

Emergency Ultrasound Fellowship Curriculum

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1 Introduction:

We are happy to offer an Emergency Ultrasound (EM US) Fellowship here at Washington University in St. Louis. Over the next year you will learn all there is to know to become an Ultrasound Director at any institution.

Our ultimate goal is that you become not only a director in Emergency Medicine Ultrasound, but also a leader in the field of Emergency Medicine. This curriculum is an outline of your goals and expectations during the fellowship. To that end we intend that you become a “good citizen” for the specialty of Emergency Medicine and subspecialty of Emergency Medicine Ultrasound

2 Learning Objectives:

1. Identify each fellows’ long-term interests and goals, knowledge base and gaps of knowledge, and the capacity to enhance the fellows overall understanding of Emergency Medicine.
 - a. We expect this to reveal itself during informal conversations. We heavily encourage fellows to create a career development outline with goals and deadlines proposed according to this year as well as the next 5 years (see Dr. Theodoro by October 31st for guidelines).
2. Begin lifelong collaborative relationships with leaders in the field of Emergency Medicine Ultrasound. We find it our mission to introduce you to the greater Academic EUS community.
3. Demonstrate competence in all core applications of EUS, described in [the ACEP 2011 Emergency Ultrasound Fellowship Guidelines](#) , and the [2014 Core Content of Clinical US Fellowship Training](#). We define competence as the knowledge of the indications and contraindications of point of care ultrasound (POCUS), ability to acquire adequate images, ability to interpret images, and most importantly, the ability to integrate POCUS into the practice of Emergency Medicine (must obtain 1,000 complete and reviewed scans, of all types, including normal and abnormal pathology).
4. Develop active and engaging teaching skills capable of reaching diverse audiences including those external to Emergency Medicine.
5. Develop the capacity to create a comprehensive training curriculum for trainees in Emergency Medicine and for those external to the specialty but involved in the acute care of emergency patients.
6. Contribute to the practical aspects of POCUS administration including the quality assurance, credentialing, and accreditation of POCUS programs.
7. Think strategically about the future of POCUS specifically concentrating on:
 - a. Clinical applications: identifying and integrating new clinical POCUS areas
 - b. Technology: familiarizing oneself with new emerging POCUS technologies
 - c. Competence: identifying competency in new and old areas of EM POCUS
 - d. Politics and Reimbursement: identifying the challenges, finances, and practical concerns related to implement EM POCUS in diverse settings.
8. Participate in POCUS research by:
 - a. Formulating a research question and operationalizing a protocol

- b. Identifying diagnostic research pitfalls and biases and recognizing the potential impact in the present literature
- c. Assisting in existing POCUS research protocols
- d. Leading one EM Journal Club (see Dr. Cohn for help on this topic)

3 Learning Modalities (Clinical and Teaching Experience)

It is helpful to follow a general learning schedule during your fellowship. Please see Sample Schedule section for sample

3.1 Learning Experience:

EM US Fellows will work 14-20 hrs per week as an attending physician in the Emergency Department. During clinical duties, fellows will be working as an Attending in the Emergency Department; which may include supervision of residents, medical students, nurse practitioners, and physician assistants. Fellows are also required to meet the job qualifications of a part-time faculty member, as described in contract with Washington University in St. Louis. We expect the fellows to devote the remaining 26-30 hours per week to the following.

3.2 Schedule

The typical schedule: (The schedule will vary towards the latter part of the year)

- a. **Monday: QA with Dr. Theodoro at 10am.** Literature and reading review. During this time we review all ultrasounds performed by the fellows, residents on rotation, and medical student or other members on the rotation. As the year progresses, the fellow will be expected to take on a supervisory role and lead the Q/A. We will devote a portion of this time to the review of sentinel and new publications in POCUS.
- b. **Tuesday: EM weekly conference (8am-10am only)** when relevant. Fellows should prepare 3 EM US presentations annually on a topic specifically related to POCUS. Fellows should also be prepared to lead EM US "Scholar Track" (3rd Tuesday monthly at 11 am) which includes supervision of the involved resident, literature review, and included relevant ultrasound images.
- c. **Wednesday: Potential ICU or Peds EM scan shift** with Dr. Ablordeppey or Dr. Renz. When not available Fellows should plan a scan day.
- d. **Thursday: QA with Dr. Shipley** and the involved resident. During this time we review all ultrasounds performed by the fellows, residents on rotation, and medical student or other members on the rotation. As the year progresses, the fellow will be expected to take on a supervisory role and lead the Q/A. Dr. Shipley scan shift (please stagger between Fellows). Fellows are expected at all Faculty Meetings they can reasonably attend. Fellows are expected to attend all Emergency Medicine Ultrasound Section meetings and, when available, attend the Division's Journal Club.
- e. **Friday: "Lean In on the ED."** Fellows may use this day as a scan day or to assist with ED workflow in areas specifically related to EM US such as relieving

the Observation Unit of DVT scans, Biliary Scans, and assisting in general with ED based procedures.

- f. **Intern Orientation:** This occurs the first weekday of each month. The fellow is expected to meet with the rotating intern, review basic image recording techniques, and perform some scanning. Please see appendix B for a specific schedule.

3.3 Scan Shifts

The EM US Fellow is required to do ultrasound scan shifts when not working clinically. **This will include time with the Ultrasound Director every Thursday afternoon (subject to change); and will also include 2-4 additional scan shifts per month.** These are to be scheduled in advance, by the fellow, while a member of the Ultrasound Division is working/available. This time is critical for the fellow to develop their own skills, while taking advantage of the vast knowledge and experience of the members of the Ultrasound Division.

3.3.1 The Fellow's Scanning Experience:

There are 52 weeks per year less 5 for vacation and CME and less another 7 for holidays, introductory week, and general absences. This results in 40 weeks during the 1-year period to obtain scans and, assuming 2 scan shifts per week, 80 scan shifts. This roughly breaks down to obtaining 10-15 scans per week (in addition to those obtained during clinical work). Fellows are encouraged to diversify their scan experience during these scan shifts. For example, the Fellow will greatly enhance their knowledge base if they concentrate on:

- a. Torsion (Ovarian and Testicular) diagnosis and the measurement of low flow
- b. Deep Venous Thrombosis (DVTs) of the lower and upper extremity
- c. Nerve blocks
- d. Musculoskeletal applications including bone, tendon, and muscle
- e. Ocular applications including vitreoretinal disease
- f. Procedural applications
- g. New applications which may include assessment of cardiac output

3.3.2 QPATH

Fellows are expected to have updated study results documented preferably in QPATH. They may also carry with them a personalized record of ultrasound examinations. If so, please record the indications, findings, corroborative studies, final diagnosis and disposition of the patient.

3.3.3 EM US outside of the Emergency Department.

Fellows are encouraged to gain experience outside of the Adult ED population. These include shifts in pediatrics as arranged with Dr. Renz and in the Intensive Care Unit as arranged with Dr. Ablordeppey.

Critical Care Ultrasound Experience: The ability to non-invasively assess hemodynamics and cardiac function has made bedside competence in basic and advance transthoracic echo an essential tool in the management of critically ill patients. During personalized scanning shifts, ultrasound fellows will scan patients in the ICU (medical, surgical, cardiothoracic, neurologic, and cardiac ICUs) and learn the following echocardiographic assessments:

- Non-invasive assessment of cardiac output
- Assessing myocardial contractility and regional wall motion abnormalities
- Volume status assessment (predicting volume responsiveness)

- Assessing diastolic ventricular dysfunction and estimating filling pressures
- Assessing right heart function
- Quantitative assessments of pericardial effusion and tamponade
- Detecting pleural effusion
- Differentiating consolidation, alveolar-interstitial syndrome, pulmonary embolism and pneumothorax using the BLUE protocol

3.4 Teaching

- Fellows will give hands on instruction to residents, faculty and students
- Fellows may be involved in faculty education and training for credentialing and ongoing learning
- Fellows will participate in EM resident Ultrasound Rotation orientation, taking place the first weekday of every month
- Fellows will participate in CME activities. They will be compensated accordingly in the same manner as all participants in these activities.

4 Academic and Personal Growth

We heavily encourage fellows to grow academically in the field of Emergency Medicine, Emergency Medicine Ultrasound, and to grow professionally. The following are suggestions to rapidly develop a deep knowledge base in the field:

Journals:

Scan journals for emerging EM ultrasound applications. We encourage the fellows to scan the monthly abstracts to Academic Emergency Medicine (AEM), Annals of Emergency Medicine, Journal of Ultrasound in Medicine, Critical Care Medicine, and Emergency Medicine Journal. Free access to all of these is offered through the Becker Library at WUSM.

Online resources

These websites include:

sonoguide.com, sonoworld.com, Emergency Ultrasound Podcast (<http://www.ultrasoundpodcast.com>).

The ultrasoundpodcast.com provides 2 FREE ibooks that will form the basis of the readings and curriculum. Fellows should consider obtaining an RSS reader for quick perusal of topics. We also encourage the fellows to follow several FOAMeD web sites such as LITFL and ALiEM.

EM US Section Library

Dr. Shipley has a library worth of ultrasound textbooks and we will ask fellows to review specific chapters by topic each month.

Simulation assets

Venous cannulation mannequins and gels as well as SonoSim.

5 Evaluations:

1. Because of the intimate nature of the fellowship, fellows will receive direct informal feedback on a weekly basis from the EM ultrasound staff.

2. Fellows will meet with the Fellowship Director, Dr. Shipley, twice in a given academic year. In October Fellows should be prepared to receive feedback regarding progress and teaching style, discuss QA issues from their clinical experience, discuss career plans, and discuss their research requirement objectives. By May fellows should be prepared to discuss their progress during the year and review their career objectives. At the end of the fellowship, the Director shall provide a letter documenting the curriculum, the fellow's accomplishments, and a recommendation to the EM US Section Chief and EM Division Chief for graduation with fellowship credentials.

5.1 Criteria for Fellowship Graduation:

1. Successful completion of
 - a. 1,000 EUS exams all reviewed.
 - b. 500 QA exams reviewed
 - c. Research participation
 - d. Participation in 1 writing project
2. Active and enthusiastic leadership of the EUS in resident and medical student education
3. Active planning and teaching of EUS to the greater EM community (this can include teaching POCUS outside of EM, teaching at national, regional, or local conferences).

6 IT Solutions and Support:

6.1 Computer:

Fellows will be loaned a desktop computer for their use during the year as well as a laptop from the EM US Section.

6.2 Calendar:

Please subscribe to wuultrasound@gmail.com to receive updated scheduling information. Note any time off, vacation, CME related absences as well as your scanning days. Changes to QA will be posted the week before using this calendar.

6.3 Internet File Sharing:

We utilize a Washington University School of Medicine sponsored "box" available at box.com. Enter your WUSTL Connect Credentials to log on. All interesting US clips are kept in a file labeled "Interesting US Cases" and shared by all section members. In addition interesting clinical cases are labeled in QPATH.

6.4 QPATH

Obtain QPATH credentials as soon as you have a WUSM account. See Dr. Theodoro for access

7 Hospital Credentials and Fellowship Administration:

Admin: Andrea Ramirez (ramireza@wustl.edu) serves as our administrative liaison.

Parking and Credentials: Janet Lewis (jlewis@wustl.edu) will organize all credentialing issues at the beginning of your academic year. Janet can also handle your *parking issues*. Some physicians opt for South Garage Parking (~\$600/year) when available. Other options to park at other locations on campus are offered at a lesser price.

Badges: Your hospital credentials (ID Badge) are available at the Becker Library (WUSM Badge) and your BJH badge is available in the Children's Hospital Parking Garage office. Andrea and Janet can provide you with information on how to obtain both of them.

8 CME and Reimbursement

Each fellow will be provided discretionary fund account to use for CME and work related reimbursements.

9 Appendix A (Supplementary Academic Areas of Discussion):

July: Physics, e-FAST, ACEP U/S Guidelines

August: First trimester pregnancy, Cardiac/basic ECHO, renal

September: AAA, Thoracic, Gallbladder/RUQ

October: Thoracic, DVT

November: Soft-tissue/MSK, Ocular

December: non-pregnant GYN, billing/coding

January: Testicular, Bowel

February: Advanced ECHO, advanced MSK and Procedural

March: Ultrasound systems, feedback mechanisms, Q/A

April- June: Directed study in area of interest

10 Appendix B. Intern Orientation

Intern Orientation is the responsibility of the fellows. During orientation basic US machine functions, workflow, and assisted scanning is performed until the intern can navigate a shift alone. A medical student may or may not accompany the resident.

Sample Schedule:

August (Monday 8/1 afternoon-Dr. Oberle)

September (Thursday 9/1-Dr. Wallace)

October (Monday 10/3-Dr. Wallace)

November (Tuesday 11/1-Dr. Wallace)

December (Friday 12/2-Dr. Oberle)

11 Appendix C: Research Objectives

1. Participate in ongoing ultrasound research
2. Development of at least one original research project, including research idea, gaining IRB approval, data collection, and write up as time permits. This is best accomplished by meeting with the Ultrasound Director prior to the start of your fellowship to discuss research ideas. This way, you can be more productive in research during your fellowship year.
3. May include participation in on-going research at facility
4. Submission of an abstract to national meeting such as ACEP, SAEM, AAEM, AIUM, etc. is highly encouraged.
5. If interested, may include participation in ACEP's Emergency Medicine Basic Research Skills course, held in November and April (must apply early)