

## SCOPE OF EMERGENCY ULTRASOUND

The emergency ultrasound examination performed by emergency physicians is distinctly different from the evaluations of other specialties. It is usually performed simultaneously with the clinical exam, resuscitation or procedure. It has been typically described as an extension of the palpating hand and a “visual” stethoscope during the physical examination, providing both anatomic and functional information far superior to the routine physical examination. The emergency physician performs the examination at the bedside to supplement and add information to the ongoing evaluation. More importantly, a “focused” examination can usually be performed at the bedside in minutes.

EM limited bedside ultrasound is different from a formal ultrasound as performed by most radiologists. For radiologists, the ultrasound exam is a complete, formal evaluation. Due to the inherent nature of our respective specialties, the radiologist has relatively less clinical information than the emergency physician who is performing the exam at the patient's bedside. Given this difference, the “radiology specialist” is called upon to obtain “all possible information” from images. Since the EM ultrasound is limited, it is not meant to replace the formal ultrasound performed by the radiologist.

EM limited bedside ultrasound is not obtained with a screening approach – it is not a complete ultrasound examination. Instead, it seeks specific information to answer focused questions, which are dictated by the clinical scenario. It can be thought of as an extension of the clinical exam. In most ED settings (until the sonographer is very experienced), “*positive*” ultrasounds (with clearly identified abnormalities) should be sought to *rule in* disease. “*Normal scans*” should be used with great caution to *rule out* disease.

More commonly, with a “normal exam,” the emergency physician will proceed with the clinical evaluation “as if the ultrasound scan had been unavailable.” This approach is consistent with the clinical context of EM bedside ultrasound: all diagnostic tests (including imaging tests) have a defined sensitivity (false negative rate). The negative predictive value of a normal test will vary with the clinician’s estimate of the pre-test probability of disease. In the ED setting (symptomatic patients, high prevalence of disease), the pre-test probability will often be high leading to a low negative predictive value, and the need to interpret a “negative test” with caution.

The bedside ultrasound examination performed by the emergency physician usually attempts to answer a single focused clinical question – “Is there fluid around the heart, an intrauterine pregnancy, hydronephrosis or an abdominal aortic aneurysm?” This is analogous to the use of ECG, point-of-care laboratory assays, naso-laryngoscope, and the slit lamp examination in the hands of emergency physicians, which have expanded and enhanced the emergency evaluation.

## INDICATIONS FOR EMERGENCY ULTRASOUND

The use of emergency ultrasound will be focused and initially limited to the following settings:

1. **Trauma:** documentation of hemoperitoneum (FAST).
2. **Aorta:** identification of abdominal aortic aneurysm.
3. **Cardiac:** evaluation for the presence of pericardial fluid and/or cardiac wall motion.
4. **Ob/Gyn:** establishment of intrauterine pregnancy in possible ectopic pregnancy cases and identification of fetal movement and/or heart motion in the pregnant patient.
5. **Biliary:** identification of gallstones in patients with suspected biliary tract disease.
6. **Renal:** evaluation for hydronephrosis or bladder distention in patients with suspected obstructive uropathies.
7. **Procedural:** facilitation of procedures that are currently performed in a “blinded” manner - central and peripheral line vascular access, suprapubic urinary bladder aspiration, pericardiocentesis, thoracentesis, paracentesis, arthrocentesis, temporary transvenous pacer placement and capture confirmation, and soft tissue foreign body removal.

## OVERVIEW OF EMERGENCY ULTRASOUND TRAINING PROGRAM

The guidelines for the proposed emergency ultrasound program are outlined as follows:

1. The emergency ultrasound credentialing system will perform the following criteria: identify eligible providers, specify training or experience requirements, specify the emergency ultrasound privileges, specify documentation requirements for the emergency ultrasound, and define the ED ultrasound CQI process.
2. The Emergency Medicine physicians who have not been previously credentialed at another hospital or in their emergency medicine residency training program will attend a 2-day (16 hour) course in emergency ultrasound (EUS) with appropriate professional sponsorship or a series of one-day single application format courses.
3. Following completion of the course(s), practice-based physicians will return to perform EUS in a supervised case-control manner. Static or video images of each ultrasound will be reviewed by a trained peer to evaluate for technique, image acquisition, and outcome. Each study will either be compared to gold-standard confirmatory testing (CT scanning, or complete formal ultrasound studies as performed by radiology), supervised by peer over-reads, or review of patient clinical outcome. (For ongoing quality assurance, see #6, below).
4. 25 documented and reviewed cases will be required in order to obtain proficiency in each of the following six primary areas: trauma, intrauterine pregnancy, emergent cardiac, AAA, biliary, and renal. Emergency physicians desiring general emergency ultrasound privileges (application not specific) should perform a minimum of 150 exams.
5. Physicians previously credentialed at another institution will require a statement from the residency director, previous department chair, or other appropriate individual about ultrasound training, and a minimum of 150 documented and reviewed ultrasound exams at the previous institution.

6. Ongoing quality assurance of those undergoing the credentialing process as well as those that are already credentialed will be provided by the DEM CQI. Random reviews of a fixed percentage of the ultrasounds performed in the ED will be performed on an ongoing basis. Ultrasounds performed by emergency personnel will be compared to the formal ultrasound examinations performed by radiology, OB/GYN or cardiology personnel, or with the results of other imaging modalities, when appropriate. Ongoing feedback will be given to the individuals being reviewed regarding the clinical appropriateness of their scans, the image quality, the accuracy of interpretation, and the adequacy of chart documentation.

Emergency physicians who perform ultrasound examinations will continue to obtain continuing medical education in ultrasound after the initial training phase. The amount of CME and the frequency will depend on the number of primary applications used and developments in EUS.