

## **Rotation: Echocardiography: Transthoracic Echocardiography (TTE)**

### **Rotation Format and Responsibilities:**

Fellows rotate in the echocardiography laboratory in each clinical year. Rotations during the first year are dedicated to TTE performance and interpretation. During the second year rotations include both TTE and TEE. Training in TTE is structured to give the cardiology fellow an opportunity to acquire the skills to perform and interpret transthoracic echocardiograms. During this rotation the fellow will learn the basic physics of cardiac ultrasound, become familiar with instrumentation and understand the strengths and limitations of this imaging modality. In addition, the fellow will learn cardiovascular anatomy, physiology, and pathophysiology as it pertains to the echocardiographic examination, and be able to integrate echocardiographic findings with the clinical scenario and other cardiovascular tests. Activities during the day include the performance of echocardiograms under the supervision of an experienced sonographer, supervision of stress tests and contrast studies as requested by the staff, and interpretation of studies with faculty review. The fellows are also expected to attend and present at the weekly echocardiography conference.

### **Learning Objectives Year 1**

<b>Medical Knowledge</b>	
<b>Objective</b>	<b>Teaching Methods</b>
1. Know the physical principles of ultrasound and the instrumentation used to obtain images.	- Hands on experience with sonographers -
2. Know the standard views included in a comprehensive transthoracic echocardiogram.	- Hands on experience with sonographers - Performance Feedback
3. Know the techniques to quantify cardiac chamber sizes and evaluate left and right ventricular systolic and diastolic function and hemodynamics.	- Clinical Teaching - Didactics - Performance Feedback
4. Know the characteristic findings of cardiomyopathies.	- Clinical Teaching - Didactics - Performance Feedback
5. Know the use of echocardiographic and Doppler data to evaluate native and prosthetic valve function	- Clinical Teaching - Didactics - Performance Feedback
6. Know the echocardiographic findings of cardiac ischemia and infarction, and the complications of myocardial infarction.	- Clinical Teaching - Didactics - Performance Feedback
7. Know the echocardiographic findings of pericardial effusion and tamponade	- Clinical Teaching

	<ul style="list-style-type: none"> <li>- Didactics</li> <li>- Performance Feedback</li> </ul>
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<b>Patient Care</b>	
<b>Objective</b>	<b>Teaching Methods</b>
1. Able to perform and interpret a basic echocardiographic study using two-dimensional , M-mode and Doppler techniques	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Hands on experiences</li> <li>- Performance Feedback</li> </ul>
2. Integrate echocardiographic findings with clinical and other testing results in the evaluation and management of patients	<ul style="list-style-type: none"> <li>- Clinical teaching</li> <li>- Performance Feedback</li> </ul>
3. Know and promote adherence to guidelines and appropriate use criteria for echocardiography	<ul style="list-style-type: none"> <li>- Clinical teaching</li> <li>- Performance Feedback</li> </ul>
4. Understand the appropriate use of contrast and how to administer safely	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Hands on experiences</li> <li>- Performance Feedback</li> </ul>

<b>Practice Based Learning and Improvement</b>	
<b>Objective</b>	<b>Teaching Methods</b>
1. Appropriately Identify areas of weakness in own skills and works to make improvements	<ul style="list-style-type: none"> <li>- Independent reading</li> <li>- Clinical teaching</li> <li>- Didactics</li> <li>- Attending evaluation and feedback</li> </ul>
2. Respond appropriately to feedback	<ul style="list-style-type: none"> <li>- Performance evaluation</li> </ul>

<b>Interpersonal and Communication Skills</b>	
<b>Objective</b>	<b>Teaching Methods</b>
1. Provide timely and appropriate communication to ordering providers when appropriate	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Clinical Experiences</li> <li>- Role Models</li> </ul>
2. Provide accurate and timely documentation	<ul style="list-style-type: none"> <li>- Clinical Experience</li> <li>- Role Models</li> </ul>

	<ul style="list-style-type: none"> <li>- Performance Feedback</li> </ul>
3. Communicate effectively with patients and families	<ul style="list-style-type: none"> <li>- Role Models</li> <li>- Performance Feedback</li> </ul>
4. Accurately and effectively obtain informed consent	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Role Models</li> <li>- Performance Feedback</li> </ul>

<b>Professionalism</b>	
<b>Objective</b>	<b>Teaching Methods</b>
1. Maintain patient privacy and comfort throughout the procedure	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Role Models</li> </ul>
2. Demonstrate appropriate sensitivity to patient and family needs	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Role Models</li> </ul>
3. Remain accessible to colleagues and laboratory personnel	<ul style="list-style-type: none"> <li>- Performance Feedback</li> </ul>
4. Accept personal responsibility for actions	<ul style="list-style-type: none"> <li>- Role Models</li> <li>- Performance Feedback</li> </ul>

<b>Systems Based Practice</b>	
<b>Objective</b>	<b>Teaching Methods</b>
1. Work effectively as a member of the echocardiography laboratory and the health care team	<ul style="list-style-type: none"> <li>- Clinical teaching</li> <li>- Role models</li> <li>- Evaluation and feedback</li> </ul>
2. Identify areas within the echocardiography laboratory that need improvement	<ul style="list-style-type: none"> <li>- Clinical teaching</li> <li>- Role Models</li> <li>- Evaluation and feedback</li> </ul>

## Learning Objectives Year 2

<b>Medical Knowledge</b>	
<b>Objective</b>	<b>Teaching Methods</b>
1. Know the echocardiographic and Doppler data necessary to evaluate complex native and prosthetic valve function	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Didactics</li> <li>- Performance Feedback</li> </ul>
2. Know the characteristic findings of simple congenital heart disease.	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Didactics</li> <li>- Performance Feedback</li> </ul>
3. Know the echocardiographic findings of pericardial constriction and how to differentiate from restrictive cardiomyopathy	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Didactics</li> </ul>

	<ul style="list-style-type: none"> <li>- Performance Feedback</li> </ul>
4. Know the techniques to diagnose cardiac masses and endocarditis	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Didactics</li> <li>- Performance Feedback</li> </ul>
5. Know the techniques to assess pulmonary artery pressures and diseases of the right heart	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Didactics</li> <li>- Performance Feedback</li> </ul>
6. Know how to assess aortic disease	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Didactics</li> <li>- Performance Feedback</li> </ul>
7. Know the role of strain imaging in the assessment of cardiac disease	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Didactics</li> <li>- Performance Feedback</li> </ul>
8. Know the applications of 3-D echocardiography	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Didactics</li> </ul>

<b>Patient Care</b>	
<b>Objective</b>	<b>Teaching Methods</b>
1. Able to perform and interpret a complete echocardiographic study using two-dimensional , M-mode and Doppler techniques	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Hands on experiences</li> <li>- Performance Feedback</li> </ul>
2. Integrate echocardiographic findings with clinical and other testing results in the evaluation and management of patients	<ul style="list-style-type: none"> <li>- Clinical teaching</li> <li>- Performance Feedback</li> </ul>
3. Interpret stress echocardiography in the assessment of coronary artery disease	<ul style="list-style-type: none"> <li>- Clinical teaching</li> <li>- Performance Feedback</li> </ul>
4. Incorporate stress hemodynamic information in the management of complex valve disease or hypertrophic cardiomyopathy.	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Hands on experiences</li> <li>- Performance Feedback</li> </ul>
5. Perform and interpret contrast echocardiographic studies	<ul style="list-style-type: none"> <li>- Clinical Teaching</li> <li>- Hands on experiences</li> <li>- Performance Feedback</li> </ul>

<b>Practice Based Learning and Improvement</b>	
<b>Objective</b>	<b>Teaching Methods</b>
1. Appropriately Identify areas of weakness in own skills and works to make improvements	<ul style="list-style-type: none"> <li>- Independent reading</li> <li>- Clinical teaching</li> </ul>

	<ul style="list-style-type: none"> <li>- Didactics</li> <li>- Attending evaluation and feedback</li> </ul>
2. Respond appropriately to feedback	<ul style="list-style-type: none"> <li>- Performance evaluation</li> </ul>

<b>Interpersonal and Communication Skills</b>	
<b>Objective</b>	<b>Teaching Methods</b>
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<b>Objective</b>	<b>Teaching Methods</b>
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3. Remain accessible to colleagues and laboratory personnel	<ul style="list-style-type: none"> <li>- Performance Feedback</li> </ul>
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<b>Systems Based Practice</b>	
<b>Objective</b>	<b>Teaching Methods</b>
1. Work effectively as a member of the echocardiography laboratory and the health care team	<ul style="list-style-type: none"> <li>- Clinical teaching</li> <li>- Role models</li> <li>- Evaluation and feedback</li> </ul>

2. Identify areas within the echocardiography laboratory that need improvement	<ul style="list-style-type: none"><li>- Clinical teaching</li><li>- Role Models</li><li>- Evaluation and feedback</li></ul>
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