HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Education and Training:
How and who should be trained for a future in transcatheter valve therapies?

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Interventional Cardiology and Structural Heart Disease

MGH 1811
MASSACHUSETTS GENERAL HOSPITAL
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Disclosures

Research grants: AHA, Siemens Healthcare

The CMS National Coverage Determination (NCD) outlines volume qualifications for new TAVR physicians

Hospital Requirements

≥ 50 total AVRs in the previous year prior to TAVR, including ≥ 10 high-risk patients

+

≥ **2 physicians** with cardiac surgery privileges

+

≥ **1,000 catheterizations/Year** including **≥400 PCIs/Year**

Physician Requirements

Cardiac Surgeon

≥ 100 career AVRs incl. 10 high-risk patients; *or*

≥ 25 AVRs in one year; *or*

≥ 50 AVRs in 2 years, including **at least 20 AVRs** in the year prior to TAVR initiation

Interventional Cardiologist

≥100 structural heart procedures lifetime; *or*

≥30 left-sided structural procedures per year of which 60% should be BAV

http://www.cms.gov

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The CMS NCD outlines volume qualifications for new transcatheter mitral repair physicians

Hospital Requirements

≥ 25 total mitral valve surgeries in the previous year, including ≥ 10 MV Repairs

✚

≥ **2 physicians** with cardiac surgery privileges

✚

≥ **1,000 catheterizations/Year** including **≥400 PCIs/Year**

Physician Requirements

Interventional Cardiologist

>50 structural heart procedures annually including ASD/PFO closure and trans-septal punctures

Cardiac Surgeon

Same?

http://www.cms.gov

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Are these requirements adequate?

- Case volume may not reflect technical proficiency given the div
- Case ge of patie
- Skills not transl interv
- Unclear what role the criteria assume the operator will play.

Procedural volume has been the primary concern of new operators.

Have sought OUS & mini-fellowship training programs or initiated basic SHD programs to build case volume.

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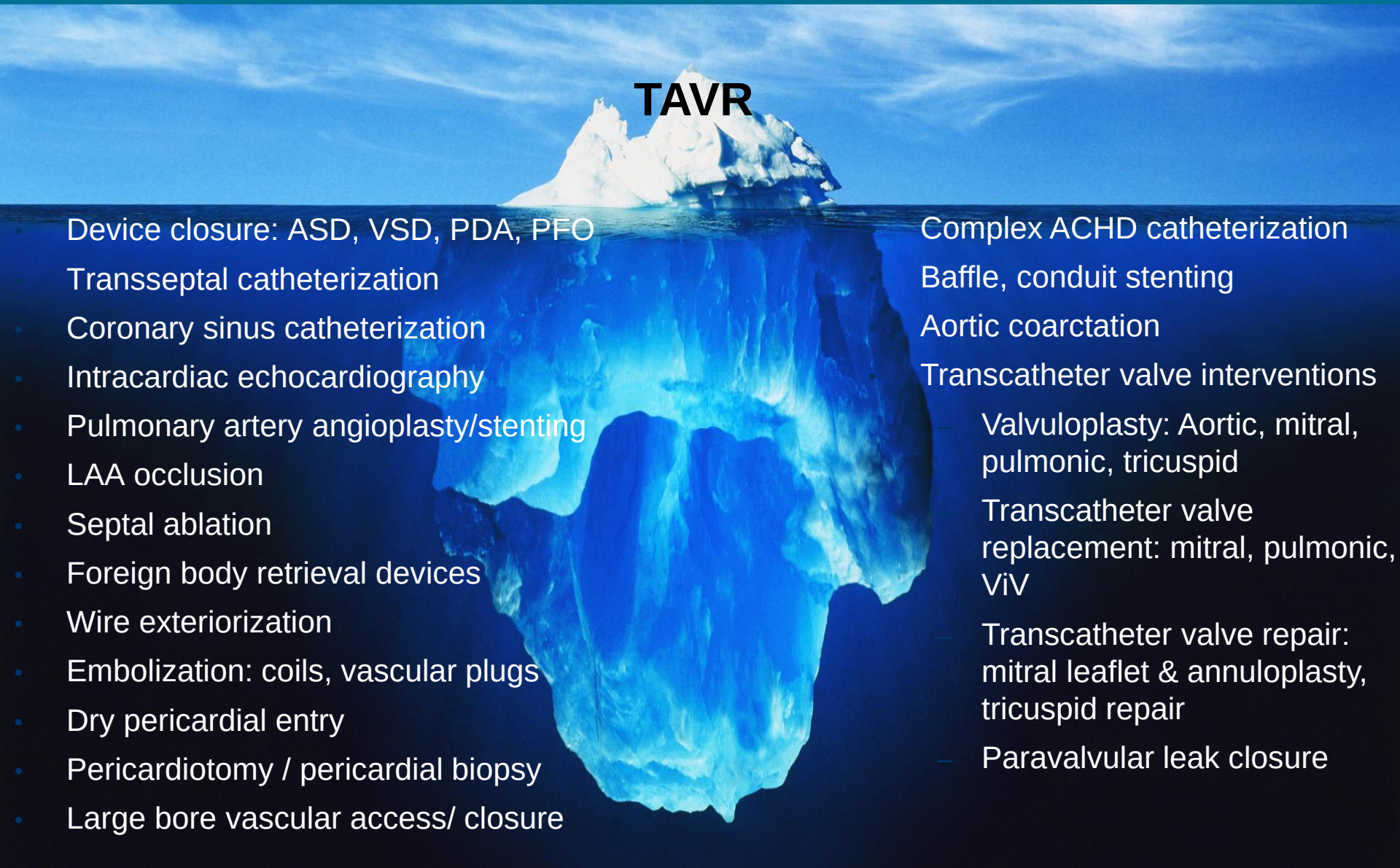
Structural Heart Interventions



- Device closure: ASD, VSD, PDA, PFO
- Transseptal catheterization
- Coronary sinus catheterization
- Intracardiac echocardiography
- Pulmonary artery angioplasty/stenting
- LAA occlusion
- Septal ablation
- Foreign body retrieval devices
- Wire exteriorization
- Embolization: coils, vascular plugs
- Dry pericardial entry
- Pericardiotomy / pericardial biopsy
- Large bore vascular access/ closure

- Complex ACHD catheterization
- Baffle, conduit stenting
- Aortic coarctation
- Transcatheter valve interventions
  - Valvuloplasty: Aortic, mitral, pulmonic, tricuspid
  - Transcatheter valve replacement: mitral, pulmonic, ViV
  - Transcatheter valve repair: mitral leaflet & annuloplasty, tricuspid repair
  - Paravalvular leak closure

Structural Heart Cognitive Knowledge

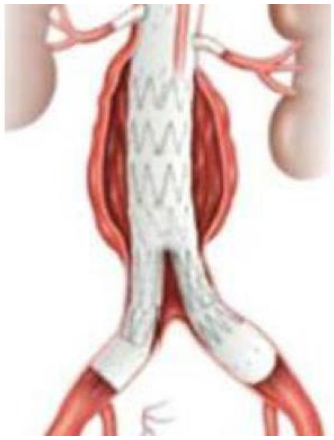
For every structural intervention, one must understand disease-specific:

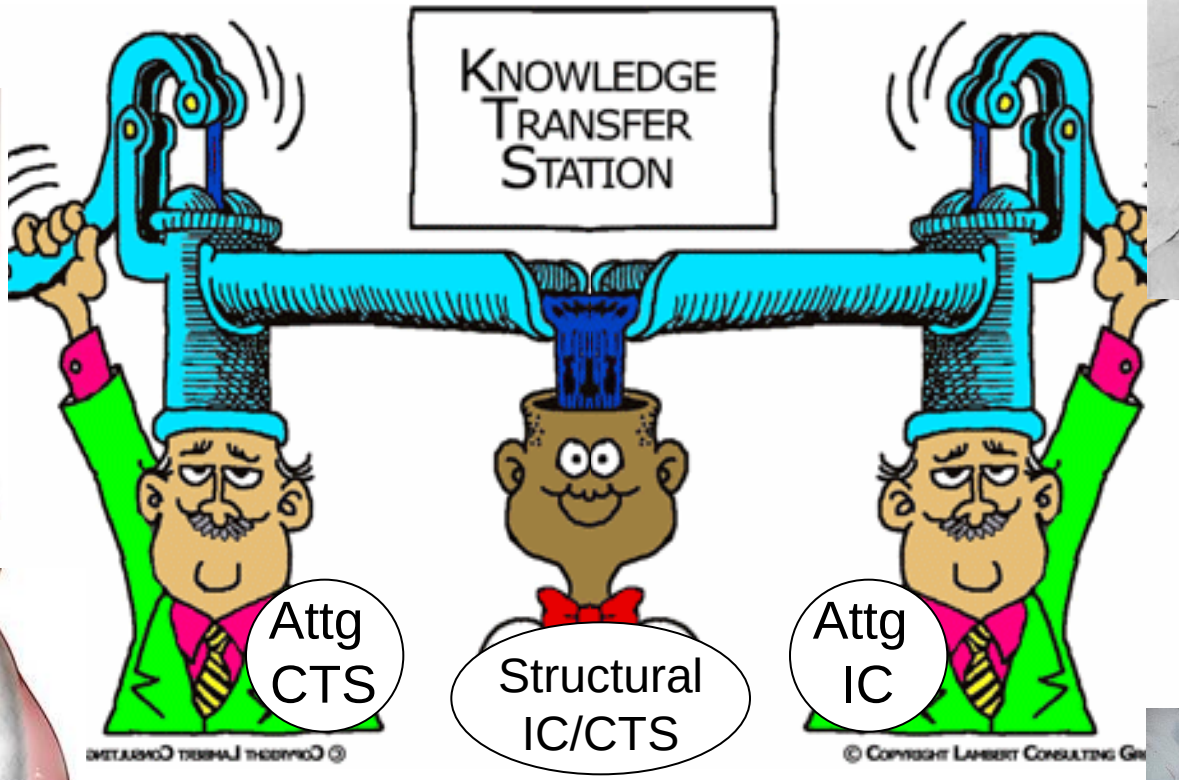
- 3D anatomic relationships
  - Normal anatomy
  - Pathologic variants
- Hemodynamics
- Noninvasive imaging
  - TTE, TEE, 3D TEE
  - Cardiac CT
  - Cardiac MR
- Clinical management options
- Surgical alternatives / techniques
- Device options
- Patient selection
  - Procedural efficacy/limitations
  - Indications for intervention
  - Surgical risk assessment: STS, frailty, anatomic concerns
  - Complications of therapeutic options
- Pre- / Post-procedure care

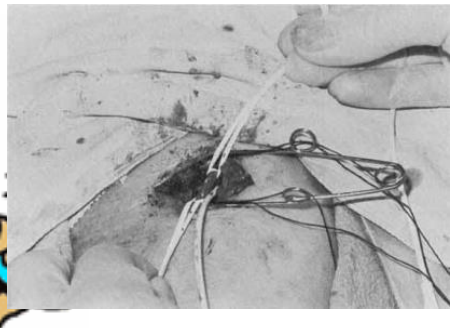
Who do we want doing these procedures?

- Expansion to lower risk patients
- Evolution to include more complex anatomy (mitral/pulmonic/tricuspid)
- Expanding number of devices and techniques

The ideal?







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TCT for Surgeons course will highlight hybrid surgical and interventional techniques

'Emerging Directions for the Cardiothoracic and Vascular Surgeon' to be co-sponsored by the American Association for Thoracic Surgery

CARDIOVASCULAR RESEARCH FOUNDATION

Cardiologists should have basic surgical skills training

Ali Khavandi,[1] Stephen Hamilton,[2] Adam Fitzpatrick,[3] David J Wright,[4] Michael Lewis,[5] Alun Harcombe,[6] Edward Rowland[7]

Heart May 2010 Vol 96 No 10

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Structural Heart Disease Council

The SCAI Structural Heart Disease Council: Toward Addressing Training, Credentialing, and Guidelines for Structural Heart Disease Intervention

Ted Feldman,[1*] MD, FACC, FSCAI, Carlos E. Ruiz,[2] MD, PhD, FACC, FSCAI, and Ziyad M. Hijazi,[3] MD, FACC, FSCAI

Interventional Fellowship in Structural and Congenital Heart Disease for Adults

Carlos E. Ruiz,[1*] MD, PhD, FACC, FSCAI, Ted E. Feldman,[2] MD, FACC, FSCAI, Ziyad M. Hijazi,[3] MD, FACC, FSCAI, David R. Holmes, Jr.,[4] MD, FACC, FSCAI, John G. Webb,[5] MD, FACC, FSCAI, E. Murat Tuzcu,[6] FACC, FSCAI, Howard Herrmann,[7] MD, FACC, FSCAI, and Gerard R. Martin,[8] MD, FACC

Results of the Society of Cardiac Angiography and Interventions Survey of Physicians and Training Directors on Procedures for Structural and Valvular Heart Disease

Howard C. Herrmann,[1*] MD, FACC, FSCAI, Sandra Baxter,[2] PhD, Carlos E. Ruiz,[3] MD, PhD, FACC, FSCAI, Ted E. Feldman,[4] MD, FACC, FSCAI, and Ziyad M. Hijazi,[5] MD, FACC, FSCAI, on behalf of the SCAI Council on Structural Heart Disease

Catheterization and Cardiovascular Interventions 2010 vol 76

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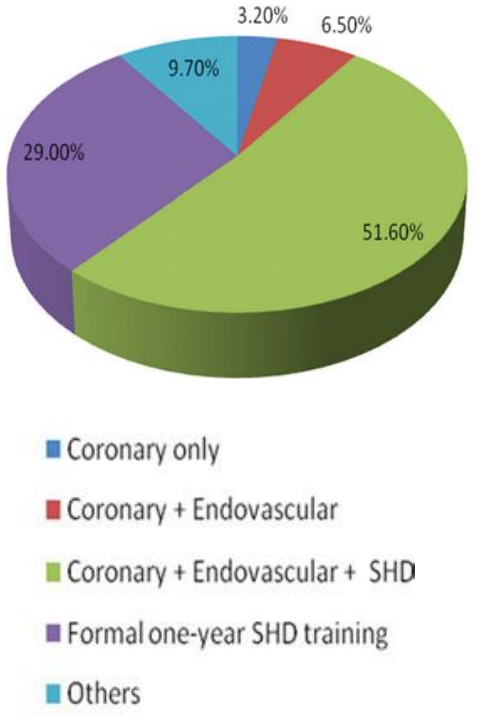
Structural Heart Disease Training Programs

- 86% of programs perform SHD interventions
- Most (52%) integrate structural interventions into 1 or 2 year IC fellowship programs
- Several programs with “advanced IC” training programs that focused on structural and peripheral arterial interventions
- Only 29% offer focused 1 year training in structural heart disease



- None are ACGME accredited

Herrmann et al. Catheterization and Cardiovascular Interventions 2010;76:E106
Marmagkiolos et al. Catheterization and Cardiovascular Interventions 2012;80:706

Structural Heart Disease Training Programs

- **Banner - University Medical Center - Phoenix, Arizona**
- Scripps Clinic - La Jolla, California
- University of California - San Diego, California
- Yale University School of Medicine - New Haven, Connecticut
- University of Miami Miller School of Medicine - Miami, Florida
- Prairie Heart Institute - Springfield, Illinois
- Ochsner Medical Center - New Orleans, Louisiana
- Johns Hopkins Hospital - Baltimore, Maryland
- University of Maryland - Baltimore, Maryland
- Massachusetts General Hospital - Boston, Massachusetts
- Henry Ford Hospital - Detroit, Michigan
- William Beaumont Hospital - Royal Oak, Michigan
- Mayo Clinic - Rochester, Minnesota
- **Minneapolis Heart Institute® at Abbott Northwestern Hospital - Minneapolis, Minnesota**
- University of Minnesota - Minneapolis, Minnesota
- Washington University - St. Louis, Missouri
- Dartmouth-Hitchcock Medical Center - Lebanon, New Hampshire
- Rutgers Robert Wood Johnson Medical School - New Brunswick, New Jersey
- Duke University - Durham, North Carolina
- **Lankenau Medical Center - Wynnewood, Pennsylvania**
- Brown Medical School - Providence, Rhode Island
- Methodist DeBakey Heart and Vascular Center - Houston, Texas
- Carilion Clinic - Roanoke, Virginia
- University of Washington - Seattle, Washington

Out of 136 ACGME-accredited IC training programs.

BOLD denotes IC and/or surgeons accepted

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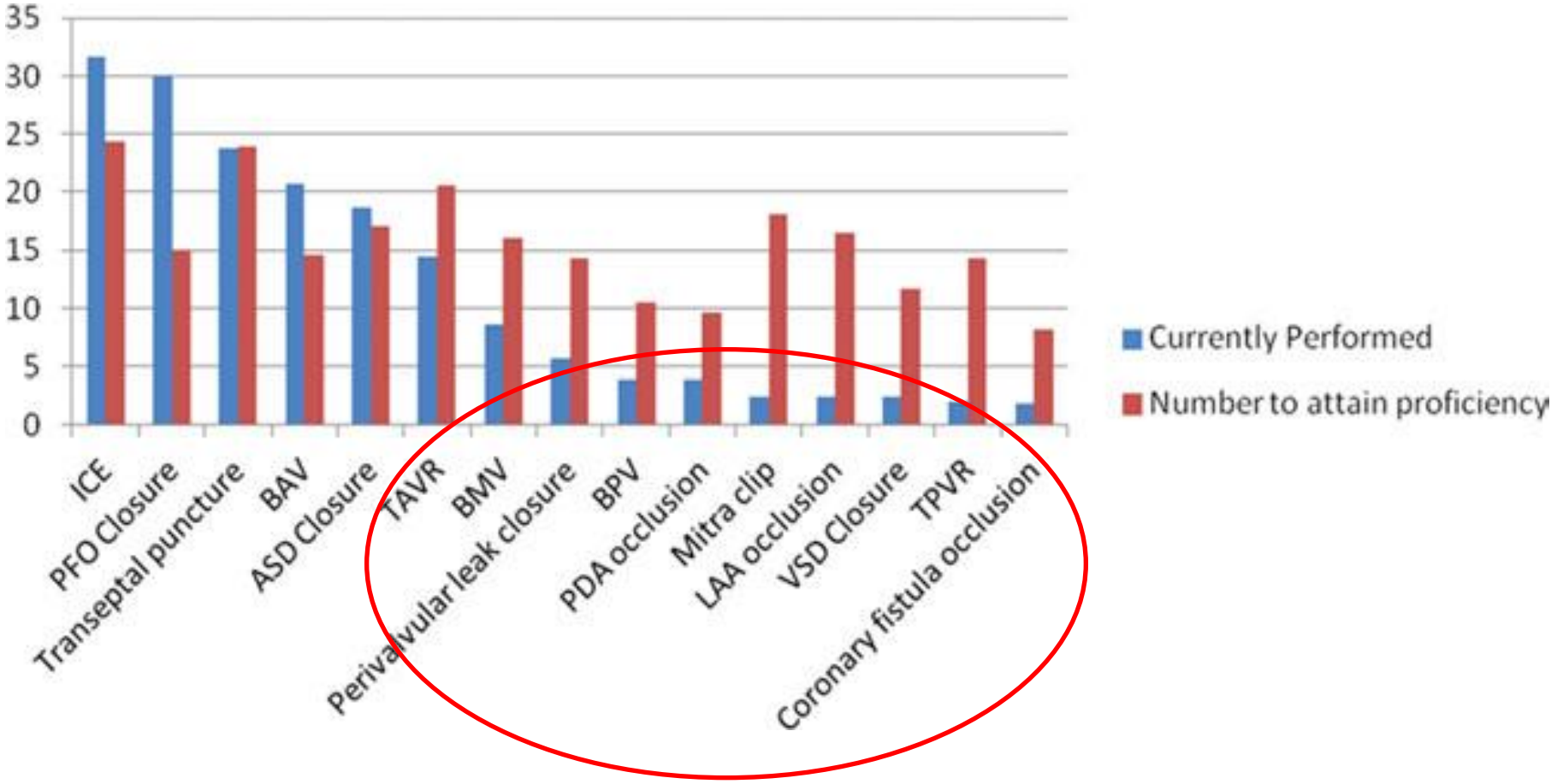
Barriers to SHD Growth

- Lack of sufficient volume of patients
- Lack of sufficient training programs
- Lack of good treatments/devices
- Reimbursement issues
- Surgeon resistance
- Lack of transseptal skills
- Lack of hybrid OR
- Lack of certification or malpractice concerns
- Lack of adjunctive imaging

Herrmann et al. Catheterization and Cardiovascular Interventions 2010;76:E106

Attaining Proficiency



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CT Surgical Training

- CT surgical trainees face similar problems to IC

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Endovascular CT Surgical Training

- Few “formal” programs
- Mini 1 to 6 month fellowships in endovascular skills
- Travel overseas to gain hands-on exposure
- Most trainees develop customized training programs that include endovascular procedures

CT Surgery Training Pathways

Currently, there are three training pathways in cardiothoracic surgery:

- **Independent Programs** (Traditional Pathway — 5 years of general surgery, plus 2-3 years of cardiothoracic surgery residency)

- **Joint Thoracic/General Surgery Track** (Fast-track Pathway — 4 years of general surgery, plus 3 years of cardiothoracic surgery residency), all completed at one institution

- **Integrated Pathway** (I-6 — 6 years of cardiothoracic surgery residency)

Industry Leadership

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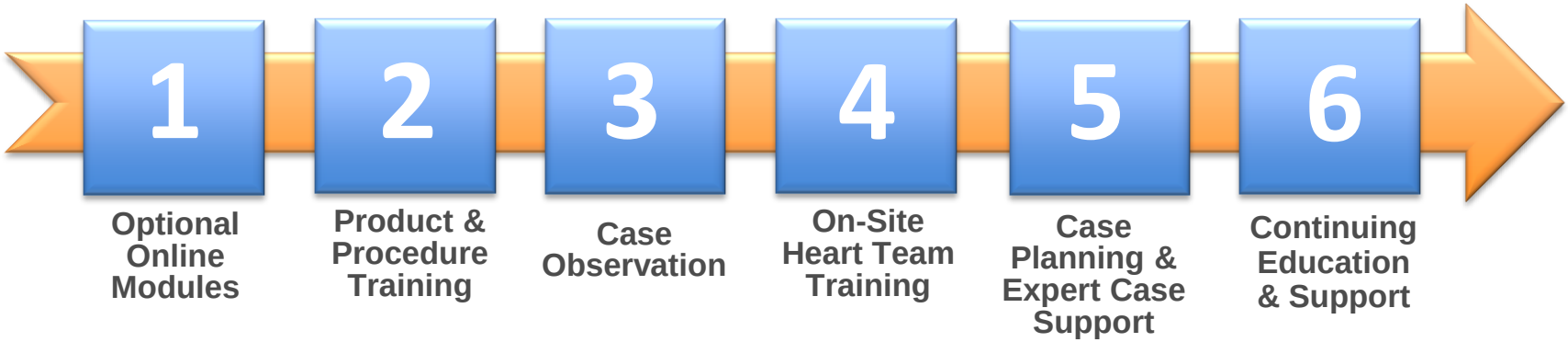
TAVR Industry Training



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TAVR Industry Training

DAY 1

- *Patient Screening: Defining the TAVR Patient*
- *TF Technology Overview*
- *Echocardiography and MDCT Screening Workshops*
- *Taped Live-Case TF*
- *Procedural Deep-dive Complication Mgt Complex Anatomy Best Practices*

Procedural Simulations

Pt Case Presentations

DAY 2

- *Technology Overview*
- *Taped Live-Case TA*
- *Procedural Deep-dive Complication Mgt Complex Anatomy Best Practices*

Procedural Simulations

Pt Case Presentations

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Take home
Potential solutions

- Focus on developing standardized & accredited training programs with clear objectives (ACGME & COCATS)
- Design training programs to provide a foundation for lifelong learning using evolving technologies
- Establish levels of SHD competency (basic/advanced)
- Increase availability and dependence on simulators for training
- Consider shift from case volume requirements to proficiency, especially in light of the requirement for multiple operators (IC and CTS)
- Foster greater cross-pollination between IC and CTS
- Centers (“and operators”) of excellence for 1st generation devices, more complex procedures (mitral), and perhaps more complex patients

Thank you!

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