Cedars-Sinai Medical Center
Department of Medicine
Artificial Intelligence in Medicine Program

QARG

Quantitative Automated Report Generator

Reference Manual

Version 2013.1

This document and the technology described herein are the property of Cedars-Sinai Medical Center and shall not be reproduced, distributed or used without permission from an authorized company official. This is an unpublished work subject to Trade Secret and copyright protection.

Copyright © 2013 Cedars-Sinai Medical Center

Warranty and Copyright Statement

Cedars-Sinai Medical Center has taken care to ensure the accuracy of this document. However, Cedars-Sinai Medical Center assumes no liability for errors or omissions and reserves the right to make changes without further notice to any products herein to improve reliability, function, or design. Cedars-Sinai Medical Center provides this guide without warranty of any kind, either implied or expressed, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Cedars-Sinai Medical Center may make improvements or changes in the product(s) and/or program(s) described in this manual at any time.

This document contains proprietary information which is protected by copyright. All rights are reserved. No part of this manual may be photocopied, reproduced, or translated to another language without written permission from Cedars-Sinai Medical Center.

Cedars-Sinai Medical Center reserves the right to revise this publication and to make changes in content from time to time without obligation on the part of Cedars-Sinai Medical Center to provide notification of such revision or change.

Copyright © 2013 Cedars-Sinai Medical Center
Artificial Intelligence in Medicine (AIM) Program
8700 Beverly Blvd, Los Angeles CA 90048, USA

Property of Cedars-Sinai Medical Center

Prescription Device Statement

Caution: Federal law restricts this device to sale by or on the order of a physician (or properly licensed practitioner).

Disclaimer

Neither Cedars-Sinai Medical Center, its parent, nor any of its worldwide affiliates shall be liable or obligated in any manner in respect of bodily injury and/or property damage from the use of the system/software if such is not in strict compliance with instructions and safety precautions contained in the relevant operating manuals and in all supplements thereto, in all product labels, and according to all terms of warranty and sale of the system, or if any change not authorized by Cedars-Sinai Medical Center is made to the software operating the system.

Trademarks

Cedars-Sinai, QGS and QPS are trademarks of Cedars-Sinai Medical Center.

Adobe, the Adobe logo, Acrobat, the Acrobat logo, and PostScript are trademarks of Adobe Systems Incorporated or its subsidiaries and may be registered in certain jurisdictions.

UNIX® is a registered trademark of The Open Group.

Linux is a trademark of Linus Torvalds and may be registered in certain jurisdictions.

Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Other brand or product names are trademarks or registered trademarks of their respective holders.

CE Marking

Cedars-Sinai Cardiac Suite is CE Marked to the Medical Device Directive 93/42/EEC.

Manufacturer:

Cedars-Sinai Medical Center

Artificial Intelligence in Medicine (AIM) Program

8700 Beverly Blvd

Los Angeles, CA 90048, USA

European Authorized Representative:

MediMark® Europe Sarl

11, rue Emile Zola – BP 2332,

38033 Grenoble Cedex 2

FRANCE

User Assistance Information

For assistance please visit our website or contact us via e-mail:

[Website] www.csaim.com

[E-mail] support@csaim.com

WARNING

Do not install software applications not approved directly by your workstation vendor. The system is only warranted and supported as configured and delivered. Refer to the vendor documentation for detailed system requirements.

Installation of Cedars-Sinai Cardiac Suite on vendor workstations is only to be performed by an authorized service engineer or applications specialist.

Contents

Introduction 8

Indication for Use 8

How QARG and ARG work together 8

Over view 9

Support studies 9

A typical workflow example 9

Connecting to the ARG Server 10

ARG Wizard 10

Implementation 10

Working with studies in QARG 12

QARG overview 12

QARG security 13

QARG study selector window 13

Opening an existing study 16

Creating a new study 16

QARG Study Window 18

Study Menu 18

View Menu 19

Previous Studies Pane 20

Consistency Checks 20

Miscellaneous Study Tasks 21

Editing Study Information 21

Deleting Studies 21

Viewing Study Logs 22

Merging Studies 22

Entering Data into QARG Study Window 23

History Screen 23

Page Macros 23

Patient Characteristics 24

Patient Information 24

Other Information 24
ECG Information 25
ECG Section Macros 26
Protocol and Dose information 26
Stress/Rest Details 26
ECG Clinical Results 27
Resting ECG 27
Stress ECG 27
Quant Screen 28
Perfusion Results 29
Function Results 29
Polar maps 30
Dictation Screen 31
Auto Text 31
Comparison 32
Custom Codes 32
Recipients Screen 33
Adding Entries 33
E-mailing the Report 33
Signing, UnSigning and Viewing Reports 34
Reconcile / Merge Studies 34
Select a study to merge with 35
Choose sections to copy 35
Generating the Report 36
Generating Reports in PDF 36
Generating Reports in Text (.txt) Format 36
Managing QARG - Administrative menu 37
Change Password 37
User Manager 38
User Properties 38
General Settings 38

Signature 38
Email Settings 39
Site Manager 39
Referring/ Monitoring Manager 40
Camera Manager 40
Custom Fields manager 41
Treadmill Protocol Manager 42
Report Editor 42
ARG Templates 43
Visual Editor 43
Appendix A – Supported code values 44
Patient fields 44
Acquisition Fields 44
Quantitative numbers 45
Findings 45
User configurable code editor 46
General User Configurable Code Editor 46
Test Type Manager 47
Blacklist Editor 48
Data Export 48
Administrative Report 49
Distribution Monitor 50
Global Preferences 51

Introduction

QARG (Quantitative Automatic Report Generator) is a tool that, together with the ARG server produces comprehensive nuclear cardiac reports. QARG includes data collection utilities, data consistency checks, report generation, search utilities and several administrative tools. During the data collection process users are automatically prompted to resolve potential inconsistencies. Once the data acquisition is complete, the reports are generated. Reports not only contain derived values, but output clear sentences designed to send to the referring physician. QARG merges data from all sources to produce a single comprehensive report.

Indication for Use

- QARG (Quantitative Automatic Report Generator) application is intended for use in multiple settings including, the hospital, clinic, and doctor's office.
- The results provided should be reviewed by qualified healthcare professionals (e.g., radiologists, cardiologists, or general nuclear medicine physicians) trained in the use of medical imaging devices.
- QARG is a tool that, together with the ARG server produces comprehensive and structured reports. QARG includes data collection utilities, data consistency checks, report generation, search utilities, and several administrative tools.
- During the data collection process, QARG prompts you to resolve potential inconsistencies. Once the data acquisition is complete, the reports are generated.
- QARG merges data to produce a single comprehensive report designed to be sent to the referring physician.

How QARG and ARG work together

QARG communicates with the ARG Server in the same manner QGS+QPS with ARG and QBS with ARG communicate with the ARG Server. Data collected via QARG resides in the same location as the data collected via QGS+QPS or QBS with ARG. Reports can be generated at any time from any application that supports ARG. All relevant consistency checks are also available from each application that supports ARG.

Over view

The ARG (Automatic Report Generator) options are integrated with QGS+QPS and QBS to provide day-to-day reporting functionality for cardiac nuclear medicine studies.

There are two ARG options:

ARG Reporting Panel: The ARG Reporting Panel integrated into QGS+QPS and QBS is the primary tool that signing physicians use to interact with the ARG database.

- The ARG reporting panel provides the following key functionality:
- Ability to add or modify patient demographic information
- Ability to add or modify dictation, history, and ECG information
- Automatic comparison to previous studies
- Automatic report generation
- Create, edit, and sign reports

QARG: This is the primary tool to interact with the ARG database. It is used mostly by technologists and administrators.

Support studies

ARG supports four different study types: Myocardial Perfusion, Blood Pool, CT Angiography, Pyrophosphate and Generic. Myocardial Perfusion and Blood Pool reporting is integrated within the quantitative applications – QGS+QPS and QBS, whereas Blood Pool, CT Angiography, Pyrophosphate and Generic study reports can only be created using the standalone application **QARG**.

A typical workflow example

QARG – technologist

1. Patient enters office and technologist creates a new study by logging into QARG and hitting the '**New**…' icon.
2. Technologist enters demographic and patient's history.
3. ECG test is performed and technologist fills out ECG, dosage and protocol sections. The tech corrects any inconsistencies.
4. Patient is imaged.

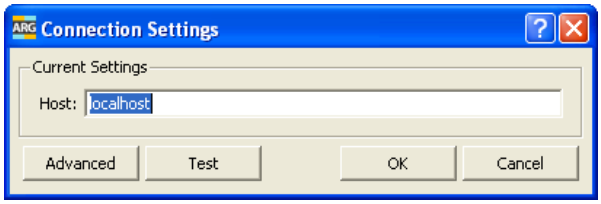
Quantitative Application (QGS+QPS) – physician

5. Physician uses QGS+QPS with ARG to automatically generate quantitative results, which are then verified and integrated with other inputs.
6. Physician reviews demographic, ECG, perfusion and function information within QGS+QPS.
7. Physician enters free-text dictation, if necessary.
8. Report is previewed and signed.

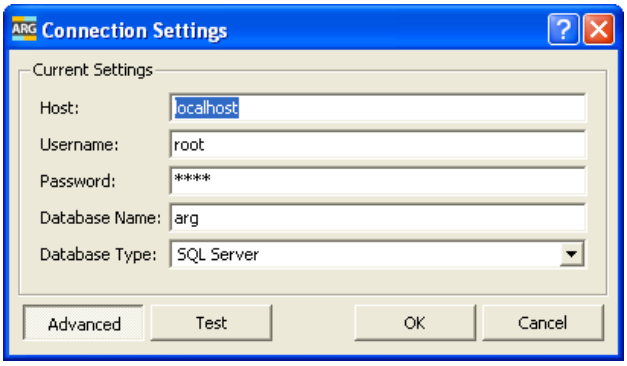
9. Report is sent to referring physician.

Connecting to the ARG Server

The first step in working with ARG is establishing a connection to the main ARG database. Most instances only require entering a hostname (DNS or IP address). After entering a hostname, it is recommended to test the connection. If the ARG Server has been installed in a non-default configuration, it may be necessary to enter advanced connection information.



Standard Connection Settings Screen



Connection Settings with Advanced View

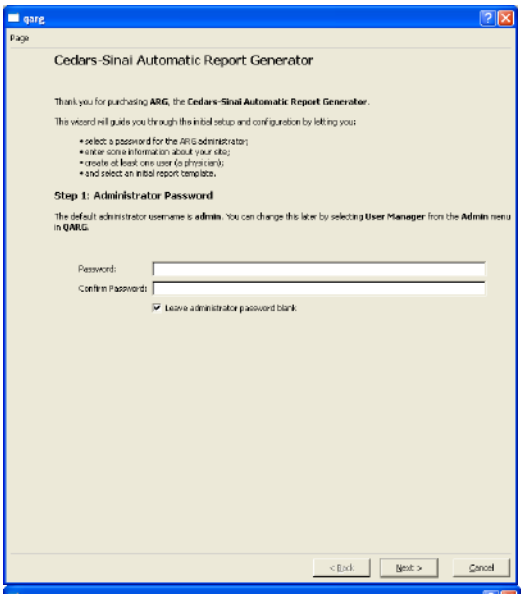
The connection settings can be modified by selecting *Connection Settings* from the *Admin* menu.

ARG Wizard

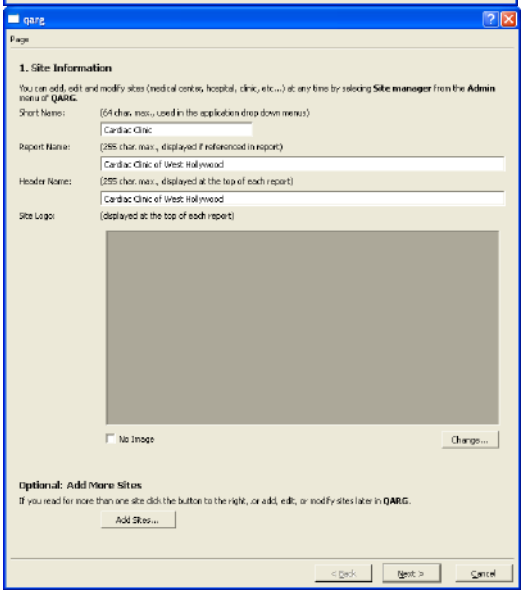
The **ARG Wizard** is a feature used to install **ARG**, Cedars-Sinai Automatic Report Generator. The installation, in addition to installing all components needed for **ARG**, allows the user to customize certain features during the initial setup. The **ARG Wizard** is only available during a first-time installation.

Implementation

Launching the **ARG Wizard** is accomplished in the following manner:

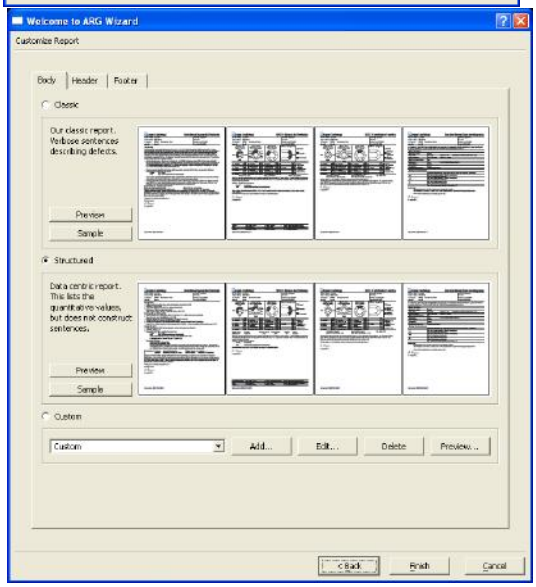


1. User launches **QARG** to display the **Welcome** window. Some information is displayed in this window as well as an option to set an administrative password. The password can also be set later by selecting **User Manager** from the **Admin** menu in the **QARG** application.



2. Clicking **Next**, brings up the **Configure Sites** window. This window allows entering of site information. The user can modify the site by changing the **Short** (name as it should appear in the user interface), **Report** (name as it should appear in the body of the report when the site is referenced), **Header** (name as it should appear in the header of the report) text in the appropriate entries. The user can also add a site logo by clicking the **Change…** button and supply the correct graphic file to be used for the logo. Optionally, the user can add additional sites at this time by clicking the **Add Sites…** button to bring up the **Site Manager** dialog window. Site configuration is also available later by selecting **Site Manager** from the **Admin** menu of the **QARG** application.

3. Clicking **Next**, brings up the **Customize Users** window. This window allows the entering of users including reading physicians, administrators, technologists, etc. The user can modify the user by changing the **Login** and **Full name** text in the appropriate entries. The user can also add a scanned physician's signature by clicking the **Change…** button and supply the correct graphic file to be used for the signature.
Optionally, the user can add additional users at this time by clicking the **Add Users…** button to bring up the **User Manager** dialog window. User configuration is also available later by selecting **User Manager** from the **Admin** menu of the **QARG** application.



4. Clicking **Next**, brings up the **Customize Report** window. This window consists of three "tab" page selections, **Body, Header and Footer**. The **Body** tab selection allows the selection of a default report template body including classic, structured and custom by clicking the appropriate selection. The **Header** tab selection allows the selection/configuration of report headers and footers. Editing of report body, header or footer template is accomplished in the custom section by (optionally adding a new custom template) and clicking Edit**…** in the appropriate section. After clicking Edit… the user will be prompted to select the page they wish to modify. The user can modify report templates later by selecting **Report Editor** from the **Admin** menu of the **QARG** application.

5. Clicking **Finish**, exits the **ARG Wizard** and launches **QARG** by displaying the **Login** dialog window. It the default administrator password was not changed during the **ARG Wizard** setup, typing in admin for **Username** (leaving **Password** blank) will bring up the **ARG** main window.

Working with studies in QARG

QARG overview

QARG is the primary standalone program for working with the ARG database. It allows user management, configuration, data entry and report viewing.

QARG security

The fundamental security provided in QARG is via user authentication. A user is required to login with his or her given username and password to have access to the program. Users may be given different degrees of privilege regarding the ability to enter/modify/view data. Refer to the User Manager section of the manual for more details.

Logging in

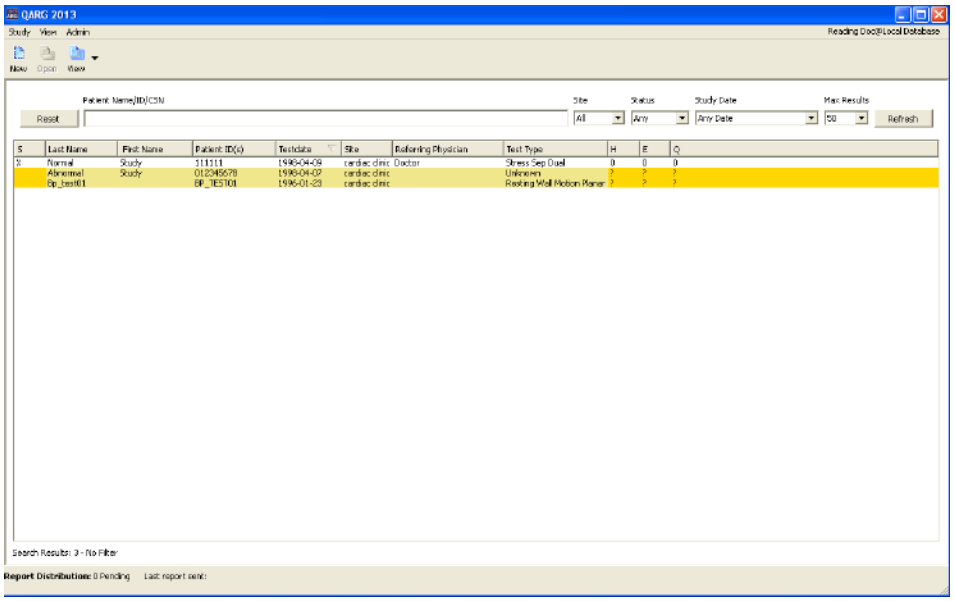
The following dialog is presented when the user runs the program. Here they must enter their username and password.

QARG study selector window

Once logged in, the study selector window can be used to:

- Open/view existing studies
- Access the Admin menu
- Create new studies

Existing studies may be searched or filtered based on numerous search criteria such as name, ID, Site, etc. The study selector window can be used to open multiple studies at the same time.



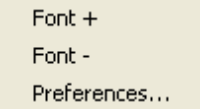
The Study selector window consists of the following three drop-down menus – Study, View and Admin.

Study Menu

Options in the Study menu are:

Function	On Toolbar?	Description
New	Yes	Opens the **Create New Study** dialog.
Logoff	No	Closes the session of QARG and displays the logon window so someone else can log on.
Exit	No	Completely closes the QARG application.

View Menu

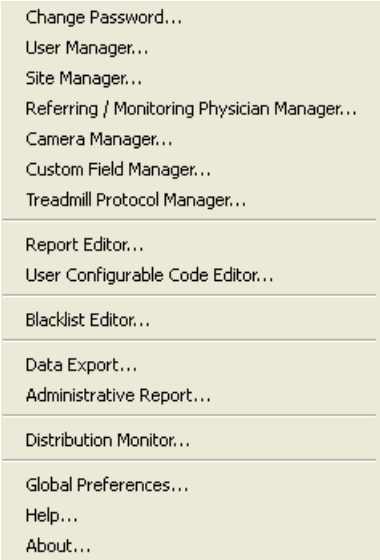


Options in the View menu are:

Note: There are no view menu functions on the **Toolbar**.

Function	Description
Font +	Increases the Font for all areas of the QARG main window.
Font -	Decreases the Font for all areas of the QARG main window.
Preferences	Opens the **Preferences** dialog window to allow user selection of fonts and colors for various areas of the application display.

Admin Menu



The Admin menu options depend on the logged in user's privilege Level.

Note: There are no **Admin** functions on the **Toolbar**.

Function	Description
Administrator Level (including signing Physicians) Only:	
User Manager	Opens the **User Manager** window.
Site Manager	Opens the **Site Manager** window.
Camera Manager	Opens the **Camera Manager** window.
Custom Field Manager	Opens the **Custom Field Manager** window.
Treadmill Protocol Manager	Opens the **Treadmill Protocol Manager** window.
Report Editor	Opens the **Report Editor** window.
User Configurable Code Editor	Opens the **User Configurable Code Editor** window.
Global Preferences	Opens the **Global Preferences** window.

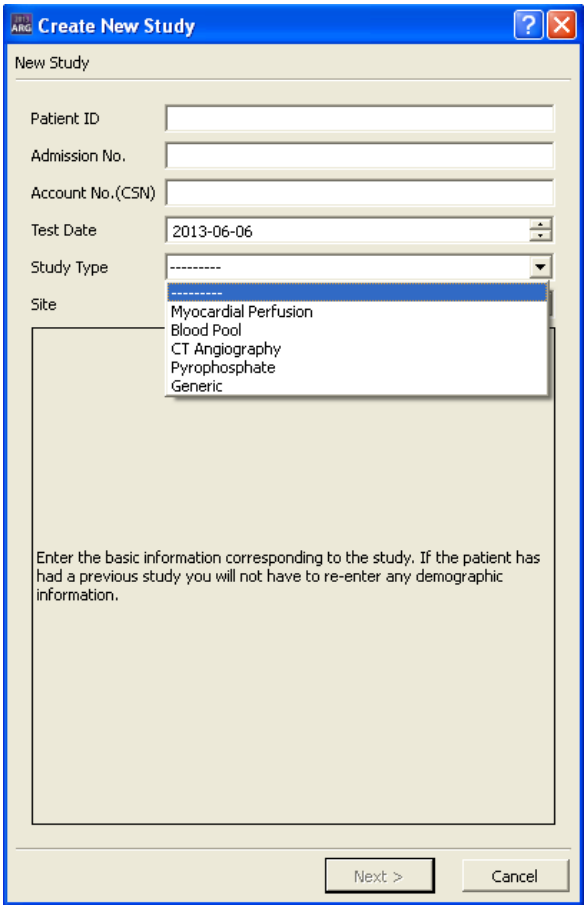
Function	Description
All Users Levels:	
Change Password	Opens a dialog allowing the current user to change their password.
Referring/Monitoring Physician Manager	Opens the **Referring/Monitoring physician manager** window.
Blacklist Editor	Views and edits all blacklisted consistency checks
Data Export	Wizard to export bulk data for research purposes
Connection Settings	Opens dialog to assist in connecting to an ARG Server
Distribution Monitor	Opens the **Report Editor** window.

Help	Opens a help file.
About	Displays version and author information.

Opening an existing study

Double-clicking on an existing study will load the specified study into the QARG study window. This is the quickest way to open an existing study. Optionally, the user may click the **Open** button on the toolbar, or from the **Study** drop-down.

Creating a new study

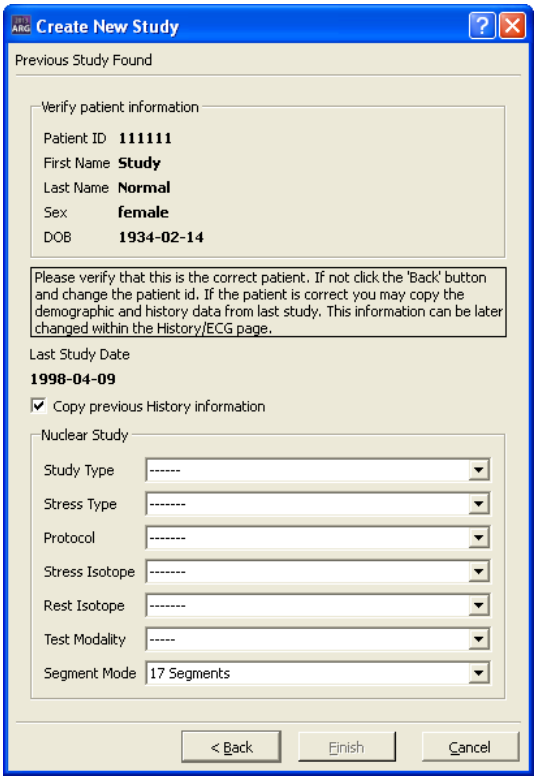


A new study can be created by selecting **New** from the toolbar or **study** drop down menu. The patient ID, Test Date, Study Type and Site fields must be completed before proceeding.

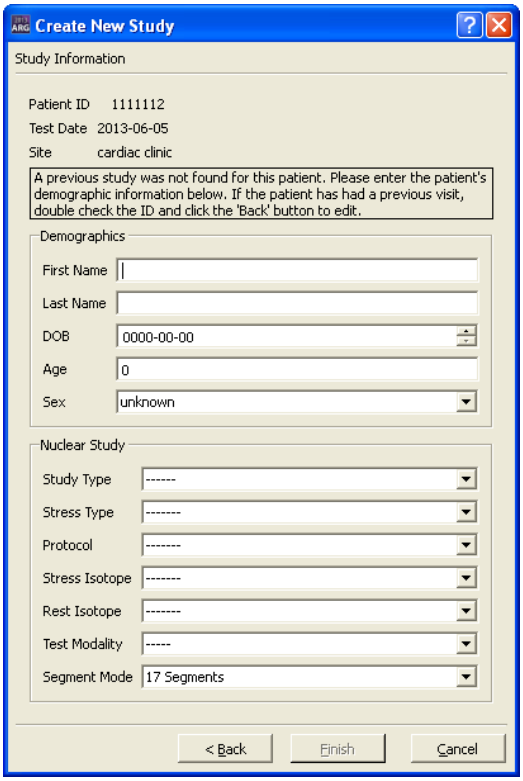
- **Patient ID**: this is the patient's ID or MRN. This field should always be patient specific and unique.
- **Admission No**: The Admission field references the admission number that your institution uses for tracking. If you do not know what to enter here, contact your administrator.
- **Account No (CSN)**: The contact service number (CSN) is usually a numerically sequential number that is unique for every encounter, appointment, visit, or admission for every patient.

- **Test Date**: Date of the procedure.
- **Study Type**: Options include Myocardial Perfusion, Blood Pool, CT Angiography, Pyrophosphate and Generic.
- **Site**: Select the site from the options.

If the specified Patient ID was found in the ARG database, the demographics will be filled in appropriately. If it is not found, the user will be presented with a data entry screen, which allows entering new demographic information. Once it is completely filled in, the user should press the **Finish** button. Data entered incorrectly while creating the study can be fixed later using the **Edit Study Information** selection from **Study** menu.



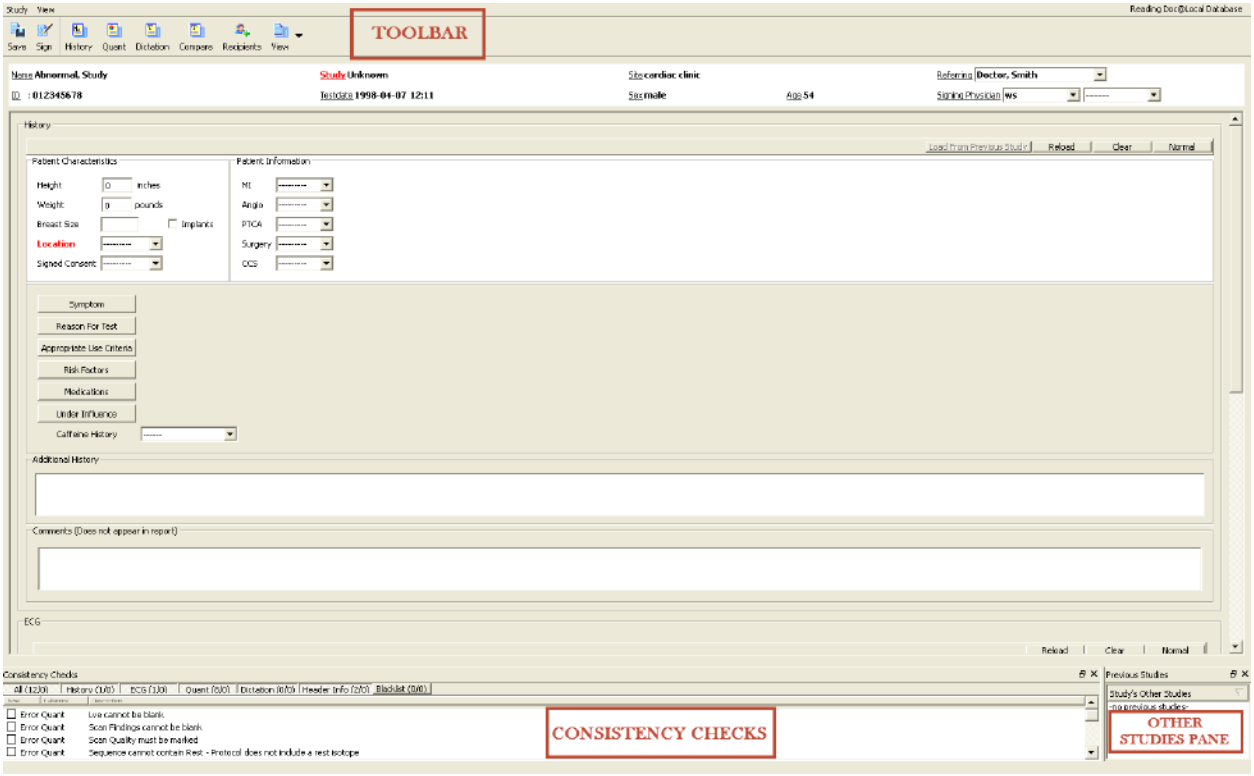
Returning Patient



New Patient

QARG Study Window

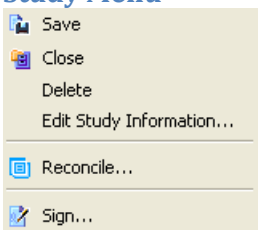
The study window of QARG is broken up into sections for interacting with patient data.



The **Main menu** consists of two items on the left-hand side, each with a drop-down menu containing numerous choices. The right-hand side shows the currently logged in user.

The figures below show the drop-down choices for the **Study** and **View** menu items.

Study Menu

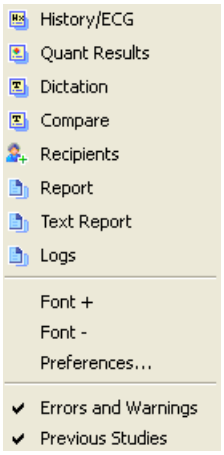


Options in the Study menu are:

Function	Description
Save	Saves modifications to the study.
Close	Closes current study.

Delete	Deletes the current study.
Edit Study information…	Opens the study editor dialog.
Reconcile	Opens the study reconciliation dialog.
Sign…	Brings up the report viewer dialog and finalizes the study after the UN/PW is entered.
Close	Closes current study.

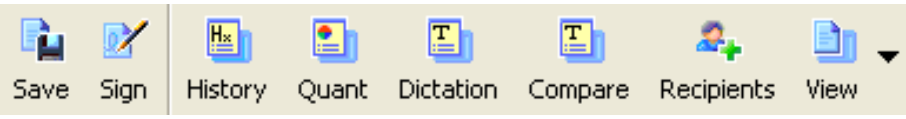
View Menu



Options in the View menu are:

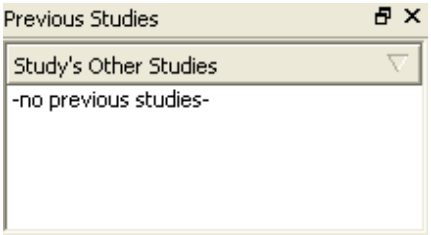
Function	Description
History/ECG	Displays the History/ECG window.
Quant Results	Displays the Quant page.
Dictation	Displays the Dictation page.
Compare	Displays the Compare page.
Recipients	Displays the Recipients page that can be used to email studies directly using QARG.
Report	Displays the report in PDF format.
Text Report	Displays the report in standard text format.
Logs	Displays the study logs window, which displays a list containing the User, Action and Time log for the current study.
Font +	Increases the window font size.
Font -	Decreases the window font size.
Preferences…	Opens the preferences dialog for creating/editing themes.
Errors and Warning:	Toggles ON/OFF the Consistency Checks section.
Previous Studies	Toggles ON/OFF the Previous Study section.
History/ECG	Displays the History/ECG window.

The **Toolbar** contains 'quick' action buttons that perform functions that are also available on the **Main menu,** but are made more readily available to the users here. For example, the **Save** button on the **Toolbar** is the same as the **Save** choice from the **Study** drop-down on the **Main menu**.



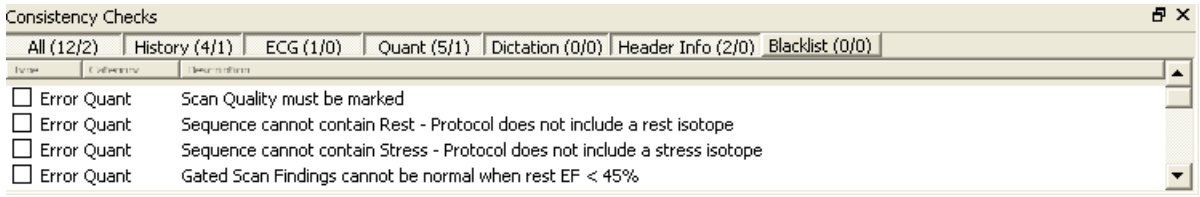
Previous Studies Pane

The **Previous Studies** pane will list other (previous) studies performed on the currently open patient, if they are present in the ARG database.



Consistency Checks

As data is entered into the program, a dynamic list of error messages and warnings grouped by category is presented in the **Consistency Checks** pane located at the bottom of the main QARG screen. The list can be (visibly) narrowed by clicking on the section titles (which also display a summary of errors/warnings).



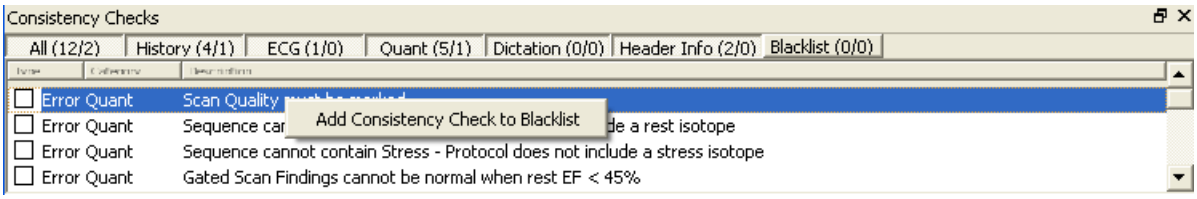
Accepting Errors

Critical errors prevent the report from being saved. These fields show up red in the ARG panel and are listed next to a check box in the errors and warning dialog. If errors exist in the report it is possible to continue, however the error(s) must be explicitly acknowledged by clicking the checkbox next to the error. Clicking the checkbox will accept the error for the current study only. To permanently disable (hide) the error, right click the error and select 'Add consistency check to blacklist'.

Blacklisting Errors

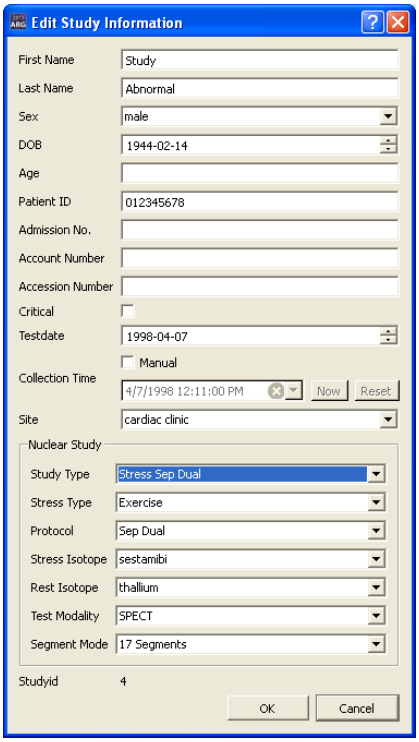
Users may disable errors and warnings that are irrelevant to their site by right clicking the consistency check. This moves the consistency check to a "hidden" group. The consistency check can be re-enabled by right clicking on the error inside the black listed group or by going to the **Blacklist editor** dialog from the admin menu (available from the study selector window).

Note that blacklisting a consistency check will affect all users of the system.



Miscellaneous Study Tasks

Editing Study Information



This is a simple dialog which allows users to change basic study fields which were entered incorrectly when the study was first created. It is accessed from the **Edit Study Information** selection from **Study** menu item list or by double clicking on any of the patient header fields within the study window.

Deleting Studies

Studies may deleted by selecting **Delete** from the **Study** menu item. Only studies that have never been signed may be deleted. Deleting studies is generally discouraged, and should only be done after careful consideration.

Viewing Study Logs

Study logs provide an ownership and change history for each patient study in QARG. To view the study log, click **View** -> **Logs** in the main toolbar. Each time report data is permanently modified or the study's status changes, the program logs the user responsible for the change as well as the time and action performed. Each time the report is signed, an archive of the report (in both PDF and Text) is created. You can view the archived copy by clicking on **View** -> **Logs** and choosing either **PDF** or **TEXT**.

Merging Studies

Occasionally, when the patient's ID is entered incorrectly at the study acquisition stage, quantitative applications are unable to automatically associate the image with the patient's demographic or ECG data. When this occurs, the patient appears to have two studies. You can avoid this situation by using the **Reconcile** option.

Important: When this feature is used to import data from one study to another, the data in the current study is overwritten.

To **Reconcile** studies:

1. Click **Study** -> **Reconcile**.
   The **Reconcile study** window appears.

2. Find the study to copy data from.
   You can click **Auto** to search for and display a list of near-identical matches to the Current Study. **Auto** returns results for studies where information in only one of the following five fields is slightly different from the Current Study:
   - **First Name**
   - **Last Name**
   - **Patient ID**
   - **Testdate**
   - **Test Type**

If information differs in more than one field, or if the information is more significantly different, **Auto** does not return any results.

Below is an examples:

Current Study		Example Study 1	Example Study 2
First Name	Test	Test	Test
Last Name	Patient	Patient	Patient
Patient ID	12345	12346	11346
Testdate	2004-02-10	2004-02-10	2004-02-10
Test Type	Rst/Str Mibi (same)	Rst/Str Mibi (same)	Rst/Str Mibi (same)
Auto returns results?		Yes	No

Entering Data into QARG Study Window

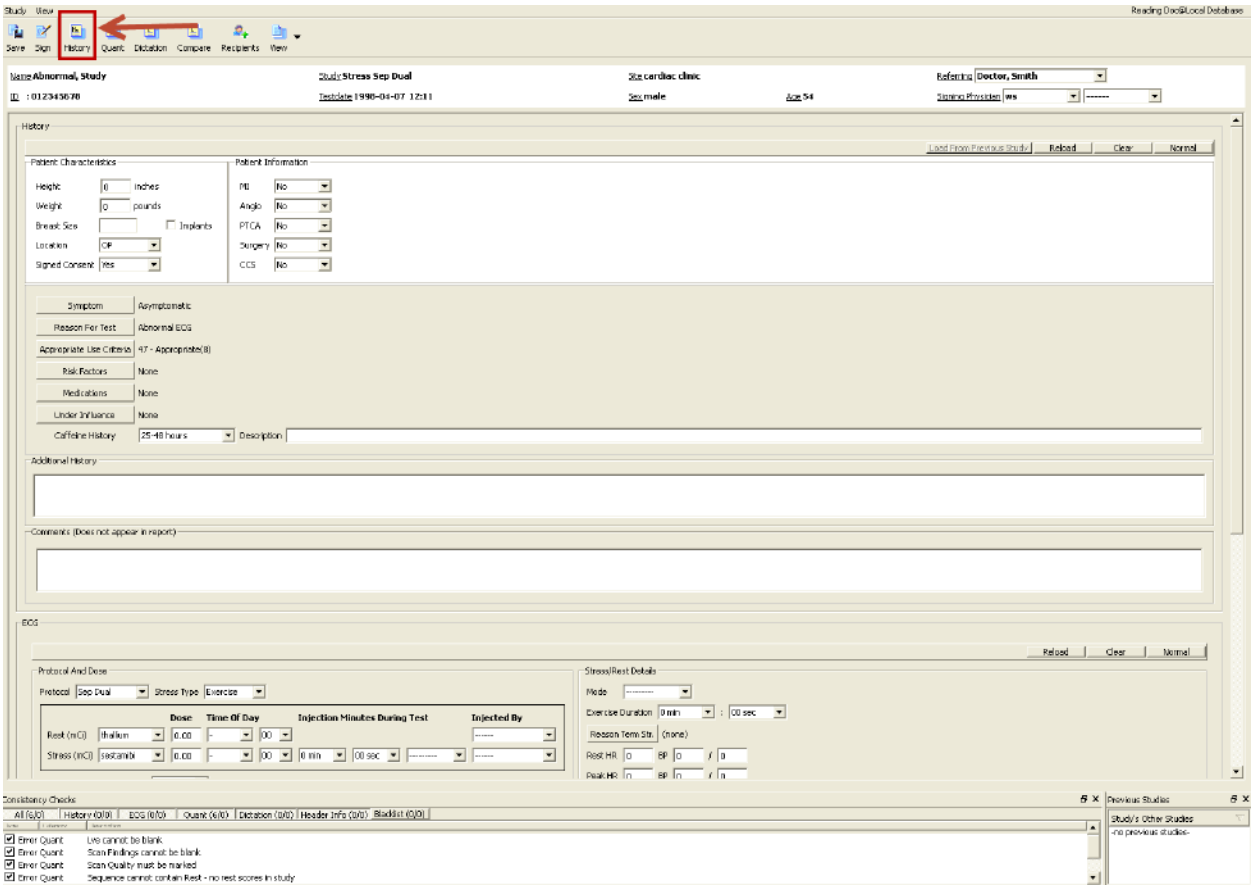
The QARG Study Window separates the data into several categories that appear in separate pages. You can select the individual pages by clicking the buttons in the toolbar.

Note: Fields that are marked with red font are required fields and correlate to error message displayed within the consistency checks area. Fields marked with yellow correlate to warning messages displayed within the consistency checks area.

History Screen

Clicking the **History** toolbar button displays the **History Screen** where users enter data into fields specific to the history of the patient. The bottom part of the **History Screen** contains fields for ECG and test protocol.

The Normal button in the upper right corner will enter 'Normal' (non-event) values for fields on the history page that have not been entered (i.e. if a symptom was entered and the normal button is clicked, then all blank values will switch to normal, but symptom will remain). Pressing the normal button is often a quick way to start data entry for each page.



Page Macros

Reload	Reloads the page information from the database

Clear	Clears all fields
Normal	Sets all non modified fields to 'Normal' (no event) values
Load From Previous Study	If the patient has a previous study, this will load the previously saved information into the form. If the information is modified it will not affect the previous studies.

For conventional SPECT studies, the following fields are available on the **History screen**. Note that the ECG section of the **History screen** will depend on the patient's selected study type.

Patient Characteristics

Field	Meaning
Height	Height of the patient in inches.
Weight	Weight of the patient in pounds.
Breast Size	Brest measurement and cup size (e.g. 34a)
Implants	Checked if the patient has breast implants
Location	ACC/CNCR /ER/Inpatient/Outpatient
Room #	Room number for patient (Only displayed if the patient location is *inpatient*)
Signed Consent	Yes/Refused/Not Asked

Patient Information

Each of the fields below asks if the patient has a history of the item. If multiple is selected, the most recent date should be used. Each date does not have to be complete, for instance if the patient only knows the year, than the year can be entered alone. Enter as much information as possible.

Field	Meaning
MI	Myocardial Infarction
Angio	Angiography
PTCA	Percutaneous Transluminal Coronary Angioplasty
Surgery	Cardiac Surgery
CCS	Coronary Calcium Scan

Other Information

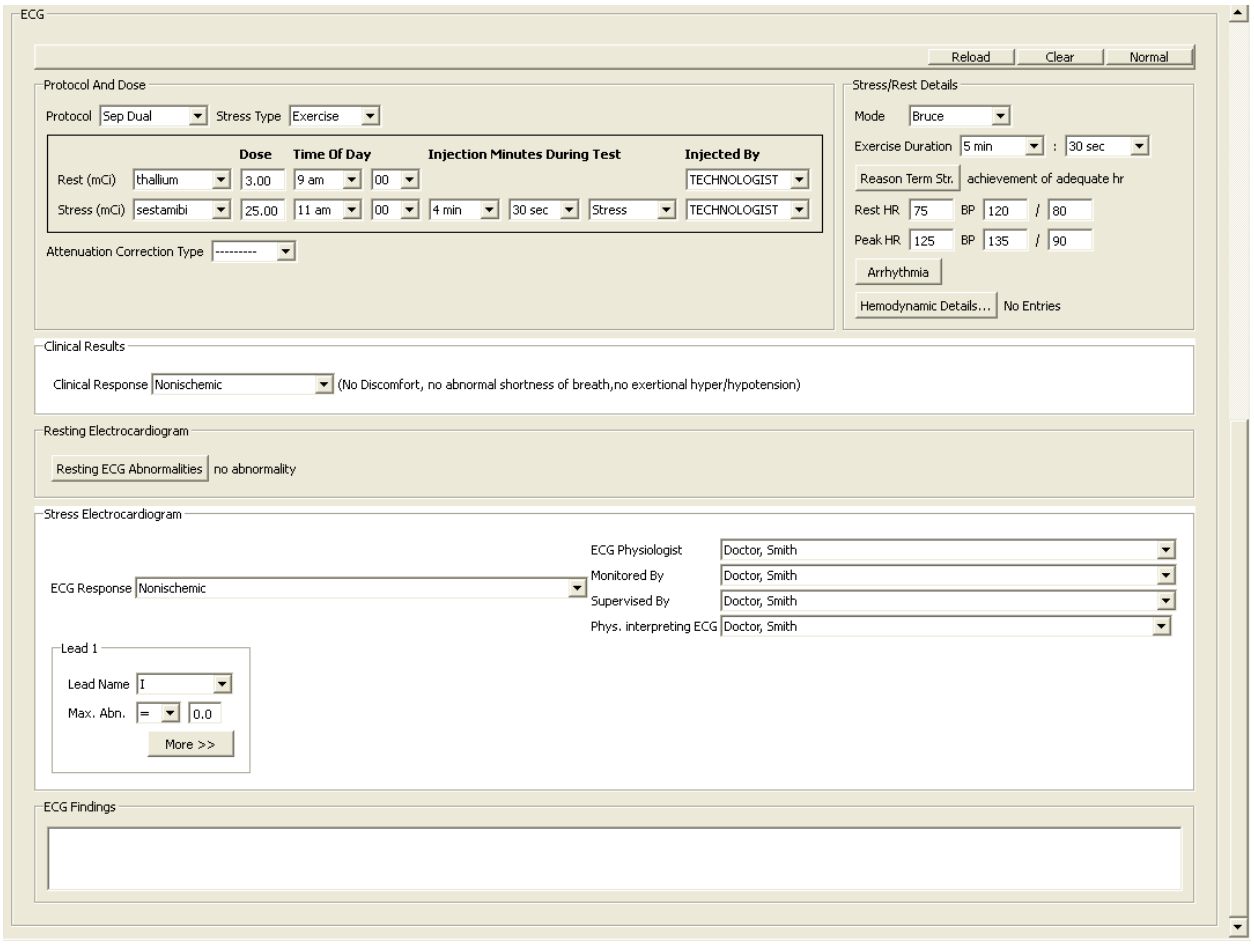
Each of the fields below may be modified within the code editor.

Field	Meaning
Symptom	Symptoms the patient is experiencing
Reason for Test	Reason why the test was performed
Appropriate Use Criteria	Users may choose the appropriate options for the patient and based on the published guidelines for AUC, the software will generate the appropriateness score automatically.
Risk Factors	Patient's risk factors
Medications	Medications the patient uses (and not currently under influence of)

Under Influence	Medications the patient was under at the time of the test.
Caffeine History	Information regarding patient's last Caffeine intake.
Additional History	A free text box for entering any additional history.
Comments (do not appear in report)	A general comments sections for this study. The comments are not included in the final report.

ECG Information

The bottom section of the **History Screen** contains ECG fields along with the protocol and dose information related fields.

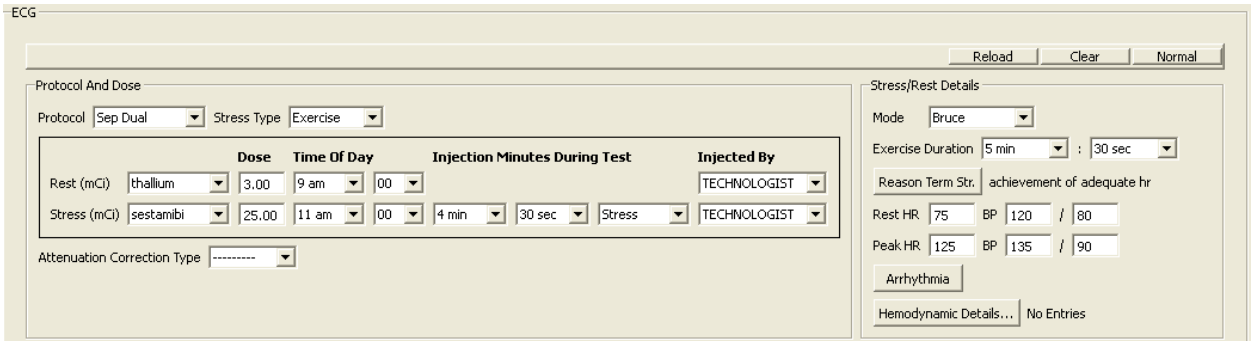


ECG Section Macros

Reload	Reloads the page information from the database
Clear	Clears all fields
Normal	Sets all non modified fields to 'Normal' (no event) values

Protocol and Dose information

Dose fields are determined by the type of study (test type). These fields are required and are measured in mCi.



Field	Meaning
Protocol	Study protocol that is filtered based on the selected Study Type during the initial creation of the study (e.g., sep dual, stress only, two day, etc… are options for the Stress Sep Dual study type).
Stress Type	Stress test type (e.g., exercise, aden, dobu, etc…)
Rest (mCi) dose	Rest isotope and dose amount
Stress (mCi) dose	Stress isotope and dose amount
Time of Day	The clock time (e.g. 1:30pm) when the rest and stress isotopes were injected
Injection minutes during test	How far along into the test the stress isotope was injected. Should always be less than the exercise duration. Typically performed 1 minute before stopping the treadmill.
Injected By	User that injected the dose
Attenuation Correction Type	If the camera uses Attenuation correction techniques, this field can be used to enter the details.

Stress/Rest Details

Field	Meaning
Mode	Stress test mode that is filtered based on the selected Study Type during the initial creating of the study (e.g., Bruce, modified Bruce, Naughton, etc… are the options when the stress type is Exercise).
Exercise Duration	The total length of time the stress test was performed.
Stress (mCi) dose	Stress isotope and dose amount
Reason Term Ex.	Reason why the test completed. This field is modifiable via the User Configurable code editor

Rest HR and BP	Resting heart rate and blood pressure
Peak HR and BP	Peak (stress) heart rate and blood pressure
Arrhythmia	Free text entry for the description of arrhythmia. (click the button to enter text)
Hemodynamic Details	Hemodynamic details for each stage can be entered using this field.

ECG Clinical Results

Field	Meaning
Clinical Response	Overall clinical response. When Abnormal is selected, the following options become available.
Angina/ Angina Equivalent	Was there any patient discomfort?
Discomfort information	Description of the discomfort; location and time
Exertional Hypo	Exertional hypotension
Exertional Hyper	Exertional hypertension
Abnormal Shortness of Breath	

Resting ECG

Enter resting ECG abnormalities here. All resting ECG variables can be user modified in the User Configurable Code Editor.

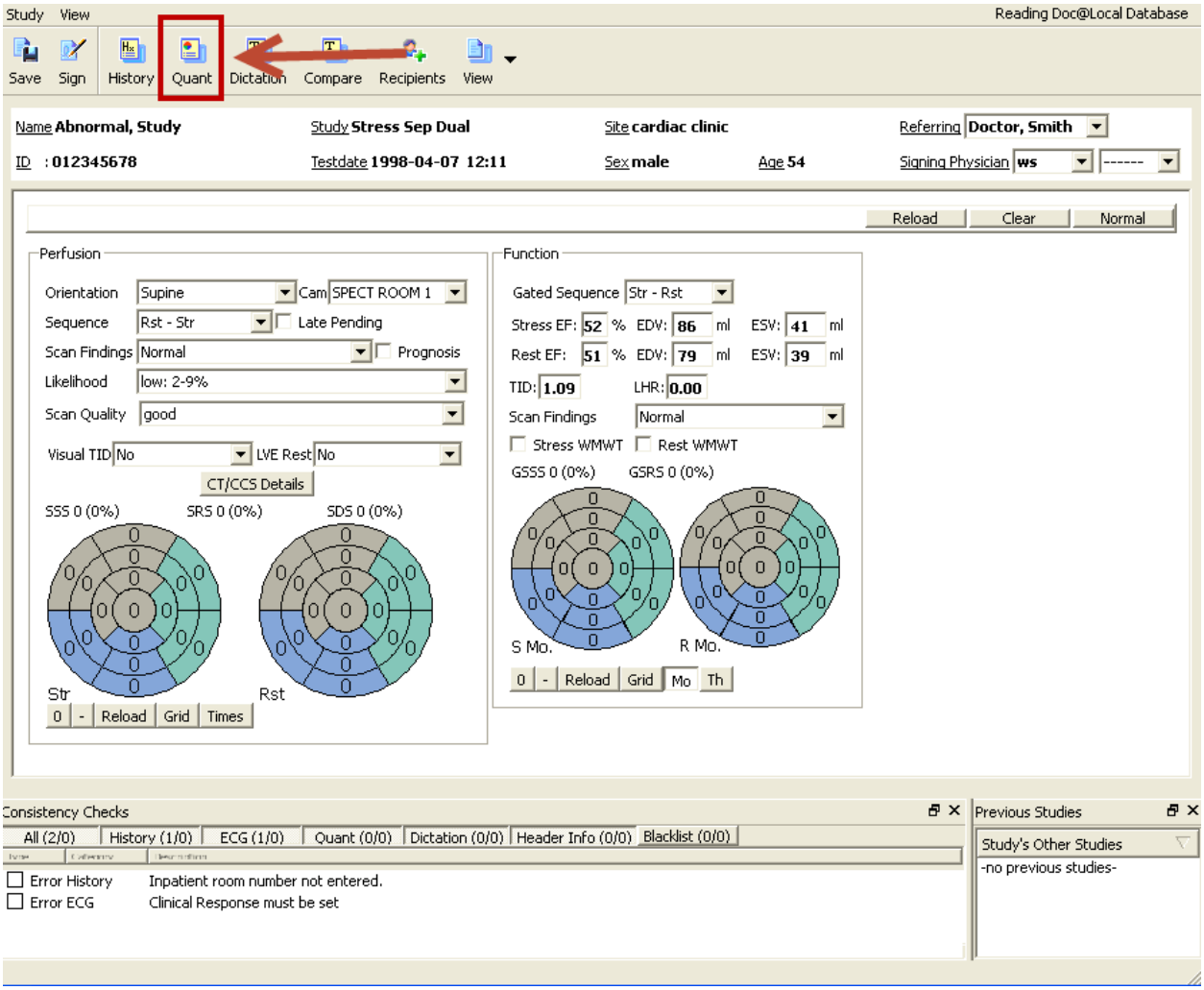
Field	Meaning
Resting ECG Abnormalities	Enter resting ECG abnormalities, if any.

Stress ECG

Field	Meaning
ECG Response	Overall ECG interpretation (summary response)
ECG Physiologist	User performing the ECG.
Monitored By	Physician that monitored the test. You may add physicians to this list through the referring / monitoring physician manager.
Supervised By	Physician that supervised the test. You may add physicians to this list through the referring / monitoring physician manager.
Phys. Interpreting ECG	Physician who interpreted the ECG. This may be any 'Signing Physician' as listed in the User Manager or the monitoring physician.
Leads (V5, AVF, 3rd Lead)	For each lead the following information may be entered
Max Abnormality	Maximum ST-Segment change in mm.
Slope	If negative ST-Segment elevation, the slope of the ST-Segment abnormality
Time, Ex/Rec	Time of maximum ST-Segment abnormality during either exercise or recovery
Elevation	Click if ST-Segment abnormality is positive (negative by default)
additional	Additional lead.

Quant Screen

Clicking the **Quant** toolbar button displays the **Quant screen** where fields pertaining to quantitative results are available for entry/modification. If the user is using a quantitative application (QGS+QPS, for example) which integrates with QARG, most of these fields may already be filled in. The screen is divided into sections (Perfusion and Function) which are described in the tables following the figure.



Perfusion Results

Field	Meaning
Orientation	Patient orientation during test
Cam	Camera used to scan the images (camera may be added using the Camera editor from the Admin menu)
Sequence	The sequence of tests performed. Combinations of Stress, Rest, Late, 4hour and FDG.
Late Pending	If the **Sequence** currently does not contain a 'late' test, but one will be performed later, this box is checked.
Scan Findings	The overall scan findings
Prognosis	To include a prognostic statement in the final report, this box should be checked.
Likelihood	Pretest likelihood
Scan Quality	The technical quality of the scan
Reversible	If the study contains reversible perfusion defects, this box should be checked.
Nonreversible	If the study contains nonreversible perfusion defects, this box should be checked.
Revers-redist	If the study contains reverse-redistribution perfusion defects, this box should be checked.
Visual TID	Does the patient have visually assessable transient ischemic dilation
LVE Rest	Does the patient exhibit left ventricular enlargement at rest
CT/CCS Details	If a Coronary Calcium Scan was performed, the specific details can be entered using this option.

Function Results

Field	Meaning
Gated Sequence	All acquisition context in which gated images were acquired
Quant values EF, EDV, ESV	Determined by the sequence, each acquisition context includes EF (Ejection Fraction), EDV (End Diastolic Volume) and ESV (End Systolic Volume). These are automatically computed by QGS, or can be manually entered or edited.
TID and LHR	Transient Ischemic Dilation and Lung/Heart Ratio can be manually entered
Scan Findings	Overall Function findings
Scan Defects	If scan findings is not normal, this describes the type of defect.
Stress and Rest WMWT	If study exhibits wall motion/wall thickening defects (at stress or rest), this box should be checked.

Polar maps

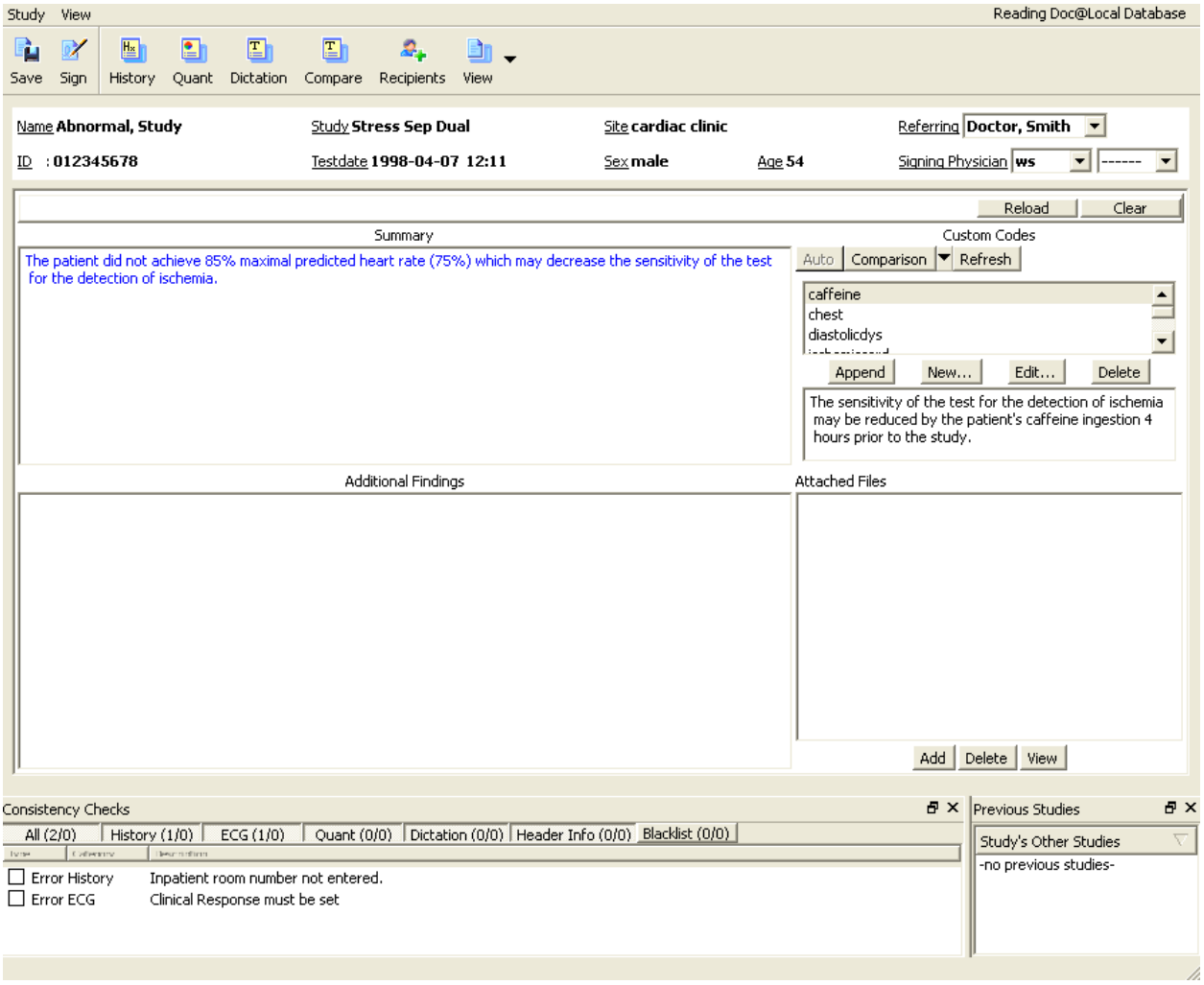
Polar maps displayed at the bottom of the **Quant screen** page allow viewing/modifying the visual scores for the study that was performed. The specific maps visible are determined by the **Sequence** selected. For example, if the **Sequence** is Rest-Stress-Late, there will be three polar maps labeled **Str**, **Rst** and **Lte**.

Action	Effect
Left Click	Increment segmental score by 1, loops through all possible values
Right Click	Brings up a menu allowing selection of a vessel
Wheel Click	Decrement segmental score by 1, loops through all possible values
Drag and Drop	Drag is performed by starting at the polar map label (e.g. Str) and dropping on any part of a different polar map
0 button	Sets all segments of all polar maps to normal ('0')
- button	Sets all segments of all polar maps to unset ('-')
Grid	Displays polar maps is grid form
Reload*	Reloads most recently saved scores
Old*	Copies scores from the patient's previous study into current study
Times	Popup to view and change image acquisition times, for each view in sequence
Mo and Th	Toggles display of **Mo**tion scores and **Th**ickening scores

* Only visible under special conditions

Dictation Screen

Clicking the **Dictation** toolbar button displays the **Dictation screen** where the clinician may, a) add 'canned' sentences from the Custom Codes area, b) type in free-form text in the Dictation area, and c) add/edit/delete custom codes. The dictation screen allows the physician to enter free text as well as automatically generated sentences, values and customizable boiler-plate text. Previous reports that were not created with ARG can be attached as attachments on this page as well. Only PDF files are accepted.



Auto Text

An automatic dictation is used by default. This dictation updates real-time as fields are modified. The automatic dictation is shown in blue. Note that text can be added before or after the automatic dictation without affecting the behavior of the auto dictation. You may alter or remove the automatic dictation at any time simply by editing it.

Note that once the automatic sentence(s) have been modified then the dictation will no longer be updated automatically. To re-enable the automatic dictation, click the Auto button.

Comparison

If the patient is returning for a follow-up visit, the Comparison button is enabled. If this is the case then the signing physician should mention any changes (or no change) since the patient's last visit. ARG will provide a warning if no mention is made. Clicking the comparison button will initialize the comparison sentence.

ARG matches the previous study based on patient ID. If the patient ID was mistyped in the original study, it must be changed before ARG can auto match. Of course you may also manually enter the old study date and ARG will be able to auto-match any future studies.

Customizing Comparison

Choosing 'Edit…' from the comparison drop-down will open a dialog allowing the ability to enable/disable factory comparison sentences. These sentences will compare defects from the most recent previous study to the current study. If advanced scripting is enabled then users may create their own comparison sentences.

Viewing RAW Differences

The 'View Differences from Previous' selection will bring up a dialog showing the raw (value) differences between the current study and the most recent previous study. Only the values that have changed will be shown.

Custom Codes

Custom codes are simple macros that provide a mechanism to store frequently typed sentences. Codes are made up of a code-key (small word describing the code) and code-value (text which is appended to the dictation). Codes are accessed by highlighting the code-key and clicking the Append/Add button, double clicking a code-key or typing @*code-key* in the dictation editor.

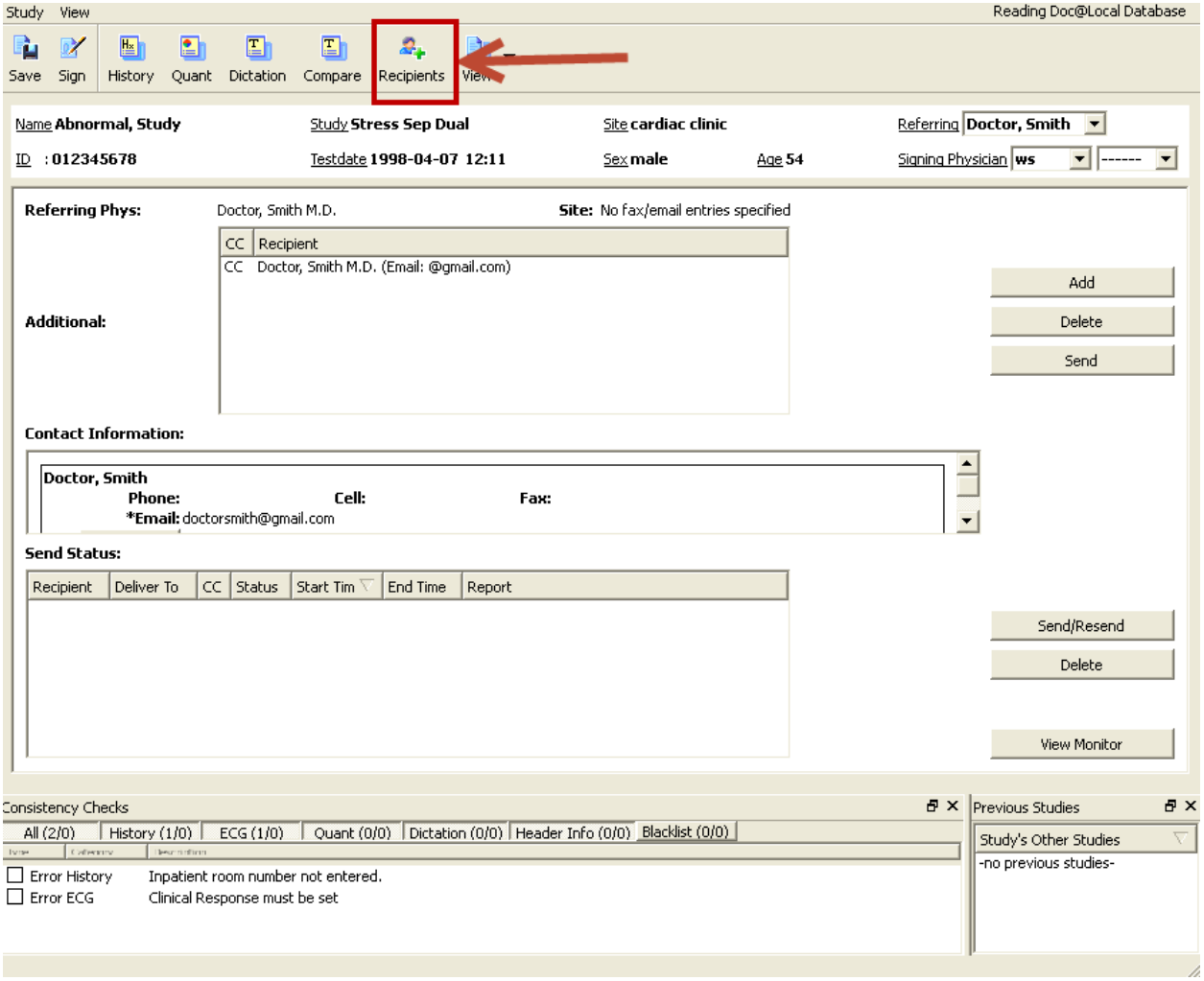
Text may be entered directly in the **Code Editor** and it will appear verbatim when inserted into a report. Some report values may be included in these sentences by surrounding the respective report code with '||' (the pipe character twice, on either side of the code). The syntax for including values is as follows:

> ||*variable-name*||
>
> The stress ejection fraction is ||Ejection_Fraction_Stress||.

If the variable name is typed incorrectly, an empty string will print out. A list of supported variable names are provided in Appendix A.

Recipients Screen

The recipients screen is an area which can be used to add a cc physician to the report; additionally the recipients page is used to e-mail (Send) the signed report.



Adding Entries

It is not necessary to add the referring physician to the report, they will be bcc'd automatically once the report is signed. Only valid referring physicians appear on the list of physicians to choose from. See the referring / monitoring physician manager section on how to add a new entry.

You may only CC a recipient before the report has been signed (after the report has been signed it has been archived with the CC information embedded, so only the bcc option is available).

E-mailing the Report

Reports must be signed prior to e-mailing. In order to successfully e-mail a report the current (logged-in) user of the system must have filled out the e-mail setting under user properties and the receiving

referring physician must have a valid e-mail address. To send, simply check the appropriate recipients and click Send.

Signing, UnSigning and Viewing Reports

The report can be generated at any time, and include as much data as possible. For example, if the perfusion section has not been collected, the report will not include any perfusion information.

The report can be generated in PDF or ASCII Text, by clicking the **View** button and selecting the report format (PDF or Text). When the report is unsigned a preview watermark is displayed. Signing the report removes the watermark and inserts the physician signature.

When all of the data has been collected and the consistency checks verified, studies are ready to be finalized. Only users of type 'Signing Physician' can sign reports. Furthermore, only physicians listed on the report can sign a report. Physicians must enter their passwords to sign, and once the report is signed it is locked from further modifications unless unsigned. The report is also archived (in the QARG database) during the signing process.

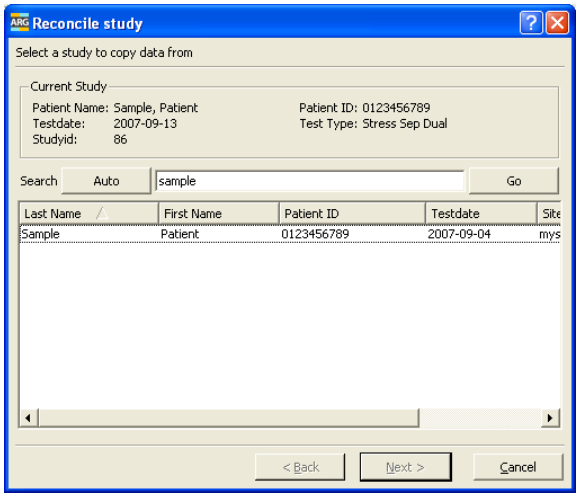
Signing and unsigning reports is accomplished by clicking the **Sign** (or **Unsign**) button on the toolbar or from the **Study** menu item drop-down list.

Unsigning reports should be a very rare occurrence. Reports should only be signed once the data is reviewed and the report is ready to be sent to the referring physician. Unsigning allows physicians to correct erroneous signed reports.

Reconcile / Merge Studies

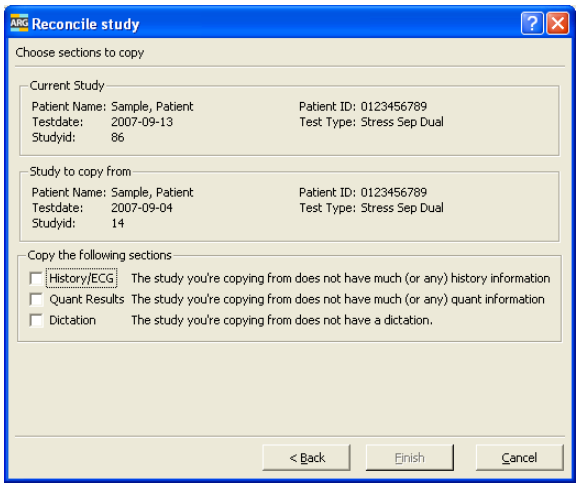
Occasionally when the patient's ID is entered incorrectly at the camera, quantitative applications with the ARG option will be unable to automatically associate the image with the patient's demographic / ECG data. When this occurs the patient will appear to have two studies. This can be reconciled with the **Reconcile** selection from the **Study** menu item drop-down list. In essence, the user wants to merge a study in the QARG database with the study currently loaded.

Select a study to merge with



The first step to merging a study is to select the study to merge with. QARG will automatically search for studies which are close to the loaded study. If the search yields no results you can execute a manual search by entering the Patient Id, First Name or Last Name of the patient in the **Search** field. Select a patient from the search result list and click the **Next** button.

Choose sections to copy



Merging, copies sections from the study selected in the previous step to the currently loaded study. Select the sections you wish to copy here and click the **Finish** button. The user has the option of deleting the previous study during this step after clicking the **Finish** button.

Generating the Report

You can generate a report at any time and include as much data as available. For example, if the perfusion section is not completed, any partial perfusion information will not be included in the report.

Generating Reports in PDF

You can generate the report in PDF format or as standard text. To view the report in PDF format, click **View** or click the arrow next to the **View** button and choose **PDF**.

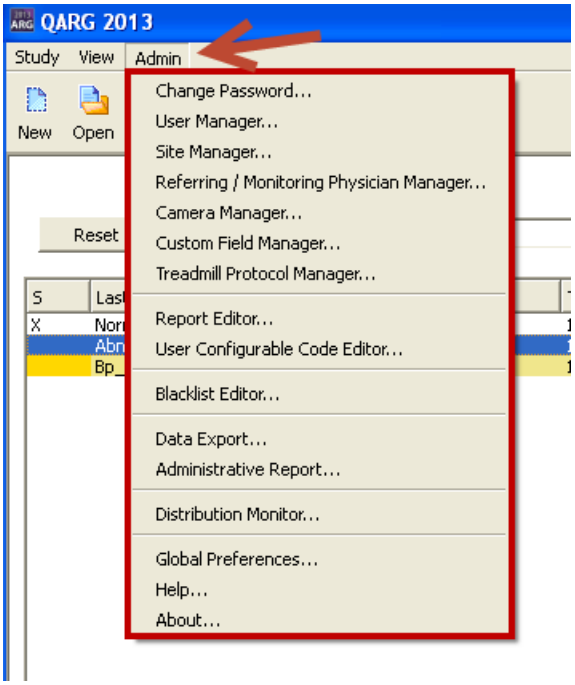
Generating Reports in Text (.txt) Format

If you choose **TEXT**, the report opens in a **Text Display** window.

Note: The polar maps, images or tables do not appear in the **Text Display** window. However, they do appear in the PDF file.

Managing QARG - Administrative menu

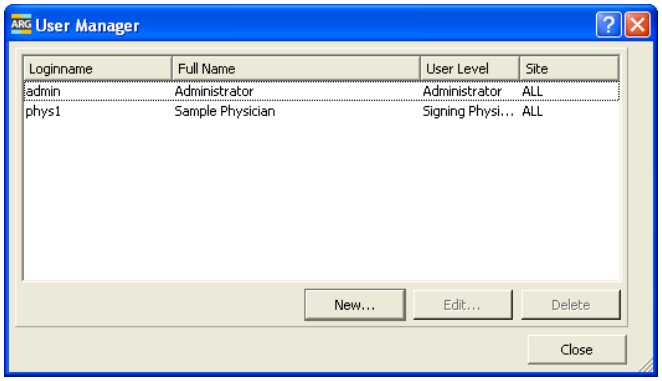
The **Admin** menu within the study selector contains various administrative related tools. Most of these items are configured and setup during initial installation or training. Some of the items available in the **Admin** menu are only available to users with administrative privileges.



Change Password

The **Change Password** option can be used to change the currently logged in user's password.

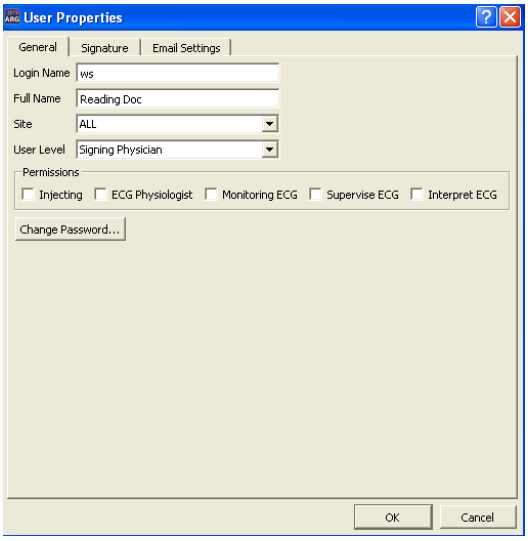
User Manager



User Manager allows editing of users; people who need to login to ARG/QARG

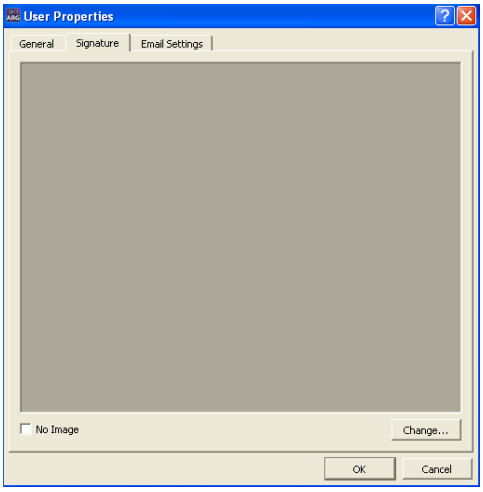
Function	Meaning
New…	Opens the **User Properties**
Edit…	Opens the **User Properties** dialog to edit the selected (highlighted) user entry.
Delete	Deletes the selected user entry

User Properties



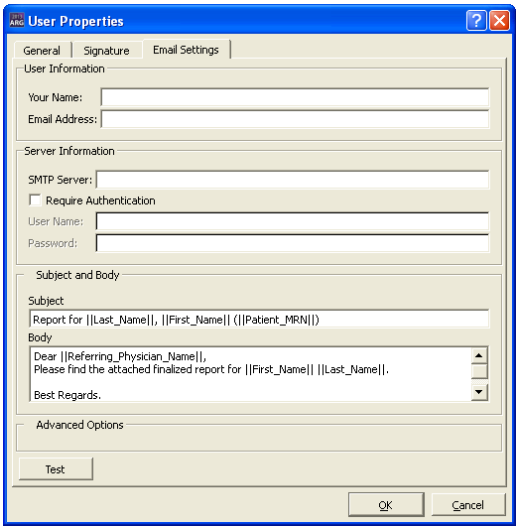
General Settings

Function	Meaning
Login Name	Should not contain any spaces
Full Name	This name is used on the final report for signing physicians
User Level	Type of user. Signing Physicians have all access; Administrators can do everything but sign.
Site	Users are assigned to a site, or ALL sites. Users assigned to site ‘ALL’ will be able to view/edit all the studies, while users assigned to a single site can only view/edit that site’s studies.
Permissions	Specify permissions for the user.



Signature

Allows adding an image to be printed at the bottom of each report page as a signature. Should be a scanned signature. Only applicable for signing physician user types



Email Settings

E-mail is sent from the **Recipients** page, and is mailed from the current logged in user.

Function	Meaning
Your Name	Friendly name to be displayed along with address.
Email Address	From e-mail address
SMTP Server	IP or name (DNS address) of SMTP server
Require Authentication	If the SMTP server requires authentication, check this and enter username and password.
Subject and Body	Customize the e-mail text; does not affect report. Variables are defined in Appendix A.
SMTP Port	Server's communication port for SMTP
Use SSL	Tunnel SMTP traffic through SSL (must be supported on server)
Test	Sends a test message to the specified address

Site Manager

ARG views a site as an independent organization that acquires images. For most installations the hospital or practice will only need to define a single site. However, if images are acquired off-site and sent to your location (for remote reading) then it may be necessary to setup an additional site. The site name and logo will be displayed at the top of each page of the report, so if this needs to change depending on the study, it will be necessary to add an additional site.

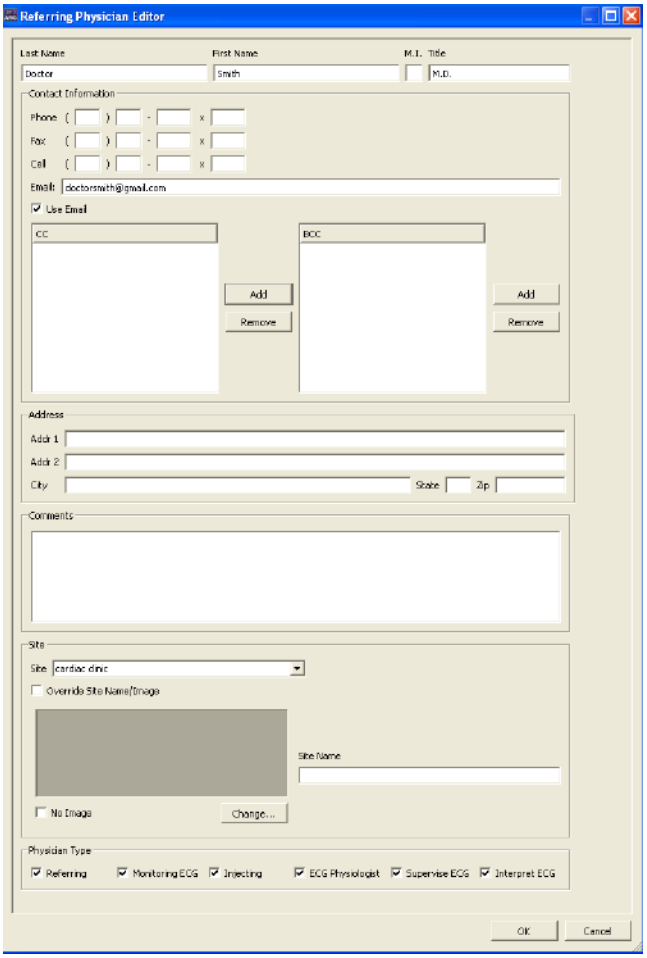
For example, if for one case Dr. Bob wants to send out a report from "Bob's Cardiology" and for another patient send out a report from "Big-Time Cardiology", then you will need to create additional sites.

Included in the site manager is the ability to add the ICANL logo to your reports. When enabled, the logo appears by default in the bottom left of the cover letter.

Important note: The site must be ICANL certified prior to checking this box! This feature is designed to make it easier for sites that have been certified to add the logo to their reports, and not intended as a replacement for certification.

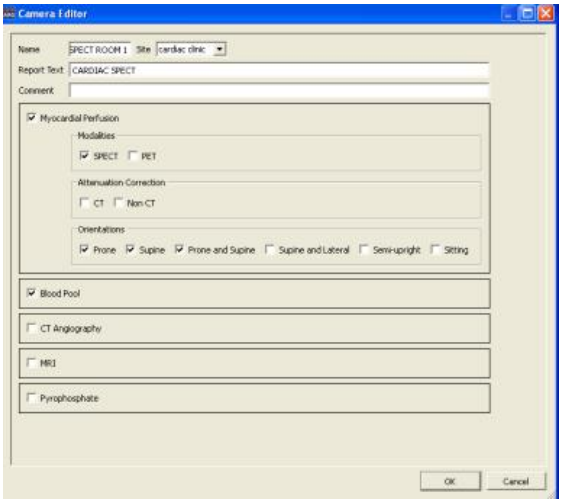
Referring/ Monitoring Manager

Referring and monitoring physicians may be added, modified and deleted from the R**eferring / Monitoring physician manager** window. Clicking **New…** or **Edit…** will open the **Referring/Monitoring Physician Editor** window.



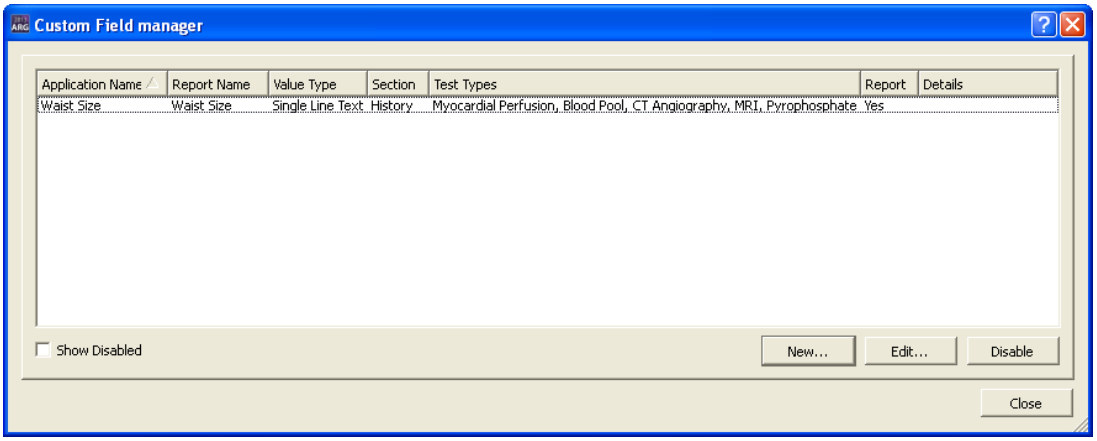
Camera Manager

By selecting **Camera Manager** from the **Admin** menu, QARG allows adding/editing/deleting the options for cameras used at the site.

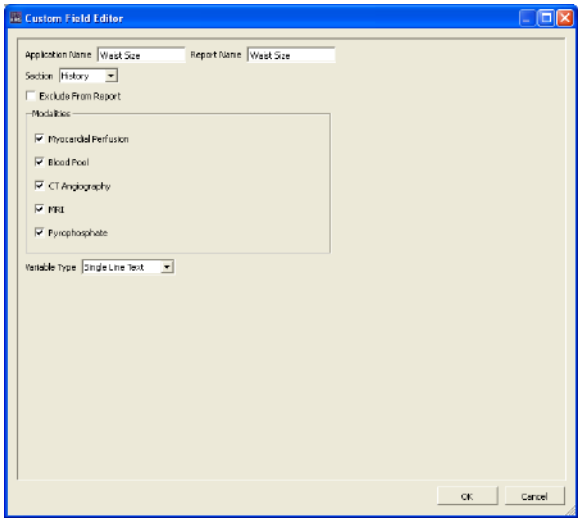


Custom Fields manager

Custom fields manager can be used create completely customized fields that can be added to QARG. The Custom Fields Manager can be accessed from the Admin menu within the Study Selector window.



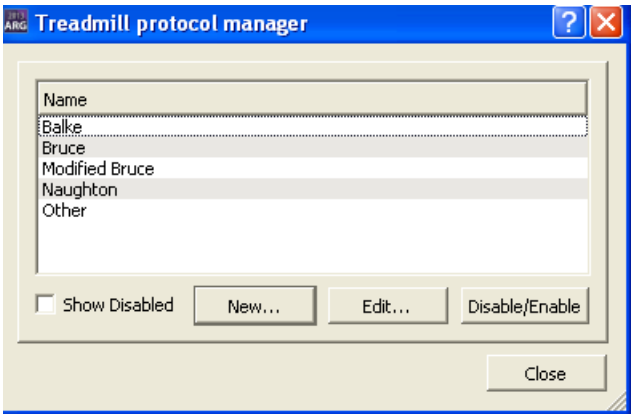
Click **New…** to create a new custom field.

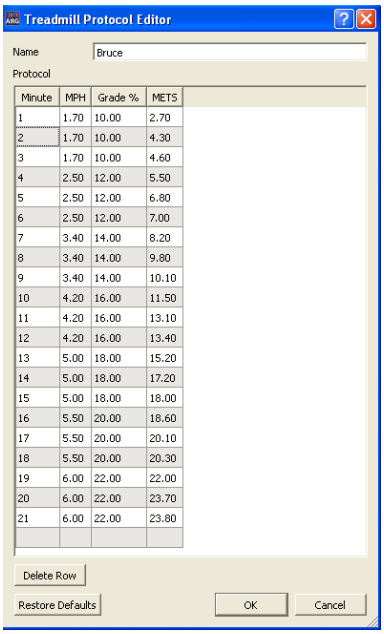


Function	Description
Application Name	This is the name that will show up within QARG for the custom field
Report Name	This is the name that will show up within the report
Section	Select the section in which this custom field should be added
Exclude from Report	Select this option if the new custom variable should not show up on the report.
Modalities	Select the modalities this custom field belongs to. Multiple modalities can be selected, if applicable.
Variable Type	Select the type, options are: single line text, multi-line text, List (pick one), List (Pick Multiple).

Treadmill Protocol Manager

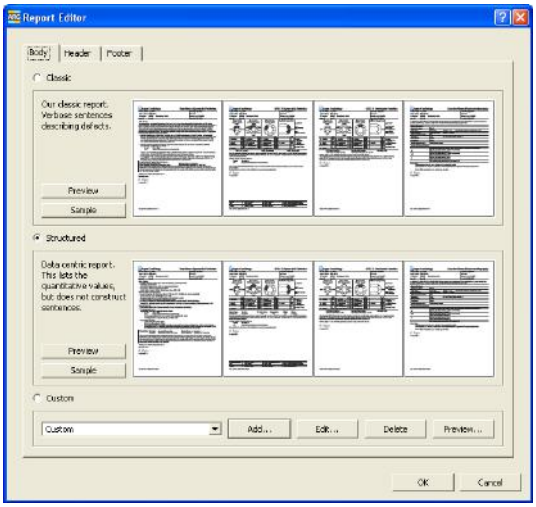
Use the **Treadmill Protocol Manager** to edit/create or disable treadmill protocols for the stress test.

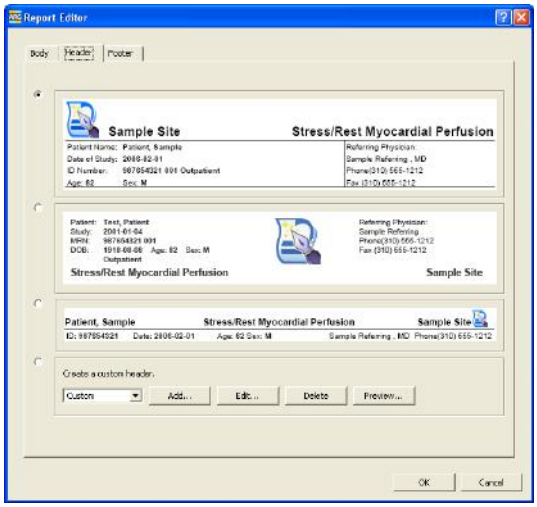




Report Editor

The templates used in the ARG may be edited using the **QARG** program. From the **Admin** menu, selecting **Report Editor…** will bring up the Report editor dialog window which will allow an Administrator to modify and select the template pages used to generate reports.





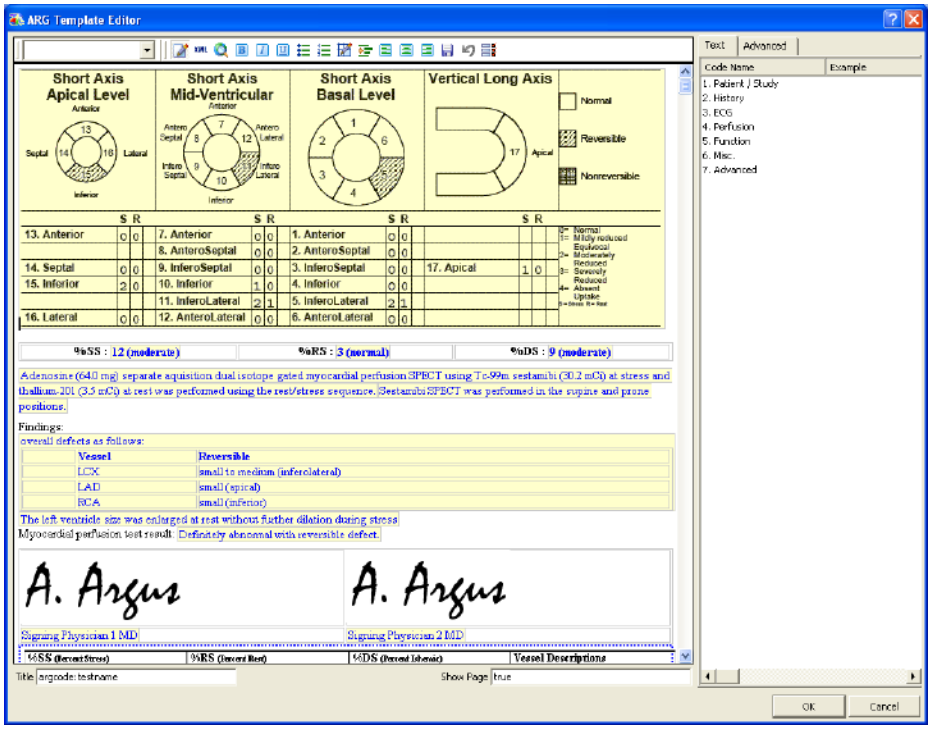
From this dialog, you may select to modify either the body of the report or the header/footer by selecting the associated tab at the top of the dialog. There are factory preset template options that may be selected or you may select Custom to create one of your own. Within the "custom" choice is an "edit" button which allows selecting and ordering pages in the case of the report body, as well as customizing the contents.

ARG Templates

A template in **ARG** is a fairly simple XML based file containing *argcodes* which will be replaced based on the currently selected study. The XML tags used in these templates are described in the advanced report customization guide, but for most basic editing, the visual editor will be sufficient – it will allow simple drag and drop of codes (viewable as examples) directly into the template.

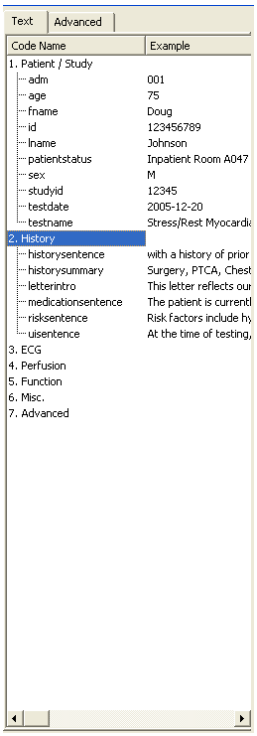
Visual Editor

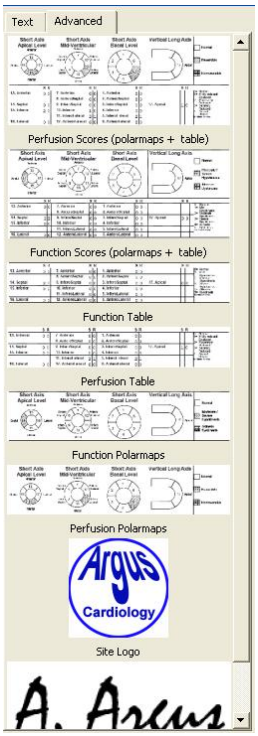
This visual editor allows editing the template while viewing it in several different ways. The default is in a visual mode which displays each *argcode* as an example of a value it might return.



Pressing the *mode toggle* button will switch to a display which lists the names of the codes, rather than their examples.

Codes may be selected from the panel on the right-hand side of the display. *Text* codes are the values and sentences which maybe be included. Double-clicking on one of the headings such as “History” will expand it to show the codes that are available under that classification.





Advanced codes include more complex features like site logo images, signatures and polar maps. With either type, you may drag the code of your choice and drop it in the desired place in the document.

For more information customizing the report please refer to the Advanced report customization for ARG/QARG document.

Appendix A – Supported code values

It's possible to use any argcode (visible on the right hand panel of the report editor) as a code. The list below contains a subset of the most commonly used codes.

Patient fields

Field Name	Meaning
Age	patient age (if available)
First_Name	patient first name
Sex	patient sex
Patient_MRN	patient ID
Last_Name	patient last name

Acquisition Fields

Field Name	Meaning
Blood_Pressure_Resting	blood pressure at rest
Blood_Pressure_Peak	blood pressure during stress
ECG_Response	description of ecg acquisition
Heart_Rate_Rest	resting heart rate
Heart_Rate_Peak	peak heart rate
Previous_Study_Date	date of last study (if available)
Likelihood	pretest likelihood

Percent_Of_Maximum_Predicted_Heart_Rate	percent of max peak heart rate achieved
Study_ID	study ID
Test_Date	test date
Test_Name	name of the test performed

Quantitative numbers

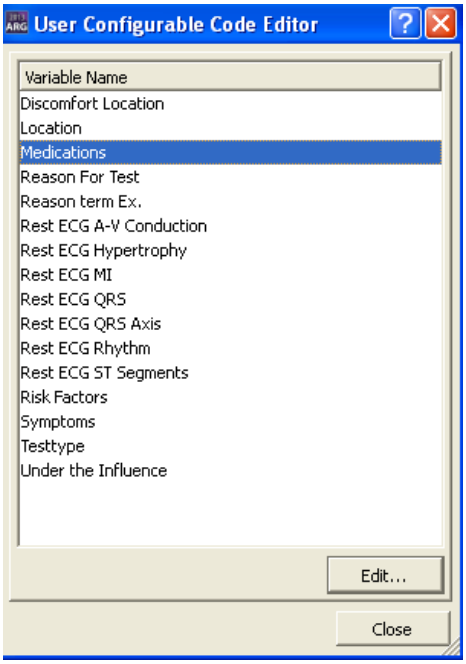
Field Name	Meaning
End_Diastolic_Volume_Index_Rest_Raw	rest end diastolic volume (if available)
Ejection_Fraction_Rest_Raw	rest ejection fraction (if available)
End_Diastolic_Volume_Index_Stress_Raw	stress end diastolic volume (if available)
Ejection_Fraction_Stress_Raw	stress ejection fraction (if available)
Transient_Ischemic_Dilation_Raw	transient ischemic dilation (if available)

Findings

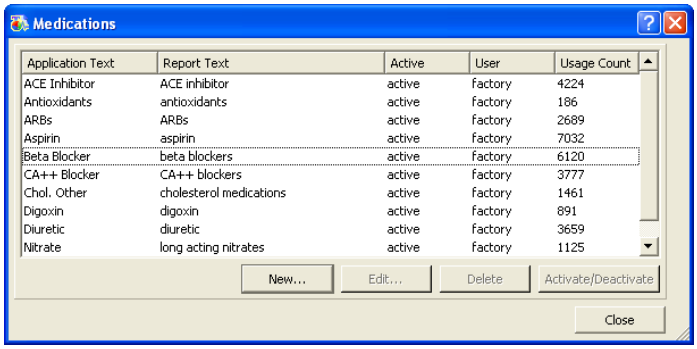
Field Name	Meaning
Gated_Scan_Findings_Summary	function scan result
Perfusion_Scan_Findings_Summary	perfusion scan result
Summed_Difference_Score_Number_Raw	perfusion summed difference score
Summed_Difference_Score_Percent_Raw	perfusion summed difference score as a percent of maximum
Summed_Rest_Score_Number_Raw	perfusion summed rest score
Summed_Rest_Score_Percent_Raw	perfusion summed rest score as a percent of maximum
Summed_Stress_Score_Number_Raw	perfusion summed stress score
Summed_Stress_Score_Percent_Raw	perfusion summed stress score as a percent of maximum

User configurable code editor

By selecting **User Configurable Code Editor…** from the **Admin** menu, QARG allows modifying the values that are available for selection for many of the codes used throughout ARG.



General User Configurable Code Editor

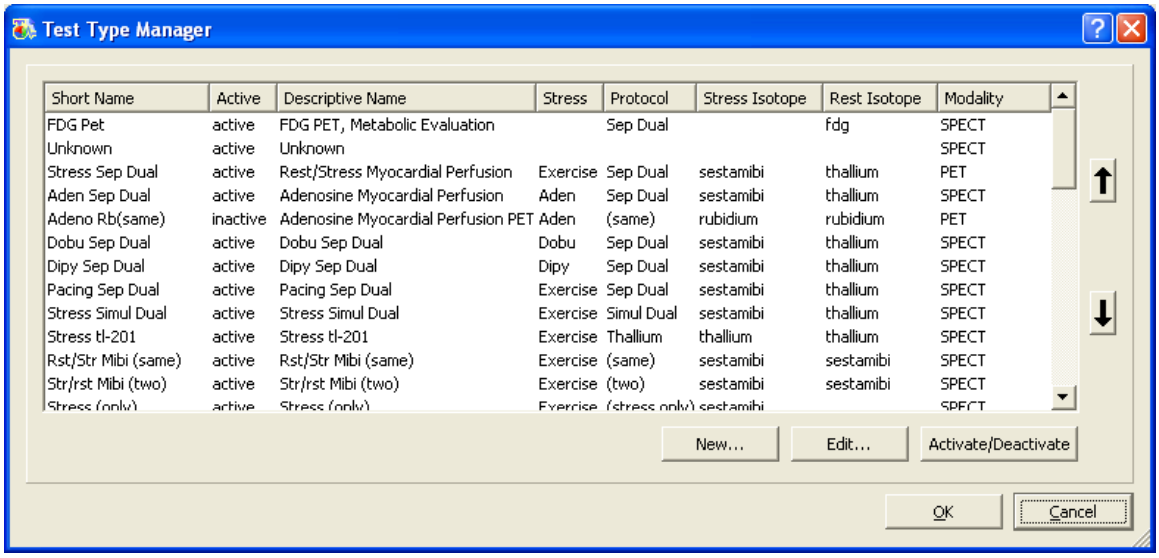


Most of the codes that are available for configuration use a standard general code editor. It presents a list of the codes currently available, their active status, source and current number of studies that use them. New codes may be added by pressing the **New…** button. Codes may be "deactivated" meaning that it will no longer appear in selection lists, yet existing studies that use them will still be valid.

If a code is not currently used in any studies, it may be **Deleted**. *Factory* codes (codes that are part of our standard configuration) may only be deactivated/activated, they may not be modified or deleted.

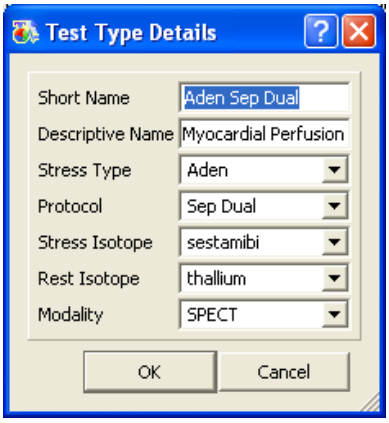
Test Type Manager

Test Type is a specialized case of the dynamic code editor which presents more fields. It is available from within the **User configurable code editor**.



Test Type Manager Dialog

Test Types may be added, modified and activated/deactivated from the **Test Type Manager** window. The up/down arrow buttons at the right, allow reordering the list as desired, for example to put the commonly used tests together at the top of the list.



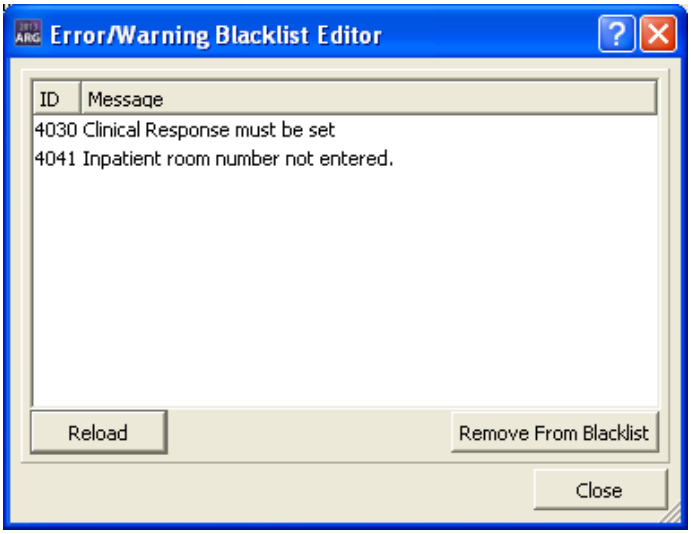
Test Type Editor Dialog

When editing a test type, the following fields are available:

Field	Description
Short Name	A descriptive name for the test type (e.g. 'Stress Sep Dual')
Descriptive Name	The test type as it should appear in the report (e.g. 'Rest/Stress Myocardial Perfusion')
Stress Type	The type of stress (*Exercise, Aden* (Adenosine), *Dobu* (Dobutamine), *Dipy* (Dipyridamole) , *Pacing*, *Regaden* (Regadenoson)).
Protocol	Type of protocol (*Sep Dual* (Separate acquisition, dual isotope), *Simul Dual* (Simultaneous dual isotope), *Stress/Redist* (Stress and Redistribution), *two* (two day), *same* (same day), *stress only, rest only*).
Stress Isotope	The isotope used at stress .
Rest Isotope	The isotope used at rest.
Modality	The modality the study us using (*SPECT* or *PET*)

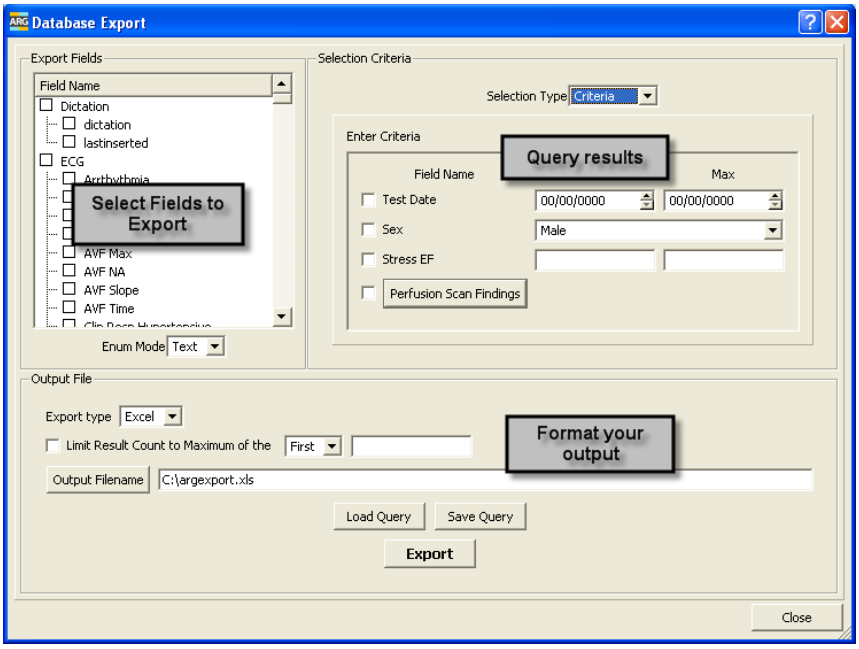
Blacklist Editor

The blacklist editor displays all consistency checks which have been hidden. Each consistency check can be unhidden from the blacklist by selecting the message and clicking **Remove From Blacklist**.



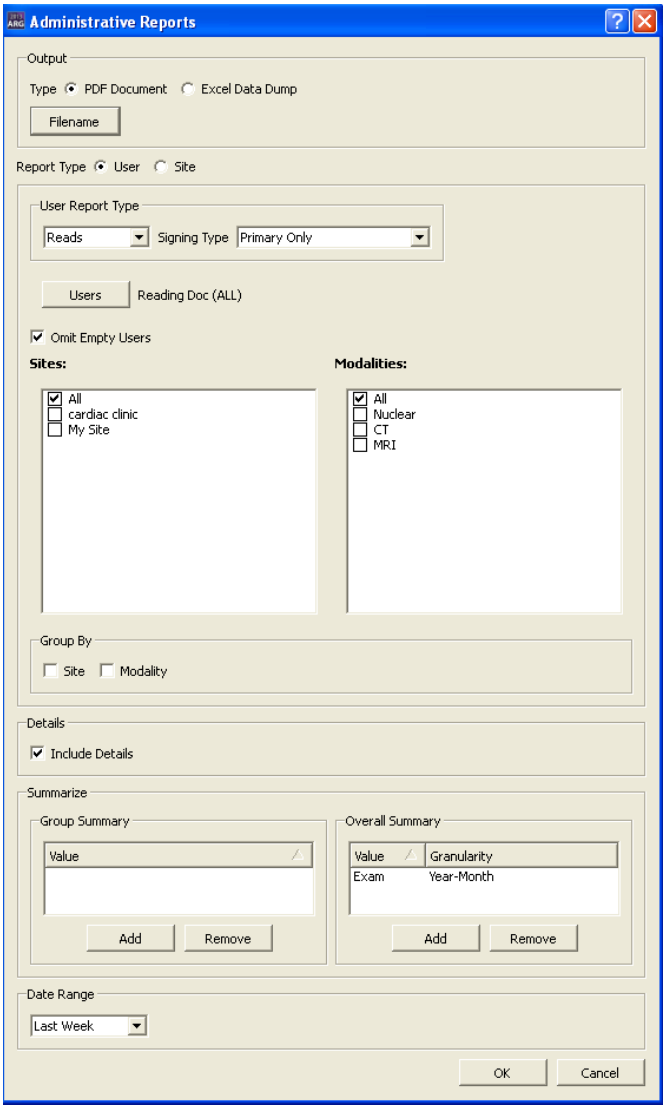
Data Export

The Data Export functionality allows users to dump various fields to Excel. This is intended to dump all records; however the list can be limited by using a simple query or only exporting the first *<number>* records.



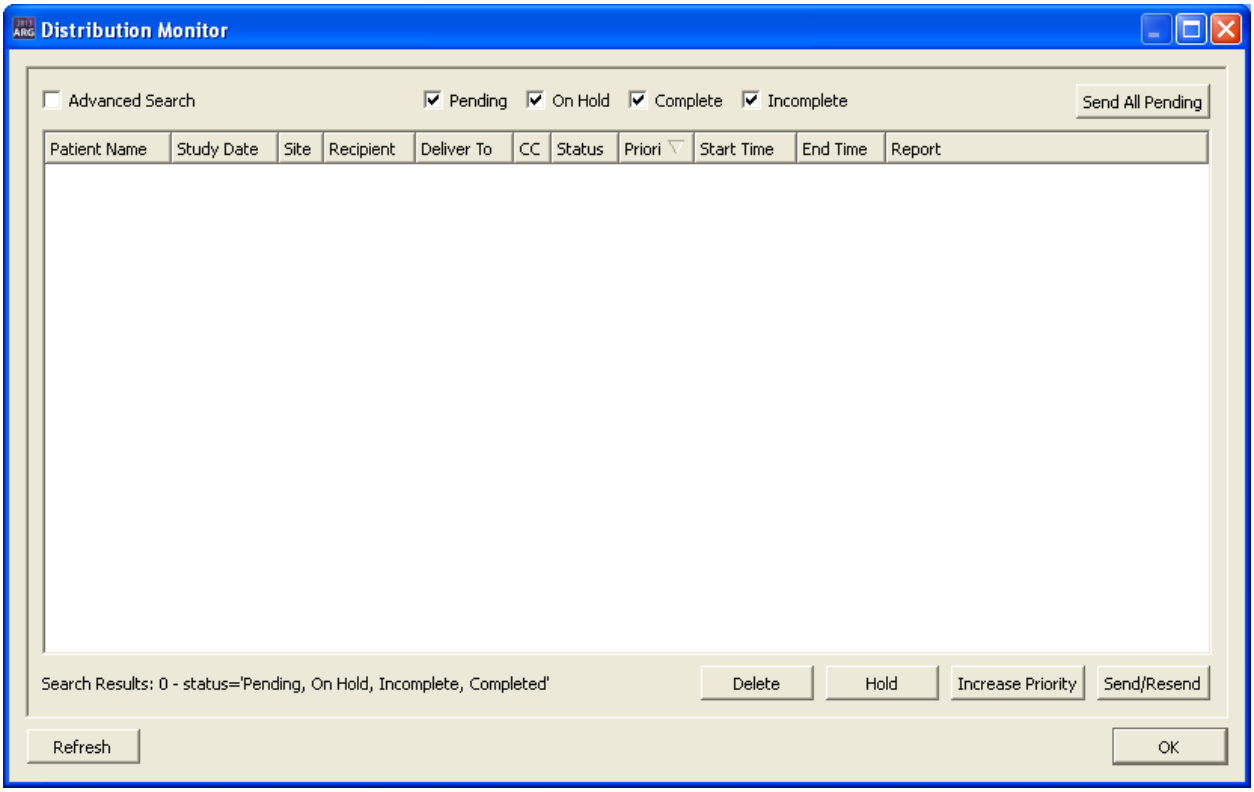
Administrative Report

The **Administrative Report** feature within the Admin menu allows users to generate reports based on user defined criteria. For example, a report can be generated to include all studies that include a specific Referring Physician or group of physician. Similarly a report can be generated that shows how many studies were read by a particular physician. Report can be created either in PDF or Excel format.

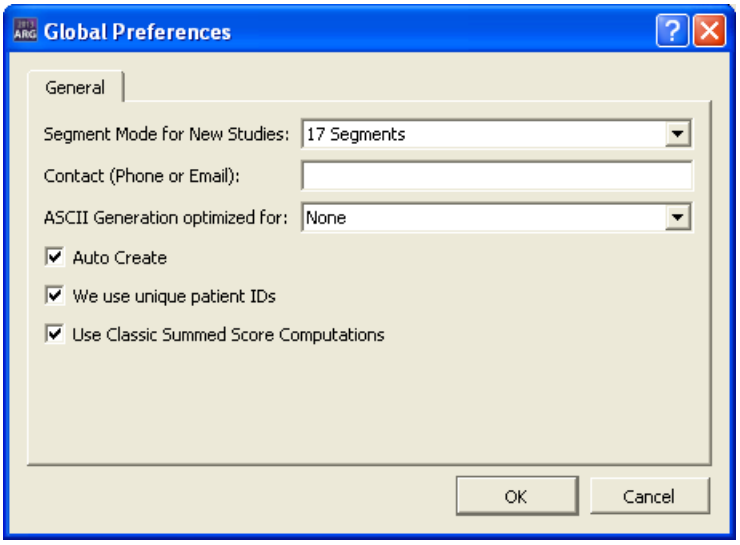


Distribution Monitor

The **Distribution Monitor** displays the status of reports that were finalized and sent out via the built in email tool. It lets users verify the sent status or a report, increase priority of a report, and hold or delete the task of the report being sent.



Global Preferences



Function	Description
Segment Mode	Setting for the default number of segments for new studies. This will overrule any QPS/QGS settings.
Contact Info	Contact information for the site. Used for HIPPA regulatory message.
ASCII Generation optimization	Changes the display type for the text version of the reports; this feature dictates which font to use for the text version of the reports, for all studies.
Auto Create	If checked, when opening a dataset in QPS/QGS and a previous study is not found, a new study will get created. If left unchecked user will be prompted. In general, if sites populate the history and ECG information prior to launching QPS/QGS this should be unchecked.
We use unique Patient IDs	When checked, allows only unique patient ids to be stored. If the center enters patient MRN number or hospital id at the camera, then this box should be checked. If the center enters a generic term for patient id (such as 'CARDIAC') for every patient, then this box should be unchecked. Entering the actual patient id rather than a generic term provides a much more reliable way of identifying the correct patient, and should be done whenever possible.
Use Classic Summed Score Computations	Uses the classic summed score rules. Refer to the QGS+QPS reference guide for details.