



eSaúde: Building a Local OpenMRS Community to Support a National EMR Implementation in Mozambique

The southern African country of Mozambique suffers under the most extreme challenges for resource-poor countries: economic instability, political strife, civil unrest, corruption and crime, unreliable infrastructure such as transportation and telecommunications, and a large-scale HIV epidemic that has yet to be declared under control. The United Nations positions Mozambique's Human Development Index at number 180 out of 188 countries, placing it as the 8th lowest nation in the world for the three basic dimensions of human development: a long and healthy life, access to knowledge, and a decent standard of living. Over 11 percent of the adult population is infected with HIV, and

approximately one in ten children will die before their fifth birthday. Compounding Mozambique's problems is a serious shortage of trained medical staff, with only 64 doctors/nurses per 100,000 people. The nation has enormous need and opportunity for improving its healthcare system and the lives of its residents. In the face of their crisis, Mozambique is working to equip its medical clinics across the nation with an electronic medical records system (EMR). Mozambique believes an EMR can empower clinicians to give high quality and consistent care to those most in need, while allowing the country to reap the insights of comprehensive reporting for responsive public health decision making.

“Our overarching goal as health workers is to make sure every person, across the globe, has access to health care services. The only way we know that is by having reliable data. Otherwise we just don’t know what is being effective or who we are reaching.”

Jan Flowers, University of Washington

The Challenge

Medical record keeping in Mozambique was a collection of poorly managed paper records and siloed databases with limited functions. Systems were not kept up to date, were not standardized in the manner they were developed or maintained, were not harmonized in the data they collected, and



2014: Paper medical records management in a typical health facility in resource constrained settings.

were only used for reporting indicators back to funders. Because the data were siloed and not standardized, the country’s health ministry and clinical care organizations could not access and use information to see if clinical care was being properly administered, if programs were effective, if the sick

were being treated, or if populations were missing from key care.

A Local and Collaborative Model: The eSaude Community

In a country like Mozambique, resources for programming, system implementation, and system maintenance and support are severely limited. The U.S. Government’s (USG) President’s Emergency Program for AIDS Relief (PEPFAR), with The Centers for Disease Control and USAID, funds six clinical partners and two technical partners to support the Mozambique Ministry of Health to provide care and treatment to the 1.5-million HIV patients. In 2014, a decision was made to have a comprehensive EMR that would be suitable for national use. The partners determined that OpenMRS had unique qualities as both a software product and as a global community that could be leveraged quickly by the Ministry and be sustainable for long-term use after the USG no longer financially supports the country’s programs. Because programming and implementation staffing were spread across organizations, they formed a Mozambique-based OpenMRS community called eSaude for collaboration and knowledge sharing on the project. The larger global OpenMRS community would serve as both a model for the collaboration and as a mentor for learning and developing OpenMRS software.

OpenMRS is an open-source platform with foundational components for building an EMR: core healthcare data model, application programming interface (API),

and the ability to customize data collection and reporting tools to the local context. A central tenet of the project is that local partners, organizations, and developers must drive implementations in order for them to be successful. With the eSaude community, the Mozambicans had a shared vision and non-competing environment to be able to work together on the EMR. They define the requirements, centralize resources to customize OpenMRS for their context, and share tools and knowledge to perform the implementation and provide ongoing support.

“It’s not just that we are impacting the lives of the patients. It’s also that we are building the capacity for the local participants to own the system. To build them the way they need,” said Flowers. “Good jobs are created and skills are learned.”

The Results

Today the eSaude community consists of 114 Mozambique-focused software developers, implementers, program managers, and M&E folks working towards a common platform of health information systems to improve the lives of Mozambicans. The eSaude distribution of OpenMRS is now deployed in over 200 facilities across seven provinces in

Mozambique, impacting hundreds of thousands of lives.

In 2014 and 2015, with guidance from the global OpenMRS community, the eSaude community produced an impressive collection of code, best practices, and interoperability tools. Some of their accomplishments include an implementation toolkit that enables those in the field to quickly implement the solution in a standardized and supportable manner, and data exchange tools that allow data from facilities to be aggregated and made available at the provincial and national levels. The community also created an OpenMRS Point of Care user interface for HIV, Maternal, and Child Health (MCH) care and treatment tools in OpenMRS, and an OpenMRS SMS appointment system so patients are reminded of their appointments.

A compelling example of the benefits of the system is with maternal and child health. On paper, without a national person identifier, tracking patients between services was unreliable, if not impossible. Once the baby is born there is no way to track if the baby is tested, enrolled, and receiving treatment, which as we know now is incredibly crucial to ensure a productive life for the child. With the new eSaude OpenMRS implementation, clinicians and program directors are able to see the transition from pre- to post-natal care and monitor the child through the Child-At-Risk program.

2015 was a watershed year for eSaude, as the local community hosted the OpenMRS Annual Implementers Meeting in Mozambique, bringing senior experts in medical informatics and software development to the country. Because of

their experience with OpenMRS, they have gone from a country with no capacity for building and using software to support direct clinical care to now building and supporting an enterprise-level Health Architecture that includes OpenMRS.



The Future

eSaude is now working toward matching the CDC's goal of having 80 percent of 1.5-million HIV patients in Mozambique on treatment and thus monitored by the eSaude EMR. The community is also working toward ambitious functionality improvements for the ongoing implementations, including HIV-testing tools

that would allow community health workers to identify, refer, and track patients into clinics for treatment, reducing the number of patients lost to follow up.

The eSaude community continues its work with the global OpenMRS project. Its members are becoming more active participants in OpenMRS, with some even becoming OpenMRS Google Summer of Code mentors, partners in other countries OpenMRS works, and contributors to ideas for the core codebase and modules. The greatest by-product of an open and collaborative project like OpenMRS is the capacity to help other countries improve their healthcare. Instead of reinventing their own systems, future national implementations can use the innovation and passion of the eSaude group. An audacious initial goal now is fully in the grasp of the people of Mozambique.

If you are in the healthcare IT world, please consider joining or supporting our community. Together, we will achieve many more audacious goals.