



# Initial Training, Credentialing, and Quality Assurance/Quality Improvement Processes

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## Introduction

The use of point of care ultrasound or emergency ultrasound (EUS) has grown tremendously over the past decade in the out of hospital environment. The ability to improve diagnostic ability and serve as a tool to facilitate therapeutic intervention is continuing to rapidly evolve. Unlike emergency medicine physicians and other physicians who typically receive formal training in ultrasound during residency or through formal courses that are often required for credentialing, there is a relative paucity of training opportunities and a lack of standardization with respect to curriculum and training standards for nonphysician prehospital providers. Numerous articles have demonstrated that nonphysician providers can be trained in accurate image acquisition and interpretation in various settings and exam types (refs). However, there are no widely accepted standards with respect to curriculum or quality oversight. That said, there is a growing interest to develop such standards in order to provide high quality training, oversight, and ultimately care delivery to patients.

In the US, clinical care including scope of practice provided by emergency medical services are regulated primarily at the state level of government. In the majority of states, EMS providers typically work under the direction or supervision of a physician medical director as a delegated provider. In some states, EMS providers are licensed to practice independently. On the other hand, in many of the European countries, the issue of delegated practice is a non-issue as many EMS agencies are

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staffed by physicians who are independently licensed. In situations where EMS personnel are practicing under the supervision of a physician, it is important that training, the achievement of competence, oversight, and quality assurance standards are clearly outlined and followed. The risk of not having training standards and quality assurance is that clinical decisions and interventions may reach a patient by well meaning providers who have not been properly trained in image acquisition and interpretation.

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## Initial Training Program Goals and Requirements

In order to establish and maintain provider competency, each program or agency should establish an initial training program. The program's goals should align with the agency or unit's goals for the use of ultrasound, including scope of practice, ability to adequately train to achieve competencies, and maintain ongoing quality assurance (QA) and quality improvement (QI) in the targeted areas.

Although there are a number of studies evaluating initial training for EUS as well as performance in the field, there are no uniform standards with respect to ideal curriculum and training for prehospital providers.

Initial training should follow a step-wise or graduated approach to ensure adequate skills prior to image acquisition and interpretation that impacts clinical decisions. Our recommendation is that any process includes the following components: formal didactics program; standardized patient or simulator hands on practice under direct supervision; image acquisition with 100% quality assurance review on live patients but the trainee should not use these training images for their medical decision making and should work within their standard operating procedures; a final exam to demonstrate that the trainee can obtain images of sufficient quality to interpret and an interpretation exam using an image bank of both normal and pathologic images.

The formal didactics program should introduce equipment, image acquisition, image file management, and the process for submitting for QA/QI. Providers must demonstrate comfort with equipment operation and image optimization. Proper sanitization, and care of the equipment should also be covered.

Additional training should introduce specific scans consistent with the scope of the agency's mission. Many programs focus on the FAST or eFAST as the initial study. This offers several benefits. First, there already exists a large body of literature evaluating its utility and it has been incorporated into trauma certification courses as part of the initial patient survey. Second, trauma is a common patient type encountered in the prehospital environment offering providers frequent contact with this group. Third, the FAST depends on understanding probe movement to maximize image quality and helps providers develop this key skill as novices. Finally, it involves less subjectivity compared to interpreting volume status, left ventricle ejection fraction, or cardiac activity in cardiac arrest. Providers are therefore able to better focus on fundamental aspects of image acquisition while they are novices.

Ultrasound simulators should be available as a learning adjunct. These are most frequently employed when providers are developing procedural skills such as IV access. Many of these procedure based phantoms can be built inexpensively with household products. Prior to performing any procedure on a patient, providers should demonstrate proficiency on a simulator.

For non-procedure based ultrasound imaging, training should incorporate standardized patient scanning under direct observation. In many programs, this should be included with the initial didactic training and represent the core knowledge prior to scanning patients in the clinical environment under direct observation. Self scanning on team members could be used when standardized ultrasound models are not available or cost prohibitive.

As part of this graduated approach, providers should then scan on their own with quality review for technique and accuracy. A reasonable benchmark including standardized patient imaging is approximately 25 scans that undergo 100% quality review and are determined to be of sufficient quality for image interpretation. This should be repeated for any new studies, though the number of initial scans may vary based on the application.

Finally, a summary examination should be required that assesses both image acquisition and image interpretation. Similar to other medical training, this should be in the form of an Objective Structured Clinical Examination (OSCE) for the study in question. Assurance of image interpretation knowledge should be assessed through a formal examination involving both normal and pathologic ultrasound images. Images of insufficient quality for interpretation should also be reviewed to encourage the novice ultrasonographer to hold definitive interpretation when the images are not of sufficient quality.

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## **Credentialing**

Each agency or department should determine what the requirements for credentialing should be for their providers. Ideally, credentialing standards should help to establish the minimum number of initial scans of sufficient quality for interpretation that must be obtained to achieve reasonably consistent image acquisition and the requirements for confirmation of image interpretation abilities. It is important to note that these two aspects of ultrasonography are separate and there may be times when providers only need to be able to obtain images such as when teleultrasound is implemented.

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## **Quality Assurance/Quality Improvement Process**

Systems must be in place to ensure continuous quality image acquisition and appropriate interpretation. This often falls to the senior leadership of the organization or the medical director; however, we encourage this process to involve the providers credentialed to perform ultrasound as this increases the number of studies they

review and interpret. It also offers an opportunity for any feedback to reach a larger number of providers (both the providers acquiring images and the ones providing feedback). Good QA/QI processes not only assure high quality of care at the patient level, they also can reveal areas of opportunities for improvement both at the system as well as the provider level.

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## Conclusion

Instituting an ultrasound program in the out of hospital environment must include a plan for initial training, a credentialing process that is equitable, and a QA/QI process that ensures a safe and efficacious ultrasound program.

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## Key Literature

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