Evaluation of the Effects of HIV-Specific Investments in the Performance of the Health Information System in Côte d'Ivoire

Summary of Results

September 2019

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MEASURE Evaluation

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Cover photo: Men bicycle in a rural area of Cote d'Ivoire. By Jimmy Delpire, courtesy of Flickr Creative Commons.

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ABBREVIATIONS

DIIS	Department of Informatics and Strategic Information
HIS	health information system
M&E	monitoring and evaluation
MSHP	Ministère de la Santé et de l'Hygiène Publique (Ministry of Health and Public Hygiene)
OpenELIS	open electronic logistics information system
PEPFAR	United States President's Emergency Plan for AIDS Relief
PRISM	Performance of Routine Information System Management
SIGDEP	Système informatique de gestion de dossiers électroniques de patients (Data Management Tool for Electronic Patient Files)
UNAIDS	Joint United Nations Programme on HIV/AIDS
USAID	United States Agency for International Development

INTRODUCTION

MEASURE Evaluation—a project funded by the United States Agency for International Development (USAID) and the United States President's Emergency Plan for AIDS Relief (PEPFAR)—has supported the Government of Côte d'Ivoire to strengthen its health management information system and HIV monitoring and evaluation (M&E) systems since 2004. Working closely with the Ministry of Health and Public Hygiene (Ministère de la Santé et de l'Hygiène Publique [MSHP]), MEASURE Evaluation has performed a leadership role in strategic planning and overall management of the health information systems (HIS). Under MEASURE Evaluation's Learning Agenda activities, the project conducted an evaluation of HIS investments in Côte d'Ivoire. The evaluation was designed to demonstrate how HIS strengthening investments affect HIS performance, health system outcomes, and public health outcomes. It assessed the broader effects of HIV-specific HIS investments in the overall improvement of the larger health system and how they can improve HIV outcomes.

This evaluation had two components:

1. A data triangulation report (validating data by cross-referencing them from multiple sources) to document trends associated with HIS interventions aimed at improving HIV services
2. A qualitative study to explore the barriers and incentives to using the government tools and data systems to improve information systems, analyses and syntheses, and health programs and outcomes

The study aimed to identify barriers and incentives to improve HIS performance in Côte d'Ivoire. The research questions were the following:

- What were the major HIS-strengthening interventions that focused on HIV in Côte d'Ivoire in the past 10 years?
- How are the major HIS strengthening interventions implemented over the past 10 years associated with HIS performance, which is defined as data use and quality?
- How did the contextual factors and health system dynamics affect the implementation and outcomes of the HIS interventions?
- What were the health system outcomes associated with the HIS interventions, specifically HIV program course corrections contributing to controlling the epidemic, to reach the global 90-90-90 targets?[1]
- What are the barriers, incentives, and factors to improve use of the HIV data in the government-supported HIV data systems to improve data quality, analysis, and synthesis, and health programs and outcomes?

1 These targets state that by 2020, 90 percent of people living with HIV will have been diagnosed; 90 percent of those diagnosed will be on antiretroviral therapy; and 90 percent of those in treatment will be virally suppressed (Joint United Nations Programme on HIV/AIDS [UNAIDS], 2014).

METHODS

Data Triangulation

Multiple data sources were reviewed for the first component of the evaluation. To identify HIS strengthening activities, we reviewed MEASURE Evaluation annual and quarterly reports for Phases III and IV, PEPFAR country operational plans for Côte d'Ivoire from 2008–2017, and searched the websites of other development partners (e.g., UNAIDS, the United Kingdom's Department for International Development). Other documents and data were reviewed for evidence of improved data quality and use: 2008 and 2012 Performance of Routine Information System Management (PRISM) assessment reports, an HIV data triangulation report, the 2016 Service Availability and Readiness Assessment report, and reports from routine data quality assurance of 2016. HIV data for Côte d'Ivoire came from publicly available data on PEPFAR's website, the Côte d'Ivoire annual health statistics reports from 2008–2016, UNAIDS, and the Demographic and Health Surveys. More information on the methods used for the triangulation of data has been published elsewhere (MEASURE Evaluation, 2018).

Qualitative Study

After conducting scoping visit meetings, purposive sampling was used to select 21 total entities for semi-structured interviews. The in-person interviews were conducted July 16–27, 2018. The interviews were conducted in French by a team comprised of MEASURE Evaluation staff (US-based and in-country) and a representative of the MSHP Department of Informatics and Strategic Information (DIIS). Following data collection, both the audio files and handwritten notes were transcribed and translated into English, then reviewed for accuracy by the interviewers prior to analysis. We used framework analysis to analyze the data. Detailed information on the methods used has been published elsewhere (MEASURE Evaluation, 2019).

In addition to the semi-structured interviews, the team conducted informal meetings with the DIIS to clarify answers to questions that arose during the formal interviews. These meetings provided a wealth of contextual information.

Validation Meeting

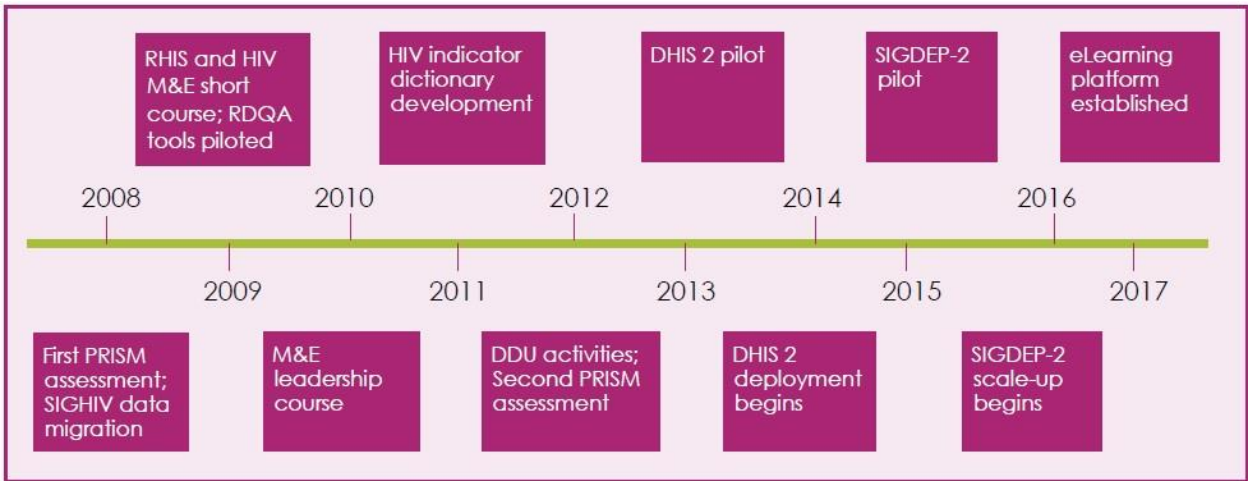
On March 19, 2019, a stakeholder validation meeting was held in Abidjan, Côte d'Ivoire. The director of the DIIS, along with representatives of approximately 15 organizations (most of the organizations included in the interviews), attended. An overview of the study and research questions, results, and recommendations were presented. This was followed by a discussion with the group about the results and recommendations.

KEY FINDINGS

What were the major HIS strengthening interventions that focused on HIV in Côte d'Ivoire in the past 10 years?

There was a myriad of HIS interventions during the study period, and MEASURE Evaluation was a leading partner in those efforts. Many activities were implemented to strengthen different aspects of the HIS, from ongoing support for an open electronic logistics information system (OpenELIS) and other software applications, to adapting country data collection tools, to conducting surveillance activities. Figure 1 provides a timeline of key interventions during this time.

Figure 1. Timeline of key HIS interventions



Source: MEASURE Evaluation, 2018

- The HIS strengthening activities were many and varied, ranging from participation in coordinating mechanisms, to developing M&E plans and indicators, capacity building, developing and or installing systems to collect data, and developing and applying tools to assess data quality and use. The interventions early in the study period focused on building M&E capacity and standardizing indicators.
- The PRISM assessment, used to design, strengthen, and evaluate RHIS, was conducted twice in Côte d' Ivoire during the study period. A third PRISM was conducted in 2018.
- In 2013, DHIS2 was chosen as the national tool for the management of HIS data in Côte d'Ivoire. MEASURE provided technical assistance for implementation, including training, software installation, and formative supervision in all regions. The national deployment occurred from December 2013 to September 2016. Currently, the DHIS2 contains 5,981 data elements, 723 indicators, 2,931 organizational units, and 27 groups of indicators. As of May of 2018, coverage had reached 100 percent in health regions, districts, regional referral and general hospitals, and large maternity and infant health centers.
- SIGDEP 2, an OpenMRS-based[2] HIV patient electronic medical records system, was developed and deployed. To meet PEPFAR implementing partners' specific information needs, the monitoring,

[2] Open source enterprise electronic medical record system platform. See https://openmrs.org/.

evaluation, and reporting data elements and indicators were set up in SIGDEP 2 version 2 in September 2017. This latest version is deployed in 100 out of 600 HIV sites, focusing on those with the largest patient load.

How are the major HIS strengthening interventions implemented over the past 10 years associated with HIS performance, which is defined as data use and quality?

The main output of a strong HIS is data of high quality that are used for decision making. Data quality can be measured by examining seven dimensions: accuracy, reliability, precision, completeness, timeliness, integrity, and confidentiality (MEASURE Evaluation, 2010). For this final summary document, some 2018 PRISM results were available that had not been released at the time of the other two study reports. Based on the PRISM assessments conducted in 2008, 2012, and 2018, there is some evidence of an improvement in these metrics in the past 10 years. Table 1 shows the results in data quality in facilities and districts. For overall accuracy, improvements were seen in both facilities and districts, with the biggest improvement observed at the district level (from 40% in 2008 to 81% in 2012). A substantial improvement was also noted in data completeness in facilities' monthly reports (from 43% in 2008 to 91% in 2018). Completeness of monthly district reports and timeliness of health facility reports at the district level showed consistent improvement over the 10-year span as well.

However, Table 2 indicates that overall accuracy showed improvement initially, and then some backsliding between 2012 and 2018, demonstrating that achieving and maintaining HIS data quality is an ongoing effort. Improvements are also still needed in data analysis, performance review, and use of information (although some of the indicators were updated in the 2018 PRISM and are, therefore, not comparable to prior results, limiting trend analysis).

Table 1. Comparison of key data quality indicators from 2008, 2012, and 2018 PRISM assessments

Quality of Data	Facilities			Districts		
	2008	2012	2018	2008	2012	2018
Overall accuracy	43%	60%	46%	40%	81%	60%
Data completeness in facilities' monthly reports	43%	65%	91%	NA	NA	96%
Completeness of monthly reports at district level	NA	NA	NA	80%	98%	91%
Timeliness of reports of health facilities at district level	NA	NA	NA	60%	50%	79%

- Respondents in the qualitative study agreed that there have been improvements in data quality, much of it attributed to the process of conducting routine data quality assurance and other quality assessments.
- DHIS2 has also been instrumental in improving data quality through internal validation and by making the data available more quickly.
- Many of the respondents commented on the fact that the use of DHIS2 has made it possible for data to be available in real time and that this has increased the accessibility of data at all levels of the health system for stakeholders who have access to DHIS2.

- Despite the improvements, several threats to data quality were identified: data entry errors at the primary collection points, inconsistent timely submission of reports across the country, and incomplete data at some levels.
- Data use is hard to measure. Some respondents questioned the assertion that the government system was underutilized and not informing decision making. However, almost all agreed that measuring data use is difficult and that many instances of data use occurring at all levels of the health sector are not being captured.

Table 2. Comparison of key data use indictors from 2008, 2012, and 2018 PRISM assessments

Data use indicators	Facilities			Districts		
	2008	2012	2018	2008	2012	2018
Data analysis	30%	23%	32%	51%	66%	46%
Presentation of data	48%	29%	NA	81%	66%	NA
Promotion of information culture	17%	71%	NA	70%	72%	NA
Performance review	NA	NA	16%	NA	NA	53%
Dissemination outside the health system	NA	NA	40%	NA	NA	82%
Use of information	38%	38%	NA	44%	70%	NA

How did the contextual factors and health system dynamics affect the implementation and outcomes of the HIS interventions?

Respondents in the qualitative study discussed many contextual factors that are important to consider when weighing the success of HIS investments over the past 10 years, including donor support and partnerships, government policies and infrastructure, and environmental and political climate. All contextual factors have an influence on outcomes, are interdependent, and should not be taken lightly.

- Donor and partner relationships were perceived as valuable, since many of the HIS interventions could not be implemented without their technical and financial contributions. They provided funds for computers, equipment, training workshops, software updates, and Internet connectivity, supporting much of the infrastructure that makes HIS possible. However, donors had a considerable influence on what they thought the country's priorities should be, and this reliance on donors is a risk for the country if the donors decide to withdraw without implementing a transition or sustainability plan.
- There were concerns that some key health stakeholders, mainly the private sector and community groups, have been excluded from the planning and implementation of HIS interventions. The private sector has no incentive to participate in the improvement of the health system if it is not included in the planning and discussions of improving the HIS.
- Community workers need to know how data systems work and to have access to the data, since they are an integral part of controlling the HIV epidemic.
- The government should continue to prioritize HIS interventions and disseminate official policies and objectives that provide clarity on the strategies used when implementing procedures that are critical to the health system. Such policies can boost morale in the workforce, encourage continued engagement, and assist in the proper disbursement of funding, because such policies provide guidance on specific objectives for health system strengthening.

- The environmental and political climate of the country were also cited as very important contextual factors that could have positive and negative effects on the health system. The political climate is influenced by who is in power: changes in national political leadership often lead to changes in key ministry positions. Some individuals in the Ministry can be champions for specific HIS interventions and can move the planning and implementation process forward.
- Respondents were keenly aware of how political unrest can completely disrupt civil life, including the provision of health services. Many recalled the 2010 political crisis, which affected all aspects of the health system: computers were seized, resources were lost, service delivery was slowed down or suspended, and the use of HIS tools was suspended.

What were the health system outcomes associated with the HIS interventions, specifically HIV program course corrections contributing to controlling the epidemic, to reach the global 90-90-90 targets?

Over the course of the study's 10-year review, there were great improvements in the number of people who were tested, in treatment, and retained in treatment, and who achieved viral suppression. There was a steady increase in the number of pregnant women who knew their HIV status, from 78,806 in 2007 to a peak of 656,306 in 2015. In 2015, this number dropped to 493,493, but this still presents a more than 500 percent increase during this period. The number of individuals who received HIV testing and counseling services for HIV and received their test results also increased in a similar manner, from 169,676 in 2007 to 1,611,345 in 2016. According to PEPFAR program data for Côte d'Ivoire,[3] retention increased 80.4 percent over two years, from 20,515 people remaining on ART 12 months after initiation at the end of 2016 to 37,013 at the end of 2018. HIV patients with documented viral load results increased 38.3 percent in the last year, from 103,584 at the end of 2017 to 143,276 at the end of 2018. Respondents in the qualitative study were asked to address how HIS interventions contributed to reaching the global HIV targets.

- First 90: HIS interventions have influenced access to estimates of people needing to be tested and led to policy change regarding facility-level approaches to better identify clients through targeting and facility-related patient flow changes. Examples include intensifying index testing, improving patient screening tools, and increasing referrals to and points of entry where testing is available. HIS improvements aided in assessing the extent to which provider-initiated testing was taking place and whether improvements were needed, and have led to approaches aimed at increasing identification of men living with HIV.
- Second 90: To increase retention, district and regional health programs use routine program data as a baseline and to provide consistent information over time on HIV patient retention indicators. Access to quality retention data has led to implementation of high-quality studies to determine which approaches are successful in leading to a reduction in patients lost to follow-up, including liaising with community health workers and ensuring patient satisfaction during clinic experiences. Through SIGDEP2, providers can generate cohort analysis reports that facilitate patient tracking and can activate actions to ensure patients return for necessary follow-up visits. According to respondents, over the past 10 years, retention rates increased from approximately 50 percent to between 75 percent and 85 percent.
- Third 90: While the module for viral load was more recently implemented in the DHIS2, and it is generally acknowledged that there is still much to be done to achieve the objective, clear improvements are already evident. Trained providers are more attuned to the need to track viral load suppression in their HIV patients, and the availability of patient-level data facilitates analysis and identification for opportunities for improvement. Specific examples include less than ideal outcomes for children and adolescents, prompting

[3] http://data.pepfar.gov

programmatic shifts to encourage clinicians to ensure timely viral load testing appointments and raise awareness among caregivers regarding linked health practices and concerns such as appropriate diet.

Health outcomes are also influenced by national policy. Better quality routine program data is the foundation on which policy change can be built, and which has served as reliable evidence to which stakeholders can point when proposing policy change. Clear national directives emerging from HIV data collected in the DHIS2 have led to focusing on attaining annual targets and examining approaches that improve those results.

What are the barriers, incentives, and factors to improve use of the HIV data in the government-supported HIV data systems to improve data quality, analysis, and synthesis and health programs and outcomes?

Despite the improvements and changes to the HIS described in the previous sections, many issues remain in the process of strengthening the HIS and continue to challenge it. This includes the continued use of paper forms, lack of adequate funding for infrastructure and activities such as supportive supervision and infrastructure, tension between implementing partners and the government sector, and continued barriers to data use.

- There are real and perceived data quality issues. Data quality has improved, but this progress has not been well advertised; therefore, stakeholders still assume it is poor. However, there are still delays in the timeliness of data submission, and there is concern from the perspective of using the national HIS system across HIV programs that it does not contain all the PEPFAR indicators.
- The culture of data use has not permeated through all levels of the health system. While there may be data use of national level indicators, there is little discussion of lower-level indicators, the reasons behind success and challenges, or why there may be undesirable outcomes at the district level and below.
- There appears to be a misunderstanding between data use and presentation, with some equating data presentation to use. Although data were analyzed and presented, and there is legitimate enthusiasm regarding facility of DHIS2 data visualization capability, for example, very little has been done so far to take "use" beyond basic indicator reporting, such as using them for deeper investigation leading to decision making or improving health systems.
- In the qualitative interviews, several respondents discussed the fact that even with many challenges remaining, the process of introducing M&E training into the country has incentivized some to improve the quality and use of data by providing them with a more complete perspective on why data use is important and equipping them with the necessary skills to implement requisite change in their work environment.
- The lack of capacity and human resources continues to impede success. Interview respondents indicated that there were not enough personnel to analyze data, nor to support the process of data collection and use, or that personnel were available but were not trained. Even in cases in which people had been trained in M&E or data collection, few people were trained to use the data. In some cases, there was only one staff person trained on data collection and use, so if that specific person was not available, no progress was made.
- There has been a trend to digitalize data collection and analysis, but there is limited funding for other important components of the HIS intervention, which affects the sustainability of the interventions. For example, supportive supervision is critical as a means of solidifying knowledge and training and understanding potential roadblocks to achieving objectives, but is not always prioritized.
- Even with this electronic wave of activity, there is not always funding to purchase equipment, and there were some anecdotes of health staff using their personal computers for data collection and other work. Infrastructural issues such as limited and often disrupted Internet service continue to challenge electronic systems that require Internet connectivity for transmission and use.

RECOMMENDATIONS

- Support development of a costed plan for sustainability and government ownership of HIS interventions to serve as a point of departure for a larger discussion and advocacy regarding financial sustainability. Dependence on donors is a concern, and the MSHP does not control the national budget in its conception or its disbursement. Because the HIS is part of a larger government system, the conversation about how to support it must include budget and finance stakeholders beyond the health domain.
- Continue to fund interoperability efforts if they are not yet complete, specifically between SIGDEP 2 and DHIS2.
- Encourage discussion across stakeholders to further streamline data collection efforts, reduce the need for supplemental data collection platforms among implementing partners, and identify means for the government to adequately share data regularly and in a timely manner with stakeholders, such as community and private sector partners that may not contribute data to the national DHIS2 database.
- Continue to fund or increase funding for supportive supervision down to the facility level.
- Adopt and fund an official data manager (or similar) position within the government health structure to assist at the facility level.
- Explore ways to broaden inclusion of the private sector in HIV elimination efforts.
- Consider the benefits of funding in-depth M&E training for people in positions of leadership. Even if they do not remain in a current position, many personnel that have been trained in the past are still operating in the field of HIV and health. Contributing to a cadre of health administrators and policymakers that have this background can only benefit efforts to end the epidemic. Ensure that these trainings equally emphasize data collection and data use.
- Visualize saturation as the goal of developing a culture of data use. The people producing the data at the facility level must understand the connection between data collection, program shifts intended to improve performance, and improved health outcomes in their local population and beyond.

CONCLUSION

The HIS of Côte d'Ivoire has seen many improvements in the past 10 years, but challenges remain. There have been many efforts to improve data quality and there is evidence of improvement, but these are difficult and continuous tasks. Sustained efforts are needed to maintain what has been achieved and to continue working to improve the HIS and the entire health system to successfully manage the HIV epidemic. It is clear from this study that there is a commitment in the country to data quality and data use, including investing at the facility level, the acknowledged source of data generation and a key influence on data quality. Stakeholders understand the need to continue efforts to develop a culture of data use that will result in a corps of health providers and policymakers that is well-positioned to make data-based HIV programming decisions. Stakeholders at all levels of HIV programming recognize the value of these investments in Côte d'Ivoire's HIS and their link to achieving the 90-90-90 goals and subsequent control of the epidemic.

It is also critical to view any improvements in the HIS in the broader context of the entire health system and other social and political factors that can either be supportive or prohibitive of HIS success. Many of the lessons learned in Côte d'Ivoire can help other countries at different stages of their HIS development and in the HIV epidemic. Therefore, it is important to disseminate what has been learned in this context.

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