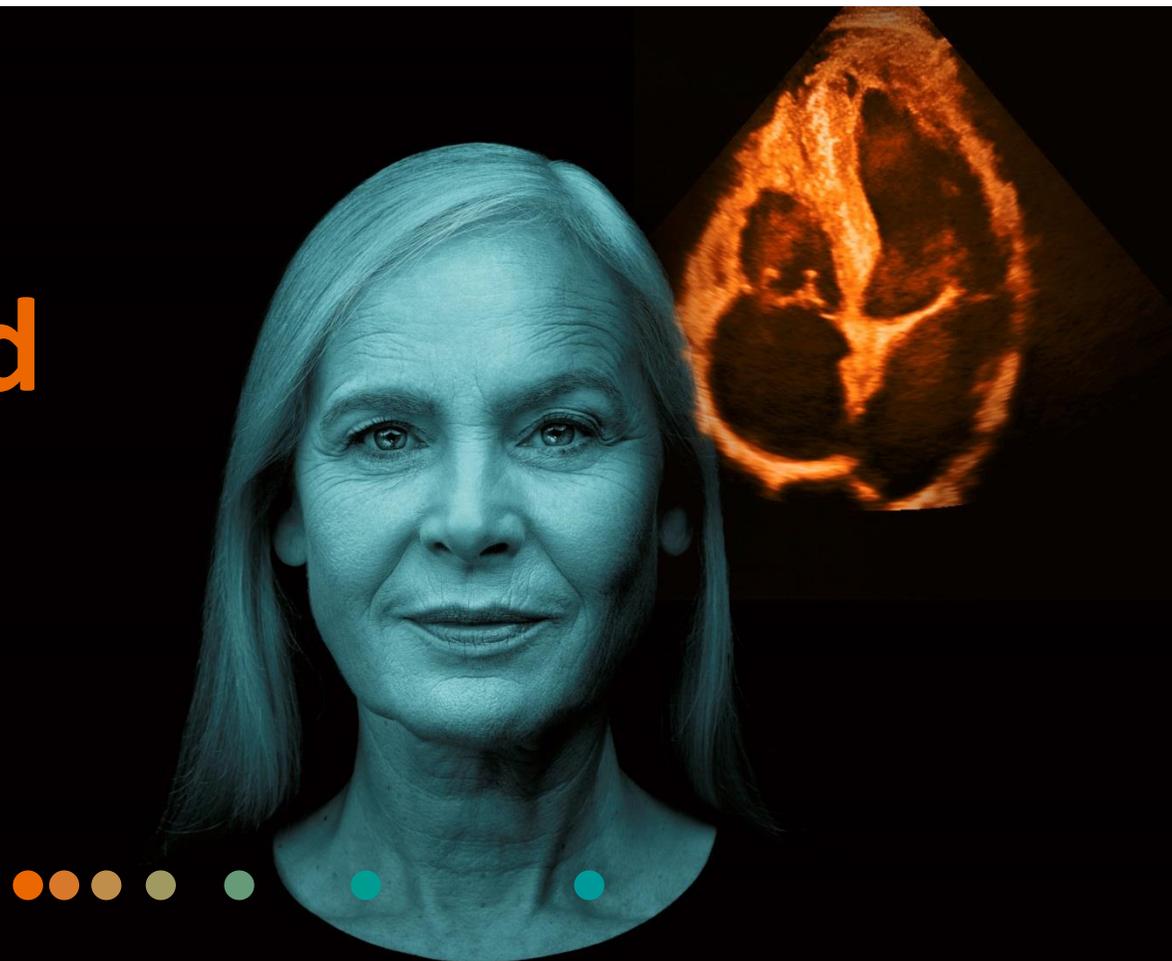


# ACUSON Redwood Ultrasound System

Stress Echo  
VA20 SW Release



# ACUSON Redwood stress echo

## Key features

Supports 6 user-definable factory default protocols

View control workflow

Comprehensive wall motion scoring package

Consistency across platforms



# Objectives

- **Describe the user interface**
- Explain protocol configuration
- Illustrate quick protocol configuration
- Discuss step-by-step workflow
- Describe stress echo review and image selection
- Summarize quick exam



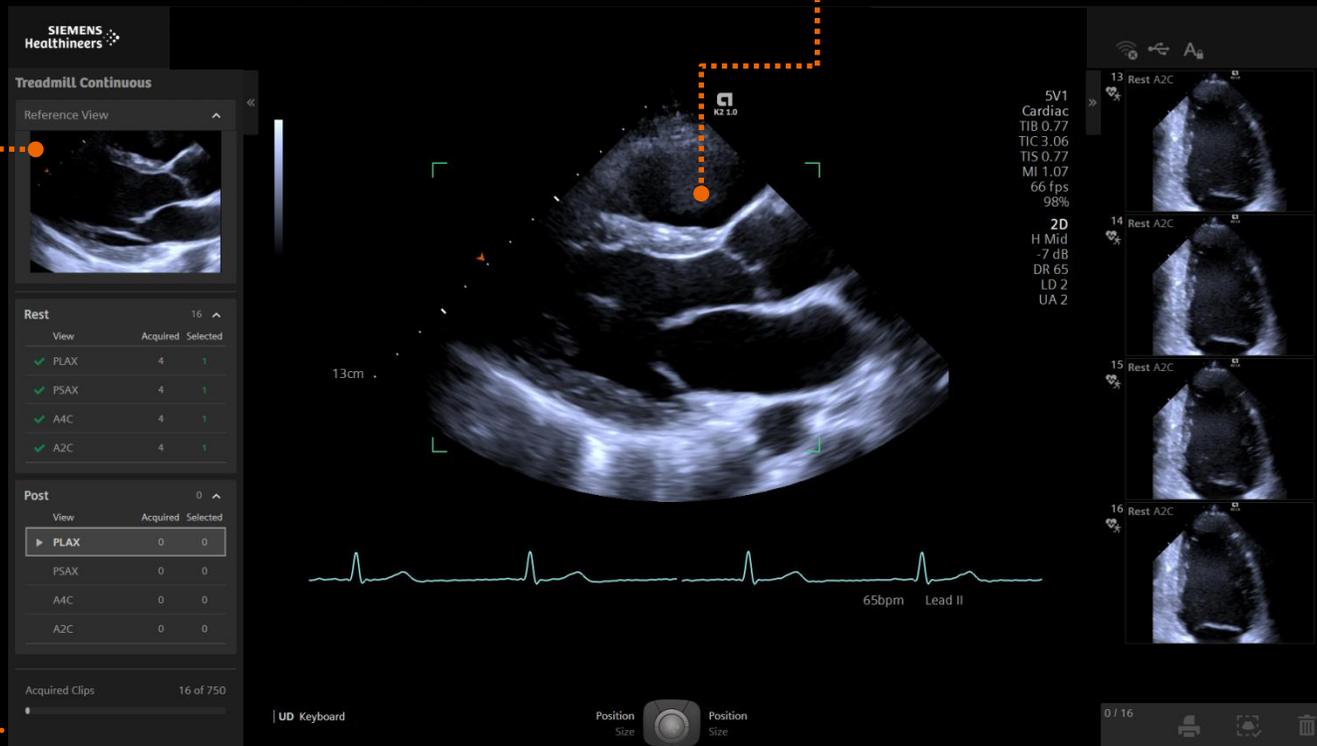
Region of Interest (ROI)

Reference image

Thumbnail panel

Navigation Panel

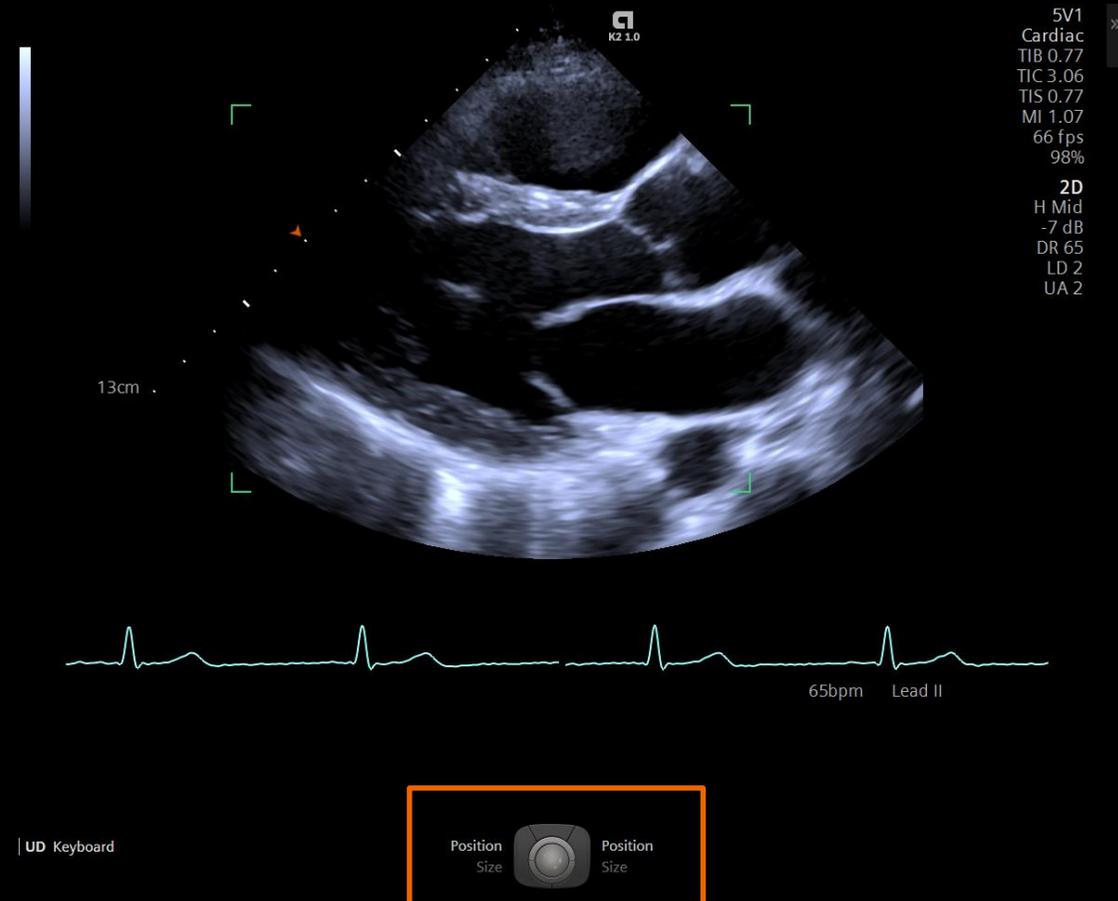
ROI Size / Position



# Region of interest

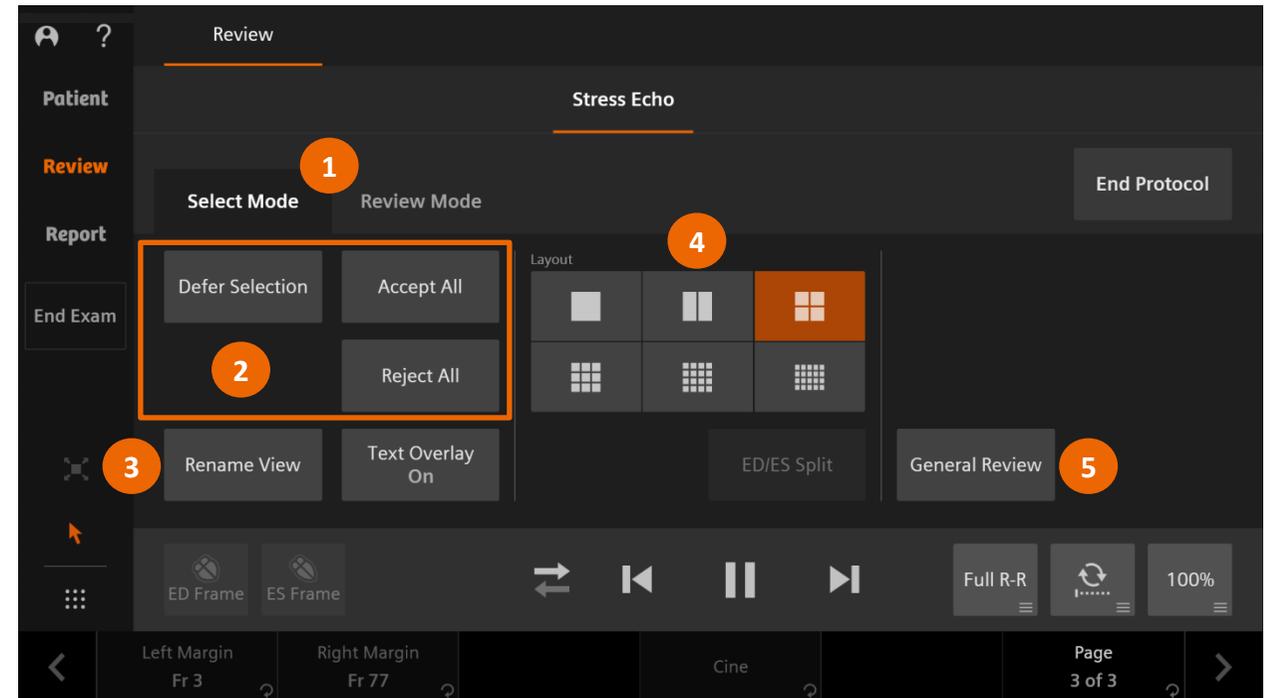
To modify the ROI size/position:

- Press the left or right **Set** key to move between position and size
- Modify ROI size/position using trackball
- Press left or right **Set** key again to confirm size/position



# Review and selection – touch screen

1. Review Mode or Selection Mode
2. Defer Selection, Accept All, Reject All
3. Rename View
4. Image layout options (4 up recommended)
5. General Review



# Image selection

1. Navigation panel
2. Image selected, indicated by check mark ✓
3. Image not selected, indicated by X

The screenshot displays the 'Treadmill Continuous' software interface. On the left is a navigation panel with a table of image acquisition data. On the right are four ultrasound image thumbnails arranged in a 2x2 grid, each with associated patient data and a heart rate of 47 BPM.

**Navigation Panel (1):**

Rest		12	
View	Acquired	Selected	
✓ PLAX	4	2	
✓ PSAX	4	2	
✓ A4C	4	1	
A2C	0	0	

Post		0	
View	Acquired	Selected	
PLAX	0	0	
PSAX	0	0	
A4C	0	0	
A2C	0	0	

Acquired Clips: 12 of 750

**Image Grid (2 and 3):**

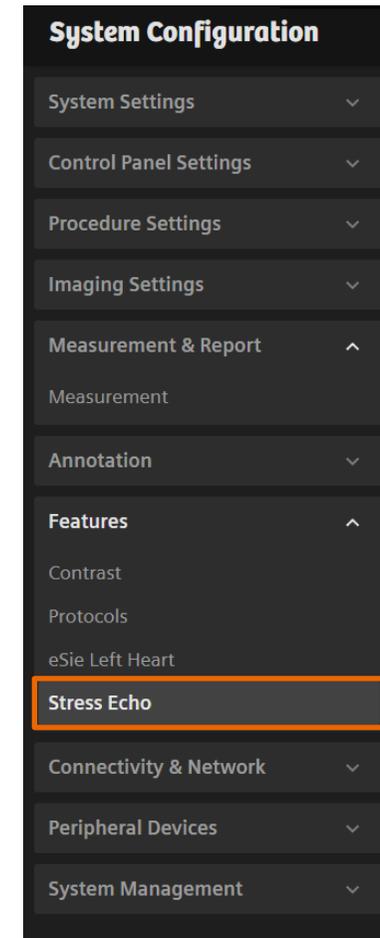
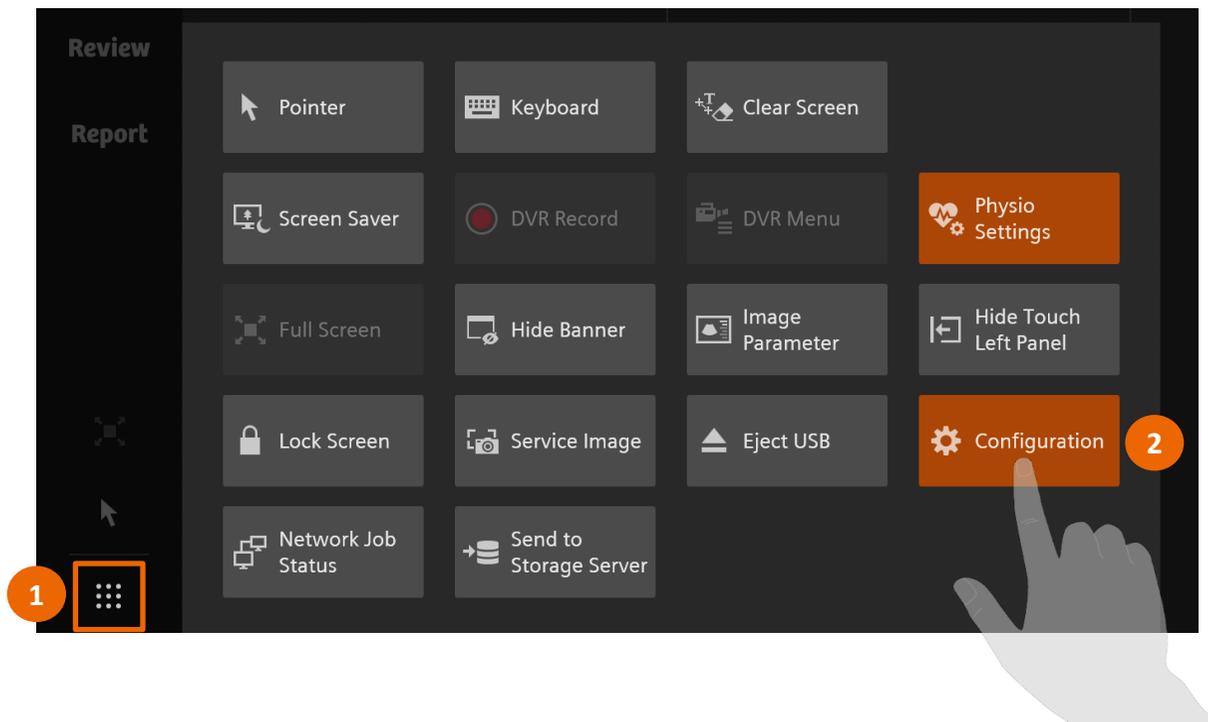
- Top-left (9): Rest A4C, 2019-04-24 11:10:56, MI: 0.88, 100%, 29/80, 72:1. Heart rate 47 BPM. No selection mark.
- Top-right (10): Rest A4C, 2019-04-24 11:10:58, MI: 0.88, 100%, 29/82, 74:1. Heart rate 47 BPM. No selection mark.
- Bottom-left (11): Rest A4C, 2019-04-24 11:11:00, MI: 0.88, 100%, 28/78, 70:1. Heart rate 47 BPM. Selected (check mark ✓).
- Bottom-right (12): Rest A4C, 2019-04-24 11:11:01, MI: 0.88, 100%, 29/80, 72:1. Heart rate 47 BPM. Not selected (X).

# Objectives

- Describe the user interface
- **Explain protocol configuration**
- Illustrate quick protocol configuration
- Discuss step-by-step workflow
- Describe stress echo review and image selection
- Summarize quick exam



## Select **Stress Echo** from System Configuration



# Stress echo configuration

Stress Echo Wall Motion Scoring

Protocols	Stages	Views
Pharmacology >	Rest >	<input type="checkbox"/> Select All Views
Pharmacology Continuous >	Post >	<input type="checkbox"/> PLAX
Bicycle >		<input type="checkbox"/> PSAX
Bicycle continuous >		<input type="checkbox"/> A4C
Treadmill >		<input type="checkbox"/> A2C
Treadmill Continuous >		

**Protocols**      **Stages**      **Views**

⏪ ⏩ ⏴ ⏵    Add    Copy    Delete

Stage Name \* Rest    Units None

**Clip Settings**

Clip Store Type  
Prospective

Retrospective

Prospective

Continuous

Beat 1 beats - +

Clip Offset Time Offset 0 msec - +

**Additional Settings**

Stage Timer

Off

Start at Beginning of Stage

Start at First Clip Store

Enter Review

Do not enter

After View Capture

After Stage Capture

# Stress echo configuration – protocol settings

The screenshot displays the 'Stress Echo' configuration interface, specifically the 'Wall Motion Scoring' section. The interface is divided into three main columns: 'Protocols', 'Stages', and 'Views'. The 'Protocols' column is highlighted with an orange border and contains a list of protocols: Pharmacology, Pharmacology Continuous, Bicycle, Bicycle continuous, Treadmill, and Treadmill Continuous. The 'Stages' column contains 'Rest' and 'Post'. The 'Views' column is currently empty. Below the list, there are buttons for 'Import', 'Export', 'Add', 'Copy', and 'Delete'. A 'Protocol Name' field shows 'Treadmill Continuous'. The 'Protocol Settings' section includes checkboxes for 'Display ROI' (checked), 'Allow selection of multiple clips per view' (checked), and 'Hide the navigation panel on the main screen as default' (unchecked). There are radio buttons for 'Progression by stage' set to 'Automatic'. The 'Default Review Settings' section includes dropdowns for 'Display Format' (2x2), 'Playback Mode' (Full R-R), and 'Playback Speed' (100%). The 'Clip Sorting' section has radio buttons for 'By View' (selected) and 'By Stage'. A 'Restore Defaults: Treadmill Continuous' button is located at the bottom right.

Protocols	Stages	Views
Pharmacology	Rest	
Pharmacology Continuous	Post	
Bicycle		
Bicycle continuous		
Treadmill		
Treadmill Continuous		

Protocol Name: Treadmill Continuous

**Protocol Settings**

- Display ROI
- Allow selection of multiple clips per view
- Hide the navigation panel on the main screen as default

Progression by stage

Automatic  Manual

**Default Review Settings**

Display Format: 2x2

Playback Mode: Full R-R

Playback Speed: 100%

**Clip Sorting**

By View  By Stage

Restore Defaults: Treadmill Continuous

# Stress echo configuration – stage settings

The screenshot displays the 'Stress Echo' configuration interface for 'Wall Motion Scoring'. It is divided into three main sections: 'Protocols', 'Stages', and 'Views'. The 'Stages' section is highlighted with an orange box and contains a list with 'Rest' and 'Post'. Below this, a detailed configuration panel for the 'Rest' stage is shown, also highlighted with an orange box. This panel includes a toolbar with 'Add', 'Copy', and 'Delete' buttons, and a 'Stage Name' field set to 'Rest'. The 'Clip Settings' section includes a 'Clip Store Type' dropdown set to 'Prospective', 'Clips per Capture' set to 4, 'Clip Type' set to 'Beat', and 'Clip Offset' set to 'Time Offset'. The 'Additional Settings' section includes a 'Stage Timer' with options 'Off', 'Start at Beginning of Stage', and 'Start at First Clip Store', and an 'Enter Review' section with options 'Do not enter', 'After View Capture', and 'After Stage Capture'.

**Stress Echo** Wall Motion Scoring

**Protocols**

- Pharmacology >
- Pharmacology Continuous >
- Bicycle >
- Bicycle continuous >
- Treadmill >
- Treadmill Continuous >

**Stages**

- Rest >
- Post >

**Views**

- Select All Views
- PLAX
- PSAX
- A4C
- A2C

Stage Name: Rest Units: None

**Clip Settings**

- Clip Store Type: Prospective
- Clips per Capture: 4
- Clip Type: Beat Beat: 1 beats
- Clip Offset: Time Offset Time Offset: 0 msec

**Additional Settings**

Stage Timer

- Off
- Start at Beginning of Stage
- Start at First Clip Store

Enter Review

- Do not enter
- After View Capture
- After Stage Capture

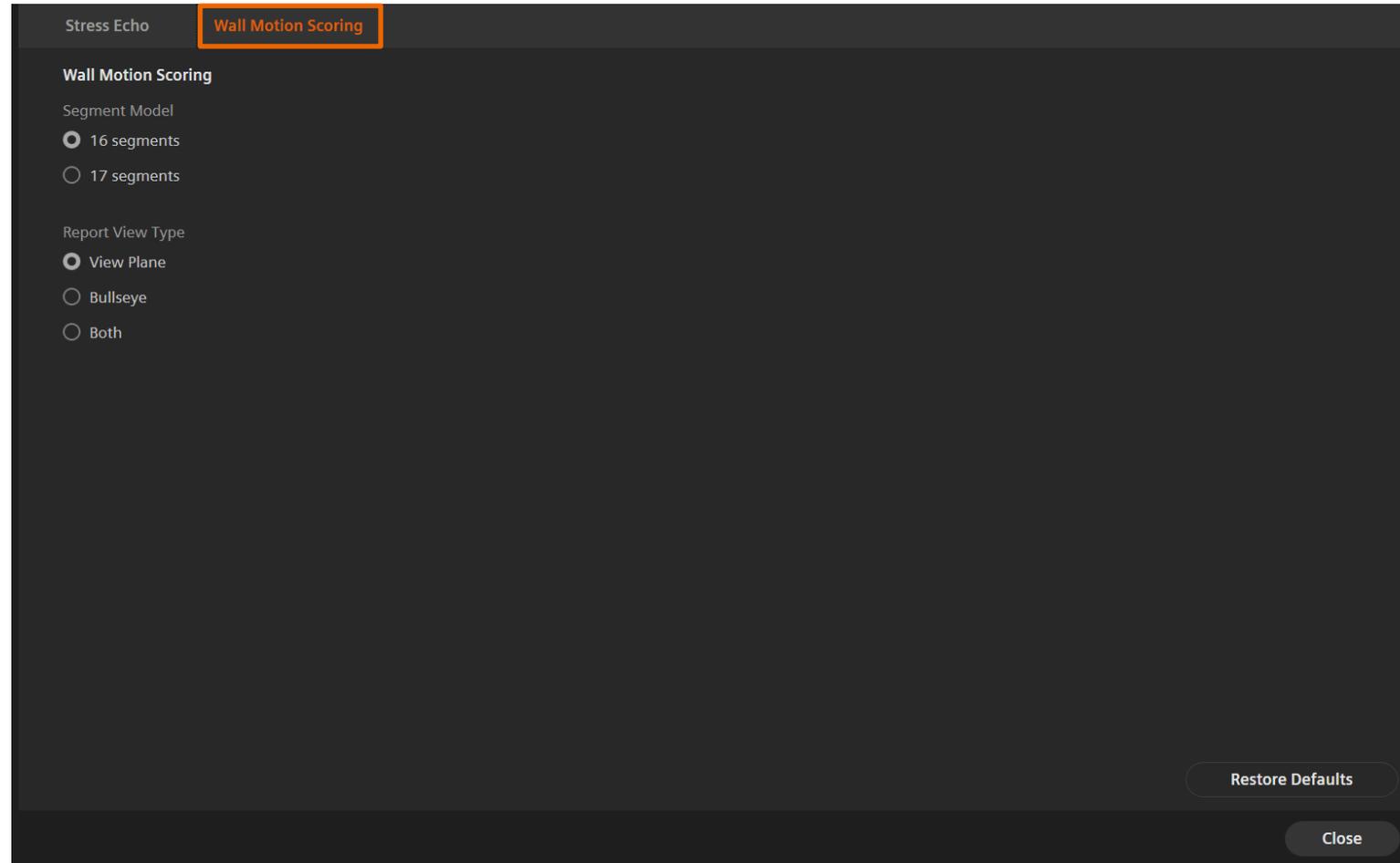
# Stress echo configuration – view settings

The screenshot displays the 'Stress Echo' configuration interface for 'Wall Motion Scoring'. It features a table with 'Protocols' and 'Stages' columns, and a 'Views' panel on the right. The 'Views' panel is highlighted with an orange border and contains a list of view options with checkboxes.

Protocols	Stages	Views
Pharmacology	Rest	<input type="checkbox"/> Select All Views
Pharmacology Continuous	Post	<input checked="" type="checkbox"/> PLAX
Bicycle		<input type="checkbox"/> PSAX
Bicycle continuous		<input type="checkbox"/> A4C
Treadmill		<input type="checkbox"/> A2C
Treadmill Continuous		

At the bottom of the interface, there are navigation icons (back, forward, search) and buttons for 'Add', 'Copy', 'Delete', and 'Copy to'.

# Stress echo configuration – view settings



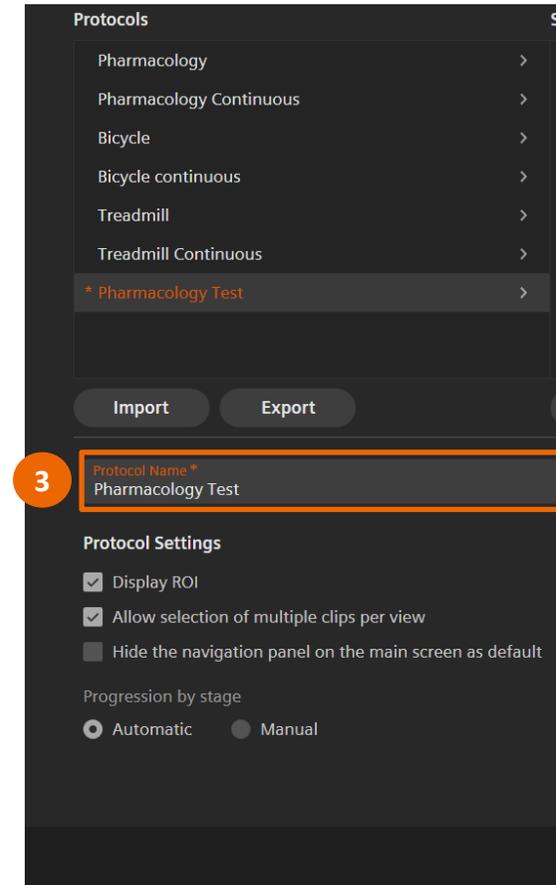
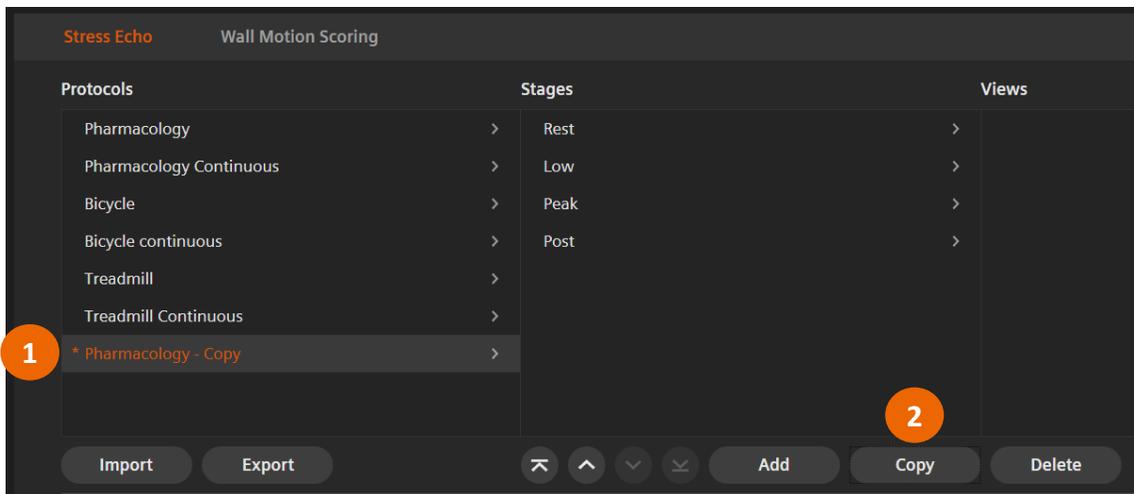
# Objectives

- Describe the user interface
- Explain protocol configuration
- **Illustrate quick protocol configuration**
- Discuss step-by-step workflow
- Describe stress echo review and image selection
- Summarize quick exam



# Quick protocol configuration

1. Highlight factory stress echo protocol
2. Copy the highlighted protocol
3. Change protocol name



# Quick protocol configuration

4. Modify stage and view settings
5. Select **Close** to save changes

Stress Echo Wall Motion Scoring

Protocols

- Pharmacology
- Pharmacology Continuous
- Bicycle
- Bicycle continuous
- Treadmill
- Treadmill Continuous

Stages

- Rest
- Post

Views

- Select All Views
- PLAX
- PSAX
- A4C
- A2C

Stage Name: Rest Units: None

Clip Settings

- Clip Store Type: Prospective
- Clips per Capture: 4
- Clip Type: Beat Beat 1 beats
- Clip Offset: Time Offset Time Offset 0 msec

Additional Settings

- Stage Timer: Off
- Start at Beginning of Stage
- Start at First Clip Store
- Enter Review: Do not enter, After View Capture, After Stage Capture

Close

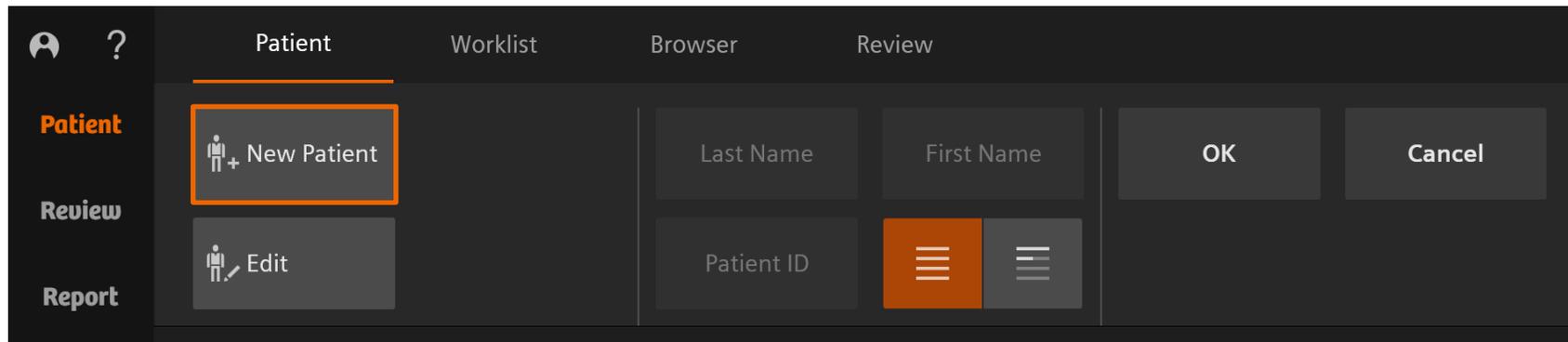
# Objectives

- Describe the user interface
- Explain protocol configuration
- Illustrate quick protocol configuration
- **Discuss step-by-step workflow**
- Describe stress echo review and image selection
- Summarize quick exam



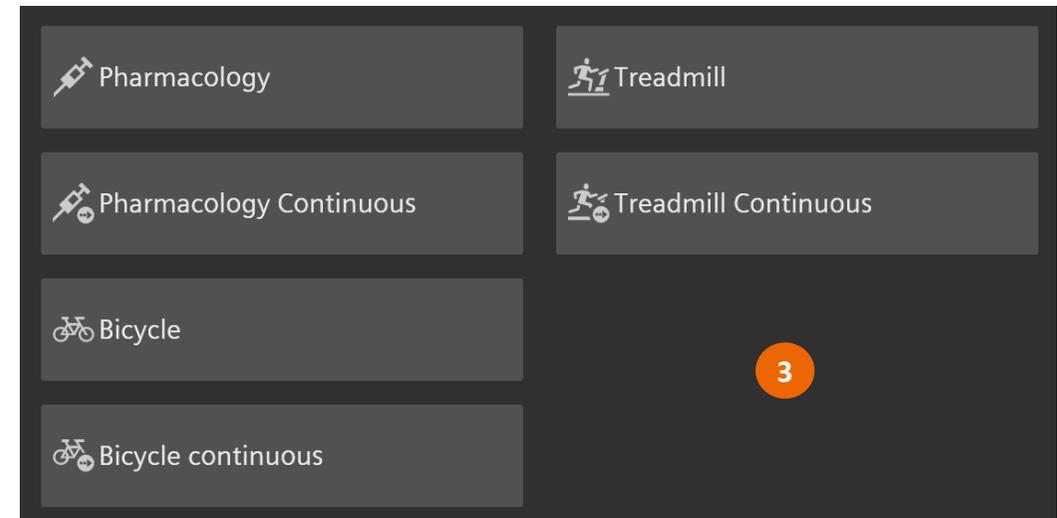
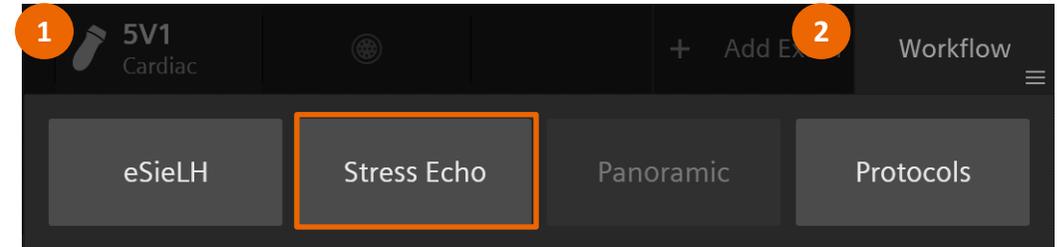
# Begin an exercise stress echo

Select **New Patient** and enter patient information, or select a patient from a modality worklist



# Activate stress echo protocol

1. Select the 5V1 cardiac transducer
2. Select **Stress Echo** from the **Workflow** tab at the top right-hand portion of the touch screen
  - A pop-up window appears
3. Select desired protocol
  - An ROI appears on the image



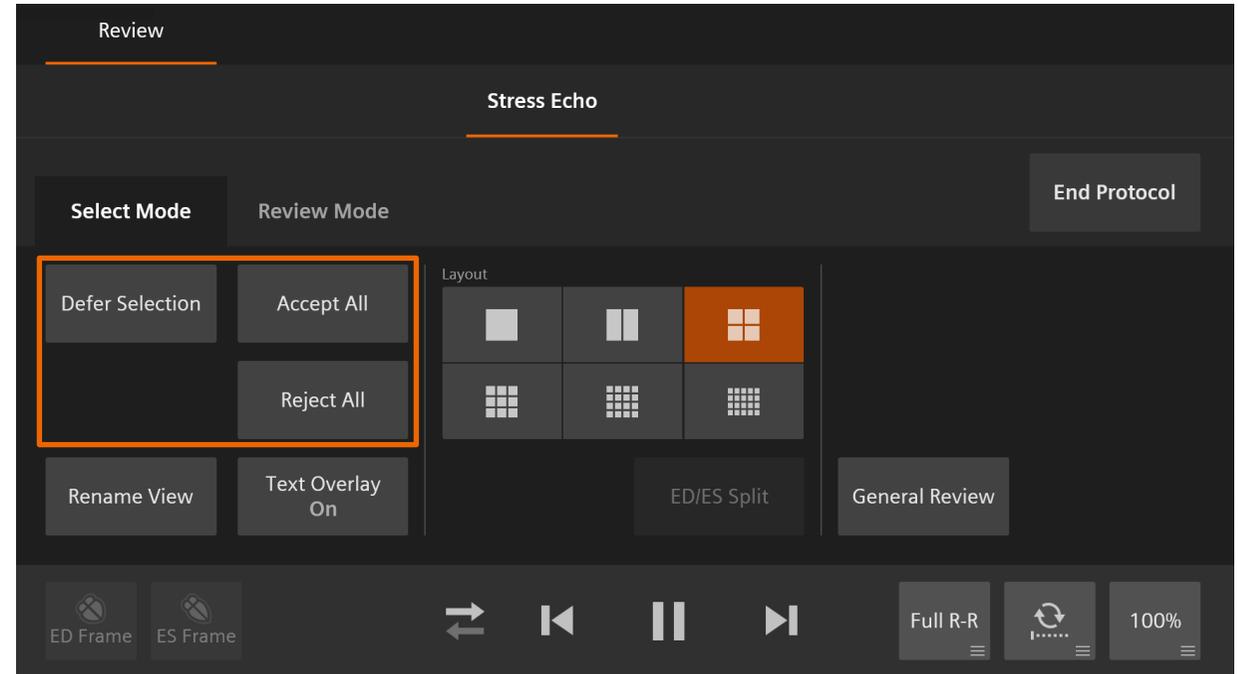
# Rest stage – imaging screen

1. Select **Clip Store** to acquire images for a view
2. Select from available clips
3. Multiple clips can be selected
  - Double click on last clip selection to progress to next acquisition
4. A check mark ✓ appears on selected clips; an X appears on non-selected clips
5. A check mark ✓ appears next to each view as it is completed



# Rest stage – touch screen

1. Defer Selection – continues to acquisition for next view; selection completed later
2. Accept All – accepts all acquired images for current view
3. Reject All – rejects all acquired images for current view and returns to acquisition mode



# Post stage – continuous capture with view control

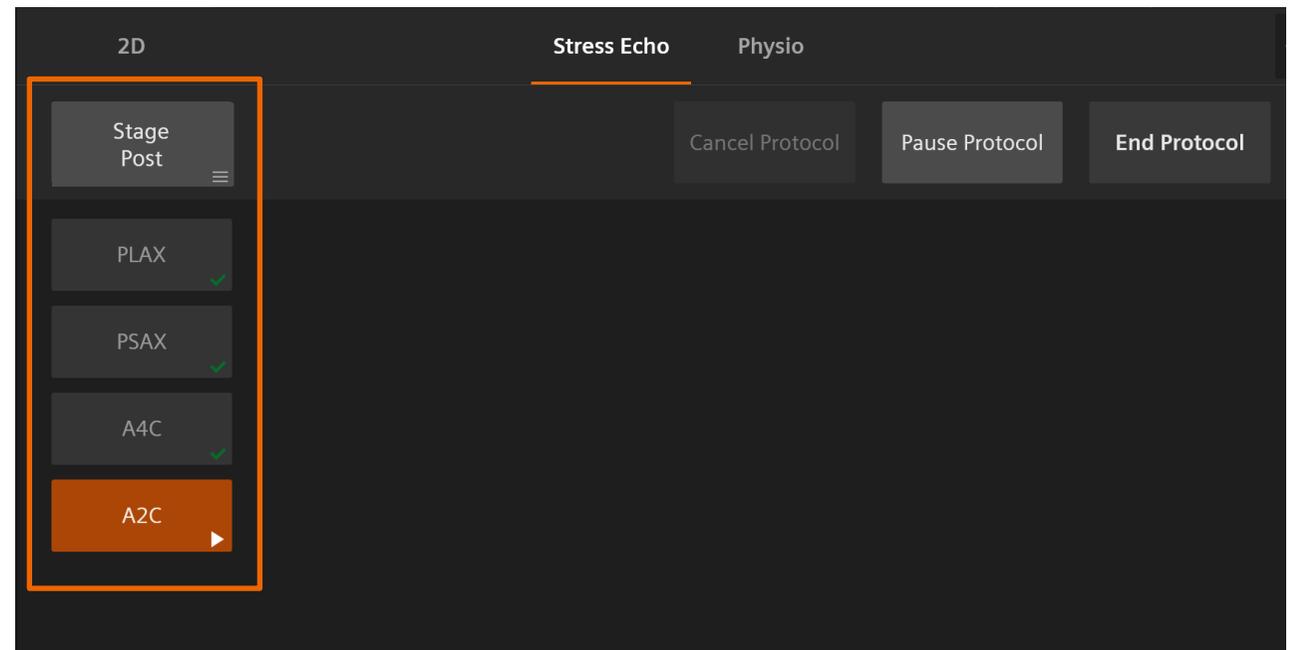
1. Select **Clip Store** to begin acquisition
  - Select **Clip Store** to stop acquisition for current view
  - Select **Clip Store** again to begin acquisition of next view
2. When acquisition for last view is completed, select **Clip Store** to end capture
  - Select **Pause Protocol** if additional images are needed
3. System will enter **Selection Mode**



# Post stage – continuous capture with view control

To use touch screen for view control:

1. Select the current view from the list on the touch screen
2. Once a view is completed, a green check mark ✓ appears
3. Once all views are completed, system enters **Select Mode** and image selection can be completed



# Post stage – continuous capture without view control

1. Select **Clip Store** to begin acquisition
2. Select **Clip Store** to end acquisition
  - Select **Pause Protocol** if additional images are needed
3. System can be configured to enter **Review** automatically or user can manually select from the touch screen

**Note:** All images will be labeled as same view and will need to be renamed when selected



# Add view

**Add View** can be used to add a view during a stress echo protocol

1. Select **Add View**
2. Type in view name
3. Select **OK**

The image illustrates the process of adding a view during a stress echo protocol. It shows three steps:

- 1**: A button labeled "Add View" is highlighted with a red circle.
- 2**: The "Add View" dialog box is shown. It lists available views: A3C, ALAX, SAX Base, SAX Mid, SAX Apex, and SSAXX. A text input field contains "RVOT" and is highlighted with a red circle. Below the input field, a message says "Duplicate name exists." At the bottom, the "OK" button is highlighted with a red circle.
- 3**: The "Treadmill Continuous" view selection screen is shown. The "RVOT" view is selected and highlighted with a red box. The screen also shows "Reference View" and "Acquired Clips" (8 of 750).

The "Treadmill Continuous" screen displays the following data:

Reference View		
Rest		
View	Acquired	Selected
... PLAX	4	0
... PSAX	4	0
A4C	0	0
A2C	0	0
▶ RVOT	0	0

Post		
View	Acquired	Selected
PLAX	0	0
PSAX	0	0
A4C	0	0
A2C	0	0

# Add stage

**Add Stage** can be used to add a stage during a stress echo

1. Select **Add Stage**
2. Select **Stage Property**
3. Type in **Stage Name**
4. Select **OK**

**1**

Add Stage

**2**

Add Stage

Stage Property  
Post

Stage Name \*  
Recovery

OK Cancel

**3**

OK

Cancel

Treadmill Continuous

Reference View

Rest 16

View	Acquired	Selected
✓ PLAX	4	1
✓ PSAX	4	1
✓ A4C	4	1
✓ A2C	4	1

Post 0

View	Acquired	Selected
▶ PLAX	0	0
PSAX	0	0
A4C	0	0
A2C	0	0

Recovery 0

View	Acquired	Selected
PLAX	0	0
PSAX	0	0
A4C	0	0
A2C	0	0

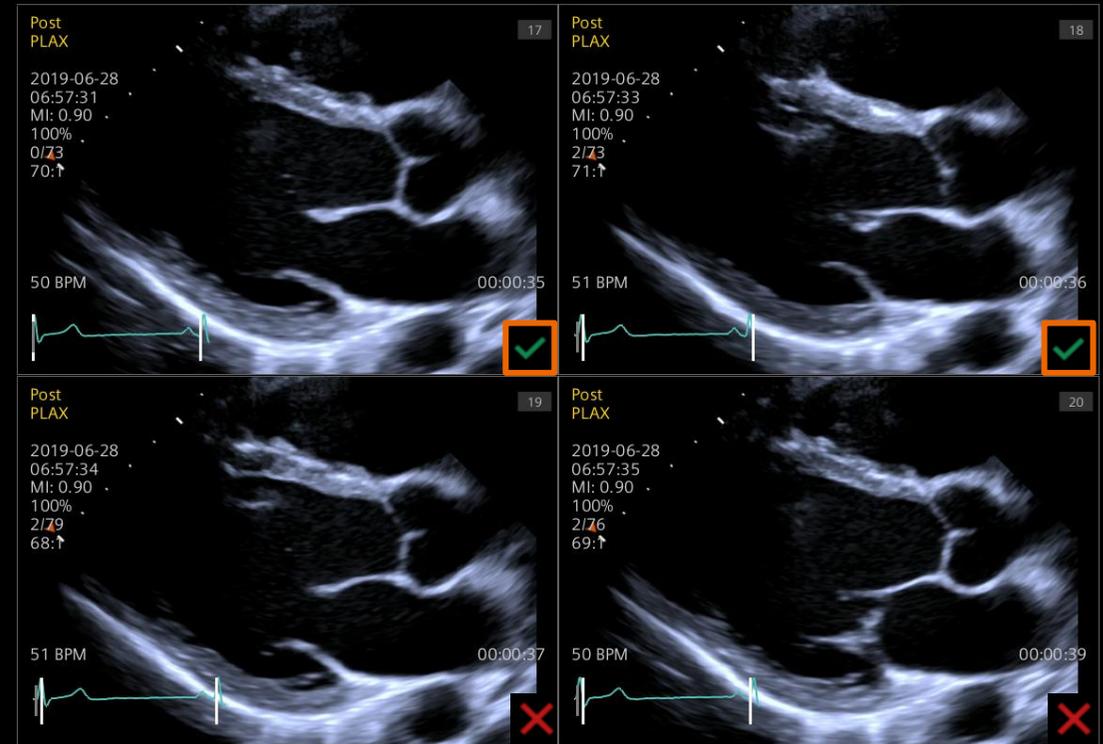
# Objectives

- Describe the user interface
- Explain protocol configuration
- Illustrate quick protocol configuration
- Discuss step-by-step workflow
- **Describe stress echo review and image selection**
- Summarize quick exam



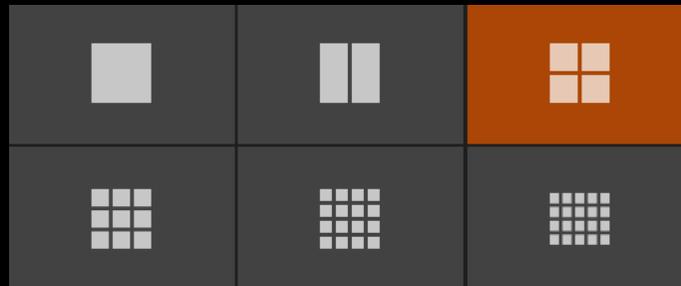
# Review post stress: selection mode with view control

1. Select left or right **Set** key to select a clip; once selected, the clip will have a green check mark ✓
2. Double-click the **Set** key to confirm selections and the application will progress to next view for selection
3. Repeat steps 1 and 2 until all desired views are selected

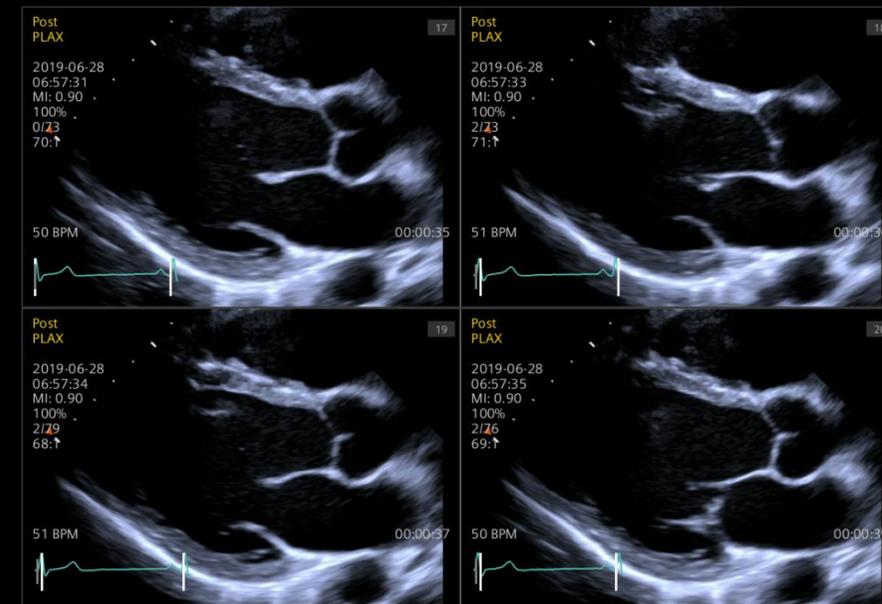
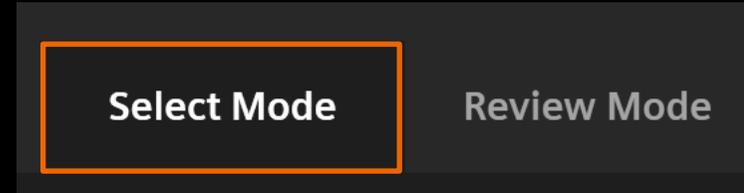
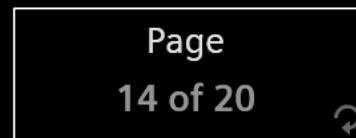


# Review post stress: selection mode with view control

- Once images are acquired, the application will automatically advance to **Select Mode**
- If desired, change the layout

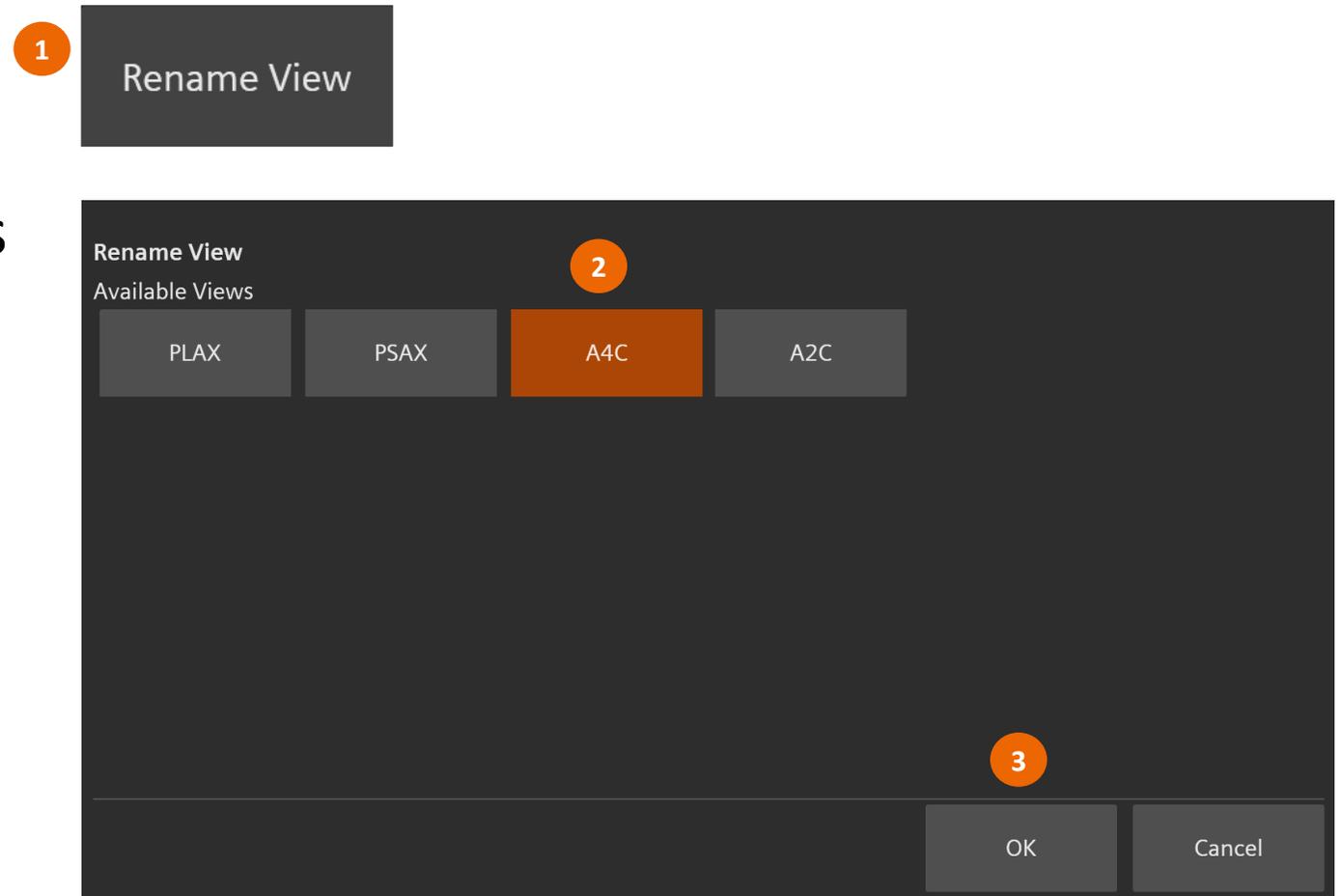


- Toggle through pages to review and select images



# Review post stress: selection without view control

1. Select **Rename View**
2. Select image to rename
  - Can select multiple images at one time
3. Select view name
4. Select **OK**



# Review post stress: selection without view control

- Selected clips will have a green check mark
- Navigation Panel displays number of clips selected for each view

The screenshot displays the 'Treadmill Continuous' software interface. On the left is a navigation panel with a 'Reference View' dropdown and two tables for 'Rest' and 'Post' phases. The 'Rest' table shows 16 acquired clips, with 1 selected in each of the four views (PLAX, PSAX, A4C, A2C). The 'Post' table shows 44 acquired clips, with 2 selected in PLAX, 2 in PSAX, 3 in A4C, and 0 in A2C. Below the tables is a progress bar for 'Acquired Clips' at 60 of 750. On the right, four ultrasound clips are shown in a 2x2 grid. Each clip includes a green checkmark in the bottom right corner, indicating it is selected. The clips are labeled 'Post A4C' (clips 49, 50, 51) and 'Post PLAX' (clip 52). Each clip displays patient information (2019-04-24, 11:32:22), MI (0.94), 100% strain, and frame counts (e.g., 64/68, 63/67, 34/38, 69/164). Heart rate (BPM) and time (00:00:37 to 00:00:39) are also shown. A red 'X' is visible in the bottom right corner of the PLAX clip (52).

Phase	View	Acquired	Selected
Rest	PLAX	4	1
	PSAX	4	1
	A4C	4	1
	A2C	4	1
Post	PLAX	39	2
	PSAX	2	2
	A4C	3	3
	A2C	0	0

# Review post stress: selection complete

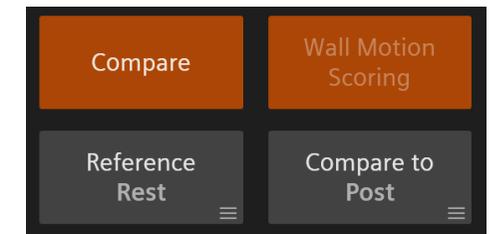
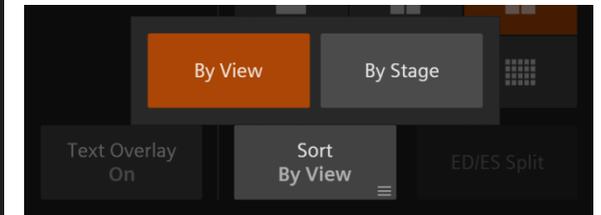
- Once selection is completed, the Navigation Panel displays a green check mark beside all views
- The number of selected views also appears to the right of each view
- Compare option is available
- Images can be sorted **By View** or **By Stage**

Rest			16	^
View	Acquired	Selected		
✓ PLAX	4	2		
✓ PSAX	4	2		
✓ A4C	4	1		
✓ A2C	4	2		

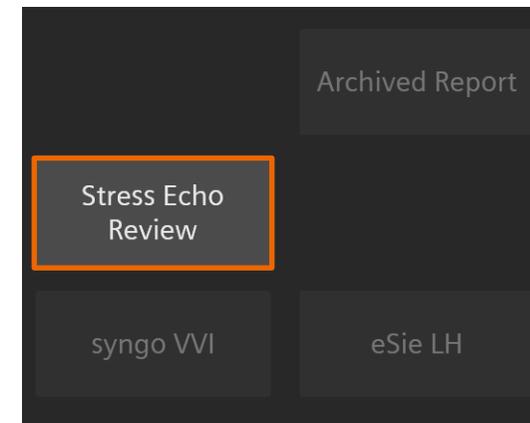
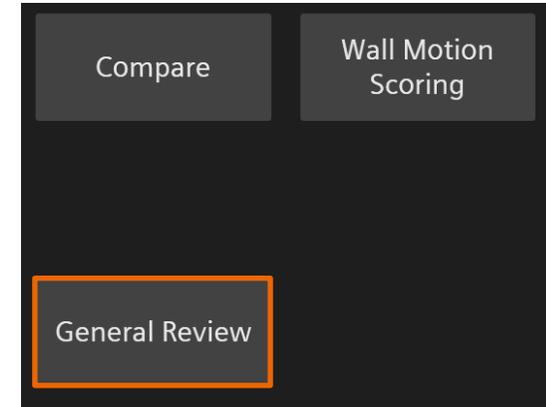
Post			54	^
View	Acquired	Selected		
✓ PLAX	35	2		
✓ PSAX	5	2		
✓ A4C	6	1		
✓ A2C	8	3		

Acquired Clips 70 of 750



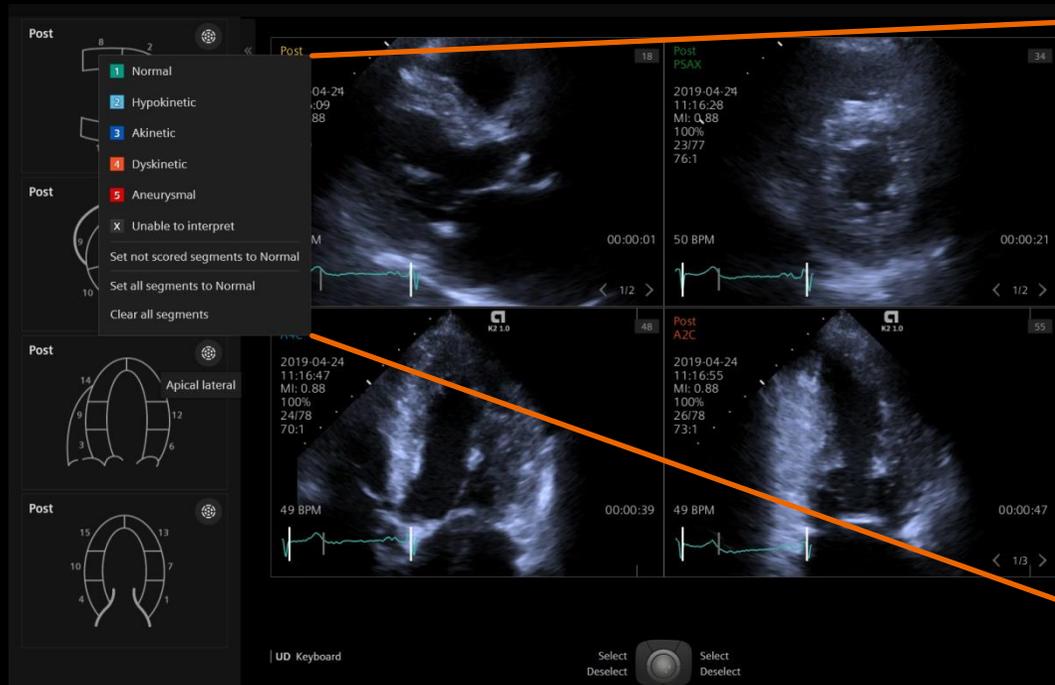
# General review

- A **General Review** option for stress echo is available
- Allows the operator to review multiple images simultaneously; also includes all images that were acquired throughout stress echo exam
- In Review and Select Modes, **General Review** is located on the touch screen
- Select **Stress Echo Review** to return to Review and select Modes



# Wall motion scoring

## Wall Motion Scoring



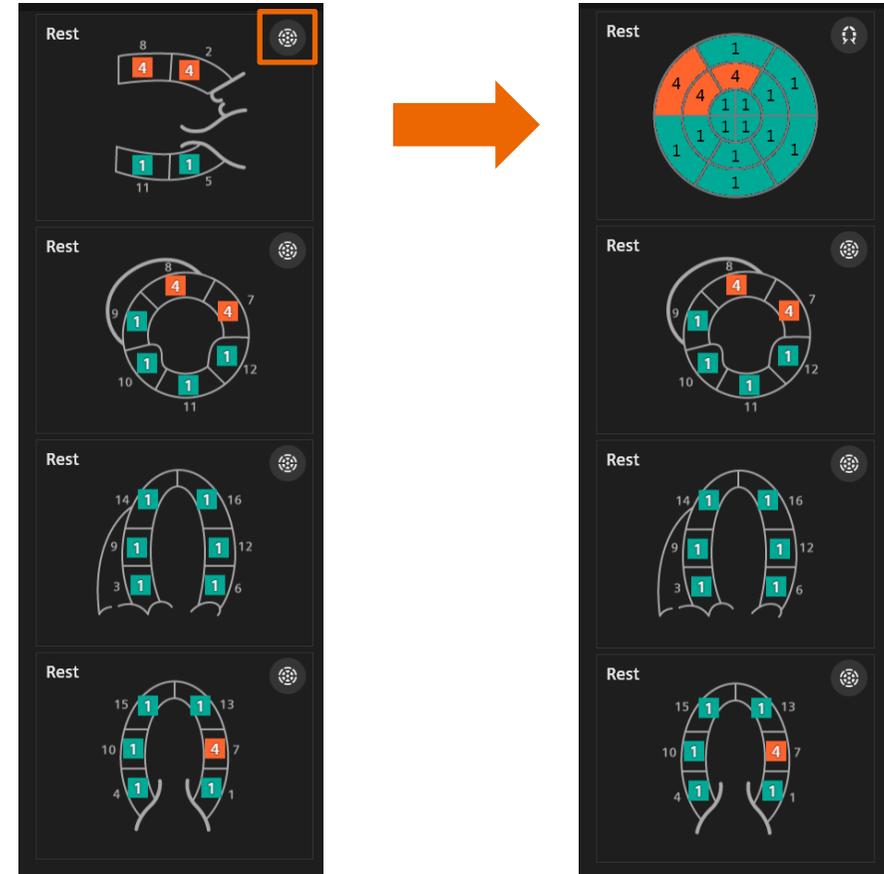
- 1 Normal
  - 2 Hypokinetic
  - 3 Akinetic
  - 4 Dyskinetic
  - 5 Aneurysmal
  - X Unable to interpret
- 
- Set not scored segments to Normal
- 
- Set all segments to Normal
- 
- Clear all segments



Use the **Set not scored segments to Normal** and **Set all segments to Normal** options for efficiency

# Wall motion scoring

- Select the bull's eye icon to view the segments in a bull's eye format
- This provides a global display of all of the segments



# Report

**Report**

Cardiac

stress, echo  
04\_06\_2019\_08\_15\_43 O ACUSON 04/06/2019

Exam Specific Information

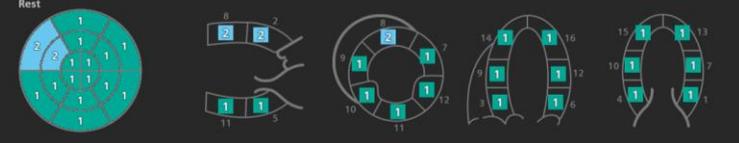
WMS Result

Indications

WMS Result

Report Type  Bull's Eye  View Plane  Both

Rest



Post



Normal  Hypokinetic  Akinetic  Dyskinetic  Aneurysmal  Unable to Interpret

WMS Summary

Segments	Rest	Post
Basal anterior	1	1
Basal anteroseptal	2	2
Basal inferoseptal	1	1
Basal inferior	1	1
Basal inferolateral	1	1
Basal anterolateral	1	1
Mid-anterior	1	1
Mid-anteroseptal	2	2
Mid-inferoseptal	1	1
Mid-inferior	1	1
Mid-inferolateral	1	1
Mid-anterolateral	1	1
Apical anterior	1	1
Apical septal	1	1
Apical inferior	1	1
Apical lateral	1	1
Sum	18	18
WMSI	1.125	1.125

Print Preview Print Report Store Report Export PDF

**Report**

Cardiac

stress, echo  
04\_06\_2019\_08\_15\_43 O ACUSON 04/06/2019

Exam Specific Information

Normal  Hypokinetic  Akinetic  Dyskinetic  Aneurysmal  Unable to Interpret

WMS Result

WMS Summary

Segments	Rest	Post
Basal anterior	1	1
Basal anteroseptal	2	2
Basal inferoseptal	1	1
Basal inferior	1	1
Basal inferolateral	1	1
Basal anterolateral	1	1
Mid-anterior	1	1
Mid-anteroseptal	2	2
Mid-inferoseptal	1	1
Mid-inferior	1	1
Mid-inferolateral	1	1
Mid-anterolateral	1	1
Apical anterior	1	1
Apical septal	1	1
Apical inferior	1	1
Apical lateral	1	1
Sum	18	18
WMSI	1.125	1.125

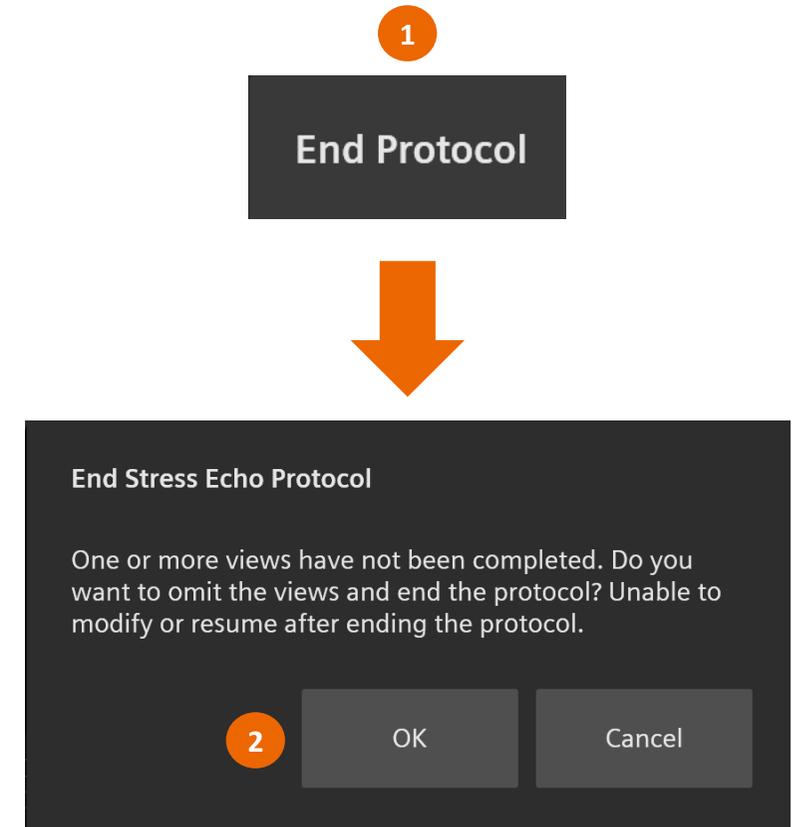
Images

2x2

Print Preview Print Report Store Report Export PDF

# End the stress echo protocol

1. Select **End Protocol** on the touch screen
  2. Select **OK** (a message will alert the user of any views that have not been completed)
- Standard imaging screen will be available
  - If desired, capture non-stress images
  - Selecting **End Study** from the touch screen will end the study completely



# Objectives

- Describe the user interface
- Explain protocol configuration
- Illustrate quick protocol configuration
- Discuss step-by-step workflow
- Describe stress echo review and image selection
- **Summarize quick exam**



# Quick stress echo exam

- Determine stress echo workflow and customize a protocol
- Begin the study
  - Obtain images outside of the stress echo
  - Launch stress echo protocol
  - Evaluate flexibility of the protocol by using View Control or without using View Control
  - Demonstrate how to pause protocol and take additional images

# Summary

- Describe the user interface
- Explain protocol configuration
- Illustrate quick protocol configuration
- Discuss step-by-step workflow
- Describe stress echo review and image selection
- Summarize quick exam



Thank you for your enthusiasm!

Questions?