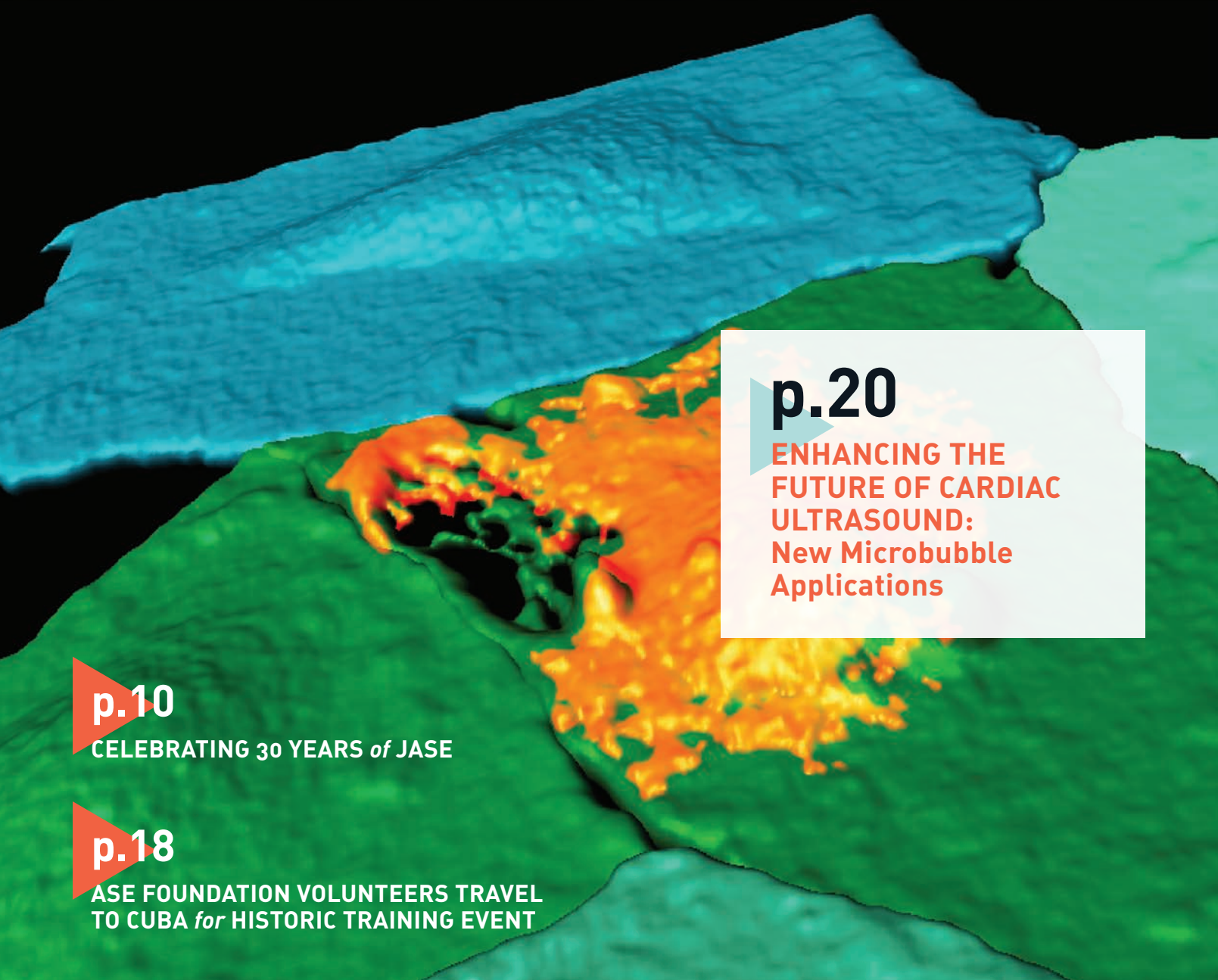
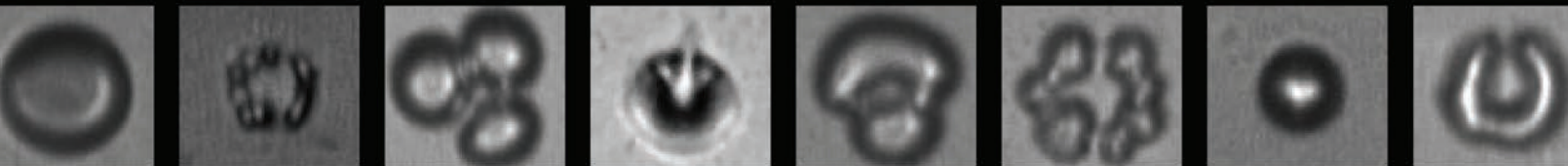


ECHO



p.20

**ENHANCING THE
FUTURE OF CARDIAC
ULTRASOUND:
New Microbubble
Applications**

p.10

CELEBRATING 30 YEARS of JASE

p.18

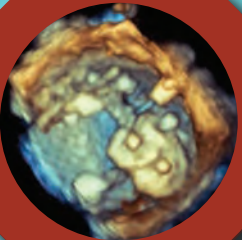
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ABOUT ASE

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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MEMBERS:

2017 has been a great year for ASE's publications. CASE, ASE's online, open access journal, debuted in February to rave reviews and has already published four stellar issues. Cases and images from around the world work to instruct practitioners on the fascinating field of cardiovascular ultrasound diagnosis and treatments. JASE, which is celebrating 30 years of being published, has had a banner year too, with its Impact Factor hitting 6.82 and ranking 13th out of 126 cardiology-related journals on the market. As a result, submissions have increased including some heavy-hitting science. *Echo* magazine is designed to complement these efforts, bringing the reader the more personal side of the field. Articles in this issue include how members of our leadership use ASE's guidelines in their practices, how women in ASE are pushing to transform gender dynamics, and how the ASEF mission to Cuba brought education to a part of the world that has had very little exposure to advanced medical training and managed to build friendships along the way. Also in this issue, cutting-edge research on percutaneous coronary interventions and new microbubble applications. All of these publications have a different role to play in shaping the field; research and stories combine to illuminate how ASE's work changes lives and makes the medical world a little more standardized and cohesive. With over 17,000 members across the globe, ASE wants to meet the needs of our diverse members. If you have an idea for an article or publication model that you think should reach our readers, let me know!

Robin Wiegink, CEO

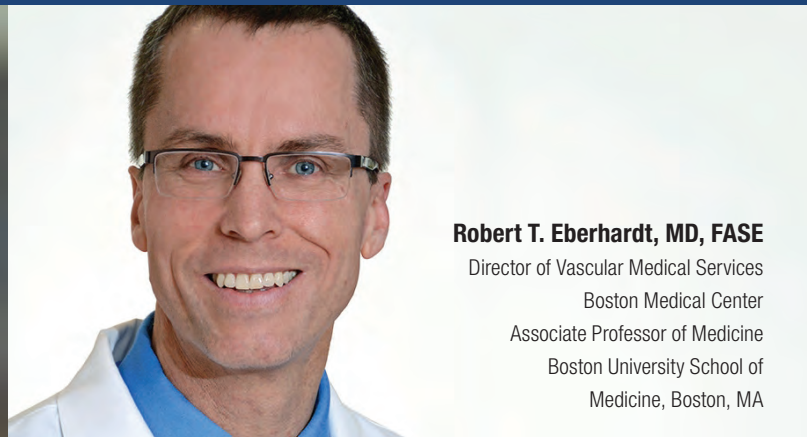
THE COVER ART is a fluorescently labeled endothelial cell monolayer, pseudo-colored in blue/green, and imaged using spectral confocal microscopy. One cell has been selectively perforated via ultrasound-induced microbubble cavitation (simultaneously captured by ultrafast imaging, top panels), allowing the entrance of a model therapeutic (orange). Helfield et al. investigated the biophysics of how rapid microbubble oscillation triggered by ultrasound waves can be used to enhance cellular uptake and increase vascular permeability. This approach, referred to as sonoporation, has utility in selectively delivering large molecules, such as therapeutic nucleic acids for cancer and cardiovascular disease, directly into target cells. Image courtesy of Brandon Helfield, Xucai Chen, Simon Watkins and Flordeliza Villanueva. See article on page 20.

Experts in the field hold the designation of FASE



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Asheville, NC

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FASE

Fellow of
American Society of
Echocardiography

TABLE OF CONTENTS >>>

6

**FOCUS ON
LEADERSHIP**

10

**CELEBRATING 30
YEARS OF JASE**

14

**ASE GUIDELINES:
WHY THEY MATTER**

16

**USING ECHOCARDIOGRAPHY
TO MASTER TRANS-SEPTAL
PUNCTURE**

18

**ASE FOUNDATION
VOLUNTEERS TRAVEL
TO CUBA FOR HISTORIC
TRAINING EVENT**

20

**ENHANCING THE FUTURE OF
CARDIAC ULTRASOUND: NEW
MICROBUBBLE APPLICATIONS**

24

**IMAGEGUIDECHO:
SHAPING THE FUTURE
OF CARDIOVASCULAR
ULTRASOUND**

26

**ASE HEADING THE FIELD IN
INCLUSION OF WOMEN IN
LEADERSHIP ROLES**

30

**ASE LAUNCHES EXCITING
NEW MENTORING PROGRAM**

31

**ECHO EDUCATION IN A
TROPICAL PARADISE**

32

**UNDERSTANDING AND
THRIVING IN EPISODES
OF CARE**

34

**EDUCATION CORNER: THE
NEW ASEUNIVERSITY
EXPERIENCE**

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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.

How do you incorporate new ASE guidelines into your practice and institution?

THERE ARE NUMEROUS GUIDELINES IN CLINICAL PRACTICE.

The sheer volume of information can be daunting and intimidating. What is the best way to digest so much information? First, focus on which guidelines are most relevant to you and your practice. For example, for clinical cardiology practice settings, the AHA/ACC practice guidelines and AUC guidelines are often the most relevant.

In the echo lab, the ASE guidelines are the cornerstone of how we acquire and interpret echo images. As a result, all of our imaging protocols and reporting templates are designed to follow the ASE guidelines. It is therefore important for each member of our lab to be up-to-date on the latest version of each of the guidelines. We achieve this by:

- 1** *Formal weekly educational sessions for sonographers and physicians. The entire lab meets once per month to discuss a relevant topic or to participate in a QA session. During the other weeks of the month, sonographers and physicians meet separately to review cases or to participate in QA. ASE echo guidelines and ACC/AHA practice guidelines are discussed in the form of case presentations, didactic teaching sessions, and QA.*
- 2** *Provide consistent feedback to sonographers and physicians on ways to improve image acquisition and interpretation.*
- 3** *Encourage lab members to view ASE webinars for the newly released guidelines.*
- 4** *Keep reporting templates up-to-date so that our reports reflect the most current version of the guidelines. For example, our reporting template was modified when the new Chamber Quantification Guidelines updated the cut-off values for left atrial size.*
- 5** *Encourage use of the ASE app, posters, and diagrams in the guidelines during reading sessions to assure accurate interpretation.*

We have been successful at incorporating guidelines into our echo lab by encouraging learning, sharing cases, and rewarding participation. We thrive on the thrill of cool images and knowing that by creating high quality echoes, we are helping our patients achieve better health.



**Vera H. Rigolin,
MD, FACC, FASE, FAHA**

PRESIDENT

Northwestern University Feinberg School of Medicine



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MD, FASE, FAHA**

VICE PRESIDENT
Duke University Health System

GUIDELINE DOCUMENTS ARE A CORNERSTONE OF ASE'S MISSION TO

improve patient health through standardization of practice and quality benchmarks. Accordingly, the release of new or revised guideline documents in echocardiography usually triggers several actions in order to guarantee appropriate incorporation. Because echocardiography in the United States is a "team sport," the specific guideline recommendations and the concepts justifying them are discussed in regularly scheduled meetings between physicians, sonographers, nurses, and allied personnel who participate in clinical and research echocardiography.

These meetings are essential for ensuring that: (1) sonographer workflow is addressed, (2) uniformity of measurement, interpretation, and reporting are established, and (3) there is no ambiguity in terms of how or when guidelines are implemented. With regards to implementation, we review guideline documents not as commandments passed down from demigods, but rather as documents intended to improve quality and standardization which sometimes rely on expert opinions without a large body of supporting evidence. Accordingly, at our meetings we often discuss situations where guidelines may not apply or where there is enough controversy that institutional consensus is needed.

There is also the critical issue of education. In institutions like ours with cardiology fellowship programs, there is not only a need to inform trainees of new guidelines (which is usually done in a dedicated imaging conference), but the review of guideline documents is an extremely useful teaching opportunity particularly when the supporting evidence behind new or revised recommendations is reviewed. Education often also includes notifying the referring population of changes in information that they will receive in an echo report and how it may influence management.

WE ARE INDEED GRATEFUL TO THE NUMBER OF SUBJECT MATTER EXPERTS

who work with each other to develop recommendations for the practice of echocardiography. Despite the ever-changing nature of technology and evidence, ASE works hard to maintain the quality and accuracy of its recommendations. My principal area of practice is perioperative imaging, where we utilize a number of relevant ASE guidelines. The most important ones in my practice pertain to imaging with transesophageal echocardiography for cardiac surgery, interventional echo for structural heart disease, and point-of-care surface ultrasound in the critically ill. As new guidelines emerge or older ones are updated, we strive to incorporate these into practice and improve the quality of imaging to align with the guidelines.

Our first step is to assess differences between the new recommendations and current practice. This includes input from multiple faculty members who are facile with and knowledgeable in perioperative echo imaging. Next, we determine the steps required to change practice and the implications for doing so – for example, in terms of logistics, changes to the reporting structure, changes in legacy database information, and education of trainees. One important area of change includes the manner in which data elements are added or updated in the reporting architecture or electronic medical record. Informatics personnel are also engaged when necessary. Once the process for the most optimal manner of incorporating new guidelines or updates has been established, we disseminate this information via online resources, laminated cards on machines for easy reference, and guideline posters when available. These are also placed in the simulation labs where trainees learn probe manipulation and views with experts. Educational resources such as didactic lectures and handouts for trainees are also updated. Incorporating change takes time, but when done in the right way, is beneficial for all, especially our patients.



**Benjamin W. Eidem,
MD, FACC, FASE**

TREASURER

Mayo Clinic

GUIDELINES ARE AN INTEGRAL COMPONENT OF OPTIMAL PATIENT CARE.

At Mayo Clinic, we have a multi-faceted process to adopt and incorporate new guidelines into our daily practice within our echo lab. Initially, our Clinical Practice Committee is charged with evaluating and prioritizing new guidelines and developing protocols for their use. Our Standardized Measurements Committee enables implementation of these protocols into daily use through development of accurate reproducible measurements as well as effective education of our sonographer, physician, and ancillary staff in the acquisition of these variables. Finally, our Quality Council evaluates various quality metrics related to these new measurements and protocols including sonographer and physician variability, AUC appropriateness, and adherence to developed standardized measurement techniques. Incorporation of new guidelines also involves education of physicians ordering these imaging studies which is integral to successful adoption of these guidelines into our clinical practice. Weekly conferences, within our echo lab, reinforce these new guidelines and demonstrate their applicability to patient management and outcomes.



**Elizabeth F. McIlwain,
MHS, RCS, FASE**

SECRETARY

West Jefferson Medical Center/LCMC Health

WE STRIVE TO INCORPORATE NEW GUIDELINE RECOMMENDATIONS INTO OUR ECHO LAB

in a way that is beneficial to our patients, echo lab staff, and the patient care team. Our usual process is:

- ▶ *Guideline review by medical and technical director.*
- ▶ *Identify changes in our scanning and interpretation protocols recommended by the new guideline document.*
- ▶ *Educate echo lab staff (sonographers, RNs, physicians).*
- ▶ *Approve any protocol changes through Cardiology Section and update policies.*
- ▶ *Implement the changes.*
- ▶ *Evaluate to ensure changes are implemented appropriately. Provide additional education as needed.*
- ▶ *Educate ordering physicians through medical staff meetings about changes that would affect patient management.*

This process provides us with ample opportunity to educate on the new guideline recommendations and implement change in an organized and intentional fashion.

How do you incorporate new ASE guidelines into your practice and institution?



Susan D. Phillip, RCS, FASE
COUNCIL REPRESENTATIVE
Johns Hopkins Medicine

ASE GUIDELINE DOCUMENTS ARE A HUGE RESOURCE FOR ALL ECHO LABS and help us keep abreast of all the new developments and best practices for echo. As a busy academic lab, it is challenging to learn and implement these new guidelines without a formal process. At Hopkins, we have a QI/QA committee led by a physician who is an Associate Director of the lab and a QI lead sonographer. We have a weekly one-hour education session, a monthly all-staff meeting, and a quarterly QI session.

The QI director and their sonographer partner pick topics for discussion. On a regular basis we rotate guidelines topics – guidelines and how to implement them are presented by a sonographer with additional comments from our physicians. We also prepare cheat sheets for our staff based on the guidelines, when needed. We repeat topics often. When new guideline documents are released we discuss them more often. Lastly, we schedule special sessions for all staff to watch the ASE webinars on the guidelines. These methods have helped us immensely in keeping our staff up to date on the new recommendations.



Allan L. Klein, MD, FACC, FASE
IMMEDIATE PAST PRESIDENT
Cleveland Clinic

I HAVE BEEN HONORED TO CHAIR THE ASE GUIDELINES AND STANDARDS COMMITTEE, serve as the chair of the writing committee for the guideline on multimodality imaging of pericardial diseases, and finally serve as president of the ASE. As you can surmise, I have reviewed many guidelines during my tenure. ASE is known nationally and internationally for publishing excellent state-of-the-art guidelines on topics related to cardiovascular ultrasound. The big question is, how do you take these large comprehensive guidelines and distill them down to practical use for the clinician in an echo lab?

I will use the diastology guideline as an example of how our echo lab applied a number of key steps to implement utilization of this guideline. The first step was to review the online webinar on ASEUniversity.org that offered practical pointers and was presented by the expert lead author of the guideline. The second step was to review the guideline and note the key tables that could be used in our lab. We then printed the two key algorithms that were used to assess the presence or absence of diastolic dysfunction as well as grading diastolic dysfunction and estimating LV filling pressures. The third step was to evaluate the ASE guideline poster that is available in the reading area of our lab. The fourth step was to have monthly QA sessions to review the guideline and then show cases illustrating the use. We would show normal and abnormal diastolic function cases with a robust discussion about the cases. The final step is repetition, repetition, and repetition! The clinicians should use the guidelines daily in their echo reading and see where there are issues with subsequent resolution.

CELEBRATING >>>

30

YEARS

OF >>

JAS E >>>

THE FIRST 20 YEARS

Contributed by Harvey Feigenbaum, MD, FASE, Founder of ASE, Founding Editor of JASE, Indiana University School of Medicine Krannert Institute of Cardiology, Indianapolis, IN



I took the approach that nothing is worthwhile unless it can be reproduced and independently verified by others.

It seems to me that as one ages, time seems to pass faster. To new parents the first year of a child's life is a very long time. To someone my age, the last 30 years is like the wink of an eye. It is hard for me to believe that the *Journal of the American Society of Echocardiography* (JASE) is 30 years old. Everyone seems to know that I founded the American Society of Echocardiography in 1975 and that I was the first editor of JASE. However, many erroneously think I initiated JASE. The fact is that I was drafted for the position of editor. I actually was not that enthusiastic about having a stand-alone echocardiography journal.

I have never considered myself to be a cardiac "imager." I am and always have been a clinical cardiologist with a special interest in echocardiography. As such I feel that echocardiography is a fundamental component to the practice of clinical cardiology, as is electrocardiography. Thus all cardiologists must be knowledgeable in all aspects of echocardiography. Thirty years ago almost all of the echocardiography papers were appearing in general cardiology journals for all cardiologists to see. I was concerned that not all cardiologists were going to read an additional journal to keep up with the latest advances in echocardiography.

I was finally convinced by others that the general cardiology journals couldn't handle all of the worthwhile echocardiography communications, and the field would be held back in its development. This fact was the reason that I accepted their request to become the first editor. When I started my editorship, it didn't take long for me to realize that those who wanted a dedicated echocardiography journal were right. There was a huge pent-up need for echocardiography papers to be published. There were many technical, early concept papers which would never be accepted in general cardiology journals. For example, our initial paper describing echocardiographic measurements of the left ventricle and the use of digital echocardiography for displaying stress echocardiograms was never accepted for publication in any general cardiology journal.

My personal difficulty in getting published what ultimately proved to be important advances in echocardiography probably influenced how I functioned as an editor. If I received a manuscript that contained an interesting or novel idea, I frequently would accept it for publication even if the research was not elegant. I took the approach that nothing is worthwhile unless it can be reproduced and independently verified by others. So I might let some "crazy" idea see the light of day and let someone else prove it right or wrong. I probably was not as critical of detail as I should have been. I am certain that some of the papers I published were really not worthy of publication, but I am also proud to say that many studies which had some flaws did prove to be worthy and important.

To those outside of the field, echocardiography is frequently considered to be a mature diagnostic technique with very little innovation yet to come. Nothing could be further from the truth. The ultrasound engineers always amaze me with their sometimes surprising innovations. I was told for years that there would never be real-time 3D echocardiography because the speed of sound was just too slow to obtain enough data to create such images. We all know how wrong the critics were. In fact, as 3D echo temporal and spatial resolution continues to improve, it is quite likely that routine echocardiography will become primarily 3D.

With the advent of multimodality cardiac imaging, there has been pressure for JASE to embrace this multimodality concept. I am personally delighted that JASE has resisted this pressure thus far. Our ASE guideline committees have adopted the multimodality approach to some extent with some unintended consequences. I still feel that echocardiography is unique partially because it uses vastly different technology and is an integral part of clinical cardiology. Every clinical cardiologist today is expected to be an expert in echocardiography. With notable exceptions the other modalities are basically integral components of radiology and are frequently, if not usually, provided by radiologists. The bottom line is that echocardiography in many ways is so unique that it clearly deserves a dedicated journal. It is my hope that JASE continues to be just that.

THE PAST 10 YEARS

Contributed by Alan S. Pearlman, MD, FASE,
University of Washington Medical Center

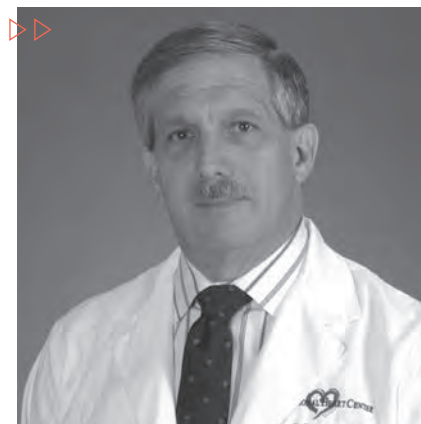
In 2005, ASE announced that Dr. Feigenbaum would step aside as JASE Editor-in-Chief at the end of 2007, and invited interested parties to apply for the position of Editor-in-Chief, to begin in January 2008. Several good friends encouraged me to apply. After 27 years, I was tired of fighting with administrators over the need for space, equipment, and personnel required to run a first-rate academic Echocardiography Laboratory. I had majored in English Literature as an undergraduate, and learned to read carefully and to write cogently. I thought that serving as Editor-in-Chief of JASE would fit my educational background and would be a nice change of pace. Many highly-qualified candidates applied, but I was told that I was the “best prepared.” I served as Deputy Editor for 18 months, giving me the opportunity to learn the Journal’s editorial system, to get experience in inviting reviewers and reaching editorial decisions, and to learn many other skills needed to keep a Journal on track. I became Editor-in-Chief of JASE in January 2008.

Space does not allow me to describe all that has happened in the past 10 years, so I will hit the high points. First, I’m not sure that the Journal would exist today if Harvey Feigenbaum had not been the Founding Editor of the Journal. Several of us might have been a good choice to serve as the second Editor of JASE, but there was only one right choice for the first Editor. Thanks to Harvey’s passion and vision, the Journal that I took over was already well-established and respected. Second, some administrative changes turned out to be good choices. About that time, Journals were shifting from “paper based” operations (manuscripts submitted and correspondence carried out by mail or fax) to communications based on email, electronic submissions, and electronic communications with reviewers and authors. To take advantage of communication methods, I appointed a group of Associate Editors most of whom were not based in the same institution as me, but instead who were chosen for their expertise and for their dedication to the Journal. Over time, I asked Jules Gardin, Jeff Stevenson, Alan Waggoner, Sherif Nagueh, Brian Hoit, Jonathan Lindner, Wyman Lai, and Philippe Pibarot to serve as Associate Editors. Appointing Victor Mor-Avi as Deputy Editor was a wise move. Working with these smart colleagues, we were able to expand our pool of peer reviewers from less than 700 to about 2,000 at present. The editorial team members help me daily to provide meaningful feedback to our authors, whose papers benefit from our input, whether published in JASE or elsewhere. Third, I decided that the JASE Editorial Office should be located at ASE headquarters; I thought that closer coordination with other ASE staff would be a wise idea, and I had no secretary or an office to house one in Seattle. Over the years, Nicole Egan, Cathy Kerr, Chelsea Flowers, and Sarah Bidgood helped to run the JASE Editorial Office. Debbie Meyer, who became JASE Managing Editor in the spring of 2013, has been wonderfully adept at interacting with prospective authors, communicating with reviewers, assisting Guest Editors when needed, and providing support for the editors.

We live in an age of “quality metrics;” some of these are used to measure the “success” of a Journal. One is submissions. In 2010, we chose to stop considering Case Re-

ports in order to focus on investigator-initiated scientific research and review articles of broad interest to members. This helped to boost other “quality metrics.” Nonetheless, the recent launch of ASE’s new cardiovascular imaging case reports journal, CASE, has been a welcome addition to ASE’s portfolio of educational materials. Without case reports, total submissions to JASE declined initially, but the number of original investigations increased by more than 20% even though many new “imaging” journals appeared on the scene. Over the past 10 years, the Journal’s Impact Factor (the average number of citations per article published during a two-year time window) rose fairly steadily from 2.062 to a current level of 6.852. More importantly, the journal’s “rank” rose from 32nd of 74 journals in the Cardiac & Cardiovascular Systems family, in 2007, to 13th of 126 journals in 2016. Only one “imaging” journal is ranked higher. Readers who want to keep up with “what is current” in echocardiography find it important to read JASE, and authors who want to reach the “echocardiography” audience find it desirable to publish in JASE.

Since I saw my first echocardiogram in 1971, the history of echocardiography has been one of continued evolution. I do not expect this trend to stop. After all, an echo instrument is really just a (very sophisticated) special purpose computer, and I have no reason to expect that computers will stop evolving and improving. The challenges for the next 10 years will be the same ones we have addressed during the past 10 years – to pick studies that are scientifically valid, dealing with novel and clinically relevant applications of cardiovascular ultrasound, to attract a reasonable number of effective state-of-the art review articles, and to continue to publish ASE standards and guidelines when the Society sees fit to develop and release them. The uses and users of clinical ultrasound continue to broaden, and it will be important to identify and focus on where and how cardiovascular ultrasound can best be used to help improve patient care through accurate diagnosis and dependable serial assessments, used in an appropriate manner. I am confident that the incoming editorial team is well positioned to maintain and expand upon the successes that JASE has enjoyed over the past 30 years, and I look forward to assisting in some small way.



▶▶ JASE THE FUTURE

Contributed by Michael H. Picard, MD, FASE, Massachusetts General Hospital and Harvard Medical School



I have been submitting and publishing manuscripts in JASE since my echocardiography fellowship in the late 1980s. One of the major reasons I have been a fan of JASE during my career as an investigator is that it is one of the few cardiovascular journals that routinely and enthusiastically publishes experimental cardiovascular physiology manuscripts and not just clinical investigations. When it was announced in 2005 that ASE was looking for a successor to Dr. Feigenbaum for the JASE Editor-in-Chief position, one of my former mentors who was a Past President of the organization encouraged me to apply for the position. I was about to start my term as President of the ASE and also still had many goals I wanted to accomplish as the leader of the echo lab at the Mass General Hospital so it was not the right time for me to apply. However, it piqued my interest. During Dr. Pearlman's term as editor, I have had the opportunity to serve as a reviewer and a guest editor and thus learn some of the "behind the scenes" (or under the cover) aspects of how the Journal runs. The timing of this most recent search for JASE Editor was perfect for me, and I was honored last fall to be selected to become the third Editor-in-Chief of JASE.

In many ways taking on this position is easy since Drs. Feigenbaum and Pearlman have created and nurtured a very popular Journal that does not need modification to continue its success. But in many ways taking on the position is very challenging since we must continue to evolve and not just rest on our laurels. My goals are to maintain the high scientific standards and quality of publications as established by my predecessors while ushering the Journal into a new era where the manner in which we obtain and manage new information differs from the past. The number of cardiology papers that are published each month can be overwhelming and at times it is difficult to decide what to read. I hope that we at JASE can provide tools that will help our ASE members, and all readers of the Journal, to efficiently review the content and gain rapid access to papers of interest whether through the hard copy or an electronic access. This will include the use of social media to alert interested readers of new content and provide a rapid link to papers. Many access our content while on the go through their smartphones, and I hope to make this easier by taking full advantage of the capabilities of the OnlineJASE.com website and also by adding audio summaries, author interviews, and expert commentaries. As Dr. Feigenbaum discusses in his essay, 3D echo will become more routine in our clinical practice and so we will make sure that the JASE website has the tools that will enable our readers to view and manipulate 3D images that will accompany papers.

As Dr. Pearlman points out, this is not a one person job. I am pleased that the JASE editorial team will be composed of a mix of current editors who are staying on and the addition of some very talented investigators and clinicians who have demonstrated a commitment to the Journal. Victor Mor-Avi will continue as Deputy Editor. Brian Hoit, Sherif Nagueh, and Wyman Lai will continue as Associate Editors, and we welcome Oscar Benavidez, Victoria Delgado, Sheldon Litwin, and Vincent Sorrell as Associate Editors. I am particularly excited that JASE will have international representation on our editorial team. The reach of JASE is world-wide, so I want to make sure we engage our authors and readers from all parts of the globe.

While the editorial team has a large role in assuring the quality of what

we publish, a major determinant of our content is based on the review process. I am most appreciative of the many volunteers who serve as reviewers of the submissions. Without their willingness to spend the time to critically examine each paper and even challenge the authors to improve their submissions, we would not have achieved our position among the top cardiovascular imaging journals. For any of you who wish to join in as a reviewer, please contact our managing editor, Debbie Meyer (dmeyer@asecho.org). It is a great way to serve ASE while also getting a chance to see what is new in the field.

It's an exciting time to lead JASE. There are so many topic areas that will continue to occupy the pages such as the use of echo and Doppler for diagnosis, echo markers associated with numerous cardiac outcomes, and various investigations on strain imaging, 3D echo, the role of echo in structural heart interventions, fetal echo, congenital heart disease, and point of care echo. Of course, the Journal will also remain a place where we communicate important ASE practice guidelines. There are also new areas that are beginning to intersect with echocardiography, and I expect that JASE will be a home to many of these topics such as "machine" or "deep" learning, population health, and also the interplay between genetics (and manipulation of genes) and cardiac structure and function, just to name three.

The Journal is here to serve the needs of the ASE membership and the entire cardiovascular ultrasound community. If you have any suggestions of topics we should be addressing or any ideas for ways we can improve the Journal, please let me know (JASEoffice@asecho.org).

I want to make sure we engage our authors and readers from all parts of the globe.



ASE GUIDELINES:

Why They Matter

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

► WHAT AND WHY

The ASE guidelines have become an essential and integral part of the practice of echocardiography. As echocardiographic technology and utilization continue to advance, an overwhelming amount of new information is being generated, requiring organized analysis, synthesis, and conversion into specific recommendations. The contents of a guideline are based on systematic evaluation of best available evidence as well as expert consensus.

ASE guidelines are designed to support decision-making in the use of echocardiography as an imaging modality. Ideally, the guidelines will reduce inappropriate variation in practice, provide a focus for continuing education, highlight limitations of existing literature, and provide direction for future research.¹

► MEETING OF THE MINDS

Guideline documents start with a concept/perceived need, a leader, and a very carefully assembled group of experts who make up the writing group. Care is taken to assemble writing groups from a variety of practice settings because the ultimate aim for ASE's guidelines is to give direction for improved patient care. What happens next depends on the topic, but typically a robust, sometimes cacophonous, in-person discussion is the starting point for these documents. Compromise is often required by writing group members representing diverse professional experiences, as well as expert consensus when data is insufficient. "My experience is that our colleagues find tremendous value in an expert consensus," said Juan Carlos Plana, MD, FASE, lead author for the 2014 "Expert Consensus for Multimodality Imaging Evaluation of Adult Patients during and after Cancer Therapy." "These are often emerging topics, and the expert opinions provide immediate direction until sufficient data becomes available."

► VETTING THE GUIDELINES

In addition to the group of experts that develop the content, another strength of ASE guideline documents is the very thorough review process. Members of the Guidelines Committee and Board of Directors, which are made up of members at large as well as representatives from all of the councils, give fresh eyes and different perspectives to the recommendations the writing groups have pondered for one or two (or more) years. It should be noted that unlike other documents published in the *Journal of the American Society of Echocardiography* (JASE), guideline documents are not reviewed by the JASE editorial board. Careful "peer review" is delegated to the Guidelines Committee and Board of Directors. A recently published guideline document had no fewer than 45 reviewers.

► DISSEMINATION AND IMPLEMENTATION— PLEASE DO NOT STAMPEDE!

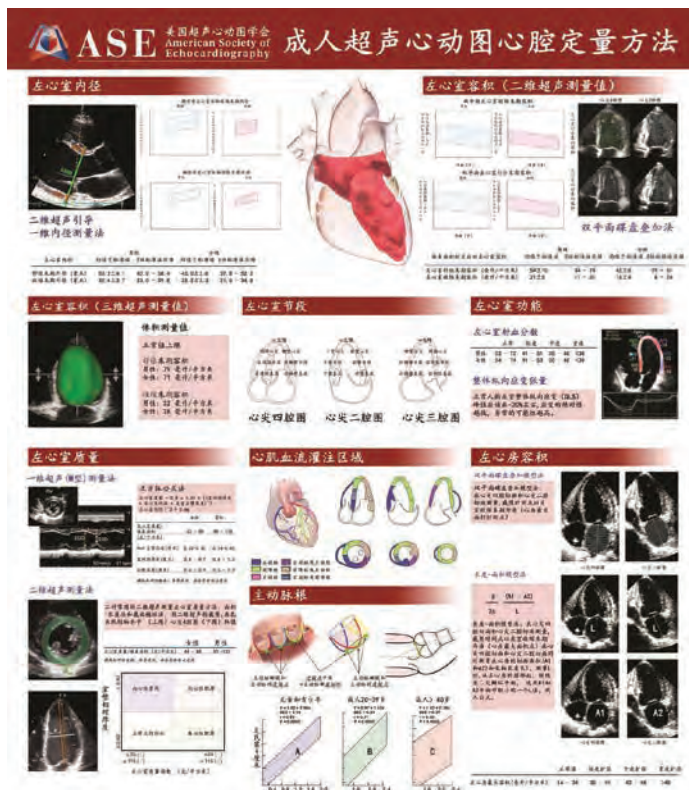
In recent years, the ASE Board of Directors has recognized the importance of taking guideline documents beyond words on paper. "It's no longer enough to just focus on writing guideline documents. We also have to make sure the guidelines are disseminated and implemented," said Neil J. Weissman, MD, FASE. Dr. Weissman planted the seed for the current implementation and dissemination ideas while he was the Guidelines Committee Chair a decade ago and had the opportunity to give these ideas a greater voice as ASE President 2014-2015. In addition, past president Roberto M. Lang, MD, FASE, led efforts to add attractive visuals to boost the visibility of the guidelines. As a result, guideline posters, apps, and webinars have evolved from the full text of the documents, making them available in convenient and user-friendly formats. More recently, patient summaries from the guideline

documents are being tested, as patients become increasingly responsible for the management of their own healthcare.

ASE guidelines have educated the world and given uniformity to the practice of echocardiography. The documents, posters, and webinars are now available in multiple languages, and have been at the forefront of ASE's global outreach.

In a blog post dating back to 2012 about a trip to China, James D. Thomas, MD, FASE, wrote about the global impact of ASE's guidelines: "[In Wuhan] we visited the Wuhan Asian Heart Hospital ... They now do 4,200 cardiovascular operations a year at their institution and over 13,000 caths and PCI's. While there I saw proof positive that ASE is having an impact in China. Right on the wall was [a translated] ASE Chamber Quantification poster! What was most remarkable was this was not in the echo lab but actually in the CT reading room, where they said they found it very useful for their measurements. I was told that they have the complete collection of posters in the echo lab [as had been the case at Fuwai Hospital in Beijing, as well]."

At the 2016 ASE Foundation training event in Xi'an and Yan'an, China, translations of ASE's 2015 Chamber Quantification and 2016 LV Diastolic Function posters were made available for distribution to all of the 500 Chinese physicians in attendance. The announcement that the popular posters would be distributed during the lunch break prompted these instructions from the local organizer: PLEASE DO NOT STAMPEDE!



document has been cited nearly 12,000 times, making it the most cited document ever on the topic of echocardiography.

▶ guide•line

noun

A general principle or piece of advice.

Synonyms: recommendation, instruction, direction, suggestion, advice

▶ IMPACT FACTOR ON THE RISE

The exciting news that the JASE impact factor increased from 4.254 in 2015 to 6.852 in 2016, and that the Journal's ranking in the Cardiac & Cardiovascular Systems journal category jumped from 29th out of 124 journals in 2015 to 13th of 126 journals in 2016, can be attributed to a great Editor-in-Chief and his team.

Credit also goes to the guideline documents published in 2014 and 2015, which gave a significant boost through their citations. The 2015 "Recommendations for Chamber Quantification by Echocardiography in Adults" document (Lang et al) resulted in more than 500 citations in 2016. This is not surprising, since the 2005 Chamber Quantification

▶ GUIDELINES PROMPT RESEARCH

"The opportunity to lead the 2005 ASE Chamber Quantification document changed my career," said Dr. Lang, lead author for the 2005 and 2015 Chamber Quantification documents. The 2015 Chamber Quantification document indicated a need for exploring whether chamber quantification values vary across countries, geographical regions, and cultures, resulting in the World Alliance Societies of Echocardiography (WASE) Normal Values study, an ASE Foundation-led research project with study centers in 16 countries. "We believe the information derived from this effort will be of benefit for echocardiography worldwide, not only in describing each population but also in comparing them to each other," said Dr. Lang.

▶ COMING UP NEXT

In 2018 (or before), look for updates of the 2008 contrast document and the 2009 stress document, and other new documents on topics such as Chagas Disease, Performing a Comprehensive TEE Examination in the Pediatric Patient, Performing a Comprehensive TTE Examination, and Residual Valvular Regurgitation After Percutaneous Valve Repair or Replacement, as well as others.

USING ECHOCARDIOGRAPHY

to MASTER TRANS-SEPTAL PUNCTURE

CONTRIBUTED BY: Feroze Mahmood, MD, FASE, Professor of Anesthesia, Harvard Medical School, Director Cardiac Anesthesia, Beth Israel Deaconess Medical Center, Boston, MA and Jeffery Bortman, Research Fellow, Valve Research Group, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA.

BACKGROUND

As imaging technology continues to progress, percutaneous coronary interventions are becoming increasingly more feasible for procedures that were previously limited to a surgical approach. Some of the procedures now available for percutaneous intervention include catheter-based mitral valve repair i.e. MitraClip®, percutaneous mitral valvuloplasty, catheter ablation, left atrial appendage closure, para-valvular leak closure, pulmonary vein isolation, hemodynamic evaluation of the mitral valve, and atrial septal defect (ASD) closure.¹ Our ability to safely perform trans-septal puncture (TSP) procedure to reach the left side of the heart, i.e. the left atrium (LA), through the inter-atrial septum (IAS) has expanded the applications of percutaneous coronary interventions. Physicians can access the left side of the heart via femoral veins in the groin and an open chest procedure is avoided. Thus a firm understanding of the TSP procedure, including an understanding of the best imaging modalities to utilize for the procedure, is integral for mastering this minimally invasive alternative to surgery.

IMAGING METHODS

The most common modalities used for real-time guidance for TSP are fluoroscopy, which can give a real-time view of catheters, guide wires, and needles relative to larger cardiac structures, and 2 and 3 dimensional (2-3D) transesophageal echocardiography (TEE), which provide more detailed imaging of anatomical structures for precise localization of the puncture site.

Fluoroscopy is a 2D imaging technique that uses X-rays to provide real-time images of internal structures. The fluoroscope has an X-ray source that emits beams through the supine patient, which are then collected by a fluoroscopic detector placed behind the patient to generate the image. Contrast media are used in tandem with the fluoroscope to better visualize anatomical structures of the heart. When used for TSP without TEE assistance, a pressure transducer

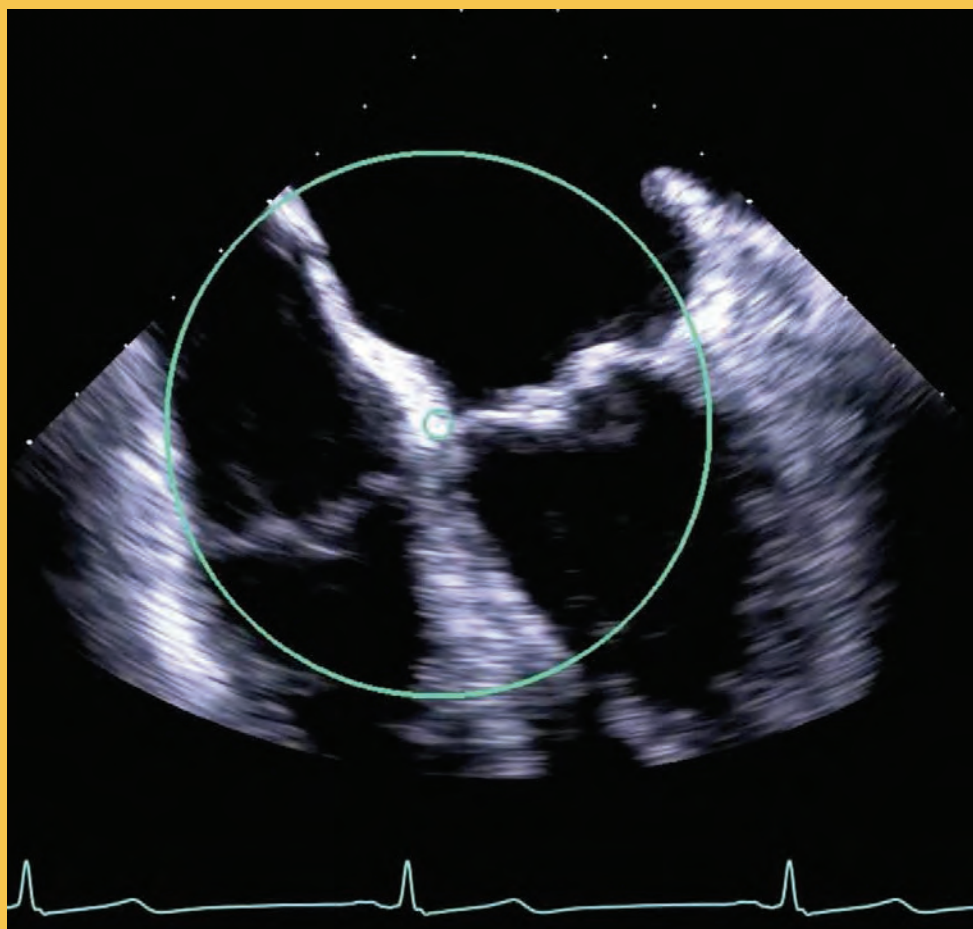
is attached to a catheter that registers a change in pressure waveform as the catheter crosses the IAS. To precisely identify the position/location of the catheters in the heart, interventional cardiologists use a change in waveforms and pressures during catheter manipulation.

In contrast to fluoroscopy, TEE is capable of direct visualization of the TSP catheter in relation to the IAS to confer a more precise puncture site location. The matrix 3D TEE probe has a matrix array of 2500 piezoelectric crystals that use mechanical vibration to create ultrasonic waves directed at patient tissue. After emitting a series of ultrasonic waves, the crystals will enter a “listening phase” where they pause to detect waves that have reflected off of patient tissues and various media. The matrix arrangement of the piezoelectric crystals generates real-time 3D views of the IAS and other heart valves that enhance operator spatial orientation and provide procedural guidance.

TSP CHALLENGES

While the complication rate of TSP procedures using the traditional fluoroscopy-only method is low, echocardiography enhances the accuracy and safety of selecting the puncture site and minimizes the risk of perforating nearby structures such as the aortic root. A precise TSP is also important to avoid creating perforations in the myocardial walls that can lead to fluid accumulation around the heart that requires immediate percutaneous or surgical drainage. Although the inter-atrial septum is often understood as a single flat wall between the left and right atria, there are embryological folds and grooves in the tissues that can be misidentified during TEE examination and TSP with consequent perforations of the RA and LA. Waterston's groove is one such congenital fold of tissue that is often un-fused or filled with epicardial fat, and so puncturing through this region will create holes to the outside of the heart leading to the potential for tamponade.²

Further contributing to the difficulty of TSP is the procedure-specific location of the puncture. For example, TSP for



◀ FIGURE LEGEND

Figure 1: Mid-esophageal 4-Chamber view and echocardiographic guidance for the location of the trans-septal puncture

MitraClip® procedures must be located >4 cm above the mitral annulus in a superior and posterior position to facilitate easier positioning and manipulation of the large MitraClip® delivery system (Figure 1). Thus a combined fluoroscopic and TEE approach must be taken for these procedures where precise positioning of the TSP is necessary. Furthermore, anatomic variations between patients should also be considered during TSP, including varying locations of the fossa ovalis, the fibrous structure that covers the foramen ovale during fetal development and often serves as the landmark for TSP. The fossa ovalis is often unable to be distinguished using fluoroscopy, however it clearly presents as a crater-like structure with TEE. Thus a combined approach using both fluoroscopic and echocardiographic guidance is now recommended for most TSP procedures to ensure a precise TSP.³

CONCLUSION

As minimally invasive percutaneous interventions continue to increase in frequency, a better understanding of difficult procedures such as TSP, including the necessary imaging techniques, is critical for mastering the full breadth of percutaneous interventions currently available. This mastery of TSP, including location of the exact site of puncture, will ultimately influence the complexity, difficulty, and duration of the procedure to follow, and is thus crucial for improving patient safety and ultimately patient outcomes.⁴

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ASE Foundation Volunteers Travel to Cuba for Historic Training Event



Hotels in Old Havana were too expensive for our limited budget, but that gave us an excuse to ride in old American and newer model Russian cars from the hotel to the hospital. Here, a group squeezes into a brightly colored Lada, a Russian car.



Dr. Jose Banchs signs a certificate for an attendee.

Nine ASE Foundation volunteers conducted a successful three-day training event in Havana, Cuba in early April. Led by Roberto Lang, MD, FASE, the group included Federico Asch, MD, FASE, Jose Banchs, MD, FASE, Javier Ganame, MD, PhD, FASE, Rachel Marcus, MD, Julio Perez, MD, FASE, Juan Carlos Plana, MD, FASE, Danny Rivera, RCS, and Lili Lang. Juan Prohias, MD, of Havana, co-chaired the conference with Dr. Lang.

Held April 6-8, 2017, the training event took place in the theatre of Hermanos Ameijeiras Hospital, the premier hospital in Havana located in a towering building that is visible from the famous Malecón seaside boulevard near the historic center. More than 300 cardiologists from throughout Cuba participated, all of whom perform echocardiography either part- or full-time. Cuban officials estimated we reached 91% of the echocardiographers in that country. The physicians located outside of Havana received support from the Cuban government for hotel accommodations as well as transportation to and from Havana to attend this event.

All talks were presented in Spanish, and included advanced topics such as strain imaging/speckle tracking, cardio-oncology, congenital heart disease, the use of echocardiography in intervention, and advances in echocardiography. The talks were recorded for future dissemination throughout Spanish-speaking countries. A popular giveaway at the event was USB drives loaded with ASE guideline documents, including Spanish translations, placing important ASE guideline documents in the hands of each participant.

Seats in the lecture room remained full throughout the three days, but the favorite (and loudest) times were breaks and lunches. With the understanding that the personal interaction would be of equal importance to the advanced lectures, meals were brought in and break times extended so everyone could stay on-site and get to know one another. These were the special times when participants from Cuba, U.S., Canada, Argentina, and Brazil mingled, asked questions, shared experiences, took group photos, and exchanged contact information.

In addition to the ASE speakers from the U.S. and Canada, other speakers included ASE members and alliance partners in South America – Ricardo Ronderos, MD, PhD, FASE, Marcelo Vieira, MD, Jorge Lowenstein, MD, FASE, Salvador Spina, MD, Mirta Casella, MD, and Diego Lowenstein, MD



Drs. Roberto Lang and Juan Prohias teamed up to make this event happen. Dr. Lang presented a plaque of appreciation to Dr. Prohias and the hospital during the closing session.



CUBAN OFFICIALS ESTIMATED WE REACHED 91% OF THE ECHOCARDIOGRAPHERS IN THAT COUNTRY.

– and 14 speakers from Cuba. Working alongside the Cuban Society of Cardiology and the InterAmerican Association of Echocardiography resulted in a unique and historic collaboration.

“I am so proud of the ASE Foundation’s efforts in Cuba,” said Dr. Lang. “Bringing this training to Cuba would not have been possible without the efforts of many people... our North and South American speakers gave of their time and expertise, as well as self-funding their own travel to Cuba to be a part of this. The ASE Foundation (ASEF) provided the financial and organizational support to make this happen, and Philips Latin America provided generous financial support for our in-country expenses. And we could not have begun to take on an event like this without the tremendous efforts of Dr. Juan Prohias and his team in Havana. They coordinated all the local logistics and also got the government permissions for us to undertake a project of this sort, which would have been daunting just a year ago.”



Drs. Salvador Spina and Juan Carlos Plana (center left and right) spent this break smiling for many cameras!

commercial airlines planning direct flights to Havana from U.S. cities, discussions began in earnest with Dr. Prohias for the right type of event to conduct in his country. As with other ASEF international humanitarian/training events, we sought to customize the event based on the greatest needs of the

country. In the case of Cuba, the need was for advanced training for physicians. Travel outside of their country is very expensive and logistically difficult for Cuban physicians, especially travel to the U.S. The logical solution was to take expert speakers to Cuba, and make advanced training available for all echocardiographers in that country.

A proposal for the training event was approved by ASEF in early 2016 for a 2017 event, and Span-

ish-speaking volunteers were selected well in advance of the event. Dr. Lang was on a flight to Havana in early December, the second week commercial U.S. flights flew to that city, to meet with Dr. Prohias about the event and work out the details. The rest is history (and historical).

The goal of this event was a deepening relationship with a potential long-term partner in Cuba, advanced training for attendees in Cuba, improved patient care, cultural and educational exchange, and a unique and rewarding volunteer opportunity for ASE members. Mission accomplished!



Drs. Ricardo Ronderos, Federico Asch, Juan Prohias, and others listen to a lecture.

Our thoughts and best wishes are with our friends and colleagues at Hermanos Ameijeiras Hospital and other institutions throughout Cuba, following the recent damage from Hurricane Irma.

**DESPISTE OUR POLITICAL DIFFERENCES,
ECHOCARDIOGRAPHY UNITES US.**

Roberto Lang, MD, FASE, Event Co-chair

How Did This Happen?

ASEF began looking for opportunities in Cuba several years ago, and we were introduced at that time to Dr. Prohias as the Cuban echocardiographer with whom we should partner. As opportunities in Vietnam, Argentina, Kenya, and other countries became available to ASEF, consideration for Cuba fell to the side due to travel challenges. When travel became less restrictive for U.S. citizens, and with the news of U.S.-based



Jose Banchs, MD, FASE, ASE Foundation Annual Appeal Chair, said one of his most memorable moments was the lobby of hospital with the Jose Marti, Cuban poet and patriot, quote (in Spanish) “The best way of saying is doing.” So true, so real.

ASEFoundation.org/Cuba



ENHANCING THE FUTURE OF **CARDIAC** **ULTRASOUND:** **NEW MICROBUBBLE APPLICATIONS**

Contributed by: Thomas R. Porter, MD, FASE, Theodore F. Hubbard Distinguished Chair of Cardiology, Professor, Internal Medicine, Division of Cardiovascular Medicine, University of Nebraska Medical Center, Omaha, NE.

THIS ARTICLE WILL TELL YOU HOW ULTRASOUND contrast users will become non-invasive surgeons in the next 10 years using microbubbles to diagnose and treat acute intravascular and microvascular disorders such as acute myocardial infarction, refractory ischemia, and even metastatic tumors.

AT THE 28TH ANNUAL ASE SCIENTIFIC SESSIONS IN BALTIMORE, I had the pleasure of chairing a symposia highlighting the latest advances in ultrasound enhancing agents. This session covered a wide-range of emerging applications for targeted and non-targeted microbubbles. This exciting research is going to change the way of the future for echocardiographers.

USING MICROBUBBLES TO DETECT EARLY ENDOTHELIAL CHANGES IN THE ATHEROSCLEROTIC PROCESS

Sharon Mulvagh, MD, FASE, Nova Scotia Health Authority, opened the symposium by presenting data on the potential for targeted microbubbles to P-selectin and other adhesion molecules on the carotid endothelial surface to predict atherosclerosis development. Studies in non-human primates on high fat diets demonstrated contrast enhancement from retained targeted microbubbles long before any other traditional atherosclerotic markers, such as carotid intimal thickness. A representative image of this is displayed in Figure 1 (courtesy of Jonathan Lindner's group at Oregon Health & Science University). This demonstrates that with high frequency low power multipulse amplitude modulation imaging, one can detect P-selectin targeted microbubbles along the carotid endothelial surface just four to six weeks after being placed on a high-fat diet.¹ Once a targeted microbubble to these endothelial inflammatory markers becomes clinically available, it could be used to detect these early abnormal endothelial responses, and potentially promote lifestyle modifications and pharmacologic interventions that lead to over atherosclerosis.

ULTRAFAST IMAGING OF HOW MICROBUBBLE RESPONSES TO ULTRASOUND AFFECT CELLULAR PERMEABILITY

Brandon Helfield, PhD, presented a review of the recently published observations from the University of Pittsburgh Medical Center which utilized simultaneous high frame rate optical microscopy and real time three dimensional confocal fluorescent microscopy observations of microbubble-endothelial cell interactions in response to ultrasound at different mechanical indices and frequencies. The mechanical index was gradually increased at different transmit frequencies and pulse durations to determine the threshold at which altered cellular permeability was observed. At kilopascal peak negative pressures (which are clearly within the diagnostic ultrasound range), a threshold was observed whereby a sonoporation event occurred. When the microbubble event occurred near an endothelial cell, the microsecond growth and collapse of the microbubble (cavitation) triggered a series of events. The first event was transient membrane pore formation at the site of cavitation. Even while the pore was closing over a period of milliseconds, there were cell to cell interactions occurring

that resulted in more prolonged alterations in intercellular gap junction permeability that persisted for minutes following the sonoporation event.² These dramatic observations demonstrated how a microsecond event (microbubble cavitation) can lead to a series of time sensitive events which could be used for sustained drug delivery (Figure 2), and provide the basis for ultrasound targeted delivery strategies.

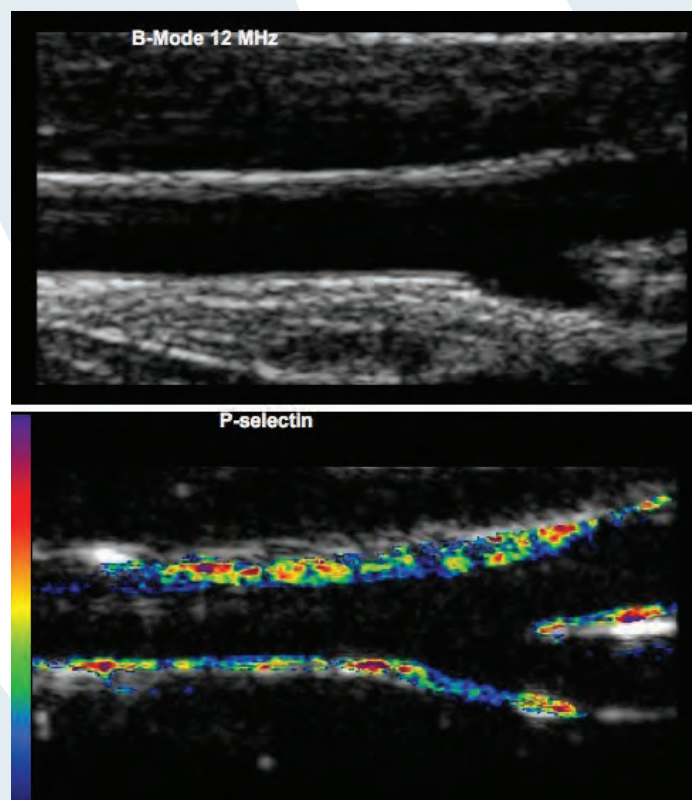


Figure 1. After a non-human primate is fed a high fat diet for one year, the carotid intimal medial thickness on high frequency ultrasound appears normal. However, following intravenous injection of microbubbles targeted to endothelial cell adhesion markers, there is diffuse signal enhancement along the vascular wall detected with contrast enhanced ultrasound. Adapted from Reference 1 (Courtesy of Jonathan Lindner, MD; Oregon Health & Science University).

DIAGNOSTIC ULTRASOUND MICROBUBBLE RESPONSES FOR TARGETED THERAPY IN CANCER AND PERIPHERAL VASCULAR DISEASE

Flordeliza Villaneuva, MD, also with the University of Pittsburgh Medical Center, presented ongoing work using targeted microbubbles to non-invasively concentrate cancer therapeutic strategies. One of their strategies is to load cationic perfluorocarbon microbubbles with a STAT 3 decoy DNA during the amalgamation process normally used to prepare microbubbles prior to intravenous delivery. STAT 3 DNA translates into a STAT3 protein that plays a vital role in tumor proliferation and invasion into normal tissue. Villaneuva's group used a commercially available diagnostic ultrasound scanner to deliver intermittent high MI impulses over the tumor site following an intravenous injection of the STAT3 decoy DNA-loaded microbubbles. This simple procedure resulted in a greater than 50% reduction in tumor volume when compared to a group of mice receiving a mutant decoy loaded onto the microbubbles.³ This simple strategy of mixing a positively -charged perfluorocarbon microbubble with negatively charged DNA, and targeting the destruction of the microbubble at the tumor with surface ultrasound, doubled the amount of therapeutic DNA delivered to the tumor.

Howard Leong Poi, MD, FASE, from the University of Toronto, shared work exploring the potential for a diagnostic ultrasound microbubble delivery technique for non-coding RNAs, termed miRNA. One specific miRNA (miR-126-3p) has been shown to have therapeutic potential in treating chronic limb ischemia, by having a pro-angiogenic effect which inhibits the translation of negative regulators that control vascular endothelial growth factor (VEGF) production. Their work in small animals with chronic limb ischemia demonstrated that the miR-126-3p could be bound

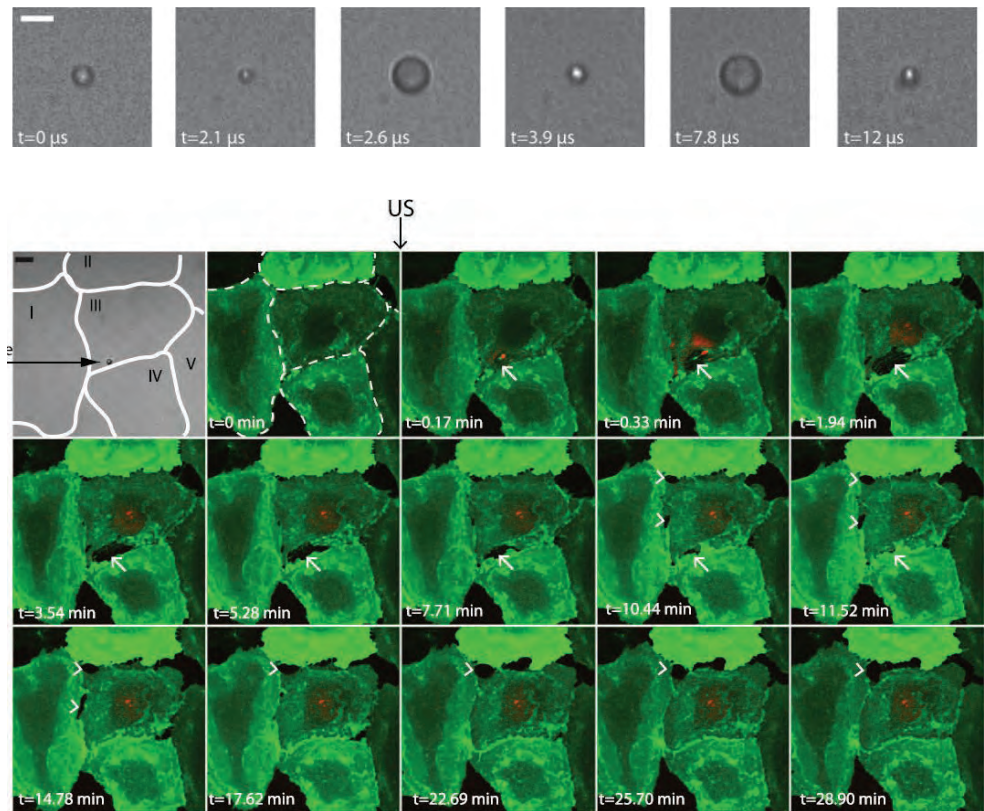


Figure 2. The top row depicts ultra-high speed recordings (>10,000,000 frames per second) of a microbubble during insonation with 1 Megahertz ultrasound at a mechanical index of 0.8. Note that over a time period of 12 microseconds, the bubble has expanded and contracted at least two times. The three rows below this depict what happens to fluorescently stained (in green) endothelial cells (numbered I-V) after this microbubble oscillation. Note that first a hole is produced in cell III (arrow) which then causes leakage of a fluorescent marker [propidium iodide] into the cell at 0.33 minutes following insonation. By 10 minutes, the original hole produced by the microbubble appears to closing, but gaps are beginning to appear in between endothelial cells (arrowheads). These gaps persist for up to 30 minutes (arrowhead, last panel). These images were adapted from Reference 2 in conjunction with Brandon Helfield and Flordeliza Villaneuva at the Center for Ultrasound Molecular Imaging and Therapeutics, University of Pittsburgh, Pittsburgh, PA.

to cationic perfluorocarbon microbubbles, and delivered effectively to chronically ischemic hindlimbs following intravenous injection with diagnostic ultrasound high MI impulses applied transcutaneously over the limb.⁴ Repeated delivery (days 15, 17, and 28 following the onset of ischemia) of the miR-126-3p inhibited regulatory protein production better than a single delivery, and produced the greatest increase in blood flow to the ischemic limb.

Both the Villaneuva and Leong-Poi presentations emphasized the advantages of a diagnostic ultrasound targeted microbubble delivery strategy.

Both the Villaneuva and Leong-Poi presentations emphasized the advantages of a diagnostic ultrasound targeted microbubble delivery strategy. In addition to the targeting ability of ultrasound to the site of tumor or ischemia, the cationic microbubbles used in their pre-clinical studies prolonged the circulatory time of the therapeutic nucleotides by protecting them from circulating DNAase and RNAase enzymes that degrade unbound nucleotides.

the mechanism by which the high MI impulse increases microvascular flow.⁶ They have demonstrated a sustained increase in adenosine triphosphate (ATP) production from both endothelial and red blood cells following diagnostic ultrasound targeted microbubble destruction over hindlimbs. This increase in ATP production increases flow not only in the field of insonation but downstream flow beyond the zone of insonation. Lindner's pre-clinical observations of

A two-fold increase in forearm blood flow was observed with diagnostic ultrasound high mechanical index impulses in sickle cell disease patients.

CLINICAL TRIALS UTILIZING ULTRASOUND TARGETED MICROBUBBLE DESTRUCTION FOR SONOTHROMBOLYSIS AND IMPROVED MICROVASCULAR FLOW.

The session concluded with a presentation from Wilson Matthias, Jr., MD, PhD, FASE, from the Heart Institute of Sao Paulo, regarding the ongoing trial examining the potential for targeted diagnostic ultrasound induced cavitation of commercially available microbubbles (Definity, Lantheus Medical) in acute ST segment myocardial infarction (STEMI). Their preliminary work was published in 2016,⁵ and they are now randomizing patients who present to the Sao Paulo Emergency Room with their first STEMI to either conventional emergent percutaneous coronary intervention (PCI) therapy, or PCI therapy combined with a diagnostic ultrasound guided high MI applications during an intravenous Definity infusion applied in the apical four, two, and three chamber windows for up to 30 minutes before and after PCI. Their preliminary findings have demonstrated both a significantly increased epicardial recanalization rate prior to PCI, and significantly less adverse left ventricular remodeling at one month follow up.

The discussion focused on the therapeutic effect of the "diagnostic high MI impulse" in these different clinical scenarios. This was highlighted by a recent publication from Jonathan Lindner's lab which further elucidated

ATP-mediated increased downstream flow were tested in 12 patients with sickle cell disease, whereby diagnostic ultrasound high MI impulses applied over the proximal forearm while simultaneously analyzing microvascular perfusion during a continuous infusion of diluted Definity microbubbles. A two-fold increase in forearm perfusion was observed with repeated applications over a 15-minute period.

CONCLUSIONS

All of this research demonstrates the exciting potential for diagnostic ultrasound and microbubbles for non-invasive surgical applications. Although specific regulatory approval would be required for targeted DNA or miRNA delivery, it would be extremely helpful to have such a method in targeting delivery of newer generation chemotherapeutic agents in order to enhance the local effects at the site of the tumor while simultaneously reducing systemic side effects. The altered cellular permeability and ATP responses following ultrasound mediated microbubble cavitation will open the door for many therapeutic applications in a wide variety of disease processes.

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ImageGuideEcho:

Contributed by Sarah Beth Bdoyan, MSPH, ASE Research Associate/Project Manager

Navigating today's changing healthcare environment and advancing technology requires the ability for clinicians, lab directors, and administrators to assess the quality of care provided and determine mechanisms for performance improvement.

The American Society of Echocardiography's creation of ImageGuideEcho™ as the only echocardiography specific clinical data registry was born out of a need to help our members and the field address these concerns in an efficient and low-cost way.

ASE's Board of Directors also wanted ImageGuideEcho to assess specific quality metrics and patient outcomes as a vehicle to drive technology application within the field of echocardiography for the benefit of patients, physicians, and researchers. Through analysis of echo-specific registry data, researchers will gain increased access to and be able to accelerate the most impactful research in the field. **ASE is very excited to offer participation in ImageGuideEcho as a complimentary member benefit for U.S.-based labs in 2017-2018.**

Physician-Driven Registry

The need for ImageGuideEcho has been widely acknowledged by the cardiovascular community as a means to address quality in cardiovascular imaging, which includes disparity identification, improvement opportunities, and public reporting via established mechanisms to ensure transparency.¹ In this era of big data, "the group that has the most accurate and actionable data will have the greatest power over the specialty and the profession."² ASE believes that the wealth of information contained within echocardiography data should remain with clinicians themselves. ASE is thus pleased to support its members by embarking on this journey together with the American Society of Nuclear Cardiology (ASNC) to create a seamless registry interface between nuclear and ultrasound modalities under the ImageGuide Registry™ platform.

Under the ImageGuide Registry, physicians have the opportunity to participate in a nuclear module, an echo module, or both in order to receive benchmarked reports on the quality of care provided to patients. The platform itself is considered a Qualified Clinical Data Registry (QCDR) by CMS. Designation as a QCDR allows the ImageGuide Registry to submit data on behalf of registry participants directly to CMS for quality reporting and, ultimately, to avoid negative payment adjustments under the new MIPS legislation. Notably, fulfilling reporting requirements by utilizing ImageGuideEcho requires a smaller patient pool than if a physician were to utilize a more broad-based registry for reporting.

Furthermore, targeted quality measures assessing echo-specific metrics allows for echo labs to excel in the changing healthcare environment while receiving valuable feedback unique to the modality (Figure 1). **ImageGuideEcho provides the ideal mechanism for aligning diagnostic imaging with value-based care.** Through examination of these quality metrics, imaging physicians have the capability to both inform healthcare decisions and quantify quality improvement in a way that has not previously been undertaken.

ImageGuideEcho

BENEFITS FOR ASE MEMBERS

- ▶ Avoid negative payment adjustments under MIPS
- ▶ Benchmark lab performance against echo-specific performance measures
- ▶ Leverage CV-ultrasound specific patient pool for reporting requirements
- ▶ Simplify with a single interface for multi-modality labs
- ▶ Investigate ImageGuideEcho data for focused research opportunities
- ▶ Guide quality of care improvement for echo patients

SHAPING THE FUTURE *of* CARDIOVASCULAR ULTRASOUND

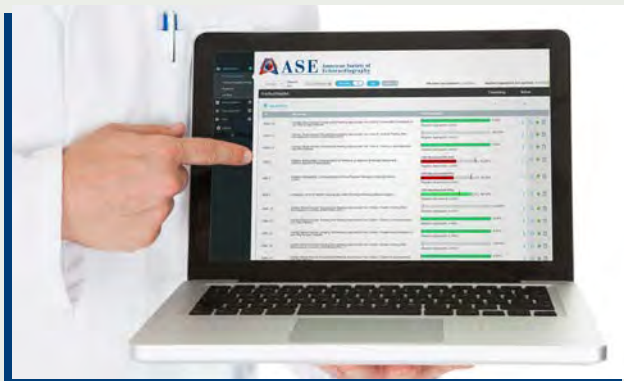


Fig. 1 Registry Platform

ImageGuideEcho Data Elements

Under the leadership of Sherif Nagueh, MD, FASE, of Houston Methodist Hospital, ASE's Registry Committee has designed a phased data implementation model (Figure 2), which is scheduled to launch in the Fall 2017 with TTE data elements. Future phases of development include stress echo, TEE, and, later, pediatrics and congenital heart disease. ASE envisions the registry will provide a comprehensive picture of the field of echocardiography. By creating phased data implementation that coincides with advanced registry capabilities,

ImageGuideEcho is uniquely positioned to become the foremost authority on echocardiography data for physicians, hospital administrators, industry, researchers, and government.

ImageGuideEcho collects data contained within the imaging report and aligns with ASE guidelines. This data includes information specific to patient demographics, baseline characteristics, indications, technology utilization (3D, strain, etc.), left ventricular size and function via both a global and 17 segment model, right ventricular size and function, the pericardium, all valves, and quantitative measurements. Data for ImageGuideEcho can be captured through PACS system integration via "Certified Software Reporting Vendors" and through web-based data collection, though manual entry is not envisioned to be the primary mechanism for data submission. Through PACS system integration, data will be pushed to the registry from the lab software to the registry vendor, FIGmd. This process has been widely and successfully utilized in a variety of other clinical data registries and ensures maximum lab participation with nominal inconvenience.

By gathering this extensive data, ImageGuideEcho will serve as a resource for researchers and other stakeholders to demonstrate the utility of echo while identifying opportunities for improvement and highlighting existing best practices.

ImageGuideEcho offers the premier opportunity for harnessing the power of big data for the field of cardiovascular ultrasound.

ImageGuideEcho & the Future

The ImageGuide Registry platform has been developed with interoperability in mind both through the data elements collected, data element definitions, and data element mappings and interfaces that can be subsequently linked with other registries, EHRs, and clinical databases. As data within the registry grows, we will be able to answer key questions previously undetermined within the field of echocardiography, conduct comparative effectiveness research, and ultimately drive the field forward in quality, advocacy, and future viability, all while addressing the immediate needs of ASE members to fulfill MIPS reporting requirements.

How to Get Involved

ImageGuideEcho launches Fall 2017! For more information on how you can be involved in advancing the field of echo through registry participation, please contact info@imageguideecho.org.

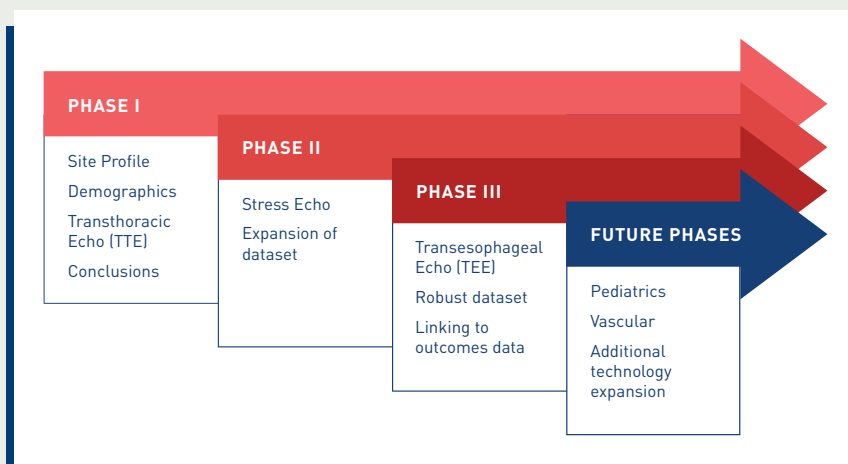


Fig. 2 Phased data implementation

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—•• ASE ••—

Heading
the Field

—•• IN ••—

Inclusion

—•• OF ••—

WOMEN

—•• IN ••—

Leadership
Roles

Contributed by Robin Wiegerink, ASE CEO



As ASE looks to the future and redesigns its governance as part of its overall strategic plan, one important aspect of Goal 4 “**creating a governance structure that is representative of our membership,**” will not have to be started, but just embraced and continued. In one area in particular, the inclusion of women, ASE has had a long tradition of including females in its leadership roles. For example, since its founding in 1975, ASE has had five female Presidents in its line-up of 27 Presidents.

In addition, women have served on ASE’s executive committee since 1984, including both of ASE’s executive directors (CEOs) Sharon Perry, 1984–2000, and Robin Wiegerink, 2001–present. The majority of the Secretary positions serving on the executive committee have been held by a female sonographer, starting with Oi Ling B. Kwan, RDCS, FASE, in 1991.

Why does this matter? Evidence on the gap between men and women in leadership roles is prevalent, especially in the medical field. While reports show that there are more women going to medical school than ever, male doctors still dominate the leadership positions in medicine. This factors in on several levels, including pay (a 2016 Compensation Report from MedScape shows that men continue to earn over 30 percent more in specialized fields of medicine¹), opportunity (a JAMA study published in March 2017 portrayed discrimination in the field. The researchers found that female doctors received lower evaluation scores from their professors than their male colleagues across all sub-competencies, which indicated bias rather than a deficit in specific skills or knowledge.²), and influence (grand rounds speakers in 2014 were overwhelmingly male in comparison to the composition of the specialty field, especially for expenses-paid visits³). In addition, a JACC article comparing the changes in the lives of cardiologists over time from 1996 to 2015 found “little to no change” in the likelihood that the women experienced discrimination and found that “discrimination continues to be an issue reported by a clear majority of female cardiologists.⁴ Thus, having a Society like ASE, which promotes women as equals and regularly recruits them as leaders,

can help change these societal trends and may empower more women members to volunteer and advocate for their appropriate role in governance.

Susan E. Wieggers, MD, FASE, summed up ASE’s supportive role saying, “Why has ASE had so many women Presidents when many organizations have had only a few (and for example EACVI—never)? The ASE community is remarkably supportive and inclusive—leadership sets that style and has for many years—I don’t mean only female leaders but all ASE leaders. There is a critical mass in our organization of professional women—sonographers, doctors, and others—who do support and promote each other. Finally, our staff are strong female leaders themselves and their contribution to the culture cannot be underestimated.”

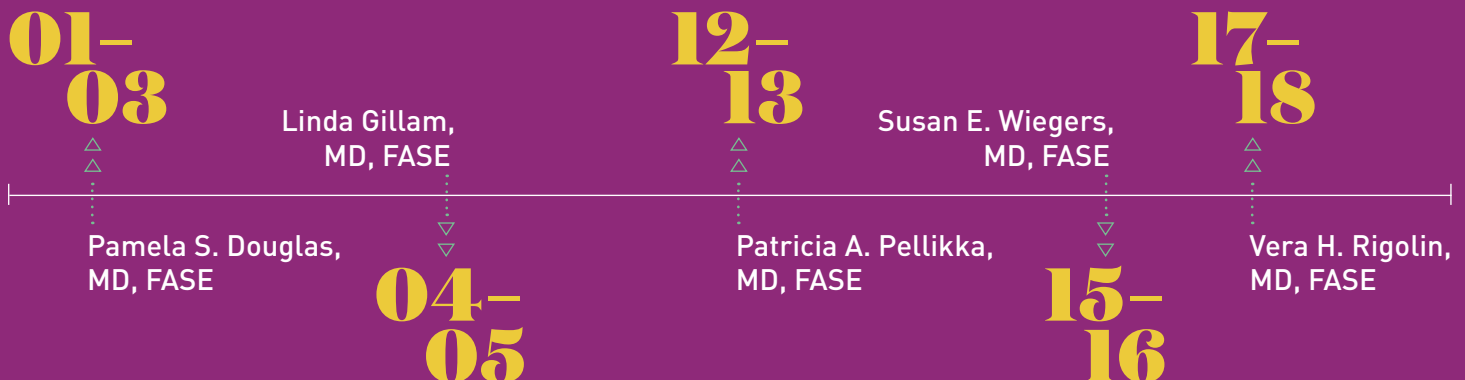
“I was very conscious of the need to do well to ensure that other women would also have this chance to serve and to be a positive role model.”

Back in 2001, Pamela S. Douglas, MD, FASE, became ASE’s first female President. This was a landmark for the Society, but what did this position mean to her? Dr. Douglas remarks “It was a huge honor to be the first female President. I was very con-

scious of the need to do well to ensure that other women would also have this chance to serve and to be a positive role model.”

Linda D. Gillam, MD, FASE, ASE’s President in 2004–2005, states “I was very honored to be President but, being of a generation where women were a small minority of medical school classes, I was particularly honored to be only the second woman President. With that I felt, perhaps, a little more pressure to do a good job. Since there were, and continue to be, few women in cardiology, my representing ASE around the world took me to places where there were few if any women in leadership positions, so in addition to representing ASE, I felt I was representing women in cardiology as well.”

WOMEN ASE PRESIDENTS ▶▶▶





This “modeling” did have the intended effect, as other women in the field took notice. Dr. Wieggers said “My first introduction to ASE was eye opening. There were women at the meeting and even one or two at the head table. They seemed respected. I was thrilled when Pam Douglas became President, and it was at that moment I could picture being the President. The ‘permission’ to entertain that aspiration helped with validating a lot of my subsequent aspirations to leadership positions throughout my career.”

These intrepid women paved the way for others to continue this mentoring, as current ASE President, Vera H. Rigolin, MD, FASE, notes “I am so grateful to have the opportunity to be President of the ASE. Being female, we are often discouraged from seeking leadership positions. So, achieving this honor provides a wonderful sense of accomplishment. I hope that my position can inspire other women to ‘shoot for the stars’ in whatever they wish to achieve in their professional lives.”

What has ASE done to succeed in being “female inclusive” when many other medical associations have not? Dr. Douglas observes “ASE very consciously created, and still

I hope that my position can inspire other women to ‘shoot for the stars’ in whatever they wish to achieve in their professional lives.”

nurtures, a broad tent approach that has made it the norm for sonographers (who are mostly women) to serve as equals alongside physicians (mostly men) on the Board, the executive committee, in planning the annual meeting, etc. These partnerships mean that a significant part of any ASE group is female, that diversity is valued, and that implicit biases are mitigated by personal contact with bright, capable, women.”

Dr. Wieggers concurs, stating “Many studies show that it can change your aspirations to see someone ‘like you’ in a role that it hadn’t occurred to you to pursue. One of the reasons suggested for why there are relatively few women in computer coding professions is that for years home computers were relentlessly marked as boys’ toys. I would like to think that I am immune from those societal influences but as the mother of two boys and a girl, I have to acknowledge that those influences can be pretty hard to fight.”

Dr. Rigolin also notes that ASE is different from other organizations, “There are strong female role models in important positions such as President, committee chairs, etc. who take the time and interest to nurture and mentor younger female members. The friendly and unintimidating vibe in the Society fosters close professional relationships that encourage women to get involved and stay engaged.”

Patricia Pellikka, MD, FASE, experienced a similar dynamic. She states, “My involvement in ASE committees and the annual Scientific Sessions connected me with wonderful colleagues outside my institution who shared my passion for echocardiography. It was my women friends that I met through my engagement in ASE that encouraged me to run for President of the Society.”

Beyond helping women achieve their personal career goals, studies have found that having a robust percentage of women in management and senior leadership positions is also beneficial to the performance of the business and organization. In fact, a 2013 Catalyst study found that “companies with sustained high representation of women—three or more women board directors in at least four of five years—significantly outperformed those with no women board directors. And companies with the most women board directors outperformed those with the least on return on sales by 16% and return on invested capital by 26% percent⁵.” Unfortunately, this percentage has not been achieved yet in the medical field; according to data from the Association of American Medical Colleges (AAMC), just 15% of department chairs are women and only 16% are deans.⁶

Dr. Pellikka adds her personal experience to this statistic, saying “Diversity in our professional societies and in the workplace is a tremendous asset. Diverse perspectives enable us to find the best and most creative solutions to complex problems and to best serve an increasingly diverse patient population. I currently work with an amazingly talented group of physicians and allied health staff in the Mayo Clinic Division of Cardiovascular Ultrasound. The physician group includes 29% women, 42% non-white, and 50% who were born outside the U.S.”

ASE’s vision is that through pushing women forward in ASE, it will also foster equality for women in the overall cardiovascular field. Dr. Douglas says “While diversity is now generally recognized as good for business, cardiology in particular has a significant problem attracting female physicians (in 2017 only about 10% of adult cardiologists are women). While we don’t know all the reasons for this, it is likely multifactorial—both a lack of opportunity and mentorship as well as an opting for other areas of medicine that are more family friendly.”

Looking into the future, ASE’s leaders are actively working to enable women to be seen as leaders in the medical field, by placing them in leadership positions. Looking at data from ASE’s recent committee, council, and taskforce appointments, over 40% of ASE’s volunteer leaders are women (of ASE’s 282 actively serving volunteers in 2017, 115 are female). This percentage will undoubtedly be enhanced in the future as the ASE’s new mentor match program facilitates mentoring opportunities for younger women. Sonographers in our leadership including master sonographers Deb Agler, Carol Mitchell, Merri Bremer, and Koko Park, have already led the way by reaching out to guide new faculty presenters to deliver their best presentations at ASE’s annual meeting.

One positive female leadership experience can provide a ripple effect. The same Catalyst study found “a clear and positive correlation between the percentage of women board of directors in the past and the percentage of women corporate officers in the future.”⁵

Dr. Gillam advocated for gender inclusion after her presidency stating “As past President, I have tried to identify and support women who are interested in leading ASE or being nominated for

One positive female leadership experience can provide a ripple effect.



its awards. Given the number of talented women, to me, it is a win-win for ASE and women that there be gender diversity throughout the organization."

Dr. Rigolin is supportive of these aims too, "First, we need to facilitate mentorship opportunities for women so that they are encouraged to strive for and achieve leadership positions. The leadership academy ASE is starting is also a wonderful opportunity. We need to ensure that women with leadership potential are encouraged to participate in this program. Finally, we have lots of talented females in the Society, so we must strive to achieve gender diversity in all of our important projects."

Dr. Douglas has also been spreading her positive experience with the ASE in her new leadership roles and is making a difference in other association's cultures. She said, "I am chairing the ACC Task Force on Diversity and Inclusion which is currently considering these sorts of (gender) issues and solutions. The new ACC strategic planning process is also examining provider support and well-being as a path to improving care."

Going forward, ASE will continue to pay attention to the composition of its leadership. Dr. Gillam notes, "It is easy to take gender equality for granted. It is important to constantly be asking the question 'Is there diversity in the composition of this committee/program/writing group/board?' If the answer is no, the necessary changes should be made."

Good advice as Dr. Rigolin and the rest of the Board of Directors continue to push gender equality and work to achieve an appropriate balance in course faculty, committee representation, leadership, and the new leadership academy. ASE's 2018 Scientific Sessions will also hold a special session on "Pathways to Leadership for Women" which will include a panel of power-house sonographers and physicians giving tips on how best to aim for the top in ASE. What can our members do to help? Ask women in the field to do their part too and follow these five powerful female examples—put yourself out there, and raise your hand and your voice!



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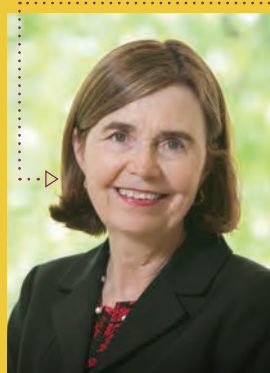


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ASE Launches Exciting New Mentoring Program

Contributed by
Hilary Lamb, ASE COE



**MENTORING IS A BRAIN TO PICK, AN EAR TO LISTEN,
AND A PUSH IN THE RIGHT DIRECTION.**

ASE PRESIDENT-ELECT JONATHAN R. LINDNER, MD, FASE

There is one thing that successful people have in common and that is mentors. Key people who share knowledge and guidance to help you achieve your goals. Mentoring has been around for ages and the relationships created can be quite transformative. It provides an opportunity for education and learning that is not dependent on age, career stage, education, or background. Mentoring is the key to building stronger connections and relationships.

The way mentoring works has changed over the years. Today, mentoring is not just pairing young professionals and older professionals together. A mentoring environment needs to provide both mentors and mentees with the ability to share certain values, respect, and trust in each other. Vera H. Rigolin, MD, FASE, ASE President, shared that mentoring has played a critical role in her career and helped open doors that she did not even know existed. Long-time ASE member and volunteer Deborah A. Agler, ACS, RDCS, FASE, said that she has had many mentors through her ASE involvement, and that two of them, David Adams and Allan Klein, encouraged and co-authored her first publication in JASE.

ASE has provided some formal opportunities for connecting mentors and mentees at past Annual Scientific Sessions. This program has been so popular and beneficial, that we felt all ASE members should have an opportunity to participate. In August, the ASE Mentor Match program was launched to allow members to connect organically by pairing people who truly want to learn from each other.

The ASE Mentor Match program is a unique online networking and career development tool that helps members find, connect, and share experiences with others. Mentors and mentees can be in the same city or on the other side of the world. You may create your own profile, as a mentor, mentee, or both, that can be searched to find interest matches. ASE Mentor Match is user-driven, allowing registered mentees to search among registered mentors, using specified criteria,

to find individuals whose experience and expertise match areas in which they wish to be mentored. Likewise, registered mentors can search for and identify potential mentees.

Mentoring does not necessarily require a large amount of your time. Brief phone calls or email exchanges can make a big difference. The ASE Scientific Sessions or other ASE Live Courses also offer a convenient venue for getting together over coffee or lunch.

ENROLLING IN THE ASE MENTOR MATCH PROGRAM IS SIMPLE.

1. Log in to Connect@ASE (<http://connect.asecho.org>)
2. Select Engage in Mentoring on the menu.
3. Select the appropriate choice: "Enroll as a Mentor" or "Enroll as a Mentee."
4. Complete the short questionnaire.
5. Save your choices.

Once you have registered you can visit the "Find a Mentor" or "Find a Mentee" pages and fill in search criteria to search for possible matches. You can then click the names of the potential Mentors/Mentees to view their profiles. After you have decided on a Mentor/Mentee, click on the Mentor/Mentee badge (seen below the profile picture) to request that person. An email will be sent to the person alerting them that they have been requested to participate. You will be able to accept or decline any request. Questions? Please contact the ASE Membership Department at ase@asecho.org.



AT THE 2016 SESSIONS, I HAD THE INCREDIBLE OPPORTUNITY OF BEING ASSIGNED A MENTOR, AN ASE MEMBER WHO SHARED MANY PEARLS OF WISDOM. WE STILL KEEP IN TOUCH, ALTHOUGH WE LIVE IN DIFFERENT REGIONS OF THE COUNTRY.

ANGELA B. MALONE, BS, RDCS, RVT

ECHO EDUCATION IN A TROPICAL PARADISE

3RD ANNUAL ECHO ASE ASEAN, MANILA, PHILIPPINES, MARCH 22-24, 2018

Contributed by James D. Thomas, MD, FASE, Northwestern Medicine, Chicago, IL

ARE YOU HUNGRY FOR ECHO EDUCATION IN A LUSH TROPICAL PARADISE?

Is Echo Hawaii not quite exotic enough for you? Well, then, you are in luck! Mark your calendars for March 22-24, 2018, and make your way to Manila, capital of the Philippines, where the third meeting of Echo ASE ASEAN will take place. This conference highlights the growing collaboration between ASE and the ASEAN (Association of Southeast Asian Nations) Society of Echocardiography. The conference will be held at the luxurious 5-star Conrad Hotel perched on the shore of Manila Bay with 180 degree views of the water. It will feature an outstanding faculty from America, Australia, Philippines, and all across Southeast Asia, presenting both basic and advanced echocardiographic topics, including material to satisfy the needs of cardiac sonographers. We will be covering the full gamut of the latest in echo technology (3D, strain, interventional guidance), along with topics of special interest to those in the region, such as rheumatic heart disease and adult congenital disease.

In many ways this meeting exemplifies the best in ASE outreach to the world. It represents the confluence of two important strategies for ASE: engagement with professional echo societies all around the world and provision of high quality education on the application of echocardiography in clinical medicine. In a sense, the seeds of this meeting were planted at a meeting of the Indonesian Society of Echocardiography in Jakarta, where I was invited to speak in September 2013. You can read all about it—and enjoy the amazing food vicariously—in my blog from the 4th INAEcho Meeting, Indonesian Society of Echocardiography.¹ There, Lissa Sugeng (a native of Indonesia herself) convened a group of leading echocardiographers from across Southeast Asia (Indonesia, Singapore, Malaysia, Philippines, Vietnam, Thailand, and others) to discuss ways in which they could work together to improve echo quality throughout their region, home to nearly 650,000,000 people. Fast forward two years to when Jonathan Lindner had the insight to realize the region was ripe for an outstanding echo conference that ASE is so well known for. Working with many of those same leaders in the region (especially KK Poh from Singapore and Decho Jakrapanichakul, President of the Thai Society of Echocardiography), we brought the first Echo ASE ASEAN meeting to Bangkok in October, 2015 (see the blog post at Greetings from Bangkok! Inaugural Echo ASE ASEAN Conference², Echo ASE ASEAN Day Two³, and Final Day - ASE's ECHO ASEAN⁴). Over 400 cardiologists and sonographers attended that meeting, which was followed a year later by the 2nd Echo ASE ASEAN Conference (see Greetings from Bangkok! 2nd Annual ASE ASEAN Conference⁵). Along the way, our colleagues from the region organized themselves into the ASEAN Society of Echocardiography and have elected to use Echo ASE ASEAN as the venue for the annual meeting of their society.



This brings us to Manila next March, where we anticipate over 500 attendees from all over the world. This year's local co-chair is an old and dear friend of ASE, Edwin Tucay, MD, who, along with his colleagues in the Philippines Society of Echocardiography, are helping to organize the scientific and social aspects of the meeting. A new feature this year will be the opportunity to present your original research at the poster session. Visit the meeting webpage at ASEcho.org/ASEAN for information on how to submit your abstract.

We are hoping to get a good attendance from North America, particularly the large Filipino ex-pat community. Note that the meeting is timed just ahead of Holy Week, the perfect time to plan an extended visit to friends and family. For those unfamiliar with Manila, it's not nearly as hard to get to as you might think, with nonstop flights from Los Angeles, San Francisco, and Vancouver, and easy connections through Tokyo, Seoul, Hong Kong, and other gateway cities. The Conrad Hotel is adjacent to the airport, so even the notorious Manila traffic won't be an issue. The cuisine is a fascinating

**AS THEY SAY IN FILIPINO,
“NAKIKITA KITA SA MAYNILA!”
“SEE YOU IN MANILA!”**

mix of Southeast Asian with Latin American, a nod to the Spanish and Mexican colonial era, with great dishes like adobo (chicken or pork with Mexican spices plus soy sauce), lechon (whole roast pig), and lumpia (a delicious savory spring roll). And if you have come all this way, why not enjoy a few days at a stunning beach resort on one of the 7000+ islands just a short hop from the airport.

I really hope you will join me and my co-chairs, Roberto Lang, Edwin Tucay, and KK Poh, along with the rest of our international faculty, at this outstanding educational conference.

¹ <http://connect.asecho.org/blogs/james-thomas/2013/10/23/4th-inaecho-meeting-indonesian-society-of-echocardiography>

² <http://connect.asecho.org/blogs/james-thomas/2015/10/23/greetings-from-bangkok>

³ <http://connect.asecho.org/blogs/james-thomas/2015/10/24/echo-ase-asean-day-two>

⁴ <http://connect.asecho.org/blogs/james-thomas/2015/10/25/final-day-ases-echo-asean>

⁵ <http://connect.asecho.org/blogs/james-thomas/2016/10/25/greetings-from-bangkok-2nd-annual-echo-ase-asean-conference>

Understanding and Thriving In Episodes of Care

CONTRIBUTED BY Larry Sobal, MBA, MHA, CMPE, MedAxiom, Neptune Beach, FL

THE SHIFT TO TRY TO PAY FOR HEALTHCARE BASED ON VALUE, VERSUS VOLUME, HAS DRIVEN PUBLIC AND PRIVATE PAYERS TO REDESIGN REIMBURSEMENT MODELS THAT STRESS ACCOUNTABILITY FOR CARE QUALITY AND HEALTHCARE COSTS. As payers seek to find more effective alternatives to traditional fee-for-service, alternative payment models, including paying for episodes of care, are becoming more popular.

An episode of care (episode) is defined as the set of services provided to treat a clinical condition and includes all services provided to a patient for a particular condition within a specific period of time across a continuum of care. The services provided during the episode of care may include the following:

- Ambulatory Care
- Acute Care
- Post-Acute Care
- Home Care
- Preventative Care
- Community Outreach

It's important to delineate the difference between an episode of care and episodic payment models (aka EPMs or bundled payments). The episode of care is exactly that, a defined set of medical services, often defined in a time frame based on a triggering event, as opposed to an EPM which is a payment mechanism that covers all the care a patient receives in the course of treatment for a specific episode, illness, condition, or medical event, sometimes during a defined time limit.

Although much of the publicity regarding EPMs has been focused on the upcoming, and subsequently canceled, January 1, 2018 starting date for the CMS cardiac bundles, the reality is that episodes of care pilot payment programs have been around for quite some time going back to 1983 when Medicare shifted from paying hospitals on the basis of reported costs to paying a fixed amount per inpatient stay based on a patient's diagnosis (aka DRGs).¹

Along the way, there have been other EPM pilots and demonstration projects, most notably the voluntary Medicare EPM for Care Improvement (BPCI) initiative launched in

2013² that at one time involved 1,600 organizations and as of January 1, 2017 includes 340 acute care hospitals, 620 skilled nursing facilities, 252 physician group practices, 81 home health agencies and nine inpatient rehabilitation facilities. Since 2011 Medicare has launched six EPM programs: four models under the EPM for Care Improvement Initiative (BPCI), as well as the Oncology Care Model (OCM)³ and the Comprehensive Care for Joint Replacement Model (CJR)⁴. CMS granted an extension to participants in 2016 and the initial BPCI model will end on September 30, 2018.

The emergence of EPMs is not likely to slow down. Over the last 12 months, we have seen multiple rules released, as well as several delays associated with the CMS Episode Payment Model⁵ and there are rumors that an updated version of BPCI⁶ will be released for 2018. In addition, several large private payers have entered the EPM arena in recent years⁷ and even large employers are establishing EPMs through their self-funded health plans.⁸

In reality, EPMs are likely to be totally new territory for many physicians and healthcare organizations. At a minimum, I anticipate that organizations who participate in EPMs, either in a mandatory or voluntary program, need to have the following capabilities:

EFFECTIVE GOVERNANCE.

1

Without a strong governance, nothing else matters if you want to be successful. However, when I refer to governance, I am talking about capability that goes far beyond an organizational chart and with a committee or two of physicians and administrators who get together every month. A competency of effective governance needs to include attributes such as a shared vision that has been well vetted with key stakeholders, strong physician/administrative dyad leadership team(s), high levels of alignment and engagement from your physicians, ability to reach meaningful consensus on priorities and opportunities, and the willingness, capacity, and resources to execute on strategic decisions that result in measureable improvement.

2

MASTERY OF CLINICAL IMPROVEMENT.

Success in any EPM model will require the organizational competency to embrace near constant change over time. Managing cost and quality in an integrated fashion demands that organizations engage in multidisciplinary group processes to develop consensus-based, best-practice protocols aimed at eliminating unnecessary variation, standardizing care, identifying/establishing best practices, reducing redundant tests and procedures, establishing clear lines of authority and communication, and lowering costs. If clinical innovation does not become part of your daily culture, you will be hard pressed to reach the level of performance to master these reimbursement models.

3

TRANSFORMING DATA INTO ACTIONABLE INFORMATION.

Most organizations I see are data rich and information poor, meaning that there are numerous silos of data, almost at an overwhelming level, but limited competency (and information technology) in synthesizing it into useful actionable information. Identifying patients, defining costs, setting prices, monitoring quality, identifying risks and complications, and managing these elements over time will make or break any bundle effort. These critical components will require timely and comprehensive information. Clinically sophisticated risk stratification models and predictive analytics will need to be applied and ongoing care carefully monitored to prevent unnecessary complications, readmissions, etc.

The two charts below illustrate examples of the types of information you might start with. The first is an example of how your hospital stacks up against others in your region. The second is an example of drilling down to specific patient episodes to understand how your patients vary within an open heart surgery program.

4

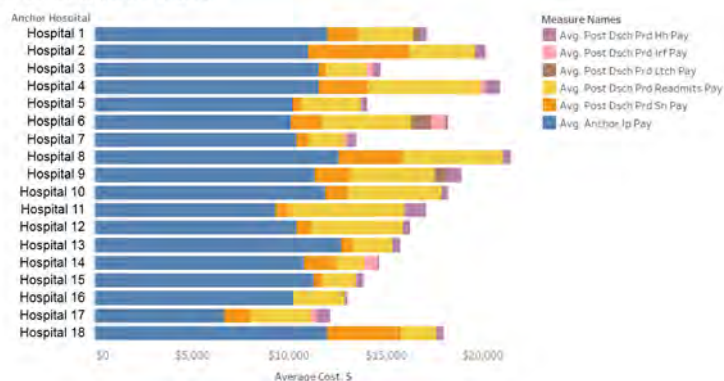
WORKING WITH EXTERNAL PARTNERS.

I have not come across many organizations that have the first three competencies fully in place today. Therefore, most must ask themselves where they can obtain these competencies in a short period of time. For all but the most sophisticated organizations who have an existing relationship with a data partner and the internal resources to support the governance, improvement work, and perform the data analytics (including interpreting CMS-provided data), you will almost certainly need external expertise and resources to help you. Furthermore, managing episodes will mean that organizations will need to work closely with other health providers who are not part of their system today, such as skilled nursing facilities, home health agencies, hospices, etc. Recognizing what you have (or don't have) as knowledge, expertise, and bandwidth, and the ability to partner with others who can bring it to you, is a key competency to embrace.

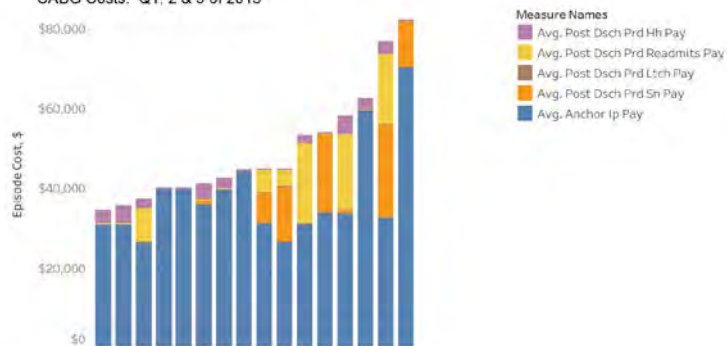
THERE ARE MANY OTHER ORGANIZATIONAL COMPETENCIES THAT YOU WILL NEED TO EVENTUALLY MASTER, including Post-Acute Care (PAC) Network Development, integrated and coordinated care transitions, and developing effective physician incentive metrics, but the four mentioned above are what I consider to be the most critical to start with.

Even if your organization was not selected in one of the mandatory EPMs or is not prepared to participate in either a BPCI or a commercial EPM strategy, it is no doubt beneficial to prepare for the possibility in the future or to keep pace with what your competitors will likely be doing. Taking the proper steps to prepare now for EPM (even in small, incremental changes) will likely expose many ways to deliver high-quality care more efficiently and effectively at a lower cost overall—a valuable effort to undertake in today's volume to value transition, regardless of the payment methodology currently in use.

AMI Costs: Q1, 2 & 3 of 2015



CABG Costs: Q1, 2 & 3 of 2015



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The New ASEUniversity Experience

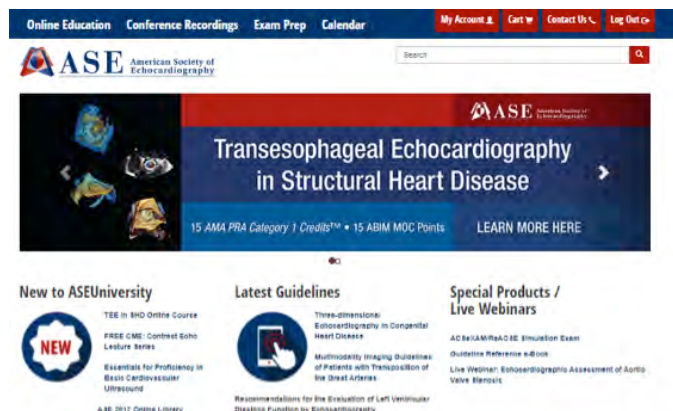
Contributed by Christina LaFuria, ASE Director of Education

ASE has always been a very forward thinking organization and tries to anticipate member needs before they know they have them. December 4th marks ASEUniversity's 17th anniversary. When ASEUniversity launched, there were 67 million Hotmail users and Netscape was losing market share to Internet Explorer. Online education was in its infancy; MIT launched its first online education just months before ASE. Since its launch in 2000, ASEUniversity has gone through several makeovers, including automatic transfers of continuing education and maintenance of certification credits.

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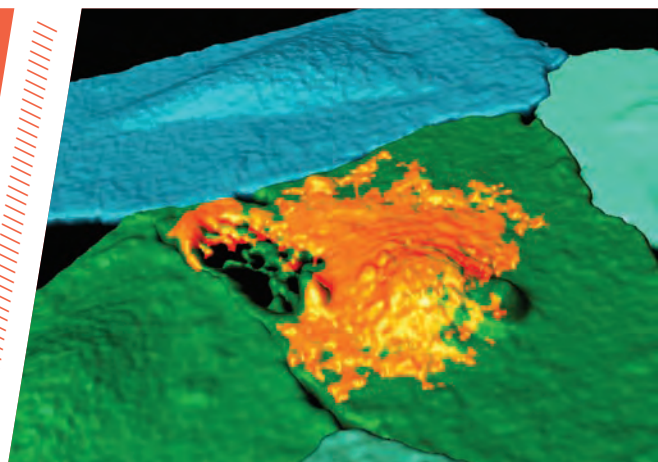
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