Data.FI Annual Performance Report 2020

October 2019–September 2020

PEPFAR

USAID
FROM THE AMERICAN PEOPLE

Data.FI
Data for Implementation

Data.FI Annual Performance Report (APR) 2020

USAID Agreement Number	7200AA19CA00004
Location	Washington, DC
Title	Translating Data for Implementation (Data.FI)
Name of Agreement Officer	Adrienne Shade
Name of USAID Agreement Officer's Representative	Emily Harris
Date of Award	April 15, 2019
Activity End Date	April 14, 2024
Ceiling Price	$184,984,745

October 30, 2020

This Annual Performance Report was developed by Data.FI's Monitoring, Evaluation, and Learning (MEL) unit and Data.FI's Communications/Knowledge Management team, in collaboration with activity leads and field staff who reported on progress and generously shared their insights, ideas, and photos.

Cover photo: Miss Ake Laurence and Mr. Kotchi Amonchi Angenor, standing, perform group work during a training of trainers on the use of upgraded OVC and DREAMS databases in Côte d'Ivoire. Photo by Data.FI/Côte d'Ivoire

Data for Implementation (Data.FI) is a five-year cooperative agreement funded by the U.S. President's Emergency Plan for AIDS Relief through the U.S. Agency for International Development under Agreement No. 7200AA19CA0004, beginning April 15, 2019. It is implemented by Palladium, in partnership with JSI Research & Training Institute (JSI), Johns Hopkins University (JHU) Department of Epidemiology, Right to Care (RTC), Cooper/Smith, IMC Worldwide, Jembi Health Systems, and Macro-Eyes, and supported by expert local resource partners.

Table of Contents

Abbreviations

AGYW	adolescent girls and young women
AI	artificial intelligence
APPR	Automated Partner Performance Reporting
ART	antiretroviral treatment
BI	business intelligence
CDC	U.S. Centers for Disease Control and Prevention
CII	Center for Innovation and Impact
CoP	community of practice
Data.FI	Data for Implementation Project
DATIM	Data for Accountability, Transparency and Impact Monitoring
DHIS2	District Health Information Software, Version 2
DREAMS	Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe
DQS	data quality scores
DSNIS	Direction du Système National d'Information Sanitaire (Department of the National Health Information System, Burundi)
ECR	Epidemic Control Room
EGPAF	Elizabeth Glaser Pediatric AIDS Foundation
EMR	electronic medical records
FMWASD	Federal Ministry of Women-Affairs & Social Development
GBV	gender-based violence
HIS	health information system(s)
HRH	human resources for health
IPs	implementing partners
LAMIS	Lafiya Management Information System
LAMISPlus	Lafiya Management Information System Plus

LIMS	Laboratory Information Management System
LP	local partner
M&E	monitoring and evaluation
MER	monitoring, evaluation and reporting
MIS	management information system
ML	machine learning
MOH	Ministry of Health
NASA	National Aeronautics and Space Administration
NDOH	National Department of Health
NDR	National Data Repository
OHA	Office of HIV/AIDS
OVC	orphans and vulnerable children
PEPFAR	United States President's Emergency Plan for AIDS Relief
PrEP	pre-exposure prophylaxis
QePMS	Quantum Electronic Patient Monitoring System
SDLC	software development lifecycle
SI	strategic information
TB	tuberculosis
TWG	technical working group
UID	unique ID
UNAIDS	Joint United Nations Programme on HIV/AIDS
USAID	United States Agency for International Development

Executive Summary

Data.FI is a global project that helps countries strengthen and sustain access to key, high-quality data to accelerate and maintain HIV and COVID-19 epidemic control. We provide **end-to-end solutions in the data ecosystem** that serve public health goals and protect clients' privacy—from streamlining information needs, to building **sustainable and scalable data systems** that support continuity of client care and robust analysis. We provide **rapid insight for decision making** and employ evidence-based approaches to ensuring that data are used to inform meaningful change and save lives. We **strengthen government capacity** for health information system (HIS) governance and **build local partner capabilities** in line with the United States Agency for International Development's (USAID's) Journey to Self-Reliance goals.

Data.FI is a five-year (2019–2024) global, field-supported mechanism with a $180 million ceiling. Data.FI, funded by the United States President's Emergency Plan for AIDS Relief through USAID, is implemented by a consortium of digital health and analytics organizations. It is led by Palladium, in partnership with the JSI Research & Training Institute, the Johns Hopkins University Department of Epidemiology, Right to Care, Cooper/Smith, IMC Worldwide, Jembi Health Systems, and macro-eyes.

During this reporting period (October 1, 2019–September 30, 2020), and with an operational budget of $19,987,362,[1] Data.FI implemented work in 19 countries and provided support to the Office of HIV/AIDS (OHA). This report summarizes our work during Fiscal Year 2020.

Data.FI/Burundi provided technical support to a training in Gitega Province on DHIS2, organized by the Tubiteho project and attended by health district directors, shown here. Photo by Data.FI/Burundi.

[1] Note: There is $4,100,000 of COVID-19 funding that is subject to de-obligation, which will reduce our current operational budget to $15,887,362.

Catalyzing Innovation for Breakthrough Solutions

Data.FI is accelerating global health gains by catalyzing breakthrough solutions. We envision and create the opportunity for innovators to adapt and apply their solutions to the global health context, finding new ways to reach epidemic control through improved use of data.

Data.FI is harnessing the predictive power of **machine learning** (ML). In Mozambique and Nigeria, Data.FI built an ML model that predicted the likelihood that individual clients would experience a treatment interruption in the future. In South Africa Data.FI applied an ML client-matching model to unify 20 million client records and link them across data systems.

Data.FI launched an **innovation accelerator** in the early weeks of the COVID-19 pandemic. With USAID, we assessed hundreds of potential novel data sources and prioritized solutions with the potential to transform the pandemic response.

Accelerating Data Use

Data.FI ensures that the end-user is at the forefront in all that we do, and that information systems, data analyses, decision-support tools, and data review interventions are laser-focused on HIV impact.

Data.FI refined and institutionalized the **Epidemic Control Room** (ECR) model in Nigeria that marries technology-driven data analytics and visualizations with focused, programmatic decision making with key stakeholders. We also rapidly launched daily COVID-19 Emergency Operations Center (EOC) meetings (holding 180 in just four months), and modelled supply requirements in eight states. We applied our experiences from Nigeria to five West African countries where we rolled out an enhanced data review meeting method, including training and standardized analyses and visualizations.

Data.FI developed a **human resources for health** (HRH) data capture, analytics, and visualization solution that will help PEPFAR teams strategically allocate HRH to achieve program targets.

Data.FI partner, Fraym, applied ML and spatial interpolation techniques to generate hyper-local risk maps and estimates of the population size of vulnerable adolescent girls and young women (AGYW), in Uganda, Tanzania, Haiti, and eSwatini in support of DREAMS (Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe) programming.

Optimizing and Scaling Health Information Systems

Data.FI optimizes HIS to track clients across the 95-95-95 continuum, improve continuity of care, and generate data for epidemic and program performance monitoring, following software development lifecycle (SDLC) best practices.

In South Africa, Data.FI is supporting the government to implement a **national HIV data warehousing architecture**. InfoHub ingests, standardizes, matches, transforms, and models data from multiple siloed systems to produce meaningful analytics.

In Nigeria we are leading a cross-partner community of practice to optimize LAMISPlus—an enhanced and **interoperable open-source HIV electronic medical record (EMR) system** that ensures alignment across testing, treatment, laboratory, pharmacy, and commodity information systems and links to the National Data Repository (NDR). We are also supporting scale-up of existing EMRs in Namibia and Malawi. To improve client tracking, Data.FI is working with government, USAID, and partners to develop online versions of EMR instances for SIDAInfo (Burundi) and SIGDEP (Côte d'Ivoire).

We are building and refining **orphans and vulnerable children (OVC) and DREAMS case management systems**. In Zimbabwe we are putting in place the first-ever harmonized case management information system (MIS) across six implementing partners (IPs).

Improving Data Sources

Data.FI collaborates with USAID partners to establish gold standard data quality and data management practices and supports IPs to responsibly store and use client data to avoid breaches of sensitive information.

Through work in Nigeria and West Africa, Data.FI developed and deployed a **data quality composite score** method and tool that aggregates data to calculate completeness, coherence, and consistency. We designed the tool to rapidly and routinely evaluate data, to inform decisions on where to target site-level data quality assessments. We were able to demonstrate improved data quality among all partners supported.

Data.FI improved accountability by developing, refining, and **standardizing reporting indicators**. We worked with the global USAID/PEPFAR projects and USAID to produce 38 custom HIV indicators. We also improved the collection of supplemental data for DREAMS, led the development of 30 original COVID-19 indicators, and are working on a standardized suite of data collection tools for USAID's COVID-19 pandemic response.

To protect those we serve, we implemented an internal **Data Management Maturity Model** and deployed a **benefits and risks assessment method** to ensure our digital solutions safely handle client data.

Strengthening Local Partners

In line with USAID's Journey to Self-Reliance, Data.FI strengthens host country government capacity to develop and maintain sustainable information systems and ensure that local partners are able to contribute to a functioning and country-led HIS.

Data.FI, together with USAID's OHA, created and rolled out the **PEPFAR Strategic Information Capacity Assessment Tool** (PSICA) to assess the strategic information capacity of local partners. Eight partners in six countries completed the self-assessment tool. The findings from the assessment will be used to package recommended interventions for capacity strengthening of local partners in strategic information.

Data.FI is **strengthening local leadership**. In Burundi, Data.FI worked with the government to implement their vision for an optimized, scaled, sustainable, government-led HIS, including providing support for the country's eHealth strategy. In South Africa, we worked with the government to understand information needs and budget and staffing limitations to enable them to select a sustainable solution business intelligence platform for integration in the national InfoHub.

Impact at the Systems Level

Data.FI worked in 19 countries in this reporting period to improve HIV outcomes. The map below outlines major achievements across our field-supported programs.

NIGERIA

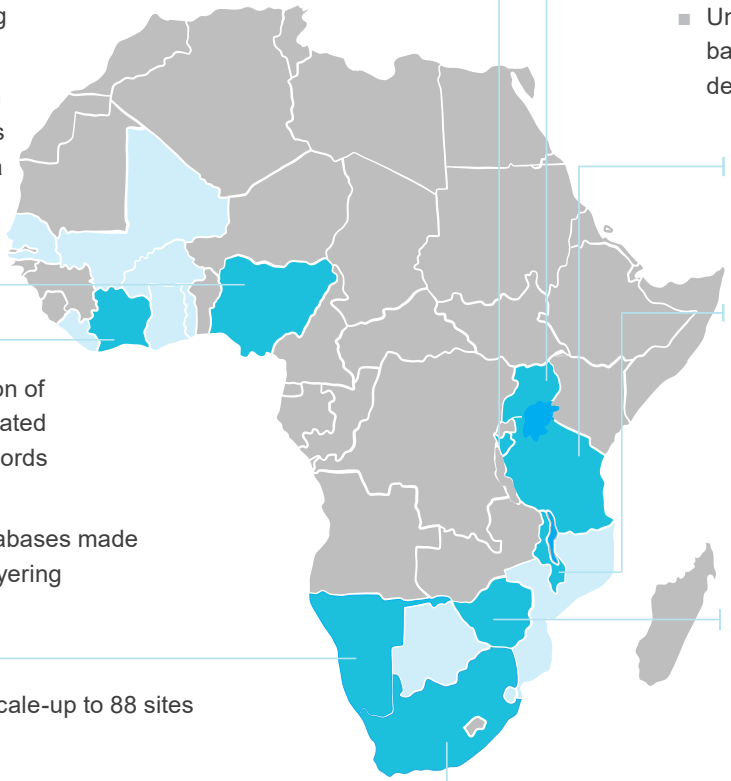
- Documented improvements across the clinical cascade with implementation of ECR methods
- EMR optimization conducted collaboratively, including LIMS-EMR integration
- Improved data quality in two information systems following uptake of Data Quality Scores

BURUNDI

- DATIM, DHIS2, and EMR made interoperable
- EMR optimization for better tracking of clients across sites

UGANDA

- OVC and AGYW size estimations provided—methods transferred to eSwatini, Haiti, Mozambique, Tanzania
- Unique ID for key populations based on "privacy protection by design" developed and rolling out



TANZANIA

- AGYW size estimation and vulnerability assessment

MALAWI

- EMR utilization improved; USAID IPs are entering data into system, more actively engaged and working with CDC HIS partner

COTE D'IVOIRE

- Developed server version of EMR allowing for automated transfer of individual records across sites
- OVC and DREAMS databases made interoperable to track layering

ZIMBABWE

- OVC and DREAMS partner data collection forms harmonized as first step in developing integrated MIS to track layering

NAMIBIA

- EMR assessment and scale-up to 88 sites in 3 new regions

SOUTH AFRICA

- Data analytic framework and use cases developed to align with InfoHub vision
- Machine learning, client-record deduplication solution deployed for NDOH across 20M records

*Countries receiving Data.FI support through HOP funds are in light blue.

Introduction

Data.FI is a global project that helps countries strengthen and sustain access to key, high-quality data to accelerate and maintain HIV and COVID-19 epidemic control. We work across all population groups and intervention areas to identify clients at risk and link them to testing, prevention, and treatment services. To do this, we leverage expertise in program implementation, measurement, digital health, data science, and data use, to help USAID and partners ask better questions, look at unsolved problems in new ways, and pivot programming to reach epidemic control faster.

What does this look like in operation? Through our experienced partnership, we provide **end-to-end solutions in the data ecosystem that serve public health goals and protect clients' privacy**—from streamlining information needs, to building sustainable and scalable data systems that support continuity of client care and robust analysis. Data.FI works across all technology platforms, aligning our interventions to each country's unique data and information system landscape. We create tools, policies, and procedures for partners who collect and manage data, offering an overarching vision of how data should and can be used responsibly.

We provide **rapid insight for decision making**, using both efficient and advanced analytics. We help the United States Agency for International Development (USAID) and partners diagnose performance and public health challenges to best focus resources. We combine traditional President's Emergency Plan for AIDS Relief (PEPFAR) data with non-traditional data sources, such as satellite imagery and commercial data, to fill data gaps

Data.FI's senior technical advisor mentors Partners in Hope and MOH data managers on data cleaning, reporting, and data use at the Chitipa District Hospital in northern Malawi. Photo by Data.FI/Malawi

and inform interventions. We apply advanced modelling techniques to enhance our understanding, empowering users with the information they need.

We develop and employ **evidence-based approaches to ensuring that data are used** to inform meaningful change and save lives. This begins with defining an analytical framework for decision making, and includes aligning data needs and employing measurement tools. We work with USAID and partners to improve data sources, hone analytical skills, and catalyze program pivots.

We **strengthen government capacity** for health information system (HIS) governance and **build local partner capabilities** in line with USAID's local partner (LP) transition goals. Data.FI leverages our existing network of in-country relationships to build government trust, coordinate stakeholders, and expand the pool of LPs able to respond to the HIV and COVID-19 pandemics.

PROJECT SCALE

Data.FI is a five-year global project (2019–2024) funded by PEPFAR and USAID. Data.FI is a consortium of organizations with expertise in digital health and analytics. It is led by Palladium, in partnership with the JSI Research & Training Institute, the Johns Hopkins University Department of Epidemiology, Right to Care, Cooper/Smith, IMC Worldwide, Jembi Health Systems, and macro-eyes. The project is a USAID field-supported mechanism, with a $180 million ceiling.

During this reporting period (October 1, 2019–September 30, 2020), Data.FI implemented work in Botswana, Burundi, Côte d'Ivoire, eSwatini, Haiti, Malawi, Mozambique, Namibia, Nigeria, South Africa, Tanzania, Uganda, West Africa (Burkina Faso, Ghana, Liberia, Mali, Senegal, Togo), and Zimbabwe and had an operational budget of $19,987,362.[2] The project made important progress enhancing digital health systems, supporting data analytics that pinpoint inefficiencies in HIV care and treatment cascades, developing data standards and structures to ensure quality in electronic medical records (EMR), and supporting LPs to use data for decision making. This report summarizes our work to date.

REPORT STRUCTURE

We present our achievements over the past year by highlighting our work across the following impact areas:

- **Catalyzing Innovation for Breakthrough Solutions**
- **Accelerating Data Use**
- **Optimizing and Scaling Health Information Systems**
- **Improving Data Sources**
- **Strengthening Local Partners**

An update on the implementation of the project's gender strategy is also provided. A Financial Summary, Workplan Status Update, Project Indicator Results, Process Indicators, and a list of Data.FI Products are provided in appendices.

[2] Note: There is $4,100,000 of COVID-19 funding that is subject to de-obligation, which will reduce our current operational budget to $15,887,362.

DATA.FI IMPACT AREA

Catalyzing Innovation for Breakthrough Solutions

Today, the world is on the cusp of a digital transformation that is fundamentally altering the structure of our society—the way we live, work, and relate to one another is evolving at an unprecedented pace, accelerated by the recent COVID-19 pandemic. With the expansion of commercial applications of artificial intelligence (AI), the widespread availability of larger and larger amounts of data, and more affordable and available computational power and electronic storage capacity, untapped opportunities exist to accelerate the global HIV response and achieve the Joint United Nations Programme on HIV/AIDS (UNAIDS) 95-95-95 goals by 2030.[3]

The new insights and predictive power of novel machine learning (ML) techniques and non-traditional data sources have the potential to provide the means to overcome the limitations of current data sources and methods. Elements of the ongoing "data revolution" can illuminate blind spots—areas where routine and survey data cannot answer the

Image adapted from a photo of a woman with an infant in Mali by Curt Carnemark, World Bank, courtesy of Flickr Creative Commons

[3] UNAIDS. (2014). Fast Track: Ending the AIDS Epidemic by 2030. Geneva, Switzerland: UNAIDS. Retrieved from https://www.unaids.org/en/resources/documents/2014/JC2686_WAD2014report

most urgent questions. For example, clients who are likely to interrupt antiretroviral treatment (ART) can be predicted before they miss an appointment; ML-enhanced hyperlocal maps can be created that facilitate improved reach to at-risk AGYW; and data from social media sites and Internet search engines can be accessed and analyzed to predict future infectious disease outbreaks. Data.FI leverages thought leadership and cutting-edge technologies across our extraordinary consortium of partners to create and source novel solutions to USAID's challenges and break through the barriers that impede countries from achieving epidemic control.

STRENGTHENING CONTINUITY OF CARE

Data.FI is using machine learning to strengthen continuity of care.

Governments, donors, and implementing partners (IPs) devote significant resources to finding HIV clients who may be experiencing treatment interruptions and returning them to treatment. Such activities may divert resources from other needs. *What if we could predict the specific clients who are likely to interrupt treatment and prevent it from occurring? What if we could link client records across health facilities and ART dispensing systems to know with better certainty whether a client that appears to have stopped treatment, has stopped treatment—or whether they have continued treatment at a different facility?*

In Mozambique and Nigeria, Data.FI applied a **machine learning model** to predict interruptions in treatment using de-identified electronic medical records (EMR) data, combined with AI-enhanced satellite imagery and other publicly available data. In Mozambique, the model showed predictive power by identifying which clients were at greatest risk of interruptions in treatment compared with historical client outcomes. We were able to derive the importance of each feature in the model's predictions. A client's past behavior, including timeliness of attendance at past appointments and clinical history (e.g., past laboratory results), were the two most important categories of variables for the model's predictions. These types of insights can be used by service delivery partners to focus resources to retain clients who are more likely to drop out of treatment, moving countries closer to achieving the second HIV 95-95-95 goal.

> **"As a local partner, the idea of machine learning that cannot just predict but also establish new algorithms that may learn from the results of its recommendations for how to intervene to promote client retention, could be a game-changer in the near future."**
>
> —Julio Pacca | Chief of Party – ECHO Project

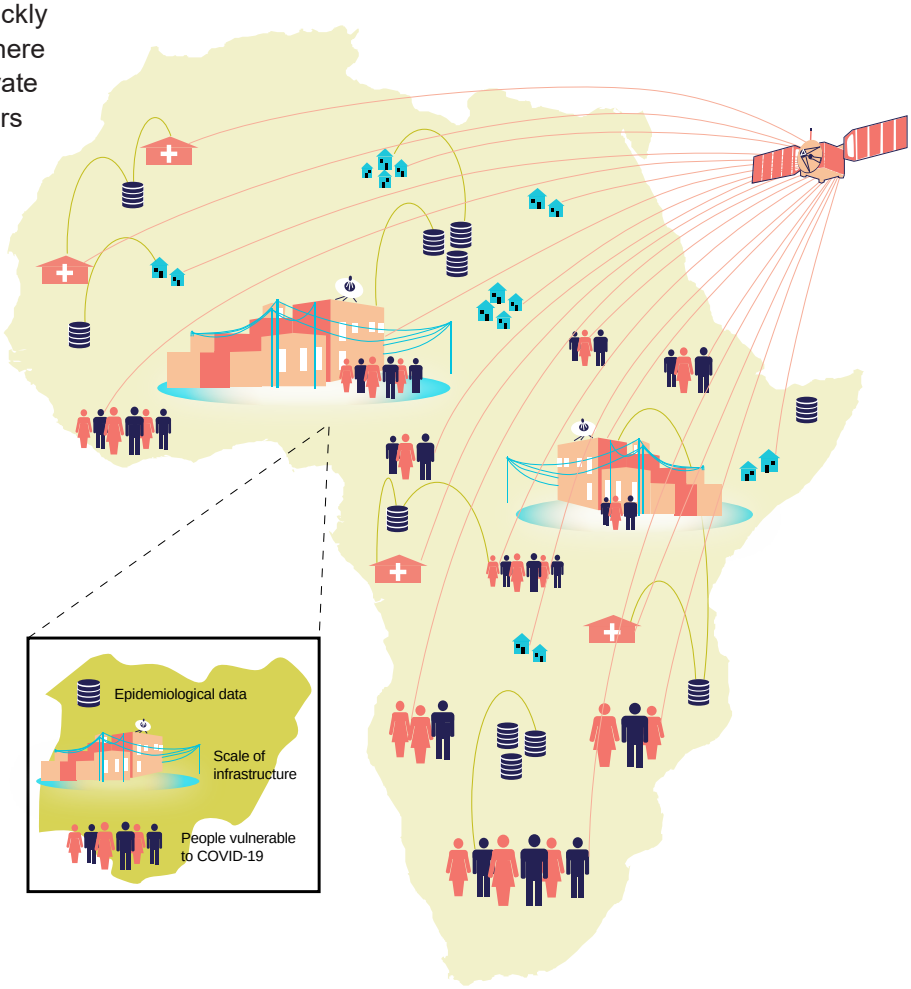
In South Africa, Data.FI is supporting the National Department of Health (NDOH) to implement a national HIV data warehouse solution called the InfoHub. Initially supported through the Digital Square project, the InfoHub presents an unprecedented opportunity to understand and respond to the world's largest HIV epidemic through advanced analytics based on linked and longitudinal client records. Building on this work, Data.FI collaborated with the NDOH to finalize and deploy a supervised **machine learning-based patient matching model**. The model first identified duplicate clients among over 20 million client records in the national tuberculosis (TB)/HIV information system and established a mechanism for other client records ingested in InfoHub to be analyzed and unified. This work results in more complete and accurate clients records and gives health facility staff a better picture of true loss to follow-up (LTFU). It also allows for client records to be augmented with additional data from other systems, such as those capturing viral load test results or differentiated care options for decentralized drug collection—data which are intended for ingestion in the InfoHub in Fiscal Year 2021.

FAST-TRACKING INNOVATION

Data.FI is fast-tracking innovation that can scale to improve health outcomes.

Data.FI uses data sources and techniques that are innovative in our field. We apply deep learning to satellite imagery to generate contextual variables that reflect the infrastructural and socio-economic context in which a client lives or a facility operates.

The rapid spread of COVID-19 and the unpredictability of the virus are challenging the global health community's ability to quickly respond to outbreaks and to predict where severe outbreaks will happen. The private sector and other non-traditional partners have innovative, ready-to-deploy methods and new data sources that can be rapidly scaled up to address information gaps in public health.



Together with USAID, Data.FI assessed approximately 300 analytic data sources and methods collected from Data.FI partners and IMC Worldwide's UKAid-funded COVIDaction[4] platform to identify high-impact and easy-to-use innovative approaches that could be applied to inform decision making on COVID-19. These innovations were selected based on information needs identified by USAID to guide the pandemic response.

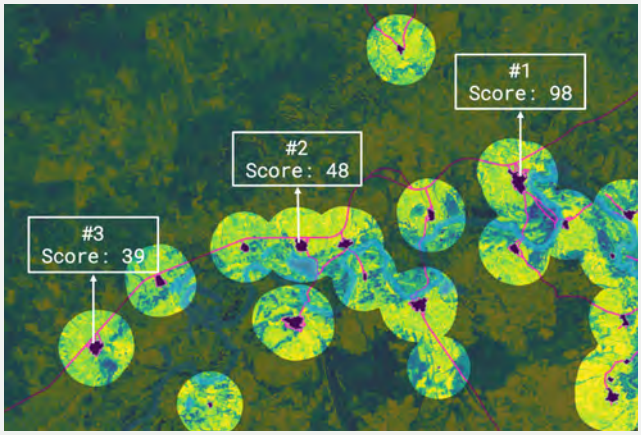
From among the hundreds of analytic products, Data.FI recommended five to a USAID/Data.FI Technical Expert Committee that the committee subsequently endorsed. The five included a simulation tool to interface with 135 country-level epidemiological models generated and updated regularly by the Imperial College London, and a geospatial product that identifies populations underserved by current health infrastructure, by triangulating population data, health facility locations, satellite imagery, and National Aeronautics and Space Administration (NASA) night light data. These **hyperlocal geospatial data sources and epidemiological models** provide unparalleled insight on underserved and vulnerable populations in low- and middle-income countries.

[4] COVIDaction is run by the Foreign Commonwealth Development Office-funded Frontier Technology Hub. (The FCDO was formerly named DFID.) The Frontier Technology Hub itself is made up of IMC Worldwide, Results for Development, and Brink, and is supported by University College London's Institute of Healthcare Engineering.

CLOSER LOOK

COVID-19 Innovations

Data.FI partners are repurposing commercial technology applications—such as hyperlocal mapping techniques used by the fast-food industry to locate new franchises—to the pandemic response. Examples of Data.FI's COVID-19 innovation accelerator include:

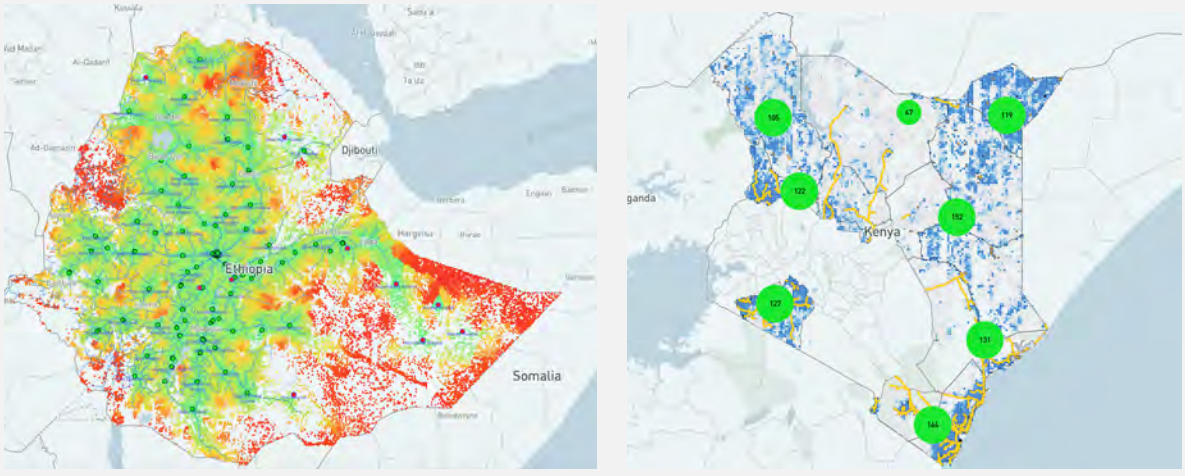


This layered image from TFE Energy is based on electricity data gleaned from satellite imagery, population density, and transportation data; images like this can be used to prioritize locations for investment to enhance health services for underserved populations.

TFE Energy creates hyperlocal maps with information on population density, satellite observation of earth, and night light imagery from NASA to map populations, infrastructure, and the electrical grid. Powered with this information, USAID can identify areas underserved by current health infrastructure in a country and determine where ministries of health (MOHs) can invest in off-grid cold storage facilities in preparation for the distribution of a COVID-19 vaccine.

Surgo Foundation offers a machine-learned COVID-19 vulnerability index: the Africa COVID-19 Community Vulnerability Index. The foundation developed subnational vulnerability metrics along seven themes identified by the U.S. Centers for Disease Control and Prevention (CDC) found to be associated with the risk for spread of COVID-19. When USAID identifies an emerging hotspot, the Surgo index can pinpoint which parts of the country face what types of risk—critical information that can help guide the response.

Fraym: Fraym's team of data scientists acquires georeferenced household surveys, satellite imagery, and remotely sensed data, and harmonizes the data by validating, cleaning, and geospatially enabling them. Fraym provides decision makers with hyperlocal profiles of five of the seven vulnerability themes of Surgo's Africa COVID-19 Community Vulnerability Index, allowing the more precise identification of potential hotspots, secondary impacts, infrastructure gaps, and communications mechanisms.



Left: Layered map by TFE Energy illustrating population by travel time to nearest health facility in Ethiopia; At right: A layered map by TFE illustrating socio-economic vulnerability in Kenya

DATA.FI IMPACT AREA

Accelerating Data Use

USAID missions need frequent and high-quality data to monitor global health investments on a continuous basis for accountability and oversight, and to plan and manage programs and partners. Governments and health program managers need data to measure progress against targets, rapidly course-correct if programs are underperforming, and determine whether they are addressing the most urgent needs of people affected by HIV and COVID-19. Yet, all programs face challenges in synthesizing, integrating, and interpreting the sheer volume of data available from multiple sources, including from facilities, laboratory, dispensing, and supply chain systems.

Data.FI helps PEPFAR and local governments improve their ability to glean insights based on data for a range of HIV services, synthesize data across multiple sources, and access decision-support tools and dashboard visualizations to inform action. We are also putting in place processes and systems for continuous data review, and training staff in them so that they can proactively address challenges and make changes to achieve meaningful impact.

A laboratory technician examines records at a COVID-19 testing facility in Zimbabwe. Photo by KM Mpofu, ILO, courtesy of Flickr Creative Commons

ENHANCED ROUTINE DATA REVIEW

Data review meetings have become a best practice for HIV service delivery partners and MOH staff. However, these meetings are often long, tedious, and lack the participation of facility-level implementers and decision makers who have the contextual knowledge to address the service delivery issues identified.

Data.FI was requested to work with three different IPs in six West African countries to improve PEPFAR reporting, and to apply its expertise implementing weekly "Epidemic Control Rooms" (ECRs) in Nigeria. Working with USAID/PEPFAR IPs in Burkina Faso, Ghana, Liberia, Mali, Senegal, and Togo, the project used existing meeting structures and improved them by training and mentoring IPs staff on how to hold **action-oriented data review meetings that included health facility staff**. Data.FI developed standard visualizations for key indicators of interest and trained participants on how to critically interrogate the data and to facilitate discussions to interpret the data, apply root cause analysis, and track progress in meeting targets.

> **We believe that root cause analysis at the health facility level will serve as a powerful tool to move overall performance at the national level.**

DATA.FI SOLUTIONS

Data Review Meetings

The enhanced data review method includes:

1. **Shorter, more focused meetings** organized by **priority indicators**
2. **Increased stakeholder participation** eliciting perspectives from service delivery partners
3. **Compelling visualizations** telling the story from big-picture priorities to **drill-downs of the data** at subnational and site levels for **accountability**
4. Modelling a habit of **asking questions** that probe the **root causes of performance issues**

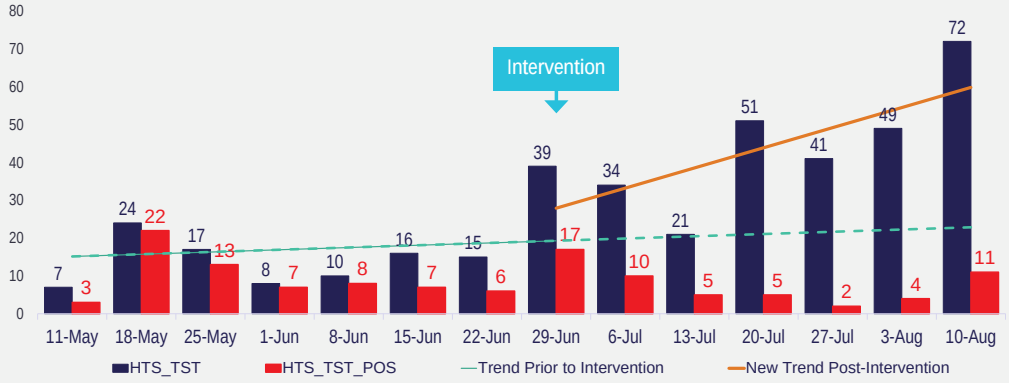
269
data review meetings supported

In Nigeria, government officials and IPs meet weekly in ECRs to review HIV data, examining digital visualizations of data on the HIV clinical cascade, index testing rates, and more. Here, Data.FI staff Nelson Ngusha demonstrated ECR dashboards to a representative of the National AIDS/STIs Control Agency. Due to COVID-19 national lockdowns these meetings are now held virtually. Photo by Data.FI/Nigeria

CLOSER LOOK

Root Cause Analysis of Performance Data in Burkina Faso

Data.FI supported enhanced data review meetings in **Burkina Faso**, working with the IP, Ending AIDS in West Africa (#EAWA), and with the National AIDS Control Program, HIV clinicians, and monitoring and evaluation (M&E) professionals. Together, they identified specific sites that showed unusually high proportions of positive HIV tests in relation to the overall number of HIV tests—more than 80 percent for several weeks. A root cause analysis supported by Data.FI revealed two likely explanations: (1) greater than expected burden of disease in the catchment area; and (2) potential underreporting of negative test results. #EAWA engaged its community-based partner to expand testing activities by providing testing materials and simultaneously reinforced data collection practices to ensure that all tests—including negative tests—were accurately captured. Following these steps, we saw an increase in the overall number of HIV tests performed and reported and more accurate data on the HIV positivity yield.



Testing rate in Kossodo Medical Center, Ouagadougou, by week.

Girl walks near boabob trees in Burkina Faso. Photo by Robert Glod, courtesy of Flickr Creative Commons

Nigeria Epidemic Control Rooms in the Time of COVID-19

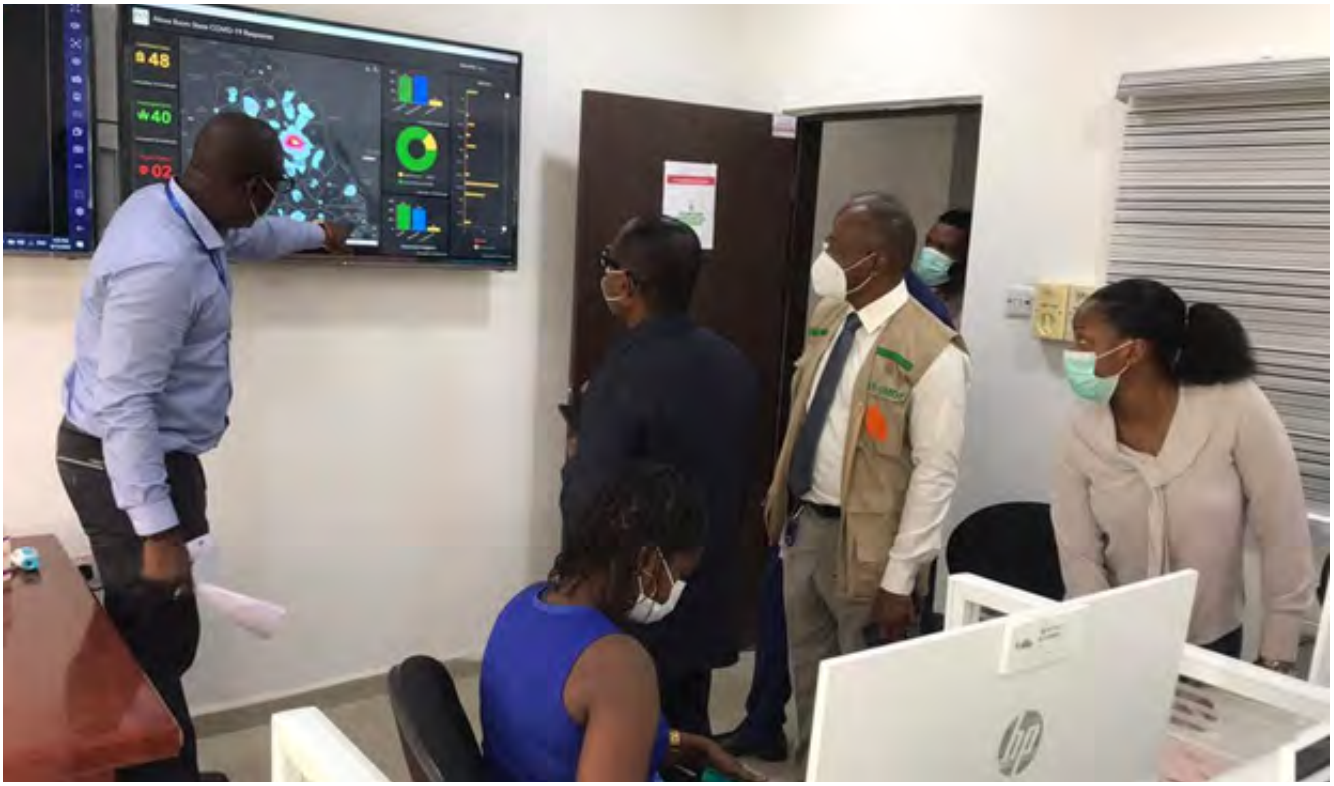
In Nigeria, Data.FI continues to implement HIV **ECRs**—the project's technology-enhanced data review meeting solution—in the context of COVID-19-related disruptions. When a nationwide lockdown was implemented in the country, stakeholders in Akwa Ibom State strategized ways to minimize the disruption to case identification and continuity of care for HIV clients. Already accustomed to functioning as a team—consisting of State Ministry of Health officials, partner organizations, and key program actors—the group pivoted to weekly virtual meetings during which they continued to review HIV data dashboards, pinpoint performance issues, and gauge the impact of the novel coronavirus on HIV programming in Akwa Ibom.

Data.FI and partners pivoted to hold ECR meetings virtually during the COVID-19 national lockdown in Nigeria, and through those meetings were able to support continuity of care for HIV clients.

The stakeholder team came up with a set of strategic approaches to support continuity of care and adjust HIV programs in response to the COVID-19 pandemic, including:

- Prioritizing key populations and index case contacts for testing
- Promoting home and community-based ART services teams and same-day ART initiation for all newly diagnosed HIV-positive clients
- Revising multi-month dispensing eligibility criteria during the lockdown to reach more clients through a "COVID pack," which contains a minimum three-month supply of drugs for clients newly initiated on treatment

As the COVID-19 lockdowns eased, Data.FI continued to hold weekly virtual ECR meetings to help the State Ministry of Health monitor its HIV response and address obstacles caused by the pandemic.



In collaboration with USAID IPs, Data.FI supports the COVID-19 response in eight states in Nigeria, and has helped set up visual analytics of data from the Nigeria Centre for Disease Control's Surveillance, Outbreak Response Management and Analysis System for each of the eight states. Photo by Data.FI/Nigeria

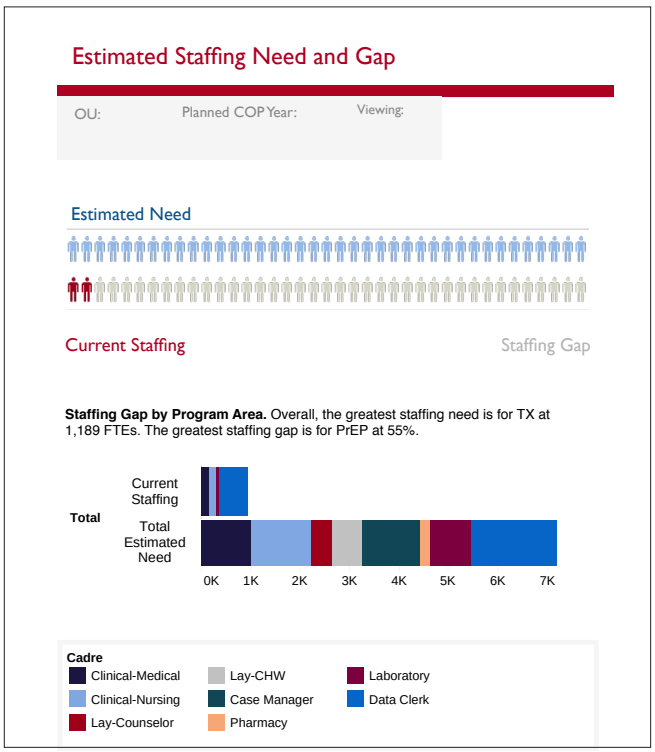
DECISION SUPPORT TOOLS

Data.FI creates practical, easy-to-use decision support tools.

Knowing where nurses, doctors, laboratory technicians, and other staff are currently working—and where they could be deployed to maximize HIV outcomes—is of paramount importance as HIV epidemic control gets closer in many countries and with the evolution of the COVID-19 pandemic. However, human resource data have historically been underused in PEPFAR's HIV response because of constraints in the availability of data and data quality. Data.FI was asked by the USAID/OHA to work with the Touch Foundation to develop a **human resources for health (HRH) optimization planning tool**. The tool consists of:

- a data collection template
- an R script (for statistical computing) that translates the Touch Foundation's method for estimating HRH staffing needs based on program targets, analyzing staffing gaps, and optimally allocating staff within budget and supply constraints
- Tableau-based dashboards that visualize the results and allow decision makers to see how various staffing structures could potentially impact monitoring, evaluation, and reporting (MER) outcomes

This data collection, analytics, and dashboard solution will help PEPFAR teams strategically allocate resources and optimally distribute HRH teams to achieve program targets for priority PEPFAR indicators.



Sample dashboard from the HRH needs and optimization planning tool

Healthcare providers at a clinic in Guinea, West Africa. Photo by Dominic Chavez, World Bank, courtesy of Flickr Creative Commons

HIGH-IMPACT DATA ANALYSES

Data.FI is conducting high-impact data analyses and visualizations to support USAID decision making.

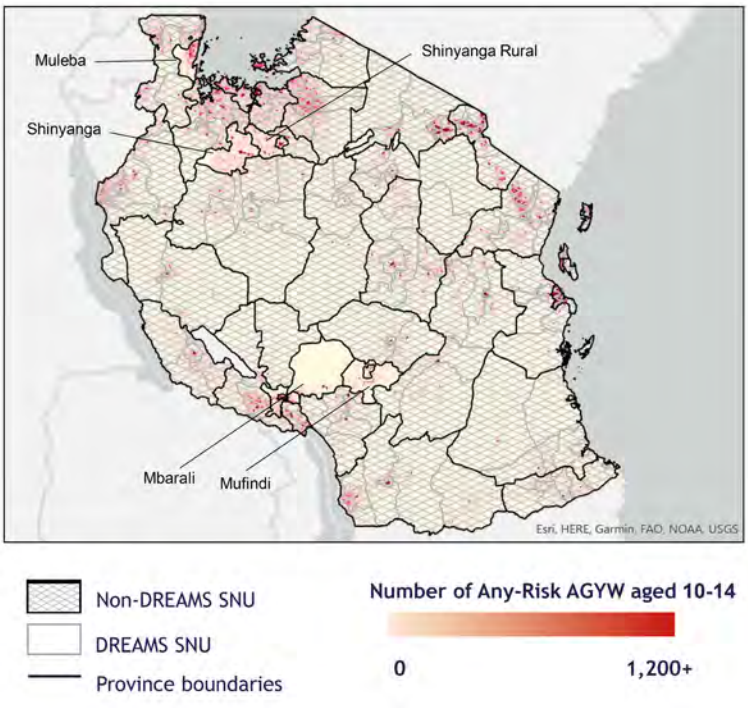
35
significant data analyses completed

The Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe (DREAMS) initiative promotes a critical package of interventions addressing the biological, economic, and social determinants that put AGYW at greater risk of contracting HIV. Although there are large amounts of existing program and survey data on DREAMS beneficiaries, they are not always used fully to inform decision making about program targeting or expansion.

Data.FI is analyzing population-based household survey data in four countries (eSwatini, Haiti, Mozambique, and Tanzania) to understand the size of the DREAMS beneficiary population at risk of HIV acquisition and to understand the current reach of the DREAMS program in districts. Data.FI partner, Fraym, applied its novel AI/ML software to integrate risk data from population-based surveys with satellite imagery to create localized population information at a 1km^2 resolution. Data.FI is using this tool to develop risk profile maps that visually represent the density and location of AGYW considered at risk for HIV and to estimate the size of these populations. This will allow USAID and partners to better understand the current reach of their DREAMS programs and better allocate DREAMS resources to reach AGYW most in need of HIV prevention services.

Data.FI is also supporting USAID/Uganda to perform in-depth analyses of program data managed through existing DREAMS databases that provide individual-line data on the receipt of multiple layered interventions delivered to vulnerable AGYW. Through granular analysis of the data on services provided, by age group and district in the DREAMS program in Uganda, we identified gaps in the completion of planned DREAMS interventions. These analyses will inform USAID/Uganda's learning activities to improve the quality of program implementation.

Data.FI is supporting USAID DREAMS programming by better estimating the density and location of AGYW considered at risk for HIV and estimating the size of those populations.

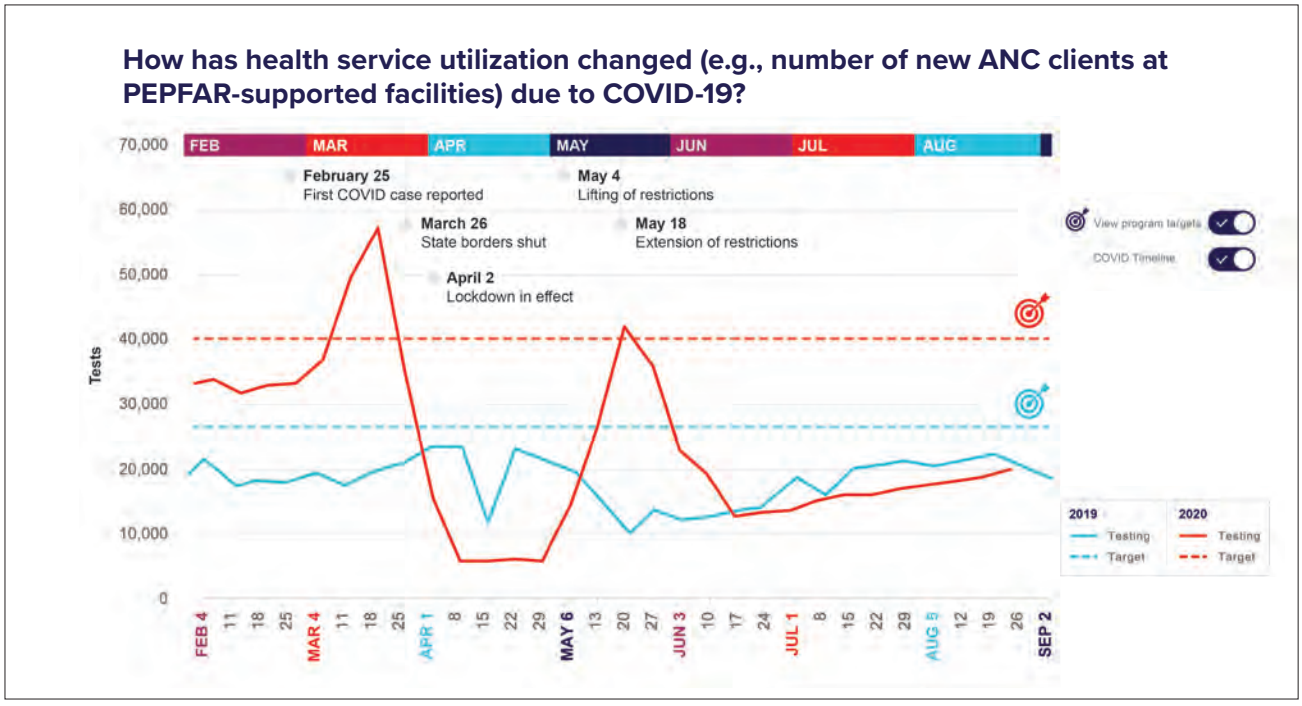


Number of any-risk AGYW ages 10–14, Tanzania

COVID-19: FROM INDICATORS TO VISUALIZATIONS

The COVID-19 pandemic has created an unprecedented need for real-time, actionable data to minimize the spread of the virus, and to mitigate how it impacts HIV care and other critical health services.

- In **Nigeria**, Data.FI worked closely with the Reaching Impact, Saturation and Epidemic Control (RISE) project to rapidly set up **emergency operation centers (EOCs) for data visualization, analytics, and coordination of the COVID-19 response** across eight states (Adamawa, Akwa Ibom, Bauchi, Cross River, Edo, Kano, Niger, and Oyo). The project provided technical support in analytics and geospatial analysis of COVID-19 data and modelled the epidemiologic impact of interventions to enable state governments to adjust their response strategies. Data.FI also incorporated the World Health Organization's integrated tool for COVID-19 surveillance in LAMISPlus (the Lafiya Management Information System Plus), Nigeria's EMR system, to enable monitoring of the effect of COVID-19 on HIV programming. We will enhance the COVID-19 module with the addition of a case management component in the next quarter.
- **With COVID-19 funding, Data.FI supported the drafting of the first-ever set of COVID-19 indicators for IPs supported by the USAID Bureau for Global Health**. The compendium was released in August 2020. It contains a set of 30 indicators developed in close consultation with the USAID Global Health Bureau's Sustained Crisis Task Force, the USAID Office of Policy, Programs, and Planning, and IPs working at the frontlines of the COVID-19 response, including Data.FI consortium partners, such as the JSI Research & Training Institute.
- Data.FI **prepared priority analytical use cases for COVID-19 that combine multiple data sources** for the USAID Bureau for Global Health. The use cases provide illustrative examples of how global, country, and subnational data can be used to provide rapid insights on the impact of COVID-19. The use cases convey the added value of data integration and can help inform further thinking on analytic needs and software solutions to address pandemic-related challenges.



Sample dashboard presenting the use case for how use of health services has changed due to COVID-19.

DATA.FI IMPACT AREA

Optimizing and Scaling Health Information Systems

In many countries, HIS are fragmented. An array of systems has been put in place by governments, donors, and IPs—often in an uncoordinated fashion—to address each group's data needs as they respond to the HIV epidemic, and now the COVID-19 pandemic. In the absence of data standards or an enterprise architecture, many governments struggle to create a cohesive national HIS platform where EMR systems link to other subsystems, such as laboratory and dispensing systems. Such connections are essential to provide continuity of care and to track program performance. Connected systems can also standardize, streamline, and improve the quality of reporting at subnational and national levels to better inform decision making.

Data.FI is partnering with governments and IPs at all levels to harmonize, optimize, and scale existing information systems. The project builds consensus among stakeholders on common standards for system alignment, supports improved HIS data policies and governance, and facilitates a sustainable HIS ecosystem in which HIV information systems operate. This work involves people-centered solutions, with the project serving as a neutral facilitator, bringing together stakeholders and contributing technical know-how to improve and align systems.

Training session on the use of the upgraded OVC and DREAMS databases in Yamoussoukro, Côte d'Ivoire. Photo by Data.FI/Côte d'Ivoire

PLATFORMS FOR INTEGRATED DATA ANALYSIS

Data.FI is integrating client records across systems in support of advanced analytics.

South Africa has a strong national HIS. Yet, nationally, a mechanism to track clients across multiple services (and systems) was not centralized in an architecture that would allow for the strategic use of HIV and TB data. When Data.FI initiated work in South Africa, implementation of such an information system architecture was underway under an initiative called the **InfoHub**. The InfoHub ingests, standardizes, matches, transforms, and models data from multiple siloed systems through a data warehousing architecture to produce meaningful analytics through a business intelligence (BI) platform.

Data.FI is working closely with the NDOH and USAID to prepare a detailed analytical framework that lays out the use cases, analytical approaches, and user access rules that will allow the project to develop interactive dashboards to meet the analytical and reporting needs defined by each user—from the frontline health worker to NDOH leadership. The analytical framework focuses on understanding what data currently look like and the impact of interventions after they have been implemented. The framework also addresses predictive questions using data science techniques.

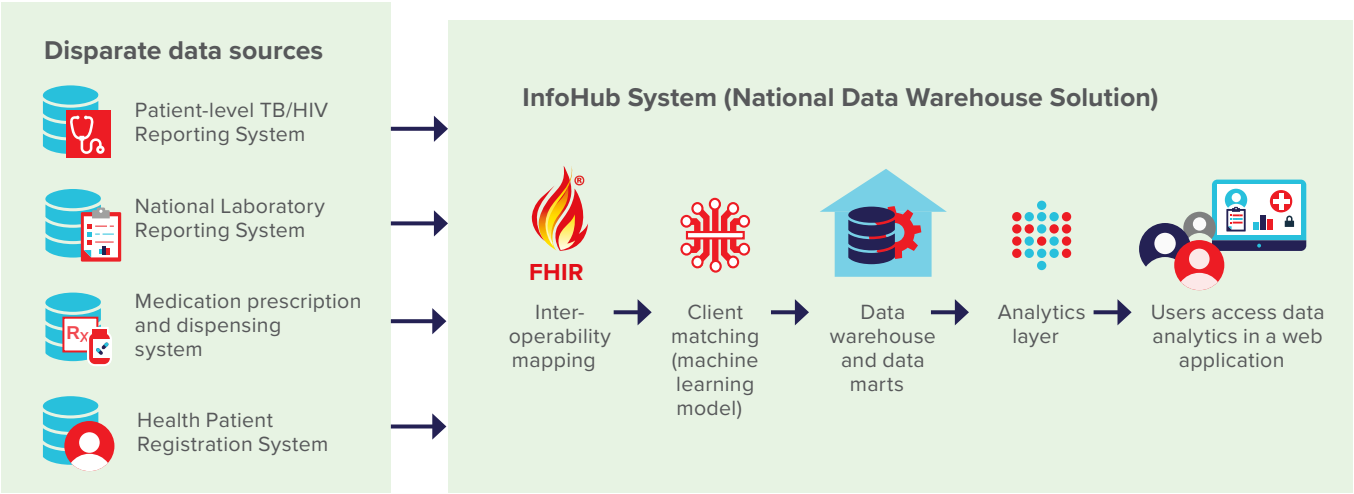
> **The public health dividend from the proper use of the InfoHub is unparalleled. Analyses on the InfoHub can empower population-level analyses, such as case-based surveillance, or facility-level analyses for clinical decision support. There is no better tool for continuous quality improvement for the HIV response.**

Data.FI is committed to recommending technology in line with an analytical framework, rather than retrofitting reports and analyses to what is technologically feasible.

DEVELOPING AND ENHANCING SOFTWARE

Data.FI is developing and enhancing systems to better track ART clients through their care journey.

When we started operations in **Nigeria**, Data.FI encountered a fragmented HIV HIS ecosystem. Each USAID/PEPFAR IP maintained its own system for collecting and analyzing HIV data. There were no standard definitions for indicators, other than those for PEPFAR's MER indicators. Systems lacked a solid, core architecture underpinning the structure of their data—a barrier to the creation of a common format for analysis of client EMRs. There was also no mechanism for USAID IPs to



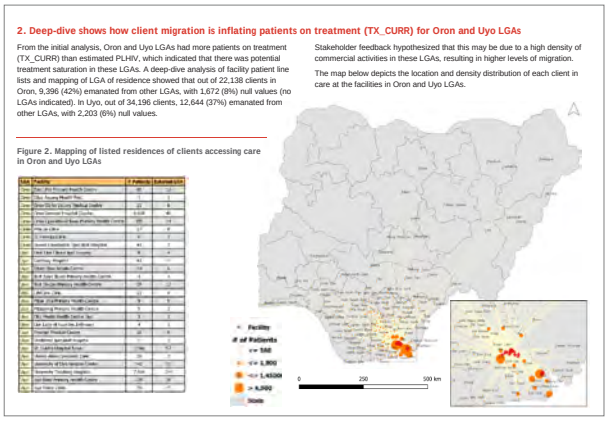
In South Africa, Data.FI is supporting the National Department of Health to implement a national HIV data architecture and warehouse solution called the InfoHub, shown above.

automatically exchange data with Nigeria's National Data Repository (NDR).

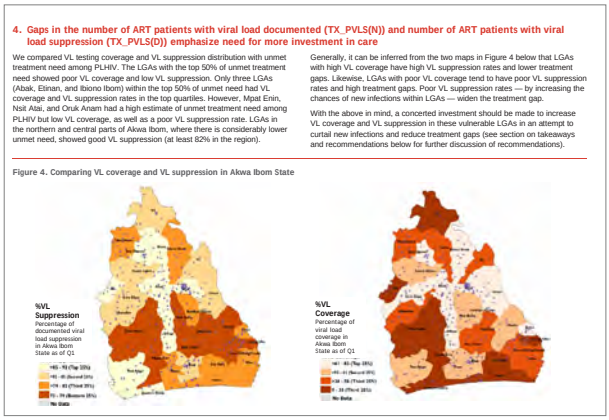
USAID/Nigeria requested Data.FI lead the enhancement of the existing LAMIS EMR system used by most USAID IPs. The project established a health informatics community of practice (CoP), which brought together informatics staff from seven partner organizations (Palladium, FHI 360, Chemonics, Heartland Alliance, Jhpiego, Management Sciences for Health, and the Society for Family Health). The team developed a terms of reference and a charter to facilitate a governance protocol outlining the process of gathering, prioritizing, and building consensus on user requirements. Data.FI then organized a series of informatics bootcamps, hackathons, and health informatics CoP meetings to develop data modules for incorporation in the enhanced system, which is called LAMISPlus. In each bootcamp, teams of informatics staff from across the IPs worked independently to develop different modules; however, all programming code was shared openly using *GitHub*. The project management software, Jira, was employed to assign and monitor progress and completion of assigned tasks, and *Slack* was used to communicate across teams.

With the systems governance protocol approved, Data.FI also worked to ensure that third-party owners of information systems for laboratories, pharmacies, and commodity management aligned their systems to interoperability standards developed by Data.FI. The resulting open-source, modular EMR system enables all USAID IPs to link client records through a facility-level interoperability layer and for IPs to exchange those data with the NDR.

User acceptability testing has confirmed that LAMISPlus will be able to capture comprehensive client records for HIV services at the facility level, allowing program managers to monitor the completeness of data across test results, lab test orders, pharmacy prescriptions and dispensation, viral load orders and results, and linkages of clients to commodity management systems. Once implemented, clinicians will have a more complete picture of the care their patients are receiving, and MOH staff at all levels will better understand which sites are high-performing and which require additional assistance.



Data.FI develops a range of easy-to-use visualizations to share data analyses. Data.FI/Nigeria developed these materials on the effects of client migration on HIV treatment outcomes in Akwa Ibom State. The one below compared viral load testing coverage and viral load suppression distribution among people living with HIV.



> **"Data.FI has continued to be supportive to the Nigeria Mission and surpassed expectations. Despite the challenges associated with COVID-19, the project has been agile in responding to changes in scope, coordinating multiple partners and government, while still providing stellar performance in delivering analytics, facilitating partner reviews, and progress in the development of the LAMISPlus EMR system."**
>
> Abdulmalik Abubakar, HIV/AIDS-TB Office - Strategic Information, USAID/Nigeria

CLOSER LOOK

Data.FI's Software Development Lifecycle Best Practices

Software development for public health initiatives is often beset with preventable problems. Too often, software is:

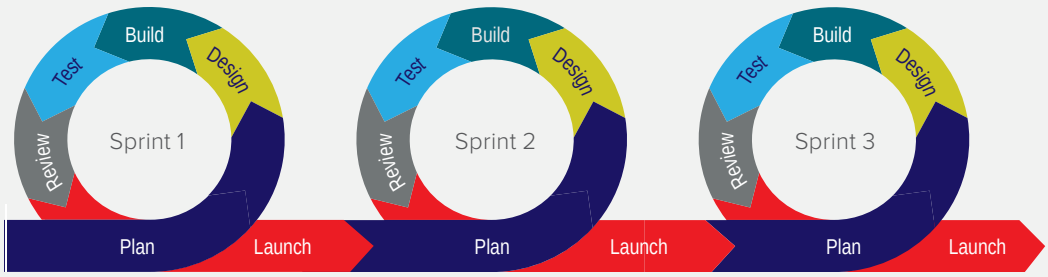
- **designed without input from users**, so it does not meet user needs
- **developed poorly**, without appropriate quality review and is therefore error-prone
- **lacks adequate documentation**, so it is unverifiable and cannot be transferred to local actors
- **never completed as envisioned** due to poor forecasting of time requirements or resources
- **more expensive** than intended
- **not scalable or reusable** due to poor architecture and visioning

Given the multiple stakeholders involved in implementing a data system, strong processes are needed to ensure that software development meets evolving stakeholder needs and can be delivered to standard and within expected timeframes. Data.FI focuses on establishing sound, transparent processes for business, analysis, technical requirements gathering, and project management that follow **software development lifecyle (SDLC) best practices**. For example, in Nigeria, Data.FI's team pre-empted and mitigated common software development pitfalls:

- **User-centered design** was incorporated through the **establishment of inclusive CoPs** through which **stakeholder engagement** was facilitated.
- The **architectural framework** was developed and signed off on by users in the CoP before a line of code was written.
- Appropriate **project management was built in from the start**.

The software development process was monitored through Jira, ensuring that projects were implemented on time, on budget, and in accordance with quality standards, and that technical **documentation was developed concurrently with code and was always up to date**.

AGILE SDLC METHOD



SCALING UP EMR USE

As countries and IPs shift from piloting to scaling up HIS, they are often unable to reach the number of sites they originally intended because of political barriers, capacity gaps, and technological challenges. Data.FI is actively working to support the full rollout of EMRs and other subsystems to achieve their potential to improve the timeliness, availability, and reliability of data for decision making.

In **Malawi**, Data.FI has been working closely with USAID-funded service delivery IPs (Baylor University and Partners in Hope) to empower them to fully use the point of care and the retrospective eMastercard EMR systems developed by CDC partner, Elizabeth Glaser Pediatric AIDS Foundation (EGPAF/Malawi). When our work in Malawi began, USAID IPs were not participating in digital data entry and cleaning and preferred to record client data on paper forms. Some sites insisted that they preferred to manually tally TX_CURR from their paper records—a process that could require multiple days each reporting period, and frequently could be inaccurate. Using a careful, ongoing process of change management—including the investigation of data quality issues, close engagement to understand and achieve agreement on revisions needed to the EMR systems, and training on use of the EMR systems—Data.FI is supporting meaningful scale-up. There is also improved, ongoing collaboration among USAID and CDC partners. Over 200 sites are now using the EMRs for reporting on key indicators, rather than reporting manually. Running the reports now takes minutes, not days. Sites are taking the initiative to review data in the EMRs and to investigate errors that they identify.

Similarly, in **Namibia**, Data.FI supported the Ministry of Health and Social Services to assess and roll out an improved HIV client EMR system throughout the country—the Quantum Electronic Patient Monitoring System (QePMS). USAID/Namibia first asked Data.FI to provide technical support to assess the new system. QePMS had been piloted

288
EMR sites supported for scale-up

Chimango Munthali, Data.FI's senior technical advisor, mentors Partners in Hope and MOH data managers on data cleaning, reporting, and data use at Nkhotakota District Hospital in Central Malawi. Photo by Data.FI/Malawi

successfully in three regions; however, not all stakeholders were on board with national scale-up. The Data.FI team engaged stakeholders, implementing a participatory, technically rigorous assessment that involved members of the QePMS technical working group (TWG) charged with advising the Ministry of Health and Social Services on EMR systems. This collaborative approach resulted in consensus for national scale-up of the QePMS and support for a plan of action to address several of the system's shortcomings. Through a partnership with IntraHealth Namibia (which developed the QePMS), Data.FI supported the scale-up of the improved system to three additional regions: Kavango East, Kavango West, and Zambezi. This effort involved software and hardware installation, data migration, and training at all 88 health facilities offering ART in those regions, achieving a big increase in access to this system.

INTEROPERATING AND NETWORKING EMRs

Data.FI is networking and interoperating client record systems to optimize client care.

In **Nigeria**, Data.FI is streamlining viral load requisitions and results reporting by **linking EMRs with the laboratory system**. Previously, lab-based data officers were responsible for registering samples received in Nigeria's Laboratory Information Management System (LIMS), a step that facilitated automated sample processing and retrieval of results by facilities. This process placed a significant strain on the data officers and resulted in long turn-around times for DNA polymerase chain reaction viral load testing. To improve overall efficiency and help ensure that clients and providers have timely, actionable information, Data.FI worked in partnership with the University of Maryland, Baltimore, the Clinton Health Access Initiative, and other USAID-funded IPs to enhance the LIMS. Together, we decentralized the sample registration process and created a platform to integrate the

Chimango Munthali, Data.FI/Malawi, works with data managers at the facility level to improve the data quality in their EMR system. Photo by Data.FI/Malawi

> **"Data.FI provides a great bridge between PEPFAR stakeholders–USAID, the CDC HIS IP (EGPAF), and USAID IPs. Site support and mentorship was great and helped identify solutions together with the site staff."**
>
> – Baylor-Malawi

EMR systems used by IPs in the LIMS, allowing health facilities to place sample orders and receive results directly from the LIMS. In August 2020, in collaboration with the University of Maryland, Baltimore and the Clinton Health Access Initiative, Data.FI conducted a training of trainers on EMR-LIMS interoperability. Staff from more than a dozen USAID- and CDC-funded IPs in two Nigerian states participated and received training on the key processes and functions of the EMR-LIMS. A post-test found significant improvements in participants' understanding of how to use the system effectively.

In **Burundi** and **Côte d'Ivoire**, health facility systems were not networked and, therefore, clients could not be tracked across sites, which impeded continuity of care and distorted interruption in HIV treatment rates. Working closely with government leadership, USAID and IPs are networking EMRs

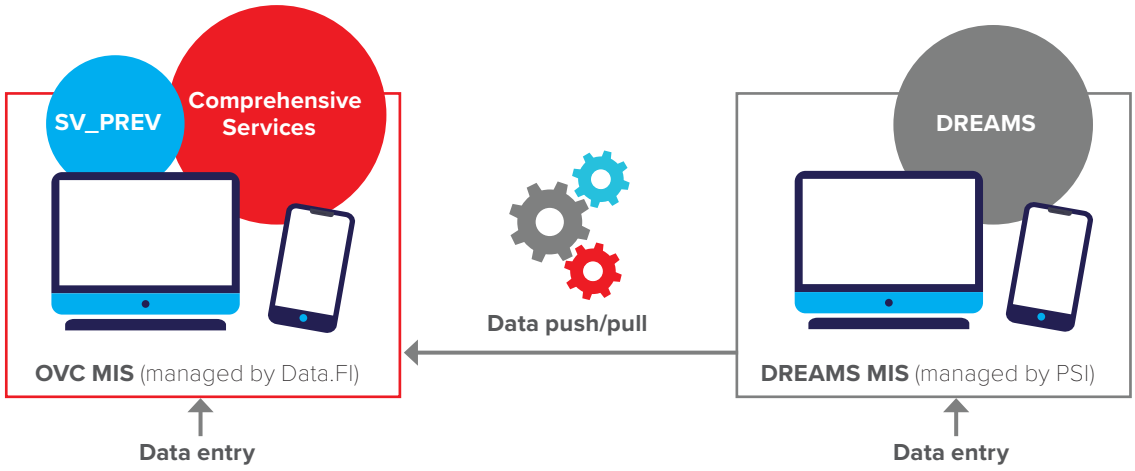
by developing online versions of EMR instances for SIDAInfo (Burundi) and SIGDEP (Côte d'Ivoire). The full potential of these changes will be realized in the coming year as health facilities start to use these online systems. Partners will be able to target resources more efficiently to support clients that have truly interrupted treatment, rather than those who simply accessed HIV care and treatment services at a different site.

Data.FI is optimizing OVC and DREAMS case management information systems.

In **Zimbabwe**, where there are six IPs providing orphans and vulnerable children (OVC), DREAMS, and sexual violence prevention services, we are **integrating OVC, DREAMS, and gender-based violence (GBV) information systems**. Each IP currently maintains its own system for collecting and reporting data to USAID. This means that on a monthly basis, partners' indicators are calculated independently by them, aggregated into Excel, and emailed to USAID. DATIM (Data for Accountability, Transparency and Impact Monitoring) indicators are also calculated independently by each IP and transferred to DATIM manually. The calculation of complex indicators has created challenges for their interpretation and use. Because the data are available only after one month, they cannot support real-time decision making. Moreover, it is inefficient and costly for USAID to support the maintenance of these separate systems.

9
interoperability of information systems advanced

USAID/Zimbabwe asked Data.FI to address this situation by developing a harmonized case management information system for use by the six IPs. During this reporting period, Data.FI supported the consolidation of more than 80 data collection forms into a core set of six forms, which will allow the reporting of Zimbabwe-specific process indicators and MER performance indicators. The project worked with consortium partner BAO Systems to select the open-source District Health Information Software, Version 2 (DHIS2) as the platform of choice, given the ease of customization, stability, and the existence of a wide and active



System architecture for sharing data between OVC and DREAMS activities in Zimbabwe

> **"The Zimbabwe Mission has been pleased with Data.FI's ability to deliver succinct, easy-to-digest information. They respond quickly to changes in the face of COVID-19 and are a great example of a project that liaises seamlessly across stakeholders and partners."**
>
> — Sara Miner, Strategic Information Advisor, USAID Contractor through GHSI-III

CoP. Data.FI is now developing the DHIS2 tracker module for the six IPs to collect individual-level data and calculate indicators when multiple events are recorded and date-stamped for one individual.

In **Côte d'Ivoire**, OVC and DREAMS interventions are implemented by the same groups, which often serve the same beneficiaries, sometimes with overlapping services. To avoid the duplication of services, USAID wanted to better understand the extent to which DREAMS beneficiaries, including AGYW, are receiving multiple "layers" of interventions. The Data.FI team assisted the Ministère de la Femme, de la Famille et de l'Enfant to update the OVC and DREAMS databases so that the same beneficiary identifier code would be used across systems. We helped launch a working group to assist with updating software and to coordinate the deployment of applications in the MOH for Côte d'Ivoire's HIV EMR system (SIGDEP2), and with the Ministère de la Femme, de la Famille et de l'Enfant for the OVC and DREAMS databases.

By providing an interoperability layer and improving the functionalities of the applications, more information became available to IPs on beneficiary services received across systems. Aligning these systems is contributing to a more holistic picture of how to better reach clients with needed HIV services.

Nine-year-old girl from Adamawa State, Nigeria. Photo by Immanuel Afolabi, courtesy of Flickr Creative Commons

A Roadmap for Nigeria's OVC Management Information System

In Nigeria, Data.FI worked closely with the Adolescents and Children, HIV Incidence Reduction, Empowerment, and Virus Elimination (ACHIEVE) project and the Federal Ministry of Women-Affairs & Social Development (FMWASD) to develop a roadmap for Nigeria's OVC Management Information Systems (NOMIS)'s development process. Work included an assessment of the system to determine recommendations for improvements. A key recommendation made by the project was to strengthen system governance by setting up a robust health informatics CoP in collaboration with the FMWASD to manage the SDLC and to align the system with program, national, and donor requirements. Ideally, this CoP will also develop a roadmap for upgrading the system. Together with the FMWASD and the CoP, Data.FI will coordinate and lead the system upgrade process.

DATA.FI IMPACT AREA

Improving Data Sources

In the fast-paced HIV response, USAID, IPs, and governments need trusted data at their fingertips so that they can quickly pivot to meet their clients' needs. Yet, when decision makers lack trust in the available data, they cannot be sure which interventions are making a difference, and may hesitate to make program changes that could ultimately save lives. Or, decision makers may assume that they are meeting HIV performance targets, but ultimately lack the data to support their assumptions.

Data.FI builds smarter systems that instill confidence among decision makers in their data. Improving data sources for digital health systems involves multilevel interventions to enhance data quality. The steps include clearer indicator definitions; deduplicating data; developing digital data checks and data validation rules; using above-site data quality scoring tools to support partners to view a snapshot of their data quality performance and track it over time; and ensuring that EMRs are capturing current treatment guidelines and data definitions. Data.FI works with stakeholders to rapidly assess and address data quality gaps and put in place practical, easy-to-use solutions to demystify the data quality improvement process.

Mr. Samake Yaya of the National OVC program's M&E staff conducting a training on PEPFAR-supported OVC and DREAMS databases, Côte d'Ivoire. Photo by Data.FI/Côte d'Ivoire

DATA QUALITY IMPROVEMENT

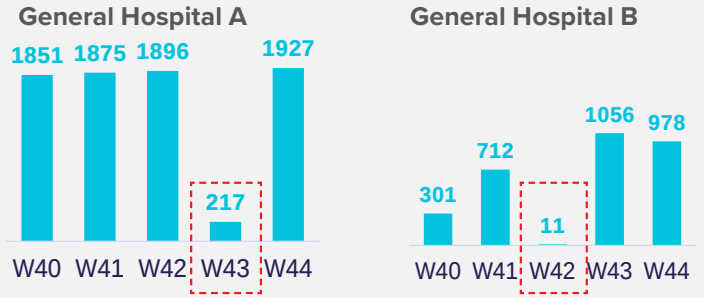
Data.FI is improving accountability by institutionalizing automated data quality checks.

Agile, easy-to-deploy data quality solutions that show change over time are needed to rapidly diagnose problem areas and help focus limited resources on low-performing sites. Through the project's experiences strengthening data quality across partners in Nigeria, Data.FI developed a methodological intervention—a simple data quality composite score. The approach uses aggregate data to calculate three facets of data quality—completeness, coherence, and consistency—using an Excel-based tool.

Data.FI used this method in Nigeria and saw significant improvements in data quality among USAID IPs over a short seven-month period. In February 2020, the overall completeness of reporting to the NDR by USAID IPs was just 46 percent, making it hard for the government to interpret the performance of HIV services. Data.FI collaborated with the IPs to determine the reasons for low rates of completeness and worked with them as they put corrective actions in place. By September 2020, the overall reporting completeness in the NDR was 98 percent. Data.FI continues to implement the

NEW DATA.FI SOLUTIONS

The Data Quality Composite Score Tool is a tool designed by Data.FI to automatically evaluate the quality of HIV data from organizational units supported by PEPFAR. The tool is simple to use and provides data quality scores (DQS) in three dimensions: *completeness* (measures the number of submitted records against the number of expected records); *coherence* (measures the number of cases when an indicator numerator is greater than its denominator); and *consistency* (measures the number of outliers). The tool is designed to work with data from any data collection tool or software, and is intended for use by staff above the facility level to assess data quality *before* expensive investments in audit processes are conducted in the field. The tool can also be used to compare performance over different time periods, including post-intervention.



Examples of how the Data Quality Composite Score Tool can pinpoint outliers in TX_CURR using its consistency metric at a site across weekly reporting numbers.

Regional Hospital of Yamoussokro, Côte d'Ivoire. Photo by Data.FI/Côte d'Ivoire.

> **"We already see a change in consciousness among our colleagues at the National Health Information System directorate on the importance of data quality through data quality desk reviews. The National AIDS and STI Control Program leadership, likewise, is starting to ask supervisors at implementing partners to probe for the underlying causes of the data quality issues."**
>
> —Serge Bisore, Data.FI Country Director, Burundi

Photo by Data.FI/Burundi

Serge Bisore, Data.FI country director, Burundi, has played a pivotal role in improving HIV information systems in Burundi.

NDR data quality score and provide feedback and support to IPs, the Government of Nigeria, and USAID.

Following the use of the Data Quality Composite Score methodology in Nigeria, Data.FI identified the need for a similar tool that could rapidly assess data quality dimensions across sites for its work in West Africa. The project used the composite score method and formalized it in an easy-to-use, automated tool that can be used by any partner.

100%
of supported partners' data quality improved

In July 2020, the Data Quality Composite Score Tool was deployed in **five West African countries** (Burkina Faso, Ghana, Liberia, Mali, Senegal, and Togo) to examine the quality of weekly HIV high-frequency reporting data. As in Nigeria, the tool and its outputs were very intuitive and helped simplify the complexity of data quality dimensions for the partners, allowing them to rapidly address issues related to completeness, coherence, and consistency. For the 12 to 37 weeks of data reviewed, all detected data quality issues were resolved by the partners, resulting in 100 percent scores. Going forward, the countries expressed interest in using the tool to review and correct data at regular intervals.

In early 2020 in **Burundi**, Data.FI met with the leadership of the National Health Information System and the National AIDS and STI Control Program to address data quality issues that were hindering efforts to track the performance of care and treatment services supported by PEPFAR. It was clear from aggregated reports at the national level that facility records were not regularly updated. Some central-level MOH supervisors could not pinpoint which districts were not reporting or were not reporting on time, or which districts were reporting data that were not consistent or accurate. Without this information, it was impossible for the central-level supervisors to help staff at IPs and at the district level track and analyze HIV testing and treatment indicators.

In July 2020, in collaboration with the National AIDS and STI Control Program, Data.FI convened a training with 14 central-level supervisors to conduct **desk reviews on data quality**. Supervisors involved in overseeing HIV data in Burundi used the World Health Organization's data quality review tool, which is installed in DHIS2 as an application, and a related national manual to review the data. We initiated a data review meeting at which the supervisors were asked to look at new data dashboards and identify the facilities that had data completeness or consistency problems. We asked how they arrived at their lists and to show where the facilities fell short—whether, for example, a facility had missing or aberrant data to correct. These desk review meetings are now held regularly to prepare supervisors to conduct quarterly data review meetings at the district level.

IMPROVING MEASUREMENT

Data.FI is improving accountability by strengthening how performance is measured.

Over the past year, Data.FI has been called on to improve or develop new detailed indicator reference sheets so that partners have indicator definitions that can be easily referenced to ensure that the data reported are consistent and can be compared across partners and countries. Starting in late 2019, we worked with the group of USAID/PEPFAR projects and USAID technical leads to prepare a compendium of 38 custom indicators across key HIV intervention areas, including capacity strengthening, commodities, gender, HIS, HRH, prevention, strategic information (SI), treatment, viral load, and laboratory. This is a global good that can be used by any USAID IP to further standardize indicators across key intervention areas.

Through core funding we also worked to improve the collection of supplemental data for custom family planning, pre-exposure prophylaxis (PreP), and gender indicators that are used to inform DREAMS programming. The project developed three Excel-based reporting tools with automated visualizations to standardize reporting for these indicators at the country level for aggregation to headquarters (OHA). It is premature to report outcomes; however, these custom indicators and the reporting tool will be important for streamlining reporting and analysis of DREAMS data going forward.

Pharmacist in Nigeria transcribes information on ARVs dispensed to clients from client folders to the national register. Photo by Data.FI/Nigeria.

CLOSER LOOK

Responsible Data Use

The world is experiencing a rapid shift from stand-alone digital technologies to integrated, smart technologies. Proper data management procedures to ensure data security and data privacy are one of the greatest challenges of this shift—and a weakness of the current HIV and COVID-19 responses. Data.FI takes seriously the responsibilities involved in collecting, storing, sharing, and using client data. We want to see the public health field increase its awareness of the importance of data protection, mainstream standard data protection practices, apply "lean data" principles, and standardize data-sharing agreements. These changes should ensure that data are used in a way that is agreed on by all parties, and that supports clients and their ability to safely access services.

To address this gap, we are collaborating with USAID and colleagues from the LINKAGES (Linkages Across the Continuum of HIV Services for Key Populations Affected by HIV) and EpiC (Meeting Targets and Maintaining Epidemic Control) projects to establish gold standard data management practices among our consortium partners. We are implementing this initiative through the adaptation and operationalization of the Data Management Maturity Model, which covers both data security and responsible data. The **Data Management Maturity Model** recognizes that it is the collective duty of all partners to prioritize and respond to the ethical, legal, social, and privacy-related challenges that come from using data.

Data.FI's model identifies four levels of data management maturity. It defines expected maturity levels with key characteristics and objective policies and processes, grouped in eight data management areas. Each Data.FI activity completes a responsible data self-assessment and the Data.FI responsible data team follows up when issues are identified, and remediation is needed.

Data.FI has instituted training for project staff on responsible data, produced a suite of documents to establish standards and procedures for responsible data use across the project, and made these materials available to partners in the consortium:

- Data Management Framework
- Data Security Checklist
- Legal Requirements for Responsible Data Management
- Benefits and Risks Assessment: How-to Guide and Framework
- Responsible Data Glossary
- Anonymization and De-identification of Data Guide
- Programmatic Data Breach Response
- Responsible Data Use Training

We plan to share what we have learned through internal use of responsible data practices to strengthen the larger field and influence the ways in which IP and government counterparts store, interact with, and use HIV data.

DATA.FI IMPACT AREA

Strengthen Local Partners and Ecosystem Governance

Today, digital systems for data collection, analysis, and visualization are indispensable, given the volume of client-level data, the complexity of HIV indicators, and the rapid pivots required to achieve epidemic control, especially in the context of the COVID-19 pandemic. However, governments, program managers, and LPs are overwhelmed by the vast number of available digital solutions. They need to know where to turn for high-quality, impartial, technical expertise to learn how to best deploy and sustain digital solutions, and how to ensure that high-quality data are first collected and used.

Data.FI aims to strengthen host country government capacity to develop and maintain cost-effective and sustainable information systems through impartial, technically sound advice; practical, applicable tools, such as job aids; accessible training and mentorship opportunities; and durable, open-source technology solutions. We are also mentoring LPs that will have the SI capacity and informatics know-how to support governments to sustain these systems. This involves developing rapid diagnostic tools to understand LP strengths and areas for improvement and providing off-the-shelf packages of technical assistance to support areas for growth, efficiently. Data.FI's goal is to empower governments to lead their HIV response through strong HIV information systems, in

Training session participants from social centers, the National OVC Program, and a PEPFAR implementing partner on the new functionalities of OVC and DREAMS databases, Côte d'Ivoire. Photo by Data.FI/Côte d'Ivoire.

partnership with technically savvy LPs. This model will result in sustainable, country-led solutions for achieving and maintaining epidemic control long into the future.

SUPPORTING GOVERNMENT HIS LEADERSHIP

Data.FI is strengthening government HIS leadership.

In **Burundi**, Data.FI works closely with the National AIDS Program and the Department of the National Health Information System (DSNIS) to implement their vision for an optimized, scaled, sustainable, government-led HIS. The project's assistance includes support for the country's eHealth strategy and working with the National AIDS Program and DSNIS to convene TWGs on DHIS2 and SIDAInfo, Burundi's HIS for HIV data. Through these TWGs, the project mentors and supports information technology experts, creating a larger pool of digital technology experts in the country. We have also conducted training and mentorship on data quality desk reviews, and with funding from the Tubiteho Project, trained DSNIS staff on how to analyze data using the DHIS2 at district and provincial levels.

At the time Data.FI initiated its work in **South Africa**, analytics for the InfoHub had been developed on a proprietary BI platform; however, there was concern about how access and cost could limit users' full potential to scale up insights provided through the InfoHub.

In consultation with the NDOH, the Data.FI team conducted a landscape analysis of available BI and analytical platforms, assessing them against NDOH priorities that considered cost, accessibility, functionality, and resources to maintain the platform—including both infrastructure and human resources. The analysis focused on ensuring that the selected BI platform would allow complex and large amounts of data to be converted to actionable insights tailored to distinct user groups at all levels of the HIS. Ultimately, the analysis led to the selection of Metabase, an open-source BI solution, which strikes a balance among functionality, usability, cost, and scale.

> **"The technical prowess as expressed by Data.FI not only highlights their commitment in supporting the improvement to health information systems with the developing country context, but it also shows their commitment to public health globally."**
>
> — Claudine Hennessey, Senior Technical Specialist (seconded), NDOH Health Informatics, National Department of Health, South Africa

The project and USAID/OHA created a **PEPFAR Strategic Information Capacity Assessment Tool** for LPs that have recently transitioned to a prime USAID partner role, or those that will soon be transitioning. The tool will improve LPs' and USAID's understanding of LP growth areas for reporting and following PEPFAR SI guidelines. Data.FI is using this tool to assess eight LPs in six countries (Democratic Republic of the Congo, Haiti, Kenya, Malawi, Tanzania, and Zimbabwe). We will aggregate and summarize the assessment results and use them to identify categories of LP capacity development interventions.

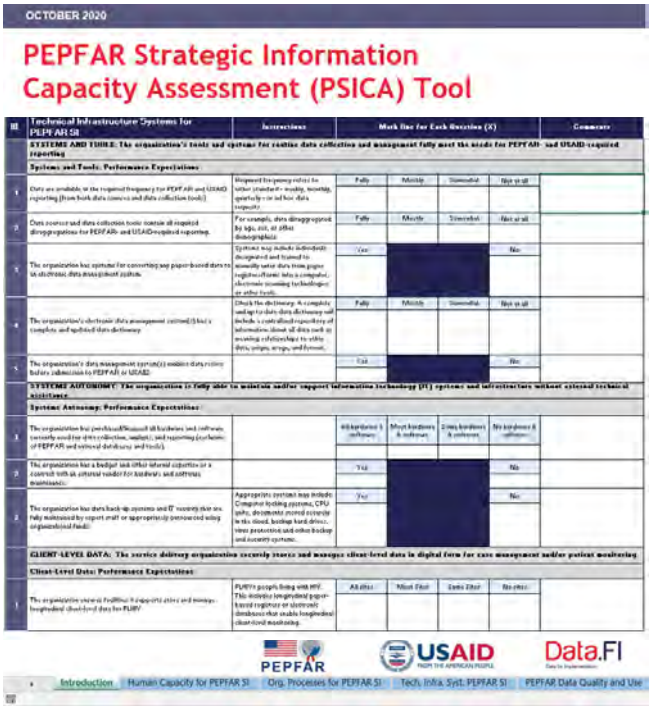
329
people trained

Data.FI is also developing curricula to strengthen the capacity of LPs to improve data quality. We are in the process of finalizing an interactive online course using

Children walking along the main highway in Malawi, where more than a million people were living with HIV in 2018, according to UNAIDS. Photo by Elizabeth T. Robinson

Adobe's Articulate 360 software to introduce and provide practical exercises on how to implement the USAID/PEPFAR HIV Cascade Quality Assurance Tool. This course can be completed by any LP interested in using this site-level data quality and quality improvement resource.

> **"The [SI capacity assessment] process has been really helpful. [The PSICA tool questions] are quite easy to follow and easy to understand."**
>
> — Grace Kumwenda, Chief of Party, Local Endeavors for HIV/AIDS Prevention and Treatment Project led by the Pakachere Insittute for Health and Development Communication Malawi



Data.FI is supporting USAID's LP transition goals by assessing the SI capacity of LPs and generating packages of technical assistance. This PSICA tool allows LPs to review their performance against indicators.

Gender Strategy Update

Although PEPFAR MER data collection requires sex and age disaggregation, and the quality of these data has improved immensely over the past decade, Data.FI has found that analysis and reporting of these data by governments and their partners are not routinely conducted. This is a missed opportunity to use the granularity that sex and age disaggregations provide to focus resources to address gender-related reasons for programmatic performance variation. Reasons for differences in access to services by gender and age may include fear of being "outed" as HIV positive and, therefore, being identified as a member of a stigmatized group; gender-discriminatory treatment at a facility; or fear of violence from an intimate partner. It is also known that GBV is a driver of HIV infection, especially among AGYW.

Data.FI promotes the integration of gender across its activities, supports efforts to improve the quality, availability, and use of gender data to strengthen and scale up gender-equitable HIV services, and to empower women and girls to lead and sustain data-driven approaches to HIV programming and policymaking.

M&E staff from Côte d'Ivoire's National OVC Program during a training of trainers on using the upgraded version of OVC and DREAMS databases. Photo by Data.FI/Côte d'Ivoire

A group of young beekeepers in Rwanda enjoys time together. Data.FI supports sex- and age-disaggregated data to identify gender-related reasons for variation in access to services or program performance. Photo by Michael Bianchi, courtesy of Flickr Creative Commons

In **Burundi**, Data.FI supported a gender analysis of routine HIV testing data. The results showed a higher proportion of female index clients compared with males. In response to these findings, IPs are now adapting strategies to further target men for testing.

In **Côte d'Ivoire**, through an analysis of routine data, IPs found that more women than men access HIV services, primarily because women and girls receive entry point screenings for prevention of mother-to-child transmission during pregnancy. IPs are now working to expand access points that target men and boys. Through its support, Data.FI has demonstrated to partners the value of gender analysis, which has led them to routinely examine gender differences.

Data.FI is building digital solutions that mitigate gender-based discrimination and violence.

Data.FI's work to integrate gender has also gone beyond the use of disaggregated data to include improving access to and reporting on gender-focused issues, including GBV, a priority of both PEPFAR and USAID's Policy on Gender Equality and Female Empowerment. In May and June 2020, in response to a request from the USAID/ Nigeria Mission, **Data.FI Nigeria** mapped PEPFAR custom GBV indicators (indicators that Data.FI developed and published in its *HIV Custom Indicator Compendium*, released in early 2020) and added them to the Automated Partner Performance

Reporting (APPR) system. These custom indicators were aligned with the MER 2.4 indicator guide, and mapped to the age and sex disaggregates, with the goal of tracking GBV services across the clinical cascade, especially for key populations. Armed with more robust indicators, USAID is now advocating for complete reporting in the APPR to ensure that GBV services are institutionalized in the clinical cascade to improve monitoring of GBV case identification, prevention, and response activities, and linkages between community-based HIV and clinical post-GBV interventions.

Using sex- and age-disaggregated data allows implementers to focus resources to address gender-related reasons for programmatic performance variation.

COVID-19 GENDER GAP IN NIGERIA

Data.FI is illuminating gender gaps and working with IPs to use results to inform action.

Globally, the World Health Organization has found little difference between the number of COVID-19 cases in men and women.[5] Nigeria, however has reported significantly more cases in men. In analyzing national data, Data.FI found that about two-thirds of confirmed cases reported July–September 2020 were among men, and only about a third were among women.

From conversations with stakeholders at the state level, one major reason suggested for this gender gap is the lack of health-seeking behavior of men. Men are also to said engage in more risk behavior, such as ignoring social distancing suggestions and working outside the home. In addition, testing may be more common among men. While it's not clear why this gender gap exists, it's important that decision makers have access to gender analyses so that they can target interventions appropriately.

Sex-disaggregated COVID-19 data analyses at state level in Nigeria. Dashboard by Data.FI/Nigeria.

[5] See https://globalhealth5050.org/the-sex-gender-and-covid-19-project/men-sex-gender-and-covid-19/

Conclusion

Over the past year Data.FI has contributed significantly to optimizing HIS across Africa, ensuring that USAID and partners maximize efficiencies in data capture, strengthen data quality and data protection, and build robust, longitudinal datasets that allow for client-centric analytics to guide the response. Data.FI continues to expand our work in decision making and programmatic improvement for countries, USAID, and partners through rigorous analytical products and frameworks, decision-support tools, and compelling visualizations.

A hallmark of Data.FI is our ability to provide **end-to-end, user-focused solutions**—from setting analytical objectives, to designing a fit-for-purpose measurement, data capture, and management strategy, to strengthening data quality and use—and to optimize any component of the strategic information pipeline. We do this by leveraging our in-country relationships and partnerships to maximize cross-project and cross-donor collaboration and to institutionalize practices within service delivery programming. We build on what exists, and innovate to improve efficiency and transform client-centric and public health outcomes.

Our approach is built on these foundational principles:

We foster country leadership. Data.FI is working with governments to strengthen HIS governance and capacitates and works with local partners. This year we have built HIS capacity in Namibia, Burundi, and Côte d'Ivoire, and drawn on local expertise to develop local, in-country solutions in South Africa, Nigeria, and Namibia.

Our solutions are driven by local needs and customized to the local context. Data.FI is working with stakeholders to define use cases *driven by public health and client care objectives*, and that are rooted in local decision-making processes and the local data ecosystem. In this way, we maximize

the impact, efficiency, and sustainability of our solutions. In South Africa we developed an analytical framework to guide the development of a context-appropriate solution, and we worked with USAID to define analytical use cases for the COVID-19 response.

We prioritize sustainable, open-source solutions. Whenever possible, we recommend and employ low-cost solutions that support country ownership. In Nigeria we are optimizing an existing open-source EMR leading a local, cross-partner community of practice. In South Africa we are shepherding open-source solutions for data warehousing and analytics.

We follow "lean data" principles. We are advocating for the collection and analysis of data needed to fulfill the information needs of stakeholders, and nothing more. This improves efficiency, ensures that investments are maximized, and reduces the data protection burden. In Zimbabwe we have harmonized indicators and tools across six IPs. In developing global customized indicators and the COVID-19 data capture tool, we have focused on high-impact data. In Nigeria and the West Africa region, we have focused data analytics and review on high-priority indicators linked to a decision-making process.

We rigorously protect client data. Data.FI has developed tools to ensure responsible collection, management, and use of data on key populations and vulnerable groups. Our responsible data framework lays out data management protocols, policies, and tools—and outlines best practices that go 'above and beyond' compliance requirements.

We foster innovation to identify and demonstrate breakthrough solutions. We are catalyzing strategic partnerships to better answer decision makers' questions. This year we demonstrated how the project can link innovators, including those in the commercial space, with development partners through our global COVID-19 response work.

In Fiscal Year 21 we look forward to continuing our work supporting USAID and host countries to strengthen and sustain access to mission-critical, high-quality data to accelerate HIV and COVID-19 epidemic control. We look forward to new opportunities to capitalize on the capabilities of our partnership and our global footprint.

Data.FI country directors and other senior staff meeting virtually during the COVID-19 pandemic. Photo by Elizabeth T. Robinson, Data.FI

Data.FI is driven to improve HIV client care and accelerate HIV epidemic control, leveraging the experience and capabilities in infectious disease surveillance and digital health systems of our partners worldwide.

Data for Implementation (Data.FI) is a five-year cooperative agreement funded by the U.S. President's Emergency Plan for AIDS Relief through the U.S. Agency for International Development under Agreement No. 7200AA19CA0004, beginning April 15, 2019. It is implemented by Palladium, in partnership with JSI Research & Training Institute (JSI), Johns Hopkins University (JHU) Department of Epidemiology, Right to Care (RTC), Cooper/Smith, IMC Worldwide, Jembi Health Systems, and Macro-Eyes, and supported by expert local resource partners.

October 2020

FOR MORE INFORMATION

Emily Harris, Data.FI AOR
emharris@usaid.gov
+1-571-309-1266

Jenifer Chapman, Project Director
jenifer.chapman@thepalladiumgroup.com
+1-202-775-9680