



# DEVELOPING AN OPEN-SOURCE DATA VISUALIZATION DASHBOARD TO FACILITATE THE ANALYSIS AND USE OF PATIENT-LEVEL DATA

## KENYA

### Background

When health managers and ministries of health have easy access to patient-level data collected across health facilities, they are better able to make informed decisions about how best to channel human and material resources to improve health services and patient outcomes. However, many countries in sub-Saharan Africa lack a centralized system into which all President's Emergency Plan for AIDS Relief (PEPFAR) implementing partners can input patient-level data from health facilities in their respective regions or provinces. This means

that, in these countries, there is generally no way to make comprehensive analyses and comparisons using patient-level data, and that health managers must rely on aggregate data to inform their decisions.

### Project Overview

From 2013 to 2015, ICAP collaborated with the Centers for Disease Control and Prevention (CDC) and Kenya's National AIDS and STI Control Program (NASCO) to develop a pilot, web-based system to capture all electronic patient-level data collected



at PEPFAR-supported health facilities across the country. In addition, a user-friendly dashboard was developed to enable health managers to assess key HIV care and treatment indicators across individual patients and to compare them by region, age, sex, etc.

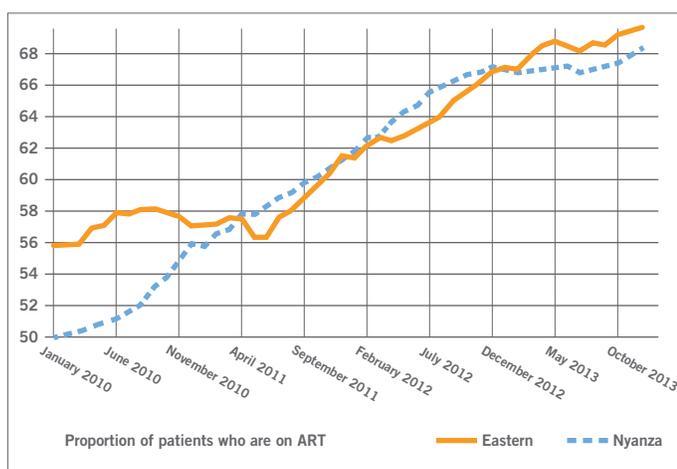
### *Developing a National Warehouse for Patient-level HIV Data*

ICAP began by developing a common-format, patient-level data warehouse that includes a list of essential patient-level data elements. Next, customized tools were developed to de-identify these data elements and import them from each HIV implementing partner's existing patient-level database (including ICAP's) into the new common-format data warehouse. By 2014, ICAP had worked with NASCOP and five PEPFAR implementing partners working in Kenya to populate the new national warehouse with existing patient-level data.

### *Developing a User-friendly, Web-based Dashboard to Facilitate Data Visualization and Use*

To enable local health managers and implementing partners to easily access and compare patient-level data from the national warehouse, ICAP developed a web-based HIV care and treatment dashboard using an open-source version of *Infoveave*. The new tool enables users to generate customizable charts and tables assessing characteristics and outcomes of patients enrolled in HIV care and treatment services at facilities with electronic patient-level data, and to assess patient outcomes over time. For example, the tool enables users to easily create graphs illustrating the difference between patient survival following antiretroviral therapy (ART) initiation among men and women; or to compare the proportion of patients on ART by region (see figure).

**Figure: Example Output of New Patient-Level Dashboard**



## What Was Achieved

The web-based data visualization dashboard represents a robust, open-source interface for users to summarize large amounts of HIV-related programmatic data in a user-friendly way. The platform, which is both modifiable and non-country-specific, is freely available and could be adopted by any ministry of health that does not currently have a national-level electronic HIV database.<sup>1</sup> Countries with national electronic HIV databases may also find the front-end interface useful for data visualization, and only a small investment would be required to organize their databases to take advantage of the front-end displays. The tool has the potential to substantially enhance the use of routinely collected, electronic patient-level data for HIV program monitoring, evaluation, and operations research, allowing users to gain a more comprehensive understanding of HIV service delivery through the creation of customized data reports that meet their specific needs. The tool can also be implemented on a smaller scale by individual implementing partners; for example, ICAP is currently rolling out country-specific data visualization dashboards to all of its country-level offices.

## Lessons Learned

- Strong, national-level buy-in is critical for developing a national, patient-level data warehouse and for encouraging the collaboration needed from all implementing partners throughout the development process.
- High-quality, user-friendly visualization of electronic patient-level data is feasible—without requiring users to have sophisticated statistical expertise—and has the potential to greatly enhance data usage.

1 To learn more about how to access the open-source dashboard, email [ICAP-communications@columbia.edu](mailto:ICAP-communications@columbia.edu).