



Point-of-Care Ultrasound for the Family Physician

Nicole T. Yedlinsky, MD, CAQSM, FAAFP, RMSK
University of Kansas Family Medicine Residency

Kansas City, KS

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Nicole Yedlinsky, MD, CAQSM, FAAFP, RMSK



Nicole T. Yedlinsky, MD, CAQSM, FAAFP, RMSK graduated from Tulane University School of Medicine in New Orleans, LA. She completed family medicine residency at Womack Army Medical Center, Fort Bragg, NC. She went on to complete her sports medicine fellowship at VCU-Fairfax Family Practice in VA as part of the National Capital Sports Medicine Consortium. Dr. Yedlinsky currently serves as core faculty at the University of Kansas Family Medicine Residency. She is a clinical assistant professor at the University of Kansas School of Medicine in Kansas City, KS.

Learning Objectives

- Review common point-of-care ultrasound (POCUS) applications and indications
- List barriers to POCUS use and implementation
- Discuss the POCUS Curriculum Guideline for residencies
- Review pathways to POCUS training and credentialing
- Understand how to incorporate POCUS into clinical practice

What is POCUS?

- Improved portability and cost
- More accurate bedside assessment
- Builds on H&P
- Improves patient/provider satisfaction
- Decreases resource utilization
- Tool to guide clinical decision making
- Does not replace diagnostic scans
- Answers a focused clinical question

POCUS Applications

■ Pulmonary

- Pleural effusion
- Pneumothorax
- Pulmonary edema
- Thoracentesis

■ Abdominal

- Free fluid
- Gallbladder
- AAA
- Paracentesis

POCUS Applications

- Genitourinary
 - Renal
 - Bladder
- Head & Neck
 - Thyroid
 - Central venous line insertion
- Cardiac
 - Pericardial fluid
 - Systolic/diastolic function
 - IVC

POCUS Applications

■ Vascular

- DVT
- Peripheral venous access
- Arterial line placement

■ Nervous

- Carpal tunnel
- Lumbar puncture

POCUS Applications

- Musculoskeletal
 - Joint effusion
 - Fracture
 - Joint aspiration/injection
- Soft Tissue
 - Cellulitis
 - Foreign body
 - Abscess
 - I&D

POCUS Applications

- Obstetric
 - Ectopic
 - Dating
 - AFI/BPP
 - Fetal lie/presentation
- POCUS protocols/algorithms
 - FAST
 - BLUE
 - CLUE
 - RUSH

POCUS Case

- 51 year old male with PMH of HTN, DM2, and asthma presents to clinic with shortness of breath. Began 1 week prior but worsening. Urgent care 1 week ago treated with albuterol and corticosteroids. Reports worsening ankle swelling.
- Differential diagnosis:
 - Asthma
 - CHF
 - Pneumonia
 - MI
 - DVT/PE

POCUS Case continued

■ Physical Exam

- Vital signs: Temp 38.2C, Pulse 95, Resp 18, O2 Sat 95%, BMI 34
- HEENT: mild TTP over maxillary sinuses
- Pulmonary: mild end expiratory wheezing bilaterally
- Cardiovascular: distant heart sounds, no murmur, no JVD, mild bilat edema to ankles
- Abdomen: no TTP, no palpable fluid wave

POCUS Case continued

- POCUS examination
- Lung:
 - Lung sliding throughout
 - Multiple bilateral B lines
 - Small bilateral pleural effusions
- Cardiac
 - Dilated IVC without collapse
 - No pericardial effusion
 - Reduced systolic function
- Abdomen: no ascites
- DVT: veins compressible bilaterally

POCUS Barriers

- Equipment – size, cost, & quality
- Operator experience and skill
- Time to train
- Ultrasound physics and artifacts
- No uniformity in medical education and residency
- Documentation and billing
- Image storage

Equipment

[Butterfly iQ: One Probe, Whole Body Imaging](#)



POCUS Training/Credentialing

- Didactics 16-24 hours
- Experiential
 - 150 total/25 each type/5 procedure
 - Supervision overreads by sonologist/radiologist
 - Keep log comparing training scans to other imaging results, surgical findings, or patient outcomes
- Proficiency – documentation & review, QA/QI
- Credentialing – buy in from radiology/cardiology
- CME – AIUM, AAFP POCUS MIG



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Recommended Curriculum Guidelines for Family Medicine Residents

Point of Care Ultrasound

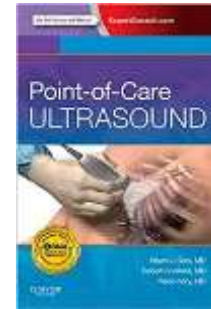
This document is endorsed by the American Academy of Family Physicians (AAFP).

Introduction

This Curriculum Guideline defines a recommended training strategy for family medicine residents. Attitudes, behaviors, knowledge, and skills that are critical to family medicine should be attained through longitudinal experience that promotes educational competencies defined by the Accreditation Council for Graduate Medical Education (ACGME), www.acgme.org. The family medicine curriculum must include structured experience in several specified areas. Much of the resident's knowledge will be gained by caring for ambulatory patients who visit the family medicine center, although additional experience gained in various other settings (e.g., an inpatient setting, a patient's home, a long-term care facility, the emergency department, the community) is critical for well-rounded residency training. The residents should be able to develop a skillset and apply their skills appropriately to all patient care settings.

Training

- POCUS courses
- SonoSim
- Manufacturer provided
- LOTS of online resources
- Phantoms
- Shadow sonographer/radiologist
- Log scans
- Write your own policy/credentialing
- POCUS champion



Resources

- Point-of-Care Ultrasound book (Soni) - Internal Medicine perspective
- www.ultrasoundpodcast.com
- www.sonospot.com
- www.5minsono.com
- MGH Emergency Ultrasound Educational Website
- Toronto General Hospital Point of Care Ultrasound
- SUSME, AIUM
- Many, many more

Documentation and Billing

Ultrasound Services

		2018 Medicare Physician Fee Schedule - National Average*			2018 Hospital Outpatient Prospective Payment System (OPPS)†	
CPT Code	CPT Code Descriptor	Global Payment	Professional Payment	Technical Payment	APC Code	APC Payment
76881	Ultrasound, complete joint (ie, joint space and periarticular soft tissue structure(s)) real-time with image documentation	\$104.01	\$32.39	\$71.62	5522	\$114.46
76882	Ultrasound, limited, joint or other nonvascular extremity structure(s) (eg, joint space, periarticular tendon(s), muscle(s), nerve(s), other soft tissue structure(s), or soft tissue mass[es]) real-time with image documentation	\$59.02	\$25.19	\$33.83	5522	\$114.46
76942	Ultrasonic guidance for needle placement (e.g., biopsy, aspiration, injection, localization device), imaging supervision and interpretation	\$61.18	\$33.11	\$28.07	Packaged Service	No Payment

Documentation and Billing

Procedures that include ultrasound guidance (Do NOT report CPT Code 76942 in addition)

		2018 Medicare Physician Fee Schedule - National Average*		2018 Hospital Outpatient Prospective Payment System (OPPS)†	
CPT Code	CPT Code Descriptor	Non-Facility Payment	Facility Payment	APC Code	APC Payment
10022	Fine needle aspiration; with imaging guidance	\$143.96	\$67.66	5071	\$572.85
20604	Arthrocentesis, aspiration and/or injection; small joint or bursa (e.g., fingers, toes) with ultrasound guidance, with permanent recording and reporting	\$73.78	\$44.87	5441	\$244.70
20606	Arthrocentesis, aspiration and/or injection; intermediate joint or bursa (e.g., temporomandibular, acromioclavicular, wrist, elbow or ankle, olecranon bursa) with ultrasound guidance, with permanent recording and reporting	\$82.06	\$55.06	5442	\$543.38
20611	Arthrocentesis, aspiration and/or injection; major joint or bursa (e.g. shoulder, hip, knee joint, subacromial bursa) with ultrasound guidance, with permanent recording and reporting	\$92.85	\$63.34	5441	\$244.70

Documentation and Billing

- Permanently recorded images maintained
 - Printed or electronic
- Written report (complete or limited)
- Within report of procedure



Incorporating into Practice

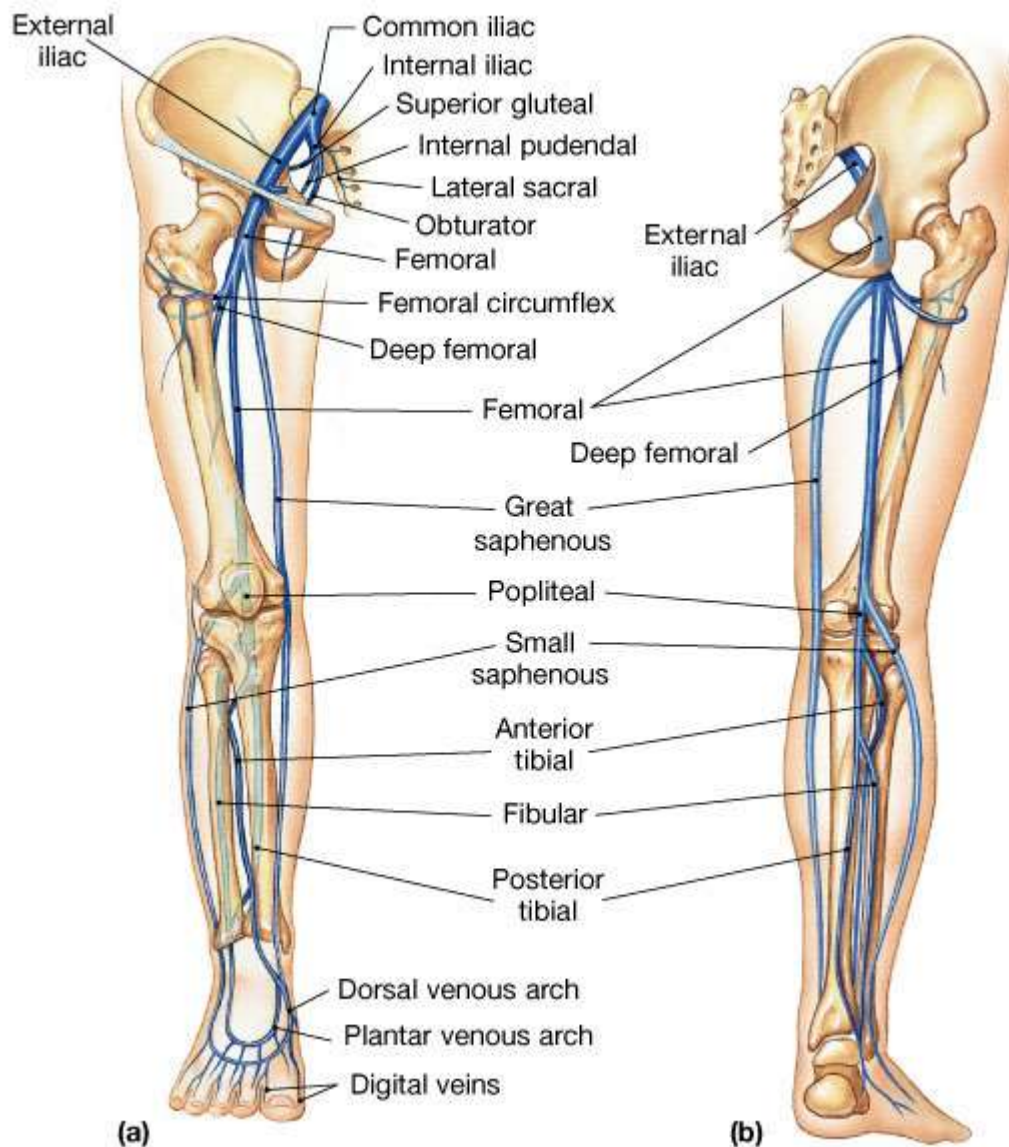
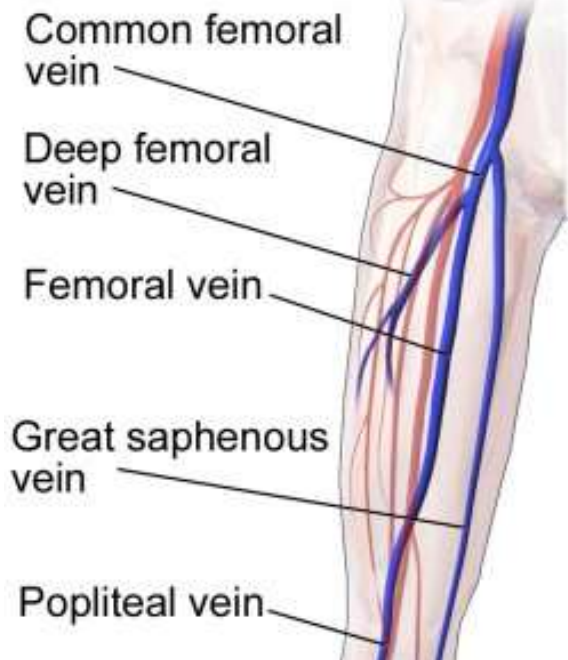
OB/Rule out ectopic

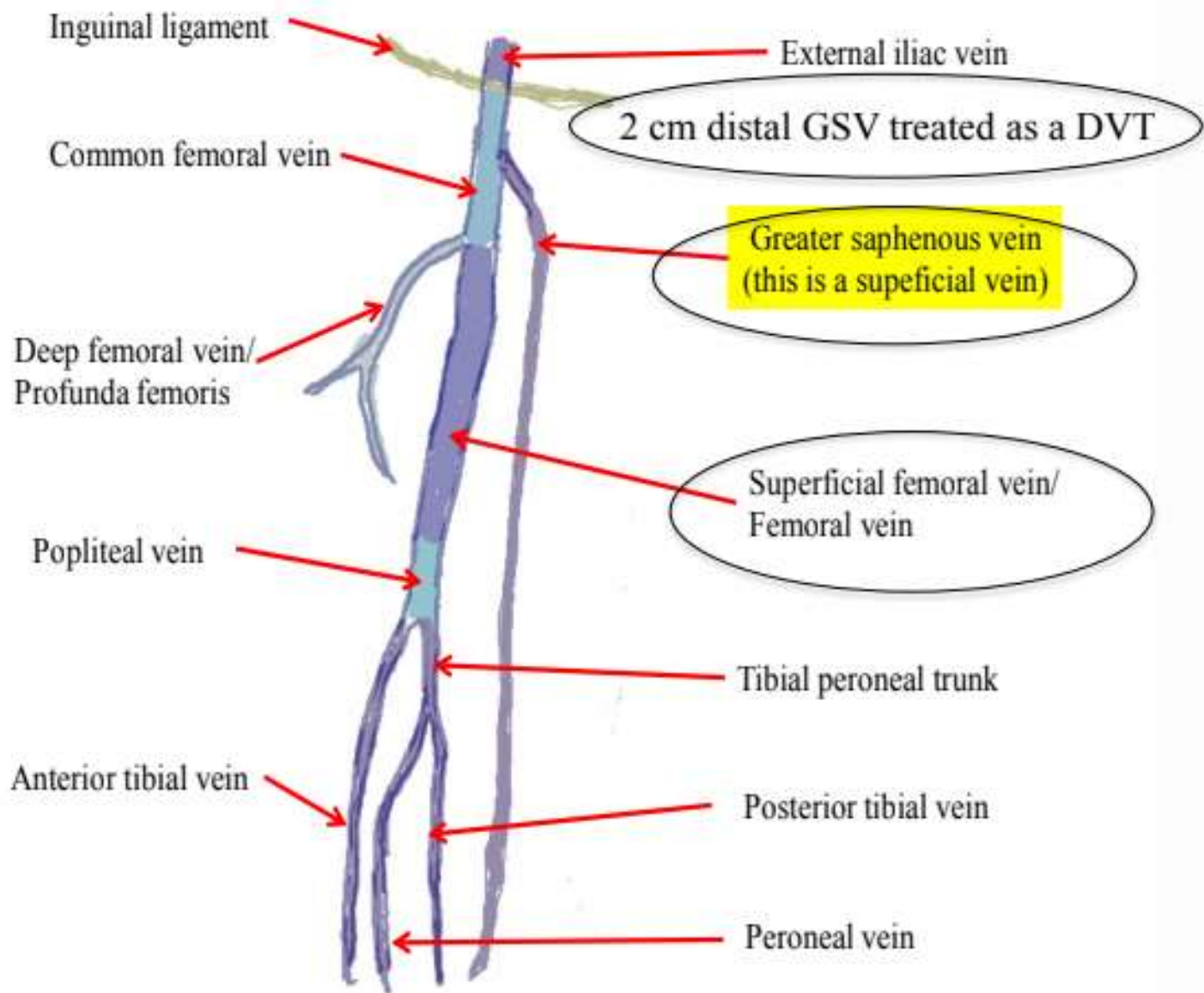
- Ectopic pregnancy 2% of pregnancies
- Leading cause 1st trimester death
- Heterotopic 1/30000 natural, 1/100 ART
- Classic triad: abd pain, vag bleed, missed period/+HCG
- 1st trimester rule out ectopic – full bladder
 1. Is there a gestational sac in the uterus?
 2. Is there a yolk sac, fetal pole, or cardiac activity?
 3. Is there free fluid in the pelvis (Morrisons pouch, pouch of douglas)?

[1 minute IUP](#)

DVT evaluation

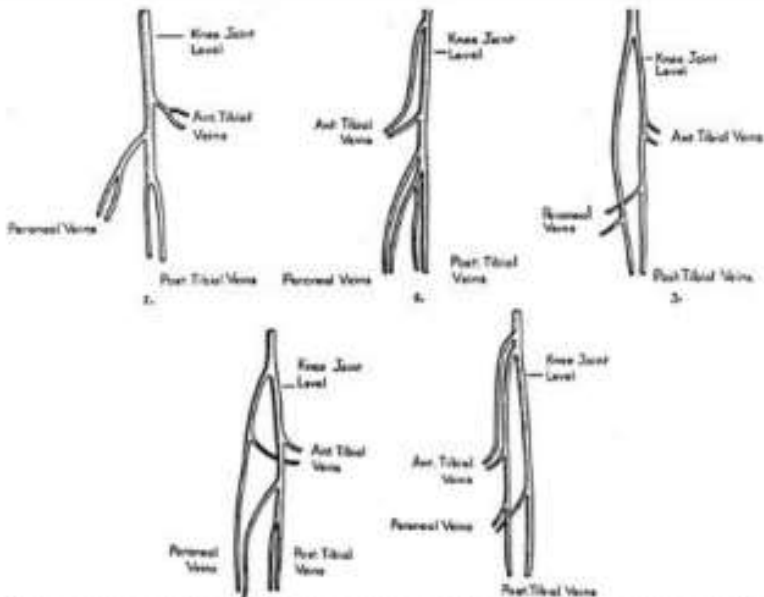
- Pain, swelling, and redness of affected limb
- 70% of asymptomatic PT patients have DVT
- Emboli arising from calf veins are generally asymptomatic





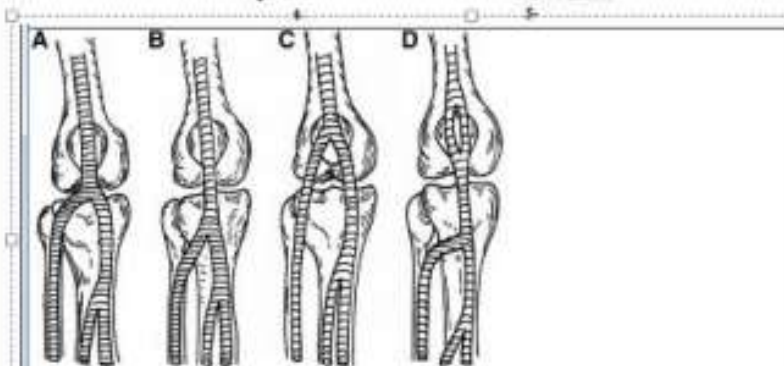
Deep veins of the lower extremity

Variation of venous anatomy



If there is duplication of deep veins – ensure all deep veins compress

Will be still paired with corresponding arteries



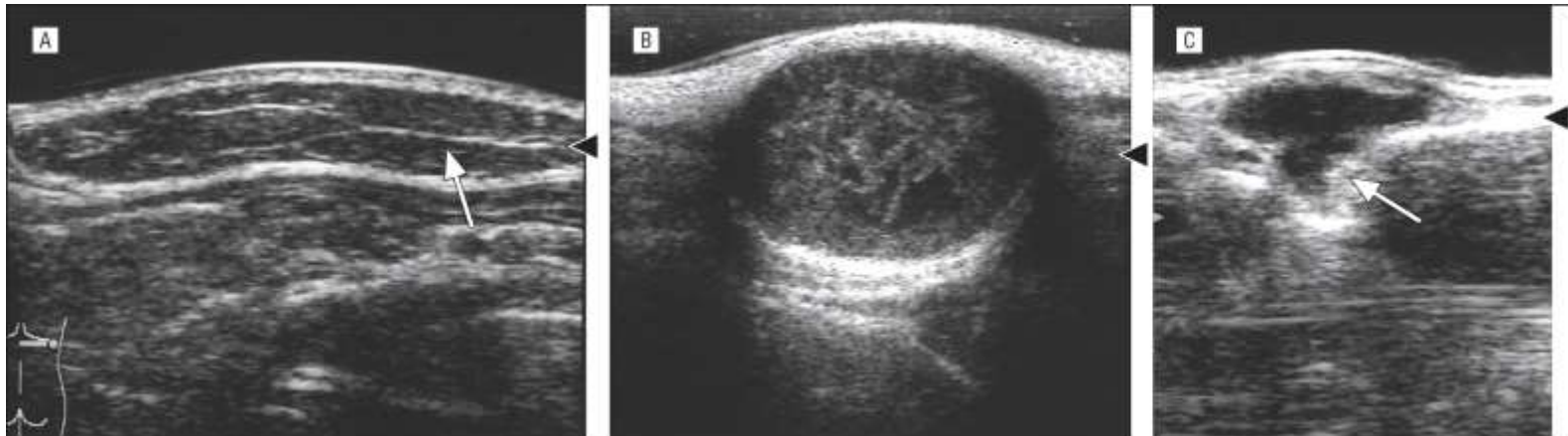
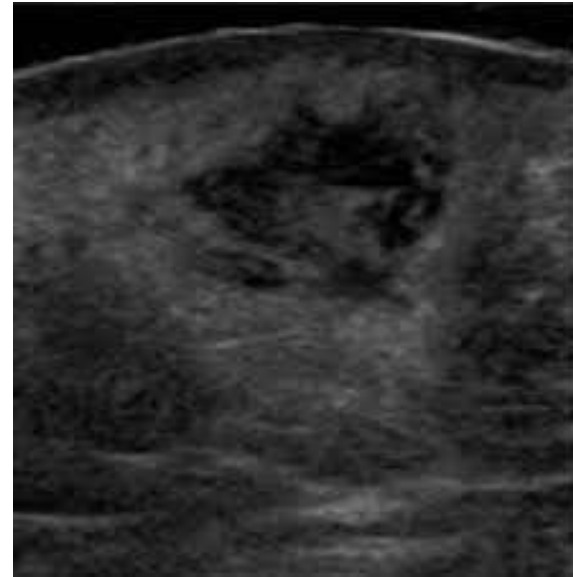
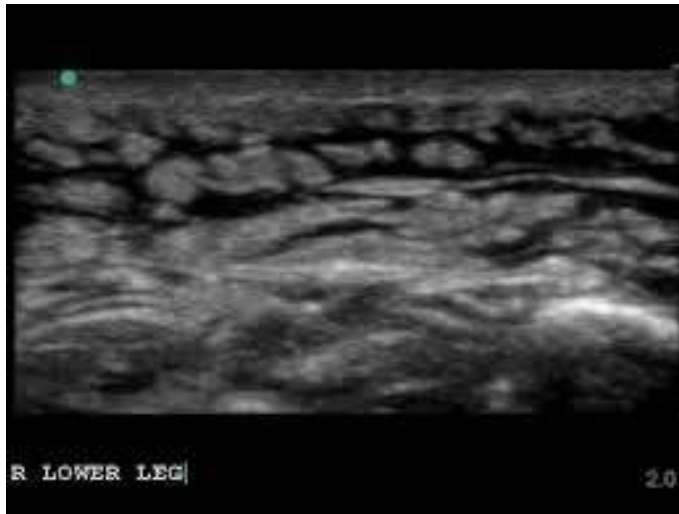
DVT evaluation

- [DVT Ultrasound from One Minute Ultrasound – YouTube](#)
- Confirm noncompressible vein in transverse and longitudinal axis

MSK ultrasound



Soft Tissue ultrasound



Gallbladder ultrasound

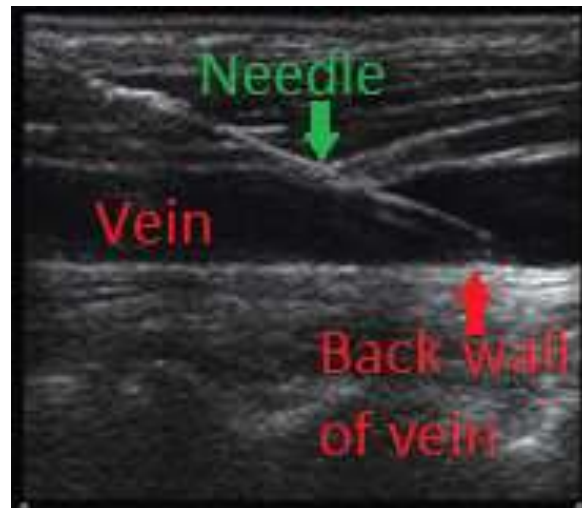
- Normal anatomy about 10x3cm
- Anterior wall thickness < 4mm
- CBD < 6mm or < 1/10 age
- Curvilinear probe
- Patient supine or left lateral decub

Gallbladder ultrasound

- Are there stones? Look in GB neck
- Is there a sonographic Murphys?
- Is there wall thickening?
- Is there pericholecystic fluid?
- Is there CBD dilation?

Peripheral IV access

- [1 minute peripheral IV](#)



Social Determinants of Health

- POCUS is an important tool to improve access to medical care especially for patients with inconsistent access to reliable transportation
- POCUS improves health literacy (able to show patient what is wrong)
- POCUS can improve short-term health care resource utilization

Summary

- POCUS is here (and growing!)
- Start small and build on successes
- Better patient care
 - More timely diagnosis
 - Less invasive
 - Patient safety
- Get institutional buy-in and form alliances
 - Complementary to radiology and cardiology
- Patient and physician satisfaction

Questions?