Using the OpenMRS electronic medical record system to strengthen health care delivery in Rwanda

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Overview

• Partners In Health and the PIH-EMR
• OpenMRS and open source systems
• Evaluating the impact of systems
• Building a community for developing and implementing OpenMRS in Rwanda
Partners In Health Model of Care

- Access to health care for all people
- Creation of long-term development by partnering with local people and communities
- Use of community health workers to grow a local and sustainable work force
- Addressing the effects of poverty including poor nutrition, water, and housing
- Drawing on the resources of the world’s elite medical and academic institutions and on the lived experience of the world’s poorest and sickest communities
PIH-EMR history

• 2001: created a web based EMR system to support the scale up of MDR-TB treatment in Peru
• 2003: created a version of PIH-EMR to support HIV treatment in rural Haiti
• 2004: plan to create a new, general and flexible platform to build EMR systems
• 2006: OpenMRS first used in Kenya and then Rwanda and South Africa
• 2007: OpenMRS released as open source
OpenMRS

- A modular, open source EMR system
- Developed as a collaboration of PIH, the Regenstrief Institute and South African MRC
- Uses a concept dictionary for data storage
- Modular design simplifies adding new functions
- Open standards for interoperability
- Multiple languages, English, French, Spanish +
- Core of paid programmers and growing community
- www.openmrs.org

Partners In Health  Regenstrief Institute  Medical research council SA
OpenMRS sites (partial list)

Red clinical use, blue development
OpenMRS at PIH sites in Rwanda

- Currently used for 12 PIH supported health centers
- Data for patients with HIV, TB and now heart failure
- Over 10,000 patients tracked
- Team of Rwandan data officers trained to enter data, ensure data quality & produce reports
OpenMRS uses in Rwanda

• Access to up to date clinical data including drug regimen and lab results
• Direct point of care use in HIV clinics
• Analysis and reporting function with new framework for non-programmers
• Support for drug forecasting
• Primary care version being implemented
• Research data collection including DDCF primary care research center (PHIT)
### Patient Information

**IMB ID**: [redacted]

**Gender**: Male

**Age**: 39 yrs (b. Jan 1, 1970)

**Adult HIV Program Group 19**

**Last Visit**: 4 months ago (Jan 7, 2009)

**ADULT RETURN VISIT by [redacted]@Kirche**

### Exam Results
- **No chest X-ray**
- **No CD4 in the last 6 months**

### Symptoms
- **Fever**: Jan 27, 2007
- **Night sweats**: Jan 27, 2007
- **Cough**: Jan 27, 2007
- **Productive cough**: Jan 27, 2007
- **Night sweats for less than 3 weeks**: Jan 27, 2007

### Drug Orders
- **Trimune**: 10 tabs/day (2/3 day x 7 days/week) from Aug 12, 2008
- **TPR/SMR 600/150**: 10 tabs/day (1/3 day x 7 days/week) from Aug 10, 2006
- **Trimune-40 (stopped)**: 10 tabs/day (2/3 day x 7 days/week) from Jul 26, 2006 to Aug 12, 2008

### Lab Tests

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<th>ALT</th>
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### Weight and CD4 Count

- **Weight (kg)**: [Graph]
- **CD4 Count**: [Graph]
CD4 Access, Rwinkwavu, Rwanda

• We evaluated whether the ID physicians had access to the latest CD4 count for their patients in Rwinkwavu, Rwanda

• The physicians record the result they have on the follow-up form based on paper lab result forms

• We checked if they were up to date before and after a new lab component was added to the EMR to generate results forms
Results – Access to CD4 counts

- The proportion of CD4 counts conducted within the past 60 days but unknown to the clinician at the time of consultation was:
  - 24.7% in the pre-intervention period
  - 16.7% in the post intervention period
  - This is a 32.4% reduction in CD4 loss (p=.002)
- We will evaluate the effect of direct clinician access to the EMR next

Systematic review of evaluation studies

POLICIES & POTENTIAL

By Joaquin A. Blaya, Hamish S.F. Fraser, and Brian Holt

E-Health Technologies Show Promise In Developing Countries

Health Affairs 2010, 29;2: 244-251
National eHealth architecture for Rwanda, potential components and links

Supply chain systems
Camerwa

National reporting system
TRACNet

Pharmacy system
PIH

EMR System
OpenMRS

SDMX-HD

Laboratory System
PIH-Lab-system

Insurance
Mutuelle de sante

Mobile health systems
OpenROSA?

Dicom

Radiology / telemedicine system

HL7

HL7

HL7

HL7?
Government of Rwanda EMR roll out

- The Government of Rwanda is committed to having a strong national EMR program
- MoH has announced that OpenMRS will be used for national roll out to health centers and small hospitals
- A non-disease specific system which can assist in the management of all outpatients
- Developing detailed rollout plan
- First sites due to start this year
Developer training, Rwanda

- Training program in Kigali for computer science graduates
- One year, mentored training course
  - Web development
  - Java programming
  - OpenMRS programming
  - Medical informatics
- Ten students graduated last fall
- Now supporting OpenMRS rollout as well as building software development capacity in Rwanda
Disease-specific EMR (MDR-TB)
OpenMRS-Google Maps–SMS-Integration, Karachi

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### Bacteriologies

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Credit: Owais Ahmed, Aamir Khan
TB in homeless patients in Los Angeles

Credit: Monica Waggoner
Challenges for OpenMRS deployments

• Understanding needs and workflow
• Support for equipment, power supplies and software
• Data management and quality control
• Evaluation
• Training – IT, programming, data management, users, researchers
Collaborators and Funders

- Partners In Health
- Regenstrief institute
- Brigham and Women hospital
- Harvard Medical School
- Medical Research Council, South Africa
- Millennium Villages Project
- JEMBI

- International Development Research Centre, Ottawa
- Rockefeller Foundation
- World Health Organization
- US Centers for Disease Control
- Fogarty International Center, NIH
- Google Inc