MUSC Emergency Ultrasound Fellowship Handbook—Policies and Expectations

Medical University of South Carolina
Division of Emergency Medicine

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I. Overview

Welcome to the MUSC Emergency Ultrasound Fellowship! We are very proud of our program and excited that you are joining us. This Handbook outlines the nature and scope of the fellowship, with a breakdown of the individual components that comprise your educational experience. Particular attention is paid to how we plan on providing you with the tools you need to succeed in your career in each discipline, and on the expectations we have of you. You will review this Handbook with the Fellowship Director at the beginning of your training, and should feel free to refer to it at any point. Likewise, do not hesitate to ask the faculty about any points which may not be clear.

The Emergency Ultrasound Fellowship began in 2013 as a one-year program designed to give graduates of Emergency Medicine residency programs the skills and knowledge to become ultrasound program directors and leaders in the field of Emergency Ultrasound (EUS). There are three primary components to the fellowship program:

1. **Education**: learning image acquisition and interpretation skills for both basic and advanced emergency and point of care ultrasound applications, and developing lecturing and teaching skills by developing an EUS lecture portfolio and contributing to the program’s educational mission.

2. **Administration**: understanding the critical components required to run an EUS program and how to best utilize information technologies for image archiving, database management, and quality assurance.

3. **Research**: understanding the state of EUS research by participating in monthly ultrasound journal club activities, developing your own independent research project from its inception to publication, and participation in one or more ongoing EUS research projects.

The fellowship is a 12-month position as an EUS fellow and attending physician (clinical instructor) in the Division of Emergency Medicine at MUSC, and as such, it is available only to graduates of ACGME-accredited Emergency Medicine residencies who are board-certified or board-eligible. A South Carolina medical license and hospital credentialing are required prior to the start date (July 1) of the EUS fellowship. Without these, you cannot work clinically in the ED. Failure to meet these requirements may result in revocation of the offer and loss of the fellowship position.
II. Schedule

Your weekly schedule requirements are approximately 34 hours per week and are broken down as follows:

• Approximately 16 hours/week clinical shifts required (moonlighting options discussed below)

• 18 hours/week fellowship responsibilities:
  - 4 hours/week resident and ultrasound didactic conference
  - At least 8 hours/week scanning (at least 5 scanning shift equivalents/month); some of these scanning hours will occur during the Wednesday conference
  - 6 hours/week research/administrative work

As the fellowship progresses, scanning shifts may be substituted for scanning shift equivalents that might include research, administrative or teaching activities at the discretion and under the mentorship of the fellowship director or faculty designee.

Yearly, you are entitled to 4 weeks of vacation. There is some flexibility as to when you can take this, but the timing needs to be approved by the fellowship director. You will also need to clear your clinical schedule for your vacation.

During the rest of your year, your clinical and ultrasound work will be performed in the MUSC Emergency Department. There may also be educational opportunities outside of the ED, including occasional shifts with ultrasound technologists in Adult and Pediatric Radiology. These may be scheduled throughout the year.

There is no call.
III. Education

The curriculum of the EUS fellowship is designed to prepare you for both the RDMS certification examination, and for a role as Director of Emergency Ultrasound in an ED. The topics covered are outlined below. We will give you didactic lectures which will cover all of these topics and modalities.

Topics:

- Billing and coding
- Setting up an EUS program
- Evidence-based EUS

Modalities:

- Aorta
- Appendix
- Biliary
- Bladder
- Cardiac
- DVT (Venous compression ultrasound)
- FAST
- Foreign body
- GI (to include evaluation for appendicitis, intussusception, and pyloric stenosis)
- Musculoskeletal
- OB/Gyn (Transabdominal and Transvaginal)
- Ocular
- Procedural Ultrasound
  - Abscess
  - Arterial line
  - Arthrocentesis
  - Line placement, central and peripheral
  - Paracentesis
  - Pericardiocentesis
  - Peritonsillar abscess
  - Thoracentesis
- Prostate
- Renal/Urinary tract
- Soft Tissue
- Testicular/Scrotal
- Thoracic
- Ultrasound Physics and Instrumentation
IV. Expectations:

☐ Read *Ultrasound: The Requisites* 3rd Edition, by Barbara Hertzberg, MD.

☐ Read *Understanding Ultrasound Physics* by Sidney Edelman.

☐ Read *Examination Review for Ultrasound: Abdomen and Obstetrics & Gynecology* by Steven Penny. [RDMS preparation]

☐ Read the *Manual of Emergency and Critical Care Ultrasound* by Noble and Nelson.

☐ Read *either* Cosby & Kendall’s *Practical Guide to Emergency Ultrasound*  OR  Ma & Mateer’s *Emergency Ultrasound* text.

☐ Read Stephanie Doniger’s *Pediatric Emergency and Critical Care Ultrasound* text.

☐ Read each online module at www.sonoguide.com.

☐ Read the *2008 ACEP Ultrasound Guidelines*.

☐ Read the *Emergency Ultrasound Imaging Criteria Compendium*.

☐ Read the *EUS Coding and Reimbursement* document, as well as the *2009 Coding Update*, the *2012 Coding Update*, and the *2014 Coding Update*.

☐ Read Dr. Chris Moore’s NEJM article on *Point-of-Care Ultrasonography*.

☐ Complete all 12 online tests at EM Sono through ACEP.

☐ Read the ACEP document “The Core Content of Clinical Ultrasonography Fellowship Training”

☐ Read the ACEP document “Emergency Ultrasound Fellowship Guidelines”

☐ Stay up-to-date with current literature, reading and reviewing ultrasound-related articles. Maintain the library of articles that we review.

☐ *If you have an iPad,* please download and read the e-book “*Practical Ultrasound Series: Deep Venous Thrombosis*”

☐ *If you have an iPad,* please download and read the e-book “*Introduction to Bedside Ultrasound: Volume 2*” by Mike Mallin & Matthew Dawson

☐ Review all of the content listed under “*Emergency Ultrasound Content*” of the EUS teaching website
V. Scanning

Paramount to all else in your fellowship, you must become an expert scanner. The skills you acquire in doing so will be invaluable to your career in emergency medicine and will make you a more powerful clinician. You should aim to become as proficient as an ultrasonography technologist in acquiring images and as a radiologist in interpreting them. Your skills need to reach a level where you feel confident in your own scans, both in identifying and ruling out pathology, and in knowing when the exams are inadequate to do so.

We will directly observe your scanning when possible, and assess your images and interpretations for adequacy when not. You will have scanning shifts with the directors, both when they are working clinically, and when they are not.

Expectations:

- Perform at least 5 scanning (on average) shift equivalents per month (at least 32 hours/month). If there are rotating residents during that week, your scanning time should be spent with them. If there are no residents or students, you should schedule your scanning time when a director is working clinically when possible.
- Seek out pathology and novel applications of ultrasound when possible. Your scanning should not be limited to established applications.
- Perform a minimum of 1,000 scans throughout the year, in preparation for the RDMS certification. These should consist of primary ACEP emergency ultrasound applications (FAST, echo, aorta, biliary, renal, 1st trimester ultrasound, DVT, procedural, soft tissue, thoracic), but will also include some advanced applications (MSK, GI, pediatric, testicular, etc.) You should have an appropriate mix of both applications and findings (both positive and negative scans).
- Log each of your scans through Q-path.
- Have each of your scans reviewed by a director for both adequacy of image acquisition and interpretation.
- Do your own external QA. Record when a patient that you scan has an “official” study performed (i.e. a formal echo, ultrasound, CT scan, operative report) and compare your findings to that study.
- Adhere to and enforce divisional policies regarding machine cleanliness and maintenance.
VI. Teaching

Learning to teach ultrasound is a fundamental component of your fellowship. Your teaching experience will consist of both lecturing and hands-on teaching of residents, attendings, and medical students. We feel this is an essential component to your EUS fellowship experience.

We will provide you with background information, literature review, and access to image and video clip databases to help you prepare for your lectures, as well as review them for quality and presentation style pointers. You will have ample hands-on experience scanning with us, in preparation for your independent teaching.

Expectations:

• Overall, you are expected to fulfill at least 20 hours per month of hands-on teaching of residents and/or other faculty in EUS. This includes but is not limited to didactic lectures, bedside teaching during your clinical shifts, research involvement of residents or faculty, and QA education.

• Develop your own emergency ultrasound lecture portfolio consisting of at least four (4) lectures. These need to be high-level case-based lectures covering at least scanning technique, normal and abnormal findings, treatment algorithms, and most importantly a critical review and appraisal of the current literature related to that application.

• Three (3) of your lecture topics should be from the ACEP list of primary eleven applications: FAST, cardiac, biliary, urinary tract, aorta, obstetric ultrasound, DVT, soft tissue, thoracic, procedural, and ocular.

• One (1) of your lecture topics should cover an advanced application, such as advanced echo, GI, pediatric-specific applications, testicular ultrasound, regional anesthesia, or contrast-enhanced ultrasound.

• Prior to presentation, you must review your lecture with one of the directors. This should be done no less than a week before your talk is scheduled.

• Present a minimum of three (3) lectures at a Thursday conference for the residents or at a PEM Fellow ultrasound conference.

• Participate and teach in all faculty, resident, and medical student courses.

• Spend individual time doing hands-on scanning with rotating residents.

• Participate in informal teaching of EM attendings or non-physician providers when opportunities arise.
VII. EUS Conference

The fellowship’s primary forum for didactics and education is the EUS Conference. This will occur on a weekly basis on Wednesday mornings from 9 am to 3 pm, unless otherwise specified for a particular week. Your presence is required. At least one of the directors will be present, as will any residents, students, or other fellows on the rotation.

During conference we will have didactic lectures, journal club, scan review, literature review, research updates, administrative issues, image management, and machine maintenance. Each week’s particular schedule will vary and will be distributed in advance.

Expectations:

- Attend weekly conference.
- Prepare in advance for that week’s agenda by reading the RDMS texts and/or EUS textbooks.
- Ensure that images/videos are ready for review, including results from any appropriate follow-up/confirmatory imaging studies. Regarding teaching cases, the Fellow or EUS rotators should:
  - Export images and videos
  - Label studies correctly
  - Word document with relevant HPI, exam, formal imaging findings, case resolution
  - Download relevant PACS images/videos
- Manage the “Journal Club” portion of the Wednesday conferences; articles should be distributed by the Monday preceding conference. Articles will be presented by the rotator and critically appraised.
- Administer weekly quizzes to the rotating interns/residents/medical students.
VIII. Research

Emergency ultrasound is at the cutting edge of clinical research in emergency departments across the nation and world. Every day new applications and uses are being studied and tested and make immediate impact on clinical practice. We feel strongly that our division can and should be among the leaders in this field. Participation in research is an integral component of your fellowship.

We will provide you with all the mentorship, resources, and support that you need to pursue your research endeavors.

Expectations:

• Actively seek and enroll patients in all EUS research projects. When you are on a scanning shift by yourself, research enrollment should be as important as educational scanning.

• Develop at least one (1) research project. As the primary investigator, you should undertake all aspects of this research including, but not limited to, idea conception, protocol authorship, IRB approval, consent and data forms, advertisement of the study, patient recruitment and enrollment, follow-up, data analysis, statistical analysis, and manuscript authorship.

• Present at least one (1) project at a national or international conference (e.g. ACEP, SAEM, or AIUM).

• Submit at least one (1) project as lead author for publication in a peer-reviewed journal.

• Be involved with at least one (1) other ultrasound research project (does not have to be one you design and implement from the ground up) during your fellowship for which publication is planned.

• Meet deadlines for research projects. Be aware that the AIUM deadline is in September (conference in March), the SAEM deadline for submission is in late November (conference in May/June), and the ACEP deadline is in April (conference in September/October).
IX. Administration

A thorough understanding of the administrative aspects of emergency ultrasound is a necessity for successful implementation of an EUS program in any emergency department. Administrative issues are often financial, medico-legal, or political in nature. We will do our best to ensure exposure and familiarity with each of these topics.

Expectations:

- Attend all divisional meetings, including but not limited to meetings with the finance division, the departmental leadership, residency leadership, or other departments.
- Understand the requirements and process of billing and reimbursement for physician-performed emergency ultrasound.
- Understand the various medico-legal aspects of performing and documenting emergency ultrasounds.
- Understand the politics and business behind ultrasound machine companies.
- Understand the nature of the politics of emergency ultrasound on a national level.
- Aid in the organization and implementation of a recruitment and selection process for the following year’s fellow.
- Attend (or complete online CME content) an Ultrasound Management Course—preferably the ACEP course prior to the national meeting.
- Attend a national Emergency Ultrasound Section meeting—either ACEP or SAEM.
- Complete all administrative readings as discussed in Section IV.

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X. Quality Assurance

Reviewing ultrasound images is almost as important as acquiring them. To assure that you are performing high-quality sonography, your images and videos will all be reviewed by a director to assure that they support your interpretations. We refer to this as internal QA. In addition, there is external QA which compares your findings to “official” findings. To further hone your skills and prepare you for a directorship of your own, you will review other peoples’ ultrasounds and give them feedback on their scans.

Expectations:

- Participate in QA of EUS exams. You will learn the QA process in a graduated manner. At first, you will observe how the directors assess image quality and adequacy and learn the scoring system for image feedback. Once you have become familiar with the process, you will perform the QA with director oversight. When your assessment of images correlates well with director assessments, you will be granted privileges to perform QA independently. The learning curve is variable, but we expect that within a few months you should be reading scans on your own.

- Studies should undergo QA within 1 week. We will devote some time on Wednesday mornings for scan review/QA. Once you are privileged to perform QA on your own, you can do this in advance of conference.

- Email feedback to the sonographers.

- Complete callbacks regarding any missed findings or incorrect interpretations.
XI. Image Management

As technology progresses, so does sophistication of ultrasound machines and systems. With increased usage of ultrasound in the emergency department, appropriate image storage and management becomes more and more imperative.

Expectations:

• Aid in the maintenance of the Q-path workflow. Coordinate with IT and Telexyhealth to ensure appropriate upgrades and functionality.

• Add interesting/useful images and video clips to the existing EUS teaching file for educational and lecturing purposes.

• Understand the process of how to edit and convert digital images and clips from the ultrasound machine into ones that can be used in a presentation.

• Make powerpoint and keynote presentations incorporating video clips and still images.
XII. Moonlighting

You may choose to moonlight within our ED to supplement your educational and financial growth. Permission to moonlight must be granted by the Fellowship Director, and will only be given if:

1. You have met all your fellowship requirements to date.
2. The additional clinical shifts would not detract from your educational experience and fellowship responsibilities.

In addition to “moonlighting” shifts, you are welcome to participate in up to four (4) paid teaching courses per year through 3rd Rock Ultrasound. These will provide an invaluable teaching experience as you instruct Emergency Physicians in basic and advanced ultrasound skills. Again, these courses must not interfere with fellowship duties and must first be discussed with the Fellowship Director.
XIII. Evaluation

Your scanning technique and images/videos will be reviewed on a continual basis. You will receive regular verbal and written feedback.

At the end of the year you will need to pass an OSCE (Observed Structured Clinical Exam).

You will have a formal evaluative meeting with the Fellowship Director 3 times during the year—at the end of October, February, and June. At each meeting, you will receive feedback on your performance as outlined in the Fellow Evaluation form. You will also have the opportunity to evaluate the fellowship. These evaluations are meant to be constructive, and to help shape the fellowship experience into one that meets your needs. Of course, you should not feel that you need to wait until one of these sessions to give or ask for feedback—we are always eager to hear about any issues that may arise.
XIV. Salary and Benefits

You will receive the following benefits during fellowship:

- Your annual salary of $90,000 is based on a total of 768 clinical hours (vacation hours already deducted) per year. [Any moonlighting shifts above these expected clinical hours will be paid at a usual Emergency Medicine attending hourly rate.]

- This corresponds to 64 hours per month (8 clinical shifts per month, approximately).

- You will work 2 overnight shifts per month, approximately.

- $3,000 CME support.

- You will receive benefits corresponding to your Clinical Instructor status.