

# WUMS Ultrasound Rotation Guide



## **Welcome**

**Welcome to your Ultrasound Elective!** Please read through this guide BEFORE you start your rotation. The goal of this rotation is to introduce you to the core applications of point-of-care ultrasound (POCUS). We have laid out specific objectives for your rotation that are based on the ACEP Policy Statement regarding POCUS educational guidelines in Emergency Medicine. We have made a concerted effort to be focused with our curriculum, but realize there are always ways to improve, and we invite your feedback at the end of the rotation.

## **Basics**

**Elective Director: Laura Wallace**

**Hours:** Monday-Friday 10a-7p (excused for Tuesday conference)

**Sites:** Barnes-Jewish Hospital Emergency Department (and SLCH EU)

**Duties:** Work with the EM Intern during their ultrasound rotation to perform POCUS studies on ED patients as requested by the treating staff. Most of your time will be spent with the intern on rotation.

**Duration:** 4 weeks

**Orientation:** First day of the rotation, usually 12:00, 8th floor offices

**Image review and proctored scanning:** Monday at 12:00, 8th floor offices

**Educational Resources:** POCUSHUB.com, texts listed at bottom of this document

**Evaluation:** Combination of subjective assessment, successfully completing the listed objectives, successfully passing the end-of-rotation exam, and observed evaluation of performance of core exam during the last proctored scan day.

**Rotation/course director evaluation:** At the end of the rotation, you will be sent a questionnaire regarding your impression of the rotation, including strengths, weaknesses, and areas for improvement.

## **Schedule**

### **Hours**

Your hours are 10am-7pm Monday through Friday. You are excused for Tuesday conference and lunch, and journal club.

Unless at conference or previously approved absence, interns are expected to be in the ED available by phone and scanning during these hours (please break to eat lunch at some point).

## **Emergency Absences**

Please notify your admin chief and Laura Wallace ([lauraawallace@wustl.edu](mailto:lauraawallace@wustl.edu) or 513-460-5950) by email if you have an emergency. Otherwise, any absence during regular hours for non-ultrasound related activities (i.e. doctor's appointments, meetings) must be pre-approved with Dr. Wallace and will likely need to be made up in your off hours.

## **Important days**

Orientation Day: Usually the first weekday of your rotation, meet on the 8th floor. Contact Dr. Wallace before your rotation starts to confirm your orientation.

QA: Weekly, usually Monday at noon. Meet in the 8th floor Barnard offices unless we plan otherwise. We will review your scans from the week (see US documentation).

## **Daily Routine (M-F, 10-7)**

On arrival, add your work phone number to the EPIC "Message Log" and ask to be put on the trauma pager so you can go to level one traumas.

When you arrive or when you have time during the day, it is good to check that all the machines are there, working and have all their probes. If you discover a problem with any of the ultrasound machines, please ask the charge nurse to put in a work order for the machine. It will also make your day flow smoother if you restock the cart on the ultrasound machine at the beginning of each of your shifts.

The flashcards (available for download at [pocushub.com](http://pocushub.com)) are a great reference for the ultrasound machines and scanning expectations. Refer to them first!

## **Rotation objectives**

### **Core objectives:**

1. Describe the differences between the 4 transducer types and their ideal applications.
2. Describe the differences between shadowing, reverberation, posterior enhancement, and mirror artifacts.
3. Demonstrate the location of transducer placement and orientation for the E-FAST exam.
4. Demonstrate the 4 basic windows for focused cardiac ultrasound.
- 5a. Describe the appearance of a pericardial effusion on cardiac US
7. Describe the appearance of pleural effusion on lung US.
8. Identify B-lines and describe their clinical significance.
9. Identify and describe common renal ultrasound findings including hydronephrosis, simple cyst, and complex cyst.
10. Demonstrate the technique for evaluation of early pregnancy via transabdominal.
11. Identify and describe the differences in appearance between soft tissue cellulitis and abscess.
13. Describe the technique for evaluation of abdominal aorta pathology.
14. Demonstrate the technique for evaluating for an abdominal fluid pocket for paracentesis.

### **Reach objectives:**

1. Describe common pathological findings on ocular US.
2. Demonstrate the complete lower extremity DVT evaluation (2-region/3-point or whole leg).
3. Describe the ultrasound findings of appendicitis.
4. Describe the technique for ultrasound-assisted lumbar puncture.
5. Demonstrate correct technique for US guided arthrocentesis.

## **Basic Workflow**

### **Basic steps for each scan**

1. Turn on the ultrasound machine.
2. Select your ultrasound probe.
3. Select Exam Type (abdominal, cardiac, nerve etc presets)
4. Press Patient Info and then Workflow, select the correct patient from the list. (If the patient is not in the list, enter their name and birth date so they can be merged in QPATH later)
5. Enter resident WustlKey for READING DOCTOR and attending Wustlkey for REFERRING DOCTOR.
6. Type in a label if needed.
7. Scan some things! Remember to adjust depth and gain, add pressure or gel to maximize image quality.
8. Save your image or clip and repeat, changing labels as needed.
9. Press New/End to close your exam (which will automatically upload the exam to QPATH).
10. Document your scan in QPATH (QPATH workflow on [pocushub.com](http://pocushub.com))

**The instructions in this section are primarily for residents, but for the most part also apply to you so I have included them here:**

### **US documentation and notes**

There is a log to download on [POCUSHUB.com](http://POCUSHUB.com) to keep track of your scans. Please make sure your log is filled out prior to QA each week.

**Every time you do an ultrasound, you should save at least one image and write a note.** This includes procedure (save a picture of the vessel you're aiming for). Some exams will be inconclusive or incomplete, and some exams will be just for teaching purposes, but they should all at least one clip saved and have a note in the chart.

For incomplete/inconclusive scans (eg. pt taken to CT before FAST was completed or unable to get a complete RUQ view): document your findings and note which parts were incomplete and why.

### **Oversight**

**Every scan (even educational) must have images saved and an attending name attached. The attending in the pod must be aware and agree to attest BEFORE you begin an ultrasound.** Every procedure, including ultrasounds and peripheral IVs, must be signed off by an attending, and they all have varying comfort levels of procedural oversight. NPs and PAs are not credentialed for ultrasound, so if you are asked to scan one of their patients, you must find an appropriate attending to attest to your scan BEFORE you do it. There are a few attendings that are not credentialed with ultrasound so they may refer you to someone else to attest to your images. If you are asked by a nurse to place an IV in the protocol room, find the swing attending, triage attending, or someone that is willing to attest to your procedure BEFORE you do it.

Furthermore, if you are not familiar with an exam, ask the attending to come perform the exam with you. If they are unable to perform the exam with you, then inform them it will need to be a teaching exam if you have not been formally trained in that particular application.

There are flash card guidelines in the pods and downloadable at [POCUSHUB.com](http://POCUSHUB.com). You can use these to help when you are not sure where to start.

### **Educational/Teaching scans**

Don't wait for phone calls. If it is slow, drum up business for yourself by walking around to the different pods and offer up your skills. It is great to practice ultrasounds for educational purposes, if the patient and attending agrees. Please **always ask the attending** before you can do a teaching exam - they will have to attest to your exam and may be too busy.

You should still save images and write a note in the chart. If you select "educational" in the QPATH note, the images and note will not transfer over to EPIC and the patient will not be charged for the scan.

### **Prioritizing**

You will sometimes get so many calls you can't get to them all. You are not expected to perform every ultrasound in the ED. Make a good effort, but be honest when someone asks you to do a scan: if you already have 3 scans to do, let the team know you will be a long time before you can get there and they should consider doing it themselves.

If you are asked to do an "urgent" scan and you are busy, let the team know you cannot come just then and they will need to do it themselves. Keep in mind that often these 'emergent' scans have great learning potential. In the same vein, you should not stay late just for scanning. It is okay to stop taking calls early if you are behind on the scans you have already been asked to do.

You should always make time to eat lunch and do interesting educational scans. You are there to learn ultrasound, not be a workhorse.

If someone gives you a hard time or insists that you do their scan first because the patient is sick, remember you are the intern-they can ultrasound at least as well as you.

**The ultrasound section will always support you! If you have any problems, please email Laura Wallace quickly so that it can be addressed.**

## **Procedures**

**Even if a senior resident is teaching you, you must let the attending know before you start. If you have any doubts or feel uncomfortable, please speak up!**

### **IV**

IV placement is likely the most common call you will receive. Although you do need to learn how to place peripheral IVs, you are not there to do other people's work. If a nurse calls and asks you for an IV, you should ask the following questions:

- Where has the nurse attempted the IV placement?
- Has the attending caring for the patient been notified the IV attempts have failed?
- Has the nurse discussed with the attending what type of IV they will need? (22 in the hand, 18 above the elbow for CTA etc)

If you feel that you are being intimidated or pressured to put in an IV over doing another US or procedure, please let Dr. Wallace know. She will address this for you.

### **Obstetric Ultrasound**

#### **A few tips:**

- Tell the patient before you begin that it is possible the pregnancy is too early, so if you are unable to find an IUP, they may need a vaginal ultrasound. This can help reassure the patient if you are unsure what you see.
- ALWAYS perform a transABDOMINAL ultrasound before a transVAGINAL ultrasound, even if another provide has attempted a transabdominal before you. This will help you understand the pathology / anatomy you are going to scan. Sometimes, you can prevent the transvaginal with your awesome ultrasound skills!
- **You MUST be supervised for transVAGINAL scans by an attending.** This is to prevent repeat scanning. You should never be asked to do a transvaginal ultrasound without an attending present.
- Do NOT tell the patient they have had a miscarriage if you are not certain or have not established a relationship with them. Discuss with the primary team how information should be disclosed with the patient before the scan.
- Unless you are 100% positive that you see a YOLK SAC or FETAL POLE IN THE UTERUS, every pregnancy should be considered ectopic until proven otherwise.

Any patients with positive pregnancy tests but no confirmed intrauterine pregnancy should have OB consulted for evaluation and follow up planning.

### **Non-ultrasound Procedures**

Often you may be asked to participate in procedures, or even get an opportunity to participate in interesting cases just because you are nearby. That is okay as long as you are not missing ultrasounds to do so. If you are asked to do a procedure (like a paracentesis) but you have other ultrasounds to do, you should pass. It is nice to be helpful, but your main goal is to learn ultrasound not be the procedure resident.

### **Image Review**

**Mondays at noon with Dr. Wallace, unless otherwise directed**

**Meet in the 8th floor offices**

During Image Review each week, we will be looking through all the images you saved from the week before to confirm your findings and improve your ultrasound skills. Keep close track of all the scans you performed, the indications for the scans and how you interpreted the images. Before Image Review each week, fill out the log sheet including. The more organized you are beforehand, the faster QA will go and the more time we will have to scan together!

### **Medical Students**

There may be single days when medical students on an EM elective join you. If there are too many students in the group to be conducive to learning, you may take the afternoon off and use it for reading time.

### **Problems:**

If you ever have any questions or concerns, please bring them to Dr. Wallace, Dr. Theodoro, Kiesha (Ultrasound Division Admin) or the ultrasound fellows. Dr. Wallace is your primary contact. If it is an emergency, you can always page the Chief pager. We will do our best to address any concerns or problems you have.

Laura Wallace: (text or email 24/7, if I don't respond I am probably sleeping but will respond when I wake up)

513-460-5950 (cell, prefer text)

[lauraawallace@wustl.edu](mailto:lauraawallace@wustl.edu)

Dan Theodoro (US Division Chair)

314 322 9250 (cell, prefer text)

[theodorod@wustl.edu](mailto:theodorod@wustl.edu)



Kiesha Cleark (US Division Admin)

[kiesha.cleark@wustl.edu](mailto:kiesha.cleark@wustl.edu)

## **Reading Curriculum**

Week 1: Physics, FAST, Renal, Procedures  
Week 2: Skin & Soft Tissue, Early Pregnancy, Aorta  
Week 3: Cardiac, Lung, RUSH, Shock  
Week 4: Biliary, Ocular, GU, DVT, MSK, Bowel

Please choose a reading reference. I recommend the free iBooks Introduction to Bedside Ultrasound Volume 1 & 2 (Matthew Dawson and Mike Mallin). If you do not have an Apple product, Manual of Emergency and Critical Care Ultrasound by Vicki Noble and Bret Nelson is available for free on the Becker Library website. [www.jeffsono.org/curriculum](http://www.jeffsono.org/curriculum) also has recommendations.

The videos below are between 5-20ish minutes long, so should be fairly easily digestible, and for some you may be able to watch them while on rotation in between calls for scans.

### **Introduction**

ACEP POCUS Guidelines - <https://tinyurl.com/y2pzdva>

### **Physics and Instrumentation**

AEUS Physics lecture- <https://vimeo.com/channels/aeus/94786374>

### **Trauma**

AEUS FAST lecture <https://vimeo.com/channels/aeus/34118863>

### **First trimester pregnancy**

AEUS TAP lecture - <https://vimeo.com/channels/aeus/52830902>

AEUS TVP lecture - <https://vimeo.com/channels/aeus/41808262>

### **Abdominal aorta**

AEUS Aorta lecture - <https://vimeo.com/channels/aeus/41791516>

### **Cardiac**

Introduction to Bedside Ultrasound, Volume 1, Chapter 2: Basic Cardiac

### **Inferior vena cava**

5minsono.com IVC lecture - <http://5minsono.com/ivc/>

### **Biliary tract**

AEUS Biliary Tract lecture - <https://vimeo.com/channels/aeus/87759897>

### **Urinary tract**

AEUS Renal lecture - <https://vimeo.com/channels/aeus/69556457>

## **Deep vein thrombosis**

AEUS DVT lecture - <https://vimeo.com/channels/aeus/52819569>

## **Soft tissue and MSK**

Introduction to Bedside Ultrasound, Volume 2, Chapter 10: Soft tissue

AEUS MSK lecture - <https://vimeo.com/channels/aeus/41682960>

## **Thoracic**

AEUS Thoracic lecture - <https://vimeo.com/channels/aeus/46515236>

## **Ocular**

AEUS Ocular lecture - <https://vimeo.com/channels/aeus/41575053>

## **Bowel**

AEUS Appendicitis lecture - <https://vimeo.com/channels/aeus/93051990>;

AEUS Small Bowel Obstruction lecture - <https://vimeo.com/channels/aeus/69551555>

## **Procedures**

Introduction to Bedside Ultrasound, Volume 2, Chapter 9: Procedures

5minsono.com US-Guided IV lecture - <http://5minsono.com/ugiv/>

5minsono.com CVC placement lecture - <http://5minsono.com/cvc/>

5minsono.com CVC confirmation lecture - [http://5minsono.com/cvc\\_confirm/](http://5minsono.com/cvc_confirm/)

5minsono.com Pericardiocentesis lecture - <http://5minsono.com/pericardiocentesis/>

AEUS US-Guided procedures lecture (LP/para/thora) - <https://vimeo.com/channels/aeus/59095992>

ACEPNow Knee Arthrocentesis article - <https://tinyurl.com/yxkyp559>

Revisions:

Revised 6/24/11 Char, Noelker

Revised 5/29/14 Hung

Revised 10/15/14 Liss

Revised 7/1/16 Wallace, Oberle

Revised 07/24/17 Conner

Revised 10/23/17 Theodoro

Revised 11/17/2017 Hanna, Theodoro

Revised 9/1/2019 Wallace