

## ***Introductory Ultrasound Course***

### **Course Description**

Whether you're a beginner or a seasoned sonographer, this year's AAEM pre-conference ultrasound course will be worth your time. We will be offering a full day course for beginners. This will include didactic sessions on Physics, Trauma exam (FAST), Abdominal Aorta and Ultrasound assisted procedures (including central line placement). Half of your time will be spent in small groups scanning models with a very favorable instructor/student ratio.

Physicians who have already taken an introductory course will have an opportunity to build their own ultrasound course in our advanced modules. These will be structured to maximize "hands-on" scanning of models. Modules will be offered in Pulmonary, OB/GYN scanning (including endovaginal), Vascular access (Central and Peripheral lines), Peripheral Nerve Blocks, Head & Neck US, Musculoskeletal and eleven more modules.

The faculty will include physicians with international reputations as outstanding ultrasound educators.

### **Credit Designation**

AAEM designates this educational activity for a *maximum of 6.25 AMA PRA Category 1 Credit(s)*<sup>TM</sup>. Physicians should only claim credit commensurate with the extent of their participation in the activity.

### **Learning Objectives**

Upon completion of this course participants will be able to:

#### **Vascular Access:**

1. Understand the sonographic landmarks and anatomical relationships as they relate to the vasculature of the neck, upper extremity and groin.
2. Acquire and interpret sonographic images of the internal jugular, femoral, basilic, brachial and axillary veins in live patient models.
3. Demonstrate ultrasound guided cannulation on vascular simulator.
4. Learn the diagnostic criteria for deep venous thrombosis (DVT).
5. Demonstrate compression technique for DVT assessment.

#### **Image Acquisition and Instrumentation:**

1. Enhance the understanding of the basic principles of ultrasound.
2. Apply these principles to the reduction of common artifacts and improvement of high quality diagnostic ultrasound images.
3. Understand the relationship between transducer position and image orientation.
4. Demonstrate the basic operator controls on the ultrasound system required for image acquisition. Enhance the understanding of the basic principles of ultrasound.
5. Apply these principles to the reduction of common artifacts and improvement of high quality diagnostic ultrasound images

**Gallbladder, Renal & Aorta:**

1. Understand the surface landmarks for appropriate transducer positioning to perform sonographic examinations of the Aorta, Kidney and Gallbladder.
2. Understand the sonographic windows and landmarks of the Aorta, Kidney and Gallbladder.
3. Demonstrate the ability to identify and visualize landmarks for the Aorta, Kidney and Gallbladder in the transverse and longitudinal scanning planes.
4. Understand the sonographic findings and pitfalls for identifying pathology including aortic aneurysm, hydronephrosis and cholelithiasis/cholecystitis.

**Equipment:**

1. Learn to be an expert on your own equipment.
2. Learn how to safely connect and remove probes from their ports.
3. Learn how to switch between transducers.
4. Learn and demonstrate how to store and review images.
5. Demonstrate adjustments to controls ie; gain, depth, frequency in hands- on session.
6. Demonstrate how to properly document an ultrasound study by adding pt. information, text annotation and proper landmarks.

**The Fast Examination:**

1. Understand the surface landmarks for appropriate transducer positioning to perform the FAST examination.
2. Understand the sonographic landmarks and anatomical relationships of the Heart, Liver, Spleen and Bladder as they relate to the FAST examination.
3. Demonstrate the ability to identify and visualize the areas of potential intra-abdominal and thoracic spaces for free fluid to collect in on the FAST examination.
4. Understand the sonographic findings and pitfalls for identifying life threatening, trauma conditions such as cardiac tamponade, hemo/pneumothorax and intra-abdominal hemorrhage.

**Cardiac:**

1. Understand the utility of motion modality (M-mode) and demonstrate its use.
2. Demonstrate the surface landmarks and transducer position necessary to perform an echocardiogram in the ED.
3. Acquire and interpret sonographic images of heart (subcostal, parasternal long, parasternal short and apical windows).
4. Identify pathologic conditions such as pericardial effusion, gross wall motion abnormalities and cardiac tamponade.

**Pulmonary:**

1. To review and understand the sonographic artifacts of normal and pathologic pulmonary conditions that give pulmonary ultrasound its diagnostic capacity. This includes but is not limited to pleural imaging, the "lung sliding sign", B-line and comet tail identification for extravascular pulmonary congestion and pleural effusion imaging techniques.
2. Demonstrate sonographic landmarks of the ribs, pleura, diaphragm and lung parenchyma.
3. Distinguish between normal and pathologic condition through image review and hands on imaging practice.

**Gastrointestinal:**

1. Understand the sonographic appearance of normal stomach, large and small bowel and pancreas, including normal anatomical structures and normal bowel peristalsis.
2. Describe transducer choices, scanning protocols and patient positions necessary to perform a gastrointestinal examination.
3. Identify and detect gastrointestinal pathology such as ileus, pneumoperitoneum, appendicitis, colitis, diverticulitis, ileitis, intussusception or hernias.
4. Describe common sites of intra-and retroperitoneal free air, systematic examination techniques and pitfalls for appendicitis, pneumoperitoneum, colitis, diverticulitis and hernia.

**First Trimester Pelvic:**

1. Understand the indications for emergency screening ultrasound examinations of the pelvis.
2. Describe the surface landmarks and transducer position necessary to perform transabdominal and endovaginal ultrasound examinations of the pelvis.
3. Perform an endovaginal US on model patients demonstrating correct scanning technique.
4. Interpret common diagnoses in first trimester pregnancy.

**Venous Access and DVT:**

1. Understand the sonographic landmarks and anatomical relationships as they relate to the vasculature of the neck, upper extremity and groin.
2. Acquire and interpret sonographic images of the internal jugular, femoral, basilic, brachial and axillary veins in live patient models.
3. Demonstrate ultrasound guided cannulation on vascular simulator.
4. Learn the diagnostic criteria for deep venous thrombosis (DVT) 5. Demonstrate compression technique for DVT assessment.

**Head & Neck:**

1. Understand the normal sonographic appearance and anatomical landmarks of organs and structures in the head and neck region, including ocular, salivary glands, thyroid gland, the upper airway including larynx and trachea, upper esophagus, facial bones and neck vessels and lymph node anatomy.
2. Describe transducer choices, scanning protocols and patient positions necessary to perform a focused ocular examination to detect retinal detachment, vitreous hemorrhage, lens dislocation, periocular free air or increased intracranial pressure.
3. Understand common thyroid abnormalities such as cysts or masses and the anatomical relation of the parathyroid glands.
4. Describe the appearance of salivary glands and appearance of salivary stones. Identify lymphnodes within the neck.
5. Describe ultrasound exam techniques to detect upper airway anatomy to guide correct endotracheal tube placement including normal esophagus and appearance of esophageal intubation.
6. Understand anatomy of main neck vessels and their relation to other musculoskeletal structures.

**Starting an Ultrasound Program:**

1. Review the responsibilities of the ultrasound director.
2. Review the requirements for training faculty and residents and discuss the process of privileging faculty to perform emergency ultrasound.

3. Review how to establish a quality assurance process and how to report, document and archive images for both teaching and clinical use.
4. Review equipment necessary to begin a successful program.
5. Share public domain resources others have used in program initiation.

#### **Billing, Coding & Reimbursement:**

1. Understand the modified coding for limited ultrasounds in the ED.
2. Understand the proper documentation and storage necessary for billing.
3. Understand the credentialing process for EMUS as well as supporting guidelines and policies.

#### **Musculoskeletal:**

1. Discuss the advantages and disadvantages of diagnostic musculoskeletal ultrasound compared to other imaging modalities.
2. Demonstrate the appearances of various tissues on diagnostic musculoskeletal ultrasound.
3. Correctly apply ultrasound basic concepts so as to ensure proper visualization of musculoskeletal structures.
4. Proficiently perform a diagnostic musculoskeletal ultrasound on various upper and lower limb structures.

#### **Peripheral Nerve Block:**

1. Discuss the science and practical performance of brachial plexus, axillary and femoral blockade
2. Learn the physiology and anatomy of the techniques, factors that influence success and complications.
3. Demonstrate approaches for peripheral nerve blocks in the upper and lower extremity.
4. Demonstrate peripheral nerve block on simulator under ultrasound guidance.

#### **Shock, The 7Up Exam:**

1. Provide a sequenced approach to ultrasound in the medical shock patient.
2. Demonstrate the surface landmarks and transducer position necessary to perform a 7-Up scan.
3. Review causes and potential responses to treatments of hypotension and tissue malperfusion.

#### **Testicular Ultrasound:**

1. Learn and demonstrate the landmarks for the testes in the longitudinal and transverse plane.
2. State the importance of using color Doppler and pulsed wave Doppler to indicate the waveform of vessels in the testes and epididymis.
3. Review the following disorders of the testis: hydrocele, varicocele, orchitis, epididymitis and varicocele.

## Course Schedule

Sunday, February 14, 2010

8:00am	Welcome
8:15am	Introduction to US
8:45am	The Fast Examination
9:30am	Abdominal Ultrasound
10:30am	Break
10:45am	Procedures
11:30am	Lunch (on your own)
12:30pm	Hands-on Session
3:30pm	Adjourn

## Course Director

**Michael J. Lambert, MD RDMS FAAEM**

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## Faculty

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**Beatrice Hoffman, MD PhD RDMS**

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