

**Echocardiography  
RI Hospital**

**Overview of Rotation**

*Revision Date: April 2007*

<b>I. GENERAL INFORMATION</b>	
<b>Name of Rotation</b>	Echocardiography
<b>Director</b>	Athena Poppas, M.D.
<b>Duration of Rotation</b>	1 month
<b>Location</b>	RI Hospital
<b>Administrative/Secretarial Contact &amp; Phone</b>	Jane Freer, 444-8041
<b>Location to report on first day of rotation</b>	Main Bldg, Rm 209
<b>Resident Study/Resource Area</b>	Echo reading room

<b>II. FACULTY</b>	Drs. Poppas, B. Abbott, Gilson, Levine, Raymond, Robertson, Stockwell, Weigner
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**Lines of Responsibility (in order):**

In all clinical in-patient rotations, cardiology fellows will interact with generalists and specialists in all areas, functioning as consultants for cardiovascular problems. This rotation is laboratory-based, and as such the fellow's primary responsibility is related to the performance and interpretation of diagnostic cardiac imaging studies. Particularly close interactions are fostered with referring physicians (all specialties), house staff, stress lab nurse clinicians, and imaging technologists. The team is led by the attending, who bears final responsibility for patient management and image interpretation. The cardiology fellow is next in line, followed by medical residents if present on the rotation.

**III. GENERAL GOALS AND EDUCATIONAL OBJECTIVES FOR THIS ROTATION**

**General Goals:** The goal of the echo lab rotation is to develop competence in the performance and interpretation of all the different modalities of echocardiography. This should be achieved in a logical step-wise approach of increasing complexity and depth of knowledge. This specific curriculum outlines the hands-on training requirements and the cognitive skills required, citing reading sources for achieving this knowledge. A clear reading curriculum is outlined for the fellows to follow and to be supplemented by Dr. Poppas and the other attendings as pertinent cases arise. This rotation, with others, also will serve to allow the fellow to achieve competence in stress testing procedures. Core training involves 3-4 months in the RIH echo lab. As an elective (additional months in the 2<sup>nd</sup> or 3<sup>rd</sup> year), the goal of this rotation is to achieve level 2 or 3 competency in echocardiography.

**Objectives:**

**First and Second Year Core 3 Month Requirement:**

Transthoracic echocardiography

1. Understand the physics involved in image acquisition and blood velocity measurement.
2. Understand and be able to properly use echocardiographic equipment.
3. Acquire a working knowledge of cardiac anatomy, physiology, hemodynamics, and pathology relevant to echocardiography.
4. Understand fluid dynamics and cardiovascular blood flow.
5. Understand the role of these procedures in clinical practice, including: diagnostic and prognostic utility, cost, and limitations.

Transesophageal echocardiography and stress echocardiography (2<sup>nd</sup> and 3<sup>rd</sup> month)

1. Understand the indications, contraindications, and risks of transesophageal echocardiography.
2. Gain experience in esophageal intubation, probe passage, acquisition, and interpretation of transesophageal echocardiography.
3. Understand the indications, contraindications, and risks of stress echocardiography.
4. Gain experience in the analysis of images and interpretation of stress echocardiography.

**Elective (for level 2 or 3 training; see ACC COCATS guidelines):**

1. Gain sufficient experience to acquire and interpret echocardiograms independently (level 2 or 3). This includes transthoracic, transesophageal, and stress echocardiography studies.
2. Learn the indications, contraindications, and limitations of all stress testing modalities (exercise and pharmacologic).
3. Obtain proficiency in producing an accurate written report.
4. Understand digital image analysis and processing.
5. Understand the risks, benefits, and mechanism of echo contrast agents.

**IV. TOPICS/TEACHING METHODS/MATERIALS USED DURING THIS ROTATION**

**Specific topics to be covered during this rotation:**

Echocardiography

**Principal teaching methods (see section IX):**

Clinical teaching (A)

Clinical experiences (B)

Performance feedback

Monthly evaluations (C1)

Semiannual evaluations (C2)

Conferences (echo conference) (D)

**Educational materials provided/referred to the resident:**

The following topics should be reviewed in one of the major, comprehensive textbooks of echocardiography (Weyman [the primary reference], Oh, Otto):

Month 1:

Physical Principles of Ultrasound

Technical Principles and Instrumentation

Cross Sectional Examination

Standard Imaging Planes

M-mode Exam

LV volumes and function evaluation

LV function

Month 2:

Principles of Doppler Flow

Routine Doppler Exam

TEE

CAD

Cardiomyopathies

Septal motion

RV pressure evaluation

Pericardium

Doppler text (from Hatle)

Month 3:

Principles of flow  
Fluid dynamics  
Endocarditis  
M.R. quantitation  
A.I. quantitation  
Diastolic function  
ASD  
Systemic venous flow  
VSD  
Ebstein's  
Constriction/restriction  
Physics of Blood flow (from Hatle)

Month 4:

Principles of color flow  
Evaluation of gradients  
Doppler and volumetric flow  
Congenital Heart Disease: Systemic Approach  
Congenital Heart Disease: Pathology  
Tumors  
Literature (available in binder in Echo lab)

**V. EVALUATIONS**

A. Evaluation of the resident's successful completion of the above goals will be carried out by the attending physicians. Assessment methods includes:

- Clinical performance ratings: Rotation evaluations (1A), semiannual evaluations (1B)
- Focused observation and evaluation (2)
- Faculty/staff meetings (4)
- Procedure logs (5)
- Project reports (portfolio) (6A)

B. Residents will evaluate the rotation annually.

**VI. RESPONSIBILITY OF ATTENDING ON ROTATION**

1. Read and report all clinical studies on the day performed.
2. Teach fellow in the principles and practice of echocardiography.
3. Teach fellow the role of echocardiography relative to other imaging modalities.
4. Recommend appropriate reading material for fellows.

**VII. RESPONSIBILITY OF RESIDENT ON ROTATION**

1. Month 1 (transthoracic imaging, instrumentation):
  - a. The fellow should spend 3-4 hours each morning with a sonographer for hands-on learning.
  - b. When needed, screen studies for appropriateness, communicate with referring physicians, and answer questions from clinicians or technologists about any aspect of the study.
  - c. Prepare an echo conference: select several interesting cases around a central theme, supplemented with relevant reading.
2. Month 2 (transthoracic imaging, pulsed Doppler, introduction to TEE):
  - a. If needed, additional studies with a sonographer for hands-on learning with a focus on Doppler.
  - b. Obtain initial experience in TEE and probe insertion.

- c. When needed, screen studies for appropriateness, communicate with referring physicians, and answer questions from clinicians or technologists about any aspect of the study.
  - d. Prepare an echo conference: select several interesting cases around a central theme, supplemented with relevant reading.
3. Month 3 (transthoracic imaging, Doppler, TEE, introduction to stress echo):
- a. Obtain additional experience in transthoracic echo and TEE (including continuous wave Doppler).
  - b. When needed, screen studies for appropriateness, communicate with referring physicians, and answer questions from clinicians or technologists about any aspect of the study.
  - c. Prepare an echo conference: select several interesting cases around a central theme, supplemented with relevant reading.
  - d. Teach basic echo principles to junior fellows.
4. Month 4 (transthoracic imaging, Doppler, TEE, stress echo, introduction to intraoperative echo):
- a. Same as month 3 above.
  - b. Obtain initial experience in intraoperative echocardiography.
5. Advanced Echo Training (additional 1-8 months):
- a. Obtain appropriate experience to achieve level 2 or 3 training in echocardiography.
  - b. Prepare an echo conference. Level 3 fellows will prepare 6 core lectures on specific topics as guided by Dr. Poppas.
  - c. The fellow will manage all aspects of the laboratory under the direction of the attending of the day.

**VIII. CONFERENCE AND CLINIC SCHEDULE SPECIFIC TO THIS ROTATION**

	Monday	Tuesday	Wednesday	Thursday	Friday	
AM			Echo conference (noon)			
PM						

**IX. CORE COMPETENCY CURRICULUM**

Competency Category	Specific Goals	Teaching & Assessment (sections IV, V above)
Medical Knowledge	Demonstration of investigatory and analytical thinking relevant to the clinical rotation	A,B,C,D -- 1,2,4,5,6A
	Acquisition the appropriate background relevant to specific rotations	B,C -- 1,2
Patient Care	Application of basic and population science to practice	A,B,C,D -- 1,2,6A
	Obtains appropriate information concerning the patient (history, past medical records, examination)	B,C -- 1,2,4
	Knowledge of the appropriate indications for diagnostic and therapeutic cardiology procedures	A,B,C -- 1,2,4
	Understands utilization of information technology as it relates to clinical care of patients	B,C -- 1,2
Practice-Based Learning &	Procedures: ECG, Holter	B,D -- 2
	Procedures: Stress testing (level 1)	B -- 2,5
	Procedures: Echocardiography or Nuclear Imaging (level 1)	A,B,C -- 1,2,4,5
	Demonstration of self-critical thinking and motivation to improve	B,C -- 1,2,4

Improvement

Professionalism

Commitment to professional responsibilities and ethics B,C -- 1,2,4

Commitment to ongoing professional development B,C -- 1,2,4