



FUSIC Lung

Training Details (last update 05/21)

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Details of Training Pathway

1: Registration with ICS

Please email FUSIC@ics.co.uk to register. A member of the secretariat will contact you to confirm your registration within 10 working days.

2: Identification of Mentor and Supervisor

There are several ways to do this:

- 1) Choose one from the ICS website. A list of local Mentors and Supervisors can be found here.
- 2) Ask someone local to apply. Application is easy using a simple form that can be downloaded from the ICS website here. Definitions, roles and responsibilities of a Mentor and Supervisor are all outlined below.
- 3) Remote mentoring. It is important to have a local Mentor to help develop your practical skills and support your clinical practice going forward. However, we recognise that this is not always possible, and remote supervision may be necessary. Cloud-based archiving and review systems, such as that found at www.hocuspocus.org, or sonoclipshare.com may facilitate this.

3: Completion of online training

E-learning, in the form of video lectures, is available on the ICS website here. We encourage learners to access this prior to attending a course or starting their logbooks. ICE-blu is no longer a requirement.

4: Attendance on an approved course

To complete the Lung module you must either complete the online video lectures or attend an ICS approved FUSIC heart course.

The ICS maintains a list of approved courses on its website.

5: Mentored practice and completion of logbook

Logbook requirements:

Minimum supervised - 10

Minimum total - 30

1 scan = 1 patient (i.e. 2 lungs for each scan)

Case mix - No more than 10 normal scans



Doctors must demonstrate competence in ultrasound-guided pleural aspiration and drainage. This is not required for nurses or allied health professionals unless the procedure is part of their routine practice.

Supervised cases: Direct supervision is an essential part of the training process. A minimum number of 10 supervised scans are required, but we encourage as much direct supervision as possible throughout your logbook collection period.

Unsupervised cases: Any scans you undertake without direct supervision should be stored for review by your Mentor. Your training studies **must not** be stored in the clinical record or used for clinical decision-making until someone suitably trained has verified them.

Timeline: Learning must take place in the real world and we acknowledge that FUSIC Lung accreditation process may take time from registration to completion. However, we strongly believe that to combat skill fade and ensure adequate uptake of knowledge, skills and attitudes the logbook collection period (from first scan to last scan) should be no more than 12 months. Consequently, these dates will be recorded and monitored closely. Applications to extend this logbook collection period may be considered under exceptional circumstances.

Case-mix: A demonstrable range of pathology is essential. Fundamentally, logbook studies should be performed on unwell patients. It is acceptable to include multiple scans from the same patient if their clinical or radiological picture has changed. No more than 10% of logbook studies should be on healthy volunteers. In previous years, examinations undertaken during an approved course were accepted as directly supervised scans. However, we no longer support this practice. Courses are important; real-life learning opportunities more so. Interpretable lung images should be possible for all patients so each scan must include imaging from each examination point (3 on each side).

Reporting: You must use the standard reporting form for all ultrasound examinations where provided. All documents, including the training record, logbook and competency assessments, can be downloaded from the FUSIC section of the ICS website.

Review: Your Mentor is responsible for reviewing your logbook and signing off that you have undertaken studies and demonstrated competence in an appropriate range of pathology. We encourage you to meet periodically with your Mentor to review your studies. Doing so all at the end limits your learning opportunities and risks losing them altogether, after considerable expense of your time and effort. Over time you should notice increasing agreement in interpretation between you and your Mentor. Comparing the images you get from lung ultrasound with chest X-rays and CT scans, where available, is an invaluable part of the training process.

Competence: Learners acquire skills at differing rates. The minimum number of scans that are likely to be necessary in order to demonstrate competence, and to have experience of the required range of pathology, is 30. Your Mentor and Supervisor are responsible for assessing competence and whether you have undertaken an adequate number before your Triggered Assessment.



6: Assessment of competence

Once you have performed and logged an appropriate number of examinations/procedures and have had your competencies signed off, you may undertake a triggered assessment with your Supervisor.

Once all the above steps have been completed and your summary training record (completed and signed by your Mentor and Supervisor) is forwarded to the ICS Secretariat, you will be awarded your certificate of accreditation in FUSIC Lung.

7: Maintenance of competence after accreditation

Once accredited, you will be responsible for maintaining your knowledge and competence in ultrasound by undertaking regular and relevant CPD. In order to maintain your practical skills it is important that you regularly undertake ultrasound examinations that involve an appropriate range of pathology.

Undertaking regular audit and multidisciplinary review of your studies by advanced practitioners is an excellent way to maintain quality assurance.

For further guidance on ultrasound governance, please read GPICS 2, section 4.7 (p138).

Trainers

Mentor

Your Mentor may be any healthcare professional with suitable experience and regular practice in Intensive Care ultrasound.

As a minimum, Mentors are expected to have been accredited in FUSIC Lung for at least 12 months and be able to demonstrate support from a local Supervisor. Application must be made and approved by the ICS. Mentor application forms can be found on here.

Mentors have the following responsibilities:

- To identify a local Supervisor for review of difficult cases and ongoing clinical support
- To enable you to access a suitable ultrasound machine and acutely ill patients
- To mentor you and review your logbook scans
- To sign-off your competencies and recommend you for a triggered assessment
- To countersign (with Supervisor) your summary training record to confirm that you have satisfactorily completed all the training components.



Supervisor

Each unit delivering FUSIC Lung training should have a nominated Supervisor.

You should not need to find yourself a FUSIC Supervisor as your Mentor will have already identified one when they registered themselves with the ICS.

The requirements for FUSIC Lung supervision are:

- Clinician with advanced lung ultrasound practice (approved by FUSIC committee) or
- Radiologist

Your training Supervisor has the following responsibilities:

- To conduct your triggered assessment.
- To counter sign (with your Mentor) summary training record to confirm that you have satisfactorily completed all the training components.
- To provide expert advice and review of scans when needed by you or your Mentor.
- To provide your Mentor with ongoing training, according to their individual needs, and support for their governance infrastructure.

FUSIC Lung syllabus

Generic knowledge

Physics and instrumentation

- Properties of sound waves: amplitude, frequency, wavelength, propagation velocity
- Ultrasound in the body:
 - Propagation velocity in different media
 - Frequency and attenuation
 - Sound and interfaces - transmission, reflection (specular, scatter), refraction, acoustic impedance
 - Biological effects - heat generation and safety
- Sound generation
 - Piezo-electric effect
 - Basic transducer design



- Types of transducers
- B mode and M mode
- Image quality
 - Frame rate, temporal resolution, spatial resolution, axial resolution, lateral resolution and how these relate to frequency, depth and width
 - Gain
 - Focus points
 - Artefacts and their generation
- Doppler
 - Colour, Power, Spectral (PW, CW)
- Ultrasound systems
 - Basic components and controls
 - ECG
- Descriptive terms
 - Hyperechoic, hypoechoic and anechoic and how they relate to structures
 - Sonographic appearance of tissues, muscle, blood vessels, nerves, bone, tendons etc

Ultrasound techniques

- Patient information and preparation
- Indications and limitations of focused examinations
- Relevance of other imaging modalities to ultrasound
- Influence of ultrasound results on the need for other imaging
- Selection of appropriate transducer and exam type
- Use of conductive gel
- Correct probe placement and orientation for standard views
- Correct adjustment of ultrasound controls (depth, gain, width and focus)
- Probe manipulation and nomenclature - e.g. pressure, sliding, fanning, rocking, rotating
- Scanning techniques - 2D, M-mode, and colour Doppler
- Identification of relevant anatomy
- Identification of common artefacts

Administration and governance

- Image recording, reporting and storage
- Indications for immediate expert assistance, subsequent comprehensive scan by accredited practitioner or need for alternative investigation
- Medico-legal aspects - outlining the responsibility to practice within specific levels of competence and the requirements for training
- Need to quality assure reports
- Relevance of data protection act to image storage
- Consent
- Understanding sterility, infection control and machine cleaning
- The value and role of departmental protocols
- The resource implications of ultrasound use

Module Specific knowledge (FUSIC Lung)

Performance of systematic examination of lung and pleura

- Scanning each lung in 3 zones (upper, lower and postero-lateral regions)

Recognition of normal thoracic structures and adjacent organs

- Ribs, subcutaneous tissues, pleura and diaphragm
- Heart, liver, spleen and kidneys

Identification of ultrasound appearances of normal aerated lung including:

- Diaphragmatic movement
- Pleural line and sliding sign (in 2D and M mode)



- Normal aerated lung (including A-line and B line artefacts)

Recognition of pleural fluid

- Ultrasound appearances of pleural fluid and pleural thickening
- Appearances suggesting transudate, exudate and loculation
- Assessment of size of effusion
- Distinguishing between pleural thickening and effusion
- Demonstration of sinusoid sign on M mode
- Distinguishing between pleural and abdominal fluid collection

Recognition of consolidation/atelectasis

- Ultrasound appearances of consolidated/atelectatic lung
- Ultrasound appearances of air and fluid bronchograms

Recognition of interstitial syndrome

- Differentiating between normal and pathological B-lines

Use of ultrasound to exclude pneumothorax

- Recognition of signs of pneumothorax (B mode and M mode)
- Absence of lung sliding, B lines and lung pulse
- Presence of lung point

Doctors (or AHPs for whom this is part of their practice) - Performance of ultrasound guided thoracocentesis and knowledge of the pros and cons of direct vs indirect approach

Allied Healthcare Professionals (when this is not part of their practice) - Description of ultrasound guided thoracocentesis