

University of South Carolina
School of Medicine
Integrated Ultrasound Curriculum
iUSC

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The Integrated Ultrasound Curriculum Initiated 2006

First (M1) and Second (M2) Year Medical Students

- Didactic classroom lectures
- Web-based learning modules
- Scheduled hands-on laboratory scanning sessions
- Open ultrasound laboratory practice sessions
- Integration of ultrasound into gross anatomy, physiology, and physical diagnosis.

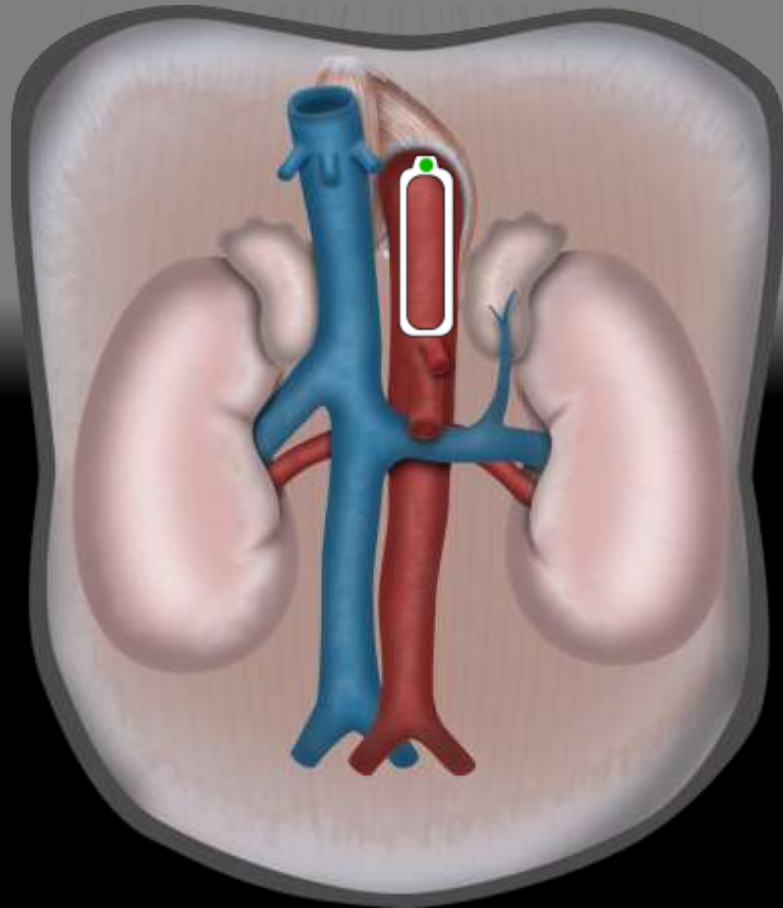








Longitudinal Scan (Upper)



M1 Student Practical Exam Fall Semester

- All first year students are individually evaluated for their ability to scan a standardized patient. They were also evaluated by an observer regarding their interaction with the standardized patient and attentiveness to patient comfort and modesty.
- Each student had 15 minutes to capture, identify structures and save the images.

Images

RUQ

Rt Kidney

Liver

Diaphragm

M. pouch

Pelvis

Bladder

LUQ

Lt Kidney

Spleen

Neck

Carotid Artery

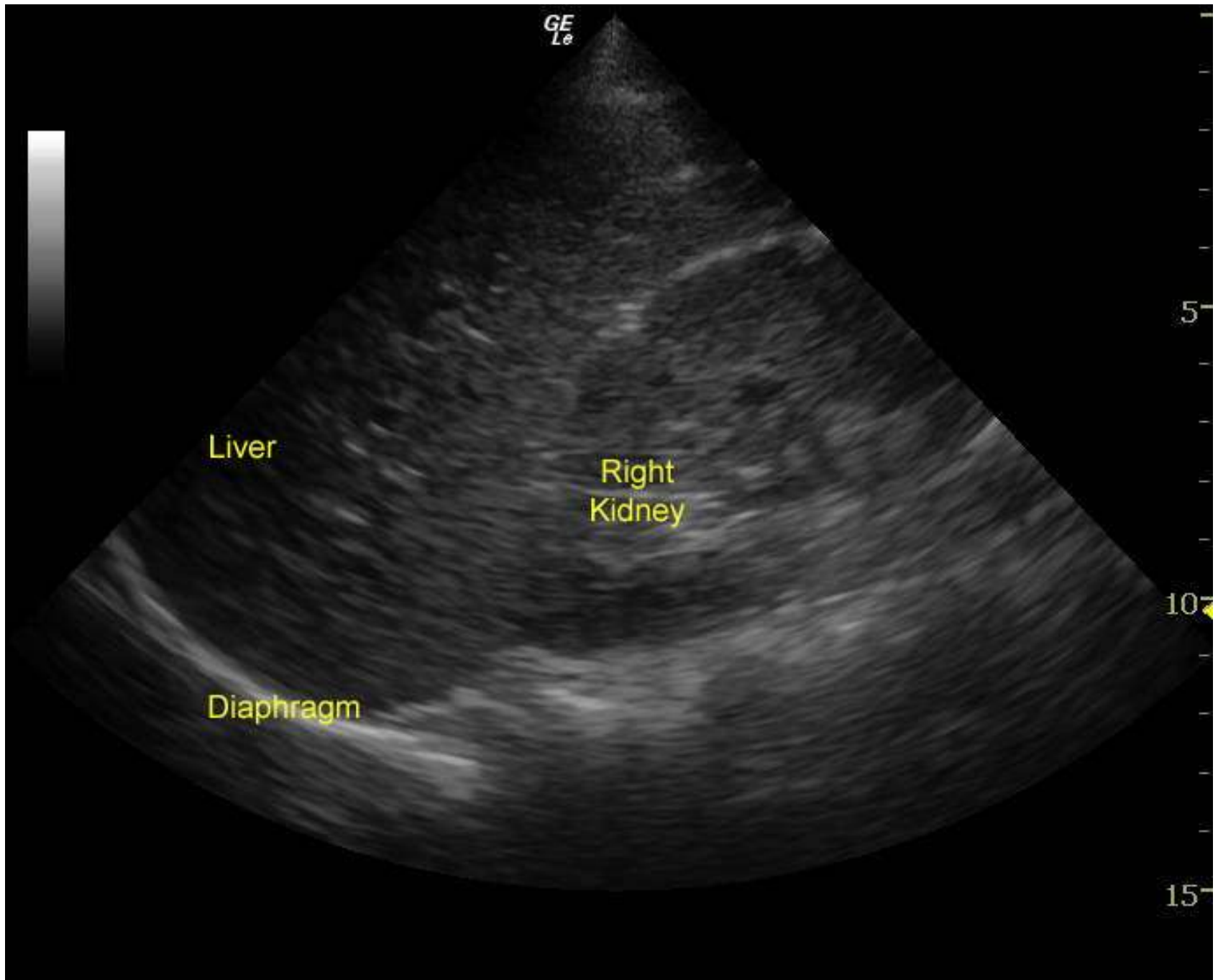
Internal Jugular Vein

Parasternal Long Axis Heart

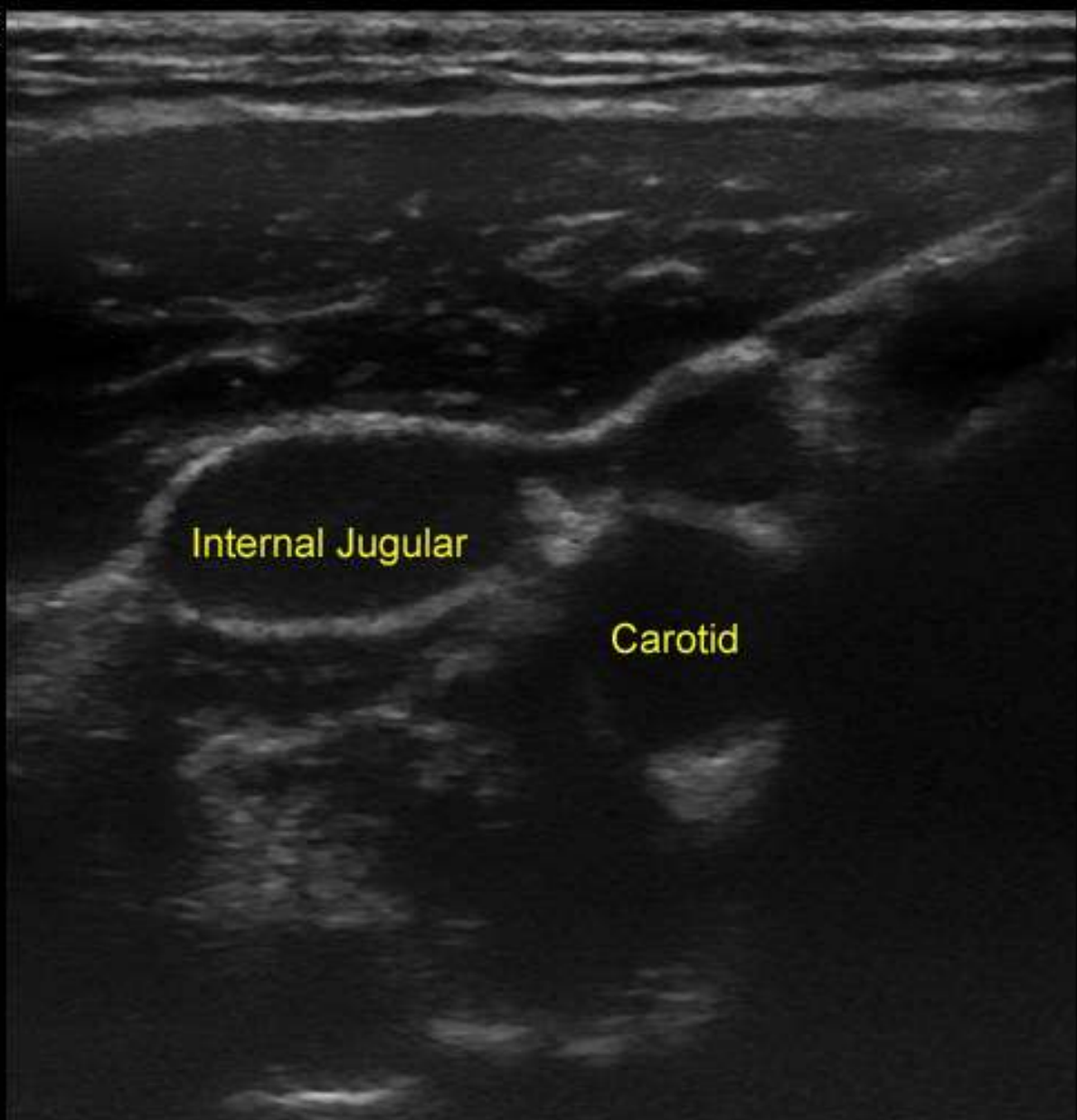
Lt Atrium

Lt Ventricle

Mitral valve



GE
Le



Internal Jugular

Carotid

1

2

3

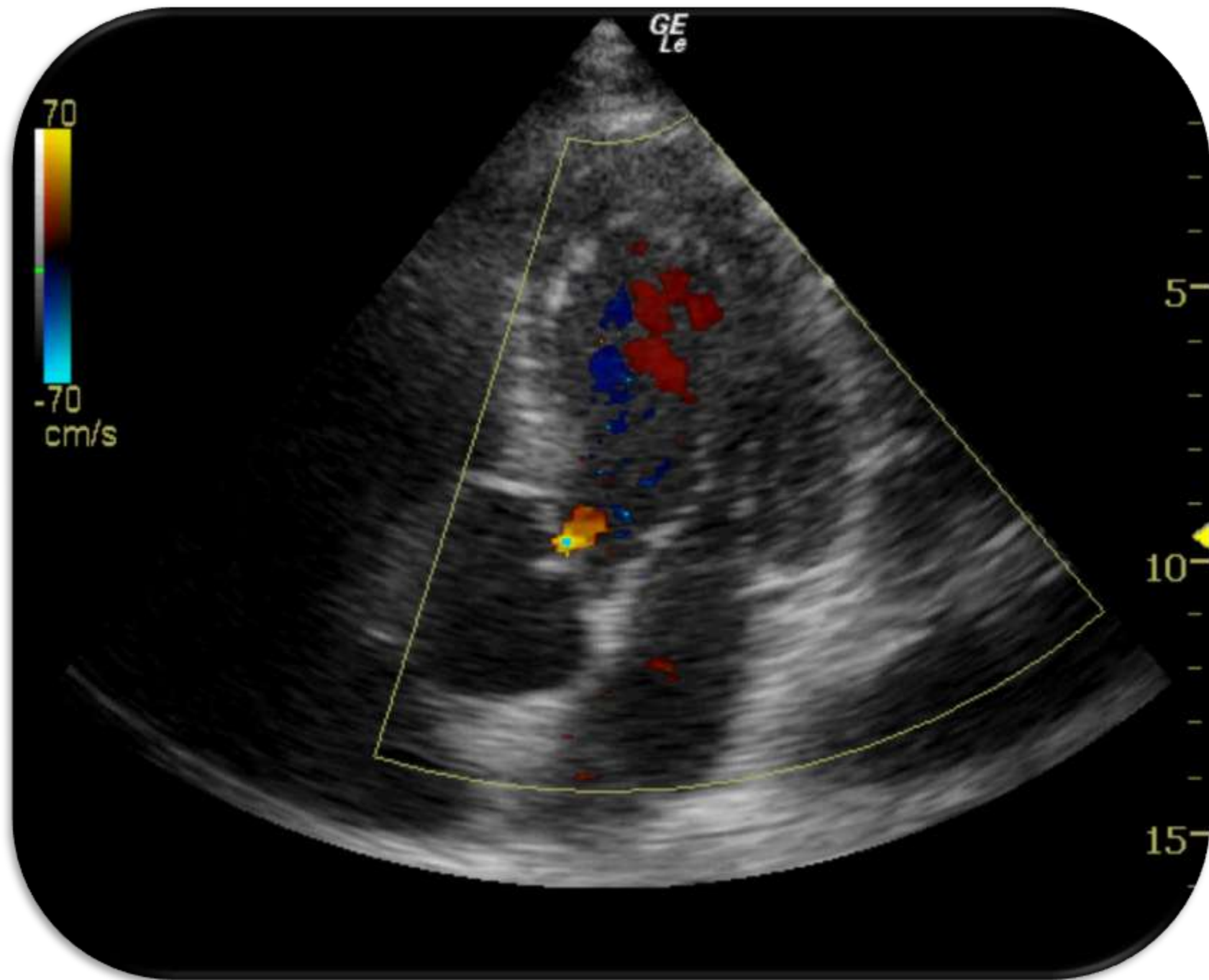
4

Results of M1 Practical

- All students easily completed the exercise within the allotted time of 15 minutes.
- Maximum possible score for the OSCE = 50 points
- Mean score for the class = 49.1 points
- Range for the class = 39.0 - 50.0 points
- Students with a perfect score of 50.0 = 65 (78%)

Physiology Ultrasound Labs

- Three ultrasound labs have been integrated into the physiology course for M1 students
- Cardiac lab: normal heart function (4-chamber apical view). Wall and valve motion; flow through the cardiac chambers
- Hemodynamics lab: doppler principles, pulse wave forms (venous / arterial systems)
- Cardiogenic Shock: gross LV/RV function, pericardial effusion, RV strain from a PE



M2 Ultrasound Curriculum: Coordinated with Physical Diagnosis and Pathophysiology

- Focused ultrasound examinations, clinical scenarios, and ultrasound guided procedures
 - Cardiac views: parasternal long and short axis, 4-chamber apical, subcostal
 - Abdomen: organ size, abdominal fluid, AAA screen
 - Vascular: DVT screen, IVC and volume status, central line placement
 - Neck: thyroid, carotid, and jugular exam
 - Pelvic ultrasound (female gynecology)



M3 Clerkship OSCEs

■ Internal Medicine:

- thyroid scan
- central line placement with ultrasound guidance

■ Family Medicine:

- Abdominal Aortic Aneurysm (AAA) screen

■ OB/GYN:

- third trimester pregnancy with bright red vaginal bleeding - transabdominal scan

■ Pediatrics:

- Assess volume status of a 9 year old using the aorta / IVC ratio

• Surgery:

- Trauma patient – FAST exam

ICU Ultrasound

- Role for Bedside Ultrasound in the ICU:
 - Quick cardiac exam: global function, pericardial effusion, severe valvular dysfunction
 - Assessment of volume status: IVC, JVD
 - Abdominal bleeding, AAA
 - Pneumothorax
 - Pulmonary embolus (effects on heart, IVC, detect DVT)
 - Pleural effusion

Fourth Year (M4) Students

- Four week Emergency Medicine Ultrasound Elective
- Hands-on ultrasound experience added to Radiology Elective
- Two day Capstone course to prepare for residency: FAST for trauma, RUSH for shock, ultrasound guided procedures
- Ultrasound Independent Study: research, further develop US skills, help with M1/M2 labs



Recent Additions to the Curriculum

- Introduced pocket devices into the curriculum
- Web-based Portal for evaluation and archiving all ultrasound images for students
- Physiology pilot with EKG and Ultrasound
- Heart sounds and ECHO on IM clerkship

Lessons Learned Years 1-4

- Start small – work with course/clerkship directors and identify a limited number of ultrasound objectives for the course/clerkship
- Timing – introduce during M1 orientation
- Open laboratory sessions
- Faculty – must have champions in multiple specialties
- Student feedback – regular and ongoing, its their curriculum too

- Student-patient interaction: using patients and standardized patients creates more “clinical time” in the first two years
- Content: do not need to develop all teaching material in-house
- Equipment: try to keep ratios low – students-machines-patients-instructors

Hoppmann RA, Rao VV, Poston MB, et al.
An integrated ultrasound curriculum (iUSC)
for medical students:4-year experience. Crit
Ultrasound J. 2011; 3:1-12.