



Operation Manual

CE

84135038 Rev. M

Radimetrics™
Enterprise Platform

About the Software

Intended Use

Radimetrics™ Enterprise Platform is a software system whose intended use is to track information within Radiology by interfacing with PACS/RIS and other systems. From these sources, Radimetrics Software: acquires radiation dose, operational and examination data; tracks and reports device-based or patient-based cumulative dose records; performs analysis of collected dosimetric data; manages protocols, device utilization; and reports results.

Radimetrics™ Enterprise Platform can also be used for the collection, management and analysis of contrast related data when received via manual entry or from Certegra™ Workstation.

Supported Modalities

Radimetrics™ Software supports the following modalities:

CT	Extracts dose information from RDSRs and DICOM dose image captures
CBCT	Extracts dose information from RDSRs and DICOM dose image captures
CR and DX	Extracts dose information from RDSRs and DICOM dose image captures
DXA	Extracts dose information from DICOM dose image captures
MG	Extracts mean glandular dose, compression force, and number of images from DICOM
MR	Extracts dose information from DICOM, provides modality utilization information and analyzes contrast and saline data from Bayer injection systems (when connected to Certegra) and manually entered hand administered contrast agents
NM	Extracts dose information from HL7, customized dose message formats or manual logbook entry
PT	Extracts dose information from RDSRs and DICOM dose image captures
RF and XA	Extracts dose information from RDSRs, and MPPS
US	See "Ultrasound Exams" on page 52

About this guide

This document is a user guide that outlines how to use Radimetrics™ Enterprise Platform. The content of this guide is available in both online (context-sensitive) and PDF formats.

Contact

For more information or support, see <https://radiology.bayer.com/> and click on Contact Us.

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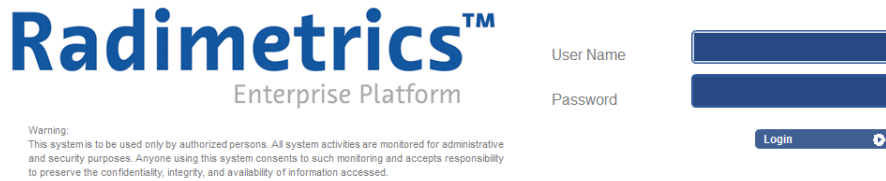
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Logging In / Password Changes

Logging In

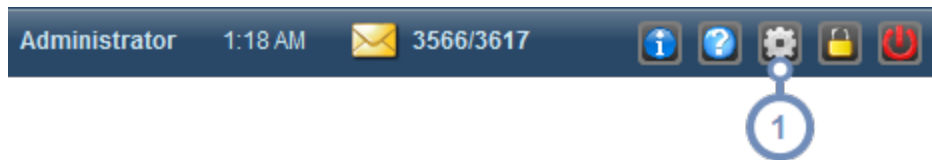



The login dialog features the Radimetrics™ logo and 'Enterprise Platform' text on the left. Below the logo is a warning message: 'Warning: This system is to be used only by authorized persons. All system activities are monitored for administrative and security purposes. Anyone using this system consents to such monitoring and accepts responsibility to preserve the confidentiality, integrity, and availability of information accessed.' On the right, there are two input fields labeled 'User Name' and 'Password', and a 'Login' button with a right-pointing arrow.

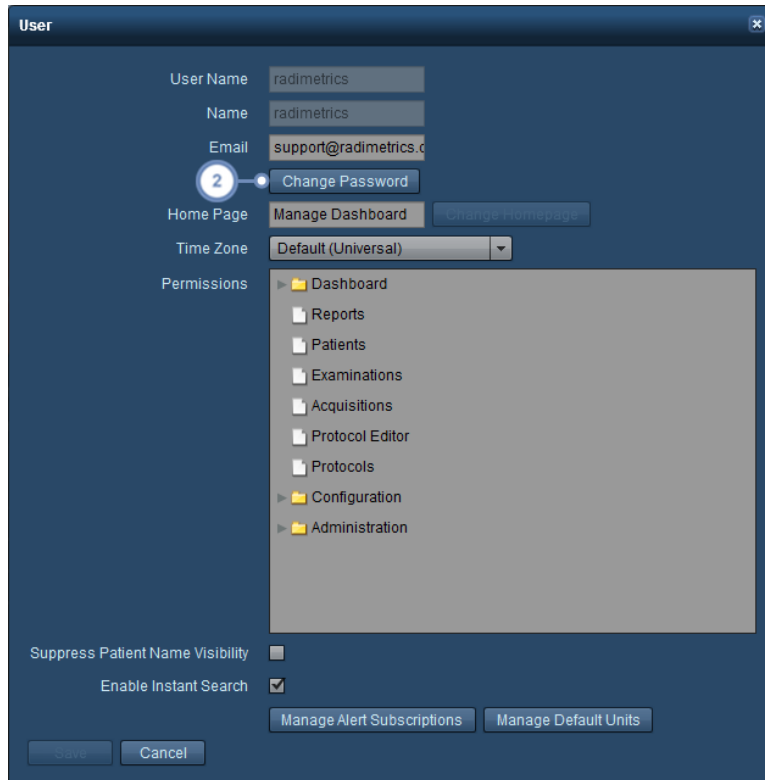
This is the login dialog. Enter your username and password here. Upon login, you will see a prompt for alerts if these have been enabled. You may choose to preview the alerts; otherwise, you will next see the main Radimetrics™ interface.

The first (default) screen that is seen upon login is determined by the system administrator, but may be customized through the user Settings page via the 'Home Page' option.

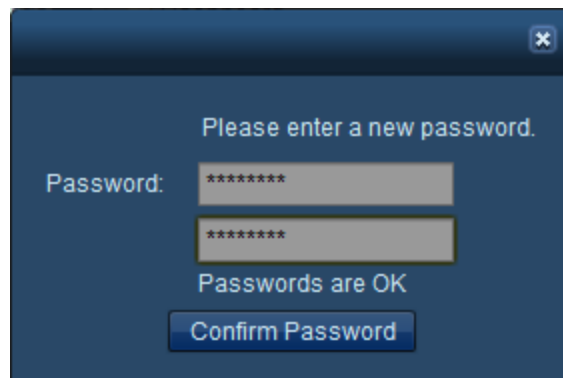
Changing your password



1 Click on the Settings  button located on the Toolbar. The User Settings dialog box will open.



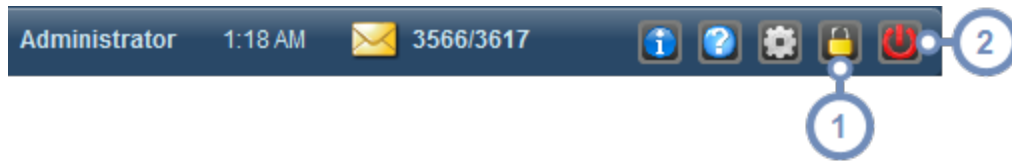
2 Selecting the Change Password button here will display the password change dialog box as shown below:




Enter your new password here twice, and then select the Confirm Password button afterwards. Remember to click on the Save button in the User Settings dialog box to save the password permanently after this step.

See "Adding or Editing Users" on page 224 for information on editing the other options in the User Settings dialog box. See "Changing the default units settings" on page 81 for information on the "Manage Default Units" function.

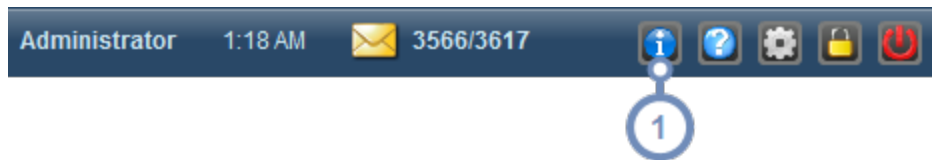
Locking and Logging Out




1 The Lock  button allows you to lock the screen while maintaining your current view; upon locking, only the login dialog will be shown on the screen, but the username will not be modifiable, showing the currently logged-in user. Entering the password will return Radimetrics™ software to the screen it was at prior to the lock. Alternately, an option to "Switch User" is provided, allowing another user to log in with their own session. If this happens, the original user will lose their session.

2 The Logout  button closes your session completely and logs you out from Radimetrics™ Enterprise Platform.

Licensing Information

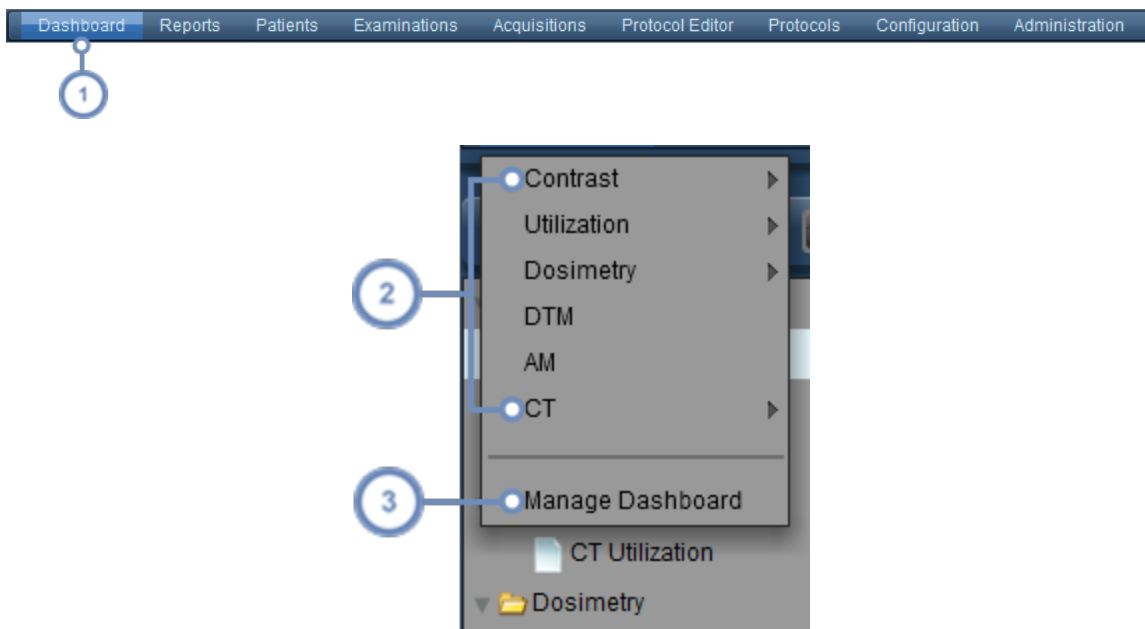


1 The Software Info  button brings up a window displaying the software version, registration number, and licensee name. The FDA Unique Device Identification (UDI) number can be found here.

Dashboard Module

The Dashboard allows you to review, manipulate and create reports of dosimetry, productivity and utilization data. Each report contains flexible, interactive components including pie-charts, tables, and bar graphs. Using components you are able to "drill down" to any level of detail. Component data can be exported for further analysis in a spreadsheet application.

Usually, upon logging in, the Dashboard is the first interface you are greeted with. Otherwise, you may click on the Dashboard menu item at the top of the screen to navigate there.



- 1 To go to the Dashboard module, click on Dashboard in the Module bar.
- 2 A drop-down menu will appear with a list of the currently available Dashboard reports. Triangular arrows on the right indicate folders containing additional reports. Click on a report to display the Dashboard for that report.
- 3 Click on "Manage Dashboard" to configure your reports. The Dashboard will be opened with the Directory management interface showing.

Managing report components

For more instructions on managing report components and the types of components available:

See "Managing components" on page 96 and

See "Dashboard component types" on page 98.


Dashboard Interface

A sample dashboard screen is shown below. By default, the components in the dashboard display data for the current month.



- 1 The Dashboard Directory frame. This shows your currently available dashboard reports and via the top row of buttons allows you to add, delete, organize and share dashboards. See "Dashboard Directory" on page 19.
- 2 This is a toggle button for the Dashboard Directory frame. Clicking on it will alternately hide or display the Directory interface.
- 3 This label displays the name of the current dashboard report.
- 4 The Date Filter controls here allow you to customize the date range of data displayed in your dashboard reports. It applies to all the components displayed unless a component has additional filtering applied to have its own date range.
- 5 Components are displayed in this window (one bar and two pie charts are shown in this example).

6

The icons here allow you to print the current report, refresh the component data and configure the report components and layouts. These are explained below. The Tool button  in particular allows you to manage components for this report.

Printing the dashboard

Click on the Print button  to produce a PDF file in a separate browser window showing the current Dashboard. The PDF file may be saved or printed as desired.

Refreshing dashboard information

Click on the Refresh button  to update the Dashboard components with any new data that has been recently processed.

Saving the current dashboard report

Click on the Tool button , and then click on 'Save Layout' in order to save your Dashboard report.


Generally, if you make changes to components or your layout and then try to exit the Dashboard, Radimetrics software will prompt you automatically to save the changes you have made.

Prompts for saving automatically may not present if:

- the date filter is changed
- you have drilled down into a component such as a pie chart

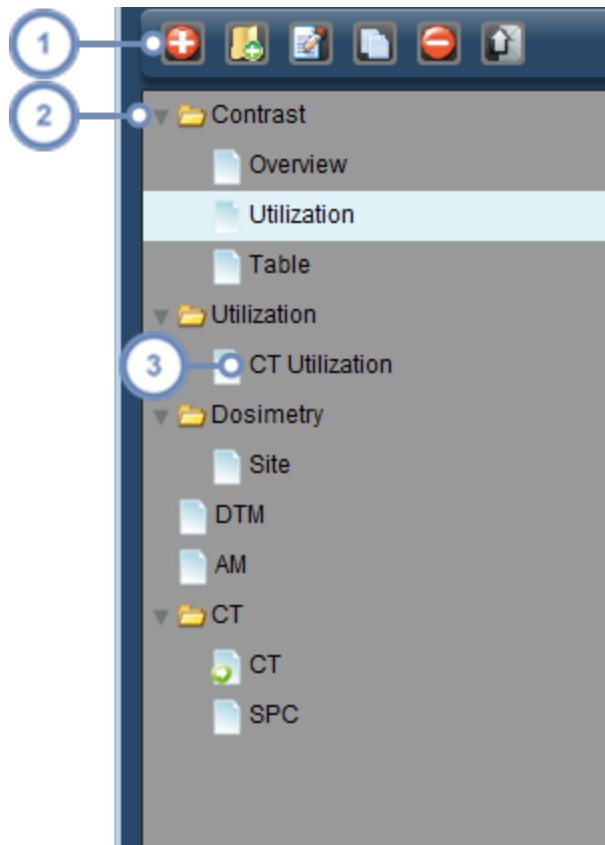
In these cases, click on Save Layout manually.



Restoring the dashboard report

In the event you made changes to your Dashboard report that you would like to undo to their previously saved state, you can click on the Tool button  and click on 'Restore Layout'.


Dashboard Directory

The Dashboard is managed via a pop-out frame on the left side of the interface.




- 1 The management toolbar contains icons for organizing and sharing Dashboard reports.
- 2 A folder icon  represents a set of 1 or more reports or folders; in the screen above all the folders are expanded, but they can be hidden by clicking on the arrow to the left of the folder icon.
- 3 A report icon  represents a Dashboard report layout. Clicking on the report name will open the report to be displayed on the Dashboard. Double-clicking on the report name allows you to rename it.

Adding a report or folder

To add a report, click on the Add Report button . A dialog box will appear asking you to name the new report you are creating.

For a folder, click on the Add Folder button  instead.


Deleting a report or folder

To delete a report or folder, select it (so it appears highlighted) in the Management frame and then click on the Delete button . A dialog box will appear asking you to confirm whether you would like to delete the item.



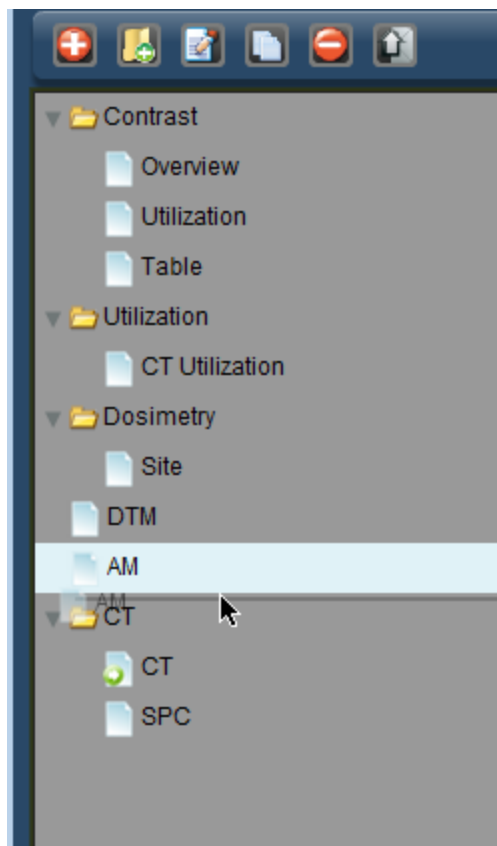
Deleting a folder will delete all the reports or folders contained within that folder.

Renaming a report or folder


To rename a report or folder, select the item and then click on the Edit button . A dialog box will appear allowing you to rename the report or folder. Alternately, you can double-click on the report to bring up the same dialog box.

Moving a report or folder

To move a report or folder, click and drag on the item and place it where you would like to go.




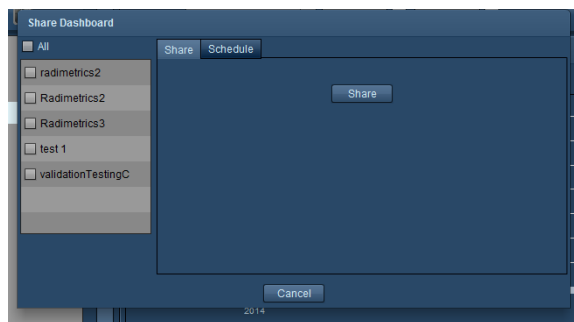
Copying a report

To make a new copy of a report, select it and then click on the Copy button . It will appear at the bottom of the list of folders and reports, marked as a Copy in its name, which can subsequently be renamed.

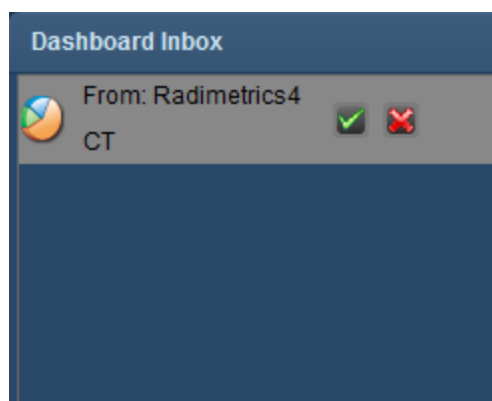
Sharing or scheduling a report

The Share feature allows you to send custom Dashboard reports that you have created to another user in Radimetrics software. In contrast, the Schedule feature allows you to display data pertaining to specified time intervals in the Reports module.

First, select the reports or folder(s) of reports you would like to share. Then, clicking on the Share/Schedule button  brings up a dialog box as shown below:



Select the users you would like to send your reports to in the dialog box. Once you click on Share Dashboard, and the receiving user logs in, they will see an Inbox in their Dashboard Directory that includes the name of the user sending the reports as well as the report names, as shown below:



Clicking on the checkmark button will add the report to their Directory; alternatively, it can be rejected by clicking on the red 'X' button.



Note that when you send a dashboard report to another user it includes whatever date parameters were set; however, setting the date to 'show last 30 days' would show a report containing the data current up to the date that the receiving user views the report. If your goal is to show data over a particular date range, it is better to specify it explicitly so it will show up on their dashboard identically to what you are seeing.

Scheduling a report

By clicking on the Schedule tab, you can set a report to be run on a schedule, such that it will display data in intervals that you specify. This may be helpful, for example, if you want to have a report that updates on a daily basis at the same time, such as a report containing the number of exams done each hour for the past day. You can schedule reports for yourself and other users.

You can choose from a preexisting schedule by its title, or specify your own title, frequency and start date and time. The date and time can be set retroactively. Based on your schedule, you will receive an email that provides a link to the report. The email will not include any Protected Health Information (PHI). To enable the schedule for the selected report, click on the "Schedule as Report" checkbox.

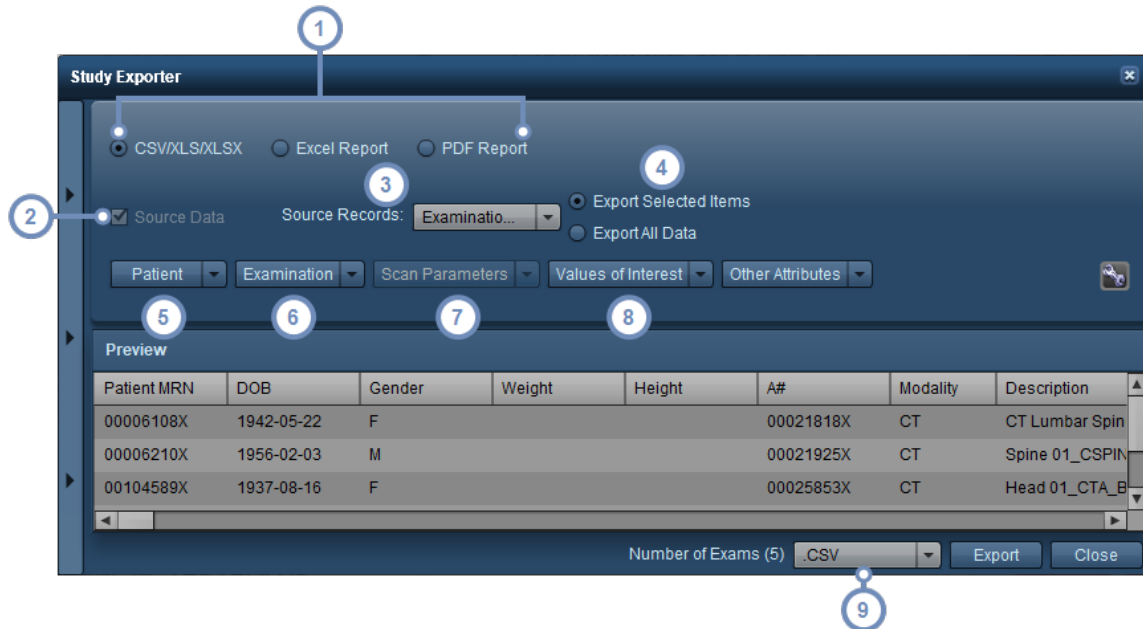
Once this is completed, the report will appear in the Reports module for viewing.

The list of schedules is configurable in the Schedules module, under Configuration. See "Scheduling" on page 205.

Exporting data

Within any Dashboard component, or from the Examinations, Patients or Acquisitions module during a search, an export of the currently displayed data to a Comma Separated Values (CSV) or Excel (XLS, XLSX) file may be performed.

Clicking on the Export button  will bring up the Study Exporter window as shown below:



By default, you can export to CSV/XLS/XLSX formats. If you're in the Examinations Module, the Excel Report option appears and allows you to export pre-defined, country-specific, Excel-formatted reports by modality (this is separate from the Templates feature). See "Excel Report" on page 27 for additional information. PDF Report Exports are only available in the Examinations module. See "PDF Report" on page 28.

Selecting Source Data (if applicable) allows you to choose the specific set of Records you would like the data to be exported from.

Source Records allowable include Patients, Examinations, and Acquisitions.

Allows you to choose between exporting only the items that were selected before entering the Study Exporter, or all the listed items.

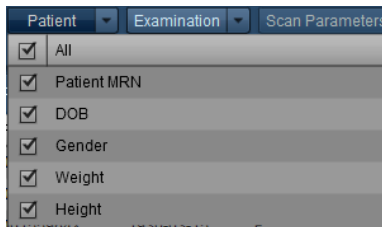
Allows you to select the fields you would like to include regarding the patient data (e.g. MRN, DOB and gender).

- 6 Allows you to select the fields you would like to include regarding examination data (time, date, scanner, operator, exam status, etc).
- 7 Allows you to select the fields you would like to include regarding scan parameters (kVp, slice thickness, pitch, etc); only available if Acquisitions is selected for your Source Records.
- 8 Allows you to select the fields you would like to include regarding likely values of interest (specific organ doses, CTDI, SSDE, etc).
- 9 The drop-down menu to the left of the Export button allows you to choose your export file format (CSV, XLS or XLSX).

Depending on the component you have selected, some of the controls may or may not be enabled, determined by the type of data you are exporting.

Click on the Export button once you are satisfied with the data you plan to export. A dialog box asking you where to save the exported data will appear.

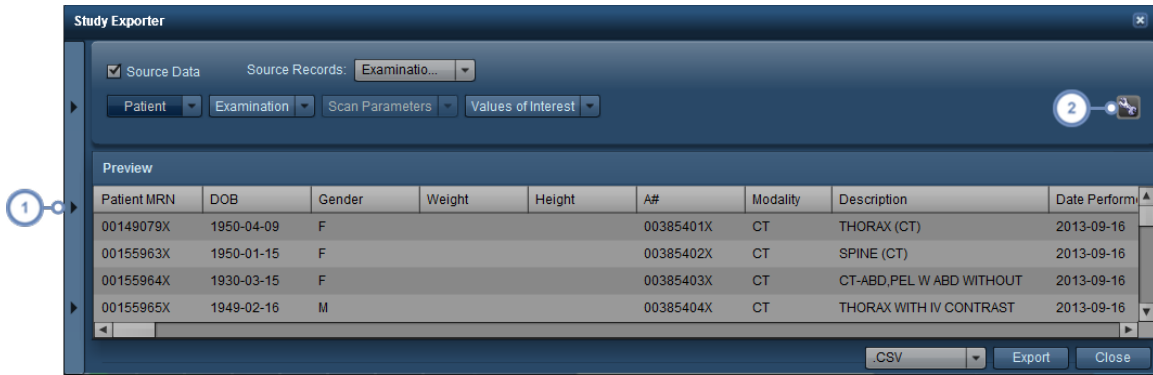
Choosing fields




Clicking on the drop-down menus displays a list of the fields, with checkboxes next to them. Checked fields will be included in the export. Select or deselect a field for inclusion by clicking on its checkbox.

Export Templates

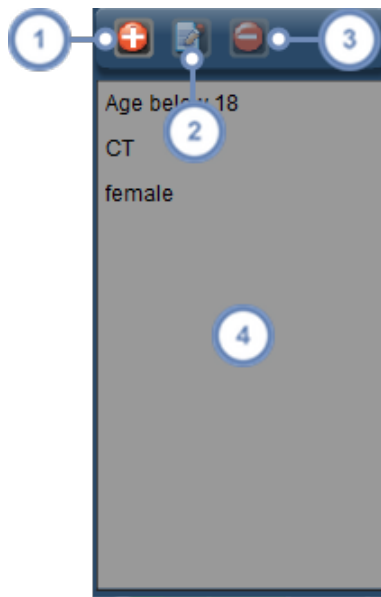
If there are export settings that you use often, it may be useful to save them to a template for easy recall later. They can be accessed by expanding the Configurations sidebar.





1 Clicking on this tab opens up the Configurations sidebar, as detailed below.


2 The Tool button  allows you to save the current export template; you may choose between saving to a currently existing template, or using "Save As" to save to a new export template.

Configurations



1 Use the Add  button to add a new blank configuration template to the list. A dialog box will appear asking you to name the template. Alternately, you may find it easier to simply modify the current export settings and then using "Save As" to create a new template.

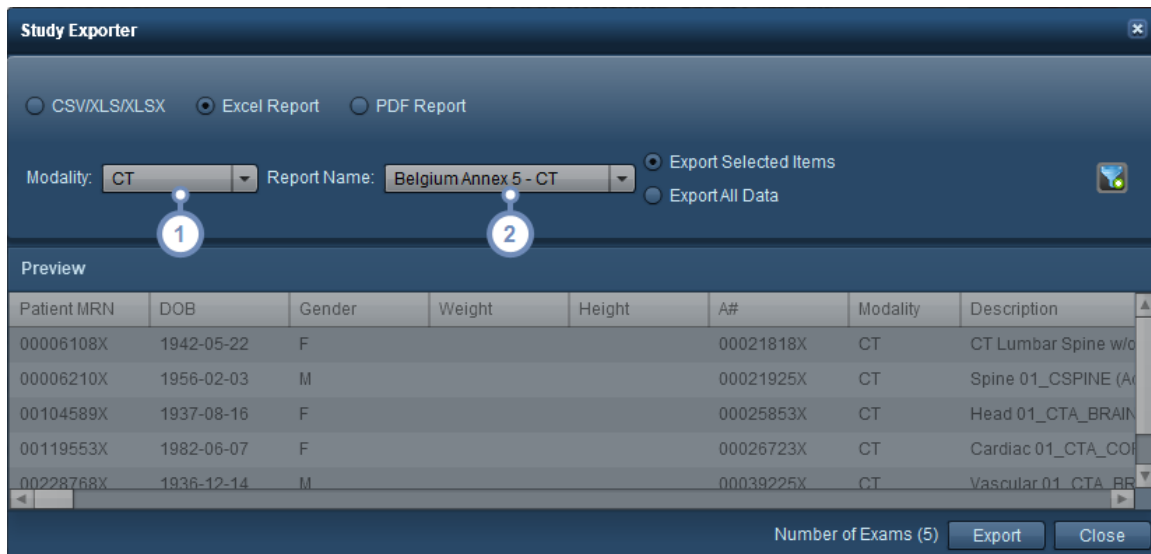
2 The Edit  button allows you to rename the currently selected template.

- 3 The Delete  button deletes the currently selected template.
- 4 The list of currently existing templates is located in this window; clicking on a template name will load its settings for export.

Excel Report

The Excel Report feature is used to export pre-defined, modality-specific Excel-formatted reports that specify additional criteria to consolidate entries together and amalgamate fields during that consolidation in a configurable fashion (e.g. averaging values, listing, selecting maximum, etc). The reports are country-specific, and if you require this feature you may need to contact Support to populate the reports you need.

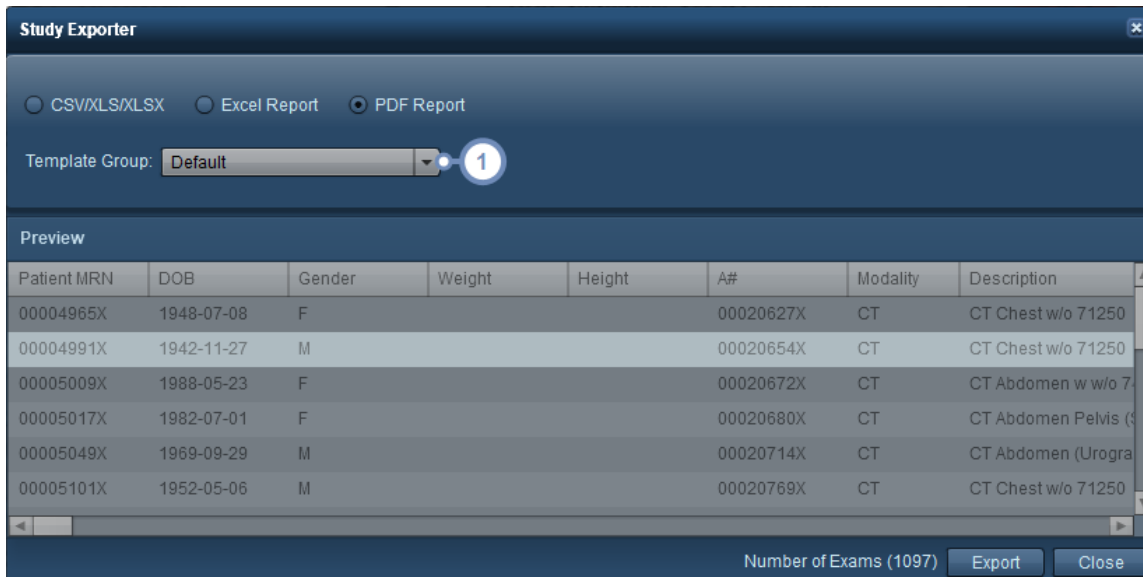
If you are planning to export studies using this feature, your examination search should contain results that match the modality you select.



- 1 Select your desired modality from this drop-down menu.
- 2 Select the name of the report you would like to export, and a new dialog box will appear prompting you to save the Excel file created. There may be a processing delay before the dialog box appears, depending on the complexity of the report. A cursor will appear indicating that the report is being processed.

PDF Report

The PDF Report feature is used to export examination data to PDFs. The exported PDF reports satisfy Euratom requirements.





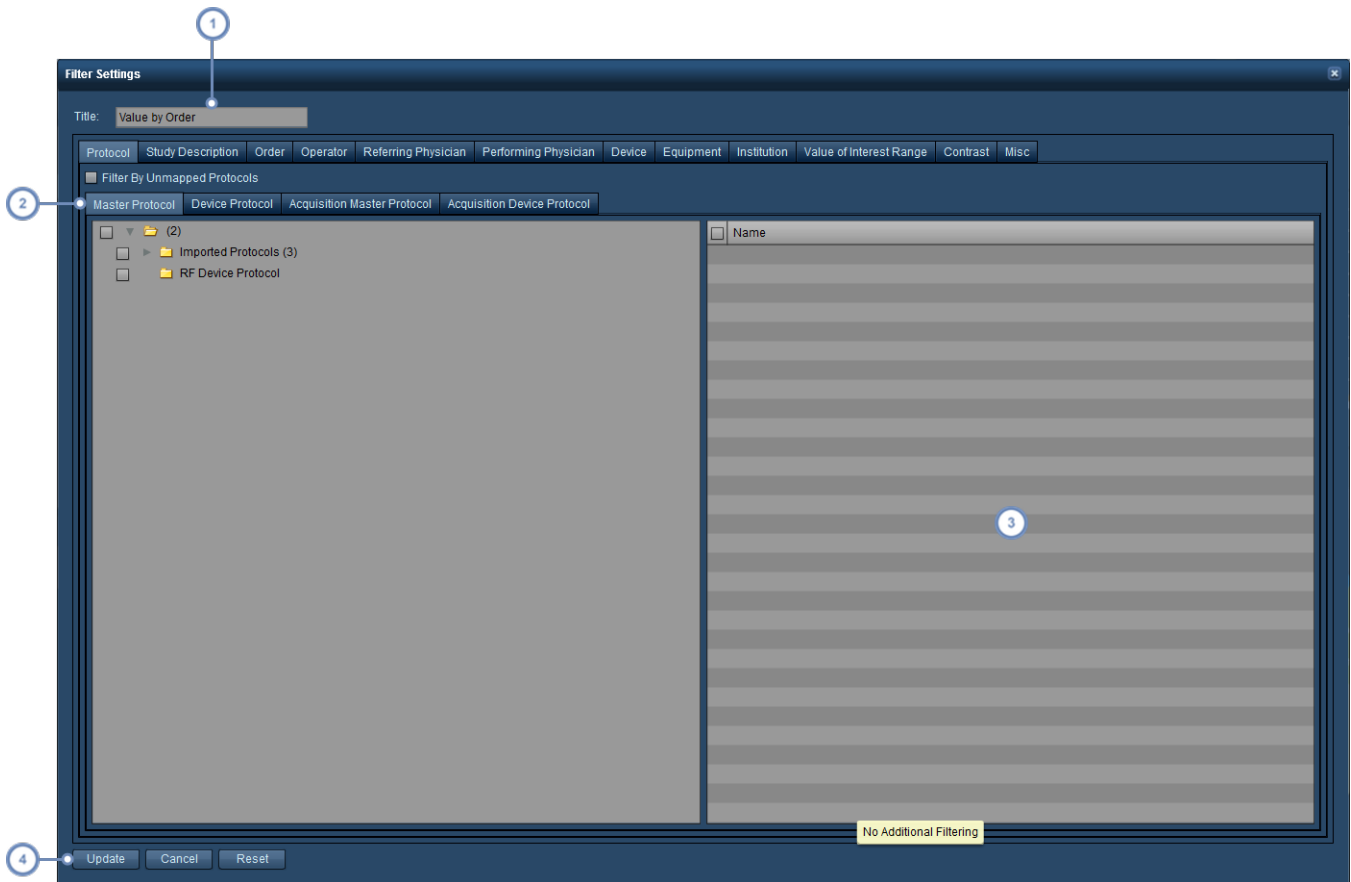
1 The Template Group can be selected with this drop-down menu. This changes the templates used to produce the PDF, and affects things such as the Values of Interest included in the report. See "PDF Report" on page 215 for more information on configuring PDF templates.

Using the Export button will subsequently process the listed exams and produce an individual PDF report for each one, bundled into a ZIP file.

Filtering data

Filtering is a powerful tool allowing you to further customize your components' displayed data by applying your specified criteria, such as specific protocols, devices, dose ranges, and more.

On a component's bottom-right hand corner, clicking the Filter button  brings up the dialog box shown below. Of note, if a green plus appears on the Filter button like this: , then this indicates that filters have not yet been applied to the component and are available.



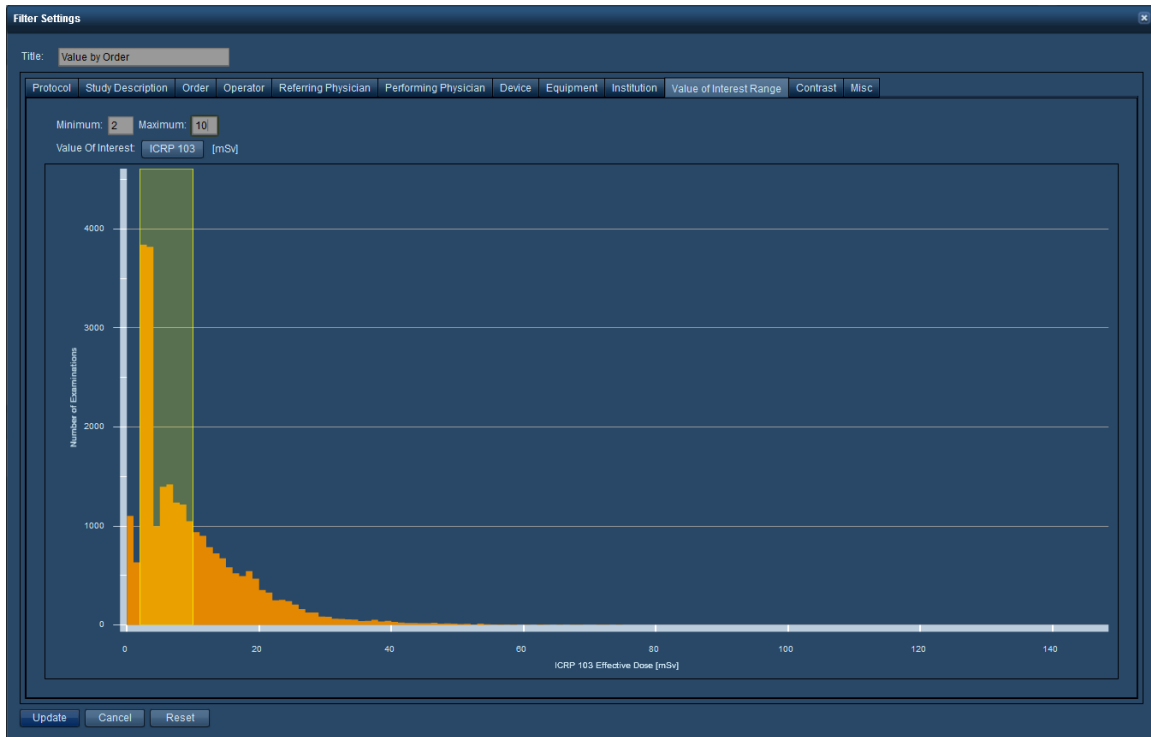
- 1 Title field - you can change the name that appears in the title bar for your component here.
- 2 Each tab represents a set of criteria that you can filter by. Between tabs, an AND filter is applied such that any selected criteria within a tab must also fulfil the criteria selected in the other tabs.

Once you select a folder of criteria for filtering, the specific criteria associated with that folder appear in this window for you to choose as needed. Within a tab, an OR filter is applied such that all selected criteria are included in your filtered results, assuming they fulfil the criteria of the other tabs as well. You can select all the criteria in a folder by clicking on the checkbox next to it in the folder tree on the left, or by clicking on the checkbox at the top left of the list of criteria in this window.
- 3
- 4 Click on Update once you have finished selecting all your filter criteria to update your component's display.

By default, no criteria are selected and all records in the database are used to produce the displayed chart/table data.

Filtering by Value of Interest Range

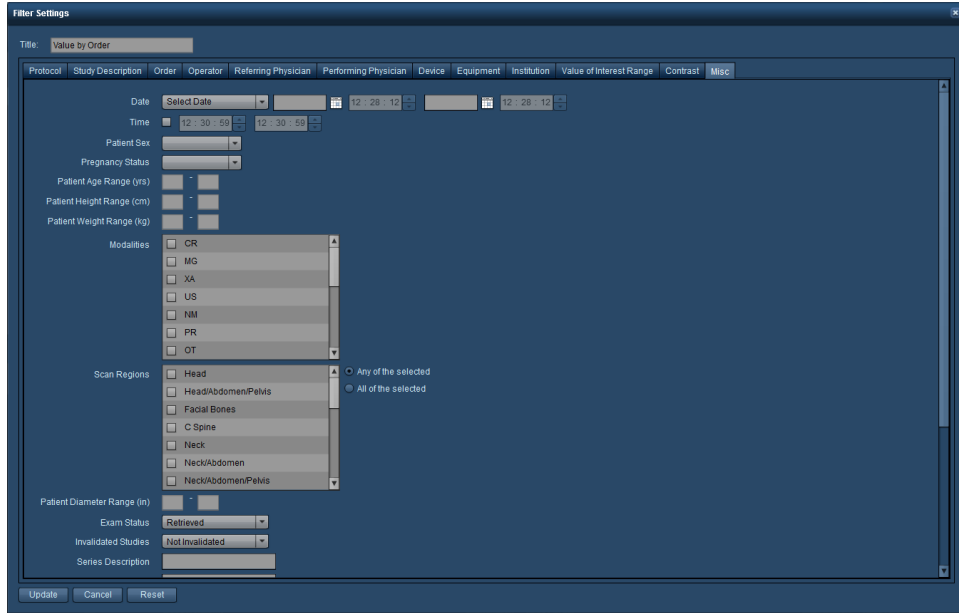
The Value of Interest Range tab allows you to include only exams with a specific value range.



You may either specify the numerical values in the Min Dose and Max Dose text fields, or click and drag a range of values on the graph itself. To delete the range, delete the values in the Min Dose and Max Dose fields.

Filtering by other miscellaneous criteria

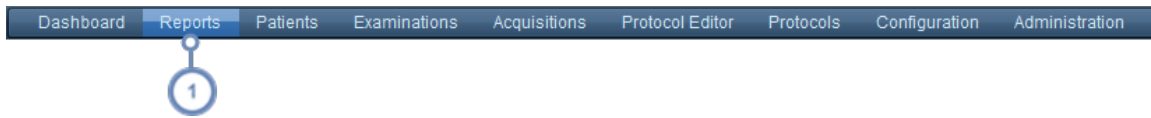
As shown below, within the Misc tab, you can perform filtering by date, time, sex, age, height, weight, diameter, modality, study retrieval status, and examination or patient tags.



By default, the date range for a component is set to the date range of the Date Filter displayed at the top of the Dashboard report screen.

Reports Module

The Reports module displays scheduled Reports configured from the Dashboard at set intervals. Reports can be printed. See "Dashboard Directory" on page 19 for more information on sending or configuring reports.




- 1 To go to the Reports module, click on Reports in the Module bar.

Reports Interface

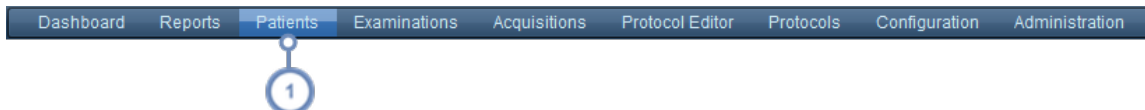
The Reports Interface is outlined below.



- 1 The left hand window (which is collapsible) displays a directory with a list of the available reports divided into their specified time intervals as they become available.
- 2 The right hand window displays the selected report. The components are interactive but cannot be moved or arranged.
- 3 The Print  button produces a PDF of the currently displayed report.

Patients Module






The Patients module allows you to find patient-specific dosimetry data. From here, the Patient Scorecard can be accessed for Cumulative Dose Tracking.



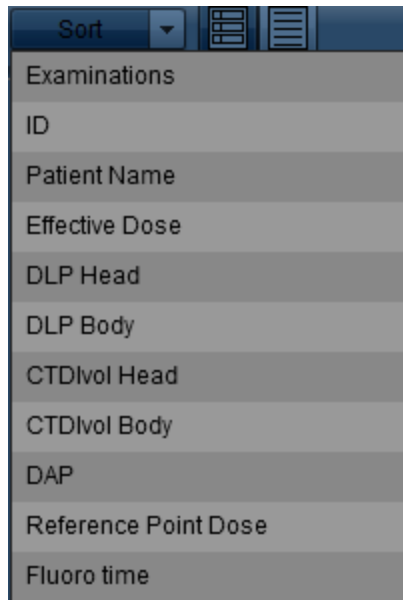
- 1 To go to the Patients module, click on Patients in the Module bar.

Patients - Searching



- 1 Using the available text fields, enter the Patient ID or the name of the patient you wish to find. The percentage symbol (%) may be used as a wildcard character. You may also use the drop down menu to select a gender or modality. The patients matching your search parameters will appear automatically in the panel below as you enter or change information.
- 2 The Advanced Search  button displays additional fields / criteria for searching, as detailed below. See "Advanced Search" on page 35.
- 3 The Combined Scorecard  button becomes active after two or more patient rows are selected. When clicked, a Combined Patients Scorecard is displayed comprising the selected patient records. This may be useful when a patient has multiple patient IDs.
- 4 The Export  button opens the Study Exporter interface, allowing you to export all (or the selected) search results.
- 5 To clear all fields and menus of current parameters, click the Reset  button.
- 6 To perform a search when Instant Search is not enabled, click the Search  button. If no search parameters are entered, then this button will cause all patients in Radimetrics database to be listed.

Sorting patient results




You may sort the search results by: Examinations, ID, Patient Name, Effective Dose, DLP Head, DLP Body, CTDIvol Head/Body, DAP, Reference Point Dose, and Fluoro time. The ascending or descending sort order may be toggled with subsequent clicks on the selected sort parameter.

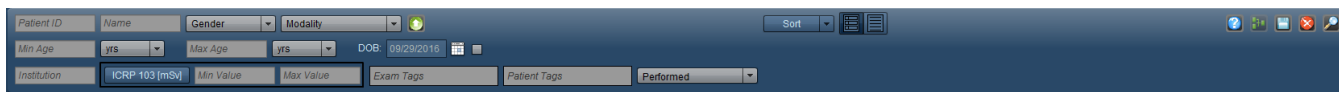
Changing the view



- 1 Summary View displays results as a list featuring the patient label and dosimetry information, as seen above. It is useful for quickly reviewing a patient's cumulative dose exposure.
- 2 Details View displays patient data in a table format. The results may be sorted by any column; this is done by clicking on the column header. This view is useful for reviewing large numbers of patients along with their extended information.

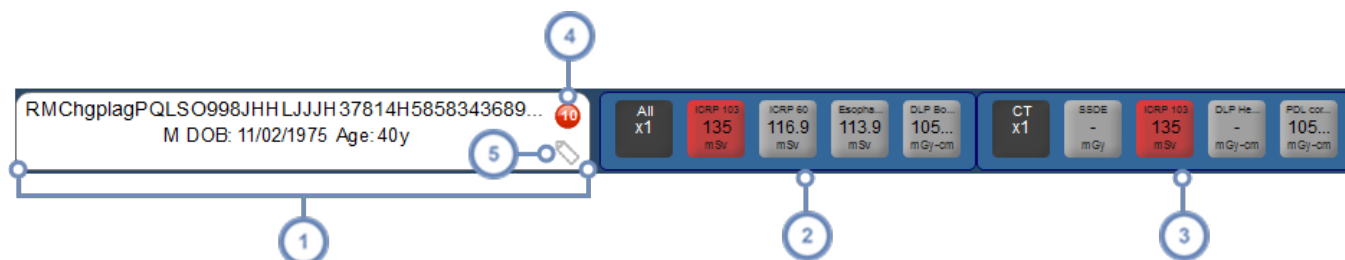
Advanced Search


Clicking on the Advanced Search  button opens up additional parameters that can be used to search for specific exams, including age range, DOB, Institution, and Value of Interest (modifiable by clicking on the Value of Interest label button). Additionally, exams can be searched for by exam or patient tags.



Interpreting patient search results

Search results in the Patients Module appear similarly to the example below. Each row in the search result represents a patient. This summary includes a Patient Label, and a Cumulative as well as modality-specific dosimetry overview. Double clicking on any exam row will open the Patient Scorecard.

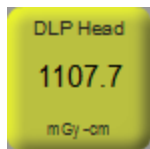


- 1 The first column displays the Patient Label including the medical record number (MRN), patient name, DOB, sex, age, weight and height.
- 2 The second column displays a summary of Cumulative dosimetry values. The displayed values are customizable in the Configuration module under Value Indicator Settings. See "Value Indicator Settings" on page 209
- 3 The subsequent columns display cumulative dosimetry values specific to each modality that the patient has been exposed to (e.g. RF or CT). These displayed values are also customizable. See "Value Indicator Settings" on page 209.
- 4 The red circle indicates that an Alert is associated with this patient, and the number indicates how many Alerts are associated. Hovering over this displays a list of associated alerts in a pop-up window; double-clicking on one of the alerts will display its details.
- 5 The Tag  icon, when hovered over, displays a pop-up window allowing you to add and delete Tags associated with this exam.

The dose labels may be color coded depending on the set Dose Reference Levels (DRL). If there are no predefined Dose Reference Levels, then the label will be grey.



Green indicates dose levels within **normal** range



Yellow indicates dose levels on the **high** end, but not exceeding the maximum acceptable



Red indicates a dose that **exceeds the maximum** level

Patients with Scheduled and Performed Exams

1	00079952X ABBAY, LORI X F DOB: 06/09/1976 Age: 40y	All x1	ICRP 103 5.7 mSv	ICRP 60 6.6 mSv	Esopha... 1 mSv	DLP Bo... - mGy-cm	CT x1	SSDE - mGy	ICRP 103 5.7 mSv	DLP He... 2520 mGy-cm	PDL cor... - mGy-cm
3	ID_test5 MIKE_RF M DOB: 02/14/1932 Age: 84y	All x0	ICRP 103 - mSv	ICRP 60 - mSv	Esopha... - mSv	DLP Bo... - mGy-cm					
2	Patient ID1 PATIENT, Clone F DOB: 11/03/1947 Age: 68y Weight: 169kg	All x1	ICRP 103 25.5 mSv	ICRP 60 25.9 mSv	Esopha... 14.3 mSv	DLP Bo... 198... mGy-cm	CT x1	SSDE - mGy	ICRP 103 25.5 mSv	DLP He... - mGy-cm	PDL cor... 198... mGy-cm

- 1 A patient with only performed examinations
- 2 A patient with only scheduled examinations
- 3 A patient with both performed and scheduled examinations

Patient Scorecard

The Patient Scorecard allows you to customize your view of a patient’s effective and cumulative dose history using multiple customizable components. Though a user is initially presented with three preconfigured reports (Summary, Examinations and Alerts), components may be added, repositioned and resized to create customized reports.

The below screen represents a possible default arrangement of the Scorecard report, comprising a Value Comparison Chart component and a Cumulative Dose component.



- 1 The first row is the patient summary which appears similarly to the patient search result row, including pertinent patient dose information and demographics.
- 2 Along this row are tabs indicating the names of different reports - in this case Scorecard, Examinations, and Alerts. The "+" (plus) tab allows a new report to be added. See "Managing Scorecard Reports" on page 38.
- 3 The Value Comparison Chart initially appears similarly to the Organ Doses window seen in other modules, with the addition of multiple tabs able to display user-configurable charts. The "+" (plus) tab allows a new chart to be added. See "Organ Doses" on page 69.
- 4 The Cumulative Dose component by default displays a bar chart with the time along the x-axis and Cumulative Dose (e.g. ICRP 103, ICRP 60, etc) in mSv along the y-axis. The variables and timeline are configurable.
- 5 The icons here allow you to print a report, refresh the component data and configure the report components and layouts. These are explained below.

Combined Patients Scorecard

When multiple patient records are selected for display simultaneously (e.g. with patients that have multiple IDs), the first row display changes to reflect this. Note that no patient records are merged or linked permanently.

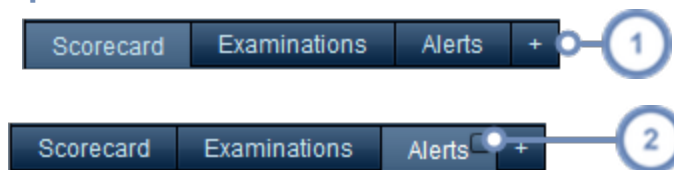


The upper left box indicates the number of merged patient records, and when hovered over with the mouse cursor, the specific patient labels comprising this Scorecard are listed below.

Managing Scorecard Reports

Scorecard Reports can be added, deleted, saved and restored as described below.

Adding or deleting reports



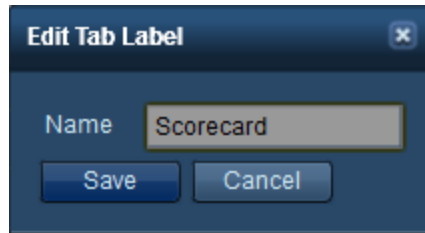
1 To add a new blank report, click on the "+" tab/button

2 To delete a report, click on the small square button that appears in the upper-right of the report's tab when the mouse cursor is hovering over that tab. A dialogue box will appear asking if you are sure you want to delete the report.

In addition, you may rearrange the report order by clicking on a report's tab and dragging it to the place you would like it to be.

Renaming reports


You may wish to rename a report after adding a new one, or to rename a currently existing report. To do so, double-click on the Scorecard Report's tab. This will bring up the "Edit Tab Label" dialog box as shown below.

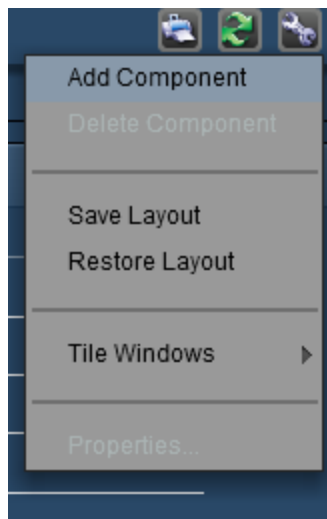


After changing the name, click on the Save button.

Saving or restoring reports

After you have finished making changes to your reports, you may want to Save them so that the next time you open a patient the same report layout is present; on the other hand, if you decide that you would prefer your previous report layout after making changes (and before saving) you can Restore the layout instead.

Clicking on the Tool button  will open a menu as shown below.




Clicking on "Save Layout" or "Restore Layout" will save or restore all your reports and their layouts, respectively.




At this time, saving or restoring applies to the Patient Scorecard as a whole. Saving a layout means all the reports and their layouts will be saved; restoring layouts will restore all the reports to their original condition before being modified. A restore includes removing reports that were added after the last save.

Refreshing reports

Clicking on the Refresh  button will update the data contained in the reports. This may be useful in the case that a patient has an examination or new data that has just arrived in

Radimetrics™ Enterprise Platform.

Printing reports

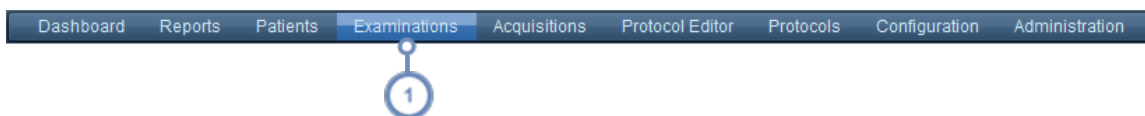
Clicking on the Print  button will generate a PDF file in a new browser window that contains the currently displayed report. This can subsequently be saved or printed depending on the PDF viewing software that is installed at your site.

Managing report components

See "Managing components" on page 96 for more instructions on managing report components. See "Scorecard component types" on page 113 for details on the different components.

Examinations Module

The Examinations module allows you to find dosimetry data for either a specific examination or a group of examinations using a wide variety of search criteria. These examinations are presented in an easy-to-read summary view. Additionally, Worklists (previously available under a separate module) have now been integrated into the Examinations module.



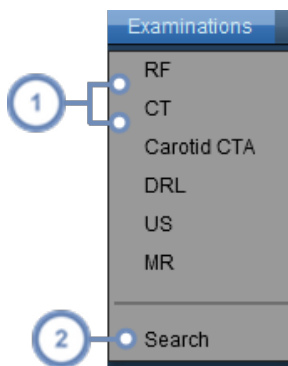
- 1 To go to the Examinations module, click on Examinations in the Module bar.

Worklists

Worklists give users the ability to save common queries (searches they may run multiple times), rather than entering search criteria each time. An example where this may be useful would be the case that you want to monitor specific types of studies over a time period (for example, all abdominal CTs performed daily). Another example would be if you'd like to monitor all studies being performed at a particular site.

Worklists can be organized into folders much like Dashboard reports. Placing Worklists within specific folders can allow you to organize them by site, modality, or any other criteria you choose. See "Worklists Management" on page 50 for details.

Hovering over the Examinations label in the Module bar will display the available Worklists.








- 1 Click on any of the listed Worklists to display the worklist.

- 2 Clicking on Search will take you to the standard Examinations Search window without any pre-defined Worklist query loaded.

Performing a search



- 1 Enter the desired exam identifiers into the fields and/or drop down menus. As you enter more parameters, the examinations matching them will automatically appear. For example, if you select "CT" from the Modality drop-down, Radimetrics software will display all the CT scan examinations it has available.
- 2 To show additional search parameters, click on the Advanced Search  button. This will also allow you to apply filtering to the search results. See "Advanced Search" on page 44.
- 3 The Tool  button displays a drop-down menu allowing you to save the current Worklist and perform other functions depending on whether a study is selected. See "Tools" on page 45.
- 4 The Export  button launches the Study Exporter, allowing you to export your search results to CSV and Excel format. See "Exporting data" on page 24 to see how to export to CSV format.
- 5 If you would like to clear the search parameters, then click the Reset  button.
- 6 Clicking the Search button  will perform a search based on the entered parameters. If no parameters are entered, all exams will be listed.

Double clicking on any exam row in the search results will open the Dosimetry module for that exam. See "Interpreting exam search results" on page 46 for more information on understanding your search results.

Using wildcards to search

In order to search for a sub-string within a field it may be helpful to use a wildcard character.

% The % symbol matches a string of 0 or more characters. For example, %ABD would match any string of characters containing ABD anywhere within that field, including "ABD" or "CT ABD".

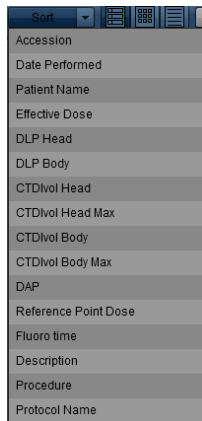
_ The _ (underscore) symbol matches any single character. For example, "A_D" would match the string "ABD" or "ADD".



Wildcards are particularly important when searching for specific protocols or procedures, as by default if you do not use wildcard characters the search string is applied only to the beginning of the field. Therefore, searching for "CTA" within the Protocol field alone would produce no results on its own as the string "CTA" usually occurs following another word, such as "Carotid CTA". You would search for "%CTA" instead to produce the desired results.

Sorting exam results

The Sort drop-down menu displays exam parameters by which you can sort.



You may sort the search results by: Accession, Date Performed, Patient Name, Effective Dose, Description, Procedure, Protocol Name as well as some selected Values of Interest. The ascending or descending sort order may be toggled with subsequent clicks on the value by which you are sorting.

Changing the view

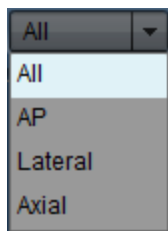
You may change the way your search results are viewed via these three icons:




- 1 Summary View displays results as a list featuring a localizer from the examination, the patient label, the examination label, and dosimetry information. It is useful for quickly reviewing examinations.
- 2 Grid View displays results as thumbnails arranged in a grid. In this manner, more exams can be seen simultaneously on the screen.
- 3 Details View displays examination data in a table format without any thumbnails. The results may be sorted by any column; this is done by clicking on the column header. This view is useful for reviewing large numbers of exams along with their extended information.

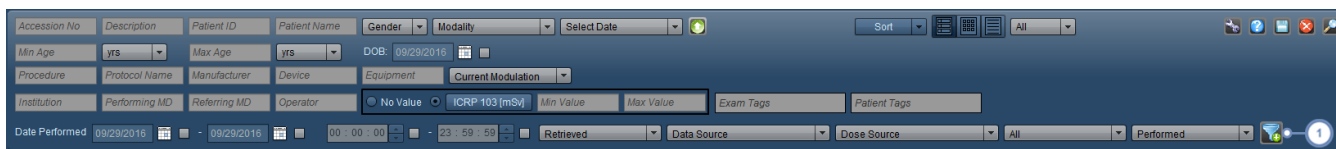
Changing the thumbnail view


The thumbnail images can be changed to display AP, lateral or axial previews of the exams listed in the Summary or Grid View by using the drop-down selector as shown below.



Advanced Search

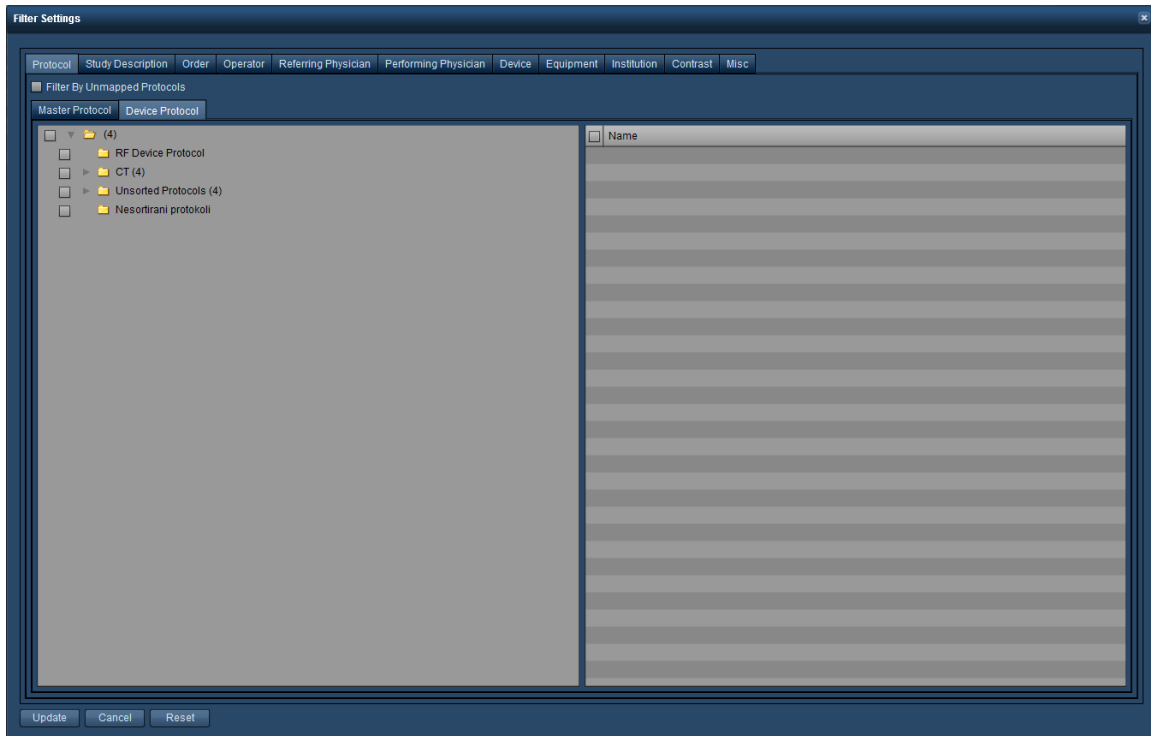
Clicking on the Advanced Search  button opens up additional parameters that can be used to search for specific exams, including age range, DOB, procedure/protocol name, Manufacturer, Device, Equipment, Current Modulation (fixed or modulated), Institution, performing/referring Provider, Date/Time, and Value of Interest (modifiable by clicking on the Value of Interest label button). Additionally, exams can be searched for by exam or patient tags, retrieval status, data source (in various combinations of Dose Sheet and SRs including RDSR, Ultrasound SR, or Other SR), dose source (Dose Sheet, RDSR, LUT Calibration, HL7, DICOM, etc.), invalidation status, or by their current status (Performed or Scheduled).





- 1 The Filter  button opens up the Filter Properties window.

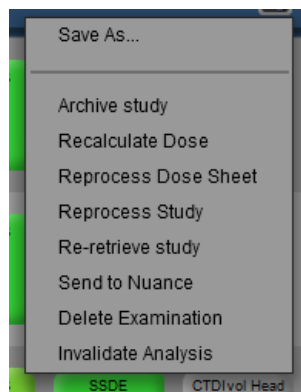
Search Filtering

Filtering provides an additional method for narrowing your results and may also be useful in cases where the exact name of the field you are trying to match is difficult to remember (e.g. a specific protocol or procedure name).



Tools

Without any exams selected, the Tool  button allows you to save to a current or to a new Worklist, via the "Save" or "Save As..." options. Once an exam (or multiple exams) are selected, clicking on the Tool  button displays additional items on its drop-down menu:



From here you can choose from a number of functions, as shown in the table below. Reprocess Options are restricted to users with Administrator level access or above.

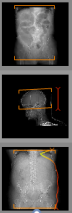


Archive study	Archives the selected studies to a DICOM Node (chosen from a drop-down list in a pop-up window).
Recalculate Dose	Forces a dose recalculation on the selected study.
Reprocess Dose Sheet	Causes the dose sheet to be reprocessed.
Reprocess study	Causes the whole study to be reprocessed.
Re-retrieve study	Attempts to re-retrieve the study and overwrites the original study retrieved in Radimetrics.
Send to Nuance	Sends the exam to Nuance (PowerScribe).
Delete Examination	Deletes the currently selected exam(s).
Invalidate Analysis	Marks a study as invalid. If this is selected, another dialog box will appear asking the user to enter a comment on why the study is being invalidated.



Invalidated studies are still sent to the ACR Dose Index Registry (DIR).

Interpreting exam search results

Each row in the search result represents a summarized exam. This summary includes a localizer/axial image from the examination, an Examination Label, a Patient Label, and a dosimetry overview. Double clicking on any exam row will open the Dosimetry module for that exam.

	00387087X CT ABDOMEN/PELVIS (CT) ABD WITHOUT/Abdomen Performed: 10/31/2013 6:33 PM Brilliance 16P CT1	00156892X TORCHIA, JACK X M DOB: 04/02/1923 Age at Exam: 90y	ICRP 103 9.8 mSv	SSDE 11.7 mSv	CTDIvol Head -	CTDIvol Body 10.4 mSv
	00387086X CT HEAD (CT) HEAD WITHOUT/Head Performed: 10/31/2013 2:29 PM iCT Z56 CT2	00156891X MESSEY, BURT X M DOB: 12/22/1992 Age at Exam: 20y	ICRP 103 2.8 mSv	SSDE -	CTDIvol Head 69.2 mSv	CTDIvol Body -
	00387084X CT ABDOMEN/PELVIS (CT) Abdomen WITHOUT/Abdomen Performed: 10/31/2013 10:32 AM iCT Z56 CT2	00156890X TREPTOW, RUSTY X M DOB: 09/11/1951 Age at Exam: 62y	ICRP 103 13.3 mSv	SSDE 13.9 mSv	CTDIvol Head -	CTDIvol Body 12.9 mSv

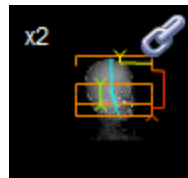


This column shows a localizer or axial preview image for the exam if present. If there is no localizer image, the primary acquisition image is used instead. See "Localizer Details" on page 47

- 2 The second column displays the Examination Label with information including the Accession #, modality, study description, protocol name, date and the scanner used. The icons displayed allow access to Tags, alerts and the text content of the Dose Report. Hovering over this label will show information about the additional imaging series (if any).
- 3 The third column displays the Patient Label including the MRN, patient name, DOB, sex and age (at the time of exam). The Tag icon allows you to add and delete tags associated with the patient.
- 4 The fourth column displays dosimetry values as detailed below. See "Dosimetry values and color coding" on page 49.

Localizer Details

An example localizer (scout) image is shown below:




The upper-left corner of the preview will display a number indicating the total number of imaging series in the exam (e.g. x3), if there is more than one.

The orange brackets indicate the scan start and end points.


The modulation curve changes color from green to yellow to red depending on the density of the body region being scanned. Green is less dense, and red is more dense.

A blue line represents the centroid provided for the image, indicating the positioning of the patient.

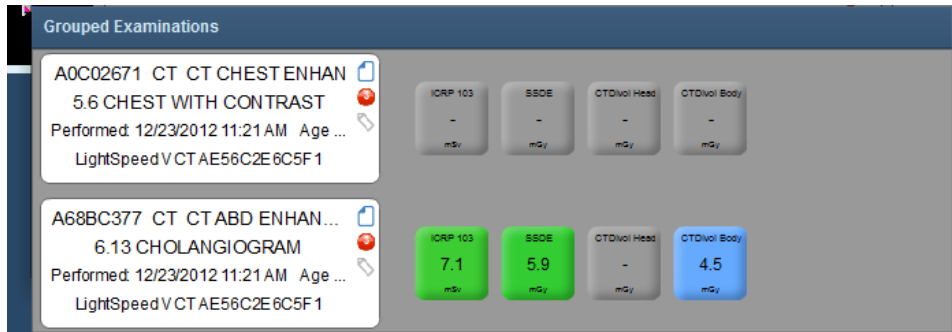
The text 'HL7' may show up in the bottom-right side of the localizer, indicating the exam data was sourced via an HL7 interface.

Finally, for dual-source CT exams, the Dual Energy icon  will display in the bottom-right hand of the localizer. Once opened, dual-source CT exams will show acquisitions with a kVp (A) and kVp (B) value (as well as their corresponding Mean mAs) to indicate the two different sources.

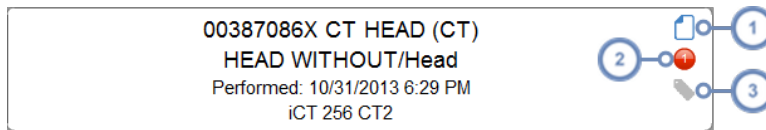
Grouped examinations

The Chain-link  icon indicates that there are other studies grouped (linked) with this study. When this icon is shown, hovering over the localizer image will list other studies grouped with

this one. Grouped studies are actually single or multiple-acquisition studies that have been split (a "split study"), due to billing, reporting, or post-processing reasons.



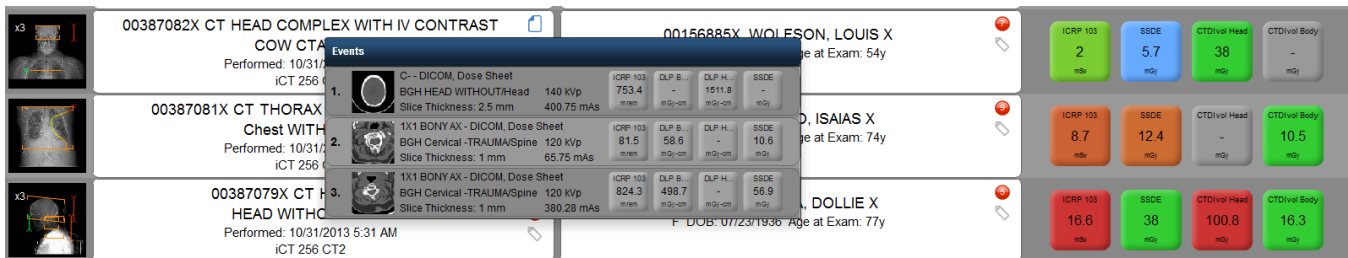
Examination Label Details



- 1 Hovering over this icon displays a pop-up window displaying the Dose Report in text format, which can be copied to the clipboard.
- 2 The red circle indicates that an Alert is associated with this exam, and the number indicates how many Alerts are associated. Hovering over this displays a list of associated alerts in a pop-up window; double-clicking on one of the alerts will display its details.
- 3 The Tag icon, when hovered over, displays a pop-up window allowing you to add and delete Tags associated with this exam.

Showing additional exposure events

As noted above, hovering over the second column (the Examination Label) shows additional information about the events in the exam, whether acquisitions, contrast, or otherwise, as shown in an example below:



You can also hover over the exposures individually to display a tooltip (noted in the yellow box in the screenshot) with additional information about the Value of Interest (VOI) Length, Irradiated Length and other pertinent information.

Dosimetry values and color coding

The dosimetry labels in the fourth column display Values of Interest such as ICRP 103 that may differ depending on your site and are customizable in the Values Indicator Settings. See "Value Indicator Settings" on page 209 to learn how to customize these labels.

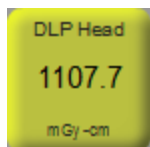


- 1 Click on the arrow buttons on the left and right sides of this column when hovering with the mouse cursor over the column to scroll through different dosimetry values.

The dose labels may be color coded depending on the set Dose Reference Levels (DRL) for the associated exam protocol. If there are no predefined Dose Reference Levels, then the label will be grey. The colors shown gradually transition from shades of green to yellow and then red, to indicate increasing dose levels.



Green indicates dose levels within **normal** range



Yellow indicates dose levels on the **high** end, but not exceeding the maximum acceptable





Red indicates a dose that **exceeds the maximum** level



Blue indicates a dose that is **below the minimum** set threshold level

Scheduled vs Performed Exams

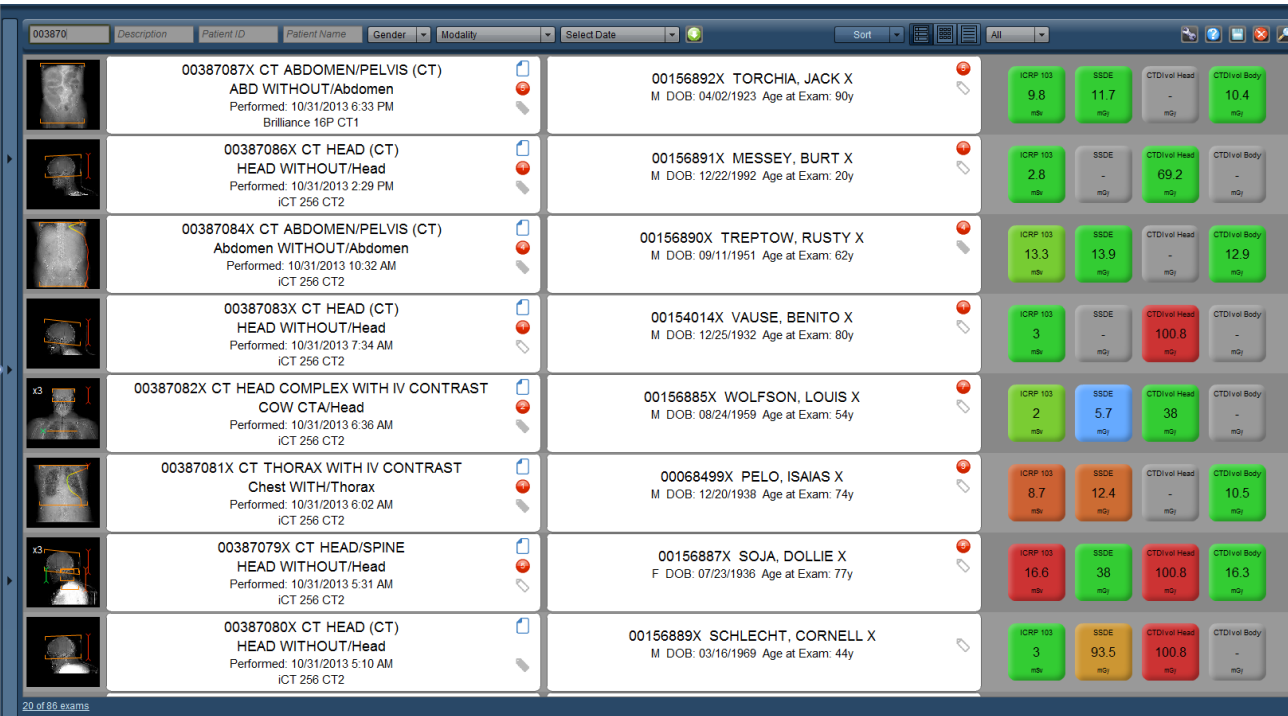
②	 ACC-1111_test3636_1 CT Requested Procedure Description Bilimleyen Protokol Adi Scheduled: 10/14/2015 12:36 AM Bilimleyen Model Bilimleyen Ekipman	Patient ID1 PATIENT, Clone F DOB: 11/03/1947 Age at Exam: 83y Weight: 169kg	ICRP 103: - mSv SSDE: - mSv CTDIvol Head: - mSv CTDIvol Body: - mSv
①	 A_8F54221AC2952034FBB063566E8C0FD4 CT CTABPW 5.15 CHEST ABD PELVIS OVER 300 LBS 6/2011 Performed: 10/31/2011 7:12 PM LightSpeed Pro 16 StationName4A37EBA82487E57DC3B38D39A8185EDF	Patient ID1 PATIENT, Clone F DOB: 11/03/1947 Age at Exam: 63y Weight at Exam: 169kg	ICRP 103: 25.5 mSv SSDE: 24.4 mSv CTDIvol Head: - mSv CTDIvol Body: 36.4 mSv

① A performed examination

② A scheduled examination

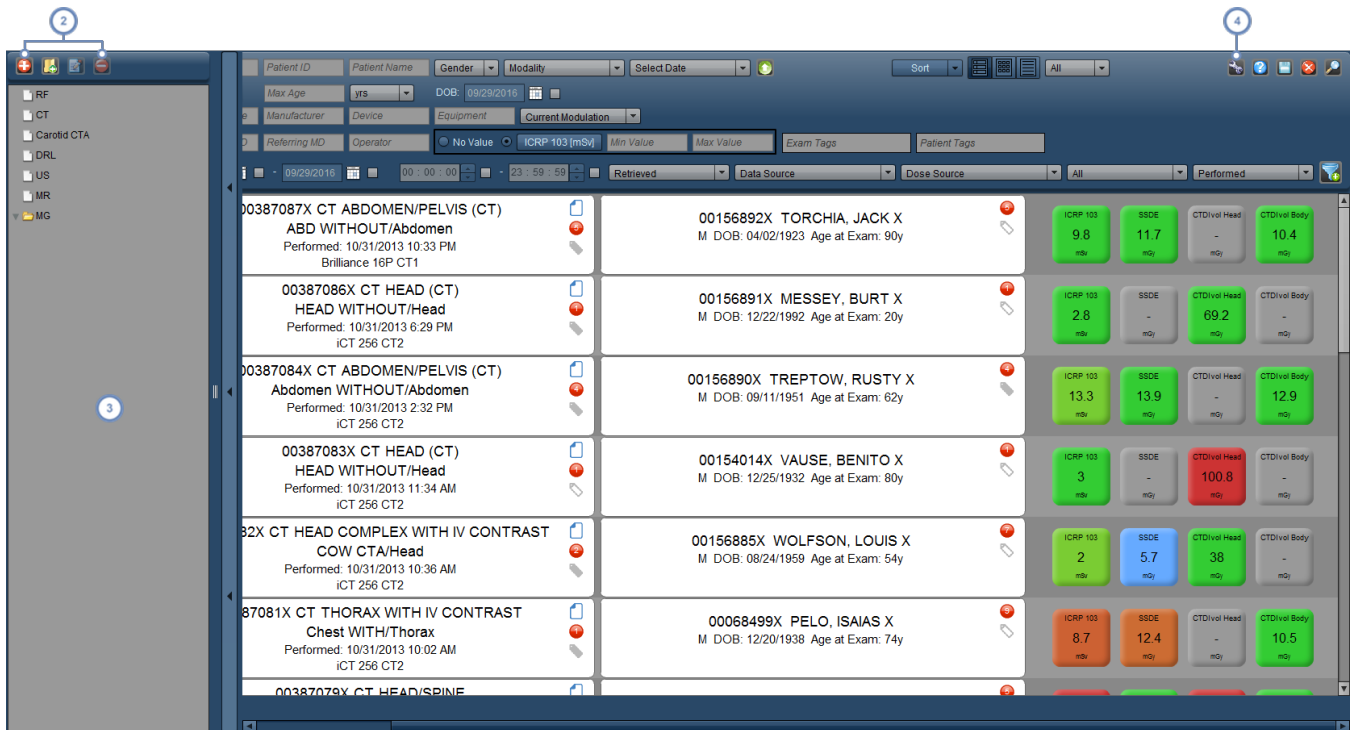
Worklists Management

In Radimetrics™ Enterprise Platform 2.1 and above, Worklists have been integrated into the Examinations Module.




003870	Description	Patient ID	Patient Name	Gender	Modality	Select Date	Sort	ICRP 103	SSDE	CTDIvol Head	CTDIvol Body
	00387087X CT ABDOMEN/PELVIS (CT) ABD WITHOUT/Abdomen Performed: 10/31/2013 6:33 PM Brilliance 16P CT1	00156892X	TORCHIA, JACK X	M	DOB: 04/02/1923 Age at Exam: 90y			9.8 mSv	11.7 mSv	- mSv	10.4 mSv
	00387086X CT HEAD (CT) HEAD WITHOUT/Head Performed: 10/31/2013 2:29 PM iCT 256 CT2	00156891X	MESSEY, BURT X	M	DOB: 12/22/1992 Age at Exam: 20y			2.8 mSv	- mSv	69.2 mSv	- mSv
	00387084X CT ABDOMEN/PELVIS (CT) Abdomen WITHOUT/Abdomen Performed: 10/31/2013 10:32 AM iCT 256 CT2	00156890X	TREPTOW, RUSTY X	M	DOB: 09/11/1951 Age at Exam: 62y			13.3 mSv	13.9 mSv	- mSv	12.9 mSv
	00387083X CT HEAD (CT) HEAD WITHOUT/Head Performed: 10/31/2013 7:34 AM iCT 256 CT2	00154014X	VAUSE, BENITO X	M	DOB: 12/25/1932 Age at Exam: 80y			3 mSv	- mSv	100.8 mSv	- mSv
	00387082X CT HEAD COMPLEX WITH IV CONTRAST COW CTA/Head Performed: 10/31/2013 6:36 AM iCT 256 CT2	00156885X	WOLFSON, LOUIS X	M	DOB: 08/24/1959 Age at Exam: 54y			2 mSv	5.7 mSv	38 mSv	- mSv
	00387081X CT THORAX WITH IV CONTRAST Chest WITH/Thorax Performed: 10/31/2013 6:02 AM iCT 256 CT2	00068499X	PELO, ISAIAS X	M	DOB: 12/20/1938 Age at Exam: 74y			8.7 mSv	12.4 mSv	- mSv	10.5 mSv
	00387079X CT HEAD/SPINE HEAD WITHOUT/Head Performed: 10/31/2013 5:31 AM iCT 256 CT2	00156887X	SOJA, DOLLIE X	F	DOB: 07/23/1936 Age at Exam: 77y			16.6 mSv	38 mSv	100.8 mSv	16.3 mSv
	00387080X CT HEAD (CT) HEAD WITHOUT/Head Performed: 10/31/2013 5:10 AM iCT 256 CT2	00156889X	SCHLECHT, CORNELL X	M	DOB: 03/16/1969 Age at Exam: 44y			3 mSv	93.5 mSv	100.8 mSv	- mSv

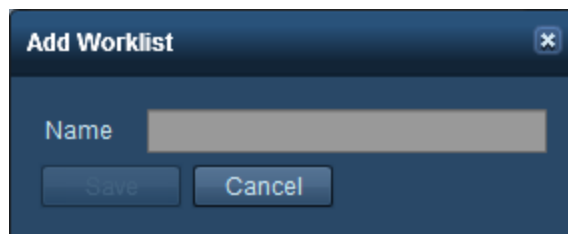
① Click on the vertical bar to expose the Worklists Management interface.




- 2 These are management buttons for adding Worklists and folders; editing their names, and deleting them.
- 3 This window (the Worklist tree) provides an overview of the available Worklists (and their organizing folders). You can drag and drop items in the Worklist tree to reorder them. Selecting any listed Worklist will display its query results in the main search window.
- 4 The Tool button allows you to save the currently selected Worklist, or to save the current search parameters to a new Worklist.

Creating a new Worklist / Deleting a Worklist


Click on the Add Worklist button  to add a new Worklist. A dialog box will appear asking you to name it.



Once you do so, the worklist will appear in the Worklist tree.

When you would like to delete a Worklist (or a folder), select it, and then click on the Delete  button.


Renaming a Worklist or Folder

Click on the Edit  button to edit the name of the currently selected worklist or folder. A dialog box similar to the one shown above will appear.


Modifying Worklist search parameters

Once the worklist is selected in the tree, modify your search parameters as desired using the available fields as you would normally use during an exam search. For most worklists it may be helpful to use the Advanced Search interface to help narrow your worklist results as desired. See "Advanced Search" on page 44.

As you modify parameters, the worklist preview will change showing you the set of exams that currently matches the parameters.

Clicking on the Reset button  will clear all your current search parameters.

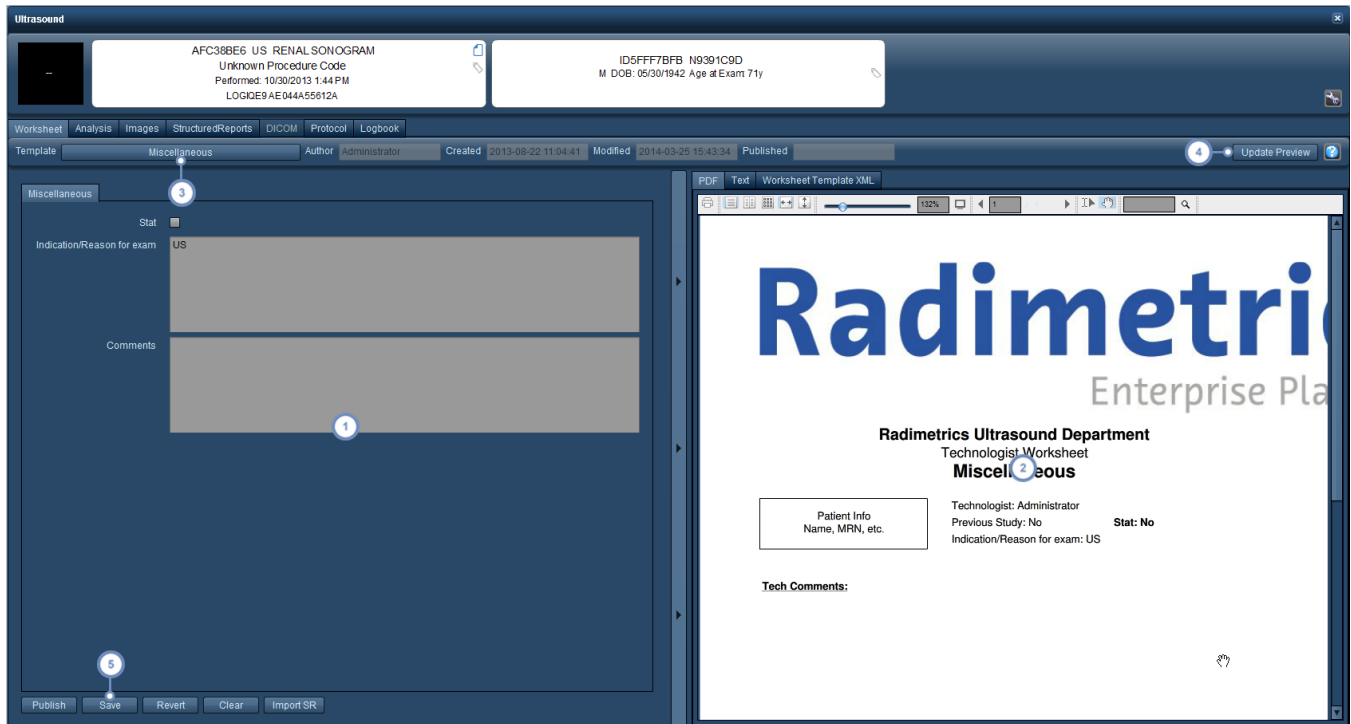
Saving worklist search parameters

Click on the Tool  button and then "Save" once you are finished, to save your currently selected worklist's search parameters. Alternatively, click on "Save As..." to save your parameters to a new Worklist.

Ultrasound Exams

Radimetrics™ Enterprise Platform is capable of collecting and transmitting Ultrasound Structured Report data to HL7 compatible information systems (e.g. for RIS/HIS Speech Recognition). Alternately, a sonographer can manually enter ultrasound details into a Worksheet that is stored with the ultrasound exam details and/or can be published to a speech-recognition system; this is detailed below.

When a US modality exam is opened, the following interface appears:



- 1 On the left, the Worksheet form is displayed. The fields here can be filled in as required.
 - 2 On the right, the PDF version of the worksheet is displayed. Text and XML representations of the worksheet may also be chosen.
- The Template button/feature allows you to choose a predefined worksheet template for the exam, if not automatically selected correctly. Templates allow different types of data to be entered and formatted correctly. Changing to a different template will display a dialog box warning the user that all the current fields will be reset to blank.
- 3
 - 4 Update Preview will update the PDF version of the worksheet with any new data / changes made to the Worksheet on the left.
 - 5 The Publish button allows the report to be published; the Save button saves the currently entered data; the Revert button 'undeletes' to the last save point.

Acquisitions Module

The Acquisitions module is similar to the Examinations module, but works at the individual acquisition level. At this time, Worklists are not available for the Acquisitions module. See "Examinations Module" on page 41 for more specific instructions on using the interface. As the overall functionality is similar to the Examinations module, this section will mainly focus on the differences found.




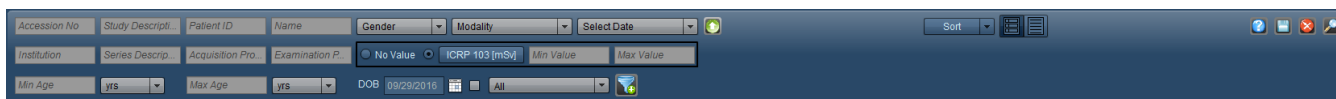
- 1 To go to the Acquisitions module, click on Acquisitions in the Module bar.

Performing a search

The difference in searching for Acquisitions is minimal compared to the Examinations module. There are no Worklists or other study-specific functions, and the Grid view for search results is not available.

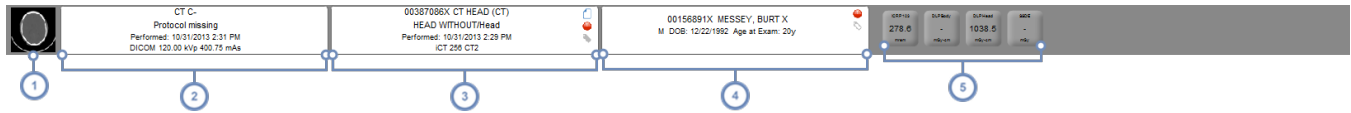
Advanced Search

As in the Examinations module, clicking on the Advanced Search  button opens up additional parameters that can be used to search for specific exams. The list is more limited, including age range, DOB, Institution, Series Description, Acquisition Protocol, Examination Protocol, and Value of Interest (modifiable by clicking on the Value of Interest label button). Filtering is available.



Interpreting acquisition search results

Each row in the search result represents a summarized acquisition. This summary includes an axial image from the acquisition, the Acquisition Label, the Exam Label, a Patient Label, and a dosimetry overview. Double clicking on any acquisition row will open the Dosimetry module for that acquisition.



- 1 This column shows an axial preview image from the acquisition.
- 2 The second column displays the Acquisition Label with information including the series description, protocol name, date performed and other details.
- 3 The third column displays the Exam Label with information including the modality, study description, protocol name, date and the scanner used. The icons displayed allow access to Tags, alerts and the text content of the Dose Report.
- 4 The fourth column displays the Patient Label including the MRN, patient name, DOB, sex and age (at the time of exam). The Tag icon allows you to add and delete tags associated with the patient.
- 5 The fifth column displays dosimetry values as detailed previously. See "Dosimetry values and color coding" on page 49.

Acquisition dosimetry

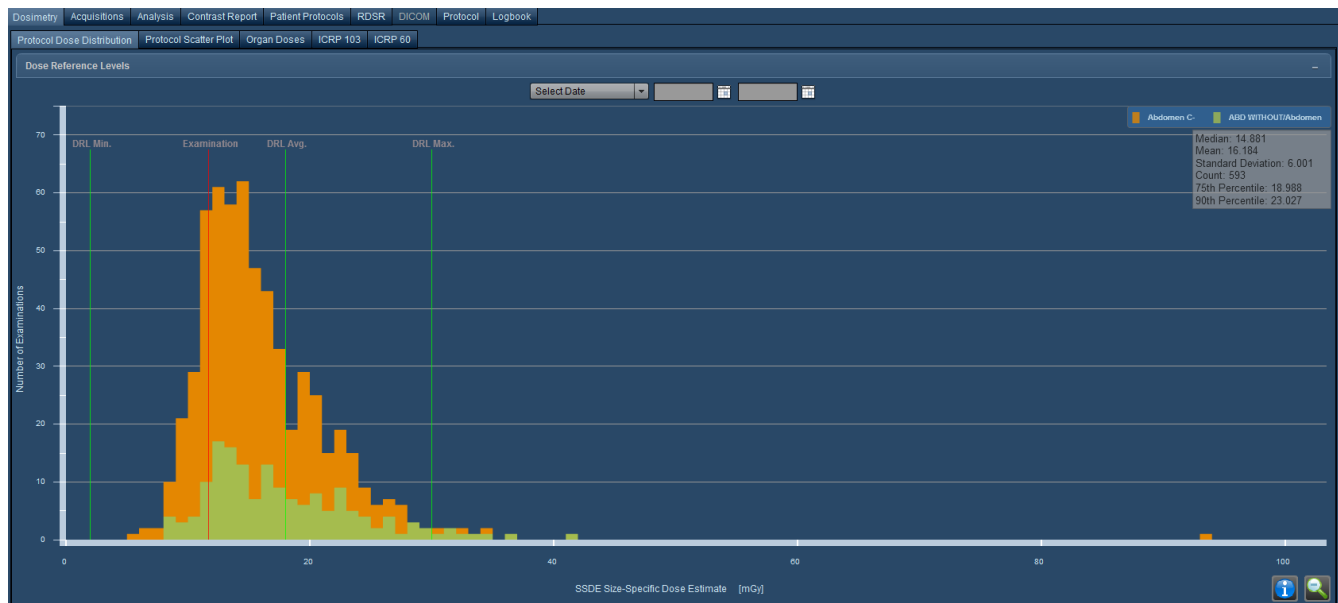
The dosimetry interface that appears when selecting an acquisition is similar to the exam dosimetry interface (See "Dosimetry and modality analytics" on page 56). However, there is an additional row of acquisition-specific information that appears.



- 1 This row gives additional information about the series number, study description, protocol, start and end times as well as more acquisition-specific values such as the isocenter, patient position and table height.

Dosimetry and modality analytics

The standard dosimetry interface appears whenever an individual CT exam is selected for review, whether from the Examinations, Patients, or Worklists module, or by drilling down to charts within the Dosimetry interface itself.



As seen above, in addition to Dosimetry information, a number of other tabs are available for reviewing the exam's technical details:

Acquisitions

Displays examination and protocol acquisition technical data.

Analysis

The analysis tab displays the exam's localizer (scout) images with overlays of the modulation curves and SSDE information. See "Analysis" on page 79.

Injection Report

This tab is only displayed if injected contrast metrics are available for an exam. See "Contrast Report" on page 83.

Patient Protocols

Displays protocol information such as the dose sheet and post-OCR translation text.

RDSR

Displays a PDF of the DICOM-standard Radiation Dose Structured Report.

DICOM

Displays the exam's DICOM information.

Protocol

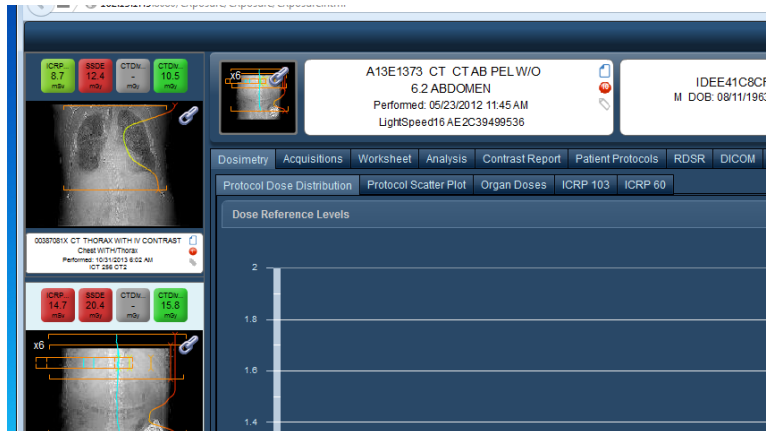
Displays a PDF of the examination's protocol as defined within Radimetrics software.

Logbook

Allows documentation of additional examination information. In some cases, this can affect dose calculations. See "Logbook" on page 87.

Grouped Examinations

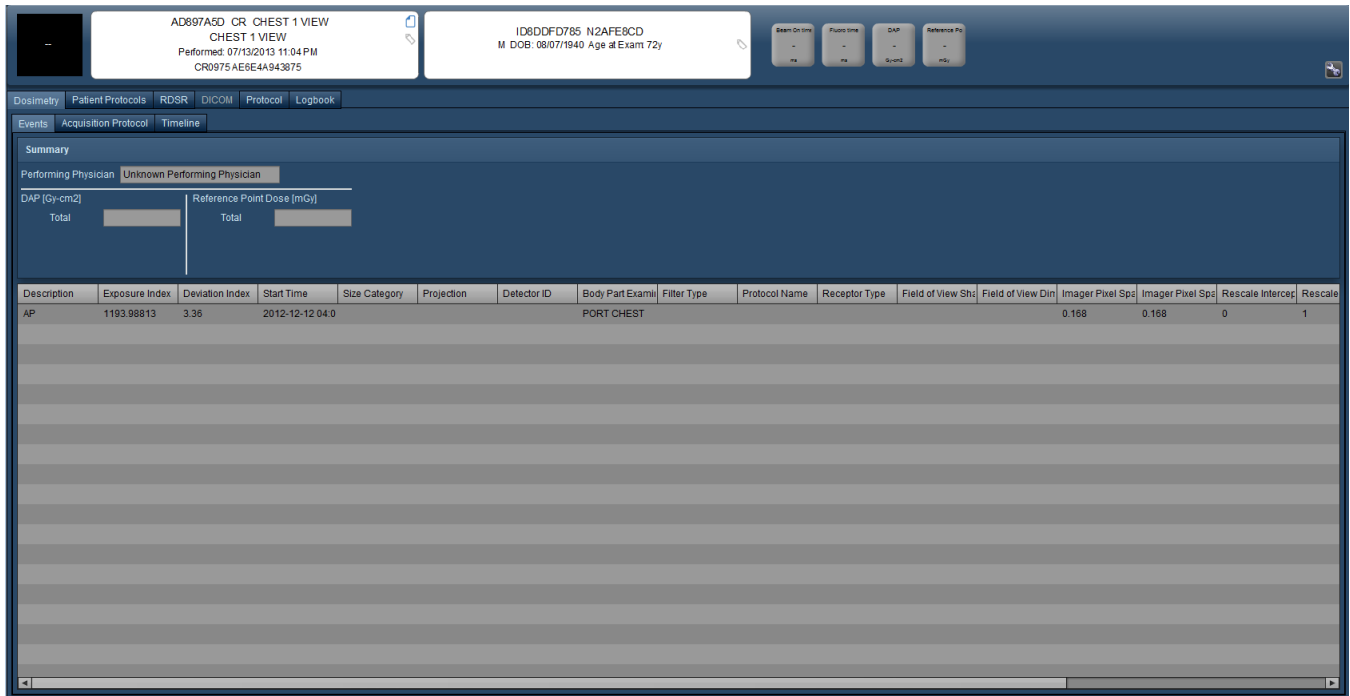
In the Examinations module, if there are other exams grouped with this one, a column will appear on the left hand side of the screen listing the details of the other exams in the group, as shown below:



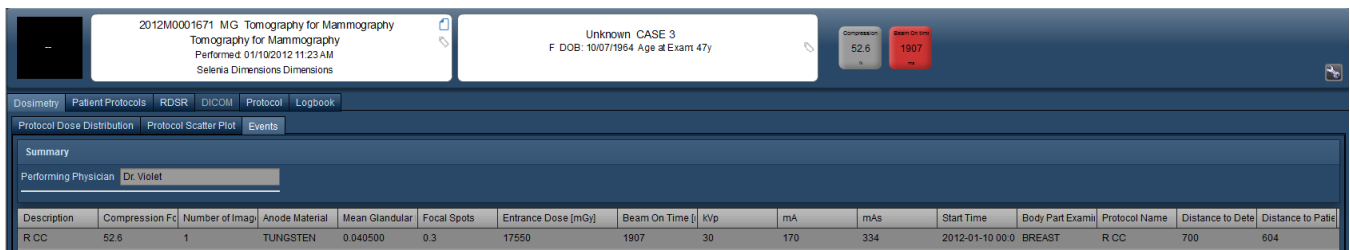
Hovering over the grouped exams will display controls that can be used to scroll through the exam localizers and Values of Interest.

X-ray (CR/DX) and Mammogram (MG) Dosimetry

For X-rays and mammograms, Radimetrics software derives the displayed values from the DICOM data transmitted with the exam. An example of a CR exam is shown below; most relevant values are stored by Radimetrics software, and in some instances Exposure Indices and Deviation Indices are derived.

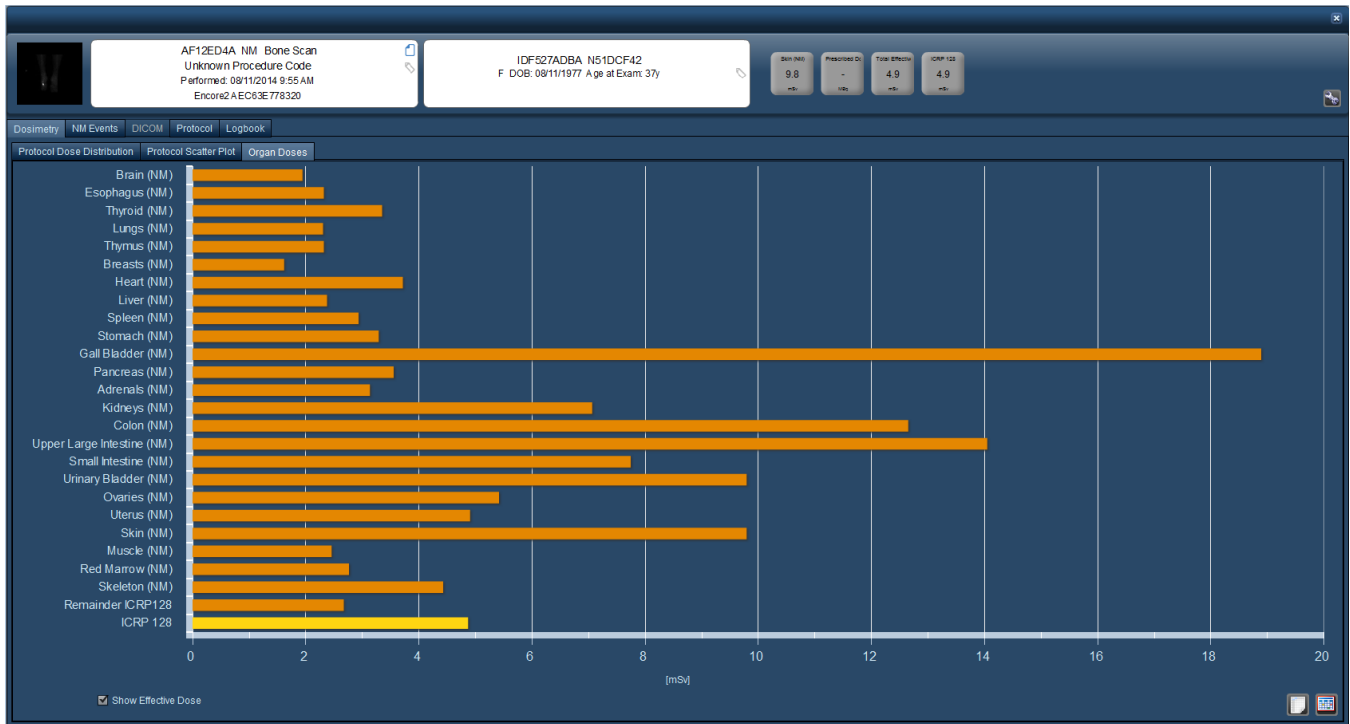


An example of an MG exam is below. Dose Distribution and Scatter Plots are available for these exams. Significant captured values include compression force, compression thickness, the number of images and mean glandular dose:



Nuclear Medicine (NM) and PET (PT) Dosimetry

Nuclear medicine and PET scan or PET/CT combined scan dosimetry is available within Radimetrics software. Nuclear medicine scans display an ICRP 128 dosimetry tab, while for PET or PET/CT combined scans, an ICRP 106 dosimetry tab is displayed.

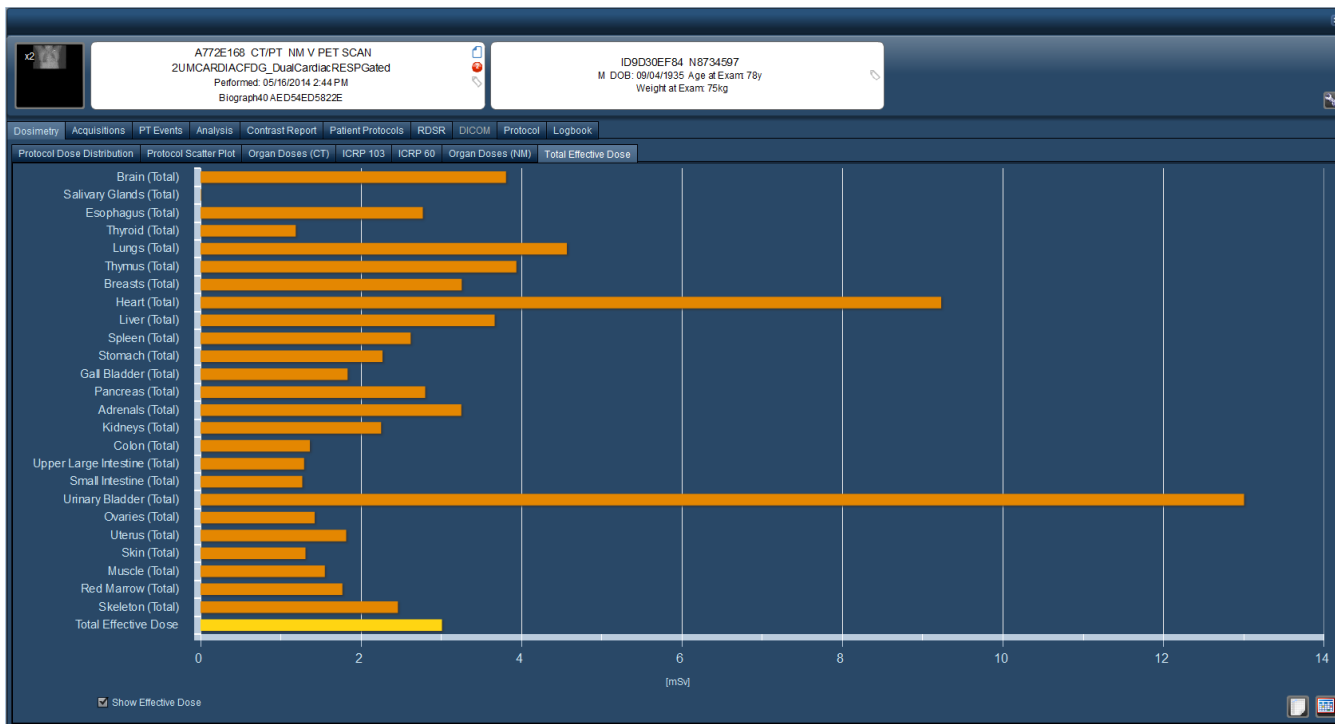


In addition, an "NM Events" or "PT Events" tab is also enabled that displays the radio-pharmaceuticals that were injected and their doses, as shown below:

Procedures						
Radiopharmace	Administered Dose (MBq)	Syringe Dose (MBq)	Pharmacon	Dose Route	Injection Site	Dose Source
99mTc-tetrofosm	698.96		Unknown		LIAC	Logbook
15O-water	44	1	Unknown	Subcutaneous	LIAC	Logbook

Acquisitions						
Series #	Description	Type	Protocol	Start	End	Images
1000	STATIC	STATIC	11506.0.906559	2014-08-11 09:5	2014-08-11 10:2	4

In the case of combined PET/CT scans, a Total Effective Dose dosimetry tab appears. This displays the combined CT (ICRP 103) and PET (ICRP 128) doses per organ.



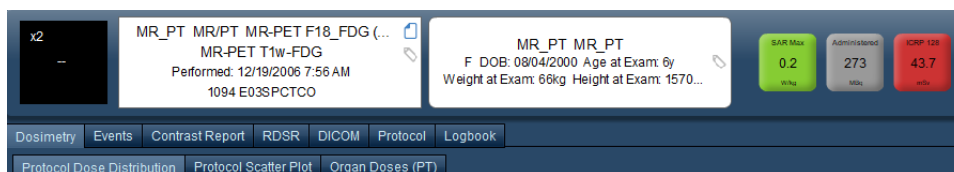
The logbook tab for these modalities allows information to be entered regarding radio-pharmaceutical-related parameters. See "Logbook" on page 87 for more details.

Magnetic Resonance Imaging (MR)

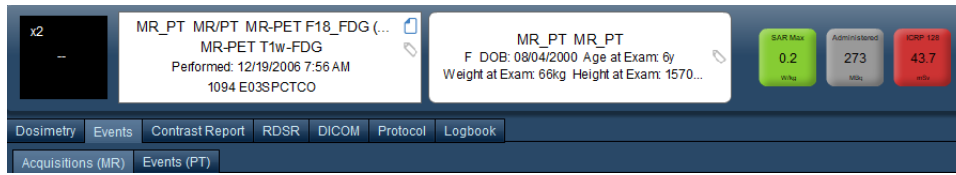
MRI (MR) exams display SAR values derived from the DICOM data transmitted with the exam. In addition, contrast injection information is also made available if present.

Multi-modality Exams

Exams with multiple modalities (beyond just PET/CT) are supported by Radimetrics™ software. When an exam with multiple modalities is viewed, the appropriate extra associated tabs for each modality are seen. For example, in a theoretical MR/PT study, you will see an extra tab for "Organ Doses (PT)".



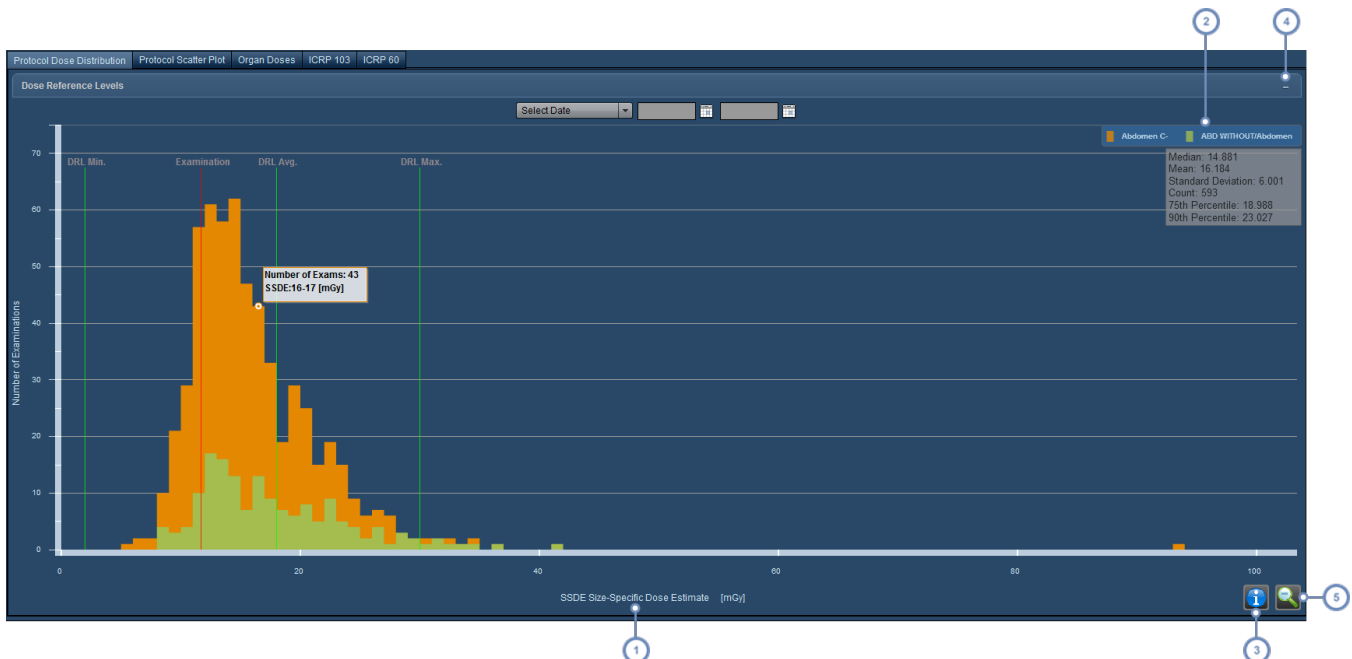
The Events tab would in this case show "Acquisitions (MR)" and "Events (PT)" as shown below.





Protocol Dose Distribution

The Protocol Dose Distribution chart enables you to compare the dose of the selected exam on a distribution curve against other exams with similar protocols in the database. In addition, with Dose Reference Levels set, the exams displayed on the distribution are filtered to show those matching the criteria specified by the reference levels (e.g. by age range or sex).

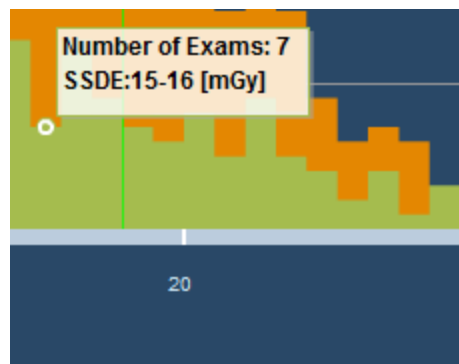
Depending on your version of Radimetrics™ Enterprise Platform, the screen may appear slightly different. The orange curve represents the Master distribution for all devices mapped to the exam's protocol. Newer versions of Radimetrics software can display a second distribution curve (in green) with specific device protocols as shown below. The exam's dose is referenced by a vertical red line through the graph, and the DRL Minimum, Average, and Maximum values are referenced by the vertical green lines. You may also specify a date range for the compared distributions via a drop down menu or calendar widget.




- 1 The x-axis variable defaults to ICRP 103, but may be changed.
- 2 The Legend displays the color key for the distributions; clicking on this area allows you to change the displayed Device-specific Protocol curve.
- 3 The Info button , when clicked, toggles the display of information about the Median, Mean, Standard Deviation and exam count - as shown in the sample screen above.
- 4 The "-" symbol can be clicked on to display a table with the types and values of the dose reference levels, along with alert settings.
- 5 The Demagnify button  is used to return to the default graph if an area has been selected for closer inspection.

Displaying additional information

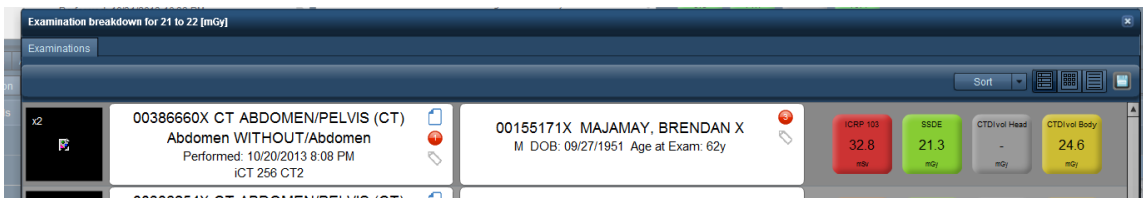
Placing the cursor over individual bars in the chart displays a ToolTip with the exam count and x-axis variable range as shown below.



In addition, as noted above, the Info button  may be clicked to display information about the Median, Mean, Standard Deviation and exam count.

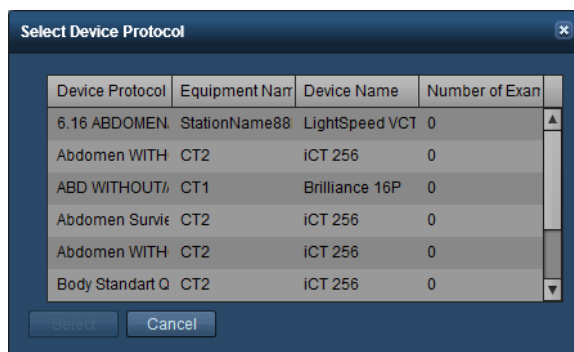
Displaying additional exam information

Any vertical bar on the chart may be *double-clicked* to bring up a list of exams associated with that bar. From the list, which appears similar to a regular search result, you can double-click to see further Dosimetry information on a particular exam of interest.



Changing the displayed Device Protocol

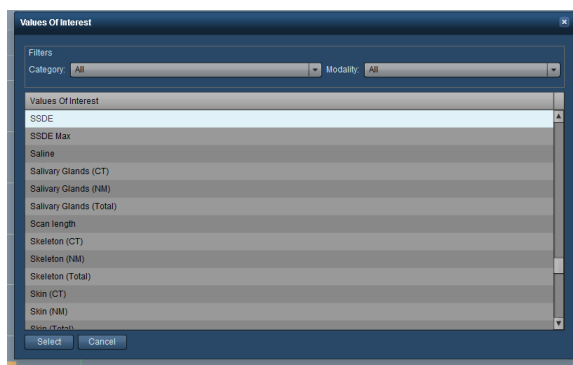
Clicking on the color key for the chart causes an additional menu to be displayed to allow you to select the Device Protocol.



Clicking on the Device Protocol name desired and then clicking the Select button will change the display of the Device Protocol graph.

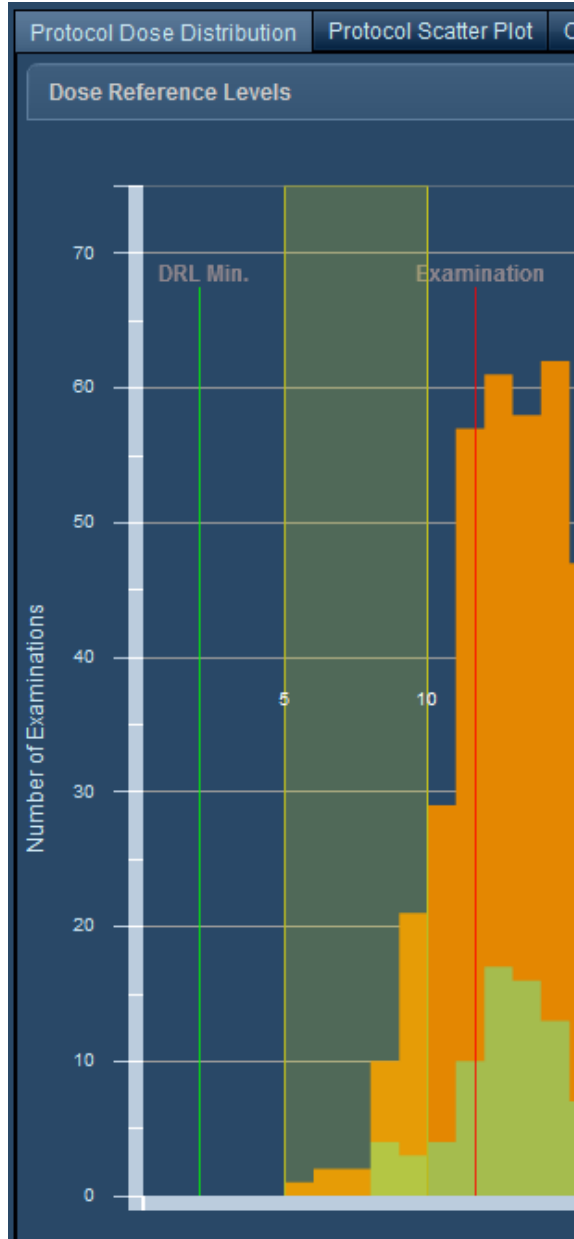
Changing the x-axis variable

The default view shows the ICRP 103 dose. This can be changed by clicking on the variable name as noted above. The following window will appear, allowing you to choose from different values of interest including organs, other dose calculations (DLP, CTDIvol) or even fluoroscopy time.

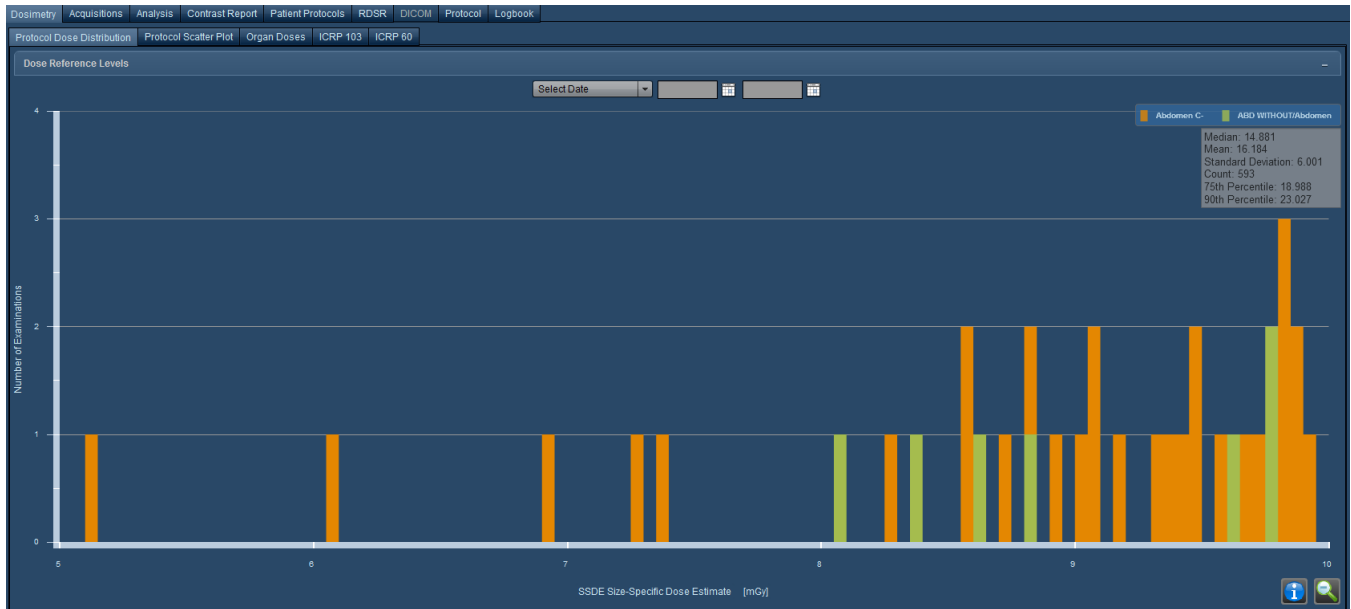


Magnifying an area of the distribution

By clicking and holding down the mouse button while moving the mouse cursor on the chart, you can define a range of values which you would like to inspect in closer detail.



As an example, for the above range (from 4.0 to 11.0), the resulting chart was as follows:



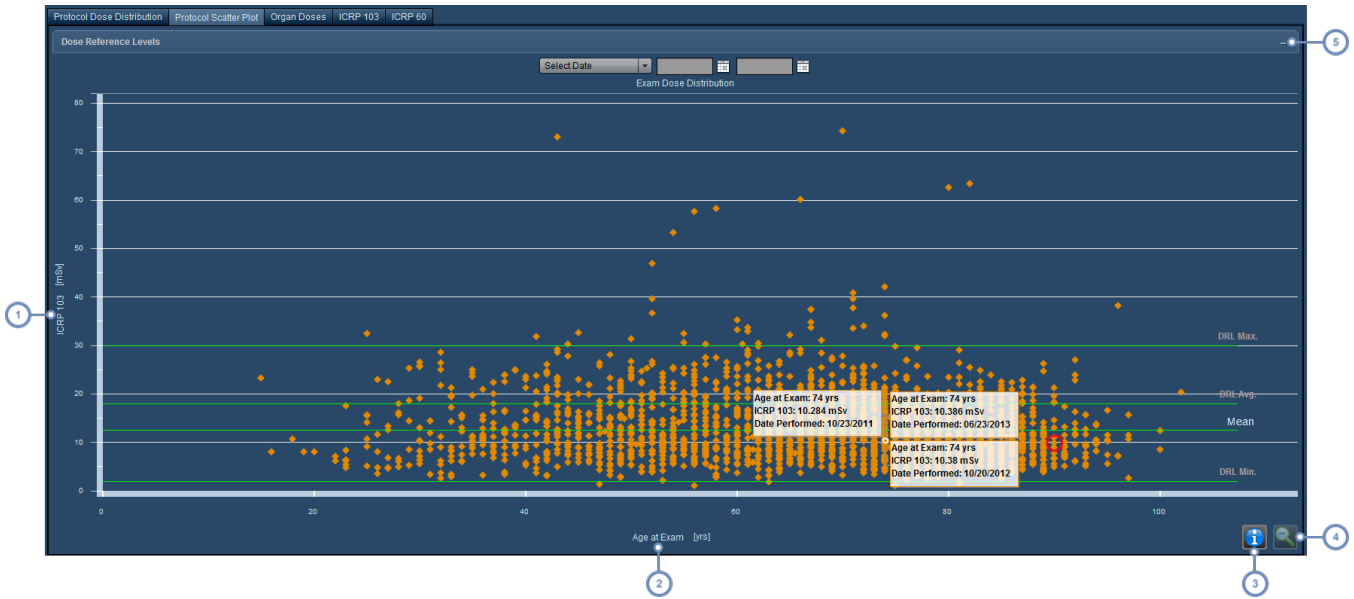
You may continue to magnify the chart by specifying more ranges.

Click on the Demagnify button  to return to the original chart.

Protocol Scatter Plot


The Protocol Scatter Plot defaults to showing ICRP 103 dose vs. Patient Age for the specific exam's protocol, but features modifiable x and y axis display variables to customize the comparison as needed. In addition, with Dose Reference Levels set, the exams displayed on the scatter plot are filtered to show those matching the criteria specified by the reference levels (e.g. by age range or sex).


Depending on the version of Radimetrics™ Enterprise Platform you have, you may be able to select a rectangular subset of the plot to be zoomed-in on. Each plot point represents a unique exam. The DRLs pertaining to the exam are shown as horizontal green lines.



1 The y-axis variable defaults to ICRP 103 but may be changed. See "Changing the plot axis variables" on page 67.

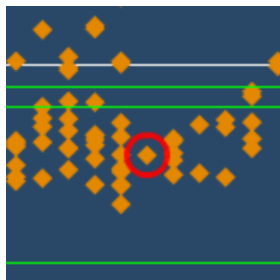
2 The x-axis variable defaults to Patient Age (which is only available on the x-axis), but may be changed.

3 The Info button , when clicked, toggles the display of information about the Median, Mean, Standard Deviation and exam count - as shown in the sample screen above.

4 The Demagnify button  is used to return to the default graph if an area has been selected for closer inspection.

5 The "-" symbol can be clicked on to display a table with the types and values of the dose reference levels, along with alert settings.

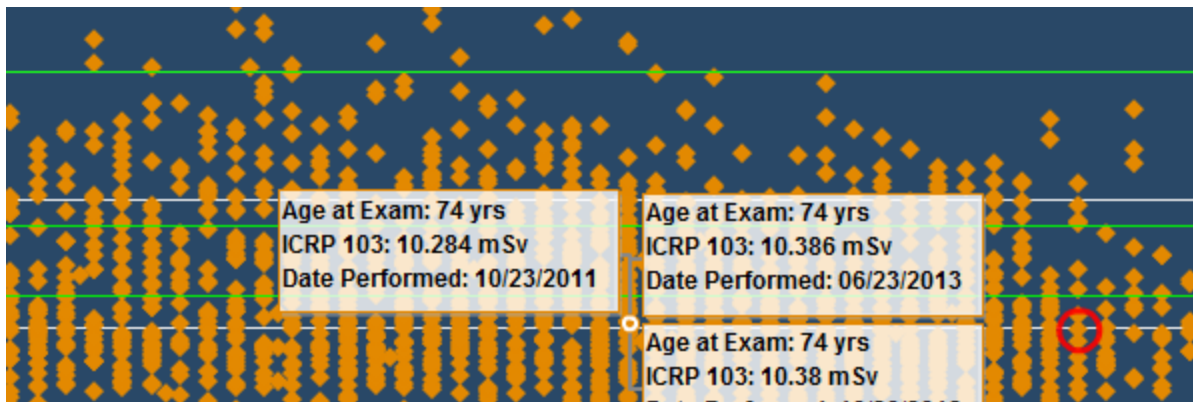
The specific exam you are reviewing is highlighted on the plot with a red circle:



Given that there may be dozens of very similar exams (or more) in your system, Radimetrics software allows you several methods for comparison as detailed below.

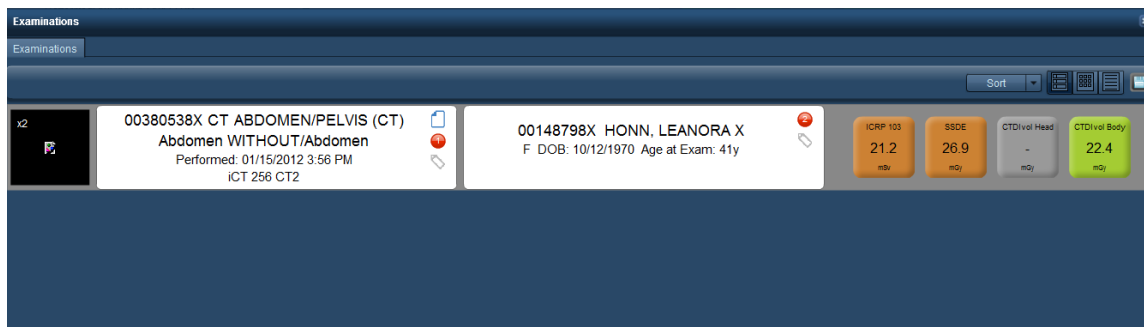
Displaying additional information

Placing the mouse cursor over a plot point will highlight it and display the data values for that plot point. If points are closely spaced or overlap, then multiple ToolTips will display the information for each exam.



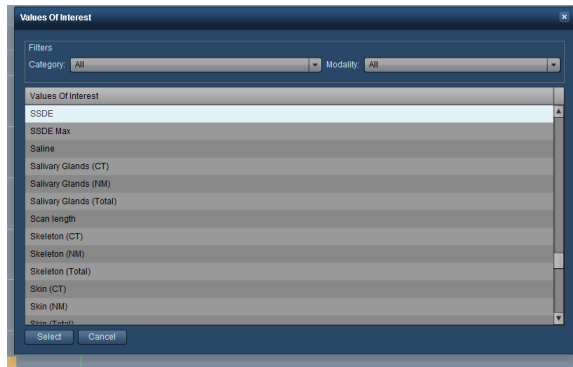
Displaying additional exam information

Clicking on an individual plot point will open the Dosimetry window for that exam; clicking on a group of points will display a list of exams from which a particular exam can be selected. From the list, which appears similar to a regular search result, you can double-click to see further Dosimetry information on a particular exam of interest.



Changing the plot axis variables

The default view shows the Patient Age along the x-axis. This can be changed by clicking on the variable name as noted above. The following window will appear, allowing you to choose from different organs, other dose calculations (DLP, CTDIvol) or even fluoroscopy time.



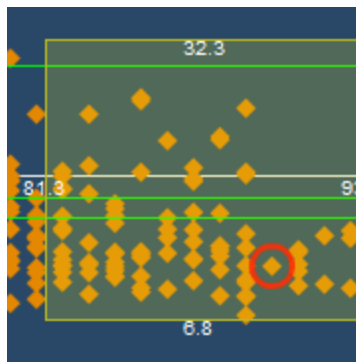
Similarly, the y-axis label can also be clicked to display a drop-down menu to select a variable to display.



The Patient Age variable can only be selected for display along the x-axis.

Magnifying an area of the plot

Magnification may be especially helpful for differentiation and comparison in the case that there are many similar or closely overlapping plot points. A rectangular area of the plot may be selected for closer examination by clicking and dragging with the mouse in order to magnify the plot points within that area.



The numbers on the sides of the rectangle indicate the upper and lower bounds of the x and y axis values to be included in the magnified area.

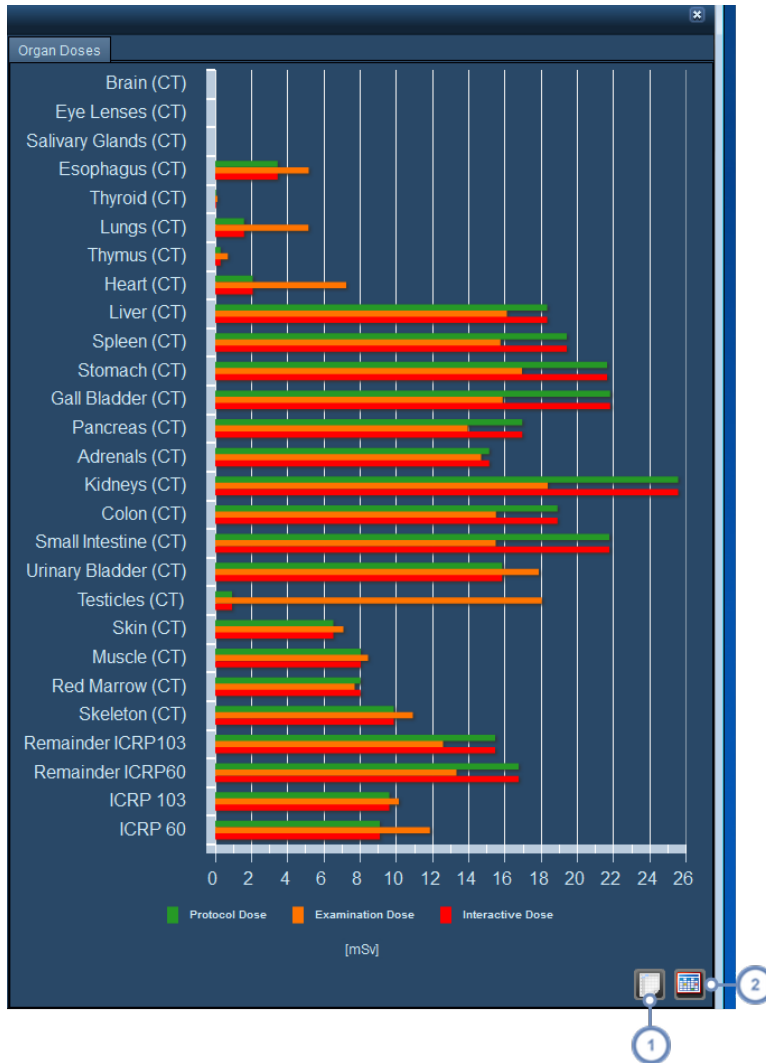
You can magnify to unlimited levels by continuing to select more rectangular areas.

Click on the Demagnify button  to return to the original plot.


Organ Doses

The organ doses view displays organ-specific radiation dose exposure, but is also configurable to display other variables such as CTDIvol, DLP, fluoroscopy exposure time and ICRP dosing. Both bar-chart and table formats can be viewed, and table data may be exported to CSV format.

If you are within the Interactive Dosimetry interface, the Organ Doses view shows comparisons of the originally calculated examination dose to the user-simulated examination dose. The simulated exam bars are below the originals.



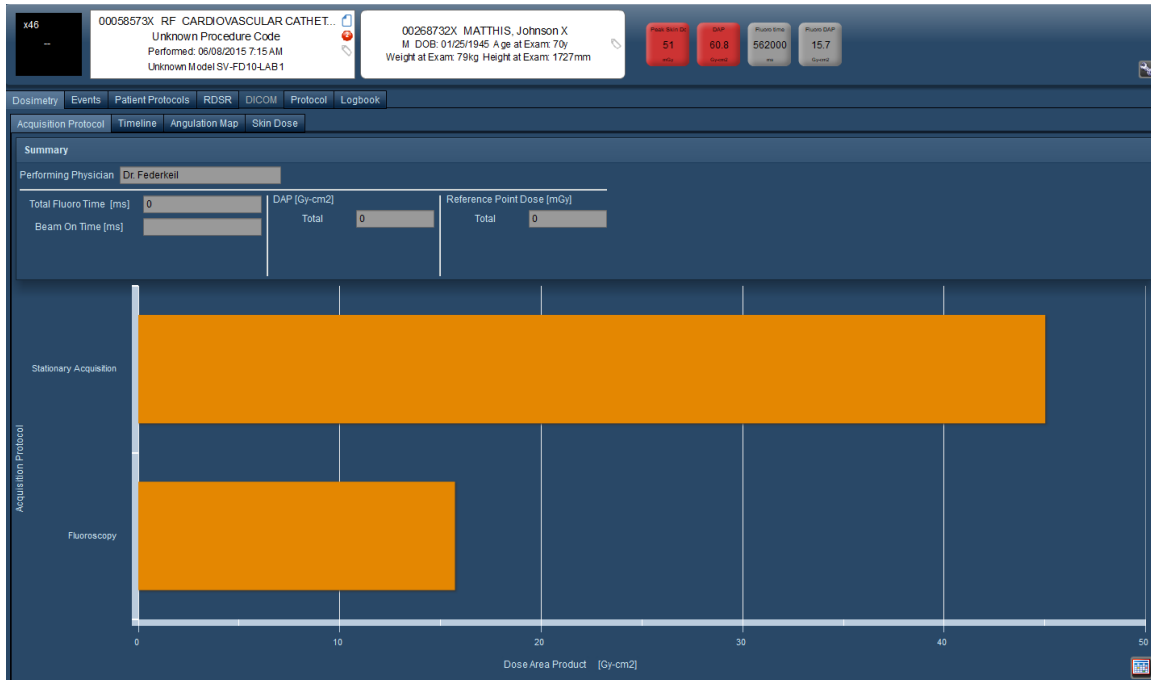
The default view is a horizontal bar graph. Placing the mouse cursor over the bars will display the numerical value (e.g. Equivalent Dose for an organ or Effective Dose for an ICRP line) in a tooltip.

1 Clicking on Export to CSV  will open a dialog box allowing you to save the currently viewed information for use in a spreadsheet or other data analysis program.

2 Clicking on the Table button  will switch to a table view; once there, clicking on the Chart button  will switch back to the Chart view.

Interventional Dosimetry

When an interventional radiology study (e.g. fluoroscopy or angiography) is selected for review, the interface is different from standard dosimetry. The different Dosimetry tabs include Acquisition Protocol, Timeline, Angulation Map, and Skin Dose.



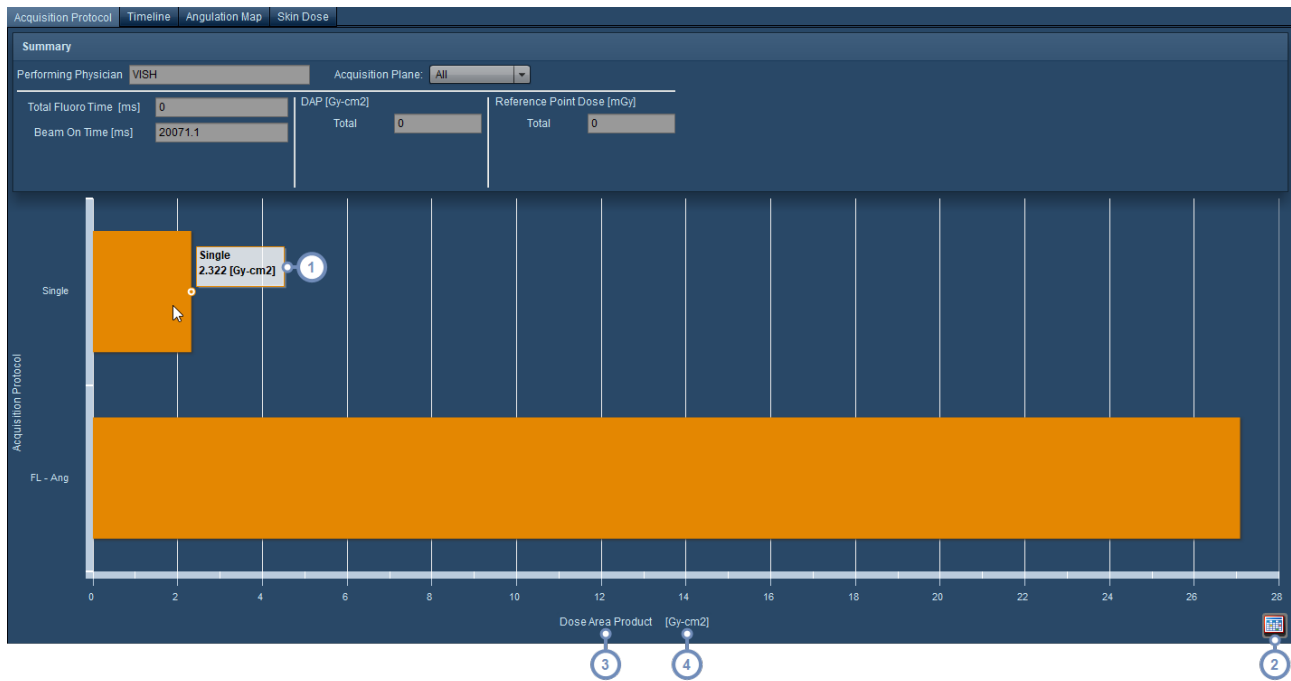
The Summary area, in addition to displaying the Performing Physician, shows the most important variables related to the exam in three columns - Time (Fluoro and Beam On), DAP (Total), and Reference Point Dose (Total). These three columns remain visible when on the Acquisition Protocol or Timeline tab. The functionality of these tabs is detailed below.

Events

The Events tab, as shown below, lists all capture events and their related parameters such as type (fluoroscopy vs. stationary acquisition), reference point or angles. The column headers may be selected to sort the events in ascending or descending order.



Summary											
Performing Physician Dr. Federkeil											
Total Fluoro Time [ms]		DAP [Gy-cm2]		Reference Point Dose [mGy]							
0		0		0							
Beam On Time [ms]		Total		Total							
		0		0							
Type	DAP [mGy-cm2]	Reference Point	Reference Point Dose [mGy]	kVp	mA	Start Time	Primary Angle [deg]	Secondary Angle [deg]	Fluoro Mode	Pulses per Seco	Number of Pulses
Fluoroscopy	571.03781	15cm below Bea	5.26406	91.08	200	06/08/2015 7:28	5.8	-0.6	Pulsed	7.5	317
Fluoroscopy	879.3565	15cm below Bea	8.19618	88.81	194.1	06/08/2015 7:30	-13.4	-0.7	Pulsed	7.5	392
Fluoroscopy	55.95259	15cm below Bea	0.89365	92.45	200	06/08/2015 7:31	28.4	-0.3	Pulsed	7.5	30
Stationary Acquit	2889.80511	15cm below Bea	49.37537	74.48	805.6	06/08/2015 7:31	28.4	-0.3			
Fluoroscopy	79.48796	15cm below Bea	1.25587	92.64	200	06/08/2015 7:31	28.4	-0.3	Pulsed	7.5	37
Stationary Acquit	1999.53603	15cm below Bea	33.90046	74.53	808.2	06/08/2015 7:31	28.1	-0.3			
Fluoroscopy	1634.87653	15cm below Bea	15.46698	87.63	188.2	06/08/2015 7:32	-26.2	-0.7	Pulsed	7.5	840
Fluoroscopy	30.90584	15cm below Bea	0.47855	89.53	197.7	06/08/2015 7:34	-27.5	16.4	Pulsed	7.5	20
Stationary Acquit	4235.62885	15cm below Bea	65.74129	75.54	857.4	06/08/2015 7:34	-27.5	16.4			
Fluoroscopy	93.171	15cm below Bea	1.46209	93.05	200	06/08/2015 7:34	-28.6	-23.5	Pulsed	7.5	31
Stationary Acquit	3268.6498	15cm below Bea	49.84599	77.09	927.1	06/08/2015 7:34	-28.6	-23.5			
Fluoroscopy	65.33925	15cm below Bea	1.15804	98.76	200	06/08/2015 7:34	-4.8	-35.6	Pulsed	7.5	17
Stationary Acquit	3328.00607	15cm below Bea	59.87706	85.14	839.4	06/08/2015 7:35	-4.8	-35.6			
Fluoroscopy	121.58247	15cm below Bea	2.17595	102.51	200	06/08/2015 7:35	26.1	-29.4	Pulsed	7.5	27
Stationary Acquit	5081.68935	15cm below Bea	95.33743	95.17	751	06/08/2015 7:35	26.1	-29.4			
Fluoroscopy	67.61225	15cm below Bea	1.21621	105.81	200	06/08/2015 7:35	26.2	29.9	Pulsed	7.5	14
Stationary Acquit	5700.03314	15cm below Bea	106.08236	101.78	702.2	06/08/2015 7:35	26.2	29.9			
Fluoroscopy	72.47448	15cm below Bea	1.18977	98.11	200	06/08/2015 7:35	-7.9	32.2	Pulsed	7.5	23

Acquisition Protocol



The acquisition protocol tab displays dosimetry or other variables such as exposure time with respect to the types of acquisitions performed within the study. By default, it displays the Dose Area Product.

1 Hovering over a bar in the chart displays a tooltip with the absolute data value of that bar

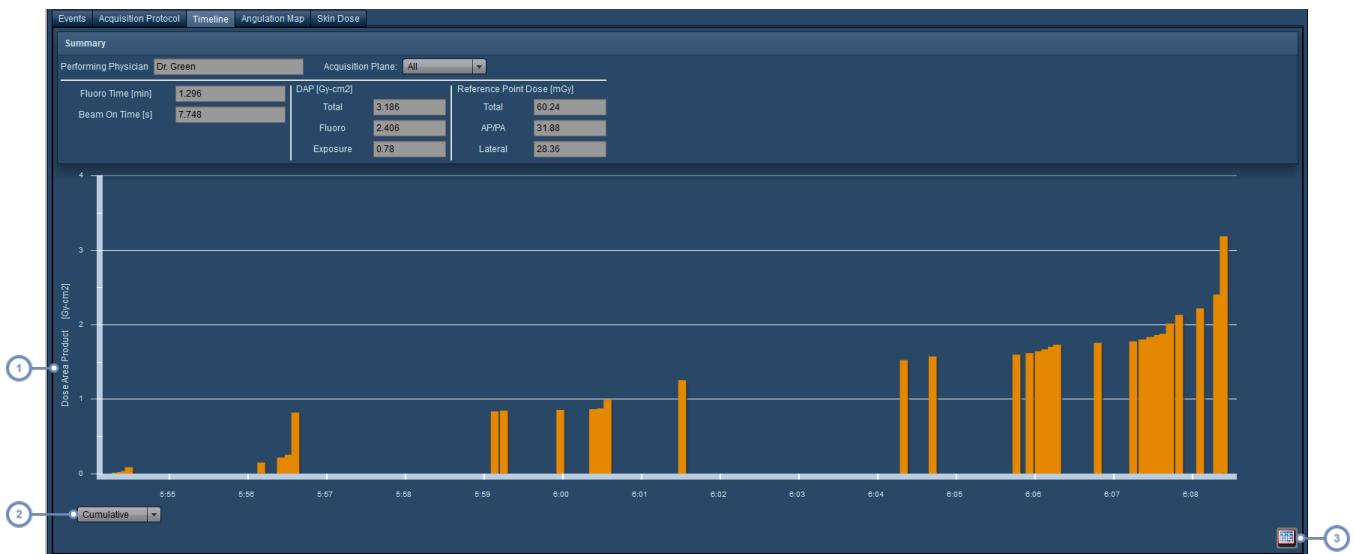
2 Clicking on the Table button  switches to a table view. Subsequently, to switch back the icon is replaced by the Chart button .

3 Clicking on the name of the variable displays a drop down menu that allows you to change the displayed variable along the x-axis.

4 Clicking on the units displays a drop down menu that allows you to change the displayed units along the x-axis. See "Changing the variables or units displayed" on page 80.



Timeline

The Timeline tab displays capture events and their variables on the y-axis, and the time captured on the x-axis.



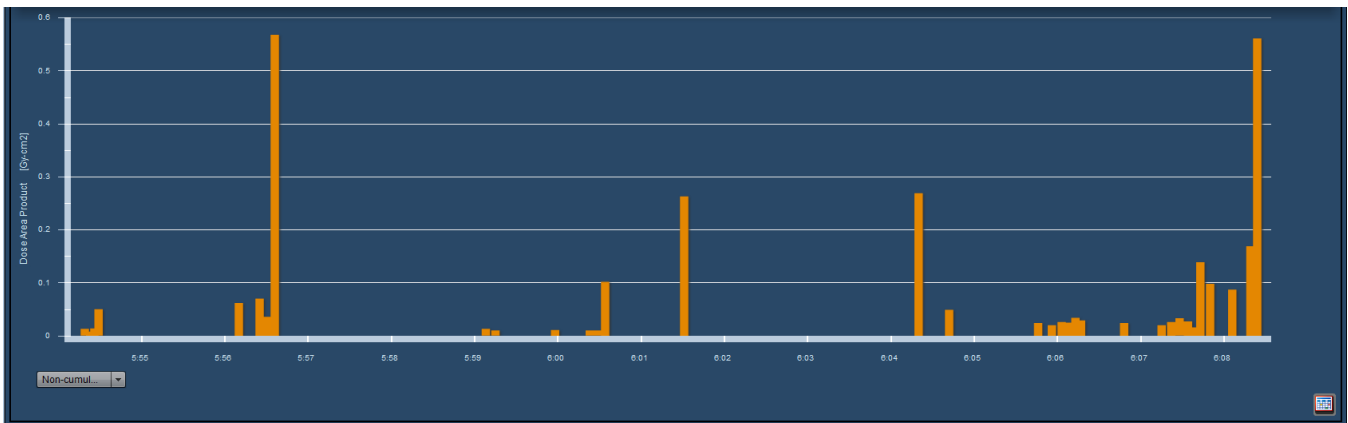
1 As with the Acquisition Protocol screen, the variable or units displayed may be changed here as well by clicking in this area. See "Changing the variables or units displayed" on page 80

2 The bar graph may be changed from Cumulative to non-Cumulative by selecting from this drop-down menu. This is detailed below.

- 3 Clicking on the Table button  switches to a table view. Subsequently, to switch back the icon is replaced by the Chart button .

Switching between Cumulative and non-Cumulative views

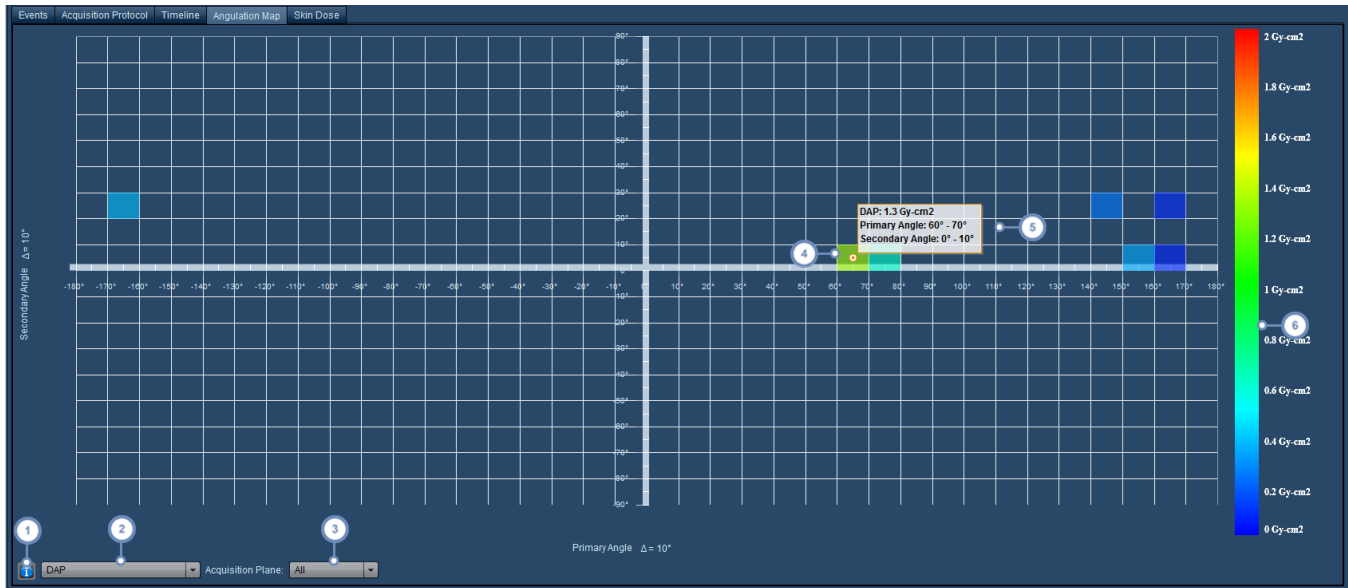
The default view is Cumulative, which adds subsequent events to the total value of the variable selected for display. For example, the Dose Area Product (DAP) in the example screen above continues to increase over time as new events are added to the total. The Non-cumulative view, by contrast, displays the individual values of the variable selected for each event as shown below.



In this particular example Non-cumulative view, it is easy to see that there were two individual events - one near the beginning between 7:56 and 7:57, and the other at the end of the procedure, that made up a large portion of the contribution to the DAP.

Angulation Map

The Angulation Map provides an abstracted visualization of where and in what quantities the dose is delivered to the skin. It is displayed as a grid showing the primary angle along the x-axis and the secondary angle along the y-axis. Each angulation is marked by a box that is colored and indexed on the right side of the screen to represent the associated DAP, Beam On Time, or Reference Point Dose.



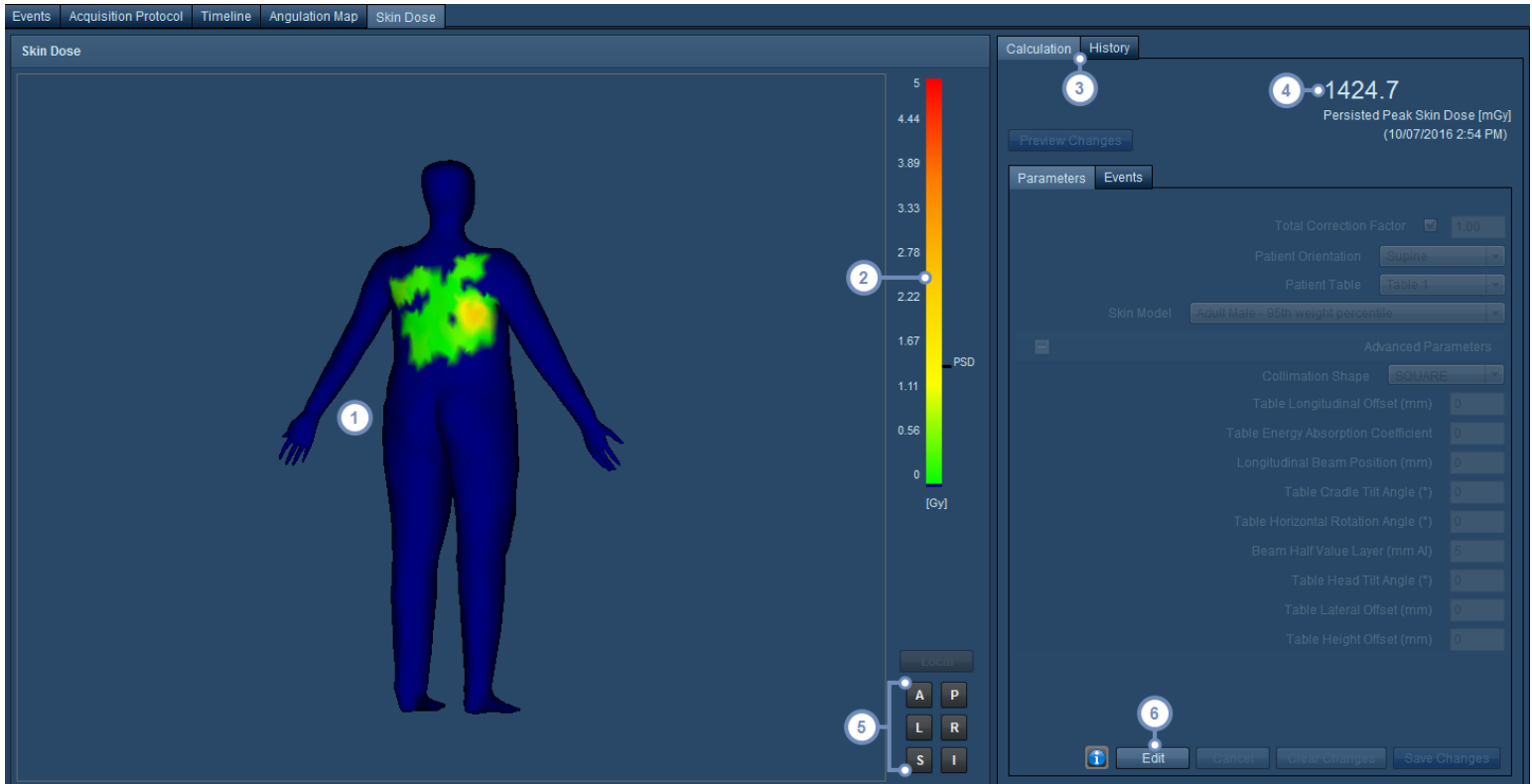
- 1 Clicking on this will display a handy reference diagram that illustrates the angles and travel directions relative to the patient's orientation.
- 2 This drop-down menu allows you to choose between DAP, Beam On Time, or Reference Point Dose.
- 3 The Acquisition Plane drop-down menu allows you to choose an individual acquisition plane to display in biplane exams.
- 4 This highlighted box represents an angulation used in the exam.
- 5 Hovering over a box displays an informational ToolTip that lists the Primary Angle, Secondary Angle, and the associated value of interest for that angulation (in this case, DAP).
- 6 The color index allows you to reference the color of the box with its associated value (product, dose, or time)

Of note, you can also adjust the delta angle for the axes by clicking on the Δ on either axis.

Skin Dose

The Skin Dose tab allows you to calculate and simulate peak skin dose in a flexible manner. Parameters such as the patient orientation, table type and skin model can be customized, and the model can be repositioned on the table to simulate the effects of a beam on a patient in any orientation. The simulation parameters can be saved for review later. After parameters are adjusted, the simulation can be recalculated to see the estimated skin dose. These edits can then be

saved to persist the dose value for purposes of analytics. On initially opening the tab, a view of the skin dose model is displayed along with the derived Peak Skin Dose or Persisted Peak Skin Dose (if previously generated and saved). Configuration of default parameters for the use of this feature is done via the Equipment module (See "Peak Skin Dose" on page 171).

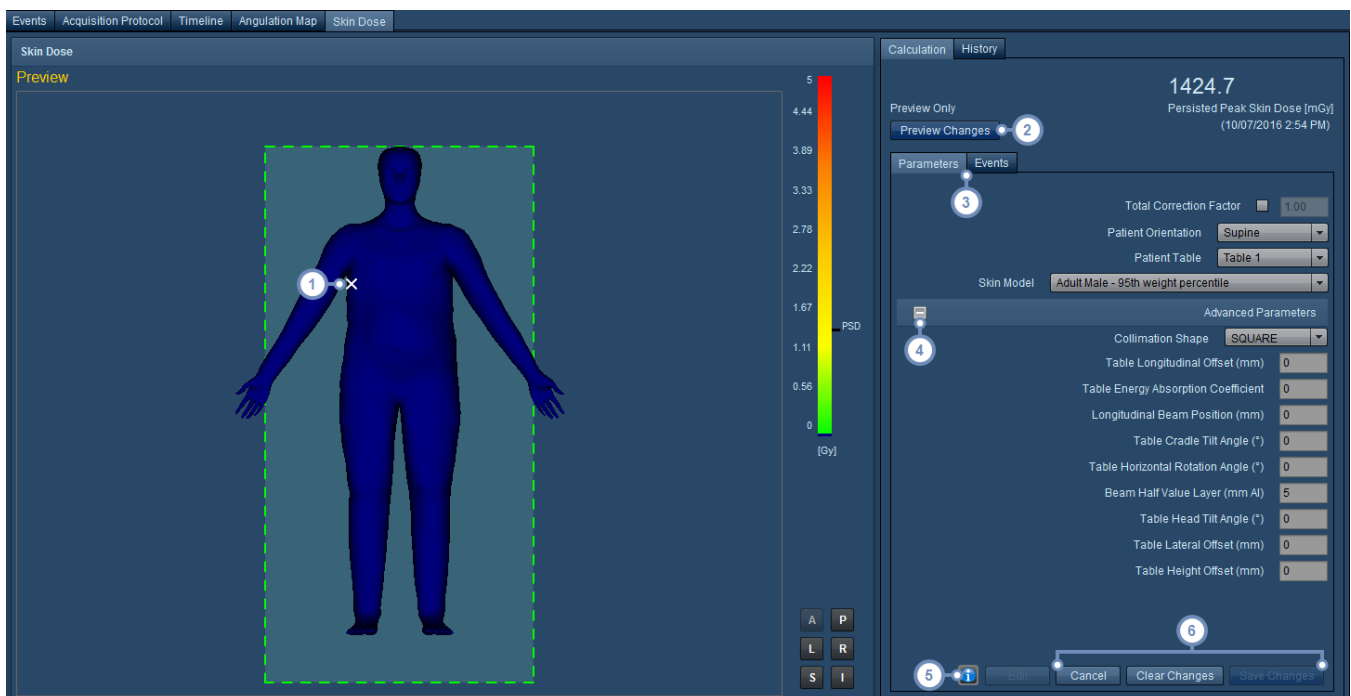


- 1 This viewport window displays the patient model with the associated estimated skin dose exposure highlighted in green through red spectrums of color indicating lower through higher skin dose. Hovering over the colored areas will display a tooltip showing the dose at that point.
- 2 This bar acts as a reference for the color spectrums used for the skin dose, and if the Peak Skin Dose has been calculated, it will be marked on the right side of the bar. A Dose Reference Level will also be marked if it has been configured.
- 3 The Calculation tab displays the current simulation parameters and Peak Skin Dose. The History tab displays a list of the previously changed and saved simulation parameters along with the dates and usernames associated with those changes.
- 4 The Persisted Peak Skin Dose (PSD), if previously saved, is displayed here.
- 5 These buttons allow you to choose the viewport orientation. Available orientations include Local (which optimizes the display of the effect of the beam), Anterior (A), Posterior (P), Left (L), Right (R), Superior (S), and Inferior (I).


- 6 The Edit button allows you to enter simulation mode so the exam parameters can be modified.

Editing Simulation Parameters

Once the Edit button is selected, the simulation preview mode is activated. For performance reasons, to start the preview, a single event with the highest reference point dose is selected from the most prominent cluster of events. In the viewport, either the model or the patient table (outlined and shaded in green) can be positioned by clicking on it, dragging and then dropping at the location desired. In anterior or posterior views, a solid table outline indicates the table is proximal to the patient, while a dotted table outline indicates the table is distal to the patient. Advanced Parameters such as the table offsets, angles, tilt and the collimation shape can be changed. The details of the parameters are explained at the end of this section. The parameters seen here are parameters that have not been otherwise defined. Thus values entered here will be used, with the exceptions that correction factor is always shown and patient position can always be adjusted.



- 1 The white X marks the location where the center of the beam intersects the table for the currently selected event. This allows you to reference the beam location as you move the exam table or the patient model.

- 2 The Preview Changes button allows you simulate Peak Skin Dose with the currently set parameters. A Simulated Peak Skin Dose will appear above this button after the simulation completes.
 - 3 The Parameters tab becomes active once the simulation preview mode is entered and is used to modify parameters such as patient orientation, the table used, and skin model. The Events tab lists the fluoroscopy or acquisition events. Clicking on an event in the Events tab, when active, will select it for use for the preview.
 - 4 The Advanced Parameters list may be toggled for display and editing via this button. Advanced Parameters include collimation shape, the table energy absorption coefficient, beam Half Value Layer, and offsets and angles.
 - 5 The Info button displays a pop-up window with a quick-reference diagram that defines the axes relative to the patient and table position (e.g. table height, lateral vs. longitudinal, and primary and secondary angles). This may be helpful while editing the Advanced Parameters.
 - 6 The Cancel button exits preview mode without editing or saving parameters. Clear Changes stays in edit mode but returns any changes to the parameters back to their original state when the Edit button was selected. The right-most button, displayed as inactive here, is the Save Changes button. Once a preview has been completed, the resulting Persisted Peak Skin Dose can be saved by clicking on this button.
-  Once the Save Changes button is clicked, the Persisted Peak Skin dose overwrites any currently saved Peak Skin Dose. As noted above, the History tab lists the saved edits to the simulation parameters.

Correction Factor and Patient Table Parameter Details

The radiation that interacts with the patient’s skin can be affected by the attenuation of the table and the effect of backscatter. The combination of these factors gives a “total correction factor” which is multiplied by the air kerma to estimate dose at the skin. To calculate these correction factors, Radimetrics™ software needs to know the:

- Half Value Layer of the beam
- Thickness of the table that the beam crosses
- Material of the table that the beam crosses

Correction Factor

See "Peak Skin Dose" on page 171 for information on the Half Value Layer lookup table and defining the table thickness and material. Alternatively, you may specify your own correction factor which will be used for the study. This can be entered in the Skin Dose Interactive Dosimetry screen. In this situation, Radimetrics will not calculate these factors, but use the value entered.

Patient Table

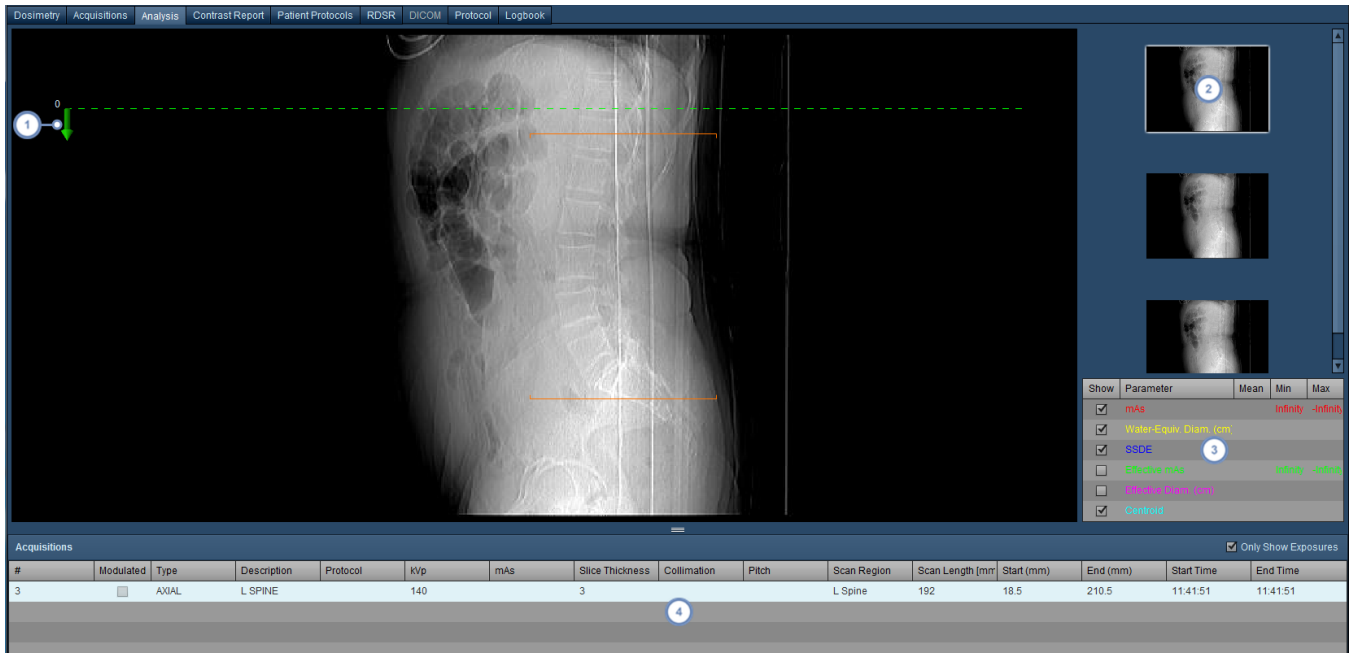
Any table selection here is only for the exam. In the Peak Skin Dose configuration module (referred to above) default tables can be defined at an equipment level. If no default is defined, this drop down should auto-populate with the first table in the list. If there are no tables available for this equipment, then this field will be blank, meaning there is no table attenuation.

Other Parameter Details

	<i>Default Value</i>	<i>Meaning</i>
Collimation Shape	SQUARE	The shape of the X-ray beam.
Table Longitudinal Offset	0	A value to add to the reported Table Longitudinal position. The distance between the mid-sagittal plane (assuming a prone patient) of the table and the isocentre when the device's "longitudinal position" reads 0.
Table Height Offset	0	A value to add to the reported Table Height position. The vertical distance between the Plane of the table top and the isocentre when the device's "table height position" reads 0.
Table Lateral Offset	0	A value to add to the reported Table Lateral Offset. The distance between the axial plane at the head edge of the table and the isocentre when the device's "Table Lateral Position" reads 0.
Table Horizontal Rotation Angle	0	The rotation of the table (in degrees) around the vertical axis that the table was placed in for the duration of the study.
Table Head Tilt Angle	0	The rotation of the table (in degrees) around a prone patient's Left-Right axis for the duration of the study.
Table Cradle Tilt Angle	0	The rotation of the table (in degrees) around a prone patient's Head-Foot axis for the duration of the study.
Longitudinal Beam Position	0	The Longitudinal Offset of the beam for systems with a roof-track C-arm.
Beam Half Value Layer	5mm	A default Half Value Layer to use if there is no appropriate value found in the lookup table.
Table Energy Absorption Coefficient		The energy absorption coefficient of table material. Not currently used.

Analysis

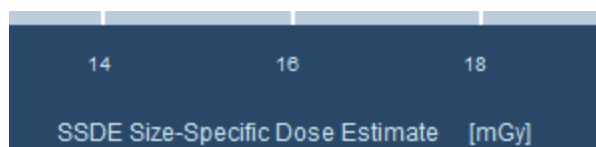
The analysis tab displays the exam's localizers and acquisition parameters. It allows overlay of the modulation (e.g. Current (mAs) and CTDIvol vs. slice location, and water-equivalent and regular diameter vs. slice location) and Size Specific Dose Estimate related information, including Effective Diameter, Conversion Factor, and CTDIvol per acquisition.



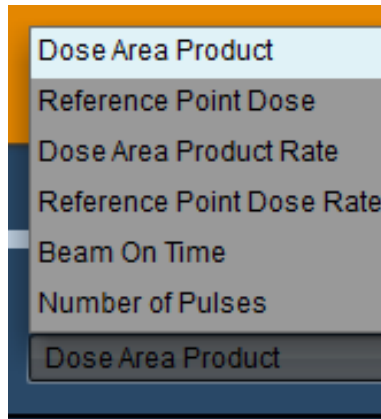
- 1 The green arrow represents the Slice Location Axis and indicates the direction of positive slices
- 2 Localizer thumbnails shown here can be selected for display in the main viewport
- 3 Various parameters can be selected for display here, including the modulation curve and SSDE
- 4 Exam acquisitions can be selected here and are listed with their technical factors such as scan length, slice thickness and CT DIvol

Changing the variables or units displayed

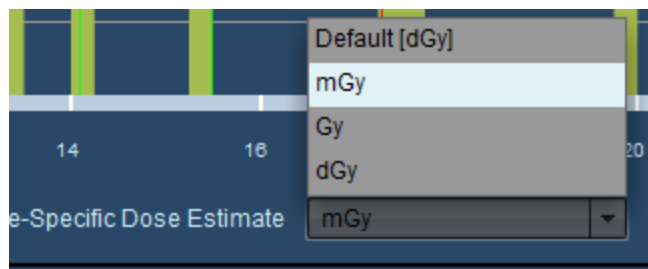
In many screens with graphical charts, you can click on the variable name (e.g. Dose Area Product) along the axis you want to change:



This will bring up a menu that allows you to select different variables to display, depending on the context, as shown below.

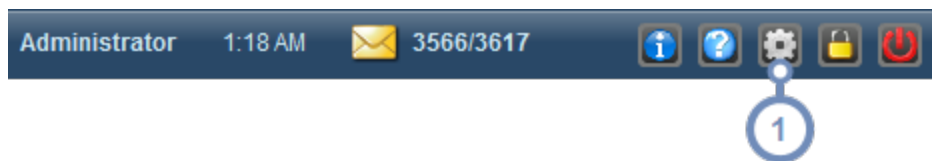



Alternately, clicking on the units displayed (in the square brackets, e.g. [cGy-cm²]) will display a menu allowing the units to be changed.



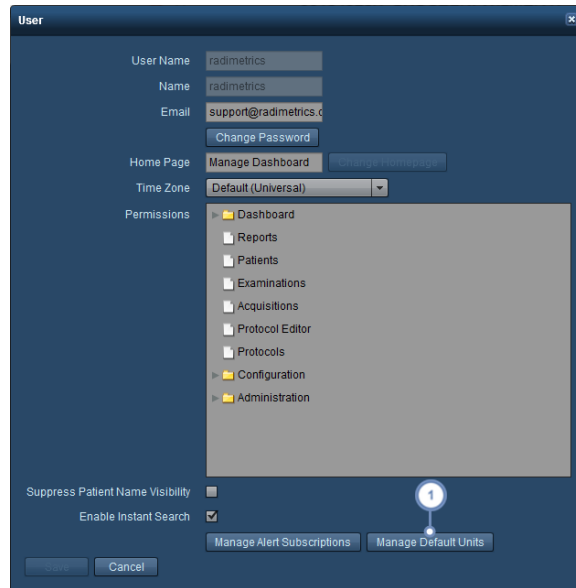
Changing the default units settings

It is possible to have Radimetrics software display a different unit for any Value of Interest by default. This is done through the user Settings page.

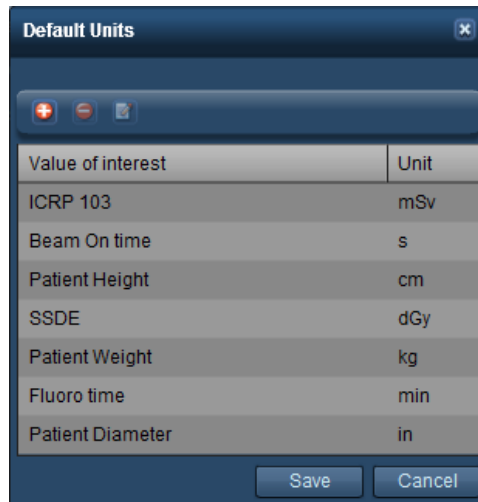





- 1 Click on the Settings  button located on the Toolbar. The User Settings dialog box will open.

The user's Settings window will appear:



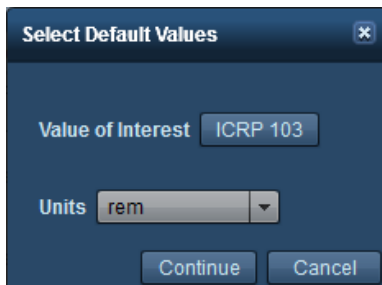
1 Click on "Manage Default Units" to open the Default Units settings page as shown, with the available buttons described below:



-  Add a new default unit for a Value of Interest
-  Delete the currently selected default unit
-  Edit a default unit

Adding or Editing a default unit

When adding or editing a default unit, the following dialog box appears. Simply choose a Value of Interest from the drop down menu, and then the Units you would like to have displayed by default when that Value of Interest appears.



Click on Continue after you are done.

Contrast Report

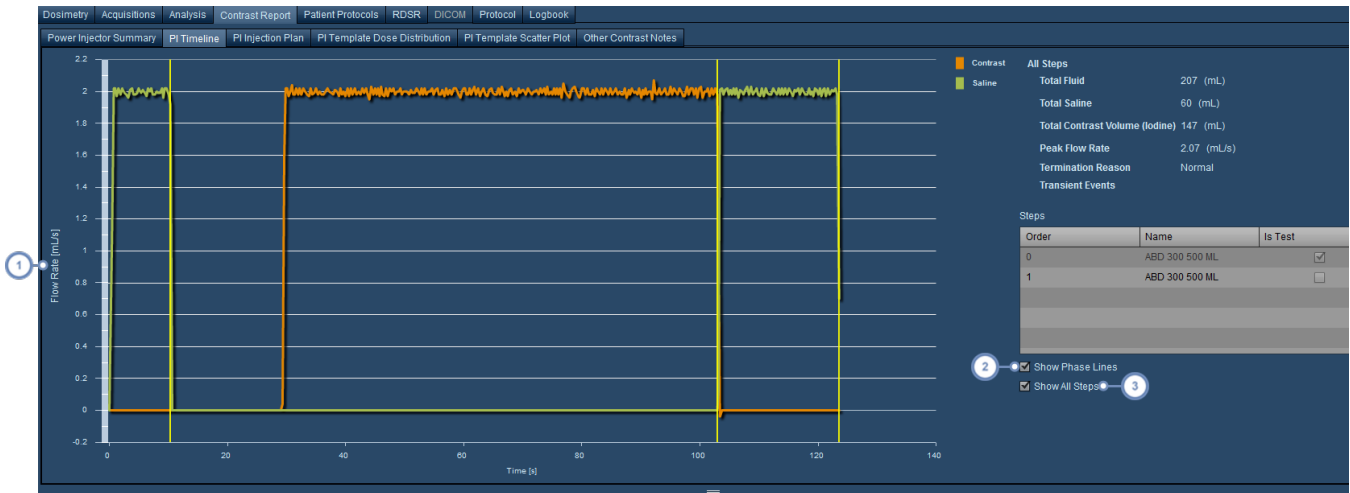
The Contrast Report tab appears only if the currently selected exam has associated contrast injection data (for example, CT exams with IV contrast). When first selected, the Power Injector Summary screen appears displaying the exam's overall metrics including the phases, contrast volume, peak pressure, flow as well as other technical data such as catheter type, injection site, associated orders and equipment used. The [Other Contrast Notes](#) tab can be used to manually document hand-held or non-Bayer injector contrast injections.

Index	Dose	Contrast Volume (mL)	Template	Started	Ended	Abnormal Events	Deviations
1	44.1 gi	147	ABD 300 500 ML	12:43:53	12:45:57		

- 1 The Injections sub-window displays a list of the injections for the exam; clicking allows you to choose which injection's details are displayed in the rest of the windows.

Power Injector (PI) Timeline

The Power Injector (PI) Timeline view displays a graph of the injection flow rate against time by default. It can also display pressure against time.



- 1 Click on the y-axis label here in order to reveal a drop-down menu allowing you to select between pressure or flow rate for display.
- 2 "Show Phase Lines" will display yellow vertical lines on the graph separating the phases of the contrast injection.
- 3 "Show All Steps", when de-selected, allows you to display the individual steps you would like on the graph by selecting them from the Steps table above.

PI Injection Plan

The Injection Plan tab makes it easy to compare the exam's contrast injection Template plan against the Programmed plan, and subsequently with the Delivered outcomes.

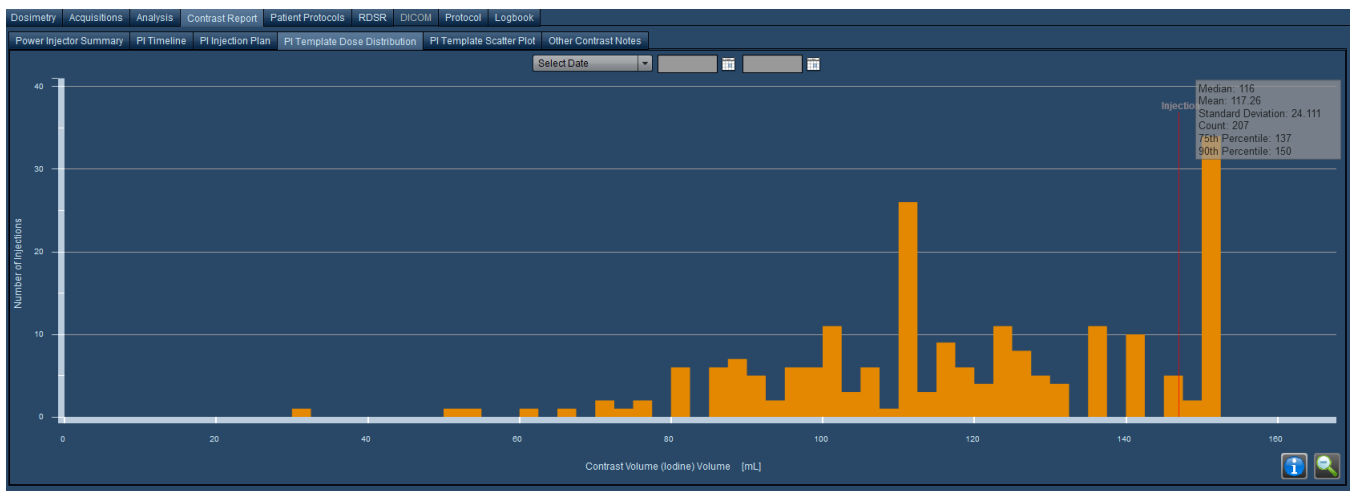
[Dosimetry](#) | [Acquisitions](#) | [Analysis](#) | [Contrast Report](#) | [Patient Protocols](#) | [RDSR](#) | [DICOM](#) | [Protocol](#) | [Logbook](#)

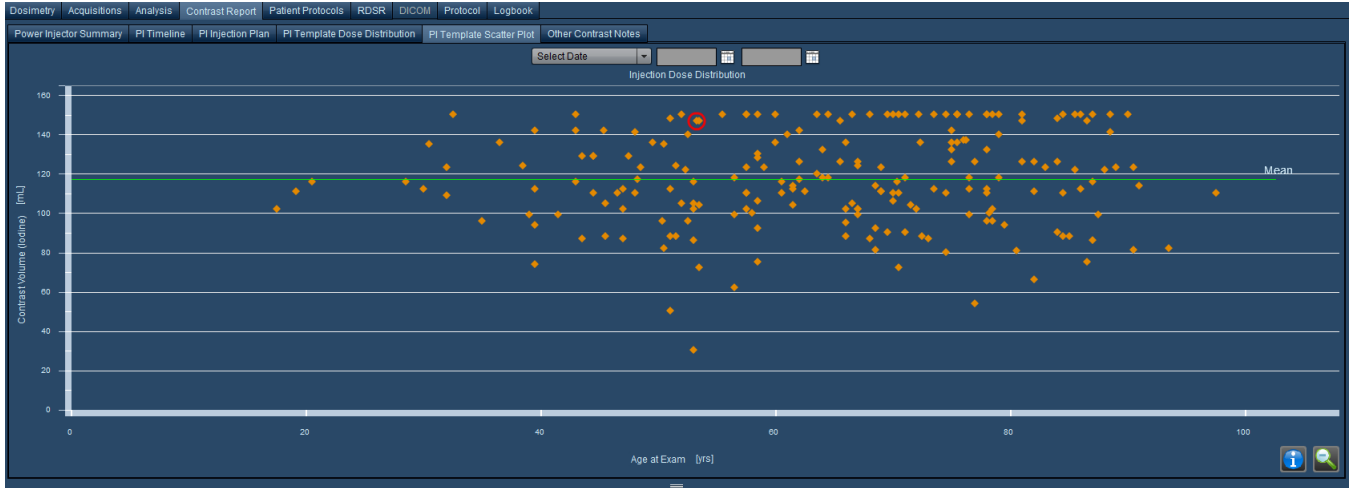
[Power Injector Summary](#) | [PI Timeline](#) | [PI Injection Plan](#) | [PI Template Dose Distribution](#) | [PI Template Scatter Plot](#) | [Other Contrast Notes](#)

Template		Programmed		Delivered	
Summary		Summary		Summary	
Name	ABD 300 500 ML	Name	ABD 300 500 ML	Name	ABD 300 500 ML
Anatomical Region	Abdomen	Anatomical Region	Abdomen	Anatomical Region	Abdomen
Has Test Injection	Yes	Has Test Injection	Yes	Has Test Injection	Yes
Total Contrast Volume (Iodine) (mL)	0	Total Contrast Volume (Iodine) (mL)	147	Total Contrast Volume (Iodine) (mL)	147
Total Saline Volume (mL)	0	Total Saline Volume (mL)	60	Total Saline Volume (mL)	60
				Protocol Saline Volume (mL)	
				KVO Saline Volume (mL)	0
				Test Injection Saline Volume (mL)	
Peak Pressure (kPa)		Peak Pressure (kPa)		Peak Pressure (kPa)	462
Peak Flow Rate (mL/s)	0	Peak Flow Rate (mL/s)	2	Peak Flow Rate (mL/s)	2.07
				Peak Pressure A (kPa)	
				Peak Pressure B (kPa)	
				Peak Flow Rate A (mL/s)	
				Peak Flow Rate B (mL/s)	
Personalization Algorithms		Personalization Algorithms		Personalization Algorithms	
Abdomen		Abdomen		Abdomen	
Phases		Phases		Phases	
Stej	Pha	Type	Rate [mL/s]	Volume [mL]	Duration [s]
					Is Test Injection

PI Dose Distribution and Scatter Plots

Similarly to the radiation dosimetry tables, you can also plot contrast-related variables against each other in a dose distribution or scatter plot graph. The exam data displayed is specific to the type of exam you have currently open (e.g. it will display only CT Power Injection data if you are looking at a CT exam).





These graphs can be interacted with in a manner similar to that used for the standard dosimetry interface. See "Protocol Dose Distribution" on page 61. See "Protocol Scatter Plot" on page 65

Other Contrast Notes

From the Other Contrast Notes tab you can manually enter contrast information (e.g. for hand or oral contrast) or relevant contrast exam parameters such as weight or eGFR (estimated Glomerular Filtration Rate).

Route	Catheter	Fluid	Fluid Volume Delivered (mL)	Number of Injection Attempts	Lot/Batch	Expiry Date
Injection			10	1		

Logbook

The logbook provides the ability to document examination information based on the modalities utilized. This may include information such as body site, contrast used, patient type (e.g. out-patient or inpatient), and reasons (if any needed) for why the scan was started early or late, or why it was short or long. For RF/XA exams, you can enter dose data manually here. If an RF/XA exam does not include dose data to begin with, then a dose calculation will be performed based on the data entered in this tab. CR and DX exams may also have dose calculations derived from the information entered here.

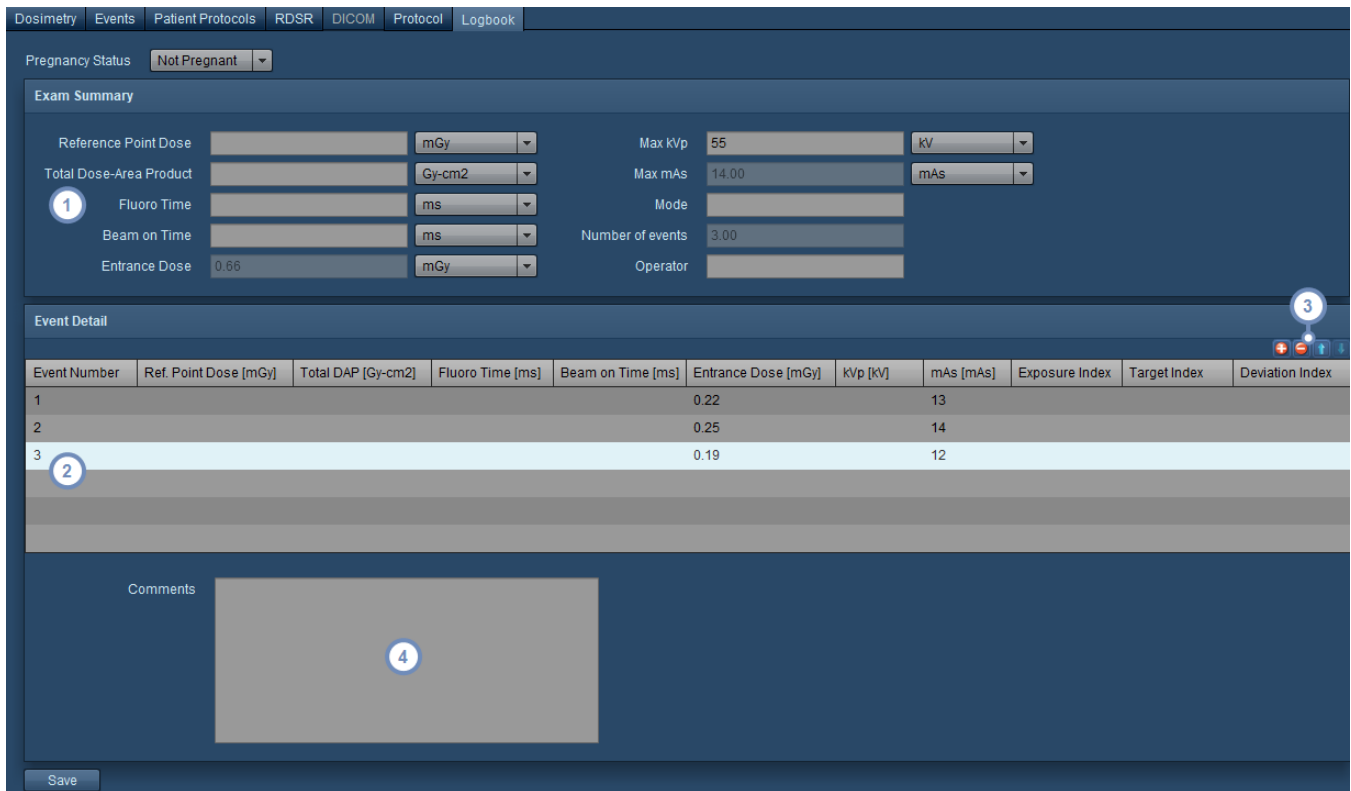
NM/PET logbook





For Nuclear Medicine (NM) or PET (PT) scans, the Logbook tab allows data entry regarding the radiopharmaceutical used and administration details such as the dose route, prepared/remainder/administered volume, and administered activity units. Mapped radio-pharmaceutical and pharmacon activity can also be logged. Once data is entered and saved, the exam dose will be recalculated if the Radimetrics software installation is configured to prioritize the data entered in the Logbook (as opposed to using HL7 data, for example).

99mTc-EC	111In labelled HIG	123I-Iodide Thyroid Blocked, IV	123I-FP-CIT	+	
Radiopharmaceutical	99mTc-EC	Mapped Radiopharmaceutical		Pharmacon Name	Unknown
Pharmacon Prepared Date		Prepared Volume		Prepared Activity	
	18 : 58	Remainder Volume		Remainder Activity	
Pharmacon Administered Date		Administered Volume		Administered Activity	40.00
	18 : 58	Renal Function		Comments	
Product Lot No.		Injection Site			
Syringe ID		Void Time (hr)			
Save					

CR and DX logbook

CR and DX logbook dose information may be used to derive dose calculations as noted previously. The logbook tab for CR and DX exams is shown below.



- 1 The Exam Summary section lists totals or exam-wide parameters such as Reference Point Dose or Max kVp. You can enter any parameters manually here, but if they are subsequently defined under Event Detail, they will be overwritten and the option will be greyed out.
- 2 The Event Detail section lists each event, which must be manually added, and its associated values. For example, a Knee X-ray may contain two or three views, and these may be recorded as separate events. If, for example, you enter an Entrance Dose for each event, the sum will automatically be totaled and override the Exam Summary's Entrance Dose.
- 3 This set of buttons allows you to Add , Delete  the events. Reordering the events can be done using the Up  button or Down  button. Subsequently, clicking on a field for an event will allow you to enter a value.
- 4 Comments may be added to the logbook here.

Interactive Dosimetry

Overview

The Interactive Dosimetry module allows you to simulate "what if" scenarios using the built in Monte Carlo simulation engine.

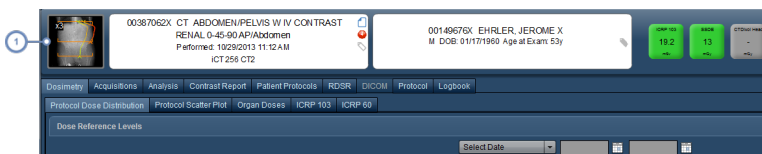
The user can explore and visualize the potential effects in a mathematical model on estimated radiation doses when scan parameters are varied. For example, the actual scan length of an examination can be modified to illustrate the effects of over scanning or under scanning on the dose received by the patient.

Other parameters such as tube voltage, tube current, pitch, and collimation can be adjusted while viewing the resulting change to the absorbed dose for each organ/body part and effective dose. The user can also observe the differences in the resulting dose to patients of different age, size, and gender.

No records are modified during simulation, but simulated data can be exported to CSV format for further analysis.

Entering Interactive Dosimetry

In order to enter the Interactive Dosimetry module, an exam must have already been selected for Dosimetry review.



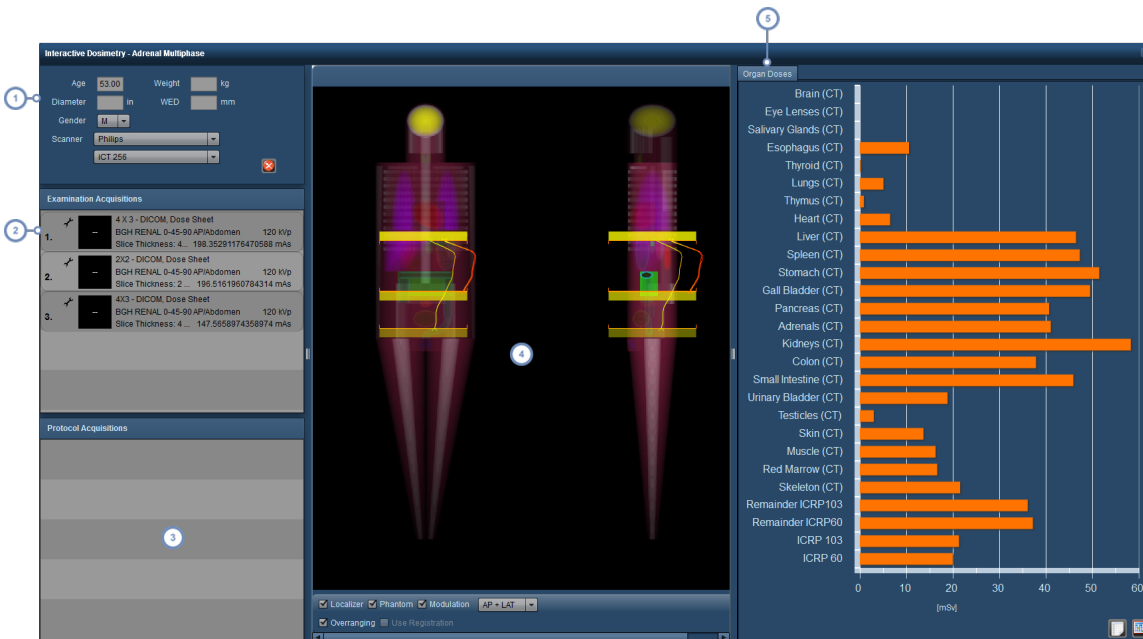
- 1 Click on the CT scan thumbnail to open up Interactive Dosimetry.


Interactive Dosimetry Interface

Below is an overview of the Interactive Dosimetry interface.


The initial organ doses displayed on the graph are based on the doses from all the available acquisitions combined. In addition, the initial calculations are made using the averaged CTDIvol

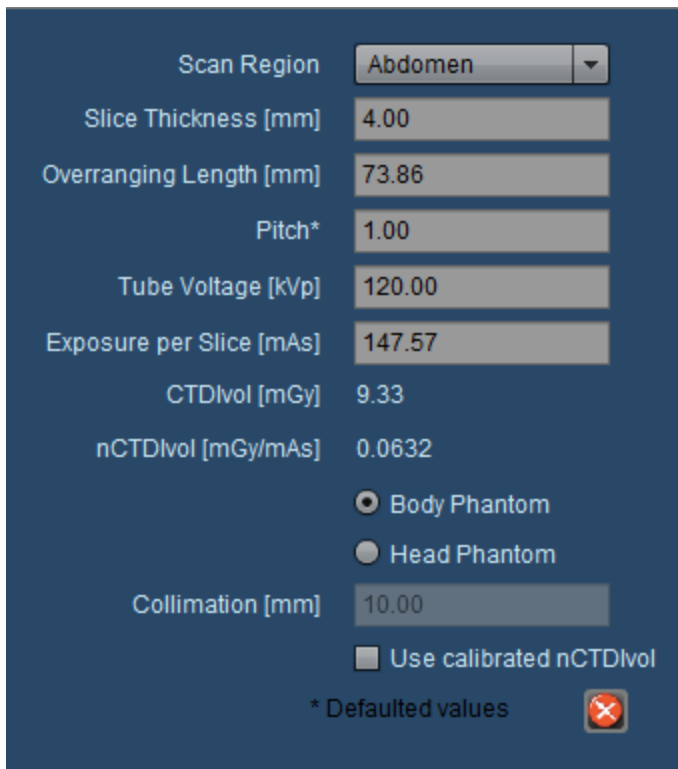
per scan and do not incorporate the CT scanner's modulation. As exam parameters are changed, the dose calculations are updated.




- 1 Scan demographics and the scanner used may be modified here. Enabling "Simulate Modulation" will scale the predicted doses based on the modulation curve as opposed to the average CTDIvol. Note that for pregnant phantom simulation, the abbreviations FT, ST and TT refer to first, second and third trimesters respectively.
- 2 Examination Acquisitions allows you to select the specific acquisition (if there are more than one) you would like to simulate protocol changes for. In addition, you can modify the scan simulation parameters with the edit button once the acquisition is selected.  See "Editing simulation exam parameters" on page 91
- 3 Protocol Acquisitions lists the acquisition protocols that would apply to this exam, based on the Master Protocol list.
- 4 The examination window displays the localizer, phantom, modulation curve and overranging bars if selected. The viewport can also be changed to show AP, LAT, or AP and LAT views. If an examination acquisition is selected, the scan range may be modified here by clicking and dragging on the scan edges. See "Examination Window" on page 92
- 5 The [Organ Doses](#) window displays radiation doses to specific organs based on the simulation parameters in comparison with the original exam parameters. It also may be configured to display other variables of interest, detailed separately here. In addition, an export to CSV format may be performed. See "Organ Doses" on page 69 for more.

Editing simulation exam parameters

Once the Edit button  has been selected within the Examination Acquisitions window, a new window will appear showing the scan simulation parameters.



Scan Region	Abdomen
Slice Thickness [mm]	4.00
Overranging Length [mm]	73.86
Pitch*	1.00
Tube Voltage [kVp]	120.00
Exposure per Slice [mAs]	147.57
CTDIvol [mGy]	9.33
nCTDIvol [mGy/mAs]	0.0632
	<input checked="" type="radio"/> Body Phantom
	<input type="radio"/> Head Phantom
Collimation [mm]	10.00
	<input type="checkbox"/> Use calibrated nCTDIvol
* Defaulted values 	

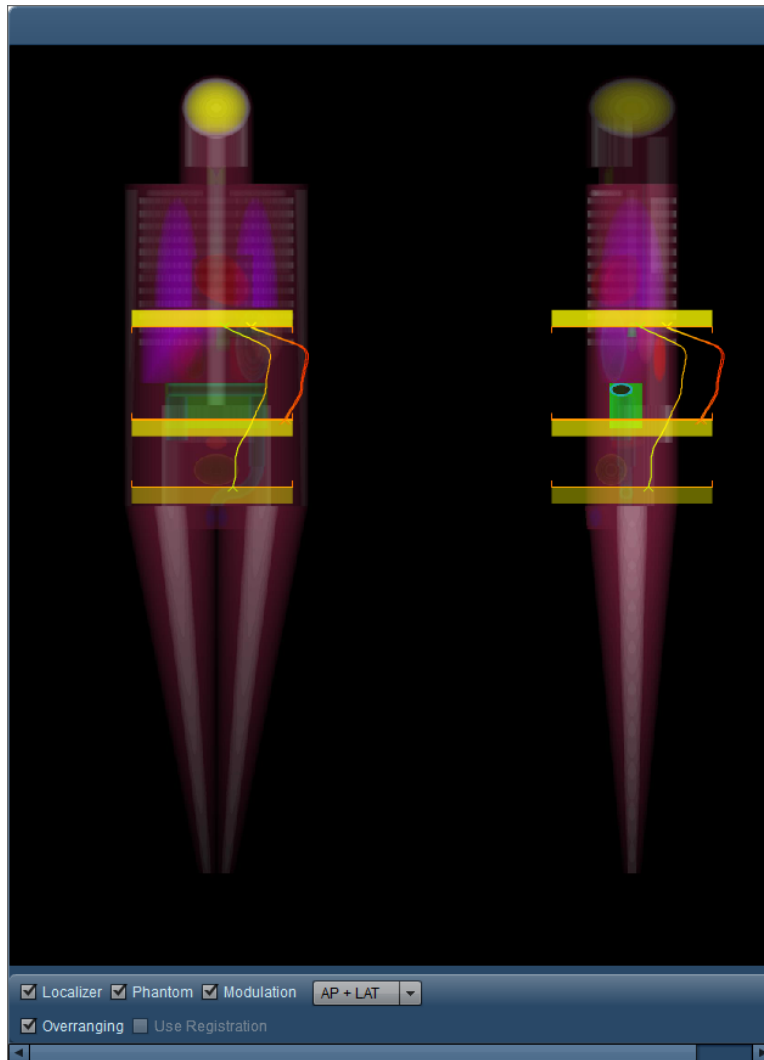
These exam parameters can be modified in order to calculate a new simulated dose. The parameters can be modified as below:

Scan Region	Changes the scan region to predetermined settings for different body areas.
Slice Thickness	Defines the CT scan slice thickness in mm.
Overranging Length	Increases or decreases the overranging length of a helical CT scan.
Pitch	Pitch represents the distance the CT table travels in the z-axis divided by the scan width (usually the width of the detector rows in the z-axis).
Tube Voltage	Tube voltage is directly correlated with x-ray photon generation and penetration. Reducing tube voltage may reduce the radiation dose at the expense of diagnostic image quality.
Exposure per Slice	Changes the number of x-ray photons (as measured by tube current, which is directly proportional), and hence radiation dose per slice. Reducing this may decrease image quality.

nCTDIvol	When multiplied by the Exposure per Slice, produces CTDIvol. nCTDIvol is CTDIvol normalized to the tube current.
Body / Head Phantom	Selects whether to use a body phantom (32 cm diameter) or head phantom (16 cm diameter) for dose calculations.
Collimation	Essentially, this represents the beam width. Wider beams generally allow faster scans with lower doses but at the expense of increased noise.
Use calibrated nCTDIvol	Calibrated nCTDIvol may be used in the case that the dose sheet from the exam did not contain a CTDIvol. CTDIvol is then generated through a scanner-specific calibration table.

Examination Window

The examination window is configurable to display only the desired information. In addition, you can adjust the simulated scan ranges.

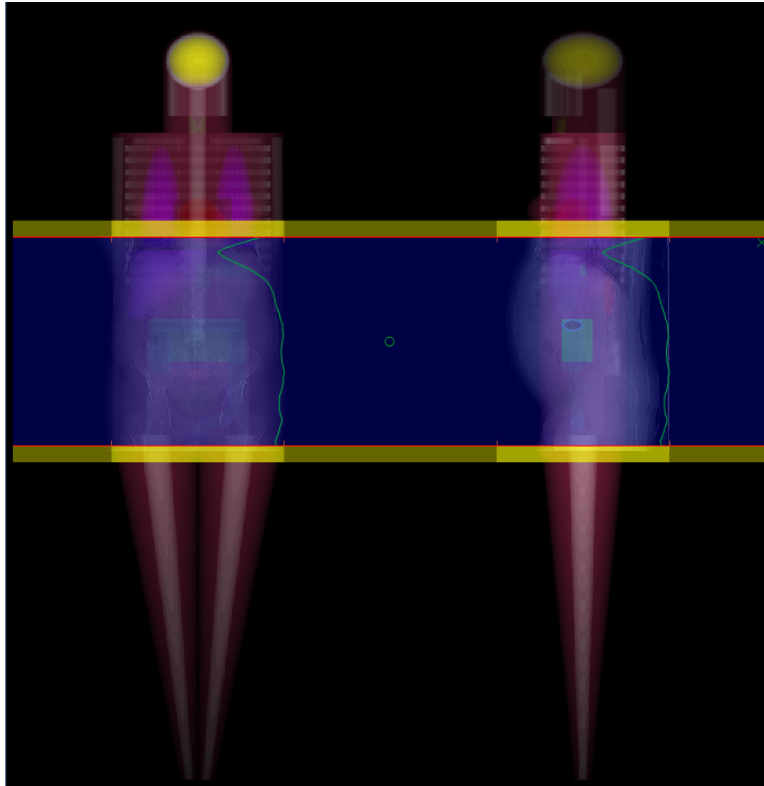


Clicking on the Localizer, Phantom, Modulation and Overranging checkboxes toggles the respective graphical representation of these items. In addition, the drop-down field may be used to switch between AP, LAT and AP + LAT views.

Use Registration will simulate the Radimetrics product's algorithms for placing localizers on the phantom to perform dose calculations, in the case that they were not already used (typically due to a lower confidence in those algorithms for a particular exam). Essentially, this allows you to see the effects of the Registration algorithms on localizer placement and radiation dose.

Adjusting the simulated exam scan range

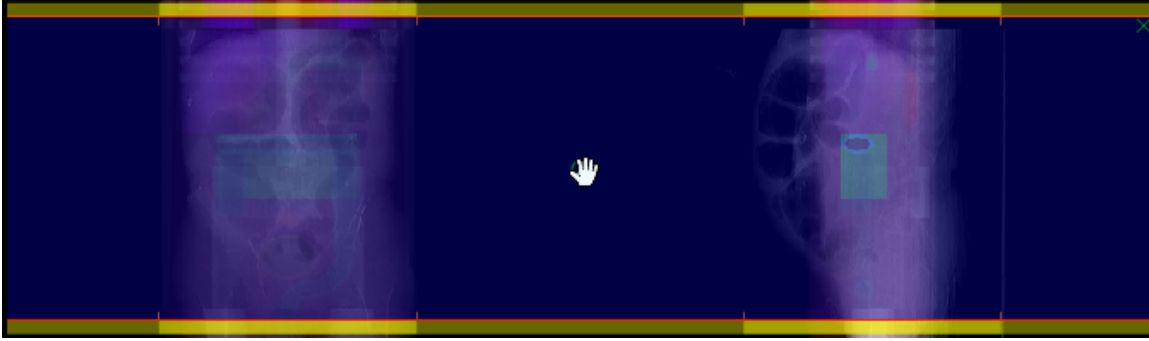
As noted above, the exam scan region can be preselected by editing the simulation exam parameters. It can also be adjusted manually. After selecting an exam acquisition, adjustable range bars appear with a transparent blue highlight over the scan region as shown below:



If the overranging bars are off, then the edges of the scan range are represented by a thin red line without the transparent yellow bar. By clicking and dragging on the edges of the scan range (the mouse cursor will turn into a hand), they can be relocated.



Clicking on the green circle at the center of the scan range allows you to drag the whole scan range up and down without changing the length of the scan.



Additionally, to redefine the borders completely you can click at any point not on the edges of the scan and drag a new scan range.

Deleting the simulated scan region

In the upper right of the highlighted scan region you can click on the 'x' to delete the simulated scan range. However, in order to get the scan range to re-appear, you must deselect the currently selected exam by holding down Control and clicking on it in the Examination Aquisitions window.


Working with Components

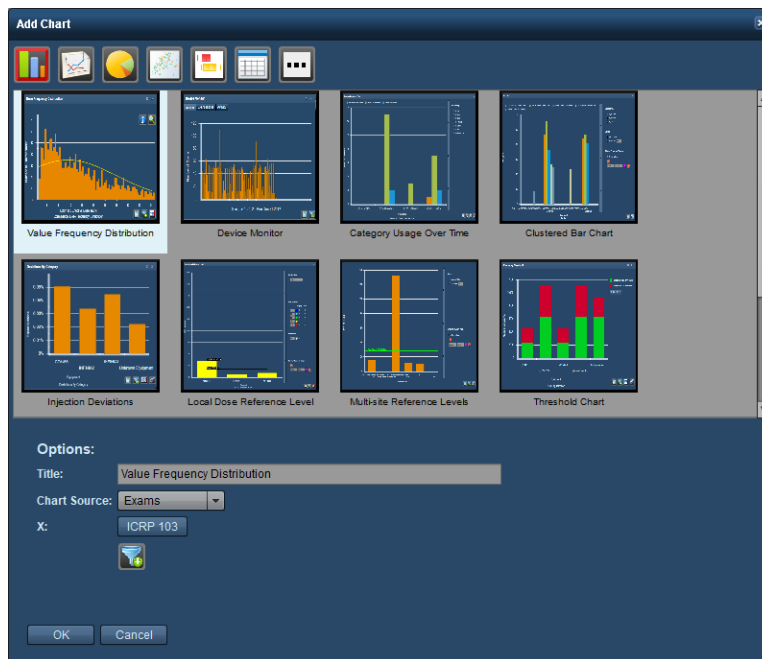
Both the Dashboard and the Patient Scorecard modules are based upon the concept of Component windows. Components display your data using a wide variety of interactive graphs, charts and tables.

Managing components


Individual patient or Dashboard report component windows can be moved and resized; in addition, new pre-defined components can be added to the report for customization.

Adding components

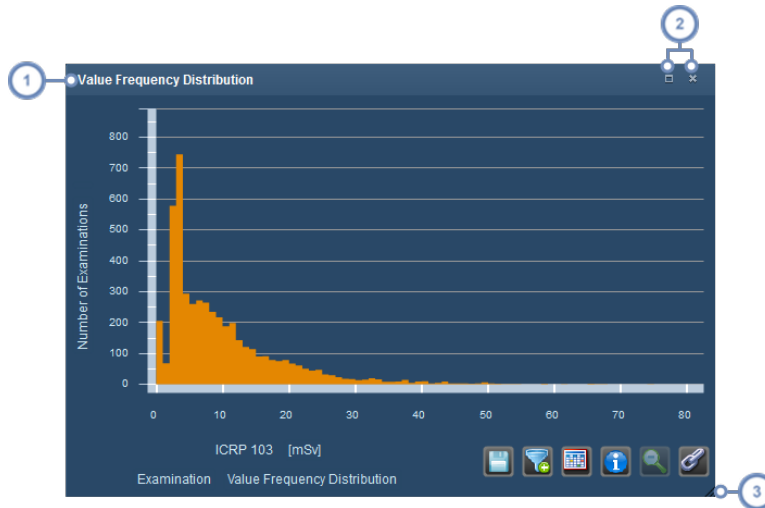
In order to add a component, click on the Tool button , and then click on Add Component in the menu as shown above. A dialog box similar to the following will appear:






Selecting a component here and clicking OK will add the component to the report. The default component name will be displayed in the Title field when selected; this can be changed prior to clicking OK in order to customize the name.

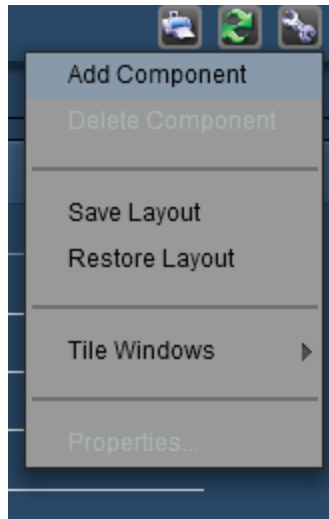
For Dashboard components, you can define additional values that your selected component may need (such as the X and Y axis variables or Chart Type). You can pre-define filtering for the component via the Filter Button  before it is placed.


Moving, sizing and deleting component windows




- 1 The title bar displays the name of the component; clicking, holding and then dragging anywhere on the title bar will move the window.
- 2 Click on the maximize/restore button  in order to have the component take up all available report space or return it back to its former location and size; double-clicking on the title bar performs the same function. Click on the Close button  to remove the component from the report.
- 3 In the bottom right corner, the component window can be resized by clicking, holding and then dragging the mouse.

By clicking on the Tool button  and opening the menu as noted above, the "Tile Windows" option may be selected in order to automatically arrange all the component windows evenly.



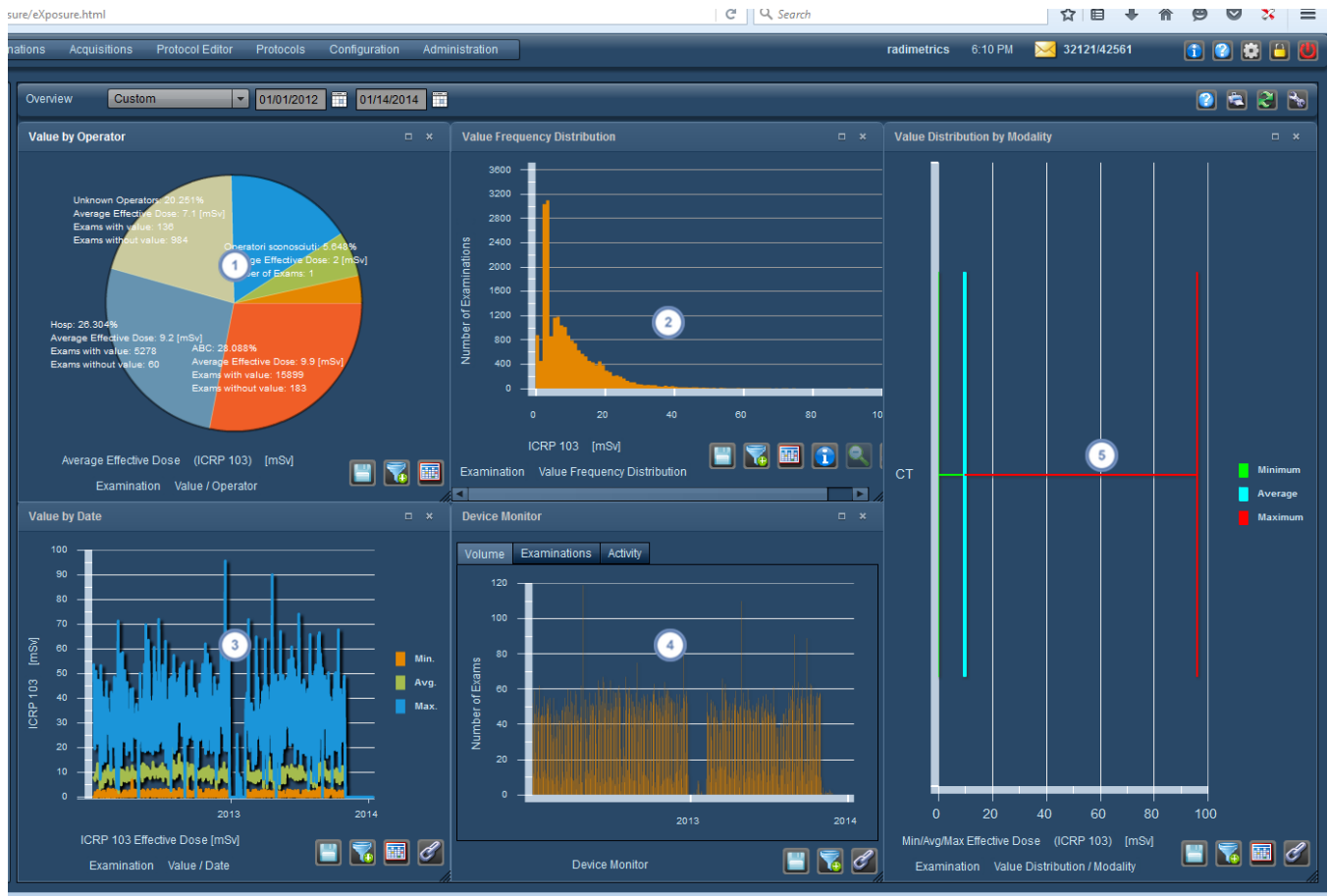
An alternate method for deleting a component is to select the window you would like to delete (by clicking on it), then clicking on the Tool button  and choosing "Delete Component".

Copying components

In the Dashboard, any component you have already configured may be copied. First click on the component you would like to copy to select it. Then, once you click on the Tool button  and select "Copy Component" from the menu, a new copied component will appear.

Dashboard component types

This page describes the types of components that may be added to a Dashboard report. There are over 30 standard components available which are mostly variations on 5 basic types of charts shown below. There are also 2 table-style reporting components for Alerts and Incident Reports. More recently, Scatter Plots and Box Plots have also been added, as well as a Local Dose Reference Level chart.



- 1 Pie Charts are useful for breaking down and comparing dosimetry or utilization data by a particular factor (e.g. analysing dose measurements by Operator).
- 2 Histograms are useful for analysing trends in dosimetry data and locating outlying examination or acquisition results.
- 3 Line Charts (Date Graphs) are useful for analysing dosimetry data over time.
- 4 Activity Monitors are useful for analyzing utilization data broken down by volume, examination or activity.
- 5 Bar Charts provide a brief overview of key metrics of dose distribution in quartiles or displayed as minimum, average or maximum dose (e.g. analysing dose measurements by modality).

If a units type (e.g. mSv) is shown on the graph, it can often be adjusted by clicking on it to reveal a drop-down menu allowing you to specify the units you would like. See "Changing the variables or units displayed" on page 80.

Guide to component buttons



The Export button allows you to export currently displayed component data into CSV and Excel formats.



The Filtering button allows you to further refine the currently displayed component's data (e.g. by specific protocols or other parameters).



The Table view button switches the current component to a table format for viewing.



The Link button will synchronize the current component's axes with other similar components that have this button selected. Bar, line and box charts are examples of charts that can be linked this way. See the example below for details on this.



The Info button displays further statistical information on histogram charts such as the median, standard deviation and average.



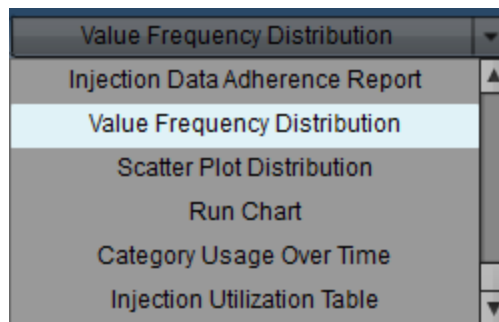
The Demagnify button (also labeled as Reset Range) allows you to zoom out of a histogram if you have selected a subset of the x-axis range for viewing.



The Zero button applies to certain charts (e.g. Clustered Bar Charts or Dose Reference Level Charts). It allows you to toggle between showing and hiding zero values (e.g. empty columns).


Changing component types

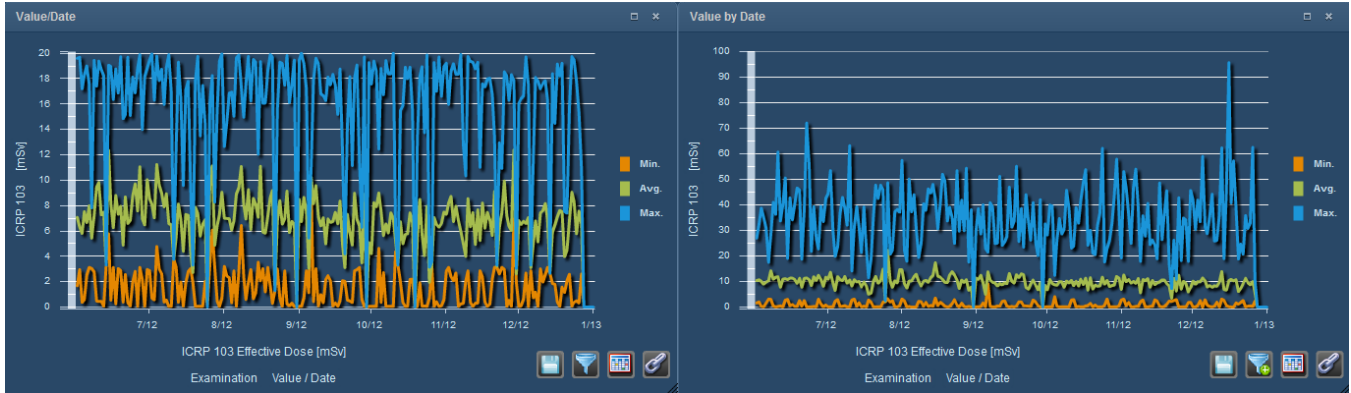
At the bottom of Pie Charts, Histograms, Date Graph and Bar Charts the graph type can be clicked on to reveal a drop-down menu of component types that can be chosen.



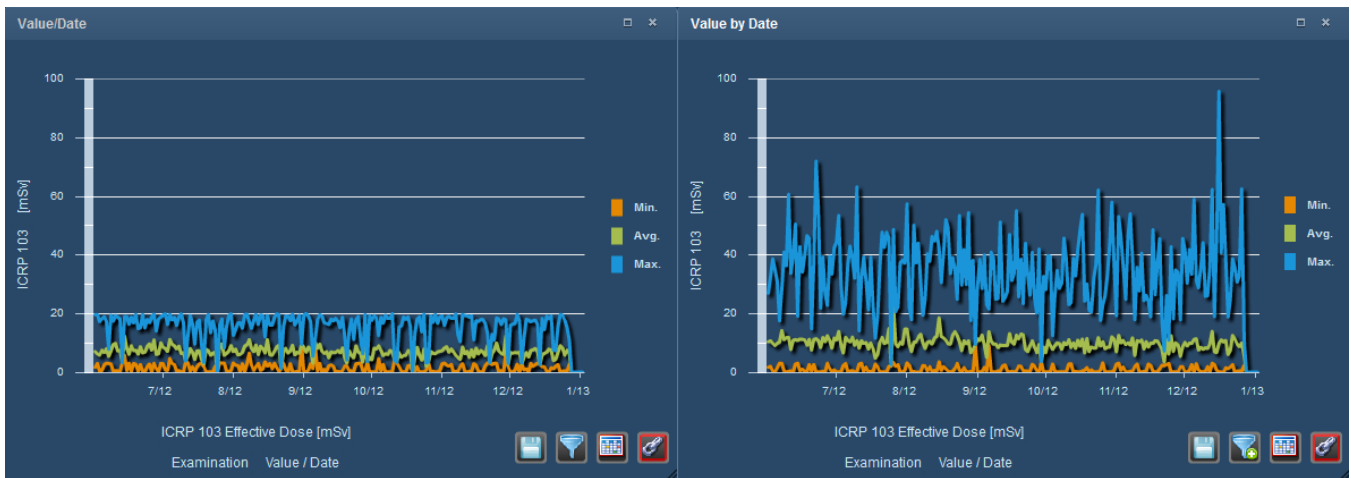
Linking components



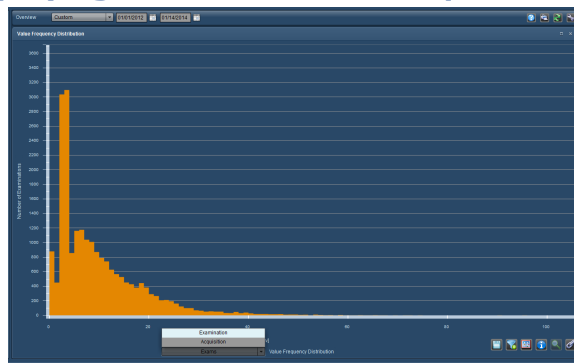
Using the Link button , you can make the scaling of the axes consistent across multiple components to make comparisons easier. In the screenshot below, prior to linking, the component on the left shows a y-axis scale ranging from 0-7:



After linking, the components display identical scales on the y-axis:



Switching between displaying Examination and Acquisition or Injection data



For many components, clicking on the left-handed X-axis label displays a drop-down menu allowing you to choose between displaying Examination or Acquisition level data. Some examples of this are shown in the next section (for example, the Clustered Bar Chart).

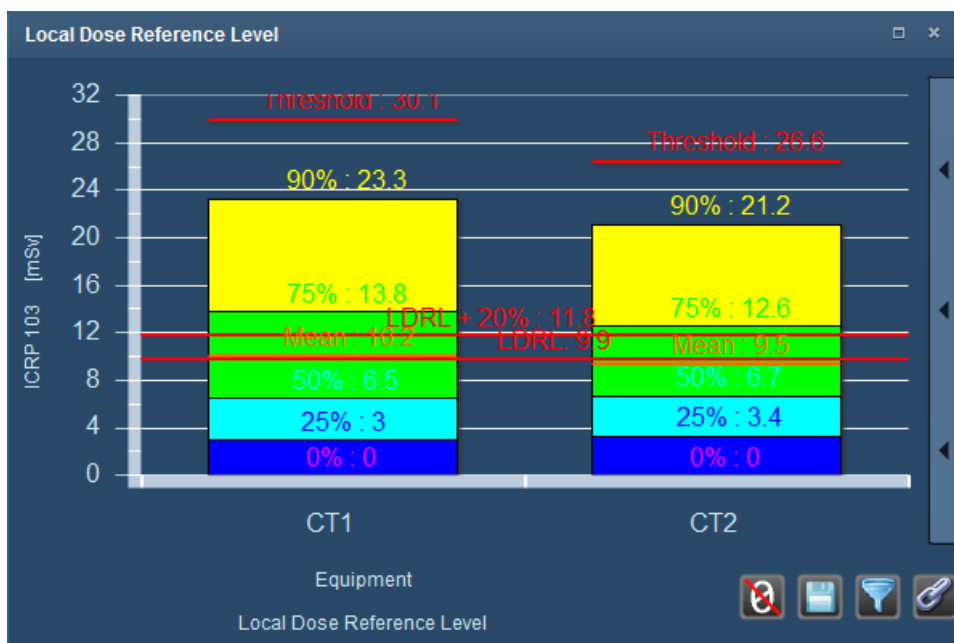
If your component's Value of Interest is relevant to injections (e.g. Injection Pressure Limit), you may be able to choose between displaying Examination or Injection level data instead.

Selected additional component types

There are a few additional component types available, detailed below, that have their own descriptions as noted below.

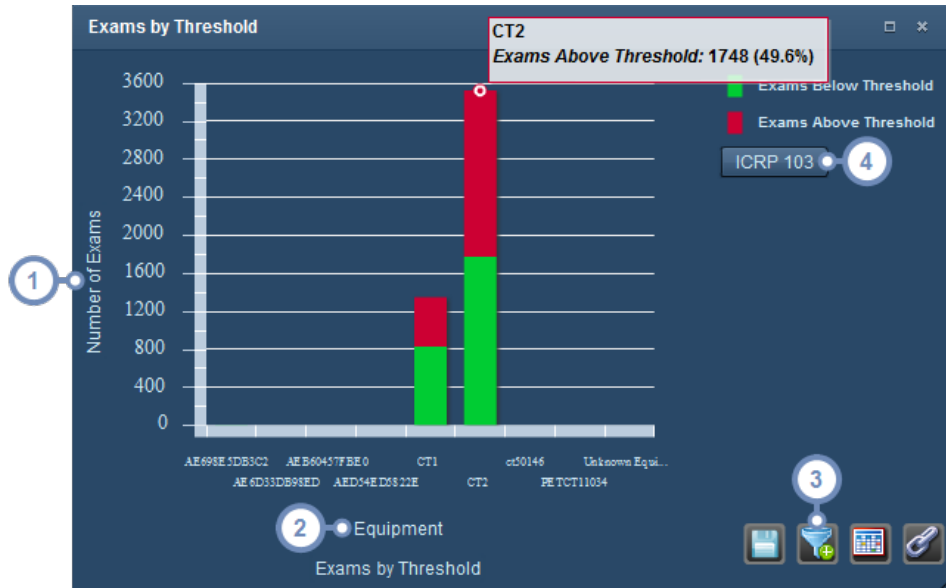
Local Dose Reference Level


The Local Dose Reference Level chart may be helpful to track exams specific to an institution by equipment, protocol or other metrics, as it provides an easy-to-interpret view with percentiles and available custom levels that are color-coded.



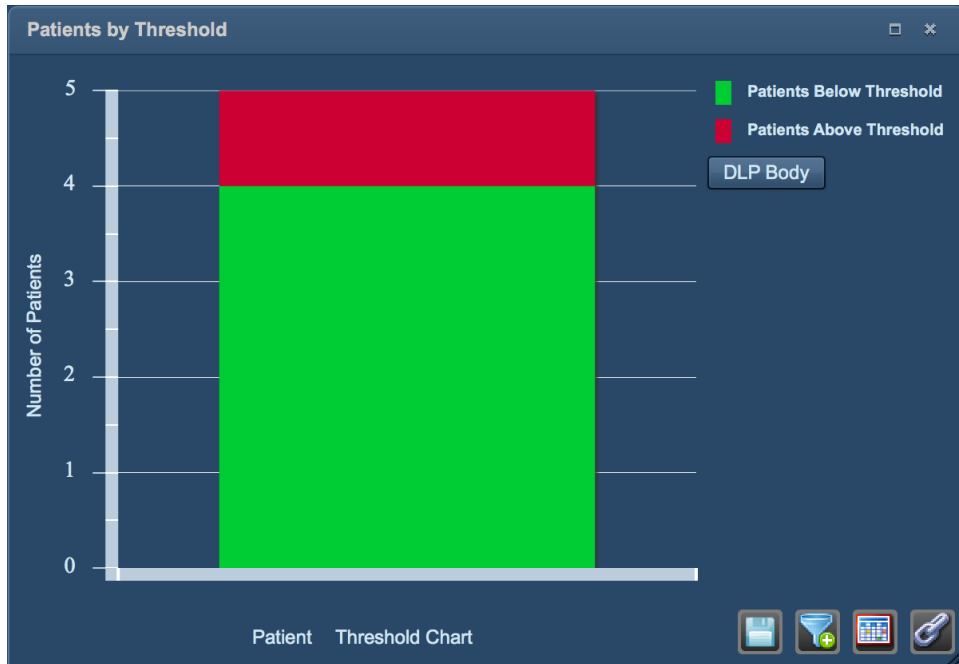
Threshold Chart / Exams by Action Levels

These component types displays a high-level view of the number of exams, acquisitions, or patients that are below and above the DRL thresholds or that have triggered an Action Level based on the Protocol, Device or other parameters. If you are viewing by Action Levels, it displays color coded bars representing the number of exams that have triggered a particular Action, with the Action to follow being labeled in the legend on the right side of the component. See "Default Dose Reference Levels and Action Levels" on page 196 for more information on setting Action Levels. The image below shows the Exams by Threshold variant of this component. The Acquisitions by Threshold variant of this component is functionally identical to this also.



- 1 Clicking on the Y-axis label displays a drop-down that will allow switching between between absolutes (Number) or percentages (Percent).
- 2 Clicking on the upper X-axis label changes the parameter used - for example, to see if exams are over the threshold for specific equipment, protocols or institutions.
- 3 You can use the Filter  button to restrict the number of bars shown on the chart to those that are relevant for the threshold comparisons you would like to make. For example, you can choose to display only the specific equipment relevant to your chart rather than all the equipment.
- 4 You can choose the Value of Interest that you would like to show the threshold for here.

In addition, an example of the Patients by Threshold chart is as below. The main difference is the absence of the ability to change the parameter as the patients themselves are the primary context for determining the threshold.



Detailed Value Analysis Table

The Detailed Value Analysis Table component displays the Minimum, Maximum, Average and Median doses as well as quartiles for a selected Value of Interest (e.g. ICRP 103) and parameter (Order, Equipment, Device, etc). For example, you could use the Third Quartile (75%) levels as a rough guide for setting an exam DRL.

Detailed Value Analysis Table

ICRP 103 by Equipment

Equipment	Minin	Maxir	Avera	First	Medi:	Third	Num
AE698E5DB3C2	2	3.7	2.8	2	2.8	3.7	2
AE6D33DB98ED	20.8	20.8	20.8	20.8	20.8	20.8	1
AEB60457FBEO	2.3	2.3	2.3	2.3	2.3	2.3	1
AED54ED5822E	1.1	1.1	1.1	1.1	1.1	1.1	1
CT1	0.07	74.2	10.1	3	7	13.7	1345
CT2	0.05	61.4	9.6	3.4	7.1	12.7	3522
ct50146	3.6	3.6	3.6	3.6	3.6	3.6	1
PETCT11034	21.7	21.7	21.7	21.7	21.7	21.7	1
Unknown Equipment	5.3	5.3	5.3	5.3	5.3	5.3	1

ICRP 103 [mSv]

Detailed Value Analysis Table

It is possible to export the table data in CSV or Excel format, as well as Filter the data to show only what you need, using the icons in the bottom right of the component. Clicking on the x-axis or y-axis labels allows you to modify the parameters or type of dose displayed.

Dose Distribution Table



The Dose Distribution Table takes the highest dose for a particular study (or set of studies) and breaks it down into five equal dose ranges; this allows you to easily visualize the exams that fall into each particular dose range, and may help you pick out outlying exams (or protocols).

Value Distribution Table □ ×

ICRP 103 by Equipment

Equipment	0-15 [r]	15-30	30-45	45-60	60-75	Total
AE698E5DB3C2	2					2
Unknown Equipment	1					1
AEB60457FBEO	1					1
AED54ED5822E	1					1
CT1	1055	224	51	10	5	1345
CT2	2837	574	93	17	1	3522
ct50146	1					1
AE6D33DB98ED		1				1
PETCT11034		1				1

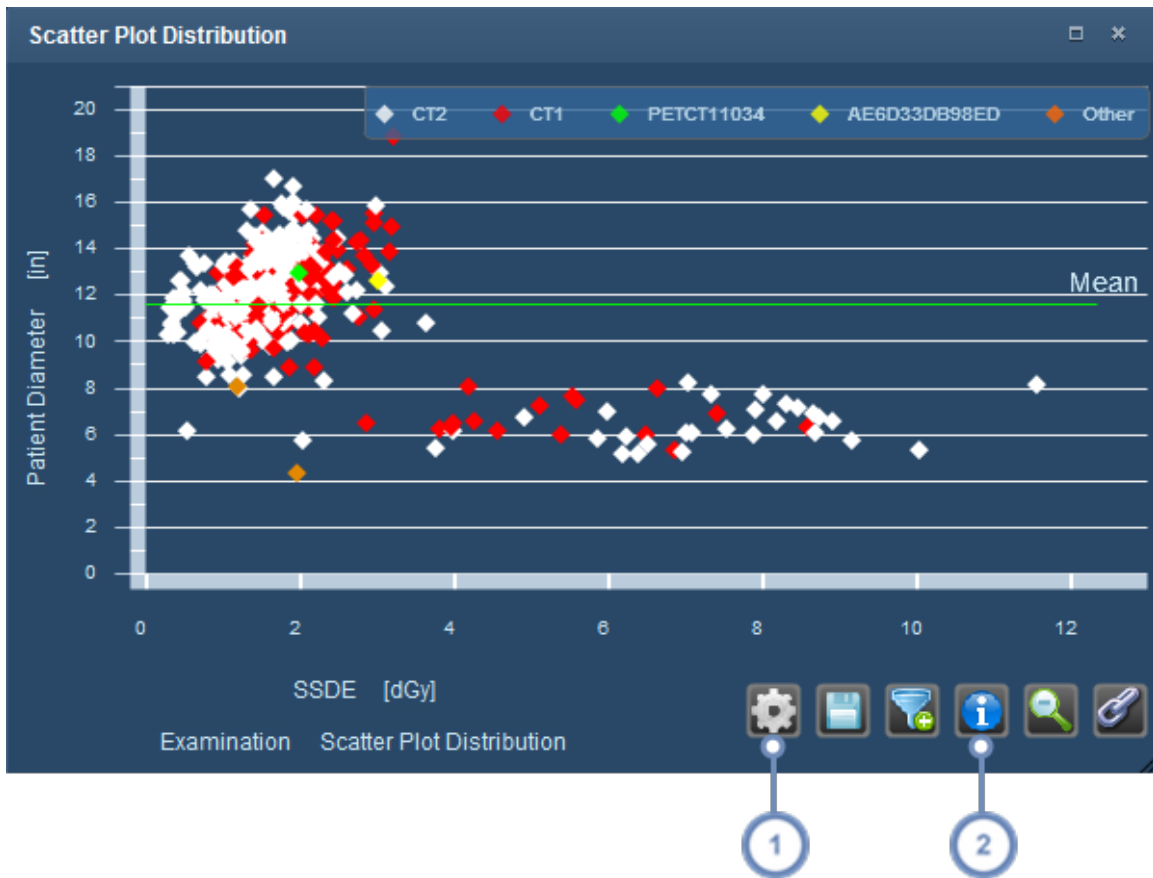
ICRP 103 [mSv]
Value Distribution Table






It is possible to export the table data in CSV format, as well as Filter the data to show only what you need, using the icons in the bottom right of the component. Clicking on the x-axis or y-axis labels allows you to modify the parameters or type of dose displayed.

Scatter Plot Distribution

The scatter plot distribution component is shown below. You can hover over individual points on the distribution to display detailed information about each plot point including their numeric values.



1 The Properties  button functionality is described below.

2 The Info/Statistics  button displays an overlay on the chart indicating Median, Mean, Standard Deviation, Count, and 75th and 90th percentiles.

Clicking on the Properties button displays the Scatter Plot Properties window:

The "Scatter Plot Properties" window is a small dialog box with a dark blue header and a white body. It contains three settings:

- Categorize By:** A dropdown menu currently set to "Equipment".
- Show Mean Line:** A checkbox that is checked.
- Show Linear Regression:** A dropdown menu that is currently empty.

Categorize By

You can choose not to categorize by picking the blank item on this drop-down, or you can categorize the plot points by the selected category (e.g. Protocol Name, Operator, Equipment, etc.); this will color code the plot points as shown in the scatter plot example above.

Show Mean Line

Displays the mean line for the Value of Interest (e.g. Patient Diameter for the example above)

Show Linear Regression

This drop-down allows you to choose between showing a Linear or Exponential regression line, or none at all (choose the blank item).

Show Regression By Category

If you have enabled the display of a regression line, then this option will display; it remains hidden otherwise. Enabling this will show individual regression lines for each category on the plot.

Category Usage over Time

The Category Usage over Time graph is a bar chart that plots a Value of Interest over time - for example, the number of examinations or acquisitions done by individual CT scanners over time.



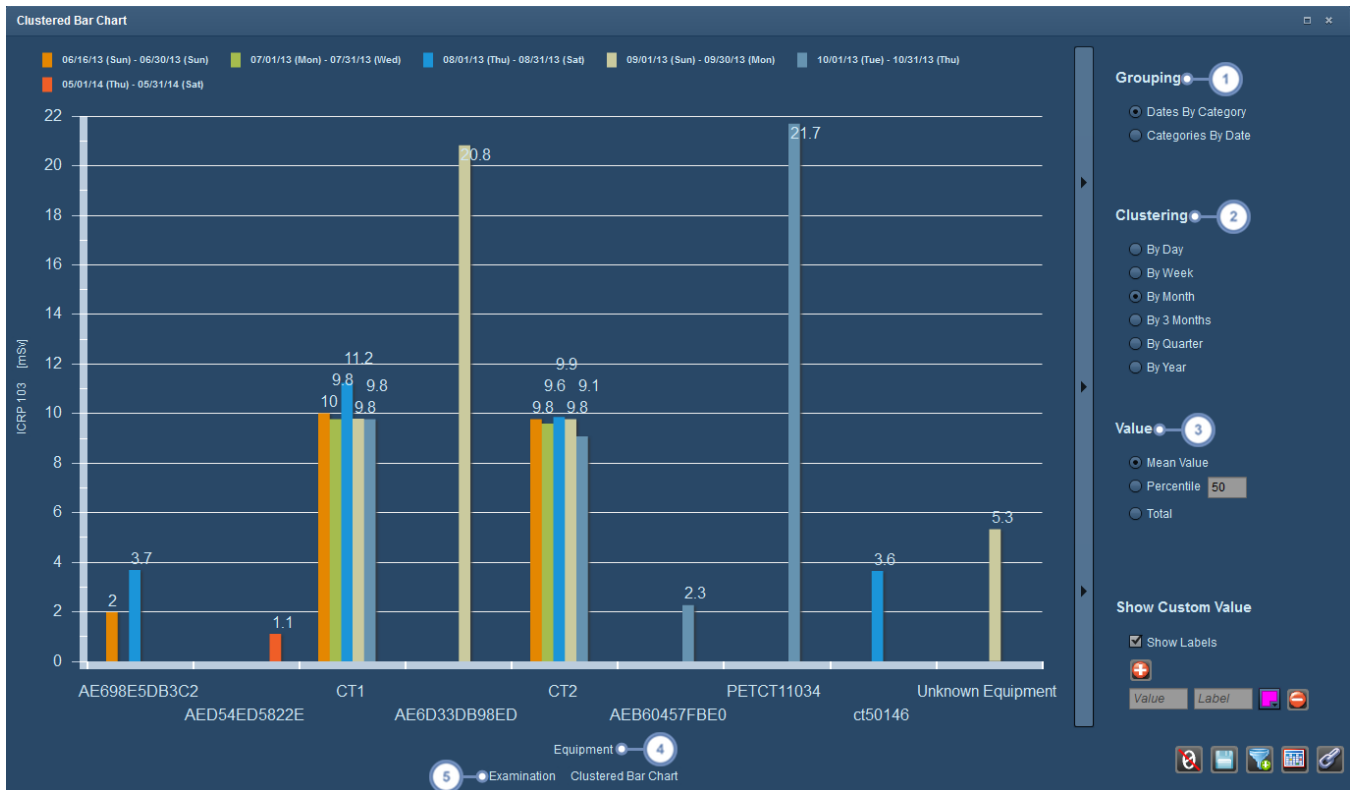
1 Clicking on the upper X-axis label displays a drop-down menu allowing you to choose the Value of Interest, which is

Equipment by default. Some other available values include Study Description, Protocol Name, and Institution Name. A variety of contrast injection values are available as well.

- 2 Clicking on the left-handed X-axis label displays a drop-down menu allowing you to choose between Examinations and Acquisitions.
- 3 Clicking on this vertical bar displays the Clustering menu, which is explained below. An option to show or hide the trend lines is also present.

Clustered Bar Chart

The clustered bar chart allows you to cluster Values of Interest by time intervals. For example, you can obtain the average or specific percentile of the ICRP 103 dose for a specific head CT protocol over sequential weeks or months. The options available to modify the clustering or grouping are available in the pull-out menu on the right side of the chart and are detailed below.



- 1 Grouping can be done via Date by Category, which places the Category on the X-axis, or Category by Date, which places the Date on the X-axis.

- 2 The chart can be clustered by the day, week, month, every 3 months, quarters, or by the year.
- 3 In the Value section, you can choose whether to display the mean value, the total value, or a custom percentile for the chosen Value of Interest.
- 4 Clicking on the upper X-axis label displays a drop-down menu allowing you to choose the Value of Interest, which is Equipment by default. Some other available values include Study Description, Protocol Name, and Institution Name. A variety of contrast injection values are available as well.
- 5 Clicking on the left-handed X-axis label displays a drop-down menu allowing you to choose between Examinations and Acquisitions.

Injection Utilization Table

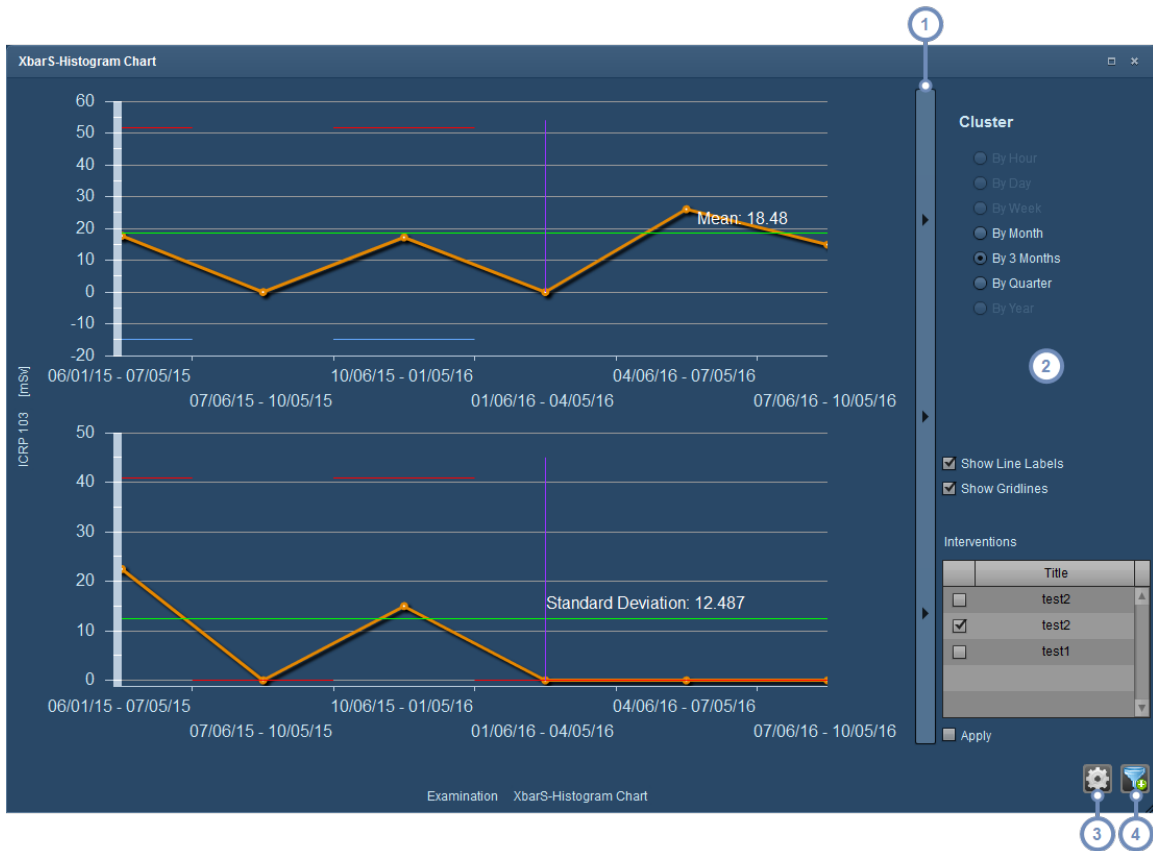
The Injection Utilization Table is mainly used to keep track of injection-related categories. Clicking on the y-axis label will allow you to change the category displayed (e.g. Equipment or Study Description).

Equipment	Injection	Utilization	Avg Peak	Avg Peak	Avg Contrast
CT1	108	25.71	0	0	109.43
CT2	312	74.29	0	0	108.11
Total	420	100	0	0	108.45

XbarS Histogram Chart


The XbarS Histogram Chart is found in the line chart component category and allows the application of Nelson Rules to the data you choose to display. Nelson Rules are detailed in the


SPC Alert Configuration section (See "SPC Alert Configuration" on page 202). Means are displayed on the upper graph, and standard deviations on the lower graph. When interventions are selected, the mean is between intervention points. Additional interpretation of the XbarS chart is detailed elsewhere (See "Viewing and managing individual alerts" on page 155).



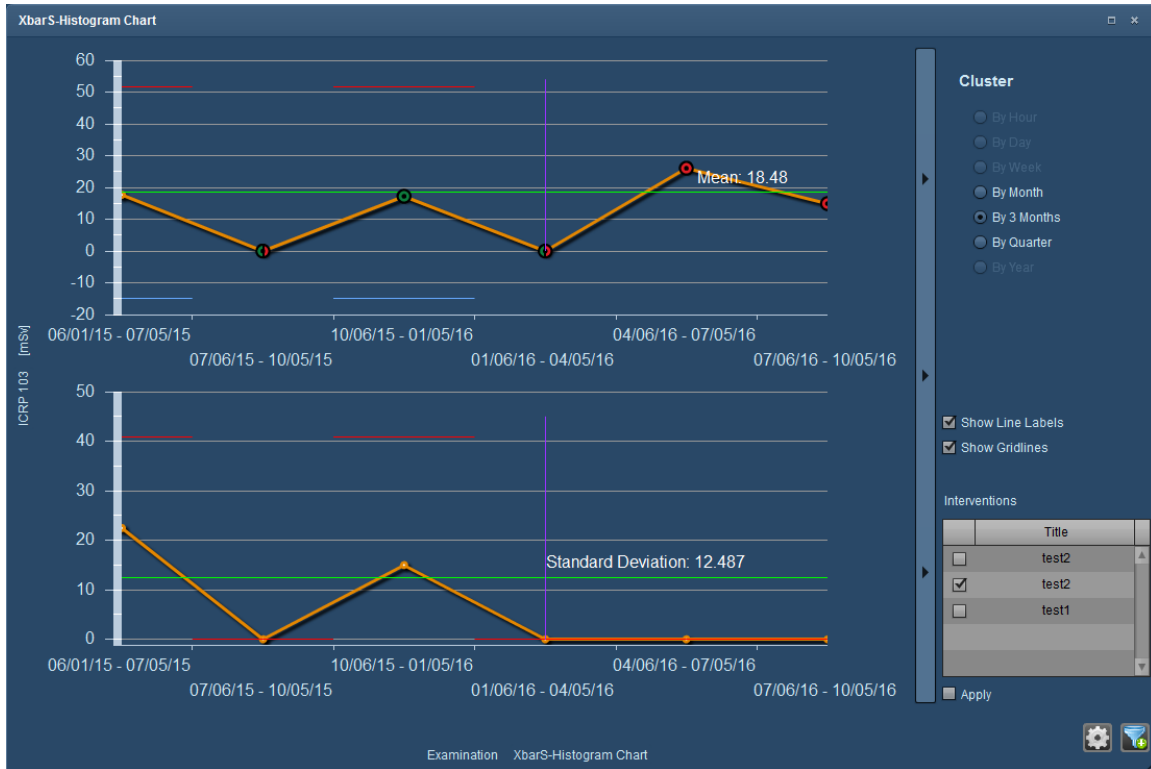
1 This button bar allows you to show and hide the right-hand options menu.

2 You can choose clustering options for the graph here, ranging in granularity from one day to one year. Two checkboxes allow you to toggle the display of Line Labels (the mean and standard deviation) and Gridlines. Interventions (displayed as vertical purple line) can be toggled for display by selecting the appropriate checkbox next to the name of the intervention, and then by clicking on the Apply checkbox. See "Process Intervention" on page 214

3 The Settings  button displays a window that allows you to select which Nelson rules to apply to the graph. If you don't apply any Nelson rules, then the graph essentially functions only to display mean and standard deviation. More than one Nelson rule can be applied simultaneously.

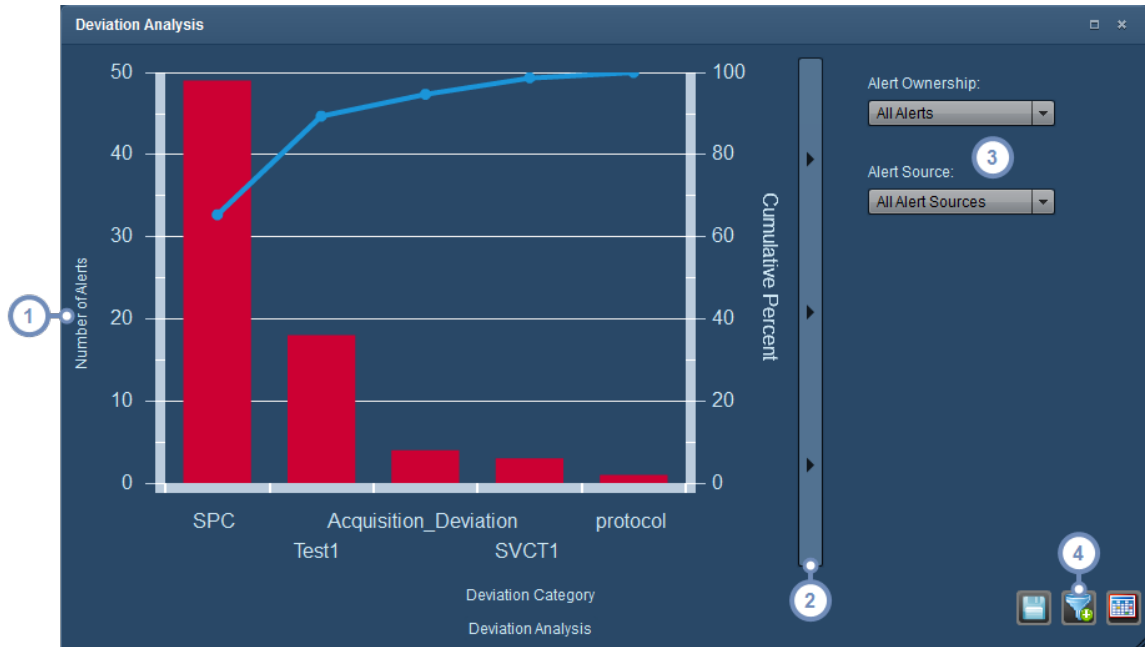
4 You can use the Filter  button to filter the data set used to generate the XbarS chart.


An example of the appearance of the graph after the Nelson rules are applied is below. Note that the colored circles depict which rule has been broken. If more than one rule has been broken, then the circles appear similarly to pie charts with multiple pieces in different colors representing each violated rule.



Deviation Analysis

The Deviation Analysis chart displays a Pareto chart that allows analysis of deviation alert categories. In particular, it allows for the quick visualization of the most prominent deviation categories and their cumulative effect in proportion to the total number or percentage of alerts. The blue line represents the cumulative total percentage of alerts that the bars account for.



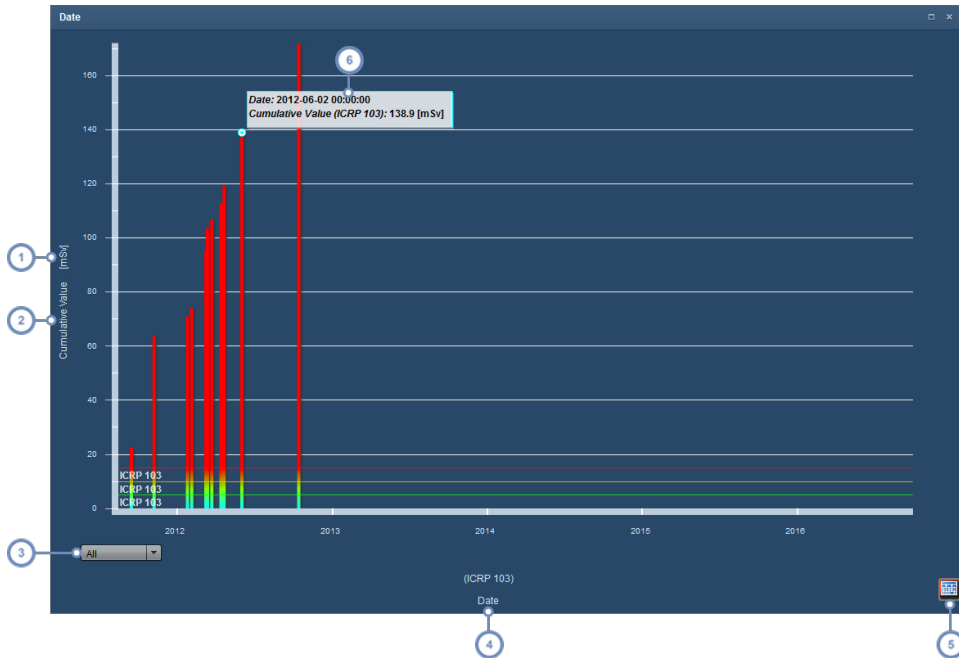
- 1 Clicking on the y-axis label allows you to switch between the number or percentage of alerts.
- 2 This button bar allows you to show and hide the right-hand options menu.
- 3 The Alert Ownership drop down allows you to choose between your personal alerts and all alerts. The Alert Sources drop-down allows you to also choose your Alert Sources (either All, SPC, Study, or other).
- 4 You can use the Filter  button to filter the data set used to generate the Deviation Analysis chart.



Scorecard component types

This page describes the types of components that may be added to the Patient Scorecard.

Cumulative Dose

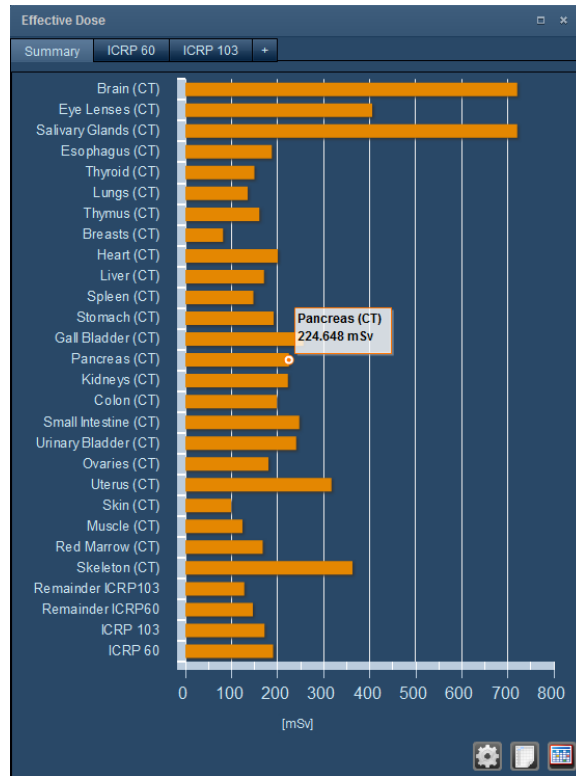
The Cumulative Dose component displays the cumulative dose of the patient’s examinations over time along with the risk thresholds.



- 1 Clicking on the units causes a drop-down menu to appear allowing the unit type to be selected.
- 2 Clicking on the y-axis label causes a drop-down menu to appear allowing you to switch between displaying Cumulative Dose and individual exam dose.
- 3 This drop-down menu sets the time scale for the graph - all years, 10 years, 5 years or 1 year.
- 4 Clicking on the x-axis label allows you to change the x-axis variable; this will change the component into a pie chart.
- 5 The Table view button  turns the graphical chart into a table. Subsequently, the Chart view button  will appear, allowing you to change the view back.
- 6 Hovering over a bar with the mouse cursor displays a Tooltip with the bar's numerical values. Double-clicking on a bar will open up the Dosimetry window for the exam associated with that bar.

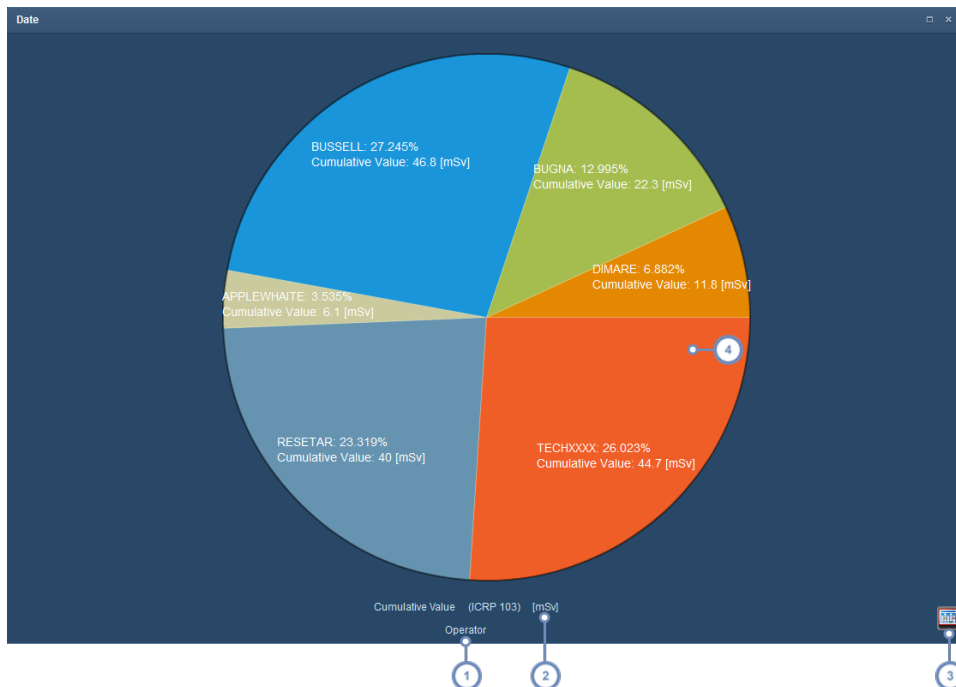
Effective Dose

This component displays the dose per organ by default along with ICRP 60 and ICRP 103. It functions similarly to the Organ Doses screen (See "Organ Doses" on page 69), with the added ability of having multiple tabs to display customized lists of variables. New charts can be added by clicking on the "+" tab.





Pie Charts

Pie chart components display percentage breakdowns of effective dose by Device, Operator, Modality or Protocol. The example below shows Dose by Operator. In addition, further details on each slice of the pie chart may be shown by clicking on the slices.



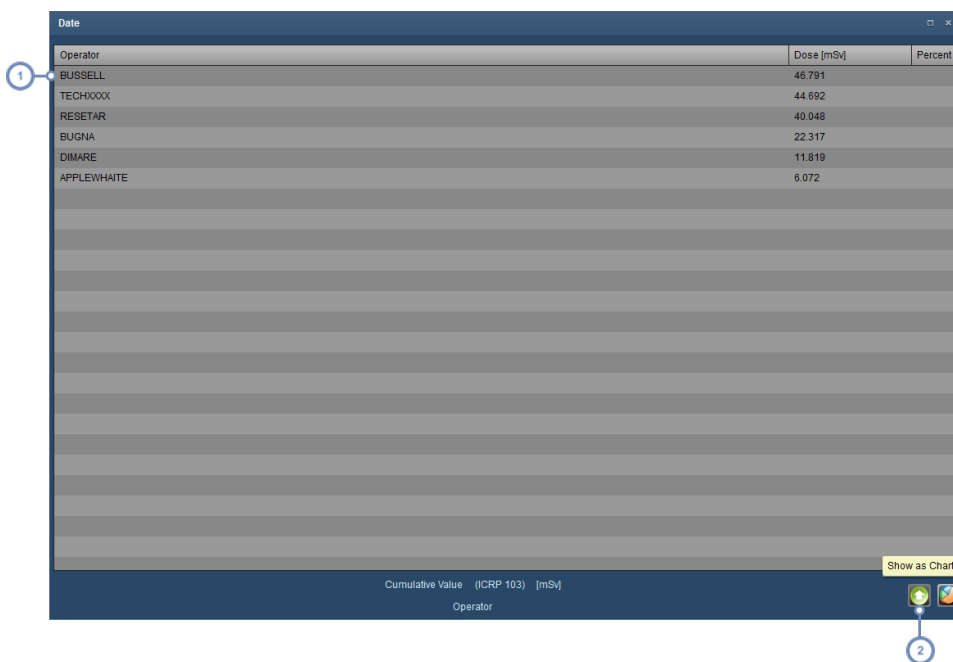
1 Clicking on the x-axis label allows you to change the dose comparison variable via a drop-down menu. If you change it to "Date" then it will turn into a Cumulative Dose component.

2 Clicking on the units label allows you to select a different unit from a drop-down menu.

3 The Table view button  turns the graphical chart into a table. Subsequently, the Chart view button  will appear, allowing you to change the view back.

4 Clicking on a pie slice will 'drill-down' to the next level of detail on a particular slice; for example, in an Operator chart, clicking on a slice will produce a new chart breaking down the operator's dose into each of the exams that operator was responsible for. Clicking outside of the pie will return back to the original pie chart.

When switching from a Pie Chart to Table view, similar functionality with respect to 'drilling-down' the data is possible. The table view is shown below. Drilling-down is specific to the type of variable you have selected; some variables only allow a single drill down, while others allow drilling down to multiple levels of detail.




Operator	Dose [mSv]	Percent o
BUSSELL	46.791	
TECHXXXX	44.692	
RESETAR	40.048	
BUGNA	22.317	
DIMARE	11.819	
APPLEWHAITE	6.072	

Cumulative Value (ICRP 103) [mSv]
Operator

Show as Chart

1 Clicking on a row will 'drill-down' to the next level of detail and display a new table regarding this operator's dose per exam

2 The ascend button  allows you to return up one level (go backwards) from drilling down.

Examinations

The examinations component lists all examinations for the patient in a manner similar to search results.

Exam ID	Description	Date	ICRP 103	SSDE	CTD/Div Head	CTD/Div Body
00369098X	CT CHEST/ABDOMEN/PELVIS W IV CONT C/A/P WITH/Thorax	10/14/2012 11:09 AM	32.8	-	-	24.1
00375051X	CT CHEST/ABDOMEN/PELVIS W IV CONT C/A/P WITH/Abdomen	06/02/2012 10:18 AM	19.7	-	-	14.1
00376...	CONTRAST HEAD WITH/Head	04/21/12	6.4	-	92.8	-
00377027X	CT HEAD V HEAD W/CONTRAST	04/14/12	6.1	-	87.5	-
00377956X	CT HEAD WITH/Head	03/23/12	3.1	-	93.7	-
00378314X	CT THORAX PE/Thorax	03/13/2012 4:15 PM	5.4	-	-	8.1
00378526X	CT HEAD WITH IV CONTRAST HEAD WITH/Head	03/09/2012 9:01 AM	3.1	-	93.7	-

Hovering over a row will bring up an Exposures window detailing individual series for that exam as shown in the screen above. Double-clicking on any row will bring up the exam's Dosimetry window.

Alerts

The Alerts component displays alerts relating to this patient as configured for your user account. See "Alerts" on page 153.

Type	Status	Deviation Category	Date/Time	Patient
	Pe		2014-04-28 17:30:05	00156684X SOHRABI, LESLIE X
	Pe		2014-04-28 17:29:12	00156684X SOHRABI, LESLIE X
			2014-04-28 17:29:04	003870

The rows can be sorted by clicking on one of the column headers.

Incident Reports

Incident Reports may occur when dose threshold levels are exceeded. These will be displayed in the Incident Reports component.

Incident No.	Description	Date of Incident	Patient	Examination
00004382	Contrast threshold	2013-11-07	00155825X... F DOB: 01...	00385145X CT CT-ABD PEL RENAL 0-45-90 AP/Abdomen Performed: 09/09/2013 2:34 PM ICT256 CT2
00004383		2013-11-11	REMOVED ... M DOB: 01... Weight: 75kg...	REMOVED CT Abdomen Ab... Abd_2phi.sig Performed: 10/14/2013 1:05 PM Biogaph40 PETCT11034
00004384	Contrast threshold	2013-11-11	00079508X... F DOB: 04...	00385149X CT HEAD/SPINE CERVICAL-TRAUMA/Spine Performed: 09/09/2013 3:23 PM

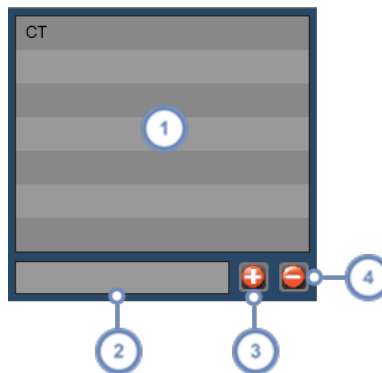
The rows can be sorted by clicking on one of the column headers.



Tags

One or more tags can be created and associated with exams or patients. Exam tags and Patient tags are independent of each other and are shared across all Radimetrics users. Using tags allows for exams or patients to be searched for based on their associated tags.

Adding/Deleting tags

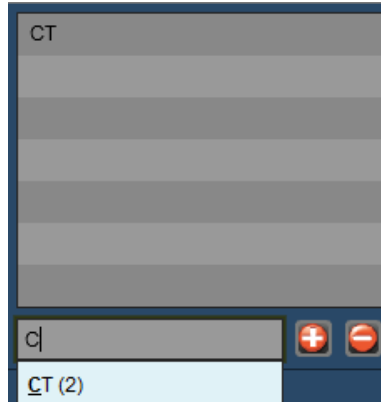
The interface for editing tags appears as follows:




- 1 The list of tags associated with the exam or patient is displayed here.
- 2 This text field allows you to enter the name of the tag.
- 3 After entering the name of the tag, click on the Add  button to add it to the list.
- 4 To delete a tag, select it from the list and then click on the Delete  button.

Entering a tag

As you enter the name of the tag, a list of the pre-existing tags matching the characters you enter will appear along with a number in brackets indicating how many existing exams already have that tag associated.



If the pre-existing tag that you would like to add appears in the list, you can click on it to auto-complete the tag name. Subsequently, click on the Add  button to add the tag to the list.

Tag-based searching

To search for exams or patients based on their tags, simply use the Advanced Search feature of the Examinations module (See "Advanced Search" on page 44) or Patients Module (See "Advanced Search" on page 35) to enter the desired tag names. You can also create Worklists utilizing specific tags as well.

Protocol Management

Protocols are the 'principles of practice' that allow users to perform an exam following standard guidelines and methodology. The powerful web-based protocol management tools of the Radimetrics product are designed for customising, configuring and managing these complex protocol structures.

Introduction to Protocols in the Software

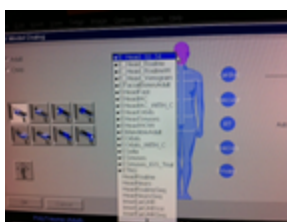
Radimetrics Protocol Definitions

There are three ways we define protocols in Radimetrics™ Enterprise Platform.

Master Protocol



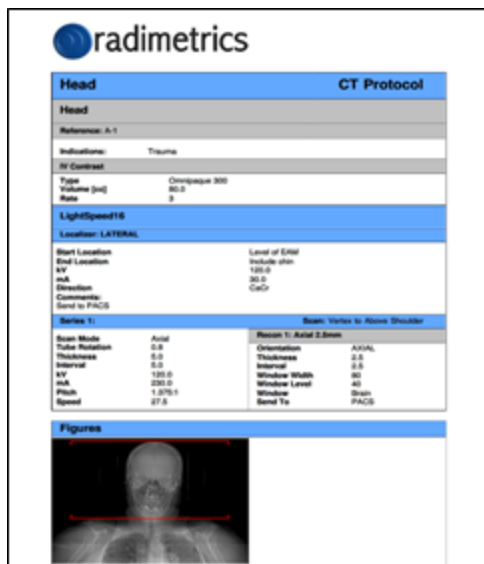
Device Protocol



Exam parameters

	Scan	kV	mAs / ref.	CTDIvol* mGy	DLP mGy*cm	TI s	cBL mm
Patient Position HSP							
Program	1	120	34 mAs	6.38 0	0	2.6	0.8
HEAD VD	2	120	356 #420	58.13 0	1020	1.6	0.9

Master Protocols



The Master Protocol is used as the standard a technologist is attempting to achieve when performing the specified protocol on a patient.

It contains detailed information, including:

- Patient Preparation
- Positioning
- Contrast Information
- Diagrams and Landmarks
- Technical Factors
- Diagnostic Reference Levels

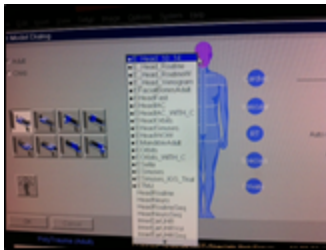
In Radimetrics software this information is a combination of manual data entry and if available information exported from a device.

Multiple device contrast and acquisition factors can be housed under a single Master Protocol name.

Why do we have Radimetrics™ Master Protocols?

- After an exam has been performed the technical factors can be used for variance analysis
- At order entry we can use the Master Protocol data to estimate the potential dose to a patient
- Technical factors in the Master Protocol can be supplemented for missing exam parameters for calculating Radimetrics's Monte Carlo simulation
- Alerts may be triggered based on exams which exceed the diagnostic reference levels entered in the Master Protocols
- Reminders can be customized to alert a user to review protocols on a prescribed basis (e.g., monthly, yearly)

Device Protocols



Device Protocols are the protocols housed on the device, which may or may not mirror the Master Protocols in Radimetrics software.

For some devices this information can be exported and used to setup the Radimetrics software's Master Protocols.

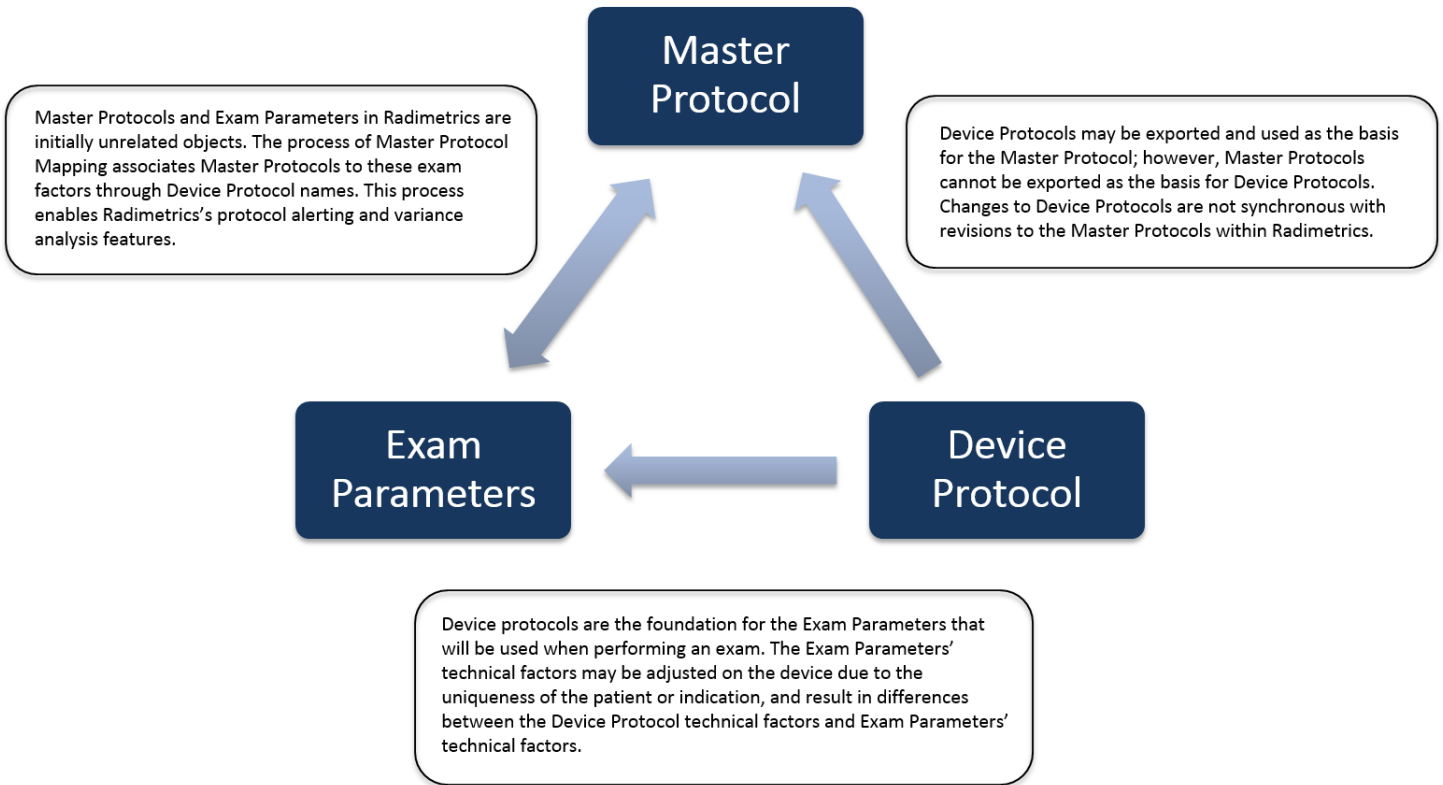
Exam Parameters

Total mAs 3562		Total DLP 1034 mRy/m					
	Scan	kV	mAs / ref.	CTDIvol* mRy	DLP mRy/cm	Tl s	cSL mm
Patient Position H-SP							
Topogram	1	120	34 mAs	0.26 S	6	2.6	0.6
HEAD PFO	2	120	356 / 420	56.12 S	1028	1.0	0.9

Captured from the DICOM information of a performed exam, this includes:

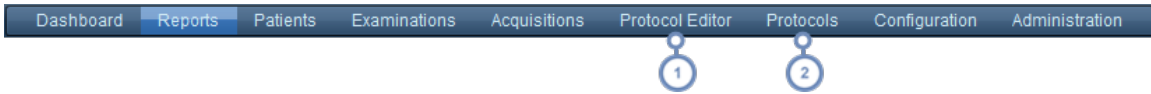
- Device Protocol Name
- Exam Technical Factors - this information can be found in the Acquisitions tab of the Dosimetry screen; See "Dosimetry and modality analytics" on page 56


Protocol Relationship Diagram



Protocol Editor / Protocol Module

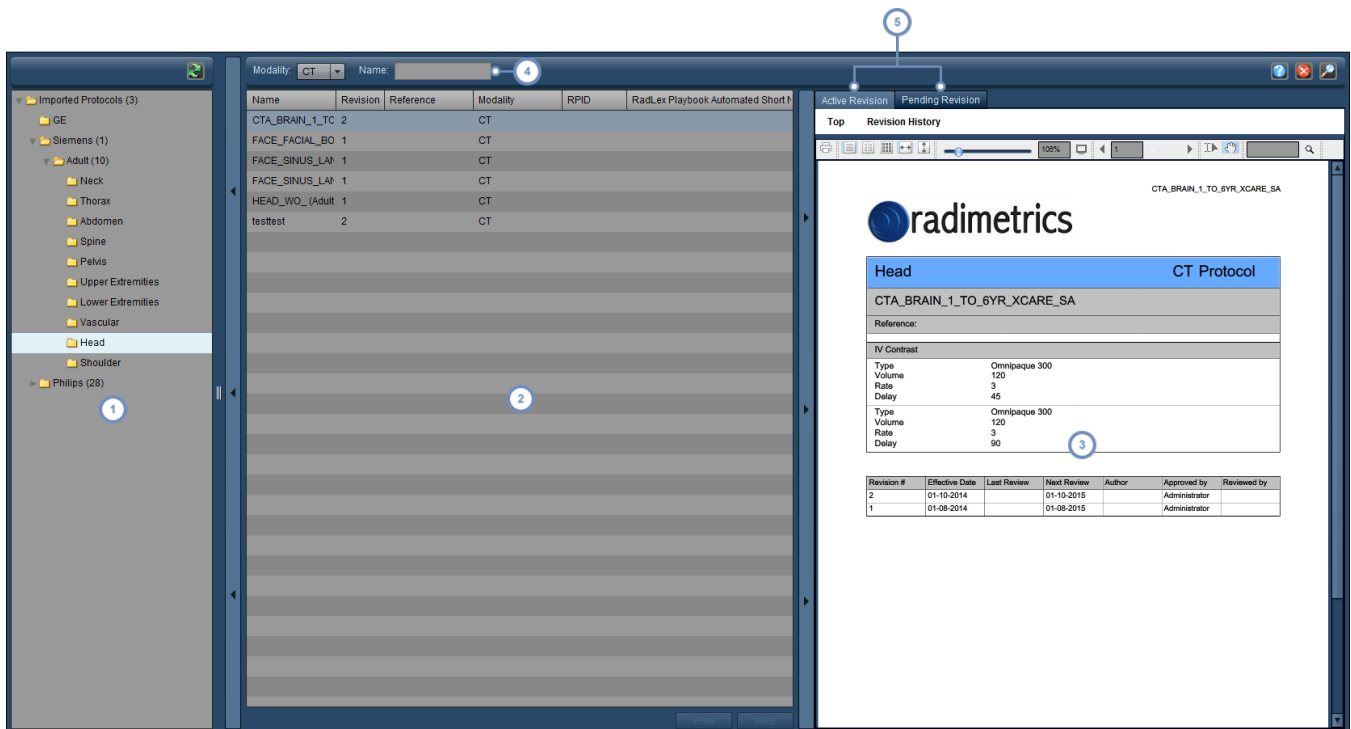
The Protocol Editor module is where Master protocols can be constructed and organized within a web based repository, with the ability to track protocol revision history and review dates.



- 1 To go to the Protocol Editor module, click on Protocol Editor in the module bar.
 - 2 If you do not have access to the Protocol Editor, or you would simply like to review the protocols, click on Protocols instead. The Protocols module is limited to read-only searching, listing and viewing of the available protocols.
-  The Protocols module is restricted to the viewing of previously Approved protocols only. Contact your administrator if you need additional access.

Viewing a protocol

The Protocols module is available for reviewing approved Master Protocols. The interface for viewing Master Protocols is similar between the Protocols module and the Protocol Editor module.



- 1 The left hand window pane contains the Protocol Tree/Directory; selecting a folder here displays all Master Protocols contained within that folder, including those that are nested into deeper folders.
- 2 The second window pane contains a list of the Master Protocols according to the folder chosen. A column may be selected for sorting the list by clicking on the name of the column.
- 3 Once a Master Protocol is selected, a preview of the Master Protocol in a template format suitable for printing is shown. At the top of the window are controls allowing you to print and change the view of the Master Protocol pages.
- 4 The Name field allows you to search for specific Master Protocols by entering characters from the Master Protocol name - however, this only searches the list of Master Protocols currently shown in the window. You can also choose the modality of the Master Protocols you are searching for with the drop-down menu just to the left of this field.
- 5 You may switch between viewing a preview of the currently approved, Active Revision of the Master Protocol and viewing the un-approved, Pending Revision of the Master Protocol here in order to make comparisons.

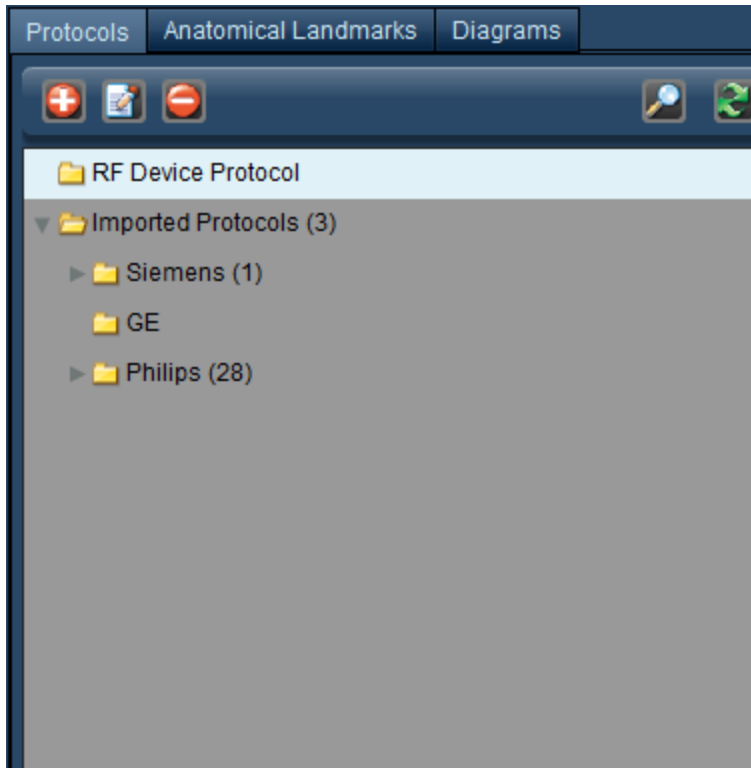
Note that there are toggle bars on the interface allowing you to expand and collapse each of the primary window panes.

Managing Master Protocols

This section provides an overview of how to create, edit and manage Master Protocols, including the setting of landmarks and Dose Reference Levels.

Organizing Master Protocols

Given that there may be many different Master Protocols in the system, it is helpful to have a set of organized folders in which to place them.





Numbers in parentheses beside the folder name indicate the number of folders/items located within that folder.

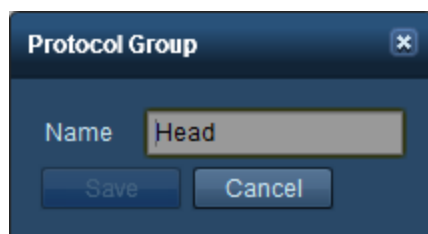


The hierarchical structure of the folder tree is important in making sure that studies are appropriately categorized by anatomical region.

Adding or Renaming a Master Protocol folder


To add a protocol folder (also known as a Protocol Group), click on the Add button . To rename a protocol folder, click to select it and then click on the Modify button . Alternately, double-click on the folder's name.

In either case, a dialog box will appear as shown below.



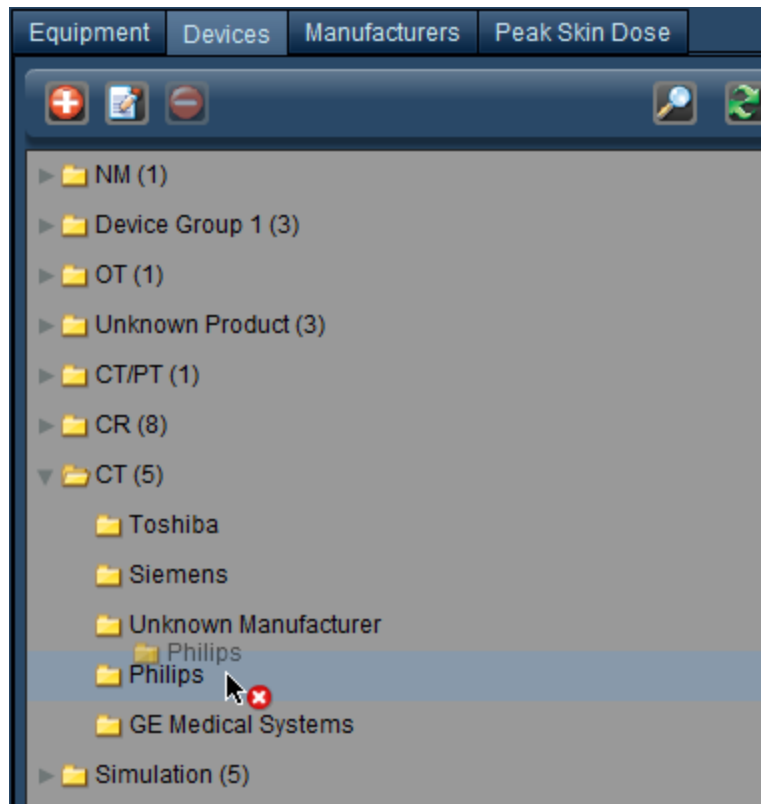
Change the name field as you wish and click on Save.

Deleting a folder

To delete a folder, select it by clicking on it and then click on the Delete button . A confirmation dialog box will be displayed asking if you are sure you would like to delete the folder.

Moving a folder

To move a folder, click and hold on it; it will appear as a 'ghost' attached to your cursor.

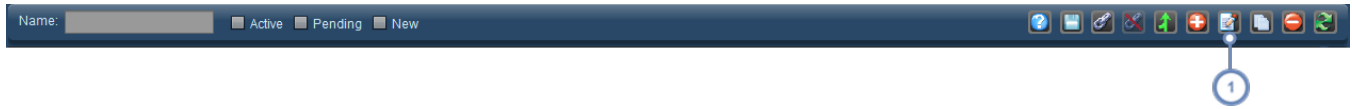



Drag it to the location you would like within the Protocol directory; the location it will be placed is highlighted underneath the mouse cursor. The red 'x' will change to a green '+' once you are in a valid location for the folder to be moved to.

Adding a Master Protocol

You may add a Master Protocol into Radimetrics software in two ways; either by entering it manually or by importing it. See "Importing a Master Protocol" on page 139.

Editing a Master Protocol




- 1 Edit a currently existing protocol by clicking on the Edit button  after it has been selected. Subsequently, follow the instructions for creating a protocol. See "Creating a Master Protocol" on page 128.


Creating a Master Protocol

To create a new Master Protocol, first select a folder in which you would like to create the Master Protocol.

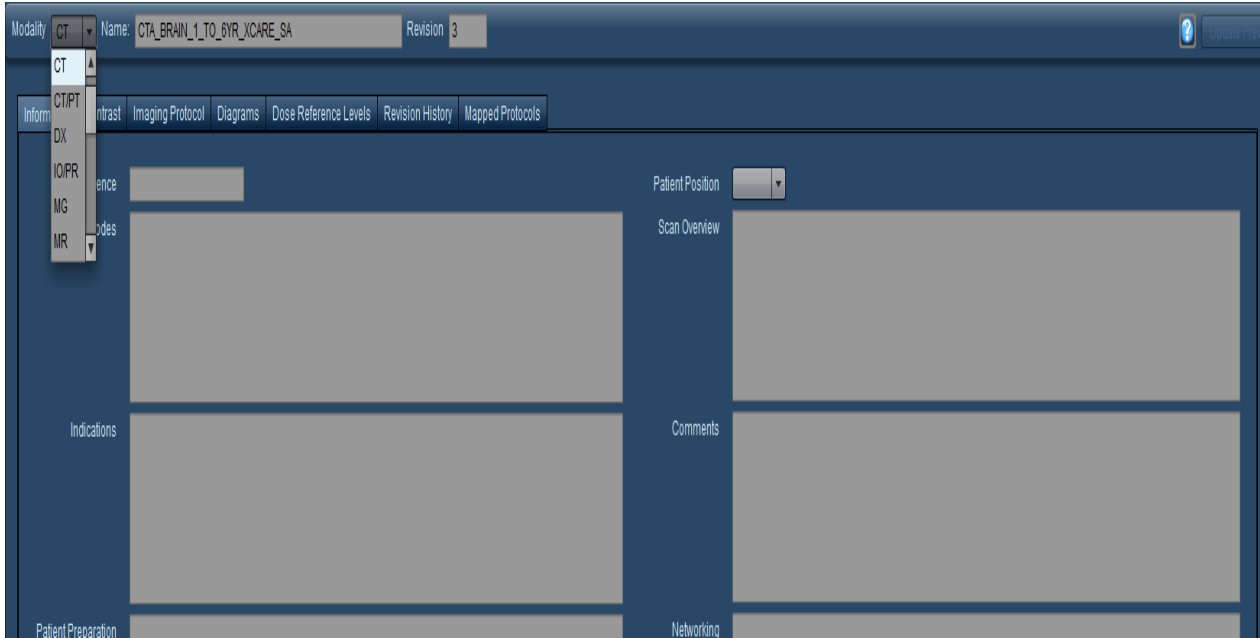


- 1 Click on the New button  to add a new Master Protocol.

 Note that as you create a Master Protocol, many fields are available which may be purposely left blank. If not included, they will not show up on the Master Protocol's rendered document (PDF).

 While editing a Master Protocol, an auto-save will occur just prior to the timeout of the Radimetrics software.

In order to proceed with adding a new Master Protocol, a Modality (e.g. CT) must be chosen and a name for the protocol must be entered. Until this is done, no further information may be added.

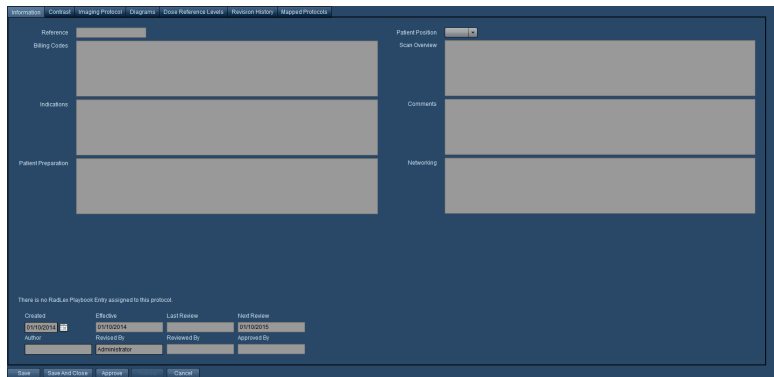


A new Master Protocol begins with a Revision number of 1; this field is not modifiable and increments as the Master Protocol is approved and reviewed.

As you start to enter fields for the Master Protocol, you may update the preview of the printed Master Protocol by clicking on 'Update Preview'.

Adding General Information

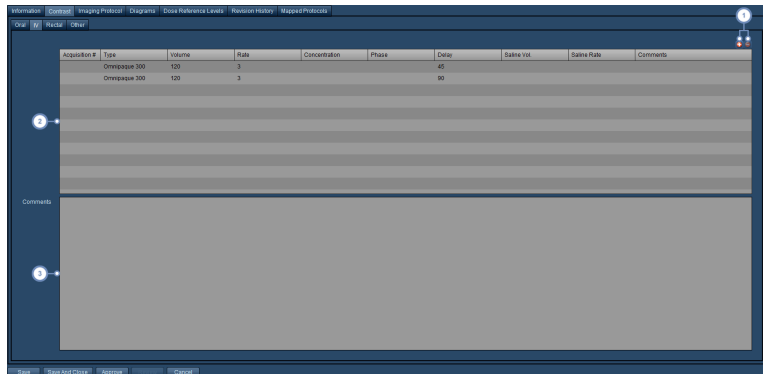
Depending on the modality you choose, different fields will be available in the general information tab.





Certain fields here are not editable - for example, the 'Approved By' field. These fields are automatically updated by Radimetrics software.

Adding Contrast

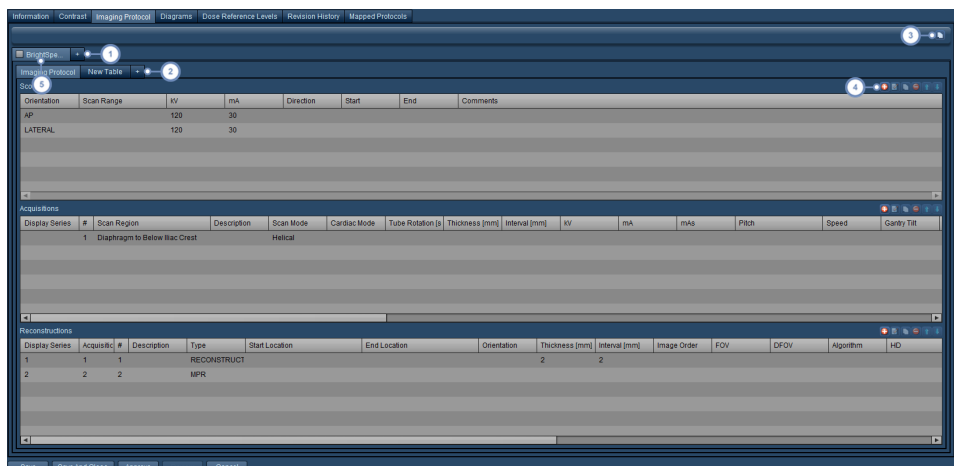
Oral, IV, Rectal or other forms of contrast may be added to the Master Protocol under the Contrast tab. To add contrast, first select the tab for the type of contrast you are adding.



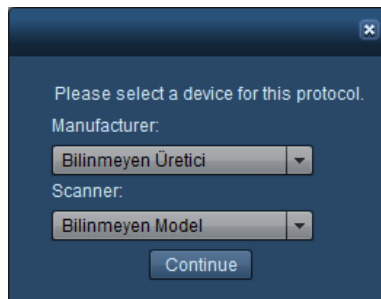
- 1 Click on the Add button  to add a row to the contrast table. Click on the Delete button  to remove a selected row.
- 2 Enter your contrast dosing information into the row by clicking on it. If your contrast dose is associated with a particular acquisition, enter the Acquisition number into the first column. Otherwise, by default, the contrast will be associated with all the acquisitions for the Master Protocol. The Type field is a drop-down menu to select the exact type of contrast you are using.
- 3 The Comments section allows you to enter additional details regarding the specific contrast dose you are entering.

Adding an Imaging Protocol or device

Under the Imaging Protocol tab, you can add device-specific protocols.

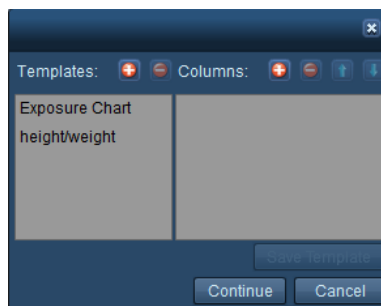


- 1 To add a new device, click on the '+' button. The following dialog box will appear.

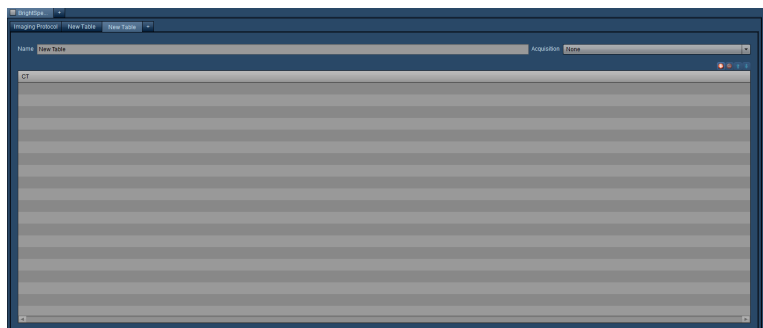


Choose the manufacturer and scanner model and click on Continue.


- 2 Add a custom table for the current device by clicking on the '+' button here. The following dialog box will appear.



You can either select from previously chosen templates or choose to create a new table by adding and naming new columns to be included in the table. The "Save Template" button allows you to save the currently listed columns into a new table template. After choosing your table, the new table will be added to the list of tabs and displayed, as shown below.



You can rename the table, choose the associated acquisition, and add/edit/delete rows from the table as desired.


3 The copy button  allows you to copy the current device's protocol into a clone device, which will appear in a new tab.

4 This row of buttons allows you to manage Scouts, Acquisitions, and Reconstructions for the protocol. These buttons are only available if the current device is not selected for inclusion (as detailed in the next step). This is detailed below:




 Add a new Scout, Acquisition, or Reconstruction.

 Edit the currently selected row. A dialog box will open.

 Copy the current row to a new row; for example, this is useful if you have many parameters that are duplicated between acquisitions.


 Delete the currently selected Scout, Acquisition, or Reconstruction row.

 Allows you to arrange a row by moving the currently selected row up.

 Allows you to arrange a row by moving the currently selected row down.

5 Click on this checkbox to include (checked box) or not include (unchecked box) the device from the protocol. Note that you will be unable to manage the Scouts, Acquisitions and Reconstructions without deselecting the device from inclusion.


Adding a Scout (also known as a localizer or Surview)

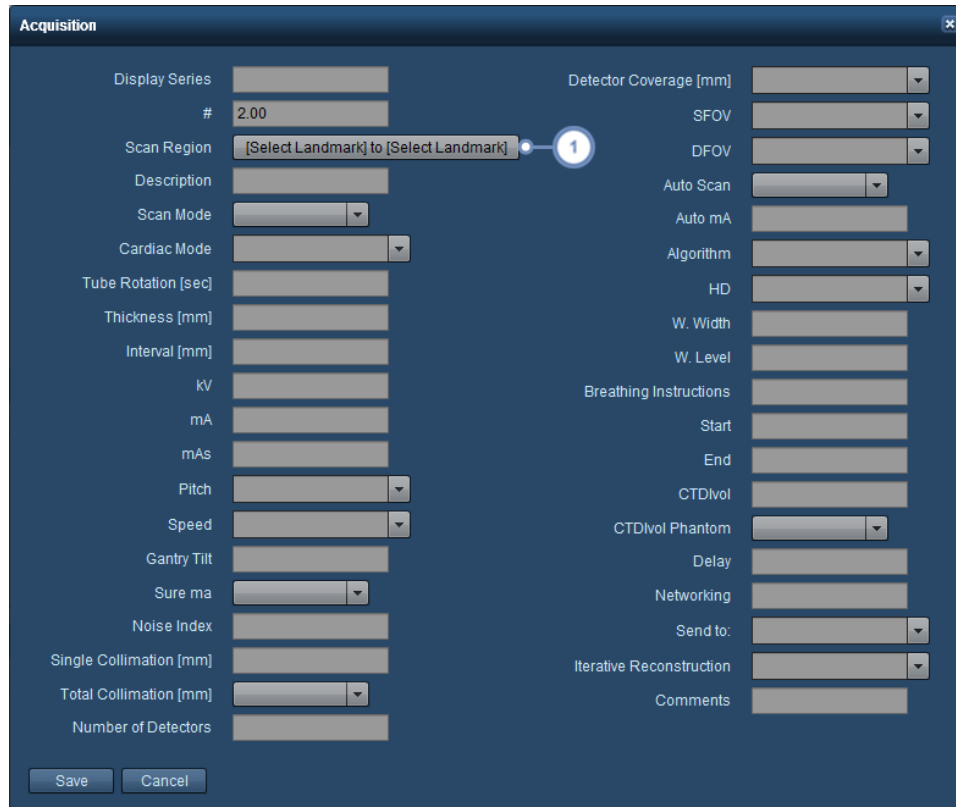
After clicking on the Add button , using the Scout dialog, enter the appropriate values. Use tab to move between fields. Click Save when you are satisfied with your entry.

The Scout dialog box contains the following fields:

- Orientation: dropdown menu
- Direction: dropdown menu
- Scan Range: text input field
- Start: text input field
- kV: text input field
- End: text input field
- mA: text input field
- Comments: text input field
- Buttons: Save and Cancel


Adding an Acquisition

After clicking on the Add button , using the Acquisition dialog, enter the appropriate values. Use tab to move between fields. Click Save when you are satisfied with your entry. A scan region (range) for the acquisition may be set.



- 1 Modify the Scan Region by clicking here. See "Scan Regions" on page 138 for more help in selecting and working with scan regions.

Adding a Reconstruction

After clicking on the Add button , using the Reconstruction dialog, enter the appropriate values. Use tab to move between fields. Click Save when you are satisfied with your entry.

The 'Reconstruction' dialog box contains the following fields and controls:

- Display Series: [Text Field]
- Acquisition #: [Text Field]
- #: [Text Field, value: 3.00]
- Description: [Text Field]
- Type: [Dropdown Menu]
- Start Location: [Dropdown Menu]
- End Location: [Dropdown Menu]
- Orientation: [Dropdown Menu]
- Thickness [mm]: [Text Field]
- Interval [mm]: [Text Field]
- Image Order: [Dropdown Menu]
- FOV: [Dropdown Menu]
- DFOV: [Dropdown Menu]
- Algorithm: [Dropdown Menu]
- HD: [Dropdown Menu]
- W. Width: [Text Field]
- W. Level: [Text Field]
- Window: [Text Field]
- Recon Opt.: [Text Field]
- Send to: [Dropdown Menu]
- Iterative Reconstruction: [Dropdown Menu]
- Comments: [Text Field]
- DMPR: [Dropdown Menu]
- ASIR: [Text Field]

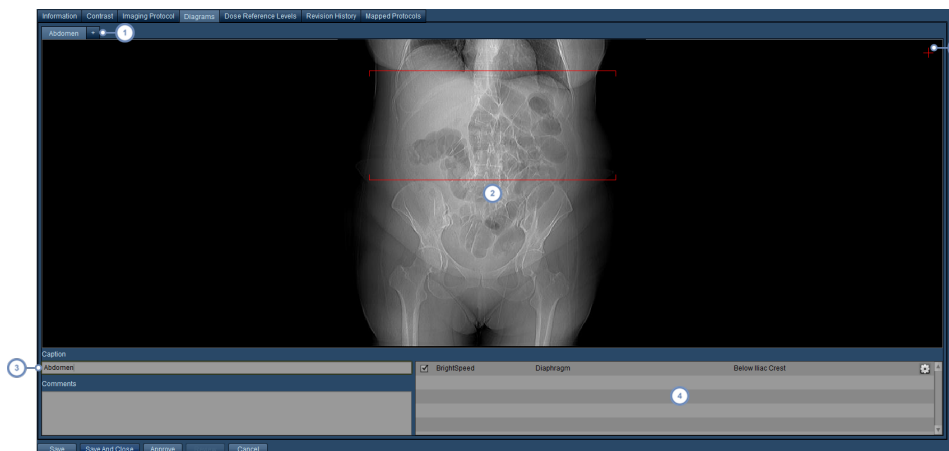
Buttons: Save, Cancel



When adding a reconstruction, you should make sure that the Acquisition # is filled in as each reconstruction should be associated with an acquisition.

Adding a Diagram


You may add a diagram with custom images or anatomy, captions, comments and associated landmarks to your Master Protocol for informational purposes.




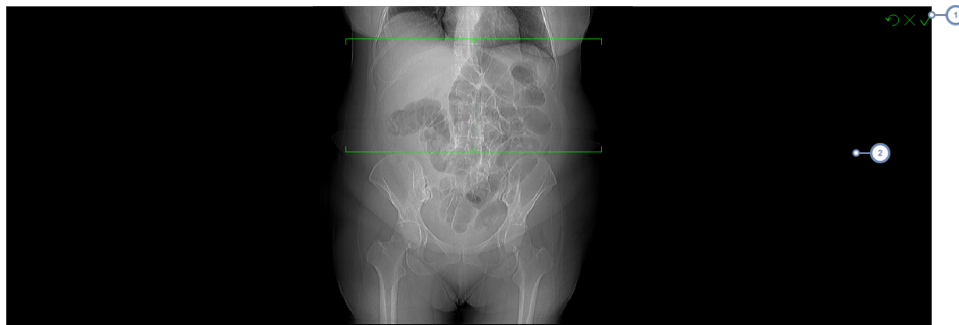
1

Clicking on the '+' button allows you to add a new image to the Master Protocol. You may re-order the images by clicking on their name, and dragging them to the desired position. In addition, you can delete them by clicking on the small square button that appears in the upper right corner of the label when the mouse cursor is hovering over

it.

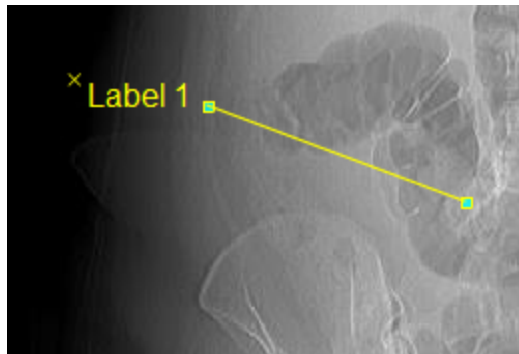
- 2 Within the image window, you can double-click in order to bring up the interface that allows you to choose an image (or an anatomical dummy) for display. See the interface that appears below.
- 3 Enter a caption in this field, along with comments in the field below if so desired. These will appear adjacent to the image in the Master Protocol.
- 4 This is a list of landmarks associated with your Master Protocol. You may enable or disable the display of your landmark lines by clicking on the checkbox; however, the image must have the particular landmark associated with it as well for this to work. The Settings/Adjust Tilt  button allows you to tilt the acquisition lines.
- 5 The Annotations option allows you to add labels (Annotations) to the diagram. To start this process, click on the thin red plus symbol at the upper right corner of the diagram. Then, follow the instructions for placing an annotation as described below.

To tilt the acquisition lines, click on the Settings/Adjust Tilt  button. The interface will change as below:

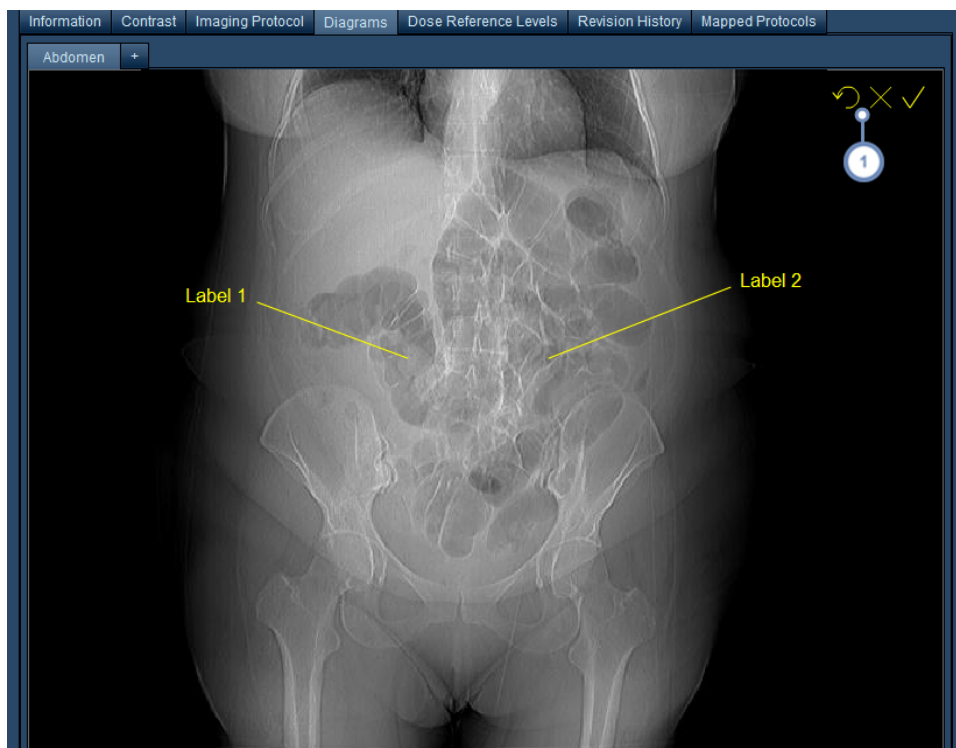


- 1 The three buttons here allow you to reset the tilt back to normal, cancel your changes, or accept the current changes respectively from left to right.
- 2 In order to tilt the scan lines, click on one of the lines and drag to adjust the tilt to the desired position. Of note, you can adjust the centre line horizontally as well as the scan lines.

Placing an annotation occurs after clicking on the red plus button. "Draw" the annotation by clicking on the diagram to place the start point for the annotation, holding the mouse button down and dragging out the line until it reaches the point where you want the label to be displayed.



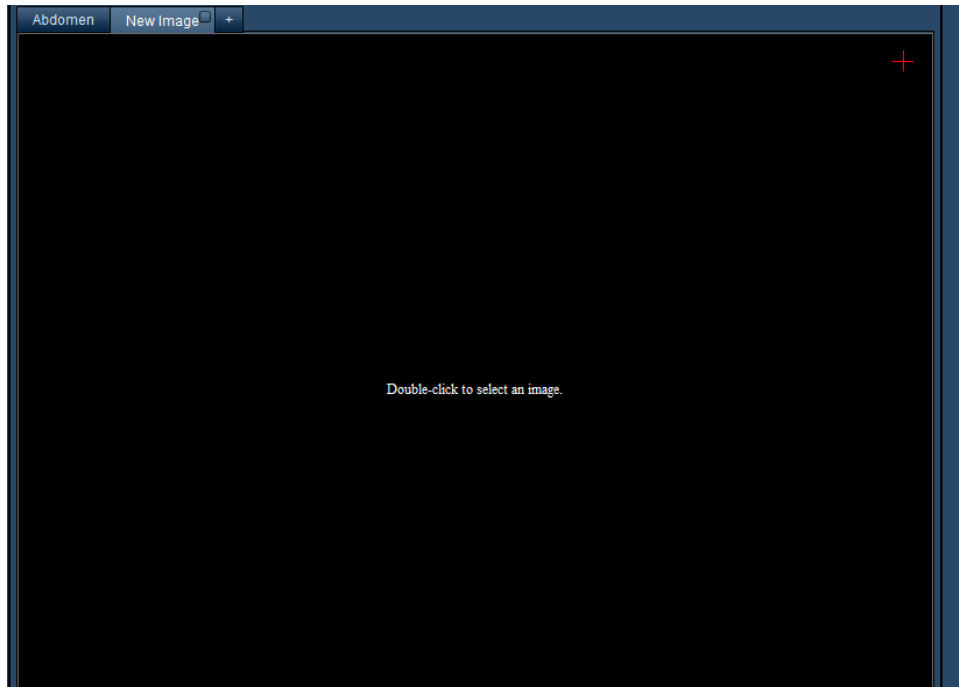
A default label will be created. Clicking on the label will allow you to change the text. Clicking on the line endpoints will allow you to move the location of the annotation. Clicking on the 'x' to the upper-right of the label will delete that annotation. In addition, the additional controls shown below are available:



- 1 The three symbols here (the reversing arrow, the x, and the checkmark) allow you to clear all the present annotations, cancel your annotation edits, or accept the current annotations respectively from left to right.

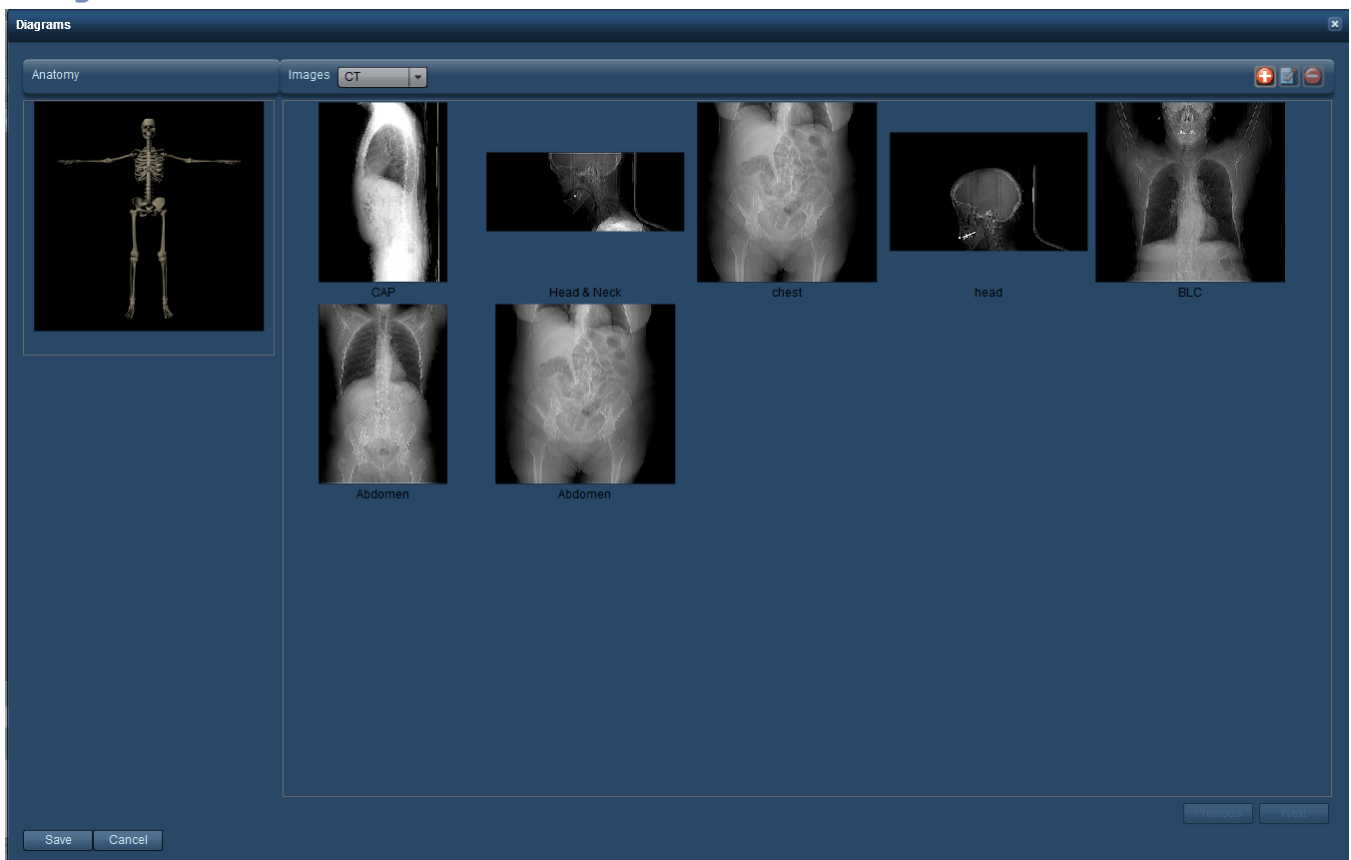
New Diagram screen

When adding a new diagram, a new tab will appear with a blank window.



Double-clicking in the blank area will bring up the Diagram Selection screen.

Diagram Selection screen

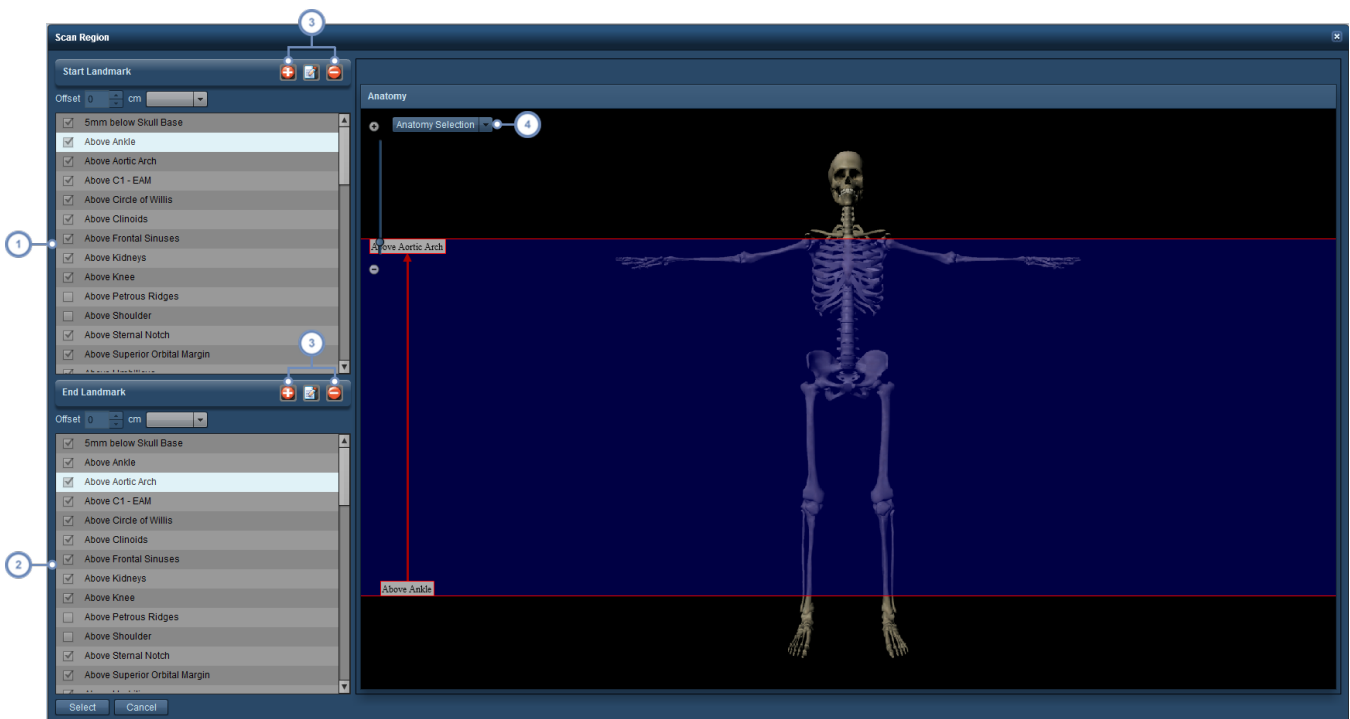


Once you double-click on the image window, the above interface appears to allow you to select between an anatomical skeleton or an image. The interface also allows you to add, delete and modify images. Clicking on an image (or the skeleton) will select it, and subsequently, you can click Save to have it appear in the Master Protocol.

See "Working with diagrams" on page 147 to learn how to modify the available images.

Scan Regions

The Scan Region interface appears when selecting a scan range for acquisitions. From the interface, you may select your start and end points from a set of landmarks as well as manage the landmarks.




1 Choose your starting landmark from this list.

2 Choose your ending landmark from this list.

3 These buttons allow you to manage the landmarks by adding, deleting or modifying the currently existing ones. Both sets of buttons duplicate the functionality of adding, deleting or modifying the landmarks. See "Anatomical Landmarks" on page 145.

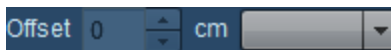
4 The Anatomy Selection drop-down menu allows you to enable/disable the display of particular organ systems. This may assist with your landmark choice and placement.

 Unchecked landmarks have not had their indicators positioned and must be edited before becoming useable.

Click on Select once you are finished in order to save your scan region.

Offsets

Using an offset allows you to set a beginning or end point relative to a pre-existing landmark, either above or below (using the drop-down menu) with a distance measured in centimetres.



Importing a Master Protocol

Radimetrics software is able to import CSV or XML files from a scanner export to help assist with creating a Master Protocol. RadLex Playbook CSV files are importable to standardize protocol nomenclature.



1 Import a protocol by clicking on the Import  button.

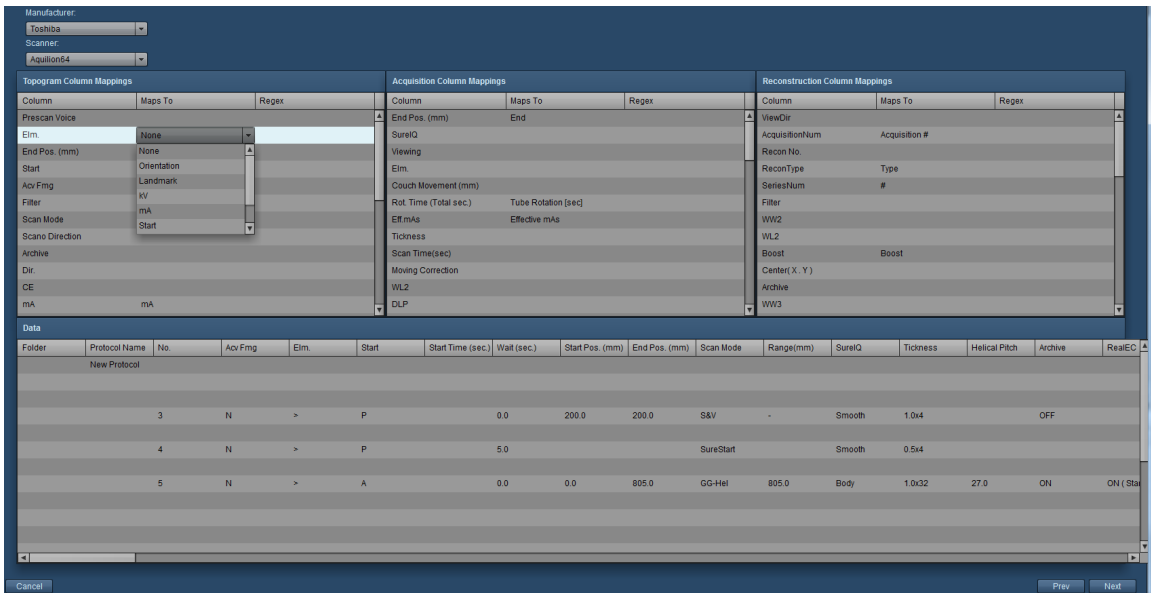
After clicking on Import, the following interface appears; usually the fields are blank but for this example, a CSV file has already been loaded by clicking on the "Open File" button, which displays a dialog box allowing you to choose a CSV or XML file for import.



Once a file is opened, the Content frame displays the raw data from the imported file. Then, you can click "Next" at the bottom right of the screen to continue to the next step. Multiple protocols may be present.

Matching fields

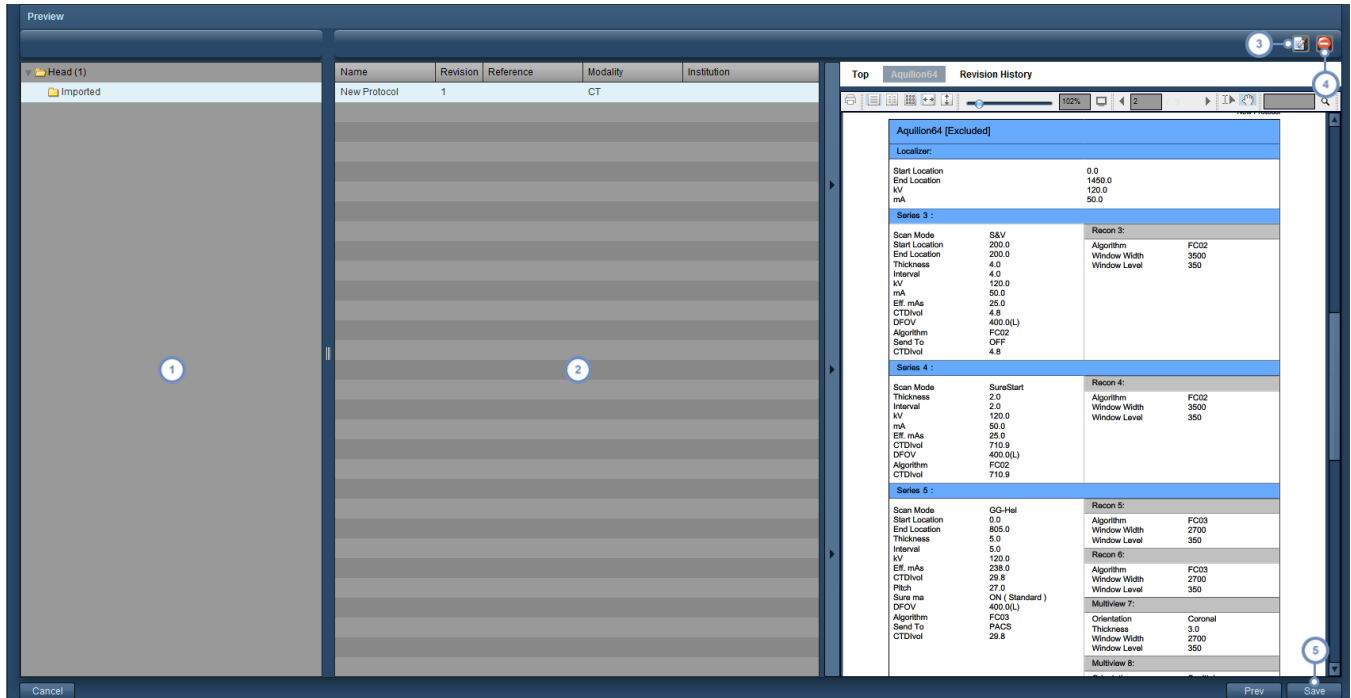
The next screen that appears allows you to map fields from the imported file to match Radimetrics's fields. The data is broken into three columns: Topogram, Acquisition, and Reconstruction.





Radimetrics software will automatically try to map fields, but clicking on the "Maps To" column allows you to select the correct mapping as needed from a drop-down containing a list of fields. Click on Next once you are comfortable with the way the fields have been mapped.

Import preview

Next, Radimetrics™ Enterprise Platform will show a preview of the new Master Protocols.




- 1 This column displays the Master Protocol's containing folder as it would appear in the list of protocols; a folder needs to be selected to display the protocols within it.
- 2 This column displays the imported Master Protocols contained within the selected folder. Once a protocol is selected, it will generate a PDF preview as shown in the image on the right.
- 3 The Edit  button allows you to edit the selected Master Protocol prior to import. See "Creating a Master Protocol" on page 128 for more information on editing the protocol.
- 4 The Delete  button allows you to delete the currently selected protocol.
- 5 Finally, once you are satisfied with your changes, you can click on the Save button to complete the import of your protocol.

Master (Mapped) Protocols

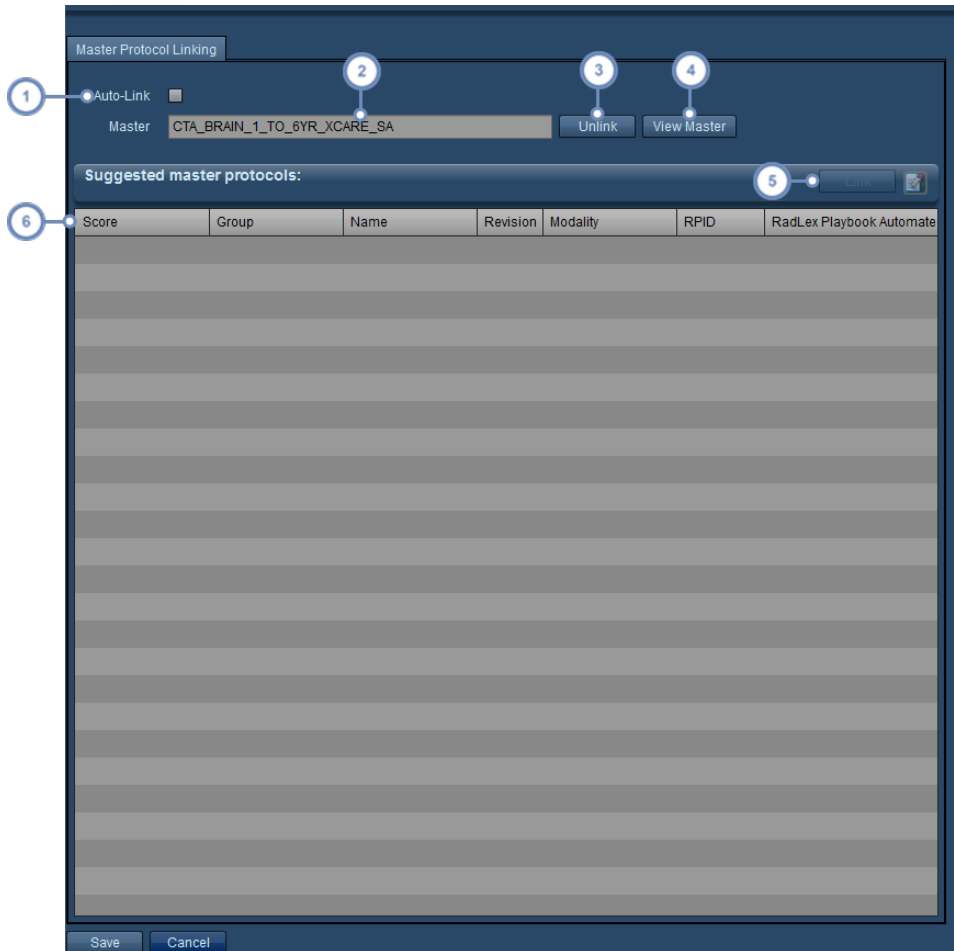
Each protocol may be mapped to one or more Device Protocols. If a protocol is mapped to a Device Protocol, it serves as the 'Master Protocol' for that Device Protocol. Clicking on the "Mapped Protocols" tab displays a list of the device protocols mapped to this protocol. The Device Protocols must be mapped by a user with access to the Configuration Module. See "Protocols and Orders" on page 178 for more on Master Protocol Mapping.


Group	Name	Revision	Modality	Institution	Equipment	Device
Unsorted Protocols	Unknown Procedure	1	Unknown Modality	Site A HospB6FA93	RF11111111	AXIOM-Artis
Unsorted Protocols	Bilateral Mammogra	1	MG	Unknown Institution	Dimensions	Selenia Dimensions
Unsorted Protocols	Mammography Bilat	1	MG	Unknown Institution	Dimensions	Selenia Dimensions
Unsorted Protocols	Unknown Procedure	1	US	HospEF291C3E	AE87281C876E	LOGIQE9
Unsorted Protocols	CHEST 1 VIEW	1	DX	Hosp6BE3E212	AEBF967F6796	"Geode Platform"
Unsorted Protocols	SPCVCREM NO GU	1	Unknown Modality	Site A HospB6FA93	RF11111111	AXIOM-Artis
Unsorted Protocols	Unknown Procedure	1	MR	JIRA HOSPITAL	Unknown Equipmer	MR0010
Unsorted Protocols	Unknown Procedure	1	Unknown Modality	Site A HospB6FA93	RF11111111	AXIOM-Artis
Unsorted Protocols	Unknown Procedure	1	US	Hosp5446CD05	AE044A55612A	LOGIQE9
Unsorted Protocols	ACUTE ABDOMINAL	1	DX	Hosp0BCFC32D	AFF145F97346	ADC Compact Plus V1

1 Click on the Edit button  to open up the Master Protocol Linking screen.

Changing the Master Protocol for a Device

The Master Protocol Linking screen allows you to change a listed device protocol's Master Protocol.



- 1 Enabling Auto-Link will automatically select the Master Protocol with the highest score for linking to the current protocol.
- 2 The name of the currently mapped Master Protocol is listed here.
- 3 Clicking on Unlink will unlink the protocol from the currently mapped Master Protocol.
- 4 Clicking on View Master will open up the currently mapped Master Protocol for editing.
- 5 Once selected from the list of Master Protocols, you can click on the Link button to map the selected Master Protocol to the current protocol. The Edit button  will allow you to edit the selected Master Protocol.
- 6 The Score field listed here indicates how strongly Radimetrics software feels that the master protocol matches the protocol you are trying to link. Score are between 0 and 1, where a higher score indicates a stronger match; 1 would indicate that the protocols are identical.

When you are done, click on the Save button at the bottom left corner of the dialog box.

Approving a Master Protocol

Once a Master Protocol has been created, or if it is up for review, it needs to be approved to be enabled.

The screenshot shows the 'Protocol Editor' dialog box with the following fields and buttons:

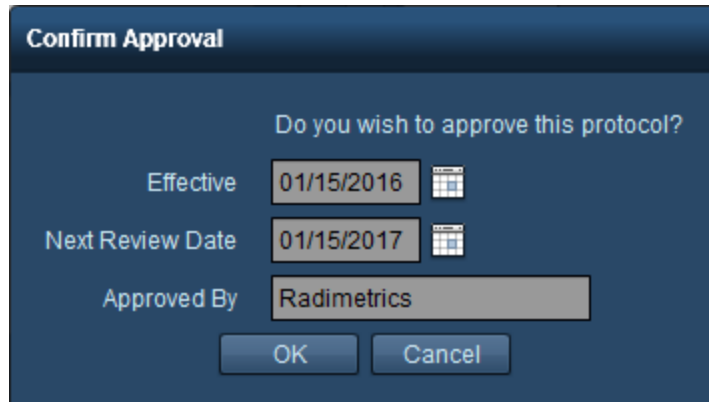
- Reference:
- Billing Codes:
- Indications:
- Patient Preparation:
- Patient Position:
- Scan Overview:
- Comments:
- Networking:

There is no RadLex Playbook Entry assigned to this protocol.

Created	Effective	Last Review	Next Review
<input type="text" value="01/10/2014"/>	<input type="text" value="01/10/2014"/>	<input type="text"/>	<input type="text" value="01/10/2015"/>
Author	Revised By	Reviewed By	Approved By
<input type="text"/>	<input type="text" value="Administrator"/>	<input type="text"/>	<input type="text"/>

Buttons at the bottom: Save, Save And Close, **Approve** (highlighted with callout '1'), Cancel.

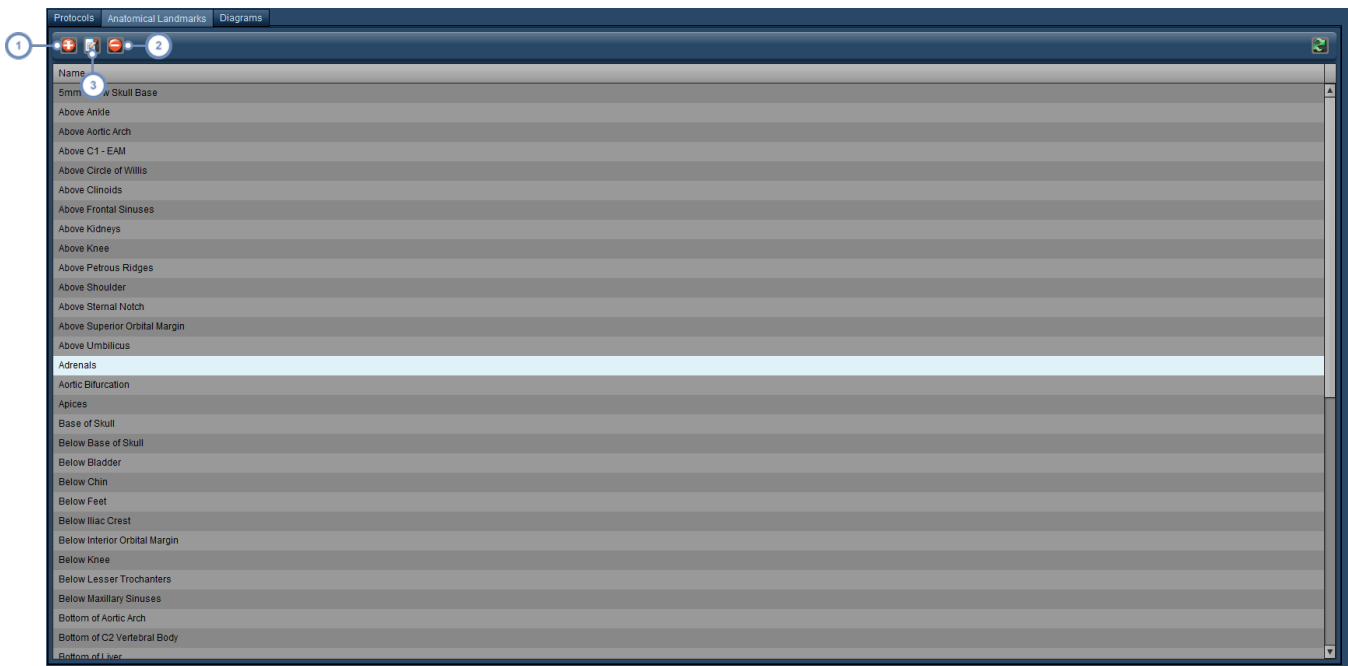
- 1 Within the Protocol Editor screen for the desired Master Protocol, click on the Approve button to bring up the following dialog box. You may need to save any current changes in order for the Approve button to be available.





Edit the Effective date, Next Review date and the Approved By field as needed. Click on OK once you are done.

Anatomical Landmarks

Landmarks are pre-defined positions that mark the beginning and endpoints of an acquisition. The Anatomical Landmarks list interface is shown below.

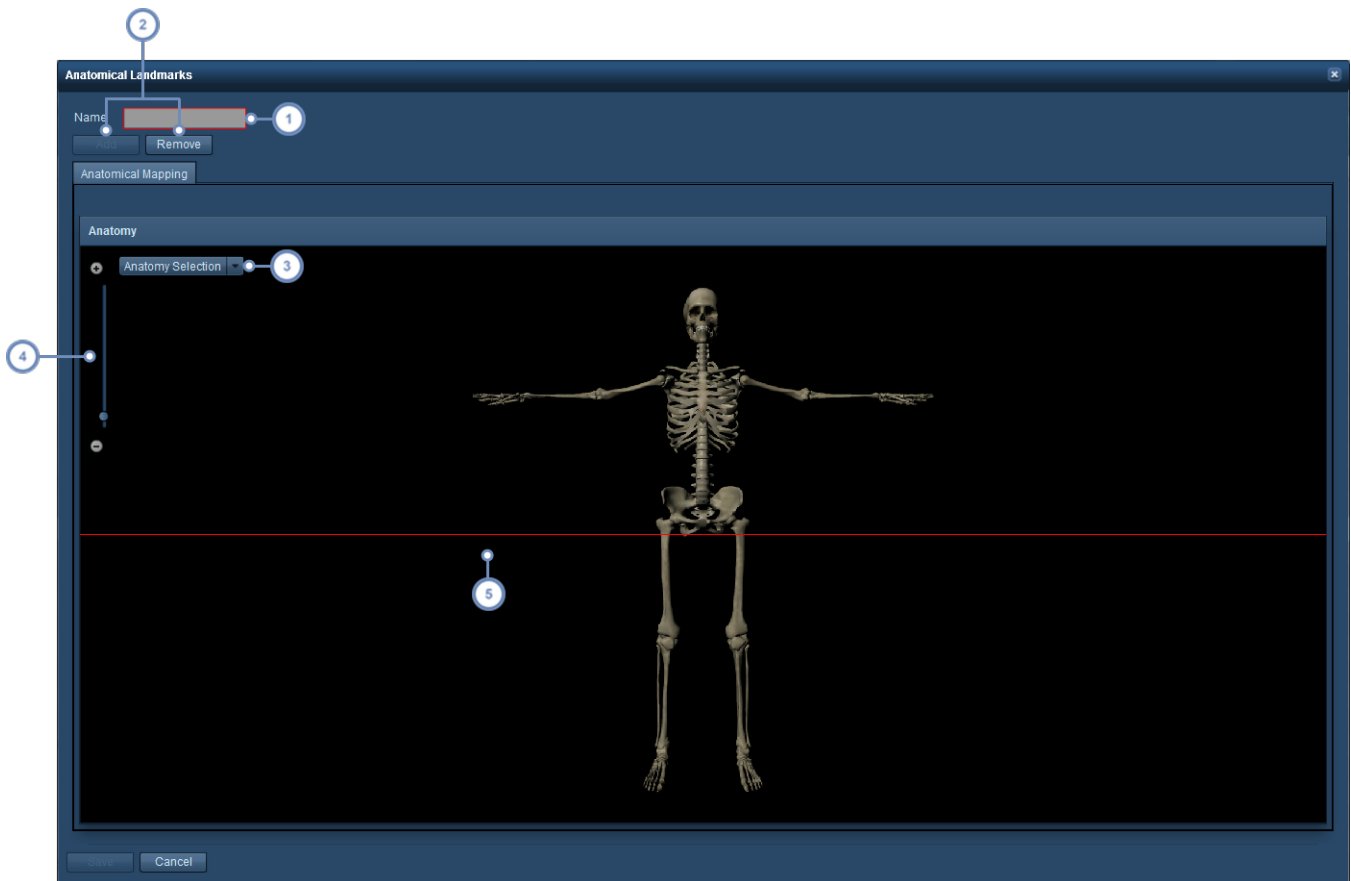


1 The Add button  allows you to add a new landmark.

- 2 The Edit button  allows you to edit the currently selected landmark.
- 3 The Delete button  deletes the currently selected landmark. A dialog box will appear asking you to confirm the deletion.

Adding or editing a landmark

The interface for adding or editing a landmark is as shown below.

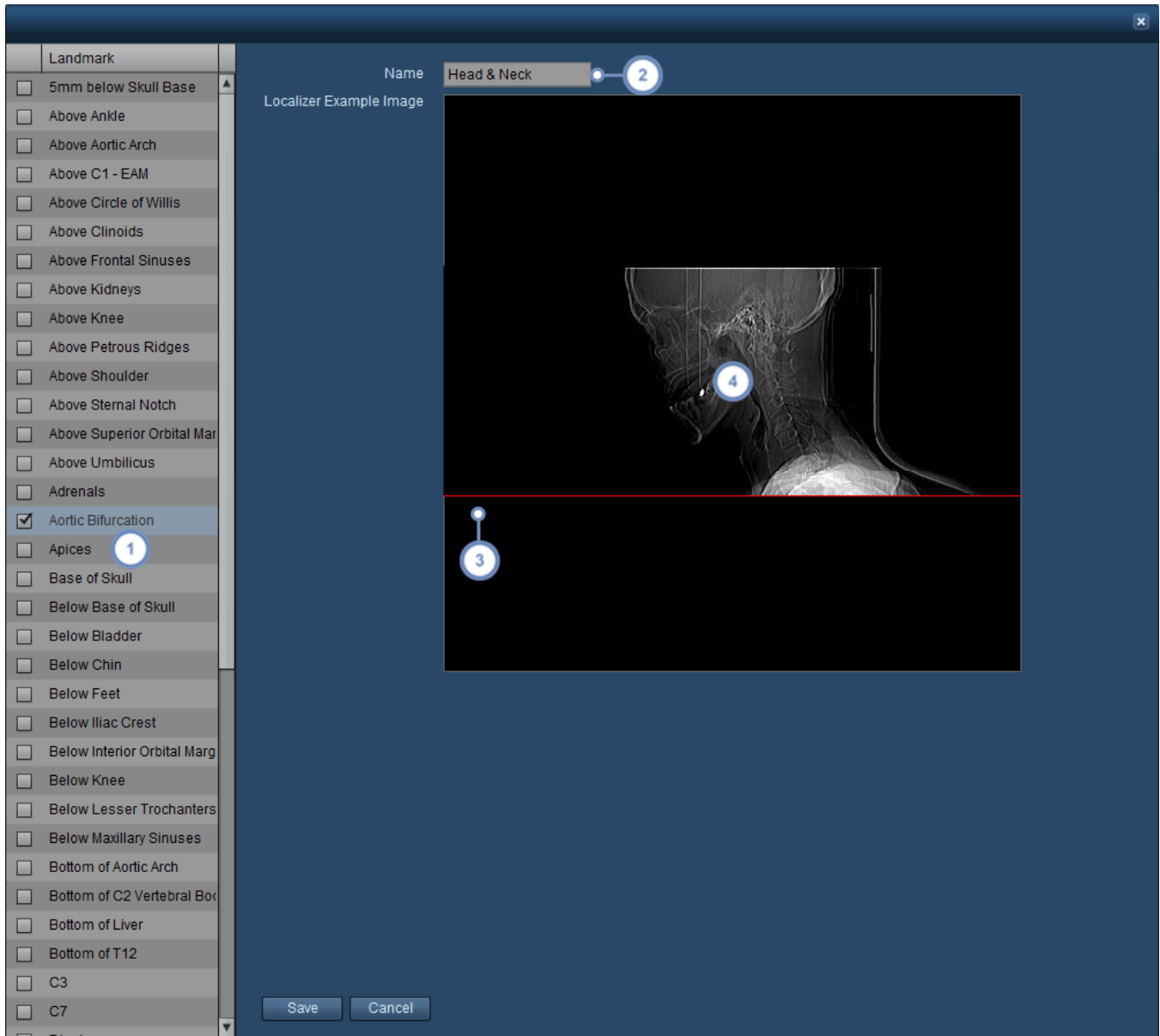


- 1 The name of the current landmark can be modified here.
- 2 The Add and Remove buttons are used to add or remove the landmark line (in red); only one landmark line is allowed per landmark.
- 3 The Anatomy Selection drop-down menu allows you to hide or display different organ systems onscreen to assist with landmark line placement.

- 4 You may zoom in using the + or - buttons, or you can click on the zoom range line. This may help you make finer adjustments to the landmark.
- 5 The red line represents the current landmark placement. You may click and drag to change its position.

Working with diagrams

When you add or modify a diagram from the Protocol Editor module, the interface below appears.

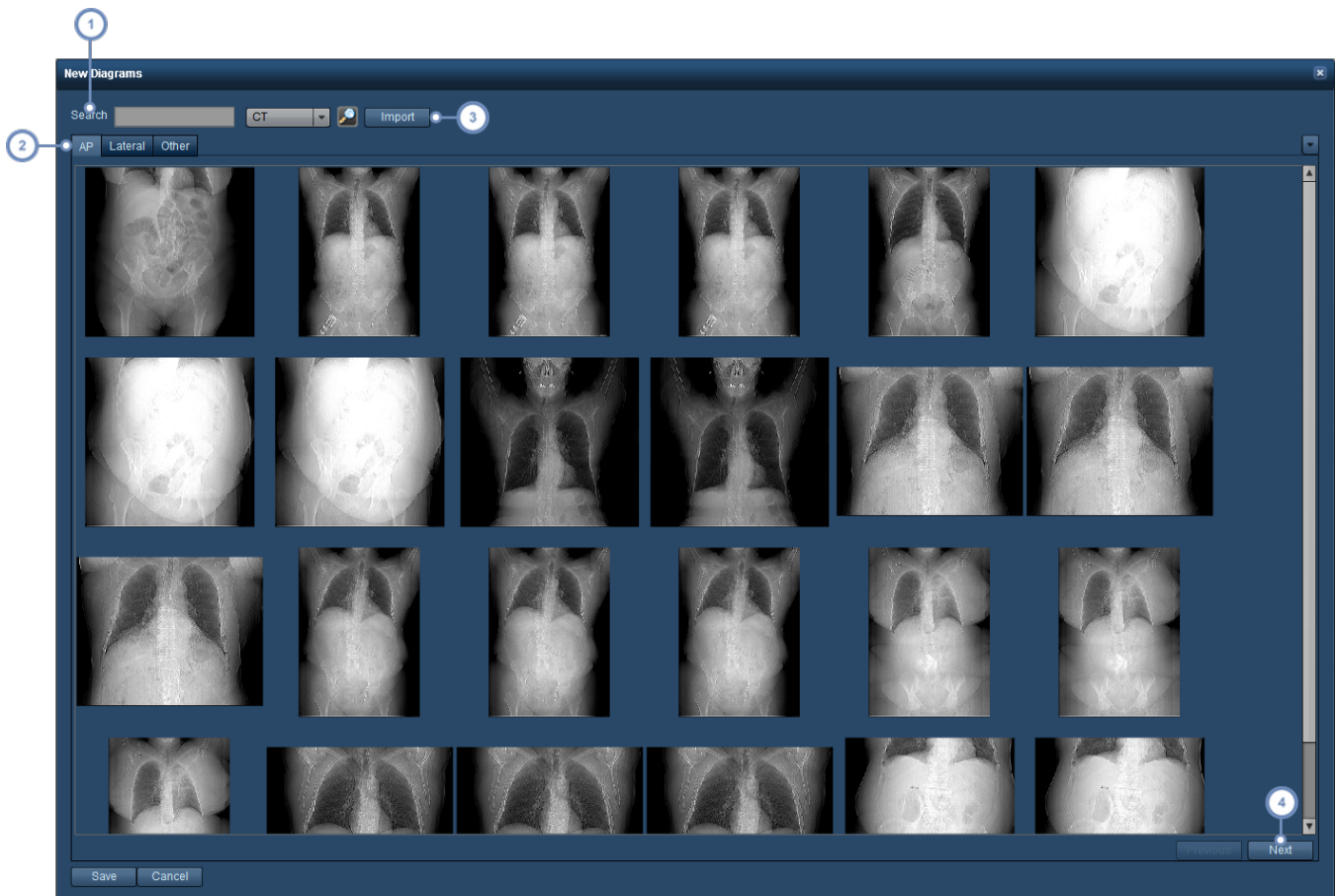


- 1 The Landmarks list is here. Enable a landmark for a diagram by clicking on the checkbox next to it. Multiple landmarks may be enabled and placed individually.
- 2 The name of the diagram can be changed in this field.
- 3 If a landmark has been enabled and selected, it will be displayed by default as a red line in the center of the image. Click and drag on this line to place it appropriately.
- 4 Double-clicking in the image window allows you to choose a different image for the diagram.

Click on Save after you are finished with your changes.

Selecting an image for a diagram

When you create a new diagram or double-click on an existing image in a diagram, Radimetrics software will bring up a display of sample images you can choose from. You may also import your own.



- 1 Entering a search term in this field (such as 'head') will narrow down the listed images to those containing the search term.
- 2 You can browse from AP, Lateral or Other (e.g. lateral decubitus) images for your diagrams.
- 3 Clicking on the Import button allows you to browse your computer and specify your own image in JPEG, PNG or GIF format for use as a diagram.
- 4 The Previous and Next buttons allow you to browse through the pages of images.

Click on an image, and if you are then satisfied with your selection you can click on the Save button to use that image for your diagram.

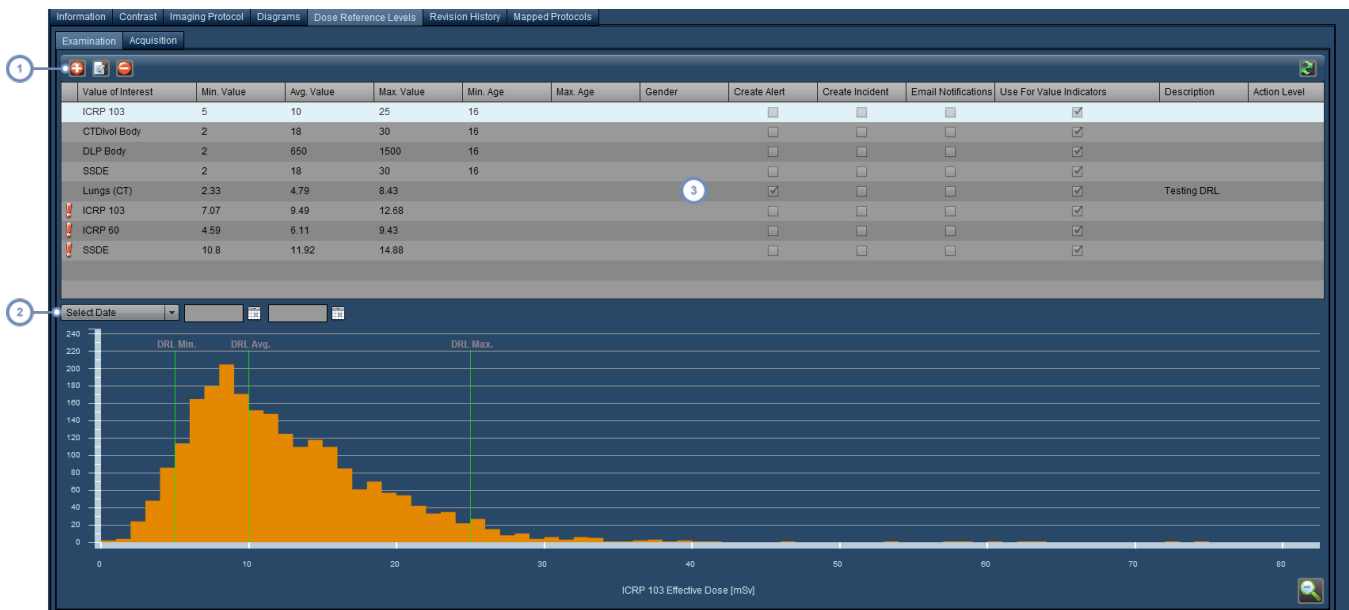
Setting Master Protocol Dose Reference Levels

Dose or Diagnostic Reference Levels are established reference values, that if exceeded, identify radiation exposures that are unusually high for common diagnostic medical imaging procedures.

Master Protocol specific dose reference levels (Protocol DRLs) are set to account for differences in expected doses due to a number of factors, for example, the range of the scans, or the radiosensitivity of the affected organs. They appear when reviewing exams and can be attached to alerts.


In order to modify the dose reference levels, the exam must be opened for modification under the Protocol Editor. After browsing for the protocol in the Protocol Directory and selecting it, double click on it or click on the Modify button.

Click on the Dose Reference Levels tab once the Master Protocol is opened for modification. The interface shown below will appear.



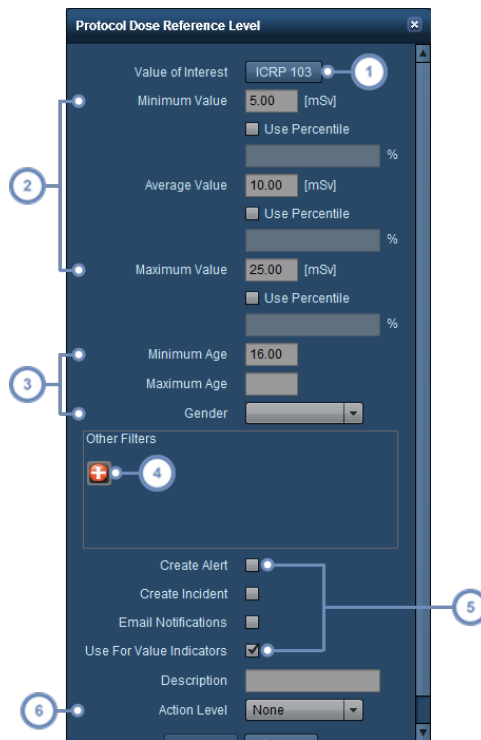
1 These buttons let you Add , Edit  and Delete  dose reference levels.

2 You can specify date ranges to limit the dose distribution displayed for comparison.

- 3 Individual dose reference levels are displayed in this table with their parameters. You must select on and then click on the Edit  button to modify its parameters.


Adding or Editing a Master Protocol DRL

For each Master Protocol, you can add multiple dose reference levels associated with different organs or standards. In addition, you can enable Alerts, Incidents, Email Notifications and associate an Action Level as well.



The screenshot shows the 'Protocol Dose Reference Level' configuration window. It includes the following elements:

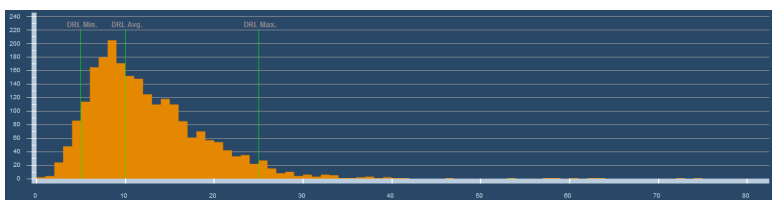
- Value of Interest:** A dropdown menu set to 'ICRP 103'.
- Minimum Value:** A text input field set to '5.00 [mSv]' with a 'Use Percentile' checkbox below it.
- Average Value:** A text input field set to '10.00 [mSv]' with a 'Use Percentile' checkbox below it.
- Maximum Value:** A text input field set to '25.00 [mSv]' with a 'Use Percentile' checkbox below it.
- Minimum Age:** A text input field set to '16.00'.
- Maximum Age:** A text input field.
- Gender:** A dropdown menu.
- Other Filters:** A section with a red plus sign icon for adding filters.
- Alerts and Notifications:** Checkboxes for 'Create Alert', 'Create Incident', and 'Email Notifications'.
- Use For Value Indicators:** A checked checkbox.
- Description:** A text input field.
- Action Level:** A dropdown menu set to 'None'.

- 1 You can choose a Value of Interest for this Reference Level.
- 2 You can set up minimum, average, and maximum dose reference levels based on absolute values or percentiles.
- 3 Age-range and gender specific constraints can be utilized as well here.
- 4 For any further refinements to the dose reference level, a custom filter can be applied by clicking on the add button  to bring up the filtering dialog.

- 5 This set of checkboxes allows you to define whether to Create an Alert, Incident, or whether to enable email notifications when the maximum value of the dose reference level is exceeded. The "Use for Value Indicators" option will enable the display of colors on exam search results to indicate normal, high and exceeding the maximum values. See "Interpreting exam search results" on page 46
- 6 An Action Level can be associated with the DRL as well via this drop-down menu. For more information on setting Action Levels, See "Default Dose Reference Levels and Action Levels" on page 196

Viewing the Master Protocol DRL chart

DRLs you have set can be displayed in a bar graph. To view the graph for a particular DRL, select an entry from the table. The bar graph is automatically regenerated as you change parameters for the DRL.

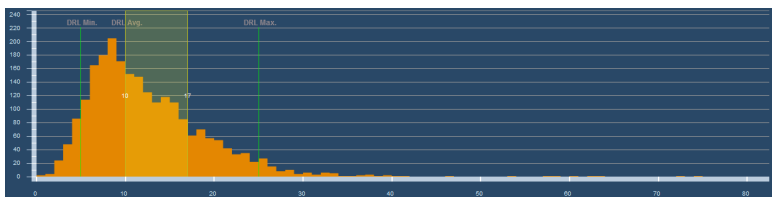


Minimum, Average and Maximum thresholds are displayed in green and in relation to the current distribution for that protocol, filtered by the settings for that DRL. Hovering over a bar will provide a ToolTip with summary information relating to the group of exams that fall within a similar range.

You can double-click on a bar to open up a list of examinations that fall underneath the range of that bar, and then subsequently select individual exams for review.

Magnifying an area of the distribution

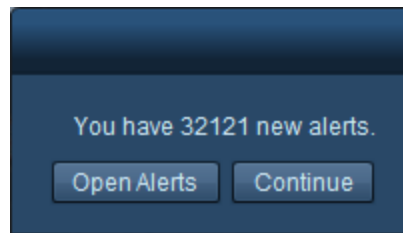
By clicking and holding down the mouse button while moving the mouse cursor on the chart, you can define a range of values which you would like to inspect in closer detail.



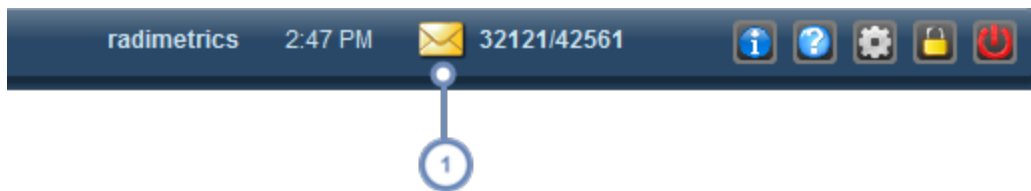
Alerts

Alerts may be set to notify you of events such as an examination exceeding a dose reference level, a patient who is reaching their cumulative dose thresholds, or dose calculation problems. Alerts are generally reviewed in the Alerts Inbox.

There are two ways that you can enter the Alerts Inbox. First, when you log into Radimetrics™ Enterprise Platform, a dialog box will appear indicating if there are any new alerts available for review.



Clicking on "Open Alerts" here will open the Alerts Inbox. Otherwise, in the main Radimetrics interface, an envelope icon will appear alongside two numbers:

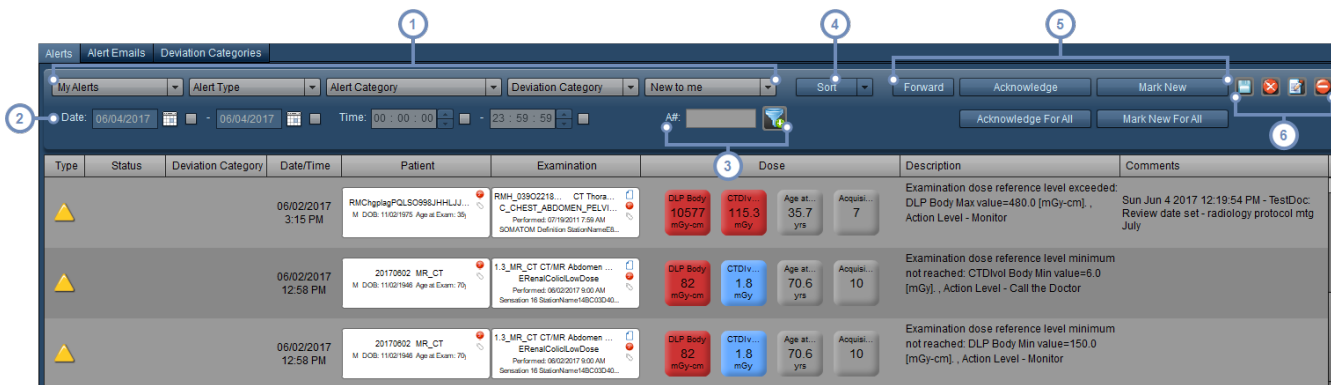


- 1 Clicking on the envelope will open the Alerts Inbox. The first number indicates the number of alerts yet to be reviewed and acknowledged; the second number indicates the total number of alerts in your inbox.

Another method of reviewing alerts is to have an Alert component on your Dashboard. See "Alerts" on page 117 for more information on this.


Alerts Inbox

The Alerts Inbox allows you to review your alerts. Alerts appear in your inbox based on your subscription settings. In addition, you can review Alert Emails and Deviation Categories.




These drop down-menus allow you to customize the alerts shown. The first drop-down menu specifies between showing alerts specific to you ("My Alerts") and All Alerts; the second drop-down menu allows you to choose between the types of alerts (All, Error, Information and Warning); the third drop-down menu allows you to choose the category of alert (e.g. Dose Report, Examination Dose, System Information, etc.); the fourth drop-down menu allows you to choose the Deviation Category; the fifth drop-down menu allows you to choose between displaying alerts that are new to either the current user, to all users, or all alerts.




Entering a start and/or end date or time on this row will enable you to select alerts from a specific date/time range. Click on the checkboxes to enable the filter.


You can search for alerts associated with a specific Accession number by entering it into this field. In addition, you can filter your displayed results by using the Filter  button located to the right.

You can sort the displayed results by variables such as the accession #, exam date, or ICRP103 dose via the drop-down menu here.

'Forward' allows you to send an alert to another user's inbox. 'Acknowledged' will mark the selected alert(s) as having been reviewed, such that it will not appear by default in the inbox. 'Mark New' reverses this, assuming that you are viewing previously acknowledged alerts. The "For All" variant buttons apply these conditions to all users' inboxes rather than just for your own inbox.

The Export  button allows you to export one or more alerts to XLS/CSV/XLSX or PDF formats. See "Exporting

alerts" on page 158. The Reset button  brings your Alerts Inbox view back to its original state, as if you have just opened it. The Edit button  allows you to view additional details for and edit individual alerts. See "Viewing and managing individual alerts" on page 155. Adjacent to this is the Delete button , which allows you to delete selected alerts.

 Only users with System Administrator privileges can view "All Alerts".


Alert Comments


Comments can be added to individual alerts when editing them (if they exist in your personal Inbox) or by forwarding them to other users. This is detailed in the next section. From the Alerts Inbox, you can review previous comments added to an Alert by hovering the mouse cursor over the Comments column of an alert as shown below.

Description	Comments
Examination dose reference level exceeded: DLP Body Max value=480.0 [mGy-cm]. , Action Level - Monitor	Sun Jun 4 2017 12:19:54 PM - TestDoc: Review date set - radiology protocol mtg July
<div style="border: 1px solid gray; padding: 5px;"> <p>Sun Jun 4 2017 12:19:54 PM - TestDoc: Review date set - radiology protocol mtg July</p> <p>Sun Jun 4 2017 12:18:01 PM - TestDoc: Protocol to be reviewed</p> </div>	

A second window appears below the Comments field for the alert, displaying a list of previous comments including the times they were entered and the user who added them.

Viewing and managing individual alerts

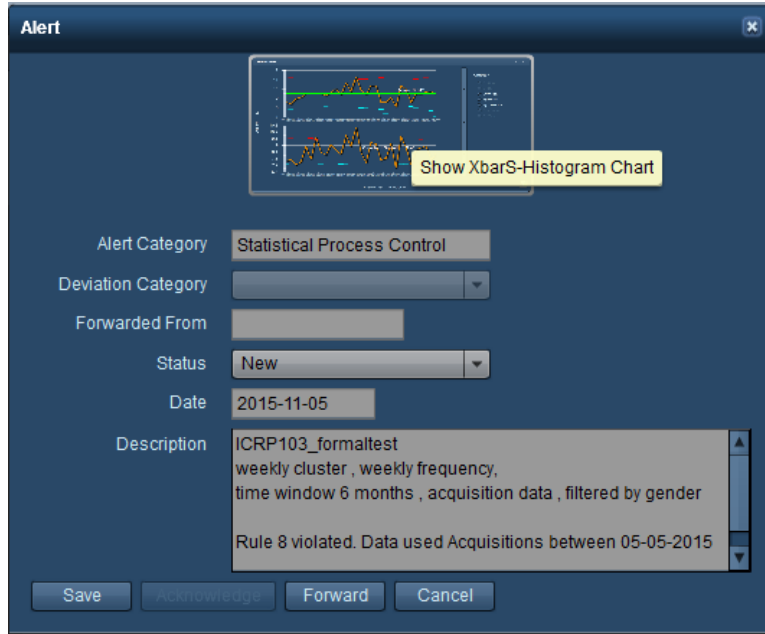
By clicking on the Edit button  when an alert is selected, or double clicking on an alert row, a dialog box will appear with additional details about the alert. The Deviation Category can be changed along with the alert's status (e.g. from New to Acknowledged). The "For All" checkbox applies the selected status to every user that has this alert in their inbox. Comments can be added to alerts if they are in your personal Inbox ("My Alerts"). To do so, enter the desired comment text into the "Add Comment" field, and then either save or acknowledge the alert.

Also note that the Export  button can be used to export the alert details. See "Exporting alerts" on page 158 for more information.

Once you are done making changes, you can click on the Save button to return to the main Inbox screen.

SPC Alerts

Statistical Process Control Alerts display a somewhat different dialog box showing a large graph icon at the top which can be clicked to show an XbarS chart. The displayed chart should show why the SPC alert was triggered.

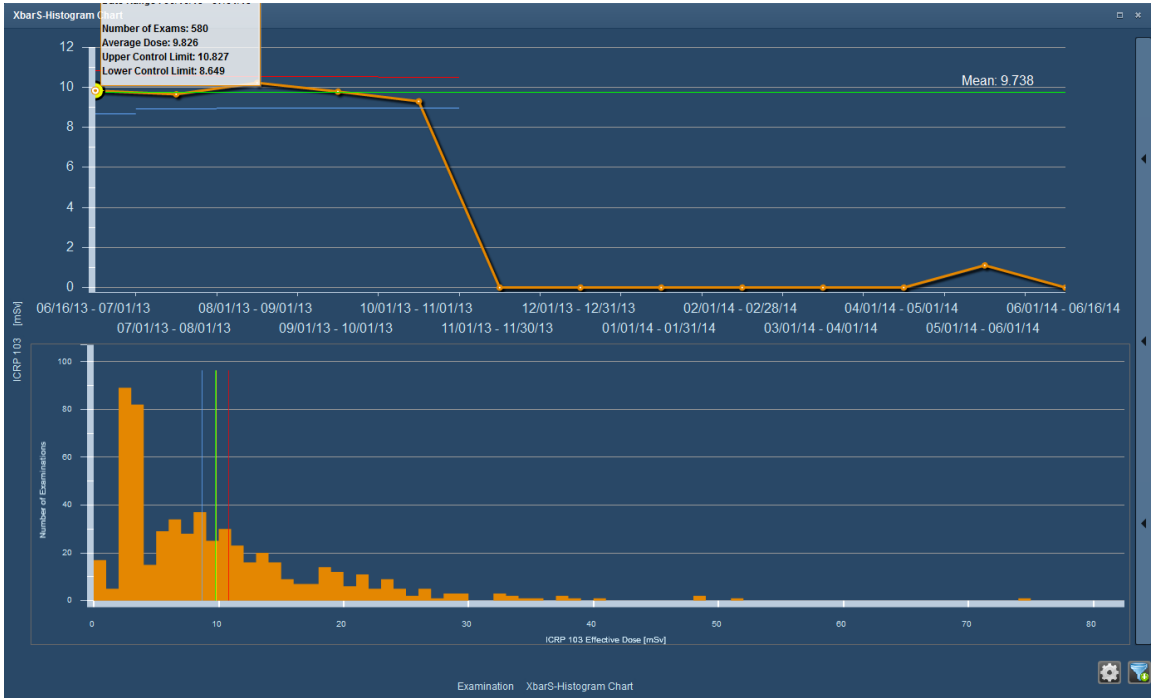


A sample XbarS chart is shown below, with averages on the upper graph and standard deviations represented on the lower graph. Colored circles represent the points that triggered the Nelson rule associated with that color.



Data points can be hovered over to display a ToolTip displaying relevant information such as the number of exams and control limits. Vertical purple lines represent points of intervention. Click-

ing on a data point on the upper chart will display the corresponding frequency distribution chart on the lower chart as shown below.



To return to the original lower chart, click in a blank area on the upper chart.

Exporting alerts

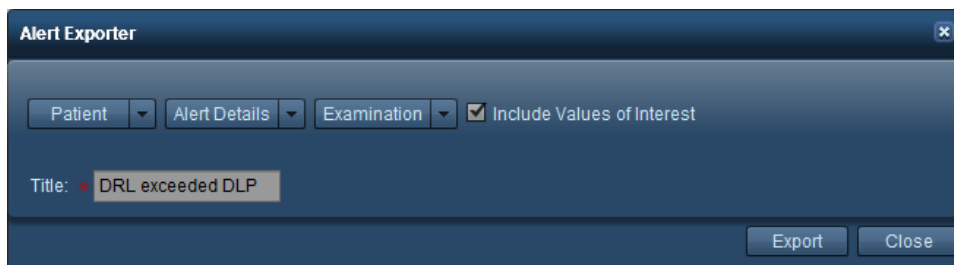
The alerts in the Alerts Inbox can be exported to XLS/CSV/XLSX or PDF formats. In addition, via the alert details dialog box, individual alerts can be exported to PDF. The Alert Exporter interface accessible from the Alerts Inbox directly is shown below.



- 1 You can switch between exporting to CSV/XLS/XLSX formats and PDF format here.
- 2 The drop-down menus allow you to select the fields you would like to include regarding the patient data, alert details, and examination data. The Values of Interest checkbox, if enabled, will include relevant Values of Interest as defined by the Value Indicator Settings configuration module. See "Value Indicator Settings" on page 209.
- 3 Allows you to choose between exporting only the items that were selected before entering the Study Exporter, or all the listed items.
- 4 Type in a title for the PDF export filename in this field.
- 5 The "Group By" drop-down menu allows a choice between no grouping (the default), or grouping exported alerts by the specified parameter such as by patient, examination, or operator.
- 6 "Include Summary", when selected, puts a summary of the exported alerts on the first page of the PDF report. This may include information such as the number or percentage of alerts associated with a specific patient, exam or other parameter as you have specified in "Group By".

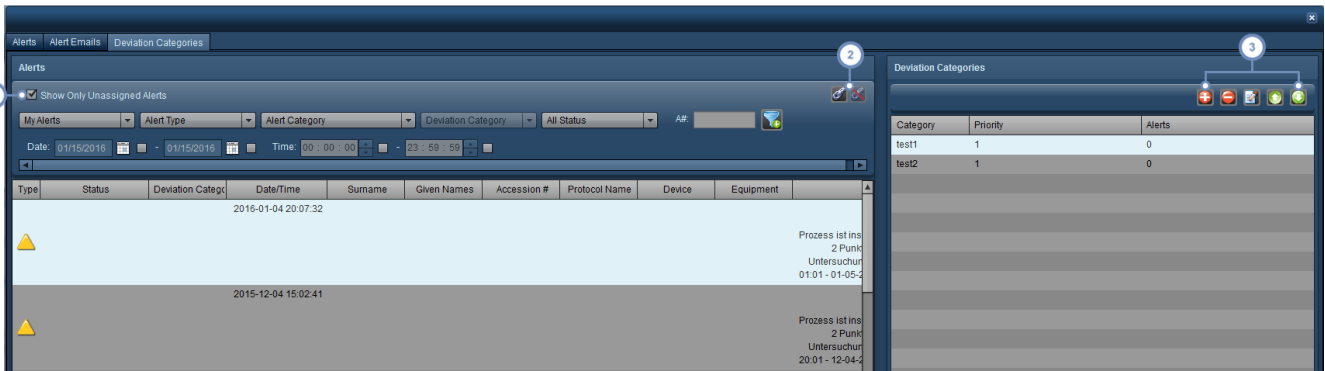
Exporting individual alerts

Via the individual alert dialog box, the Export feature brings up the following simplified Alert Exporter interface. The drop-down menus allow you to select the Patient, Alert Details, and Examination values to be included as before.










Deviation Categories

Alerts may be categorized by means of user customized Deviation Categories. Deviation Categories may be created to represent and assign different types of root causes to specific alerts. Alerts are manually assigned to specific Deviation Categories, as explained below. The interface is similar to the standard Alerts Inbox, with the addition of a list of Deviation Categories on the right side.



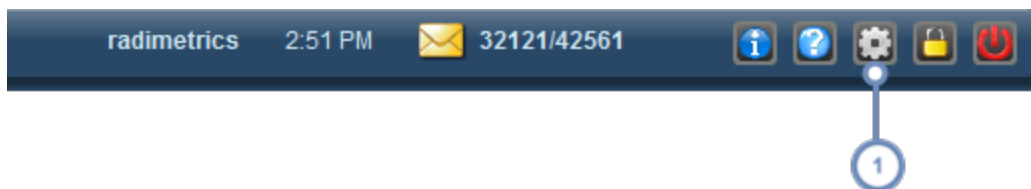
1 The "Show Only Unassigned Alerts" checkbox is enabled by default, to facilitate the display of alerts that may still need a Deviation Category Assigned.

If one or more alerts are selected from the list, and a Deviation Category is selected from the list on the right-hand side, the Chain-Link  button allows the assignment of the currently selected Deviation Category to the alert(s) selected. If a Deviation Category is currently assigned to the selected alert, then, the un-link  button removes the association.

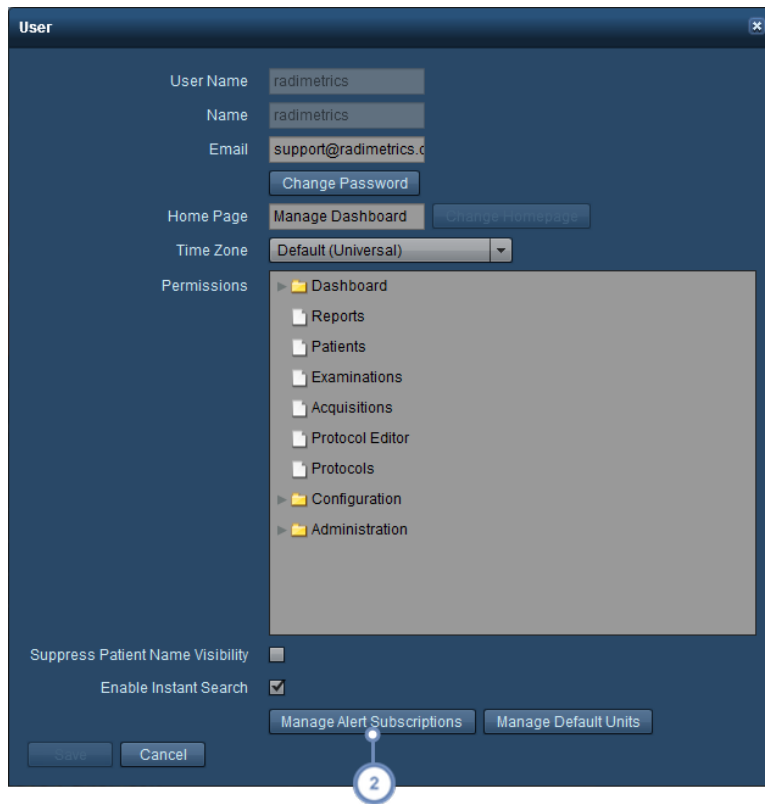
This series of buttons manages the Deviation Category list. The Add  button displays a dialog box allowing you to define a new Deviation Category including its description and priority. The Delete  button deletes/removes the currently selected Deviation Category. The Edit  button displays a dialog box allowing you to edit the currently selected Deviation Category. Finally, the Up  and Down  buttons increase and decrease the priority where 1 is the highest priority and 2 is second-highest priority, etc.

Subscribing to Alerts

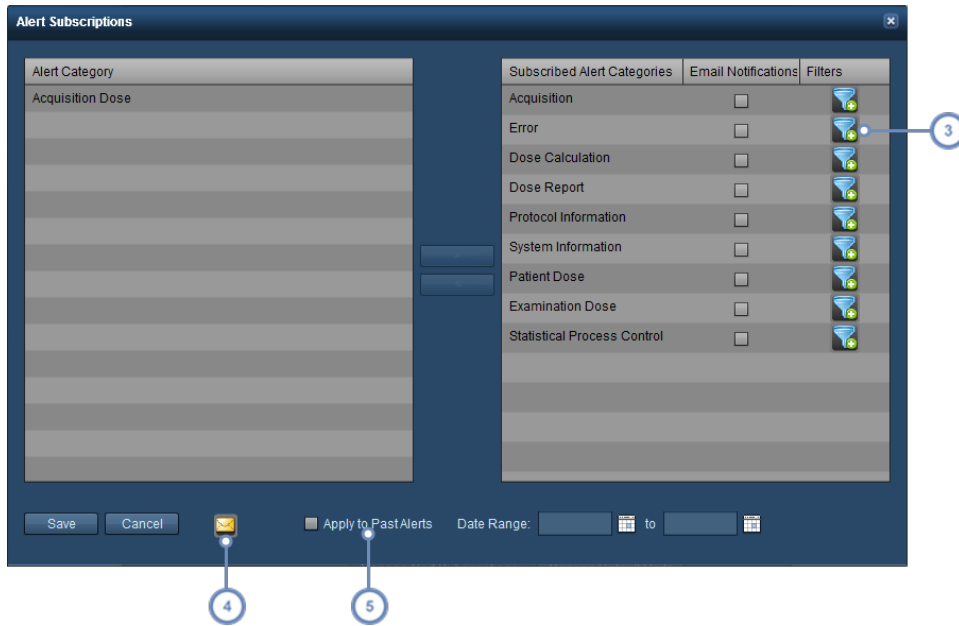
Multiple categories of alerts can be subscribed to such that they will be sent to your Inbox automatically when they are triggered. The management of these is done through the Settings menu. This page describes subscription to alerts for the currently logged-in user; an Administrator is able to configure alerts for any user via the Configuration module. See "Alerts Configuration" on page 228 for more details.





- 1 Click on the Settings button to bring up the User Settings screen.



- 2 Click on 'Manage Alert Subscriptions' to bring up the Alert Subscriptions window.



- 3 The Filter  button allows you to add filtering parameters to each category that you subscribe to.
- 4 The Mail  button brings up the Alert Notification Settings dialog, allowing you to set up your alert e-mail address, frequency and scheduling. The notification settings apply as long as you have also enabled Email Notifications for an Alert Category.
- 5 By enabling "Apply to Past Alerts" and specifying a date range, you can send alerts to yourself that have been generated in the past within the date range that match your subscribed Alert Categories.

From the Alert Subscriptions window, you can choose the categories of Alerts you want. The available categories of Alerts are dependent on your level of access to Radimetrics software. The left column contains unsubscribed alert categories. Click on a category and then the '>' button to move it to the subscribed column on the right. If you want to remove it then click on it in the right hand column and then the '<' button.

In addition, once subscribed to, you can enable Email Notifications for a particular alert category by clicking on the associated checkbox.

Alert Categories

Below are the types of Alerts that are available (depending on your user permissions) and their descriptions.

Dose Calculation	Dose Calculation alerts may occur with problems during dose calculation, such as missing DICOM data for exposures listed on the dose sheet.
Error	Various errors
Acquisition	Acquisition alerts occur when an exam has an acquisition outside of a localizer.
Acquisition Dose	An Acquisition Dose alert may occur if acquisition-specific dose reference levels are exceeded.
Patient Dose	A Patient Dose alert may occur if cumulative dose reference levels are exceeded.
Examination Dose	An Examination Dose alert may occur if exam-specific dose reference levels are exceeded.
Dose Report	Dose Report alerts may occur if a dose report is accessed.
Protocol Information	Protocol Information alerts are triggered when protocol revisions need review or become active.
Statistical Process Control	A Statistical Process Control (SPC) alert may occur if it is triggered by its selected Nelson rules.
System Information	These may occur if a background Radimetrics process encounters an error such as missing dose sheet mappings, missing acquisitions on a Dose Sheet, skipped calculations, duplicate examinations are found, or if there are OCR problems.

What steps do I need to take to receive alerts?

1. Organize your Device Protocols

This can be completed within Configuration under the Protocols & Order Sorting module and Protocols tab. See "Sorting Protocols" on page 182.

2. Enter/Import Master Protocols

This can be completed within Protocol Editor. See "Creating a Master Protocol" on page 128 or See "Importing a Master Protocol" on page 139.



To import the technical factors from the device protocols as the basis or shell for creating master protocols a CSV or XML file export must be obtained from the scanner. This export file needs to be saved to a drive on your computer to be accessed during the import process.

3. Map Device Protocols to Master Protocols

This can be completed within Configuration under the Protocols & Order Sorting module and Master Protocol Mapping tab. See "Mapping Master Protocols" on page 194.

4. Set Patient Dose Reference Levels for Cumulative Dose Alerts

This can be completed within Configuration under the Dose Reference Levels module and Patient tab. See "Patient Cumulative Dose Reference Levels" on page 196.

5. Set Default Exam or Protocol Specific Dose Reference Levels for exam based alerts

Default Exam DRL's: This can be completed within Configuration under the Dose Reference Levels module and Default Exam tab. See "Default Exam and Acquisition Dose Reference Levels" on page 198.

Protocol Specific DRL's: This can be completed using Protocol Editor within each individual protocol by navigating to the Dose Reference Levels tab. See "Setting Master Protocol Dose Reference Levels" on page 150.

6. Subscribe to desired Alert Categories through your settings tab – Manage Alert Subscriptions button

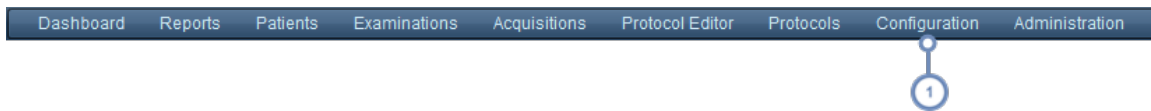
Configuration Category

The Configuration category is comprised of multiple Modules as listed below that allow you to organize and edit the mapping of DICOM fields and protocols as well as manage default Dose Reference Levels. This is important in allowing the reports to display useful, organized information. Depending on your user access permissions, you may or may not be able to access all Modules within the Configuration category.

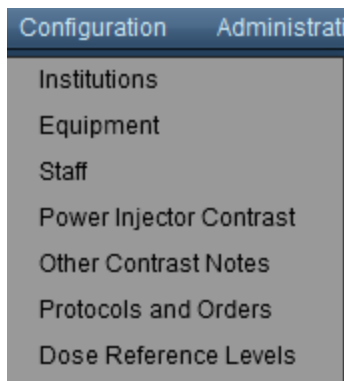
Institutions	Organize the institutions (hospitals or other locations) identified in retrieved studies. See "Institutions and Staff" on page 166.
Equipment	Organize the equipment (e.g. CT scanners) identified in retrieved studies. See "Equipment" on page 169.
Staff	Organize the staff (physicians, technologists) identified in retrieved studies. See "Institutions and Staff" on page 166.
Power Injector Contrast	Organize and configure Power Injector related parameters such as the injectors, injection sites, operators, fluids, and catheters. See "Power Injector Contrast" on page 174.
Other Contrast Notes	Organize contrast related parameters (routes, fluids and catheters).
Protocols and Orders	Allows you to organize protocols and orders; also, you can perform Master Protocol and Device Protocol mapping through this interface, including protocols that have not yet been mapped. RadLex Playbook configuration is also available via this module. See "Protocols and Orders" on page 178.
Dose Reference Levels	Allows you to set patient and examination Default Dose Reference levels where they have not already been set within the protocols themselves. See "Default Dose Reference Levels and Action Levels" on page 196.
Scheduling	Allows you to configure the available schedules. As an example, this is used in Dashboard reports to run reports at specified time intervals. See "Scheduling" on page 205.
Value Indicator Settings	Enables the customization of the Value Indicators displayed under the Patients, Examinations, or Acquisitions search results as well as in the corresponding detail views for individual search results. See "Value Indicator Settings" on page 209.
Radiopharmaceuticals	Links Radiopharmaceuticals with their identifiers. See "Radiopharmaceuticals" on page 212.
Study Type Assignment	Mainly for use in Belgium at this time, this allows the linking of Study Descriptions to Study Types, for the purposes of the Excel Report feature. See "Study Type Assignment" on page 213.

Process Intervention Allows you to define and set timelines for Interventions. See "Process Intervention" on page 214.

PDF Report Allows the customization of exported PDF report templates to include custom logos and specific Values of Interest. The layout for the Values of Interest can be modified. See "PDF Report" on page 215.

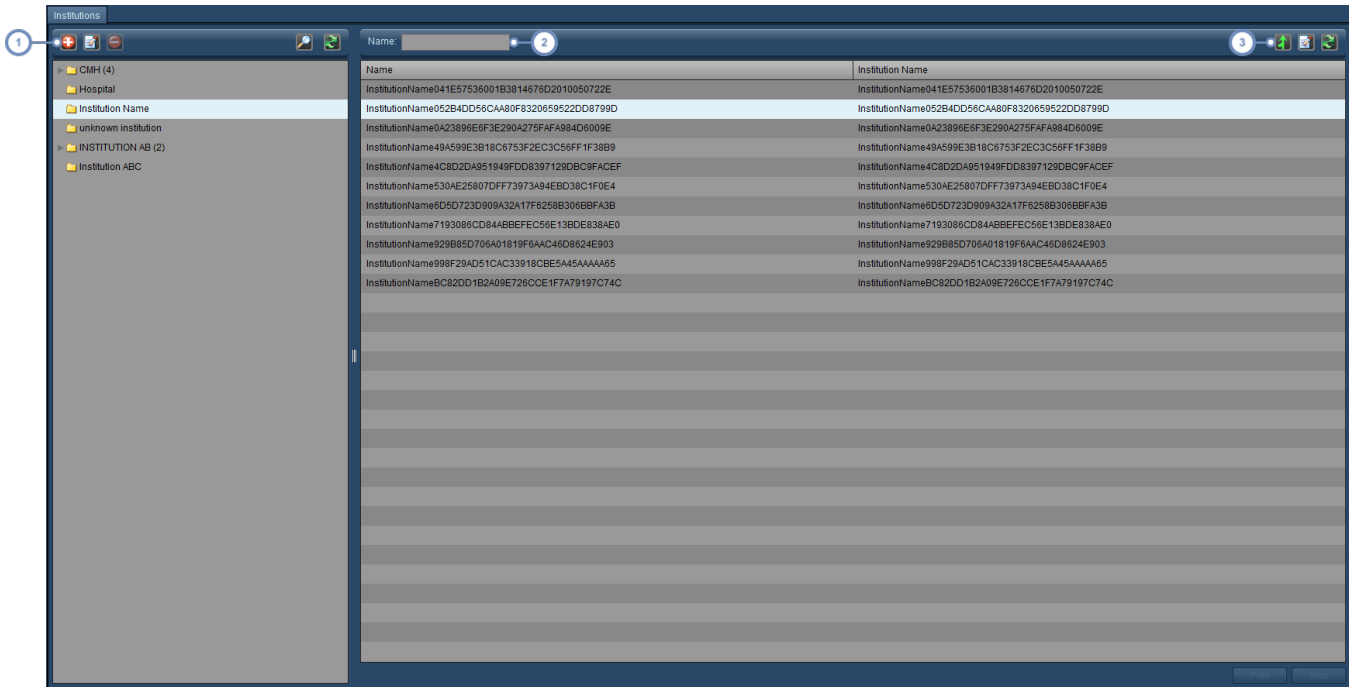


1 To access the Configuration Module, click on the corresponding task you would like to perform under the Configuration menu, shown below.






Institutions and Staff

The Institutions and Staff modules allow you to define how Radimetrics™ Enterprise Platform sorts studies so they can be appropriately organized and displayed in reports. The interface between the two modules is similar, though the Staff module is subdivided into Operators, Referring Physicians, and Performing Physicians.




1 This set of buttons allows you to modify the list of Institution folders. See "Working with folders" on page 219.

2 You can search for institutions in the current folder via this field; wildcard characters (for example, the % symbol) are allowed.

The Merge  button brings up another dialog box allowing you to merge different institutions together. See "Merging" on page 168 for more information. The Edit  button here is used to edit the selected institution and is detailed below. The Refresh  button reloads the list of institutions.

Editing Institutions

After selecting an institution and clicking on the Edit  button, a dialog box appears allowing you to specify the institution's Address, City, State / Province, Country, and Zip / Postal Code.

Merging

The Merge Items dialog box appears after clicking on the Merge  button.




Name	Institution Name
InstitutionName041E57536001B3814676D201005072	InstitutionName041E57536001B3814676D201005072
InstitutionName052B4DD56CA80F8320659522DD871	InstitutionName052B4DD56CA80F8320659522DD871
InstitutionName0A23899E6F3E290A275FAF984D600	InstitutionName0A23899E6F3E290A275FAF984D600
InstitutionName49A599E3B18C6753F2EC3C56FF1F3E	InstitutionName49A599E3B18C6753F2EC3C56FF1F3E
InstitutionName4C8D2DA951949FDD8397129DBC9FA	InstitutionName4C8D2DA951949FDD8397129DBC9FA
InstitutionName530AE25807DFF73973A94EBD38C1FC	InstitutionName530AE25807DFF73973A94EBD38C1FC
InstitutionName6D5D723D909A32A17F62588306BBF	InstitutionName6D5D723D909A32A17F62588306BBF
InstitutionName7193088CD844BBEFC56E138DE838	InstitutionName7193088CD844BBEFC56E138DE838
InstitutionName929B85D706A01819F6AAC4D8624E9	InstitutionName929B85D706A01819F6AAC4D8624E9
InstitutionName998F29AD51CAC33918CBE5A45AAAA	InstitutionName998F29AD51CAC33918CBE5A45AAAA
InstitutionNameBC82DD1B2A09E726CCE1F7A79197C	InstitutionNameBC82DD1B2A09E726CCE1F7A79197C

On the left hand side, the items that you would like to keep should be selected. On the right hand side, you should select one (or more) institutions that you would like to merge with the institution to the left. Once you are done, click on the Merge button at the bottom left of the dialog box.




Equipment

The Equipment module, similarly to the Institution and Staff modules, allow you to define how Radimetrics software sorts studies so they can be appropriately organized and displayed in reports. The Equipment module is divided into Equipment, Devices, and Manufacturers tabs.




1 This set of buttons allows you to Add , Edit  and Delete  the Equipment Group folders. See "Working with folders" on page 219 for more on organizing folders.

2 The Name field can be used to search for items within the current folder. Wildcard characters (for example, the % symbol) may be used.

The Merge  button allows two different equipment records to be seen as one piece of equipment. This may be useful, for example, if you have two equipment records for the same piece of equipment due to variations in the software version or institution name. The Edit  button here is used to edit the selected equipment and is detailed below. The Refresh  button reloads the list of equipment.

 Once you perform a Merge, it cannot be undone.

Editing Equipment

If you select an equipment item and click on the Edit button , the following dialog box appears:



Equipment

Name

Manufacturer

Device

Compliance **Utilization**

Supports RDSR

Supports Dose Sheets

Reports CTDIw

Reports Max CTDIvol

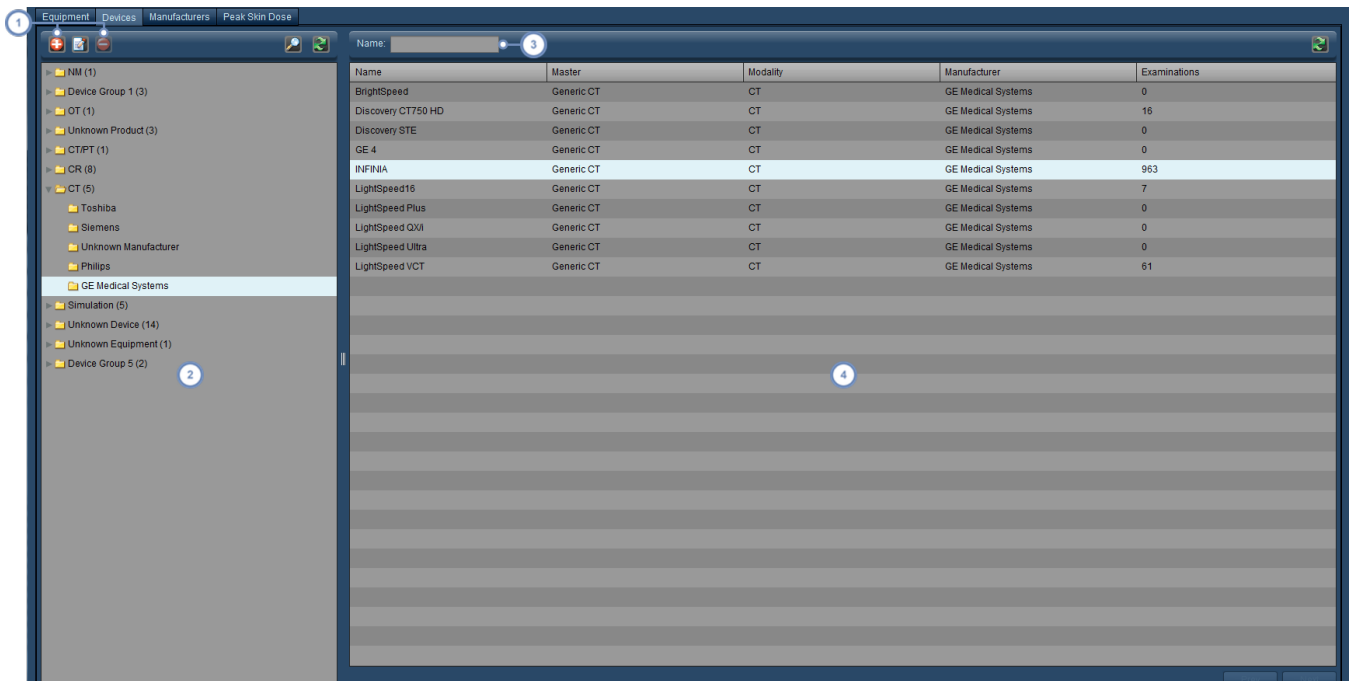
You can modify the Name, Manufacturer and specific Device using the available field and drop down menus.






Older Toshiba CT device models are known in the wider CT community for outputting CTDvol Max in their DICOM tags and Dose DICOM Secondary Capture images, which is different than what all other CT vendors record. For a facility attempting to compare and benchmark their CT device doses this difference between vendors can skew the results, making the Toshiba doses appear higher. If you have such a Toshiba CT, you can use the "Reports Max CTDIvol" option to cause the software to output an average CTDIvol per acquisition. Please note that you will need to contact Bayer support to reprocess any exams that were received before making this change.

Devices

The Devices tab allows individual devices to be added, edited and deleted.



- 1 You can Add , Edit  the name of, and Delete  the Device folders via these buttons.
- 2 This window displays the Device folders, typically organized into types (CT scanner, PET/CT scanner, etc.) and then manufacturer.
- 3 The Name field allows you to search for a device by entering its name (or a partial name); wildcards are allowable.
- 4 This window displays the Device names, lists their Master Device, and also shows the number of examinations from that device.

Manufacturers

The Manufacturers tab is a simple list of the manufacturer names. Manufacturer names can be edited.

Peak Skin Dose

The Peak Skin Dose tab is subdivided into further tabs that allow configuration of Patient Tables, Skin Dose Default Parameters, and Half Value Layer Calibration.



Patient Tables

This tab allows you to manage the available patient tables.

Name	Width [mm]	Length [mm]	Thickness [mm]	Material	shoulderToTableTop	Lateral Offset [mm]	Longitudinal Offset [r]	Height Offset [mm]	Equipment
AR-RF-RM2_table1	1000	2000	300	Carbon Fibre					AR-RF-RM2
AR-RF-RM2_table2	1000	2500	300	Carbon Fibre	100	100	100		AR-RF-RM2
SHIMADZUR_table1	1000	2000	400	Carbon Fibre	20	20	20		SHIMADZUR
SHIMADZUR_Table2	1000	2500	400	Carbon Fibre	20	30	40		SHIMADZUR
table1	1200	2000	300	Carbon Fibre	10	10	20		
Table2	1000	3000	1500	Carbon Fibre					
Table_3	1000	1000	1000	Carbon Fibre					

1 You can Add  a new table and Delete  or Edit  the selected table via these buttons.

2 This is a simple list of tables and their physical characteristics. Clicking on the column headers allows you to sort the list by those categories.

Adding  a table or Editing  the currently selected table brings up the Patient Table Configuration:

Patient Table Configuration ✕

Table Name

Table Properties ?

Table Length [mm]

Table Width [mm]

Table Thickness [mm]

Table Material ▾

Default Surface Height [mm]


Shoulder to Table Top [mm]

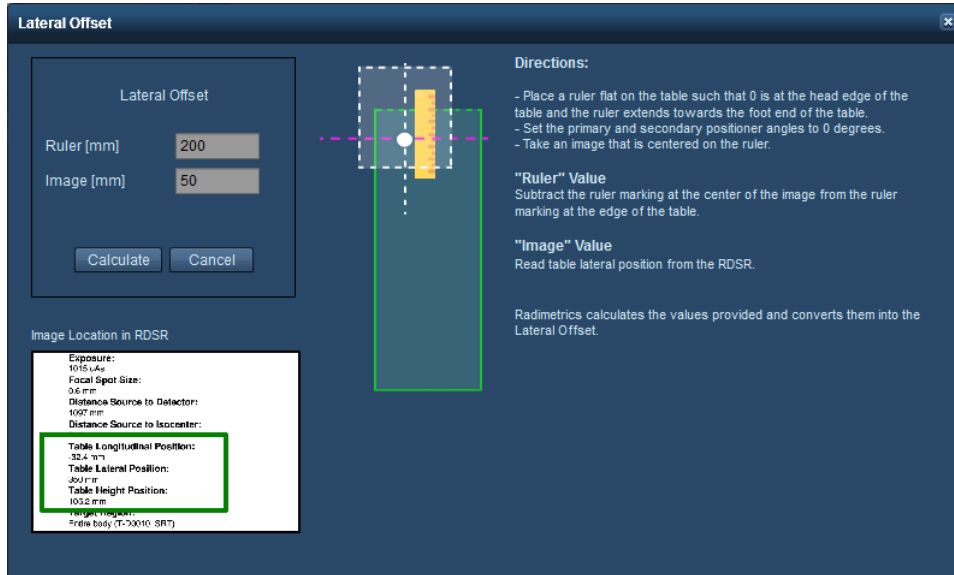
Table Offsets

Lateral Offset [mm] ?

Longitudinal Offset [mm] ?

Height Offset [mm] ?

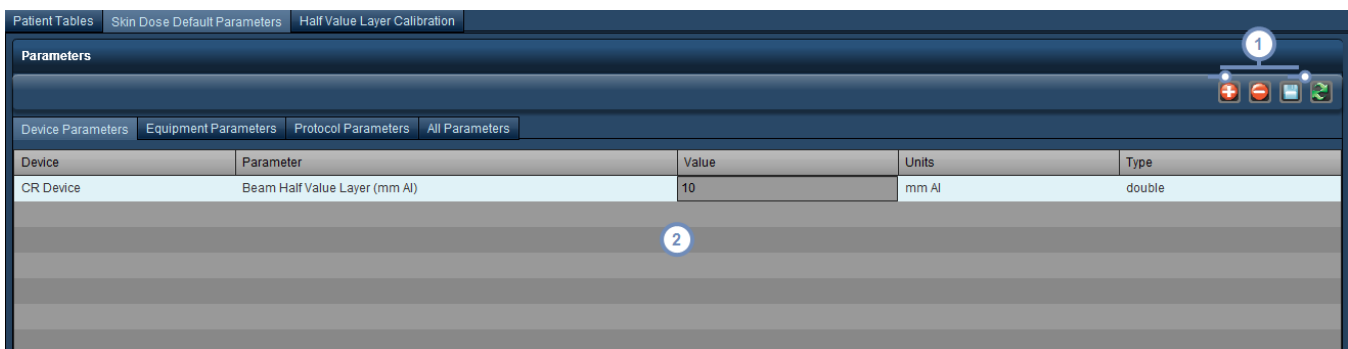
From here, table parameters can be edited directly. For additional help with entering values correctly, the  Help buttons can be used to bring up quick reference windows that give directions on taking physical measurements. For example, below is the Lateral Offset quick-reference.







The Lateral, Longitudinal and Height Offset references also include fields for entering measurements. These are used to automatically calculate and insert the correct offset value.

Skin Dose Default Parameters

The skin dose default parameters are divided into Device, Equipment, and Protocol. The Device, Equipment and Protocol tabs allow you to modify default parameter values associated with specific devices, equipment, or protocols and operate similarly as shown below:

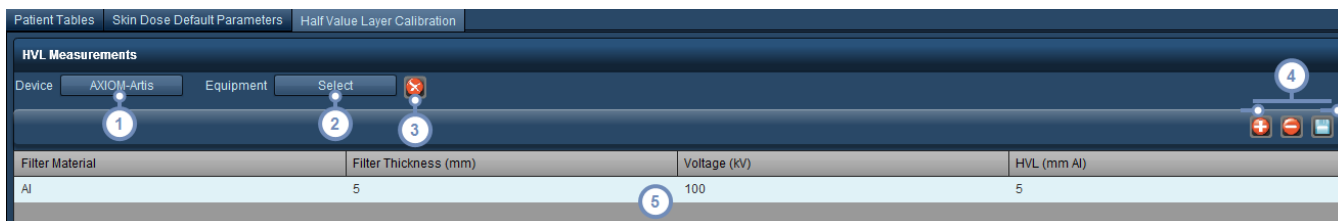






 You can Add  a new Skin Dose parameter to a device and Delete  it if it is selected. The Save  button allows you to save changed parameter values.

- 2 The list of parameters for the Devices, Equipment, or Protocols is here. Clicking on the field under the Value column allows you to modify it; the entered value must be consistent with the Type.

Half Value Layer Calibration

The Half Value Layer (HVL) Calibration tab allows you to enter HVL measurements for Devices or Equipment. You can enter associated filter material along with its thickness; then specify voltage and its associated HVL measured in mm Al.




- 1 Clicking on the Device button will bring up a dialog box allowing the selection of a device and, if present, its associated HVL measurements.
- 2 Similarly, clicking on the Equipment button will bring up a dialog box allowing the selection of a specific piece of equipment (which may be associated with a device), and, if present, its associated HVL measurements.
- 3 The Clear  button removes the device or equipment selection and its associated HVL measurements.
- 4 You can Add  a new HVL measurement with its associated parameters. If you use Add without selecting Device or Equipment then you will be specifying parameters for all Devices or Equipment. You can Delete  a measurement if it is selected. The Save  button allows you to save changed calibration values.
- 5 Clicking on any of the fields allows direct editing of the filter material (name, thickness, voltage, or HVL thickness). Once the desired values are entered, they must be saved.

Power Injector Contrast





The Power Injector Contrast module enables the configuration of Bayer Power Injectors and related parameters. The overall interface is similar to that of the Equipment and Staff modules, with the exception of the Secondary Capture Configuration tab that is specific to handling DICOM images from the Power Injector Contrast device. The instructions below apply to the Injectors, Templates, Fluids, Catheters, Injection Sites, and Injection Operators tabs.



1 This set of buttons allows you to Add, Edit and Delete folders. See "Working with folders" on page 219 for more on organizing folders.

2 The Search  button brings up a dialog box allowing you to quickly search for and select an item anywhere within the folder tree by entering part of its name.

3 The Name field can be used to search for items within the current folder. Wildcard characters (for example, the % symbol) may be used.

4 The Merge  button allows two different records to be seen as one. The Edit  button is specific to Injectors and allows you to edit the currently selected injector's configuration. The Delete  button deletes the currently selected injector, and the Refresh  button reloads the list.

 Once you perform a Merge, it cannot be undone.

Secondary Capture Configuration

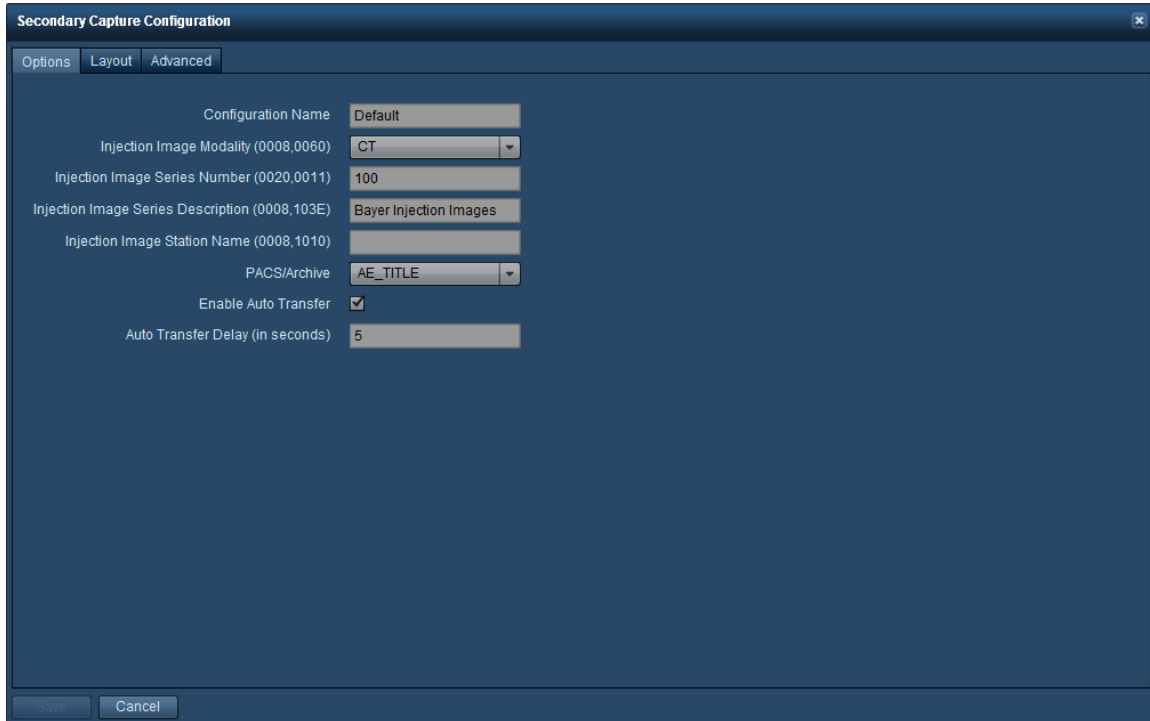
Contrast devices may send a DICOM image that can be routed to a PACS/RIS system or archive. The routing and appearance of such images may be configured here.



1 The buttons in this row allow you to Add , Edit , Copy  or Delete  configurations.

Adding or Editing a configuration

When adding or editing a configuration, a window opens containing 3 tabs - Options, Layout and Advanced:

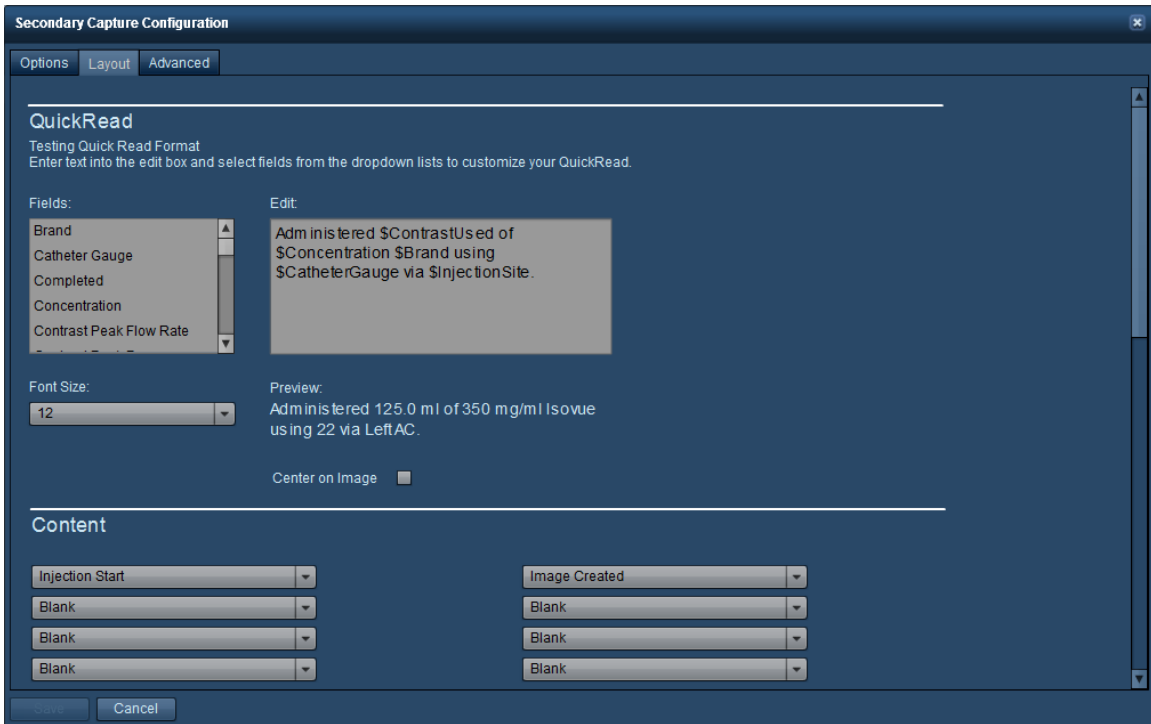


The screenshot shows a dialog box titled "Secondary Capture Configuration" with three tabs: "Options", "Layout", and "Advanced". The "Options" tab is selected. The dialog contains the following fields and controls:

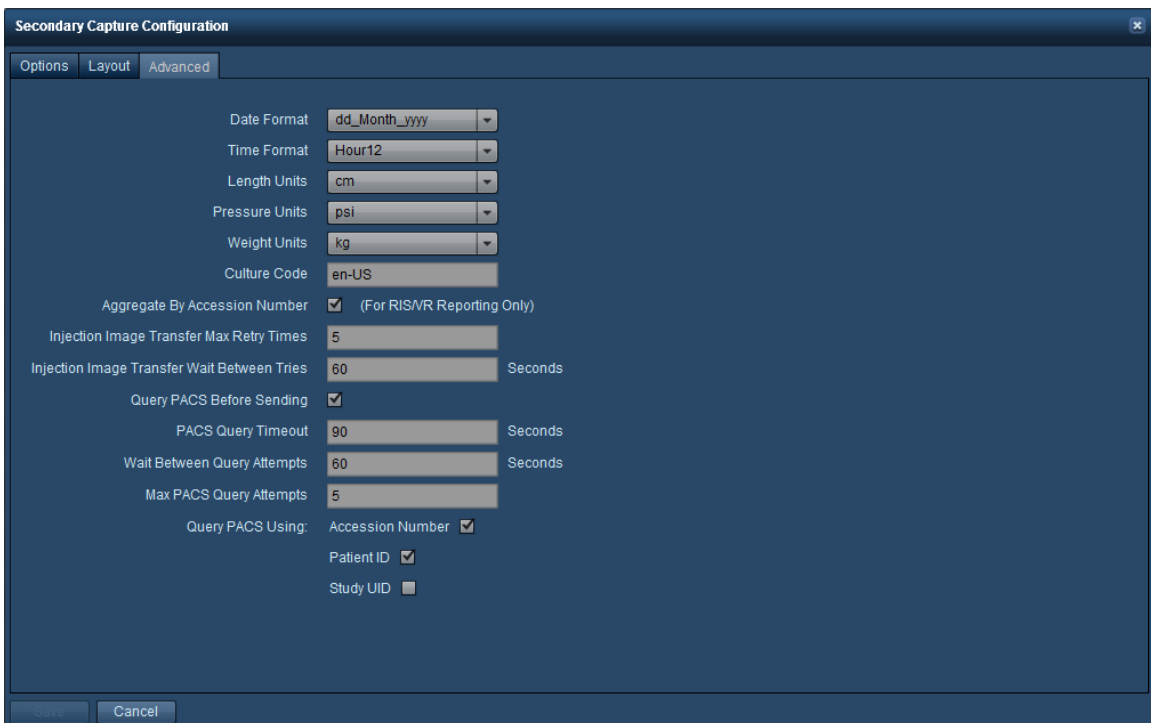
Field Name	Value
Configuration Name	Default
Injection Image Modality (0008,0060)	CT
Injection Image Series Number (0020,0011)	100
Injection Image Series Description (0008,103E)	Bayer Injection Images
Injection Image Station Name (0008,1010)	
PACS/Archive	AE_TITLE
Enable Auto Transfer	<input checked="" type="checkbox"/>
Auto Transfer Delay (in seconds)	5

At the bottom of the dialog, there are two buttons: "OK" and "Cancel".

The Options tab allows you to name the current configuration, the modality, and the PACS/Archive where the image will be sent. You can also enable/disable automatic transfer of the image and specify a delay.



The Layout tab defines how the Secondary Capture image will appear. It is possible to rearrange the fields displayed or to choose to include the programmed vs. actual protocol, or a pressure or flow graph.



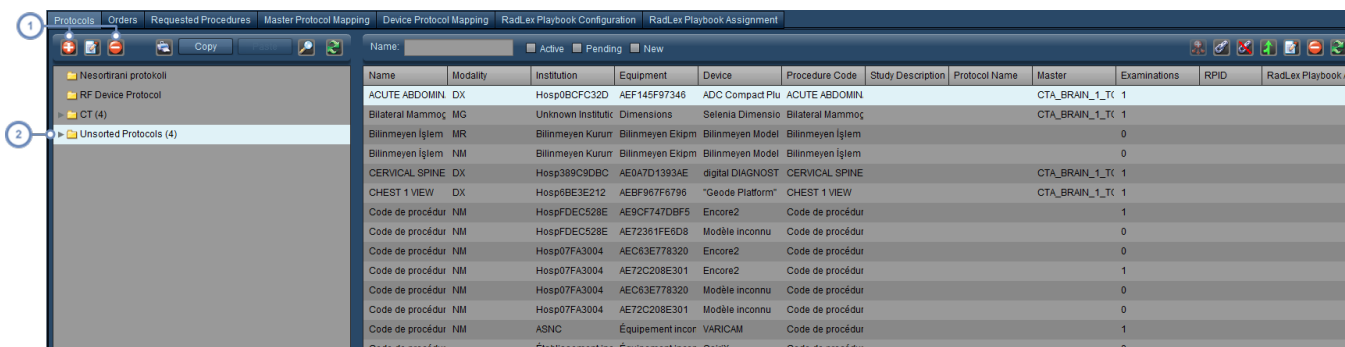
The advanced tab allows you to format options such as the date, time and other units (e.g. cm for length).




Protocols and Orders

The Protocols and Orders module allows you to organize protocols and orders, as well as perform Master Protocol and Device Protocol Mapping. RadLex Playbook configuration and protocol assignment is also done here, and may be helpful in assisting sites with submissions to the ACR.

Protocols

The Protocols tab is important as it is used to organize Device Protocols in a manner that allows Dashboard reports to display useful data. Device Protocols are often organized by equipment. Therefore, it is advised that prior to sorting the Device Protocols, you name and organize your equipment under the Equipment module. See "Equipment" on page 169. It is possible to perform Mapping/Unmapping and edit or create protocols starting from this interface, but the main focus of this tab is to facilitate organization.



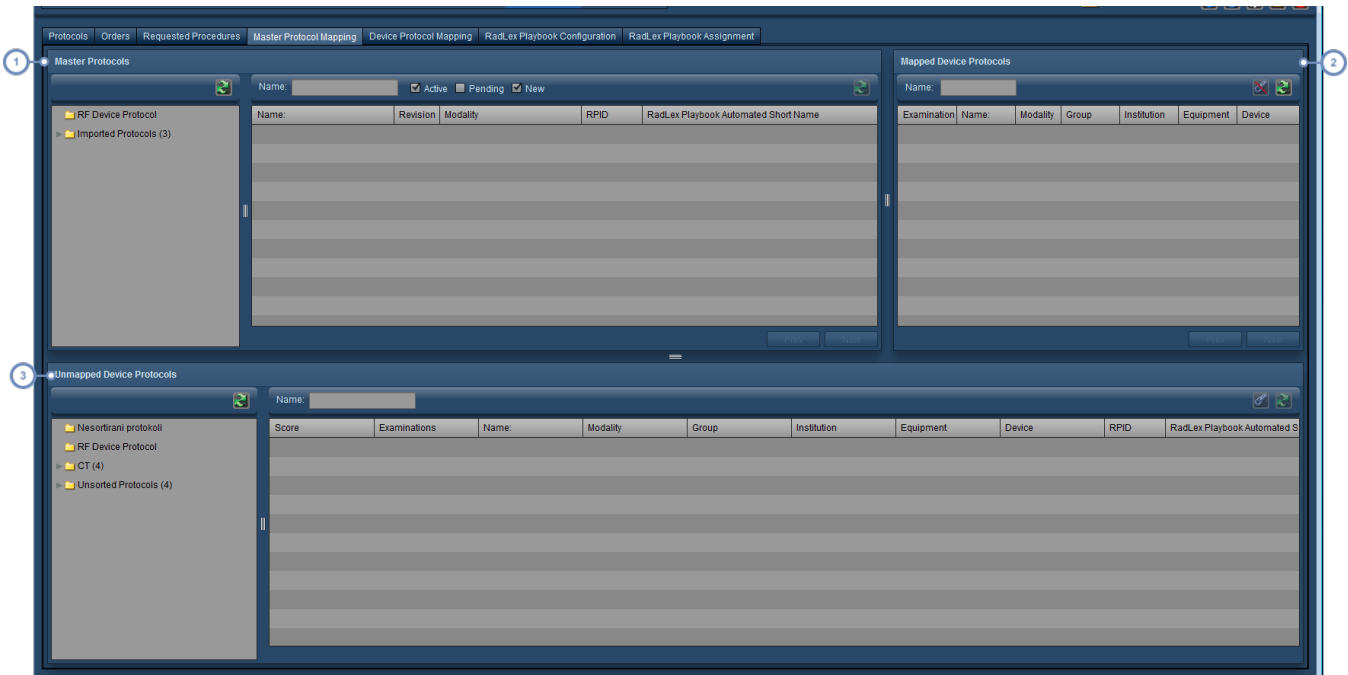
1 The Add , Edit  and Delete  buttons here allow you to add, edit (the name and rules for), and delete the Device Protocol folders.

2 Of particular note, the Unsorted Protocols folder contains protocols seen by Radimetrics software that have not yet been organized.

See "Sorting Protocols" on page 182 to learn how to sort Device Protocols.

Master Protocol Mapping

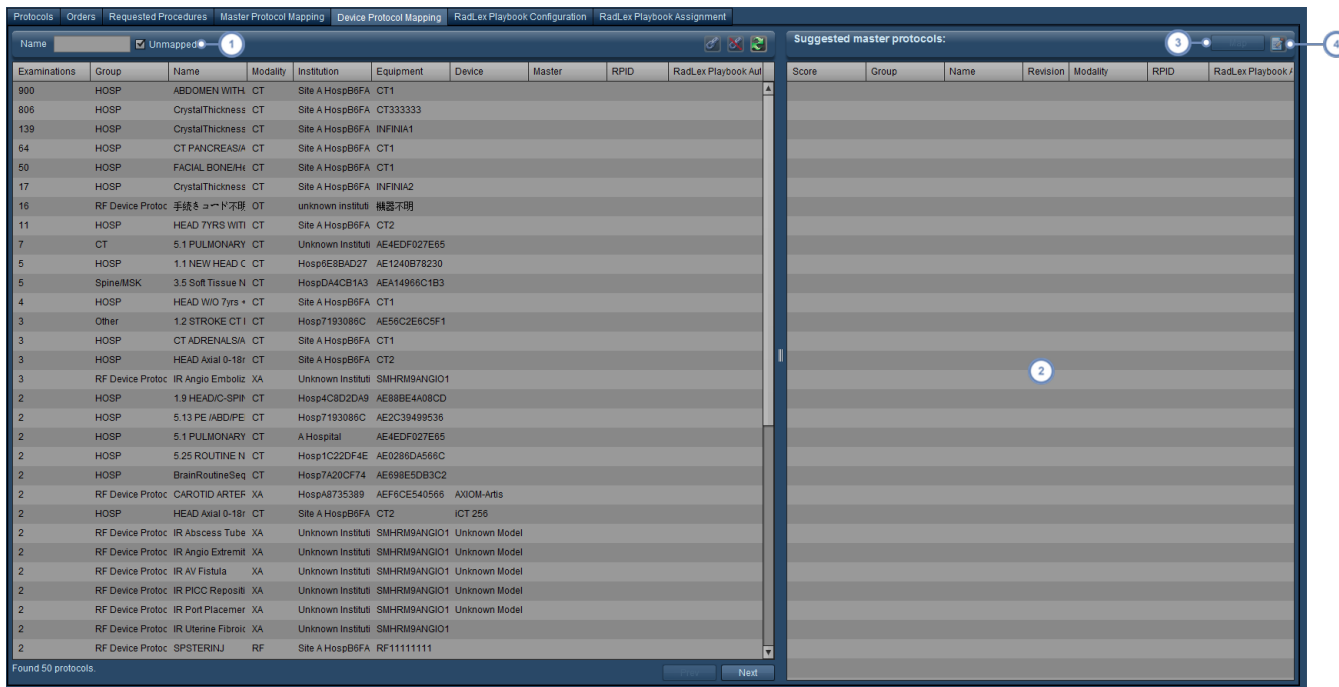
The Master Protocol Mapping page enables associating Exam Parameters with the Master Protocol standards through the Device Protocol name. This mapping process enables alerting, variance analysis, and simplified Dashboard reporting. See "Mapping Master Protocols" on page 194 for more information on this.




- 1 The top-left pane shows the Master Protocol directory. The Master Protocols are located within the body region folders.
- 2 The Mapped Device Protocols pane displays any protocols mapped to the currently selected Master Protocol - in the above example, the pane displays protocols mapped to the Master Protocol 'CTA-Carotid'.
- 3 The Unmapped Device Protocols pane is located on the bottom. Once a Master Protocol is selected, the corresponding body region folder (if it exists) is also selected automatically with its contained Device Protocols displayed on the right.

Device Protocol Mapping

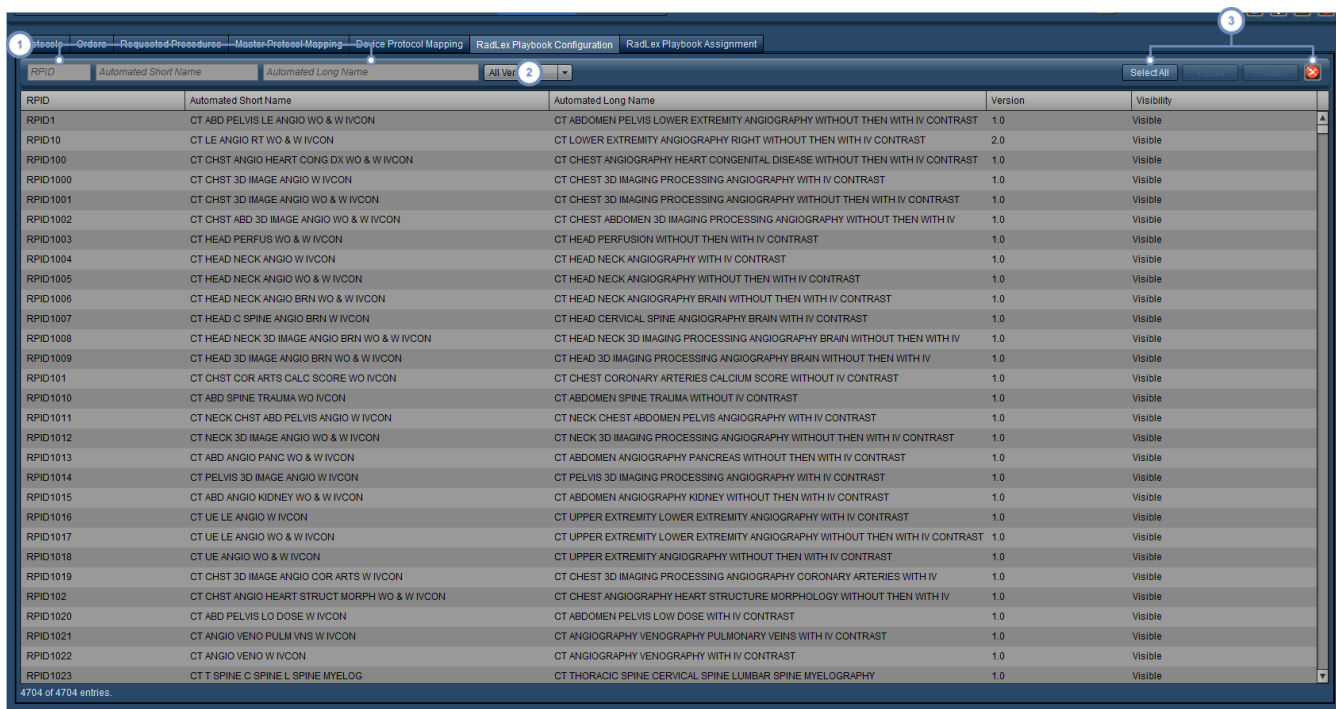
The Device Protocol Mapping page lists all of the Device Protocols in Radimetrics™ Enterprise Platform and allows you to map and unmap them to suggested master protocols.




- 1 Enabling the 'Unmapped' check box displays only those protocols that have not yet been mapped to a Master Protocol.
- 2 If a Device Protocol has been selected from the list on the left, then the suggested Master Protocols (normally ranked by descending Score) will be listed here.
- 3 You can Map a Device Protocol to a selected Master Protocol by clicking on the Map button.
- 4 The Edit  button allows you to edit the selected Master Protocol.

RadLex Playbook Configuration

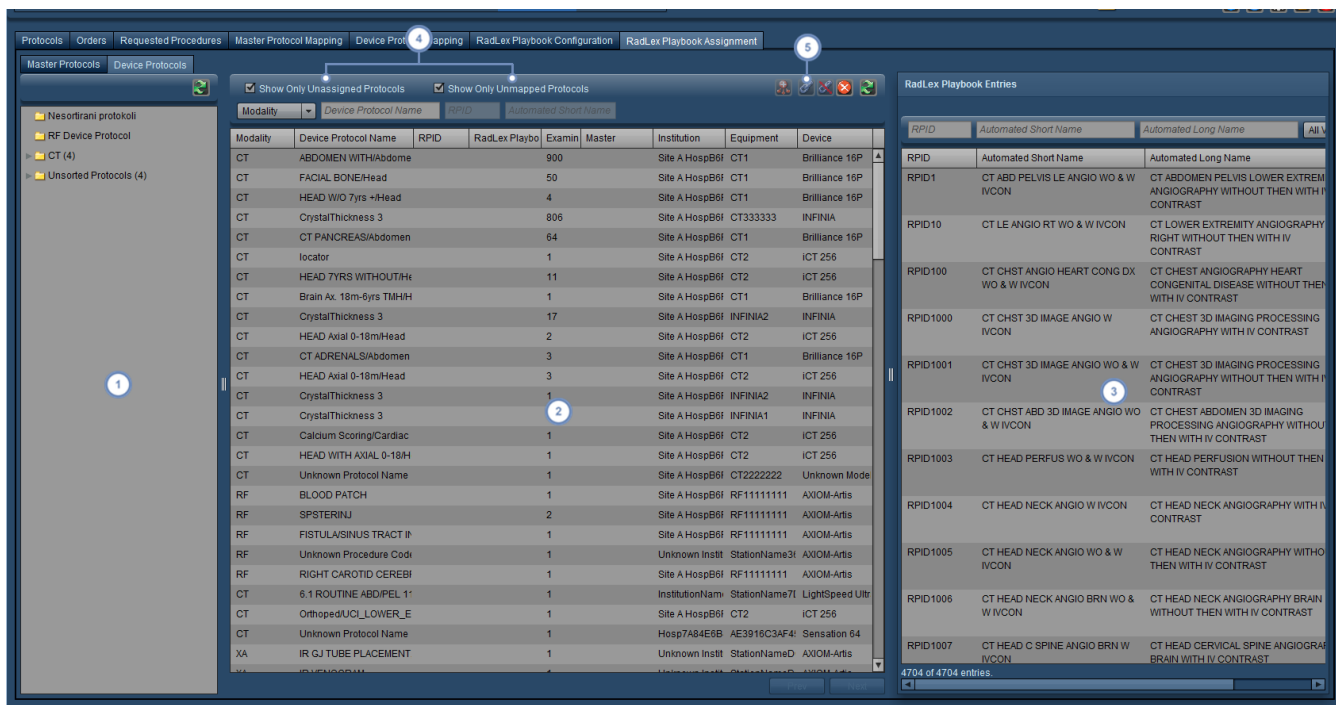
The RadLex Playbook Configuration page contains a list of RadLex defined exams. From this interface you can browse RadLex Playbook entries or toggle whether individual entries are shown or hidden. Hiding unused entries may help simplify assignment by limiting selection to only those entries that your site uses.



- 1 Use the RPID, Automated Short Name, or Automated Long Name fields to search for a specific entry.
- 2 You can choose to display either RadLex Playbook version 1 or 2 via this drop-down menu.
- 3 These buttons allow you to Select All entries or make the selected entries Visible or Hidden. The Reset  button cancels your selection.



RadLex Playbook Assignment

The RadLex Playbook Assignment page allows you to link Master or Device Protocols to specific RadLex Playbook Entries.



- 1 The Master or Device Protocol folder tree is displayed here; you can select between Master or Device protocols via the tabs at the top.
- 2 The Master or Device protocols are listed in this window. Multiple protocols may be selected simultaneously by using the Shift or Control keys as appropriate.
- 3 RadLex Playbook entries are listed here, and can be searched through by utilizing the fields at the top for RPID, Automated Short Name and Automated Long Name
- 4 You can select to display only unassigned protocols, or unmapped Device protocols via these selection boxes. If you're assigning Master protocols, then the Show Only Unmapped option is replaced by Active, Pending and New selection boxes.

Once you've selected a protocol in the main window, and a corresponding RadLex Playbook entry in the right win-

- 5 dow, you can use the Chain-link  button to assign the selected Playbook entry to the protocol. If there's a previously assigned Playbook entry for your current protocol, you can use the Chain-link UnMap  button to disassociate the Playbook entry.

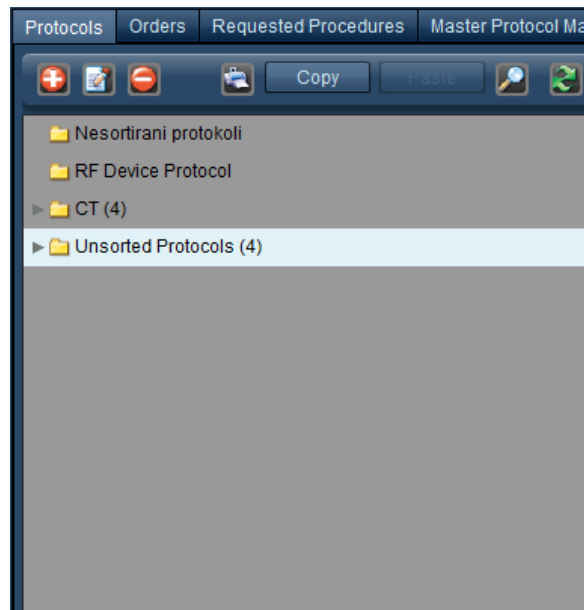
Sorting Protocols

What are the Benefits?

Organizing your Device Protocols has two primary functions:

- allows the presentation of meaningful data within the dashboard reports
- is a pre-requisite for mapping Device to Master protocols for triggering protocol based alerts

All the data that has come into Radimetrics™ Enterprise Platform will initially appear in a folder titled 'Unsorted Protocols'. If the method of receiving data is query/retrieve, some outside studies may be visible. It will be important in the next steps to ensure only relevant data is captured in folders.

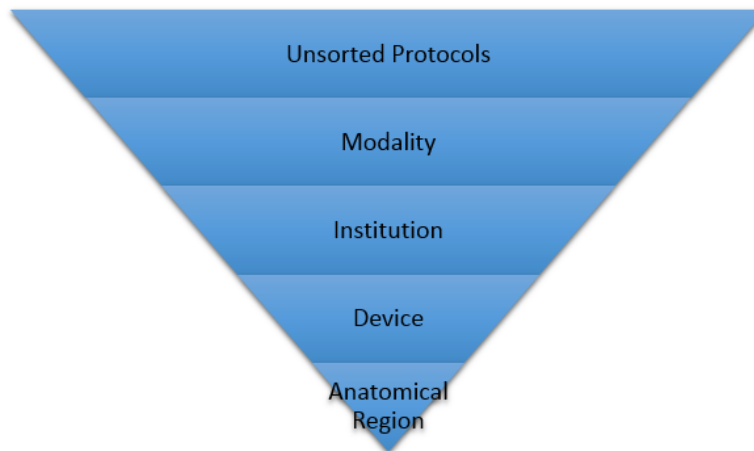


This is the starting place for organizing your protocols in a meaningful structure. The 'Master Protocols' folder (constructed in Protocol Editor) will also appear. This will provide a quick reference for ensuring consistency between the nomenclature of the Master and Device Protocols.

Before mapping Device to Master protocols we need to ensure the protocols are organized appropriately; the folder names and structure in Master Protocols must match those in Device Protocols. In other words, you need to use identical anatomical groupings to create an association for mapping – 'Thorax' and 'Thorax' works vs. 'Thorax' and 'Chest' which does not. Upper and lower case letters and spaces must match.

The sorting process begins with the creation of a hierarchical folder structure. The objective is to funnel the data from a large scope (Modality) to a finer-grained level of information (Anatomical Region found in the Protocol Name).

Device Protocol Sorting



Suggested folder structure

We suggest that the following structure will provide the most effective interactive Dashboard reports:

- {Institution Name} Device Protocols
 - Modality
 - Site Name (if there are multiple)
 - Device Name
 - Anatomical Regions
 - Head
 - Chest
 - Abdomen
 - Pelvis
 - MSK
 - etc.

Filtering data into folders

You are able to filter the data from the 'Unsorted Protocols' into the appropriate anatomical folders using a step-by-step process, filtering the data through each level of the folder structure using 'regular expression rules'.

Regular expression rules are created for each folder. The data is filtered by several variables, which come across with the DICOM tags on the examination, including: Name, Modality, Institution, Device, Equipment, ProtocolName, StudyDescription, and ProcedureCode. The system

will use the expression rules of the folder to pull in any data with matching criteria from folders higher in the hierarchy.

The regular expression rules are used to filter the device protocols into the desired folders.

Wildcards

There are many variations in the format of protocol names. In order to ensure all desired protocols are filtered appropriately, a wildcard `.*` is used in the regular expression rule, before and after the key word. Regular expression rules with a wild card will filter in any protocols that have the keyword, including those with additional words or characters before and after. The regular expression rules are not case sensitive.

For example, in the Head folder, using the following regular expression rules: `.*head.*`, `.*brain.*`, `.*facial.*`, `.*iac.*`, would pull in all of the following desired protocols: 01_head or HeadRoutine or FacialBones.


Folder Order

The order of the folders is key in determining where the protocols will filter. The application reviews all data to determine if it meets the criteria of the expression rules. If it does, it will place it in that folder.


For example:

- In order to capture a PE protocol in the Chest folder, the regular expression rule `.*pe.*` would be used
- In order to capture a Pelvis protocol in the Pelvis folder the regular expression rule of `.*pel.*` or `.*pelvis.*` may be used
- If the Chest folder was first in the sequence, pelvis protocols would filter into the Chest folder due to the fact it met the criteria of the `.*pe.*` expression rule
- To ensure the Pelvis protocol filtered into the Pelvis folder, the folder can be dragged above the Chest folder so the protocol will meet the criteria of `.*pelvis.*` before it reaches the regular expression rule of `.*pe.*` in the Chest folder

Creating the first folder


The first folder to create is one to start sorting the device protocols (ie. {Institution Name} Device Protocols). Click on the New  button, which will bring up the Protocol Group window.

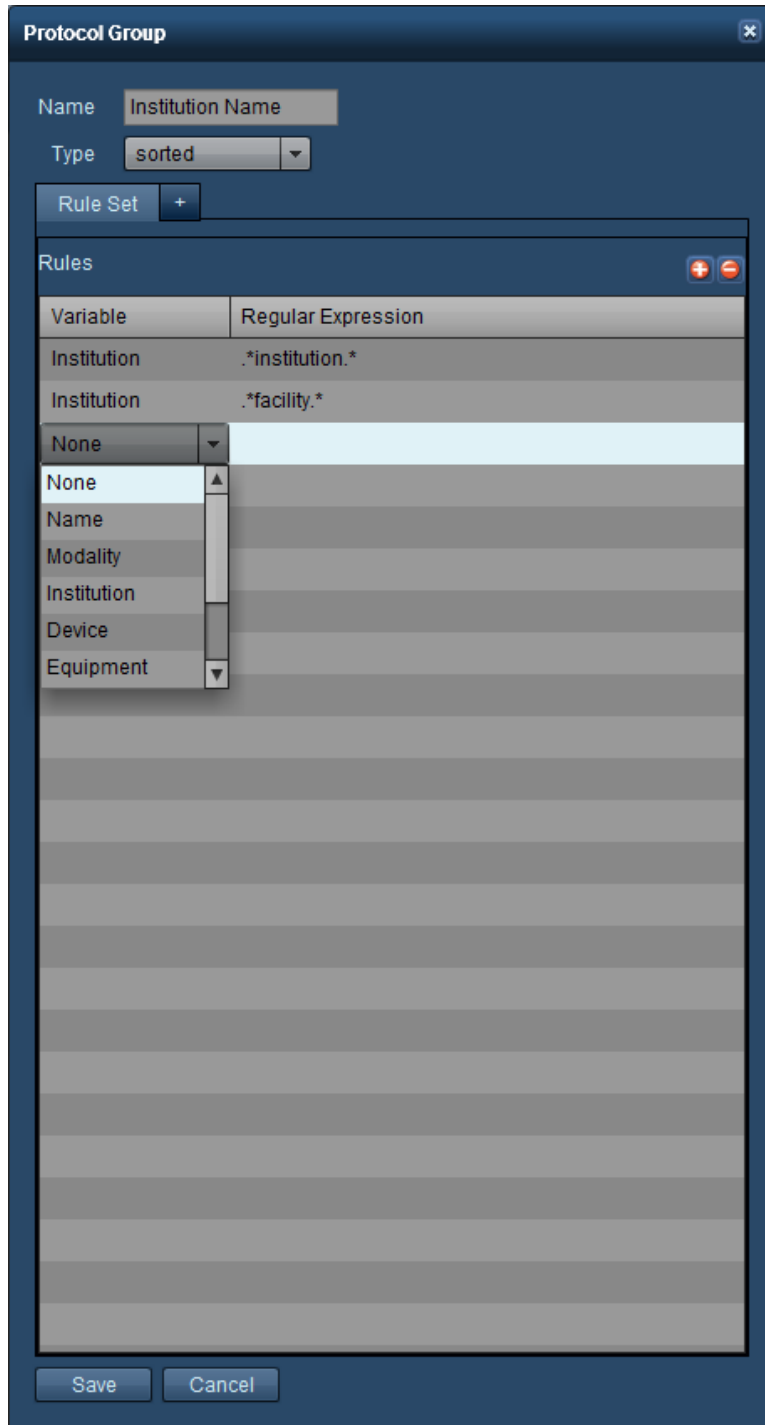
2 The Rules applying to this folder are listed here.

3 The Add  button allows you to add a new rule; The Delete  button deletes the currently selected rule.

The next step is to create the regular expression rules that will determine which protocols are filtered into this folder.

Adding or Editing a rule for the Institution folder

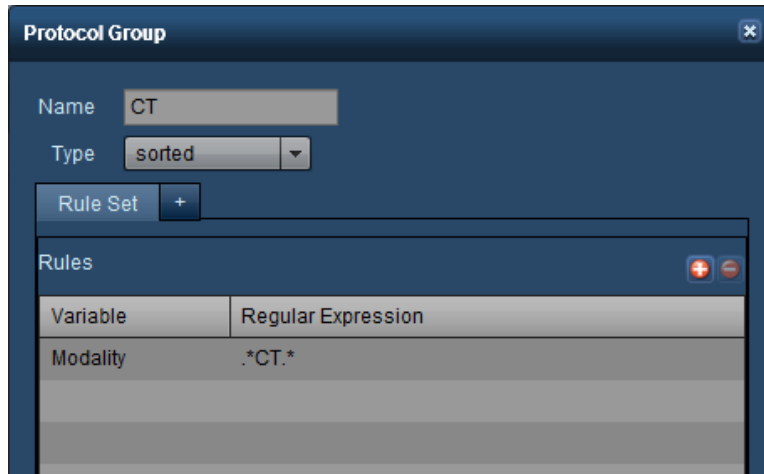
Clicking on the Add  button adds a new blank row to the table.



You will need to determine what you would like to take from the Unsorted folder. If all of the data is relevant you can choose a variable and put only .* as the regular expression which will move everything from the previous folder into this one. If there are outside studies which should not be filtered into the folder, more specific rules need to be made in order to capture the data accurately.

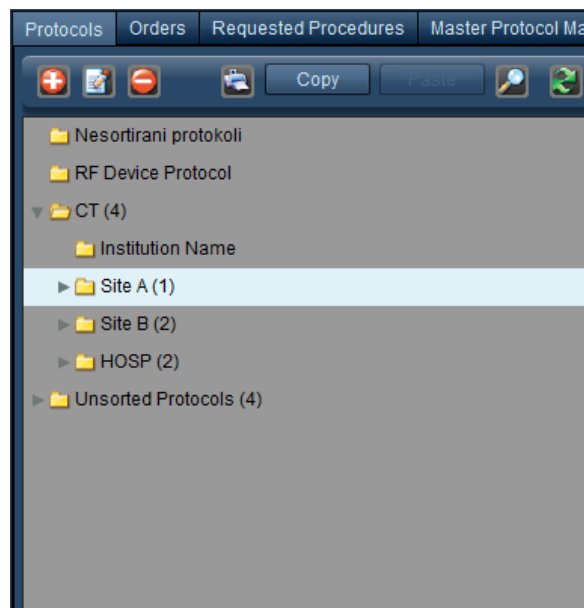
Adding a Modality folder

The next step is to add a Modality folder inside the Institution folder. In the example below, please note there is no .* wildcard as there are no other characters in this field attached to the studies, so no wildcard is necessary.

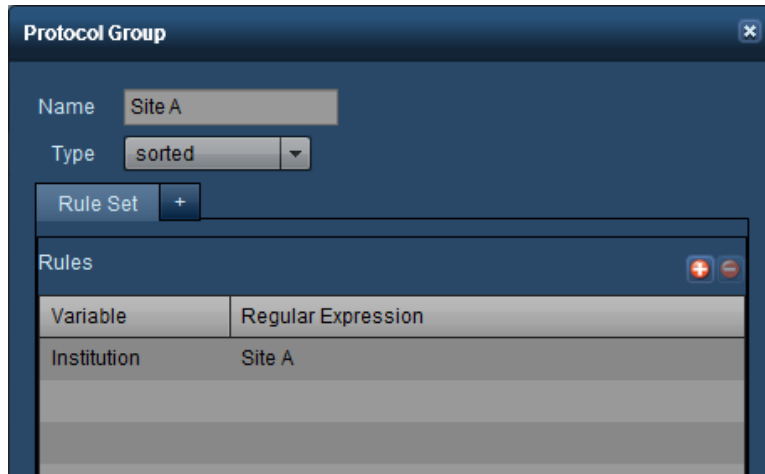


Adding a Site folder

Next is to add a site folder, if your institution has more than one.

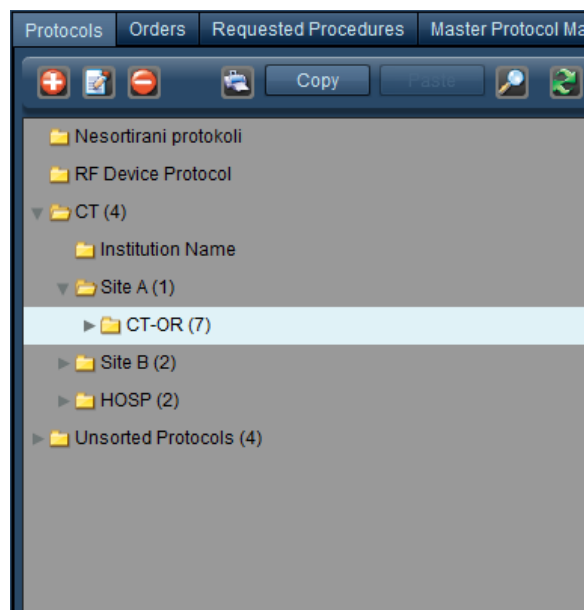


Choose the Institution variable:

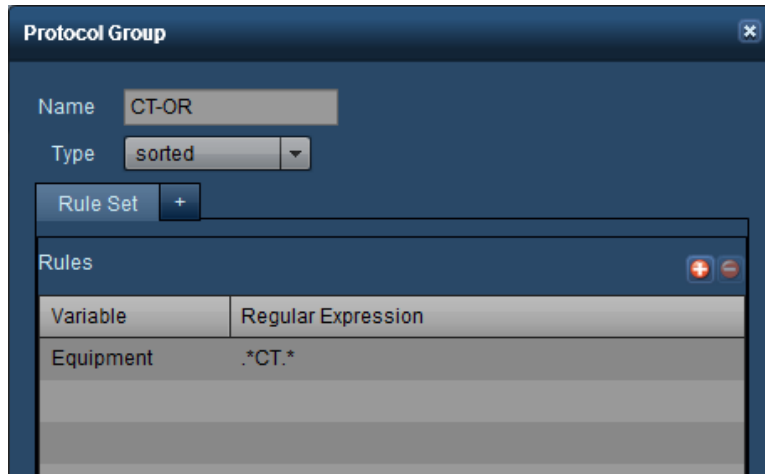


Adding an Equipment folder

The next folder is the scanner (equipment) name – the importance of naming and organizing the equipment will come into play at this level.

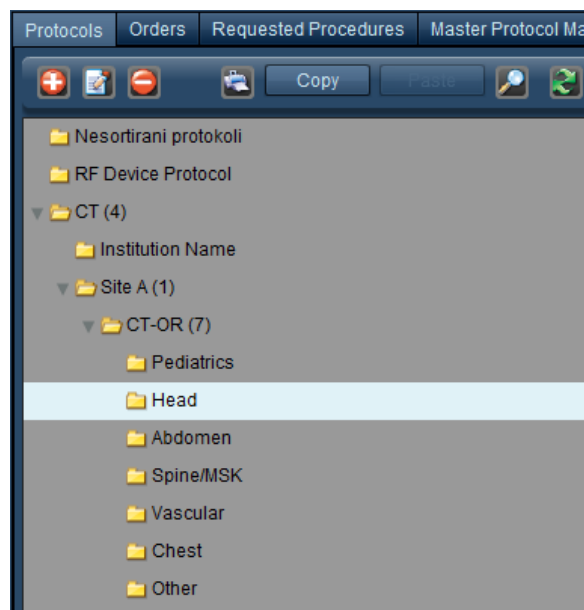


Use the Equipment variable:

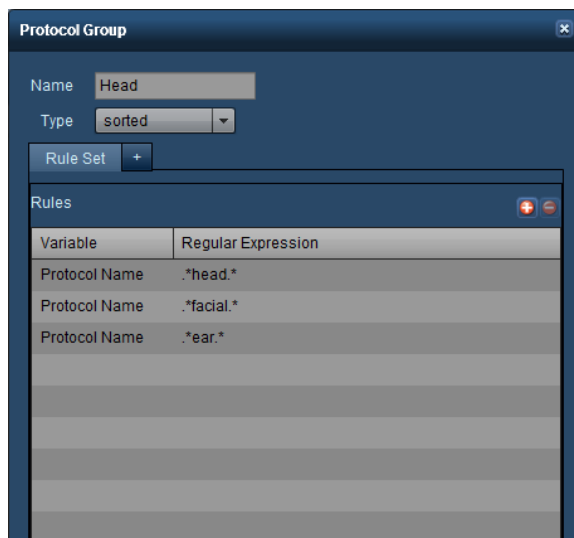



Adding anatomical region folders

The final set of folders to be added are the anatomical regions, all of which will be added into the Equipment folder to ensure they present at the same level:

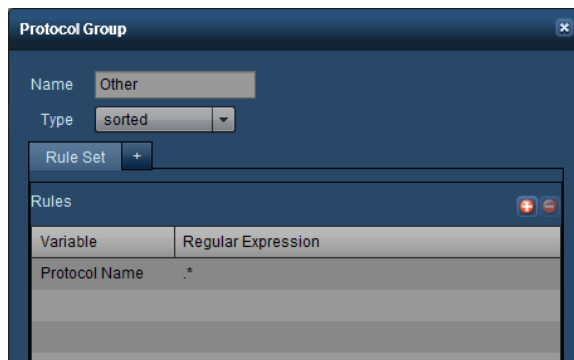


Use the variable of Protocol Name.



 Include as many regular expressions as you can for the first device being sorted. The folder structure can be copied for subsequent devices, therefore reducing the need to add additional rules.

The last folder to be created should be an “Other” folder and this is the “catch all” folder for the protocols that are left unsorted. The key is to ensure this is the last folder in the sequence as the regular expression rule used will be “.*” (without the quotation marks).

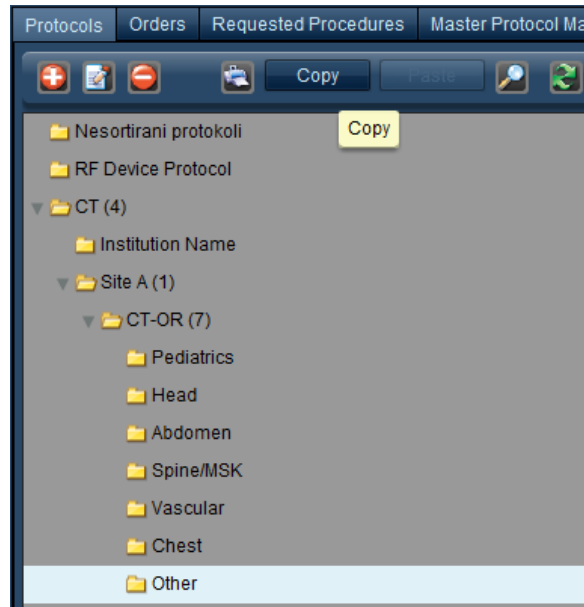


When doing “housekeeping” this is the folder to review in the event additional regular expression rules need to be created in order to capture protocols in this folder.

Finalizing the folder structure and making a copy

After you have created all of the anatomical folders, you should review the contents of each folder to ensure the appropriate protocols have been captured in the desired folders.

Once you have completed a folder structure for one scanner, you can simply highlight the highest level folder you want to copy and the folder structure to apply to another piece of equipment:



In this example, all of the folders and the regular expression rules from Site A through to the anatomical folders, will be copied once the Copy button is clicked on.

Then highlight the folder you would like to place this folder into, and click on the Paste button.

The items to change to ensure filtering is correct with the copied folder is the name and regular expression rule in the Site folder as well as the name and regular expression rule in the equipment folder.

For example, in the copied folder:

- Change the folder name to Site B and the regular expression rule to Site B
- Change the equipment folder name to CT222222 (or whatever name applies) and the regular expression rule
- Review the folders to ensure all protocols are filtering as expected

Key points to remember when sorting device protocols

- Equipment has been sorted and nomenclature standardized
- There are identical folder names between Master Protocol folder structure and Device Protocol folder structure
- The .* wildcard is used in regular expression rules
- Folder order is considered, as this will impact how protocols will filter by the regular expression rules

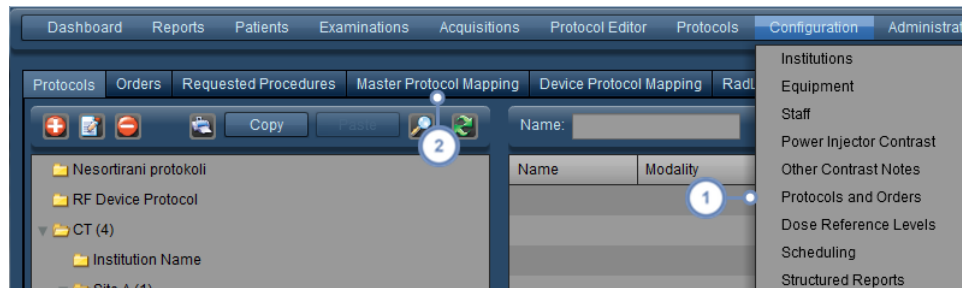
Mapping Master Protocols

Master Protocol Mapping is the process of associating Exam Parameters with the Master Protocol standards through the Device Protocol name. This mapping process enables alerting, variance analysis, and simplified Dashboard reporting.

For example, a location may have numerous head protocols being performed with slightly different names on several devices. Mapping allows us to associate those Device Protocols to the Master Protocol that best represents the procedure being performed.

Once Device Protocols are mapped to a specific Master Protocol it allows the system to compare the results of that particular study to all other "similar or associated" studies; for example, when viewing a dose frequency distribution.

To begin, we need to open the interface for Master Protocol Mapping:



1 Navigate to Configuration - Protocols & Orders.

2 Then, select the Master Protocol Mapping tab.

See "Protocols and Orders" on page 178 for an overview of the interface.

Mapping

Below you will see Radimetrics software uses a scoring system based on characters found in the protocol name. Higher scores represent those Device Protocols with names that have been identified as a better match to the Master Protocol.

Suggestions to make protocol mapping easier

1. Have a common protocol naming convention across devices
2. Name the Master Protocol in Radimetrics™ Enterprise Platform the same as the common protocol name on the devices
3. If renaming is not possible, add a reference code at the beginning of the protocol on the device; this makes it easier to locate the same protocol across devices
4. Record Master Protocol names with Device Protocol names for multiple scanners to be associated in mapping

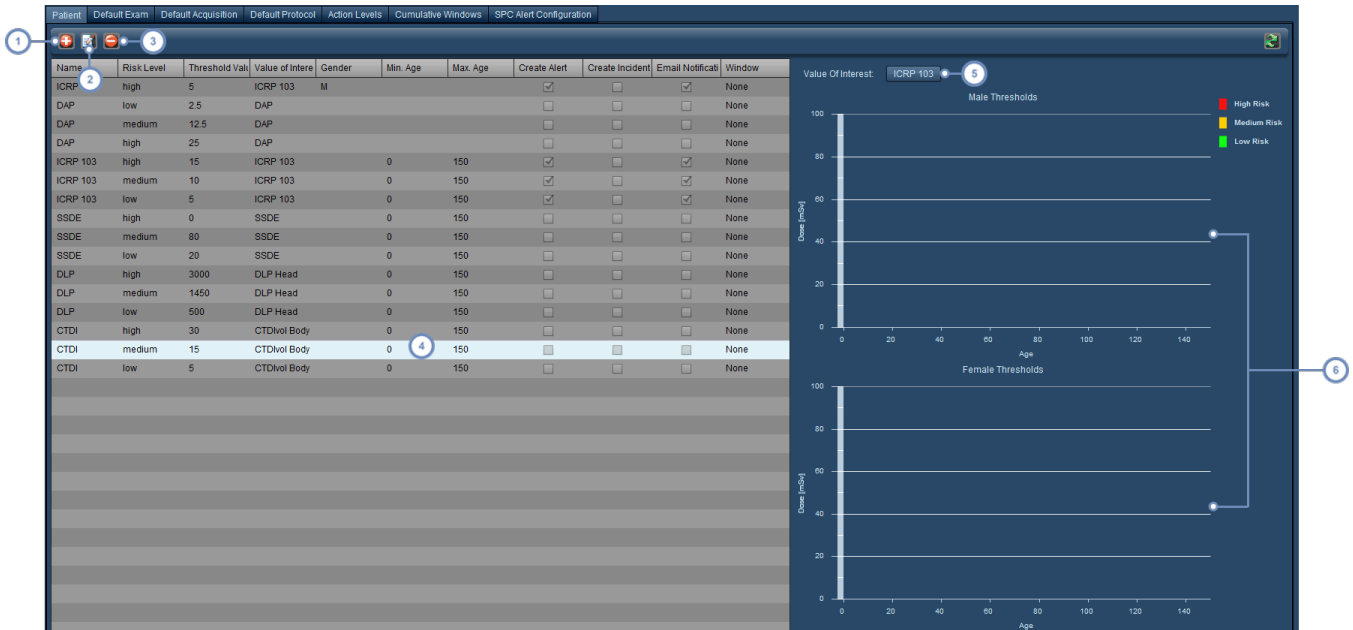
Default Dose Reference Levels and Action Levels




In this module, [Patient Cumulative Dose Reference Levels](#) are set to define cumulative allowable levels for an individual patient. [Default Exam and Acquisition Dose Reference Levels](#) are fallback values in cases where no other Dose Reference Level has been set, or when master protocols have not been mapped to the device protocols. [Default Protocol Dose Reference Levels](#) apply to the dose reference levels of all protocols (approved or draft) that have not been explicitly defined. [Action Levels](#) are user-defined "Actions" that can be tied to maximum values in the Default Exam Dose Reference Levels, or to specific protocols within the Protocol Editor module. [Statistical Process Control Alerts](#) apply statistical methods to generate alerts based on the Nelson rules.

Default Dose Reference levels can be tied to trigger alerts and incidents as well as to e-mail notifications.

Patient Cumulative Dose Reference Levels


The interface for working with patient Dose Reference Levels is shown below.



- 1 The Add button  allows you to add a new cumulative dose reference level.
- 2 The Edit button  allows you to edit the currently selected dose reference level.
- 3 The Delete button  deletes the currently selected dose reference level.
- 4 This window lists all the currently defined patient cumulative dose reference levels and their configured parameters, including the Value of Interest, gender, and age range. You can also see whether an alert, incident, or e-mail notification has been enabled.
- 5 Choosing the Value of Interest from the drop-down menu here allows you to change the sample graphs to display all Reference Levels that are tied to that Value of Interest.
- 6 The sample graphs are separate for Male and Female thresholds. The x-axis always displays the age range. Risk levels are shown in their respective colors (red for high, yellow for medium, and green for low).

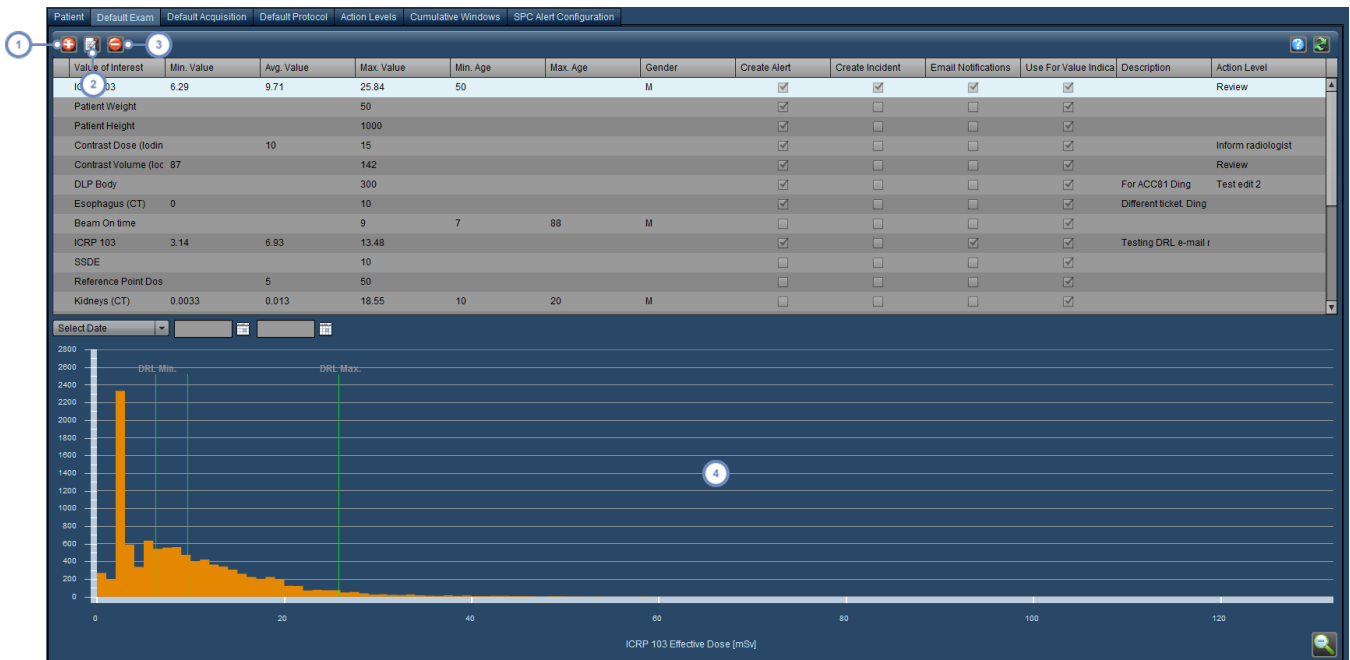
Adding or Editing a Cumulative Dose Reference Level




After choosing to Add a new level or to Edit a currently existing one, the Threshold window will appear on the left side of the interface.

Definable parameters for a Dose Reference Level include Value of Interest, Name, Threshold value (i.e. the reference value), Risk Level, Age (minimum and maximum), and Gender. You can choose to utilize other values as well (such as patient weight or BMI) by clicking on the Add  button. In addition, if the threshold is exceeded you can enable or disable alerts, incidents and e-mail notifications. Finally, if there are any available, you can assign a Cumulative Window to the threshold so it can be tracked over a period of time. See "Cumulative Windows" on page 201.

Default Exam and Acquisition Dose Reference Levels

Default Exam or Acquisition Dose Reference Levels apply to any exams or acquisitions lacking a protocol-specific Dose Reference Level. This may be useful in tracking outlying exams or acquisitions; for example, you can define a maximum value that no exam should ever exceed and set an alert if this occurs.



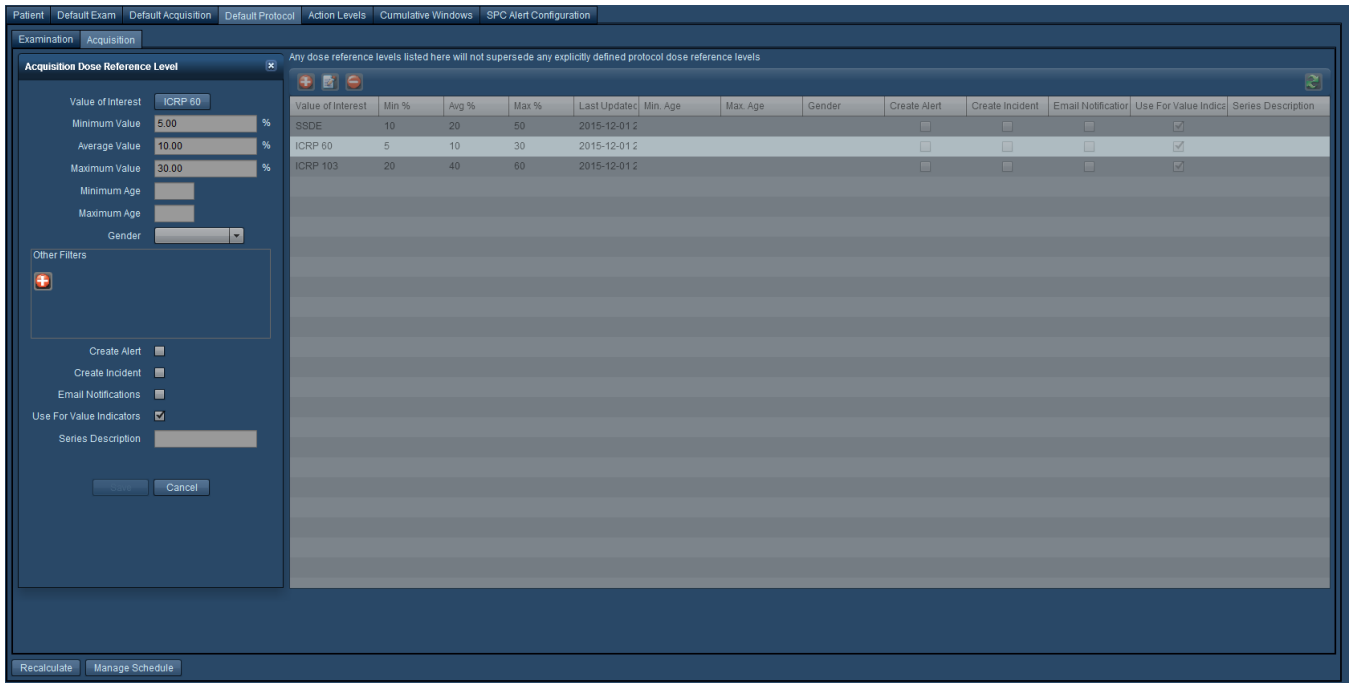
- 1 The Add button  allows you to add a new exam dose reference level.
- 2 The Edit button  allows you to edit the currently selected dose reference level.
- 3 The Delete button  deletes the currently selected dose reference level.
- 4 The sample graph displays the currently selected dose reference level's Value of Interest along the x-axis along with the defined Dose Reference Levels as a vertical line labeled at the top of the graph.

Adding or Editing a Default Exam Dose Reference Level

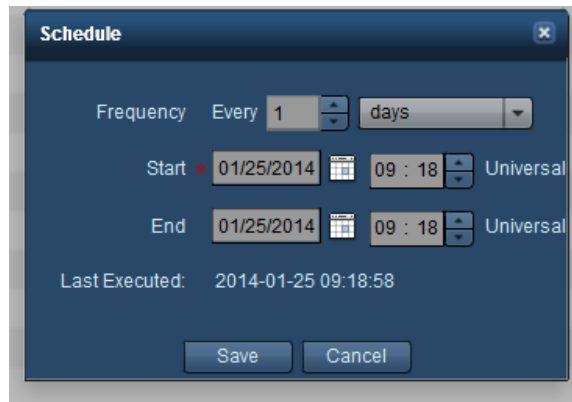
Similarly to the patient cumulative Dose Reference Levels, the "Default Examination Dose Reference Level" window will appear once you choose to Add a new exam DRL or Edit a current one. The procedure is essentially identical to that found when editing a Master Protocol. See "Adding or Editing a Master Protocol DRL" on page 151.

Default Protocol Dose Reference Levels

As noted above, the Default Protocol Dose Reference Levels apply to those protocols which do not have dose reference levels explicitly defined. The interface is similar to the previous section, but there are separate tabs for exam and acquisition protocol specific Dose Reference Levels.



- 1 The Manage Schedule button displays the window shown below, allowing you to set the interval between updates to the DRL percentiles as more exams get added to Radimetrics software.








From this window, you can set the frequency of DRL percentile recalculations and also the Start and End times defining the interval over which the DRLs are re-calculated. If the End time is blank, then the recalculations will occur indefinitely as specified by the frequency. If the End time is in the past, then no recalculations will occur. The window also displays the date and time of the last recalculation.

Action Levels

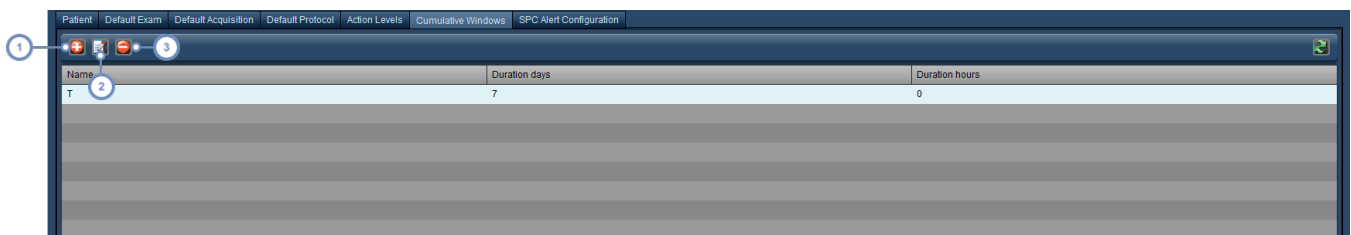
Action Levels can be used to specify, as they are named, actions to be taken when a particular level (dose) is reached. They are modified through the Action Levels tab, and are linked to Default Dose Reference Levels or Protocols. You can monitor them, after they are linked, via the Dashboard (Exams by Action Levels component).






- 1 The Add button  allows you to add a new Action Level.
- 2 The Edit button  allows you to edit the name of the currently selected Action Level.
- 3 The Delete button  deletes the currently Action Level.
- 4 The Up  and Down  buttons allow you to move selected Action Levels up and down the list.

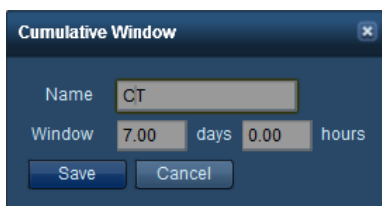
Cumulative Windows

You can specify the periods of time over which a Patient Cumulative Dose Reference Level may be tracked in this tab.



- 1 The Add button  allows you to add a new Cumulative Window.
- 2 The Edit button  allows you to edit the duration of the currently selected Cumulative Window.
- 3 The Delete button  deletes the currently selected Cumulative Window.

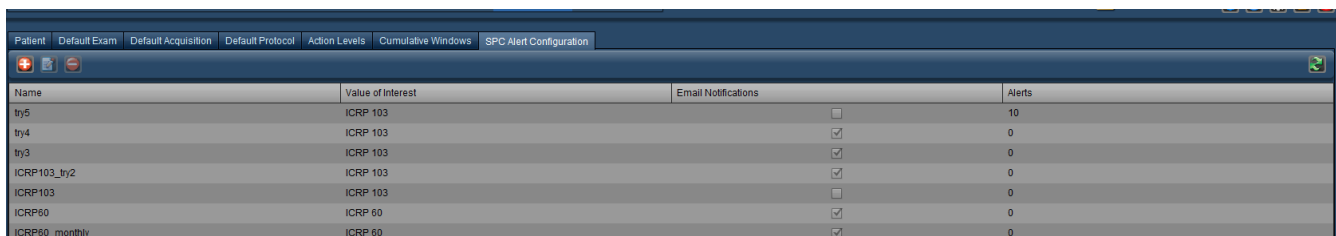
When adding editing a new Cumulative Window, the below window appears.






Enter the name of the Cumulative Window, and define the window in days and hours in the appropriate fields as shown. Click on Save when you are satisfied with your values.

SPC Alert Configuration

The Statistical Process Control Alert Configuration can be configured to generate alerts when an exam or groups of exams signal a statistical trend or grouping that deviates from established operational norms. The SPC Alert Configuration tab displays a list of currently configured SPC Alerts.



Name	Value of Interest	Email Notifications	Alerts
try5	ICRP 103	<input type="checkbox"/>	10
try4	ICRP 103	<input checked="" type="checkbox"/>	0
try3	ICRP 103	<input checked="" type="checkbox"/>	0
ICRP103_try2	ICRP 103	<input checked="" type="checkbox"/>	0
ICRP103	ICRP 103	<input type="checkbox"/>	0
ICRP60	ICRP 60	<input checked="" type="checkbox"/>	0
ICRP60_monthly	ICRP 60	<input checked="" type="checkbox"/>	0

- 1 The Add button  allows you to add a new SPC Alert.
- 2 The Edit button  allows you to edit the currently selected SPC Alert; it opens the SPC Alert Schedule Form as shown below.
- 3 The Delete button  deletes the currently selected SPC Alert.

Statistical Process Control Alert Schedule Form

When adding or editing an alert, the form describing the options available will appear. Within the form graphical representations of the Nelson Rules are displayed, and hovering over each image will trigger a tool tip that describes the rule shown in the image.

- Name** Enter a name for the SPC Alert here.
- Description** You can enter a detailed description for the alert here.
- Value of Interest** This button allows you to select the Value of Interest you will be applying the Nelson rules to.
- Data Source** Choose between Examination-level or Acquisition-level data.
- Time Window** The Time Window represents the rolling time interval over which the rules will be applied, specified in some combination of months, days and hours.
- Cluster Type** Values will be clustered by the time span selected - hours, days, weeks, months, 3 months, quarter, or year. Depending on the Time Window defined, some of the Cluster Types will be disabled, as they may be inappropriate choices for the window chosen (e.g. clustering values by month may not be helpful if your time window only spans 1 hour).
- Schedule** You can define the frequency that the alert's rules are run here, along with when the execution will start and stop. The last executed time is also specified.
- Email Notifications** This checkbox enables email notifications if an alert is generated. To receive an alert, you will also

need to subscribe to them. See "Subscribing to Alerts" on page 160.

The Nelson rules are used in process control to detect whether a measurement is unstable (i.e. out of control). Marking the checkbox next to one of the rules enables it. Multiple Nelson rules can be applied simultaneously. The description for each rule is displayed if you hover over the adjacent graph, and the colored circles in the bottom right represent the appearance of the point in the XbarS chart when a rule is violated.

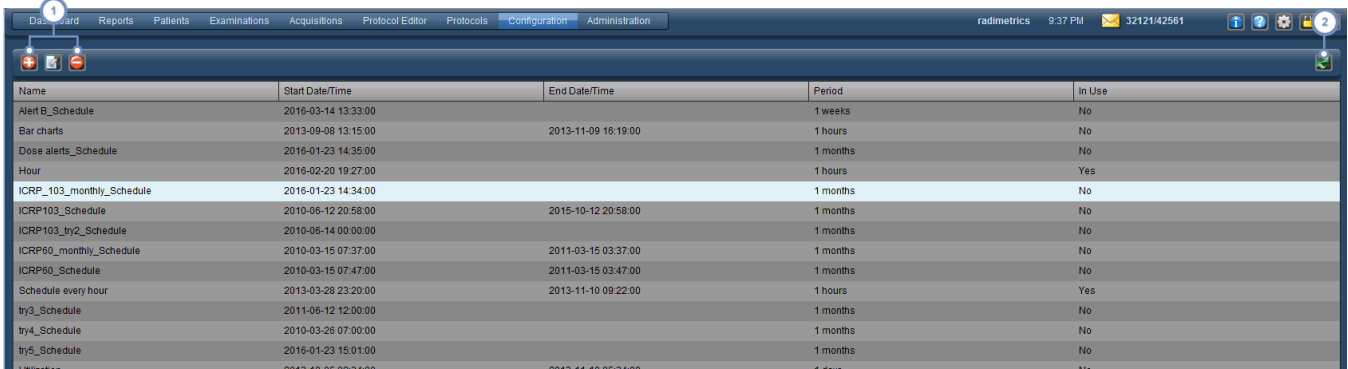
Nelson Rules

The Nelson Rules are described in the table below:





	<i>Definition</i>	<i>Implication</i>
Rule 1	One point is more than 3 standard deviations from the mean.	One sample is grossly out of control.
Rule 2	Eight points in a row are on the same side of the mean.	Some prolonged bias exists.
Rule 3	Six points in a row are continually increasing (or decreasing).	A trend exists.
Rule 4	Fourteen points in a row alternate in direction.	This much oscillation is beyond noise.
Rule 5	Two (or three) out of three points in a row are more than 2 standard deviations from the mean in the same direction.	There is a medium tendency for samples to be mediumly out of control.
Rule 6	Four (or five) out of five points in a row are more than 1 standard deviation from the mean in the same direction.	There is a strong tendency for samples to be slightly out of control.
Rule 7	Fifteen points in a row are all within 1 standard deviation of the mean on either side of the mean.	With 1 standard deviation, greater variation would be expected.
Rule 8	Eight points in a row exist with none within 1 standard deviation of the mean and the points are in both directions from the mean.	Jumping from above to below whilst missing the first standard deviation band is rarely random.

Scheduling



The Scheduling module allows you to define custom schedules used in other areas, such as in Dashboard Reports. The interface displays a list of named schedules along with details such as their scheduled start and end times, period, and whether they are in use.

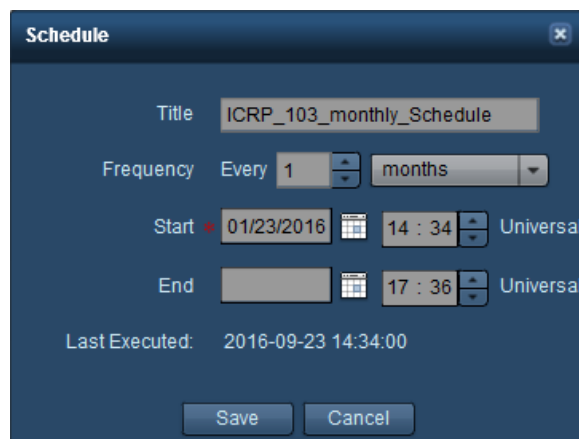


Name	Start Date/Time	End Date/Time	Period	In Use
Alert_B_Schedule	2016-03-14 13:33:00		1 weeks	No
Bar charts	2013-09-08 13:15:00	2013-11-09 16:19:00	1 hours	No
Dose alerts_Schedule	2016-01-23 14:35:00		1 months	No
Hour	2016-02-20 19:27:00		1 hours	Yes
ICRP_103_monthly_Schedule	2016-01-23 14:34:00		1 months	No
ICRP103_Schedule	2010-06-12 20:58:00	2015-10-12 20:58:00	1 months	No
ICRP103_try2_Schedule	2010-06-14 00:00:00		1 months	No
ICRP60_monthly_Schedule	2010-03-15 07:37:00	2011-03-15 03:37:00	1 months	No
ICRP60_Schedule	2010-03-15 07:47:00	2011-03-15 03:47:00	1 months	No
Schedule every hour	2013-03-28 23:20:00	2013-11-10 09:22:00	1 hours	Yes
try3_Schedule	2011-06-12 12:00:00		1 months	No
try4_Schedule	2010-03-26 07:00:00		1 months	No
try5_Schedule	2016-01-23 15:01:00		1 months	No

- 1 These buttons allows you to Add , Edit  and Delete  schedules. In order to Edit or Delete a schedule, select it first by clicking on it.
- 2 The Refresh  button reloads the list of schedules.

Adding or Editing a Schedule

If you click the Add  or Edit  buttons, the dialog box below appears. The explanation for each field is described below.



Schedule ✕

Title:

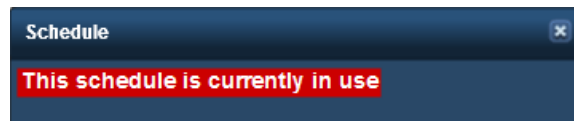
Frequency: Every

Start:

End:

Last Executed: 2016-09-23 14:34:00

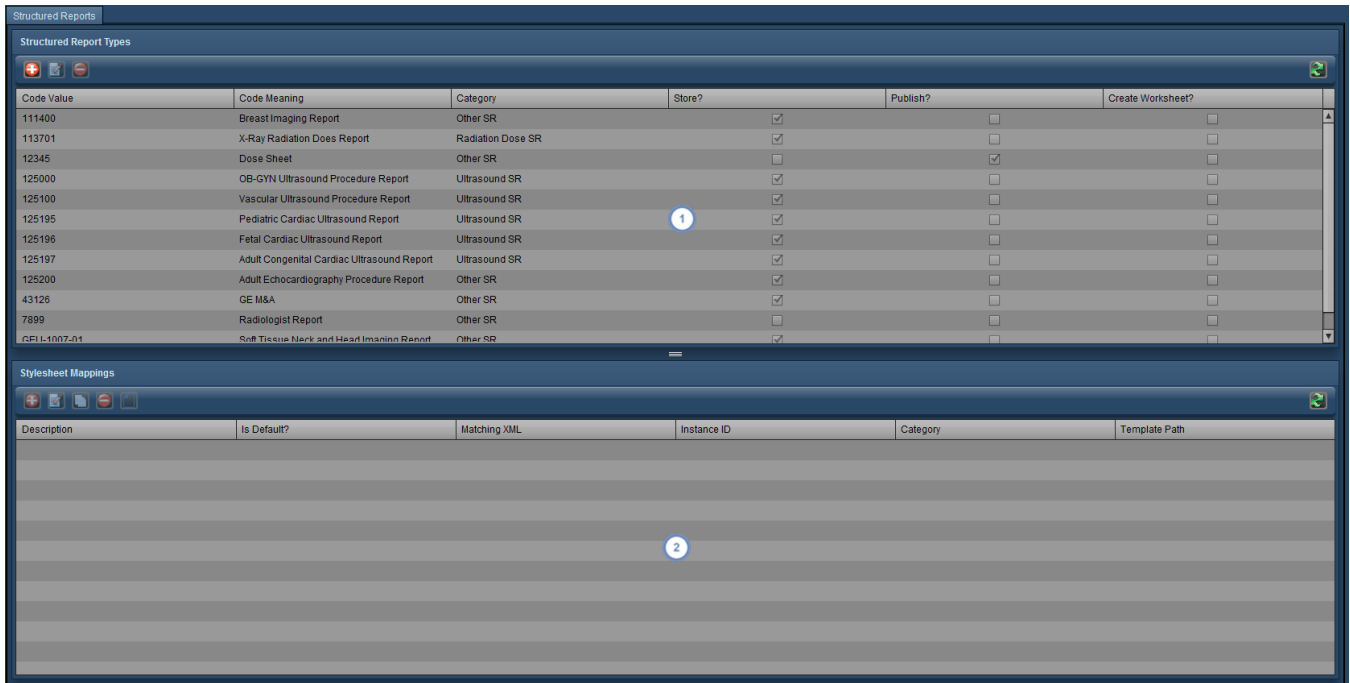
Title	A text field containing the name (or description, if desired) of the schedule. This text is what will appear in the drop-down menus for selection in other modules such as Dashboard Reports.
Frequency	Defines the frequency of the schedule by a number and duration (hours, days, weeks, months, or years).
Start	The start date and time for this schedule is defined here.
End	The end date and time for this schedule is defined here.
Last Executed	The last time this schedule was executed is displayed here.






If the schedule you are currently editing is being used by another function (like a Dashboard Report), the red highlighted text warning shown above is displayed. You may want to verify what the schedule is being used for prior to changing it.

Structured Reports






The Structured Reports configuration interface allows you to configure the collection and transmission of Structured Report data to HL7 compatible systems - for example, in sending Ultrasound Structured Reports to RIS/HIS Speech Recognition. The interface appears as below:



The Structured Report Types window contains structured report codes. You can choose whether to store or publish

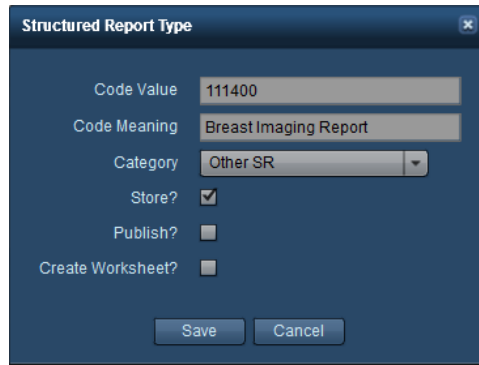
1 specific structured report types by using the Edit  button. You can also add or delete selected report types by using the Add  or Delete  buttons. See "Adding or Editing Structured Report Types" on page 207

The Stylesheet Mappings window allows you to choose or edit specific style sheets to be applied to the currently

2 selected structured report. The buttons in this window allow you to Add , Edit , Copy  or Delete  the mappings; additionally you can Edit the Stylesheet . See "Stylesheet Mappings" on page 208.

Adding or Editing Structured Report Types

When adding or editing structured reports, the below interface appears. The table below describes each item.



Code Value This is the code value defined by DICOM (or another standard) indicating the type of structured report.

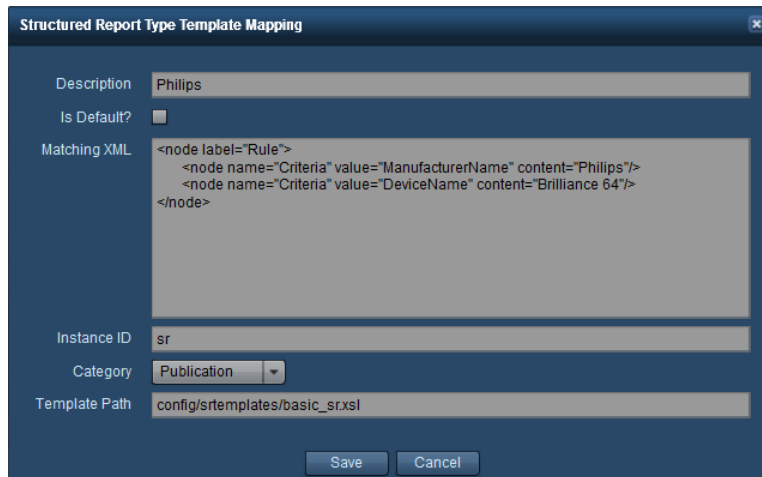
Code Meaning This is a text description of what the code value means.

Store? If this is checked, Radimetrics software will retain an XML version of the structured report.

Publish? If this is checked, Radimetrics software will automatically publish a processed version of the structured report using one of the stylesheets specified by the Stylesheet Mappings window.

Stylesheet Mappings

When adding or editing stylesheet mappings, the below interface appears. The table below describes each item.




Description A text description of the stylesheet.

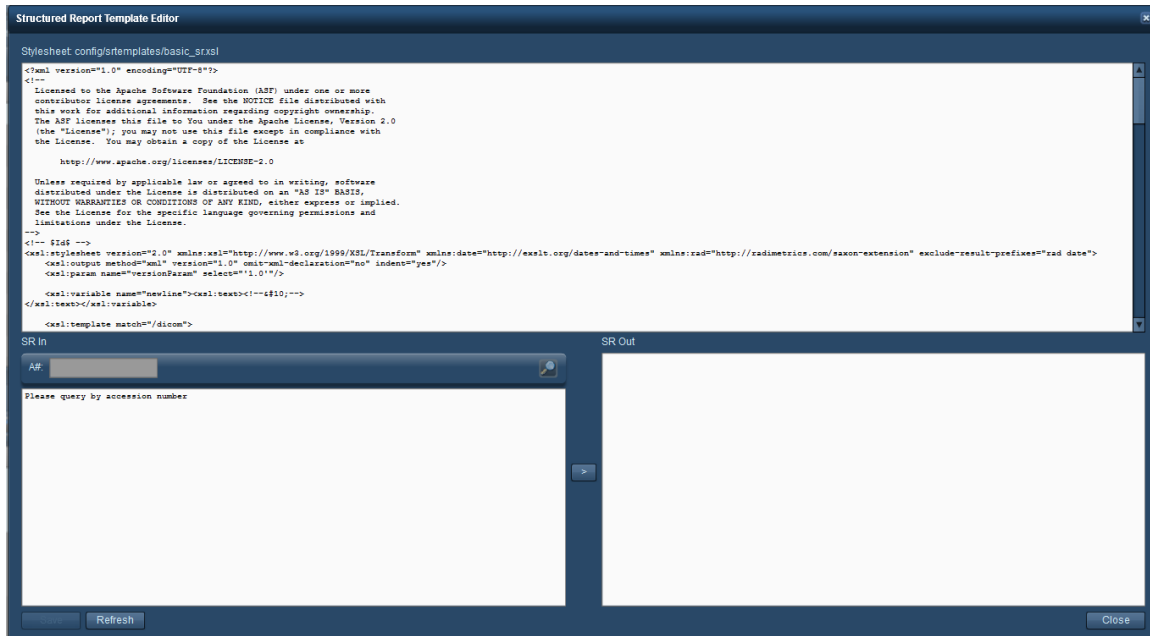
Matching XML XML matching rules in this field are applied to the incoming structured report to decide if this stylesheet is applicable.

Instance ID A unique ID for the stylesheet.

Template Path The location of the XSL stylesheet that will transform the structured report prior to publishing.

Structured Report Template Editor

If you edit the currently selected stylesheet by clicking on the Edit Stylesheet  button, the Structured Report Template Editor interface appears.

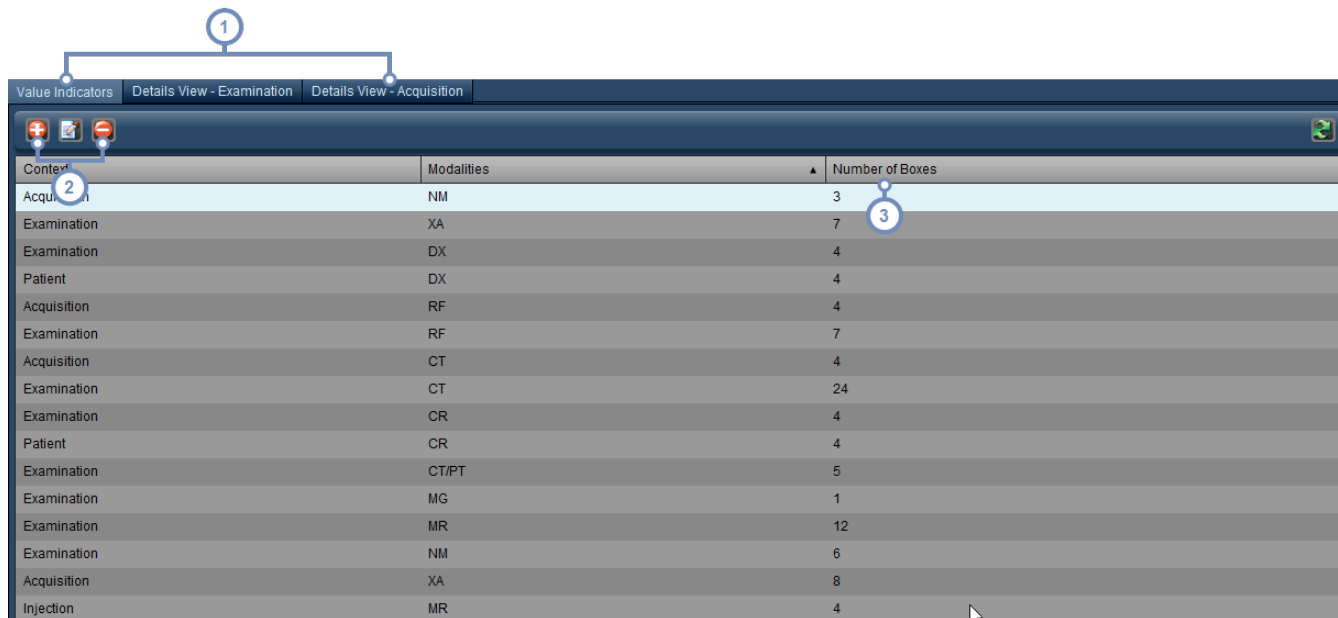





The contents of the XSL stylesheet file can be edited in the upper panel; the bottom half allows you to preview how a structured report would be transformed by the stylesheet. You can search for a sample structured report by entering an accession number, and then using the ">" button to produce the preview. Once you are done, click on the "Save" button to save your stylesheet.

Value Indicator Settings


The Value Indicator Settings module allows customization of the displayed Values of Interest depending on context (i.e. Patient, Examination, Acquisition or Injection) and modality. In addition, custom values for display in the Details View for Examinations and Acquisitions can be chosen. If no customized values have been defined for a particular combination of modalities the default displayed Values of Interest are defined by the customized values for the individual modalities first. If individual modality does not exist, then the lines containing "All" under the Modality column are used. For example, if under the context of Examination the modality CT/PT/DX

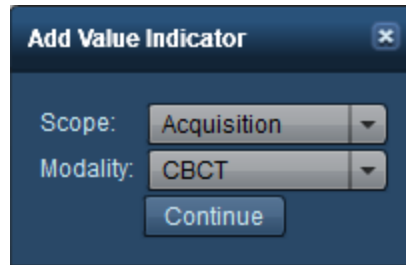
has not been defined, the Values of Interest displayed would be whatever is contained under the context Examination with the individual modalities CT, PT and DX.



- 1 These three tabs allow you to switch between editing Value Indicators, and the Values of Interest shown in the Details View for Examinations or Acquisitions.
- 2 This set of buttons allows you to Add , Edit  and Delete  the Value Indicators. This is detailed below.
- 3 "Number of Boxes" refers to the number of Values of Interest that are included in the display for the specific context and associated modalities. A large number of boxes may make the interface more difficult to read.

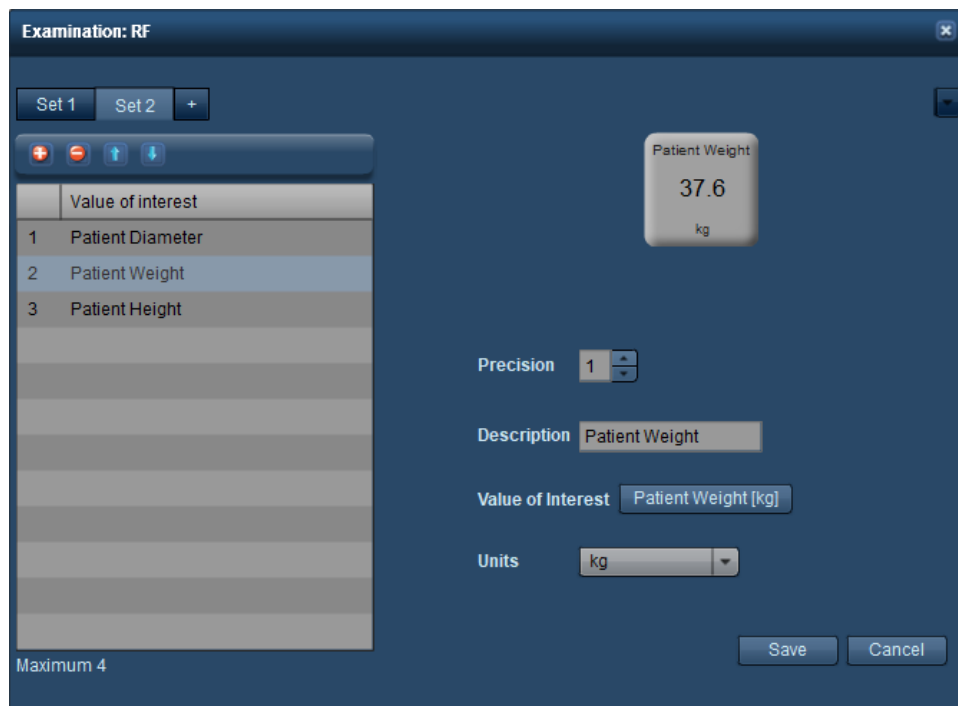
Adding a Value Indicator





Clicking on the Add  button brings up the dialog box below. Choose a scope (Patient, Examination, Acquisition or Injection) and then a modality (or a combined set of modalities as appropriate). Clicking on the Continue button will bring up the window allowing editing as shown in the next section. If you choose a combination of scope and modality that already exists, you will then be allowed to edit the pre-existing combination.



Editing a Value Indicator

When editing a Value Indicator, the values of interest are divided into Sets, containing a maximum of four Values of Interest each. The Sets allow you to group related Values of Interest together for display. For example, you might group Patient Diameter, Weight and Height together. Set 1 is displayed as the leftmost set, followed by Set 2, Set 3, etc. Within each set, Values of Interest can be added, deleted, or their display order can be changed.







- 1 You can choose between the Sets you are editing with these tabs. The '+' (plus) tab allows you to add a new Set.
- 2 This set of buttons allows you to Add , and Delete  the Values of Interest, as well as perform reordering using the Up  and Down  buttons of the currently selected row.

- 3 On the right side, you can select the Value of Interest for display. The dosimetry label can be customized with an appropriate Description (typically you will want to match the name of the Value of Interest). In addition, the precision of the number displayed (in terms of decimal places) and Units can be changed as appropriate for the Value of Interest.



Radiopharmaceuticals

The Radiopharmaceuticals module allows the creation of Radiopharmaceutical identifiers (text descriptions) that are linked to specific radiopharmaceuticals.



- 1 This field can be used to quickly search the list of Radiopharmaceutical Identifiers.
- 2 This set of buttons allows you to Add , Edit  and Delete  a Radiopharmaceutical Identifier. The Refresh  button reloads the list of Identifiers.

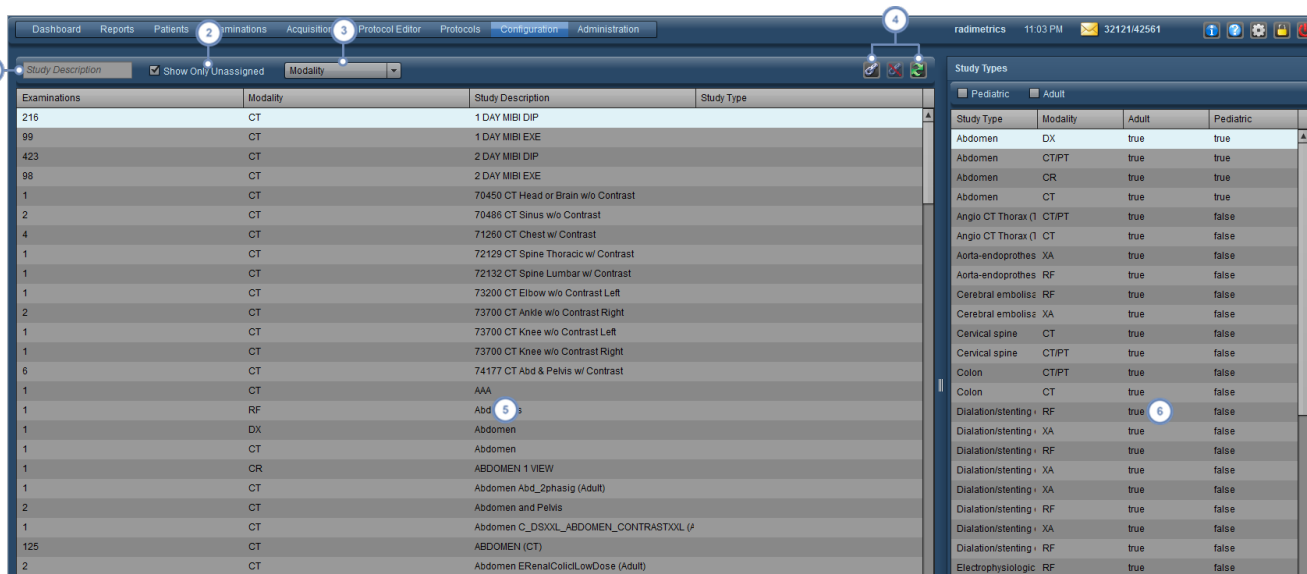
Adding or Editing a Radiopharmaceutical Identifier




If you click the Add  or Edit  buttons, the dialog box below appears.

You can change the Identifier text and its linked radiopharmaceutical using the drop-down menu. Click the Save button after finishing.

Study Type Assignment

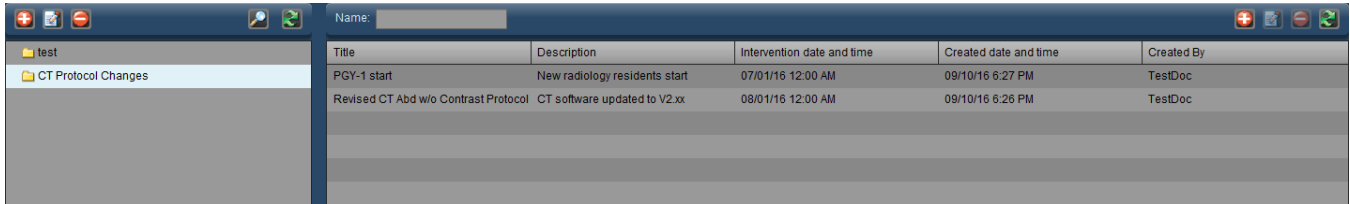
The Study Type Assignment module allows the linking of Study Descriptions to Study Types. This allows the proper export of Excel Spine Reports for Belgium. The interface is shown below.










- 1 The Study Description field allows you to search for specific Study Descriptions by entering text.
 - 2 The Show Only Unassigned button restricts the list of Study Descriptions to those that are not already linked.
 - 3 The Modality drop-down menu allows you to restrict the list of Study Descriptions to a particular modality (CT, RF, etc).
- Once a Study Description selected in the left-hand window, and a Study Type is selected in the right-hand window,
- 4 the Chain-link  button allows them to be linked together. If a Study Description is already assigned to a Study Type, the Unlink  button removes the assignment. Finally, the Refresh  button re-loads the list of Study Descriptions.
 - 5 The left-hand window displays a list of the Study Descriptions, along with the number of exams with that description, the modality, and the linked Study Type if any.
 - 6 The right-hand window displays a list of Study Types. These can be restricted to show only Adult or Pediatric Study Types via the appropriate checkboxes above the window.

Process Intervention



The Process Intervention module allows you to define the time frame for interventions. Doing this will allow the XbarS Dashboard component chart to show the effects of an intervention taking place on the mean and standard deviation.

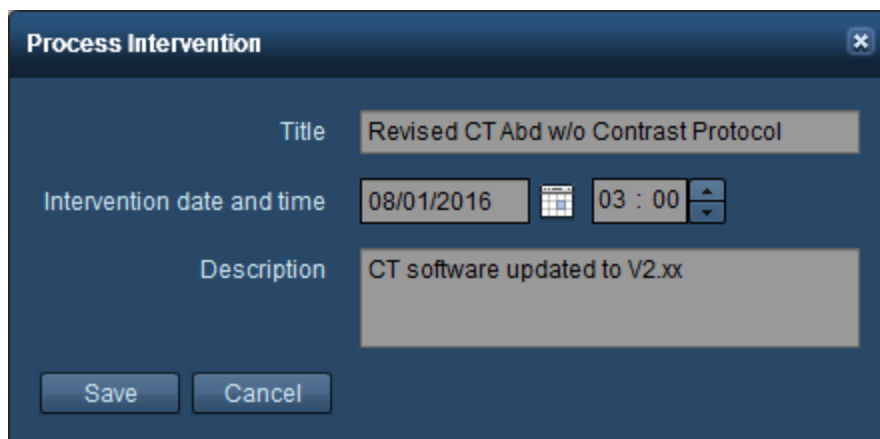


Name:	Title	Description	Intervention date and time	Created date and time	Created By
	PGY-1 start	New radiology residents start	07/01/16 12:00 AM	09/10/16 6:27 PM	TestDoc
	Revised CT Abd w/o Contrast Protocol	CT software updated to V2.xx	08/01/16 12:00 AM	09/10/16 6:26 PM	TestDoc

- 1 This set of buttons allows you to Add , Edit  and Delete  the intervention folders. See "Working with folders" on page 219 for more on organizing folders.
- 2 The Name field can be used to search for items within the current folder. Wildcard characters (for example, the % symbol) may be used.
- 3 The Add  or Edit  buttons here are used to add a new intervention or edit the selected intervention. The dialog box for this is detailed below. The Delete  button deletes the selected intervention. The Refresh  button reloads the list of interventions.

Adding or Editing a Process Intervention

If you click the Add  button or select an intervention and click on the Edit button , the following dialog box appears:



Process Intervention ✕

Title

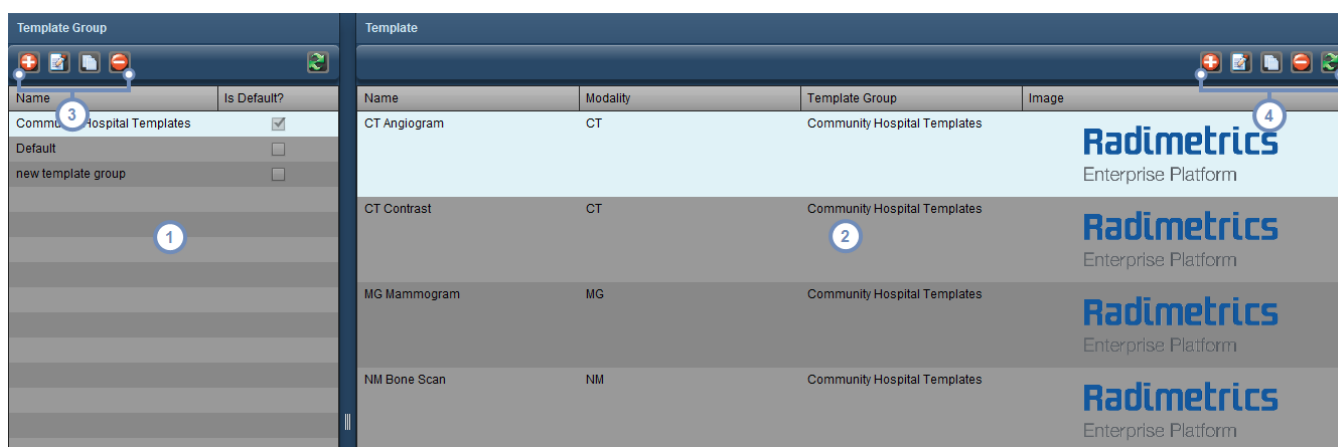
Intervention date and time

Description

The intervention title, date and time, as well as description can be entered here. Note that the date and time of intervention is entered in your local time, but will be displayed in the server's time zone.





PDF Report






The PDF Report configuration module allows for organizing and editing PDF Report templates. Template parameters include customizing the displayed logo as well as to choose the Values of Interest that will be included. For Values of Interest, the general layout (in one of two columns) or order of appearance can also be modified. Upon opening the PDF Report module, the following interface appears:



Each Template Group listed here can contain one or more templates. If the "Is Default?" checkbox is marked, then the templates for a specific modality in that Template Group are chosen by default if they exist for the modality of the exam being exported to PDF. Otherwise, the "Default" Template Group takes precedence. The Default Template Group and the templates it contains are neither editable nor deletable, but can be copied as a basis for a new Template Group or templates.

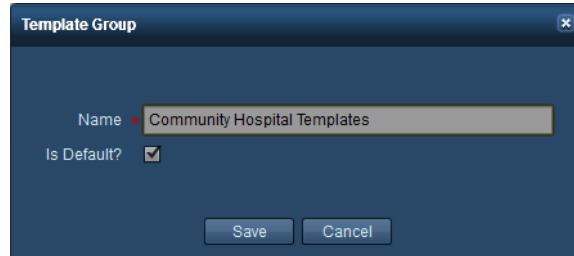
The list of templates is shown here including their name, modality, Template Group they belong to and associated logo image if present.

This set of buttons allows you to Add  a new Template Group or Edit , Copy  and Delete  the selected Template Group. When copying a Template Group, all its contained templates are also copied. See "Working with Template Groups" on page 216.


This set of buttons allows you to Add  a new template or Edit , Copy  and Delete  the selected template. The list can also be Refreshed  to display changes if someone else has edited the templates while you are present in the module. See "Working with Templates" on page 216

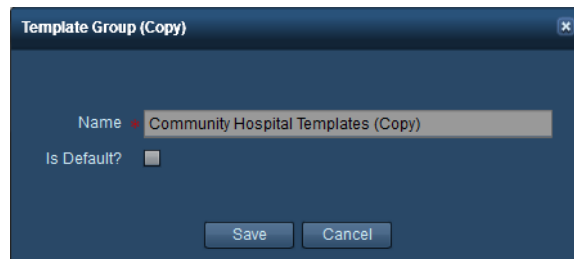
Working with Template Groups

When Adding  or Editing  a Template Group, the following dialog box appears:



You can specify a name for the template. The "Is Default?" checkbox, if selected, will cause this Template Group's templates to become the default for their modality, overriding the "Default" template group or whatever other Template Group is currently set as default. Click on Save once you are done.


When Copying  a Template Group, a similar dialog box appears but with "Copy" added to the title bar:



The name of the Template Group is changed to add "(Copy)" to the end. You can rename the Template Group as you wish and click Save afterwards to keep the changes. Copying a Template Group also copies all the templates within that group.

Working with Templates

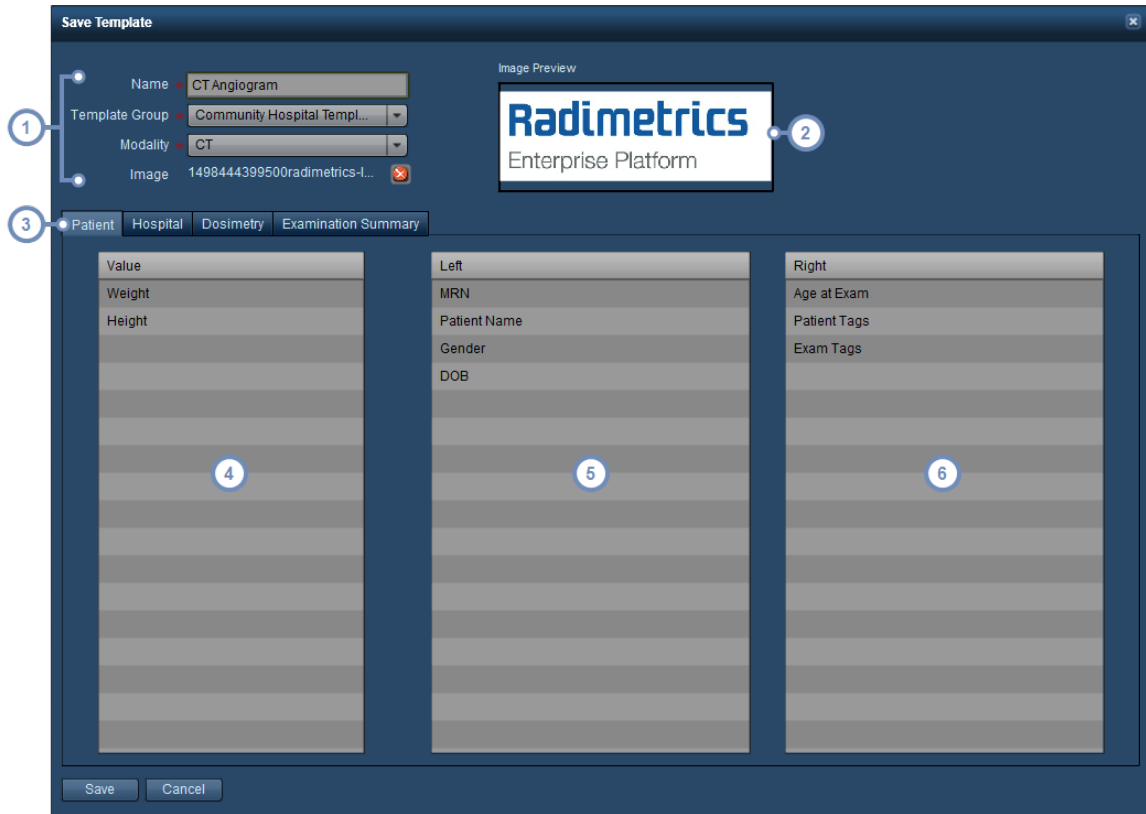
In creating or editing a template, it is useful to understand the expected appearance of the output. In particular, note that Values of Interest can be assigned to the "Left" or the "Right" columns as denoted below. The below image is an example of a PDF export, taken from the top of the first page:

PATIENT NAME: ADAMS, MARIAN INSTITUTION: Default DATE PERFORMED: 10/19/2016 11:29 ACCESSION #: 589484596 STUDY DESCRIPTION: 71275 - CTA CHEST FOR PE WITH CONTRAST			
PATIENT			
MRN	1J8816E29NVR4	Age at Exam [yrs]	29.7
Patient Name	ADAMS MARIAN	Height [mm]	1860
Gender	F	Weight [kg]	53.2
DOB	01/28/1987	Patient Tags	
		Exam Tags	

- 1 Demographic information for the report is located in the top left of the first page and is not customizable.
- 2 The logo image, if present, is located here on the top right of the first page.
- 3 In this case, "Patient" represents the section header. Section headers include Patient, Hospital, Dosimetry, and Examination Summary. Under Dosimetry first the Examination level Values of Interest are displayed, and then the Acquisition level Values of Interest follow under their subheadings "Acquisition 1", "Acquisition 2", etc.
- 4 This column represents the "Left" side.
- 5 This column represents the "Right" side.

Adding or Editing Templates

When Adding  or Editing  a template, you will see the following interface:



- 1 You can name your template here, choose the Template Group it belongs to, the Modality it applies to, and select the logo image that will be displayed on the top right of the first page of the PDF report.
- 2 The logo image, if present, is shown as a preview here. Alpha (transparency) channels are supported, so your logo can have a transparent background when placed onto the report.
- 3 This set of tabs allows you to switch between the section headers (Patient, Hospital, Dosimetry and Examination Summary) that you are editing.
- 4 The "Value" column contains the Values of Interest available to be put into the report. The Values of Interest available are specific to the particular section you are editing and are not customizable. If a Value of Interest remains in this column when the report is saved, it will not be included anywhere in the report.
- 5 This column represents the "Left" side. Any Values of Interest located here will be listed on the left column of the report.
- 6 This column represents the "Right" side. Any Values of Interest located here will be listed on the right column of the report.

In order to assign Values of Interest to a specific column you can drag and drop them with the mouse from one column to the other (e.g. from the Value column to the Left or Right columns). You can also reorder the Values of Interest within the same column via drag and drop.

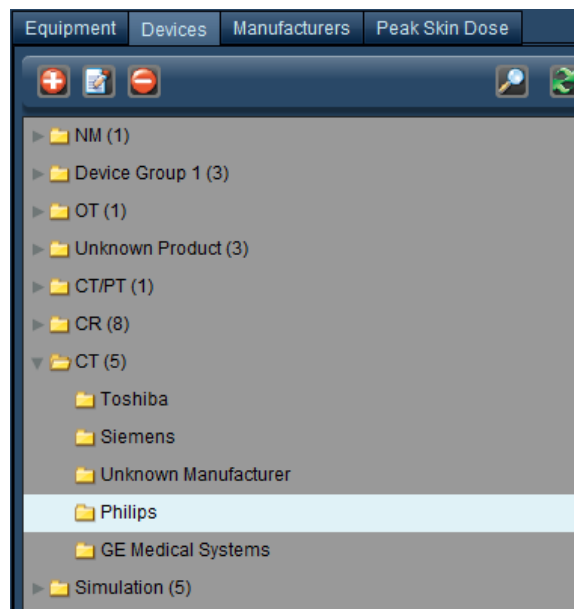
Once you are done, click "Save".

Copying a Template

When copying a template, the same interface shows up as above, but the template name has a "(Copy)" added to the end automatically. You can rename the template and move the Values of Interest around as desired before clicking on the "Save" button, which will save a new, customized copy of the template you selected.

Working with folders

In working with either the Institutions, Equipment or Staff Modules you may need to create and maintain a set of organized Group folders and their respective contents. An example Devices folder list is shown below:





Numbers in parentheses beside the folder name indicate the number of folders located within that folder.

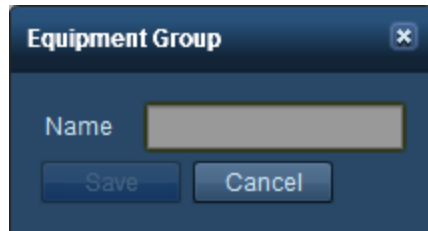


The hierarchical structure of the folder tree is important in making sure that studies are appropriately categorized.

Adding or Renaming a Group folder


To add a folder, click on the Add button . To rename a folder, click to select it and then click on the Modify button . Alternately, double-click on the folder's name.

In either case, a dialog box will appear as shown below.



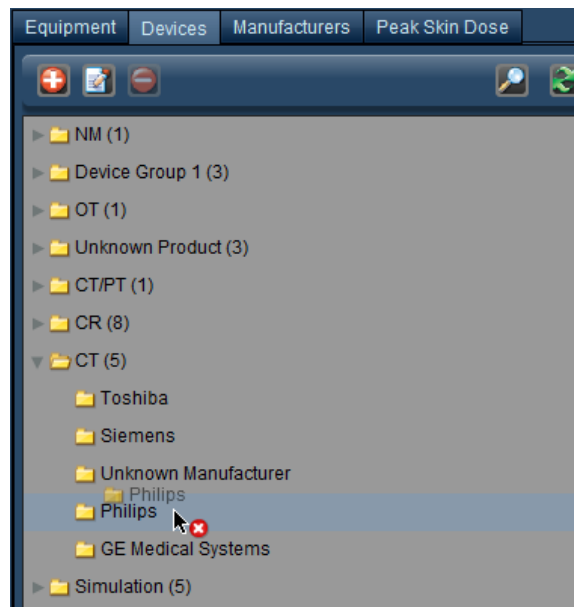
Change the name field as you wish and click on Save.

Deleting a folder

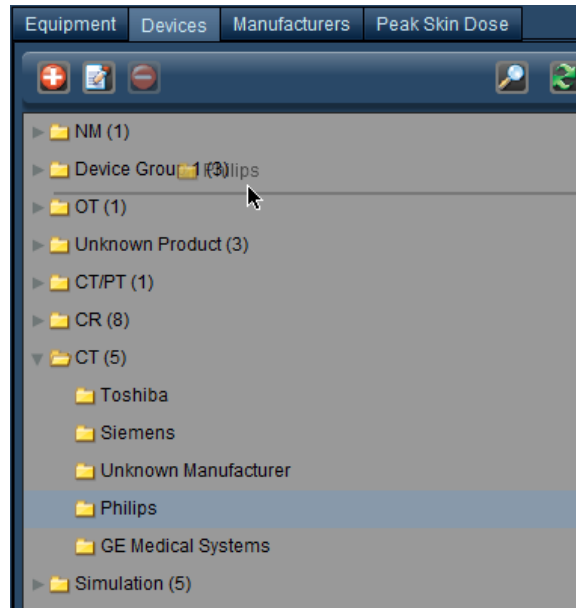
To delete a folder, select it by clicking on it and then click on the Delete button . A confirmation dialog box will be displayed asking if you are sure you would like to delete the folder.

Moving a folder or item

To move a folder or an item, click and hold on it; it will appear as a 'ghost' attached to your cursor.



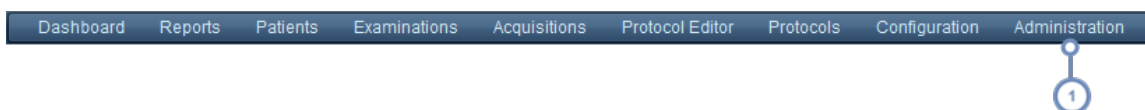
Drag it to the location you would like within the folder tree; the location it will be placed is highlighted underneath the mouse cursor. The red 'x' will change to a green '+' once you are in a valid location for the folder to be moved to.



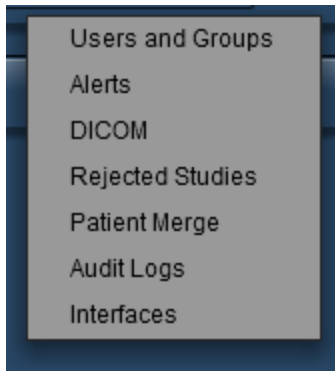
Administration Category

The Administration Category is comprised of multiple modules as listed below. These modules allow various aspects of the workflow to be managed and configured, and also allows management and monitoring of user access to Radimetrics software. Depending on your user access permissions, you may not be able to access all Modules within the Administration Category.

Users & Groups	Manage Users & Groups (e.g. passwords and permissions). See "Managing Users & Groups" on page 223.
Alerts	Allows you to fine-tune alert settings for each category of alert, including filtering based on Values of Interest, e-mail notifications, and individual user subscriptions. See "Alerts Configuration" on page 228.
DICOM	Perform DICOM-related tasks such as synchronization and migration, searching for remote studies via DICOM and configuring DICOM nodes. See "DICOM" on page 231.
Rejected Studies	Review and manage studies rejected from Radimetrics software. See "Rejected Studies" on page 240.
Patient Merge	Allows you to merge any two patient records together.
Audit Logs	Review accessing of patient records by Radimetrics users. See "Audit Logs" on page 241.
Interfaces	Review communication of examination or patient information with PowerScribe 360/Radwhere or the ACR. A summary page is available to monitor Study Bundling. See "Interfaces" on page 242.

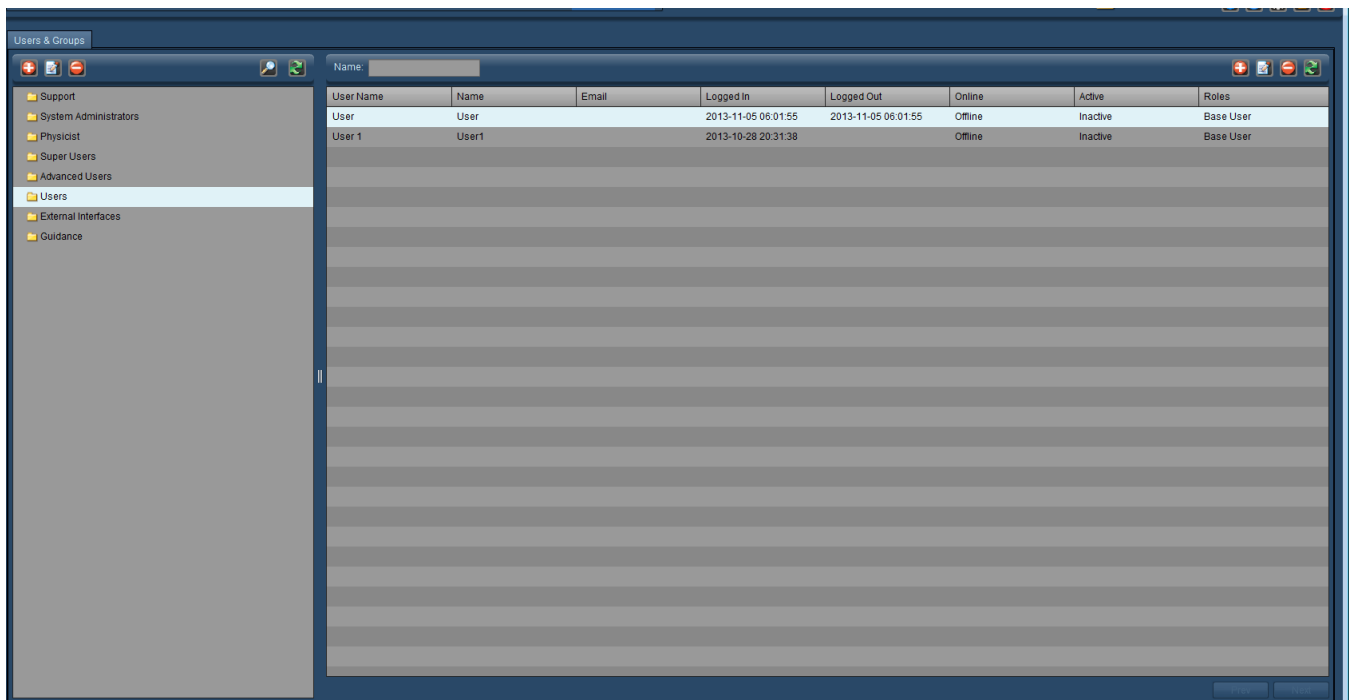


- 1 To access the a module within the Administration Category, click on the corresponding task you would like to perform under the Administration menu, shown below.



Managing Users & Groups

In order to manage users and groups within Radimetrics™ Enterprise Platform, you must have System Administrator level access or above, with permissions to access the Users & Groups screen. The Users & Groups interface is shown below. On the left hand side are folders for User Groups, and on the right hand side the selected Group's users are listed. In the 'Name' field, you can search for a particular user within a folder by their name.



This button allows you to add a Group or User.



This button allows you to modify a selected Group or User.



This button allows you to delete a Group or User.





The Refresh button allows you to re-display the folders or users listed on screen. This may be handy if more than one administrator is editing users or groups simultaneously.



Each folder shown is associated with a specific Permission Group; users contained or created in a particular folder have overall permissions restricted by these Permission Groups. See "Default Roles" on page 227

Adding or Editing Users

To add a user, click on the Add button  on the right side of the screen, above the user list. Remember to choose the folder that you would like to add the user to beforehand, as that will dictate the basic permissions that the user has. To edit a user, first select the user in the list on the right (if none show up, a folder that contains at least one user must be selected first), then click on the Edit button . The window below will appear.

The table below describes the fields in the User Editing window.

User Name	The username that is used for logging into the system.
Name	The user's real name goes here.
Email	The e-mail address is used for communications generated by Radimetrics software such as Alerts subscriptions.
Password	The user's password. This field needs to be confirmed by entering it again on the second row. If you are creating a new user, these fields will be disabled for editing. Radimetrics™ Enterprise Platform will bring up a new window with an automatically generated default password in this case for you to give the new user. Subsequently, upon their first login, Radimetrics software will request they change their password.


Timeout [min]	This is the amount of time (in minutes) after which an idle user will automatically be logged out from Radimetrics™ Enterprise Platform.
Home Page	By clicking on a particular module in the Permissions box, and then clicking on 'Change Homepage', the user can have a different module show up as their first screen upon login.
Language	This drop-down menu defines the language of the user interface that the user will see upon login.
Time Zone	This drop-down menu allows you to select the default time zone displayed for the user.
Roles	Roles define the set of modules that the user may have access to, if given permission. A user may have multiple roles selected. This may be useful when two different custom roles have mutually exclusive sets of modules available and the user requires access to both sets. The default set of roles is defined below. See "Default Roles" on page 227.
Module Access	The listed modules here will vary depending on the Roles that the user is a part of. The check-boxes beside each module allow you to enable and disable the user's access to these modules. Note that Configuration and Administration are represented by folders; the arrow beside the folders may be clicked to reveal the other screens contained within them which can be individually enabled or disabled for access. By clicking on any permission checkbox, you will cause the Module Access Preset to be set to Custom, as described below.
Module Access Presets	Module Access presets allow a range of pre-defined Module Access settings to be selected. The four available presets are Custom (such that you can select permissions individually for a user), Read-Only, Reduced, and Full.
Disable Patient Name Access	If you enable this option, patient identification information is anonymized for the user.
Enable Instant Search	Enables or disables instant searching (e.g. after putting a search string in for an exam); disabling this requires the Search button to be clicked in order to display results.
Active	Enables or disables the user from accessing Radimetrics™ Enterprise Platform. If a user is having difficulty logging into Radimetrics software despite having had their password reset, this field should be checked.
Manage Alert Subscriptions	This setting is used to manage the user's Alert subscriptions. See "Subscribing to Alerts" on page 160.

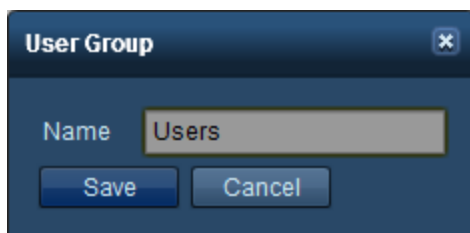
Once you are done, click on the Save button to finish adding or editing the user.



Creating a new user using a previously deleted, old username will 'attach' the old user's audit logs to the new user.


Adding or Editing Groups

To add or edit a group, click on the Add button  on the left side of the screen. The following dialog box will appear:



Enter or change the name of the group in the Name field, and click Save when done.

Deleting a user or group

To delete a user or group, simply select the user or group from the list and then click on the Delete button . For groups, the button is on the left side, while for users, it is on the right side. Users can only be deleted if they are offline, and in addition, their audit logs will remain available even after deletion.

Default Roles

Below is a table of the four basic Roles and their default accessible areas. An 'X' indicates that the group has access to that area.


	<i>Dashboard</i>	<i>Worklists</i>	<i>Patients</i>	<i>Examinations</i>	<i>Protocols</i>	<i>Protocol Editor</i>	<i>Configuration</i>	<i>Administration</i>
System Administrator	X	X	X	X	X	X	X	X
Super User	X	X	X	X	X	X	X	-
Advanced User	X	X	X	X	X	X	-	-
Basic User	X	X	X	X	X	-	-	-

The Configuration and Administration modules further subdivide into permissions for additional screens that can be customized for each user.

Alerts Configuration

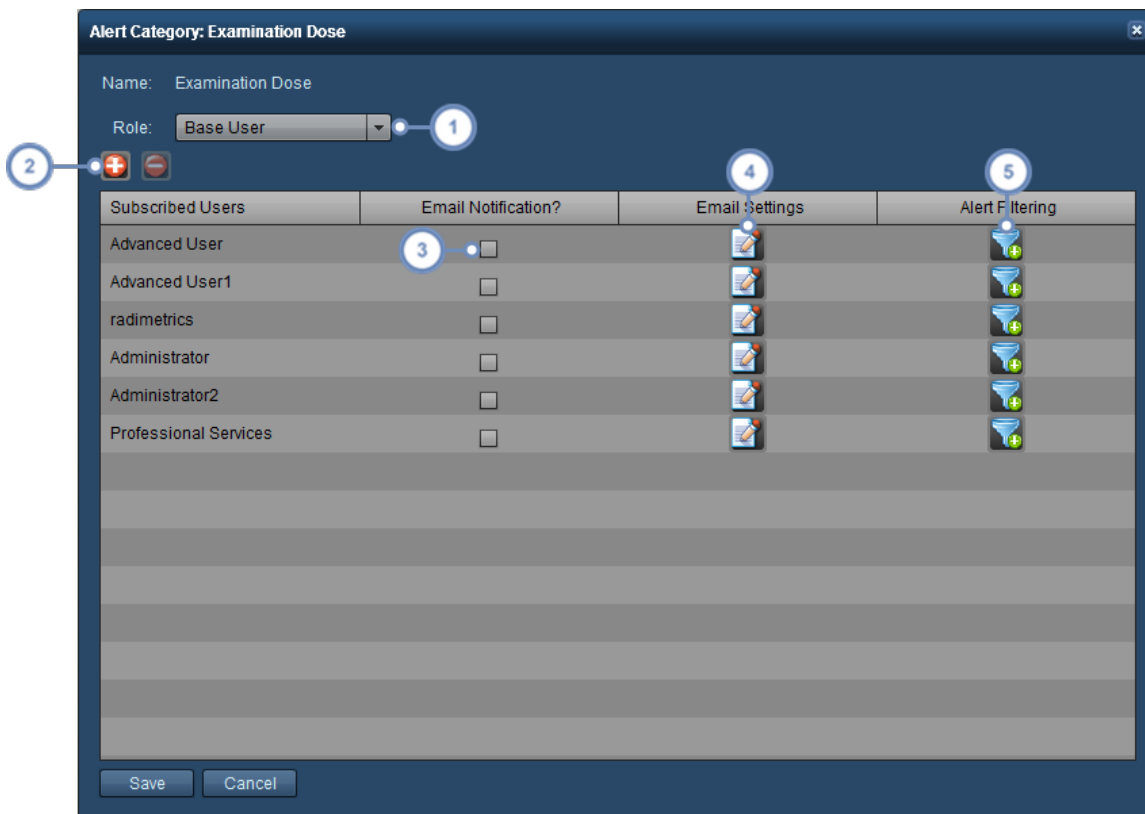
The Alerts administration page allows you to modify the settings for each alert category, including fine-grained filtering of alerts to specific users and e-mail notification setup. See "Alerts" on page 153 for documentation regarding reviewing and setting up alerts for the currently logged-in user.







- 1 The Edit button  opens a window allowing you to edit the currently selected Alert Category, as shown in the next image.

Editing an Alert Category

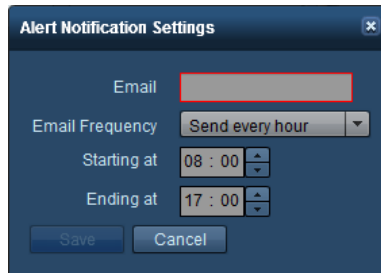
The Alert Category editing window allows editing of the permissions required to access that Category and has a Subscribed Users list that allows you to add and remove users from receiving Alerts within the Category.



- 1 The Permissions Group drop-down menu allows you to define the minimum permission group level that a user needs in order to view that Alert Category's alerts. This may be overridden by a Subscription.
- 2 The Add  button brings up a dialog box allowing you to add users for subscription to this category of Alert. The Delete  button allows you to delete the selected Subscribed User, removing them from the alert notification.
- 3 Email Notification allows you to enable and disable email notifications to the user, based on the email address specified in Email Settings.
- 4 Clicking on the Edit  button here takes you to the "Alert Notification Settings" dialog box, as noted below. See "Alert Notification Settings" on page 229.
- 5 The Filter  button allows you to specify filtering criteria for sending an alert to the user within the Alert Category being edited. See "Alert Filtering" on page 230

Alert Notification Settings

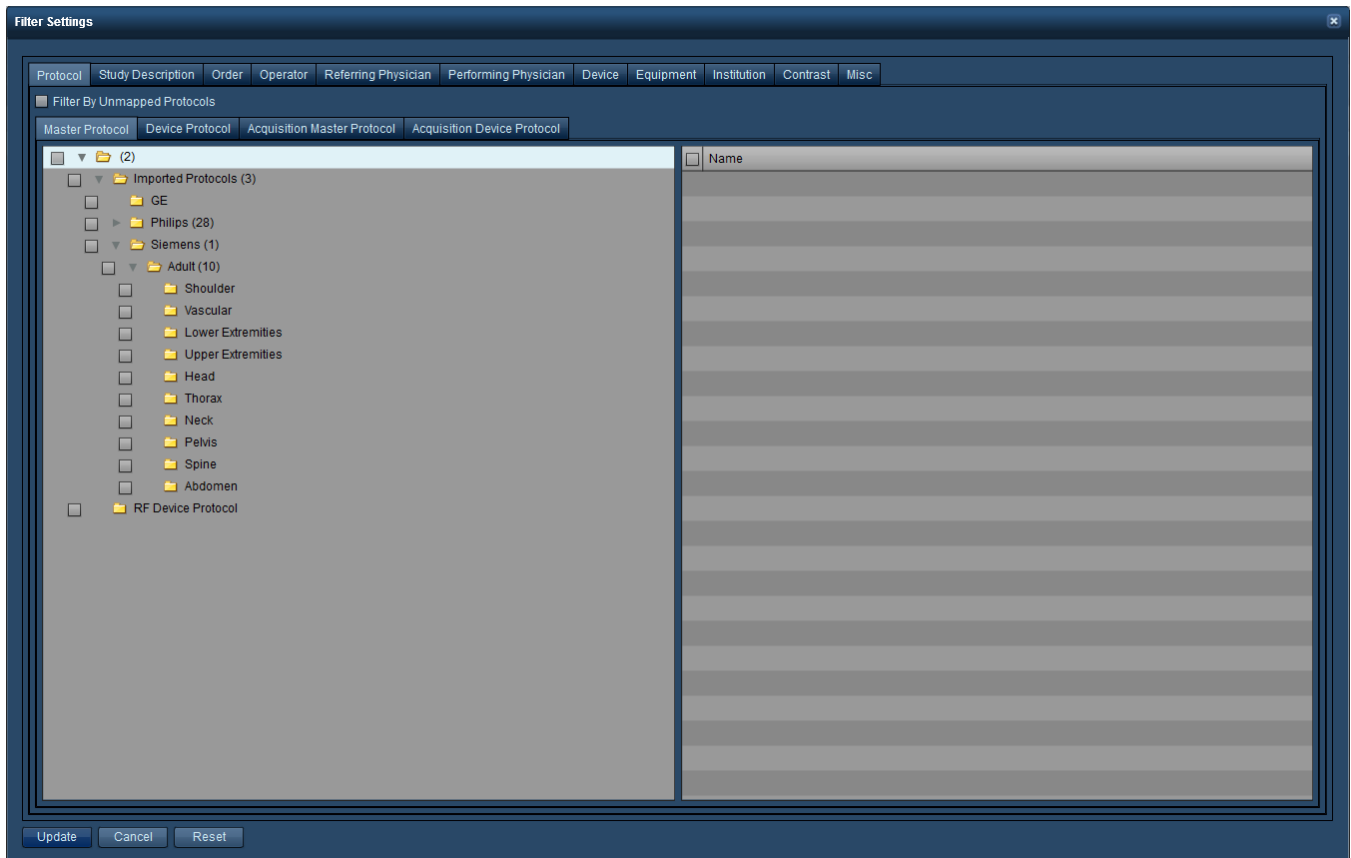
The Alert Notification Settings dialog box appears upon clicking on the Edit button under the Email Settings column.



From here, you can edit the email address used for this specific Alert, change the email frequency and also define the times that the Alert emails are sent.

Alert Filtering

Specifying filtering criteria for an Alert allows you to send alerts that are specific to a user's needs. For example, you could develop a filter to send alerts specifically linked to a certain device protocol, or a specific CT scanner. Or, in a multi-site situation, you can filter alerts so that only alerts for your site are received.



The available categories include Master Protocol, Device Protocol, Order, Operator, Referring Physician, Performing Physician, Device, Equipment, Institution, and Misc (which is explained below).

Miscellaneous Filtering categories

The last tab available within the filtering dialog box allows you to specify filters for Alerts by Date, Time, Patient Sex, Age, Height, Weight, Modality and Examination or Patient Tags. A combination of the criteria may be used.

The screenshot shows the 'Filter Settings' dialog box with the 'Misc' tab selected. The dialog contains the following fields and options:

- Date:** Select Date, 15 : 41 : 03
- Time:** 00 : 00 : 00, 23 : 59 : 59
- Patient Sex:** [Dropdown]
- Pregnancy Status:** [Dropdown]
- Patient Age Range (yrs):** [Range input]
- Patient Height Range (cm):** [Range input]
- Patient Weight Range (kg):** [Range input]
- Modalities:**
 - CR
 - MG
 - XA
 - US
 - NM
 - PR
 - OT
- Scan Regions:**
 - Head
 - Head/Abdomen/Pelvis
 - Facial Bones
 - C Spine
 - Neck
 - Neck/Abdomen
 - Neck/Abdomen/Pelvis
- Radio buttons:**
 - Any of the selected
 - All of the selected
- Series Description:** [Text input]
- Examination Tags:** [Text input]
- Patient Tags:** [Text input]
- Has Worksheet:** [Dropdown]
- Worksheet Published:** [Dropdown]

Buttons at the bottom: Update, Cancel, Reset.

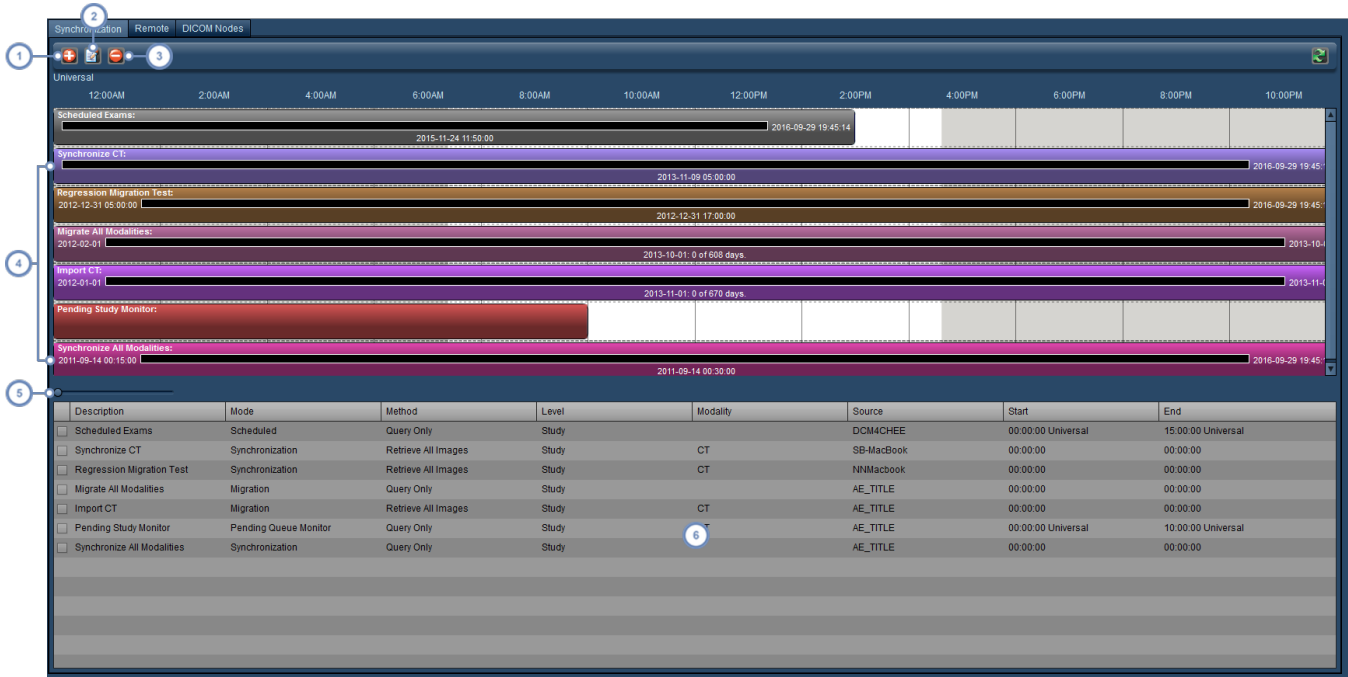
DICOM




The DICOM module allows you to configure synchronization, remotely query, and configure DICOM (AE - Application Entity) nodes. You can switch between these tasks by choosing the appropriate tab at the top of the DICOM module interface.

Synchronization

Synchronization events ensure that local data is up to date, by: pulling studies from a PACS as they are updated (i.e. Synchronization), pulling studies from previous updates not available locally (i.e. Migration), or queuing studies that did not successfully transfer on previous attempts

(i.e. Pending Queue). These events are displayed in a timeline, with a bar to show current progress. The interface for synchronization is as shown below:

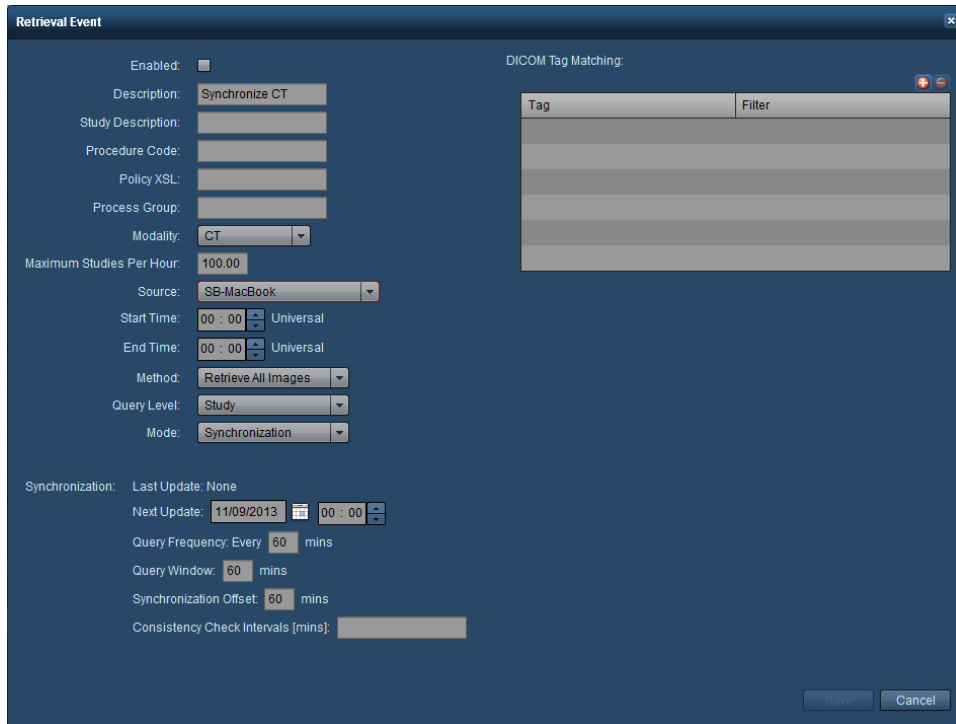


- 1 The Add button  allows you to add a new Synchronization Event.
- 2 The Edit button  edits the currently selected Synchronization Event; it must be selected by clicking on its Timeline bar, not in the table view.
- 3 The Delete button  deletes the currently selected Synchronization Event; it must be selected by clicking on its Timeline bar, not in the table view.
- 4 This area of the screen displays a Timeline, showing individual Synchronization Events as horizontal colored bars that span the time they are scheduled for. Note that the timeline is displayed directly above the bars.
- 5 This control serves to scroll back and forth in the timeline, so you can visually see when Events begin and end. Click on the small blue circle button and drag it back and forth to adjust the displayed timeline.
- 6 The Synchronization Event table shows all the Events entered along with their important details, such as Mode, Method, DICOM Source, and start and end times. Double-clicking on an event will also allow you to edit it.

Adding or Editing a Synchronization Event

To Add or Edit a synchronization event, click on the Add button or click on its timeline bar to select it and then click on the Edit button. You can also double-click on the Event in the table.

The Retrieval Event window appears as below, followed by a table explaining the key fields associated with every Event Mode. See "Synchronization - Retrieval Modes" on page 237 for explanations of the different Event Modes.



- Enabled** This checkbox allows you to enable or disable the Event from running.
- Description** This changes the description that appears in for the Event in the table or the Timeline.
- Study Description** You can enter a description for the studies you are retrieving here. This may be useful when DICOM Tag Matching is used to retrieve specific sets of studies.
- Policy XSL** If left blank, the default retrieval policy called retrievalpolicy.xsl will be used. The default policy states that if the number of images for a study in Radimetrics software is equal to or greater than the number of the images on the PACS, then the study should not be retrieved; otherwise, the study is retrieved.
- Modality** Specifies the modality of the studies you are retrieving (CT, XR, etc.)
- Maximum Studies Per Hour** To limit the load placed on the DICOM AE source (e.g. the PACS server), this number can be lowered, as retrieving a large number of studies may stretch the network resources and CPU load on the server.
- Source** Select the DICOM source for the Event. See "DICOM Nodes (configuration)" on page

235.



Start Time / End Time	Choose the start and end time for this event.
Method	The method can be Query Only, Retrieve Single Image, or Retrieve All Images.
Query Level	You can choose to query from the level of Studies, Series, or Images (Studies includes Series and Images; Series includes Images).
Mode	The mode can be Synchronization, Migration, Pending Queue Monitor, Scheduled, or Manual. See "Synchronization - Retrieval Modes" on page 237.



The Method should be set to Retrieve All Images in most cases unless you have been informed otherwise.

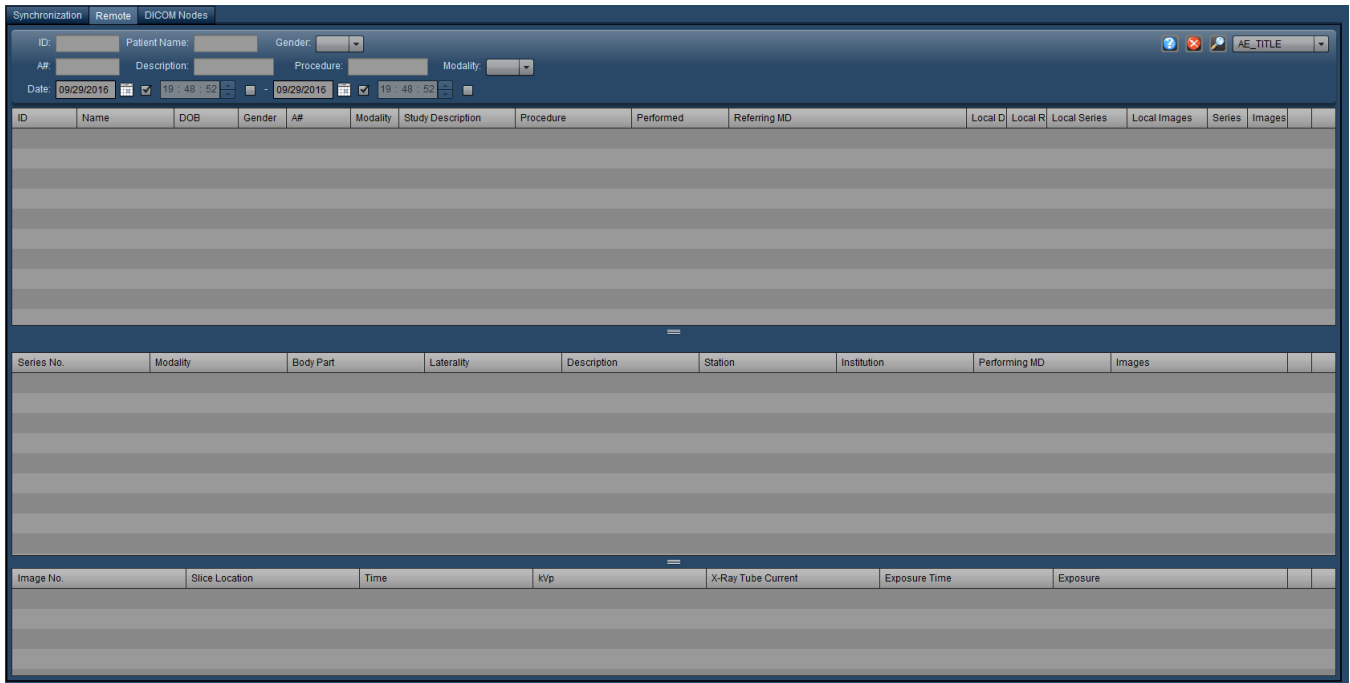
Once you have finished entering or editing your Event details, click on Save to retain them.

DICOM Tag Matching

In this table, you can limit the scope of the Event to retrieve studies that match specific DICOM tags. The small Add button  and Delete button  allow you to add and delete rows from the Tag Matching table.

Remote (query)

Remotely querying a DICOM node allows you to search through the studies located there. The information displayed will include a list of studies, their included series, as well as fields from individual images within the series. This may be helpful during troubleshooting, such as when connectivity is being tested, data is being compared between Radimetrics software and the remote DICOM node, or to help with matching DICOM tags.



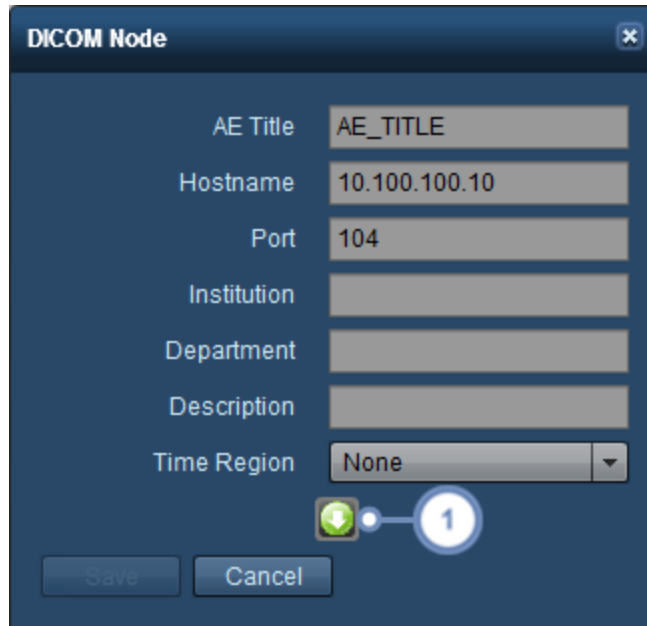
DICOM Nodes (configuration)

The DICOM Nodes tab allows you to add, edit, and delete the available DICOM nodes.



Adding or Editing a DICOM Node

When adding or editing a DICOM node, the following window appears:




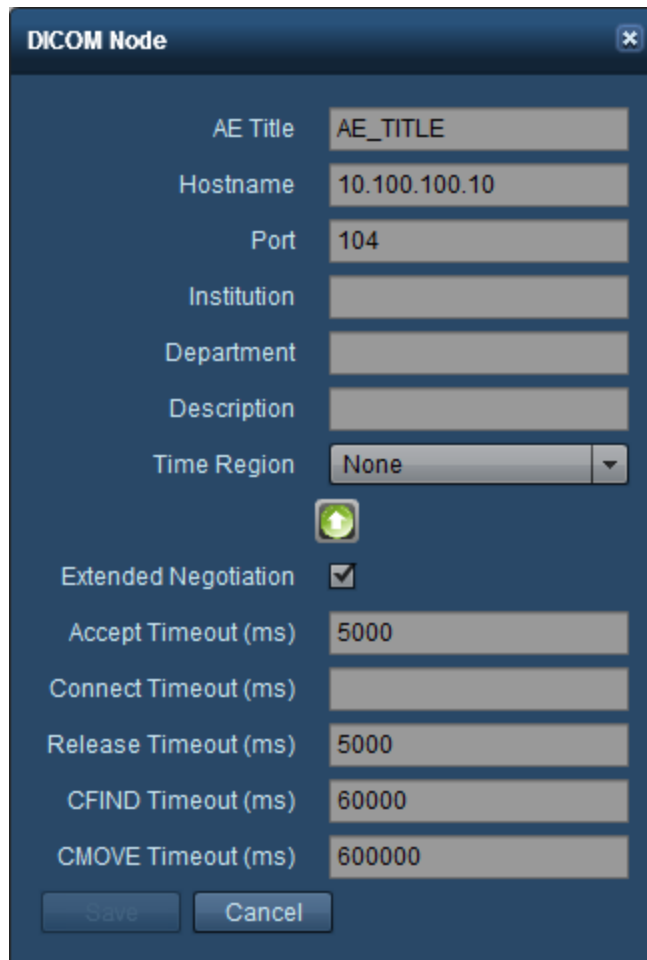
The screenshot shows a dialog box titled "DICOM Node" with a close button in the top right corner. The dialog contains several input fields and a dropdown menu:

- AE Title: AE_TITLE
- Hostname: 10.100.100.10
- Port: 104
- Institution: (empty)
- Department: (empty)
- Description: (empty)
- Time Region: None (dropdown menu)

At the bottom of the dialog, there is a "Save" button, a "Cancel" button, and a green square button with a white downward arrow. A blue circle with the number "1" is overlaid on the green button, and a line connects it to the "1" in the text below.

Enter or edit the relevant fields here. Required fields are the AE (Application Entity) Title, Hostname (can be an IP address), and Port. Fill in Institution, Department and Description as appropriate for your site.

- 1 Clicking on the Advanced  button allows you to change additional parameters for the DICOM node including Extended Negotiation and Timeout periods as shown in the next image.



The image shows a 'DICOM Node' configuration window with the following fields and values:

Field	Value
AE Title	AE_TITLE
Hostname	10.100.100.10
Port	104
Institution	
Department	
Description	
Time Region	None
Extended Negotiation	<input checked="" type="checkbox"/>
Accept Timeout (ms)	5000
Connect Timeout (ms)	
Release Timeout (ms)	5000
CFIND Timeout (ms)	60000
CMOVE Timeout (ms)	600000

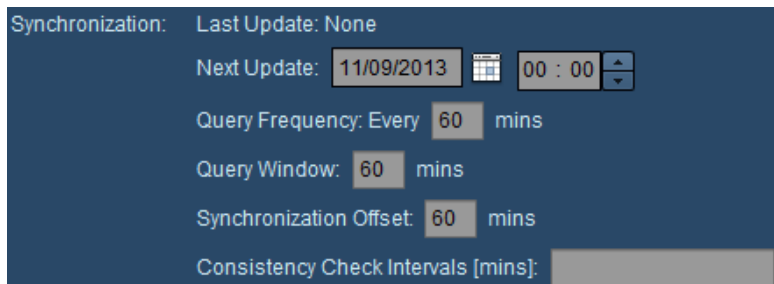
Buttons: Save, Cancel

Synchronization - Retrieval Modes

The primary DICOM Retrieval Modes available are Synchronization, Migration, Pending Queue Monitor and Scheduled.

Synchronization

Synchronization mode sets up an event to retrieve studies from a PACS as they are updated. This is used in sites where Radimetrics™ Enterprise Platform does the 'pulling' of studies from the server.



Last Update

If you are editing the event, the Last Update field shows the last time the synchronization was completed.

Next Update

The Next Update field represents the start period for the synchronization event. It should be set to a time and date in the future using the calendar and time fields present.

Query Frequency

This represents how often data will be synchronized with the PACS or scanner server. Increasing the interval decreases the load on the server by querying and retrieving studies less often.

Query Window

This specifies the time period of studies that Radimetrics software will attempt to synchronize during a query attempt.

Synchronization Offset-set

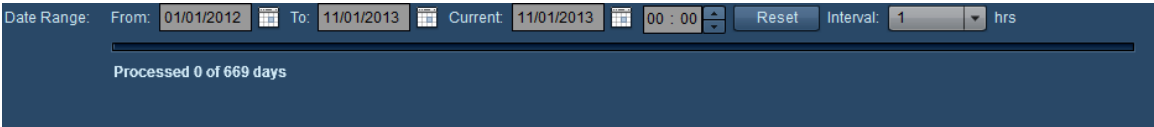
This is the time period added to the performed time of an exam after which Radimetrics software will attempt to retrieve the study. It may be positive (indicating minutes *before* the current server time) or negative (indicating minutes *after* the current server time). This setting may be useful when sites are located in multiple time zones.

Consistency Check Interval [mins]

This feature allows for a check of the server at the specified interval to make sure that retrieved studies are complete. This is a list of comma separated values indicating the times following the initial query that further synchronization attempts will be made. For example, "5, 10, 15" would query at the 5, 10 and 15 minute marks following the initial attempt.

Migration

The Migration mode allows retrieval of past studies from a remote server. For example, this may be used when importing studies that have previously been done prior to installation of the Radimetrics software, or to retrieve studies that had previously been excluded from retrieval by Radimetrics.

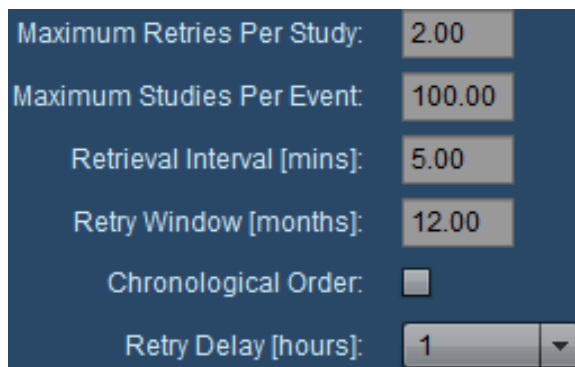


Set the Date Range in Migration mode to include the period of the studies that you wish to retrieve; it can be set to any time period in the past. The Interval specifies the size of the time

'chunks' that Radimetrics software will divide the specified date range into. This may be modified to adjust server load; setting the interval to a smaller period will retrieve and process less studies at a time. A longer period will retrieve and process more studies at a time.

Pending Queue Monitor

The Pending Queue Monitor mode is used as a retry mechanism for failed or partial retrievals. It is essentially a backup for the Synchronize mode - acting somewhat like an extension of the Study Consistency Check. It acts in the case that a study has appeared as pending but nothing has been sent by the server yet even after a request has been made.



Maximum Retries Per Study

The number of times Radimetrics software tries to retrieve the study before giving up.

Maximum Studies Per Event

Each time the Pending Queue event runs, it retrieves up to the specified maximum number of studies. This limits server load. Any studies that exceed the maximum are pushed to the next event time.

Retrieval Interval [mins]

This specifies the time period between pending queue monitor events.

Retry Window [months]

If a study is older than the specified number of months, no attempts are made to retrieve it.

Chronological Order

Enabling this attempts to retrieve the oldest failed or previously partial retrievals first.

Retry Delay [hours]

The Retry Delay specifies the time (in hours) between retries for retrieving a study.

Scheduled

The Scheduled mode enables the query of pending exams from a Modality Worklist. Enabling this mode will display exams and patients with pending studies, and estimates the projected dose. The estimate is based on the ordered procedure type (the Study Description), not the

imaging protocol selected. Once the exam is completed, the scheduled exam (and patient) record is merged with the actual exam results.

Synchronization: Last Update: None

Next Update: 11/24/2015 06 : 50

Query Frequency: Every 5 mins

Query Window: 3000 mins

Time Offset: 0 mins

Consistency Check Intervals [mins]:

Next Update identifies when the next query for exams will be run. Setting the Future Offset parameter allows you to choose how far into the future exams will be queried for relative to the Next Update date and time.

Rejected Studies

The Rejected Studies interface allows you to review studies that have been sent to Radimetrics™ Enterprise Platform but have been rejected from processing. Rejected examinations may be retrieved or reprocessed as well.

Count	Modality	Station Name	Device	Manufacturer	Institution	Serial No.
1	XA	Unknown Equipment	Unknown Model	Unknown Manufacturer	Unknown Institution	Unknown

Restored	UID	Accession No.	Modality	Station Name	Device	Manufacturer	Institution	Serial No.	Requests	Series Retrieved	Images Retrieved
<input checked="" type="checkbox"/>	1.2.840.113845.11.10	Unknown	XA	Unknown Equipment	Unknown Model	Unknown Manufacture	Unknown Institution	Unknown	1	1	1

1 of 1 rejected examinations.


Reprocess Study
Retrieve Study AE_TITLE

Cancel

Audit Logs

The Audit Logs administration interface allows users with appropriate permissions to view logs of Radimetrics software system activity. This includes events such as logging in and out of the software and access to patient records.

Name	User Name	Created	Patient ID	Patient Name	Type	Description
radimetrics	radimetrics	2016-09-29 18:12:51	RMPQ2526H9QJ		Patient	Viewed Patient record attributes MRN=RMPQ2526H9QJ, SURNAME, GIVENNAMES, SINGLEBYTESURNAME, SINGLEBYTEGIVENNAMES, IDEOGRAPHICSURNAME, IDEOGRAPHICGIVENNAMES, PHONETICSURNAME, PHONETICGIVENNAMES.
radimetrics	radimetrics	2016-09-29 18:12:51	RMPQ08HL1652L		Patient	Viewed Patient record attributes MRN=RMPQ08HL1652L, SURNAME, GIVENNAMES, SINGLEBYTESURNAME, SINGLEBYTEGIVENNAMES, IDEOGRAPHICSURNAME, IDEOGRAPHICGIVENNAMES, PHONETICSURNAME, PHONETICGIVENNAMES.
radimetrics	radimetrics	2016-09-29 18:12:51	RMPQL516LOQ5		Patient	Viewed Patient record attributes MRN=RMPQL516LOQ5, SURNAME, GIVENNAMES, SINGLEBYTESURNAME, SINGLEBYTEGIVENNAMES, IDEOGRAPHICSURNAME, IDEOGRAPHICGIVENNAMES, PHONETICSURNAME, PHONETICGIVENNAMES.
radimetrics	radimetrics	2016-09-29 18:12:51	RMChgplagPQLSO1		Patient	Viewed Patient record attributes MRN=RMChgplagPQLSO998JHLLJJH37814H5858343689LQ, SURNAME, GIVENNAMES, SINGLEBYTESURNAME, SINGLEBYTEGIVENNAMES, IDEOGRAPHICSURNAME, IDEOGRAPHICGIVENNAMES, PHONETICSURNAME, PHONETICGIVENNAMES.
radimetrics	radimetrics	2016-09-29 16:52:4	RMWhchal246		Patient	Viewed Patient record attributes MRN=RMWhchal246, SURNAME, GIVENNAMES, SINGLEBYTESURNAME, SINGLEBYTEGIVENNAMES, IDEOGRAPHICSURNAME, IDEOGRAPHICGIVENNAMES, PHONETICSURNAME, PHONETICGIVENNAMES.
radimetrics	radimetrics	2016-09-29 16:52:4	RMWhchal23		Patient	Viewed Patient record attributes MRN=RMWhchal23, SURNAME, GIVENNAMES, SINGLEBYTESURNAME, SINGLEBYTEGIVENNAMES, IDEOGRAPHICSURNAME, IDEOGRAPHICGIVENNAMES, PHONETICSURNAME, PHONETICGIVENNAMES.
radimetrics	radimetrics	2016-09-29 16:52:4	RMWhchal244		Patient	Viewed Patient record attributes MRN=RMWhchal244, SURNAME, GIVENNAMES, SINGLEBYTESURNAME, SINGLEBYTEGIVENNAMES, IDEOGRAPHICSURNAME, IDEOGRAPHICGIVENNAMES, PHONETICSURNAME, PHONETICGIVENNAMES.
radimetrics	radimetrics	2016-09-29 16:52:4	RMWhchal247		Patient	Viewed Patient record attributes MRN=RMWhchal247, SURNAME, GIVENNAMES, SINGLEBYTESURNAME, SINGLEBYTEGIVENNAMES, IDEOGRAPHICSURNAME, IDEOGRAPHICGIVENNAMES, PHONETICSURNAME, PHONETICGIVENNAMES.
radimetrics	radimetrics	2016-09-29 16:52:4	RMWhchal20		Patient	Viewed Patient record attributes MRN=RMWhchal20, SURNAME, GIVENNAMES, SINGLEBYTESURNAME, SINGLEBYTEGIVENNAMES, IDEOGRAPHICSURNAME, IDEOGRAPHICGIVENNAMES, PHONETICSURNAME, PHONETICGIVENNAMES.
radimetrics	radimetrics	2016-09-29 16:52:4	RMWhchal22		Patient	Viewed Patient record attributes MRN=RMWhchal22, SURNAME, GIVENNAMES, SINGLEBYTESURNAME, SINGLEBYTEGIVENNAMES, IDEOGRAPHICSURNAME, IDEOGRAPHICGIVENNAMES, PHONETICSURNAME, PHONETICGIVENNAMES.
radimetrics	radimetrics	2016-09-29 16:52:4	RMWhcha_tpkq8		Patient	Viewed Patient record attributes MRN=RMWhcha_tpkq8, SURNAME, GIVENNAMES, SINGLEBYTESURNAME, SINGLEBYTEGIVENNAMES, IDEOGRAPHICSURNAME, IDEOGRAPHICGIVENNAMES, PHONETICSURNAME, PHONETICGIVENNAMES.
radimetrics	radimetrics	2016-09-29 16:52:4	RMWhcha_tpkq8		Patient	Viewed Patient record attributes MRN=RMWhcha_tpkq8, SURNAME, GIVENNAMES, SINGLEBYTESURNAME, SINGLEBYTEGIVENNAMES, IDEOGRAPHICSURNAME, IDEOGRAPHICGIVENNAMES, PHONETICSURNAME, PHONETICGIVENNAMES.
radimetrics	radimetrics	2016-09-29 16:52:4	RMWhcha_tpkq0		Patient	Viewed Patient record attributes MRN=RMWhcha_tpkq0, SURNAME, GIVENNAMES, SINGLEBYTESURNAME, SINGLEBYTEGIVENNAMES, IDEOGRAPHICSURNAME, IDEOGRAPHICGIVENNAMES, PHONETICSURNAME, PHONETICGIVENNAMES.


- 1 To search for audit logs related to a specific user, patient ID or patient name, a search string can be entered into these fields.
- 2 This drop-down menu allows you to select the time interval over which you would like to display logs for (e.g. last 7 days, last 6 months, etc).
- 3 The Export  button allows you to save the currently displayed audit logs to a CSV file. A warning dialog will appear reminding you that PHI may be present in the exported data.
- 4 The Description column on the right-hand side details the activity associated with each log event.

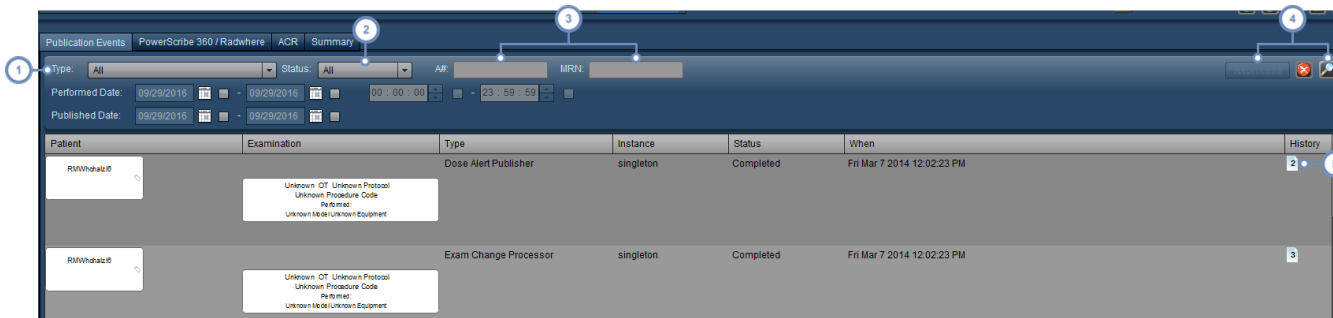
Note that clicking on the title of any column allows you to sort the log entries by that column.



Interfaces

The Interfaces module allows you to monitor publications events to external interfaces including PowerScribe 360 and the ACR. The Summary tab displays information on Study Bundling statistics.


Publication Events

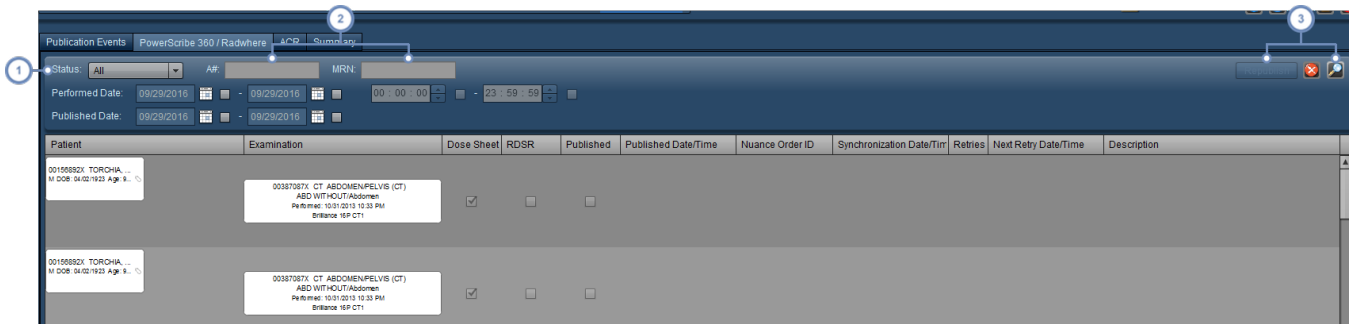
The Publication Events tab displays the current status of publication events to interfaces including the Dose Alert Publisher, HL7 events and more. Once you enter the desired search criteria, click on the Search  button to list results.





- 1 The Type drop down menu allows you to choose the Publication Event type. This may include the Dose Alert Publisher, Exam Change Processor and different HL7 or web services interfaces including via Certegra™ Workstation.
- 2 The Status drop-down menu allows you to search for specific event statuses, including Pending, Complete, Stopped, or Dispatched.
- 3 You may search for specific A#'s or MRNs via these fields; note that you can also search by Performed Date or Published Date.
- 4 You may reprocess events via the Reprocess button if an event is selected. There is also a Reset  button to clear the search parameters, and a Search  button that allows you to search based on your currently defined criteria.
- 5 Hovering over the page icon here will display previous status updates with a description.

PowerScribe 360 / Radwhere and ACR

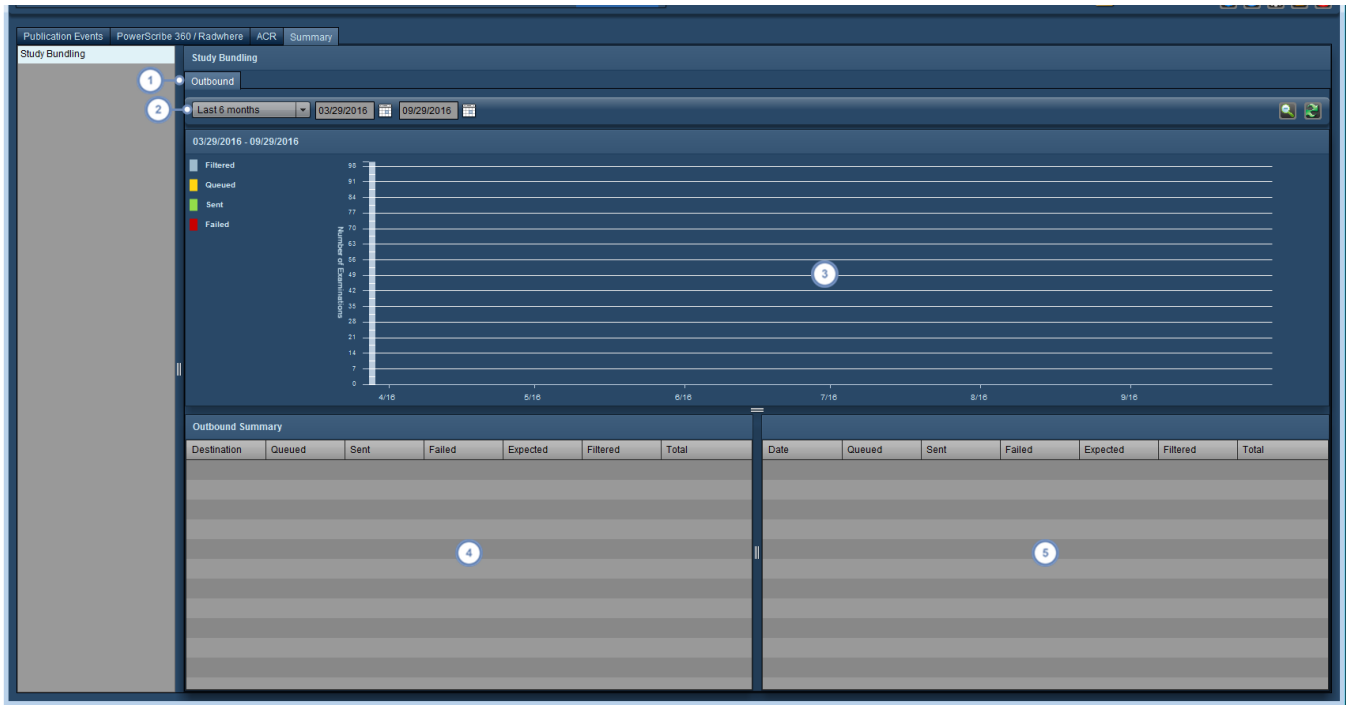
These tabs function similarly to the Publication Events tab, but are specific to publication events for the PowerScribe 360 / Radwhere and ACR interface respectively. Relevant listed columns specific to the PowerScribe 360 interface include the Nuance Order ID, synchronization dates and the number of retries along with pending retry times. The ACR interface includes a column for Processed Date/Time. Once you enter the desired search criteria, click on the Search  button to list results.



- 1 The Status drop-down menu allows you to search for specific event statuses including Published, or Not Published. ACR event statuses include Published, Pending, Invalid, or Excluded.
- 2 You may search for specific A#'s or MRNs via these fields; note that you can also search by Performed Date or Published Date.
- 3 You may republish events via the Republish button if an event is selected. There is also a Reset  button to clear the search parameters, and a Search  button that allows you to search based on your currently defined criteria.

Summary

Currently, the Summary tab allows you to review Study Bundling for both inbound and outbound exams. In order to configure the Study Bundling interfaces, you must contact support.



- 1 Choose between displaying Inbound and Outbound bundle statistics here; the tabs available depend on the server's configuration as an inbound or outbound server, or both.
- 2 This drop-down menu allows you to choose the time period over which you would like to display transmissions (for the previous day, week, month, etc.). You can use the date fields to set a custom period.
- 3 The Source or Destination graph presents a timeline based view of the bundle transmission status, which is also reflected in the Summary by Date table. Of note, you can select a date range to zoom in on, similarly to how you would when looking at a dosimetry distribution (See "Magnifying an area of the distribution" on page 64).
- 4 The Inbound or Outbound Summary is displayed here, showing the totals over the selected time period.
- 5 The Summary by Date table displays per date (or per month, depending on the time scale or length of period selected) statistics.

Definition of Study Bundling Statuses

- Queued** The number of bundles that are pending transmission.
- Sent** The number of bundles that were successfully sent.
- Failed** The number of bundles that failed to be transmitted.

Expected	The number of bundles that were expected to be transmitted. $\text{Expected} = \text{Queued} + \text{Sent} + \text{Failed}$.
Filtered	The number of bundles that were filtered before transmission. Filter rules are configurable via contacting support.
Total	The total number of bundles. $\text{Total} = \text{Expected} + \text{Filtered}$.

Glossary

A list of technical terms.

ACR

ACR stands for the American College of Radiology.

ALARA

Stands for "As Low As Reasonably Achievable". In radiology, ALARA is a safety principle that aims to reduce radiation exposure as much as possible while maintaining diagnostic quality.

Becquerel

One of three units used to measure radioactivity, which refers to the amount of ionizing radiation released when an element spontaneously emits energy as a result of the radioactive decay of an unstable atom. As such, 1 Bq represents a rate of radioactive decay equal to 1 disintegration per second, and 37 billion (3.7×10^{10}) Bq equals 1 curie (Ci).

Bq

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CBCT

CBCT stands for Cone Beam Computed Tomography. In CBCT, the x-rays are emitted in a cone-shaped beam. Relative to standard x-ray imaging, this provides 3D imaging information but with higher radiation dose. Relative to standard CT, the imaging resolution is decreased but the radiation dose is generally lower. CBCT is used primarily in dental and interventional radiology procedures.

CTDI

CTDI stands for Computed Tomography Dose Index and is a measured dose quantity per slice of the scan. The measurement is quantified in units of gray (Gy).

CTDIvol

CTDIvol stands for volume CTDI, a derivative of the CTDI which describes the average absorbed dose delivered to a scan volume. The scan volumes used are standardized phantoms, 16 cm in diameter for the head and 32 cm in diameter for the body.

CTDI_w

The weighted (or average) CTDI across a single CT scan plane.

Curie

Curie (Ci) - One of three units used to measure the intensity of radioactivity in a sample of material. Radioactivity is also the term used to describe the rate at which radioactive material emits radiation, or how many atoms in the material decay (or disintegrate) in a given time period. As such, 1 Ci is equal to 37 billion (3.7×10^{10}) disintegrations per second, so 1 Ci also equals 37 billion (3.7×10^{10}) Becquerels (Bq). A curie is also a quantity of any radionuclide that decays at a rate of 37 billion disintegrations per second (1 gram of radium, for example).

DAP

The Dose Area Product quantifies radiation risk from diagnostic or interventional procedures by including both the radiation dose and the area of the tissue irradiated. It is expressed in units of $\text{mGy} \cdot \text{cm}^2$.

DICOM

Stands for Digital Imaging and Communications in Medicine. DICOM is the international standard for defining the exchange of medical imaging data. It is defined in ISO 12052.

DLP

DLP stands for Dose-Length Product. It is an estimate of the total radiation dose delivered by a CT scan. See DLP Body and DLP Head. The Dose-Length Product is derived from the CTDI_{vol}.

DLP Body

Represents CTDI_{vol} (mGy) multiplied by scan length (cm). For DLP Body, a 32 cm acrylic phantom is used in the calculation of CTDI_{vol}.

DLP Head

Represents CTDI_{vol} (mGy) multiplied by scan length (cm). For DLP Head, a 16 cm acrylic phantom is used in the calculation of CTDI_{vol}.

Dose Area Product

The Dose Area Product quantifies radiation risk from diagnostic or interventional procedures by including both the radiation dose and the area of the tissue irradiated. It is expressed in units of $\text{mGy} \cdot \text{cm}^2$.

DRL

Dose or Diagnostic Reference Levels are established reference values, that if exceeded, identify radiation exposures that are unusually high for common diagnostic medical imaging procedures.

DXA

DXA (also known as DEXA) stands for Dual-energy X-ray absorptiometry. In a DEXA scan, two x-ray beams with different energy levels are used. This type of scan is mainly used to measure bone mineral density.

Gray

The gray is the SI unit defined by the absorption of one joule of ionizing radiation energy per kilogram of matter. Gy is short for gray, whereas mGy stands for milliGray (1/1000th of a gray).

Gy

The gray is the SI unit defined by the absorption of one joule of ionizing radiation energy per kilogram of matter. Gy is short for gray, whereas mGy stands for milliGray (1/1000th of a gray).

Half value layer

HVL, or half value layer, is the thickness of a material required to reduce the intensity of radiation entering it by one half; it is measured in millimetres of aluminium (mm Al).

HL7

This is a term used to refer to both the organization Health Level 7 and the standards for the exchange, management and integration of electronic healthcare information that have been created by the organization.

HVL

HVL, or half value layer, is the thickness of a material required to reduce the intensity of radiation entering it by one half; it is measured in millimetres of aluminium (mm Al).

ICRP

ICRP stands for the International Commission on Radiological Protection. It is an independent, international organization that develops and maintains the International System of Radiological Protection used world-wide as the common basis for radiological protection standards, legislation, guidelines, programmes, and practice.

ICRP 103

A method of calculating effective dose. Effective dose is calculated by multiplying weighting factors by an equivalent dose per organ in order to correct for the differences in tissue radiosensitivity. The

weighting factors set out in ICRP Publication 60 were updated in ICRP Publication 103 (2007).

ICRP 106

A method of calculating effective dose. Effective dose is calculated by multiplying administered activity by weighting factors of equivalent dose per organ in order to correct for the differences in tissue radiosensitivity and pharmacological persistence.

ICRP 128

A method of calculating effective dose. Effective dose is calculated by multiplying administered activity by weighting factors of equivalent dose per organ in order to correct for the differences in tissue radiosensitivity and pharmacological persistence.

ICRP 53

A method of calculating effective dose. Effective dose is calculated by multiplying administered activity by weighting factors of equivalent dose per organ in order to correct for the differences in tissue radiosensitivity and pharmacological persistence.

ICRP 60

A method of calculating effective dose. Effective dose is calculated by multiplying weighting factors by an equivalent dose per organ in order to correct for the differences in tissue radiosensitivity. One set of weighting factors is set out in the ICRP Publication 60 (1990).

KVO

KVO, also known as Keep Vein Open, is a setting on an injector that uses the lowest possible infusion rate of saline in order to keep a patient's vein open.

Localizer

The localizer or scout image is essentially an x-ray taken before the imaging series in order to plan the location of the actual CT scan or series of scans. Some manufacturers refer to this as a Surview or Topogram.

mCi

A unit representing one thousandth of a Curie.

mGy

The gray is the SI unit defined by the absorption of one joule of ionizing radiation energy per kilogram of matter. Gy is short for gray, whereas mGy stands for milliGray (1/1000th of a gray).

Millicurie

A unit representing one thousandth of a Curie.

Modulation

Refers to the modulation of CT tube current. In general, this is done to minimize radiation dose while keeping diagnostic image quality optimal. Most CT scan manufacturers have their own optimizations for modulation of the CT tube current.

mSv

The sievert is the SI unit defined by the biological effect of the absorption of one joule of ionized radiation per kilogram. Unit-wise it is equivalent to the gray, however, it is not interchangeable as it describes the delivered dose in relation to its effect on biological tissues. X-rays, alpha rays, gamma rays and neutrons are different forms of ionizing radiation that may be measured in terms of gray but have different impacts on biological tissue measured in sieverts. mSv stands for millisieverts.

Overranging

In order to generate the first and last slice in a spiral CT scan, the scanner is required to scan past the ends of the defined scan length. This is termed 'overranging'. It is a source of excess radiation.

PACS

An acronym standing for Picture Archiving and Communications System. It is the basis for storage and retrieval of medical imaging and reports.

Pareto

A Pareto chart is composed of a bar graph (in descending order) which is overlaid with a line graph that represents the cumulative total of the values represented by the bars. It can help to isolate the most important factors among a large set of factors.

Phantom

A phantom within the context of Radimetrics software is a virtual model of the human body used to help model and calculate radiation dosing.

PT

PT (more commonly known as PET) stands for Positron Emission Tomography. PET scans fall under the category of nuclear medicine. PET utilizes a positron-emitting radioactive tracer as part of a molecule that is the analog of a metabolically active molecule in the body such as glucose. Gamma rays that are emitted from this molecule are detected by a gamma camera and the resulting images

are often combined with another modality such as CT or MRI to produce metabolic (functional) and anatomic information that can be correlated.

RadLex

A unified language of radiology terms created by committees formed by the Radiological Society of North America (RSNA), intended to allow standardized indexing and retrieval of radiology information resources. The RadLex Playbook provides consistent procedure names for radiology procedures.

RPID

RPID stands for RadLex Playbook ID - a unique identifier of a Playbook name.

SAR

SAR stands for Specific absorption rate, which is the rate at which radiofrequency energy is absorbed by a biological mass. The units used are watts per kilogram (W/kg).

Scout

The localizer or scout image is essentially an x-ray taken before the imaging series in order to plan the location of the actual CT scan or series of scans. Some manufacturers refer to this as a Surview or Topogram.

Sievert

The sievert is the SI unit defined by the biological effect of the absorption of one joule of ionized radiation per kilogram. Unit-wise it is equivalent to the gray, however, it is not interchangeable as it describes the delivered dose in relation to its effect on biological tissues. X-rays, alpha rays, gamma rays and neutrons are different forms of ionizing radiation that may be measured in terms of gray but have different impacts on biological tissue measured in sieverts. mSv stands for millisieverts.

SPC

Statistical Process Control (SPC) is a quality control method that applies statistics to determine whether a process is stable. If a process is found to be unstable, controls can be applied to correct the process.

SSDE

A Size Specific Dose Estimate is used to account for differences in body size and is derived from multiplying CTDIvol and a conversion factor corresponding to the midline axial's effective diameter.

Statistical Process Control

Statistical Process Control (SPC) is a quality control method that applies statistics to determine whether a process is stable. If a process is found to be unstable, controls can be applied to correct the process.

Survival

The localizer or scout image is essentially an x-ray taken before the imaging series in order to plan the location of the actual CT scan or series of scans. Some manufacturers refer to this as a Survival or Topogram.

Sv

The sievert is the SI unit defined by the biological effect of the absorption of one joule of ionized radiation per kilogram. Unit-wise it is equivalent to the gray, however, it is not interchangeable as it describes the delivered dose in relation to its effect on biological tissues. X-rays, alpha rays, gamma rays and neutrons are different forms of ionizing radiation that may be measured in terms of gray but have different impacts on biological tissue measured in sieverts. mSv stands for millisieverts.

Topogram

The localizer or scout image is essentially an x-ray taken before the imaging series in order to plan the location of the actual CT scan or series of scans. Some manufacturers refer to this as a Survival or Topogram.

UDI

UDI stands for Unique Device Identifier. The UDI is a unique numeric or alphanumeric code defined by the FDA and allows identification of devices through their distribution and use.

Ultrasound Worksheet

A user created form containing notes pertaining to an ultrasound examination.

XbarS - Histogram Chart

An XbarS Chart is a statistical quality control chart that is used to monitor the mean and variation of a process utilizing samples in order to calculate control limits and indicate if a process is in-control (within upper and lower control limits) or perhaps trending towards a control limit. In Radimetrics software we paired the XbarS Chart with additional functionality which allows a user to view a Histogram chart relating to a particular sample.

Release Notes

This page contains release notes for Radimetrics™ Enterprise Platform, in reverse chronological order (newest to oldest). Each version is divided into an Improvements (additions or changes to existing features) and a New Features section.

Version 2.9 - June 2017

Improvements

General

- The patient protocol image displayed now matches the dose sheet image
- The Device Protocol Selector displays the protocol exam count
- RDSR information is now prioritized over dose sheet information when both are available for an exam
- Additional scan regions are supported - "eyes to thighs" and "run offs"

Examinations

- CR and DX logbooks can now capture detailed dose information

New Features

General

- Multi-Modality support is now available, allowing for the support of exams combining multiple modalities beyond just CT/PET
- DXA (DEXA) exams are now supported
- Exams can be exported in a PDF format that meets Euratom requirements
- A high-availability database configuration is available allowing secondary database servers to provide failover service in case the primary database server fails

Dashboards

- Threshold charts for patient or acquisition level data are now available

Configuration

- The configuration of Value Indicators is now available, allowing customization of the displayed Values of Interest in search results

Alerts

- Alerts can now be exported to PDF or XLS/CSV/XLSX formats

Version 2.8 - October 2016

Improvements

General

- There are new bariatric phantoms for both pregnant and pediatric patients
- Time zone can now be set for each user

Dashboards

- The XbarS chart now allows selection of interventions to be displayed on the chart; also, mean is calculated between the intervention lines
- The Deviation Analysis component now displays a Pareto chart

Examinations

- Gantry tilt is now used as an extra criteria in simulation when available
- Ultrasound structured reports are now searchable as a Data Source

CT Enhancements

- Dual-source CT scans are now supported

NM Enhancements

- Nuclear medicine exams now support ICRP 53, 80, 108 and 128; ICRP 128 is now default
- Decay rate is now added into calculations

MG Enhancements

- Compression Thickness is a new Value of Interest
- Mean glandular dose equations have been updated

New Features

General

- Peak Skin Dose is available with a flexible simulation mode including new skin dose models to represent a wide range of pediatric phantoms
- Support for the Cone Beam CT (CBCT) modality has been added

Patients Module

- Patient Cumulative Dose Grouping is now in place, allowing for a merged Patient Scorecard display of a single patient that has multiple patient IDs

Version 2.7 - November 2015

Improvements

General

- In search results with more than 1000 results, the total number of exams is now abstracted (e.g. will display "more than 1000 results"), resulting in improved performance
- When managing folders, it is now possible to delete 'parent' folders directly without having to delete all the contained items first
- Units, and preferred units are indicated within the Value Comparison Chart
- Radimetrics software supports filtering and searching by contrast batch and lot numbers

Examinations

MR Enhancements

- Delivered Dose is now a Value of Interest
- KVO, Test Inject and Protocol Saline are now displayed and filterable

NM Enhancements

- Intego DICOM data is now processed

Protocol Editor

- MR Master Protocols are now viewable in PDF format

New Features

General

- Statistical Process Control allows the reporting and investigation of trends based upon Nelson rules; alerts and dashboard components can be generated based on these rules

Examinations

RF/XA Enhancements

- Dose information can now be entered manually via the Logbook and can be subsequently used for analytics if the exam does not already have DICOM-transmitted dosimetry

Alerts

- User-defined Deviation Categories (root causes) can now be created to tag alerts

Version 2.6 - July 2015

Improvements

General

- Additional HL7 and DICOM data capture parameters have been added, including tube current modulation parameters, indications, and radiology reports
- Study exports can specify additional criteria to consolidate entries together and amalgamate fields during that consolidation
- MR exams now display additional Values of Interest including SAR

Dashboards

- New initial dashboards are included along with configured value indicators for modalities of interest
- A new Zero button is available, allowing some types of graphs to hide zero-value columns

New Features

Examinations

- Exam searches can now be filtered by data source or dose source as well as scan region

Configuration

- RadLex Playbook ID mapping is now available to end-users, allowing the assignment of protocols to RadLex Playbook IDs

Version 2.5 - November 2014

Improvements

General

- MR-specific data is now viewable in exams

Dashboards

- New contrast-specific charts are now available, such as the Repeat Injection chart
- There are other chart types available, such as Category Usage over Time, Deviations by Category and the Clustered Bar Chart

Examinations

- MG exams now have some additional Values of Interest available; separate VoIs are generated for the left and right breasts and dose distribution and scatter plots are displayed

New Features

Examinations

MR Enhancements

- Hand injection data for MR exams may now be added manually

NM/PET Enhancements

- Nuclear Medicine (NM) and Positron Emission Tomography (PET) studies now have an effective dose calculation, defined by ICRP 106

Version 2.4 - July 2014

Improvements

General

- Radimetrics software is now able to accept inbound HL7 messages from Hospital Information Systems (HIS) to update examination information
- Radimetrics software can export data in Excel format (.xlsx or .xls) and comma-separated values (.csv)
- A British date format can be configured for the English language pack

Examinations

Ultrasound

- Previously, the Radimetrics software was capable of transforming and republishing ultrasound structured reports, as well as supporting manual entry of measurement data in custom ultrasound worksheets that could be saved and published
- With this release, the Radimetrics software can pre-populate the custom worksheets with data captured from ultrasound structured reports. Users can edit and revise this data prior to saving and publishing to their Radiology Information System (RIS), HIS and/or speech-recognition systems

RF/XA Enhancements

- Various skin models have been added to allow for the dose estimate to be more representative of a person's age/height/weight
- Arms up and arms down configuration is available for skin models
- The Peak Skin Dose estimate can be displayed as an exam level Value of Interest

Alerting

- Users can set cumulative windows for dose exceeding thresholds in a specified time-frame

Administration

- User access in the system is no longer controlled through a permission group, but is now defined through their assigned role and module access

- Radimetrics software can now perform DICOM queries and retrievals at the series levels

New Features

Acquisitions Module

- The Acquisitions module is now available; it allows users to query for acquisition level data using enhanced filtering capability
- The filtering capability to search by acquisition specific criteria (e.g., series description, kVp) is available within the Acquisitions module as well as the Dashboard module
- Users can set Acquisition dose reference levels for their preferred Values of Interest. Once defined, over- and underexposures can be the source of alerts, emails and data for reports

Version 2.3 - February 2014

Improvements

General

- New Values of Interest have been introduced including Body Mass Index (for Patients), Number of Injections (for Injections), and Deviation and Exposure Index (for DX exams)
- Series on Dashboard scatterplots can be identified with different colorization
- Date and Times are now stored with a timezone; the display of these is affected by the timezone setting of the browser

New Features

General

- eXposure is now known as Radimetrics™ Enterprise Platform
- A setting is now available to specify the language preference for each user
- PDF reports of examination search results can now be produced, in addition to the already existing CSV export feature
- Scheduled exams can now be displayed in Radimetrics software, along with predicted dose estimates, if the appropriate DICOM configuration has been setup

Version 2.2 - December 2013

New Features

General

- Injected contrast metrics are now available as Values of Interest and are displayed if an interface with a Certegra™ Workstation is enabled (may require a license)

Dashboards

- Axes for multiple charts of the same type can be set to use the same scale
- Histogram charts can display a mean line on the y-axis
- Percentile values may be displayed in the statistics box (where relevant)
- Pie charts now include counts where the selected Value of Interest does not exist
- There are several new types of Bar Charts available

Patient Module

- Contrast related value indicators are displayed in the Scorecard if available and an interface with a Certegra™ Workstation is enabled (may require a license)

Examinations Module

- Examination details may include injector template, program, delivery and delivered pressure and flow graphs for contrast dose exams if they are available and an interface with a Certegra™ Workstation is enabled (may require a license)

Dosimetry

- MG exams display mean glandular dose when available
- CT dose calculations utilize new phantoms more appropriate in size for larger patients
- Interventional dosimetry exam Angulation Maps allow display of individual planes in biplane exams

Alerts

- Alerts can be generated when the scan region of an acquisition falls outside the area captured by the localizer

Version 2.1 - September 2013

Improvements

General

- When viewing a chart in table format, an additional row for 'Total' appears at the bottom when appropriate (e.g. when displaying the total number of exams)
- A new user setting is available that allows instant searching to be enabled or disabled
- The Siemens color scheme may be chosen for the interface
- Patient height and weight will be presented when transmitted in exam data; height and weight may be used as a filter and can also be used in generating tables of technical factors distributed by weight

Logging In

- Upon loading Radimetrics software in any browser, the username field is automatically selected so a user can simply start typing it in rather than having to click on it first

Dashboards

- When adding Dashboard components, the components now appear with graphical preview images (instead of a drop-down list) to allow easier visualization
- When exporting data, while in chart table mode, multiple items may be selected such that only the selected items are exported
 - When in the Export dialog box, use the 'Selected Items' option to export the selected items only
- Some dashboard components (e.g. frequency distribution) now have a statistics toggle button that displays statistics including standard deviation, median, mean and sample size
- A new chart is available that displays Scatter Plots by date, with overlaid thresholds associated with a Value of Interest

Examinations Module

- Examinations can now be tagged so they can be bookmarked or filtered
 - Hovering over the 'Tag' icon on an exam label displays a pop-up that allows you to remove or add tags from the exam

- Exams can be searched for by age at exam with monthly granularity (e.g. in infants less than 1 year of age)
- When viewing exams, the Analysis tab now shows the slice location axis and the direction of the slices (positive or negative), represented by a green dotted line with an arrow

Patient Module

- Patients can now be tagged so they can be bookmarked or filtered
 - Hovering over the 'Tag' icon on a patient label displays a pop-up that allows you to remove or add tags from the patient
- When using Grid view, Values of Interest for all types of scans (not just CTs) are shown

Protocol Editor

- CR and DX protocols can now be added and edited
- Searching for a protocol now searches within all folders, rather than the currently selected folder
- Protocols now have a Revision History indicating what dates the protocol was revised on
- 'Clinical Indications' and 'Recommended Projections' text boxes have been added to the Protocol Information page
- A new field for Dose Notification - CTDIvol has been added to the Protocol Editor
- When adding a new Imaging Protocol, templates can be used to display a table of technical factors

New Features

General

- String-based tags may now be applied to either patients or exams; searches and exports may be performed using these tags

Configuration

- Users can now create their own export setting presets when exporting data
- Save a new preset by clicking on the Save icon after selecting the appropriate parameters. A pop-up will prompt for the name of the new preset
- Values of Interest (VOIs) available are now consistent across Radimetrics™ Enterprise Platform (e.g. Age is now available in the Dashboard)
- New Values of Interest include "Number of Acquisitions" for CT studies and "Number of Localizers"

Worklists Module

- You can now export data from the Worklists view without editing the worklist
 - The Export icon is now available from the Worklists view and management screens

Alerts

- An alert can be triggered if the DLP (or other Value of Interest) exceeds 75th percentile; it is triggered when an examination is processed that has a dose that is in the 4th quartile for that protocol

Administration

- Administrators may now have access to manage Radimetrics Daemons
- A new user access level is now available - Support

Version 2.0 - March 2013

Improvements

Examinations Module

Changes to the localizer thumbnail

- The numerical value in the upper left corner shows the # of acquisitions for the study
- Orange lines indicate the scan start and end points
- The Modulation Curve changes color from green to yellow to red depending on the density of the region being scanned
- The blue line is a centroid provided for the image, indicating the patient's positioning
- If the localizer is missing, the primary acquisition image is used instead

Changes to the Examination label

- Hovering over the label shows the acquisition level dose and now shows an axial slice for each acquisition
- Dose indicator boxes are shown per acquisition and configurable based on preferred VOI

Advanced Search

- An additional search field: Current modulation – allows a search based on whether tube current was modulated or fixed

- A new Funnel icon replaces the old beaker icon for additional filtering
 - A green plus symbol is visible if filtering can be added
 - If no green plus symbol is present, then filtering has already been applied, and hovering over the filter icon will list the applied filters
- You can now export from this module
- An additional sorting option – Interventional VOIs are now available
- Alert icon (red dot on exam label)
 - Hovering over this shows a date/time stamp

Dosimetry

- Study Invalidation – if you observe a study on a protocol distribution that you feel is not valid you are now able to invalidate this study (if you are a system admin)
 - The user will be requested to enter a comment on why the study is being selected for Invalidation
 - Can search for invalid studies using advanced filtering – All, Not Invalidated, Invalidated
- Protocol Dose Distribution graph
 - Orange – represents the Master distribution for all devices mapped to this protocol
 - Green – represents a subset of the data corresponding to a specific device protocol
 - You can now alter the distribution by clicking on the legend; this will show a comparative histogram for a particular device against that of this exam
- Dose Distribution – you can now alter the Value of Interest on the x-axis

RF/XA Dosimetry

- The Performing Physician field has been added
- Dose information displayed in three columns (when available):
 - Time: Fluoro Time & Beam on Time
 - DAP: Total, Fluoro & Exposure
 - Reference Point Dose: Total, AP/PA & Lateral Cumulative dose
- Beam On Time has been added to chart VOI drop-downs

Angulation Map

- Provides a visualization of how the dose is being spread over the skin
- Can show the dose by angulation for each primary and secondary angle defined
- X – axis – primary angle: -180 degrees to +180 degrees
- Y – axis – secondary angle: -90 degrees to +90 degrees
- Each square on the map represents a 10 degree increment of the angle as the C-arm moves
- If you hover over the square it will display the DAP
- Squares are color coded based on the dose color scale on right hand side of interface

Patient Module

- You can now search by modality within the patient module
- Changes to patient return interface include:
 - no localizer thumbnail
 - "All" category for dose indicator boxes – can select up to 12 dose VOIs; 'All' shows the total # of exams
 - Dose indicator boxes can also be displayed by individual modality

Protocol Editor

- Auto saving in case of timeout – an auto save will occur just prior to the application time out
- Status bar indicating saving and loading of protocols
- Ability to import CSV files from a scanner export via the Import File icon
 - Compatible with GE and Toshiba at this time; validation for Phillips is pending
 - Following import, Radimetrics software displays an interface allowing you to correctly map fields from the CSV import with the Protocol Editor
 - Imported protocols are placed into the "Imported" folder

Administration

Audit logs

- You can now export logs in CSV format by clicking on the Disc icon

Rejected Studies

- Detail tab – if you find a device in the rejected studies summary tab that should not be rejected you should first contact support regarding adjustment of config rules to allow this device in
 - You can now query for studies in the detail tab and after selecting the study you now have the option to reprocess it

Users & Groups

- Deleting Users
 - You can only delete offline users
 - Usernames that have been used previously and deleted still have remaining audit logs available; in order for a new user to have a separate audit history a new username cannot be identical to the old user (i.e. jsmith vs jsmith1)
 - Users are deactivated and removed – not deleted entirely

Configuration

Master Protocol Mapping tab

- Mapped Device Protocols tab
 - New column identifying number of exams conducted using this device protocol

Settings

- User
 - [Manage Default Units](#) allows a user to set their own default Value of Interest (for graphs, etc.)
- Updated User Guide available

New Features

Dashboards

Filters

- There is now the ability to filter time over two days, allowing users to evaluate by day/night shift; this is found in the Misc. tab, when in the Filtering screen for a report
- Indicates Overnight if time frame covers night shift

Exporting

- When exporting data – the title of the component will be the default name of the file to be saved

New Dashboards

- All within Dosimetry folder
- Exams by Threshold – shows a high level view of # of exams within/exceeding DRLs, color coded bars
- Exams by Action Levels – color coded bars configured to represent # of exams that have triggered a particular action; the legend indicates action to follow and the hover over provides # of exams
- Configuration: DRL module – Action Levels tab
 - You can configure Action Levels here
- Protocol Editor Module –
 - Open protocols and adjust exam specific DRLs under Dose Reference Levels
 - You can indicate Action level here based on alert level triggered
- Detailed Dose Analysis Table
 - Shows distribution of min, max and average doses as well as quartiles
 - Third quartile values can be used as a simple indication of “abnormally high dose” - a starting point in setting DRLs
 - Interactive x and y axis

- Dose Distribution Table
 - Takes the highest dose for a particular study and breaks it down into five equal dose ranges/buckets
 - For each protocol for example you are able to see the # of exams that fall within each dose bucket

Sharing Reports

- Reports can be shared with other users
- Scheduler
 - You can now set up reports on a schedule
 - You can schedule yourself or others for reports
 - An email can be sent based on your established frequency, including a link to the report
 - No graphical or chart data is sent to email for protection of PHI

Reports Module

- Allows you to view scheduled reports. See "Reports Module" on page 32.

Alerts

Alert Subscriptions

- There is now additional filtering available as in the Dashboards module
- The frequency of e-mail notifications can be modified
- Administrators can manage a user's alert subscriptions via the See "Alerts Configuration" on page 228

Examinations module

- Alerts are now visible in the Examinations module, signified by a red circle on the exam label
 - Hovering over the red circle displays a pop-up showing a date/time stamp for the alert
 - Double-clicking on the pop-up displays an alert management dialog box
 - This shows the patient and exam label as well as a description of the alert (not edit-able)
 - The description is not editable
 - The user can either forward, acknowledge personally, or globally acknowledge the alert
 - If the user globally acknowledges the alert, they will be alerted that a comment is required

Alerts interface changes

- Newly visible dose boxes give a visual for alert indicated
- Administrators can view alerts for any user
- A status filter allows you to choose between showing all alerts, new to user, or new to all users
- Options are available to search through alerts by using A# and filters (as in Dashboards)

- Selecting an alert activates options for forwarding and acknowledging the alert
- There is a Status column which display icons relating to the alert
 - A 1-person icon indicates your acknowledgement of the alert
 - A 3-person icon indicates global acknowledgement of the alert
 - Both icons present indicates that the alert has been acknowledged by the user and globally
 - A blue arrow indicates it has been forwarded
- The Alert Emails tab displays expected and actual delivery times for the alerts, as well as the number of acknowledged alerts vs. the total number of alerts sent out

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