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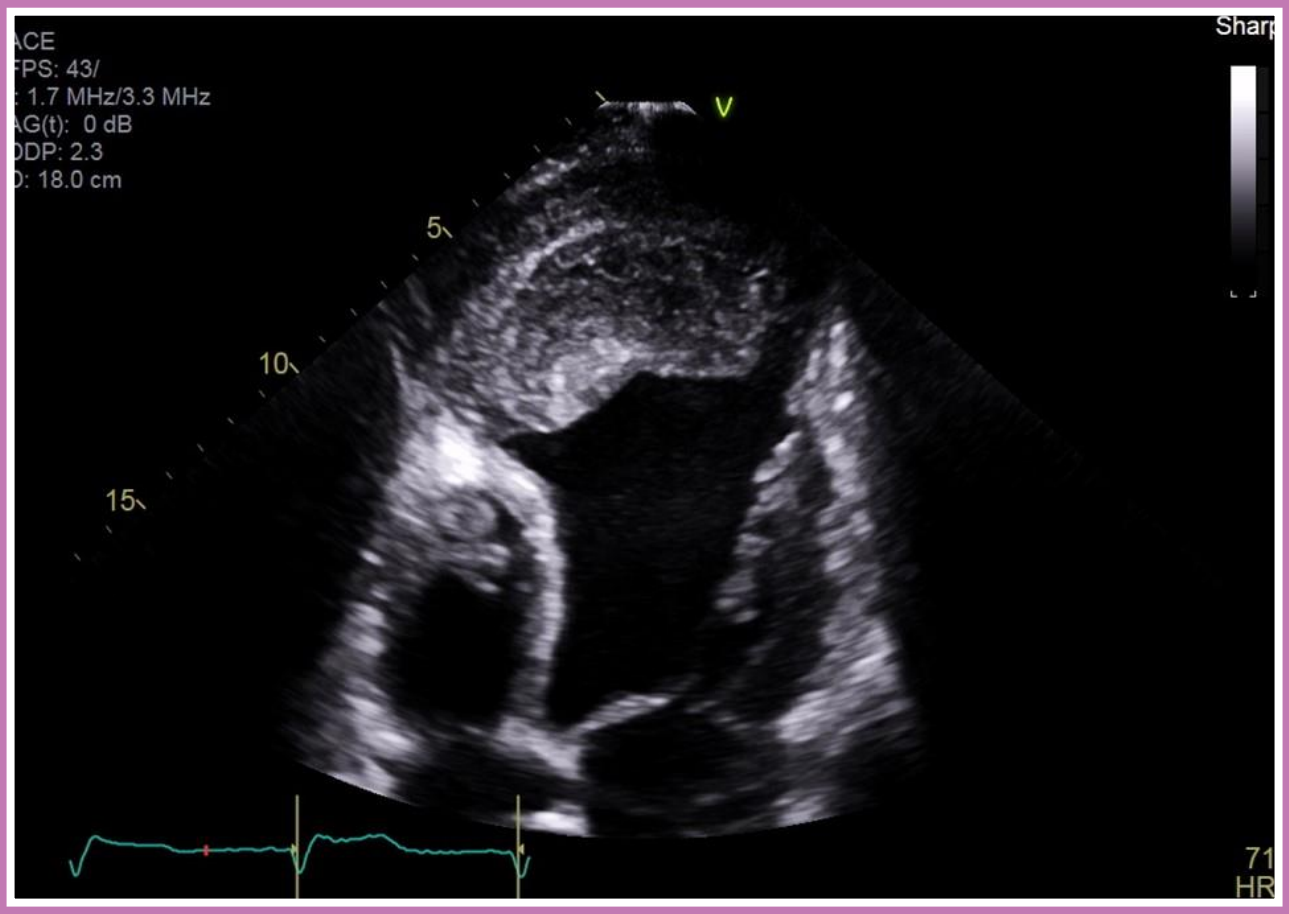

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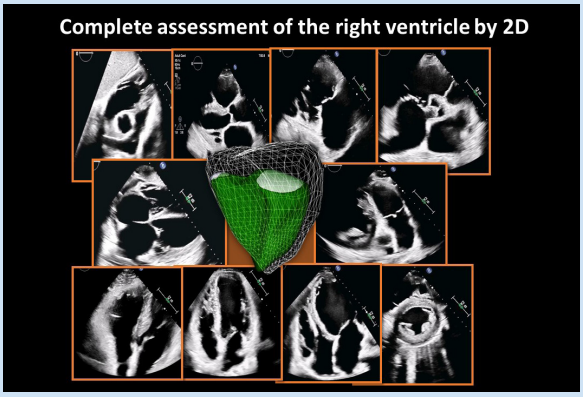

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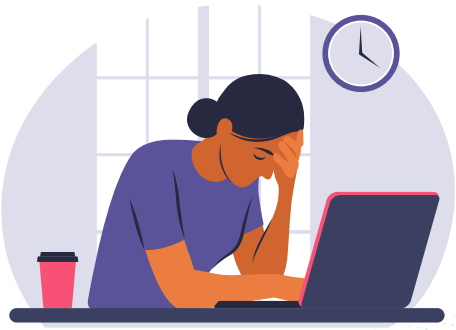

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Cover art: "Lima Bean" (Large LV Thrombus) Madeline Schiminger, MPH, RDCS (AE, PE), FASE and Morgan Bachmann, RCS, The Johns Hopkins Hospital, Baltimore, Maryland

EDITORS' 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.

INTERVENTIONAL ECHOCARDIOGRAPHY: THE EMERGENCE OF A NEW IMAGING SPECIALTY

*Contributed by **Stephen H. Little, MD, FASE**, Cardiology Fellowship Program Director at Houston Methodist Hospital, System Director for Structural Heart, Professor of Medicine, Weill Cornell Medical College, Cornell University, and Adjunct Professor at Rice University in the Department of Bioengineering*

Gradually, with a series of incremental steps, a new medical specialty has emerged. Combining the professional elements of direct patient care, diagnostic ability, and procedural expertise – Interventional Echocardiography (IE) is now widely regarded, but not yet formally recognized, as a sub-specialty of medicine. Typical training pathways include a background in cardiology or cardiovascular anesthesiology with initial subspecialty training in echocardiography, and further training in periprocedural guidance of catheter-based procedures.

> “What may have begun as a “cottage industry” of infrequent procedural support has now become a global medical activity worthy of specific training guidelines.

The birth of this specialty can be traced back to the advent of real-time 3D transesophageal echocardiography (3D TEE) roughly 20 years ago. It was quickly recognized that 3D TEE could provide unique images of intracardiac structures (native or prosthetic) as well as catheters, wires, and other temporary hardware. Early applications included guidance for transcatheter paravalular regurgitation repair, followed by atrial septal and ventricular closure device implantation, transcatheter aortic valve implantation (TAVI), left atrial appendage occlusion, mitral valve transcatheter edge-to-edge repair (TEER), and a host of expanding investigational devices for transcatheter valve implantation within the mitral valve, tricuspid valve, pulmonic valve, and caval vessels.

A remarkable aspect of IE is how rapidly this specialty has evolved in conjunction with novel structural heart devices, and with the co-development of other imaging tools such as multi-detector computed

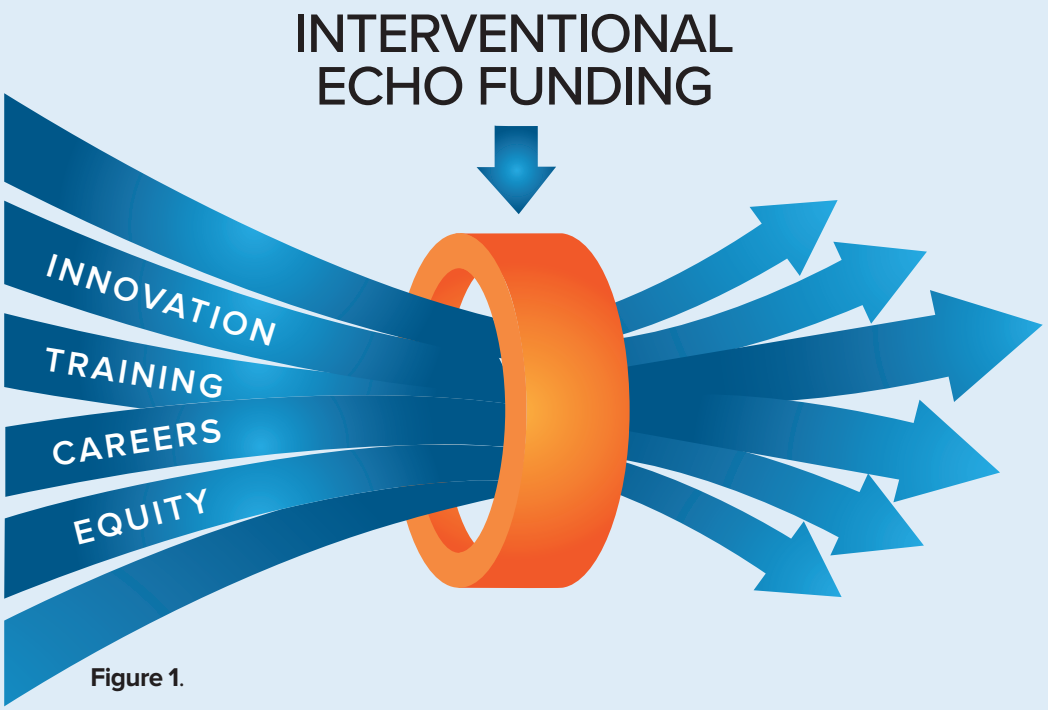

Figure 1.

tomography (MDCT) and intracardiac echocardiography (ICE). Today the IE specialist must possess a specific set of procedural skills, a thorough understanding of an expanding list of therapies – each employing specific devices and catheters, the requisite technical skill to image and guide beating heart procedures, and a familiarity with other complementary imaging modalities. What may have begun as a "cottage industry" of infrequent procedural support has now become a global medical activity worthy of specific training guidelines, a mechanism to assess professional competency in this area, and national payer recognition of both the training, complexity, and risks associated with this specialty.

In this issue of JASE, ASE has published the first guideline specifically focused on the training elements of Interventional Echocardiography.[1] These recommendations for special competency for interventional/structural heart disease echocardiography guidance were created to outline the general features of training institutions and their faculty, and to focus on the knowledge and procedure competencies that should be acquired during IE training. A series of general recommendations are provided, as well as recommendations specific to the most common current structural heart procedures. An important principle of this training guideline is that the time devoted to training and the number of cases performed, are less important than the demonstration of specific acquired competencies of the IE skill set.

A consequence of the rapid evolution of the IE specialty is that it no longer fits within the classic definition of medical activity as recognized by most hospitals, payors, and regulators. Historically, the cardiac imaging specialties are responsible for the recognition and diagnosis of conditions – but the active participation in therapy at the same time is not expected. The IE specialty has moved beyond this simple construct. Today, the Interventional Echocardiographer works synergistically with an Interventional Cardiologist or Cardiac Surgeon. The active participation of both operators is required to deliver the therapy – thus both treating physicians are cooperators. One provides the hands; the other provides the eyes.

This heart team model of care is now highly developed and capable of delivering very sophisticated treatment. However, there are significant hurdles to overcome before the field of transcatheter structural heart interventions can move beyond its current limitations. The most pressing issue is the lack of a consistent funding model for the professional efforts of the Interventional Echocardiographer ***(Figure 1)***. Despite similar training requirements, expertise, procedural time commitment, and physical effort and risk, there may be up to a 10-fold difference in professional payment for the two co-operators. In general, this funding insecurity has had direct negative impact on almost all aspects of this new field, including training, early career opportunities, program expansion, and ultimately patient

access to care. ASE is aware of these challenges and has been working diligently for several years to address these important issues.

Several years ago, ASE created an IE task force to better understand these concerns, and to prioritize our societal actions. Soon to follow was a very active IE specialty interest group (SIG), which recently grew into a full council within the ASE – thus providing even more Society focus on the needs of the IE practitioner. Along the way we have developed guidelines on the performance of TEE for SHD screening (Hahn, 2022)[2]; for the echocardiographic evaluation of rheumatic heart disease (Pandian, 2023)[3]; and recommendations for special competency in the performance of IE (Little, 2023).[1] In addition, we have an active task force to explore the applications and continued development of 2D/3D ICE technology.

But perhaps most importantly, our regulatory and advocacy teams have been exploring all options to address the national shortfall in funding for this professional service. Strategic and creative approaches will undoubtedly be required. But with the ongoing effort of our advocacy and payment experts, and in collaboration with our Industry Roundtable (IRT) partners, there is significant optimism that a durable solution will be found. The new medical sub-specialty of IE is critical for the delivery of novel patient care; thus, these efforts must be successful.

"The new medical sub-specialty of IE is critical for the delivery of novel patient care; thus, these efforts must be successful."

Stephen H. Little, MD, FASE
ASE President

REFERENCES

1.Little S, Rigolin V, Garcia-Sayan E, et al. Recommendations for special competency in echocardiographic guidance of interventions/structural heart disease. J Am Soc Echocardiogr 2023;36:350-65.

2.Hahn R, Saric M, Faletra FF, et al. Recommended standards for the performance of transesophageal echocardiographic screening for structural heart intervention: from the American society of echocardiography. J Am Soc Echocardiogr 2022;35:1-76.

3.Pandian N, Kim JK, Arias-Godinez JA, et al. Recommendations for the use of echocardiography in the evaluation of rheumatic heart disease: a report from the American society of echocardiography. J Am Soc Echocardiogr 2023;36:3-28.

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Burnout: From COVID and Beyond

*Contributed by **Josh Pearson, RCS, CRAT, FASE**, Phoebe Putney Memorial Hospital in Albany, Georgia*

I never would have imagined the horrors that I would see weekly when the virus hit the community, and I will never be able to forget them.

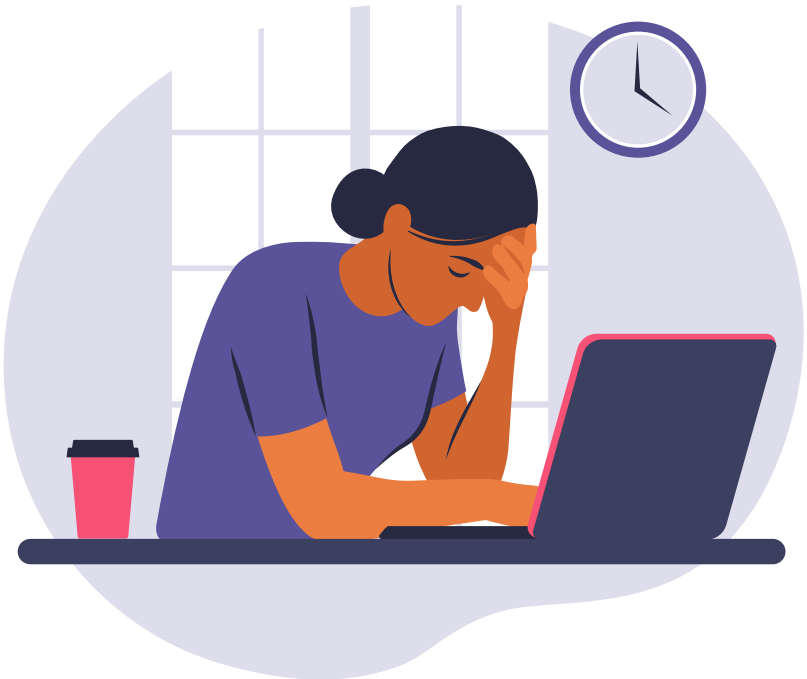
IN APRIL 2020, Dougherty County had more coronavirus-related deaths than anywhere else in the state of Georgia.[1] During the pandemic, I worked as a PRN echocardiographer at Phoebe Putney Memorial Hospital, and I also worked full-time at a cardiology private practice as the director of a noninvasive imaging lab. I never would have imagined the horrors I would see weekly when the virus hit the community, and I will never be able to forget them. The CDC visiting the hospital, the mobile morgue that was delivered to the county, the Georgia National Guard sending troops to help the hospital due to staffing shortages, the opening of the Phoebe's North Campus hospital as a "COVID-19 only" facility, the uncertainty as a portion of the hospital staff members became ill, and of course, the COVID-19 patients. When the virus first struck, it hit the county like a freight train. The hospital used a six-month stockpile of PPE within one week.[2] The noninvasive cardiology department at Phoebe was hit as hard as any other part of the hospital. With two hospitals now running in the county, the echo/vascular staff had to develop two separate on-call schedules without the addition of new staff (there was not a large source of agency/travel technologists at the time). There was a constant barrage of STAT venous doppler and STAT echocardiogram orders and no one knew how to best treat the patients; local critical care physician Dr. Enrique Lopez said in a local news interview that he was living in a room in his garage to avoid getting his wife and children sick when he wasn't working in the hospital.[3]

Eventually things did get better at Phoebe: local churches would hold prayer vigils and line up at employee entrances/exits to send well wishes, people from all over the USA would send greeting cards, a local brewery (Pretoria Fields) converted their operation to make hand sanitizer instead of beer, and Phoebe offered free emotional support visits and a chaplaincy to all employees, along with seminars about avoiding burnout. The hospital also developed a mask-making operation to make cloth masks to wear over N95 masks, and the instructions were shared with all hospitals across the nation. When Phoebe would

run short on ventilators or supplies, regional hospitals would step up to send ventilators for Phoebe to use. Fast forward to vaccines and COVID-19 treatments today and it gives time to reflect on the start of the pandemic. How did the staff members who chose to stay during the pandemic "Make it work?" Why did some healthcare workers retire early or switch professions when others felt the need to stay in the field? What were the major differences in the ones who stayed and the ones who left the healthcare field? The pandemic opened my eyes to burn out and its associated issues, and I'd like to share a few thoughts from an echo/vascular lab supervisor's perspective.

I would love to see all hospitals treating their staff with the same level of importance that they treat patients and their visitors.

Burnout is a serious issue in healthcare that requires a holistic approach to find a cure. My institution luckily positioned itself to try to help the best way it could; it turned the "Me" problem into a "We" problem (a phrase coined by the Surgeon General's office). The CEO of Phoebe's health system, Scott Steiner, was available at all times during the pandemic, and he made weekly appearances on the local news to keep the public updated- he was also in the hospital daily helping in any way possible. This set an example for hospital leaders to keep up the work that they were doing. At one point, the chief of medicine, the county coroner and other local leaders in Dougherty County would update the public daily at press conferences via our local news station. Seeing this top-down leadership encouraged me to continue working. So how did the noninvasive staff cope?



Just like the doctors, nurses and staff who continued to work through the pandemic and beyond, the sonographers in the noninvasive department shared several similarities that I observed:

1. **Most didn't react to impulses to cope in an unhealthy way (like overeating or other high-risk behaviors).**
2. **They reportedly didn't turn to drugs or abuse alcohol excessively to cope.**
3. **They didn't blame themselves for patients that didn't have a good prognosis or a good outcome.**
4. **They found a motivation to continue treating patients and working for a reason that was "Greater" than themselves.**

When I spoke to my staff members about the pandemic after I became the team leader, the ones who stayed full-time admitted that they kept working to either "Keep doing what they could for the patients who are sick" or to "Keep supporting their families and to keep them safe." These answers suggested to me that the ones who continued working were high in empathy, cared deeply for others and wanted to show compassion for the sick, and the love of their families acted as a fuel for the long hours worked and taking on-call shifts. This is all anecdotal and speculation on my part, but the shared characteristics of the nurses,

doctors, respiratory techs and sonographers are difficult to ignore.

My noninvasive department staff is diverse: from religious to non-religious, males and females, people who live nearby and people who commute over thirty miles- but they all felt as if they were part of an important team doing essential, instrumental work. I have no doubt that the camaraderie and companionship of having a cohesive team helped the majority of the healthcare workers who were able to successfully keep working through the pandemic. I have noticed many of the nurses on several floors who worked together throughout the pandemic posting pictures on social media where they were attending gatherings together, indicating that the pandemic may have brought them closer together. Most of the staff could recognize when they "Needed a break," which is what I call the "Burning up" phase. This is the stage where a person is starting to feel mental and physical fatigue and suffering more emotional or more aggressive behavior than usual. Some would report sleepless nights and verbally fighting with their significant others during this time as well. If I ever noticed a staff member "Burning up," I would want to offer them to use paid time off to regroup before it turned into burnout. The hospital also offered "Mental Health Days" for those who needed it. On a daily basis in the noninvasive department, staff would have assigned areas for different days of the week-STATs, TEE/OR, COVID-19 patients, and pediatrics. These daily-rotating assignment designations would give each staff member a chance to alternate and take a break from the donning and doffing of PPE for several shifts a week by not having to treat COVID-19 patients. This also helped prevent some of the compassion fatigue that is associated with caring for the severely ill patient population. I plan on using this method for future potential outbreaks to protect the staff and to limit their exposure. Prior management also implemented using a "COVID-only" echo machine in hopes of preventing nosocomial infections. Another obvious component of employee burnout is staffing shortages. Like most hospitals after the worst of the pandemic, my facility had to utilize agency technologists to fill spots that were left vacant. Concerning the "Great resignation" of sonographers and healthcare workers, only one of Phoebe's echo technologists left for a career change, another left for a life-changing family issue, and two others moved due to families relocating. Out of the ten full-time employees who worked in the department through the worst of the pandemic, only one resigned from the cardiovascular ultrasound profession to find a new career.

I am obviously no expert on healthcare worker burnout, and this is just my story of dealing with the stress, pressure and horrors of the pandemic from the noninvasive cardiovascular lab. I encourage everyone reading this article to research Dr. Christina Maslach, social psychologist and professor emerita of psychology at the University of California, Berkeley, who is considered to be one of the foremost experts on burnout. All lab directors and supervisors should do their best to try and recognize burnout before it becomes an issue for their staff. I would love to see all hospitals treating their staff with the same level of importance as they treat patients and their visitors. Everyone in the medical field has heard that "Patient safety is number one," but personally I would rather see hospitals adopt a "patient AND staff safety are number one." My institution recently invested in new metal detectors at entrances to help protect all patients, staff, and visitors and also added to its vehicle patrols around the hospital at the recommendation for preventing violence in the workplace.[4] For the benefit and retention of hospital personnel, the staff needs to understand that they are valued and viewed in the same way that hospital administration prioritizes patients. I believe wholeheartedly that this one simple change could help alleviate burnout in the healthcare profession. Do I have any real-world evidence to prove my theory? No, I don't, but it couldn't hurt to make healthcare workers feel more appreciated for all of their hard work. Combine that with a work-life balance, fair compensation, a safe work environment, employee engagement, support from management, and allowing time-off when needed, and we could make strides into creating long, fulfilling careers for sonographers and all other healthcare workers.

References

1. Tracking Coronavirus in Dougherty County, Ga.: Latest Map and Case Count. Published 2021.
2. Diaz, J and Sewell W. Anticipate the unimaginable: 5 steps to mitigate crises. Published 2021.
3. Forrester, E. Critical care specialist gives insight into Albany COVID-19 outbreak. Published 2020.
4. Murthy, V. Addressing health worker burnout: the U.S. Surgeon General's advisory on building a thriving health workforce. Published 2022.

Sonographer

VOLUNTEER OF THE MONTH- APRIL

Congratulations

Jennifer Acevedo, ACS, RDCS, FASE

Ann & Robert H. Lurie Children's Hospital of Chicago
Chicago, IL

Q&A

When and how did you get involved with cardiovascular ultrasound?
I knew I wanted to work in healthcare, but all I was familiar with was nursing, and I was not in a position to go to school full-time. I attended a career fair and met recruiters from an allied healthcare program that offered evening and weekend classes. This allowed me to work full-time to care for my children and pursue a better career.

What is the name and type of facility/institution at which you work, and what is your current position?
Lurie Children's Hospital in Chicago, Illinois, is a free-standing children's hospital with an academic affiliation with Northwestern Feinberg School of Medicine. I have been with the organization since 2009. I started as a senior cardiac sonographer, and now I work as a clinical educator. Someone along my journey told me to constantly reinvent myself. That was solid advice, and I am fortunate to have done it within the same career path.

When and how did you get involved with the ASE?
I became an ASE member in 2003, shortly after I became a registered cardiac sonographer because I wanted to stay up to date on the latest innovations and research by reading the journal. I attended my first

> **"I attended my first Scientific Sessions in Toronto (2008) and was impressed with the education. I hadn't realized the opportunities ASE afforded sonographers."**

Scientific Sessions in Toronto (2008) and was impressed with the education. I hadn't realized the opportunities ASE afforded sonographers. I left there with a desire to get involved with research, publishing, and presenting. When I joined Lurie Children's, we hosted a meeting for ASE, and I was a co-director and presenter. I enjoyed teaching others and have built my career focusing on education. I have volunteered with ASE since 2016.

Why do you volunteer for ASE?

My main driver is that I love what I do and have a pay-it-forward mindset. Volunteering for ASE allows me to give back in some capacity, whether it is participating in a webinar, mentoring FASE candidates, or simply telling other sonographers about the benefits of being an ASE member. It brings me joy to positively impact others' careers. I also enjoy the camaraderie you experience within the different groups you are selected to participate in which bring colleagues together that we otherwise, would never meet.

What is your current role within ASE? In the past, on what other committees, councils or task forces have you served and what have you done with the local echo society?

I am a member of ASE Leadership Academy, Cohort 3, ASE liaison for the board of the Joint Review Committee for Cardiovascular Technology Programs (JRC-CVT), and beginning July 1st, I will serve as an Education Representative on ASE's Cardiovascular Sonography Council Steering Committee.

Chicago used to have a strong society, where a different hospital would host a monthly meeting, but it lost momentum in 2017. A small group (Akhil Narang, Shivani Patel, Jyothy Puthumana, and myself) have restarted the Chicagoland Society of Echo! We are in the infancy stages of the establishment. Still, the collegiality and education have been exceptional, and the echo community here has responded positively to what we are doing. I am excited for what is to come.

Mentorship is key! There is no one size fits all career pathway, and having a mentor(s) to guide you is important.

What is your advice for members who want to become more involved in their profession or with the ASE?

Mentorship is key! There is no one size fits all career pathway, and having a mentor(s) to guide you is important. They are the Jedis we hope to become one day.

Organization: pay attention to application deadlines! ASE sends emails when applications are open to apply for committees, councils, and the leadership academy. Plan accordingly because the deadline will be here before you know it.

Last, there is value in attending the Scientific Sessions, beyond the CMEs. It is so important for your career. The education and networking are great, I equate it to adult summer camp: learning new things, making new friends, and saying goodbye, until next year at the end.

I was inspired to pursue a career in education while attending my first Scientific Sessions. It was a session for early-career pediatric cardiologists. Although he was talking to physicians, I took that information and applied it to where I saw my career taking me.

What is your vision for the future of cardiovascular sonography?

It sounds cliché to say, but the field is evolving so fast. I am excited to see where AI will take us! The potential to standardize measurements while decreasing scan time (decreasing Work-Related Musculoskeletal Disorders) is appealing.

A few lessons from a sonographer's journey through Interventional Echo...

Truly a Trip Down the Rabbit Hole!

Contributed by ***Karen G Zimmerman, BS, ACS, RDCS, RVT, FASE****, University of Michigan Health, Michigan Medicine*

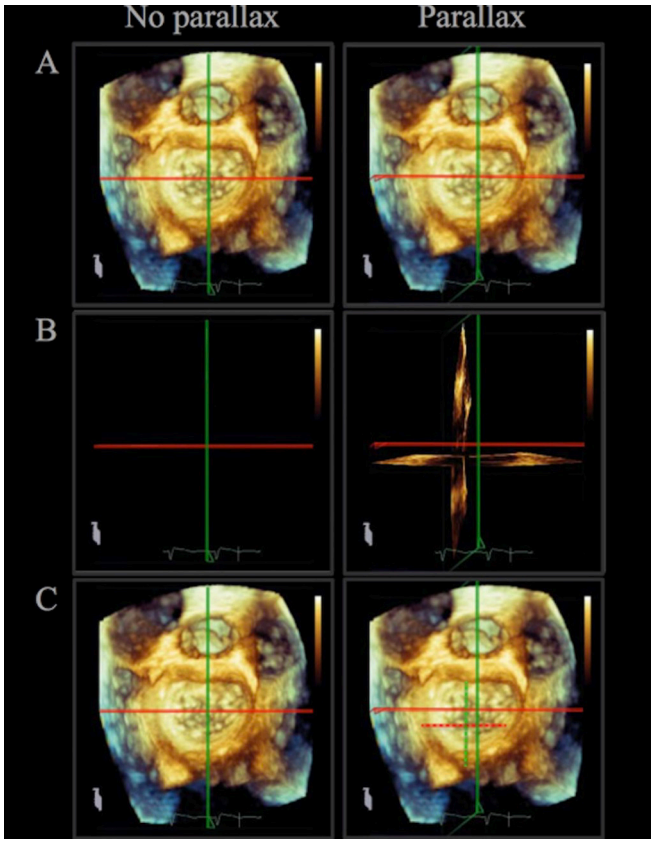
MY FASCINATION WITH interventional echo (IE) came with the introduction of three-dimensional (3D) imaging. Figuring out how to acquire 3D images and discovering the mysteries within, set off my curiosity. Mitral surgeon, Dr. Dan Drake, my partner-in-crime, saw my interest and pushed me down the rabbit hole to help guide mitral and tricuspid repair.

The operating room and cath lab were new to me. The rules of sterile corridors, sterile fields, bunny suits, and perhaps most importantly, knowing how and when to speak up had to be learned. I needed to understand what the surgeon and interventional cardiologist were looking for and what they were planning to do. As a sonographer in the field of IE, I had to grow and learn rapidly. Here are a few lessons for the sonographers in training or those trying to establish themselves in this field.

As a sonographer in the field of IE, I had to grow and learn rapidly.

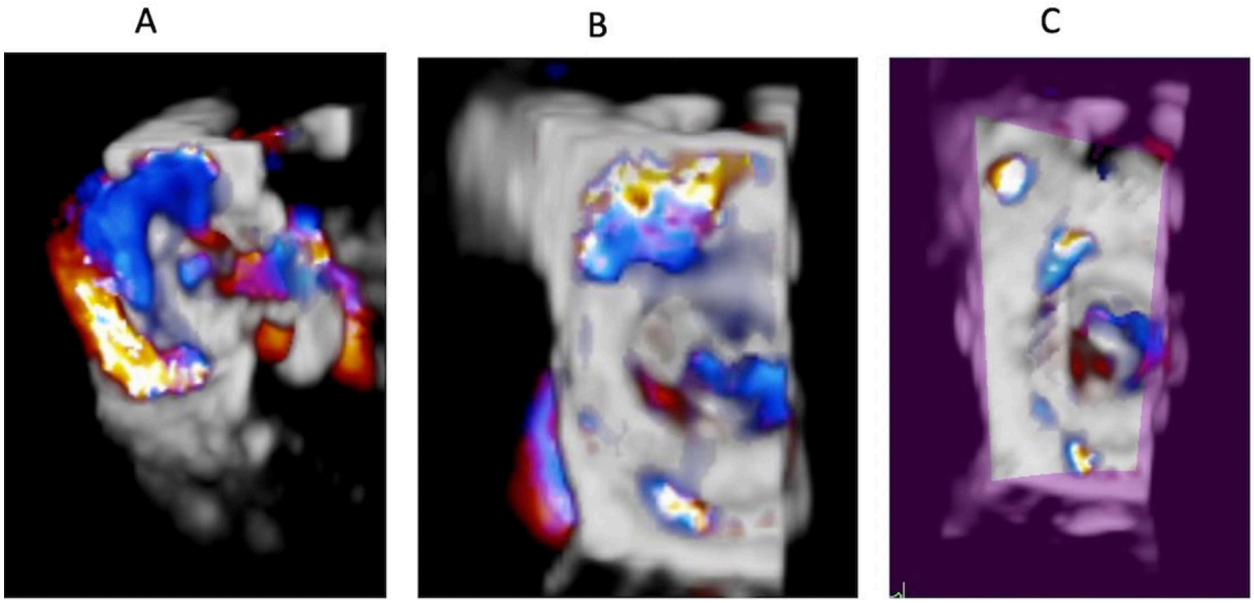
Three-dimensional (3D) imaging is your friend. Learn it!

When I first started learning 3D imaging, my job wasn't only about locating the defect, it was also about eliminating parallax, cropping into the color plume quickly, and speaking the many languages of the team in this specialty. Working with our cardiac surgeon, we discovered the hidden dangers of 3D, such as parallax. Recognition of the displacement of the apparent position from the actual position of 2D planes as they cross a 3D object (parallax), was essential ***(Figure 1)***.



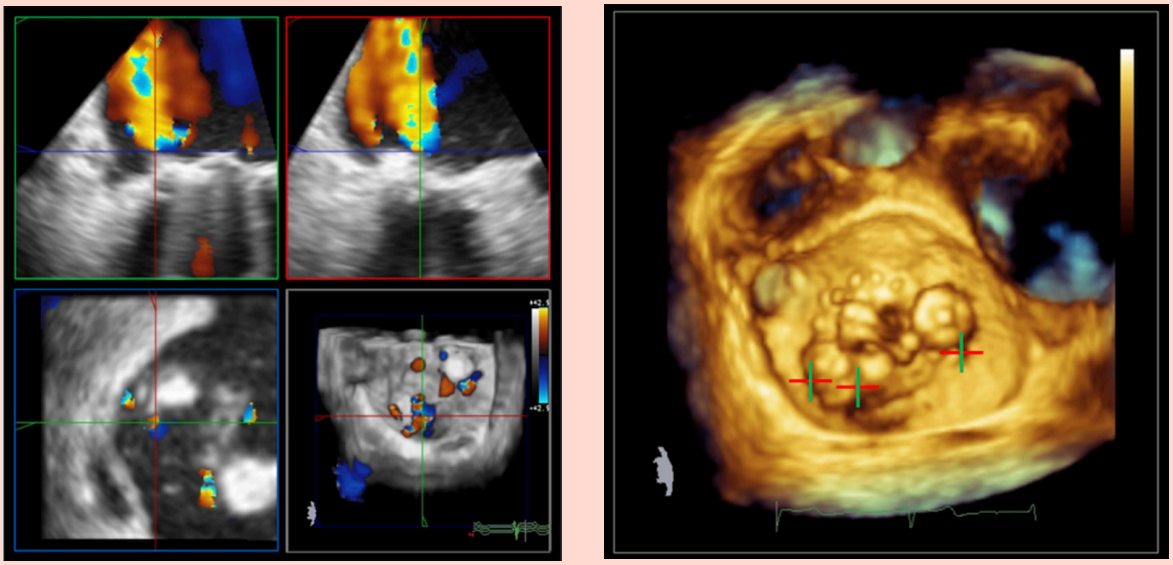
◀ **FIGURE 1:** Parallax results in the displacement of the apparent position from the actual position of 2D planes as they cross a 3D object. The mitral valve is shown in volume mode. Parallax is not present in the image on the left. Dashed red and green lines on the right-hand image indicate the actual position that the 2D image planes cross the 3D mitral valve. To eliminate parallax, the position of the long-axis and commissural image planes are adjusted in slice mode so they the echo data disappears and only the red and green lines remain. The image on the left shows the planes crossing in the center of the valve at A2 and P2. The image on the right shows the planes crossing at A1 and P1. Reproduced with permission from Drake DH, Zimmerman KG, Sidebotham DA, Transesophageal Echocardiography for Surgical Repair of Mitral Regurgitation In: Otto CM, ed. The Practice of Clinical Echocardiography, 5th edition. Elsevier Saunders, Philadelphia, Pennsylvania 2016

I had to learn the differences between actual defects and 3D drop out when cropping into the color plume *(**Figure 2**)*.

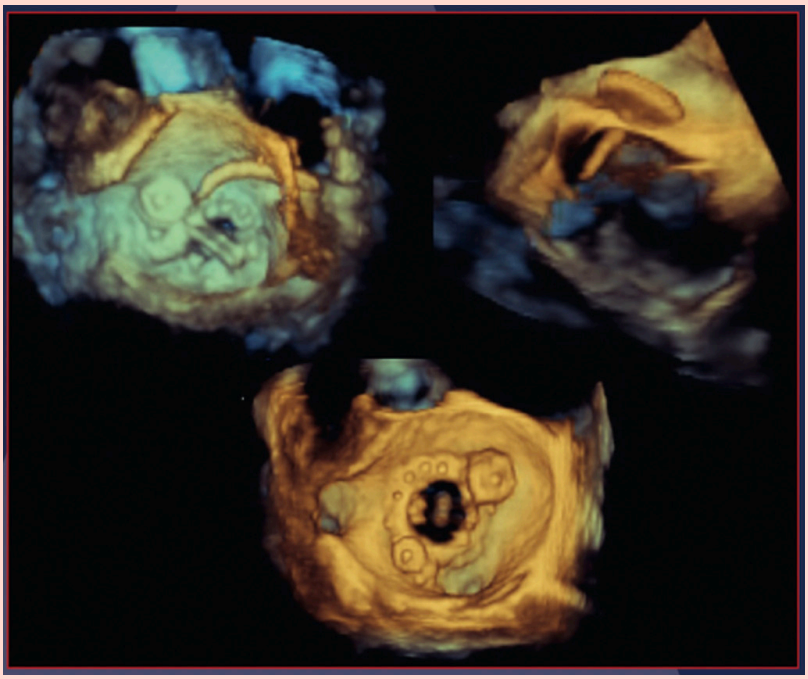


▲ **FIGURE 2:** It is essential to understand the importance of and techniques for cropping away almost all of the 3D color Doppler plume to allow for procedural planning. A) Oblique imaging demonstrates the splay of the color Doppler jet into the left atrium from a mitral prosthetic perivalvular leak. B) The color voxel is rotated to the axial en face "surgeons" view. C) The exact size and location of the defects is optimally demonstrated using axial orientation and cropping very close to the prosthetic annulus. Note the two jets just outside of the prosthetic ring at both 11:00 and 6:30.

This skillset came from practicing alone in the dark for many hours trying to "see" into that 3D voxel. Sometimes painstaking post-acquisition analysis was required, such as with multiple leaks. Practicing helped tremendously when I was thrown into the cath lab with my interventional echocardiographer and had to help locate the paravalvular leak (PVL) or ventricular septal defect (VSD) and crop and chop to size the defect on the fly (***Figure 3, 4***).



▲ **FIGURE 3:** Multiplanar reconstruction analysis of the color voxel allows for precise location of paravalvular leaks.



◀ **FIGURE 4:** This composite image demonstrating echo-guided crossing of atrial septum and closure of multiple perivalvular leaks using the Amplatzer device was selected for the 2020 cover of the journal CASE.

Protect yourself

When I started in this field, I had to learn quickly how to position myself in the cath lab and wear proper protective equipment to minimize radiation exposure. There are many challenges to imaging during these procedures, such as limited windows, artifacts, and radiation exposure. We must protect and educate our sonographers on how to acquire challenging images while minimizing radiation exposure during these cases ***(Figure 5)***.

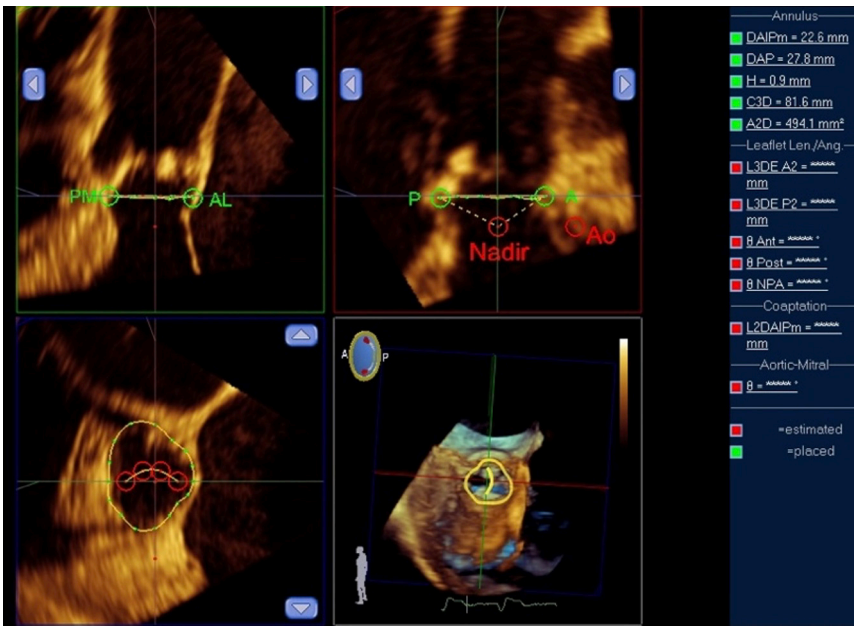
Also, remember to protect your intellectual development and contributions. Sonographers should be included as co-authors for their efforts acquiring the images for many publications in which they contribute. Additionally, sonographers should aim to submit publications as first authors. ASE offers many opportunities for sonographer publications.

▲ **FIGURE 5:** Karen diving into the world of interventional echo with a transthoracic TAVR evaluation

Ask for help

Throughout my career as a sonographer, I have never been afraid to ask for help, whether it was within my own institution or outside of my comfort zone. This is how I learned to speak and understand the languages of the many specialists involved. In 2014, Dr. Rebecca Hahn published a novel approach for measuring aortic valve area using multi-planar reconstruction (MPR) ***(Figure 6)***. I tried to follow the article and do it myself. I failed and wrote to Dr. Hahn asking for clarification. She didn't know me, but she answered right away. Soon she was texting pictures and instructions on how to correct my technique. It comes as no surprise that Dr. Hahn is the recipient of ASE's 2023 Lifetime Achievement Award. I knew at that moment that experts in this field had a vested interest in teaching and advancement of the field of IE. For sonographers starting out or even seasoned sonographers, do not be afraid to ask for help. It only makes you better at what you do.

▼ **FIGURE 6:** We learned to use MPR and Dr. Hahn's novel approach for sizing the aortic annulus prior to TAVR. We had a little competition with CT to see which sizing was right. We were almost always identical, only ours didn't use radiation!



Take time for professional development

ASE provides many learning opportunities to help prepare for a career in interventional echo. There are numerous speciality interest groups, councils, webinars, publications, live and online conferences, and hands-on training. Anyone can reach out to anyone in ASE and receive help and information, just like I did. The entire organization is full of nothing but passionate people wanting to help, and share tips and tricks to advance you and the field of echo.

Being involved with Team ASE led to the privilege of serving on numerous councils, education and writing projects and the honor of becoming a founding Editor-in-Chief for CASE. I was able to work with sonographers, physicians, and collaborators from all over the world. It was also my honor to share these lessons with other sonographers in ASE as well as with my students in West Virginia and colleagues in Michigan. The support and opportunities through ASE are boundless. They made my career worthwhile.

Unfortunately, over the years, it has become increasingly difficult for sonographers to carve out protected time to continue to learn, grow, network, and develop professionally. The national sonographer shortage has put a lot of strain on the existing sonographers to carry out the day-to-day workload of busy echo labs. Sonographers need to be educated on devices and adequately trained to provide the pre and post procedural imaging in structural heart disease. We want sonographers to think critically and not be mere "picture-takers." We want them to be "detectives" and find the crucial pieces of information needed to put it all together.

Being involved with Team ASE led to the privilege of serving on numerous councils, education and writing projects and the honor of becoming a founding Editor-in-Chief for CASE.

Be a lifelong learner

Even after several decades as a sonographer, I continually strive to learn about new devices and new imaging techniques. As a lifelong learner, I urge all sonographers to continually read, attend courses, practice, and keep up to date on the latest technologies in echo.

I wanted to make a difference and hope that I did. You can too. Jump down the rabbit hole. See where you can go, what you can discover, share your adventures, and experience the difference you can make while imaging with the Team.

Thank you, ASE!

Sneak Preview of

PCHD Track at SS 2023!

Contributed by ***Jennifer Hake, RDCS (PE, AE), RDMS (FE), FASE; Jimmy Lu, MD, FASE; Seda Tierney, MD, FASE; Shiraz Maskatia, MD, FASE;*** *and* ***Rita France, RDCS, RDMS, RT, FASE***





Q/A

Our primary goal going into the planning retreat was to secure more pediatric and congenital track sessions this year in order to maximize the educational experience for our PCHD community.

THE GAYLORD National Resort & Convention Center in National Harbor, Maryland, will be welcoming the 34th Annual Scientific Sessions of the American Society of Echocardiography in June. This year, the Pediatric and Congenital Heart Disease Track is being led by Chair Luciana Young, MD, FASE, and Co-Chair Anitha Parthiban, MD, FASE. Here, they graciously share their insights on what went into the planning, as well as what we can look forward to as attendees. Thank you to both of these very busy physicians for the immense time, effort, and dedication they put in to create a phenomenal experience for our PCHD community.

Q. When it came to planning this year's Scientific Sessions pediatric track, what were your goals?

A. Our primary goal going into the planning retreat was to secure more pediatric and congenital track sessions this year in order to maximize the educational experience for our PCHD community. We have provided a diverse range of topics featuring emerging advances in imaging technologies and artificial intelligence and machine learning, as well as practical perspectives in imaging-guided management of complex congenital defects. We strove to highlight original research and provide an abundance of mentoring opportunities for sonographers, trainees, and faculty at all career levels.

Q. How did you choose lectures and speakers to fulfill these goals?

A. We incorporated several suggestions for interesting session topics that were provided by our imaging community, as well as a wide variety of case-based image reviews to ensure a comprehensive educational experience for all. Presentations will be provided by content experts and individuals who have recently published in the areas of interest. We also tried to balance out the faculty by ensuring representation of our sonographers as well as physician faculty at various stages of their career with focus on geographic and programmatic diversity. For our fetal session, we are trying out a new format where we are pairing junior faculty with senior faculty from another institution to maximize mentoring and networking opportunities. Several sessions will be interactive and involve audience participation, so we hope to mix in some fun with the learning.

Q. Could you please share a broad overview on how the PCHD sessions/tracks will be organized this year?

A. The PCHD track will be separate from the ACHD track this year. The majority of sessions are scheduled to take place in one location, so that there will always be a pediatric session available for our pediatric community to attend at any given time. All sessions will be live and in-person to maximize audience engagement, participation, and discussion of important topics. This year's program will continue to feature popular sessions such as Nomenclature Fest and Pediatric Jeopardy. In addition, we have added an abstract and interesting case session to highlight the best abstract and cases submitted this year and a "Year in Review" talk to feature important imaging related research published over the last year. There will be dedicated review of recently released ASE guidelines pertinent to our community as well.

Q. Last year's Sessions had a hybrid approach with some in-person and some virtual content...should we expect the same this year?

A. We are excited that the Sessions will be held live and in person again this year. For those who cannot attend in person, there is an opportunity to register for a virtual live-streaming portion of the program with CME credits.

I am excited that the meeting will be held live and in person this year and that we are able to offer a greater number of pediatric specific sessions.

–Luciana Young, MD, FASE

Q. What workshops are planned and why were those chosen?

A. We have planned for a 90-minute Learning Lab in 3D imaging provided by recognized experts in the field, which will feature pre- and post-operative assessment of the common atrioventricular valve, mitral and tricuspid abnormalities, and complex abnormalities of the left ventricular outflow tract and ventricular septum. There will also be a separate 90-minute Learning Lab providing tips on how to troubleshoot and optimize strain analysis and measure LA, LV and RV strain. The DIY session with 1:1 imaging guidance and hands-on scanning was a great success last year and is being offered again.

Q. Dr. Young, any surprises moving from PCHD track Co-Chair last year to Session Chair this year? What has been the most exciting part for you?

A. It is a true honor to serve as chair of the PCHD track this year. I am grateful to our previous track chair, David Parra for showing me the "ropes" regarding how to organize and plan a diverse, comprehensive educational program, and most importantly, how to gracefully navigate and overcome the various challenges that present themselves during the preparation and go-live phase. This year, I am fortunate to work with Dr. Parthiban, our track co-chair who has been a thoughtful, supportive, and resourceful colleague. I am excited that the meeting will be held live and in person this year and that we are able to offer a greater number of pediatric specific sessions.

Q. Dr. Parthiban, how have you enjoyed your PCHD track Co-Chair role and what has been the biggest lesson that you've learned in organizing such a huge event?

A. I have greatly enjoyed and learned from this experience. Participating in the planning retreat with the all the track chairs and the ASE administration was an eye opener for me helping me understand a lot about how much goes into planning a scientific program of this size and scope. I also got to network and meet some fun people in this process. Dr. Young has been an amazing mentor and resource for me and it has been such an honor to work with her. As far as the biggest lesson, I've learned to be flexible as we have gone through multiple iterations of topics and speakers and how to work within the resources allocated to us.

I've learned to be flexible as we have gone through multiple iterations of topics and speakers and how to work within the resources allocated to us.

—Anitha Parthiban, MD, FASE

Q. What are you both looking forward to the most during the Scientific Sessions?

Learning, connecting, and moving our field forward by bringing the top experts in our field together. We hope the PCHD community will enjoy the 2023 ASE Scientific Sessions as much as we have enjoyed putting it together. We are looking forward to seeing our friends and colleagues and simply having fun while learning a ton!

THE NATIONAL BOARD OF ECHOCARDIOGRAPHY – A Basis for Important Collaborative Accomplishments

A recent article in *Echo* magazine focused on the evolution of perioperative echocardiography, and mentioned some early investigations done in the operating room (OR) by cardiologists and cardiovascular anesthesiologists - working together - using transesophageal echocardiography (TEE).[1] A related example of collaboration is also quite worthy of discussion.

The National Board of Echocardiography (NBE) began in the early 1990s; the evolution of the NBE provided an important opportunity for cardiovascular anesthesiologists and cardiologists to work together toward the common goal of documenting their expertise in the clinical use of echocardiography. The driving force behind this project was Arthur E. (Ned) Weyman MD, FASE, ASE's eighth President. As I recall, Dr. Weyman was Dr. Feigenbaum's first "echo fellow" at Indiana University. After doing some impressively innovative work with a very early 2D scanner developed in Indianapolis, Dr. Weyman moved to Boston in 1980, where he founded the Cardiac Ultrasound Laboratory at Massachusetts General Hospital. This developed into an incredibly productive academic laboratory in which many future leaders in cardiac ultrasound not only trained, but also were imbued with the importance of excellence. During his term as ASE President (1991-1993), Dr. Weyman became concerned that as the clinical use of cardiac ultrasound

Contributed by **Alan S. Pearlman, MD, FASE**, ASE Past President, and Editor-in-Chief, Emeritus, *Journal of the American Society of Echocardiography* (JASE)

expanded, echo studies were not always uniform and sometimes not of high quality. Approaches for evaluating the knowledge base and skills of cardiac sonographers already existed at the time,[2] and before long, ASE also became directly involved in developing a mechanism for accreditation of echo laboratories. Dr. Weyman thought it was important to develop an appropriate method for testing the skills of physicians who were responsible for providing echocardiographic services, including study interpretations. Discussions during meetings of ASE's Board of Directors resulted in the formation of the ASEeXAM Parent Committee. In late 1993, ASE President Julius M. Gardin MD, FASE, appointed Dr. Weyman to chair the ASEeXAM committee. Members of the ASEeXAM Parent Committee (listed alphabetically) included Drs. Chris Appleton, Ed Geiser, Steve Goldstein, Sanjiv Kaul, Mary Etta King, Art Labovitz, Mike Picard, and Tom Ryan. The committee members held several meetings to consider the material to be covered and to review the mechanics of writing valid exam questions. They also discussed who would be eligible to sit for the exam, how the exam should be graded, and the implications of achieving a passing grade. The committee agreed that the exam should be fair - but challenging - and that the purpose of the exam would be to document "special competency" in echocardiography. This was a key decision, since the committee also felt strongly that failure to pass the ASEeXAM should not be taken to imply that the examinee was incompetent. Rather, successful passage of the exam would indicate that the physician had achieved special knowledge and skills in clinical echocardiography, a noteworthy accomplishment. The committee members evaluated proposals from a series of testing organizations and decided that the National Board of Medical Examiners (NBME), founded in 1915 and based in Philadelphia, would be the right organization to oversee the process of physician assessment.

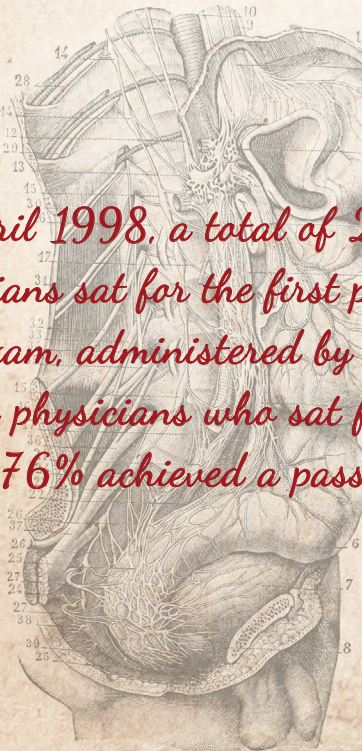
Dr. Weyman thought it was important to develop an appropriate method for testing the skills of physicians who were responsible for providing echocardiographic services, including study interpretations.

An important step in the process was "testing the test." The ASEeXAM committee created a pilot exam that was given in June 1995, during ASE's Scientific Sessions in Toronto. Minutes from the November 1995 meeting of ASE's Board of Directors remind me that 100 people took the pilot exam. While the exam was geared to test physicians, 79 physician echocardiographers, 11 anesthesiologists, and 10 cardiac sonographers signed up to take the pilot exam. In fact, the committee gave two exams, both of which included written questions and video case interpretations. Scores ranged from 80% to 34%, with a mean score of 67.4%. An a priori passing grade was not established, but if a score of 70% had been set as a passing grade, then two-thirds of the physician echocardiographers would have passed. As incoming ASE President in June 1995, I thought it was important to "walk the talk;" hence, I was one of those physicians who took the pilot exam. I am happy to report that my score was above the 70% threshold. The committee decided that an individual who had earned a passing grade on the ASEeXAM should receive a certificate documenting that noteworthy accomplishment and would properly be described as a "testamur" (a term describing someone who has satisfactorily passed an examination and received a certificate documenting that result).

Based on feedback from the pilot exam, the ASEeXAM Committee made some adjustments. They examined each of the 245 questions on the two pilot exams and

found them to be psychometrically valid, with a single exception. They also expanded the video portion of the exam considerably. The Committee made plans to give the first "official" exam in June 1996 during the Scientific Sessions in Chicago. ASE's attorney recommended that the exam be administered by a separate corporation, and not by the ASE per se. To that end, ASEeXAM, Inc. was founded in 1996. Initial officers of this new entity were President Arthur E. Weyman, Vice-President Michael H. Picard, Secretary Steven A. Goldstein, and Treasurer Arthur J. Labovitz.

Because it did not focus on perioperative echocardiography, some cardiovascular anesthesiologists felt threatened by the ASEeXAM, and worried that they might be excluded from practicing echocardiography.[3] Accordingly, in 1996 the leaders of the Society of Cardiovascular Anesthesiologists (SCA) formed a Task Force for Certification in Perioperative Transesophageal Echocardiography. This group created an outline of knowledge categories to be tested through an examination, developed a series of multiple-choice questions based on videotaped cases, and – with the assistance of the NBME, ultimately developed an examination specific for perioperative TEE. In April 1998, a total of 243 physicians sat for the first perioperative TEE exam, administered by the SCA. Of the physicians who sat for this exam, 76% achieved a passing score.[3]



In April 1998, a total of 243 physicians sat for the first perioperative TEE exam, administered by the SCA. Of the physicians who sat for this exam, 76% achieved a passing score.

Soon thereafter, SCA leadership and the officers of ASEeXAM, Inc. began to discuss the idea of merging the two exam processes. In November 1998, the National Board of Echocardiography (NBE) was created by merger of the SCA Exam and ASEeXAM, Inc. The NBE is a not-for-profit corporation; according to its website,[4] the mission of the NBE is "To improve the quality of cardiovascular patient care by developing and administering examinations for physicians leading to certification that recognizes special knowledge and expertise in echocardiography." Equally important is the statement "The examination of special competence and certification in echocardiography is not intended to restrict the practice of echocardiography."

Initially, the NBE developed two examinations of special competency: one in adult echocardiography (the ASCeXAM) and the other in perioperative TEE (the PTEeXAM). Board certification in cardiovascular medicine follows requirements established by a series of guideline documents initiated by the first Core Cardiology Training Symposium (COCATS) sponsored by the American College of Cardiology (ACC) in 1994. Dr. Weyman and I were both co-authors on the echocardiography portion of that document, published in 1995.[5] Over the years, COCATS requirements have been updated several times; the most recent document[6] was published in 2015. To earn NBE certification in adult echocardiography, the successful cardiologist would need to pass the ASCeXAM, but would also need to document completion of an approved training program in cardiovascular medicine as well as additional training in adult echocardiography. Achieving the status of a Diplomate requires that the candidate document the number (and – depending on the nature of the certification being sought – the types) of studies performed and interpreted.

At the time, however, no similar training guidelines existed to support accreditation of fellowship training in cardiac anesthesiology and certification in perioperative echocardiography. Believing that consensus

recommendations for training in cardiac anesthesiology (including perioperative TEE) were needed, a proactive approach was adopted. A joint ASE-SCA task force was created and chaired by Dr. Michael Cahalan. I was also a part of this writing group, whose recommendations for training in perioperative echocardiography were published in 2002.[7] After reviewing the requirements for subspecialty accreditation, the NBE helped to develop a proposal for subspecialty certification. Ultimately, the Residency Review Committee (RRC) for Anesthesiology approved the SCA's application to accredit cardiothoracic anesthesiology training programs. Board certification for adult echocardiography through the ASCeXAM began in 2001, while certification in Perioperative TEE through the PTEeXAM was first granted in 2004. Being recognized as a Diplomate of the NBE certainly deserves professional respect.

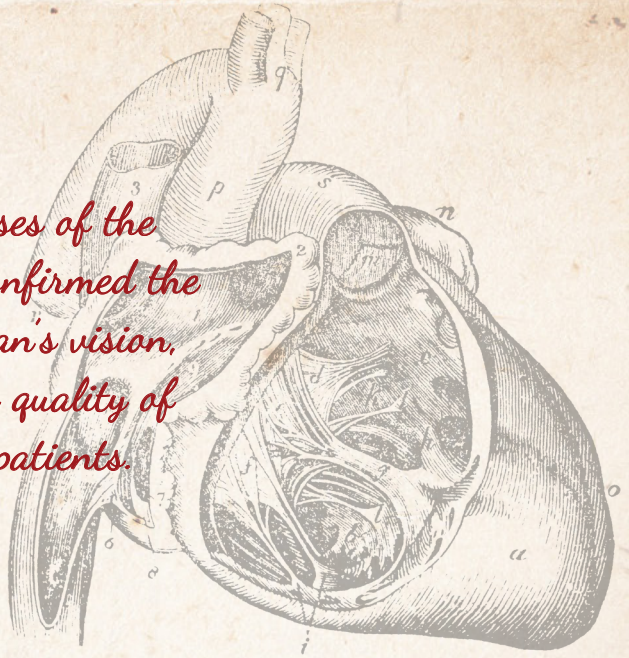
At present, the NBE Board of Directors includes representation from adult cardiology, pediatric cardiology, anesthesiology, emergency medicine, and critical care medicine. The NBE's menu of offerings now includes a series of Examinations of Special Competence: in adult echocardiography (ASCeXAM®), in basic perioperative transesophageal echocardiography (Basic PTEeXAM®), in advanced perioperative echocardiography (Advanced PTEeXAM®), and in critical care echocardiography (CCEeXAM®). Re-certification exams in adult echocardiography and in perioperative TEE have also been developed, allowing physicians whose initial 10-year certifications have expired to update documentation of their skills and retain their status as NBE Diplomates. In addition, for the past seven years, the NBE has helped to organize a Spanish language, NBE-style examination by working with Spanish speaking colleagues in Latin America through the Sociedad de Imágenes Cardiovasculares de la Sociedad Interamericana de Cardiología (SISIAC).

I believe that the principals who worked together to form the NBE were wise to adopt what appears to be a balanced structure, with representatives from both ASE and SCA functioning as equal partners. The role of NBE President has been filled by both cardiologists and cardiac anesthesiologists; the current President is Christopher Troianos MD, FASE, Professor and Chair of the Anesthesiology Institute at the Cleveland Clinic, while the President-Elect is Roberto Lang MD, FASE, Professor of Medicine and Director of the Noninvasive Imaging Lab at the University of Chicago. The NBE Board of Directors consists of representatives from those subspecialties in which cardiac ultrasound plays an important role (cardiology, cardiac anesthesiology, and critical care medicine). The use of cardiac ultrasound by other specialties continues to expand, and I would not be surprised if, in the future, the NBE were to become even more diversified.

I believe that the principals who worked together to form the NBE were wise to adopt what appears to be a balanced structure, with representatives from both ASE and SCA functioning as equal partners.

The principal goal of the ASEeXAM, and the iterations that followed, was to improve the quality of echocardiographic studies. Importantly, it appears that this goal has been accomplished. As one of the original members of the ASEeXAM Committee reminded me, cardiology fellowship programs began to focus on echo training and to enhance the curriculum, at least in part because of the exam. More recent American College of Cardiology Core Cardiovascular Training Statements (COCATS) have increased the recommended time spent in echocardiography training. Increases in the number of textbooks devoted to echocardiog-

Ultimately, the successes of the NBE have not only confirmed the wisdom of Dr. Weyman's vision, but also enhanced the quality of care delivered to our patients.



raphy, and the courses specific to echocardiography (including several board review courses), are also noteworthy. Equally noteworthy is accreditation of fellowship training in cardiovascular anesthesiology, and recognition of the value of appropriate training in perioperative echocardiography. Board review textbooks have been written, and online practice exam simulations have been developed. I understand that psychometricians at the National Board of Medical Examiners have found that while the exam has not become easier over time, the passing grade has increased over the years, suggesting that the echocardiographic knowledge base among physicians in the field has expanded over the years.

The evolution of the NBE is an important example of how responsible professional organizations can take an active – and effective – role in promoting excellence in the performance and interpretation of cardiac ultrasound studies in patients in a wide range of clinical settings. It is also a noteworthy (and praiseworthy) example of how professional organizations can grow, adapt, and thrive by working together instead of competing with each other. Ultimately, the successes of the NBE have not only confirmed the wisdom of Dr. Weyman's vision, but also enhanced the quality of care delivered to our patients.

ACKNOWLEDGMENT

I must express my gratitude to my friends and colleagues (listed alphabetically) Stephen A. Goldstein MD, FASE, Michael H. Picard MD, FASE, Jack S. Shanewise MD, FASE, Daniel M. Thys MD, FASE, and Arthur E. Weyman MD, FASE, for their valuable input, which greatly enhanced the content of this article.

1. Perioperative Echocardiography – Novel Applications in a New Environment. ECHO Magazine 2023, vol 12, issue 3, pages 28-32.

2. How Did Cardiac Sonography Become Cardiac Sonography? ECHO Magazine 2022, vol 11, issue 10, pages 23-27.

3. Thys DM. Cardiac Anesthesia: Thirty Years Later – The Second Annual Arthur E. Weyman Lecture. Anesth Analg 2009;109:1782-90.

4. NBE Website, https://www.echoboards.org, accessed Feb 10, 2023.

5. Stewart WJ, Aurigemma GP, Bierman FZ, et al. Guidelines for Training in Adult Cardiovascular Medicine. Core Cardiology Training Symposium (COCATS). Task Force 4: Training in Echocardiography. J Am Coll Cardiol 1995;25:16-9.

6. Ryan T, Berlacher K, Lindner JR, et al. COCATS 4 Task Force 5: Training in Echocardiography: Endorsed by the American Society of Echocardiography. J Am Soc Echocardiogr 2015:28:615-27.

7. Cahalan MK, Stewart W, Pearlman A, et al. American Society of Echocardiography and Society of Cardiovascular Anesthesiologists Task Force Guidelines for Training in Perioperative Echocardiography. J Am Soc Echocardiogr 2002;15:647-52

Introducing the Training Guidelines for Interventional Echo: COMPETENCIES DEFINED

We are delighted to introduce the American Society of Echocardiography (ASE) Recommendations for Special Competency in Echocardiographic Guidance of Structural Heart Disease (SHD) Interventions, published this month in the *Journal of the American Society of Echocardiography*.[1] This important document outlines the requirements, training pathways, and general and procedure-specific competencies for formalized training in interventional echocardiography (IE) and the achievement of level III IE training.



Contributed by **Vera H. Rigolin, MD, FASE**, Guideline Co-Chair, Northwestern University Feinberg School of Medicine, Chicago, IL; **Enrique Garcia-Sayan, MD, FASE**, University of Texas Health Science Center at Houston, TX; and **Muhamed Saric, MD, FASE**, New York University Langone Health, New York, NY

A historical perspective of training in IE and SHD imaging

The term interventional echocardiographer (IE) was first coined in 2009 to describe an imager with specific knowledge and skills in all aspects of SHD as an integral part of the multidisciplinary "heart team" with specific tasks in the overall path of care, including the imaging guidance of transcatheter heart interventions. Historically, the skills required to achieve competency in IE were acquired on a "learn as you go" basis through on-the-job training and proctoring by more experienced echocardiographers which were available to few individuals. However, there is an increasing need for competent IE imagers in an era of rapidly evolving and expanding SHD therapies and devices, heart team-based decision-making, and the required participation of a dedicated imager in specific interventions.

The fundamental competencies for cardiology training have been defined by the American College of Cardiology (ACC) as part of the Core Cardiovascular Training Statements (COCATS). Criteria for the echocardiography portion of cardiology training were outlined in the COCATS 4 Task Force 5 document published in 2015 in collaboration with ASE.[2] In 2019, ASE published an Advanced Training Statement (ATS) on echocardiography that identified specific competencies required to achieve level III echocardiography training, recommended additional dedicated training after general cardiology fellowship, and proposed minimum procedural numbers for the development of level III echocardiography competencies for additional, optional special cardiovascular ultrasound procedures.[3] That same year, recognizing that IE competencies may not apply to all level III echocardiographers, an expert consensus group proposed unique SHD competencies within the level III framework.[4]

Why are these new recommendations necessary?

Due to the rapid growth of transcatheter therapies for SHD, the evolution of the IE field, and the recognition that IE competencies may differ from those of a general level III-trained echocardiographer, ASE felt that it was important to adopt specific nomenclature for the level III IE and develop specific recommendations for the elements of training, including general and procedure-specific competencies, as a guide to both trainees and trainers ***(Figure 1)***. Furthermore, recognizing that prospective trainees may be in the process of completing a fellowship in cardiology or

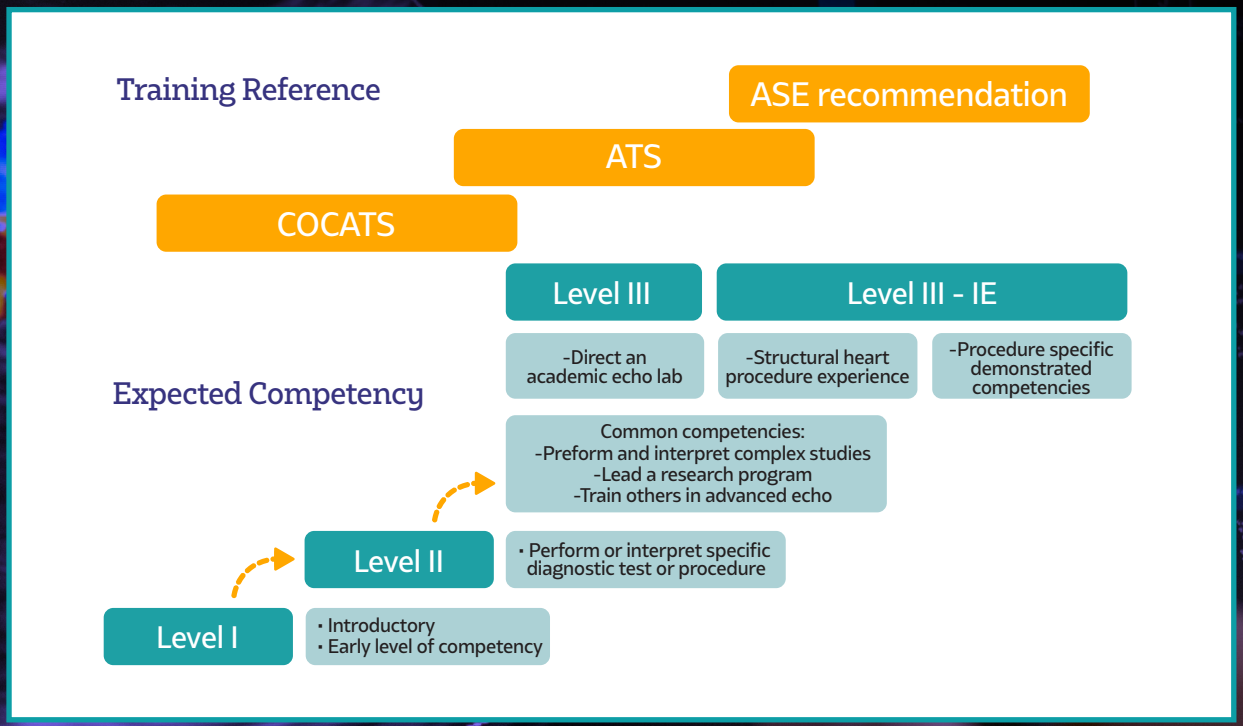


FIGURE 1. Cardiology training references and expected competencies in echocardiography. Modified from Hahn et al.[3]

TABLE 1 Elements of institutional support for IE training for fellows

· ACGME-accredited general cardiovascular and/or cardiothoracic anesthesiology training programs (or international equivalent) that provide exposure to a broad spectrum of patient populations and cardiovascular pathology
· Support of a multidisciplinary valve team (including but not limited to cardiac surgeon, interventional cardiologist, imaging specialist, clinical cardiologists, heart failure specialist, cardiothoracic anesthesiologist, valve coordinator) with regularly scheduled multidisciplinary heart team conferences
· Full range of diagnostic and therapeutic facilities, including ambulatory clinic, cardiac surgery operating room, cardiac catheterization laboratory, IAC-accredited (or equivalent) echocardiography laboratory or perioperative echocardiography service, CCT, vascular laboratory, CMR, and postprocedural recovery facilities
· Cardiothoracic surgery program and interventional cardiology program with appropriate procedural range and volume to support structural heart procedures†
· Administrative support to monitor performance and benchmark measures and ensure participation in the NCDR
· Up-to-date echocardiography equipment that allows advanced imaging capabilities, including 3D echocardiography acquisition, postprocessing, and image storage capabilities in an up-to-date PACS
· Cardiology or cardiothoracic anesthesiology faculty members capable of performing and teaching advanced echocardiographic imaging for structural cases*
· Adequate radiation safety training and protective equipment

CCT, Cardiac computed tomography; *CMR*, Cardiac magnetic resonance; IAC, Intersocietal Accreditation Commission; *NCDR*, National Cardiovascular Data Registry; *PACS*, picture archiving and communication system.

*Faculty members should be level III trained (or international equivalent) and have achieved NBE testamur status (or international equivalent).

REFERENCE

† Bonow RO, O'Gara PT, Adams DH, et al. 2019 AATS/ACC/SCAI/STS expert consensus systems of care document: operator and institutional recommendations and requirements for transcatheter mitral valve intervention: a joint report of the American Association for Thoracic Surgery, the American College of Cardiology, the Society for Cardiovascular Angiography and Interventions, and the Society of Thoracic Surgeons. J Am Coll Cardiol 2020;76:96-117.

cardiovascular anesthesiology, or practicing physicians interested in developing IE skills, it was necessary to establish distinct pathways to achieve competency.

What are the institutional requirements to provide level III training in IE?

In addition to the criteria required to provide general level III training in echocardiography outlined in the 2019 ATS document, institutions seeking to provide level III IE training should have an established multidisciplinary heart valve team with sufficient expertise, volume, and case complexity to provide a well-rounded IE training experience.[3] Faculty and trainees should have access to a full range of diagnostic and therapeutic facilities and equipment, including an IAC-accredited echocardiography laboratory and up-to-date echocardiography equipment that allows advanced 2D and 3D imaging capabilities. Cardiology or cardiothoracic anesthesiology faculty members should be proficient in performing and teaching advanced echocardiographic imaging for structural cases. Finally, established ACGME-accredited general cardiovascular medicine and/or cardiothoracic anesthesiology training programs that provide exposure to a broad spectrum of populations and pathology and institutional administrative support are fundamental to establishing a successful IE training program. The elements of institutional support for IE training for fellows are summarized in **Table 1**.

Who should have the opportunity to enter a formalized Interventional Echocardiography training program?

The new ASE recommendations recognize that training in IE should be available to cardiology and cardiothoracic anesthesiology trainees or practicing physicians and outline different training pathways to achieve level III IE competency ***(Figure 2)***. Regardless of their career stage, trainees seeking level III IE training should meet the minimum procedural volume required to achieve COCATS level II competency in adult echocardiography and/or be eligible or have achieved NBE testamur status (or equivalent) in adult echocardiography or perioperative echocardiography. Experienced cardiologists and cardiothoracic anesthesiologists who plan to receive on-the-job IE training through a "practice experience" pathway should demonstrate a minimum procedural volume, including at least 50 TEEs per year in two of the three years immediately preceding IE training. The document summarizes prerequisites for trainees or practicing physicians seeking IE training in **Tables 2 through 4**.

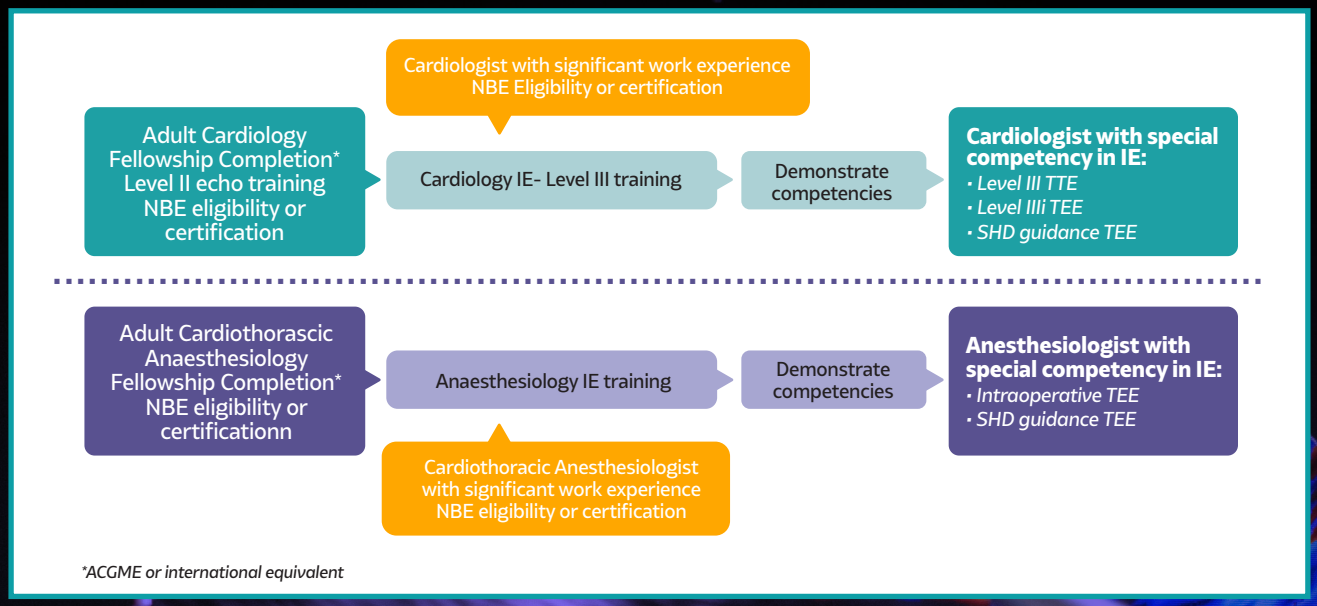


FIGURE 2. Training pathways to achieve level III IE competency

When should this training occur, and what is the recommended duration of the training?

It was the consensus of the writing group that significant dedicated training, after completing a general cardiology or cardiothoracic anesthesiology fellowship, is required to develop the skills and experience to achieve SHD imaging competency. For cardiology trainees, the recommendation is to undergo an additional 9 to 12 months of advanced echocardiography training after completing a three-year ACGME-accredited cardiology fellowship, irrespective of whether level II or level III training was achieved in the core cardiology training program. For cardiothoracic anesthesiology trainees, the recommendation is to actively participate in at least 75 structural heart cases, of which 40 must be personally performed, anticipating requiring an additional minimal SHD-focused training period of six months after completion of a one-year ACGME-accredited cardiothoracic anesthesiology fellowship. Cardiologists or cardiothoracic anesthesiologists with significant practice experience (defined as at least 150 complex TEE studies performed) may complete IE training through a "practice experience" pathway and demonstrate competencies faster than less experienced trainees; however, they are subject to the same competency milestones.

TABLE 2 Prerequisites for trainees entering a dedicated IE training program

• Completion of an ACGME-accredited cardiology or adult cardiothoracic anesthesiology fellowship (or equivalent if trained outside the United States)
• Cardiology or anesthesiology board eligibility or certification (or equivalent if trained outside the United States)
• NBE eligibility or testamur status (or international equivalent)
• Cardiology: minimum procedural volume required to achieve COCATS level II competency in adult echocardiography
• Anesthesiology: minimum procedural volume required for board certification by the NBE for special competence in advanced perioperative TEE for anesthesiologists

TABLE 3 IE prerequisites for cardiologists receiving practice experience training after fellowship

• Completion of ACGME-accredited cardiology fellowship and specialty board certification (or international equivalent)
• NBE testamur status (or international equivalent)
• Demonstration of performance and interpretation of ≥50 transesophageal echocardiograms† per year for 2 of the 3 years immediately preceding IE training

REFERENCE

† National Board of Echocardiography, Inc. Application for certification: adult echocardiography handbook, (ASCeXAM). Accessed March 9, 2022.

TABLE 4 Prerequisites for anesthesiologists receiving practice experience in IE training after fellowship

• Completion of ACGME-accredited adult cardiothoracic anesthesiology fellowship and specialty board certification (or equivalent if trained outside the United States)
• Examination of Special Competence in (Advanced Perioperative Transesophageal Echocardiography [Advanced PTEeXAM]) testamur status or international equivalent
• Applicants must have performed and interpreted ≥50 perioperative transesophageal echocardiograms per year in 2 of the 3 years immediately preceding IE training

Is there a minimum procedural volume to achieve competency in IE?

Compared to interventional cardiology training, less data exist regarding the optimal number of procedures needed to achieve expertise in SHD imaging. Therefore, the minimum procedural volume previously suggested by the 2019 ATS was reproduced in **Table 8** of the new recommendations, with the understanding that these numbers are based on consensus, intended as general guidance, considered an absolute minimum, and assume exposure to a broad range of patients, pathologies, modalities, and therapies. Specifically, these recommendations include the echocardiographic guidance of 75 interventional procedures, of which 30 should be structural valve interventions, 10 transseptal catheterization guidance, 15 percutaneous closure of septal defects and perivalvular leaks, 10 alcohol septal ablations, and 10 left atrial appendage exclusion devices. Additional supervised procedures are likely needed for complex cases and novel devices, and competency must be based on evaluation by the supervising echocardiography laboratory director. The document also references the use of TEE simulation training, which could potentially help to flatten the learning curve for trainees in IE. Of note, the recently published ACC/American Heart Association/Society for Cardiovascular Angiography and Interventions ATS on Interventional Cardiology recommends more specific and significant procedural numbers to achieve competency as a proceduralist.[5] The recommended procedural numbers for imaging may continue to evolve in the future.

TABLE 8 Minimum procedural volume typically necessary for the development and demonstration of level III IE[††]

Procedure/technical skill	Number*
Echocardiographic guidance of interventional procedures,[†] which include	75
Structural valvular interventions[‡]	30
Transseptal catheterization guidance	10
Percutaneous closure of septal defects and perivalvular leaks	15
Alcohol septal ablation	10
Placement of devices to exclude the LAA	10
Intraoperative TEE, which includes	75
Surgical valve repair or replacement	50
Ventricular assist device placement and assessment	20
Intracardiac Echocardiography	10

*Numbers are based on consensus; are intended as general guidance, on the basis of the educational needs and progress of typical level III echocardiography trainees; and represent the cumulative experience that may occur at any time during training. Competency to perform each procedure must be based on evaluation by the supervising echocardiography laboratory director and may exceed or be below the threshold number shown in this table.

† The experience represented by these numbers must include exposure to a broad range of adult patient ages, pathologies, modalities, and therapies, including complex congenital heart disease, mechanical circulatory support devices and transplantation, ultrasound enhancing agents, and 3D and speckle -racking to achieve the competencies outlined in the competency components and curricular milestones for level III training in echocardiography. Additional training may occur at centers with high volumes of complex congenital heart disease or mechanical assist devices and transplantation to achieve the outlined competencies.

‡ The range of experience must include exposure to a broad range of indications, settings, and pathologies, inclusive of operative and intraprocedural studies and the use of 3D echocardiography to achieve the competencies outlined in the competency components and curricular milestones for level III training in echocardiography

REFERENCE

†† Writing Committee Members, Wiegers SE, Ryan T, et al. 2019 ACC/AHA/ASE advanced training statement on echocardiography (Revision of the 2003 ACC/AHA clinical competence statement on echocardiography): a report of the ACC Competency Management Committee. J Am Soc Echocardiogr 2019;32:919-43.

What are some of the common core competencies of IE Training?

The new recommendations outline baseline and core competencies specific to IE training. Proficiency in comprehensive 2D and 3D echocardiography, the skill to independently perform these studies, and detailed knowledge of cardiac anatomy, valvular, and SHD are considered prerequisite general competencies for entering IE training, as summarized in **Table 6**. Competency components expected by the end of IE training include expertise in advanced TEE of complex cardiac disorders

TABLE 6 Prerequisite general competencies of the IE trainee

· Know the basic principles of echocardiography, physics, artifacts, and best practices for image optimization for both 2D and 3D echocardiography
· Know the use of 2D and 3D and Doppler echocardiography to evaluate native and prosthetic valve disease, basic adult congenital heart disease (including atrial and ventricular septal defects), and imaging of LAA
· Know the standard views included in a comprehensive TEE for SHD assessment*
· Skill to independently perform comprehensive diagnostic or perioperative 2D, 3D, and Doppler TEE†,‡
· Skill to independently perform 3D transesophageal echocardiographic image acquisition, cropping, and postprocessing††
· Skill to identify the potential complications of and how to manage them‡
· Skill to effectively communicate detailed information on cardiac anatomy periprocedurally and intraprocedurally in addition to collaborating in interdisciplinary cardiovascular care teams

TABLE 7 Medical knowledge and procedural skills competency components for level III IE training: common to all procedures

Medical knowledge
· Know the comprehensive anatomy of the structure being treated and its relationship to surrounding structures
· Know standard and nonstandard imaging with TTE and TEE of native and prosthetic valve disease, LAA, and basic congenital lesions before, during, and after SHD interventions
· Know the limitations and advantages of 3D vs 2D echocardiographic imaging for SHD assessment and procedural guidance
· Know the physical characteristics, sizing requirements, and expected functional characteristics of available surgical and percutaneous devices
· Know the indications, contraindications, and complications for each device procedure
· Know the strengths and limitations of each type of noninvasive imaging (i.e., echocardiography, CCT, and CMR) for assessing cardiac structure and function (i.e., valves, chambers, septa, and appendage)
· Know the intraprocedural imaging protocols for device implantation, including the assessment of postdevice technical success and evaluation of complications
· Know the postprocedural imaging protocols required to assess the structure and function of each device
· Know the strengths, limitations, and correlation of invasive and noninvasive assessment of native and postdevice valve function
· Know the fluoroscopic landmarks in relation to transesophageal echocardiography imaging landmarks
· Know when to use alternative intraprocedural imaging modalities, including but not limited to fusion imaging and ICE
· Know the fundamentals of radiation safety and the ALARA principle and the methods of reducing radiation exposure
· Know when TEE for SHD is contraindicated and the clinical and patient-specific factors that may increase the risk for a complication
Procedure skills
· Skill to appropriately apply the use of 2D and 3D imaging and Doppler hemodynamics, as well as 3D MPR, for preprocedural assessment of SHD
· Skill to appropriately and expeditiously apply the use of 2D and 3D imaging and Doppler hemodynamics, as well as 3D MPR, for intraprocedural guidance
· Skill to anticipate the procedural steps for device implantation and appropriately image moving wires, catheters, and devices during procedures
· Skill to assess postdevice technical success and procedural complications
· Skill to communicate effectively and guide the interventionalist for the safe and precise implantation of devices
· Skill to implement radiation safety measures and ergonomic considerations
· Skill to adopt new and emerging imaging technologies

ALARA, As low as reasonably achievable.

REFERENCES

* Hahn RT, Saric M, Faletra FF, et al. Recommended standards for the performance of transesophageal echocardiographic screening for structural heart intervention: from the American Society of Echocardiography. J Am Soc Echocardiogr 2022;35:1-76.

‡ Hahn RT, Abraham T, Adams MS, et al. Guidelines for performing a comprehensive transesophageal echocardiographic examination: recommendations from the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists. Anesth Analg 2014;118:21-68.

† Nicoara A, Skubas N, Ad N, et al. Guidelines for the use of transesophageal echocardiography to assist with surgical decision-making in the operating room: a surgery-based approach: from the American Society of Echocardiography in Collaboration with the Society of Cardiovascular Anesthesisiologists and the Society of THoracic Surgeons. J Am Soc Echocardiogr 2020;33:692-734.

†† Lang RM, Badano LP, Tsang W, et al. EAE/ASE recommendations for image acquisition and display using three-dimensional echocardiography. Eur Heart J Cardiovasc Imaging 2012;13:1-46.

TABLE 9 Medical knowledge and procedural skills competency components for level III IE training: transseptal puncture

Medical knowledge
· Know the interatrial septal anatomy, including the location of the fossa ovalis, PFO, and their relationships to surrounding structures
· Know common variants and abnormalities of the IAS and associated structures, including atrial septal aneurysm, lipomatous atrial hypertrophy, Eustachian valve, and Chiari network
· Know the ideal sites of transseptal puncture for specific devices and procedures
Procedure skills
· Skill to visualize the IAS using 2D and 3D echocardiography during all phases of the transseptal puncture
· Skill to guide the transseptal puncture in the location of the fossa ovalis that is specific to the type of percutaneous procedure, device used, and location of pathology

TABLE 10 Medical knowledge and procedural skills competency components for level III IE training: transcatheter mitral valve interventions

Medical knowledge
· Know the anatomy of the mitral valve and adjacent structures
· Know the mechanisms of mitral valve disease and morphologic differences that define primary and secondary MR
· Know the comprehensive echocardiographic evaluation (TTE, TEE, 3D echocardiography, and 3D MPR) of mitral valve disease, including the identification of mitral valve morphology, grading of severity, and suitability for transcatheter intervention
· Know the role of multimodality imaging for identification of mitral valve morphology, grading of severity, and procedural planning
· Know the anatomic predictors of technical and procedural success of transcatheter mitral valve interventions and how to assess for procedural candidacy
· Know the steps for mitral device deployment and the required imaging for guidance
Procedure skills
· Skill to optimally guide transseptal puncture, delivery of guide catheter and transcatheter mitral valve devices into the left atrium and optimal device positioning
· Skill to perform rapid and accurate assessment of complications during the interventional procedure (i.e., leaflet injury, singleleaflet device attachment, device malposition, pericardial effusion)
· Skill to evaluate the technical and hemodynamic success of the mitral valve procedure and the need for further intervention

before, during, and after SHD interventions, proficiency with intraprocedural 3D imaging, knowledge of the devices, indications, procedural steps, and complications, and radiation safety. The IE should also be familiar with 2D and 3D intracardiac echocardiography, an evolving and rapidly developing field, but specific competencies are yet to be defined. Detailed medical knowledge and procedural skills competency components for level III IE training that are common to all procedures are summarized in **Table 7**.

TABLE 11 Medical knowledge and procedural skills competency components for level III IE training: transcatheter aortic valve interventions

Medical knowledge
· Know the aortic valve and root anatomy for both tricuspid and bicuspid morphologies, and the anatomic predictors of procedural complications
· Know the comprehensive multimodality evaluation of aortic stenosis for grading of severity and procedural planning
· Know the effects of stroke volume and blood pressure on the assessment of aortic stenosis severity
· Know the anatomic features that increase complication risk for transcatheter intervention (e.g., coronary obstruction, aortic root disruption, heart block, perivalvular regurgitation), and features that predict procedural success
· Know the anatomic and clinical features that may favor surgical or transcatheter intervention
Procedure Skills
· Skill to size the aortic annulus, root, coronary height, and determine the risk for coronary obstruction, using 3D echocardiography with MPR
· Skill to guide predeployment valve position and assess immediate postdeployment valve position and function
· Skill to perform a rapid and accurate assessment for complications, including annular rupture, aortic dissection, pericardial effusion, acute aortic or MR, and coronary flow compromise, and promptly communicate findings
· Skill to quantify valvular function, including the presence and severity of central or paravalvular aortic regurgitation

TABLE 12 Medical knowledge and procedural skills competency components for level III IE training: imaging for transcatheter tricuspid valve interventions

Medical Knowledge
· Know the anatomy of the tricuspid valve apparatus and adjacent structures
· Know the mechanisms of tricuspid valve disease and morphologic differences that define primary, secondary, and cardiac implantable electronic device–related tricuspid regurgitation
· Know the comprehensive echocardiographic evaluation (TTE, TEE, 2D, 3D echocardiography, and 3D MPR) of tricuspid valve disease, including the identification of tricuspid valve morphology, grading of severity, and suitability for transcatheter intervention
· Know the role of multimodality imaging for identification of tricuspid valve morphology, grading of severity, and procedural planning
· Know the imaging characteristics of transcatheter tricuspid valve devices
· Know the anatomic predictors of technical and procedural success of transcatheter tricuspid valve interventions and how to assess for procedural candidacy
· Know the steps for tricuspid valve device deployment and the required imaging for guidance
Procedure skills
· Skill to determine appropriateness of specific device therapies
· Skill to perform a rapid and accurate assessment for complications (i.e., leaflet injury, single-leaflet device attachment, device malposition, pericardial effusion)
· Skill to evaluate the technical and hemodynamic success of tricuspid valve device implantation

Getting more specific: procedure-specific competencies

The IE training document discusses the specific skill and knowledge competencies needed for each transcatheter SHD intervention currently being performed under echocardiography guidance. The specific procedures include transseptal puncture, mitral procedures, transcatheter aortic valve interventions, tricuspid procedures, interventions on replaced and repaired valves, left atrial appendage occlusion procedures, and transcatheter septal occluder procedures. The medical knowledge and procedure skills competency components for level III IE training for each procedure are listed in **tables 9-15**.

A core principle emphasized in this document is that the length of program duration or achieved procedure numbers are less important than demonstrated competencyin the procedure-specific IE competencies within the milestone domains of knowledge, skill, and communication.

TABLE 13 Medical knowledge and procedural skills competency components for level III IE training: interventions on replaced and repaired valves

Medical knowledge
· Know the assessment of the mechanism and accurate quantification of severity of structural and nonstructural dysfunction of replaced and repaired valves
· Know the device-specific sizing techniques for transcatheter management of prosthetic valve dysfunction
· Know the anatomic features that pose increased risk for adverse outcomes after device therapy for prosthetic valve dysfunction
· Know the characteristics of available septal occluder devices
Procedure skills
· Skill to distinguish between prosthetic paravalvular and valvular regurgitation
· Skill to accurately quantify and describe the location of a PVL and provide imaging guidance for percutaneous closure
· Skill to rapidly display and interpret multiplanar imaging to guide positioning of the percutaneous device

TABLE 14 Medical knowledge and procedural skills competency components for level III IE training: LAA occlusion procedures

Medical knowledge
· Know the key anatomic features of the LAA, including its ostium, body, and accessory lobes
· Know the variety of LAA shapes (windsock, chicken wing, cauliflower, etc.) and their impact on percutaneous LAA closure
· Know the anatomic relationships of the LAA to the surrounding structures, including the mitral valve, pulmonary artery, pericardial space, and left-sided pulmonary veins
· Know the characteristics of available LAA occluder devices
Procedure Skills
· Skill to visualize the LAA in multiple 2D and 3D transesophageal echocardiographic views for LAA sizing and procedural guidance specific to each closure device
· Skill to evaluate the technical success and complications of the LAA closure device implantation and the need for further intervention

TABLE 15 Medical knowledge and procedural skills competency components for level III IE training: transcatheter septal occluder procedures

Medical knowledge
· Know the characteristics of available septal occluder devices
· Know the anatomy of the fossa ovalis, IAS and interventricular septum, and relationship with adjacent structures
Procedure Skills
· Skill to perform agitated saline contrast study to assess for intracardiac shunt
· Skill to size ASD, PFO, and VSD and adjacent anatomy using 2D and 3D echocardiography, as well as 3D MPR
· Skill to guide the delivery system through the septal defect using a combination of 2D and 3D imaging, including ICE
· Skill to perform a comprehensive assessment for appropriate device position, stability, function, and presence of PDL

ASD, Atrial septal defect; *VSD*, ventricular septal defect.

A core principle emphasized in this document is that the length of program duration or achieved procedure numbers are less important than demonstrated competency in the procedure-specific IE competencies within the milestone domains of knowledge, skill, and communication.

REFERENCES

1. Little SH, Rigolin VH, Garcia-Sayan E, Hahn RT, Hung J, Mackensen GB, Mankad S, Quader N, Saric M. Recommendations for special competency in echocardiographic guidance of interventions/structural heart disease. J Am Soc Echocardiogr 2023;36:350-65.

2. Ryan T, Berlacher K, Lindner JR, Mankad SV, Rose GA, Wang A. COCATS 4 Task Force 5: Training in Echocardiography: Endorsed by the American Society of Echocardiography. J Am Soc Echocardiogr 2015;28:615-627.

3. Wiegers SE, Ryan T, Arrighi JA, Brown SM, Canaday B, Damp JB, Diaz-Gomez JL, Figueredo VM, Garcia MJ, Gillam LD, Griffin BP, Kirkpatrick JN, Klarich KW, Lui GK, Maffett S, Naqvi TZ, Patel AR, Poulin MF, Rose GA, Swaminathan M. 2019 ACC/AHA/ASE advanced training statement on echocardiography (revision of the 2003 ACC/AHA clinical competence statement on echocardiography): A Report of the ACC Competency Management Committee. Catheter Cardiovasc Interv 2019;94:481-505.

4. Hahn RT, Mahmood F, Kodali S, Lang R, Monaghan M, Gillam LD, Swaminathan M, Bonow RO, von Bardeleben RS, Bax JJ, Grayburn P, Zoghbi WA, Sengupta PP, Chandrashekhar Y, Little SH. Core Competencies in Echocardiography for Imaging Structural Heart Disease Interventions: An Expert Consensus Statement. JACC Cardiovasc Imaging 2019;12:2560-2570.

5. Writing C, Bass TA, Abbott JD, Mahmud E, Parikh SA, Aboulhosn J, Ashwath ML, Baranowski B, Bergersen L, Chaudry HI, Coylewright M, Denktas AE, Gupta K, Gutierrez JA, Haft J, Hawkins BM, Herrmann HC, Kapur NK, Kilic S, Lesser J, Lin CH, Mendirichaga R, Nkomo VT, Park LG, Phoubandith DR, Quader N, Rich MW, Rosenfield K, Sabri SS, Shames ML, Shernan SK, Skelding KA, Tamis-Holland J, Thourani VH, Tremmel JA, Uretsky S, Wageman J, Welt F, Whisenant BK, White CJ, Yong CM. 2023 ACC/AHA/SCAI Advanced Training Statement on Interventional Cardiology (Coronary, Peripheral Vascular, and Structural Heart Interventions): A Report of the ACC Competency Management Committee. J Am Coll Cardiol 2023.

WIELDING *the* SHIELD,

THE ESSENTIAL LESSON FOR AN ALTRUIST

Sir William Osler's address, *Aequanimitas*, is still taught in residency programs today as physicians-in-training build the mental stamina to practice medicine with integrity. Osler emphasized the importance of imperturbability: the "coolness and presence of mind under all circumstances," for the virtuous physician. However, the pursuit of achieving this state of mind has translated over the years for physicians and healthcare providers as a message to carry as much of the medical workload as possible, without setting boundaries of what is realistically or humanly possible.

ASE's Women in Echo (WIE) webinar, *Book Club: Brave Boundaries*, held on February 23, 2023, addressed this issue perfectly, as the medical workforce dwindles due to burnout. Dr. Ritu Thamman, ASE WIE chair and moderator of ASE's WIE webinar, invited Dr. Sasha Shillcutt, an established cardiac anesthesiologist at the University of Nebraska, to share her journey and inspiration behind her book, *Brave Boundaries*. Dr. Shillcutt's list of achievements appears to be endless. In addition to being a physician, she is a doting wife, mother, and the founder of "Brave Enough," a platform where she coaches and supports fellow female physicians.

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Dr. Shillcutt's inspiration for her book came from her own experience with burnout. She reflected on two waves of burnout. The first was after dedicating her early life to her career and family achievements, and finding success as a physician and mother. Although her diligence and ambition allowed her to focus on her contribution to others in her life, they failed to protect her own energy. To reignite her ardor, she founded "Brave Enough" to support and coach fellow female physicians with navigating the unforgiving medical work climate. However, the pandemic led to her second wave of burnout. This time, she felt she should have felt more "in control" given the flexibility of work settings. This led to feelings of guilt and shame, and she sought help from a therapist for the first time.

She had developed a toxic relationship with herself, prompting her to take on extra responsibilities, and prioritizing her contribution to those around her. She calls this, the "hero complex"...

She learned that working from home, the boundaries between her work life and personal life quickly blurred. As a physician in pursuit of an altruistic goal, Dr. Shillcutt was not immune to the impending burnout. After deep conversations with her therapist, she realized that she had developed a toxic relationship with herself, prompting her to take on extra responsibilities, and prioritizing her contribution to those around her. She calls this, the "hero complex," which is evident in her astounding achievements and community outreach. This was the first time she discovered the importance of setting boundaries. Her book, *Brave Boundaries*, is the amalgamation of her deep dive into boundaries in the healthcare setting.

In *Brave Boundaries*, Dr. Shillcutt writes without hesitation that "the business of healthcare depends on exploiting doctors and nurses" and that this business is not sustainable: a reality transparent to the public after the pandemic. So where do we start? Dr. Shillcutt expressed the moral responsibility each healthcare worker has, to be brave enough to reject inappropriately heavy burdens that lead to burnout. She explained that burnout is not a result of duties agreed to for compensation. Rather, it is a result of small duties, added bit by bit, for no or low compensation, contributing to inflexible schedules. Women are especially susceptible to burnout because of their willingness to take on these duties, which may stem from "Impostor Syndrome." She illuminated that while "our world runs on the backs of women who have no boundaries," it is not a sustainable design. That is why Dr. Shillcutt is intentional about teaching female colleagues the value of setting boundaries.

Identifying and communicating boundaries is the cornerstone for developing resilience in the medical field.

At first, declining work may seem unconventional to the dedicated physician, but Dr. Shillcutt conveyed the importance of being intentional when taking on extra duties. She advised attendees to have a clear understanding of their career goals. She explained that women should know what excites them, and when presented with an opportunity that doesn't align with their missions, they should decline. When you're young, you can enthusiastically accept opportunities for exposure, as they may help you achieve your long-term goals. However, often as a result of "Impostor Syndrome," women end up accepting extra responsibilities and spreading themselves thin to prove their worth. This hurts the sustainability of their contribution to the healthcare service. Therefore, identifying and communicating boundaries is the cornerstone for developing resilience in the medical field.

Next, Dr. Shillcutt emphasized the importance of upholding boundaries. Dr. Shillcutt encouraged attendees to "find [their] 20 seconds of brave and set boundaries." She reminded participants of Dr. Brene Brown's philosophy that "clear is kind." She proposed that while declining may feel awkward at first, eventually, it garners respect due to the expression of dedication to consistency and integrity. When some attendees expressed fear of "ruffling feathers," Dr. Shillcutt spoke about the disparity between expectations from men versus women. She accepted that in a society where men who advocate for themselves and set boundaries are respected, women who do the same are met with disapproval. She explained that this is precisely why the culture needs to change. Current expectations are not sustainable for

the working woman. She encouraged individuals to be honest with themselves about realistic expectations and to take on the burden of making things more equitable for everyone who will follow their path in the years to come.

Dr. Shillcutt concluded by providing an example to female attendees who feared the potential ramifications setting boundaries may have on their annual performance reviews. She reminded attendees that if an additional duty is given, one can ask which duty should be set aside to address the new responsibilities. This provides a clear indication of realistic expectations, which prevents resentment, and ultimately boosts performance in a collaborative environment.

Early career zeal is not sustainable nor efficacious for the marathon that is a career in medicine. Eventually, medical training needs to translate into balanced, consistent, and intentional medical practice.

As a resident physician, Sir William Osler's words of advice in *Aequanimitas* are still relevant to me. It is important for me to exercise grit to become a resilient and assiduous attending physician. As I strive to embody "imperturbability," I need to practice taking more responsibilities in my training. As Dr. Shillcutt reflected, more exposure is productive in early medical career development. My years in residency and fellowship are meant to challenge me as I tap into my potential. However, this early career zeal is not sustainable nor efficacious for the marathon that is a career in medicine. Eventually, medical training needs to translate into balanced, consistent, and intentional medical practice. This demanding career requires resilience that can only be fostered by focus. Therefore, attending physicians must be honest with themselves and colleagues about committing to pragmatic workloads. It is of paramount importance for the integrity and sustainability of our workforce.

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