Strengthening Côte d'Ivoire's Health Information System to Combat HIV
Validating Data on the Effectiveness of Interventions

September 2018

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Evaluation

ACKNOWLEDGMENTS

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ABBREVIATIONS

ANC	antenatal care
ART	antiretroviral treatment
ARV	antiretroviral
CDC	United States Centers for Disease Control and Prevention
CESAG	Centre Africain d'Etudes Supérieures en Gestion
COP	Country Operating Plan
DDU	data demand and use
DIPE	Direction de l'Information, de la Planification et de l'Evaluation (Directorate of Information, Planning and Evaluation)
eLMIS	electronic logistics monitoring information system
FSW	female sex workers
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GOCI	Government of Côte d'Ivoire
HIS	health information system(s)
HISSM	health information system strengthening model
HMIS	health management information system
HSS	health system strengthening
HTC	HIV testing and counseling
INFAS	National Training Institute for Health Agents
IT	information technology
M&E	monitoring and evaluation
MOH	Ministry of Health
MSHP	Ministère de la Santé et de l'Hygiène Publique (Ministry of Health and Public Hygiene)
MSLS	Ministère de la Santé et de la Lutte contre le Sida (Ministry of Health and the Fight Against AIDS)
MSM	men who have sex with men
OVC	orphans and vulnerable children
PCR	polymerase chain reaction
PEPFAR	United States President's Emergency Plan for AIDS Relief
PMTCT	prevention of mother-to-child transmission of HIV
PNLS	Programme National de Lutte contre de SIDA (National Program for the Fight Against AIDS)

PN-OEV	Programme National de prise en charge des Orphelins et Enfants rendus Vulnérables du fait du VIH (National Support Program for Orphans and Vulnerable Children)
PRISM	performance of routine information system management
RDQA	routine data quality assurance
SARA	service availability and readiness assessment
SCMS	supply chain management system
SIGDEP	Système Informatique de Gestion de Dossiers Electroniques de Patients (Data Management Tool for Electronic Patient Files)
SIGHIV	système informatique de gestion VIH (data management tool for HIV)
STI	sexually transmitted infections
TA	technical assistance
TOT	training of trainers
TWG	technical working group
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development
USG	United States Government

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 (GOCI) to strengthen its health management information system (HMIS) and HIV monitoring and evaluation (M&E) systems since 2004. MEASURE Evaluation, working closely with the Ministry of Health (Ministère de la Santé et de l'Hygiène Publique [MOH]), has performed a leadership role in strategic planning and overall management of the health information systems (HIS). MEASURE Evaluation is conducting an evaluation of HIS investments in Côte d'Ivoire to contribute to the project's Learning Agenda. The evaluation is designed to show how HIS strengthening investments affect HIS performance, health system outcomes, and public health outcomes. It led us to take a step back, to assess 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 has two components:

- Triangulation of data (that is, validating data by cross-referencing them from multiple sources) to document trends associated with HIS interventions aimed at improving HIV services

- 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 aims to identify barriers and incentives to improve HIS performance in Côte d'Ivoire. The research questions are 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?

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[1] These targets state that, by 2020, 90 percent of those 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).

This report focuses on the data triangulation component of the evaluation, which involved the review of HIS strengthening interventions implemented from January 1, 2008 to December 31, 2017, evidence of improved data quality and use, and HIV indicators in this period. The focus is on activities funded by the U.S. Government (USG), because these have been the principle source of support focused on improving HIS as part of combatting the HIV epidemic. The interviews for the qualitative study were conducted in July and August of 2018 and are being translated and transcribed. The results should be available by the end of 2018.
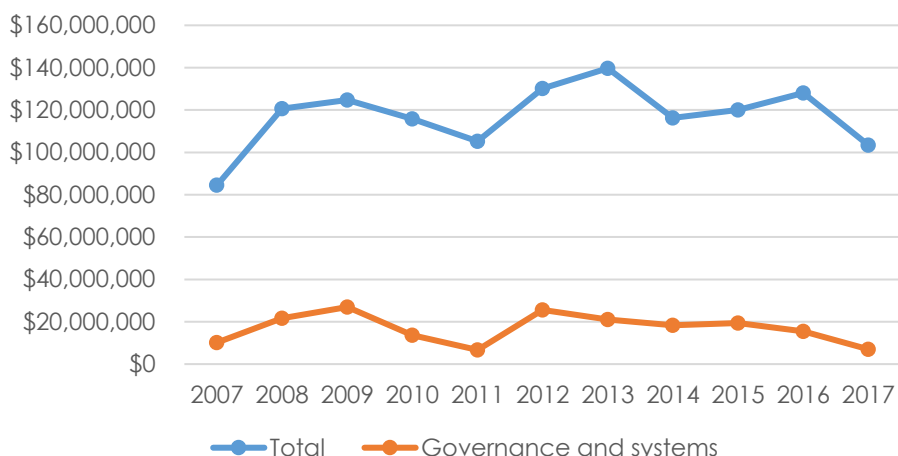
BACKGROUND

Côte d'Ivoire has seen a decrease in HIV prevalence among adults, from 4.7 percent in 2005 to 3.7 percent in 2012 (Institut National de la Statistique [INS]/Côte d'Ivoire, Ministère de la Lutte contre le Sida/Côte d'Ivoire, and ICF International, 2012). The 2017 UNAIDS estimate is 2.8 percent for the general population but with persistent differences between men and women (1.9% versus 3.7%) (UNAIDS, 2017). The rate of HIV is estimated to be 11.4 percent among female sex workers (FSWs) (John Hopkins University & Enda Santé, 2014) and 18 percent among men who have sex with men (MSM) (FHI 360, 2013). The GOCI has emphasized HIS strengthening to control the HIV/AIDS epidemic and is taking active steps to address high HIV prevalence rates and gaps in family planning services. Particularly with HIV/AIDS, GOCI has created the following priorities for high-impact interventions of the National HIV Plan 2016–2020 (Plan Stratégique National 2016–2020):

> 1. Strengthening prevention services by "targeting" key populations
>
> 2. Strengthening the pediatric care and treatment services, including integrating pediatric care in 100 percent of adult care and treatment sites
>
> 3. Improving the implementation of activities designed to achieve the elimination of mother-to-child transmission
>
> 4. Contributing to achievement of the global 90-90-90 goal by 2020—i.e., 90 percent of all people living with HIV will know their HIV status; 90 percent of all people with diagnosed HIV infection will receive sustained antiretroviral therapy; and 90 percent of all people receiving antiretroviral therapy will have viral suppression.

The effort to strengthen the HIS and control the HIV epidemic in Côte d'Ivoire has involved several international partnerships: Gavi–the Vaccine Alliance, UNICEF (with funding from the European Union), the United Nations Population Fund (UNFPA), and the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) (Konan, 2016). The Global Fund alone has contributed US$260 million between 2014–2017 alone (Global Fund, 2016). The World Bank has been implementing its Health Systems Strengthening and Ebola Preparedness Project since 2015. The World Bank project has a focus on performance-based financing and universal health coverage, and HMIS strengthening is one component to support these activities (World Bank, 2014).

PEPFAR made significant contributions to combat the HIV epidemic in Côte d'Ivoire between 2007–2017 (Figure 1). The figure shows total funding for all categories and funding specifically for governance and systems, which is where funding for HIS strengthening activities would fall. Funding peaked in 2012 and has been declining in the past few years.

Figure 1. PEPFAR funding 2007–2017

Source: PEPFAR (https://data.pepfar.net)

Learning Agenda

USAID asked MEASURE Evaluation to implement activities to justify and build an evidence base for which investments in HIS are effective and useful. The HIS Learning Agenda explores what works to strengthen HIS and aims to answer the following questions:

- What are the factors and conditions of HIS performance progress?

- What are the stages of progression to a strong HIS and how are they measured?

- What are the characteristics of a strong HIS?

The project is also implementing activities to build the evidence base on HIS strengthening. One of the first activities under the Learning Agenda was the development of HIS strengthening model (HISSM) (Figure 2). The model illustrates the logical progression of the effects of HIS strengthening activities to improve management, data, and data use to improve health systems and health outcomes for people. One of the questions we are asking is what types of HIS investment—in which components of the model—are most effective for better outcomes.

Figure 2. HISSM

Source: MEASURE Evaluation. 2017. Chapel Hill, NC: MEASURE Evaluation, Carolina Population Center, University of North Carolina.

This model is divided into several areas: the human element and contextual factors (both of which affect everything); the enabling environment (HIS leadership and governance and HIS management); information generation (data sources, data management, and information products and dissemination); and HIS performance (data quality and use). It is a starting point for framing how an HIS works, what we know now about contributions to improved outcomes, and where in the framework are the opportunities to learn more about strengthening the HIS. This model also helps us map MEASURE Evaluation's activities, to assess what part of HIS strengthening we are addressing. One of the model's premises is that the HIS is a tool that serves the larger health system, and it can only be as strong as the system it supports. An HIS is part of the larger health system that meets the information needs of the health system. The health system itself is part of the larger country context and political system. Health information is one of the six core functions of a health system, along with service delivery; human resources for health; medical products, vaccines, and technologies; financing; and leadership and governance (USAID, 2015). Therefore, investments in one of these areas will affect and be affected by the other core functions of the health system.

Link from Improved HIS to Improved HIV Outcomes

Health systems require high-quality data from HIS to plan for and ensure that the workforce is fully funded and equipped with the necessary commodities, infrastructure, resources, and policies to deliver services (Nutley & Reynolds, 2013). However, establishing the direct link of how this leads to improved health outcomes has been challenging for a variety of reasons: for example, the field is relatively new and the interventions that are implemented are complex. HSS and HIS interventions are very distal from specific health outcomes, which may result in a longer period to observe the effects on health outcomes (Hatt, et al., 2015). Another issue is the interconnectedness of health system functions; as a result, isolating the effect of an intervention in the HIS is difficult when there are also interventions focusing on service delivery or medicines, vaccines, and technology, for example. Health outcome improvements will happen when all the health system functions are improved in concert. Though attributing changes in health outcomes to changes in an HIS presents challenges, an improved HIS will contribute to changes in health outcomes. For example, the number of people who know their HIV status can increase, by reducing stigma about knowing ones status, increasing the number of locations where a person can be tested, assuring that counsellors/medical personnel are adequately trained to counsel and test, having a system to track and report how many people are being tested, and having a system that links confirmed laboratory results to providers. At the most basic level, a strong HIS that supports the collection of uniform HIV indicators, timely reporting, and the ability to assess and improve data quality, analysis, and use makes it possible to track gaps and progress being made to combat the epidemic. The use of high-quality data can help to identify areas that are being underserved or that are underperforming and will lead to more questions to address these issues.

METHODS

We reviewed multiple data sources for this report. To identify HIS strengthening activities, we began with MEASURE Evaluation annual and quarterly reports for Phases III and IV, because the project had been involved in multiple HIS strengthening activities in the country during the period under review. We also reviewed PEPFAR Country Operating Plans (COPs) for Côte d'Ivoire from 2008–2017, to identify other non-MEASURE activities. This began by searching for activities funded under the HIV Strategic Information or Office of Health System Strengthening categories and then selecting those that were related to improving HIV program data. We also searched the websites of the following development partners, to identify other HIS investments: UNAIDS, Department for International Development, Agence Française de Développement, the World Bank, the Global Fund, and the European Commission. 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 (SARA) report, and reports from Routine Data Quality Assurance (RDQA) 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. The PEPFAR data were downloaded directly from the site, and data from the annual health statistics reports were manually extracted from the reports. Table 1 presents a full list of the documents reviewed for this report.

Table 1. Documents reviewed

2008 performance of routine information system management (PRISM) assessment reports	MEASURE Evaluation. (2008). Evaluation of the Routine Health Information Management System of Côte d'Ivoire Report.
2012 performance of routine information system management (PRISM) assessment reports	MEASURE Evaluation, and Direction de L'Information, de la Planification, de l'Évaluation (DIPE). (2012). Evaluation of the national routine health information system by the PRISM methodology.
HIV data triangulation report	Dirección de la Prospective, de la Planification, de L'Évaluation et de L'Information Sanitaire (DPPEIS), and MEASURE Evaluation. (2016). Analyse de l'Efficacité des Programmes de Prise en Charge (PTME, ARVG, OEV) en Termes de Couverture, Utilisation des Services, et Atteinte des Cibles en S'Aidant de la Triangulation des Données et La Cartographie.
2016 Service Availability and Readiness Assessment (SARA) report	Dirección de la Prospective, de la Planification, de L'Évaluation et de L'Information Sanitaire (DPPEIS). (2016). Évaluation de la Disponibilité et de la Capacité Opérationnelle des Services de Santé (SARA).
Reports from routine data quality assurance (RDQA) of 2016	Ministère de la Sante et L'Hygiène Publique, et Direction de la Planification, de L'Évaluation et de L'Information Sanitaire. (2016). Mission d'appui aux Directions Régionales de la Santé et de L'Hygiène Publique pour la Conduite d'une Mission de Contrôle de la Qualité des données avec l'outil RDQA.
PEPFAR's website	The United States President's Emergency Plan for AIDS Relief. (2018). Côte d'Ivoire Operational Plan Report 2007–2017. Washington, DC: Office of U.S. Global AIDS Coordinator and the Bureau of Public Affairs. Retrieved from https://www.pepfar.gov/countries/cop/index.htm
The Côte d'Ivoire annual health statistics reports from 2008–2016	Ministère de la Sante et de la Lutte Contre le SIDA, et Direction de L'Information, de la Planification, de l'Évaluation. (2011). Rapport sur la Situation Sanitaire (RSS) 2007–2009. Abidjan, Côte d'Ivoire: République de Côte d'Ivoire.

Ministère de la Sante et de L'Hygiène Publique, Direction General de la Sante, Direction de la Prospective, de la Planification, de l'Évaluation et de l'information Sanitaire (DPPEIS). (2013). Rapport Annuel sur la Situation Sanitaire 2010–2012. Abidjan, Côte d'Ivoire: République de Côte d'Ivoire.

Ministère de la Sante et de L'Hygiène Publique, Direction General de la Sante, Direction de la Prospective, de la Planification, de l'Évaluation et |

	de l'information Sanitaire (DPPEIS). (2014). Rapport Annuel sur la Situation Sanitaire 2013. Abidjan, Côte d'Ivoire: République de Côte d'Ivoire.
	Ministère de la Sante et de L'Hygiène Publique, et Direction de la Prospective, de la Planification, de l'Évaluation et de l'information Sanitaire (DPPEIS). (2016). Rapport Annuel sur la Situation Sanitaire 2015. Abidjan, Côte d'Ivoire: République de Côte d'Ivoire.
	Ministère de la Sante et de L'Hygiène Publique. (2017). Rapport Annuel sur la Situation Sanitaire 2016. Abidjan, Côte d'Ivoire: République de Côte d'Ivoire.
UNAIDS	UNAIDS. (2018). Data set. Retrieved from http://www.unaids.org/en/topic/data
Demographic and Health Surveys	Institut National de la Statistique—Côte d'Ivoire (INS) and ICF International. (2012). Enquête Démographique et de Santé et à Indicateurs Multiples de Côte d'Ivoire 2011–2012. Calverton, Maryland, USA: INS and ICF International.

RESULTS

Here are the data triangulation study's findings in the areas of HIS strengthening, improvements in data quality and use, and HIV outcomes in Côte d'Ivoire.

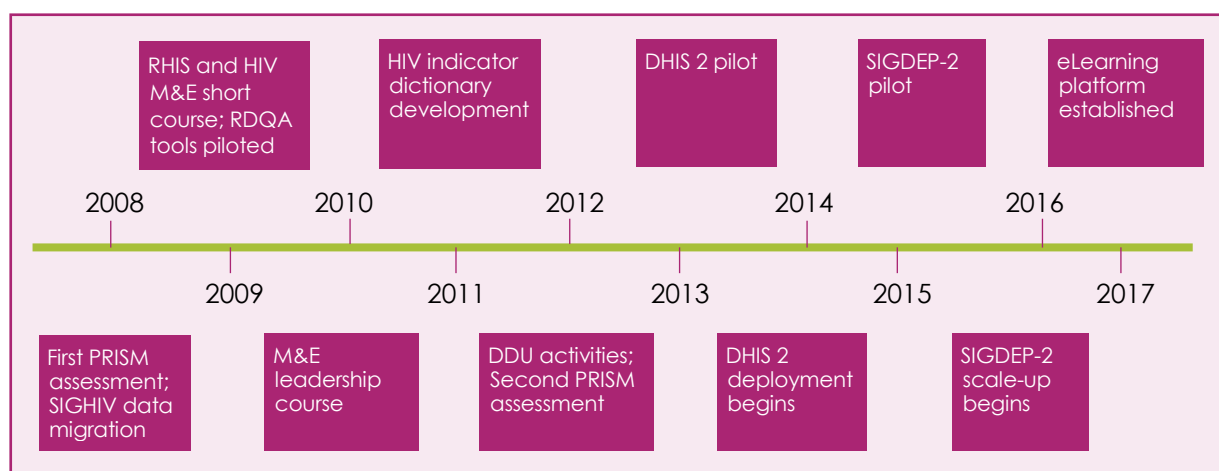## HIS Strengthening Activities

There have been significant efforts in Côte d'Ivoire to strengthen the HIS in the review period and the Appendix provides a table of the types of activities funded by PEPFAR under strategic information. Figure 3 presents a timeline of some key HIS interventions in Côte d' Ivoire. MEASURE Evaluation has been a leading partner in these efforts. Many activities have been implemented to strengthen different aspects of the HIS, from ongoing support for an open electronic logistics information system (OpenELIS), to adapting country data collection tools, to conducting surveillance activities. Boxes 1–3 illustrate some examples of other USG-funded projects that have worked on strengthening other data sources of the HIS in Côte d'Ivoire.

The MEASURE Evaluation activities that fall under HIS strengthening are many and varied and range from being part of coordinating mechanisms, 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. These activities were mapped to the HISSM, and many of the activities fall under the area of the enabling environment of the HISSM, particularly the subarea of leadership and governance. This highlights the point that it is difficult to improve an HIS without having all the foundational pieces in place, and this point was acknowledged by the funder because MEASURE Evaluation was funded to ensure the presence of these foundational pieces during this period. Work to improve the enabling environment often involves participation in coordinating mechanisms—such as various technical working groups (TWGs) (e.g., the National IT TWG and DHIS 2 TWG).

Box 1. University of Washington I-TECH

The University of Washington's I-TECH has worked in Côte d'Ivoire since 2009 in partnership with the U.S. Centers for Disease Control and Prevention (CDC) and the Côte d'Ivoire Ministry of Health and Public Hygiene (MSHP). The focus of their work has been on strengthening laboratory information systems at the national and regional levels. Their work has included the development and deployment of an open source laboratory information system, OPENLIS. In conjunction with this effort, they have also worked to strengthen national laboratory policies and procedures. Along with MSHP, activities have also focused on improving training programs for laboratory staff, which included identifying, developing, and reinforcing the capacity of local professionals to lead and conduct logistics information system training, deployment, and maintenance activities. Other interventions supported HIV testing certification, the expanded use of laboratory information systems and their data for decision making, and blood safety interventions and accreditation of national blood transfusion service points (https://www.go2itech.org/where-we-work/cote-divoire/).

Figure 3. Intervention timeline

Figure 3. Intervention timeline

- RHIS and HIV M&E short course; RDQA tools piloted
- HIV indicator dictionary development
- DHIS 2 pilot
- SIGDEP-2 pilot
- eLearning platform established

2008 — 2010 — 2012 — 2014 — 2016

2009 — 2011 — 2013 — 2015 — 2017

- First PRISM assessment; SIGHIV data migration
- M&E leadership course
- DDU activities; Second PRISM assessment
- DHIS 2 deployment begins
- SIGDEP-2 scale-up begins

Box 2. ACONDA-VS

ACONDA is a local nongovernmental organization that was formed in 2002 that has partnered with CDC and PEPFAR since 2004 to implement HIV activities in such areas as prevention, biological monitoring, psychosocial care, and strategic information management (http://www.serviceongsante.ci/RAPPORT/2RAPPORT2015.pdf). In the area of strategic information management, they were involved in the procurement and provision of computers and other equipment to ART sites. In 2008, the electronic management of ARV treatment and HIV patient records was initiated by ACONDA using Monistac software. ACONDA led the migration of data from the Monistac software used to manage patient records electronically to SIG-HIV, which eventually became SIGDEP, the current electronic record system. (The abbreviation stands for Système Informatique de Gestion de Dossiers Electroniques de Patients.)

Strengthening the HIS required building the capability for sharing data across systems, to avoid duplication of data collection processes and to decrease the burden on health workers. MEASURE Evaluation provided technical assistance (TA) to the MSLS/Direction de la Prospection de la Planification de l'évaluation et de l'Information Sanitaire in the design of an HMIS architecture that will enable interoperability across the existing national systems (e.g., DHIS 2, eSIGL, and SIGDEP 2).

The findings from the "Case Study to Measure National HIV Monitoring and Evaluation System Strengthening," published in 2012, identified the five most significant changes in Côte d'Ivoire's HIV M&E system. The following were among these changes: (1) indicators and data collection tools were harmonized, and the Indicator Dictionary was produced to improve reporting processes; and (2) national databases to process and manage HIV-related data were deployed, with manuals to accompany them, all designed to improve data quality (Salestine & Kemerer, 2014). Since the publishing of these findings, the deployment and use of DHIS 2 for routine health data management, and SIGDEP 2 for the management of individual health records, have been rolled out. The use of these two systems have the potential to increase the quality of data used to monitor and track indicators to achieve PEPFAR goals and improve health outcomes for HIV-positive individuals. This next section will provide more detail about the progression of interventions in Côte d'Ivoire between 2008–2017.

HIS Development 2008–2014

MEASURE Evaluation's goal was to improve the collection, analysis, and presentation of data to promote better use of information in health programs. The broad categories of interventions implemented in Côte d'Ivoire between 2008 and 2014 are (1) national M&E capacity building, (2) PRISM toolkit, (3) data use and decision making, and (4) RDQA. Though there is significant overlap in the intervention designs, a progression can be seen in their application. The document review reveals patterns of increased specificity of the tools and methods used to address emerging opportunities that resulted from previous MEASURE Evaluation activities.

National M&E Capacity Building

Building M&E capacity at the national level was an important development in strengthening the overall HIS in Côte d'Ivoire. Part of this being involved in key technical working groups such as the National M&E Reference Group, the MOH National IT Technical Working Group, the HIV Surveillance Group, and as the secretariat for the HMIS Technical Working Group.

In addition to working with the Ministry of Health, MEASURE Evaluation provided the following to build the capacity of the Ministry of Education's HIV M&E system: a 12-component M&E assessment, an M&E plan, coordination meetings, and revision of a data collection tool. MEASURE also provided the following to build the capacity of the Ministry of Family and Social Affairs: an HIV M&E workshop, coordination meetings, supervision visits, mapping of OVC indicators, and strengthening of data transmission at the decentralized level (Internet connectivity and electronic databases.) In 2009, Centre Africain d'Etudes Supérieures en Gestion (CESAG) in Senegal, the MEASURE Evaluation capacity building team in Chapel Hill, and the Côte d'Ivoire country resident advisor coordinated training opportunities for national level M&E staff specifically, the RHIS short course and the HIV M&E short course.

The RHIS short course was based on key elements from the MEASURE Evaluation-CESAG regional RHIS workshop materials. Key elements were identified based on findings from a 2008 PRISM assessment of the RHIS (please see below for more details on the PRISM). All content related to the PRISM framework and tools were adapted and presented with a focus on application to the Côte d'Ivoire context. The HIV M&E short courses included M&E fundamentals, M&E tool implementation, and M&E leadership development. In addition, an M&E leadership development program was launched with the M&E units of the four target ministries with the

Box 3. Partnership for supply chain Management

Supply Chain Management System (SCMS) is led by the Partnership for Supply Chain Management, a nonprofit organization established by MSH and John Snow, Inc, worked in Côte d'Ivoire from 2006–2016. It is funded to help deliver an uninterrupted supply of high-quality, affordable products including antiretroviral drugs, drugs to treat opportunistic infections such as tuberculosis, and drugs and supplies for palliative and home-based care, HIV rapid test kits, and laboratory equipment. A critical component of SCMS support is strengthening the data-management and leadership capacities of the Ministry of Health and AIDS (MSLS). They worked with MEASURE to improve the functionality of the SIGDEP electronic tool to provide reliable, timely ARV/lab logistics data (https://www.msh.org/our-work/country/cote-divoire).

objective of increasing collaboration among the ministries to coordinate the collection, reporting, and use of national HIV/AIDS data.

In 2010, MEASURE worked with the National Training Institute for Health Agents (INFAS) to offer M&E and RHIS curricula to nursing students during their pre-service training. By 2012, INFAS began to independently offer M&E and RHIS curricula in their pre-service training program. The National Training Institute for Social Workers initiated an independent M&E curriculum in their pre-service training program; and the Côte d'Ivoire National Institute for Public Health independently began to offer the M&E curriculum in an in-service training program.

In 2010, an M&E leadership and development course for all four ministries administering HIV programs in the country (ministries of health, HIV/AIDS, education, and social services) was provided at the national level. Follow-up support was provided to the participants guided by an organizational development plan. The leadership course participants collaborated on the development of a common compendium of HIV indicators for the country. In 2011, MEASURE supported the development of six M&E plans for the following programs: VCT, OVC, PMTCT, key populations,[2] HIV, care and treatment, and BCC. Finally, MEASURE Evaluation supported an analysis using the Know Your Epidemic, Know Your Response approach, which found minimal data on MSM and drug users in Côte d'Ivoire.

PRISM

The Performance of Routine Information System Management (PRISM) is used to design, strengthen, and evaluate RHIS emphasizing the organizational, technical, and behavioral determinants of performance. PRISM tools include a diagnostic tool for data quality and use, an overview tool to map existing information system interactions and overlaps, a management assessment tool, and an organizational and behavioral tool that measures factors such as motivation, task-confidence, demand for data, and culture of information.

There have been three PRISM assessments in Côte d'Ivoire: 2008, 2012, and 2018. The first one was conducted in 2008 and it surveyed 119 health facilities and 12 districts to assess HMIS performance. The 2012 survey covered 10 medical regions, 20 health districts, and 190 health facilities. The behavioral survey tool was administered to 342 people, two at the level of the Direction de l'Information, de la Planification et de l'Evaluation (Directorate of Information, Planning and Evaluation [DIPE]), 13 in the regions, 44 in the districts, and 283 in the health facilities. The 2018 PRISM is currently under way using the revised PRISM tools, including those for software assessment, and results will be available later this year. The main results of the 2008 and 2012 assessments are discussed in the section below about data quality and use. As mentioned previously, the results of the 2008 assessment led to the development of the RHIS short course. In 2012, the PRISM assessment was conducted again, and system improvements were demonstrated in the following areas: an increase in global data accuracy scores, an increase in the data use scores, an increase in available, trained staff, an increase in Internet connections, and an increase in all the HMIS management functions, most notably

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[2] "These groups include gay men and other men who have sex with men, people who inject drugs, sex workers, transgender persons, and prisoners. In almost every country in the world, members of these populations are at greater risk for HIV than the rest of the population" (PEPFAR, n.d.).

the culture of information at the facility level. The National SIGDEP system for managing HIV data functionality improved to include antiretroviral (ARV) quantification and was being used to manage data in 233 HIV treatment sites.

Data Use in Decision Making

In 2012, MEASURE Evaluation built on its efforts from the previous years to improve the performance of the RHIS by outlining the following eight data use in decision making activities: asses and improve the data use context, engage data users and data producers, improve data quality and availability, identify information needs, build capacity in data use competencies, strengthen the organization's data demand and use infrastructure, conduct monitoring and evaluation, and communicate data demand and use successes.

In 2009, the tool, Framework for Linking Data to Action was used in two districts in Lagunes. Later, in 2011, 28 individuals from four ministries attended a data use workshop. Participants identified barriers to data use. Participants developed one global Linking Data to Action framework, and one framework for each ministry. A TOT for DDU was held in 2012 to aid in the efforts to institutionalize data use at all levels.

Routine Data Quality Assessment

MEASURE Evaluation developed the Routine Data Quality Assessment (RDQA), which is a tool to verify the quality of data, assess the system that produces the data, and develop action plans to improve both. The following dimensions of quality are used in the tool: M&E structure, functions, and capabilities; indicator definitions and reporting guidelines; data collection and reporting forms; data management processes; links with the national system; and use of data for decision making. The original RDQA tool was field tested in Côte d'Ivoire in 2009 and in 2010, the project worked with the Lagunes II Health Region staff to integrate the RDQA tool as part of supervisory visits primarily around ART patient monitoring data. Eventually, the RDQA tool was used by other USG implementing partners, which underscores the level of attention and commitment to improving the routine health information system in Côte d'Ivoire. Follow-up RDQA assessments in the nine intervention districts found that the completeness of reports increased from 75 percent to 81 percent and timeliness of reports increased from 14 percent to 32 percent. In addition, all reports were available at the regional directorate and at the DIPE (up from 78% to 100%). By January 2012, seven members of the DIPE conducted an RDQA in six health districts without technical assistance from MEASURE Evaluation. The teams successfully applied the tools in the field and prepared a report. MEASURE Evaluation provided examples of analysis, which the teams replicated independently, and reviewed the results with the teams.

HIS Development 2015–2017

Some activities from the previous period were continued, such as the support of various TWGs, but data source and data management interventions were added to address the evolving data needs in the country.

National M&E Capacity Building

A monitoring and evaluation framework for Option B+ in the prevention of mother-to-child transmission of HIV was developed in 2015. The DHIS 2 TWG was established in 2016, while the SIGDEP TWG, the quality assurance TWG, the informatics TWG, and the care and treatment TWG continue to be supported. In 2016, MEASURE facilitated a 12 Components M&E System Assessment of the NACP; and supported the use of the findings in the 2016–2020 National M&E Plan. In 2016, MEASURE Evaluation worked with the MOH to conduct a SARA and data quality review. The SARA surveyed 963 health facilities at different levels of the health pyramid in both the public and private sectors and urban and rural areas. This survey measured the actual and physical availability of health services and their operational capacity to deliver basic interventions in family planning, pediatric services, essential and comprehensive obstetric care, HIV/AIDS, tuberculosis, malaria and non-communicable diseases. An "Applied Epidemiology Training Curriculum" was developed in 2016 before the rollout of a national, electronic, longitudinal, HIV surveillance system. In 2017, the Directorate for Informatics and Health Information developed the Transition and Decentralization Plan for Informatics Applications DHIS 2, electronic logistics monitoring information system (eLMIS), and SIGDEP 2 at the Ministry of Health and Hygiene.

Data Source and Data Management

Phase IV has seen the move towards the use of new data collection mechanisms and the need to make these various systems interoperable. This has involved the deployment of DHIS 2 and the SIGDEP 2, which are discussed more in detail below.

DHIS 2

From 1995 to 2013, routine data were managed by SIGVISION, which was a Microsoft Access file that was a "stand-alone" mechanism that was difficult to update and became very slow as the volume of data it was expected to manage increased. This data came from health facility reports entered to SIGVISION at the district level, which was then sent to the region via CD, USB, or Internet. The data were transmitted in the same way from the regions to the national level. SIGVISION was also not comprehensive of all health programs (MEASURE Evaluation, 2016).

In 2013, DHIS 2 was chosen as the national tool for the management of HIS data in Côte d'Ivoire. Following a pilot in six districts, a mechanism for collaboration and coordination to deploy DHIS 2 was established, and key partners financed deployment in all 20 health regions in the country. 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 DHIS 2 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 (Table 2). All health programs have been integrated into the system.

Table 2. DHIS 2 coverage

Zone of coverage	Number completed	Number planned	Percentage
Health regions	20	20	100%
Health districts	82	82	100%
Region referral hospitals	17	17	100%
General hospitals*	87	81	107%*
Faith-based general hospitals	2	3	66%
Large urban facilities	3	10	30%
Large maternal and infant and health centers	2	2	100%

*Additional hospitals constructed between 2016–2018

Source: Gnassou, L. (2018). DHIS2 Coverage in Côte d'Ivoire [GIS data analysis]. Unpublished data set.

SIGDEP 2

The GOCI began using an electronic system to manage patient files *Système informatique de gestion VIH*, or Data Management Tool for HIV (SIGHIV) in facilities with more than 100 ART patients in 2007.[3] This was revised and renamed in 2010 to *Système informatique de gestion de dossiers électroniques de patients*, or Data Management Tool for Electronic Patient Files (SIGDEP), but because it was also an Access-based application, it was not able to handle increased patient loads. MEASURE Evaluation developed a web-based version of SIGDEP 2, using Open MRS—to correct the shortcomings of the previous version and enable the tracing of patient history—designed to enhance sustainability and improve the real-time accessibility of patient data. SIGDEP 2 was piloted from August 2015 to March 2016 with the scale-up beginning in July of 2016 with additional sites identified as PMTCT Option B+ enhanced monitoring sites. To meet PEPFAR implementing partners' specific information needs, the monitoring, 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. Modules were also developed to enable data exchange with all other applications—including eLMIS; DHIS 2; and Data for Accountability, Transparency and Impact to meet these requirements.

In 2017, the PMTCT component of SIGDEP 2 saw the following improvements: integrating antenatal care (ANC) records for patients who are HIV-positive into SIGDEP 2, updating the indicator list, creating performance reports, and creating SIGDEP 2 modules specific to PMTCT case management.

Ongoing Trainings for Sustainability of Systems

The uptake of these new electronic systems can bring about great improvements over the previous systems used, and there is great need for continuous training to develop capacity in-country to maintain, update, and respond to any system challenges. In 2015, MEASURE Evaluation trained 320 people to support national HIS. Forty-five people participated in a regional data quality review training; 44 users and 116 health data managers were trained on the software deployment framework for DHIS 2; 57 people were trained on eLMIS; 25 people

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[3] This was developed with a local developer, ACONDA, and the University of Bordeaux

participated in a training in and adaptation of open MRS based on SIGDEP 2 web-based specifications; and 33 trained as trainers on the OVC web-based database. In 2016, 79 staff were trained to manage and use these systems; 21 people participated in a TOT on the LMIS; 11 participated in a eLMIS architecture and development tools training; 42 participants were trained on SIGDEP 2; 28 on the PNOEV (Côte d'Ivoire's national program for the care of orphans and other children made vulnerable by HIV/AIDS); 20 on Applied Epidemiology; 40 on community epidemiology surveillance and short message service; and 16 on RDQA. In 2016, user manuals were developed for DHIS 2, eLMIS, SIGDEP 2, and PNOEV. In 2017, MEASURE supported the MSHP to develop and manage an eLearning platform to help build skills among HIS users, including a needs assessment, development of multimedia training materials, and the of launch the first DHIS 2 user training on the platform.

Data use in Decision Making

There was also ongoing technical support to improve data use for decision making at the central, regional, and district levels. This included the coordination of biannual data use meetings (which began in 2016), trainings on data analysis and interpretation of data from the HIV care cascade for two health regions, the development of the data use module in DHIS 2, and the draft plan for Côte d'Ivoire MOH M&E data use. The project also provided TA to the MOH through the Programme National de Lutte contre de SIDA (National Program for the Fight against AIDS [PNLS]) to implement the enhanced monitoring of PMTCT Option B+.

Data use was also a focus of a coordination meeting facilitated by MEASURE and organized by PNLS, which brought together implementing partners involved in PMTCT work, with the aim to identify measures to improve the results for 2017. At this meeting, 2016 PMTCT data were presented and discussed with IPs. These partners provided explanations and identified the causes of the gaps observed in the field. Based on these data, recommendations were made to correct the problems identified. The partners endorsed the corrective actions to be carried out, but also requested that the PNLS harmonize the practices and procedures for assigning the polymerase chain reaction (PCR) codes to better popularize the PCR lab test. It was suggested to the partners to introduce a use of information component in the validation meetings of the data they organize at the regional and/or district levels. A second meeting in 2017 focused on the calculation of patients in care and the patients with viral load suppression, which differed between PNLS and PEPFAR data. The reasons given for the discrepancies relate to the difference in understanding and calculation of the patients in care indicator, the data source, and the quality of the validated data. After the discussion, an action plan linking data to action was developed based on these two indicators.

In the data analysis trainings, participants learned how to analyze data from the HIV care and PMTCT cascades by conducting comparative analyses of 2015 and 2016 data along with the data from the first quarter of 2017. The teams from the two regions summarized the data obtained by each district. Participants then used the adapted framework linking data to action to identify problems and corrective actions. Each district or region developed an action plan to address the identified problems.

Improved Data Quality and Use

The main output of a strong HIS is data of high quality that is used for decision making. Data quality can be measured by examining seven dimensions: accuracy, reliability, precision, completeness, timeliness, integrity, and confidentiality (MEASURE Evaluation, 2010). There is some evidence that there has been an improvement in these metrics in the past 10 years mostly coming from the PRISM assessments conducted in 2008 and 2012 (most recent PRISM results are forthcoming). Table 3 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).

Table 3. Quality of data scores PRISM 2008 and 2012

Quality of data	Facilities		Districts	
	2008	2012	2008	2012
Overall accuracy	43%	60%	40%	81%
Data completeness in facilities monthly reports	43%	65%	NA	NA
Completeness of monthly reports at district level	NA	NA	80%	98%
Timeliness of reports of health facilities at district level	NA	NA	60%	50%
Use of information	38%	38%	44%	70%

Source: PRISM 2012

There was also an increase in the completeness of monthly reports at the district level but a decrease in the timeliness of reports from the health districts. However, this was before the implementation of DHIS 2. The changes to this dimension will be assessed in the 2018 PRISM results. But results from an RDQA in 2015 after DHIS 2 was implemented indicate that there has been an improvement (MEASURE Evaluation, 2016). The RDQA conducted in four regions and compared data in DHIS 2 to data submitted to the region using four indicators: number of deliveries in a health center, number of confirmed uncomplicated malaria cases for children under five, number of pregnant women who test positive for HIV, and number of diagnosed cases of STI. This RDQA concluded that the quality of the data has improved considerably in terms of timeliness, completeness, use of standard tools and procedures, and data management. For example, completeness was over 95 percent in all four regions and timeliness was over 92 percent (Figure 4). The 2016 SARA report also observed 100 percent completeness of reports between districts and the national level.

Figure 4. Completeness and timeliness of reports (results from RDQA)
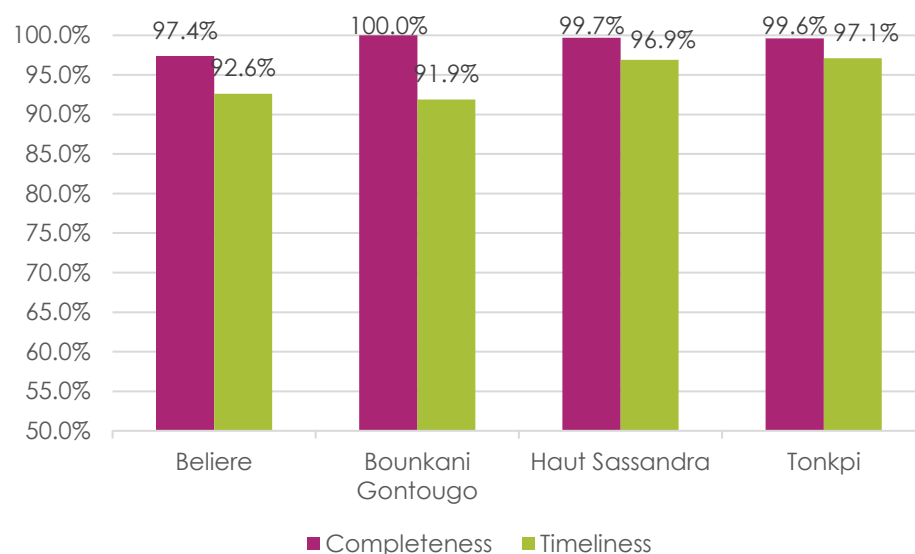
Source: 2016 SARA report

However, there were still areas that needed improvement, e.g., the accuracy of the data collected in the monthly activity reports at hospitals and primary care health facilities. The possible cause is the lack of data verification prior to transmission to the next level and lack of regular supervision and monitoring of data quality.

While data quality has shown improvement, evidence of data use from the PRISM assessments is more limited[4]. The two PRISM results indicate that there had been no change in the use of information at the facility level but data use increased from 44% to 70% at the district level (Table 4). The use of data at the regional and national (i.e. DIPE*)* level were not assessed in the 2008 PRISM, but in 2012, 50% of regions were using data and there was 100% data use at the DIPE.

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[4] Overall score for the use of information was calculated after a review of the minutes of meetings available according to the following criteria: discussions of the management of the RHIS (quality of data and report and timeliness of the report) and of the RHIS results (use of services, surveillance, service coverage, shortages of medications, etc.); decision making based on these discussions; and reference of questions or problems related to the RHIS at the regional or national level for actions to be taken.

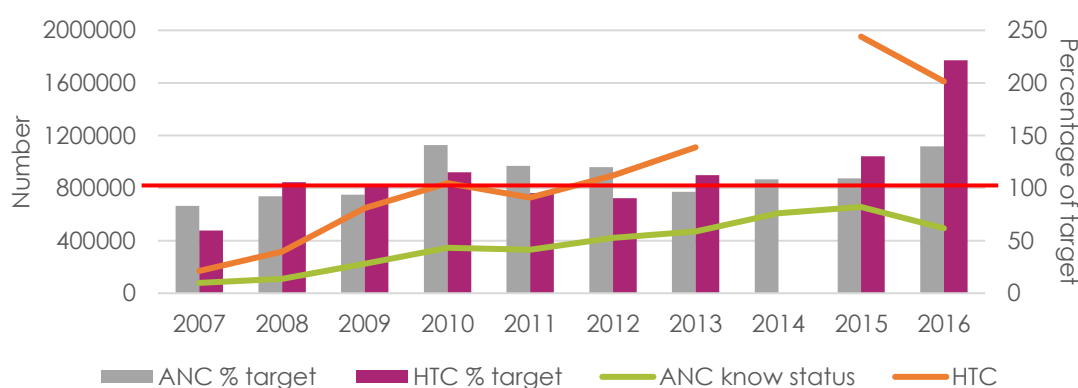**Table 4. Data analysis and use indicators, PRISM 2008–2012**

Data use indicators	Facilities		Districts		Region	DIPE
	2008	2012	2008	2012	2012	2012
Data analysis	30%	23%	51%	66%	82%	100%
Presentation of data	48%	29%	81%	66%	67%	NA
Promotion of information culture	17%	71%	70%	72%	74%	68%
Use of information	38%	38%	44%	70%	50%	100%

Source: 2012 PRISM

Other indicators that illustrate data use are the analysis of data and the presentation of data. The PRISM assessed what types of analyses each level was conducting and how often. Types of analysis include the following: calculating indicators by target areas, comparison of data to regional or national targets, and changes across time. The rate of data analysis decreased in facilities but went up at the district level (51% to 66%). Data presentation or information display went down at both the facility and district levels. But there was big change in the in the promotion of information culture at the facility level from 17 percent to 71 percent.

Changes in HIV Indicators

There have been great improvements in the number of people who have been tested, are in treatment, are retained in treatment, and have achieved viral suppression. There has been a steady increase in the number of pregnant women who know 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 over a 500 percent increase during this period (Figure 5). The number of individuals who received HIV testing and counseling (HTC) services for HIV and received their test results have also increased in a similar manner from 169,676 in 2007 to 1,611,345 in 2016.

**Figure 5. PEPFAR testing indicators, total numbers, and achievement of targets, 2007–2106**

Source: PEPFAR Côte d'Ivoire
https://data.pepfar.net/country/impact?country=Côte%20d%27Ivoire&indicatorGroup=HIV%20Prevention&year=2016

The achievement of set targets has fluctuated from 2007 to 2013, but the ANC and HTC targets have been exceeded in 2015 and 2016, with the over 200 percent of the target achieved for HTC in 2016. The achievement for ANC was below the target in the first few years, but after 2010, the target has been met or exceeded.

We can also look at changes in terms of coverage of these indicators. For example, Figure 6 shows increases in the percentage of pregnant women who attended ANC, were counseled, and were offered an HIV test for the years this data was available in the annual health reports. This proportion grew from 2009, when 68 percent of pregnant women had been counseled and offered an HIV test, to over 100 percent in 2016. There was also an increase in the percentage who received their results, from 82 percent in 2009 to 99 percent in 2016.

Figure 6. Percentage of pregnant women who were counseled and offered HIV test and percentage who received results
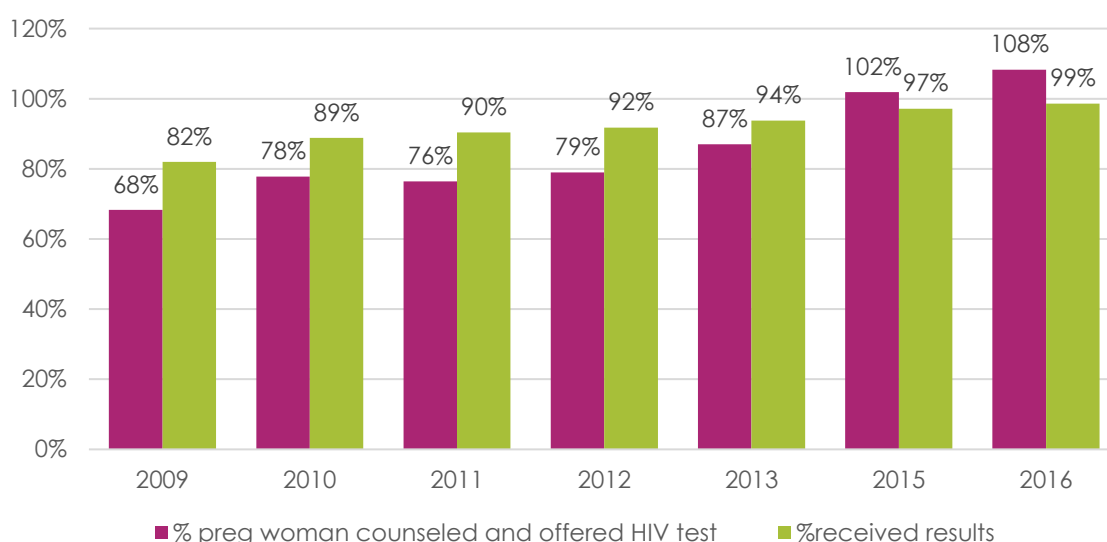
Source: Côte d'Ivoire Rapport Annuel sur la Situation Sanitaire 2009–2016.

The number of people who are currently on ART has also experienced a large increase in the review period. There were 34,874 currently on ART in 2007, and this number steadily increased until 2013, but then there was an increase from 94,989 to 129,993. There has been over a 400 percent increase in the number of people on ART between 2007 and 2016. This is while the number of people newly on ART has stayed roughly the same (20,731–29,573) between 2007 and 2015. This number increased to 45,255 in 2015. This indicates that more people are living longer while in treatment. The target for this indicator was not achieved in 2007–2009 or 2015, but in other years, the target was exceeded.

Figure 7. PEPFAR current on ART, total numbers and achievement of target, 2007–2016
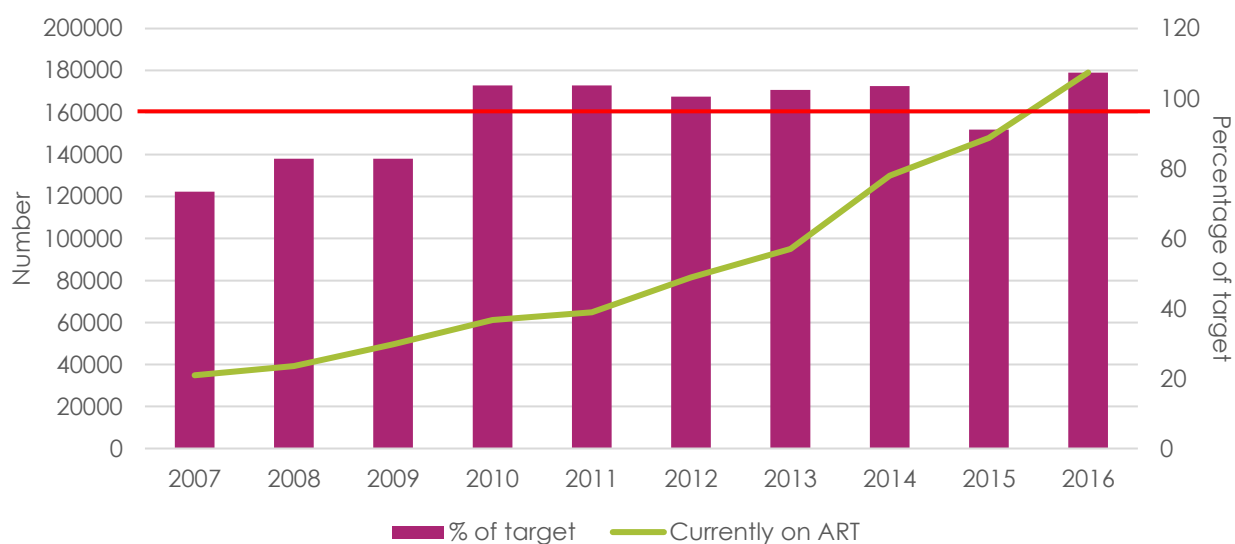
The number of PMTCT clients on ART are lower and there has been little change between 2007 and 2016. We can also look at the changes in the percentage of women who have tested positive who are on ART (Figure 8). There was little change in this population between 2011–2015, but then it increased to 21 percent in 2016. Some key interventions during this time may have contributed to this increase—for example, the HIV indicator and data collection validation workshops and a desk review report on Option B+ in Côte d'Ivoire.

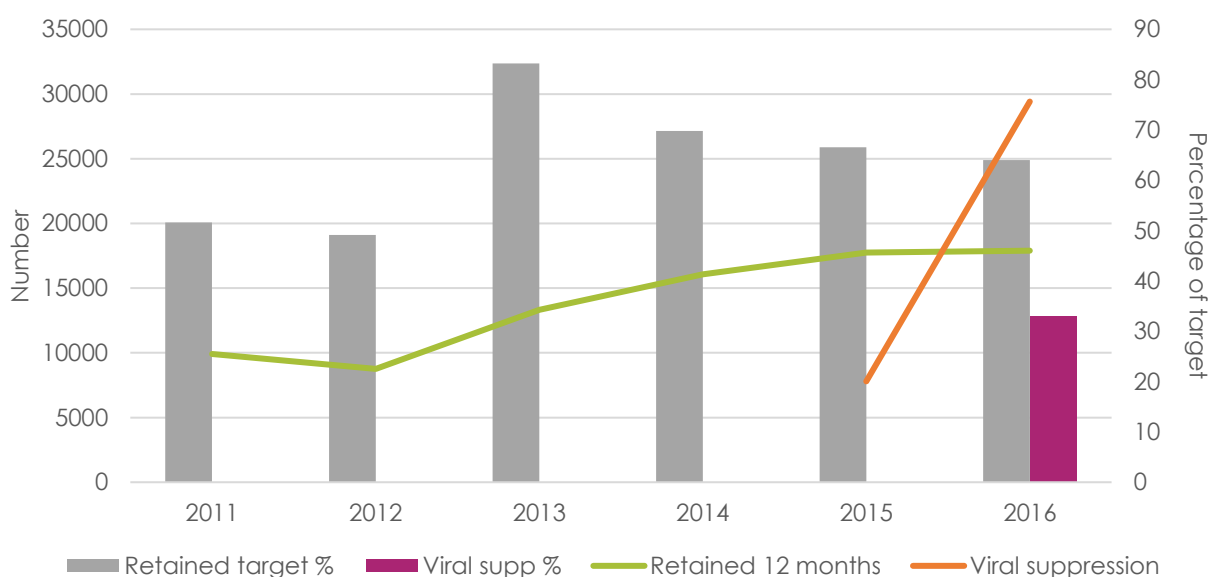**Figure 8. Percentage of HIV-positive women on ART**
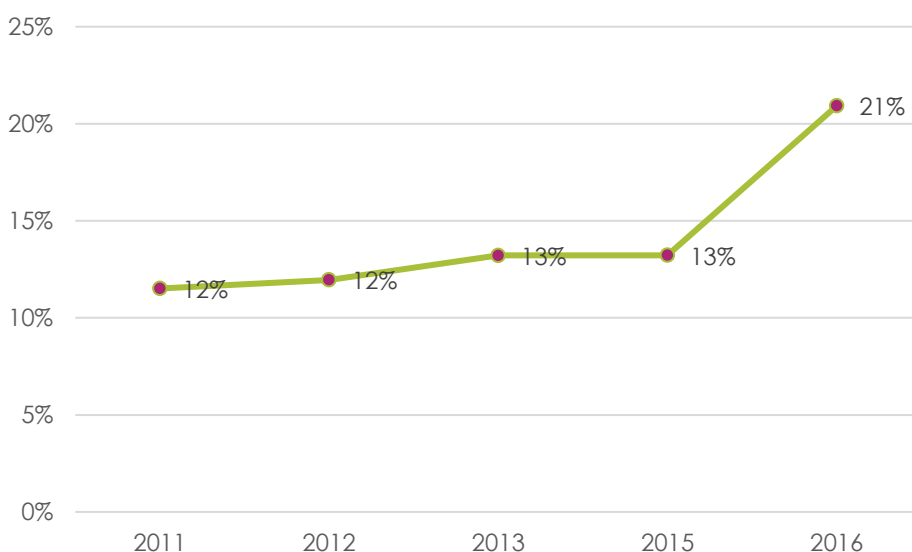
The final set of indicators are those concerning retention and viral suppression. There are years of data available for these indicators. Here we can see that since 2011, the overall trend is for the number of people retained in treatment for 12 months to increase, from 9,916 in 2011 to 17,894 in 2016. The target has not been achieved in any of the study years for retention with the highest achievement observed in 2013 (83%). Viral suppression has only been tracked since 2015 so there are only two data points, but the number of people increased from 7,796 to 29,418. There was no target in 2015, but in 2016, only one-third of the target for viral suppression had been met.

Figure 9. PEPFAR retention and viral suppression indicators, 2011–2016

Source: PEPFAR Côte d'Ivoire
https://data.pepfar.net/country/impact?country=Côte%20d%27Ivoire&indicatorGroup=HIV%20Prevention&year=2016

DISCUSSION

There has been significant investment in strengthening the HIS in Côte d'Ivoire as part of the larger effort to combat diseases like HIV between the years of 2008–2017. This is despite the second Ivorian Civil War in 2010–2011 and the west African Ebola epidemic in 2014 that diverted efforts to preventing the spread of Ebola from neighboring countries. These are important contextual factors that disrupted HIS interventions. Yet, many key achievements can be attributed to these efforts, such as the harmonization of HIV indicators, the uptake of electronic systems for various health system functions, and the improved capacity to maintain these systems and train staff to use these systems. MEASURE Evaluation, specifically, has supported the GOCI to improve the HMIS and HIV M&E systems. This support has led to an enhanced capacity among a wide range of health staff, particularly in the areas of data collection, quality control, and M&E leadership. These activities all aim to increase the sustainability of these interventions in the country.

This is also a period when the information needs at the HIV program and national level have grown immensely. The many USG implementing partners have been challenged with changing reporting requirements and data demands to show the success of programmatic investments year by year. The national information system was in development and was unable to meet these needs. This resulted in parallel data collection systems, even while the USG is supporting national HIS development and implementation. In the past five years, the emphasis on data use for decision making has dramatically increased, meaning that the HIS must be able to handle HIV data and consistently produce reliable, timely, and accurate data to demonstrate health outcomes for HIV patients. This tension between systems will be further explored in the qualitative interventions that are part of this evaluation.

In this period, there is also evidence of improved data quality, and it will be possible to assess if these improvements have been maintained or further improved once the results of the 2018 PRISM assessment are available. However, struggles with consistent data use continue below the national level. Capturing data use is a challenge, so there may be more use of data at all levels that is not being measured. The issue of data use will be explored in more detail in the qualitative interviews conducted as part of the larger evaluation.

In terms of HIV outcomes, there has been a decline in the overall HIV prevalence in the country. This change in overall prevalence is a product of the various efforts undertaken to control the HIV epidemic: HIV testing services, service delivery improvement, improving access to medications, and improving the HIS. The HIV data presented above are only available because of improvements in the HIS as well as programmatic or structural improvements. However, we have the data and can see what improvements have been made and what remains to be done. All of the various HIV investments together have contributed to positive changes in HIV outcomes.

CONCLUSION

Côte d'Ivoire has seen many improvements in its HIS and the coverage of its HIV interventions, which have resulted in the overall decrease of the HIV prevalence. But there are still many areas for improvement such as assuring the interoperability of the various systems, maintenance of data quality achievements, and evidence of data use at all levels of the health system.

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APPENDIX. EXAMPLES OF PEPFAR-FUNDED HIS ACTIVITIES

COP Year	Activity Mechanism	Partner	Description
2017	LABQUASY - Itech/University of Washington Cooperative Agreement(CoAg)	ITECH	Deploy and maintain OPEN Logistics Information System (OPENLIS) and OPENLIS Basic on ART sites
2016	Ministry of Health 2010 CoAg	Ministry of Health and Public Hygiene, Côte d'Ivoire	Reproduce paper-based data collection tools; Conduct supervision, assess performance of the RHIS, conduct data validation workshops, deploy paper-based and electronic tools and maintenance; Assess PMTCT program data quality for HIV surveillance among pregnant women in Côte d'Ivoire; Conduct Early Warning Indicators survey
2016	FHI360_ Surveillance and Program Evaluation	FHI 360	Conduct biological and behavioral survey among Key Populations, e.g. men who have sex with men, commercial sex workers
2016	PSI Côte d'Ivoire	Population Services International	Support Ministry of Sports and Recreation committee against AIDS (CSLS) and the military health system to improve their reporting through the use of the DHIS 2 MIS system.
2016	HIV Impact Assessment (HIA)	Columbia University Mailman School of Public Health	HIV Impact Assessment
2015	Ministry of Health 2010 CoAg	Ministry of Health and Public Hygiene, Côte d'Ivoire	Data quality audit for routine PMTCT data; ANC surveillance survey; HIV drug resistance surveillance; Pharmacovigilance activities; HIV sentinel survey among pregnant women and PMTCT routine Data Quality Audit survey; Early Warning Indicators survey; HIV incidence survey using DBS specimens from ANC
2015	University of Washington ITECH 2011 CoAg	University of Washington	Support the implementation of specific software for laboratory management and equipment management; Technical assistance for the deployment of OpenLIS
2015	University of Washington ITECH 2011 CoAg	University of Washington	Recruitment, deployment and retention at PEPFAR supported high impact sites;

2015	TBD- DOD-FRCI HIV	Population Services International	Biological and behavioral survey among military
2015	TBD- DOD-FRCI HIV	Population Services International	Quality improvement for HTC and data
2015	Measure Evaluation Phase IV	University of North Carolina at Chapel Hill, Carolina Population Center	Technical Assistance to support the rollout out of DHIS 2; Technical assistance for the implementation of a new EMR (SIGDEP2/OpenMRS); Technical Assistance for the implementation of eLMIS; Adapting and revision of existing paper-based and electronic data collection and reportingtools; Training of providers at sites on the new indicators and on updated data collection tools
2015	LINKAGES	FHI 360	Biological and behavioral survey and size estimation among key populations (MSM, CSW); ARV Treatment outcome study; OVC program outcomes evaluation
2013	Supply Chain Management System	Partnership for Supply Chain Management	Work with PEPFAR implementing partners and national entities to improve the quality of data collected on a routine basis in sites serving 80% of patients on ART.; Support quarterly supervision; improve the functionality of the SIGDEP electronic tool to provide reliable, timely ARV/lab logistics data; Assist with the integration of the MACS/SAGE warehouse information tool to improve the performance of the Public Health Pharmacy (PSP), especially in terms of warehouse management and distribution.
2013	Ministry of Health 2010 CoAg	Ministry of Health and Public Hygiene, Côte d'Ivoire	Continue building the capacities of the MSLS at the central and decentralized levels, with an emphasis on strengthening the management of strategic information for the health sector national response; Continue to focus on regional-level capacity to meet challenges and expectations for improved data management
2013	University of Washington ITECH 2011 CoAg	University of Washington	Ongoing support for OpenELIS maintenance, use, and enhancement at RETRO-CI and LNSP; continue development and installation of OpenELIS versions tailored to meet the data management needs of IPCI and the (CIRBA).
2012	Supply Chain Management System	Partnership for Supply Chain Management	Work with PEPFAR implementing partners and national entities to improve the quality of data collected on a routine basis in sites serving 80% of patients on ART.

2012	Ministry of Health 2010 CoAg	Ministry of Health and Public Hygiene, Côte d'Ivoire	Continue building the capacities of the MSLS at the central and decentralized levels, with an emphasis on strengthening the management of strategic information for the health sector national response.
2012	Supporting Local Organizations to Implement & Expand ComprehensiveHIV/AIDS Prevention, care, and Treatment in the Republic of Côte d'Ivoire under the President's Emergency Plan for AIDS Relief (PEPFAR)/ACONDA CDC 2011	ACONDA	Build structural and operational capacity of health districts, in close collaboration with regional health boards, to further develop skills of the health workforce and improve the quality of service delivery; Take a systematic approach to health systems strengthening (HSS), addressing six essential areas of the health system framework as recommended by the WHO (Human resources, service delivery, leadership and good governance, health system financing, HIS, technology)
2012	University of Washington ITECH 2011 CoAg	University of Washington	Ongoing support for OpenELIS maintenance, use, and enhancement at RETRO-CI and LNSP; continue to develop and install OpenELIS versions tailored to meet the data management needs of IPCI and the (CIRBA)
2010	University of Washington I-TECH	University of Washington	Support continued development and implementation by the International Training and Education Center on HIV (I-TECH) of an open-source laboratory information system at CDC/Projet Retro-CI and two other national laboratories in Côte d'Ivoire; deploy OpenELIS at the LNSP and Institut Pasteur
2010	CoAg Ministry of AIDS #U62/CCU024313	Ministry of AIDS, Côte d'Ivoire	Support the MLS to continue and strengthen its coordination of the national response to HIV/AIDS. Develop of a new National HIV/AIDS Strategic Plan 2010-2013, a Partnership Framework with the U.S. government, and coordinate National HIV Testing Day.
2010	TBD (SIGVIH)	TBD	Provide technical assistance to: assist electronic patient-monitoring system stakeholders; ensure the technical governance and maintenance of the electronic patient-monitoring system; provide follow-up training of local data managers; continue to monitor data quality through direct supervision and cross-matching of data; produce and submit publications to peer-reviewed journals

Year	Program	Organization	Description
2009	ACONDA CoAg	ACONDA	Make data-management system available to all the health centers and add HIV/AIDS activities; provide computers, other equipment, and training to new sites; Strengthen monitoring activities at all ART sites by providing refresher training and monthly supervision; Train 300 individuals in strategic information and provide 34 local organizations with technical assistance for strategic- information activities
2009	International Center for AIDS, Care and Treatment Program (ICAP)	Columbia University	Continue to support routine data collection, management, use, and transmission at the site level; promote integration, analysis, use, and reporting of data at the country headquarters level; participate in the building and strengthening of a national monitoring and evaluation system
2009	EGPAF Rapid Expansion (country supp)	Elizabeth Glaser Pediatric AIDS Foundation	Continue to participate in adapting country data-collection tools; provide ongoing technical support and training to data managers and data clerks; train EGPAF multidisciplinary care teams on how to use program data to assess the quality of care at their sites; provide quarterly, semi-annual and annual program results and ad hoc data sets as requested by the USG team
2009	CDC-RETRO-CI GHAI	US Centers for Disease Control and Prevention	Support the building and strengthening of one national M&E system and the conversion of data to useful information through the three components of strategic information — monitoring and evaluation, health management information systems, and surveillance.
2008	EGPAF Rapid Expansion (country supp)	Elizabeth Glaser Pediatric AIDS Foundation	Collaborate with partners to provide ongoing technical support and training to data clerks; participate in adapting country data-collection tools (paper and electronic); train EGPAF multidisciplinary care teams on how to use program data to assess the quality of care; provide semi-annual and annual program results and ad hoc data sets as requested; participate in quarterly SI meetings organized by the USG strategic information branch and implement decisions made during these meetings

2008	MOH- CoAg #U2G PS000632- 01	Ministry of Health, Côte d'Ivoire	Set up a nationwide longitudinal HIV-positive patient-monitoring system using an adapted version of the electronic system currently used by ACONDA; assure reliability and validity of data collection by developing and executing a data-quality improvement plan with technical assistance from external contractors and in close collaboration with district data managers; work with the PNPEC and other partners toward the use of unique patient identifiers as a way of following patients; reproduce and disseminate self-evaluation tools (for CT, PMTCT, and adult and pediatric ART) at 16 CT sites, eight PMTCT sites, and six treatment sites, in preparation for an evaluation exercise;
2008	CoAg Ministry of AIDS #U62/CCU024313	Ministry of AIDS, Côte d'Ivoire	Identify cross-sectoral M&E training needs of all institutions involved in HIV/AIDS data collection; implement trainings based on this assessment of training needs; collaborate with other ministries, the private sector, and community partners to identify structures and define mechanisms outside the MLS to collect HIV/AIDS data and send it to the central level; reinforce the capacity of these structures to collect HIV/AIDS data and send to the central level in support of the national M&E plan; elaborate, validate, and disseminate the 2008 National HIV/AIDS Report; implement a population-based survey in collaboration with the MOH and Project RETRO-CI.
2008	International Center for AIDS, Care and Treatment Program (ICAP)	Columbia University	Fund activities to support M&E data collection, management, use, and transmission at the site level as well as data integration, analysis, use, and reporting at the country headquarters level. The M&E country team will participate in the building and strengthening of a unified national M&E system

2007	ACONDA CoAg	ACONDA	Expand use of data management system to 10 district hospitals in which ACONDA will add HIV/AIDS activities. Strengthen monitoring activities at its existing 38 ART sites by providing refresher training and monthly supervision. In total, train 480 people in strategic information and provide 48 local organizations with technical assistance for strategic-information activities. Design or modify other management tools for data recording, data transfer, electronic recording and process, and report editing; Provide support to district teams using data management tools; technical support for data analysis; train team on better data management; hold quarterly workshop to discuss practical issues on the field and appropriate solutions
2007	EGPAF Rapid Expansion (country supp)	Elizabeth Glaser Pediatric AIDS Foundation	Collaborate with MOH, JHPIEGO, and Measure Evaluation/JSI, to address weaknesses within M&E and data management (identified in the FY2006) through technical and logistic support.
2007	CoAg Ministry of AIDS #U62/CCU024313	Ministry of AIDS, Côte d'Ivoire	M&E Plan and Capacity Building: evaluate the implementation of functional M&E units in 13 administrative regions of the country under government control; evaluate the implementation of the telecommunications system; maintain existing communications systems; reproduce and disseminate data-collection tools and other support materials;
2007	MOH- CoAg #U2G PS000632-01	Ministry of Health and Population, Côte d'Ivoire	Planning: finalize consolidated 3-year national plan for HIV/AIDS activities; develop decentralized plan for HIV prevention, care and treatment services; provide TA to decentralized authorities in 10 districts Coordination: support the development of a GIS map of clinical HIV/AIDS prevention, care and treatment interventions; establish central database to track financial inputs from all sources for HIV/AIDS activities in the health sector
2007	CDC-RETRO-CI GHAI	US Centers for Disease Control and Prevention	Provide concrete technical support for collecting, managing, analyzing, and disseminating strategic information for the National HIV/AIDS Program; coordinate activities to reduce duplication of work and facilitate integration of data into a national health GIS system that will be used for strategic decision making; evaluate ARV primary resistance.

| 2007 | CoAg PS000633-01 Alliance National CI Expansion of Community-Led | Alliance Nationale Contre le SIDA | Technical assistance partner to provide ongoing support to build the capacity of the ANS-CI and mobilize additional resources. The target for the number of local organization provided with technical assistance for strategic information services is 66 and the number of individual trained in strategic information (including M&E, surveillance and/or HMIS) is 175. Continue to strengthen the national response in M&E activities at community level in collaboration with national authorities, EP partners and other stakeholders. disseminate materials and relevant training tool kits and support the database of VCT activities to expand M&E capabilities at the community level through regular supervision of the selected 66 institutions. |