





Accreditation Pack







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Core Echo Module for Intensive Care Medicine

Introduction and Aims

Our aim is to put forward a relevant and achievable training pathway for focused level echo aimed at general intensive care clinicians in the UK. It is anticipated that the module could be completed during a 6-month block of training in an appropriate unit. There will be many similarities to pathways in other specialties and countries.

This document refers to focused adult transthoracic echocardiography, and does not cover advanced, transoesophageal (TOE) or paediatric echo.

Administration and "ownership"

Development of the module was a joint Intensive Care Society (ICS) / British Society of Echocardiography (BSE) project, and ongoing changes will continue to have input from both societies. The ongoing administration will be controlled by the ICS, including composition of committee and finances. This will be reviewed in the future depending on integration of focused echo in the FICM curriculum.

Evidence base

Multiple international studies have documented the utility of a focused or limited transthoracic echo study in the management of acutely ill patients, both within and without the Critical Care area¹⁻⁴. Most of the studies have been with modest numbers, and from units with particular expertise in echo, but consensus statements from a number of international bodies have been uniform in the call for implementation of basic level echo in critical care⁵⁻⁸.

Relation to other training programmes and modules

There is considerable overlap and repetition with several other training pathways in focused echo; many groups have already developed good training structures. The aim of this module is to bring together the best areas of these pathways in a format most applicable to ICM, rather than attempt to create something new.

The College of Emergency Medicine (CEM) has defined levels of training in place for ultrasound training; this level would be similar in many ways to the echo / heart in cardiac arrest component of level 1 training.

The British Society for Echocardiography (BSE) has adopted Focused Echocardiography in Emergency Life support (FEEL). Although there will be





many similarities with this programme, our focus will be on all critically ill patients rather than the peri-arrest population.

Other excellent training documents and statements have been produced, such as Focused Ultrasound and Echocardiography (FUSE), Focused Assessment with Transthoracic Echo (FATE), Echo in Life Support (ELS) and the recent round table consensus document from the ESICM⁵⁻⁸. The key message and core elements of training are largely uniform across all these documents. As the round table document reflects the expert views from 13 critical care societies across the world, we have tried to follow recommendations from this group where possible.

Patient population

"Critically ill" refers to patients requiring level 2 or 3 care, but is not restricted to those within the Intensive Care Unit. A focused echo study will have the highest sensitivity in the sickest patients, and potentially less benefit in those who have minimal organ dysfunction. It is anticipated that the vast majority of cases collected for logbook should be on patients who have either cardiovascular or respiratory support. Outpatient studies performed on stable patients in the echo lab are generally not suitable as part of the logbook.

Summary of Process Requirements

- A fee will be charged to cover administration of the module of £30 for Intensive Care Society members and £50 for non-members.
- You should address all queries regarding the FICE core module to:

FICE Administrator
The Intensive Care Society
Churchill House
35 Red Lion Square,
London WC1R 4SG

Tel: 0207 2804350 Fax: 0207 280 4369

Email: FICE@ics.ac.uk

You should register and attend an approved basic echo workshop. The Intensive Care Society will provide a small number of courses, however alternative courses (eg: FEEL) may be suitable. Please find a complete list of approved courses on the ICS website. The basic echo course should take place no more than 12 months prior to the first logbook recorded scan; the course should be completed no later than 12 months after the first log book recorded scan. Individual exceptions may be considered for those who attended courses before the inception of FICE, they should apply by email to the secretariat. There should be no more than 12 months from the 1st to the last





logbook scan. An extension to 18 months may be considered in exceptional circumstances after review by FICE committee.

- Locate a mentor (list available on the ICS website)
- You must complete:
 - o 10 scans, with direct supervision
 - o Logbook with 50 cases (including above)
 - Triggered Assessment
- Complete the Summary of Training document, to be signed by the Mentor and supervisor, and submitted to the Intensive Care Society Offices within 3 months of completing the final scan.
 - Please note: Log books are NOT to be submitted to the Intensive Care Society Offices.
 - The deadline for submitting the Summary of Training document is 3 months after the last date of collection of cases. Failure to submit by this deadline will necessitate repeating the entire process from the beginning.
 - Extensions to this deadline may be granted only following periods of maternity or extended sick leave or in exceptional circumstances. Extension requests must be submitted in writing to the secretariat before the original deadline. A charge may be made for each request.
- A Certificate of Completion will be issued by the ICS.

Composition of FICE module:

- 1. Background knowledge
- 2. Initial hands-on instruction
- 3. Collection of suitable logbook of 50 cases
- 4. Review of all cases by mentor, acceptable agreement of findings
- 5. "Triggered assessment" of candidate performing a focused study
- 6. Formal "signoff" of completion of above to acceptable standard.

Phase 1

Background reading material and self-directed learning, suggested reading list will be available on website.

e-learning module available via FICE website

Attend approved basic echo workshop

E-learning

This will be expanded upon in due course. The E- Learning module has now been completed. This will be mandatory from 1 May 2014. Please click on the link here http://www.e-lfh.org.uk/programmes/icu-echoultrasound/ A certificate will be available to download once the module has been successfully completed.





Course

Attend a pre-approved course on basic echocardiography. A list of approved courses will be available on the Intensive Care Society website.

ICS will provide a minimum of one course per year to this end. Please see the website for details of course dates.

Phase 2

Mentored session to ensure basic machine functions and ability to acquire views

At least 1st 10 scans directly mentored to ensure suitable image acquisition, this number may increase depending on individual skill acquisition. Some of these scans may be collected on approved course.

Student performs and records a total of 50 focused echo exams (see below) within a 12 month timescale from 1st to last scan

Attendance at departmental echo sessions encouraged when possible. Each exam reported on focused echo logbook report form and images archived.

Phase 3

50 exams and reports reviewed by ICU module mentor with focused echo experience

Supervisor +/- mentor carry out triggered assessment

Should be at least 2 adequate views each study, and agreement with main findings of mentor in majority of cases.

Completed "sign-off" sheet sent to ICS secretariat, certificate awarded for successful completion.

Further logbook cases / training may be recommended if candidate fails to demonstrate competence.

Definition of ICM Core echo module supervisor

Mentor

- The ICM echo unit mentor should have suitable experience and regular practice in critical care echo. This could be defined by appropriate accreditation (eg: BSE, CEM level 2, FEEL etc), logbook or by agreement with BSE supervisor.
- They will be either a consultant in ICM, Anaesthesia, EM or an acute medical specialty *or* a member of the BSE or ICS. Those without regular ICM commitment must be members of either BSE or ICS.
- Responsible for the majority of the mentoring and review of trainee scans
- Responsible for main "sign-off" of trainee logbook after review of scans





- Must have the ability to refer to supervisor for difficult cases and advice
- Should have access to ongoing training from BSE accredited supervisor depending on individual requirements
- Must retain logbook of personal cases
- It is anticipated that from 31st December 2014, all future mentors will require at least FICE accreditation equivalence (by an abbreviated process)

Supervisor

- Any practitioner with full BSE TTE or TOE accreditation, or equivalent.
- Supervisors wishing to explore "equivalence" should contact the secretariat for details.
- Should ensure mentor has access to ongoing training depending on individual needs
- Will sign-off trainee logbook as verification of ongoing relationship with mentor
- Must perform "triggered assessment" of candidate with mentor towards end of module
- Has the facility to review scans and accept further referral when needed
- Is encouraged to participate in trainee teaching when possible
- Should facilitate mentor's path to full BSE accreditation if appropriate

There should be a dedicated ultrasound machine of acceptable standard (including image archiving) for transthoracic echo in each unit responsible for training.

Some possible scenarios.

- Mentor has BSE full adult TTE / TOE / equivalent accreditation
 - Supervisor not required, mentor can act as sole party. Links with echo departments are strongly encouraged.
- Mentor has no echo qualifications, but considerable experience and expertise.

<u>Or</u>

- Mentor has CEM level 2 echo competence / FEEL / FICE / other qualification, but not full BSE.
 - Ongoing link with supervisor required for governance. This may be occasional (eg: once a month) supervised scanning to serve as a "triggered assessment" of ability to obtain and interpret basic echo images.





- Mentor has enthusiasm, but limited skills and experience in ICM echo.
 - It is not possible to act as a mentor until further experience and skills are acquired

These are only examples, and each department will have different circumstances and challenges.

Focused study

Should generally only be carried out on patients meeting criteria for level 2 care or above. A maximum of 10 healthy volunteer scans are acceptable. Patient details entered, ECG monitoring for capture. Images must be stored At least 2 adequate views to be recorded.

5 views - Parasternal long axis

Parasternal short axis Apical 4 chamber

Subcostal 4 chamber, including IVC view

Lung bases for evidence of fluid

Basic scanning modes only – 2D, freeze, calliper measurements No use of M mode (except IVC collapse) colour-flow or other doppler. If these are recorded for training purposes, conclusions must only be made from 2D images.

Image quality (good / acceptable / poor) should be noted along with number of views achieved.

Questions to be asked by each study (Answers can be yes / no / unsure)

Is the LV function significantly (ie: moderately / severely) impaired?

Is the LV dilated?

Is the RV dilated or severely impaired?

Is there pericardial fluid?

Is there evidence of hypovolaemia?

Is there pleural fluid?

Other comments can be made, and conclusion of study should be related to clinical significance of findings.

Logbook report

Must not be entered in patient notes, nor should major treatment decisions be made on unverified findings – this is a training logbook only Logbooks and cases must be fully anonymised – please read the BSE Policy on the Non-anonymisation of Patient data in appendix 14.





Should include clinical haemodynamics, and relevance of echo findings to clinical scenario

This logbook is not to be submitted to the Intensive Care Society offices. A Supervisor signature indicating completion of the logbook will suffice as evidence when submitting completed training summary sheet.

Limitations

A focused study should not be carried out on stable patients to define or diagnose ongoing chronic cardiac disease eg: stable valve disease, ventricular hypertrophy or regional wall abnormalities not leading to acute haemodynamic compromise. A full comprehensive departmental echo is still the investigation of choice for many patients. Findings from the study must be related to the clinical scenario, and may change with time and interventions. A focused study is inappropriate to diagnose or exclude endocarditis. Critically ill patients are often difficult to achieve good quality images, and it will not be possible to achieve diagnostic studies on all patients. The temptation to over interpret poor quality images must be avoided.

Definition of "competence"

Firm evidence is lacking, and training should fit into the existing modular ICM training structure. The round table recommendations are that 30 scans are the minimum number to achieve competence in image acquisition. We would suggest 50 scans as a minimum number for the core module, to allow for differing levels of skill acquisition. For some candidates, a further period of training may be recommended. Completion of the module should normally be possible within a 6 month time period.

- 1. Cholley BP, Vieillard-Baron A, Mebazaa A (2006) Echocardiography in the ICU: time for widespread use! Intensive Care Med 32:9–10
- 2. Beaulieu Y (2007) Bedside echocardiography in the assessment of the critically ill. Crit Care Med 35:S235–S249
- 3. Stanko LK, Jacobsohn E, Tam JW, De Wet CJ, Avidan M (2005). Transthoracic echocardiography: impact on diagnosis and management in tertiary care intensive care units.
- 4. Orme RM, Oram MP, McKinstry CE (2009) Impact of echocardiography on patient management in the intensive care unit: an audit of district general hospital practice. Br J Anaesth102:340–344
- 5. Morris C, Bennett S, Burn S, Russell C, Jarman R, Swanevelder J for the NPOCUS critical care echocardiography working group. Echocardiography in the intensive care unit: current position, future directions. JICS April 2010
- 6. Jensen M, Sloth E, Larsen K, Schmidt M. Transthoracic echocardiography for cardiopulmonary monitoring in intensive care. *European Journal of Anaesthesiology* 2004; 21: 700-707
- 7. Royse C, Seah J, Donelan L, Royse A. Point of care ultrasound for basic haemodynamic





assessment: novice compared with an expert operator. Anaesthesia 2006, 61:849

- 8. International expert statement on training standards for critical care ultrasonography. Intensive Care Med (2011) 37:1077–1083
- 9. Manasia AR, Nagaraj HM, Kodali RB, Croft LB, Oropello JM, Kohli-Seth R, Leibowitz AB, DelGiudice R, Hufanda JF, Benjamin E, Goldman ME (2005) Feasibility and potential clinical utility of goal-directed transthoracic echocardiography performed by noncardiologist intensivists using a small hand-carried device (SonoHeart) in critically ill patients. J Cardiothorac Vasc Anesth 19:155–159
- 10. Melamed R, Sprenkle MD, Ulstad VK, Herzog CA, Leatherman JW (2009) Assessment of left ventricular function by intensivists using hand-held echocardiography. Chest 135:1416–1420
- 11. Price S, Via G, Sloth E, Guarracino F, Breitkreutz R, Catena E, Talmor D (2008) Echocardiography practice, training and accreditation in the intensive care: document for the World Interactive Network Focused on Critical Ultrasound (WINFOCUS). Cardiovasc Ultrasound 6:49
- 12. Vignon P, Dugard A, Abraham J, Belcour D, Gondran G, Pepino F, Marin B, Francois B, Gastinne H (2007) Focused training for goal-oriented hand-held echocardiography performed by noncardiologist residents in the intensive care unit. Intensive Care Med 33:1795–1799





Appendix 1: FICE Curriculum

General Principles

Focused Intensive Care Echocardiography (FICE) is a valuable non-invasive bedside technique to diagnose potentially reversible life threatening conditions in patients that are acutely short of breath or haemodynamically unstable. This curriculum details the knowledge, skills and attitudes required for competent performance of FICE.

Features of Competent Performance

- Understands the technology and it's limitations
- Uses focused echo in appropriate circumstances
- Reliably acquires images of adequate quality
- Correctly identifies normal and abnormal findings
- > Integrates echo findings with clinical picture
- Documents findings in standard echo report
- Communicates findings with the clinical team
- Recognises when expert assistance or alternative investigation is needed
- Follows infection control precautions
- Appreciates patient safety and comfort
- > Safeguards confidential patient data
- > Stores images for subsequent review

The curriculum is mapped to the relevant assessment tools as follows:

Assessment Tools		
Full name	Code	
e-Learning	Е	
Mentored Practice	M	
Logbook	L	
Triggered Assessment	T	

The curriculum is also mapped to the four domains of Good Medical Practice:

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





Below is a detailed list of items which describe the knowledge, skills and attitudes which make up the above competences.

Domain 1: Imaging Physics & Instrumentation	Assessment	GMP
Knowledge		
Properties of sound wave: amplitude, frequency, wavelength, propagation velocity	E	1
Frequency range of sound waves used in diagnostic imaging	E	1
Speed of sound in different media	E	1
Behaviour of sound waves at interfaces between media	E	1
Generation of ultrasound waves: the piezo-electric effect	E	1
Design of the ultrasound transducer	E	1
Structure of the ultrasound beam	E	1
Principles of attenuation, scattering and reverberation	E	1
Skills		
Selects appropriate ultrasound transducer	M, T	1
Uses conductive gel to aid transmission of ultrasound wave	M, T	1
Correctly adjusts depth, gain and focus position	L, M, T	1
Identifies common artefacts	E, L, M, T	1, 2

Domain 2: Cardiac Anatomy and Pathophysiology	Assessment	GMP
Knowledge		
Echo anatomy: cardiac chambers/valves/great vessels/pericardium	E	1
Coronary anatomy relevant to blood supply of the myocardium	E	1
Typical size of cardiac chambers and great vessels	E	1
Temporal relationship of the electrocardiogram (ECG) to myocardial contraction and valve movement	E	1
Components of systolic function: wall motion and wall thickening	E	1
Normal patterns of inferior vena cava (IVC) movement	E	1
Effect of spontaneous and positive pressure ventilation on the cardiac cycle and IVC movement	E	1
Effect of vasoactive drugs on cardiac physiology	E	1
Causes of: left ventricular dilatation, right ventricular dilatation, systolic dysfunction, regional wall motion abnormalities,	E	1
pulmonary hypertension, aortic dilatation / dissection, pericardial and pleural collections		
Skills		
Recognises cardiac structures: chambers/valves/great vessels/pericardium	L, M, T	1
Identifies walls of left ventricle (LV) and territories of coronary arteries	L, M, T	1
Uses ECG to determine phase of the cardiac cycle	L, M, T	1





Domain 3: Image Acquisition and Interprétation	Assessment	GMP
Knowledge		
Movements of transducer and orientation with respect to screen	E	1
Echo windows and standard views	E	1
Findings in:		
Left ventricular dilatation: left ventricle end diastolic diameter (LVEDD) > 6cm	E	1
Right ventricular dilatation: right ventricle (RV) greater than 2/3rds the length of the left ventricle	E	1
Ventricular dysfunction: reduction in wall motion and thickening	E	1
Regional wall motion abnormalities: regional reduction in wall motion and thickening	E	1
Pulmonary Hypertension: RV dilatation, 'D' shaped deformity of septum, paradoxical septal motion	E	1
Hypovolemia: IVC collapse with respiratory cycle, approximation of papillary muscles during systole	E	1
Aortic pathology: aortic dilatation or dissection flap	E	1
Pericardial collection: collection in pericardial space, distinction from pleural collection	E	1
Pleural Collection: collection in pleural space, distinction from pericardial collection	E	1
Skills		
Reliably acquires standard views	L, M, T	1, 2
Comments on whether image is adequate or not	L, M, T	1, 2
Correctly identifies normal and abnormal findings	L, M, T	1, 2
Interprets echo findings with respect to cardio-respiratory support at time of imaging	L, M, T	1, 2
Correlates echo findings with clinical picture and takes appropriate action / inaction	L, M, T	1, 2
Repeats focused echo after intervention	L, M, T	1, 2

Domain 4: Patient Safety and Governance	Assessment	GMP
Knowledge		
Indications and limitations of focused echo	E	1, 2
Relationship between conduct of peri-arrest echo and the Advanced Life Support (ALS) alogorithm	E	1, 2
Format of standard echo report	E	1
Indications for immediate expert assistance, subsequent comprehensive echo by accredited practitioner or need for	E	1, 2
alternative investigation		
Importance of entering patient information, capturing images and uploading study to appropriate archiving system	E	1, 2
Need to quality assure echo reports	E	1, 2
Relevance of Data Protection Act to image storage	Е	1, 2, 4
Infection control precautions	Е	1, 2, 4





Potential hazardous biological effects of ultrasound: heating/resonance		1, 2, 4
Need to provide patient explanation relevant to the clinical setting	E	3, 4
Skills		
Performs focused echo in appropriate circumstances and in ALS compliant manner	M, L	1, 2
When needed seeks expert assistance in a timely fashion	L, M, T	1, 2, 4
Enters patients details and saves studies		1, 2
Accurately documents findings using standard reporting structure	L, M, T	1, 2, 3
Takes appropriate infection control procedures	M, T	1, 2, 4
Attitudes		
Communicates findings with clinical team	L, M	3
Considers patient comfort during procedure		3, 4
Seeks regular hands on tuition and review of their echo reports	L, M	2,4







Appendix 2: Summary of Training Record

Focused Intensive Care Echocardiography

Trainee Information Name GMC number Hospital(s) at which FICE module completed Name of FICE approved Mentor Name of Supervisor

Summary of Training

Component	Date	Signature
Phase 1		
FICE basic knowledge base	100	A
completed (please circle) E-		
learning/ Other		
Please summarise in space below:		
FICE Approved Course		
Venue:		
Date:		
Organiser		
Phase 2		
Supervised cases		
Phase 3		
Triggered Assessment		
Completed logbook		

Date of co	mpletion
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Mentor:	
Supervisor (if applicable):	







Appendix 3: Supervised Cases Log

Focused Intensive Care Echocardiography Directly Supervised Cases

Case	Brief description	Date	Mentor's comments	Mentor's signature
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Case	Brief description	Date	Mentor's comments (when required)	Mentor's initials
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Appendix 5: FICE Logbook form				
Patient Details / Cross reference	Date:			
	Operat	tor:		
(Any documents leaving clinical area must be anonymised) Haemodynamics:	Good	otable	ality	(
le the LV function significantly	Circle YES	NO	U/A –Unable U/A	to assess
Is the LV function significantly impaired? Notes:	163	NO	U/A	
Is the LV dilated? Notes:	YES	NO	U/A	
Is the RV dilated or severely impaired? Notes:	YES	NO	U/A	
Is there pericardial fluid? Notes:	YES	NO	U/A	
Is there evidence of hypovolaemia??\forall \forall \fo	YES		NO	U/A
Is there pleural fluid? Notes:	YES	NO	U/A	
Other comments:				
Conclusion and clinical significance:				

Is expert referral required? Y N Counter signed:

Signed:





Appendix 6: Triggered Assessment Evaluation

Before using this document, a trainee should have completed the following steps:

- 1. Nominated a FICE-approved mentor and supervisor
- 2. Gained an comprehensive understanding of the following theoretical and practical competencies, as detailed in the curriculum
 - a. Ultrasound imaging physics and instrumentation
 - b. Cardiac anatomy and physiology
 - c. Image acquisition and interpretation
 - d. Patient safety and governance
- 3. Attended a FICE-approved course
- 4. Carried out 10 mentored scans
- 5. Completed a logbook of at least 50 scans

Within each of the following	Medical assessors comments recorded during the	Competent?
three sections, the learner	assessment	(please initial)
must:		
1. Preparation for the scan		
Greets the patient		
appropriately and identify the		
patient with the notes		
Confirms that the indication for		
the procedure is within own		
competency		
Positions the patient correctly		
Demonstrates appropriate		
attitude and professional		
manner		
2. The scan		
Sets up the equipment		
acceptably, including ECG		
Probe selection, handling and		
scanning technique		
Acquisition of the best possible		
image using depth, gain and		
focus		
Demonstrates all views		
available		
Identifies pericardium and		
describes any pericardial		
effusion		
Describes LV dimensions		
Describes overall LV systolic		
function		
Comments on evidence of		
hypovolaemia		
Comments on right ventricular		
dimensions		
Describes right ventricular		
function		





Certified as complete by (Mentor)	
Countersigned by Supervisor (if applicable)	
Date Completed	





Appendix 7: Policy on the Anonymisation of Patient Data (Summary of BSE guidance)

The duty of confidentiality arises out of the common law of confidentiality, professional obligations and also staff employment contracts. Breach of confidence may lead to disciplinary measures, bring into question professional reputation and possibly result in legal proceedings.

Guidance is provided to NHS staff in the 'NHS Code of Practice on Confidentiality' (November 2003).

http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_digitalassets/@dh/@en/documents/digitalasset/

Patient information that can identify individual patients is confidential and must not be used or disclosed. In contrast, anonymised information is not confidential and may be used.

Key identifiable information includes:

Patient's name, address, full post code, date of birth;

NHS number and local identifiable codes;

Anything else that may be used to identify a patient directly or indirectly. For example, rare diseases, drug treatment or statistical analyses which have very small numbers within a small population may allow individuals to be identified.

Anonymisation requires the removal of such information from all reports and images.

Guidance to candidates submitting Logbooks and Cases for Accreditation

The NHS Code of Practice on confidentiality means that evidence submitted for the practical part of the Accreditation process must have all patient identification removed.