New technologies - Innovation in eHealth

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DHIS 2 – District Health information System v 2
HISP – Health Information Systems Program

Information for decision making in health

- Online ‘cloud’ based web systems
  - Access to information
    - From anywhere
    - At any time
  Now also ‘even’ in rural Africa!!
Health Information Systems Program

HISP & DHIS 2

- HISP: global collaborative network for HIS development, Open Source Software, education and research
- DHIS 2 open source software: reporting, analysis and dissemination of health data & tracking individuals
- Started in South Africa in the 1990’s - Now 40+ countries using DHIS v2
- Improved Internet & mobile network: Access from anywhere - anytime
- Now online web systems supporting local & district health management & services delivery
HISP collaborative *Network of Action*

**Health Information Systems**
*Research, Implementation Development*
Use of information for action
Integration & Interoperability

**Open Source Software**
Sharing across the world
*DHIS2*; National HIS & Tracking Individuals

**Capacity Building**
Training, Education, Research
Training of health workers
Graduate courses, Masters, PhD

Network of Action example West Africa:
WAHO /ECOWAS
Background: New system for South Africa after apartheid in the 1990’s

- **Inequity** between blacks & whites, rural & urban, urban & “peri-urban”, former “homelands”, etc.
- “**Equity**” main target
  - But how to know whether targets are achieved?
- **Need standard data from across the country on**
  Health status & Health services provision
- **Districts: Building blocks for new Health System**
  Integration of health services
- **DHIS** – District Health Information System
  District management & equity across country
Apartheid legacy: a fragmented and top down health structure as reflected and ‘reproduced’ every day by the information systems
Information infrastructure - Installed base
Information management at district level
- From fragmentation to integration;
Decentralisation: From central control to local empowerment

A) Pre-apartheid centralised, vertical and fragmented structure in Atlantis (simplified).

B) Decentralised integrated district model
As according to the ANC Health Plan
Technology and Infrastructure

Rapid development of Internet and mobile networks in Africa – as from about 2011

District based integrated & online HIS implemented country-wide in
- Kenya, Ghana, Burkina Faso, Liberia, Gambia, Uganda, Rwanda, Bangladesh, .......
Mobile subscribers per 100 persons,

Source: World Bank
Total bandwidth of communication

Source: AFRINIC
DHIS 2

Data warehouse

- Data mart
- Meta data
- Visualising tools

Web Portal

Dashboard

Graphs

Maps

Getting data in - Data warehousing

Getting data out - Decision support systems

Data capture from paper forms

Data from Mobile devices

Extract Transform Load

LMIS

HR

EMR

Mobile

Web Portal

Data from Mobile devices

Data capture from paper forms

Extract Transform Load

LMIS

HR

EMR
Dashboards: Real time update of data using maps and graphs
Be designed to target different user groups & Make your own
DHIS2
Online data capture
Measles under 1 year coverage by district 2006
(Measles doses given to children < 1 year / total population < 1 year)

74.7 81.3 79.0 80.7
89.5 94.4 80.0 79.9
93.6 93.8

Chake Chake District
Micheweni District
Mkoani District
Wete District
Central District
North A District
North B District
South District
Urban District
West District
Pemba Zone
Unguja Zone

Annual measles coverage %

Online data use; web pivot reports, charts, maps

DHIS2

Online Data capture

Online data use; web pivot reports, charts, maps

Offline data use application
Datamart - pivot tables
Archive - reports, Charts, maps

Mobile Data Use

Mobile Data Capture

Browser
Offline Data Capture
DHIS2 Output tailored to the range of devices and infrastructures

- SMS
- Lightweight Browser
- Android app or browser
- Tablet
- PC/laptop

More flexible
Online forum for support, discussion of e.g. Interpretation of data – social media

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<tr>
<th>Sender</th>
<th>Subject</th>
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Maternal Mortality Ratio by Regions - Current

- Maternal mortality ratio

Kwame Brenyah 2013-09-05
In my view,
1. I think distance between communities & health facilities they receive care can contribute to that.
2. Delay in deciding to take the mother to the health facility & even the terrain.

Robert Jirapa 2013-09-05
I think the distance to the health facilities that contribute to that so there is the need to build more facilities

Michael Azumah 2013-09-06
This is fantastic to us. But we have to screen the reporting facilities in respective regions for analyzing.

more than 30 comments
Technology and Infrastructure

One central online server

Make interoperability
- sharing of data between systems
Possible
Online central server vs Offline stand-alone HIS

- > hundreds of installations vs one installation
Interoperability with other systems
Interoperability and integration – at each level

Replicated at each Administrative Level:
National State/Province District

Data warehouse

Reports, GIS, Pivot, graphs, etc.

Import Electronic data

Data from / to Mobile telephones

Data capture from paper reports

Monthly summary reports

Register pregnant women & children for immunization

Export electronic summary data

Human Resource records

Medical Records

OpenMRS / DHIS2 tracker

RBF

DHIS2
Integration and Interoperability
– across technologies and systems

Users of primary data & data providers

Electronic Medical Records

Interoperability

Electronic transfer

Performance Based Financing reporting

Aggregate & indicator data

Users of processed & integrated data

Finance

Mobile reporting

Users of primary data & data providers

‘Interoperability’

Paper reports

Paper based systems: OPD, EPI, RCH, other programs

Integration of technologies, systems, data & health programs
SDMX-HD: Technical Standard for Interoperability

Electronic transfer of aggregate data from OpenMRS:
#deliveries @health centre X for month of May, 2013

DHIS: Data warehouse Statistical data

DHIS is calculating the indicator:
Deliveries per midwife

OpenMRS: Medical records

SDMX-HD: Piloted in Sierra Leone and launched in Accra

Electronic transfer of aggregate data from iHRIS:
#midwives @health centre X for month of May, 2013

iHRIS: Human Resource records
Regional data warehouse
Regional data warehouse

### ED Case fatality rates for quarters 2012

**WAHO**

<table>
<thead>
<tr>
<th>Data</th>
<th>Jan to Mar 2012</th>
<th>Apr to Jun 2012</th>
<th>Jul to Sep 2012</th>
<th>Oct to Dec 2012</th>
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<tbody>
<tr>
<td>Case fatality rate of cholera (%)</td>
<td>2.6</td>
<td>1.7</td>
<td>1.2</td>
<td>0.91</td>
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<td>Case fatality rate of lassa fever (%)</td>
<td>10.3</td>
<td>6.1</td>
<td>42.9</td>
<td>0.74</td>
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<td>Case fatality rate of meningitis (%)</td>
<td>9.7</td>
<td>8.9</td>
<td>5.7</td>
<td>7.0</td>
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<tr>
<td>Case fatality rate of yellow fever (%)</td>
<td>1.7</td>
<td>0.23</td>
<td>1.4</td>
<td>1.4</td>
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### Population density

**2012-01-01**

- 12.20 - 25.50 (4)
- 25.50 - 58.80 (6)
- 58.80 - 142.10 (9)
- 142.10 - 185.40 (2)

### DEM Population by country 2012

#### Reports
- indicator dictionary
- indicator list
SUMMARY 1

• New opportunities for Africa: Countrywide implementation of online web & ‘cloud’ based systems now possible

• New opportunities for Health Information: Africa can now implement similar web based systems for health as in Europe
  – Central server systems solve problem of hundreds of standalone offline system instances
  – Access to system and information from everywhere – with mobile network
BUT, also new challenges for Africa:

- The ‘politics of hosting’:
  Where to host: in the cloud or in the basement?
  How to ensure in-country control?

- New types of more advanced skills required

- Solution: Safaricom took over cloud hosting – in Kenya
  ‘National cloud’
  National hosting company in Ghana