Implementing E-Health Systems in Low-Income Countries

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The Learning Health System

EHR Data

Afferent (Sensory)

Machine Learning
Statistics

Knowledge

Clinical Practice

Efferent (Motor)

Training
Human Factors
Building the Learning Health System in a Low-Resource Setting

- Utilize open source software and open standards
- Foster innovation and build workforce capacity
- Engage clinical, business, government, academic communities
Our Research

- EHR Survey
- Case Study
- Co-design
2009 EMR Assessments

• CDC ART EMR assessment report
• NASCOP EMR assessment report
• HMIS assessment report
• Identified 33 systems in use across health sector
MoH Guidelines for EHR Adoption

- Standards and guidelines for EMR systems
- Electronic pharmacy information systems
- Electronic lab information systems

- Reviewed 17 sites
- Framework for reporting/scoring
- 6 systems:
  - CPAD
  - IQ care
  - Care2000
  - Funsoft
  - Compact
  - OpenMRS
Kenya National eHealth Strategy

- World bank health in Africa initiative
- Kenya investment climate program
- 2011: Naivasha stakeholder workshop
- Principles:
  - Collaboration and partnerships for shared information and services among stakeholders
  - Harmonizing and coordinating Kenya's disparate health and information technology expertise
Secondary Use of Data

• Policy goals:
  • Centralize reportable data collection (DHIS2)
  • System interoperability (e.g. HL7)
  • Clinical decision support (CDS)

• Related benefits:
  • Improve process efficiencies
  • Re-use of data for research
  • Improve billing and collections for facilities
EHR Survey

• Telephone survey of County CHRIOs
• Interviews with EMR/EHR software vendors
• Site visits to hospitals to see systems in use
# EMR Systems in Kenya

<table>
<thead>
<tr>
<th>EHR System</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afya-E-HMIS (OpenMRS)</td>
<td>Hospital wide including inpatient</td>
</tr>
<tr>
<td>MedBoss</td>
<td>Outpatient, pharmacy, billing</td>
</tr>
<tr>
<td>Sanitas</td>
<td>Outpatient, inpatient, billing, pharmacy, lab</td>
</tr>
<tr>
<td>Funsoft</td>
<td>Outpatient, billing pharmacy, lab</td>
</tr>
<tr>
<td>Attain HMIS</td>
<td>Outpatient, billing, pharmacy, lab</td>
</tr>
<tr>
<td>OpenHMIS (OpenMRS)</td>
<td>Outpatient, inventory, billing</td>
</tr>
<tr>
<td>CHIS</td>
<td>Hospital wide</td>
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<tr>
<td>IQCare</td>
<td>Hospital wide</td>
</tr>
<tr>
<td>Med360</td>
<td>Hospital wide</td>
</tr>
<tr>
<td>Compufix</td>
<td>Registration, outpatient billing</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CCC EMR System</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>KenyaEMR</td>
<td>HIV, TB, ARV Patient Management</td>
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<tr>
<td>IQCare</td>
<td>HIV, TB, ARV Patient Management</td>
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<tr>
<td>CPAD</td>
<td>HIV, TB, ARV Patient Management</td>
</tr>
<tr>
<td>OpenMRS-Faces</td>
<td>HIV, TB, ARV Patient Management</td>
</tr>
<tr>
<td>AMPATH Medical Record System</td>
<td>HIV, TB, ARV Patient Management</td>
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</tbody>
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EHR Use in Hospitals

- 95% of facilities surveyed have some sort of EMR: Either for CCC clinics or hospital
- Hospital level systems tied to finance and billing
- Clinical systems used in Out Patients
- OP systems linked to registration/pharmacy/labs
- CCC systems separate from hospital systems
- Some reporting for MoH and management
Current Challenges

- No systems have functional clinical decision support
- Some systems cannot exchange clinical data with other systems
- Little or no data use for clinical in-patient purposes
- Challenges with workflow and business logic
- Different levels of support offered by different vendors
Data use

• HRIO for MOH reports e.g. 718,717,705a
• Financial purposes/accountability
• Management of drug supply
• General management e.g. Lists of patients
• Quality improvement/research e.g. A study on maternal patients
• Medical reports
AFYA-E-HMIS Case Study

- OpenMRS-based hospital system
- Initially implemented in 6 facilities Machakos (including level 5 hospital)
- Now being implemented in 6 counties in smaller facilities
Co-Design
Thanks

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