

Development and deployment of the OpenMRS-Ebola Electronic Health Record System for an Ebola Treatment Centre In Sierra Leone

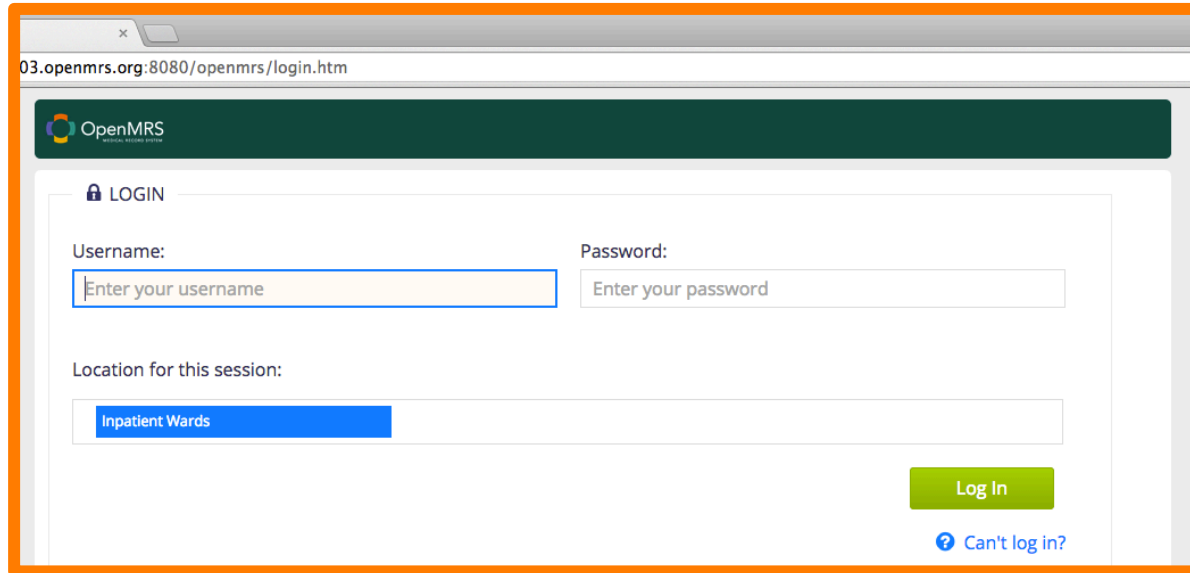
Shefali Oza, Darius Jazayeri, Jonathan M. Teich, Ellen Ball, Patricia Nankubuge, Job Rwebembera, Kevin Wing, Alieu Sesay, Andrew S. Kanter, Glauber Ramos, David Walton, Rachael Cummings, Francesco Checchi, Hamish Fraser

Multimedia appendix 1:

Complete screenshots of the desktop/laptop-based OpenMRS-Ebola application

Primary use – Green (non-infectious) zone of Ebola Treatment Center

Desktop: login and dashboard



03.openmrs.org:8080/openmrs/login.htm

OpenMRS
MEDICAL RECORD SYSTEM

LOGIN

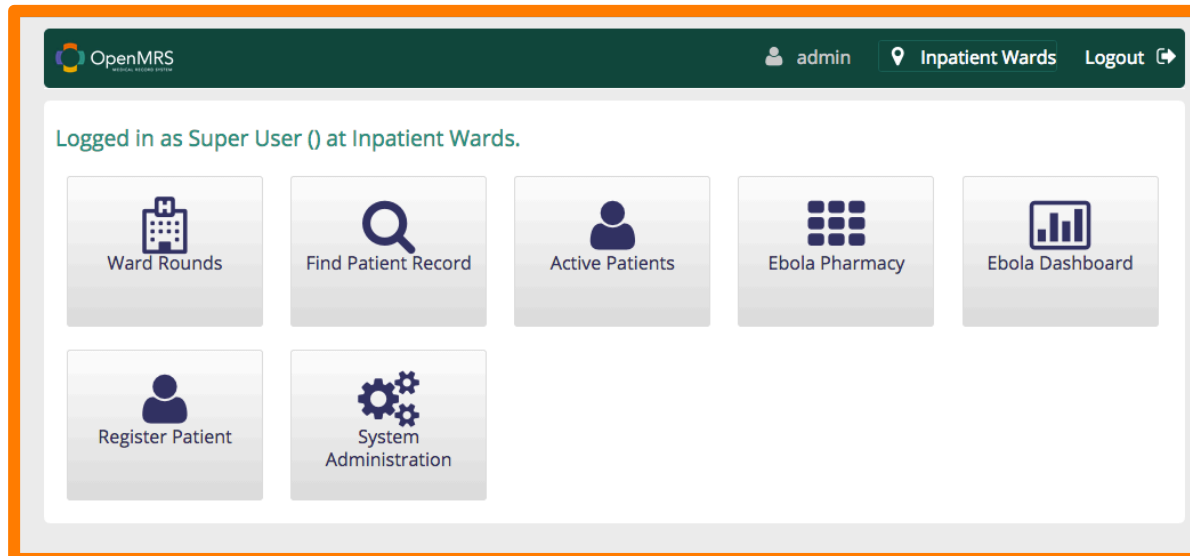
Username:

Password:

Location for this session:

Log In

[? Can't log in?](#)



OpenMRS admin Inpatient Wards Logout

Logged in as Super User () at Inpatient Wards.

- Ward Rounds
- Find Patient Record
- Active Patients
- Ebola Pharmacy
- Ebola Dashboard
- Register Patient
- System Administration

Desktop: patient registration

OpenMRS
MEDICAL RECORD SYSTEM

Home > Register a patient

Register a patient

Registration Date
Registration Date
When was this patient registered?
 Today

Demographics
Name
Gender
Birthdate

Contact Info
Address
Phone
Next of Kin

ID Number
ID Number

Quick Assessment
Weight
Type of Patient
Stage

Confirm

OpenMRS
MEDICAL RECORD SYSTEM

Home > Register a patient

Register a patient

Registration Date
Registration Date
What's the patient's name?

Demographics
Name
Given (required) Family Name (required)
Gender
Birthdate

Contact Info
Address
Phone
Next of Kin

ID Number
ID Number

Quick Assessment
Weight
Type of Patient
Stage

Confirm

Desktop: patient registration

OpenMRS demo Inpatient Wards Logout


[Home](#) > **Register a patient**

Register a patient

| | |
|---|---|
| Registration Date | Registration Date: Today |
| <input checked="" type="checkbox"/> Registration Date | Name: unknown unknown |
| Demographics | Gender: Female |
| <input checked="" type="checkbox"/> Name | Birthdate: 30 year(s) |
| <input checked="" type="checkbox"/> Gender | Address: Western area unknown Freetown unknown |
| <input checked="" type="checkbox"/> Birthdate | Phone: 09230981312 |
| Contact Info | Next of Kin: Beep 0023412345 |
| <input checked="" type="checkbox"/> Address | ID Number: KT-0-07006 |
| <input checked="" type="checkbox"/> Phone | Weight: 60 kg |
| <input checked="" type="checkbox"/> Next of Kin | Type of Patient: Confirmed case |
| ID Number | Stage: 2 - GI / Wet |
| <input checked="" type="checkbox"/> ID Number | |
| Quick Assessment | |
| <input checked="" type="checkbox"/> Weight | |
| <input checked="" type="checkbox"/> Type of Patient | |
| <input checked="" type="checkbox"/> Stage | |
| Confirm | |

Confirm submission?

Desktop: bed allocation

 OpenMRS demo Inpatient Wards Logout

[← Back to Summary \(discard changes\)](#)

unknown unknown

Current Assignment: **Inpatient Wards, (No Bed)**

Change Bed Assignment

Select type of ward

Select the ward

Select the bed

| | |
|--|--|
| <input type="button" value="Bed #1"/> | <input type="button" value="Bed #6 Occupied"/> |
| <input type="button" value="Bed #2"/> | <input type="button" value="Bed #7 Occupied"/> |
| <input type="button" value="Bed #3 Occupied"/> | <input type="button" value="Bed #8 Occupied"/> |
| <input type="button" value="Bed #4"/> | <input type="button" value="Bed #9 Occupied"/> |
| <input type="button" value="Bed #5"/> | <input type="button" value="Bed #10"/> |

Desktop: active patients

The screenshot displays the OpenMRS desktop interface. At the top, there is a dark green header with the OpenMRS logo on the left, and user information 'admin' with a profile icon, 'Inpatient Wards' with a location pin icon, and a 'Logout' button with an arrow icon on the right. Below the header is a navigation bar with a home icon and the text '> Active Patients'. The main content area is titled 'View Active Patients: 07 Apr 2015' and contains four sections, each representing a confirmed ward. Each section has a table with three columns: Patient Number, Patient Name, and Bed.

Confirmed Ward 1

| Patient Number | Patient Name | Bed |
|----------------------------|---------------------|--------|
| KT-1-09876 | Michael Pai | Bed #2 |
| 10027D | Leonardo Marquezini | Bed #3 |
| KT-3-00031 | Amani Tambo | Bed #6 |
| KT-3-00021 | Joram Mwesine | Bed #8 |
| KT-3-00812 | Romeo Bana | Bed #9 |

Confirmed Ward 2

| Patient Number | Patient Name | Bed |
|----------------------------|---------------|--------|
| KT-3-33333 | John Doe | Bed #3 |
| KT-3-45678 | Happy Day | Bed #6 |
| KT-3-99665 | David Walton | Bed #7 |
| KT-3-00024 | Annet Sangaza | Bed #8 |
| KT-0-22223 | beep beepboop | Bed #9 |

Confirmed Ward 3

| Patient Number | Patient Name | Bed |
|----------------------------|--------------------|--------|
| KT-9-55555 | hylaesus alcyoneus | Bed #1 |

Confirmed Ward 5

| Patient Number | Patient Name | Bed |
|----------------------------|-------------------|---------|
| KT-1-34568 | fallacious mystic | Bed #10 |

Note: All patients and data included here are fictitious

Desktop: summary screens

The screenshot displays the OpenMRS desktop interface for a patient's summary. The top navigation bar includes the OpenMRS logo, a user profile for 'admin', and links for 'Inpatient Wards' and 'Logout'. The breadcrumb trail shows the path: Home > Confirmed Ward 1 > Ebola Overview.

The patient information section identifies the patient as 'Patient, Test', a 27-year-old male born on 11 May 1989. The patient ID is KT-1-09876. Below this, a 'Jump to:' menu provides quick access to various clinical areas: Lab results, Vitals, Symptoms, Prescriptions, Med admin, IV fluids, and Clinical notes.

The main 'Ebola Overview' section contains key clinical data: Ebola stage (Stage 2(GI/Wet)), location (Confirmed Ward 1, Bed #2), and treatment outcome (None). It also lists admission details: weight (70.0kg), stage at admission (Stage 3(Severe)), type of patient (Confirmed diagnosis), and enrollment status (Enrolled since 09.Mar.2015, 15:00:48). A status bar indicates an active visit on 09 Mar 2015 at 03:00 PM and that the patient is inpatient at Bed #2.

The 'Laboratory' section shows test results for Ebola and Malaria. The Ebola test is positive (dated 2 Apr 2015), and two Malaria tests are also positive (dated 29 Aug 2016 and 31 Mar 2015).



The 'Vitals' section provides a table of recent observations:

| Time | AVPU | Pain | T | Pulse | Resp | O ₂ | BP |
|--------------|-------------|------|-----------|------------|----------|----------------------|---------------|
| 8 Jul 22:27 | AVPU: Pain | | T: - | Pulse: - | Resp: - | O ₂ : 19% | BP: 100 / 120 |
| 4 May 21:21 | AVPU: Alert | | T: 37.0°C | Pulse: 120 | Resp: 30 | O ₂ : 90% | BP: 80 / 60 |
| 10 Apr 12:10 | AVPU: - | | T: 38.2°C | Pulse: 102 | Resp: 22 | O ₂ : 91% | BP: 96 / 62 |

The 'Symptoms' section lists observed symptoms with their respective dates and times:



- 25 Sep 6:56: Hiccups, IV Site bleeding,
- 8 Jul 22:26: Diarrhoea, Vomitus bleeding, Stage(2 - GI/Wet)
- 4 May 21:20: Fatigue, Confusion, Muscle/joint pain, Chest pain, Cough, Vomiting, Vomitus bleeding, Stage(2 - GI/Wet)

Desktop: summary screens

 **Prescriptions** [View All](#) 

MULTIVITAMIN *Multivitamin Tablets*
1 Tablet Oral each Night (*prescribed by: ebola doctor jones*) 31.Mar 19:07



[Back to top](#)

 **Medication Administration** [Modify Data](#) 

[← Previous week](#)

| | 01-Apr-15 | 02-Apr-15 | 03-Apr-15 | 04-Apr-15 | 05-Apr-15 | 06-Apr-15 | 07-Apr-15 |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| MULTIVITAMIN <i>Multivitamin Tablets</i> | | | | | | | |
| 1 Tablet Oral each Night | | | | | | | |

[Back to top](#)

 **IV Fluids** [View All](#) 

NS + KCL 40 MMOL/L 100.0 mL IV over 60 Minutes
ordered by ebola doctor jones - STARTED: 31.Mar 19:08 31.Mar 19:08

NORMAL SALINE 75.0 mL IV over 60 Minutes
ordered by Super User - NOT STARTED 16.Mar 14:37

[Back to top](#)

Desktop: drug administration charts

| Medication Administration | | Modify Data | | | | | |
|--|-----------|-------------|-------------------|-----------|-----------|-----------|---|
| ← Previous week | | | | | | | |
| | 01-Apr-15 | 02-Apr-15 | 03-Apr-15 | 04-Apr-15 | 05-Apr-15 | 06-Apr-15 | 07-Apr-15 |
| OMEPRAZOLE <i>Omeprazole 20mg Capsule</i> | | | | | | | |
| 2 Tablet Oral each Morning, Afternoon, Evening, Night PRN COUGH | | | | | | | START |
| AMOXICILLIN <i>Amoxicillin 500mg Capsules</i> | | | | | | | |
| 1 Tablet Oral each Evening, Night for 4 Days | | | | | | | START |
| ZINC SULFATE <i>Zinc Sulfate 20mg Tablets</i> | | | | | | | |
| 6 Microgram Oral each Morning | | | 14:50 Fully Given | | | | 09:45 Fully Given 14:12 Not Given <i>Aggressive mood</i> 14:13 Fully Given |

Desktop: lab results

OpenMRS MEDICAL RECORD SYSTEM demo Inpatient Wards Logout

[Home](#) > [shoiup, osama](#) > **Ebola Laboratory Test**

osama shoiup Male 40 year(s) (~19.Jan.1975) [Edit](#) [Show Contact Info](#) Patient ID **KT-1-12345**

Given Family Name

Active Visit - 19 Jan 2015 05:12 PM **Inpatient at Bed #8**

Date of test

(dd/mm/yyyy)

Ebola test

Positive
 Negative

Malaria test

Positive
 Negative


Cancel **Save**

Desktop: clinical notes

The screenshot displays the OpenMRS Medical Record System interface. At the top, the OpenMRS logo is on the left, and user information 'demo' and navigation links 'Inpatient Wards' and 'Logout' are on the right. Below the header, a breadcrumb trail shows the path: Home > Suspect Ward 1 > shoiup, osama > Clinical Notes. The patient's name 'shoiup, osama' is prominently displayed, with 'shoiup' as the surname and 'osama' as the name. Additional patient details include 'Male 40 year(s) (~19.Jan.1975)', an 'Edit' button, and a 'Show Contact Info' dropdown. The Patient ID is 'KT-1-12345'. The main content area is titled 'Clinical notes' and includes a 'Back to Summary' link and an 'Add clinical note' button. A table lists three clinical notes:

| Timestamp | User | Note Content |
|----------------------|---------------------|---|
| 07 Apr 2015 14:19:49 | Demonstration, User | more clinical notes testing. i'm writing boring text. |
| 07 Apr 2015 14:19:17 | Demonstration, User | testing text (wiki) - An electronic health record (EHR), or electronic medical record (EMR), is a systematic collection of electronic health information about an individual patient or population. [1] It is a record in digital format that is theoretically capable of being shared across different health care settings. In some cases this sharing can occur by way of network-connected, enterprise-wide information systems and other information networks or exchanges. EHRs may include a range of data, including demographics, medical history, medication and allergies, immunization status, laboratory test results, radiology images, vital signs, personal statistics like age and weight, and billing information.[2] |
| 07 Apr 2015 14:17:55 | Demonstration, User | testing - this is a clinical note. |


Desktop: discharge

 OpenMRS
demo Inpatient Wards Logout

[← Back to Summary \(discard changes\)](#)

unknown unknown


Current Status: None

 **Discharge a Patient**

Please select Final Outcome:

- Suspected negative and discharged
- Cured and discharged
- Discharged against medical advice
- Suspect referred to other facility
- Confirmed case transferred to other facility
- Died on ward
- Dead on arrival

Discharge Date:

07-04-2015 

Cancel **Save**