MonashHealth

Training & Accreditation in Emergency Ultrasound

MODULE 1 eFAST

Purpose of Document

This document describes the process for credentialing Emergency Physicians within Monash Health (MH) to perform

- Extended Focused Assessment with Sonography for Trauma (eFAST)

Module 1 eFAST is the foundational training & credentialing module which must be completed prior to progression to advanced ultrasound modules. Module 2 AAA will also be undertaken in conjunction with Module 1 eFAST (or at later stage for paediatric ED specialists) but is not required to be completed before moving to other modules.

This should be read in conjunction with ACEM (2016) P22 *Policy on Credentialing for Emergency Department Ultrasonography: Trauma Examination and Suspected AAA*.

Background

The Physician performed FAST scan is a highly accurate, rapid and repeatable bedside test in determining which blunt abdominal trauma patients require laparotomy. Incorporating ultrasound into routine trauma management has been shown to improve care of Emergency department patients, as well as decreasing the utilization of both DPL and CT, which has been associated with a decreased cost of caring for trauma patients. (Scalea et al 1996, Moore et al, 2004) Extension of the FAST scan to assess the chest for pleural effusion and pneumothorax (eFAST) has become well established in trauma and critical care settings. (Husain et al, 2012, Lichtenstein et al, 1995, Volpicelli et al 2012) It has been acknowledged that eFAST scanning is an appropriate use of ultrasound within MH Emergency departments.

The Australasian College for Emergency Medicine (ACEM) supports the use of focussed ultrasound examinations in the Emergency Department, stating that u*ltrasound imaging has been shown to enhance the Clinician's ability to assess and manage patients with a variety of acute illnesses and injuries* and *focused bedside ultrasound examinations performed by trained Emergency Physicians in order to answer specific clinical questions have been shown to improve patient outcomes. (ACEM* 2013) The Australasian Society for Ultrasound in Medicine (ASUM) also supports *the devolution of diagnostic ultrasound to the clinical specialties only where the necessary regulatory environment and infrastructure exist for the supervision of training in the medical and surgical specialties.* (ASUM 2014).

This document describes:

- A 3 stage process for accrediting Emergency Physicians to perform Module 1 eFAST scans
  1. Initial Training – option of ASUM accredited external or internal course
  2. Skills Development / Electronic Logbook / MH Accreditation (internal)
  3. Ongoing Quality Audit / Skills Maintenance (internal)

- A method for auditing scan quality, maintaining a MH electronic logbook and ongoing accreditation

- A practical evaluation consisting of a direct assessment of the skills necessary to obtain and interpret appropriate ultrasound images for an eFAST examination

STAGE 1 - Initial Training

Emergency Registrars & Consultants intending to perform ultrasound within MH are expected to complete:

- Appropriate practical ultrasound course (MH internal course or external private course)
- Compulsory online ultrasound physics module (external – NSW ECI)

Note any external PoCUS courses undertaken should be ASUM accredited standard (eg. Australian Institute Ultrasound AIU Gold Coast, Ultrasound Training Solutions U-T-S Melbourne introductory courses covering eFAST & AAA at minimum).

STAGE 2- Program Induction/ Skill Development / eLogbook / MH Accreditation

Clinicians who have undertaken the MH internal course will complete the practical skills development stage as part of Session C of the course structure. Clinicians who have completed an external training course will undertake an internal 90 minute induction session by Sonographer educator, prior to practical skills development stage and commencing scanning at MH.

Further development of ultrasound scanning skills is achieved through one-on-one training sessions with program Sonographer or officers of ED Governance group as required according to level of scanning experience and skill. MH internal PoCUS course minimum requirement is 4 hours, but training sessions are unlimited and available as required. Practical scanning support, mentoring and feedback is offered throughout the completion of Stage 2. Additional self-directed learning is expected including viewing eFAST learning tools, revising cases, journal reading and other online resources.

Stage 2 requires the completion of a logbook which documents a minimum of 25 eFAST examinations:

- A minimum of 5 cases in logbook must be positive (ie. pericardial effusion, pleural effusion, haemoperitoneum, ascites or pneumothorax)
- An entry is only valid if the ED physician is the person performing the examination
- Multiple entries of same patient in the same episode of care by a physician is not acceptable
- eFAST and AAA examinations performed on the one patient is acceptable and will be electronically logged for each scan type conducted
- ED Physician is to record an adequate eFAST series of images as described in examination protocols
- Physician must complete EMR PoCUS adhoc charting of scan findings for all examinations performed, even if clinically limited or focussed (eg. single view pericardium for tamponade)
- EMR PoCUS produces a clinician worksheet, facilitating adequate patient identification, upload of scan images to PACS, generation of an electronic logbook and quality auditing process based on documented scan findings
- All examination images will be transmitted to Monash Imaging (general scans) or Monash Heart (echo scans) for upload to relevant PACS
- ED physician will be provided with support & feedback during this training & skills development stage as required

Quality Auditing

Regular quality auditing will be conducted and data maintained by PoCUS program sonographer educators. Quality audit reports will be provided to ED Governance group, including Directors of Ultrasound & Emergency. Examinations will be qualitatively assessed using a simple system assessing technical adequacy and diagnostic accuracy of examination, with reference to correlative imaging, surgical or clinical findings where available.

eLOGBOOK QUALITY AUDIT FEEDBACK	
3	**good scan, accurate diagnosis & technical quality**
2	**technical errors, but no misdiagnosis**
A	**misidentified aorta**
1	**false negative**
0	**false positive**

See page 9-11 for detailed Audit criteria.
Audit results and comments for clinician feedback will be provided in personal elogbooks maintained for clinicians (see also eFAST Audit Guidelines p9). A minimum 25 eFAST examinations will be

audited until a physician achieves MH credentialing in Module 1. Thereafter, random audit of a minimum 5 examinations will be conducted yearly to ensure maintenance of skill and quality.

Accreditation

Once logbook requirements (minimum scan numbers and positive cases) are completed, a brief practical competency assessment will be conducted by program Sonographer. Assessments for those wanting concurrent ASUM CCPU can also be completed at this time.

Alternative Accreditation Pathways

In certain select situations, alternative accreditation pathways may be considered for approval by ED Governance group.

A. Fast tracked 'grandfathering' credentialing for clinicians with considerable prior experience, but no formal credentialing. This process would involve Monash Health program induction, practical competency assessment & the completion of a minimum of five quality reviewed scans, to be reviewed & considered for approval by committee.
B. ASUM CCPU, DDU or other credential holders from external institutions. This process would involve Monash Health program induction, practical competency assessment & the completion of a minimum of five quality reviewed scans, to be reviewed & considered for approval by ED Governance group.

STAGE 3: Ongoing Skills Maintenance

After completing the MH Accreditation process, the Emergency Physician is able to perform eFAST scans within MH. In order to maintain MH credentials they are required to:

1. Perform and log a minimum of 10 eFAST scans annually (no required number of positives)
2. Undertake 3 hours of ultrasound education annually (including practical skills refresher sessions, case review, online resources)

eFAST Training & Evaluation

System Set-up

- Turn machine on, enter patient UR, surname & Dr initials
- Select correct transducer (C6-2MHz)
- Select correct exam preset (FAST)

Transducer Positioning

- Orientation of transducer and correlation with image
- Demonstrates the ability to manipulate the transducer to achieve the required images (sliding, rocking, rotating, heel-toe)

Image optimization

- Overall gain
- TGC
- Depth
- Focal zone position

Image interpretation

- Identification of the potential spaces for fluid (peritoneum, pericardium or pleural space)
- Recognition of the presence of fluid in peritoneum, pericardium or pleural space
- Differentiation between free fluid and complex fluid/blood
- Identification of sonographic features of pneumothorax (absence of lung sliding sign and presence of lung point sign)
- Ability to perform M-mode trace to exclude pneumothorax

Recognition of artefacts and how to modify image accordingly:

- Increased attenuation of ultrasound beam due to patient habitus
- Patient movement or respiration
- Shadowing from ribs
- Shadowing from air filled bowel
- Artefacts from air filled lung

Plane 1 – Right Upper Quadrant View (Morrison's Pouch)

- Coronal view in the right mid-axillary line
- Labelled RUQ
- Scan in a cranio-caudal direction to recognise and demonstrate the: Right Kidney; Liver; Morrison's Pouch; Right Diaphragm
- Identify the potential space for fluid – Hepatorenal Interface (Morrison's Pouch); Right Diaphragm; Right Paracolic Gutter

Plane 1 Extension – Right pleural space

- Coronal chest view in the mid-axillary line
- Scan in a cranial direction to recognise and demonstrate the: Right Diaphragm; Liver; Right Pleural Space
- Identify normal lung sliding with respiratory movement
- Identify potential space for fluid – Right Pleural Space

Plane 2 – Left Upper Quadrant View

- Coronal view in the left mid-axillary line
- Labelled LUQ
- Scan in a cranio-caudal direction to recognise and demonstrate the: Left Kidney; Spleen; Left Diaphragm.
- Identify the potential space for fluid – Splenorenal Interface; Left Subdiaphragmatic/ Perisplenic Space; Left Paracolic Gutter.

Plane 2 Extension – Left pleural space

- Coronal chest view in the mid-axillary line
- Scan in a cranial direction to recognise and demonstrate the: Left Diaphragm; Spleen; Left Pleural Space
- Identify normal lung sliding with respiratory movement
- Identify potential space for fluid – Left Pleural Space

Plane 3 – Pelvic View

- Sagittal midline view 2cm superior to the symphysis pubis
- Labelled Pelvic
- Female patients:
    - Recognise and demonstrate the: Bladder; Uterus; POD; Rectum.
    - Identify the potential space for fluid – Vesico-Uterine Space; POD.
- Male Patients:
    - Recognise and demonstrate the: Bladder; Prostate; Rectum
    - Identify the potential space for fluid – Vesico-Rectal Space

Plane 4 – Subxiphoid View

- Transverse view through the subxiphoid region of the chest (alternative left long axis parasternal or apical views also acceptable if subxiphoid view undiagnostic)
- Labelled SUBX/ PLAX/ APIC
- Recognise and demonstrate the: Liver; Heart (in 4 chamber view, or long axis parasternal view if required); Pericardium
- Identify the potential space for fluid – around pericardium

Plane 5 - Right Anterior Chest View

- Longitudinal view at most anterior region of chest – generally above nipple between second and fourth intercostal spaces in mid-clavicular line)
- Labelled Rt
- Recognise the sonographic features of pneumothorax - absence of lung sliding
- Acquire an M-mode trace to verify the presence of lung sliding ('sea and sand') or the absence of lung sliding due to pneumothorax ('barcode' or 'stratosphere' sign)

Plane 6 - Left Anterior Chest View

- Longitudinal view at most anterior region of chest – generally above nipple between second and fourth intercostal spaces in mid-clavicular line)
- Labelled Lt
- Recognise and identify the sonographic features of pneumothorax - absence of lung sliding sign
- Acquire an M-mode trace to verify the presence of lung sliding ('sea and sand') or the absence of lung sliding due to pneumothorax ('barcode' or 'stratosphere')

Integration of results to management of the patient

- Recognise the limitations of a scan and be able to explain these to patient/carer
- Recognise patients requiring formal imaging assessment
- Incorporate ultrasound findings with the rest of the clinical assessment (US results must be recorded in EMR PoCUS)

Evaluation

- Quality Audit results are communicated in Clinician e-logbooks

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Monash Health Practical Competency Evaluation - eFAST

Dr Name:

Hospital:

Date: **Assessor:**

Evaluation
Completion in ≤ 10 minutes
Satisfactory or Non-satisfactory only
Any score of 0 = Non-satisfactory
Scores 1 or 2 = Satisfactory
2 levels of Pass scores are for feedback and to monitor areas for improvement

Explain Examination	**0** Incomplete or Misinformation	**1** Explanation Complete but Brief	**2** Full Explanation with Indication and Limitations
Entry of Patient Details, Selection of Transducer and Examination Presets	**0** Unable to complete task completely	**1** Task completed but with hesitancy	**2** Excellent knowledge of machine, accurate data input
Image optimisation (depth, gain, TGC, focus)	**0** Suboptimal image quality	**1** Optimizes image but uncertainty using controls	**2** Optimizes image confidently & appropriately
RUQ view – Demonstration of kidney, liver and diaphragm	**0** Incomplete demonstration	**1** Structures demonstrated but unsystematic approach	**2** Systematic approach in demonstrating all structures
Subxiphoid View – Demonstration of chambers and pericardium	**0** Incomplete demonstration	**1** Structures demonstrated but unsystematic approach	**2** Systematic approach in demonstrating all structures
LUQ view – Demonstration of kidney, spleen and diaphragm	**0** Incomplete demonstration	**1** Structures demonstrated but unsystematic approach	**2** Systematic approach in demonstrating all structures
Pelvic View – Demonstration of bladder, uterus/prostate and rectum	**0** Incomplete demonstration	**1** Structures demonstrated but unsystematic approach	**2** Systematic approach in demonstrating all structures
Chest Views – Demonstration of right and left pleural spaces	**0** Incomplete demonstration	**1** Structures demonstrated but unsystematic approach	**2** Systematic approach in demonstrating all structures
Documentation of Examination (images, measurements, M-mode)	**0** Incorrect images, measurements or M-mode	**1** Minor inaccuracy of imaging, measurements or M-mode	**2** Accurate imaging, measurements and M-mode
Interpretation of Sonographic Appearances (Images, Measurements and M-mode traces)	**0** Unable to interpret ultrasound appearances correctly	**1** Correct but some hesitancy interpreting appearances	**2** Correct and confident interpretation of appearances

QUALITY AUDITING

eFAST module examinations will be routinely audited by PoCUS program sonographer educators for technical and diagnostic accuracy. Reference to correlative imaging, surgical and clinical findings will be made when available. Audit results will be recorded in logbooks for clinician quality feedback. A coloured 'traffic light' system of visual quality feedback will be used (see details below) with further audit comments as required.

All cases with significant error or quality problems (false positive, false negative, misidentification of aorta) will be reported to Director of Ultrasound and Emergency Department Ultrasound Governance group for review. Immediate feedback by email or in person, will be given by program sonographer for such cases. The ED Governance group will follow up issues of repeated poor quality or program non-compliance.

eLOGBOOK QUALITY AUDIT FEEDBACK	
3	**good scan, accurate diagnosis & technical quality**
2	**technical errors, but no misdiagnosis**
A	**misidentified aorta**
1	**false negative**
0	**false positive**

Green 'traffic light' will be recorded for an examination with correct scan planes, adequate sonographic anatomy visualised for each view and correct clinician interpretation, as detailed in scan audit criteria below.

Orange & yellow 'traffic lights' will be recorded for any incorrect scan planes, suboptimal demonstration of anatomy or suboptimal technical settings, as detailed in scan audit criteria below.

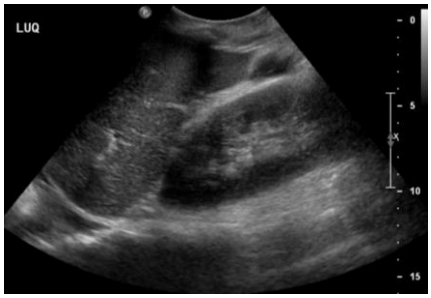
Red 'traffic light' will be recorded for any false positive or false negative scan findings, whether from technical or interpretive errors, as verified by correlative imaging or other findings. All significant false positive or false negative cases will be reviewed and verified by ED Governance group & Director of Ultrasound.

eFAST AUDIT CRITERIA

RUQ VIEW

- Coronal/longitudinal plane view in right mid-axillary line
- Curvilinear or phased array transducer on eFAST or ABDO preset
- Anatomy - include right lobe liver caudal tip, upper half right kidney & Morrison's pouch without rib shadowing obscuring hepatorenal interface
- Depth - adequate if no portion of Morrison's pouch cut-off OR deepest portion of Morrison's pouch within the superficial half of the image field
- Gain/TGC - adequate to demonstrate free fluid without over-gain obscuring anatomy/free fluid OR under-gain making tissues appear anechoic
- Focal Zone - at midpoint of image field within +/- 5cm mid level of kidney
- Label – RUQ

LUQ VIEW

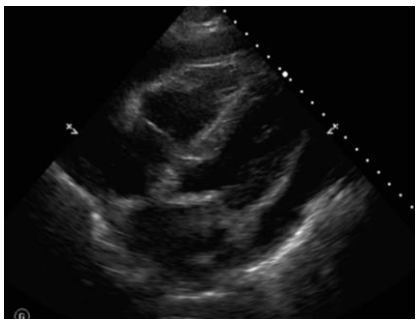


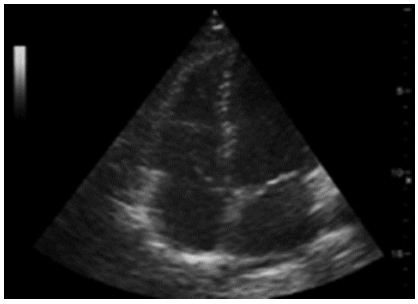
- Coronal/longitudinal plane view in left mid-axillary line
- Curvilinear or phased array transducer on eFAST or ABDO preset
- Anatomy - include spleen, upper half left kidney & splenorenal space without excessive rib shadowing obscuring splenorenal interface
- Depth - adequate if no portion of splenorenal space cut-off OR deepest portion of splenorenal space within the superficial half of the image field
- Gain/TGC - adequate to demonstrate free fluid without over-gain obscuring anatomy/free fluid OR under-gain making tissues appear anechoic
- Focal Zone - at midpoint of image field within +/- 5cm mid level of kidney
- Label - LUQ

PELVIC VIEW

- Longitudinal plane midline pelvis view above symphysis pubis
- Curvilinear or phased array transducer on eFAST or ABDO preset
- Anatomy - FEMALE include bladder, uterus, rectum, vesicouterine pouch, rectouterine pouch (Pouch of Douglas) or MALE include bladder, prostate, rectum, rectovesical pouch
- Depth - adequate if no portion of rectovesical/ rectouterine pouch is cut-off OR deepest portion of rectovesical/rectouterine pouch is within the superficial half of the image field
- Gain/TGC - adequate to demonstrate free fluid without over-gain obscuring anatomy/free fluid OR under-gain making tissues appear anechoic
- Focal Zone - adequate if focal zone +/- 5cm level of rectouterine pouch (Pouch of Douglas) or rectovesical pouch
- Label - PELVIS

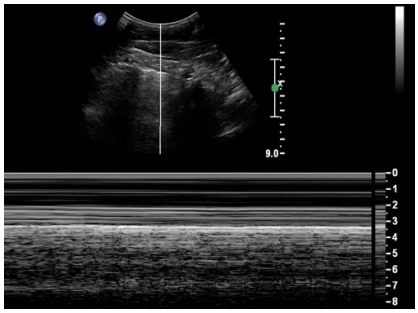
PERICARDIUM VIEW

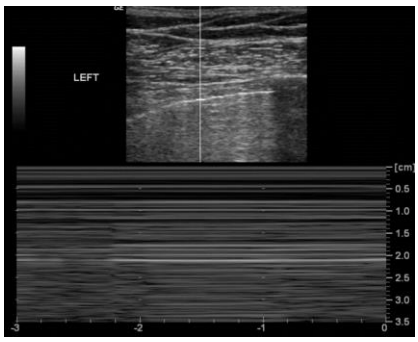




- Transverse plane subxiphoid cardiac view, or alternative parasternal long axis or apical four chamber plane view of pericardium
- Curvilinear or phased array transducer with eFAST or ECHO preset
- Anatomy - include entire pericardium, with ventricles, atria, interventricular septum, aorta according to view plane
- Depth - adequate if no portion of pericardium is cut-off OR if deepest portion of pericardium is within the superficial half of the image field
- Gain/TGC - adequate to demonstrate pericardial fluid without image being over-gained to obscure chambers/ pericardial fluid OR under-gained so soft tissues appear anechoic OR significantly uneven TGC settings
- Focal Zone - adequate if focal zone +/- 5cm mid level of heart
- Label – PERICARD/ SUBX/ PLAX /AP4

LUNG VIEWS





- Longitudinal plane view of right & left lung
- Curvilinear or linear array transducer on eFAST or LUNG preset
- Anatomy - include anterior chest wall, lung, pleural line, ribs
- M-mode trace acquired to verify presence of lung sliding (‘sea and sand’) or absence of lung sliding (‘barcode’), in intercostal space between ribs
- Depth - adequate if no portion of the pleural line is cut-off OR if pleural line is within the superficial third of the image
- Gain/TGC- adequate to demonstrate anterior chest wall & pleural line, with gain in M-mode trace to demonstrate “sea/sand” or “barcode” features, without over-gain OR under-gain obscuring pleural line or M-mode trace detail
- Focal Zone - adequate if focal zone is +/- 3cm level of pleural line
- Label - RT or LT CHEST

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