

Inter-operability, Integration & Standardization of E-Health Initiatives in Malawi: Current Efforts & Prospects

By Shawo Mwakilama

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1. Introduction

- e-Health:

- *WHO defines e-Health as the use of information & communication technology for health.*

- *Is the use of technologies to improve access, efficiency, effectiveness & quality of clinical care and business processes, with an aim to improve health outcomes (HIMSS).*

- In Malawi, e-Health emerged from at least 10 years ago, and today is one important area in health.

- The primary purpose is to help improve health care – efficiency, effectiveness etc in e.g. *pharmaceuticals management, continuum of care – improved patient outcomes (ART program).*



1. Introduction cont'

- One common problem is usually existence of various players with different e-Health solutions that are NOT inter-operable and integrated e.g. *EMRS, mHealth, Telemedicine, etc.*
- Fragmentation of e-health systems creates many challenges
 - For example, USA faced problems due to presence of many vendors providing e-health solutions with different standards.
 - Inability to electronically transfer information between two different systems.
 - *No continuity of patient care*
 - *Difficult to compile reports*
- International organizations (e.g. The EU, WHO) and countries such as Canada, Australia, Denmark, UK began placing greater emphasis on interoperability and standards for e-health.



1. Introduction ... cont'

Key Terms Defined

- **Interoperability:** *Is the ability of data and information generated by one system to be accessed and (re-)used in a meaningful way by another system, whether or not the latter is based on different technologies (Open Clinical, 2007).*
- **Integration:** *Is the linking together of an array of multiple information or data sets through a well defined protocol e.g. coordinating the merging of data from different systems within or across health facilities.*
 - *It can also refer to the merging of functionalities of different systems or software applications to function as one whole.*
- **Standards:** *Are technical specifications set to guide in the development of e-health solutions, to ensure quality, uniformity, easy access and so on.*



1. Introduction cont'

Key Areas of focus in Inter-operability, Integration & Standards

1. Architecture

- Overall structure or plan for a health information system e.g. components & their relationships.
- Platform of applications e.g. design & ability to interface with other systems.
- Communication or messaging system capability e.g. HL7.

2. Data Dictionary/ Vocabulary

- Clinical concepts – uniformity and easy sharing of data/ info.
- Data mapping & relationships between them.
- Other standard conceptualizations/ understanding – prevents medical errors and adverse events.

3. Security

- Data & system privacy and security – prevent unauthorized access, loss and theft.
- Unique identifiers (individual & organizations) – easy identification and continuity of care for patients, able to identify and transmit info. Between organizations in the network.



1. Introductioncont'

4. Messaging standards

- Establish format and sequence for data transmission

5. Networks & Infrastructure

- Hardware solutions e.g. workstations, hand-sets, printers, etc.
- Connectivity – ability to connect with other machines and organizations.
- Power solutions – standard power equipment (durable, easy to find on the market, etc)



J2



Barcode Printer



Barcode Scanner



2. Why Is Interoperability, Integration & Standardization of e-Health Initiatives Important

- *It benefits patients, health workers, health facility managers, researchers and policy makers.*

1. Interoperability & standards enable e-health systems to exchange data/ info. accurately & consistently, & use the info. exchanged.
2. Improves access to health records and information e.g. health workers accessing patient history from different systems.
3. Assists with continuum of care as patients data can be accessed/ moved within and across health facilities.
4. Enables decision makers and facility managers to have access to data with which to forecast on supplies/ needs, & do various analyses e.g. economic, resource allocation, and so on.
5. Increases availability of clinical data which can be useful for research, surveillance and other purposes.



4. Methods

- Used a qualitative approach.
- Listed and reviewed documents of some main e-health implementers in Malawi.
- Undertook an e-health situation assessment in selected districts in Malawi – *Karonga, Mzimba North, Lilongwe, Dedza, Blantyre and Thyolo*.
- Analyzed e-health implementations in relation to interoperability, integration and standardization.
- Complemented with information from e-Health meetings and workshops.



5. Results

1. Existence of various implementers and systems, but which are not inter-operable or integrated. *Patient identifiers are also different.*

| # | Implementer | Systems |
|-----|------------------------------|--------------------------------------|
| I | EMR | |
| | Baobab Health | OPD, ART, EPICS, ANC, Maternity etc. |
| | Luke International | Paxi Radiology & TESMART |
| | Nkhoma Mission Hospital | Afyapro |
| | MSF France | FUCIA |
| II | mHealth | |
| | D-Tree | Maternal-Child health application |
| | COOPI | MNCH |
| | Village Reach/ Baobab Health | MNCH |
| III | Telemedicine | |
| | Kenya Central and Coast | |



5. Results

Example

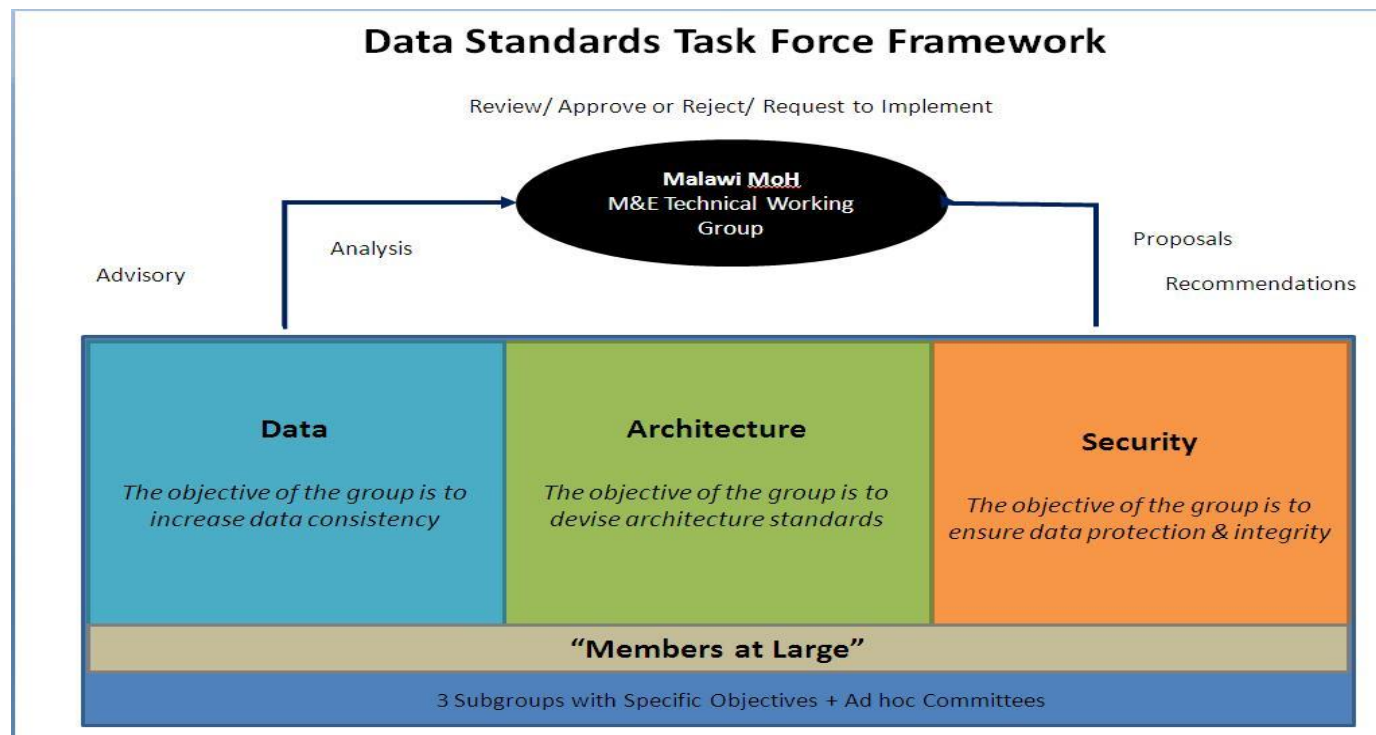
- Baobab Health: Data model is OpenMRS, MySQL database, Ruby on-rails (programming framework), Linux.
- Luke International: Microsoft SQL server, Visual basic 6.0, MS windows
- D-Tree: MS Windows
- Afyapro: Microsoft SQL server, Microsoft C#.NET,



5. Results

2. MoH established the National Data Standards Task Force

- To formulate policies and standards to guide implementations of health information systems.
- To monitor implementations of partners in the sector.
- To provide a forum for Implementers to update each other on their work, share knowledge and experiences, and partner in some initiatives.



Source: Chawani, M; Mwakilama, G.S., et. al. (2011)

5. Results

3. E-Health Strategy development (2012 – 2013) and implementation from 2014.

- to address issue of having stakeholders implementing e-Health initiatives without a clear National Strategy to guide them.
- to highlight MoH's areas of interest and have implementations done in a coordinated manner.

4. MoH mandated e-Health implementers to use HL7 as a standard national messaging system for the sector, though only few players follow this.



5. Results

5. Partners/ stakeholders initiatives

- **Integration:** In 2012, Baobab Health and Luke International decided to integrate functionality of Baobab ART and TESMAT systems into one National EMR. Now the NEMR is being rolled out.
- **Migration:** In 2012 to 2013, MSF Belgium migrated to Baobab's Electronic Medical Record system, which is a de-facto national EMR.
- **Interoperability:** Baobab worked with CMED at MoH to initiate the transfer of patient level data from Baobab EMR to MoH's District Health Information System (DHIS), which stores aggregates.

6. mHealth Subgroup under Data Standards Taskforce was established recently as another platform where stakeholders can set standards, share experiences, and partner in some projects.



5. Results

Short-comings

- Yet to have national standards as official and compulsory for every implementer to follow, with clearly defined way(s) of dealing with those that do not follow.
 - *Delays by the National Data Standards Taskforce to finalize critical standards documents – Architecture, Security and Data dictionary.*
- No deliberate and close monitoring of the work of partners.
- Lack of enforcement mechanisms.
- Inadequate resources – financial, human and infrastructure, for MoH to pioneer work in e-Health; and therefore NGOs and donors lead and define the course.



5. Results

Future Prospects

- Interoperability and integration of systems is possible as most systems in Malawi have been implemented either at a small scale or are still in pilot phase, unlike in other countries e.g. in the West with many private vendors in the health sector.
- Partners willingness to get involved in the National Data Standards Taskforce can facilitate adoption and adherence to agreed upon standards/ policies.
- Current advocacy/ conversation is building momentum for the same.



6. Conclusion & Recommendations

- Existence of many players e.g. in EMR and mHealth, but with the majority of systems that are not inter-operable/ integrated.
 - *But few partners embarked on integration and interoperability.*
- Malawi should have a clear road map to achieving interoperability, integration & standardization in e-health sooner than later.
 - *Systems Architecture, Data, Security & Infrastructure*
- Unique national healthcare identifiers for individuals, health-workers and organizations should be introduced/ used.
- Systematic monitoring & enforcement mechanisms should be in place, so that all players adhere to national standards.
- Govt. should make adequate resources available for e-health & its governance.
- Need to have a clear sustainability plan for e-Health initiatives introduced.



Thank you for your attention

Questions and Comments

