

## **Point-of-Care Imaging Rotation Educational Goals & Objectives**

Family physicians provide care for patients with a myriad of medical problems. Correct and timely diagnosis is paramount to successfully addressing these illnesses. This pursuit has been aided by the advent of new imaging technologies; specifically addressed here is the bedside ultrasound, which has been nicknamed the “stethoscope of the future,” also known as point-of-care ultrasound (POCUS). Today’s residents must gain experience both operating the imaging modality as well as interpreting the images. The Point-of-Care Imaging rotation will provide the upper level resident with opportunities to learn normal and abnormal anatomy, recognize ultrasonographic findings of common diseases (with a special focus on cardiac echocardiography), understand the indications for POCUS-guided procedures, and learn the appropriate use of POCUS to guide interventional procedures. The goal of the rotation is to help the resident become competent in the cost-effective use of ultrasound imaging in the evaluation and treatment of disease.

Faculty will facilitate learning in the 6 core competencies as follows:

### **Patient Care and Procedural Skills**

- I. All residents must be able to provide compassionate, culturally-sensitive, and appropriate care for patients in the course of evaluating and treating disease.
- II. Residents will develop a fundamental knowledge of how echo and ultrasound can augment information derived from the history and physical exam and which POCUS indications constitute a viable, billable indication.
- III. Residents should become familiar with the indications, contraindications, complications, limitations, alternatives and interpretation of the following ultrasound studies:
  - Abdomen, renal/bladder, lower extremity veins
  - Cardiac echocardiogram
- IV. All residents should be able to understand the role of imaging guidance to facilitate common radiological procedures and become familiar with the following ultrasound-guided procedures (and take part as appropriate given level of training and experience):
  - Paracentesis and thoracentesis
  - Central line placement/arterial line placement
- V. All residents will also develop skill in use of the echocardiogram as well as point-of-care ultrasound, when possible, in the following areas:
  - Abdomen – identify ascites, common locations for ascites collection, largest fluid pocket, and safest locations for paracentesis
  - Right upper quadrant abdomen – identify the liver and gallbladder; diagnose or exclude cholelithiasis; assess sonographic Murphy's sign

- Chest – identify pleural effusion, location of lung, and safest location for thoracentesis; identify pneumothorax
- Cardiac – obtain standard views including parasternal long/short, apical four-chamber, and subxiphoid; identify pericardial effusion; assess for mitral regurgitation and aortic stenosis; estimate ejection fraction; examine IVC
- Vascular – identify jugular vein/carotid artery, common femoral vein/artery; differentiate vein from artery; check patency
- Renal – evaluate for presence/absence of hydronephrosis
- Bladder – estimate bladder urine volume

## **Medical Knowledge**

- I. PGY2s will develop an understanding of the appropriate use of echo and/or ultrasound imaging for patients with the following presenting conditions:
  - Acute abdomen
  - Ascites
  - Bladder obstruction
  - Congestive heart failure
  - Deep venous thrombosis
  - Gallstones
  - Hydronephrosis
  - Pleural effusion
  - Pneumothorax
  - Valvular disease
  - Shock

PGY3s will be able to interpret results within the context of patient comorbidities, pretest probability of disease, and sensitivity and specificity of the study.

## **Practice-Based Learning and Improvement**

- I. All Residents should
  - be able to use PACS to access radiology studies
  - be able to access current national guidelines to apply evidence-based strategies to the appropriate use of echo and ultrasound studies and procedures
  - develop progressive independence in understanding studies aimed at evaluating the utility of echo and ultrasound and interventional techniques in patient care, through Journal Club and independent study
  - participate in case-based decision-making
- II. All residents should respond with positive changes to feedback from members of the health care team.

## **Interpersonal and Communication Skills**

- I. All residents must demonstrate organized and articulate electronic and verbal communication skills that convey information to other health care professionals, and provide timely documentation in the chart as appropriate.

- II. Residents should understand and comply with HIPPA with respect to use of health information.
- III. PGY3s must be able to obtain consent for procedures in situations with complex social dynamics, for example, when identifying the power of attorney or surrogate decision maker is required.

### **Professionalism**

- I. All residents must demonstrate strong commitment to carrying out professional responsibilities as reflected in their conduct, ethical behavior, attire, interactions with colleagues and community, and devotion to patient care.
- II. PGY2s should be able to counsel patients and families on decisions involving ultrasound studies and procedures.
- III. PGY3s should be able to provide constructive criticism and feedback to more junior members of the team.

### **Systems-Based Practice**

- I. PGY2s must be able to identify current quality issues in use of echo and ultrasound for diagnosis.
- II. PGY3s must also demonstrate an awareness of alternatives in discussing interventional procedures and their costs, risks, and benefits.

### **Teaching Methods**

- I. Supervised reading of ultrasound studies and supervised performance of interventional procedures.
  - Initial emphasis will be on identifying key diagnostic findings in commonly ordered ultrasound studies
  - When residents have mastered these skills, focus will be on medical decision-making and procedural skill
- II. Conferences
  - Specialty-specific didactics
- III. Independent study
  - Journal and Textbook reading TBD by radiology attending
  - Online educational resources
    - Atlas of Radiological Images  
[http://www.meddean.luc.edu/lumen/MedEd/Radio/curriculum/Harrisons/Harrisons\\_f.htm](http://www.meddean.luc.edu/lumen/MedEd/Radio/curriculum/Harrisons/Harrisons_f.htm)
    - The following POCUS resource list was developed by Dr. Dversdal, the Director of the Oregon Health & Science University Point of Care Ultrasound and General Medicine Ultrasound Fellowship Director and provides an initial foundation for all learners:

- POCUS Resource Handout
- Cardiac Limited Ultrasound Examination (CLUE)  
Webinar: <https://www.youtube.com/watch?v=Hv-I9T1dVCg>
- Basic abdomen for internist by Irene  
Ma: <https://www.youtube.com/watch?v=H9vIokcQMo8>
- PEARLS physical exam with pocket size US by Janice Boughton & Mike  
Wagner: <https://www.youtube.com/watch?v=ywuIeoEfG1I&t=33s>
- IMpocus: a weekend on the wards: <https://www.youtube.com/watch?v=jvtBufD-2og>
- Primary Care US including FAQ about billing & credentialing by Paul Bornemann (FM at Univ of S Carolina): <https://www.youtube.com/watch?v=HHRZvq1XBU4&t=975s>
- The Evidence Atlas (subset of POCUS atlas): Fantastic compilation of evidence including brief synopsis of journal articles, tables with sensitivity/specificity, positive/negative likelihood ratios, and PMID with link to pubmed for article: <http://www.thepocusatlas.com/ea-home>
- 5-minute Sono: Very well composed & concise “just in time” videos to review before you go practice! <http://5minsono.com>
- Ultrasound of the week Tools page: Includes amazing stuff programmed by Dr. Ben Smith including sonogif (can de-identify, trim & convert to gif all in 1 program), clipdeidentifier, and several tutorials to make your US presentations better: <https://www.ultrasoundoftheweek.com/tools/>
- Ultrasound Podcast: “Making horrible doctors decent and good doctors GREAT”: <http://www.ultrasoundpodcast.com>
- Ultrasound Training Solutions famous site in general: includes weekly wrap of everything found on social media, links, etc. <https://www.ultrasoundtraining.com.au/foamus/foamus>
- Up to Date
- Clinical Key

## Evaluation

- I. Verbal mid-rotation individual feedback
- II. Attending written evaluation of resident at the end of the month based on rotation observations and chart review.

## Rotation Structure

- I. Residents should contact the Radiology and Cardiology attendings 1-3 days prior to the rotation start date to determine start time and location.
  - In general, the hours of the rotation are 0800-1600 Monday through Friday.

- To help residents gain skills in point-of-care ultrasound (POCUS), residents will complete a **checklist of skills for both diagnostic and interventional** procedures. *When residents complete the checklist, they should return it to their Program Coordinator.*
  - **Residents can check out the hand held/bedside unit from the GME library at the start of the rotation**, since this unit or a similar unit is what is available on the floors and in the clinic. **Residents should learn how this works prior to starting their Imaging rotation** since the radiologists and sonographers may not be familiar with this unit.
- II. Residents may be working with several attendings during the rotation as well as with the sonographers and physician assistants to develop POCUS and echocardiogram skills as well as procedural skills as the case mix permits.
- III. Residents will be dividing their time between the reading room and procedure suites as appropriate. Residents may be rotating through the CMH outpatient office, CMH Department of Radiology, and CMH Department of Physiology.
- Rotations are expected to be a “hands-on” experience. Residents will be involved in discussion of study appropriateness, image interpretation, and creation of a differential diagnosis. In addition, residents will be involved in radiological procedures as is appropriate.
  - Case-based learning is most effective. Residents will have read out sessions with the radiologist and cardiologist along with teaching sessions. Nightly reading/study should be based on cases reviewed during the day.
  - Residents may be asked to do focused literature searches or presentations during the course of the rotation.
  - Residents may be asked to communicate with patients, family members, primary care providers, and consulting providers as is appropriate. Discretion and decorum is always paramount.
- IV. Any call and weekend responsibilities TBD by the attending physician.
- Hours worked must be consistent with ACGME requirements and are subject to approval by the Program Director.
- V. Residents have specialty-specific didactics and should be excused in a timely fashion to attend.