

Focused Acute Medicine Ultrasound (FAMUS)



Curriculum pack



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Introduction

Point of care ultrasound (POCUS) is becoming recognised as an increasingly useful investigation in the management of the acutely unwell patient. It has become a core component of the curriculum for Emergency Medicine and there is a training pathway for ultrasound within Intensive Care Medicine, but none had previously been designed for the management of the unwell medical patient. This document outlines the training pathway and curriculum for Focused Acute Medicine Ultrasound (FAMUS), a competency framework designed specifically for physicians looking after the acutely unwell medical patient. It has been endorsed by the Society for Acute Medicine and incorporated into the curriculum for Acute Internal Medicine trainees as a specialist skill for ultrasound. The curriculum is designed to support decision making for clinicians of all grades who look after the acutely unwell patient, particularly those who undertake acute care as part of a General or Acute Internal Medicine commitment.

Administration

FAMUS accreditation is administered by the Society for Acute Medicine:

FAMUS Administrator

Society for Acute Medicine

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Edinburgh

EH2 1JQ

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Candidates are required to register with the administrator (fee involved) prior to undertaking theoretical and practical training as outlined below. Upon completion of training, candidates must send their completed documentation to the administrator who will issue a certificate confirming completion of training and the candidate will be registered on the FAMUS database.

In addition, the administrator will maintain a list of registered FAMUS supervisors, and of upcoming FAMUS-approved practical courses.

Training can be undertaken by any healthcare professional (or student). However, accreditation may only be awarded to those who are registered with their professional body (which includes provisional registration for Foundation Year 1 Doctors).

Summary of curriculum

FAMUS involves training in thoracic, abdominal/renal and DVT/peripheral vascular imaging as separate modules of practice in the complete curriculum. Once registered, the candidate will undertake supervised practice in each of these areas and once training is completed they will need to undertake an assessment of completion of training (ACT) in each area. Having completed the ACT they will be able to undertake independent practice in that area and once all ACTs have been completed the Summary of Training Record can be submitted to the FAMUS administrator to obtain a certificate confirming completion of training.

The curriculum does not cover training in focused echocardiography as the FAMUS committee acknowledge the Focused Intensive Care Echocardiography (FICE) curriculum covers all of the necessary aspects of echocardiography in the acutely unwell patient. We would recommend candidates consider completing FICE accreditation alongside FAMUS accreditation to aid the management of the acutely unwell patient. For more details of FICE accreditation see [here](#).

It is expected that this curriculum pack be read in conjunction with the European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB) 'Minimum training requirements for the practice of medical ultrasound in Europe' document (available [here](#)). This outlines the concepts of training in ultrasound for non-radiologists and as such has formed the basis of much of the FAMUS curriculum.

Scope of practice and reporting

Point of care ultrasound is a form of diagnostic ultrasound which aims to answer specific physiological and anatomical questions at the bedside to aid clinical management. It does not aim to provide fine anatomical detail and as such should not be regarded as an alternative to departmental ultrasound where indicated. In a similar vein, the reports generated from a POCUS scan should be limited to the questions being answered and not seek to provide information beyond the scope of the FAMUS curriculum (for example, we would discourage comments such as "the kidneys appeared normal") as that falls outside the learning objectives set out here.

It is likely that where a practitioner positively identifies pathology (particularly within the abdominal/renal or DVT modules) they will follow up the POCUS scan with departmental imaging to confirm the diagnosis and gain further anatomical information where possible.

Machine specifications and quality assurance

FAMUS does not intend to mandate the minimum standards for the hardware required to undertake point of care imaging. However, it is imperative that hardware procurement, maintenance and quality assurance takes place as part of a locally agreed Trust policy on the use of ultrasound for diagnostics +-medical procedures (or equivalent).

Outline of training process

Candidates will need to register with the FAMUS administrator and identify a Supervisor to oversee their training; a list of Supervisors will be maintained on the SAM website. They will then need to undertake the FAMUS online training modules (2 modules and one assessment) available via the e-LFH portal ([here](#)) and register for a FAMUS approved practical course (dates available from FAMUS administrator, and available on the FAMUS section of the [SAM website](#)). The first supervised scan may be undertaken up to 3 months prior to the course date, and must be undertaken within 3 months of the course completion. The training must be completed within 2 years (but unlikely to be less than 10 months for novices) from the date of the first supervised scan.

Upon completion of training in each area an Assessment of Completion of Training will be undertaken. Once all theoretical training and ACTs have been completed the candidate must submit the signed Summary of Training Record to the FAMUS administrator to complete accreditation and receive a certificate confirming completion of training. FAMUS accreditation will last for 3 years at which point an up to date logbook will need to be submitted to the FAMUS administrator to ensure ongoing accreditation.

Maintaining competency and CPD

Once a candidate has completed FAMUS accreditation it is incumbent on them to maintain their skills through regular clinical practice and continuing professional development/continuing medical education (CPD/CME). This may include supervision of candidates but should also involve regular practice of the skills determined within the curriculum. If a significant time period elapses without regular exposure to point of care ultrasound the candidate would be expected to ensure their skills remain up to date before undertaking further independent practice.

As is best practice for many practical competencies, practitioners should maintain an up to date (anonymised) logbook of all scans undertaken/supervised; a blank logbook is available from the SAM website if required.

FAMUS accreditation will last for three years, at which point practitioners will be required to confirm ongoing regular scanning in order to maintain their accreditation. This will require *as a minimum* the following numbers of scans performed/supervised on average *per year*:

Thoracic scans	20
Abdominal/renal scans	20
DVT/peripheral vascular	10

Practitioners should aim to upload all images on to the hospital picture archiving and communication (PACS) system with written reports where appropriate, and undertake regular audit/review of clinical practice in conjunction with local radiology departments or accredited peers where suitable. We would recommend that for the first six months of practice post accreditation a clear audit plan is in place to consolidate the

learning from the accreditation process. Beyond this, regular audit as part of the clinician's appraisal process should be undertaken according to local guidance.

Supervisors and mentors

The candidate will have to identify a Supervisor at the outset of their accreditation to oversee their training, and a database of approved Supervisors will be available via the FAMUS administrator and SAM website. The roles of the Supervisor and Mentor are summarised below:

Supervisors

- Help coordinate and provide overview of a candidate's learning and experience
- Provide advice for candidates on where additional or specialist experience can be obtained
- May undertake supervised scans, review unsupervised scans and can perform ACTs
- Ensure a candidate has demonstrated competence prior to sign off of overall training, and must sign the Summary of Completion of Training document.
- Provide advice for mentors

A supervisor may be a clinician of any grade who can demonstrate competence and experience in the whole curriculum, which will often be an Acute Medical Consultant or Associate Specialist, or Radiology Consultant with ongoing ultrasound experience (including knowledge of respiratory failure - equivalent to FAMUS accreditation). Supervisors must have a complete understanding of the FAMUS curriculum, and be registered on the FAMUS database. As a guide, FAMUS accreditation for more than one year with regular ongoing experience and teaching experience would usually suffice to become a FAMUS supervisor. Supervisors must apply to the FAMUS administrator and be registered on the database before undertaking the training of FAMUS candidates – details of how to do this are available on the website.

Mentors

- Provide direct supervision of candidate's scans in early training (supervised practice)
- Will review images from unsupervised scans (mentored practice)
- May complete ACT if suitably qualified

A mentor must be competent in performing the scan they intend to oversee, and can be any grade clinician. Appropriate level of experience for mentors includes (but not exclusively) Consultant Radiologists, FAMUS accredited practitioners, ultrasonographers and vascular scientists. Suitability for an individual to act as a mentor should be determined locally by the candidate's supervisor; if necessary this decision could be guided by the FAMUS committee.

Detailed outline of training pathway and syllabus

The FAMUS curriculum has been split into 3 practical areas – thoracic, abdominal/renal and DVT/peripheral vascular. These will all be learned in a 3 stage approach, as outlined below.

Each of these areas has a core list of pathologies which form their basis (see table 4, page 10). By the end of each area of practice candidates will be expected to be able to identify these pathologies and be comfortable with the sonographic features which may reasonably rule many of them out. They will also learn the limitations of the focused approach and how this form of imaging fits in with established imaging modalities. Although candidates will become familiar with what grossly ‘normal’ and ‘abnormal’ looks like in relation to structures associated with these areas (particularly the liver, spleen and kidney), FAMUS accreditation will not teach the competence to confidently judge these structures to be normal or abnormal, and reports should reflect this. As with all POCUS imaging, if a suspected abnormality is found while performing a focused scan then we would recommend referral for appropriate departmental imaging for clarification (and subsequent reflection on those images and reports to enhance learning).

Each area of practice (and the theoretical knowledge required) has been mapped to a knowledge, skills and behaviour (KSB) framework and linked to the GMC’s Good Medical Practice guidance to form a comprehensive assessment framework for the candidate and assessor to follow. These curriculum maps can be found within appendices 2, 4, 7 and 10, and use the following keys:

Assessment tool	Key
E-Learning (‘FAMUS’ module on e-learning for health)	E
FAMUS approved course	C
Supervised / Mentored practice	S
Assessment of completion of training (ACT)	A

Table 1: Assessment descriptors for use with KSB framework

Domains of Good Medical Practice	
Domain	Descriptors
1	Knowledge, skills and performance
2	Safety and quality
3	Communication, partnership and teamwork
4	Maintaining trust

Table 2: GMC Good Medical Practice Domains for use with KSB framework

Theory module outline: The theory module will outline the basis of the generation of ultrasound images and artefacts, and how the user can achieve and optimise these images for diagnostic purposes. It will cover the governance of the use of ultrasound (particularly of POCUS) and of storing images and generating reports, and where POCUS fits in to traditional diagnostic and examination pathways.

Thoracic module outline: This module gives the candidate competence in using ultrasound to diagnose the common causes of respiratory failure, using a protocolised approach. This will include the use of ultrasound to aid the diagnosis of pneumonia, increased lung water, asthma/COPD and pulmonary embolism and to confidently rule out a pneumothorax. Additionally, this module will give candidates the skills to be able to safely site mark a pleural effusion for real-time aspiration or drainage.

Abdominal/renal module outline: Candidates will be able to assess the renal tract for evidence of hydronephrosis, and/or a distended bladder, using a protocolised 7 step approach. They will also be able to assess the abdomen for the presence of free fluid and learn the skill of using ultrasound to safely mark a site for real time ascitic aspiration or drainage. This module *does not* teach the skills to make assessments of the parenchyma of the intra-abdominal organs, nor teach imaging of the abdominal aorta, IVC, biliary tree or small or large bowel.

DVT/peripheral vascular access outline: This module utilises a 3 point compression approach to positively identify the significant majority of lower limb DVTs. Additionally, it will give candidates the skills to site peripheral cannulae using ultrasound guidance. It does not teach a 'rule out' approach to DVT scanning and therefore will not replace established pathways for the diagnosis of suspected DVT.

3 stage approach to learning each area of practice

1st stage: Theoretical component

Theoretical training will consist of completion of the FAMUS e-learning modules (see 'outline of training process') and attendance at a FAMUS-approved practical course – list of approved courses available via the [FAMUS](#) section of the SAM website. The Supervisor is responsible for ensuring the candidate has completed the necessary theoretical training and it will be signed off as part of the Summary of Training Record (for curriculum see Appendix 1 and 2).

2nd stage: Supervised practice

Each area of practice (thoracic, abdominal/renal and DVT/peripheral vascular) will require the candidate to undertake a separate block of training and individual sign off with an assessment of completion of training (ACT). The candidate may undertake training in more than one area at any given time, although it is worth noting that trying to learn the skills for each system all at once may prove difficult. Once the ACT for each system is completed, the candidate may practice independently in that area, although FAMUS accreditation can only be awarded once training has been completed in all areas. It is expected that once training is completed in each system the candidate will continue to maintain those skills throughout their FAMUS training and beyond even when focussing on an alternative area.

Although training is competency based, it is anticipated that the candidate will need to undertake a *minimum* number of supervised scans before independent reporting can be undertaken, alongside an indicative minimum training time (see table 3, page 9). In addition, it is expected that a minimum number of pathologies will be imaged during the training process to ensure confidence across the range of the curriculum (see table 4). Until such time as the candidate has completed their ACT the outcome of scans should not be reported in the clinical notes/on PACS systems and should not be used to influence clinical management (unless directly supervised scans have been undertaken and verified by a Mentor/Supervisor).

On commencing each system, a minimum number of scans will need to be directly supervised by a Mentor or Supervisor. Each directly supervised scan should be reported using the anonymised reporting sheet for that system so a logbook of scans and pathologies for the candidate can be kept (Appendices 3, 6, 9). Once the minimum number of directly supervised scans has been undertaken *and* appropriate competency demonstrated, the Mentor/Supervisor may sign the candidate off as suitable for mentored practice.

3rd stage: Mentored practice

The candidate will then be able to undertake scans without direct supervision in order to build up a logbook of cases and pathologies. For each scan a report sheet should be completed and images captured to reflect the entirety of the scan; both of which will be reviewed by the Mentor/Supervisor. The candidate at this point may not write the report in the clinical notes/PACS systems and clinical decisions should not be undertaken on the basis of these scans.

An indicative minimum number of scans will need to be undertaken at this stage for each system, in order to capture the entirety of pathologies listed within the curriculum. Each mentored scan and report *must be reviewed and countersigned* by the Mentor or Supervisor and there must be general agreement as to the findings demonstrated.

	Directly supervised	Mentored scans	Minimum training time
Thoracic	10 scans (20 lungs)	30 further scans (60 lungs), to include rule out pneumothorax, increased lung water, consolidation and effusion	6 months from first supervised scan
Abdominal/renal	10 scans	30 further scans to include abdominal free fluid, bladder distension and hydronephrosis	4 months from first supervised scan
DVT/peripheral vascular	5 scans	Further 5 scans (10 legs) to include positive DVT Minimum 5 supervised or mentored (depending on candidate experience) US guided peripheral vascular cannulation	1 month from first supervised scan

Table 3: Indicative minimum numbers of scans and training time for each area of FAMUS competency

Prior ultrasound experience

There will be some candidates who have prior ultrasound experience, either formal or experiential. It may be possible for some of this experience to count towards the training numbers and times indicated above. For example, practitioners with Royal College of Radiologists Level 1 thoracic ultrasound accreditation are unlikely to need the full six months training time for the thoracic module, or those with echocardiography experience will be familiar with many theoretical aspects of ultrasound scanning. These candidates must still undertake the full number of directly supervised scans and this time can be used to gauge the candidate's level of competence. Shortening of training time or numbers should be determined on an individual basis at the discretion of the Supervisor, and it is the responsibility of the Supervisor to ensure the candidate demonstrates competence in all aspects of each individual module. It should be noted that level 1 thoracic ultrasound is not directly comparable to the FAMUS thoracic module and it is imperative that the candidate demonstrates full competence in all aspects of the latter prior to the Supervisor signing the ACT.

Ultrasound simulators

There is an increasing availability of high-quality ultrasound simulators from a variety of manufacturers. Simulated scans can form part of your log book, as long as they are undertaken as supervised scans which highlight pathology. We do not recommend the use of simulators for your logbook of normal scans, although they may well form part of your practical course or be used to teach technique during your training. We do not recommend the use of simulators for the assessment of completion of training (ACT).

Minimum numbers of pathologies

Although FAMUS is intended to be a competency-based rather than a time- or number-based accreditation, it is recognised that a minimum amount of experience in each pathology will be beneficial. This is particularly true when considering site marking for pleural or ascitic intervention, to ensure safe practice. The table below indicates indicative minimum numbers of pathologies that are recommended to be seen within each module to ensure competence. These numbers are not absolute and any variance can be agreed between candidate and mentor/supervisor depending on progress in that module.

Module	Pathology	Indicative minimum number seen
Thoracic	Consolidation/pneumonia	5
	Increased lung water	5
	Pleural effusion (with site mark for intervention)	20
	Pneumothorax	0 (but understands concepts to rule out pneumothorax)
Abdominal	Abdominal free fluid (any)	10
	Abdominal free fluid (with site mark for intervention)	5
	Hydronephrosis (any grade)	5
	Bladder distension	5
DVT/peripheral vascular	DVT	1

Table 4: Indicative minimum numbers of pathologies to be seen during training process to ensure competence

Practical procedures

FAMUS accreditation does not teach the practical component of procedures (pleural or ascitic). It provides you with the ability to safely site mark these procedures so they may be undertaken in real time, as is best practice in the case of pleural procedures, and we would recommend where possible for paracentesis.

If pleural intervention is necessary, candidates are strongly advised to follow the latest British Thoracic Society Pleural Disease Guideline (available [here](#)).

Extended skills and pathology recognition

During accreditation in FAMUS the candidate is likely to come across pathologies and structures which are outside the learning objectives. With time, these will become more familiar and candidates may feel able to comment on certain pathologies or structures seen. A list of the most common examples of these is

found in appendix 12. As previously stated, we would discourage the reporting of any structure as 'normal' that does not appear within the core FAMUS learning objectives, as subtle abnormalities will require significantly more training time than is required here. However, if abnormalities are suspected that sit outside the core FAMUS curriculum we would strongly recommend referral for further imaging/assessment, and reflection on these cases once further imaging is undertaken to enhance your learning.

Assessment of Completion of Training (ACT) and Summary of Training Record

Once the minimum number of mentored scans has been undertaken, the candidate has completed their training time and is considered by the Mentor or Supervisor to have demonstrated competence across the curriculum for that system they will undertake the ACT (Appendices 5, 8, 11). This is a structured assessment of examination of each system and includes a witnessed scan being undertaken and then a review of the logbook/report sheets to ensure all pathologies have been imaged. The ACT may be completed by either a Supervisor or Mentor competent in that area of practice. Once the ACT has been signed, the candidate may image (and report) independently in that area of practice. Once all ACTs have been completed, the candidate and Supervisor must complete the Summary of Training Record (Appendix 13) and send it to the FAMUS administrator. This will then be registered on the database and a certificate to confirm completion of training will be issued. The Summary of Training Record can be signed by the Supervisor only.

Confidentiality and Data Protection

As with all clinical data, patient identifiable information should not be removed from your Trust. Any completed report sheets must be anonymised for administrative purposes but should be linked to images on the ultrasound machine to enable the candidate and Supervisor/Mentor to review the report and images together. For example, the anonymised report may be labelled T1, T2, T3 to reflect the first, second and third thoracic scans and the stored images may similarly bear the same label to allow cross-referencing. The ACTs and Summary of Training Record for submission to the FAMUS administrator should contain no patient identifiable information.

Theoretical syllabus

(adapted from Royal College of Radiologists guidelines)

Physics and instrumentation

- The basic components of an ultrasound system
- Types of transducer and the production of ultrasound, with an emphasis on operator controlled variables
- Use of ultrasound controls
- An understanding of the frequencies used in medical ultrasound and the effect on image quality and penetration
- The interaction of ultrasound with tissue including biological effects
- The basic principles of 2D and M mode ultrasound
- The basic principle of Doppler ultrasound including spectral, colour flow and power Doppler
- Understanding of hyperechoic, hypo-echoic and anechoic and how it relates to tissues, structures and formation of the image
- Sonographic appearance of tissues, muscle, blood vessels, nerves, tendons, etc.
- The safety of ultrasound and of ultrasound contrast agents
- The recognition and explanation of common artefacts
- Image and report recording systems

Ultrasound techniques

- Patient information and preparation
- Indications for examinations
- Relevance of ultrasound to other imaging modalities
- The influence of ultrasound results on the need for other imaging
- Scanning techniques including the use of spectral, power and colour Doppler

Administration

- Image recording
- Image storing and filing
- Image reporting and storing
- Medico-legal aspects—outlining the responsibility to practise within specific levels of competence and the requirements for training
- Consent
- Understanding of sterility, health and safety and machine cleaning
- The value and role of departmental protocols
- The resource implications of ultrasound use

Theoretical knowledge – KSB framework

Physics of ultrasound and machine set-up

	Knowledge	Assessment	GMP
1	Properties of sound wave: amplitude, frequency, wavelength, propagation velocity	E, C	1
2	Frequency range of sound waves used in diagnostic imaging	E, C	1
3	Speed of sound in different media	E, C	1
4	Behaviour of sound waves at interfaces between media	E, C	1
5	Generation of ultrasound waves: the piezo-electric effect	E, C	1
6	Design of the ultrasound transducer	E, C	1
7	Structure of the ultrasound beam	E, C	1
8	Principles of attenuation, scattering and reverberation	E, C	1
9	Understands B-mode and M-mode and their uses	E, C	1
10	Understands the principles of the Doppler effect and colour Doppler	E, C	1
	Skills	Assessment	
1	Cleans probe & machine adequately before & after scan	S, A	1, 2
2	Selects appropriate ultrasound transducer	E, C, S, A	1, 2
3	Chooses appropriate pre-made settings for selected scan	C, S, A	1, 2
4	Uses conductive gel to aid transmission of ultrasound waves	E, C, S, A	1, 2
5	Correctly adjusts depth, gain and focus position	E, C, S, A	1, 2
6	Identifies common artefacts	E, C, S, A	1, 2
7	Uses colour Doppler to identify blood vessels	E, C, S	1, 2
	Behaviours	Assessment	
1	Shows awareness of key components. Handles probes with care	S, A	1, 2
2	Aware of battery lifetime and keeps machine charged when not using	S	1, 2

Theoretical knowledge – KSB framework

Image acquisition, patient safety & clinical governance

	Knowledge	Assessment	GMP
1	Understands probe orientation & movements in relation to screen	E, C, S	1, 2
2	Knows how to position patient for optimum image acquisition	E, C, S, A	1, 2
3	Understands indication for scan and appropriateness for POCUS vs formal scan	E, C, S, A	1, 2, 3
4	Knows local protocols for image storage	S, A	1, 2, 4
5	Understands relevance of data confidentiality act with regards to images produced	E, C, S, A	1, 2, 4
6	Aware of own limitations and when to seek expert help	E, C, S, A	1, 2, 3, 4
	Skills	Assessment	
1	Optimises image for best possible quality	C, S	1, 2
2	Knows how to freeze images for capture and acquire clips	S, A	1, 2
3	Knows how to label images	S, A	1, 2
4	Knows how to use measurement callipers	S, A	1, 2
5	Knows how to conclude scan and save acquired images	S, A	1, 2, 4
6	Anonymises data prior to exporting media to external storage device	S, A	1, 2, 4
7	Completes scan within appropriate timescale	S, A	1, 2
8	Able to report scans concisely and appropriately, making clear the limitations of point-of-care ultrasound	C, S, A	1, 2, 3, 4
	Behaviours	Assessment	
1	Gains consent when able to	C, S, A	1, 2, 3, 4
2	Maintains good communication with patient during scan and gives clear instructions	C, S, A	1, 2, 3, 4
3	Does not cause patient discomfort	C, S, A	1, 2, 4
4	Maintains patient's dignity	C, S, A	1, 2, 4

Focused Acute Medicine Ultrasound (FAMUS)

Reporting sheet – thoracic ultrasound

Candidate name:

Date:

Patient identifier:

Image quality:

Good

Adequate

Poor

		Lung sliding?	A lines present?	B lines present?	Effusion?	Consolidation/ Collapse?
Right	Upper anterior	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐
Right	Lower anterior	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐
Right	Postero-lateral	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐
Left	Upper anterior	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐
Left	Lower anterior	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐
Left	Postero-lateral	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐
Has a suitable site for pleural procedure been identified?			Yes (performed)	Yes (not performed)	No	
Comment/further details and conclusion of scan: e.g. description of effusion type/size presence of shred sign dynamic air/fluid/bronchograms seen						
Candidate reflection on scan (optional) e.g. how did the scan affect management						
Mentor/supervisor comments:						

Signed (candidate):

Signed to confirm above findings (mentor/supervisor):

Initial to confirm candidate suitable to commence mentored practice (only required once):
 (minimum 10 supervised scans)

Is a Departmental scan required? Yes ☐ No ☐Requested? Yes ☐ No ☐

Once completed candidate must maintain logbook of countersigned report sheets. Please remember not to remove patient confidential information from Trust property

Thoracic module – KSB framework

	Knowledge	Assessment	GMP
1	Understands indications for thoracic ultrasound	C, S, A	1
2	Aware of other modalities of lung imaging and their respective benefits/risks compared to point-of-care ultrasound	C, S, A	1,2,4
3	Demonstrates knowledge of lung anatomy and their appearance on ultrasound	E, C, S, A	1, 3
4	Understands the BLUE protocol of lung US	C, S, A	1, 2
5	Understands limitations & pitfalls of lung US	E, C, S, A	1, 2, 3, 4
	Skills	Assessment	
	Able to show/recognise the following:		
1	Normal appearances including 'Bat's wings', 'Lung sliding', 'seashore' signs and lung pulsation	E, C, S, A	1, 2
2	Normal lung bases & lung curtain sign	E, C, S, A	1, 2
3	A lines & B lines	E, C, S, A	1, 2
4	Absent lung sliding / stratosphere sign	E, C, S, A	1, 2
5	Understand the lung point in pneumothorax	E, C, S	1, 2
6	Consolidation signs: Shred sign, tissue-like sign, lung 'hepatisation'	C, S	1, 2
7	Pleural effusion signs: jellyfish sign, quad sign, sinusoid sign	E, C, S	1,2
8	Able to mark suitable location for pleural fluid aspiration	C, S	1, 2, 3
	Pathology	Assessment	
	Has identified the following:		
1	Pleural effusions, including identifying 20 suitable for pleural aspiration	C, S	1, 2
2	Lung collapse and consolidation	C, S	1
3	Interstitial syndrome	C, S	1
4	Aware of the sonographic features of pneumothorax	E, C, S	1

Focused Acute Medicine Ultrasound (FAMUS)

Assessment of Completion of Training - thoracic

Candidate name:

Date:

Supervisor name:

ACT assessed by (print name):

Mentor/Supervisor

Pre-procedure preparation	
	Initials
Appropriate approach and manner	
Consents patients and explains risks and indications	
Checks patient's name badge; enters details into machine	
Comfortable and ergonomic positioning of patient and machine	
Scanning	
Correct probe selection and frequency	
Optimisation of machine settings	
Identification of Upper and Lower BLUE points	
Demonstrates characteristic 'batwing' appearance of ribs and pleura	
Identification of pleural sliding in 2D and M mode with lung pulse	
Able to demonstrate A lines, and B lines where present	
Able to identify lung, hemidiaphragms, spleen and liver	
Able to demonstrate diaphragmatic movement with respiration	
Is systematic and follows BLUE algorithm	
Identifies any abnormalities and pathology correctly	
Identifies appropriate site for pleural procedure (if appropriate)	
Storage, documentation and interpretation	
Saves cines and pictures for each area as appropriate	
Reports results to patient where indicated	
Identifies need for further imaging and limitations of scan	
Cleans equipment and shuts down machine as appropriate	
Logbook and pathology review	
At least 10 supervised and (indicative) further 30 mentored scans completed	
Full range of pathology seen with indicative minimum numbers (effusion [including site marked for pleural procedure], consolidation, increased lung water, ability to rule out pneumothorax)	
Assessment of Completion of Training complete?	
Comments (if applicable):	

Signed (candidate):

Signed (mentor/supervisor):

Once completed keep with logbook of report sheets; send only Summary of Training Record to FAMUS administrator

Focused Acute Medicine Ultrasound (FAMUS)

Reporting sheet – abdominal/renal ultrasound

Candidate name:

Date:

Patient identifier:

Image quality:

Good

Adequate

Poor

Abdominal and renal ultrasound focused scan			
Right kidney identified?	Yes ☐	No ☐	
Morison's pouch identified?	Yes ☐	No ☐	Fluid present ☐
Left kidney identified?	Yes ☐	No ☐	
Spleno-renal recess identified?	Yes ☐	No ☐	Fluid present ☐
Liver including hemidiaphragm identified?	Yes ☐	No ☐	
Spleen including hemidiaphragm identified?	Yes ☐	No ☐	
Bladder identified?	Yes ☐	No ☐	
Distended?	Yes ☐	No ☐	
Free fluid identified around bladder inc Pouch of Douglas?	Yes ☐	No ☐	
Any evidence of hydronephrosis?	Yes ☐	No ☐	
Degree of hydronephrosis if present	Mild ☐	Moderate ☐	Severe ☐
Site identified for ascitic tap/drain if required?	Yes ☐	No ☐	
Comments/further details and conclusion of the scan: e.g. clinical relevance of findings is there hydronephrosis or free fluid?			
Candidate reflection on scan (optional) e.g how did the scan affect management			
Mentor/Supervisor comments:			

Signed (candidate):

Signed to confirm above findings (mentor/supervisor):

Initial to confirm candidate suitable to commence mentored practice (only required once):
(minimum 10 supervised scans)

Is a Departmental scan required? Yes ☐ No ☐Requested? Yes ☐ No ☐

Once completed candidate must maintain logbook of countersigned report sheets. Please remember not to remove patient confidential information from Trust property

Abdominal/renal module – KSB framework

	Knowledge	Assessment	GMP
1	Understands indications for abdominal ultrasound	C, S, A	1
2	Aware of other modalities of abdominal imaging and their respective benefits/risks compared to point-of-care ultrasound	C, S, A	1, 2, 4
3	Demonstrates knowledge of abdominal anatomy and their appearance on ultrasound	C, S, A	1
4	Understands the different levels of echogenicity produced by abdominal organs ('PLISK')	C, S, A	1
	Skills	Assessment	
	Able to show/recognise the following:		
1	Liver & hemidiaphragm	C, S, A	1
2	Spleen & hemidiaphragm	C, S, A	1
3	Right kidney & Morrison's pouch	C, S, A	1
4	Left kidney & splenorenal recess	C, S, A	1
5	Bladder & comment on approximate size/volume	C, S, A	1
6	Recognise hydronephrosis and grade it as mild/moderate/severe	C, S	1
7	Identify appropriate site for tap/drain of ascites	C, S	1, 2
	Pathology	Assessment	
	Has seen and diagnosed the following:		
1	Abdominal free fluid	C, S	1
2	Bladder distension	C, S	1
3	Hydronephrosis	C, S	1

Focused Acute Medicine Ultrasound (FAMUS)

Assessment of Completion of Training – abdominal/renal

Candidate name:

Date:

Supervisor name:

ACT assessed by (print name):

Mentor/Supervisor

Pre-procedure preparation	
	Initials
Appropriate approach and manner	
Consents patients and explains risks and indications	
Checks patient's name badge; enters details into machine	
Comfortable and ergonomic positioning of patient and machine	
Scanning	
Correct probe selection and frequency	
Optimisation of machine settings	
Able to demonstrate site for safe paracentesis, if appropriate	
Able to demonstrate liver, spleen and kidneys	
Able to demonstrate pouch of Douglas and/or describe it's anatomical relations	
Able to demonstrate kidney and bladder	
Able to demonstrate hydronephrosis if present, and/or describe it's severity	
Storage, documentation and interpretation	
Saves cines and pictures for each area as appropriate	
Reports results to patient where indicated	
Identifies need for further imaging and limitations of scan	
Cleans equipment and shuts down machine as appropriate	
Logbook and pathology review	
At least 10 supervised and (indicative) further 30 mentored scans completed	
Full range of pathology seen with indicative minimum numbers (abdominal free fluid including site marked for drainage, distended bladder, hydronephrosis)	
Assessment of Completion of Training complete?	
Comments (if applicable):	

Signed (candidate):

Signed (mentor/supervisor):

Once completed keep with logbook of report sheets; send only Summary of Training Record to FAMUS administrator

Focused Acute Medicine Ultrasound (FAMUS)

Reporting sheet – ‘rule in’ DVT

Candidate name:

Date:

Patient identifier:

Image quality:

Good

Adequate

Poor

RIGHT LEG			LEFT LEG		
Examined?	Yes ☐	No ☐	Examined?	Yes ☐	No ☐
‘Mickey Mouse’ sign (CFA, CFV, SFJ) visualised?	Yes ☐	No ☐	‘Mickey Mouse’ sign (CFA, CFV, SFJ) visualised?	Yes ☐	No ☐
Common Femoral Vein (CFV)			Common Femoral Vein (CFV)		
Compressible?	Yes ☐	No ☐	Compressible?	Yes ☐	No ☐
Superficial Femoral Vein (SFV)			Superficial Femoral Vein (SFV)		
Compressible?	Yes ☐	No ☐	Compressible?	Yes ☐	No ☐
Popliteal vein trifurcation visualised?	Yes ☐	No ☐	Popliteal vein trifurcation visualised?	Yes ☐	No ☐
Popliteal Vein (PV)			Popliteal Vein (PV)		
Compressible?	Yes ☐	No ☐	Compressible?	Yes ☐	No ☐
Deep vein thrombosis confirmed?					
Yes ☐ No ☐					
Comments/further details and conclusion of the scan: e.g. site of DVT if confirmed need for formal imaging					
Candidate reflection on scan (optional) e.g. how did the scan affect management					
Mentor/Supervisor comments:					

Signed (candidate):

Signed to confirm above findings (mentor/supervisor):

Initial to confirm candidate suitable to commence mentored practice (only required once):
(minimum 5 supervised scans)

Is a Departmental scan required? Yes ☐ No ☐Requested? Yes ☐ No ☐

Once completed candidate must maintain logbook of countersigned report sheets. Please remember not to remove patient confidential information from Trust property

‘Rule in’ DVT scan – KSB framework

	Knowledge	Assessment	GMP
1	Understands concept of a ‘rule-in’ DVT scan vs a ‘rule-out’ departmental scan.	C, S, A	1
2	Demonstrates anatomical knowledge of peripheral vessels and their appearance on ultrasound	C, S, A	1
3	Understands the theory behind performing the 3-point lower limb scan and the anatomical structures found within each point.	C, S, A	1
	Skills	Assessment	
	Able to show/recognise the following:		
1	The CFA, CFV & SFJ in the groin crease (i.e ‘Mickey Mouse sign)	C, S, A	1
2	The SFV in the mid-thigh level and recognises anatomical variants	C, S, A	1
3	The popliteal trifurcation	C, S, A	1
4	The POPA and POPV at the knee crease and recognises anatomical variants	C, S	1
5	Able to instruct patient to change position to optimise views	C, S, A	1
6	Demonstrates appropriate compression technique at the 3 designated points	C, S, A	1
7	Shows ability to perform sequential vein compression in between the designated points to increase sensitivity	C, S, A	1
	Pathology	Assessment	
	Has seen and diagnosed the following:		
1	Deep vein thrombosis	C, S	1

Peripheral vascular cannulation – KSB framework

	Knowledge	Assessment	GMP
1	Understands the indications for ultrasound-guided peripheral vascular cannulation	C, S	1
3	Knows the sonographic differences between arteries and veins	C, S	1, 2
4	Selects suitable probe and anatomical sites for cannulation	C, S	1, 2
5	Understands the theory behind 'in-plane' and 'out-of-plane' techniques and their relevant advantages & disadvantages	C, S	1, 2, 3
6	Understands the rationale for using real-time visualisation of needle-tip	C, S	1,2, 4
	Skills	Assessment	
	Able to:		
1	Demonstrate competence using 'in-plane' technique	C, S	1
2	Demonstrate competence using 'out-of-plane' technique	C, S	1
3	Visualise a needle-tip in real-time whilst advancing	C, S	1
4	Able to troubleshoot and modify technique to proceed with cannulation	C, S	1, 2
5	If using Seldinger technique, able to demonstrate wire in required vessel	C, S	1
6	Use local anaesthetic safely and adequately if suitable	C, S	1, 2, 4
7	Secure vascular cannulas with appropriate dressings	C, S	1, 2

Focused Acute Medicine Ultrasound (FAMUS)

Assessment of Completion of Training – DVT/peripheral vascular access

Candidate name:

Date:

Supervisor name:

ACT assessed by (print name):

Mentor/Supervisor

Pre-procedure preparation	
	Initials
Appropriate approach and manner	
Consents patients and explains risks and indications	
Checks patient's name badge; enters details into machine	
Comfortable and ergonomic positioning of patient and machine	
Scanning	
Correct probe selection and frequency	
Optimisation of machine settings	
Correctly identifies CFV, SFV and femoral artery including 'mickey mouse sign'	
Identifies popliteal vein including point of trifurcation	
Uses compression where required	
Can correctly identify arteries and veins when questioned	
Can appropriately locate site for peripheral vascular cannulation	
Storage, documentation and interpretation	
Saves cines and pictures for each area as appropriate	
Reports results to patient where indicated	
Identifies need for further imaging and limitations of scan	
Cleans equipment and shuts down machine as appropriate	
Logbook and pathology review	
At least 5 supervised and (indicative) further 5 mentored DVT scans completed	
Positive DVT scan undertaken with images captured	
Minimum of 5 successful US guided peripheral vascular cannulations undertaken (supervised or mentored)	
Assessment of Completion of Training complete?	
Comments (if applicable):	

Signed (candidate):

Signed (mentor/supervisor):

Once completed keep with logbook of report sheets; send only Summary of Training Record to FAMUS administrator

Extended skills & pathology recognition

It is recognised that some individuals may encounter pathology outside the 'core' FAMUS curriculum and with time may gain experience in diagnostic techniques that lie beyond the scope of FAMUS.

Furthermore, the use of POCUS has other practical applications outside of FAMUS which clinicians may wish to become competent in.

The following is a list of pathology which one may encounter and wish to record in their logbooks for reflection. If any of these pathologies are encountered please consider alternative forms of imaging or requesting a departmental scan.

Thoracic pathology
Empyema/complex effusions
Air bronchograms
Rib fracture
Abdominal pathology
CBD dilatation
Pneumobilia
Cholecystitis
Abdominal visceral abscesses (e.g Liver & spleen abscesses)
Pyelonephritis
Polycystic kidneys
Abdominal aortic aneurysm
Enlarged prostate

A list of other practical clinical skills has been provided which the clinician may wish to pursue with appropriate supervision and accreditation, but also fall outside the current remit of FAMUS:

Other ultrasound-guided skills
Central line insertion
Chest drain insertion
Arterial line insertion
Ascitic drain insertion

Focused Acute Medicine Ultrasound (FAMUS)

Summary of Training Record

Candidate name:

Professional registration number (e.g. GMC):

SAM membership no. (if applicable):

Supervisor name (PRINTED):

Theoretical practice		
	Date	Signature
FAMUS e-learning completed		
FAMUS course attended		
Theory syllabus complete		
Thoracic		
First supervised scan		
Logbook completed		
ACT completed	Indicative not <6 months from first scan	
Abdominal/renal		
First supervised scan		
Logbook completed		
ACT completed	Indicative not <4 months from first scan	
DVT/peripheral vascular		
First supervised scan		
Logbook complete		
ACT completed	Indicative not <1 month from first scan	

Date of completion of final sign off:

Signed (candidate):

Signed (supervisor):

Once completed return to FAMUS administrator, Society for Acute Medicine, 9 Queen Street, Edinburgh, EH2 1JQ or scan and e-mail famus@acutemedicine.org.uk