



Australasian College for Emergency Medicine

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Provision of focused ultrasound training and governance

Guidelines

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Document Review

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Revision History

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Supporting documents

- [ACEM Policy on the use of focused ultrasound in emergency medicine \(P21\)](#)
- [ACEM Policy on credentialing for emergency medicine ultrasonography \(P733\)](#)
- [ACEM Statement on Cleaning and Disinfection Of Ultrasound Transducers That Are Used For Needle-Based Procedures \(S686\)](#)
- [ACEM Guidelines on minimum criteria for ultrasound workshops \(G25\)](#)
- [EMUGs \(Emergency Medicine Ultrasound Groups\)](#)
- [ACEP Policy Statement on Emergency Ultrasound Ann Emerg Med. 2009;53:550-570](#)
- [ASUM Guidelines for Reprocessing Ultrasound Transducers](#)

Abbreviations

ASUM – Australasian Society for Ultrasound in Medicine

CCPU – Certificate in Clinician Performed Ultrasound

DDU – Diploma of Diagnostic Ultrasound

DMU – Diploma of Medical Ultrasound

FRANZCR – Fellow of the Royal Australian and New Zealand College of Radiologists

EFAST – Extended Focused Assessment with Sonography for Trauma

AAA – Abdominal Aortic Aneurysm

FELS – Focused Echo in Life Support

SEED – Sonographer Educators in the ED

1. Purpose and scope

This guideline relates to the provision of emergency department-focused ultrasound services and training. This guideline aims to provide advice and guidance to emergency departments about what is desirable to provide quality ultrasound training and services.

This includes guidance on how to:

- provide the resources, personnel and infrastructure needed to ensure a safe environment for trainees and FACEMs to perform ultrasound
- implement a peer review and feedback process with image archiving and logbook maintenance.
- integrate scans with medical records for general clinical usage.

The policy is applicable to both public and private hospital emergency departments throughout Australia and New Zealand.

2. Role of ultrasound in emergency medicine

The role of ultrasound in the field of emergency medicine is continually evolving. The original descriptions and focus of practice in the unstable trauma patient are still relevant but have also changed significantly in the last decade or more. It is no longer a specialist-only skillset, but now extends all the way through from undergraduate to postgraduate study to incorporation within specialist training programs. This topic is the subject of significant texts and a full and detailed discussion is beyond the purpose of this document. The focus of ultrasound training during progression through the ACEM training program is targeted to the basic modalities utilised within the resuscitation room, as well as using ultrasound to improve the safety of ED procedures.

2.1 Definition of Focused Ultrasound

Focused Ultrasound, also called 'Point of Care Ultrasound' (PoCUS) and previously 'bedside ultrasound', has expanded significantly in utility, scope and accessibility over the last couple of decades. An Australasian Society for Ultrasound in Medicine (ASUM) standards of practice [discussion paper](#) provides a definition.

ASUM recommends the terms 'comprehensive ultrasound', 'limited ultrasound' and 'focused ultrasound' be used to capture the differences in the range of ultrasound examinations.

- **Focused:** used in specific clinical settings to recognise a narrow list of potential diagnoses. As such, these examinations may have lower requirements for training and equipment and can often be performed more quickly.
- **Limited:** an examination performed using the skill and equipment suitable for a comprehensive examination, but not undertaking the full protocol of a comprehensive examination.
- **Comprehensive:** following a recognized protocol to obtain good quality images that are interpreted by a physician who has undertaken advanced training in ultrasound. Usually would be associated with a comprehensive report.

ACEM supports these definitions.

3. Developing ultrasound programs in emergency departments

The development of a focused ultrasound program in emergency medicine departments includes:

- Defining the scope of practice within your department
- Designing a program plan
- Initial basic-level training – in-house workshops, courses and external providers
- Peer review, proctored scanning and log books
- Credentialing and Assessments
- Faculty requirements for accredited emergency departments
- Special Skills Placements (SSPs)
- Fellowships
- Documentation
- Image saving, archiving, reviewing, logging and integration into the medical record
- Quality Assurance (QA) processes
- Machine characteristics incl. purchasing and matching the scope of practice

3.1 Defining the scope of practice within your department

ACEM's *The Use of focused ultrasound in emergency medicine* (P21) policy states that emergency physicians and/or trainees who perform and interpret focused ultrasound should possess appropriate training and hands-on experience. It is recognised that the current scope of practice of clinicians who already perform and interpret scans should not be limited. In addition, emergency physicians and/or trainees should also be competent in the interpretation of images related to additional ultrasound applications.

Each accredited department should provide the mechanisms to achieve this scope. It is recognised that some departments may not have the capacity to train staff in all the modalities within the ACEM curriculum. These sites are strongly encouraged to seek assistance from appropriately trained clinicians or within their personal, professional, departmental or hospital networks to achieve this goal.

3.2 Designing the program plan

Any focused ultrasound training program should include the minimum ACEM ultrasound applications for emergency medicine practice, EFAST (extended focused assessment with sonography in trauma), AAA (abdominal aortic aneurysm), FELS (Focused Echo in Life Support), lung, and procedural guidance techniques (in particular, central and peripheral vein cannulation). Further modules may be included by individual departments or practitioners as the skillsets increase. Without limiting more advanced practice for individual practitioners, ACEM recommends department training programmes initially concentrate on building competence in these modules.

In developing the program plan, departments may wish to collaborate with other emergency departments, other specialties, medical imaging departments, other groups in the hospital or external providers. Local modifications are encouraged to meet the underlying goals and principles outlined in this document.

3.3 Teaching plan

Initial basic didactic training may include internal, external or remote access learning. There are a growing number of online providers for these topics. The [online UTEC program](#) established in New South Wales is available as open-access education.

The program should include relevant ultrasound physics and machine instrumentation (knobology) to ensure a basic understanding of beam formation, image acquisition and optimisation, and artifacts. An assessment

process for the basic understanding of ultrasound physics is available through online ACEM ultrasound resources as well as third party providers.

3.4 Credentialing

The credentialing and maintenance requirements for ED trainees and specialists are outlined in the ACEM Policy On Credentialing For Emergency Medicine Ultrasonography P733.

It is recognised that many clinicians are unable to complete credentialing in a timely manner (if at all) unless it is considered mandatory by either their department, hospital organisation or College. It is recognised that local factors, including the support of the ED Director, are critical to the success of credentialing. ED Directors are strongly encouraged to make this process mandatory for their department(s).

Once the training and assessment requirements are satisfied, the emergency medicine practitioner will be credentialed for the appropriate ultrasound module. The emergency medicine sonologist may then document the results of his/her ultrasound scans in the medical record and incorporate the results into clinical decisions.

ACEM has a formal link with the Australasian Society for Ultrasound Medicine (ASUM). ACEM accepts successful completion of the Certificate in Clinician Performed Ultrasound (CCPU) and comparable workshops as described by the ACEM Ultrasound Committee.

3.5 Proctored examinations

Ultrasound is fundamentally a practical, user dependent skill and time spent acquiring these skills can be prolonged and individualised. It is advised that practical skill acquisition should be supported by peer review in real time (proctored) to assist with machine manipulations and optimisation techniques. Credentialing and assessment processes are essential for quality and standards purposes.

Proctoring is the longest part of the process and can cause significant delays. Real-time proctoring involves a proctor sitting with and guiding the trainee through the examination and is the best way to learn. It is time-consuming and should be shared with a large cohort of credentialed operators and may include sonographers, SEEDs and echocardiographers in addition to emergency medicine trained practitioners. Delayed proctoring involving image reviews at a later time may also be employed but has disadvantages to the real-time proctoring and if employed should have some intermittent real-time proctoring included. The formative assessments will also form part of the proctoring process.

Individual departments may elect to incorporate ultrasound training within existing programs or develop alternatives to assist with managing the demand for training, which can be personnel-intensive.

- Proctored logged examinations are a required part of the credentialing process. For each module, at least two directly supervised formative assessments must be completed prior to the final, summative assessment.
- Patients must be informed that the ultrasound examination is being performed for credentialing purposes and appropriate consent obtained.
- All ultrasound examinations must be documented, preferably in a personal logbook. The findings and interpretation should subsequently be compared to other clinical data and a notation made as to whether the scan findings were accurate.

Minimum numbers of ultrasound examinations for each module are detailed below. Further details can be found in the ACEM Policy On Credentialing For Emergency Medicine Ultrasonography P733.

- **Extended Focused Assessment with Sonography for Trauma (EFAST)** – a minimum of 25 accurate examinations must be performed. At least 50% of these exams must be clinically indicated and at least five should be positive for either intraperitoneal, pleural, pericardial fluid, or pneumothorax.
- **Abdominal Aortic Aneurysm (AAA)** – a minimum of 15 accurate examinations of the aorta must be performed. At least 50% of these exams must be clinically indicated and at least three should demonstrate an aneurysm.

- **Basic Lung** – a minimum of 25 accurate examinations of the lung must be performed. At least 50% of these exams must be clinically indicated and at least five should demonstrate significant pathology e.g. pneumothorax, effusion, pneumonia, interstitial syndrome.
- **Focused Echo in Life Support (FELS)** – A minimum of 25 accurate examinations of the heart must be performed. At least five should be clinically indicated (i.e. shock/peri arrest/cardiac arrest) and these scans should be reviewed by a sonologist. At least five examinations should be performed under the direct supervision of a sonologist, or cardiac sonographer.
- **Evidence of review of clinical images/loops from a further 25 cases should be provided.** The total 50 FELS cases must include at least two cases each of pericardial effusion, right heart failure / massive pulmonary embolism, hypovolemia or distributive shock and left ventricular failure.
- **Procedural Guidance** – 25 successful procedures including at least three supervised cases of peripheral venous cannulation and at least five cases of central venous cannulation.
- **Up to 50% of log book cases can be completed in a non-clinical environment**, including a refresher workshop or finishing school. All scans performed in a finishing school environment must be directly supervised by one of the practitioners described in 4.2, and educational feedback provided to the candidate.

3.6 Summative assessment

An emergency medicine sonologist or qualified sonographer will observe the candidate performing the ultrasound examination. The candidate will be required to demonstrate the ability to create adequate ultrasound images of all the appropriate anatomical structures. The candidate must be able to identify any relevant artifacts or pathology present during real time scanning and/or on recorded scans and/or hard copies of scans. The candidate must be able to recognise an inadequate scan and must demonstrate an understanding of the indications and limitations of ultrasound examination for the condition in question.

4. Guidelines for training in accredited emergency departments

4.1 Clinical lead in ultrasound (CLUS)

It is recommended that sites appoint Clinical Leads in Ultrasound (CLUS) to assist with the supervision, assessment, ultrasound training and education of all FACEM trainees at their site(s).

Appointment process

Suitably qualified Fellows of the Australasian College for Emergency Medicine (FACEMs) or equivalent (i.e. if no FACEM is available, ED doctors with a special interest in ultrasound).

A single CLUS may be appointed or the role may be shared. It is recommended that each FACEM is at least 0.2 FTE in the applicable department. Sharing of the CLUS role may enable individuals to take a particular focus to their respective roles and may also assist with succession planning.

FTE recommendation

The clinical support time required for the CLUS role will depend on the number of trainees locally as well as local infrastructure and the extent of the portfolio. The following minimum allocated clinical support time is suggested:

Minimum allocated clinical support time for CLUS

| Trainees | FTE | Additional faculty recommended | Number of machines suggested |
|----------|------|--------------------------------|------------------------------|
| Up to 20 | 0.2* | 2–6 | 2–4 |
| 20+ | 0.4 | 6+ | 4+ |

*based on 10-hour shifts

Selection criteria

The ultrasound program CLUS is a FACEM with sufficient expertise in focused ultrasound that ideally may include any of the following in preference order:

- DDU or equivalent
- A master's or higher degree in ultrasound
- Certificate in Clinician Performed Ultrasound (CCPU) in at least the minimum modules for ACEM trainees including EFAST, AAA, FELS, Lung and procedural guidance.
- Other higher qualifications in ultrasound education

Roles/responsibilities – education and training

The primary role of the CLUS is to ensure the highest quality of clinical governance and patient safety is developed and maintained. In order to achieve this, the CLUS will support fellows and trainees in achieving the specific learning outcomes as they relate to emergency ultrasound as described in the ACEM curriculum framework. In general, this will include providing the opportunity for trainees to reach CCPU standard in EFAST, AAA, FELS, Lung and procedural/vascular guidance by the completion of FACEM training. In addition, the role of the CLUS is to support other clinical staff, including non-ACEM trainees and EMET trainees, in utilising ultrasound in their daily practice.

The CLUS and faculty (including SEEDs) who may be involved in designing the program/teaching plan, credentialing and assessments will be responsible for image reviews, feedback and sign-off, and formative and summative assessments. The CLUS is responsible for setting up or participating in local training courses and establishing/monitoring credentialing pathways for trainees. This process includes liaison with DEMENTs, WBA co-ordinators, DEMS and medical imaging departments (radiology). There may be opportunities with external private providers including training organisations.

Local arrangements and resources will dictate whether a parallel (several modalities simultaneously) or serial (one ultrasound modality at a time) approach is taken to the training in ultrasound modalities.

Roles/responsibilities – assessment: Directly Observed Procedural Skills

The performance of EFAST is a core DOPS assessment in the FACEM Training Program. The assessment should be performed by a credentialed practitioner. A log of acceptable assessors should be kept for each department and available on request to ACEM training and examination staff and the regional censor (or delegate).

Additional focused ultrasound examinations may be added to the DOPS list of assessments and will follow similar guidelines.

Policy development/ implementation local guidelines

The CLUS will ideally also be involved in local policy/guideline development and/or review for the use of ultrasound within the ED. In addition, the CLUS will create, review and maintain clinical governance and patient safety standards.

QA/audit/research

The CLUS will be expected to have a leadership role with local quality assurance processes, audit and research that relates to Emergency Ultrasound.

Advocacy/liaison

The role of the CLUS may also include advocacy for and liaison with local, state and national stake-holders with regards to the use of Emergency Ultrasound. These stakeholders may include local trainee representatives, DEMENTs, SST supervisors, DEMS, departments of imaging, EMUGs, ASUM etc.

4.2 Administrative support

Adequate administrative support should be available to the CLUS and supporting faculty. A minimum of 4 hours per week is suggested.

4.3 Documentation

Appropriate documentation of the clinician's findings should be in written form either:

- For credentialed clinicians: in hard copy format or within an electronic patient record and be accessible to subsequent review by the patient's treating team or for clinical review and audit.
- For non-credentialed clinicians with findings not reviewed by a credentialed practitioner: in the clinician's logbook.

The results of scans performed by clinicians in training should, in general, be clearly differentiated from those performed by qualified clinicians. Where the image management system allows, these scan results should be 'blinded' from the clinical record but readily available to supervisors/more qualified clinicians to allow quality assurance, training and feedback. If the system does not allow for blinding of the report from general use, the report should be clearly identified as 'unverified report,' or 'awaiting verification.' Phrases such as 'informal scan' are to be avoided, as they imply a lack of accountability or process that ensures a scan result will be verified. Non-credentialed clinicians should not discuss any of their results with the patient but should seek a credentialed clinician to review their images and findings as soon as practicable. Real-time review is strongly encouraged for all clinicians in training.

It is preferable to also include a mechanism of image capture and storage as part of the logbook and/or patient's record. This is covered in more detail below under ED IT support requirements.

Documentation of the ultrasound examination in the patient's medical record should be entitled appropriately as an 'EFAST' or a 'focused ED ultrasound for aortic aneurysm'. The notes should describe the views obtained, the adequacy of those views and indicate whether the findings were normal, abnormal or indeterminate. If the study was inadequate, this must be clearly stated as such studies should not be used to make clinical decisions.

Documentation should also be limited to the pertinent question being addressed by the focused ultrasound and remain within the scope of the practitioner. It is unlikely that a focused ultrasound can be considered a rule-out investigation in many ED clinical scenarios and further definitive imaging should be considered.

All departments and practitioners should have mechanisms to record incidental and/or important unexpected findings. Practitioners are strongly encouraged to seek input from credentialed or qualified practitioners in the first instance and obtain real-time review. Radiologists and Sonographers may also be of assistance but may defer formal comments until a diagnostic imaging study is complete.

4.4 Audit

Emergency departments in which focused ultrasound is performed are recommended to conduct annual (at a minimum) audits of the ultrasound examinations as part of the department's quality improvement process.

Departments are strongly encouraged to periodically review their focused ultrasound practice, compliance with governance standards in the fellowship training modalities and the need for additional modalities to be included in the scope of practice.

Clinically significant false positive or negative studies should form part of a clinical review process or morbidity and mortality review program as per each departmental governance.

4.5 Governance

Emergency Departments should have clear governance structures in place including representation and reporting lines to the departmental and hospital clinical governance and/or safety committees. The size and configuration of the governance structure can be locally designed and administered.

4.6 Special Skills Placement

ACEM supports the maintenance of and further progression of special skills terms in focused ultrasound. The local arrangements will dictate the exact design and duration of the term. The minimum period is three months if full time equivalent (1.0 FTE) and may extend to six months as part-time. Most terms are fractional with clinical emergency medicine time concurrently. Each department will design their program independently

to include the core competencies, optional CCPU modules, core and extended, an education, audit and quality improvement element to the program. All trainees in a special skills term will complete a learning needs analysis for the term and receive specific in-training assessments every three months.

If additional support from non-emergency department sources are utilised in the program it is recommended that each additional person/group/unit/entity establish a memorandum of understanding with the emergency department to ensure the trainee is not disadvantaged by any abrupt change in circumstances.

ACEM's ultrasound SSP accreditation guideline is available [here](#).

4.7 Ultrasound Fellowships

The development of ultrasound fellowships for the provisional fellow or newly qualified fellow is supported by ACEM. These roles will provide additional ultrasound portfolio time and responsibilities within the department including audit, research and support the CLUS and faculty. They will be transitioning from a learner role to an educator role and/or developing towards a higher qualification. These positions will have increased or specific portfolio time (approximately 0.5 FTE) and last for a minimum of six months up to a maximum of 24 months.

5. Emergency department IT support requirements

IT support is required for Emergency Department ultrasound (EDUS) to enable efficient and practicable processes for:

- Adequate training for practitioners to ensure focused ultrasound images are saved and documented
- *Streamlined processes for the transfer of images from the ultrasound systems to a review portal or system.
 - Ultrasound systems are frequently able to transmit wirelessly or through ethernet/network ports to a specific server or drive.
 - USB devices are strongly discouraged owing to the poor security, easily lost or misplaced and need for a second stage process to upload images to servers/drives. If USB devices are utilised, they should meet local security requirements for encryption.
- *Storage of clinical images as part of training and release of clinically significant images to the medical record.
- *Image review process for delayed proctoring for training - including image review by supervisors of scans performed without direct supervision.
 - This is a crucial step in the training process and particularly if delayed proctoring is a significant method of review.
 - Log of completed formative and summative assessments
- Maintenance of training logbooks and credentialed practitioners' CPD requirements.
- Log of credentialed practitioners in each department
- Audit, research and quality improvement capacity of the IT system.
- *Availability of clinically significant images to third party review, in/out-patient services and to be able to assess for change in condition of findings previously noted.
 - Medical record and/or imaging storage system e.g. PACS (Picture archiving and communication systems)

*Systems must comply with relevant jurisdictional health information and IT requirements and principles, particularly with regards to maintaining security, accessibility and patient confidentiality. The solutions may not be part of current IT systems in emergency departments and therefore some temporary solutions may be

considered until an appropriate definitive system is established.

5.1 Training, audit and QI requirements

The system should allow storage of images (both still and video clips or cine loops), clinician reports and offline review at a centralised station (i.e. not using the ultrasound machine itself). Automated image transfer which complies with relevant jurisdictional health information requirements is strongly recommended. The storage and transfer of images on physical memory devices (for example USB sticks) is strongly discouraged due to both confidentiality issues and inefficiency. The ability to transfer selected training images to the permanent medical record storage system is recommended if possible (for example images which are considered to contain important information that may be useful for future comparison or that major clinical decisions relied upon).

5.2 Medical record storage

The system should store images and clinician reports, including the interpretation of the US examination, in compliance with standard health information / IT requirements. Images, reports and interpretations should be available to other clinical teams and imaging departments for clinical and risk management purposes.

For clinicians who have completed credentialing it is recommended that clinical images/loops are retained with a report of the conclusions made. With current available technology it is recommended that this should occur electronically, with secure wireless data transfer. These images and report should be available to all clinicians involved with the patients care and for teaching/training purposes. This better allows reflective review of practice, to minimise duplication of process and to minimise misinterpretation errors. Recording of images and reports can allow for the detection and correction of errors (by both the initial clinician and others) but more often will help justify decisions that were based on images but subsequently questioned. Verbal reports and 'phantom scanning' (i.e. scanning without any record of the clinical interaction) are to be strongly discouraged.

6. Equipment

6.1 Machines

The availability of machines is crucial to assist Fellows and trainees in their clinical practice and their training in focused ultrasound. Each accredited department should seek to ensure an adequate suite of ultrasound systems that meet the needs of the patient cohorts they are being used for and the skills of the practitioner. Systems aimed at the novice, intermediate and advanced user may be required and many of the higher end machines can be detrimental to the experience of a novice user, thereby limiting their training and further uptake of this skill. Machines must be readily available for the emergent patient when required with appropriate transducers and peripherals for timely use. Systems should have as short a start-up time as possible to ensure they are readily available to the critically ill patient.

6.2 Hygiene

All systems are considered essential to an emergency department's equipment and processes to support the cleaning, re-stocking and checking of hardware and consumables are required. The issue of machine and transducer hygiene and contamination has been highlighted by other agencies (see references) and ACEM supports the attainment of the highest possible standards in hygiene possible whilst also ensuring the process is not prohibitive to patient care and training. Further information about transducer reprocessing and cleaning can be found in the reference and supporting documents listed in section 7.

6.3 Gels

Standard non-sterile gel is suitable for most situations where focused ultrasound is used on intact skin. Sterile gel should be used for procedural guidance and on irritated or non-intact skin, including exposure to mucous membranes.

6.4 Transducer covers

Sterile transducer covers to protect the transducer from contamination and the patient from cross-infection should be used for all invasive procedures and for contact with non-intact skin or mucous membranes. Transducer covers in various lengths with coverage of the transducer and trailing cables are commercially available. Care should be taken to ensure practitioners and patients with allergies such as latex are not exposed to transducer covers that may cause a reaction.