

OPENMRS RADIOLOGY MODULE USER GUIDE V 1.0



Victor Cortés, Juan Pastás

The radiology module is intended to help in the radiology department workflow: order creation by the referring physician, scheduling by the scheduler staff, image acquisition for an order by the performing physician either a technician or specialist and finally the diagnostics from the reading physician. The module is designed for three modalities Computed Radiography, Magnetic Resonance, and Computed Tomography. The module is developed following DICOM standard.

University of Cauca

11/18/2011

RADIOLOGY MODULE USER GUIDE

The Radiology module supports the clinical part of the radiology department workflow by integrating the functionalities of EHR, RIS and PACS: order creation by the referring physician, scheduling by the scheduler staff, image acquisition for an order by either a technician or a specialist, and finally diagnostics by the radiologist. The module conforms to DICOM and is designed for three modalities: Computed Radiography (CR), Magnetic Resonance (MR), and Computed Tomography (CT).

CONTENTS

1. **MANAGE RADIOLOGY ORDERS** explains the interface for radiology orders management. This interface allows access to other interfaces.
2. **REFERRING PHYSICIAN** explains the interaction between the module and a referring physician.
3. **SCHEDULER** explains the interaction between the module and a scheduler.
4. **READING PHYSICIAN** explains the interaction between the module and a radiologist.

MANAGE RADIOLOGY ORDERS

This interface allows viewing, finding, and selecting an order from which any of the four roles (referring physician, scheduler, performing physician, reading physician) created by the module perform a specific task.

The user gets this interface (Figure 1) by clicking “Manage radiology orders” in the admin page. The following are the interface functions (look for the numbers in the figure):

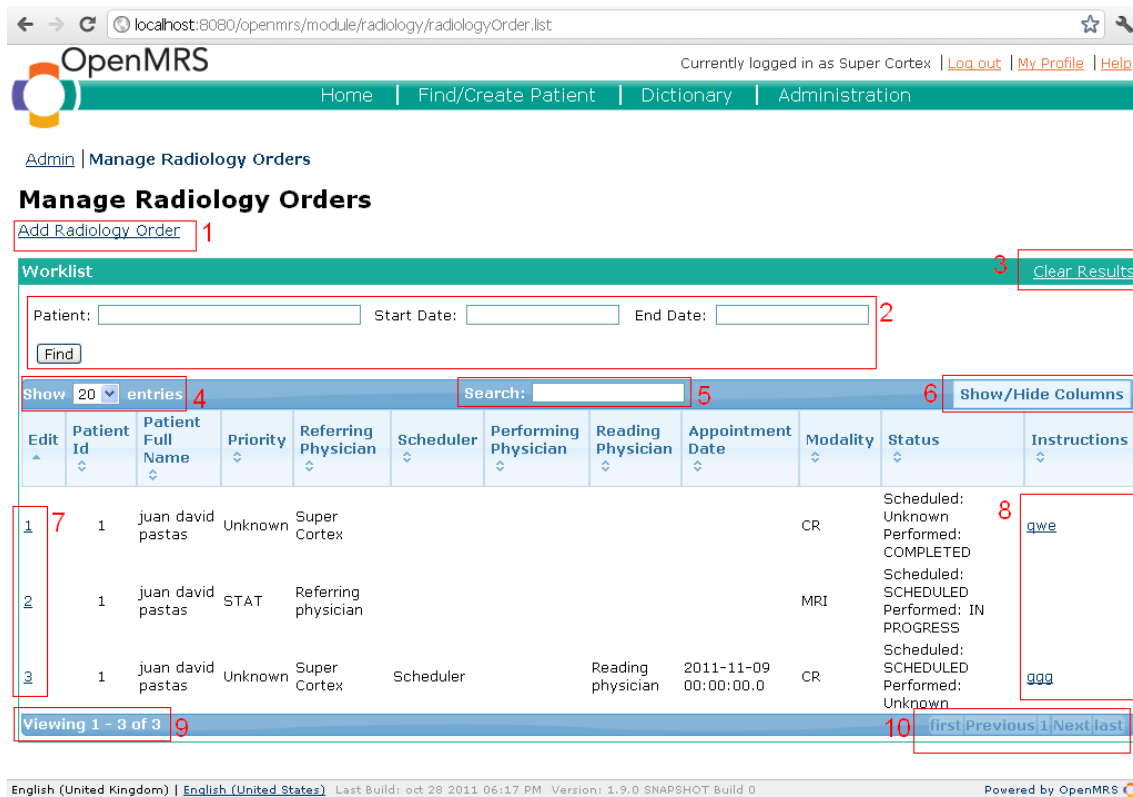


Figure 1. Manage Radiology Orders.

1. Allows creating a new order to a user that has 'Add orders' privilege.
2. Permits user to query for orders complying with the criteria (Patient, Start Date and End Date) established.
3. Clears the results in the table.
4. Selects results per page.
5. Filters currently listed entries by all columns contents.
6. Lets the user customize the columns viewed.
7. From each one of these links the user edits a radiology order or makes observations depending on the user role.
8. Shows instructions for an order. A popup window extends the information when the link is clicked on.
9. Information about entries being viewed.
10. Page navigation controls.

The order status (Status column) is showed depending on the role of the user viewing the interface (Table 1):

Table 1. Type of status showed depending on the user role.

Role	Status shown
Referring physician	Scheduled and performed
Scheduler	Scheduled
Performing physician	Scheduled and performed

Reading physician Performed

REFERRING PHYSICIAN

Referring physician gets this interface (Figure 2) by clicking add or edit a radiology order in Figure 1 (functions 1 and 7). The following are the interface functions (look for the numbers in the figure):

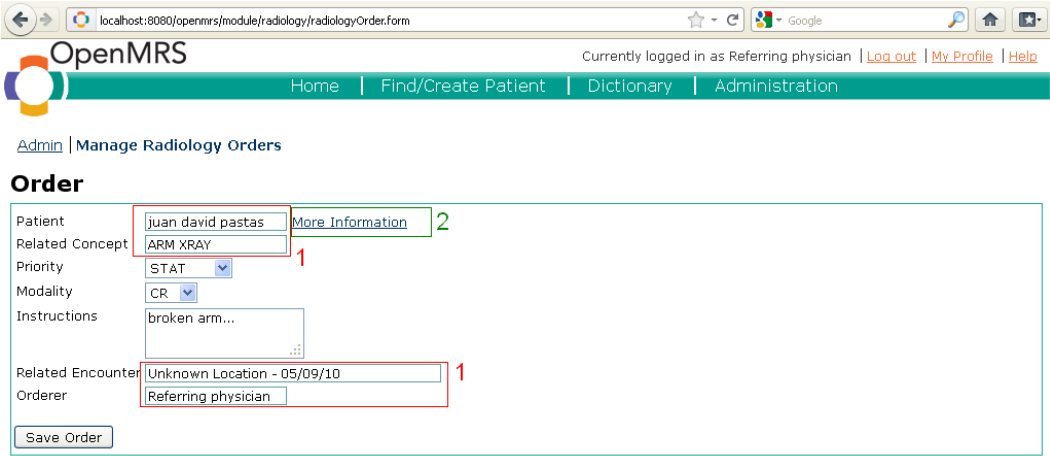


Figure 2. Order form – Referring physician.

1. Fields that searches in database while the user is writing. It looks for: patients, concepts, encounters and system users, respectively.
2. Shows a popup window with patient overview when clicked (Figure 3).

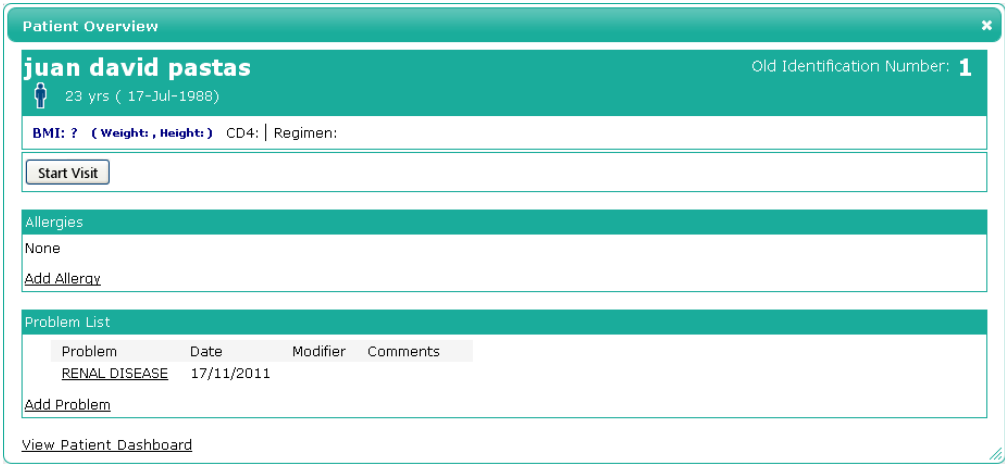


Figure 3. Patient overview popup.

Here the user can view basic information about the selected patient as well as see and add allergies and other problems.

Other fields the referring physician enters in the order form are: Priority (STAT, HIGH, ROUTINE, MEDIUM or LOW), Modality (CR, MRI, or CT) and Instructions.

SCHEDULER

The scheduler selects an unscheduled order and sets a date to it. He gets this interface (Figure 4) clicking edit radiology order (function 7) in Figure 1. The following are the interface functions (look for the numbers in the figure):

The screenshot shows the OpenMRS web interface for managing radiology orders. The browser address bar indicates the URL is localhost:8080/openmrs/module/radiology/radiologyOrder.form?orderId=7. The user is logged in as 'Scheduler'. The page title is 'Order' and the patient name is 'juan david pastas'. The form contains several fields: Patient (juan david pastas), Related Concept (X-RAY, ARM), Priority (STAT), Modality (CR), Instructions (broken arm...), Related Encounter (Encounter: [1 2010-C]), Orderer (Referring physician), Start date (17/11/2011), Auto-expire date (17/11/2011), Reading Physician (Reading physician), and Created By (Referring physician - 17 November 2011 19:56:32 COT). There is a 'Save Order' button. Below the main form, there are sections for 'Discontinued date', 'Reason discontinued', 'Discontinue this Order', and 'Void Reason' with a 'Void this Order' button. Red boxes and numbers 1, 2, and 3 highlight the date selectors, reading physician selector, and the discontinuation/voiding section respectively.

Figure 4. Order form – Scheduler

1. Order dates selectors. Date of the image acquisition process.
2. Reading physician selector.
3. Discontinue or void this order.

When the scheduler sets the date, the scheduled status of the order is set to SCHEDULED in the manage radiology orders interface (Figure 5).

OpenMRS
Currently logged in as Scheduler | [Log out](#) | [My Profile](#) | [Help](#)

Home | [Find/Create Patient](#) | [Dictionary](#) | [Administration](#)

Order saved

[Admin](#) | [Manage Radiology Orders](#) | [Manage Radiology Reports](#)

Manage Radiology Orders

[Add Radiology Order](#)

Worklist [Clear Results](#)

Patient: Start Date: End Date:

Show 20 entries Search: [Show/Hide Columns](#)

Edit	Patient Id	Patient Full Name	Priority	Referring Physician	Scheduler	Performing Physician	Reading Physician	Appointment Date	Modality	Status	Instructions
1	1	juan david pastas	Unknown	Super Cortex					CR	Scheduled: Unknown	View
2	1	juan david pastas	STAT	Referring physician					MRI	Scheduled: SCHEDULED	View
3	1	juan david pastas	Unknown	Super Cortex	Scheduler		Reading physician	2011-11-09 00:00:00.0	CR	Scheduled: SCHEDULED	View
4	1	juan david pastas	STAT	Referring physician	Scheduler		Reading physician	2011-11-17 00:00:00.0	CR	Scheduled: SCHEDULED	View

Viewing 1 - 4 of 4 [first](#) | [Previous](#) | [Next](#) | [last](#)

Figure 5. Order status set to SCHEDULED.

READING PHYSICIAN

Reading physician gets the observation form (Figure 6) from function 7 in Figure 1, when the order status is set to COMPLETED. This happens after the modality has taken the image(s). The following are the interface functions (look for the numbers in the figure):

OpenMRS
Currently logged in as Reading physician | [Log out](#) | [My Profile](#) | [Help](#)

Home | [Find/Create Patient](#) | [Dictionary](#) | [Administration](#)

[Admin](#) | [Manage Radiology Orders](#)

Previous Observations

Id	Reading Physician	Location	Observation Date	Question Concept	Value	Comment
5	Reading physician	HSLV	2011-11-17 00:00:00.0	CURRENT DRUGS USED	View	jjjjj
6	Reading physician	HSLV	2011-11-17 00:00:00.0	TUBERCULOSIS TREATMENT PLAN	View	lllll

[Add Observation](#) **2**

Observation

1

Id 5 **3**

Person [More Information](#)

Encounter

Order Z

Location

Observation Date (Format: dd/mm/yyyy)

Question Concept CURRENT DRUGS USED
Question on encounter forms: "Is the patient currently taking, or has the patient ever taken, any of the following other medications?" This particular concept stores a history of active use of the associated medications.

Value FLUCONAZOLE
Fluconazole is an antifungal medication of the azole (triazole) class, and is used to treat systemic yeast and fungal infections. Commonly called Diflucan.

Comment

Created By Reading physician - 17-Nov-2011

Results **5**

Void this Observation **4**

Reason

Figure 6. Observation form.

1. Previous observations for this order.
2. Adds new observation to this order.
3. Current observation. It can be a new or a previous one to be edited.
4. The user can void this observation.
5. Downloads a file that allows the user to automatically launch an application (the Weasis viewer) to see the diagnostics image(s) (Figure 7).

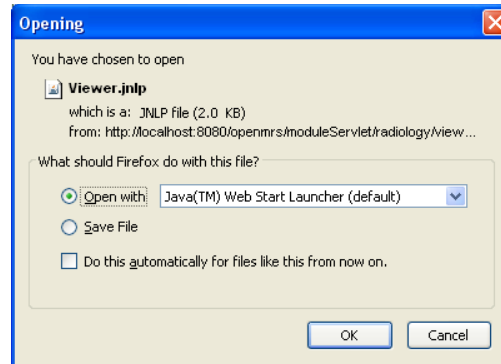


Figure 7. Application launcher in Firefox.

The downloading interface (Figure 7) depends on the user web browser. The system may ask for several confirmations before executing this file, the user should accept all of them.

When the user executes the downloaded file, the Weasis image viewer is launched (Figure 8). The following are the interface functions (look for the numbers in the figure):

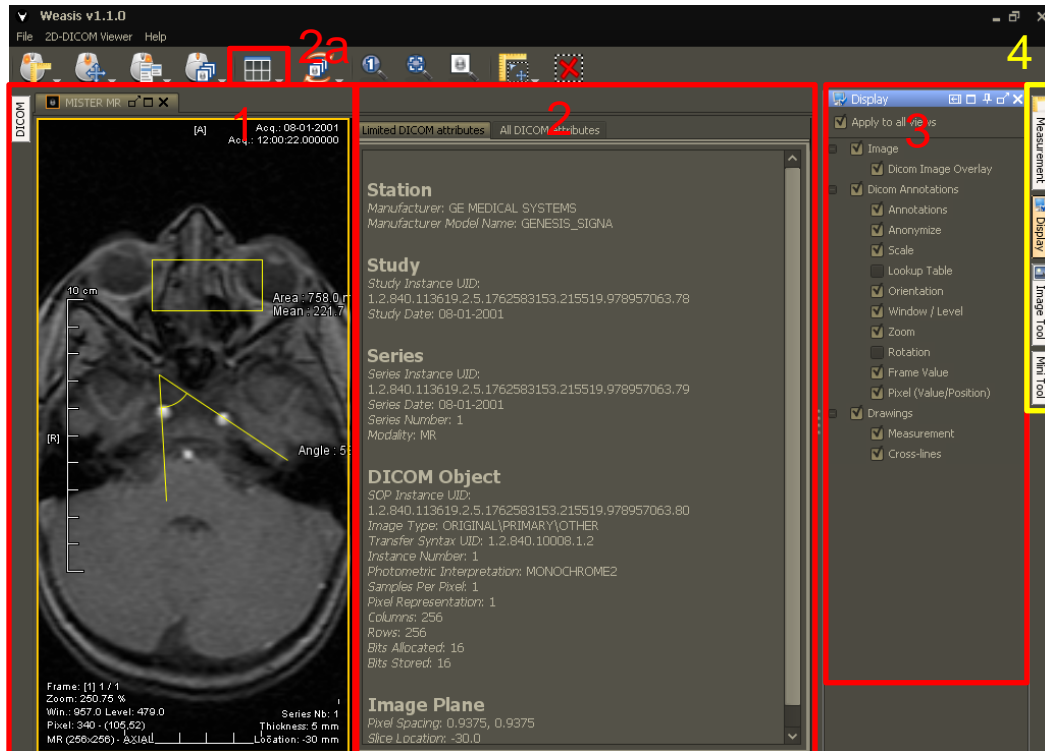


Figure 8. Weasis controls.

1. Displays the image. The example in the figure shows the viewer measurement capabilities for area and angle, but there are a lot more. You can access to them through the Measurements button in the yellow rectangle marked 4 in Figure 8.
2. Shows all DICOM information contained in the file. You can activate this function with an option (DICOM Information) in the button marked 2a in Figure 8.
3. Expanded area corresponding to the selected button in rectangle marked 4. The example in the figure shows the options for Display button, which allow the customization of the information shown around the image (e.g. for anonymization).
4. There are four menus:
 1. Measurements, for selecting measurements as shown in rectangle 1.
 2. Display, for display options as explained above.
 3. Image Tool (Figure 9). Windowing, level, lookup table (LUT), filter, zoom, rotation, frames per second options are available to the user.

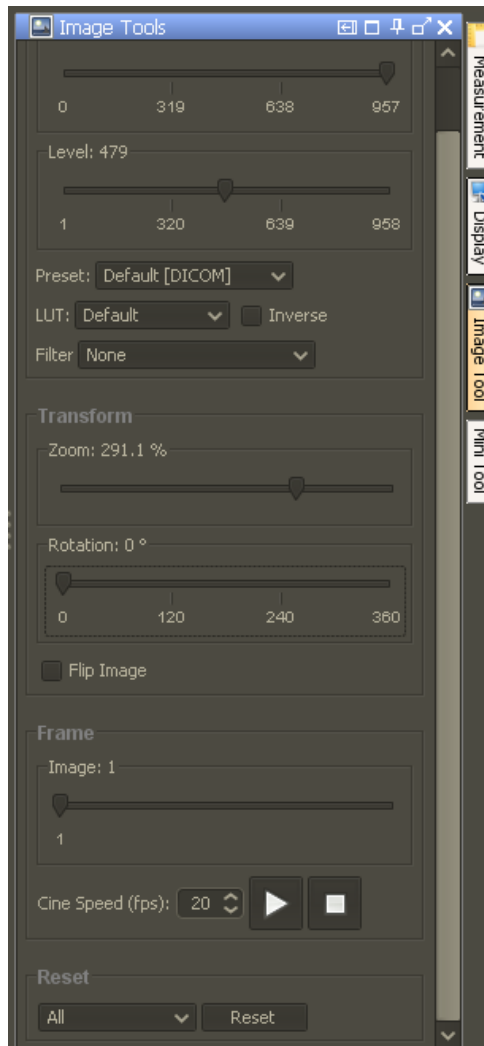


Figure 9. Image Tool.

4. Mini Tool, allows scrolling between several images in a series.