Open Health Information Exchange (OpenHIE)

OpenHIE works to help underserved environments better leverage their electronic health information through standardization.

Supporting Organizations

Apelon – medical terminology in practi
Cardno – Shaping the Future
CDC – Centers for Disease Control and Prevention
dimagi
ecGroup Inc.
HINGX
HISP – Health Information Systems Programme
IDRC | CRDI – International Development Research Centre / Centre de recherches pour le développement international
Canada
InSTEDD
IntraHealth International – Because Health Workers Save Lives.
jembi health systems
Mohawk College
NetHope
PEPFAR – U.S. President's Emergency Plan for AIDS Relief
Public Health Informatics Institute
Regenstrief Institute
Rockefeller Foundation – Innovation for the Next 100 Years
Redwood MedNet
RTI International
sysnet international
ThoughtWorks
USAID – From the American People

OpenHIE

More Information @ **www.ohie.org**

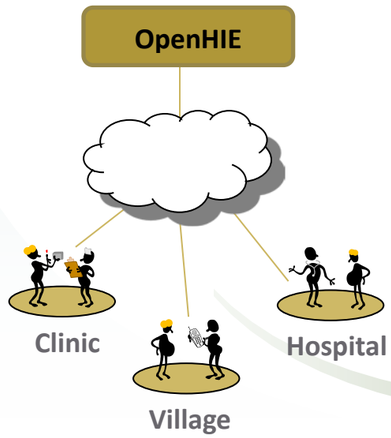
Technology Saves Lives…

Mosa is a 19-year-old woman living in a small village in Rwanda. Mosa is pregnant, and like many in her village, she is HIV positive. She is registered at a local clinic providing Ministry of Health sponsored antenatal care (ANC). The clinic uses a local instance of an electronic medical record (EMR), referencing her national ID and syncing with her country-wide shared electronic health record (EHR) maintained in the Ministry's database. The clinic's EMR notes that she requires a hospital delivery using PMTCT (prevention of mother-to-child transmission) protocols. This information is updated to the national shared EHR.

Weeks into her pregnancy Mosa experiences minor bleeding or spotting. During a routine home visit, Mosa's community health care worker (CHW), Grace, logs this information. Grace uses a basic mHealth application on her mobile phone to update Mosa's EHR. Grace advises Mosa to go to the local clinic for a checkup. At the clinic Mosa is found to be anemic and referred to hospital for follow-up. The referral is flagged as urgent, and is updated to Mosa's shared EHR.

Three days later when Mosa has not checked into the hospital, a mobile alert is sent to Grace to follow up with Mosa. Grace finds her at home with a severe fever. Grace arranges for Mosa's transport to the hospital where they retrieve her medical history from the shared EHR. With this important information, they are able to provide appropriate care to Mosa and her unborn baby.

OpenHIE Has Created a Functional Health Information Exchange in Africa



The first OpenHIE implementation is the Rwanda Health Enterprise Architecture (RHEA) project. The cloud-based eHealth infrastructure supports continuity of care over time and between care delivery sites. RHEA also helps health system managers implement and manage guideline-based care processes and further facilitates data aggregation to support population health planning as well as monitoring and evaluation (M&E).

OpenHIE SUPPORTED BY PEPFAR – U.S. President's Emergency Plan for AIDS Relief

Rwanda Health Enterprise Architecture (RHEA) Project

RHEA has positively demonstrated how a health information exchange based on open-source tools has made it possible to deliver community-generated health information to multiple disparate stakeholders at the point of care in a resource-challenged setting.

Today RHEA enables access to up-to-date information about pregnant women's medical records and histories across several clinics. Health workers in Rwamagana District now have immediate access to a mother's health information—even from another clinic, hospital, or from data captured in the community—to make informed decisions about which services to provide.

RHEA's OpenHIE Enterprise Architecture integrates mobile and traditional eHealth component, including hosted/cloud-based infrastructure, to facilitate continuity of care supported by shared, longitudinal health records for each individual. This technology not only benefits the current maternal use case, but also establishes a generalized Health Enterprise Architecture which can be applied to future health interventions throughout the country.

The RHEA architecture is illustrated in Figure 1. As described in the diagram below, RHEA leverages a number of architectural elements.

The health information exchange architecture within Rwanda is composed of 6 open source components, all interacting/interoperating to ensure that health information from various point of service applications is aggregated into a unified person-centric medical record.

To accomplish this, the exchange normalizes the context in which health information is created across four dimensions: 1) who received health services, 2) who provided those services, 3) where did they receive the services, 4) and what specific care did they receive.

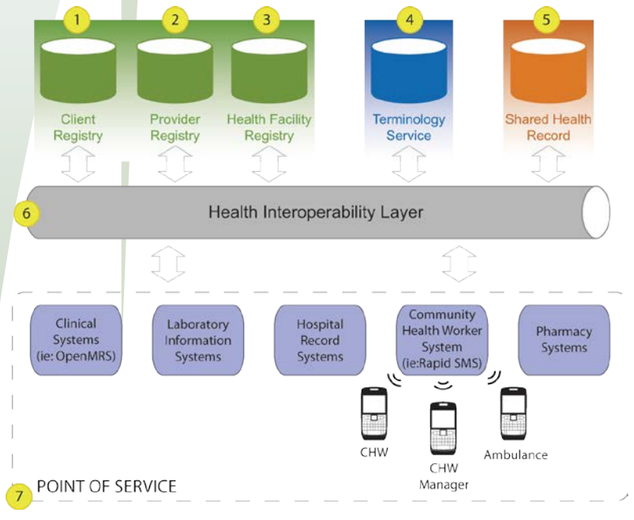


Figure 1: RHEA OpenHIE Enterprise Architecture

1. An enterprise master patient index (EMPI), or **Client Registry** manages the unique identity of citizens receiving health services with the country – "For whom"
2. A **Provider Registry** is the central authority for maintaining the unique identities of health providers within the country – "By whom"
3. A **Health Facility Registry** serves as a central authority to uniquely identify all places where health services are administered within the country – "Where?"
4. A **Terminology Service** serves as a central authority to uniquely identify the clinical activities that occur within the care delivery process by maintaining a terminology set mapped to international standards such as ICO10, LOINC, SNOMED, and others – "What?"
5. A **Shared Health Record** (SHR) is a repository containing the normalized version of content created within the community, after being validated against each of the previous registries. It is a collection of person-centric records for patients with information in the exchange.
6. A **Health Interoperability Layer** receives all communications from point of service applications within a health geography, and orchestrates message processing among the point of service application and the hosted infrastructure elements.
7. **Point of service applications**, such as the OpenMRS electronic medical records (EMR) system and the RapidSMS mHealth application, are used by clinicians and by community health workers to access and update a patient's person-centric shared health information and to record healthcare transactions.

How OpenHIE Makes a Difference

OpenHIE is a community of people who all are deeply committed to serving the very poorest of the poor: to bring responsible technical solutions to large scale electronic health information sharing. We are composed of a diverse group of organizations and people collaborating and employing open source technologies and international standards to enhance the value and availability of health information.

The OpenHIE initiative actively addresses the dimensions of technology, interoperability, community development, and uptake of international health information standards to support real world, resource-constrained use cases. By working with reference open source components, we hope to simultaneously create real world implementation value for countries that immediately need support and harvest common architectural approaches from those experiences for future reuse.

An important aspect of our community approach is to work in solidarity with countries to build the local capacity to further develop and support these technologies and approaches long-term. In many ways, individuals from Rwanda are fundamental members of the community in the same way that members from a standards-development organization would be.

Our Mission

Our mission is to improve the health of the underserved through the open, collaborative development and support of country driven, large scale health information sharing architectures.

Our Vision

We envision a world where all countries are empowered to pragmatically implement sustainable health information sharing architectures that measurably improve health outcomes.

"Help us understand what your needs are and help us build technologies that are supportive of those needs."

Aid Organizations Working Together to Strengthen National Health Systems

Working with humanitarian sponsors, including the President's Emergency Plan for Aids Relief (PEPFAR), the Rockefeller Foundation, and the International Development Research Centre (IDRC), OpenHIE advances efforts to address the major health threats facing resource challenged economies today.

OpenHIE promotes philanthropic goals by making comprehensive, value-enriched information available for policy development, system planning and decision-making. This information supports initiatives already underway including:

- Transitioning emergency response programs to sustainable country programs;
- Strengthening partner government leadership capacities;
- Expanding prevention care and treatment for concentrated and generalized epidemics;
- Maximizing health system impact by integrating and coordinating local and global health and development programs; and
- Developing research and evaluation programs to optimize health system operations.