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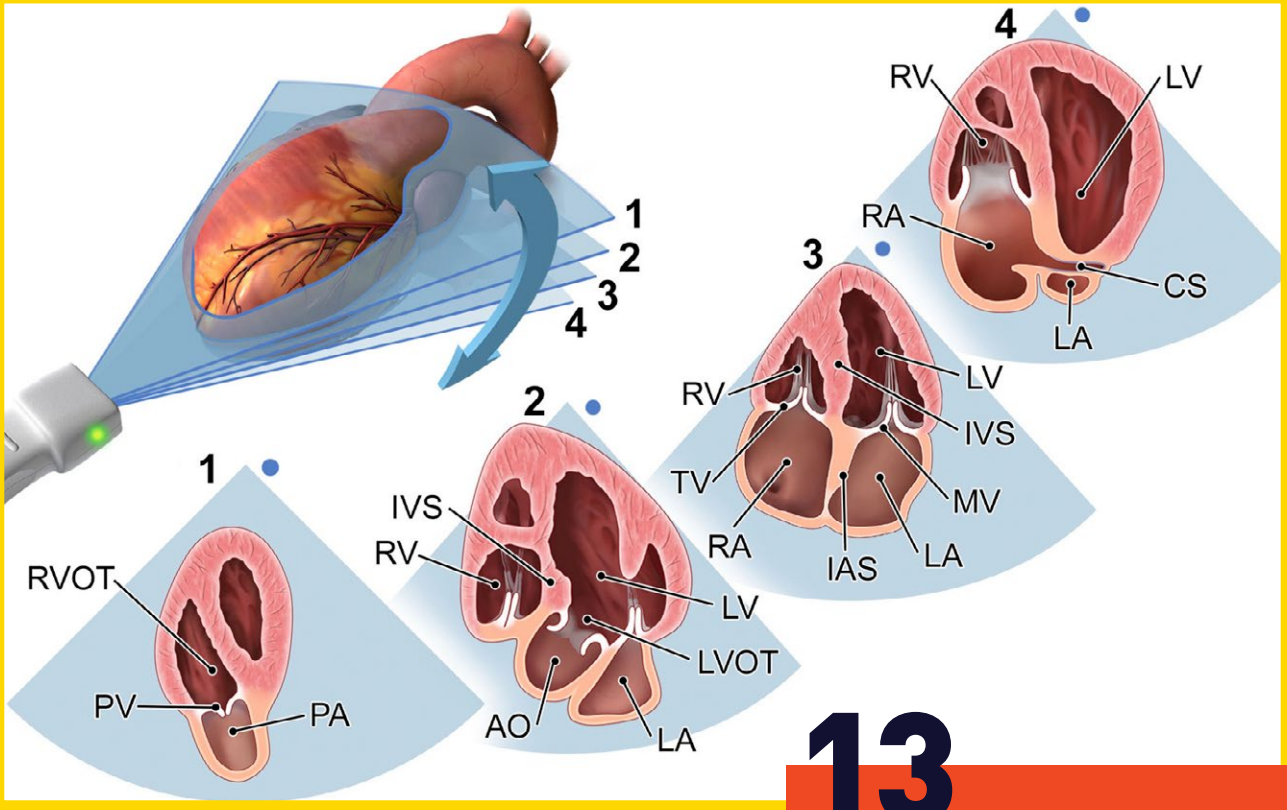

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ABOUT ASE

The American Society of Echocardiography (ASE) is a professional organization of over 17,000 physicians, cardiac sonographers, nurses, and scientists involved in echocardiography, the use of ultrasound to image the heart and cardiovascular system. The Society was founded in 1975 and is the largest international organization for cardiovascular ultrasound imaging.

ASE'S MISSION

ASE is committed to excellence in cardiovascular ultrasound and its application to patient care through education, advocacy, research, innovation, and service to our members and the public.

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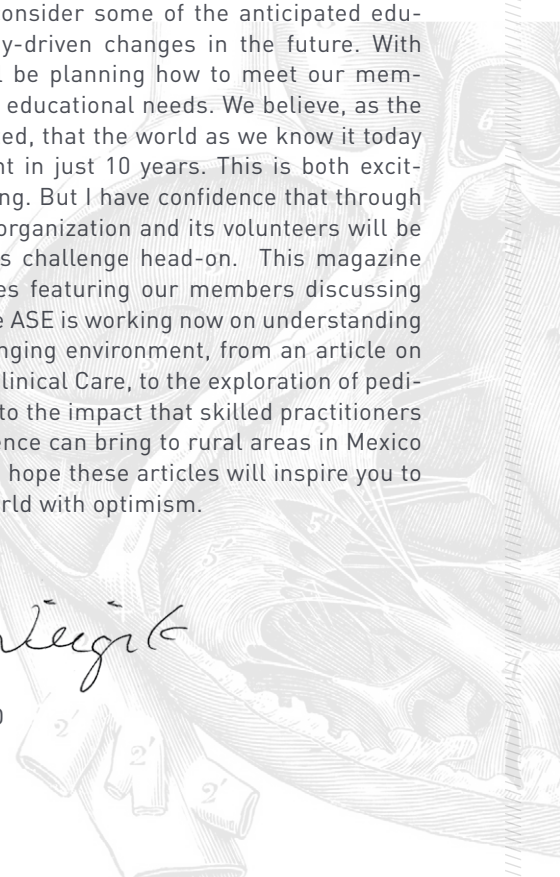
ASE MEMBERS:

The Pace of Change is Accelerating....
(Forbes Magazine, March 2018)

As I am writing this, ASE's Board of Directors are preparing to meet and have an annual "deep-dive" into a specific topic at their November retreat. This year's subject is "Education." It goes without saying that the organization has staked its reputation on the quality of its educational offerings and resources in the field of cardiovascular ultrasound. We plan to continue this long-standing tradition by bringing thought leaders together to consider some of the anticipated education and technology-driven changes in the future. With their insights we will be planning how to meet our members perceived future educational needs. We believe, as the Forbes article predicted, that the world as we know it today will be vastly different in just 10 years. This is both exciting and nerve-wracking. But I have confidence that through pro-active work, the organization and its volunteers will be prepared to meet this challenge head-on. This magazine contains many articles featuring our members discussing their takes on how the ASE is working now on understanding and shaping this changing environment, from an article on How AI is Impacting Clinical Care, to the exploration of pediatric lab procedures, to the impact that skilled practitioners and cutting-edge science can bring to rural areas in Mexico and West Virginia. We hope these articles will inspire you to face this changing world with optimism.

Robin Wiegerink, CEO



THE COVER ART is from the new Guidelines for Performing a Comprehensive Transthoracic Echocardiographic Examination in Adults. See article on page 13.

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EDITOR'S NOTE

ASE is very grateful to our members who contribute to *Echo* magazine and values their willingness to share personal insights and experiences with the ASE community, even if they may not be in total alignment with ASE's viewpoint.

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Technology has created a world without borders. In what ways has technology changed your practice in the past year?

Jonathan Lindner, MD, FACC, FASE
President
Oregon Health & Science University

Technology, while important in advancing the care of our patients, can be a double-edge sword. The obvious example is the electronic health record (EHR). Without a doubt, the EHR has:

- centralized complex medical records,
- improved the efficacy and speed of communication, and
- provided a tool for avoiding errors and harmful drug interactions.

Yet, the EHR has forced healthcare workers to spend less time on face-to-face patient care and more time transcribing, billing, and inputting data. It is no wonder that many recent publications have linked use of the EHR with provider dissatisfaction and burnout. In echocardiography, the story is pretty much the same. We have benefited from centralized PACS systems that are accessible from remote monitors located not only in the echo lab but in the office, clinic, wards, and even home. We have benefited from new echo technologies that have revolutionized care such as 3D imaging for guiding percutaneous interventions in real-time; and the use of contrast to better visualize cardiac structure and function. New technology has also made it easier, through automation, to perform quantitative echo in terms of ventricular function, valve disease, and chamber size. This innovation has helped workflow for sonographers and has improved quality. At the same time, it has introduced new sources of error and has increased the "information load" which sometimes has the unintended consequence of forcing the interpreter to deal with discrepant data. New technology always looks shiny and exciting on the surface, but there are always growing pains that are associated with its implementation. In the coming years, I would love to see less attention to the shiny new button, and more attention to how technology can help solve the major problem of sonographer work-related injuries. The time to address this issue has come.

Madhav Swaminathan, MD, FASE, FAHA
President-Elect
Duke University Health System

Technology truly transcends borders. And this truth is most visible in the field of information technology, which has fewer barriers to global adoption than other forms of technology in healthcare. One of the most important aspects of what we do is education–both in terms of teaching as well as learning. It is probably the one thing that influences the practice of medicine the most. While advances in ultrasound technology have helped echocardiographers explore new methods of characterizing heart disease and further refining risk prediction, effective and rapid dissemination of this information encourages widespread adoption. Furthermore, exchange of information across borders encourages dialogue, and accelerates both the development and application of this technology, and improves care. The socialization of information, for me, has been the most significant revolution in technology that has impacted my practice of echocardiography. The wide reach of social media, and the universal access that professionals have, almost agnostic of national economic status, makes this a powerful medium for information exchange and enhancing of teaching and learning.

I have seen a tremendous improvement in the way I personally learn and teach through digital exchanges like Twitter and Facebook. With access to more than half the population of the planet, technology of this kind is hard to beat. Through 'tweetorials' and Twitter journal clubs, we have seen robust engagement from echo enthusiasts from diverse cultures and backgrounds with one simple aim – to improve their knowledge in echocardiography and become better healthcare providers. This is a powerful statement. I have learned more from interacting with experts on social media than I ever did through physical interactions in conferences. In fact, my most influential teachers are now those with a wealth of experience who enthusiastically share information from their practice to help others improve their knowledge. I have become a better echocardiographer from the sharing of experiences with other practitioners through social media technology. I am sure my fellow digital learners feel similarly. This technology truly has transcended all borders. Follow ASE (@ASE360) on Twitter and find out why.

Judy Hung, MD, FACC, FASE
Vice President
Massachusetts General Hospital

Technology is the key driver of innovation in medicine and this is especially true for echocardiography. There are constant technological improvements in imaging for both diagnosis and therapy. Within the past year, my practice has changed in a number of ways. One is improved connectivity and access to obtaining imaging data for patients. This allows for better access, efficiency (decreased need for repetitive testing), and more timely and informed decision-making. Another is improved imaging technology (machines, probes, and software) that has allowed better interventional imaging guidance in structural heart cases and also clinical decision-making for subclinical myocardial dysfunction (strain imaging in valvular disease and myopathy). Importantly, technology has improved communication and patient access to medical care.

Technology has changed how I deliver educational content and receive education. In my early years, education was often delivered in the form of face-to-face meetings, and hands-on skill demonstrations, then followed with a paper and pencil test to demonstrate knowledge. Now, many healthcare and academic institutions have embraced the use of technology in the form of learning management systems to deliver education in hybrid methods (face-to-face and online educational formats) or gone to complete online delivery of educational content. Apps are also being integrated into the classroom. Advantages of hybrid and online courses are that they are able to address many learning styles, increase efficiency of sharing knowledge with many learners at one-time, and virtually can be delivered at any time. Technology has also allowed for the delivery of the educational content to be interactive and engaging. I am excited to see how technology will continue to change how we deliver education and share knowledge.

Carol Mitchell, PhD, RDMS, RDCS, RVT, RT(R), ACS, FASE
Treasurer
University of Wisconsin School of Medicine and Public Health

Working in a community hospital offers a different view of how technology affects the practice of echocardiography. The community medical center works hard to stay current in practice and technology, but often they are not early adopters of the newest technologies for various reasons.

As a clinical manager in cardiology services I function as an Advanced Cardiac Sonographer (ACS). The use of remote access to review images has been invaluable. I can review images remotely and assist and guide sonographers to ensure the clinical question is answered even when I am unable to be at their side. In the cath lab and operating room settings, remote viewing allows the cardiologist to offer direction to the sonographer and heart team as well as stay abreast of when they will be needed in the procedures. This provides better time utilization and has increased volume in procedures using echocardiography.

The use of Ultrasound Enhancement Agents (contrast) has also advanced in my facility. With the support of ASE guidelines documents we have been able to reduce more and more barriers to the use of contrast. Protocols are set so the sonographer can opt to use contrast when they deem it is appropriate. Sonographers can start IVs and administer the contrast. Using contrast in our lab is now truly seen as an advantageous tool and not an obstruction to workflow.

Technology advancements are always fun (who doesn't want the newest smart phone or gadget)! Technology advancements that are amazing are those that aim to provide better care for our patients. Echocardiography has seen amazing advancements since its inception. I am hopeful that the next wave of technology continues to develop echocardiography as that foundational and necessary tool in cardiac care and imaging.

Elizabeth F. McIlwain, MHS, ACS, RCS, FASE
Secretary
West Jefferson Medical Center/ LCMC Health

Wyman W. Lai, MD, MPH, MBA, FASE
Council Representative
CHOC Children's Hospital

I am now using the MD1World website to screen children for a humanitarian mission in Vietnam. The cardiology team at Hanoi Heart Hospital is able to upload images, including echocardiography videoclips, for the team in the United States to review prior to the trip. This allows us to properly determine the equipment, material, and medication needs for our upcoming congenital heart surgery mission. We can also advise the team in Vietnam about the preoperative testing needs of some of the patients prior to our arrival. We are able to discuss the patients via Skype video chat. Without this communication technology, which is not all that advanced, we would not arrive in Vietnam as well prepared to operate. We also plan to use the website to provide ongoing easily available teaching modules for practitioners around the globe.

Vera H. Rigolin, MD, FACC, FASE, FAHA
Immediate Past President
Northwestern University Feinberg School of Medicine

We live in a world that is surrounded by technology. Our existence at home, work, and leisure are all influenced in one way or another by computers, apps, and other electronic media. The field of medicine has also embraced technology. For example, paper charts have been replaced by the electronic medical record, which allows us to access our patients' data anytime, anywhere. Cardiovascular imaging is a field that exists today because of technology. Echocardiography, in particular, has benefited from innovation and computer processing. In the last year, our echo laboratory has significantly increased the use of strain and 3D echo imaging in many of our patients. The use of advanced imaging techniques has allowed us to discover new, previously undetected disorders. 3D echo has also revolutionized the guidance of percutaneous treatments of structural heart disease. As the amount of data grows, we need tools to help us quickly and easily access information. The updated ASE guidelines app is one such tool that we use daily when interpreting echocardiograms to assure that our reports are in alignment with ASE recommendations.

Working in an academic institution, teaching is one of our missions. We are fortunate to be affiliated with a world-class medical school that has embraced technology as a teaching tool. Our simulation laboratory allows students to learn basic and complex medical information that complements bedside teaching. In the last year, the use of hand-held devices and echo simulators has played a more extensive role in the education of our students, residents, and fellows. The use of WebEx during conferences has also facilitated sharing knowledge with our affiliate institutions.

Technology is now an integral part of our daily lives and influences patient care, research, and education. Significant advances in cardiovascular imaging have occurred in the last several years as a result of technology. I can't wait to experience the new innovations that technology will bring to our field in the future.

How is New Technology, Like AI, Impacting Clinical Care?

Artificial Intelligence (AI), one of the hottest tech topics in not just medicine but almost every field right now, has the promise to improve both diagnostic accuracy and workflow in echo labs around the world. Five ASE members agreed to share their expert thoughts on how they see AI impacting clinical care and the field of cardiovascular ultrasound as a whole.

Contributed by: (RA) *Rima Arnaout, MD, FASE, Cardiologist and Assistant Professor in Medicine, University of California, San Francisco, San Francisco, CA;* (FA) *Federico Asch, MD, FASE, Director, Echocardiography Core Lab, MedStar Health Research Institute and Associate Professor of Medicine, Georgetown University, Washington, DC;* (MJ) *Madeline Jankowski, BS, RDCS, FASE, Lead Cardiac Sonographer, Northwestern Memorial Hospital, Chicago, IL;* (SL) *Steven Lester, MD, FASE, Associate Medical Director of the Department of Business Development, Associate Medical Director of Contracting and Payer Relations, Director, Hypertrophic Cardiomyopathy Clinic, Mayo Clinic Arizona, Scottsdale, AZ;* (PS) *Partho Sengupta, MD, FASE, Director, Cardiovascular Imaging, Chair, Center for Innovation, West Virginia University Heart and Vascular Institute and Chief and Professor of Medicine, Section of Cardiology, WVU School of Medicine, Morgantown, WV*

When you first started hearing about Artificial Intelligence (AI) as it related to echocardiography, what was your reaction?

RA: My reaction was excitement. There are a lot of ways this can improve what we do as echocardiographers. My lab has published some of the very first work on using AI for echocardiography.

FA: I do not think I had an in-depth understanding of the potential AI had for changing our practice. I initially thought of it purely as an automated measuring tool.

MJ: Sometimes when we're faced with the unknown, fear is the first thing that comes to mind. Where some might have worries about being replaced, I know that echo still needs a human touch. There are so many subtleties in our everyday work, like breathing techniques and minute hand motions in our scanning, along with compassionate bedside care, that make echo a very human, user-dependent career. The goal of AI is not to replicate and replace, but to advance and coexist.

SL: *My first reaction was to think of a quote some attribute to Albert Einstein, "Computers are incredibly fast, accurate, and stupid. Human beings are incredibly slow, inaccurate, and brilliant. Together they are powerful beyond imagination."*

PS: I learned about AI in 2011 and realized the full implications for the field of echocardiography while preparing for my Feigenbaum lecture at the Annual Scientific Session of ASE in July 2013. I presented my early data and potential implications for the future of echo in my lecture.

What do you think will be the overall impact of AI on echocardiography as time goes by?

RA: Hopefully, AI will decrease diagnostic error by improving accuracy and decreasing inter-observer variability for image acquisition and interpretation. The ability to do those things at large scale will change our clinical workflows and our ability to research cardiac diseases.

FA: *It will change the way we practice echo and imaging in general. It will help optimize image acquisition and quality, facilitate image interpretation and reporting, expedite processes for more efficient operations, and integrate our imaging readings with Big Data in a way that will help integration into a patient's path of care for a better decision-making process.*

MJ: I think AI will make a lasting impact on access to cardiovascular care around the country and world. It will provide tools for non-experts on how to use ultrasound technology, as well as provide preliminary reads that could be funneled for physicians to confirm. This will allow more people to have access to preventive cardiovascular screening and ultimately diagnose and treat earlier stages of disease.

SL: Its transformational impact on echocardiography will be its ability to expand access uniformly to high quality performance across a much broader user pool.

PS: Despite all the enthusiasm with AI, at present times, complex decisions like determining the appropriateness of a test or the mechanism to weigh and extract information from a study in the clinical context are a few steps that are arduous for current computational algorithms to appertain. The best utilization of AI in present times would be to free up time for physicians from repetitive low-level and uneventful activities, like measurements and data preparation, to spend more direct time on higher calibers of interpretations, patient care, and medical decision-making.

In what ways do you think AI might be able to increase echo lab efficiency?

RA: I hope it may improve acquisition of images, and decrease time spent re-measuring structural and functional measurements. I think these will be available soon.

FA: It will improve image quality, allow for non-experts obtaining focused, limited studies with a better quality, and it will expedite the process of reading and reporting.

MJ: Image recognition software could help physicians read echoes more efficiently. It could provide a basic read in a stat situation, which means a quick decision on whether a full study by a sonographer is required. Scanning assist software could also help screen patients in a primary care setting, so clinical staff could send only people who really need a full echo to the lab.

SL: For any innovation in echocardiography to be widely accepted and adopted it must be equal to or have exceeded its innovation in workflow. Although automating image interpretation is certainly an exciting opportunity, potentially afforded by the application of AI, the humbler initial application is its ability to impact workflow favorably and capital asset management through time efficient and accurate and reproducible quantification of image parameters.

PS: AI algorithms can help in automating several facets of echocardiography measurements and interpretation. Standardized assessments help further improve quality and overall can help increase echo lab efficiency.

How will AI impact the physicians and sonographers in your echo lab?

RA: I hope positively, in the ways specified above. It's important to realize that at the end of the day, AI is simply a new tool applied to echo that is meant to help physicians and sonographers care for patients, just as the advent of harmonic imaging, contrast, and other tools improved image quality in years past.

FA: It will shift our duties to more expert-level ones as machines will be able to take care of the "bread and butter" of our daily operations. Sonographers and echocardiographers will be best when properly adopting AI technologies, in a manner that human input will be incremental to what machines can provide for an end product that is more efficient and of the highest quality.

MJ: *I think AI could add supportive quantitative information, like automated left ventricular ejection fraction, which we will use every day. AI algorithms in reporting could help decrease time spent on preliminary reporting so that sonographer staff can better focus on study quality and patient-centered interactions.*

SL: The evolution of AI into human workflow will initially transform the sonographer role from largely that of image acquirers to one that primarily involves image processing and ensuring that the information is in a place and form that is most readily useable. Early adoption for image interpretation will finally allow us to completely evolve past the videotape era allowing for the presentation of a series of tomographic images based on anatomy or disease states; I refer to this as reading in stacks. This is just the beginning of a large transformational impact on our field. Rest assured though, AI will never exceed the global circle of intelligence as its foundation is based on human experience and knowledge.

PS: Most physicians and sonographers now face an unprecedented time crunch, as they are required to perform and interpret more and more procedures. The need to multitask creates exhaustion leading to burnouts and frequent reporting errors. The use of AI techniques may offer a solution to reduce a physician's workload including repetitive and tedious tasks involved in diagnosing and analyzing patient data and imaging.

What are the ethical challenges associated with AI?

RA: It will always be the responsibility of sonographers and physicians to understand enough about new echo tools to put them in context for the patient, to know when to be suspicious of artifacts or mismeasurements and over-read the study.

FA: A major challenge I see is that as physicians get more detached from the bedside and personal interactions, the patient-physician relationship will change and probably be affected in a negative manner. This is an area on which I believe we have to keep our focus as a medical community and society.

MJ: Technology can have a big effect on our humanity and interactions, and with AI, that problem is even more pronounced. We can overcome this ethical challenge by continuing to provide meaningful interactions with patients, keeping a focus on the human side of what we do.

SL: I am not sure it is a matter of ethics or moral principles but rather the challenge is one of security and truth. How do we ensure validation of the clinical behavior of a model or algorithm? And how do we protect against "hacker-attacks" which may unknowingly disrupt the model leading to false conclusions?

PS: Digitization of healthcare and AI-driven care carries the risk of dehumanizing care besides other challenges like data security and liability of AI-driven decisions.

Do you think that AI will change medical education?

RA: *AI could enhance medical education, or it could make us re-think what is needed to train new echocardiographers.*

FA: Yes, it is doing it already. In regards to echo specifically, AI technologies are coming to medical schools, and probably to colleges and high schools in the near future, to facilitate echo acquisitions at the bedside by novice adopters, and make echo part of the daily initial encounter (physical exam?) with individuals in the health system.

MJ: AI image guiding software can be used in the sonography classroom to learn basic views and scanning techniques. Although AI will be helpful for basic teaching, sonography students still need to understand the underlying significance of the pathology so graduates learn to be sonographers, not just photographers. Off-axis views, following pathology, and breathing techniques are not within the scope of AI, at least not yet! However, AI could be valuable in a classroom setting to track progress of students scanning abilities and reproducibility.

SL: As machines begin integrating into the care-team model as part of the collective medical conscious, then the machines will take care of a lot of the science, and individual knowledge stocks will diminish. The individual's need for a "fire hose" of encyclopedic knowledge will be less important and the role of the care provider will focus more on the human side of medicine, relationship building, empathy, judgement, discussion, and shared decision-making. If this is the case then medical education will transform both with respect to recruitment and curriculum design. Emotional intelligence may exceed the impact of some score on a standardized test or "place holder class" like organic chemistry.

PS: Absolutely, AI can work as a tutor in order to maintain quality of imaging.

Do you think patients will trust the integration of AI into care, and how do you handle explaining it to them?

RA: I think they will. There are a lot of things we do in medicine for the end user, be it for the patient or the physician, that we don't completely understand. For example, how exactly are blood gasses measured from a tube of blood? What is the exact mechanism of a certain antibiotic? We are comfortable with not knowing these things because the indications for, behavior of, and caveats to/side effects of, these lab tests and medicines have been tested and benchmarked with rigorous research. If we do the same for AI-based medical tools, I believe patients and providers will be able to accept them.

FA: They will. AI is now everywhere and has improved processes in other technologies that are part of our daily lives: in your cell phone, in the Internet, in your emails, and in your smart TV at home. We have to bring it back to examples of everyday life for all to understand.

MJ: Patients should understand that AI is another tool we use to make better diagnoses. It will be a leap forward in screening for preventative medicine. As healthcare providers, we just need to continue to provide patient-focused, compassionate care, regardless of the tools we are using.

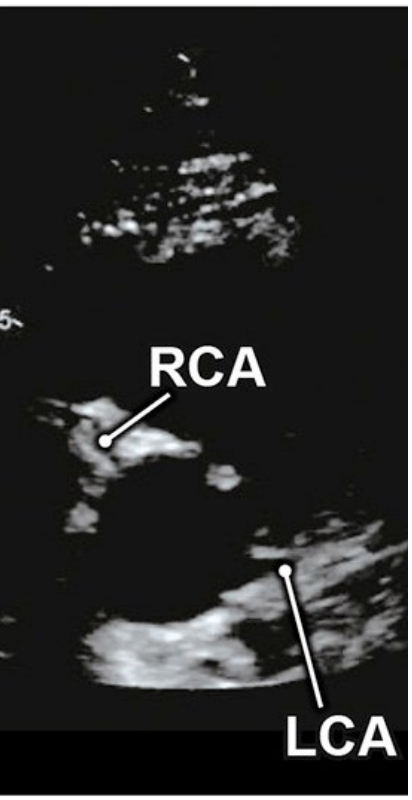
SL: I do believe that the consumer will trust the integration of AI into healthcare. AI in medicine is not a futuristic concept. AI is all around us with a reported 85% of Americans using some program, device, or service that features elements of AI. The healthcare consumer is less interested in the process than the outcome. AI will facilitate the qualities that consumers value and support making more informed decisions.

PS: *A well-functioning patient-physician encounter is an essential part of healing, particularly for chronic disorders where the skills of physicians can influence patients' objective and subjective measures of well-being. Therefore it's unlikely that patients will completely trust decisions solely provided by AI, although AI-driven care may act as a decision support system for triaging problems appropriately to a physician.*

THE COMPREHENSIVE TRANSTHORACIC ECHOCARDIOGRAPHIC EXAMINATION DEFINED

Contributed by: Peter S. Rahko, MD, FASE, Director, Adult Echocardiography, University of Wisconsin Hospital and Professor, Cardiovascular Medicine, University of Wisconsin School of Medicine and Public Health, Madison, WI; and Carol Mitchell, PhD, RDMS, RDCS, RVT, RT(R), ACS, FASE, Assistant Professor, University of Wisconsin School of Medicine and Public Health, Madison, WI.

Why do we need to define the Transthoracic Exam?



The American Society of Echocardiography (ASE) convened a writing group to establish new guidelines for the performance of a transthoracic echocardiogram (TTE). The purposes of the new guideline are to:

1. Establish the content of a comprehensive TTE examination,
2. Provide recommendations for technical performance and appropriate use of instrumentation during the exam,
3. Provide guidance for the integration of all ultrasound-based imaging modalities into the comprehensive exam, and
4. Describe best practices for the measurement and display of data generated by the TTE exam.

ASE first established standards for the comprehensive TTE exam back in 1980 and updated recommended components of the exam in 2011. As echocardiography continues to evolve, there is a need to reexamine what constitutes a contemporary comprehensive TTE for the purpose of:

- Establishing a standard definition of the comprehensive TTE for clinical research protocols.
- Providing a standard for educators teaching new students about the elements of a full examination.
- Establishing guidance for accreditation organizations that judge lab performance.
- Providing for a universal standard of performance to help reduce regional variation in what constitutes a comprehensive TTE.
- Establishing information for advocacy groups to educate the general public, hospital administrators, health policy makers, government regulators, and insurance companies about the depth and breadth of a comprehensive exam.
- Providing knowledge about the use of all major modalities of ultrasound that are necessary for a TTE to help guide industry vendors designing new ultrasound systems as to the type of equipment necessary to fully utilize cardiovascular ultrasound.

Sonographer Performance

As the writing committee surveyed the many excellent educational resources available, we found a void in information available to students and new sonographers. There is a lack of material defining how to best perform the TTE exam. Thus, part of the focus of the new guideline is to provide information focusing on exam performance and how to acquire the echocardiography views.

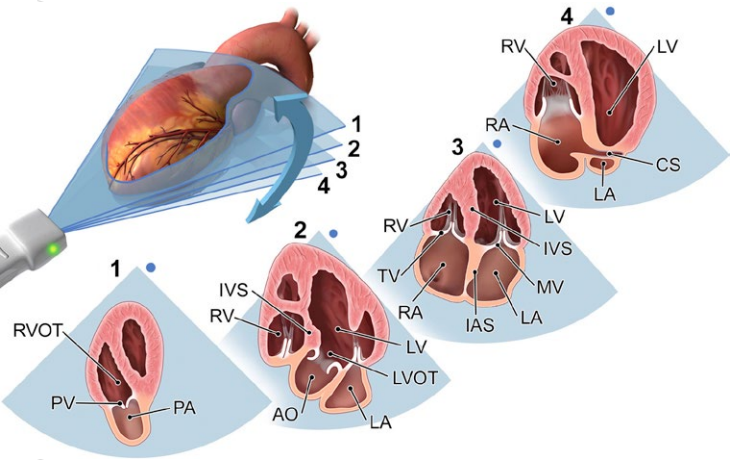
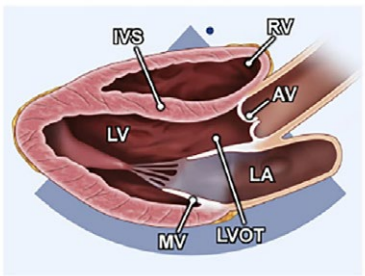


Figure 1

What's in the New Guideline?

Image acquisition. We found a lack of consensus as to how to define the various scanning maneuvers that sonographers use. The guidelines describe and define transducer movements such as tilt, sweep, rotation, sliding, rocking, and angling which we hope will provide a common standard for the future. The guideline provides illustrations of the scanning maneuvers (Figure 1) and labeled illustrations of each view (Figure 2).



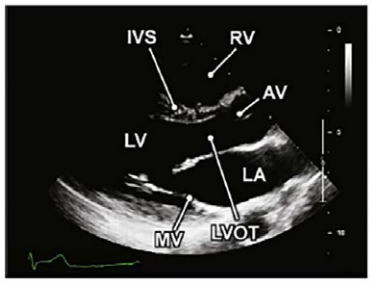


Figure 2

Image optimization. The guidelines include a considerable amount of content, with many examples, regarding best practices for instrumentation settings, image optimization, and pitfalls to excellence in image display. Areas discussed include not only two-dimensional transthoracic imaging but also all modes of Doppler.

The comprehensive examination. The guidelines describe a complete set of views from standard imaging windows that define the two-dimensional exam. Added into this are definitions of effective use of spectral Doppler, color Doppler, and tissue Doppler. We also define basic measurements that should be a part of every comprehensive transthoracic examination.

Specialized procedures. The role of the use of specialized procedures such as utilization of ultrasound enhancing agents and saline contrast studies and strain are discussed in the context of the TTE exam.

The Limited Exam

Limited exams focused on a specific area of interest in a patient who has already had a comprehensive exam. The guidelines provide three examples of brief protocols for a limited examination: follow-up for a pericardial effusion, follow-up for evaluation left ventricular function, and follow-up for pulmonary hypertension. These examples are provided to differentiate a limited exam that is done by an echocardiography laboratory, from a very focused point of care exam done to rapidly answer a single question.

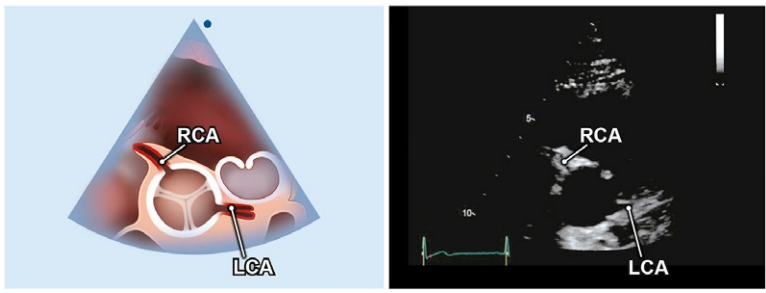


Figure 3

Alternate Views

The guidelines end with a brief overview of some specialized views that may not apply broadly to the routine exam, but can be very helpful in specific circumstances. Examples of alternate views include imaging of the coronary arteries and short axis views from the subcostal window (see Figures 3 and 4).

It is hoped that the guidelines will benefit a wide-range of echocardiographers. We hope laboratories will use these recommendations as a starting point to design comprehensive protocols that best fit the patient populations they serve. As such, ASE plans release of the guidelines not only in traditional journal and written format but also in a wide range of venues from posters to video-based interactive educational products to slide libraries.

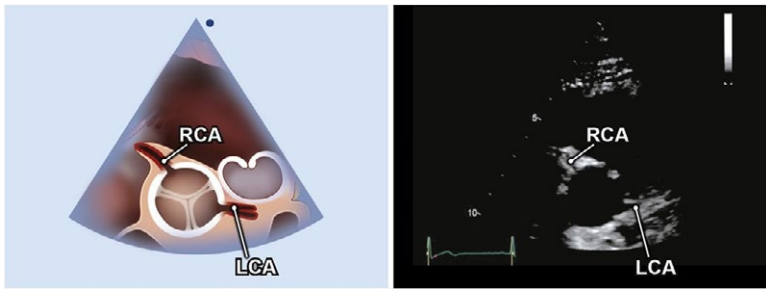


Figure 4

Two live webinars related to this guideline are planned for December 6, 2018 at 12 Noon EST and January 31, 2019 at 6:00 PM EST. These activities are approved approved for 1 AMA PRA Category 1 Credit™. ASE members can register for these webinars free of charge. Nonmembers can register for $25. After the webinars have aired, they will be available online at ASEUniversity.org free of charge to everyone but will not include CME.

A Practical Approach to Ensuring Quality

Contributed by: Geoffrey A. Rose, MD, FASE, Chief, Adult Cardiology, Sanger Heart & Vascular Institute, Atrium Health, Charlotte, NC.

As professionals, we should be striving continually to deliver the highest quality services. To actually do this, we must be able to answer three simple questions:

1. What are we good at?
2. How do we know?
3. What are we doing to get better?

The foundation of quality is built upon on how well we answer these questions.

What are we good at?

We begin by evaluating our innate capabilities, which can be thought of as our structure. Key things to consider:

1. What is the degree of expertise amongst our providers?
2. What tools do they have access to?
3. Day-in and day-out, do they reliably use their expertise and effectively use these resources when delivering care?

In the echo lab, we start this evaluation process by assessing the experience and technical skill of our sonographer and physician staff. We set standards for minimum levels of required training that must be achieved before joining the lab staff. Licensure, credentialing, professional certification—these all are useful proxies for professional expertise and serve as important starting points for building a program of quality.

The next step in our analysis is an examination of the resources (e.g., equipment, information systems) we have available to perform the services we provide. We set requirements for the capabilities of these tools. Technology advances quickly, so it is understood that each piece of equipment in the lab will not always be of the latest technical iteration. Nevertheless, there are lines that demarcate obsolete equipment from that of contemporary standard. For example, no matter our technical proficiency, we cannot claim "we are a high quality echo lab" if our lab equipment does not support use of imaging with ultrasound enhancing agents or provide us with tissue Doppler data.

While a well-trained team utilizing current day equipment is fundamental in building a quality program, this in and of itself does not ensure quality. We next have to consider our processes, or how well we put our people and equipment to use. Key questions:

1. Are we available to provide services?
2. Do we do so in an environment that is safe and patient-centered?
3. Are we complete in capturing the clinical information that is needed?
4. Are we complete in reporting what has been captured?
5. Do we reliably communicate the information to those who need it in a clinically appropriate timeframe?

As defined by the Institute of Medicine, quality comprises six elements: effectiveness, efficiency, safety, timeliness, patient-centeredness, and equity in application[1]. In reviewing the questions above, answering each begins to address these elements.

In sum, if we have an experienced, well-trained staff utilizing up-to-date equipment in a predictable way that leads to consistent and safe application, we can begin to think that we are actually good at providing the service.

But how do we really know?

The next step is quality assessment (QA). This is where attention now centers on the outcomes of the procedures we have performed, the accuracy of the diagnoses we have made, and the impact of how well we have communicated results to the care team. The outcomes measured are the ones most relevant to the particular service. For a specific example, let's use stress echocardiography:

1. Do we obtain the images within an acceptable timeframe post exercise?
2. How often are ultrasound enhancing agents utilized in situations when they should be used?
3. Do we follow our communication policy for reporting test results?
4. What is our lab's overall false positive rate and false negative rate? How much does this vary by sonographer or physician?

The example illustrates the importance of QA, the 'proving ground' for the laboratory's structure and processes. Does everything come together accurately and reliably? The more robust the QA program, the better we are able to answer this question.

Stepwise analysis of each aspect of service is how we initiate a QA program. Going further, we will want to know how our performance compares to that of our peers. This is where clinical registries enter our approach to quality. In benchmarking to peers, we learn not only of our areas of competence (or excellence) but also where we might not quite measure up.

What are we doing to get better?

In his classic work, Avedis Donabedian defined the foundational elements of quality as structure, process, and outcome[2]. These domains correspond to the context of care, the actions of care, and the ultimate effects of care. Examining each allows us to learn where we excel, but more importantly where our opportunities for improvement may lie.

Going further, rather than simply gauging our quality, a program of excellence seeks to improve upon it. This is what we mean by quality improvement (QI): after systematically reviewing all the elements of our program, we then act upon them to make them better.

The QI program is built on a framework of (1) assessment; (2) feedback; (3) education + application of support tools; (4) reassessment. This cycle is continuous, and the frequency of inspection (monthly vs. quarterly vs. annually) is dictated by the degree of deviation of present state from our targeted performance. Chinnaiyan and Weiner provide an excellent summary of a number of QI projects in imaging that have proven effective[3].

From QA to QI and all the elements contained therein, how can we possibly keep track each step along the way? This is the role of accreditation[4]. A rigorous evaluation at each step of the so-called 'imaging chain', coupled with external expert review and peer benchmarking, help us to ensure that each aspect of our program meets our expectations for performance. It is actually the process of accreditation—the purposeful, step-by-step analysis of each domain of quality—that is the true dividend of any accreditation program, rather than any designation ultimately awarded. This is because when done right, participation in an accreditation program helps us to improve. And in the end, that is the aim of any programmatic approach to quality.

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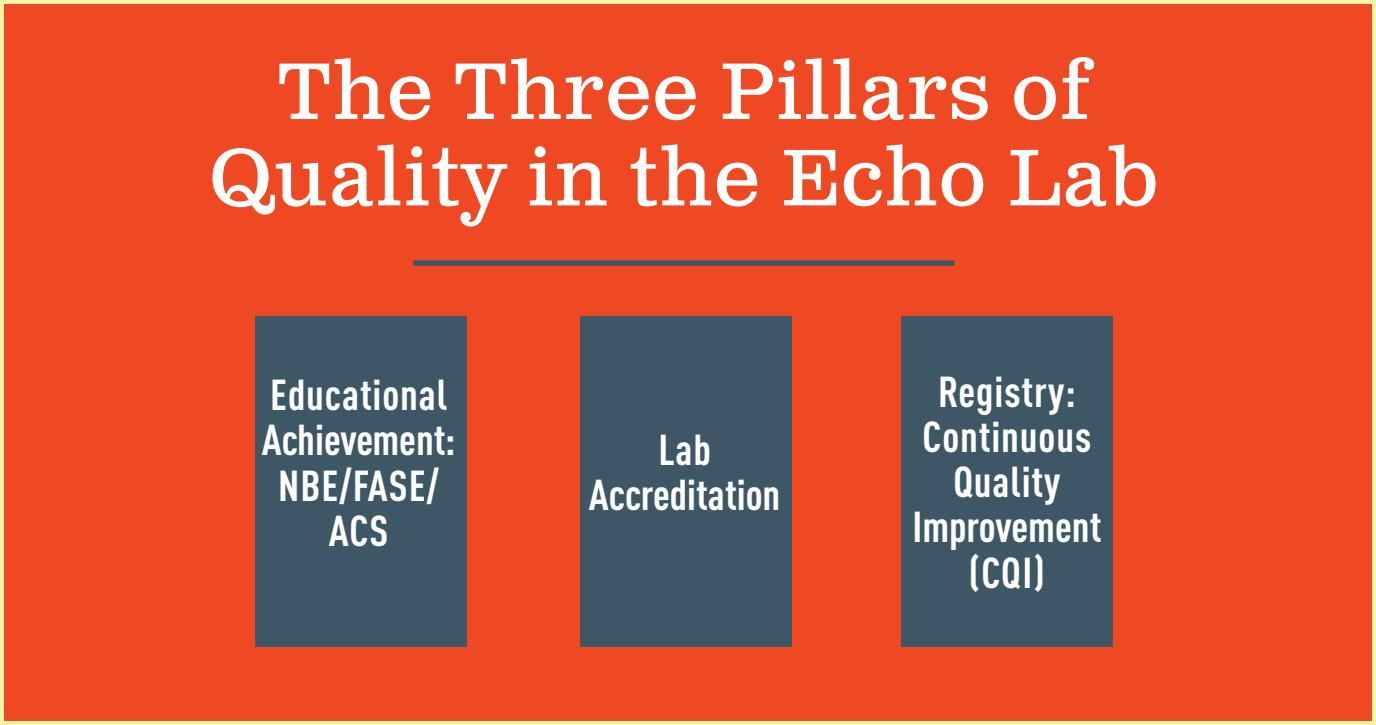
4. Douglas P, Iskandrian AE, Krumholz HM, et al. Achieving quality in cardiovascular imaging: proceedings from the American College of Cardiology-Duke University Medical Center Think Tank on Quality in Cardiovascular Imaging. J Am Coll Cardiolog 2006;48:2141-51



PROJECT CHAGAS:
Making a World of Difference in Mexico
Mérida • Yucatán • Mexico • August 24–26, 2018

Contributed by: Rhonda Price, ASE Chief Standards Officer and International Relations Specialist

Benefits from the development of ASE's International Alliance Partners program include increased opportunities and trusted collaborators for efforts outside the United States. The Project Chagas ASE Foundation (ASEF) global health outreach event that took place August 24-26 in Mérida, the capital city of the Yucatán state in Mexico, is a perfect example of this kind of partnership. Dr. Federico Asch, co-chair of ASE's recent guideline document on Chagas Disease and participant in ASEF's global outreach events in Argentina and Cuba, as well as multiple other leadership roles, and Dr. Pedro Gutiérrez Fajardo, a long-time ASE member from Mexico and current President of the Mexican National Association of Cardiology (ANCAM), saw an opportunity for a multi-partner collaboration that could have a long-term impact in the prevention of heart failure for individuals with Chagas positive serology.

"It was a most amazing collaboration from local to international volunteers, from societies to industry and health services, and everybody contributed with his/her best."
—Dr. Pedro Gutiérrez Fajardo, Team Leader

Project Chagas was organized to focus on pre-identified patients diagnosed with Chagas disease, to investigate the prevalence of Chagas cardiomyopathy, detect individuals previously undiagnosed, and connect them with local cardiologists who would provide proper cardiac care within the regional public system. To make this happen, Drs. Asch and Gutiérrez Fajardo recruited Dra. Hilda Peralta, a cardiologist within the public health system in Mérida, to lead the local efforts. The Yucatán state has a high prevalence of Chagas disease, and Dra. Peralta is widely known for her ability to make (good) things happen.

The leaders also recognized the need for advanced equipment that could do 2D, 3D, and strain echocardiography. Philips Mexico agreed to provide the equipment support, and their early commitment was instrumental in getting the project proposal approved by the ASE Foundation.

As the planning developed, the three leaders saw an opportunity for the project's impact to extend well beyond the patients they would examine during a three-day time period at General Hospital Agustin O'Horan. To have a lasting impact and extend the reach of their efforts, they needed the support and recognition from local and national government officials. And so the phone calls began…first to professional contacts and family members who could open doors for connections with the right people, and finally the important conference call with the Health Secretary, resulting in advance and on-site participation by state and national health services.

"Collaboration was at the core of this altruistic work," said Dr. Asch. "Yucatán and National Health Services provided the opportunity to identify patients with Chagas positive serology, contact them in their rural communities, and bring them to the hospital in Mérida. Hospital O'Horan and the State of Yucatán Government provided the facilities, organization, and local personnel. Philips Mexico provided top-of-the-line echo and ECG technologies and technical support. Fifteen physician and sonographer

"Having participated in several of these events, it is always uplifting to see how quickly the event volunteers, arriving as strangers, form a bond of friendship based on their common desire for improved patient care and their love for the profession of echocardiography. For us, it is a respite from the everyday bureaucracy and a chance for us to focus solely on the patient and the science.

—Dr. Roberto Lang, ASE Past President and Project Chagas Participant

volunteers from the U.S., Mexico, and Argentina provided the ultrasound and cardiology expertise, while ASEF and ANCAM provided funding and overall organization. And the Mexican Federal Government—through their Center for Disease Prevention, CENAPRECE—provided the commitment to expand this effort in the near future to other endemic areas in Mexico."

What is Chagas Disease?

Chagas Disease (CD) is caused by a parasite, Trypanosoma cruzi, that is transmitted through the "kissing bug." A kissing bug sounds romantic, but it is not. The infection hides in the bloodstream of its victim and may not reappear until decades later, often in the form of heart disease. Over the last 10 years, the Mexican Government has taken significant initiatives to extinguish the bug and develop campaigns to detect the blood infection of this disease mostly prevalent in rural areas. This situation created a unique opportunity for the ASE Foundation and its partners to build on the previous government initiatives and screen for Chagas heart disease, which occurs in roughly 30% of those infected.

By the Numbers

After 2.5 days, with the use of 5 advanced echo machines, 5 teams of volunteers from 3 countries performed comprehensive echo exams on 161 pre-identified individuals with Chagas positive serology. Of the individuals examined, the team of 15 medical professionals detected Chagas cardiomyopathy in approximately 30% of the patients. The 30% with Chagas cardiomyopathy were immediately connected with local public health system professionals and added to a registry to track and provide preventative care to manage their disease. The 70% examined with no detection of Chagas cardiomyopathy went back to their homes and work with 1 less cause for concern. Mexican healthcare leaders have committed to continue these screenings throughout Mexico, following the protocols established for the Mérida study. Specific data will be provided in a scientific document in the coming months.

Dr. Roberto Lang worked daily with sonographer Allison Sterk.

The Volunteer Experience

The days and nights were full for our volunteer team members, beginning with the planning meeting on the evening of arrival. This was the opportunity for the members of the medical, government, and industry teams to meet each other, and also discuss the goals and protocols for the coming days. In these types of situations, and with a shared passion for echocardiography, it does not take long for strangers to become friends.

Each day began with a meeting in the hospital theatre, where the day's patients were awaiting the arrival of the volunteer team. All the patients were transported from their rural communities by local volunteers, some traveling one to two hours to reach the hospital. The team leaders addressed the room full of patients and respectfully explained the process and what to expect during their examinations. Then, it was time to go to work.

Working in the hospital's research offices, the five echo machines were placed in three adjacent rooms, with electrocardiogram equipment in a fourth room, creating tight working spaces but an excellent opportunity for the five teams to cross-consult and share new and interesting information.

The patients were guided from the theatre to the workspace in small groups of five. While waiting for their examinations, they were shown an informative video on Chagas disease. After collecting their personal information, patients received an ECG before moving to the echo rooms. 2D, 3D, and strain echocardiography were available and used as the team members deemed appropriate. Having three members on each team provided professional and geographical diversity, allowing the team members to learn from each other and also take breaks as needed without interrupting the flow of patients.

At the end of the day, each patient had a report and a plan for action (if needed). And after waiting patiently for each individual to be examined, the patients were returned to their communities and loved ones waiting for good news.

You can learn more about imaging patients with Chagas disease here (also available in Spanish, Chinese, and Portuguese).

ASEFoundation.org/Mexico-2018

"This was my DREAM TEAM."

—Dra. Hilda Peralta, Team Leader

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Society Partner

Asociación Nacional Cardiólogos de México (ANCAM)

Government Partners

Servicios de Salud de Yucatán (SSY)

El Centro Nacional de Programas Preventivos y Control de Enfermedades (CENAPRECE)

ASEF Outreach Event in West Virginia Includes Many "Firsts"

Contributed by: Mary Carmody, ASE Foundation Manager

On October 20, 2018, the ASE Foundation partnered with the West Virginia University (WVU) Heart and Vascular Institute to hold its first U.S.-based health outreach event since 2014. Led by Partho Sengupta, MBBS, MD, DM, FASE, Chief of Cardiology at the WVU Heart and Vascular Institute, and Sanjeev Bhavnani, MD, Scripps Clinic and Research Foundation, a team of 20 ASE Foundation volunteers travelled to West Virginia to participate in this one-day, free cardiovascular screening and diagnostic event.

To disseminate information about the free testing, local primary healthcare providers recruited and referred their high-risk adult patients to attend. The WVU marketing team also distributed flyers, ran digital advertisements, and pitched pre-event interviews to local media outlets. The overwhelming interest from people in the region yielded over 2,000 responses!

Patients who pre-registered were scheduled for appointments on a first come, first served basis. During the span of just 7 ½ hours across four WVU Medicine locations (Morgantown, Fairmont, Bridgeport, and Elkins), 374 patients were provided free cardiovascular screening exams which included vitals, EKGs, and point-of-care cardiac ultrasounds. Each patient underwent two visitations, one with a physician and the other with a sonographer and clinical team. In total, the four locations featured 40 exam rooms with 20 providers and 20 teams of sonographers and trainees, including fellows and residents from internal medicine, family medicine, emergency medicine, and critical care, who were trained to use innovative technologies.

"When you have an event of this magnitude, it's difficult to exactly predict the needs," said Dr. Sengupta. "But everyone improvised–and the event was smoothly-run–there was no long waiting in queues, no chaos. To have this many patients visit and get diagnostically tested, with reports in seven-and-a-half hours, is unbelievable."

The group gathered on Sunday morning and Dr. Sengupta shared some interesting cases seen the day of the event.

The results of the diagnostic tests were provided to the patients immediately. The teams detected moderate or severe cardiovascular disease requiring immediate triage in roughly 8% of the patients screened. In some instances, the teams saw patients with ejection fractions as low as 10% or 15%. In one symptomatic patient, they identified critical aortic stenosis and this led to a call to a surgical team for an immediate consultation. Follow-up care was scheduled as needed.

"This event had several 'firsts,'" said Dr. Sengupta. "It was the first time a national society, such as ASE, partnered with an institution for an event in West Virginia; the first time a screening and diagnostic event with ultrasound-on-a-chip technology was used in a community event organized by the ASE Foundation in the United States; and the first time in the world where so many unique mHealth and cloud-based technologies came together at the point-of-care for a screening or diagnostic event."

These innovative technologies were provided in-kind by AliveCor, Butterfly Network, Cloud DX®, Hitachi Healthcare Americas and Hitachi Healthcare Americas Informatics Division, Kencor Health, and Phosphorus Inc. Over 140 dedicated volunteers comprised of physicians, sonographers, nurse practitioners, fellows, residents, and other non-medical staff donated their time and service to make this event possible.

ASEF volunteer Tom Van Houten performing a point-of-care cardiac ultrasound

Data collected from the event will be used to advance research in the field of cardiology and early intervention. Feedback collected from patients will also help providers meet the needs of residents and better serve the community. "We are excited with the prospects of using more and more technology at the point-of-care to build patient confidence and patient-doctor relationships," said Dr. Sengupta.

The need for cardiac care extends worldwide. The United States is not a developing country, but there are numerous underserved communities nationwide. West Virginia has vast rural areas, and poor and elderly citizens in every commu-

nity, factors which further exacerbate health disparities due to limited access to care and diagnostics, transportation, isolation, and shortages of health care professionals. The ASE Foundation is honored to have supported this health outreach event to help bring cardiac care to underserved patients in West Virginia.

This event was supported by the ASE Foundation, its donors, and by a grant from the Edwards Lifesciences Foundation's Every Heartbeat Matters program.

ASEFoundation.org/WestVirginia2018

THANK YOU, TEAM WEST VIRGINIA!

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Partners in Care

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Edwards Lifesciences Foundation

Hitachi Healthcare Americas & Hitachi Healthcare Americas Informatics Division

Kencor Health

Phosphorus Inc.

WVU Heart and Vascular Institute

Why is ASE Helping Lead Cardiovascular Point of Care Ultrasound Education?

Contributed by: Amer Johri, MD, MSc, FRCPC, FASE, Clinician Scientist, KGHRI, Associate Professor, Echocardiography and Founder & Director, Cardiovascular Imaging Network, Salwa Nihal, MSc, and Julia Herr, MSc, Queen's University, Kingston, Ontario, Canada.

Rapid, safe, portable, and inexpensive, point of care ultrasound (POCUS) has changed the landscape of clinical practice. POCUS is indicated for the bedside assessment of a wide range of clinical scenarios: such as assessment of trauma in the emergency room (ER) to the imaging of a joint in the rheumatology clinic. Many of these subspecialties have established extensive protocols to ensure high quality training and image acquisition, whereas in some fields the application of POCUS continues to evolve.

The area of cardiovascular (CV) POCUS, especially for medical students and the novice user, is still emerging and is as of yet underdeveloped with respect to training guidelines and educational approaches. It is in the bridging of this educational gap that the American Society of Echocardiography can offer its greatest strength. **The ASE's premiere goal is to *attract all users of CV ultrasound by creating quality and value.***

How is the ASE Creating Quality and Value in CV POCUS?

In line with this strategic plan, the ASE has the opportunity to lead further development of CV POCUS using its rich network of cardiac ultrasound experts, educators, and bridge builders. ASE has undertaken several important initiatives in the last five years including an ever-growing series of 'hands-on' workshops teaching CV POCUS at the Annual Scientific Sessions (SS). This workshop, initially an initiative of the Vascular Steering Committee, was just an 'add-on' to the start of the SS, and now being tremendously popular is a 'must-attend' event. As the popularity and demand for the workshop grew, it was recognized that more didactic teaching of cardiac POCUS was also in demand and further sessions have been added to the SS tract led by POCUS experts from diverse backgrounds such as intensive care, emergency medicine, and anesthesia.

In 2017, recognizing that POCUS was becoming an emerging competency for medical students, Dr. Vera Rigolin charged the ASE POCUS Taskforce with creation of a CV POCUS curriculum for medical students. The result of this two-year endeavour has been the creation of ASE's first dedicated product for teaching medical students the utility of CV POCUS in all years of training. The curriculum itself is based on collaborative research conducted with the Canadian Society of Echocardiography (CSE) defining how CV ultrasound is being used in medical school to: teach anatomy, understand physiology and hemodynamics, enhance physical exam teaching, and finally, integrate into assessment of pathology and clinical assessment.

What is the new ASE Cardiovascular Point-of-Care Imaging for the Medical Student and Novice User?

Modular: The ASE Curriculum attempts to reflect all aspects of how CV ultrasound is used as a tool to teach, diagnose, and guide treatment. It is modular in nature, recognizing that some schools already have extensive POCUS as part of their curriculum and so they may choose to select only the components they need, at the time they need it. However, the program is also complete and comprehensive for schools that are just beginning to consider starting POCUS teaching and offers basic instruction for educators, for example in the "Teach the Teachers" module.

Living: Thanks to the critical outreach efforts of Dr. Jonathan Linder, the ASE Cardiovascular Point-of-Care Imaging for the Medical Student and Novice User is a collaborative effort with the CSE and WINFOCUS. It is meant to be a 'living curriculum' where constant feedback and endorsement has been invited by other organizations including The Society of Ultrasound in Medical Education (SUSME) and the American Institute of Ultrasound in Medicine (AIUM). The first version is freely available on the ASEUniversity, following its launch at the Canadian Cardiovascular Congress, October 2018. A further module is planned in the next iteration allowing for submission of cases by medical students, creation of a library of images, and peer-review of further CV POCUS research.

In Scope: An important consideration when developing the Curriculum was a consensus as to what defines a CV POCUS protocol, from beginning to end, at the medical student level. Following extensive discussion, the ASE POCUS Taskforce felt that assessment of jugular venous pressure and lung fields was a reasonable addition to the basic cardiac views, and was reflective of the practical utility of enhancing the physical examination of cardiovascular patients such as in the assessment of congestive heart failure. We also considered the value of adding vascular atherosclerotic assessment but at this time deferred its incorporation into the CV POCUS protocol. We describe an introductory CV POCUS protocol that was deemed achievable following evaluation of published accounts of CV POCUS teaching at various medical schools. It is recognized that this protocol may evolve. The Curriculum does not offer certification, but an educational supplement to CV POCUS training undertaken by a novice learner or medical student.

This Program is careful in its differentiation between the terms 'echocardiography' (a formal diagnostic test) and 'cardiovascular POCUS' used in this context as a learning tool and to

enhance the physical examination. This program will support more advanced learning guidance being created by Dr. James Kirkpatrick as part of a second taskforce dedicated to sub-specialty CV POCUS users (i.e. critical care echocardiography).

What are the Components?

Introductory Module
This Introductory Module outlines the modular curriculum suggested by the review of point of care ultrasound teaching strategies by various medical schools around the world entitled, "Cardiac Point-of-Care Ultrasound: State of the Art in Medical School Education" by Johri et al 2018.

Module A–Anatomy
Module A is an introduction to cardiac point of care ultrasound views as they correlate to basic anatomy. Module A presents the standard imaging views used in cardiac ultrasound, and relates them to both diagrammatic representation of cardiac anatomy and the cross-sections of preserved heart specimens that many medical school students are familiar with already. This Module identifies the important anatomical features and landmarks seen in each ultrasound view, and concludes with a brief review quiz of cardiac anatomy.

Module B–The CV POCUS Protocol
Module B takes the anatomy lessons learned in Module A, and focuses specifically on the complete cardiac POCUS scan. It outlines the views to be obtained during a POCUS examination, including vessels, heart, and lung. The POCUS scan is an abbreviated version of a full cardiac examination, and as such, it is important to capture the most representative views. In Module B, videos are introduced to demonstrate features that are only visible in motion.

Module C–The New Cardiac Physical Exam
Module C demonstrates the procedure of the cardiac POCUS exam, from the initial physical exam, to the positioning of the cardiac transducer for the acquisition of each POCUS view.

Module D–Pathology
Module D focuses on pathology through the presentation of clinical cases. For each case, the specific POCUS view or views used to image the pathology in question are identified, and anatomical features that assist in diagnosis are highlighted. Module D concludes with a self-guided review question section for learners to test their understanding of how POCUS can assist with diagnosis.

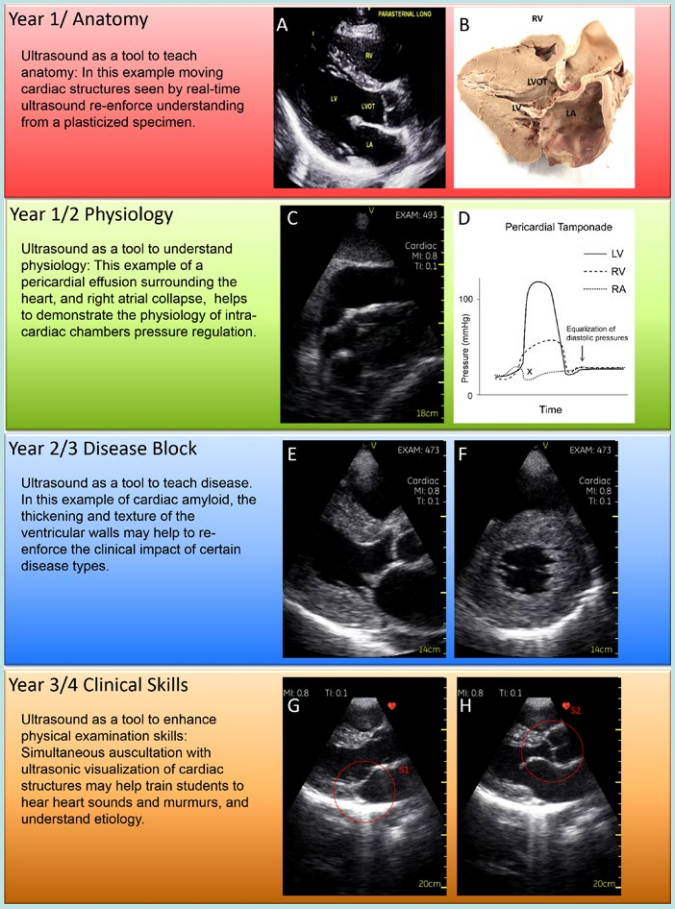
Module E–Teach the Teachers
Module E, Teach the Teacher, focuses on what should be taught to enable someone to adequately perform POCUS, and how this information should be presented.

Module F–Testing
Finally, Module F is a testing module designed for quality control and to assess knowledge gained.

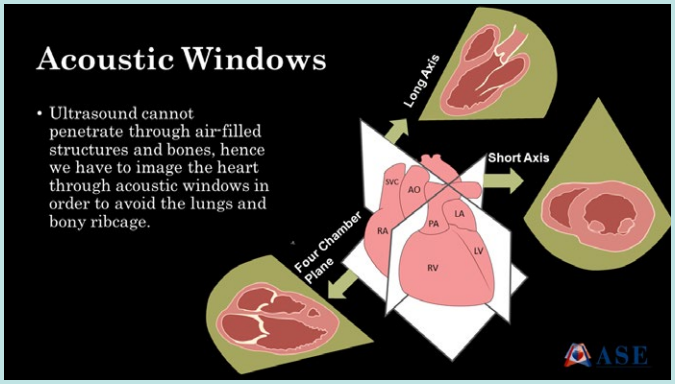
The entire curriculum is freely available online at:

ASEUniversity.org/ASE/Conferences/266/View

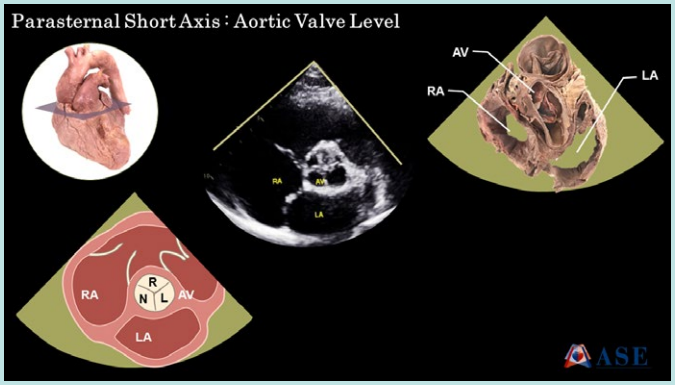
The Curriculum may serve as in important starting point for medical school teaching of CV POCUS, not only as a tool to teach but to also enhance skills. We welcome feedback and input to further enhance this collaborative endeavour.



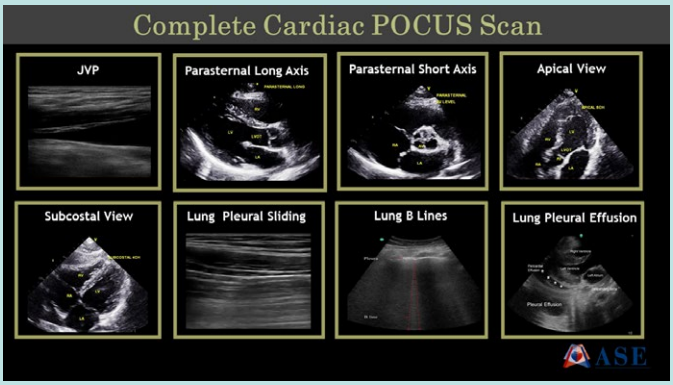
The Modular Curriculum. Image first published in J Am Soc Echocardiogr. 2018 Jul;31(7):749-760.



Module A slide



Module A slide



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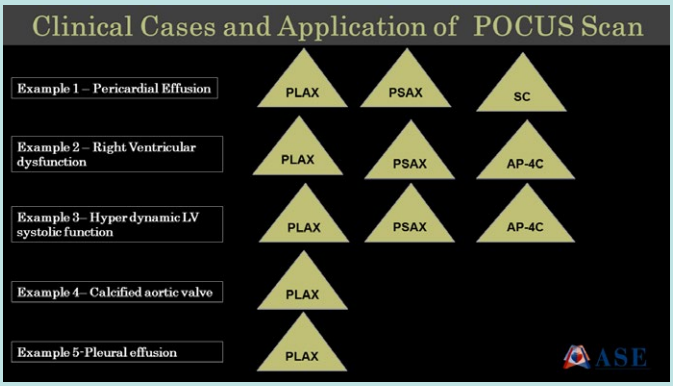

Module D slide

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Julia Herr, MSc is a program coordinator of the Cardiovascular Imaging Network at Queen's University (CINQLab.com) and is a highly accomplished medical illustrator. She created the original artwork for the ASE CV POCUS Curriculum and was responsible for overall organization of the design process.

Amer M. Johri, MD, FRCPC FASE is the ASE POCUS Task Force Chair. He led a dynamic group of ASE members contributing to the content creation of the CV POCUS Curriculum (see module for acknowledgements).

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What Should an Echo Lab Be Concerned About When Teaching Cardiac Ultrasound to Other Specialties?

Contributed by: James N. Kirkpatrick, MD, FASE, Director, Echocardiography Laboratory, University of Washington Medical Center, Associate Professor of Medicine and Cardiology, and Adjunct Associate Professor of Bioethics and Humanities, University of Washington, Seattle, WA.

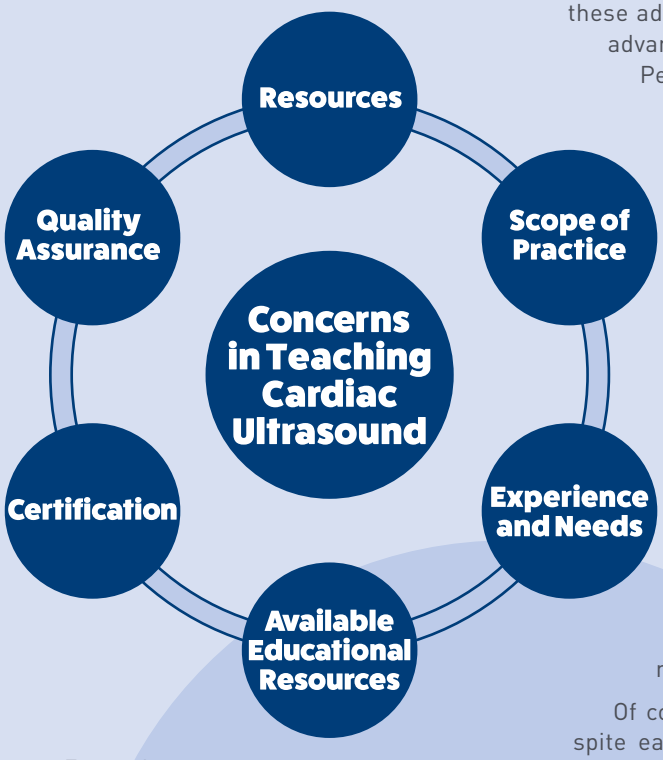

Figure 1

Scenario: you show up to the echo lab one morning in July. A trainee wearing scrubs introduces herself as a pulmonary fellow wanting to learn "echocardiography so I can scan patients in the medical intensive care unit (ICU)." The ICU has an older lap-sized ultrasound device with a cardiac transducer. She intends to spend the next month in your lab, after which she will start independently scanning.

There is no denying the amazing diagnostic power of cardiac ultrasound. The ability to assess cardiac anatomy and motion with high fidelity images provides an incredible insight into the size, shape, and function of the heart. Coupling these advantages with real-time imaging at bedside affords a tremendous advantage to patients, particularly patients with life-limiting illnesses. Perhaps best of all, diagnostic cardiac ultrasound is non-toxic and relatively inexpensive.

The development of small, portable, and even hand-carried ultrasound devices with excellent image quality has further expanded the field. The evolution from carts on wheels to laptops to devices the size of smart phones to devices that display images on smart phones means that diagnostic quality imaging can travel anywhere. Modern cardiac ultrasound devices are increasingly easy to use, and the price has dropped such that a hand-carried device is affordable to many practicing physicians. It is no wonder that devices have made their way into hands outside the cardiovascular field. Studies have examined the use of cardiac ultrasound by non-cardiovascular practitioners in a wide-range of settings, from rural areas in the developing world,[1] to subspecialty clinics,[2] to emergency departments,[3] to intensive care units.[4] Cardiac ultrasound is now frequently employed for a wide-range of diagnoses, from rapid differentiation of shock and acute hypoxia[5] to the identification of subclinical rheumatic valve disease.[6,7]

Of course, every technological advance comes with certain risks. Despite ease of use and excellent image quality afforded by modern machines, performance of cardiac ultrasound remains a complex task. Obtaining diagnostic quality images on patients with severe lung disease or obesity can be a herculean effort. Artifacts are common, even in uncomplicated patients.

Life-threatening pathology can exist between the imaging planes of a limited examination, and normal variants mistaken for pathology can lead to unnecessary (and potentially life-threatening) interventions. Improperly performed and/or interpreted imaging has consequences, some of which can be devastating, not to mention subject to litigation.

Echocardiography has evolved, in many countries, into a highly specialized test requiring performance by one specialist (sonographer) and interpretation by another (echocardiographer). The dissemination of point of care cardiac ultrasound tasks a single individual with both jobs. While anyone can purchase and use an echo device (similar to a stethoscope), there are processes for certification. Inteleos and its affiliates, the Alliance for Physician Certification and Advancement™ (APCA) and the American Registry for Diagnostic Medical Sonography® (ARDMS), offer certification for physicians in addition to sonographers,[8] and the National Board of Echocardiography is now providing an Examination of Special Competence in Critical Care Echocardiography.[9] Certification in critical care echocardiography is on its way and is sure to involve a training component in scanning. (Though perhaps not the 12 months of full-time clinical ultrasound experience or documentation of 800 studies required for ARDMS/APCA certification for physicians.) Other organizations already offer certification, whether as part of seminars or accredited training programs, in critical care and emergency medicine, anesthesiology, and other specialties.[10,11]

As cardiologists and sonographers, we are members of a larger medical team. We have an obligation to participate collegially in the care of patients. We also have the responsibility to uphold quality in the practice of our discipline on behalf of patients. Cardiac ultrasound by non-traditional practitioners is here to stay and has great potential to improve patient care. In order to discharge our duties, we need to play a role in the training process. We must partner with cardiac ultrasound users from other specialties to set standards for the scope of practice, to improve scanning and interpretation, and to ensure that expert echocardiography is available to confirm or correct diagnoses made by providers not trained in the comprehensive practice of echocardiography. As Dr. Catherine Otto mentioned in a recent editorial, echocardiographers and sonographers have a responsibility to jettison the protectionist stance as "master of our own small ship," and instead take on a broader role.[12]

Concerning ourselves with ensuring high quality cardiac ultrasound for the good of patients is not an easy task, however. The American Society of Echocardiography recognizes the complexity of helping to teach others to perform cardiac ultrasound and has established a task force to develop guidance for its members. A document is currently in preparation and will address multiple areas of concern, including those depicted in Figure 1. We must apportion echo lab resources thoughtfully and seek resources to enable us to provide excellent training experiences. We should tailor curricula to the trainees' scope(s) of practice and educational needs. We should seek out and use trusted educational resources. Finally, we should carefully consider what role to play in the certification and quality assurance processes.

As echocardiographers and sonographers, we are privileged to wield a powerful diagnostic tool, but we are also privileged to be in a position to teach others how best to use it. Collaborative educational endeavors between the experts of cardiac ultrasound and other specialties are not simple endeavors. They require careful consideration.

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THE EVOLUTION OF THE ASE FOUNDATION:

A Driving Force for Improving Healthcare

Contributed by: Jose Banchs, MD, FASE, Chair, ASE Foundation Annual Appeal Committee, Director of Echocardiography and Associate Professor, Department of Cardiology, The University of Texas MD Anderson Cancer Center, Houston, TX

The ASE Foundation is ASE's charitable arm helping to assure the viability and visibility of cardiovascular ultrasound through initiatives like research, training scholarships, and guideline-based projects that are not funded by ASE membership dues. The Foundation's work upholds ASE's core values of integrity, professionalism, quality, learning, innovation, and community, while also supporting patient awareness and the careers of investigators.

It is in "community" that the Foundation has a history of growth and shared happiness. As we look toward the future, we want to share a bit of our past and express gratitude to all who have had a hand in making the Foundation what it is today.

First incorporated in July 2002, the ASE Foundation is now a dynamic enterprise that has taken the Society's name and representatives across our planet! In 2003, the ASE Foundation launched its first funding campaign. It was the 50th anniversary of echocardiography, and our goal through this "Charter Campaign" was to maintain and advance the role of echocardiography for the next 50 years. ASE Past Presidents Linda Gillam and Tom Ryan oversaw the Foundation's early growth and development. In 2011, the organization started its first Annual Appeal campaign to continue these good works in a more formalized and routine manner. I inherited the Annual Appeal Committee from Dr. Ryan in July of 2016, becoming your first 'regular member' to be the chair.

The primary goal of the Annual Appeal Committee is to attract donations to the Foundation. The scope and success of the initiatives we raise funds for is completely dependent on donor giving. These initiatives include: Research Investigator Support, Research Studies, Guideline Translations and Global Dissemination, Travel Grants and Scholarships, Global Health Outreach Events, Patient Awareness, and Demonstrating the Value of Cardiovascular Ultrasound.

Since 1996, ASE and the Foundation have allocated over $5 million to specifically support cardiovascular ultrasound research activities. Funding for these awards was transitioned solely to the ASE Foundation, from ASE, in 2012. While the Foundation allocates a large portion of funding to research studies and investigator support, don't forget we also fund travel grant stipends and scholarships for students, sonographers, and fellows to assist training and educational conference participation. In 2018, the Foundation was able to offer 54 travel grants to sonographers, members of ASE's four specialty councils, and research abstract presenters to attend the 29th Annual Scientific Sessions in Nashville. Other funding is used for one of our more widely known initiatives, the Global Health Outreach events. Since January of 2012, the Foundation has hosted a total of 14 events in nine countries. These events combine training, research, and patient scanning to promote heart health around the world. Participation in these events by our member volunteers has made us real participants in a global health community. Since 2011, over $1.8M has been distributed to all the initiatives, programs, and services of the Foundation. As we continue these efforts and improve on the application of cardiovascular ultrasound, we strengthen the entire community.

The ASE Board of Directors have always provided fertile ground for ideas and tactics that have helped the ASE Foundation navigate into the future. The Foundation has now grown to a point where we must balance our vision with the realities of healthcare and government. As an organization, we must continuously anticipate strategic factors likely to affect our ability to succeed and be flexible to assess the implications. *In that spirit, we are embarking on the process of establishing a separate Board of Directors dedicated to the Foundation as well as a strategic plan that distinguishes the Foundation from the Society.*

The Foundation's activities will always complement ASE's strategic goals and be aligned with its mission. However, the Foundation requires a formal independent structure to assure the two organizations grow to their full potential. This will also protect the Foundation's ability to apply for and accept grants. We want to continue to be proactive as we are aware challenges will come in many forms. The future of the Foundation depends on adequately funding our initiatives.

As healthcare issues continue to globalize, we foresee both great opportunities for cardiovascular ultrasound as well as potential challenges. Changes in government and policy will undoubtedly impact charitable contributions and the financial scrutiny of nonprofit organizations. Due to its cost-effectiveness and portability, cardiovascular ultrasound provides a constant opportunity to play a significant role in greater access to care and alleviating health disparities. Moreover, as modern technology develops, our members will continue to expand the Foundation's horizons by conducting outstanding research and participating in global health outreach events for years to come. *We envision the ASE Foundation becoming a driving force for improving health for all through the use of cardiovascular ultrasound.*

ARE YOU PRODUCTIVE?

Contributed by: Brian D. Soriano, MD, FASE, Seattle Children's Hospital, Seattle, WA.

Thoughts and Musings from a Pediatric Echocardiographer Involved in a Pediatric Echocardiography Lab Productivity Project

Picture the start of a typical day in your echocardiography laboratory. It's morning. You walk into work, identification badge in hand. You set down your personal items and prepare your desk space for the day ahead. You look at the staffing board and the patient schedule and probably make a quick, mental assessment of your work load. What thoughts go through your head? "Oh, it's going to be busy." Or, "hmm, light day today." Or maybe you hear a sonographer utter: "How many called in sick??" As the cardiologist, your mind kicks into gear: "I wonder which fellow is with us today...will I have time to finish the lecture I need to give? When do I have time to submit that manuscript?" Just like the Goldilocks and the Three Bears tale, you are determining if your load for the day is going to be too much, too little, or just right.

With the myriad possible starts to the day, there are just as many challenges with appropriately staffing, organizing, and coordinating a busy academic pediatric echocardiography laboratory. In 2011, a group of pediatric cardiologists recognized the benefit of creating a more formal, comprehensive assessment of echocardiography laboratory practices. They formed a Committee on Pediatric Echocardiography Laboratory Productivity (C-PELP). Starting in 2011, C-PELP, with support from the American Society of Echocardiography (ASE) and spearheaded by cardiologists Drs. Wyman Lai and Vivek Allada, devised and created a set of surveys that revolved around helping answer seemingly simple questions: What is echocardiography lab productivity and what are the ways to define it? How are pediatric echocardiography laboratories organized? What facets within an echocardiography laboratory influence productivity? Currently, a total of three surveys have been released and published. I had the privilege of serving on the group for the second and third surveys. Some highlights are covered in this article, and I highly recommend that readers refer to the publications (linked at the end) for complete information.

Laboratory Identification

North American academic pediatric echocardiography laboratories were initially identified through fellowship programs, known contacts among echocardiography laboratory directors, and registry data from ASE. The number of laboratories identified for the survey expanded from 74 in 2011, to 99 in 2013. Seven of the centers were determined to be purely clinical–not associated with a university, or self-assigned as non-academic. Since the intent was to focus on academic centers, the database of laboratories was updated accordingly.

Physician Productivity and Roles

In 2011, physicians covered a combination of the three modalities: transthoracic echocardiography (TTE), transesophageal echocardiography (TEE), and fetal echocardiography in 69%, or 37 of 54 laboratories. In 2014, a similar pattern emerged. Based on the phrasing of the survey, we also determined that 51 of 64 laboratories, or 80%, had a separate physician whose assignment was primarily dedicated to cover fetal echocardiograms. Laboratories whose physician responsibilities included "echocardiography coverage in addition to other clinical responsibilities" were similar in 2011 (19 of 54 [35%]) and 2014 (26 of 85 [31%]).

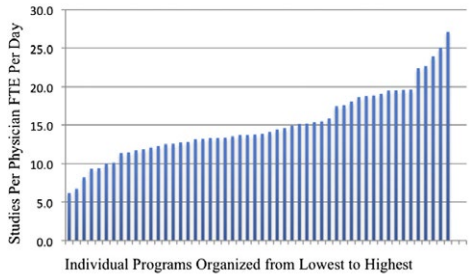


Figure 1 Program distribution for number of studies per physician FTE per day (n = 52).

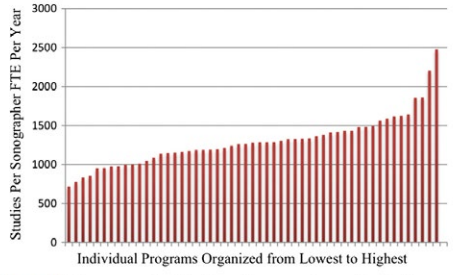


Figure 2 Program distribution for number of studies per sonographer FTE per year (n = 53).

Not adjusting for multiple factors, including range of physician responsibilities, case complexity, and level of staff experience, the average number of studies performed per physician and per sonographer remained stable between the 2011 and 2013 surveys. Physicians read 15.0 (± 4.4 and 5.6 in 2011 and 2013) studies in a typical day. Sonographers performed 8.0 (± 3.8 and 9.7 ± 5.5 studies in 2011 and 2013), which did not reach statistical significance (Table "7"). Lower volume centers were more likely to have physicians with additional responsibilities above reading echocardiograms.

Table 7 Physician and sonographer FTE and productivity for 42 centers who participated in both 2011 and 2013 surveys

	Total echocardiograms	Physician FTE/day	Sonographer FTE/day	Echocardiograms/ physician FTE/day	Echocardiograms/ sonographer FTE/year	Echocardiograms/ machine/year
2011	10,502 ± 4,749	2.8 ± 1.0	8.0 ± 3.8	15.0 ± 4.4	1,290 ± 235	1,213 ± 425
2013	11,502 ± 5,708	2.9 ± 1.0	9.7 ± 5.5	15.0 ± 5.6	1,202 ± 394	798 ± 222*

Data are expressed as mean ± SD.
*$P < .001$.

In most North American pediatric cardiology practices, clinical echocardiography is comprised of the collaborative "two-party" system—cardiologists and sonographers. Traditionally, the sonographers scan patients; and the cardiologists render their interpretation and place their report in the clinical record. In many centers that answered the surveys, that demarcation line is more porous. Sonographers provide an important "extra set of eyes"—helping and contributing to interpretation of the echocardiogram images. In 2013, 32% of centers stated that sonographers created detailed, pre-finalized reports. Cardiologists render final interpretation and reports, which in fee-for-service healthcare model also generates a bill. However, in certain cases, physicians feel obligated to scan some patients themselves, in order to glean a better understanding of a patient's anatomy and physiology, and to better convey a clinically meaningful report. In the 2013 survey, physicians were estimated to perform hands-on imaging in a median of 10% +/- 12 of TTE patients and 60% +/- 33 of fetal patients.

Additional Productivity Measures

The median number of echocardiograms performed per machine was 812+/-303 (Table 2) and was not adjusted for location or purpose. Rationales used to acquire new echocardiography equipment were qualitative in 43% of the laboratories.

Table 4 Sonographer and machine productivity*

	Mean	SD	Median	Minimum	Maximum
Sonographer FTE/Day	8.3	5.0	7.0	1.4	27.0
Echocardiograms/FTE/year	1,056	441	982	360	3,427
Echocardiograms/FTE/Year with outreach	1,221	500	1,244	318	3,642
Echocardiograms/FTE/day	5.0	2.2	5.0	1.7	16.0
Echocardiograms/FTE/day with outreach	5.8	2.4	6.0	2.0	17.0
Echocardiograms/machine/year	778	303	812	803	1,838

*Sonographer allocation and productivity measured by number of echocardiograms per FTE per year and per day. The echocardiograms performed per FTE per day are calculated assuming 210 working days per sonographer FTE.

The surveys were also intended to trend procedural and staffing data across time, and it is worthwhile to include a direct quotation from the 2013 survey: "Longitudinal comparison was done for physician, sonographer, and equipment productivity between the first [2011] and second C-PELP surveys for 42 centers that participated in both surveys. The only difference noted between the two periods was an increase in the total number of machines and a decrease in the number of echocardiograms per machine. No significant changes were noted in physician and sonographer productivity when looking at total echocardiography volume inclusive of fetal echocardiograms and TEEs… There was a notable increase in the number of echocardiography systems per laboratory…, but the number of echocardiograms per machine decreased. This change may reflect purchase of new-generation equipment and retention of older, underutilized machines in the fleet." Since in a two-year timeframe there was little change in the per-physician and per-sonographer procedural volumes, additional collection of procedural data was tabled in lieu of obtaining information surrounding laboratory organization.

Laboratory Composition

The third survey, published this year, sought to collect additional factors that were associated with physician and sonographer clinical activity. We examined other features that are considered vital to academic centers such as research and training; and we evaluated the extent of participation among fellows and sonographers. We also sought to quantify and describe leadership roles. While the survey was sent to 92 centers, there were fewer replies – 38 responses or 41%.

Directors were asked to determine whether their categorical fellows would ''be able to independently perform and interpret'' three different echocardiographic modalities. Among the 31 laboratories that answered, 90% replied ''yes'' for TTE, 29% said ''yes'' for TEE, and 0% of centers replied ''yes'' for fetal echocardiography. These values reflect a general sentiment that most categorical pediatric cardiology fellowship programs are geared to enable most graduates to perform TTE, but less so for the TEE, and fetal. In response to a follow-up question, over 90% answered that if trainees were interested, they would spend additional time during their categorical fellowship, in order to independently perform TEE and fetal echocardiography. For other modalities such as cardiac MRI, 35% of centers stated that fellows could receive advanced training during categorical fellowship years to become independent.

Balancing clinical responsibilities with research is always an ongoing challenge. When centers were asked, "What are the greatest barriers to successfully completing a research project?'' the barriers cited, in order from the most frequent to the least frequent were (1) sonographer full time equivalent (FTE)/time, (2) cardiologist FTE/time, (3) funding, (4) statistical/database support, and (5) laboratory ''culture.'' Physical infrastructure, such as echocardiography machine, postprocessing software, and examination room availability, were the least likely to be barriers to research.

Quality improvement initiatives are becoming more prevalent in clinical care. With one exception, all respondents were accredited by the Intersocietal Accreditation Commission. This would translate to a similar proportion of laboratories performing quality improvement. A majority (71%) also reported that sonographers actively participated in novel QI projects. Fortunately, despite the perceptions associated with additional work, there was no statistically significant association between degree of QI efforts, and either academic or research productivity.

Productivity Assessments, Survey Limitations and Challenges

How are productivity and a noninvasive physician FTE defined? These may be answered differently, depending on the perspective. In the United States, the Centers for Medicare and Medicaid Services created a measure called relative value units, or RVUs. Stated simplistically, the goal was to devise a scale that would allow administrators to "slice the pie" of healthcare dollars into the right number of appropriately-sized slices. Perhaps as an unintended consequence, these measures have been adapted into the credo that "how many RVUs have you billed lately" is a direct marker for "are you contributing appropriately to our practice?" Weighted toward reimbursements and revenues, one person's perspective may require the highest amount of patient turnover as possible. In other words, the more studies read in a given day, the more revenue or work generated. Another person would answer that a combination of scholarship activity, clinical care, and teaching effectiveness are important in productivity—tenets that define some, but not all, the roles of an academic faculty member.

Every laboratory is unique, and the heterogeneity of practices between centers makes it challenging to collect standardized data. Sonographer work expectations will vary between centers. For cardiologists, one center may require that they participate in clinic proctoring or seeing patients. While "assigned" to echocardiogram reading, they may be so pressed for time and have other obligations such that a significant portion of their efforts may be focused away from reading studies. In other centers, there may be a number of cardiologists whose sole focus is a single echocardiographic modality. These practice variabilities in turn

transform what appears to be a straightforward metric: number of studies/(staffing unit of measurement)/(unit of time), into something that is most meaningful only when considering all contexts as described in the surveys. However, "…the rationale for measuring clinical productivity as daily studies per physician was to allow a direct comparison between laboratories despite the great variability among institutions in the definition of a physician FTE."

Given the heterogeneity of physician and sonographer roles, and using the words from the first publication, it is this writer's opinion that the numbers generated in these surveys may guide, but are "…not intended to generate recommendations for clinical staffing requirements." As demonstrated in the surveys, it is nearly impossible to standardize or uniformly define a noninvasive physician FTE, yet the notion that the standard definition exists "… cannot be understated, as RVU targets are generated with such a definition in mind. It should be noted that the information captured with [these surveys] was laboratory-centered, and not directly applicable to the productivity of any one person…. Moreover, the issues of study quality and accuracy were not addressed."

Looking Back, Moving Forward

Survey writing is its own science—creating questions that are free of intrinsic biases and providing answers that are meaningful and analyzable. Questions are carefully crafted to ensure they are uniformly interpreted by the people answering. At the same time, we continue to work on where to set the needle for the overall length of a survey: striking a balance between obtaining detailed, granular information, and remaining mindful of the proportional amount of time and work required to complete it.

Over the series of three surveys, of which I was a co-author in the latter two, the pediatric echo laboratory community was able to glean workflow and productivity data on a more widely documented scale. Our community can continue to reap the benefits of collecting and serializing pediatric echocardiography laboratory organizational metrics. In separate experiences, co-authors have been notified that laboratories have been able to use our data to shape staffing and echocardiography laboratory organization. Several labs were able to use the data to their benefit, with the main goal of being able to provide quantitative data to administrators and to provide a broader perspective of what it means to be imaging cardiologists and sonographers, and how RVUs will not always match an individual's workload. The survey data also provided a guide for how many machines are needed, as well how one may balance between studies, sonographers, and readers. Additionally, it also gives some data that allows labs to support needs for equipment upgrade, resource allocation for research and quality and education.

We are at a point in time to consider collecting a new set of serial data. This year, under the auspices of the Society of Pediatric Echocardiography, a group of echocardiography laboratory directors met to discuss the past and the future of the productivity surveys. There was universal agreement that a follow-up survey to assess procedural and staffing volumes would be beneficial. With support from ASE's Pediatric and Congenital Heart Disease Council, the ASE Board has considered this need. This survey will once again be supported by the ASE with its funding, volunteers, and staff resources. We hope to publish this survey, as we did the prior studies, in the *Journal of the American Society of Echocardiography* (JASE).

Author Disclosure

The thoughts in this article represent my own opinions and would not necessarily reflect those who co-authored all of the publications to date. I would also like to thank Shubhi Srivastava, MD, FASE, who provides continued guidance and mentorship.

First survey summary published October 2013:
https://www.onlinejase.com/article/S0894-7317(13)00489-6/pdf

Second survey summary published October 2016:
https://www.onlinejase.com/article/S0894-7317(16)30253-X/pdf

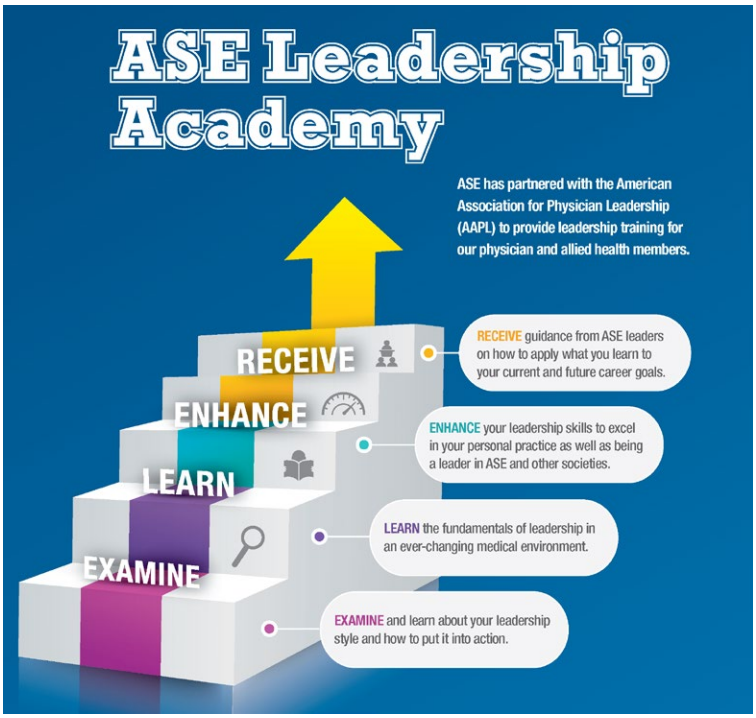
Third survey summary published September 2018:
https://www.onlinejase.com/article/S0894-7317(18)30130-5/pdf

ASE's Inaugural Leadership Academy Kicks Off

Contributed by: Neil J. Weissman, MD, FASE, Chief Scientific Officer, MedStar Health and Professor of Medicine, Georgetown University School of Medicine, Washington, DC; and Chair, ASE Governance Task Force.

As ASE entered its fourth decade, it became apparent to its Board of Directors that the organization needed to look closely at the growing diversity of its membership and focus on building future leaders for the Society and the field of cardiovascular ultrasound.

As an outgrowth from this insight, in 2015 the Board approved a five-year strategic plan that included a goal to "create a dedicated volunteer workforce with allegiance to ASE, to be accomplished through mentorship and training." To accomplish this initiative, ASE's Leadership Academy was born. The concept for the program is to create a process to mentor and train potential leaders, ultimately creating a pipeline of emerging leaders with specific talents that would be helpful for ASE's committees and Board, and in serving in their own respective institutions.



Leadership training can provide an opportunity to strengthen ASE's future and positively impact our members' professional careers.

ASE's Governance Task Force (GTF) was charged with developing this leadership program. The GTF members envisioned a program that would include didactics, experiential learning, self-directed online learning, and access to ASE senior advisors, with minimal face-to-face commitment outside of ASE's yearly meetings. A key aim of the program is to serve the field of cardiovascular ultrasound as well as to develop a robust pipeline of members to be future leaders of ASE. The GTF defined the ideal candidates as members who:

- Have 15-20 years to be involved in the advancement of ASE
- Are committed to the cardiovascular ultrasound community and ASE
- Regularly attend the ASE Scientific Sessions
- Work on ASE committees, task forces, writing groups, or councils
- Hold Fellowship (FASE) designation at the time of application for the program, or plan to achieve FASE by the conclusion of the program

ASE staff and the GTF researched potential leadership programs used at hospitals and other professional organizations. The GTF and ASE's Board of Directors determined that the American Association for Physician Leaders (AAPL) would be the best partner to provide much of the core online leadership training. AAPL provides education that is applicable to physicians as well as non-physicians who work in a clinical environment. This was a very important component for the ASE Leadership Academy because our membership is made up of both physicians and allied health professionals, and we wanted the Leadership Academy to benefit all ASE members.

This program provides a unique opportunity for members to increase their knowledge and develop a skill set that will help them throughout their career. During this 24-month program, Leadership Academy participants will be matched with a senior ASE advisor, acquire a personalized evaluation of their leadership aptitude, and receive high-quality online tutorials on leadership topics that are valued at over

$5000. In addition, participants will interact with fellow Leadership Academy classmates, and meet face-to-face with ASE leaders and staff several times over the two-year program.

For the first cohort, 14 ASE members, representing all areas of our membership, were selected from a pool of over 50 very qualified and talented applicants. The overwhelming interest for this program confirmed the need and desire for leadership training from our members in their early to mid-careers.

The inaugural class launched in November 2018 with the kickoff meeting, "Leadership Development Within a Culture of Trust," that was held in North Carolina as a full-day introduction session. It was facilitated by AAPL faculty member, Dr. Matum Gautam, an experienced lecturer on clinician leadership. The Leadership Academy participants will also participate in CPI™ assessments at the start and end of the program. CPI assessment can be used to enhance leadership competencies by assessing individuals' orientation toward people, rules, and values as well as their inner feelings. The CPI assessments identify which competencies are strengths and which are areas of opportunity.

Leadership Academy participants will acquire the appropriate fundamentals to be highly competitive for future leadership roles in ASE, other organizations, and in serving the community as a whole. Participants will gain knowledge through:

- Receiving guidance from a wide-range of leaders in the field. These leaders will candidly share their successes and failures in their leadership roles and be available for open dialogue on all issues.
- Examining their own leadership style and learn how to put that style into action.
- Learning the fundamentals of leadership in an ever-changing medical environment.
- Enhancing their leadership skills to excel within the business world, organized medicine, medical staffs, group and corporate practices, and the public policy arena.

While completion of the ASE Leadership Academy does not automatically guarantee a spot in ASE's leadership, this program will help participants be the best possible candidate for future openings. ASE's Bylaws were amended to include one graduate from the ASE Leadership Academy to be elected to ASE's Board of Directors beginning June 2021.

2018–2020 Inaugural Leadership Academy Members

Kristen Billick, BS, ACS, RDCS, FASE, Scripps Clinic and La Jolla Hospital, La Jolla, CA

Ashlee Davis, BS, ACS, RDCS, FASE, Duke University Medical Center, Durham, NC

Enrique Garcia-Sayan, MD, FASE, University of Texas, Houston, TX

McKenzie Hollon, MD, FASE, Emory Healthcare, Atlanta, GA

Pei-Ni Jone, MD, FASE, Children's Hospital Colorado, Aurora, CO

Eric Kruse, BS, ACS, RDCS, RVT, FASE, University of Chicago Medical Center, Chicago, IL

Jimmy Lu, MD, FASE, C.S. Mott Children's Hospital University of Michigan, Ann Arbor, MI

Sharon McCartney, MD, FASE, Duke University Medical Center, Durham, NC

Akhil Narang, MD, Northwestern Medicine, Chicago, IL

Dermot Phelan, MD, PhD, FASE, Cleveland Clinic, Cleveland, OH

Lucy Safi, DO, FASE, Hackensack University Medical Center, Hackensack, NJ

Sangeeta Shah, MD, FASE, Ochsner Heart and Vascular Institute, New Orleans, LA

Jordan Strom, MD, MSc, FASE, Beth Israel Deaconess Medical Center, Boston, MA

Gregory Tatum, MD, FASE, Duke Children's & Health Center, Durham, NC

EDUCATION CORNER

CME Without Packing a Suitcase How Does JASE CME Happen?

Contributed by: Priscilla Peters,BA, RDCS, FASE, Clinical Specialist, Echocardiography Lab, Cooper University Hospital, Clinical Assistant Professor of Medicine, Cooper Medical School, Rowan University, Camden, NJ, and Journal of American Society of Echocardiography Continuing Medical Education Co-Editor.

Maintaining registry certification for sonographers, maintaining competency for physician echocardiographers, and maintaining laboratory accreditation all require that practitioners earn credits for continuing medical education (CME) activities on an ongoing basis. In 2007, as it was becoming clear that costs for educational meetings were going up and reimbursement for such meetings for many individuals was diminishing or disappearing altogether, journal-based CME seemed an ideal method to provide necessary CME at little or no cost. Dr. Rebecca Hahn and I were the first *Journal of the American Society of Echocardiography* (JASE) CME co-editors, beginning mid-2008, and our first full year of ten articles (one hour of credit each) was in 2009. The CME offering is available to both members and nonmembers, with a cost of nothing additional for ASE members and $25 (for one hour of Category 1) for nonmembers. Since 2012, over 15,000 physicians and 52,000 allied health professionals (most are cardiac sonographers) have availed themselves of this benefit. It is important to note that because each CME offering is available for 12 months, the actual user numbers change substantially for each paper over the course of the year it is offered. In January 2018, Dr. Theodore Abraham replaced Dr. Hahn as my co-editor and he and I now decide how to split the tasks. Our JASE CME duties are, of course, in addition to our hospital clinical responsibilities. What we as editors provide to the Journal are the learning objectives (at least four, sometimes five) for the activity, the questions (always at least ten), and an explanatory paragraph which contains the answer for each question. It takes at least three hours–to read the article, write the questions, and summarize the answer to each question. This is a very conservative estimate of time. Selection of the articles was initially done or offered by Alan Pearlman, former Editor-in-Chief (EIC) of JASE. After several years, the ASE staff started providing us with a copy of the table of contents of each Journal issue far enough in advance for us to choose a paper and then write the questions. All of the ASE guidelines documents include CME. Sometimes more than one hour of CME credit is offered if we can write 12-15 intelligent questions. It is interesting how sometimes that is a compellingly difficult task. The final Journal content is sometimes not available until right before publication for a number of valid and unavoidable reasons. This can create a problem both for timely choice of the article and the subsequent author vetting necessary. Issues like "is the paper interesting enough?"; "is it novel enough?"; "does it have a good general appeal"; "is it long enough to generate ten questions"; can limit our options. A good title does not always guarantee content meaty enough for CME. Review and guideline documents tend to be the papers that generate the best questions and have the broadest general appeal. It is also true that many papers that are introducing fascinating new technology cannot be considered for CME because they represent a specific, proprietary technology limited to one manufacturer, and thus create a conflict for the authors that typically cannot be easily resolved. In order for ASE to retain its status as an ACCME Category 1 provider, there is a firewall between the Journal EIC and the CME editors, so that the CME is perceived as free from bias and is recognized as a function of the ASE, not JASE. In this context, once Journal article CME objectives and questions are written, the ASE CME committee, not the JASE EIC, provides oversight. While there is no doubt that question-writing takes a particular skill set, a conscientious writer will take the responsibility seriously while not making the questions so obtuse as to be not-answerable. Currently Dr. Abraham and I split the writing responsibilities, and this physician/sonographer team approach is very effective especially since as noted above, by far the bulk of the users, are sonographers. It is important to note that the ASE staff deserves a great deal of credit for their contribution to the final product. They vet the authors (most conflicts of interest can be resolved), keep track of all certificates awarded, and keep the availability of papers current. As I write this article in the early fall of 2018, there are currently 13 papers still available for CME; this nicely explains why the "user" number is in constant flux. Many of us will go after five or six credits at once, long after the original publication of the paper. The members of the Society owe a great debt to the ASE staff. I have been serving as a JASE CME co-editor since 2008, with no specific end in sight. I was originally chosen for this position by Dr. Pearlman, and in 2018 was asked by Dr. Michael Picard, the new JASE EIC, to stay on (actually I was asked after I volunteered) as the veteran member of the team and to ease the transition of both him and Dr. Abraham in their new roles.

In a thoughtful editorial in JASE in 2009, Dr. Pearlman noted that our ability to offer Journal CME enhances the value of the Journal, of ASE membership, and of the article itself, and no doubt the authors of the paper get a bit of a rush as well! Indeed, it has been my privilege to participate in providing "CME without the need to pack a suitcase."

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