Making global the new local! How can digital Health Information Systems support local decision-making?

Achieving Tanzania’s eHealth Vision

Walter Ndesanjo
MOHCDGEC, Tanzania

Nsaghurwe Alpha
MCSP, Tanzania
The Team Leads

Ministry of Health
• Hermes Sotter
• Marcos Mzeru
• Happiness Mariki
• Edwin Nyella
• The eGov team

USAID
• Moses Busiga

Other partners
UCC, IHI, CDC, MNH, MOI, D-TREE, SOFTMED, UDSM, CCBRT, CSSC, RITA, RTI, EGPAF, PS3, IHI, PATH, MDH, MHEALTH TZ PPP, JSI/MEASURE, TFDA, MSD, JSI
Aims of Health Information System

1. Increase citizen access to health information (resources, providers, data from SHR)
2. Better continuity of care across program / facilities / health needs
3. Increased ability to triangulate and compare data across domains / tiers / functions and resources (horizontal across health sector)
4. Better visibility of anonymized patients level data
5. Improved data quality by reduced manual data entry / transfer. Collect once and use multiple times. Single source of all health data the right data and harmonized information system
Health in the SDGs

**SDG 3:** Ensure healthy lives and promote well-being for all at all ages

**Target 3.8:** Achieve universal health coverage, including financial risk protection, access to quality essential health-care services, medicines and vaccines for all

**MDG unfinished and expanded agenda**
- 3.1: Reduce maternal mortality
- 3.2: End preventable newborn and child deaths
- 3.3: End the epidemics of AIDS, TB, malaria and NTDs and combat hepatitis, waterborne and other communicable diseases
- 3.7: Ensure universal access to sexual and reproductive health-care services

**New SDG 3 targets**
- 3.4: Reduce mortality from NCDs and promote mental health
- 3.5: Strengthen prevention and treatment of substance abuse
- 3.6: Halve global deaths and injuries from road traffic accidents
- 3.9: Reduce deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

**SDG 3 means of implementation targets**
- 3.a: Strengthen implementation of framework convention on tobacco control
- 3.b: Provide access to medicines and vaccines for all, support R&D of vaccines and medicines for all
- 3.c: Increase health financing and health workforce in developing countries
- 3.d: Strengthen capacity for early warning, risk reduction and management of health risks

**Interactions with economic, other social and environmental SDGs and SDG 17 on means of implementation**

- Goal 3, “Good health and well-being” calls on countries to ensure healthy lives and promote well-being for all at all ages, with 13 targets and 26 indicators, including the unfinished business of the Millennium Development Goals, as well as new targets such as achieving Universal Health Coverage.

- But the health isn’t limited just to Goal 3. Across all 17 goals, there are numerous targets for which gains in health will have either a direct or indirect influence.
“Common platforms with inter-operability of systems help overcome the problems of poor quality information, inadequate coordination, and weaknesses in governance of health information systems.”

“The increasing use of ICT platforms brings opportunities for increased transparency and accountability”

Measurement and Accountability for Health Summit, Washington DC, 2015
eGov website – Contains guiding policy for ICT in Gov
Strategic Direction: The health and social welfare sector will embrace the rapid development of ICT for improving administrative processes, patient/client recording and communication. The MOHSW will stimulate the development and guide interoperability of systems.
eHealth Strategy

eHealth Strategy identified three strategic objectives as eHealth Foundations:

1. Enhance ICT infrastructure and services to **improve communication and information sharing** across the health systems and at all levels.

2. Establish eHealth standards, rules, and protocols **for information exchange** and protection.

3. Establish comprehensive health facility, provider, and client registries with **complete and current information** that meets stakeholders’ needs.
Health Information System Evolution

**Ad Hoc:** Multitude of systems, no standards, redundancy, gaps, limited scale, no governance

**Organized:** Some nationally scaled systems, limited peer-to-peer interoperability, key architectural gaps, limited governance

**Integrated:** Enterprise architecture, common standards and guidelines, formal governance, linked with broader eGovernment architecture
Current Situation: Data Landscape

- **Data Standards** - Lack of data standards and meta data definitions is a root cause of health sector’s limited ability to analyze, compare, and understand results across the sector with respect to the Health Sector Resources data.

- **Data Integration**: Multiple, non-integrated data sources for budgeted resources, actual, and forecast information, as well as differing sources for decision makers and functional views, require manual aggregation, consolidation, and reconciliation for reporting and analysis.

- **Data Availability**: Limited data available at a detailed level within MoHSW with respect to the entire Health Sector for analysis and understanding of results requiring significant follow-up with each stakeholder for further analysis and understanding.

- **Manual Systems**: Highly manual and time-consuming data capture and report production processes with respect to National and Regional reporting.

- **Data Duplication**: Duplicative and non-integrated processes rather than acquiring data once and leveraging for multiple purposes; MoHSW and its agencies, PMORALG, and MoF, produce ministry service and functional views separately.

- **Data Request Processes**: Significant effort responding to frequent ad hoc requests is caused by the high number of unplanned data requests made to MoHSW and its Agencies.

- **Data Reporting Flexibility**: Existence of highly disparate systems and lack of flexible reporting solutions result in manual reporting processes, and a lack of ability to drill down and quickly aggregate and analyze results across the health sector.

- **Financial Data**: The MoHSW is harmonizing its the Multiple charts of accounts exist within different databases across it Agencies with a view of single financial reporting at Budget, Assets, Accounts Receivables and Accounts Payables. This has helped to improve financial analysis within the ministry.
Current Situation: Data We Have

- We know **what service** (eg. ANC) is provided (DHIS2)
Current Situation: Data We Have

- We know where a **facility** provides services (HFR)
Current Situation: Data We Have

- We know the provider who provides services (HRHIS)
Current Situation: Data We Have

- We know *which commodities* are available at HF (eLMIS)
Current Situation: Data We Have

- We know *tracer commodities* availability (ILSGateway)

More than 4,800 Lower level health facilities (Dispensaries and Health centres) are using ILSGateway
Current Situation: Data We Have

- We know *how much money* is available (District ERP, & MSD)
Current Situation: Data We Have

• We know what service (eg. ANC) is provided (DHIS2)
• We know where a facility provides services (HFR)
• We know the provider who provides services (HRHIS)
• We know which commodities are available (eLMIS)
• We know how much money is available (District ERP, MSD)

• We don’t know to whom (beneficiary) services are provided (EMR) except HIV care (CTC2)
• We cannot easily compare what, where, who, which, or how much
Health Information System
As Is
Sample of pear to pear integration – eLMIS and DHIS2
Health Information System
Could Be
HIE To Be Conceptual Model
Enterprise Architecture is…

A design approach that links business-related goals, objects, products, and services to information technology architecture
Layers of the enterprise architecture

Business processes and activities use...

Data that must be collected, organized, safeguarded, and distributed using...

Applications such as custom or off-the-shelf software tools that run on...

Technology such as computer system and telephone networks.
## Health Enterprise Architecture

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<tr>
<th>Four Layers</th>
<th>Representative Questions</th>
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| **Business Architecture** | 1. Who are the key decision makers, what are their roles and behaviors insofar as decision-making is concerned?  
2. What are the essential questions and requirements of users?  
3. What are the business domains and processes (functions)?  
4. Who will be responsible for managing the health information system? |
| **Data Architecture** | 1. What are the essential core and common data necessary to support the organization’s business architecture?  
2. How will the sources of these data be extracted, linked, and transformed for use from the existing operational systems? |
| **Application Architecture** | 1. What are the priority applications that a core Health Information Exchange must deliver?  
2. What applications are best included within a single platform design versus those applications that are best maintained as separate operational systems?  
3. How should the user interface work? |
| **Technical Architecture** | 1. What are the requirements for information to be captured, data entered, tagged, communicated, and managed?  
2. What is the minimum information and communication technology capacity needed across the country to support access to the applications and dissemination of information? |
Overarching Policy: eGov Tanzania

- **Interoperability**: allows seamless exchange of information, reuse of data models and inter-changeability of data across systems.
- **Open Standards**: provides interoperability, data preservation and greater freedom from technology and vendor lock-in. Adoption of open standards will facilitate storing of electronic national records and data using open data file formats.
- **Flexibility**: facilitates the adoption of new technologies and allows managing any change in the governance processes.
- **Collaboration**: provides a platform that will allow various Public Institutions to make use of the repositories such as reusable models, script, data and metadata etc.
- **Technology**: ensures that the technologies adopted are open so that they can be easily interfaced with other systems across Public Institutions.
AN EXAMPLE FROM THE HEALTH SECTOR
## Functional Requirements

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<th>ADMISSIONS / REGISTRATIONS (A&amp;E)</th>
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<tr>
<td>2.1</td>
<td>All admissions must be performed through a registration function (inpatient, outpatient, A&amp;E).</td>
<td>Must</td>
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<tr>
<td>2.2</td>
<td>The system should have the ability to carry out a quick registration with minimal mandatory registration information process, e.g. for the A&amp;E Department</td>
<td>Must</td>
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<td>2.3</td>
<td>System should be able to flash alert to Registration Clerk if patient has any outstanding bills</td>
<td>Must</td>
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<td>2.4</td>
<td>The system should have the ability to capture insurance and billing information at admission/registration time. These details will include whether the patient should be billed or not, Guarantee Letter information, Third Party Payer/Insurance information etc.</td>
<td>Must</td>
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<td>2.5</td>
<td>If billing is applicable, the system should automatically determine the consultation charges applicable based on the billing rules, to determine the applicable charge, and to enable the charges to be collected prior to the consultation.</td>
<td>Must</td>
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A DETAILED VIEW OF THE TANZANIAN HEALTH INFORMATION EXCHANGE
Key Lesson learned

• MOH leadership and strong governance
• Close partners collaboration
• Early design of the architecture to support coordinated development
• Standard and requirement based technology development