Society of Critical Care Medicine
The Intensive Care Professionals

Critical Care Ultrasound
PEDIATRIC & NEONATAL

Critical Care Ultrasound: Pediatric and Neonatal
Sample Course Agenda

Day 1	
8:00 a.m. – 8:15 a.m.	**Welcome and Course Announcements** **Critical Care Ultrasound: Pediatrics and Neonatal Overview**
8:15 a.m. – 8:45 a.m.	**Ultrasound Physics and Machine Basics** • Outline basic ultrasound physics • Recognize spatial and temporal resolution • Identify ultrasound modes
8:45 a.m. – 9:30 a.m.	**Introduction to Focused Cardiac Ultrasound** • Identify standard transthoracic echocardiography views • Review basic conventions about axes and screen orientation • Recognize pitfalls and limitations
9:30 a.m. – 9:45 a.m.	**BREAK**
9:45 a.m. – 10:15 a.m.	**Qualitative Assessment of Left Ventricular (LV) Function** • Outline a rationale for focused cardiac ultrasound • Discuss the qualitative assessment of LV function
10:15 a.m. – 10:45 a.m.	**Lung and Thorax** • Identify lung ultrasound artifacts in normal and abnormal lungs • Identify pleural effusions and lung consolidation • Discuss the use of ultrasound in the evaluation for pneumothorax
10:45 a.m. – 11:15 a.m.	**Focused Assessment With Sonography in Trauma (FAST) or Focused Assessment for Free Fluid (FAFF) Examinations** • Review the components of the FAST examination • Demonstrate common pathologic findings • Discuss the limitations of the FAST examination
11:15 p.m. – 12:15 p.m.	**LUNCH With Clinical Cases A and B** • Review a series of cases focused on the topics covered in this morning's presentations • Apply the knowledge gained from presentations when responding to questions posed in the cases • Evaluate your knowledge of the topics covered in this afternoon's presentations
12:15 p.m. – 2:15 p.m.	**Skill Stations Rotation 1** **A. Apical Views** • Discuss how to obtain an apical 4-chamber view and transition to an apical 5-chamber view • Identify the cardiac structures visualized in optimized apical 4- and 5-chamber views • Describe the strengths of the apical views in hemodynamic assessment, including evaluation of ventricular size and functional assessment **B. Parasternal Views**

	• Describe how to obtain parasternal long- and short-axis views of the heart • Discuss the cardiac structures visualized in an optimized parasternal long-axis view • Review the cardiac structures visualized in an optimized view in each of the 3 major planes of the parasternal short-axis view **C. Subcostal Views** • Discuss how to obtain subcostal long- and short-axis views of the heart • Describe the strengths of the subcostal view in hemodynamic assessment, including evaluation of pericardial fluid, ventricular size, and functional assessment • Identify the cardiac structures visualized in an optimized subcostal view
2:15 p.m. – 2:45 p.m.	**Right Ventricle (RV)** • Describe the anatomy and structure of the RV • Illustrate echocardiographic views for assessing the RV • Evaluate the various components of RV function
2:45 p.m. – 3:15 p.m.	**Predicting Volume Responsiveness** • Differentiate between static and dynamic methods of volume assessment and volume responsiveness • Discuss how ultrasound can be used to assess volume status and to predict preload-recruitable cardiac output • Review limitations and pitfalls
3:15 p.m. – 3:30 p.m.	**BREAK**
3:30 p.m. – 5:30 p.m.	**Skill Stations Rotation 2** **A. Lung and Thoracic Examination** • Explain basic ultrasound anatomy of the chest wall • Discuss how different probes are used in evaluating the lung and thorax • Describe normal and abnormal artifacts and how they can be used to detect pathologic conditions such as pneumothorax, pulmonary edema, and pleural effusion **B. Vascular Procedures** • Identify positioning of peripheral and central venous catheters in short- and long-axis views • Discuss differences between veins and arteries, including collapsibility, pulsatility, and pulsed wave and color flow Doppler characteristics • Describe how to obtain ultrasound images of internal jugular, subclavian, and femoral veins **C. Left Ventricular (LV) and Right Ventricular (RV) Function** • Review key principles of qualitative assessment of LV and RV function • Discuss the importance of verifying LV qualitative assessment by looking at multiple views of the heart • Describe how to use Doppler to assess regurgitant flow across the mitral and tricuspid valves
5:30 p.m. – 5:45 p.m.	**WRAP UP DAY 1**

Day 2	
7:30 a.m. – 7:45 a.m.	**Welcome and Announcements**
7:45 a.m. – 8:15 a.m.	**Ultrasound-Guided Pediatric and Neonatal Procedures** • Discuss short- and long-axis approaches to vascular access

	• Describe the most common neonatal procedures performed under ultrasound guidance • Highlight how ultrasound guidance increases patient safety and procedural success
8:15 a.m. – 8:45 a.m.	**Ultrasound in the Perioperative Setting** • Review the clinical applications of ultrasound in the perioperative setting • Review evidence for the use of ultrasound in pediatric anesthesia • Describe when and how to use ultrasound for evaluation of the airway, lungs, stomach, and heart
8:45 a.m. – 9:15 a.m.	**Quantitative Assessment of Left Ventricular (LV) Function** • Discuss the measurements used to assess LV function • Obtain transthoracic views for assessment of LV function
9:15 a.m. – 9:45 a.m.	**Pericardial Fluid and Pulmonary Embolism** • Analyze the ultrasound findings of cardiac tamponade • Explore the clinical nature of cardiac tamponade • Evaluate the ultrasound findings of pulmonary embolism
9:45 a.m. – 10:00 a.m.	**BREAK**
10:00 a.m. – 12:00 p.m.	**Skill Stations Rotation 3** **A. Focused Assessment With Sonography in Trauma (FAST)/Focused Assessment for Free Fluid (FAFF) Examinations for Assessment of Gastric Contents** • Discuss performance of a complete FAST/FAFF examination • Describe locations of fluid collection in each of the 4 views during the FAST/FAFF examination • Describe how to differentiate ascites from intraluminal fluid **B. Predicting Volume Responsiveness** • Review basic approaches to assessing volume status • Discuss how to obtain transverse view of the inferior vena cava and aorta in the subcostal position • Describe how to measure aortic peak velocity/velocity-time integral variation **C. Lumbar Puncture and Thoracentesis** • Demonstrate how ultrasound is used to localize the site for needle insertion • Describe ultrasound anatomy of the spine and how to mark the area in preparation for lumbar puncture
12:00 p.m. – 1:00 p.m.	**LUNCH With Clinical Cases C and D** • Review a series of cases focused on the topics covered in this morning's presentations • Apply the knowledge gained from presentations when responding to questions posed in the cases • Evaluate your knowledge of the topics covered in this afternoon's presentations
1:00 p.m. – 1:30 p.m.	**Shock and Resuscitation** • Review the use of ultrasound in the management of shock and resuscitation • Discuss the role of ultrasound during CPR
1:30 p.m. – 2:00 p.m.	**Neonatal Ultrasound Diagnostic Applications** • Evaluate various diagnostic applications available for neonates • Identify options for point-of-care ultrasound for neonatal ICU patients

	• Discuss cardiac output measurement
2:00 p.m. – 2:15 p.m.	**BREAK**
2:15 p.m. – 2:45 p.m.	**Education and Program Development** • Identify the core problems faced by pediatric critical care clinicians • Review concerns about assessing and ensuring competency of clinicians who use ultrasound in pediatric patients
2:45 p.m. – 3:15 p.m.	**Ultrasound-Guided Resuscitation** • Identify problems and processes using case discussions • Review options of using ultrasound to rule out and determine causation in pediatric patients
3:15 p.m. – 5:15 p.m.	**Skill Stations Rotation 4** **A. Ask the Expert and Pathology Review** • Review core pathologies of pericardial effusion, severe left ventricular dysfunction, pneumothorax, pleural effusion, and hypovolemia • Review other topics covered **B. Case Scenarios** • Review details of case scenarios
5:15 p.m. – 5:30 p.m.	**WRAP UP DAY 2**