



BROWN
Alpert Medical School

Alpert Medical School of Brown University
Pediatric Emergency Medicine Fellowship Program
Point-of-Care Ultrasound Curriculum

Goals

The goal of ultrasound training in PEM fellowship is to be able to competently incorporate point-of-care ultrasound (POCUS) into the clinical practice of pediatric emergency medicine.

Objectives

By the end of fellowship, PEM fellows should demonstrate competence in:

- Use and basic maintenance of the ultrasound machine
- Ability to acquire technically appropriate images
- Image interpretation and application
- Appropriate use of acquired images in a clinical context

For a detailed list of competencies, please refer to Appendix III.

Fellowship Scanning Expectations

By the end of fellowship, fellows need to complete at least **300 scans**. Fellows are responsible for keeping track of their own scan numbers, including those performed at Women and Infants Hospital. Only those on-site scans (RIH, HCH, Miriam) formally entered into Qpath with an interpretation will count towards scan numbers. Scans must include the following:

- 50 cardiac scans (5 positive)
- 50 FAST scans (5 positive)
- 50 lung scans (5 positive)
- 25 soft tissue scans (abscess and/or foreign body)
- 25 gallbladder scans (5 positive)
- 25 pelvic or obstetric scans (5 positive 1st trimester US)
- 10 appendicitis scans (1 positive)
- 5 pyloric stenosis scans (1 positive)
- 10 intussusception scans (1 positive)
- 10 ultrasound-guided IV starts
- 5 ultrasound-guided central line placements
- 10 ultrasound-guided peripheral nerve blocks

First Year Curriculum

Scan Numbers

Fellows need to complete at least **100 scans** in their first year of fellowship. The majority of these scans should be obtained during their elective month.

Elective Month

The ultrasound elective month gives fellows dedicated time to learn independently, participate in ultrasound journal club and weekly scan review during Brown Ultrasound Tape Review (BUTR), scan independently and participate in group scanning sessions. **Any vacation time taken during the elective month will require pre-approval at least one month in advance by both the Program Director and Director of Pediatric Emergency Ultrasound**, as it can be challenging to complete the required number of scans.

Independent Learning

It is the expectation that fellows view the relevant online content. Details of these learning modalities can be found in Appendix 1.

Fellows should complete and achieve competency in all 4 sections of **ImageSim Ultrasound** (FAST, cardiac, lung and soft tissue) **by the end of the month**.

BUTR and Faculty-Run Scanning Shifts

Fellows are expected to attend BUTR every week and attend **all** faculty-run scanning sessions unless there are conflicts with other approved academic responsibilities. These conflicts need to be made clear with all ultrasound faculty members **at the start** of the fellow's elective month. **Fellows should arrive 20 minutes before the scheduled scan time to determine which patients are appropriate for scanning.**

Elective Scanning Requirements

Fellows need to complete a minimum of **80 scans** during their one month of elective time. Scan numbers will be assessed weekly and feedback given. IF the minimum number is not fulfilled a meeting will be held with the Program Director and Director of Pediatric Emergency Ultrasound to determine a remediation plan.

SUCCESSFUL COMPLETION:

Scan numbers, independent learning, and BUTR attendance will be reviewed during fellow bi-annual review with program directors. If benchmarks are not being met, a remediation plan will be developed mutually agreeable between fellow and program directors.

Second Year Curriculum

Scan Numbers

Fellows need to complete at least **100 scans** during their second year of fellowship. The majority of these scans should be obtained during their elective month.

Elective Month

The elective month in the second year of fellowship is run similarly to the first year with similar expectations for independent learning, scanning independently and in groups, and participating in weekly journal club and image review during BUTR sessions. Fellows are again expected to attend all faculty-run scanning shifts unless there is a conflict with other approved academic responsibilities. **Fellows should arrive 20 minutes before the scheduled scan time to determine which patients are appropriate for scanning.**

Fellows must let all ultrasound faculty members know at the beginning of their elective month if they cannot make a faculty-run scanning shift due to conflicts with other academic responsibilities. Any vacation time taken during the elective month will require pre-approval at least one month in advance by both the Program Director and Director of Pediatric Emergency Ultrasound as it can be challenging to complete the required number of scans. See appendix 2 for details on videos and reading requirements for second year fellows.

Independent Learning

It is the expectation that fellows view the relevant online content. Details of these learning modalities can be found in Appendix II.

Pass the Pointer Image Review

Fellows are expected to run an image review session in conjunction with the PEM US director to be held during fellows' conference nearest to their POCUS rotation. Fellows need to be aware of their presentation date (sessions occur quarterly) and plan accordingly.

Elective Scanning Requirements

Fellows need to complete a minimum of **80 scans** during their one month of elective time. It is expected that fellows meet Rhode Island Hospital credentialing criteria for cardiac, FAST and lung ultrasound (25 scans of each modality, including at least 5 positive scans per modality) by the end of their elective time in their second year.

SUCCESSFUL COMPLETION:

Scan numbers, independent learning, and BUTR attendance will be reviewed during fellow bi-annual review with program directors. If benchmarks are not being met, a remediation plan will be developed mutually agreeable between fellow and program directors.

Third Year Curriculum

By the third year of fellowship, fellows are expected to scan regularly during their teaching shifts, and in particular, seek out high quality images that will be of particular interest to medical students, residents, fellows and faculty members. Fellows should review expected competencies for PEM fellowship and aim to achieve an advanced level.

Scan Numbers

Fellows are expected to complete a minimum of **100 scans** in their third year of fellowship. These can be completed either on a clinical shift, during independent scanning time or during faculty-run scanning shifts.

Pass the Pointer Image Review

Fellows are expected to run an image review session to be held during PEM fellows' conference by the end of their third year of fellowship. Images presented should ideally be **their own scans** encountered on a clinical shift. Fellows should schedule this session early in the year and plan their scanning throughout the year accordingly.

Longitudinal Fellowship Scanning Experience

All fellows are expected to scan in the Pediatric ED after Tuesday conference once a month after their Sim Center session. Fellows should seek out clinically relevant scans on patients presenting in the ED and review their scans in real time with an ultrasound faculty member should such a faculty member be available.

Letter of Completion of Pediatric Emergency Medicine Ultrasound Curriculum

By the end of fellowship, fellows must be able to demonstrate that they can competently acquire and interpret the scans outlined in this document, ***excluding*** gallbladder, pyloric stenosis and appendicitis studies.

A letter attesting to the completion of the pediatric emergency medicine ultrasound curriculum can only be provided to fellows who have satisfied ***all*** the requirements detailed in this document, or for completion of other ultrasound activities deemed appropriate and approved by the Director of Pediatric Emergency Ultrasound.

Appendix I

Independent Learning Requirements for First Year Fellowship

1) UNC Pediatric POCUS Narrated Lectures

The following videos should be viewed by the end of the **first week** of your 1st year US elective.

Module 1 - Introduction to Point of Care Ultrasound <https://vimeo.com/436184016>

Module 2 - Instrumentation/Knobology <https://vimeo.com/435806498>

Module 3- Physics <https://vimeo.com/436208190>

Module 4 - FAST Exam (Trauma) <https://vimeo.com/246857566>

Module 5 – IVC <https://vimeo.com/254553754>

Module 6 - Basic Cardiac Ultrasound <https://vimeo.com/272607772>

Module 7 - The RUSH Exam <https://vimeo.com/279792745>

Module 8 - Ultrasound-guided Vascular Access <https://vimeo.com/336644725>

Module 9 - Pulmonary Ultrasound <https://vimeo.com/337817436>

Module 10 - Practical Pediatric POCUS <https://vimeo.com/337860899>

2) Pediatric Lung Ultrasound Video – JAMA Network 2013

Please view the following pediatric lung ultrasound video by the end of the **first week** of your 1st year US elective.

[YouTube link](#)

3) ALIEM Intussusception Module

Please enroll in the free ALiEM University Intussusception Course and complete the module by the end of the month.

<https://aliemu.com/courses/point-of-care-ultrasound-intussusception/>

4) Academy of Emergency Ultrasound (AEUS) Videos

The following videos should be viewed by the end of the **first week** of your 1st year US elective. All videos are available at the following link:

<http://community.saem.org/blogs/matt-fields/2014/09/07/aeus-narrated-lecture-series>

- Transabdominal Pelvic Ultrasound
- Emergency Ultrasound of the biliary tract

5) Podcasts

Please browse through the following podcasts and blog postings during your elective month. **All of the following should be completed by the second week of your rotation.**

- Obtaining cardiac windows: <https://www.coreultrasound.com/how-to-obtain-cardiac-windows/>
- US guided peripheral IV placement: <https://www.coreultrasound.com/ultrasound-guided-peripheral-iv-access/>
- Soft tissue US: <https://www.coreultrasound.com/cellulitis-vs-abscess/>
- RUSH exam: <https://emcrit.org/rush-exam/>. The first 10 mins of the lecture and “The Original RUSH Article” are what are most interesting.
- Nerve blocks:
 - Forearm Blocks <http://highlandultrasound.com/forearm-blocks>
 - Posterior Tibial Nerve Block <http://highlandultrasound.com/tibial-block>
 - Fascia Iliaca Compartment Block <https://vimeo.com/97725137>
 - Femoral Nerve Block <http://highlandultrasound.com/femoral-block>
- First trimester pregnancy: Please check out the first 10 mins or so of this podcast to get an overview of first trimester pregnancy and obtaining fetal heart rate. You may also skip through sections of this podcast to look at images of ectopic pregnancy, for your interest.
 - <https://www.coreultrasound.com/pregnancy-ultrasound-part-2-episode-89-ultrasound-podcast-archives/>
- Hips and shoulders:
 - <https://www.coreultrasound.com/hip-effusion/>
 - <http://5minsono.com/shoulder-dislocation/>

5) ImageSim Ultrasound

Fellows should complete and achieve competency in all 4 sections of ImageSim ultrasound (FAST, cardiac, lung and soft tissue) **by the end of their first ultrasound rotation.**

Appendix II

Independent Learning Requirements for Second Year Fellowship

1) Academy of Emergency Ultrasound (AEUS) Videos

The following videos should be viewed by the end of the **first week** of your 2nd year US elective. All videos are available at the following link:

<http://community.saem.org/blogs/matt-fields/2014/09/07/aeus-narrated-lecture-series>

- Intussusception
- Pyloric Stenosis
- Intravascular volume assessment by sonography of the IVC
- Renal ultrasound
- Appendicitis: A diagnosis at the bedside
- Ultrasound guided procedures: LP, paracentesis, thoracentesis

2) Podcasts

Feel free to browse through the following websites for more interesting postings!

Coreultrasound.com

Ultrasoundgel.org

Highlandultrasound.com

Appendix III
Educational Competencies and Sub-competencies for
Point-of-Care Ultrasound in PEM Fellowship
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Competency 1: Demonstrates knowledge of ultrasound physics and knobology

Basic Skills

- Explains “depth” and how to adjust the US machine “depth” settings
- Explains “gain” and how to adjust the US machine “gain” settings
- Explains “M-mode” and how to adjust the US machine “M-mode” settings
- Demonstrates proper cleaning and handling of ultrasound machine with attention to infection control standards
- Understands the relationship between imaging planes of the body and images on the screen
- Defines an ultrasound artifact

Intermediate Skills

- Explains “color doppler” and how to adjust the US machine “color doppler” settings
- Demonstrates how to adjust machine settings and presets for image optimization
- Understands the relationship between frequency, penetration and resolution
- Characterizes common ultrasound artifacts like shadowing, enhancement, mirror images, etc.

Advanced Skills

- Understands and is able to explain the theoretical safety risks involving the use of ultrasound
- Applies clinical uses for, and principles of color Doppler
- Demonstrates effective teaching of ultrasound physics and knobology

Competency 2: Demonstrates knowledge and correct technique with regard to point-of-care ultrasound image acquisition

Basic Skills

- Illustrates consideration for patient comfort when positioning, draping, or applying gel

Intermediate Skills

- Selects the correct transducer for specific ultrasound examinations
- Recognizes normal sonographic anatomy for specific ultrasound examinations

- Demonstrates proper positioning of patient, application of gel, and draping of materials for image optimization
- Labels images accurately
- Appropriately informs the patient and family as to the indications for and benefits/risks of a POCUS examination

Advanced Skills

- Discriminates between normal anatomy and pathology on ultrasound
- Manipulates the transducer properly to obtain the desired image
- Obtains ultrasound images that are of sufficient quality for medical decision making and billing
- Acquires the necessary views for an ultrasound examination and saves appropriate still and video images
- Accurately documents POCUS image findings, including the necessary components needed for billing
- Demonstrates effective teaching of point-of-care ultrasound image acquisition

Competency 3: Demonstrates accurate image interpretation and effective utilization of POCUS for medical-decision-making as it pertains to your scope of practice

Basic Skills

- Describes the clinical indications for using specific ultrasound studies

Intermediate Skills

- Identifies the contraindications for specific ultrasound studies
- Identifies which ultrasound study to obtain based on patient presentation

Advanced Skills

- Properly integrates POCUS studies into medical decision making
- Describes the “pearls” (advantages) and “pitfalls” (cautions) when using ultrasound across specific applications
- Accurately interprets the ultrasound image
- Clearly and effectively communicates ultrasound results to patients, families, and the medical team
- Has working understanding of the basic relevant pediatric POCUS literature
- Has awareness of the test characteristics of published data for specific ultrasound indications, (e.g. sensitivity, specificity)
- Demonstrates effective teaching of POCUS for medical-decision-making

Competency 4: Demonstrates a broad understanding of the administrative elements of a comprehensive POCUS Program

Basic Skills

- Recognizes the differences between ED POCUS and radiology ultrasound

Intermediate Skills

- Effectively communicates the distinction between POCUS and comprehensive ultrasound to patients/families

Advanced Skills

- Recognizes the value of a quality assurance database for POCUS examinations
- Describes policy statements pertinent to PEM POCUS, e.g. AAP Policy Statement on point-of-care ultrasonography by pediatric emergency medicine physicians, ACEP emergency ultrasound guidelines)
- Recognizes the need for a standardized process for properly credentialing providers in ultrasound