

Progress Through Partnership:

Perspectives from Pediatric Disciplines on the ASE Recommendations for Cardiac Point-of-Care Ultrasound in Children

IN 2020, ASE published recommendations regarding the role of the Echocardiography Laboratory (Echo Lab) in Adult Cardiac Point-of-Care Ultrasound (POCUS)

education.¹ Shortly thereafter, a multidisciplinary task force was developed to explore the unique considerations for pediatric Echo Lab involvement in pediatric cardiac POCUS. Recently published ASE recommendations developed by this taskforce attempt to define cardiac POCUS scope of practice and identify important opportunities for echo lab and pediatric cardiologist support of POCUS initiatives.²

As co-authors of the recommendations, we recognize that our singular voices are insufficient to account for all the perspectives within our respective communities. Yet, the process of working together has illuminated a singular goal ultimately guiding their development: to improve the care of sick children. This article explores how the recommendations were influenced by both shared and unique experiences as clinical providers across different pediatric subspecialties, and might change our individual and collective care of children moving forward.



The Pediatric Cardiology Perspective

Contributed by Alan Riley, MD, Baylor College of Medicine, Texas Children's Hospital

With more portable ultrasound devices in the hands of non-traditional imaging medical providers, there can be a natural initial response that cardiac POCUS is a direct assault upon cardiology scope of practice and revenue streams. It is informative to remember the origins of echocardiography in cardiology were initially viewed as an attack upon radiology services. When Dr. Harvey Feigenbaum, considered “the father of echocardiography,” was trying to advocate for a larger cardiologist role in cardiac imaging, the response was purportedly blunt and dismissive from the then-chair of the American College of Radiology, Harold Schwinger, MD:

“We can’t allow that. We are medicine’s imagers.”³

Not surprisingly, Dr. Feigenbaum cites this conversation as one of the final inspirations to create the American Society of Echocardiography in 1975. The organization has a subsequent long track record of collaboration outside of cardiology with multi-disciplinary leadership and via multi-disciplinary guideline statements.

Due to the broad variety and technical imaging needs unique to pediatric congenital and acquired heart disease, pediatric cardiologists have a distinctive task in the growth of cardiac POCUS. In this month's JASE, the recommendations² provide the best available guidance for the use of pediatric cardiac POCUS by non-cardiologists while also providing a framework for pediatric cardiologists to deliver collaborative leadership. With the goal of partnering to optimize patient safety and outcomes, pediatric echocardiographers and sonographers can help colleagues within their own communities and institutions build robust training initiatives, competency assessments, and quality assurance programs. While we all agree on the wisdom of collaboration, this document can be used in tandem with the 2020 ASE Recommendations for Echocardiography Laboratories Participating in Cardiac POCUS and Critical Care Echocardiography Training¹ to identify adequate time and resources to support these efforts and maintain their health and longevity.

This document does not address specifically how pediatric cardiologists can use cardiac POCUS themselves. Cardiology expert use of cardiac POCUS, particularly in non-emergent settings, is not defined. The potential of cardiac POCUS in hands of pediatric cardiologists to improve medical management, patient satisfaction, family counseling, and/or outpatient clinic efficiency needs further exploration.^{4,5} It is also evident that pediatric cardiologists have much to learn from pediatric subspecialty colleagues about innovative bedside ultrasound evaluations. The use of bedside lung ultrasound⁶ or multi-system organ ultrasound protocols⁷ in volume status assessments seem like ultrasound imaging protocols that could possibly translate well to clinical use in the echo lab, cardiology clinics or acute care cardiology units. Ultrasound is becoming a common language in modern pediatric medicine, and collaborative uses of ultrasound across disciplines seems to be the future.



The Pediatric Critical Care Perspective

Contributed by Thomas Conlon, MD, Children's Hospital of Philadelphia

Over the past two decades, critical care professionals primarily learned ultrasound as a procedural adjunct. Now, ultrasound machines are ubiquitous among the technologies encountered in the pediatric intensive care unit and are incorporated in both procedural and diagnostic applications, including evaluation of the heart. Literature supports the rapid acquisition of ultrasound skill by non-imaging specialists⁸ and the discovery of new information⁹ facilitating rapid assessment and timely targeted interventions improving outcomes.¹⁰ Critical care physicians and cardiologists have a shared love of physiology only superseded by our real-time need-to-know physiology.

The publication of the ASE recommendations regarding the role of adult¹, and now pediatric Echo Labs² in supporting cardiac POCUS program development integrates not just divisions, but communities. They open conversations that may be difficult but are necessary in achieving our shared goals of optimized care delivery. We must be willing to engage in these

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conversations. Studies suggest that, among POCUS learners, prominent perceived barriers to POCUS implementation include a lack of experts available for training and supervision.¹¹ Interestingly, our recent survey of pediatric Echo Lab leadership identified a lack of willingness or interest among POCUS learners to receive training from cardiologists.¹² The recommendations establish a framework to begin and guide community communication and collaboration.

The ASE recommendations also attempt to set forth suggestions for cardiac POCUS training and translation to clinical practice. Within the Echo Lab survey, a prominent concern among cardiology colleagues is the risk of mis- or missed diagnosis by POCUS providers.¹² Currently there are no definitions of POCUS competency across clinical applications and therefore no methods of competency measurement and no standards for training. Yet how much of what we “do” have definitions and validated measures of competency? POCUS presents an exciting opportunity to qualify and quantify educational outcomes and model methods of developing competencies when integrating new technologies in clinical care. The widespread agreement among Echo Lab leadership regarding involvement in defining and delivering POCUS education is how this opportunity might best become a reality.

We are far from widespread dissemination of reliable and sustainable POCUS programs, but the most efficient and effective method of reaching our destination is by going there together.



The Pediatric Anesthesiology Perspective

Contributed by Wanda C. Miller-Hance, MD, Baylor College of Medicine, Texas Children's Hospital

Approximately 6 million pediatric patients in the United States undergo anesthesia care annually, a quarter of them being infants.¹³ This figure represents a staggering 10% of American children. Over time, technological and quality advances have significantly improved the safety of anesthesia in children.¹⁴ However, despite a favorable safety profile and low rates of complications, the pediatric age group is recognized as a vulnerable population during anesthesia care. Children are well known to have the potential for critical events requiring a high level of vigilance, preparedness, and immediate response to institute interventions that limit morbidity and, in some cases, can even be lifesaving.

Anesthesiologists have been quite familiar with the principles of ultrasonography, have made significant contributions to perioperative ultrasound and taken advantage of this technology for many years. Notable applications include those regarding vascular access, regional anesthesia, and transesophageal echocardiography. The important role that POCUS plays in perioperative medicine to assist patient management has also been demonstrated and continues to be recognized.¹⁵ Yet, the widespread adoption of cardiac POCUS in pediatric anesthesia and respective training efforts

have lagged behind other pediatric fields. This is even though a significant number of acute perioperative events in children revolve around the respiratory and cardiovascular systems and are likely to benefit from the goal-directed immediate real-time assistance that cardiac POCUS can provide in these settings.

Pediatric anesthesiology has been, and continues to be, at the forefront and a leading voice in safety and quality in children. The recent publication addressing pediatric cardiac POCUS² will undoubtedly foster additional interest and promote further implementation of this modality within the pediatric perioperative environment. The recommendations are also likely to stimulate the exploration of unique aspects of the cardiac POCUS practice in pediatric anesthesia and expanded applications in the perioperative care of children.

The fact that the development of these guidelines was a combined effort of several disciplines, integrating various types of expertise, and recognizing potentially different applications, should assist in conquering usual obstacles and barriers when technology customary to different medical fields is used or shared. This common ground effort among pediatric subspecialties should correspondingly promote a culture of interdisciplinary collaboration, knowledge, and learning in general.

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As the adoption of cardiac POCUS continues to evolve, several aspects will require ongoing appraisal. These include the quantitative impact of the exam findings on clinical practice and patient outcome, and the frequency of diagnostic errors associated with study interpretation and inappropriate interventions.



The Pediatric Emergency Medicine Perspective

Contributed by Charisse Kwan, MD, University of Western Ontario, Children's Hospital, London Health Sciences Centre

Point of care ultrasound performed by pediatric emergency medicine (PEM) physicians has increased dramatically in clinical importance during the past three decades. Currently, all emergency medicine residency programs in Canada and the United States are required to teach ultrasound in their curriculum, and 95% of pediatric programs queried reported using emergency ultrasound within their practice setting by 2011.¹⁶ Accordingly, there has been progressive growth of scientific literature demonstrating the benefits to quality of care, and the ability of emergency physicians to accurately interpret focused ultrasound exams.

However, over the years, PEM POCUS physicians have struggled to educate themselves and others within the subspecialty without the support and guidance of our pediatric subspecialty colleagues. As such, the definition and limitation of applications as well as learning curves and competency standards have been slow to develop. The publication of the ASE recommendations² is a welcome, needed, and highly anticipated document supporting collaboration between our cardiology colleagues and POCUS physicians from

an ever-expanding number of pediatric subspecialties. Through many hours of thoughtful discussion amongst experienced cardiologists and POCUS physicians, it suggests basic standards for POCUS cardiac imaging, training, and competency. These pediatric recommendations (along with the adult POCUS cardiac recommendations)¹ are the first of their kind, soliciting consensus across so many of the pediatric subspecialists and attempting to define training and competency in cardiac POCUS imaging.

It is my hope that, with this publication, future work in POCUS cardiac imaging will foster seamless partnerships amongst POCUS physicians and cardiologists in an effort to optimize patient-centered care. It also hopefully serves as a blueprint for other subspecialty collaborations not just in ultrasound, but also in the integration of other technologies that, when shared, may improve the care of children everywhere.

Integrating Cardiac POCUS Perspectives

The question “why” cardiac ultrasound has been asked and answered within our respective specialties. The question “how” cardiac ultrasound is more nuanced. The cardiology community once themselves asked, and worked diligently to answer, this question. Thus, the cardiology community is best positioned to support cardiac POCUS initiatives and facilitate translation of education to life-saving care. Non-cardiology communities learning cardiac POCUS must embrace responsibilities for proper governance ensuring that the ideals of quality care are rendered at the bedside through the development competent cardiac POCUS imaging providers. As reflected within the critical care, anesthesiology and emergency medicine perspectives, learner populations may be at very different places within and between specialties regarding implementation needs. These recommendations² were designed to provide a framework acknowledging the need for open discussion incorporating local contextual elements to both define and achieve successful cardiac POCUS implementation. Only through open discussion and collaboration will we be able to realize our shared goal of improved outcomes for the children we serve.

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