

Core Ultrasound Intensive Care (CUSIC)

Accreditation pack

Introduction

This document outlines the training pathway for achieving accreditation in the core competencies in point of care ultrasound which is endorsed by the Faculty of Intensive Care Medicine and the Intensive Care Society. The pathway includes all aspects of what is considered core critical care ultrasound practice with the exception of focussed echocardiography which is covered by the Focussed Intensive Care Echocardiography (FICE) accreditation pathway. The ultrasound skills in these pathways are expected to become a standard level of competence for those practicing Intensive Care Medicine and to be incorporated into the Faculty of Intensive Care curriculum in the future.

Outline

Accreditation will require completion of theoretical training, introductory supervised practice, mentored practice with completion of log book demonstrating knowledge of an appropriate range of pathology and satisfactory completion of competency assessments within each area of practice (lung, vascular and abdominal).

The pathway should be able to be completed within a 6 month training block in an appropriate intensive care unit. Accreditation may be completed in individual modules (vascular, lung and abdominal) although all three areas of practice are considered core skills for critical care point of care ultrasound. A triggered assessment should be completed in each module in order to demonstrate competence. Each individual module should be completed within 12 months after commencing formal ultrasound training.

Administration

This is provided by the Intensive Care Society. Trainees wishing to complete CUSIC training should register with the ICS having identified a training mentor. A fee will be charged to cover administration costs (details of current fees are on the ICS website). The ICS maintains a database of approved CUSIC mentors and supervisors. Once training has been completed and signed off by mentor and supervisor, the trainee should submit their summary training record to the ICS for confirmation of accreditation in the individual modules completed. The ICS will provide a certificate of completion of training having confirmed that training has been signed off by an approved mentor/supervisor.

All enquiries regarding the training pathway should be addressed to:

CUSIC Administrator
The Intensive Care Society
Churchill House
35 Red Lion Square,
London WC1R 4SG
Tel: 0207 2804350 Fax: 0207 280 4369
Email: CUSIC@ics.ac.uk

Syllabus

The syllabus covers ultrasound guided vascular access, lung ultrasound and basic abdominal scanning to detect free fluid. The details of the syllabus and competencies are listed in the appendix. A vascular assessment (venous thrombosis) module is being developed.

Details of Training Pathway

Phase 1: Theoretical Training and Introductory Practice

This can be completed by attending a course or through locally delivered training as long as the theoretical and knowledge based aspects of syllabus are covered. The training mentor is responsible for confirming satisfactory completion of theoretical training.

The ICS will maintain a list of approved courses on its website.

Phase 2: Supervised practice

Different trainees will acquire the required skills at differing rates. The underlying principle is demonstration of competence rather than completion of a set number of studies/procedures in order to achieve accreditation. It is recognised that there are transferrable skills between the different areas of critical care ultrasound which can influence how quickly competence may be gained within a new area of practice.

A number of factors will influence the individual number of scans that need to be undertaken in order to gain competence. The expected number of scans that are likely to be necessary in order to demonstrate competence are summarised below. However, it is the supervisor who is responsible for assessing competence and whether the trainee has undertaken an adequate number and range of scans.

The first ultrasound scans undertaken by the trainee will need to be directly supervised by the mentor until the trainee has demonstrated competence in undertaking ultrasound examination and safely acquiring and storing images. For lung and abdominal scanning, this is likely to involve at least 10 examinations. Examinations undertaken during an approved course may be included in log book as directly supervised scans. Subsequent scans can be undertaken without direct supervision but must be stored for review by the training mentor. Direct supervision will be required when undertaking ultrasound guided procedures until competence has been demonstrated.

Phase 3: Mentored Practice and Completion of Log book

Each examination should be recorded in the log book and images archived for later review by training mentor. The standard reporting form should be used for all lung ultrasound examinations. All documents including training record, log book and competency assessments can be downloaded from the ICS website.

During training, the reports of scans which are not directly supervised, should not be recorded in the clinical record nor used for clinical decision making until they are reviewed by the trainees mentor.

The mentor is responsible for reviewing the log book and signing off that trainee has undertaken studies in an appropriate range of pathology and demonstrated competence. There should be agreement between trainee and mentor for the majority of study reports.

Although there is no set number of studies required to achieve competence, it is expected that the trainee will need to log the number of studies outlined below in order to become competent in the use of point of care ultrasound in the critically and to have experience of the required range of pathology.

Lung ultrasound: 30 scans with no more than 10 normal scans should be included for the purposes of accreditation. An appropriate range of pathology should be included. Trainees must demonstrate competence in ultrasound guided (direct and indirect) pleural aspiration and drainage.

Vascular Access

For a trainee without previous ultrasound experience a minimum of 5 supervised procedures is recommended in order to demonstrate competence.

Abdominal: 20 scans with no more than 10 of these scans should be normal.

Trainees must demonstrate competence in ultrasound guided paracentesis.

Phase 4: Assessment of competence

For each area of practice (vascular, lung and abdominal), the mentor needs to confirm competence in the core skills has been demonstrated and confirmed in the training record. Once an appropriate number of examinations/procedures have been performed and logged for each module, a triggered assessment needs to be undertaken. Completion of training in each module occurs following a satisfactory triggered assessment with the supervisor/mentor. The trainee will agree with their mentor when it is appropriate to undertake the triggered assessment(s).

Once training has been completed and competencies signed off, the summary training record detailing the areas of practice that have been completed is signed by mentor and supervisor and forwarded to the ICS Secretariat for award of certificate of completion of training. The certificate will identify the areas of practice in which training has been completed.

Maintenance of competence after accreditation

The practitioner is responsible for maintaining their knowledge and competence in ultrasound by undertaking regular and relevant continuing medical education (CME/CPD). In order to maintain practical skills it is important that regular ultrasound examinations (and guided procedures) are undertaken which involve an appropriate range of pathology and practical procedures.

Practitioners should undertake regular audit of their practice and multidisciplinary review of studies with advanced practitioners and/or radiology colleagues.

Trainers

Mentor

The ultrasound training mentor should have suitable experience and regular practice in critical care ultrasound. They should have as minimum demonstrated competency in core critical care ultrasound with at least 12 months of regular practice. This could be confirmed either by evidence of completion of core critical care ultrasound training and maintenance of log book demonstrating on-going experience or by or sign off by local supervisor that mentor has suitable knowledge and experience.

The mentor may be either a clinician in ICM, Anaesthesia, EM or an acute medical specialty with a regular commitment to ICM. Mentors have the following responsibilities:

- Mentoring and review of trainee scans
- Supervise triggered assessments and sign off competence when achieved
- Final sign off of trainees logbook and training record to confirm that they have satisfactorily completed core ultrasound training

Mentors should have ongoing access to the critical care ultrasound supervisor for review of difficult cases and advice.

Supervisor

Each unit undertaking Critical care ultrasound training should have a nominated training supervisor. The following would be appropriate to take on this role:

- Intensive Care Clinician with advanced critical care ultrasound practice
- RCR level 2 practitioner from relevant specialty (ICM, respiratory medicine, emergency medicine, acute medicine)
- Consultant ultrasonographer or radiologist

The training supervisor has the following responsibilities:

- Provide mentor with on going training according to individual needs
- Counter sign trainees training record before submission to ICS as verification of ongoing relationship with mentor

- Provide expert advice and review of scans when needed by mentor
- Facilitate mentor's path to advanced level accreditation if appropriate

The supervisor is encouraged to participate in trainee teaching when possible. An ICU consultant with advanced critical care ultrasound accreditation would be expected to take on roles of training mentor and supervisor.

Appendix 1: CUSIC Syllabus

1. Theoretical knowledge

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.

Needling techniques

- Understanding of terminology of planes of view, e.g. transverse, longitudinal.
- Understanding of terminology of needle insertion: in-plane and out-of-plane.
- Relationship of needle gauge, angle of insertion, depth and needle visibility.
- Limitation of out-of-plane needle insertion with regard to visibility of needle tip.
- Limitation of in-plane technique: beam width, parallelism.
- The use and limitations of needle guides and ultrasound visible needles.
- Knowledge of common causes of failure to see the needle during placement.

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.

2. Lung Ultrasound

Performance of systematic examination of lung and pleura

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

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

- Recognition of B-lines
- 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

Performance of ultrasound-guided (direct and indirect) thoracocentesis.

Performance of ultrasound-guided chest drain insertion and identification of when to use a direct or indirect approach.

3. Ultrasound guided vascular access

Generic competencies

- Identification of vein and artery in transverse and longitudinal scan.
- Differentiating arteries and veins with 2D ultrasound and Doppler
- Identification of common anatomical variations.
- Identification of common pathology (thrombus)
- Undertaking of ultrasound-guided cannulation in real time maintaining sterility
- Identification of needle tip with transverse and longitudinal views.
- Identification of guide wire within vessel.

Real time use of ultrasound to guide cannulation of following vessels

- internal jugular vein
- femoral vessels: vein and artery
- peripheral veins and arteries (including peripherally inserted central catheters)

(Although ultrasound guided axillary/subclavian cannulation is recommended this is not considered a core competency)

4. Abdominal ultrasound

Recognition of ultrasound appearances of the following structures:

- Liver spleen and kidneys
- Bowel

Detection of free intraperitoneal fluid

- Assessment of ascites
- Distinguishing abdominal and pleural fluid

Performance of ultrasound guided diagnostic tap and paracentesis

Bladder assessment

- Recognition of full bladder
- Differentiate full bladder from pelvic fluid and ascites

Appendix 2. Training Record

	Name	Initials	GMC number
Trainee			
Main trainers			
Mentor			
Supervisor			
Additional trainers			

Section 1. Ultrasound guided central venous access

Trainee name		
	Competence	Assessor
Demonstration of appropriate attitude and professional manner		
Explanation of procedure, risks and complications to patient as appropriate		
Positioning of patient and machine ergonomically		
Selection of appropriate probe and optimisation of machine settings		
Appropriate aseptic technique including preparation of probe		
Identification of the internal jugular vein and carotid artery in transverse and longitudinal scan		
Confirmation of patency and absence of thrombus or haematoma by compression		
Demonstrate use of spectral and colour doppler to confirm vein and artery		
Undertake ultrasound guided cannulation in real time demonstrating ability to follow needle tip path through subcutaneous tissues into vein		
Identification of needle tip in vein using in-plane or out-of-plane technique		
Identification of guide wire within vein		
Insertion of appropriate sized cannula into vessel to correct length and secure		
Performance of technique safely and effectively maintaining sterility		
Attention to sterility with respect to procedure, patient and machine		
Cleaning of equipment and storage to minimise damage		

Section 2. Lung ultrasound

Trainee name		
Competence		Assessor (signature)
Checking patient's details/entry into machine as appropriate		
Confirmation of indication and check any supportive imaging		
Positioning of patient and machine ergonomically		
Selection of appropriate probe and optimisation of machine settings		
Performs scan at upper, lower and postero-lateral points bilaterally with probe in correct orientation (longitudinal cephalad – caudad)		
Identification of subcutaneous tissue, ribs and pleura		
Identification of pleural sliding in 2D and M mode		
Recognition of signs of pneumothorax (2D and M-mode) including lung point sign		
Demonstration of lung pulse		
Identification of A lines and B lines		
Identification of normal diaphragm, liver and spleen		
Identification of consolidation / atelectasis		
Identification of interstitial syndrome		
Identification of pleural effusion		
Differentiation of pleural thickening and pleural effusion		
Differentiation of pleural effusion from intra-abdominal fluid (ascites)		
Description of appearances of transudate and exudate		
Demonstration of how volume of effusion may be estimated		
Use of ultrasound to identify appropriate site for drainage of effusion		
Demonstration of ultrasound guided thoracocentesis		
Demonstration of ultrasound guided chest drain insertion		
Performance of technique safely and effectively		
Attention to sterility with respect to procedure, patient and machine		
Adequate documentation and storage of images and scans as appropriate		
Informing patient and reporting findings where appropriate		
Identification of whether a further scan or alternative imaging is indicated		
Cleaning of equipment and storage to minimise damage		

Triggered Assessment in Lung Ultrasound

Trainee name		
	Competency	Assessor
	1. Preparation	
	Demonstration of appropriate attitude and professional manner	
	Explanation of procedure, risks and complications to patient as appropriate	
	Checking patient's details/entry into machine as appropriate	
	Confirmation of indication and check any supportive imaging	
	Positioning of patient and machine ergonomically	
	2. The scan	
	Selection of appropriate probe and optimisation of machine settings	
	Places probe at upper anterior point, lower anterior point and postero-lateral point on each side in a longitudinal (cephalad/caudad) plane	
	Identification of subcutaneous tissue, ribs and pleura	
	Identification of pleural sliding in 2D and M mode	
	Identification of A lines, B lines, diaphragm, liver and spleen	
	Performs a systematic examination	
	Identifies any abnormalities and pathology correctly	
	3. Post scan	
	Adequate documentation and storage of images and scans as appropriate	
	Informing patient and reporting findings where appropriate	
	Identification of whether a further scan or alternative imaging is indicated	
	Cleaning of equipment following infection control standards and storage to prevent damage	
Confirmation of completion	Mentor	
	Supervisor	
	Date completed	



Lung ultrasound reporting form

Date of study						
Patient details/cross reference		Any documents leaving clinical area must not include patient identifiable information.				
Name of sonographer						
Image quality		Good		Acceptable		Poor
		Lung sliding	B lines	Effusion	Collapse/consolidation	
					Minimal	Significant
Right	Upper ant Point					
Right	Lower ant point					
Right	Post-lateral Point					
Left	Upper ant point					
Left	Lower ant point					
Left	Post-lateral point					
Comments or further details:						
Signature						
Mentor sign off confirming findings						

Section 3: Abdominal ultrasound

Trainee name		
Competence		Assessor (signature)
Checking patient's details/entry into machine as appropriate		
Confirmation of indication and check any supportive imaging		
Positioning of patient and machine ergonomically		
Selection of appropriate probe and optimisation of machine settings		
Identification of normal diaphragm, liver, spleen and kidneys		
Identification of bowel and bladder		
Identification of free fluid		
Demonstration of how bladder volume may be estimated		
Use of ultrasound to identify appropriate site for drainage of ascites		
Demonstration of ultrasound guided paracentesis		
Demonstration of ultrasound guided ascitic drain insertion		
Performance of technique safely and effectively		
Attention to sterility with respect to procedure, patient and machine		
Adequate documentation and storage of images and scans as appropriate		
Informing patient and reporting findings where appropriate		
Identification of whether a further scan or alternative imaging is indicated		
Cleaning of equipment and storage to minimise damage		

Abdominal ultrasound log book

Study no.	Date	Diagnosis/ procedure	Summary of findings	Assessor

Triggered Assessment in Core Abdominal Ultrasound

Trainee name			
Competency		Assessor	
1. Preparation			
Demonstration of appropriate attitude and professional manner			
Explanation of procedure, risks and complications to patient as appropriate			
Checking patient's details/entry into machine as appropriate			
Confirmation of indication and check any supportive imaging			
Positioning of patient and machine ergonomically			
2. The scan			
Selection of appropriate probe and optimisation of machine settings			
Identifies diaphragms, liver, spleen and kidneys			
Identifies bowel and bladder			
Estimates bladder volume			
Identifies ascites and quantifies if present			
3. Post scan			
Adequate documentation and storage of images and scans as appropriate			
Informing patient and reporting findings where appropriate			
Identification of whether a further scan or alternative imaging is indicated			
Cleaning of equipment following infection control standards and storage to prevent damage			
Confirmation of completion	Mentor		
	Supervisor		
	Date completed		

Appendix 3: Summary Training Record

Critical Care Core Ultrasound Training Record		
Trainee name		
GMC number		
Confirmation of training completed		
	Date	Signature
Theoretical training		
Confirmation of satisfactory experience (log book review)		
Vascular		
Lung		
Abdominal		
Completion of competency assessments		
	Date	Signature
Vascular access		
Lung ultrasound		
Abdominal ultrasound		
Lung triggered assessment		
Abdominal triggered assessment		
Modules completed		
	Vascular access	
	Lung	
	Abdominal	
Mentor name		
Mentor sign off	Date	
Supervisor name		
Supervisor sign off	Date	