Caractérisation du système national d’information sanitaire en Côte d’Ivoire

Characterisation of the Health Information System in Côte d’Ivoire

REPORT OF FINDINGS*
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Final report – March 2017

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

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>BM</td>
<td>Banque Mondiale (World Bank)</td>
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<tr>
<td>CCM</td>
<td>Country Coordinating Mechanism (Global Fund)</td>
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<tr>
<td>CPN</td>
<td>Consultation Prénatal</td>
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<td>CPoN</td>
<td>Postnatal consultation</td>
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<tr>
<td>CSRS</td>
<td>Centre Suisse de Recherches Scientifiques en Côte d’Ivoire</td>
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<tr>
<td>CRCT</td>
<td>Cluster Randomised Controlled Trial</td>
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<tr>
<td>DHIS2</td>
<td>District Health Information Software 2</td>
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<tr>
<td>HDSS</td>
<td>Health and Demographic Surveillance System</td>
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<tr>
<td>DGS</td>
<td>Direction Générale de la Santé (General Directorate General of Health)</td>
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<tr>
<td>DHO</td>
<td>District Health Office</td>
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<tr>
<td>DHS</td>
<td>Demographic and Health Survey</td>
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<tr>
<td>DPPEIS</td>
<td>Direction de la Prospective, de la Planification, de l’Evaluation et de l’Information Sanitaire (Directorate on the future, planning, evaluation and health information)</td>
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<tr>
<td>DPT</td>
<td>Diphtheria, pertussis, tetanus vaccine</td>
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<tr>
<td>DQA</td>
<td>Data Quality Audits</td>
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<tr>
<td>EPI</td>
<td>Expanded Programme on Immunisation</td>
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<td>EU</td>
<td>European Union</td>
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<td>FM</td>
<td>Fond Mondial (Global Fund)</td>
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<tr>
<td>Global Fund</td>
<td>Global Fund to Fight AIDS, Tuberculosis and Malaria</td>
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<td>GF</td>
<td>Health Facility</td>
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<td>HIS</td>
<td>Health Information System</td>
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<td>HIUS</td>
<td>Health Information Use System</td>
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<td>HMIS</td>
<td>Health Management Information System</td>
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<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
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<tr>
<td>INS</td>
<td>Institut National de la Statistique</td>
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<tr>
<td>LLIN</td>
<td>Long-lasting insecticide-treated nets</td>
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<td>LMIC</td>
<td>Low- and middle-income countries</td>
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<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
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<tr>
<td>MSHP</td>
<td>Ministère de la Sante et de l’Hygiène Publique</td>
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<tr>
<td>NRI</td>
<td>National Research Institution</td>
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<tr>
<td>ODK</td>
<td>Open Data Kit</td>
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<tr>
<td>OMS</td>
<td>Organisation Mondiale de la Santé</td>
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<td>ORT</td>
<td>Oral Rehydration Therapy</td>
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<tr>
<td>PARSSI</td>
<td>Projet d’Appui à la Redynamisation du Secteur de la Santé en Côte d’Ivoire</td>
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<tr>
<td>PAV</td>
<td>Programme Elargi de Vaccination (EPI)</td>
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<tr>
<td>PEPFAR</td>
<td>President’s Emergency Plan for AIDS Relief</td>
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<tr>
<td>PEV</td>
<td>Programme Élargie de Vaccinations</td>
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<tr>
<td>PHC</td>
<td>Primary Health Care</td>
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<tr>
<td>PHISICC</td>
<td>Paper-Based Health Information System in Child Care</td>
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<tr>
<td>PTME</td>
<td>Transmission Mère-Enfant (Prévention of Mother-to-Child Transmission; HIV/AIDS)</td>
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<tr>
<td>RCT</td>
<td>Randomised Controlled Trial</td>
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<tr>
<td>SCIH</td>
<td>Swiss Centre for International Health</td>
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<tr>
<td>SNIS</td>
<td>Système National d’Information Sanitaire</td>
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<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>USD</td>
<td>US Dollar</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<tr>
<td>WS</td>
<td>Work Stream</td>
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Synthèse des résultats

La santé de la population est directement affectée par les décisions prises par les politiciens, les gestionnaires, les fournisseurs de soins de santé et par la population elle-même. Par conséquent, les actions visant à améliorer la cohérence des décisions doivent prendre en compte tous les processus décisionnels, en commençant par le niveau des établissements de santé. Le projet PHISICC (Paper Health Information Systems In Child Care) se concentre sur les composants papier du système d'information dans trois pays africains (Côte d'Ivoire (CIV), Mozambique et Nigéria).

Notre thème de recherche est le suivant: Quel est l'impact de nos interventions sur les systèmes d'information sur la qualité et l'utilisation des données et sur les résultats liés à la santé dans les Soins de Santé Primaires des pays à revenu faible et intermédiaire (LMIC)? À cette fin, nous évaluerons les caractéristiques du système national d'information sanitaire (SNIS), afin de comprendre comment les données sont produites, stockées et transmises et quelle est l'expérience humaine en matière de collecte de données et de prise de décision. Ensuite, dans un partenariat créatif avec des partenaires nationaux, nous nous engagerons dans des activités de conception co-créative, collaborative et intentionnelle afin d'innover sur les outils et les processus pour améliorer les systèmes papier. Nous allons ensuite tester ces innovations en utilisant des essais contrôlés aléatoires. Ce rapport constitue la première partie du projet: la caractérisation du SNIS dans le pays.

Nous avons utilisé des méthodes mixtes avec plusieurs angles: santé publique, systèmes de santé et Human Centred Design. Les méthodes comprenaient: l'examen des principaux documents sur la politique de santé de la CIV et un travail sur le terrain pendant deux semaines dans le Nord et le Sud de la CIV pour mener des entretiens et des ateliers avec des intervenants clés, des analyses d'intervenants, des entretiens avec des agents de santé, des exercices de vérification des données des établissements de santé et de « shadowing » des agents de santé. Nous n'avons pas cherché à obtenir des résultats généralisables, mais plutôt à acquérir une connaissance approfondie de l'état du SNIS en synthétisant plusieurs types de preuves provenant de plusieurs sources. Bien que nous ne puissions pas exclure un certain degré de partialité dans nos résultats, nous avons pris toutes les précautions nécessaires pour respecter les normes de recherche largement acceptées. Cette recherche a été approuvée par le comité d'éthique compétent de la CIV.

Vingt-deux intervenants ont été approchés dans le travail sur le terrain et ont participé aux différentes activités. Cinq d'entre eux ont également participé à des entretiens approfondis. Nous avons également visité 16 établissements de santé pour effectuer des entrevues, la vérification des données et des entretiens avec les agents de santé dans les zones d'Abidjan et de Korhogo.

Nous avons constaté que le SNIS est une priorité au niveau national dans le secteur de la santé et qu'il y a un débat intensif dans le pays par rapport à la configuration du SNIS et la manière dont il pourrait être mieux exploité pour la prise de décision. La Direction de la Prospective, de la Planification, de l'Evaluation et de l'Information Sanitaire (DPPEIS) est clairement perçue comme l'entité leader dans le SNIS et joue d'une bonne réputation.

Le SNIS est complexe en termes de nombre d'indicateurs, de formulaires, d'exigences en
matière de rapports et de coordination entre secteurs et programmes. Cela s'explique en partie par le besoin perçu d'accommoder les perspectives et les besoins du secteur de la santé publique, en premier lieu, mais aussi ceux des parties prenanentes, en particulier dans le domaine du VIH / Sida. Malgré le fait que le DPPEIS soit perçu comme jouant un rôle de premier plan dans le SNIS, il doit être en mesure de satisfaire divers parties prenanentes ayant besoins de plus en plus de données.

Les parties prenanentes visent clairement à maximiser la quantité et la qualité des données. Ces intérêts concurrents ne sont pas toujours alignés et cela a mis en péril la qualité des données et le potentiel d'utilisation de ces données. L'objectif du SNIS est clairement de reporter les données au niveau supérieur, au détriment de la prise de décision au niveau ou sont collectées les données. Il en résulte une charge de travail élevée et des défis au niveau des établissements de santé pour se conformer, d'une part aux exigences en matière de soins de santé, et d'autre part à la gestion des données. L'attention est alors orientée vers les aspects techniques du SNIS pour se conformer aux exigences de la gestion données par opposition à l'utilisation de données pour la prise de décision à chaque niveau du système.

Il est compréhensible que, dans ce contexte, le SNIS pose de sérieux défis, notamment : le manque de ressources, la faible capacité du personnel au niveau périphérique et le manque d'harmonisation et de normalisation. Cela a été reflété dans les visites aux établissements de santé, où les outils papier étaient généralement désorganisés sans matériel et sans pratiques d'archivage appropriés. Des ruptures des stocks d'outils ont été observées mais celles-ci ont été très intelligemment gérées avec des solutions locales. Les besoins spécifiques (par exemple, le suivi des enfants perdus de vue pour le suivi de la vaccination) ont également été abordés avec des adaptations locales des outils ou avec la création de nouveaux.

PHISICC est perçu comme une occasion de produire de solides et nouvelles preuves sur ce qui fonctionne pour améliorer le SNIS basé sur le papier, en particulier pour la prise de décision au niveau des établissements de santé. Il est largement reconnu que, malgré des progrès technologiques remarquables, le papier continuera d'être un outil essentiel pour la prise de décision dans le pays.

Ces résultats et les nombreux détails recueillis dans les notes de terrain et les conversations sont une base prometteuse pour soutenir le développement d'interventions novatrices visant à améliorer les systèmes et les outils en papier en CIV. Ils confirment la nécessité de se concentrer sur la prise de décision au niveau des établissements de santé en tant que principale raison d'être pour améliorer les systèmes. À cette fin, nous avons commencé la décomposition des différentes fonctions prenant part à la prise de décision afin d'étudier comment rendre les systèmes adaptés à ces fonctions. L'équipe et les partenaires reconnaissent également les défis représentés par ceux qui n'utilisent pas les établissements de santé, car l'impact de toute amélioration dans les systèmes ne les atteindra que si un nouveau SNIS favorise directement ou indirectement l'utilisation des services de santé. Nos résultats confirment également le besoin indispensable de mettre les agents de santé au centre du processus de conception des innovations afin de rendre leur travail plus efficace, moins lourd, plus satisfaisant et, par ces moyens, plus précis et plus adapté aux besoins de santé des populations.
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 (CIV), 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 of Low- and Middle-Income Countries (LMIC)? To this end, we will assess the status of the Health Management Information System (SNIS in CIV), 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 SNIS in the country.

We used a mixed methods approach from several angles: public health, health systems and Human Centred Design. Methods included: review of key CIV health policy documents and two weeks field work in the North and South of CIV to carry out interviews and workshops with key stakeholders, stakeholders analyses, interviews with health workers, health facility data verification exercises and health workers shadowing. We did not aim to obtain generalizable findings, but rather to acquire an in-depth knowledge of the status of the SNIS 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 CIV ethical review board.

Twenty-two stakeholders were approached in the field work and participated in the different activities. Five of them were also engaged in in-depth interviews. We also visited 16 health facilities to carry out interviews, data verification and health workers shadowing in the areas of Abidjan and Korhogo.

We found that the SNIS is a priority at national level in the health sector and that there is an intensive debate in the country in relation to the configuration of the SNIS and how can it be better used for decision making. The Direction de la Prospective, de la Planification, de l’Evaluation et de l’Information Sanitaire (DPPEIS) is clearly perceived as the leading entity in the SNIS and is well considered.

The SNIS is complex and heavy, in terms of the number of indicators, forms, reporting requirements and coordination between sectors and programmes. This is partially due to the perceived need to accommodate perspectives and needs of the governmental health sector, in the first instance, but also those of stakeholders, particularly in the area of HIV/AIDS. Despite the DPPEIS being perceived as having a leading role in the SNIS, it has to face the difficult challenge to respond to the data needs of a complex stakeholders environment in the country.

Stakeholders clearly aim at maximising both data quantity and quality. These competing interests are not always aligned and this has been reported to jeopardise the quality of data and the potential for data use. The focus of the SNIS
The figure found through the re-counting in the register). 
These findings, and the 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 CIV. They confirm the need to focus on decision making at health facility level as the main rationale to address improvements in the systems. To this end, we started the ‘dissection’ of the component of decision making in order to study how to make the systems responsive to these components. Team and partners also acknowledge 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 SNIS actually directly or indirectly promotes the use of health services. Our findings also confirm the unnegotiable 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.

Data verification exercises were performed in three health facilities. Of the 14 data verification exercises, four had perfect concordance. The other ten data verification exercises revealed four 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 six under-reporting cases (i.e. the figure found in the monthly report was smaller than...
1 Project background

Population health is directly affected by decisions taken by policy makers, managers, health care providers and by the population itself. Decisions are taken by applying judgements to evidence describing problems or suggesting solutions. However, judgments are influenced by personal, organisational and political factors; besides, evidence has always 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 System – HMIS / SNIS).

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 source of data and, therefore, errors at this level are transmitted and amplified to the highest levels of the information systems.

In the current project (Paper-Based Health Information System in Child Care – PHISICC) we focus on the paper components of the information system in three African countries. For Côte d’Ivoire, the project is organised in a partnership between the Swiss TPH (Switzerland), gravitytank (the USA), the Centre Suisse de Recherches Scientifiques en Côte d’Ivoire (CSRS - Côte d’Ivoire) and the Ministère de la Santé et de l’Hygiène Publique (MSHP / MOH).

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 the SNIS in the country, in order to understand how data are produced, stored and transmitted and what is the human experience around data and decision making (work stream 3 in PHISICC). 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. Finally, we will in each of the three participating countries design and implement randomised controlled trials to test the effects of the interventions designed. This report refers to the first part of the project: the assessment of the SNIS in the country through an observational, mixed-methods approach. The fieldwork of this assessment in Côte d’Ivoire took place in late June 2016. The objectives of the assessment are to:

1. understand the SNIS in the context of the governmental health sector;
2. describe the perceptions and use of the SNIS in the country;
3. identify the strengths and weaknesses of the SNIS and potential entry points for innovations.
4. outline the implications of these findings for WS4 and WS5.
2 Approaches and methods

We summarise in the next section the approaches and methods used in Work Stream 3 (WS3) in Côte d’Ivoire. For a full description of methods, see the WS3 protocol†.

2.1 Documents review and analyses of tools

The MSHP 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 SNIS. Documents (see Annex 1) were scrutinised and relevant statements related to SNIS, decision making, evidence and use of evidence were searched and extracted. Information on SNIS guidelines, flow of data and processes was especially searched and extracted to provide a synthesis to inform the field work. The document review was supported by a series of online, informal interviews with experts knowledgeable of the health sector and SNIS in Côte d’Ivoire.

The content analysis of the documents review followed Mayring” approach, screening the documents in the general aspects of the health systems and particularly focusing on the use of data within the health system.

The DPPEIS was requested to provide a set of forms used in PHC in the governmental health sector. Besides, in 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 were analysed and tabulated, detailing its characteristics (e.g. name, topic, presentation, format). Data items across different forms were mapped using a line graphic in order to describe the flow and use of each data item across the different tools.

2.2 Stakeholders engagement

A subset of stakeholders that were identified as active contributors to the SNIS in the country by officials at the MSHP and by the PHISICC counterparts, the CSRS. Selected stakeholders were individually interviewed in order to gather additional, first-hand information on the functioning of the SNIS, challenges, opportunities and, overall, on how stakeholders would see the future of the SNIS and the paper components of it.

Interviews were structured and followed a guide. However, interviewers (senior members of the research team) deviated from the guide if there was a specific issue that would seem especially relevant for the research topic and which would benefit from more insight information. Therefore, not all resulting interviews were strictly comparable. See the generic interview guide in Annex 2.

† Mayring P. Qualitative Content Analysis. Forum: Qualitative Social Research, 2000. 1(2).
Furthermore, stakeholders in the country with direct or indirect interests and contributions to the SNIS were invited to two workshops: one at the beginning of the fieldwork, to present the project and the plan and rationale of the fieldwork; and another one at the end, to share preliminary findings.

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

(a) project background and introductions;
(b) discussion on the current state of PHC and HIS;
(c) listing and prioritisation of challenges in the health sector.

The restitution workshop consisted of a mix of plenary sessions and small group sessions and was structured as follows:

(a) welcoming;
(b) video immersion;
(c) discussion, based on questions to participants;
(d) co-creation session; using scenarios, brainstorm solutions to improve the HIS.

2.3 Visits to health facilities

A purposive sample of health facilities was agreed with project partners, including the MSHP. The sample included rural and urban, well performing and poorly 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 2.

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 2.4).

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2.4 Human-centred design approach

A human-centred design approach was used as background across all activities aiming at understanding information use and decision-making, by health care providers and stakeholders. The human-centred design understands health care processes, including data production, management and use, as a human experience and from the perspective of the passive or active actors of health care events. From this perspective, the relevance and appropriateness of health care activities are assessed in terms of actors’ views and perspectives, and not only in terms of efficacy or efficiency. The underlying hypothesis suggests that sound interventions have to be adapted to improve users’ experience.

Part of the research team ‘shadowed’ health workers in their daily activities to get a first-hand impression of how the work flow was organised and the role of the SNIS in the different activities carried out. Some of the working sessions were recorded in order to allow an in-depth analysis by the research team later on. Appropriate permissions for granted (see section 2.5).

2.5 Administrative and ethical clearances

Visits to health facilities were partially video recorded and photographs were taken using standard equipment by gravitytank, 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.

Data extraction for the document review was done using MS Excel\(^1\). 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 stakeholders interviews and all data from site visits was entered into a tablet-based data collection tool (ODK\(^3\)), which uploaded the data to a server and then was downloaded in csv format. Qualitative information was revised and rewritten to be part of this report. No specific qualitative data management techniques were used. Quantitative data were imported and analysed using R\(^4\) to produce estimates and graphs.

All activities involving interaction with country stakeholders, partners and health care providers were supported by professional simultaneous translation.

The research protocol was translated into French in order to obtain administrative and research ethical clearances. Documentation was submitted by the CSRS before the appropriate authorities in the country to approve the research, provide clearances to national research partners and to allow visiting of health facilities. Verbal authorisation was obtained by the heads of health facilities to allow videotaping of interviews and activities in the health facilities.

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1 Microsoft Corp, Redmond, Washington, USA.
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 SNIS 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 SNIS 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

Fieldwork activities took place in the area of Abidjan and in the north of the country, Korhogo, during June 2016 (Figure 3). Before that, the PHISICC team worked in the documents review. The chronogram of the field mission can be found in Annex 3.

3.1 Country health indicators

Table 1 provides an overview of key health related indicators of Côte d’Ivoire.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Indicator</th>
<th>22.7 million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>Life expectancy at birth</td>
<td>53 years</td>
</tr>
<tr>
<td>Maternal mortality ratio</td>
<td>Infant mortality rate</td>
<td>645 per 100’000 live births</td>
</tr>
<tr>
<td>General government expenditure on health as a % of total government expenditure</td>
<td>General government expenditure on health as a % of total expenditure on health</td>
<td>8.5% in 2013</td>
</tr>
<tr>
<td>Out-of-pocket expenditure as a % of total expenditure on health</td>
<td>Distribution of years of life lost by major cause group (%): Communicable</td>
<td>69%</td>
</tr>
<tr>
<td></td>
<td>Non-communicable diseases</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>Injuries</td>
<td>9%</td>
</tr>
<tr>
<td>Prevalence of HIV, (% of ages 15-24 years)</td>
<td>Prevalence of HIV</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

Findings are from 2015 unless otherwise stated. Sources: (i) Côte d’Ivoire Factsheets of Health Statistics 2016, WHO Afr; (ii) on HIV.

3.2 Outline of the SNIS in Côte d’Ivoire

The main documents accessed during the desk review were:

- National Health Development plan 2009 to 2013
- National Health Development plan 2012 to 2015
- Health Management Information System Policy
- The Handbook for the management of data.

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In Côte d’Ivoire, the SNIS is defined as the “ensemble of elements and procedures, tightly interrelated, with the aim of providing health related information to allow the surveillance of the health services state of a country, with the objective of improving administration and the decisions related to the management of public health care at all levels”. This definition, taken from a WHO-Afro document, stresses the ‘managerial’ and ‘public health’ function of the SNIS, without an explicit reference to the primary users (i.e. health workers in health facilities) or their main tasks (i.e. clinical care).

The national Health Information System (HIS) is organised into three levels where data are produced: the primary level, the intermediate aggregation level (with two sub-levels: district and region) and the central or national level. At the periphery, the data are produced by the peripheral health facilities (établissement sanitaires de premier contact), be they public, private or faith-based. There are also health facilities that are called para-public. From these facilities, the data are sent in the form of monthly reports to the next level, the district health office, where digitalisation of data takes place: data are entered from the monthly paper-based reports into the DHIS2 system (District Health Information Software 2). In general, only public health facilities, faith-based health facilities and other private non-profit health facilities do this type reporting, although all facilities are required to do so by law. For profit private health facilities in general do not report data. The aggregated data are then sent to the regional health office. In addition, regional hospitals send their data to the regional health office where data are again aggregated and sent to the national level. At the national level, the recipient of the regional aggregate data is the so-called DPPEIS (Direction de la Prospective, de la Planification, de l’Evaluation et de l’Information Sanitaire). DPPEIS shares the data with the National Statistics Office, other Ministries, international NGOs, UN agencies and technical as well as financial partners.

Apart from this routine data collection system, there is what is called the non-routine data collection system: surveys and special studies. Also, a census is performed every ten years. However, these data are not necessarily centralised at the level of the DPPEIS. Civil registration of births and deaths is also conducted, though to a limited degree: in the time span 2007 to 2013, only 65% of births were registered (regarding deaths, there were no data available)¹.

We based our SWOT analysis on statements extracted from the selected documents. In the desk review 617 statements were extracted in total. Half of these statements were linked to organisational issues (51% of 617 statements); around one third of the extracted statements addressed processes within the Health sector in general and the SNIS in particular (35% of 617 statements). Actors and the context of the system were less often identified (5% and 8% of 617 statements, respectively).

Within the overall data corpus of 617 statements, 225 statements were identified as having a direct link to data and information (36%²). Around two thirds of these statements were related to processes (61% of

¹ « Le Système National d’Information Sanitaire (SNIS) est un ensemble d’éléments et de procédures étroitement liés ayant pour but de fournir des renseignements et des informations sanitaires permettant de surveiller l’état et les services de santé d’un pays, afin d’améliorer l’administration et les décisions concernant la gestion des soins de santé publique à tous les niveaux
Source: OMS, Interventions prioritaires pour renforcer les systèmes nationaux d’information sanitaire ; Comité régional de l’Afrique; rapport du Directeur régional, Brazzaville, Congo, 30 août - 3septembre 2004.
² WHO Afro: Côte d’Ivoire - Factsheets of Health Statistics 2016
² Note that two of the documents were directly related to the SNIS and therefore, a relatively high proportion of these types of statements, as found in our review, would be expected.
225 statements). Organisational aspects were mentioned in approximately one third of the SNIS-related statements (31% of 225 statements).

Overall, the majority of the extracted statements addressed issues in the area of planning and management as a topic of priority (48% of 617 statements). The provision of services (17% of 617 statements) and questions regarding the leadership (11% of 617 statements) were less frequently identified.

Within the extracted statements, data use and data quality were represented in around 40% (250 of 617 statements). Data quality was a topic in only 10% of these representations of data and information (25 of 250 statements).

We summarise the SNIS outline in the following SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) was based on the data extraction of the desk review. Table 2 presents the findings.
Table 2. SWOT analysis of the HIS.

<table>
<thead>
<tr>
<th>SWOT</th>
<th>Organisational level</th>
<th>Process level</th>
</tr>
</thead>
</table>
| **Strengths** | • Institutionalisation of a functional HIS by law  
• Existence of a network for the epidemiological surveillance with the “Centres de Surveillance Epidémioiologique”  
• Operationalization of a warning system  
• National actors (e.g. DPPEIS) and international agencies (e.g. World Bank, European Union) form partnerships | • There are tools for data collection, registers and reporting tools with clear timelines  
• Use of the application “SIGVISION” for management of data as well as for planning and decision making. SIGVISION allows aggregation of data at the various levels  
• As of June 2017, the country has transitioned from SIGVISION to DHIS 2; DHIS 2 now covers all regions and districts of the country.  
• Decentralisation of managerial activities and recognition of the key role of the health districts  
• Formalisation of the flow of information  
• Efforts made towards an integration of regional and general hospitals into the HIS.  
• Continued education of work force |
| **Weaknesses** | • Existence of parallel information systems for data collection and management  
• Lack of integration of the private and faith-based sector  
• Lack of a comprehensive integration of data from different national establishments (e.g. “Etablissements Publics Nationaux”, “Centres Hospitaliers Universitaires”)  
• Lack of integration of work-related diseases into the national HIS  
• Weak organisational integration of research and its results. Regarding research there are:  
  ➢ scarce financial resources  
  ➢ poor capacity of human resources  
  ➢ lack of national policy and legislation, lack of research programmes, and lack of planning and follow-up on research activities and results (results of research not used in decision making).  
• Inefficiency of managerial tools for the HIS  
• Lack of adequate equipment (e.g. ICT tools and servers)  
• Lack of well trained and motivated staff  
• Weaknesses in the leadership of the HIS in the area of harmonisation and definition of data collection methods and tools. | • Planning and management in general  
• Human resources  
• Monitoring and evaluating  
• Managerial incapacities at the district and regional level  
• “Anarchical” establishing of new health facilities  
• Lack of supervision and controlling of activities at all levels, including irregular feedback (hindering informed decision making at all levels) |
| **Opportunities** | • Existence of political and strategic planning of the circulation and transmission of data  
• To strengthen leadership, there are plans that include definitions of roles and responsibilities of actors at all levels of the health system  
• Clear drivers for standardisation  
• Taabo HDSS since 2008 | • There is an overall political interest in promoting the procedural strength of the HIS together with the development of follow-up and evaluation mechanisms at all levels  
• For human resources, a minimum package of HIS activities was implemented  
• Based on several already performed activities (e.g. cartography of human resources) and the Ferkessedougou project on motivation of health work force), processes of the HIS can be strengthened |
| **Threats** | Difficult socio-political context which hampers planning and managerial activities, including a complex donor environment with conflicting views and perspectives. | |
3.3 SNIS metadata

We have analysed the tools provided by the DPPEIS based on the forms and also on the data items contained in the forms. We could not find an inventory of forms per se and we built a list based on what was made available to the team.

3.3.1 Overview of forms

In total, we identified 18 forms across a series of domains as outlined in Table 3. Of these forms, 16 were level 1 forms (i.e. filled at the same time that health care events took place) and two were level 2 forms used to aggregate data for reporting at higher levels of the system.

Table 3. List of printed forms found at health facility level.

<table>
<thead>
<tr>
<th>Form name</th>
<th>Form domain</th>
<th>Form title</th>
<th>Form level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Consultations</td>
<td>Consultation</td>
<td>NA</td>
<td>1</td>
</tr>
<tr>
<td>2. ANC</td>
<td>ANC</td>
<td>NA</td>
<td>1</td>
</tr>
<tr>
<td>3. Delivery</td>
<td>Delivery</td>
<td>NA</td>
<td>1</td>
</tr>
<tr>
<td>4. PNC</td>
<td>PNC</td>
<td>NA</td>
<td>1</td>
</tr>
<tr>
<td>5. HIV adult</td>
<td>HIV</td>
<td>FICHE ADULTE</td>
<td>1</td>
</tr>
<tr>
<td>6. HIV child</td>
<td>HIV</td>
<td>FICHE ENFANT</td>
<td>1</td>
</tr>
<tr>
<td>7. HIV TARV (old)</td>
<td>HIV</td>
<td>ADULTES / ENFANTS</td>
<td>Traitement antirétroviral</td>
</tr>
<tr>
<td>8. HIV TARV (new)</td>
<td>HIV</td>
<td>REGISTRE DE TARV</td>
<td>1</td>
</tr>
<tr>
<td>9. Family screening HIV</td>
<td>HIV</td>
<td>DÉPISTAGE FAMILLE</td>
<td>1</td>
</tr>
<tr>
<td>10. PMTCT</td>
<td>HIV</td>
<td>NA</td>
<td>1</td>
</tr>
<tr>
<td>11. HIV screening lab</td>
<td>HIV</td>
<td>NA</td>
<td>1</td>
</tr>
<tr>
<td>12. Bilans</td>
<td>HIV</td>
<td>BILANS</td>
<td>1</td>
</tr>
<tr>
<td>13. Support TB-HIV</td>
<td>HIV-TB</td>
<td>REGISTRE DE VISITE POUR LES SOINS ET SOUTIENS</td>
<td>1</td>
</tr>
<tr>
<td>14. HIV cohort</td>
<td>HIV</td>
<td>RAPPORT ANALYSE COHORTE DES PATIENTS SOUS TRAITEMENT ARV</td>
<td>1</td>
</tr>
<tr>
<td>15. Filing dossier</td>
<td>HIV</td>
<td>CLÔTURE DE DOSSIER</td>
<td>1</td>
</tr>
<tr>
<td>16. Cover page</td>
<td>NA</td>
<td>DOSSIER INDIVIDUEL DU PATIENT</td>
<td>1</td>
</tr>
<tr>
<td>17. Monthly report - HF</td>
<td>Any</td>
<td>SYSTEME D'INFORMATION DE GESTION RAPPORT MENSUEL DE L'ETABLISSEMENT SANITAIRE PRIMAIRE</td>
<td>2</td>
</tr>
<tr>
<td>18. Monthly report - EPI</td>
<td>Vaccination</td>
<td>RAPPORT MENSUEL PEV DU CENTRE DE SANTE</td>
<td>2</td>
</tr>
</tbody>
</table>

There are two monthly pieces of data reported to higher levels: the overall monthly report (item 17 in the table) and a short monthly report dedicated to vaccination data, despite that the former already has a section on vaccination data. Strikingly, 11 of the 16 level 1 forms were in the domain of HIV, similarly to the proportion of data items dedicated to this disease. Actually, not all health centres in Côte d’Ivoire have HIV services and therefore, the proportion of actual data on HIV collected and sent to higher levels varies by type of health centre.

The monthly report consists of a 30 pages booklet structured in sections and subsections (Table 4), with data organised in a combination of single items, lists and tables and some instructions on how to complete them. In the monthly report, there are two sections dedicated to HIV: a main section and then with the

* Version April 2012.
laboratory services; although HIV related data can be found in other places, such as in antenatal care. This suggests that most of the HIV data in level 1 forms are linked to clinical care, while only part of it is further aggregated and sent to higher levels of the systems.

**Table 4. Structure of the monthly report.**

<table>
<thead>
<tr>
<th>Section 1: Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Health Consultation: curative care, nursing care, hospitalization</td>
</tr>
<tr>
<td>1.2 Maternity: place of birth, type of birth (live, stillborn, abortion), etc.</td>
</tr>
<tr>
<td>1.3 Prenatal Care (CPN) and Postnatal Care (CPoN)</td>
</tr>
<tr>
<td>1.4 Prevention of Transmission from Mother to Infant (PTME)</td>
</tr>
<tr>
<td>1.5 Weight and Nutrition of Infants</td>
</tr>
<tr>
<td>1.6 Vaccination</td>
</tr>
<tr>
<td>1.7 Diarrheal Disease</td>
</tr>
<tr>
<td>1.8 People Living with HIV</td>
</tr>
<tr>
<td>1.9 Communication for Behaviour Change</td>
</tr>
<tr>
<td>1.10 Family Planning</td>
</tr>
<tr>
<td>1.11 Counselling and Screening</td>
</tr>
</tbody>
</table>

| Section 2: Incidence of Disease: infectious diseases by age category |
| Section 3: Deaths: patient number, date of death, place of death, diagnosis |

<table>
<thead>
<tr>
<th>Section 4: Technical Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Laboratory: types of labs by specialty, disease diagnosis, results of HIV tests</td>
</tr>
<tr>
<td>4.2 Dental Clinic</td>
</tr>
</tbody>
</table>

| Section 5: Anti-Leprosy Fight |
| Section 6: Anti-Tuberculosis Fight |
| Section 7: Buruli Ulcer Disease |
| Section 8: Diabetic Disease |

<table>
<thead>
<tr>
<th>Section 9: Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1 Management of the stock of medications: meds, vaccines, kits</td>
</tr>
<tr>
<td>9.2 Management of the finances</td>
</tr>
<tr>
<td>9.3 Management of the monthly report</td>
</tr>
</tbody>
</table>

### 3.3.2 Data items in the SNIS

We extracted all data items from all forms made available to use, we tabulated them and classified according to several criteria (see Methods section). During data extraction we identified several issues which could compromise the quality of data. Some of the issues included, for example, inconsistency in the coding of options to fill in, ambiguities in the use of abbreviations or inconsistencies across forms in the way similar information is reported (see Annex 4). The complete analyses of meta-data will be included in a separate report.

### 3.4 Stakeholders perspectives and views

The project team was very well supported by partners and the DPPEIS itself to identify and approach stakeholders which are supportive or interested in the SNIS in the country. Some stakeholders had a prominent role in the elaboration of the “Dictionnaire National des Indicateurs de Santé”. This is a very thick document listing and describing the whole set of indicators for the health sector in Côte d’Ivoire. These were: the Global Fund, MEASURE Evaluation, PARSSI (EU-funded project in the health sector), PEPFAR and USAID. Additional partners identified in the DPPEIS website* include: fhi360, International


3.4.1 Interviews

The following stakeholders were interviewed (in alphabetical order): the DPPEIS, the INS (Institut National de la Statistique), MEASURE Evaluation, PSI and The Global Fund. Unfortunately, due to competing agendas, it was not possible to carry out interviews in UNICEF or in the WHO country office. Responses of stakeholders to interviews are qualitatively reported in the next paragraphs. As mentioned in the methods section, despite that all interviews were guided by a generic questionnaire, specific issues that were judged to be specially relevant to the research were prioritised and, therefore, the various interviews do not necessarily follow the same patterns.

The MSHP, particularly the DPPEIS, strongly stressed the importance of data for decision making at all levels of the health system and the need to achieve high data quality standards. It was estimated that 80% of the data used at national level for decision making came from the SNIS, although other relatively minor sources were mentioned, such as surveys and M&E reports; but the annual SNIS reports are the most important by far. The DPPEIS stated that the system has had notable improvements in the recent past, although some areas still require attention. Interestingly, the DPPEIS noted that despite SNIS sustainability being ensured through national financing, external funding is essential for the running of services, although it poses also remarkable challenges in the system, including the SNIS.

One of the main achievements is the capacity to produce in a timely fashion annual reports based on the SNIS and to have meaningful data outputs quarterly at national level. The main problems of the SNIS reported were (i) the integration of all sectors, particularly the private sector and the military; (ii) human resources capacity; and (iii) the quality of data. Usually, the national report can be produced within six months of the closing of the previous calendar year.

Very early, the DPPEIS stressed the essential role of ‘paper’ in the SNIS, which would stay active for ‘at least 30 years’. The ‘paper’ tools are mainly seen as a way of collecting data, but not particularly to produce analytical outcomes. The DPPEIS also pointed at some of the issues with paper tools, notably the high costs of covering the whole country with adequate amounts of tools. There are quality checks of data at central level, mainly quarterly, and the DPPEIS is relatively satisfied in terms of the levels of accuracy (concordance) and timelines achieved. At higher levels, districts and regions are connected through the DHIS2, and hospitals will join in the near future.

Every three years there are revisions of the system following the ‘dictionary of indicators’, a document which was introduced to the team. The last revision took place in 2016. Their priority areas are: (i) integration within the SNIS; (ii) regulatory issues; and (iii) staff capacity to ensure quality. The MSHP is very active in addressing those issues acknowledging that some may take time to fix. It was also mentioned that simplification of the system, including the tools, could have advantages although it could be anticipated that there would be obstacles related to stakeholders acceptability of initiatives which may

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1 The MSHP has a website with a link to ‘statistics’ (http://www.sante.gouv.ci/#); however, the link was not available at the time it was accessed.
reduce the availability of data, even if superfluous: ‘Everyone wants his data’. The issue of system
simplification was prominent and spontaneously raised by several stakeholders. This was no surprise to us
since, as shown across several findings, the issues of complexity and amount of indicators were already
present in high level discussion before the landing of PHISICC in CIV.

MEASURE Evaluation, mainly funded by PEPFAR, was clearly identified as a key stakeholder. MEASURE
Evaluation actively promoted the integration of HIV indicators into the SNIS and also helped in setting up
the transmission of data across levels when the information was not usually available at central level.
MEASURE Evaluation accompanies the MSHP in relation to HIV data recording and reporting. It is
estimated that 80% of the costs of the SNIS are funded by PEPFAR. The Global Fund (through the CCM) is
also assisting to develop the SNIS at the MSHP level with funding.

Since 2008, all health programmes have integrated the key indicators and an electronic system for HIV
patients. However, each programme comes with its own indicators and they discuss these issues in long
meetings with stakeholders. Despite that, several systems currently coexist and the aim of reaching a
global, integrated system in the future is more urgent than ever. In 2012, the strengthening plan for DHIS2
was drafted, including HIV data issues. In 2012 and then again in 2014, PEPFAR introduced new indicators.
This system is complemented by other systems, such as the data management tools for medication,
known as ILMS. At present, though, there are only a few health facilities which are using the current
forms.

It was reported that currently when PEPFAR changes the indicators for any reason, the country has to
adapt the SNIS. The last change took place in the SNIS revision in February 2015. These changes may bring
a relative overload of staff to the extent that it is being considered by some stakeholders to monetarily
incentivise health workers to fill in data collection tools. We did not enquiry on which and how HIV
indicators are used by PEPFAR, by Government, or by other stakeholders. Although, any stakeholders can
access HIV data in the annual, national reports, we did not enquiry how data could be accessed in the
interim.

Paper tools are prominent in health facilities and this will continue for many coming years. However, there
are stock outs of forms, which seems more severe in hospitals. This is seen as a consequence of having
free hospital services and a consequent reduction of income to dedicate to the reproduction of paper
tools. MEASURE Evaluation considers that the highest quality should not necessarily be the aim all the
time, despite that the MSHP delays its reports aiming at completeness, given that there is not much
trained staff at the MSHP and because early realises release of data may lead to biased data sent to the
exterior world.

Stakeholders were asked what would be the desired and the actual sources of evidence to support
decision making in the governmental health sector in the country. Desired evidence sources consistently
included SNIS and less frequently mentioned were surveys and M&E reports; other sources occasionally
mentioned were reports issued by the MOH, published research and ‘other’ reports. Stakeholders equally
mentioned SNIS as the main source for actual decision making and occasionally surveys and M&E reports.

* Probably operational costs.
Stakeholders were also requested to rank which data quality criteria among a list of criteria provided would be considered the most important for the SNIS in general and for data based on paper tools. Criteria included: Relevance, Comprehensiveness, Completeness, Accuracy (Concordance), Precision, Timeliness, Simplicity and Presentation. Interestingly, no stakeholders seemed prepared to compromise any criteria in order to improve others.

Needs and challenges

The following was identified as the main needs and challenges of the SNIS:

1. Availability of tools/forms because national printing services have collapsed after the government has disengaged from this function. The challenging logistics of reproducing and distributing paper tools led to the suggestion that a functional printing service should be made available at national level again.

2. Training to use these tools, understanding indicators and other data issues because training up to the end of the chain does not seem to be a real priority partially due to lack of resources;

3. Clinicians may not be aware of diagnostic criteria which lead to bad recording and classification of diseases;

4. Improvement of the quality of data where supervision is weak.

5. Data collecting tools are not adapted; e.g. the consultation register is not always complete, such as no place for the diagnosis.

6. Some of the recording tools are of heavy weight.

7. Motivation, training and the quality of training of health workers is an issue.

8. An issue was raised in relation to the Department of Defence, which does not work with the SNIS, but they rather have their own information system. Integration of systems is currently a priority.

9. Not all data are available at all levels. Another example is the data from the private sector, i.e. most private health facilities do not report to the national HIS

10. Timeliness is also an issue since data reaches decision points too late.

11. Data collection is not good, completeness is a problem, especially at the most peripheral levels of the systems. Apparently, in past years (i.e. 2002 to 2004) the situation regarding completeness had been better.

12. Integration issues referred to the vaccination programme and hospitals.

13. Limitations were also identified at MSHP level and at regional and district levels, where the capacity to process and analyse data is limited.

14. Some of the underlying problems included funding, services, infrastructure, that ‘people like paper’ as opposed to computers, complexity of tools and the high number of indicators.

15. Stronger leadership was mentioned as a potential driver to improve the SNIS. This was often related to the negotiating capacities of the MHSP vis-à-vis stakeholders on issues related to the management of the SNIS, mechanisms to change it or adapt it, and funding needs.

16. The strengths of the SNIS included the political interest and willingness to improve, the availability of DHIS2 and the mechanisms of the MSHP to deliver the annual report based on the SNIS before the fourth month following the end of the calendar year.

Views regarding PHISICC

Another issue addressed in the interactions with stakeholders was the initial positioning of stakeholders in relation to PHISICC. Responses included:
• Stakeholders were consistently supportive of the aim of the project to improve the information system in the country; for example, the access and availability to paper-based tools.

• There was a clear support to the project, mentioning the need to coordinate with the MSHP and to avoid repeating work already done.

• PHISICC could contribute to the improvement of the archiving system and data collection.

• Interestingly, the focus on the peripheral level (i.e. PHC) was considered an asset and the possibility to ‘listen’ to the first line staff who produce the data.

• There was a consistent view that paper tools could not be ‘left behind’; however, the possibility of particular individuals opposing the project to the extent that they may perceive it as a competition with digitalisation of the systems was mentioned.

• Stakeholders were in general willing to be updated about the project progress, either regularly or ad hoc.

• Even more, stakeholders were willing to contribute to the design stages of the project.

• However, it was also clear that the landscape of stakeholders and their interests in relation to the SNIS was a challenge, each one trying to promote its own perspective and data requirements (e.g. indicators). The case of HIV related data was mentioned, where it took several workshops over a process lasting half a year to come to agreement. Consultations, contributions and ownership were judged as essential in the context of PHISICC.

We got other interesting views from stakeholders. For example, the INS, not particularly involved in the SNIS, had a specific view on the SNIS in country. They were very explicit in defending that paper will be the basis of data collection all over the country, both for the SNIS as well as for the data collected for the INS. Staff seemed to be very active and willing to engage in PHISICC.

There were not many inputs in specific terms on the use of data, although it was an issue frequently mentioned. A concrete example was the use of epidemiological profiles for planning at all levels of the system. UNICEF suggested that the SNIS was neglected in some areas. We certainly identified some lack of clarity related on what data use may mean and how this actually happens.

It was suggested to consider sustainability indicators in the system and to have a long-term plan which could allow prospective measurements of performance with a limited number of indicators.

3.4.2 Stakeholders positioning

Some stakeholders were invited to comment on the positioning of others in relation to the SNIS. The INS was seen as a player with remarkable technical capacity and furthermore its current director was ‘health director’ in a former position. However, they are not so active in the health sector since they focus on demographic data. The INS and the DPPEIS have a very good collaborative relationship. WHO is active and has the capacity to produce advice and are well renowned. However, their influence may be seen as limited. Similarly with UNICEF, although their involvement tend to be minor. On the other hand, it was reported that the Global Fund contributes with quite some funding to the health system and tends to

7th July 2016.
request lots of data, mainly related to the diseases they prioritise. The World Bank has been supporting, directly or indirectly, the SNIS. They are not particularly active or influential, but they have a role to play.

Stakeholders were requested to respond a questionnaire to give their opinions about the positioning of other stakeholders in relation to the following parameters:

- Influence: to which extent each stakeholder influences data issues (mainly SNIS) in the MOH;
- Readiness: to which extent each stakeholder is prepared to address data issues (mainly SNIS) in the MOH;
- Initiative: to which extent each stakeholder is active in addressing data issues (mainly SNIS) in the MOH;
- Effective: to which extent each stakeholder is seen as actually solving data issues (mainly SNIS) in the MOH;
- Advice: to which extent each stakeholder should advice on data issues (mainly SNIS) in the MOH;
- Reputation: to which extent each stakeholder has a reputation of addressing data issues (mainly SNIS) in the MOH;
- Obstacles: to which extent each stakeholder is an obstacle for data issues (mainly SNIS) in the MOH.

The project team independently assessed what should be the ‘ideal’ or ‘desired’ parameters for each stakeholder. We plotted both sets of assessments, the ones made by stakeholders and the ‘desired’ situation conceived by the project team (see Figure 1). The aim and interpretation of this graphic is not to become a blueprint of the current or future situations, but rather a discussion tool for the project team and partners to inform a good configuration of stakeholders relations vis-à-vis the potential changes and improvements of the SNIS.
Figure 1. Stakeholders positioning, based the view of the stakeholders ('current') and of the project team ('desired').

Abbreviations: see page ii.

Note: Each bubble represents one stakeholder. Solid colours represent assessments of the ‘current’ situation; semi-transparent bubbles represent the ‘desired’ positioning envisioned by the project team ('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 ‘wish’ bubbles may overlap.

In the current situation (solid coloured bubbles), clearly MEASURE Evaluation and the Global Fund are considered the most active and influential, while multilateral agencies and donors were rather in the lower side of the influential scale. The DPPEIS (labelled as DIPE) is considered to be not so influential and moderately active. Reputation was in general good, except for the INS and the World Bank (BM). The most effective stakeholders (size of bubbles) were MEASURE Evaluation and the Global Fund, followed by the WHO and UNICEF and then by the DPPEIS.

On the other hand, the ‘desired’ situation (semi-transparent bubbles) would position the DPPEIS, WHO and UNICEF to a more influential and active role, particularly improving the reputation of the DPPEIS; in this situation, donors would be less influential and become less active.

3.5 Stakeholders workshops

To guide workshops discussions, we proposed a taxonomy of decisions in health care:

1) Clinical decisions: decisions taken to address an individual health care problem which is specific for a given subject in a given time (e.g. decision to treat a case of malaria);
2) Public health decisions: decisions taken on the grounds of a subject belonging to a given group of individuals, usually defined in demographic terms (e.g. decision to vaccinate based on the belonging to a given age group);
3) Managerial decisions: decisions taken to change the course of managerial activities, such as resource allocation or planning of activities;
4) Strategic and policy decisions: decisions taken to change the strategic course of health strategies and policies, which affect the whole health systems (e.g. decisions on the portfolio of health care activities at each tier of the health system).

A critical issue addressed was how could we anticipate that a paper-based intervention would eventually produce measurable changes in health related outcomes beyond quality of data and use of data outcomes. Within the project team we tried to put decision points at health facility level in the context of the overall delivery of care (Figure 2). The model suggests that health outcomes related to decision making are limited to those clients who actually access health facilities and which are actually identified as requiring a critical decision. For example, pregnant women who do not attend health facilities will not be affected by clinical decision making; and from those who attend the health facility, only those who are identified at risk will eventually benefit form a sound, evidence-informed decision. This has implications on how paper-based interventions are designed, so as to avoid the situation in which the effects of interventions are minimised by externalities such as lack of access to health facilities. Therefore, we felt that our PHISICC intervention – even though it is focussed on the information system— may need to be three-pronged: while the main focus of the intervention is the data tool (such as records, reports), the intervention needs to be accompanied by training of the users and by an intervention at the level of the community.

**Figure 2. Decisions at health facility level in the context of health care delivery: two examples.**

<table>
<thead>
<tr>
<th>POPULATION</th>
<th>INFORMATION</th>
<th>ACTION</th>
<th>OUTPUT</th>
<th>OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant women come to PHC</td>
<td>Women with at risk / complicated labour are identified</td>
<td>Pregnant women are successfully referred</td>
<td>Pregnant women receive advanced care</td>
<td>Healthy mother and new born</td>
</tr>
<tr>
<td>Pregnant women do not come to PHC</td>
<td>At risk pregnancy / labour is missed</td>
<td>Pregnant women managed at PHC</td>
<td>Pregnant women receive basic care at PHC</td>
<td>Mothers disease and death</td>
</tr>
<tr>
<td>Children come for vaccination</td>
<td>Children due to vaccination are identified</td>
<td>Children are successfully tracked</td>
<td>Children receive vaccines due</td>
<td>Healthy children</td>
</tr>
<tr>
<td>Children do not come for vaccination</td>
<td>Children due to vaccination are unknown</td>
<td>Children due to vaccination are not sought</td>
<td>Children drop out from vaccination</td>
<td>Children are vulnerable to VPD</td>
</tr>
</tbody>
</table>

D: decision point.
3.6 Visits to sites

3.6.1 Health facilities profile

The following health facilities were visited:

<table>
<thead>
<tr>
<th>Region *</th>
<th>Locality</th>
<th>Urban / Rural</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abidjan</td>
<td>Adiopodoumé</td>
<td>Semi-urban</td>
<td>Close to CSRS</td>
</tr>
<tr>
<td>Abidjan</td>
<td>Centre Thérese Haury</td>
<td>Urban</td>
<td>Private / NGO</td>
</tr>
<tr>
<td>Abidjan</td>
<td>FSU-COM Gonzagueville</td>
<td>Urban</td>
<td>“Community-directed” large gov’t facility</td>
</tr>
<tr>
<td>Abidjan</td>
<td>DHO Cocody-Bingerville</td>
<td>Urban</td>
<td>District Health Office</td>
</tr>
<tr>
<td>Abidjan</td>
<td>FSU-COM Ouassakara</td>
<td>Urban</td>
<td>“Community-directed” gov’t hospital</td>
</tr>
<tr>
<td>Poro</td>
<td>DHO Korhogo</td>
<td>Urban</td>
<td>District Health Office</td>
</tr>
<tr>
<td>Poro</td>
<td>Péguékaha</td>
<td>Rural</td>
<td></td>
</tr>
<tr>
<td>Poro</td>
<td>Nakaha</td>
<td>Rural</td>
<td></td>
</tr>
<tr>
<td>Agnéby-Tiassa</td>
<td>Azaguié</td>
<td>Rural</td>
<td>This was merely a short meeting to coordinate.</td>
</tr>
<tr>
<td>Agnéby-Tiassa</td>
<td>Achiekoi</td>
<td>Rural</td>
<td></td>
</tr>
<tr>
<td>Agnéby-Tiassa</td>
<td>M’bromé</td>
<td>Rural</td>
<td></td>
</tr>
<tr>
<td>Agnéby-Tiassa</td>
<td>Léléblé</td>
<td>Rural</td>
<td></td>
</tr>
<tr>
<td>Agnéby-Tiassa</td>
<td>CSRS Taabo</td>
<td>Rural</td>
<td>CSRS site (has DHSS)</td>
</tr>
<tr>
<td>Agnéby-Tiassa</td>
<td>Office in Taabo</td>
<td>Rural</td>
<td>Visit to office of the NGO FAIRMED</td>
</tr>
<tr>
<td>Agnéby-Tiassa</td>
<td>Tokohiri</td>
<td>Rural</td>
<td></td>
</tr>
<tr>
<td>Agnéby-Tiassa</td>
<td>Pacobo</td>
<td>Rural</td>
<td></td>
</tr>
</tbody>
</table>

* second-level administrative subdivision regions that were created in 2011–12.

These health facilities represent a reasonable mix of good and bad performing, and busy and less busy health facilities, as suggested in the WS3 protocol. We also travelled far North (Korhogo) of the country where health indicators tend to be much worse than in the South. We use the infant mortality indicator to select this area. This was an important decision in order to detect potential differences in the SNIS depending on the area in the country.

Figure 3 is a map of the country with the sites visited plotted.
A range of services is offered in health facilities in Côte d’Ivoire; however, not all health facilities included the same portfolio of services. Services identified included:

Table 6. Lists of curative, preventive and other types of activities at primary health care.

<table>
<thead>
<tr>
<th>Curative</th>
<th>Preventive</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Curative care: adults and children</td>
<td>• Family Planning</td>
<td>• Laboratory</td>
</tr>
<tr>
<td></td>
<td>• Maternity – Delivery</td>
<td>• Pharmacy</td>
</tr>
<tr>
<td></td>
<td>• Tuberculosis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Malaria</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• HIV/AIDS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Family Planning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Vaccination</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Prenatal Care (CPN)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Postnatal Care (CPoN)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Prevention of HIV Transmission from Mother to Infant (PTME)</td>
<td></td>
</tr>
</tbody>
</table>

Focal points in health facilities were mainly heads of facility but we also interviewed a deputy head and data manager. The number of staff ranged from 3 to 144 (median 5) in a urban health centre. Medical doctors were only available in large urban centres. The number of clinical staff ranged from 1 to 42 (median 3). We found health facilities without any midwife.
Health workers fulfil a range of roles in Côte d’Ivoire. In small, remote health facilities a single nurse handles all the roles. While busy, urban health centres may have multiple people in each role:

- Director of the health facility is the head doctor or nurse.
- Doctor (only large urban health facilities)
- Nurse
- Midwife
- Midwife’s helper
- Pharmacist
- Pharmacy manager
- Laboratory technician
- Assistant (to doctor, nurse, pharmacist, etc.)
- Cashier

All rural health facilities had only one room or space for consultation, one room for delivery (where deliveries are part of the health care portfolio) and one room for vaccination. Some health facilities had separate pharmacy and storage rooms.

All health facilities had toilette services, but we found at least one health facility without running water, soap, or functional cold chain. Electricity installations were found in all health facilities but were not always functional. Windows had no mosquito nets and there were no incinerators in visited health facilities. In several occasions, order and organisation in storage sites and rooms to deliver health care was not optimal.

### 3.6.2 Handling of data

A consistent finding across health facilities was the lack of organisation and order of paper tools with poor archiving facilities. There were also shortages of paper tools which health facilities heads solved by creating manual forms, adapting existing forms by changing headings and sections or by using local reproduction facilities in their areas. Photocopying is used to create missing forms or to reproduce reports, but it is usually of poor quality, and for remote health facilities, access to photocopying can be a major challenge. It was reported that supplies from higher levels of the health systems were erratic.

There were situations where the existing forms did not seem to respond to health facility needs. This was the case, for example, of tools to track children lost to follow up in vaccination. We witnessed several examples where health facilities heads developed their own forms with lists to track these children.

The estimation of time used in filling forms, as reported by health facility focal points, ranged from 2 to 45 hours a month (median 7; i.e. one full day per month), depending largely on the volume of patients accessing the facility. Despite that our health facilities selection method do not allow for generalisation, the subjective perception by interviewees was that the time used in filling forms was far too much.

Quality of data exercises were occasionally reported, but these were typically carried out at district level based on monthly reports. Quality issues related to specific topics, such as disease surveillance, seemed to be more actively addressed than in other topics. Interviewees could not consistently describe standard procedures to deal with incompleteness, inaccuracy, missing or late reporting of data. Data security and confidentiality could not be ensured in the way forms and books were organised and kept (only one health facility kept data locked). We did not systematically explore how supervision was done and its potential effects on data quality.
In terms of specific management data tools available, only two health facilities had a list of human resources (one rural and one urban), only two had a duty roster (both rural), one had an inventory list, one had accounting forms, stock cards were available in all but two health facilities. Summaries (e.g. tables or graphics) on clinical cases were present in two health facilities, and on vaccination in all but one health facility; finally, cold chain temperature monitoring was available in two health facilities.

Only three interviewees had smartphones with data access, but they were only used for calls.

We also enquired about the sources of population denominators to estimate coverage rates in monthly reports. Two sources were reported: the district office and the INS; although respondents were not clear whether these two sources were related. In any case, there were examples of coverage figures above 100% suggesting problems with denominators used. The denominators seem to come from the National Institute of Statistics. The last censuses were completed in 1998 and in 2014. Interestingly, though, the PAV is using its own denominators.

Challenges reported by interviewees in health facilities included the amount of data for the HIV programme and concerns about plans to digitalise this data collection and the fact that there are too many forms, too many items in each form and too much time to fill them.

3.6.3 Flow of users and flow of data in health facilities

We observed health workers administering care to various patients, such as treatment to tuberculosis, antenatal care, immunizations and outpatient care. Each service unit has different forms and registers. Overall, regardless of the specific service unit, the paper-based HIS followed a similar structure and process.

Figure 4, Figure 5 and Figure 6 present examples from three programmes. Figure 7 presents the flow regarding the monthly reporting.

The flows shown below make explicit the relative complexity of health care delivery and data management practices. Actually, the synchronisation between health care and data recording was identified as an issue in interviews and also observed in the analyses of the ‘shadowing’ exercises. It was suggested that the way these two different types of events (i.e. health care and data management) may determine both quality of data and data quality.
Figure 4. Current immunization flow overview.
Figure 5. Current child out-patient care flow overview.
Figure 6. Current antenatal care flow overview.
3.6.4 Data verification

We carried out data verification exercises in three health facilities (represented by the three colours in Figure 8). Of the 14 data verification exercises, four had perfect concordance (for instance, we found 3,257 births reported and also 3,257 births re-counted in the register). Figure 8 presents the findings.

Under-reporting means that the figure found in the monthly report was smaller than the figure found through the re-counting in the register; and over-reporting means that the figure found in the monthly report was larger than the figure found through the re-counting in the register. For “Number of birth” and “Children vitamin A” the comparison was the figure found in the annual report versus the aggregated figures found in the 12 monthly reports. Four comparisons found in Figure 5 were checking of stock cards versus physical counts: Plaquette, Albendazole, blisters of Microgynon and Paracetamol 500 mg.
Figure 8. Results of the data verification activities in three health facilities, Côte d’Ivoire.

Notes:
For the four item where there was no discrepancy (i.e. the number reported and the number re-counted in the register was identical), dots lay in the line 1. Substantial over-reporting is not captured by Figure 8: two comparisons of stock cards versus physical count showed large discrepancies and where omitted from the graph for readability: (i) Co-trimoxazole: 247,210 according to the stock card but only 25,182 could be found during the physical re-count; (ii) Oral rehydration therapy sachets: 43 according to the stock card but only 20 were found during the physical re-count.
Size of samples: the smallest verification exercise comparing monthly report with re-count in the register was 6/11 (extra-pulmonary TB cases); the largest was 3257/3257 (number of births at clinic).

3.6.5 Data use for decision making

The team prompted clinicians and managers with several questions regarding decision making: which types of decisions were routinely made, how and where were they made or the information used to make them. From the numerous answers received, it seemed that some decisions are taken in a much more straightforward way than others. For example, decisions based on disease surveillance were reported as being done efficiently, with hardly any time delay from when the information of an outbreak is available. On the other hand, decisions related to low coverage of services seemed to be slow and often with inadequate follow-up. This made us wonder what the differences are between those types of decisions, such as the difficulty of the problems to be addressed but the capacity or empowerment of health workers
to actually take action. It was also reported that decisions are sometimes made on the basis of direct instructions from supervisors or from high level MSHP officials.

The data available did not seem to help to support decision making. There were multiple forms, some of them hand-made reproducing the ‘official’ forms and others to fit particular needs (e.g. follow-up of missed children to vaccination). Furthermore, some forms did not seem to be adapted to the real activity of the health facility; for example, it was observed that there was a large number of forms with missing or ‘zero’ values, because the variables in the forms did not apply to that health facility or were not properly tailored to the PHC level data needs. When prompted with the types of actions that health workers could carry out, the most common answers were: sensitisation, community mobilisation and alike. We could not find a ‘menu’ or ‘guidance’ on the type of decisions that could be made.

The concept of use of data was limited at health facility level and was typically understood as ‘sending’ the data to the district, to specific programmes or to NGOs. Apart from the punctual examples of initiatives to track users lost to follow up, there were hardly any clear examples of use of data for decision making. Our hypothesis is that decision-making can make a difference in the performance of health facilities, even if they are similar in resources and setting. However, it was not in our scope to check how decision making would take place in facilities showing different levels of performance.

As an example, we describe the flow of data and information observed in the prenatal care and under five years activities of an urban health facility in Abidjan (Table 7).
Table 7. Comparative flow of health care and data handling in antenatal and curative care in an urban health facility.

<table>
<thead>
<tr>
<th>Antenatal care</th>
<th>Curative care children under 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pregnant woman gives her personal health book to the cashier.</td>
<td>1. Mother gives child’s health book to the cashier.</td>
</tr>
<tr>
<td>2. Cashier puts a ticket in the woman’s personal health book.</td>
<td>2. Cashier puts a ticket in the child’s health book.</td>
</tr>
<tr>
<td>3. Cashier takes the stack of personal health records of the waiting women and stacks it on the midwife’s desk.</td>
<td>3. Cashier takes child’s weight and temperature and writes it in child’s health book.</td>
</tr>
<tr>
<td>3. Midwife’s first helper calls the next woman into the consultation room, designated by the personal health book on the top of the stack.</td>
<td>4. Cashier takes the stack of personal health books and stacks it on the doctor’s desk.</td>
</tr>
<tr>
<td>4. Midwife’s second helper copies administrative information from the personal health book to the registry: name, age, address, etc.</td>
<td>5. Doctor copies administrative information (name, age, gender, address, etc.) from the child’s health book to the registry.</td>
</tr>
<tr>
<td>5. Woman sits and answers midwife’s questions.</td>
<td>6. The mother gives the doctor the child’s name and answers questions about the child’s symptoms, history and medications which the doctor records in the personal health book and registry.</td>
</tr>
<tr>
<td>6. First helper takes woman’s weight, temperature, etc. and writes on a small paper.</td>
<td>7. Doctor physically examines the child.</td>
</tr>
<tr>
<td>7. First helper transfers the information into woman’s personal health book.</td>
<td>8. Doctor writes the results of the examination in the child’s health book.</td>
</tr>
<tr>
<td>8. Midwife examines the pregnant woman and calls out the results.</td>
<td>9. Doctor explains to mother the results of the examination, asks more questions and gives the mother instructions.</td>
</tr>
<tr>
<td>9. First helper records the results in the woman’s personal health book.</td>
<td>10. Doctor stamps child’s health book</td>
</tr>
<tr>
<td>10. Second helper records the results in the registry.</td>
<td>11. Doctor stamps outside prescription paper with her name and phone number.</td>
</tr>
<tr>
<td>11. Midwife and woman return to the desk and sit down.</td>
<td>12. Doctor writes a prescription for antibiotic for throat infection.</td>
</tr>
<tr>
<td>12. First helper hands the woman’s personal health book to the midwife.</td>
<td>13. Doctor writes a prescription for malaria medication on the triPLICATE internal prescription form.</td>
</tr>
<tr>
<td>13. First helper marks the tally sheet to record the visit.</td>
<td>14. Doctor stamps all three forms with her name and phone number.</td>
</tr>
<tr>
<td>14. Midwife asks the woman questions.</td>
<td>15. Doctor gives the mother instructions.</td>
</tr>
<tr>
<td>15. Midwife uses the circular cardboard disk and writes information the personal health book.</td>
<td>16. Doctor adds a prescription for syrup so the child will eat to the outside form.</td>
</tr>
<tr>
<td>16. First helper looks through the stack of registries to find the one containing the woman’s previous prenatal visit.</td>
<td>17. Doctor writes the information in the child’s health book and the registry.</td>
</tr>
<tr>
<td>17. Midwife writes 2 prescriptions and gives the woman instructions.</td>
<td></td>
</tr>
<tr>
<td>18. Woman will keep one prescription and give one to the pharmacy.</td>
<td></td>
</tr>
</tbody>
</table>

In several health facilities it was observed that partograms were hardly filled in. It was reported that while nurses may be in charge of managing deliveries in the absence of midwives, the former are not really
trained on the use of partogrammes. Furthermore, partogrammes are neither used for deliveries at home, although women may get registered in the common registry of deliveries, which contain a page for the partogramme; in these cases, the partogramme remains blank. In other occasions, the partogramme was filled a posteriori. As a consequence, a partogramme may be left blank in any of the following circumstances:

- because the delivery took place at home, in which case a signal that this was the case should appear in the registry page;
- because the delivery took place at the health facility by a midwife who did not use the partogramme;
- because the delivery was managed at the health facility by another type of staff not trained in the use of partogramme.

The problem of the partogramme was a good case example of challenges in the use of forms and in the use of data for decision. Many stakeholders and in health facilities this issue was raised. It is known that it is often not used due to workload and capacity, although health workers are often exhorted to use it. It is also acknowledged that they are not easy to fill.

We could not find any evidence of clear guidelines on the links between data collection and data use or decision making, despite that this was explicitly explored in the visits to health facilities.

3.6.6 Visit to TAABO Health and Demographic Surveillance site

We paid a special visit to the TAABO DHSS site, as a potential study site for the randomised controlled trial (WS5). The sous-prefecture of Taabo had 14 villages and 130 ‘campements’ with 45,000 people and 8,000 households in demographic surveillance. Taabo urban accounts for 18% of the population.

Staff at Taabo HDSS site include 12 interviewers, 6 supervisors, 3 data entry operators (DEO), 1 assistant data base manager (supervisor DEO), a databased manager (head), a field manager, logistics-finances officer and the head of the HDSS station (demographer).

Within the Taabo areas there are seven health facilities; some other facilities do exist but they are not functional. Health facilities are visited regularly by FAIRMED, an international NGO working in the area of health care.

The HDSS sites follow standard INDEPTH† practices and include three rounds of data collection per year by fieldworkers. Supervisors -one for each three interviewers- also do second visits to the households. The HDSS databases include verbal autopsies for all deaths and occasionally issues about health care seeking behaviour†. Specific diseases surveillance is conducted such as malaria and soil transmitted helminthiasis.

Quality of data can eventually be compromised by the long duration of data collection cycles; however, data are double entered for a sample of questionnaires, depending on available resources. ODK has already been used in some projects.

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1 Visit 27/06.
3 Done by FAIRMED.
There were possibilities to adapt the HDSS activities to the needs of the trial; for example:

- extend the surveillance area with less rounds, with the possibility to keep the extended area for future uses; the convenience and timing of this approach has to take into account affected communities perceptions; this would involve: cartography (2 to 4 weeks), numbering (1.5 months), census (2 month);

- surveys, without extending the surveillance area, can be done but will need a "base de sondage" (INS) and to provide tools by the PHISICC team; this would involve 2 to 3 weeks to prepare forms and data bases, manual for training and piloting.

FAIRMED is an important NGO operating in the area. They are collecting data on Buruli ulcer and leprosy from health facilities, they delivery materials, influence the health management committee (24 committees of "caisse pharmacie") and “Total Sanitation Led by the Communities”, among other activities. Their involvement in the design phases of the RCT in Taabo will be essential.

### 3.7 The human-centred experience with the SNIS: observations from Côte d’Ivoire

The effective creation, analysis and use of information is critical to the functioning of the SNIS. In order for health workers and both regional and national MSHP officials to do their work well, and play their respective roles in the system as a whole, they need access to useful information.

In Côte d’Ivoire, we observed multiple challenges in the SNIS, ranging from the amount of time spent recording information at health facilities to the lack of practical feedback about that information from district, regional and national institutions.

We observed many challenges that prevent the effective use and transfer of information to these three core stakeholders in the SNIS: (1) population, (2) health workers, and (3) district decision makers.

**Figure 9. Actors of the health system prioritised by PHISICC.**

#### 3.7.1 Challenge: reaching patients and population

**Many responsibilities demand patients’ time**

Clients of service balance the need to work and earn money for their families with many other needs, one of which is following up for routine care visits. In some cases, this is exacerbated by long waiting times and the need to block an entire day to receive care.
Figure 10. Transport difficulties in getting to health facilities.

“Coming to the facility is a poor experience for women. Since we don’t have appointments, they have to wait all day to be seen by the nurse”

— Nurse at urban health centre

“I go out to the village to give vaccinations. This first woman was fasting, so she went to work in the field early. By the time she had returned, the vaccination had expired.”

— Nurse at rural health centre

Communication tools lack cultural context

Some clients are illiterate or only speak the local language, making health materials difficult to understand. For instance, a nurse explained: “It’s quite rare that someone forgets to bring their personal health book. It’s more common that illiterate children will bring their sibling’s book instead of their own.”

In order to overcome these barriers, nurses look to community health workers, local holidays and events, and other community resources to communicate important messages.

Figure 11. Local calendar to plan for public health activities.

“We go to the village on market days when everyone is around. We list the market days here in the local language.”

— Nurse

Tracking ‘lost to follow up’ patients is a challenge

A challenge for nurses at the less busy health facilities is keeping track of and finding clients who have not returned for their follow up vaccination or treatment. Each month, time is spent pouring through the pages of the registry to determine who has missed their follow up appointment. In some facilities, a list is created and, at the appointed time, the nurse travels throughout the area to deliver the needed care to the “lost to follow up” patients. Usually, not all lost to follow up patients are found.
Figure 12. Self-made list to follow-up of clients.

“At the end of the month, I look in the register to see who has missed their vaccination and compile all of the names so that I can call the patients during the following month.”
— Nurse at rural health centre

At the busy health facilities, there is in general no time to find lost to follow up patients, instead, the focus is on caring for the long line of waiting patients. The long wait can discourage patients from attending their follow up appointment.

“This unit receives so many women –600 prenatal consultations <per month>. Looking for women not coming back is time consuming. The 15 midwives who work here are not sufficient. Some women have to wait the whole day to be seen by a midwife.”
— Nurse at rural health centre

Implications and Opportunities for Intervention

- What kind of information should be provided to patients and how should it be provided so that the patients can more effectively balance their many responsibilities with their need for routine care?

- How might information about routine health matters be made culturally relevant to populations of patients both in terms of their legibility and their integration to existing routines?

- How might equal emphasis be placed on registering patients who do arrive for care as well as noting when they don’t and strategizing for how to reach them?

3.7.2 Challenge: lacking data to make decisions at the health facility

Referrals depend on government policies and on local capacity to handle cases. Following governmental policies, each level of the health system offers a defined set of services. Some health facilities, though, may not offer services they are meant to due to lack of capacity (e.g. space, equipment or training). In these cases, nurses have to make decisions about when to refer patients to hospitals or better equipped facilities.

For example, one health facility in Abidjan had a maternity unit with midwives, but no surgical services. When a delivery becomes complicated, midwives have to decide whether or not to evacuate the woman to the surgeon at the nearby hospital and arrange transport as the hospital has only one ambulance.
“I fill out the partogramme during the delivery because if something goes wrong, I have the information to make my case.”
— Midwife

Clinical capacity is linked with the capacity to produce clinical information
Each health unit has a registry and section of the monthly district report to fill in. When health workers perform functions they are not trained for, it can lead to missing information because they do not know how to fill the form or register associated with that function.

Figure 13. The partogram.

“Unlike the midwives, the nurses don’t fill out the partogramme because they don’t know how.”
— Director of health centre

Information hierarchy created by the staff themselves through pen colour
In several health facilities, health workers used red and blue pens to differentiate between information types, creating information hierarchy. The red pen was used to record information that indicates a problem, such as fever, blood pressure, and the like. Blue was used for supporting information.

Figure 14. Filling the patient registry.

Completing the monthly report is time consuming
In many occasions, health workers use self-made tally sheets in order to fill out the monthly report. Completing the tally sheets is less of a burden when it is done more often, for example at the end of each
day as opposed to the end of the month. Even with the support of a tally sheet, a head midwife reported that she spends almost 30 hours each month tallying, aggregating and recording the number of women who have visited. Although we did not aim at measuring time used on data in different types of health facilities, the perception of health workers for unanimously pointing at feeling that they spent too much time with data.

Figure 15. Preparing the monthly reports.

“I spend three hours every week tallying the number and type of visits for that week. Then it takes me about 15 hours to add up all the tallies and fill out my section of the monthly report.”
— Midwife at urban health facility

In the more rural health centres, the nurse sees fewer patients, so he or she spends less time tallying, but he is the only one trained to fill out the monthly report and has to tally, aggregate and fill out all the sections himself, which divides his time away from clinical work.

Figure 16. Self-made tally sheets.

“Each month, it takes me two days to fill out the tally sheet for the curative care because I get interrupted when patients come. Then I still have to aggregate the tallies for curative care and all the other units to complete the monthly report. It’s a headache.”
— Nurse at rural health centre

Implications and Opportunities for Intervention

- How might we provide tools that have the potential to augment the skills and knowledge of nursing staff so that, in the absence of sustained and comprehensive training, the forms may prompt the nursing staff towards the established best practices of the field?
- How might we provide paper-based tools that make practical distinctions between routine information that is gathered but in general not used for decision making and non-routine
information critical for decision making so that health workers can prioritize decisions about care over paperwork?

3.7.3 Challenge: one-way exchange with the district

Lack of training on data use and decision making
In some occasions, heads of health facilities meet with district managers to review reports every month. During the meeting, the emphasis seems to be on data accuracy, rather than data use and training. Nurses recognize that health care is a dynamic field and want continuous training to be more effective at their job. The district meetings could be a forum for knowledge sharing.

Figure 17. Monthly report review.

“We review the report with the district for data accuracy. We don’t usually talk about how I should use this data to make decisions.”
— Nurse

The lone nurse lacks collaboration to inform clinical decisions
In some remote areas, one nurse is assigned to the health facility and does everything himself or herself. Activities include: caring for patients, ordering medicines and supplies, taking vaccines to villagers who missed their follow up appointments, filling out the monthly report, delivering the monthly report to the district office and picking up medicines from the district office.

As a lone nurse in a remote area, the lack of collaboration with other health workers in making clinical decisions is a consistent challenge. For some, the monthly district meeting is a welcome solution to isolation.

“One thing I really want is more training. None of the medical reps visit me because I’m so remote. Medicine is dynamic. It’s always changing. I need a way to stay up to date.”
— Nurse

“At the district meetings there are retired nurses. We talk about challenges and they offer solutions. That’s where I learned to do this [daily tally of curative care].”
— Nurse

Communication between health facilities is limited
If a child does not return for a vaccination, they become “lost to follow up” though they may have actually received services at another health facility. There is no reliable mechanism for nurses to know if their patients have been seen elsewhere.
“During the rainy season, my patients can’t make it here because the river floods. I know many of them will go to another centre across the river; however, I don’t have any way of following up with them easily. I mark them lost to follow up.”
— Nurse

Implications and Opportunities for Intervention

- How might we leverage contact with others (at district meetings) to share best practices and create a community of practice out of presently isolated peers?
- How might we create a system of collaborative population care such that a patient’s care is monitored and managed regardless of what facility they visit?
4 Synthesis and implications

4.1 The 10 key findings

1) The SNIS is a priority at national level in the health sector and the main source of decision making.

2) The main and almost exclusive focus of the SNIS in the country is management and public health decisions at higher levels of the systems, in detriment of the most peripheral levels. This becomes obvious in the definition of SNIS and how this is unfolded in policies and procedures.

3) The SNIS is a complex, heavy weighed system, with multiple components not totally coordinated and harmonised, often donor-driven, oriented towards reporting to government and third party entities and seriously challenging the capacity of front-line health workers to carry out their primary health care activities. The concerns related to the SNIS are increasing. The SNIS does not seem to be responsive enough to decision making activities at health facility level but rather it seems conceived, designed and implemented to feed data and information needs at the higher levels of the health system. The consequences of this are:
   a. excessive resources are used by health facility staff to produce information which is of limited value to them; these include person-time but also stationary items;
   b. feedback is hardly possible in a meaningful way, because the information to provide feedback on is either (i) already largely known by the health facility staff; (ii) not relevant; (iii) not actionable.

4) There is a preponderance of HIV data at health facility primary forms and in reports to be sent to the district.

5) Consistently with the points above, the main topics related to the SNIS have a technical nature, neglecting all those aspects which have to do with the human experience in (i) the use of the SNIS and (ii) the decision making at peripheral level.

6) Stakeholders seem to aim at maximum data of maximum quality, which is not feasible even in contexts without important resources constraints.

7) The main challenges of the SNIS are: lack of resources, poor capacity of staff at peripheral level and lack of harmonisation and standardisation. This is consistent with the high importance given to paper-based tools.

8) Paper tools were usually disorganised without proper archiving tools and practices; and with stock-outs which were addressed with local solutions. Specific needs (e.g. tracking children lost to follow up for vaccination) were also addressed with local adaptations of forms or creation of new ones.

9) The DPPEIS is seen as the leader and key driver of the SNIS; however, it has a very difficult coordinating role and the responsibility of establishing the SNIS norms collides with pressure from donors.

10) Stakeholders from all constituencies acknowledge the need of reform of the SNIS and are committed to do so under the guidance of the DPPEIS. PHISICC is seen as a promising avenue to provide evidence for future reforms.
4.2 Implications for WS4: interventions designs

- Interventions will need to take into account, on one hand, the real situation of health facilities which have infrastructure, equipment and staff contrarians; and on the other hand, the diversity of health facilities in terms of performance and workload.
- Interventions should have an explicit and special focus on decision making related to health care events, whether clinical events, public health events, or managerial events.
- Interventions should be able to accommodate several types of information; such as:
  - description of the problem (e.g. health condition, epidemiological situation) which requires a course of action;
  - information on possible courses of action to address each problem (e.g. clinical guidelines);
  - feasibility or practical information (e.g. opening times of referral destination centre).
- In response to the challenges observed, we identified early intervention opportunities:
  - Challenges reaching the patient population (see Annex 6)
    - Intervention Opportunity: strengthening community engagement
      The success of the health system does not begin with the nurse at the health facility. It requires commitment from and communication with the broader population.
  - Disconnect between available data and decision making at the health facility (see Annex 7)
    - Intervention Opportunity: shifting from paperwork to patient care
      The amount of paperwork at the facility level impedes health workers’ ability to spend quality time with patients.
  - One-way information exchange with the district (see Annex 8)
    - Intervention Opportunity: Improving clinical decisions
      Data are only valuable if it is useful and actionable. We shared early ideas with the Ministry of Health, stakeholders, and health workers.
- Additionally, we expect that the PHISICC documentation will be useful to countries, at present and in the future, to establish a transparent and systematic approach to support changes or adaptations of the SNIS.

4.3 Implications for WS5: experimental studies to test interventions

- The CSRS is well equipped to support the experimental studies in collaboration with the Directorate of the Community Health.
- The study area of Abidjan is suitable from the logistical point of view but the predominance of urban health facilities may limit the representativeness of findings.
- The HDSS in Taabo provides an excellent opportunity to have another study area where routine data collection is already taking place; however, the size of the area and the number of health facilities may challenge the statistical approach to sampling and analyses.
• The North of the country is a very different area in terms of health indicators but not so much in terms of the health system. It seems reasonable to consider a second or main study area in Korhogo.
ANNEXES
Annex 1. **List of documents reviewed**

- National Health Development plan 2009 to 2013
- National Health Development plan 2012 to 2015
- Health Management Information System Policy
- The Handbook for the management of data.

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Annex 2. **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

PHISIC3 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 ${calc_staff_technical}$
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 ${calc_staff_total}$

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**

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 feedback 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 3. Chronogram of activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Place</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting Swiss TPH – MOH</td>
<td>Abidjan</td>
<td>Mon 20/06</td>
</tr>
<tr>
<td>Meeting Swiss TPH and CSRS: management</td>
<td>Abidjan</td>
<td>Mon 20/06</td>
</tr>
<tr>
<td>Meeting with the MOH</td>
<td>Abidjan</td>
<td>Mon 20/06</td>
</tr>
<tr>
<td>Project management set up</td>
<td>Abidjan</td>
<td>Tue 21/06</td>
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<tr>
<td>Schedule</td>
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<tr>
<td>Protocol and discussion guides</td>
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<tr>
<td>Technical issues Swiss TPH</td>
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<tr>
<td>Sites and verification</td>
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<tr>
<td>AV equipment</td>
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<tr>
<td>Presentation for the workshop</td>
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<tr>
<td>Curtesy visit health facility close to CSRS</td>
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<tr>
<td>Preparation of workshop facilitators</td>
<td>Abidjan</td>
<td>Tue 21/06</td>
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<tr>
<td>Logistics</td>
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<tr>
<td>Preparation of facilitators</td>
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<tr>
<td>Piloting</td>
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<tr>
<td>Stakeholders’ interviews</td>
<td>Abidjan</td>
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<tr>
<td>Introduction and background</td>
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<tr>
<td>Project PHISICC interest and advice</td>
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<tr>
<td>Current initiatives and specifics of CIV</td>
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<tr>
<td>Health information needs and challenges</td>
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<td>Sustainability of interventions</td>
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<td>Next steps</td>
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<tr>
<td>Stakeholders interviews</td>
<td>Abidjan</td>
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<tr>
<td>Banque Mondiale</td>
<td></td>
<td>Wed 22/06</td>
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<tr>
<td>MEASURE Evaluation</td>
<td></td>
<td>Wed 22/06</td>
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<tr>
<td>Organisation Mondiale de la Santé</td>
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<td>Wed 22/06</td>
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<tr>
<td>UNICEF</td>
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<td>GAVI</td>
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<td>Wed 22/06</td>
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<tr>
<td>FM: Fonds Mondial</td>
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<td>Wed 22/06</td>
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<tr>
<td>PSI: Population Service International</td>
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<td>Wed 22/06</td>
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<tr>
<td>INHP: Institut National d’Hygiène Publique</td>
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<td>Wed 22/06</td>
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<tr>
<td>CTH : Centre Thérèse Haury (Adiopodoumé Km 17)</td>
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<td>Wed 22/06</td>
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<tr>
<td>Kick off workshop</td>
<td>Abidjan</td>
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<tr>
<td>Set up</td>
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<tr>
<td>Registration</td>
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<tr>
<td>Welcome</td>
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<tr>
<td>Project background and introductions of participants</td>
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<tr>
<td>Break</td>
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<tr>
<td>Data Use in Decision Making</td>
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<tr>
<td>Needs &amp; Challenges</td>
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<td>Lunch</td>
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<td>Share Out</td>
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<tr>
<td>Prioritization Activity of challenges</td>
<td>Thu 23/06</td>
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<tr>
<td>Wrap Up</td>
<td>Thu 23/06</td>
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<tr>
<td>Stakeholders’ interviews</td>
<td>Abidjan</td>
<td>Thu 23/06</td>
</tr>
<tr>
<td>INS: Institut national de la Statistique</td>
<td></td>
<td>Thu 23/06</td>
</tr>
<tr>
<td>MSHP Directeur de cabinet 2 (adjoint) + DGS + DPPEIS</td>
<td></td>
<td>Thu 23/06</td>
</tr>
<tr>
<td>Activity</td>
<td>Place</td>
<td>Date</td>
</tr>
<tr>
<td>----------</td>
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</tr>
<tr>
<td>Prof. Samba - à son bureau</td>
<td></td>
<td>Thu 23/06</td>
</tr>
<tr>
<td>CSRS: Centre Suisse de Recherches Scientifiques</td>
<td></td>
<td>Thu 23/06</td>
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### Field visits

<table>
<thead>
<tr>
<th>Activity</th>
<th>Place</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion with responsible of SNIS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction and background</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand tour of health information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health information flow, use and 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>
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</tr>
<tr>
<td>Discussion with health workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roles and Responsibilities</td>
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<tr>
<td>Grand Tour of Health Information</td>
<td></td>
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<tr>
<td>Shadow</td>
<td></td>
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<tr>
<td>Needs and Challenges</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stimulus activity</td>
<td></td>
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<tr>
<td>Wrap Up</td>
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</table>

### Data verification exercise

<table>
<thead>
<tr>
<th>Activity</th>
<th>Place</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSU-COM Gonzagville</td>
<td>Abidjan</td>
<td>Fri 24/06</td>
</tr>
<tr>
<td>District office</td>
<td>Abidjan</td>
<td>Fri 24/06</td>
</tr>
<tr>
<td>Travel to the North</td>
<td></td>
<td>Fri 24/06</td>
</tr>
<tr>
<td>Tiongofolokaha</td>
<td></td>
<td>Sat 25/06</td>
</tr>
<tr>
<td>Toko</td>
<td></td>
<td>Sat 25/06</td>
</tr>
<tr>
<td>Adiopodoumé Km 17</td>
<td>(bad)</td>
<td>Sat 25/06</td>
</tr>
<tr>
<td>FSU-COM Wassakara: Formation sanitaire urbaine à base communautaire de Yopougon-Wassakara</td>
<td></td>
<td>Sat 25/06</td>
</tr>
<tr>
<td>Achiékoi</td>
<td>(remote)</td>
<td>Mon 27/06</td>
</tr>
<tr>
<td>Odoguié</td>
<td>medium</td>
<td>Mon 27/06</td>
</tr>
<tr>
<td>Leleble</td>
<td>Léléblé</td>
<td>Mon 27/06</td>
</tr>
<tr>
<td>Travel to Taabo</td>
<td></td>
<td>Mon 27/06</td>
</tr>
<tr>
<td>Taabo DHSS</td>
<td>good</td>
<td>Tue 28/06</td>
</tr>
<tr>
<td>Pacobo</td>
<td>medium</td>
<td>Tue 28/06</td>
</tr>
<tr>
<td>Ahondo</td>
<td>medium</td>
<td>Tue 28/06</td>
</tr>
<tr>
<td>Tokohiri</td>
<td>(remote)</td>
<td>Tue 28/06</td>
</tr>
<tr>
<td>Dinner team</td>
<td>Abidjan</td>
<td>Tue 28/06</td>
</tr>
<tr>
<td>Preliminary analyses and preparation of workshop</td>
<td>Abidjan</td>
<td>Wed 29/06</td>
</tr>
<tr>
<td>Project management</td>
<td></td>
<td>Wed 29/06</td>
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<tr>
<td>Problem analyses (Swiss TPH)</td>
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<td>Wed 29/06</td>
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<tr>
<td>Interventions for the workshop</td>
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<td>Wed 29/06</td>
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<tr>
<td>Workshop planning</td>
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<tr>
<td>Restitution workshop</td>
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<td>Thu 30/06</td>
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<tr>
<td>Preparation workshop</td>
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<td>Thu 30/06</td>
</tr>
<tr>
<td>Day 1</td>
<td></td>
<td>Thu 30/06</td>
</tr>
<tr>
<td>Welcome back</td>
<td></td>
<td>Thu 30/06</td>
</tr>
<tr>
<td>Introduction</td>
<td></td>
<td>Thu 30/06</td>
</tr>
<tr>
<td>Findings from the field</td>
<td></td>
<td>Thu 30/06</td>
</tr>
<tr>
<td>Fieldwork Immersion</td>
<td></td>
<td>Thu 30/06</td>
</tr>
<tr>
<td>Break</td>
<td></td>
<td>Thu 30/06</td>
</tr>
<tr>
<td>Co-Creation Session</td>
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<td>Thu 30/06</td>
</tr>
<tr>
<td>Wrap Up</td>
<td></td>
<td>Thu 30/06</td>
</tr>
<tr>
<td>Team working</td>
<td></td>
<td>Thu 30/06</td>
</tr>
<tr>
<td>Activity</td>
<td>Place</td>
<td>Date</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------</td>
<td>----------</td>
</tr>
<tr>
<td>Project management</td>
<td></td>
<td>Fri 01/07</td>
</tr>
<tr>
<td>Interventions framework</td>
<td></td>
<td>Fri 01/07</td>
</tr>
<tr>
<td>Website</td>
<td></td>
<td>Fri 01/07</td>
</tr>
<tr>
<td>Autopsy visit</td>
<td></td>
<td>Fri 01/07</td>
</tr>
<tr>
<td><strong>Workshop day 2</strong></td>
<td></td>
<td>Fri 01/07</td>
</tr>
<tr>
<td>Welcome Back</td>
<td></td>
<td>Fri 01/07</td>
</tr>
<tr>
<td>Define Ideas</td>
<td></td>
<td>Fri 01/07</td>
</tr>
<tr>
<td>Break</td>
<td></td>
<td>Fri 01/07</td>
</tr>
<tr>
<td>Define Ideas (continuation)</td>
<td></td>
<td>Fri 01/07</td>
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<tr>
<td>Closing workshop</td>
<td></td>
<td>Fri 01/07</td>
</tr>
<tr>
<td>Lunch</td>
<td></td>
<td>Fri 01/07</td>
</tr>
<tr>
<td><strong>CSRS final meeting</strong></td>
<td>Abidjan</td>
<td>Fri 01/07</td>
</tr>
</tbody>
</table>
Annex 4. Issues in forms and data items of the SNIS (examples)

- Complex and small table: ‘Registre de dépistage par les tests rapides (2)’
- Inconsistency of abbreviations (e.g. POS, Positf)
- Inconsistency age ranges
- Inconsistency formatting codes
- Use of NA
- Error in heading Table 9 Monthly report, page 5; same table 11a
- Codified and 0/ cannot be distinguished
- Management of abbreviations
- Consistency of codes (see legal tutor Fiche enfant_ok.pdf)
- No tally to go from ANC individual forms to the monthly report.
- Inconsistent language: ‘référés’ (in monthly report) versus ‘évacue’ (in delivery form)
- Lack of detail in clinical exams; e.g. Examen de periné
- Entry point for HIV
- No data on ANC, PNC or delivery coverage over all population or women child bearing age. Coverage data only in vaccination.
- In the delivery form the outcome is partially in the heading (delivery info) and partially elsewhere (footer 1st page for maternal death)
- Data to collect to monthly reports is in different places and types in source documents
- Merge register TB-HIV
- Some data may not be actually entered into DHIS2 or used; e.g. ‘numéro of pansements, injections…’ (Table 2 page 3 monthly report)
- Mix of tools: codes, free text, codes to write, codes to tick
- Misuse of space: ‘Registre PTME de suivi mère-enft page enft’
### Annex 5. List of people met

#### Table 8. List of people met.

<table>
<thead>
<tr>
<th>Family name</th>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samba</td>
<td>Mamadou</td>
<td>MOH-DPPIES</td>
</tr>
<tr>
<td>Ahoty</td>
<td>Frank</td>
<td>MOH-DPPIES</td>
</tr>
<tr>
<td>Serge</td>
<td>N’Zore K.</td>
<td>UFHB: Université Félix Houphouët-Boigny</td>
</tr>
<tr>
<td>Abitche</td>
<td>Bosso Edwige Epse</td>
<td>MEASURE</td>
</tr>
<tr>
<td>Gnassou</td>
<td>Leontine</td>
<td>MEASURE</td>
</tr>
<tr>
<td>Òsseri</td>
<td>Zozo Henri</td>
<td>Health facility (HF) Adiopodoumé</td>
</tr>
<tr>
<td>NA</td>
<td>NA</td>
<td>Global Fund</td>
</tr>
<tr>
<td>Soro</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gnodé</td>
<td>Germain</td>
<td>CTH hospital (CTH: Centre Thérese Haury)</td>
</tr>
<tr>
<td>Louan</td>
<td>Gba Aimé</td>
<td>CTH hospital (CTH: Centre Thérese Haury)</td>
</tr>
<tr>
<td>Iriébi</td>
<td>Danielle</td>
<td>CTH hospital (CTH: Centre Thérese Haury)</td>
</tr>
<tr>
<td>Tié</td>
<td>Valerie</td>
<td>CTH hospital (CTH: Centre Thérese Haury)</td>
</tr>
<tr>
<td>N’Guessan</td>
<td>Doffou</td>
<td>Institut National de la Statistique</td>
</tr>
<tr>
<td>Krou</td>
<td>Edmond Bony</td>
<td>Institut National de la Statistique</td>
</tr>
<tr>
<td>Bogo Agobu</td>
<td>Christian</td>
<td>Institut National de la Statistique</td>
</tr>
<tr>
<td>Niangué</td>
<td>Joseph</td>
<td>MOH-HMIS</td>
</tr>
<tr>
<td>Bleou</td>
<td>Boris</td>
<td>MOH-DPPIES</td>
</tr>
<tr>
<td>Egou Assi</td>
<td>Hugues</td>
<td>MOH, office of the Director General</td>
</tr>
<tr>
<td>N’Guessan</td>
<td>Konan</td>
<td>Institut National d’Hygiène Publique</td>
</tr>
<tr>
<td>Krouman</td>
<td>Aboubakar</td>
<td>Institut National d’Hygiène Publique</td>
</tr>
<tr>
<td>Tetchi</td>
<td>Orsot</td>
<td>Institut National de Santé Publique</td>
</tr>
<tr>
<td>Beat</td>
<td>Alain</td>
<td>Institut National de Santé Publique</td>
</tr>
<tr>
<td>Waota</td>
<td>Tidiane</td>
<td>FSU-COM Gonazagueville</td>
</tr>
<tr>
<td>Arriko Adjo</td>
<td>Juliette</td>
<td>DHO Cocody-Bingerville</td>
</tr>
<tr>
<td>Konan N’dri</td>
<td>Patrice</td>
<td>DHO Cocody-Bingerville</td>
</tr>
<tr>
<td>Ouattara</td>
<td>Clément</td>
<td>FSU-COM Ouassakara</td>
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<tr>
<td>Kouamé</td>
<td>Pascal</td>
<td>FSU-COM Ouassakara</td>
</tr>
<tr>
<td>Kouamé</td>
<td>Bakary</td>
<td>District Health office in Korhogo</td>
</tr>
<tr>
<td>NA</td>
<td>NA</td>
<td>HF 1 from the north: Péguékaha</td>
</tr>
<tr>
<td>NA</td>
<td>NA</td>
<td>HF 2 from the north: Nakaha</td>
</tr>
<tr>
<td>Koutouan N’Gbesso</td>
<td>Ives</td>
<td>Head doctor of HF (CSU) in Azagué</td>
</tr>
<tr>
<td>Atchiiahi,</td>
<td>Ekeni Felix</td>
<td>HF Achièkoi</td>
</tr>
<tr>
<td>Kouakour</td>
<td>Firmin</td>
<td>HF M’bromé</td>
</tr>
<tr>
<td>?</td>
<td>Mickaël</td>
<td>HF Léléblé</td>
</tr>
<tr>
<td>Koné</td>
<td>Siaka</td>
<td>CSRS Taabo</td>
</tr>
<tr>
<td>Boti</td>
<td>Louis</td>
<td>CSRS Taabo</td>
</tr>
<tr>
<td>Abou</td>
<td>Marie-Chantelle</td>
<td>CSRS Taabo</td>
</tr>
<tr>
<td>Allé</td>
<td>Fabrice</td>
<td>Office FAIRMED in Taabo</td>
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<tr>
<td>Ouattara</td>
<td>Yoranté</td>
<td>HF Tokohiri</td>
</tr>
<tr>
<td>Koffi</td>
<td>? (or Koffi is family name)</td>
<td>HF Pacobo</td>
</tr>
<tr>
<td>Amidjio</td>
<td>Alia Seraphin</td>
<td>Programme National de la Santé Scolaire et Universitaire</td>
</tr>
<tr>
<td>Gnonsio</td>
<td>George Rolland</td>
<td>Programme National de la Santé Scolaire et Universitaire</td>
</tr>
<tr>
<td>Oulai</td>
<td>Ibode Valeri</td>
<td>PNLT (Nat. TB programme)</td>
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<tr>
<td>Bamba</td>
<td>Inza</td>
<td>PNLS (Nat. AIDS programme)</td>
</tr>
<tr>
<td>Tanouh Kouamé</td>
<td>Parfait</td>
<td>PNLS (Nat. AIDS programme)</td>
</tr>
<tr>
<td>Edi</td>
<td>Constant</td>
<td>CSRS</td>
</tr>
<tr>
<td>Monan</td>
<td>Francis</td>
<td>CCM - in charge of TB</td>
</tr>
<tr>
<td>Baby</td>
<td>Bernadette</td>
<td>CCM - in charge of HSS</td>
</tr>
</tbody>
</table>
Annex 6. Intervention opportunity: Strengthening Community Engagement

How might we design the paper-based health information system to...

- track which patients have missed their follow up vaccination or treatment
- increase the likelihood that nurses can find the lost patients
- make patient’s time waiting for the consultation productive
- enable communication with illiterate patients

**Figure A - 1. Early ideas of interventions for strengthening community engagement.**

**Community Tracker**
This idea makes data transparent for the community by sharing it at a central, well-attended location like a church or mosque, making the whole village accountable for follow up.

**Visual Patient Health Books**
Illiteracy is a barrier to understanding information even as simple as which child a record belongs to within a household. This record uses illustrations and diagrams to make dense information visual and therefore understandable.

**Delivery Backup Plan**
The delivery backup plan is a card with the mother’s pertinent information like parent’s phone numbers, back up car ride to the hospital and other important information in case of emergency.
FEEDBACK ON IDEAS

The personal health books are too complicated

“The current home based record is too complicated”
–Stakeholder

Local media channels are good for communication

A combination of local radio stations, town criers, and religious leaders are used to communicate important issues to a village. Currently, the cost of radio advertisements is going down, making it easier to use. However, there is uncertainty around the most effective method for communicating.

Lack of feedback to the community reduces motivation

It’s important to provide feedback to the community on their progress and status. However, in reality, getting feedback is rare and so community members disengage.

“We need to train community health workers on how to alert their communities to outbreaks, so that they can help educate the community and stop the spread”
–Stakeholder

“Community health workers should be responsible for the whole community and help take ownership over health problems”
–Stakeholder
Annex 7. **Intervention opportunity: Shifting from paperwork to patient care**

How might we design the paper-based health information system to...

- help health workers make smart decisions about patient evacuations
- reduce the time it takes to fill out forms
- highlight the information health workers need to make decisions about patient care
- ensure health workers are trained to fill out the forms correctly

**Figure A - 2. Early ideas of interventions for shifting from paper work to patient care and use attention.**

- **Real-Time Tally Sheet**
  
  Nurses are pressed for time completing reports at the end of the month and tally sheets are often used as a way to ease this process. This idea is about a real-time tally sheets replace the monthly report, freeing up precious time for patient care.

- **Tickler File**
  
  In the current registers, it’s difficult to keep track of when patients are due next for routine visits like immunization, antenatal care, or HIV care. The tickler file reminds nurses who is due for vaccination each month, avoiding the lengthy and often unsuccessful process of browsing through registry books.

- **Indicators Organized by Use**
  
  In Côte d’Ivoire the monthly report is over 40 pages with indicators that aren’t always immediately actionable by health workers at the facility. Indicators organized by use suggests that the report is organized in a way that differentiates types of data by user.
FEEDBACK ON IDEAS

There’s a collective desire to reduce the strain paperwork creates on health workers

“Doing this in real time will facilitate the process of filling the monthly report and help us have a good result. If we make a mistake in a consultation, for example tracking Malaria cases, it will help me compare and double check my work.”
–Nurse

“We know the workload on the health workers is heavy, but we can’t see a way around reducing the number of indicators required for the monthly report.”
–MOH

Actionable data on the wall helps educate the patients

It’s important to provide feedback to the community on their progress and status. However, in reality, getting feedback is rare and so community members disengage.

“I use the targets from the district to make sure we’re reaching everyone we’re supposed to. I put them on the wall so that it’s a constant reminder for our team, a tool for educating the population, and reference for the district when they visit.”
–Nurse

“I keep track of when my HIV patients come to visit on the wall. Keeping track of it on the wall where I can see it, helps remind me if I need to follow up with them if they’ve missed their visit.”
–Nurse

How might we design the paper-based health information system to...

- continually educate health workers about the changing dynamics of health care
- enable communication between nearby health facilities to find lost follow up patients
- give clear guidelines for treating patients?

**Figure A - 3. Early ideas of interventions for improving clinical and public health decisions.**

<table>
<thead>
<tr>
<th>Personalized Sets of Indicators and Targets</th>
<th>Data for Action</th>
<th>Retired Nurses Knowledge Sharing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every district and village is different, with different sets of needs and priorities. This idea suggests that indicators tracked monthly are tailored and condensed to fit a specific context.</td>
<td>Though data are collected during a consultation, it’s not always used in the moment to make decisions. This idea suggests that providing tools for clear, in-the-moment analysis will drive health workers toward action.</td>
<td>Learning directly from peers is the best way of learning. However, nurses are often isolated from one another making it difficult to share best practices. This idea provides a forum for knowledge sharing at district meetings between retired, experienced nurses and active nurses.</td>
</tr>
</tbody>
</table>

**FEEDBACK ON IDEAS**

**Further investigation is required to understand underlying issues**

Customer service surveys are a successful tactic for investigating problem areas. For example, one survey identified a need for better paediatric care and another identified that women didn’t return for follow up visits because they didn’t like their interaction with the gynaecologist.
Tools available to further this investigation are limited within the current system.

Learning from other practitioners is invaluable

“Experience sharing in meetings is valuable. In the TB program, we have regional review workshops to review therapy types and success rates”
— Stakeholder

“At the district I was trained on a data calculation. When I came back to my health centre, I couldn’t do it, so I called another nurse and he showed me how. There is no shame in asking for help.”
— Nurse