

Echo Guidance

Understanding the Exam

An echo ultrasound is performed to assess heart and valve function. The exam can be transthoracic or transesophageal. In a transthoracic echo, the transducer is placed on the chest. In a transesophageal echo, a small transducer is inserted down the throat into the esophagus.

A doctor might order an echo ultrasound if the patient has abnormal heart sounds (murmurs or clicks), unexplained chest pain, shortness of breath, or an irregular heartbeat. The ultrasound can show

- Enlarged heart
- Thickness and movement of the heart walls
- Problems with valve function
- Problems with blood flow through the heart
- Blood clots or tumors in the heart

The exam typically lasts about 40 minutes.

Performing and Approving Users

		Required Credentials	Common Additional Credentials
Performed by	Sonographer	One of the following: <ul style="list-style-type: none"> • Registered Diagnostic Cardiac Sonographer (RDCS): Certified by the American Registry for Diagnostic Medical Sonography (ARDMS) • Registered Cardiac Sonographer (RCS): Certified by Cardiovascular Credentialing International (CCI) 	

		<ul style="list-style-type: none"> Registered Vascular Technologist (RVT) 	
Read by	Cardiologist	Typically board certified by the American Board of Internal Medicine (ABIM) or the American College of Cardiology (ACC) in internal medicine and at least one cardiac sub specialty	

Facility Types

This type of study is performed in these facility types:

- Community hospitals
- Outpatient imaging centers
- Public health facilities
- University-affiliated teaching hospitals and medical institutions
- Government and private research institutes
- Medical imaging facilities
- Private physician offices

Worksheet

Protocol

Selecting one of the three protocols (Transthoracic, Pediatric, Transesophageal) will adjust the worksheet to accommodate for the imaging technique used.

Items in the measurements and observations sections will change when you select a different protocol.

Transesophageal (TEE) protocol includes the addition of the Left Atrial Appendage (LAA) and Interatrial Septum (IA) tabs and does not include the Pulmonary Artery (PA) tab. A TEE requires a physician to be present, and the patient is under sedation. TEEs are normally performed in a hospital setting.

Pediatric protocol includes z-score values in the measurements section and the tab structure is designed for pediatric exams.

Measurements and Observations

This section contains the three standard tabs (Report Images, Report Attachments, Report Recipients), and 12 study-type-specific tabs. Each of these tabs corresponds to anatomical sections of the heart and relevant blood vessels.

Calculated Values

The following calculated values automatically update when any of the source values are changed in the worksheet.

Calculated Value	Source Values
LVSV	LVEDV, LVESV
LVCO	LVSV, HR
LVOT SV	LVOT Diam, LVOT VTI
LVOT CO	LVOT SV, HR
RV FAC	RV Area ED, RV Area ES
RVSP	TR Pk Vel or RAP
AVA (VTI)	LVOT Diam, LVOT VTI, or AV VTI

Note: Pacemaker observation is on the LV tab, Septal Wall Motion dropdown

MyChoice form options

- 4 Wall Motion diagram options
- By default, an observation selected for Global Wall Motion generates a statement but does not update the diagram to reflect that choice. Client can choose to have the observation selection automatically update the diagram.

Studycast Advisor

Studycast Advisor offers recommendations based on ASE guidelines related to

- AV, MV, TV, PV, Regurgitation
- LVEF Filling Dysfunction

MyChoice form options

- Studycast Advisor can be enabled or disabled.

Findings

MyChoice form options

- Available options for conditions that generate findings:

	Never Include	Always Include	Include Only If Outside Normal Range
LA	Default	X	X
AV PEAK GRAD	Default	X	X
AV MEAN GRAD	Default	X	X
AVA (VTI)	Default	X	X
AVA/BSA	Default	X	N/A
WMSI	Default	X	N/A
Global Longitudinal Strain	Default	X	N/A
EF	Default	X	X

Conclusions

MyChoice form options

- Choose whether to include only abnormal conclusions (default is no)
The following individual choices will override this global choice:

	Never Include	Always Include	Include Only If Abnormal/Outside Normal Range
Calculated EF	X	Default	X
RV		X	Default
RVSP	Default	X	X
QP/QS	Default	X	N/A
MV EROA	Default	X	N/A
MV REG VOL	Default	X	N/A
TR PEAK GRAD	Default	X	N/A

Reports

Accreditation

Reports are designed to meet requirements from

- **ICAEL:** Intersocietal Commission for the Accreditation of Echocardiography Laboratories
- **ASE:** American Society of Echocardiography
- **ASNC:** American Society of Nuclear Cardiology

MyChoice form options

- Measurements appear in a table on the report, but there are options to also have them in Findings & Conclusions
- Include (Default) or exclude Wall Motion diagram

Demo Path

When training, insert this demo path after you've covered basic worksheet orientation.

If the training is for a technologist

- Study Quality defaults to Excellent (default can be something else)
- Protocol defaults to Transthoracic, which is most commonly used
- Procedure defaults to Complete
- Informed Consent can be checked or unchecked by default

Open the report to show how Study Quality, Protocol, Procedure, Informed Consent, and Contrast Agents affect the procedure statement on the report.

For all trainees

In each tab, you'll see measurements followed by observations.

On the 4 heart chamber tabs (LV, LA, RA, RV), the cavity size measurements drive the observations. On the Aorta tab, the diameter dimension drives an observation. If any of these tabs have abnormal observations, point out the measurement that drives the observation. (Review the Worksheet Specifications document to familiarize yourself with value ranges that set various observations).

On the right, you'll see the findings and conclusions.

When you open the worksheet, you'll see findings statements already in place, including normal statements and statements generated by any abnormal observations that have already been set automatically by the measurements on the 4 chamber tabs and the Aorta tab.

That means that if no other measurements outside the normal range require your consideration, you can generate the conclusions and Set Preliminary/Approve.

Key Studycast Benefit

Abnormal measurements **automatically** set observations and generate findings.

Normal reports can be generated with two clicks (generate conclusions and Set Preliminary/Approve).

Then clear the conclusions so you can show how to make changes.

Knowing that normal statements are already in place, you only need to visit tabs where you want to comment on any abnormality.

On the LV tab, you have the interactive diagram. Demonstrate that if you click on any segment and continue to click, it will rotate through the legend choices, or if you click on the legend and then click the segment, it will apply that choice automatically.

Note whether the client has it set to appear on the report by default and demonstrate that you can toggle it on/off for this particular study (Display on report check box).

Show example of documenting abnormality on another tab.

Mitral valve: choose mild stenosis and mild regurgitation, then click Generate to update the findings.

(**Note:** This combination can generate two statements or a single combined statement, depending on what the client chose in the MyChoices form.)

Generate conclusions and note that it pulls down everything from the LV as it did before, along with other abnormal statements, including the one we just generated for the mitral valve.

Conclusions either...

ALWAYS pull down everything from the left ventricle (and RV, if MyChoices option set) and statements from any tab where an abnormal observation was noted.

Or (based on MyChoices option)

Pull down everything from LV (and RV if MyChoices option set) and ONLY statements generated from abnormal observation selections.

Key Studycast Benefit

Instead of choosing each finding statement to pull down to conclusions individually, the worksheet automatically pulls down LV and all statements from any tab with abnormal observation.

This saves time and you won't accidentally

Let's say you wanted to add your own findings statement. Demonstrate how to free type additional findings by adding something like "more abnormal info." Then regenerate conclusions and note whether that free-typed statement is pulled down (MyChoices option: default = yes). If you don't want this statement in the Conclusions, you can click the X to delete it.

miss something.
(MyChoices option on everything from tab with abnormal observation vs. only abnormal statements should be based on user preference/ likelihood of free text in findings.)

Advisor

Explain that if the Advisor is highlighted yellow, it has a recommendation. Open the Advisor window and hover over the ? next to a recommendation to show the specific ASE guidelines the recommendation is based on.

If you click Apply, it updates the relevant observation. If the Regenerate box is checked, it automatically updates the findings, too.

Note that in the Before/After window, you can override individual changes. Choose Apply and note where the new statement appears in the findings.

Regenerate the conclusions to show that a new statement appears there, as well.

As you work through the observations, you do NOT have to generate findings/conclusions after working on each tab.

To demonstrate, choose the following observations:

- Pericardium: Small pericardial effusion
- Aorta: Aneurysm
- Pulmonary Artery: Stenosis

Then click Generate All Findings and note that the statements are updated with all the abnormal findings we just selected. Generate conclusions, those are updated as well.

Demonstrate how to delete and reorder statements.

Open the report to show that all the changes are reflected there.

SWOT Analysis

Strengths	Weaknesses
<ol style="list-style-type: none"> 1. Access to comprehensive Echo images and report via any browser. 2. All echo values are consistent with IAC and ASE requirements. 3. All aspects of Doppler measurements are available (2d vs MM). 4. Multiple options for interactive diagrams. 5. Worksheet prompts for abnormal values in the observations section. 6. Customized calculations panel favorites. 7. Browser-based calculations package for post-measurement ability. 8. Can Compare to patient's previous results in both the viewer and generated statements. 	<ol style="list-style-type: none"> 1. Procedure list does not reflect whether contrast agent or agitated is used in test and does not indicate which contrast agent was used. 2. Abnormalities must be manually entered into the observations box by tech. 3. DICOM Query Retrieval is not available. 4. Cannot post-process 3D/4D imaging.
Opportunities	Threats
<ol style="list-style-type: none"> 1. Better identifier for contrast and agitated saline studies. 2. Have a published criteria limit available to prompt abnormal values in the measurement section of the worksheet, thus triggering the abnormal observations. (Alerting user to be mindful of the observation section.) 3. Since IAC requires Ht, Wt and BP to be recorded prior to exam, the 	<ol style="list-style-type: none"> 1. Studycast is viewed as a small company, and the solution is seen as unsophisticated 2. Larger facilities are moving toward VNA's (Vendor Neutral Archive) and are no longer looking for a traditional PACS.

<p>worksheet could force user to add these values before allowing any changes to the worksheet.</p> <ol style="list-style-type: none">4. Rural or small hospital facilities with remote reading physicians.5. Expand within facilities using Studycast in a single department.	
---	--