

# ECHOCARDIOGRAPHY ROTATION

Our program observes the three training levels described in the *ACC/AHA Clinical Competence Statement on Echocardiography*, *JACC* Vol. 41 (4) 2003. Trainees should confirm that they have “passed” their current level of training by scheduling a formal review meeting with the medical director during months 2 and 5. The different levels require minimum numbers of examinations performed and interpreted. In order to obtain an adequate case mix, fellows should generally exceed the minimum case number requirements for an ideal training experience. Trainees must learn to perform complete and technically adequate echo exams routinely. Moreover, the echo exam should adequately answer the clinical question at hand. Reporting should be timely and convey not only the objective data, but provide appropriate synthesis that is practical for clinical management. Accordingly, trainees will be evaluated on their ability to understand referred cases prospectively, develop their fund of clinical cardiology knowledge and physical exam skills. Trainees should communicate important echo findings to the responsible echo medical staff and referring physicians with the proper level of urgency and decorum. Lab protocols, standards and accreditation are emerging requirements that are incorporated into the program.

## LEARNING OBJECTIVES & EXPECTATIONS

1. Exam indication and appropriateness (chart review, H& P)
2. Correlate physical exam findings (auscultation)
3. Technical ability (scanning)
4. Interpretation—independent pre-reads with staff over read.
5. Reporting: timely, concise, provides synthesis
6. Patient care: Echo trainees must always be available in the lab
  - 6.1. Examine and treat patients experiencing symptoms or instability
  - 6.2. Inject contrast for techs when RN’s not able (certain floors)
  - 6.3. Other patient care activities, back up for stress lab
7. Q/A measures (participation by all level trainees required)
  - 7.1. Echo-MRI correlation conference
    - 7.1.1. alternate Wednesdays 8:00 AM—MRI reading room, radiology, B1
    - 7.1.2. Prepare cases in advance
    - 7.1.3. Complete correlation sheets—deliver to Sue Maisey, Manager.
  - 7.2. Stress Echo review conference
    - 7.2.1. alternate Thursdays 1:00 PM—echo reading room
    - 7.2.2. Prepare cases in advance
    - 7.2.3. Complete correlation sheets—deliver to Sue Maisey, Manager
  - 7.3. “Critical results” notification data (echo worksheet and final report summary)
8. Lab Policies for patient safety, procedures, reporting and accreditation.
  - 8.1. General SLEH and Joint Commission policies
    - 8.1.1. Contact =Elizabeth Phashe, RN (supervisor)—documentation & consent.
  - 8.2. Intersocietal Commission for the Accreditation of Echo Laboratories (ICAEL).
    - 8.2.1. Contact =Sue Maisey, Manager
  - 8.3. “Stat” or on call exam issues

- 8.3.1. Contact = echo tech on call
- 8.3.2. Contact = Upper level echo fellow on call
- 8.3.3. Contact = Medical Director or designee / on call medical staff
- 9. Learning
  - 9.1. Scanning—one on one with techs progressing to independent scanning
  - 9.2. Review scanned exams with medical staff
  - 9.3. Reading—ongoing, see text list, below & online resources available in lab.
  - 9.4. Lectures—attend comprehensive year long bi-monthly noon echo lecture series
  - 9.5. Physics of ultrasound lecture series (6 hours, Jan & Feb) times TBA
  - 9.6. Daily read out sessions with assigned medical staff
  - 9.7. Journal Club—fellow directed
- 10. Feedback & Evaluation
  - 10.1. Fellow evaluation forms
  - 10.2. Meet with medical director whenever needed
  - 10.3. Schedule formal review with medical director during months 2 & 5
  - 10.4. Level 3 trainees should discuss lab issues frequently with medical director.
  - 10.5. Discuss progress or concerns with any of the teaching medical staff

## TRAINING LEVELS

### Level 1

- Minimum training months: 3
- Minimum performed surface echo exams: 75
- Minimum interpreted surface echo exams: 150

This level of training is introductory and provides basic scanning and interpretation skills for most common cardiovascular pathology. Level 1 training is needed in order to be “board eligible” for cardiovascular disease certification. Level 1 is not considered adequate training for independent interpretation of surface echocardiograms or for becoming eligible as a medical staff member in an ICAEL-accredited lab. *Note: The St. Luke’s Medical Tower clinical rotation may be count towards echo training. If, over two months in the tower echo lab a fellow performs and interprets a significant number of exams (> 60 performed and interpreted) with feedback, the trainee will earn the equivalent of 1 month echo training. Discuss with medical director at 2 & 5 month review meeting.*

### Level 2 Transthoracic Echo

- Minimum cumulative training months: 6
- Minimum performed surface echo exams: 150 (75 additional)
- Min. interpreted surface echo exams: 300 (150 additional)

This training level should provide the skills necessary for independent interpretation of a broad spectrum of cardiovascular pathology, including commonly encountered congenital heart disease using standard techniques, including echo contrast agents. For advanced techniques, complex

congenital and unusual cases, the back up of a level 3 echocardiographer may be needed. Note: **ICAEL echo lab accreditation standards:** medical staff members must have level 2 training or above. If level 2 trained, the lab's Medical Director must first have had 1 year practice experience following training with a minimum of 600 echo interpreted during the practice year.

### Level 2 + Stress Echo:

Stress echo certification requires level 2 transthoracic echo training (6 mo's). However, the stress echo experience may begin at any time. A Level 1 trainee may not independently perform or supervise a stress echo in our lab. With prior experience and medical staff approval, Level 2 and Level 3 trainees may supervise and perform stress echo independently. *Note: Fellows must not discuss stress echo results with a patient or family until interpretation and approval by the responsible medical staff member.*

- Minimum cumulative training months           6 (level 2)
- Minimum SE performed + interpreted:       100

### Level 2 + TEE

TEE: Permission from the Medical Director is required. A list of approved TEE trainees will be provided to the nursing and medical staff. Training may begin only after the trainee has met level 2 requirements (150 TTE performed and 300 interpreted) and no sooner than the 5<sup>th</sup> month of training. For THI fellows, TEE examinations performed at other hospitals may not be applied towards TEE credentialing numbers. Note: Medical Staff should be present for probe insertion and exam.

- Minimum cumulative training months:       8
- esophageal intubations, gastroscope       5       (GI service—Dr. L. Hochman)
- Min. TEE's performed and interpreted:       50       (single operator with probe insertion)

TEE skills can be easily acquired by most operators with the minimum recommended number of exams (50). Excellence in TEE requires an extensive base of surface echo knowledge and experience in addition to a strong case mix. In our experience, 50 TEE's does not provide an adequate case mix. Patient volumes generally allow > 100 exams per trainee even when starting TEE's after the 5<sup>th</sup> month of echo training.

### Level 3

- Minimum cumulative echo months           12
- Consecutive months in the lab               6
- TEE's performed & interpreted                $\geq 50$  (300 ideal + intraop)
- SE's performed & interpreted                $\geq 100$
- All exams performed (TTE, TEE, SE)       300 (150 additional)
- All exams interpreted                         750 (450 additional)
- Significant exposure to adult congenital (may rotate for 1 mo on pedi echo, TCH)

- Know special techniques: contrast, 3D, parametric modalities, emerging
- Publish approved echo-related research project
- Supervise lab personnel
- Teach junior trainees
- Coordinate lab special procedure schedule
- Coordinate lab Q/A meetings
- Coordinate sonographer clinical lecture series (bi-monthly by fellow)
- NBE comprehensive certification (ASCeXAM)—recommended
- Work closely with medical director

Level 3 trainees should be proficient in performance, interpretation and *teaching* of standard surface echocardiograms, stress echos and TEE’s. Case mix should include the broad spectrum of cardiovascular pathology. Special techniques should be learned. An echo-related research project should be started early on with a publication draft submitted prior to departure. The level 3 trainee completing our program should be able to “run” a tertiary cardiovascular center teaching echo lab.

Perioperative TEE:

This unique experience is available for cardiology trainees at the THI. Because experienced cardiologists may be called upon for back up in complex intraoperative cases, all level 3 and interested level 2 + TEE trainees are strongly encouraged to gain additional intraoperative TEE experience. The laboratory participates in the training of cardiovascular anesthesiology fellows for perioperative NBE TEE certification. For anesthesiologists, this requires “study” of 300 TEE case of which 150 must be both performed and interpreted by the trainee. Cardiology fellows’ mentoring of CV anesthesiology fellows on shared cases has proven to be invaluable for their learning. There are no formally accepted cardiology trainee intraoperative TEE training guidelines. Cases should be supervised by the cardiology service medical staff. CV anesthesia fellows setting up each case should be instructed to page the cardiology TEE fellow for participation.

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|---|-----------|
| • Min. recommended MV repair                | 20        |
| • Min. recommended other valve, etc.        | 20        |
| • Min. recommended congenital               | <u>10</u> |
| • Min. recommended total with good case mix | 50        |

A separate Perioperative TEE experience can be noted (if appropriately documented) on a trainee’s final certification letter.

<b>Legend for Learning Activities</b>	
ERG—Echo report generation	EMC – Echo MR conference
FS – Faculty Supervision	LR – Literature Review (independent)
CC – Core Curriculum conferences	RC – Research Conference
DPC – Direct Patient Contact in the echo lab	SER – Stress echo review conference
PSTT -- Patient Scanning (transthoracic)	RWF—Reading with faculty
JC---- Journal Club	TEE—Transesophageal echo performance
POU—Physics of Ultrasound lecture series	SEP--- Stress echo performance
COR—Communication of results to ordering MD	

<b>Legend for Evaluation Methods for Fellows</b>	
AE – Attending Evaluations	EDR—Echo director review
PDR – Program Director’s Review (twice annually)	

### **Principal Educational Goals by Relevant Competency**

The educational goals and objectives for the CD fellow on this rotation are indicated for each of the six ACGME competencies in the tables below. The first column describes whether the objective is knowledge, skill and/or attitude. The third column lists the most relevant learning activities for that objective, and the fourth column indicates the evaluation methods for that objective.

#### **A. Patient Care**

**Goal:** Fellows rotating on echocardiography must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of Cardiovascular diseases.

<b>Knowledge, Skills, Attitude</b>	<b>Objectives – Fellows will demonstrate the:</b>	<b>Learning Activities</b>	<b>Evaluation Methods</b>
Knowledge, Skills	Ability to take a relevant medical history and perform a careful and accurate physical examination relevant to echocardiographic indication	DPC, PSTT, TEE, SEP	AE
Knowledge, Skills	Ability to write concise, accurate and informative histories, physical examinations on patients undergoing Stress echo/ TEE	DPC, TEE, SEP	AE
Knowledge, Skills	Ability to explain to the patients the risks, as well as benefits of a particular echocardiographic procedure	DPC, TEE, SEP	AE

#### **B. Medical Knowledge**

**Goal:** CD fellows rotating on echocardiography must demonstrate knowledge about established principles and evolving basic and clinical science of cardiovascular diseases, as it relates to the use of echocardiography as a diagnostic tool.

<b>Knowledge, Skills, Attitude</b>	<b>Objectives – Fellows will demonstrate the:</b>	<b>Learning Activities</b>	<b>Evaluation Methods</b>
Knowledge, Skills	Ability to properly order, perform, and interpret echocardiographic results.	ERG, PSTT, FS, RWF, TEE, SEP, JC, CC	AE, EDR, PDR
Knowledge, Skills	Ability to correlate findings of echocardiographic studies as it related to other imaging modalities	EMC, JC, SER, LR, CC	AE/ EDR
Knowledge	Ability to understand the generation as well as physical properties of ultrasound waves, as it relates to echocardiography.	POU	EDR
Knowledge, Skills	Knowledge/ performance of the use of echocardiographic contrast studies	PSTT, SEP	AE
Knowledge, Skills	Demonstrate knowledge for the diagnosis / follow-up of patients with ischemic heart disease	ERG, RWF, SEP, SER	AE
Knowledge	Demonstrate knowledge for the diagnosis / follow-up of patients with valvular heart disease	ERG, RWF	AE
Knowledge	Understand the utility of echocardiography in the care of post-operative patients.	ERG, RWF, PSTT, TEE	AE

### **C. Interpersonal Skills and Communication**

**Goal:** Fellows rotating on echocardiography must demonstrate the knowledge, skills and attitudes necessary to develop and maintain appropriate interpersonal relationships and to communicate effectively with patients, families, colleagues and the public.

<b>Knowledge, Skills, Attitude</b>	<b>Objectives – Fellows will:</b>	<b>Learning Activities</b>	<b>Evaluation Methods</b>
Skill	Communicate sensitively and effectively with patients and with their families	DPC, FS, TEE, SEP	AE
Skill, Attitude	Develop ability to communicate their findings with colleagues in the field of echocardiography, as well as other imaging modalities.	EMC, LR, JC, RWF, SER	AE, EDR

#### D. Professionalism

**Goal:** CD fellows rotating on echocardiography must demonstrate the knowledge, skills, and attitudes necessary to practice professionally responsible, ethical and compassionate care in clinical cardiovascular diseases.

<b>Knowledge, Skills, Attitude</b>	<b>Objectives – Fellows will:</b>	<b>Learning Activities</b>	<b>Evaluation Methods</b>
Knowledge, Skill, Attitude	Interact professionally towards patients, families, colleagues, and all members of the health care team	DPC, FS, PSTT, TEE, SEP	AE, EDR, PDR
Attitude	Display an appreciation of the social context of illness	DPC, TEE, PSTT, SEP	AE
Knowledge, skill, Attitude	Fulfill all the requirements to assure the privacy and confidentiality of all the medical information of the patient.	DPC	AE

#### E. Practice-Based Learning and Improvement

**Goal:** CD fellows rotating on echocardiography must demonstrate the knowledge, skills, and attitudes necessary to initiate self-directed and independent learning. CD fellows must keep abreast of current information and practices relevant to cardiovascular disease.

<b>Knowledge, Skills, Attitude</b>	<b>Objectives – Fellows will:</b>	<b>Learning Activities</b>	<b>Evaluation Methods</b>
Attitude	Demonstrate a commitment to professional scholarship through the systematic and critical persual of relevant print and electronic medical literature, with an emphasis on the integration of basic science with clinical medicine, and evaluation of information in light of the principles of evidence-based medicine	CC, JC, EMC, LR, SER	AE, EDR, PDR
Skill, Attitude	Demonstrate a commitment to learning through participation in research and producing formal presentations and/or publications	CC, LR, RC	EDR, PDR

#### F. Systems-Based Practice

**Goal:** CD fellows on echo rotation must demonstrate the knowledge, skills, and attitudes necessary to manage effectively in multiple, diverse, complex systems of care to provide effective treatment, consultation and referrals for patients.

<b>Knowledge, Skills, Attitude</b>	<b>Objectives – Fellows will:</b>	<b>Learning Activities</b>	<b>Evaluation Methods</b>
Skill, Attitude	Display a willingness and ability to help the requesting physician in a consultative management capacity, according to the needs of the situation	COR	AE, EDR
Skill, Attitude	Integrate knowledge learned through participation in echo reading with faculty, multimodality review conferences and other educational activities into their practice	RWF, EMC, SER	AE, EDR
Attitude	Participate in refinement of care delivery systems ensuring provision of evidence-based care	RC, JC, LR, CC	EDR, PDR
Attitude	Consider the cost-effectiveness of diagnostic, prevention and treatment modalities when selecting such strategies for patients.	RWF	AE
Attitude	Participate in continuous quality improvement of echo lab as it relates to Intersocietal Commission for the Accreditation of Echo Laboratories (ICAEL)	FS, RWF	EDR