Using the OpenHIE and OpenHIM to implement the Health Normative Standards Framework: Experiences from Africa

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Agenda

- The Health Normative Standards Framework, an extension to the South African National Health Act, developed by the National Department of Health

- Implementation of MomConnect, a project of the South African National Department of Health

- Other Data Exchanges in South Africa and lessons learned.
MomConnect

• Project of the South African National Department of Health, under the guidance of the Minister

• Operationalized through the mobile maternal health task team
THE HEALTH NORMATIVE STANDARDS FRAMEWORK - AN EXTENSION TO THE SOUTH AFRICAN NATIONAL HEALTH ACT - DEVELOPED BY THE NATIONAL DEPARTMENT OF HEALTH
HNSF Act

GOVERNMENT NOTICE

DEPARTMENT OF HEALTH

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NATIONAL HEALTH ACT, 2003 (ACT NO. 61 OF 2003)

NOTICE IN TERMS OF THE NATIONAL HEALTH ACT NO 61 OF 2003: NATIONAL HEALTH NORMATIVE STANDARDS FRAMEWORK FOR INTEROPERABILITY IN EHEALTH

Development of the HNSF

- Commissioned by the National Department of Health (NDoH)
- Developed by the Meraka Institute of the Council for Scientific and Industrial Research (CSIR) in collaboration with the Nelson Mandela Metropolitan University (NMMU)
HNSF Some Highlights

- Patient-centric approach including a shared health record
- Maturity levels based on paper and electronic records
- Based on international standards, including base standards, profiles and interoperability specifications (IHE, ISO, HL7 etc)
- Adopt, adapt and develop (in that order) standards
- Interoperability architecture based on Health Information Exchange with demographic and clinical registries
- Requires a unique patient identifier and identification system
- Enterprise Architecture required to extend HNSF for a particular implementation
National Health Normative Standards Framework (HNSF)
Generic eHealth Architectural Components

HNSF - Local paper-based medical record system

HNSF - IHE profiles mapped to a fully integrated national shared electronic health record system

MOMCONNECT – A PROJECT OF THE SOUTH AFRICAN NATIONAL DEPARTMENT OF HEALTH
MomConnect

• Project of the South African National Department of Health, under the guidance of the Minister

• Operationalized through the mobile maternal health task team
MomConnect High Level Workflows

The workflows are designed to support the main aims of the MomConnect application which are to:

1. **Register pregnant women** attending antenatal care (ANC) facilities into a national pregnancy registry, and
2. **Subscribe** them to receive health promotion messaging during their pregnancy
3. Get **feedback** from the women about the **service received** in the ANC facilities in terms of **ratings and waiting periods**
4. Get **feedback** from women about the service received in the ANC facilities from their interactions with the **Helpdesk** in terms of **compliments, complaints and questions**
MomConnect

Partners:
- NDOH
- Jembi
- Praekelt Foundation
- CSIR
- HISP-SA
Architectural Design

- Architecture based on the HNSF integrated national shared electronic health record system
- Five layers:
  - Edge Devices, eg mobile phone
  - Consumer Applications, eg mHealth services
  - Health Information Exchange, eg OpenHIM
  - Demographic and Clinical Repositories, eg the National Pregnancy Registry
  - Security / Audit Services, eg certificate service
HNSF Maternal Health Standards and Profiles

MomConnect Standards and Profiles

HIE (OpenHIM)

Patient Identity Management
ITI-30 Patient Identity Feed
HL7v2 ADT

Mobile Application Service

HIE (OpenHIM)

Save Clinical Encounter
ITI-65 Put Document Dossier
CDA

Mobile Application Service
MomConnect Backend System

- Client Registry (MPI)
- Shared Health Record
- MomConnect Program (DHIS Patient Tracker)
- DHIS

- HIE (OpenHIM)
- Audit database

- Clinical Systems
- Mobile Application Service
General Workflow pattern

1. Send data [JSON]
2. Response (OK)

3. Send data

4. Response (OK)

2. Query patient identifier
3. Resolve patient identifier

4. Send data

5. Response (OK)

www.websequence diagrams.com
Results

Minister Aaron Motsoaledi: Health Dept Budget Vote 2015/16
5 May 2015

In August last year, we launched the MomConnect project at Motubatse clinic in Soshanguve, Tshwane Metro.

This project uses cellphone technology to register pregnant women – all pregnant women in both public and private health care. This empowers them to get all the information and instructions necessary for them to ensure a healthy pregnancy and deliver a healthy vibrant baby.

After delivery, the messages switch over to focus on information on the health needs of a new-born and will continue for up to one year after birth.

Honourable Speaker, I am very happy to announce that in a short space of only 8 months we have been able to register 383,354 pregnant women on the system. It is regarded as the largest number in the world. Before we started, Bangladesh was regarded as a world leader after registering 100,000 women in 18 months, while other countries are having only small pilot projects – nothing yet on a massive scale like we have.
Current Implementations of the OpenHIM
in RSA
DHIS2 Integration

- DHIS2 traditionally used for capture of routine, aggregate data
- Culture of switching of the server after hours, not transactional
- Poses a problem for a highly available transactional system
- Needed to build additional components to handle
Facility Cache

• DHIS2 used as the Facility Registry
• High load on this end point
• Use in-memory cache updated daily, with failsafe facility list written to disk
• This allows facility lookup even when DHIS2 is down
• Built a mediator to translate DHIS2 json response to CSD format
File Queue

- In order to cater for DHIS2 (or other registry) downtime, need for asynchronous queue
- Built a file based queue - writes CDA and json files to the file system (simple)
- Queue also smooths out spikes in traffic
- HTTP responses returned to HIM asynchronously to update transaction details
- Stores error-ed files in a separate folder for investigation
- Allows planned downtime (queue can accept files, but does not post them to DHIS2)