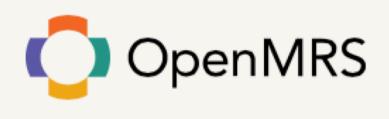
Università degli Studi di Trieste

Corso di Laurea Magistrale in INGEGNERIA CLINICA



**OpenMRS: OVERVIEW** 

Corso di Informatica Medica

Docente Sara Renata Francesca MARCEGLIA





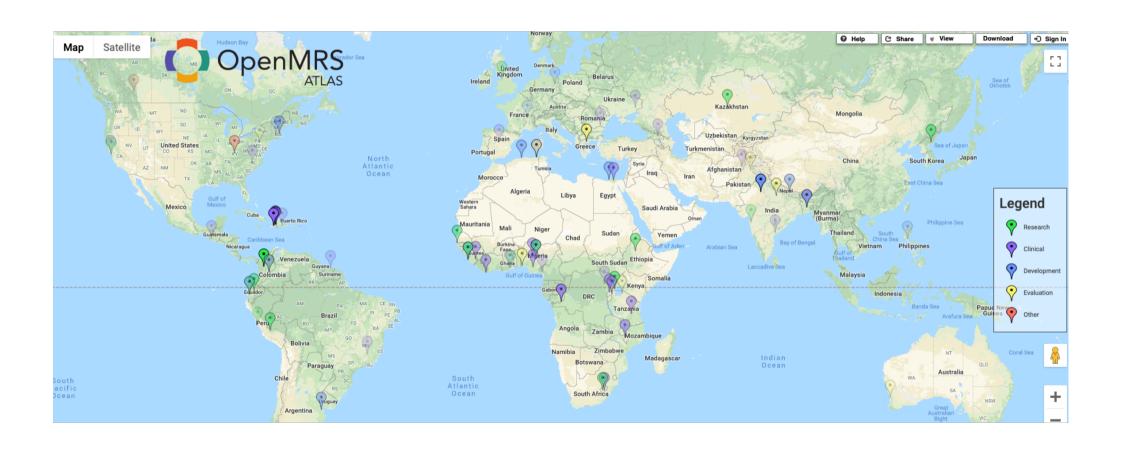
# WHAT IS OPENMRS

The mission of OpenMRS is to improve health care delivery in resource-constrained environments by coordinating a global community that creates a robust, scalable, user-driven,

open source medical record system platform

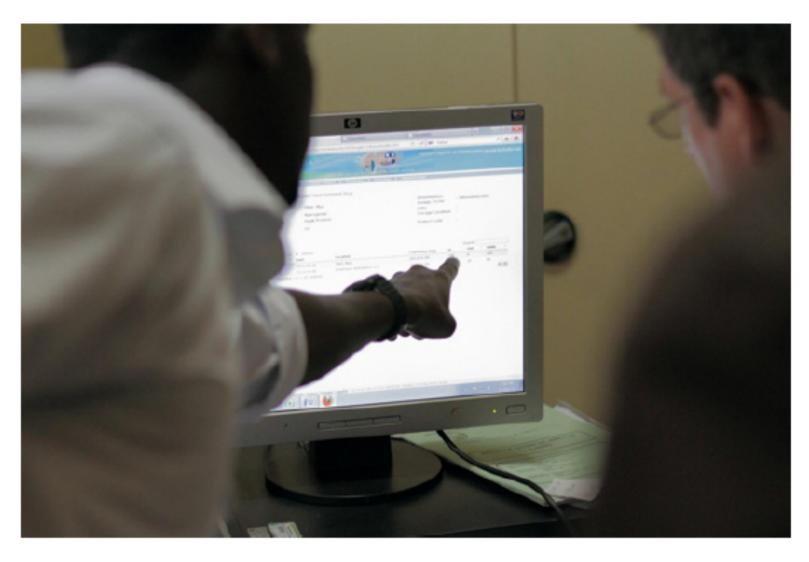
# OPENMRS: LOCATIONS AROUND THE WORLD







# OPENMRS WAS CREATED FOR THE DEVELOPING COUNTRIES



OpenMRS in use at TRAC Plus Clinic in Kigali, Rwanda.

# OPEN SOURCE: IMPLEMENTATION VS DEVELOPMENT



### **IMPLEMENTERS**

- Clinics/Hospitals in need of the EHR system
- Install OpenMRS and Use it
- Create the dictionary and the forms useful for their implementation
- Rely on the development community for new features → use modules

### **DEVELOPERS**

- Information scientists who develop the source code
- Work independently or after being committed to a project
- The source code is available
- There is a large developer community around the world
- Develop modules

# FROM PAPER-BASED RECORDS... TO THE UNIVERSITÀ DEGLI STUDI DI TRIESTE **EHR**





A paper-based patient register book at an African OpenMRS clinic.





#### YOUR ORGANIZATIONAL GOALS AND PRACTICES

For now, forget about technology and instead think about your organizational goals and processes. Here's a list of questions to start:

- What are the high level goals of your organization?
- · What are the teams and staff in the clinic? What roles exists? What functions does each role perform?
- What tasks are staff involved with on a day to day basis?
- What services does the clinic provide to your patients? What activities are involved?
- What other 3rd-party or government organizations do you report to? What information is included in each of these reports?

#### TAKE ADVANTAGE OF INSTITUTIONAL KNOWLEDGE

As you think about your patients and how they interact with your organization, talk to your clinical and administrative staff -both those who have been around a long time, and those who have just joined. Talk to as many people as you possibly can to get a complete picture of every service provided to patients.



MAP YOUR NEEDS TO OPENMRS



# THE OPEN SOURCE COMMUNITY

#### DO NOT "REINVENT THE WHEEL"

The open source ethos of OpenMRS extends beyond just the application, to a much larger open community where ideas and experiences are shared. There are many existing resources available in the form of pre-built OpenMRS features (modules) and content that a new implementer should take advantage of. You should explore the following resources before building anything new.

#### Reuse an existing concept dictionary

### Adapt existing forms

Implementers should evaluate data collection forms built by other OpenMRS users before creating new custom forms for their specific needs.

### Explore the module repository

Implementers should consult the OpenMRS Module Repository at <a href="http://modules.openmrs.org/">http://modules.openmrs.org/</a> before considering customization through software development.



# ...AND THEN IMPLEMENT...



An OpenMRS server in Uganda.



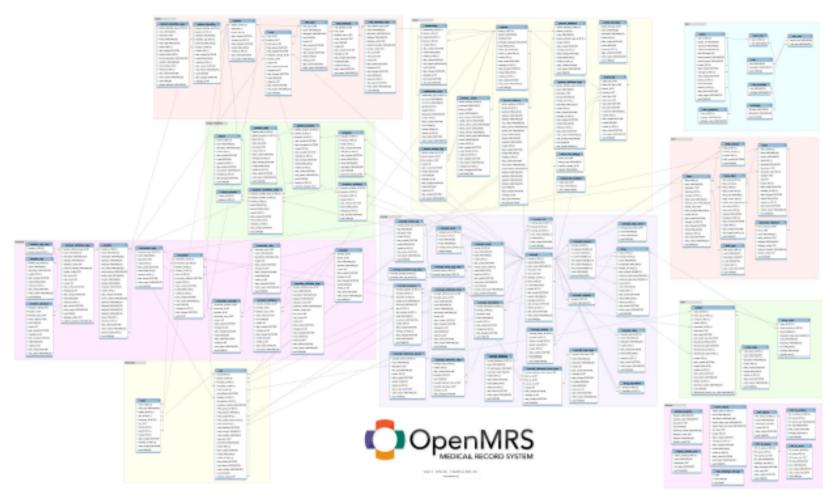
# THE INFORMATION MODEL

### DATA

- Person
- Encounter
- Visit
- Observation
- Order
- Workflow
- METADATA
  - Locations
  - Concept Dictionary
- FORMS



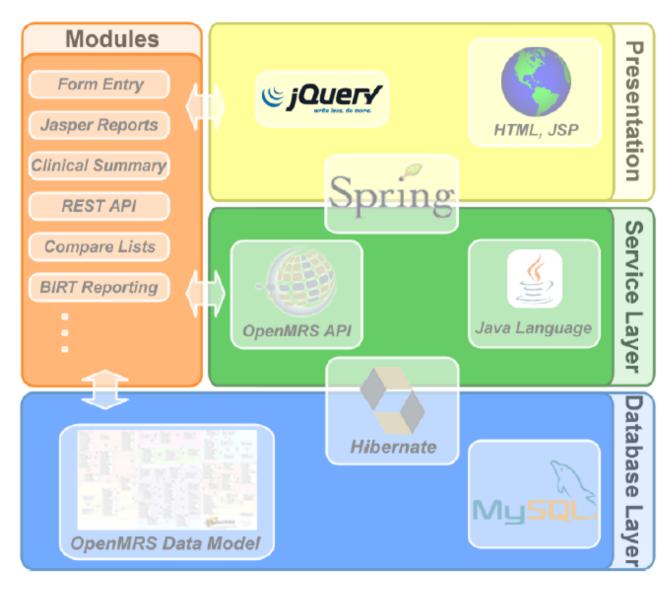
# THE DATA MODEL



OpenMRS data model version 1.9. Details at <a href="http://go.openmrs.org/newdev-data">http://go.openmrs.org/newdev-data</a>



# **ARCHITECTURE**



An overview of OpenMRS



# **GET INVOLVED**



The OpenMRS Community, circa 2013



# **DOWNLOAD OpenMRS**

### **STANDALONE**

### **PRODUCTION**

### Reference Application 2.8.0

#### Standalone Edition

323.1 MB at sourceforge.net · Released 27-June-2018 Linux, Mac OS X, Windows · Release Notes

**Recommended for new people exploring OpenMRS.** A self-contained ZIP archive that includes an embedded database and application server, as well the option to install demo data for sample patients. Expand the ZIP archive and run the .jar file to start the Reference Application. Log in with username: admin, password: Admin123.

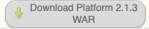
This is not intended for production use.

### Reference Application 2.8.0

#### Individual Components for Advanced Installation

Released 27-June-2018
Linux, Mac OS X, Windows · Release Notes

For production use of the Reference Application, you must install an OpenMRS Platform WAR, which requires an existing Java servlet container such as Apache Tomcat, and an existing database such as MySQL. Download these individual components here:





#### Platform 2.1.3

#### Standalone Edition

395.7 MB at sourceforge.net · Released 30th March 2018 Multi-platform Java webapp · Release Notes

**Recommended for people exploring the latest stable version of Platform.** A self-contained ZIP archive that includes an embedded database and application server, as well the option to install demo data for 5,000 sample patients. Expand the ZIP archive and run the .jar file to start OpenMRS. Log in with username: **admin**, password: **test**.

This is not intended for production use.

### Platform 2.1.3

### WAR (for Enterprise)

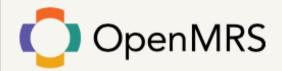
83.4 MB at sourceforge.net · Released 30th March 2018 Multi-platform Java webapp · Release Notes

Recommended for advanced users using Reference Application 2.x or Platform in production. Requires an existing Java servlet container such as Apache Tomcat, and an existing database such as MySQL. Separate demo data is available for download below.

http://openmrs.org/download/



# THE DEMO ENVIRONMENT



Home

About Us

Get Involved

Tools

Demo

### **OpenMRS Demo**

OpenMRS demos are designed to give you a taste of OpenMRS from an implementer's point of view. It is a fully working copy of OpenMRS with observations on large numbers of anonymized patients. **These are not real patients.** Log in to examine all of OpenMRS's features.

Our demo is a standard OpenMRS reference application installation – what you would find if you download OpenMRS yourself from our download page.

### ✓ Launch the OpenMRS Demo

Username: admin

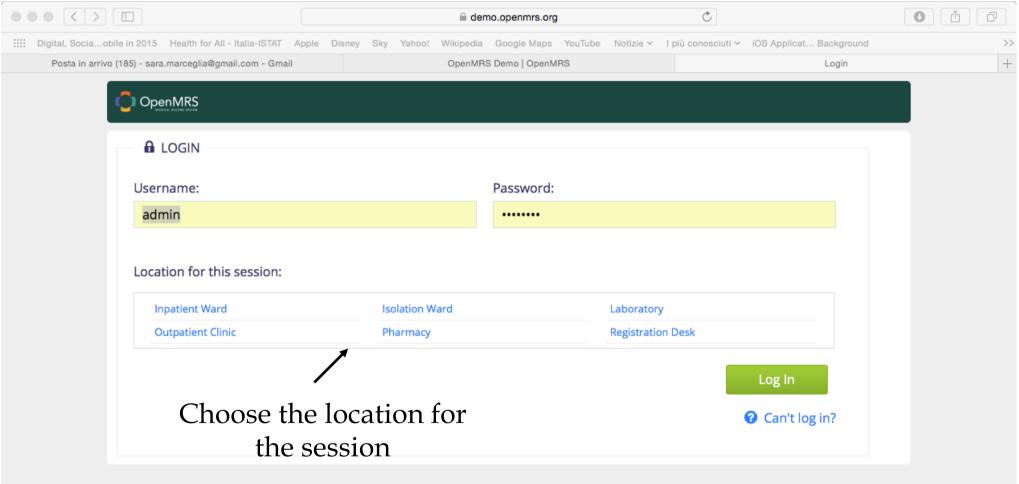
Password: Admin123

On your first visit, you must select a location before you will be able to log in.

This demo system resets itself periodically. If it is temporarily unavailable, please try again in a few minutes.



# THE STANDALONE EDITION

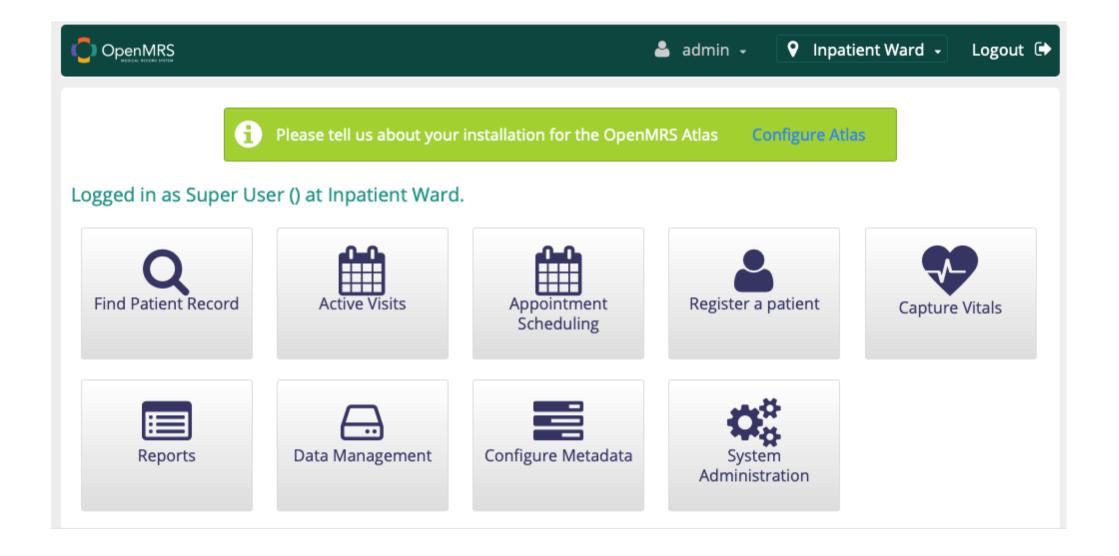


Username: admin

Password: Admin123



# **APPLICATION HOMEPAGE**







♣ admin -

**♀** Inpatient Ward •

Logout 🕩



→ Find Patient Record

### Find Patient Record

smith

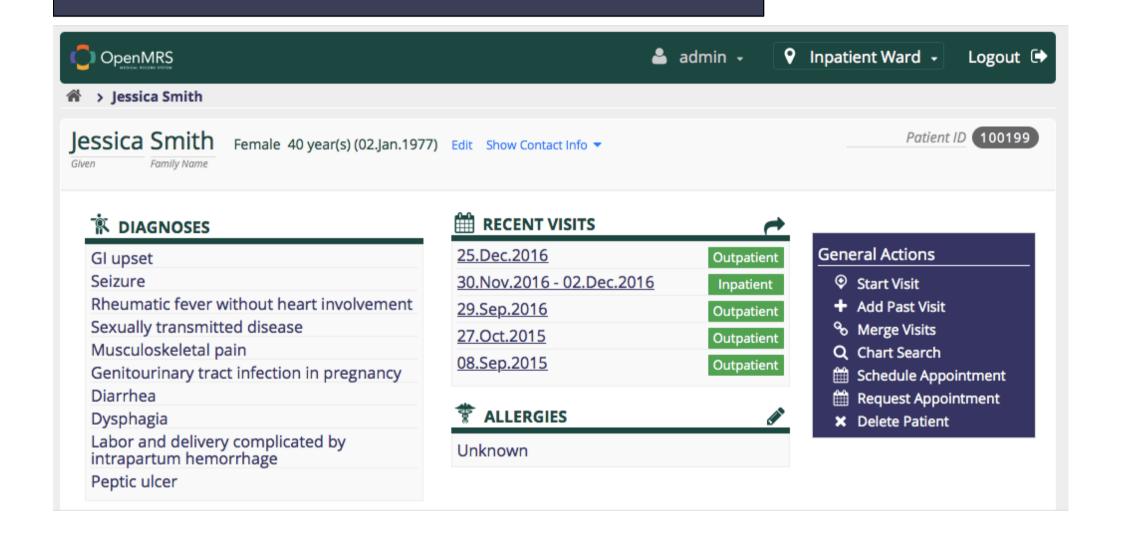


Identifier	Name	Gender	Age	Birthdate
100397	Brian Smith	М	58	17 Jun 1958
100199	Jessica Smith	F	40	02 Jan 1977
1001MH	John Smith	М	47	19 Jun 1969
100694	Joseph Smith	М	42	09 Jan 1975
1001LK	Lisa Smith	F	76	04 May 1940
100GHA	Mary Smith	F	61	18 Jun 1955
1005HM	Michelle Smith	F	30	14 Apr 1986
10064F	Paul Smith	М	51	04 Jul 1965
10080M	Paul Smith	М	39	12 May 1977
100DEM	Robert Smith	М	77	13 Apr 1939
10017E	Thomas Smith	М	18	25 Mar 1999

Showing 1 to 11 of 11 entries

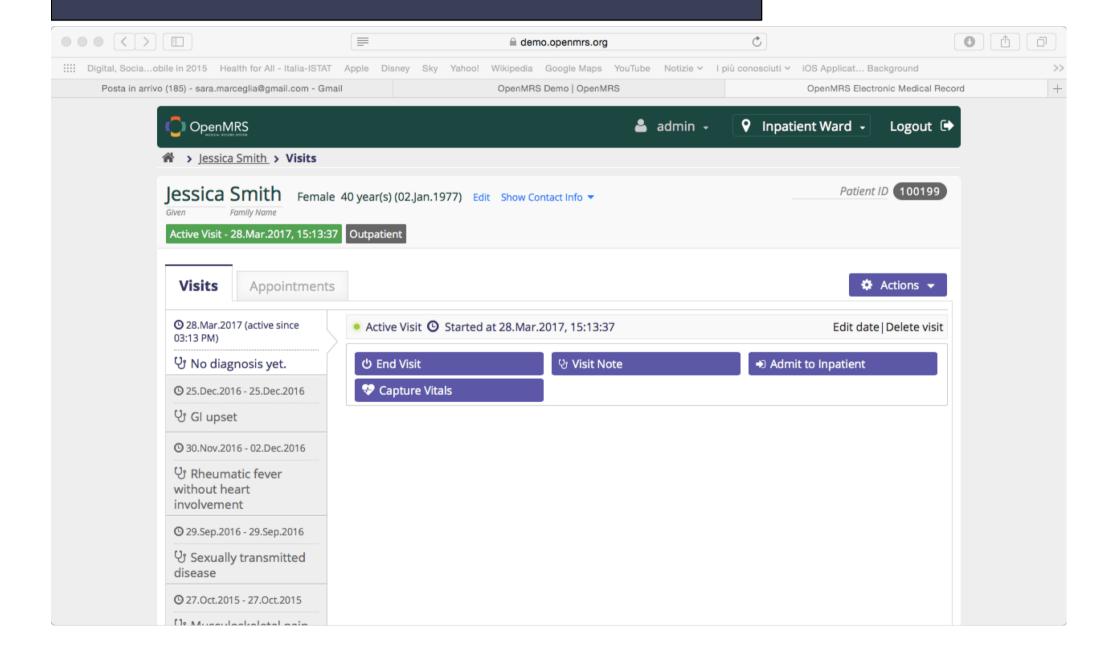
First Previous 1 Next Last





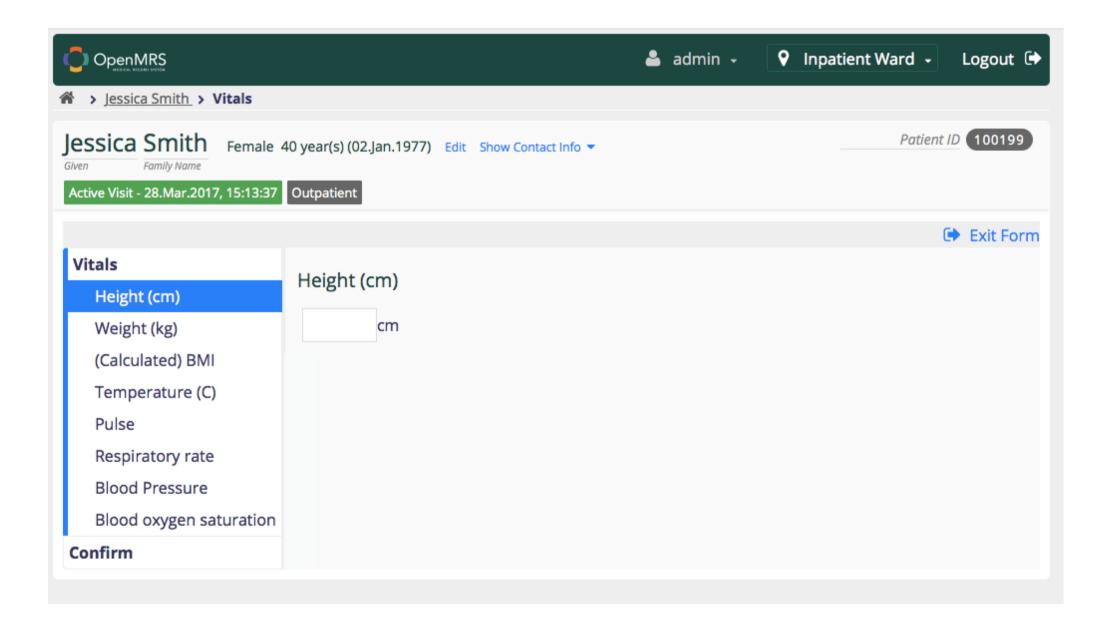


# **START VISIT**



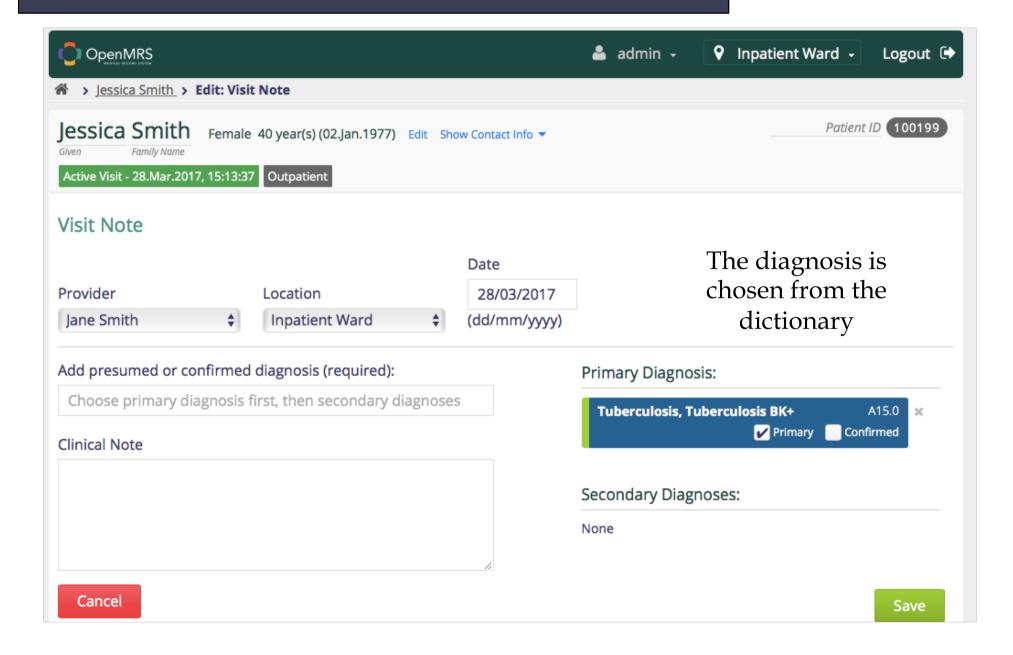


# **CAPTURE VITALS**





# **VISIT REPORT**





# **ADMINISTRATION SECTION**



#### **Administration**

#### Users

Manage Users
Manage Roles
Manage Privileges
Manage Alerts

#### **Patients**

Manage Patients
Find Patients to Merge
Manage Identifier Types
Manage Patient Identifier Sources
Auto-Generation Options
View Log Entries

#### Person

<u>Manage Persons</u> <u>Manage Relationship Types</u> Manage Person Attribute Types

#### Visits

Manage Visit Types
Manage Visit Attribute Types
Configure Visits

#### **Encounters**

Manage Encounters

Manage Encounter Types

Manage Encounter Roles

#### **Providers**

Manage Providers
Manage Provider Attribute Types

#### Concepts

View Concept Dictionary
Manage Concept Drugs
Manage Proposed Concepts
Manage Concept Classes
Manage Concept Datatypes
Manage Concept Sources
Manage Concept Stop Word
Manage Reference Terms
Manage Concept Attribute Types

#### Forms

Manage Forms
Manage Fields
Manage Field Types
Merge Duplicate Fields

#### **HL7 Messages**

Manage HL7 Sources
Manage Queued Messages
Manage Held Messages
Manage HL7 Errors
Manage HL7 Archives
Migrate HL7 Archives

#### Maintenance

Set Implementation Id System Information View Quick Reports Settings Advanced Settings

#### Modules

Manage Modules Module Properties

#### **Data Exchange Module**

Export Import

#### **HTML Form Entry**

Manage HTML Forms
Preview HTML Form from File

#### Reports

Run Reports
Manage Reports
Manage Report Macros
Manage Data Exports
Manage Row Per Obs Data Exports
Manage Cohorts
Manage Patient Searches
Manage Report Elements

#### **REST Web Services**

<u>Settings</u> <u>Test</u> API Documentation

#### OpenMRS Atlas

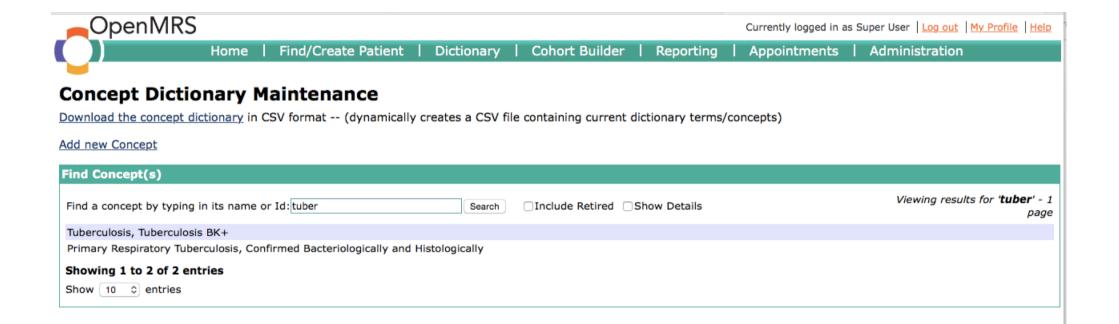
Manage Atlas Marker

#### Provider Management Module

Manage Provider Roles



# **CONCEPT DICTIONARY**





# **CREATE NEW CONCEPT**

OpenMRS

Currently logged in as Super User | Log out | My Profile | Help

Home Find/Create Patient | Dictionary

Cohort Builder

Reporting

Appointments

Administration

### **Creating New Concept**

Id Locale English   English (United Kingdom)   Spanish   French   Italian   Portuguese  Fully Specified Name*?  Synonyms ? Add Synonym  Search Terms ? Add Search Term  Short Name ?  Class ? Tost	<u>New</u>		Search			
Synonyms? Add Synonym Search Terms? Add Search Term  Short Name?  Description?  Class? Test   Is Set?  Datatype? Numeric  Numeric? Absolute High  Critical High  Normal High  Normal Low  Critical Low  Critical Low		Locale	English   English (Unit	ed Kingdom)   Spa	nish   French   Italia	an   <u>Portuguese</u>
Search Terms ? Add Search Term  Short Name ?  Description ?  Class ? Test  Is Set ?  Datatype ? Numeric  Numeric ? Absolute High  Critical High  Normal High  Normal Low  Critical Low	Fully Sp	ecified Name* ?			O	
Short Name ?  Description ?  Class ? Test		Synonyms ?	Add Synonym			
Class ? Test  Is Set ?  Datatype ? Numeric  Numeric ?  Absolute High  Critical High  Normal High  Normal Low  Critical Low		Search Terms ?	Add Search Term			
Class ? Test  Is Set ?  Datatype ? Numeric  Numeric ?  Absolute High  Critical High  Normal High  Normal Low  Critical Low		Short Name ?				
Is Set ? Datatype ? Numeric ? Absolute High Critical High Normal High Normal Low Critical Low		Description ?				
Numeric ?  Absolute High  Critical High  Normal High  Normal Low  Critical Low		Class ?	Test			
Numeric ? Absolute High  Critical High  Normal High  Normal Low  Critical Low		Is Set ?				
Critical High  Normal High  Normal Low  Critical Low			Numeric			
Normal High  Normal Low  Critical Low		Numeric ?	Absolute High			
Normal Low Critical Low			Critical High			
Critical Low			Normal High			
			Normal Low			
Absolute Low			Critical Low			
			Absolute Low			



# **QUESTION&ANSWER CONCEPTS**

OpenMRS Currently logged in as Super User | Log out | My Profile | Help Find/Create Patient Cohort Builder Home Dictionary Reporting Appointments Administration Concept saved successfully **Viewing Concept Diagnosis** Previous | Edit | Stats | Next | New Search Id 163140 Resources UUID 063290b6-fe5f-460e-83a8-3d3cacc99d2b Similar Concepts English | English (United Kingdom) | Spanish | French | Italian | Portuguese Locale Merriam Webster® **Fully Specified Name** Diagnosis Google™ Synonyms UpToDate® Dictionary.com® Search Terms Lab Tests Online Short Name Wikipedia Description Class Question Concept Usage Datatype Coded Epilepsy (155) Answers Obs for this concept: 0 Tetanus (124957) Poliomyelitis (5258) Mappings Version Created By Super User - 28 March 2017 16:09:02 UTC Changed By Super User - 28 March 2017 16:15:47 UTC



# **CREATE A NEW FORM**

• We want to create a form that contains:

# CASE DETAILS

Age:
Gender:
□ Male
□ Female
Diagnosis:
Years of disease history:
Predominant side:
□ Left
□ Right
Date of implant:
Target structure:

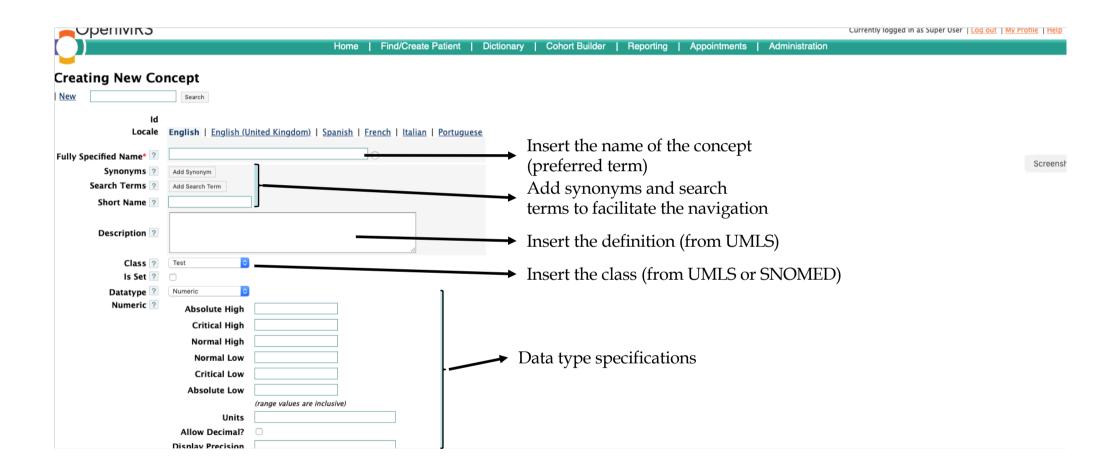


# **CREATE THE CONCEPTS**

- Age →
  - question with numeric answer
  - Equivalent to SNOMED CT "current chronological age "code: 424144002
- Gender →
  - Question with answers "male" and "female"
  - First you have to create the concepts for the answers
- Diagnosis →
  - Question with either open answer or coded answer (set of diagnoses)
- Years of disease history →
  - question with numeric answer

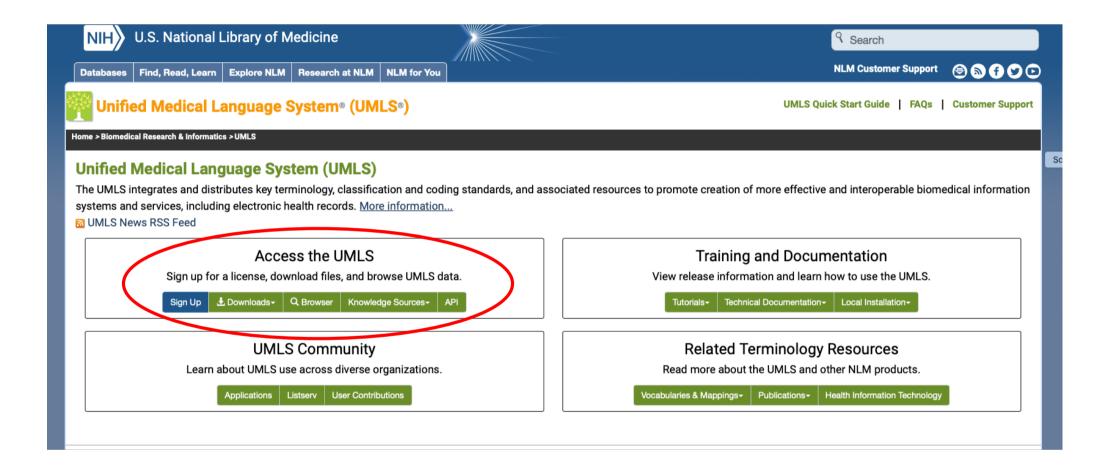






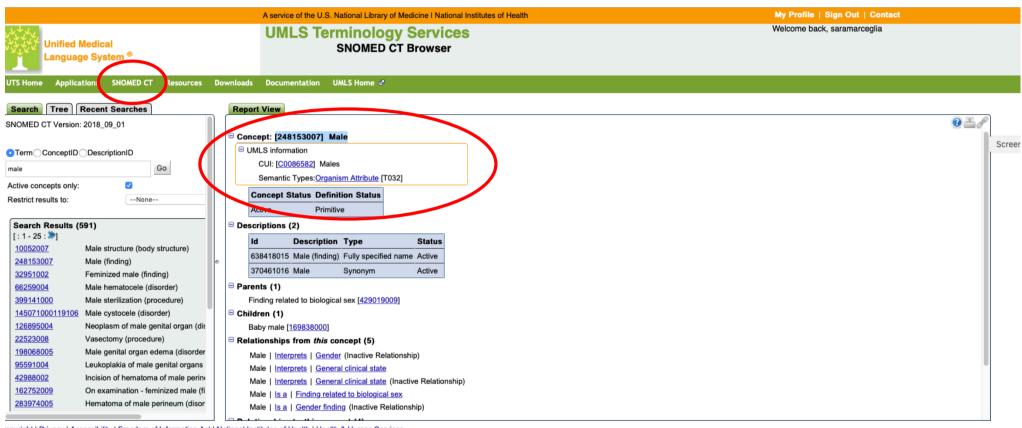


# **NAVIGATE UMLS or SNOMED**





# **NAVIGATE UMLS or SNOMED**

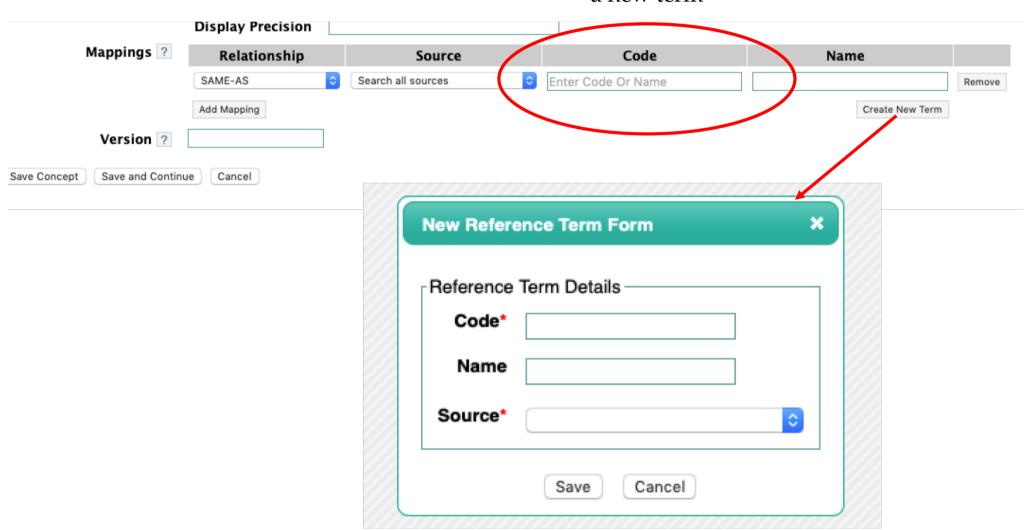


opyright | Privacy | Accessibility | Freedom of Information Act | National Institutes of Health | Health & Human Services



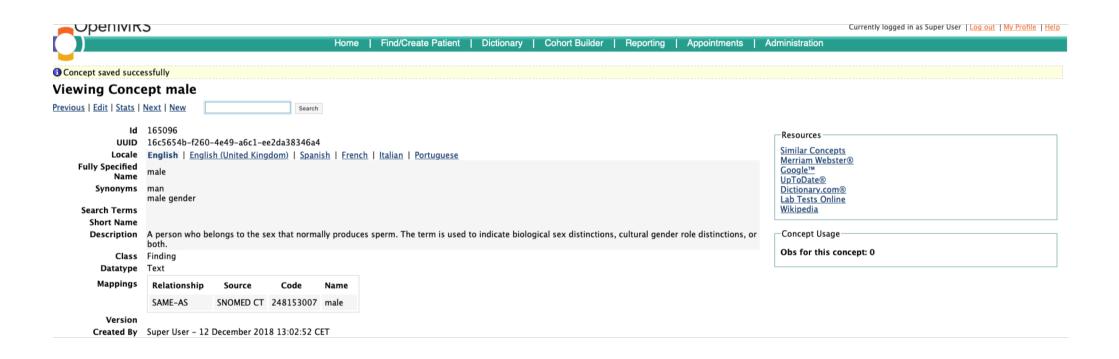
# **ADD MAPPING**

If the mapping term already exists, you can select it, otherwise you have to create a new term









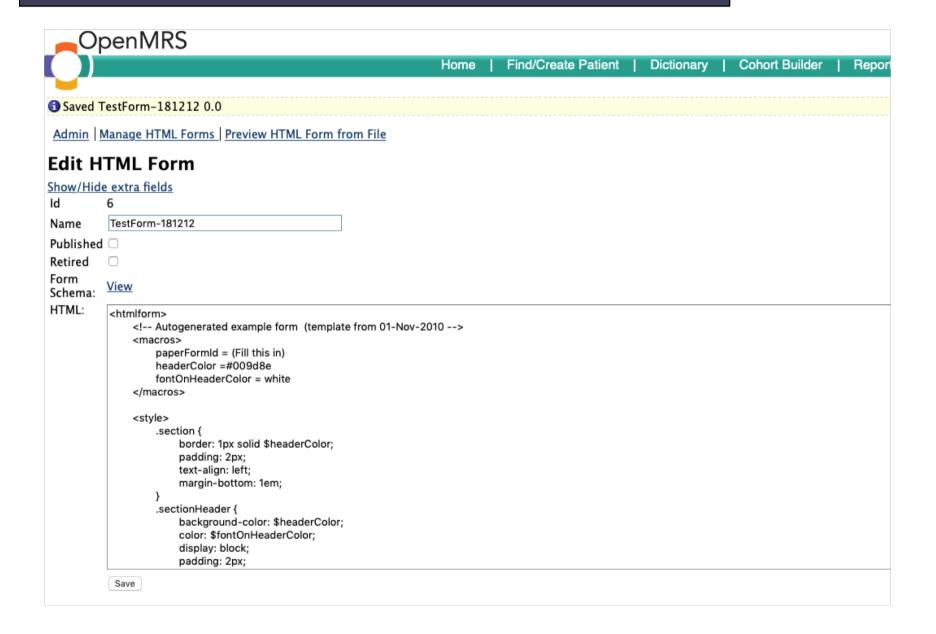


# **CREATE THE NEW FORM**

OpenMRS						Currently logged in as	Super User   Log out   My Profile   Help
	Home	Find/Create Patient	Dictionary	Cohort Builder	Reporting	Appointments	Administration
Admin   Manage HTML Forms   Preview HTML Form from File							
Create HTML Form							
Name							
Description							
Version							
Encounter Type		•					
		Save					



# **EDIT THE NEW FORM**





# **EXAMPLE CODE**

3" answerLabels="Label 1, Label 2, Label 3"/>

Simple examples to copy-and-paste. Full reference at http://wiki.openmrs.org/x/kg8z **SECTION** <section headerLabel="\#. Title"> Content </section> **NUMERIC OBSERVATION** <obs conceptId="id-of-numeric-concept" labelText="Label before"/> DATE OBSERVATION <obs conceptId="id-of-date-concept" labelText="Label before"/> CODED OBSERVATION (as a dropdown) <obs conceptId="id-of-coded-concept" labelText="Label before"/> (as radio buttons) <obs conceptId="id-of-coded-concept" labelText="Label before" style="radio"/> (as an autocomplete) <obs conceptId="id-of-coded-concept" labelText="Label before" style="autocomplete" answerClasses="Diagnosis"/> (as a checkbox for a specific answer) <obs conceptId="id-of-coded-concept" labelText="Label before" answerConceptId="id-of-answer-concept"</pre> answerLabel="label for answer"/> (as a dropdown with specific choices)

<obs conceptId="id-of-coded-concept" labelText="Label before" answerConceptIds="concept-id-1,concept-id-2,concept-id-



# **CREATE THE CODE**

# Working on the pre-filled form, add the information you need to collect



# PREVIEW THE NEW FORM

Preview			
TestForm-181212	(v0.0)		Paper Form ID: (Fill this in)
1. Encounter Details			
Date: 12/12/2018 (dd/mm	/уууу)		
Location: Choose a Location			
Provider: Choose a Provider 💠			
2. Clinical data			
Name:	Demo The Person		
OpenMRS ID:			
Old Identification Number:	TestingOld Identification Number123		
OpenMRS Identification Numbe	r:		
Age:	Anni:		
Gender:	Select: 💮 😊		



# **ESERCIZIO**

Dato il seguente stralcio di lettera di dimissione:

- 1- creare una form strutturata e codificata adatta a rappresentare tutte le informazioni in esso contenute
- 2- creare I concetti necessari alla codifica
- 3- creare la form HTML relativa

Il sig Mario Rossi, 63 anni, è stato diagnosticato con malattia di Parkinson nel 2001, con un'insorgenza dei sintomi sul lato destro.

Attualmente è trattato con levodopa 100 mg/5 volte die. È stato sottoposto a intervento di stimolazione cerebrale profonda del nucleo subtalamico in data 11/12/2018. Non presenta complicanze di tipo emorragico