

# Case Study



## Royal Derby University Hospital integrates simulation into its Ultrasound Critical Care Course (DUCC)



*Developed by Dr. Craig Morris, Consultant Intensivist and Anaesthetist at the Royal Derby University Hospital, the DUCC course is a stimulating two day course of lectures and workshops covering the essentials of transthoracic echocardiography in critical care settings. The course is CPD accredited by FICE (Focused Intensive Care Echo) and the Royal College of Anaesthetists (RCoA).*

Over the last 10 years, the use of ultrasound has evolved into a valuable diagnostic and patient monitoring aid in the fields of anesthesia and intensive care. The increasing availability of small, portable 'point of care' devices has resulted in a greater interest from clinicians outside the traditional fields of cardiology and cardiac anesthesia to acquire a working knowledge of ultrasound practice. With this growing interest has come the need to explore and develop training programmes to ensure competencies for appropriate staff are clearly defined and achieved. The DUCC course has been designed in response to this need and allows the Royal Derby Hospital to optimise the use of ultrasound in the management of critically ill patients as it seeks to further increase patient outcomes while ensuring patient safety.

### An emphasis on the practical

The current training pathway available to UK intensivists, and open to non-intensivists as a competency based programme is Focused Intensive Care Echocardiography (FICE), developed as a collaboration between working groups of the Intensive Care Society and British Society of Echocardiography. FICE is a 6- 12 month mentored module, which while including a basic echo course, is more importantly delivered through mentoring and supervision as students compile their log books of 50 ultrasound studies while 'on the job' over this period. As a co-author of the FICE training programme, Dr Morris and Derby Hospital's DUCC course provides the key FICE learning objectives but adds additional content with topics including Color Doppler and calculative assessments of cardiac function such as stroke volume. Recognition of pathology is also a feature of the course including the more common in critical care settings such as: hypovolemia, aortic dissection, mitral regurgitation and right ventricular

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*Dr. Craig Morris, Consultant Intensivist  
Royal Derby University Hospital*

dysfunction. Much of this additional content was made possible by use of Medaphor's HeartWorks Simulator, which facilitated the hands-on workshops.

Commenting on the overall design of the course Dr. Craig Morris said, "While our lectures covered the principal themes of basic echo, we were keen that the emphasis of this course was on the practical. To achieve this, delegate numbers were limited to four per work station and balanced the use of standardized patients for the practice of probe handling skills to achieve standard viewing planes and the HeartWorks simulator to help users visualize anatomical relationships with ultrasound views, as well as recognize pathology and apply Doppler tools for quantitative assessment."

### Shortening the learning curve

A unique feature of the HeartWorks simulator is the realism of the real-time, beating animated 3D heart. Anatomically correct, the animation of the heart model allows for sections to be removed and sliced to reveal underlying structures that will help students understand and interpret image relationships between corresponding ultrasound views.

Commenting on the use of simulation in the course, Dr. Morris said, "Teaching ultrasound presents some unique challenges to the student. Students must refine their dexterity to become proficient in probe handling skills to acquire quality images, understand and interpret what they see and act on the information correctly.

### Reducing 'Skills-Fade'

Real-life experiences will often provide the most profound teaching moments but in a culture of patient safety, it is essential that clinicians have acquired the necessary approved competencies before attending real patients. Simulation can replicate these teaching moments and not only shorten the learning curve to a skill that has been dependent on

time, available supervision and sufficient presentations of patients with varied pathology; it also presents a solution to the realities of 'skills-fade' for clinicians who do not regularly practice ultrasound within their respective clinical disciplines." Dr Morris is perhaps a case in point; working outside of a specialist cardiac unit, the Heartworks simulator enables crucial yet "occasional" diagnoses not to be missed eg acute mitral valve failure, and examination technique eg transesophageal echocardiography to be refreshed in the absence of actual pathology.

### Looking ahead...

Feedback from the course has been very positive with delegates particularly enjoying the time given to the simulation workshops. Commenting on the future of ultrasound training at Derby, Dr. Morris said, "It is important that we can measure our training outcomes and certify competence to ensure standards at the hospital are assured and of the highest standards. We are keen to explore the possibilities of implementing certification with the HeartWorks START (Student Software and Review Tool) software programme. Being able to set tailored simulated tests with gradient levels of complexity that assess both the students' theoretical and practical knowledge from basic to advanced practice will be extremely helpful in establishing benchmark standards at the hospital in a measurable way."

The Royal Derby Hospital also delivers courses in lung ultrasound and advanced echocardiography.

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