Merge PACS™

v. 6.6

WORKSTATION ADVANCED USERS GUIDE

Merge Healthcare
900 Walnut Ridge Drive
Hartland, WI 53029

INDICATIONS FOR USE:

MERGE PACS is designed and marketed for soft copy reading, communication and storage of studies produced by digital modalities, to include Digital Mammography.

MERGE PACS receives images acquired from DICOM-compliant medical imaging systems, data from FDA-cleared Computer-Aided Detection systems and other FDA-cleared Image processing systems.

MERGE PACS imports images and render said images, upon request, within the viewer component utilizing both lossless (reversible) and lossy (irreversible) compression.

To support the diagnostic interpretation of Mammography studies, MERGE PACS will display the full fidelity DICOM image in a non-compressed format. Images will be rendered with patient and clinical information clearly displayed as part of the DICOM Overlay as required by MQSA, on monitors cleared by FDA for use in Digital Mammography. Lossy compressed mammography images and digitized film screen images must not be used for the purpose of primary diagnosis. Mammographic images may only be interpreted using an FDA approved monitor that offers at least 5Mpixel resolution and meets other technical specifications reviewed and accepted by FDA.

Within MERGE PACS, the MERGE Real Time Worklist offers real-time status of radiology activity and provides customizable workflow management capabilities. Communication of critical results is facilitated and documented through optional, and configurable, components within the Real Time Worklist.

MERGE PACS also offers the Patient Dashboard which provides a single view of all patient data, both imaging and non-imaging.

MERGE Reach is an optional component within MERGE PACS which provides clinicians secure, proactive communication and access to clinical reports and images.

Order and Report information generated by HIS/RIS and report creation systems are received and displayed in PACS via the transmission of HL7 messaging. For this data, MERGE PACS is not the creator, but instead the downstream recipient which relies on the validity of data from said systems.

MERGE PACS must be installed on suitable, commercial-standard hardware.

It is the user's responsibility to ensure monitor quality, ambient light conditions and image compression ratios are consistent with the clinical application.

CAUTION: **Federal law restricts this device to sale by or on the order of a physician**.

CAUTION: **Not for diagnostic use on a mobile device such as a smart phone or a tablet**.

CANADIAN DEVICE IDENTIFIER: Merge PACS

CE 0120

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Welcome to the Merge PACS™ 6.6 Workstation (The "Merge PACS Workstation"). The Merge PACS Workstation is a Java-based diagnostic workstation that has all the tools required by a radiologist to perform primary interpretation of both cross sectional and plain film studies, and can be configured to individual user preferences. The purpose of this guide is to walk you through all the major features of the Merge PACS Workstation, both basic and advanced, and allow you to begin using it. If there is any information that you are unable to find in this manual, please contact your local system administrator or contact Merge Healthcare for assistance.

NOTE: In certain instances, such as for use in a clinical trial, the Merge PACS Workstation can be configured to hide patient, series and study-specific information in various places throughout the application. The specific information that is hidden when so configured is customizable on a site-by-site basis.

Chapter 1. Introduction

The Merge PACS Workstation consists of the following major components, each of which are described in greater detail throughout this Guide:

Welcome Screen	The Welcome Screen is a web page that can be viewed from within any supported Web browser. The Welcome Screen verifies that you have the latest available version of the Workstation software installed and provides a mechanism for installing necessary updates. The Welcome Screen also provides you with the information you need to properly adjust your monitor with regard to brightness and contrast.
Workstation Browser	The Workstation Browser is the launching pad for all non-imaging related data in different views. Depending on your system configuration and login privileges, these may include the **Patient Record**, **RealTime Worklist™**, **RealTime Study List**, **Query Search**, and **Local Study**. Note that the Browser is launched automatically as a separate window once you have logged into the system.
Merge PACS Viewer	The Merge PACS Viewer, which can be launched from RealTime Worklist, RealTime Study List, the Patient Record, Query Search or Local Study, is the primary application for viewing and manipulating patient images.
Mammography Thumbnail Viewer	When a mammography study is loaded into the Merge PACS Viewer, the Mammography Thumbnail Viewer will be launched in a separate window. The Mammography Thumbnail Viewer contains a special Toolbar that can be used instead of the standard Viewer toolbar to work with mammography images. This toolbar has additional tools available that are specific to Mammography and can be configured to display as many of the standard tools as the user desires.

Chapter 2. Getting Started

2.1. Logging Into the Merge PACS Workstation

The Merge PACS Workstation can be launched from within a web browser or directly via an icon on your computer's desktop. How you log into the Workstation will depend on how it is launched.

2.1.1. Logging In from within a Web Browser

When you first access the Merge PACS Workstation from within a web browser, you will be shown the login screen as shown in the following example:

Merge PACS Workstation Login Screen

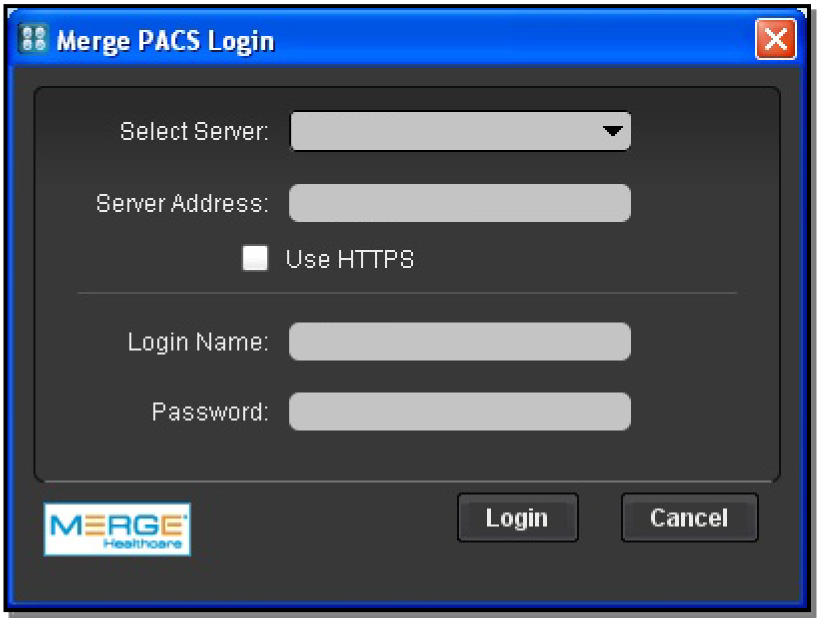
- Enter your **Login Name** and **Password** in the appropriate fields.
- If appropriate, select the **domain** to which you belong.
- Click the **Login** button.
- If necessary, click on the **Reset** button to clear both fields.

Once you have logged in, the Welcome Screen will be displayed, as described in the following Section. In addition, the Workstation Browser will be launched in a separate window, as described in Chapter 3 below.

2.1.2. Logging In via a Desktop Icon

The Merge PACS Workstation can optionally be launched directly via an icon on your computer's desktop without needing to start within a web browser. This will cause the Welcome Screen, described in the following section, to be bypassed completely and will launch the Workstation Browser directly.

When you first access the Merge PACS Workstation via an icon on your computer's desktop, a login screen such as the one in the following example will be displayed:



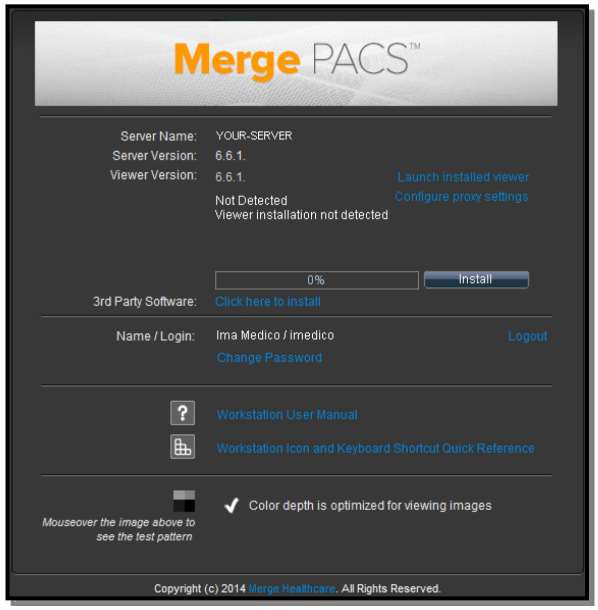
The Merge PACS Workstation Login Screen

- By default, the name and address of the Merge PACS Server you are using should be already be filled in.
  - If you need to access a different Merge PACS Server, select the desired Server from the drop-down **Select Server** menu.
  - If the desired Server is not currently listed in the Select Server menu, enter the URL or IP Address of the Server in the **Server Address** field (the next time you access the login screen, this Server will be added to the Select Server menu).
- If the Merge PACS Server you are accessing requires secure communications, make sure the **Use HTTPS** box is selected (ask your PACS Administrator if you are unsure whether secure communications are required or not).
- Enter your **Login Name** and **Password** in the appropriate fields.
- If appropriate, select the domain to which you belong.
- Click on the **Login** button to proceed.

NOTE: Your login name will automatically be remembered from your last login session and can be changed if necessary. Your password, however, will not be preserved and will need to be reentered each time.

2.2. The Welcome Screen

Before you can begin using the Merge PACS Workstation, your Web browser and monitor must be correctly configured. In particular, you need to make sure that you have the latest version of the Workstation software and your monitor is properly adjusted with regard to brightness and contrast. The Welcome Screen, as shown in the following example, will help you determine if everything is configured correctly and will guide you through the necessary procedures if not:



Merge PACS Workstation Welcome Screen

At the Welcome Screen you can do the following:

- Install or upgrade to the latest available version of the Workstation as necessary
- Install available third-party software
- Change your password
- Properly calibrate your monitor with regard to brightness and contrast
- Manually launch the Workstation Browser, if necessary
- Log out of the Workstation
- Display an electronic version of this User Guide.

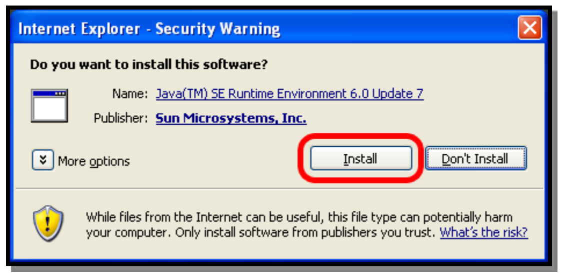
NOTE: If your computer currently has the latest version of the Merge PACS Workstation software installed on it, the Browser (as described in Chapter 3 below) will automatically be launched in a separate window after the system has verified that the latest version is installed.

NOTE: If your system has been configured to launch the Merge PACS Workstation directly from a desktop icon instead of via a web browser, the Welcome Screen may not be displayed at all (instead, the Browser described below will be launched by itself).

2.2.1. Installing Java

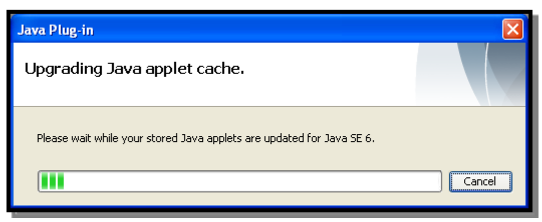
The Merge PACS Workstation requires Java version 1.5 or higher to be installed. If your local machine has an earlier version of Java installed on it, this version must be removed before accessing the Merge PACS Workstation. This can be done via the Windows **Add/Remove Programs** feature (available from the Windows Control Panel).

- If your local machine does not have any version of Java installed on it when you first access the Merge PACS Workstation, the system will automatically prompt you to install the correct version, as in the following example:



Installing Java

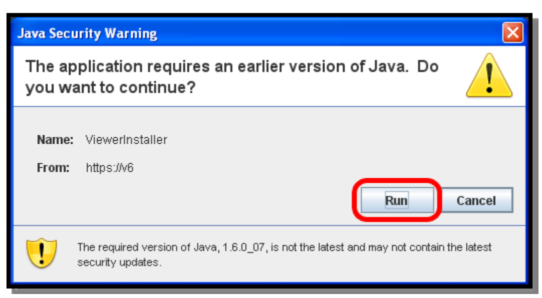
  - Click on the **Install** button to proceed with the installation process. Once the installer has finished, click the **Finish** button. Depending on your system, you may then see a screen similar to the following while any stored Java applets are updated:



Updating Stored Java Applets

  - When this screen disappears, you are ready to proceed to the next step, as described in the following subsection.

- If your local machine has a version of Java that is newer than 1.6.07, a Java Security Warning similar to the following may be displayed when you first access the Merge PACS Workstation:



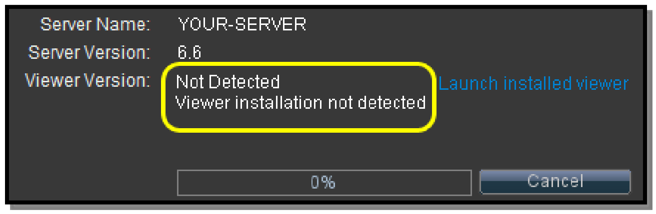
Java Security Warning

If this message is displayed, click on the **Run** button to proceed.

2.2.2. Installing or Upgrading to the Latest Available Version

When you first log into the Merge PACS Workstation, the system will automatically perform a test to determine if the latest available version of the Workstation software is currently installed on your workstation. If you currently have an out of date version of the Workstation installed, it will be upgraded automatically. Depending on how your system is configured, the latest version may also be installed automatically if you do not currently have it installed at all.

If you do not currently have the Merge PACS Workstation installed and your system is not configured to install it automatically, a message will be displayed similar to the one shown in the following example:



No Viewer Software Detected

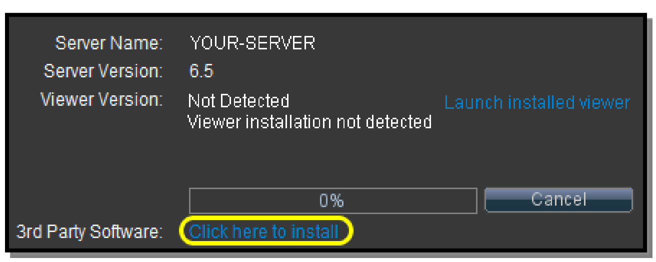
To install the latest available version of the Workstation software, click on the **Install** button immediately below the message described above. The installation process may take a few minutes depending on the speed of your internet or intranet connection, whether a new installation or an upgrade is being performed, etc.

Once the latest version has installed, the Workstation Browser will automatically be launched in a separate window as described in Chapter 3 below.

NOTE: Once the latest version of the Viewer has been installed, a new **Reinstall** button will be displayed the next time you log in. As long as the version of the Viewer is current with the version available on the Merge PACS Server, clicking this button will perform an analysis of the currently installed version and repair it if necessary.

2.2.3. Installing OrthoView™

If you need to install the OrthoView™ orthopedic templating toolset, click on the **Click here to install** link as shown in the following example:



Click to Install OrthoView™

NOTE: Workstations that are configured for use with OrthoPACS will have access to Merge OrthoCase by default and will not need to install OrthoView.

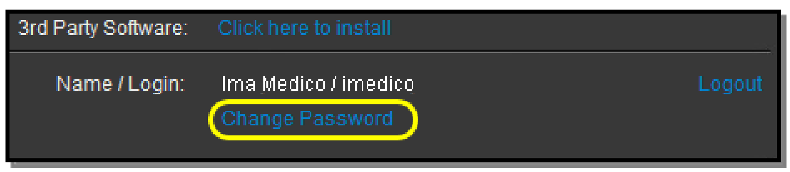
Clicking this link will launch the OrthoView installer in a separate window, as in the following example:

The OrthoView Installation Window

At the OrthoView Installation window, click on the appropriate link as directed to begin the installation process.

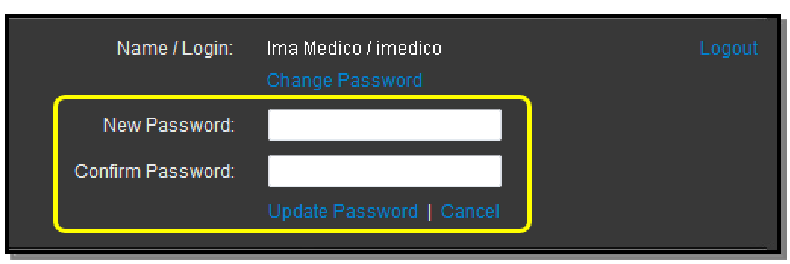
2.2.4. Changing Your Password

To change your login password from the Welcome Screen, click on the Change Password link, as in the following example:



Change Password Link

Clicking this link will cause the Change Password fields to be displayed, as in the following example:



Change Password Fields

Enter and confirm your new password in the spaces provided and then click on the **Update Password** link.

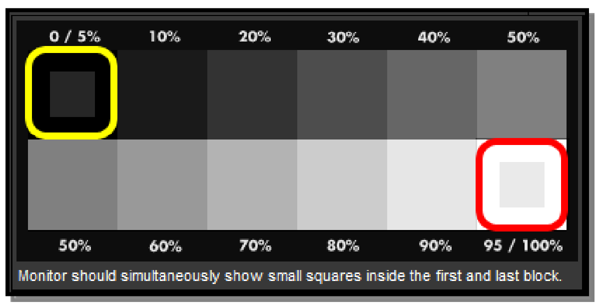
2.2.5. Calibrating Your Monitors

The Merge PACS Workstation is appropriate for clinical diagnosis, but it is the user's responsibility to provide a suitable monitor that has been appropriately calibrated. In particular, the brightness and contrast levels of your image viewing monitors must be carefully adjusted in order to view images correctly.

The Welcome Screen provides a test pattern image that can be used to calibrate your monitor, which is accessed by placing your mouse over the test pattern icon as shown in the following example:

Accessing the Monitor Calibration Test Pattern

The first and last squares of the test pattern contain a small dark gray and a small light gray square, respectively, as seen below:



The Monitor Calibration Test Pattern

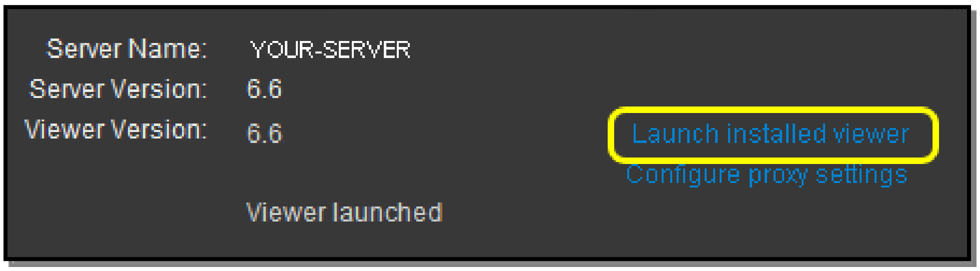
- If you cannot see either one of these squares, adjust the brightness and contrast controls of your monitor until they **both** become visible.
- When performing the test described above, it is recommended that you dim the lights in the room if possible.
- When adjusting the brightness and contrast, change each setting as **little** as possible until the desired results are achieved. Remember -- the goal is to have the **maximum** brightness and contrast that still allows all 12 squares in the test pattern to be discernible.
- Brightness and contrast interact with each other [greater contrast, for example, will make an image appear brighter], so it is important to adjust **both** the brightness and contrast.
- Note that, although you should not need to recalibrate your monitor every time you turn on your computer, it is recommended that you visually check each time to make sure you can see the "hidden" squares described above.

NOTE: For detailed instructions on how to configure dual monitors for use with the Merge PACS Workstation, refer to **Appendix A**, below.

2.2.6. Manually Launching the Workstation Browser

As described above, when you first log into the Merge PACS Workstation and visit the Welcome Screen, the system will check to see if you have the latest version of the Workstation software installed on your computer and, if necessary, prompt you to install or update it. Once your computer has the latest version of the Workstation software installed on it (or immediately if the system verifies that your version is current), the Workstation Browser will automatically be launched in a separate window.

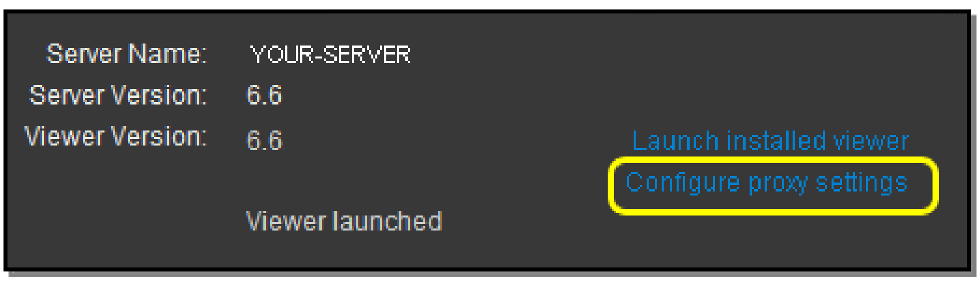
If you need to launch the Browser manually (*e.g.*, if you close the Browser and want to restart it without logging out and logging back in), you can do so by clicking on the **Launch installed Viewer** link on the Welcome Screen, as shown in the following example:



Manually Launching the Browser

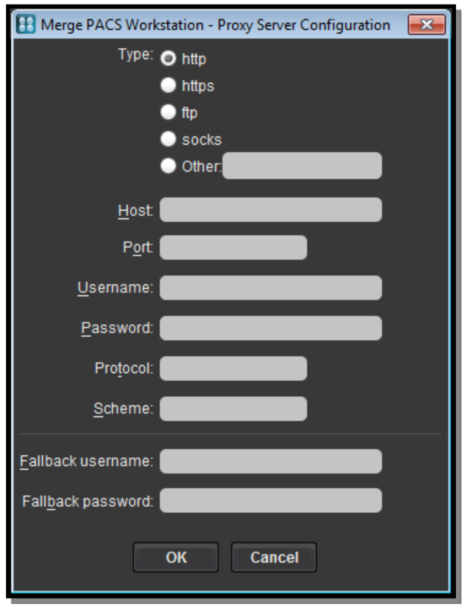
2.2.7. Configuring Proxy Settings

If your Merge PACS Workstation needs to connect through a proxy server, you can configure the proxy settings from the Welcome Screen. Once the Workstation browser has been launched, whether automatically or manually, a new **Configure proxy settings** link will be displayed on the Welcome Screen, as in the following example:



Manually Launching the Browser

Clicking on this link will cause the **Proxy Server Configuration** window to be displayed as a separate pop-up window, as in the following example:

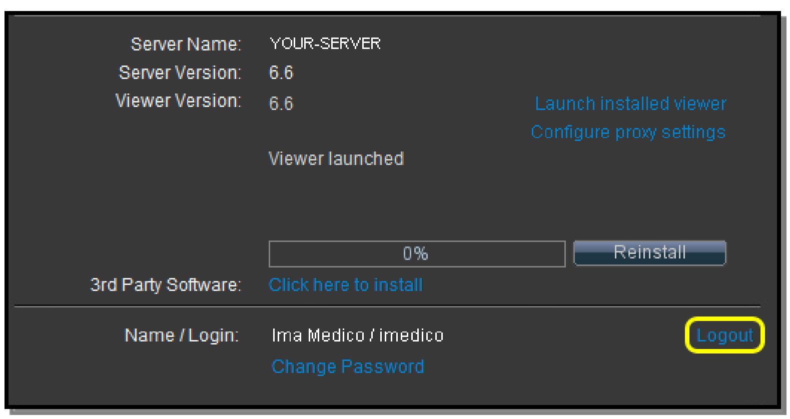


Proxy Server Configuration

Enter the required information and click the **OK** button.

2.2.8. Logging Out of the Merge PACS Workstation

To manually log out of the Merge PACS Workstation, click on the **Logout** link on the Welcome Screen, as shown in the following example:



Logging Out of the Merge PACS Workstation

2.2.9. Exiting the Merge PACS Workstation

To exit the Merge PACS Workstation entirely, click on the red [X] in the upper-right corner of the Welcome Screen.

Chapter 3. The Workstation Browser

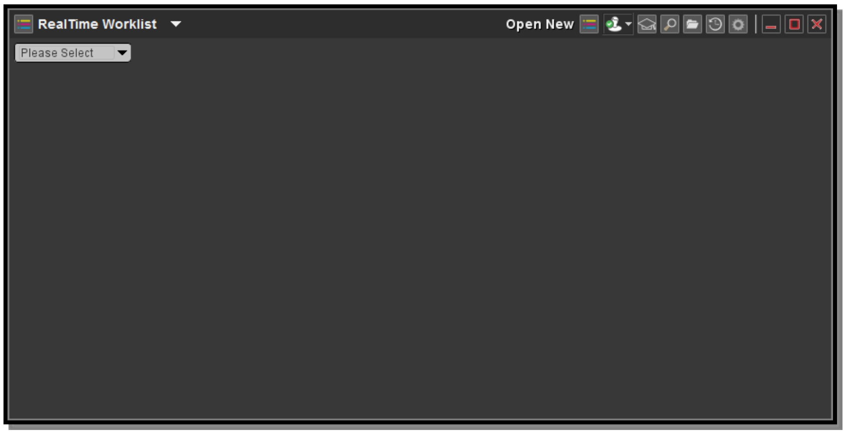
The Workstation Browser provides six separate ways to access patient images, depending on your login privileges:

Method	Description
RealTime Worklist™ (RTWL)	Lets you view and manage one or more lists of patient studies ("worklists") that have been assigned to you.
Teaching Worklists	Lets you view and manage one or more lists of patient studies that you have tagged for teaching and/or conferencing purposes.
Query Search	Lets you search for a particular patient based on such criteria as patient name, physician's name, modality type, etc.
RealTime Study List (RTSL)	Combined interface that lets you view and manage RTWL worklists and Teaching Worklists on the same page, as well as create and save special Query Worklists on the fly. Note that you can either have RealTime Study List or RealTime Worklist enabled, but not both at the same time.
Local Study	Lets you open studies that have been previously saved to your local workstation or on a network accessible drive.
Recently Viewed Studies	Lets you quickly access a list of studies that you have recently viewed.
Patient Record	Once a study has been opened, the Patient Record displays Series Navigation thumbnails for that study as well as any prior studies for the same patient. These Series Navigation thumbnails can be used to open the study into the Merge PACS Viewer or into a separate pop-up Series Viewport window.

NOTE: The Workstation Browser will either be displayed with a "light on dark" color scheme or a "dark on light" color scheme. This is configurable on a site-by-site basis.

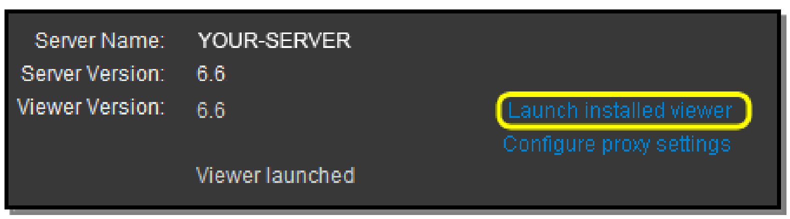
3.1. Accessing the Workstation Browser

As described in the preceding Chapter, when you first log into the Merge PACS Workstation and visit the Welcome Screen, the system will check to see if you have the latest version of the Workstation software installed on your computer and, if necessary, prompt you to install or update it. Once your computer has the latest version of the Workstation software installed on it (or immediately if the system verifies that your version is current), the Workstation Browser will automatically be launched in a separate window, as in the following example:



The Workstation Browser

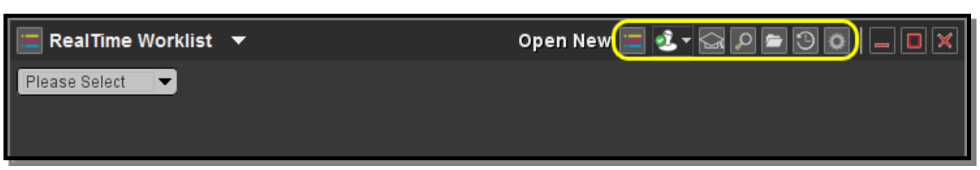
You can also launch the Browser manually (*e.g.*, if you close the Browser and want to restart it without logging out and logging back in) by clicking on the **Launch installed Viewer** link on the Welcome Screen, as shown in the following example:



Manually Launching the Browser

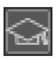
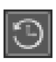
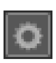
3.2. The Workstation Browser Toolbar

The top of the Workstation Browser includes a selection of tools that can be used at any time, as shown in the following example:



Workstation Browser Toolbar

The following tools are available, depending on your login privileges:

Tool	Name	General Description
	**Merge Messenger**	Launches the Merge Messenger window to send and receive instant messages to other users who are currently online, as described in Chapter 24 below.
	**Merge Messenger Status Menu**	Displays a menu that lets you manually change your Merge Messenger status (e.g., from online to busy), as described in Chapter 24 below.
 	**Open New RTWL /** **Open New RTSL**	Displays a menu that lets you select a new RealTime Worklist or RealTime Study List (depending on how your system is configured) to be opened in a separate window, as described in subsection 3.3.12 below.
	**Open New Teaching Worklist**	Displays a menu that lets you select a teaching worklist to be opened in a separate window, as described in subsection 3.4.12 below.
	**Open New Query Page**	Launches a Query Search Page in a separate window, as described in subsection 3.5.6 below.
	**Open New Local Study Search Page**	Launches a Local Study Search Page in a separate window, as described in subsection ☐ below.
	**Recently Viewed Study Quick Select**	Displays a menu that lets you quickly select a recently viewed study to be opened in a Secondary Merge PACS Viewer window, as described in subsection 3.8.3 below.
	**Merge PACS Management Pages**	Launches the Merge PACS Management Pages in a separate window, as described in Section 3.10 below.

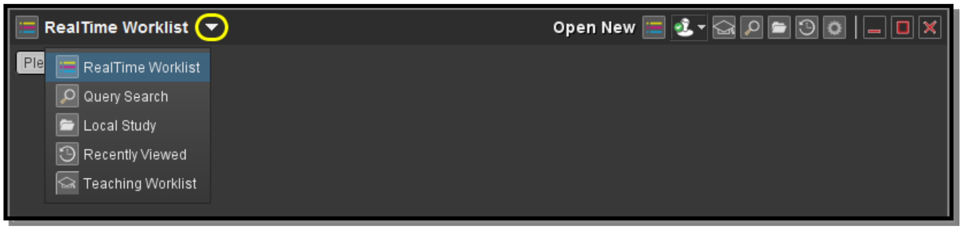
3.3. RealTime Worklist™

RealTime Worklist (RTWL) is a powerful and flexible feature that allows you to view and manage one or more lists (or “worklists”) of studies that have been assigned to you.

CAUTION: In order to avoid delay of treatment, alert your PACS Administrator immediately if you notice unintended patients on your worklists.

3.3.1. Accessing RealTime Worklist

The top of the Workstation Browser includes a drop-down menu that displays the various functions that can be shown within the Browser, as in the following example:



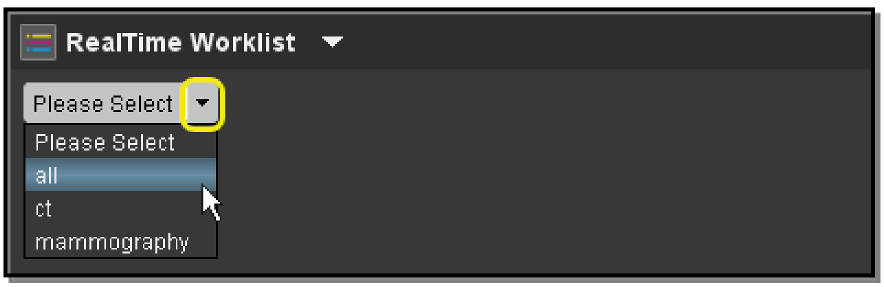
Workstation Browser Options

By default, RealTime Worklist should be activated when you first access the Workstation Browser, but you can access it at any time by selecting **RealTime Worklist** from this menu.

3.3.2. Selecting a Worklist

Once you have selected RealTime Worklist, select the desired worklist from the drop-down menu of available worklists in one of the following ways:

- Click on the down arrow to display a list of all available worklists, as in the following example, and then click on the desired worklist:

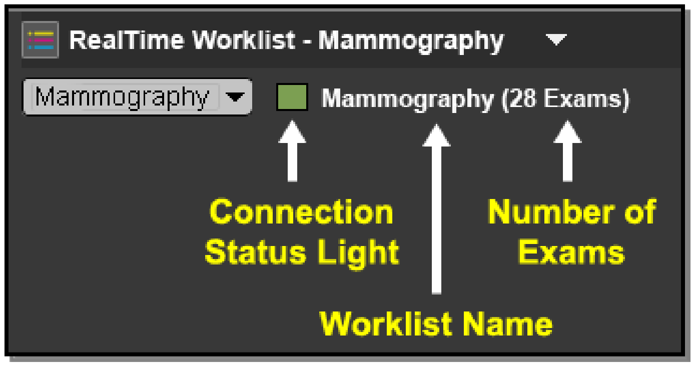


Displaying All Available Worklists

- If the list of available worklists is large, you can filter it to display only those worklists whose names contain certain characters by clicking on the field to the left to the drop-down menu arrow and entering one or more characters, as in the following example:

Filtering the Menu of Available Worklists

Once you have selected a worklist, the name of the worklist will be displayed near the top of the screen, together with a connection status light, as shown in the following example:



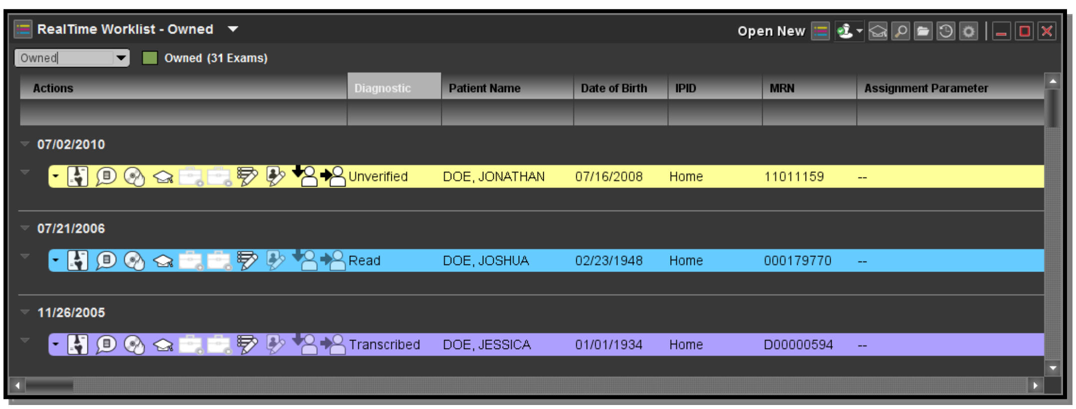
Worklist Connection Status

The color of the connection status light indicates the following:

Color	Meaning
Red	Not yet connected to RealTime Worklist
Green	Connected to RealTime Worklist

3.3.3. Worklist Overview

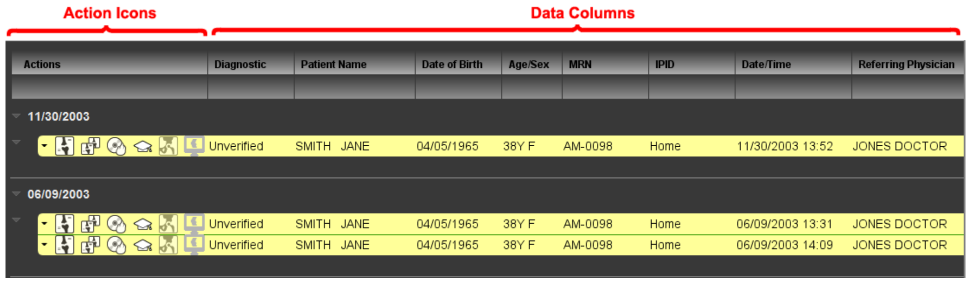
Once you have selected a worklist from the menu, the chosen worklist will be displayed as shown in the example below:



Viewing a Worklist

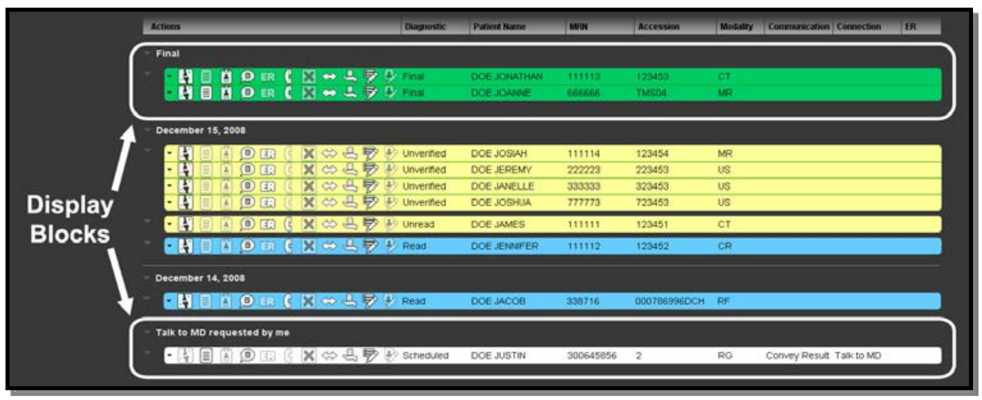
- Each worklist is divided by default into separate sections for each day. The studies for each day are, in turn, divided by default into separate groups according to their current status.

- Each worklist entry contains a set of **action icons** on the left that you can click on to perform different tasks, and **data columns** on the right that display information about each study/order on the worklist, as shown in the following example:



Action Icons and Data Columns

- In addition, a worklist may be configured to have one or more “Display Blocks” at the top and/or bottom of the worklist to highlight certain studies/orders that have been deemed to be of special interest, as in the following example:

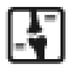
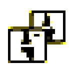


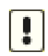
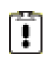
Display Blocks

NOTE: The actual action icons and data columns, the order the columns appear, the configuration of Display Blocks and the names of the possible worklist status options are all customizable by an Administrator and will vary from one worklist to another and one site to another.

3.3.4. Action Icons

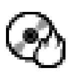
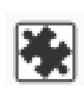
The following action icons may be available on your worklist, depending on how this particular worklist is configured, your login privileges, etc.:

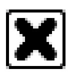
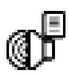
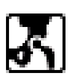
Icon	Name	General Description
	**View Study**	Load the selected study into the Merge PACS Viewer, as described in Chapter 4 below. You can also load a study into the Merge PACS Viewer by double-clicking anywhere in the Data Columns section of the worklist for a particular study. Note the following: • Once a study has been opened, its status on the Worklist will be changed to "In Use" and it will change color to alert other users that it is currently open by somebody else. • If Merge PACS has an archive configured and the study is currently offline, attempting to view a study will automatically trigger an archive retrieval request, as described in Chapter 17 below.
	**View Study in Secondary Viewer**	If you are already viewing a study in the Merge PACS Viewer and want to view another study without exiting the first one, click on the View Study in Separate Viewer icon to load the selected study into a separate Merge PACS Viewer. Note the following: • By default, studies displayed in the Secondary Viewer will be read-only (they will not be locked and you will be unable to change the workflow status). This default behavior can be changed, however, from the User Preference menu, as described in subsection 25.2 below. • This method can be used to open any number of simultaneous viewer windows. However, keep in mind that each open window will consume additional memory, and this may have an adverse effect on your system's performance if too many windows are kept open at the same time. • Each currently open study will have a separate navigation tab associated with it within the Patient Record, as described in subsection 3.9.1, below. • Use cases for multiple-instance viewer windows include the following examples: o While reading one patient's study, the user is asked to look at another patient's study. The user does not want to exit the first study, but wants to be able to view the study in a second window while leaving the first study open. o If a comparison study for a patient has a different patient name or MRN associated with it, that study will not be available from the list of available comparison studies for that patient from within the Primary Viewer. The user can load that study into the secondary Viewer, however, to compare the two studies side by side in separate viewer windows.

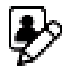
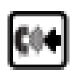
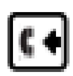
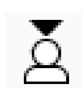
Icon	Name	General Description
		o The user might prefer to view the same study in the secondary Viewer to keep the layout of the Primary Viewer unchanged. For example, 3D images can be viewed in the secondary Viewer while the Primary Viewer displays the study in standard 2D layout. o The user might prefer to run the secondary Viewer on a color monitor in order to display data in color, including 3D color volume rendering, color US images, color maps applied to US or PT or NM monochrome images, etc. • If Merge PACS has an archive configured and the primary study is currently archived and not available online, attempting to view a study in a Secondary Viewer will automatically trigger an archive retrieval request, as described in Chapter 17 below.
  	**View Orders and/or Comments**	Launch the Order Viewer as a separate pop-up window with any orders and/or comments displayed. Note that the appearance of the icon will change depending on whether there is just an order associated with this study, just comments, or both:  There is an order associated with this study.  The most recent comment for this study was manually flagged by the commenter.  There is an order associated with this study and the most recent comment for this study was manually flagged by the commenter. For more information on using the Order Viewer to view orders and view and/or enter comments, refer to Chapter 5 below.

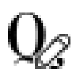
NOTE: If there is no order or comment currently associated with this study, the Orders and Comments icon will be disabled. If you need to add a comment, you can do so from the **Technologist WorkPanel** or the **Comments Viewer**, depending on your login privileges.

	**Launch Report Viewer**	Launch the Report Viewer as a separate pop-up window. For more information on using the Report Viewer, refer to Chapter 6 below.

Icon	Name	General Description
	**Launch Comment Viewer**	Launch the Comment Viewer as a separate pop-up window with any comments displayed. Note that the appearance of the icon will change as follows:  The study has one or more jailed images.  The study has no jailed images but the most recent comment has been manually flagged by the commenter.  The study has no jailed images and the most recent comment (if any) has not been manually flagged. This is the default icon. For more information on using the Comments Viewer, refer to Chapter 5 below. For details on viewing jailed images, refer to Chapter 18 below.
	**Technologist WorkPanel**	Launch the Technologist WorkPanel for the selected study in a separate pop-up window. The Technologist WorkPanel provides a number of different tools commonly used by Technologists in a single window. For details on the Technologist WorkPanel, refer to Chapter 20 below.
	**ER WorkPanel**	Launch the ER WorkPanel for the selected study in a separate pop-up window. The ER WorkPanel provides a number of different tools commonly used by Emergency Room Physicians in a single window. For details on the ER WorkPanel, refer to Chapter 21 below.
	**Burn CD**	Add the selected study (together with any priors) to the Burn CD dialog's Study List. Note that multiple studies from multiple patients can be added to the same Burn CD Study List. For details on burning patient images onto a CD, see Chapter 14 below.
	**Route Study**	Send the selected study to another available Merge PACS location (*i.e.*, a different Merge PACS Server or a local DICOM device. For details on routing studies, see Chapter 15 below.
	**3rd-party App Sync**	If your system has been configured for direct ("API-based") integration with a third-party dictation/report applications such as Dictaphone's PowerScribe™, clicking on the Third-party Application Synchronization icon will launch the application with the study's accession number and the patient MRN prepopulated. For additional information on using the 3rd-party Application Synchronization feature, refer to Chapter 10 below and the user documentation specific to the third-party dictation/report application being used.

Icon	Name	General Description
	NOTE: The Merge PACS Workstation also provides indirect ("XML file-based") integration with a number of third-party applications including dictation/report applications (such as Dolbey and SoftMed), document management applications (such as OnBase), and any other application that supports XML file-based integration. You do not need to click on the Third-party Application Synchronization icon for this type of integration, as those applications can be configured to launch automatically when you open a study for viewing.	
	**Study Tagging**	If you have the login privileges to access the optional Teaching Files feature, this will launch the **Study Tagging** window. For more information on tagging studies, refer to Chapter 23 below.
	**Quick Add to Default Teaching Worklist**	If you have the login privileges to access the optional Teaching Files feature, add this study to whichever Teaching Worklist (including Briefcase) is currently configured as your default Teaching Worklist.
	**Quick Remove from Current Worklist**	Remove a study that was manually associated with this worklist. Note that removal will be instantaneous and will not cause the **Associate/Dissociate Study** pop-up window to be displayed.
	**Remove Associated Study**	Launch the **Associate/Dissociate Study** pop-up window to remove a study that was manually added to this RTWL worklist, whether via the Associate Study icon or the Drag and Drop feature described in subsection 3.6.7 below. For details on the Associate/Dissociate Study window, see Chapter 7 below.
	**Associate Study**	Launch the **Associate/Dissociate Study** pop-up window to add the selected study to another RTWL worklist to which you have access. For details on the Associate/Dissociate Study window, see Chapter 7 below.
	**VoiceClip**	Listen to the audio annotation, if any, that has been recorded for this study. For details on using VoiceClip to listen to audio annotations, refer to Chapter 9 below.
	**Access Control**	Grant one or more users or groups access to this study/exam. For details on Access Control, see Chapter 11 below.
	**OrthoLink**	View the selected CR study within the Image Viewer and launch the orthopedic templating toolset installed on your workstation, such as OrthoView or Merge OrthoCase. For details on using OrthoLink, see Chapter 4.12 below and the user documentation specific to your orthopedic templating toolset software.

Icon	Name	General Description
	**Change Status**	Change the workflow status and/or selected HL7 attributes for a particular study directly from the Worklist without opening the study within the Merge PACS Viewer. For details on changing status and/or selected HL7 attributes, see Chapter 12 below.
	**Study Demographics**	Launch the Study Demographics window in a separate pop-up window that lets you view and edit patient and study demographic information for the selected study. For additional information on viewing and editing patient and study demographics, refer to Chapter 19 below.
	**Communication WorkPanel**	If the optional Merge RadStream™ component has been enabled, launch the Communication WorkPanel for the selected study in a separate pop-up window. The Communication WorkPanel provides a number of different tools commonly used by Merge RadStream Operators in a single window. For details on the Communication WorkPanel, refer to Chapter 22 below.
	**Change Status to MD Connected**	Sets the connection dimension status of the selected study to MD Connected (or the equivalent status used by your site).
	**Change Status to Talk to MD**	Sets the connection dimension status of the selected study to Talk to MD (or the equivalent status used by your site).
	**View Study in iConnect Access Viewer**	If your system is configured to provide access to the iConnect® Access viewer, display the selected study within iConnect Access. For information on using iConnect Access, refer to the iConnect Access user documentation.
	**Reserve Study**	Flag this study as reserved to you. If a worklist containing this study has been configured to include the Reservation display column, as described in subsection 3.3.5 below, the Reservation status will be displayed in that column.
	**Assign Study**	Flag this study to be assigned to another user. If that user has access to a worklist configured to display studies assigned to him, this study will appear on that worklist. For information on assigning studies to other users, refer to Chapter 8 below.

Icon	Name	General Description
	**Retrieve from Archive**	If Merge PACS has an archive configured and this study is currently offline (*i.e.*, only available in the archive), submit a request to retrieve the study from the archive. Note the following: • Once an archive retrieval request has been submitted, the progress can be tracked from the **Availability** data column, as described in subsection 3.3.5.c below. • You can submit a retrieval request for multiple studies at the same time by clicking on the Retrieve from Archive icon for each study. The retrieval requests will be processed in the order it they were submitted. • If Merge PACS is configured with an archive, but the **Retrieve from Archive** action icon is not enabled for this worklist, you can still submit an archive retrieval request from the **Worklist Right-click Study Menu**, as described in subsection 3.3.8 below, or by clicking on the **View Study** or **View Study in Secondary Viewer** action icons for a study that is currently offline, as described in Chapter 17 below.
	**Save Series**	Save images from one or more Series for this study in a variety of available image formats for inclusion in a document or an e-mail message. For more information on saving a Series, refer to subsection 4.6.1 below.
	**Open Study in QC Editor**	Open the study within the **Quality Control Editor**. Refer to the *Merge PACS 6.6 Quality Control Editor Users Guide* for more information.

3.3.5. Data Columns

a. In General

The following general data columns may be available on your worklist, depending on how your system is configured:

- **Diagnostic Status**
- **Patient Name**
- **Date of Birth**
- **Age/Sex**
- **Patient ID**
- **IPID** (Issuer of Patient ID)
- **Accession**
- **Date - Time**
- **Last Action**
- **Referring Physician**
- **Modality**
- **Description [Procedure]**
- **Institution Name**
- **Institution Group**
- **Licensure Region**
- **Priors**
- **Images**
- **Order Priority**
- **Patient Location**
- **Patient Class**
- **Order Status**
- **Reading Pool**
- **Series with Images**
- **Due In**
- **Objects**
- **Availability**
- **Communication Status**
- **Connection Status**
- **Reservation Status**
- **Image Transfer Status**
- **Study Locking Status**
- **ER Status**
- **Order Match Status**
- **Update Order Status**
- **Prefetch Status**
- **Assignment Status**

- **Station Name**
- **Reading Physician**

NOTE: An additional data column labeled **Acuity** may be present if the optional Merge RadStream feature has been enabled.

NOTE: Additional custom data columns may be configured on a site-by-site basis

NOTE: Column headers for the various status dimensions (**Communication**, **Connection**, **Reservation**, **Image Transfer**, **Study Locking** and **ER**) may be displayed as text or as an icon, depending on how the worklist is configured. If the column header is configured to display as an icon, the values for that column will also be displayed as an icon, if set.

NOTE: Additional "Parameter" columns for the various status dimensions may be included to display the current value for a particular status (*e.g.*, the **Reservation Status** column might indicate that a study has a status of "Reserved" and the **Reservation Parameter** column might display the name of the user who has reserved the study).

NOTE: If a study has been edited in the Quality Control Editor after being imported to change the station name associated with that study, both the original and the new station name may appear in the Station Name column.

NOTE: The prior count displayed in the **Priors** column is based on MRN and IPID and is not not affected by Prior Selection Criteria and Patient Comparison Strategy configured for your site. As a result, the count may not reflect the actual number of priors that are displayed if you choose to show priors for the study, as described in subsection 3.3.10 below.

b. Due In Column

If your site's workflow includes deadline tracking due to **Service Level Agreements** (SLAs), the **Due In** column will let you keep track of studies that are required to be read within a certain deadline.

Depending on how your site is configured, up to four separate threshold limits (in minutes), each with its own display color, may be tracked in the Due In column. For example, if the SLA is set to 30 minutes, the Due In column might display a **GREEN** background when 10 minutes are remaining, a **YELLOW** background when 5 minutes are remaining and a **RED** background when 1 minute is remaining.

In addition to the configured color and the amount of time remaining until due (or time past due), the Due In column will display the following information as "hover" text when the mouse cursor is placed over it:

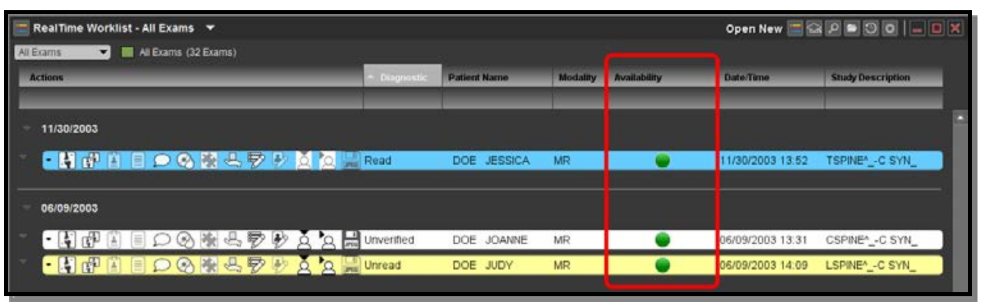
Value	Description
Arrived	The time the last image was received for the study plus the Inactivity Timeout period configured for your site.
Due By	The "Arrived" time plus the SLA value defined for the study's Priority.
Completed	The time the study was transitioned to (or past) the diagnostic status configured for your site to indicate completion.

Note the following:

- If there is no order associated with a study, the study will be considered "Routine" priority and the SLA will be whatever is currently configured for the Routine priority.
- If a new or updated order is associated with a study and that order contains a priority, the study Due In time will be updated.
- If a new image is received for a study that is not yet complete, the "Arrived" and "Due By" times will be updated.
- If a new Presentation State or Key Object is received for a study that is not yet complete, the "Arrived" and "Due By" times will be not be updated.
- Depending on how your site is configured, the "Arrived", "Due By" and "Study Completion" times will be not updated may or may not be updated if a new image arrives for a study that is complete.
- If a new PR or KO arrives for a study that is complete, the "Arrived" and "Due By" times will be not updated and the Study Complete value will not be cleared.

c. Availability Column

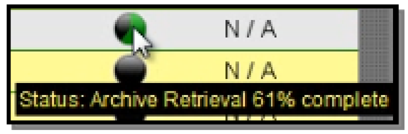
If Merge PACS has an archive configured, individual worklists can be configured to include an **Availability** column, as in the following example:



Availability Column

The Availability column shows an availability status indicator for each study. The appearance of the indicator indicates the availability of the study as follows:

Indicator	Color	Description
	Green	The study is available online for viewing.
	Black	The study is currently offline and not available for viewing.
	Blue	A request to retrieve the study has been submitted, but the retrieval process has not yet started.

Indicator	Color	Description
	**Black / Green**	The study is currently being retrieved from the archive. Note that the percentage of green shown will change to indicate the progress of the retrieval process. Hovering your mouse cursor over the indicator will cause the exact percentage to be shown in a tool-tip window, as in the following example:  **Retrieval Progress**
	**Orange**	Images for this study are currently being imported into Merge PACS for the first time or additional images are currently being added to an existing study.
	**Red**	Retrieval of the study from the archive has completed, but with errors (either fewer images were received than expected or all images failed compression)
	**Gray**	The availability of the study is currently unknown (this may occur during timeout or error scenarios). Clicking the **Availability** column header will refresh the data.

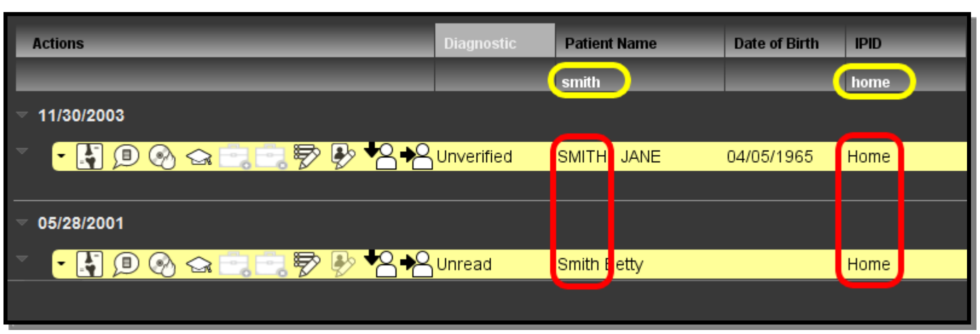
d. Sorting by Data Column

You can sort a worklist by clicking on any of the data column headings. Clicking on the column heading a second time will reverse the direction of sorting

NOTE: If the worklist is displayed in Worklist View as opposed to Patient List View, as described in 3.3.9 below, the data will be sorted separately within each status group and for each day and not for the entire worklist.

e. Searching within a Data Column

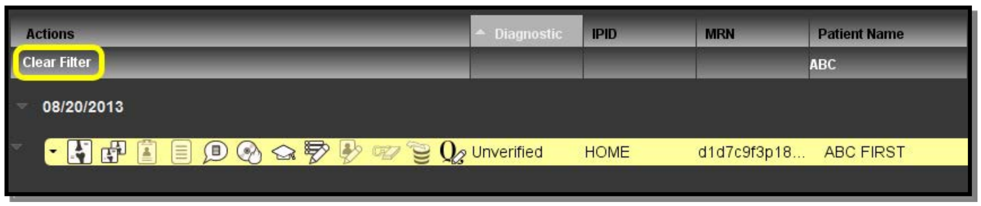
You can temporarily narrow the entries in a given worklist by entering text to be matched in the fields beneath one or more of the column headings, as in the following example:



Searching within Data Columns

- Filtering will occur as you enter the text; there is no need to press the **Enter** key.

- The search will match any part of the word or words in the column (*e.g.*, “smith” will match both “Gold**smith**” and “**Smith**field”).
- In general, the search will match the actual text in the column. For example, if dates are displayed in mm/dd/yyyy format and you want to filter the results by June 29, you will have to enter “06/29” instead of “June 29”.
- The search does, however, support word separation (e.g., entering “J Doe” and “Doe J” will both work to display “Jane Doe”, “Jessica Doe” and “Jonathan Doe”).
- You can filter by multiple columns at the same time by entering text in more than one fields, as in the example shown above.
- Filtering a worklist will cause the worklist count in the window title bar to be updated to match the number of studies currently being displayed.
- Once you have filtered on one or more columns, a new **Clear Filter** link will be displayed that will let you remove all filters and return to the original worklist display, as in the following example:



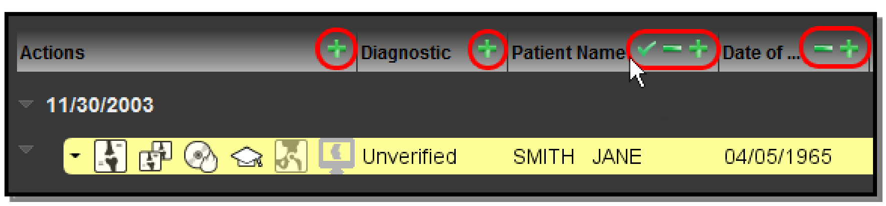
Clear Filter Link

f. Editing Data Columns

If desired, you can edit the display of any worklist to add or remove data columns, change the order in which the columns appear and/or change the width of one or more columns.

NOTE: Any change made to a worklist will only affect your view of that worklist and will not affect how other users view the same worklist. In addition, any future changes made to the underlying worklist by a PACS Administrator will not be reflected in your view of that worklist once you have made changes to it.

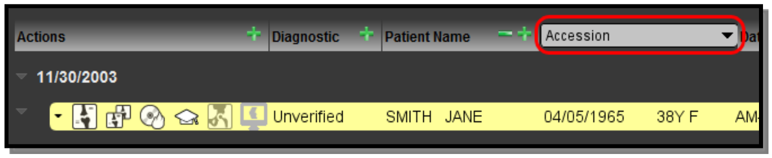
To enable editing of the data columns, **right**-click on any column heading to activate the column editing controls for all columns, as in the following example:



Column Editing Controls

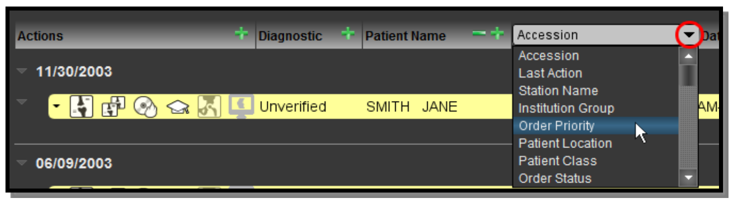
Once column editing has been enabled, you can do the following:

- To **remove** a column from the worklist display, click on the **Remove Column** icon, as displayed to the left, on that column's header. Note that the **Actions** and **Diagnostic** columns cannot be removed.
- To **add** a new column to the right of an existing column, click on the **Add Column** icon, as displayed to the left, on the column header to the left of where you would like the new column to appear. This will cause a new column to be displayed with a drop-down menu as a header, as in the following example:



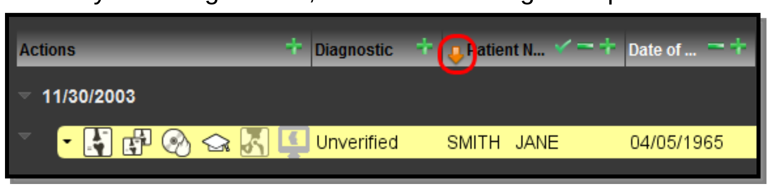
Newly Added Data Column

Click on the drop-down menu and select the desired column header, as in the following example:



Selecting Data Column to Add

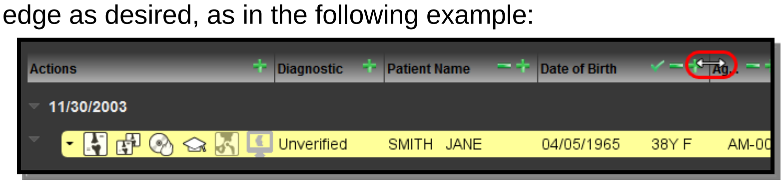
- To **move** a column to a different location, **left-**click on the column header and drag it to the desired location. As you are dragging the column header, its current location will be indicated by an orange arrow, as in the following example:



Moving a Column

When you release the mouse button, the column will be moved to the location indicated by the orange arrow.

- To **resize** a column, hover your mouse over the left or right edge of the column header until your mouse cursor changes to a special resize icon and then drag and drop the edge as desired, as in the following example:



Resizing a Column

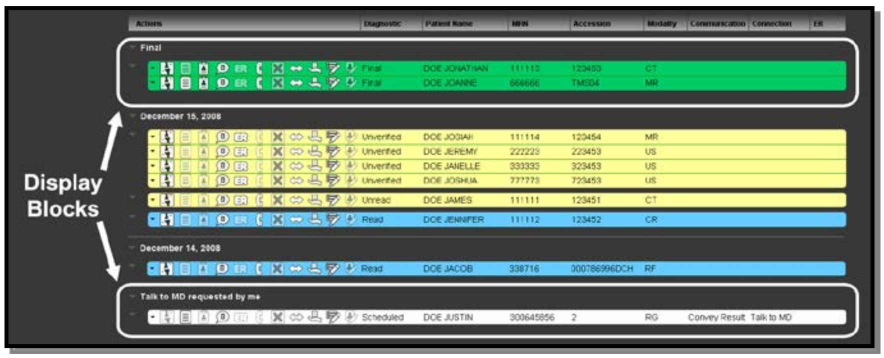
To save all changes that have been made to all columns, click on the **Commit Changes** icon, as displayed to the left, on any column header.

NOTE: If you want to cancel any changes that you have made before commiting them, you can temporarily select a different worklist or choose to reload all worklists, as described in paragraph 3.3.14 below.

NOTE: You can reset the default column settings for all worklists at any time from the **Worklist Right-click General Menu**, as described in subsection 3.3.8 below.

3.3.6. Display Blocks

Each worklist can be configured to have one or more “Display Blocks” at the top and/or bottom of the worklist to highlight certain studies/orders that have been deemed to be of special interest, as in the following example:



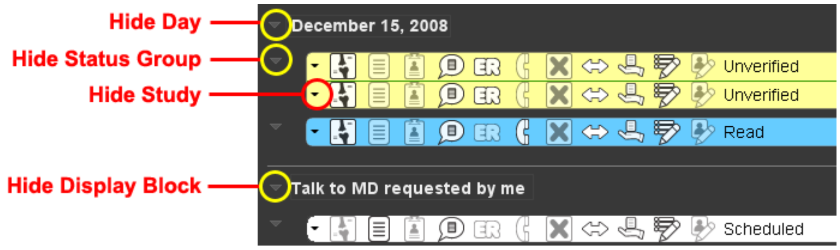
Display Blocks

Display Blocks can be configured by your PACS Administrator to include studies/orders that match specified status-based criteria. Your PACS Administrator can also configure whether each Display Block appears above or below the main section of the worklist.

NOTE: By default, studies/orders that appear in Display Blocks will not be displayed in the main section of the worklist unless your system has been configured to display them in both locations.

3.3.7. Hiding and Revealing Studies and Display Blocks

You can temporarily hide selected portions of a worklist by clicking on the small triangles on the left-hand side of the screen. Clicking on these triangles allows you to hide an individual study/order, a status group, an entire day's worth of studies, or a Display Block, as shown in the example below:



Hiding Parts of a Worklist

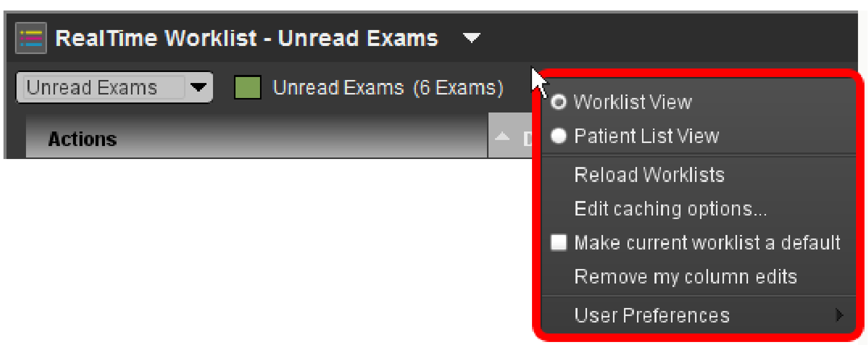
Click on the appropriate triangle a second time to reveal a study or group of studies that has been hidden.

3.3.8. Worklist Right-click Menus

There are two right-click menus available from within RealTime Worklist.

a. Worklist Right-click General Menu

The **Worklist Right-click General Menu** displays a number of options that apply to RealTime Worklist in general and is accessible by clicking anywhere above the currently displayed worklist with the **right** mouse button, as in the following example:



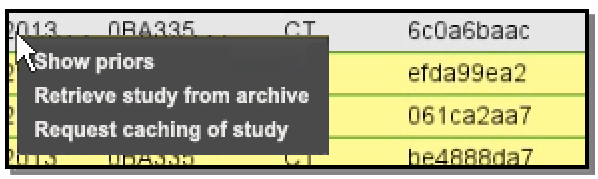
Worklist Right-click General Menu

The Worklist Right-click General Menu will display one or more of the following options, depending on your login privileges:

Option	General Description
Worklist View	Displays the worklist in default **Worklist View** mode, as described in subsection 3.3.9, below.
Patient List View	Displays the worklist in **Patient List View** mode, as described in subsection 3.3.9, below.
Reload Worklists	Reloads the currently displayed worklist, as described in subsection 3.3.14, below.
Edit Caching Options	Configure Workflow Accelerator properties, as described in subsection 3.3.11 below.
Make Current Worklist a Default	Sets the currently displayed worklist as the default worklist, as described in subsection 3.3.12 below.
Remove my column edits	Restores the display of all worklists to their default column settings (visibility, order, width).
User Preferences	Let you set your personal Viewer preferences, as described in Chapter 25 below.

b. Worklist Right-click Study Menu

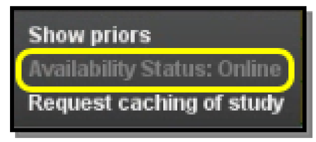
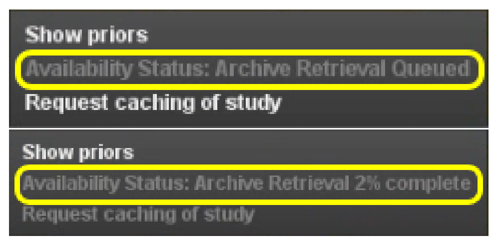
The **Worklist Right-click Study Menu** displays options that apply to a specific exam or study and is accessible by right-clicking anywhere on the worklist entry for that exam or study, as in the following example:



Worklist Right-click Study Menu

The Worklist Right-click Study Menu will display one or more of the following options, depending on your login privileges:

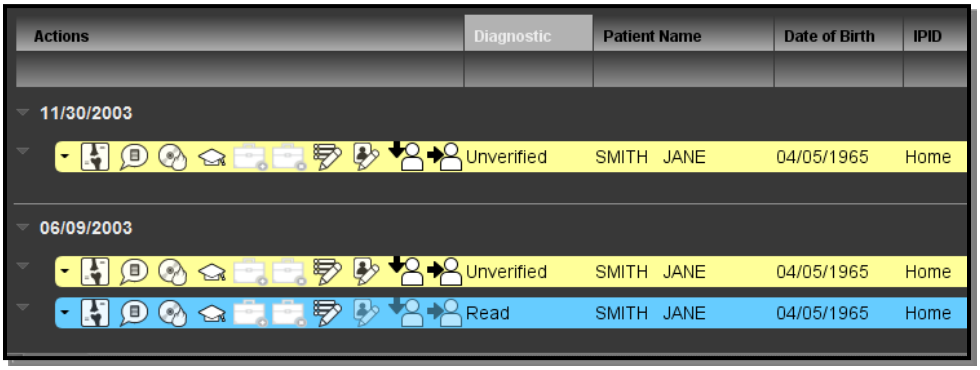
Option	General Description
Show [Hide] priors	Displays [or hides] prior exams, if any, for the selected study, as described in subsection 3.3.10, below.

Option	General Description
Retrieve study from archive [Availability Status]	If Merge PACS has an archive configured and the primary study is currently archived and not available online, submit an archive retrieval request for this study. Note the following: • This action is equivalent to clicking the **Retrieve from Archive** action icon, as described in subsection 3.3.4 above and would typically only be used if the Retrieve from Archive action icon is not enabled for a particular worklist. • If the study is currently online, the option will be grayed out and will read "**Availability Status: Online**", as in the following example:  **Study Is Online** • If a retrieval request has been submitted but not yet completed, the option will be grayed out and will display the current status of the retrieval process, as in the following example:  **Archive Retrieval Status**
Request caching of study	Manually request caching of the selected study's images, as described in subsection 3.3.11 below.

3.3.9. Changing Between Worklist and Patient List View

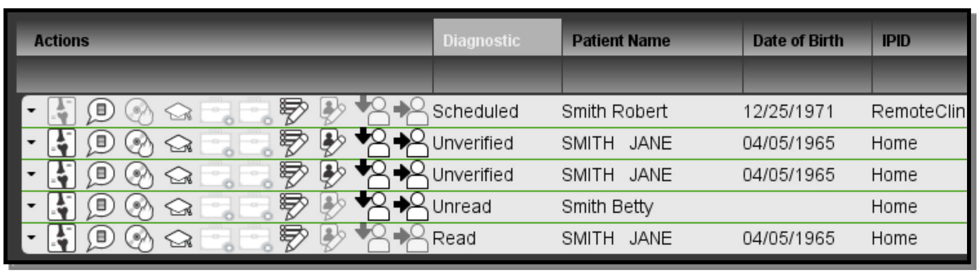
Depending on the type of worklist being viewed and how it has been configured, it will be displayed either in Worklist View mode or Patient List View mode:

- **Worklist View** divides the worklist into separate sections for each day with color-coding for various statuses, as in the following example:



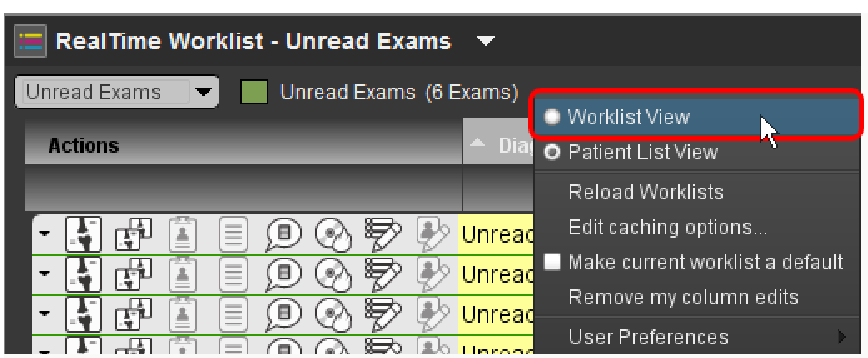
Worklist View

- **Patient List View** shows all the studies in the current worklist without them being grouped by day or color-coded for status, as in the following example:



Patient List View

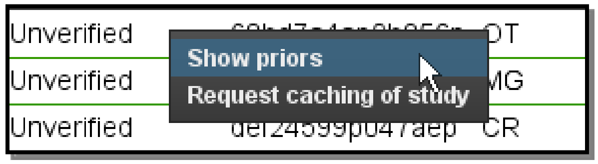
Regardless of how a worklist is displayed by default, however, you can select a different mode at any time from the RealTime Study List Right-click General Menu, as in the following example:



Selecting Worklist View

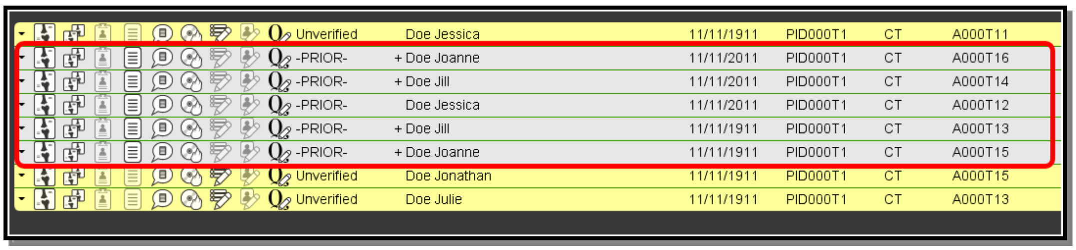
3.3.10. Viewing Prior Studies

If a particular study on a worklist has prior studies associated with it, you can add those prior studies to the worklist. This is done by clicking on the desired study with the **right** mouse button and then selecting the **Show Priors** option from the **Worklist Right-click Study Menu**, as shown in the following example:



Adding Prior Studies to Worklist

The prior studies, if any, will then be listed below the current study in the worklist, as shown in the example below:



Prior Studies in the Worklist

NOTE: Individual worklists can be configured by an Administrator to "automatically display priors." When this feature is enabled, all prior studies for a selected study will be displayed in the worklist when that study is opened into the Merge PACS Viewer, as described in Chapter 4 below.

NOTE: The list of prior studies displayed on the worklist is determined by the Patient Comparison Strategy and "Selection of Priors" option configured for your site, as described in Appendix C below.

You can remove the prior studies from the worklist by clicking on one of the priors with the **right** mouse button and selecting the **Hide Priors** option from the **Right-Click Worklist Menu**:

Hiding Prior Studies

3.3.11. Using Workflow Accelerator™

RealTime Worklist includes an optional feature called Workflow Accelerator™ that allows studies to be copied to and stored ("cached") on your computer's hard drive before you launch the study in the Merge PACS Viewer. This is especially beneficial in situations where network bandwidth is limited, such as when a user is reading studies from home with a cable or DSL connection.

If your particular worklist has the Workflow Accelerator option enabled, you can manually select to cache the images for a particular study prior to launching the Image Viewer. You can also configure your system to cache images automatically.

For users who are in a "spoke and hub" setup (*i.e.*, where patient images are sent from multiple "spoke" sites to a central "hub" and are then redistributed to the necessary locations for reading), the automatic caching option can be configured to first attempt to download the images from a nearby spoke site instead of waiting for the images to arrive at the hub.

NOTE: When automatic caching is enabled, Workflow Accelerator will not necessarily cache all studies on your worklist. Instead, it will only cache those studies that have a particular status type (or types) that is defined as part of your worklist. This is typically "unread" studies, but it can be custom configured by the Administrator who sets up your worklist.

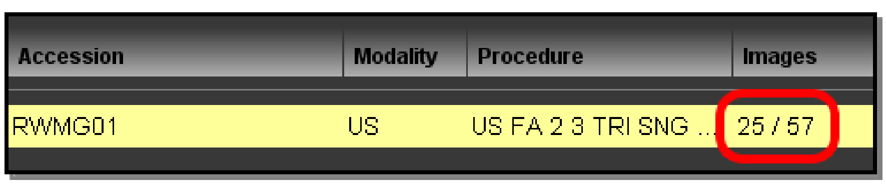
CAUTION: Studies that are hidden, as described in subsection 3.3.7 above, will not be cached.

a. Manually Caching Studies

If your particular worklist has the Workflow Accelerator option enabled, the **Right-Click Worklist Menu** will include an option to **Request Caching of Study** when you **right-click** on a specific study, as shown in the following example:

Manually Caching a Study's Images

If your worklist is configured to show the number of images in each study (*i.e.*, there is an "Images" column), the progress of the caching process will be displayed as shown in the following example:

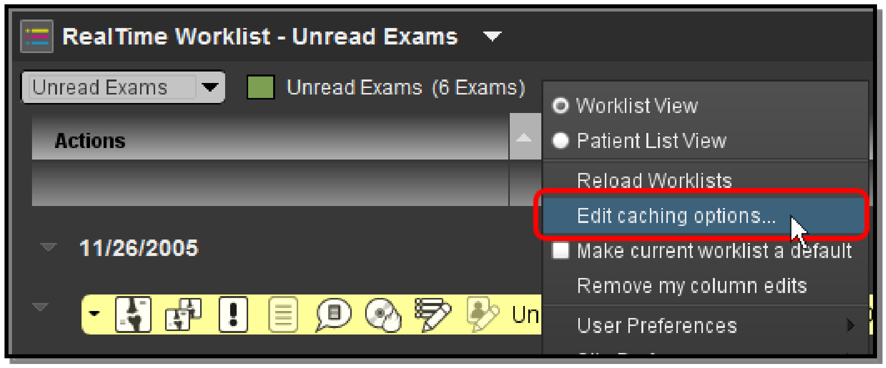


Caching Progress

In the example above, 25 out of 57 images for this study have been saved to the workstation's hard drive. When the count reaches 57/57, all images will have been cached.

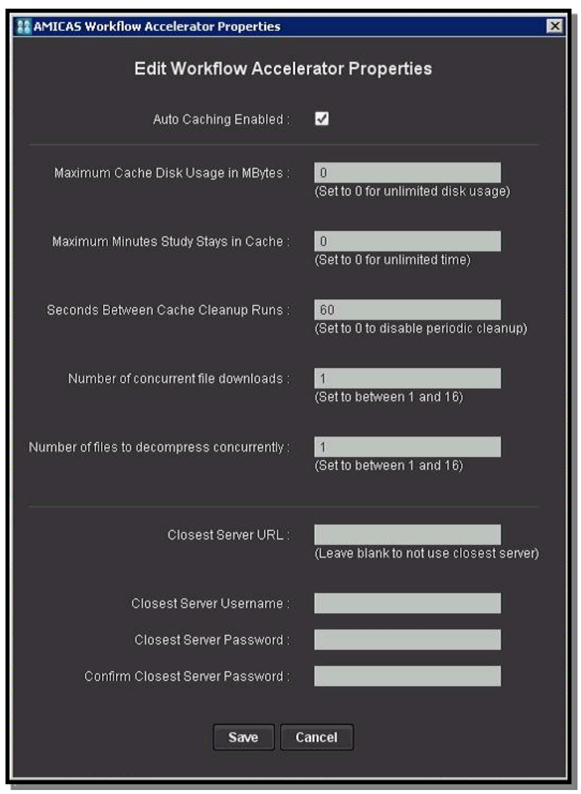
b. Automatically Caching Studies

If your worklist includes the Workflow Accelerator option, you can turn on the auto-caching feature by clicking anywhere above the worklist with the **right** mouse button and selecting **Edit caching options** from the **Right-Click Worklist Menu**, as shown in the following example:



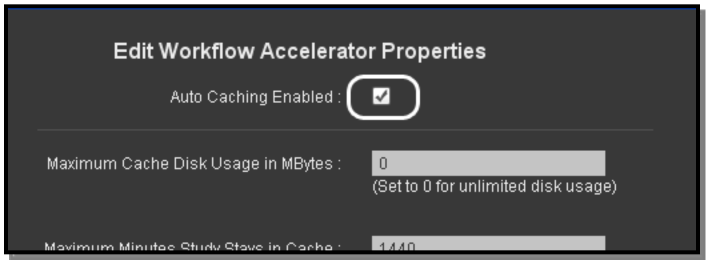
Editing the Caching Options for Workflow Accelerator

This will cause the **Workflow Accelerator Properties** pop-up window to be displayed, as in the following example:



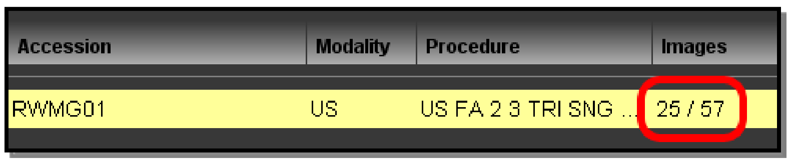
Workflow Accelerator Properties Window

To turn on automatic caching of images, click the check box next to **Auto Caching Enabled** at the top of the window:



Enabling Auto Caching

If your worklist is configured to show the number of images in each study (*i.e.*, there is an “Images” column), the progress of the caching process will now be displayed for each applicable study as shown in the following example:



Caching Progress

At the Workflow Accelerator Properties window, you can also customize how automatic caching will work on this workstation. The following properties can be changed or set as needed:

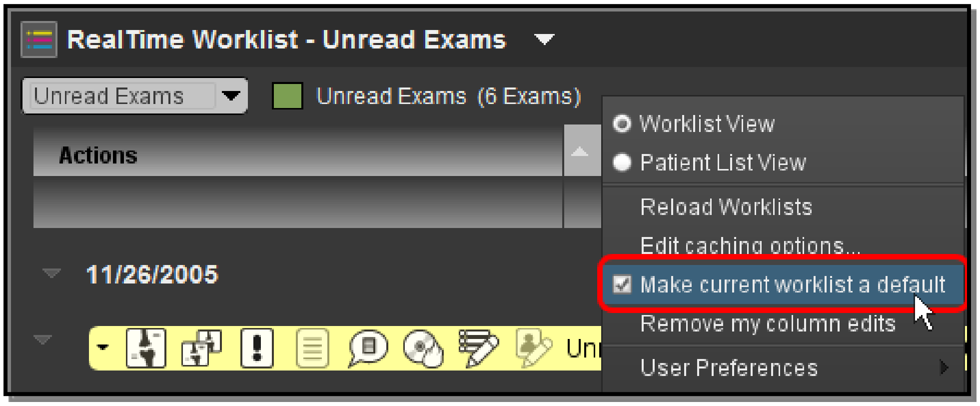
Option	General Description
Maximum Cache Disk Usage in MBytes	The default value of “0” will allow for unlimited disk storage (*i.e.*, studies will continue to be cached until your hard drive is full). If necessary, this can be changed to a specific amount. Note that a higher value will cause more disk space to be used, while a lower value will cause less disk space to be used.
Maximum Minutes Study Stays in Cache	Workflow Accelerator can be configured to automatically mark for removal studies that are older than a specified length of time based upon their study date and time, regardless of the amount of disk storage available. A value of “0” will provide for unlimited time. Note that a higher value will use more disk space, but should provide better perceived performance as more studies will be available immediately. Conversely, a lower value will use less disk space but could result in slower time-to-first image for studies that are older than the specified age.

Option	General Description
Seconds Between Cache Cleanup Runs	During each "cache cleanup run" Workflow Accelerator will delete studies that have been marked for removal. A value of "0" will disable this feature. Note that the lower the value, the more system resources will be devoted to determining what needs to be deleted, which may affect performance.
Number of concurrent file downloads	This controls how many concurrent file downloads are allowed for the Workflow Accelerator caching process. The maximum value allowable is calculated based on the number of internal processors on your workstation. Note that increasing the value will boost the rate of download for the cache, but will at the same time degrade interactive performance. Therefore, set this to the maximum that you can tolerate in terms of degradation in performance.
Number of files to compress concurrently	This controls how many concurrent file decompressions are allowed for the Workflow Accelerator caching process. The maximum value allowable is calculated based on the number of internal processors on your workstation. Note that increasing the value will boost the rate of download for the cache, but will at the same time degrade interactive performance. Therefore, set this to the maximum that you can tolerate in terms of degradation in performance.
Closest Server URL	If you want Workflow Accelerator to attempt to get studies from a local spoke server instead of the main hub, enter the spoke server's URL here.
Closest Server Username	If you have entered the URL of the closest server above, enter a valid username for a local Windows account on that server here.
Closest Server Password	If you have entered the URL of the closest server above, enter the login password for the local Windows account described above here.
Confirm Closest Server Password	If you have entered the URL of the closest server above, re-enter your login password for that server here.

When finished, click on the **Save** button to record your changes and exit the Workflow Accelerator Properties window, or click on the **Cancel** button to exit the Workflow Accelerator Properties window without saving your changes.

3.3.12. Setting a Default Worklist

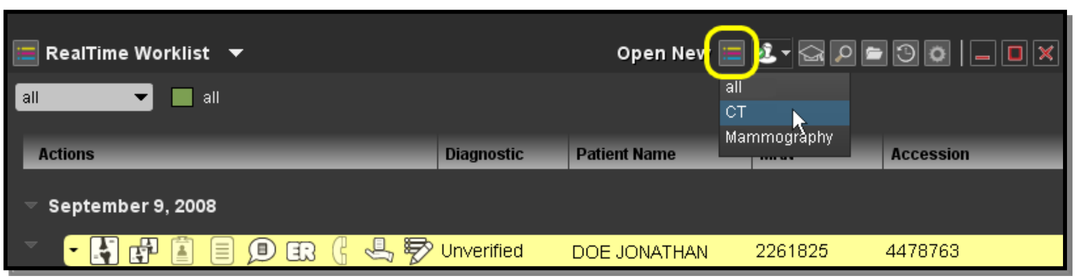
If you have multiple worklists available to you, you can select one worklist to be launched by default when you first access RealTime Worklist. To do this, first select the desired worklist from the drop-down menu of available worklists (as described in subsection 3.3.2 above), then click anywhere above the worklist with the **right** mouse button and then select **Make current worklist a default** from the **Worklist Right-Click Menu**, as shown in the following example:



Setting the Current Worklist as the Default

3.3.13. Opening Multiple Worklists

If desired, you can open additional worklists in their own separate windows. To do so, click on the **Open New Worklist** icon at the top right of the Workstation Browser and select the desired worklist from the drop-down menu, as in the following example:

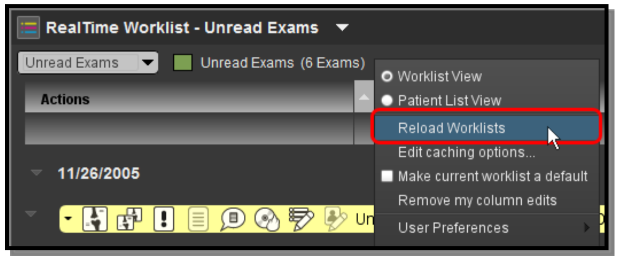


Opening a Worklist in a New Window

NOTE: When you open a study from a secondary worklist in the primary Viewer window, the content of the secondary worklist will be displayed within the Workstation Browser instead of the original worklist as long as that study is open. Once the study is closed in the primary Viewer window, the original worklist will once again display in the Workstation Browser.

3.3.14. Reloading a Worklist

If desired, you can manually refresh the worklist currently being viewed. To do so, click anywhere above the worklist with the **right** mouse button and then select **Reload Worklist** from the **Right-Click Worklist Menu**, as shown in the following example:



Reloading a Worklist

3.4. Teaching Worklists

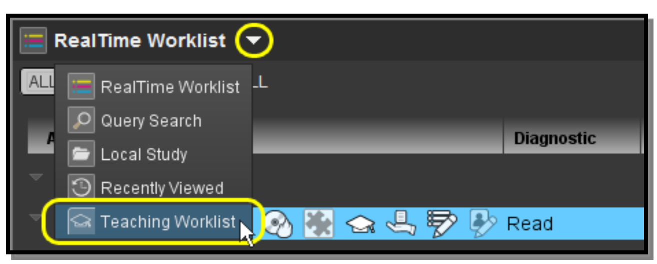
As described in Chapter 23 below, the optional Teaching Files feature lets you tag studies for later reference for teaching and/or conferencing purposes. These tagged studies can be located from the Query Search page, as described in Section 3.5 below, by searching on any of the study criteria or the special teaching tags that have been associated with those studies.

In addition, however, tagged studies can be associated with one or more “teaching” worklists that function like the RTWL worklists described in Section 3.3 above. These allow you to quickly access tagged studies without needing to search for them.

NOTE: If your site has the “Briefcase” option enabled, a default teaching worklist will be created for you automatically called “<*username*>’s briefcase” (the formatting of the actual name is configurable on a site-by-site basis). This worklist will initially be empty until you add studies to it.

3.4.1. Accessing Teaching Worklists

If you have the login privileges to access the Teaching Files feature, you can access the individual teaching worklists that are available to you by selecting **Teaching Worklist** from the drop-down menu at the top of the Workstation Browser, as in the following example:



Accessing Teaching Files

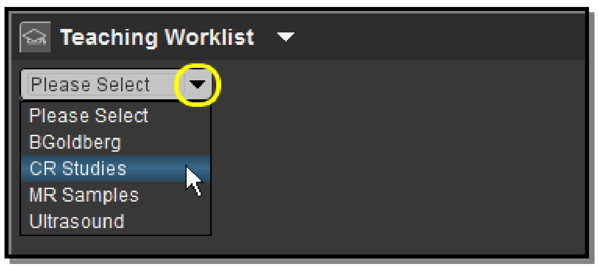
The Teaching Worklist screen will then be displayed within the Browser, as in the following example:

Teaching Worklist Screen

3.4.2. Selecting a Teaching Worklist

At the Teaching Worklist screen you can select a particular teaching worklist from the drop-down menu of available worklists in one of the following ways:

- Click on the down arrow to display a list of all available worklists, as in the following example, and then click on the desired worklist:



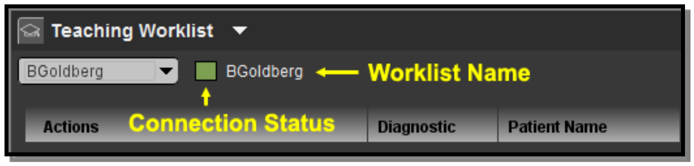
Displaying All Available Worklists

- If the list of available worklists is large, you can filter it to display only those worklists whose names contain certain characters by clicking on the field to the left to the drop-down menu arrow and entering one or more characters, as in the following example:

Filtering the Menu of Available Worklists

NOTE: If your site has the “Briefcase” option enabled, a default teaching worklist will be created for you automatically called “<*username*>’s briefcase.” This worklist will initially be empty until you add studies to it.

Once you have selected a worklist, the name of the worklist will be displayed near the top of the screen, together with a connection status light, as shown in the following example:



Worklist Connection Status

The color of the connection status light indicates the following:

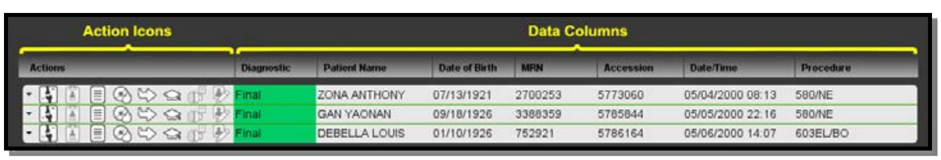
Color	Meaning
Red	Not yet connected to the selected teaching worklist
Green	Connected to the selected teaching worklist

3.4.3. Teaching Worklist Overview

Once you have selected a teaching worklist from the menu, the chosen worklist will be displayed as shown in the example below:

Viewing a Worklist

- By default, teaching worklists display studies in “Patient List” view, which is a combined list of patients that shows all the studies in the worklist without grouping them by day. This can be changed, however, as described in subsection 3.4.7 below.
- Each worklist entry contains a set of **action icons** on the left that you can click on to perform different tasks, and **data columns** on the right that display information about each study/order on the worklist, as shown in the following example:



Action Icons and Data Columns

NOTE: The actual action icons and data columns, the order the columns appear and the names of the possible diagnostic status options are all customizable by an Administrator and may vary from one worklist to another and one site to another.

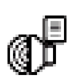
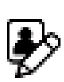
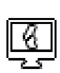
3.4.4. Action Icons

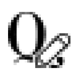
The following action icons are available on teaching worklists by default:

Icon	Name	General Description
	View Study	Load the selected study into the Merge PACS Viewer, as described in Chapter 4 below. You can also load a study into the Merge PACS Viewer by double-clicking anywhere in the Data Columns section of the worklist for a particular study. Note the following: • Once a study has been opened, its status on the Worklist will be changed to “In Use” and it will change color to alert other users that it is currently open by somebody else. • If Merge PACS has an archive configured and the primary study is currently archived and not available online, attempting to view a study will automatically trigger an archive retrieval request, as described in Chapter 17 below.
	View Orders and/or Comments	Launch the Order Viewer as a separate pop-up window with any orders and/or comments displayed. Note that the appearance of the icon will change depending on whether there is just an order associated with this study, just comments, or both: There is an order associated with this study. The most recent comment for this study was manually flagged by the commenter. There is an order associated with this study and the most recent comment for this study was manually flagged by the commenter. For more information on using the Order Viewer to view orders and view and/or enter comments, refer to Chapter 4.11 below.

NOTE: If there is no order or comment currently associated with this study, the Orders and Comments icon will be disabled. If you need to add a comment, you can do so from the **Technologist WorkPanel** or the **Comments Viewer**, depending on your login privileges.

Icon	Name	General Description
	View Report	Launch the Report Viewer as a separate pop-up window. For more information on using the Report Viewer, refer to Chapter 6 below.

Icon	Name	General Description
	**Launch Comment Viewer**	Launch the Comment Viewer as a separate pop-up window with any comments displayed. Note that the appearance of the icon will change as follows:  The study has one or more jailed images.  The study has no jailed images but the most recent comment has been manually flagged by the commenter.  The study has no jailed images and the most recent comment (if any) has not been manually flagged. This is the default icon. For more information on using the Order Viewer to view orders and view and/or enter comments, refer to Chapter 5 below. For details on viewing jailed images, refer to Chapter 18 below.
	**Burn CD**	Add the selected study (together with any priors) to the Burn CD dialog's Study List. Note that multiple studies from multiple patients can be added to the same Burn CD Study List. For details on burning patient images onto a CD, see Chapter 14 below.
	**Route Study**	Send the selected study to another available Merge PACS location (*i.e.*, a different Merge PACS Server or a local DICOM device. For details on routing studies, see 0 below.
	**Study Tagging**	Launch the **Study Tagging** window to change tags or assign this study to another teaching worklist. For more information on using tagging studies, refer to Chapter 23 below.
	**Quick Add to Default Teaching Worklist**	If you have the login privileges to access the optional Teaching Files feature, add this study to whichever Teaching Worklist (including Briefcase) is currently configured as your default Teaching Worklist.
	**Quick Remove from Current Worklist**	Remove this study from the Teaching Worklist (including Briefcase) you are currently viewing.
	**VoiceClip**	Listen to the audio annotation, if any, that has been recorded for this study. For details on using VoiceClip to listen to audio annotations, refer to Chapter 9 below.
	**Study Demographics**	Launch the Study Demographics window in a separate pop-up window that lets you view and edit patient and study demographic information for the selected study. For additional information on viewing and editing patient and study demographics, refer to Chapter 19 below.
	**View Study in iConnect Access Viewer**	If your system is configured to provide access to the iConnect® Access viewer, display the selected study within iConnect Access. For information on using iConnect Access, refer to the iConnect Access user documentation.

Icon	Name	General Description
	**Data Masking**	For studies that are on a Teaching Worklist, creates a copy of the study with certain personally identifiable Protected Health Information (PHI) about the study (including Patient Name, MRN, Accession Number) replaced with randomized data. For details on data masking studies on a Teaching Worklist, refer to subsection 3.4.7 below.
	**Retrieve from Archive**	If Merge PACS has an archive configured and this study is currently offline (*i.e.*, only available in the archive), submit a request to retrieve the study from the archive. Note the following: • Once an archive retrieval request has been submitted, the progress can be tracked from the **Availability** data column, as described in subsection 3.4.5.b below. • You can submit a retrieval request for multiple studies at the same time by clicking on the **Retrieve from Archive** icon for each study. The retrieval requests will be processed in the order it they were submitted. • If Merge PACS is configured with an archive, but the **Retrieve from Archive** action icon is not enabled for this worklist, you can still submit an archive retrieval request from the **Teaching Worklist Right-click Study Menu**, as described in subsection 3.4.6 below, or by clicking on the **View Study** or **View Study in Secondary Viewer** action icons for a study that is currently offline, as described in Chapter 17 below.
	**Open Study in QC Editor**	Open the study within the **Quality Control Editor**. Refer to the *Merge PACS 6.6 Quality Control Editor Users Guide* for more information.

NOTE: Any other action icon available for standard RTWL worklists may optionally be displayed on a teaching worklist, depending on how your system is configured. For more information on these icons, refer to subsection 3.3.4 above.

3.4.5. Data Columns

a. In General

The following data columns are displayed on teaching worklists by default:

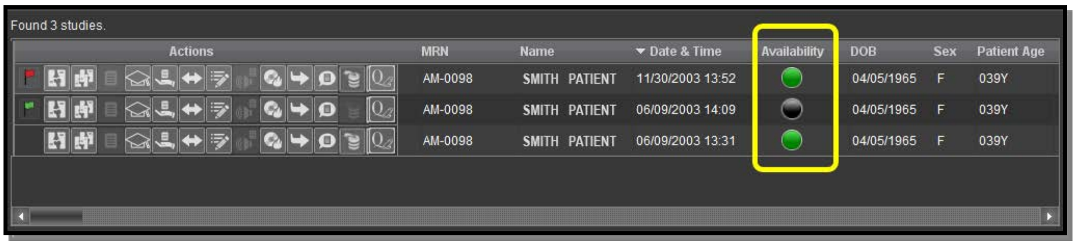
- **MRN**
- **Patient Name**
- **Age/Sex**
- **Procedure**
- **Date/Time**
- **Accession**

NOTE: Any other action data column available for standard RTWL worklists may optionally be displayed on a teaching worklist, depending on how your system is configured. For more information on these columns, refer to subsection 3.3.5 above.

NOTE: By default, teaching worklists are displayed in reverse chronological order, based on study Date/Time.

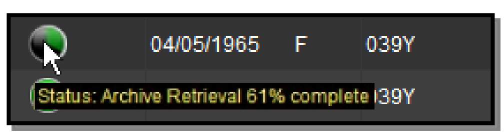
b. Availability Column

If Merge PACS has an archive configured, teaching worklists can be configured to include an **Availability** data column, as in the following example:



Availability Column

The Availability column shows an availability status indicator for each study. The appearance of the indicator indicates the availability of the study as follows:

Indicator	Color	Description
	**Green**	The study is available online for viewing.
	**Black**	The study is currently offline and not available for viewing.
	**Blue**	A request to retrieve the study has been submitted, but the retrieval process has not yet started.
	**Black / Green**	The study is currently being retrieved from the archive. Note that the percentage of green shown will change to indicate the progress of the retrieval process. Hovering your mouse cursor over the indicator will cause the exact percentage to be shown in a tool-tip window, as in the following example:  **Retrieval Progress**
	**Orange**	Images for this study are currently being imported into Merge PACS for the first time or additional images are currently being added to an existing study.
	**Red**	Retrieval of the study from the archive has completed, but with errors (either fewer images were received than expected or all images failed compression)

Indicator	Color	Description
	Gray	The availability of the study is currently unknown (this may occur during timeout or error scenarios). Clicking the **Availability** column header will refresh the data.

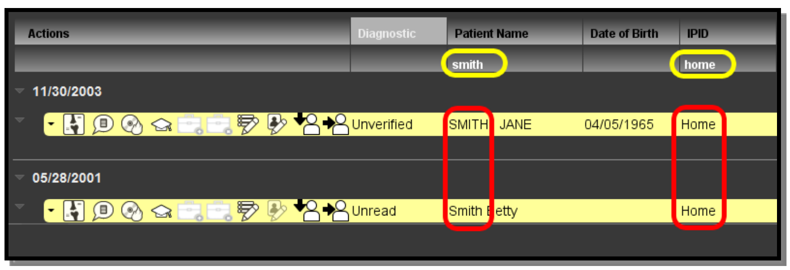
c. Sorting by Data Column

You can sort a worklist by clicking on any of the data column headings. Clicking on the column heading a second time will reverse the direction of sorting

NOTE: If the worklist is displayed in Worklist View as opposed to Patient List View, as described in 3.4.8 below, the data will be sorted separately within each status group and for each day and not for the entire worklist.

d. Searching within a Data Column

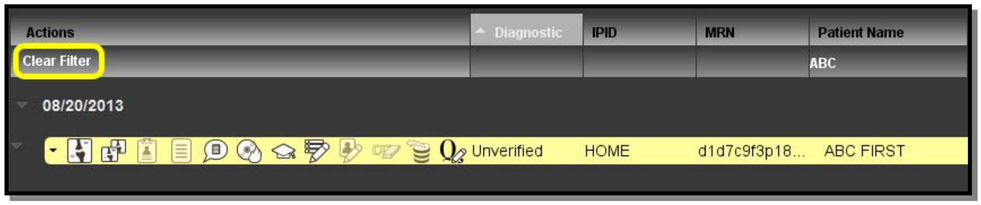
You can temporarily narrow the entries in a given worklist by entering text to be matched in the fields beneath one or more of the column headings, as in the following example:



Searching within Data Columns

- Filtering will occur as you enter the text; there is no need to press the **Enter** key.
- The search will match any part of the word or words in the column (*e.g.*, “smith” will match both “Gold**smith**” and “**Smith**field”).
- In general, the search will match the actual text in the column. For example, if dates are displayed in mm/dd/yyyy format and you want to filter the results by June 29, you will have to enter “06/29” instead of “June 29”.
- The search does, however, support word separation (e.g., entering “J Doe” and “Doe J” will both work to display “Jane Doe”, “Jessica Doe” and “Jonathan Doe”).
- You can filter by multiple columns at the same time by entering text in more than one fields, as in the example shown above.
- Filtering a worklist will cause the worklist count in the window title bar to be updated to match the number of studies currently being displayed.

- Once you have filtered on one or more columns, a new **Clear Filter** link will be displayed that will let you remove all filters and return to the original worklist display, as in the following example:



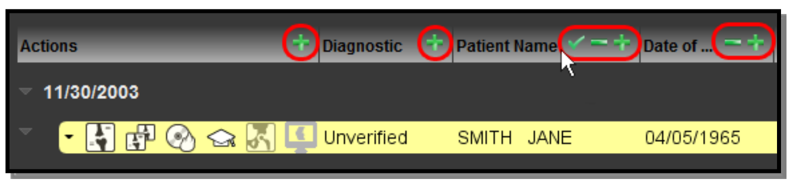
Clear Filter Link

e. Editing Data Columns

If desired, you can edit the display of any worklist to add or remove data columns, change the order in which the columns appear and/or change the width of one or more columns.

NOTE: Any change made to a Teaching worklist will only affect your view of that worklist and will not affect how other users view the same worklist. In addition, any future changes made to the underlying worklist by a PACS Administrator will not be reflected in your view of that worklist once you have made changes to it.

To enable editing of the data columns, **right**-click on any column heading to activate the column editing controls for all columns, as in the following example:

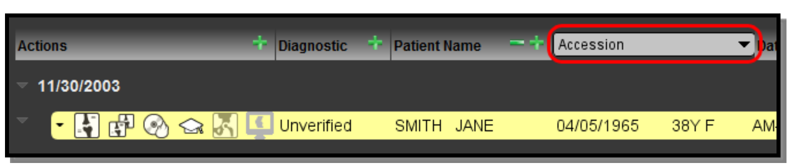


Column Editing Controls

Once column editing has been enabled, you can do the following:

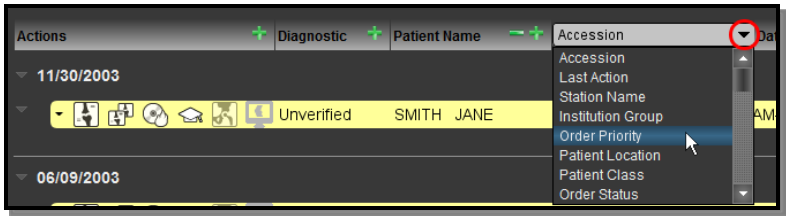
To **remove** a column from the worklist display, click on the **Remove Column** icon, as displayed to the left, on that column's header. Note that the **Actions** and **Diagnostic** columns cannot be removed.

To **add** a new column to the right of an existing column, click on the **Add Column** icon, as displayed to the left, on the column header to the left of where you would like the new column to appear. This will cause a new column to be displayed with a drop-down menu as a header, as in the following example:



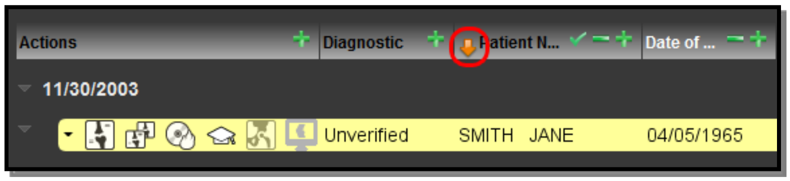
Newly Added Data Column

Click on the drop-down menu and select the desired column header, as in the following example:



Selecting Data Column to Add

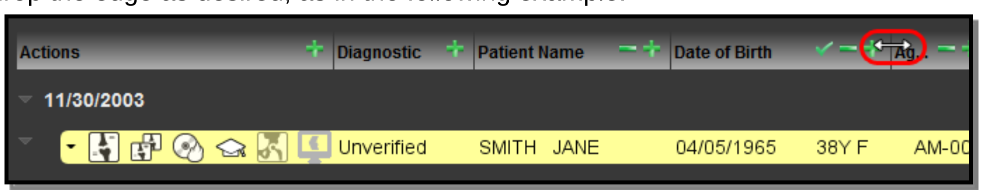
- To **move** a column to a different location, **left-**click on the column header and drag it to the desired location. As you are dragging the column header, its current location will be indicated by an orange arrow, as in the following example:



Moving a Column

When you release the mouse button, the column will be moved to the location indicated by the orange arrow.

- To **resize** a column, hover your mouse over the left or right edge of the column header until your mouse cursor changes to a special resize icon and then drag and drop the edge as desired, as in the following example:



Resizing a Column

To save all changes that have been made to all columns, click on the **Commit Changes** icon, as displayed to the left, on any column header.

NOTE: If you want to cancel any changes that you have made before commiting them, you can temporarily select a different worklist or choose to reload all worklists, as described in paragraph 3.3.14 above.

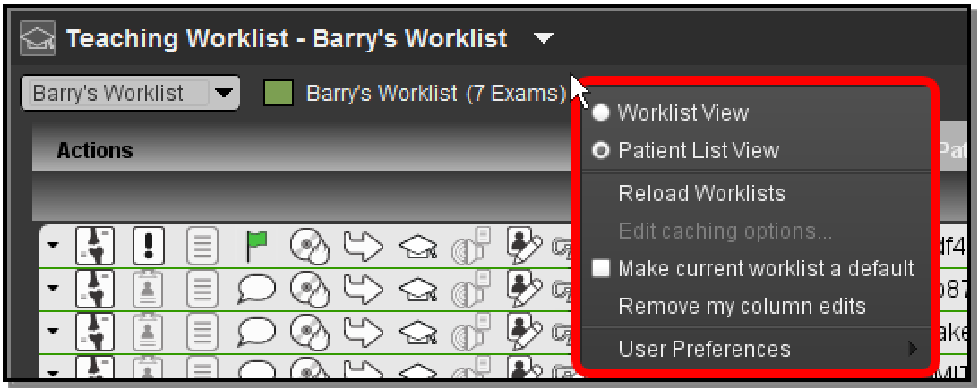
NOTE: You can reset the default column settings for all worklists at any time from the **Teaching Worklist Right-click General Menu**, as described in subsection 3.4.6 below.

3.4.6. Teaching Worklist Right-click Menus

There are two right-click menus available from within Teaching Worklists.

a. Teaching Worklist Right-click General Menu

The **Teaching Worklist Right-click General Menu** displays a number of options that apply to Teaching Worklists in general and is accessible by clicking anywhere above the currently displayed worklist with the **right** mouse button, as in the following example:



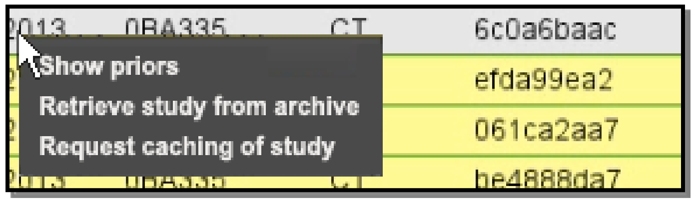
Teaching Worklist Right-click General Menu

The Teaching Worklist Right-click General Menu will display one or more of the following options, depending on your login privileges:

Option	General Description
Worklist View	Displays the worklist in default **Worklist View** mode, as described in subsection 3.4.7 below.
Patient List View	Displays the worklist in **Patient List View** mode, as described in subsection 3.4.7 below.
Reload Worklists	Reloads the currently displayed worklist, as described in subsection 3.4.13 below. Also updates the list of teaching worklists in the drop-down menu, as described in subsection 3.4.2 above.
Edit Caching Options	Configure Workflow Accelerator properties, as described in subsection 3.3.11 above.
Make Current Worklist a Default	Sets the currently displayed worklist as the default teaching worklist, as described in subsection Note: below.
Remove my column edits	Restores the display of all worklists to their default column settings (visibility, order, width).
User Preferences	Let you set your personal Viewer preferences, as described in Chapter 25 below.

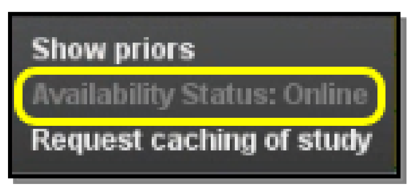
b. Teaching Worklist Right-click Study Menu

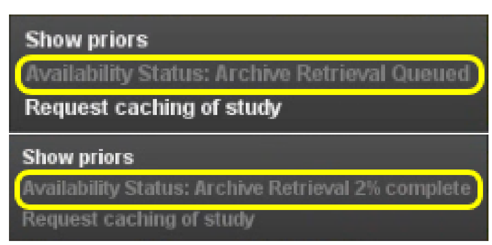
The **Teaching Worklist Right-click Study Menu** displays options that apply to a specific exam or study and is accessible by right-clicking anywhere on the entry for that exam or study, as in the following example:



Teaching Worklist Right-click Study Menu

The Teaching Worklist Right-click Study Menu will display one or more of the following options, depending on your login privileges and how the worklist is configured:

<table>
<tr><th>Option</th><th>General Description</th></tr>
<tr><td>Show [Hide] priors</td><td>Displays [or hides] prior exams, if any, for the selected study, as described in subsection 3.4.9 below.</td></tr>
<tr><td>Retrieve study from archive [Availability Status]</td><td>If Merge PACS has an archive configured and the primary study is currently archived and not available online, submit an archive retrieval request for this study.
Note the following:
• This action is equivalent to clicking the Retrieve from Archive action icon, as described in subsection 3.4.4 above and would typically only be used if the Retrieve from Archive action icon is not enabled for a particular worklist.
• If the study is currently online, the option will be grayed out and will read “Availability Status: Online”, as in the following example:


Study Is Online
• If a retrieval request has been submitted but not yet completed, the option will be grayed out and will display the current status of the retrieval process, as in the following example:


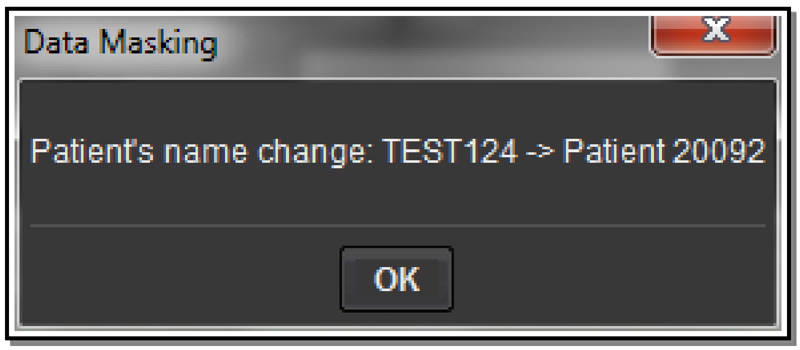
Archive Retrieval Status</td></tr>
</table>

Option	General Description
Request caching of study	Manually request caching of the selected study's images, as described in subsection 3.3.11 above.

3.4.7. Data Masking

Once a Study has been added to a Teaching Worklist, you can create a copy of that study with certain personally identifiable Protected Health Information (PHI) about the study (including Patient Name, MRN, Accession Number) replaced with randomized data by clicking on the **Data Masking** icon on the Teaching Worklist, as illustrated to the left.

When you click on the Data Masking Study icon for a particular study on a Teaching Worklist, a confirmation window will be displayed, as in the following example:



Data Masking Confirmation

The following patient information will be masked (*i.e.*, replaced with non-identifiable information):

- **Study Instance UID**
- **Series Instance UID**
- **SOP Instance UID**
- **Accession Number**
- **Institution Name**
- **Referenced SOP Instance UID**
- **Study Presentation Step Info**
- **Referring Physician**
- **Patient Name**
- **Patient ID**
- **Patient Birth Date**
- **Series Date**
- **Spine Label Set**
- **Series Time**
- **Study Date**
- **Study Time**
- **Content Date**
- **Content Time**
- **Viewer Layout Information**

NOTE: Date values will be shifted so that the relationship between them will remain constant.

CAUTION: **Although any Presentation States in the study will also be masked, this does not include the content of text annotations.**

In addition, the following patient information will be removed entirely:

- **Institution Address**
- **Physicians Of Record**
- **Physicians Of Record ID Sequence**
- **Performing Physician Name**
- **Performing Physician ID Sequence**
- **Name Of Physician Reading Study**
- **Physician Reading Study ID Sequence**
- **Issuer Of Patient ID**
- **Other Patient IDs**
- **Other Patient Names**
- **Other Patient IDs Sequence**
- **Patient Birth Name**
- **Patient Address**
- **Insurance Plan Identification**
- **Patient Mother Birth Name**
- **Responsible Person**
- **Acquisition Date**
- **Acquisition Time**
- **Admitting Date**
- **Admitting Time**
- **Overlay Date**
- **Overlay Time**
- **Performed Procedure Step Date**
- **Performed Procedure Step Time**
- **Scheduled Procedure Step Start Date**
- **Scheduled Procedure Step Start Time**
- **Scheduled Procedure Step End Date**
- **Scheduled Procedure Step End Time**

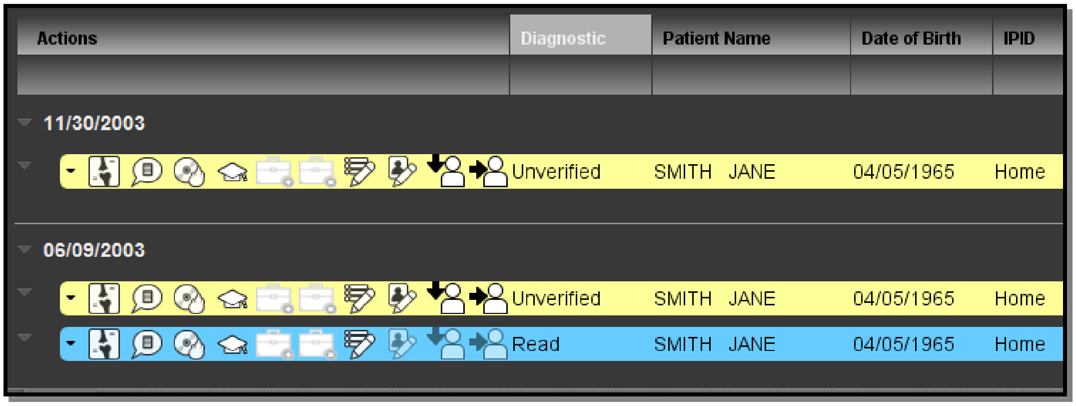
NOTE: When you perform data masking on a study, a copy of that study is created and saved to the Teaching Worklist. The original study on the originating worklist is not affected.

NOTE: Additional patient information may also be masked or deleted depending on how your system has been configured.

CAUTION: **There are standard locations for patient information in the DICOM header of images and the Data Masking tool supports these standard locations. However, patient information may also frequently be hidden in non-standard locations or private tags as well as burned into the pixel data by the modality device or other systems. It is the user's responsibility to inspect, scrutinize and verify the newly masked images in the image area as well as the DICOM headers including both "public"/ standard tags as well as "private"/non-standard tags.**

3.4.8. Worklist View

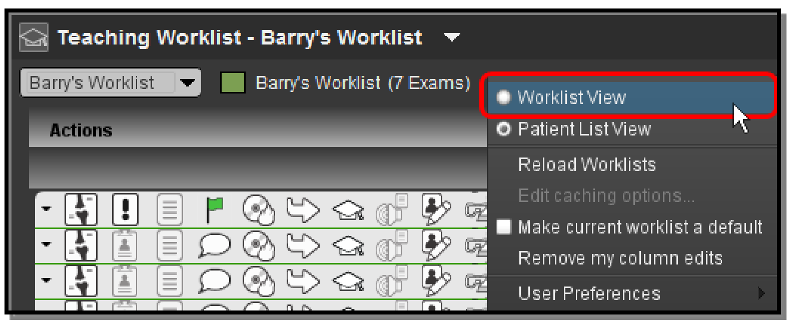
In addition to the default Patient List view, you can also choose to display a teaching worklist in Worklist View, as in the following example:



Worklist View

Worklist View divides studies into separate sections for each day. The studies for each day are, in turn, divided into separate groups according to their current status.

- To display a Teaching Worklist in Worklist View, select the **Worklist View** option from the **Teaching Worklist Right-Click Menu**, as in the following example:



Selecting Worklist View

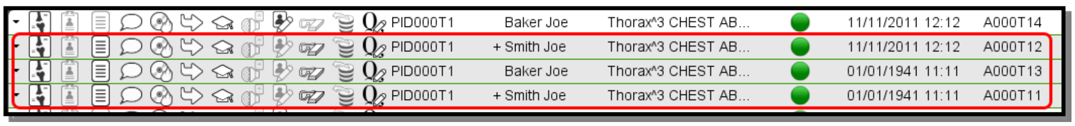
- To return to Patient List View, select **Patient List View** from the **Right-Click Teaching Worklist Menu**.

3.4.9. Viewing Prior Studies

If a particular study on a teaching worklist has prior studies associated with it, you can add those prior studies to the worklist. This is done by clicking on the desired study with the **right** mouse button and then selecting the **Show Priors** option from the **Teaching Worklist Right-click Study Menu**, as shown in the following example:

Adding Prior Studies to Worklist

The prior studies, if any, will then be listed below the current study in the worklist, as shown in the example below:



Prior Studies in the Teaching Worklist

NOTE: Individual worklists can be configured by an Administrator to "automatically display priors." When this feature is enabled, all prior studies for a selected study will be displayed in the worklist when that study is opened into the Merge PACS Viewer, as described in Chapter 4 below.

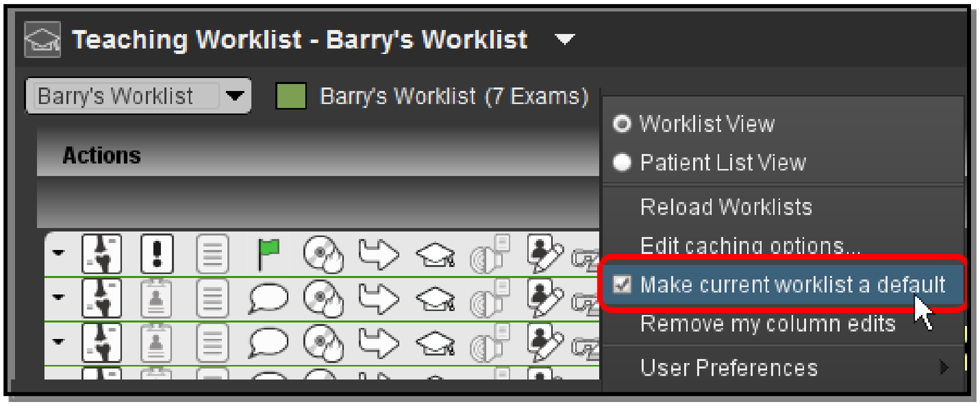
NOTE: The list of prior studies displayed on the worklist is determined by the Patient Comparison Strategy and "Selection of Priors" option configured for your site, as described in Appendix C below.

You can remove the prior studies from the worklist by clicking the **right** mouse button and selecting the **Hide Priors** option from the **Right-Click Worklist Menu**:

Hiding Prior Studies

3.4.10. Setting a Default Teaching Worklist

If you have multiple teaching worklists available to you, you can select one worklist to be launched by default when you first access the Teaching Worklist screen. To do this, first select the desired worklist from the drop-down menu of available worklists (as described in subsection 3.4.2 above), then click anywhere above the worklist with the **right** mouse button and select **Make current worklist a default** from the **Teaching Worklist Right-Click Menu**, as shown in the following example:



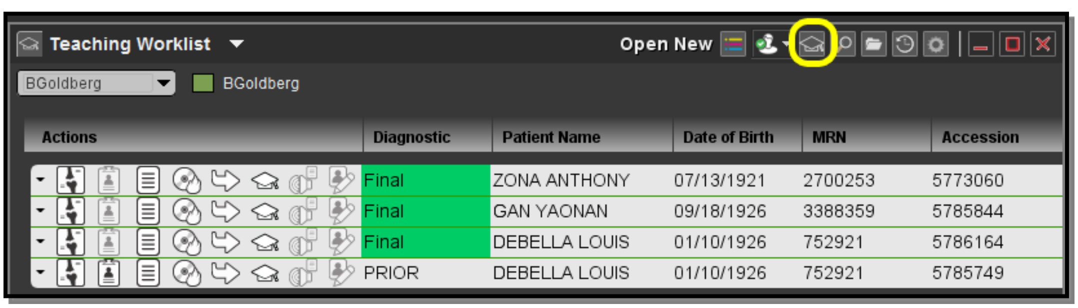
Setting the Current Worklist as the Default

3.4.11. Using Workflow Accelerator™ with Teaching Worklists

Workflow Accelerator works with teaching worklists exactly the same way as it does with RTWL worklists. For detailed information, refer to subsection 3.3.11 above.

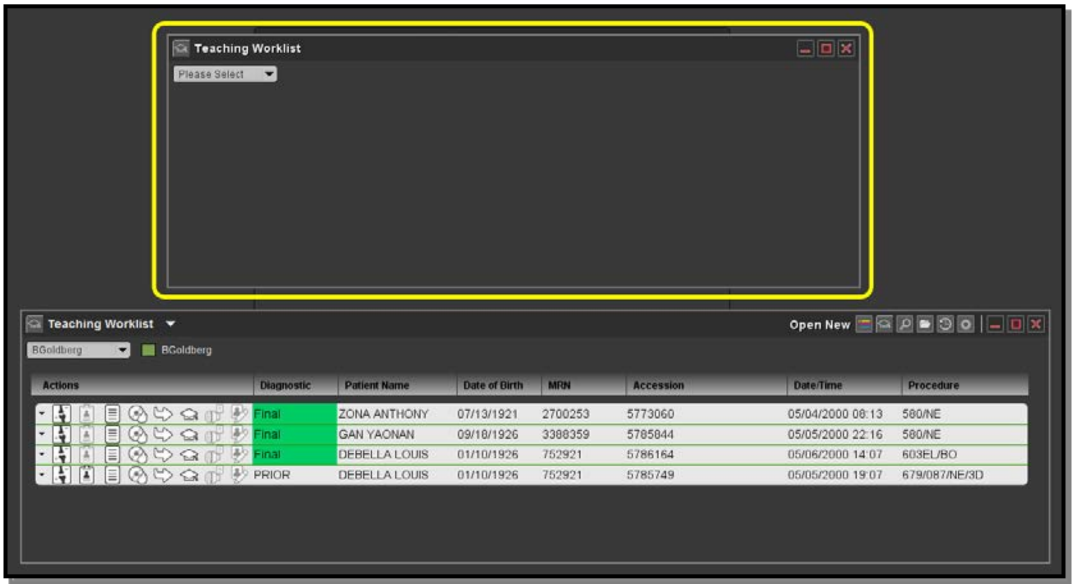
3.4.12. Opening Multiple Teaching Worklists

If desired, you can open additional teaching worklists in their own separate windows. To do so, click on the **Open New Teaching Worklist** icon at the top right of the Workstation Browser, as in the following example:



Opening a Worklist in a New Window

This will cause a separate Teaching Worklist screen to appear in a separate window, as in the following example:

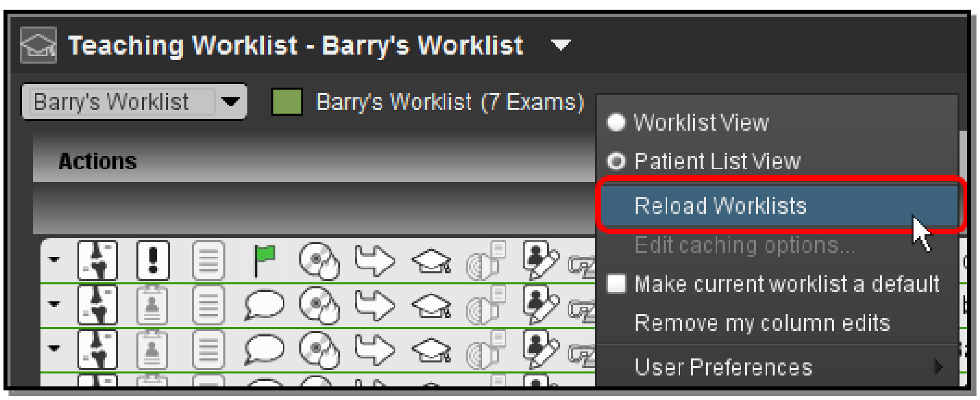


Separate Teaching Worklist Window

At the new window you can select the desired worklist from the drop-down menu as with the main Teaching Worklist screen.

3.4.13. Reloading a Teaching Worklist

If desired, you can manually refresh the worklist currently being viewed. To do so, click anywhere above the worklist with the **right** mouse button and then select **Reload Worklists** from the **Right-Click Worklist Menu**, as shown in the following example:



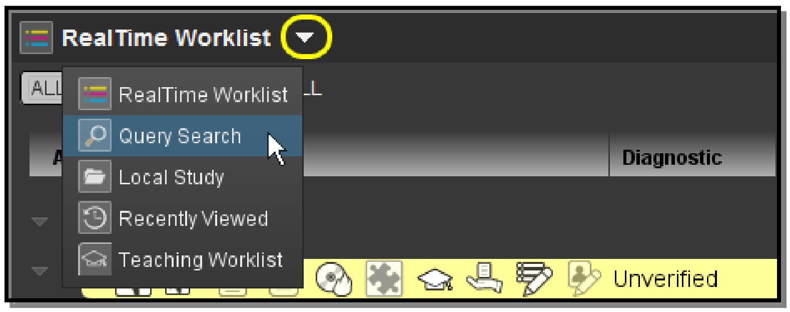
Reloading a Worklist

3.5. Query Search

The Merge PACS Query Search feature allows you to enter a variety of search parameters, including patient name, study accession number, referring physician, most recent studies sent to the system, etc. Once you have entered the desired search parameter, you will then be shown a list of matching studies and can then select the particular study you wish to view.

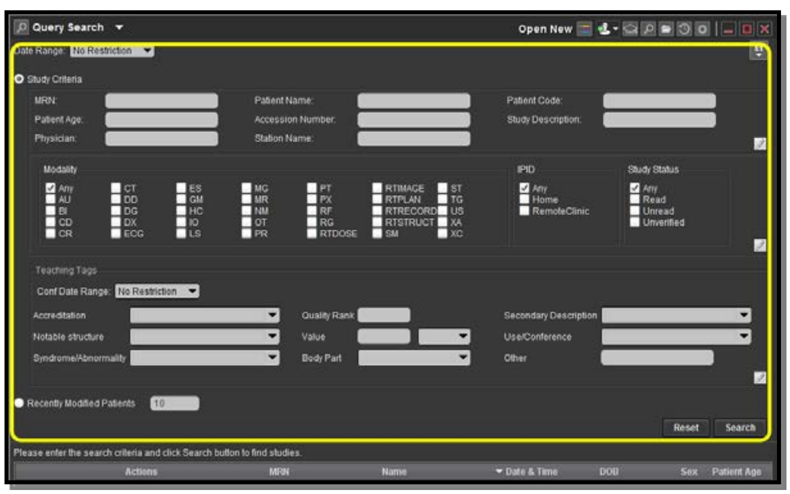
If your system includes the optional Merge Archive component, you can also use Query Search to locate patient images that are no longer currently stored on Merge PACS but that have been moved offline to tape storage for backup or disaster recovery purposes.

Query Search is accessible from the Merge PACS Browser by selecting **Query Search** from the drop-down menu at the top of the Workstation Browser, as in the following example:



Accessing the Query Search

The Query Search fields will then be displayed at the top of the Browser window, as in the following example:



Query Search Fields

NOTE: The actual appearance of the Query Search page will vary, based on the way your site is configured, the fields you have personally configured to be displayed (as described in paragraph d below) and whether you have privileges to access optional features.

If you use the Windows docking feature to dock the Query Search page to the left or right half of a monitor (*i.e.*, by clicking on the page's title bar and dragging it all the way to the left or right of the screen), the Query Search page will be displayed similar to the following example:

Query Search Page with Half Screen Docking

NOTE: The docking feature is not supported in Merge PACS 6.6 with Windows 8.1.

3.5.1. Entering Search Criteria

The following types of search criteria can be entered at the Query Search Page in order to locate a particular patient:

- **Date Range**
- **Study Criteria** (including **Teaching Tags**, if available)
- **Recently Modified Patients**

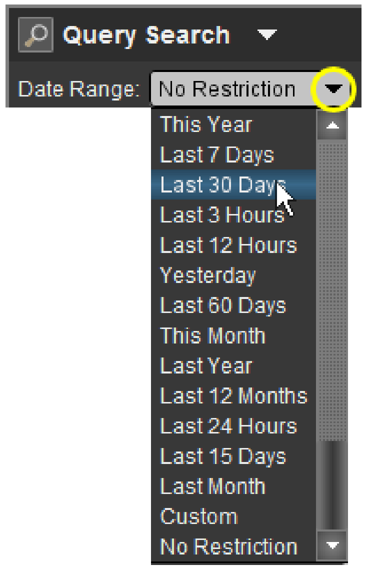
You can also specify which of the available Study Criteria query fields you want to display.

a. Restricting a Query by Date

Once you have entered one or more search criteria, as described above, you can optionally restrict your query to particular time frame using the **Date Range** fields at the top of the query Search Page, as shown below:

Date Range Restriction

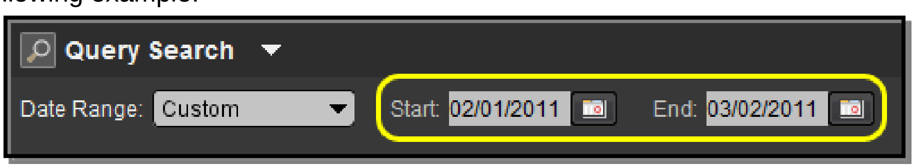
- Select an item from the drop-down “Date Range” menu:



Entering a Date Restriction

NOTE: The actual values that appear in the Date Range menu are configurable on a site-by-site basis.

- If you selected **Custom**, you can then enter a start and/or an end date, as in the following example:



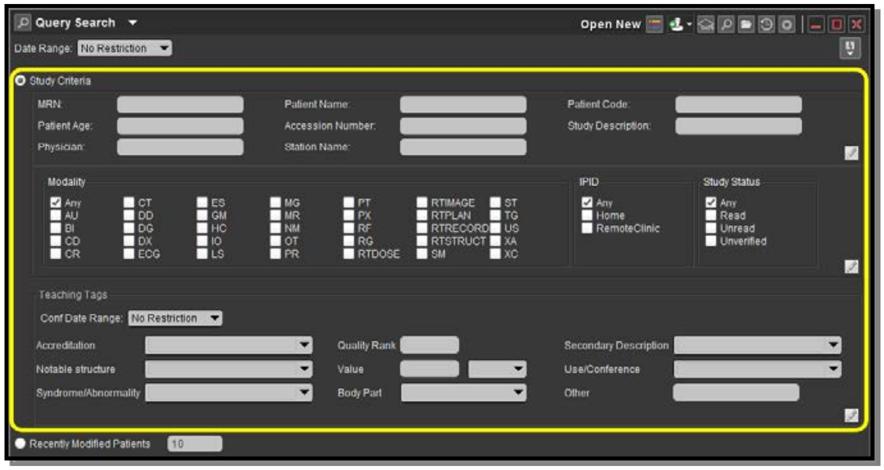
Entering a Date Restriction

  - Dates should be entered in whatever format is currently configured for your site. Contact your PACS Administrator to find out what format is being used.

- You can also click on the calendar icon to the right of either date field to bring up a calendar window that will let you select the desired date instead of manually typing it in.

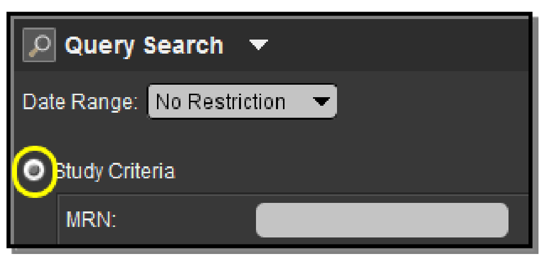
b. Searching by Study Criteria

The middle section of the Query Search Page contains fields that can be used to narrow your search according to a variety of different study attributes, as in the following example:



Study Criteria Search Fields

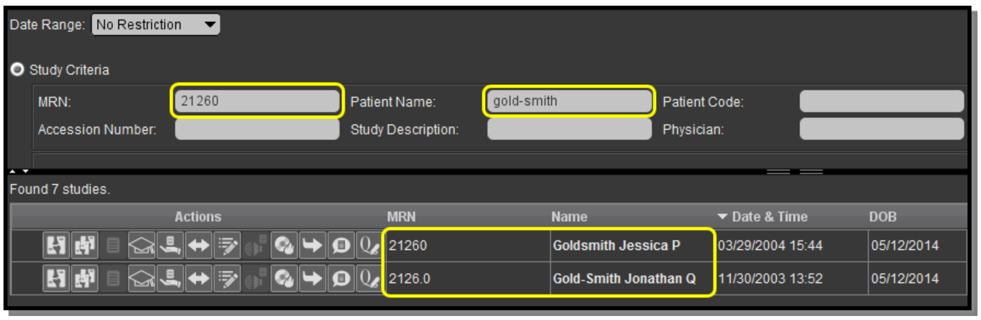
- The actual fields that appear in the Study Criteria section are configurable on a site-by-site basis and can also be personally configured, as described in subsection d below.
- The various **Teaching Tags** fields let you search for studies that have been tagged as teaching files (as described in Chapter 23 below) and will only be available if you have the login privileges to access the optional Teaching Files feature.
- To use the Study Criteria fields, the **Study Criteria** radio button must be selected, as shown below:



Enabling Study Criteria Search Fields

NOTE: You cannot use this option in conjunction with the **Recently Modified Patients** option described below.

- Any alphanumeric characters can be entered for **Patient Name**, **MRN**, **Physician**, **Accession Number**, **Study Description**, and **Station Name** fields. In addition, you can use * or % as wildcard characters in these fields to fill in for letters or numbers you are unsure of. For example:
  - "**B*K**" would find "Black, John" as well as "Beckman, Timothy" and "Brown, Kelly."
  - "***SMITH**" would find both "Goldsmith, David" and "DrSmith, Robert J."
  - "***B*G**" would find both "Goldberg, Benjamin" and "Cable, George."
- If searching by **MRN**, **Patient Name**, **Physician** or **Study Description**, bear in mind that the search will match based on the "normalized" (*i.e.*, with non alpha-numeric characters removed) versions of the data. As a result, a search for an MRN of "21260" will locate a patient with an MRN of 21260 as well as a patient with an MRN of 2126.0, since the search will ignore the period. Similarly, a search for a Patient Name of "Gold-Smith" will also locate a patient with the name Goldsmith. Note, however, that the search results will display the original values so you can verify that the correct patient is selected, as in the following example:



Searching with Normalized Data

- If searching by **Patient Name** or **Physician**, you can enter the name you are searching for in the format **"last name, first name**" or simply enter the **last name** to find all people with that last name.
  - An "**implicit** wildcard" is automatically added to the **end** of your query, meaning that "**BL**" would find "Black, John" as well as "Blake, James" and "**B**" would find all people whose last name begins with the letter "B."
  - You can also manually insert one or more asterisks [*****] as wildcard characters to fill in for letters you are unsure of at the beginning or middle of a name, as described above.
  - Names are stored in the Merge PACS database in whatever format they arrive from the DICOM modality and/or the HIS/RIS. Typically, this format is **last name**, **first name**, **middle name (or initial)**, **prefix**, **suffix**, meaning that "Dr. John Q. Smith" would be stored as "SmithJohnQDr." This practice can vary from site to site, however, and may affect how wildcard searches work for you. Some sites, for example, may append the **prefix** at the beginning of the name (*e.g.*, "DrSmithJohnQ"). If you have any questions about how names are stored at your site, talk to your Merge PACS Administrator.
- An "implicit wildcard" is also automatically added to the **start** and **end** of **Study Description** queries, meaning that "**Chest CT**" would find "Chest CT," "Chest CT w/Contrast" and "Chest CT w/o Contrast" and "**CT**" would find both "CT" and "Chest CT."

- If searching by **Patient Age**, you can enter a simple number (*e.g.*, "42"), a number with units (*e.g.*, "42Y"), or a range (*e.g.*, "40-45" or "40Y-45Y"). The valid units are "**D**"' (days), "**W**" (weeks), "**M**" (months), and "**Y**" (years) [these are all **case-sensitive**].
- You can use * or % as wildcard characters in any of the following **Teaching Tag** fields: **Accreditation**, **Quality Rank**, **Notable Structure**, **Syndrome/Abnormality**, **Use/Conference**, **Secondary Description**, **Other**. In addition, an "implicit wildcard" is also added automatically to the start and end **Secondary Description** and **Other** queries.

NOTE: The names of the various Teaching Tags are configurable on a site-by-site basis and may differ from the list described above.

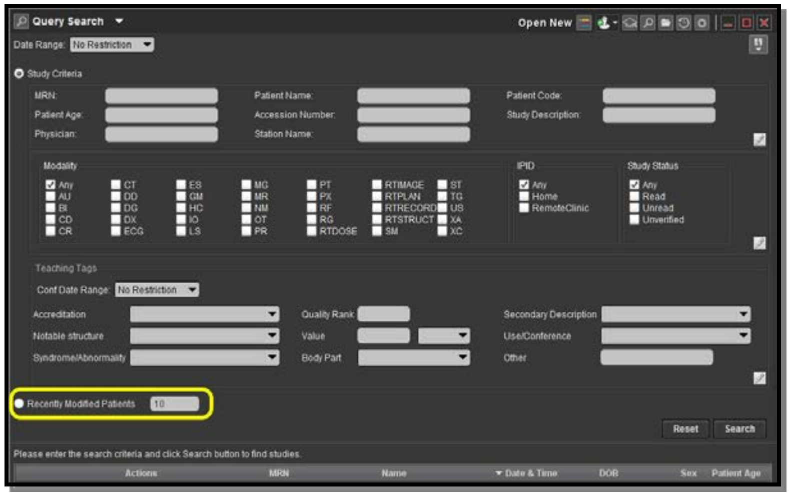
- If searching by **Body Part** (in the "Teaching Tags" section), the search will display results matching the specified body part as well as any body parts associated with that body part that are lower in hierarchical order.
  - For example, searching on "**Lower Extremity**" would display studies tagged with "Lower Extremity" as well as those tagged with "**Hip Joint**," "**Femur**," "**Knee**," "**Lower Leg**," "**Ankle**," "**Foot**," "**Patella**," or "**Toe**," since all are contained within "Lower Extremity."
  - Searching on "**Knee**," however, would only display studies tagged with "Knee" or "**Patella**," since "Lower Leg", "Ankle," "Foot" and "Toe" are not contained within "Knee."
- By default, the following fields are **case-sensitive** (although this can be changed on a site-by-site basis):
  - **Patient Age** (with regard to **units**)
  - **Study Description**
  - **Accreditation**
  - **Syndrome/Abnormality**
  - **Use/Conference**
  - **Accession Number**
  - **Station Name**
  - **Notable Structure**
  - **Secondary Description**
  - **Other**

NOTE: For example, if the study description is L-SPINE, the study won't be returned if you search for a Study Description of "spine" or "Spine."

- If you need to locate a report that is not associated with a study or an order but has an accession number associated with it, you can enter the exact accession number in the **Accession Number** field.

c. Searching By Recently Modified Patients

The bottom section of the Query Search Page lets you narrow your search by displaying a list of recently modified patients, as shown below:



Recently Modified Patients Search Option

- To use this option, the **Recently Modified Patients** radio button must be selected, as shown below:

Enabling Recently Modified Patients Search Option

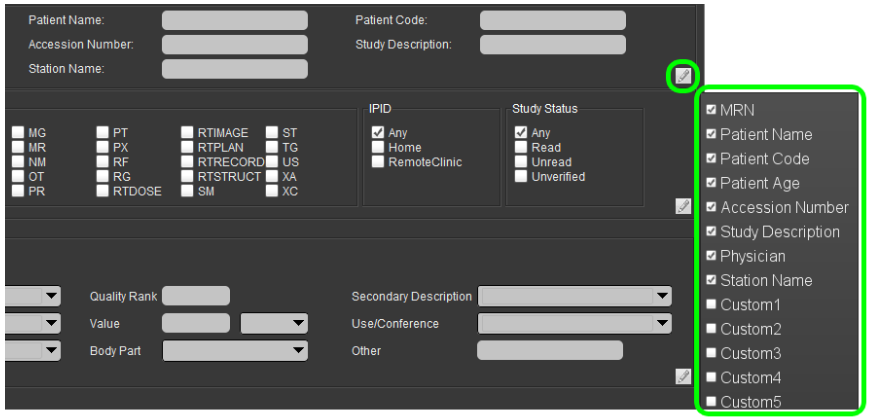
NOTE: You cannot use this option in conjunction with the **Study Criteria** options described above.

- Enter the number of most recent studies sent to the system you want to display (the default is the last 10 patients).

d. Selecting the Study Criteria Query Fields to Display

If desired, you can customize the Study Criteria area to add or remove various query fields as well as to determine which modalities are available for selection.

- Click on the pencil icon in the top section of the Study Criteria area to add or remove query fields from that section, as in the following example:

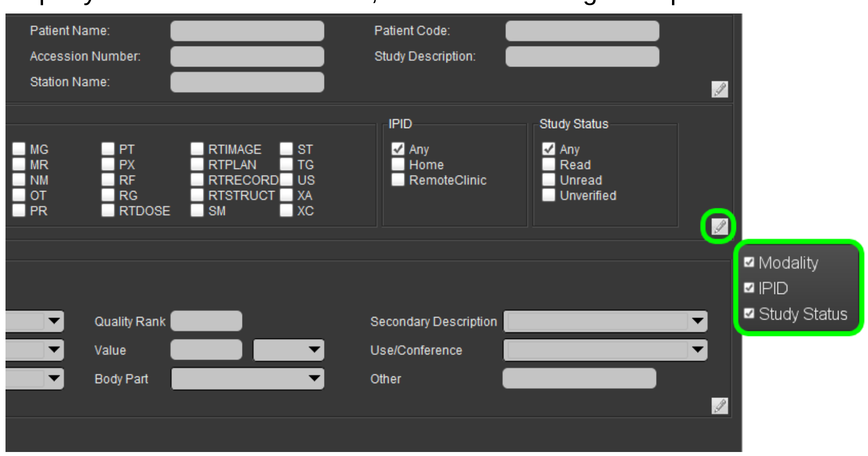


Upper Study Criteria Query Fields Selection Menu

Check the box next to the field you would like to add, or uncheck the box next to a field you would like to remove.

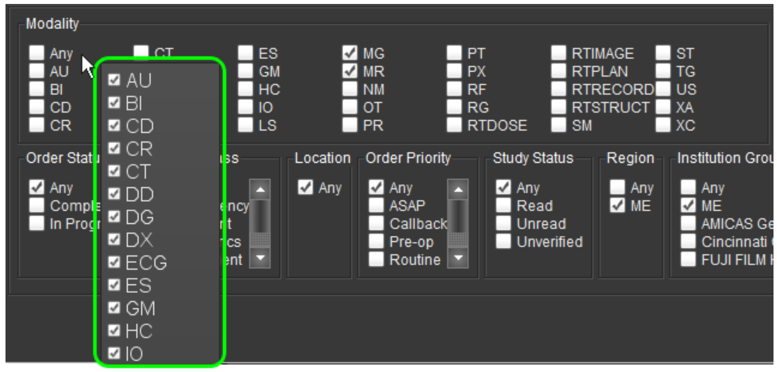
NOTE: The list of available options in this menu is configurable on a site-by-site basis.

- Click on the pencil icon in the middle section of the Study Criteria area to add or remove query fields from that section, as in the following example:



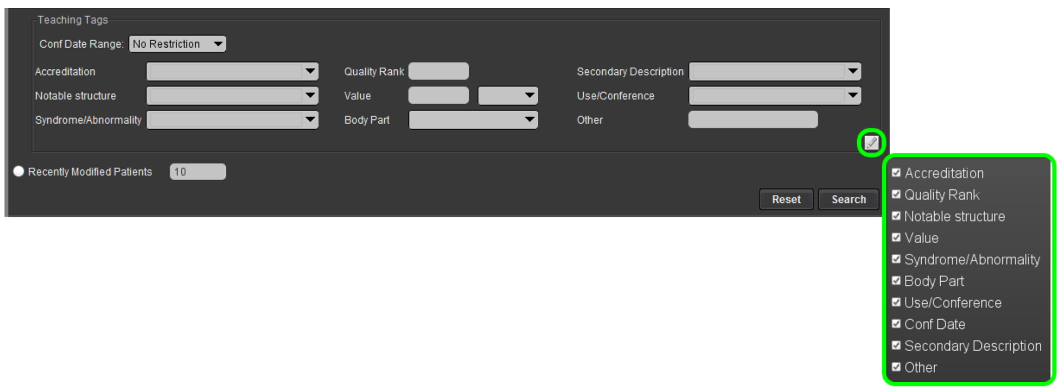
Middle Study Criteria Query Fields Selection Menu

If **Modality** is selected as an option for the middle section of the Study Criteria area, **right**-click anywhere on the list of available modalities to add or remove modalities from the list, as in the following example:



Modality Selection Menu

- Click on the pencil icon in the Teaching Tags section of the Study Criteria area to add or remove Teaching Tag related query fields, as in the following example:



Teaching Tag Query Fields Selection Menu

NOTE: Query fields related to the optional Teaching Files feature will only be available if you have the login privileges to access those tools.

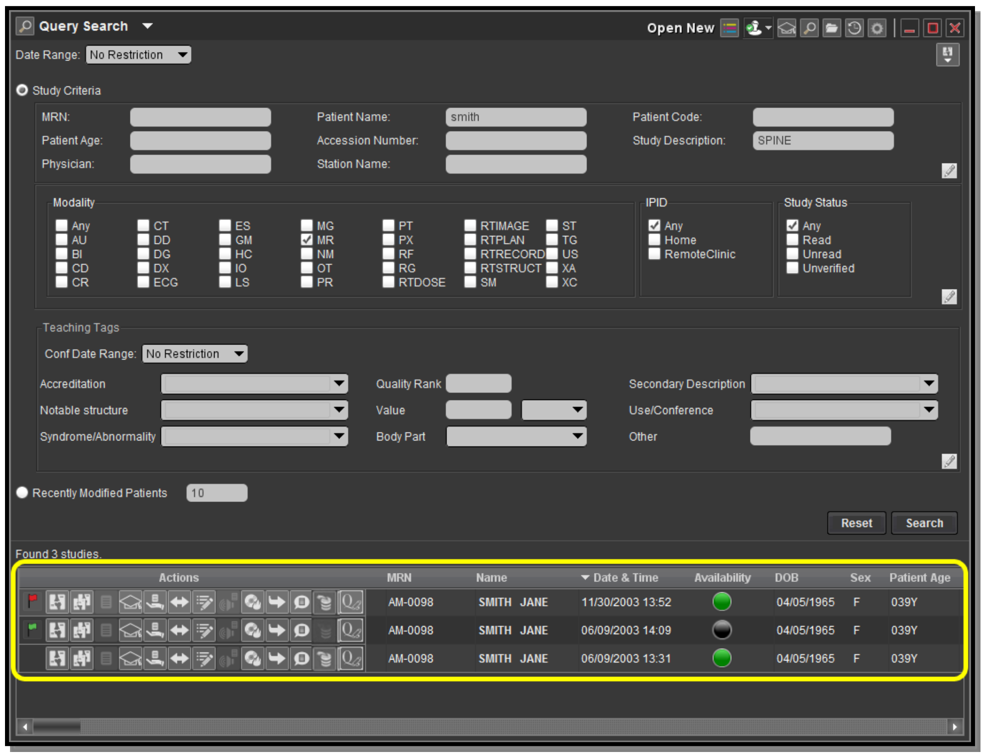
3.5.2. Submitting the Query

When you have entered the desired search parameters, press the "**Search**" button at the bottom of the search criteria to begin the search. This may take a little time, depending on the speed of your system and the number of patients listed. The query results will then be displayed as described in the following subsection.

NOTE: The maximum number of results returned from a query is configurable on a site-by-site basis. If your search would exceed the defined maximum, you will be shown a warning asking you to please refine your search criteria and resubmit the query.

3.5.3. Query Results Page Overview

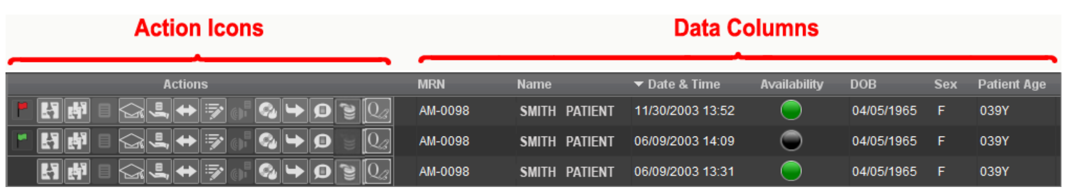
Once you have run a query by entering the desired criteria and clicking on the **Search** button, the results of that query will be displayed below the query fields as shown in the example below:



Query Results

Note that each patient may have one or more Series listed per study, and may also have more than one study listed.

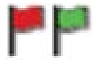
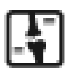
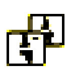
Each entry on the Query Results Page contains a set of **action icons** on the left that you can click on to perform different tasks, and **data columns** on the right that display information about each study, as shown in the following example:

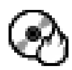
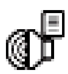


Action Icons and Data Columns

3.5.4. Action Icons

For each study listed on the Query Results Page, one or more of the following action icons may be available, depending on the study and how your system is configured:

Icon	Name	General Description
	**Warning/Comments**	Launch the Comment Viewer for the selected study in a separate pop-up window to view system generated warnings and/or comments. Note that the appearance of the flag icon will change as follows:  The study has one or more jailed images.  The study has no jailed images but the most recent comment has been manually flagged by the commenter. Hovering your mouse over this icon will display the text of the warning or comment as a pop-up tool tip. For details on using the Comments Viewer, refer to Chapter 5 below. For details on viewing jailed images, refer to Chapter 18 below.
	**Open Study**	Open study in the primary Merge PACS Viewer window. Note the following: • You can also open a study by clicking on the patient's name in the Query Results or clicking on one of the icons in the Image column. • If Merge PACS has an archive configured and the primary study is currently archived and not available online, attempting to view a study will automatically trigger an archive retrieval request, as described in Chapter 17 below.
	**Open Study in Secondary Viewer**	Open the study in a Secondary Merge PACS Viewer window. This feature is typically used when you are already viewing a study and want to open this study in a secondary Viewer without exiting the previous study. Note the following: • By default, studies displayed in the Secondary Viewer will be read-only (they will not be locked and you will be unable to change the workflow status). This default behavior can be changed, however, from the User Preference menu, as described in subsection 25.2 below. • Each currently open study will have a separate navigation tab associated with it within the Patient Record, as described in subsection 3.9.1, below. • If Merge PACS has an archive configured and the primary study is currently archived and not available online, attempting to view a study in a Secondary Viewer will automatically trigger an archive retrieval request, as described in Chapter 17 below.

Icon	Name	General Description
	**View Reports**	Launch the Report Viewer as a separate pop-up window. For more information on using the Report Viewer, refer to Chapter 6 below.
	**Study Tagging**	If you have the login privileges to access the optional Teaching Files feature, this will launch the **Study Tagging** window that will let you add this study to a Teaching Worklist. For more information on tagging studies, refer to Chapter 23 below.
	**Access Control**	Grant one or more users or groups access to this study/exam. For details on Access Control, see Chapter 11 below.
	**Associate/Dissociate Study**	Add the selected study to or remove the selected study from a specified worklist to which you have access. For details on associating and dissociating studies, see Chapter 7 below.
	**Change Status**	Change the workflow status and/or selected HL7 attributes for a particular study directly from the Worklist without opening the study within the Merge PACS Viewer. For details on changing status and/or selected HL7 attributes, see Chapter 12 below
	**Burn CD**	Add the selected study (together with any priors) to the Burn CD dialog’s Study List. Note that multiple studies from multiple patients can be added to the same Burn CD Study List. For details on burning patient images onto a CD, see Chapter 14 below.
	**VoiceClip**	Listen to the audio annotation, if any, that has been recorded for this study. For details on using VoiceClip listen to audio annotations, refer to Chapter 9 below.
	**Route Study**	Send the selected study to another available Merge PACS location (*i.e.*, a different Merge PACS Server or a local DICOM device. For details on routing studies, see Chapter 15 below.
	**Technologist WorkPanel**	Launch the Technologist WorkPanel for the selected study in a separate pop-up window. The Technologist WorkPanel provides a number of different tools commonly used by Technologists in a single window. For details on the Technologist WorkPanel, refer to Chapter 20 below.

Icon	Name	General Description
	Retrieve from Archive	If Merge PACS has an archive configured and this study is currently offline (i.e., only available in the archive), submit a request to retrieve the study from the archive. Note the following: • Once an archive retrieval request has been submitted, the progress can be tracked from the Availability data column, as described in subsection 3.5.5.c below. • You can submit a retrieval request for multiple studies at the same time by clicking on the Retrieve from Archive icon for each study. The retrieval requests will be processed in the order it they were submitted. • You can also click on the **Open Study** or **Open Study in Secondary Viewer** action icons for a study that is currently offline to submit an archive retrieval request and cause the study to automatically open when retrieved, as described in Chapter 17 below.
	Open Study in QC Editor	Open the study within the Quality Control Editor. Refer to the *Merge PACS 6.6 Quality Control Editor Users Guide* for more information.

3.5.5. Data Columns

a. In General

The following general data columns can be displayed on the Query Results Page:

- **Patient Name**
- **MRN**
- **IPID (Issuer of Patient ID)**
- **Date of Birth**
- **Age**
- **Sex**
- **Accession Number**
- **Study Date/Time**
- **Modality**
- **Study Description**
- **Image Count per Series**
- **Objects**
- **Status**
- **Availability**
- **Station Name**
- **Institution**
- **Reading Physician**
- **Referring Physician**

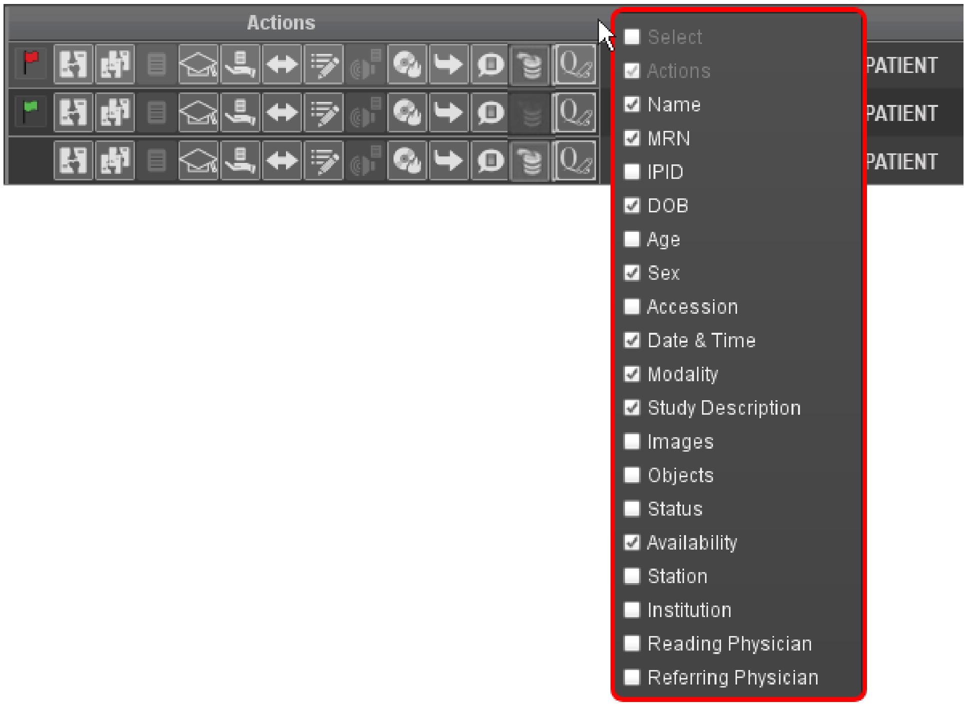
NOTE: There may also be one or more custom data columns available, depending on how your site is configured.

In addition, if you have the login privileges to access the optional Teaching Files feature, the following data columns can also be displayed:

- **Accreditation**
- **Body Part**
- **Quality Rank**
- **Secondary Description**
- **Syndrome/Abnormality**
- **Use/Conference**
- **Conference Date**
- **Value**
- **Notable Structure**
- **Other**

b. Selecting the Data Columns to Display

To add or remove a data column from the Query Results Page, click on any of the column headings once with the **right** mouse button to cause the Data Column Selection Menu to be displayed, as in the following example:



The Query Results Display Column Selection Menu

Check the box next to the column you would like to add, or uncheck the box next to a column you would like to remove.

c. Availability Column

If Merge PACS has an archive configured, the Query Results Page can be configured to include an **Availability** data column, as in the following example:

Availability Column

The Availability column shows an availability status indicator for each study. The appearance of the indicator indicates the availability of the study as follows:

Indicator	Color	Description
	Green	The study is available online for viewing.
	Black	The study is currently offline and not available for viewing.
	Blue	A request to retrieve the study has been submitted, but the retrieval process has not yet started.
	Black / Green	The study is currently being retrieved from the archive. Note that the percentage of green shown will change to indicate the progress of the retrieval process. Hovering your mouse cursor over the indicator will cause the exact percentage to be shown in a tool-tip window, as in the following example:

Retrieval Progress

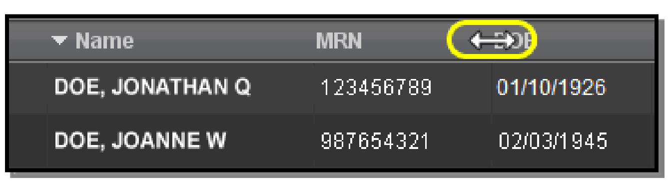
Indicator	Color	Description
	Orange	Images for this study are currently being imported into Merge PACS for the first time or additional images are currently being added to an existing study.
	Red	Retrieval of the study from the archive has completed, but with errors (either fewer images were received than expected or all images failed compression)
	Gray	The availability of the study is currently unknown (this may occur during timeout or error scenarios). Clicking the **Availability** column header will refresh the data.

d. Reordering Data Columns

You can change the order in which the various data columns are displayed on the Query Results Page by clicking on a particular column's heading with the **left** mouse button and dragging the column to the desired location.

e. Resizing Data Column

You can resize any data column by hovering your mouse between the heading of the column whose size you wish to change and the column heading to its right until your cursor changes to a resizing arrow, as in the following example:



The Resizing Cursor

Once the resizing arrow cursor appears, click with the **left** mouse button and drag the edge of the column to the left or right as desired.

CAUTION: If you attempt to resize a column when the resizing arrow cursor is not displayed, you will move the column to a new location as described above.

NOTE: Some columns, such as **Name**, **MRN**, **DOB**, **Sex** and **Time**, have a minimum display width.

f. Sorting Query Results

You can sort the data on the Query Results Page by clicking on any of the column headings at the top of the screen except for Image Count.

3.5.6. Opening Multiple Query Pages

If desired, you can open additional Query Pages in their own separate windows. To do so, click on the **Open New Query Page** icon at the top right of the Workstation Browser, as shown below:

Opening a Query Page in a New Window

3.5.7. Importing from a DICOM Device

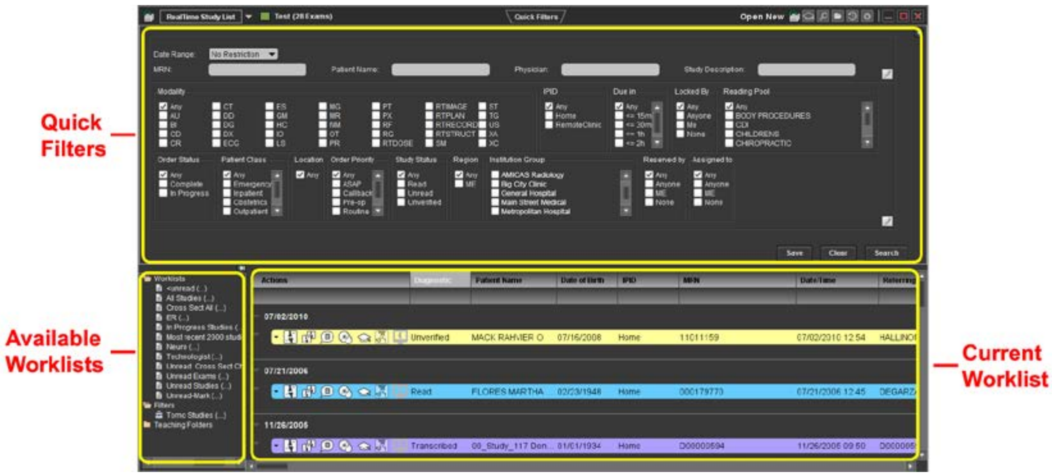
You can request one or more images from a separate DICOM Archive at any time, if available, by clicking on the **Import from DICOM Device** icon displayed at the top-right of the Query Search Page, as in the following example:

Import from DICOM Device Icon

For details on importing images from a DICOM device, see Chapter 16 below.

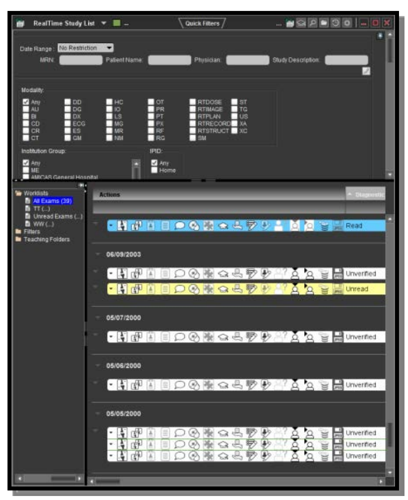
3.6. RealTime Study List

The RealTime Study List is a combined interface that lets you view RealTime Worklist (RTWL) worklists and Teaching Worklists on the same page, along with special Query Worklists that can be created and saved on the fly, as in the following example:



RealTime Study List

If you use the Windows docking feature to dock the RTSL to the left or right half of a monitor (*i.e.*, by clicking on the page's title bar and dragging it all the way to the left or right of the screen), RTSL will be displayed similar to the following example:



RTSL with Half Screen Docking

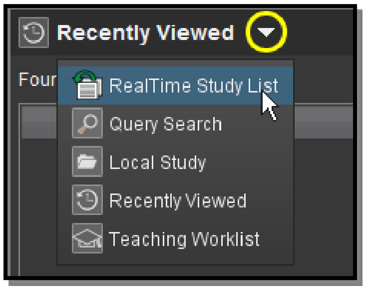
When the RealTime Study List is enabled, it takes the place of RTWL entirely. You can select whether you want to have it or RTWL appear from the User Preferences menu, as described in Section 25.2 below.

NOTE: The docking feature is not supported in Merge PACS 6.6 with Windows 8.1.

CAUTION: In order to avoid delay of treatment, alert your PACS Administrator immediately if you notice unintended patients on your worklists.

3.6.1. Accessing the RealTime Study List

The top of the Workstation Browser includes a drop-down menu that displays the various functions that can be shown within the Browser, as in the following example:



Workstation Browser Options

By default, if you have the login privileges to access the RealTime Study List and your workstation is configured to display it, as described in Section 25.2 below, the RealTime Study List should be activated when you first access the Workstation Browser. You can access it at any time by selecting the **RealTime Study List** option from this menu, however.

3.6.2. Creating and Saving Quick Filter Worklists

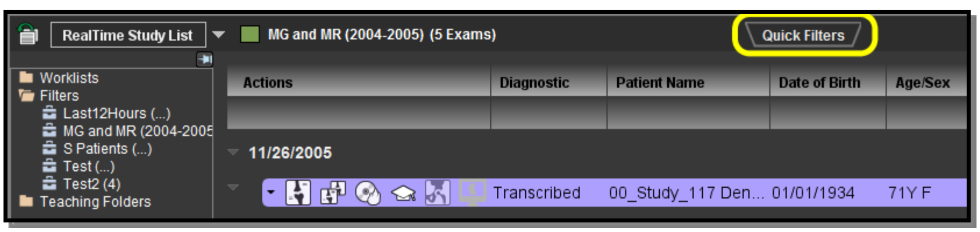
A Quick Filter Worklist is simply a saved set of search criteria that will generate a matching list of studies each time it is accessed. Once created and saved, you can access the Quick Filter Worklist directly to see the list of matching studies without needing to rerun the query.

a. Accessing/Hiding the Quick Filters

Quick Filter Worklists are created using the Quick Filters in the top panel of the RealTime Study List, as in the following example:

RealTime Study List – Quick Filters Panel

If the Quick Filters panel is not currently displayed, you can access it by clicking on the **Quick Filters** button at the top of the screen, as in the following example:



Quick Filters Button

NOTE: Clicking the Quick Filters button repeatedly will toggle the display of the Quick Filters panel on and off.

b. Creating a Quick Filter Worklist

Quick Filter Worklists are created using the Quick Filter search criteria in the top panel of the RealTime Study List, as in the following example:

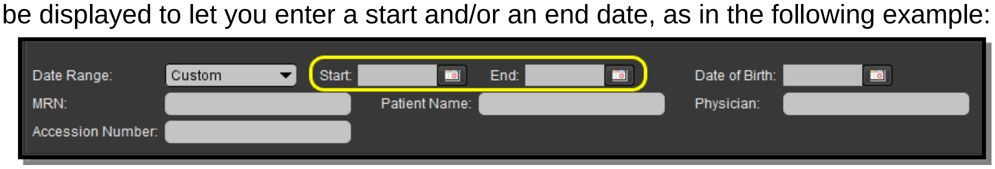
RealTime Study List – Quick Filter Search Criteria

The list of search criteria that appear in the RealTime Study List may include one or more of the following options, depending on how your site is configured and which options you have chosen to display, as described in Paragraph d below:

- **Date Range**
- **Date of birth**
- **MRN**
- **IPID**
- **Patient Name**
- **Accession Number**
- **Study Description**
- **Physician**
- **Modality**
- **Institution**
- **Location**
- **Patient Class**
- **Order Status**
- **Reading Pool**
- **Study Status**
- **Order Priority**
- **Reserved By**
- **Region**
- **Locked By**
- **Due In**
- **Assigned To**
- **QC Search Criteria**
- **Custom Tags 1-10**

Enter or select search criteria in one or more of the available fields, bearing the following in mind:

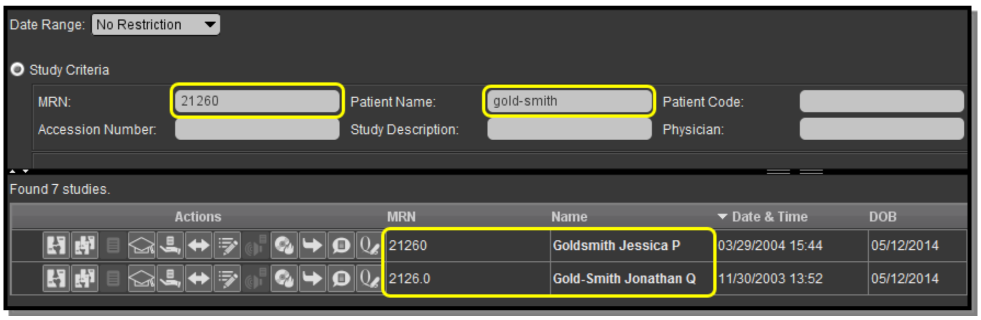
- If you selected **Custom** from the drop-down **Date Range** menu, additional fields will be displayed to let you enter a start and/or an end date, as in the following example:



Entering a Date Restriction

  - Dates should be entered in whatever format is currently configured for your site. Contact your PACS Administrator to find out what format is being used.
  - You can also click on the calendar icon to the right of either date field to bring up a calendar window that will let you select the desired date instead of manually typing it in.

- Any alphanumeric characters can be entered for **Patient Name**, **MRN**, **Physician**, **Accession Number**, **Study Description**, and **Institution Name** fields. In addition, you can use * or % as wildcard characters in these fields to fill in for letters or numbers you are unsure of. For example:
  - "**B*K**" would find "Black, John" as well as "Beckman, Timothy" and "Brown, Kelly."
  - "***SMITH**" would find both "Goldsmith, David" and "DrSmith, Robert J."
  - "***B*G**" would find both "Goldberg, Benjamin" and "Cable, George."
- If searching by **MRN**, **Patient Name**, **Physician** or **Study Description**, bear in mind that the search will match based on the "normalized" (*i.e.*, with non alpha-numeric characters removed) versions of the data. As a result, a search for an MRN of "21260" will locate a patient with an MRN of 21260 as well as a patient with an MRN of 2126.0, since the search will ignore the period. Similarly, a search for a Patient Name of "Gold-Smith" will also locate a patient with the name Goldsmith. Note, however, that the search results will display the original values so you can verify that the correct patient is selected, as in the following example:



Searching with Normalized Data

- If searching by **Patient Name** or **Physician**, you can enter the name you are searching for in the format **"last name, first name**" or simply enter the **last name** to find all people with that last name.
  - An "**implicit** wildcard" is automatically added to the **end** of your query, meaning that "**BL**" would find "Black, John" as well as "Blake, James" and "**B**" would find all people whose last name begins with the letter "B."
  - You can also manually insert one or more asterisks [*****] as wildcard characters to fill in for letters you are unsure of at the beginning or middle of a name, as described above.
  - Names are stored in the Merge PACS database in whatever format they arrive from the DICOM modality and/or the HIS/RIS. Typically, this format is **last name**, **first name**, **middle name (or initial)**, **prefix**, **suffix**, meaning that "Dr. John Q. Smith" would be stored as "SmithJohnQDr." This practice can vary from site to site, however, and may affect how wildcard searches work for you. Some sites, for example, may append the **prefix** at the beginning of the name (*e.g.*, "DrSmithJohnQ"). If you have any questions about how names are stored at your site, talk to your Merge PACS Administrator.
- An "implicit wildcard" is also automatically added to the **start** and **end** of **Study Description** queries, meaning that "**Chest CT**" would find "Chest CT," "Chest CT w/Contrast" and "Chest CT w/o Contrast" and "**CT**" would find both "CT" and "Chest CT."

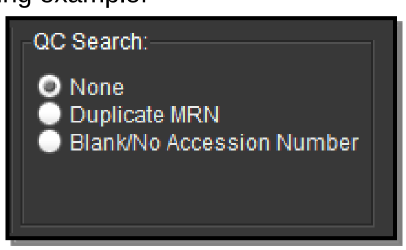
- By default, the following fields are **case-sensitive** (although this can be changed on a site-by-site basis):
  - **Accession Number**
  - **Study Description**
  - **Institution Name**

NOTE: For example, if the study description is L-SPINE, the study won't be returned if you search for a Study Description of "spine" or "Spine."

- The **Study Status** field includes the following options with regard to whether an exam has an order or study associated with it:

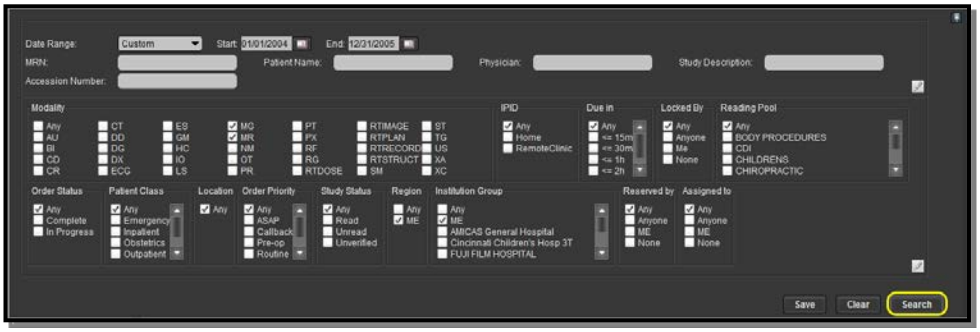
Option	General Description
Any	Include exams with all statuses, including those without orders or studies associated with them.
Include Orders	Only include exams with orders associated with them but no studies.
Include Studies	Only Include exams with studies associated with them, whether or not there are also orders.

- If your site has configured **Licensure Regions** for individual users, you will likely only be able to view exams for the licensure region(s) assigned to you (in which case the **Region** filter will have the "ME" option enabled and you will not be able to change it). If your PACS Admin has granted you the user privilege to allow creation of worklists that include any region or institution, however, you can use the **Region** options to select whether you wish to search among all exams ("Any") or just among those that are within the licensure region(s) associated with you ("ME").
- Similarly, if your site has configured **Credentialing** for individual users, you will likely only be able to view exams for the institution groups assigned to you (in which case the **Institution Group** filter will have the "ME" option enabled and you will not be able to change it). If your PACS Admin has granted you the user privilege to allow creation of worklists that include any region or institution, however, you can use the **Institution Group** options to select whether you wish to search among all exams ("Any"), among specific institution groups or just among those that are within the institution group(s) associated with you ("ME").
- If you have **QC Editing** login privileges, you can use the **QC Search** fields to search for studies that have duplicate MRNs and/or studies that have blank/no accession numbers, as in the following example:



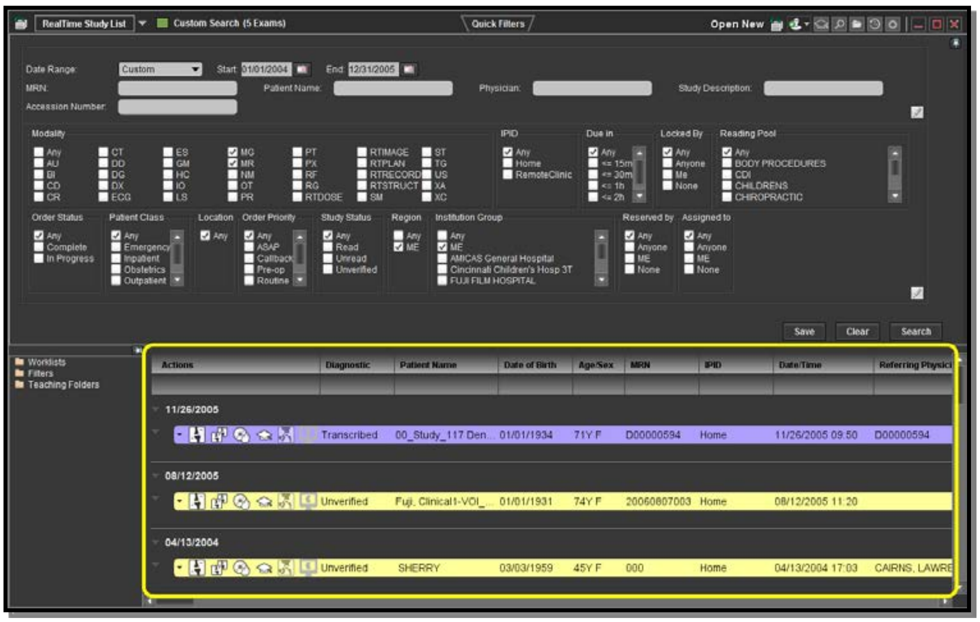
QC Search Criteria

Once you have entered or selected all the desired search criteria, click on the **Search** button at the bottom right of the Search Criteria section, as in the following example:



Running the Query Search

The search results will be displayed as a Quick Filter Worklist in the bottom section of the RealTime Study List, as in the following example:



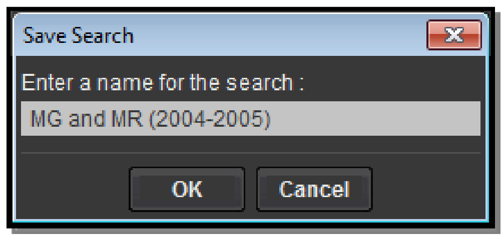
Newly Created Quick Filter Worklist

c. Saving a Quick Filter Worklist

Once you have created a Quick Filter Worklist, you can save it to your list of available worklists for future use by clicking on the **Save** button at the bottom right of the Search Criteria section, as in the following example:

Running the Query Search

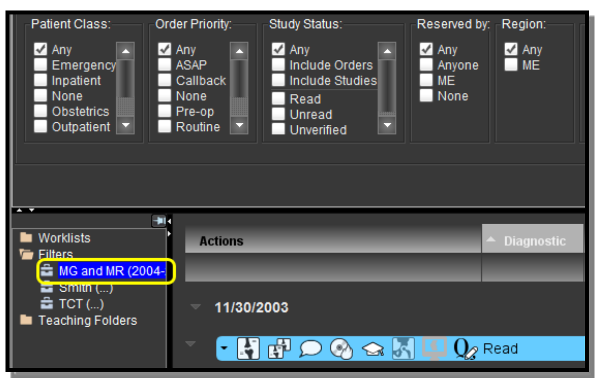
The **Save Search** window is displayed, as in the following example:



Save Search Window

Enter a name for this Quick Filter Worklist in the field provided and click on the **OK** button.

*The newly created Quick Filter Worklist will now be included in the **Filters** folder of the **Available Worklist** section of the RealTime Study List, as in the following example:*



Newly Saved Quick Filter Worklist

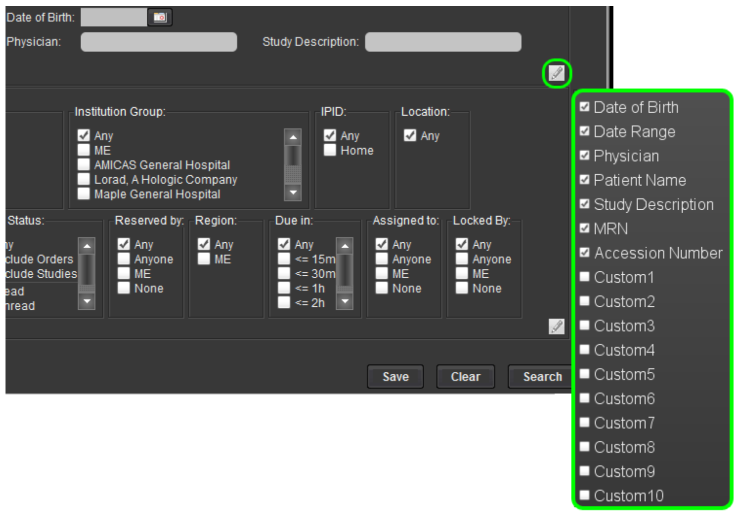
NOTE: You may need to click on the Filters folder in order to display the worklists contained within that folder.

d. Customizing the Quick Filters

If desired, you can customize the Quick Filters panel to add or remove various query fields as well as to determine which modalities are available for selection.

NOTE: The list of available options in the following menus is configurable on a site-by-site basis.

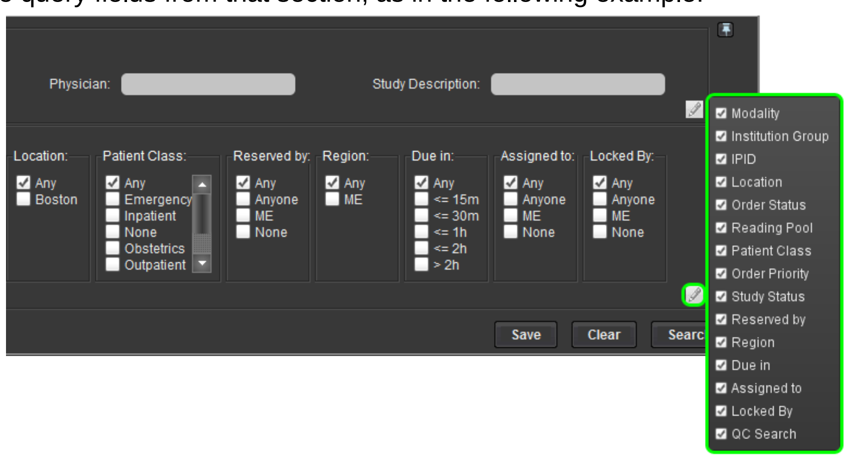
- Click on the pencil icon in the top section of the Quick Filters panel to add or remove query fields from that section, as in the following example:



Upper Quick Filters Selection Menu

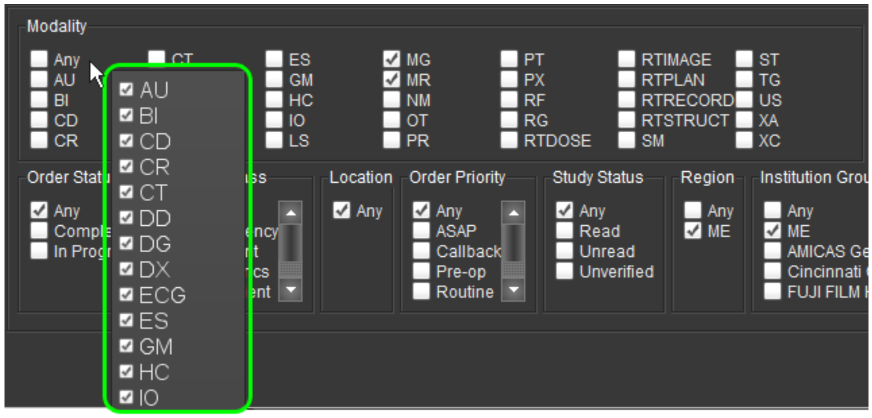
Check the box next to the field you would like to add, or uncheck the box next to a field you would like to remove.

- Click on the pencil icon in the bottom section of the Quick Filters panel to add or remove query fields from that section, as in the following example:



Lower Quick Filters Selection Menu

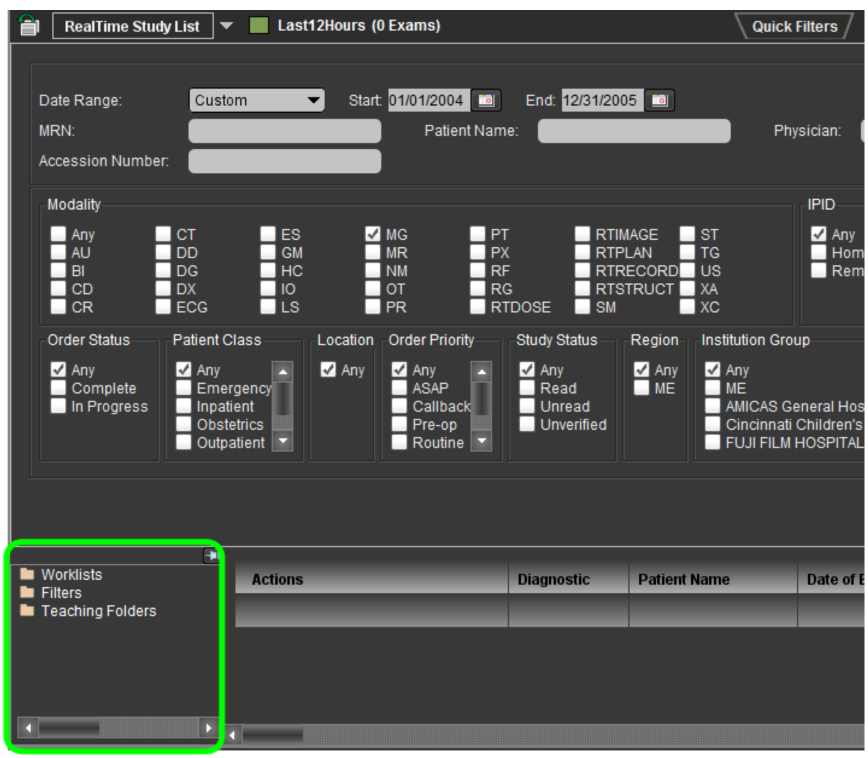
If **Modality** is selected as an option for the bottom section of the Quick Filters panel, **right**-click anywhere on the list of available modalities to add or remove modalities from the list, as in the following example:



Modality Selection Menu

3.6.3. Available Worklists Panel

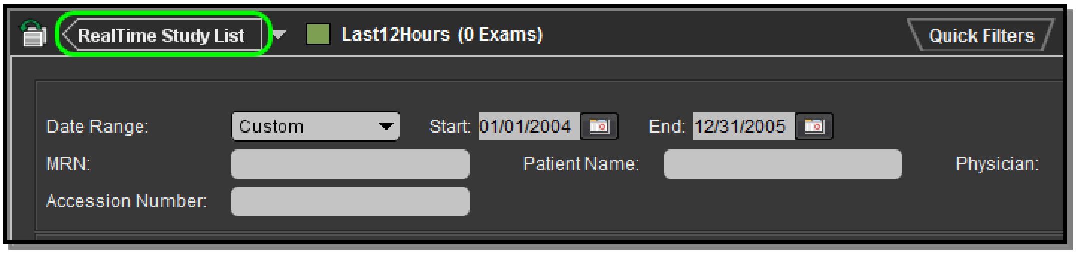
The Available Worklists panel lists all worklists that are currently available to you, including RTWL worklists ("Worklists"), saved Quick Filter Worklists ("Filters") and saved Teaching worklists ("Teaching Folders"), as in the following example:



RealTime Study List – Available Worklists Panel

a. Accessing/Hiding the Available Worklists Panel

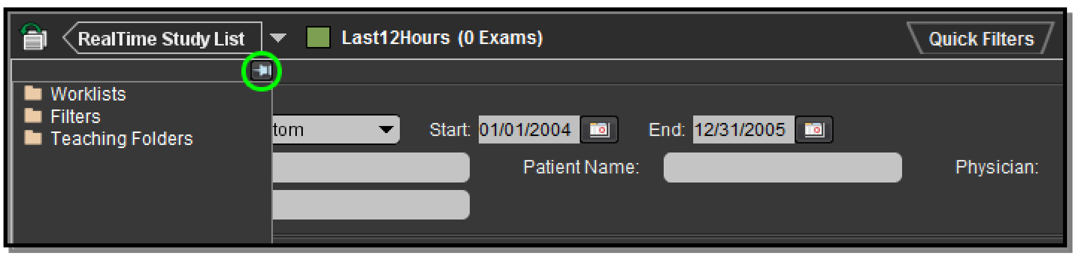
If the Available Worklists panel is not currently displayed, you can access it by clicking on the **RealTime Study List** button at the top-left of the screen, as in the following example:



RealTime Study List Button

NOTE: Clicking the RealTime Study List button repeatedly will toggle the display of the Available Worklists panel on and off, unless the panel has been pinned in place, as described below.

Once the Available Worklists panel is displayed, you can pin it in place so that it cannot be hidden by clicking on the Available Worklists pushpin icon in the upper-right corner of the panel, as in the following example:



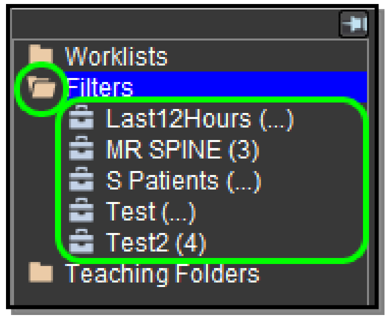
Available Worklists Pushpin

NOTE: Once the Available Worklists panel is pinned, it will be moved down to the bottom-left of the RealTime Study List screen.

NOTE: Clicking on the pushpin icon a second time will unpin the Available Worklists panel and cause it to be hidden until you click on the RealTime Study List button described above.

b. Selecting a Worklist

Clicking on any of the folders listed in the Available Worklists panel will cause all the worklists within that folder to be displayed, as in the following example:



Expanded Folder of Worklists

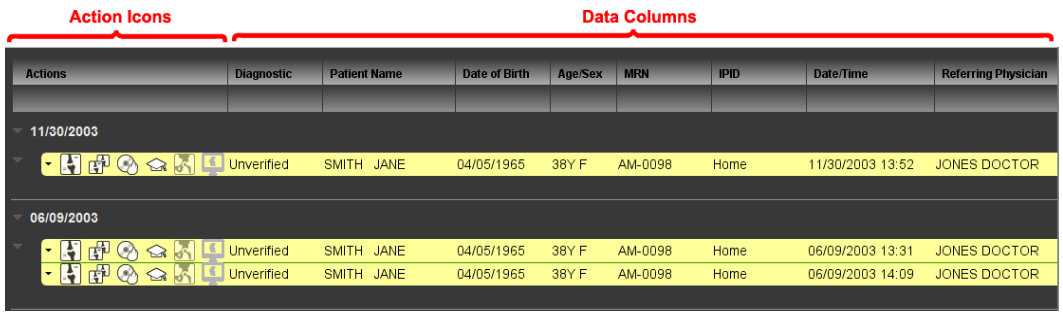
NOTE: The number in parentheses after a worklist's name indicates how many studies are currently in that worklist. By default, this number will only be displayed for worklists that are currently being viewed by any user, but individual worklists can also be configured so that their study count is always displayed.

NOTE: If your site has the "**Briefcase**" option enabled, a default teaching worklist will be automatically created for you in the Teaching Folders folder called "<*username*>'s briefcase" (this worklist will initially be empty until you add studies to it).

Clicking on a worklist will cause it to be displayed in the Search Results section of the RealTime Study List, as in the following example:

RealTime Study List – Selected Worklist

Each worklist entry contains a set of **action icons** on the left that you can click on to perform different tasks, and **data columns** on the right that display information about each study/order on the worklist, as shown in the following example:



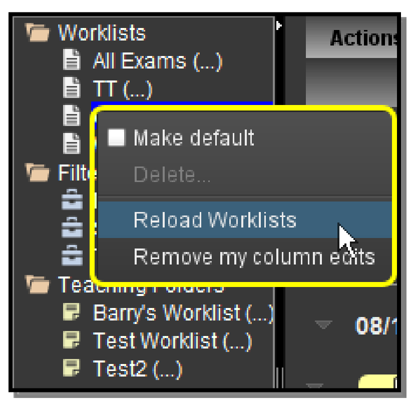
Action Icons and Data Columns

NOTE: The actual action icons and data columns, the order the columns appear and the names of the possible worklist status options are all customizable by an Administrator and may also vary from one worklist to another and one type of worklist to another.

By default, any RTWL worklists will be displayed in Patient List View, which shows all the studies in the current worklist without them being grouped by day. This can be switched to standard Worklist View, however, as described in subsection 3.6.8 below.

c. Setting a Default Worklist

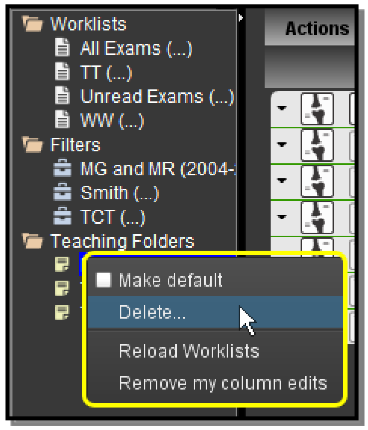
If you have multiple worklists available to you, you can select one worklist to be launched by default when you first access the RealTime Study List. To do this, right-click on the desired worklist in the Available Worklists panel and select **Make Default** from the pop-up **Available Worklists Right-click Menu**, as shown in the following example:



Setting the Default Worklist

d. Deleting a Saved Teaching or Quick Filter Worklist

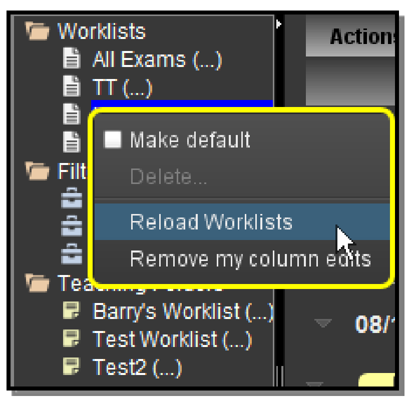
You can delete any Teaching Worklist (including your Briefcase) or Quick Filter Worklist so that it no longer is displayed in your list of available worklists. To do this, right-click on the desired worklist in the Available Worklists panel and select **Delete** from the pop-up **Available Worklist Right-click Menu**, as shown in the following example:



Deleting a Teaching or Quick Filter Worklist

e. Reloading All Worklists

If desired, you can manually refresh all worklist available to you. To do this, right-click on any folder or individual worklist in the Available Worklists panel and select **Reload Worklists** from the pop-up menu, as shown in the following example:



Reloading All Worklists

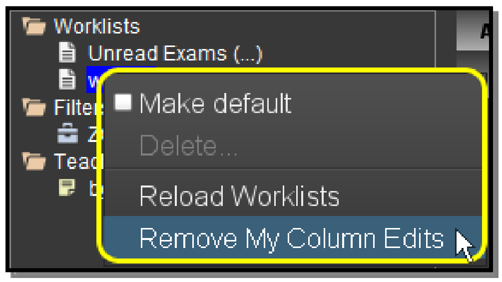
NOTE: You can also reload all worklists from the RealTime Study List Right-click General Menu, as described in subsection 3.6.6 below.

f. Restoring Column Defaults

If you have edited the data columns for any worklists, as described in subsection 3.6.5 below, those changes will be automatically saved to your user preferences. For RTWL and Teaching worklists, this means that the settings will be preserved the next time you access those worklists. For Quick Filter worklists, it means that these settings will be applied by default to any future Quick Filter searches you perform (regardless of whether or not you save that search as a Quick Filter worklist).

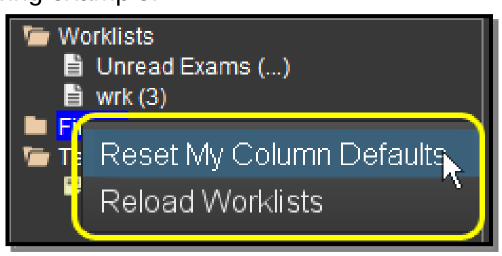
If desired, you can reset the display of worklist columns to the default values defined for your Merge PACS. For RTWL and Teaching worklists, this can be done for individual worklists. For Quick Filter worklists, you can restore the default column settings that will be used for the current display of Quick Filter search results and any future Quick Filter searches (previously saved Quick Filter worklists will not be affected, however).

- To restore the column defaults for individual **RTWL** or **Teaching** worklists, right-click on the desired worklist and select **Remove My Column Edits** from the pop-up menu, as in the following example:



Reloading Column Defaults for a Worklist

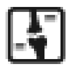
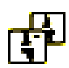
- To restore the column defaults for the current and future **Quick Filter** searches, right-click on the **Filters** folder and select **Reset My Column Defaults** from the pop-up menu, as in the following example:

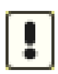
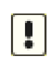


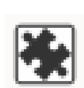
Reloading Column Defaults for Quick Filter Searches

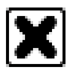
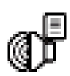
3.6.4. Action Icons

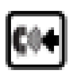
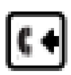
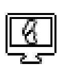
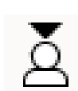
The following action icons may be available on each worklist, depending on the type of worklist, how this particular worklist is configured, your login privileges, etc.:

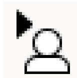
Icon	Name	General Description
	**View Study**	Load the selected study into the Merge PACS Viewer, as described in Chapter 4 below. You can also load a study into the Merge PACS Viewer by double-clicking anywhere in the Data Columns section of the worklist for a particular study. Note the following: • Once a study has been opened, its status on the Worklist will be changed to "In Use" and it will change color to alert other users that it is currently open by somebody else. • Depending on how your system is configured, you can also load a study on a Teaching Worklist into the Merge PACS Viewer by **double-clicking** on a Teaching Worklist entry anywhere other than on an action icon. • If Merge PACS has an archive configured and the primary study is currently archived and not available online, attempting to view a study will automatically trigger an archive retrieval request, as described in Chapter 17 below.
	**View Study in Secondary Viewer**	If you are already viewing a study in the Merge PACS Viewer and want to view another study without exiting the first one, click on the View Study in Separate Viewer icon to load the selected study into a separate Merge PACS Viewer. Note the following: • By default, studies displayed in the Secondary Viewer will be read-only (they will not be locked and you will be unable to change the workflow status). This default behavior can be changed, however, from the User Preference menu, as described in subsection 25.2 below. • This method can be used to open any number of simultaneous viewer windows. However, keep in mind that each open window will consume additional memory, and this may have an adverse effect on your system's performance if too many windows are kept open at the same time. • Each currently open study will have a separate navigation tab associated with it within the Patient Record, as described in subsection 3.9.1, below. • Use cases for multiple-instance viewer windows include the following examples: o While reading one patient's study, you are asked to look at another patient's study. You do not want to exit the first study, but want to be able to view the study in a second window while leaving the first study open.

Icon	Name	General Description
		o If a comparison study for a patient has a different patient name or MRN associated with it, that study will not be available from the list of available comparison studies for that patient from within the Primary Viewer. You can load that study into the secondary Viewer, however, to compare the two studies side by side in separate viewer windows. o You might prefer to view the same study in the secondary Viewer to keep the layout of the Primary Viewer unchanged. For example, 3D images can be viewed in the secondary Viewer while the Primary Viewer displays the study in standard 2D layout. o You might prefer to run the secondary Viewer on a color monitor in order to display data in color, including 3D color volume rendering, color US images, color maps applied to US or PT or NM monochrome images, etc. • If Merge PACS has an archive configured and the primary study is currently archived and not available online, attempting to view a study in a Secondary Viewer will automatically trigger an archive retrieval request, as described in Chapter 17 below.
  	**View Orders and/or Comments**	Launch the Order Viewer as a separate pop-up window with any orders and/or comments displayed. Note that the appearance of the icon will change depending on whether there is just an order associated with this study, just comments, or both:  There is an order associated with this study.  The most recent comment for this study was manually flagged by the commenter.  There is an order associated with this study and the most recent comment for this study was manually flagged by the commenter. For more information on using the Order Viewer to view orders and view and/or enter comments, refer to Chapter 4.11 below. **NOTE:** If there is no order or comment currently associated with this study, the Orders and Comments icon will be disabled. If you need to add a comment, you can do so from the **Technologist WorkPanel** or the **Comments Viewer**, depending on your login privileges.
	**View Report**	Launch the Report Viewer as a separate pop-up window. For more information on using the Report Viewer, refer to Chapter 6 below.

Icon	Name	General Description
	**Launch Comment Viewer**	Launch the Comment Viewer as a separate pop-up window with any comments displayed. Note that the appearance of the icon will change as follows:  The study has one or more jailed images.  The study has no jailed images but the most recent comment has been manually flagged by the commenter.  The study has no jailed images and the most recent comment (if any) has not been manually flagged. This is the default icon. For more information on using the Order Viewer to view orders and view and/or enter comments, refer to Chapter 5 below. For details on viewing jailed images, refer to Chapter 18 below.
	**Technologist WorkPanel**	Launch the Technologist WorkPanel for the selected study in a separate pop-up window. The Technologist WorkPanel provides a number of different tools commonly used by Technologists in a single window. For details on the Technologist WorkPanel, refer to Chapter 20 below.
	**ER WorkPanel**	Launch the ER WorkPanel for the selected study in a separate pop-up window. The ER WorkPanel provides a number of different tools commonly used by Emergency Room Physicians in a single window. For details on the ER WorkPanel, refer to Chapter 21 below.
	**Burn CD**	Add the selected study (together with any priors) to the Burn CD dialog's Study List. Note that multiple studies from multiple patients can be added to the same Burn CD Study List. For details on burning patient images onto a CD, see Chapter 14 below.
	**Route Study**	Send the selected study to another available Merge PACS location (*i.e.*, a different Merge PACS Server or a local DICOM device. For details on routing studies, see Chapter 15 below.
	**3rd-party App Sync**	If your system has been configured for direct ("API-based") integration with a third-party dictation/report applications such as Dictaphone's PowerScribe™, clicking on the Third-party Application Synchronization icon will launch the application with the study's accession number and the patient MRN prepopulated. For additional information on using the 3rd-party Application Synchronization feature, refer to Chapter 10 below and the user documentation specific to the third-party dictation/report application being used.

Icon	Name	General Description
		NOTE: The Merge PACS Workstation also provides indirect ("XML file-based") integration with a number of third-party applications including dictation/report applications (such as Dolbey and SoftMed), document management applications (such as OnBase), and any other application that supports XML file-based integration. You do not need to click on the Third-party Application Synchronization icon for this type of integration, as those applications can be configured to launch automatically when you open a study for viewing.
	**Associate Study**	Launch the **Associate/Dissociate Study** pop-up window to add the selected study to another RTWL worklist to which you have access. For details on the Associate/Dissociate Study window, see Chapter 7 below.
	**Remove Associated Study**	Launch the **Associate/Dissociate Study** pop-up window to remove a study that was manually added to this RTWL worklist, whether via the Associate Study icon or the Drag and Drop feature described in subsection 3.6.7 below. For details on the Associate/Dissociate Study window, see Chapter 7 below.
	**Study Tagging**	If you have the login privileges to access the optional Teaching Files feature, this will launch the **Study Tagging** window that will let you change tags or assign this study to a Teaching Worklist. Note that you can also drag and drop studies to a Teaching Worklist, as described in subsection 3.6.7 below. For more information on tagging studies, refer to Chapter 23 below.
	**Quick Add to Default Teaching Worklist**	If you have the login privileges to access the optional Teaching Files feature, add this study to whichever Teaching Worklist (including Briefcase) is currently configured as your default Teaching Worklist. Note that you can also drag and drop studies to a Teaching Worklist, as described in subsection 3.6.7 below.
	**Quick Remove from Current Worklist**	Remove a study that was manually added to this worklist, regardless of type, whether via the Associate Study icon or the Drag and Drop feature described in subsection 3.6.7 below. Note that removal will be instantaneous and will not cause the **Associate/Dissociate Study** pop-up window to be displayed in the case of RTWL worklists.
	**VoiceClip**	Listen to the audio annotation, if any, that has been recorded for this study. For details on using VoiceClip to listen to audio annotations, refer to Chapter 9 below.
	**Access Control**	Grant one or more users or groups access to this study/exam. For details on Access Control, see Chapter 11 below.

Icon	Name	General Description
	**OrthoLink**	View the selected CR study within the Image Viewer and launch the orthopedic templating toolset installed on your workstation, such as OrthoView or Merge OrthoCase. For details on using OrthoLink, see Chapter 4.12 below and the user documentation specific to your orthopedic templating toolset software.
	**Change Status**	Change the workflow status and/or selected HL7 attributes for a particular study directly from the Worklist without opening the study within the Merge PACS Viewer. For details on changing status and/or selected HL7 attributes, see Chapter 12 below.
	**Study Demographics**	Launch the Study Demographics window in a separate pop-up window that lets you view and edit patient and study demographic information for the selected study. For additional information on viewing and editing patient and study demographics, refer to Chapter 19 below.
	**Communication WorkPanel**	If the optional Merge RadStream™ component has been enabled, launch the Communication WorkPanel for the selected study in a separate pop-up window. The Communication WorkPanel provides a number of different tools commonly used by Merge RadStream Operators in a single window. For details on the Communication WorkPanel, refer to Chapter 22 below.
	**Change Status to MD Connected**	Sets the connection dimension status of the selected study to MD Connected (or the equivalent status used by your site).
	**Change Status to Talk to MD**	Sets the connection dimension status of the selected study to Talk to MD (or the equivalent status used by your site).
	**View Study in iConnect Access Viewer**	If your system is configured to provide access to the iConnect® Access viewer, display the selected study within iConnect Access. Depending on how your system is configured, you can also load a study on a Quick Filter Worklist into the iConnect Access viewer by **double-clicking** on a Quick Filter Worklist entry anywhere other than on an action icon. For information on using iConnect Access, refer to the iConnect Access user documentation.
	**Data Masking**	For studies that are on a Teaching Worklist, creates a copy of the study with certain personally identifiable Protected Health Information (PHI) about the study (including Patient Name, MRN, Accession Number) replaced with randomized data. For details on data masking studies on a Teaching Worklist, refer to subsection 3.4.7 above.
	**Reserve Study**	Flag this study as reserved to you. If a worklist containing this study has been configured to include the Reservation display column, as described in subsection 3.3.5 above, the Reservation status will be displayed in that column.

Icon	Name	General Description
	**Assign Study**	Flag this study to be assigned to another user. If that user has access to a worklist configured to display studies assigned to him, this study will appear on that worklist. For information on assigning studies to other users, refer to Chapter 8 below.
	**Retrieve from Archive**	If Merge PACS has an archive configured and this study is currently offline (i.e., only available in the archive), submit a request to retrieve the study from the archive. Note the following: • Once an archive retrieval request has been submitted, the progress can be tracked from the Availability data column, as described in subsection 3.6.5.c below. • You can submit a retrieval request for multiple studies at the same time by clicking on the Retrieve from Archive icon for each study. The retrieval requests will be processed in the order it they were submitted. • If Merge PACS is configured with an archive, but the Retrieve from Archive action icon is not enabled for this worklist, you can still submit an archive retrieval request from the **RealTime Study List Right-click Study Menu**, as described in subsection 3.6.6.b below, or by clicking on the **View Study** or **View Study in Secondary Viewer** action icons for a study that is currently offline, as described in Chapter 17 below.
	**Open Study in QC Editor**	Open the study within the Quality Control Editor. Refer to the *Merge PACS 6.6 Quality Control Editor Users Guide* for more information.

3.6.5. Data Columns

a. In General

The following general data columns may be available on your worklist, depending on how your system is configured:

- **Diagnostic Status**
- **Patient Name**
- **Date of Birth**
- **Age/Sex**
- **Patient ID**
- **IPID** (Issuer of Patient ID)
- **Accession**
- **Date - Time**
- **Last Action**
- **Referring Physician**
- **Modality**
- **Description [Procedure]**
- **Station Name**
- **Institution Name**
- **Institution Group**
- **Licensure Region**
- **Priors**
- **Images**
- **Order Priority**
- **Patient Location**
- **Patient Class**
- **Order Status**
- **Reading Pool**
- **Series with Images**
- **Due In**
- **Reading Physician**
- **Objects**
- **Availability**
- **Communication Status**
- **Connection Status**
- **Reservation Status**
- **Image Transfer Status**
- **Study Locking Status**
- **ER Status**
- **Order Match Status**
- **Update Order Status**
- **Prefetch Status**
- **Assignment Status**

NOTE: An additional data column labeled **Acuity** may be present if the optional **Merge RadStream** feature has been enabled.

NOTE: Additional custom data columns may be configured on a site-by-site basis

NOTE: Column headers for the various status dimensions (Communication, Connection, Reservation, Image Transfer, Study Locking and ER) may be displayed as text or as an icon, depending on how the worklist is configured. If the column header is configured to display as an icon, the values for that column will also be displayed as an icon, if set.

NOTE: Additional "Parameter" columns for the various status dimensions may be included to display the current value for a particular status (*e.g.*, the **Reservation Status** column might indicate that a study has a status of "Reserved" and the **Reservation Parameter** column might display the name of the user who has reserved the study).

NOTE: If a study has been edited in the Quality Control Editor after being imported to change the station name associated with that study, both the original and the new station name may appear in the Station Name column.

b. Due In Column

If your site's workflow includes deadline tracking due to **Service Level Agreements** (SLAs), the **Due In** column will let you keep track of studies that are required to be read within a certain deadline.

Depending on how your site is configured, up to four separate threshold limits (in minutes), each with its own display color, may be tracked in the Due In column. For example, if the SLA is set to 30 minutes, the Due In column might display a **GREEN** background when 10 minutes are remaining, a **YELLOW** background when 5 minutes are remaining and a **RED** background when 1 minute is remaining.

In addition to the configured color and the amount of time remaining until due (or time past due), the Due In column will display the following information as "hover" text when the mouse cursor is placed over it:

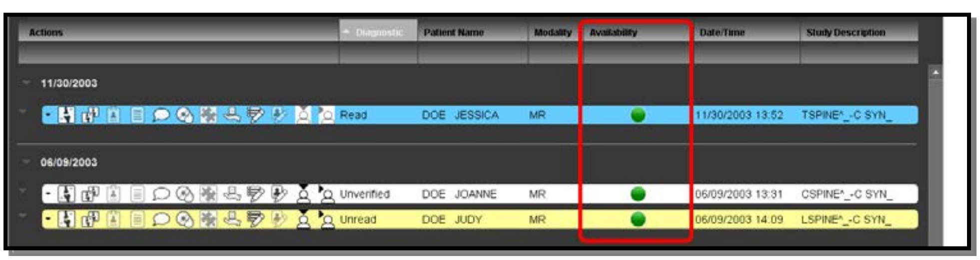
Value	Description
Arrived	The time the last image was received for the study plus the Inactivity Timeout period configured for your site.
Due By	The "Arrived" time plus the SLA value defined for the study's Priority.
Completed	The time the study was transitioned to (or past) the diagnostic status configured for your site to indicate completion.

Note the following:

- If there is no order associated with a study, the study will be considered "Routine" priority and the SLA will be whatever is currently configured for the Routine priority.
- If a new or updated order is associated with a study and that order contains a priority, the study Due In time will be updated.
- If a new image is received for a study that is not yet complete, the "Arrived" and "Due By" times will be updated.
- If a new Presentation State or Key Object is received for a study that is not yet complete, the "Arrived" and "Due By" times will be not be updated.
- Depending on how your site is configured, the "Arrived", "Due By" and "Study Completion" times will be not updated may or may not be updated if a new image arrives for a study that is complete.
- If a new PR or KO arrives for a study that is complete, the "Arrived" and "Due By" times will be not updated and the Study Complete value will not be cleared.

c. Availability Column

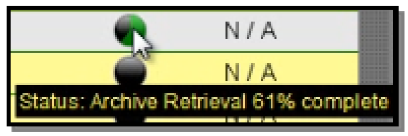
If Merge PACS has an archive configured, individual worklists can be configured to include an **Availability** column, as in the following example:



Availability Column

The Availability column shows an availability status indicator for each study. The appearance of the indicator indicates the availability of the study as follows:

Indicator	Color	Description
	Green	The study is available online for viewing.
	Black	The study is currently offline and not available for viewing.
	Blue	A request to retrieve the study has been submitted, but the retrieval process has not yet started.
	Black / Green	The study is currently being retrieved from the archive. Note that the percentage of green shown will change to indicate the progress of the retrieval process. Hovering your mouse cursor over the indicator will cause the exact percentage to be shown in a tool-tip window, as in the following example:



Retrieval Progress

Indicator	Color	Description
	Orange	Images for this study are currently being imported into Merge PACS for the first time or additional images are currently being added to an existing study.
	Red	Retrieval of the study from the archive has completed, but with errors (either fewer images were received than expected or all images failed compression)
	Gray	The availability of the study is currently unknown (this may occur during timeout or error scenarios). Clicking the **Availability** column header will refresh the data.

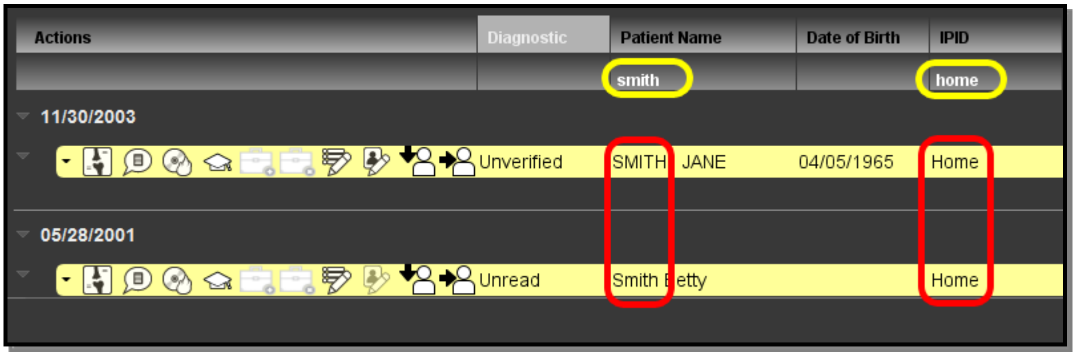
d. Sorting by Data Column

You can sort a worklist by clicking on any of the data column headings. Clicking on the column heading a second time will reverse the direction of sorting

NOTE: If the worklist is displayed in Worklist View as opposed to Patient List View, as described in 3.6.8 below, the data will be sorted separately within each status group and for each day and not for the entire worklist.

e. Searching within a Data Column

You can temporarily narrow the entries in a given worklist by entering text to be matched in the fields beneath one or more of the column headings, as in the following example:



Searching within Data Columns

- Filtering will occur as you enter the text; there is no need to press the **Enter** key.
- The search will match any part of the word or words in the column (*e.g.*, “smith” will match both “Gold**smith**” and “**Smith**field”).
- In general, the search will match the actual text in the column. For example, if dates are displayed in mm/dd/yyyy format and you want to filter the results by June 29, you will have to enter “06/29” instead of “June 29”.
- The search does, however, support word separation (e.g., entering “J Doe” and “Doe J” will both work to display “Jane Doe”, “Jessica Doe” and “Jonathan Doe”).
- You can filter by multiple columns at the same time by entering text in more than one fields, as in the example shown above.
- Filtering a worklist will cause the worklist count in the window title bar to be updated to match the number of studies currently being displayed.
- Once you have filtered on one or more columns, a new **Clear Filter** link will be displayed that will let you remove all filters and return to the original worklist display, as in the following example:

Clear Filter Link

f. Editing Data Columns

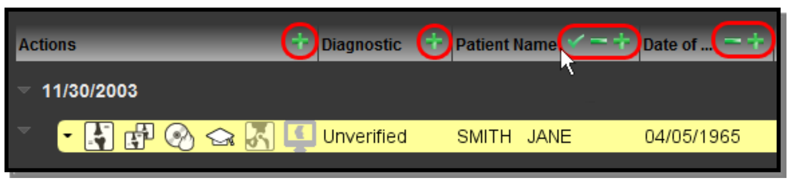
If desired, you can edit the display of any worklist to add or remove data columns, change the order in which the columns appear and/or change the width of one or more columns.

NOTE: Any change made to a **RTWL** or **Teaching** worklist will only affect your view of that worklist and will not affect how other users view the same worklist. In addition, any future changes made to the underlying worklist by a PACS Administrator will not be reflected in your view of that worklist once you have made changes to it.

NOTE: Any changes made to a **Quick Filter Worklist** will change the actual definition of that worklist and will also be used by default for any Quick Filter searches you perform in the future.

NOTE: Default column settings can be restored from the **Available Worklist Panel**, as described in subsection 3.6.3 above.

To enable editing of the data columns, **right**-click on any column heading to activate the column editing controls for all columns, as in the following example:

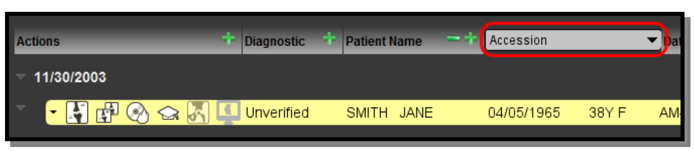


Column Editing Controls

Once column editing has been enabled, you can do the following:

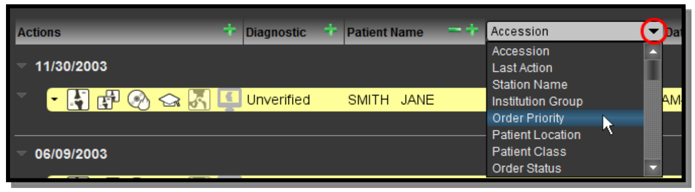
 To **remove** a column from the worklist display, click on the **Remove Column** icon, as displayed to the left, on that column's header. Note that the **Actions** and **Diagnostic** columns cannot be removed.

 To **add** a new column to the right of an existing column, click on the **Add Column** icon, as displayed to the left, on the column header to the left of where you would like the new column to appear. This will cause a new column to be displayed with a drop-down menu as a header, as in the following example:



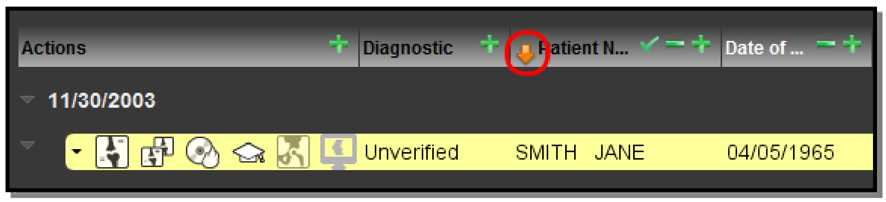
Newly Added Data Column

Click on the drop-down menu and select the desired column header, as in the following example:



Selecting Data Column to Add

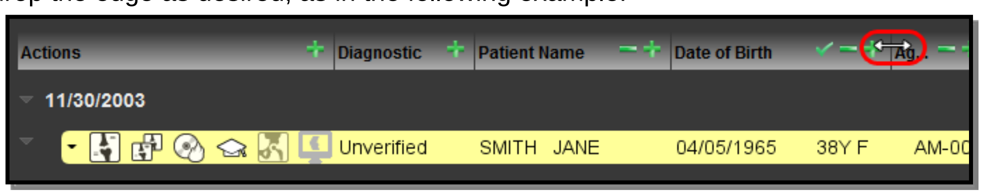
- To **move** a column to a different location, **left-**click on the column header and drag it to the desired location. As you are dragging the column header, its current location will be indicated by an orange arrow, as in the following example:



Moving a Column

When you release the mouse button, the column will be moved to the location indicated by the orange arrow.

- To **resize** a column, hover your mouse over the left or right edge of the column header until your mouse cursor changes to a special resize icon and then drag and drop the edge as desired, as in the following example:



Resizing a Column


To save all changes that have been made to all columns, click on the **Commit Changes** icon, as displayed to the left, on any column header.

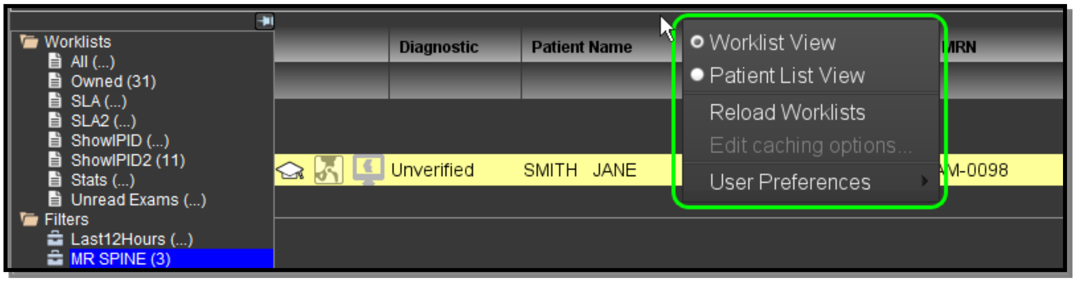
NOTE: If you want to cancel any changes that you have made before commiting them, you can temporarily select a different worklist from the **Available Worklists** panel, click on an exam in the search results or choose to reload all worklists, as described in paragraph 3.6.3.e above.

3.6.6. RealTime Study List Right-click Menus

In addition to the Available Worklists Right-Click Menu described in subsection 3.6.3 above, there are two other right-click menus available from within the RealTime Study List.

a. RealTime Study List Right-click General Menu

The **RealTime Study List Right-click General Menu** displays a number of options that apply to RealTime Study List in general and is accessible by clicking anywhere directly above the Data Column headers, as in the following example:



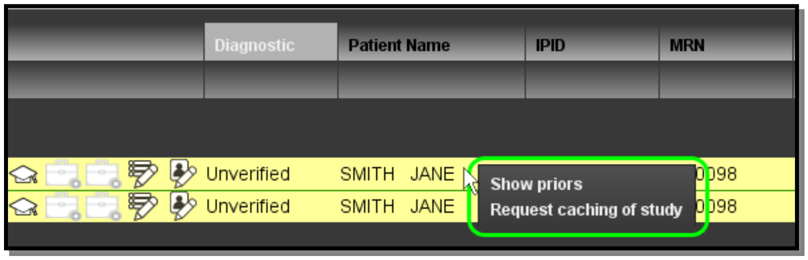
RealTime Study List Right-click General Menu

The RealTime Study List Right-click General Menu will display one or more of the following options, depending on your login privileges:

Option	General Description
Worklist View	Displays the current worklist in **Worklist View** mode, as described in subsection 3.6.7 below.
Patient List View	Displays the current worklist in **Patient List View** mode, as described in subsection 3.6.7 below.
Reload Worklists	Reloads all worklists available to you, as described in subsection 3.6.3.e above.
Edit Caching Options	Lets you configure Workflow Accelerator properties if caching has been enabled for this worklist, as described in subsection 3.3.11 above.
User Preferences	Let you set your personal Viewer preferences, as described in Chapter 25 below.

b. RealTime Study List Right-click Study Menu

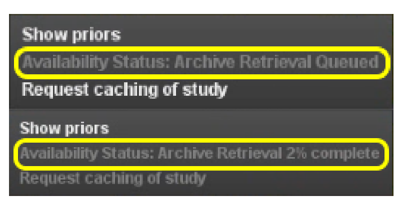
The **RealTime Study List Right-click Study Menu** displays options that apply to a specific exam or study and is accessible by right-clicking anywhere on the worklist entry for that exam or study, as in the following example:



Worklist Right-click Study Menu

The Worklist Right-click Study Menu will display one or more of the following options, depending on your login privileges:

<table>
<tr><th>Option</th><th>General Description</th></tr>
<tr><td>Show [Hide] Priors</td><td>Displays [or hides] prior exams, if any, for the selected study, as described in subsection 3.3.10, below.</td></tr>
<tr><td>Retrieve study from archive [Availability Status]</td><td>If Merge PACS has an archive configured and the primary study is currently archived and not available online, submit an archive retrieval request for this study.
Note the following:
This action is equivalent to clicking the Retrieve from Archive action icon, as described in subsection 3.6.4 above and would typically only be used if the Retrieve from Archive action icon is not enabled for a particular worklist.
If the study is currently online, the option will be grayed out and will read “Availability Status: Online”, as in the following example:

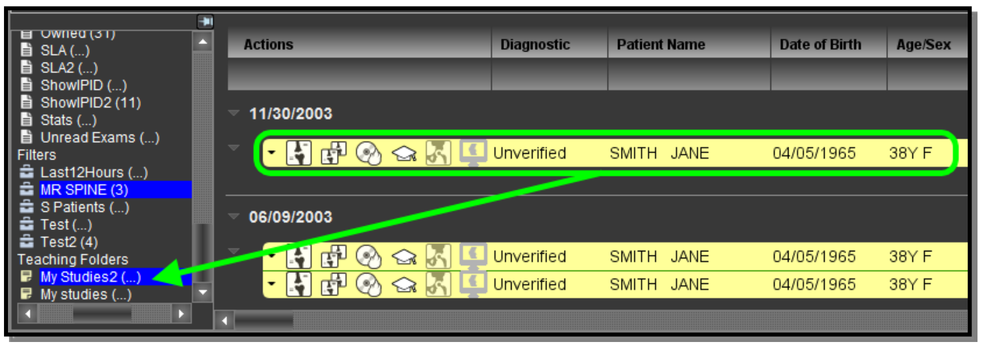

Study Is Online
If a retrieval request has been submitted but not yet completed, the option will be grayed out and will display the current status of the retrieval process, as in the following example:


Archive Retrieval Status</td></tr>
</table>

Option	General Description
Request caching of study	Manually request caching of the selected study's images if caching has been enabled for this worklist, as described in subsection 3.3.11 above. Note that this option will only be available for RTWL worklists.

3.6.7. Adding Studies to Worklists via Drag and Drop

You can quickly add a study from any worklist to any other worklist by clicking on the desired study's entry in the source worklist and dragging and dropping it to the target worklist in the Saved Worklist window, as in the following example:



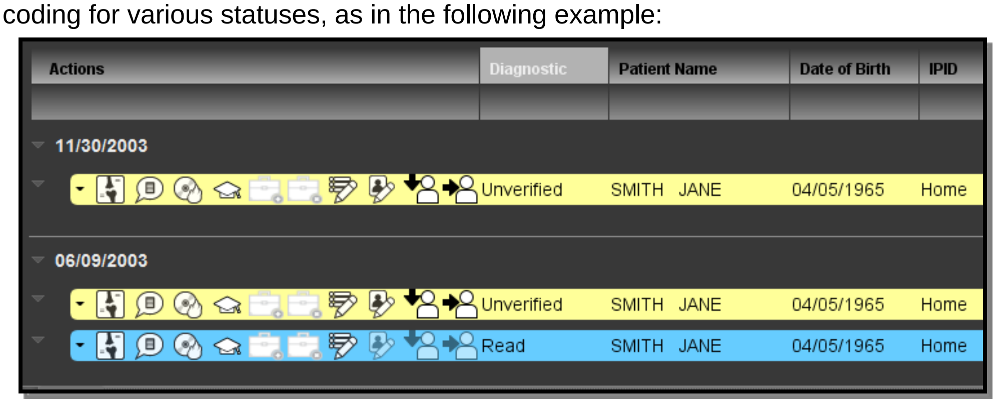
Dragging and Dropping to Another Worklist

In the example above, the study for the patient "SMITH JANE" is being dragged and dropped from a Quick Filter Worklist called "MR SPINE" to the a Teaching Worklist called "My Studies2."

3.6.8. Changing Between Worklist and Patient List View

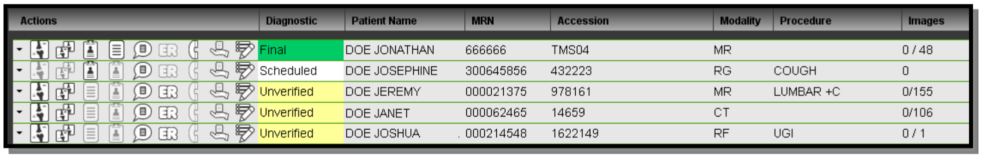
Depending on the type of worklist being viewed and how it has been configured, it will be displayed either in Worklist View mode or Patient List View mode:

- **Worklist View** divides the worklist into separate sections for each day with color-coding for various statuses, as in the following example:



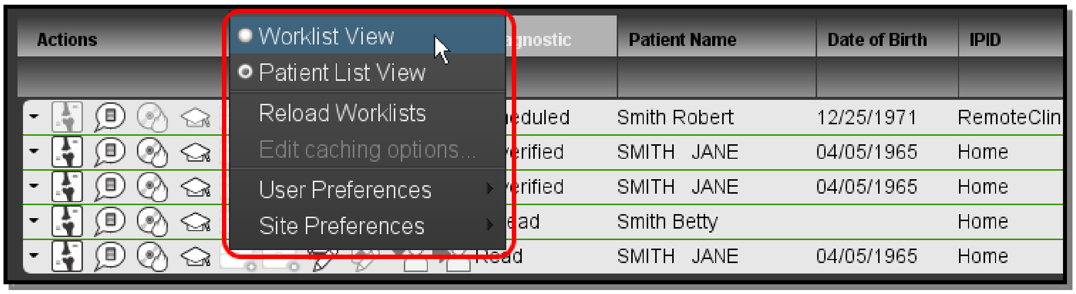
Worklist View

- **Patient List View** shows all the studies in the current worklist without them being grouped by day, as in the following example:



Patient List View

Regardless of how a worklist is displayed by default, however, you can select a different mode at any time from the RealTime Study List Right-click General Menu, as in the following example:



Selecting Worklist View

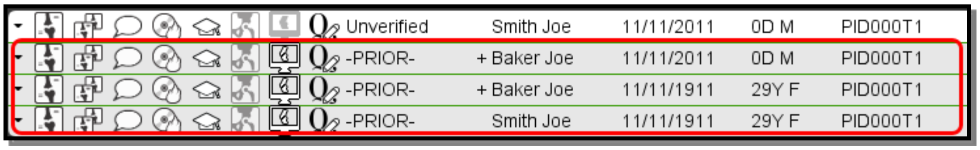
3.6.9. Viewing Prior Studies

If a particular study on a worklist has prior studies associated with it, you can add those prior studies to the worklist. This is done by clicking on the desired study with the **right** mouse button and then selecting the **Show Priors** option from the **Worklist Right-click Study Menu**, as shown in the following example:

Adding Prior Studies to Worklist

NOTE: The Show Priors option will be grayed out if there are no available priors that can be displayed.

The prior studies will then be listed below the current study in the worklist, as shown in the example below:

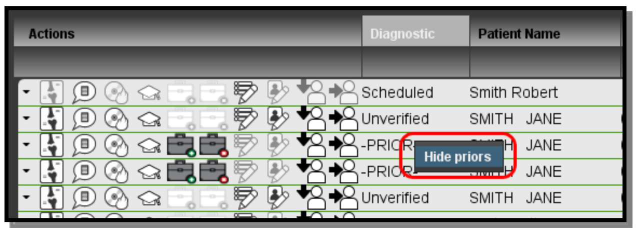


Prior Studies in the Worklist

NOTE: Individual RTWL worklists and Teaching Worklists can be configured by an Administrator to "automatically display priors." When this feature is enabled, all prior studies for a selected study will be displayed in the worklist when that study is opened into the Merge PACS Viewer, as described in Chapter 4 below.

NOTE: The list of prior is determined by the Patient Comparison Strategy and "Selection of Priors" option configured for your site, as described in Appendix C below.

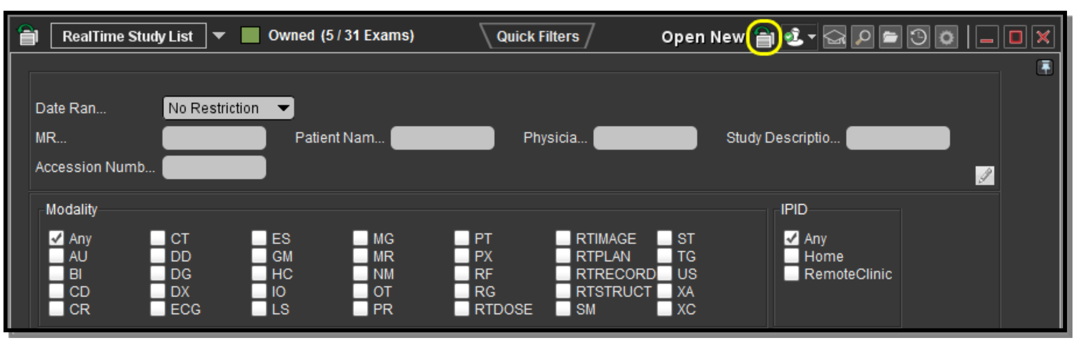
You can remove the prior studies from the worklist by clicking the **right** mouse button and selecting the **Hide Priors** option from the **Right-Click Worklist Menu**:



Hiding Prior Studies

3.6.10. Opening Multiple RealTime Study Lists

If desired, you can open additional RealTime Study Lists in their own separate windows. To do so, click on the **Open New RealTime Study List** icon at the top right of the Workstation Browser, as in the following example:



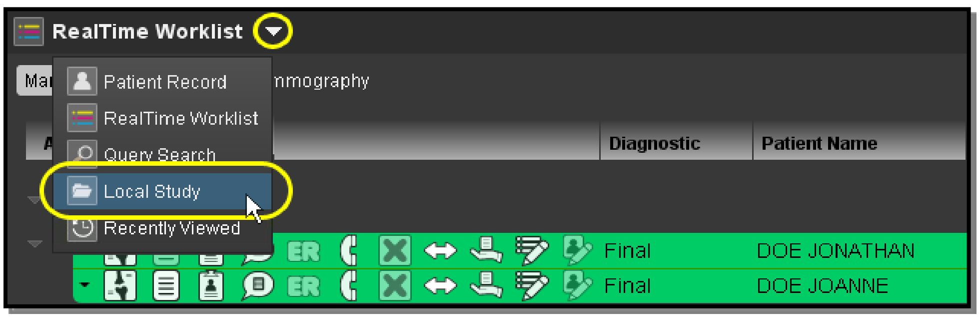
Opening a RealTime Study List in a New Window

NOTE: When you open a study from a secondary RealTime Study List in the primary Viewer window, the content of the secondary RealTime Study List will be displayed within the Workstation Browser instead of the original RealTime Study List as long as that study is open. Once the study is closed in the primary Viewer window, the original RealTime Study List will once again display in the Workstation Browser.

3.7. Local Study

The Local Study feature allows you to search for and open studies that have been saved to your local Workstation, a CD/DVD, or a network accessible drive. Depending on your user privileges, you can choose to have these local studies imported into the Merge PACS Server as well as search for non-DICOM images that can be imported into the Merge PACS Server as a new study.

Local Study is accessible from the Merge PACS Browser by selecting **Local Study** from the drop-down menu at the top of the Workstation Browser, as in the following example:



Accessing Local Study

The Local Study screen will then be displayed within the Browser, as in the following example:

Local Study Screen

3.7.1. Viewing and Importing DICOM Studies

a. Searching for Studies

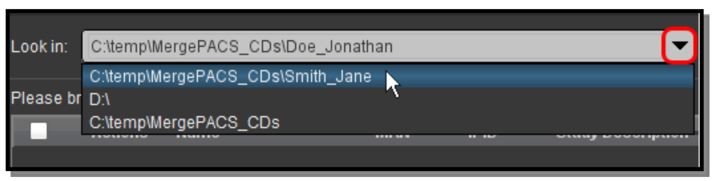
NOTE: Depending on how your system is configured, the Merge PACS Workstation may automatically search the CD drive for a CD containing studies when you first access the Local Study screen.

There are two ways to search for studies from the Local Study screen:

- The **Look In Folder** option lets you to specify the location where the desired study is stored, as follows:
    - If you know the exact name of the folder, you can enter it directly in the **Look in** field, as in the following example:

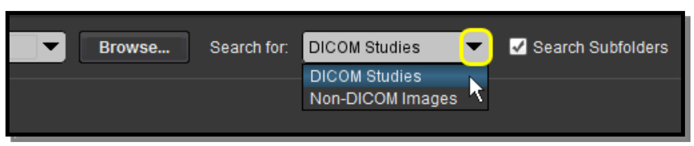
Entering the Specific Folder

You can also select from a list of recently opened folders that contained studies from the drop-down **Look in** menu, as in the following example:



Listing for Specified Study

    - Make sure that the **DICOM Studies** option is selected from the drop-down **Search for** menu, as in the following example:



Selecting What to Search For

    - If you want to search for all studies contained in subfolders within the main folder entered in the **Look In** field, click the **Search Subfolders** option, as in the following example:

Search Subfolders

    - Click the **Search** button to start the search.

- The **Browse to Folder** option allows you to navigate to the location where the desired study is stored:
  - From the main Local Study screen, make sure that the **DICOM Studies** option is selected from the drop-down **Search for** menu, as in the following example:

Search For DICOM Studies

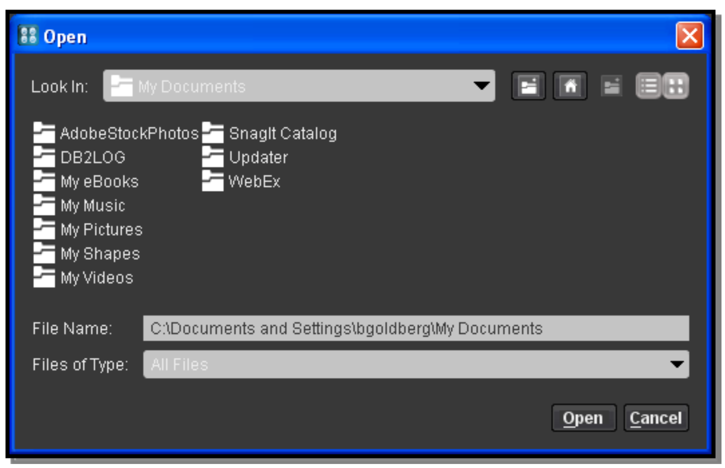
  - If you want to search for all studies/images contained in subfolders within the main folder entered in the **Look In** field, click the **Search Subfolders** option, as in the following example:

Search Subfolders

  - Click on the **Browse** button, as shown below:

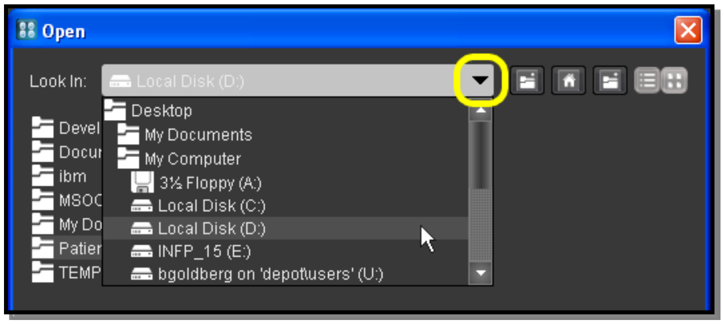
The Browse Button

This will cause the File Browser to be displayed in a separate pop-up window, as in the following example:



The File Browser Window

- From the drop-down **Look In** menu, select the drive where the desired study is located, as in the following example:

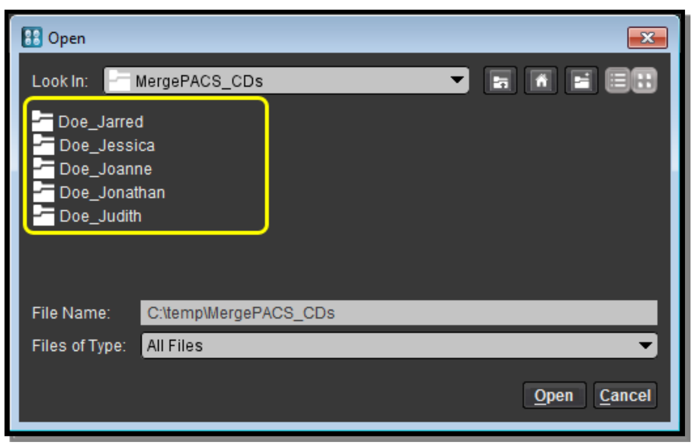


Selecting a Drive

- Once you selected a drive, the folders on that drive will be displayed in the main portion of the File Browser window, as in the following example:

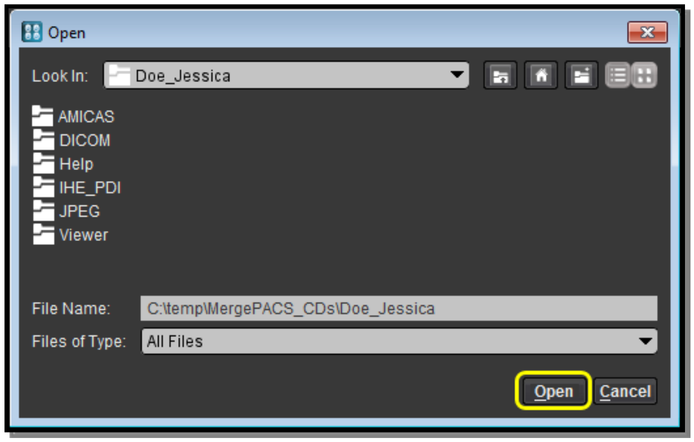
Folders on the Selected Drive

- Double-click on any folder to display the subfolders within that folder, as in the following example:



Subfolders on the Selected Drive

- When you are inside the folder containing the desired DICOM study or studies, click the **Open** button, as in the following example:



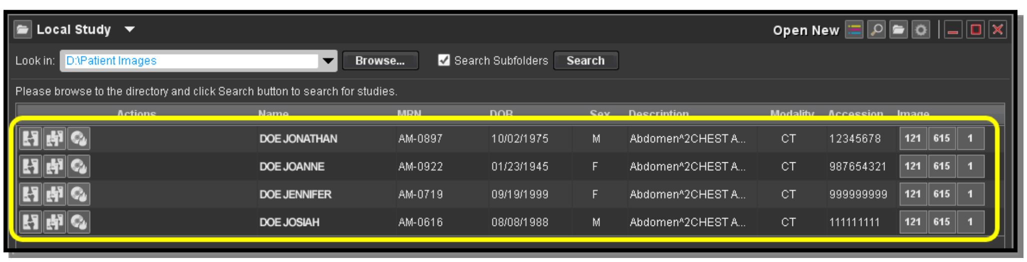
Opening the Selected Study

NOTE: If you selected the **Search Subfolders** option before browsing, you only need to open the top-level folder containing the subfolder(s) where the DICOM studies reside.

NOTE: You can also enter a directory name manually in the **File Name** field. If entering a directory network drive, however, the drive must be to a mapped letter drive.

b. Local Study Search Results Overview

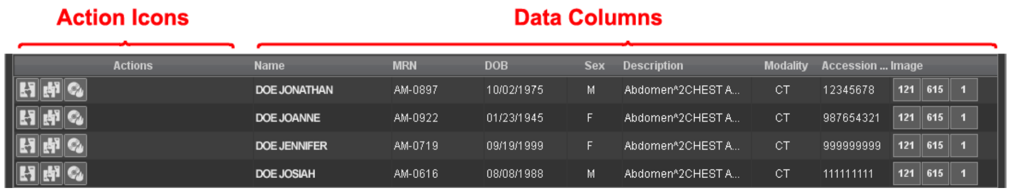
Once you have searched for and located one or more local studies, the results of that search will be displayed in the Local Study screen as shown in the example below:



Search Results for Local Studies

Note that each patient may have one or more series listed per study, and may also have more than one study listed.

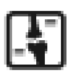
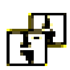
Each entry on the Local Study screen contains a set of **action icons** on the left that you can click on to perform different tasks, and **data columns** on the right that display information about each study, as shown in the following example:



Action Icons and Data Columns

c. Action Icons

For each study listed on the Local Study screen, one or more of the following action icons may be available, depending on the study, how your system is configured and your login privileges:

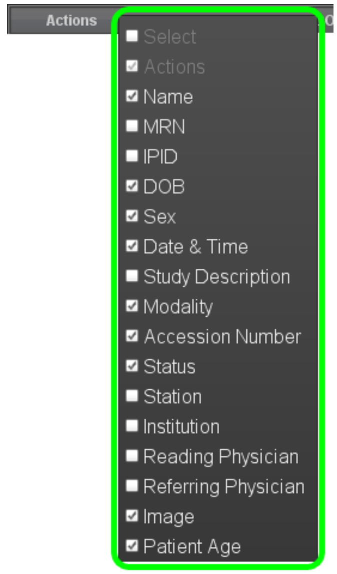
Action Icon	Name	General Description
	**Open Study**	Open study in the primary Merge PACS Viewer window. Note that you can also open a study by clicking on the patient's name or clicking on one of the icons in the Image column.
	**Open Study in Secondary Viewer**	Open the study in a Secondary Merge PACS Viewer window. This feature is typically used when you are already viewing a study and want to open this study in a secondary Viewer without exiting the previous study. Note that each currently open study will have a separate navigation tab associated with it within the Patient Record, as described in subsection 3.9.1 below.
	**Burn CD**	Add the selected study (together with any priors) to the Burn CD dialog's Study List. Note that multiple studies from multiple patients can be added to the same Burn CD Study List. For details on burning patient images onto a CD, see Chapter 14 below.

d. Data Columns

The following general data columns can be displayed on the Local Study Search Results Page:

- **Patient Name**
- **Date of Birth**
- **Accession Number**
- **Study Description**
- **Status**
- **Reading Physician**
- **Medical Record Number (MRN)**
- **Age**
- **Study Date/Time**
- **Image Count per Series**
- **Station Name**
- **Referring Physician**
- **Issuer of Patient ID (IPID)**
- **Sex**
- **Modality**
- **Objects**
- **Institution**

- You can **add or remove a data column** from the Local Study Search Results Page, click on any of the column headings once with the **right** mouse button to cause the Data Column Selection Menu to be displayed, as in the following example:



The Local Study Data Column Selection Menu

Check the box next to the column you would like to add, or uncheck the box next to a column you would like to remove.

- You can **reorder** the various data columns are displayed on the Local Study Search Results Page by clicking on a particular column's heading with the **left** mouse button and dragging the column to the desired location.
- You can **sort** the data on the Local Study Search Results Page by clicking on any of the column headings at the top of the screen except for Image Count.

e. Transferring a Single Study to the Merge PACS Server for Import

If you have the login privileges to import studies from a local source and the feature is enabled for your site, you can send studies one at a time to the Merge PACS Server for import.

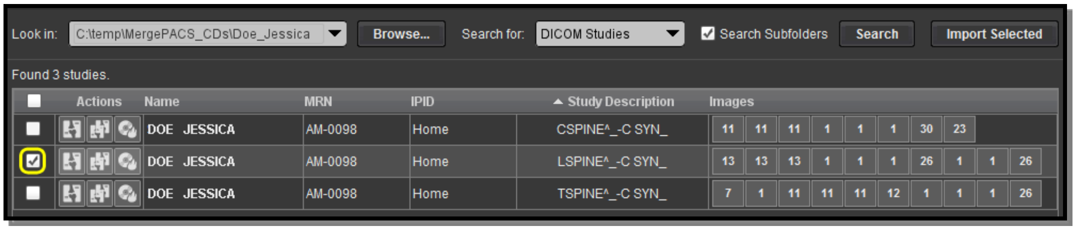
CAUTION: **If importing from a CD, the CD containing the study must still be in the CD drive in order to import the study, even if it is displayed in the Search Results section.**

CAUTION: **While you can import additional studies for a patient who already exists on the Merge PACS Server, you cannot import a study that already exists.**

NOTE: You can also transfer multiple studies at once, as described in paragaph 3.7.1.f below.

To import a single study into the Merge PACS Server:

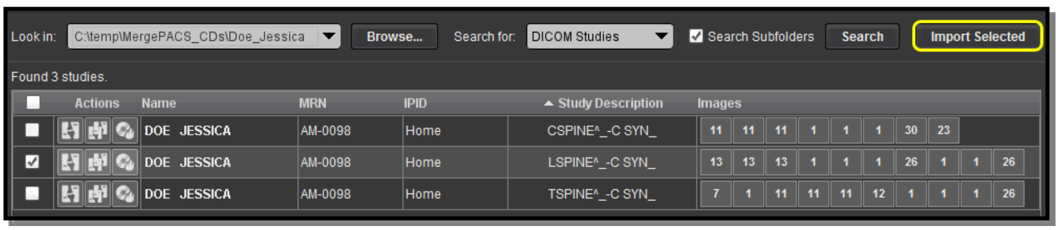
1. Select one a study from the Search Results section of the Local Study screen by clicking the checkbox next to the study you want to import, as in the following example:



Selecting a Study for Import

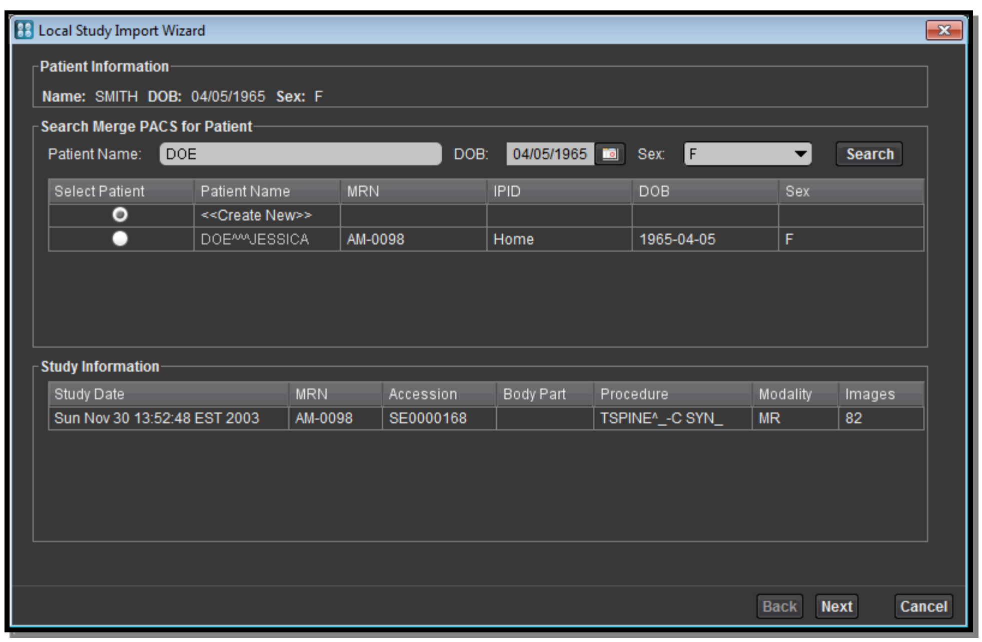
- All studies will be selected by default.
- You can deselect all listed studies by clicking on the checkbox to the left of the **Actions** column.

2. Click the **Import Selected** button, as in the following example:



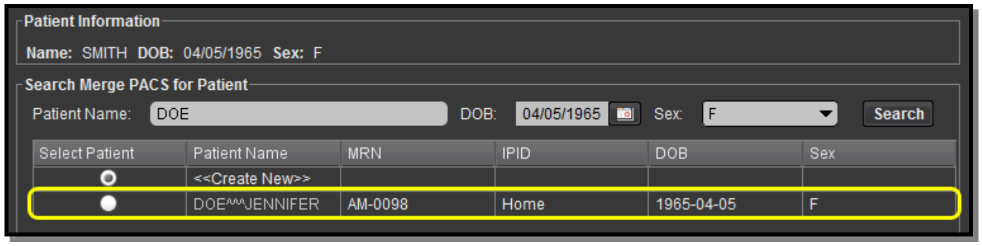
Import Selected

*The **Local Study Import Wizard** dialog is shown in a separate pop-up window, as in the following example:*



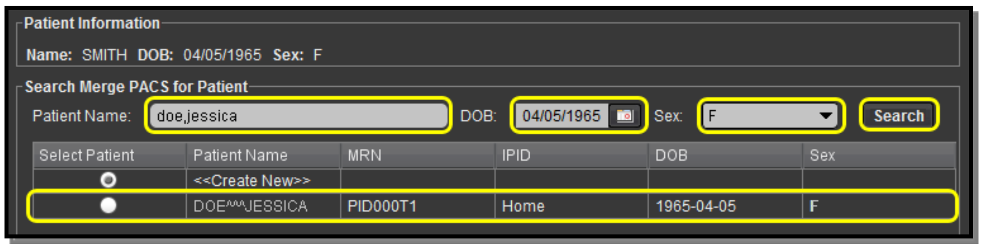
Local Study Import Wizard – Single Study

*The Local Study Import Wizard will automatically search the Merge PACS Server to see if a patient already exists with the same **Name**, **Date of Birth** and **Sex** as the selected study. If one or more matches are found, they will be listed as in the following example:*



Existing Patient on the Merge PACS Server

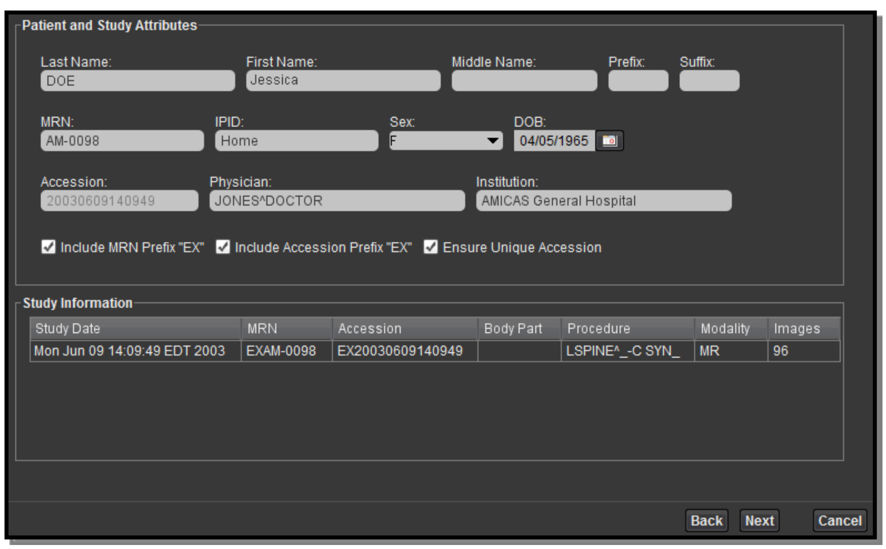
3. If no match is found automatically, or if the wrong patient is listed, you can use the query fields at the top of the screen to search for a different patient, as in the following example:



Searching for a Patient on the Merge PACS Server

4. If this patient does not already exist on the Merge PACS Server, leave the default **<<Create New>>** option selected in the **Select Patient** column; otherwise, select the desired patient from the list by clicking the radio button for that patient in the **Select Patient** column.
5. When finished, click on the **Next** button at the bottom of the window.

   *The **Patient and Study Attributes** screen will be displayed, as in the following example:*



Local Study Import Wizard – Patient and Study Attributes

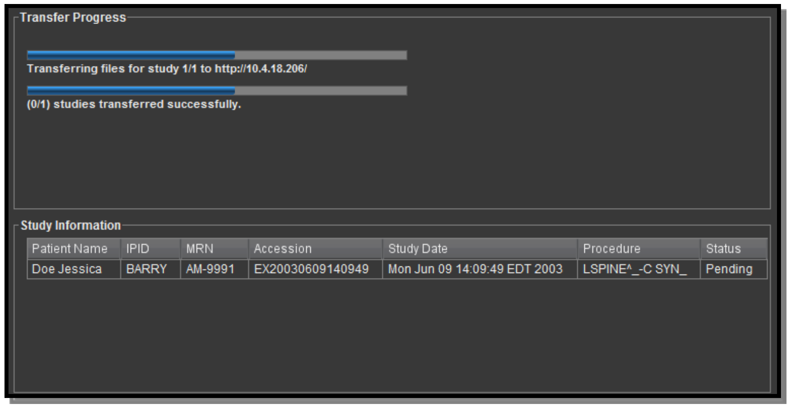
Enter as much information for this patient as possible, keeping the following in mind:

- One or more of the fields will be populated based on the local study information (if <<Create New>> was selected) or based on the information for this patient already on the Merge PACS Server (if an existing patient was selected).
- If necessary, the various demographic fields should be edited to match your internal records or system.
- If this patient exists on the Merge PACS Server, only the **Physician**, **Institution** and **Accession** fields are editable.
- The **IPID** and **Accession** fields may not be visible, depending on how Merge PACS is configured for your site.
- The following information is required:
  - The **patient name** (**Last Name** + **First Name** + **Middle Name** + **Prefix** + **Suffix**) cannot be completely empty and the combined fields cannot exceed 64 characters.
  - **MRN** (excluding prefix) cannot be empty and cannot exceed 64 characters (including prefix).
  - If included, **IPID** cannot be empty.
  - If included, **Accession** (excluding prefix) cannot be empty and cannot exceed 16 characters (including prefix).
  - For a new patient, the **MRN** plus **IPID** (if included) cannot match an existing patient on the Merge PACS Server.
- Depending on how Merge PACS is configured for your site, you may be able to select to include a specific prefix to the beginning of the **MRN** and/or to include a prefix to the beginning of the **Accession Number**. Note the following:
  - The **Include MRN Prefix** option will never be available for patients that already exist on the Merge PACS Server.
  - Your selections will be saved as the defaults for the next time you access the Local Study Import Wizard.
- Depending on how Merge PACS is configured for your site, you may be able to select the **Ensure Unique Accession** option.
  - If this option is selected, Merge PACS will determine the accession number for the imported study as follows:
    - If the local study's accession number, with or without prefix, does not match an existing accession number on the Merge PACS Server, that accession number will be used.
    - If the local study's accession number does match an existing accession number on the Merge PACS Server, Merge PACS will attempt to use the study's date/time value as the accession number, in the format yyyymmddhhmmss.
    - If the accession number based on the study's date/time already exists on the Merge PACS Server, the first two digits of the year will be replaced with two random uppercase letters until a unique accession number is found.
    - The **Accession** field will no longer be editable.

NOTE: If the **Ensure Unique Accession** option is not available, it will be enabled automatically behind the scenes and the **Accession** field will not be editable.

6. When finished, click on the **Next** button at the bottom of the window.

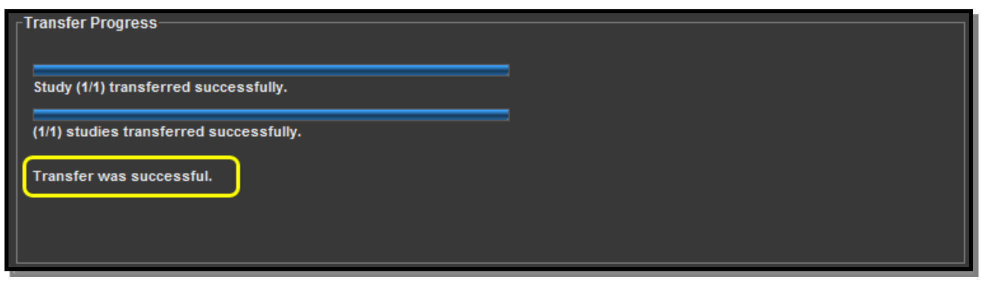
   The transfer process will begin and the progress of the transfer will be shown, as in the following example:



Local Study Import Wizard – Transfer Progress

NOTE: The attribute information for the study, including any modifications made, is shown in the **Study Information** panel at the bottom of the screen.

Once the transfer is complete, a message will be displayed indicating this fact, as in the following example:



Local Study Import Wizard – Transfer Progress

NOTE: If the transfer was not successful, an error message will be shown instead and you can click on the **Back** button at the bottom of the screen to return to the previous screen and fix any problems.

NOTE: A successful transfer of a study to the Merge PACS Server does not necessarily mean that the study will be successfully imported into Merge PACS. If there is a problem with the study (*e.g.*, the images match those of a study with a different accession number already in the system), the study will be jailed, as desribed in Chapter 18 below. If you do not see your studies after transferring them to the Merge PACS Server, contact your PACS Administrator to see if the problem can be fixed with the Problem Study Tool.

7. Click the **Finish** button at the bottom of the screen to exit the Local Study Import Wizard.

f. Transferring Multiple Studies to the Merge PACS Server for Import

If you have the login privileges to import studies from a local source and the feature is enabled for your site, you can send multiple studies at once to the Merge PACS Server for import.

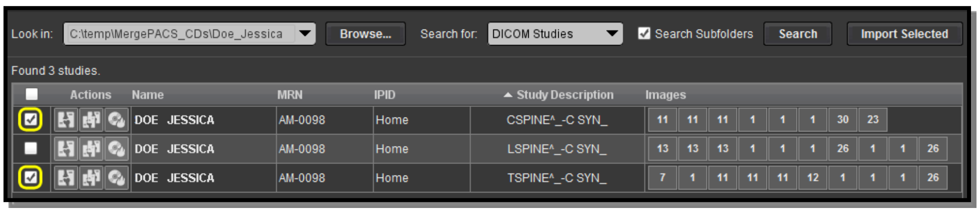
CAUTION: If importing from a CD, the CD containing the study must still be in the CD drive in order to import the study, even if it is displayed in the Search Results section.

CAUTION: While you can import additional studies for a patient who already exists on the Merge PACS Server, you cannot import a study that already exists.

CAUTION: All selected studies will be imported under the same patient, even if they have different attributes.

To import multiple studies into the Merge PACS Server:

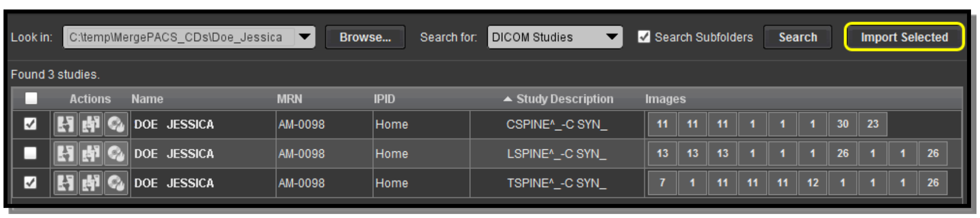
1. Select multiple studies from the Search Results section of the Local Study screen by clicking the checkbox next to each study you want to import, as in the following example:



Selecting Studies for Import

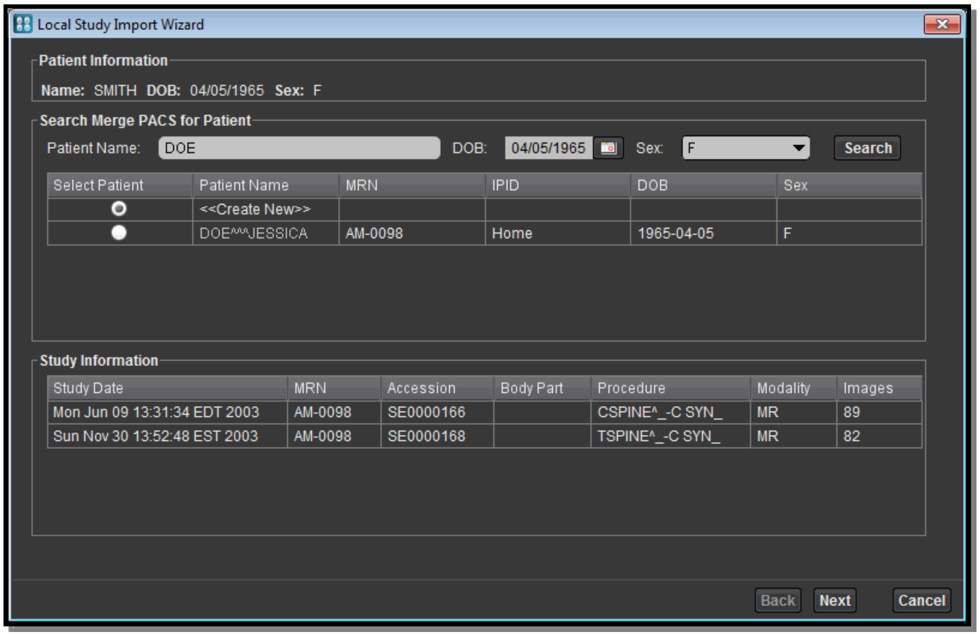
- All studies will be selected by default.
- You can select/deselect all listed studies by clicking on the checkbox to the left of the **Actions** column.

2. Click the **Import Selected** button, as in the following example:



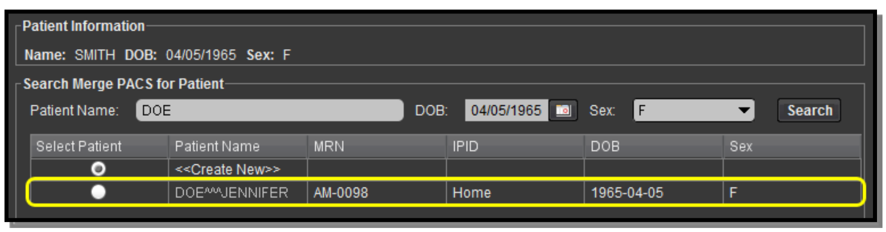
Import Selected

*The **Local Study Import Wizard** dialog is shown in a separate pop-up window, as in the following example:*



Local Study Import Wizard – Multiple Studies

*The Local Study Import Wizard will automatically search the Merge PACS Server to see if a patient already exists with the same **Name**, **Date of Birth** and **Sex** as the first selected study (i.e., the study highest in the Search Results section). If a match is found, it will be listed as in the following example:*



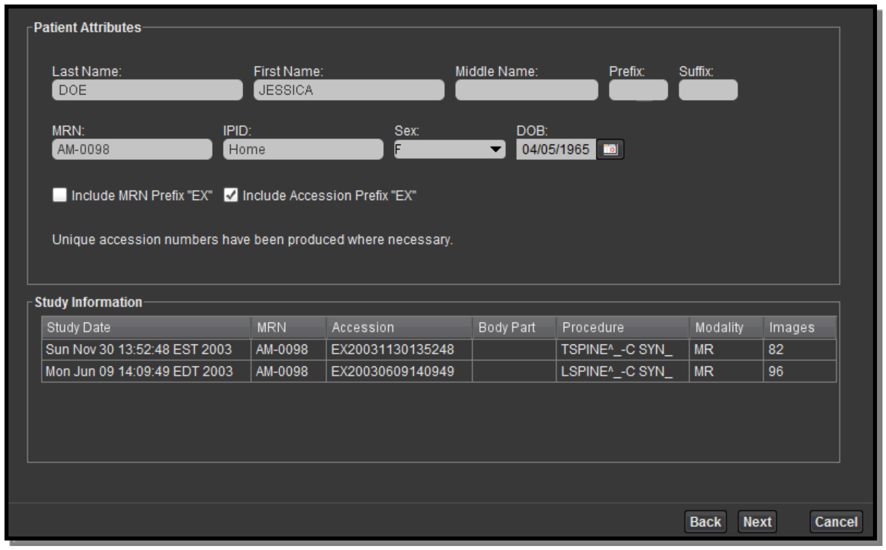
Existing Patient on the Merge PACS Server

3. If no match is found automatically, or if the wrong patient is listed, you can use the query fields at the top of the screen to search for a different patient, as in the following example:

Searching for a Patient on the Merge PACS Server

4. If none of the patients already exist on the Merge PACS Server, leave the default **<<Create New>>** option selected in the **Select Patient** column; otherwise, select the desired patient from the list by clicking the radio button for that patient in the **Select Patient** column.
5. When finished, click on the **Next** button at the bottom of the window.

   *The **Patient and Study Attributes** screen will be displayed, as in the following example:*



Local Study Import Wizard – Patient Attributes

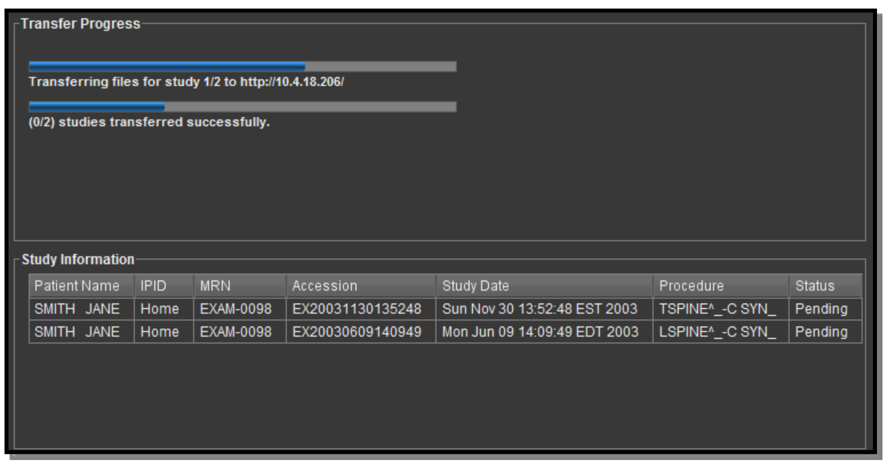
Enter as much information for this patient as possible, keeping the following in mind:

- One or more of the fields will be populated based on the local study information (if <<Create New>> was selected) or based on the information for this patient already on the Merge PACS Server (if an existing patient was selected).
- If you are creating a new patient, the various demographic fields should be edited to match your internal records or system (none of the fields will be editable if the patient already exists on the Merge PACS Server).
- The **IPID** field may not be visible, depending on how Merge PACS is configured for your site.
- The following information is required:
  - The **patient name** (**Last Name** + **First Name** + **Middle Name** + **Prefix** + **Suffix**) cannot be completely empty and the combined fields cannot exceed 64 characters.
  - **MRN** (excluding prefix) cannot be empty and cannot exceed 64 characters (including prefix).
  - If included, **IPID** cannot be empty.
  - For a new patient, the **MRN** plus **IPID** (if included) cannot match an existing patient on the Merge PACS Server.

- Depending on how Merge PACS is configured for your site, you may be able to select to include a specific prefix to the beginning of the **MRN** and/or to include a prefix to the beginning of the **Accession Number**. Note the following:
  - The **Include MRN Prefix** option will never be available for patients that already exist on the Merge PACS Server.
  - Your selections will be saved as the defaults for the next time you access the Local Study Import Wizard.
- Merge PACS will automatically determine the accession number for the imported study as follows:
  - If the local study's accession number, with or without prefix, does not match an existing accession number on the Merge PACS Server, that accession number will be used.
  - If the local study's accession number does match an existing accession number on the Merge PACS Server, Merge PACS will attempt to use the study's date/time value as the accession number, in the format yyyymmddhhmmss.
  - If the accession number based on the study's date/time already exists on the Merge PACS Server, the first two digits of the year will be replaced with two random uppercase letters until a unique accession number is found.

6. When finished, click on the **Next** button at the bottom of the window.

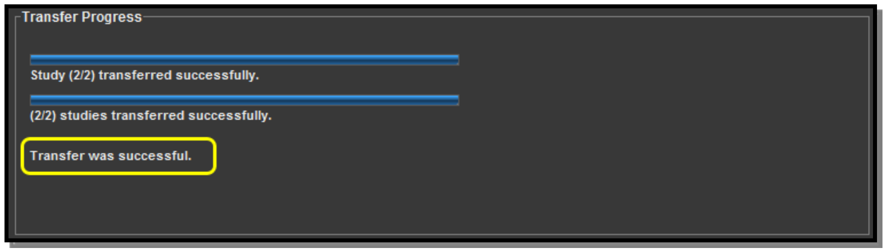
   The study import process will begin and the transfer progress will be shown, as in the following example:



Local Study Import Wizard – Transfer Progress

NOTE: The attribute information for the study, including any modifications made, is shown in the **Study Information** panel at the bottom of the screen.

Once the transfer is complete, a message will be displayed indicating this fact, as in the following example:



Local Study Import Wizard – Transfer Progress

NOTE: If the transfer was not successful for one of the studies, you will be given the option to abort or proceed with the other studies. If you choose to proceed, you can then click on the **Back** button at the bottom of the screen after the other studies have successfully been transferred to return to the previous screen and fix any problems with the one study.

NOTE: A successful transfer of a study to the Merge PACS Server does not necessarily mean that the study will be successully imported into Merge PACS. If there is a problem with the study (*e.g.*, the images match those of a study with a different accession number already in the system), the study will be jailed, as desribed in Chapter 18 below

7. Click the **Finish** button at the bottom of the screen to exit the Local Study Import Wizard.

3.7.2. Importing Non-DICOM Images

The Local Study page lets you search for non-DICOM images that can be imported into the Merge PACS Server as a new study. Note, however, that it is important to analyze your workflow and assess the risk of having multiple patient photos on a given piece of media.

Keep in mind the following:

- Placing non-dicom photos or documents of multiple patients on a single piece of media is inherently risky due to the lack of integral demographic data within the images.
- While naming of files on the source system could help, it is typically not practical with most cameras. In the absence of the ability to firmly name the images, it is recommended that your image capture protocol reduce the likelihood of mismatches. While there are many possible approaches, the following two approaches are commonly used:
    - Have an printed tag in the field of view of the photo. This would contain the demographics. This is often possible with external images.
    - Capture photos of the name plate tag separately before and after the sequence for the patient. For example image 6032.jpg would be the nameplate, images 6033-6040 would be patient images and image 6041 would be another nameplate. Then during the import process you would verify the nameplate images versus the demographics being added to the image.

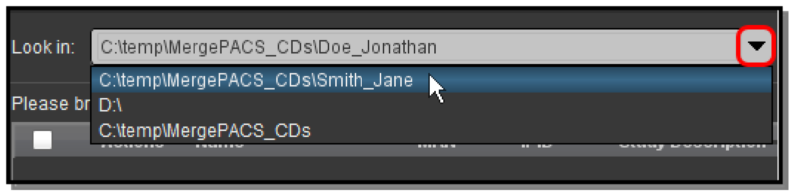
a. Searching for Non-DICOM Images

There are two ways to search for non-DICOM images from the Local Study screen:

- The **Look in Folder** option allows you to specify the location where the desired images are stored:
    - If you know the exact name of the folder, you can enter it directly in the **Look in** field, as in the following example:

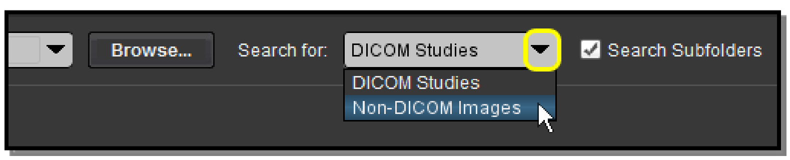
Entering the Specific Folder

You can also select from a list of recently opened folders that contained studies from the drop-down **Look in** menu, as in the following example:



Listing for Specified Study

- From the main Local Study screen, make sure that the **Non-DICOM Images** option is selected from the drop-down **Search for** menu, as in the following example:



Selecting What to Search For

The following non-DICOM image formats can be searched for (all other types will be ignored):

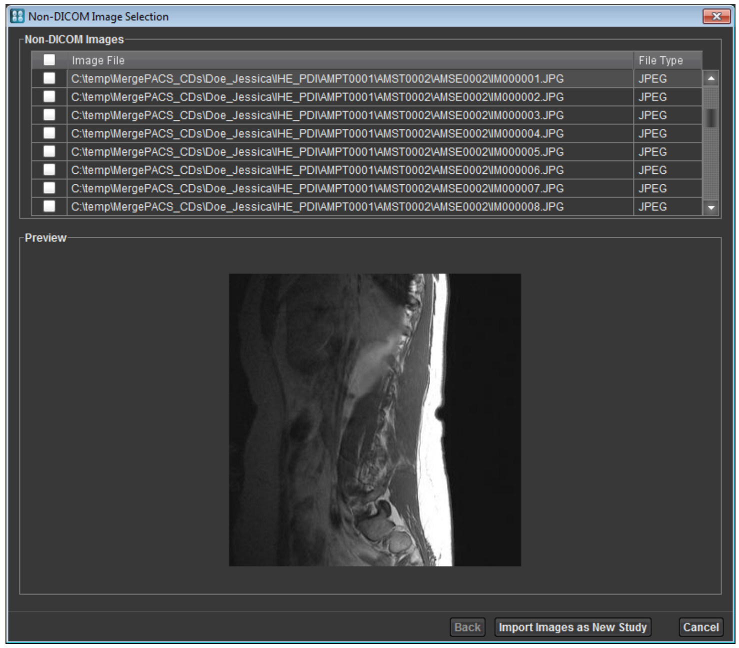
- **.jpg**
- **.jpeg**
- **.jp2**
- **.jpe**
- **.jfif**
- **.jif**

- If you want to search for all images contained in subfolders within the main folder entered in the **Look In** field, click the **Search Subfolders** option, as in the following example:

Search Subfolders

- Click the **Search** button to start the search.

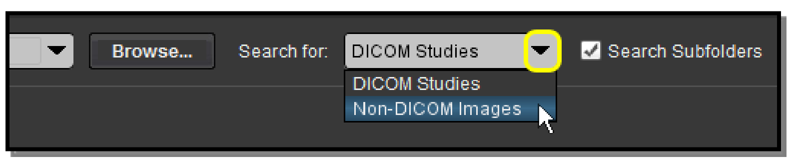
The eligible non-DICOM images in the selected folder(s) are shown in a pop-up ***Non-DICOM Image Selection*** *dialog, as in the following example:*



Non-DICOM Image Selection

Proceed to subsection 3.7.2.b below.

- The **Browse to Folder** option allows you to navigate to the location where the desired study is stored:
  - From the main Local Study screen, make sure that the **Non-DICOM Images** option is selected from the drop-down **Search for** menu, as in the following example:



Search For DICOM Studies

The following non-DICOM image formats can be searched for (all other types will be ignored):

- **.jpg**
- **.jpeg**
- **.jp2**
- **.jpe**
- **.jfif**
- **.jif**

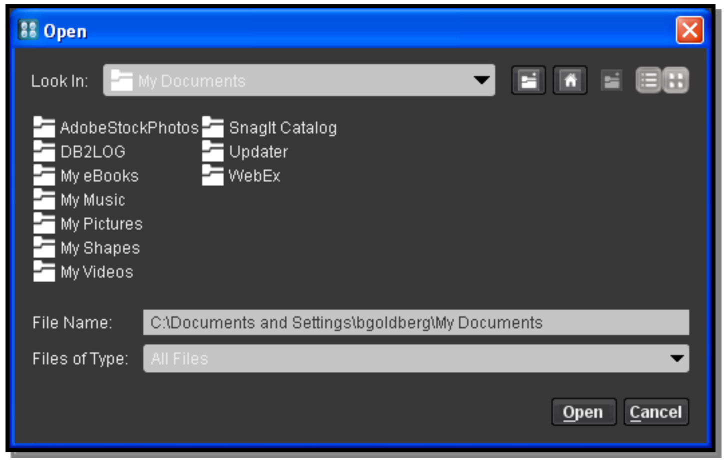
  - If you want to search for all images contained in subfolders within the main folder entered in the **Look In** field, click the **Search Subfolders** option, as in the following example:

Search Subfolders

- Click on the **Browse** button, as shown below:

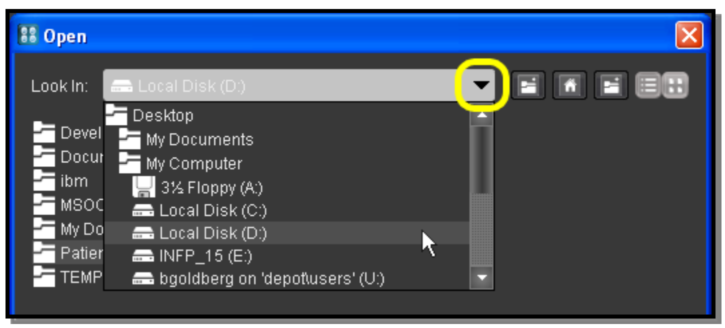
The Browse Button

- This will cause the File Browser to be displayed in a separate pop-up window, as in the following example:



The File Browser Window

- From the drop-down **Look In** menu, select the drive where the desired images are located, as in the following example:

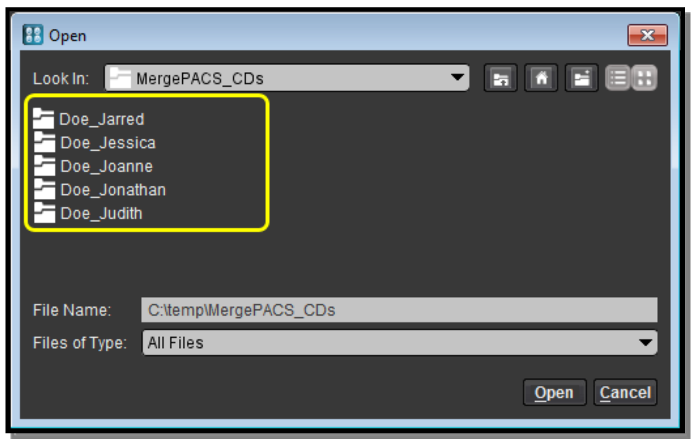


Selecting a Drive

- Once you selected a drive, the folders on that drive will be displayed in the main portion of the File Browser window, as in the following example:

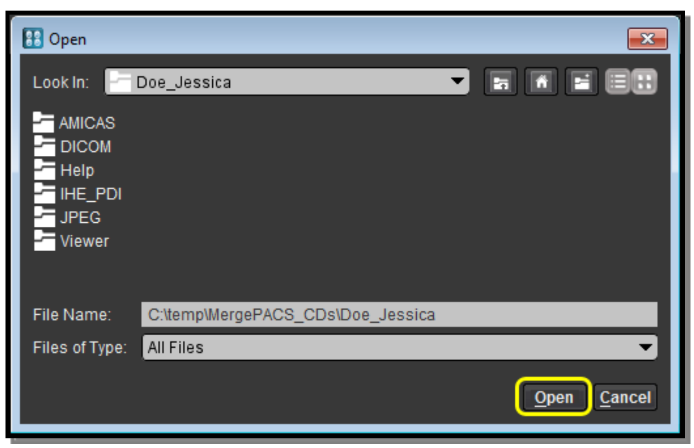
Folders on the Selected Drive

- Double-click on any folder to display the subfolders within that folder, as in the following example:



SubFolders on the Selected Drive

- When you are inside the folder containing the desired non-DICOM images, click the **Open** button, as in the following example:

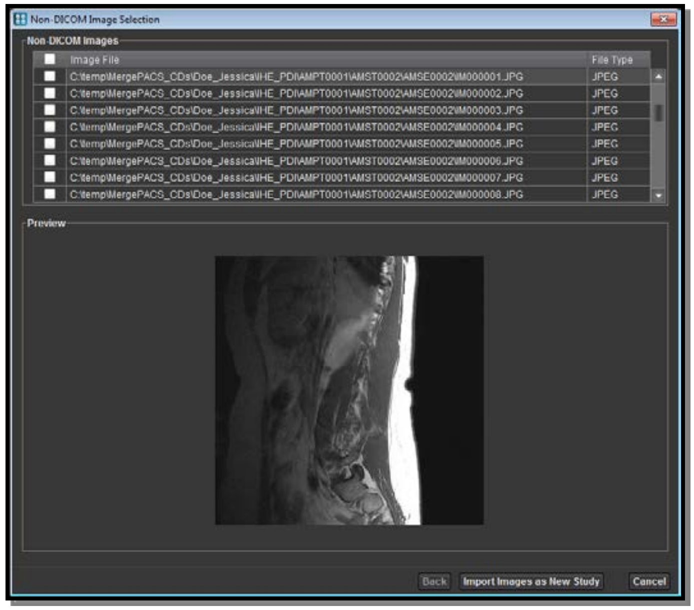


Opening the Selected Study

NOTE: If you selected the **Search Subfolders** option before browsing, you only need to open the top-level folder containing the subfolder(s) where the non-DICOM images reside.

NOTE: You can also enter a directory name manually in the **File Name** field. If entering a directory network drive, however, the drive must be to a mapped letter drive.

*The eligible non-DICOM images in the selected folder(s) are shown in a pop-up **Non-DICOM Image Selection** dialog, as in the following example:*

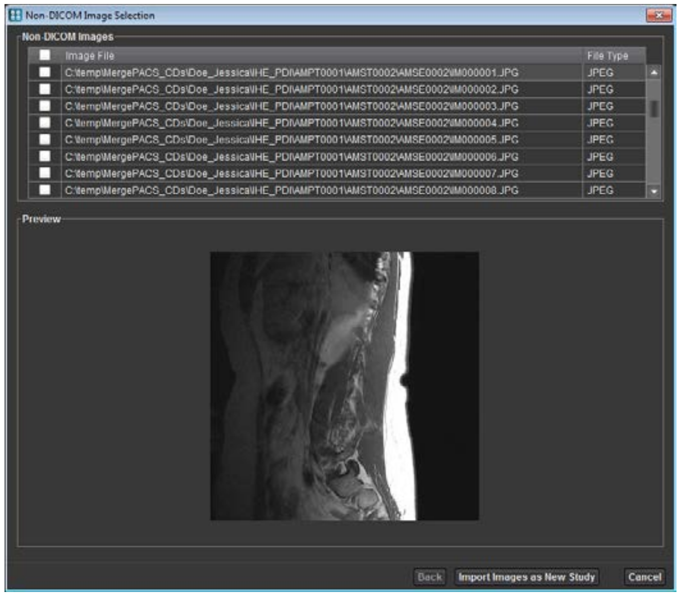


Non-DICOM Image Selection

Proceed to subsection 3.7.2.b below.

b. Non-DICOM Image Selection

The **Non-DICOM Image Selection** dialog displays all eligible non-DICOM images located in the specified folder(s), as in the following example:



Non-DICOM Image Selection

The **Preview** pane at the bottom of the dialog will show a preview of the image currently highlighted in the list of images.

- If an image is larger than the preview area, it will be scaled down to fit (with the aspect ratio of the image being preserved).
- Image previews are not available for JPEG 2000 (.jp2) files, but the images can still be imported into Merge PACS.
- If an image is identified as invalid for any reason, a preview will not be available and a message will be shown in the Preview pane stating that the image cannot be imported.

Select an image for previewing by either clicking on it with your mouse or using the keyboard arrow keys to move to it.

c. Transferring Non-DICOM Images to the Merge PACS Server

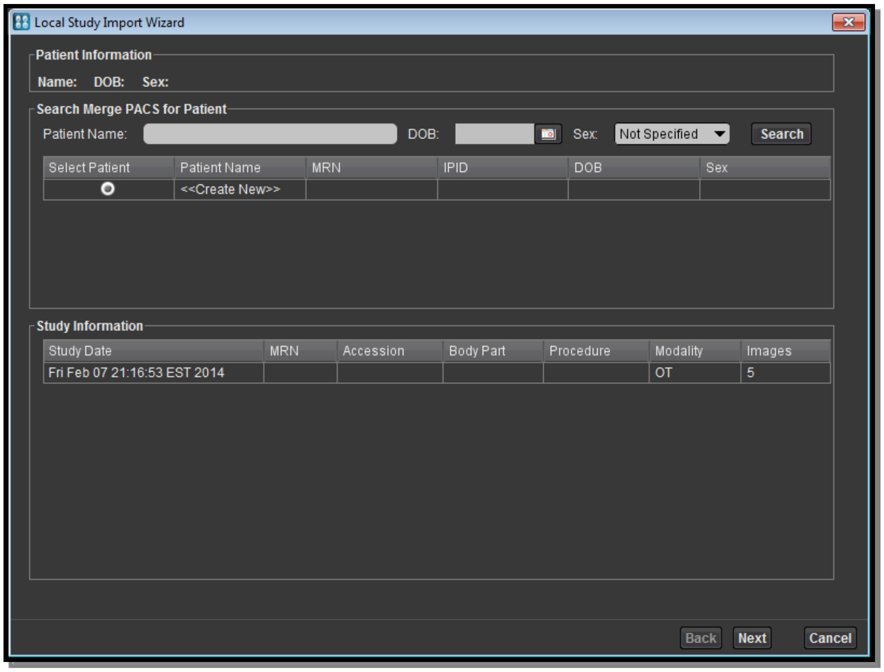
If you have the login privileges to import studies from a local source and the feature is enabled for your site, you can send a group of non-DICOM images to the Merge PACS Server for import as a new study.

CAUTION: **If importing from a CD, the CD containing the study must still be in the CD drive in order to import the study, even if it is displayed in the Search Results section.**

To transfer non-DICOM images to the Merge PACS Server:

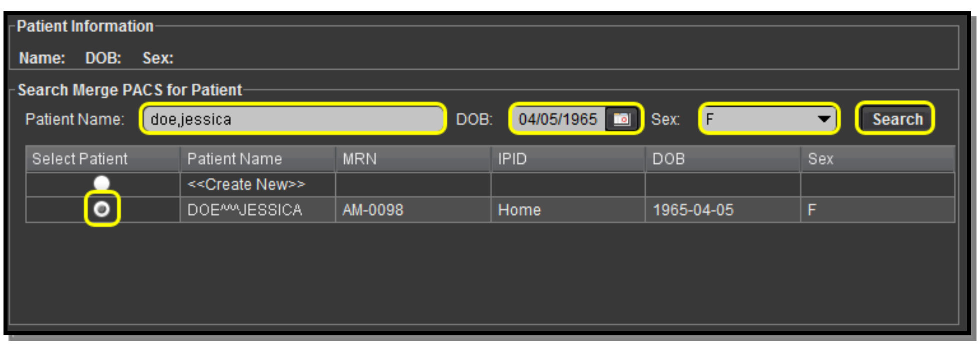
1. Select one or more images for transferring to the Merge PACS Server by either clicking the checkbox next to each image or by highlighting the image and pressing the keyboard SPACE bar.
2. Once you have selected all the images you wish to import, click the **Import Images as New Study** button at the bottom of the dialog.

   *The selected images will be converted to DICOM format and, when the conversion process is complete, the **Local Study Import Wizard** will be displayed, as in the following example:*



Local Study Import Wizard – Non-DICOM Images

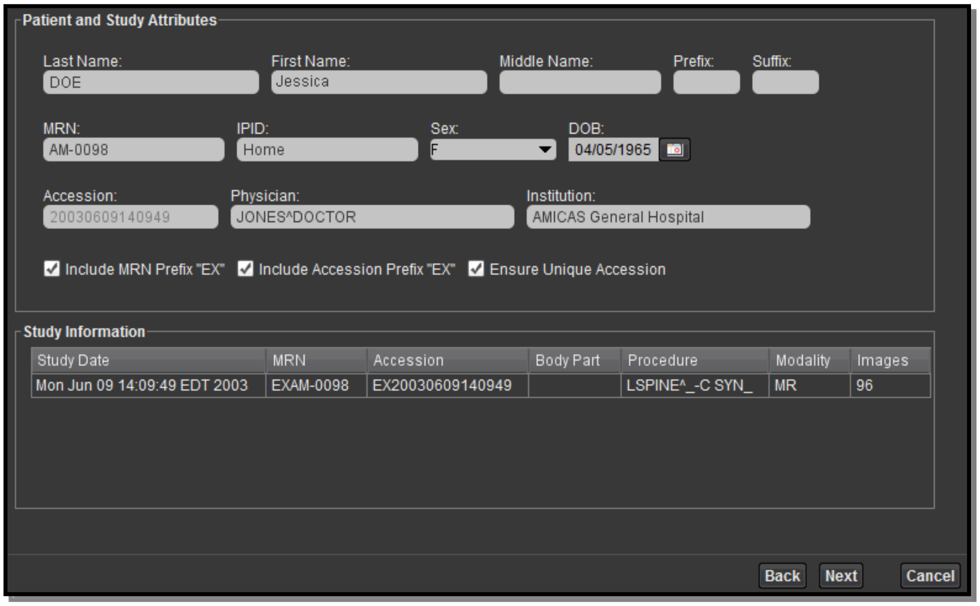
3. To import the new study under an existing patient on the Merge PACS Server, use the query fields at the top of the screen to locate the desired patient and then click on the radio button for that patient in the search results section, as in the following example:



Local Study Import Wizard – Selecting an Existing patient

4. To create a new patient on the Merge PACS Server to import the new study under, leave the search fields blank and select the **<<Create New>>** radio button.
5. When finished, click on the **Next** button at the bottom of the window.

   *The **Patient and Study Attributes** screen will be displayed, as in the following example:*



Local Study Import Wizard – Patient and Study Attributes

Enter as much information for this patient as possible, keeping the following in mind:

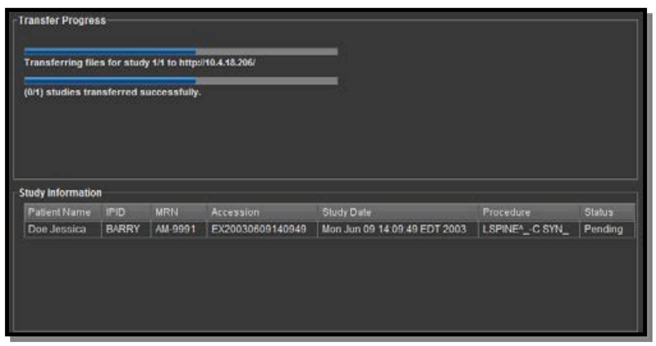
- One or more of the fields will be populated based on the local study information (if <<Create New>> was selected) or based on the information for this patient already on the Merge PACS Server (if an existing patient was selected).
- If necessary, the various demographic fields should be edited to match your internal records or system.
- If this patient exists on the Merge PACS Server, only the **Physician**, **Institution** and **Accession** fields are editable.
- The **IPID** and **Accession** fields may not be visible, depending on how Merge PACS is configured for your site.
- The following information is required:
  - The **patient name** (**Last Name** + **First Name** + **Middle Name** + **Prefix** + **Suffix**) cannot be completely empty and the combined fields cannot exceed 64 characters.
  - **MRN** (excluding prefix) cannot be empty and cannot exceed 64 characters (including prefix).
  - If included, **IPID** cannot be empty.
  - If included, **Accession** (excluding prefix) cannot be empty and cannot exceed 16 characters (including prefix).
  - For a new patient, the **MRN** plus **IPID** (if included) cannot match an existing patient on the Merge PACS Server.

- Depending on how Merge PACS is configured for your site, you may be able to select to include a specific prefix to the beginning of the **MRN** and/or to include a prefix to the beginning of the **Accession Number**. Note the following:
  - The **Include MRN Prefix** option will never be available for patients that already exist on the Merge PACS Server.
  - Your selections will be saved as the defaults for the next time you access the Local Study Import Wizard.
- Depending on how Merge PACS is configured for your site, you may be able to select the **Ensure Unique Accession** option.
  - If this option is selected, Merge PACS will create a unique accession number for the new study and the **Accession** field will not be editable.
  - If this option is not selected, you will need to enter information in the **Accession** field manually.

NOTE: If the **Ensure Unique Accession** option is not available, it will be enabled automatically behind the scenes and the **Accession** field will not be editable.

6. When finished, click on the **Next** button at the bottom of the window.

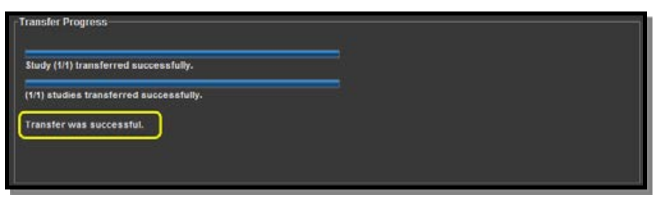
   The study import process will begin and the transfer progress will be shown, as in the following example:



Local Study Import Wizard – Transfer Progress

NOTE: The attribute information for the study, including any modifications made, is shown in the **Study Information** panel at the bottom of the screen.

Once the transfer is complete, a message will be displayed indicating this fact, as in the following example:



Local Study Import Wizard – Transfer Progress

7. Click the **Finish** button at the bottom of the screen to exit the Local Study Import Wizard.

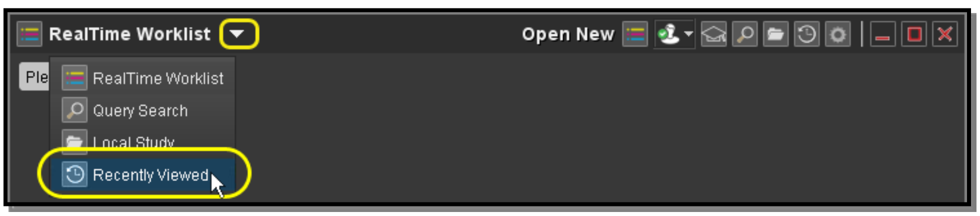
3.7.3. Opening Multiple Local Study Windows

If desired, you can open additional Local Study screens in their own separate windows. To do so, click on the **Open New Local Study** icon at the top right of the Workstation Browser, as shown below:

Opening a Local Study Query Page in a New Window

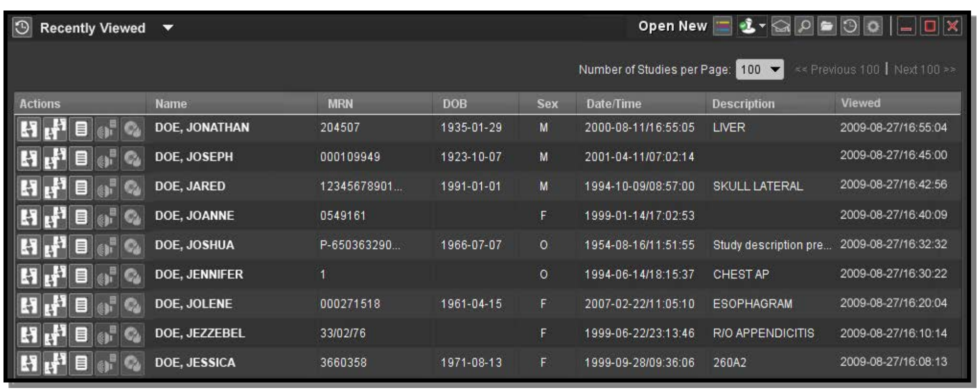
3.8. Recently Viewed Studies

The Recently Viewed Study feature lets you quickly access a list of studies that you have recently viewed. It is accessible from the Merge PACS Browser by selecting **Recently Viewed** from the drop-down menu at the top of the Workstation Browser, as in the following example:



Accessing Recently Viewed Studies

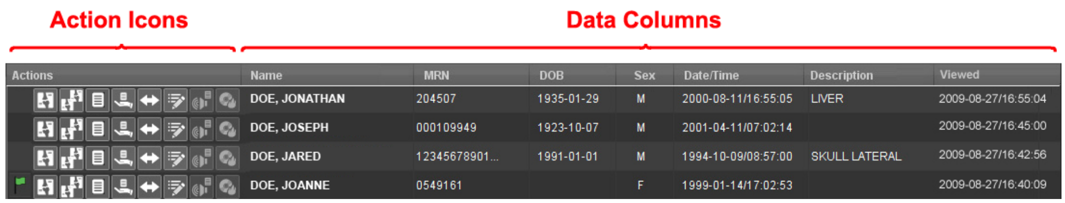
The list of recently viewed studies will then be displayed, as in the following example:



List of Recently Viewed Studies

Note that each patient may have one or more Series listed per study, and may also have more than one study listed.

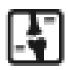
Each entry on the Recently Viewed Page contains a set of **action icons** on the left that you can click on to perform different tasks, and **data columns** on the right that display information about each study, as shown in the following example:

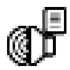
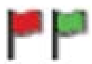


Action Icons and Data Columns

3.8.1. Action Icons

For each study listed on the Recently Viewed Page, one or more of the following action icons may be available, depending on the study and how your system is configured:

Action Icon	Name	General Description
	**Open Study**	Open study in the primary Merge PACS Viewer window. Note the following: • You can also open a study by clicking on the patient's name in the **Name** column or clicking on one of the icons in the **Image** column. • If Merge PACS has an archive configured and the primary study is currently archived and not available online, attempting to view a study will automatically trigger an archive retrieval request, as described in Chapter 17 below.
	**Open Study in Secondary Viewer**	Open the study in a secondary Merge PACS Viewer window in read-only mode. This feature is typically used when you are already viewing a study and want to open this study in a secondary Viewer without exiting the previous study. Note that If Merge PACS has an archive configured and the primary study is currently archived and not available online, attempting to view a study in a Secondary Viewer will automatically trigger an archive retrieval request, as described in Chapter 17 below.
	**View Reports**	Launch the Report Viewer as a separate pop-up window. For more information on using the Report Viewer, refer to Chapter 6 below.
	**Access Control**	Grant one or more users or groups access to this study/exam. For details on Access Control, see Chapter 11 below.
	**Associate/Dissociate Study**	Add the selected study to or remove the selected study from a specified worklist to which you have access. For details on associating and dissociating studies, see Chapter 7 below.

Action Icon	Name	General Description
	**Change Status**	Change the workflow status and/or selected HL7 attributes for a particular study directly from the Worklist without opening the study within the Merge PACS Viewer. For details on changing status and/or selected HL7 attributes, see Chapter 12 below.
	**Burn CD**	Add the selected study (together with any priors) to the Burn CD dialog's Study List. Note that multiple studies from multiple patients can be added to the same Burn CD Study List. For details on burning patient images onto a CD, see Chapter 14 below.
	**VoiceClip**	Listen to the audio annotation, if any, that has been recorded for this study. For details on using VoiceClip listen to audio annotations, refer to Chapter 9 below.
	**Warning/ Comments**	Launch the Comment Viewer for the selected study in a separate pop-up window to view system generated warnings and/or comments. Note that the appearance of the flag icon will change as follows:  The study has one or more jailed images.  The study has no jailed images but the most recent comment has been manually flagged by the commenter. Hovering your mouse over this icon will display the text of the warning or comment as a pop-up tool tip. For details on using the Comments Viewer, refer to Chapter 5 below. For details on viewing jailed images, refer to Chapter 18 below.

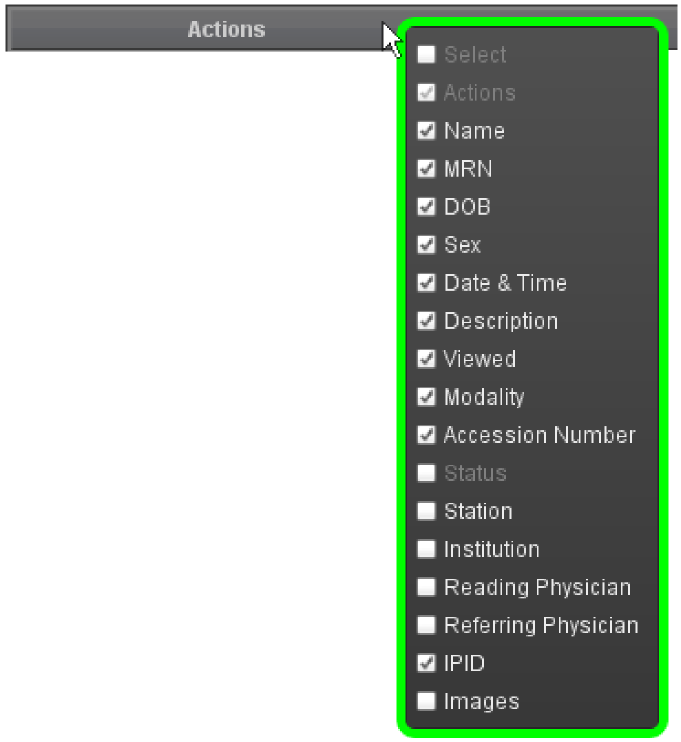
3.8.2. Data Columns

The following general data columns can be displayed on the Recently Viewed Page:

- **Patient Name**
- **Date of Birth**
- **Study Description**
- **Status**
- **Reading Physician**
- **Medical Record Number (MRN)**
- **Sex**
- **Modality**
- **Station Name**
- **Referring Physician**
- **Issuer of Patient ID (IPID)**
- **Study Date/Time**
- **Accession Number**
- **Institution**
- **Image Count per Series**

a. Selecting the Data Columns to Display

To add or remove a data column from the Recently Viewed Page, **right-click** on any of the column headings to cause the **Data Column Selection Menu** to be displayed, as in the following example:



The Recently Viewed Column Selection Menu

Check the box next to the column you would like to add, or uncheck the box next to a column you would like to remove.

b. Reordering Data Columns

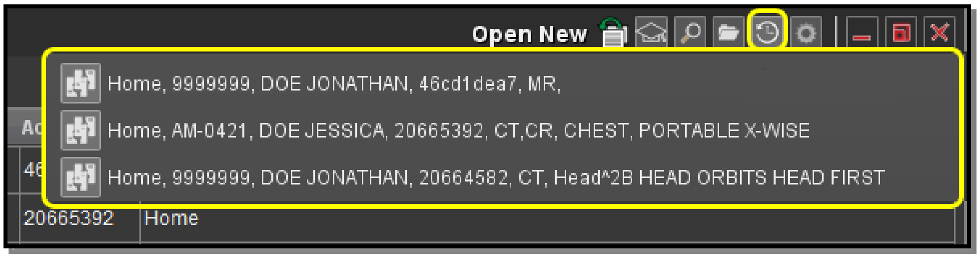
You can change the order in which the various data columns are displayed on the Recently Viewed Page by clicking on a particular column's heading with the **left** mouse button and dragging the column to the desired location.

c. Sorting Recently Viewed Studies

You can sort the data on the Recently Viewed Page by clicking on any of the column headings at the top of the screen except for Image Count.

3.8.3. Quickly Selecting a Recently Viewed Study

In addition to the Recently Viewed Page described above, you can also quickly select a recently viewed study via the **Recently Viewed Study** icon at the top right of the Workstation Browser. Clicking on this icon will cause a drop-down menu to appear that will contain up to the 20 most recently viewed studies, as in the following example:



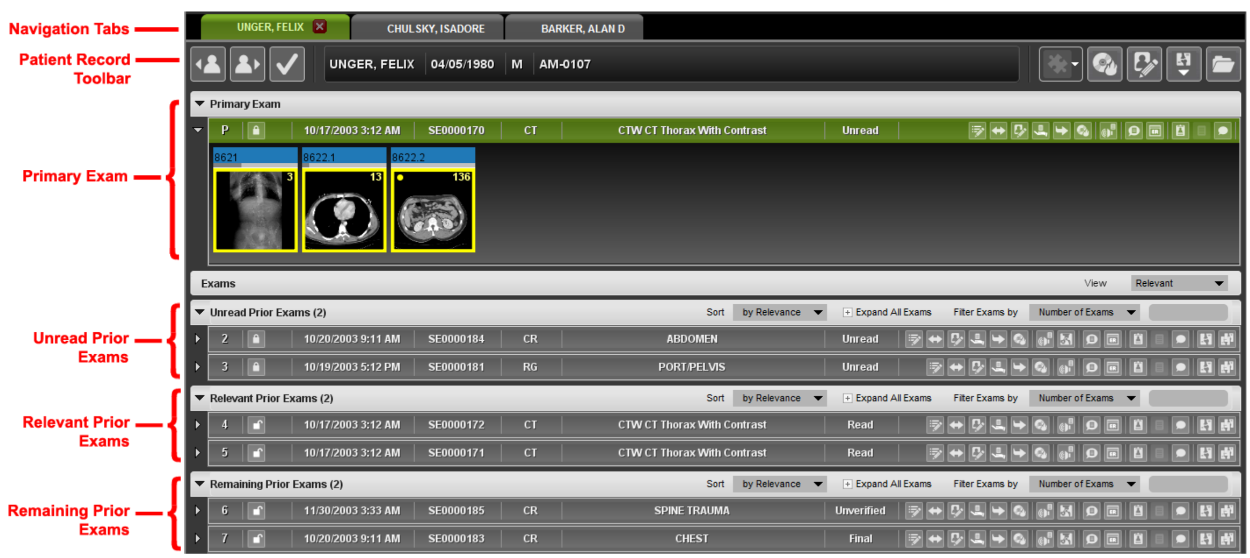
Selecting from a List of Recently Viewed Studies

Clicking on a study in the menu will open the study in a Secondary Merge PACS Viewer window.

3.9. Patient Record

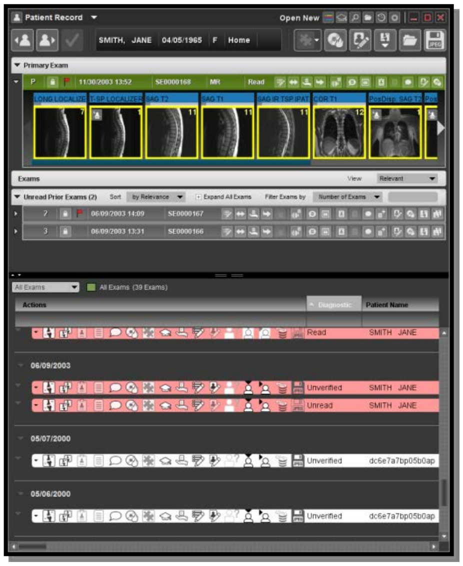
The Patient Record displays Series Navigation thumbnails for that study as well as any prior studies for the same patient. These Series Navigation thumbnails can be used to open the study into the Merge PACS Viewer or into a separate pop-up Series Viewport window.

Once a study has been launched in the Merge PACS Viewer, whether from RealTime Worklist or the Query Page, the Patient Record for that patient will automatically be displayed at the top of the Workstation Browser, as shown in the following example:

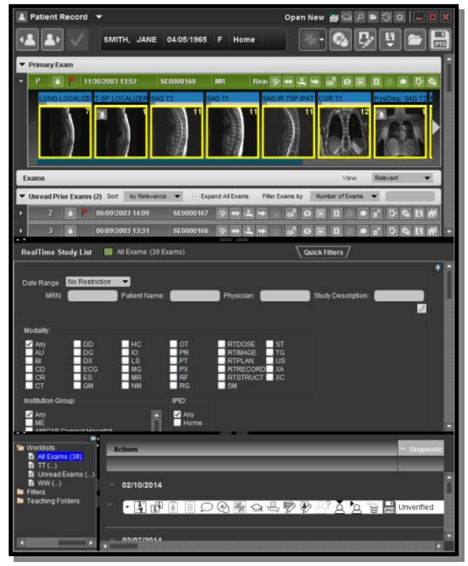


The Patient Record

If you use the Windows docking feature to dock the Patient Record to the left or right half of a monitor (*i.e.*, by clicking on the page's title bar and dragging it all the way to the left or right of the screen), the Patient Record will be displayed similar to one of following examples, depending on whether you have RealTime Worklist or Real Time Study List enabled:



Patient Record with Half Screen Docking (RTWL)



Patient Record with Half Screen Docking (RTSL)

NOTE: The docking feature is not supported in Merge PACS 6.6 with Windows 8.1.

The Patient Record has the following sections:

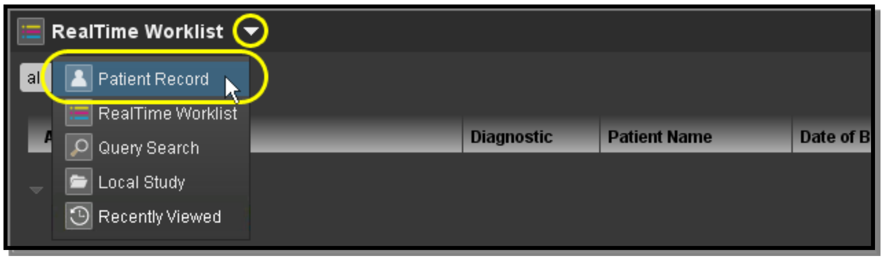
Section	Description
Navigation Tabs	Lets you navigate between the study open in the Primary Viewer and those, if any, open in one or more Secondary Viewers. Note that these tabs will only be displayed if there is a study currently open in a Secondary Viewer.
Patient Record Toolbar	Displays information about this patient, as well as tools that apply to that patient's studies.
Primary Exam	Displays information about the study currently being viewed in the Merge PACS Viewer for this patient, as well as tools that apply to that study.
Unread Prior Exams	Displays information about all prior studies for this patient that have an Unread status (whether relevant or not), as well as tools that apply to those studies.
Relevant Prior Exams	Displays information about all relevant prior studies for this patient that have a status other than Unread, as well as tools that apply to those studies.
Remaining Prior Exams	Displays information about all non-relevant prior studies for this patient that have a status other than Unread, as well as tools that apply to those studies.

NOTE: The various **Prior** Exam sections will only be displayed if there actually are any unread, relevant and/or remaining (*e.g.*, non-relevant) prior exams for the primary study.

NOTE: If the **Consider All Unverified as Unread Studies** user preference has been selected, as described in Section 25.5 below, the “Unread Prior Exams” section will include both Unread and Unverified prior studies.

NOTE: By default, the Prior Exams section is divided up into separate sections (Unread Prior Exams, Relevant Prior Exams and Remaining Prior Exams). However, this can be changed to display all prior exams in a single section, as described in subsection 3.9.8 below.

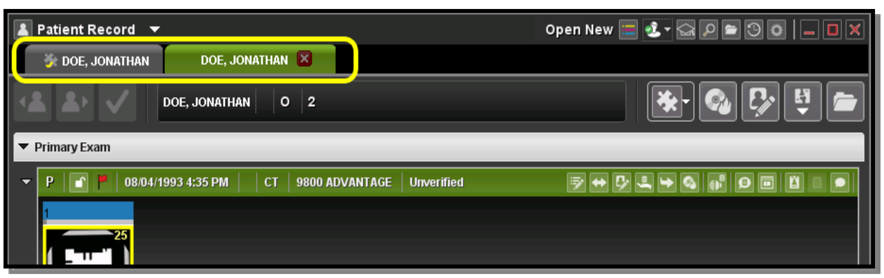
Once a study has been launched in the Merge PACS Viewer, you can also access the Patient Record by selecting **Patient Record** from the drop-down menu at the top of the Workstation Browser, as in the following example:



Accessing Patient Record

3.9.1. Patient Record Navigation Tabs

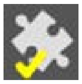
As mentioned in subsections 3.3.4, 3.5.4 and 3.7.1.c, above, after opening a primary study within the Merge PACS Viewer you can choose to view additional studies within separate “Secondary Viewer” windows. Once you have opened a study within the Secondary Viewer, the Patient Record will display a separate navigation tab at the top of the screen for each open study, as in the following example:



Multiple Study Tabs

- Clicking on a tab will cause the Viewer window for the study associated with that tab to be brought forward to the front of the other Viewer windows.
- The tab for the study currently being viewed will be highlighted in green.

NOTE: This assumes that you are viewing the study that was either last selected (*i.e.*, from a worklist, the Query Page or Local Study Open) or whose navigation tab you most recently clicked on. If you manually bring another Viewer window forward (*e.g.*, by clicking on the window with your mouse or pressing **Alt+Tab**), the highlighting of the navigation tabs will not automatically be updated to match. If this happens, clicking on the appropriate navigation tab will resynchronize the highlighting with the study.



If your system is configured for integration with one or more third-party applications, such as PowerScribe, the navigation tab for the study that is currently synchronized with the third-party applications will contain an integration icon.

- Clicking on the red [X] on the highlighted tab will close the Viewer window associated with the tab.

3.9.2. Patient Record Toolbar

The Patient Record Toolbar is located at the top of the Patient Record and displays information about the patient whose studies are currently open as well as action icons that apply to that patient's studies, as shown in the following example:

Patient Record Toolbar

a. Patient Information

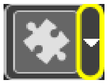
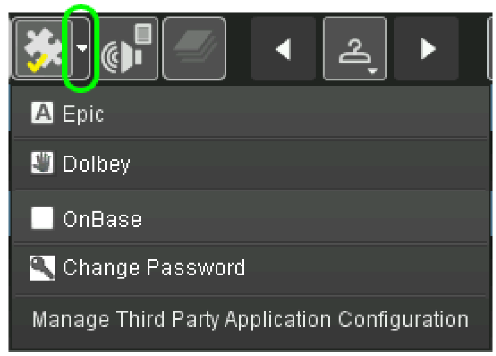
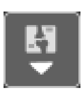
The center section of the Patient Record Toolbar displays the following information about the patient being viewed:

- **Patient Name**
- **Patient Date of Birth**
- **Patient Sex**
- **Patient Medical Record Number (MRN)**
- **Issuer of Patient ID (IPID)**

b. Available Action Icons

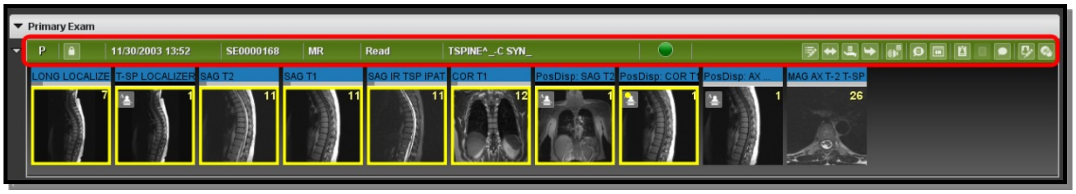
The left and right sides of the Patient Record Toolbar display the available action icons that apply to the Patient Record. Note that the actual action icons that appear will depend on your login privileges.

Tool	Name	General Description
	**Open Previous Study**	Open the previous study on the applicable worklist. Note that this button will not be displayed if the optional Merge RadStream component is enabled and **Load Next Study Based on Acuity Score** is selected as a user preference, as described in Section 25.2 below.
	**Open Next Study**	Open the next study on the applicable worklist. Note that this button will displayed with a red border if the optional Merge RadStream component is enabled and **Load Next Study Based on Acuity Score** is selected as a user preference, as described in Section 25.2 below.
	**Mark Study Read**	Lets you open the next study and mark the current study as “Read” (this button is only available if the status of the current study is “Unread”). Note that this button will displayed with a red border if the optional Merge RadStream component is enabled and Load Next Study Based on Acuity Score is selected as a user preference, as described in Section 25.2 below.
	**Convey Result**	If optional RadStream component has been enabled for your system, this sets the communication dimension status of the selected study to Convey Results (or the equivalent status used by your site).
	**Talk to MD**	If optional RadStream component has been enabled for your system, this sets the connection dimension status of the selected study to Talk to MD (or the equivalent status used by your site).
	**3rd-party App Sync**	If your system has been configured for integration with one or more third-party applications (*e.g.*, for dictation, report, document management, etc.), the 3rd-party Application Synchronization button will let you synchronize the application(s) with the selected study. Clicking this button will synchronize the study with all applications, except those you have specified should not be synched, as described below. For additional information on using the 3rd-party Application Synchronization feature, refer to Chapter 10 below and the user documentation specific to the third-party application being used.

Tool	Name	General Description
	**3rd-party App Sync Menu**	This lets you define whether and how each application should be synched by clicking on the triangle to the right of the button and then clicking on the desired application(s) from the drop-down menu, as in the following example:  **The 3rd-party Application Synchronization Menu** In addition, this lets you change your user name and password for integration with PowerScribe360 or Epic Hyperspace and configure the integration between Merge PACS and third-party applications. For additional information on using the 3rd-party Application Synchronization Menu, refer to Chapter 10 below.
	**Burn CD**	Add the selected study (together with any priors) to the Burn CD dialog's Study List. Note that multiple studies from multiple patients can be added to the same Burn CD Study List. For details on burning patient images onto a CD, see Chapter 14 below.
	**Patient Demographics**	Launch the Patient Demographics window in a separate pop-up window that lets you view and edit patient demographic information for the selected patient. For additional information on viewing and editing patient demographics, refer to Chapter 19 below.
	**Import from DICOM Device**	Request images from a separate DICOM Archive, if available. For details on importing images from a DICOM device, see Chapter 16 below.
	**Import Foreign Studies**	Open additional studies for this or other patients into the Patient Dashboard. For details on importing foreign studies, see subsection 3.9.8 below.
	**Save Series**	Save images from one or more Series for this study in a variety of available image formats for inclusion in a document or an e-mail message. For more information on saving a Series, refer to subsection 4.6.1 below.

3.9.3. Primary Exam Toolbar

The Primary Exam Toolbar is located at the top of the Primary Exam section and displays information about the study currently being viewed in the Merge PACS Viewer as well as action icons that apply to that study, as in the following example:



Primary Exam Toolbar

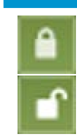
a. Exam Information

The center section of the Primary Exam Toolbar displays the following information about the exam:

- **Study Exam Date/Time**
- **Accession Number**
- **Modality**
- **Diagnostic Status**
- **Study Description**

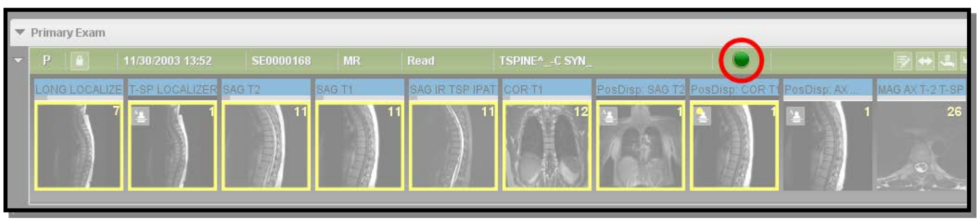
b. Available Icons

The far left side of the Primary Exam Toolbar may display one or more of the following action icons:

Tool	Name	General Description
	**Lock/ Unlock Exam**	Indicates whether the primary exam is currently locked or unlocked. Clicking on the icon will toggle between the locked and unlocked state.

Tool	Name	General Description
	Warning/ Comments	Launch the Comment Viewer for the selected study in a separate pop-up window to view system generated warnings and/or comments. Note that the appearance of the flag icon will change as follows: The study has one or more jailed images. The study has no jailed images but the most recent comment has been manually flagged by the commenter. Hovering your mouse over this icon will display the text of the warning or comment as a pop-up tool tip. For details on using the Comments Viewer, refer to Chapter 5 below. For details on viewing jailed images, refer to Chapter 18 below.

If Merge PACS has an archive configured, the center of the Primary Exam Toolbar will include the **Availability Status** indicator for the study, as in the following example:



Primary Exam Toolbar

NOTE: Since the Primary Exam Toolbar is for the study currently being viewed, this icon should always appear green to indicate that the study is available for viewing.

The right side of the Primary Exam Toolbar displays the available action icons that apply to the exam. Note that the actual tools that appear will depend on your login privileges.

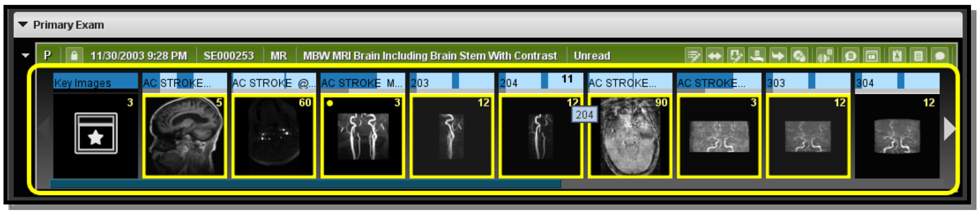
Tool	Name	General Description
	Change Status	Change the workflow status and/or selected HL7 attributes for a particular exam directly from the Patient Record. For details on changing status and/or selected HL7 attributes, see Chapter 12 below.
	Associate/Dissociate Study	Add the selected study to or remove the selected study from a specified worklist to which you have access. For details on associating and dissociating studies, see Chapter 7 below.
	Study Demographics	Launch the Study Demographics window in a separate pop-up window that lets you view and edit patient and study demographic information for the selected study. For additional information on viewing and editing patient and study demographics, refer to Chapter 19 below.
	Access Control	Grant one or more users or groups access to this study/exam. For details on Access Control, see Chapter 11 below.

Tool	Name	General Description
	**Route Study**	Send the selected study to another available Merge PACS location (*i.e.*, a different Merge PACS Server or a local DICOM device). For details on routing studies, see Chapter 15 below.
	**Burn CD**	Add the selected study (together with any priors) to the Burn CD dialog's Study List. Note that multiple studies from multiple patients can be added to the same Burn CD Study List. For details on burning patient images onto a CD, see Chapter 14 below.
	**VoiceClip**	Listen to the audio annotation, if any, that has been recorded for this study. For details on using VoiceClip to listen to audio annotations, see Chapter 9 below.
	**OrthoLink**	View the selected CR study within the Image Viewer and launch the orthopedic templating toolset installed on your workstation, if any. For details on using OrthoLink, see Section 4.12 and the user documentation specific to your orthopedic templating toolset software.
	**Technologist WorkPanel**	Launch the Technologist WorkPanel for the selected study in a separate pop-up window. The Technologist WorkPanel provides a number of different tools commonly used by Technologists in a single window. For details on the Technologist WorkPanel, refer to Chapter 20 below.
	**ER WorkPanel**	Launch the ER WorkPanel for the selected study in a separate pop-up window. The ER WorkPanel provides a number of different tools commonly used by Emergency Room Physicians in a single window. For details on the ER WorkPanel, refer to Chapter 21 below.
	**Communication WorkPanel**	If the optional Merge RadStream™ component has been enabled, launch the Communication WorkPanel for this study in a separate pop-up window. The Communication WorkPanel provides a number of different tools commonly used by Merge RadStream Operators in a single window. For details on the Communication WorkPanel, refer to Chapter 22 below.
	**Order Viewer**	Launch the Order Viewer in a separate pop-up window. For more information on using the Order Viewer to view orders, refer to Chapter 5 below.
	**Report Viewer**	Launch the Report Viewer as a separate pop-up window. For more information on using the Report Viewer, refer to Chapter 6 below.
	**Notes Viewer**	Launch the Order Viewer as a separate pop-up window, with just comments displayed. For more information on using the Order Viewer to view orders, refer to Chapter 5 below.

NOTE: You can also open the primary exam as a Comparison Study within the Primary Viewer by **double-clicking** anywhere on the Primary Exam Toolbar other than on an action icon.

3.9.4. Primary Exam Series Navigation Thumbnails

The Primary Exam Series Navigation Thumbnails are located below the Primary Exam Toolbar and can be used to open one or more series into the Merge PACS Viewer or into a separate pop-up Series Viewport window, as in the following example:



Primary Exam Series Navigation Thumbnails

NOTE: If there are too many thumbnail images to fit the width of the screen, arrows will appear to the left and/or right of the thumbnail images that you can click on to view the rest of the thumbnails. In addition, a scrollbar will be displayed directly below the thumbnail images.

NOTE: The Series Navigation Thumbnails can be hidden or displayed, as described in subsection 3.9.10 below.

- To open a particular series into the Merge PACS Viewer, click on the Navigation Thumbnail for that series and drag and drop it into a Series Viewport within the Merge PACS Viewer.
- Double-clicking on a Navigation Thumbnail will open the series in a separate pop-up "clone" window, as described in subsection 4.1.6 below. By default, there can only be one clone window open at a time; if you want to open additional series in separate clone windows (as opposed to reusing the currently open clone window), hold down the **Shift** key while double-clicking.
- If there are any key images that have been flagged for this exam, the first Navigation Thumbnail will be a special Key Image Series Navigation Thumbnail, as in the following example:

Key Image Navigation Thumbnail

  - ○ You can **drag** this Thumbnail into an existing Series Viewport within the Merge PACS Viewer to view all key images in that Series Viewport.
  - ○ You can **double-click** on this Thumbnail to open a separate Key Image Viewport, as described in Section 4.10, below.

- You can also **right-click** on this Thumbnail and select **Open Key Image Viewport** from the Right-click Menu to open a separate Key Image Viewport, as described in Section 4.10, below.

a. Thumbnail Right-click Menu

The Thumbnail Right-click Menu

Right-clicking on an individual Series Navigation Thumbnail will immediately cause the **Series Navigation Thumbnail Right-click Menu** to pop-up, as shown in the example on the left.

Note that, depending on the type of image and your login preferences, one or more of these options may not be available.

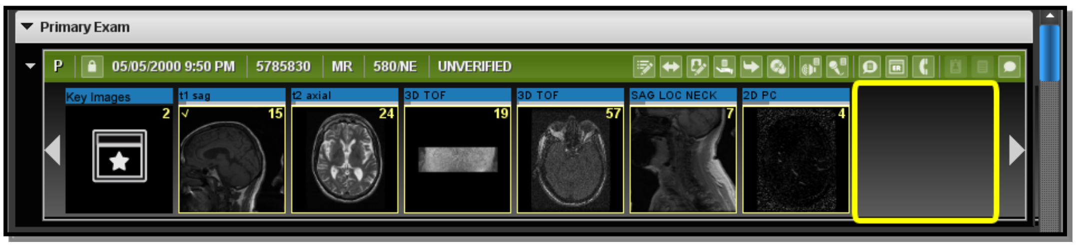
The Series Navigation Thumbnail Right-click Menu contains some or all of the following options, depending on the type of image and your login preferences:

Option	General Description
Open in Window	Open the Series in a separate pop-up "clone" window, as described in subsection 4.1.6 below.
Axial MIP	Display this Series as a single Axial MIP 3D view, as described in Chapter 4.7 below.
Sagittal MIP	Display this Series as a single Sagittal MIP 3D view, as described in Chapter 4.7 below.
Coronal MIP	Display this Series as a single Coronal MIP 3D view, as described in Chapter 4.7 below.
3D Volume	Display this Series as a single Color Volume Rendering (CVR) 3D view, as described in Chapter 4.7 below.
Axial MPR	Display this Series as a single Axial MPR 3D view, as described in Chapter 4.7 below.
Sagittal MPR	Display this Series as a single Sagittal MPR 3D view, as described in Chapter 4.7 below.
Coronal MPR	Display this Series as a single Coronal MPR 3D view, as described in Chapter 4.7 below.
MPR Viewport	Create a 2x2 Multi-Planar Reconstruction (MPR) Window for this Series, as described in Chapter 4.7 below.

Option	General Description
	NOTE: If this series needs to be split before it can be displayed and you have disabled automatic splitting of CT and/or MR Series, as described in Section 25.2 below, clicking on any of the 3D related options described above will display a set of thumbnail images that will let you choose the image set you want to be displayed.
Thumbnail Size	Change the size of the Series Navigation Thumbnails.

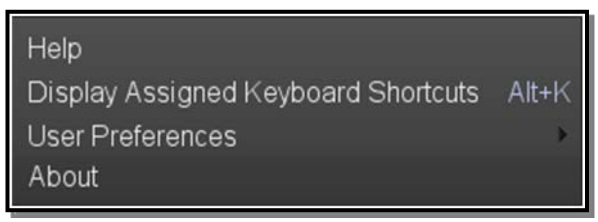
b. Patient Record Right-Click Menu

The Series Navigation Thumbnails area includes a blank space at the far right, as in the following example:



Accessing the Patient Record Right-click Menu

Right-clicking on the blank space will immediately cause the **Patient Record Right-click Menu** to pop-up, as shown in the example below:



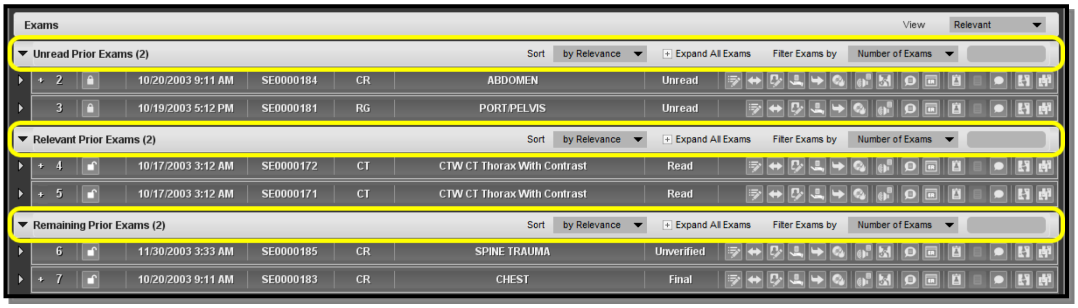
The Patient Record Right-click Menu

The Patient Record Right-click Menu has the following possible options:

Option	General Description
Help	Launches this User Guide in PDF format.
Display Assigned Keyboard Shortcuts	Displays a printable list of currently assigned keyboard shortcuts in a separate pop-up window.
User Preferences	Let you set your personal Viewer preferences as described in Chapter 25 below.
About	Displays system information, including the current version of the Merge PACS Workstation you are using, your Windows operating system and username, memory and disk usage, etc. For more information, refer to Chapter 26 below.

3.9.5. Prior Exam Control Bars

By default, the Prior Exams section of the Patient Record is divided up into separate sections (Unread Prior Exams, Relevant Prior Exams and Remaining Prior Exams), each of which displays a separate Prior Exam Control Bar that lets you sort, collapse and/or filter the exams within the section, as in the following example:



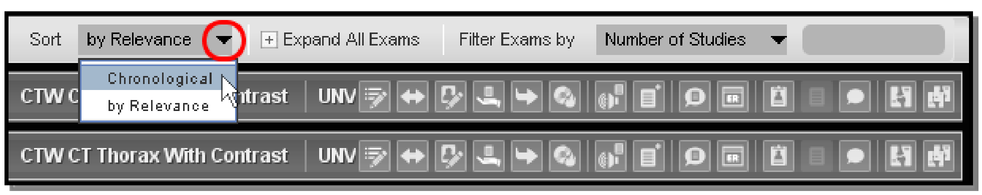
Prior Exam Control Bars

NOTE: The various **Prior** Exam sections will only be displayed if there actually are any unread, relevant and/or remaining (*e.g.*, non-relevant) prior exams for the primary study.

NOTE: If the **Consider All Unverified as Unread Studies** user preference has been selected, as described in Section 25.5 below, the "Unread Prior Exams" section will include both Unread and Unverified prior studies.

NOTE: The list of prior is determined by the Patient Comparison Strategy and "Selection of Priors" option configured for your site, as described in Appendix C below.

- To change the order in which the exams in a particular Prior Exam Navigator are displayed, select **by Relevance** or **Chronological** from the pull down **Sort** menu, as in the following example:

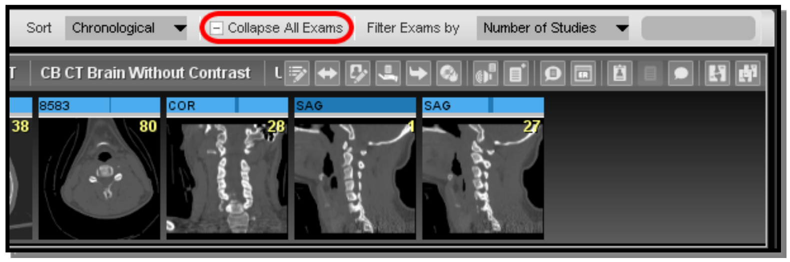


Changing the Sort Order

NOTE: Selecting "Chronological" will initially result in exams being presented in reverse chronological order (newest exam at the top, oldest at the bottom). Selecting this option again will toggle between chronological and reverse chronological order.

- To display or hide the Series Navigation Thumbnails for all exams within a Prior Exam Navigator, click on the **Expand All Exams / Collapse All Exams** toggle, as in the following examples:

Expanding All Exams



Collapsing All Exams

NOTE: You can also collapse and expand individual exams, as described in subsection 3.9.10 below.

- You can limit the number of studies that appear in a Prior Exam Navigator by using the **Filter Exams by** fields:
  - To set the maximum number of studies that will be displayed in the Navigator, select **Number of Studies** from the drop-down **Filter Exams by** menu and enter the desired number in the field to the right of the menu, as in the following example:

Filtering By Number of Studies

  - To filter the list of studies according to study description, select **Study Description** from the drop-down **Filter Exams by** menu and enter the text you want to match in the field to the right of the menu, as in the following example:

Filtering By Study Description

NOTE: Studies will be considered a match if any part of the study description contains the text entered into the field described above.

3.9.6. Prior Exam Toolbar

Each exam listed in either of the Prior Exam sections is represented by a Prior Exam Toolbar that displays information about the exam as well as action icons that apply to that exam, as in the following example:

Prior Exam Toolbars

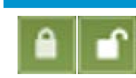
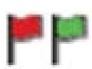
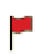
a. Exam Information

The left side of each Prior Exam Toolbar displays the following information about the exam:

- **Study exam date/time**
- **Accession number**
- **Modality**
- **Diagnostic status**
- **Study description**

b. Available Action Icons

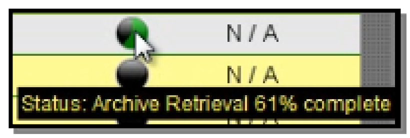
The far left side of the each Prior Exam Toolbar may display one or more of the following action icons:

Tool	Name	General Description
	**Lock/Unlock Exam**	Indicates whether the prior exam is currently locked or unlocked. Clicking on the icon will toggle between the locked and unlocked state.
	**Warning/Comments**	Launch the Comment Viewer for the selected study in a separate pop-up window to view system generated warnings and/or comments. Note that the appearance of the flag icon will change as follows:  The study has one or more jailed images.  The study has no jailed images but the most recent comment has been manually flagged by the commenter. Hovering your mouse over this icon will display the text of the warning or comment as a pop-up tool tip. For details on using the Comments Viewer, refer to Chapter 5 below. For details on viewing jailed images, refer to Chapter 18 below.

If Merge PACS has an archive configured, the center of the Primary Exam Toolbar will include the **Availability Status** indicator for the study, as in the following example:

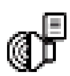
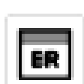
Availability Status Indicator

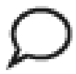
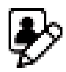
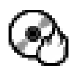
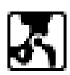
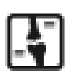
The appearance of the indicator indicates the availability of the study as follows:

Indicator	Color	Description
	**Green**	The study is available online for viewing.
	**Black**	The study is currently offline and not available for viewing.
	**Blue**	A request to retrieve the study has been submitted, but the retrieval process has not yet started.
	**Black / Green**	The study is currently being retrieved from the archive. Note that the percentage of green shown will change to indicate the progress of the retrieval process. Hovering your mouse cursor over the indicator will cause the exact percentage to be shown in a tool-tip window, as in the following example:  **Retrieval Progress**
	**Orange**	Images for this study are currently being imported into Merge PACS for the first time or additional images are currently being added to an existing study.
	**Red**	Retrieval of the study from the archive has completed, but with errors (either fewer images were received than expected or all images failed compression)
	**Gray**	The availability of the study is currently unknown (this may occur during timeout or error scenarios).

The right side of each Prior Exam Toolbar displays the available action icons that apply to the exam. Note that the actual action icons that appear will depend on your login privileges.

Tool	Name	General Description
	**Change Status**	Change the workflow status and/or selected HL7 attributes for a particular exam directly from the Patient Record. For details on changing status and/or selected HL7 attributes, see Chapter 12 below.
	**Associate/Dissociate Study**	Add the selected study to or remove the selected study from a specified worklist to which you have access. For details on associating and dissociating studies, see Chapter 7 below.

Tool	Name	General Description
	**Access Control**	Grant one or more users or groups access to this study/exam. For details on Access Control, see Chapter 11 below.
	**Route Study**	Send the selected study to another available Merge PACS location (*i.e.*, a different Merge PACS Server or a local DICOM device. For details on routing studies, see Chapter 15 below.
	**Retrieve from Archive**	If Merge PACS has an archive configured and this study is currently offline (*i.e.*, only available in the archive), submit a request to retrieve the study from the archive. Note the following: • Once an archive retrieval request has been submitted, the progress can be tracked from the **Availability Status** indicator, as described in subsection 3.9.6.b above. • You can submit a retrieval request for multiple studies at the same time by clicking on the **Retrieve from Archive** icon for each study. The retrieval requests will be processed in the order it they were submitted. • You can also click on the **Open Study** or **Open Study in Secondary Viewer** action icons for a study that is currently offline to submit an archive retrieval request and cause the study to automatically open when retrieved, as described in Chapter 17 below.
	**VoiceClip**	Listen to the audio annotation, if any, that has been recorded for this study. For details on using VoiceClip to listen to audio annotations, see Chapter 9 below.
	**Technologist WorkPanel**	Launch the Technologist WorkPanel for the selected study in a separate pop-up window. The Technologist WorkPanel provides a number of different tools commonly used by Technologists in a single window. For details on the Technologist WorkPanel, refer to Chapter 20 below.
	**ER WorkPanel**	Launch the ER WorkPanel for the selected study in a separate pop-up window. The ER WorkPanel provides a number of different tools commonly used by Emergency Room Physicians in a single window. For details on the ER WorkPanel, refer to Chapter 21 below.
	**Communication WorkPanel**	If the optional Merge RadStream^{TM} component has been enabled, launch the Communication WorkPanel for the selected study in a separate pop-up window. The Communication WorkPanel provides a number of different tools commonly used by Merge RadStream Operators in a single window. For details on the Communication WorkPanel, refer to Chapter 22 below.

Tool	Name	General Description
	**Order Viewer**	Launch the Order Viewer in a separate pop-up window. For more information on using the Order Viewer to view orders, refer to Chapter 5 below.
	**Report Viewer**	Launch the Report Viewer as a separate pop-up window. For more information on using the Report Viewer, refer to Chapter 6 below.
	**View Comments**	Launch the Order Viewer as a separate pop-up window with just comments displayed. For details on using the Order Viewer to view comments, refer to Chapter 5 below.
	**Study Demographics**	Launch the Study Demographics window in a separate pop-up window that lets you view and edit patient and study demographic information for the selected study. For additional information on viewing and editing patient and study demographics, refer to Chapter 19 below.
	**Burn CD**	Add the selected study (together with any priors) to the Burn CD dialog’s Study List. Note that multiple studies from multiple patients can be added to the same Burn CD Study List. For details on burning patient images onto a CD, see Chapter 14 below.
	**OrthoLink**	View the selected CR study within the Image Viewer and launch the orthopedic templating toolset installed on your workstation, if any. For details on using OrthoLink, see Section 4.12, below, and the user documentation specific to your orthopedic templating toolset software.
	**Open Study**	Open study in the primary Merge PACS Viewer window (replacing any study currently displayed there). Note the following: • You can also load a study into the Merge PACS Viewer by double-clicking on the Prior Exam Toolbar. • If Merge PACS has an archive configured and the primary study is currently archived and not available online, attempting to view a study will automatically trigger an archive retrieval request, as described in Chapter 17 below.

Tool	Name	General Description
	**Open Study in Secondary Viewer**	Open the study in a Secondary Merge PACS Viewer window. This feature is typically used when you are already viewing a study and want to open this study in a secondary Viewer without exiting the previous study. Note the following: • By default, studies displayed in the Secondary Viewer will be read-only (they will not be locked and you will be unable to change the workflow status). This default behavior can be changed, however, from the User Preference menu, as described in Section 25.2 below. • Each currently open study will have a separate navigation tab associated with it within the Patient Record, as described in subsection 3.9.1, above. • If Merge PACS has an archive configured and the primary study is currently archived and not available online, attempting to view a study in a Secondary Viewer will automatically trigger an archive retrieval request, as described in Chapter 17 below. • When closing the Primary Viewer, any Secondary Viewers launched this way from the Patient Record will be automatically closed.

NOTE: You can also open a prior exam as a Comparison Study within the Primary Viewer by **double-clicking** anywhere on the Prior Exam Toolbar other than on an action icon. Note, however, that any externally created ("foreign") Presentation States associated with the comparison study will not be displayed.

3.9.7. Prior Exam Series Navigation Thumbnails

The Prior Exam Series Navigation Thumbnails are located below each Prior Exam Toolbar and can be used to open one or more series into the Merge PACS Viewer or into a separate pop-up Series Viewport window, as in the following example:

Prior Exam Series Navigation Thumbnails

NOTE: If there are too many thumbnail images to fit the width of the screen, arrows will appear to the left and/or right of the thumbnail images that you can click on to view the rest of the thumbnails.

NOTE: The Series Navigation Thumbnails for each exam can be individually hidden or displayed, as described in subsection 3.9.10 below.

- To open a particular series into the Merge PACS Viewer, click on the Navigation Thumbnail for that series and drag and drop it into a Series Viewport within the Merge PACS Viewer.
- Double-clicking on a Navigation Thumbnail will open the series in a separate pop-up “clone” window, as described in subsection 4.1.6 below. By default, there can only be one clone window open at a time; if you want to open additional series in separate clone windows (as opposed to reusing the currently open clone window), hold down the **Shift** key while double-clicking.
- If there is currently a comparison study window open in the Merge PACS Viewer, as described in subsection 4.2.3 below, you can load the entire prior exam into that window by clicking on the blank space to the right of the Navigation Thumbnails and dragging and dropping the prior exam into that window. If there is currently another study displayed in the comparison window, it will be replaced with the prior exam.

a. Thumbnail Right-click Menu

The Thumbnail Right-click Menu

Right-clicking on an individual Series Navigation Thumbnail will immediately cause the **Series Navigation Thumbnail Right-click Menu** to pop-up, as shown in the example on the left.

Note that, depending on the type of image and your login preferences, one or more of these options may not be available.

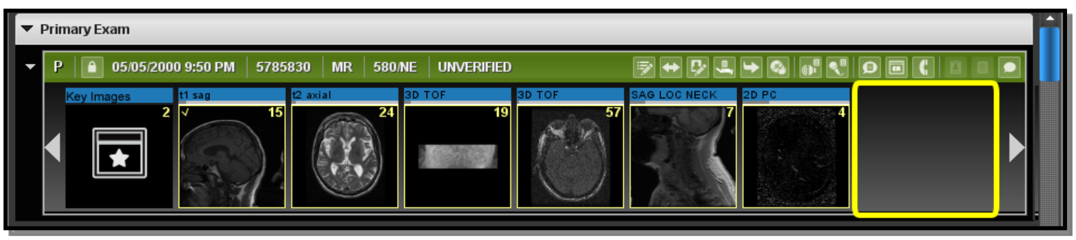
The Series Navigation Thumbnail Right-click Menu contains some or all of the following options, depending on the type of image and your login preferences:

Option	General Description
Open in Window	Open the Series in a separate pop-up “clone” window, as described in subsection 4.1.6 below.
Axial MIP	Display this Series as a single Axial MIP 3D view, as described in Chapter 4.7 below.
Sagittal MIP	Display this Series as a single Sagittal MIP 3D view, as described in Chapter 4.7 below.
Coronal MIP	Display this Series as a single Coronal MIP 3D view, as described in Chapter 4.7 below.
3D Volume	Display this Series as a single Color Volume Rendering (CVR) 3D view, as described in Chapter 4.7 below.

Option	General Description
Axial MPR	Display this Series as a single Axial MPR 3D view, as described in Chapter 4.7 below.
Sagittal MPR	Display this Series as a single Sagittal MPR 3D view, as described in Chapter 4.7 below.
Coronal MPR	Display this Series as a single Coronal MPR 3D view, as described in Chapter 4.7 below.
MPR Viewport	Create a 2x2 Multi-Planar Reconstruction (MPR) Window for this Series, as described in Chapter 4.7 below. **NOTE:** If this series needs to be split before it can be displayed and you have disabled automatic splitting of CT and/or MR Series, as described in Section 25.2 below, clicking on any of the 3D-related options described above will display a set of thumbnail images that will let you choose the image set you want to be displayed.
Thumbnail Size	Change the size of the Series Navigation Thumbnails.

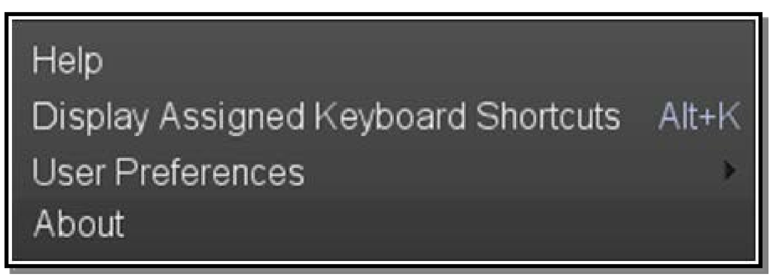
b. Patient Record Right-Click Menu

The Series Navigation Thumbnails area includes a blank space at the far right, as in the following example:



Accessing the Patient Record Right-click Menu

Right-clicking on the blank space will immediately cause the **Patient Record Right-click Menu** to pop-up, as shown in the example below:



The Patient Record Right-click Menu

The Patient Record Right-click Menu has the following possible options:

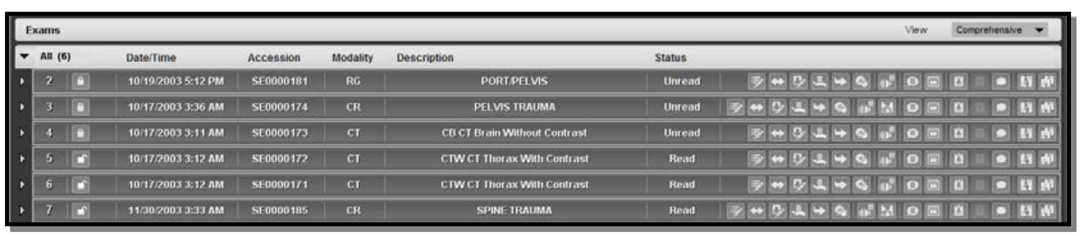
Option	General Description
Help	Launches this User Guide in PDF format.
Display Assigned Keyboard Shortcuts	Displays a printable list of currently assigned keyboard shortcuts in a separate pop-up window.
User Preferences	Let you set your personal Viewer preferences as described in Chapter 25 below.
About	Displays system information, including the current version of the Merge PACS Workstation you are using, your Windows operating system and username, memory and disk usage, etc. For more information, refer to Chapter 26 below.

3.9.8. Displaying Prior Exams in Comprehensive View

By default, the Prior Exams section of the Patient Record is divided up into separate sections (Unread Prior Exams, Relevant Prior Exams and Remaining Prior Exams). If desired, however, you can choose to display all prior exams together in one section by selecting **Comprehensive** from the **View** menu at the top of the Prior Exams section, as shown below:

Selecting Comprehensive View

Once Comprehensive view is selected, all priors will be displayed together as in the following example:



Displaying Prior Exams in Comprehensive View

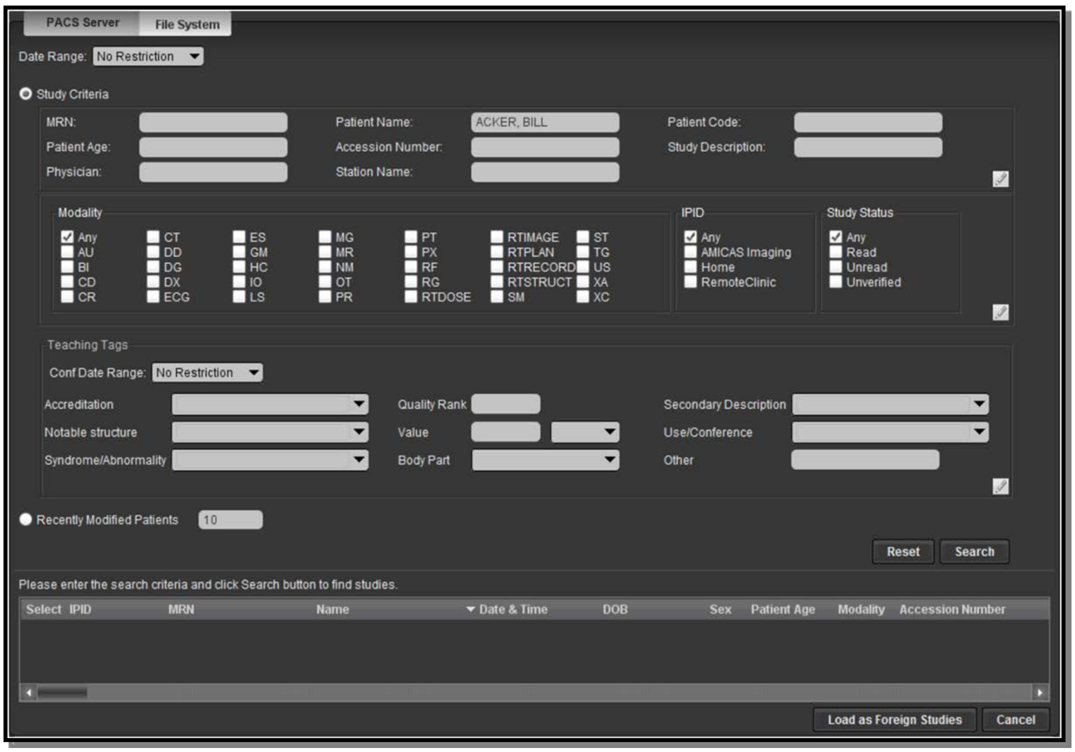
NOTE: There is no Prior Exam Control bar in Comprehensive view, so you do not have the options to sort by relevance or chronological order, expand all exams or filter exams. You can, however, sort the list by clicking on any of the column headers.

NOTE: To return to the standard way of displaying prior exams, select **Relevant** from the View menu.

3.9.9. Importing Foreign Studies

As described in subsection 3.9.1 above, clicking the **Import Foreign Studies** icon on the **Patient Record Toolbar**, as illustrated to the left, will let you search for and open additional studies for this or other patients that are not considered prior studies.

Clicking on the Import Foreign Studies icon will cause the **Open Study Control** window to be displayed in a separate pop-up window, as in the following example:



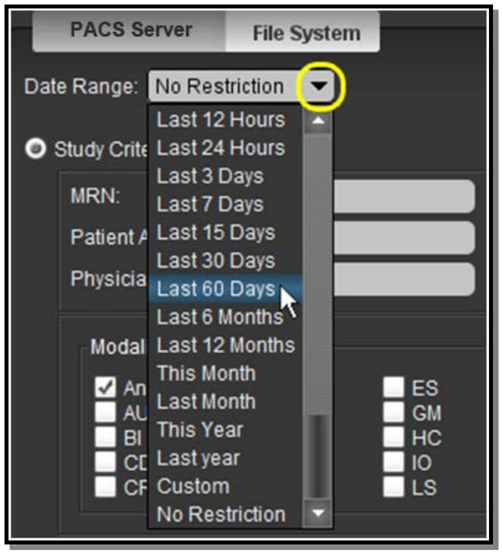
The Open Study Control Window

a. Searching for Foreign Studies

At the Open Study Control window you can either perform a Query Search on the Merge PACS Server or else search for a study that has been saved to your local Workstation, a CD/DVD, or a network accessible drive.

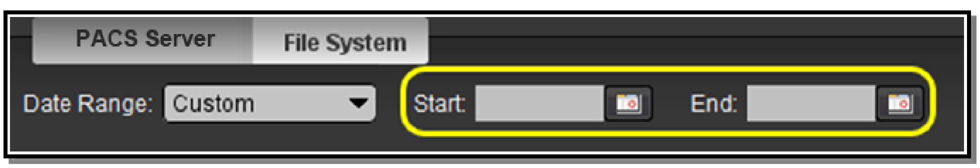
To perform a Query Search on the Merge PACS Server:

1. Click on the **PACS Server** tab at the top of the Open Study Control window (this will be selected by default when you first open the Open Study Control window).
2. If desired, select an item from the drop-down **Date Range** menu to restrict your query to a particular time frame:



Selecting a Date Range

If you select the **Custom** option, you will be presented with additional fields to enter the start and end date for your search, as in the following example:



Custom Date Range Fields

3. If you want to filter the search results according to a variety of different study attributes, click on the **Study Criteria** radio button to use the query fields in the middle section of the screen, as in the following example:

Study Criteria Search Fields

NOTE: You cannot use this option in conjunction with the **Recently Modified Patients** option described below.

NOTE: The various **Teaching Tags** fields let you search for studies that have been tagged as teaching files (as described in Chapter 23 below) and will only be available if you have the login privileges to access the optional Teaching Files feature

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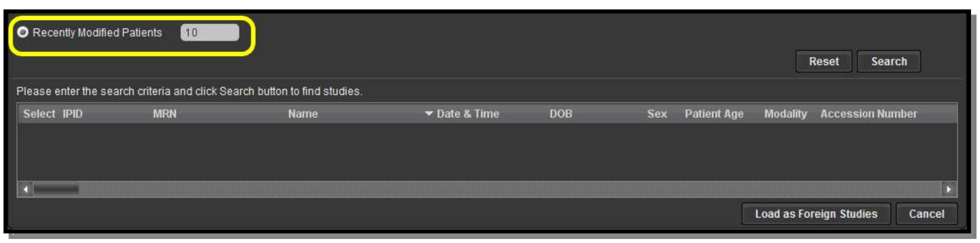
4. Alternatively, you can narrow your search by displaying a list of recently modified patients by clicking on the **Recently Modified Patients** radio button at the bottom of the screen and entering the number of most recent studies sent to the system you want to display (the default is the last 10 patients), as in the following example:



Enabling Recently Modified Patients Search Option

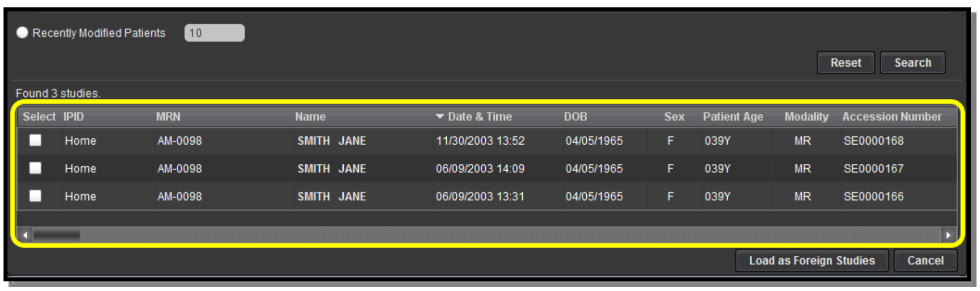
NOTE: You cannot use this option in conjunction with the **Study Criteria** options described above.

---

5. Click on the **Search** button at the bottom of the query fields to generate a list of matching studies, as in the following example:

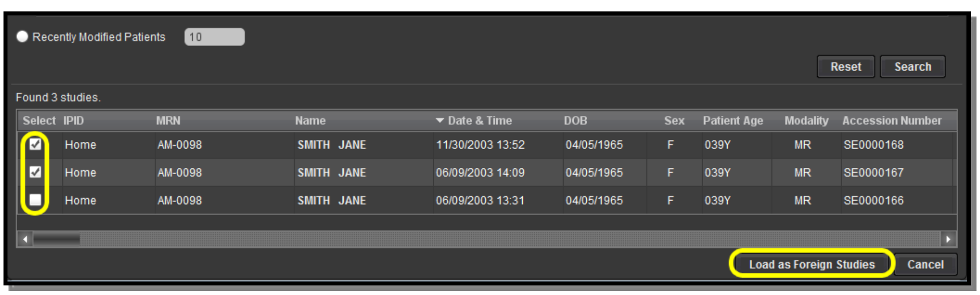
The Search Button

A list of studies matching your query will be displayed at the bottom of the screen, as in the following example:



Search Results

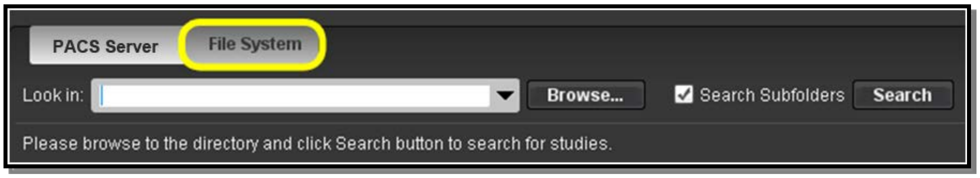
6. Click on the checkbox of each study you want to load as a foreign study and then click on the **Load as Foreign Studies** button at the bottom of the window, as in the following example:



Selecting Studies to be Imported

To search your local Workstation, a CD/DVD, or a network accessible drive:

1. Click on the **File System** tab at the top of the Open Study Control window:

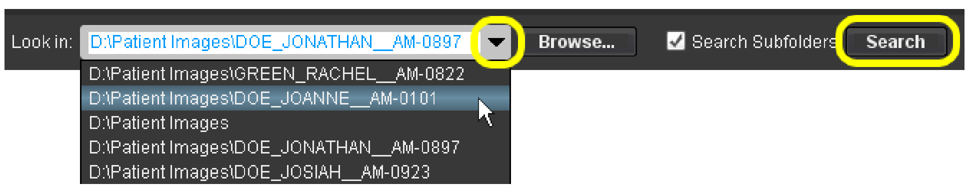


The File System Tab

2. If you know the exact name of the folder where the desired study is located, you can enter it directly in the **Look in** field and then click the **Search** button, as in the following example:

Entering the Specific Folder

- You can display all studies contained in subfolders within a higher level folder by entering the exact name of the higher level folder, clicking the **Search Subfolders** option and then clicking the **Search** button.
- You can also select from a list of recently opened folders that contained studies from the drop-down **Look in** menu, as in the following example:

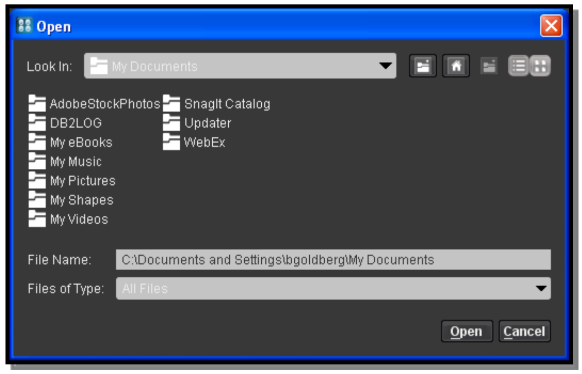


Entering the Specific Folder

3. If you don't know the exact name of the folder where the desired study is located, click on the **Browse** button:

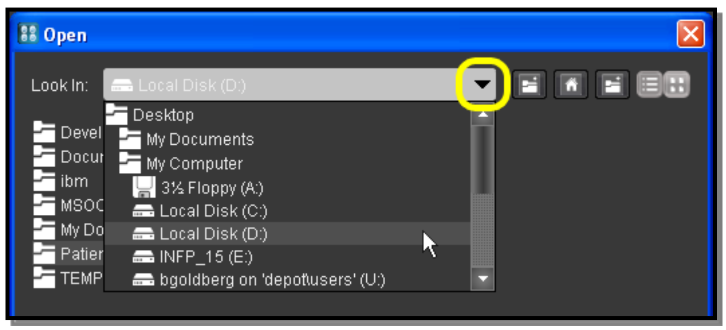
The Browse Button

*This will cause the **File Browser Window** to be displayed in a separate pop-up window, as in the following example:*



The File Browser Window

- From the drop-down **Look In** menu, select the drive where the desired study is located, as in the following example:

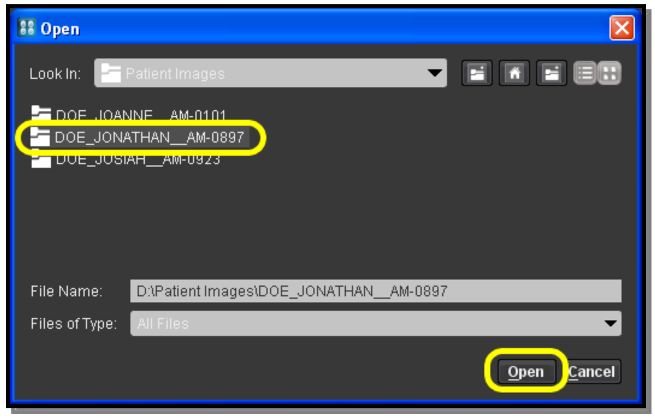


Selecting a Drive

- Once you selected a drive, the folders on that drive will be displayed in the main portion of the File Browser window, as in the following example:

Folders on the Selected Drive

- Click on the folder containing the desired study images and then click the **Open** button, as in the following example:

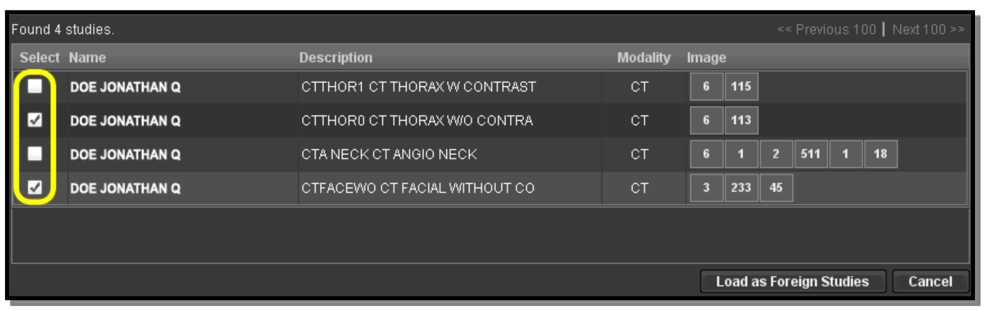


Opening the Selected Study

- If necessary, you can double-click on any folder to view the subfolders within.

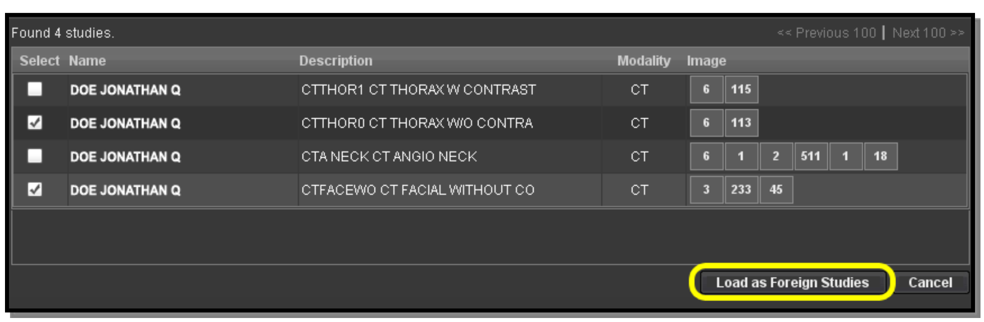
NOTE: If you click the **Search Subfolders** option before opening the File Browser window, you can open all studies within a folder by clicking on that folder and then clicking the **Open** button.

4. Click on the checkbox of each study you want to load as a foreign study:



Selecting Studies to be Imported

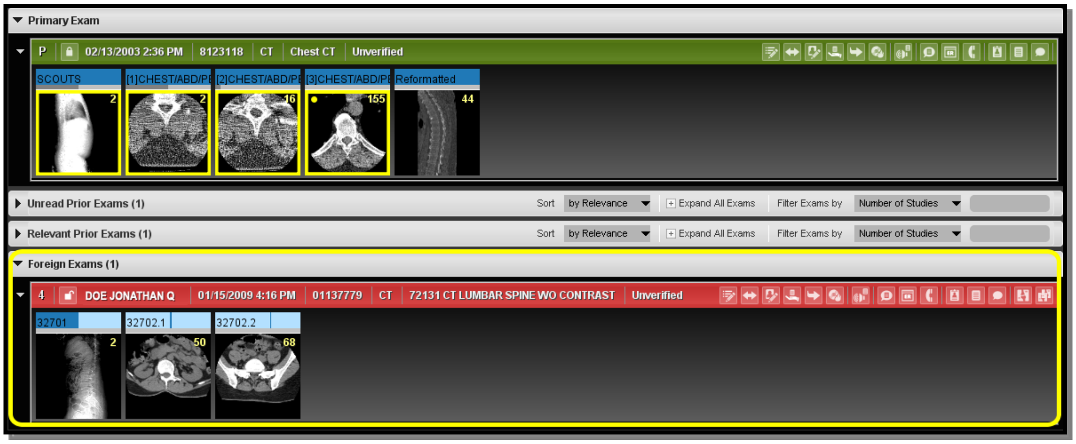
5. Click on the **Load as Foreign Studies** button at the bottom of the window:



Loading the Selected Study or Studies

b. Viewing Foreign Studies

Studies that have been loaded as foreign studies will be displayed in the Patient Record in a special section below the Prior Exams with a red Toolbar, as in the following example:



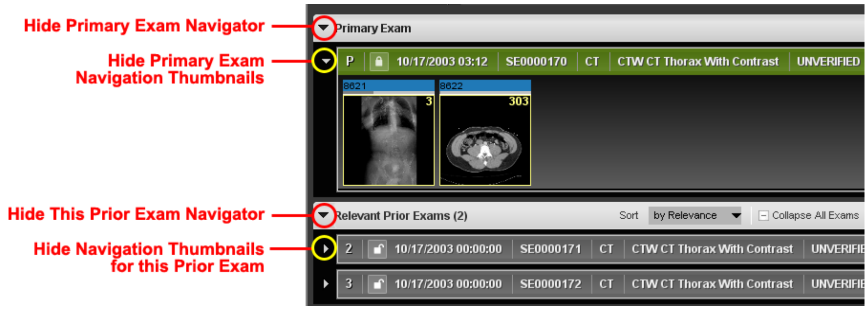
Foreign Study in the Patient Record

- The **Foreign Exam Toolbar** has the same options as the **Prior Exam Toolbar**, described in subsection 3.9.6 above.
- The **Foreign Exam Series Navigation Thumbnails** operate the same as the **Prior Exam Series Navigation Thumbnails**, described in subsection 3.9.7 above.
- If you open a series from a foreign study into the Merge PACS Viewer, it will be displayed with a large red warning icon, as in the following example:

Viewing a Series from a Foreign Study

3.9.10. Collapsing and Expanding Exam Navigators and Exams

You can temporarily hide selected portions of the Patient Record by clicking on the small triangles on the left-hand side of the screen. Clicking on these triangles allows you to hide an entire Navigator and/or the Series Navigation Thumbnails for one or more individual exams within a Navigator, as shown in the example below:

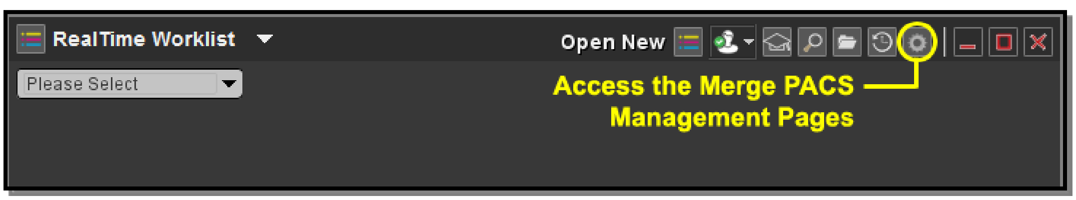


Hiding Parts of the Patient Record

Click on the appropriate triangle a second time to reveal the Navigator or Series Navigation Thumbnails.

3.10. Accessing the Merge PACS Management Pages

If you have access rights to the Merge PACS Management Pages, you can access them directly from the Workstation Browser by clicking on the **Merge PACS Management Pages** icon at the top right of the Workstation Browser, as in the following example:



Accessing the Merge PACS Management Pages

NOTE: The system will use the login name and password you entered to log into the Merge PACS Workstation when accessing the Management Pages.

Chapter 4. The Merge PACS Viewer

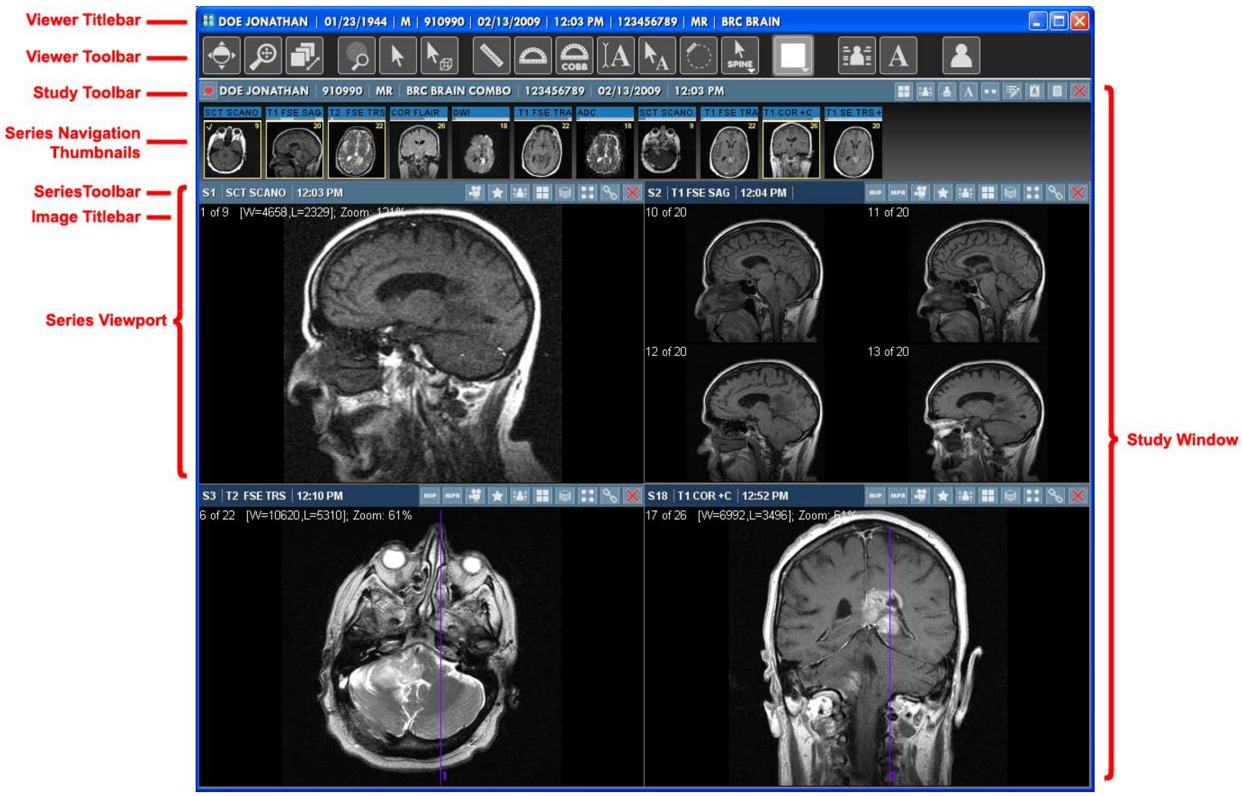
The Merge PACS Viewer is the primary application for viewing and manipulating images within the Merge PACS Workstation. This chapter covers the following topics:

- **Overview**
- **Changing the Screen Layout**
- **Navigating through Images, Series and Studies**
- **General Image Manipulation**
- **The Spine Labeling Tool**
- **Saving, Printing and Copying Images**
- **3D Rendering Tools**
- **Viewing Mammography Images**
- **Setting Key Images**
- **Viewing Key Images**
- **Hanging Protocols and Study Presentations**
- **Using Orthopedic Templating Toolsets**
- **Managing Window/Level Presets**

NOTE: Depending on how your system is configured, you may also be able to view images within the iConnect® Access viewer. For information on using iConnect Access, refer to the iConnect Access user documentation.

4.1. Overview

When you select a study to open, the study images will be displayed in a separate Merge PACS Viewer window, as shown in the example below:



The Merge PACS Image Viewer

If you are using a multi-screen monitor, you can position this window where you like it by clicking on the Titlebar with your mouse and dragging it to where it needs to go.

The number and layout of the images displayed in the Image Viewer depends on the type of images being displayed, what screen layout you have selected using the various layout tools, whether there is a Hanging Protocol or Study Presentation associated with this study, and how the default layout preferences have been configured.

The Merge PACS Viewer consists of the following general components, most of which are configurable:

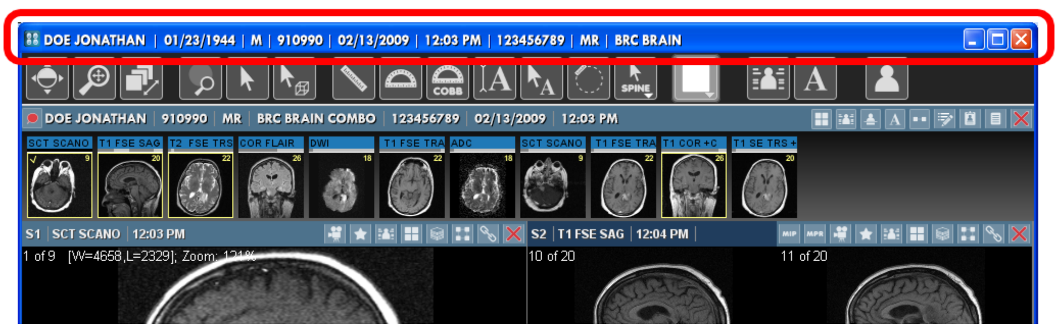
Component	Description
Viewer Titlebar	Displays information about the patient and the primary study.
Viewer Toolbar	Displays various tools that apply to the Image Viewer as a whole.
Study Toolbar	Displays study information (study description, study exam date/time, accession number and modality) as well as various tools that apply to the selected study.

Component	Description
Series Navigation Thumbnails	Let you drag and drop a Series into a Series Viewport.
Series Viewports	Each Series Viewport displays images and information relating to a single Series.
Series Toolbar	Displays information for the Series in a particular Series Viewport as well as various tools that apply to that Series Viewport.
Image Titlebar	Displays information about the image currently being displayed in a Series Viewport, including image number, lossy compression ratio (if applicable), window and level, and zoom.
Right-click Menus	Each component listed above (except for the Viewer Titlebar) has an associated menu of options that can be accessed by clicking and holding the right-mouse button on that component. Depending on the component, the menu may include additional tools, preferences, and/or the ability to hide or display tools.

Each of these components is described briefly below, and the individual tools and functions are described in greater detail in the following Sections.

4.1.1. The Viewer Titlebar

At the very top of the Image Viewer is the **Viewer Titlebar**, as in the following example:



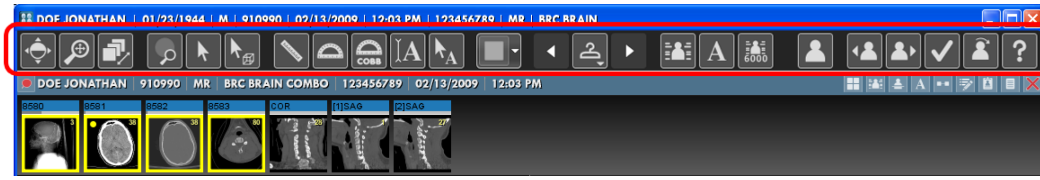
The Viewer Titlebar

The Viewer Titlebar displays the following information about the patient and primary study being viewed:

- **Name**
- **Date of Birth**
- **Sex**
- **Issuer of Patient ID** (IPID)
- **Medical Record Number** (MRN)
- **Study Time/Date**
- **Accession Number**
- **Modality**
- **Primary Study Description**

4.1.2. The Viewer Toolbar

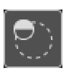
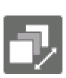
Below the Viewer Titlebar is the **Viewer Toolbar**, as shown in the following example:

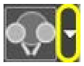
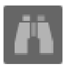


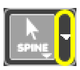
The Viewer Toolbar

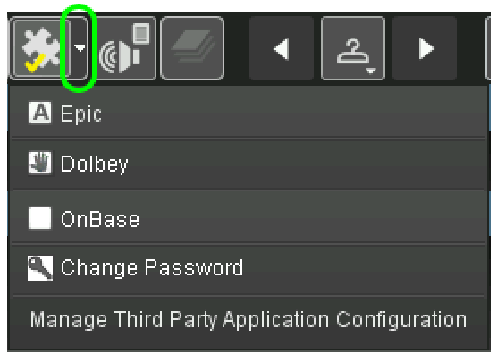
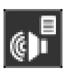
a. Available Tools

The Viewer Toolbar displays various tools that apply to the Image Viewer as a whole. The actual tools that appear will depend on your login privileges and how you have configured the Toolbar (as described in paragraph b below).

Tool	Name	General Description
	**Window/Level**	Lets you adjust the Window and Level [contrast and brightness] of an image “on the fly” by dragging the mouse cursor over the image. See subsection 4.4.1 below for more information.
	**ROI Window/Level**	Lets you to select an area of an image for automatic Window/Level optimization. See subsection 4.4.1 below for more information.
	**3-in-1 Mouse Tool**	Lets you simultaneously change the Window/Level of an image with the left mouse button, resize it with the right mouse button and pan it with the center scroll wheel. See subsection 4.4.6 below for more information.
	**Zoom/Pan Combo**	Lets you simultaneously pan an image with the mouse cursor and resize it using the mouse center wheel. See subsection 4.4.5 below for more information.
	**Zoom**	Lets you resize an image using the mouse cursor. See subsection 4.4.3 below for more information.
	**Pan**	Lets you use the mouse cursor to move an image that is too big to fit entirely in the Series Viewport at the current viewing resolution. See subsection 4.4.4 below for more information.
	**Page Images**	Lets you page sequentially ("scroll") through the images in a Series Viewport by clicking and dragging the mouse cursor up or down. See subsection 4.3.1 below for more information.
	**Auto Scroll**	Lets you page sequentially ("scroll") through the images in a Series Viewport simply by moving the mouse cursor over an image without needing to click on the mouse button. See subsection 4.3.1 below for more information.
	**Skim**	Lets you use the mouse cursor to rapidly scroll through all images in a Series Viewport, skipping over some images in the process if the Series contains a large number of images. See subsection 4.3.1 below for more information.

Tool	Name	General Description
	**Dual Link Magnifier**	For Mammography images, lets you use the mouse cursor to simultaneously magnify a selected region of two side-by-side mammography images. See Section 4.8 below for more information.
	**Dual Link Magnifier Preferences**	For Mammography images, lets you select whether you want the Dual Link Magnifier to display in **Normal** or **Invert** mode by default. See Section 4.8 below for more information.
	**Magnify**	Lets you enlarge selected portions of an image with the mouse cursor. See subsection 4.4.8 below for more information.
	**Binocular Tool**	For Mammography images, lets you use the mouse cursor to display only the part of the image within the tool's viewing area; the rest of the image will be shuttered/remain hidden. See Section 4.8 below for more information.
	**Hot Light**	For Mammography images, lets you use the mouse cursor to display the part of the image within the tool's viewing area with a percentage increase in intensity; the rest of the image will be displayed with the original Window/Level values. See Section 4.8 below for more information.
	**Probe**	Lets you use the mouse cursor to determine the intensity value for a selected pixel of an image in a Series Viewport. See subsection 4.4.16 below for more information.
	**3D Cursor**	Lets you click any part of an image displayed in one Series Viewport with the mouse cursor and have the images displayed in the other Series Viewports (containing orthogonal or other planes) be updated based upon the position of the cursor. See subsection 4.3.2 below for more information.
	**Orthopedic Plumb Line**	Lets you add a vertical or horizontal plumb line anywhere on an image. See subsection 4.4.15 below for more information.
	**Orthopedic Plumb Line Menu**	Lets you toggle between adding a horizontal or vertical plumb line. See subsection 4.4.15 below for more information.
	**Orthopedic Joint Line Measurement**	Lets you measure joint angles with the assistance of a line perpendicular to the base of the angle. See subsection 4.4.15 below for more information.
	**Orthopedic Transischial Line Measurement**	Lets you compare trochanted positions in images to measure and assess differential leg lengths. See subsection 4.4.15 below for more information.
	**Line Measurement**	Lets you use the mouse cursor to measure in millimeters the actual (as opposed to the displayed) distance between two points on an image, as well as mark the image with an appropriate annotation. See subsection 4.4.15 below for more information.
	**Angle Measurement**	Lets you use the mouse cursor to add an angle measurement to an image. See subsection 4.4.15 below for more information.
	**Cobb Angle Measurement**	Lets you use the mouse cursor to add a Cobb angle (or "Cobb's angle") measurement to an image. See subsection 4.4.15 below for more information.

Tool	Name	General Description
	**Manual Calibration**	Lets you manually calibrate the pixel spacing used by the Line Measurement Tool for a particular image. See subsection 4.4.15 below for more information.
	**Text Annotation**	Lets you use the mouse cursor to add annotated text to an image. See subsection 4.4.15 below for more information.
	**Arrow Annotation**	Lets you use the mouse cursor to add a labeled arrow to an image. See subsection 4.4.15 below for more information.
	**ROI Measurement**	Lets you use the mouse cursor to add a statistics display for a specified area of an image. The tool displays the minimum and maximum pixel intensity values for a selected area of an image, as well as the average pixel value and the standard deviation for the selected region. See subsection 4.4.15 below for more information.
	**Spine Labeling**	Lets you use the mouse cursor to manually label vertebrae in sagittal slices and have the corresponding axial slices be automatically labeled. See Section 4.5 below for more information.
	**Spine Label Menu**	Lets you access the **Spine Label Preferences Menu**, as described in Section 4.5 below. See Section 4.5 below for more information.
	**Study Layout Menu**	Lets you determine the screen layout for use when multiple studies are being displayed at the same time. See subsection 4.2.3 below for more information.
	**Comparison Toggle**	Once you have selected a screen layout from the Study Layout Menu, lets you toggle between the default layout and the last selected layout. See subsection 4.4.15 below for more information.
	**3rd-party App Sync**	If your system has been configured for integration with one or more third-party applications (*e.g.*, for dictation, report, document management, etc.), the 3rd-party Application Synchronization button will let you synchronize the application(s) with the selected study. Clicking this button will synchronize the study with all applications, except those you have specified should not be synched, as described below. For additional information on using the 3rd-party Application Synchronization feature, refer to Chapter 10 below and the user documentation specific to the third-party application being used.

Tool	Name	General Description
	**3rd-party App Sync Menu**	This lets you define whether and how each application should be synched by clicking on the triangle to the right of the button and then clicking on the desired application(s) from the drop-down menu, as in the following example:  **The 3rd-party Application Synchronization Menu** In addition, this lets you change your user name and password for integration with PowerScribe360 or Epic Hyperspace and configure the integration between Merge PACS and third-party applications. For additional information on using the 3rd-party Application Synchronization Menu, refer to Chapter 10 below.
	**VoiceClip**	Launches the VoiceClip dialog that lets you listen to, record and/or overwrite brief audio annotations that can be associated with the particular study. Refer to Chapter 9 below for more information.
	**Scroll MG Priors**	When viewing Mammography studies with relevant priors, toggles between two modes used to display the prior studies. See Section 4.8 below for more information.
	**Previous Step**	Displays the previous step of the currently applied Hanging Protocol or Study presentation, if any, as described in Section 4.11 below.
	**Hanging Protocol**	Displays the Hanging Protocol Menu, as described in Section 4.11 below. Note that if a Hanging Protocol or Study Presentation is currently loaded, the icon will change to reflect that.
	**Next Step**	Displays the next step of the currently applied Hanging Protocol or Study presentation, if any, as described in Section 4.11 below.
	**Toggle Color Bar**	Toggles the display of the MPR Viewport Color Bar on and off, as described in subsection 4.7.2 below.
	**Toggle DICOM Overlay**	Turns the DICOM Overlay display off for all Series Viewports that currently have images displayed in them. See subsection 4.4.9 below for more information.
	**Toggle Annotations**	Toggles the display of any existing annotations on and off. See subsection 4.4.15 below for more information.
	**Toggle DICOM 6000 Overlay**	Toggles the display of DICOM 6000 Overlays, if available, on and off for all Series Viewports that currently have images displayed in them. See subsection 4.4.10 below for more information.

Tool	Name	General Description
	**Toggle CADSR Overlay**	Toggles the display of Computer Aided Detection Structured Reports, if available, on and off for Mammography images. See Section 4.8 below for more information. **NOTE:** You can also toggle the CADSR Overlay from the Series Right-click Menu, as described in subsection 4.1.5 below.
	**Toggle CADSR Overlay Menu**	Lets you select one or both of the following items to display when the **CADSR Overlay** is enabled: • **Show CAD Marking** • **Show CAD Summary** If Show CAD Marking is selected and Show CAD Summary is **not** selected, a special icon will be displayed on the image to allow you to view the CAD Summary information, as described in subsection 4.8.8 below.
	**Patient Record**	Causes the Patient Record to be displayed if it is not currently showing in the Workstation Browser. See Section 3.8 above for more information.
	**Merge Messenger**	Launches the Merge Messenger window to send and receive instant messages to other users who are currently online. See Chapter 24 below for more information.
	**Merge Messenger Status Menu**	Displays a menu that lets you manually change your Merge Messenger status (*e.g.*, from **online** to **busy**). See Chapter 24 below for more information.
	**Recently Viewed Studies**	Displays a menu containing up to the 20 most recently viewed studies. Clicking on a study will open it in a secondary Merge PACS Viewer window in read-only mode. See subsection 4.3.3 below for more information.
	**Open Previous Study**	Opens the previous study on the worklist. Note that this button will not be displayed if the optional Merge RadStream component is enabled and Load Next Study Based on Acuity Score is selected as a user preference, as described in Section 21.1 below.
	**Open Next Study**	Opens the next study on the worklist and prompts you to set the status of the currently open study. Note that this button will displayed with a red border if the optional Merge RadStream component is enabled and Load Next Study Based on Acuity Score is selected as a user preference, as described in Section 21.1 below.
	**Mark Study Read**	Lets you open the next study and mark the current study as "Read" (this button is only available if the status of the current study is "Unread"). Note that this button will displayed with a red border if the optional Merge RadStream component is enabled and Load Next Study Based on Acuity Score is selected as a user preference, as described in Section 21.1 below.

Tool	Name	General Description
	**Skip Study**	Opens the next study on the worklist without setting or prompting you to set the status of the currently open study. Note that this button will not be displayed if the optional Merge RadStream component is enabled and Load Next Study Based on Acuity Score is selected as a user preference, as described in Section 21.1 below.
	**Convey Results**	If optional RadStream component has been enabled for your system, this sets the communication dimension status of the selected study to Convey Results (or the equivalent status used by your site).
	**Talk to MD**	If optional RadStream component has been enabled for your system, this sets the connection dimension status of the selected study to Talk to MD (or the equivalent status used by your site).
	**Print DICOM**	Sends selected images and/or series to an available DICOM printer, as described in subsection 4.6.2 below.
	**Help**	Launches this User Guide in PDF format.
	**Exit Viewer**	Closes the Merge PACS Viewer (without prompting for status of currently open studies).

By default, repeatedly right-clicking on an image will toggle the cursor among a variety of commonly used mouse modes specific to the type of image being viewed.

NOTE: The available mouse modes, as well as the order in which they appear, can be customized for different modalities, as described in Section 25.12 below.

NOTE: This feature can be disabled by **deselecting** the **Delayed Right Click** option in the User Preferences Menu, as described in Section 25.11, below. If the feature is disabled (or if you hold down the right mouse button on an image instead of briefly clicking), the **Series Right-click Menu** will be displayed instead, as described in subsection 4.1.5, below.

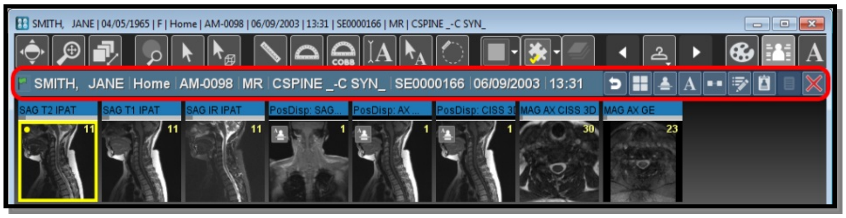
b. Viewer Toolbar Right-click Menu

Right-clicking anywhere on the Viewer Toolbar will immediately cause the **Viewer Toolbar Right-click Menu** to pop-up.

- The Viewer Toolbar Right-click Menu lets you select which of the available tools you would like to appear on the Viewer Toolbar itself. Note that, depending on your login privileges and your general system configuration, one or more of these options may not be available, in which case they will appear "grayed out" in the menu.
- The Viewer Toolbar Right-click Menu also includes a **User Preferences** option that will let you set your personal user preferences as described in Chapter 25 below.

4.1.3. Study Toolbar

Below the Viewer Toolbar is the **Study Toolbar**, as shown in the following example:



Study Toolbar

The Study Toolbar displays information about the currently open study as well as tools that apply to that study.

a. Warning / Comments Flag

If there is a system-generated warning (*e.g.*, with regard to jailed images) associated with this study and/or a comment that has been manually flagged by the commenter, a red or green warning flag as illustrated to the left will be displayed at the far left of the Study Toolbar. The appearance of the flag will change as follows:

 The study has one or more jailed images.

 The study has no jailed images but the most recent comment has been manually flagged by the commenter.

- If there is both a system-generated warning and a user comment, only the red flag will be displayed.
- Hovering your mouse over this icon will display the text of the warning (or the most recently flagged comment if there is no warning) as a pop-up tool tip.
- Clicking on this icon will launch the **Comment Viewer** as a separate pop-up window with comments and warnings displayed, as described in Chapter 5 below.
- For details on viewing jailed images, refer to Chapter 18 below.

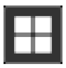
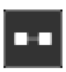
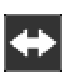
b. Study Information

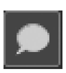
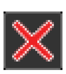
The left side of the Study Toolbar displays the following information about the study being viewed:

- **Patient Name**
- **Issuer of Patient ID** (IPID)
- **Medical Record Number (MRN)**
- **Modality**
- **Study Description**
- **Accession Number**
- **Study Date/Time**
- **Current Hanging Protocol/Study Presentation (If Any)**

c. Available Tools

The right side of the Study Toolbar displays the available tools that apply to the selected study. The actual tools that appear will depend on your login privileges and how you have configured the Toolbar (as described in paragraph d below).

Tool	Name	General Description
	**Reset Presentation**	Resets all parameters (W/L, zoom, pan, etc.) to default values.
	**Hanging Protocol**	Displays the Hanging Protocol Menu, as described in Section 4.11 below. Note that if a Hanging Protocol or Study Presentation is currently loaded, the icon will change to reflect that.
	**Series Layout**	Displays the Series Tiling Menu that allows you to select a preset Series tiling layout or enter a manual layout. This determines the number and layout of Series Viewports on the screen for this study.
	**Cross-reference Lines**	Toggles the display of any available reference lines on and off when you are viewing multiple Series. This feature is used primarily for CT and MR images where there are sequential "slices". With CT studies, there is typically a master or "scout" image against which the images of a second Series are referenced. With MR studies, on the other hand, there are typically multiple viewing angles of the same set of images, and the references lines will show the relationship between the linked Series.
	**Display Annotations**	Toggles the display of any annotations on and off.
	**Auto Series Synchronization**	Toggles Series synchronization on and off. When enabled, this will link together all Series in the same plane for navigational purposes. Thus, if you have three axial Series displayed in different Series Viewports and turn on Auto Series Synchronization, paging through the images in one of the axial Series will cause the images in the other axial Series to page as well.
	**Study Tagging**	If you have the login privileges to access the optional Teaching Files feature, this will launch the **Study Tagging** window. For more information on tagging studies, refer to Chapter 23 below.
	**VoiceClip**	Launches the VoiceClip dialog that lets you listen to, record and/or overwrite brief audio annotations that can be associated with the particular study. For details on using VoiceClip to record or listen to audio annotations, see Chapter 9 below.
	**Associate/Dissociate Study**	Lets you add the selected study to or remove the selected study from a specified worklist to which you have access. For details on associating studies, see Chapter 7 below.

Tool	Name	General Description
	**Set Status**	Lets you set the workflow status for the study. For details on changing status, see Chapter 12 below.
	**Access Control**	Lets you grant one or more users or groups access to the study. For details on Access Control, see Chapter 11 below.
	**Order Viewer**	Launch the Order Viewer in a separate pop-up window. For more information on using the Order Viewer to view orders, refer to Chapter 5 below.
	**ER WorkPanel**	Launch the ER WorkPanel for the selected study in a separate pop-up window. The ER WorkPanel provides a number of different tools commonly used by Emergency Room Physicians in a single window. For details on the ER WorkPanel, refer to Chapter 21 below.
	**Technologist WorkPanel**	Launches the Technologist WorkPanel for the selected study in a separate pop-up window. The Technologist WorkPanel provides a number of different tools commonly used by Technologists in a single window. For details on the Technologist WorkPanel, refer to Chapter 20 below.
	**Communication WorkPanel**	Launches the Communication WorkPanel for the selected study in a separate pop-up window. The Communication WorkPanel provides a number of different tools commonly used by a Merge RadStream Operator in a single window. For details on the Communication WorkPanel, refer to Chapter 22 below.
	**Report Viewer**	Launch the Report Viewer as a separate pop-up window. For more information on using the Report Viewer, refer to Chapter 6 below.
	**Launch Comment Viewer**	Launch the Comment Viewer as a separate pop-up window with any comments displayed. For more information on using the Comments Viewer, refer to Chapter 5 below.
	**Close Study**	Closes the study currently being viewed and prompts you to set study status.

d. Study Toolbar Right-click Menu

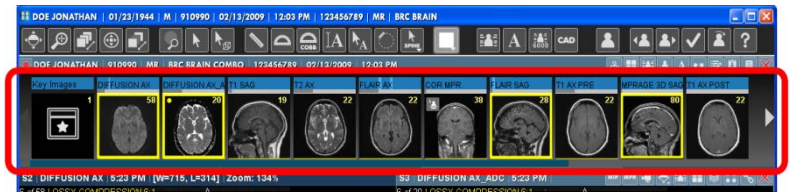
Right-clicking on the Study Information section of the Study Toolbar will immediately cause the **Study Toolbar Right-click Menu** to pop-up.

- The Study Toolbar Right-click Menu lets you select which of the available tools you would like to appear on the Study Toolbar itself. Note that, depending on your login privileges and your general system configuration, one or more of these options may not be available, in which case they will appear "grayed out" in the menu.

- At the Study Toolbar Right-click Menu you can also select whether you want the tool buttons to always appear, never appear, or only appear when a study is in the active panel (in cases where multiple studies are being viewed simultaneously).

4.1.4. Series Navigation Thumbnails

Below the Study Toolbar are the **Series Navigation Thumbnails**, as shown in the following example:



Series Navigation Thumbnails

Each Series consists of one or more related images. In most cases, a Series will be equivalent to a DICOM series sent from the modality. However, the Image Viewer has a built-in "Intelligent Ordering" feature that can arrange the images into more logical sets of images in cases such as the following:

- Multiple multi-frame images are grouped together in one series
- Multiple echo sequences are grouped together in one series
- Separate dual proton density images (T1 and T2) are grouped together in one series
- Multiple CR/MG images are grouped together in one series
- CT axial series with overlap or scout views are grouped together in one series

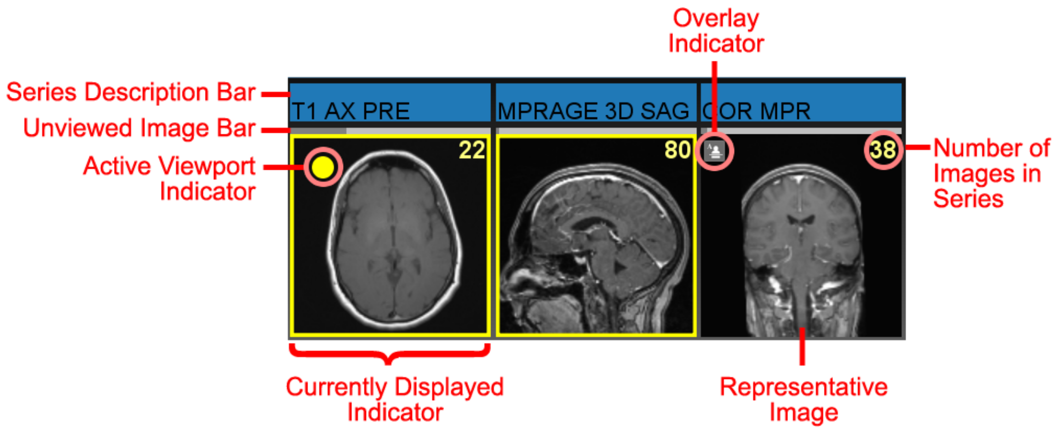
NOTE: If there are too many thumbnail images to fit the width of the screen, arrows will appear to the left and right of the thumbnail images that you can click on to view the rest of the thumbnails. In addition, a scrollbar will be displayed directly below the thumbnail images.

NOTE: If the **Automatically Stack/Scroll MG Priors** modality preference is selected, as described in Section 25.14 below, any relevant prior mammography studies will automatically be loaded into the Viewer along with the primary study and the Navigation Thumbnails for the prior studies will be displayed with the primary study's Navigation Thumbnails.

NOTE: The display of Series Navigation Thumbnails can be toggled on and off from the User Preferences Menu, as described in Chapter 25 below.

a. Overview

Each Series Navigation Thumbnail can display a variety of information, as illustrated in the following example:



Series Navigation Thumbnails Overview

- The **Series Description Bar** has the following features:
  - Displays the series description associated with the Series.
  - Changes color progressively to indicate the progress of image caching from light blue (uncached) to dark blue (cached). Note that if image precaching is enabled, as described in paragraph c, below, all images will automatically begin to be cached as soon as the series is loaded into the Merge PACS Viewer. Otherwise, individual images will be cached only when are actually viewed.
  - Allows you to select a particular image from the Series to view, as described in subsection 4.3.1, below.
- The **Unviewed Image Bar** changes color progressively to indicate how many of the images within the Series you have viewed from light gray (unviewed) to dark gray (viewed).
- A **representative image** from the Series (typically the middle image) is displayed as the body of the thumbnail.
- The **number of images** within the Series is displayed in the upper-right corner.
- An **Overlay Indicator** icon is displayed if the Series has DICOM 6000 or CAD Structured Report overlays associated with it. Note that the icon will change depending on the type of overlay.
- A **yellow border** indicates that the Series is currently displayed within a Series Viewport, as described in subsection 4.1.5, below.
- A **yellow dot** indicates that the Series is displayed in the active Series Viewport, as described in subsection 4.1.5, below.

b. Thumbnail Right-click Menu

The Thumbnail Right-click Menu

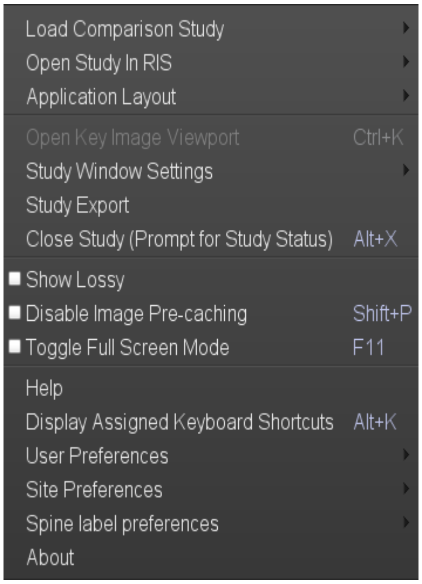
Right-clicking on an individual Series Navigation Thumbnail will immediately cause the **Series Navigation Thumbnail Right-click Menu** to pop-up, as shown in the example on the left.

Note that, depending on the type of image and your login preferences, one or more of these options may not be available.

The Series Navigation Thumbnail Right-click Menu has the following possible options:

Option	General Description
Open in Window	Open the Series in a separate pop-up "clone" window, as described in subsection 4.1.6 below.
Axial MIP	Display this Series as a single Axial MIP 3D view, as described in Chapter 4.7 below.
Sagittal MIP	Display this Series as a single Sagittal MIP 3D view, as described in Chapter 4.7 below.
Coronal MIP	Display this Series as a single Coronal MIP 3D view, as described in Chapter 4.7 below.
3D Volume	Display this Series as a single Color Volume Rendering (CVR) 3D view, as described in Chapter 4.7 below.
Axial MPR	Display this Series as a single Axial MPR 3D view, as described in Chapter 4.7 below.
Sagittal MPR	Display this Series as a single Sagittal MPR 3D view, as described in Chapter 4.7 below.
Coronal MPR	Display this Series as a single Coronal MPR 3D view, as described in Chapter 4.7 below.
MPR Viewport	Create a 2x2 Multi-Planar Reconstruction (MPR) Window for this Series, as described in Chapter 4.7 below. **NOTE:** If this series needs to be split before it can be displayed and you have disabled automatic splitting of CT and/ MR Series, as described in Section 25.2 below, clicking on any of the 3D-related options described above will display a set of thumbnail images that will let you choose the image set you want to be displayed.
Thumbnail Size	Change the size of the Series Navigation Thumbnails.

c. Study Right-click Menu



The Study Right-click Menu

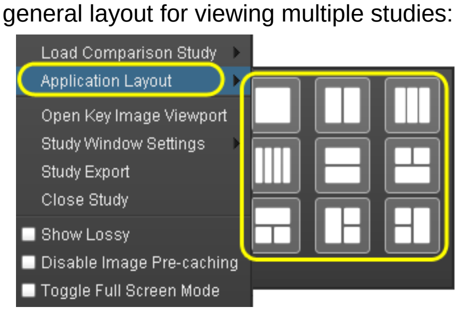
The Series Navigation Thumbnails area includes a blank space at the far right, as in the following example:

Accessing the Study Right-click Menu

Right-clicking on the blank space will immediately cause the **Study Right-click Menu** to pop-up, as shown in the example on the left.

Note that, depending on the study and the type of modality involved, your login privileges, and your general system configuration, one or more of these options may not be available.

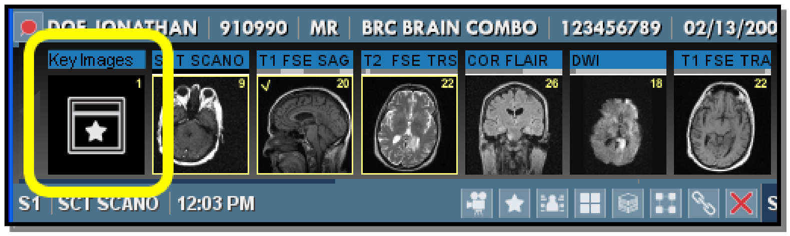
The Study Right-click Menu has the following possible options:

Option	General Description
Load Comparison Study	Select from a list of available comparison studies that can be opened within the Image Viewer alongside the currently open study or studies, as described in subsection 4.3.4 below.
Open Study in RIS	If your system is configured to provide Bi-directional XML Integration with a 3rd-party RIS, this option lets you select from a list of available prior studies, if any, that can be added to the current study that is being dictated within the RIS, if the RIS has been configured supports this feature.
Application Layout	Select the general layout for viewing multiple studies:  **Selecting the Application Layout**
Open Key Image Viewport	Displays all key images for this study in a separate pop-up Key Image Viewport window, a described in Section 4.10 below.

Option	General Description
Study Window Settings	Change any of the following study-level settings: • **DICOM Overlay Toggle** • **Show Annotations** • **Show Cross-reference Lines** • **Study Invert Toggle** • **Study Window Layout**
Study Export	Add the selected study (together with any priors) to the Burn CD dialog's Study List. Note that multiple studies from multiple patients can be added to the same Burn CD Study List. For details on burning patient images onto a CD, see Chapter 14 below.
Close Study	Close the current study.
Show Lossy	If you have the login privilege to view lossless images, selecting this option will temporarily stop additional lossless images from being downloaded and will cause lossy-compressed images to be downloaded instead. Note that any change to this option will be effective for the duration of your current Merge PACS Workstation session (*i.e.*, until you log out and log back in). For details on using lossy vs. lossless images, see Chapter 13 below.
Disable Image Pre-caching	If you have the login privilege to allow background caching, selecting this option will temporarily stop additional images from being cached in the background. Selecting it again will cause background caching to resume. Note that any change to this option will be effective for the duration of your current Merge PACS Workstation session (*i.e.*, until you log out and log back in).
Toggle Full Screen Mode	Display the current study in full-screen display mode with all non-image details hidden.
Help	Launches this User Guide in PDF format.
Display Assigned Keyboard Shortcuts	Displays a printable list of currently assigned keyboard shortcuts in a separate pop-up window.
Launch Thumbnail Viewer	Opens the Mammography Thumbnail Viewer in a separate pop-up window (mammography images only). For details on using the Thumbnail Viewer, see Chapter 4.8 below.
User Preferences	Let you set your personal Viewer preferences as described in Chapter 25 below.
About	Displays system information, including the current version of the Merge PACS Workstation you are using, your Windows operating system and username, memory and disk usage, etc. For more information, refer to Chapter 26 below.

d. Key Image Series Navigation Thumbnail

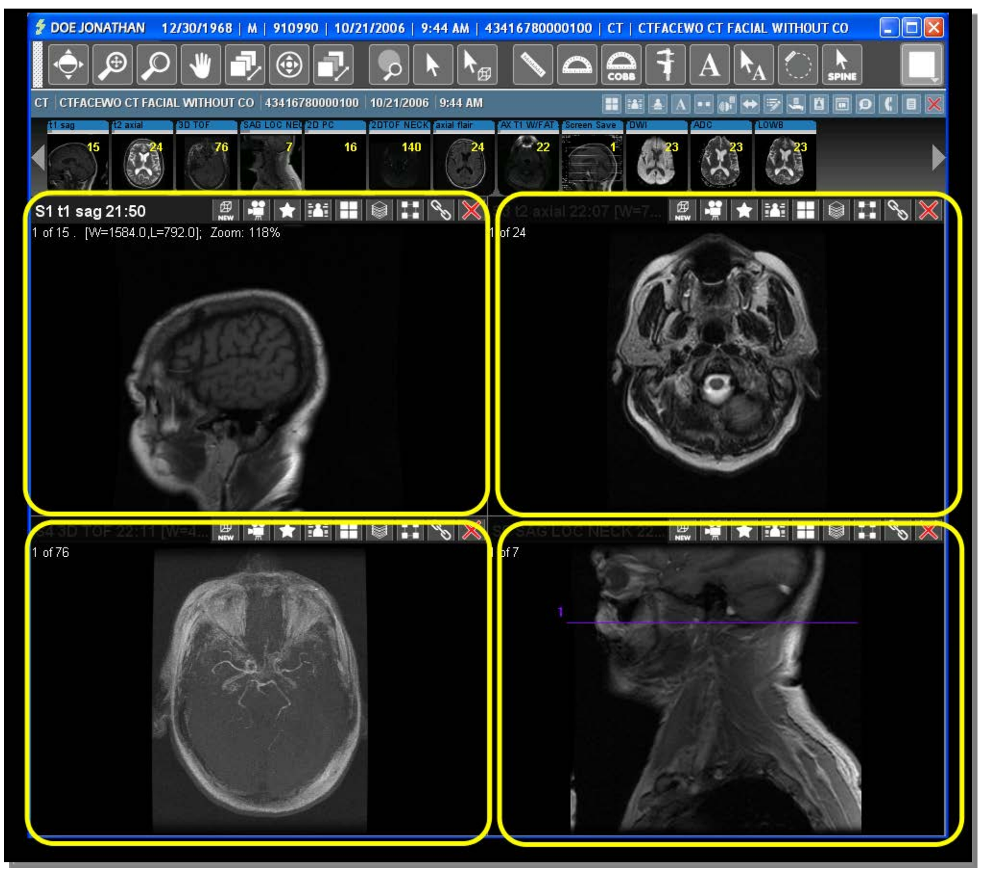
If there are any key images that have been flagged for this exam, the first Navigation Thumbnail will be a special Key Image Series Navigation Thumbnail, as in the following example:



Key Image Navigation Thumbnail

4.1.5. Series Viewports

The Merge PACS Viewer can be divided into a number of individual viewing windows called “Series Viewports,” as shown in the following example:



Series Viewports

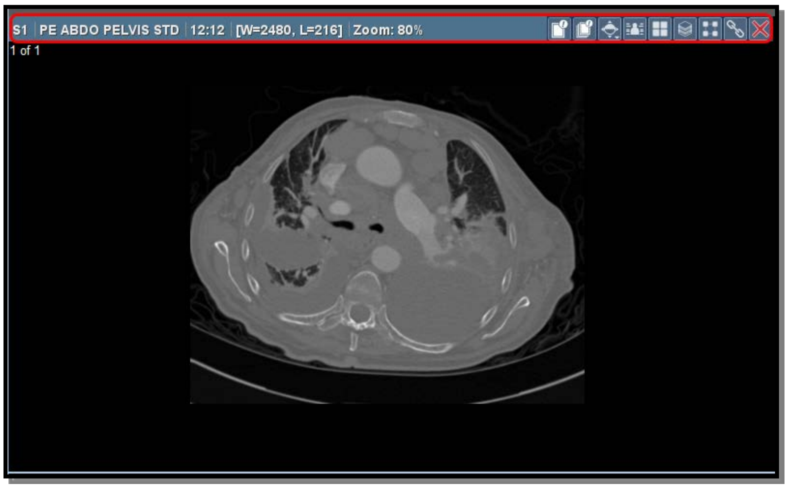
Each Series Viewport can display a separate Series, and the same Series can be displayed in multiple Series Viewports (*e.g.*, to see the same Series with different window/level values).

The number and layout of the Series Viewports that are displayed when a study is first opened depends on what screen layout you have selected using the various layout tools, whether there is a Hanging Protocol or Study Presentation associated with this study, and how the default layout preferences have been configured.

If you have multiple Series Viewports open, many of the available image manipulation tools will only affect the images in the **active Series Viewport** (*i.e.*, the Series Viewport where the mouse cursor is currently located). The active Series Viewport will have its Toolbar, as described below, highlighted.

a. Series Toolbar

At the top of each Series Viewport is the **Series Toolbar**, as shown in the following example:

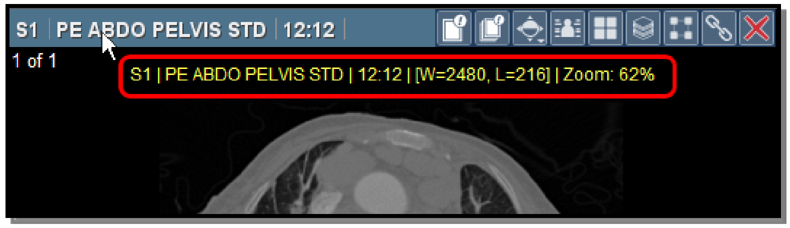


Series Toolbar

The Series Toolbar displays information for the Series in the Series Viewport as well as various tools that apply to that Series Viewport:

- By default, the left side of the Series Toolbar displays the following information about the Series:
  - **Series Number**
  - **Series Description**
  - **Series Time**
  - **Window/Level**
  - **Zoom Factor**

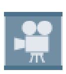
If the size of the viewport is too small to include all the information described above, it can still be viewed as a "tool tip" by hovering your mouse briefly over the Series Toolbar without clicking, as in the following example:



Series Toolbar Tool Tip

NOTE: If the **Image-level Manipulation** option has been enabled for this Series Viewport from the **Series Right-click Menu**, as described in paragraph c below, Window/Level and Zoom factor will be displayed in the **Image Titlebar** instead, as described in paragraph b below.

- The right side of the Series Toolbar displays the available tools that apply to the series currently being displayed in that Series Viewport. The actual tools that appear will depend on the type of image, your login privileges and how you have configured the Toolbar (as described below).

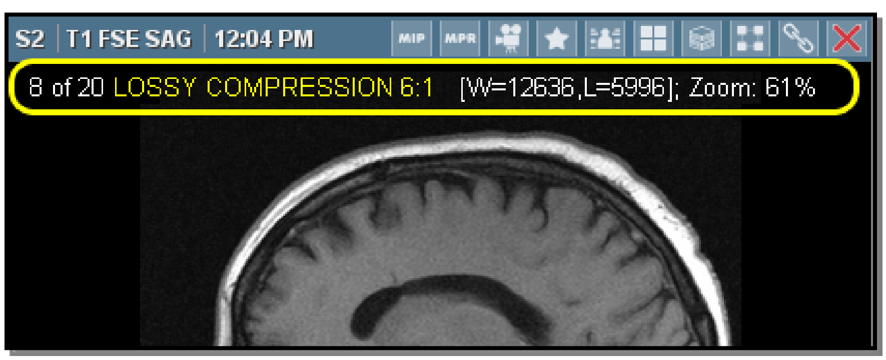
Tool	Name	General Description
	**One-click MIP**	Displays the Series as a Maximum Intensity Projection rendered volume.
	**Spinning MIP**	Displays the Series as a rotating Maximum Intensity Projection rendered volume in a head-to-foot orientation (PET Series only).
	**One-click MPR**	Displays the Series as a Multi-Planar Reconstruction (MPR) rendered volume
	**3D Create MPR Slab View**	Creates a separate Multi-Planar Reconstruction (MPR) Series Viewport for this Series.
	**Cine**	Rapidly pages through the images in this Series. The speed of the paging can be controlled by dragging the mouse cursor up and down within the Series Viewport.
	**Select Image**	Select/Deselect this image for use with DICOM printing.
	**Select Series**	Select/Deselect this series for use with DICOM printing.
	**Window/Level Menu**	Choose a window/level option for the selected Series Viewport.
	**Set Key Image**	Marks the image currently displayed in the Series Viewport as a key image and launches the Key Image Viewport in a separate pop-up window.
	**DICOM Overlay**	Toggles DICOM Overlay display for this Series Viewport on and off.

Tool	Name	General Description
	Image Layout	Lets you change the number of images that can be displayed simultaneously within this Series Viewport.
	Global Stack	Lets you to page from the end of one series to the beginning of the next one.
	Grouping	Lets you group together multiple Series Viewports so that various tools (Window/Level, Pan, Zoom, etc.) will be applied to all selected Series Viewports when applied to one.
	Manual Linking	Lets you link series that are in different frames of reference (whether in the same study or between two studies in Compare Studies Mode, as described in subsection 4.3.4 below). The Manual Linking feature can also be used if you want to link only certain related series instead of all of them.
	Paired Invert	Apply Intelligent Invert to paired mammography images, as described in Section 4.8 below. Note that this tool will only be available when viewing mammography images.
	Clear Viewport	Removes the currently displayed Series from the Series Viewport.

- Right-clicking on the Series Information section of the Series Toolbar will immediately cause the **Series Toolbar Right-click Menu** to pop-up.
  - The Series Toolbar Right-click Menu lets you select which of the available tools you would like to appear on the Series Toolbar itself. Note that, depending on the type of images, your login privileges and your general system configuration, one or more of these options may not be available for the Series currently being displayed.
  - At the Series Toolbar Right-click Menu you can also select whether you want the tool buttons to always appear, never appear, or only appear when the Series Viewport is active.

b. Image Titlebar

The top section of the Series Viewport displays information about the image currently showing in the Series Viewport, as in the following example:



The Image Titlebar

By default, the Image Titlebar will just show the image number and the compression ratio (if the image has been lossy compressed). If the Image-level Manipulation option has been enabled for this Viewport from the **Series Right-click Menu**, as described in paragraph c below, Window/Level and Zoom factor will also be displayed here.

NOTE: If an image has been compressed multiple times ("recompressed"), the highest compression ratio used will be displayed.

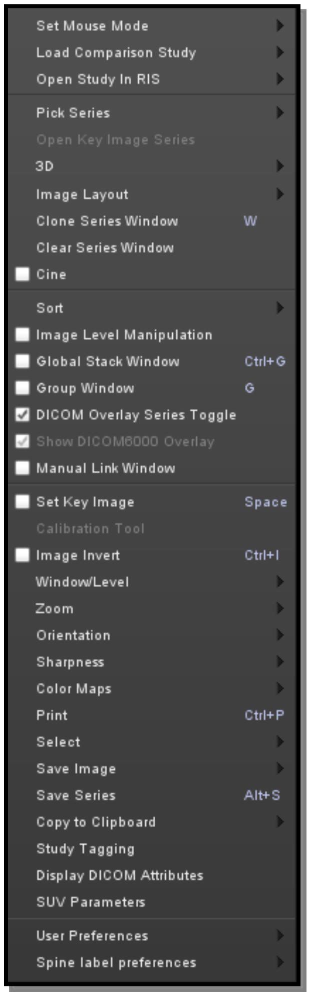
Images that have been flagged as a Key Image will have an orange triangle displayed beneath their Image Titlebar, as in the following example:

Key Image Indicator

Images that have been selected for DICOM printing will have a blue triangle displayed beneath their Image Titlebar, as in the following example:

Selected Image Indicator

c. Series Right-click Menu



The Series Right-click Menu

Right-clicking on a Series Viewport and holding the mouse button down for a few seconds will bring up the **Series Right-click Menu**, as shown in the example to the left.

The Series Right-click Menu contains a variety of additional navigation, layout, and image manipulation options, as well as the ability to save and print an image. Some of the options available on the Series Right-click Menu are also available elsewhere in the Image Viewer, and are included here for your convenience.

Note the following:

- Depending on the study and the type of modality involved, your login privileges, and your general system configuration, one or more of these options may not be available, in which case they will appear "grayed out" in the menu.
- If you right-click on a Series Viewport that is currently empty, the Series Right-click menu will only contain options to **Pick Study** and **Pick Series**, as in the following example:

Menu in Empty Viewport

The Series Right-click Menu has the following possible options:

Option	General Description
Set Mouse Modes	Lets you select one of the following tools (note that your mouse cursor will change to reflect the chosen tool): **Window/Level** — **Binoculars** **3-in-1 Mouse Tool** — **Hot Light** **Zoom/Pan Combo** — **Probe** **Page** — **3D Cursor** **Zoom** — **Cobb Angle** **Pan** — **Calibrate** **Vertical Plumb Line** — **Text Annotation** **Horizontal Plumb Line** — **Pointer Text** **Transischial Line** — **ROI** **Joint Line** — **Spine Label** **Line Measurement** — **Cine** **Angle Measurement** — **Auto Scroll** **Magnify** — **Skimming** **Dual Link Magnifier** — **ROI Window/Level**
Load Comparison Study / Pick Study	Lets you select from a list of available comparison studies that can be opened within the Image Viewer alongside the currently open study or studies, as described in subsection 4.3.4 below. Note that if you right-click on a Series Viewport that is currently empty, the option will be called Pick Study.
Open Study in RIS	If your system is configured to provide Bi-directional XML Integration with a 3rd-party RIS, this option lets you select from a list of available prior studies, if any, that can be added to the current study that is being dictated within the RIS, if the RIS has been configured supports this feature.
Pick Series	Lets you pick a Series to be viewed in the selected Series Viewport, including Series from prior exams.
Open Key Image Series	Opens all key images for this study as a separate Series within this Series Viewport.

Option	General Description
3D	If applicable to this Series, lets you select one of the following 3D options: • **Axial MIP** • **Sagittal MIP** • **Coronal MIP** • **Spinning MIP (PET Series only)** • **3D Volume** • **Axial MPR** • **Sagittal MPR** • **Coronal MPR** • **MPR Viewport** • **Crop MPR Viewport** **NOTE:** If this series needs to be split before it can be displayed and you have disabled automatic splitting of CT and/ MR Series, as described in Section 25.2 below, clicking on any of the options described above (except **Open in Window**) will display a set of thumbnail images that will let you choose the image set you want to be displayed.
Image Layout	Lets you change the number of images that can be displayed simultaneously within this Series Viewport.
Clone Series Window	Display the contents of the active Series Viewport in a new pop-up Series Viewport window, as described in subsection 4.1.6 below.
Clear Series Window	Removes the series being displayed in the selected Series Viewport
Cine	Turns on the Cine feature to rapidly page through images in a series
Sort	Lets you change the order of the images displayed in the Series Viewport according to one of the options: • **Image Number Ascending** • **Image Number Descending** • **Image Position Ascending** • **Image Position Descending** • **Image Acquisition Time Ascending** • **Image Acquisition Time Descending** • **Image Echo Number Ascending** • **Image Echo Number Descending**
Image Level Manipulation	When selected, various image manipulation tools (Window/Level, Pan, Zoom, etc.) will only apply to the image currently displayed and will not affect other images in the Series. Also, when selected, the Viewport Title will display the Window/Level and Zoom factor for each image.
Global Stack	Lets you page from the end of one series to the beginning of the next one. See subsection 4.3.1.g below for more information.
Group Window	Lets you manually link multiple Series Viewports together for display purposes. See subsection 4.4.7 below for more information.
DICOM Overlay Series Toggle	Turns on the DICOM Overlay display for the selected Series Viewport. See subsection 4.4.9 below for more information.

Option	General Description
Show DICOM6000 Overlay	Turns on the DICOM6000 Overlay display for the selected Series Viewport. See subsection 4.4.10 below for more information.
CAD Markings	Shows the DICOM structured report for the selected Series Viewport (only applies to Mammography images). See subsection 4.8.8 below for more information.
Manual Link Window	Lets you link series that are in different frames of reference (whether in the same study or between two studies in Compare Studies Mode, as described in subsection 4.3.4 below). The Manual Linking feature can also be used if you want to link only certain related series instead of all of them.
Set Key Image	Flag the selected image as a “key image” for later reference. See Section 4.9 below for more information.
Calibration Tool	Lets you manually calibrate the various measurement annotations for DICOM images that do not have valid pixel spacing information associated with them when they are sent from the modality. See subsection 4.4.15 below for more information.
Invert	Reverse the black and white pixels of the images in the selected Series Viewport. See subsection 4.4.12 below for more information.
Window/Level	Choose a window/level option for the selected Series Viewport, as well as manage your personal Window/Level presets. See subsection 4.4.1 below for more information.
VOI LUT	If an image has one or more Values of Interest Lookup Tables associated with it, lets you select the VOI LUT you wish to apply. See subsection 4.4.2 below for more information.
Zoom	Selects a magnification level for the images in the selected Series Viewport. See subsection 4.4.3 below4.9 below for more information.
Orientation	Temporarily change the orientation of the selected image (flip, rotate, etc.). See subsection 4.4.14 below for more information.
Sharpness	Applies a filter that improves the edges of certain structures within an image. See subsection 4.4.13 below for more information.
Color Maps	Choose a color mapping option, if available, for the selected Series Viewport. See subsection 4.4.11 below for more information.
Print	Send the selected image, together with any user annotations, to a printer. See subsection 4.6.2 below for more information.
Select	Select/deselect this image or series to be sent to a DICOM printer, if available. Refer to subsection 4.6.2 below for information on DICOM printing.
Save Image	Save the selected image, together with any user annotations, to your hard drive in a variety of available image formats, as described in subsection 4.6.1 below.
Save Series	Save the entire series, together with any user annotations, to your hard drive in a variety of available image formats, as described in subsection 4.6.1 below.
Copy to Clipboard	Temporarily copies the currently displayed image to your computer’s memory so that it can be pasted into another application (*e.g.*, by pressing **Ctrl-V** while inside that application).

Option	General Description
Study Tagging	Launch the **Study Tagging** window to add this study to a teaching worklist, as described in Chapter 23 below.
Display DICOM Attributes	View the complete set of DICOM attributes for the selected image. See subsection 4.4.9 below for more information.
SUV Parameters	Lets you define any missing parameters that are required to calculate SUV values (PET Series only). See subsection 4.4.17 below for more information.
User Preferences	Lets you set various personalized viewing preferences, as described in Chapter 25 below.
Spine Label Preferences	Lets you access the **Spine Label Preferences Menu**, as described in Section 4.5 below.

If the **Use Basic Right-click Menu** option has been selected from the User Preferences menu, as described in Section 25.11 below, the Series Right-Click Menu will instead contain only the active tools that are present in the mouse cycle mode for the modality from which the menu was invoked, as in the following example:

Basic Series Right-Click Menu

Click on the **Configure** option to manually select additional tools to be displayed on the menu.

4.1.6. Clone Windows

Clone windows are stand-alone Series Viewports that are displayed as separate pop-up windows. A typical use case scenario would be to position the clone window on a color monitor so as to easily view color images on that monitor when needed.

Clone windows can be invoked in two ways:

- From within an **existing Series Viewport**, by selecting the **Clone Series Window** option from the **Series Right-click Menu** for that Viewport. If invoked this way, the clone window will display the contents of that Series Viewport and preserve all the current settings of that Series Viewport (Window/Level, Zoom, etc.).

- From a **Navigation Thumbnail**, either by double-clicking on the Thumbnail or by selecting the **Open in Window** option from the **Thumbnail Right-click Menu** for that Thumbnail. Note that if you want to open additional series in separate clone windows (as opposed to reusing the currently open clone window), hold down the **Shift** key while double-clicking.

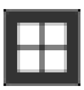
4.2. Changing the Screen Layout

From within the Merge PACS Viewer you can view:

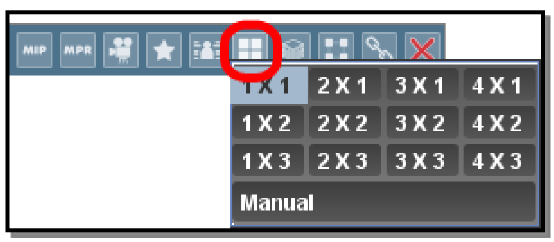
- Multiple images in a Series simultaneously in a single Series Viewport
- Multiple Series from one or more studies simultaneously in multiple Series Viewports (or one Series in multiple Series Viewports)
- Multiple studies side-by-side in separate Study Windows.

NOTE: Once you have opened multiple Series Viewports, you can choose a different Series to appear in each Series Viewport by using the navigation tools described in Section 4.3 below.

4.2.1. Viewing Multiple Images in a Single Viewport

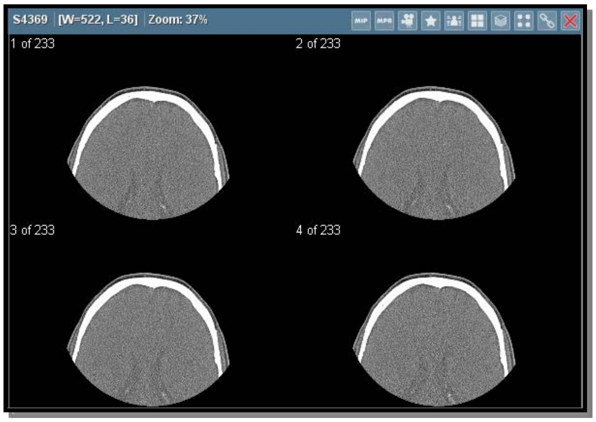


Clicking on the **Image Layout** button on the **Series Toolbar**, as shown on the left, will cause a drop-down **Image Layout Menu** to appear, similar to the figure below:



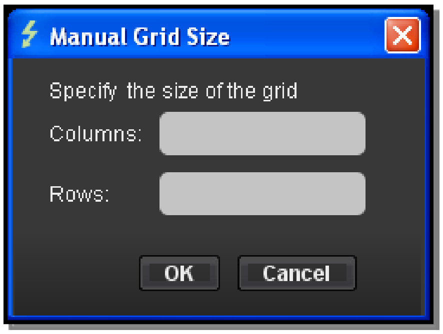
The Image Layout Menu

- Selecting a layout option other than 1x1 will cause multiple Series images, if there is more than one, to be displayed within the Series Viewport, as in the following example:



Multiple Image Layout

- For each option in the Image Layout Menu, the numbers indicate the number of images displayed per column and row. For example, 3x3 would indicate a layout of three columns and three rows, and 7x6 would indicate a layout of seven columns and six rows.
- Clicking on the **Manual** option in the Image Layout Menu will bring up the following window that will allow you to specify a particular image layout other than one listed in the menu:



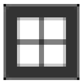
Manually Setting an Image Layout

4.2.2. Viewing Multiple Series in Separate Viewports

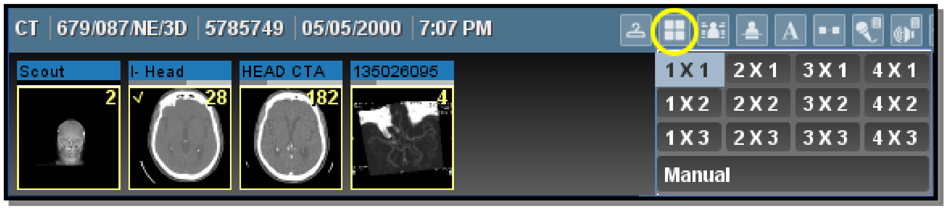
You can divide the main Merge PACS Viewer into multiple series display windows or "Series Viewports." If you are viewing a study with more than one Series of images, this will allow you to view some or all of the Series simultaneously. You can also view the same Series in multiple Series Viewports (*e.g.*, to see the same Series with different window/level values).

Only one Series Viewport at a time can be "active" (*i.e.,* can be affected by the various image manipulation and display tools), but any changes you make to the images in one Series Viewport will be preserved when you move to another Series Viewport. This means that each Series Viewport can have a different Window/Level setting, image layout, etc.

a. Series Layout Menu

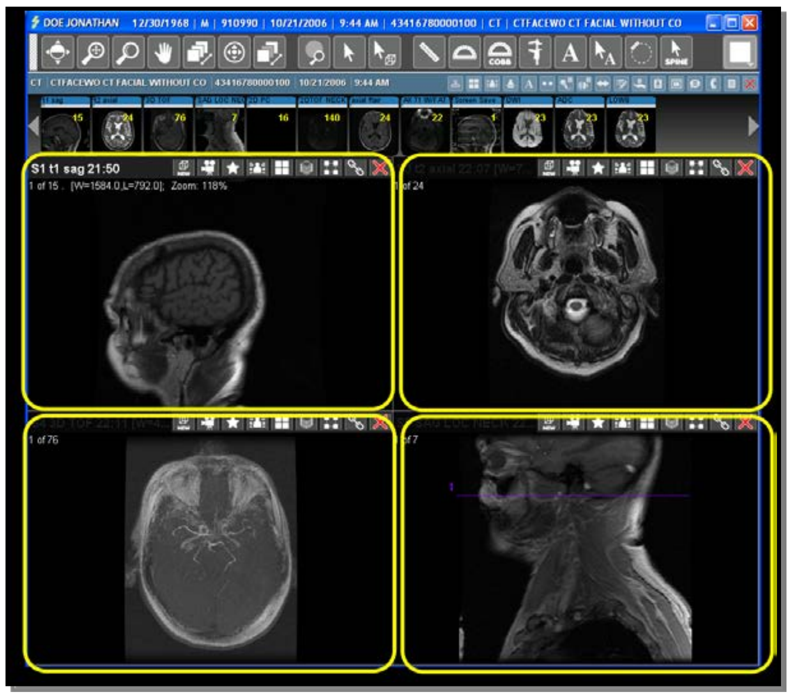


Clicking on the **Series Layout** button on the **Study Toolbar**, as shown on the left, will bring down a **Series Tiling Menu** that allows you to select a custom series tiling layout:



Series Layout Menu

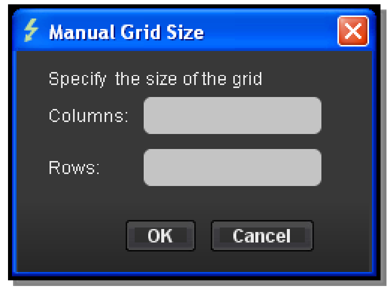
- Selecting a layout option other than 1x1 will cause multiple Series Viewports to be displayed within the main Study Window, as in the following example:



Multiple Viewports

- For each option in the Series Layout Menu, the numbers indicate the number of Series Viewports displayed per column and row. For example, 2x2 would indicate a layout of two columns and two rows, and 4x4 would indicate a layout of four columns and three rows.

- Clicking on the **Manual** option in the Image Layout Menu will bring up the following window that will allow you to specify a particular image layout other than one listed in the menu:

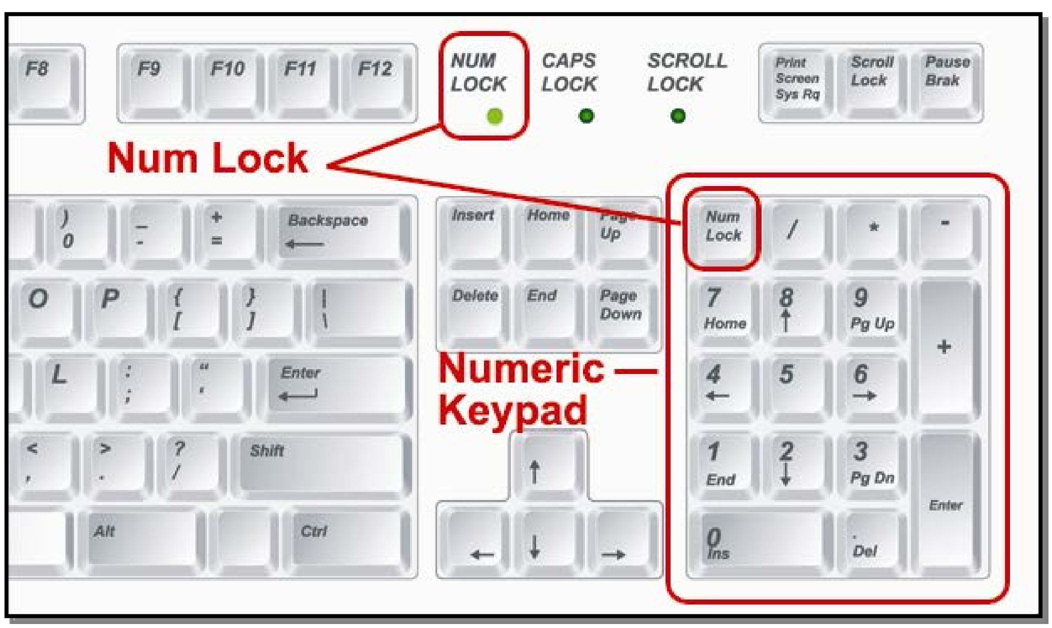


Manually Setting an Image Layout

- Double-clicking on a Series Viewport with the left mouse button will cause it to expand to fill the entire image viewing area. Double-clicking a second time will return the display to the previously selected Series layout.

b. Keyboard Shortcuts

You can also use the **numeric keypad** (typically on the right side of your keyboard) to select among various preset series layouts, as described below. Keep in mind that these shortcuts are only available from the numeric keypad (the regular keyboard numbers are used for Window/Level presets) and that the **Num Lock** button on your keyboard must be engaged, as shown in the following example:



The Numeric Keypad and the Num Lock Key

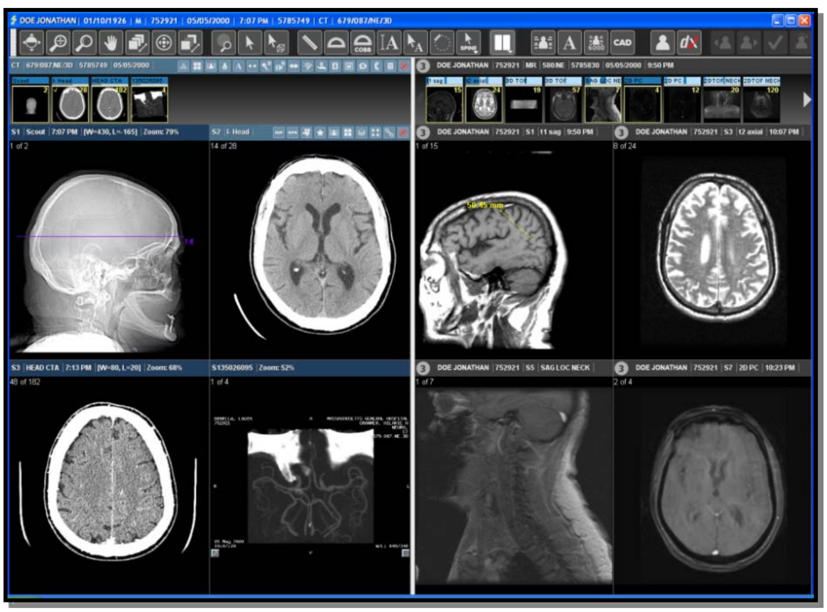
The available shortcuts from the numeric keypad are as follows:

Keystroke	Layout
1	Columns = 1; Rows = 1 (1x1)
2	Columns = 2; Rows = 1 (2x1)
3	Columns = 3; Rows = 1 (3x1)
4	Columns = 2; Rows = 2 (2x2)
5,6	Columns = 3; Rows = 2 (3x2)
7,8	Columns = 4; Rows = 2 (4x2)
9	Columns = 3; Rows = 3 (3x3)
0	Columns = 4; Rows = 3 (4x3)

NOTE: In order for the keyboard shortcuts to work, your mouse cursor must be over a Series Viewport that is not empty.

4.2.3. Comparing Multiple Studies

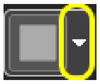
The Merge PACS Viewer can display two or more different studies for the same patient in multiple viewing panels within the main Image Viewing Window, as in the following example:



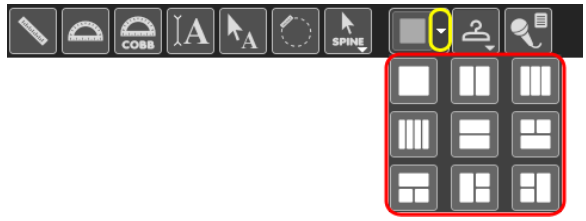
Two Studies Compared Side-by-Side

Each study can be displayed with its own Window/Level setting, image layout, Series layout, etc. You can also open multiple instances of a single study, and each instance can have its own display settings as well.

a. Study Layout Menu



Clicking on the **Study Layout** arrow to the right of the **Comparison Toggle** button on the **Series Toolbar**, as shown on the left, will cause a drop-down **Study Layout Menu** to appear, similar to the figure below:



The Study Layout Menu

Each icon on the Study Layout Menu represents how the individual study panels will be displayed. Once you have chosen a layout, you can select the studies for each panel as described in subsection 4.3.4 below.

NOTE: You do not have to select a study layout before selecting a comparison study. If you select a comparison study (as described in subsection 4.3.4 below), the layout will automatically default to a side-by-side layout.

b. Comparison Toggle Button

Once you have selected a study layout from the **Study Layout Menu**, as described in the preceding paragraph, clicking on the **Comparison Toggle** button on the **Viewer Toolbar**, as shown on the left, will let you switch between the last selected layout and the default single-study layout.

c. Keyboard Shortcuts

You can also use the **numeric keypad** to select among various preset study layouts, as described below. The available shortcuts from the numeric keypad are as follows:

Keystroke	Layout	Keystroke	Layout	Keystroke	Layout
Alt+0,1		Alt+2		Alt+3	
Alt+4		Alt+5		Alt+6	
Alt+7		Alt+8		Alt+9	

NOTE: In order for the keyboard shortcuts to work, your mouse cursor must be over a Series Viewport that is not empty.

4.3. Navigating through Images, Series and Studies

The Merge PACS Viewer has a number of different methods for navigating among a patient's images. You can move from one image in a particular series to another, move from one series of images in a study to another, and move from one whole study to another study if there are multiple studies available for a patient. This is especially useful if you want to display multiple series side-by-side or compare two different studies in separate display windows.

4.3.1. Navigating through Images in a Series

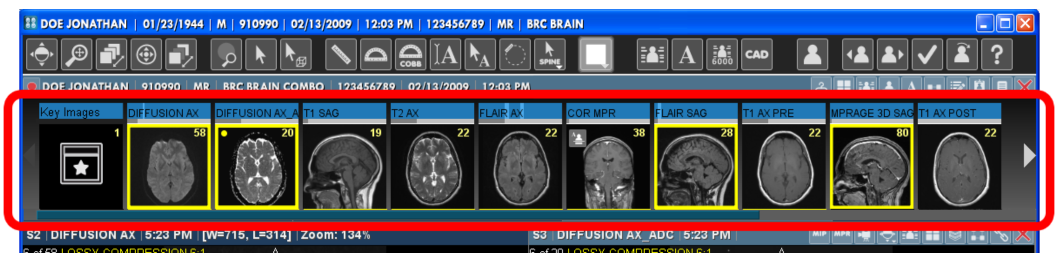
There are a variety of different ways to navigate between multiple images in a series, each of which is described in detail below:

- **Series Navigation Thumbnails**
- **Page Images Tool**
- **Auto Scroll Tool**
- **Mouse Wheel**
- **Skimming**
- **Cine Tool**

In addition, you can also use the **Global Stacking** feature to control whether you can move directly from the images in one series to the images in the next series.

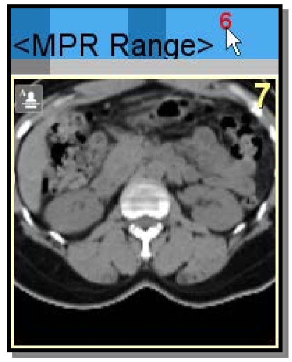
a. The Series Navigation Thumbnails

As described in subsection 4.1.4, above, each Series has a Series Navigation Thumbnail associated with it that is located at the top of the Merge PACS Viewer, as shown in the following example:



Series Navigation Thumbnails

By default, the first image in the Series will be initially displayed in the Viewport. To display a different image, hover your mouse over the Series Description bar and move the mouse right or left until you see a red number corresponding to the desired image, as in the following example:



Selecting an Image

You can then click on that number and drag and drop it into the desired Series Viewport.

b. The Page Images Tool

The Page Images tool, located on the Viewer Toolbar and illustrated to the left, is used to page sequentially ("scroll") through a series of images in a particular series. Once you have selected the Page Images tool, your mouse pointer will change to match the icon for this tool. You can then move through the series forwards or backwards by positioning your mouse pointer over any image in a series, clicking and holding down the left mouse button, and moving the pointer up and down.

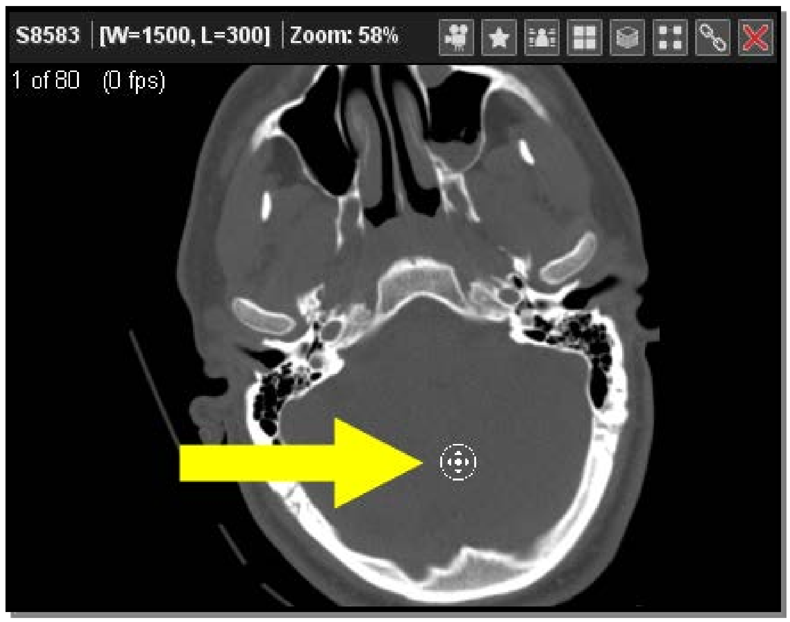
- You can move forwards through a series by moving the mouse from top to bottom, and you can go backwards through a series by moving the mouse from bottom to top.
- By default, horizontal movement of the mouse is ignored. This can be changed, however, from the User Preferences Menu, as described in Chapter 25 below. If you select to not ignore horizontal motion, you will also be able to go forwards through a series by moving the mouse from left to right and go backwards by moving the mouse from right to left.
- This tool is also available by placing your pointer over an image and then clicking the right mouse button repeatedly until the pointer changes to the Page Images icon.
- As you use the Page Images tool to scroll through a series, every consecutive image is displayed. For large series, this means that you may need to release the mouse button and reposition the pointer several times to get through the entire series. If you want to scroll rapidly through an entire series without worrying about whether every consecutive image is displayed, use the **Skimming** feature described in paragraph Note: below.

NOTE: **Keyboard Shortcut:** When using a tool other than the various annotation tools, you can temporarily switch to the Page Images tool by pressing and holding the **Shift** key. When you release the Shift key, your cursor will return to the tool you were using previously.

c. The Auto Scroll Tool

The Auto Scroll tool, located on the Viewer Toolbar and illustrated to the left, is used to page sequentially ("scroll") through a series of images in a particular series simply by moving the mouse cursor over an image without needing to hold down the mouse button. Once you have selected the Page Images tool, your mouse pointer will change to match the icon for this tool. You can then move through the series forwards or backwards by positioning your mouse pointer over any image in a series, clicking once to activate the tool and then and moving the pointer up and down.

- You can move forwards through a series by moving the mouse from top to bottom, and you can go backwards through a series by moving the mouse from bottom to top.
- When you first click on an image to activate the Auto Scroll tool, a marker icon is displayed on the image at the location clicked, as in the following example:



Auto Scroll Tool Marker

- As you use the Auto Scroll tool to scroll through a series, every consecutive image is displayed. For large series, this may take too long. If you want to scroll rapidly through an entire series without worrying about whether every consecutive image is displayed, use the **Skimming** feature described in paragraph Note: below.

NOTE: **Shortcut:** If your mouse has a center wheel, you can activate the **Auto Scroll** feature by pressing and holding the center wheel while any other tool except for **Skimming** or **Magnify** is in use.

d. Image Navigation Using the Mouse Wheel

If your mouse is equipped with a center wheel, you can also page through the images in a series by using that wheel. This will work regardless of what tool is currently selected, except for the following tools which have special uses for the center wheel:

- **Zoom/Pan Combo**
- **Skimming**
- **Magnify**

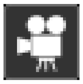
NOTE: Depending on your mouse, you may be able to adjust the speed at which images page by changing the properties of your mouse. From your computer's **Start Menu**, select **Control Panel** and then click on the **Mouse** option. If the Mouse Properties window includes a tab labeled "Wheel," you can change the number of lines (or images) that will be scrolled (or paged) for each notch of the wheel you roll.

e. Skimming

The Skimming tool, located on the Viewer Toolbar and illustrated to the left, lets you use the mouse cursor to rapidly scroll through all images in a Series Viewport, skipping over some images in the process if the Series contains a large number of images. Once you have selected the Skimming tool, your mouse pointer will change to match the icon for this tool.

- As mentioned above, the Page Images tool displays every consecutive image in a series, which can prove tedious when trying to scroll through series with large numbers of images. The Skimming tool, on the other hand, can be used to rapidly scroll through all images in a series, skipping over some images in the process if the series contains a large number of images.
- To use the Skimming tool, position your mouse pointer at the very top or bottom of a Series Viewport click the left mouse button, and then move the mouse from to the opposite side of the Series Viewport to. You can move forwards through a series by moving the mouse from top to bottom, and you can go backwards through a series by moving the mouse from bottom to top.
- Depending on how your user preferences are set, as described in Chapter 25 below, you may also be able to activate the Skimming feature by pressing and holding the center wheel button on your mouse as you move the cursor across a Series Viewport, regardless of the tool that is currently selected.

f. The Cine Tool



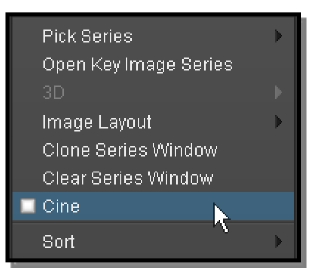
The Cine tool, located on the Series Toolbar and illustrated to the left, allows you to automatically cycle through all the images in a particular series without having to manually use the Page Images tool. Selecting this option will pop up the Cine Controller on your screen, as shown in the following figure:

The Cine Controller

- The slide bar at the top of the controller allows you to select the relative speed at which the images cycle. The actual speed will depend on such factors as the size of the images in the series, the speed of your connection to the Merge PACS server, etc.
- The Cine Controller has the following buttons available:

Button	Name	Description
	**Reverse**	Click to make the images cycle backwards.
	**Pause**	Click to temporarily stop the Cine feature without exiting it altogether.
	**Forward**	Click to make the images cycle forwards.
	**Loop**	Click to cause the images in the series to continually cycle, starting over again at the first image after the last image is displayed.
	**Bounce**	Click to cause the images in the series to continually cycle, reversing direction after the first or last image is displayed.

- The Cine Tool is also available from the **Series Right-click Menu**, as seen in the following example:

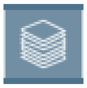


Selecting the Cine Tool from the Right-click Menu

- When you are finished using the Cine feature, make sure you exit it by clicking on the small ☒ in the upper right corner of the Controller.

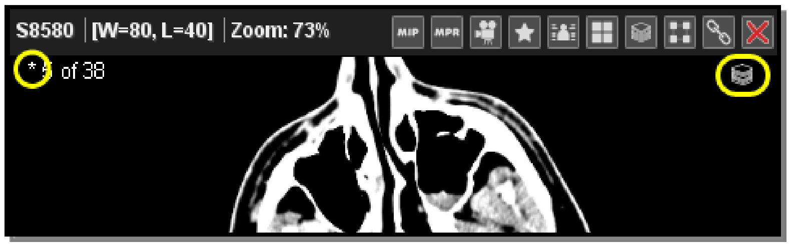
NOTE: If you exit the Cine Controller while the images are cycling, they will continue to cycle until you click on the Cine tool again.

g. Global Stacking



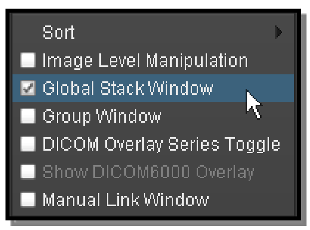
By default, when using keyboard shortcuts or the mouse wheel (as described in the preceding paragraphs) to page through images in a series, you can only page through one series at a time; when you reach the last image in a particular series the arrow and page keys will have no further effect in that direction. If you would like to be able to move from the last image of one series directly to the first image of the next series, you can do so by selecting the Global Stacking Tool from the Series Right-click Menu.

- The Global Stack option only applies to the Series Viewport in which it was activated, and this Series Viewport will display both an asterisk to the left of the number of images and a small Global Stacking icon, as shown in the following example:



Global Stacking Enabled for this Viewport

- Global Stacking is also available by selecting the **Global Stack Window** option from the **Series Right-click Menu**, as shown in the following example:



Selecting "Global Stack Window" from the Right-click Menu

4.3.2. Navigating Among Different Series

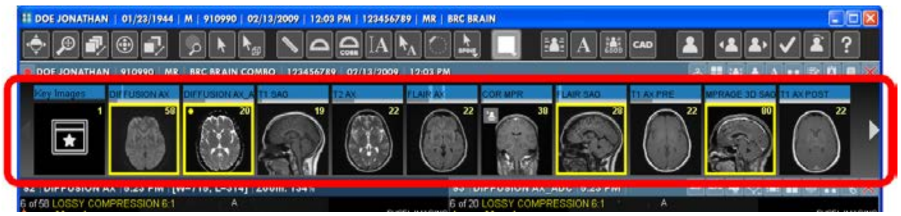
There are a variety of different ways to navigate between multiple images in a series, each of which is described in detail below:

- **Series Navigation Thumbnails**
- **The Series Right-click Menu**
- **Cross-reference Lines**
- **Automatic and Manual Synchronization**
- **Grouping**

You can also move a series from one image Series Viewport to another and clear a series from a Series Viewport.

a. The Series Navigation Thumbnails

As described in subsection 4.1.4, above, each Series has a Series Navigation Thumbnail associated with it that is located at the top of the Merge PACS Viewer, as shown in the following example:



Series Navigation Thumbnails

You can use the Navigation Thumbnails to load a particular Series into a Series Viewport in any of the following ways:

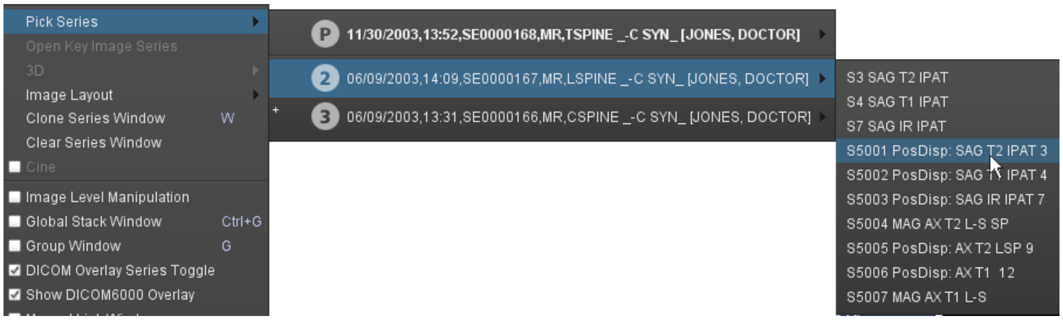
- Use the left mouse button to drag and drop a Series into an existing Series Viewport.
- Double-click on a Thumbnail to open a series in a separate pop-up “clone” window, as described in subsection 4.1.6 above. Note that, by default, there can only be one clone window open at a time; if you want to open additional series in separate clone windows (as opposed to reusing the currently open clone window), hold down the **Shift** key while double-clicking.
- Right-click on a Thumbnail and select **Open in Window** from the **Thumbnail Right-click Menu** to open the series in a separate pop-up “clone” window, as described in subsection 4.1.6 above.

Note the following:

- The thumbnail for each series that is currently being displayed in a Series Viewport will be outlined with a thin yellow border.
- The thumbnail image for the series in the currently active Series Viewport will be outlined with a thick yellow border.
- The display of series thumbnail images can be toggled on and off from the User Preferences Menu, as described in Chapter 25 below.

b. The Series Right-click Menu

From the Series Right-click Menu you can select a Series to be displayed in the active Series Viewport as shown in the following example:



Picking a Series from the Series Right-click Menu

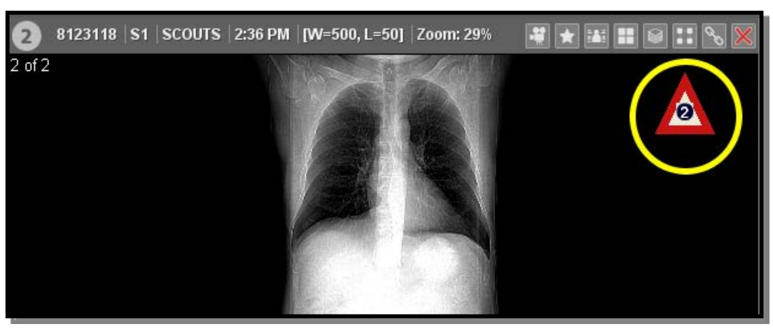
- You can select a Series from the primary study (marked with a “P”) or from any available Prior Study (marked with a number).
- When you place the mouse cursor over the desired study, a sub-menu will appear to the right of that study to display the individual Series.

NOTE: The list of prior is determined by the Patient Comparison Strategy and “Selection of Priors” option configured for your site, as described in Appendix C below.

NOTE: If Merge PACS has an archive configured, only series for studies that are currently online will appear in the Pick Series menu.

NOTE: Only the first nine prior studies will have a specific number associated with them. Any additional prior studies will be marked as “C”.

- If you select a Series from a prior study, it will be displayed with a red warning triangle to indicate that it is not part of the primary study, as in the following example:



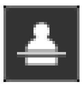
Foreign Series Displayed in Viewport

NOTE: If some or all of the DICOM information for a series was not correctly entered, the description for that series may contain question marks. This does not indicate a problem with the images in the series, however.

NOTE: The number inside the triangle corresponds with the number associated with the prior study on the Pick Series menu. If this study was not one of the first nine prior studies listed, the number will be replaced with an “X”.

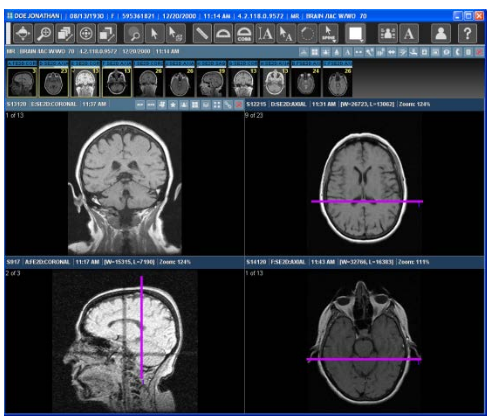
NOTE: **Dual proton density** series (*i.e.*, MR series where some images have one echo number and some images have another echo number) will be split into two separate series within the Merge PACS Viewer, even though they appear as a single series on the Query Page. Each series will be listed on the Right-click Menu and will have the same series description, but will be preceded by [1] and [2].

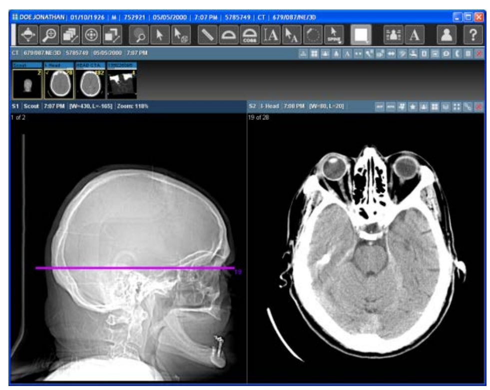
c. Cross-reference Lines



Clicking on the **Cross-reference Lines** button on the **Study Toolbar**, as shown on the left, will toggle the display of any available reference lines on and off when you are viewing multiple series. This feature is used primarily for CT and MR images where there are sequential "slices". With CT studies, there is typically a master or "scout" image against which the images of a second series are referenced. With MR studies, on the other hand, there are typically multiple viewing angles of the same set of images, and the references lines will show the relationship between the linked series.

- When the Cross-references feature is enabled, a bright purple (light gray, if using a grayscale monitor) line will appear on those series that reference the series in the “active”Viewport, as shown in the examples below (lines exaggerated for illustration purpose):





Reference Lines on a CT Study

Reference Lines on an MR Study

- As you page through the series in the active Series Viewport, the reference line or lines in the other Series Viewports will move to show the corresponding position on the other images.

NOTE: Only those series that reference the series in the active Series Viewport will have a reference line displayed. If a series does not reference the series in the active Series Viewport, no line will be displayed.

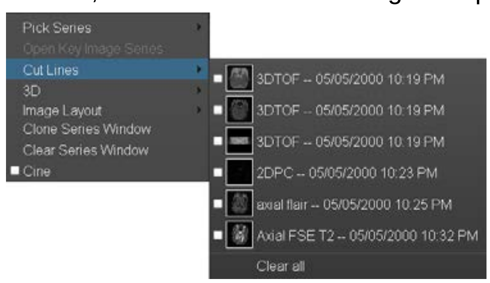
NOTE: Note that the reference lines will be always displayed in whichever Series Viewports are **not** currently active.

NOTE: By default, the "active" Viewport for the purpose of cross-reference lines is whichever Viewport the mouse cursor is currently hovering over, regardless of whether you have actually clicked on that Viewport. This behavior can be changed from the **User Preferences** menu, as described in subsection 25.11 below, however, so that you must actually click on a Viewport to make it "active" for the purpose of cross-reference lines.

d. Cutlines

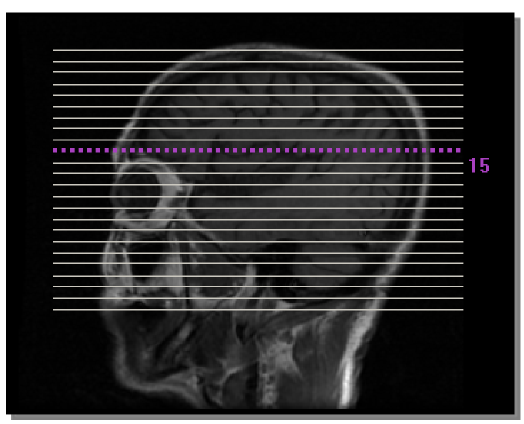
The optional Cutlines feature is similar to the Reference Lines feature described above, except that it allows you to display all the reference lines of one or more series on a single image of another series. As with standard Reference Lines, this feature is used primarily for CT and MR images where there are sequential "slices". With CT studies, there is typically a master or "scout" image against which the images of a second series are referenced. With MR studies, on the other hand, there are typically multiple viewing angles of the same set of images, and the references lines will show the relationship between the linked series.

- If the Cutlines feature has been enabled for your site it will be available via the **Series Right-click Menu**, as shown in the following example:



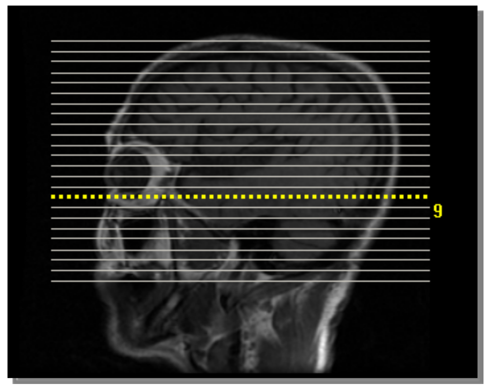
Accessing the Cutlines Feature

- To enable the Cutlines feature for the image in the active viewport, select the desired series whose reference lines you want to display. Note that you can return to this menu and select additional series, if available, to be shown simultaneously. Once a series has been selected, the reference for that series will be displayed, as in the following example:



Displaying Reference Lines for an Entire Series

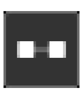
- The purple dotted line acts with the mouse cursor to allow you to select a different slice. As you move your mouse over the image, the purple line will move with the mouse cursor and display the slice number. Click with the left mouse button to move to the slice currently highlighted in purple.
- Once you have selected a slice by clicking on one of the reference lines, that line will be highlighted in yellow, as in the following example:



Selected Slice

- To turn off the Cutlines feature for the image in the active viewport, deselect the series whose reference lines you no longer wish to display. You can also select the **Clear All** option to remove the reference lines for all series at once.

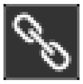
e. Automatic Series Synchronization



Clicking on the **Auto Series Synchronization** button on the **Study Toolbar**, as shown on the left, will link together all Series in the same plane for navigational purposes. Thus, if you have three axial Series displayed in different Series Viewports and turn on Auto Series Synchronization, paging through the images in one of the axial Series will cause the images in the other axial Series to page as well.

- Linked series will page together according to their relative slice thickness. So, for example, if one linked series has slices twice as thick as those of another linked series, two images in the second series will page for every one image in the first series.
- Differences in table position among series may also cause one linked series to have a number of images that don’t correspond to those of other linked series. When this is the case, paging through those images will not affect the display of the other series until you reach a common table position.
- Clicking on the **Auto Series Synchronization** button a second time will turn this feature off.
- The Auto Series Synchronization tool will only link those series that share a common geometric frame of reference. If you need to link series that are in different frames of reference (whether in the same study or between two studies in Compare Studies Mode, as described in subsection 4.3.4 below), you can use the **Manual Series Synchronization** feature described in the following Paragraph. The Manual Series Synchronization feature can also be used if you want to link only certain related series instead of all of them.

f. Manual Series Synchronization



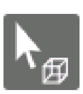
The **Manual Series Synchronization** button on the **Series Toolbar**, as shown on the left, lets you manually link multiple Series that are in the same plane for navigational purposes. Once these series are linked, paging through the images in one linked series will cause the images in the other linked series to page as well.

- To link multiple Series together, click on the **Manual Series Synchronization** button for each Series. Clicking this checkbox a second time will unsynchronize the series. Note that you can create up to three sets of synchronization links at once, one for each of the available planes.
- Once a Series has selected for manual synchronization, a special synchronization icon will be displayed in the upper right corner of the Series Viewport for that Series, as in the following example:

Manual Series Synchronization Enabled

- Manual Series Synchronization is useful for linking together series that are in the same plane but which do not share a common geometric frame of reference, as is often the case when the patient was repositioned between series or between studies. This is especially common when viewing two studies side-by-side in Compare Studies Mode, as described in subsection 4.3.4 below.
- A typical use case scenario would be to have two studies for a patient displayed in Compare Studies mode. You would first use the **Manual Series Synchronization** feature to link the desired pairs of axial, coronal and/or sagittal images between the two studies. You would then click on the **Auto Series Synchronization** button, as described in the preceding Paragraph, to link the rest of the series within each study. The result would be complete synchronization for all series in both studies.

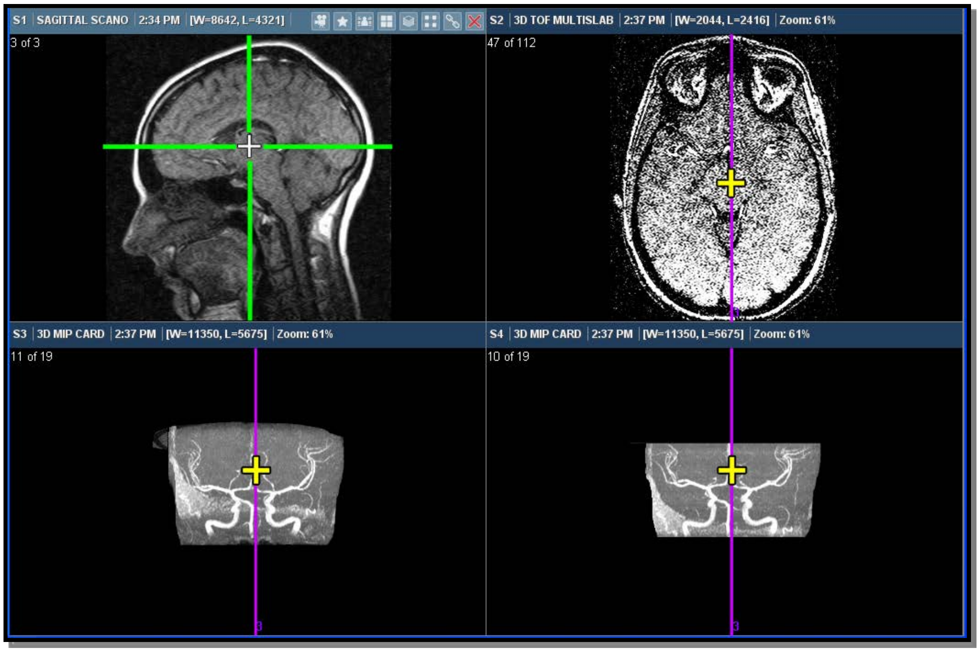
g. 3D Cursor



Clicking on the **3D Cursor** button on the **Viewer Toolbar**, as shown on the left, converts the mouse cursor to a special 3D cursor icon. When you click any part of an image displayed in one Series Viewport with this cursor, the images displayed in the other Series Viewports (containing orthogonal or other planes) will automatically be updated based upon the position of the cursor.

For example, in the case of a multi-Series MR study, when the user picks a point on an axial image the location of that point in the sagittal and coronal planes will be displayed instantaneously. In addition, a marker will appear in those other Series Viewports to show the spatial relationship between the various images.

The following image shows an example of the 3D cursor being used (lines exaggerated for illustration purpose):



Using the 3D Cursor

Note that the upper left Series Viewport shows the position of the 3D cursor, while in the other three Series Viewports a special marker in the shape of yellow cross hairs indicates the relative position on each image.

The 3D Cursor tool provides the following benefits:

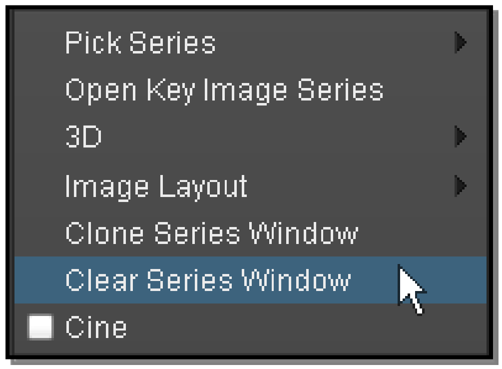
- **Primary Function/Benefit –** Most importantly, the 3D Cursor tool can be used to set **all** planes (axial, sagittal, and coronal to the same point that 3D cursor is placed at. When you click the left mouse button on any image, all the other planes “line up.” The 3D Cursor tool is therefore especially useful for **MRI**s with multiple slices in multiple planes.
- **Navigate quickly to area of interest –** With the 3D Cursor tool the user can click on the scout image to update the axial to the exact location of interest. For example, if you are looking at a large whole body CT for trauma and want to see the pelvic area, you can click on the pelvis/lower abdomen with the 3D Cursor tool and the axial view of this area will be updated. This eliminates using wheel/arrow/scroll tool to move through 1,000 slices to get to the area of interest.
- **Navigate by scrolling scout image –** You can also use the 3D Cursor tool as a **paging/scrolling** tool. Simply click on the 3D Cursor tool and move up/down on the scout image while holding down the left mouse button to scroll though the axial views.

h. Moving a Series from One Viewport to Another

You can move a series from one Series Viewport to another by clicking on the **Series Toolbar** of the series you wish to move and, while holding the left mouse button down, moving your cursor to the Series Viewport where you wish to put the series.

i. Removing a Series from a Viewport

At any time, you can remove the series that is currently being displayed within a Series Viewport. This is done by selecting the **Clear Series Window** option from the Series Right-click Menu, as shown in the following example:



Clearing a Viewport

4.3.3. Selecting a Different Study

There are a variety of different ways to navigate between multiple studies within the Merge PACS Viewer, each of which is described in detail below:

- **Worklist Navigation Buttons**
- **Recently Viewed Studies Menu**
- **Patient Record**
- **Rapid Review**

NOTE: You can also compare multiple studies simultaneously, as described in subsection 4.3.4 below.

a. Worklist Navigation Buttons

If you accessed the Merge PACS Viewer via the RealTime Worklist as described in Section 3.3 above, the Viewer Toolbar will contain the following additional buttons that will allow you to navigate between studies on your Worklist:

Tool	Name	General Description
	**Open Previous Study**	Opens the previous study on the worklist. Note that this button will not be displayed if the optional Merge RadStream component is enabled and **Load Next Study Based on Acuity Score** is selected as a user preference, as described in Section 25.2 below.
	**Open Next Study**	Opens the next study on the worklist and prompts you to set the status of the currently open study. • This button will displayed with a red border if the optional Merge RadStream component is enabled and **Load Next Study Based on Acuity Score** is selected as a user preference, as described in Section 25.2 below. • If the **Get Next Study by Precedence** user preference is selected, as described in Section 25.5 below, the system will check to see if any new studies have arrived since the last time the **Open Next Stud**y button was clicked. If new studies are found that are higher in the display order than the current study, the highest one will be opened.
	**Mark Study Read**	Lets you open the next study and mark the current study as “Read” (this button is only available if the status of the current study is “Unread”). Note that this button will displayed with a red border if the optional Merge RadStream component is enabled and **Load Next Study Based on Acuity Score** is selected as a user preference, as described in Section 25.2 below.
	**Skip Study**	Opens the next study on the worklist without setting or prompting you to set the status of the currently open study. Note that this button will not be displayed if the optional Merge RadStream component is enabled and **Load Next Study Based on Acuity Score** is selected as a user preference, as described in Section 25.2 below.

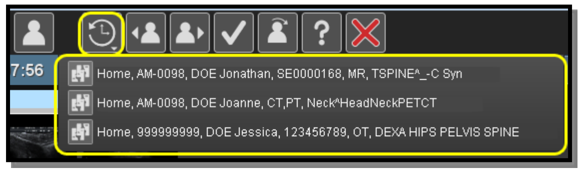
NOTE: The last two buttons will be disabled (“grayed out”) if you do not have privileges to change study status.

NOTE: If Merge PACS has an archive configured and the Next or Previous study on the worklist is currently offline, an archive retrieval request will be submitted as soon as you click the button. Once the retrieval process is complete, the study will automatically open within the Viewer if no other study was opened during the retrieval process. If another study is opened in the Viewer while the archived study is being retrieved, the archived study will need to be manually opened once it is fully online.

NOTE: If the optional Merge RadStream component is enabled for your system, the various “Next Study” buttons will open the next unread study with the highest acuity score.

b. Recently Viewed Studies Menu

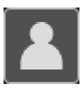
Clicking on the **Recently Viewed Studies** icon, located on the Viewer Toolbar and illustrated to the left, displays a menu containing up to the 20 most recently viewed studies, as in the following example:



Recently Viewed Studies

Clicking on a study on this menu will open that study in a secondary Merge PACS Viewer window in **read-only** mode.

c. Patient Record



Clicking on the Patient Record icon, located on the Viewer Toolbar and illustrated to the left, causes the Patient Record to be displayed if it is not currently showing in the Workstation Browser. From there, you can select another study to be displayed, as described in Section 3.8 above.

d. Rapid Review

The Rapid Review feature allows you to quickly navigate among a patient's relevant and unread prior studies by pressing the Plus and Minus (**+** and **−**) keys on the **numeric keypad** as follows:

- When viewing two studies in **comparison mode** (as described in subsection 4.3.4 below):
  - The **+** key will load the **next most recent relevant** prior study, relative to the prior study currently displayed. Once all relevant priors have been viewed, the next most recent **unread** other prior will be loaded (note that this behavior can be changed from the **User Preferences** menu, as described in subsection 25.5, below).
  - The **−** key will load the **next oldest relevant** prior study, relative to the prior study currently displayed. Once all relevant priors have been viewed, the next oldest **unread** other prior will be loaded (note that this behavior can be changed from the **User Preferences** menu, as described in subsection 25.5, below).
- When viewing a study in **standard** (non-comparison) mode:
  - The **+** key will launch **comparison** mode and load the **most recent relevant** prior study in the comparison study window.
  - The **−** key will launch **comparison mode** and load the **oldest relevant** prior study in the comparison study window.

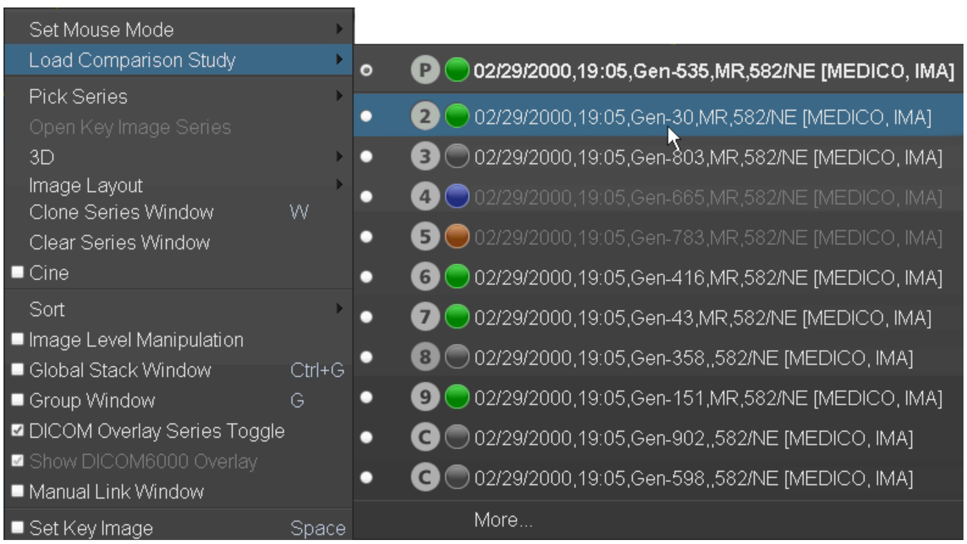
NOTE: The actual keys used for Rapid Review functionality (Open Next Prior and Open Previous Prior) can be configured from the User Preferences menu, as described in Section 25.16 below.

4.3.4. Comparing Multiple Studies

As described in subsection 4.2.3 above, the Merge PACS Viewer can display two or more different studies for the same patient in multiple viewing panels within the main Image Viewing Window. Each study can be displayed with its own Window/Level setting, image layout, Series layout, etc. You can also open multiple instances of a single study, and each instance can have its own display settings as well.

a. Selecting a Comparison Study

You can select a comparison study from the **Study Right-click Menu** and the **Series Right-click Menu** by clicking on the **Load Comparison Study** option and then selecting a specific study from the sub-menu, as seen in the following example:



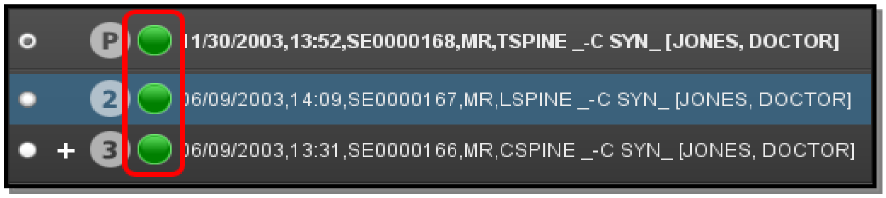
Selecting a Comparison Study

NOTE: The list of prior is determined by the Patient Comparison Strategy and “Selection of Priors” option configured for your site, as described in Appendix C below.

NOTE: Only the first nine prior studies will have a specific number associated with them. Any additional prior studies will be marked as “C” as in the example above.

- If you are currently viewing a study in a single-study layout, selecting a comparison study from a Series Right-click Menu will open a new study panel to the right of the current study window with the selected study displayed within.

- If you have already selected a multiple-study layout, as described in subsection 4.2.3 above, you can right-click on any study panel and select the comparison study to be loaded in that panel from the **Series Right-click Menu**. If the study panel is currently empty, the only menu option available will be **Pick Study**.
- The dividing lines between each study panel can be moved by clicking on them with your mouse and dragging them.
- The list of available comparison studies includes an **Availability Status** indicator for each study, as in the following example:



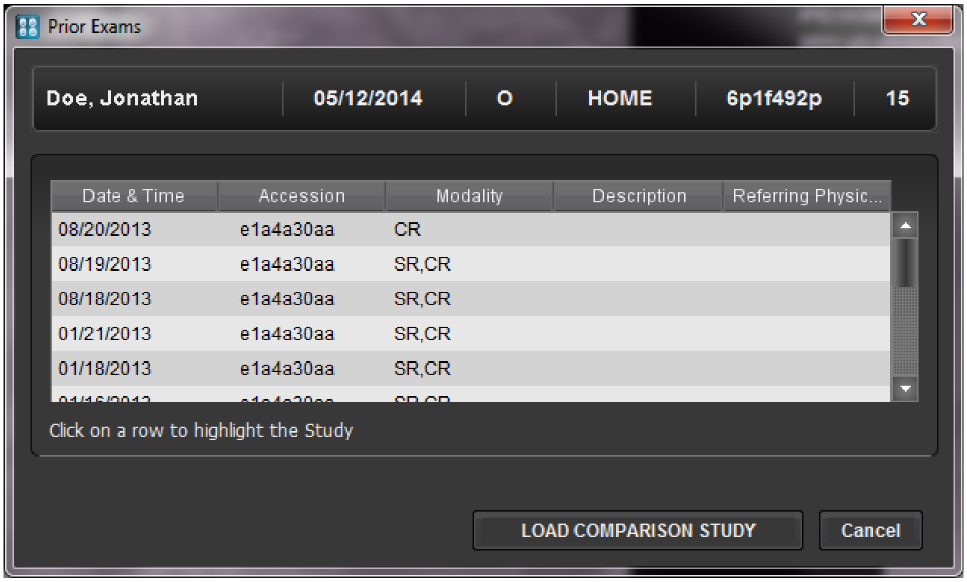
Availability Status Indicator

If Merge PACS has an archive configured, the appearance of the indicator shows the availability of the study as follows:

Indicator	Color	Description
	Green	The study is available online for viewing.
	Black	The study is currently offline and not available for viewing.
	Blue	A request to retrieve the study has been submitted, but the retrieval process has not yet started.
	Black / Green	The study is currently being retrieved from the archive. Note that the percentage of green shown will change to indicate the progress of the retrieval process.
	Orange	Images for this study are currently being imported into Merge PACS for the first time or additional images are currently being added to an existing study.
	Red	Retrieval of the study from the archive has completed, but with errors (either fewer images were received than expected or all images failed compression)
	Gray	The availability of the study is currently unknown (this may occur during timeout or error scenarios).

- If a particular study is currently online (green status), selecting the study will cause it to be loaded in the Viewer.
- If a particular study is currently offline (black status), selecting the study will automatically trigger an archive retrieval request, as described in Chapter 17 below.
- If a particular study is in the process of being retrieved from the Archive or imported into Merge PACS (blue, black/green or orange status), you will not be able to select the study. If you need to load the study in its current state, locate it from **RTWL**, **RTSL**, the **Patient Record** or the **Query Page** and load it in the Primary or Secondary Viewer directly rather than as a prior comparison.

- If there are too many prior studies to be displayed in this sub-menu (the maximum number is configurable on a site-by-site basis), a “More” button will be included that will launch a complete list of available priors in a separate window, as in the following example:



All Prior Exams for this Patient

  - Select the study you wish to load and click the **LOAD COMPARISON STUDY** button.
  - If Merge PACS has an archive configured, the following apply:
    - If a particular study is currently online, selecting the study will cause it to be loaded in the Viewer.
    - If a particular study is currently offline, the “LOAD COMPARISON STUDY” button will be labeled “RETRIEVE COMPARISON STUDY” instead and clicking the button will automatically trigger an archive retrieval request, as described in Chapter 17 below.
    - If a particular study is in the process of being retrieved from the archive or imported into Merge PACS, the button will be disabled. If you need to load the study in its current state, locate it from **RTWL**, **RTSL**, the **Patient Record** or the **Query Page** and load it in the Primary or Secondary Viewer directly rather than as a prior comparison.

NOTE: Externally created (“foreign”) Presentation States associated with the comparison study will not be displayed.

b. Exiting Compare Studies mode

To exit Compare Studies Mode, click on the **Comparison Toggle** button on the **Viewer Toolbar**, as shown on the left to return to the default study layout.

4.4. General Image Manipulation

The Merge PACS Viewer includes a wide variety of tools to manipulate the appearance of the images being viewed. These tools, which are described in this Section, allow you to do the following:

- Change the **Window and Level** settings for all images in a series
- **Zoom** an image
- **Magnify** a portion of an image
- **Pan** an image across a Series Viewport
- **Group** multiple series together for display purposes
- Display **DICOM** information for an image.
- View various **Color Maps** for an image, if available
- Temporarily **Invert** images being viewed
- **Sharpen** an image
- Change the **Orientation** of an image on the screen
- Add or remove **Annotations** to an image
- **Probe** to view the intensity value for a selected pixel of the image being viewed

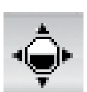
NOTE: The Merge PACS Viewer also includes some optional advanced image manipulation features, including **3D Rendering**, **Spine Labeling, Mammography Support** and **OrthoLink**, that are described in the following Sections.

4.4.1. Changing the Window and Level Values of Images

The Merge PACS Viewer provides a number of ways of adjusting the **Window** and **Level** [otherwise known as brightness and contrast] values of the image being viewed, including an interactive mouse tool, a menu of preset Window and Level options, a “Region of Interest” Window and Level tool, and a Manual Window/Level option.

Window/Level values for one series can be linked to those of other series by using the **Grouping** option described in subsection 4.4.7 below.

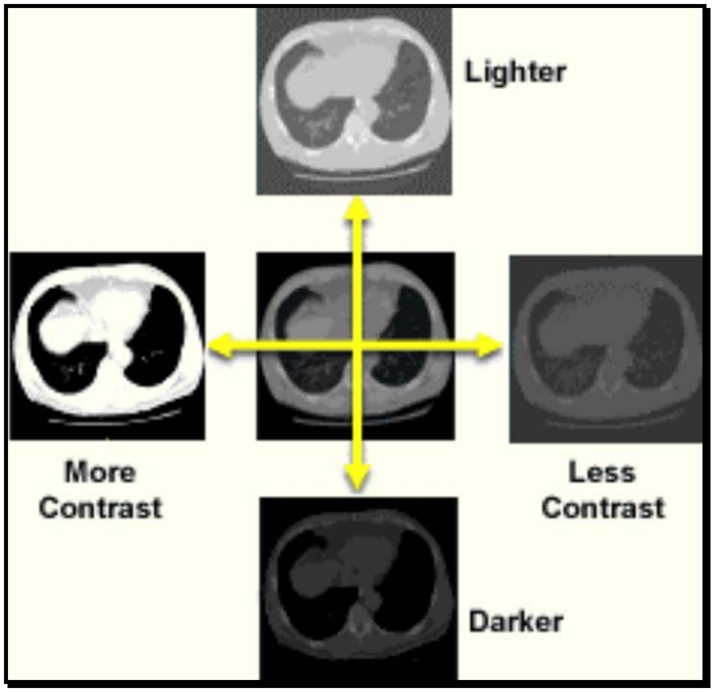
a. The Window/Level Mouse Tool



Clicking on the **Window/Level** button on the Viewer Toolbar, as shown on the left, converts the mouse cursor to a special Window/Level cursor icon. Once selected, you can use your mouse to adjust the Window and Level [contrast and brightness] of an image “on the fly” by clicking and dragging your mouse pointer over an image.

NOTE: **Keyboard shortcut:** When using any other tool, you can **temporarily** switch to the Window/Level tool by pressing the **Alt** key. When you release the key, your cursor will return to whichever tool you were using before.

The following figure illustrates the use of the Window/Level tool:

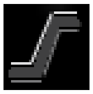


Using the Window/Level Tool

- To adjust **Window**, hold down the left mouse button and move your mouse pointer **left or right** over the image until the desired Window setting is reached.
- To adjust **Level**, hold down left mouse button and move your mouse pointer **up or down** over the image until the desired Level setting is reached.
- Adjusting the Window and Level values for one image in a series will affect the values for all the images in that series for the duration of the current viewing session. If you exit the Viewer, the Window and Level for the series will return to their default values the next time that series is viewed.
- By default, adjusting the Window and Level values for one image in a series will **not** affect the values for other series. The Window/Level values for one series can be linked to those of other series, however, by using the **Grouping** option described in subsection 4.4.7 below.
- The Window/Level tool is also available by placing your pointer over an image and then clicking the right mouse button repeatedly until the pointer changes to the Window/Level icon.

NOTE: By default, the Window/Level tool only affects grayscale images. A site may choose to enable window and leveling for color images, however. If window/leveling of color images has been enabled, using the Window/Level tool on color images will actually change the color of those images (as opposed to only changing the gray portions of the images). Be aware that some types of images, such as those that use particular colors to represent specific metabolic information, will therefore be **clinically incorrect** and this feature should be used with caution.

b. The Window Range Tool



If the **Use Window Range Instead of Level** User Modality Preference is selected for the modality in a viewport, as described in Section 25.14 below, the Window/Level tool will appear as a special **Window Range** cursor, as shown to the left.

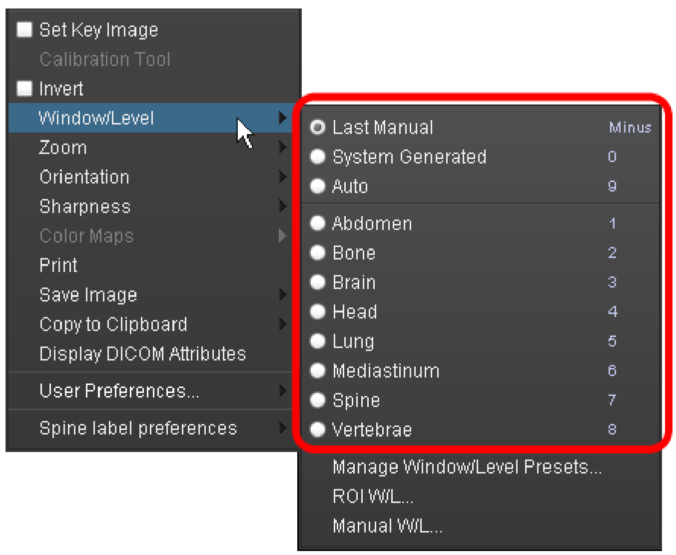
Once this tool has been selected, moving the cursor up and down adjusts the lower end of the window and moving it left and right adjusts the upper end of the window.

In addition, the standard “W=xxxx, L=xxxx” text that is displayed in the Image Title Bar and on the images themselves will be displayed as “L=xxxx, U=xxxx” and the Manual W/L Settings dialog, described in Paragraph 4.4.1.f below, will let you enter Lower and Upper instead of Window and Level.

NOTE: This option is selected by default for **NM** and **PT** modalities.

c. Window/Level Presets

From the **Series Right-click Menu** you can select from a variety of available Window/Level presets, as in the following example:



Window/Level Presets

The menu of Window/Level presets is also available by clicking on the **Window/Level** icon on the **Series Toolbar**, as illustrated to the left

The menu of presets includes the following options:

Option	Description
Last Manual	Returns the Window and Level to the last values you set with the Window/Level tool. If you have not yet used the tool, this option will be grayed out.

Option	Description
System Generated	Automatically sets the Window and Level to an optimal average setting for the entire Series.
Auto	Automatically sets the Window and Level to an optimal setting for the image currently being viewed.
Modality-specific Presets	Depending on the image modality involved, the menu of presets may also include a number of additional preset Window and Level settings that are optimized for specific body parts.

NOTE: The various W/L presets are also available by pressing keys 1 through 0 and **–** on your keyboard, as described in paragraph d below.

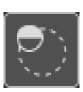
NOTE: The various presets can be custom configured for each major modality type, as described in Chapter 4.13 below.

d. Window/Level Keyboard Shortcuts

You can make use the keyboard to select among any available window/level presets that have been defined for the specific modality being viewed:

Keystroke	Description
1 - 8	W/L Presets 1 - 8
9	Auto Preset
0	System Generated
–	Last Manual

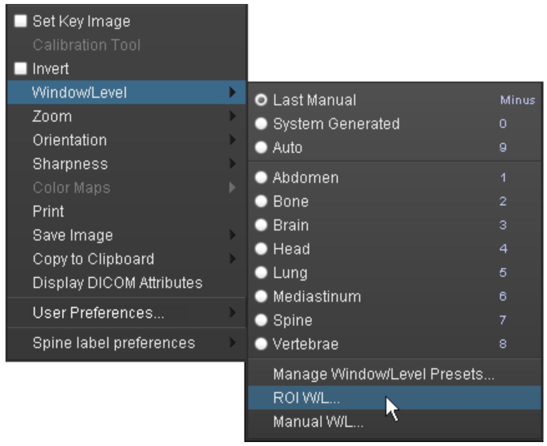
e. The Region of Interest Window/Level Tool



Clicking on the **ROI Window/Level** button on the **Viewer Toolbar**, as shown on the left, converts the mouse cursor to a special **Region of Interest Window/Level** cursor icon that will let you select an area of an image for automatic Window/Level optimization.

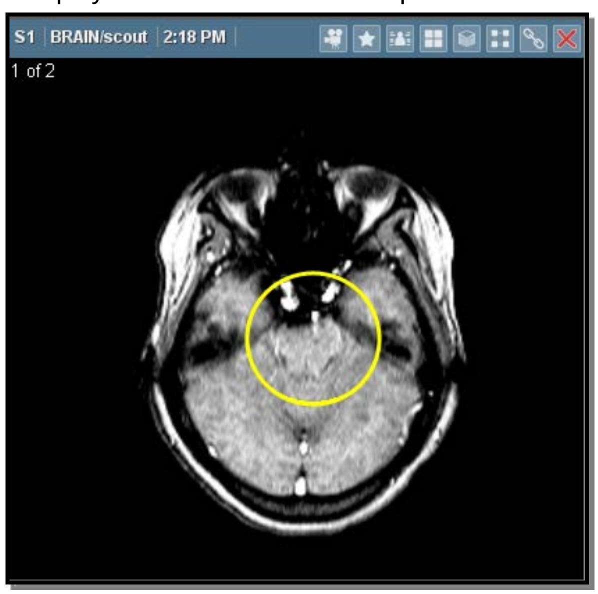
The Region of Interest Window/Level tool is also available by clicking on the **Window/Level** icon on the **Series Toolbar**, as illustrated to the left, and selecting the ROI W/L option.

The **Region of Interest Window/Level** tool is also available from the **Series Right-click Menu**, as in the following example:



Accessing the ROI Window/Level Tool

- Once you have selected the W/L ROI tool, your mouse pointer will change to a special ROI W/L cursor. You can then place your pointer at one corner of the area you want to optimize, click the left mouse button, drag the pointer to the opposite corner, and then release the mouse button.
- As you are dragging the cursor, a yellow circle indicating the selected region will temporarily be displayed as shown in the example below:

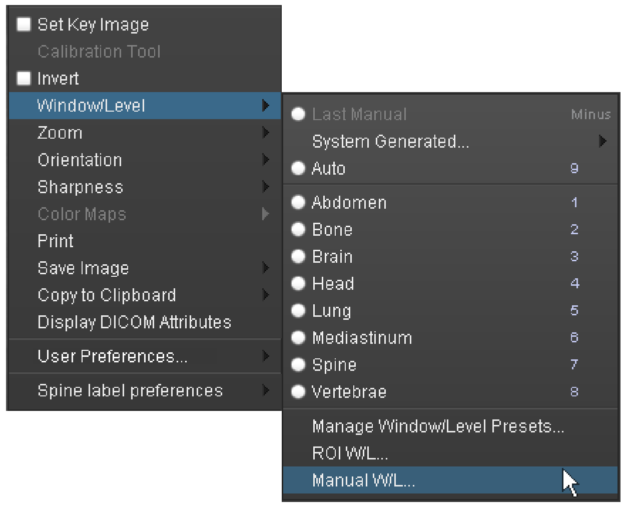


Using the ROI Window/Level Tool

- Note that the Window and Level values for the entire image -- not just the selected area -- will be set to the optimized values for the selected area.
- As with any Window/Level adjustment, using the Window/Level Region of Interest tool to change the Window and Level values for one image in a series will affect the values for all the images in that series.

f. Manually Setting the Window/Level

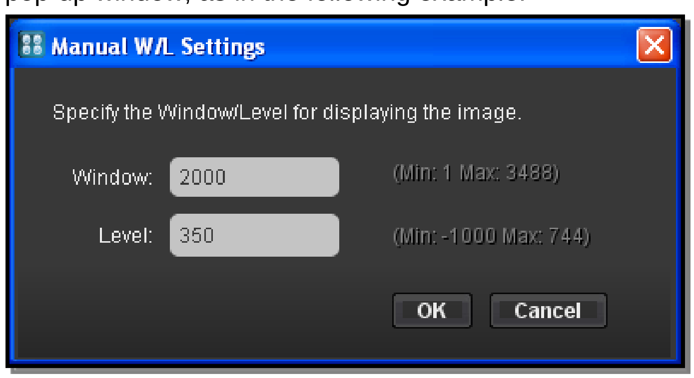
If you know the specific Window and Level values you wish to use for a certain series, you can manually enter those values and apply them to the series being viewed. To do this, select the **Manual W/L** option from the **Window/Level** sub-menu of the **Series Right-click Menu**, as in the following example:



Accessing the Manual W/L Option

The Manual Window/Level option is also available by clicking on the **Window/Level** icon on the **Series Toolbar**, as illustrated to the left.

- When you select this option, the **Manual W/L Settings** window will be displayed as a separate pop-up window, as in the following example:



Accessing the Manual W/L Option

- Enter the desired window and level settings and then click the **OK** button.

NOTE: If the **Use Window Range Instead of Level** User Modality Preference is selected for the modality in a viewport, as described in Section 25.14 below, you will be able to specify Lower and Upper ranges instead of Window and Level.

4.4.2. Applying a Values of Interest Lookup Table

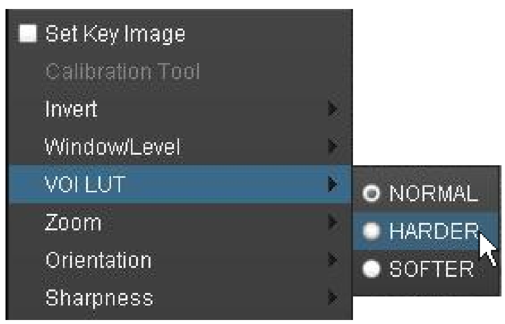
Some images may have one or more Values of Interest Lookup Tables (VOI LUT) associated with them. A VOI LUT defines the attributes that describe the transformation of the pixel values generated by the modality that produced the image into pixel values that are meaningful for print, display, etc. This includes such things as Window and Level values as well as Window Width and Window Center.

If an image has VOI LUT information associated with it, a special LUT icon will be displayed in the upper right corner of the Series Viewport, as in the following example:

VOI LUT Icon

The VOI LUT will be applied by default when the image is first displayed, but can be overridden by manually adjusting the W/L settings or selecting a W/L preset. If the VOI LUT is not currently being applied to the image, the icon shown above will appear grayed out.

If an image has one or more VOI LUTs associated with it, the **Series Right-click Menu** will contain a special **VOI LUT** option, as in the following example:



Accessing the VOI LUT Option

This option can be used to re-apply a VOI LUT that was overridden and also to select a different VOI LUT in cases where multiple ones are available.

4.4.3. Zooming Images

The Merge PACS Viewer provides you with the ability to increase or decrease the display size of an entire Series. This can be done either by using the Zoom tool or by selecting a zoom level from the Series Right-click Menu, as described below.

NOTE: You can also change the display size by using the **Zoom/Pan Combo** tool, described in subsection 4.4.5 below.

NOTE: The zoom level for one series can be linked to those of other series by using the **Grouping** option described in subsection 4.4.7 below.

a. The Zoom Tool

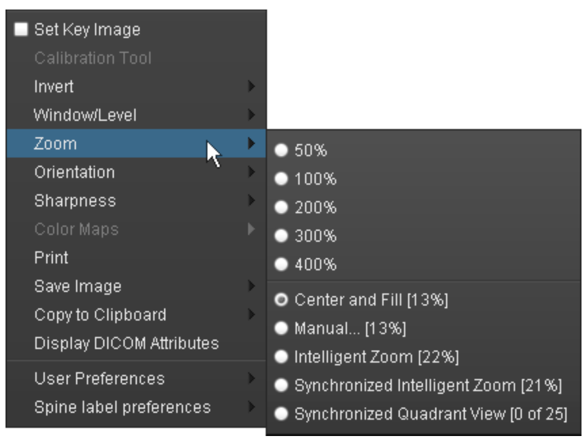
Clicking the **Zoom** button on the **Viewer Toolbar**, as illustrated to the left, allows you to resize an image. Once you have selected the Zoom tool, your mouse pointer will change to match the icon for this tool. You can then increase or decrease the size of an image by positioning the icon over the image, holding down the left mouse button, and moving the cursor up to enlarge and down to shrink.

NOTE: Changing the zoom level affects every image in a series.

NOTE: **Keyboard shortcut:** When using any of the annotation tools described in 4.4.15 below, you can **temporarily** switch to the Zoom tool by pressing the **Shift** key.

b. The Series Right-click Menu

The **Series Right Click Menu** provides a sub-menu of zoom options, as in the following example:



Series Right-click Menu Zoom Options

From the Zoom sub-menu, you can perform the following:

- Select a preset zoom level from 50% to 400%
- Let the Merge PACS Viewer calculate the optimal zoom level that will center the image and have it fill the Series Viewport.
- Enter a manual zoom level

NOTE: When viewing mammography images, a number of other options will be available, as described in Section 4.8.5 below.

4.4.4. Panning Images

Clicking the **Pan Images** button on the **Viewer Toolbar**, as illustrated to the left, allows you to move an image within a Series Viewport (*e.g.*, in cases where the image is currently displayed too large to fit within the Series Viewport).

- Once you have selected the Pan Image tool, your mouse pointer will change to match the icon for this tool. You can then pan an image by positioning the icon over the image, holding down the left mouse button, and dragging the image into the desired position.
- The pan offset will be applied to every image in the series being viewed, so that as you page through the images in the series, each image will appear in the same location.
- The pan offset for one series can be linked to those of other series by using the **Grouping** option described in subsection 4.4.7 below.

NOTE: **Keyboard shortcut:** When using any other tool, you can **temporarily** switch to the Pan tool by pressing the **Ctrl** key. When you release the Ctrl key, your cursor will return to whichever tool you were using before.

4.4.5. The Zoom/Pan Combo Tool

If your mouse has a center scroll wheel, clicking the **Zoom/Pan Combo** button on the **Viewer Toolbar**, as illustrated to the left, allows you to both increase or decrease the display size of an image (Zoom) as well as move it within a Series Viewport (Pan).

- Once you have selected the Zoom/Pan Combo tool, your mouse pointer will change to match the icon for this tool.
- With the tool activated, you can pan an image by positioning the icon over the image, holding down the center scroll wheel on the mouse, and dragging the image into the desired position.
- With the tool activated, you can increase or decrease the display size of an image by positioning the icon over the image, holding down the **right** mouse button, and moving the cursor up to enlarge and down to shrink.
- using the center wheel on your mouse to scroll up or down. Scrolling down will enlarge the image, while scrolling down will shrink it.
- The pan offset and zoom level will be applied to every image in the series being viewed, so that as you page through the images in the series, each image will appear in the same location at the same magnification.
- The pan offset and zoom level for one series can be linked to those of other series by using the **Grouping** option described in subsection 4.4.7 below.

4.4.6. The 3-in-1 Mouse Tool

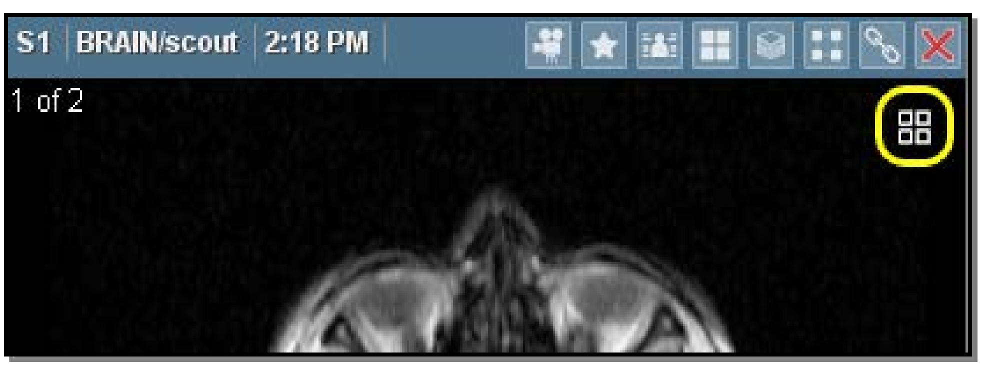
If your mouse has a center scroll wheel, clicking the **3-in-1 Mouse Tool** button on the **Viewer Toolbar**, as illustrated to the left, allows you to increase or decrease the display size of an image (Zoom), move it within a Series Viewport (Pan) and adjust the Window/Level of the series displayed within the Viewport.

- Once you have selected the 3-in-1 Mouse tool, your mouse pointer will change to match the icon for this tool.
- With the tool activated, you can do the following:
  - Click and hold the **left** mouse button to adjust the **Window and Level** as you move the mouse cursor. Moving the cursor **left or right** over the image will adjust **Window** and moving it **up or down** will adjust **Level**.
  - Click and hold the **right** mouse button to adjust the display size (**Zoom**) of the image as you move the mouse cursor. Moving the cursor **up** will **increase** the zoom level and moving it **down** will **decrease** the zoom level.
  - Click and hold the **center wheel** mouse button to move the image (**Pan**) as you move the mouse cursor.
- The pan offset, zoom level and Window/Level settings will be applied to every image in the series being viewed, so that as you page through the images in the series, each image will appear in the same location at the same magnification with the same Window/Level.
- The pan offset, zoom level and Window/Level settings for one series can be linked to those of other series by using the **Grouping** option described in subsection 4.4.7 below.

4.4.7. Grouping Series

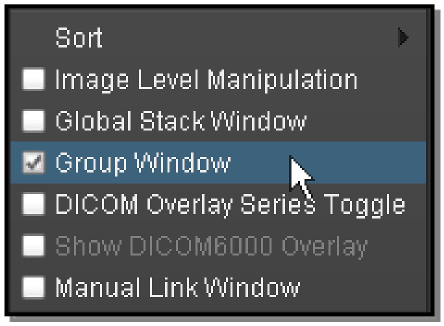
By default, using the various **Window/Level** tools, the **Zoom** tool, the **Pan Images** tool and the **Zoom/Pan Combo** tool to change the way images are displayed only affects the series in the active Series Viewport. You can choose, however, to **group** multiple Series together so that these tools will apply to all of them at the same time.

Once a series has been grouped, a special "grouping" icon will appear in the title bar of the series' Series Viewport, as shown in the following example:



The Grouping Icon

To group multiple Series together for display purposes, select the **Group Window** option from the **Series Right-click Menu**, as shown in the example below:



Grouping Series Together

- Repeat this step for each Series you wish to group with the first one.
- To ungroup a Series, simply deselect the **Grouping** option from the **Series Right-click**.

4.4.8. Magnifying Images

Clicking the **Magnify** button on the **Viewer Toolbar**, as illustrated to the left, allows you to enlarge selected portions of an image. Once you have selected the Magnify tool, your mouse pointer will change to match the icon for this tool. You can then enlarge a section of an image by positioning the icon over the image and pressing the left mouse button, as shown below:

Using the Magnification Tool

While holding the left mouse button down, you can increase and decrease the magnification by using the center wheel of your mouse.

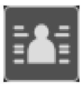
4.4.9. Displaying Standard DICOM Information

The Merge PACS Viewer can display standard DICOM information in the following ways:

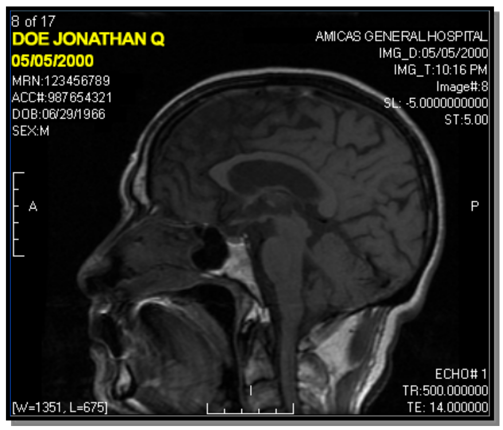
- Overlaid directly on the images themselves
- Within a separate DICOM information window

NOTE: Mammography images have their own special set of DICOM tags overlaid on them, as described in subsection 4.8.1 below.

a. DICOM Overlay



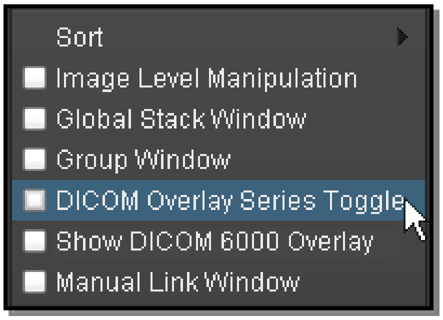
Clicking the **DICOM Overlay** button on the **Viewer Toolbar**, the **Study Toolbar** or the **Series Toolbar**, as illustrated to the left, will toggle the display of patient and series information directly on the images themselves, as shown in the following example:



DICOM Overlay Enabled

- Clicking on the DICOM Overlay button from the **Viewer Toolbar** will toggle the DICOM Overlay display for all images in all Series Viewports and in all studies currently being displayed.
- Clicking on the DICOM Overlay button from the **Study Toolbar** will toggle the DICOM Overlay display for all images and all Series Viewports currently being displayed for the selected study.
- Clicking on the DICOM Overlay button from the **Series Toolbar** will toggle the DICOM Overlay display for all images within the active Series Viewport.

- You can also turn the DICOM Overlay on and off for a **particular Series Viewport** by selecting or deselecting the **DICOM Overlay Series Toggle** option from the **Series Right-click Menu**, as shown in the following example:

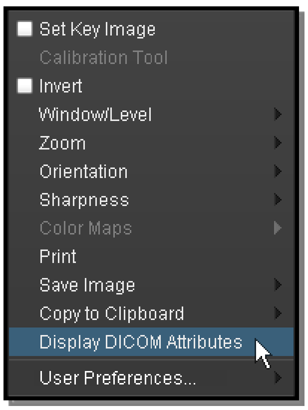


Toggling DICOM Overlay for this Viewport

NOTE: The actual information displayed in the DICOM overlay is configurable on a site-by-site basis and may vary depending on the type of image as well as the user group(s) you belong to, if any.

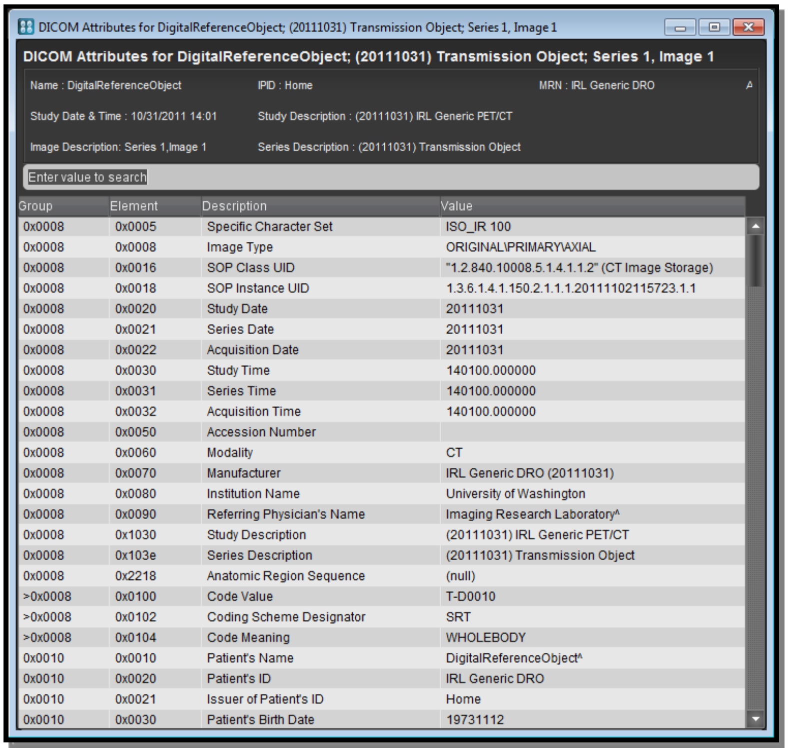
b. DICOM Attributes Viewer

You can view all the DICOM attributes associated with a particular image by selecting the **Display DICOM Attributes** option from the **Series Right-click Menu**, as shown in the following example:



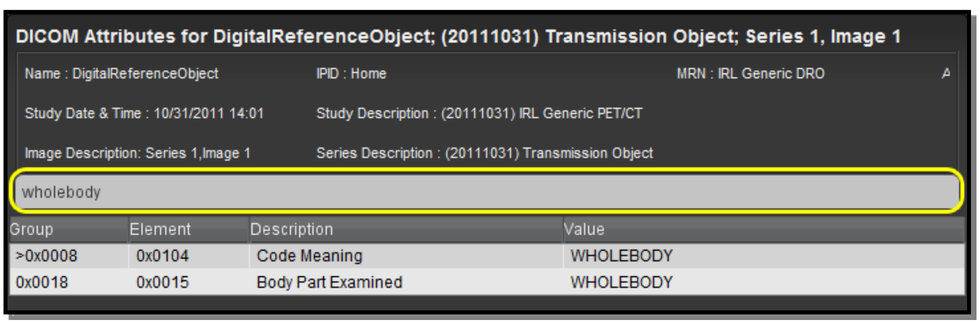
Viewing DICOM Attributes

Selecting this option will cause a separate DICOM Attributes pop-up window to be displayed with information for this image, as shown in the following example:



DICOM Attributes Viewer

If desired, you can use the search field at the top of the viewer to display one or more specific attributes by entering some or all of the attribute's Group, Element, Description or Value, as in the following example:



DICOM Attributes Viewer Search

NOTE: The search function works automatically as soon as you begin to type characters.

4.4.10. Displaying DICOM 6000 Information

If one or more Series have DICOM 6000 information associated with it, clicking the **Toggle DICOM 6000 Overlay** button on the **Viewer Toolbar**, will toggle the display of that information for all applicable images, Series Viewports and studies currently being displayed within the Merge PACS Viewer, as shown in the following example:

DICOM 6000 Overlay Enabled

If a Series has DICOM 6000 information associated with it that is not currently being displayed, a special DICOM 6000 icon will be displayed in the upper right corner of the Series Viewport, as in the following example:

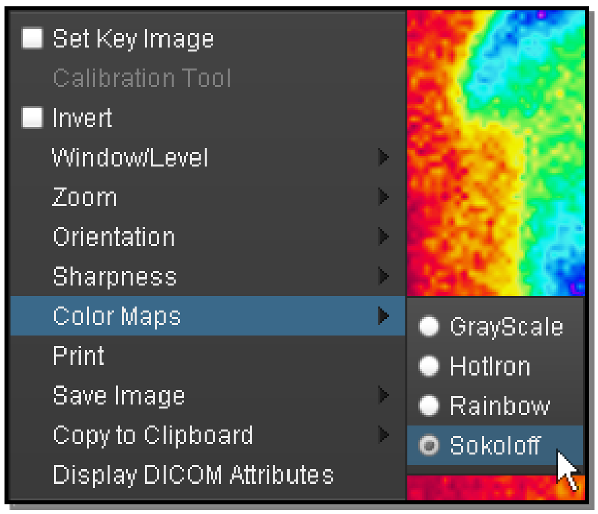
DICOM 6000 Information Available

You can also toggle the DICOM 6000 Overlay display for all Series by selecting the **Show DICOM6000 Overlay** option from any **Series Right-click Menu**, as in the following example:

Toggling DICOM 6000 Overlay Display

4.4.11. Viewing Color Maps

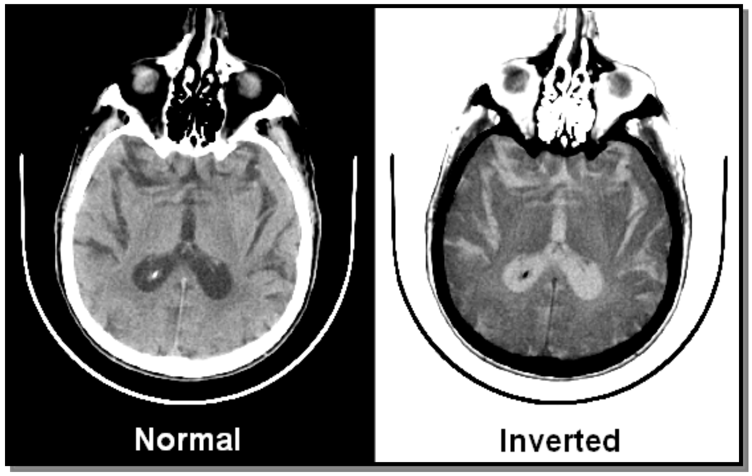
The Merge PACS Viewer provides you with a selection of color mapping options for Ultrasound (US), Nuclear Medicine (NM) and Positron Emission Tomography (PT or PET) images, where available, similar to those found on dedicated NM, US, or PET workstations. These are available from the **Series Right-click Menu**, as seen in the following example:



Selecting a Color Mapping Option

4.4.12. Inverting Images

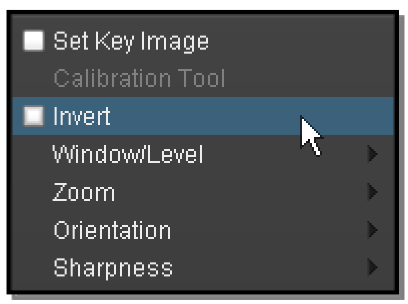
The Merge PACS Viewer provides you with the option of temporarily reversing the black and white pixels for all images in the series currently being viewed, as shown in the example below:



Inverting an Image

- Selecting the Invert option a second time will return all images in the series to normal.
- Note that this change is temporary for viewing purposes only and does not permanently affect the images.

This option is available from the **Series Right-click Menu**, as seen in the following example:



Selecting "Invert" from the Series Right-click Menu

NOTE: When viewing mammography images, a sub-menu of mammography-specific options will be displayed instead of a single Invert option, as described in subsection 4.8.4 below.

4.4.13. Sharpening an Image

The Merge PACS Viewer lets you apply a filter that improves the edges of certain structures within an image. The various degrees of sharpness available are illustrated in the following examples:

Unsharpened Image

Low Sharpness

Medium Sharpness

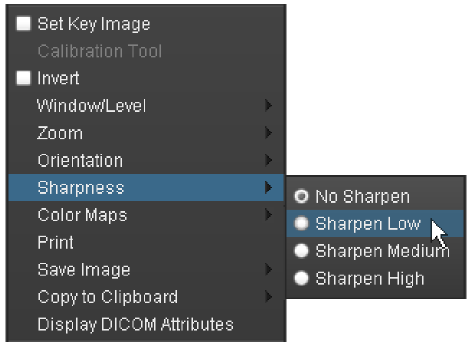
High Sharpness

- Once an image has been sharpened, a special icon will be displayed in the upper right-hand corner as in the following example:

The Sharpness Indicator

- Sharpening one image in a Series will apply the same level of sharpening to all images in that Series.
- This change is temporary for viewing purposes only and does not permanently affect the images.

The sharpening feature is available from the **Series Right-click Menu**, as seen in the following example:

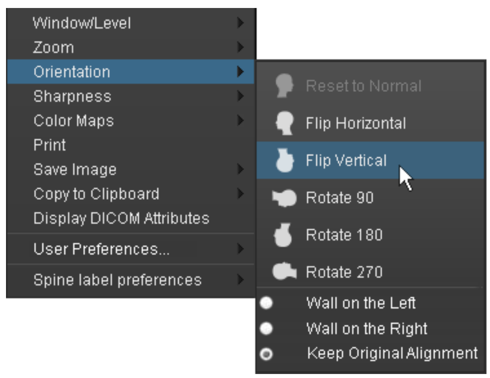


Selecting a Sharpness Option

4.4.14. Changing Image Orientation

The Merge PACS Viewer lets you temporarily change the orientation of an image on the screen, rotating it 90, 180 or 270 degrees, as well as flipping it horizontally or vertically. Note that these actions will only affect how the image currently appears on your screen and are not permanent – the next time you view the image it will be oriented to its original position.

This option is available from the **Series Right-click Menu**, as seen in the following example:



Choosing an Orientation Option from the Right-click Menu

- The icons in the Orientation sub-menu indicate the options relative to the **current** orientation and will change as the orientation is changed.
- The **Reset to Normal** option will restore the image to its original orientation.
- The **Wall on the Left/Right** and **Keep Original Alignment** options will only be visible when viewing mammography images, as described in Chapter 4.8 below.

4.4.15. Adding, Removing and Calibrating Annotations and Measurements

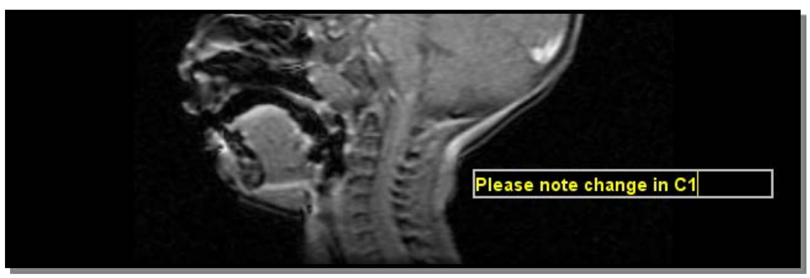
The Merge PACS Viewer lets you add various annotations to an image, including measurements, text, angles, and “region of interest” statistics. You can also manually calibrate the measurement ruler for images that do not have valid pixel spacing information associated with them, as is often the case with ultrasound images.

If you have the appropriate login privileges, these annotation can be saved with the study so that it will be visible the next time you or somebody else views the study; otherwise, they will be purely temporary for the purposes of reference printing or saving and will not be permanently stored with the image. If you have the rights to save annotations, you can also set whether or not the annotations should be saved automatically when you exit a study. This is done from the User Preferences menu, as described in Chapter 25 below.

a. Text Annotation

You can add annotated text to an image by selecting the **Text Annotation** tool from **Viewer Toolbar**, as shown on the left. Once you have selected the Text Annotation tool, your mouse pointer will change to match the icon for this tool.

Once you have selected the Text Annotation tool, you can position your pointer to the spot on the image where you would like to begin adding text, click with the left mouse button, and begin typing:



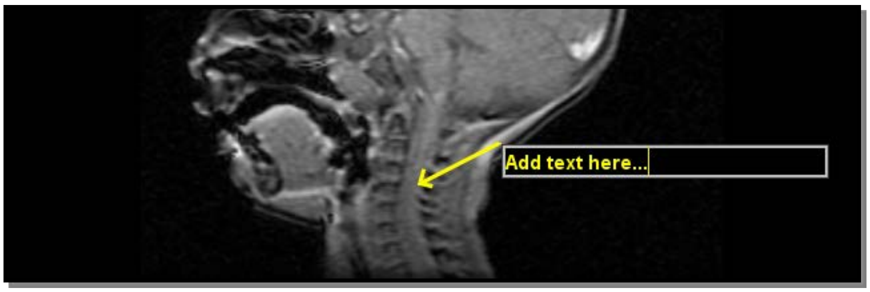
Using the Text Annotation Tool

- If you make a mistake before you have finished, you can use the **Backspace** key to back up or press the **Esc** key to delete the entire annotation.
- Once you have finished adding the text, press the **Enter** key to finalize the annotation. You can then move, edit or delete the annotation by clicking once it with the mouse while in any of the annotation modes:
  - To **move** the text, click directly on the text with the left mouse button and, while holding the left mouse button down, drag the mouse to reposition the text.
  - To **edit** the text, double-click directly on the text with the left mouse button to turn on the editing mode. You can then enter the desired changes.

b. Arrow Annotation

You can add one or more labeled arrows to an image by selecting the **Arrow Annotation** tool from the **Viewer Toolbar**, as shown on the left. Once you have selected the Arrow Annotation tool, your mouse pointer will change to match the icon for this tool.

Once you have selected the Arrow Annotation tool, click and hold the left mouse button where you want the tip of the arrowhead to appear and then drag the mouse to draw the pointer line. When you are satisfied with the length and direction of the pointer line, release the mouse button. A text box will then appear in which you can enter the label for the arrow, as shown in the following example:

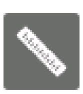


Using the Arrow Annotation Tool

Once you have finished entering the desired text, press the **Enter** key to finalize the annotation. Note that while you are drawing the arrow, a yellow box will be displayed to indicate where the text will appear once you have finalized the annotation.

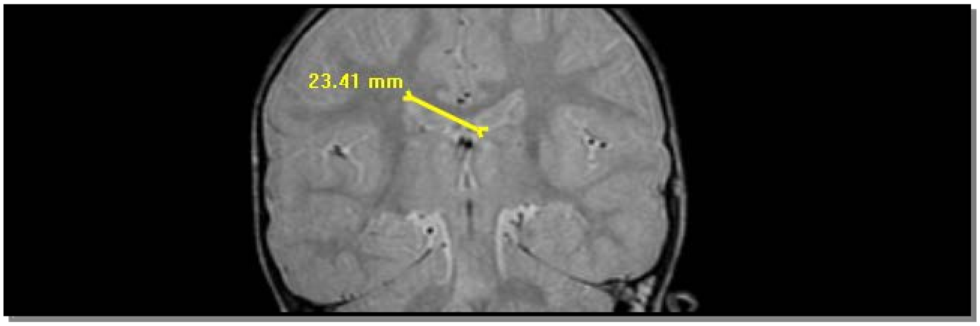
- If you make a mistake before you have finished, you can use the **Backspace** key to back up or press the **Esc** key to delete the entire annotation.
- To **move** the **entire annotation**, click on the body of the arrow with the left mouse button and, while holding the left mouse button down, drag the mouse to reposition the annotation.
- To **move** and/or **resize** just the **arrow**, click on the point of the arrow with the left mouse button and, while holding the left mouse button down, drag the point of the arrow to the desired location.
- To **move** just the **text**, click on the text with the left mouse button and, while holding the left mouse button down, drag the text to the desired location.
- To **edit** the **text**, click once on the text with the left mouse button to turn on the editing mode. You can then enter the desired changes.

c. Line Measurements



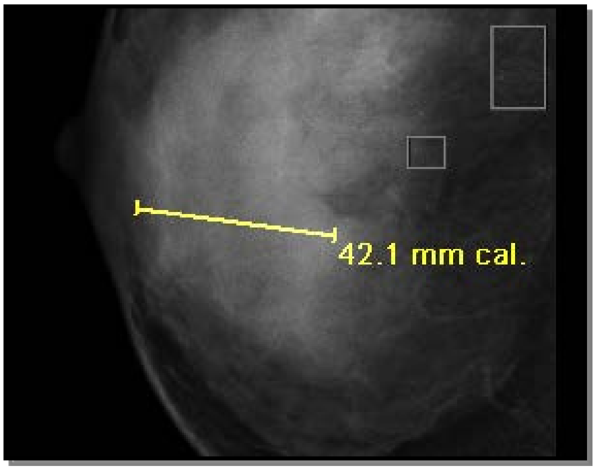
You can measure in millimeters the actual (as opposed to the displayed) distance between two points on an image, as well as mark the image with an appropriate annotation, by selecting the **Line Measurement** tool on the **Viewer Toolbar**, as shown on the left. Once you have selected the Line Measurement tool, your mouse pointer will change to match the icon for this tool.

Once you have selected the Line Measurement tool, you can measure the distance between any two points on an image by placing your mouse cursor over the point where you want to start measuring, holding down the left mouse button, and releasing it when you have moved the pointer to the point where you want to stop measuring, as in the following example:



Using the Line Measurement Tool

- If the image is an **X-ray**, **Mammography**, **X-ray Fluorescence** or **DX** image, a special suffix will be appended to the measurement, as in the following example:



Line Measurement with Suffix

The available suffices are as follows:

Suffix	Description
det.	Indicates that the pixel spacing for the measurement came directly from the detector/modality and was not calibrated by Merge PACS.
cal.	Indicates that the pixel spacing for the measurement was calibrated by Merge PACS, either by using the provided Estimated Radiographic Magnification Factor (ERMF) or else by using other correction factors provided by the modality.
Cal PS.	Indicates that the pixel spacing for the measurement was manually calibrated using the Manual Calibration Tool, as described in paragraph m below.

- Depending on the type of calibration performed, one of the following indicators may also be displayed:

Indicator	Description
FIDUCIAL	Indicates that the pixel spacing values have been calibrated by the operator or image processing software by measurement of an object (fiducial) that is visible in the pixel data and is of known size and is located close to the central ray (e.g. a catheter).
GEOMETRY	Indicates that the pixel spacing values account for assumed or known geometric magnification effects and correspond to some unspecified depth within the patient.
ERMF	The Estimated Radiographic Magnification Factor provides the ratio of Source Image Receptor Distance (SID) over Source Object Distance (SOD): • **SID** – the distance between the source of x-ray and the front face of the detector • **SOD** – the distance between the source of X-ray and the surface where the body part is resting (for Mammography, where the breast is resting) In case of a normal view the ERMF is unity, while in case of a magnified view the body part gets closer to the source of radiation and ERMF becomes > 1.

- With the Line Measurement Tool as your cursor, you can make the following adjustments to the annotation once you have created it:
    - To **move** the **entire annotation**, click on the drawn line and drag the entire annotation to a new location.
    - To **move** the accompanying **text**, click on the text and drag it to a new location.
    - To **resize** the annotation, click on either end of the line and drag the endpoint to a new location.

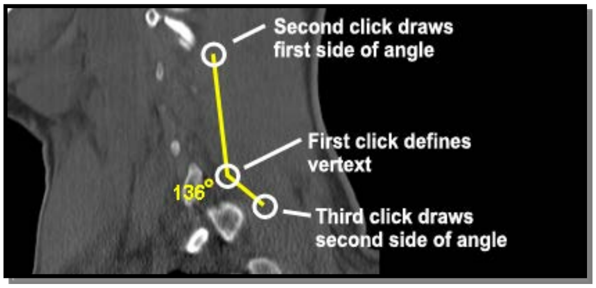
NOTE: If the image to which you are trying to add a line measurement annotation does not have valid pixel spacing information associated with it, you will be prompted to calibrate the Line Measurement tool, as described in paragraph m below.

NOTE: For Ultrasound images with multiple regions, the Line Measurement tool will be calibrated according to the specific region where it is applied, as described in paragraph l, below.

d. Adding Angle Measurements

You can add an angle measurement to an image by selecting the **Angle Measurement** tool on the **Viewer Toolbar**, as shown on the left. Once you have selected the Angle Measurement tool, your mouse pointer will change to match the icon for this tool.

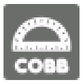
Once you have selected the Angle Measurement tool, you can then define an angle by clicking three times with the left mouse button – first, to position of the **vertex** of the angle; second, to define the end of the angle's **first side**; and third, to define the end of the angle's **second side**, as in the following example:



Creating an Angle Measurement

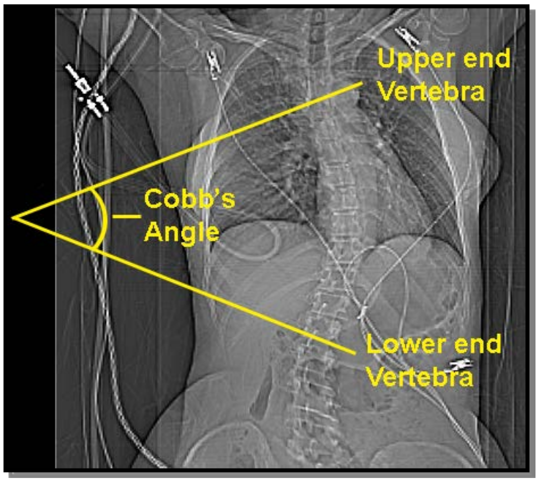
- To **move** the **entire annotation**, click on the body of the drawn angle and drag the entire annotation to a new location.
- To **move** the accompanying **text**, click on the text and drag it to a new location.
- To **resize** the annotation, click on the endpoint of either line and drag it to a new location.

e. Adding Cobb Angle Measurements



You can add a Cobb angle (or "Cobb's angle") measurement to an image by selecting the **Cobb Angle Measurement** tool from the **Viewer Toolbar**, as shown on the left. Once you have selected the Add Cobb Angle tool, your mouse pointer will change to match the icon for this tool.

A Cobb angle measures the curvature of the spine (*e.g.*, of a patient with scoliosis) and is formed by drawing one line the superior end plate of the superior end vertebra and a second line along the inferior end plate of the inferior end vertebra. As shown in the example below, the angle between these two lines (or lines drawn perpendicular to them) is measured as the Cobb angle:

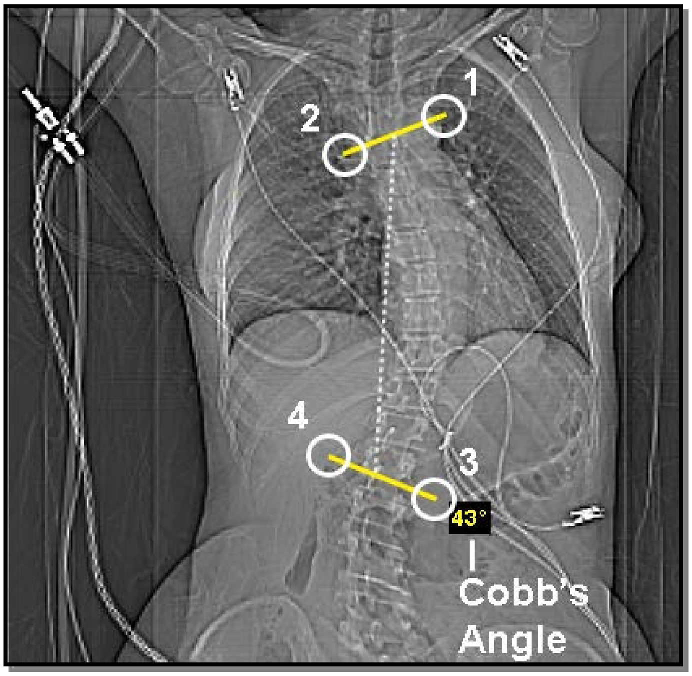


Example of a Cobb Angle

Once you have selected the Add Cobb Angle tool, you can measure a Cobb angle by performing the following steps:

1. Click once with the left mouse button where you want to define the starting position of one of the angle measurement lines.
2. Click a second time with the left mouse button where you want to define the end position of the first angle measure measurement line.
3. Click a third time with the left mouse button where you want to define the starting position of the second angle measurement line.
4. Click a fourth time with the left mouse button where you want to define the end position of the second angle measure measurement line.

When you have finished, your Cobb angle measurement should look similar to the following:



Measured Cobb Angle

- To **move** the **entire annotation**, click on the body of the either of the two yellow lines and drag the entire annotation to a new location.
- To **move** the accompanying **text**, click on the text and drag it to a new location.
- To **resize** the annotation, click on the endpoint of either line and drag it to a new location.

NOTE: Merge PACS implementation of Cobb Angles can calculate the complementary angles (angles totaling 90 degrees) as well as the supplementary angles (angles totaling 180 degrees).

NOTE: You do not need to draw either line of the angle completely; as long as you define a starting and end point for each line, The Merge PACS Viewer will extrapolate the lines until they intersect.

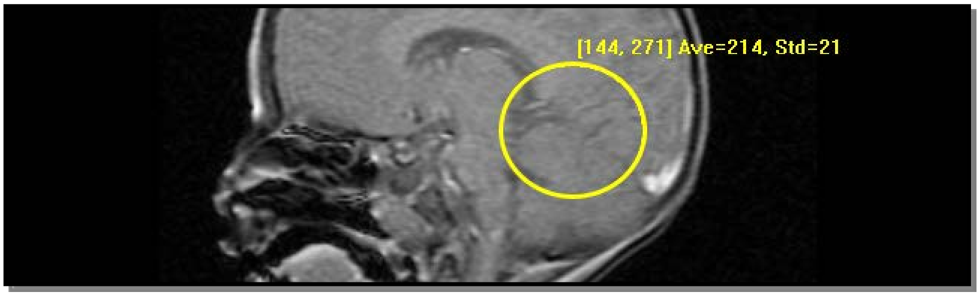
NOTE: It does not matter if the lines are drawn left-to-right, right-to-left, or a combination of the two.

f. Region of Interest Measurements

You can add a statistics display for a specified area of an image by selecting the ROI Measurement option from the Viewer Toolbar, as shown on the left. This tool displays the minimum and maximum pixel intensity values for a selected area of an image, as well as the average pixel value and the standard deviation for the selected region.

Once you have selected the Region of Interest tool, your mouse pointer will change to match the icon for this tool. You can then place your pointer at one corner of the area you want to optimize, click the left mouse button and drag the pointer to the opposite corner.

The relevant information will be displayed above the selected area, as in the example below:



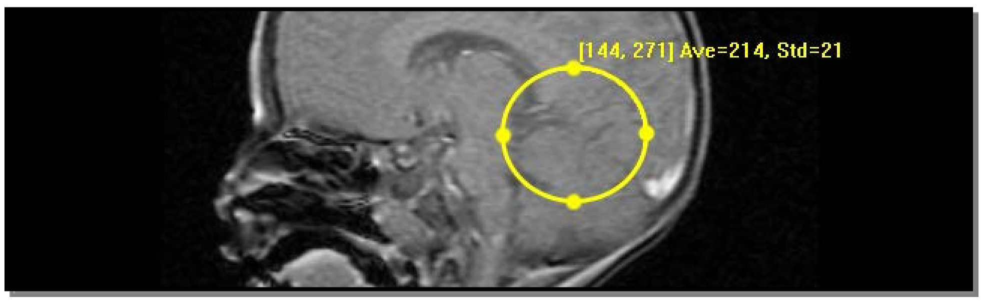
Using the Region of Interest Measurement Tool

- This tool measures the intensity of the pixel in the **original image**, regardless of what the current Window and Level viewing values are set to.
- For all the supported modalities except PET and CT, the units provided by the modality will be displayed. If no units are provided by the modality, no units will be displayed.
- For **CT** images, if no units are provided by the modality the units will be assumed to be **Hounsfield Units** (**HU**).
- For **PET** images, the following units will be available:

Unit	Description	Unit	Description
NONE	unitless	**MLG**	milliliter/gram
CNTS	counts	**1CM**	1/centimeter
CM2	centimeter^2	**UMOLML**	micromole/milliliter
CM2ML	centimeter^2 / milliliter	**PROPCNTS**	proportional to counts
PCNT	percent	**PROPCPS**	proportional to counts/sec
CPS	counts/second	**MLMINML**	milliliter/minute/milliliter
BQML	Becquerels/milliliter	**MLML**	milliliter/milliliter
MGMINML	milligram/minute/milliliter	**GML**	grams/milliliter
UMOLMINML	micromole/minute/milliliter	**STDDEV**	standard deviations
MLMING	milliliter/minute/gram		

  - If the units are in **BQML**, **GML**, or **CM2ML**, the ROI tool will display **Standardized Uptake Values (SUV)** that represent the absorption of an injected isotope in body tissue.
  - There are four different types of SUVs that can be displayed, if available:
    - **Body Weight (BW)**
    - **Lean Body Mass (LBM)**
    - **Body Surface Area (BSA)**
    - **Ideal Body Weight (IBW)**

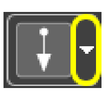
  - You can configure which types of SUVs you want to be displayed (if any) from the User Preferences menu, as described in Section 25.11 below.
  - If there is insufficient information available to calculate one or more types of SUV values, you can manually enter the missing parameters, as described in subsection 4.4.17 below.
  - Refer to Appendix B below for detailed information regarding how SUVs are calculated.
- To **move** the **entire annotation**, click anywhere on the yellow line and drag the entire annotation to the desired location.
- To **move** just the **text** to a new location, click on the text and drag the text to the desired location.
- To **resize** the annotation, hover your mouse cursor over the top, bottom, left or right sections of the yellow line to display one of the four activators, as shown in the following example:



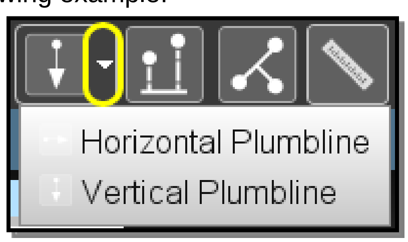
Activators

Then, click on the desired activator and drag it to the desired location.

g. Orthopedic Plumb Lines



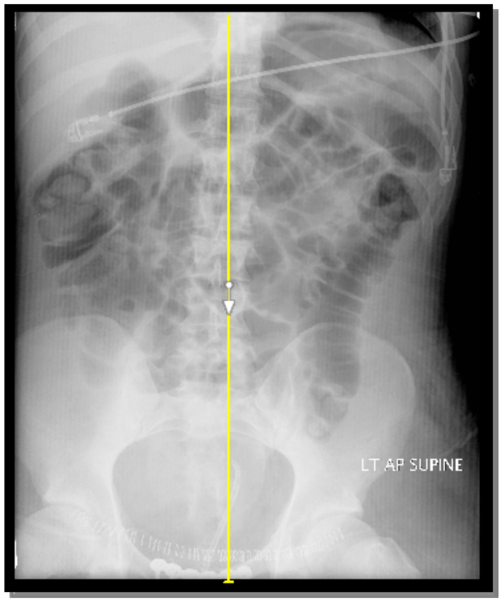
You can add a vertical or horizontal plumb line anywhere on an image by selecting the Orthopedic Plumb Line Menu option from the Viewer Toolbar, as shown on the left. When you click on the Menu icon, the Orthopedic Plumb Line Menu will be displayed immediately below the icon, as in the following example:



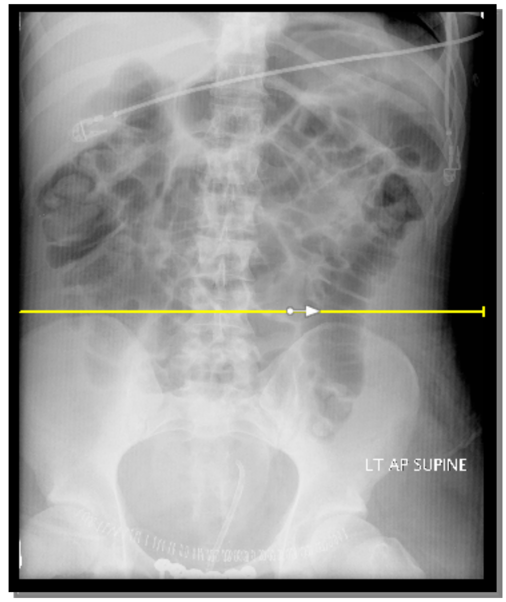
Orthopedic Plumb Line Menu

Select whether you want to draw a Horizontal or Vertical Plumb Line. Once you have made your selection, your mouse pointer will change to match the icon for this tool.

- Click anywhere on the image to draw the plumb line horizontally or vertically across the entire image intersecting the location of the mouse pointer, as in the following examples:

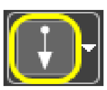


Vertical Plumb Line



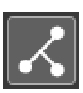
Horizontal Plumb Line

- If desired, you can move an existing line by clicking anywhere along it and dragging it to a new location.



You can also click on the main Orthopedic Plumb Line tool, as shown on the left, to draw the same type of line as last selected from the Orthopedic Plumb Line Menu. For example, if you previously drew a vertical plumb line and then switched to the Window/Level tool, clicking on the main Orthopedic Plumb Line tool will let you draw another vertical line without needing to select it from the Orthopedic Plumb Line Menu.

h. Orthopedic Joint Line Tool

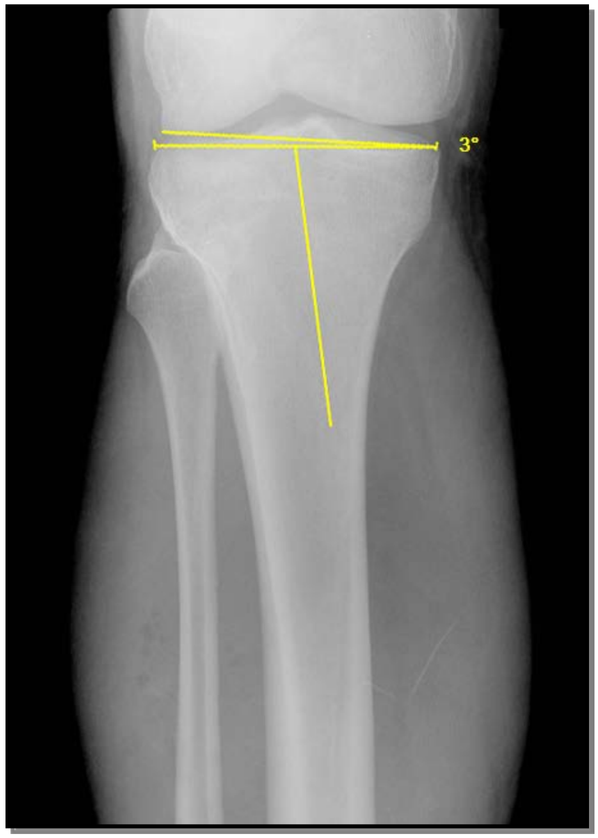


You can measure angles for metatarsal osteotomies with the assistance of a line perpendicular to the base of the angle by selecting the **Orthopedic Joint Line** tool from the **Viewer Toolbar**, as shown on the left. Once you have selected the Orthopedic Joint Line tool, your mouse pointer will change to match the icon for this tool.

Once you have selected the Orthopedic Joint Line tool, you can measure a joint angle by performing the following steps:

1. Click once with the left mouse button where you wish to begin drawing the first line.
2. Click a second time with the left mouse button where you want to define the end position of the first line.
3. Click a third time with the left mouse button where you want to complete the angle.

When you have finished, the angle will be placed and the angle measurement will appear at the intersection point, as in the following example:

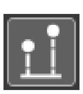


Measured Joint Angle

With the Orthopedic Joint Line Tool as your cursor, you can make the following adjustments to the annotation once you have created it:

- To **move** the **entire annotation**, click on the any of the drawn lines and drag the entire annotation to a new location.
- To **move** the location of the **perpendicular**, click on the line's endpoint and drag it to a new location.
- To **move** the accompanying **text**, click on the text and drag it to a new location.
- To **change** the **angle**, click on any line's endpoint and drag it to a new location.

i. Orthopedic Transischial Line Tool

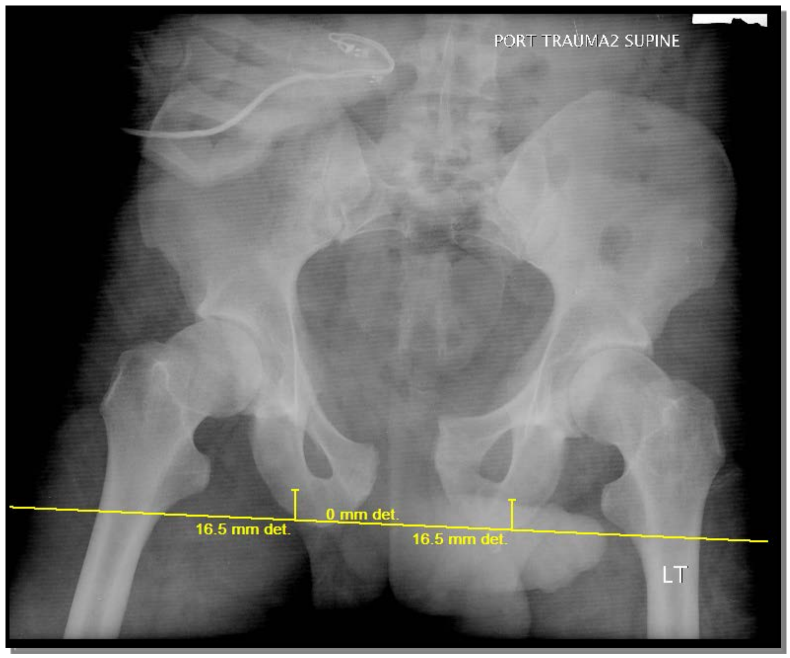


You can compare trochanted positions in images to measure and assess differential leg lengths by selecting the **Orthopedic Transischial Line** tool from the **Viewer Toolbar**, as shown on the left. Once you have selected the Orthopedic Transischial Line tool, your mouse pointer will change to match the icon for this tool.

Once you have selected the Orthopedic Transischial Line tool, you can place a transischial line by performing the following steps:

1. Click and hold down the left mouse button (do not release the button) to place the first line in the desired location.
2. While continuing to hold down the button, move the mouse to the location of the second point, and release the button
3. Click a third time with the left mouse button where you want to complete the angle.

When you have finished, the angle will be placed and the angle measurement will appear at the intersection point, as in the following example:

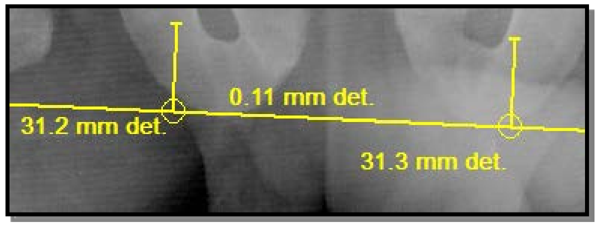


Transischial Line

With the Transischial Joint Line Tool as your cursor, you can make the following adjustments to the annotation once you have created it:

- To **move** the **entire annotation**, click on the drawn line and drag the entire annotation to a new location.
- To **move** any of the accompanying **text**, click on the text and drag it to a new location.
- To **resize** any of the measurement lines, click on the endpoint of the desired line and drag it to a new location.
- To **modify** the **angle** of the connecting line, do the following:

- ○ Hover your cursor over one of the two intersection points until a circle appears around the intersection point, as in the following example:



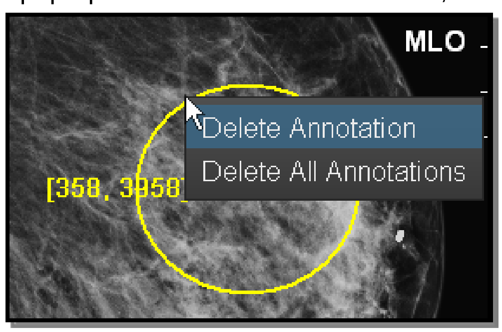
Intersection points

- ○ Click and drag the point to its new location, noting that the angle of the line moves accordingly, and release the mouse button. Using the points on the connecting line, you can rotate it a full 360°.

j. Deleting Annotations

Annotations can be deleted in one of the following ways:

- Hover your mouse cursor over the yellow line or text of the annotation you wish to delete and then press the **Delete** button on your keyboard.
- If you have multiple annotations on a single image and want to delete them all, press **Ctrl-A** on your keyboard to select all annotations and then press the **Delete** button to remove them.
- Right-click on the yellow line or text of the annotation you wish to delete and select an option from the pop-up **Annotation Deletion Menu**, as in the following example:



Annotation Deletion Menu

k. Toggling Display of Annotations

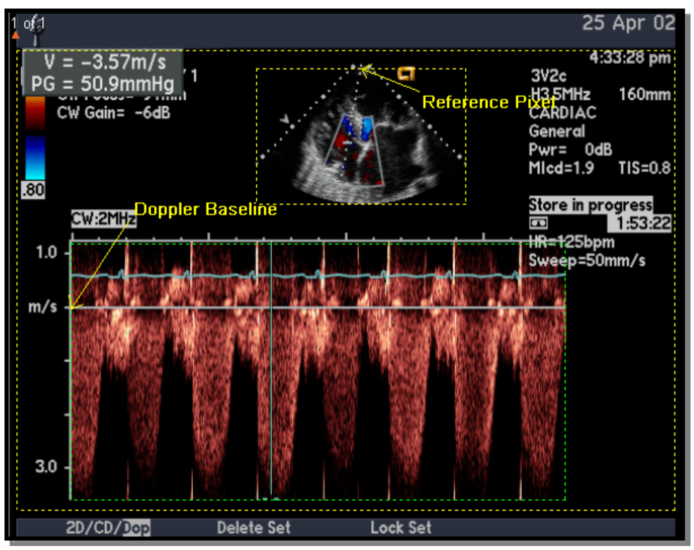
Once annotations have been applied to one or more images in a study, you can toggle the display of those annotations on and off by selecting the **Toggle Annotations** tool from the **Viewer Toolbar** or **Study Toolbar**, as shown on the left.

If the display has been toggled off, any image that has annotations will include an **A** in its image information, as in the following example:

This Image Has Hidden Annotations

I. Ultrasound Regional Measurements

If more than one region is included in an Ultrasound image, each region will be displayed with a separate dotted yellow line border when the Line Measurement tool is selected, as in the following example:



Multiple Ultrasound Regions

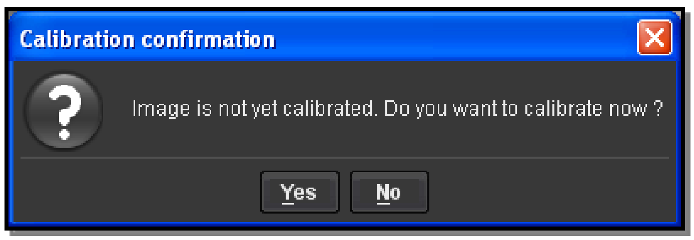
When using the Line Measurement tool, the tool will be calibrated according to the specific region where it is applied.

m. Manually Calibrating Line Measurements

Some DICOM images, such as ultrasound images, do not always have valid pixel spacing information associated with them when they are sent from the modality. For such images, the **Line Measurement** tool described above cannot display lengths in millimeters. The Merge PACS Viewer, however, lets you manually calibrate the Line Measurement tool by measuring something in the image of a known length and telling the system that length in millimeters.

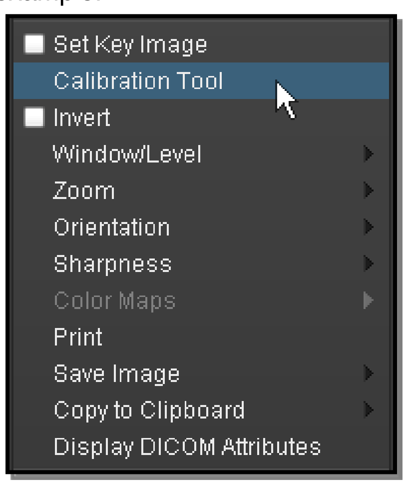
You can also manually calibrate the Line Measurement tool images that do have valid pixel spacing information associated with them, except for modalities that support volumetric reconstruction (MR, CT, NM and PET).

- Manual Calibration can be initiated in the following three ways:
  - If you try to use the Line Measurement tool on an image with no valid pixel spacing information, a **Calibration Confirmation** window will be displayed, as in the following example:



Calibration Confirmation

  - If you need to calibrate (or recalibrate) an image that requires calibration, you can select the **Calibration Tool** option from the **Series Right-click Menu**, as shown in the following example:

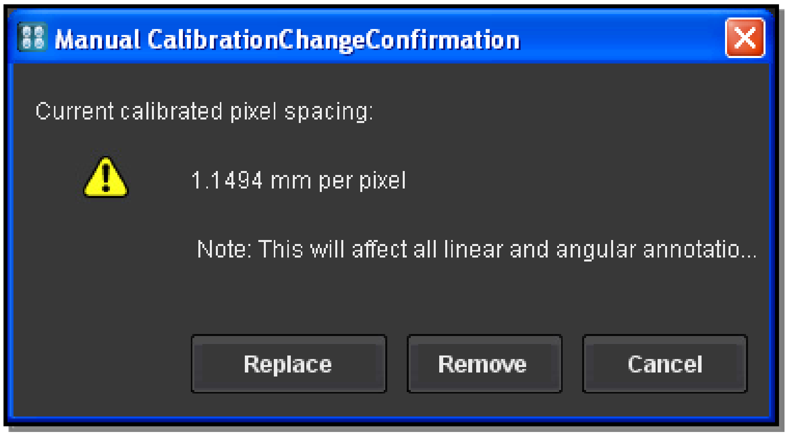


Calibration Tool Option

NOTE: The Calibration Tool option will only be enabled if the image requires calibration.

If you want to manually calibrate an image that does not automatically require calibration, click on the **Manual Calibration** icon on the **Viewer Toolbar**, as shown on the left.

- Once Manual Calibration has been initiated, your cursor will change to a special calibration icon. In addition, if manual calibration has already been performed for this image, a confirmation window similar to the following will be displayed:

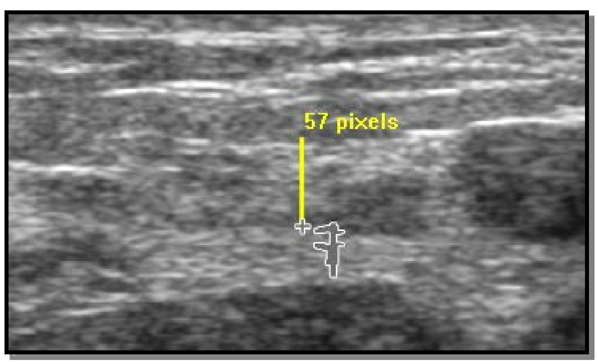


Manual Calibration Change Confirmation Window

  - Click the **Remove** button to undo any manual calibration that was previously saved.
  - Click the **Replace** button to recalibrate the image, after which you can manually calibrate the image as described above.

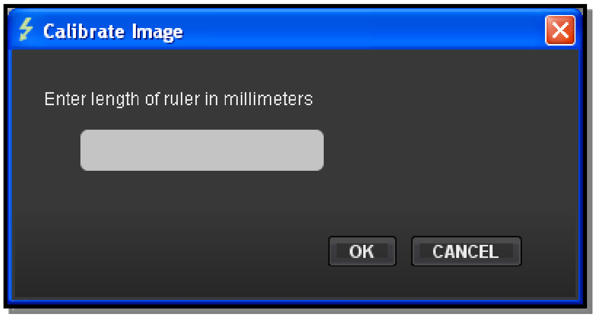
- Once you see the Manual Calibration cursor, perform the following steps to manually calibrate line measurements for the image:

  1. Click and hold the left mouse button where you want to define the starting position of the calibration ruler.
  2. While holding the left mouse button down, move the mouse until you reach the end point of the area you are measuring, as in the example below:



Using the Calibration Tool

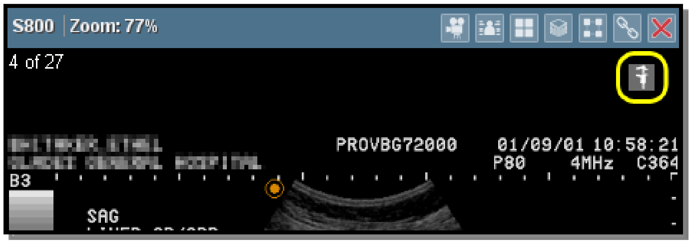
3. When you reach the end point of the area you are measuring, release the left mouse button. The **Calibrate Image** dialog box will be displayed, as in the following example:



The Calibrate Image Dialog Box

4. Enter the length of the measured area, in millimeters, in the space provided and press the **OK** button. Note that only whole numbers are permitted.

   Once an image has been manually calibrated, a small calibration icon will be displayed in the Image Titlebar for that image, as shown in the following example:

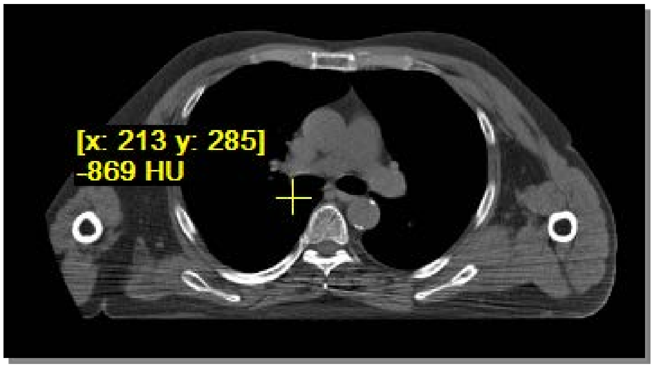


Calibration Marker

4.4.16. The Probe Tool

The Merge PACS Viewer provides you with the ability to determine the intensity value for each selected pixel of the image being viewed by selecting the **Probe** tool from the **Viewer Toolbar**, as shown on the left. Once you have selected the Probe tool, your mouse pointer will change to match the icon for this tool.

Once you have selected the Probe tool, you can then place your pointer over the pixel you want to probe and click with your left mouse button. As long as you hold down the left mouse button, the pixel intensity will be displayed above the pointer, as in the example below:



Using the Probe Tool

- The Probe tool measures the intensity of the pixel in the **original image**, regardless of what the current setting of the Window and Level viewing values.
- For all the supported modalities except PET and CT, the units provided by the modality will be displayed. If no units are provided by the modality, no units will be displayed.
- For **CT** images, if no units are provided by the modality the units will be assumed to be **Hounsfield Units** (**HU**). For all other image types (except PET), unspecified units will be displayed as **US**.
- For **PET** images, the following units will be available:

Unit	Description	Unit	Description
NONE	unitless	**MLG**	milliliter/gram
CNTS	counts	**1CM**	1/centimeter
CM2	centimeter^2	**UMOLML**	micromole/milliliter
CM2ML	centimeter^2 / milliliter	**PROPCNTS**	proportional to counts
PCNT	percent	**PROPCPS**	proportional to counts/sec
CPS	counts/second	**MLMINML**	milliliter/minute/milliliter
BQML	Becquerels/milliliter	**MLML**	milliliter/milliliter
MGMINML	milligram/minute/milliliter	**GML**	grams/milliliter
UMOLMINML	micromole/minute/milliliter	**STDDEV**	standard deviations
MLMING	milliliter/minute/gram		

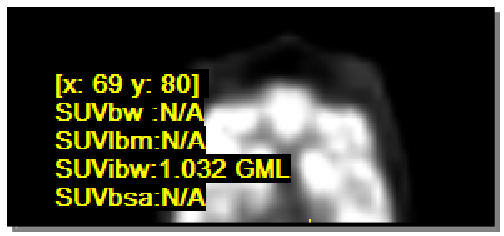
  - If the units are in **BQML**, **GML**, or **CM2ML**, the Probe tool will display **Standardized Uptake Values (SUV)** that represent the absorption of an injected isotope in body tissue.
  - There are four different types of SUVs that can be displayed, if available:
    - **Body Weight (BW)**
    - **Lean Body Mass (LBM)**
    - **Body Surface Area (BSA)**

- **Ideal Body Weight (IBW)**

  - You can configure which types of SUVs you want to be displayed (if any) from the User Preferences menu, as described in Section 25.11 below.
  - If there is insufficient information available to calculate one or more types of SUV values, you can manually enter the missing parameters, as described in subsection 4.4.17 below.
  - Refer to Appendix B below for detailed information regarding how SUVs are calculated.

4.4.17. Setting SUV Parameters (PET Series Only)

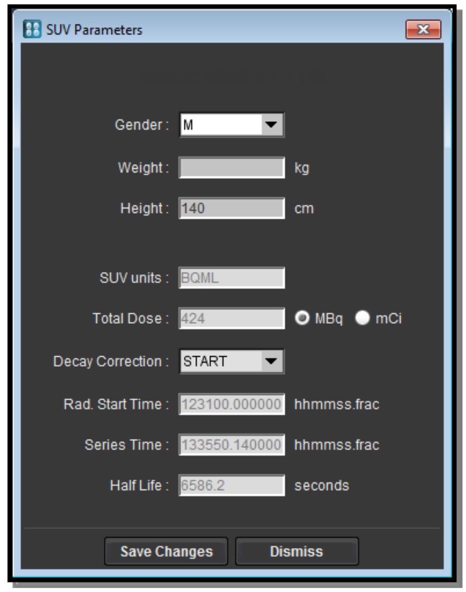
As described in subsections 4.4.15 and 4.4.16 above, the ROI Measurement and Probe tools can display various **Standardized Uptake Values (SUV)** that represent the absorption of an injected isotope in body tissue. If you have selected to display a particular type of SUV from the User Preferences menu, as described in Section 25.11 below, and there is insufficient information available to calculate that type SUV value, the value will be displayed as N/A, as in the following example:



Undefined SUV Values

If desired, you can manually enter the missing information by selecting the **SUV Parameters** option from either the **Series Right-click Menu** or the **MIP Viewport Right-click Menu** while viewing a PET Series within a Viewport.

When you select the SUV Parameters option, the **SUV Parameters** window will be displayed, as in the following example:



SUV Parameters Window

The following fields can be edited as necessary:

- **Gender**
- **Weight**
- **Height**
- **Total Dose Units** (MBq or bCi)

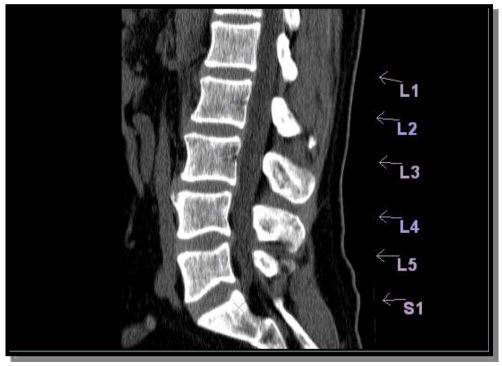
Enter the missing information and click on the **Save Changes** button to record your changes and close the SUV Parameters window.

NOTE: This information will be saved with the study itself, so it will not need to be re-entered the next time it is viewed. It will also be included when the study is archived or transferred.

4.5. The Spine Labeling Tool

The Merge PACS Viewer includes the ability to intelligently label vertebrae by clicking on the **Spine Labeling** button on the **Viewer Toolbar**, as shown on the left. This "intelligent labeling" means that the user can manually label the vertebrae in sagittal slices and have the corresponding axial slices automatically labeled for them. It also means that the Merge PACS Viewer can remember the last label assigned and automatically increment the label for the next vertebra.

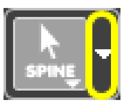
Below is an example of spine labeling in action:



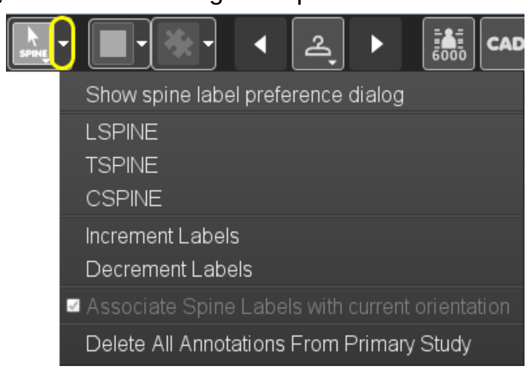
Example of Spine Labeling

NOTE: In order to see spine labels in external systems, including iConnect Access, they must be first saved as key images, as described in Section 4.9 below.

4.5.1. The Spine Label Preferences Menu



The Spine Labeling Tool is configured via the **Spine Label Preferences Menu**, which is accessed by clicking on the triangle to the right of the **Spine Labeling** button on the **Viewer Toolbar**, as shown on the left. When you click on this triangle, the Spine Label Preferences Menu will be displayed, as in the following example:



The Spine Label Preference Menu

NOTE: The Spine Label Preferences Menu is also available from the **Series Right-click Menu**, as described in subsection 4.1.5 above.

4.5.2. Defining the Spinal LabelSets

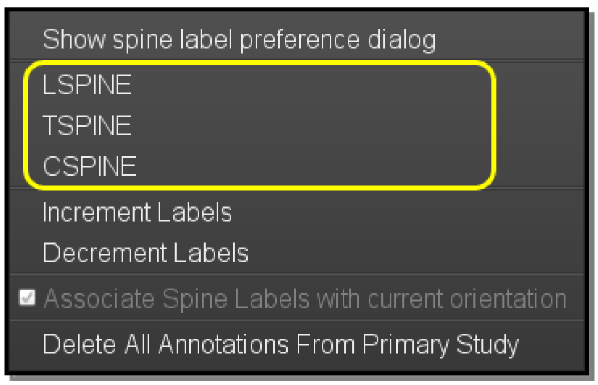
A related group of spine labels is called a "LabelSet." Before you can begin creating a LabelSet, you need to define the LabelSet preferences. The LabelSet preferences tell the Merge PACS Viewer such things as where you plan to begin labeling, whether you want the labels to increment in ascending or descending order, and whether you want the Merge PACS Viewer to automatically label the vertebra on the axial views when you manually label the vertebrae on the sagittal views.

There are two ways that the preferences can be defined for a particular LabelSet:

- Predefined LabelSet preferences can be selected from the **Series Right-click Menu**.
- LabelSet Preferences can be manually defined from the **Spine Label Preference Dialog**.

a. Selecting a Predefined Default LabelSet

If you have not already started adding labels to a study, you can select predefined LabelSet preferences from the **Spine Label Preferences Menu**, as shown in the following example:



Selecting a Predefined Set of LabelSet Preferences

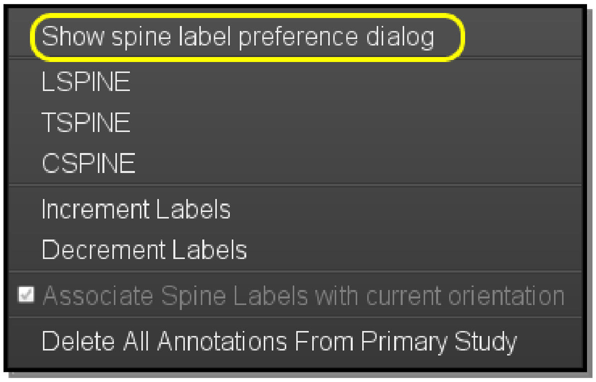
By default, the following three preferences are available:

Preference	Description
LSPINE	Creates automatic labeling starting at **S1** and **descending**.
TSPINE	Creates automatic labeling starting at **T1** and **ascending**.
CSPINE	Creates automatic labeling starting at **C2** and **ascending**.

NOTE: With each of the default preferences described above, the Merge PACS Viewer will automatically label the vertebra on the **axial** views when you manually label the vertebrae on the **sagittal** views.

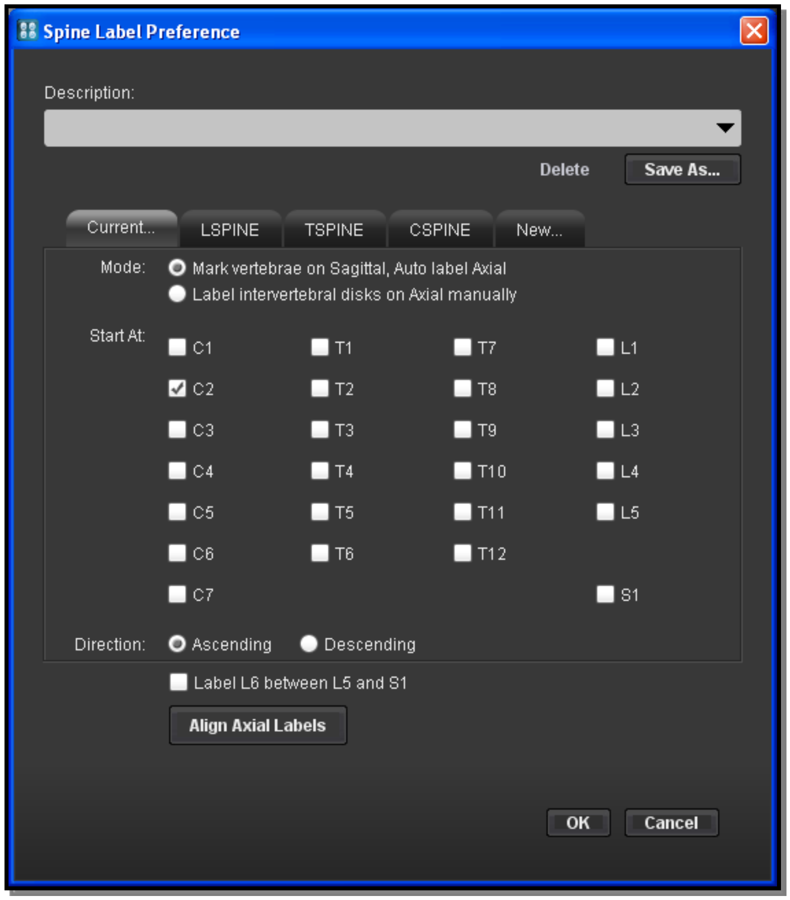
b. Manually Defining LabelSet Settings

If a study does not already have any LabelSets associated with it, or if you want to edit information for an existing LabelSet, you can access the **Spine Label Preference Dialog** from the main **Spine Label Preferences Menu**, as in the following example:



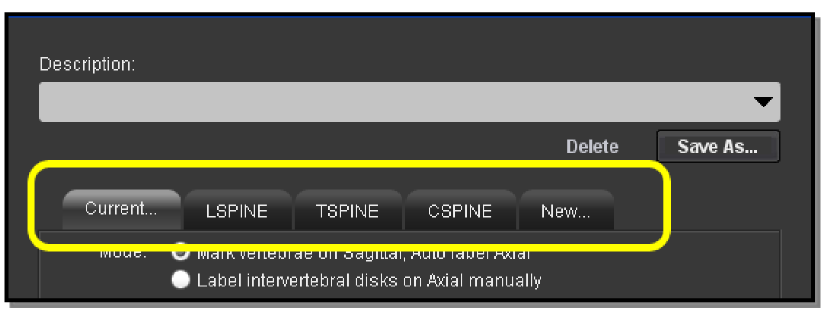
Accessing the Spine Label Preference Dialog

This will cause the **Spine Label Preference Dialog** to be displayed in a separate pop-up window, as in the following example:



The Spine Label Preference Dialog

The top section of the Spine Label Preferences Dialog has a number of tabs, as shown in the following example:



Spine Label preference Dialog Tabs

The tabs let you do the following:

- Temporarily set the preferences for current use.
- Edit an existing predefined set of preferences.

- Create a new set of preferences that can be saved for display in the Series Right-click Menu.

Once you have selected the desired tab, the following information can be entered for this set of preferences:

Option	Description
Mode	Select whether you want The Merge PACS Viewer to automatically label the vertebra on the axial views when you manually label the vertebrae on the sagittal views (“Mark vertebrae on Sagittal, auto label Axial”), or whether you want to manually label the vertebrae on the axial views as well (“Label intervertebral disks on Axial manually”).
Start at	Select where you want to begin labeling. The Merge PACS Viewer will automatically increment the labels numbers for you as you mark each vertebrae, freeing you from having to type out each label manually
Direction	Select whether you want the labels to increment in ascending (*e.g.*, C2, C3, C4, etc.) order or descending (*e.g.*, C6, C5, C4, etc.) order.
Label L6 between L5 and S1	Select this if you want the labeling to include a L6 label between L5 and S1.
Align Axial Labels	Click this button if you want to customize how axial labels will be aligned. A small pop-up window will be displayed, as in the following example:  **Aligning Axial Labels** Use your mouse to move the **Label** icon to the desired position and then click on the red **X** to save your change and close the window.

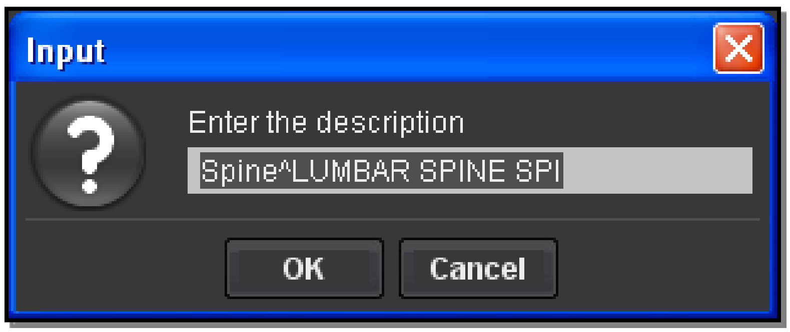
To save your changes, do one of the following:

- If you are setting preferences for current use or have edited an existing predefined set of preferences, click on the **OK** button at the bottom of the window to save your changes and return to the Merge PACS Viewer.

CAUTION: If you make changes to an existing predefined set of preferences, clicking the OK button will automatically update the predefined set of preferences with your changes. Therefore, do not hit OK if you only want to temporarily make a change to that set of preferences. If you are creating a new set of preferences and want to have them appear as an option in the Series Right-click Menu, click on the Save As… button at the top of the window, as in the following example:

Saving a New Set of LabelSet Preferences

- Clicking the Save As… button will cause a small **Input** dialog box to be displayed, as in the following example:



New LabelSet Preferences Input Dialog

- In the **Description** field, enter the text you want to match in the study's description. By default, this field will contain the description of the currently open study, but it can be changed to anything you want. Note that the description does not need to be case sensitive and the use of wildcard characters is currently **not** supported. When finished, click the **OK** button to save your changes.

4.5.3. Labeling a Vertebra

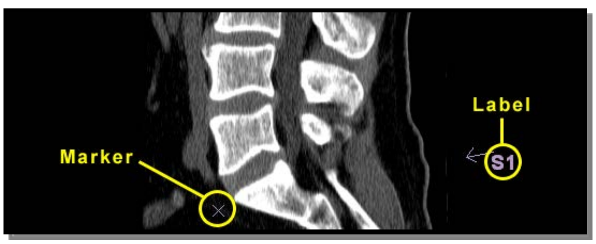
Once LabelSet settings have been defined, clicking on Spine Label button on the Toolbar will cause the mouse cursor to appear as the special Spine Label cursor, as shown in the following example:

The Spine Labeling Cursor

The cursor will remain this way until you exit Spine Labeling mode (whether by selecting another tool from the Toolbar or clicking with your right mouse button to cycle through the standard mouse modes). If you accidentally exit Spine Labeling mode, you will need to click on the Spine Labeling tool on the Toolbar once again to re-enter it.

To label a vertebra, do the following:

1. Position the Spine Labeling cursor over the desired vertebra and depress the left mouse button.
2. While holding the left mouse button down, move the cursor to where you want the label to appear. While you are moving the cursor, a thin dotted line will be displayed to indicate the relationship between the spot being marked and the location of the label.
3. When the label is where you want it, release the mouse button. There will now appear a small “x” at the point where you first clicked on the image (the “marker”), and the label will have a small arrow pointing to that spot, as in the following example:



First Labeled Vertebra

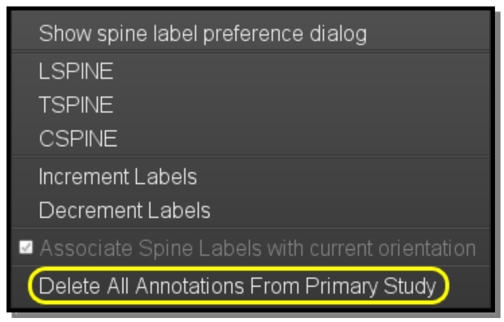
4. Repeat steps 1-3 as desired to label additional vertebrae. The Merge PACS Viewer will automatically increment the labels as you do so.

NOTE: Spine labels applied to one sagittal view in a study will automatically be applied to all other sagittal views in the same frame of reference and orientation for that study, whether or not that view is currently being displayed in a Series Viewport. If the view you are currently labeling is not clear enough to allow you to label all the desired vertebrae, at any time you can switch to a different view and continue the labeling process there.

4.5.4. Correcting Mistakes

The Merge PACS Viewer allows you to correct mistakes made while using the Spine Labeling tool in the following ways:

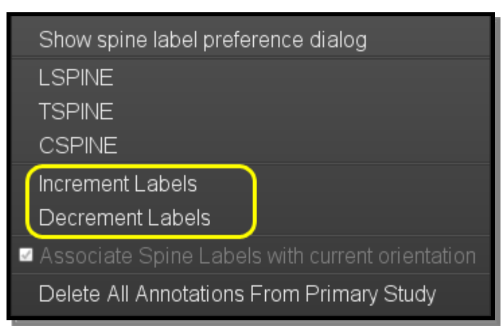
- If you want to **reposition** the location of a **marker**, click on it with the left mouse button and drag it to the desired location.
- If you want to **reposition** the location of a **label**, click on the base of the arrow associated with that label with the left mouse button and drag it to the desired location.
- If you want to **delete** the **last created** spine label entirely, press **Ctrl+Z** on your keyboard. If you have created multiple spine labels, pressing **Ctrl+Z** repeatedly will delete each spine label in the reverse order in which it was created.
- If you want to **delete all** spine labels from the primary study, select **Delete All Annotations from Primary Study** from the **Spine Label Preferences Menu**, as in the following example:



Deleting All Spine Labels

- If you started the labeling at the wrong place, you can increase or decrease the entire range of labels by increments. For example, if your set of labels goes from T1 to T6 and you realize that what you labeled as T1 is actually C7, you can **decrement** the set of labels so that they range from C7 to T5 instead of T1 to T6. Conversely, if you realized that what you labeled as T6 is really T7, you can **increment** the labels so that they range from T2 to T6.

  To increment or decrement the current set of labels, select the desired option from the **Spine Label Preferences Menu**, as in the following example:

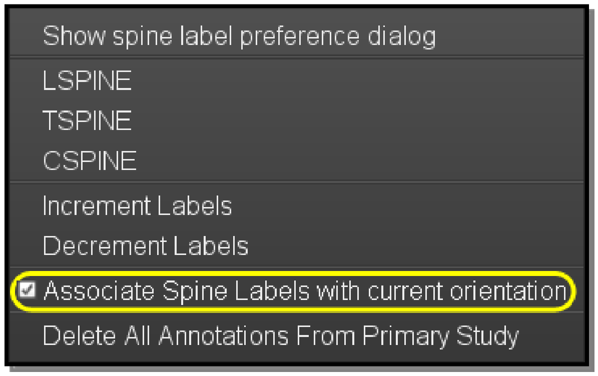


Incrementing or Decrementing Labels

4.5.5. Associating Spine Labels of Two Different Orientations

If two different sagittal images share the same DICOM Frame of Reference but different orientations, the Merge PACS Viewer allows you to associate spine labels defined using images of one orientation with a different orientation. In this way, the labels will display on all images with the associated orientation.

To associate all spine labels with the currently viewed orientation, select **Associate Spine Labels with current orientation** from the **Spine Label Preferences Menu**, as in the following example:



Associating Spine Labels with Current Orientation

At any time, you can also disassociate the spine labels from different orientations by deselecting the **Associate Spine Labels with current orientation** option.

4.6. Saving, Printing and Copying Images

The Merge PACS Viewer lets you do the following:

- **Save Images in a variety of different formats**
- **Print Images**
- **Copy and Paste Images into Another Application**

4.6.1. Saving images

You can save individual study images or an entire Series of images in a variety of available image formats for inclusion in a document or an e-mail message.

CAUTION: **Saved images are intended for inclusion in other documents, not for diagnostic purposes.**

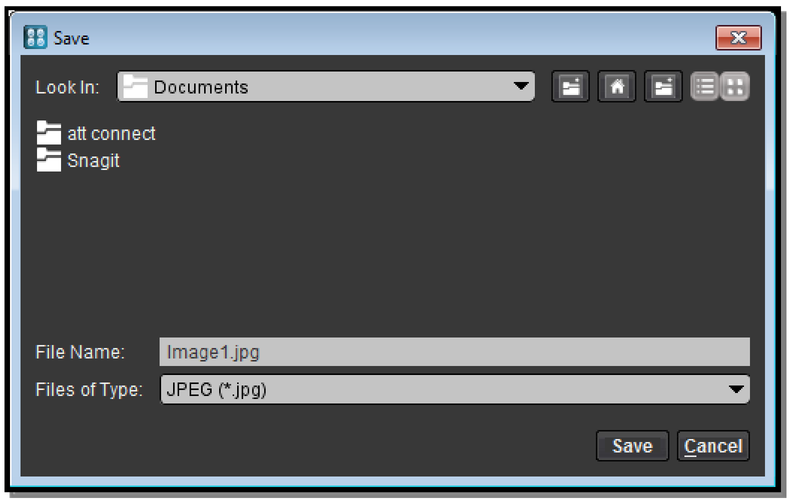
a. Saving Individual Images

To save an individual image, select one of the available Save Image options from the **Series Right-click Menu**, as shown in the following example:

Saving an Image

You can choose whether to save the image at the zoom factor currently being displayed in the viewport or at 100% resolution.

When you select a Save Image option, the **Save Image** dialog window will be displayed, as in the following example:



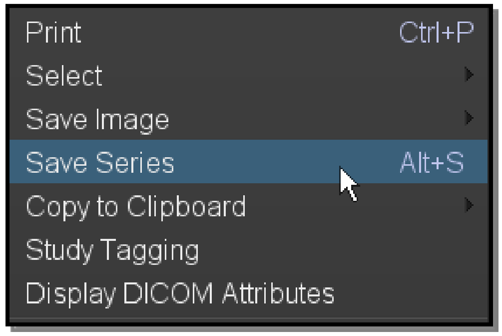
Save Image Dialog

- By default, the images will be saved to the Windows Documents folder associated with your login account. If necessary, use the **Look In** drop-down menu to select another location.
- If desired, change the default name of the image in the **File Name** field.
- If desired, select a different file type for this image from the drop-down **Files of Type** menu. The following image formats are currently supported:
    - JPEG (*.**jpg**)
    - PNG (*.**png**)
    - BMP (*.**bmp**)
    - JPEG (*.**jpeg**)
- When finished, click on the **Save** button at the bottom of the window.

b. Saving Entire Series

To save all images from one or more Series, do one of the following:

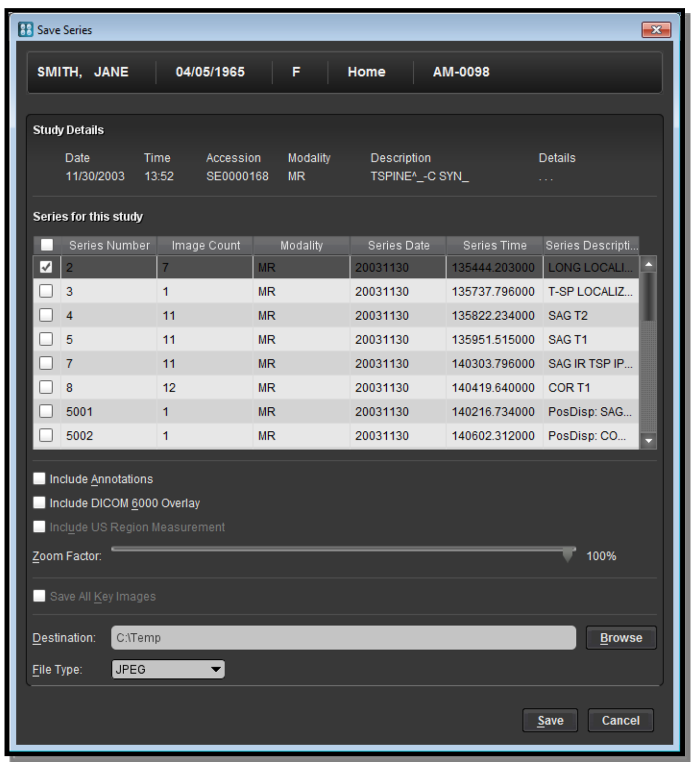
- Select the **Save Series** option from the **Series Right-click Menu**, as shown in the following example:



Saving a Series

Select the **Save Series** icon from the **RTWL** or the **Patient Record Toolbar**, as illustrated to the left.

When you select the Save Series option or icon, the **Save Series** dialog window will be displayed, as in the following example:



Save Series Dialog

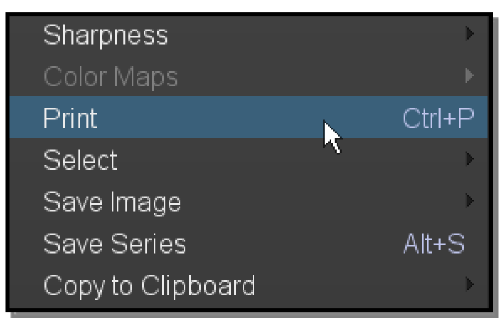
- If there are multiple Series associated with this study, you can select one or more Series to be saved from the **Series for this study** panel.
- Depending on the type of Series, you can optionally select to save one or more of the following using the checkboxes provided:
  - **Annotations**
  - **DICOM 6000 Overlay** information
  - **US Region Measurements** (Ultrasound Series only)
  - **Key Image** (only if key images have been flagged)
- By default, all images will be saved at 100% resolution. If desired, you can choose a smaller resolution using the **Zoom Factor** slide bar.
- Click on the **Browse** button to select a different location to save the images, if necessary.
- If desired, select a different file type for this image from the drop-down **Files of Type** menu. The following image formats are currently supported:
  - JPEG (*.**jpg**)
  - PNG (*.**png**)
  - BMP (*.**bmp**)
  - JPEG (*.**jpeg**)
- When finished, click on the **Save** button at the bottom of the window.

4.6.2. Printing Images

If your machine is connected to a printer, either locally or over a network, you can print the image displayed in the **active Series Viewport**. In addition, if your site has been configured with one or more DICOM printers, you can send individual images or entire Series to one of those DICOM printers.

a. Standard Image Printing

To send the image currently displayed in a viewport to a standard printer, select the **Print Image** option from the **Series Right-click Menu**, as shown in the following example:



Printing an Image

A standard print dialog will be displayed that will let you select the desired printer, the number of copies, etc.

- Your printer's driver must support Postscript.
- The image will be printed one image per page, regardless of the tiling settings on the screen.
- Depending on how Merge PACS is configured, the printed image may or may not include a header with Patient, Study and Series information.
- Depending on how Merge PACS is configured, the image will either be printed as shown or else it will be resized and cropped to fill the entire page, as in the following example:

Normal Printing

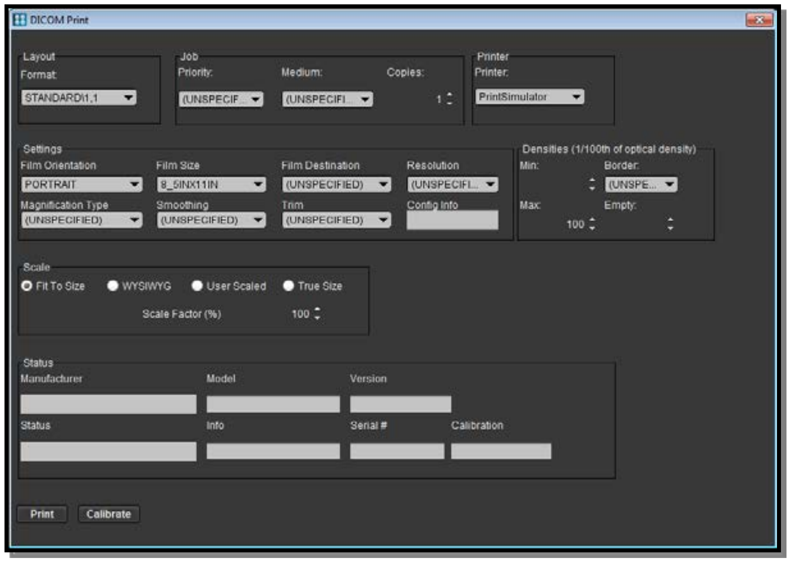
Full-Page Printing

b. DICOM Printing

If Merge PACS has been configured for DICOM printing and you have the login privilege to send studies to a DICOM printer, once you have selected one or more images and/or series for DICOM printing, either from the **Series Toolbar** or from the **Series Right-click Menu** (as described in subsection 4.1.5 above), you can send them to an available DICOM printer by clicking on the Print DICOM icon on the Viewer Toolbar, as shown on the left.

You can also send all key images to an available DICOM printer by selecting the **DICOM Print Key Images** option from the **Key Image Series Right-click Menu**, as described in subsection 4.10.4 below.

When you click on the Print DICOM icon (or select DICOM Print Key Images), the DICOM Print dialog window will be displayed, as shown in the following example:



DICOM Print Dialog

- If necessary, select the desired printer from the list of available DICOM printers, as in the following example:

Selecting a DICOM Printer

NOTE: Your printer selection will be automatically stored with your workstation preferences, so you should not need to select it each time you print.

- The remaining fields will automatically be filled in with the configured default settings for the selected printer. You can change any of the settings for this particular print job as desired, however, such as the **Format**, **Film Orientation**, **Film Size** and **Scale**.
- When ready to print, click on the **Print** button at the bottom of the window.

CAUTION: **Only the overlay text currently shown in the viewport will be printed on the image when it it is sent to a DICOM printer. If the image is being printed for diagnostic purposes, DICOM Overlays should be toggled on so that identifying patient information is included. If the image is being printed for use with Teaching Files, any overlay text that contains patient information should be disabled.**

CAUTION: **True Size should not be selected as a Scale option unless the Film Size is large enough to fit the image.**

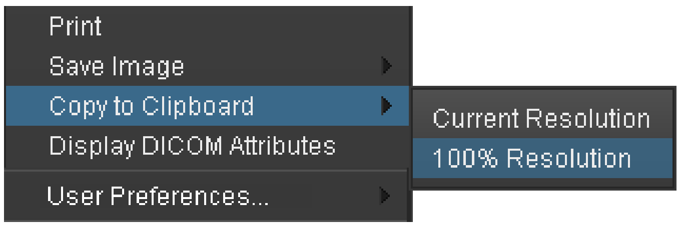
CAUTION: For uncalibrated images, it is important to redo measurements on a printout by calibrating a ruler with an embedded marker in the image, if available.

NOTE: Printed images will include a caliper representing 5 cm. If you have selected **True Size** for the scale, it is recommended to match the caliper on printout with a ruler to verify the scale.

4.6.3. Copying and Pasting Images

You can temporarily copy the image currently displayed in the **active Series Viewport** to your computer's memory. You can then paste the image directly into another application, such as an e-mail message or a word processing document, by pressing **Ctrl-V** within that application.

To copy an image into memory, select one of the **Copy to Clipboard** options from the **Series Right-click Menu**, as shown in the following example:



Copying an Image to the Clipboard

4.7. 3D Rendering Tools

The Merge PACS Viewer provides inherent 3D support directly within the application, which lets you seamlessly navigate between 2D and 3D/MPR views. The majority of functionality available to 2D views is equally available to 3D/MPR views, including toolbar commands, menus, mouse modes, mouse cycle modes, and keyboard shortcuts.

MPR and 3D Viewports can be loaded directly into the main Image Viewer window (*i.e.*, replacing an existing 2D view), or displayed within a separate 2x2 Grouped 3D Viewing frame where you can manipulate the Axial, Sagittal, and Coronal MPR Series Viewports to create the desired reconstruction in the 4th window (for rendered volume or slab).

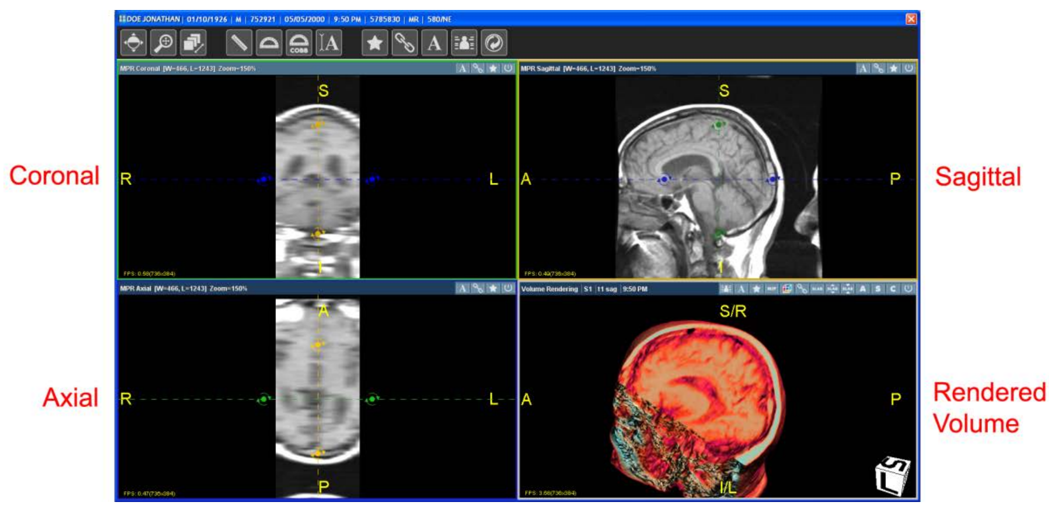
In addition, you can drag and drop any window (2D, MPR, or CVR) and exchange it with another window as well as persistence of any Series Viewport so it can be recreated at a later time.

The following terms are specific to 3D Rendering:

Term	Description
MPR	Multi-Planar Reconstruction (MPR) allows image data to be displayed as three standard orthogonal views corresponding to the Transverse, Coronal and Sagittal axes, reconstructing two of the planes when applied to a single plane. MPR thus allows you to view the image data from any viewpoint without having to re-scan the patient.
MPR Oblique	As with standard MPR, MPR Oblique allows image data to be displayed as three standard orthogonal views corresponding to the Transverse, Coronal and Sagittal axes, reconstructing two of the planes when applied to a single plane. In addition, though, you can specify single or double oblique planes within the volume, if required.
MIP	Maximum Intensity Projection (MIP) is typically used with contrast-enhanced images to maximize the visualization of vasculature. A MIP is created by combining a series of slices with display of the brightest pixel on any slice at each location.
CVR	Color Volume Rendering (CVR) adds a color dimension to a 3D rendered image. Typically used to better define the pathology.

4.7.1. Multi-Planar Reconstruction (MPR) Window

Multi-Planar Reconstruction (MPR) Series can be displayed in a special MPR Window that has its own Toolbar and Right-click Menu. The MPR Window displays three standard orthogonal views corresponding to the Axial, Coronal and Sagittal axes, as well as a rendered 3D volume within a special Rendered Volume Viewport, as shown in the following example:



MPR Window

The Rendered Volume can be generated according to one of the following methods:

Method	Description
Maximum Intensity Projection (MIP)	Grayscale method that emphasizes tissue with the highest pixel values, such as bone and vasculature.

Method	Description
Minimum Intensity Projection	Grayscale method that emphasizes tissue with the lowest pixel values, such as air-filled structures.
Average Intensity Projection	Grayscale method that displays tissue with average pixel values, similar to a standard CT or MR image.
Faded MIP	Standard MIP shows 100% white at each point of intersection and 0% white otherwise. Faded MIP, on the other hand, shows an alpha value based on how far the ray goes through and therefore provides greater detail.
CVR	Color Volume Rendering (adds a color dimension to a 3D rendered image).

By default, the rendered MPR volume in the Rendered Volume Viewport will be displayed as a MIP in an Axial view, but this default behavior can be changed from the User Preferences Menu, as described in Chapter 25 below.

NOTE: Image Fusion, described in subsection 4.7.2.g below, cannot be performed within the MPR Window and must be performed within a single-view MPR Viewport, as described in subsection 4.7.2 below.

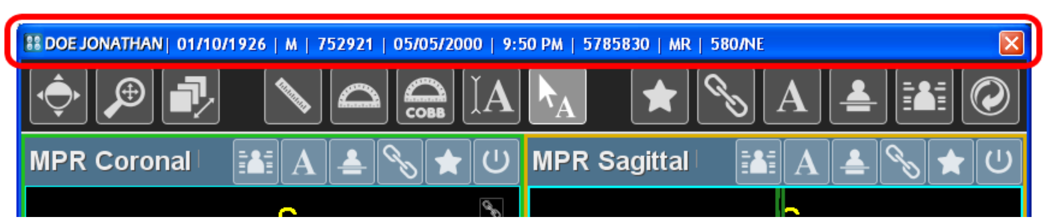
The MPR Window can be launched in any of the following ways:

Clicking on the **Create 3D MPR Slab View** icon on the **Series Toolbar**, as described in subsection 4.1.5, above, and shown on the left.

- Selecting **Open MPR Viewport** from the Primary and Prior Exam **Series Navigation Thumbnail Right-click Menus** at the **Patient Record**, as described in subsections Note: and Note: above.
- Selecting **Open MPR Viewport** from the **Series Thumbnail Right-Click Menu**, as described in subsection 4.1.4 above.
- Selecting **3D** → **MPR Viewport** from the **Series Right-click Menu**, as described in subsection 4.1.5, above.

a. MPR Window Titlebar

At the very top of the MPR Window is the **MPR Window Titlebar**, as in the following example:



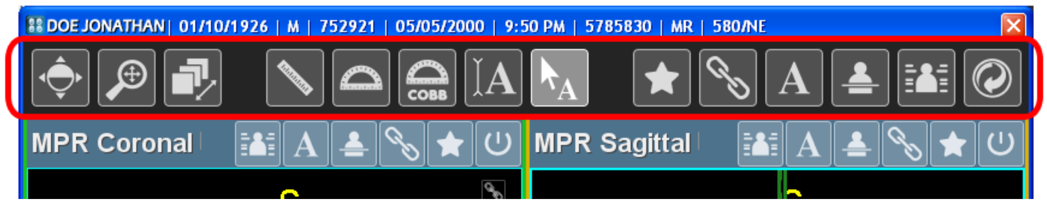
The MPR Window Titlebar

The MPR Window Titlebar displays the following information about the patient study being viewed:

- **Name**
- **Date of Birth**
- **Sex**
- **Medical Record Number** (MRN)
- **Issuer of Patient ID** (IPID)
- **Study Time/Date**
- **Accession Number**
- **Modality**
- **Primary Study Description**

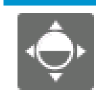
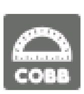
b. MPR Window Toolbar

Below the MPR Window Titlebar is the main **MPR Window Toolbar**, as in the following example:



The MPR Window Toolbar

The MPR Window Toolbar displays the following tools that apply to the MPR Window as a whole:

Tool	Name	General Description
	**Window/Level**	Lets you adjust the Window and Level [contrast and brightness] of an image “on the fly” by dragging the mouse cursor over the image.
	**Zoom/Pan Combo**	Lets you simultaneously pan an image with the mouse cursor and resize it using the mouse center wheel.
	**Page Images**	Lets you page sequentially ("scroll") through the images in a Series Viewport by clicking and dragging the mouse cursor up or down.
	**Line Measurement**	Lets you use the mouse cursor to measure in millimeters the actual (as opposed to the displayed) distance between two points on an image, as well as mark the image with an appropriate annotation.
	**Angle Measurement**	Lets you use the mouse cursor to add an angle measurement to an image.
	**Cobb Angle Measurement**	Lets you use the mouse cursor to add a Cobb angle (or “Cobb’s angle”) measurement to an image.
	**Text Annotation**	Lets you use the mouse cursor to add annotated text to an image.
	**Arrow Annotation**	Lets you use the mouse cursor to add labeled arrows to an image

Tool	Name	General Description
	Set Key Image	Marks the image currently displayed in the Series Viewport as a key image and launches the Key Image Viewport in a separate pop-up window.
	Toggle Link to 3D	Toggles Link to 3D mode (as described in paragraph d below) on and off.
	Toggle Annotations	Toggles the display of any existing annotations on and off.
	Toggle Reference Lines	Toggles the display of Cross-reference Lines on and off.
	Toggle DICOM Overlay	Turns the DICOM Overlay display off for all Series Viewports.
	Reset	Resets all Series Viewports to their default settings.

c. Available Mouse Modes

Repeatedly right-clicking on an image will toggle the cursor among the following commonly used 3D mouse modes:

- **Rotate**
- **Page** (except for **CVR**)
- **Window/Level**
- **Zoom/Pan Combo**
- **Line Measurement**

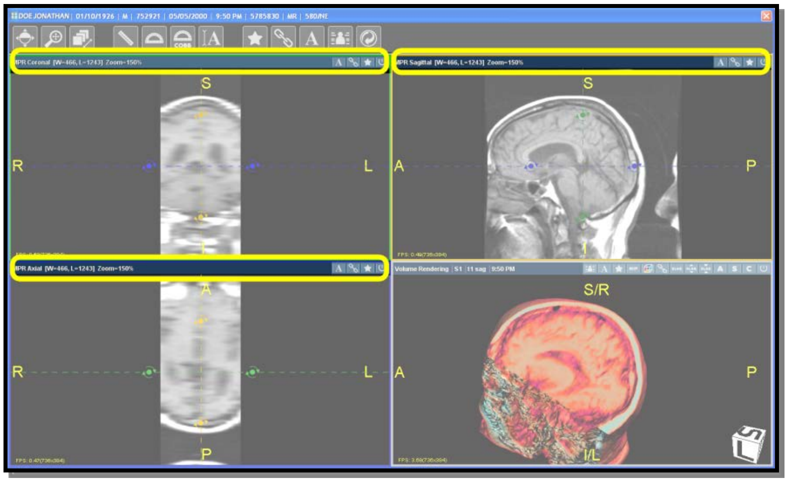
NOTE: The available mouse modes, as well as the order in which they appear, can be customized for different modalities, as described in Section 25.12 below.

NOTE: This feature can be disabled by **deselecting** the **Delayed Right Click** option in the User Preferences Menu, as described in Section 25.11, below. If the feature is disabled (or if you hold down the right mouse button on an image instead of briefly clicking), the **Series Right-click Menu** will be displayed instead, as described in paragraphs e and k, below.

These mouse modes are also available, along with additional mouse modes, via the various 3D Right-click Menus, as described in paragraphs e and k, below.

d. Orthogonal MPR Series Toolbars

At the top of each of the three standard orthogonal MPR Series Viewports is an **Orthogonal MPR Series Toolbar**, as shown in the following example:

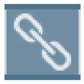


Orthogonal MPR Series Toolbars

The Orthogonal MPR Series Toolbars display information for the Series in the Series Viewport as well as various tools that apply to that Series Viewport:

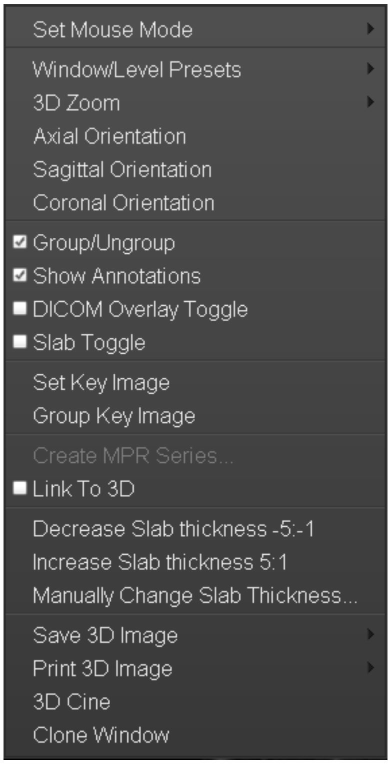
- By default, the left side of each Orthogonal MPR Series Toolbar displays the following information about the Series within that Series Viewport:
  - **Orientation (Coronal, Sagittal or Axial)**
  - **Percentage through the Volume**
  - **Window/Level**
  - **Zoom Factor**
- The right side of each Orthogonal MPR Series Toolbar displays the available tools that apply to that Series Viewport. The actual tools that appear will depend on how you have configured the Toolbar, as described below:

Tool	Name	General Description
	**Toggle DICOM Overlay**	Toggles the DICOM Overlay display on and off for this Series Viewport.
	**Toggle Annotations**	Toggles the display of any existing annotations on and off.
	**Toggle Reference Lines**	Toggles the display of Cross-reference Lines on and off for this Series Viewport.

Tool	Name	General Description
	**Link to 3D**	Lets you link this Series Viewport with the Rendered Volume Viewport When this tool is selected, transformations made to this Series Viewport (*e.g.*, by rotating the series in this Viewport or changing the slab thickness of the series in the other two orthogonal Series Viewports) will affect the rendered MPR volume in the 3D Viewport.
	**Set Key Image**	Marks the image currently displayed in the Series Viewport as a key image and launches the Key Image Viewport in a separate pop-up window.
	**Reset**	Resets this Series Viewport to its default settings.

- Right-clicking on the Series Information section of an Orthogonal MPR Series Toolbar will immediately cause the **Orthogonal MPR Series Toolbar Right-click Menu** to pop-up. The Orthogonal MPR Series Toolbar Right-click Menu lets you select which of the available tools you would like to appear on the Orthogonal MPR Series Toolbar itself, as well as select whether you want the tool buttons to always appear, never appear, or only appear when the Series Viewport is active. Note that any change made to one Orthogonal MPR Series Toolbar will affect all three Orthogonal MPR Series Toolbars.

e. Orthogonal Series Right-click Menu



The Orthogonal Viewport Right-click Menu

Right-clicking on one of the Orthogonal Series Viewports and holding the mouse button down for a few seconds will bring up the **Orthogonal Series Right-click Menu**, as shown in the example to the left.

The Orthogonal Series Right-click Menu contains a variety of additional navigation, layout, and image manipulation options, as well as the ability to save and print an image. Some of the options available on the Right-click Menu are also available elsewhere in the MPR Window and are included here for your convenience.

The options in the Orthogonal Series Right-click Menu apply to all Orthogonal Series Viewports and not just the one your cursor was in when you accessed it.

Note that, depending on the study and the type of modality involved, as well as the orientation of the series being displayed in the Series Viewport, one or more of these options may not be available, in which case they will appear "grayed out" in the menu.

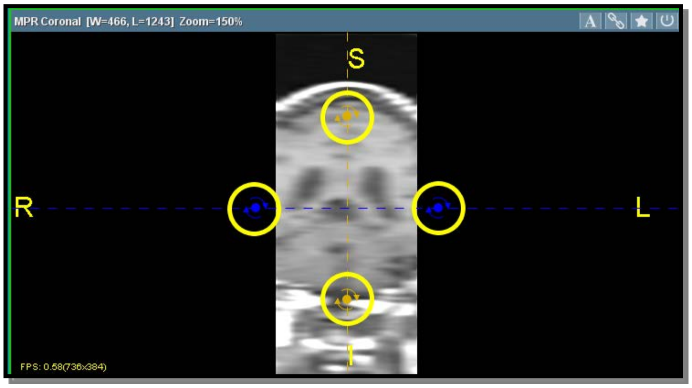
Each Orthogonal Series Right-click Menu has the following possible options:

Option	General Description
Set Mouse Mode	Lets you select one of the following tools (note that your mouse cursor will change to reflect the chosen tool): **Page** — **Probe** **Window/Level** — **ROI** **MPR Slab** — **Line Measurement** **Zoom/Pan Combo** — **Angle Measurement** **Pan** — **Cobb Angle** **Zoom** — **Text Annotation** **Auto Skim** — **Arrow Annotation**

Option	General Description
Zoom	Selects a magnification level for the images in the selected Series Viewport, including “center and fill.”
Axial Orientation	Change the orientation of the image in the MIP/CVR viewport to Axial and links it to the corresponding MPR window.
Sagittal Orientation	Change the orientation of the image in the MIP/CVR viewport to Sagittal and links it to the corresponding MPR window
Coronal Orientation	Change the orientation of the image in the MIP/CVR viewport to Coronal and links it to the corresponding MPR window
Group/Ungroup	Lets you manually link multiple Series Viewports together for display purposes.
Show | Hide Annotations	Toggles the display of any existing annotations on and off for this Series Viewport.
DICOM Overlay Toggle	Toggles the DICOM Overlay display on and off for this Series Viewport.
Slab Toggle	Toggles slab mode on and off. When turned on, slab controllers that let you change the slab thickness with the mouse are displayed in the orthogonal Series Viewports corresponding to the orientations not currently displayed in the Rendered Volume Viewport (*e.g.*, if the Rendered Volume Viewport is currently displaying an Axial orientation, the slab controllers will be enabled in the Sagittal and Coronal orthogonal Series Viewports).
Set Key Image	Flag the selected image as a “key image” for later reference.
Group Key Image	Saves all images currently displayed in each of the 4 MPR Series Viewports as a single key image.
Create MPR Series	Lets you create a physical set of DICOM images that represent the MPR images displayed in the Viewport (this option will only be available for Series Viewports that are currently linked to the Rendered Volume Viewport). A dialog window will appear that will let you crop the size of the region to be saved, if desired. The saved MPR series will then be available from within the Patient Record and the Merge PACS Viewer as a separate Series.
Link to 3D	Toggles the Link to 3D tool, described in paragraph d above, on and off for this viewport.
Decrease Slab Thickness	Decreases the width of the slab currently displayed in the Rendered Volume Viewport by a small increment.
Increase Slab Thickness	Increases the width of the slab currently displayed in the Rendered Volume Viewport by a small increment.
Manually Change Slab Thickness	Lets you manually enter a value for the slab thickness, in millimeters.
Save3D Image	Save the image currently displayed in the Series Viewport, together with any user annotations, to your hard drive as a standard jpeg file.
Print 3D Image	Send the image currently displayed in the Series Viewport, together with any user annotations, to a printer.
3D Cine	Turns on the Cine feature to rapidly page through images in a series
Clone Window	Display the contents of the Series Viewport in a new pop-up Series Viewport window.

f. Using the Rotation Controllers

Each of the three orthogonal Series Viewports displays special rotation controllers that allow you to rotate the axes with regard to the other two orthogonal Series Viewports, as in the following example:

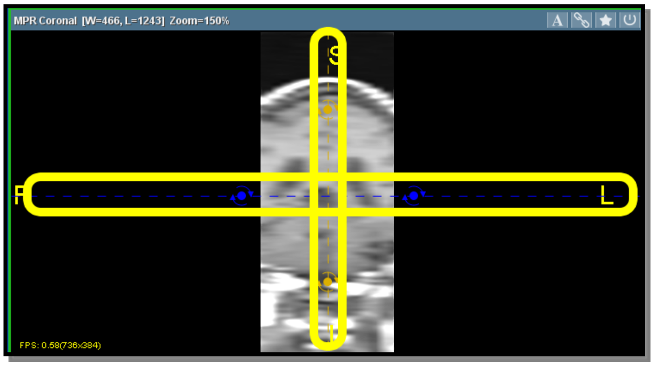


Rotation Controllers

When you place your mouse over one of the controllers, the cursor will change to the Rotation Tool. You can then click and drag the controller to rotate the axes.

g. Using the Cross-reference Controllers

Each of the three orthogonal Series Viewports displays special dotted lines to represent the cross-reference points with the other orthogonal views as well as the 3D rendered volume, as in the following example:



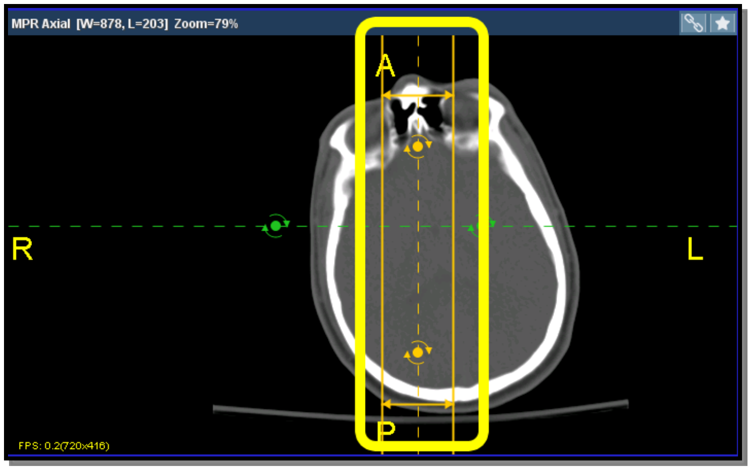
Cross-reference Controllers

You can place your mouse directly over any of the lines and then drag the line to a new location. This will update the corresponding views in the other Series Viewports.

NOTE: You can click on the 3D Viewport while holding the **Shift** key to shoot a ray into the volume, and the target will be the new 3D point with all cross-reference lines updated to this point.

h. Using the Slab Controllers

When the slab controllers have been enabled for one or more orthogonal Series Viewports, as described above, they will be displayed as in the following example:



Cross-reference Controllers

You can place your mouse directly over either of the two solid lines that make up the controller and then drag the line to increase or decrease the width of the slab.

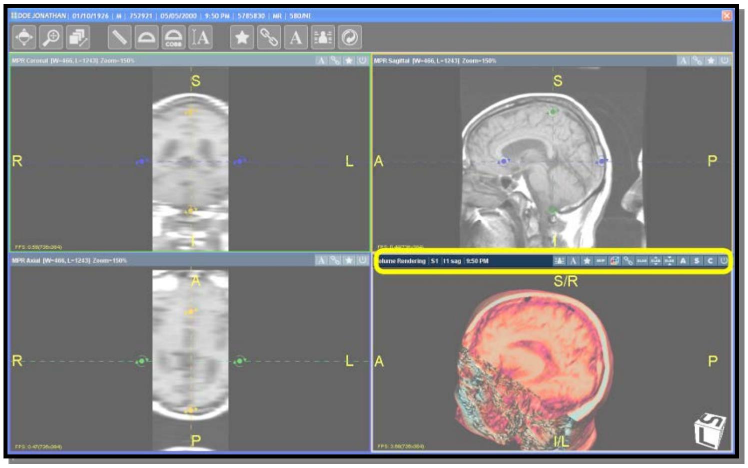
i. Creating Oblique Views

The standard orthogonal views (Axial, Sagittal and Coronal) are each 90 degrees from the original Series along one axis. A non-orthogonal view (*i.e.*, one that is not 90 degrees from the original) is known as an **oblique** view and can be created in one of two ways:

Type of Oblique	Description
Single Oblique	A single oblique is a standard plane that is rotated around one axis. It is created by manipulating a plane in only one of the orthogonal Series Viewports, thus directly affecting the reconstruction in the other Series Viewports. The Rendered Volume Viewport will also show the corresponding reconstruction of the same view, but using MIP or CVR display mode.
Double Oblique	A double oblique is a standard plane that is rotated around two axes. It is created by first manipulating a plane in one orthogonal Series Viewport and then selecting a separate plane on another orthogonal Series Viewport. The third orthogonal Series Viewport will then be reconstructed based on the manipulation of the first two. The Rendered Volume Viewport will also show the corresponding reconstruction of the same view, but using MIP or CVR display mode.

j. Rendered Volume Series Toolbar

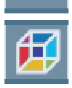
At the top of the **Rendered Volume Viewport** is the **Rendered Volume Series Toolbar**, as shown in the following example:



Rendered Volume Series Toolbars

The Rendered Volume Series Toolbar displays information for the Series in the Rendered Volume Viewport as well as various tools that apply to that Viewport:

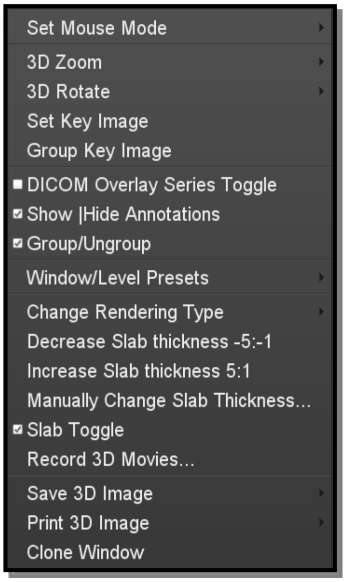
- The left side of the Rendered Volume Series Toolbar displays the following information about the Series within the Rendered Volume Viewport, where available:
    - **Percentage through the Volume** (except for **CVR**)
    - **Series Number**
    - **Series Description**
    - **Series Time**
- The right side of the Rendered Volume Series Toolbar displays the available tools that apply to the Rendered Volume Viewport. The actual tools that appear will depend on how you have configured the Toolbar, as described below:

Tool	Name	General Description
	**Toggle DICOM Overlay**	Toggles the DICOM Overlay display on and off for this Series Viewport.
	**Toggle Annotations**	Toggles the display of any existing annotations on and off.
	**Toggle Reference Lines**	Toggles the display of Cross-reference Lines on and off for this Series Viewport.
	**Set Key Image**	Marks the image currently displayed in the Series Viewport as a key image and launches the Key Image Viewport in a separate pop-up window.
	**Show MIP**	Displays the rendered volume as a Maximum Intensity Projection (MIP).
	**Show CVR**	Displays the rendered volume using Color Volume rendering (CVR).

Tool	Name	General Description
	**Link to 3D**	Lets you link this Series Viewport with the three Orthogonal Viewports. When this tool is selected, rotating the Series in this Viewport will cause the Series in the three Orthogonal Viewports to rotate in a corresponding fashion.
	**Slab Toggle**	Toggles slab mode on and off. When turned on, slab controllers that let you change the slab thickness with the mouse are displayed in the orthogonal Series Viewports corresponding to the orientations not currently displayed in the Rendered Volume Viewport (*e.g.*, if the Rendered Volume Viewport is currently displaying an Axial orientation, the slab controllers will be enabled in the Sagittal and Coronal orthogonal Series Viewports).
	**Increase Slab Thickness**	Decreases the width of the slab currently displayed in the Rendered Volume Viewport by a small increment.
	**Decrease Slab Thickness**	Increases the width of the slab currently displayed in the Rendered Volume Viewport by a small increment.
	**Axial Orientation**	Changes the rendered volume in the Rendered Volume Viewport to an Axial orientation.
	**Sagittal Orientation**	Changes the rendered volume in the Rendered Volume Viewport to a Sagittal orientation.
	**Coronal Orientation**	Changes the rendered volume in the Rendered Volume Viewport to a Coronal orientation.
	**Reset**	Resets this Series Viewport to its default settings.

- Right-clicking on the Series Information section of the Rendered Volume Series Toolbar will immediately cause the **Rendered Volume Series Toolbar Right-click Menu** to pop-up. The Rendered Volume Series Toolbar Right-click Menu lets you select which of the available tools you would like to appear on the Rendered Volume Series Toolbar itself, as well select whether you want the tool buttons to always appear, never appear, or only appear when the Series Viewport is active.

k. Rendered Volume Series Right-click Menu



The Rendered Volume Series Right-click Menu

Right-clicking on the Rendered Volume Viewport and holding the mouse button down for a few seconds will bring up the **Rendered Volume Series Right-click Menu**, as shown in the example to the left.

The Rendered Volume Series Right-click Menu contains a variety of additional navigation, layout, and image manipulation options, as well as the ability to save and print an image. Some of the options available on the Right-click Menu are also available elsewhere in the Rendered Volume Viewport and are included here for your convenience.

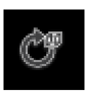
The Rendered Volume Series Right-click Menu has the following possible options:

Option	General Description
Set Mouse Mode	Lets you select one of the following tools (note that your mouse cursor will change to reflect the chosen tool): **Rotate** · **Probe** **Page** · **ROI** **Window/Level** · **Line Measurement** **Zoom/Pan Combo** · **Angle Measurement** **Pan** · **Cobb Angle** **Zoom** · **Text Annotation** **Auto Skim** · **Arrow Annotation**
Zoom	Selects a magnification level for the images in the selected Series Viewport, including “center and fill.”
3D Orientation	Temporarily change the orientation of the selected image (flip horizontal, flip vertical, rotate 90 degrees, etc.)

Option	General Description
Set Key Image	Flag the selected image as a “key image” for later reference and launches the Key Image Viewport in a separate pop-up window.
Group Key Image	Saves all images currently displayed in each of the 4 MPR Series Viewports as a single key image.
DICOM Overlay Toggle	Toggles the DICOM Overlay display on and off for this Series Viewport.
Show | Hide Annotations	Toggles the display of any existing annotations on and off for this Series Viewport.
Slab Toggle	Toggles slab mode on and off. When turned on, slab controllers that let you change the slab thickness with the mouse are displayed in the orthogonal Series Viewports corresponding to the orientations not currently displayed in the Rendered Volume Viewport (*e.g.*, if the Rendered Volume Viewport is currently displaying an Axial orientation, the slab controllers will be enabled in the Sagittal and Coronal orthogonal Series Viewports).
Group/Ungroup	Lets you manually link multiple Series Viewports together for display purposes.
Show Full MIP Volume	Sets the current MIP mode to **full volume** mode. This will display and let you rotate the entire volume instead of just a plane within the volume. Note that this option will automatically be turned off if you manually turn on **slab mode** (either from the right-click menu or the toolbar) or enter **CVR mode**.
Window/Level Presets (Color Presets)	Choose a window/level option, if available, for the rendered volume. Note that if Color Volume Rendering is in use, this option will let you select from a variety of color presets instead.
Change Rendering Type	Lets you change how the rendered volume in the Rendered Volume Viewport is generated. The following options are available: • **CVR** • **MIP** • **Spinning MIP (PET Series Only)** • **Average Intensity Projection** • **Faded MIP** • **Minimum Intensity Projection**
Decrease Slab Thickness	Decreases the width of the slab currently displayed in the Rendered Volume Viewport by a small increment.
Increase Slab Thickness	Increases the width of the slab currently displayed in the Rendered Volume Viewport by a small increment.
Manually Change Slab Thickness	Lets you manually enter a value for the slab thickness, in millimeters.

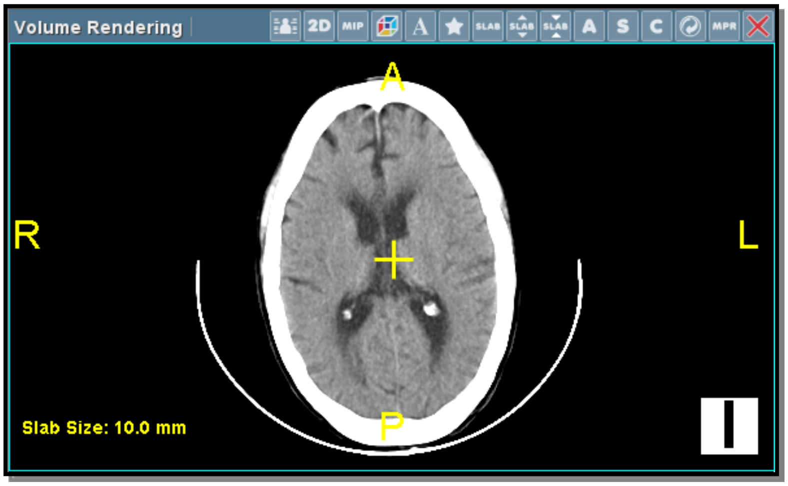
Option	General Description
Record 3D Movies	Lets you record a sequence of steps that includes the transformation and Series Viewport settings for each frame. When this option is selected a special **Record 3D Movies** dialog will be displayed. You can then transform the Series displayed in the Rendered Volume Viewport with the various available tools. When finished, click the **Stop** icon within the Record 3D Movies dialog and then click the **Save** icon to save the sequence. Once saved, the 3D movie will be available from within the Patient Record and the Merge PACS Viewer as a separate Series.
Create MPR Series	Lets you create a physical set of DICOM images that represent the MPR images displayed in the Viewport. A dialog window will appear that will let you crop the size of the region to be saved, if desired. The saved MPR series will then be available from within the Patient Record and the Merge PACS Viewer as a separate Series.
Save Image	Save the image currently displayed in the Series Viewport, together with any user annotations, to your hard drive as a standard jpeg file.
Print Image	Send the image currently displayed in the Series Viewport, together with any user annotations, to a printer.
Clone Window	Display the contents of the Series Viewport in a new pop-up Series Viewport window.

I. Rotating the Rendered Volume



Unlike the three orthogonal Series Viewports that have special rotation controllers displayed on the screen, rotation of the Rendered Volume is done via the **Rotate** mouse mode. When selected, your mouse cursor will change to the rotate icon displayed on the left.

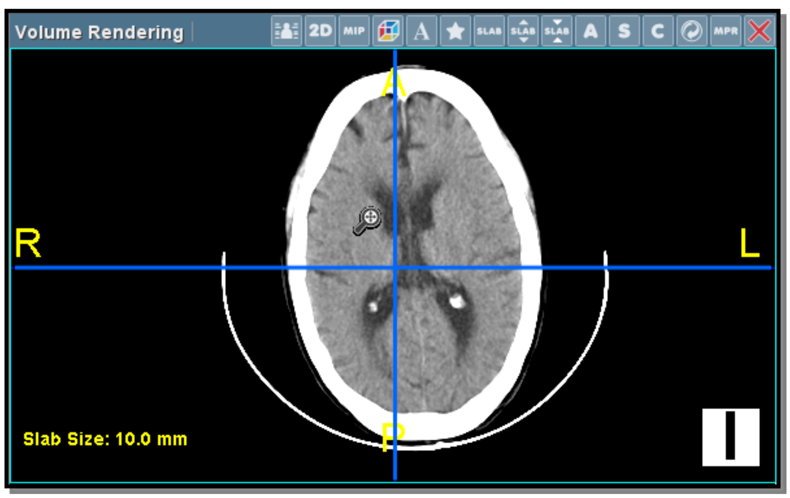
Once you have selected the Rotate mouse mode, click and drag the mouse cursor in any direction over the rendered volume to rotate the volume along and of the three axes. Note that center of rotation will always be the center of the viewport, which is indicated by small yellow crosshairs, as in the following example (exaggerated for viewability):



Center of Rotation / Viewport

m. Panning the Rendered Volume

When using the Zoom/Pan Combo tool (as shown on the left) to pan the rendered volume, thin blue crosshairs will be displayed while panning to show the center of the viewport, as in the following example (exaggerated for viewability):



Panning Crosshairs

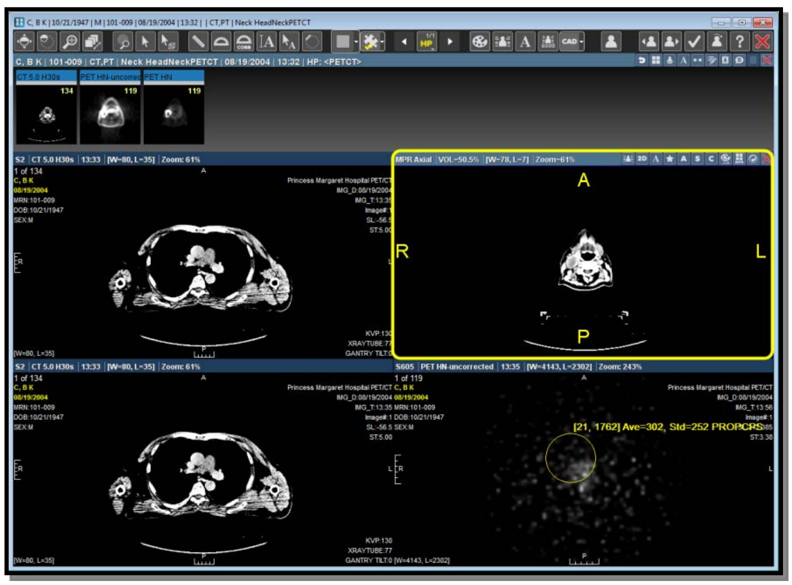
4.7.2. One-click MPR

Multi-Planar Reconstruction (MPR) Series can also be displayed within the standard viewports as opposed to a separate stand-alone MPR window. When this feature is activated, each available view (Axial, Coronal or Sagittal) can be displayed separately in its own MPR Viewport. This single-view MPR can be displayed either within an existing standard viewport or as a separate pop-up single-view MPR Viewport.

NOTE: Image Fusion, described in subsection 4.7.3 below, can only be performed within a single-view MPR Viewport in an existing standard viewport and not in a separate pop-up single-view MPR Viewport.

a. Displaying a Single MPR View within a Standard Viewport

A single MPR view can be displayed within the Merge PACS Viewer by converting a standard Series Viewport into a special MPR Viewport, as in the following example:



Rendered Volume Viewport

This special MPR Viewport can be invoked in any of the following ways:

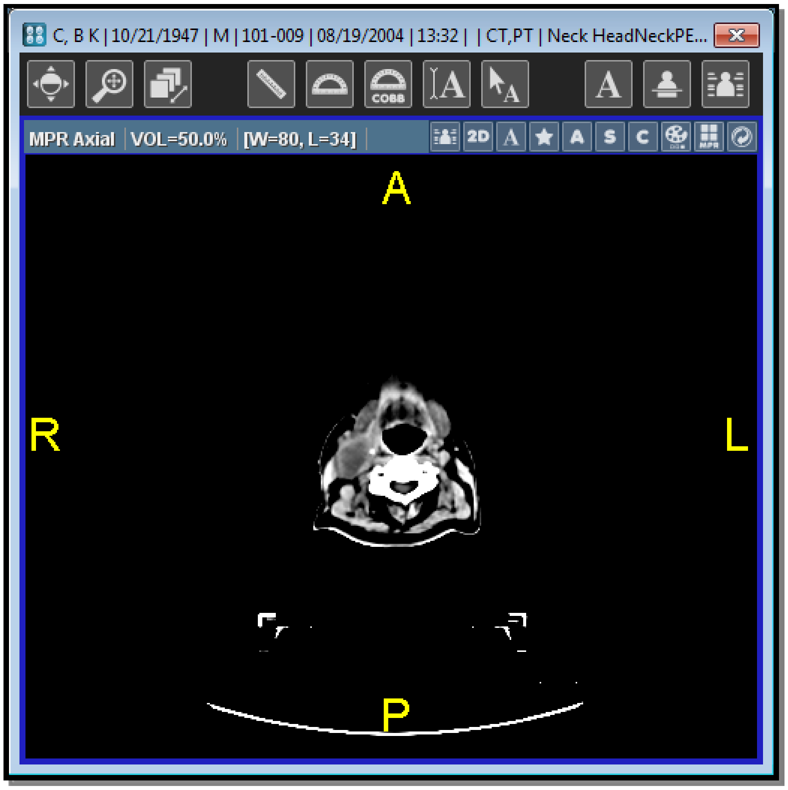
Clicking on the **One-click MPR** icon on the **Series Toolbar**, as described in subsection 4.1.5, above, and shown on the left.

NOTE: When you click on the One-click MPR icon, The Merge PACS Viewer will automatically determine what view (Axial, Coronal or Sagittal) should be displayed by default, but the view can be changed with toolbar buttons described below.

- Selecting **Axial MPR**, **Sagittal MPR**, or **Coronal MPR** from the **3D** sub-menu of the **Series Right-click Menu**, as described in subsection 4.1.5, above.

b. Displaying a Single MPR View in a Separate MIP Viewport

A single MPR view can also be displayed in a separate stand-alone pop-up 3D window, as in the following example:



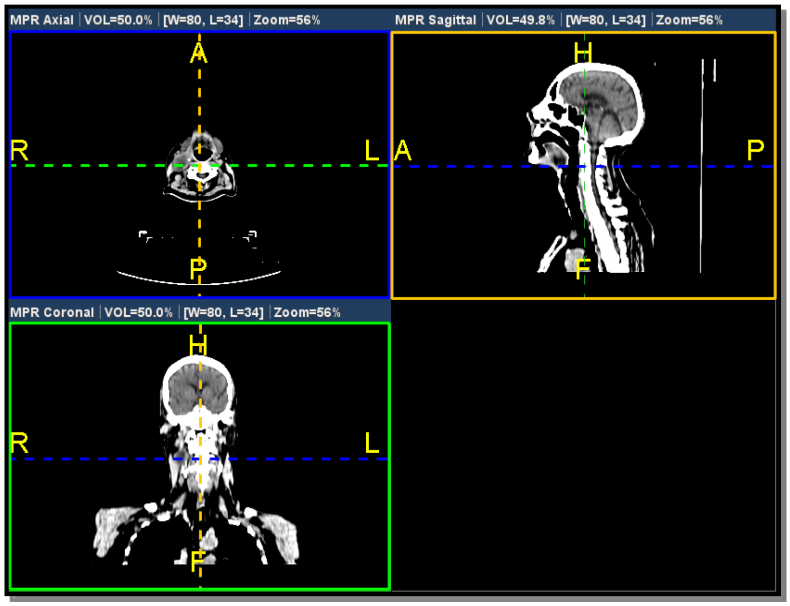
Stand-alone Rendered Volume Viewport

This pop-up single MPR Viewport can be invoked in any of the following ways:

- Selecting **Axial MPR**, **Sagittal MPR**, or **Coronal MPR** from the Primary and Prior Exam **Series Navigation Thumbnail Right-click Menus** at the **Patient Record**, as described in subsections Note: and Note: above.
- Selecting **Axial MPR**, **Sagittal MPR**, or **Coronal MPR** from the **Series Thumbnail Right-Click Menu**, as described in subsection 4.1.4 above.

c. Color Coding of MPR Viewports

Each MPR Viewport, whether standard or stand-alone, will have a colored border that indicates what type of view (Axial, Sagittal or Coronal) is displayed within that Viewport, as shown in the following example (colors exaggerated for emphasis):

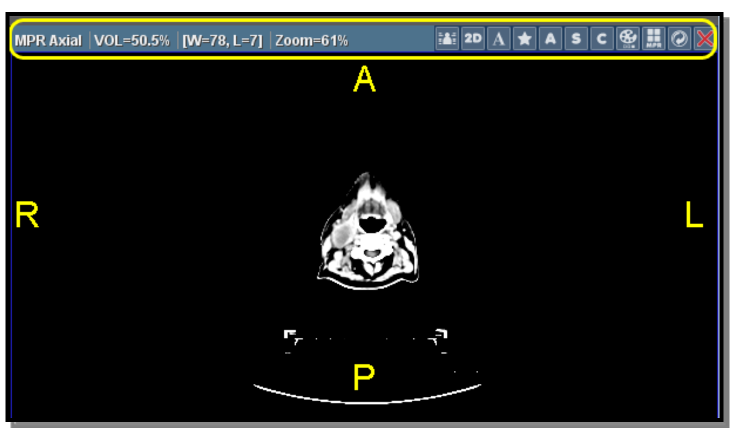


Color-coded MPR Viewports

Note that cross reference lines, if any, will also be color-coded to match the viewport to which they are referencing.

d. The MPR Viewport Toolbar

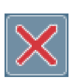
At the top of the MPR Viewport is the **MPR Viewport Toolbar**, as shown in the following example:



MPR Viewport Toolbar

The **MPR Viewport Toolbar** displays information for the Series in the MPR Viewport as well as various tools that apply to that Viewport:

- The left side of the MPR Viewport Toolbar displays the following information about the Series within the Viewport, where available:
  - **Type of View**
  - **Percentage through the Volume**
  - **Window/Level**
  - **Zoom Factor**
- The right side of the MPR Viewport Toolbar displays the available tools that apply to the Viewport. The actual tools that appear will depend on how you have configured the Toolbar, as described below.

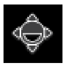
Tool	Name	General Description
	**Registration Toggle**	Lets you manually align the series displayed in a fused MPR Viewport, as described in subsection 4.7.3 below.
	**Toggle DICOM Overlay**	Toggles the DICOM Overlay display on and off for the Viewport.
	**2D Mode**	Reset the view to standard 2D mode.
	**Toggle Annotations**	Toggles the display of any existing annotations on and off.
	**Set Key Image**	Marks the image currently displayed in the Viewport as a key image and launches the Key Image Viewport in a separate pop-up window.
	**Axial Orientation**	Changes the MPR image to the Axial orientation.
	**Sagittal Orientation**	Changes the MPR image to the Sagittal orientation.
	**Coronal Orientation**	Changes the MPR image to the Coronal orientation.
	**Color Map Select**	Displays a drop-down list of available color map options that can be applied to this series.
	**3D Create MPR Slab View**	Creates a separate Multi-Planar Reconstruction (MPR) Series Viewport for this Series.
	**Reset**	Resets this Series Viewport to its default settings.
	**Clear Series Window**	Clears this Viewport completely.

- Right-clicking on the Series Information section of the MPR Viewport Toolbar will immediately cause the **MPR Viewport Toolbar Right-click Menu** to pop-up. This lets you select which of the available tools you would like to appear on the MPR Viewport Toolbar itself, as well as select whether you want the tool buttons to always appear, never appear, or only appear when the MPR Viewport is active.

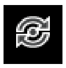
e. Available Mouse Modes

Repeatedly right-clicking on an image within the MPR Viewport will toggle the cursor among the following commonly used 3D mouse modes:

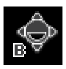
 **Page**

 **Window/Level (Except for Image Fusion)**

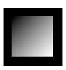
 **Pan/Zoom**

 **Rotate**

 **Line Measurement**

 **Base Window/Level (Image Fusion Only)**

 **Overlay Window/Level (Image Fusion Only)**

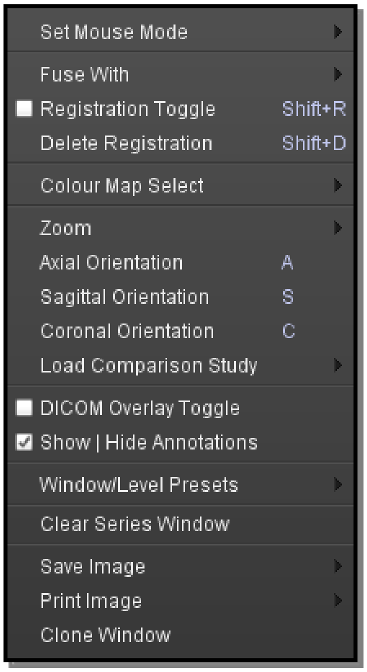
 **Fusion Blending (Image Fusion Only)**

NOTE: The available mouse modes, as well as the order in which they appear, can be customized for different modalities, as described in Section 25.12 below.

NOTE: This feature can be disabled by **deselecting** the **Delayed Right Click** option in the User Preferences Menu, as described in Section 25.11, below. If the feature is disabled (or if you hold down the right mouse button on an image instead of briefly clicking), the **MPR Viewport Right-click Menu** will be displayed instead, as described in paragraph f below.

These mouse modes are also available, along with additional mouse modes, via the MPR Viewport Right-click Menu, as described in paragraph 4.7.2.f below.

f. MPR Viewport Right-click Menu



MPR Viewport Right-click Menu

Right-clicking on the MPR Viewport and holding the mouse button down for a few seconds will bring up the **MPR Viewport Right-click Menu**, as shown in the example to the left.

The MPR Viewport Right-click Menu contains a variety of additional navigation, layout, and image manipulation options, as well as the ability to save and print an image. Some of the options available on the Right-click Menu are also available elsewhere in the MPR Viewport and are included here for your convenience.

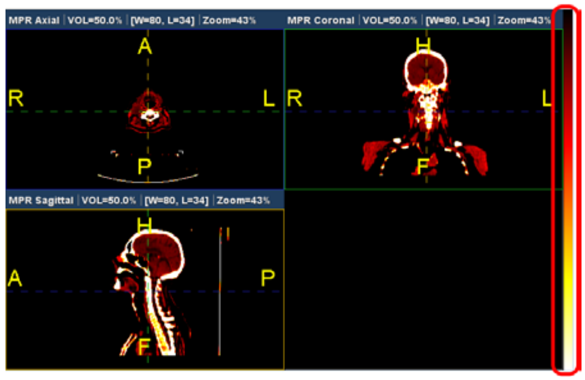
The MPR Viewport Right-click Menu has the following possible options:

Option	General Description
Set Mouse Mode	Lets you select one of the following tools (note that your mouse cursor will change to reflect the chosen tool): **Page** **Window/Level** **Base W/L** (Image Fusion Only) **Overlay W/L** (Image Fusion Only) **Zoom/Pan Combo** **Pan** **Zoom** **Rotate** **Fusion Blending** (Image Fusion Only) **Auto Skim** **Probe** **ROI** **Line Measurement** **Angle Measurement** **Cobb Angle** **Text Annotation** **Arrow Annotation**

Option	General Description
Fuse With	Lets you select from a list of available series that can be fused with this series. See subsection subsection 4.7.3 below for more information.
Registration Toggle	Lets you manually align fused series. See subsection 4.7.3 below for more information.
Delete Registration	Lets you undo any manual alignment of fused series and revert to the default alignment. See subsection 4.7.3 below for more information.
Color Map Select	Lets you select from a list of color mapping options for the selected series.
Zoom	Selects a magnification level for the images in the selected Series Viewport, including “center and fill.”
3D Orientation	Temporarily change the orientation of the selected image (flip horizontal, flip vertical, rotate 90 degrees, etc.)
Axial Orientation	Lets you manually select to display the axial orientation view of the series in this Viewport.
Sagittal Orientation	Lets you manually select to display the sagittal orientation view of the series in this Viewport.
Coronal Orientation	Lets you manually select to display the coronal orientation view of the series in this Viewport.
Load Comparison Study	Lets you select from a list of available comparison studies that can be opened within the Merge PACS Viewer alongside the currently open study or studies.
DICOM Overlay Series Toggle	Toggles the DICOM Overlay display on and off for this Series Viewport.
Show | Hide Annotations	Toggles the display of any existing annotations on and off for this Series Viewport.
Window/Level Presets	Choose a window/level option, if available.
Clear Series Window	Clears this Series Viewport completely.
Save Image	Saves the image currently displayed in the Series Viewport, together with any user annotations, to your hard drive as a standard jpeg file.
Print Image	Sends the image currently displayed in the Series Viewport, together with any user annotations, to a printer.
Clone Window	Displays the contents of the Series Viewport in a new pop-up Series Viewport window. Note that this feature is not available with Image Fusion.

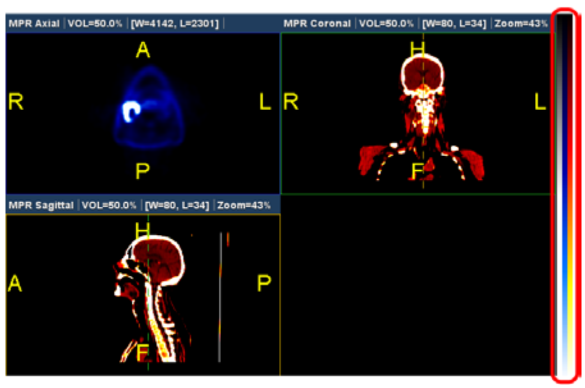
g. MPR Viewport Color Bar

When you select a Color Mapping option for one or more MPR Viewports from the MPR Viewport Toolbar or the MPR Viewport Right-click Menu, a special Color Bar will be shown at the far right side of the main Viewer window that will display the unique color maps (including grayscale) currently being used in all viewports, as in the following example:



MPR Viewport Color Bar

Note that if different MPR Viewports have different color map settings, a separate Color Bar will be displayed for each color map, as in the following example:



MPR Viewport Color Bars

Clicking the **Toggle Color Bar** button on the main **Viewer Toolbar**, as illustrated to the left, will turn the display of the color bars on and off.

NOTE: By default, CT and MR images will be displayed as grayscale (no color map) and PET images will be displayed with a Reverse Grayscale color map.

NOTE: The color bars will show and hide automatically based on whether any non-grayscale color maps are being displayed. When the "Toggle Color Bar" button is activated, however, the color bars will remain shown or hidden until the button is deactivated again and will not go back to the automatic mode until a new study is loaded.

4.7.3. Image Fusion

Image Fusion provides you with a way to overlay/blend two image objects. The primary use is with 3D image sets such as those from CT, PET and MR modalities. The fused images may be of the same or different modality types. The most commonly cited and simplest example is that of PET-CT fusion.

The fused images may come from a common frame of reference where they are gathered in a single study on a single machine (such as PET-CT) or they may be from a non-common frame of reference where they were performed as two separate studies at different times.

With Image Fusion, the series that was originally in the viewport is referred to as the "Base" series and the series added to the viewport is referred to as the "Overlay" series.

NOTE: Image Fusion can only be performed within a single-view MPR Viewport in an existing standard viewport, as described in subsection 4.7.2 above, and there are certain features and tools that are only be available during Image Fusion.

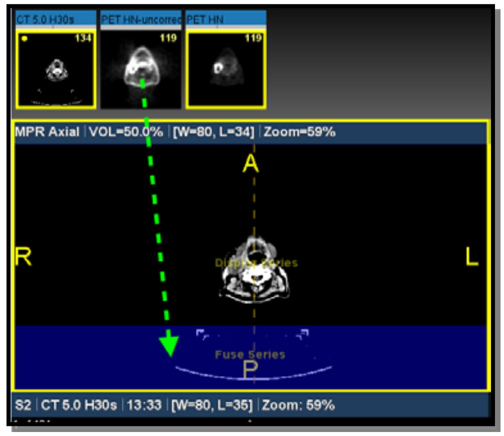
a. Initiating Image Fusion

Once you have loaded a series into a single-view MPR Viewport, as described in subsection 4.7.2 above, you can fuse another series into that viewport in one of three ways:

- Select **Fuse With** from the MPR Viewport Right-click Menu, as described in subsection 4.7.2 above, and select the series from the list of available options, as in the following example:

Selecting a Series to Fuse With

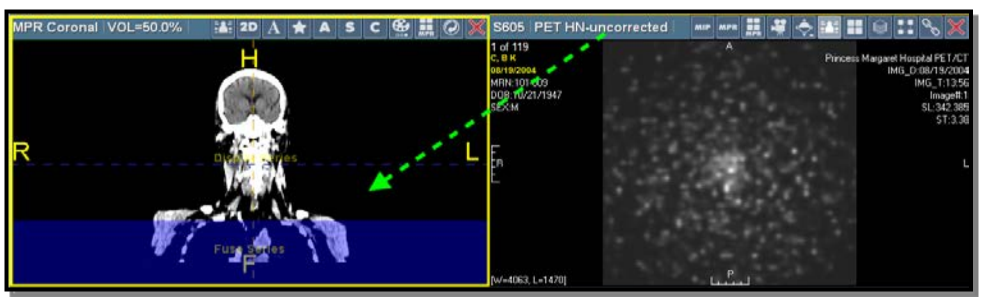
- Drag and drop the **Series Navigation Thumbnail** for the desired series into the **bottom** section of the MPR Viewport, as in the following example:



Selecting a Series to Fuse With

  - If you drag the Thumbnail into the top section, it will simply replace the series currently displayed with the new series.
  - When dragging, be sure to click on the **central** portion of the Thumbnail, as shown above, and not the status bar at the top of the Thumbnail.

- Drag and drop the desired series from another Series Viewport into the MPR Viewport, as in the following example:

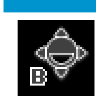


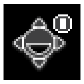
Selecting a Series to Fuse With

  - You can drag and drop the series into **any** part of the MPR Viewport.
  - When dragging, be sure to click on the **Series Toolbar** portion, as shown above.

b. Image Fusion Window/Level Options

While in Image Fusion Mode, two special window/level mouse modes will be available, both from the **MPR Viewport Right-click Menu** and by repeatedly right-clicking on an image to cycle through the available mouse modes:

Mode	Name	General Description
	**Base Window/Level**	Lets you adjust the Window and Level of the base series.

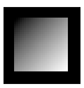
Mode	Name	General Description
	**Overlay Window/Level**	Lets you adjust the Window and Level of the overlay series.

NOTE: Press and hold the **Alt** key while using one of the two W/L mouse modes to temporarily switch to the other W/L mouse mode until the Alt key is released.

Any Window/Level changes made to the base or overlay series in the fused MPR Viewport will apply to the modified series in any other MPR viewport that contains the series that was changed.

Similarly, any Window/Level changes made to a series in another MPR Viewport will apply to the modified series within the fused MPR Viewport.

c. Image Fusion Blending



By default, both the base series and the overlay series in a fused MPR Viewport are displayed at 50% opacity. This can be adjusted, however, by selecting the **Fusion Blending** mouse mode, either from the MPR Viewport Right-click Menu or by repeatedly right-clicking on an image to cycle through the available mouse modes.

Once the Fusion Blending mouse mode has been selected, click and drag the cursor from the bottom of the fused MPR Viewport to the top in order to increase the opacity of the **base** series (once you reach the top of the Viewport, only the base series should be visible).

Alternatively, you can click and drag the cursor from the top of the fused MPR Viewport to the bottom in order to increase the opacity of the **overlay** series (once you reach the bottom of the Viewport, only the overlay series should be visible).

d. Image Fusion Registration

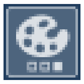
By default, the **Page Images**, **Pan** and **Rotation** tools will affect both the base and the overlay series simultaneously. Registration Mode, however, will let you affect just the overlay series with these tools in order to manually align the overlay with the base series. It can be turned on either by clicking the **Registration Toggle tool** on the **MPR Viewport Toolbar**, as shown to the left, or by selecting **Registration Toggle** from the **MPR Viewport Right-click Menu**.

Registration Mode will be turned **off** by default for series with a **common frame of reference**. These are generally acquired on a single device in a single session (e.g. a PET/CT scanner) and will be automatically aligned when displayed together in a fused MPR Viewport.

Registration Mode will be turned **on** by default for series with a **non-common frame of reference**. These series will be initially displayed in a fused MPR Viewport as closely aligned as possible without needing to analyze pixel data and the overlaid series shall be scaled to match the size of the base series. When you are satisfied with the alignment of the fused series, be sure to turn Registration Mode off before attempting to use the Page Images, Pan or Rotation tools.

If you change the alignment by mistake or otherwise wish to revert to the default alignment settings, select **Delete Registration** from the **MPR Viewport Right-click Menu**.

e. Selecting Color Maps for Fused Images



While in Image Fusion Mode, you can select a color map for the base and overlay series independently by clicking on the **Color Map Select** tool on the MPR Viewport Toolbar, as shown on the left, or by selecting **Color Map Select** from the **MPR Viewport Right-click Menu**.

In each case, you will be shown a submenu with an entry for each of the two series, as in the following example:

Color Map Options for Fused Series

Click on the desired series to select from the full list of available color map options for that series.

NOTE: By default, CT/MR series will be displayed in grayscale and NM/PT series will be displayed with Hot Iron.

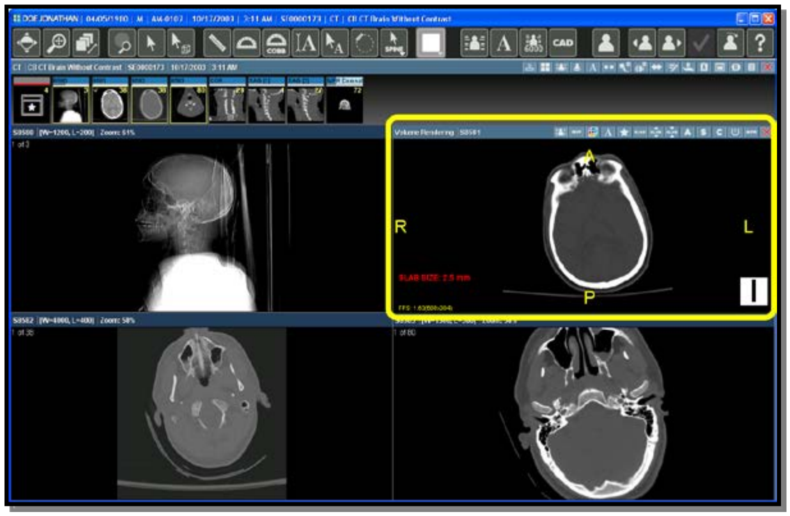
4.7.4. One-click MIP

Maximum Intensity Projection (MIP) is typically used with contrast-enhanced images to maximize the visualization of vasculature. A MIP is created by combining a series of slices with display of the brightest pixel on any slice at each location.

A MIP can be displayed as a 3D Rendered Volume either within a standard viewport or in a separate pop-up MIP Viewport.

a. Viewing a MIP Rendered Volume within a Standard Viewport

A MIP 3D Rendered Volume can be displayed within the Merge PACS Viewer by converting a standard Series Viewport into a special Rendered Volume Viewport, as in the following example:



Rendered Volume Viewport

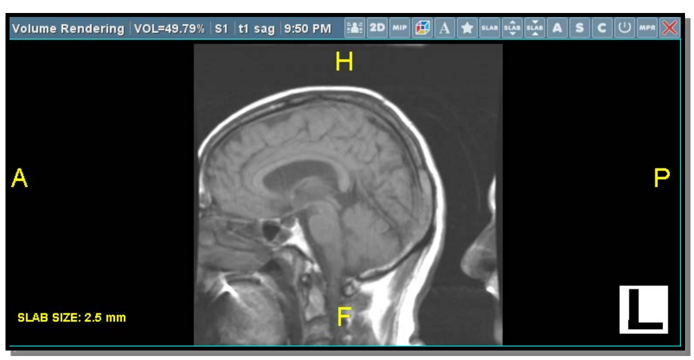
This special MIP Viewport can be invoked in either of the following ways:

Clicking on the **One-click MIP** icon on the **Series Toolbar**, as described in subsection 4.1.5, above, and shown on the left.

- Selecting **Axial MIP**, **Sagittal MIP**, **Coronal MIP** or **3D Volume** from the **3D** sub-menu of the **Series Right-click Menu**, as described in subsection 4.1.5, above.

b. Viewing a MIP 3D Rendered Volume in a Separate MIP Viewport

A MIP 3D Rendered Volume can also be displayed in a separate stand-alone pop-up 3D window, as in the following example:



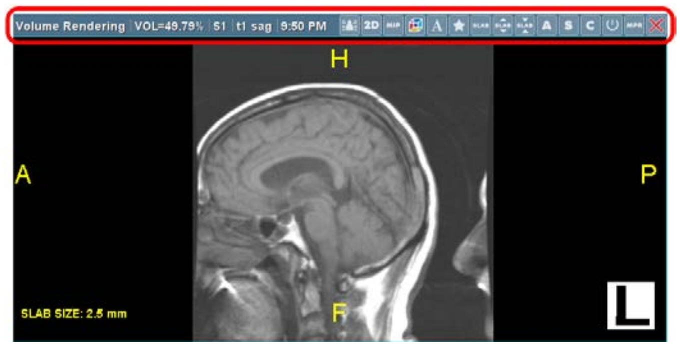
Standalone Rendered Volume Viewport

This pop-up MIP 3D Rendered Volume Viewport can be invoked in any of the following ways:

- Selecting **3D CVR Volume**, **Sagittal MIP**, **Coronal MIP** or **Axial MIP** from the Primary and Prior Exam **Series Navigation Thumbnail Right-click Menus** at the **Patient Record**, as described in subsections Note: and Note: above.
- Selecting **3D CVR Volume**, **Sagittal MIP**, **Coronal MIP** or **Axial MIP** from the **Series Thumbnail Right-Click Menu**, as described in subsection 4.1.4 above.

c. The MIP Viewport Toolbar

At the top of the MIP Viewport is the **MIP Viewport Toolbar**, as shown in the following example:



MIP Viewport Toolbar

The **MIP Viewport Toolbar** displays information for the Series in the MIP Viewport as well as various tools that apply to that Viewport:

- The left side of the MIP Viewport Toolbar displays the following information about the Series within the Viewport, where available:
  - **Percentage through the Volume** (**MIP** Only)
  - **Series Number**
  - **Series Description**
  - **Series Time**
- The right side of the MIP Viewport Toolbar displays the available tools that apply to the Viewport. The actual tools that appear will depend on how you have configured the Toolbar, as described below.

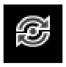
Tool	Name	General Description
	**Toggle DICOM Overlay**	Toggles the DICOM Overlay display on and off for the Viewport.
	**2D Mode**	Reset the view to standard 2D mode.
	**Show MIP**	Displays the rendered volume as a Maximum Intensity Projection (MIP).

Tool	Name	General Description
	Spinning MIP	Displays the Series as a rotating Maximum Intensity Projection rendered volume in a head-to-foot orientation (PET Series only), as described in subsection 4.7.5 below.
	Show CVR	Displays the rendered volume using Color Volume rendering (CVR).
	Toggle Annotations	Toggles the display of any existing annotations on and off.
	Set Key Image	Marks the image currently displayed in the Viewport as a key image and launches the Key Image Viewport in a separate pop-up window.
	Slab Toggle	Toggles slab mode on and off.
	Increase Slab Thickness	Decreases the width of the slab currently displayed in the Rendered Volume Viewport by a small increment.
	Decrease Slab Thickness	Increases the width of the slab currently displayed in the Rendered Volume Viewport by a small increment.
	Axial Orientation	Changes the rendered volume in the Rendered Volume Viewport to an Axial orientation.
	Sagittal Orientation	Changes the rendered volume in the Rendered Volume Viewport to a Sagittal orientation.
	Coronal Orientation	Changes the rendered volume in the Rendered Volume Viewport to a Coronal orientation.
	Reset	Resets this Series Viewport to its default settings.
	3D Create MPR Slab View	Creates a separate Multi-Planar Reconstruction (MPR) Series Viewport for this Series.
	Clear Series Window	Clears this Viewport completely (does not apply to the pop-up Rendered Volume Viewport).

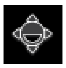
- Right-clicking on the Series Information section of the MIP Viewport Toolbar will immediately cause the **MIP Viewport Toolbar Right-click Menu** to pop-up. This lets you select which of the available tools you would like to appear on the MIP Viewport Toolbar itself, as well as select whether you want the tool buttons to always appear, never appear, or only appear when the MIP Viewport is active.

d. Available Mouse Modes

Repeatedly right-clicking on an image within the MIP Viewport will toggle the cursor among the following commonly used 3D mouse modes:

 **Rotate**

 **Page**

 **Window/Level**

 **Pan/Zoom**

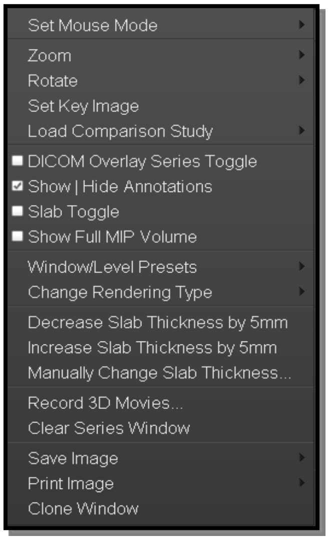
 **Line Measurement**

NOTE: The available mouse modes, as well as the order in which they appear, can be customized for different modalities, as described in Section 25.12 below.

NOTE: This feature can be disabled by **deselecting** the **Delayed Right Click** option in the User Preferences Menu, as described in Section 25.11, below. If the feature is disabled (or if you hold down the right mouse button on an image instead of briefly clicking), the **MIP Viewport Right-click Menu** will be displayed instead, as described in paragraph e, below.

These mouse modes are also available, along with additional mouse modes, via the Rendered Volume Series Right-click Menu, as described in paragraph e, below.

e. MIP Viewport Right-click Menu



MIP Viewport Right-click Menu

Right-clicking on the MIP Viewport and holding the mouse button down for a few seconds will bring up the **MIP Viewport Right-click Menu**, as shown in the example to the left.

The MIP Viewport Right-click Menu contains a variety of additional navigation, layout, and image manipulation options, as well as the ability to save and print an image. Some of the options available on the Right-click Menu are also available elsewhere in the MIP Viewport and are included here for your convenience.

The MIP Viewport Right-click Menu has the following possible options:

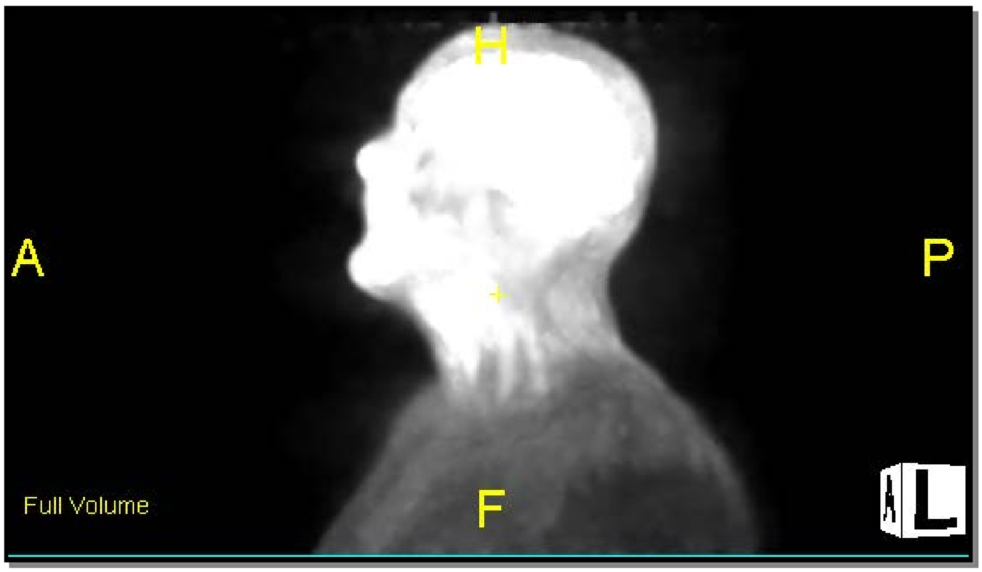
Option	General Description
Set Mouse Mode	Lets you select one of the following tools (note that your mouse cursor will change to reflect the chosen tool): **Page** · **Probe** **Window/Level** · **ROI** **MPR Slab** · **Line Measurement** **Zoom/Pan Combo** · **Angle Measurement** **Pan** · **Cobb Angle** **Zoom** · **Text Annotation** **Auto Skim** · **Arrow Annotation**
Zoom	Selects a magnification level for the images in the selected Series Viewport, including “center and fill.”
3D Orientation	Temporarily change the orientation of the selected image (flip horizontal, flip vertical, rotate 90 degrees, etc.)
Set Key Image	Flag the selected image as a “key image” for later reference and launches the Key Image Viewport in a separate pop-up window.

Option	General Description
Load Comparison Study	Lets you select from a list of available comparison studies that can be opened within the Merge PACS Viewer alongside the currently open study or studies.
DICOM Overlay Series Toggle	Toggles the DICOM Overlay display on and off for this Series Viewport.
Show | Hide Annotations	Toggles the display of any existing annotations on and off for this Series Viewport.
Slab Toggle	Toggles slab mode on and off.
Show Full MIP Volume	Sets the current MIP mode to **full volume** mode. This will display and let you rotate the entire volume instead of just a plane within the volume. Note that this option will automatically be turned off if you manually turn on **slab mode** (either from the right-click menu or the toolbar) or enter **CVR mode**.
SUV Parameters	Lets you define any missing parameters that are required to calculate SUV values (PET Series only).
Window/Level Presets / Color Presets	Choose a window/level option, if available, for the rendered volume. Note that if Color Volume Rendering is in use, this option will let you select from a variety of color presets instead.
Change Rendering Type	Lets you change how the rendered volume in the Rendered Volume Viewport is generated. The following options are available: • **CVR** • **MIP** • **Spinning MIP (PET Series Only)** • **Average Intensity Projection** • **Faded MIP** • **Minimum Intensity Projection**
Decrease Slab Thickness	Decreases the width of the slab currently displayed in the Rendered Volume Viewport by a small increment.
Increase Slab Thickness	Increases the width of the slab currently displayed in the Rendered Volume Viewport by a small increment.
Manually Change Slab Thickness	Lets you manually enter a value for the slab thickness, in millimeters.
Record 3D Movies	Lets you record a sequence of steps that includes the transformation and Series Viewport settings for each frame. When this option is selected a special **Record 3D Movies** dialog will be displayed. You can then transform the Series displayed in the Rendered Volume Viewport with the various available tools. When finished, click the **Stop** icon within the Record 3D Movies dialog and then click the **Save** icon to save the sequence. Once saved, the 3D movie will be available from within the Patient Record and the Merge PACS Viewer as a separate Series.
Clear Series Window	Clears this Series Viewport completely.
Save Image	Save the image currently displayed in the Series Viewport, together with any user annotations, to your hard drive as a standard jpeg file.
Print Image	Send the image currently displayed in the Series Viewport, together with any user annotations, to a printer.

Option	General Description
Clone Window	Display the contents of the Series Viewport in a new pop-up Series Viewport window.

4.7.5. Spinning MIP View (PET Series Only)

If you are currently viewing a PET Series within a Viewport, clicking on the **Spinning MIP** icon Clicking on the **Series Toolbar** or the **MIP Viewport Toolbar**, as shown on the left, will cause the series to be displayed as a rotating Maximum Intensity Projection rendered volume in a head-to-foot orientation, as in the following example:



Spinning MIP View

NOTE: The Spinning MIP view can also be enabled by selecting Spinning MIP from the **3D** submenu of the **Series Right-click Menu** or the **Change Rendering Type** submenu of the MIP Viewport Right-click Menu

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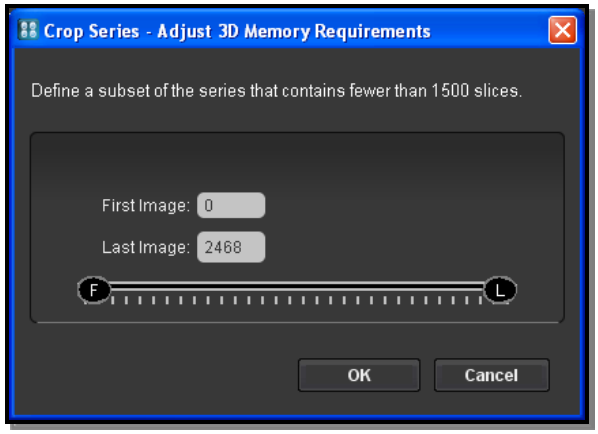
Repeatedly clicking the **Spinning MIP** tool a second time will toggle the rotation of the MIP on and off.

4.7.6. 3D Cropping

CT Series with more than 1500 slices cannot be loaded as-is into 3D mode on Workstations using 32-bit operating systems. Therefore, you may need to crop series that have more than 1500 slices before being able to view them in 3D mode.

NOTE: This limitation only applies to systems using 32-bit operating systems (as opposed to 64-bit). In addition, setting the user preference **Automatically Split CT Series**, as described in Section 25.2, below, may reduce the need to crop large CT studies.

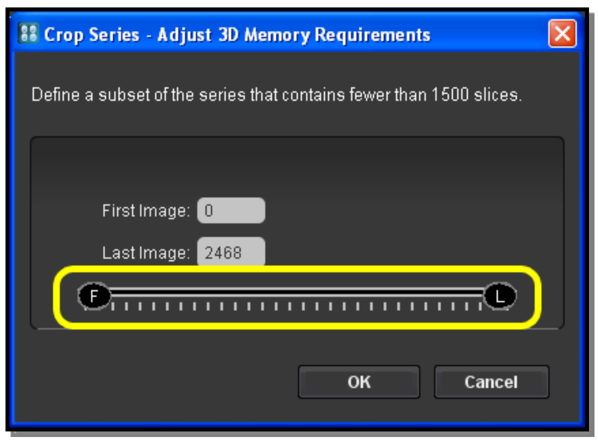
If a CT series needs to be cropped before being loaded into 3D mode, a dialog box such as the one shown below will be displayed when you first attempt to load the series in 3D mode:



3D Cropping Dialog Window

NOTE: The 3D Cropping Dialog Window can also be manually invoked from the Series Right-click Menu, as described in subsection 4.1.5, above.

The bottom half of the window contains a slider to define the subset of images you wish to be included, as seen in the following example:



Defining the Subset Range

To define the subset of images to be loaded into the 3D viewer, move the left slider to the right and/or the right slider to the left with your mouse until the number of slices of required memory drops below 1500. Alternatively, you can manually enter the desired starting and ending image numbers in the boxes to the left of the sliders.

When finished, click on the **OK** button to display the cropped series.

4.8. Viewing Mammography Images

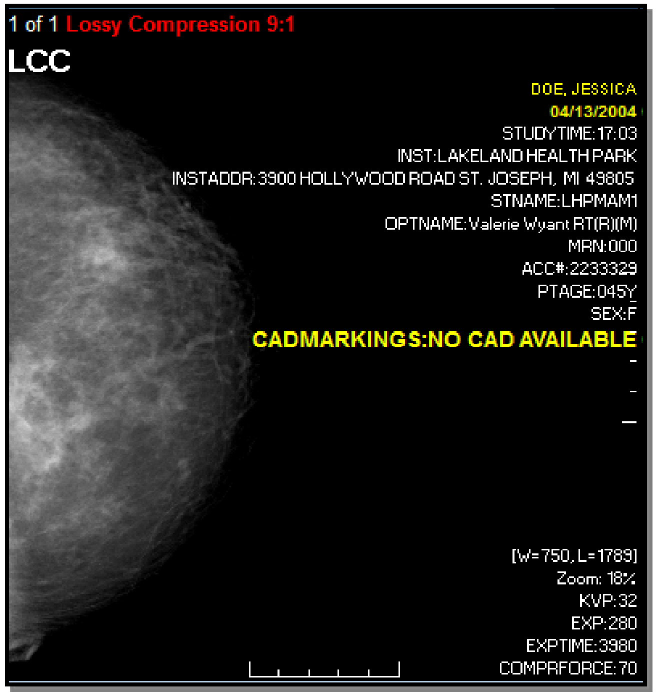
The Merge PACS Viewer treats mammography images different from other images. In particular:

- Mammography images are always displayed **uncompressed**.
- Certain **DICOM fields** are always displayed, regardless of whether the DICOM Overlay feature is turned on or off.
- A special interface is provided for **paging** through alternate views of mammography images, where applicable.
- Special **Wall-to-Wall** orientation options are available that can align two side-by-side Mammography images so that they appear chest-wall to chest-wall.
- A special **Intelligent Invert** feature is available.
- Special **Zoom** options are available.
- Special **Display Tools** are available.
- Display of prior mammography studies can be stacked and scrolled through in two special modes.
- A special **Thumbnail Viewer** is launched automatically that provides access to the tools most commonly used with mammography images for use when viewing images in full-screen mode, including some tools designed specifically for use with mammography images.

NOTE: Breast tomosynthesis images that are received as multiframe images with modality MG will be treated as mammography images by the Merge PACS Viewer. Tomosynthesis images that are received as single-frame CT images, however, will be displayed as ordinary CT images and none of the special mammo features will be available when viewing them.

4.8.1. DICOM Overlay for Mammography Images

Mammography images have their own special set of DICOM tags overlaid on them, as shown in the following example:



Sample Mammography Image

- The following optional tags may be toggled on and off via any of the DICOM Overlay tools:
  - **Institution Name**
  - **Institution Address**
  - **Station Name**
  - **Operator Name**
  - **Patient age**
  - **Study Time**
  - **Cassette/screen identification**
  - **kVp**
  - **Exposure (mAs)**
  - **Exposure Time (msec)**
  - **Compression Force**
- The following tags are permanently displayed and cannot be toggled off:
  - **Patient Name**
  - **Patient MRN**
  - **Issuer of Patient ID (IPID)**
  - **Study Date**
  - **Laterality**
  - **View**
  - **Window/Level**

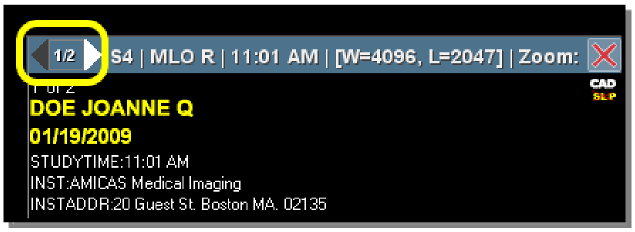
- In addition, if the “Presentation Intent Type” DICOM tag indicates that the image is not for presentation, a warning message to this effect will be displayed at the top of the image, as in the following example:

This Image Is Not for Presentation

- The various tags will be repositioned so as to not block anatomical structures if the image is flipped horizontally.

4.8.2. Paging through Multiple Views

Although mammography images are usually displayed one per series, occasionally there may be multiple alternate views of a given mammography image. When this is the case, a left and right arrow will be displayed, together with the image count, at the far left of the Series Toolbar, as in the following example:

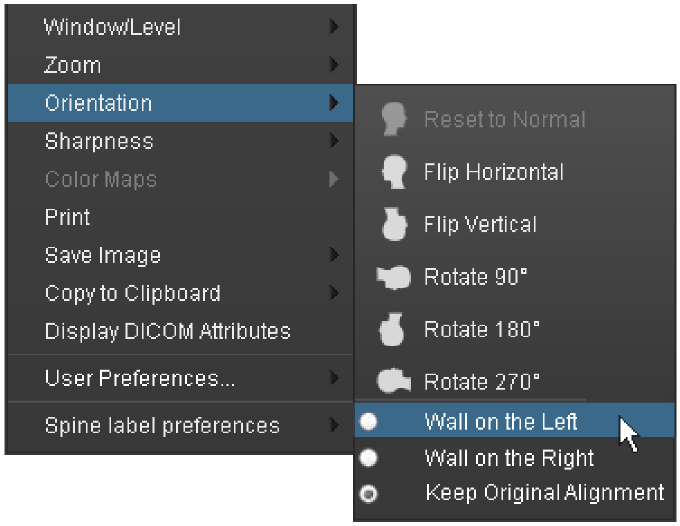


Arrows for Paging through Mammography Images

NOTE: You can also use all the standard image navigation tools, as described in subsection 4.3.1 above, to page through different views.

4.8.3. Wall-To-Wall Display of Mammography Images

When viewing mammography images, you can opt to display side-by-side Mammography images so that they appear chest-wall to chest-wall. This is done by selecting the **Wall on the Left** or **Wall on the Right** option (as applicable) from the **Orientation** sub-menu of the **Series Right-click Menu**, as seen in the following example:

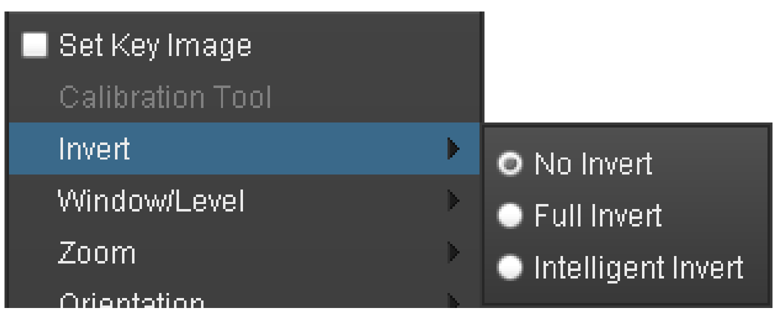


Wall-To-Wall Option

- Select **Wall on the Left** to align the wall of the breast with the left side of the Viewport.
- Select **Wall on the Right** to align the wall of the breast with the left side of the Viewport.
- Click the **Keep Original Alignment** option to turn off the Wall-To-Wall feature.

4.8.4. Mammography Invert Options

When viewing mammography images, the standard **Invert** option in the **Series Right-click Menu**, as described in subsection 4.4.12 above, will instead display a sub-menu of invert options, as in the following example:

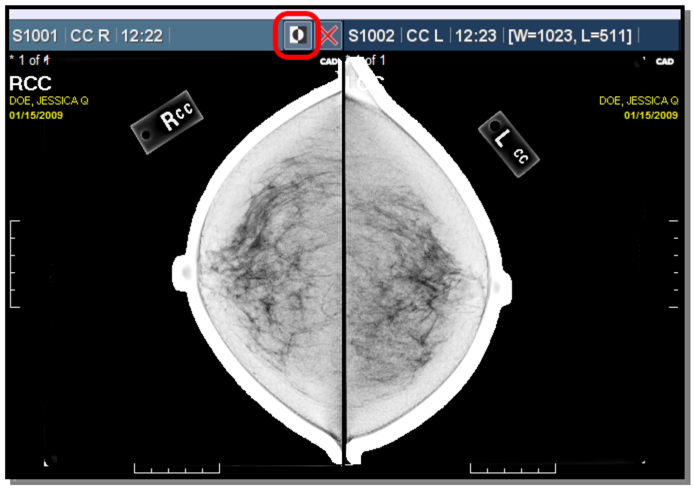


Mammography Invert Options

The following options are available:

Option	General Description
No Invert	Displays the image in standard display mode.
Full Invert	Temporarily reverses all black and white pixels for the images currently within the Series Viewport.
Intelligent Invert	Temporarily inverts only the breast region of the image and not the region outside.

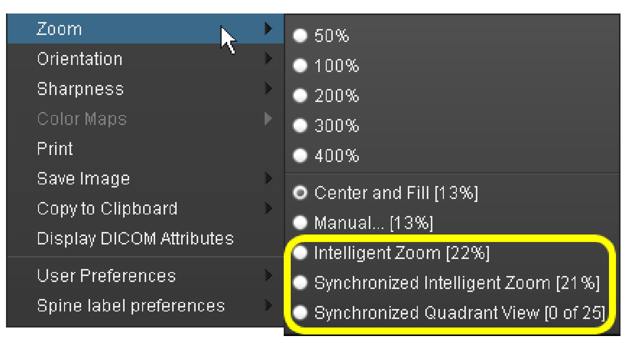
In addition, you can perform an Intelligent Invert for a pair of related side-by-side mammography images by clicking on the special **Paired Invert** icon that appears on the Series Toolbar for mammography images, as shown on the left and illustrated in the following example:



Paired Intelligent Invert

4.8.5. Intelligent Zoom and Quadrant View

When viewing mammography images, the standard **Zoom** sub-menu of the **Series Right-click Menu**, as described in subsection 4.4.3 above, contain a number of additional mammography-specific options, as in the following example:



Mammography-specific Zoom Options

The following options are available:

Option	General Description
Intelligent Zoom	Optimizes the display of the image in the active Series Viewport so that the maximum region is displayed without clipping of any of the breast tissue.
Synchronized Intelligent Zoom	Optimizes the display of the images in all Series Viewports, synchronizing them so that they all have the same zoom level. This means that the zoom level will be set to the minimum required to display the maximum region of the largest image without clipping of any of the breast tissue of that image. As a result, smaller images may not fill their entire Viewport.
Synchronized Quadrant View	Divides each image into enough regions so that each region will fit in the Series Viewport at 100% (full resolution) and then lets the user step through these regions. The same corresponding region is displayed in each Series Viewport for each image and the number of regions will depend on the size of the Series Viewport and the resolution of the images.

4.8.6. Mammography Prior Studies Stacking Options

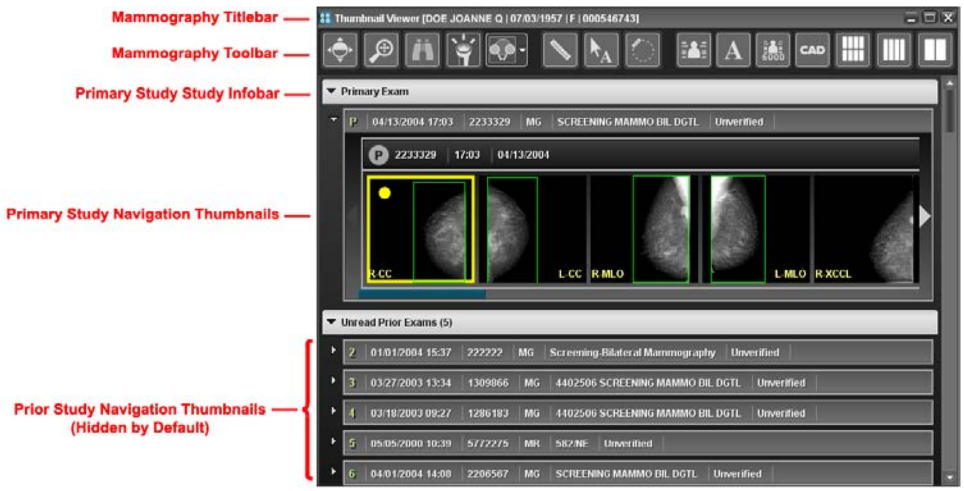
If the **Automatically Stack/Scroll MG Priors** modality preference is selected, as described in Section 25.14 below, the **Scroll MG Priors** button will be available on the **Viewer Toolbar**, as shown on the left. Clicking on this button will toggle between the following two display modes (note that the appearance of the button will change to reflect the currently selected mode):

<table>
<tr><th>Button</th><th>Mode</th><th>General Description</th></tr>
<tr><td></td><td>Mode #1</td><td>For each view (RCC, LCC, etc.), the image from the primary study will be displayed in one Series Viewport with the image(s) of the same view from any qualifying prior studies stacked below it in the same Series Viewport. For example:
<table><tr><td>RCC from primary study (with prior RCCs stacked underneath)</td><td>LCC from primary study (with prior RCCs stacked underneath)</td><td>RMLO from primary study (with prior RMLOs stacked underneath)</td><td>LMLO from primary study (with prior LMLOs stacked underneath)</td></tr></table>
When scrolling on the first Series Viewport, after passing the primary study RCC, you can move through the RCC view for each of the prior studies.</td></tr>
<tr><td></td><td>Mode #2</td><td>For each view (RCC, LCC, etc.), the image from the primary study will be displayed in one Series Viewport and the images from the qualifying prior studies will be displayed in the next Series Viewport. For example:
<table><tr><td>RCC from primary study</td><td>Stacked RCCs from prior studies</td><td>LCC from primary study</td><td>Stacked LCCs from prior studies</td></tr></table>
There will only be one image in the first and third Series Viewports. When scrolling through the second viewport, for example, you can move through the RCC view for each of the prior studies.</td></tr>
</table>

NOTE: If desired, you can configure the Viewer to always display Prior Mammography studies to the left of the Primary study from the User Preferences Menu, as described in Section 25.14 below.

4.8.7. Mammography Thumbnail Viewer

When a mammography study is loaded into the Merge PACS Image Viewer, a separate Mammography Thumbnail Viewer will be launched in a separate pop-up window, as in the following example:

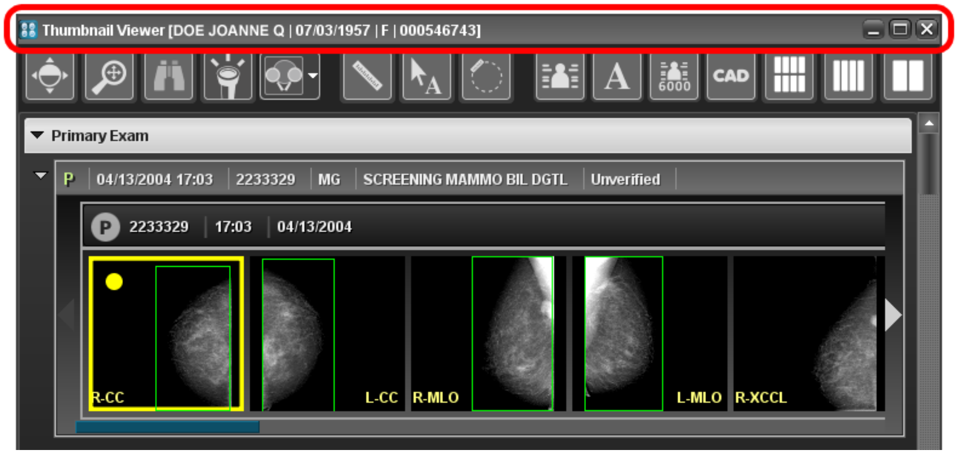


Mammography Thumbnail Viewer

The Mammography Thumbnail Viewer is designed to be positioned on a separate monitor when viewing mammography images in full-screen mode (*i.e.*, with the Viewer Toolbar and Series Navigation Thumbnails hidden). It provides access to the tools most commonly used with mammography images and also provides navigation thumbnails for the primary and any relevant prior studies.

a. Mammography Titlebar

The **Mammography Titlebar** is located at the top of the Mammography Thumbnail Viewer and displays information about the patient whose study is currently being viewed in the Merge PACS Viewer, as in the following example:



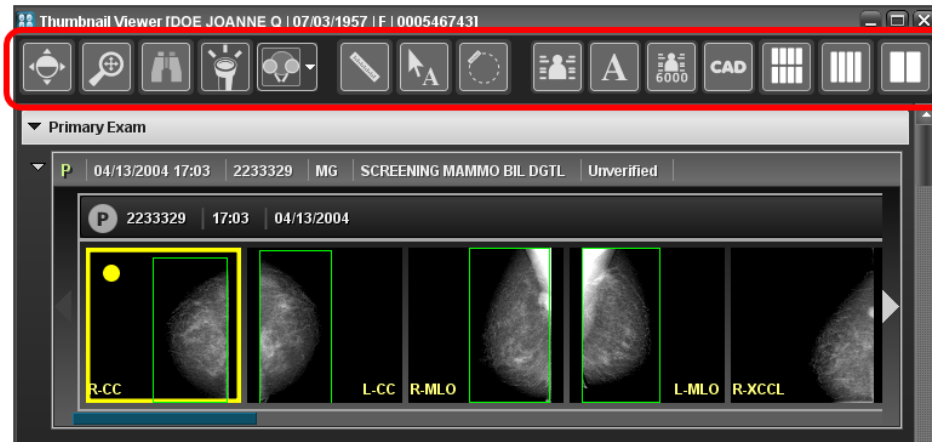
The Mammography Titlebar

The Mammography Titlebar displays the following information about the study:

- **Patient Name**
- **Patient Date of Birth**
- **Patient Sex**
- **Issuer of Patient ID (IPID)**
- **Patient Medical Record Number (MRN)**

b. Mammography Toolbar

The **Mammography Toolbar** is located below the Titlebar and displays tools that apply to that study being viewed, as in the following example:

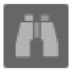
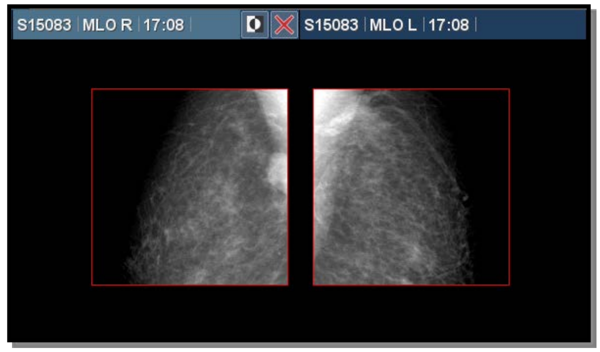
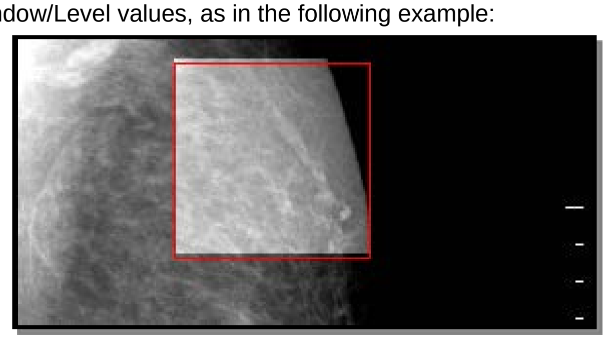


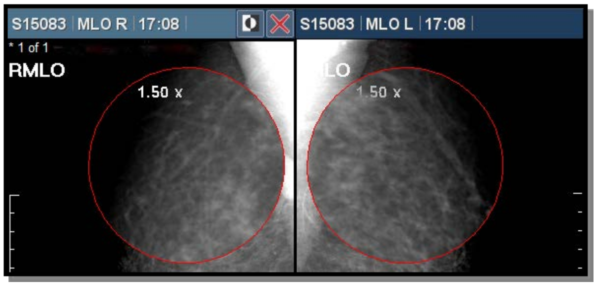
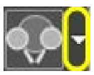
The Mammography Toolbar

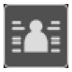
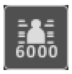
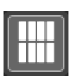
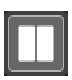
The Toolbar may display one or more of the following tools, depending on your login privileges and how the Toolbar is configured (as described below):

NOTE: All of these tools, with the exception of the three **Series Layout** buttons, can also be configured to be available on the **Viewer Toolbar**, as described in subsection 4.1.2 above.

Tool	Name	General Description
	**Window/Level**	Lets you adjust the Window and Level [contrast and brightness] of an image “on the fly” by dragging the mouse cursor over the image.
	**Zoom/Pan Combo**	Lets you simultaneously pan an image with the mouse cursor and resize it using the mouse center wheel.

Tool	Name	General Description
	**Binocular Tool**	Lets you use the mouse cursor to display only the part of the image within the tool's viewing area for a pair of related side-by-side mammography images; the rest of the images will be shuttered/remain hidden, as in the following example:  **Binocular View** • The default size and shape of the viewing area can be changed from the User Preferences Menu, as described in Section 25.11 below. • When active, you can manually change the size of the tool's viewing area with the mouse wheel (scroll up to decrease the size and down to increase the size). • By default, the Binocular tool will remain active only while you hold down the left mouse button ("operate on click-drag"). If desired, this can be changed so that the tool remains active until another tool is selected or the left mouse button is clicked a second time ("operate on click") from the User Preferences Menu, as described in Section 25.11 below. Note that if "operate on click" is selected, the right mouse button will not work within the Viewport until the tool is dismissed.
	**Hot Light**	Lets you use the mouse cursor to display the part of the image within the tool's viewing area with a percentage increase in intensity; the rest of the image will be displayed with the original Window/Level values, as in the following example:  **Hot Light View** • The default size and intensity of the viewing area can be changed from the User Preferences Menu, as described in Section 25.11 below.

Tool	Name	General Description
		• When active, you can manually change the intensity within tool's viewing area with the mouse wheel (scroll up to decrease the intensity and down to increase the intensity). • By default, the Hot Light tool will remain active only while you hold down the left mouse button ("operate on click-drag"). If desired, this can be changed so that the tool remains active until another tool is selected or the left mouse button is clicked a second time ("operate on click") from the User Preferences Menu, as described in Section 25.11 below. Note that if "operate on click" is selected, the right mouse button will not work within the Viewport until the tool is dismissed.
	**Dual Link Magnifier**	Lets you use the mouse cursor to simultaneously magnify a selected region of a pair of related side-by-side mammography images, as in the following example:  **Dual Link Magnifying Glass View** • When active, you can manually change the magnification level within tool's viewing area with the mouse wheel (scroll up to decrease the magnification and down to increase the magnification). • When active, you can click on the right mouse button to toggle between Normal and Invert mode. • By default, the Dual Link Magnifier tool will remain active only while you hold down the left mouse button ("operate on click-drag"). If desired, this can be changed so that the tool remains active until another tool is selected or the left mouse button is clicked a second time ("operate on click") from the User Preferences Menu, as described in Section 25.11 below.
	**Dual Link Magnifier Preferences**	Lets you select whether you want the Dual Link Magnifier to display in **Normal** or **Invert** mode by default. Regardless of which option is selected, you can still manually select a different mode while using the tool by clicking on the **right** mouse button, as described above.
	**Line Measurement**	Lets you use the mouse cursor to measure in millimeters the actual (as opposed to the displayed) distance between two points on an image, as well as mark the image with an appropriate annotation.
	**Arrow Annotation**	Lets you use the mouse cursor to add a labeled arrow to an image.

Tool	Name	General Description
	**ROI Measurement**	Lets you use the mouse cursor to add a statistics display for a specified area of an image. The tool displays the minimum and maximum pixel intensity values for a selected area of an image, as well as the average pixel value and the standard deviation for the selected region.
	**Toggle DICOM Overlay**	Turns the DICOM Overlay display off for all Series Viewports that currently have images displayed in them.
	**Toggle Annotations**	Toggles the display of any existing annotations on and off.
	**Toggle DICOM 6000 Overlay**	Toggles the display of DICOM 6000 Overlays, if available, on and off for all Series Viewports that currently have images displayed in them.
	**Toggle CADSR Overlay**	Toggles the display of Computer Aided Detection Structured Reports, if available, on and off for Mammography images. See Section 4.8 above for more information. **NOTE:** You can also toggle the CADSR Overlay from the Series Right-click Menu, as described in subsection 4.1.5 above.
	**Toggle CADSR Overlay Menu**	Lets you select one or both of the following items to display when the **CADSR Overlay** is enabled: • **Show CAD Marking** • **Show CAD Summary** If Show CAD Marking is selected and Show CAD Summary is **not** selected, a special icon will be displayed on the image to allow you to view the CAD Summary information, as described in subsection 4.8.8 below.
	**Series Layout 2x4**	Sets the Series Layout for this study to 2 rows by 4 columns.
	**Series Layout 1x4**	Sets the Series Layout for this study to 1 row by 4 columns.
	**Series Layout 1x2**	Sets the Series Layout for this study to 1 row by 2 columns.

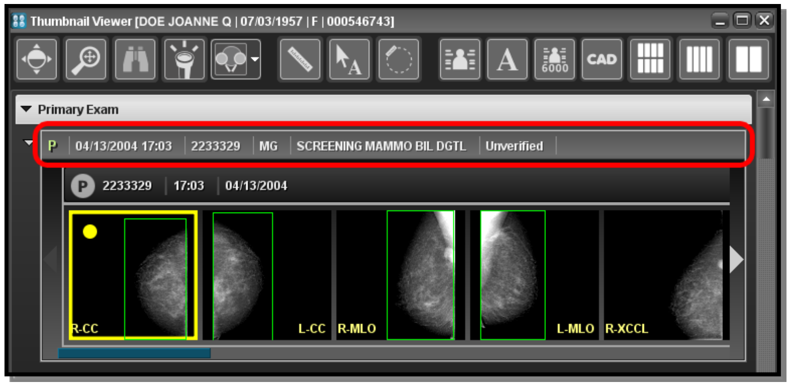
c. Mammography Toolbar Right-click Menu

Right-clicking on any blank part of the Mammography Toolbar (*i.e.*¸ not on a tool*)* will immediately cause the **Mammography Toolbar Right-click Menu** to pop-up.

- The Mammography Toolbar Right-click Menu lets you select which of the available tools you would like to appear on the Viewer Toolbar itself. Note that, depending on your login privileges and your general system configuration, one or more of these options may not be available, in which case they will appear "grayed out" in the menu.
- You can also access the User Preferences Menu, as described in Chapter 25 below.

d. Mammography Study Infobar

The primary study and each prior study have their own **Mammography Study Infobar** that displays information about that study, as in the following example:



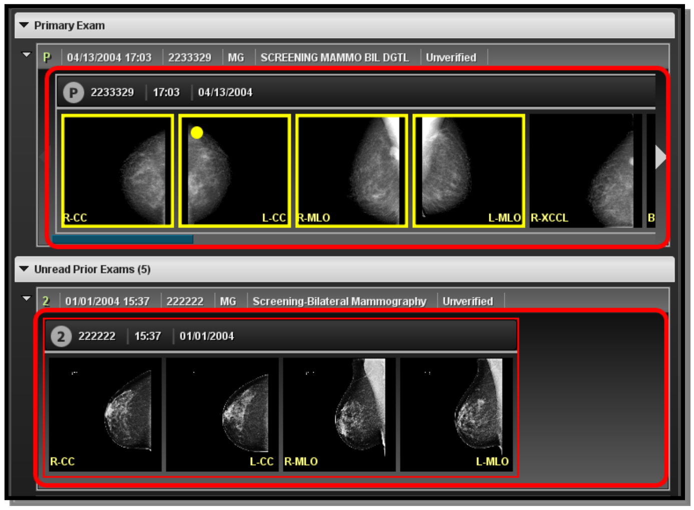
Mammography Study Infobar

Each Mammography Study Infobar displays the following information about the study:

- **Study Date/Time**
- **Accession Number**
- **Modality**
- **Study Description**
- **Workflow Status** (primary study only)

e. Mammography Navigation Thumbnails

The primary study and each prior study also have their own set of **Mammography Navigation Thumbnails** that can be used to open one or more series into the Merge PACS Viewer or into a separate pop-up Series Viewport window, as in the following example:



Mammography Navigation Thumbnails

NOTE: If there are too many thumbnail images to fit the width of the screen, arrows will appear to the left and/or right of the thumbnail images that you can click on to view the rest of the thumbnails. In addition, a scrollbar will be displayed directly below the thumbnail images.

NOTE: By default, the Navigation Thumbnails for prior studies will be hidden. Click on the small triangle to the left of a study's Infobar to display/hide the Navigation Thumbnails for that study.

NOTE: If the **Automatically Stack/Scroll MG Priors** modality preference is selected, as described in 25.14 below, the Navigation Thumbnails for all relevant priors will also be displayed to the right of the primary study's Navigation Thumbnails.

- To open a particular series into the Merge PACS Viewer, click on the Navigation Thumbnail for that series and drag and drop it into a Series Viewport within the Merge PACS Viewer.
- Double-clicking on a Navigation Thumbnail will open the series in a separate pop-up "clone" window, as described in subsection 4.1.6 above. By default, there can only be one clone window open at a time: if you want to open additional series in separate clone windows (as opposed to reusing the currently open clone window), hold down the **Shift** key while double-clicking.

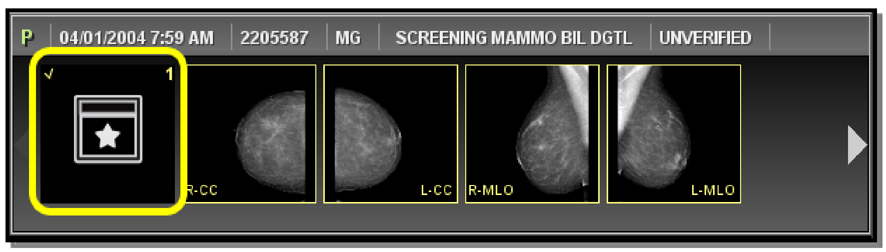
- Right-clicking on a thumbnail image will display the **Mammography Navigation Thumbnail Right-click Menu** for that Series, as in the following example:

Mammography Navigation Thumbnail Right-click Menu

Each Mammography Navigation Thumbnail Right-click Menu contains the following options:

Option	General Description
Open in Window	Open the Series in a separate pop-up "clone" window, as described in subsection 4.1.6 above.
Thumbnail Size	Change the size of all Series Navigation Thumbnails within the Patient Record.

  - If there are any key images that have been flagged, the first Navigation Thumbnail will be a special **Key Image Series Navigation Thumbnail**, as in the following example:

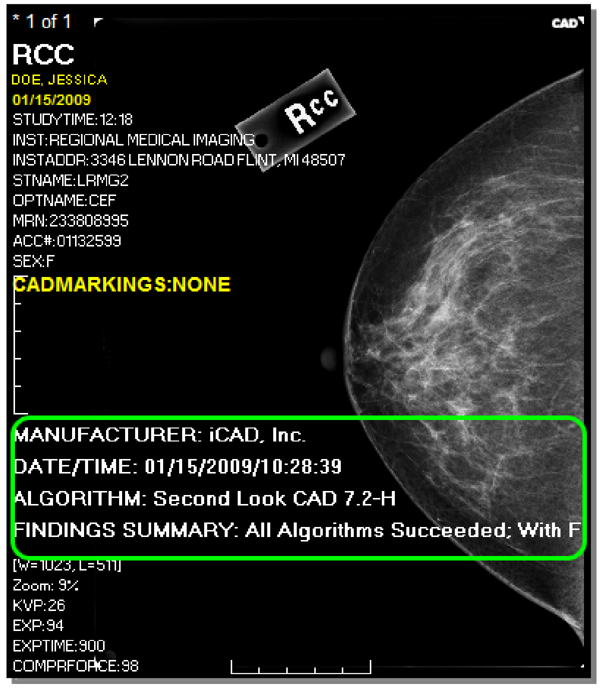


Key Image Navigation Thumbnail

  - You can **drag** this Thumbnail into an existing Series Viewport within the Merge PACS Viewer to view all key images in that Series Viewport.
  - You can **double-click** on this Thumbnail to open a separate Key Image Viewport, as described in Section 4.10, below.
  - You can also **right-click** on this Thumbnail and select **Open Key Image Viewport** from the Right-click Menu to open a separate Key Image Viewport, as described in Section 4.10, below.

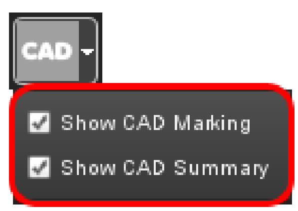
4.8.8. Displaying CAD Summary

If you have turned the display of CAD markings on from the **Viewer Toolbar**, the **Series Right-click Menu** or the **Mammography Toolbar**, CAD summary information will be displayed directly on the image by default, as in the following example:



CAD Summary

This behavior can be changed from the **Toggle CADSR Overlay Menu**, located on the **Viewer Toolbar** and the **Mammography Toolbar** and shown to the left. When activated, the menu displays the following options:



CAD Overlay Menu Options

If the **Show CAD Marking** option is selected but the **Show CAD Summary** option is **not** selected, the summary will not be displayed on the image and a special Cad Summary indicator will be displayed in the upper-right corner of the image instead, as in the following example:

CAD Summary Indicator

Clicking on this icon will cause a small pop-up window to be displayed with the summary information, as in the following example:

CAD Summary Window

Click on the red X in the upper-right corner of this window to close it.

4.8.9. Mass Density Marks

If CAD markings are turned on, some mammography images may display **mass density marks**. Each mark consists of a center point and an outline represented by a polyline to indicate the high density tissue border.

NOTE: Although mass density marks may, at times, appear to follow the rough outline of the breast, their purpose is not to display the outline of the breast.

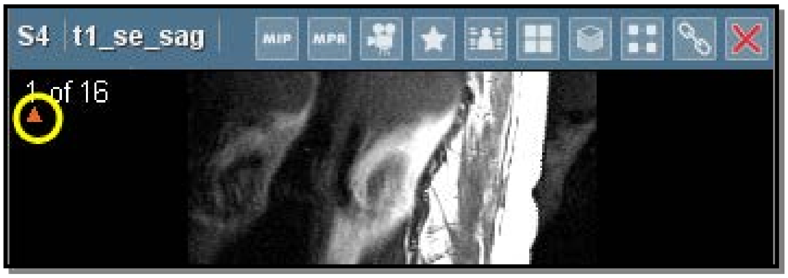
4.9. Setting Key Images

The Merge PACS Viewer lets you mark any number of images in a series as a “key” image. Key images are flagged and added to a special Key Image Series that can be viewed within any Series Viewport in the Merge PACS Viewer or in a special Key Image Viewport, as described in Section 4.10 below.

Each Key Image reflects the state of the image (zoom factor, window/level, annotations, etc.) at the time the image was flagged as a Key Image. You can therefore flag the same image multiple times if you want different states preserved. If you accidentally flag an image as a Key Image, you can remove it from the Key Image Series via the Key Image Viewport.

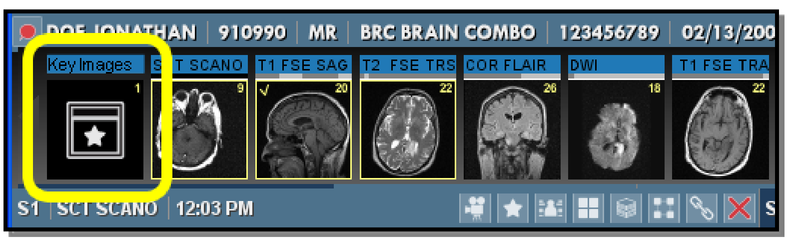
Depending on how your custom user preferences are configured, as described in Chapter 25 below, setting a key image may cause the Key Image Viewport to be automatically launched.

Once an image has been flagged as a Key Image, a special marker will be displayed beneath the Image Titlebar for that image, as in the following example:



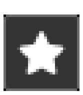
Key Image Marker

In addition, as described in subsections Note: and 4.1.4 above, a separate Navigation Thumbnail will be displayed for the Key Image Series in the Patient Record and within the Merge PACS Viewer, as in the following example:



Key Image Navigation Thumbnail

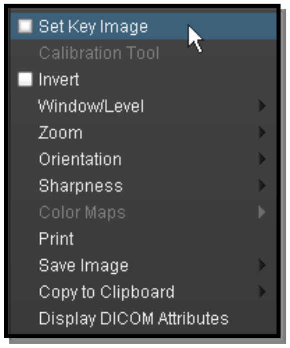
4.9.1. Setting Key Images from the Series Toolbar



You can flag an image as a Key Image by selecting the **Set Key Image** tool from the **Series Toolbar**, as shown on the left.

4.9.2. Setting Key Images from the Series Right-click Menu

You can flag an image as a Key Image from the **Series Right-click Menu**, as seen in the following example:



Setting a Key Image

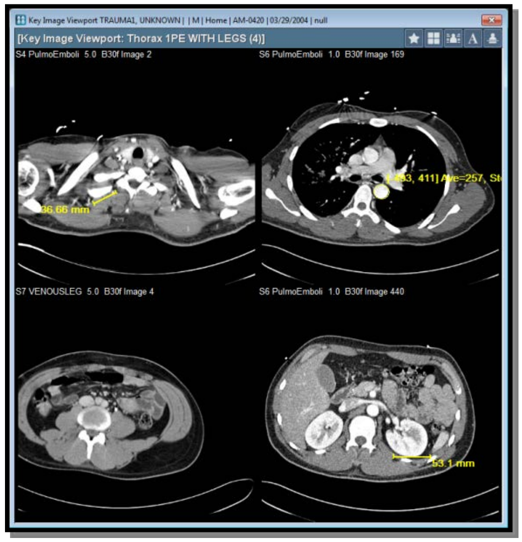
4.9.3. Automatically Setting Annotated Images as Key Images

If the **Automatically Mark Annotated Images as Key Images** user preferences is selected, as described in Section 25.8 below, adding a text annotation (not including spine labeling) to an image will cause that image to automatically be flagged as a key image. Key images that are automatically set will be displayed with a special icon within the Key Image Viewer, as described in subsection 4.10.7 below.

NOTE: This feature will not work with comparison studies. If the user preference is enabled and you load a comparison study with annotated images, a message stating that "Comparison study annotated images are not automatically marked as key images" will be displayed.

4.10. Viewing Key Images

The Key Image Viewport displays the Key Image Series, which contains all images for the current study that have been flagged as Key Images, as in the following example:



Key Image Viewport

The Key Image Viewport can be accessed in the following ways:

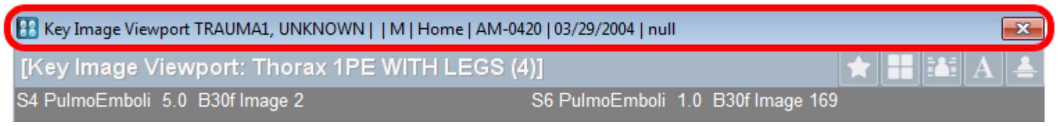
- **Double-clicking** the **Key Image Navigation Thumbnail** from the Patient Record or within the Merge PACS Viewer, as described in subsections 3.9.1 and 4.1.4 above, will launch the Key Image Viewport in a separate pop-up window.
- Selecting **Open Key Image Viewport** from the **Key Image Thumbnail Right-click Menu** will also launch the Key Image Viewport in a separate pop-up window.
- **Dragging and dropping** the **Key Image Navigation Thumbnail** into a Series Viewport within the Merge PACS Viewer will convert that Series Viewport into a Key Image Viewport.
- Selecting **Open Key Image Series** from a **Series Right-click Menu** will also convert that Series Viewport into a Key Image Viewport and display the Key Image Series within.

In addition, you can configure your User Preferences, as described in Chapter 25 below, so that the Key Image Viewport is automatically launched as a separate pop-up window in one or more of the following situations:

- Whenever an image is flagged as a Key Image
- When the primary study is first opened within the Merge PACS Viewer
- When a comparison study is opened

4.10.1. Key Image Viewport Titlebar

If the Key Image Viewport is being displayed as a separate pop-up window, the top of the window will contain the **Key Image Viewport Titlebar**, as shown in the following example:



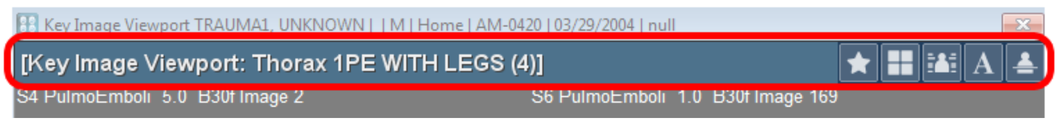
The Key Image Viewport Titlebar

The Key Image Viewport Titlebar displays the following information, where available:

- **Patient Name**
- **Patient Date of Birth**
- **Patient Sex**
- **Issuer of Patient ID (IPID)**
- **Patient Medical Record Number (MRN)**
- **Study Date/Time**
- **Accession Number**

4.10.2. Key Image Series Toolbar

Below the Key Image Viewport Titlebar (or at the top of the Viewer if The Key Image Viewport is being displayed within an existing Viewport) is the **Key Image Series Toolbar**, as shown in the following example:



Key Image Series Toolbar

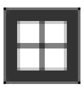
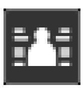
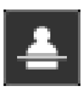
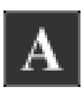
The Key Image Series Toolbar displays information for the Series in the Key Image Viewport as well as various tools that apply to the Key Image Viewport.

a. Series Information

By default, the left side of the Key Image Series Toolbar displays the Study Description, where available, and the number of key images.

b. Available Tools

The right side of the Key Image Series Toolbar displays the available tools that apply to the Key Image Viewport. The actual tools that appear will depend on how you have configured the Toolbar (as described in paragraph c below).

Tool	Name	General Description
	**Process Pending Annotated Key Images**	If the user preference has been selected to mark annotated images as key images upon exiting a study, selecting this option will process those annotated images immediately. This option can also be accessed from the Key Image Series Right-click Menu, as described in subsection 4.10.4 below.
	**Create Key Image Collage**	Create a new key image showing the existing key images combined into a single collage image, as described in subsection 4.10.5 below.
	**Image Layout**	Lets you change the number of images that can be displayed simultaneously within the Key Image Viewport.
	**DICOM Overlay Series Toggle**	Toggles DICOM Overlay display for the Key Image Viewport on and off.
	**Cross-reference Lines**	Toggles the display of any available reference lines on and off.
	**Display Annotations**	Toggles the display of any annotations on and off.

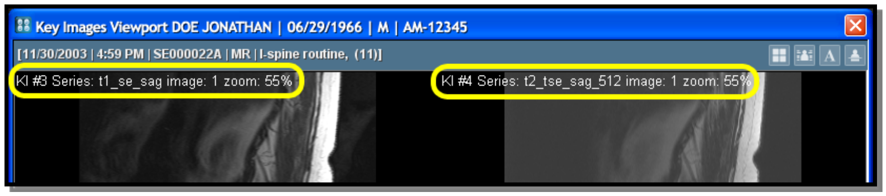
c. Key Image Series Toolbar Right-click Menu

Right-clicking on the Series Information section of the Key Image Series Toolbar will immediately cause the **Key Image Series Toolbar Right-click Menu** to pop-up.

- The Key Image Series Toolbar Right-click Menu lets you select which of the available tools you would like to appear on the Toolbar itself.
- You can also select whether you want the tool buttons to always appear, never appear, or only appear when the Key Image Viewport is in the active Series Viewport.

4.10.3. Key Image Titlebar

The top section of the each key image within the Key Image Viewport displays information about that image, as in the following example:

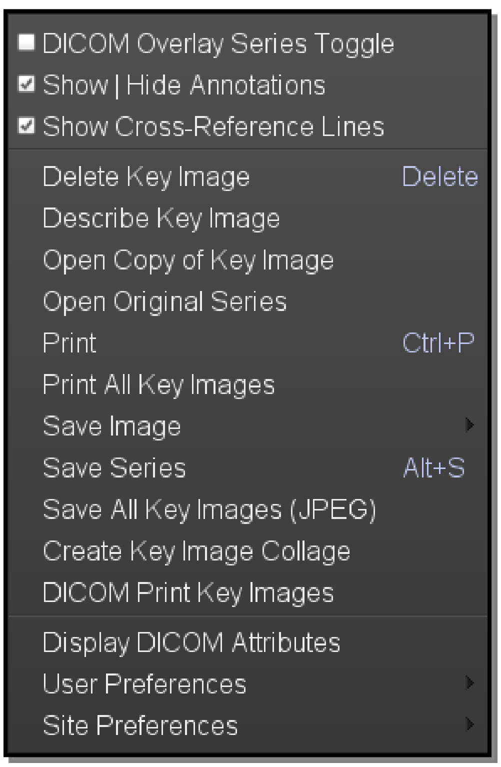


The Key Image Titlebar

The Key Image Titlebar displays the following information about the image:

- **Image Description**
- **Zoom Factor**
- **Compression Ratio** (if the image has been lossy compressed)

4.10.4. Key Image Series Right-click Menu



The Key Image Series Right-click Menu

Right-clicking on a Key Image and holding the mouse button down for a few seconds will bring up the **Key Image Series Right-click Menu**, as shown in the example to the left.

The Key Image Series Right-click Menu contains a variety of options, some of which are also available from the Key Image Series Toolbar.

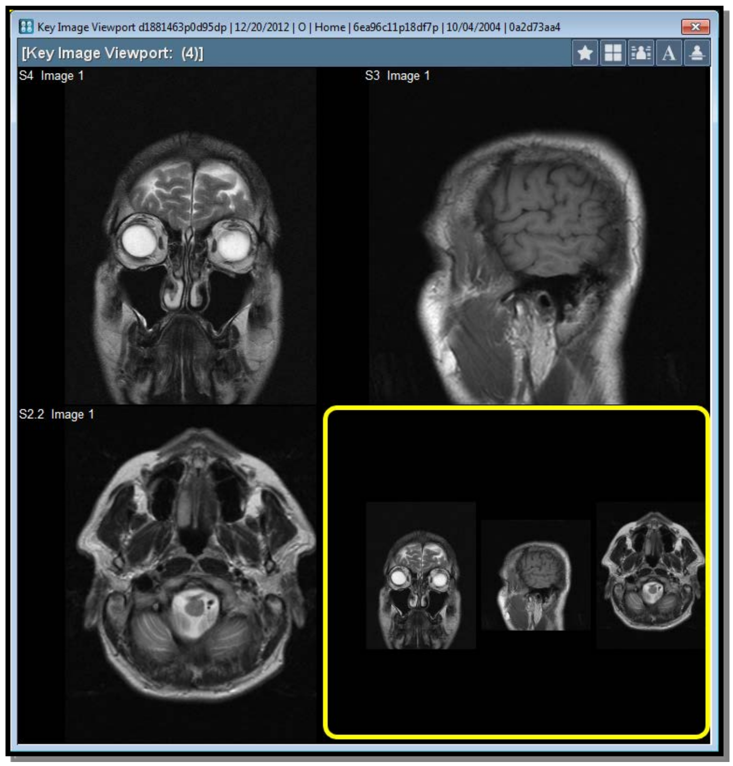
The Key Image Series Right-click Menu has the following possible options:

Option	General Description
DICOM Overlay Series Toggle	Toggles DICOM Overlay display for the Key Image Viewport on and off.
Show | Hide Annotations	Toggles the display of any annotations on and off.
Show Cross-Reference Lines	Toggles the display of any available reference lines on and off.
Delete Key Image	Removes the image from the Key Image Series.
Describe Key Image	Lets you edit the description of this key image via a separate pop-up dialog window.
Open Copy of Key Image	Opens a copy of the image in a separate pop-up Series Viewport window for manipulation.
Open Original Series	Opens the entire Series that the image is a part of in a separate pop-up Series Viewport window.
Print	Send the image, together with any user annotations, to a printer.
Print All Key Images	Sends all key images, together with any user annotations, to a printer.
Save Image	Save the selected image, together with any user annotations, to your hard drive in a variety of available image formats, as described in subsection 4.6.1 above.
Save Series	Save the entire series, together with any user annotations, to your hard drive in a variety of available image formats, as described in subsection 4.6.1 above.
Save All Key Images (JPEG)	Create JPEG versions of all key images and prompt you for a directory where they should be saved.
Create Key Image Collage	Create a new key image showing the existing key images combined into a single collage image, as described in subsection 4.10.5 below.
DICOM Print Key Images	Sends selected images and/or series to an available DICOM printer, as described in subsection 4.6.2 above.
Display DICOM Attributes	View the complete set of DICOM attributes for the image.
Process Pending Annotated Key Images	If the user preference has been selected to mark annotated images as key images upon exiting a study, selecting this option will process those annotated images immediately. This option can also be accessed from the Key Image Series Toolbar, as described in subsection 4.10.2 above.
User Preferences	Lets you set various personalized viewing preferences, as described in Chapter 25 below.

4.10.5. Creating a Key Image Collage

Once you have flagged two or more images as key images, you can create a new key image showing the existing key images combined into a single collage image by clicking on the **Create Key Image Collage** icon on the **Key Image Series Toolbar**, as shown on the left, or by selecting **Create Key Image Collage** from the **Key Image Series Toolbar Right-click Menu**.

The new key image collage will be displayed as a new key image within the Key Image Viewport as in the following example:



Key Image Collage

NOTE: You may need to change the Image Layout of the Key Image Viewport, as described in subsection 4.10.2 above, in order to view the new key image collage.

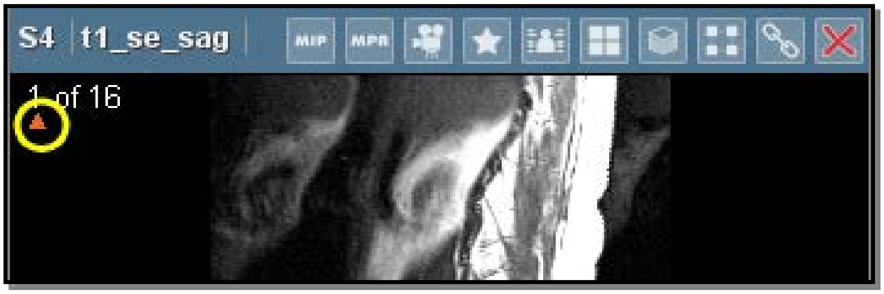
NOTE: If not all key images are currently being displayed in the Key Image Viewer (*e.g.,* five total key images but a 2x2 layout), you will be prompted for a choice of whether you want to create a collage for just the current page or to create separate collages for each page within the Key Image Viewport.

NOTE: The collage will be added as a Key Image to the KO series for the study.

NOTE: Collage key images will not be included in other collages; instead, the cell where the collage would be located will be blank in the newly created collage.

4.10.6. Key Image Indicator

Images that have been flagged as a Key Image will have an orange triangle displayed beneath the Image Titlebar for that image in the standard Series Viewport, as in the following example:



Key Image Indicator

4.10.7. Automatically Flagged Key Images

As described in subsection 4.9.3 above, the Merge PACS Viewer can be configured to automatically flag an image as a key image when a text annotation (not including spine labeling) is added to that image. Key images that are automatically flagged will be displayed with a special icon within the Key Image Viewer, as in the following example:

Automatically Flagged Key Image

NOTE: Annotations on automatically flagged key images will dynamically be updated within the Key Image Viewport whenever the annotations on the original image are changed.

4.11. Hanging Protocols and Study Presentations

A ***Hanging Protocol*** is essentially a display template for a specified type of study that controls the way a study is displayed when it is first opened in the Merge PACS Viewer. When a study is opened in the Merge PACS Viewer, the system checks to see if there is an existing Hanging Protocol associated with that type of study and, if so, displays the study according to settings contained within that Hanging Protocol. If there are multiple Hanging Protocols associated with a particular study, the most recently created one will be used and the user will be given the ability to select a different protocol once the study has been opened. Hanging protocols are associated with usernames, and which Hanging Protocols are available to you will depend on your user account.

A ***Study Presentation*** is a Hanging Protocol that has been assigned to a specific study as opposed to a specific type of study. When a study is opened in the Merge PACS Viewer, the system will first check to see if there is a Study Presentation associated with that study and, if so, will display the study according to the settings contained within that presentation. If there is no Study Presentation associated with a study, the system will then check to see if there are any general Hanging Protocols associated with that type of study. Study presentations are associated with the studies themselves and are independent of login privileges.

4.11.1. Settings Preserved by Hanging Protocols and Study Presentations

In general, Hanging Protocols and Study Presentations can be defined to preserve the following:

- **A wide variety of display attributes (Window/Level, Zoom, Pan, Invert, DICOM Overlay, etc.)**
- **Display of multiple comparison studies**
- **Display of Series-level comparison Series Viewports**
- **Display of 3D/MPR Series**
- **Display of Cloned windows**

In addition, Hanging Protocols and Study Presentations can be configured to perform multiple steps.

4.11.2. Hierarchy of Hanging Protocols and Study Presentation Application

The Merge PACS Viewer will initially display studies according to the following hierarchy:

- If a Study Presentation has been saved for the study, it will be initially applied by default.
- If there is no Study Presentation saved for a particular study, the best matching Hanging Protocol that applies to that study will be applied.
- If there is no Study Presentation or Hanging Protocol that applies to the study, the study will be displayed according to any default modality-specific layout that has been defined for this modality.

4.11.3. The Hanging Protocol Menu

The creation, selection and management of Hanging Protocols and Study Presentations is done via the **Hanging Protocol Menu**, which is accessed by clicking on the **Hanging Protocol** button on the **Viewer Toolbar** within the Merge PACS Viewer. The appearance of the Hanging Protocol button will vary depending on whether there is Hanging Protocol or Study presentation currently loaded, as described below:

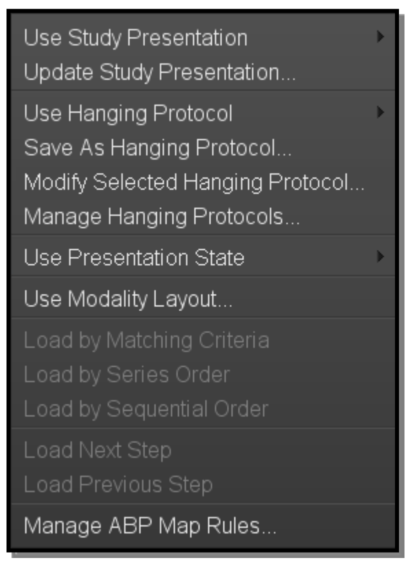
There is no Hanging Protocol or Study Presentation currently loaded for the current study.

There is a **Study Presentation** currently loaded for the current study.

There is a **Hanging Protocol** currently loaded for the current study.

NOTE: The **Study Toolbar** within the Merge PACS Viewer can also be optionally configured to display the Hanging Protocol button, as described in subsection 4.1.3 above. However, the version of the button that appears on the Study Toolbar will always appear as the standard coat hanger icon regardless of whether there is a Study Presentation or Hanging Protocol currently loaded for the study.

When you click on the Hanging Protocol button, the Hanging Protocol Menu will be displayed as in the following example:



The Hanging Protocol Menu

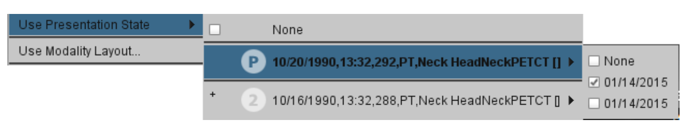
NOTE: The availablity of many of the options on the Hanging Protocol is determined by your login privileges.

The Hanging Protocol Menu has the following options available, each of which is described in greater detail below:

Option	General Description
Use Study Presentation	Select a specific step of the Study Presentation, if any, that has been saved for this study.
Create Study Presentation / Update Study Presentation	Create a new Study Presentation based on the current display settings of this study or edit the Study Presentation that has already been saved for this study.
Use Hanging Protocol	Select from a list of available Hanging Protocols, if any, that apply to this study.
Modify Selected Hanging Protocol	Modify the Hanging Protocol, if any, that is currently being applied to this study.
Manage Hanging Protocols	Subscribe and unsubscribe to shared Hanging Protocols created by other users, as well as delete Hanging Protocols you have previously created.
Use Presentation State	Displays a submenu of externally created ("foreign") Presentation States available for the study or studies currently loaded into the Viewer (*e.g.*, a primary study and a prior comparison study) that lets you apply one or more of foreign Presentation States to those studies. If there is only one study currently being viewed, the submenu will display a list of available foreign Presentation States for that study, along with a "None" option that will let you deselect any Presentation States currently applied, as in the following example:

Available Foreign Presentation States for One Study

If multiple studies are currently being viewed, the submenu will display an option for each study with a further nested submenu that will let you select one or more foreign Presentation States from a particular study, along with a "None" option for each study and a global "None" option for all studies, as in the following example:



Available Foreign Presentation States for Multiple Studies

NOTE: Hovering your mouse cursor over an option will cause a pop-up "tool-tip" to be displayed showing the time the Presentation State was created.

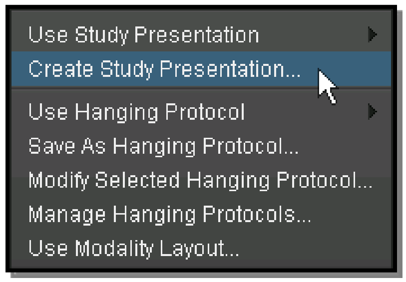
Option	General Description
	In general, the selected foreign Presentation State(s) will be applied on top of the currently selected Hanging Protocol or Study Presentation. The images the selected Presentation State(s) reference will have their presentations updated in the following ways: • The annotations specified in the foreign Presentation State(s) will be added to the image in addition to any annotations drawn on the image from Merge PACS. If an image is referenced by more than one presentation instance in the foreign Presentation State(s), the annotations from all references shall be added to the image. • The viewing parameters (*e.g.*, window/level) specified in the Foreign Presentation State(s) shall be used instead of those defined in the Hanging Protocol, Study Presentation or image defaults. If an image is referenced by more than one presentation instance in the Foreign Presentation State(s), the viewing parameters of the most recently applied Foreign Presentation State that includes viewing parameters will be used. In other words, the final state of an image with multiple foreign Presentation States applied to it will depend on the order you choose to apply those Presentation States. **NOTE:** If the **Automatically Apply Presentation State** user preference is selected, as described in Section 25.5 below, the most recently created Presentation State will be automatically applied to each study currently being viewed. **NOTE:** If you **deselect** a foreign Presentation State that is currently selected, the Viewer will go back to the original presentation and then apply the currently selected foreign Presentation States in the order that you selected them. **NOTE:** The PACS Viewer supports the application of up to five separate foreign Presentation States per study.
Use Modality Layout	Apply the default modality-specific layout that has been defined for this modality in lieu of the Hanging Protocol currently applied.
Load by Matching Criteria	Forces the Hanging Protocol to match based on the defined Matching Criteria (this is the default behavior).
Load by Series Order	Forces the Hanging Protocol to match based on Series Order.
Load by Sequential Order	Forces the Hanging Protocol to match based on Sequential Order.
Load Next Step	If multiple steps have been defined for the Hanging Protocol or Study Presentation currently being applied, loads the next step in the sequence.
Load Previous Step	If multiple steps have been defined for the Hanging Protocol or Study Presentation currently being applied, loads the previous step in the sequence.
Manage ABP Map Rules	Lets you manage the Anatomical Body Parts mapping rules.

4.11.4. Creating a Study Presentation

Once you have manually adjusted the display of the study currently being viewed in the Merge PACS Viewer, you can choose to save those display settings as a Study Presentation for the study. If a Study Presentation has already been saved for the study, you can also add additional steps to the Study Presentation or delete existing steps.

a. Creating the First Step for a Study Presentation

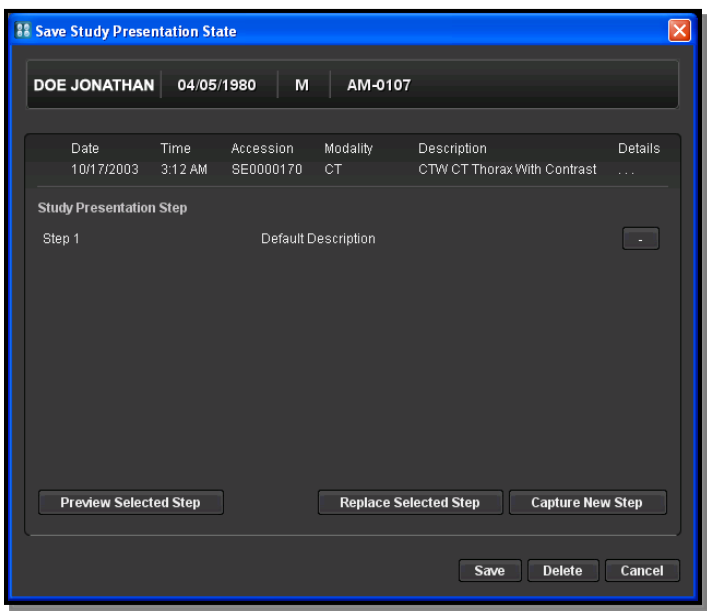
To begin creating a Study Presentation, make sure the study is displayed in the desired manner and then select **Create Study Presentation** from the Hanging Protocol Menu, as in the following example:



Creating a Study Presentation

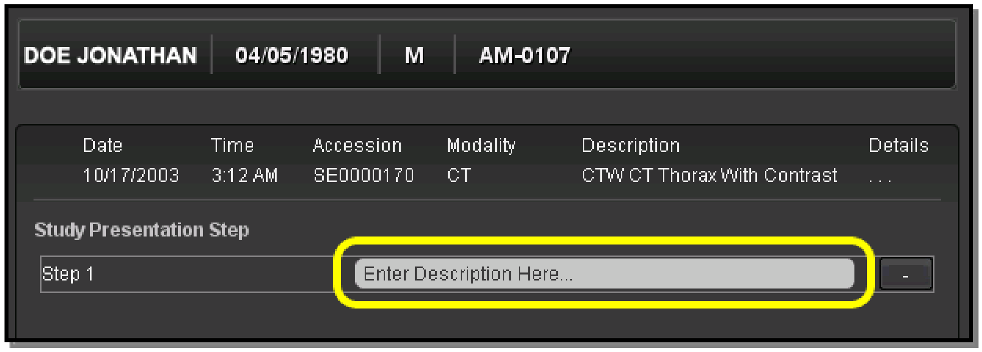
NOTE: If a Study Presentation has already been created for this study, this menu option will appear as **Update Study Presentation** instead.

Clicking on the Create Study Presentation option will cause the **Save Study Presentation State** window to be displayed, as in the following example:



The Save Study Presentation State Window

- If desired, you can click on the **Default Description** of this step and enter a new description, as in the following example:

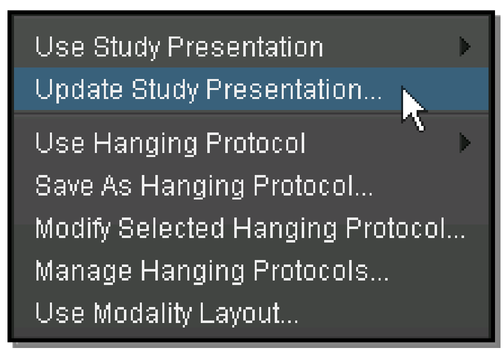


Changing the Default Description of this Step

- When finished, Click on the **Save** button at the bottom of the window to create the Study Presentation.

b. Updating an Existing Study Presentation

If a Study Presentation has already been created for a study, you can add additional steps as well as replace and delete existing steps. If you want to add an additional step or replace an existing step with a new one, first make sure the study is displayed in the desired manner. When you are ready to update the Study Presentation, select **Update Study Presentation** from the Hanging Protocol Menu, as in the following example:

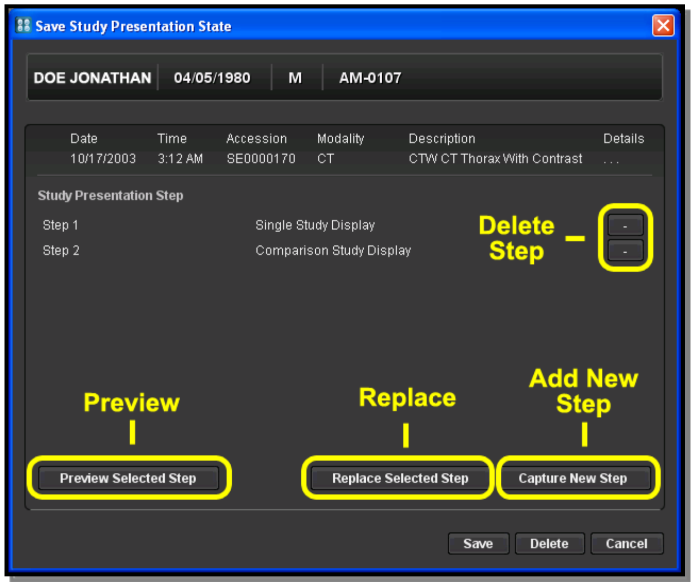


Update Study Presentation

NOTE: If no Study Presentation currently exists this study, this menu option will appear as **Create Study Presentation** instead.

NOTE: Presentation states created in the QC Editor cannot be edited in the Viewer, and any attempts to do so will not be retained.

Clicking on the Update Study Presentation option will cause the **Save Study Presentation State** window to be displayed, as in the following example:



The Save Study Presentation State Window

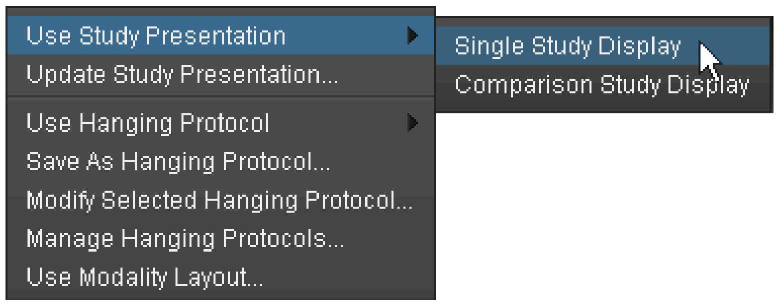
- To **add** the current display settings as a new step, click on the **Capture New Step** button.
- To **replace** an existing step with the current display settings, click on the description of the step to be replaced and then click on the **Replace Selected Step** button.
- To **preview** how an existing step will cause the study to be displayed, click on the description of the desired and then click on the **Preview Selected Step** button.
- To **delete** an existing step, click on the ▬ button to the right of that step's description.
- To **edit** the description of an existing step, click on the **Default Description** of the desired step and enter a new description.
- When finished, click on the **Save** button at the bottom of the window.

4.11.5. Selecting a Study Presentation Step

As described in subsection 4.11.4 above, Study Presentations can be created with multiple steps. By default, the first step will be applied to the study when it is first opened in the Merge PACS Viewer, but you can select a different a different step in one of the following ways:

a. Selecting a Study Presentation Step from the Hanging Protocol Menu

As described above, you can select a specific step of the Study Presentation, if any, that has been saved for this study from the **Use Study Presentation** option of the Hanging Protocol Menu, as in the following example:



Selecting a Study Presentation Step

b. Selecting a Study Presentation Step from the Viewer Toolbar

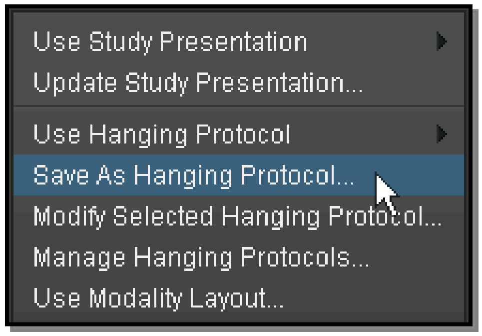
If there are multiple steps defined for the Study Presentation currently loaded, you can move among them by clicking on the left and right arrow buttons to the left of the Hanging Protocol button on the **Viewer Toolbar**, as in the following example:

Study Presentation Navigation Buttons

The numbers displayed on the Study Presentation icon, if any, represent how many additional or previous steps are available. In the example above, the third of eight steps is currently being displayed (*i.e.*, there are two previous steps and there are five additional steps available).

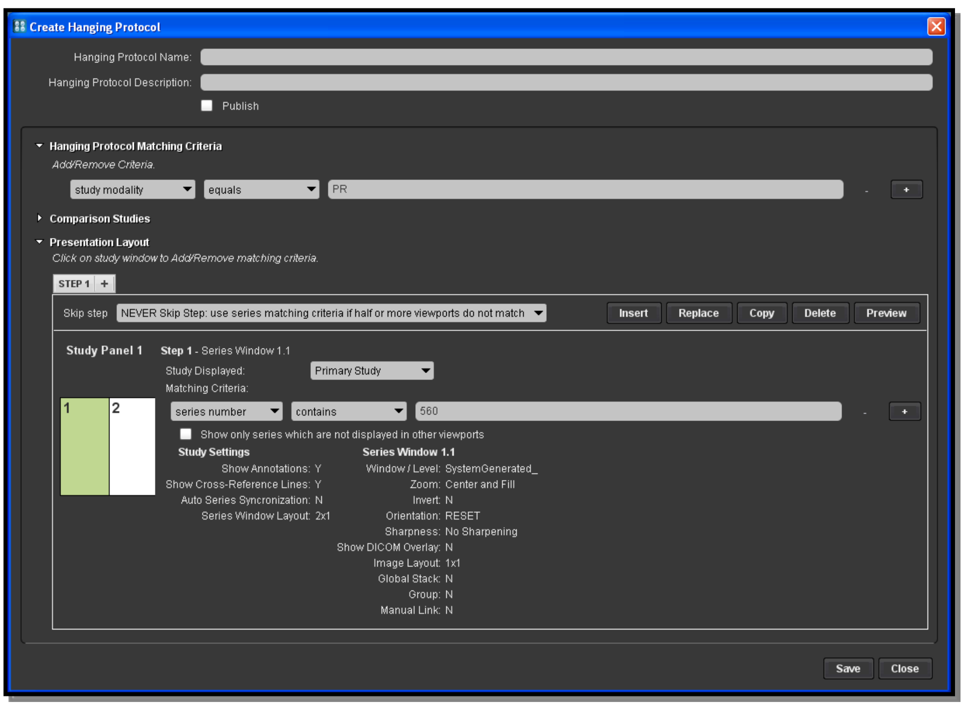
4.11.6. Creating a Hanging Protocol

Once you have manually adjusted the display of the study currently being viewed, you can choose to save those display settings as a Hanging Protocol for other studies of the same type. This is done by then selecting **Save As Hanging Protocol** from the Hanging Protocol Menu, as in the following example:



Creating a Hanging Protocol

Clicking on the Save As Hanging Protocol option will cause the **Create Hanging Protocol** window to be displayed, as in the following example:

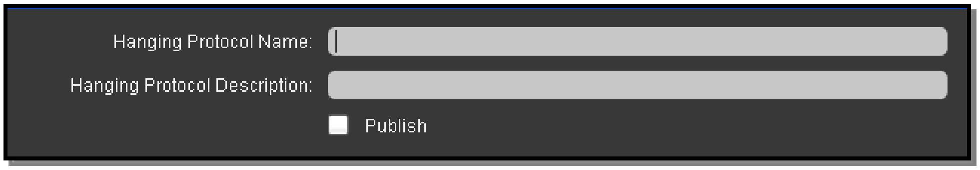


The Create Hanging Protocol Window

The Create Hanging Protocol window is divided up into several sections, described below, each of which can be used to customize the hanging protocol.

a. General Information

At the top of the Create Hanging Protocol window is the General Information section, as in the following example:



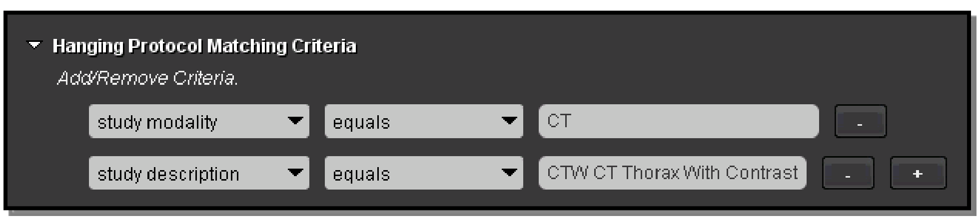
The General Information Section

The following information can be entered:

Option	Description
Hanging Protocol Name	Enter a name for this Hanging Protocol so it can be easily identified.
Hanging Protocol Description	If desired, enter additional descriptive information to help distinguish this protocol from other protocols for the same study type.
Publish	If you have the appropriate login privileges, you can click on the Publish box to allow other users to have access to this Hanging Protocol.

b. Matching Criteria

Below the General Information section is the Hanging Protocol Matching Criteria section, as in the following example:



The Hanging Protocol Matching Criteria Section

NOTE: You can choose to hide or display this section by clicking on the small triangle to the left of the section heading.

- By default, this section will already contain information to match the current study, but you can edit this information as follows:
  - To **edit** an existing matching criterion, select the desired options from the two drop-down menus for that criterion and enter the desired text in the matching field on the right.
  - To **add** a new criterion, click on the **[+]** button to the right of the last criterion listed.
  - To **delete** an existing criterion, click on the **[–]** button to the right of that criterion.

- To **reorder** the criteria and change the order in which they are applied, click on any criterion (any place other than on the drop-down menus, fields or buttons) and drag and drop it above or below another criterion.

- In general, the Hanging Protocol will match **all** the specified criteria. However, if you use the **same** criterion multiple times (*e.g.*, "study modality equals CR," "study modality equals DR"), the Hanging Protocol will match **any** of those criteria.
- If using the **equals** operator, the text must match exactly. Wildcard characters cannot be used.
- If using the **contains** operator, the following applies:
  - You can use an asterisk (*) as a wildcard to replace a single character or a string of characters to make the information more generic so as to apply to a larger number of studies. For example, "Study Description – contains – **Head CT * Contrast**" would apply to "Head CT **with** Contrast" , "Head CT **without** Contrast" and "Head CT **w/** Contrast."
  - You do not need to put an asterisk at the beginning or ends of words. For example, "Study Description – contains – **spin**" would apply to all studies that have the word "spin" in the study description (including "spine" and "spinal").
  - You can use the vertical separator (**|**) [**shift-**] as an "or" indicator. For example, ""Study Description contains **spin|pelvis**" would apply to all studies that either have the word "spin" in the study description **or** have the word "pelvis" in the description.
- You can use the **Regular Expression** operator to create flexible criteria, as in the following examples (note that all keywords should be lower case in the actual expressions):

Desired Criteria	Regular Expression
Starts with "Head"	`head.*`
Does not start with "Head"	`(?!head.*).*`
Ends with "Head"	`.*head`
Does not end with "Head"	`(?!.*head).*`
Contains "Head"	`.*head.*`
Does not contain "Head"	`(?!.*head.*).*`
Starts with "Head" and ends with "Neck"	`head.*neck`
Contains "Head" or "Neck"	`.*(head|neck).*`
Contains "Head" and "Neck" in order	`.*head.*neck.*`
Contains "Neck" or "Head" but not "Brain"	`(?!.*brain.*).*(neck|head).*`

c. Comparison Studies

Below the Hanging Protocol Matching Criteria section is the Comparison Studies section, as in the following example:

The Comparison Studies Section

NOTE: You can choose to hide or display this section by clicking on the small triangle to the left of the section heading.

- If one or more comparison studies are currently being displayed, this section will already contain information to match those studies. Otherwise, the entire section will be hidden except for the heading, and you can force it to be displayed by clicking on the small triangle next to the section header.
- Information in the Comparison Studies section can be edited as follows:
  - To **add** a listing for an additional **comparison study**, click on the **[+]** button to the right of the last study listed.
  - To **delete** a listing for an existing **comparison study**, click on the **[–]** button to the right of that study.
  - To **add** a new **matching criterion** for a study, click on the **[+]** button to the right of the last criterion listed for that study.
  - To **delete** an existing **matching criterion** for a study, click on the **[–]** button to the right of that criterion.
  - To **reorder** the comparison **studies** listed, click on the description of a study and drag and drop it above or below one of the other comparison studies.
  - To **reorder** the **criteria** for a study, click on any criterion (any place other than on the drop-down menus, fields or buttons) and drag and drop it above or below another.
- In general, the Hanging Protocol will match **all** the specified criteria. However, if you use the **same** criterion multiple times (*e.g.*, "study modality equals CR," "study modality equals DR"), the Hanging Protocol will match **any** of those criteria.
- If using the **equals** operator, the text must match exactly.
- If using the **contains** operator, the following applies:
  - You can use an asterisk (*) as a wildcard to replace a single character or a string of characters to make the information more generic so as to apply to a larger number of studies. For example, "Study Description – contains – **Head CT * Contrast**" would apply to "Head CT **with** Contrast" , "Head CT **without** Contrast" and "Head CT **w/** Contrast."
  - You do not need to put an asterisk at the beginning or ends of words. For example, "Study Description – contains – **spin**" would apply to all studies that have the word "spin" in the study description (including "spine" and "spinal").

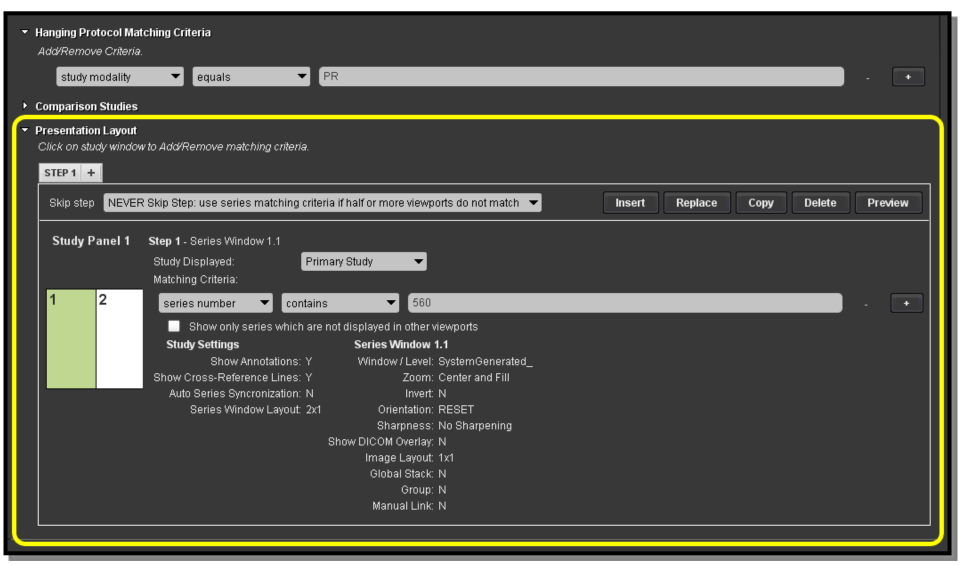
- You can use the vertical separator (**|**) [**shift-**] as an "or" indicator. For example, ""Study Description contains **spin|pelvis**" would apply to all studies that either have the word "spin" in the study description **or** have the word "pelvis" in the description.

- You can use the **Regular Expression** operator to create flexible criteria, as in the following examples (note that all keywords should be lower case in the actual expressions):

Desired Criteria	Regular Expression
Starts with "Head"	`head.*`
Does not start with "Head"	`(?!head.*).*`
Ends with "Head"	`.*head`
Does not end with "Head"	`(?!.*head).*`
Contains "Head"	`.*head.*`
Does not contain "Head"	`(?!.*head.*).*`
Starts with "Head" and ends with "Neck"	`head.*neck`
Contains "Head" or "Neck"	`.*(head|neck).*`
Contains "Head" and "Neck" in order	`.*head.*neck.*`
Contains "Neck" or "Head" but not "Brain"	`(?!.*brain.*).*(neck|head).*`

d. Presentation Layout

At the bottom of the Create Hanging Protocol window is the **Presentation Layout** section, as in the following example:

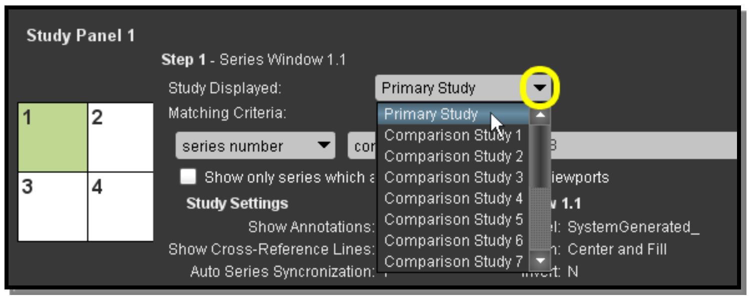


The Presentation Layout Section

If multiple studies are currently being displayed in separate study panels, information for each panel will have a separate listing (you will need to use the scroll bar at the right of the window to view the information for these panels). In addition, the information for each study panel will display the Series Layout currently being displayed within that panel.

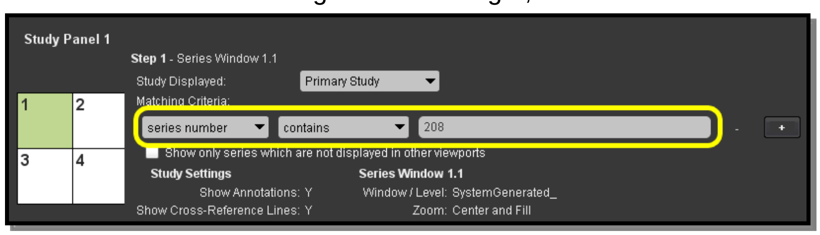
NOTE: The Study and Series layout information will always reflect the Study and Series layout currently being displayed within the Merge PACS Viewer and cannot be edited from the Create Hanging Protocol Screen.

- The following information can be edited for each of the available study panels:
  - To specify which **study** is to be displayed within this Study Panel, select the desired study from the drop-down **Study Displayed** menu, as in the following example:



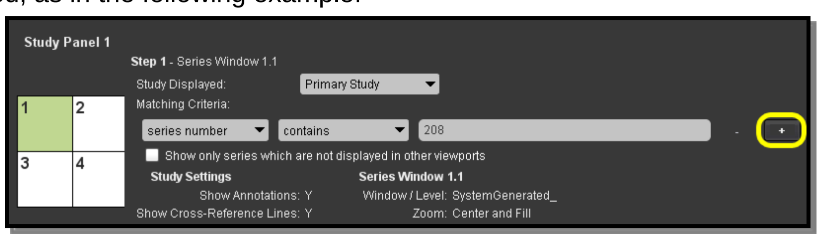
Specifying the Desired Study

  - If the current Series Layout is displaying multiple Series Viewports, click on the graphic representing that Series Viewport to change the matching criteria for that Series Viewport as follows:
    - To **edit** an existing matching criterion for a Series Viewport, select the desired options from the two drop-down menus for that criterion and enter the desired text in the matching field on the right, as shown below:



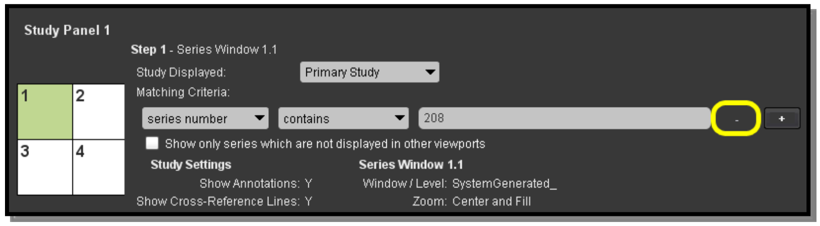
Editing Matching Criterion

    - To **add** a new criterion, click on the **[+]** button to the right of the last criterion listed, as in the following example:



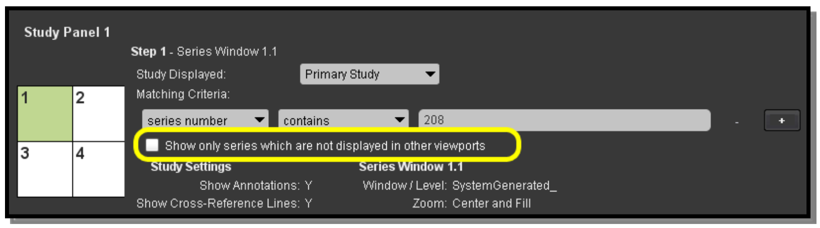
Adding a New Matching Criterion

- To **delete** an existing criterion, click on the **[–]** button to the right of that criterion, as in the following example:



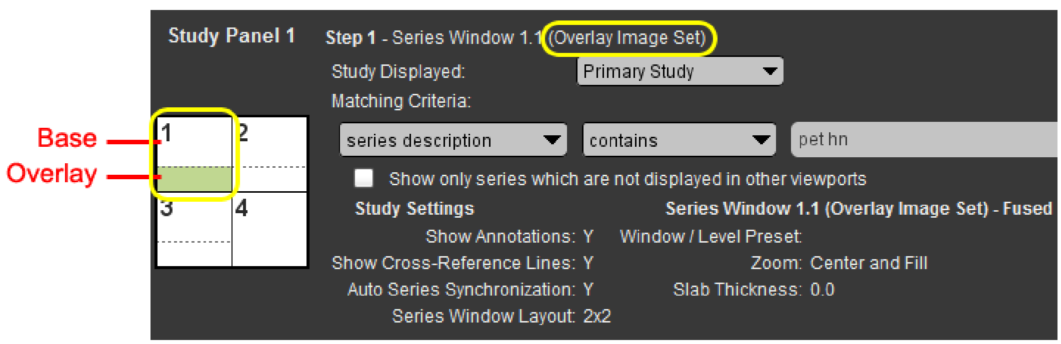
Deleting a Matching Criterion

- To **reorder** the criteria and change the order in which they are applied, click on any criterion (any place other than on the drop-down menus, fields or buttons) and drag and drop it above or below another criterion.
- To prevent series that are already displayed in other viewports from being displayed in the current viewport, select the **Show only series which are not displayed in other viewports** option, as in the following example:



Show Only Series Which Are Not Displayed in Other Viewports

◦ If the current Series Layout includes any fused MPR Viewports, as described in subsection 4.7.3 above, the graphic representing each fused MPR Viewport will be divided into a top and bottom section, as in the following example:



Fused MPR Viewport Representation

- Click on the top section of the graphic to change the matching criteria for the base series.
- Click on the bottom section of the graphic to change the matching criteria for the overlay series.

- You can also add, insert, replace, copy, delete and preview steps as follows:
  - To **add** a new step, make whatever changes are desired to the display within the Merge PACS Viewer and then click on the **[+]** button at the top of the Presentation Layout Section, as in the following example:

Adding a New Step

  - To **Insert** a step **before** an existing step, click on the tab corresponding to the desired existing step at the top of the Presentation Layout Section and then click the **Insert** button, as in the following example:

Adding a New Step

  - To **replace** an existing step, make whatever changes are desired to the display within the Merge PACS Viewer, click on the tab corresponding to that step at the top of the Presentation Layout Section and then click the **Replace** button, as in the following example:

Replacing a Step

  - To **copy** a step (which can then be edited as necessary), click on the tab corresponding to that step at the top of the Presentation Layout Section and then click the **Copy** button, as in the following example:

Copying a Step

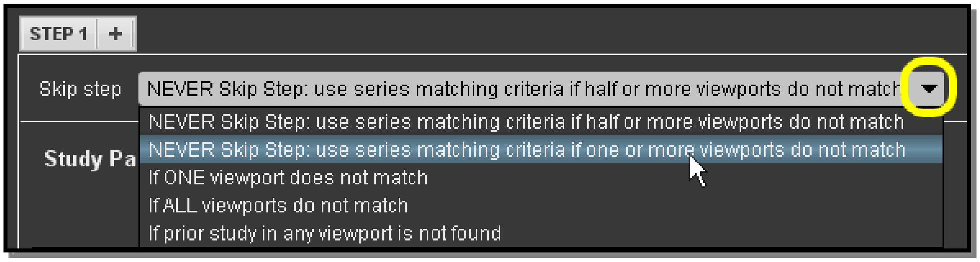
  - To **delete** a step, click on the tab corresponding to that step at the top of the Presentation Layout Section and then click the **Delete** button, as in the following example:

Deleting a Step

- To **preview** a step, click on the tab corresponding to that step at the top of the Presentation Layout Section and then click the **Preview** button, as in the following example:

Previewing a Step

- For each step, you can also select an option to skip the step under specified circumstances from the drop-down **Skip step** menu, as in the following example:



Skipping a Step

The following options are available:

- **Never skip step: use series matching criteria if half or more viewports do not match** – If more than half of the viewports have a matching series based on the matching criteria selected, non-matching viewports will be blank. Otherwise (if less than half of the viewports have a matching series), the system will try to populate hanging protocol viewports with the actual series data based on default series order.

  For example, suppose you have a hanging protocol Step 1 having three viewports for which you have selected this skip option and the rules have been specified in such a way that Viewport1 will be loading strictly axial series, Viewport2 will be loading strictly sagittal series and Viewport3 will be loading strictly coronal series. The following scenarios explain how this option will work:

  - If the study has matching series for all three viewports, all viewports will be loaded with matching series.
  - If the study has matching series for two of the three viewports, the two matching viewports will be loaded with matching series and the one non-matching viewport will be blank.
  - If the study has matching series for one of the three viewports, all the viewports will be loaded based on the default series order since less than half of the viewports are matching.
  - If the study has matching series for none of the three viewports, all the viewports will be loaded based on the default series order since less than half of the viewports are matching.

- **Never skip step: use series matching criteria if one or more viewports do not match** – If at least one series matches a viewport based on the selected matching criteria, the system will load all the matching viewports with corresponding matching series and all non-matching viewports will be blank. Otherwise (if none of the viewports have a matching series), the system, will attempt to populate hanging protocol viewports with the actual series data based on default series order.

  For example, suppose you have a hanging protocol Step 1 having three viewports for which you have selected this skip option and the rules have been specified in such a way that Viewport1 will be loading strictly axial series, Viewport2 will be loading strictly sagittal series and Viewport3 will be loading strictly coronal series. The following scenarios explain how this option will work:

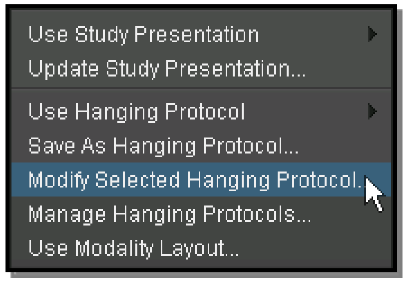
  - If the study has matching series for all three viewports, all viewports will be loaded with matching series.
  - If the study has matching series for two of the three viewports, the two matching viewports will be loaded with matching series and the one non-matching viewport will be blank.
  - If the study has matching series for one of the three viewports, the two non-matching viewports will be blank and the one matching viewport will be loaded with corresponding series.
  - If the study has matching series for none of the three viewports, all the viewports will be loaded based on the default series order.
- [Skip step] **If one viewport does not match**
- [Skip step] **If all viewports do not match**
- [Skip step] **If prior study in any viewport is not found**
- [Skip step] **If priors in all viewports are not found**

e. Saving the Hanging Protocol

When you have finished making whatever edits are desired, as described in the preceding paragraphs, click on the **Save** button at the bottom of the Create Hanging Protocol window. Alternatively, you can click on the **Close** button to exit the window without saving your changes.

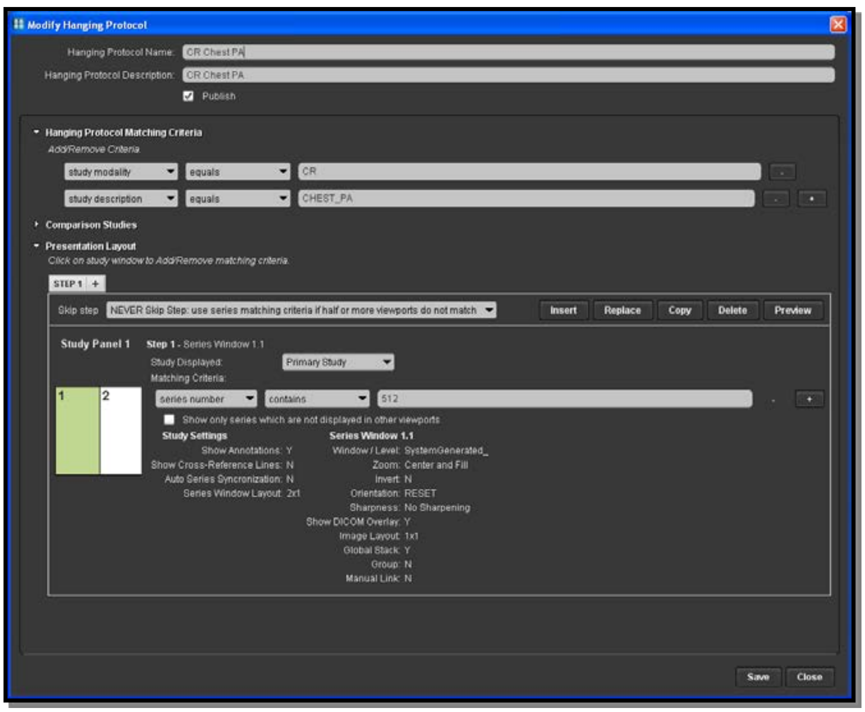
4.11.7. Modifying Current Hanging Protocol

If there is a Hanging Protocol currently being applied to the study displayed within the Merge PACS Viewer, you can modify that Hanging Protocol by selecting **Modify Selected Hanging Protocol** from the Hanging Protocol Menu, as in the following example:



Modifying the Current Hanging Protocol

Clicking on the **Save As Hanging Protocol** option will cause the **Modify Hanging Protocol** window to be displayed, as in the following example:

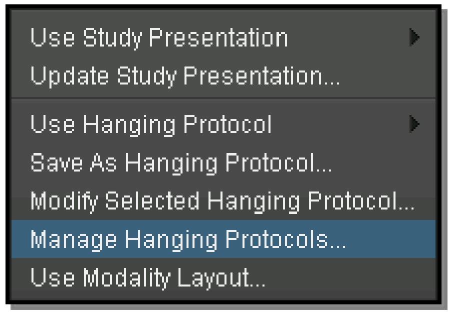


The Create Hanging Protocol Window

The Modify Hanging Protocol window has the same options available as the Create Hanging Protocol window described in subsection 4.11.6 above.

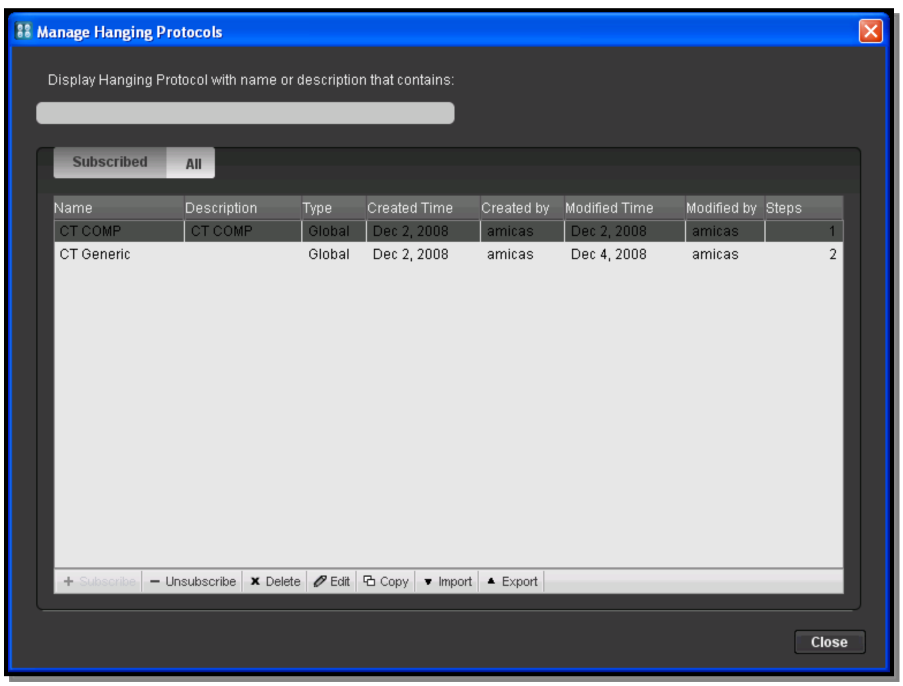
4.11.8. Managing Hanging Protocols

Depending on your login privileges, you can subscribe and unsubscribe to shared Hanging Protocols created by other users, as well as delete and edit Hanging Protocols you have previously created, by selecting **Manage Hanging Protocols** from the **Hanging Protocol Menu**, as shown in the following example:



Managing Hanging Protocols

Clicking on the Manage Hanging Protocols option will cause the **Manage Hanging Protocols** window to be displayed, as in the following example:



The Manage Hanging Protocols Window

The top of Manage Hanging Protocols window has the following two tabs:

Tab	Description
Subscribed	Displays the Hanging Protocols to which you are currently subscribed
All	Displays all hanging protocols that have been created.

Once you have clicked on the desired tab, select the desired Hanging Protocols and then use the buttons at the bottom of the window to do any of the following:

NOTE: You can select multiple Hanging Protocols by holding down the Ctrl or Shift key while clicking on the desired Hanging Protocols.

- Click on the **Unsubscribe** button to remove the selected Hanging Protocols from the list of Hanging Protocols available for your use.
- Click on the **Delete** button to delete the selected Hanging Protocols from the system.
- Click on the **Edit** button to modify the selected Hanging Protocols (this will cause the **Modify Hanging Protocol** window to be displayed, as described in subsections 4.11.6 and 4.11.7 above).

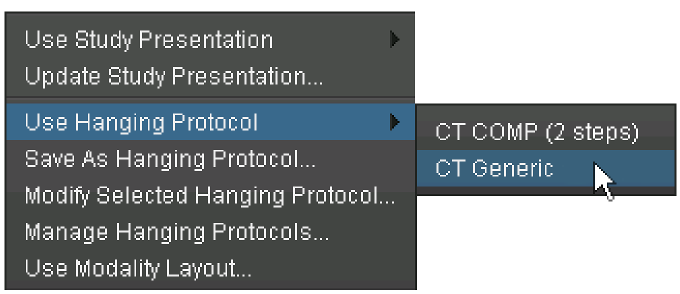
NOTE: When editing a Hanging Protocol from the Manage Hanging Protocols window, the **Preview** button will not be available to preview individual steps. The **Preview** button is only available when creating a new Hanging Protocol or modifying the Hanging Protocol that is currently applied to the study.

- Click on the **Copy** button to make duplicates of the selected Hanging Protocols that can then be edited.
- Click on the **Import** button to add one or more Hanging Protocols that have been saved to a local or network resource.
- Click on the **Export** button to save the selected Hanging Protocols to a local or network resource.

NOTE: If the list of subscribed or all Hanging Protocols is lengthy, you can reduce the number of entries displayed by entering text in the field at the top of the window. The window will then only display Hanging Protocols whose name or description contains that text.

4.11.9. Selecting a Hanging Protocol

If one or more hanging protocols apply to the study you are currently viewing, you can select a hanging protocol to use from the **Hanging Protocol Menu**, as shown in the example below:



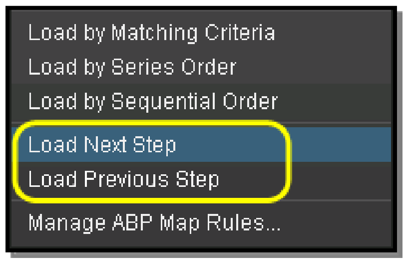
Selecting a Hanging Protocol

4.11.10. Loading the Next or Previous Hanging Protocol Step

As described in subsection 4.11.6 above, Hanging Protocols can be created with multiple steps. By default, the first step will be applied to the study when it is first opened in the Merge PACS Viewer, but you can select a different a different step in one of the following ways:

a. Selecting a Hanging Protocol Step from the Hanging Protocol Menu

If the Hanging Protocol or Study Presentation currently loaded has multiple steps defined, you can move forward and backwards through those steps by selecting the **Load Next Step** and **Load Previous Step** options from the **Hanging Protocol Menu**, as in the following example:



Navigating Through Steps

b. Selecting a Hanging Protocol Step from the Viewer Toolbar

If there are multiple steps defined for the Hanging Protocol currently loaded, you can move among them by clicking on the left and right arrow buttons to the left of the Hanging Protocol button on the **Viewer Toolbar**, as in the following example:

Hanging Protocol Navigation Buttons

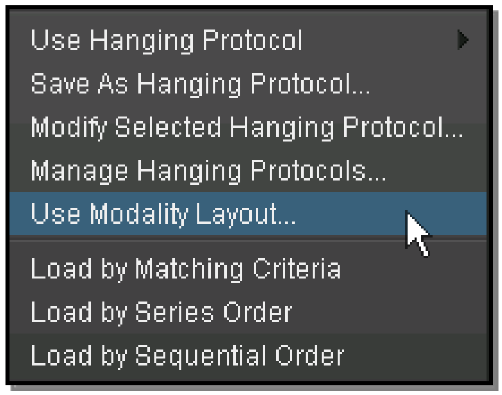
The numbers displayed on the Hanging Protocol icon, if any, represent how many additional or previous steps are available. In the example above, the third of eight steps is currently being displayed (*i.e.*, there are two previous steps and there are five additional steps available).

c. Keyboard Shortcuts

If there are multiple steps defined for the Hanging Protocol, you can press **F1 – F10** on your keyboard to go directly to a numbered step.

4.11.11. Using Modality Layout

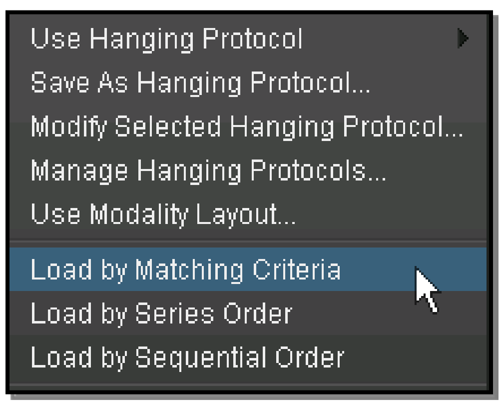
If no Study Presentation or Hanging Protocol matches the current study, the Merge PACS Viewer will initially display the study according to the default modality-specific layout that has been defined for this modality, if any. If, however, there is a Study Presentation or Hanging Protocol that matches and you would like to manually apply the default modality-specific layout, you can do so by selecting the **Use Modality Layout** option from the **Hanging Protocol Menu**, as in the following example:



Using Modality Layout

4.11.12. Loading by Matching Criteria

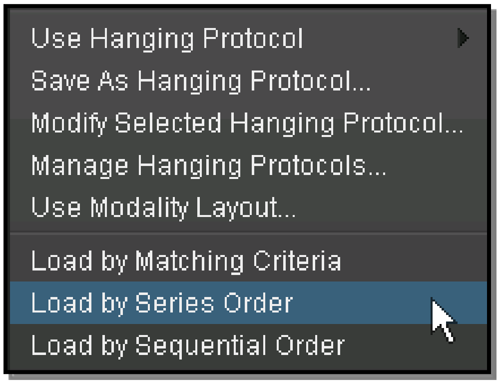
By default, Hanging Protocols are applied based on matching criteria. If you select a different option, as described below, you can return to this default setting by selecting the **Load by Matching Criteria** option from the **Hanging Protocol Menu**, as in the following example:



Load by Matching Criteria

4.11.13. Loading by Series Order

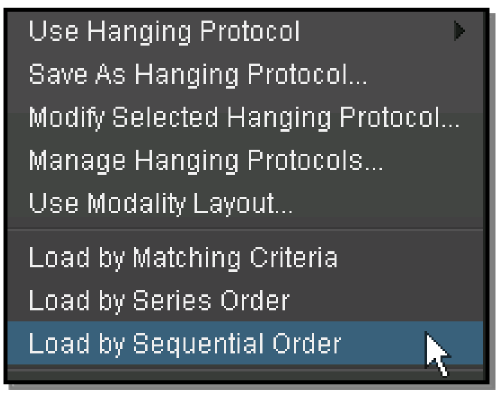
By default, Hanging Protocols are applied based on matching criteria. If you would like to have them applied according to Series order instead, select the **Load by Series Order** option from the **Hanging Protocol Menu**, as in the following example:



Load by Series Order

4.11.14. Loading by Sequential Order

By default, Hanging Protocols are applied based on matching criteria. If you would like to have them applied according to sequential order instead, select the **Load by Sequential Order** option from the **Hanging Protocol Menu**, as in the following example:



Load by Sequential Order

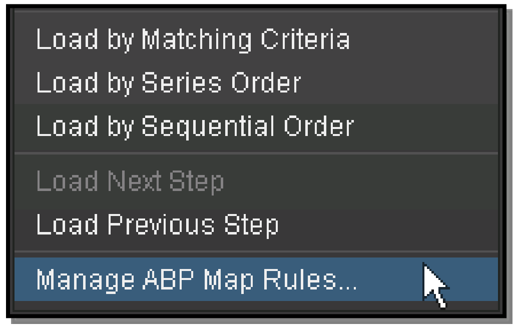
4.11.15. Managing Anatomical Body Part Mapping Rules

The Merge PACS Workstation can be optionally configured to utilize the concept of an **Anatomical Body Part (ABP)** to characterize a study based on the physical region of the scan. In general, an ABP map provides mapping of modality, procedure name/code, Study Description or other HL7/Dicom fields to specific body parts.

Once an ABP map has been defined, the various Anatomical Body Parts can be used to create matching criteria when creating a Hanging Protocol, as described in subsection 4.11.6 above.

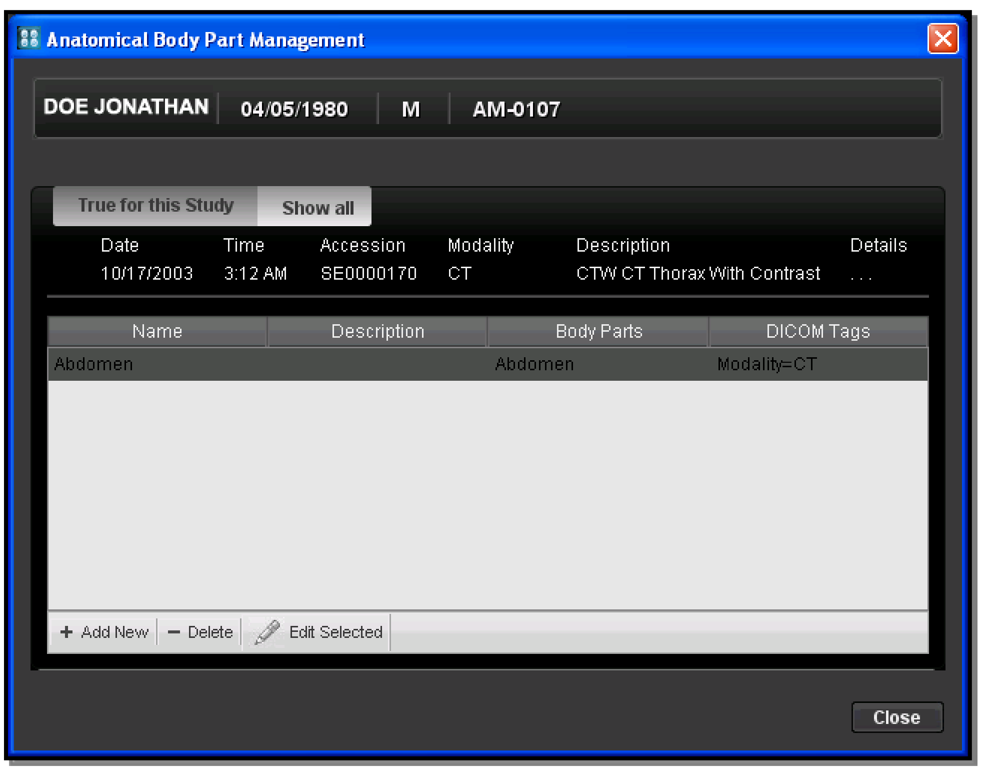
The ABP map can also be used for determining relevant priors, depending on how your user preferences have been set, as described in Chapter 25 below.

To edit the ABP map, select the **Manage ABP Map Rules** option from the **Hanging Protocol Menu**, as in the following example:



Editing the ABP Map

Clicking on the Manage ABP Map Rules option will cause the **Anatomical Body Part Management** window to be displayed, as in the following example:



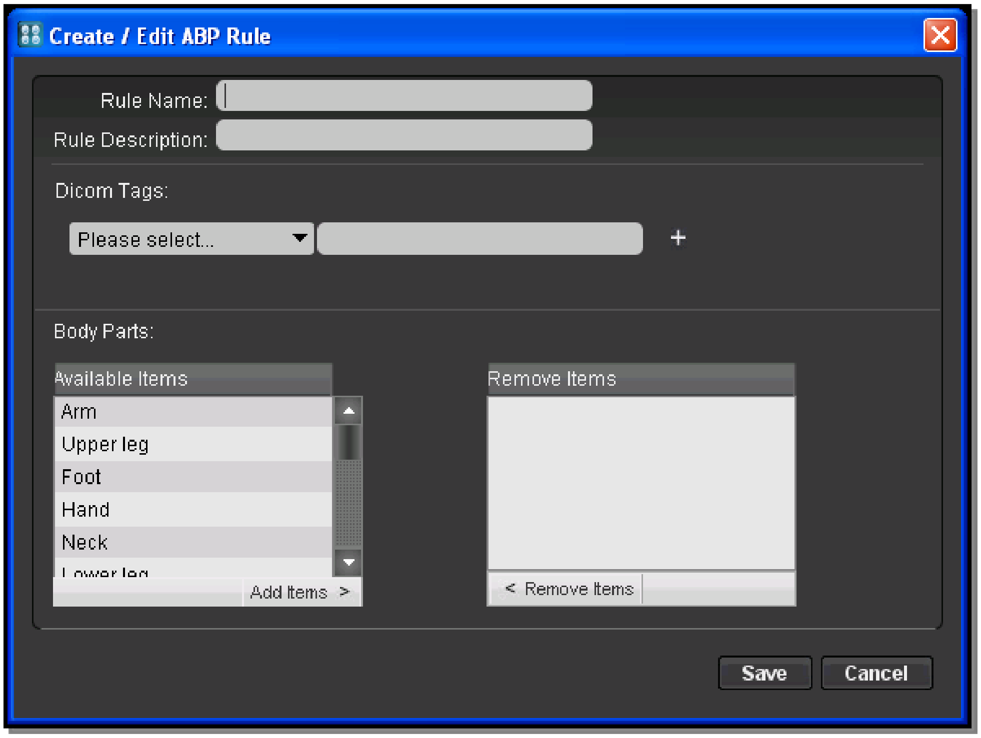
The Anatomical Body Part Management window

The top of Anatomical Body Part Management window has the following two tabs:

Tab	Description
True for this Study	Displays the body part rules that apply to the current study.
Show all	Displays all body part rules.

At each tab, you can use the buttons at the bottom of the window to do any of the following:

- Click on the **Add New** button to create a new body part rule. When you click on the Add New button, the **Create / Edit ABP Rule** window will be displayed, as in the following example:

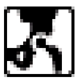


The Create / Edit ABP Rule Window

  - Enter a name and, if desired, a brief description for this rule in the fields at the top of the window.
  - Select the type of DICOM Tag to be matched from the drop-down menu and enter the text to be matched in the field to the right.
  - If necessary, click on the **[+]** button to add additional DICOM tags to be matched.
  - If more than one DICOM tag has been defined, you can click on the **[–]** button next to a DICOM tag to remove it from the rule.
  - Click on the body part you wish to map to the DICOM tags in the **Available Items** window and then click on the **Add Items** button (or else just double-click on the desired body part to add it). Repeat for additional body parts.
  - If you need to delete a body part from the rule, click on the unwanted body part in the **Remove Items** window and then click on the **Remove Items** button (or else just double-click on the desired body part to add it).
  - When finished, click on the **Save** button at the bottom of the window.
- Click on the **Delete** button to remove the selected rule entirely.

- Click on the **Edit Selected** button to make changes to a previously defined rule. This will cause the **Create / Edit ABP Rule** window described above to be displayed.

4.12. Using Orthopedic Templating Toolsets



The OrthoLink icon on the RealTime Worklist and the Patient Record, as shown on the left, provides integration with third-party orthopedic templating toolsets such as OrthoView™ or Merge OrthoCase™. If your workstation has such a toolset installed, clicking on the OrthoLink will let you load selected images into that toolset.

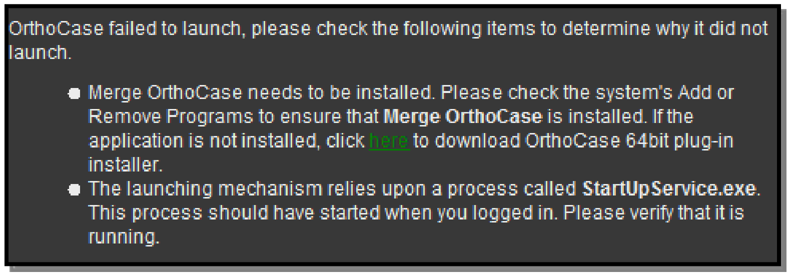
NOTE: OrthoLink is only available with CR images.

If your Workstation is configured to work with OrthoView, clicking on the OrthoLink icon will cause a pop-up OrthoLink Staging Dialog to appear, as shown in the following example:

OrthoLink Staging Dialog

- Select the image you want to load into the orthopedic toolkit by clicking on the image description in the staging dialog. Hold down the **Ctrl** key while clicking to select multiple images.
- Enter your OrthoView username in the field desired and, if desired, click the "Save Username" checkbox to have your username entered automatically the next time you use OrthoLink.
- Click the **Launch OrthoView** button to start OrthoView and pass the selected images to it.

If your Workstation is configured to work with Merge OrthoCase, OrthoCase will be launched automatically in a separate window. If OrthoCase is not currently installed on your workstation, a warning dialog such as the following will be displayed that will let you install OrthoCase by clicking on a link:



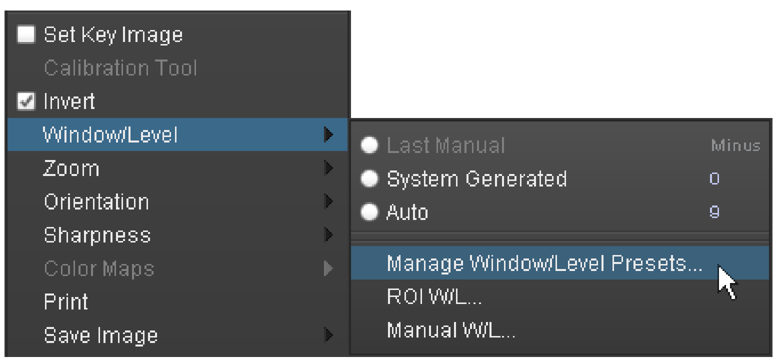
OrthoCase Launch Failure

For information on using the specific orthopedic templating toolset installed on your workstation, refer to the user documentation specific to that toolset.

4.13. Managing Window/Level Presets

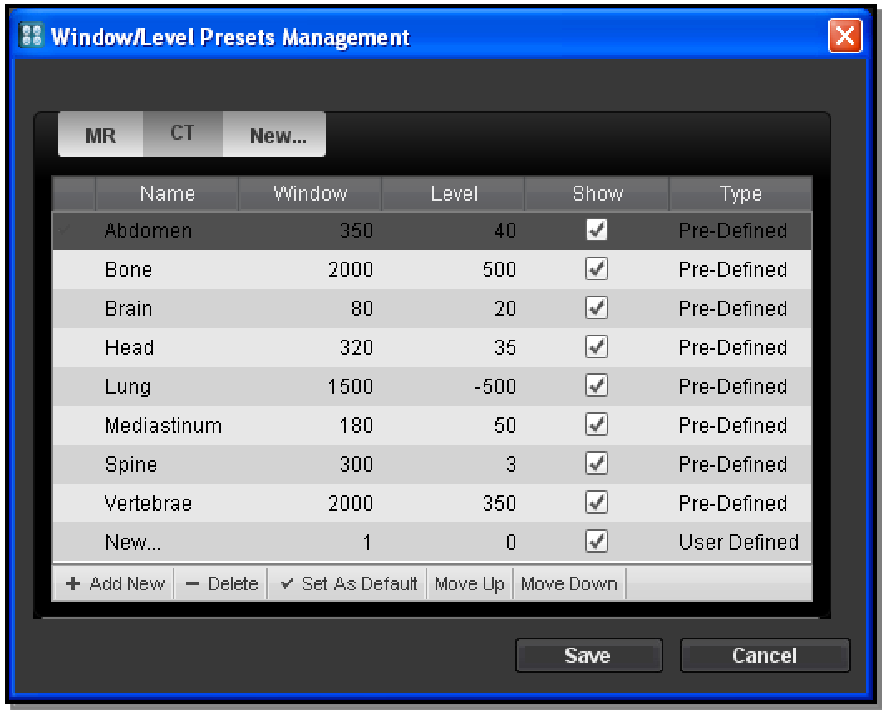
As described in subsection 4.4.1 above, various Window and Level presets are available from the **Series Right-click Menu**. You can create new presets as well as edit or delete any existing preset for a particular modality type. Any custom window/level presets you create will be stored with your user profile and will be available to you regardless of which machine you log onto.

To access the Window/Level Presets Manager, select **Manage Window Level Presets** from the **Window/Level** sub-menu of the **Series Right-click Menu**, as shown in the following example:



Using the Right-click Menu to Manage Window/Level Presets

This will bring up the **Window/Level Presets Manager** as shown in the example below:

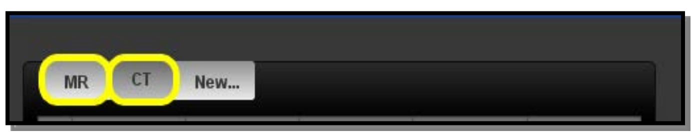


The Windows/Level Presets Manager

At the Window/Level Presets Manager you can make changes to existing presets or create new presets.

4.13.1. Editing Existing Window/Level Presets for a Modality

If you want to make changes to presets that have already been created for a specific modality, including adding new presets for that modality, click on the tab corresponding to that modality at the top of the window, as in the following example:

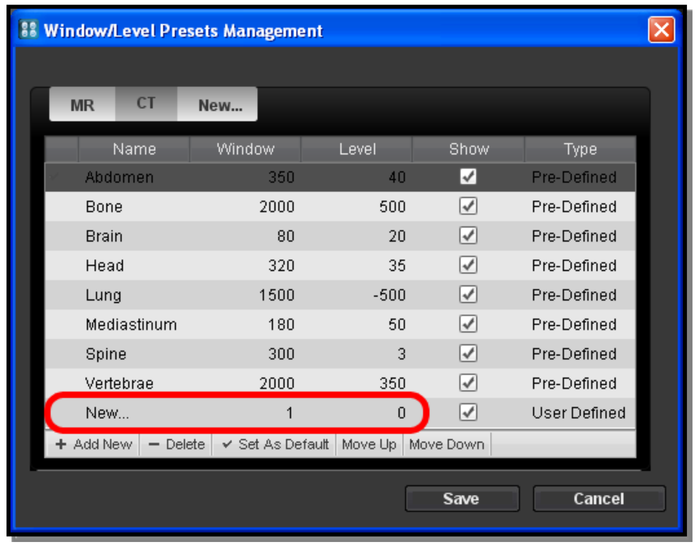


Modality Tabs

NOTE: If the modality for the study currently being viewed has Window/Level presets associated with it, the presets for that modality will be displayed by default.

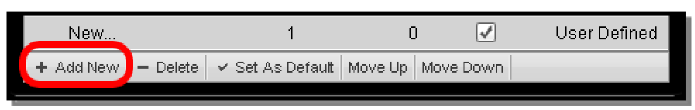
NOTE: CT studies have a set of predefined Window/Level presets that cannot be edited or deleted. You can, however, choose not to show them and/or add new presets for CT studies, as described below.

- To **edit** an existing preset for this modality, **double-click** on the **Name**, **Window** and **Level** columns for that preset to edit the information displayed, as well as select whether or not this preset should be displayed as an option in the **Series Right-click Menu**.
- To create a **new** preset for this modality, **double-click** on the **Name**, **Window** and **Level** columns for the default **New…** preset that appears at the bottom of the list, as in the following example:



Entering a New Preset for this Modality

If you need to add additional presets, click on the **Add New** button at the bottom of the window to add a new blank preset, as in the following example:

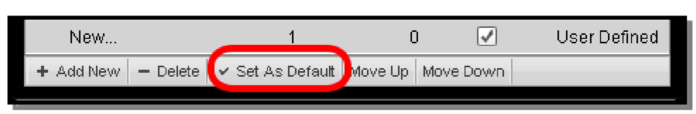


Adding Another New Preset

- To **delete** an existing preset, highlight the unwanted preset by clicking on it once and then click the **Delete** button at the bottom of the window, as in the following example:

Deleting a Preset

- To set one of the presets as the **default** for this modality, highlight the desired preset and then click the **Set As Default** button at the bottom of the window, as in the following example:



Setting a Default Preset

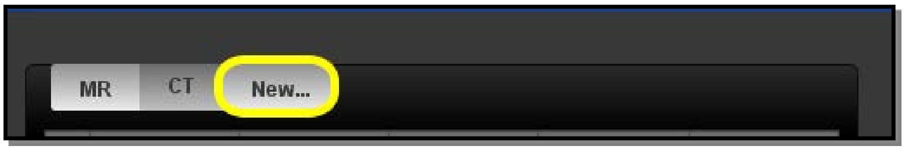
- To **reorder** the way the presets appear in the Series Right-click Menu, highlight the desired preset and then click the **Move Up** and **Move Down** button at the bottom of the window as needed, as in the following example:

Repositioning a Preset

- When you have finished making the desired additions, deletions and/or edits, click on the **Save** button at the bottom of the screen to record your changes. Note that any preset that has been created or edited will have a check mark in the first column to indicate that it contains changes that will be saved.

4.13.2. Defining New Window/Level Presets for a Modality

If you want to define Window/Level presets for a modality that does not already have presets associated with it, click on the **New** tab at the top of the window, as in the following example:



Defining a New Set of Window/Level Presets

You will then be prompted to enter the name of the modality, as in the following example:

Entering the Name of the Modality

- Enter the desired name and click the **OK** button to save the name and return to the main Window/Level Preset window.
- You can then define and edit the various presets as described in subsection 4.13.1 above.

4.13.3. Deleting a Set of Modality Window/Level Presets

If necessary, you can delete an entire set of Window/Level presets for a given modality. When you click on the tab for the modality at the top of the screen, a white **X** will appear next to the modality's name, as in the following example:

Deleting a Set of Presets

NOTE: The Window/Level presets for CT studies is hard coded and cannot be deleted.

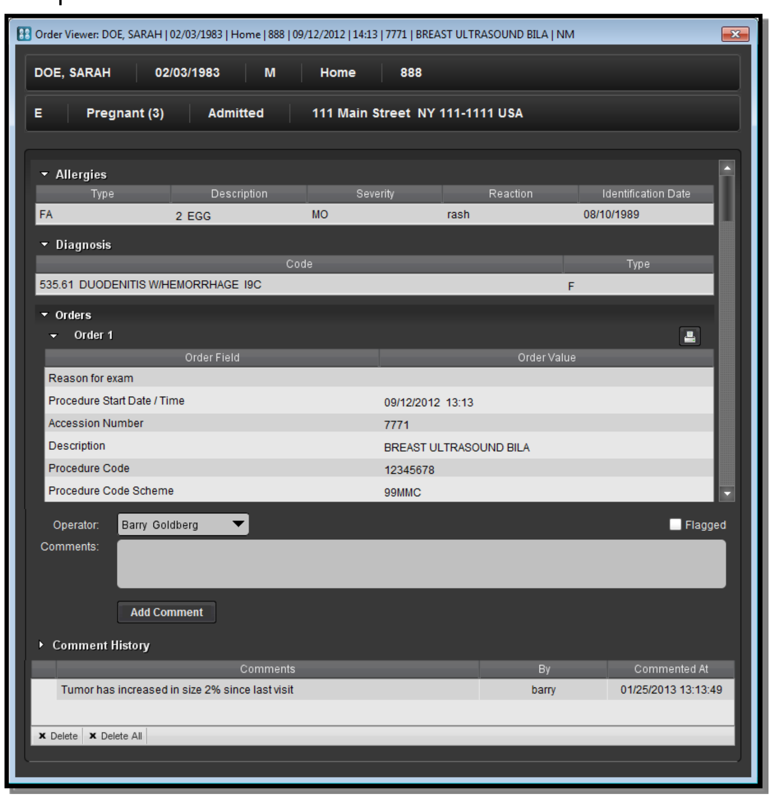
Chapter 5. Viewing Orders and Comments

As described in Sections 3.3, 3.4, 3.8, and 4.1 above, orders, comments and warnings associated with a specific study or exam can be viewed either via a separate pop-up **Order Viewer** window or a separate pop-cup **Comments Viewer**.

5.1. The Order Viewer

5.1.1. Overview

The **Order Viewer** icon, as illustrated to the left, lets you view information about any orders, comments or warnings associated with a study or exam, as well as additional information such as allergies, diagnosis and questionnaires (where available), in the **Order Viewer**, as in the following example:



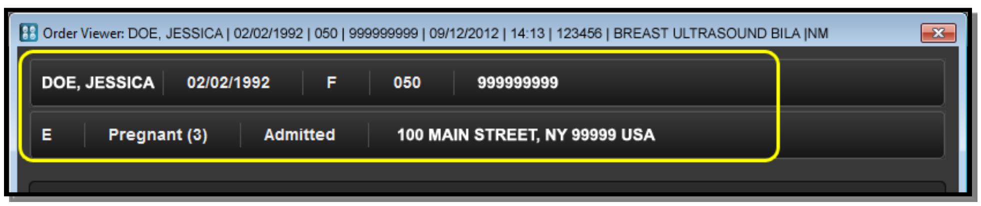
The Order Viewer

Note that, when accessed from the RTWL, the appearance of the Order Viewer icon will change depending on whether there is just an order associated with a study, just comments, or both:

Icon	Description
	There is an order associated with this study.
	The most recent comment for this study was manually flagged by the commenter.
	There is an order associated with this study and the most recent comment for this study was manually flagged by the commenter.

5.1.2. Viewing General Patient Information

The top section of the Order Viewer displays general information about the patient, as in the following example:



General Patient Information

The following information is included:

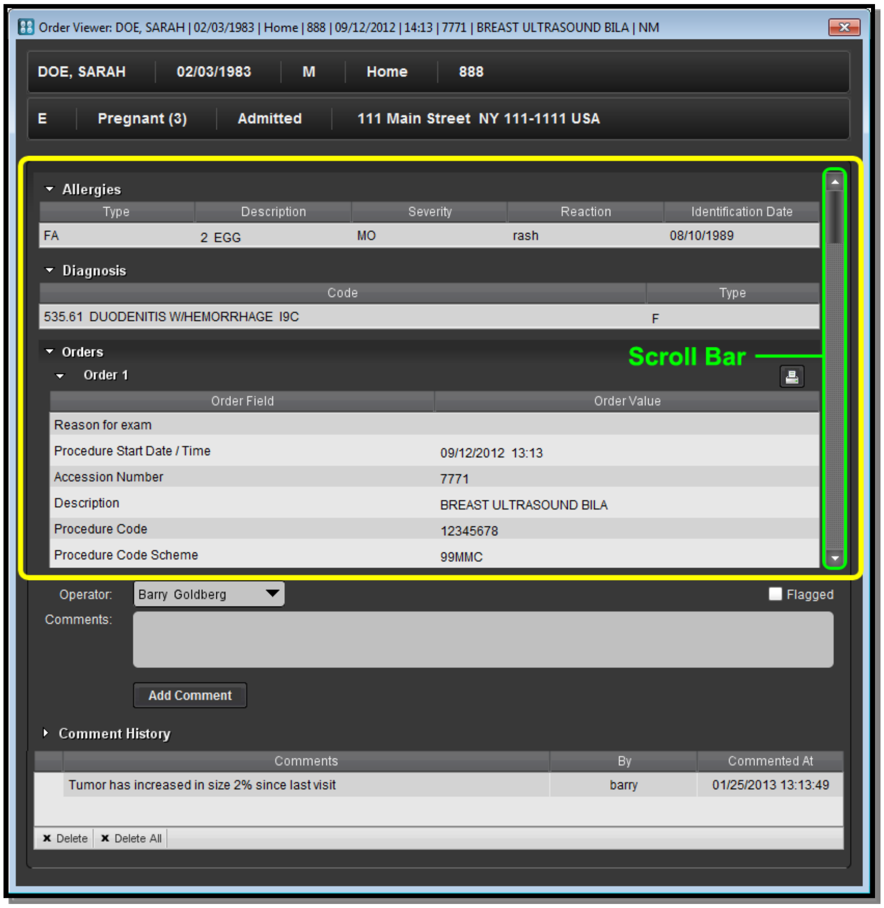
- **Name**
- **Date of Birth**
- **Gender**
- **IPID**
- **MRN**
- **VIP Indicator** (if available)
- **Pregnancy Status** (if available)
- **Admission Status**
- **Address**

NOTE: **VIP Indicator**, **Pregnancy Status** and **Admission Status** are received directly from the third-party Electronic Medical Record (EMR)/Ordering System and cannot be edited from within Merge PACS, although Pregancy Status will be shown as "Unknown" if no pregnancy status is provided by the EMR/Ordering System. If any of this information is incorrect, contact your PACS Administrator to have it updated in that third-party system.

NOTE: The availability of the Pregnancy Status can be configured on a site-by-site basis.

5.1.3. Viewing Allergies, Diagnoses, Orders and Questionnaires

The center section of the Order Viewer has separate panels to display Allergy information, Diagnosis information, the actual Order(s) and any Questionnaire associated with this exam, as in the following example:



Allergies, Diagnosis, Orders and Questionnaire

NOTE: The **Allergies** and **Diagnosis** panels are optional and may be hidden on a site-wide basis.

- If there is too much information to be displayed within this center section, a scroll bar will appear on the right-hand side to let you scroll through the various panels, as in the example above.
- Each panel within this section can be expanded or contracted by clicking on the white triangle to the left of the panel's name.
- When there is too much information to be displayed within this center section, a site preference determines which panel should be shown by default (*e.g.*, the preference might be set to always scroll down to the bottom of the section and show the Questionnaire panel). Regardless of which panel is shown by default, however, you can always use the scroll bar to view the other panels.

a. Viewing Allergy Information

If this order has any allergy information associated with it, you can view/hide it by clicking on the small triangle next to **Allergies**, as in the following example:

Allergy Information

NOTE: Allergy information is received directly from the third-party Electronic Medical Record (EMR)/Ordering System and cannot be edited from within Merge PACS. If any of this information is incorrect, contact your PACS Administrator to have it updated in that third-party system.

b. Viewing Diagnosis Information

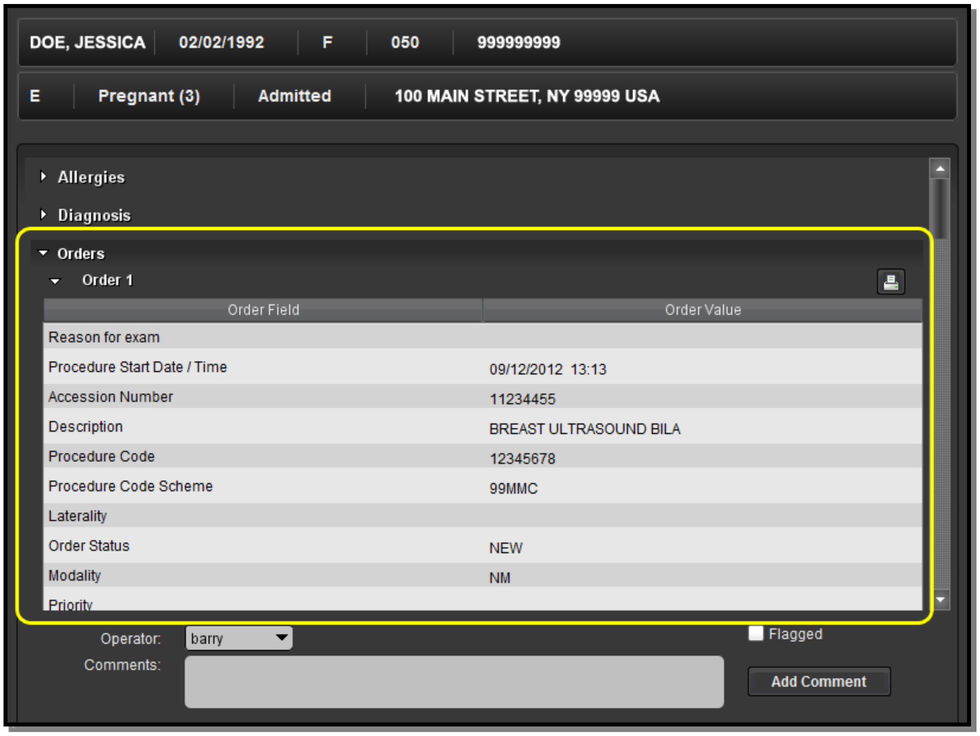
If this order has any diagnosis information associated with it, you can view/hide it by clicking on the small triangle next to **Diagnosis**, as in the following example:

Diagnosis Information

NOTE: Diagnosis information is received directly from the third-party Electronic Medical Record (EMR)/Ordering System and cannot be edited from within Merge PACS. If any of this information is incorrect, contact your PACS Administrator to have it updated in that third-party system.

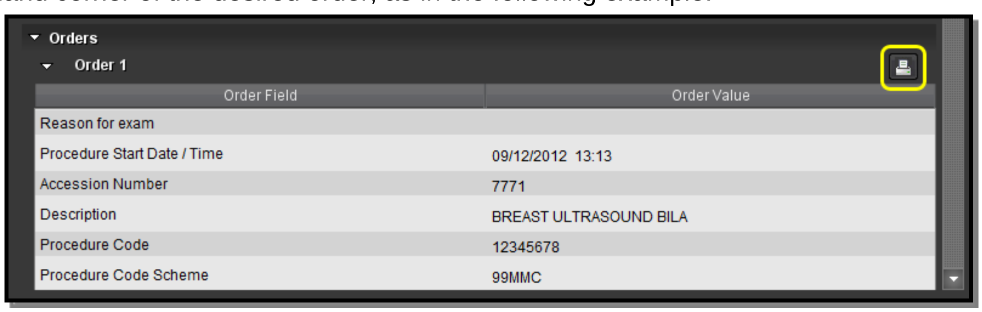
c. Viewing and Printing Orders

If there are any orders associated with this exam, they will be displayed in the Orders section of the Order Viewer, as in the following example:



Viewing an Order

- If there are multiple orders, each order will be displayed in its own subsection and you can collapse or expand the display of each order individually by clicking on the small white triangle next to the heading for that order.
- To print out a copy of an order, click on the little printer icon shown in the upper-right hand corner of the desired order, as in the following example:



Printing an Order

d. Viewing Questionnaires

If your system is configured to include technician-entered questionnaires as part of the order information and there is such a questionnaire for this exam, the questions and responses to those questions will be displayed below the order information, as in the following example:

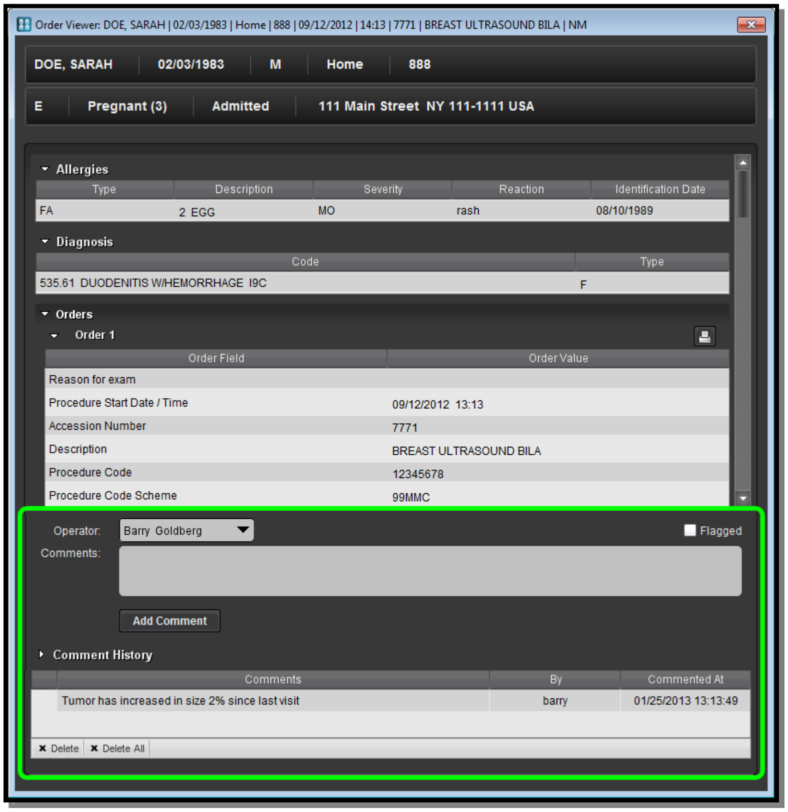
Questionnaire

Acuity Questions	Answers
Vena Cava filt/shunt?	N
Pacemaker/Internal Defibrillator?	N
Shrapnel?	N
Jnt replacement/prost./rods?	N
Are You Claustrophobic?	N
Hx. of metal in either eye?	N
Cochlear Implant?	N

Questionnaire Questions and Responses

5.1.4. Adding, Viewing and Deleting Comments

The bottom section of the Order Viewer lets you add, view and delete comments for this exam, as in the following example:



Adding, Viewing and Deleting Comments

a. Adding Comments

The Add Comments section lets you add a comment to this exam that can be viewed by other users, as shown in the following example:

Adding a Comment

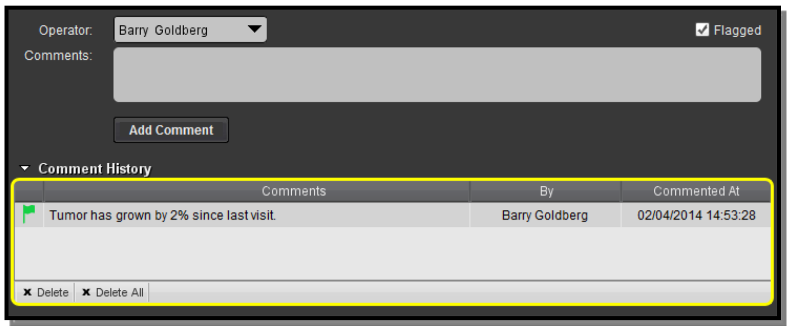
To add a comment:

1. Select a different user from the drop-down **Operator** field if necessary (*e.g.*, if you are entering this comment on somebody else's behalf).
2. Enter the desired text in the **Comments** field.
3. If you want this comment to be flagged throughout the system, make sure that the checkbox marked "**Flagged**" is selected.

NOTE: If the most recent comment for a study is flagged, a green flag icon will be displayed in various places throughout the system, including on the RTWL, the Query Page, the Patient Record and the Image Viewer.

4. Click the **Add Comment** button to submit your comment.

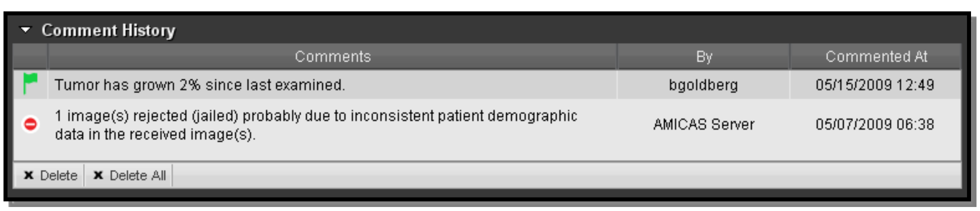
   *The comment is added to the **Comment History** section, as in the following example:*



Newly Added Comment

b. Viewing Comments and Warnings

Any manually-entered comments and system-generated warnings are displayed in the Comments History section at the very bottom of the Order Screen, as in the following example:

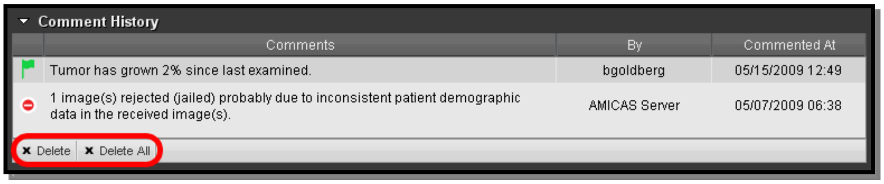


Viewing Previously Entered Comments and Warnings

- You can toggle the display of the list of comments and warnings by clicking on the small white triangle to the left of the Comment History.
- You can resize any of the columns in the Comments History section by clicking on the space between any two column headers and dragging the header to the desired size. The new column sizes will be saved with your user preferences and will appear the same the next time you access the Order Viewer, even after logging out and logging back in to the Workstation.

c. Deleting Comments

Comments that have been manually entered (as opposed to system-generated warnings) can be deleted either individually or all together from the Comment History section, as in the following example:



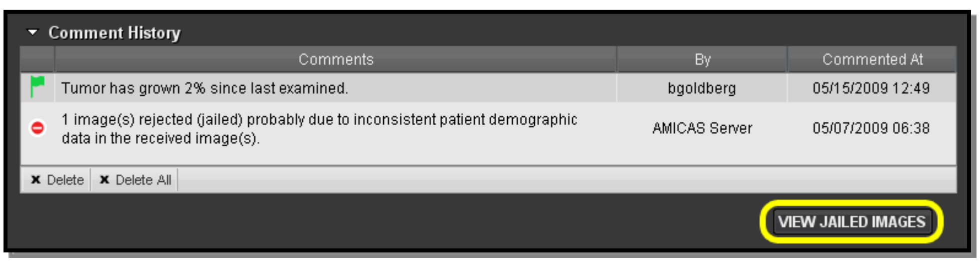
Deleting Manually-Entered Comments

NOTE: You may need to manually resize the bottom of the Order Viewer window to display the delete buttons.

- To delete a specific comment, clicking on the comment once to highlight it and then clicking on the **Delete** button at the bottom of the Comment History section.
- To delete all comments, click on the **Delete All** button.

5.1.5. Accessing Jailed Images

If there are any jailed images for this study, a **VIEW JAILED IMAGES** button will be displayed at the bottom of the window, as in the following example:

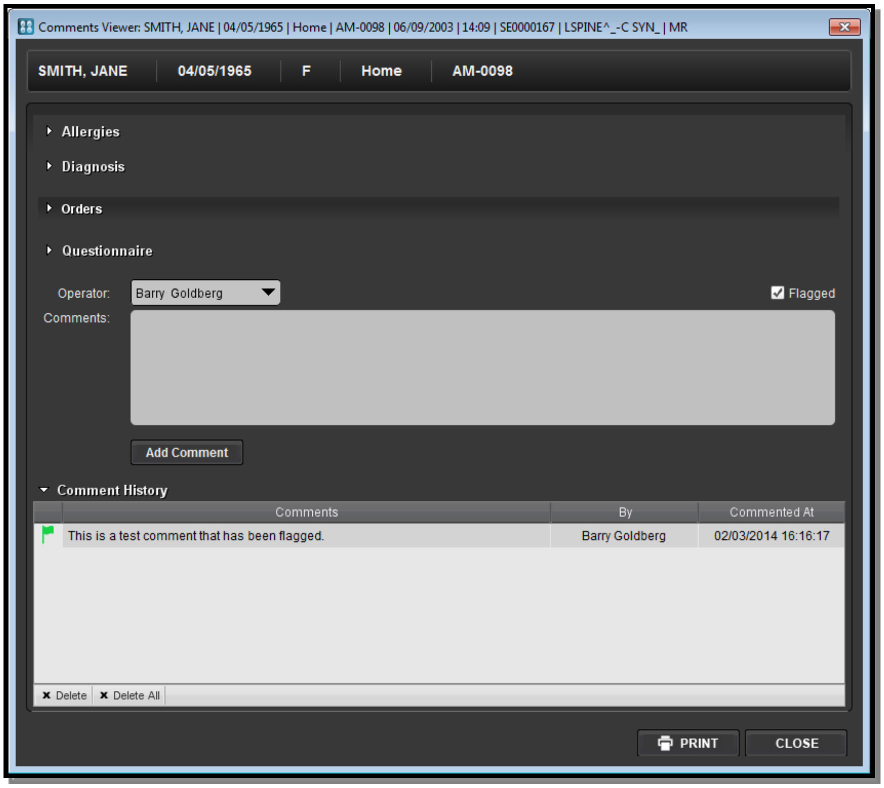


View Jailed Images Button

For information on viewing jailed images, refer to Chapter 18 below.

5.2. The Comments Viewer

The Comments Viewer is accessed by clicking on the **Comments Viewer** icon, the **Comments** flag or the **Warning** flag, as illustrated to the left. It is functionally identical to the Order Viewer, except that the top of the window does not display as much information and you can print all information instead of just the order, as shown in the following example:



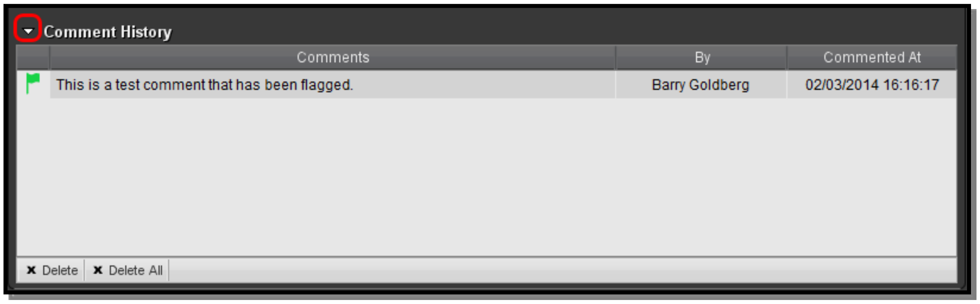
Comments Viewer

Depending on your user privileges and how your system is configured, you can also use the Comments Viewer to do the following:

- View general patient information
- View allergy information, if any
- View diagnosis information, if any
- View the order associated with a study, if any
- View the questionnaire associated with a study, if any
- Access jailed images, if any
- Print any of the information displayed within the Comments Viewer

5.2.1. Showing and Hiding Information

The visibility of each section of the Comments Viewer can be toggled on and off by clicking on the triangle to the left of that section, as in the following example:



Displaying/Hiding a Section

Unlike with the Order Viewer, when you choose to show or hide particular sections, your choices will be saved with your user preferences so the same sections will be showed or hidden the next time you access the Comments Viewer, even after logging out and logging back in to the Workstation.

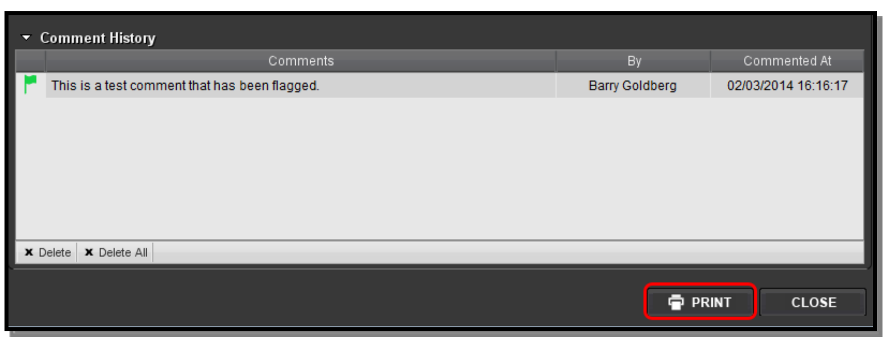
NOTE: You may need to expand the Comment History section the first time you open the Comment Viewer.

5.2.2. Printing from the Comments Viewer

Unlike the Order Viewer, which only lets you print the order associated with a study, the Comments Viewer lets you print all information that is currently displayed within the Viewer.

To print information from the Comments Viewer:

1. Expand each section of the Comments Viewer you want to print, making sure to hide any section you do not want to print.
2. Click on the **PRINT** button at the bottom of the Comments Viewer, as in the following example:



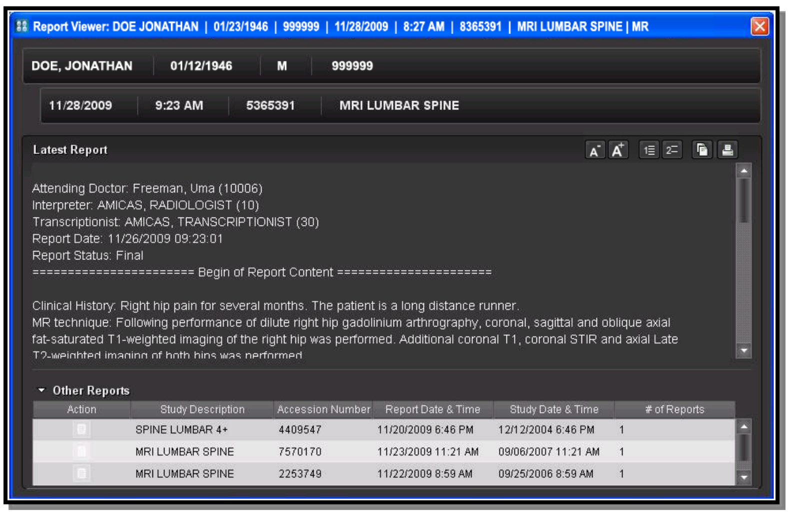
Printing All Displayed Information

Chapter 6. Viewing Reports

As described in Sections 3.3, 3.4, 3.8, 3.8 and 4.1 above, reports associated with a specific study or exam can be viewed via a separate pop-up **Report Viewer** window.

6.1. Overview

The **Report Viewer** icon, as illustrated to the left, lets you view reports associated with a specific study or exam in the **Report Viewer**, as in the following example:



The Report Viewer

6.2. Changing the Display Font Size

If desired, you can change the font sized used to display the report by clicking on either of the **Font Size** icons displayed in the upper-right hand corner of the Report Viewer, as in the following example:

Changing the Font Size

NOTE: This feature only affects the size of the text displayed within the Report Viewer and does not affect the size of the text when printed out.

6.3. Changing the Line Spacing

If desired, you can change the line spacing for the displayed report by selecting one of the two available line spacing icons displayed in the upper-right hand corner of the Report Viewer, as in the following example:

Changing the Line Spacing

NOTE: This feature only affects the way the text is displayed within the Report Viewer and does not affect the text when printed out.

6.4. Copying a Report

To copy the text of a report (*e.g.*, so that you can paste it into an e-mail or a document), use your mouse to select the desired text and then click on the little copy icon displayed in the upper-right hand corner of the Report Viewer, as in the following example:

Copying a Report

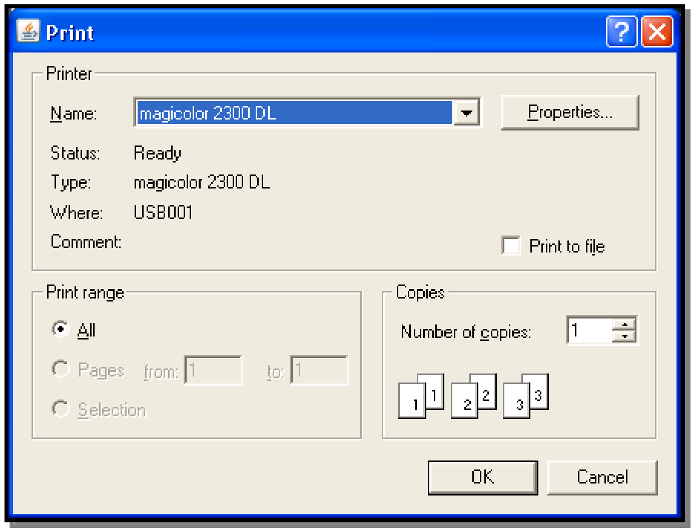
You can also click on the copy icon without selecting any text to copy all the text of the report.

6.5. Printing a Report

To print a copy of the report, click on the little printer icon displayed in the upper-right hand corner of the Report Viewer, as in the following example:

Printing a Report

This will cause a Print dialog to display, as in the following example:



Print Dialog

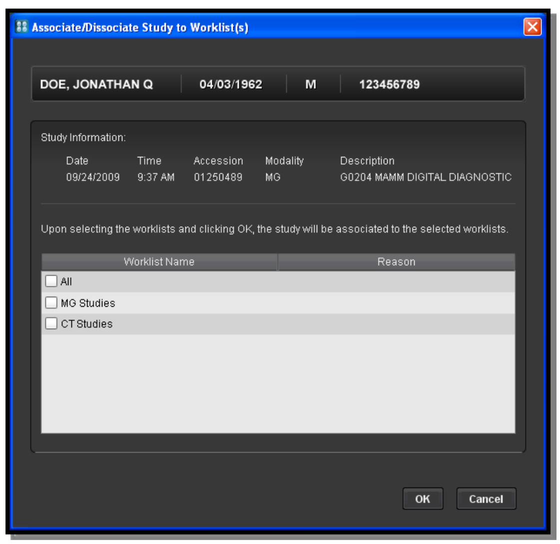
Chapter 7. Associating and Dissociating Studies to and from Worklists

As described in subsections 3.3.4, 3.5.4, 0, 3.8.1 and 4.1.3 above, if you accessed a particular exam or study via RealTime Worklist, you can add that study or exam to another worklist to which you have access. You can also remove the study or exam from another worklist to which you have previously added it.

7.1. Associating Studies to a Worklist

You can add a study or exam to another worklist to which you have access by clicking on the **Associate/Dissociate Study** icon from a worklist, the Query Page, the Patient Record, or the Study Toolbar within the Merge PACS Viewer, as shown on the left.

When you click on the Associate/Dissociate Study icon, the **Associate/Dissociate Study** window will be displayed, as in the following example:

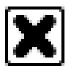


The Associate/Dissociate Study Window

- Click on the check box next to each worklist you want to associate this study to.
- If this study is already associated to a worklist and you want to dissociate it, click on the check box next to that worklist to deselect it.
- If desired, enter a reason for the association/dissociation in the **Reason** field for the selected/deselected worklist.

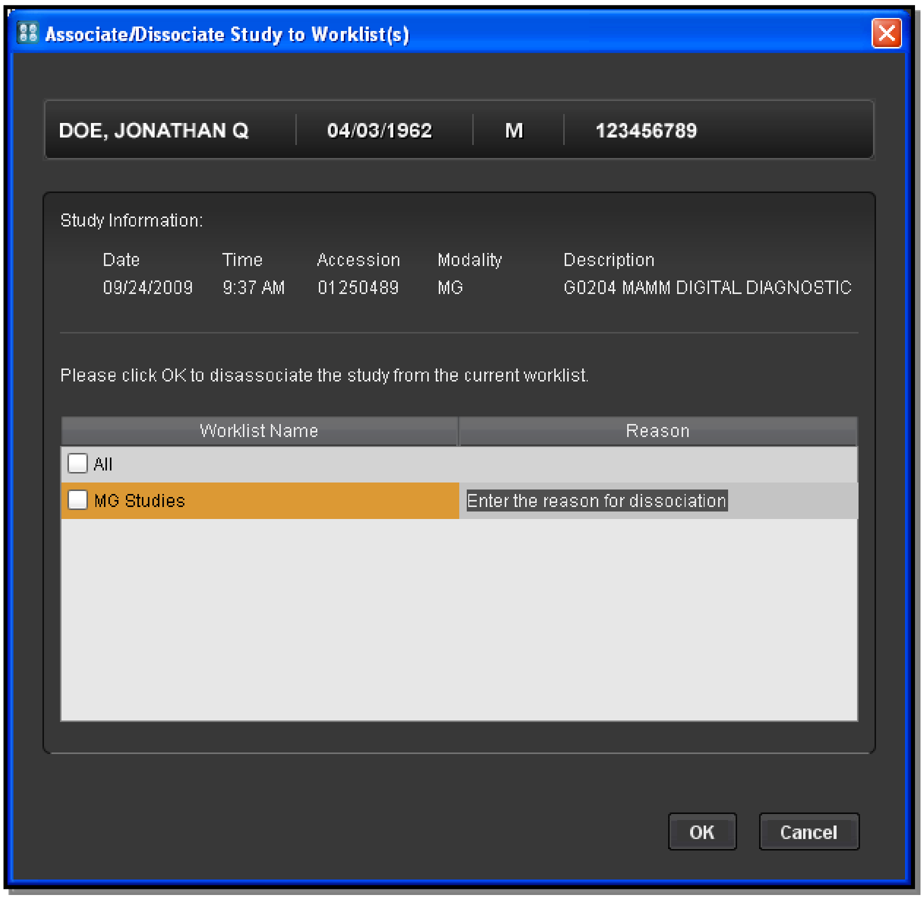
- When finished, click on the **OK** button at the bottom of the window.

7.2. Removing Studies from a Worklist



If you are viewing a worklist that one or more studies have been associated to, you can remove those studies from the worklist by clicking on the **Remove Study** icon, as shown on the left.

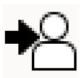
When you click on the Remove Study icon, a special version of the **Associate/Dissociate Study** window will be displayed, as in the following example:



The Associate/Dissociate Study Window

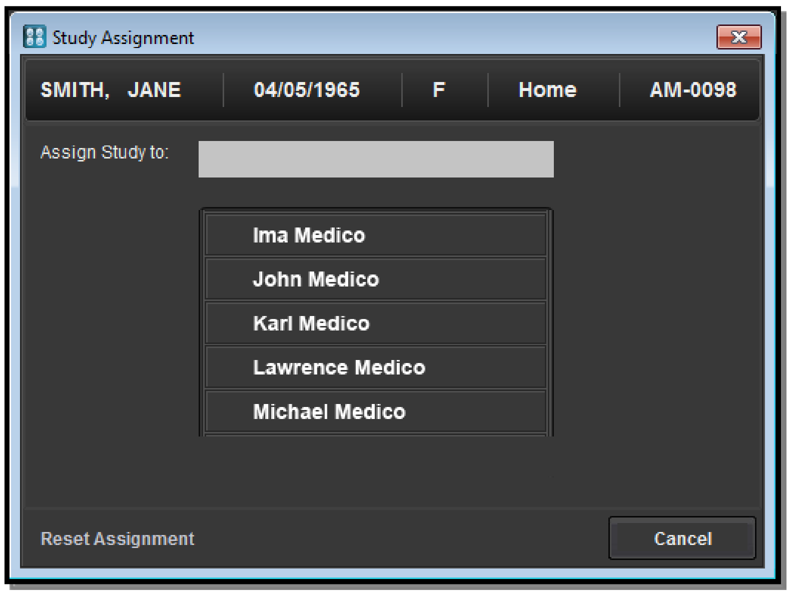
- Click on the check box next to the worklist from which you want to remove this study (the currently viewed worklist will be highlighted in orange).
- Enter a reason for the association/dissociation in the **Reason** field for the selected worklist.
- When finished, click on the **OK** button at the bottom of the window.

Chapter 8. Assigning a Study to Another User



As described in subsections 3.3.4, and 3.6.4 above, you can flag a study that appears on a RTWL worklist to have it be assigned to another user by clicking on the **Assign Study** icon, as shown on the left. If that user has access to a worklist configured to display studies assigned to him, this study will appear on that worklist.

Clicking the Assign Study icon will cause the **Study Assignment** window to be displayed, as in the following example:



Study Assignment

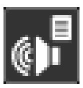
NOTE: The list of available users includes those users who are currently in a group that has the “Allow Group to be added for Study Assignment” privilege assigned to it.

- Click on the name of the user to whom you want to assign this study. The Study Assignment window will close and the study will be assigned to the selected user.
- If the list of users is too long, you can filter the list by entering all or part of the desired user’s name in the **Assign Study to** field.
- If a study has already been assigned to another user and you want to remove that assignment, the **Reset Assignment** button at the bottom left of the window will be active and you can click on it.

Chapter 9. Recording and Listening to Audio Annotations

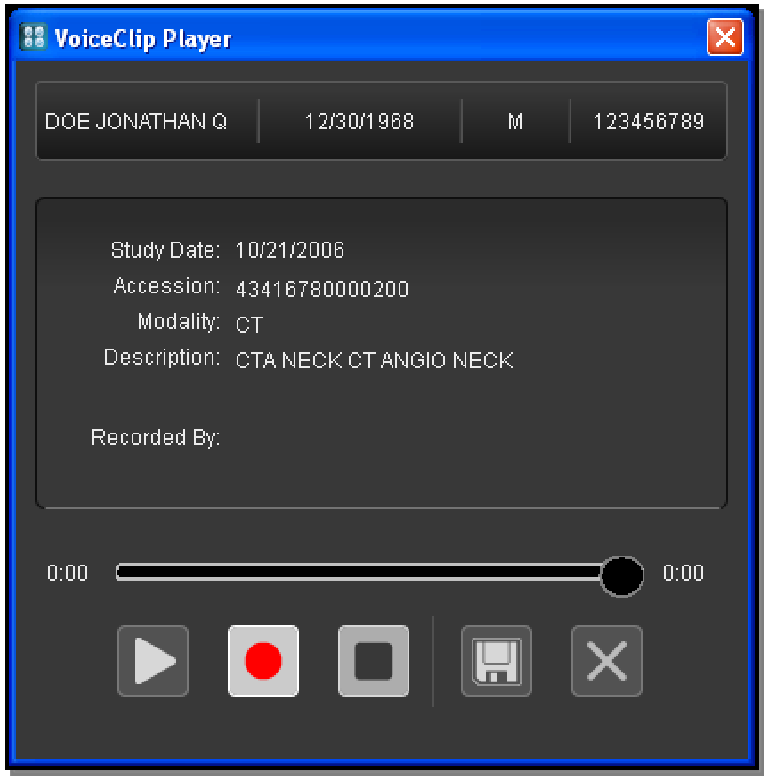
VoiceClip is an optional feature that, depending on your login privileges, allows you to listen to, record and/or overwrite brief audio annotations that can be associated with a particular study. Each annotation can last up to thirty seconds.

9.1. Recording Audio Annotations with VoiceClip



If you have been given the user privilege to record voice annotations with VoiceClip, you can activate the VoiceClip recorder by clicking on the VoiceClip icon on the **Viewer Toolbar** or **Study Toolbar** within the Merge PACS Viewer, as shown on the left. Note that you must have properly installed microphone and speakers connected to your workstation in order to use this feature.

Once you have clicked the VoiceClip icon, the VoiceClip Player window will be displayed in record/playback mode, as in the following example:

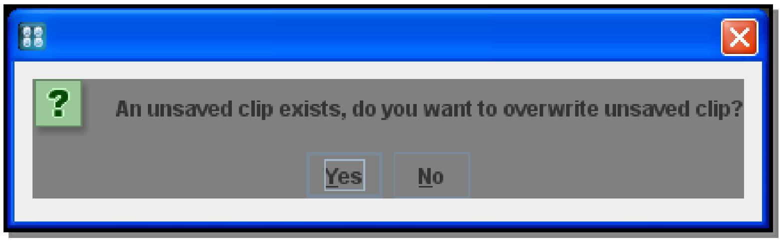


Recording an Audio Annotation with VoiceClip

- The VoiceClip Player has the following buttons:

Button	Name	General Description
	**Play**	Click this button to play back an audio annotation that has previously been recorded.
	**Record**	Click this button to begin recording an audio annotation.
	**Stop**	Click this button to stop recording or stop playing back an audio annotation.
	**Save**	Click this button to save an audio annotation that you have recorded.
	**Delete**	Click this button to erase an audio annotation that has previously been saved.

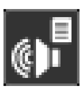
- When finished, exit the VoiceClip Player window by clicking on the small **X** in the upper right corner. If you have recorded an annotation and have not saved it, you will be prompted to save it now, as in the following example:



Do You Want to Save this Annotation?

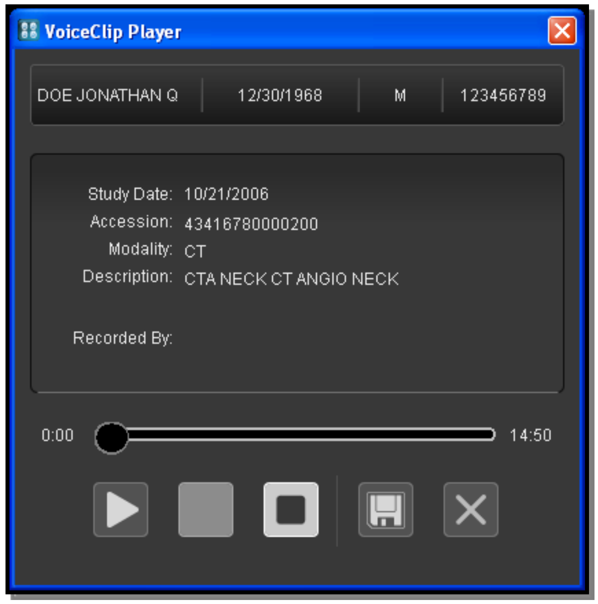
NOTE: Only one audio annotation can be associated with a given study. If a study already has an audio annotation associated with it and you have been given overwrite privileges, you can replace the existing clip with a new one by clicking on the VoiceClip icon in the Toolbar and following the procedure outlined above. If you do not have overwrite privileges, you will only be able to play the existing clip and will not be able to record a new one.

9.2. Playing Existing Annotations with VoiceClip



If there is an audio annotation associated with a particular exam or study, you can activate the VoiceClip player by clicking on the VoiceClip icon, as shown on the left, on the **RealTime Worklist**, the **Query Results Page** or an **Exam Toolbar** within the Patient Record. Note that you must have properly installed speakers connected to your workstation in order to use this feature.

Clicking on the VoiceClip icon from one of the locations described above will cause the VoiceClip Player window to be displayed in playback-only mode, as in the following example:



Playing an Audio Annotation with VoiceClip

- The audio annotation should begin playing automatically once the VoiceClip Player window is opened.
- The following buttons will be enabled when accessing the VoiceClip Player in playback-only mode:

Button	Name	General Description
	**Play**	Click this button to play back an audio annotation that has previously been recorded.
	**Stop**	Click this button to stop playing back an audio annotation.

- When finished, exit the VoiceClip Player window by clicking on the small **X** in the upper right corner.

NOTE: Your Merge PACS Workstation can be configured to automatically launch the VoiceClip Player window whenever you view a study that has an audio annotation associated with it. For details, refer to Section 25.2 below.

Chapter 10. Integration with Third-party Applications

10.1. Types of Integration

The Merge PACS Workstation provides two types of integration with third-party applications:

10.1.1. Direct API-based Integration

Direct API-based integration is used for certain third-party dictation/report applications such as Dictaphone's **PowerScribe**™ and Agfa's **TalkStation**™. Integration involves passing patient and study information directly to the application.

10.1.2. XML File-based Integration

XML File-based integration is used with dictation/report applications (such as Dolbey, Epic and SoftMed), document management applications (such as OnBase), and any other application that supports XML file-based integration.

The Merge PACS Workstation integrates with these applications by writing patient and study information to an XML file and placing ("dropping") it into a directory on the Workstation. By default, this occurs when the study is first loaded into the Primary Viewer, but the system can be configured so that it occurs at one or more of the following times:

- When the user logs in to the Workstation
- When the user logs out of the Workstation
- When a study is loaded into the Primary Viewer
- When the user switches between studies
- When a prior study is opened within the 3rd-party application
- When the Primary Viewer is closed
- When the user clicks on the 3rd Party Application Synchronization button

NOTE: Some applications can be configured to launch automatically when the XML file is created, whereas others will need to be manually launched after the XML file is created.

For certain applications, such as **PowerScribe 360** and **Epic Hyperspace**, Merge PACS can also be configured to provide **Bi-directional XML Integration**, which lets Merge PACS **receive** inbound XML messages and act on those messages. For example, if an XML file for a study is received where “response event = dictated,” the study state can be automatically changed to “preliminary.” Or if an XML file for a study is received where “response event = signed,” the study state can be automatically changed to “read.”

In addition, a URL is provided that the Dictation/Document Software vendor may use to send a status update notifying Merge PACS that the user has finished a dictation. Once the external application has sent a call to this URL, Merge PACS will process and update the study status to DICTATED. This will save the Radiologist time by removing the need to click the appropriate status update in the Merge PACS Workstation.

Note the following:

- For **Powerscribe360**, the Study Close event is not supported.
- For **Epic**, the Dictation event will be disabled.

10.2. General Information

3rd-party Application Synchronization is not a voice dictation system; it only provides a link to the voice dictation system, if any, that is installed on your workstation. For additional information, refer to the user documentation specific to the third-party dictation/report application being used.

3rd-party Application Synchronization supports **PowerScribe** in both **Voice Recognition** and **Digital Dictation** modes, and which mode is launched will depend on how PowerScribe is configured for your login.

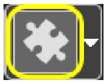
When 3rd-party Application Synchronization is being used with Direct API based integration (including VoiceLink), there are a number of user preferences available that can control its behavior, as described in Section 25.3 below.

If **Bi-directional XML integration** is being used, whether with **PowerScribe 360**, **Epic Hyperspace** or some other application, there are a number of user preferences available that can control its behavior, as described in Section 25.13 below.

NOTE: When running multiple instances of the Merge PACS Workstation on one workstation, only one instance may communicate with **PowerScribe**.

CAUTION: When a study is launched in a third-party application, make sure you check the demographics to verify the correct patient’s information was sent.

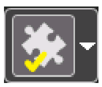
10.3. 3rd Party Application Synchronization Button



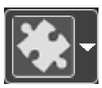
The **3rd-Party Application Synchronization** icon on the **Patient Record Toolbar** and the **Viewer Toolbar**, as shown on the left, lets you synchronize one or more application with the selected study.

Depending on how your system and the third-party applications are configured, clicking this button will also cause the applications(s) to be launched if not already launched.

The 3rd-party Application Synchronization button will appear as one of the following two ways:



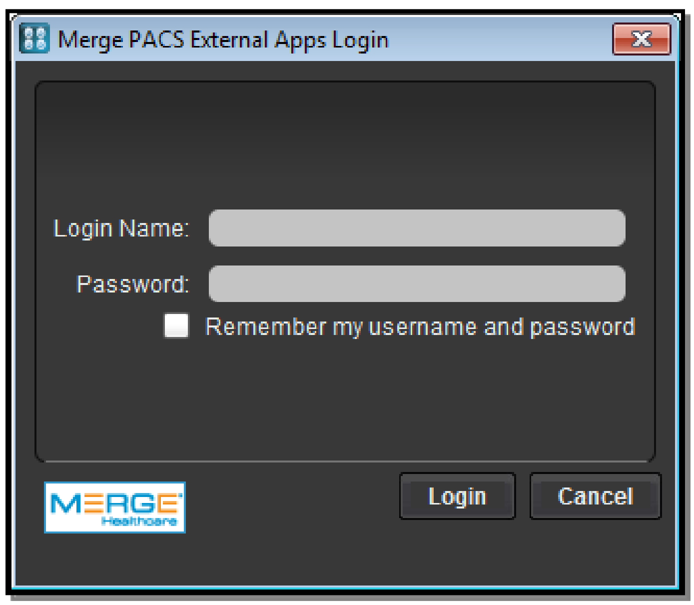
Third-party applications are currently synchronized with this study.



Third-party applications are currently not synchronized with this study.

Clicking this button will synchronize the study with all applications, except those that you have specified should not be synched, as described in Section 10.4 below.

If the third-party dictation/report application is not already running, when you click on the 3rd-party Application Synchronization icon you will be prompted to enter a username and password as in the example shown below:

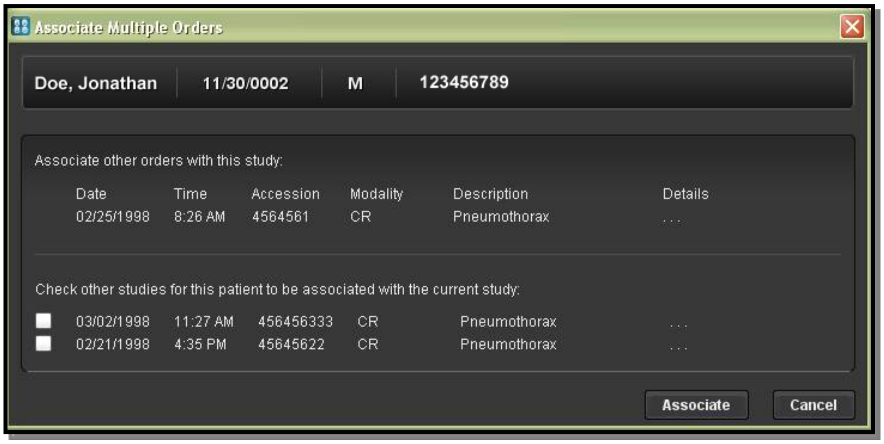


External Application Login

- If the third-party application is one that requires a separate user name and password (such as PowerScribe), enter that information here and click the **Login** button. Depending on how Merge PACS has been configured, you can also click on the **Remember my username and password** checkbox to prevent being prompted for your username and password in the future.

- If the third-party application does not require a separate username and password, you can click the **Cancel** button to exit this window. If you would like to prevent this window from reappearing in the future, however, you can enter any random text for a username and password, click the **Save Password** option, and then click the **OK** button.

If there are multiple unread studies when you click on the 3rd-party Application Synchronization button, a window will be displayed to let you associate multiple studies/orders with the report being dictated:



Associate Multiple Orders Window

- If desired, select one or more additional studies to be associated with the report to be dictated.
- Click on the **Associate** button (whether or not you have selected any additional studies).

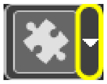
NOTE: If an application has been configured for auto synchronization, the Associate Multiple Orders window will not be displayed automatically. It will, however, still be displayed (if appropriate) by clicking on the 3rd-party Application Synchronization button.

NOTE: This feature will be enabled only if the **Associate accessions with primary study to 3rd Party Application** user preference is selected, as described in Section 25.2 below, and if the application is configured to drop an XML file when dictation of the primary study is started.

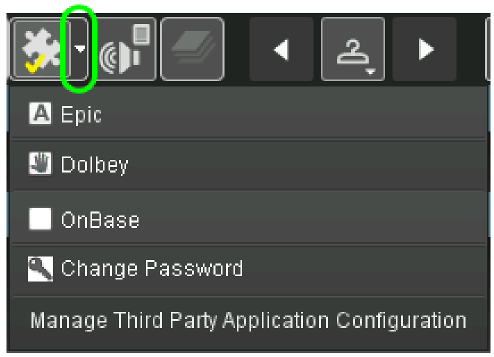
CAUTION: Upon closing the study, all the associated studies will be marked as Read (automatically if "Get next study, Mark current as Read" button is used or through the change status dialog).

For additional information on the third-party application being used, refer to the user documentation specific to that application.

10.4. 3rd Party Application Synchronization Menu



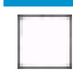
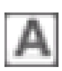
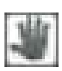
The **3rd Party Application Synchronization Menu** is accessed by clicking on the triangle to the right of the **3rd-Party Application Synchronization** icon on the **Patient Record Toolbar** and the **Viewer Toolbar**, as shown on the left. When that triangle is clicked, the menu itself will be displayed, as in the following example:



The 3rd-party Application Synchronization Menu

10.4.1. Configuring Individual Applications

The top section of the menu lists each application for which integration is currently configured and clicking on the checkbox next to each listed application repeatedly will cycle through the following states:

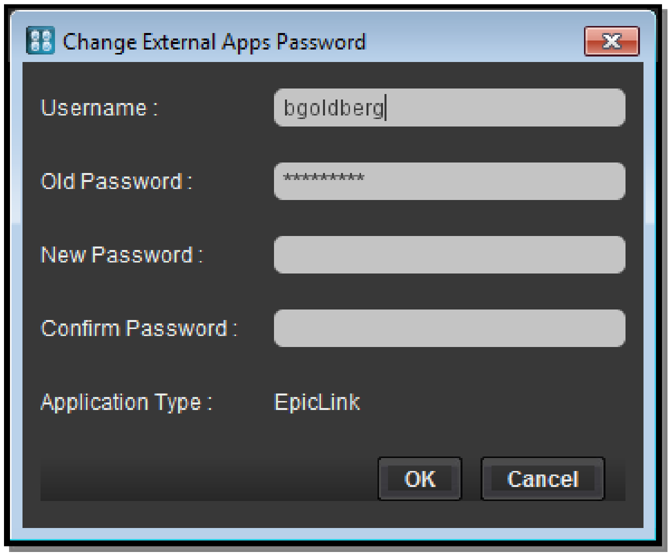
State	Description
	Do not synch this application. For applications using XML Integration, this means that no XML file will be created).
	Synch this application automatically whenever a study is launched (*i.e.*, switch the study context to the active primary study being loaded). Note that for applications that use XML integration, automatic synchronization will only occur if your system has been configured to create an XML file for this application when a study is loaded into the Primary Viewer.
	Only synchronize studies with this application when the 3rd-party Application Synchronization button is manually clicked. If the application is already synchronized with one study, clicking on the button for another study will change the focus of the application to that study (if the application is configured to do this)

NOTE: When the "**Lock and Update Study Status in Secondary Viewer**" user preference is enabled, as described in Section 25.2 below, the Secondary Viewer will behave like a Primary Viewer. If the application is configured to sync automatically, the study will be automatically synced with the 3rd-party application when it is opened in the Primary Viewer. If a second study is then opened in the Secondary Viewer without closing the primary study, the primary study will lose the sync and the secondary study will automatically sync with the third party application instead.

10.4.2. Changing a Password

If your system is configured to provide Bi-directional XML Integration with a 3rd-party application and the password is saved within Merge PACS after the first login, an additional **Change Password** option will be available that will let you change the external application username and password you entered when you first logged into the Merge PACS Workstation.

Clicking on this option will cause the **Change External Apps Password** dialog to be displayed, as in the following example:



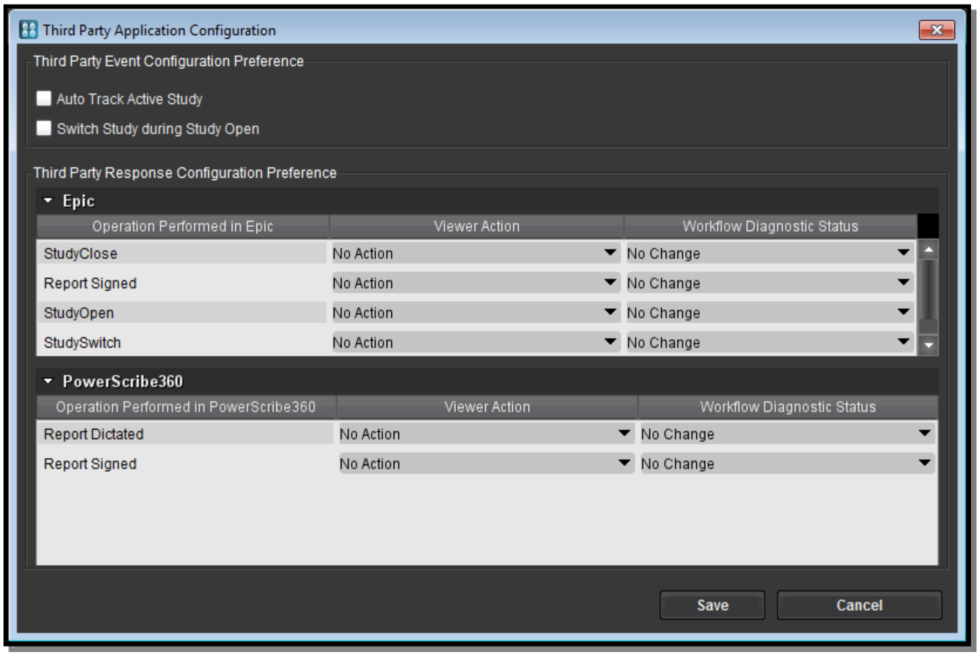
The 3rd-party Application Synchronization Menu

Update your username and/or password in the spaces provided and then click on the **OK** button at the bottom of the dialog.

10.4.3. Managing Third-party Application Configuration

If your site has been configured to use Bi-directional XML, you can configure the actions performed by the Workstation when various responses are sent from the integrated third-party application. You can also configure what notifications are sent to the third-party application (via xml drop) in certain circumstances. This is done by selecting the **Manage Third-party Application Configuration** option from the 3rd Party Application Synchronization Menu.

Clicking on this option will cause the **Third Party Application Configuration** window will be displayed as a separate pop-up window, as in the following example:

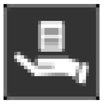


The Third Party Application Configuration Window

NOTE: This option is also available from the **User Preferences** menu, as described in Section 25.13 below.

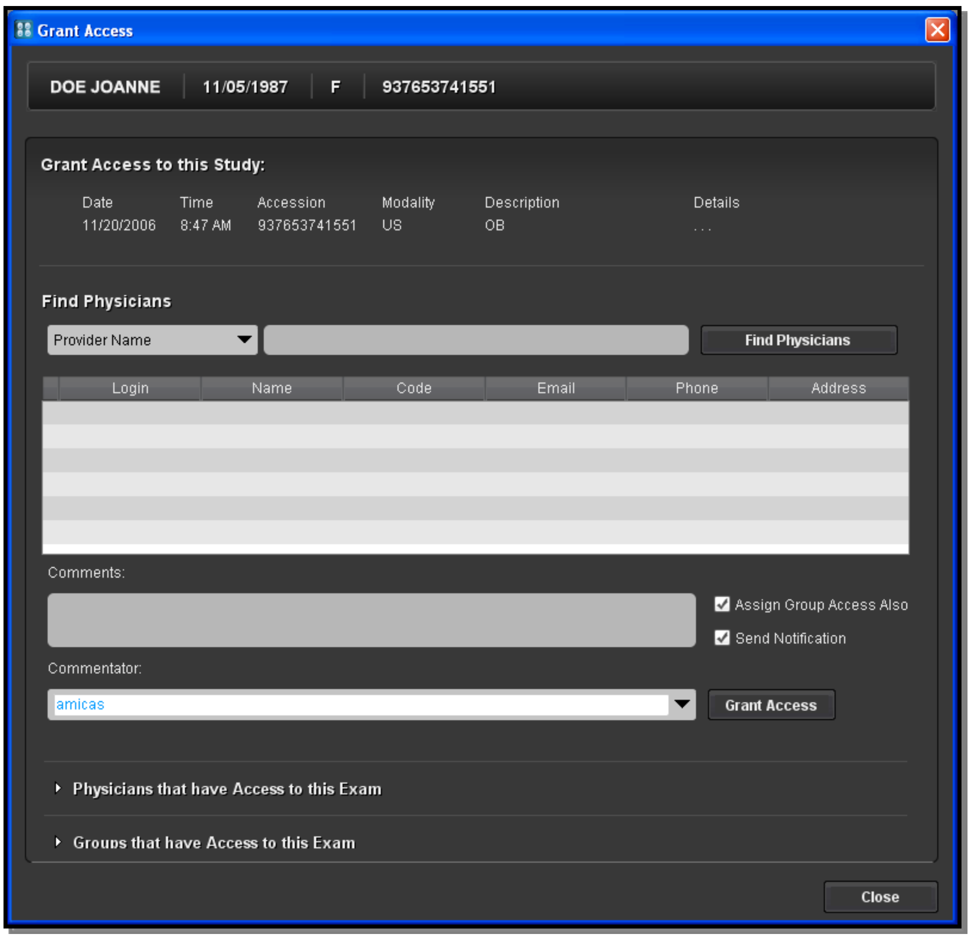
For more information on configuring 3rd Party Application options, refer to subsection 25.13 below.

Chapter 11. Managing Access to a Study



The **Access Control** icon on the **RealTime Worklist**, the **Exam Toolbar** within the Patient Record and the **Study Toolbar** within the Merge PACS Viewer, as shown on the left, lets you grant one or more users or groups access to a particular study or exam.

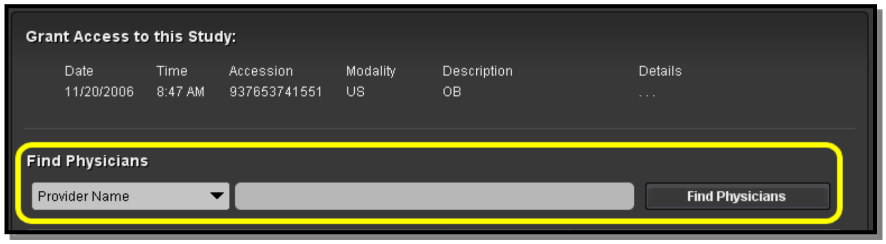
Clicking on this icon will cause a separate **Grant Access** pop-up window to appear, as in the following example:



The Grant Access Window

11.1. Granting Access to a Study

The top section of the Grant Access window lets you to search for physicians to whom you want to grant access to this exam, as shown in the following example:



Search for Physicians to Grant Access

- Select either **Provider Name** or **Provider Code** from the drop-down search options menu, enter the desired text in the field provided, and then click the **Find Physician** button to display a list of matching physicians, as in the following example:

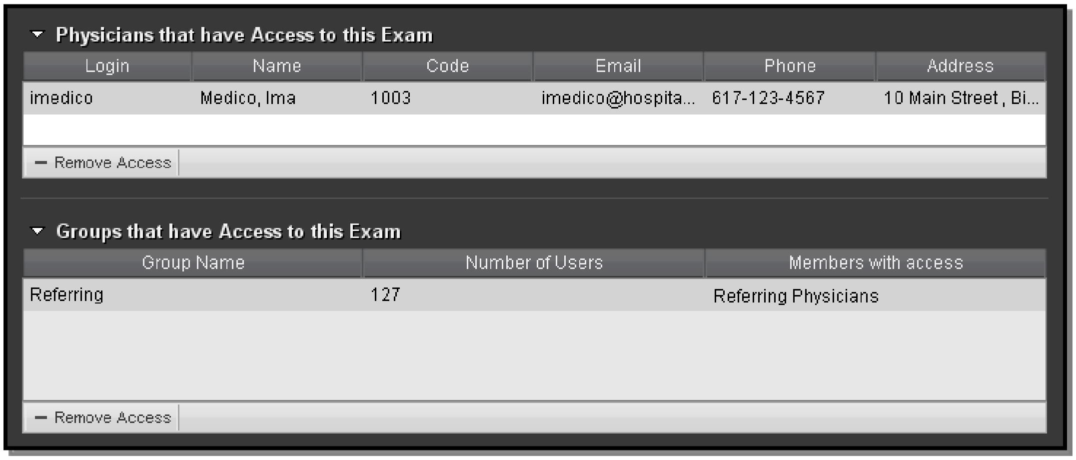
List of Matching Physicians

NOTE: If searching by Provider Name, you need to enter the physician's full name in the format "Last Name, First Name, Middle Initial." Alternatively, you can use an asterisk as a wild card. For example, "gold*" will find physicians named Jonathan Gold, Barry S. Goldberg and Harold Goldstein.

- Click on the listing of the physician to whom you want to grant access to this exam.
- If you want to grant access to all groups this physician is a member of, click the checkbox next to the **Assign Group Access Also** option.
- If your site is using Merge's AMICAS Reach Referring Physician Module and you want a notification e-mail sent to this physician saying that he or she has been granted access to this exam, click the checkbox next to the **Send Notification** button and enter a comment in the **Comments** box.
- When finished, click the **Grant Access** button to perform the selected actions.

11.2. Revoking Access to a Study

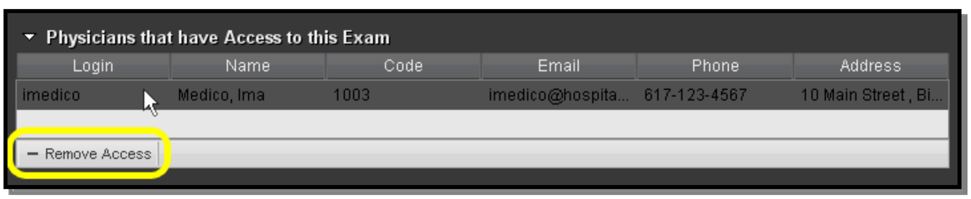
If any users and/or groups have already been granted access to this exam, they will be listed at the bottom of the Grant Access window, as in the following example:



Users and Groups with Access to this Exam

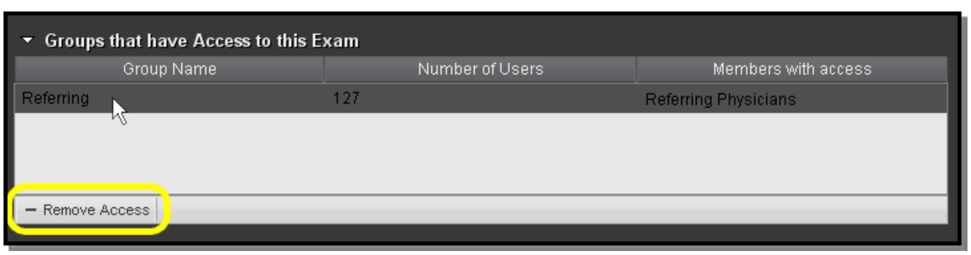
NOTE: Click on the white triangles to expand or hide each individual list.

- To revoke access from a user included in the list of Existing Users, click on that user's listing with the left mouse button to highlight it and then click the **Remove Access** button, as in the following example:



Revoking User Access to this Exam

- To revoke access from an entire group included in the list of Existing Groups, click on that group's listing with the left mouse button to highlight it and then click the **Remove Access** button, as in the following example:



Revoking Group Access to this Exam

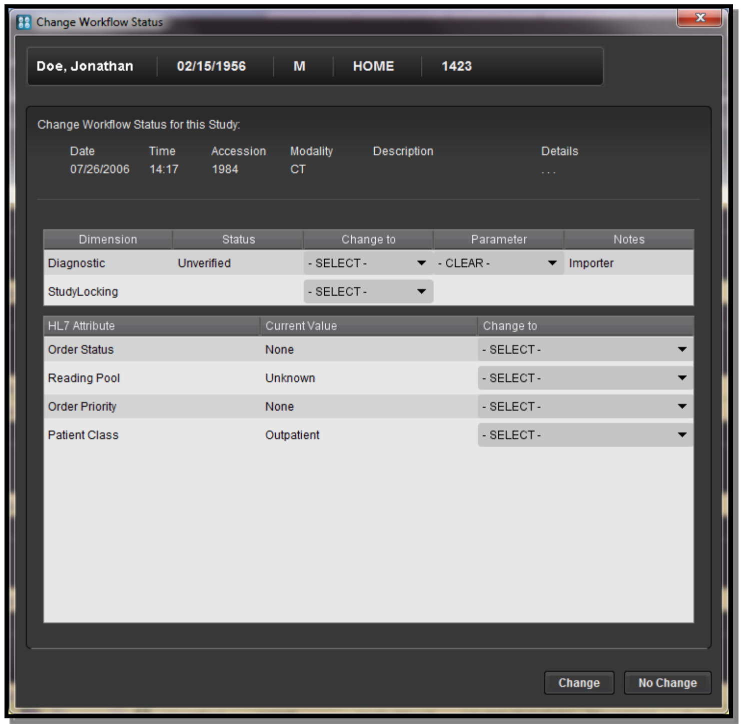
Chapter 12. Changing the Workflow Status and/or HL7 Attributes of a Study

Depending on how your system is configured, you can change the status and/or specific HL7 Attributes of a study in either of the following two locations:

- The **Change Workflow Status** window, accessed by clicking on the **Change Status** icon
- At the **Update Study Status** window, accessed automatically when exiting a study

12.1. The Change Workflow Status Window

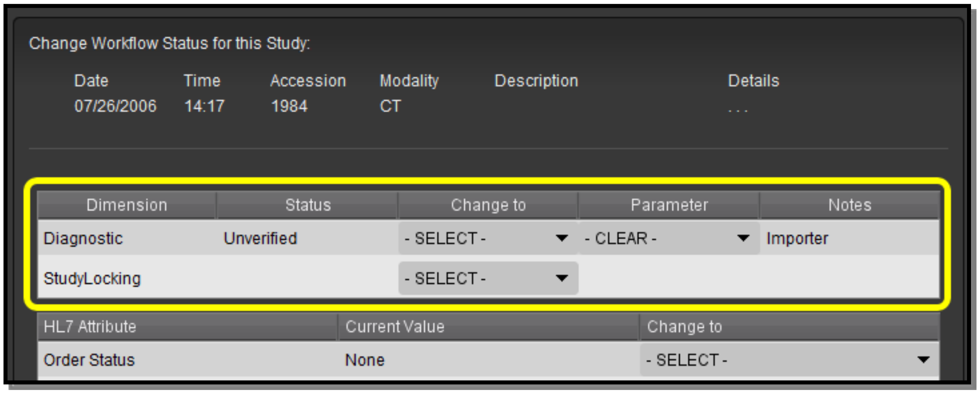
The **Change Status** icon on the **RealTime Worklist**, the **Exam Toolbar** within the Patient Record and the **Study Toolbar** within the Merge PACS Viewer, as shown on the left, lets you change the workflow status and/or select HL7 attributes for a study or exam. When you click on the Change Status icon, the **Change Workflow Status** window for the exam or study will be displayed as a separate pop-up window, as in the following example:



The Change Workflow Status Window

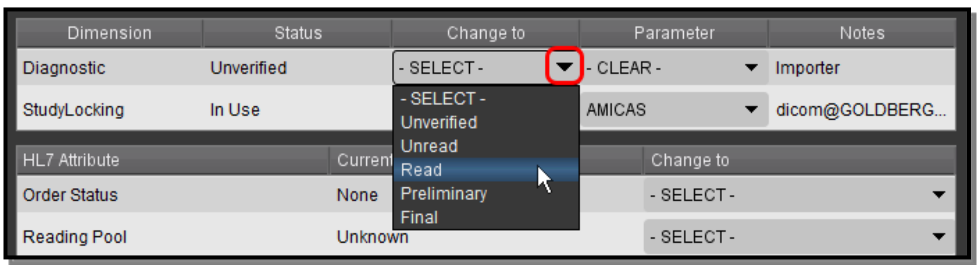
12.1.1. Changing the Workflow Status

The top panel of the Change Workflow Status window lets you change the status of the exam, as in the following example:



Change Status Panel

- The actual number of statuses that can be set from the Change Status panel depends on how your system and individual worklist have been configured.
- For each available status type (or "dimension") you can set the status by selecting the desired option from the drop-down menu for that dimension, as in the following example:

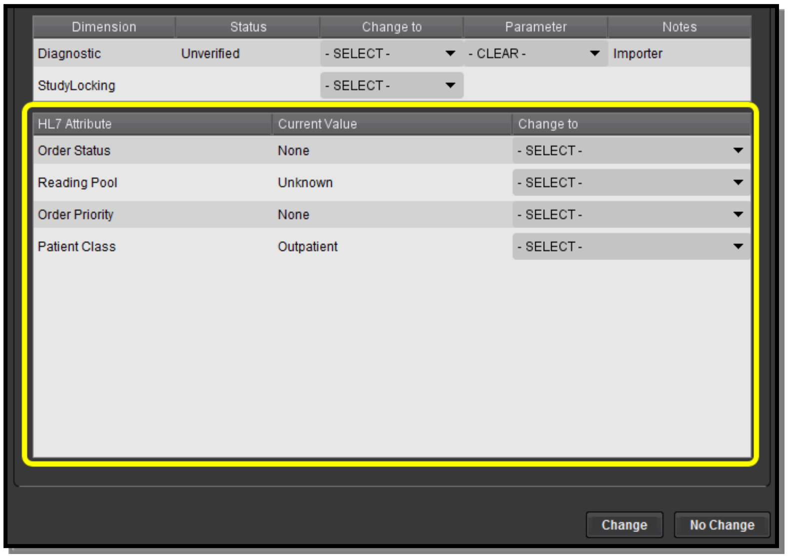


Selecting a Status

- If a particular status dimension has multiple parameters available, you can select the desired parameter for that status from the list of options in the **Parameter** column.
- If desired, you can add a note in the **Notes** column for any status by double-clicking on the column for the desired status and entering the desired text.
- Once you have entered the desired information, click on the **Change** button at the bottom of the window to record your changes and close the window, or else proceed with changing HL7 attributes, as described in the following subsection.

12.1.2. Changing HL7 Attributes

If you have login privileges to update HL7 attributes, the bottom panel of the Change Workflow Status window lets you change one or more specific HL7 attributes of the exam, as in the following example:



Change HL7 Attributes Panel

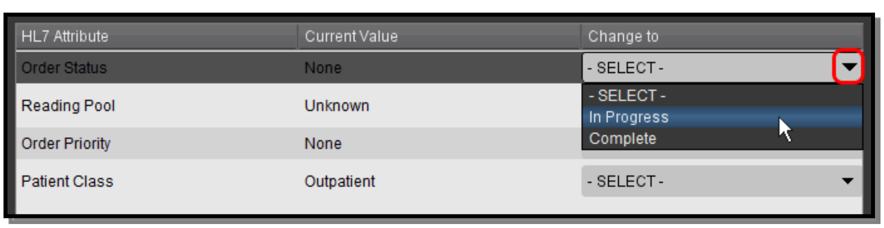
This feature provides users with the ability to override the order status of an exam and is typically only available to administrators and technologists.

NOTE: If either the order or the accession number is missing for this exam, you will not be able to change the HL7 attributes and a message to this effect will be displayed at the bottom of the window.

The following HL7 Attributes can be changed from the Change Workflow Status window:

- **Order Status**
- **Reading Pool**
- **Order Priority**
- **Patient Class**

To change an HL7 attribute, click the drop-down menu for the desired attribute in the **Change to** column and select the desired value, as in the following example:



Changing an HL7 Attribute

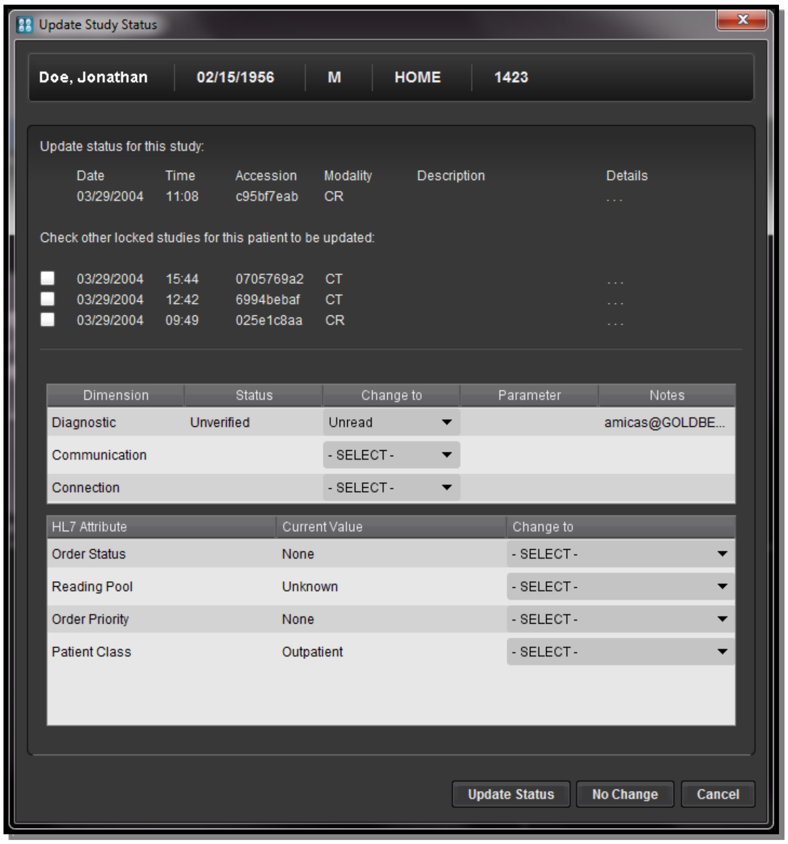
When finished, click the **Change** button at the bottom of the window to record your changes and close the window. You can also click on the **No Change** button to exit the study without changing the status and/or HL7 attributes.

Sample workflows for the use of this feature include the following:

- Change the **Order Priority** HL7 attribute to increase the status of an order to STAT or to lower the status from STAT to Urgent or Routine (*e.g.*, when a referring physician has requested a study as STAT just because a patient is waiting during an appointment and it would be more appropriate for the status to be Urgent).
- Change the **Patient Class** HL7 attribute to correct the frequent miscoding of Emergency patients as Outpatient on the RIS.
- Change the **Reading Pool** HL7 attribute in cases where Reading Pool is used to drive worklists and where the assignment may be wrong in some cases (*e.g.*, Neck or Head CT to Neuro instead of MSK).

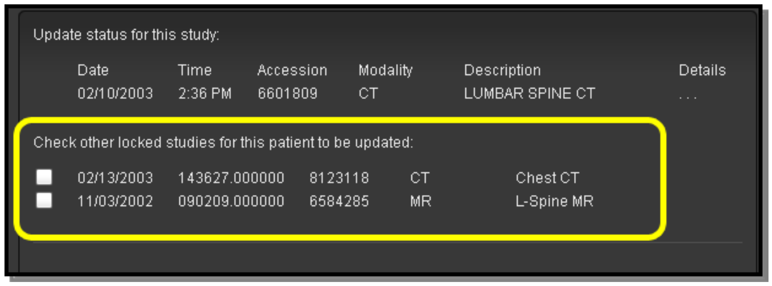
12.2. The Update Study Status Window

Depending on how your system is configured, whenever you exit a study the **Update Study Status** window may automatically be displayed, as in the following example:



The Update Study Status Window

If your user preferences are set to automatically lock unread prior studies (whether all priors, relevant priors, or priors of the same modality type), as described in Section 25.7 below, the top section of the Update Study Status window will let you select which of those prior studies you want to be updated with the chosen statuses and HL7 attributes, as in the following example:

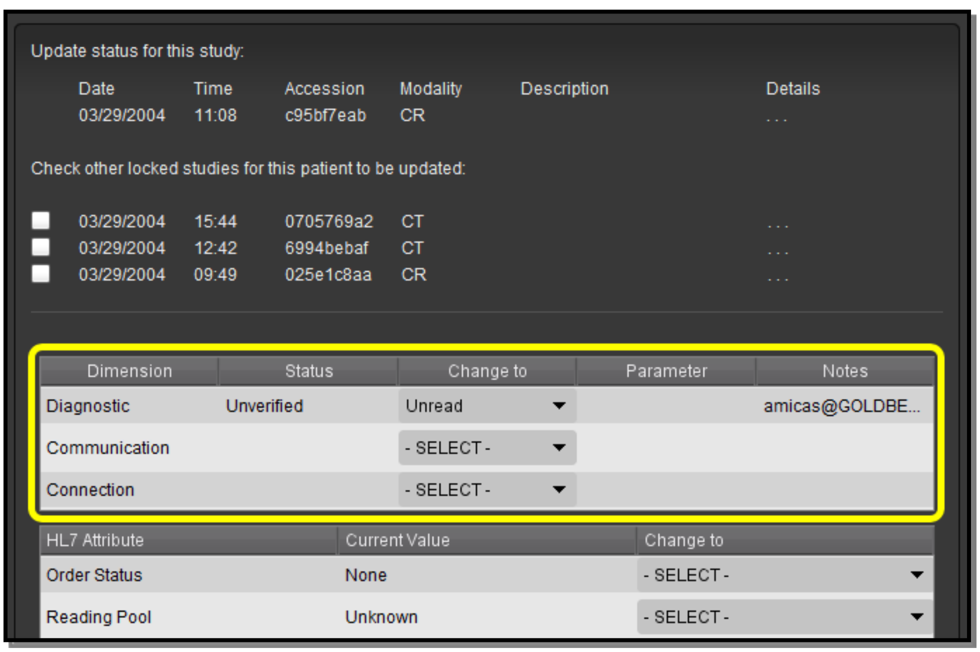


Prior Studies that are Currently Locked

NOTE: Selecting one or more prior studies will always update the status and/or attributes of those prior studies **in addition to** the status of the primary study. It is not possible to just update the status and/or attributes of the prior studies.

12.2.1. Changing the Workflow Status

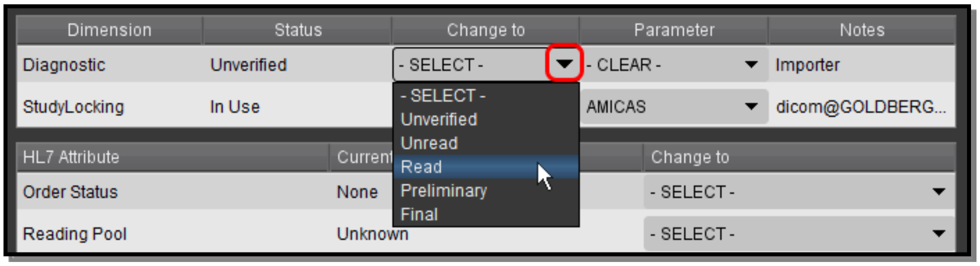
The top panel of the Change Workflow Status window lets you change the status of the exam, as in the following example:



Change Status Panel

- The actual number of statuses that can be set from the Update Status panel depends on how your system and individual worklist have been configured.

- For each available status type (or "dimension") you can set the status by selecting the desired option from the drop-down menu for that dimension, as in the following example:

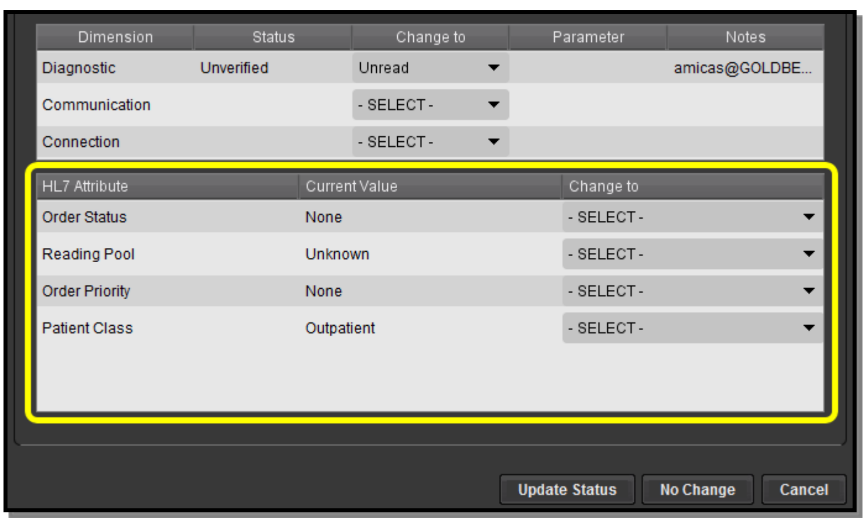


Selecting a Status

- If a particular status dimension has multiple parameters available, you can select the desired parameter for that status from the list of options in the **Parameter** column.
- If desired, you can add a note in the **Notes** column for any status by double-clicking on the column for the desired status and entering the desired text.
- Once you have entered the desired information, click on the **Change** button at the bottom of the window to record your changes and close the window, or else proceed with changing HL7 attributes, as described in the following subsection.

12.2.2. Changing HL7 Attributes

If you have login privileges to update HL7 attributes, the bottom panel of the Update Status window lets you change one or more select HL7 attributes of the exam, as in the following example:



Change HL7 Attributes Panel

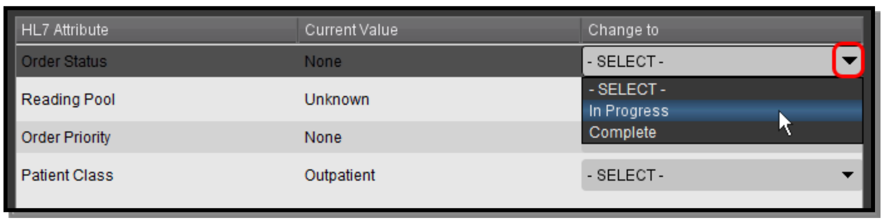
This feature provides users with the ability to override the order status of an exam and is typically only available to administrators and technologists.

NOTE: If either the order or the accession number is missing for this exam, you will not be able to change the HL7 attributes and a message to this effect will be displayed at the bottom of the window.

The following HL7 Attributes can be changed from the Change Workflow Status window:

- **Order Status**
- **Reading Pool**
- **Order Priority**
- **Patient Class**

To change an HL7 attribute, click the drop-down menu for the desired attribute in the **Change to** column and select the desired value, as in the following example:



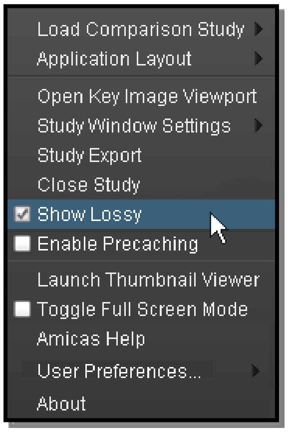
Changing an HL7 Attribute

When finished, click the **Update Status** button at the bottom of the window to record your changes and close the window. You can also click on the **No Change** button to exit the study without changing the status or the **Cancel** button to return to the study without changing the status and/or HL7 attributes.

Sample workflows for the use of this feature include the following:

- Change the **Order Priority** HL7 attribute to increase the status of an order to STAT or to lower the status from STAT to Urgent or Routine (*e.g.*, when a referring physician has requested a study as STAT just because a patient is waiting during an appointment and it would be more appropriate for the status to be Urgent).
- Change the **Patient Class** HL7 attribute to correct the frequent miscoding of Emergency patients as Outpatient on the RIS.
- Change the **Reading Pool** HL7 attribute in cases where Reading Pool is used to drive worklists and where the assignment may be wrong in some cases (*e.g.*, Neck or Head CT to Neuro instead of MSK).

Chapter 13. Using Lossy Images Instead of Lossless



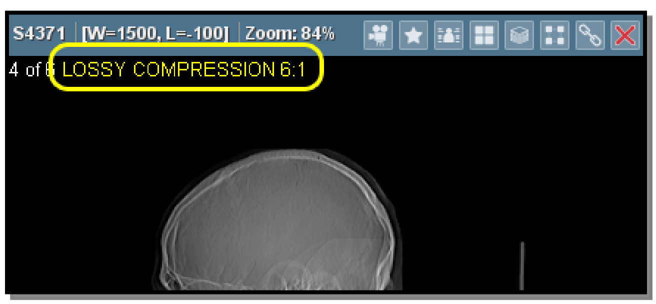
Selecting Lossy Compression

By default, the Merge PACS Viewer displays patient images using “lossless” compression. Lossless compression reduces the file size of images by encoding them more efficiently without removing any information.

In situations where bandwidth and transmission speeds are a concern (*e.g.*, if accessing the Merge PACS Workstation from a home computer with a slow Internet connection), you can choose to display “lossy” versions of the images instead. Lossy compression removes redundant or unimportant information in the original image data, resulting in greatly reduced file sizes with no reduction in clinical diagnostic image quality.

To display lossy images instead of lossless, select the **Show Lossy** option from the **Study Right-click Menu**, as described in subsection 4.1.4 above and shown in the example to the left.

Once you have turned off the Lossless option, each image will display a lossy compression ratio in its general description, as shown in the following example:



Lossy Compression Ratio

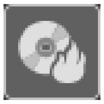
Once the Show Lossy option has been selected, all images that have not already been loaded in lossless format will be displayed with lossy compression until you deselect this option.

Deselecting the Show lossy option will cause the loading of lossless images to resume.

NOTE: Selecting or deselecting the Show Lossy option will apply to all studies viewed during the current Merge PACS Workstation session (*i.e.*, until you log off the system or exit the Workstation Browser entirely).

NOTE: If an image has been compressed multiple times (“recompressed”), the highest compression ratio used will be displayed.

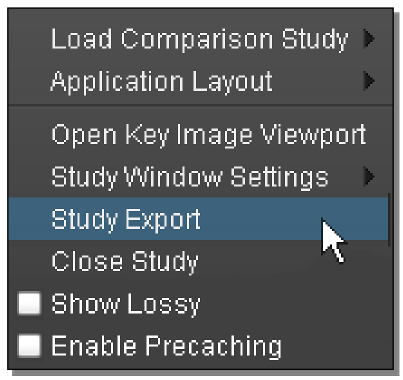
Chapter 14. Exporting Studies



Clicking on the **Burn CD** icon from a **worklist**, the **Query Page**, the **Patient Record**, the **Local Study** page or the **Recently Viewed** page, as shown on the left, will let you export one or more studies for one or more patients to a CD (if you have a CD writer installed on your Workstation), to a folder on your local Workstation, and/or to a folder on network accessible drive. If desired, you can also export any available prior studies as well as reports, key images or annotations associated with the studies.

NOTE: Mammography images that are exported will be displayed without laterality or view position within the CD Viewer, but users can view this information within the DICOM Attributes Viewer for each image.

The study export feature can also be accessed by selecting **Study Export** from the **Study Right-click Menu**, as in the following example:

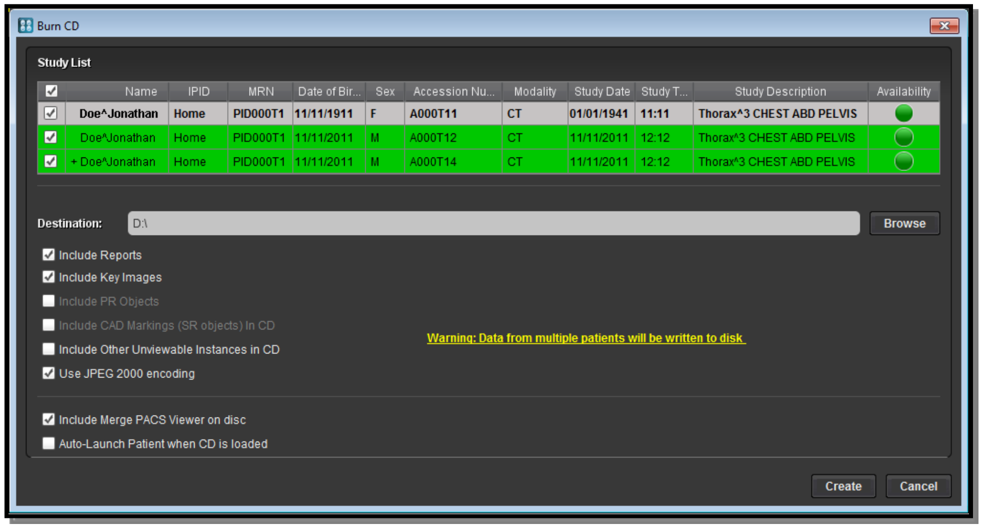


Study Export

The following procedure describes the necessary steps to export one or more studies:

1. Make sure there is a blank CD in your CD writer or an empty folder on a local or network accessible drive.
2. Click on the Burn CD icon for the study you wish to copy (or select **Study Export** from the **Study Right-click Menu** while viewing the study).

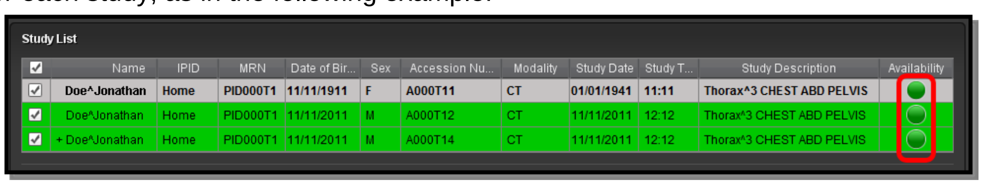
*The **Burn CD** window opens:*



The Burn CD Window

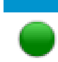
The top section of the Burn CD window contains a **Study List** that displays the primary study selected at the top with any prior studies below it.

- The list of prior is determined by the Patient Comparison Strategy and “Selection of Priors” option configured for your site, as described in Appendix C below.
- If one or more prior studies has the same MRN and IPID as a different patient on the Merge PACS Server but is included because it matches the Patient Comparison Strategy and “Selection of Priors” option configured for your site, a yellow warning message will be displayed indicating that data from multiple patients will be included.
- The far right column of the Study List that displays the **Availability Status** indicator for each study, as in the following example:



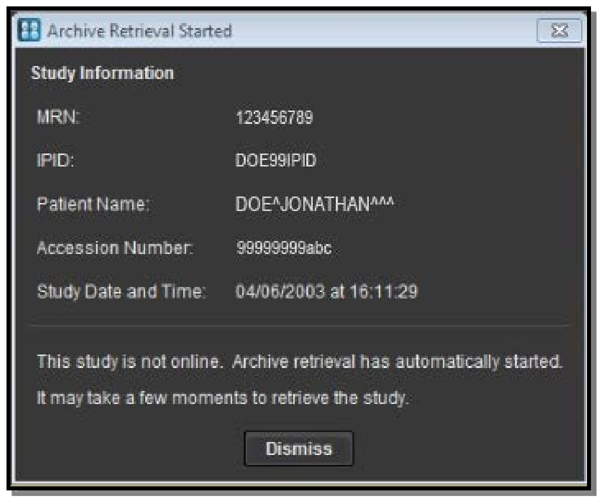
Availability Status Indicator

  - The appearance of the indicator indicates the availability of the study as follows:

Indicator	Color	Description
	**Green**	The study is available online for exporting.
	**Black**	The study is currently offline and not available for exporting.
	**Blue**	A request to retrieve the study has been submitted, but the retrieval process has not yet started.
	**Black / Green**	The study is currently being retrieved from the archive. Note that the percentage of green shown will change to indicate the progress of the retrieval process.

Indicator	Color	Description
	Orange	Images for this study are currently being imported into Merge PACS for the first time or additional images are currently being added to an existing study.
	Red	Retrieval of the study from the archive has completed, but with errors (either fewer images were received than expected or all images failed compression)
	Gray	The availability of the study is currently unknown (this may occur during timeout or error scenarios).

- If Merge PACS has an archive configured and the **primary** study is currently archived and not available online, an archive retrieval request will automatically be submitted when you first launch the Burn CD window for that study and a dialog similar to the following will be displayed:

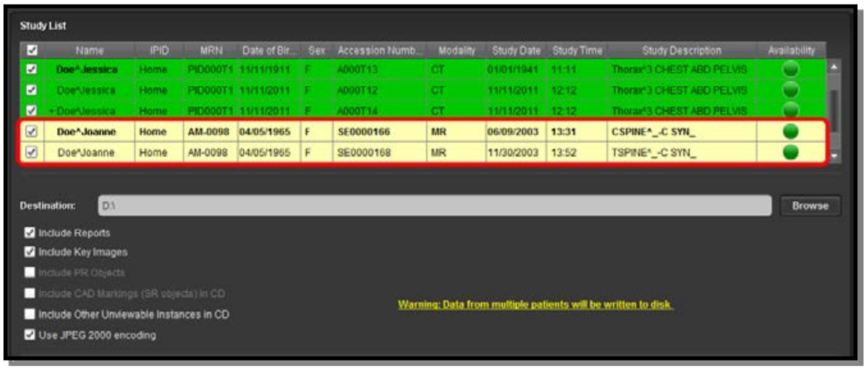


Archive Retrieval Started

NOTE: **Prior** studies will not automatically be retrieved from the archive when you launch the Burn CD window for the primary study. Instead, all selected priors will be retrieved when you click on the **Create** button, as described below.

3. If you wish to export another study (and any or all of its priors) to the same CD or folder, leave the Burn Study window open and click on the **Burn CD** icon (or select the **Study Export** option) for the second study.

The **Study List** will now display both studies selected and their priors, as in the following example:



Multiple Studies Selected

CAUTION: If you have selected studies belonging to different patients, a yellow warning message will be displayed informing you of this, as in the example above.

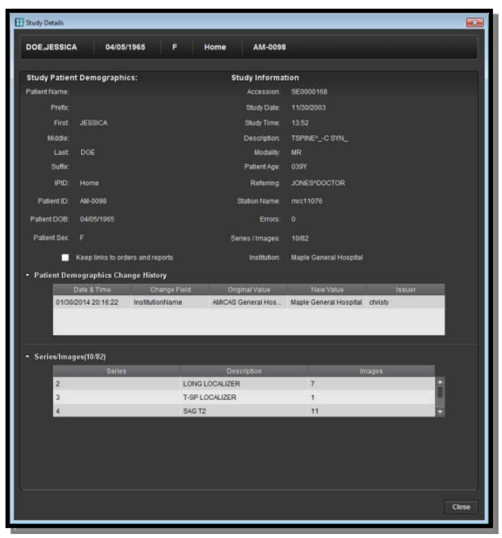
---

4. Use the checkboxes in the Study List to deselect any studies you do not want to be included on the CD.

NOTE: By default, all prior studies included in the Study List will be selected. The Workstation can be configured, however, to have prior studies unselected by default via the User Preferences menu, as described in Section 25.1 below.

---

5. If desired, you can double-click on any study in the Study List to view the study patient demographics for that study in the **Study Details** window, as in the following example:

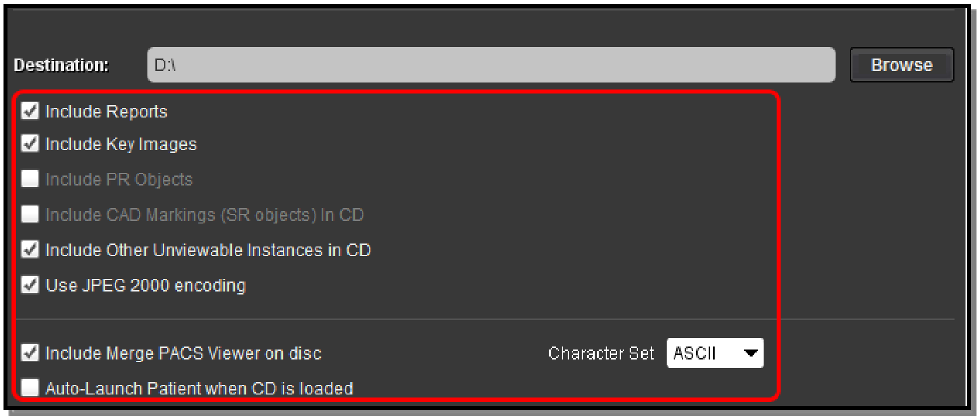


Accessing the Study and Patient Demographics for a Study

Refer to Section 19.1 below for more information on the Study Details window.

NOTE: You cannot edit patient or study demographics at the Study Details window when accessed from the Burn CD dialog.

6. If desired, select one or more options by clicking the applicable checkboxes at the bottom of the Burn CD window, as in the following example:



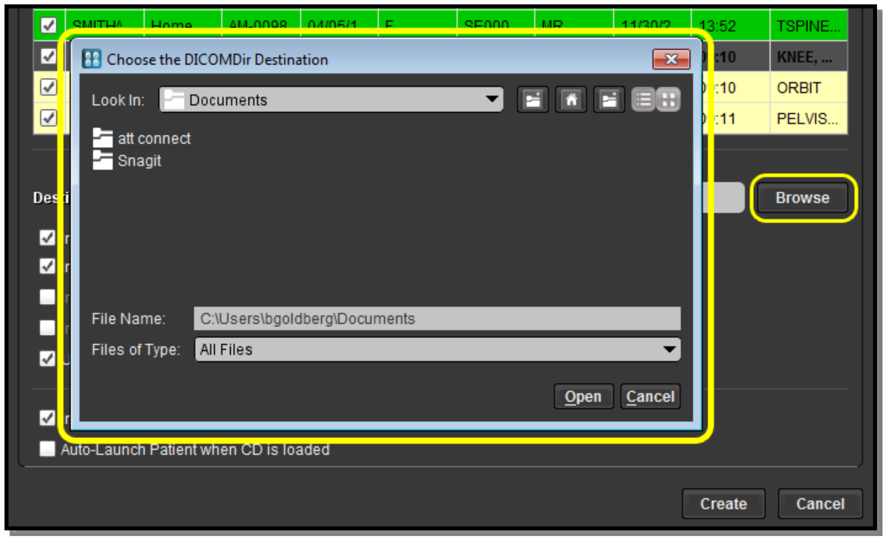
CD Burning Options

The following options may be available, depending on how your site is configured:

Option	General Description
Include Reports	If **selected**, any reports associated with the selected studies will be included.
Include Key Images	If **selected**, any key images associated with the selected studies will be included.
Include PR Objects	If **selected**, any Presentation State objects, including annotations, associated with the selected studies will be included. Note that this option may be disabled on a site-by-site basis.
Include CAD Markings (SR objects) in CD	If **selected**, any CAD markings and Structured Reports associated with the selected studies will be included. Note that this option may be disabled on a site-by-site basis.
Include Other Unviewable Instances in CD	If selected, certain other DICOM objects that are not viewable in the Merge PACS viewer will be included. These include specialized image/object types such as RT images, private SOP classes, or Raw Storage IODs (objects that hold private data types).

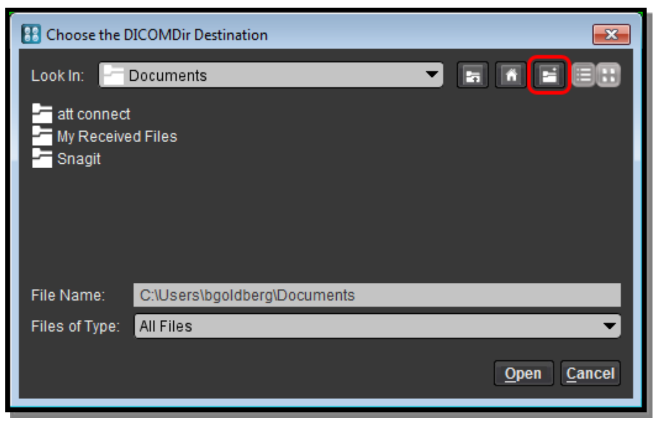
Option	General Description
	NOTE: These specialized image / object types may be useful in certain circumstances but may cause problems for the destination PACS when trying to import the studies that contains them. As a result, we recommend that the default selection be to NOT export these to the CD.
Use JPEG 2000 encoding	If **selected,** study images will be compressed using JPEG2000 encoding. This will result in smaller images, but the images may not be viewable by non-Merge PACS viewers. If this option is **deselected**, images will be burned in uncompressed DICOM format. This will result in larger images, but the images will be viewable by all viewers. Note that this option may be disabled on a site-by-site basis.
Include Merge PACS Viewer on disc	If **selected**, a thin client version of the Merge PACS Viewer will be included on the disc so that patients can view the images directly from the CD.
Auto-Launch Patient when CD is loaded	If **selected**, the CD Viewer will automatically be launched when the CD is inserted into the CD drive. If the CD contains a single study, that study will automatically be opened in the Viewer. If the CD contains multiple studies, a Study List will be displayed to let the user select the desired study to open.
Character Set	Select the character-set attribute(s) that OrthoPACS will set in the DICOM Directory (DICOMDIR) that it creates on the CD. The following options may be available: **ASCII** PACS will not set the character set attribute (0008,0005) in the DICOMDIR that it creates on the CD. **LATIN1** PACS will set the character set attribute (0008,0005) to "ISO_IR 100" in the DICOMDIR that it creates on the CD. **AUTO** PACS will set the character set attribute (0008,0005) to the union of the character sets in the patient hierarchy that is being burned to CD.

7. Click on the **Browse** button, if necessary, to select the location where the blank CD or destination folder is located is located, as in the following example:



Selecting the Desired Location

If you are exporting to folder on a local or network accessible drive and need to create a new empty folder, click the **Create new Folder** icon, as in the following example:



Creating a New Folder

8. Click on the **Create** button at the bottom of the window to begin the study export process.

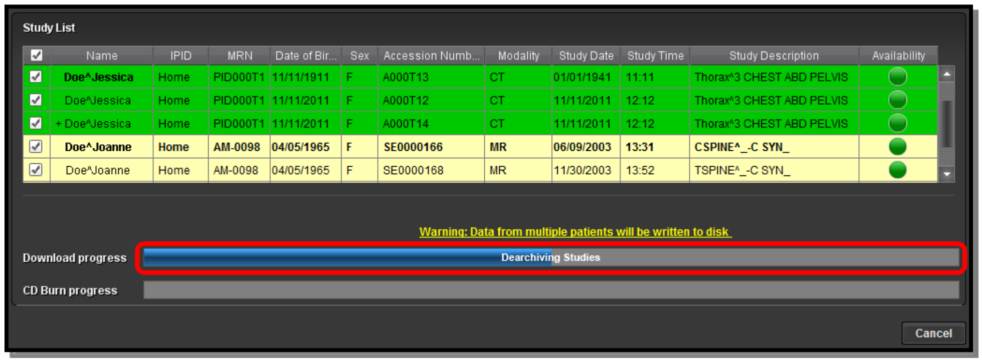
The study export process proceeds as follows:

- *All selected studies are verified to make sure they are eligible for export (i.e., there are no Quality Control operations in progress or waiting in the queue on the Merge PACS Server for the study, the study has not been modified on the Server since you viewed it or selected it to be exported, etc.).*

NOTE: If a study has been modified on the Server, a warning will be displayed and you can choose to export the study anyway. If a QC operation is in progress or in the queue, however, an error will be displayed and you will not be allowed to proceed.

- *If Merge PACS has an archive configured and any of the selected studies are not currently online, an archive retrieval request will automatically be triggered for those studies. Archive retrieval will then occur at the same time as the studies that are online are downloaded to your Workstation and the archived studies will be downloaded as soon as they are retrieved. Once all the selected studies have been downloaded from the Server, they will then be exported to the selected CD or folder.*

  The archive retrieval and downloading progress will be displayed on the ***Download progress*** *bar, as in the following example:*



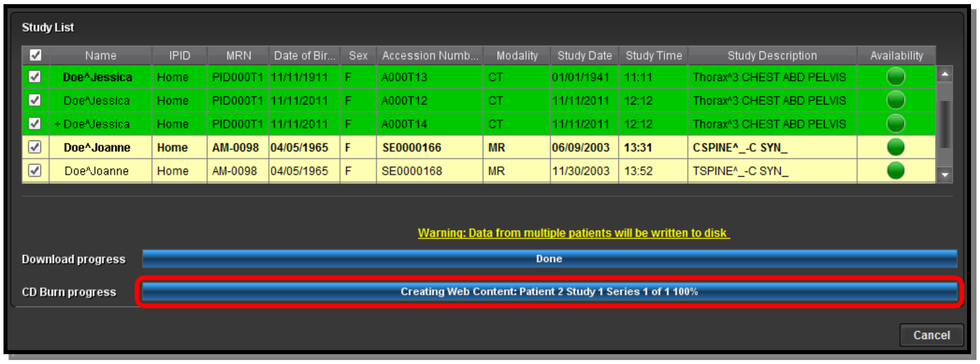
Download Progress

The following messages may appear on the Download progress bar during the download process:

Message	General Description
Dearchiving Studies	All selected studies are currently archived and we are waiting for the studies to be retrieved from archive.
Downloading & Dearchiving Studies	Some of the selected studies are archived and are being de-archived and some of the selected studies are online and are being downloaded.
Downloading Studies	All selected studies are online and are being downloaded

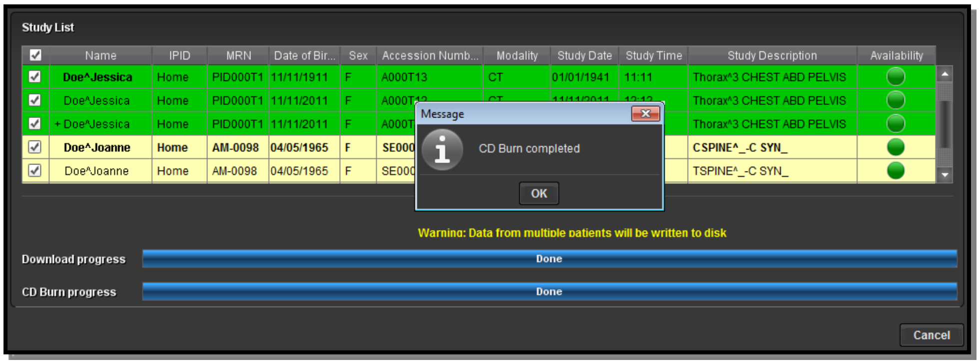
NOTE: At any point during the Download and/or Dearchiving Studies process, you can click **Cancel** button to terminate. If there are any issues, you will be notified of the error(s) and then taken to initial CD Burn dialog.

- *Once all eligible studies are downloaded, the progress of the actual export process will be displayed on the* ***CD Burn progress*** *bar, as in the following example:*



CD Burn Progress

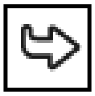
- *When the export process is complete, a message will be displayed, as in the following example:*



CD Burn Complete

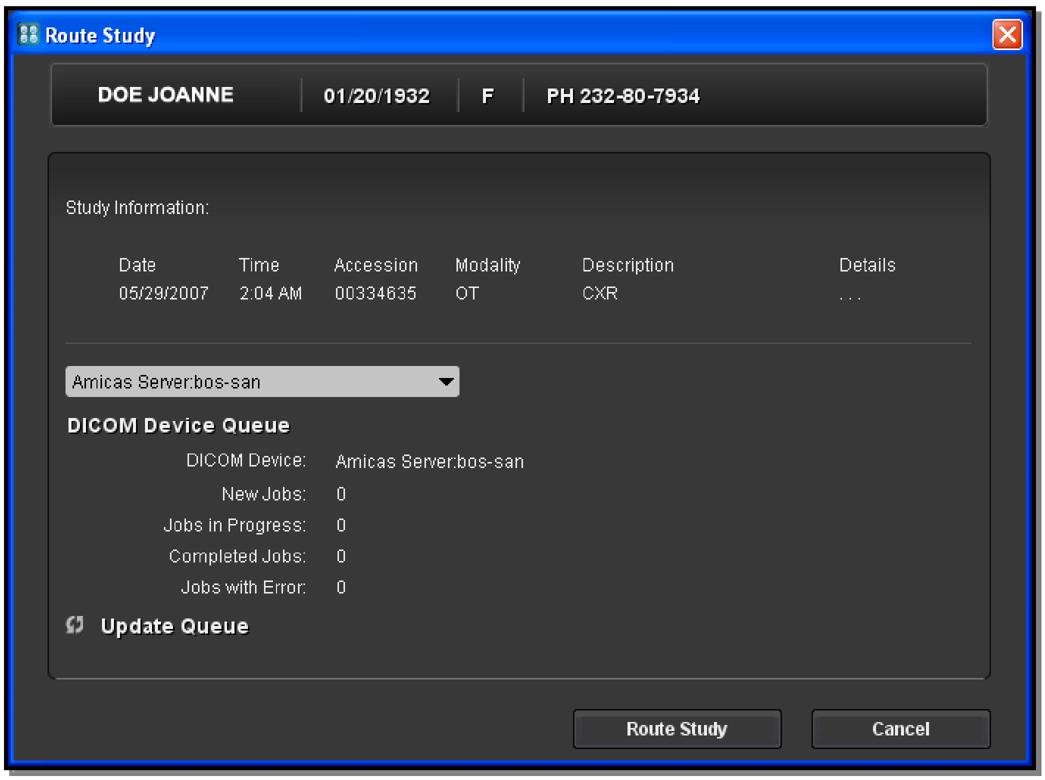
9. Click the **OK** button on the message dialog to exit the CD Burn window.

Chapter 15. Routing Studies to Other Locations



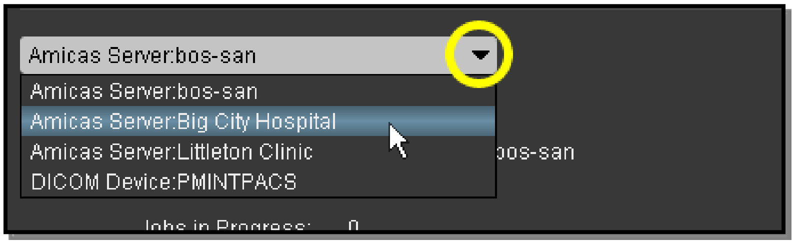
Clicking on the **Route Study** icon from a **worklist** or the **Patient Record**, as shown on the left, will let you manually send a study to another available location (a different Merge PACS Server or a local DICOM device) and to view the transmission status of studies that have been, or are in the process of being, sent.

When you click on the Route Study icon, the **Route Study** window for that study will be displayed as a separate pop-up window, as in the following example:



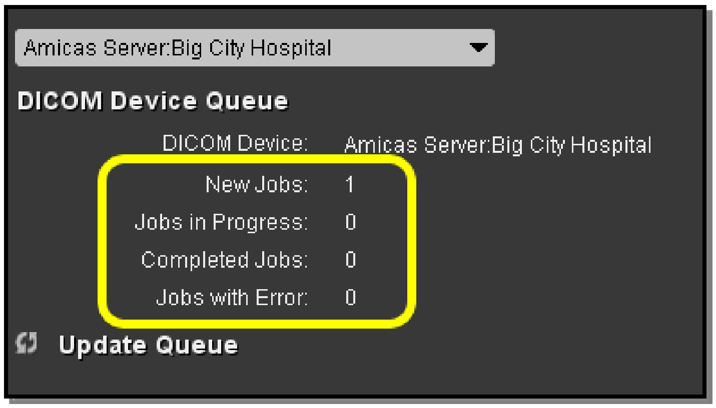
The Route Study Window

- Select from the list of available destinations that have been configured for Merge PACS, as shown in the example below:



Selecting a Routing Destination

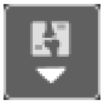
- Click on the **Route Study** button at the bottom of the window to begin the transfer process. If you are sending the study to another Merge PACS Server, the transfer status will be displayed as in the example below:



Viewing the Transfer Status of a Study

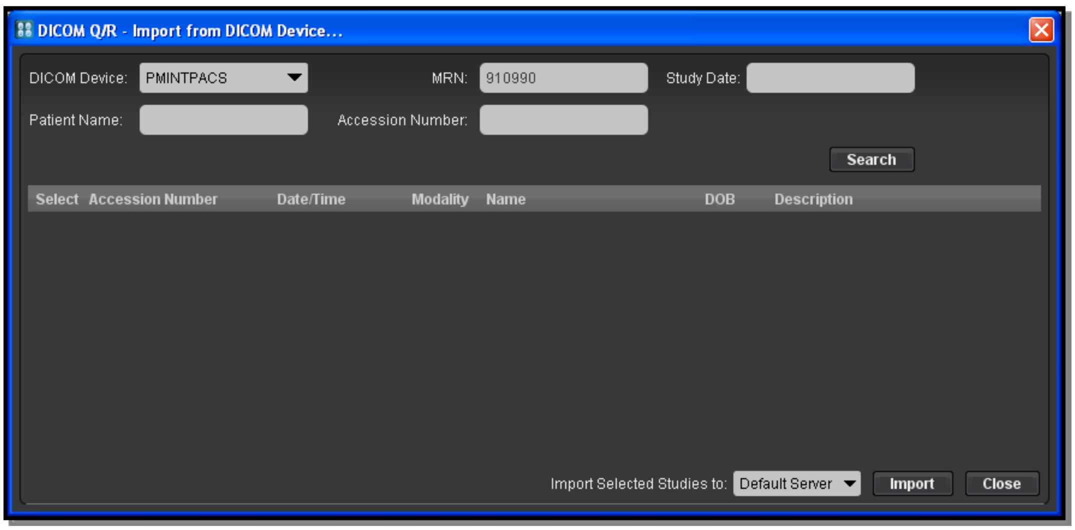
- Press the **Update Queue** button to refresh the information on the screen.

Chapter 16. Requesting Studies from a DICOM Archive



If your Merge PACS has access to a separate DICOM Archive, clicking on the **Import from DICOM Device** icon from the **Patient Record**, as shown on the left, will let you request images from that archive.

When you click on the Import from DICOM Device icon, the **DICOM Q/R – Import from DICOM Device** window will be displayed as a separate pop-up window, as in the following example:



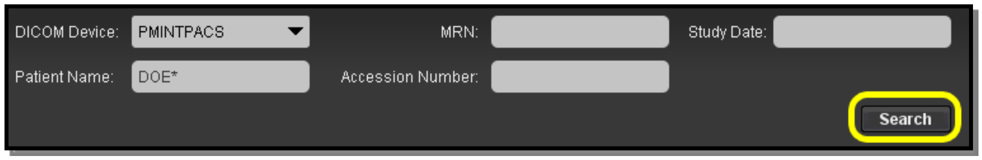
The DICOM Q/R – Import from DICOM Device Window

Once a request has been made, the study images will then be brought into Merge PACS, where they can be retrieved using the standard Query feature described in Section 3.4. Note that the DICOM Q/R feature is unrelated to the Merge Archive feature.

To request and retrieve a study from a DICOM archive:

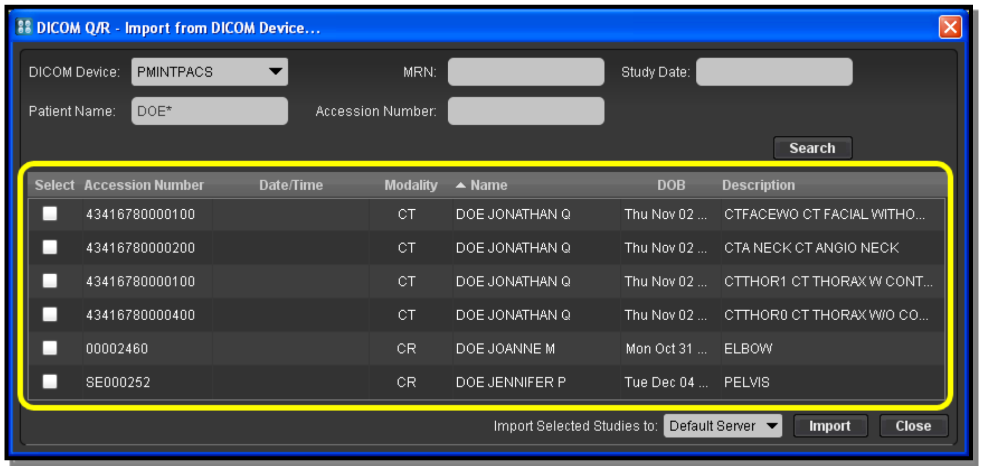
1. Select the desired DICOM Device from the drop-down **DICOM Device** menu, if necessary, and enter one or more of the following search criteria in the appropriate fields:
   - **MRN** (this will be entered by default, but can be changed or removed if desired)
   - **Study Date**
   - **Patient Name** (you can use an asterisk at the end of a partial last name as a wildcard. For example, “gold*” will locate patients with the last name Goldberg and Goldstein)
   - **Accession Number**

2. Click the **Search** button to send your request to the specified DICOM archive, as in the following example:



Searching for Matching Studies

If any studies are found that match your request, they will be displayed in the window with check boxes next to them, as in the following example:



List of Matching Studies

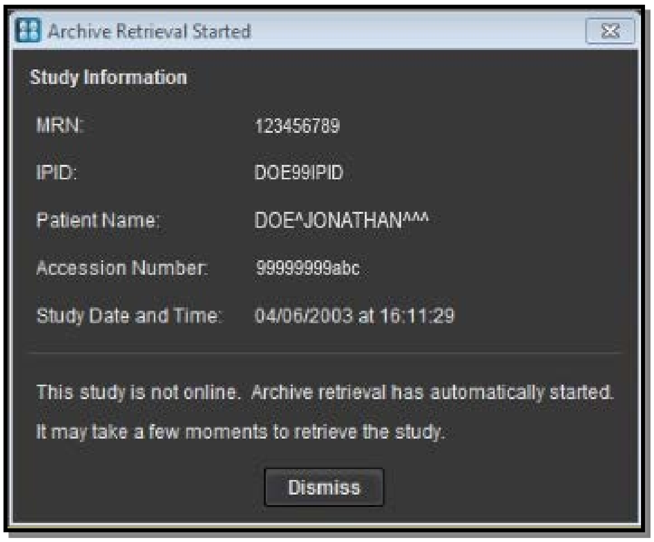
3. Select the desired study or studies and then click on the **Import** button at the bottom of the window. Note that the status of the import process will be displayed at the bottom of the window, as in the following example:

Import Status

4. When the importing process is complete, you can close the DICOM Q/R window. The retrieved study or studies will now be available via the regular Query feature, as described in Section 3.4.

Chapter 17. Viewing Archived Studies

If Merge PACS has an archive configured and the primary study is currently archived and not available online, attempting to open the study in the Primary or Secondary Viewer will automatically trigger an archive retrieval request. When this occurs, an **Archive Retrieval Started** dialog such as the following will be shown:



Archive Retrieval Started

NOTE: This dialog will disappear automatically after five seconds or when you click the **Dismiss** button. Clicking the **Dismiss** button will not cancel the archive retrieval.

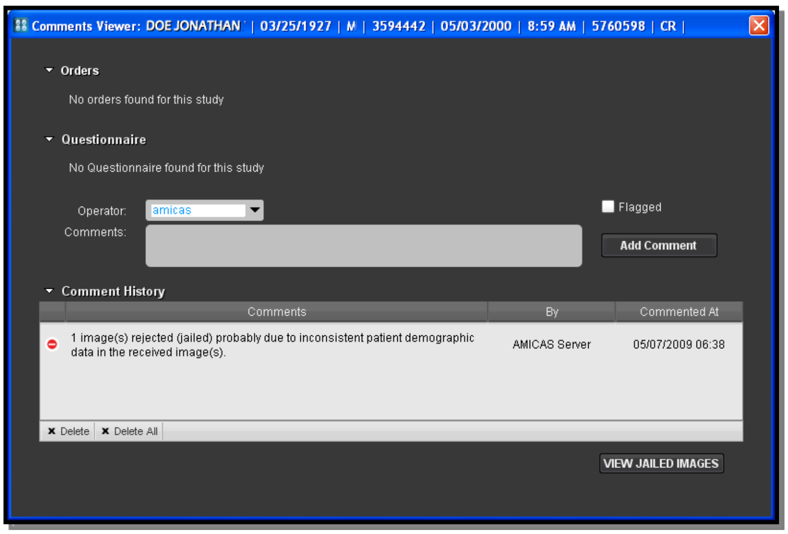
Once the archive retrieval process has completed, the study will automatically open in the selected Viewer, except as noted below:

- If another study is opened in the Viewer while the archived study is being retrieved, the retrieval process will continue in the background but the study will need to be manually opened (*e.g.*, by clicking on the **View Study** action icon again) once it is fully online.
- If you are attempting to open the study in the **Secondary Viewer**, the maximum number of archived studies that can be automatically opened in simultaneous instances of the Viewer instances (including the Primary Viewer) is configurable on a site-by-site basis. For example, if the maximum number is set to four and there are already four Viewer instances open, attempting to open another archived study in a Secondary Viewer will cause the study to be retrieved but will not automatically open it in a Viewer.
- Merge PACS can also be configured to never automatically open retrieved studies in the Secondary Viewer. In this case, the retrieval process will occur in the background and you will need to manually open it in a Secondary Viewer once the process is complete.

Chapter 18. Viewing Jailed Images

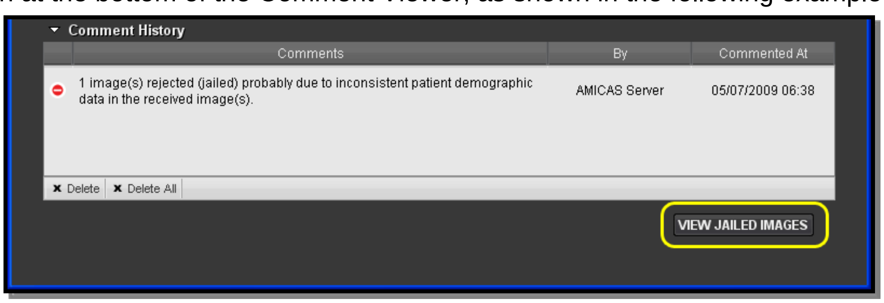
Each image that is sent to Merge PACS from the various imaging modalities has a number of DICOM attributes associated with it to tell Merge PACS which patient and study the image belongs to. If an image is received by the system with missing DICOM information or else with information that doesn't match images that have already been received for that study, the image is placed into a special folder on the Merge PACS Server called the "DICOM Jail."

As mentioned in subsections 3.5.4, 3.9.3, 3.8.1 and 4.1.3 above, studies with one or more jailed images will have a red warning icon displayed on the Query Page, The Patient Record and within the Merge PACS Viewer. Clicking on the warning icon point will launch a separate pop-up **Comment Viewer** window with the warning message displayed, as shown in the following example:



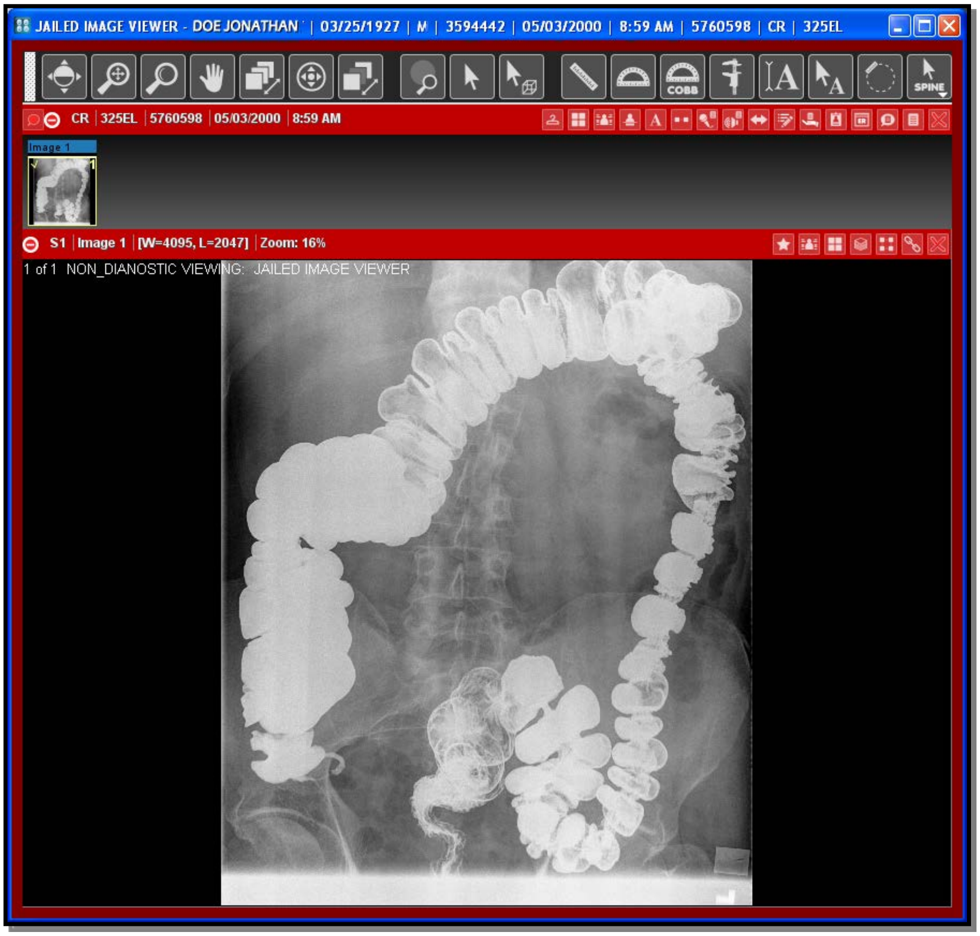
Comment Viewer Window with Warning Displayed

- If the study has one or more **jailed images** (*i.e.*, images that were not compressed due to missing or mismatched DICOM information) and Merge PACS has been configured to permit viewing of these images, you will see a "VIEW JAILED IMAGES" button at the bottom of the Comment Viewer, as shown in the following example:



View Jailed Image Button

- Clicking on the View Jailed Images button will launch a special Viewer window that will display only the jailed images from that study, as shown in the following example:



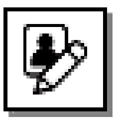
Viewing Jailed Images

  - Studies that have jailed images will not appear on a worklist and can only be viewed by using the Query Page.
  - This special Viewer window is outlined in red to distinguish it from the regular Viewer window.
  - Because the images have not been fully imported into Merge PACS System, they will not have been compressed and may take longer than usual to display.

Chapter 19. Viewing and Editing Patient and Study Demographics

Depending on your login privileges, you can view and edit patient and study demographic information from a variety of locations within the Merge PACS Workstation. This can be done from a **Study Details** window that lets you view and edit both patient and study demographic information for a particular study, as well as a **Patient Demographics** window that lets you view and edit general patient demographic information for a particular patient.

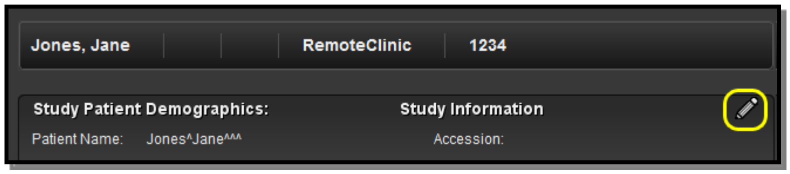
19.1. Study Details Window



The **Study Demographics** icon on the **RealTime Worklist**, the **RealTime Study List**, the **Teaching Worklist** and the Primary Exam Toolbar and Secondary Exam Toolbar within the **Patient Record**, as shown on the left, will display the demographic information for the exam in a separate pop-up **Study Details** window, as in the following example:

The Study Details Window

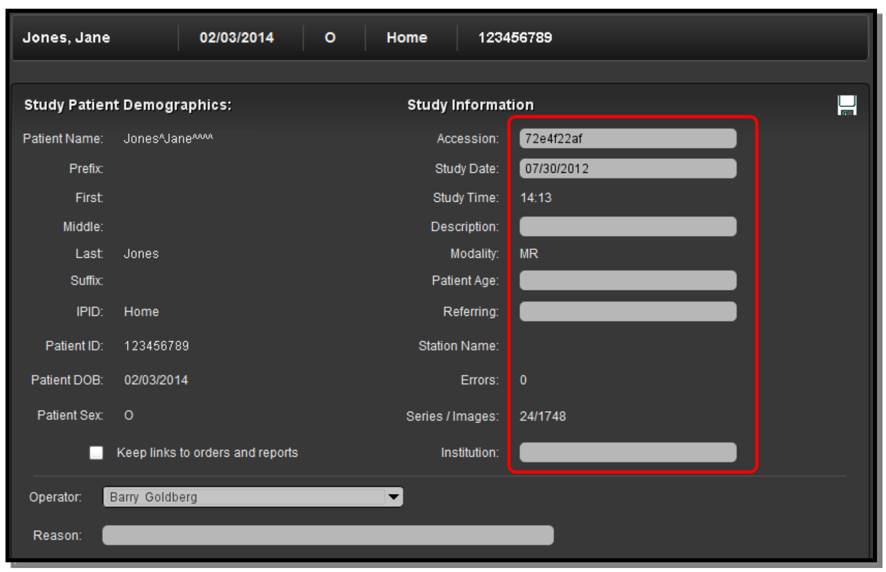
- The top section of the Study Details window displays both patient demographic and study demographic information for this exam.
- The center section of the Study Details window displays the history of any changes that have previously been made to the demographics for this exam.
- The bottom section of the Study Details window displays information about the individual series that make up this exam.
- If you have access privileges to edit patient and study information, you can click on the small pencil icon in the upper right-hand section of the window to launch a **patient data editor**, as in the following example:



Accessing the Patient Data Editor

NOTE: The Patient Name, Date of Birth and Sex are the calculated values based on consolidated patient information, as described in Appendix C below.

- ○ This will convert the study demographic information displayed at the top of the window into editable fields, as in the following example:



Editing Study Demographic Information

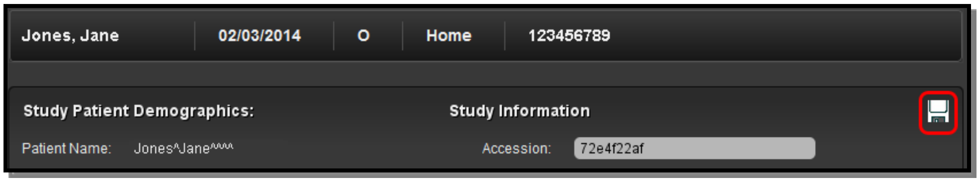
NOTE: The Patient Demographics information cannot be edited from this window. To edit patient demographics, use the Patient Demographics Window, as described in Section 19.2 below.

NOTE: Study demographics can also be edited from the Quality Control Editor. For more information, refer to the *Merge PACS 6.6 Quality Control Editor Users Guide*.

- ○ Edit the information as necessary.
- ○ Select the **Keep Links to Orders and Reports** checkbox if you want to preserve the links between this study and any orders or reports associated with it.

NOTE: The default state of the **Keep Links to Orders and Reports** checkbox is determined by a site configuration, but it is recommended to be selected. If you change the default, it will be preserved for your login.

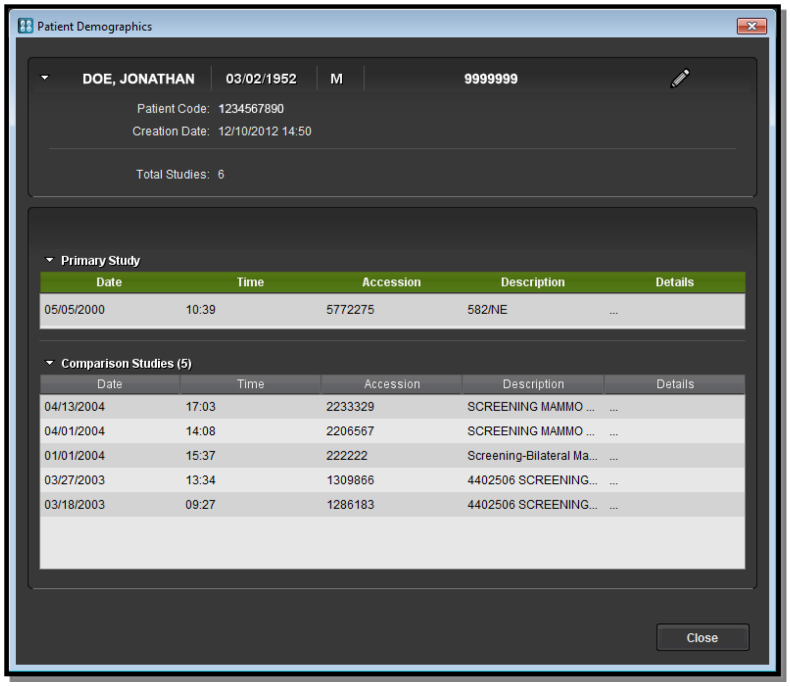
- ○ Make sure you are selected from the **Operator** drop-down menu
- ○ Enter a reason for the edit in the **Reason** field.
- ○ When finished, click on the **Save Edited Study Details** icon in the upper right-hand section of the window, as in the following example:



Saving Edited Patient and Study Demographic Information

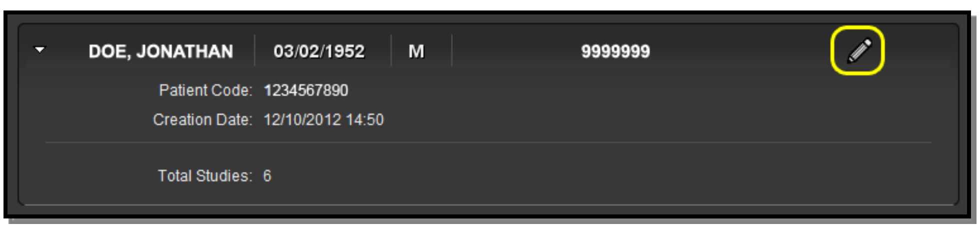
19.2. Patient Demographics Window

The **Patient Demographic** icon on the main **Patient Record Toolbar**, as illustrated to the left, will display the general demographic information for this patient in a separate pop-up window, as in the following example:



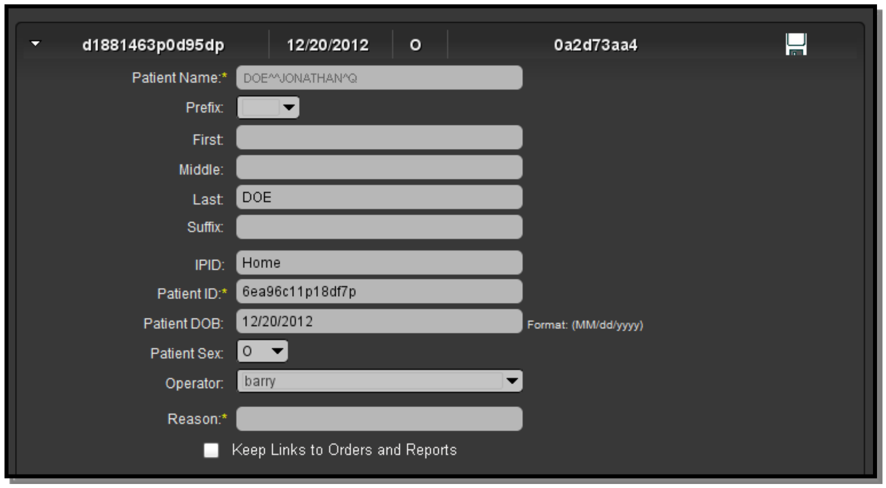
The Patient Demographics Window

If you have access privileges to edit patient data information, you can click on the small pencil icon in the upper right-hand section of the window to launch a **patient data editor**, as in the following example:



Accessing the Patient Data Editor

This will cause a number of editable fields to be displayed at the top of the window, as in the following example:



Editing Patient Demographic Information

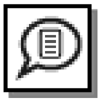
NOTE: Patient demographics can also be edited from the Quality Control Editor. For more information, refer to the *Merge PACS 6.6 Quality Control Editor Users Guide*.

Edit the information as necessary, make sure you are selected from the Operator drop-down menu, enter a reason for the edit in the **Reason** field and then click on the **Save Edited Study Details** icon in the upper right-hand section of the window, as in the following example:

Saving Edited Patient Demographic Information

NOTE: Select the **Keep Links to Orders and Reports** checkbox if you want to preserve the links between this patient and any orders or reports associated with the patient. The default state of the checkbox is determined by a site configuration, but it is recommended to be selected. If you change the default, it will be preserved for your login.

Chapter 20. The Technologist WorkPanel



The **Technologist WorkPanel** icon on the **RealTime Worklist**, the **Patient Record** and the **Study Toolbar** within the Merge PACS Viewer, as shown on the left, is an optional feature that provides a number of different tools commonly used by Technologists in a single window, as in the following example:

The Technologist WorkPanel

Some of these tools can only be found on the Technologist WorkPanel, while others can also be accessed from elsewhere within the Merge PACS Workstation. If the optional Merge RadStream component has been enabled on your system, the Technologist WorkPanel will also contain tools specific to Merge RadStream.

At the Technologist WorkPanel you can do the following:

- View **Patient and Exam Information**
- Set the **verification status** of the study
- **Manually match** the study to an order so that the study will assume the patient demographics of that order.
- **Manually link** the study to an order so that an outbound HL7 message will be generated for that order.
- Enter **Comments** that can be viewed from within the Order Viewer
- View **Contact Information** for physicians associated with this study/order

- Change the **Access Control** for this study/exam

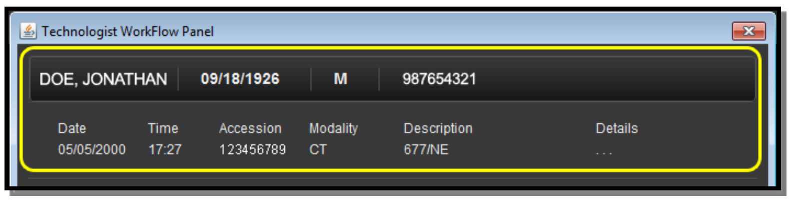
In addition, if the optional Merge RadStream component has been enabled, you can do the following:

- Set the **Communication** and **Connection status** for this study
- Set **Exam Acuity**

NOTE: If the Technologist WorkPanel is already open for one study and you click on the Technologist WorkPanel icon for a different study, a new instance of the Technologist WorkPanel will be opened for the new study in a separate window.

20.1. Viewing Patient and Exam Information

The top portion of the Technologist WorkPanel displays information about the patient and exam , as in the following example:

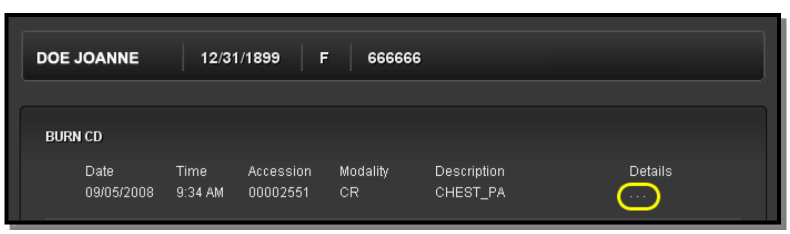


Patient and Exam Information

The following information is displayed:

- **Patient Name**
- **Patient Date of Birth**
- **Issuer of Patient ID (IPID)**
- **Patient Medical Record Number (MRN)**
- **Patient Sex**
- **Study Accession Number**
- **Study Modality**
- **Procedure Date/Time**
- **Reason for Exam**
- **Exam Description**

In addition, you can click on the **…** link in the **Details** column to view the study demographics for any study listed, as in the following example:

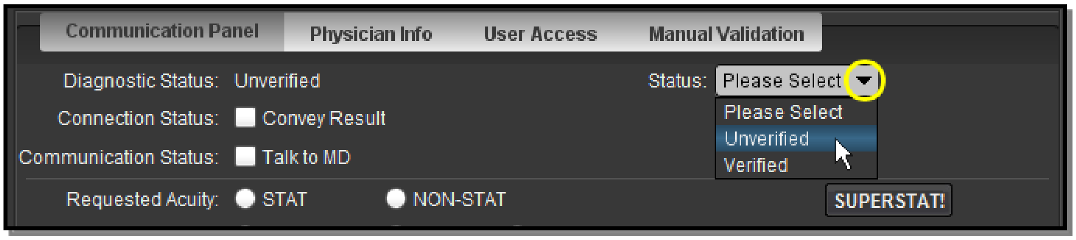


Accessing the Study and Patient Demographics for a Study

Clicking on this link will cause the **Study Details** window to be displayed as separate pop-up window, as described in Chapter 19 above.

20.2. Verifying a Study

Depending on how your system is configured, the Communication Panel tab of the Technologist WorkPanel may include a drop-down **Status** menu, as in the following example:



Setting the Validation Status

NOTE: The Status menu is only available at the default **Communication Panel** tab.

The Status menu allows you to set the validation status of the current study in the following situations:

- If **Manual Validation** has been enabled for your system, this would primarily be done for **quality control** purposes (*i.e.*, to prevent studies from being forwarded to other Merge PACS Servers or displayed on the Query Page unless they are first manually verified). Depending on how your site is configured, manually setting the validation status of a study to “Verified” might also trigger the automatic assignment of that study to a pre-defined group of users.
- If **Automatic Validation** has been enabled for your system, this would primarily be done to override the validation and allow a study to be forwarded to another Merge PACS Server despite the fact that it failed automatic validation.

NOTE: In general, it is recommended that the underlying problem be fixed (*i.e.*, by using the **Manual Order Matching** feature described in Section 20.3, below or using the **Problem Studies Tool** described in the *Merge PACS 6.6 Administration Manual* rather than simply manually setting the validation status here.

Click the **Save** button to submit your status. You can then exit the Technologist WorkPanel by clicking the red **X** in the upper right-hand corner of the window.

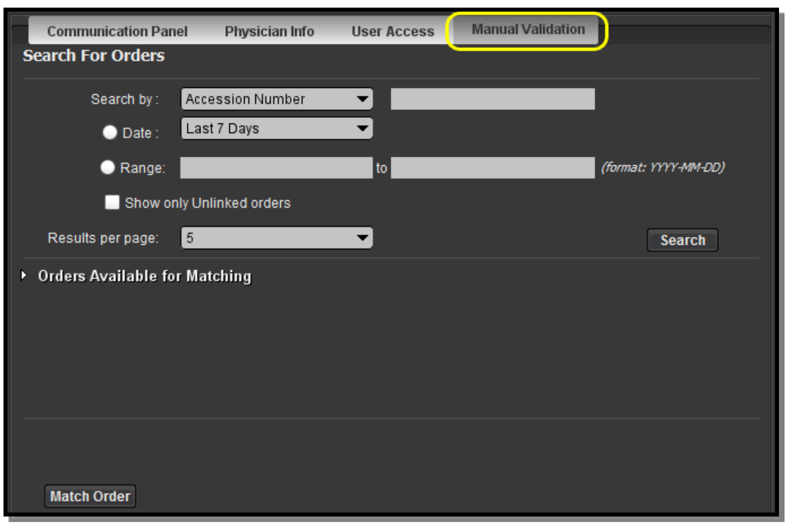
NOTE: If you accessed this study via the RealTime Worklist, setting the validation status to “Verified” will change the study’s **workflow status** on the worklist from **Unverified** to **Unread** (or the equivalent names for your site). Conversely, setting the validation status to “Unverified” will change the study’s workflow status to **Unverified** (or the equivalent thereof).

20.3. Manually Matching an Order to the Study

If **Automatic Validation** has been enabled and configured to check for **matching orders** ("Order Matching Validation"), the system will automatically flag as "Unverified" any study for which it cannot find a matching order. Rather than simply overriding the automatic validation and manually setting the validation status, as described in the preceding Section, you can use the Technologist WorkPanel to you search for orders currently in the system and manually match one of those orders to the current study, at which point the Automatic Validation process will re-validate the study and change the status to "Verified."

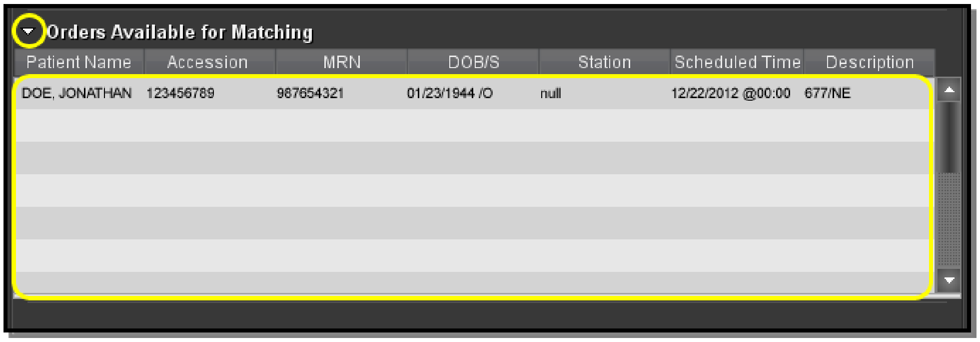
If **Automatic Validation** has **not** been enabled (or if it has been configured to check for something other than matching orders), you can still use the Technologist WorkPanel to you search for orders currently in the system and manually match one of those orders to the current study. Once this is done, however, the status of the study will not be changed.

Clicking on the **Manual Validation** tab will cause the Manual Validation section of the WorkPanel to be displayed instead of the default Communication Panel, as in the following example:



The Manual Validation Section

Click on the arrow to the left of **Orders Available for Matching** to display a list of all orders from this modality that are not currently matched with a study, if any, as in the following example:



The Manual Validation Section

If the desired order is not displayed, you can use the **Search for Orders** section to locate the correct order:

- Select a search criterion from the **Search by** drop-down menu and enter a value to match in the field next to the menu.

NOTE: If searching by **Station Name** or **Patient Name**, you can use an asterisk (*) as a wildcard character.

- If desired, you can select a pre-defined date range for your search by clicking on the **Date** option and selecting from the drop-down Date menu.
- Alternatively, you can enter a specific date range by clicking on the **Range** option and then entering a starting and ending date in the fields provided.
- If desired, you can opt to only show orders that are not currently associated with any studies by selecting the **Show only unlinked orders** option.
- If desired, you can also change the number of results to be displayed per page from the drop-down **Results per page** menu.
- When finished, click on the **Search** button to generate a list of orders matching your query.

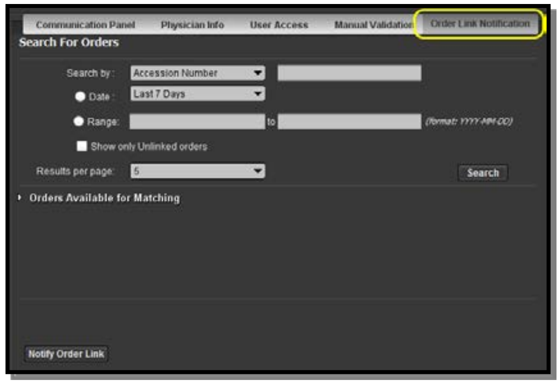
Once you have located the desired order, click on the **Match Order** button for that order to manually match it with the study currently open in the Viewer.

NOTE: Once an order is manually matched with the study, the study will assume the patient demographics of that order.

20.4. Manually Linking Multiple Orders to the Study

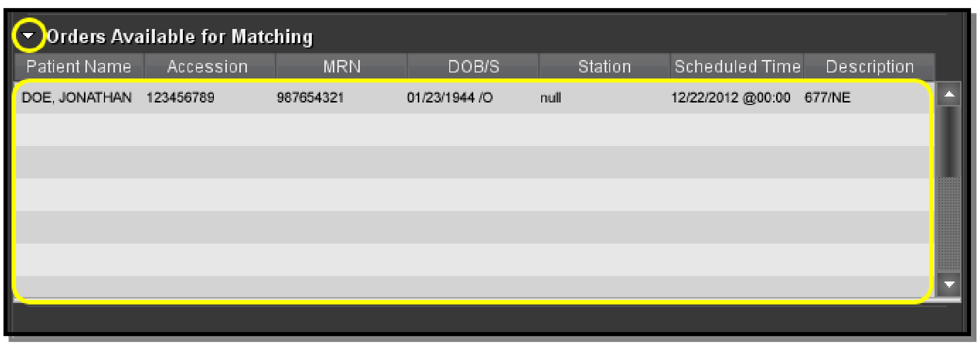
Occasionally, a situation might arise where multiple orders are generated for a study but the study is only linked to one of those orders. If you are using a dictation system that will only generate reports for orders that are associated with a study, you can manually link all orders associated with the current study to that study and cause a notification message to be sent to the dictation system.

If your system is configured with this feature enabled, clicking on the **Order Link Notification** tab will cause the Order Link Notification section of the WorkPanel to be displayed instead of the default Communication Panel, as in the following example:



Order Link Notification Section

Click on the arrow to the left of **Orders Available for Matching** to display a list of all orders from this modality that are not currently matched with a study, if any, as in the following example:



Unlinked Orders from this Modality

If the desired order is not displayed, you can use the **Search for Orders** section to locate the correct order:

- Select a search criterion from the **Search by** drop-down menu and enter a value to match in the field next to the menu.

NOTE: If searching by **Station Name** or **Patient Name**, you can use an asterisk (*) as a wildcard character.

- If desired, you can select a pre-defined date range for your search by clicking on the **Date** option and selecting from the drop-down Date menu.
- Alternatively, you can enter a specific date range by clicking on the **Range** option and then entering a starting and ending date in the fields provided.
- If desired, you can opt to only show orders that are not currently associated with any studies by selecting the **Show only unlinked orders** option.
- If desired, you can also change the number of results to be displayed per page from the drop-down **Results per page** menu.

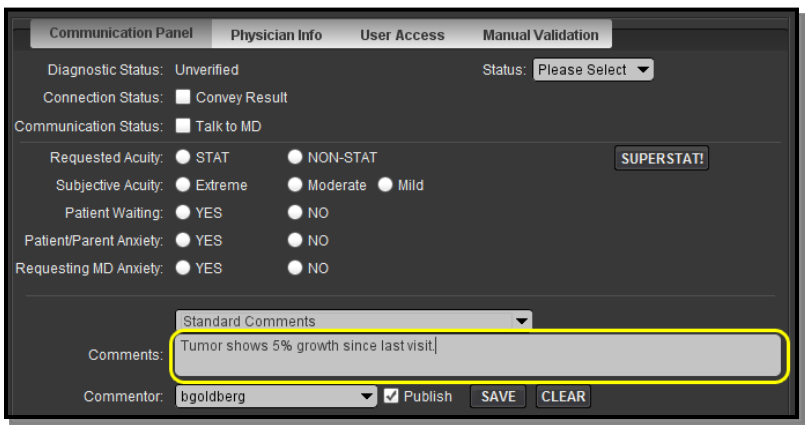
- When finished, click on the **Search** button to generate a list of orders matching your query.

Once you have located the desired order, click on the **Notify Order Link** button to manually send a message to the dictation system stating that the selected order is linked to the current study.

NOTE: Only one message can be sent at a time. If a message needs to be sent for an additional order, you will need to re-run your search and click on the **Notify Order Link** button again.

20.5. Adding Comments to a Study

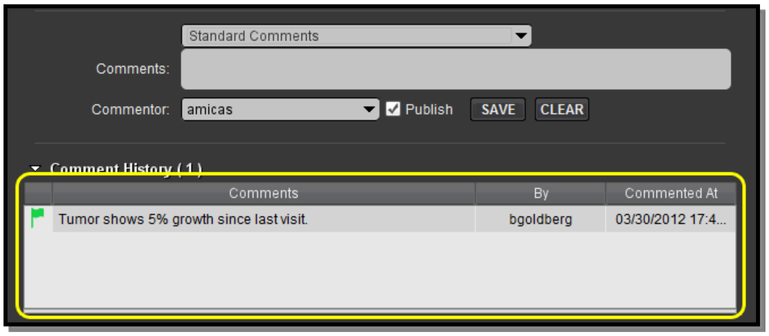
You can add a comment about this study that will be saved on Merge PACS and can be viewed later by entering your comment at the Technologist Workstation, as in the following example:



Adding a Comment

- To add a comment:
  - Make sure the **Communication Panel** tab is being selected.
  - Enter the desired text in the **Comments** field.
  - Make sure that your user name is correctly displayed in the **Commenter** box.
  - Click the **Save** button to submit your comment and close the Technologist WorkPanel, or click the **Clear** button to clear the comments field before submitting. Note that once you have submitted a comment by clicking the **Save** button you cannot delete it.

- Once you have entered a comment, it will be displayed below the Comments field together with any previous comments or warnings (including system generated warnings), as in the following example:



List of Comments

- By default, the most recent comment will be accessible from the Query Results page and RealTime Worklist. If you do not want it to be accessible from the Query Results page and RealTime Worklist, make sure that the checkbox marked “**Publish**” is **not** selected.
- Comments entered here will also appear in the Order Viewer, as described in Chapter 4.11 above.

20.6. Setting the Communication and Connection Status for a Study

If the optional Merge RadStream component has been enabled, you can set two common statuses for the current study/order directly from the Technologist Workstation without needing to select them from drop-down menus, as shown in the following example:

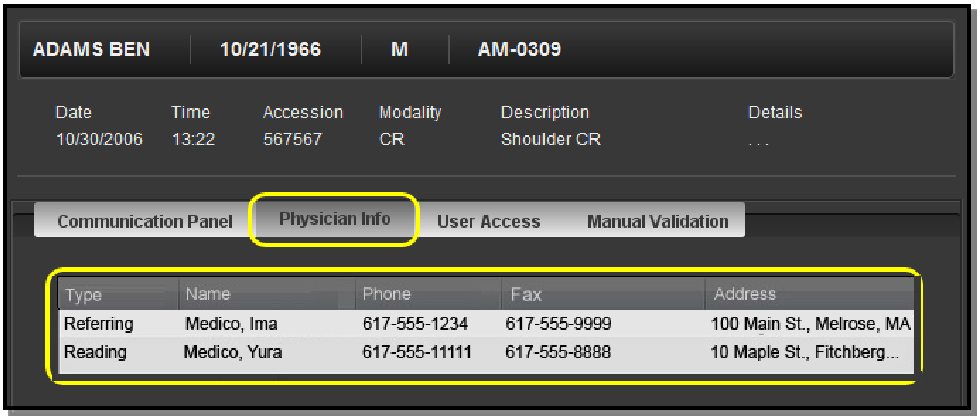
Setting Status from the Technologist WorkPanel

- Make sure the **Communication Panel** tab is selected.
- To set the Communication status for this study/order to “Convey Result”, select the **Convey Result** checkbox.
- To set the Connection status for this study/order to “Talk to MD”, select the **Talk to MD** checkbox.
- Click the **Save** button to save your changes.

NOTE: The names of the Communication and Connection status options displayed at the WorkPanel will reflect the actual status names defined for your site.

20.7. Viewing Physician Contact Information

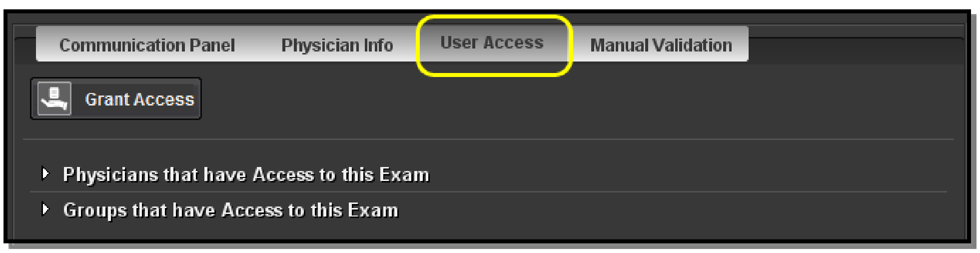
Clicking on the **Physician Info** tab will let you view contact information for any physician associated with this study/order (Ordering Physician, Referring Physician, Attending Physician or Other Physician), as in the following example:



Physician Contact Information

20.8. Granting Access to a Study/Exam

If you have the login privilege to grant other users access to exams, you can do so by clicking on the **User Access** tab on the Technologist Workstation to display the User Access section, as shown in the following example:

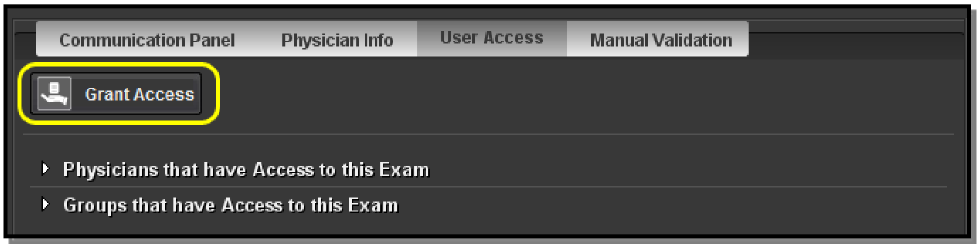


The User Access Section

The User Access section lists all physicians and groups that currently have access to this study/exam. Click on the white triangles to expand or hide each individual list.

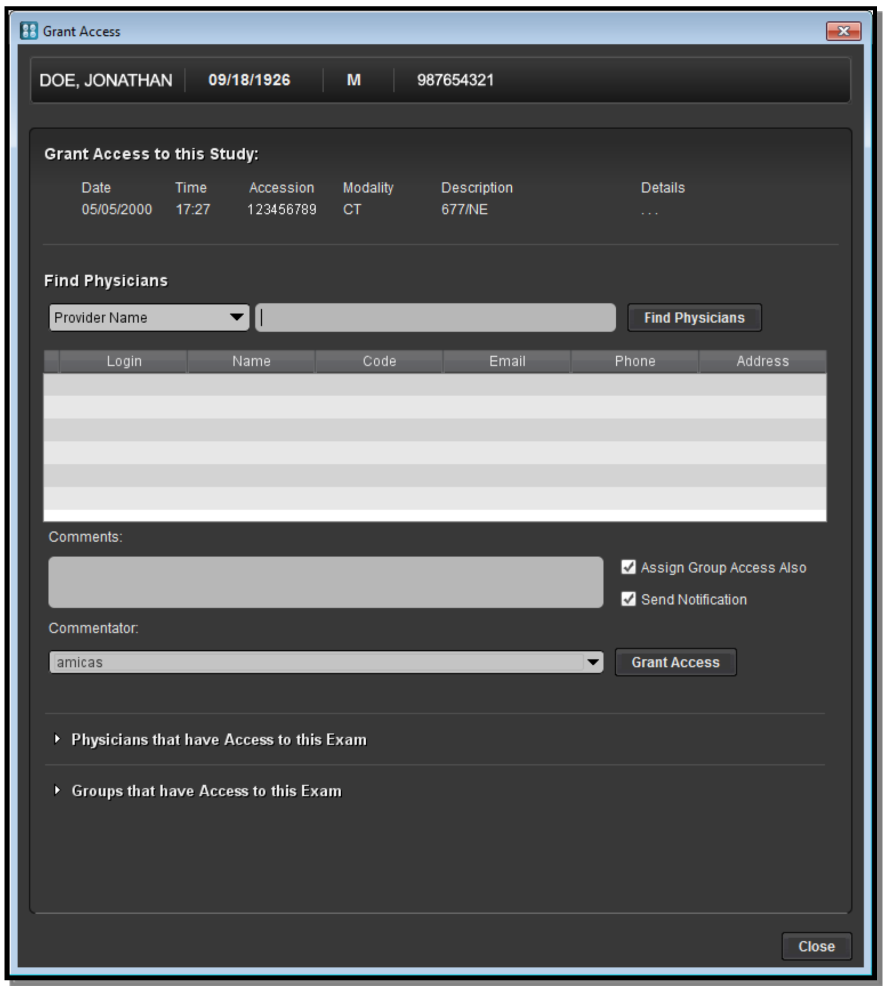
NOTE: Depending on how Merge PACS is configured, some users and groups may have unrestricted access to all studies/exams. These users and groups will not be displayed, since their access can neither be granted nor revoked.

To grant or revoke access to this study/exam, click on the **Grant Access** link, as in the following example:



The Grant Access Link

*This will cause the **Grant Access** screen to appear as a separate pop-up window, as in the following example:*

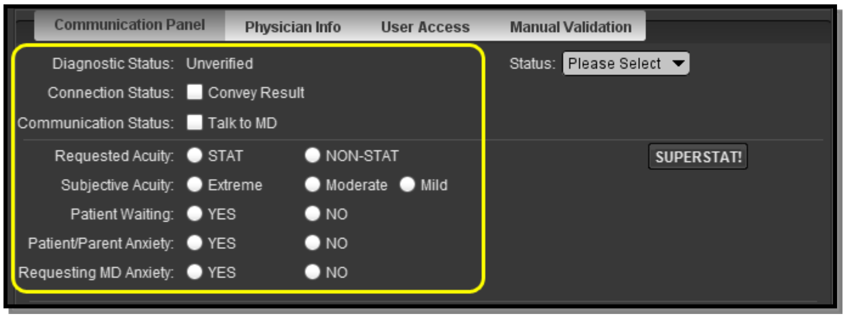


The Grant Access WIndow

- Refer to Chapter 11 above for information regarding the Grant Access window.
- When finished, click on the **Close** button at the bottom of the window.

20.9. Setting Exam Acuity

If the optional **Merge RadStream** component is enabled for your system, the Technologist WorkPanel can also be used to enter information that will allow Merge RadStream to determine the acuity for this study, as in the following example:



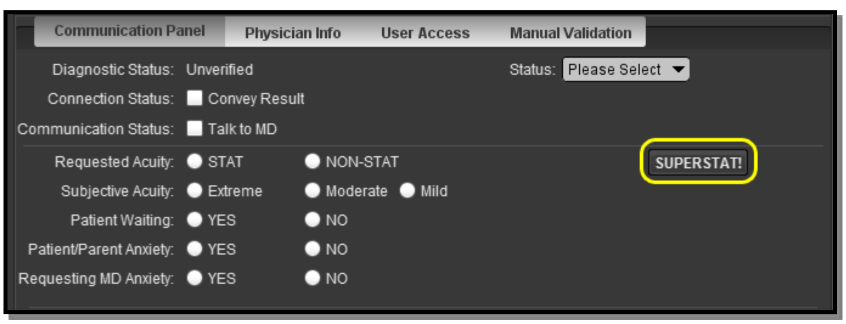
Setting Acuity

NOTE: Exam Acuity is only available at the default **Communication Panel** tab.

Studies that are assigned a higher acuity score by the system will appear higher up in worklists that are set up to be sorted by acuity. The questions shown on the Technologist WorkPanel are one factor the system uses to set acuity scores.

Answer the questions by clicking on the radio buttons next to the desired response and then click on the **Save** button to record your answers.

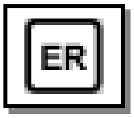
Depending on how your system is configured, the Technologist Workstation may also contain a **SUPERSTAT!** button, as in the following example:



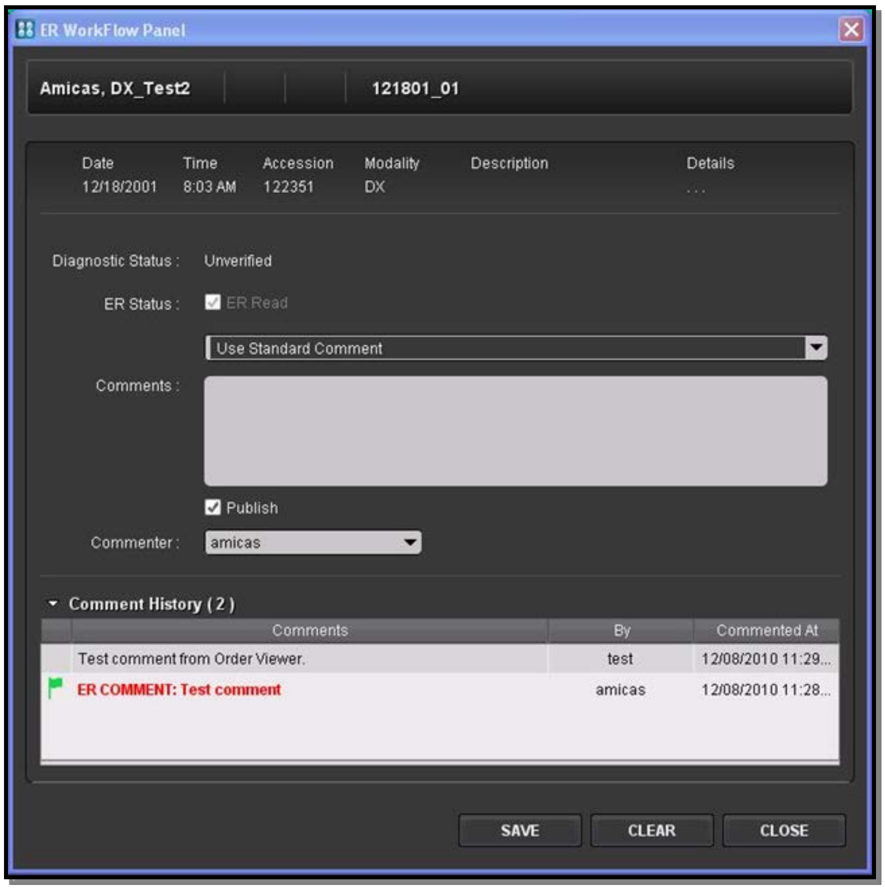
The SUPERSTAT! Button

- If this option is available, clicking on the SUPERSTAT! button will cause the study in question to be assigned an acuity score that will exceed anything that is currently on the worklist, thereby enabling it to move right to the top.
- Once SUPERSTAT has been enabled, click on the **Save** button to apply the status and close the Technologist WorkPanel.
- Note that once the SUPERSTAT! button has been clicked, the rest of the acuity options will be disabled and the SUPERSTAT! button itself will be replaced with a **Cancel SuperStat** button.

Chapter 21. The ER WorkPanel



The **ER WorkPanel** icon on the **RealTime Worklist**, the **Patient Record** and the **Study Toolbar** within the Merge PACS Viewer, as shown on the left, is an optional feature that provides a number of different tools commonly used by Emergency Room Physicians in a single window, as shown in the following example:

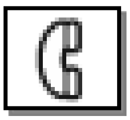


The ER WorkPanel

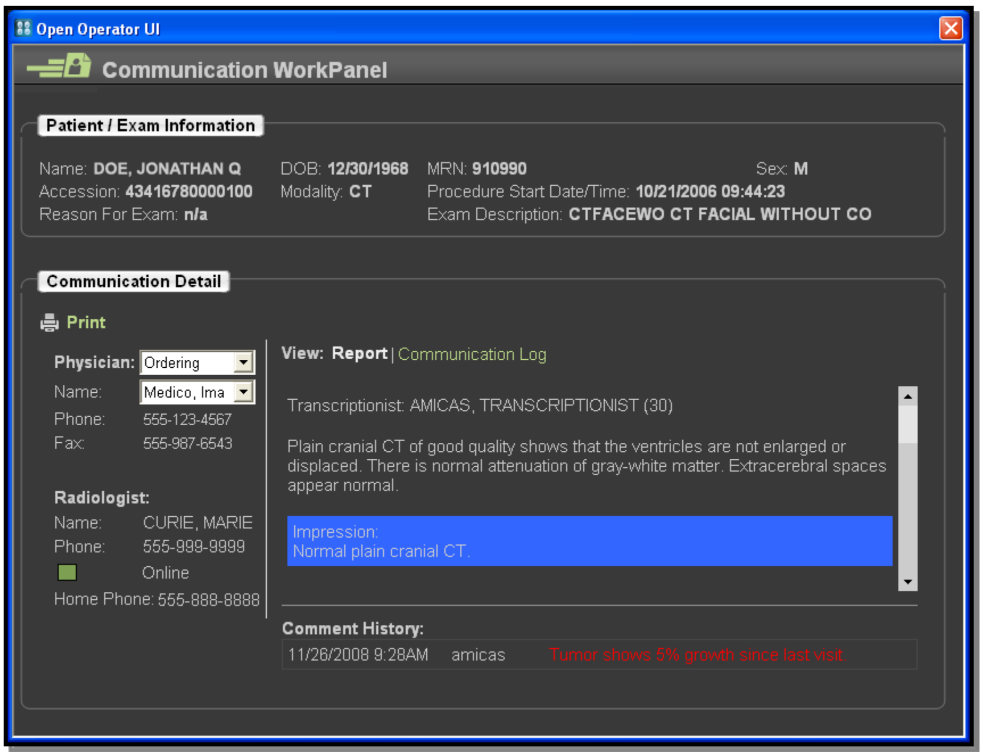
At the ER WorkPanel you can do the following:

- View **Patient** and **Exam** Information.
- Set the **ER Status** for this study to **Read**
- **Enter Comments** (select the "Publish" option if you want the comment to be accessible from the Query Results page and RealTime Worklist)
- Select a **Standard Comment** (if any have been defined for your system) by selecting the desired comment from the "Use Standard Comment" drop-down menu.
- **View Past Comments** that have been entered for this study

Chapter 22. The Communication WorkPanel



If the optional Merge RadStream component is enabled for your system, the **Communication WorkPanel** icon on the **RealTime Worklist**, the **Patient Record** and the **Study Toolbar** within the Merge PACS Viewer, as shown on the left, will launch the Communication Workpanel, as in the following example:



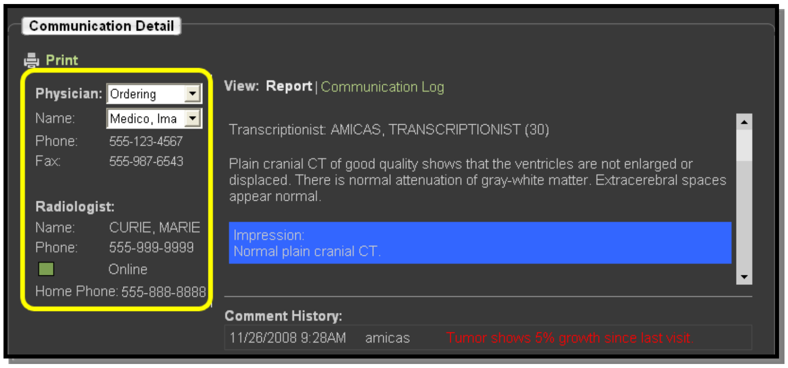
The Communication WorkPanel

The Communication WorkPanel provides a mechanism for an authorized user (the "Operator") to do the following:

- See **contact information** for the various physicians associated with a study (Ordering Physician, Referring Physician and Radiologist)
- View a copy of the **report** associated with this study, if any, with relevant portions highlighted
- **Enter comments** regarding the contact made or attempted with each Physician and view a log of previously entered comments
- Set the **Communication** and **Connection status** for this study

22.1. Viewing Physician Contact Information

Depending on how your system is configured, the Communication WorkPanel will let you view contact information for any physician associated with this study/order (Ordering Physician, Referring Physician, Attending Physician or Other Physician) as well as the Radiologist, as in the following example:



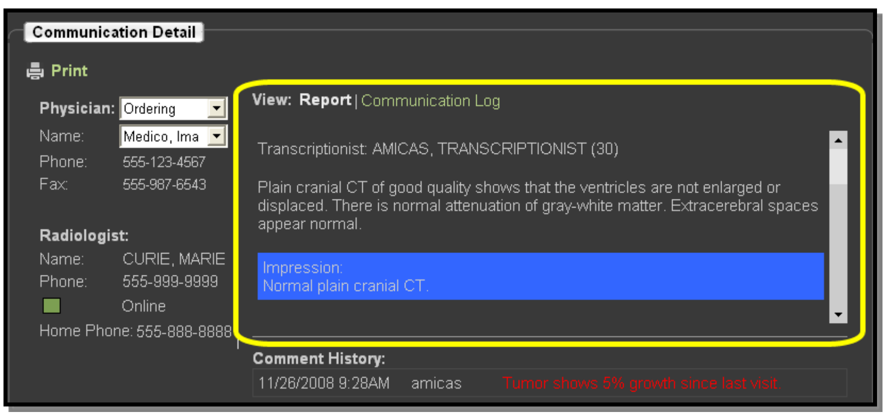
Physician Contact Information

To view the contact information for a particular physician associated with this study/order, select the type of physician from the **Physician** drop-down menu, followed by the name of the desired physician from the **Name** drop-down menu. If available, that physician's contact information will then be displayed.

If information for the Radiologist is available for this study, it will be displayed below the Physician information together with a note indicating whether he or she is currently online or not.

22.2. Viewing Highlighted Reports

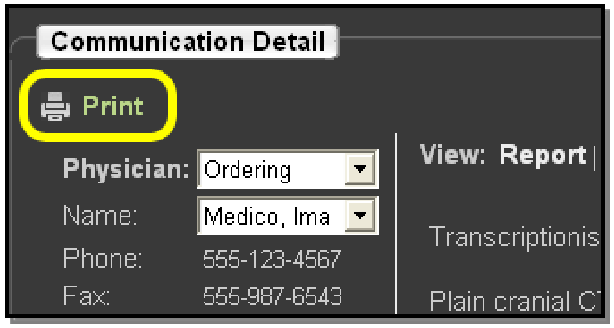
If there is a report associated with this study, it will be displayed in the Communication WorkPanel as shown in the following example:



Highlighted Report

Depending on how your system is configured, key portions of the report may be highlighted. Note that the highlighting is done automatically based on keywords typically contained in reports (such as “impression” or “findings”).

If you would like to print a copy of the report currently being displayed, click on the **Print** icon, as shown in the following example:

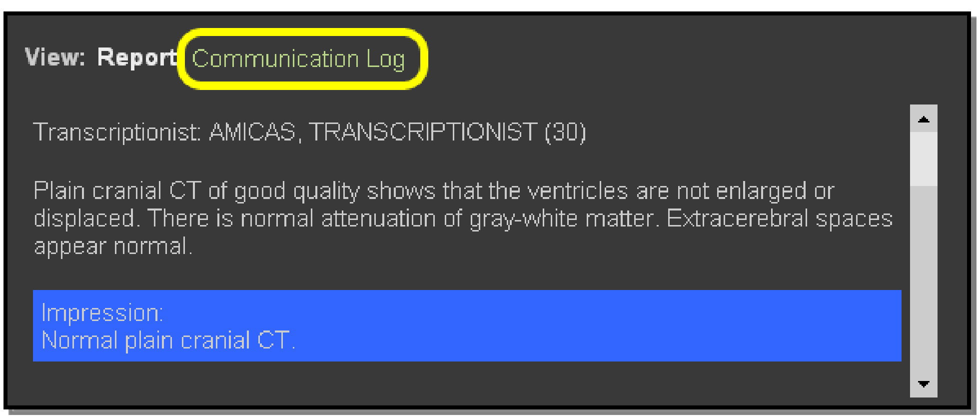


Printing a Report

22.3. Entering Comments and Setting Status

The Communication WorkPanel includes a separate **Communication Log** section that lets you enter comments regarding the contact made or attempted with each Physician associated with this study and view a log of previously entered comments for this study. You can also set the Communication and Connection status for this study from the Communication Log.

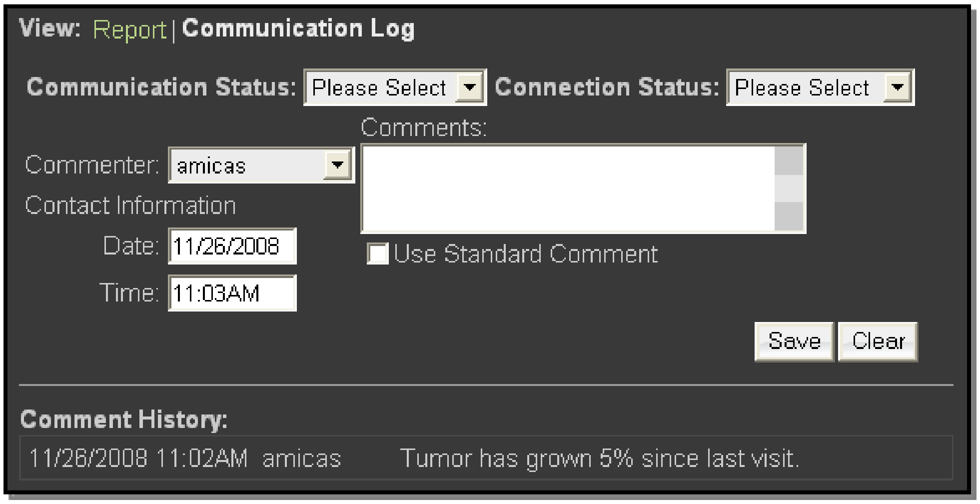
To access the Communication Log, click on the **Communication Log** link as shown in the following example:



Communication Log Link

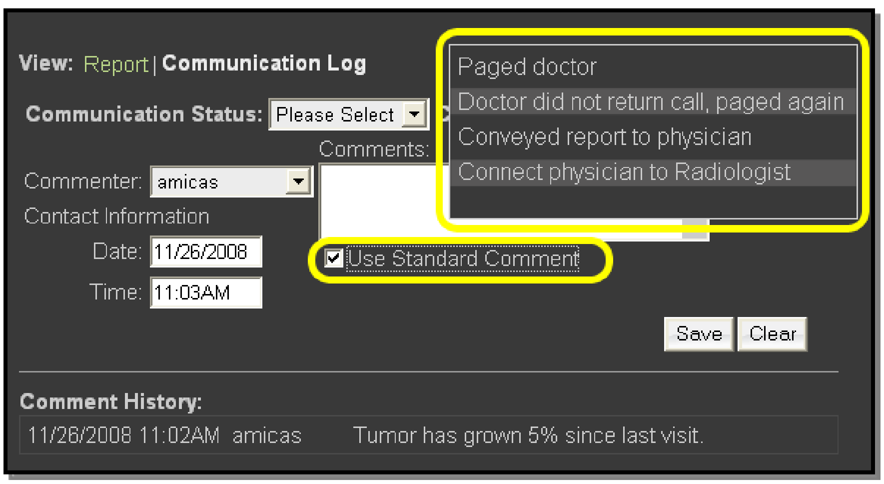
NOTE: When viewing the Communication Log section you can click on the **Report** link to view the report instead.

When you click on the Communication Log link, the Communication Log section will be displayed as in the following example:



The Communication Log

- To leave a comment, make sure your username is selected in the drop-down **Commenter** menu and enter the desired text in the **Comments** box.
- If standard comments have been defined for your system, you can also click on the **Use Standard Comment** check box and select a comment from a pop-up list of available comments, as in the following example:

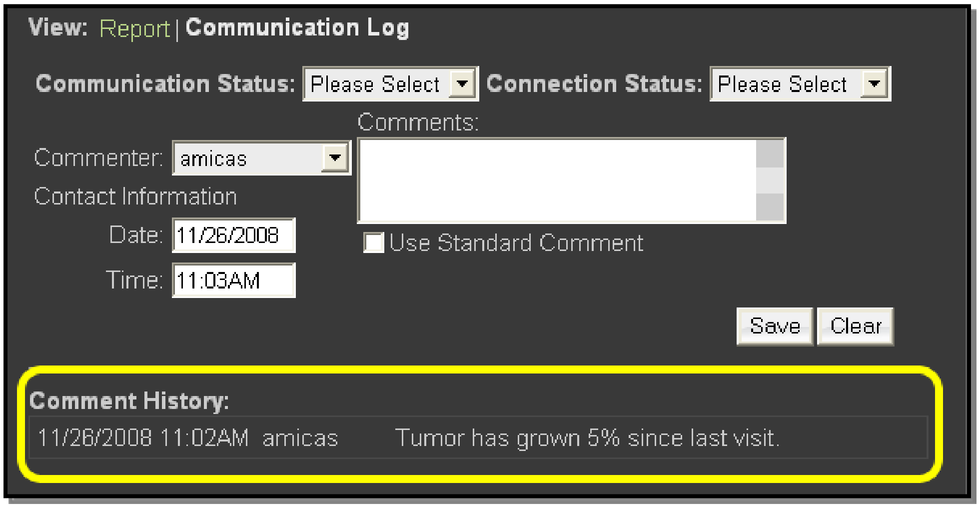


Selecting a Standard Comment

- To set the **Communication** and/or **Connection status** for this study, select the desired status from one or both of the drop-down status menus.
- Click the **Save** button to record your changes and exit the Communication WorkPanel entirely.
- Alternatively, you can click the **Clear** button to remove any text entered in the Comments field.

22.4. Viewing Previously Entered Comments

Comments that have been previously entered can be viewed at the **Comment History** section of the Communication WorkPanel, as in the following example:



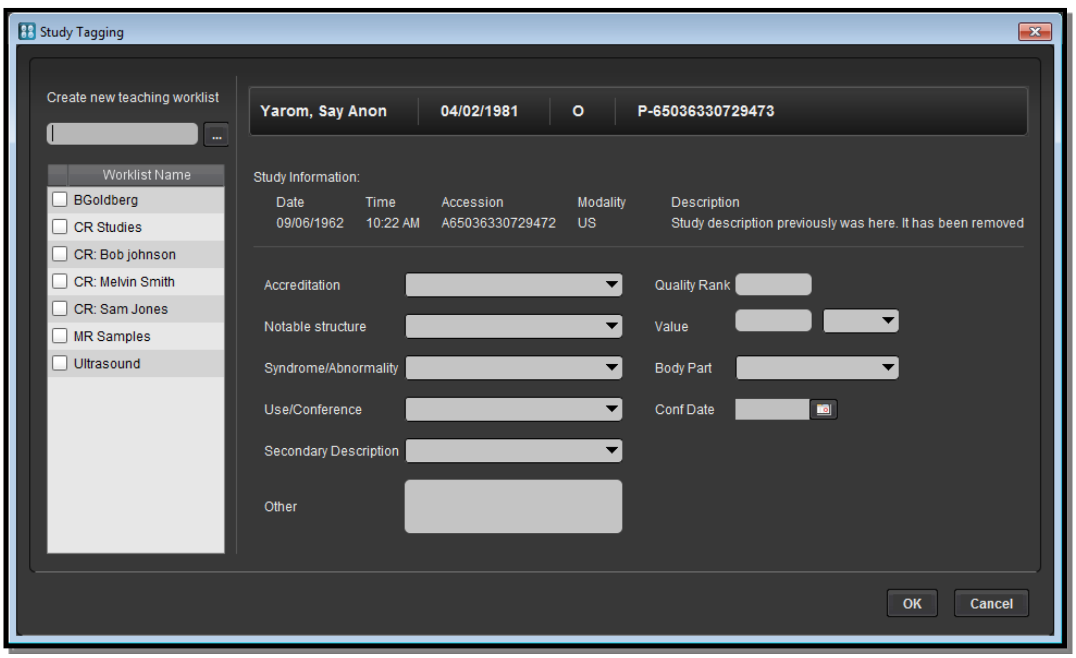
Viewing Comment History

Chapter 23. The Study Tagging Window

If you have the login privileges to access the Teaching Files feature, you can tag studies for later reference for teaching and/or conferencing purposes by clicking on the **Study Tagging** icon (found on the RealTime Worklist, the Query Search page, an existing Teaching Worklist or the Study Toolbar), as shown on the left. You can also tag a study by selecting the Study Tagging option from the Series Right-click Menu.

Once tagged, these studies are displayed in special Teaching Worklists that allow you to quickly select and open the desired study, as described in Section 3.4 above. In addition, you can add one or more special teaching tags to each study that can be used to locate that study at the Query Search Page, as described in Section 3.5 above.

When you click on the Study Tagging icon for a particular study, the **Study Tagging** window to be displayed, as in the following example:

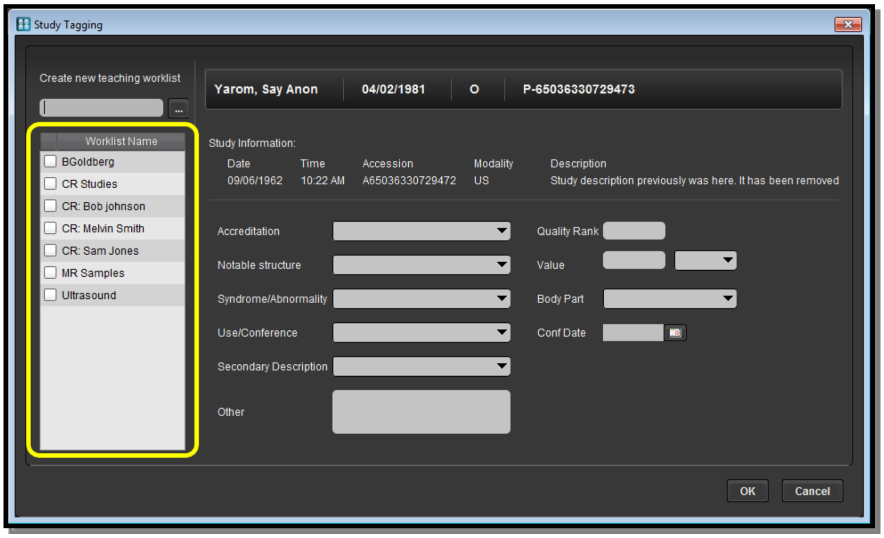


Study Tagging Window

At the Study Tagging window you can assign the study to one or more teaching worklists as well as add optional teaching tags to the study. Depending on your login privileges, you can also create new teaching worklists, edit the tags for a study already assigned to a teaching worklist and/or edit the lists of available values for the various tags.

23.1. Assigning a Study to a Teaching Worklist

The left-hand side of the Study tagging window displays a list of teaching worklists that have already been created and to which you have access, as in the following example:



List of Available Teaching Worklists

NOTE: If your site has the "Briefcase" option enabled, a default teaching worklist will be created for you automatically called "<*username*>'s briefcase." This worklist will initially be empty until you add studies to it.

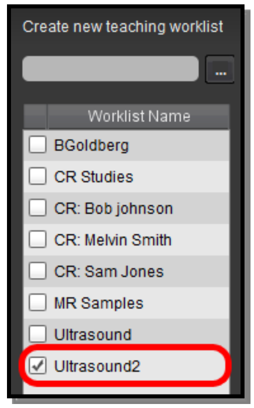
- To assign this study to one or more existing teaching worklists, click on the checkboxes next to the desired worklists so that a checkmark appears in the box.
- To remove a study from a teaching worklist to which it is currently assigned, click on the checkbox next to the worklist so that the checkmark disappears.

NOTE: Even if a study is not assigned to any teaching worklists, it can still be located via the Query Search Page based on any teaching tags that are assigned to it.

- If you have the login privilege to create new teaching worklists, you can create a new worklist for this study by entering the desired name of the worklist and clicking on the button to the right of the name field, as in the following example:

Creating a New Teaching Worklist

The new worklist will be added to the list of available worklists and the study will be added to it by default, as in the following example:

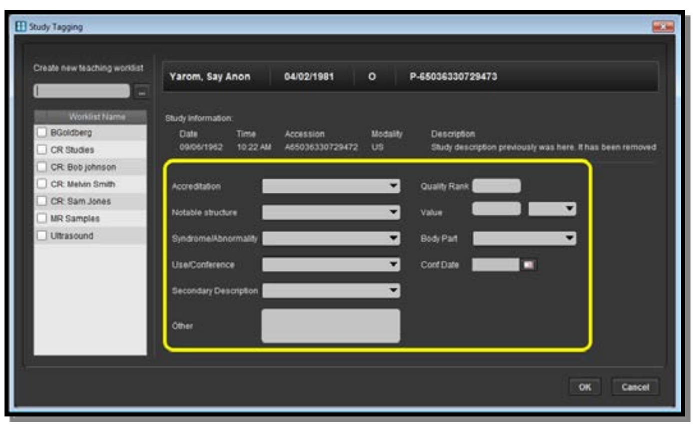


Newly Created Teaching Worklist

NOTE: Once a new teaching worklist is created, it can only be renamed or deleted by an Administrator.

23.2. Adding Teaching Tags to a Study

The right-hand side of the Study Tagging window contains a variety of fields and drop-down menus that let you optionally assign one or more teaching tags to the study, as in the following example:

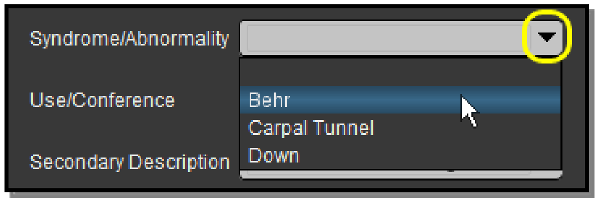


Teaching Tags

NOTE: Teaching tags are user-specific, meaning that multiple users can add tags to the same study and each user will only be able to search on tags that they have added.

NOTE: The actual tags that appear in the Study Tagging window are customizable by an Administrator and may vary from site to site.

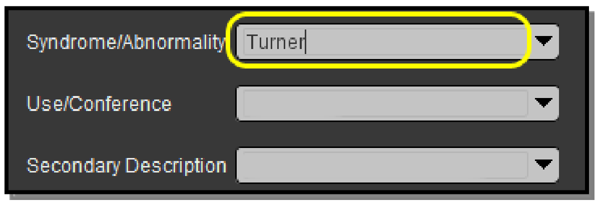
- If a tag has an arrow to the right of the field, click on the arrow to display a list of available options for that tag, as in the following example:



Selecting a Tag Value from a Drop-down Menu

NOTE: You can remove a previously assigned tag from a study by selecting the default “blank” value.

- If you have the login privilege to add new tag values to the list of available values, you can also enter a new value for that tag by typing the desired value directly into the field, as in the following example:



Entering a New Tag Value

NOTE: If you have the login privilege to add new tag values, clicking anywhere on a field other than on the arrow will cause a cursor to be displayed for typing; you must click on the arrow to access the drop-down menu. If you do not have the login privilege to add new tag values, clicking anywhere on a field that has an arrow will cause the associated drop-down menu to be displayed.

NOTE: Once a new value has been added to the list of available values for a tag, it can only be renamed or deleted by an Administrator.

NOTE: When you add a new tag value, it will be applied to the current study and will be available in the drop-down menu the next time you access the Study Tagging window.

- If a tag does not have an arrow to the right of the field, you can enter a value for that field regardless of your privileges and can remove a value by deleting it.

23.3. Saving Tag Information

Once you have finished assigning this study to one or more teaching worklists and/or assigning teaching tags to it, click on the **OK** button at the bottom of the Study Tagging window to save your changes and exit the window:

Saving Changes

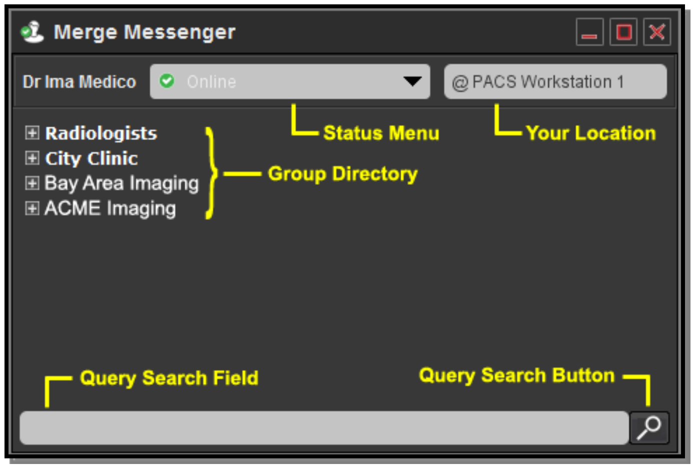
Chapter 24. Merge Messenger

The **Merge Messenger** icon on the **Workstation Browser Toolbar** and the **Study Toolbar** within the Merge PACS Viewer, as shown on the left, is an optional feature that provides instant messaging capability between you and other users who have access to this feature and who are currently online.

Note that the actual appearance of the Merge Messenger icon will vary, depending on your current Messenger status:

Icon	Status	General Description
	**Not Connected**	The system is attempting to connect with the Merge Messenger service and your status is currently unknown. While your status is Not Connected, you will not appear on anybody else's contact list within Merge Messenger.
	**Online**	You are currently online and will appear on other users' contact lists within Merge Messenger. Note that this is the default status once connected and can also be manually selected after choosing one of the other statuses described below.
	**Offline**	You have chosen the "Offline" option from the Status Menu, described in Section 24.5 below, and will not appear on other users' contact lists within Merge Messenger.
	**Busy**	You have chosen the "Busy" option from the Status Menu, described in Section 24.5 below. You will still appear on other users' contact lists within Merge Messenger and other users can still send you messages, but you will have a red "busy" icon next to your name.
	**Away**	You have chosen the "Away" option from the Status Menu, described in Section 24.5 below. You will still appear on other users' contact lists within Merge Messenger and other users can still send you messages, but you will have a yellow "away" icon next to your name.

Clicking on the Merge Messenger icon will cause the main Merge Messenger window to be launched as a separate pop-up, as in the following example:



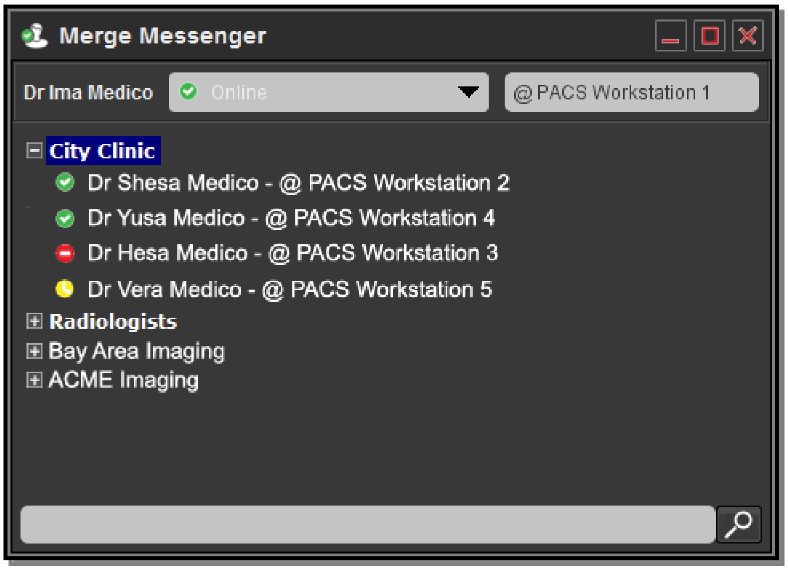
Merge Messenger Window

24.1. Initiating a Conversation

To initiate a conversation with another user from the Merge Messenger window, you need to first locate the user. This can be done via the **Group Directory** or via the **Query Search** function.

24.1.1. Locating a User via the Group Directory

The Group Directory on the Merge Messenger window lists all groups that have at least one member currently available (with a status of **Online**, **Busy** or **Away**). To view the available members in a group, **double-click** on the group name. The group will then be expanded to show you the available users in that group, as in the following example:

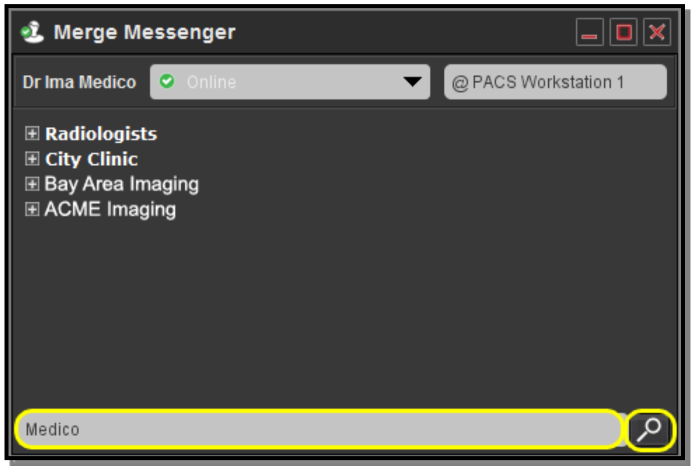


Expanded Group Showing Available Members

To initiate a conversation with a user, double-click on the desired user's name to launch the Merge Messenger Chat window, described is subsection 24.2 below.

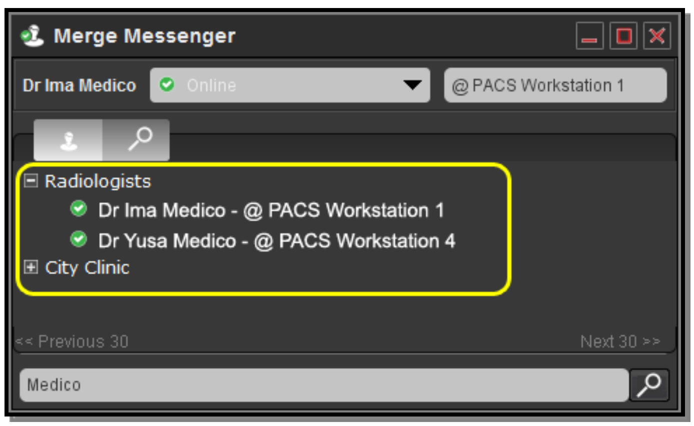
24.1.2. Searching for a User

You can perform a query search to quickly locate a user by entering all or part of the user's **last** name in the Query Search Field at the bottom of the Merge Messenger window and clicking on the Query Search Button, as in the following example:



Searching for a User

Once you click the Query Search Button, the search results will be displayed as in the following example:



Search Results

The search results will display all groups that contain users whose last names match your query. By default, the group that you belong to will be expanded to display all matching members in that group. If desired, you can double-click on any other group name to see the matching members in that group.

To initiate a conversation with a user, double-click on the desired user's name to launch the Merge Messenger Chat window, described in subsection 24.2 below.

24.2. The Merge Messenger Chat Window

When you double-click a user's name, the Merge Messenger Chat window will be displayed as a separate pop-up, as in the following example:

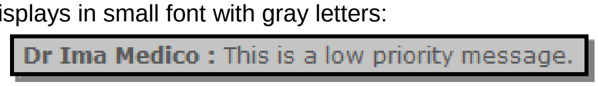
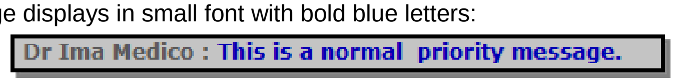
Merge Messenger Chat Window

Note that the Chat Window is divided into two windows:

Window	General Description
Text Entry	Enter text in this window (maximum of **256** characters) and then either hit the **Enter** key or click on the **Send** button to the right of the Text Entry window.
Conversation	Both sides of your conversation will be displayed in this window. The contents of this window will be preserved until you log out of the Merge PACS Workstation, even if you close the Merge Messenger Chat window or the main Merge Messenger window.

24.2.1. Changing the Priority of Your Message

By default, your message will be sent at **Low** priority, which will cause the text to be displayed in a small font with gray letters. If desired, however, you can change the priority as follows:

Priority	General Description
Low	Message displays in small font with gray letters: 
Normal	Message displays in small font with bold blue letters: 
High	Message displays in large font with bold red letters:

Priority	General Description
	

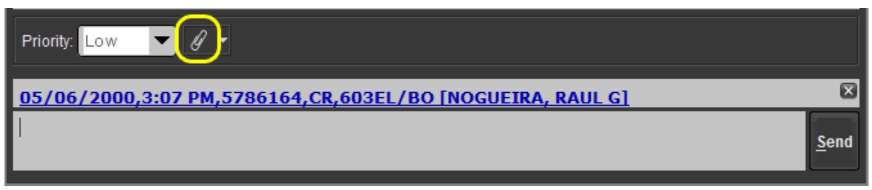
To change the priority of a message before sending it, select the desired priority from the drop-down **Priority** menu, as shown below:

Selecting Message Priority

24.2.2. Sending a Study Link

If have a study currently open in a Viewer window (whether in a primary or secondary window), you can include a link to that study within your message in one of two ways:

- Click on the **Send Study Link** icon to include a link to the **Primary** study currently being viewed, as in the following example:



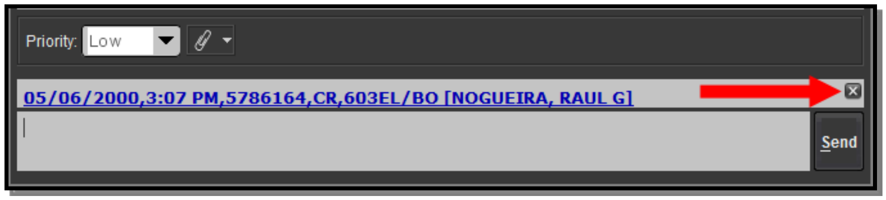
Sending Link to Primary Study

- If you are currently viewing multiple studies, click on the triangle to the right of the Send Study Link icon and select the study you want to send a link to, as in the following example:

Selecting a Study

Once you have selected the study, enter your text message (if any) in the Text Window and click on the **Send** button.

Note that if you want to remove a study link from a message **before** sending it, click on the little **X** to the far-right of the study description, as in the following example:



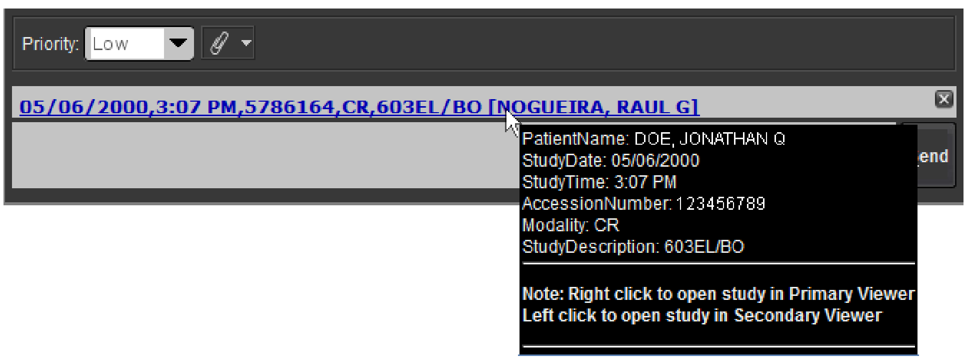
Removing a Study Link

CAUTION: Sending a study link to another user via Merge Messenger will allow that user to view the study even if that user would not otherwise have login privileges to do so.

24.2.3. Viewing a Linked Study

If another user sends you a study link in a message, you can do the following:

- Hover your mouse cursor over the link to view detailed information about the study, as in the following example:



Viewing Linked Study Information

- **Right-click** on the link to open the study in the **Primary** viewer.
- **Left-click** on the link to open the study in a **Secondary** viewer.

24.3. Having Conversations with Multiple Users

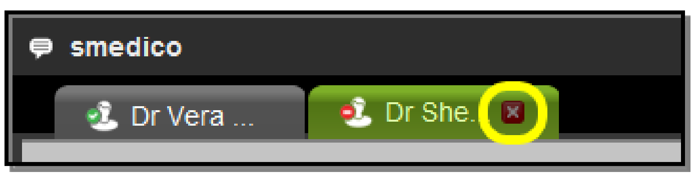
If you want to start a conversation with another user without exiting your conversation with the current user, click on the new user's name in the main Merge Messenger window. Each user will now be displayed with a separate conversation tab at the top of the Chat Window, as in the following example:

User Conversation Tabs

You can then click on any user's conversation tab to resume the conversation with that user. Note that once a tab has been added for a user, the tab will remain until you end the conversation, as described below.

24.4. Ending a Conversation

If you want to end a conversation with a user, make sure that user's conversation tab is selected (as described above) and then click on the red **X** on the right side of the tab, as in the following example:



Ending a Conversation

When the last user conversation tab is closed, the entire Chat Window will automatically close as well.

NOTE: Closing the Chat Window without closing the individual user conversation tabs will not end the conversations and all tabs will still be there the next time you reopen the Chat Window during the current login session.

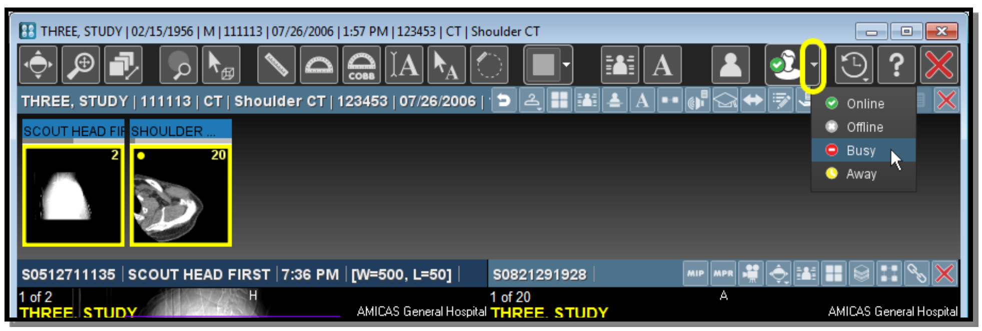
24.5. Manually Changing Your Status

As stated above, if you have access privileges for Merge Messenger your status will be set to Online automatically once you log into the Merge PACS Workstation. At any time, however, you can manually change your status in any of the following ways:

- From the **Workstation Browser**, click on the arrow next to the Merge Messenger icon on the **Workstation Browser Toolbar** and select the desired status option from the drop-down menu:

Changing Merge Messenger Status from the Workstation Browser

- From the **Merge PACS Viewer**, click on the arrow next to the Merge Messenger icon on the **Viewer Toolbar** and select the desired status option from the drop-down menu:

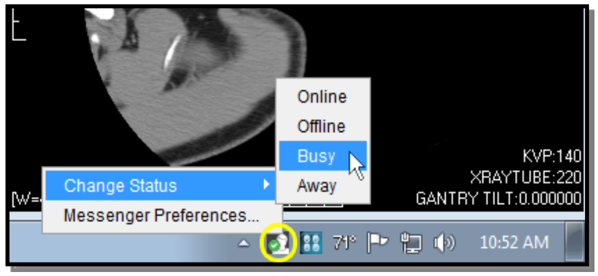


Changing Merge Messenger Status from the Merge PACS Viewer

- From the **Merge Messenger Window**, click on the arrow next to the Merge Messenger icon on the **Viewer Toolbar** and select the desired status option from the drop-down menu:

Changing Merge Messenger Status from Merge Messenger Window

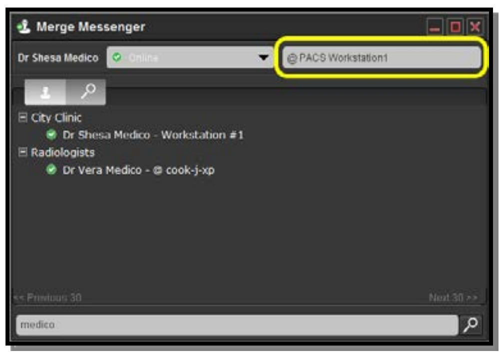
- From the **Windows System Tray** ("**Task Bar**"), **right**-click on the **Merge** Messenger icon, select **Change Status** from the pop-up menu and then select the desired status option:



Changing Merge Messenger Status from Windows System Tray

24.6. Manually Changing Your Location

When you show up in other user's contact lists within Merge Messenger, your user name will be displayed along with your location. By default, the location is the name of the Workstation where you are currently logged in. If desired, however, you can change the default text in the **Location** field at the main Merge Messenger window, as in the following example:



The Merge Messenger Location Field

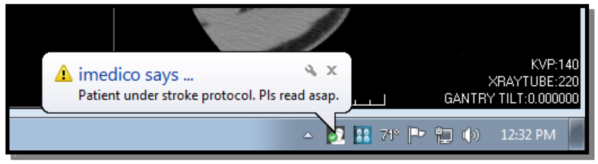
Enter the desired text (the @ sign is there by convention, but does not need to be retained) and press the **Enter** key. Your new location will now be displayed to all users.

NOTE: The @ sign included in the location field by default is there by convention and does not need to be retained.

NOTE: Your location is automatically saved as a local user preference for the Workstation and does not need to be re-entered every time you log in. If you access a different Workstation, however, you will need to enter it again.

24.7. The Merge Messenger Alert Balloon

Depending on how you have configured Merge Messenger, as described in Section 25.10 below, an alert balloon will be displayed in your Windows System Tray / Task Bar whenever another user sends you an instant message. The balloon will contain the text of the message, as in the following example:

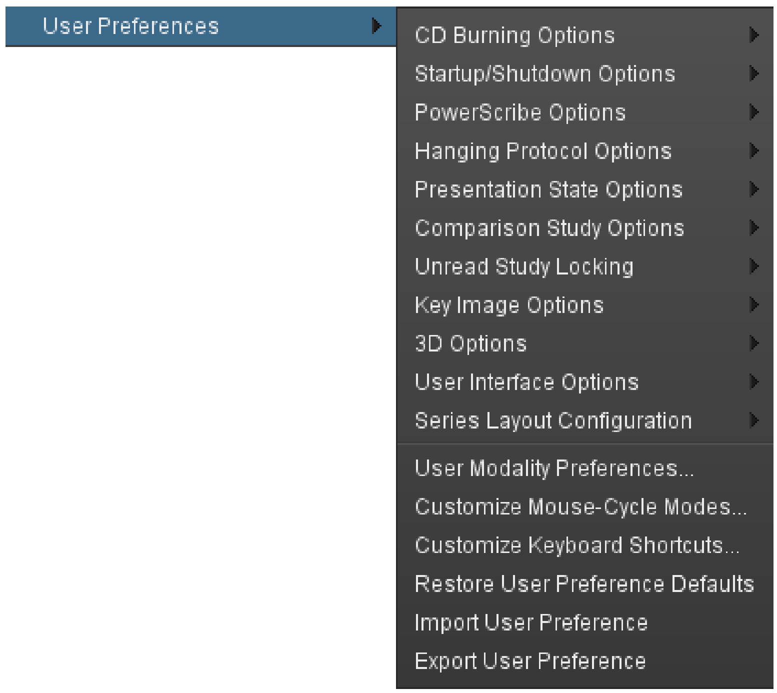


Merge Messenger Alert Balloon

NOTE: The font of the alert text will not change based on the priority of the message, but high priority messages will have a yellow alert icon displayed next to the user's name, as in the example above.

Chapter 25. Configuring Custom Viewing Preferences

Many of the various right-click menus within the Merge PACS Viewer described above contain a **User Preferences** option that will display a variety sub-menu options, as in the following example:



The User Preferences Menu

NOTE: The availability of the various sub-menus will depend on how your system is set up and what your login privileges are.

25.1. CD Burning Options

The following CD Burning option may be available, depending on how your system is set up and your login privileges:

Option	General Description
Select Priors Automatically	If selected, when adding studies to the CD Burning dialog's study list, the prior studies will be automatically selected.

25.2. Startup/Shutdown Options

One or more of the following Startup/Shutdown options may be available, depending on how your system is set up and your login privileges:

Option	General Description
Display RTWL in Workstation Browser on Launch	If selected, RealTime Worklist (or RealTime Study List, if applicable) will be displayed by default in the Workstation Browser when it is launched.
Enable RealTime Study List	If you have login privileges to access the RealTime Study list, this option will be selected by default. If deselected, you will see the RealTime Worklist within the Workstation Browser instead.
Load Next Study Based on Acuity Score	If selected and the optional **Merge RadStream** component is enabled, the **Open Next Study** option on the Patient Record Toolbar and the Merge PACS Viewer Toolbar will select the next study based on acuity score instead of position on the worklist. If this preference is selected, the **Open Next Study** and **Mark Study Read** options will be highlighted in red and the Open Previous Study option will be hidden.
Automatically Open Order Viewer	If selected, the Order Viewer will automatically be launched when a study is first opened within the Merge PACS Viewer.
Automatically Open Report Viewer	If selected, the Report Viewer will automatically be launched when a study is first opened within the Merge PACS Viewer.
Automatically Play Voice Clip on Load	If selected and you have login privileges to listen to audio annotations via VoiceClip, any audio annotations that have been recorded for studies will be played automatically when studies are first opened.
Automatically Save Annotations on Exit	If selected and you have login privileges to save annotations, any text annotations you add to a study's images will automatically be saved when you exit the study.

Option	General Description
Warn if Annotations Cannot Be Saved	If selected, a warning message will be displayed when you attempt to create an annotation if annotations cannot be saved for this study (*e.g.*, due to your login privileges, the status of the study, etc.)
Automatically Split CR Series	If selected, CR Series with multiple images will automatically be split into separate Series for display purposes within the Merge PACS Viewer.
Automatically Split CT Series	If selected, CT series will be split into multiple series for display purposes within the Merge PACS Viewer in the following cases: • **When the origin of the images change** • **When the orientation of the images change** (except for short runs, *i.e.,* of 5 slices or less) • **When the gap between slices exceeds 5 times the current slice thickness**
Automatically Split MR Series	If selected, MR Series with multiple images will automatically be split into separate Series for display purposes within the Merge PACS Viewer based on: • **Echo Number** • **Temporal Position Identifier (TPI)** • **Positional Sequence** • **Stack Axis/Positional Break**
Automatically Split MG Series	If selected, MG series with multiple images will automatically be split so that each image will be its own series. CAUTION: **Deselecting this option may cause Hanging Protocols for MG studies to be applied incorrectly and therefore should only be deselected if you are using the Quality Control Tool from the Merge PACS Management Pages.**
Lock and Update Study Status in Secondary Viewer	If selected, studies opened in a Secondary Merge PACS Viewer window will be locked and users will be prompted to set the set the status upon exiting. If not selected, studies opened in the Secondary Viewer window will be read-only (they will not be locked, you will be unable to change the workflow status and the context of any dictation application will remain on the study in the Primary Viewer).

Option	General Description
	NOTE: When this option is enabled, the Secondary Viewer will behave like a Primary Viewer. If the application is configured to sync automatically, the study will be automatically synced with the 3rd-party application when it is opened in the Primary Viewer. If a second study is then opened in the Secondary Viewer without closing the primary study, the primary study will lose the sync and the secondary study will automatically sync with the third party application instead..
Mark Studies as Viewed when Launched in Web Viewer	If selected, studies will be given a status of "Viewed" as soon as you click on the **View Study in iConnect Access Viewer** button on a worklist. **CAUTION:** **When this option is enabled, the study status will be set to "Viewed" prior to actually launching the iConnect Access Viewer. As a result, the status will be set to "Viewed" even if the Viewer fails to launch or the study cannot be displayed.**
Keep Viewer Running in Background upon Exit	If selected, the Merge PACS Viewer will be kept running in the background when you exit the Workstation so that it will load faster the next time it is launched. To exit the Viewer completely, right-click on the Merge PACS Workstation icon on the Windows Taskbar and select "Exit Merge PACS Diagnostic Workstation" from the pop-up menu. **NOTE:** This option will only be available if you are running The Merge PACS Viewer from within another application (*i.e.*, as an "embedded viewer") or from a command-line with setBrowserVisible=false.
Preserve Presentation State within Viewport	If selected, the current presentation state (W/L, zoom, etc.) within each Series Viewport will be maintained when a new Series is opened within that Series Viewport.
Associate accessions with primary study to 3rd Party Application	If selected, and your system is configured to integrate with a third-party dictation application, you will be prompted to select multiple accession numbers if there are multiple unread studies when you click the **3rd party Application Synchronization** button.
Delete Image Cache upon Exit	If you have background pre-caching enabled, selecting this option will cause all images to be deleted from your workstation's hard drive when you exit the Merge PACS Workstation.
Log off Windows on Exit	If selected, you will be logged out of Windows when you exit the Merge PACS Workstation.

Option	General Description
Set Autologout Timeout…	If your system has a default auto logout period set, selecting this option will display a pop-up dialog that will let you override the default logout period and either turn it off completely (by setting the logout period to 0) or else set a custom period from 1 to 60 minutes. **NOTE:** If your system has a default auto logout period set, you will not be able to save your login credentials even if you set the logout period to 0. You will not be automatically logged out, but you will need to still provide your password whenever you log in.
Pre-caching Priority	If you have background pre-caching enabled, you can select from one of the following options to determine what priority the pre-caching process should be given by your Workstation: • **Low** • **Medium** • **High** • **Highest**

25.3. PowerScribe Options

Depending on how your system is set up and your login privileges, you may select **one or more** of the following PowerScribe-related options:

Option	General Description
Automatically Launch PowerScribe	If selected, PowerScribe will automatically be launched in the background when the Merge PACS Workstation is first opened.
Automatically Hide PowerScribe Windows	If selected, all PowerScribe windows will be hidden when not in use.
Automatically Load Non-Final Reports in PowerScribe	If selected, reports that are **not** marked as final will automatically be loaded into PowerScribe in addition to reports that are marked as final.
Automatically Add Addendum to Final Reports in PowerScribe	If selected, any addendums to final reports will automatically be added within PowerScribe.

In addition, you may select any **one** of the following options that deal with saving or signing into PowerScribe:

Option	General Description
No Action When Saving or Signing in PowerScribe	If selected, no special action will be performed when you **sign** or **save** within PowerScribe.
Close Study When Signing In PowerScribe	If selected, any study that is currently open will automatically be closed when you **sign** within in PowerScribe.

Option	General Description
Close Study When Saving In PowerScribe	If selected, any study that is currently open will automatically be closed when you **save** within PowerScribe.
Open Next Study When Signing In PowerScribe	If selected, the next study will automatically be opened when you **sign** within PowerScribe.
Open Next Study When Saving In PowerScribe	If selected, the next study will automatically be opened when you **save** within PowerScribe.

25.4. Hanging Protocol Options

One or more of the following options relating to Hanging Protocols may be available, depending on how your system is set up and your login privileges:

Option	General Description
Override Hanging Protocol DICOM Overlay Settings	If selected, any DICOM Overlay settings contained within a Hanging Protocol or Study Presentation will be overridden by the **DICOM Overlay button** and the **DICOM Overlay Series Toggle** option.
Include UNREAD studies as comparison candidates for Hanging Protocols	If selected, studies with a status of UNREAD will be considered valid comparison candidates for Hanging Protocols.
Include studies newer than primary as comparison candidates for Hanging Protocol	If selected, studies that have a time/date stamp newer than the primary study will be considered valid comparison candidates for Hanging Protocols.
Show unviewed images after the last Hanging Protocol Step (MG Only)	If selected, when a Hanging Protocol is applied to a Mammography study, all unviewed images will automatically be displayed in a 2x1 layout after the last step has been applied. The images will be displayed using modality preferences and in the same sequence as they are present in a study. **NOTE:** Once the unviewed images have been viewed, they will no longer be appended to the last step of the HP.

25.5. Presentation State Options

The following Presentation State option may be available, depending on how your system is set up and your login privileges:

Option	General Description
Automatically Apply Presentation State	If selected, if there are any externally created ("foreign") Presentation States available for a Series, the most recent one will be automatically applied when the Series is opened, whether as part of the primary study or as part of a comparison study. Note that the externally created Presentation State will be applied on top of the currently selected Hanging Protocol or Study Presentation, if any.

25.6. Comparison Study Options

Depending on how your system is set up and your login privileges, you may select **one or more** of the following options related to how Comparison Studies are displayed:

Option	General Description
Display Warning Indicator on All Priors	If selected, all prior studies loaded in comparison mode will bear the warning icon indicating that they are prior studies.
Allow Rapid Review of Unread Studies	If selected, studies with a status of UNREAD will be included for use with the **Rapid Review** feature described in subsection 4.3.3 above.
Consider All Unverified as Unread Studies	If selected, studies with a status of UNVERIFIED will be treated the same as UNREAD studies while in comparison mode.
Get Next Study by Precedence	If selected, when the **Open Next Study** button on the Viewer Toolbar is clicked the system will check to see if any new studies have arrived since the last time the Open Next Study button was clicked. If new studies are found that are higher in the display order than the current study, the highest one will be opened.
Automatically pre-cache relevant prior studies	If selected, images for relevant prior studies will be pre-cached as soon as the primary study is loaded into the Merge PACS Viewer. If not selected, images for relevant prior studies will not be cached until the prior study is itself loaded into the viewer.
Automatically pre-cache unread studies	If selected, images for unread prior studies will be pre-cached as soon as the primary study is loaded into the Merge PACS Viewer. If not selected, images for unread prior studies will not be cached until the prior study is itself loaded into the viewer.

In addition, you may select **one** of the following options that deal with how comparison studies are sorted:

Option	General Description
Order Priors Chronologically	If selected, the list of prior studies will be displayed in chronological order instead of by relevance.
Order Priors by Relevance	If selected, the list of prior studies will be sorted by relevance. Note that this is the default setting.

25.7. Unread Study Locking

One or more of the following options related to Unread Study Locking may be available, depending on how your system is set up and your login privileges:

Option	General Description
Lock All	If selected, all studies related to the study currently being viewed (primary as well as priors) will be locked from within RTWL.
Lock Same Modality	If selected, only studies of the same modality type as the study currently being viewed will be locked from within RTWL.
Lock Only Relevant	If selected, only relevant prior studies related to the study currently being viewed will be locked from within RTWL.
Lock Only Primary Study	If selected, only the primary study currently being viewed will be locked from within RTWL.

25.8. Key Image Options

One or more of the following options related to Key Images may be available, depending on how your system is set up and your login privileges:

Option	General Description
Automatically Mark Annotated Images as Key Images	If selected, any images that have annotations added to them will automatically be flagged as key images. **NOTE:** This feature will not work with comparison studies. If this option is selected and you load a comparison study with annotated images, a message stating that “Comparison study annotated images are not automatically marked as key images” will be displayed.
Open Key Image Viewport on Primary Study Load	If selected, the Key Image Viewport will automatically be displayed when the primary study is loaded, if applicable.
Show Key Image Series for Comparison Study	If selected, key images for comparison studies will be displayed when the primary study is being viewed.

Option	General Description
Open Key Image Viewport on Comparison Study Load	If selected, the Key Image Viewport will automatically be displayed when a prior study is loaded, if applicable.
Open Key Image Viewport When Image Added	If selected, the Key Image Viewport will automatically be displayed whenever an image is flagged as a key image.
Allow Priors as Key Images	If selected, images that are part of a prior study will be able to be flagged as key images.
Auto Layout Key Image Window	If selected, the system will attempt to optimize the layout of the images within the Key Image Viewport (as opposed to displaying them in the order they were flagged).

25.9. 3D Options

One or more of the following options related to The Merge PACS Viewer's inherent 3D functionality may be available, depending on how your system is set up and your login privileges:

Option	General Description
Default Single View Orientation	Lets you select one of the following options as the default single view orientation: • **Axial** • **Coronal** • **Sagittal**
Grouped 3D View Orientation	Lets you select one of the following options as the default grouped view orientation: • **Axial** • **Coronal** • **Sagittal**
Volume Rendering Orientation	Lets you select one of the following options as the default volume rendering orientation: • **MIP** • **MinP** • **Average** • **CVR** • **Faded MIP**
Initial Slab Thickness	Lets you select one of the following options as the default initial slab thickness: • **2.5mm** • **5.0mm** • **10.0mm** • **no slab**
Thin Slice Interpolation	Lets you select one of the following options as the default thin slice interpolation for MPR images to improve the image quality: • **None** • **Trilinear** • **Tricubic**

Option	General Description
Thick Slice Interpolation	Lets you select one of the following options as the default thick slice interpolation for MPR images to improve the image quality: • **None** • **Trilinear** • **Tricubic**
Thick / Thin Boundary	Lets you set the default thick / thin boundary (in millimeters) for MPR images, which will determine whether the image quality should be in thin slice interpolation or thick slice interpolation.
Enable Skimming for Volume Navigation Mouse Mode	When selected, the standard “page” mouse tool will act as a “skimming” tool for 3D volumes, except that no warning will be displayed that images are being skipped.

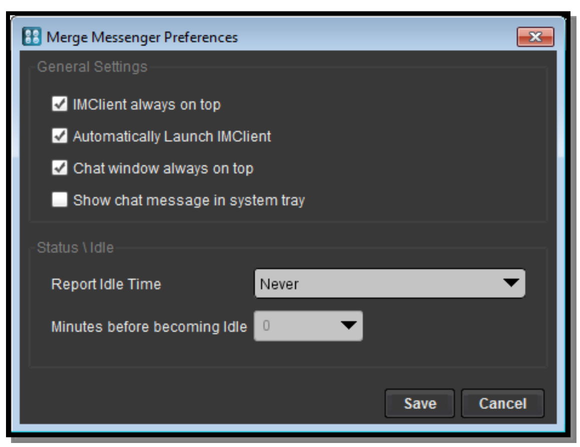
25.10. Merge Messenger Options

You can customize how Merge Messenger works on your workstation from the Merge Messenger Preferences dialog. This dialog can be accessed in either of the following ways:

- Select the **Merge Messenger Preferences** option from the **User Preferences Menu**.
- **Right**-click on the Merge Messenger icon on the **Windows System Tray** (“**Task Bar**”) and select **Messenger Preferences** from the pop-up menu, as in the following example:

Accessing the Messenger Preferences Dialog

The Merge Preferences window will then be displayed, as in the following example:



Merge Messenger Preferences Dialog

At the Merge Messenger Preferences Dialog, you can configure the following options:

Option	General Description
IMClient always on top	If selected, the main Merge Messenger window will always be on top of other application windows unless minimized.
Automatically Launch IMClient	If selected, the Merge Messenger application will be automatically launched when you log into the Merge PACS Workstation (*i.e.*, the Merge Messenger icon will be displayed on the Windows System Tray as "**Online**" and will begin listening for messages). If not selected, the Merge Messenger icon will display as "**Not Connected**" on the System Tray as well as in the Workstation Browser and the Merge PACS Viewer. To launch Merge Messenger, click on the Merge Messenger icon in the Workstation Browser or the Merge PACS Viewer once to launch the application and then, once the icon changes to "online" status, click it again to open the Merge Messenger window as usual.
Chat window always on top	If selected, the Merge Messenger Chat window will always be on top of other application windows unless minimized.
Show chat message in system tray	If selected, the content of any messages received will be displayed in an alert balloon in the Windows System Tray / Task Bar.
Report Idle Time	Lets you select one of the following options: • **Never** – Remain "Online" until you manually select another status or log off entirely. • **Based on mouse or keyboard use –** Automatically change your status to "Away" after a set period of keyboard and mouse inactivity.
Minutes before becoming Idle	If the **Based on mouse or keyboard use** option has been selected for "Report Idle Time", this lets you specify how many minutes of inactivity should trigger a change to "**Away**" status. Note that you can either select a number from the drop-down menu or enter a number manually.

When finished, click on the **Save** button to record your changes and exit the dialog.

25.11. User Interface Options

One or more of the following options related to the general User Interface may be available, depending on how your system is set up and your login privileges:

Option	General Description
Viewer Icon Size	Lets you select the size of the various icons displayed within the Merge PACS Workstation. The following options are available: • **Largest** • **Large** • **Medium** • **Small** • **Smallest**
Image Resampling Interpolation	Lets you change the type of resampling interpolation algorithm used by the Merge PACS Viewer to display digitized CR images. The following options are available: • **Linear** • **Super Sampling** Note that selecting **Super Sampling** may reduce the appearance of grid artifacts (a.k.a. “moiré patterns”).
Report Viewer Font Size	Lets you select one the default font size used in the Report Viewer. The following options are available: • **Large** • **Medium** • **Small**
Annotation Lines Thickness	Lets you select the thickness of all annotation measurement lines. The following options are available: • **Thin** • **Medium** • **Thick**
Show Cursor While Annotating	If selected, the mouse cursor will remain visible while you are creating annotations.
Allow Xref Update on Mouse Hover	By default, the “active” Viewport for the purpose of cross-reference lines is whichever Viewport the mouse cursor is currently hovering over, regardless of whether you have actually clicked on that Viewport. If this option is **not** selected, you must actually click on a Viewport to make it “active” for the purpose of cross-reference lines.
Allow Small Line Annotations	By default, very small line measurements (*i.e.*, of only a few pixels) are not recognized. If this option is selected, line measurements of any size (*i.e.*, if you have moved the mouse cursor to any new location after clicking), will remain after releasing the mouse button.

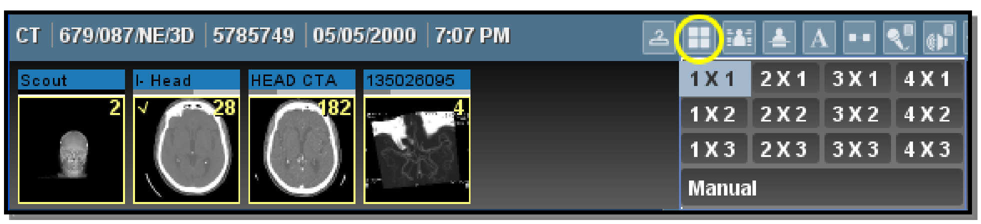
Option	General Description
Mouse Interaction Options	Lets you whether you need to hold down the left mouse button in order to use the various Mammography-specific tools (**Binocular**, **Hot Light**, **Dual Link Magnifier**). The following options are available: • **Operate on Click-drag** – The left mouse button must be held down. • **Operate on Click** – Click once to activate the tool, click again to turn off.
Magnify Glass Tool Size	Lets you select the size of the Magnify tool's viewing area. The following options are available: • **Largest** • **Large** • **Medium** • **Small** • **Custom**
Magnify Glass Tool Shape	Lets you select the shape of the Magnify tool. The following options are available: • **Square** • **Circle**
Binocular Size	Lets you select the size of the Binocular tool's viewing area. The following options are available: • **Smallest** • **Small** • **Medium** • **Large** • **Largest** • **Custom**
Binocular Tool Shape	Lets you select the shape of the Binocular tool. The following options are available: • **Circle** • **Square**
Hot Light Size	Lets you select the size of the Hot Light tool's viewing area. The following options are available: • **Smallest** • **Small** • **Medium** • **Large** • **Largest** • **Custom**
Hot Light Intensity	Lets you select the intensity of the Hot Light tool. The following options are available: • **10%** • **15%** • **20%** • **25%** • **Custom**

Option	General Description
PET SUV Measurements	Lets you select one or more of the following Standardized Uptake Values (SUVs) to be displayed when using the Probe or the ROI tool with PET images: • **Body Weight (g/ml)** • **Lean Body Mass (g/ml)** • **Ideal Body Weight (g/ml)** • **Body Surface Area (cm^3/ml)** Refer to Appendix B below for details on how SUVs are calculated.
UI Color Model	Lets you select the color scheme for the Merge PACS Viewer. The following options are available: • **Color** • **Grayscale**
List Priors without Timestamps	Lets you specify where prior studies without timestamps should appear in relation to other prior studies. The following options are available: • **Top** – Above all other prior studies • **Bottom** – Below all other prior studies
Show status as check box	If selected, any status dimension that has only one available status option will be displayed as a checkbox instead of a drop-down menu on the Update Study Status dialog.
Render Annotations in Grayscale Mode with Shadow Effect	If selected, any text annotations will be displayed as gray text with a shadow, so as to be more visible against white backgrounds. **CAUTION: Using this option on color monitors is not recommended, since CAD markers may not be visible.**
Use Skimming for Middle Mouse Drag	If selected, the **Skimming** tool (described in subsection 4.3.1 above) will be available by pressing and holding the center wheel on your mouse as you drag your cursor across a Series Viewport.
Delayed Right Click	If selected, the Series Right-click Menu will only appear if you click on hold the mouse button for a brief period of time and single clicking with the right-mouse button will toggle among mouse modes. If not selected, single-clicking with the right mouse button will immediately display the menu.
Ignore Horizontal Mouse Movement when Paging	If **not** selected, you will be able to page through images forwards and backwards by moving the mouse to the right and left, in addition to moving the mouse up and down.
Wrap When Paging Images	If selected, images will “wrap” when you are paging through them. In other words, when you reach the last image in a Series while paging forward, the first image will be displayed next. Similarly, when you reach the first image in a Series while paging backwards, the last image will be displayed next.

Option	General Description
	NOTE: This preference will only be effective if **Global Stack** has **not** been enabled for the Series Viewport.
Show Application Toolbar	If **not** selected, the main Viewer Toolbar will be hidden from view.
Show Thumbnails	If **not** selected, the Series Navigation Thumbnails within the Merge PACS Viewer will be hidden from view.
Skip Update Status for Close Viewer	If selected, clicking on the Close Viewer button on the Viewer Toolbar will exit the application without prompting you to update the study status.

25.12. Series Layout Configuration

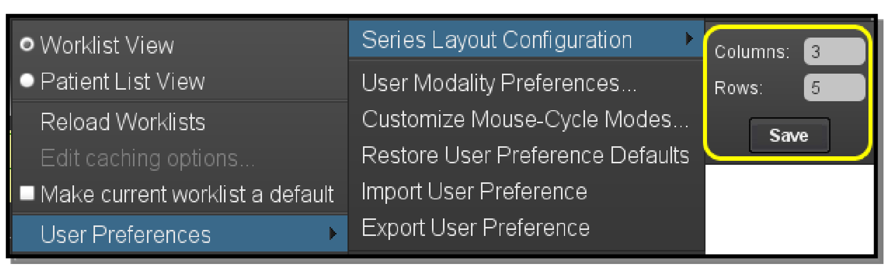
By default, the Series Layout Menu icon, described in subsection 4.2.2 above, will display a 3x5 grid of layout options, as in the following example:



Series Layout Menu

If you wish to have more (or fewer) layout options displayed, you can do so by selecting the **Series Layout Configuration** option from the main User Preferences Menu, as described above.

When you select this option, a new attached dialog will be displayed that will allow you to enter how many rows and columns worth of options to display, as in the following example:



Series Layout Configuration Dialog

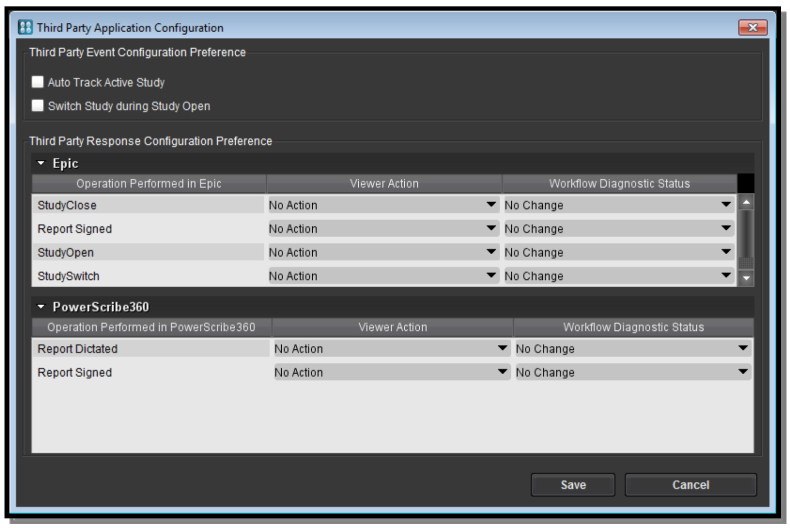
Enter the desired number of rows and columns you wish to display and then click the **Save** button.

25.13. Third-Party Application Configuration

If your site has been configured to use Bi-directional XML, as described in Chapter 10 above, you can configure the actions performed by the Workstation when various responses are sent from the integrated third-party application. You can also configure what notifications are sent to the third-party application (via xml drop) in certain circumstances. This is done by selecting the **Third Party Application Configuration** option from the main User Preferences Menu, as described above.

NOTE: This option is also available from the **3rd Party Application Synchronization Menu**, as described in Section 10.4 above.

When you select this option, the **Third Party Application Configuration** window will be displayed as a separate pop-up window, as in the following example:



The Third Party Application Configuration Window

25.13.1. Third-party Event Configuration Preferences

As described in Chapter 10 above, Merge PACS can be configured to notify an available 3rd-party application of various Viewer events by dropping an XML file into a directory on the workstation that is monitored by that application. If Merge PACS has been configured to notify a 3rd-party application whenever a user switches between studies in general, you can configure the following options for your specific Workstation via the checkboxes in the top section of the Third Party Application Configuration window:

Option	General Description
Auto Track Active Study	If selected, the 3rd-party application will automatically be notified of a study switch whenever you change study focus (*e.g.*, when you switch from the Primary Viewer to the Secondary Viewer). This will cause the context within the 3rd-party application to switch to the study that was switched to.

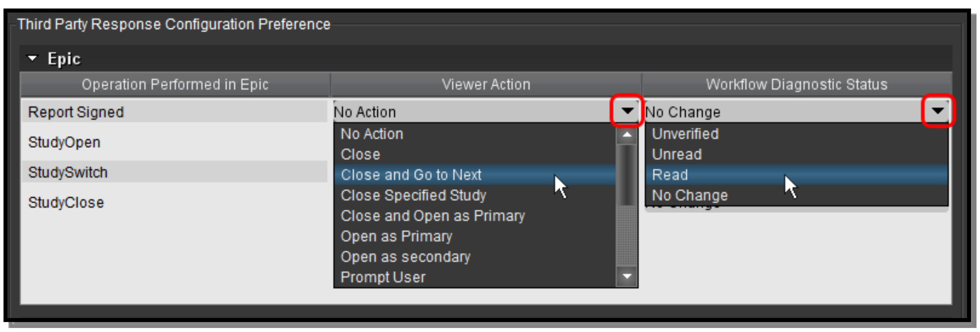
Switch Study during Study Open	If selected, the 3rd-party application will automatically be notified of a study switch whenever you open a study for viewing in the Primary Viewer.

25.13.2. Third-party Response Configuration Preferences

The bottom section of the Third Party Application Configuration window lets you configure response configuration preferences for one or more individual third-party applications. Each available third-party application will be listed separately, and you can expand/collapse the information for each application by clicking on the triangle to the left of that application's name.

Each application will list one or more "response events" that describe the operation performed by the application (*e.g.*, "Report Dictated" or "Report Signed"). The list of actual response events may vary depending on the application and is also customizable on a site-by-site basis.

For each response event, you can specify what action you want the Workstation to perform and what the workflow diagnostic status for the study should be set to when the response event is received. This is done by selecting from the drop-down **Viewer Action** and **Workflow Diagnostic Status** menus for each response event, as in the following example:



Specifying Viewer Action and Workflow Diagnostic Status

With the options being selected in the example above, when the "Epic" application sends a "StudyClose" response event to the Merge PACS Viewer for a study, the Viewer will close the study and mark it as "Read."

The following actions can be configured:

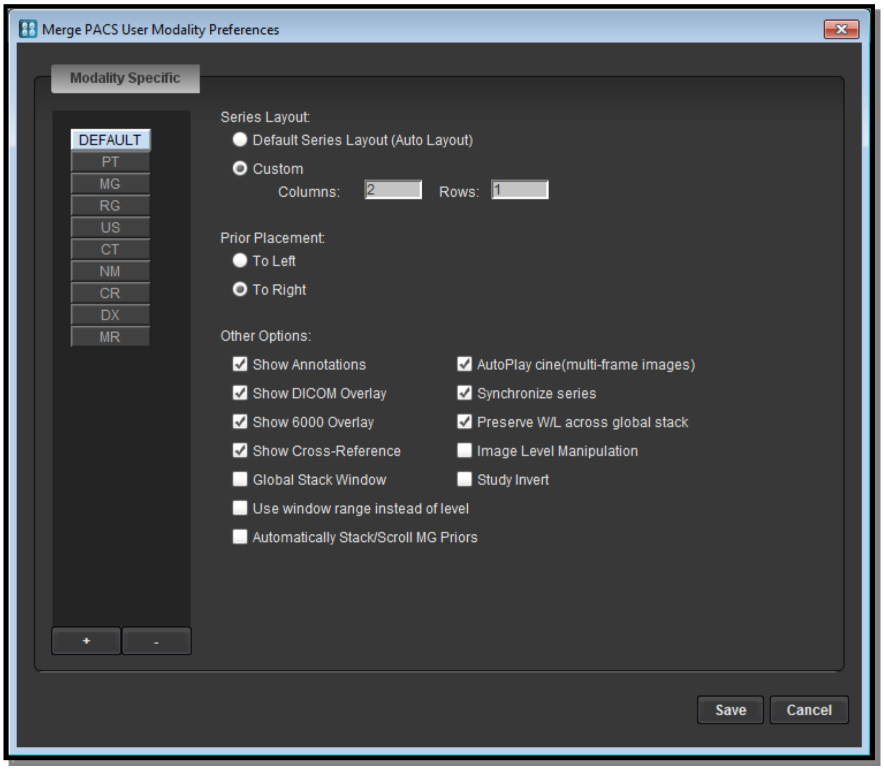
Action	General Description
No Action	No action will be taken in Merge PACS.
Close	Close the current study in the Primary Viewer.
Close and go to Next	Close the current study in the Primary Viewer and load the next study in the Primary Viewer.

Action	General Description
Close Specified Study	If there is no accession number in the XML file, the study currently in focus will be closed. If there is an accession number in the XML file: • If the accession number matches a currently open study, that study will be closed. • If the accession number does not match a currently open study, do not close anything.
Close and Open as Primary	Close the current study in the Primary Viewer and open the requested study in the Primary Viewer.
Open as Primary	Open the specified study in the Primary Viewer if there is currently no study in the Primary Viewer. If the specified study is open in the Primary or Secondary Viewer, switch focus to that Viewer instead. If the specified study is not already open and another study is already open in the Primary Viewer, take no action.
Open as Secondary	Open the specified study in a Secondary Viewer. If the specified study is currently open in the Primary or a Secondary Viewer, switch focus to that Viewer instead.
Prompt User	Display a dialogue letting the user select any of the actions described above. Note that an additional action called “Send Resync Response to Third Party Application” will be included that will drop the Study Open XML with the Primary study accession number, followed by the Study Switch XML (if configured to drop this event).
Pre-Caching of Studies [Scroll bar required to view this option]	Pre-cache all studies that match the criteria in the list of the newly received pre-caching request XML message, in the order specified in the list, to the Workstation where the request XML message was received. Note that any study pre-caching requests still pending from a previous pre-caching request XML message will be cancelled.

25.14. User Modality Preferences

The Merge PACS Viewer lets you set a variety of default preferences for different modalities. This is done by selecting the **User Modality Preferences** option from the main User Preferences Menu, as described above.

When you select this option, the **Merge PACS User Modality Preferences** window will be displayed as a separate pop-up window, as in the following example:



The Merge PACS User Modality Preferences Window

The left-hand side of the window has a menu displaying four specific image modality types that can be selected [**CT**, **MR**, **CR** and **MG**], as well as a **DEFAULT** setting for every other type of modality. You can also use the **+** and **–** buttons at the bottom of the menu to add new modality types or remove modality types that you have previously added (you cannot remove any of the four predefined modality types).

For each modality type, you can set the default series layout as well as various miscellaneous preferences, as described below.

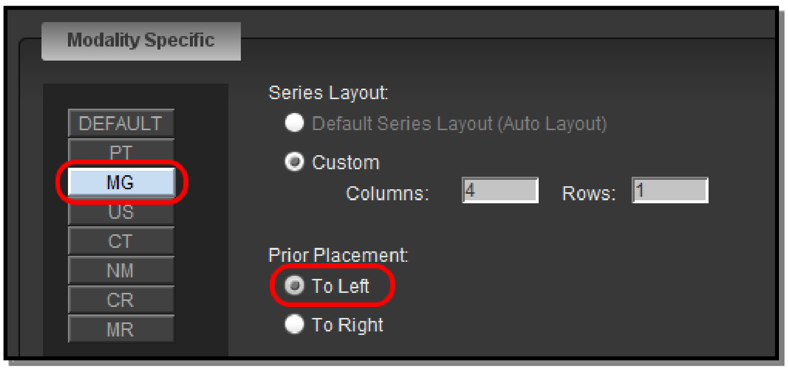
25.14.1. Series Layout Settings

For each modality type you can select one of the following two options with regard to Series Layout:

Option	General Description
Default Series Layout	This allows the Merge PACS Viewer to automatically determine the optimal series layout, based on the number of series in a given study.
Custom	This allows you to manually enter the number of rows and columns that should be displayed.

25.14.2. Prior Placement

By default, when you are viewing Primary Mammography and Prior Mammography studies together in **Compare Studies** mode, as described in subsection 4.3.4 above, or **Stack Scrolling** mode, as described in subsection 4.8.6 above, the Prior study will be displayed to the right of the Primary study. If desired, however, you can configure the Viewer to always display Prior Mammography studies to the left of the Primary study by selecting the **To Left** option under **Prior Placement**, as in the following example:



Selecting Prior Placement to the Left

NOTE: This option will only be available when setting the **MG** preference.

25.14.3. Other Options

For each modality type, you can set the following miscellaneous display preferences:

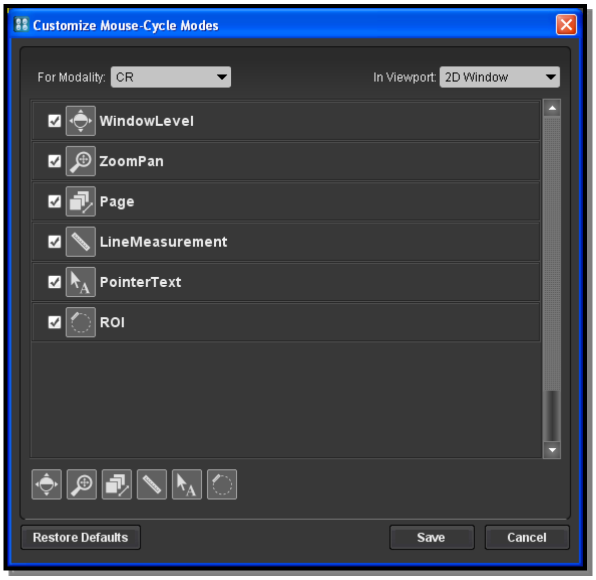
Option	General Description
Show Annotations	If selected, the display of annotations will be automatically enabled whenever a study of this particular modality type is loaded into the Viewer.
AutoPlay Cine (multi-frame images)	If selected, multi-frame images will automatically be loaded in **Cine** mode whenever a study of this particular modality type is loaded into the Viewer.

Option	General Description
Show DICOM Overlay	If selected, the **DICOM Overlay** option will be automatically enabled whenever a study of this particular modality type is loaded into the Viewer.
Synchronize Series	If selected, the **Automatic Series Synchronization** option will be automatically enabled whenever a study of this particular modality type is loaded into the Viewer.
Show 6000 Overlay	If selected, the **DICOM 6000 Overlay** option will be automatically enabled (if applicable) whenever a study of this particular modality type is loaded into the Viewer.
Preserve W/L Across Global Stack	If selected, window and level settings will be carried over from one series to the next when using the **Global Stack** feature.
Show Cross Reference	If selected, the **Reference Lines** button on the Toolbar (as described in subsection 4.3.2 above) will be automatically enabled whenever a study of this particular modality type is loaded into the Viewer.
Image Level Manipulation	If selected, the **Image Level Manipulation** option will automatically enabled whenever a study of this particular modality type is loaded into the Viewer.
Global Stack Window	If selected, the **Global Stack** option will be automatically enabled whenever a study of this particular modality type is loaded into the Viewer.
Study Invert	If selected, the **Invert** option will be automatically enabled for all images whenever a study of this particular modality type is loaded into the Viewer.
Use Window Range Instead of Level	 If selected, the Window/Level tool will appear as a special **Window Range** cursor, as shown to the left, whenever a study of this particular modality type is loaded into the Viewer. Once selected, moving the cursor up and down adjusts the lower end of the window and moving it left and right adjusts the upper end of the window. Note that this option will be checked by default for **NM** and **PT** modalities.
Automatically Stack/Scroll MG Priors	If selected, any relevant prior mammography studies will automatically be loaded into the Viewer along with the primary study and the Navigation Thumbnails for the prior studies will be displayed with the primary study's Navigation Thumbnails. In addition, the **Scroll MG Priors** tool in the **Viewer Toolbar** will become active, as described in subsection 4.8.6 above. Note that this option is only available when setting the preferences for the **Default** and **Mammography (MG)** modalities.

25.15. Customize Mouse-Cycle Modes

As described in subsections 4.1.2, 4.7.1 and 4.7.2, above, repeatedly right-clicking on an image will toggle the cursor among a variety of commonly used mouse modes. The Merge PACS Viewer lets you customize, for each modality, which mouse modes will be available as well as the order in which they appear. This is done by selecting the **Customize Mouse-Cycle Modes** option from the main User Preferences Menu, as described above.

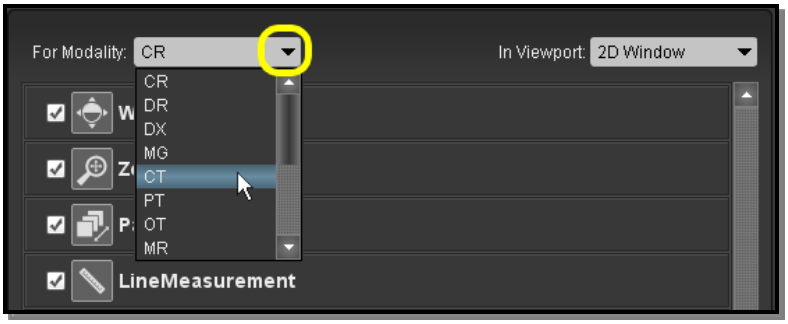
When you select this option, the **Customize Mouse-Cycle modes** window will be displayed as a separate pop-up window, as in the following example:



The Customize Mouse-Cycle Modes Window

25.15.1. Selecting the Modality

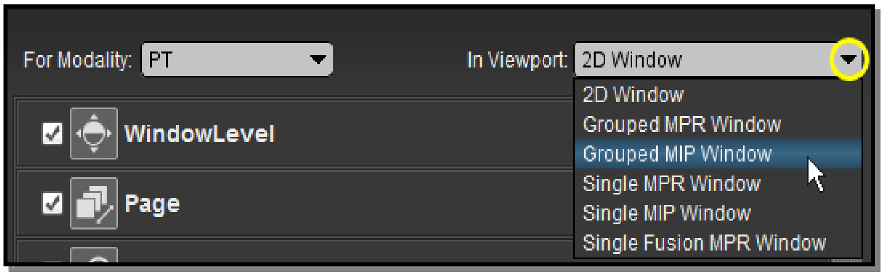
Since mouse-cycle modes can be customized for individual modality types (and different modality types have different mouse modes available), you need to first select the modality whose mouse-cycle mode you wish to customize. This is done by selecting the desired modality from the drop-down **For Modality** menu, as in the following example:



Selecting the Modality

25.15.2. Selecting the Viewport Type

For modalities that support 3D viewing, each type of viewport can also have its own customized mouse-cycle mode. Once you have selected the desired modality, you can select the desired type of viewport whose mouse-cycle mode you want to customize from the drop-down **In Viewport** menu, as in the following example:



Selecting the Viewport Type

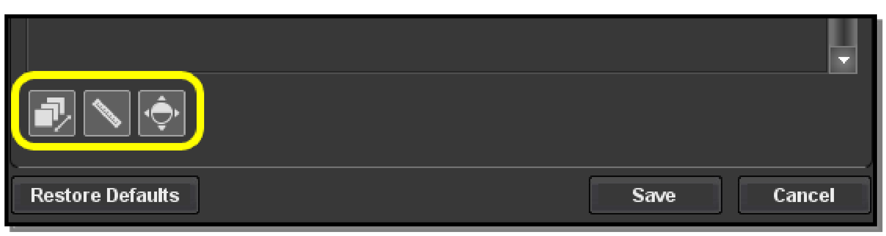
25.15.3. Selecting and Re-ordering the Mouse Modes

Once you have selected the desired modality (and, if applicable, viewport type), you can select and change the order of the available mouse modes as follows:

- To select or deselect an available mouse mode for inclusion in the cycle, click on the check box next to the mouse mode, as shown below:

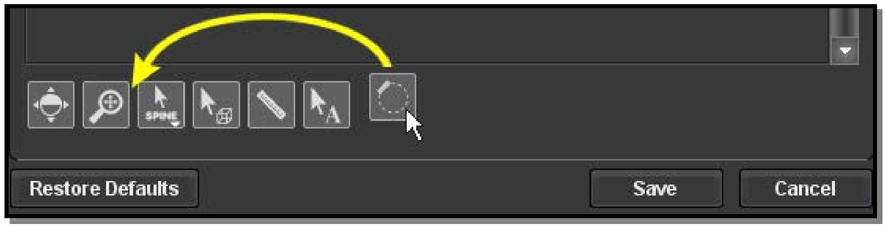
Selecting and Deselecting Mouse Modes

Mouse modes that have been selected will be displayed at the bottom of the window, as in the following example:



Selected Mouse Modes

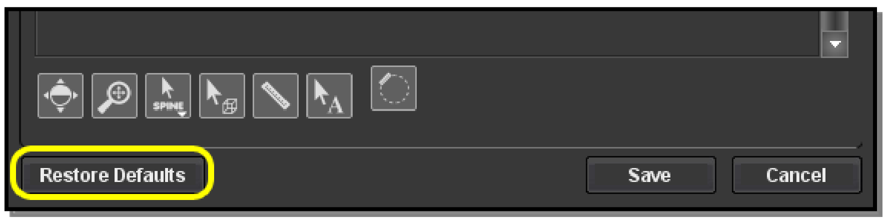
- To change the order of the selected mouse modes, use your mouse to drag and drop them into the desired order, as in the following illustration:



Reordering Mouse Modes

25.15.4. Restoring Defaults

If you need to restore all mouse-cycle modes to their default settings, click on the **Restore Defaults** button at the bottom of the window, as in the following example:



Restoring Default Settings

25.15.5. Saving Your Changes

When you have finished making all the desired changes, click on the **Save** button at the bottom of the window, as in the following example:

Saving Changes

You can also click on the **Cancel** button to exit the window without saving any changes.

25.16. Customize Keyboard Shortcuts

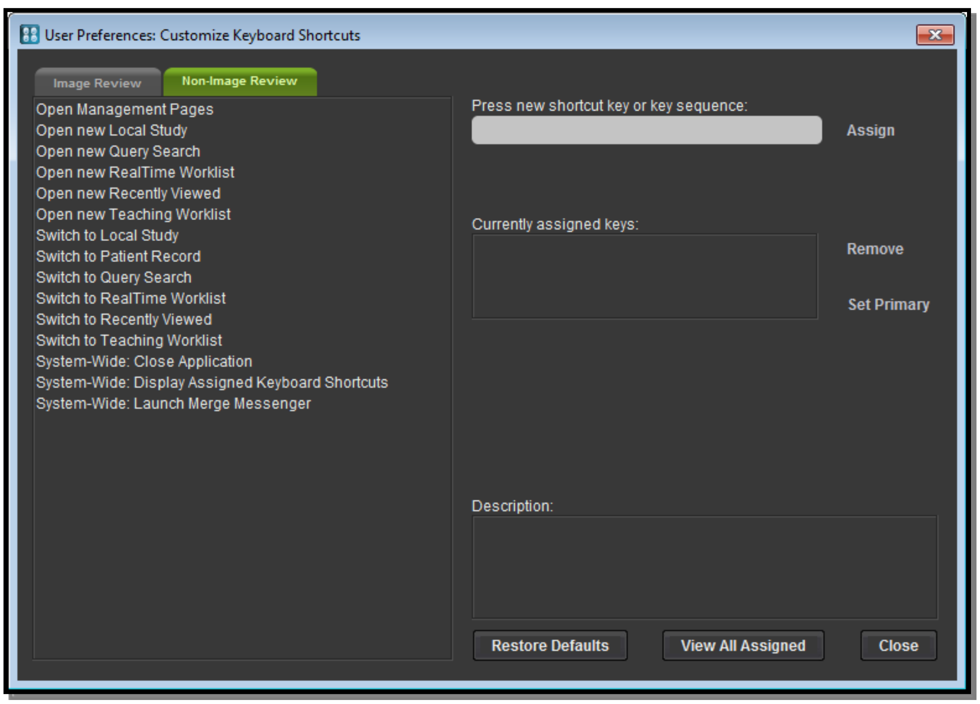
Most of the various actions (whether functions or tools) described throughout this Users Guide are associated with keyboard shortcuts that let you perform the function or select the tool by pressing one or more keys on your keyboard. Each Workstation comes with a set of factory default keyboard shortcuts that can also be customized on a site-wide basis by your PACS Administrator. Most of these default shortcuts can be changed, however, to suit your personal preferences.

Note the following:

- Not all keys or keystroke combinations are allowed (a warning message will be displayed if you attempt to use an invalid key).
- Some actions have shortcuts that are not configurable.

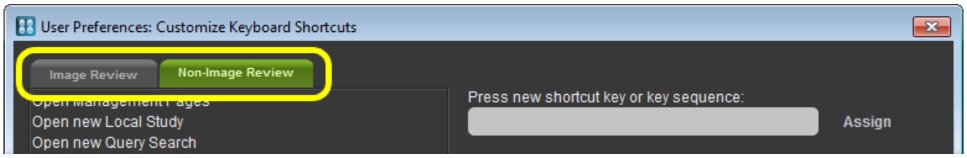
The **Customize Keyboard Shortcuts** option on the User Preferences menu lets you view a list of all keyboard shortcuts that are currently assigned as well as add new shortcuts and change existing ones. You can print the list and/or export it to a Comma Separated Value (.csv) file that can be opened in spreadsheet applications such as Microsoft® Excel.

When you select this option, the **Customize Keyboard Shortcuts** window will be displayed as a separate pop-up window, as in the following example:



Customize Keyboard Shortcuts Window

The tabs at the top of the window let you select between **Image Review** actions and **Non-Image Review** actions, as in the following example:

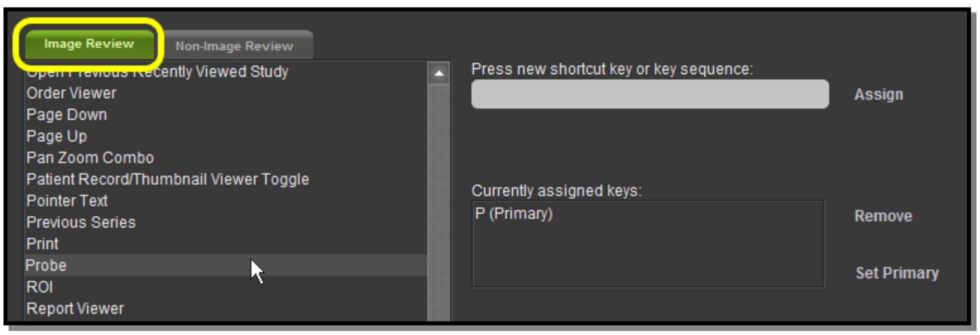


Selecting Between Image Review and Non-Image Review

NOTE: By default, the tab that is initially selected corresponds to the location from which you launched the dialog (*i.e.*, if launched from the Viewer, the Image Review tab will be selected).

25.16.1. Assigning or Changing a Keyboard Shortcut

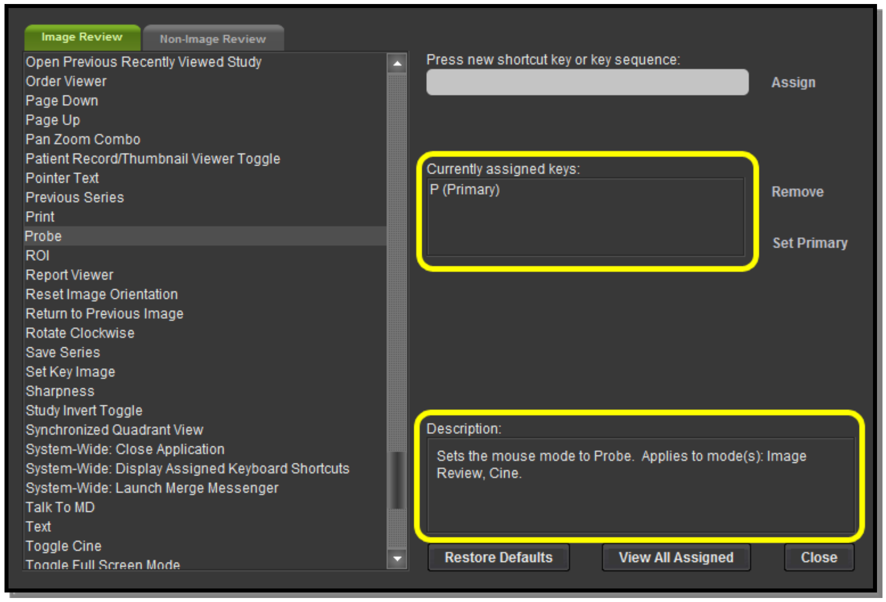
To assign or change the keyboard shortcut associated with a particular action, click on the appropriate tab at the top of the Customize keyboard Shortcut window (Image Review or Non-Image Review) and then click on the desired action, as in the following example:



Selecting the Desired Action

NOTE: Once you have clicked on any action, you can type a letter or character to jump directly to the first action that begins with that letter or character. For example, typing “R” while viewing the Image Review list of actions will jump directly to **ROI**.

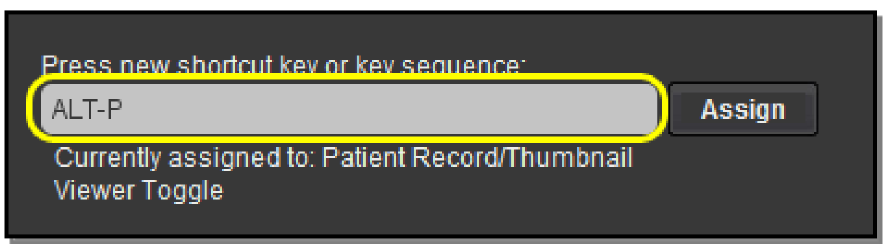
When you click on an action, the right side of the window will display the shortcut or shortcuts currently assigned to that action as well as a brief description of the action, as in the following example:



Information About the Selected Action

NOTE: Up to four keyboard shortcuts can be assigned to a single action. Only one shortcut can be configured as the "**primary**" shortcut for the action, however, and that shortcut will be displayed alongside the action's name in the various menus and tool-tips.

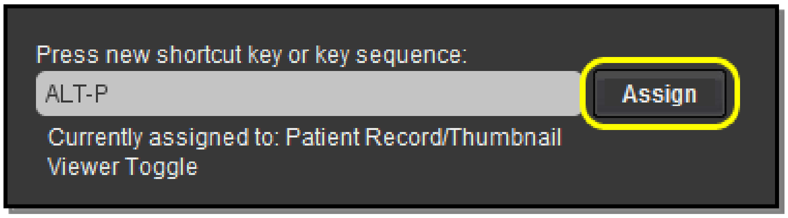
Click on the **Press new shortcut key or key sequence** box and enter the key or combination of keystrokes (*e.g.*, ALT+P) you want to assign to this action, as in the following example:



Entering The Keyboard Shortcut

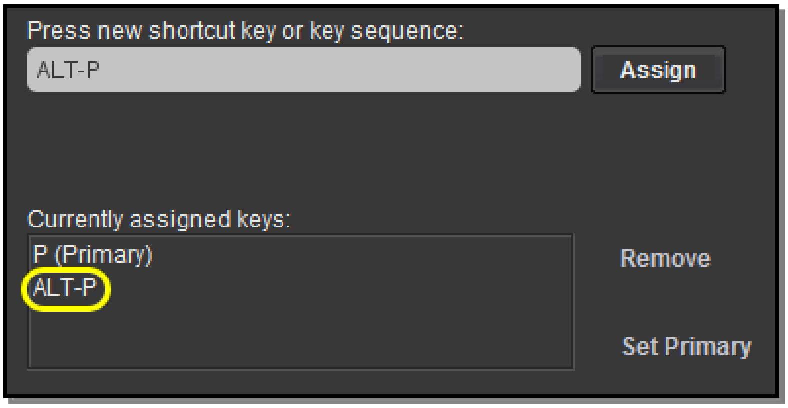
CAUTION: If the key or key sequence entered is already assigned to another action, that information will be displayed directly below the box as in the example above. Proceding with the assignment will remove the shortcut from the currently assigned action.

Once you have entered the desired key or keystroke combination, click on the **Assign** button, as in the following example:



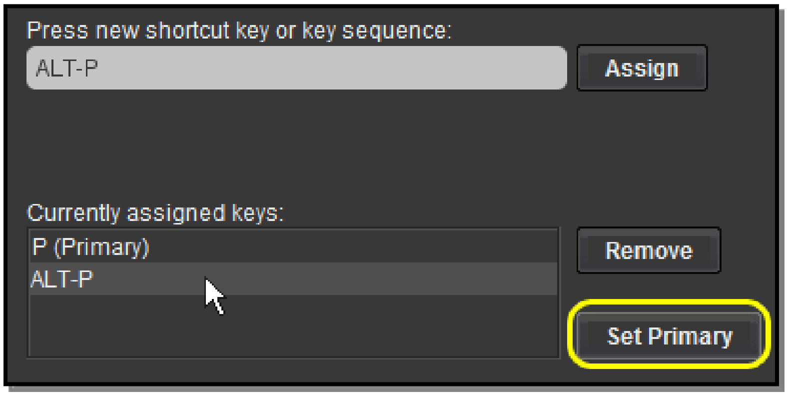
The Assign Button

The newly assigned keyboard shortcut will now be displayed in the list of **Currently assigned keys** for this action, as in the following example:



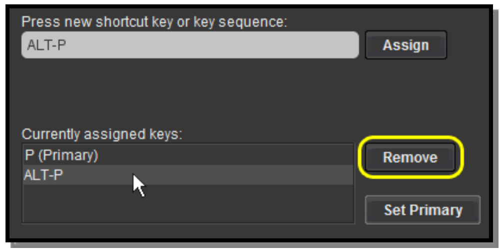
Newly Assigned Keyboard Shortcut

If the newly assigned shortcut is the only one assigned to this action, it will be designated the **primary** shortcut automatically and will be displayed alongside the action in the various menus and tool-tips. If there was already a primary shortcut and you want to make the newly assigned shortcut primary, click on the new shortcut once to select it and then click on the **Set Primary** button, as in the following example:



Setting Keyboard Shortcut as Primary

If you need to remove a keyboard shortcut that you have assigned to an action, click on the shortcut once to select it and then click on the **Remove** button, as in the following example:

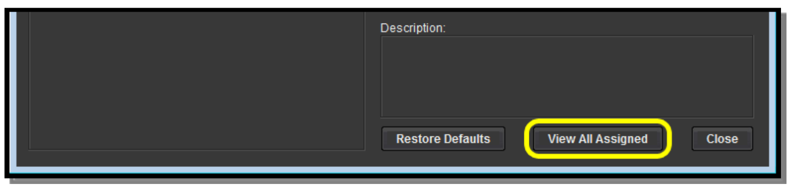


Removing a Keyboard Shortcut

25.16.2. Viewing a List of Currently Assigned Keyboard Shortcuts

If desired, you can view a list of all currently assigned keyboard shortcuts that can be sorted, printed out or exported to a Comma Separated Value (.csv) file that can be opened in spreadsheet applications such as Microsoft® Excel.

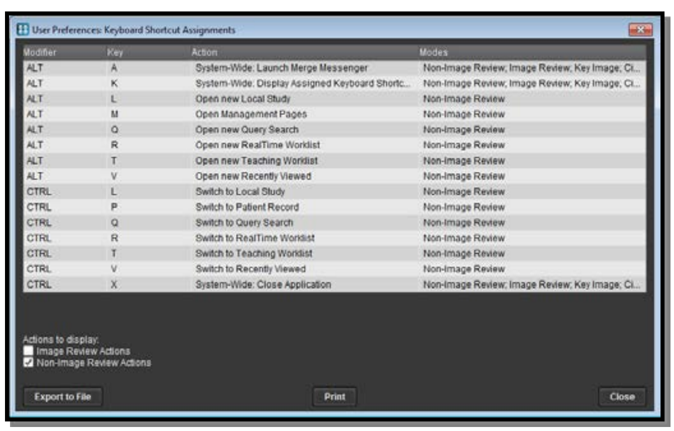
To view the list of available keyboard shortcuts, click on the **View All Assigned** button at the bottom of the Customize Keyboard Shortcut window, as in the following example:



Viewing All Assigned Keyboard Shortcuts

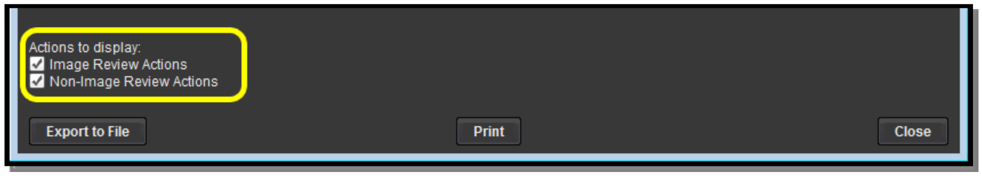
NOTE: You can also view all assigned keyboard shortcuts by selecting Display Assigned Keyboard Shortcuts from the Patient Record Right-click Menu or the Study Right-click Menu.

*The **Keyboard Shortcut Assignments** window is displayed, as in the following example:*



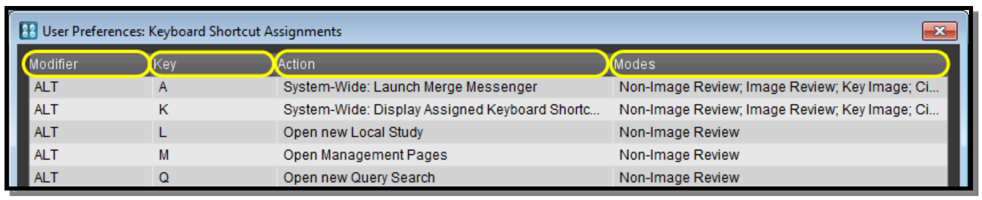
Keyboard Shortcut Assignments Window

- By default, only the actions that correspond with the location from which you accessed the Customize Keyboard Shortcuts window will be displayed (*i.e.*, if launched from the Viewer, only Image Review actions will be displayed), but you can use the checkboxes at the bottom of the window to display the shortcuts assigned to other actions in addition to or instead of, as in the following example:



Selecting the Keyboard Shortcuts to Display

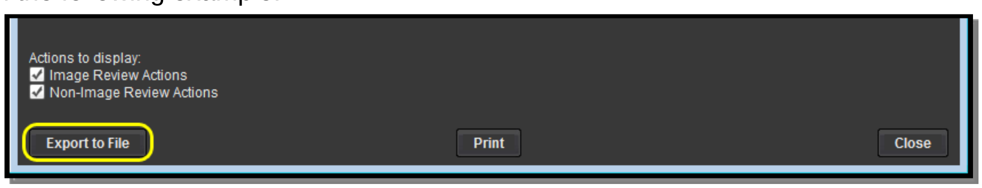
- Once you have selected the type of shortcuts to display, you can **sort** the list by clicking on any of the column headings at the top of the window, as in the following example:



Sorting the List of Keyboard Shortcuts

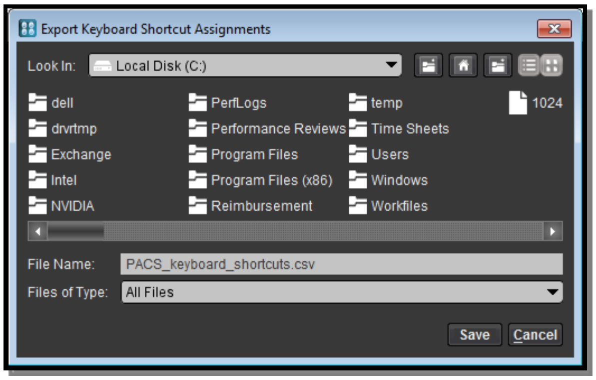
NOTE: Clicking on the same column header repeatedly will toggle between sorting in ascending and descending order for that column.

- Click on the **Export to File** button at the bottom of the window to create a **Comma Separated Value** (.csv) file containing the shortcuts currently being displayed that can be saved and opened in spreadsheet applications such as Microsoft® Excel, as in the following example:



The Export to File Button

*The **Export Keyboard Shortcut Assignments** window is displayed, as in the following example*:



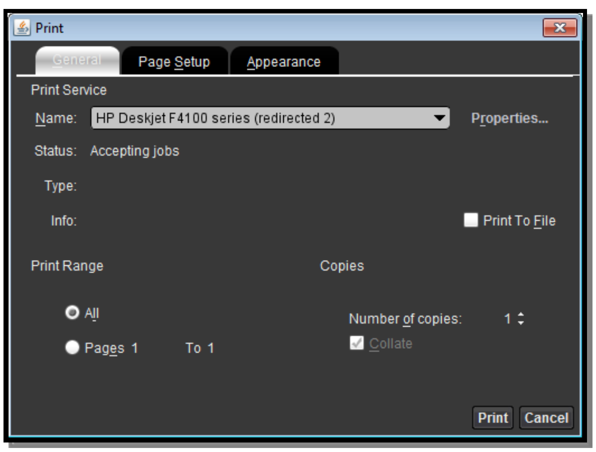
Exporting the List of Keyboard Shortcuts

Browse to the location where you would like to save the file and click on the **Save** button at the bottom of the window.

- Click on the **Print** button at the bottom of the window to send the list of shortcuts currently being displayed to a local or network attached printer, as in the following example:

The Print Button

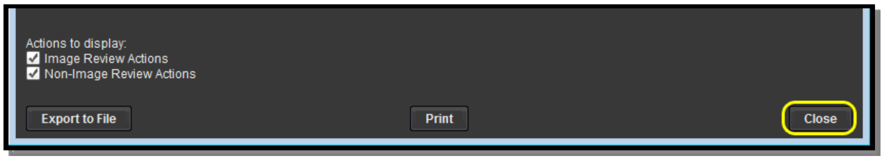
*The **Print Keyboard Shortcut Assignments** window is displayed, as in the following example*:



Printing the List of Keyboard Shortcuts

Select the desired printer from the drop-down **Name** menu and click on the **Print** button at the bottom of the window.

- Click on the **Close** button at the bottom of the window to exit the Keyboard Shortcut Assignments Window and return to the main Customize Keyboard Shortcuts Window, as in the following example:



Exporting the List of Keyboard Shortcuts

25.16.3. Restoring Keyboard Shortcut Defaults

At the main Customize Keyboard Shortcuts window, click on the **Restore Defaults** button at the bottom of the window to reset all keyboard shortcuts to their default values, as in the following example:

Viewing All Assigned Keyboard Shortcuts

NOTE: If your PACS Administrator has customized the keyboard shortcuts on a site-wide basis, the keyboard shortcuts will be reset to those values. Otherwise, they will be reset to the factory defaults.

25.17. Restore User Preference Defaults

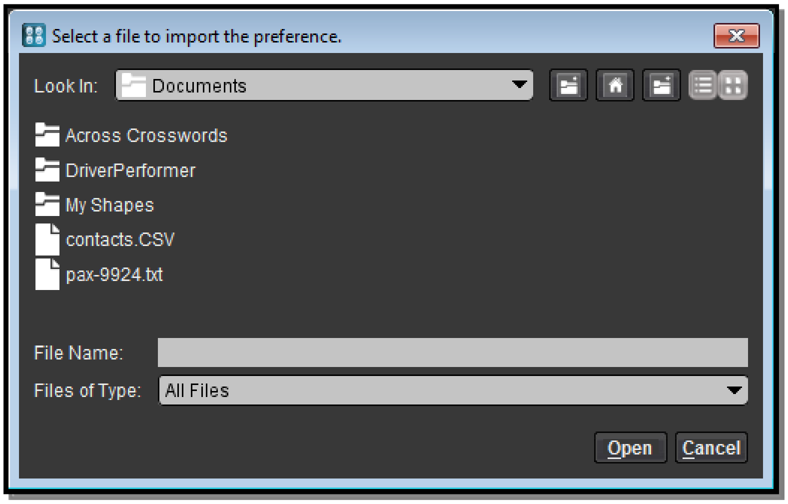
If this option is selected, all preferences will be rest to their default values.

NOTE: Selecting this option will cause the Merge PACS Workstation to close and you will need to manually restart the Workstation in order to continue.

25.18. Import User Preferences

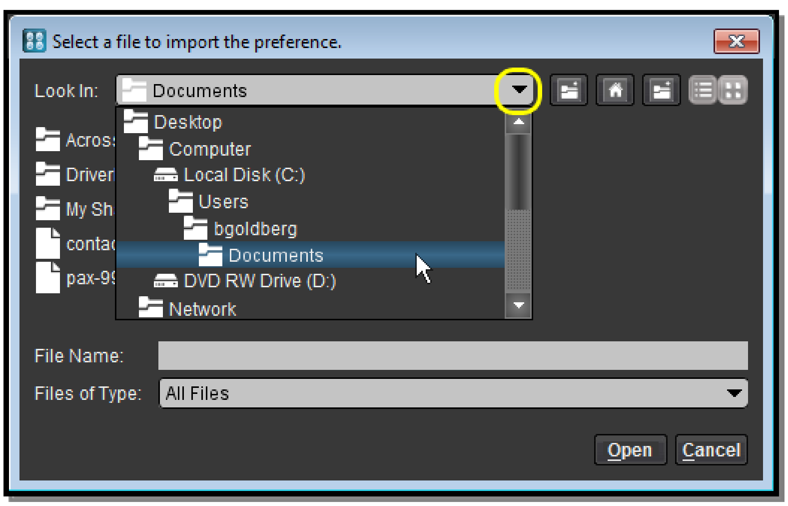
This option lets you import all user preferences from another Workstation or from a different user on the same Workstation. Note that the preferences are stored in an external **.xml** file that must first be created, as described in Section 25.19 below.

When you select this option, the **Import User Preferences** window will be displayed as a separate pop-up window, as in the following example:



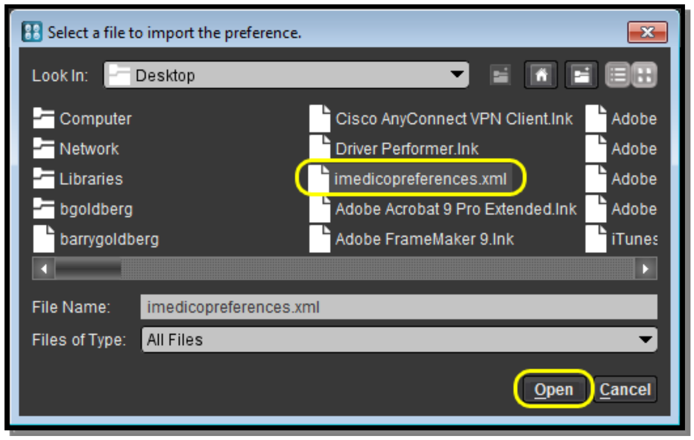
The Import User Preferences Window

By default, Import Preferences Dialog will display the contents of your individual Windows user directory. If the file containing the preferences is displayed there, click on it to select it. If the file is located somewhere else, you can browse to the file's location from the **Look In** drop-down menu, as in the following example:



Selecting the File to Be Imported

Once you have located the directory where the preferences file is stored, click on the name of the file once to select it and then click on the **Open** button, as in the following example:



Selecting the File to Be Imported

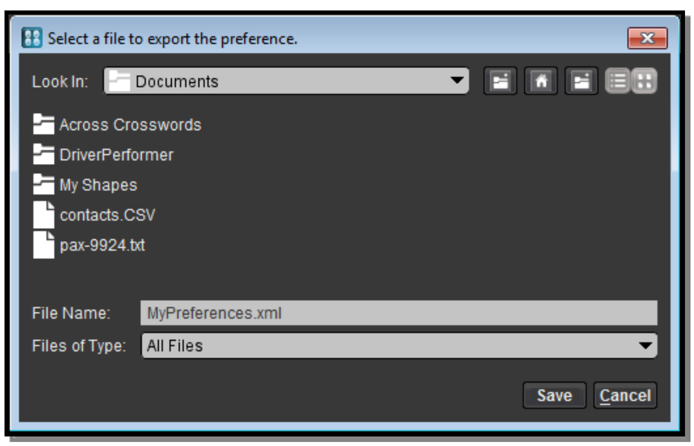
NOTE: You can also double-click on the name of the file to open it.

NOTE: Selecting this option will cause the Merge PACS Workstation to close and you will need to manually restart the Workstation in order to continue.

25.19. Export User Preferences

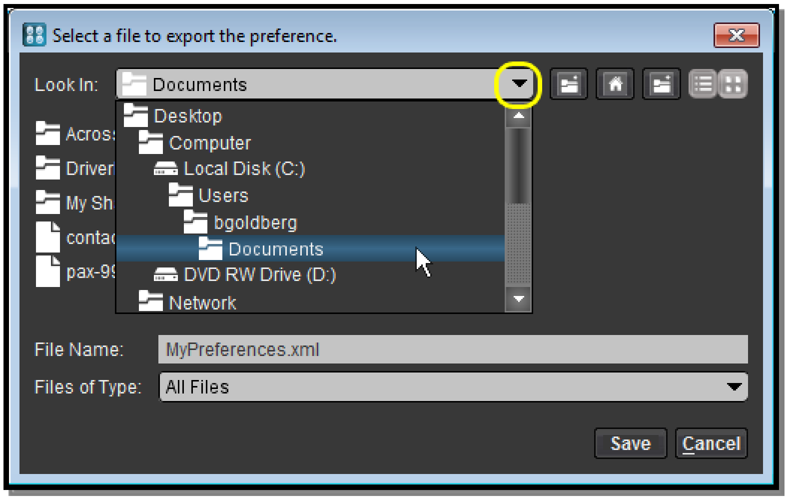
This option lets you export all user preferences to an external **.xml** file that can then be used to import the preferences to another Workstation or to a different user on the same Workstation.

When you select this option, the **Export User Preferences** window will be displayed as a separate pop-up window, as in the following example:



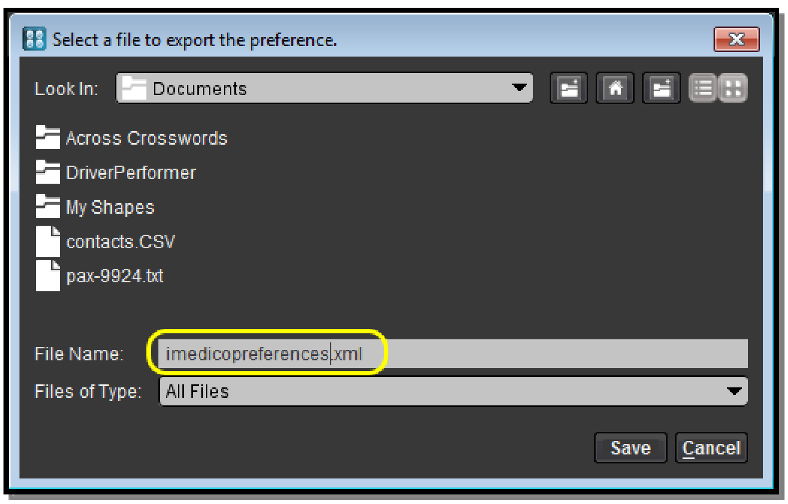
The Export User Preferences Window

By default, the file will be saved to your individual Windows user directory. If desired, however, you can select a different location for the file from the **Look In** drop-down menu, as in the following example:



Selecting a Location for the Exported File

If desired, you can change the name of the file in the **File Name** text field, as in the following example:

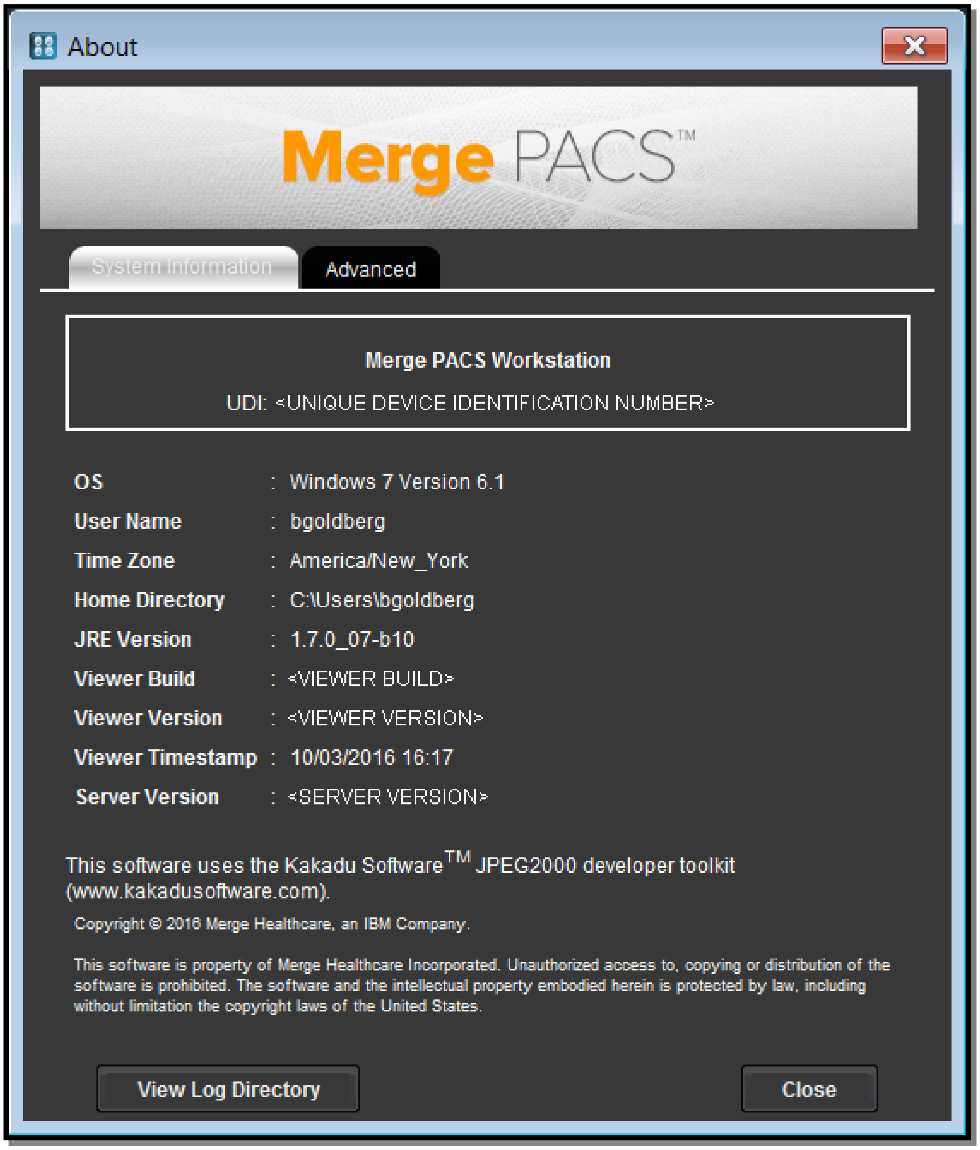


Selecting a Location for the Exported File

When finished, click on the **Save** button at the bottom of the window.

Chapter 26. Viewing System Information

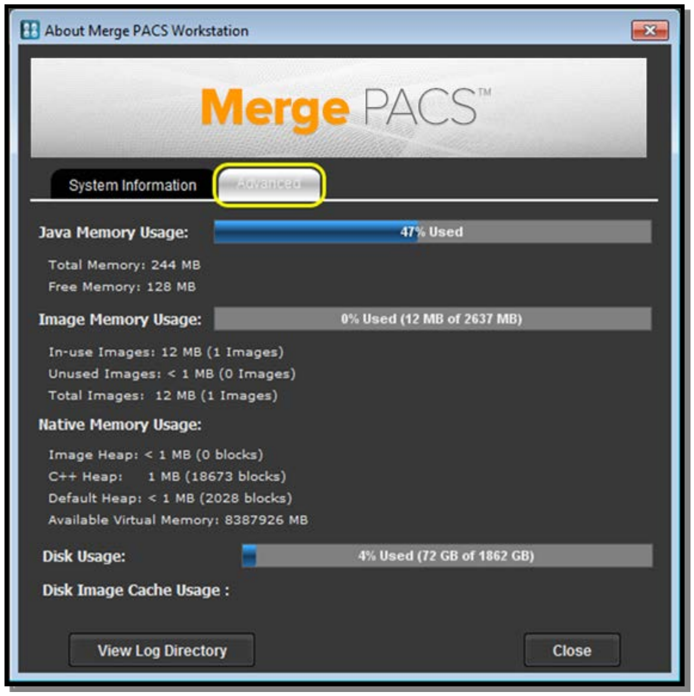
As described in subsections 3.9.4.b, 3.9.7.b and 4.1.4.c above, various right-click menus throughout the Merge PACS Workstation include an **About** option. Selecting this option will display a pop-up window that provides system information, as in the following example:



The About Merge PACS Workstation Window (System Information)

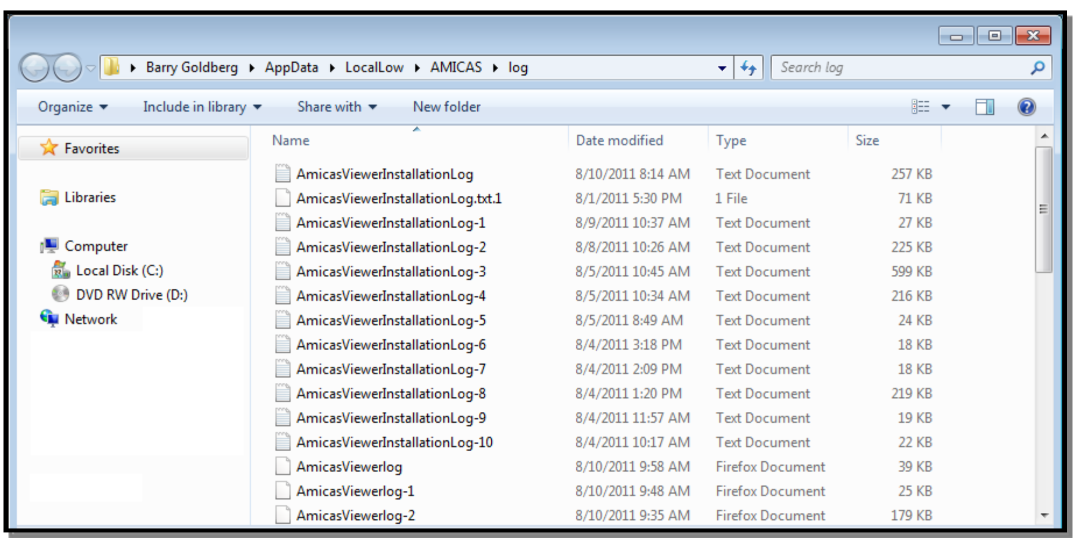
By default, the **System Information** tab will be displayed, which shows the current version of the Merge PACS Workstation you are using as well as your Windows operating system and username.

Clicking on the **Advanced** tab at the top of the window display will information about memory and disk usage, as in the following example:



The About Merge PACS Workstation Window (Memory and Disk Usage)

Clicking on the **View Log Directory** button at the bottom of the window will launch Windows Explorer and display the contents of the directory where Merge PACS Workstation log files are stored, as in the following example:



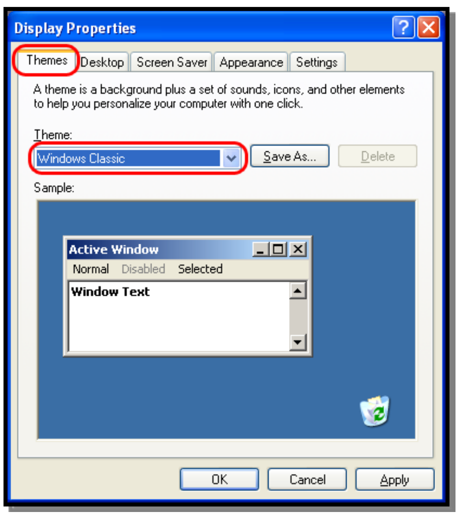
Viewing the Merge PACS Workstation Log Directory

Appendix A. Dual Monitor Configuration

The following steps describe how to configure dual Barco[TM] monitors for use with the Merge PACS Workstation.

NOTE: The appearance of the windows and dialog boxes displayed below will vary according to your specific operating system and are meant as examples only.

1. Right-click anywhere on your workstation's desk-top and select "Properties" from the pop-up menu to launch the **Display Properties** window.
2. If your workstation is running **Windows XP**, click on the **Themes** tab and make sure that "Windows Classic style" from the drop-down "Windows and buttons" menu:

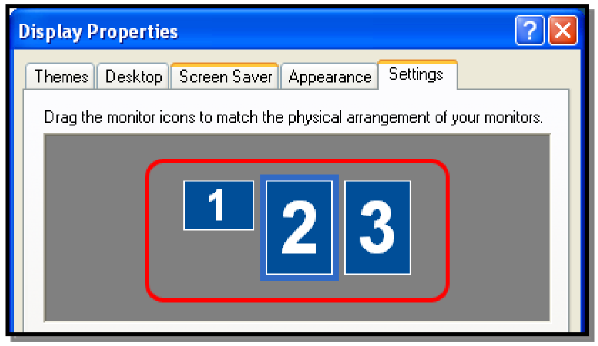


Setting the Display Appearance

3. For all operating systems, click on the **Settings** tab at the top of the Display Properties window:

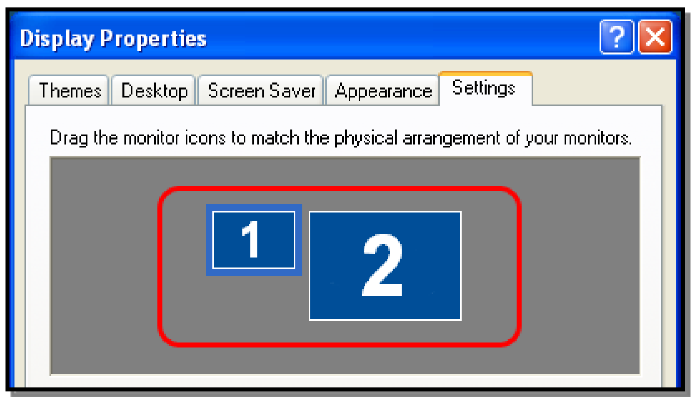
Changing the Display Settings

- A correctly configured dual monitor set-up should show icons representing three separate monitors (one primary and two attached), as in the following example:



Correct Configuration

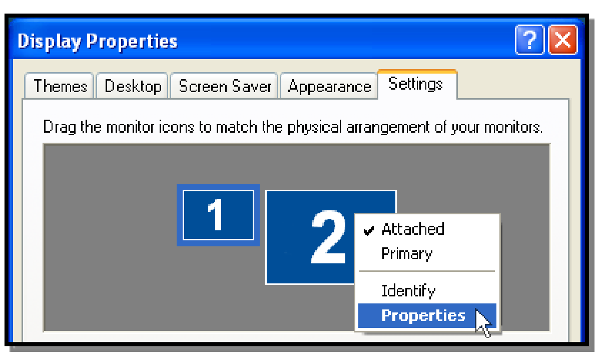
- An incorrectly configured dual monitor set-up will only show icons representing two separate monitors (one primary and one attached), as in the following example:



Incorrect Configuration

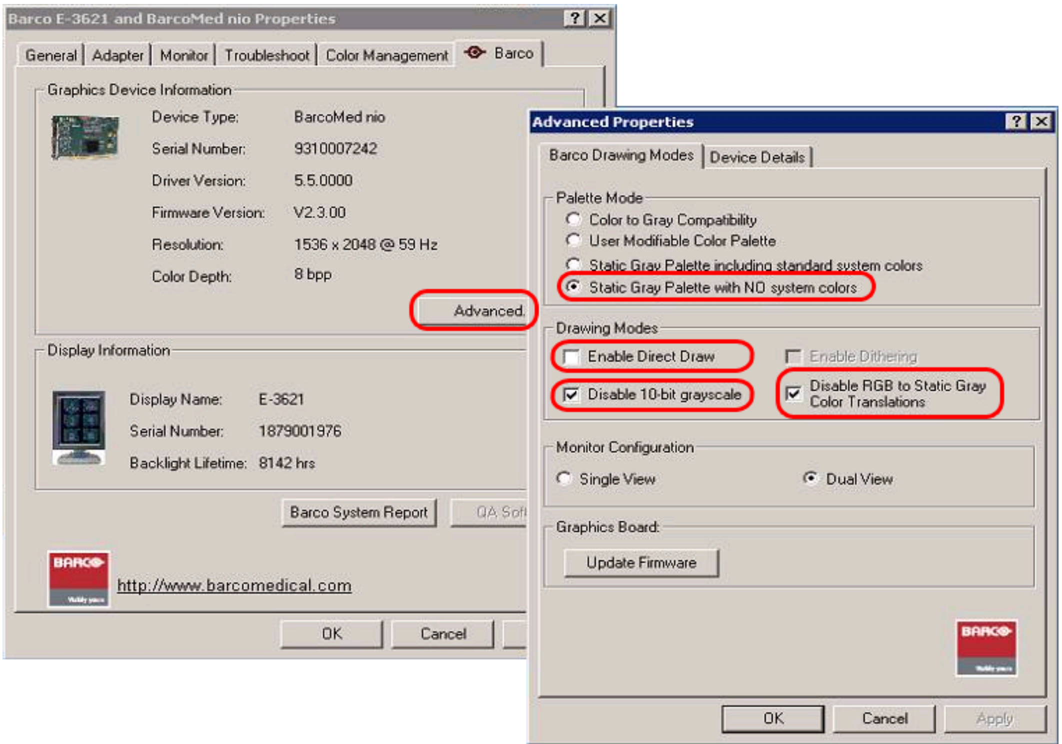
4. If the monitors are correctly configured, click the **OK** button at the bottom of the Display Properties window. Note that if you had to change the scheme or theme as described in steps 2 or 3 above, it may take a little while for your workstation to adjust.

5. If the monitors are incorrectly configured, right-click on the icon for the second monitor and select “Properties” from the pop-up menu:



Setting the Monitor Properties

A Barco Properties window similar to the one shown below will be displayed:



Barco Properties Window

NOTE: Depending on the version of your Barco drivers, you may need to click on the **Advanced** tab or the **BarcoMed Driver** tab to see this window.

- If available, make sure that the **Static Gray Palette with NO system colors** option is selected.
- Make sure that **Enable Direct Draw** is **not** selected.
- Make sure that **Disable 10-by grayscale** is selected.
- If available, make sure that Disable RGB to Static Gray Color Translations is selected.
- Under “Monitor Configuration” make sure that the **Dual View** option is selected (depending on your operating system, this option may be labeled “DualView is active” or “Enable DualView”).

Click the **OK** button at the bottom of the Display Properties window. Note that if you had to change the scheme or theme as described in steps 2 or 3 above, it may take a little while for your workstation to adjust.

Appendix B. Standardized Uptake Values (SUV)

When using the **ROI Measurement** and **Probe** tools with PET images, values can be displayed with any of the following units, based on the data provided by the modality:

Unit	Description	Unit	Description
NONE	unitless	**MLG**	milliliter/gram
CNTS	counts	**1CM**	1/centimeter
CM2	centimeter^2	**UMOLML**	micromole/milliliter
CM2ML	centimeter^2 / milliliter	**PROPCNTS**	proportional to counts
PCNT	percent	**PROPCPS**	proportional to counts/sec
CPS	counts/second	**MLMINML**	milliliter/minute/milliliter
BQML	Becquerels/milliliter	**MLML**	milliliter/milliliter
MGMINML	milligram/minute/milliliter	**GML**	grams/milliliter
UMOLMINML	micromole/minute/milliliter	**STDDEV**	standard deviations
MLMING	milliliter/minute/gram		

To aid in the interpretation of PET images, if the units are in **BQML**, **GML**, or **CM2ML**, the ROI and Probe tools will display the absorption of an injected isotope in body tissue based on **Standardized Uptake Values (SUV)**. SUV statistics are indicated based on the DICOM data present in the image and one or more of the following user preferences for SUV display:

- **Body Weight (BW)**
- **Lean Body Mass (LBM)**
- **Body Surface Area (BSA)**
- **Ideal Body Weight (IBW)**

CAUTION: Standardized Uptake Values are not absolute values. For details on the equations used to calculate these values in the application, see below.

CAUTION: Standardized Uptake Values are displayed only if the image contains values for the required DICOM tags.

B.1. Requirements for Displaying Standardized Uptake Values

If the units are **GML** or **CM2ML** than the modality pixel values represent the SUV, no correction has to be applied.

If the units are **CM2ML**, the SUV will be considered BSA; all other SUV types will display N/A

If the units are **GML**, the SUV can be either BW or LBM. There is an extra tag SUV Type (0054, 1006) that can distinguish between BW and LBM; if not present, the SUV will be considered implicitly BW; all other SUVs will display N/A

If the units are **BQML**, a correction has to be applied to the modality pixel values. In order to calculate the SUV, the following DICOM tags are required to be present in the dataset (refer to Appendix B.1 for details how these DICOM tags are used in SUV calculations):

DICOM Tag Name	Group, Element	Required Value	BW	LBM	IBW	BSA
Units	(0054,1001)	BQML(Becquerels per milliliter)	X	X	X	X
Decay Correction	(0054,1102)	START or ADMIN	X	X	X	X
Series Time	(0008,0031)	Specified (Expressed in hhmmss.frac)	X	X	X	X
Radionuclide Total Dose	(0018,1074)	Specified in BQ (becquerels) and > 0	X	X	X	X
Radiopharmaceutical Start Time	(0018,1072)	Specified (Expressed in hhmmss.frac)	X	X	X	X
Radionuclide Half Life	(0018,1075)	Specified in seconds and > 0	X	X	X	X
Patient Weight	(0010,1030)	Specified and > 0.0 (Expressed in kg)	X	X	X	X
Patient Size	(0010,1020)	Specified and > 0.0 (Expressed in meters)			X	X

NOTE: If one of the required DICOM tags listed above is not present in the dataset, the SUV will display N/A.

B.2. Basic Calculation for Standardized Uptake Value (SUV)

The general equation for SUV is as follows:

`SUV = **Modality Pixel Value** * (**Body Parameter**) / (**Corrected Dose**)`

- **Body Parameter** has a different value for each type of SUV:

SUV	Body Parameter Value
BW (g)	Patient Weight * 1000
LBM (g)	• **Male (Patient Sex is 'M'):** (1.10 * Patient Weight - 120.0 * POWER ((Patient Weight / (Patient Size * 100)), 2)) * 1000 • **Female (Patient Sex is 'F'):** (1.07 * Patient Weight - 148.0 * POWER ((Patient Weight / (Patient Size * 100)), 2)) * 1000 Lean Body Weight refers to the sum of the weight of your bones, muscles and organs (everything other than fat in your body)[1].
IBW (g)	• **Male (Patient Sex is 'M'):** (48.0 + 1.06 * (Patient Size - 152)) * 1000 • **Female (Patient Sex is 'F'):** (45.5 + 0.91 * (Patient Size - 152)) * 1000[2]
BSA (cm2)	POWER(Patient Weight, 0.425) * POWER(Patient Size * 100, 0.725) * 0.007184 * 10000[3]

- **Corrected Dose** has different values depending on the Decay Correction value:
  - If the Decay Correction is **ADMIN** then the **corrected dose** = Radionuclide Total Dose
  - If the Decay Correction is **START** then the **corrected dose** = Radionuclide Total Dose * EXP(-0.693147 * TIME_DIFF / Radionuclide Half Life), where TIME_DIFF is the difference in seconds between Radiopharmaceutical Start Time (the time the patient activity was measured) and the Series Time (start scan time); if the two times are equal then the corrected dose = Radionuclide Total Dose. Note that Radionuclide Half Life is usually 6588 seconds for F18 isotope.

NOTE: The Merge PACS Viewer uses only tags defined by the DICOM standard to calculate the SUVs; it does not take into account any private tags used by some modality vendors.

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[1] *James WPT. Research on obesity. London. Her Majesty's Stationery Office*

[2] *Hamwi GJ. Therapy: changing dietary concepts. In: Diabetes Mellitus: Diagnosis and Treatment (vol. 1). Danowski TS (ed). American Diabetes Association. New York. 1964, pp73-8.*

[3] *DuBois D; DuBois EF: A formula to estimate the approximate surface area if height and weight be known. Arch Int Med 1916 17:863-71.*

Appendix C. Consolidating Patient Information

When a study is imported into Merge PACS, a patient identity for the new study is created and a unique PACS Internal ID is generated. Based on the PACS Internal ID, the study is either matched to a pre-existing patient and stored as such or stored as a new patient. When patient demographics are updated or merged with another patient, the unique identifier is then used to group all related studies and process the update or merge request.

Merge PACS can additionally be configured with a Patient Comparison Strategy to provide fine grain control on patient update and merges, using additional patient demographic values to identify and group studies related to a given patient.

There are five Patient Comparison Strategies available with Merge PACS:

Comparison Strategy	Description
PACSComparisonStrategy	Matching of priors is strictly controlled by the “Selection of Priors” Site Preference and no consolidation is performed for the patient identity. This is the default strategy on installing Merge PACS.
PACSInternalComparisonStrategy	Uses the PACS internal ID to group related studies.
StrictComparisonStrategy	Uses the Patient’s full name (all five components of DICOM person name), Patient MRN and Patient IPID to group related studies.
LastNameOnlyComparisonStrategy	Uses the Patient’s last name (Last Name component of DICOM person name), Patient MRN and Patient IPID to group related studies.
PatientIDOnlyComparisonStrategy	Uses Patient MRN and Patient IPID to group related studies.

NOTE: Consult with your PACS Administrator if you want to know which strategy is employed with your Merge PACS implementation.

When patient information is grouped using Patient Comparison Strategy, Merge PACS applies a “Last Wins” rule (*i.e.*, based on patient information in the most recent study) to calculate the final patient information and for all related studies.

The following pieces of information are calculated:

- **Patient Name**
- **Patient Date of Birth**
- **Patient Sex**

Under “Last Wins” rule, Merge PACS uses the last piece of data that is not null or empty. For example, look at the three studies in the following example:

Study #	Patient Name	DOB	Sex
1	Doe, Jonathan	19770101	O
2	Doe, Jonathan	19770101	
3	Doe, Jonathan Q		M

After consolidation, the patient information for all studies would be consolidated as follows:

Patient Name	DOB	Sex
Doe, Jonathan Q	19770101	M

When determining whether a particular study is considered a “prior” study of another study within Merge PACS, Merge PACS first looks to the Patient Comparison Strategy configured for a site to determine a match. Merge PACS then looks to the “Selection of Priors” option that is selected for the site to see if any additional studies should be included in the list of priors. Studies that do not match the Patient Comparison Strategy but do match the “Selection of Priors” option are displayed with a “+” from various places within the Workstation.

NOTE: If the Patient Comparison Strategy is set to **PACSComparisonStrategy**, all prior studies will be displayed with a “+” even if they have the exact same patient demographics as the primary study.

The following is a list of “Selection of Priors” options that are available for Merge PACS:

Preference	Description
MRN	Determine priors based solely on MRN
IPID and MRN	Determine priors based on a combination of Issuer of Patient ID (IPID) and MRN (*i.e.*, both must match to be considered a prior).
MRN and Name	Determine priors based on a combination of MRN and Patient Name (*i.e.*, both must match to be considered a prior).
IPID and MRN and Name	Determine priors based on a combination of IPID, MRN and Patient Name (*i.e.*, all must match to be considered a prior).
MRN or Name/DOB/Sex	Determine priors based on either MRN or a combination of Patient Name, Date of Birth and Sex.
(MRN and Name) or Name/DOB/Sex	Determine priors based on either a combination of MRN and Patient Name or a combination of Patient Name, Date of Birth and Sex.
Name/DOB/Sex	Determine priors based on a combination of Patient Name, Date of Birth and Sex.

NOTE: Consult with your PACS Administrator if you want to know which option is selected with your Merge PACS implementation.