national levels and irregular at the national level due to funding constraints.
The document graphically portrays gaps in data sources, analytical capacity and in the mechanisms for review and action:

**Figure 13. Summary of gaps on data sources.**

![Data sources](image)

**Figure 14. Summary of gaps in analytical capacities.**

![Analytical capacities](image)

**Figure 15. Summary of gaps in the mechanisms for review and action.**

![Review & action](image)
Annex 4. **List of persons met**

<table>
<thead>
<tr>
<th>Family name</th>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mustapha</td>
<td>Zubair Mahmud</td>
<td>NPHCDA</td>
</tr>
<tr>
<td>Odu</td>
<td>Emmanuel</td>
<td>NPHCDA</td>
</tr>
<tr>
<td>Makinde</td>
<td>Oye</td>
<td>Planning Research and Statistics FMOH</td>
</tr>
<tr>
<td>Ihebuzor</td>
<td>Nnenna</td>
<td>NPHCDA</td>
</tr>
<tr>
<td>Okpani</td>
<td>Arnold Ikedichi</td>
<td>NPHCDA</td>
</tr>
<tr>
<td>Yusuf</td>
<td>Yusufari</td>
<td>BMGF</td>
</tr>
<tr>
<td>Agbor</td>
<td>John</td>
<td>UNICEF</td>
</tr>
<tr>
<td>Ezire</td>
<td>Onoriode</td>
<td>Marie Stopes (FH+)</td>
</tr>
<tr>
<td>Ikenyei</td>
<td>Uche</td>
<td>USAID</td>
</tr>
<tr>
<td>Gakuru</td>
<td>Tenin</td>
<td>WHO</td>
</tr>
<tr>
<td>Olutobi</td>
<td>Ade Ogu</td>
<td>MEASURE Evaluation</td>
</tr>
<tr>
<td>Ogorny</td>
<td>Otse</td>
<td>PEPFAR</td>
</tr>
<tr>
<td>Abatta</td>
<td>Emmanuel</td>
<td>FMOH / DPRS</td>
</tr>
<tr>
<td>Nuga</td>
<td>Kehinde</td>
<td>NBS</td>
</tr>
<tr>
<td>Garba</td>
<td>A.B.</td>
<td>NPHCDA</td>
</tr>
<tr>
<td>Ogui</td>
<td>Clara</td>
<td>AFNET</td>
</tr>
<tr>
<td>Ogah</td>
<td>Ogo Phyllis</td>
<td>NPHCDA</td>
</tr>
<tr>
<td>Okposen</td>
<td>Bassey</td>
<td>NPHCDA</td>
</tr>
<tr>
<td>Ugi</td>
<td>Benedict</td>
<td>Cross River State MOH, Department of Planning Research and Statistics, Calabar</td>
</tr>
<tr>
<td>Abdulaziz</td>
<td>Mohammed</td>
<td>DFID MNCH2</td>
</tr>
<tr>
<td>Smith</td>
<td>Heather</td>
<td>USAID</td>
</tr>
<tr>
<td>Sule</td>
<td>Adamu</td>
<td>CDC NSTOP</td>
</tr>
<tr>
<td>Ojumu</td>
<td>Abiola</td>
<td>CHAI</td>
</tr>
<tr>
<td>Ekpenyong</td>
<td>Nnette</td>
<td>UC</td>
</tr>
<tr>
<td>Oteri</td>
<td>Joseph</td>
<td>NPHCDA South South</td>
</tr>
<tr>
<td>Ezebilo</td>
<td>Obiora</td>
<td>NPHCDA State Coordinator</td>
</tr>
<tr>
<td>Sequeira</td>
<td>Jenny</td>
<td>BMGF</td>
</tr>
<tr>
<td>Adeoko</td>
<td>Olutobi</td>
<td>MEASURE Evaluation</td>
</tr>
<tr>
<td>Nwaze</td>
<td>Eric</td>
<td>NPHCDA</td>
</tr>
<tr>
<td>Kwaghga</td>
<td>Lawrence</td>
<td>NACA</td>
</tr>
<tr>
<td>Endurance</td>
<td>Elimare</td>
<td>SFH (Society for Family Health)</td>
</tr>
<tr>
<td>Ukor</td>
<td>Nkiru</td>
<td>WHO</td>
</tr>
<tr>
<td>Bwala</td>
<td>Ali Bukar</td>
<td>SFH</td>
</tr>
<tr>
<td>Tebu</td>
<td>Joy</td>
<td>SFH</td>
</tr>
<tr>
<td>Adegoke</td>
<td>Joel</td>
<td>CDC NSTOP</td>
</tr>
<tr>
<td>Okpani</td>
<td>Ikedichi A.</td>
<td>NPHCDA</td>
</tr>
<tr>
<td>Fadeyibi</td>
<td>Fadeke</td>
<td>FMOH</td>
</tr>
<tr>
<td>Fasulu</td>
<td>Olutubosun</td>
<td>FMOH</td>
</tr>
<tr>
<td>Zaidi</td>
<td>Saira</td>
<td>CHAI</td>
</tr>
<tr>
<td>Fadeyibi</td>
<td>Opeyemi</td>
<td>World Bank</td>
</tr>
<tr>
<td>Bisong</td>
<td>John O.</td>
<td>FMOH</td>
</tr>
<tr>
<td>Oyemakinde</td>
<td>Akin</td>
<td>FMOH</td>
</tr>
<tr>
<td>Cheshi</td>
<td>Fatima</td>
<td>UNICEF</td>
</tr>
<tr>
<td>Adekugbe</td>
<td>Yinka</td>
<td>WHO</td>
</tr>
<tr>
<td>Toye</td>
<td>Femi A.</td>
<td>FMOH</td>
</tr>
<tr>
<td>Fatai</td>
<td>Mojeed K.</td>
<td>NBS</td>
</tr>
<tr>
<td>Alozie</td>
<td>Alexander</td>
<td>FHI360</td>
</tr>
<tr>
<td>Salihu</td>
<td>Daniel</td>
<td>UNICEF</td>
</tr>
<tr>
<td>Ezirim</td>
<td>Chinanye</td>
<td>FMOH</td>
</tr>
<tr>
<td>Edu</td>
<td>Betta</td>
<td>NPHCDA, Cross River State</td>
</tr>
</tbody>
</table>
Annex 5. Health worker and stakeholder feedback on intervention designs

We shared early intervention prototypes with health workers and stakeholders to stimulate discussion on the impact of potential changes to the paper-based health information system in Nigeria.

Intervention opportunity: include clinical guidance in the forms

Positive

“Guidance on when to refer a patient is helpful within the form”

“Giving the action to take, such as “refer” is better than just noting an alert”

Concerns

“Color is most helpful, since red means “dangerous” to everyone, but it can be expensive to produce”
**Intervention opportunity: allow for mobility and use alongside patient care**

<table>
<thead>
<tr>
<th>Date of Visit</th>
<th>1. Identify the Patient</th>
<th>2. Understand Symptoms</th>
<th>3. Examine</th>
<th>4. Diagnose and Treat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First Name</td>
<td>Symptoms</td>
<td>Temperature</td>
<td>Diagnoses</td>
</tr>
<tr>
<td></td>
<td>Surname</td>
<td></td>
<td>Respiration Rate</td>
<td>Diabetes (Adult)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Weight</td>
<td>Hypertension (Adult)</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td></td>
<td>Height</td>
<td>Asthma (Adult)</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td></td>
<td>Blood Pressure</td>
<td>Malaria (Malaria)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pulse</td>
<td>Adults</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other Notes</td>
<td>Other</td>
</tr>
</tbody>
</table>

**Positive**

“Smaller registers would be easy to use both in the health center and during out reach.”

**Concerns**

“Check boxes for symptoms or questions to ask the patient are helpful prompts, but people may skip them over time.”

“Recording the outcomes of two patients per page in the register means you lose the view of continuous patient care which the current treatment cards offer.”
Intervention opportunity: design organization and storage into the system

Positive
“A smaller file would be great for tuberculosis when there are few patients.”

Concerns
“For immunization, there are many patients. We would need a larger file system.”
Intervention opportunity: design for tracking and follow up

Positive

“It’s helpful to know how many are expected to come during immunization day for planning purposes.”

“This is better [than a register organized by birth month] because I can easily see who has missed their appointment and call them.”
**Intervention opportunity: reduce redundancies and streamline reporting**

<table>
<thead>
<tr>
<th>Facility</th>
<th>LGA</th>
<th>Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor &amp; Delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Deliveries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal Deliveries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deliveries by midwives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deliveries monitored using a paragraph</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deliveries by a skilled birth attendant</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Pregnancy Outcomes**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live Births</td>
<td></td>
</tr>
<tr>
<td>Outborns</td>
<td></td>
</tr>
<tr>
<td>Complications</td>
<td></td>
</tr>
</tbody>
</table>

**Referrals**

<table>
<thead>
<tr>
<th>Referral</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referral for complications</td>
<td></td>
</tr>
</tbody>
</table>

**Monthly Report Out Patient**

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Nutrition</td>
<td></td>
</tr>
<tr>
<td>Abnormal weight (Children 0-5 years)</td>
<td></td>
</tr>
<tr>
<td>Severe malnutrition</td>
<td></td>
</tr>
<tr>
<td>Severe undernutrition (Children 0-5 years)</td>
<td></td>
</tr>
<tr>
<td>Severe wasting (Children 0-5 years)</td>
<td></td>
</tr>
<tr>
<td>Severe underweight (Children 0-5 years)</td>
<td></td>
</tr>
<tr>
<td>Infections</td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td></td>
</tr>
<tr>
<td>Malaria rapid test</td>
<td></td>
</tr>
<tr>
<td>Home care (children)</td>
<td></td>
</tr>
<tr>
<td>Home care (children with complications)</td>
<td></td>
</tr>
<tr>
<td>Diarrhea cases referred</td>
<td></td>
</tr>
<tr>
<td>Diarrhea cases referred for further treatment</td>
<td></td>
</tr>
</tbody>
</table>

**Positive**

“The tally sheet works well for immunization. We should use a tally sheet for other services.”

**Concerns**

“We just recently instituted the five circles for tally sheets and it works well.”