



**College of Intensive Care Medicine
of Australia and New Zealand**
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LEVELS OF TRAINING IN ADULT CRITICAL CARE ECHOCARDIOGRAPHY

INTRODUCTION

Critical Care Echocardiography (CCE) is widely performed in intensive care units (ICUs). It provides timely and enhanced diagnostic and monitoring information that is important for safe and appropriate treatment of critically ill patients. The College of Intensive Care Medicine (CICM) recognises the importance of CCE, and Basic Critical Care Echocardiography (Focused Cardiac Ultrasound or FCU) is now a mandatory component of training. CICM has also established an Ultrasound Special Interest Group (USIG). Expertise and practice in CCE varies widely and includes Transthoracic Echocardiography (TTE) and Transoesophageal Echocardiography (TOE). There are many training and qualification pathways for different levels of echocardiographic expertise, including accredited workshops, university courses, and diplomas.

The College has consequently developed these guidelines to categorise the different levels of CCE expertise among intensive care specialists in Australia and New Zealand, and to recommend minimum training requirements for each. These guidelines will allow CICM Fellows and trainees to choose the appropriate level of echocardiographic competency for their practice and the training that will be involved. These guidelines do not represent or recommend a mechanism for certification to practise cardiac ultrasound. This remains primarily a local process at the site or institution of practice.

In developing these guidelines, the USIG obtained information from a survey of CICM Fellows, conducted a review of the literature and collated the standards and recommendations promulgated by other Australian and New Zealand medical colleges and international intensive care organisations.

LEVELS OF PRACTICE FOR CRITICAL CARE ECHOCARDIOGRAPHY

1. Focused cardiac ultrasound

This is a “basic” level of echocardiographic competency for the assessment of a critically ill patient. It is used when there is a need to answer a specific but “limited” question or range of clinical questions that have an important bearing on the immediate treatment of a patient. In this sense, these studies are deemed “goal directed” or “focused” studies. These include identification of types of shock and monitoring of major physiological abnormalities. Therefore, the term focused cardiac ultrasound is preferred to the term ‘limited’ as it refers to the specific purpose and the narrowed scope of such a study and the modalities used (two-dimensional and M-mode).

A full diagnostic comprehensive study may be focused or goal-directed to answer a specific clinical question, but may include findings unrelated to this primary purpose. The term “echocardiography” often implies the latter. Therefore, to avoid confusion, the term “cardiac ultrasound” is preferred when referring to focused studies, and the term “advanced echocardiography” is used for a full comprehensive (diagnostic) study that necessitates advanced training and interpretation.

2. *Advanced CCE*

These are examinations performed with a level of expertise similar to that of a cardiologist. While these examinations are usually requested for a specific purpose, this method looks at the heart through multiple windows, in multiple views and uses multiple echocardiographic modalities (pulse wave and continuous wave Doppler, with M mode and/or three-dimensional added as required). Note that given the variability in specific training in TOE it is recommended that Advanced CCE be divided into "TTE only" and "TTE and TOE". TOE has the additional procedural risks of damage to the teeth, pharynx and oesophagus, including rupture or burns. For these reasons, it is important that those performing CCE do so within a defined level of expertise commensurate with their training and experience.

3. *Expert CCE*

The Expert level in CCE is a practitioner who provides excellence in all aspects of practice and training. Involvement in echocardiography research and publications are not obligatory, but desirable. Experts are endorsed by peers and the term acknowledges intensive care specialists who have practiced at the Advanced level of TTE and TOE echocardiography in intensive care medicine for at least seven years.

2. **TRAINING REQUIRED**

1. *Basic level of Adult Critical Care Echocardiography- Focused Cardiac Ultrasound:*

To perform FCU, the practitioner should be competent in obtaining basic TTE views, identifying normal versus grossly abnormal anatomical structures, and identifying significant functional abnormalities. It is limited to the use of only 2D and M-mode modalities with explicit understanding of the associated limitations of these techniques by the user. FCU studies do not include Doppler techniques or other complex ultrasound modalities. Completion of the basic level of training (or FCU) in adult critical care echocardiography now constitutes part of the CICM training curriculum.

Minimum Requirements:

- Attendance at an CICM accredited echocardiography course
- A short on-line examination
- Completion of a log-book under supervision of CICM accredited supervisor (30 focussed cardiac ultrasound cases evaluated as satisfactory by an assessor)
- Signed off as passed by a CICM accredited supervisor (accredited supervisors can have various backgrounds e.g. cardiologist, experienced ICU sonographer)
- All studies must be performed in the intensive care environment

2. *Advanced Critical Care Echocardiography in Transthoracic Echocardiography*

Intensive care specialists, practising critical care transthoracic echocardiography (TTE) at an advanced level should be fully proficient in independent performance and interpretation of TTE in adult intensive care patients with a wide variety of medical and surgical pathologies. These include complex haemodynamic abnormalities, variable pharmacological and mechanical cardiorespiratory support, and structural and functional cardiac pathology. Training to the Advanced level CCE significantly exceeds Basic level of proficiency and takes at least 12 to 24 months to achieve. Practitioners undertaking Advanced level of CCE training should be able to perform echocardiographic examinations without supervision and within an appropriate time-frame, but their work should be overseen by an Expert level CCE practitioner.

Minimum Requirements:

- Evidence of completion of an accredited course with exit exam
- Syllabus must cover advanced physics, knobology, artefact formation and image optimisation. It should also include in-depth specifics of clinical adult echocardiography (including valvular and quantitative haemodynamic assessment) with emphasis on various shock states, heart-lung

interactions, volume state assessment, and complex pharmacological and mechanical cardiorespiratory support.

- Log book of 450 studies
 - 300 studies performed and reported
 - 150 studies reported
 - Signed off by CICM accredited supervisor
 - At least two thirds of all studies must be performed in a critical care environment
- Ongoing professional development in echocardiography

3. Advanced Critical Care Echocardiography in Transthoracic and Transoesophageal Echocardiography

TOE education is available to the Intensive Care Specialist by completing qualifications such as the Diploma of Diagnostic Ultrasound (DDU) (Critical Care), or the equivalent, which has both TTE and TOE included within theoretical, practical and examination components of training. Acquisition of appropriate advanced practical and theoretical skills can be assisted through enrolment in dedicated Critical Care Echocardiography Fellowship Programs.

Minimum Requirements

(In addition to the requirements for Advanced level TTE)

- Log book of 50 TOE studies
 - 25 studies performed and reported
 - 25 studies reported
 - Signed off by CICM accredited supervisor
 - At least half of all studies must be performed in critical care environment

4. Expert Level in Adult Critical Care Echocardiography.

The Expert level in Adult Critical Care Echocardiography is a peer-endorsed recognition of intensive Care Specialists who practice echocardiography in intensive care medicine.

Minimum Requirements

- More than seven years of practising at Advanced TTE and TOE level
- Substantive involvement in education and training
- Echocardiography research profile and publications (desirable)
- Evidence of ongoing professional development in echocardiography

Promulgated by CICM: 2018

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