

A Guide to ED Ultrasound:

Continuous Quality Management and Governance

This is a guide to inform directors or supervisors of Emergency Ultrasound Training and Emergency Department directors of the necessary requirements to ensure robust continuous quality assurance and governance of ED performed ultrasound scans.

In order to ensure continued quality, facilitate ultrasound education and satisfy credentialing pathways, a structure for emergency performed ultrasound quality assurance and improvement should be in place.

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Director / Supervisor of Emergency Ultrasound

An emergency ultrasound director or supervisor is essential to oversee and manage the local emergency medicine ultrasound training programme. The requirements for a director or supervisor of ED ultrasound training can be found in the 'guide to running an ultrasound training programme' document.

Documentation

Emergency ultrasound (US) differs from radiology department performed ultrasound as the emergency physician performs, interprets and appropriately acts upon the ultrasound examination in a given clinical context. Typically, ED US findings are immediately interpreted and communicated to other physicians and services verbally and by written reports. Emergency US documentation reflects the nature of the exam which is focused, goal-directed, and performed at the bedside contemporary with clinical care. This documentation may be preliminary and brief in a manner reflecting the presence or absence of the relevant findings. However, only appropriately trained, accredited or credentialed ED practitioners should have the clinical privileges to document and act upon their ultrasound findings.

If the ED US is performed by a doctor who has yet to achieve the necessary accreditation, the scan should be directly observed by a colleague with the relevant ultrasound qualification. Ultrasound findings, interpretation and subsequent actions will be agreed upon together and documented appropriately under supervision.

Documentation may be hand-written, transcribed or computerised. All relevant positive and negative findings should be documented. If inadequate images are obtained, then this should also be documented.

A 'normal' ED US is only 'normal' for the specific focused, goal-directed scan performed in the ED. It does not mean the entire body region imaged is 'normal'. It does mean that the specific clinical question(s) assessed in the ED has been confirmed as negative. It does not mean the same thing as a normal ultrasound scan performed in the department of radiology or echocardiography. As such, this must be communicated with the patient and other medical staff. The patient may well require formal imaging in the department of radiology even if the ED US is negative or 'normal'

Quality Assurance (QA) Process

Quality assurance systems are an integral part of any ultrasound programme. The objective of the QA process is:

- To evaluate and review images for technical competence
- To assess the interpretations of such images for clinical accuracy
- To provide timely feedback to improve physician performance and patient care.

The QA process should be an integrated part of the educational, training, and credentialing processes of each ED.

Direct supervision of physician performance of ultrasonography by an accredited FACEM (CCPU, DDU or equivalent), or those with other appropriate qualifications (as stated in the 'guide to running an ultrasound training programme' document), should be considered an ideal form of QA and practice performance activities.

Regular multidisciplinary team meetings including representatives from ED, radiology and ultrasonography are to be encouraged. Such meetings should be used as fora to discuss interesting cases and include reviews of ultrasound image acquisition and interpretation.

Policy, process, education, quality assurance and governance should also be addressed when required and relationships fostered between the necessary departments.

The QA system should compare the impression from the emergency ultrasound interpretation to patient outcome measures such as radiology performed ultrasound, other imaging modalities, surgical procedures, or patient clinical outcome. The QA system design should strive to provide timely feedback to physicians. Balancing quality of review with provision of timely feedback is a key part of QA process design. Video review is superior to still image review but is generally more time consuming, and may not be practical in some institutions.

Regular audit of ED performed US should be fulfilled to ensure that the necessary standards detailed in the ultrasound training programme policies are being achieved. This should include review of education and credentialing, appropriate machine utility and maintenance, documentation, image storing and image interpretation as compared to further investigation and patient outcome. Failure to achieve the required standards should be addressed and resolved with timely review and feedback essential.

Those emergency physicians who have achieved accreditation in a domain of ED US must be responsible for maintaining their credentials as set out by ACEM and ASUM. This will involve yearly ongoing ED US training (usually 3 hours) and a documented number of US scans (usually 15-25 depending on scan type). Maintenance of credentials will also be monitored and audited as part of the QA process.

Storing and Saving ED Ultrasound Images

Any ED US system design should have a data storage component system that enables data and image recall.

All images obtained prior to a physician becoming credentialed should be reviewed by an appropriately qualified clinician, while images from credentialed physicians may be sampled at random during the QA process.

A suggestion for the general data flow in the QA system is as follows:

- US images obtained by the physician are saved on the US machine and subsequently exported to some type of media (external hard drive, flash drive, direct link to PACS system). These images may be video clips / cineloops (preferable) or still images.
- Minimum of 4 data entry points entered when saving US images:
 - E.g. patient first name, last name, MRN and user initials

- Electronic or paper documentation including; clinical information, US examination performed and relevant positive and negative findings. Inadequacy of images should be documented. Interpretation of US findings and subsequent suggested investigation and management plans in clinical context, should be documented.
- If available a record or note of the 'ED US event' should be made in the patient's Electronic Medical Record (EMR). E.g. create and set the event 'PoCUS note' on EMR for each ED US performed.
- All US images and documentation by trainees are then reviewed by the ultrasound director/supervisor or his/her designee.
- A random selection of US images and documentation by credentialed clinicians will be reviewed by the ultrasound director/supervisor or his/her designee for audit.
- Reviewers evaluate images for accuracy and technical quality and feedback the reviews to the performing physician.
- ED US studies are archived (for a designated period of time – usually 3 years) and available for review at a later date should they be needed.

QA systems currently in place worldwide range from paper log books and documentation, to complete digital solutions with full PACS and EMR (or equivalent) integration. Finding the system that works best for each institution will depend on multiple factors, such as machine type, administrative, IT, infrastructure and financial support, and physician compliance.

Ultrasound Machines, Maintenance and Infection Control

Dedicated US machines located in the ED for use by emergency physicians are expected equipment for optimal care in any hospital ED. Such machines should be chosen to handle the rigors of the multi-user, multi-location practice environment of the ED.

Each clinician using the machine must ensure it is appropriately cleaned (to infection control standards) maintained and stored in the correct designated area after each use. This is an essential component of patient and departmental safety. Some institutions have employed a 'three strikes and you're out' policy. Whereby clinicians witnessed using the machines inappropriately without complying with these set' standards of machine care' will have their US privileges revoked for a period of time.

Other issues that should be addressed regarding emergency ultrasound equipment include:

- Regular review and education of personnel using the equipment and appropriate transducer care

- Stocking and storage of supplies (US gel, transducer covers, cleaning equipment, IV cannulas etc.)
- Adequate cleaning of transducers with respect to infection control
- Upkeep and maintenance of US machines by clinical engineering or others
- Efficient communication to the ED ultrasound director/supervisor or his/her designee of equipment and utility issues.

Risk Management

Ultrasound is an excellent diagnostic risk reducing tool when used in appropriate clinical context to answer specific goal-directed binary questions, by an appropriately trained ED clinician. ED US has been proven to increase diagnostic certainty, shorten time to definitive therapy, and decrease complications from blind procedures that carry an inherent level of complication.

An important step to managing risk is insuring that physicians are properly trained and credentialed according to national guidelines such as those set by ACEM and ASUM. Proper quality assurance, improvement and governance programmes should be in place not only to identify and correct substandard practice, but also to acknowledge appropriate application and health benefits to our patients.

Lastly, the standard of care of ED US is the performance and interpretation of ultrasound by a credentialed emergency physician within the limits of the clinical scenario. It is the ability to act expediently on the US findings in the given clinical context and to improve timely critical decision making and hence patient care. Physicians performing US imaging in other specialties or in different settings have different goals, scope of practice, documentation requirements, and consequently should not be comparable to those practicing emergency medicine. Remember, you are a clinician first and ED sonographer second. Always treat your patient and not the scan. The clinical context is paramount when weighing-up the risks of utilising the tool of ultrasound to assist diagnosis, investigation and accurate management of our patients.