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# Echocardiography Training in Intensive Care: What Have We Learned?

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**Abstract**

*Aims*

To review the initial experience of three years (2020 – 2023) of level 1 echocardiography training at University Hospital Limerick (UHL).

*Methods*

There is a clear pathway to accreditation for this increasingly recognised core ICU skill. This involves supervised scanning, maintenance of an online logbook, scanning a minimum of fifty patients with regular image reviews by a mentor before formal assessment.

*Results*

We outline ten key lessons that we have learned through our experiences of developing a formal echocardiography teaching programme. The main group taking this accreditation are Anaesthesia & Intensive Care Medicine trainees and Cardiology trainees. Cardiology trainees have the fastest completion rate and were seen to complete the program in 3 months or less, compared to an average of 9 months for Anaesthesia & Intensive Care Medicine trainees. The commitment and workload involved is significant. Eight out of thirty-five trainees (23%) that attended structured scanning sessions went on to complete the accreditation process within the designated 1-year period.

*Discussion*

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Developing a systematic pathway is achievable but requires time, planning and allocation of resources for success.

**Introduction**

Focused Ultrasound in Intensive Care (FUSIC) Heart is a level 1 accreditation in echocardiography developed in conjunction with the Intensive Care Society and British Society of Echocardiography. It has been adopted by the Joint Faculty of Intensive Care Medicine of Ireland as the framework for teaching level 1 echocardiography to Intensive Care Medicine trainees in Ireland. They have identified "FUSIC Heart" as being deliverable on a national scale. This pathway allows the acquisition of the skills necessary for basic echocardiographic assessment of the critically ill patient through completion of a recognised training framework. We describe the pathway and some key lessons from implementing this new framework at UHL from July 2020 - July 2023.

**Methods**

There are a number of main competencies that ultrasound training for critical care medicine aims to achieve[1]. The structure of the FUSIC Heart pathway is as follows:

1. The trainee completes a series of online lectures.
2. The trainee attends an approved basic echocardiography course.
3. The trainee identifies a mentor from a list of accredited mentors or experienced ultrasound providers of an equivalent level.
4. The trainee attends practical small-group scanning sessions with hands-on scanning experience supervised by their mentor.
5. The mentor supervises their first 10 cases.
6. The trainee completes a logbook of 50 cases within a 1-year period.
7. The trainee stores all scans in a confidential online storage database with de-identified images for review by mentors/supervisors.
8. Upon completion of their logbook, a 'triggered assessment' is conducted by a supervisor (Level 2 TTE accreditation or equivalent) to assess competency in a real-life scenario e.g., on a cardiology inpatient with an identifiable cardiac pathology. The supervisor is often not the original mentor.

**Results:**

The FUSIC Heart training pathway has been available at UHL for over three years now. Since its inception, our experiences of implementing this training framework are as follows:

1. The main group taking this accreditation are Anaesthesia & Intensive Care Medicine trainees and Cardiology trainees. Emergency Medicine trainees are also engaging but to

a lesser extent. There is no specific Irish formal training pathway for basic echocardiography for cardiologists early in their career, so the learning of this skill is often self-directed and unstructured.

2. The time commitment for pursuing this pathway is considerable for both the trainee and the mentor, usually undertaken on top of an already demanding clinical workload.
3. Fewer than 25% of trainees complete the accreditation process within the designated 1-year period. Over three years we have had eight trainees from a total of thirty-five that attended scanning sessions go on to complete their accreditation. This has led us to develop a better filtering process. Trainees must have uploaded scans and submitted certification of completion of online modules prior to attendance at dedicated scanning sessions.
4. Cardiology trainees have the highest completion rate and were seen to complete the program in 3 months or less. This was largely attributed to access to patients with cardiac pathology, both in the outpatient clinic and on the coronary care unit.
5. Integration with cardiologists and cardiac physiologists allows the training platform to grow locally and to gain recognition, support and greater access to resources. Additional mentor availability results in increased access to supervised scanning with more trainees taking part.
6. Teaching correct ergonomics and scanning technique from the beginning is desirable as it can be difficult to reverse habits once formed.
7. Having actors/volunteers available initially for practice scanning enabled trainees to focus on scanning.
8. Following a structured training pathway enabled greater trainee and trainer commitment and clarity of purpose and gave a framework for skill acquisition.
9. Frequent uploading of scans as they happened rather than all at once allowed more in-depth feedback and greater development between scans.
10. Formal rehearsal of the triggered assessment was a useful exercise.

**Discussion**

Increasingly, basic echocardiography is recognised as a core skill for doctors looking after a critically ill patient. The integration of point-of-care ultrasound in the diagnostic process of undifferentiated hypotension has been shown to contribute towards improved emergency diagnostic judgements and helps to guide initial therapies and resuscitation[2, 3]. There is now widespread agreement among intensive care physicians that general critical care ultrasound and basic echocardiography should be mandatory in the intensive care curriculum[1]. Over the past decade, there has been an exponential rise in the use of critical care echocardiography both globally and here in Ireland[4].

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Training of Intensive Care Medicine trainees without previous knowledge in ultrasound has been shown to be possible and efficient to address simple clinical questions using point-of-care echocardiography[5]. A pathway for teaching and learning basic echocardiography is now in place, evolving and growing in popularity and recognition at UHL. This is likely to become an increasingly utilised pathway for Intensive Care Medicine trainees in different centres around Ireland. As this training pathway develops nationally, we feel that sharing these key lessons from our experiences to date in UHL can help other centres to plan their programme for echocardiography teaching more efficiently.

**Declarations of Conflicts of Interest:**

None declared.

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