

#ASEchoJC Twitter Chat

Tuesday, May 9, 2023 – 8 PM ET

- **Recommendations for Special Competency in Echocardiographic Guidance of Structural Heart Disease interventions** (JASE, April 2023)

Authors

- G. Burkhard Mackensen, MD, PhD, FASE (@gb_mackensen)
- Nishath Quader, MD, FASE (@nishath_quader)

Moderators:

- Nadeen Faza, MD (@NadeenFaza)
- Purvi Parwani, MD (@purviparwani)
- Enrique Garcia-Sayan, MD, FACC, FASE (@EGarciaSayan)

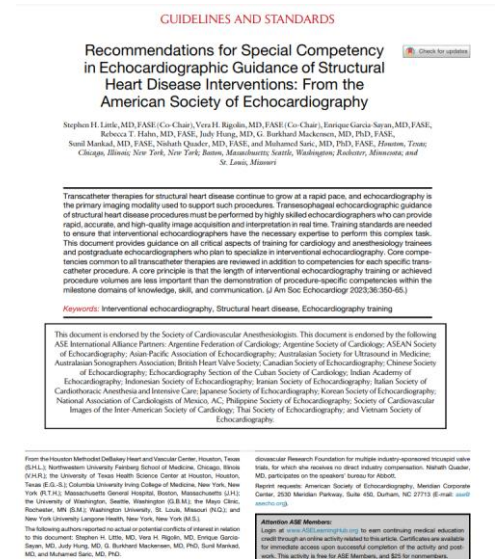
Introduction and Welcome: 🗨️ Welcome to tonight's #ASEchoJC!

🔥 We'll discuss the @ASE360 IE training guidelines w/ guest authors @gb_mackensen @nishath_quader & co-moderators @NadeenFaza & @purviparwani

🔥 10? for discussion will follow

🔥 Use #ASEchoJC in all Tweets

👉 Guideline: <http://bit.ly/3NqSRlo>



GUIDELINES AND STANDARDS

Recommendations for Special Competency in Echocardiographic Guidance of Structural Heart Disease Interventions: From the American Society of Echocardiography

Stephen H. Little, MD, FASE (Co-Chair), Vera H. Rigolin, MD, FASE (Co-Chair), Enrique Garcia-Sayan, MD, FASE, Rebecca T. Hahn, MD, FASE, Judy Hung, MD, G. Burkhard Mackensen, MD, PhD, FASE, Sunil Mankad, MD, FASE, Nishath Quader, MD, FASE, and Mohamed Saric, MD, PhD, FASE, *Houston, Texas; Chicago, Illinois; New York, New York; Boston, Massachusetts; Seattle, Washington; Rochester, Minnesota; and St. Louis, Missouri*

ASE'S TWITTER JOURNAL CLUB

AMERICAN SOCIETY OF ECHOCARDIOGRAPHY
Since 1955, we've been saving lives.

Tuesday, May 9, 2023
8:00 to 9:00 PM (ET)

JOIN THE DISCUSSION ON:

Recommendations for Special Competency in Echocardiographic Guidance of Structural Heart Disease Interventions

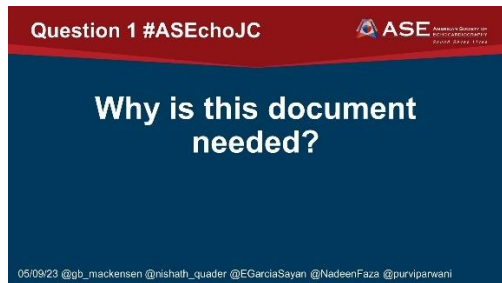
Earn CME!
1 AHA/ACC Category 1 Credit™

Guest Authors G. Burkhard Mackensen, MD, PhD, FASE (@gb_mackensen) and Nishath Quader, MD, FASE (@nishath_quader) will join ASE Twitter Journal Club Moderators Nadeen Faza, MD (@NadeenFaza), Purvi Parwani, MD (@purviparwani), and Enrique Garcia-Sayan, MD, FACC, FASE (@EGarciaSayan).

The ASE Twitter Journal Club will answer your questions! Follow @ASE360 and use hashtag #ASEchoJC for all tweets!



Q1:



A1 Notable Responses:

@EGarciaSayan: 🚀 Question 1 #ASEchoJC: Why is this document needed?

@EGarciaSayan: 1 # of complex THI requiring expert imaging guidance

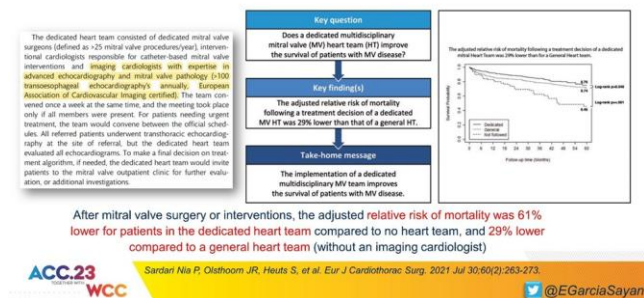
▲ Evolving role of imager as part of the ❤️ team

▲ ≠ skillset than traditional Level III echo

▲ @ASE360 felt the need to develop specific Level III-IE training recommendations, inclusive of fellows & practicing physicians

@EGarciaSayan: It's important to highlight that an expert structural heart imager as part of a dedicated heart team is associated with improved outcomes & survival. Formal pathways are needed to train Level III-IE experts.

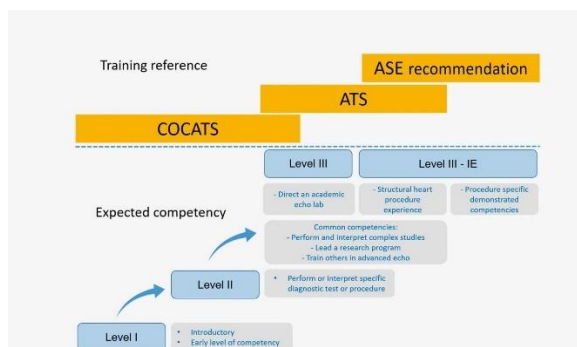
Heart Team + IE and Outcomes



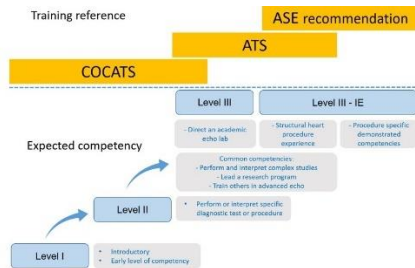
@purviparwani: Currently, 272 ACGME-approved cardiology training programs and 80 ACGME-approved adult cardiothoracic anesthesiology training programs.

-> more than 500 US hospitals with transcatheter aortic valve replacement (TAVR) programs, mitral transcatheter edge- to-edge repair (TEER) programs, or both.

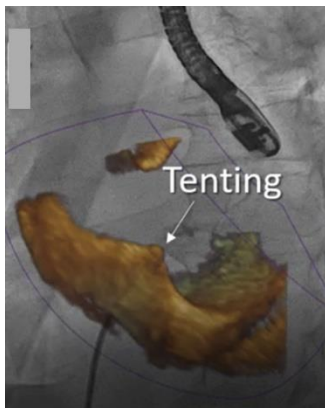
We need standardization of the program and training they offer! Lots of heterogeneity in training requirements across the societies as well.



@nishath_quader: Level III IE



@iamritu: This document is an important "aid" since there's such heterogeneity in procedure volume across us& standards which continue to rapidly evolve as our imaging tools continue to improve like fusion imaging



@EGarciaSayan: Why are the new @ASE360 training guidelines for Interventional Echocardiography needed?

@NadeenFaza: A beautiful example of fusion imaging!

@purviparwani: Unique skills required for #IEcho

Training standardization necessary!

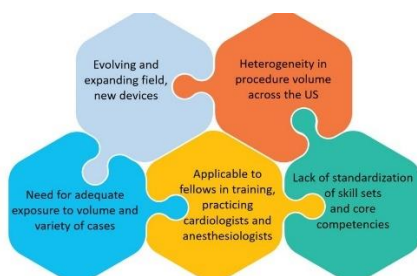
-> #Real Time Imaging, communication with #SHD team

-> Immediate and profound impact on patient care

-> Heterogenous training requirement across speciality

-> heterogeneity in procedure volume across the US. The potential for trainees to gain exposure to SHD pro- cedures is highly dependent upon the breadth and depth of the institutional SHD program

@nishath_quader: The field of IE has evolved rapidly; because of the variability in SHD procedures performed across various centers, this document serves as a guide for those seeking IE training. The nomenclature of level III IE denotes special competency in specific SHD procedures



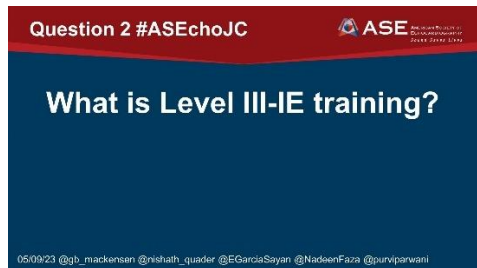
@NadeenFaza: The challenges of training for interventional echo!

@NadeenFaza: An important document that serves as a guide, especially as the field is rapidly evolving! Structural heart interventions have revolutionized the care of patients with complex disease and novel technologies allow us to treat a wide array of pathologies! Guidance is 🔑

@gb_mackensen: The document was needed to provide guidance and structure to this emerging field of interventional echocardiography, a new subspecialty of CV ultrasound

@gb_mackensen: A unique skillset is required and we felt strongly that we needed to have a structured approach for both specialties, cardiology and CT Anesthesiology to provide this guidance.

Question 2:



A2 Notable Responses:

@EGarciaSayan: ❌ Question 2 #ASEchoJC: What is Level III-IE training?

@EGarciaSayan: ▲ Need for specialized competencies recognized in 2019 ATS by Wiegers et al: <https://jacc.org/doi/10.1016/j.jacc.2019.02.003>

▲ Expert consensus led by @hahn_rt introd concept of Level III-SHD <https://jacc.org/doi/10.1016/j.jcmg.2019.10.008>

▲ @ASE360 IE training guidelines define Level III-IE + procedure-specific competencies

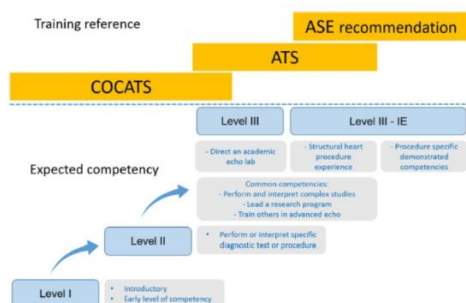


Figure 1 Cardiology training references and expected competencies in echocardiography. Modified from Hahn et al.⁵¹

@EGarciaSayan:

▲ Imager w/ specific knowledge & skills in all aspects of SHD

▲ Integral part of the multidisciplinary heart team

▲ Procedure-specific competencies

▲ #iEcho as a new & evolving subspecialty in Cardiology

@iamritu: Level III-IE Structural heart is an expert in advanced TEE complex cardiac disorders before, during, & after SHD interventions, live 3D, manipulation of 3D images, use of 3D color Doppler, MPR cropping for procedural planning & intraprocedural guidance & afterwards

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

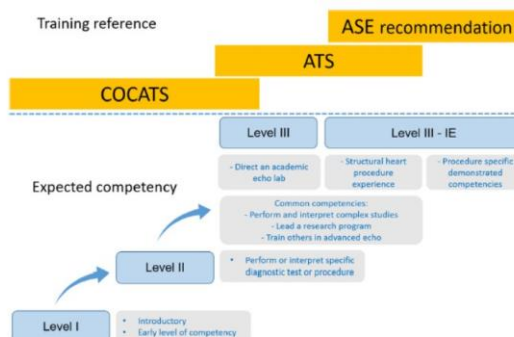


Figure 1 Cardiology training references and expected competencies in echocardiography. Modified from Hahn et al.⁵¹

@EGarciaSayan: What is Level III-IE training?

@purviparwani: #Level III

--> The minimum procedural volumes given are based on consensus opinion.

--> procedural proficiency and outcomes matter more than length of exposure or the number of procedures performed for advancement of the trainee.

@gb_mackensen: And ideally, the IE does not only provide the best possible image (excellence in imaging) at any given time of the procedure but also provides active guidance, feedback and anticipates next procedural steps as part of the imaging skillset...

@DavidWienerMD: "Heart Team" in action in the OR or interventional suite

@nishath_quader: communication is key and one of the key components for IE training

@NadeenFaza: Could not agree more! Being an effective communicator in the cath lab requires knowledge of the different wires, catheters, devices, procedural steps, and procedure specific complications. It requires integration of echo, hemodynamic, and fluoroscopic data.

@EGarciaSayan: Interventional Echocardiography skills extend well beyond imaging. Knowing devices, anticipating procedural steps and communication are key competencies.

@NadeenFaza: #CANDID communication is the key. The #SHD should allow and facilitate honest communication. Clapping is not possible with one hand.

@gb_mackensen: Exactly, an IE needs to be willing (and able) to communicate and speak the language of the structural heart team. For instance, instead of referring to a leaflet grasp during a TEER procedure as "grabbing a leaflet" you should rather use "grasping or leaflet insertion" or else.

@RezaEmaminia: Of paramount importance that imagers know the procedural steps, and structuralist know the imaging/views. Communication gets easier this way.

@purviparwani: Level III IE minimum procedural numbers do not differ significantly from the traditional level III;

For #IEcho however, the emphasis on imaging for valvular heart disease and #SHD interventions is emphasized in the document.

Here is what the trainees need to before entering the dedicated interventional #Echofirst program

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

@NadeenFaza: The paradigm has shifted and the focus is nowadays on competencies rather than numbers.

@purviparwani: --> The range of experience for LEVEL III learner -- must include exposure to

- broad range of indications,

- settings, and
- pathologies,
- inclusive of operative and intra- procedural studies and
- the use of 3D #Echofirst to achieve the competencies outlined in the document

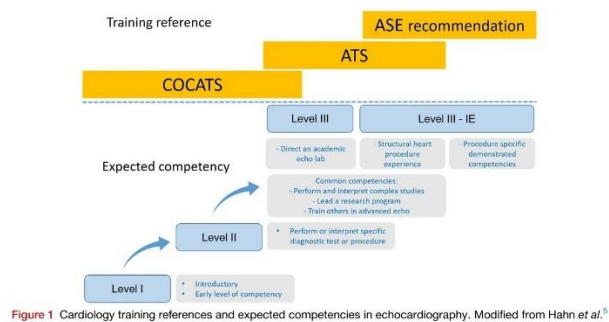
#LAA image for attention 🙄



@wpentz: What evidence base is there for these numbers?

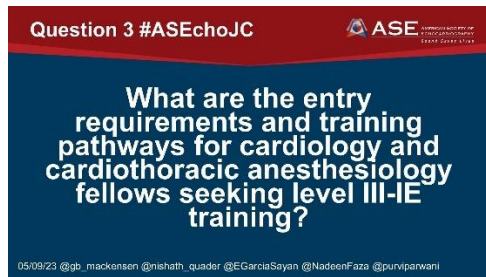
@nishath_quader: This training emphasizes procedural competencies related to medical knowledge, procedure/communications skills in IE. The focus is on imaging for VHD/SHD interventions

@NadeenFaza: the full spectrum of #EchoFirst competencies. Level III #iecho focuses on structural heart disease experience and procedure specific demonstrated competencies. This requires an additional skillset and training.



@gb_mackensen: It entails teaches general and procedure-specific competencies within the domains of medical knowledge, procedure skills, and communication skills as a guide to trainees in the emerging field of IE. The skills needed to provide safe image-guided SH therapy

Question 3:

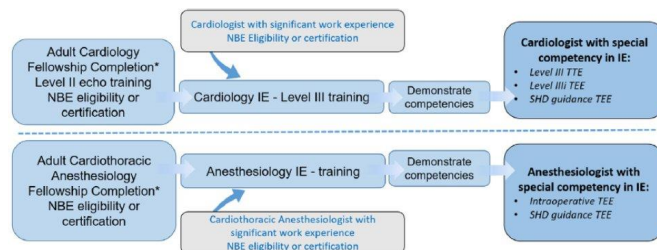


A3 Notable Responses:

@EGarciaSayan: ❌ Question 3 #ASEchoJC: What are the entry requirements and training pathways for cardiology and cardiothoracic anesthesiology fellows seeking level III-IE training?

@EGarciaSayan:

- ▲ Pathways for cardiology & anesthesiology trainees + practicing physicians
- ▲ Completed fellowship & achieved level II COCATS or NBE testamur
- ▲ Advanced level of competence in echo
- ▲ Additional training requirements: 9-12 months for cardiology & 6 months for CT anesthesiology



*ACGME or international equivalent

Figure 4 Training pathways to achieve level III IE competency.

@NadeenFaza: #ACCFIT, if you are interested in interventional echo as a subspecialty, this document serves as a guide. If you are interested in #EchoFirst and structural heart disease, consider this exciting and rapidly evolving subspecialty.

@jumakoush: Great 👍 Very beneficial

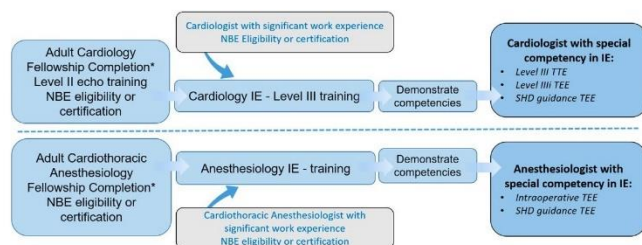
@iamritu: For cardiology trainees additional 9 to 12 months of advanced #echofirst training, regardless of what level (II or III training) was achieved in their cardiology fellowship & For anesthesia minimal SHD-focused training period of 6 months to get their numbers

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

@purviparwani: IE prerequisites for #Cardiologist or #Anesthesiologist receiving practice experience training after fellowship

Need to have level II echo training. Look at the numbers required for level II #Echofirst training in the last slide.



*ACGME or international equivalent

Figure 4 Training pathways to achieve level III IE competency.

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)
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- Anesthesiology: minimum procedural volume required for board certification by the NBE for special competence in advanced perioperative TEE for anesthesiologists

@nishath_quader:

- 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

@gb_mackensen: So yes, criteria for entry differ a bit between cardiologists and CT Anesthesiologists but both lead to a similar pathway of training in IE

@gb_mackensen: For Cardiac Anesthesiologists:

1. Completion of ACGME-accredited adult CT anesthesiology fellowship
2. Examination of Special Competence: Advanced PTEeXAM, testamur or equal
3. >50 perioperative TEE/year in 2/ 3 years immediately preceding IE training

Question 4:

Question 4 #ASEchoJC

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American Society of Echocardiography
1963-2023

What are the entry requirements and training pathways for practicing cardiologists and cardiothoracic anesthesiologists seeking level III-IE training?

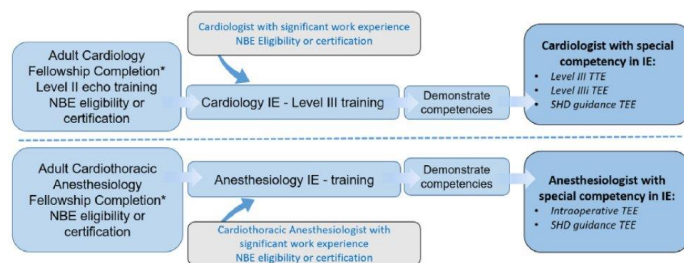
05/09/23 @gb_mackensen @nishaath_quader @EGarciaSayan @NadeenFaza @purviparwani

A4 Notable responses

@EGarciaSayan: 🌟 Question 4 #ASEchoJC: What are the entry requirements and training pathways for practicing cardiologists and cardiothoracic anesthesiologists seeking level III-IE training?

@EGarciaSayan:

- ▲ "Practice experience" pathway for experienced cardiologists & cardiothoracic anesthesiologists
- ▲ Completed ACGME-accredited fellowship
- ▲ NBE testamur status
- ▲ Advanced level of competence in echo
- ▲ ≥50 TEEs (or perioperative TEE) / year in 2 of 3 years preceding application



*ACGME or international equivalent

Figure 4 Training pathways to achieve level III IE competency.

@NadeenFaza: how can practicing cardiologists achieve the interventional echo competencies?

@EGarciaSayan: Though experienced cardiologists or anesthesiologists with >150 complex TEE studies performed may demonstrate IE competency faster than less experienced trainees, the competency milestones and procedural numbers are similar.

will be required. The recommended IE training pathway for cardiologists is to undergo an additional 9 to 12 months of advanced echocardiography training, irrespective of whether level II or level III training is achieved in the core cardiology training program. The recommended IE training pathway for cardiothoracic anesthesiology trainees includes active participation in ≥75 structural heart cases, of which ≥40 must be personally performed, while the remainder may be interpreted with a supervising echocardiographer to meet the requirement of a total of 75 examinations.⁵ It is anticipated that these requirements will not be achieved during a regular adult ACGME-accredited cardiothoracic anesthesiology fellowship and that an additional minimal SHD-focused training period of 6 months is necessary to achieve these numbers.

Cardiologists or anesthesiologists posttraining with extensive prior imaging experience (e.g., >150 complex transesophageal echocardiographic studies performed) may demonstrate IE competencies faster than less experienced trainees. However, the competency milestones are the same for all trainees. The milestone intervals provided indicate the timing of advancement by which a typical trainee will have

@iamritu: While Cardiologists or anesthesiologists posttraining with extensive prior experience (e.g., >150 complex TEE #Echofirst may demonstrate IE competencies faster, they need to perform & interpret ≥50 TEE/yr for 2 of 3 years immediately preceding IE training

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 echocardiograms¹⁰ per year for 2 of the 3 years immediately preceding IE training

@purviparwani: For a cardiologist out of training wanting to do #lecho here are the requirements

-> 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 TEE per year

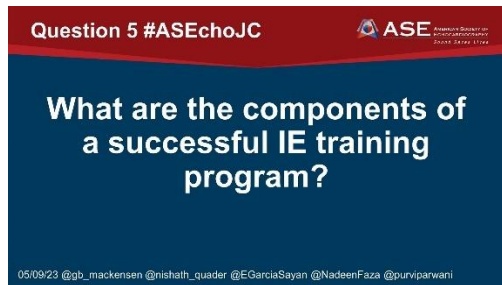
@EGarciaSayan: What are the entry requirements and training pathways for practicing cardiologists and cardiothoracic anesthesiologists seeking level III-IE training?

@nishath_quader: Because IE is a relatively new field with many cardiologists following a “practice experience” path of training, the prerequisites differ somewhat from someone going through fellowship training



@NadeenFaza: is there a role for simulation training?

Question 5:



A5 Notable responses

@EGarciaSayan: 🌟 Question 5 #ASEchoJC: What are the components of a successful IE training program?

@EGarciaSayan:

- ▲ Established multidisciplinary ❤️ team w/ expertise, volume & case complexity
- ▲ Expert faculty as part of ACGME-accredited fellowship programs
- ▲ @IACaccred accredited echo lab
- ▲ Updated equipment & institutional support

GME / Learning Environment

- Meets general criteria for providing level III echo training
- ACGME-accredited general cardiovascular and/or cardiothoracic anesthesiology training programs

Faculty

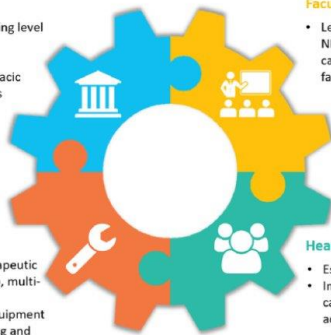
- Level III-trained (or equivalent) and NBE-certified cardiology or cardiothoracic anesthesiology faculty with extensive IE expertise

Equipment and Facility

- Full range of diagnostic and therapeutic facilities, IAC-accredited echo lab, multi-modality imaging
- Up-to-date echocardiography equipment
- Adequate radiation safety training and access to shielding

Heart Team

- Established heart valve team
- Interventional cardiology and cardiothoracic surgery programs with adequate case volume and complexity



@DavidWienerMD: A plug for @IACaccred accreditation, @ASE360's partner in quality

@iamritu: Know procedure-specific location of transseptal puncture

Use Biplane imaging to determine optimal transseptal location <http://bit.ly/3NRsjjT> depending on which procedure

All the imaging for TAVI, mitral, tricuspid, LAAO, LVADs

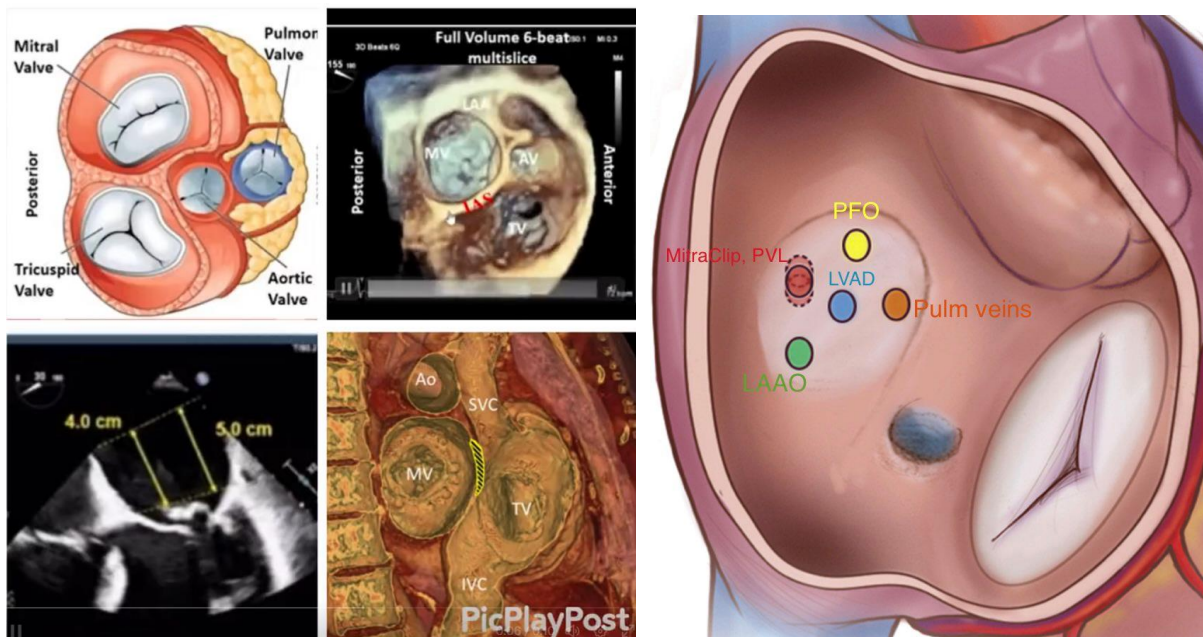


Table 8 Minimum procedural volume typically necessary for the development and demonstration of level III IE³

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
ICE	10

@purviparwani: -> Program should take all the steps towards Radiation safety

-> numerous studies have now documented the high radiation exposure of the #IE procedure to the #Echofirst #Operators

-> everyone from #Echoteam should receive the appropriate radiation safety training in order to apply the "as low as reasonably achievable" principle

-> lead apron with a minimum lead equivalency of 0.25 mm at the back and 0.5 mm in the front, along with a thyroid lead collar and lead goggles.

-> direct ion storage dosimeter, regularly monitored and reported.

-> Additional shielding with a lead acrylic shield with 0.5-mm lead equivalency should be available that can either be ceiling suspended or a mobile

@purviparwani: Components of successful #SHD program

- ACGME-Program with sufficient volume
- Support to the valve team
- Established valve clinic, #CVimaging laboratory
- Enough #CT surgery volume
- State of ART #Echofirst lab with 3D

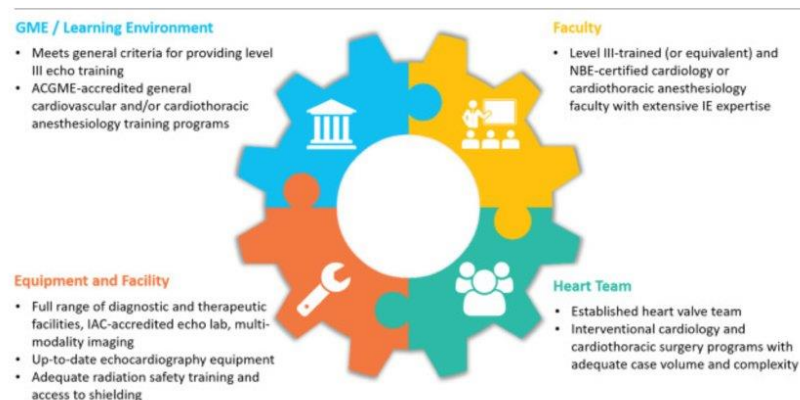
- #Echofirst faculty with #IE capabilities

-Adequate radiation safety training and protective equipment

Table 1 Elements of institutional support for IE training for fellows
<ul style="list-style-type: none">• 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 procedures⁸• 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 cases⁹• Adequate radiation safety training and protective equipment

@nishath_quader:

1. ACGME accredited general training program
- 2 Multidisciplinary valve team
3. Diagnostic/therapeutic facilities
4. Procedural volumes
5. Administrative support to participate in NCDR
6. Up to date echo equipment
7. Faculty performing advanced SHD
8. Radiation safety.



@NadeenFaza: This figure illustrates the key components of a successful #iecho training program.

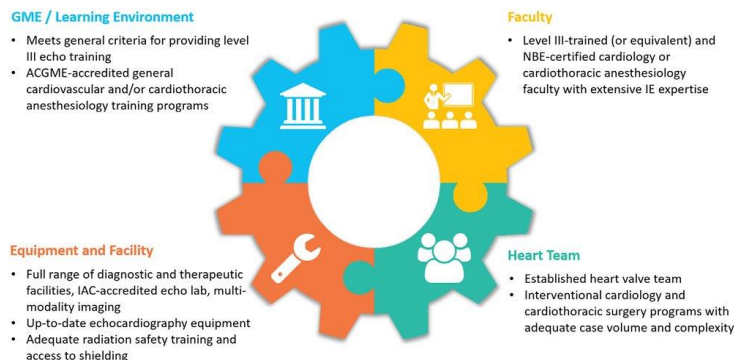
✓ #GME/learning environment

✓ Trained faculty

✓ Equipment and facility

✓ A well established HEART TEAM!

Exposure to a wide range of pathologies and structural procedures is 🔑



@EGarciaSayan: What are the components of a successful IE training program as recommended by new @ASE360 IE training guidelines?


@EGarciaSayan: @gb_mackensen outlines the components of a successful IE training program as recommended by new @ASE360 IE training guidelines.

@gb_mackensen:

1. ACGME-accredited general cardiovascular and/or CT anesthesiology training programs (or international equivalent) that provide exposure to a broad spectrum of patient populations and cardiovascular pathology
2. Support of a multidisciplinary valve team with regularly scheduled multidisciplinary heart team meetings
3. Full range of diagnostic & therapeutic facilities, including ambulatory clinic, cardiac surgery operating room, cardiac catheterization lab, IAC-accredited (or equivalent) echo lab or perioperative echo service, CCT, vascular lab, CMR, and postprocedural recovery
4. CT surgery program and interventional cardiology program with appropriate procedural range and volume to support structural heart procedures
5. Administrative support to monitor performance and benchmark measures and ensure participation in the NCDR
6. 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
7. Cardiology or cardiothoracic anesthesiology faculty members capable of performing and teaching advanced echocardiographic imaging for structural cases
8. Adequate radiation safety training and protective equipment

Question 6:

Question 6 #ASEchoJC

ASE
AMERICAN SOCIETY OF
ECHOCARDIOGRAPHY
LEVEL 3 ECHO LIVE

What procedural numbers are needed to achieve the level III-IE training requirement?

05/09/23 @gb_mackensen @nishath_quader @EGarciaSayan @NadeenFaza @purviparwani

A6 Notable responses

@EGarciaSayan: 🌟 Question 6 #ASEchoJC: What procedural numbers are needed to achieve the level III-IE training requirement?

@EGarciaSayan:

- ▲ Minimum procedural numbers recommended by 2019 ATS were reproduced
- ▲ General guidance and absolute minimum
- ▲ Additional # likely needed for complex cases and novel devices
- ▲ Competency assessment is not based on numbers

Table 5 Minimum procedural volume typically necessary for development of level III echocardiography competencies ³		
Type of procedure	Number performed	Change beyond level
TTE, performed	150	Represents no change beyond level II
TTE, interpreted	750	Represents an additional 450 studies beyond level II
TEE, performed and interpreted	150*	Represents an additional 100 studies beyond level II
3D echocardiography		
For valve disease, rendering/image manipulation	50 (TEE or TTE)	
For ventricular volumes, function, ejection fraction	50 (TTE)	
Contrast echocardiography	100 (TTE)	
Strain and strain rate quantification	50	
Stress echocardiography: includes 50 studies for noncoronary indications, of which 25 should be to assess severity of valvular disease	200	Represents an additional 100 studies beyond level II

*TEE performed for IE training should consist of studies to evaluate complex structural disease, including severe single or multivalvular heart disease, screening, and/or guidance of structural heart cases.

@nishath_quader: Minimum procedural volume but focus is also on competencies

Table 8. Minimum procedural volume typically necessary for the development and demonstration of level III IE³

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
ICE	10

@EGarciaSayan: Totally agree! "A core principle [...] 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"

raphers. This document provides the minimum competencies and standards for training institutions to design high-quality programs and for individuals pursuing IE training to understand basic procedural and knowledge-based benchmarks. A core principle of each training program 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.

@gb_mackensen: this table outlines the expectations for numbers. Admittedly, this was a more challenging task to identify the right set of expectations and meet those of other regulatory organizations and overall consensus.

Table 8 Minimum procedural volume typically necessary for the development and demonstration of level III IE³

Procedure/technical skill	Number*
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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
ICE	10

@EGarciaSayan: A challenging task indeed, and perhaps a moving target. Also see the recent ACC-AHA-SCAI ATS for IC which outline specific procedural numbers including 50 TAVR and 20 mitral TEER. Will procedural requirements for imager continue to evolve? #ASechoJC

📄 https://jacc.org/doi/10.1016/j.jacc.2022.11.002?_ga=2.249322180.231932347.1683671432-121033613.1683671432

CVD Fellowship (3 years)	<p>Required: Level I competency in all aspects of cardiovascular medicine Level II competency in diagnostic cardiac catheterization (6 months and a minimum of 300 procedures) to pursue Interventional Cardiology training</p> <p>Optional: Level II competency in other selected specialty areas based on career focus (Refer to ACC Core Cardiovascular Training Statement for details)</p>		
Interventional Cardiology Fellowship (+1 year)	<p>Required: Competency in coronary interventions</p> <p>Optional: Competency in limited specialty areas within peripheral vascular and/or structural heart interventions</p> <table border="1"> <tr> <td> <p>250 interventional procedures</p> <ul style="list-style-type: none"> • 200 PCI procedures • 50 additional coronary, peripheral vascular, or structural heart procedures, based on career focus </td><td> <p>50 adjunctive procedures</p> <ul style="list-style-type: none"> • 25 coronary physiology procedures • 25 intracoronary imaging procedures </td></tr> </table>	<p>250 interventional procedures</p> <ul style="list-style-type: none"> • 200 PCI procedures • 50 additional coronary, peripheral vascular, or structural heart procedures, based on career focus 	<p>50 adjunctive procedures</p> <ul style="list-style-type: none"> • 25 coronary physiology procedures • 25 intracoronary imaging procedures
<p>250 interventional procedures</p> <ul style="list-style-type: none"> • 200 PCI procedures • 50 additional coronary, peripheral vascular, or structural heart procedures, based on career focus 	<p>50 adjunctive procedures</p> <ul style="list-style-type: none"> • 25 coronary physiology procedures • 25 intracoronary imaging procedures 		
Additional Training*	<p>Required: Expertise in career focus areas through competencies and breadth of procedural experience, as defined in Tables 1-4 and Figure 2</p> <p>Procedural numbers by career focus of choice within each specialty area:</p> <table border="1"> <tr> <td> <p>Peripheral Vascular Interventions:</p> <ul style="list-style-type: none"> • 100 diagnostic/50 interventional peripheral artery interventions (PAIs); half as primary operator • 25 carotid stents (13 as primary operator) • 20 endovascular aortic aneurysm repairs (in addition to required PAI numbers) • 20 peripheral venous interventions (minimum of 5 cases of any individual procedure, in addition to required PAI numbers) </td><td> <p>Structural Heart Interventions:</p> <ul style="list-style-type: none"> • 50 transcatheter aortic valve replacements with 25 as primary operator • Foundation of 50 lifetime transcatheter structural heart procedures, including minimum 20 transseptal procedures (10 as primary operator) through an intact septum (ie, non-PFO), in addition to: <ul style="list-style-type: none"> * 20 transcatheter mitral valve edge-to-edge repairs * 15 atrial septal defect closures * 12 patent foramen ovale closures * 10 left atrial appendage closures * 5 mitral balloon valvuloplasties • ACHD interventions in addition to foundational IC numbers (see Table 4) </td></tr> </table> <p><i>Numbers in this figure reflect the minimum experience required to achieve the competencies defined in Tables 1 and 2. See Section 4.2.1. for additional details.</i></p>	<p>Peripheral Vascular Interventions:</p> <ul style="list-style-type: none"> • 100 diagnostic/50 interventional peripheral artery interventions (PAIs); half as primary operator • 25 carotid stents (13 as primary operator) • 20 endovascular aortic aneurysm repairs (in addition to required PAI numbers) • 20 peripheral venous interventions (minimum of 5 cases of any individual procedure, in addition to required PAI numbers) 	<p>Structural Heart Interventions:</p> <ul style="list-style-type: none"> • 50 transcatheter aortic valve replacements with 25 as primary operator • Foundation of 50 lifetime transcatheter structural heart procedures, including minimum 20 transseptal procedures (10 as primary operator) through an intact septum (ie, non-PFO), in addition to: <ul style="list-style-type: none"> * 20 transcatheter mitral valve edge-to-edge repairs * 15 atrial septal defect closures * 12 patent foramen ovale closures * 10 left atrial appendage closures * 5 mitral balloon valvuloplasties • ACHD interventions in addition to foundational IC numbers (see Table 4)
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* Training time required is dependent on number of specialty focus areas within PVI and/or SHI

After Level II competency is acquired during CVD Fellowship, procedural experience in PVI or SHI may be counted towards minimum volume requirements for procedural competency in selected areas of career interest. Additional training may therefore occur before, during, or after completion of IC Fellowship training.

@gb_mackensen: To elaborate a bit, the recent CMS NCD memo for TEER states that a qualified IC should have professional experience of 50 SHD procedures or 30 left-sided SH procedures/year with participation in 20 career transseptal interventions, with 10 as primary or coprimary operator.

@iamritu: While minimal procedural volumes for level III IE competency are 75, > 200 likely beneficial for more experience especially given complex valve cases & indication creep

Table 8 Minimum procedural volume typically necessary for the development and demonstration of level III IE³

Procedure/technical skill	Number*
Echocardiographic guidance of interventional procedures, [†] which include	75
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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
ICE	10

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

Medical knowledge
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • 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, single-leaflet 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

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

@purviparwani: General competencies for #IE trainee

- Know the #echofirst physics
- know doppler echo
- Get comfortable with standard views
- Get comfortable with 3D views
- Identify the complications
- learn how to COMMUNICATE perioperatively

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 assessment¹¹
- Skill to independently perform comprehensive diagnostic or perioperative 2D, 3D, and Doppler TEE^{12,13}
- Skill to independently perform 3D transesophageal echocardiographic image acquisition, cropping, and postprocessing¹⁴
- Skill to identify the potential complications of and how to manage them¹²
- Skill to effectively communicate detailed information on cardiac anatomy periprocedurally and intraprocedurally in addition to collaborating in interdisciplinary cardiovascular care teams

@nishath_quader: note the competencies for IE training

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 assessment¹¹
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- Skill to independently perform 3D transesophageal echocardiographic image acquisition, cropping, and postprocessing¹⁴
- Skill to identify the potential complications of and how to manage them¹²
- Skill to effectively communicate detailed information on cardiac anatomy periprocedurally and intraprocedurally in addition to collaborating in interdisciplinary cardiovascular care teams

@AntonioBarros_: "It is emphasized that this table represents the minimal numbers of procedures in each type of SHD intervention. Additional numbers of supervised procedures are likely needed for complex cases and novel devices." pg355

Table 8 Minimum procedural volume typically necessary for the development and demonstration of level III IE³

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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
ICE	10

@NadeenFaza: It is important to remember that there are no data to relay the optimal number of procedures, as per this document. This table represents the minimal number of procedures. Again, the focus is on competencies rather than mere numbers.

@EGarciaSayan: Indeed, the writing group was clear about the fact that these numbers are just general guidance and absolute minimum, additional # likely needed for complex cases and novel devices, and that competency assessment is not solely based on numbers.

MINIMAL PROCEDURAL VOLUME FOR COMPETENCY IN IE

There are no data that relay the optimal number of procedures needed for an interventional echocardiographer to gain expertise in SHD imaging. This is due in part to the rapidly evolving nature of the field, with new devices and imaging technology constantly emerging. The minimal procedural volumes for level III IE competency are suggested in the ATS document and are reproduced in Table 8. It is emphasized that this table represents the minimal numbers of procedures in each type of SHD intervention. Additional numbers of supervised procedures are likely needed for complex cases and novel devices.

@DavidWienerMD: Highlighting the difference between competence and proficiency

@jumakoush: Very nice 🙏 thank you for sharing

Question 7:

Question 7 #ASEchoJC

ASE

Since not every center has an equal number of complex cases, how can ongoing expertise be ensured?

05/09/23 @gb_mackensen @nishath_quader @EGarciaSayan @NadeenFaza @purviparwani

A7 Notable responses

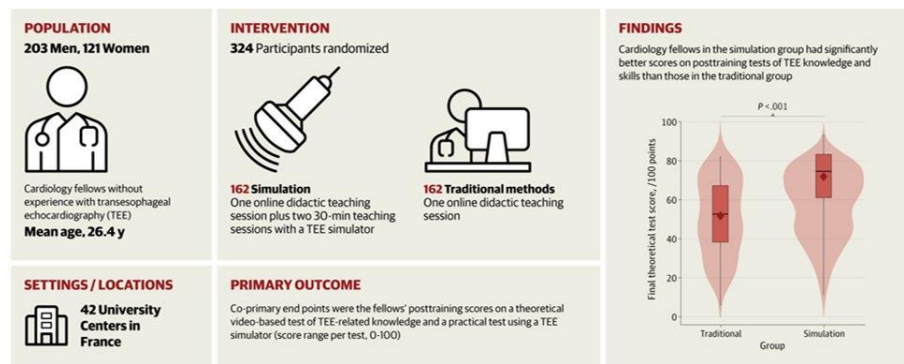
@EGarciaSayan: 🌟 Question 7 #ASEchoJC: Since not every center has an equal number of complex cases, how can ongoing expertise be ensured?

@EGarciaSayan:

- ▲ Exposure to an adequate number, variety & complexity of procedures and devices is needed
- ▲ Can simulation training help flatten the curve?
- ▲ See recent RCT by Pezel et al (diagnostic TEE)

👉 <https://jamanetwork.com/journals/jamacardiology/article-abstract/2800011>

RCT: Effectiveness of Simulation-Based Training on Transesophageal Echocardiography Learning



Pezel T, Dreyfus J, Mouhat B, et al. SIMULATOR Investigators. Effectiveness of simulation-based training on transesophageal echocardiography learning: the SIMULATOR randomized clinical trial. JAMA Cardiol. Published online January 11, 2023. doi:10.1001/jamacardio.2022.5016

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@SIwa23288585: 🇯🇵循環器専攻医シミュレーション指導

👉導入により専門医知識スキル熟練度自己評価👉大幅向上🎉

👉プログラム完了必要な時間短縮

📌シミュレーション トレーニング専攻医教育必須

Thank you @ASE360 🍀🍀🍀

@iamritu: Simulation/VR and visiting high volume centers to observe & learn tele echo or tele echo proctoring? bit.ly/3pv41Cc

Why remote proctoring?

- Save costs
- Travel time
- Reduce CO2 footprint
- enhanced (technical) training options (i. e. annotations of OR situs)

Obvious benefit during a PANDEMIC!

Does allow for other applications:

- Resident/students teaching
- Cost efficient production of Livebox cases
- Webinar to share with other surgeons
- Expert surgeon counselling (including on-call situations etc.)

How to facilitate?

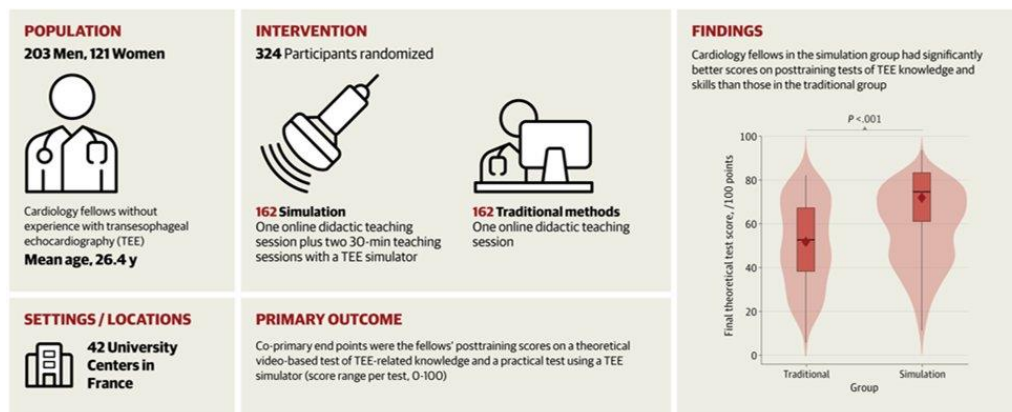
Through European based certified servers to comply with EU data protection laws



@EGarciaSayan: Can simulation training help flatten the curve? See recent RCT by Pezel et al (diagnostic TEE, not #iEcho but same principles may apply as technology continues to evolve) #ASEchoJC

<https://jamanetwork.com/journals/jamacardiology/article-abstract/2800011>

RCT: Effectiveness of Simulation-Based Training on Transesophageal Echocardiography Learning



Pezel T, Dreyfus J, Mouhat B, et al; SIMULATOR Investigators. Effectiveness of simulation-based training on transesophageal echocardiography learning: the SIMULATOR randomized clinical trial. *JAMA Cardiol*. Published online January 11, 2023. doi:10.1001/jamacardio.2022.5016

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@purviparwani: If you don't have enough cases at your home institute - @ASE360 Scientific session @ACCinTouch with multiple sessions with discussion of #Complex Case

- Live cases at #TCT and #TVT incredibly useful

- High rise in structural publications. Read about area of your niche and learn from others.

@NadeenFaza: As the field rapidly evolves, the learning and training never stops! Great resources 📌 #iecho

@EGarciaSayan: indeed, in this era of information overload, IE trainees need to know where to look. Multiple sources for education, experience and sharing of ideas may exist outside of your home institution.

@nishath_quader: The field will continue to evolve. The IE needs to actively seek out every learning opportunities and be creative: be methodical with valve/structural/3D echo, seek out industry partners for courses/learning opportunities, attend courses by ASE with SHD focus


@gb_mackensen: tee-masterclass.de is one excellent additional learning opportunity! Virtual or in person in Leipzig! <https://tee-masterclass.de/>

@EGarciaSayan: Since not every center has an equal number of complex cases, how can ongoing expertise be ensured? Different learning pathways and opportunities, industry involvement, simulation training, etc.

@gb_mackensen: Many SH companies are also very keen to support IE training and will potentially offer in house training or arrange for travel to an expert site to obtain additional experience. In addition, consider LIVE courses that support IE training such as @ASE360 Scientific sessions.

Question 8:

Question 8 #ASEchoJC



Beyond knowledge of echocardiography, what are specific competencies an interventional echocardiographer needs to master to work in the cath lab effectively?

05/09/23 @jb_mackensen @rihath_quader @EGarciaSayan @NadeenFaza @purvipanwani

A8 Notable responses

@EGarciaSayan: 🌟 Question 8 #ASEchoJC: Beyond knowledge of echocardiography, what are specific competencies an interventional echocardiographer needs to master to work in the cath lab effectively?

@NadeenFaza: The language! Communication is pivotal. Procedural knowledge allows for effective communication.

@EGarciaSayan:

- ▲ Many general competencies (outlined in Table 7) go beyond imaging skills
- ▲ Know the device being implanted
- ▲ Know & anticipate procedural steps & fluoroscopic landmarks
- ▲ Communication & teamwork
- ▲ Radiation safety

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

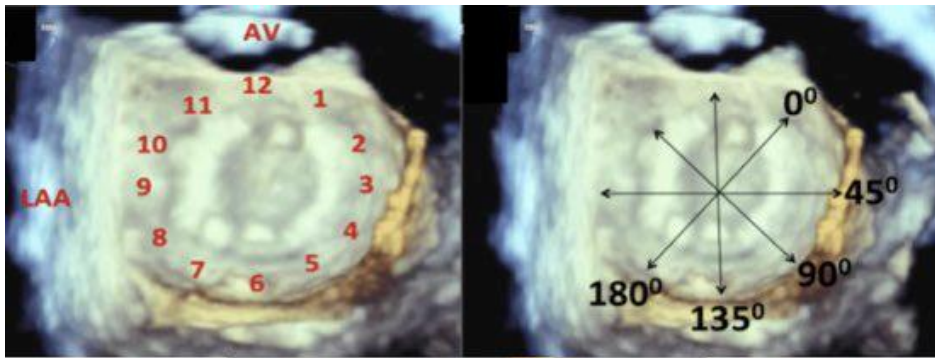
- Skill to appropriately apply the use of 2D and 3D imaging and Doppler hemodynamics, as well as 3D MPR, for preprocedural assessment of SHD
- Skill to appropriately and expeditiously apply the use of 2D and 3D imaging and Doppler hemodynamics, as well as 3D MPR, for intraprocedural guidance
- Skill 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

@gb_mackensen: The IE needs to learn to be factual, differentiate quickly between artifact and actual findings, use all imaging modalities to prepare the most informed & clear communication, and always be willing to learn & improve. "Everyday is a learning day!"

@iamritu: Learning to speak the same language as the IC is key 🔑 Both should know the procedural requirements, which specific parameters to monitor, & what incremental diagnostic info #Echofirst TEE or fluoroscopy may provide during each step

<http://bit.ly/3BaQcLt> #ASEchoJC

🍅 tomato



@nishath_quader: totally agree, effective communication is a core principle of effective teamwork as part of a heart-team approach, and a key competency to achieve Level III-IE training

@rajdoc2005: I can't emphasize this point any more! This is EVERYTHING!!! More important than just being able to take "pretty pictures" IMHO ..

@nishath_quader: The IE not only needs to master echo, but also speak the same language as the implanters, anesthesiologists, staff: communication is key. They also need to know hemodynamics, basic fluoroscopic views, wires/catheters used, knowledge about radiation safety

@EGarciaSayan: Beyond knowledge of echocardiography, what are specific competencies an interventional echocardiographer needs to master to work in the cath lab effectively?

@gb_mackensen: IE should really know the technology that is being used to treat the patient. Train alongside your IC colleagues!

Question 9:

Question 9 #ASEchoJC

ASE
American Society of
Echocardiography
ESTD 1969

Given the expansion of the procedure and complexity involved, does an interventional echocardiographer require knowledge of multimodality imaging? Intracardiac echocardiography?

05/09/23 @gb_mackensen @nishath_quader @EGarciaSayan @NadeenFaza @purviparwani

A9 Notable responses

@EGarciaSayan: 🌟 Question 9 #ASEchoJC: Given the expansion of the procedure and complexity involved, does an interventional echocardiographer require knowledge of multimodality imaging? Intracardiac echocardiography?

@EGarciaSayan:

▲ IE must understand the role and uses of multimodality imaging, whether they interpret it or not

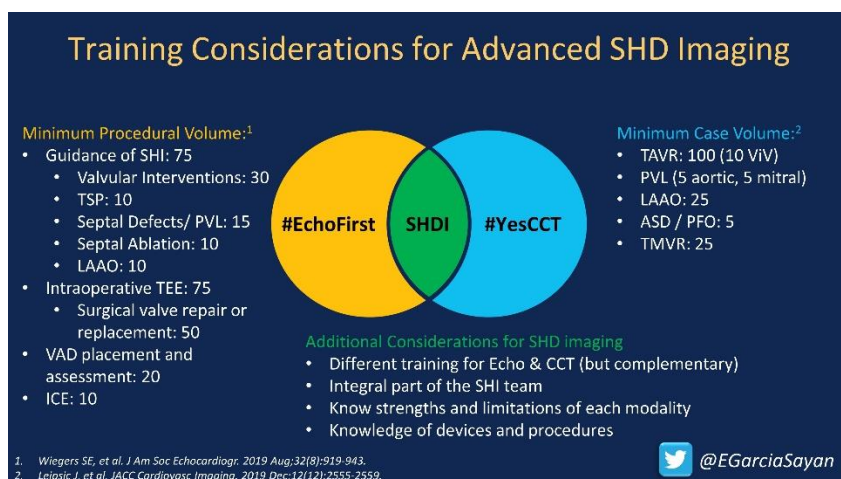
▲ Key for sizing & planning transcatheter valve replacement

👉 See #YesCCT consensus by @JonathonLeipsic et al:

<https://sciencedirect.com/science/article/pii/S1936878X19309556?via%3Dihub>

@rajdoc2005: Great point! Same think for the structural interventionist too! They should understand the nuances of multimodality imaging - even if they are not the imager or "reading" them.

@EGarciaSayan: Understanding multimodality imaging is key for IE (cardiologists & anesthesiologists). Here's a slide from recent talk at @scahq #EchoWeek where @nicoa002 & @charles_nyman asked the question: is it a unique skillset? Thoughts



@tiffchenMD: Unique skillset because of paucity of formalized training programs and multidisciplinary nature of the field. Need to translate individual expertise to standards/best practice and leverage the strengths of each discipline. Breaking the silos will be the way to propel

@OKhaliqueMD: No question it's a unique skillset. Must know step by step procedures with significant procedural knowledge nearly on par with invasive operator. Device characteristics, materials, equipment. As new devices commonly are researched and roll out, must also learn how to learn ...

@OKhaliqueMD: new procedures. Incorporating a new procedure into the framework of #SHDimaging #iecho #echofirst #yesCCT knowledge is a critical and lesser talked about aspect of the field. Also, communication on par with IC and surgeon - active rather than passive (diagnostic) imaging...

@OKhaliqueMD: Very different than anything that has come before. 10 years after my mentors @MartyBLEon and @hahn_rt defined the interventional imager, the construct continues to be misunderstood

@EGarciaSayan: There is an evolving role of 3D ICE imaging during THI. Many questions have emerged, including best practices, workflow & compensation models. @ASE360 recently established ICE task force led by @saricmu & @MarkusSchererMD to address some of these important questions.

@iamritu: Need MMI, particularly #yesCCT, for pt evaluation & preprocedural planning esp w challenges

bulky LVOT & leaflet calcification

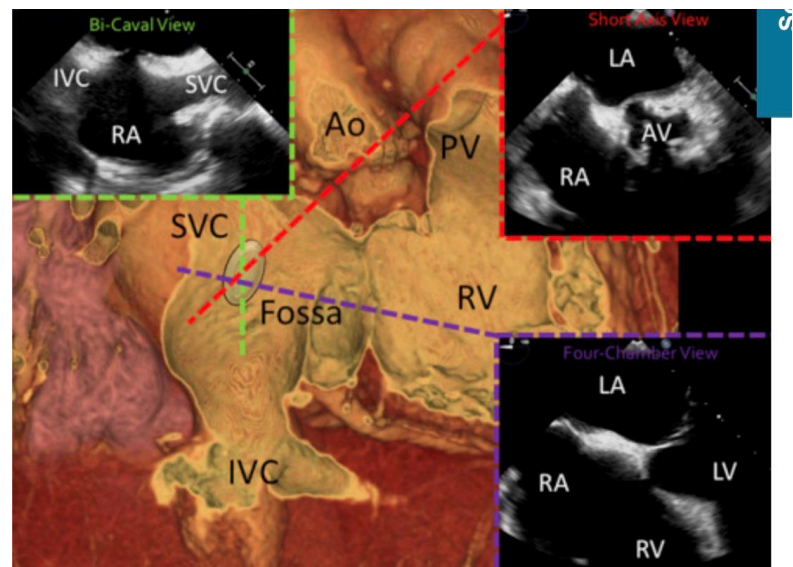
bicuspid AV w asymmetric calcification

<http://bit.ly/3nNt6aQ>

ICE is evolving limited by physics like #echofirst

<http://bit.ly/3HW3orn>

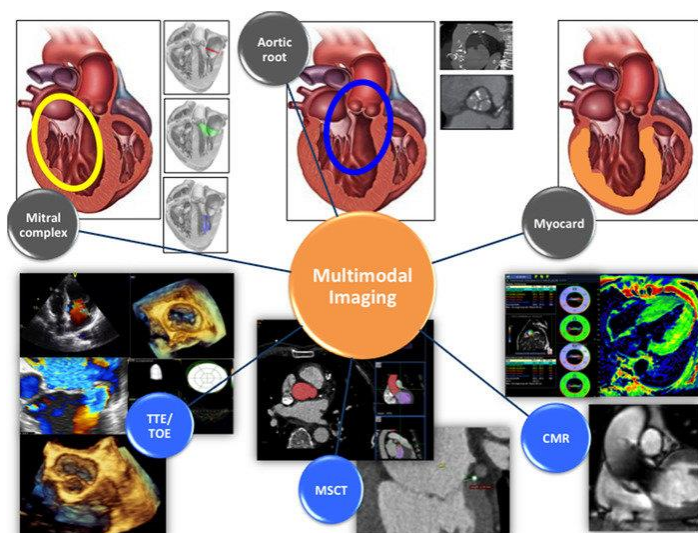
Advantages of ICE	Disadvantages of ICE
<ul style="list-style-type: none"> • No acoustic shadowing from other intracardiac devices • No acoustic shadowing of the clip delivery system • Alternative if TEE is contraindicated • Shorter procedure times and with faster turnaround • No general anesthesia needed • Hemodynamics not influenced by anesthetic drugs and mechanical ventilation 	<ul style="list-style-type: none"> • Second venous access needed • Instability of probe during intervention • Additional cost of the ultrasound catheter • Learning curve



@purviparwani:

-> Multimodal imaging utilizing several techniques provides added value in terms of procedural planning and efficacy by combining the individual strength of each imaging modalities. #Echofirst #whyCMR #yesCCT

-> Unlike CT surgery, we cannot "SEE" whats going on around the areas of interest. #multiplanar imaging and having the knowledge to put it all together is FUN and helpful to the team.

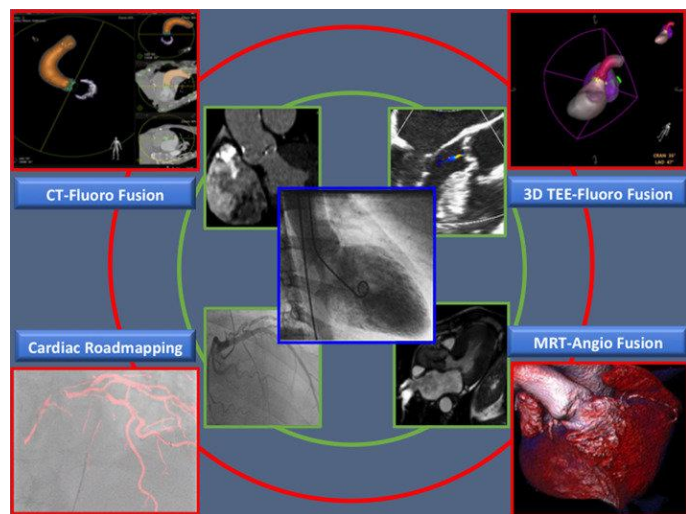


@NadeenFaza: Choosing the right test for the right patient and the right indication requires knowledge of the strengths & limitations of different imaging modalities! In addition, fusion images intraop can be very helpful in guiding interventions!

@purviparwani:

- > Fusion imaging as combined "hybrid" procedure of several imaging modalities has real potential in future
- > multi-dimensional view with an excellent spatial resolution and anatomic orientation.

The "anatomical intelligence" is helpful beyond the heart model-derived heart valve construction and individual anatomic conformation.



@nishath_quader: CT for annular, neoLVOT, vascular sizing; knowledge of CT important for IE. cMRI for valve assessment: IE should know limitations/advantages. With increasing interest in ICE/SHD, the IE will play an integral role; important to familiarize with ICE as the field expands

@OKhaliqueMD: Yes, current trainees should learn #iecho and #yesCCT . These are "bread and butter" for the expert #iecho imager. #ICE as well - many of our procedural colleagues are not imaging experts and still need guidance no matter who is manipulating the #ICE catheter...

@OKhaliqueMD: @adnanalkhouli showed the need for #noleaks with #LAO requiring careful 2D and 3D evaluation. Need live 3D MPR for #TEER and #TMVR #TTVR regardless of TEE or ICE being used.

@EGarciaSayan: @OKhaliqueMD on the need for Interventional Echocardiography training to include concepts of #YesCCT and #ICE

@gb_mackensen: Undoubtedly the answer is a resound "yes"! Plus, there are growing similarities in the technical abilities of multimodal imaging technologies where it's helpful and informative to understand one modality to extrapolate to another.

@EGarciaSayan: @gb_mackensen on the importance of knowledge of multimodality imaging for interventional echocardiographers

Question 10:

Question 10 #ASEchoJC

ASE
American Society of
Echocardiography
PACIFIC PACIFIC PACIFIC

How can interventional
echocardiographers reduce
radiation exposure?

05/09/23 @gb_mackensen @nishath_quader @EGarciaSayan @NadeenFaza @purviparwani

A10 Notable responses

@EGarciaSayan: 🌟 Question 10 #ASEchoJC: How can interventional echocardiographers reduce radiation exposure? anyone has any experience with #ECHOSAFE? #Echofirst

<https://lemerpax.com/en/products/echosafe-en/>



LEMER PAX

@OKhaliqueMD: Looks amazing!

@iamritu:

▲ lead apron w min lead equiv 0.25 mm back/0.5 mm front

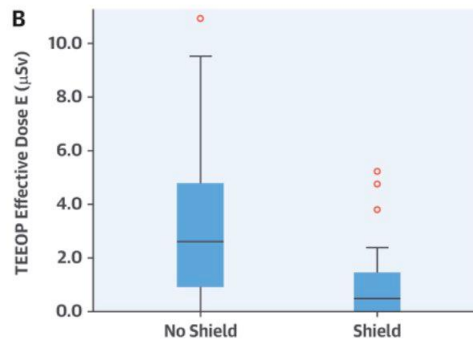
thyroid lead collar

lead goggles

dosimeter regularly monitored

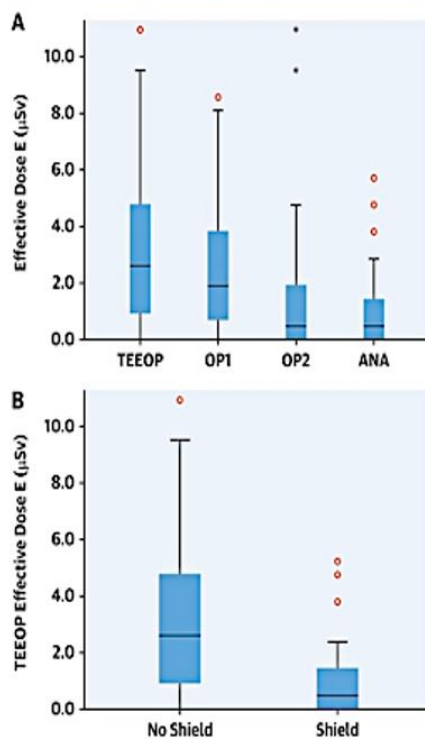
▲ Additional shielding w lead acrylic shield <http://bit.ly/3poHEOA>

0.5-mm lead equiv ceiling suspended or mobile one ↓ ↓ radiation exposure to IE



Crowhurst, J.A. et al. J Am Coll Cardiol. 2018;71(11):1246-54.

@nishath_quader: @jaccjournals <https://jacc.org/doi/10.1016/j.jacc.2018.01.024#.ZFrMDCyVoRA.twitter>
#ASEchoJC-Shielding versus no shielding for IE



Crowhurst, J.A. et al. J Am Coll Cardiol. 2018;71(11):1246-54.

@nishath_quader: Radiation safety is paramount for the IE. Radiation glasses, dosimeter, properly fitted lead, appropriate and ergonomically feasible shielding is necessary for the IE during these cases

@RezaEmaminia: Curious to know what radiation shields each of you use? Would be great if you can post pictures

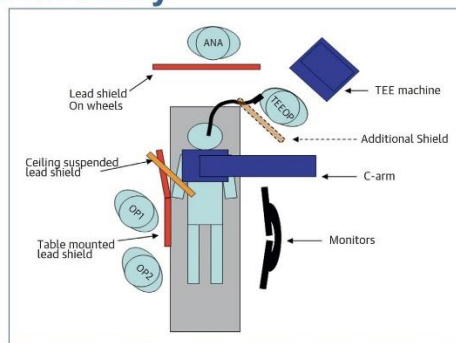
@NadeenFaza: Distance is your friend when it comes to radiation ☢️. Knowing the procedural steps allows one to know when active imaging is required and when it's not.

Radiation pads and shields also help mitigate the risk.

Shield the back! Unlike IC, our backs are exposed to ☢️

@gb_mackensen: Distance, use more echo rather fluoroscopy & effective shielding!

IE and patient safety



A As
L Low
A As
R Reasonably
A Achievable

Radiation Exposure of Operators
Performing Transesophageal
Echocardiography During Percutaneous
Structural Cardiac Interventions

Operator and patient safety: radiation

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Radiation Exposure of Operators Performing Transesophageal Echocardiography During Percutaneous Structural Cardiac Interventions



James A. Crowhurst, BSc (Hons),^{a,b} Gregory M. Scalia, MBBS, MMSc,^{a,b} Mark Whitby, MSc, PhD,^c
Dale Murdoch, MBBS,^{a,b} Brendan J. Robinson, BSc,^a Arianwen Turner, BSc,^a Liesie Johnston, BSc,^a
Swaroop Margale, MBBS,^a Sarvesh Natani, MBBS, MD,^a Andrew Clarke, MBBS,^a Darryl J. Burstow, MBBS,^{a,b}
Owen C. Raffel, MB,^{a,b} Darren L. Walters, MBBS, MPhil,^{a,b}

@EGarciaSayan: Question 10 #ASEchoJC: How can interventional echocardiographers reduce radiation exposure? @gb_mackensen on the importance of distance, limiting fluoro and effective shielding.

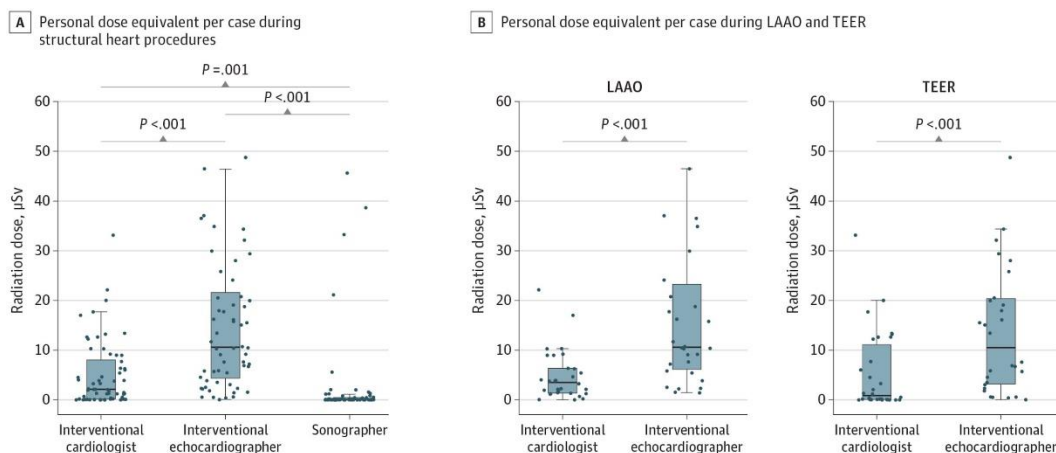
@puravmody: 1/2 I think this is also a culture issue, where staff need to be educated that Interventional imagers need protection too. When requesting for basic additional shields comes across as trying to make unreasonable demands.

@puravmody: 2/2 i also worry about occupational injuries, holding un ergonomic postures for long time especially regarding critical step. IMHO, need to take care of yourself to prevent long term injuries

@nishath_quader: I am sorry you experienced that. My experiences have been different...you still have to advocate for yourself

@davidmcnam: Important to advocate for interventional echocardiographers who are at higher risk for radiation exposure than our interventional colleagues during two of the most common structural procedures. An underappreciated risk to many.

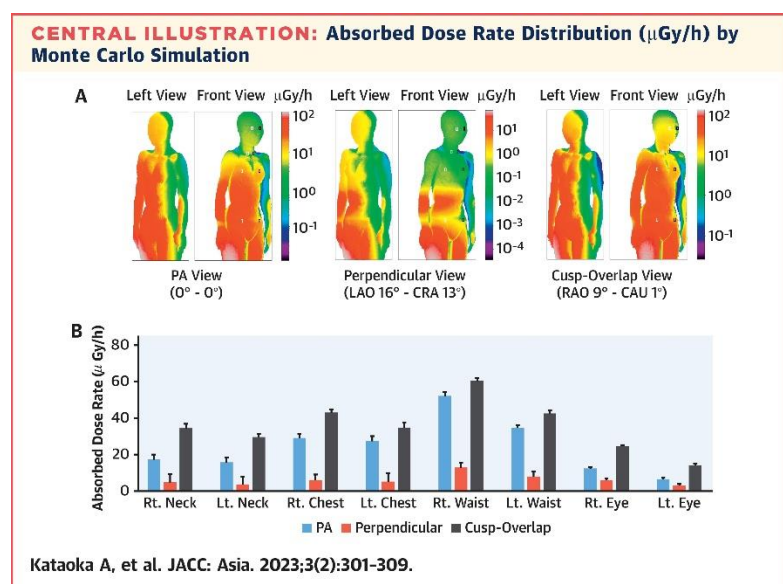




@ElenaGalli10: Pay attention to your exposure during periprocedural echo!

@AntonioBarros_: From @jaccjournals

<https://jacc.org/doi/10.1016/j.jacasi.2022.12.008#.ZFrr4j6gQqo.twitter>



@EGarciaSayan: thank you for sharing this data @AntonioBarros_. Fluoro time and C-arm angles both impact radiation exposure to the IE.

@EGarciaSayan: 🎉 And that's a wrap! Thank you all for participating in tonight's #ASEchoJC on the new #iEcho training guideline w/ our guest authors @gb_mackensen @nishath_quader & 🌟 co-moderators @NadeenFaza & @purviparwani. If you missed anything, you can follow the #ASEchoJC hashtag.



@rajdoc2005: Well done! Great

@EGarciaSayan: Thank you so much for joining @rajdoc2005!

@iamritu: Great job!

@EGarciaSayan: Thank you so much for joining @iamritu and for your excellent comments!

@ase360: Thank you to EVERYONE who participated in tonight's #ASEchoJC! ❤️

Huge shout-outs to our moderators, @purviparwani, @EGarciaSayan and @NadeenFaza, and our guest authors, @nishath_quader and @gb_mackensen!



@EGarciaSayan: Amazing discussion on the new @ASE360 IE training guidelines tonight. Thanks to guest authors @gb_mackensen @nishath_quader & co-moderators @NadeenFaza & @purviparwani. If you missed anything, you can follow the #ASEchoJC hashtag.

@EGarciaSayan: Great discussion on the new @ASE360 IE training guidelines. You can also read our recent article in the April edition of Echo magazine (collaboration w/ @RigolinVera & @saricmu). Look forward to a lively discussion of this important topic during #ASE2023. <https://asecho.org/wp-content/uploads/2023/04/IE-Guideline-article-in-Echo-magazine.pdf>

@DavidWienerMD: Another great #ASEchoJC. Thanks also and a big H/T to the guideline authors and experts in IE who couldn't join tonight: @ASE360 President and Past Presidents @SLittleMD, @RigolinVera and @JudyHungMD; also @MDMankad @hahn_rt @saricmu

Recommendations for Special Competency in Echocardiographic Guidance of Structural Heart Disease Interventions: From the American Society of Echocardiography



Stephen H. Little, MD, FASE (Co-Chair), Vera H. Rigolin, MD, FASE (Co-Chair), Enrique Garcia-Sayan, MD, FASE, Rebecca T. Hahn, MD, FASE, Judy Hung, MD, G. Burkhard Mackensen, MD, PhD, FASE, Sunil Mankad, MD, FASE, Nishath Quader, MD, FASE, and Muhamed Saric, MD, PhD, FASE, *Houston, Texas; Chicago, Illinois; New York, New York; Boston, Massachusetts; Seattle, Washington; Rochester, Minnesota; and St. Louis, Missouri*

Transcatheter therapies for structural heart disease continue to grow at a rapid pace, and echocardiography is the primary imaging modality used to support such procedures. Transesophageal echocardiographic guidance of structural heart disease procedures must be performed by highly skilled echocardiographers who can provide rapid, accurate, and high-quality image acquisition and interpretation in real time. Training standards are needed to ensure that interventional echocardiographers have the necessary expertise to perform this complex task. This document provides guidance on all critical aspects of training for cardiology and anesthesiology trainees and postgraduate echocardiographers who plan to specialize in interventional echocardiography. Core competencies common to all transcatheter therapies are reviewed in addition to competencies for each specific transcatheter procedure. A core principle is that the length of interventional echocardiography training or achieved procedure volumes are less important than the demonstration of procedure-specific competencies within the milestone domains of knowledge, skill, and communication. (J Am Soc Echocardiogr 2023;36:350-65.)

Keywords: Interventional echocardiography, Structural heart disease, Echocardiography training

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From the Houston Methodist DeBakey Heart and Vascular Center, Houston, Texas (S.H.L.); Northwestern University Feinberg School of Medicine, Chicago, Illinois (V.H.R.); the University of Texas Health Science Center at Houston, Houston, Texas (E.G.-S.); Columbia University Irving College of Medicine, New York, New York (R.T.H.); Massachusetts General Hospital, Boston, Massachusetts (J.H.); the University of Washington, Seattle, Washington (G.B.M.); the Mayo Clinic, Rochester, MN (S.M.); Washington University, St. Louis, Missouri (N.Q.); and New York University Langone Health, New York, New York (M.S.).

The following authors reported no actual or potential conflicts of interest in relation to this document: Stephen H. Little, MD, Vera H. Rigolin, MD, Enrique Garcia-Sayan, MD, Judy Hung, MD, G. Burkhard Mackensen, MD, PhD, Sunil Mankad, MD, and Muhamed Saric, MD, PhD.

The following authors reported relationships with one or more commercial interests: Rebecca T. Hahn, MD, has received speaker fees from Abbott Structural, Baylis Medical, Edwards Lifesciences, and Philips Healthcare; has institutional consulting contracts for which she receives no direct compensation with Abbott Structural, Boston Scientific, Edwards Lifesciences, Medtronic, and Novartis; and is chief scientific officer for the Echocardiography Core Laboratory at the Car-

diovascular Research Foundation for multiple industry-sponsored tricuspid valve trials, for which she receives no direct industry compensation. Nishath Quader, MD, participates on the speakers' bureau for Abbott.

Reprint requests: American Society of Echocardiography, Meridian Corporate Center, 2530 Meridian Parkway, Suite 450, Durham, NC 27713 (E-mail: ase@asecho.org).

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@EGarciaSayan: Thanks so much for joining tonight's #ASEchoJC @DavidWienerMD, and for your leadership helping to get this document to the finish line. And thanks to the guideline co-chairs @SLittleMD @RigolinVera & amazing writing group, it was an honor to work with such luminaries.