CACTUS® Cardiac Training Pack

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Details of Training Pathway

1. Identification of a Trainer

CACTUS® Cardiac module is designed to be a very basic introduction to bedside cardiac PoCUS, with the main requirement for accreditation at this level to be to identify left ventricular function, pericardial effusions and a basic comment on volume status (recognising the over distended LV).

CACTUS ® Cardiac is supported by Trainers who oversee both logbook scans and the triggered assessment. This is different to FUSIC ® Heart, where there is a separate Mentor and Supervisor, due to the advanced skills covered within the mentioned accreditation. The latter approach will be replicated in more advanced CACTUS® Cardiac modules which are to be released in due course.

Requirements, responsibilities, and ways to identify a CACTUS® Cardiac Trainer are all outlined below:

- CACTUS® & FUSIC® approved Trainers may already be known to you, and you can approach them.
- If you cannot identify a local Trainer yourself, then please contact the ICS learning team who will be able to direct you to one.
- Definitions, roles and responsibilities of a Trainer are outlined below.
- If for any reason it has not been possible to identify a Trainer (due to availability), it is possible to nominate a qualified clinical colleague who possesses the correct accreditation(s) and experience to act as a Trainer on your behalf. They will however be required to make an application to become an officially recognised Trainer before training should commence.

Submitting an application is straightforward and can be done using a simple form available on the ICS website, if unable to access the form please contact the ICS learning team for assistance.

Requirements for a Trainer

Your Trainer may be any healthcare professional with relevant echocardiography experience and/or regular practice in Intensive Care ultrasound.

A CACTUS® Cardiac trainer can be from a FUSIC® Heart mentor OR supervisor, a paediatrician with expertise in cardiology, a paediatric cardiologist, an echocardiographer, a paediatric anaesthetist/intensivist with expertise in cardiology/echocardiography.

Trainers have the following responsibilities:

- To have access to an identified CACTUS® committee member (via ICS learning team), to review difficult cases and provide ongoing clinical support.
- To enable you to access a suitable ultrasound machine and patients with pathologies relevant for successful accreditation.
- To mentor you and review your logbook scans.

- To sign-off your competencies and undertake a triggered assessment.
- To sign your summary training record (STR) to confirm that you have satisfactorily completed all components of the accreditation.

2. Registration with ICS

Registration is an essential way to ensure that you are kept up to date with all aspects of the accreditation. It will also enable you to freely access our online learning material. We therefore recommend that you register at the beginning of your learning.

- Go to the CACTUS® Cardiac module page.
- Click on the "add to basket" button.
- Register and pay. *Note: the cost includes registration as well as all e-learning content, and a certificate of accreditation at the end of the training.*
- Upon registration, you will receive an email providing details of what the next steps are. This can sometimes take up to 48 hours.
- Once registered, your access to all accreditation-related content will last for exactly 24 months, after which your registration will expire.

If you experience any problems, please email the ICS learning team.

3. Completion of online training

The price of CACTUS® Cardiac e-learning content is included in the cost of registration and covers the theory required to complement your learning journey. We encourage learners to access and work through it prior to starting their logbook.

4. Attendance on an approved course

To achieve CACTUS® Cardiac accreditation, you must complete the **mandatory e-learning**, accessible via our **ICS** CACTUS® Portal and attend an **approved CACTUS® face-to-face (F2F) course**. Note: you do not need to attend another F2F course if you have already completed an approved CACTUS® Course or FUSIC® Heart course within the last 3 years.

A list of forthcoming approved courses can be accessed by emailing the ICS learning team.

5. Mentored practice and completion of logbook

All training documents, such as the reporting forms, logbook, assessment and competency sign offs, and Summary of Training (STR) form, can be downloaded from the CACTUS® Cardiac page as soon as your CACTUS® cardiac registration and enrolment have been approved.

Logbook requirements:

- Minimum directly supervised scans – 15 (these do not have to be the first 15 scans or be contiguous)
- Minimum total number of scans – 50

- Case mix – see guidance below
- Sufficient and legible information ensuring no patient identifiable data

Supervised cases:

- Direct supervision is an essential part of the training process.
- A minimum number of 15 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 Trainer.
- Your training scans ***must not*** be documented in the patients' medical record or used to influence your clinical decision-making until a suitably trained individual has verified them. We recommend that training scans stored on machines or exported from them for review are labelled with a training reference, and not identifiable patient details.

Scanning Under a Non-Paediatric Trainer
Candidates receiving supervision from a non-paediatric trainer must meet the following requirements:

- At least 50% of submitted scans must be paediatric.
- A minimum of 10 paediatric scans must be directly observed.
- If all supervision is non-paediatric, at least one scan on a child under 1 year must be reviewed by a CACTUS® Committee member (arranged upon request).

Timeline:

- Your logbook collection period, from ***first scan*** to ***last scan*** should be no more than ***12 months*** out of the **24-month** accreditation learning period.
- Learning must also take place in the ***real world***, and we acknowledge that the CACTUS® Cardiac accreditation process, from registration to completion, may take time. Conversely, to combat skill fade and ensure appropriate development of knowledge and experience, we advise that scan dates be recorded and monitored closely by your Trainer.
- Applications to extend this logbook collection period will only be considered under ***exceptional circumstances***, in which case you should contact the *ICS learning team* at least ***4 weeks*** prior to the expiry of your ***12-month logbook window*** to request an extension.

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 overtime if their clinical or radiological picture has changed.
- No more than 20% of logbook studies should be on healthy volunteers (who should still have been scanned within a clinical setting).
- In previous years, examinations undertaken during an approved course were accepted as directly supervised scans. However, we no longer support this practice.
- All CACTUS® Cardiac (apical, subcostal, parasternal long and short axis) views should be attempted in each scan however we recognise adequate images are not always possible in

each view. You and your Trainer should ensure your logbook reflects that you can obtain all views competently, but focussing on the limited learning outcomes we are aiming for.

Reporting:

- You must use the standard CACUTS® Cardiac reporting form for all training ultrasound examinations as provided.

- All documents, including the summary training record form, logbook, and competency assessments, can be downloaded from the **ICS** CACTUS® Portal once registration is complete.

Review:

- Your Trainer 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 Trainer 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 Trainer.

Competence:

- Learners acquire skills at different rates. The minimum number of scans that are likely to be necessary to demonstrate competence and to have experience of the required range of pathology, is 50. It can often be more in cardiac cases.
- Your Trainer is responsible for assessing competence and whether you have undertaken an adequate number of scans before your Triggered Assessment. *Please note this is very different to FUSIC® Heart and the more advanced CACTUS® Cardiac modules to be released, when a different supervisor is required to perform the 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 Trainer.
- If your scans are not signed off by a CACTUS®/FUSIC® approved Trainer and your final summary training record does not include a name and signature of a CACTUS®/FUSIC® approved Trainer, they cannot be accepted.
- Once all the above steps have been followed and your **summary training record (STR)** has been completed, dated and signed off by your CACTUS®/FUSIC® approved Trainer, prior to submitting your STR for review, please ensure all information is legible. Then please submit your STR via the **ICS** CACTUS® Portal and after approval, you will be awarded your certificate of accreditation in CACTUS® Cardiac.

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/CME. 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.
- 12 months after CACTUS® Cardiac accreditation, with evidence of ongoing clinical activity in cardiac ultrasound and further training, you may be eligible to become a CACTUS® Cardiac Trainer by application via the ICS website or to the ICS learning team. Please note, unlike lung, this is not guaranteed and applications will be reviewed on a case by case basis.

For further guidance on 'echocardiography and ultrasound' governance, please read GPICS 2,

CACTUS® Cardiac 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 point
    - Artefacts and their generation
- 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
- Identification of relevant anatomy and 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 (CACTUS® Cardiac)

Knowledge

- Indications and limitations of focused echo/cardiac ultrasound
- Relationship between conduct of peri-arrest echo and the APLS algorithm
- Format of basic Cardiac POCUS report

Performance of systematic examination of the heart

- Scanning the heart from the PLAX, PSAX, A4C and subcostal windows, ensuring at least the left ventricle is identified in two views or more per scan

Recognition of normal anatomy

- Pericardium, walls, chambers, valves, great vessels, lung, ribs, sternum

Recognition of pathology including

- LV dilatation
- Ventricular dysfunction - reduction in wall thickening and motion
- RV dilatation, D shaped septum, paradoxical septal motion
- Features of low venous return (vasodilatation, hypovolaemia) - small, collapsing IVC, small, hyperdynamic LV and RV, papillary apposition in systole
- Pericardial and or pleural collection - distinguish one from the other

Clinical integration and conclusions

- Is the left ventricle significantly dilated or impaired?
- Is the right ventricle significantly dilated or impaired?
- Are there features of low venous return?
- Are there features of volume overload?
- Is there a pericardial effusion?
- Is there a pleural effusion?