



To further standardize ultrasound learning objectives within emergency medicine residency programs, ACEP released their 2016 policy statement [Ultrasound Guidelines: Emergency, Point-of-care, and Clinical Ultrasound Guidelines in Medicine.](#)<sup>1</sup> Within the policy statement, ACEP laid out their recommended curriculum for comprehensive training in emergency ultrasound (EUS). The award-winning, patented SonoSim Ultrasound Training Solution matches these industry recommendations through an ecosystem of cloud-based courses, knowledge assessments, interactive SonoSimulator® scanning cases, performance tracking, and access to real-patient pathology.

Physics & Instrumentation		
ACEP Emergency Ultrasound Learning Objective	Fundamentals of Ultrasound Course & Lessons	Covered
<b>Explain ultrasound physics relevant to EUS:</b>		
Piezoelectric effect, frequency, resolution, attenuation, and echogenicity	Introduction, Basic Ultrasound Physics, Imaging Artifacts	✓
Doppler including pulse wave, color, and power	Imaging Modes, Doppler Mode Imaging	✓
<b>Operate the EUS system as needed to obtain and interpret images adequate for clinical decision making:</b>		
Image mode	Imaging Modes	✓
Gain, time gain compensation, and focus	Ultrasound System Operation	✓
Probe types	Transducer Basics	✓
<b>Recognize common ultrasound artifacts:</b>		
Reverberation, side lobe, mirror, shadowing, enhancement, and ring-down	Imaging Artifacts	✓

\*ACEP Emergency Ultrasound Learning Objective Category not covered: Introduction

Trauma			
ACEP Emergency Ultrasound Learning Objective	Trauma Courses & Lessons	SonoSimulator Cases to Scan	Covered
<b>Describe the indications, clinical algorithm, and limitations of EUS in:</b>			
Blunt and penetrating thoracoabdominal trauma	eFAST & FAST: Background/Introduction	--	✓
<b>Perform the EUS protocol for:</b>			
Trauma	eFAST & FAST: All Lessons	eFAST & FAST Cases	✓
<b>Identify relevant US anatomy including:</b>			
Pleura and diaphragm	eFAST: The eFAST Exam	eFAST Cases	✓
Inferior vena cava	RUSH: The Tank - Intravascular Volume	RUSH Cases	✓
Pericardium, liver, spleen, kidneys, and bladder	eFAST & FAST: RUQ Views, Cardiac Views, LUQ Views, Pelvic Views	eFAST & FAST Cases	✓
Prostate and uterus	eFAST & FAST: Pelvic Views Prostate: Anatomy, Sonographic Anatomy Female Pelvis: Anatomy	eFAST & FAST Cases Prostate Cases Female Pelvis Cases	✓

Recognize pathologic findings and pitfalls in the evaluation of:			
Pneumothorax and hemothorax	<i>eFAST</i> : The <i>eFAST</i> Exam, Imaging Artifacts and Pitfalls, Case Studies	<i>eFAST</i> & RUSH Cases SonoSim LiveScan® Critical Care & Trauma Care Cases	✓
Hemopericardium and cardiac activity	<i>eFAST</i> & <i>FAST</i> : Cardiac Views, Performing the <i>FAST</i> Exam, Case Studies	<i>eFAST</i> Cases SonoSim LiveScan® Trauma Care Cases	✓
Volume status	<i>RUSH</i> : The Pump - Global LV Function, The Tank - Intravascular Volume, Case Studies	RUSH Cases SonoSim LiveScan® Critical Care Cases	✓
Hemoperitoneum	<i>eFAST</i> & <i>FAST</i> : RUQ Views, LUQ Views, Pelvic Views, Performing the <i>FAST</i> Exam, Case Studies, Imaging Artifacts and Pitfalls	<i>eFAST</i> & <i>FAST</i> Cases SonoSim LiveScan® Trauma Care Cases	✓
Integrate trauma EUS findings into:			
Individual patient, departmental, and disaster management	<i>eFAST</i> & <i>FAST</i> : Case Studies <i>FAST</i> : Role of <i>FAST</i>	<i>eFAST</i> , <i>FAST</i> , & RUSH Cases SonoSim LiveScan® Critical Care & Trauma Care Cases	✓

## First-Trimester Pregnancy

ACEP Emergency Ultrasound Learning Objective	First-Trimester Pregnancy Course & Lessons	SonoSimulator Cases to Scan	Covered
Describe the indications, clinical algorithm, and limitations of EUS in:			
First-trimester pregnancy pain and bleeding	Introduction, First-Trimester Pregnancy Ultrasound	--	✓
Understand the utility of:			
Quantitative B-HCG in the evaluation of first-trimester pregnancy pain and bleeding	<i>OB/GYN</i> : Pathologic Conditions <i>First-Trimester Pregnancy</i> : Detecting Pregnancy Failure	--	✓
Perform EUS protocols for:			
Transabdominal and transvaginal views as needed, including fetal heart rate and gestational age measurement techniques	Sonographic Imaging Techniques, First-Trimester Pregnancy Ultrasound, Pregnancy Dating Using Ultrasound	First-Trimester Pregnancy Cases	✓
Identify relevant US anatomy including:			
Cervix, uterus, adnexa, bladder, and cul-de-sac	Anatomy	First-Trimester Pregnancy Cases	✓
Recognize the relevant findings and pitfalls when evaluating for intrauterine and ectopic pregnancy:			
Early embryonic structures including the gestational sac, yolk sac, fetal pole, and heart	First-Trimester Pregnancy Ultrasound	First-Trimester Pregnancy Cases SonoSim LiveScan® Early Stage Pregnancy Cases	✓
Location of embryonic structures in pelvis	First-Trimester Pregnancy Ultrasound	First-Trimester Pregnancy Cases SonoSim LiveScan® Early Stage Pregnancy Cases	✓
Embryonic demise	Detecting Pregnancy Failure	--	✓
Molar pregnancy	Pathologic Conditions	--	✓
Findings of ectopic pregnancy including pseudogestational sac, free fluid, and adnexal masses	Pathologic Conditions	<i>OB/GYN</i> Cases SonoSim LiveScan® Early Stage Pregnancy Cases	✓
Integrate first trimester pregnancy EUS findings into:			
Individual patient and departmental management	--	First-Trimester Pregnancy Cases SonoSim LiveScan® Early Stage Pregnancy Cases	✓

## Abdominal Aorta

ACEP Emergency Ultrasound Learning Objective	Aorta/IVC Core Clinical Course & Lessons	SonoSimulator Cases to Scan	Covered
<b>Describe indications, clinical algorithm, and limitations of EUS in:</b>			
Evaluation of aortic pathology	Introduction, Clinical Considerations	--	✓
<b>Perform EUS protocols to evaluate:</b>			
Abdominal aorta, including measurement techniques	Aortic Anatomy, Imaging Technique, Aortic Case Studies	Aorta/IVC Anatomy & Physiology Cases Aorta/IVC Core Clinical Cases	✓
<b>Identify relevant US anatomy including:</b>			
Aorta with major branches, inferior vena cava, and vertebral bodies	<i>Aorta/IVC Anatomy &amp; Physiology:</i> Anatomy, Aortic Sonographic Anatomy, IVC Sonographic Anatomy <i>Aorta/IVC Core Clinical:</i> Aortic Anatomy, IVC Evaluation	Aorta/IVC Anatomy & Physiology Cases Aorta/IVC Core Clinical Cases	✓
<b>Recognize pathologic findings and pitfalls when evaluating for:</b>			
Aortic aneurysm and dissection	Aortic Case Studies	Aorta/IVC Core Clinical Cases RUSH Cases SonoSim LiveScan® Cardiac Resuscitation & Critical Care Cases	✓
<b>Integrate aorta EUS findings into:</b>			
Individual patient and departmental management	--	Aorta/IVC Anatomy & Physiology Cases Aorta/IVC Core Clinical Cases	✓

## Echocardiography & HD Assessment

ACEP Emergency Ultrasound Learning Objective	Echocardiography Courses & Lessons	SonoSimulator Cases to Scan	Covered
<b>Describe the indications and limitations of:</b>			
Emergency echocardiography	<i>Cardiology:</i> Introduction <i>FoCUS Part I:</i> Introduction <i>Heart:</i> Introduction	--	✓
<b>Perform standard echocardiography windows and planes:</b>			
Parasternal: Long and Short Axes	<i>Cardiology:</i> Parasternal Long-Axis View, Parasternal Short-Axis View: Mid-Ventricle, Parasternal Short-Axis View: Base <i>FoCUS Part I:</i> Imaging Windows <i>Heart:</i> Sonographic Technique	Heart Cases Cardiology Cases FoCUS Part I Cases	✓
Apical: Four Chamber	<i>Cardiology:</i> Apical Four-Chamber View <i>FoCUS Part I:</i> Imaging Windows <i>Heart:</i> Sonographic Technique	Heart Cases Cardiology Cases FoCUS Part I Cases	✓
Subcostal: Four Chamber and Short Axis	<i>Cardiology:</i> Subcostal Four-Chamber View <i>FoCUS Part I:</i> Imaging Windows <i>Heart:</i> Sonographic Technique	Heart Cases Cardiology Cases FoCUS Part I Cases	✓

Identify relevant US anatomy including:			
Pericardium, cardiac chambers, valves, aorta, and inferior vena cava	<i>Heart: Anatomy, Sonographic Anatomy</i>	Heart Cases Cardiology Cases FoCUS Part I Cases	✓
Guide HD assessment of patient by:			
Estimating qualitative left ventricular function and central venous pressure	<i>Cardiology: Parasternal Long-Axis View, Parasternal Short-Axis View: Mid-Ventricle, Apical Four-Chamber View, Subcostal Four-Chamber View, IVC Evaluation &amp; RAP, Case Studies</i> <i>FoCUS Part I: Pulmonary Artery Pressure Measurements, Case Studies II</i>	Heart Cases Cardiology Cases FoCUS Part I Cases	✓
Recognize:			
Cardiac arrest	--	SonoSim LiveScan® Cardiac Resuscitation & Late Stage Pregnancy Cases	✓
Pericardial effusions with or without tamponade	<i>Cardiology: Parasternal Short-Axis View: Mid-Ventricle, Subcostal Four-Chamber View, Case Studies</i>	Cardiology Cases FoCUS Part I Cases eFAST Cases RUSH Cases SonoSim LiveScan® Cardiac Resuscitation, Critical Care, Early Stage Pregnancy, Late Stage Pregnancy, & Trauma Care Cases	✓
Dilation of the aortic root or the descending aorta	<i>FoCUS Part I: Imaging Windows</i>	Cardiology Cases SonoSim LiveScan® Cardiac Resuscitation Cases	✓
Integrate emergency echocardiography findings into:			
Individual patient and departmental management	--	Cardiology Cases FoCUS Part I Cases SonoSim LiveScan® Cardiac Resuscitation Cases	✓

## Biliary Tract

ACEP Emergency Ultrasound Learning Objective	Intestinal/Biliary Course & Lessons	SonoSimulator Cases to Scan	Covered
Describe the indications and limitations of EUS of:			
Biliary tract	Introduction, Gallbladder Evaluation, Common Bile Duct Evaluation	--	✓
Perform EUS protocols to evaluate:			
Biliary tract	<i>Biliary Tree: Biliary Physiology</i> <i>Intestinal/Biliary: Gallbladder Evaluation, Common Bile Duct Evaluation</i>	Biliary Tree Cases Intestinal/Biliary Cases SonoSim LiveScan® Hepatobiliary Cases	✓
Identify relevant US anatomy including:			
Gallbladder, portal triad, inferior vena cava, and liver	<i>Biliary Tree: Anatomy, Sonographic Anatomy</i>	Biliary Tree Cases Intestinal/Biliary Cases SonoSim LiveScan® Hepatobiliary Cases	✓

<b>Recognize the relevant findings and pitfalls when evaluating for:</b>			
Cholelithiasis and cholecystitis	Gallbladder Evaluation	Intestinal/Biliary Cases SonoSim LiveScan® Hepatobiliary, Early Stage Pregnancy, & Late Stage Pregnancy Cases	✓
<b>Integrate EUS of the biliary tract into:</b>			
Individual patient and departmental management	--	Biliary Tree Cases Intestinal/Biliary Cases SonoSim LiveScan® Hepatobiliary Cases	✓

## Urinary Tract

ACEP Emergency Ultrasound Learning Objective	Urinary Tract Courses & Lessons	SonoSimulator Cases to Scan	Covered
<b>Describe the indications and limitations of EUS of the:</b>			
Urinary tract	<i>Bladder Core Clinical:</i> Introduction, Normal Bladder Sonography <i>Renal Core Clinical:</i> Introduction, Renal Imaging	--	✓
<b>Perform EUS protocols to evaluate the:</b>			
Urinary tract	<i>Bladder Core Clinical:</i> Normal Bladder Sonography, Case Pathologies, Bladder Volume Measurement <i>Renal Core Clinical:</i> Renal Imaging, Obstructive Uropathy, Case Studies	Bladder & Renal Anatomy & Physiology Cases Bladder & Renal Core Clinical Cases SonoSim LiveScan® Genitourinary Cases	✓
<b>Identify relevant US anatomy including:</b>			
Renal cortex and renal pelvis	<i>Renal Anatomy &amp; Physiology:</i> Anatomy, Sonographic Anatomy <i>Renal Core Clinical:</i> Anatomy	Renal Anatomy & Physiology Cases Renal Core Clinical Cases SonoSim LiveScan® Genitourinary Cases	✓
Ureter and bladder	<i>Bladder Anatomy &amp; Physiology:</i> Anatomy, Sonographic Anatomy <i>Bladder Core Clinical:</i> Anatomy	Bladder Anatomy & Physiology Cases Bladder Core Clinical Cases SonoSim LiveScan® Genitourinary Cases	✓
Liver	<i>Liver:</i> Anatomy, Sonographic Anatomy	Liver Cases	✓
Spleen	<i>Spleen:</i> Anatomy, Sonographic Anatomy	Spleen Cases	✓
<b>Recognize the relevant findings and pitfalls when evaluating for:</b>			
Hydronephrosis	<i>Renal Core Clinical:</i> Obstructive Uropathy, Case Studies	Renal Core Clinical Cases SonoSim LiveScan® Genitourinary, Early Stage Pregnancy, & Late Stage Pregnancy Cases	✓
Renal calculi and masses	<i>Renal Core Clinical:</i> Case Studies	Renal Core Clinical Cases SonoSim LiveScan® Genitourinary, Early Stage Pregnancy, & Late Stage Pregnancy Cases	✓
Bladder volume	<i>Bladder Core Clinical:</i> Bladder Volume Measurement	Bladder & Renal Core Clinical Cases	✓
<b>Integrate EUS of the urinary tract into:</b>			
Individual patient and departmental management	--	Bladder & Renal Anatomy & Physiology Cases Bladder & Renal Core Clinical Cases SonoSim LiveScan® Genitourinary Cases	✓

Deep Vein Thrombosis (DVT)			
ACEP Emergency Ultrasound Learning Objective	DVT Course & Lessons	SonoSimulator Cases to Scan	Covered
<b>Describe the indications and limitations of EUS for:</b>			
Detection of DVT	Introduction, POCUS DVT Examination, Case Studies	--	✓
<b>Perform EUS protocols for the detection of DVT of the lower extremities including:</b>			
Vessel identification	Normal Anatomy & Physiology, Sonographic Technique	DVT Cases	✓
Compression	<i>DVT:</i> Sonographic Anatomy <i>RUSH:</i> The Pipes - DVT	DVT & RUSH Cases SonoSim LiveScan® Critical Care Cases	✓
Doppler imaging of respiratory variation and augmentation	Sonographic Anatomy, Sonographic Technique	DVT & RUSH Cases SonoSim LiveScan® Critical Care Cases	✓
<b>Identify relevant US anatomy of:</b>			
Upper extremities, including the deep venous and arterial systems, major nerves, and lymph nodes	<i>Arm-Arterial &amp; Arm-Venous:</i> Anatomy, Sonographic Technique	Arm-Arterial & Arm-Venous Cases	✓
Lower extremities, including the deep venous and arterial systems, major nerves, and lymph nodes	<i>DVT:</i> Normal Anatomy & Physiology, Sonographic Technique <i>Leg-Arterial &amp; Leg-Venous:</i> Anatomy, Sonographic Technique	DVT Cases Leg-Arterial & Leg-Venous Cases	✓
<b>Recognize the relevant findings and pitfalls when evaluating for:</b>			
DVT	Sonographic Anatomy, Sonographic Technique, POCUS DVT Examination, Case Studies, Imaging Tips and Pitfalls	DVT & RUSH Cases SonoSim LiveScan® Critical Care Cases	✓
<b>Integrate EUS for DVT into:</b>			
Individual patient and departmental management	Management	DVT & RUSH Cases SonoSim LiveScan® Critical Care Cases	✓

\*ACEP Emergency Ultrasound Learning Objective not covered: Perform EUS protocols for the detection of DVT of upper extremities

Soft Tissue & Musculoskeletal (MSK)			
ACEP Emergency Ultrasound Learning Objective	MSK & Soft Tissue Courses & Lessons	SonoSimulator Cases to Scan	Covered
<b>Describe the indications and limitations of EUS for:</b>			
MSK	<i>MSK Core Clinical:</i> Introduction, Tissue Identification	--	✓
Soft tissue	<i>Soft Tissue Core Clinical:</i> Identification of Tissue Types	--	✓
<b>Perform EUS protocols for the evaluation of:</b>			
MSK pathology	<i>MSK Core Clinical:</i> Bone Evaluation, Joint Evaluation, Tendon Evaluation	MSK Core Clinical Cases	✓
Soft tissue pathology	<i>Soft Tissue Core Clinical:</i> Cellulitis and Abscess Imaging, Advanced Abscess Evaluation, Foreign Bodies, Foreign Body Removal Techniques	Soft Tissue Core Clinical Cases	✓

Identify relevant US anatomy including:			
Skin, Adipose, Fascia, Muscles, Tendons and Ligaments Lymph Nodes, Bones and Joints	<i>Introduction to MSK: Anatomy &amp; Physiology, Sonographic Anatomy</i> <i>MSK Core Clinical: Tissue Identification</i> <i>Soft Tissue Anatomy &amp; Physiology: Anatomy &amp; Physiology, Sonographic Anatomy</i> <i>Soft Tissue Core Clinical: Identification of Tissue Types</i>	Introduction to MSK, Ankle, Elbow, Foot, Hand & Finger, Hip, Knee, Shoulder, Spine, Wrist, & Soft Tissue Anatomy & Physiology Cases MSK & Soft Tissue Core Clinical Cases	✓
Recognize the relevant findings and pitfalls when evaluating the following:			
Soft tissue infections: abscess versus cellulitis	<i>Soft Tissue Core Clinical: Cellulitis and Abscess Imaging</i>	Soft Tissue Core Clinical Cases	✓
Subcutaneous fluid collection identification	<i>Soft Tissue Core Clinical: Advanced Abscess Evaluation</i>	Soft Tissue Core Clinical Cases	✓
Foreign body location and removal	<i>Soft Tissue Core Clinical: Foreign Bodies, Foreign Body Removal Techniques</i>	--	✓
Tendon injury (laceration, rupture)	<i>MSK Core Clinical: Tendon Evaluation</i>	--	✓
Fractures	<i>MSK Core Clinical: Bone Evaluation</i>	MSK Core Clinical Cases	✓
Joint identification	<i>MSK Core Clinical: Joint Evaluation</i> <i>Elbow, Foot, Hand &amp; Finger, Hip, Knee, Shoulder, and Wrist: Anatomy, Sonographic Anatomy</i>	Introduction to MSK, Elbow, Foot, Hand & Finger, Hip, Knee, Shoulder, & Wrist Anatomy & Physiology Cases MSK Core Clinical Cases	✓
Integrate soft tissue and MSK EUS findings into:			
Individual patient and departmental management	<i>MSK Core Clinical: Effusion Evaluation</i> <i>Soft Tissue Core Clinical: Advanced Abscess Evaluation, Peritonsillar Abscess, Foreign Body Removal Techniques</i>	MSK & Soft Tissue Core Core Clinical Cases	✓

## Thoracic - Airway

ACEP Emergency Ultrasound Learning Objective	Pulmonary Course & Lessons	SonoSimulator Cases to Scan	Covered
<b>Describe the indications and limitations of:</b>			
Thoracic EUS	Introduction, Lung Evaluation	--	✓
<b>Perform EUS protocols for the detection of:</b>			
Pneumothorax	Pneumothorax Rule-Out, Pneumothorax Rule-In	eFAST Cases Pulmonary Cases RUSH Cases SonoSim LiveScan® Cardiac Resuscitation, Critical Care, & Trauma Care Cases	✓
Pleural Effusion	Pleural Effusion	Cardiology & FoCUS Part I Cases eFAST Cases Pulmonary Cases RUSH Cases SonoSim LiveScan® Cardiac Resuscitation, Critical Care, & Trauma Care Cases	✓

Alveolar Interstitial Syndromes	Alveolar Interstitial Syndrome	Pulmonary Cases RUSH Cases SonoSim LiveScan® Cardiac Resuscitation & Critical Care Cases	✓
<b>Identify relevant US anatomy of:</b>			
Thoracic structures	<i>Lungs Anatomy &amp; Physiology: Anatomy, Sonographic Anatomy</i>	Lungs Anatomy & Physiology Cases	✓
<b>Recognize the relevant findings and pitfalls when evaluating for:</b>			
Thoracic pathology	Lung Evaluation, Imaging Adjuncts, Imaging Artifacts	Pulmonary Cases	✓
<b>Recognize the sonographic findings of:</b>			
Tracheal and esophageal anatomy, especially in regards to EM procedures	<i>Airway Core Clinical: Imaging Basics, Imaging Adjuncts, Endotracheal Tube Localization, Trachea Imaging, Cricothyroidotomy</i> <i>Upper Airway: Anatomy, Sonographic Anatomy, Sonographic Technique</i>	Airway Core Clinical Cases Upper Airway Cases	✓
<b>Integrate thoracic EUS findings into:</b>			
Individual patient and departmental management	<i>Airway Core Clinical: Endotracheal Tube Localization, Endotracheal Tube Confirmation</i> <i>Pulmonary: Pleural Effusion</i>	Airway Core Clinical Cases Pulmonary Cases	✓

## Ocular

ACEP Emergency Ultrasound Learning Objective	Ocular Course & Lessons	SonoSimulator Cases to Scan	Covered
<b>Describe the indications and limitations of:</b>			
Ocular EUS	Anatomy and Indications	--	✓
<b>Perform EUS protocols for:</b>			
Detection of vitreous hemorrhage, retinal detachment, and other pathology	Ocular Trauma, Retinal Detachment, Vitreous Hemorrhage, Vitreous Detachment, Optic Nerve Evaluation and ICP	Ocular Cases	✓
<b>Identify relevant US anatomy of:</b>			
Globe and orbital structures	Anatomy and Indications	Ocular Cases	✓
<b>Recognize the relevant findings and pitfalls when evaluating for:</b>			
Ocular pathology	Anatomy and Indications, Scanning Techniques, Ocular Trauma, Retinal Detachment, Vitreous Hemorrhage, Vitreous Detachment, Optic Nerve Evaluation and ICP	Ocular Cases	✓
<b>Integrate ocular EUS into:</b>			
Individual patient and departmental management	--	Ocular Cases	✓



## Procedural Guidance

ACEP Emergency Ultrasound Learning Objective	Procedures Courses & Lessons	SonoSimulator Cases to Scan	Covered
<b>Describe the indications and limitations when using US guidance for bedside procedures:</b>			
Vascular access: central and peripheral	<i>Introduction to US-Guided Procedures, US-Guided Internal Jugular Vein Cannulation, US-Guided Subclavian Vein Cannulation, US-Guided Femoral Line Placement, and Peripheral Venous Access: Introduction</i>	--	✓
Confirmation of endotracheal intubation	<i>Airway Core Clinical: Introduction</i>	--	✓
Pericardiocentesis	<i>Pericardiocentesis: Introduction [In Development]</i>	--	
Paracentesis	<i>Paracentesis: Introduction [In Development]</i>	--	
Thoracentesis	<i>Thoracentesis: Introduction [In Development]</i>	--	
Foreign body detection removal	<i>Soft Tissue Core Clinical: Foreign Body Localization</i>	--	✓
Bladder aspiration	<i>Bladder Core Clinical: Ultrasound-Guided Suprapubic Catheterization</i>	--	✓
Abscess identification and drainage	<i>Soft Tissue Core Clinical: Cellulitis and Abscess Imaging, Advanced Abscess Evaluation, Peritonsillar Abscess</i>	--	✓
<b>Perform EUS protocols for procedural guidance including both transverse and longitudinal approaches when appropriate. These procedures may include:</b>			
Vascular access: central and peripheral	<i>US-Guided Internal Jugular Vein Cannulation, US-Guided Subclavian Vein Cannulation, and US-Guided Femoral Line Placement: Procedure Preparation, Procedure Steps, Imaging Adjuncts Peripheral Venous Access: Procedure Preparation, Procedure Steps</i>	US-Guided Internal Jugular Vein Cannulation Cases US-Guided Subclavian Vein Cannulation Cases US-Guided Femoral Line Placement Cases Peripheral Venous Access Cases	✓
Confirmation of endotracheal intubation	<i>Airway Core Clinical: Endotracheal Tube Localization, Endotracheal Intubation Confirmation</i>	Airway Core Clinical Cases	✓
Pericardiocentesis	<i>Pericardiocentesis: All Lessons [In Development]</i>	Pericardiocentesis Cases [In Development]	
Paracentesis	<i>Paracentesis: All Lessons [In Development]</i>	Paracentesis Cases [In Development]	
Thoracentesis	<i>Thoracentesis: All Lessons [In Development]</i>	Thoracentesis Cases [In Development]	
Foreign body detection removal	<i>Soft Tissue Core Clinical: Foreign Bodies, Foreign Body Removal Techniques</i>	--	✓
Bladder aspiration	<i>Bladder Core Clinical: Foley Catheter Placement, Ultrasound-Guided Suprapubic Catheterization</i>	--	✓
Abscess identification and drainage	<i>Soft Tissue Core Clinical: Cellulitis and Abscess Imaging, Advanced Abscess Evaluation, Peritonsillar Abscess</i>	Soft Tissue Core Clinical Cases	✓
<b>Identify relevant US anatomy for:</b>			
Vascular access: central and peripheral	<i>US-Guided Internal Jugular Vein Cannulation, US-Guided Subclavian Vein Cannulation, and US-Guided Femoral Line Placement: Regional Anatomy, Sonographic Anatomy Peripheral Venous Access: Anatomy</i>	US-Guided Internal Juglar Vein Cannulation Cases US-Guided Subclavian Vein Cannulation Cases US-Guided Femoral Line Placement Cases Peripheral Venous Access Cases	✓
Confirmation of endotracheal intubation	<i>Upper Airway: Anatomy, Sonographic Anatomy, Sonographic Technique</i>	Airway Core Clinical Cases Upper Airway Cases	✓

Pericardiocentesis	<i>Pericardiocentesis: Regional Anatomy, Sonographic Anatomy [In Development]</i>	Pericardiocentesis Cases <i>[In Development]</i>	
Paracentesis	<i>Paracentesis: Regional Anatomy, Sonographic Anatomy [In Development]</i>	Paracentesis Cases <i>[In Development]</i>	
Thoracentesis	<i>Thoracentesis: Regional Anatomy, Sonographic Anatomy [In Development]</i>	Thoracentesis Cases <i>[In Development]</i>	
Foreign body detection removal	<i>Soft Tissue Anatomy &amp; Physiology: Anatomy &amp; Physiology, Sonographic Anatomy</i>	Soft Tissue Anatomy & Physiology Cases Soft Tissue Core Clinical Cases	✓
Bladder aspiration	<i>Bladder Anatomy &amp; Physiology: Anatomy, Sonographic Anatomy, Sonographic Technique</i>	Bladder Anatomy & Physiology Cases Bladder Core Clinical Cases	✓
Arthrocentesis	<i>Intro to MSK, Ankle, Elbow, Foot, Hand &amp; Finger, Hip, Knee, Shoulder, Spine, and Wrist: Sonographic Anatomy</i>	Introduction to MSK Cases Ankle, Elbow, Foot, Hand & Finger, Hip, Knee, Shoulder, & Wrist Anatomy & Physiology Cases MSK Core Clinical Cases	✓
Pacemaker placement and capture	<i>Heart: Anatomy, Sonographic Anatomy, Sonographic Technique</i>	Cardiology Cases Heart Anatomy & Physiology Cases	✓
Abscess identification and drainage	<i>Soft Tissue Anatomy &amp; Physiology: Anatomy &amp; Physiology, Sonographic Anatomy</i>	Soft Tissue Anatomy & Physiology Cases Soft Tissue Core Clinical Cases	✓
<b>Recognize the relevant findings and pitfalls when performing EUS for:</b>			
Vascular access: central and peripheral	<i>US-Guided Internal Jugular Vein Cannulation, US-Guided Subclavian Vein Cannulation, US-Guided Femoral Line Placement, and Peripheral Venous Access: Technical Tips &amp; Pitfalls</i>	US-Guided Internal Jugular Vein Cannulation Cases US-Guided Subclavian Vein Cannulation Cases US-Guided Femoral Line Placement Cases Peripheral Venous Access Cases	✓
Confirmation of endotracheal intubation	<i>Airway Core Clinical: Endotracheal Tube Localization, Endotracheal Intubation Confirmation</i>	Airway Core Clinical Cases	✓
Pericardiocentesis	<i>Pericardiocentesis: All Lessons [In Development]</i>	Pericardiocentesis Cases <i>[In Development]</i>	
Paracentesis	<i>Paracentesis: All Lessons [In Development]</i>	Paracentesis Cases <i>[In Development]</i>	
Thoracentesis	<i>Thoracentesis: All Lessons [In Development]</i>	Thoracentesis Cases <i>[In Development]</i>	
Foreign body detection removal	<i>Soft Tissue Core Clinical: Foreign Bodies, Foreign Body Removal Techniques</i>	--	✓
Bladder aspiration	<i>Bladder Core Clinical: Foley Catheter Placement, Ultrasound-Guided Suprapubic Catheterization</i>	--	✓
Abscess identification and drainage	<i>Soft Tissue Core Clinical: Cellulitis and Abscess Imaging, Advanced Abscess Evaluation, Peritonsillar Abscess</i>	Soft Tissue Core Clinical Cases	✓
<b>Integrate EUS for procedural guidance into:</b>			
Individual patient and departmental management	--	All SonoSim Procedure Cases	✓

\*ACEP Emergency Ultrasound Learning Objective not covered: Describe the indications and limitations when using US guidance for bedside procedures, perform EUS protocols for procedural guidance including both transverse and longitudinal approaches when appropriate, and recognize the relevant findings and pitfalls when performing EUS for procedural guidance: arthrocentesis and pacemaker placement and capture

## Bowel

ACEP Emergency Ultrasound Learning Objective	Intestinal/Biliary Course & Lessons	SonoSimulator Cases to Scan	Covered
<b>Describe the indications and limitations of:</b>			
Bowel EUS	Introduction, Imaging the Intestines	--	✓
<b>Perform EUS protocols for the detection of:</b>			
Appendicitis	Appendicitis	Intestinal/Biliary Cases	✓
Bowel Obstruction	Small Bowel Obstruction	Intestinal/Biliary Cases	✓
Pneumoperitoneum	Pathological Gas	Intestinal/Biliary Cases	✓
Pediatric Intussusception	Intussusception	Intestinal/Biliary Cases	✓
<b>Identify relevant US anatomy of:</b>			
Bowel structures	<i>GI Tract: Anatomy, Sonographic Anatomy, Sonographic Technique</i> <i>Intestinal/Biliary: Imaging the Intestines</i>	GI Tract Cases Intestinal/Biliary Cases	✓
<b>Recognize the relevant findings and pitfalls when evaluating for:</b>			
Bowel pathology	<i>GI Tract: Sonographic Technique</i> <i>Intestinal/Biliary: Appendicitis, Small Bowel Obstruction, Pathological Gas, Intussusception</i>	GI Tract Cases Intestinal/Biliary Cases	✓
<b>Integrate bowel EUS findings into:</b>			
Individual patient and departmental management	--	GI Tract Cases Intestinal/Biliary Cases	✓

\*ACEP Emergency Ultrasound Learning Objective not covered: Perform EUS protocols for the detection of: diverticulitis, hernia, and pyloric stenosis