

A Curriculum Grab-bag - elements of curricula from various programs

Don't forget to train other faculty/supervising providers - Identify a motivated core group to train, then leverage them to help train residents and less motivated faculty. You can't have an robust POCUS curriculum with only 1 or 2 faculty providers doing POCUS.

Workshops

1. **Hands-on only workshops:** Invite a rep from a sono company to bring several machines at once (experience w/ Mindray and Sonosite doing this). Contra Costa does this during resident half-day conference for targeted learning session, MSk, echo, etc.
2. **Make Quizzes to test knowledge after lectures** (Examples from JPS at the end of this document - feel free to use or make your own).
3. **Ultrasound OSCE** (see example from Lawrence at the end of the document)
4. **Two day ultrasound course** - lectures and hands on scanning. See sample agenda from Contra Costa. Consider when (CC replaces ACLS, Lawrence does during intern education week mid first year).
5. **Longitudinal course: (spread content of course over a year)**
 - a. **Brown:** 1.5 hour POCUS didactic every 2 months during didactic time - **link to survey used at Brown to evaluate sessions** - https://docs.google.com/forms/d/e/1FAIpQLScGh0y3rAvQ5gRznO79Ik6xyQX1RmhnimjihHmwoYnK2ukeg/viewform?usp=sf_link
 - b. **JPS:** 1.5 hour POCUS didactic 4 times Fall, 4 times Spring, 1, 4 hour workshop (hands on only) Fall, 1 workshop Spring. Quizzes with each lecture (see end of document for links).

Longitudinal Activities

1. 2-4 week POCUS elective (Contra Costa does this in the ED. Minimum 10 scanning shifts, with goal for residents to get 150 total scans, and 25 of each diagnostic category).
2. Scan in radiology with Ultrasound techs
3. Half day with Echo techs doing echos in the hospital (can build into a sono or cardiology rotation)
4. Half day with interventional radiology
5. FM Clinic dedicated sono resident (scans patients educationally in FM clinic)
6. Critical care or ER sono elective days (scanning in ER as part of established ultrasound rotation or scanning in ICU and reviewing studies with ICU docs or with FM ultrasound director).
7. On inpatient rounds practice the same scan on each patient regardless of reason for admission: Kidney, PLAX, bladder, etc. Pick a different target organ each day.
8. US rounds: weekly or monthly group image review of recent POCUS cases (morning report style). Multi-purpose:
 - a. QI: learners bring scans - critique image quality and interpretation.
 - b. Review when/how to apply POCUS to clinical decision-making.

- c. Increase curricular buy-in by showcasing cases where POCUS improved care/decreased time to diagnosis.

Hand-Held Ultrasound Machines

1. **Phillips Lumify:** Starts at 200/month/probe. Can buy outright. Android tablet based. Separate probes plug in.
2. **GE VSCAN (and VSCAN Extend):** 3-6 K (single vs. dual probe). Single probe version is a phased array. Dual probe version has linear high frequency on one side and phased array on the other. PACS/wireless capable.
3. **Sonosite IVIZ:** Standalone hand-held device. Separate probes. Wireless/PACS capable. 10-20K.
4. **Butterfly IQ:** 2K. Plugs into iphones or ipads. Single probe for all applications (micro-chip based). Cloud subscription mandatory at least for first year (100/month for up to 10 probes or 35/month for individual subscription)

How do I clean the probes? AIUM Guidelines

https://www.aium.org/accreditation/Guidelines_Cleaning_Preparing.pdf

What are the right limited billing codes? SonoSite has the best resource on this.

<https://www.sonosite.com/sites/default/files/2019%20SonoSite%20-%20Emed%20Guide.pdf>

If you own equipment in your own practice, consider the modifier 26 (professional component only). (STARK laws).

A good description from the PA POCUS society on billing issues:

<https://spocus.org/Billing-Statement>

High Level Disinfection (systems you need if doing TV sonography)

· **Soaking Solution systems:** Hydrogen peroxide, gluteraldehyde require systems to deal with fumes. Soaking stations assist in doing this safely. Cheaper option, but may still be 800-1000 dollars and requires staff time and training, personal protective equipment still.

<http://www.pcimedical.com/products/ultrasound-disinfection/>

· **Trophon/Vapor Systems:** Much easier, minimal staff time, 5-7 minute cycles. Just refill the solution. 5-7K per unit, cost-limiting for many. <http://www.nanosonics.com.au/Trophon-EPR/Trophon-EPR>

GE has a new generation Trophon (approximately 8-10K) coming out July 2019 - 7 minute clean cycles, touch screen.

Paid Ultrasound Education Options:

1. **EMSONO:** Subscription based with institutional discounts available (reasonably priced). Video modules with interactive quizzes. ER focused but primary-care “tracks” available (just includes a few less videos). Allows for faculty tracking progress of residents. <https://www.emsono.com>
2. **The Ultrasound Leadership Academy:** A 12-month distance learning ultrasound fellowship-equivalent with some of the leading ultrasound experts in emergency medicine and critical care worldwide. Google hangouts, videos, articles. Free attendance at courses offered by faculty. Significant investment in time (several hours per week) and money (12-20K). <http://www.ultrasoundleadershipacademy.com/ULA/one-page/index.html>
3. **Global Ultrasound Institute:** Hi-yield, in-depth, clinically-relevant online instructional videos for achieving competency in POCUS for Family Medicine including cardiac echo, lung, gallbladder, aorta, renal, MSk, procedures, FAST, and others. Quizzes after each lecture, and allows faculty to track resident progress. Most affordable option. <https://globalultrasoundinstitute.com>
4. **Ultrasound “course in a box”:** From the makers of ULA (above). Will tailor pre-course video content (mostly ULA videos) and provide access for your learners. For extra money, will send instructors (pricey). Provide short summary lectures in PPT as well as video format to play on course day. <http://ciab.ultrasoundpodcast.com>
5. **SonoSim:** Hand held simulated ultrasound probe attaches to a computer and trainees can work through a variety of cases while ‘scanning’ the computer patient. Also includes informative video lectures and knowledge assessments. https://sonosim.com/ultrasound-training/?campaignid=130081384&adgroupid=7293539584&keyword=sonosim&matchtype=e&gclid=Cj0KCQjw4-XIBRDuARIsAK96p3A0IWBakOPGvTIOxLWLS8ddfA-nu9leluCVy0Em6IRM4n8TQzjVKP0aAoIbEALw_wcB
6. **Ultrsim: The world’s first ultrasound simulation technology. Includes a large ultrasound machine simulator, several simulator probes, and a mannequin to practice scanning.** <https://www.gtsimulators.com/ultrasim-ultrasound-training-simulator-p/uts100.htm>
7. **Contra Costa 2 day POCUS course:** Offered in January and June every year. Priority enrollment is for FM faculty/residents who are interested in starting or developing a POCUS curriculum in their FM Residency Program. Rates are heavily discounted compared to commercial vendors who offer the same course. Please google Contra Costa Point of Care Ultrasound for further info about the course and enrollment details.
8. **Introduction to Primary Care Ultrasound.** This is a 2 day course offered multiple times throughout the year through the University of South Carolina School of Medicine Ultrasound Institute in Columbia, SC. This activity has been approved for 15 AMA PRA Category 1 Credit™. https://sc.edu/study/colleges_schools/medicine/centers_and_institutes_new/ultrasound_institute/education.php for more information or contact ultrasoundinstitute@uscmcd.sc.edu.

Wireless Image Archiving Software Options

- **Ultralingq:** Lesser known in the point of care community, but an option for archiving. <http://ultralingq.com>
- **Qpath by telexy:** The most commonly used product. Pricy – better for large institutions or programs with multiple residencies etc. <http://www.telexy.com/our-products/qpath/>
- **PDAS by sonosite:** 1-2K, allows ability to upload to a network computer on which images can be reviewed and stored. <https://www.sonosite.com/support/connectivity>

Point of Care Ultrasound Curriculum Guideline (AAFP)

- AAFP Commission on education recently accepted a curriculum guideline on POCUS authored by FM ultrasound leaders from several institutions. <http://www.aafp.org/medical-school-residency/program-directors/curriculum.html>

Other Important Free POCUS Resources

Contra Costa Point of care ultrasound website. Look under resources section and there is plethora of information to help you start or develop a POCUS program in your FM Residency Program. <https://cchealth.org/residency/ghf/pocus.php>

Lots of great tools made free by Ben Smith - sonogif allows you to turn an MP4 clip into a gif for easier presenting, tweeting, or use in google quizzes. SonoClip Share allows you to de-identify and upload a clip to share with someone else for review. Also has a new tool for editing images in your butterfly IQ cloud. <https://www.ultrasoundoftheweek.com/tools/>

Cascades East POCUS resource website
<https://sites.google.com/site/residencycefm/home>

5 min sono - Brief summary videos. Can be used as a refresher prior to performing or teaching a POCUS study. <http://5minsono.com/>

2019 AIUM Practice Parameter for the Performance of Point-of-Care Ultrasound Examinations: <https://www.aium.org/resources/guidelines/pointofcare.pdf>

Twitter: #FOAMED (free open access medical education) #FOAMUS, #POCUS. You can post images to get questions answered, or just browse interesting cases and educational tools posted by others.

The POCUS Atlas/The Evidence Atlas - open access clips of normal and pathology sorted by exam type. Great to download and add to presentations, or simply review abnormals if you are scanning each other and mostly looking at normal.

<http://www.thepocusatlas.com/>

More Free Ultrasound resources:

Ultrasound GEL: Podcasts “gathering evidence from the literature” (apple podcasts or google play)

<https://www.ultrasoundgel.org/>

Youtube

Twitter: #FOAMUS #POCUS #EMPOCUS #FMPOCUS #IMPOCUS

Ultrasound of the Week – Cases (84)

<https://www.ultrasoundoftheweek.com/>

The ultrasound podcast: “making horrible doctors decent and good doctors great”

<http://www.ultrasoundpodcast.com/category/podcast/>

How to lecture on ultrasound:

<http://www.ultrasoundpodcast.com/category/podcast/page/2/>

Opioid sparing pain control (blocks) and procedures:

<https://www.nysora.com/> (NY school or regional anesthesia)

<http://highlandultrasound.com/>

Ohio State – Lecture slides, videos, self-study modules

<https://sites.google.com/a/osuultrasound.com/website/>

Sonoguide – ACEP resource (exam specific and US procedure instructions)

<https://www.acep.org/sonoguide/introduction.html>

Sonomojo – a guide to bedside ultrasound education:

Teaching modules, cheat sheets, FOAMed links:

<http://www.sonomojo.org/>

Western Sono: Canadian University POCUS site with variety of resources:

<https://westernsono.ca/>

AAFP – consider joining the POCUS MIG (member interest group), has a resource library.

<https://www.aafp.org/membership/involve/mig/ultrasound.html>

AIUM – American Institute for Ultrasound in Medicine: some free lectures, practice parameters

AMSSM – American Medical Society for Sports Medicine (library of detailed MSK videos- free, but need to register): <https://www.amssm.org/UltrasoundOnlineDidactics.php>

Free Ultrasound I-books:

<https://www.ultrasoundtraining.com.au/foamus/foamus-free-ebooks>

Other Links:

<https://sites.google.com/a/osuultrasound.com/website/links/educational-and-organizational-links>

<https://www.ultrasoundtraining.com.au/foamus/foamus-ultrasound-links>

<https://sites.google.com/site/residencycefm/>

Quizzes from JPS Curriculum (if you find bothersome typos or errors.. Email nlefevre@jpshealth.org, otherwise feel free to use if you'd like)

1. FM-Sono 1: Physics: <https://forms.gle/P9gkZpwM4JGGefUZ9>
2. FM-Sono 2: Skin and Soft Tissue: <https://forms.gle/TdtmHw7kRfyMLKax5>
3. FM-Sono 3: Renal Bladder: <https://forms.gle/dNsCCdhx5rLjGU128>
4. FM-Sono 4: FAST: <https://forms.gle/VbYYhQn9NVa7K53P9>
5. FM-Sono 5: Basic Obstetric: <https://forms.gle/cjTWTkCD6b3wSKAB6>
6. FM-Sono 6: RUQ: <https://forms.gle/u8h94HHPMHpXhgZz9>
7. FM-Sono 7: AAA: <https://forms.gle/9ZipZeNSqHapuSuZ9>
8. FM-Sono 8: Cardiac: <https://forms.gle/JM5KKgSVwfHdgzS67>
9. FM-Sono 9: Lung: <https://forms.gle/SibVaYv8fLfrDjYG8>
10. FM-Sono 10: Ocular: <https://forms.gle/NwhFq42SJ6QeiwvJ9>
11. FM-Sono 11: DVT: <https://forms.gle/WnyHxvvg8F7jSymcA>
12. Cumulative Assessment (used at Lawrence in 2-day course): <https://forms.gle/V8q99MVrncGdq8jy8>

An Ultrasound OSCE Example from Lawrence

Hands-On Ultrasound OSCE

Scenario: A 28-year old patient arrives at your hospital in Ghana where you are holding clinic, being wheeled in on a gurney by a family member after a motorcycle. He is complaining of shortness of breath and abdominal pain and has a blood pressure of 80/40 and a pulse of 115. You have a small hand-held ultrasound machine and three ultrasound probes to choose from - phased array, curvilinear, and linear probes. You start by performing ultrasound exams to rule out hemothorax, pneumothorax, and hemoperitoneum.

<u>Task</u>	<u>Performs w/ Help</u>	<u>Performs</u>
<u>Selects the curvilinear abdominal or phased array probe for the study</u>		
<u>Selects the exam type as abdominal</u>		
<u>Enters patient information (may write “Trauma” under name) into the demographics and start the study</u>		
<u>Uses appropriate depth and gain, fans through Morrison’s (hepato-renal) pouch in the RUQ</u>		
<u>Freezes and saves a still image of Morrison’s (hepato-renal) pouch in the RUQ</u>		
<u>Slides the probe superiorly to the diaphragm and demonstrates the curtain sign</u>		

<u>Uses appropriate depth and gain, fans through the left upper quadrant to demonstrate the spleno-renal space</u>		
<u>Freezes and <i>saves a still image</i> of the spleno-renal space in the LUQ</u>		
<u>Slides the probe superiorly to the diaphragm and demonstrates the curtain sign</u>		
<u>Uses appropriate depth and gain, fans through the suprapubic space</u>		
<u>Decreases the depth to focus on the pleural line and moves to the right lung apex. <i>Saves a clip</i> of lung sliding</u>		
<u>Moves to the left lung apex and visualizes lung sliding.</u>		
<u>Uses M-Mode to show the “seashore” sign. <i>Saves a still image</i> of your M-Mode tracing</u>		
<u>Returns to the patient screen and ends the study</u>		