Deploying OpenMRS in Rwanda

Yaw Anokwa

http://cs.washington.edu/homes/yanokwa
Scaling up a healthcare system

• Began in 2005 as first Partners in Health project in Africa. Partners: Clinton and Gates Foundations and TED.

• Scale up PIH model of health nationwide with services including HIV/TB, family planning, malnutrition, community health workers, housing, employment, schooling.

• Started in Rwindi and in two years has grown into two hospitals and four health clinics. Training center and third hospital are being built.

• Technology is playing an important role in the scale up and OpenMRS is the vehicle.
What is OpenMRS?

• OpenMRS is an application which enables design of a scalable and customized medical records system with no programming skills.

• Framework on which medical informatics effort in developing countries can be built.

http://openmrs.org
Who are the key players?

- Developers: PIH, Regenstrief, and others
- Funders: WHO, CDC, Rockefeller, PEPFAR, IRDC, NIH, Google, SA-MRC, MVP
- Deployments: Kenya, Rwanda, Lesotho, South Africa, Zimbabwe, Mozambique, Uganda, Malawi, Tanzania, Haiti, Peru
How is it put together?

• OpenMRS is built in Java. The core application works through a web browser.
• Tomcat is used as the application server. The database is currently in MySQL. Hibernate is used as an interface layer to the database. Also use Spring, Dojo, DWR, BIRT, etc.
• The system creates XML schemas for form design. Form design data entry is currently done in Microsoft Infopath.
**Viewing Concept** HUMAN IMMUNODEFICIENCY VIRUS

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Id</strong></td>
<td>884</td>
</tr>
<tr>
<td><strong>Locale</strong></td>
<td>English, French, Spanish, Portuguese, Italian</td>
</tr>
<tr>
<td><strong>Name</strong></td>
<td>HUMAN IMMUNODEFICIENCY VIRUS</td>
</tr>
<tr>
<td><strong>Short Name</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The virus that causes the acquired immune deficiency syndrome (AIDS).</td>
</tr>
<tr>
<td><strong>Synonyms</strong></td>
<td>HIV, P23</td>
</tr>
<tr>
<td><strong>Class</strong></td>
<td>Diagnosis</td>
</tr>
<tr>
<td><strong>Datatype</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Version</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Retired</strong></td>
<td>false</td>
</tr>
<tr>
<td><strong>Created By</strong></td>
<td>Super User - May 27, 2004 12:00:00 AM PDT</td>
</tr>
<tr>
<td><strong>Changed By</strong></td>
<td>Super User - February 16, 2005 5:32:05 PM PST</td>
</tr>
</tbody>
</table>

**Resources**

- Similar Concepts
- Merriam Webster®
- Google™
- UpToDate®
- Dictionary.com®
- Lab Tests Online
INSHUTI MU BUZIMA
Clinique des Maladies Chroniques

Information démographique
1. Date (jour/mois/année): ___/___/___
2. Nom: ___________________________ Prénom: ___________________________
3. (a) Nom de l’Accompagnateur: ___________________________ Prénom: ___________________________
   (b) Changement de l’accompagnateur? non oui (spécifier raison)
4. Catégorie du patient: Maladie du cœur Maladie des reins Diabètes
   Désordre de saisie Asthme Autres: ___________________________
5. Groupe du patient: ___________________________
6. Clinique: Rwinkwavu Mulindi Rukira Nyarubuye Kirehe
   Rusumo Autre (à spécifier): ___________________________

Anamnèse

7. Hospitalisé(e) depuis la dernière visite? non oui
   Si oui, quel était le diagnostic? ___________________________

Examen clinique
8. (a) Signes vitaux: TA ___/___ Poulx ___/min. Temp. ___°C FR ___/min. Glycémie___
    (b) Paramètres: Poids ___(kg) Taille ___(cm) BMI ___
Cohort Builder

Search History:
1. Patients with any encounters at Rukira - 1073 results (cached)
2. Patients currently taking ANY of [LPV/r (Kaletra), 3TC Susp, 3TC 150, ABC 300, NVP Susp, NVP, EFV 600, EFV 100, EFV 50, EFV 200, AZT+3TC (Duovir), d4T 30, d4T 40, d4T 20, d4T 15, TFV 300, DDI 125, DDI 200, Triomune-30, Triomune-40, AZT Sirop, AZT 100, AZT 300] - 2790 results (cached)
3. Patients in program HIV PROGRAM - 5138 results (cached)
4. 1 AND 2 AND 3 - 481 results (cached)

Display which cohort: Result of last search

View method: List
Other methods are not yet implemented

Displaying 16 to 30 of 9344

16. Geoffry Lokai (4 year old Male)
17. Vicky Siror (33 year old Female)
18. Aoice Kener (46 year old Male)
19. Anjela Lugado (47 year old Female)
20. Romana Sirtui (46 year old Female)
21. Colland Kenebei (13 year old Male)
22. Metrin Singarei (9 year old Female)
23. Fransisca Tingei (32 year old Female)
24. Mitchell Cherwon (29 year old Female)
# Modular Design

<table>
<thead>
<tr>
<th>Action</th>
<th>Name</th>
<th>Version</th>
<th>Author</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double Entry Reconciliations</td>
<td>1.5</td>
<td>Darius Jazayeri</td>
<td>This module allows you to specify a form, and pulls all of those forms ever entered from the database. Any time a patient has two or more of that form with the same encounter date, those are take...</td>
<td></td>
</tr>
<tr>
<td>Child VCT Report Module</td>
<td>1.1</td>
<td>Chase Yarbrough</td>
<td>Child VCT Report Module. Creates a report of children who have not been tested for HIV, but whose parents are HIV+...</td>
<td></td>
</tr>
<tr>
<td>PatientSummaryModule</td>
<td>1.0</td>
<td>Yaw Anokwa</td>
<td>Generates a printable one page clinical summary for a patient. ...</td>
<td></td>
</tr>
<tr>
<td>Form Import Export [Not Started]</td>
<td>1.4.3</td>
<td>Darius Jazayeri</td>
<td>Allows you to import/export forms between installations with identical concept dictionaries. Optionally keeps dictionary in sync with a parent dictionary. See module documentation...</td>
<td></td>
</tr>
<tr>
<td>FormEntry</td>
<td>3.1</td>
<td>Ben Wolfe</td>
<td>OpenMRS FormEntry Module...</td>
<td></td>
</tr>
<tr>
<td>Patient Lookup Module</td>
<td>1.0</td>
<td>Christian Allen</td>
<td>Easy patient lookup for clinical use...</td>
<td></td>
</tr>
<tr>
<td>BIRT Report Module</td>
<td>1.2</td>
<td>Justin Miranda</td>
<td>BIRT Reporting Module...</td>
<td></td>
</tr>
<tr>
<td>Food Program Module</td>
<td>0.1</td>
<td>Justin Miranda</td>
<td>OpenMRS Food Program Module...</td>
<td></td>
</tr>
<tr>
<td>Form Data Export Module</td>
<td>0.7</td>
<td>Justin Miranda</td>
<td>OpenMRS Form Data Export Module...</td>
<td></td>
</tr>
<tr>
<td>PIH Hacks Module</td>
<td>1.0</td>
<td>Darius Jazayeri</td>
<td>Various quick hacks can be put here so that we don’t have to create a new module every time...</td>
<td></td>
</tr>
</tbody>
</table>

[Check for Updates]
Patient Registration

Enter patient information

Name (Example: Mukamana) Sample
Other names (Example: Alice) Patient

Gender: Male

Birthdate: October 2 2009
Year unknown

Address

Province: EASTERN District: KAYONZA Sector: RWINKWAVU Cell: GIHINGA Umudugudu: N/A

Submit

Double-check birthdate: in the future
# Patient Summary

**Paul Persil Patient**

- **Gender**: Male  
- **Age**: 44 years (~ Jun 01, 1934)  
- **Last Visit**: 6 months ago (Oct 26, 2007)  
  - **Doctor**: Doug, Ruhengeri Hospital

**Alerts**

- **NO CD4 RESULT IN THE LAST 6 MONTHS!**
- **NO CXR RESULT!**

**Notes**

- No known allergies
- No known height

**Recent Symptoms**

- **Hypersensitivity/allergic reactions, purple toes syndrome**: Jan 01, 1999
- **Anemia, pallor, fever, rash, dermatitis, including bullous eruptions**: Jan 01, 1999
- **Dizziness, loss of consciousness, syncope, coma, taste perversions, pruritus, alopecia, cold intolerance, and paresthesia including feeling cold and chills.**: Jan 01, 1999

**Drug Order**

<table>
<thead>
<tr>
<th>Drug Order</th>
<th>Dose</th>
<th>Frequency</th>
<th>Start Date</th>
<th>Stop Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triomune-40</td>
<td>1.0 tab(s)</td>
<td>2/d x 7 d/w</td>
<td>Sep 13, 2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EFV 600</td>
<td>1.0 mg</td>
<td>1/d x 7 d/w</td>
<td>Aug 02, 2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triomune-40 (stopped)</td>
<td>1.0 tab(s)</td>
<td>2/d x 7 d/w</td>
<td>Sep 13, 2007</td>
<td>Sep 13, 2007</td>
<td>Horrible rash spread all over patient's face</td>
</tr>
<tr>
<td>EFV 600 (stopped)</td>
<td>1.0 mg</td>
<td>1/d x 7 d/w</td>
<td>Aug 02, 2007</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Lab Test**

<table>
<thead>
<tr>
<th>Lab Test</th>
<th>Result</th>
<th>Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD 4 count</td>
<td>200 units</td>
<td>Jan 01, 1999</td>
<td>Test issued due to lateness</td>
</tr>
<tr>
<td>Viral load</td>
<td>A billion</td>
<td>Jan 01, 1999</td>
<td>Second test for verification of status</td>
</tr>
<tr>
<td>Viral load</td>
<td>3.1415</td>
<td>Jan 01, 1988</td>
<td>Ordered by Dr. Green</td>
</tr>
</tbody>
</table>

**Graphs**

- **Weight (KG)**
  - No Data Available
- **CD4 Count**
  - Graph showing an upward trend from Jul-05 to Jan-06
- **Weight (KG)**
  - Graph showing a stable trend from Sep-05 to Sep-06
How can I help?

• Improve user interface and interactivity
• Improve report/form design and generation
• Improve decision support tools
• Improve data synchronization tools
• Improve programmability and documentation
• Help train local developers in Africa
• Build modules for community healthcare workers, food supplementation, pharmacy, and clinicians
Relevant Links

• Change – [http://change.cs.washington.edu](http://change.cs.washington.edu)
• OpenMRS – [http://openmrs.org](http://openmrs.org)
• Partners in Health – [http://pih.org](http://pih.org)
• OpenROSA – [http://openrosa.org](http://openrosa.org)
• GATHER – [http://gatherdata.org](http://gatherdata.org)