

## Background

The University of California, San Francisco is part of the 10-campus UC public university system in California. It is exclusively dedicated to health sciences through its top-ranked Schools of Medicine, Pharmacy, Nursing, Dentistry, and Graduate Division with 19 PhD and 11 Master's Programs, including Global Health.

UCSF's Institute for Global Health Sciences (IGHS) has been working with CDC PEPFAR-supported countries since 2004. In 2015, IGHS created the Health Informatics Hub. The Hub focuses on establishing data pipelines – from data collection systems all the way to analysis and visualization – to track and respond to HIV epidemics. The Hub has expanded to serve malaria elimination and pandemic response strengthening efforts. Our informatics team spans five countries and has:

- 40+ staff members with multi-disciplinary expertise, including general software and app development; data integration and linkages; policy and governance; big data and data warehouses; electronic medical records (EMRs); statistical analysis and data triangulation; data visualizations, dashboards and standards; interoperability and data exchange;
- Extensive experience building and maintaining collaborative relationships with ministries of health, local partners, universities and international donors;
- Strong integration with IGHS Global Strategic Information's surveillance and monitoring and evaluation programs.

## Core Capabilities

### Electronic medical records

The Hub can support the identification, development, and implementation of electronic medical record systems. It leverages various open-source EMR systems, such as OpenMRS and custom open-source tools like Django/Python, and is currently the lead developer of an OpenMRS-based EMR focusing on HIV, COVID-19, maternal and child health, and cervical cancer, with other disease areas in active development as well.

### Unique identifiers and master patient index

The Health Informatics Hub can help countries establish unique identifiers within a master patient index that can be used throughout the health system to identify, track, and

link clients through HIV and non-HIV related health services. This includes de-duplication of clients and extracting information into a single, comprehensive client record.

### Case-based Surveillance (CBS)

The Hub can develop individual, de-duplicated, longitudinal HIV datasets to support case-based surveillance, which allow clients diagnosed with HIV to be followed up individually over time as they move from initial diagnosis through care and treatment and ultimately to viral suppression. The Hub developed a data warehouse and interactive dashboard for CBS in Kenya analyzing over 700,000 clients active on antiretroviral therapy at more than 1,000 facilities. The Hub is also supporting Myanmar, Uganda, and Namibia with comprehensive CBS strategies.

### Monitoring systems and surveillance tools

The Hub supports CDC offices developing partner-monitoring systems based on the open-source health information management system DHIS2 and other technologies, including ODK, Python, and CommCare. The Hub has also developed some continuous quality improvement (CQI) tools to provide near real-time monitoring of quality-of-service delivery.

### Data warehouses for health

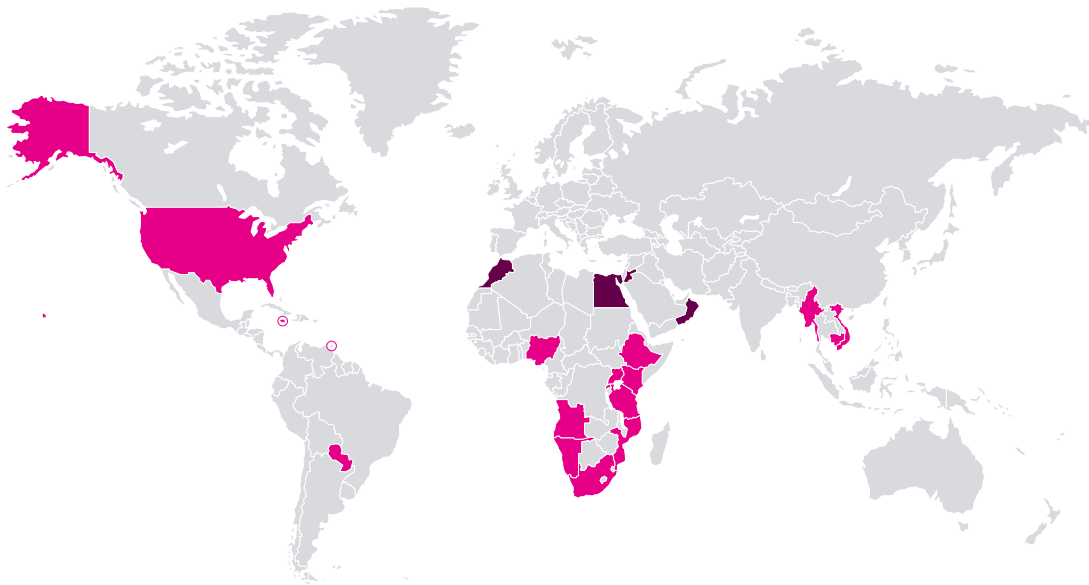
The Health Informatics Hub has extensive data warehouse expertise. Data warehouses can integrate data from a wide variety of heterogeneous datasets and databases and present them as a single, unified dataset. The Hub has a dedicated data warehouse/business intelligence team responsible for extracting data from source databases; cleaning, linking, and transferring it to the data warehouse; and transforming data to machine readable formats to meet reporting and analysis needs.

### Health Information System (HIS) assessments

The Hub supports comprehensive HIS assessments to define capacity and progress within the HIS landscape. Focus areas can be defined and customized by stakeholders, but might include HIS planning, eHealth strategy, enterprise architecture, interoperability frameworks and standards, workforce and in-country capacity, and eHealth governance and policies. HIS assessments can also be tailored to achieve specific objectives, such as feasibility for producing clinical cascades, indicator realignments, country-wide evaluations, etc.

### Data visualization

The Health Informatics Hub works with stakeholders to formulate and articulate use cases to explore data from

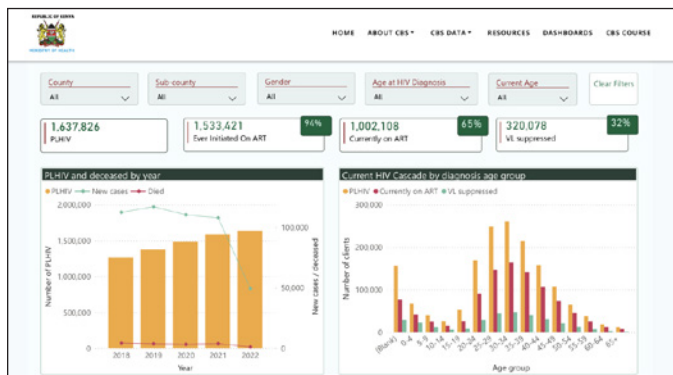


## Where we work

The Hub has multiple ongoing projects in the Caribbean, North and South America, Africa and South East Asia with emerging projects in the Middle East and North Africa.

■ Recent and ongoing projects  
■ Emerging projects

the national down to the patient level. Our skilled data visualization team builds sophisticated dashboards to answer pressing questions and turn data into actionable information.



Comprehensive CBS Kenya dashboard

## Server and Cloud infrastructure

As cybersecurity policies grow more complex, the Hub provides the sophisticated expertise needed to properly secure systems. The Hub also provides design, provision, and administration of cloud-based servers with Azure. Cloud hosting allows for rapid response to project storage needs, with the flexibility to spin up new servers or decommission old ones within days.

## Emerging Areas

### Machine learning and Big Data

With the increasing availability of health data, there is a growing opportunity for machine learning to improve quality of care and use of resources. With programmatic

and technical expertise, the Hub is poised to integrate machine learning models, such as disease forecasting or other predictive analytics, into data pipelines.

### One Health and pandemic response

Pandemic response and One Health approaches require innovative technologies and solutions to harness multiple data streams for real-time response. Data integration across multiple ministries and disparate stakeholders creates unique challenges and requires different approaches for data systems. The Hub leverages IGHS domain experts and strong relationships across ministries to guide digital strategies.

### Electronic cancer registries

Understanding the burden of cancer incidence, treatment and outcomes is a critical component for clinical cancer care, surveillance and research purposes. The Health Informatics Hub is positioned to support development of cancer registries to track high-level incidence, treatment, and outcomes. The Hub can provide anonymized and standardized cancer registry data to research and surveillance consortia as well as identifiable data of recently diagnosed patients for clinical trials.

## Our Team

**Director:** Fitti Weissglas (Kenya)  
**Deputy Director:** David Mugume (Uganda)  
**Program Manager:** Michelle Moghadassi (California)  
**Program Coordinator:** Denise Barrios (California)

### Technical Team Leads

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