# Interventional Cardiology Transitions to *Structural Heart Disease*


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20 mins

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Columbia University Medical Center
NewYork-Presbyterian

# Disclosure Statement of Financial Interest
## TCTAP 2016; Seoul, Korea; April 26-29, 2016

# Martin B. Leon, MD

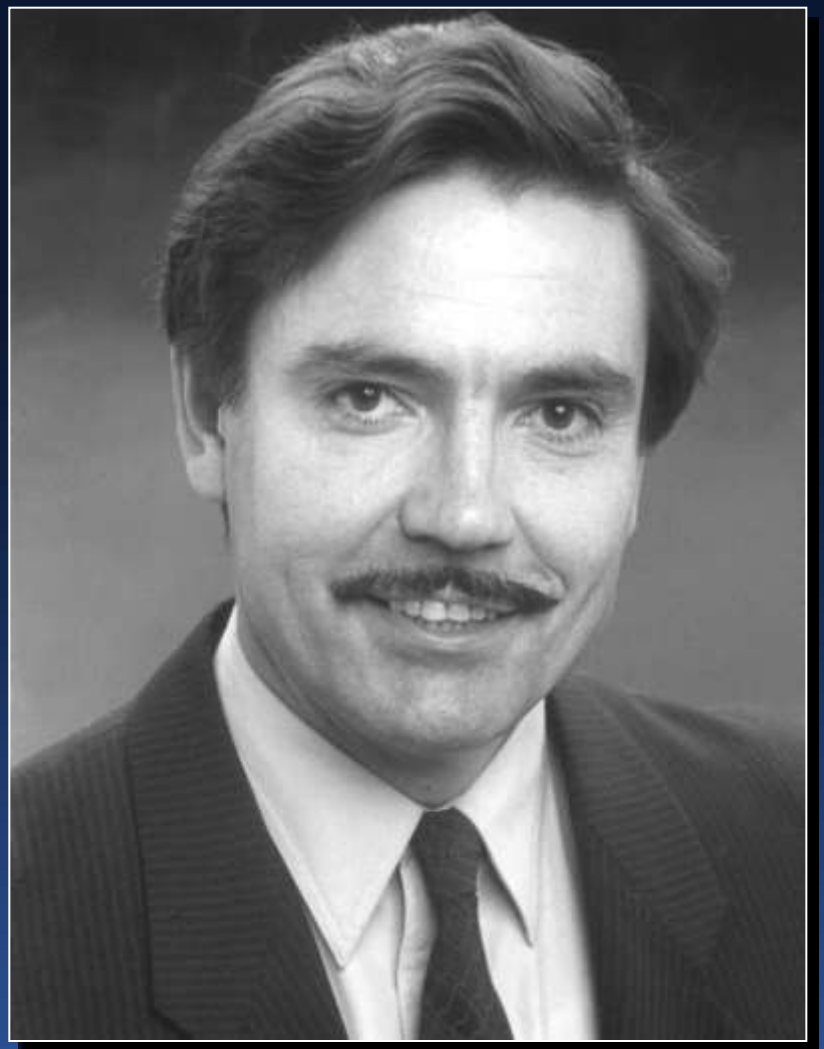
Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

| Affiliation / Financial Relationship | Company |
|---|---|
| • Grant / Research Support | Abbott, Boston Scientific, Edwards Lifescience, Medtronic, St. Jude Medical |
| • Consulting Fees / Honoraria | Abbott, Boston Scientific, Medtronic, St. Jude Medical |
| • Shareholder / Equity | Claret, Coherex, Elixir, GDS, Medinol, Mitralign, Valve Medical |

# IC 2016: An Evolving Landscape

## PTCA…
## The Beginning

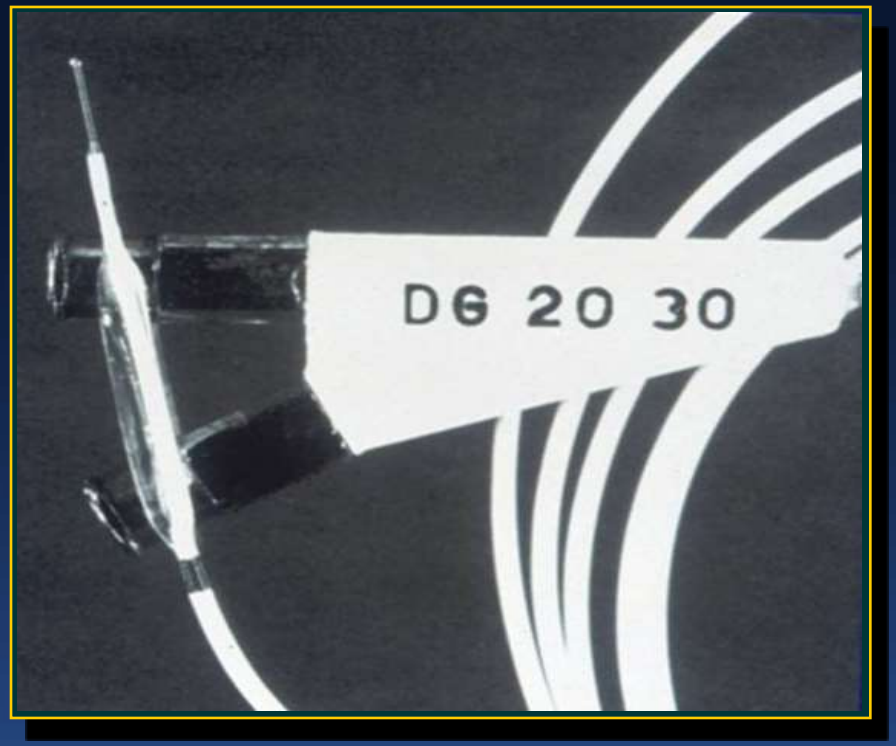
# The Father of PTCA!



## Andreas Gruentzig
## 1939 - 1985

***His dream was the catheter-based percutaneous treatment of vascular disease in alert, awake patients!***

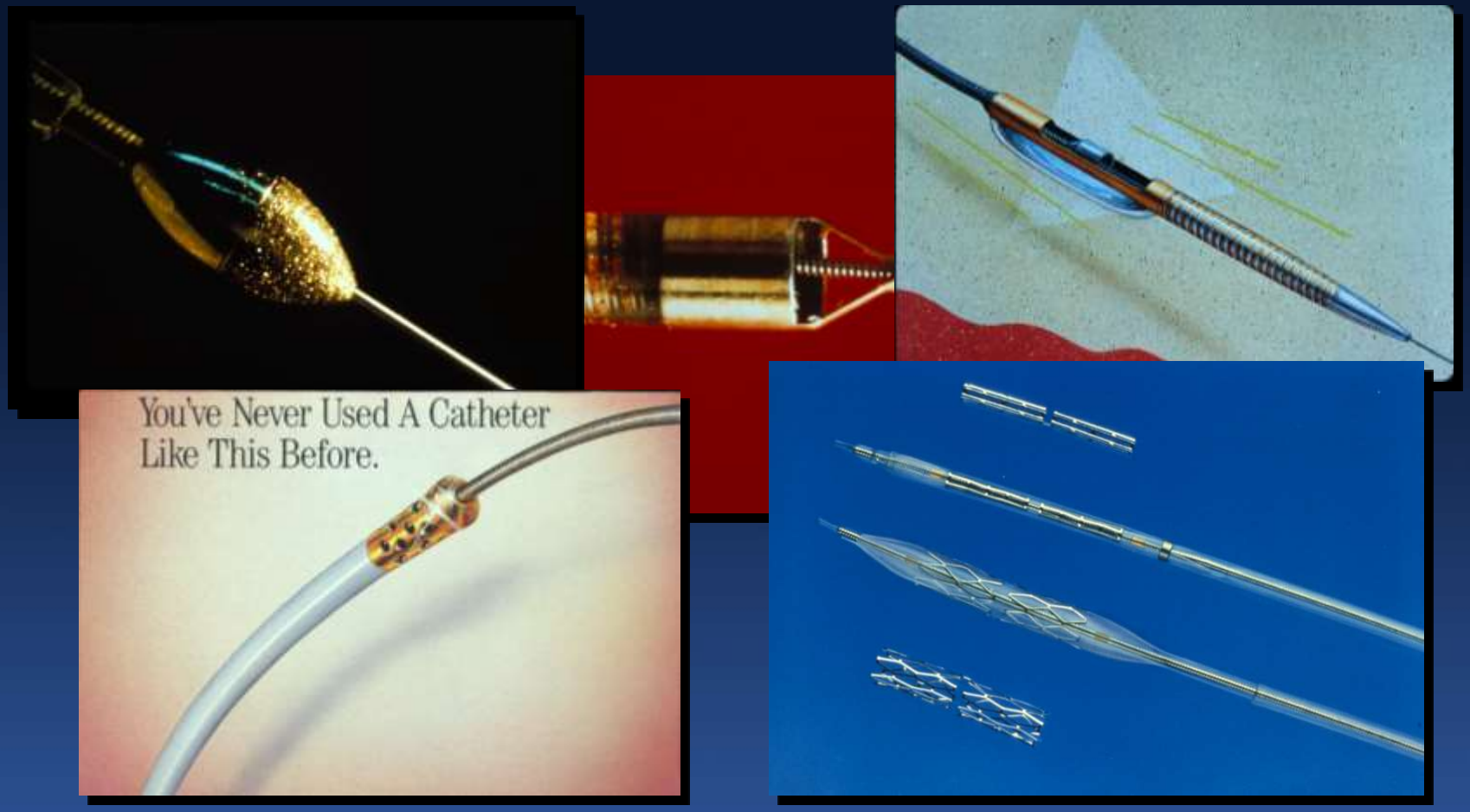
# Andreas' Tools



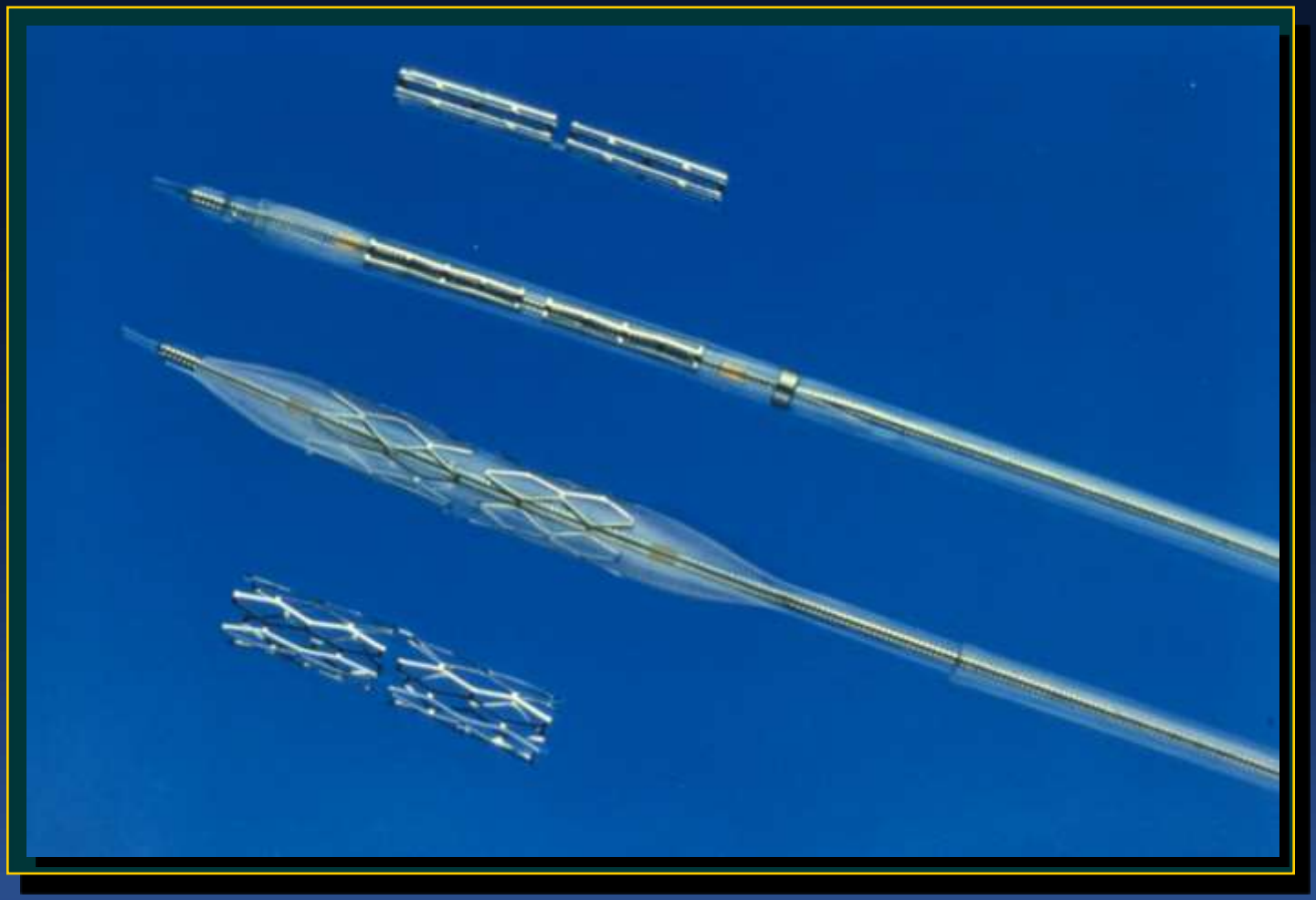
# Andreas' Results

# IC 2016: An Evolving Landscape

# The "New Device" Era (1988-1993)



# The Palmaz-Schatz Stent

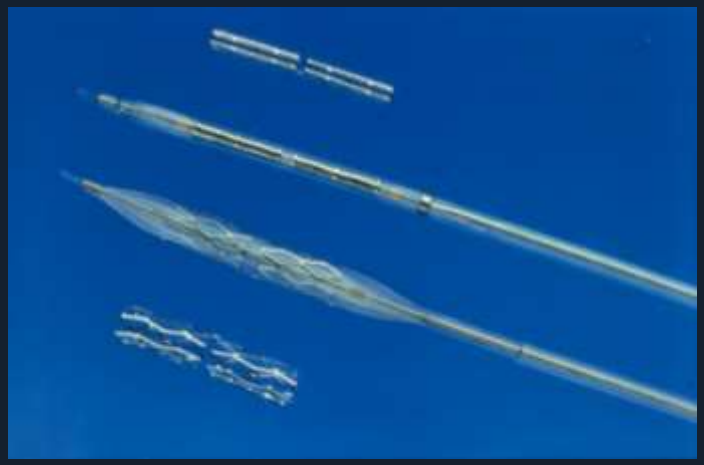


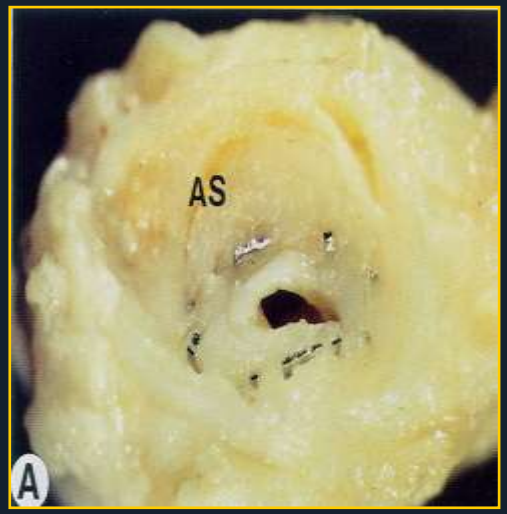
# Early Days of Coronary Stents

***First Palmaz-Schatz Stent in Human***

**December 31st, 1987**

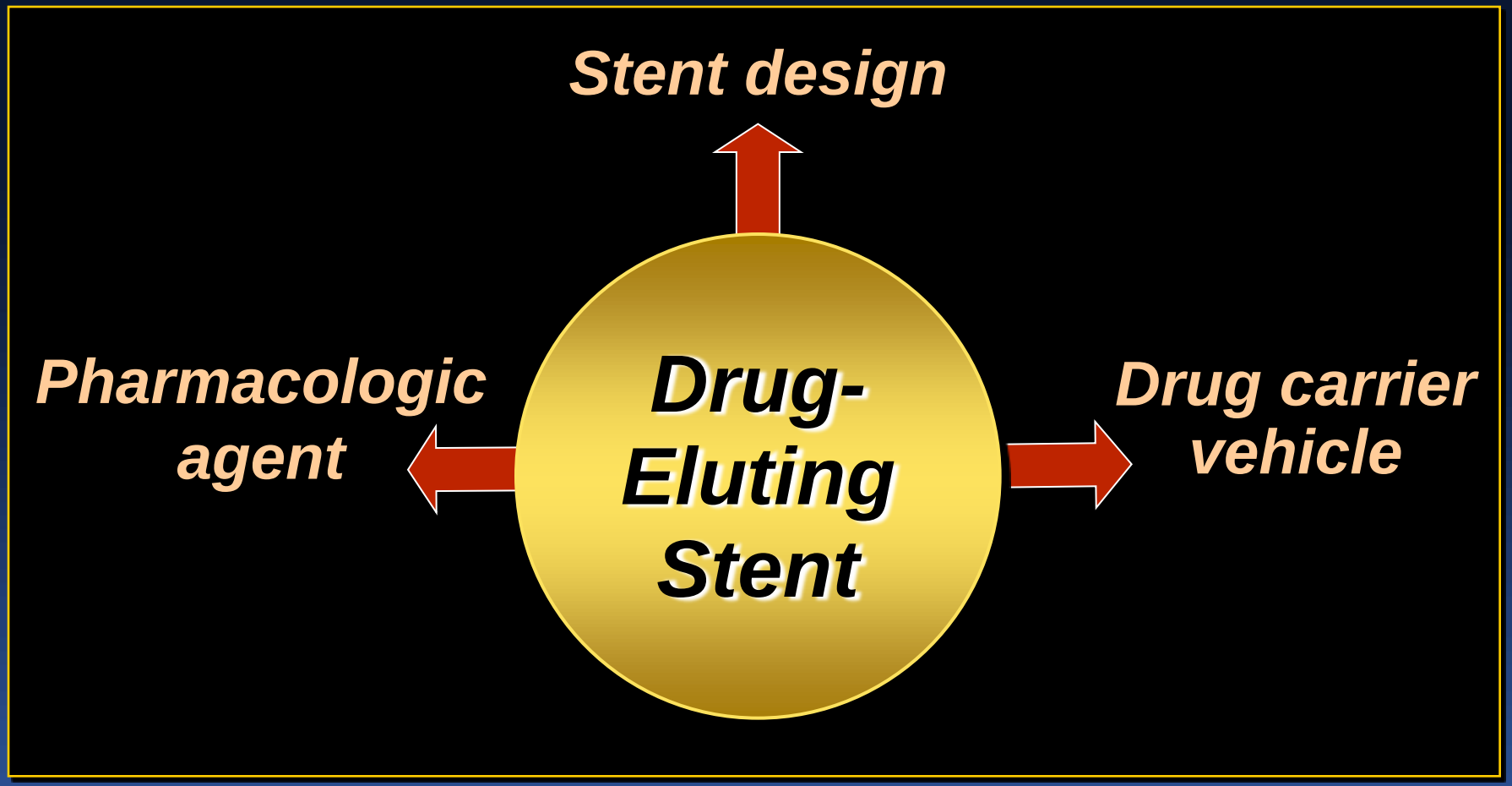
# Bare Metal Stents….
# the good, the bad, and the ugly!






# Drug-Eluting Stents

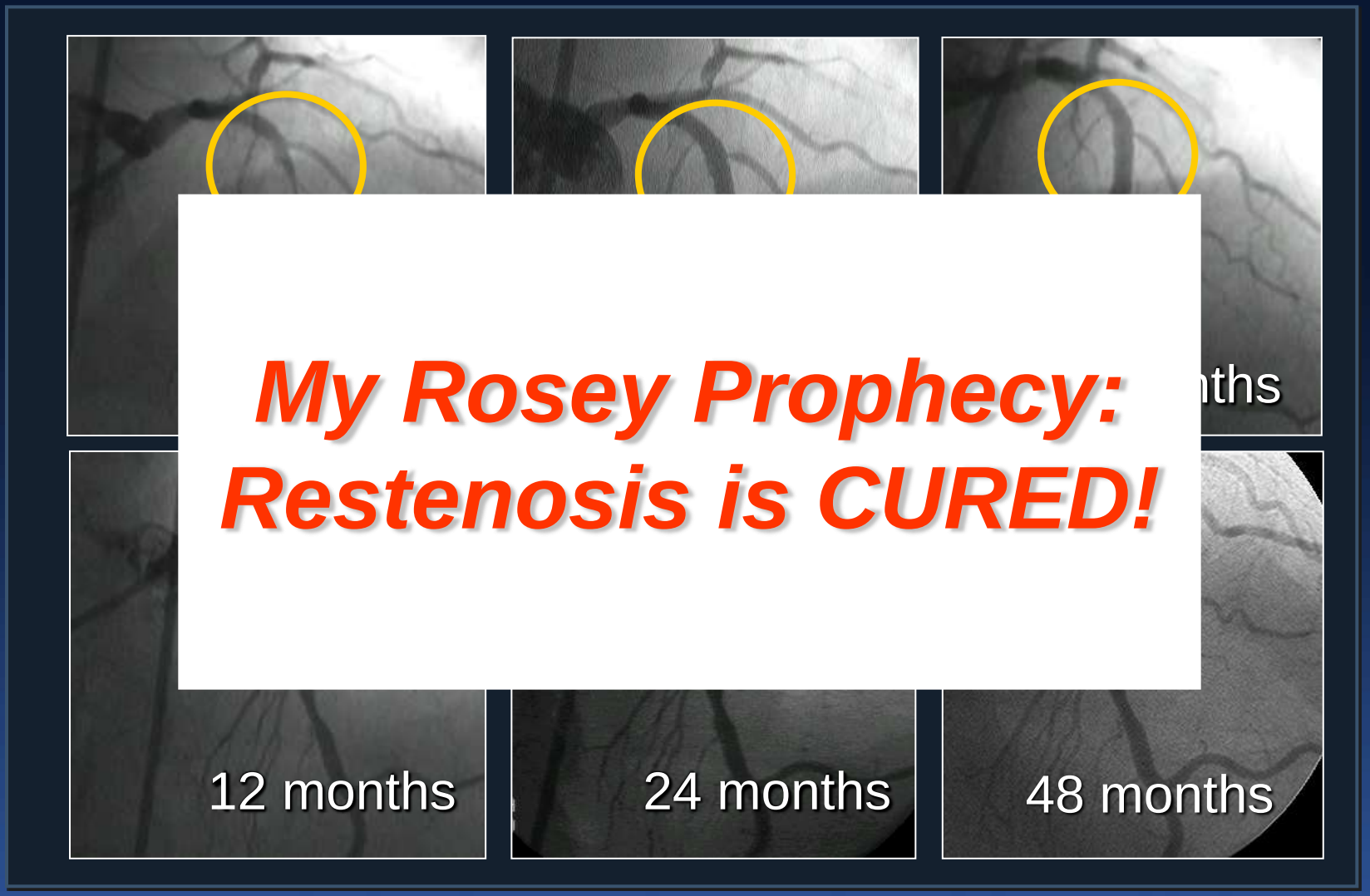
## *Advanced Biotechnology Platform*



# First-In-Man study with CYPHER

## *Sao Paulo, FU completed*

# DES - A Transforming Technology



# First Generation DES

TAXUS

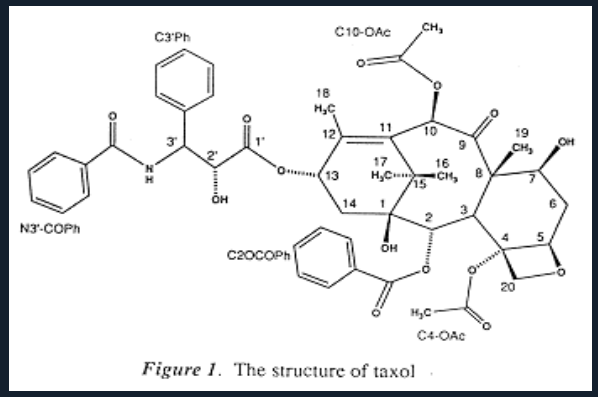
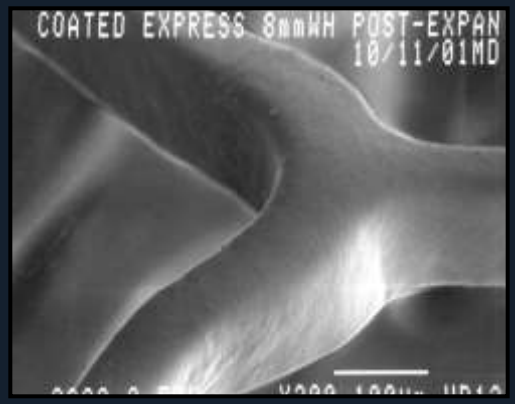


*Figure 1.* The structure of taxol

Paclitaxel

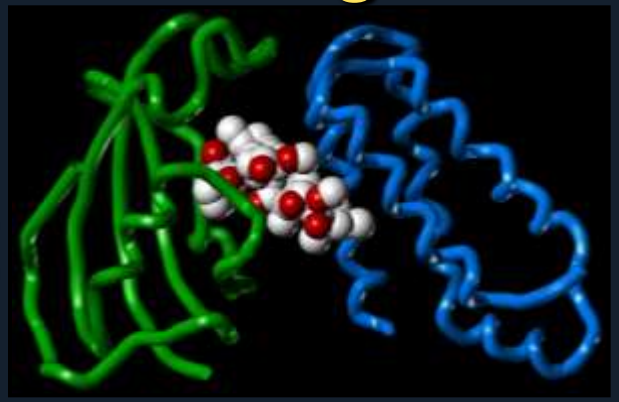



Polyolefin derivative

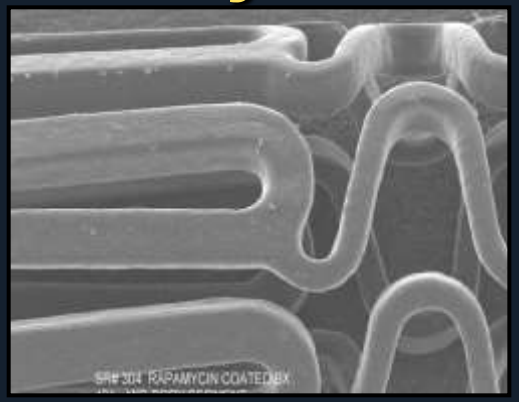
Express²

**Drug** | **Polymer** | **Stent**

Cypher



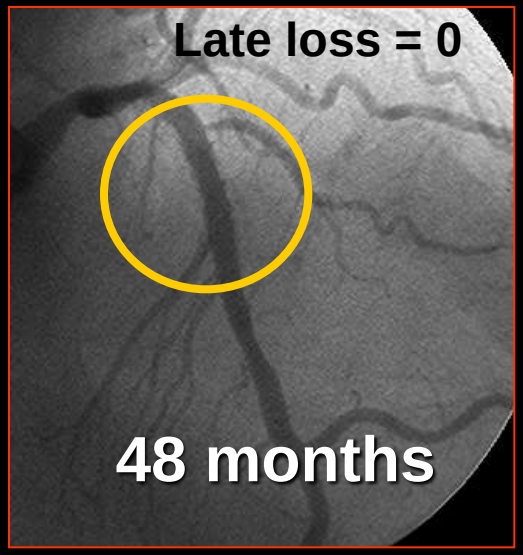
Sirolimus

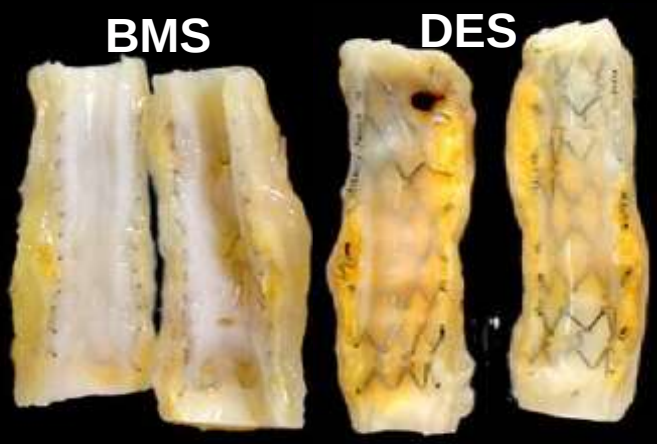



PEVA + PBMA blend

BX Velocity

# DES….the good, the bad, and the ugly!



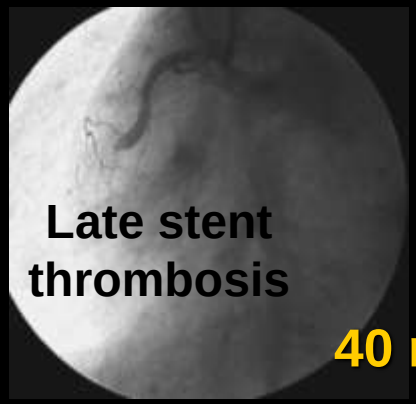



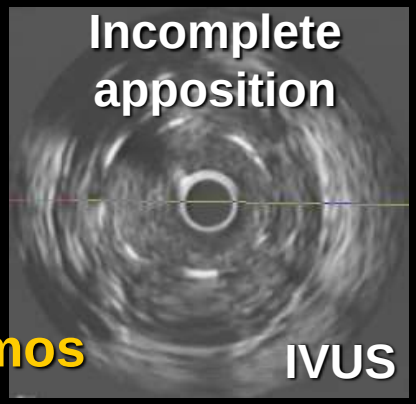

Delayed Healing!

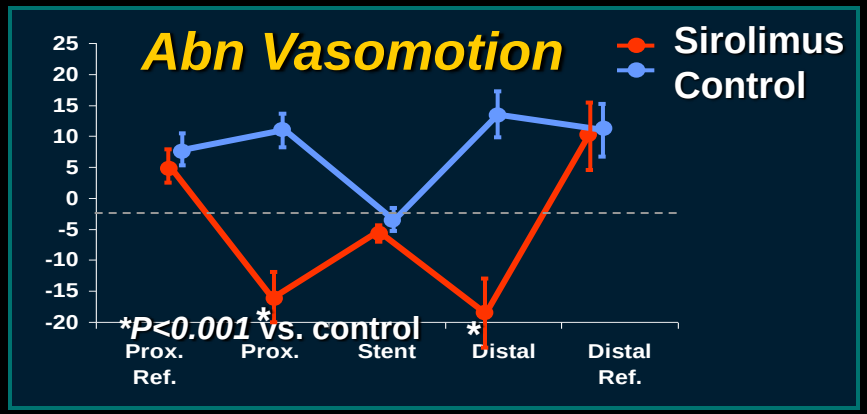

Angioscopy




Inflammation

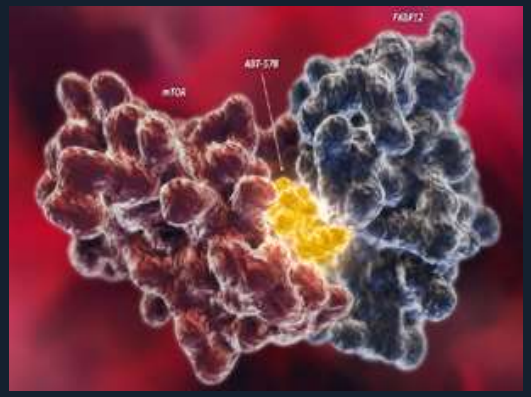


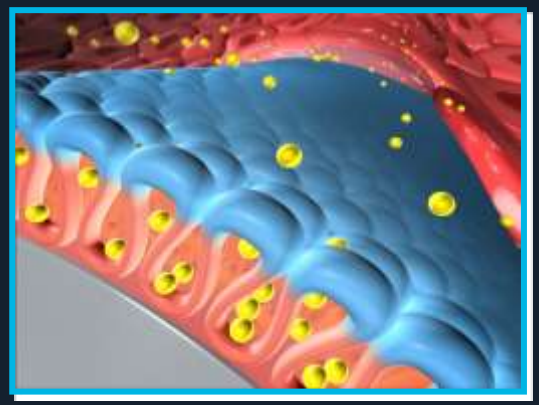
# Second Generation DES

## Resolute



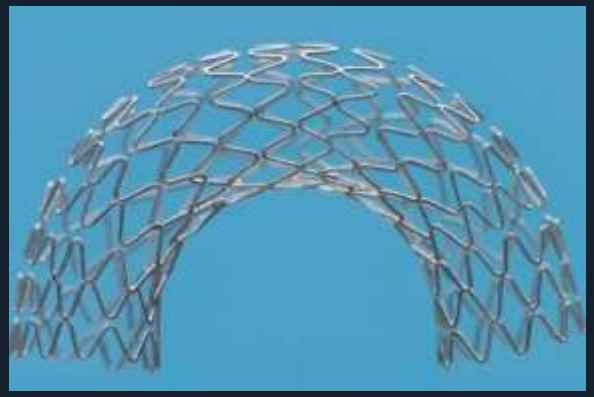
Zotarolimus

**Drug**



BioLinx copolymer

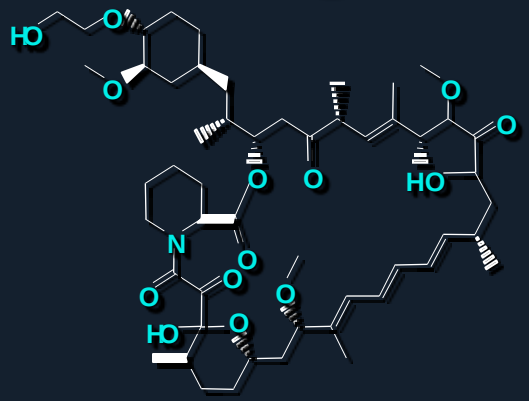
**Polymer**



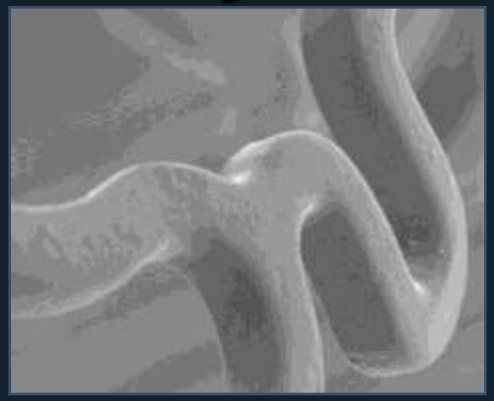
Driver

**Stent**

## Xience V*



Everolimus

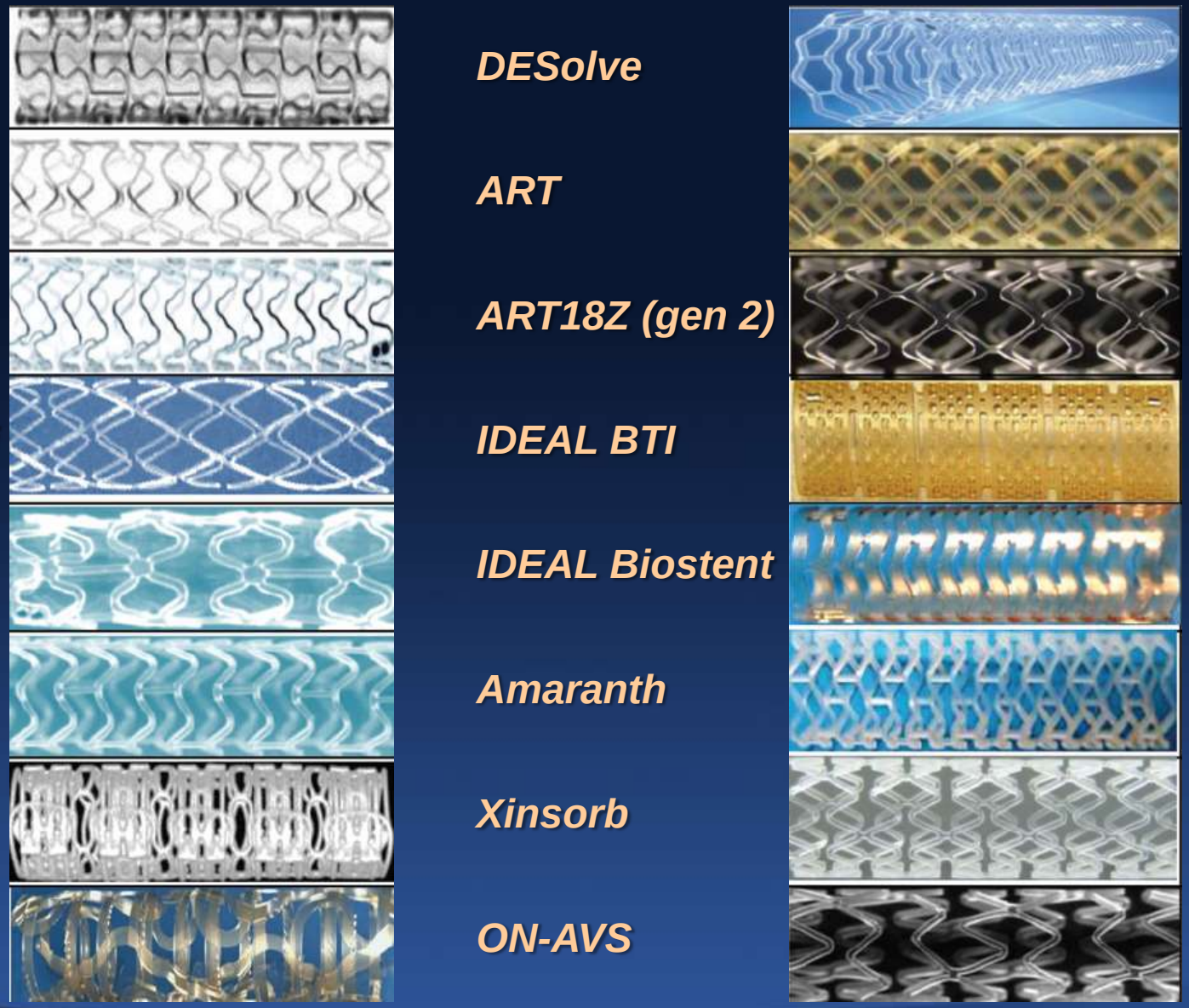


VDF + HFP copolymer

Vision

*AKA Promus

# Bioresorbable Vascular Scaffolds (BRS)




Iqbal J et al. EHJ. 2014;35,:765-76

# IC Perspectives: 1977 - 2016
## *A Modern Subspecialty*

- The acceptance of evidence-based medicine (EBM) has distinguished IC as a modern subspecialty, committed to scientific principles and the highest ethical standards of conduct.
- Other factors beyond EBM must also be heavily weighed to optimize clinical decision-making.
- Iterative device development and transformative new therapy solutions are imbedded in the culture of IC.
- Global participation in the assessment of new therapies, physician training, and sharing of educational activities.
- A true subspecialty with formal certification processes!

# IC 2016: An Evolving Landscape

## Transition to Structural Heart Disease

# IC Perspectives: 1977 - 2016
## *Evolution to Mainstream Therapies*

- The less-invasive (non-surgical) use of catheter-based therapies to remotely treat distant disease targets has transformed medicine.
  - *Neuro-radiology and neuro-surgery*
  - *Minimally invasive endoscopic surgery*
  - *Gastroenterology*
  - *Orthopedics*
  - *Oncology*
  - *Pulmonology (and ENT)*
  - *Urology and gynecology*

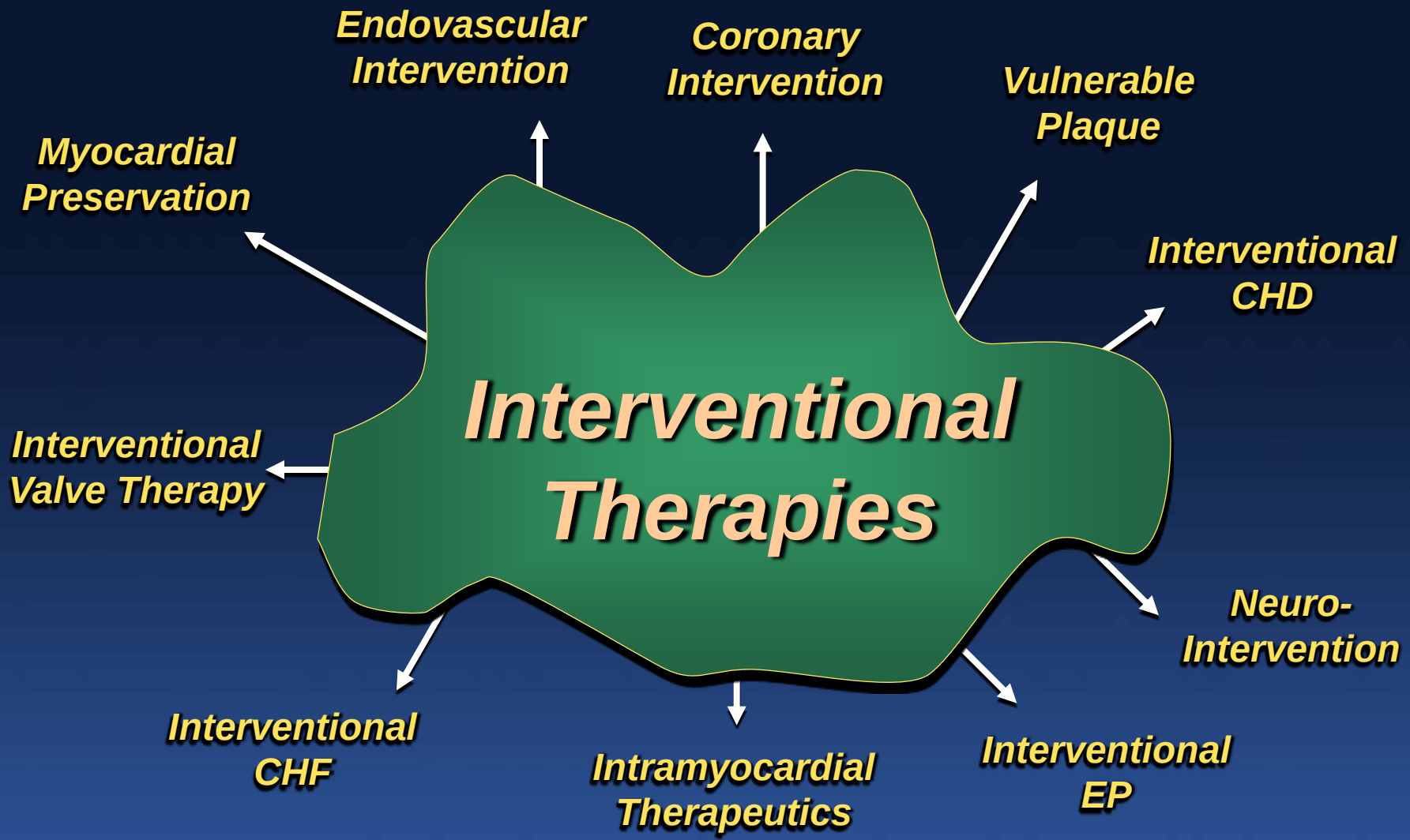
# IC Perspectives: 1977 - 2016
## *Evolution to Mainstream Therapies*

- The less-invasive (non-surgical) use of catheter-based therapies to remotely treat distant disease targets has transformed medicine.
- A major current effort is to redirect intra-vascular interventional therapies to address “mainstream” cardiovascular and non-cardiovascular disease (e.g. Valve disease, HTN, AF, and HF therapies).
- This requires that the interventionalist become an integrated member of multi-disciplinary teams AND learn new cognitive skills; the transformation from isolated proceduralist to engaged therapist!

# IC Perspectives: 1977 - 2016
## *Important Evolution*

| "Early" Days | Modern Era |
| --- | --- |
| ***Devices*** | ***Therapies*** |
| ***Proceduralists*** | ***Therapists*** |

# TCT Opening 2001




SHD = structural heart disease

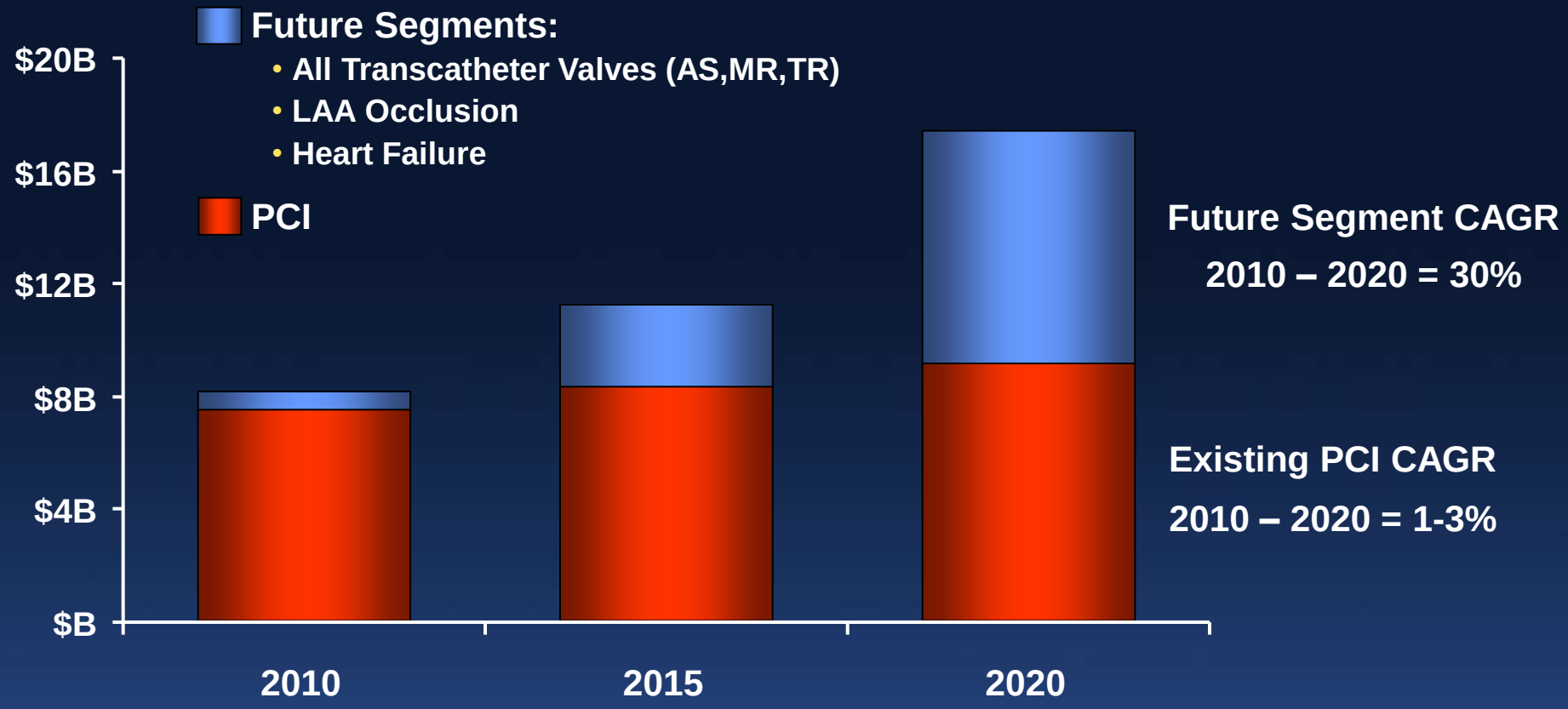
# IC Perspectives: 1977-2016
# *The STRUCTURAL REVOLUTION*

- *Structural Heart Disease is a WASTE BASKET* meant to include all non-vascular procedures utilizing catheter-based technologies!

# IC Perspectives: 1977-2016
# *The STRUCTURAL REVOLUTION*

- *Structural Heart Disease is a WASTE BASKET* meant to include all non-vascular procedures utilizing catheter-based technologies!
- Emphasizes the confluence of two fully evolved concepts – non-vascular image-guided therapies (echo and MSCT) and multi-disciplinary heart team strategies (with pre-procedure planning).
- Requires significant adjustments in training of interventional operators and treatment milieus (e.g. hybrid cath lab/ORs).

# WW $ Cardiology Market Trends



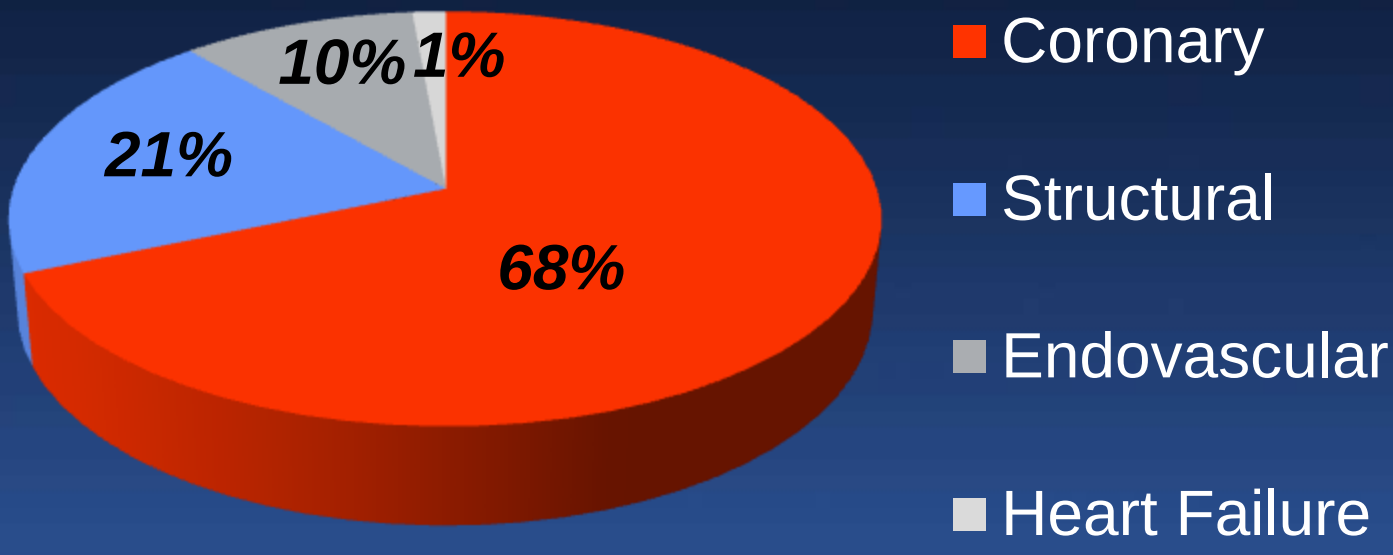

- New market segments may exceed PCI market size by 2020
- Emergence of future segments relies on technology and clinical data
- OUS markets will lead and exceed the size of US markets

*Mulitple Industry Sources*

# Interventional Cardiology - 2015

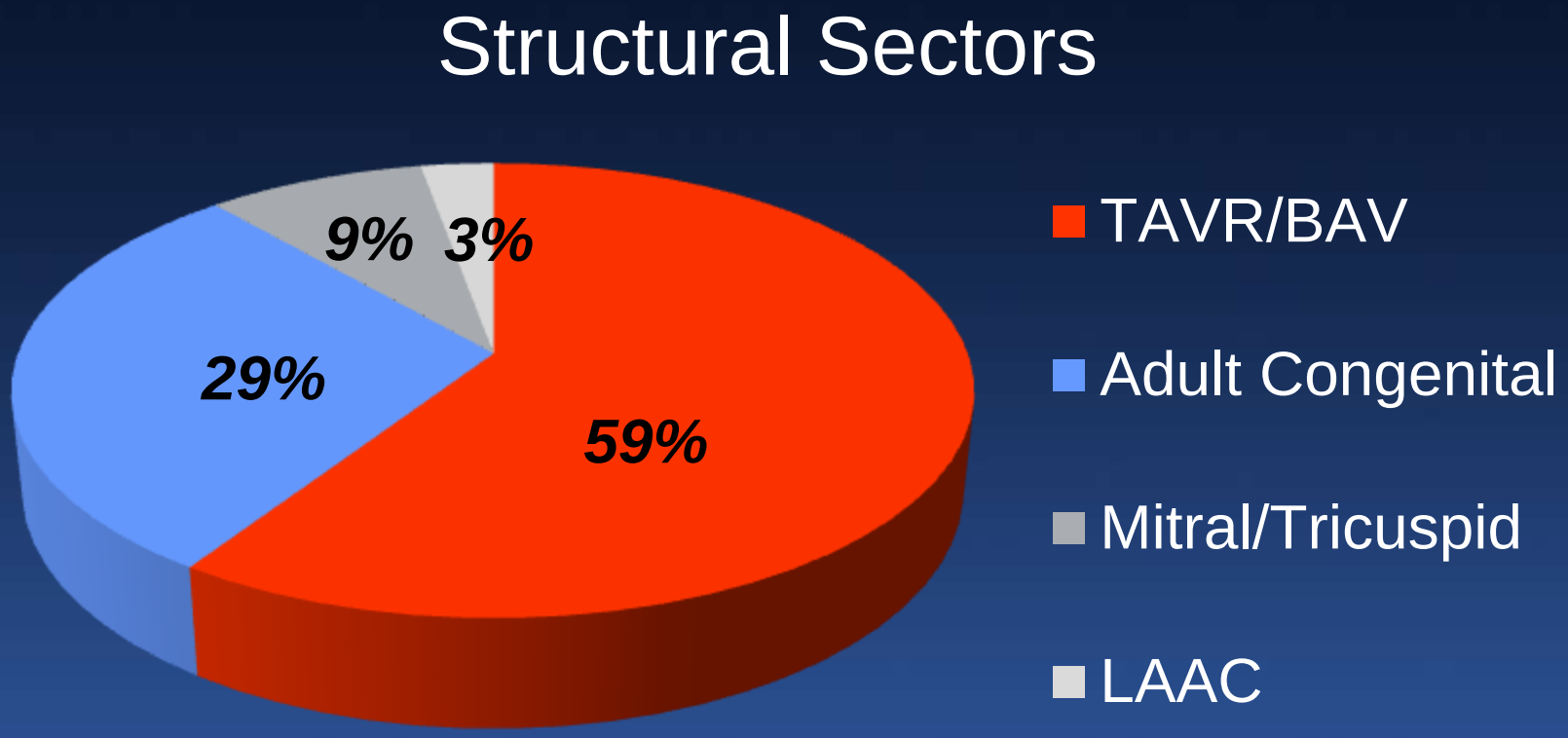
## *Columbia University Medical Center (4,100 interventions)*

### Interventional Sectors

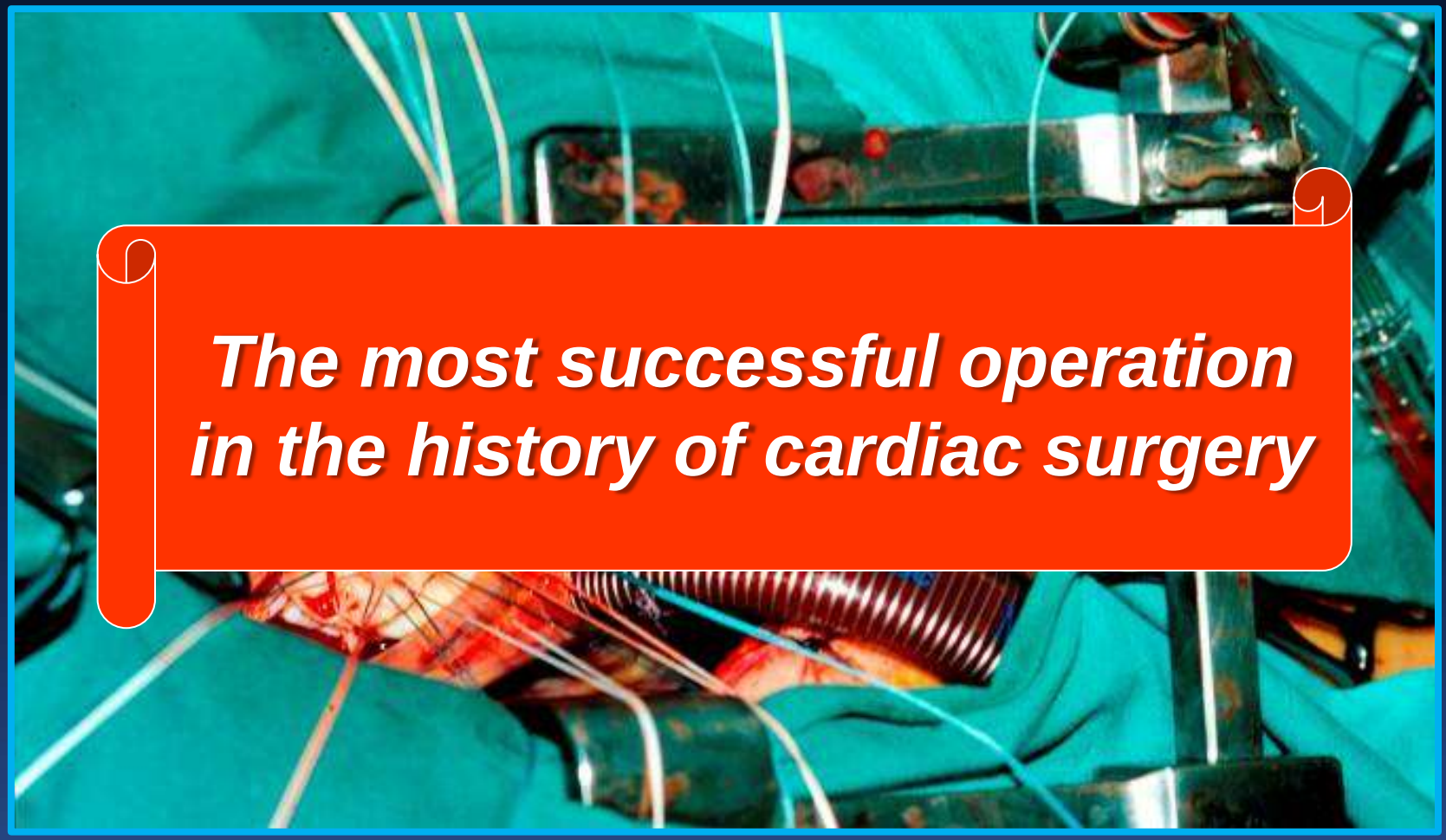


# Structural Heart Interventions - 2015

## *Columbia University Medical Center (850 interventions)*



# Conventional Aortic Valve Surgery



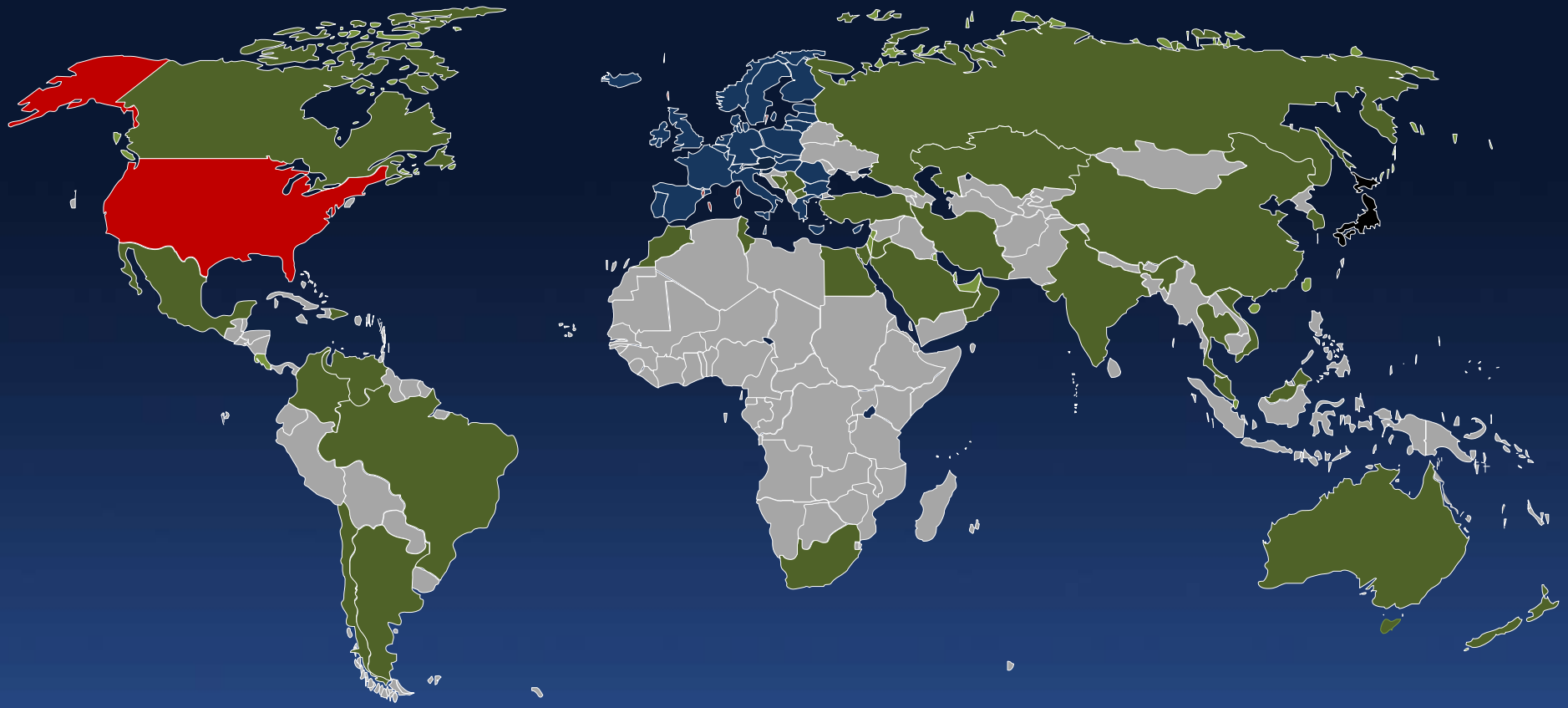

**Is there a better way?**

# April 16, 2002; FIM-TAVR; Rouen, FR

# TAVR in 2016: *Milestones*

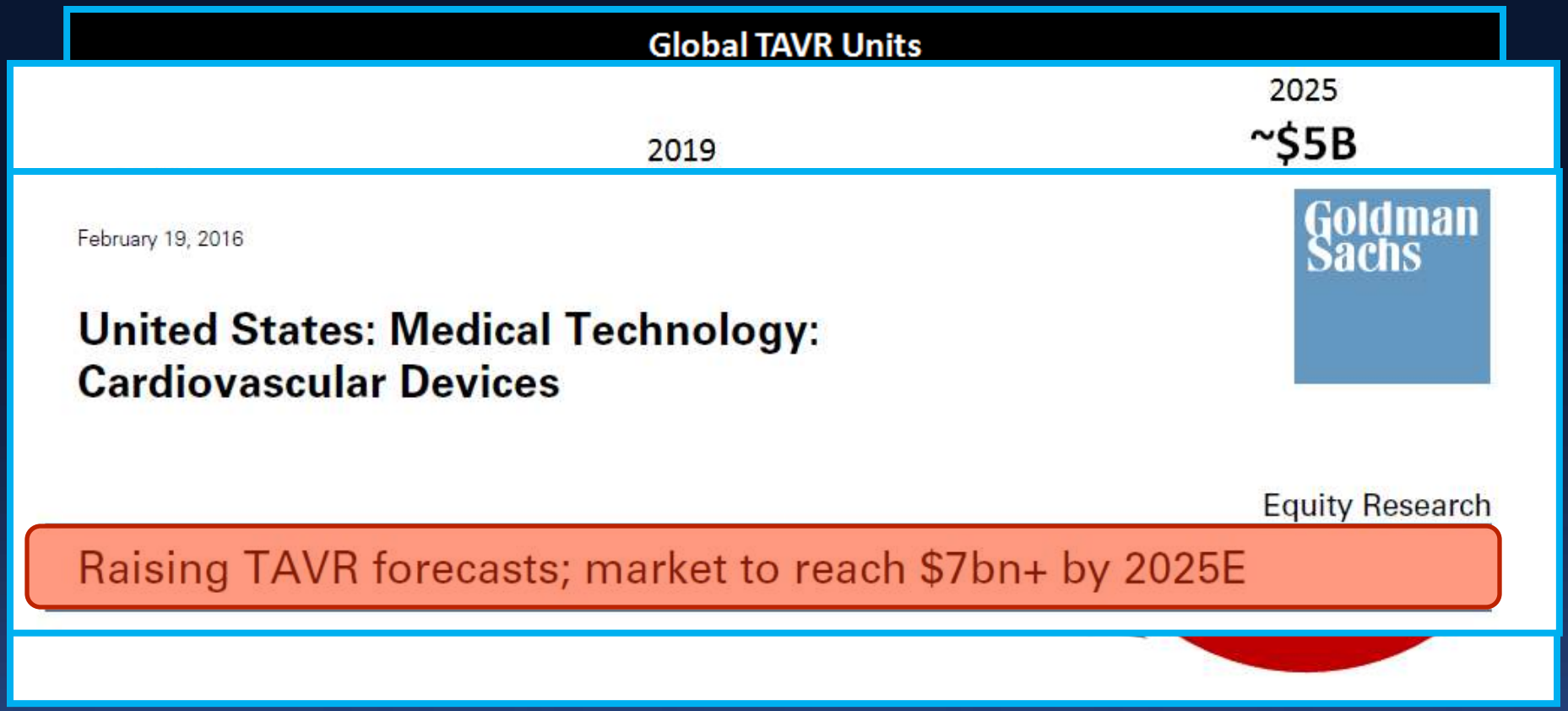
- ***TAVR is a "Breakthrough" Technology –*** Dramatic global growth and universal acceptance with seemingly "unlimited" future potential!

# TAVR is Available in More Than 65 Countries Around the World



***>250,000 total implants to date***

# Estimated Global TAVR Growth




SOURCE: Credit Suisse TAVI Comment –January 8, 2015. ASP assumption for 2024 and 2025 based on analyst model. Revenue split assumption in 2025 is 45% U.S., 35% EU, 10% Japan, 10% ROW

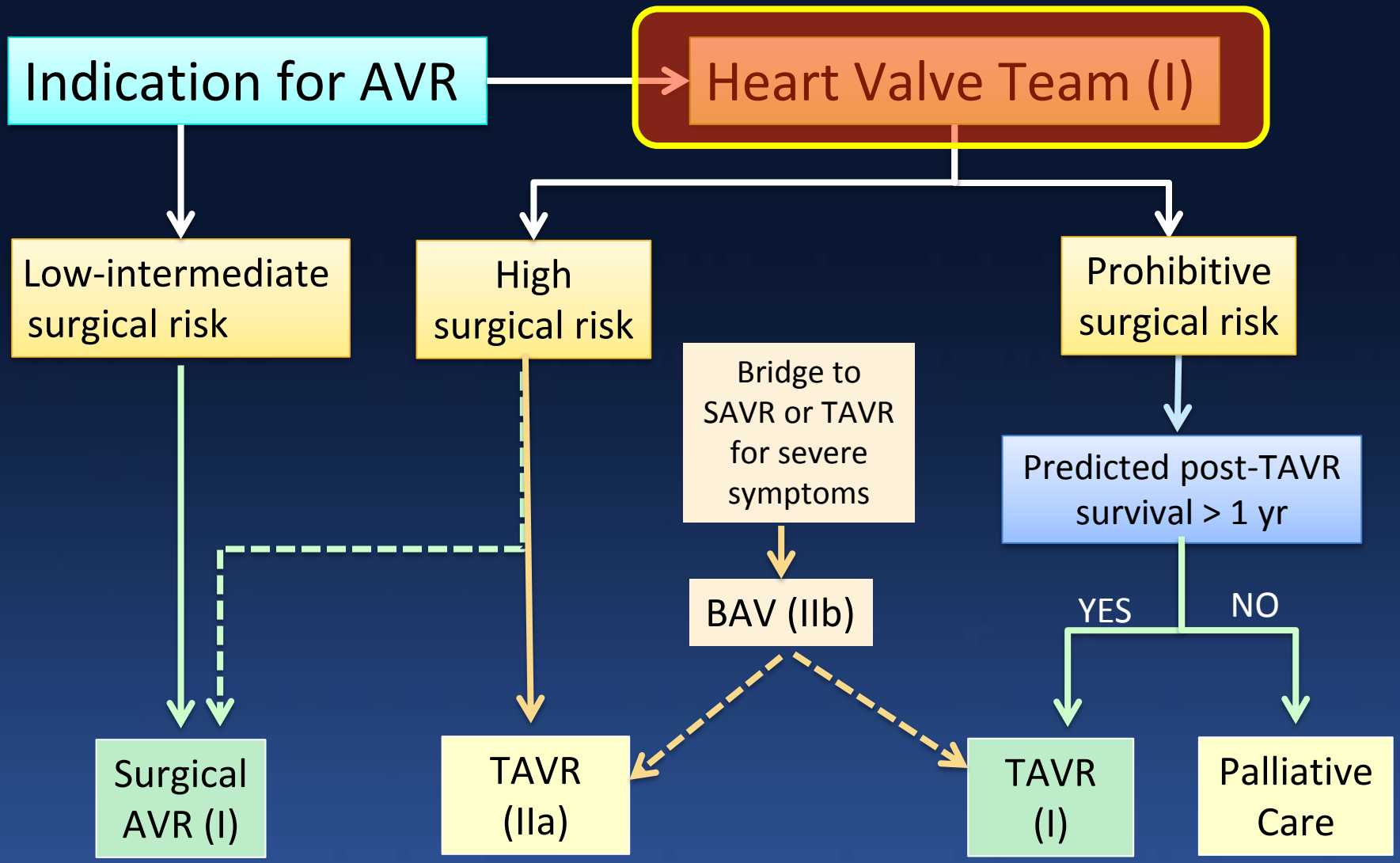
***In the next 10 years, TAVR growth will increase X4!***

# TAVR in 2016: *Milestones*

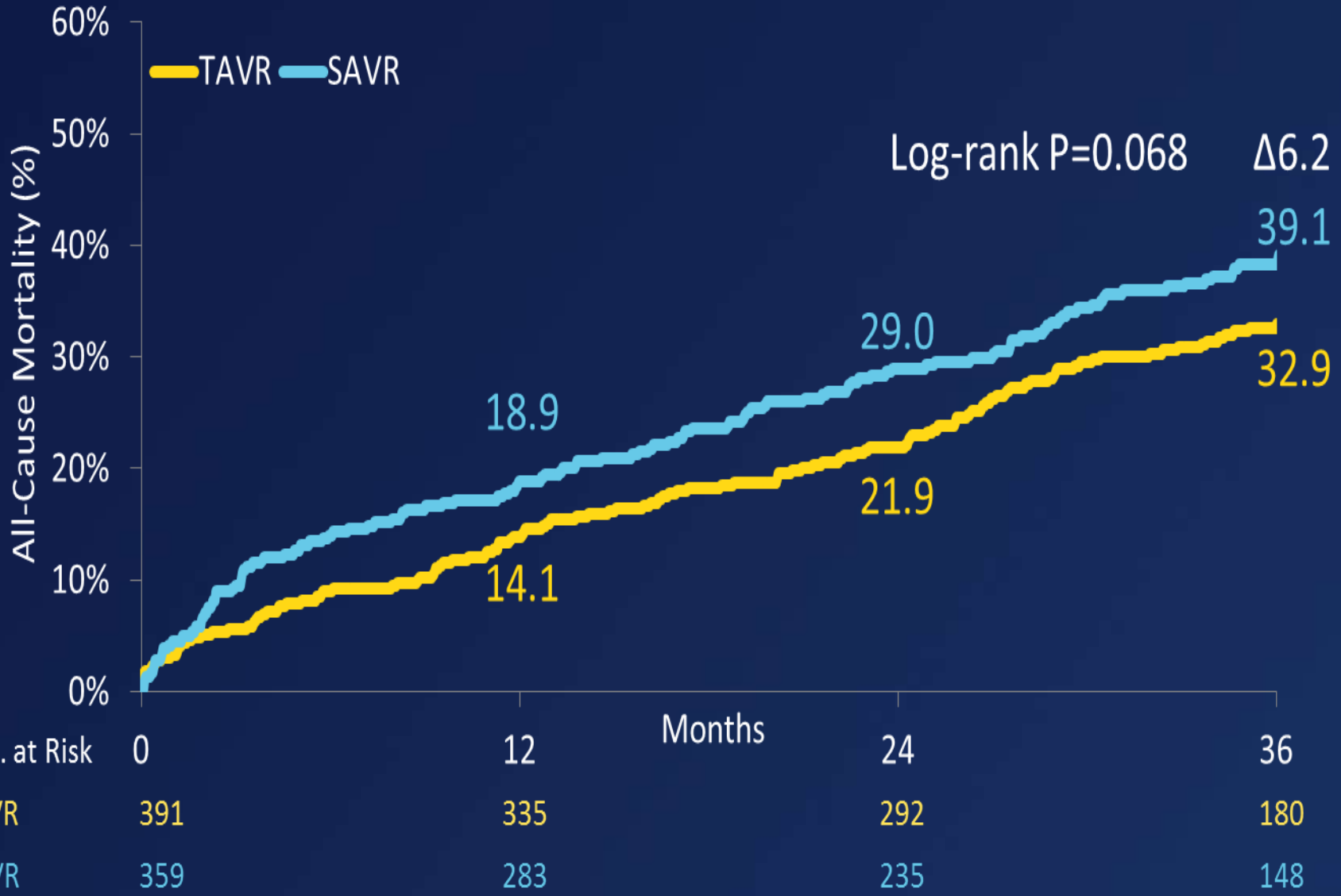
- ***TAVR is a "Breakthrough" Technology –*** Dramatic global growth and universal acceptance with seemingly unlimited future potential!
- ***TAVR growth has been fueled by:***
  - the multi-disciplinary heart team
  - commitment to evidence-based medicine
  - rapid technology enhancements
  - striking reduction in complications
  - simplification of the procedure (generalizable)

2014 ACC/AHA Valve Guidelines

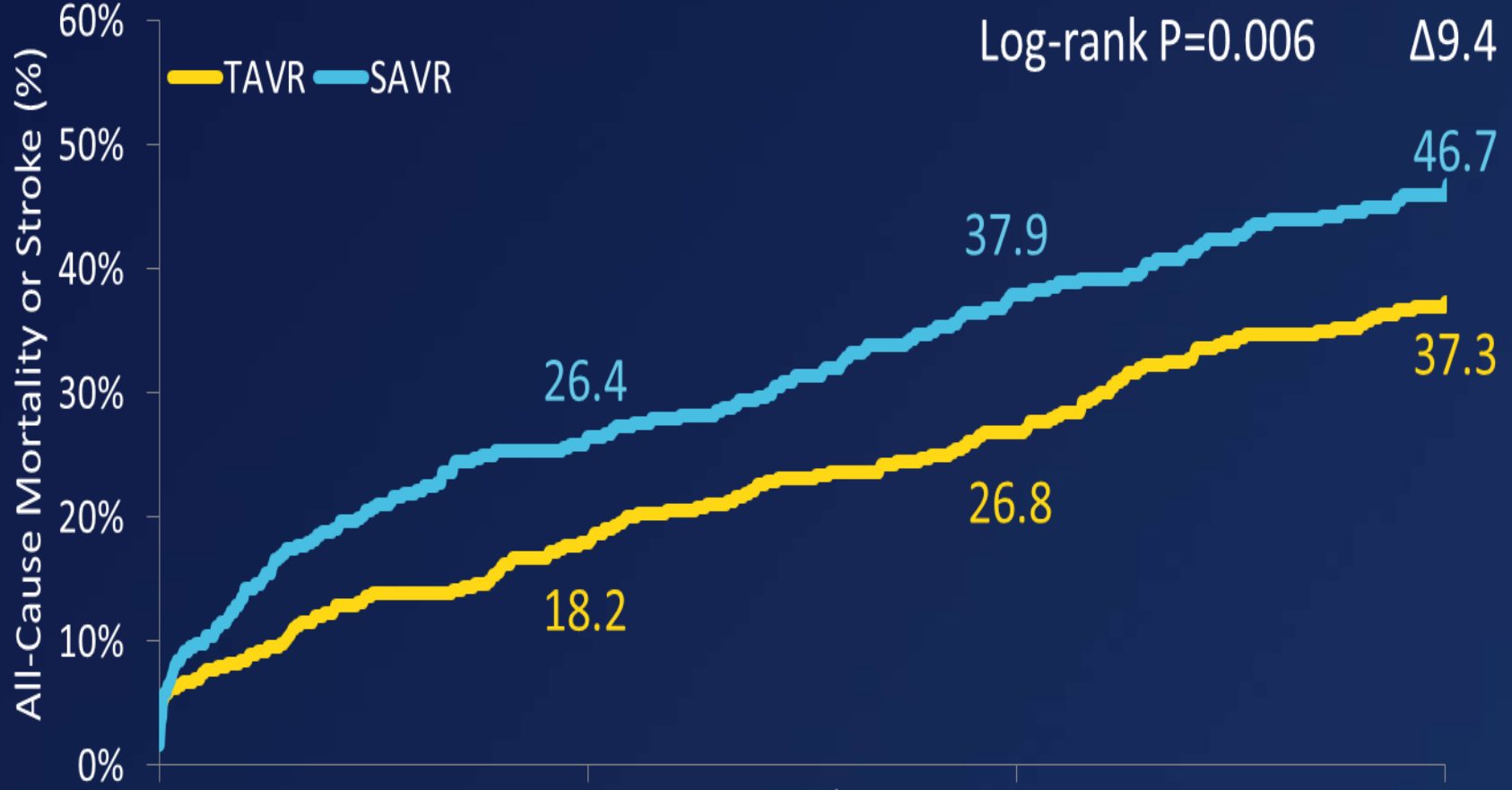
# CHOICE of Intervention for AS



# All-Cause Mortality

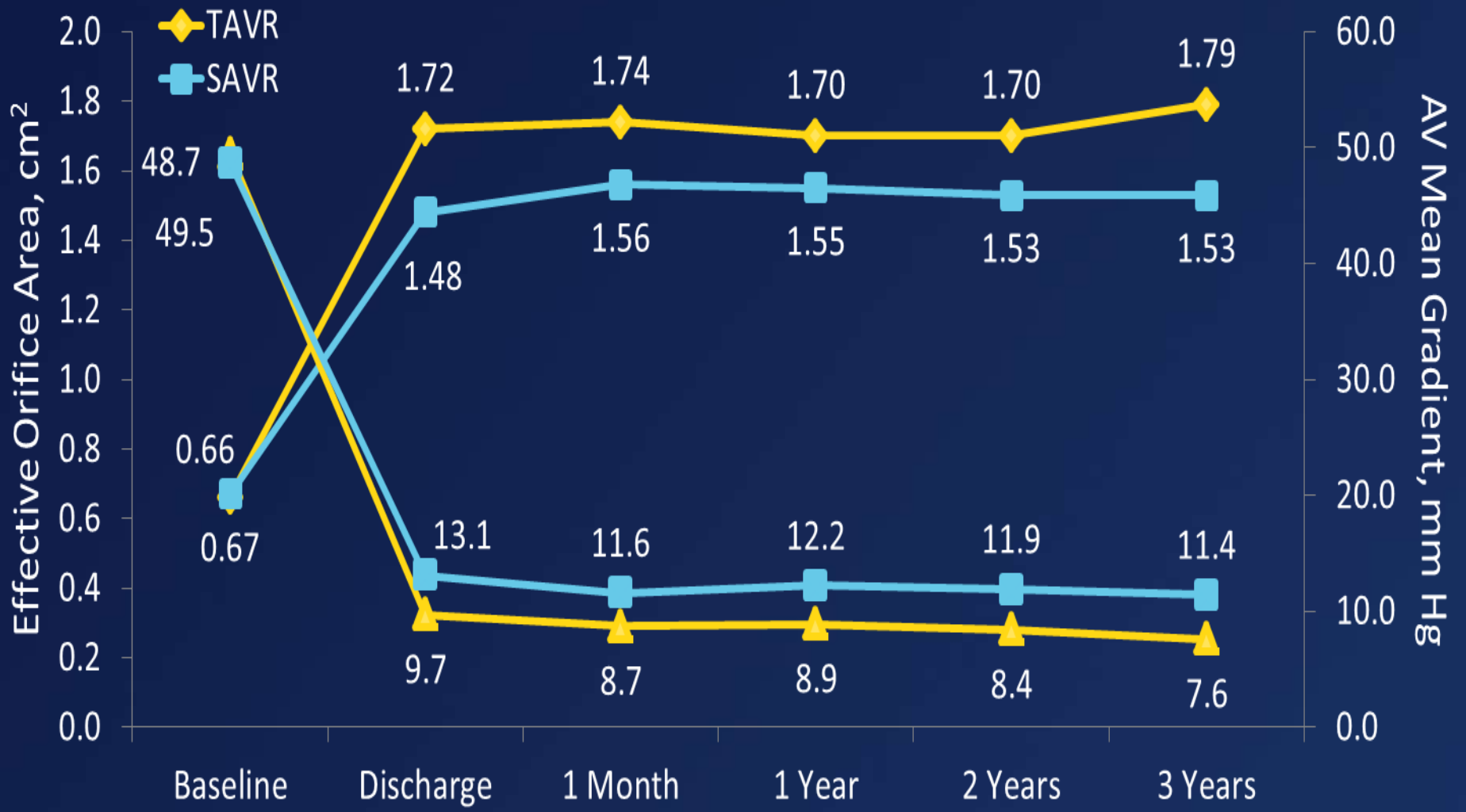


# All-Cause Mortality or Stroke



# Valve Hemodynamics*

CoreValve had significantly better valve performance vs SAVR at all follow-ups (P<0.001)




*Site-reported

# PARTNER THV Evolution

***PI - 2007***

***Edwards SAPIEN™ THV***
***23 mm and 26 mm***

***PII - 2010***

***Edwards SAPIEN XT ™ THV***
***23 mm, 26 mm, and 29mm***

***PII S3 - 2013***

***Edwards SAPIEN 3™ THV***
***20 mm, 23 mm, 26 mm, and 29mm***

***PARTNER enrolled >9,000 patients in FDA studies (including 4 RCTs) with 3 generations of TAVR systems in ~ 7 years!***

# Baseline Patient Characteristics

## S3i Patients (n=1076 at 51 sites)

THE PARTNER II TRIAL

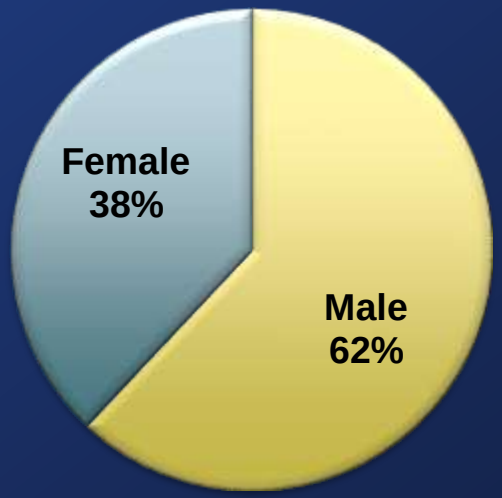
Average STS =

**5.3%**

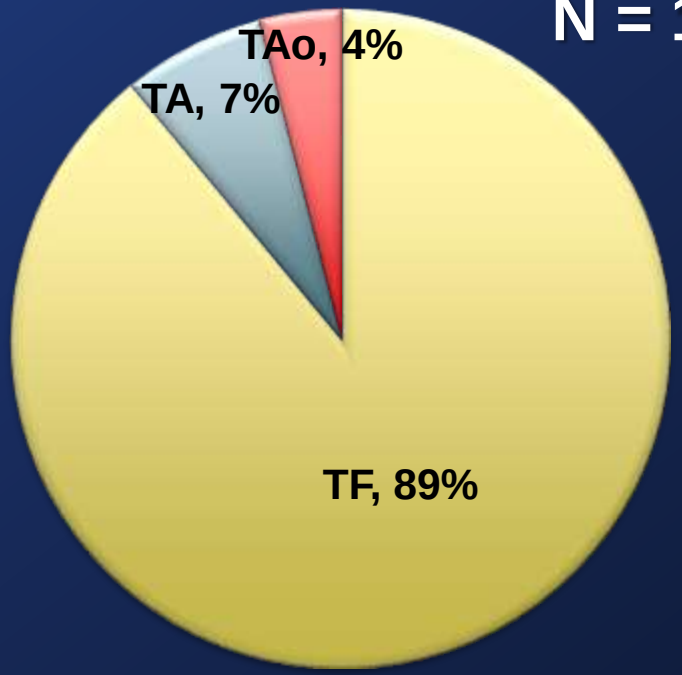
(Median 5.2%)

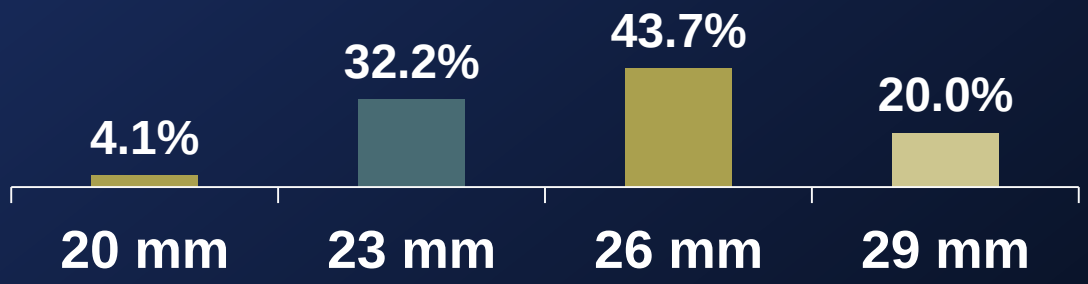
Average Age =

**81.9yrs**




N = 1076



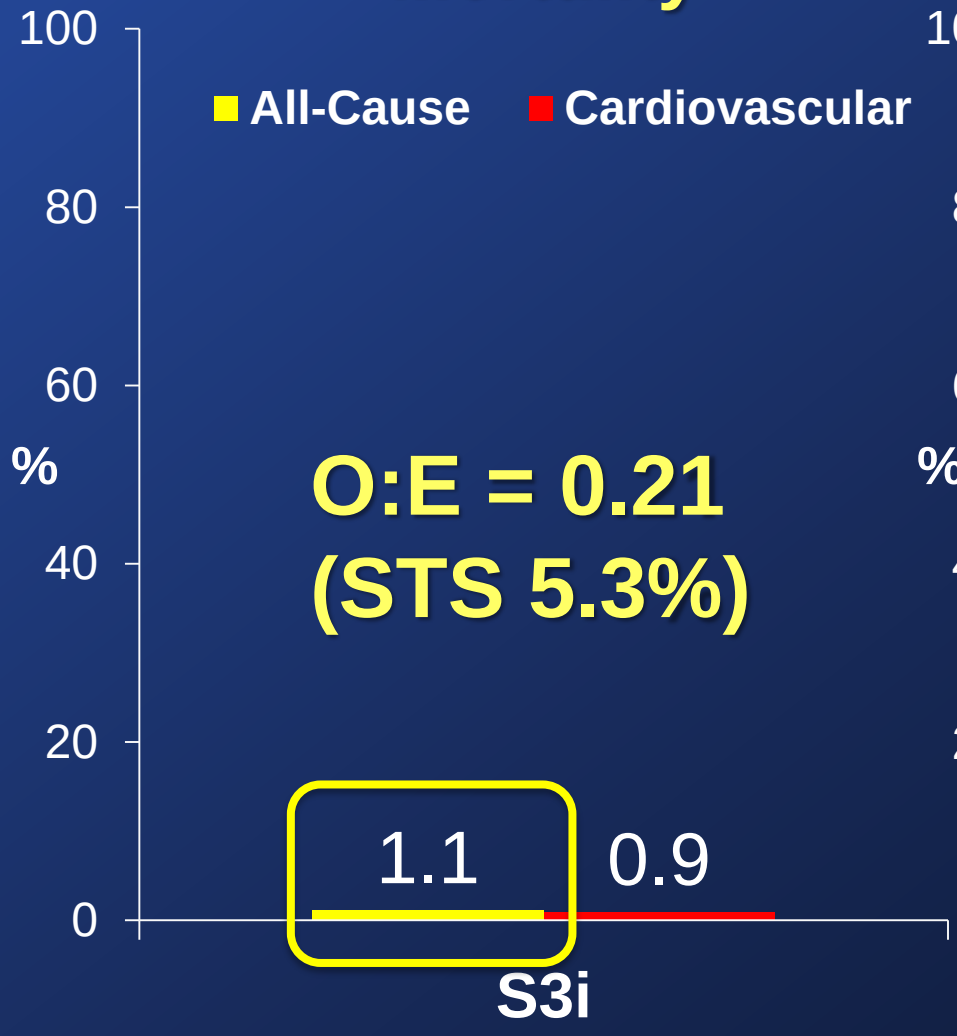



# Mortality and Stroke: S3i

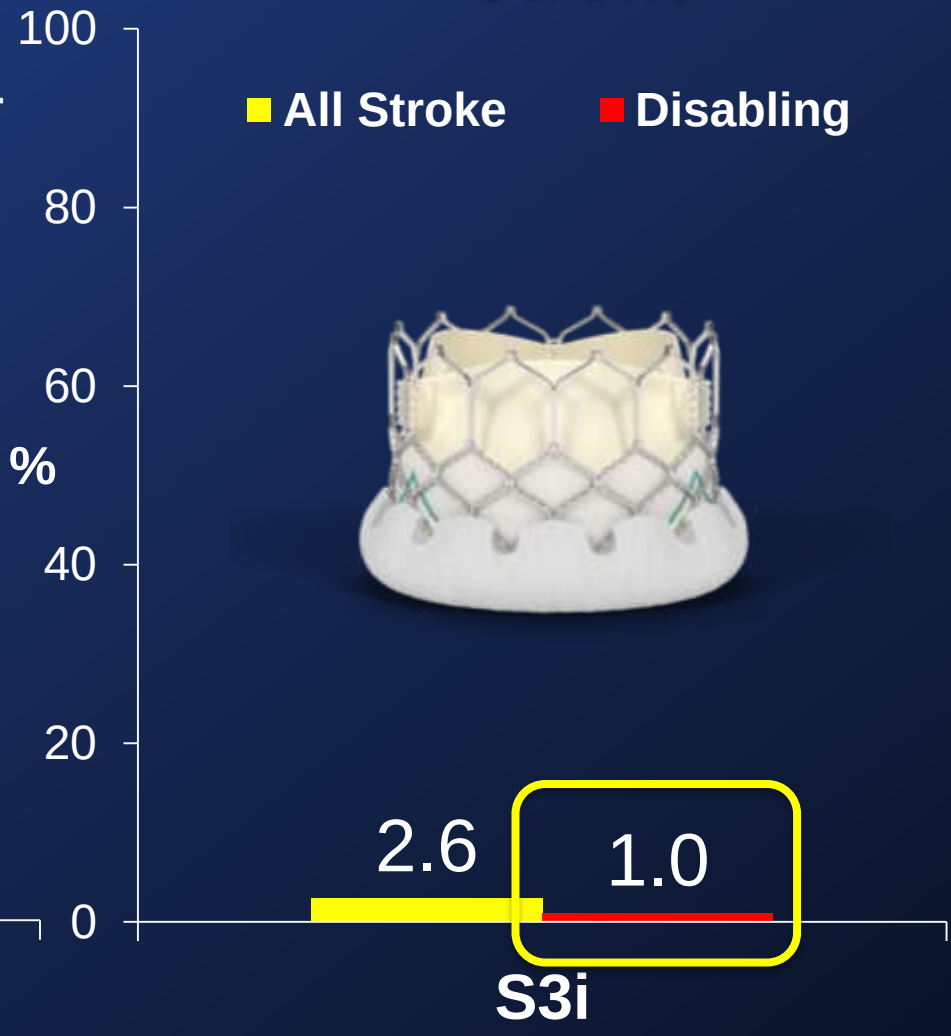
## At 30 Days (As Treated Patients)

THE PARTNER II TRIAL

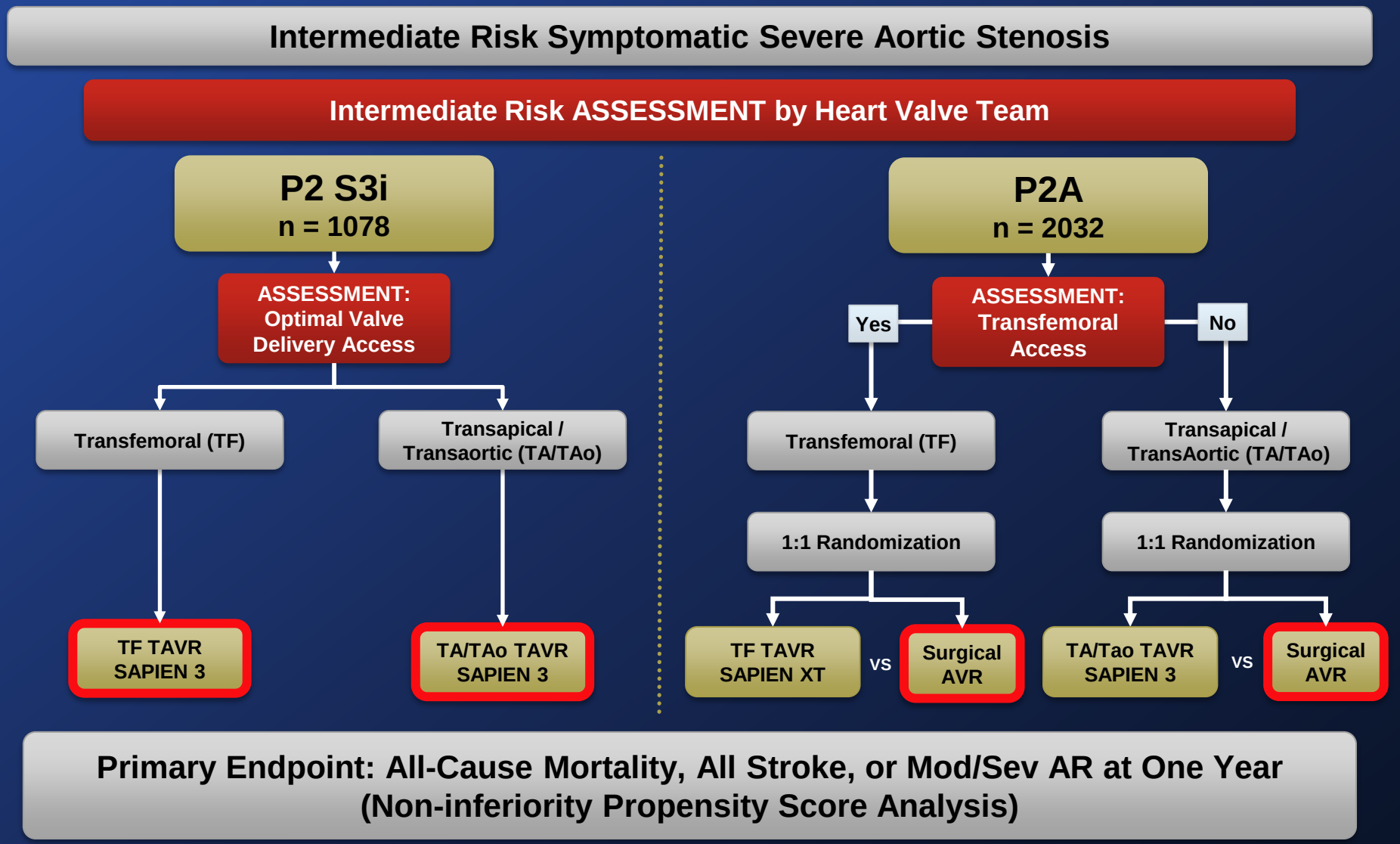
### Mortality




### Stroke



# The PARTNER 2A and S3i Trials
## Study Design



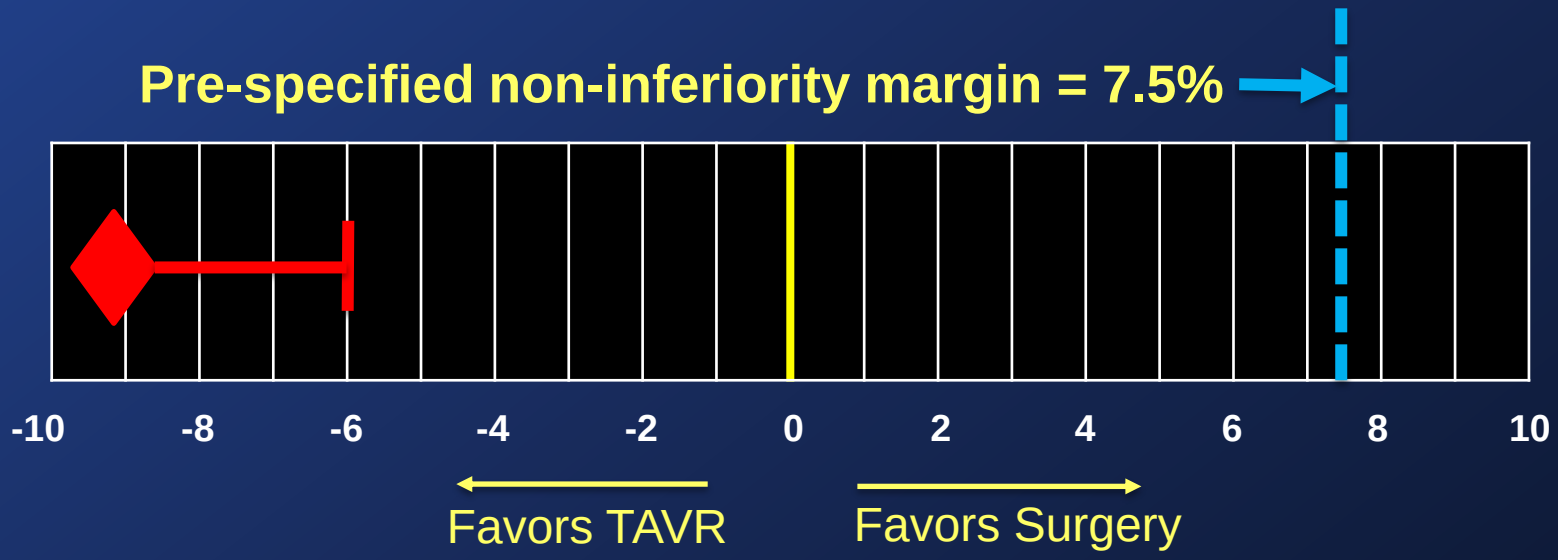
# Primary Endpoint - Non-inferiority

## Death, Stroke, or AR ≥ Mod at 1 Year (VI)

THE PARTNER II TRIAL

**Weighted Difference** **-9.2%**
**Upper 1-sided 95% CI** **-6.0%**

**Non-Inferiority**
**p-value < 0.001**




**Primary Non-Inferiority Endpoint Met**

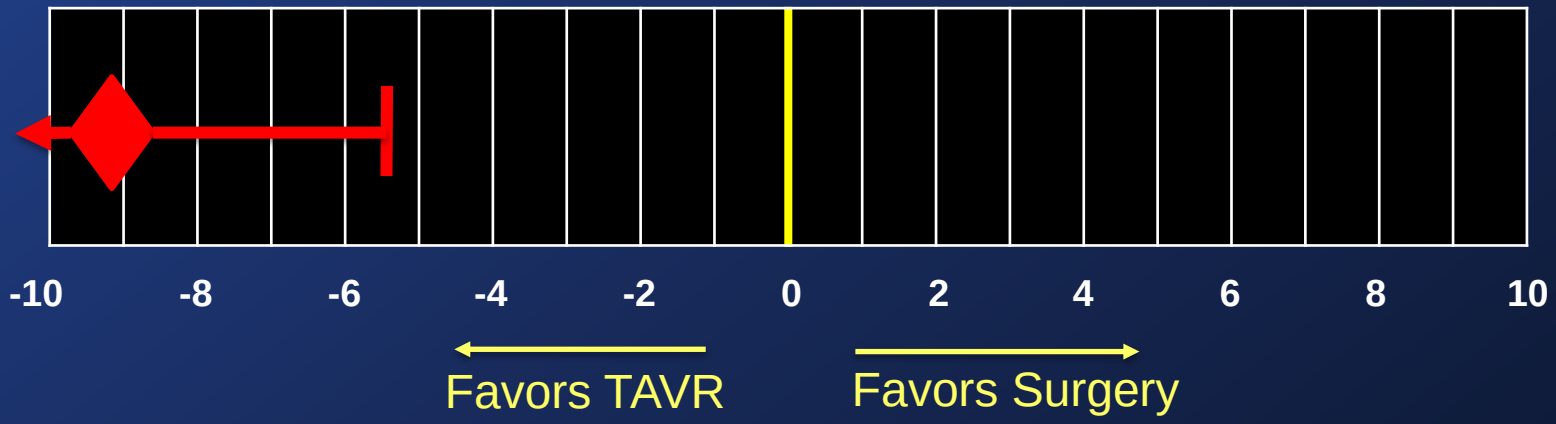
# Primary Endpoint - Superiority

## Death, Stroke, or AR ≥ Mod at 1 Year (VI)

THE PARTNER II TRIAL

**Weighted Difference -9.2%**
**Upper 2-sided 95% CI -5.4%**

**Superiority Testing**
**p-value < 0.001**

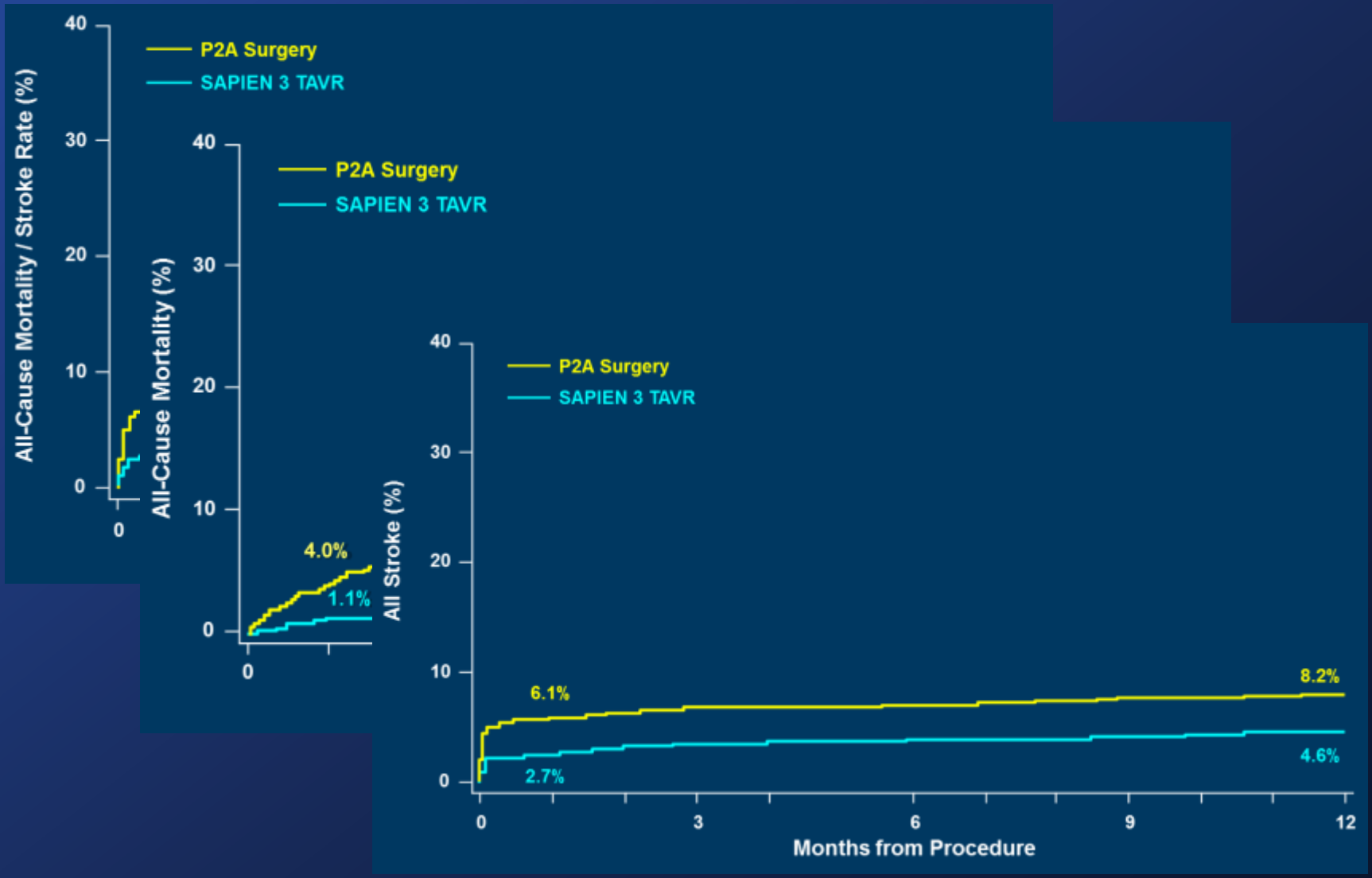



**Superiority Achieved**

# Unadjusted Time-to-Event Analysis

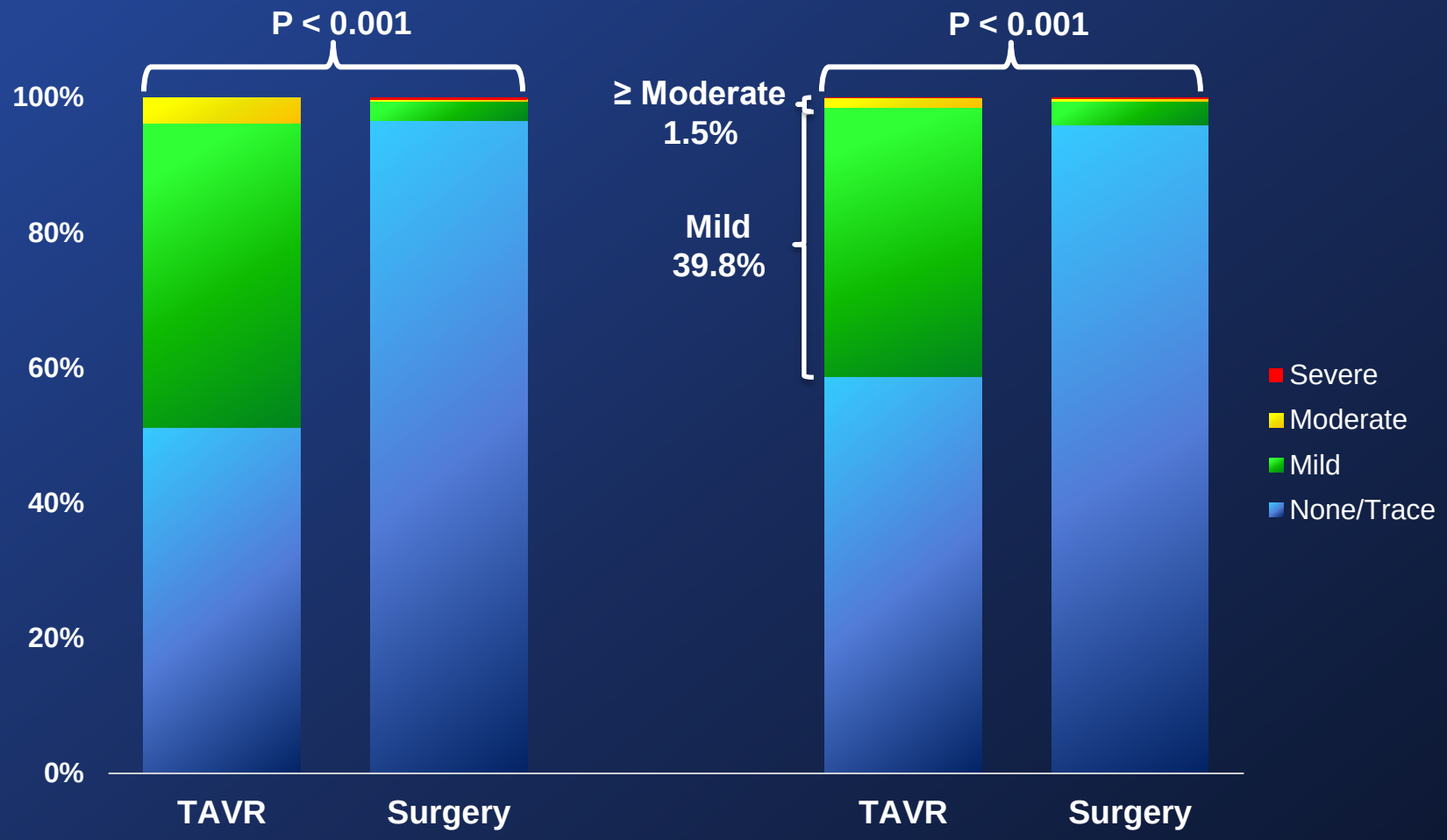
## All-Cause Mortality and All Stroke (AT)

THE PARTNER II TRIAL



# Paravalvular Regurgitation
## 3-Class Grading Scheme (VI)

THE PARTNER II TRIAL




| No. of echos | 30 Days | 1 Year |
|---|---|---|
| P2A Surgery | 755 | 610 |
| S3i TAVR | 992 | 875 |

# The PARTNER 2A and S3i Trial
## Clinical Implications

- The results from the PARTNER 2A randomized trial and the S3i propensity score analysis in > 3,100 intermediate-risk patients with severe aortic stenosis, provide strong evidence that SAPIEN 3 TAVR when compared with surgery *improves clinical outcomes and is the preferred therapy!*

# The PARTNER 2A and S3i Trial
## The NEJM and Lancet On-line

THE PARTNER II TRIAL

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

### Transcatheter aortic valve replacement versus surgical valve replacement in intermediate-risk patients: a propensity score analysis

Vinod H Thourani, Susheel Kodali, Raj R Makkar, Howard C Herrmann, Mathew Williams, Vasilis Babaliaros, Richard Smalling, Scott Lim, S Chris Malaisrie, Samir Kapadia, Wilson Y Szeto, Kevin L Greason, Dean Kereiakes, Gorav Ailawadi, Brian K Whisenant, Chandan Devireddy, Jonathon Leipsic, Rebecca T Hahn, Philippe Pibarot, Neil J Weissman, Wael A Jaber, David J Cohen, Rakesh Suri, E Murat Tuzcu, Lars G Svensson, John G Webb, Jeffrey W Moses, Michael J Mack, D Craig Miller, Craig R Smith, Maria C Alu, Rupa Parvataneni, Ralph B D'Agostino Jr, Martin B Leon

Brian K. Whisenant, M.D., Robert W. Hodson, M.D., Jeffrey W. Moses, M.D., Alfredo Trento, M.D., David L. Brown, M.D., William F. Fearon, M.D., Philippe Pibarot, D.V.M., Ph.D., Rebecca T. Hahn, M.D., Wael A. Jaber, M.D., William N. Anderson, Ph.D., Maria C. Alu, M.M., and John G. Webb, M.D., for the PARTNER 2 Investigators*

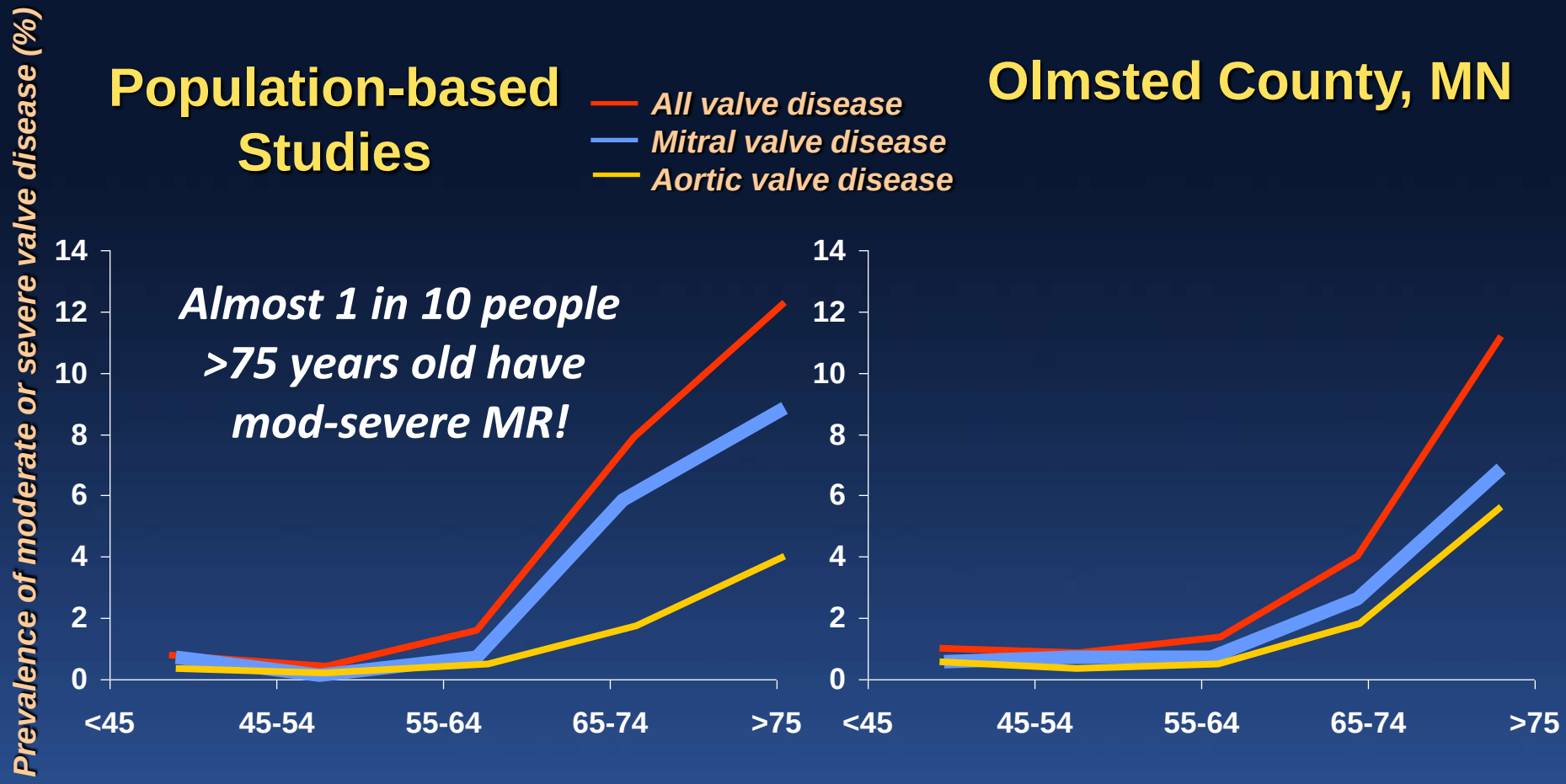
# Expanding Clinical Indications
## *A TAVR Crossroads?*

- Bioprosthetic valve failure (aortic and mitral)
- Intermediate and low-risk patients
- Low-flow, low-gradient AS
- Bicuspid AV disease
- AS + concomitant disease (CAD, MR, AF)
- Severe asymptomatic AS
- Moderate AS + CHF
- High-risk AR

# TAVR: A 10-Year Anniversary

*Legion of Honor (2012)*

# Increasing Prevalence of Valvular Heart Disease in the Elderly






Nkomo VT at al. Lancet 2006;368:1005-1011

# An Issue of COMPLEXITY

## *Anatomy and Management*

Aortic Valve

Mitral Valve

*MR comprises many diseases, some of which aren't even directly associated with mitral valve pathology!*

Simple

Complex

Cardiovascular Research Foundation

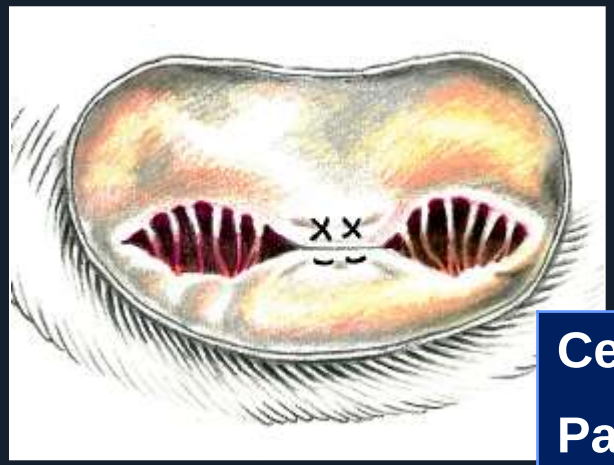
**Adapted from J. Hermiller**

Columbia University Medical Center

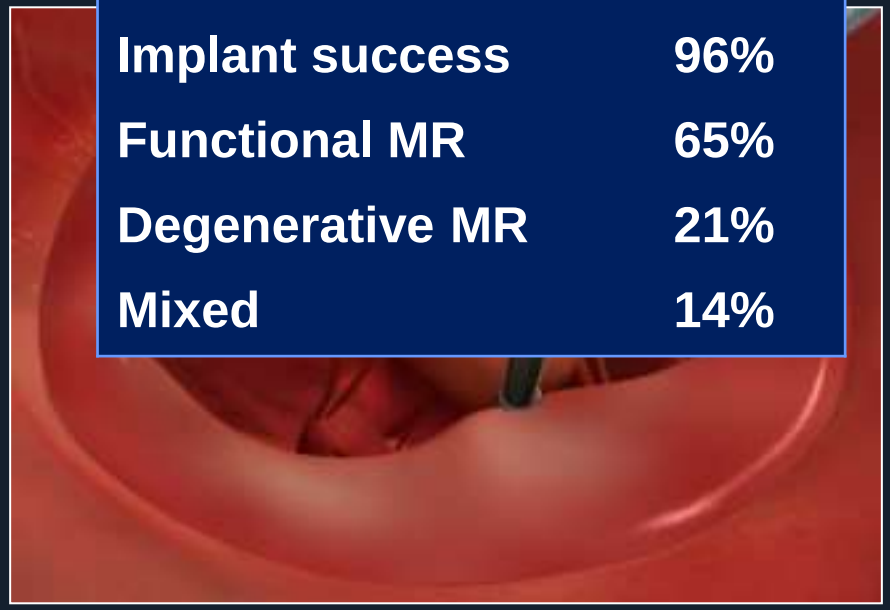
NewYork-Presbyterian

# Catheter-Based Mitral Valve Repair

## *MitraClip System*



| | |
|---|---|
| Centers | > 600 |
| Patients | >30,000 |
| Implant success | 96% |
| Functional MR | 65% |
| Degenerative MR | 21% |
| Mixed | 14% |



# COAPT: Trial Design

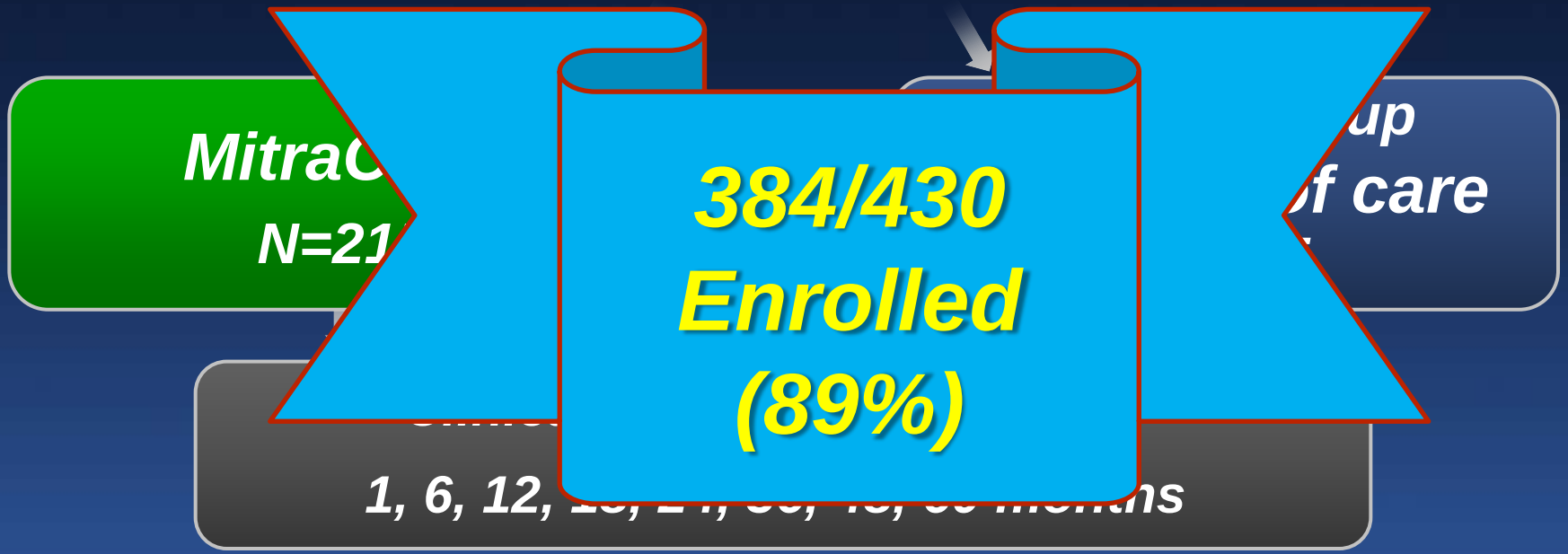
***~430 patients enrolled at up to 85 US sites***

**Significant FMR (≥3+ by core lab)**

**Not appropriate for mitral valve surgery (local heart *team)***

**Specific anatomical criteria**

**Randomize 1:1**




*PIs: Michael Mack and Gregg W. Stone*
*Sponsor: Abbott Vascular*

# Transcatheter MV Repair: Device Landscape 2015

**Edge-to-edge**
- MitraClip*
- MitraFlex

**Direct annuloplasty and basal ventriculoplasty**
- Mitralign Bident*
- GDS Accucinch*
- Valtech Cardioband*
- MVRx*
- Valcare*
- Mitraspan*
- Quantum Cor (RF)
- Micardia enCor

**Coronary sinus annuloplasty**
- Cardiac Dimensions Carillon*
- Cerclage annuloplasty

**MV replacement**
- Edwards CardiAQ*
- Edwards Fortis*
- Neovasc Tiara*
- Abbott Tendyne*
- Medtronic Twelve*
- NCSI Navigate
- Mvalve* • Direct Flow
- Micro Interventional
- Valtech Cardiovalve
- ValveXchange
- HighLife
- MitrAssist
- Cephea • Sinomed

**Other approaches**
- MitraSpacer*
- St. Jude leaflet plication*
- Cardiac Implant perc ring
- NeoChord*
- Babic chords*
- Valtech Vchordal
- Middle Peak Medical
- Mardil BACE*
- Mitralis
- Millipede

*In patients

# Mitral Annuloplasty Systems

## *Under Current development*

### Cardiac Dimensions Carillon

Indirect annuloplasty
Coronary sinus cinching

### Mitralign TAMR

- Trans-aortic
- LV implant of 1-3 annular pairs of pledgets

### GDS Accucinch

- Basal ventriculoplasty
- LV implant of 16-18 anchors

### Valtech Cardioband

- Trans-septal
- LA implant of a posterior annulus band (screw fixation)

# The TMVR "Wars"


***Competitive or Complementary?***

# Transcatheter MV Repair: Device Landscape 2015

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**Coronary sinus annuloplasty**
- Cardiac Dimensions Carillon*
- Cerclage annuloplasty

**MV replacement**

***15 new transcatheter MV Replacement Technologies***

**Other approaches**
- MitraSpacer*
- St. Jude leaflet plication*
- Cardiac Implant perc ring
- NeoChord*
- Babic chords*
- Valtech Vchordal
- Middle Peak Medical
- Mardil BACE*
- Mitralis
- Millipede

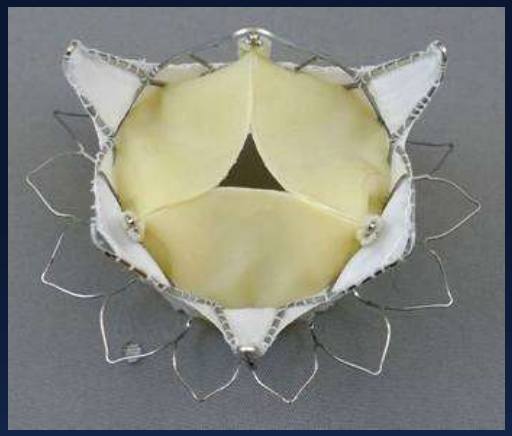
*In patients

# Transcatheter MV Replacement

## *Devices with Human Implants*

CardiAQ

Edwards Fortis



Neovasc Tiara

Tendyne

Twelve

# Summary of Clinical Experiences

## *( ~ 85 cases; compassionate use, EU high-risk registries, and U.S. EFS studies)*

- *Difficult to find patients* - high screen failure rate due to various anatomic and clinical factors (esp. annulus size and LVOT obstruction); ? optimal patient candidates
- *Multi-modality imaging requirements intense* - CTA important for screening but analysis algorithms in early stage of development; echo necessary for intra-procedural guidance – may be difficult to confirm fixation
- *System profile and access concerns (trans-apical may be problematic)* – end-stage FMR patients don't tolerate TA approach; current system profiles and stiffness limit TS
- *Ultra-sick patients with very low EF do poorly* - no reserve, little improvement, continued HF, early mortality

# Summary of Clinical Experiences

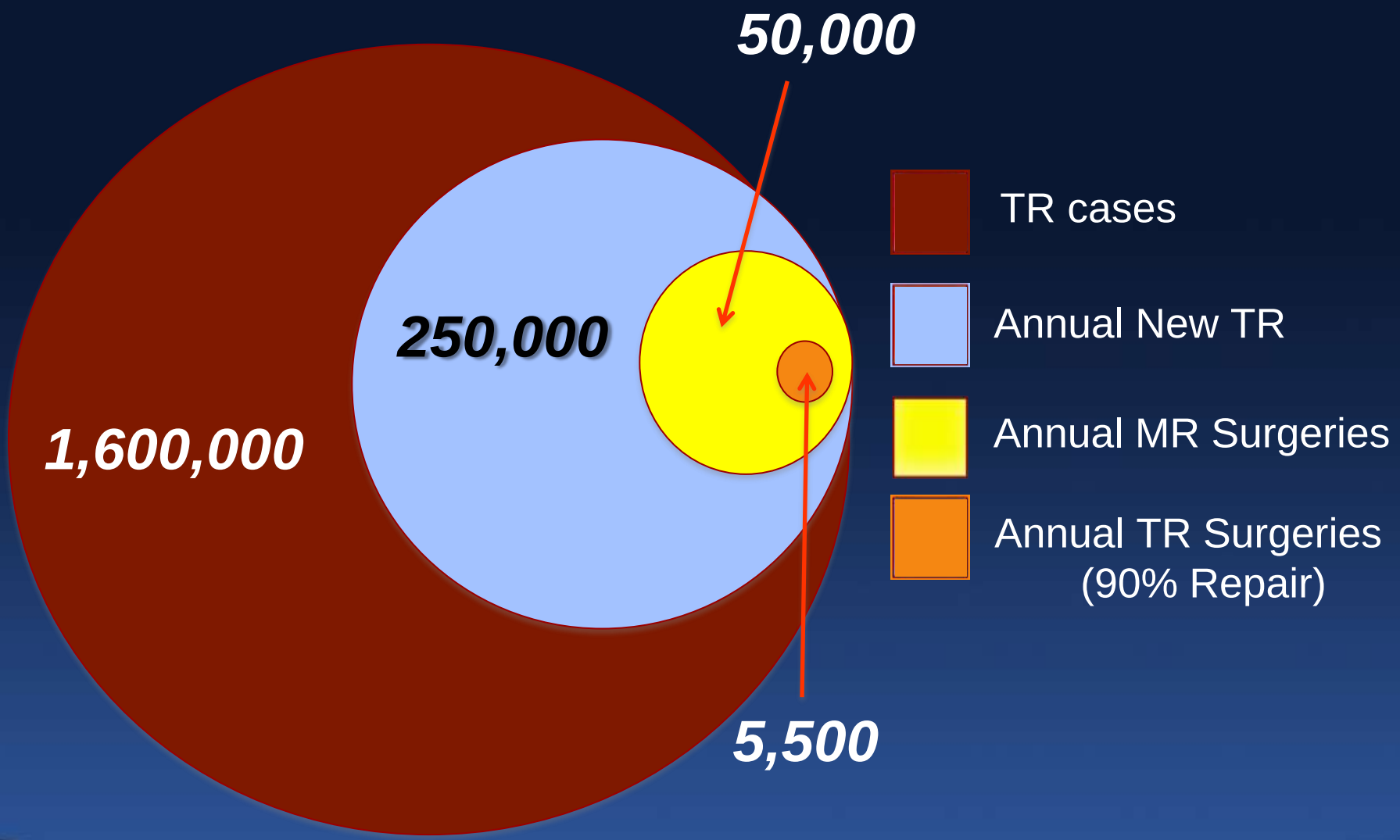
*( ~ 85 cases; compassionate use, EU high-risk registries, and U.S. EFS studies)*

- *Precise positioning difficult and device-specific -* echo-dependent and few retrieval options
- *LVOT obstruction is a definite concern -* requires careful planning and shallow LV device footprint
- *Excellent MR reduction observed -* with correct sizing and positioning, MR is usually eliminated
- *PVR uncommon, but still can be problematic* - unusual cases with PVR but not well tolerated (mainly hemolysis)
- *Device thrombosis is a serious issue* - requires careful anti-coagulation for at least several months
- ***In less sick patients with correct positioning, clinical outcomes have been gratifying!***

# TMVR: Roadmap for Success

- There is unbridled enthusiasm for continued device growth in the transcatheter mitral space, esp. TMVR - beware “buyer’s remorse”, reset expectations and anticipate a step-wise incremental growth trajectory during the next decade in response to iterative device refinements and validating clinical trial data.
- *Expect many speedbumps and longer gestation times before these TMVR devices are fully realized and they must be integrated with transcatheter repair strategies and surgery!*

# TR is Currently Undertreated

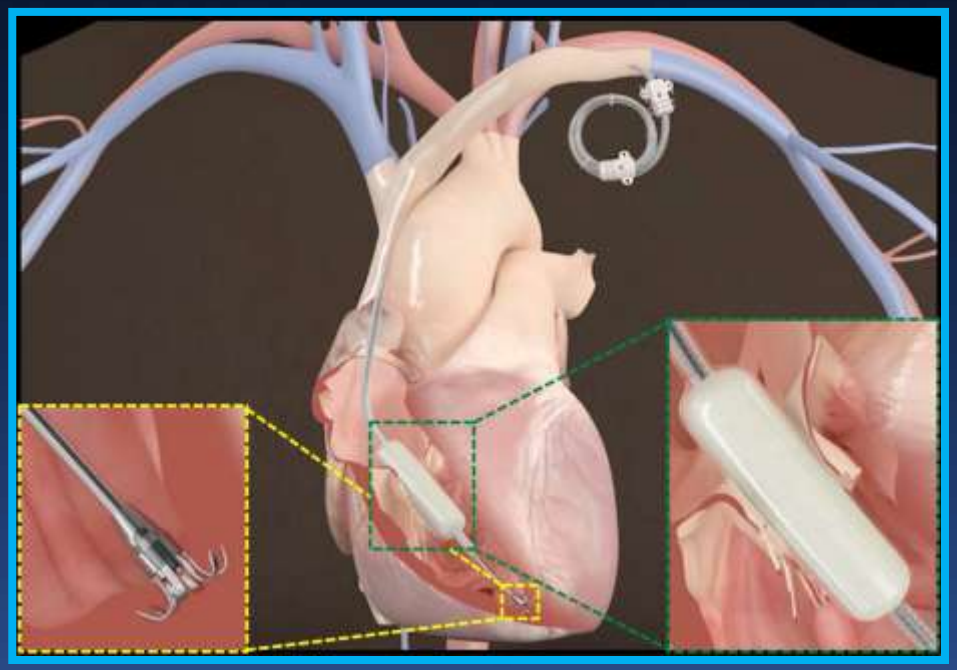



Argarwal et al. Circ Cardiovasc Interv 2009;2:565-73

# Edwards FORMA Repair System

## *Designed to restore leaflet coaptation*

FORMA System Consists of:



***Spacer***

- Positioned into the regurgitant orifice
- Creates a platform for native leaflet coaptation

***Rail***

- Tracks spacer into position
- Anchored distally and proximally

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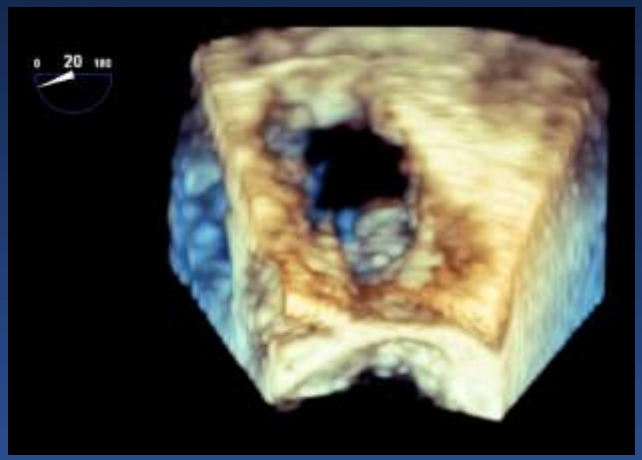
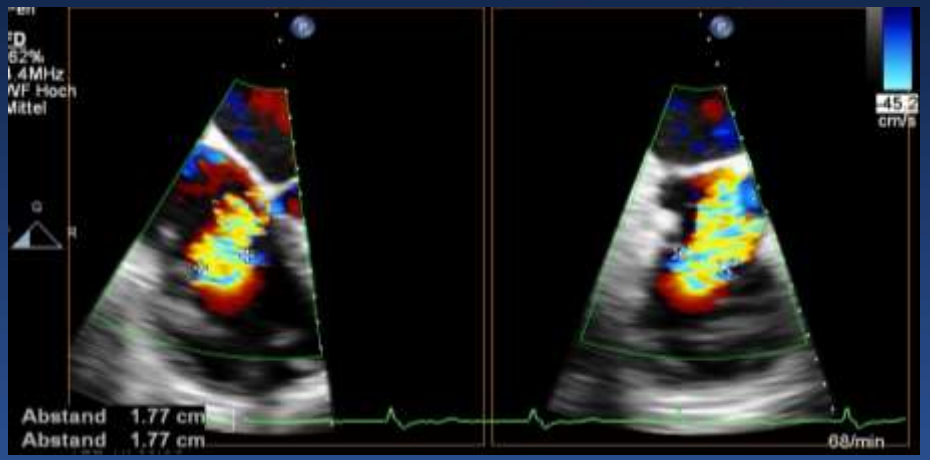
http://dx.doi.org/10.1016/j.jacc.2015.01.025

# First-in-Human Transcatheter Tricuspid Valve Repair in a Patient With Severely Regurgitant Tricuspid Valve

Joachim Schofer, MD,* Klaudija Bijuklic, MD,* Claudia Tiburtius, MD,* Lorenz Hansen, MD,* Adam Groothuis, PhD,† Rebecca T. Hahn, MD‡

J Am Coll Cardiol 2015;65:1190–5

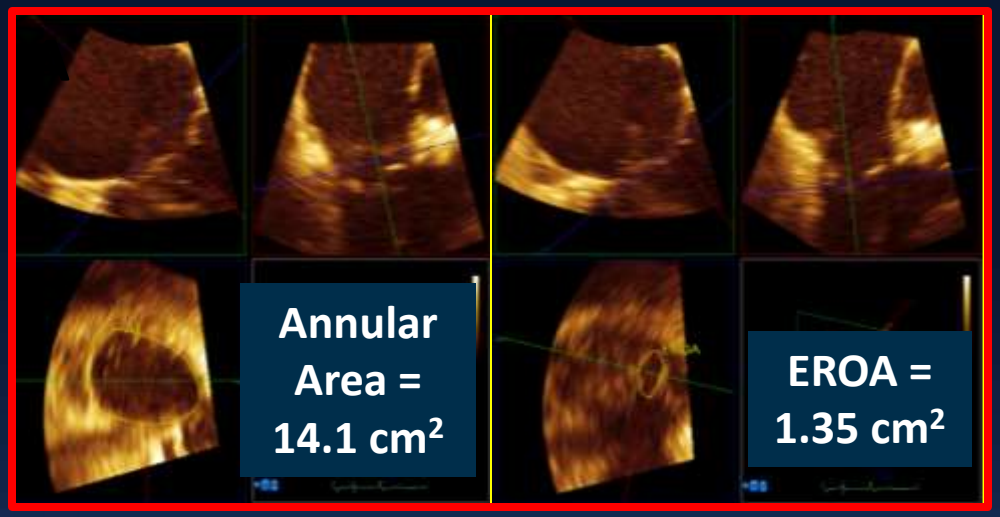


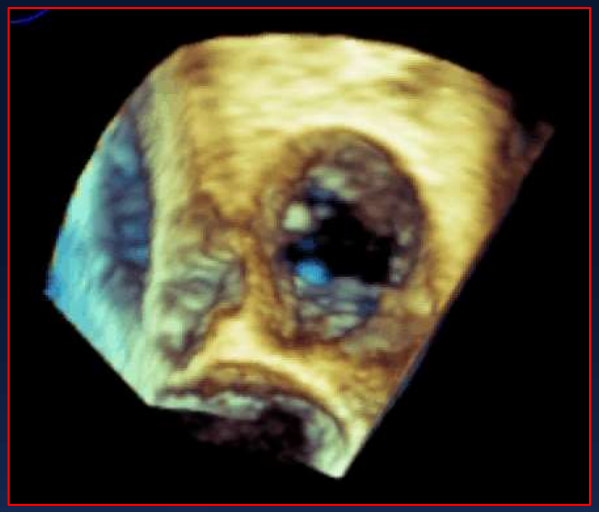



**Severe Isolated Primary Tricuspid Regurgitation**

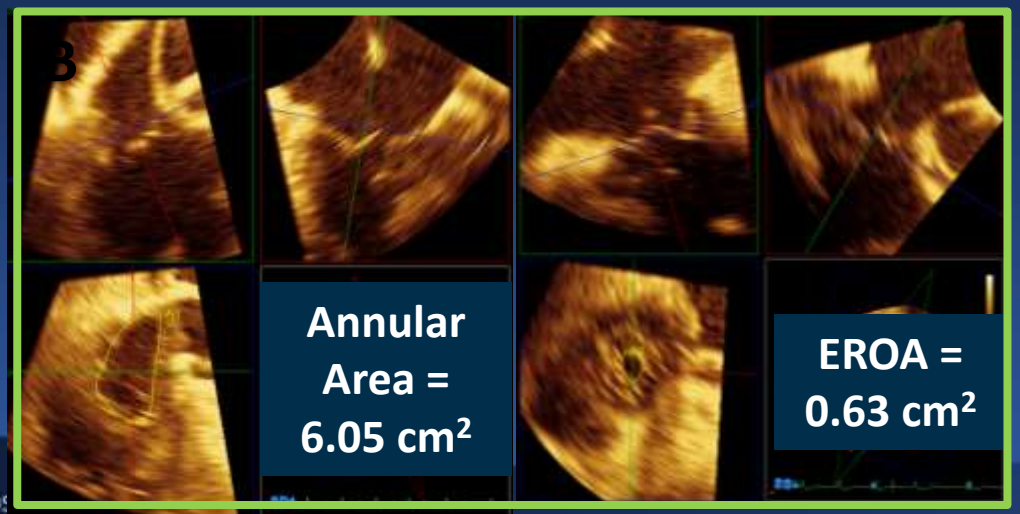
# Trialign - Final 3D TEE Result

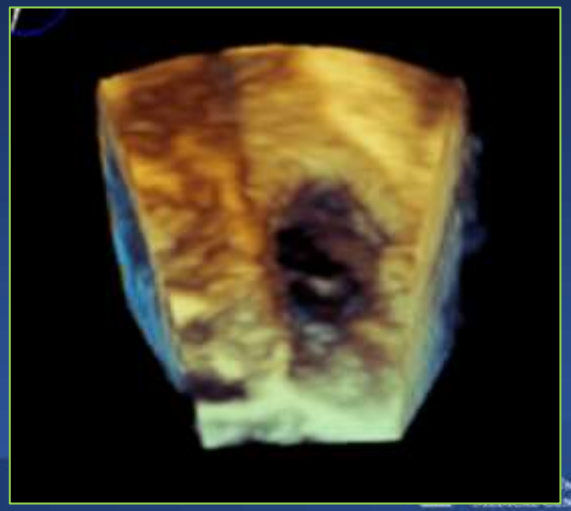
*Baseline*



*Post-Transcatheter Tricuspid Annuloplasty*

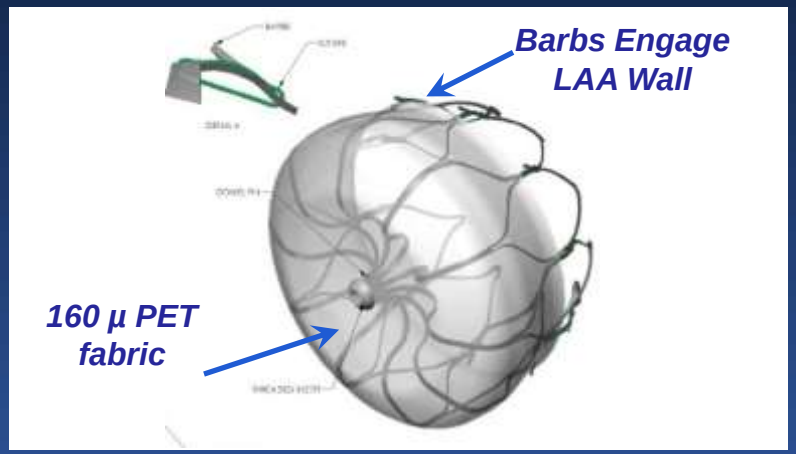


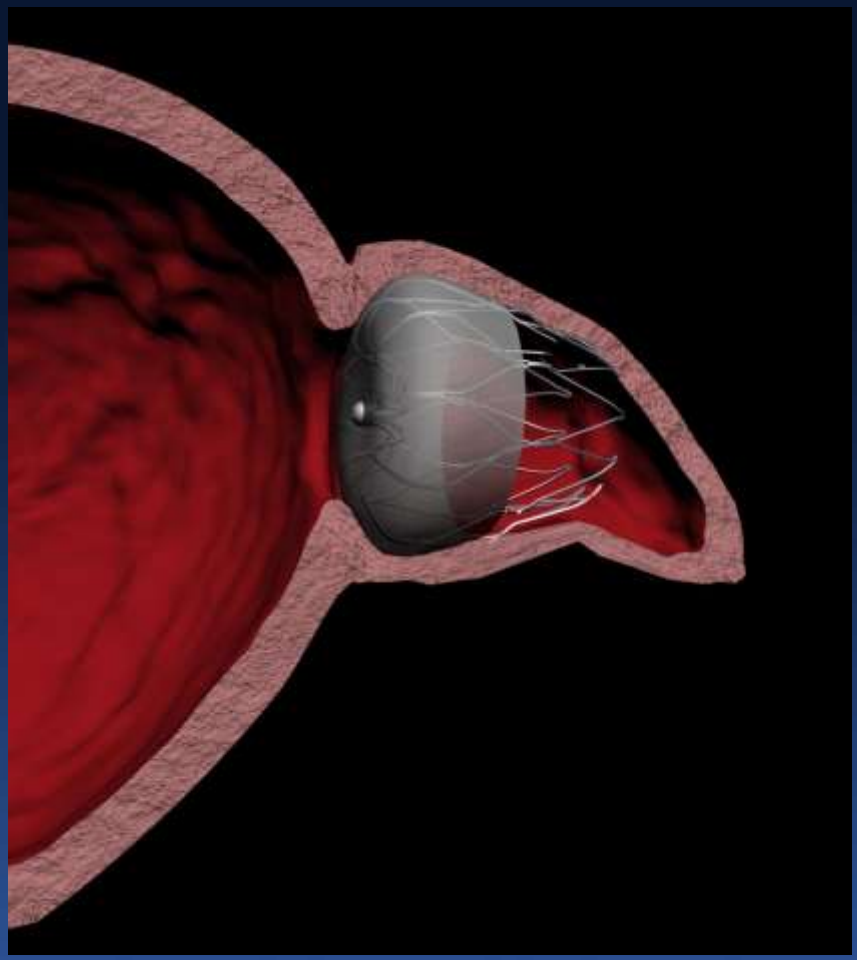



# LAAC: An Important Structural Therapy

## *Stroke Prevention in AF Patients*

- ***Difficulties with Warfarin use***
  - **Frequent Monitoring**
  - **Difficulty in Compliance (TTR 48-63%)**
  - **Drug / Diet Interactions**
  - **Bleeding Risk (ICH)**
  - **Risks in Elderly (falls, poly-pharmacy)**
- ***Autopsy & TEE data implicate LAA***
- ***LAA Closure Devices Beneficial***



# LAAC: An Important Structural Therapy

- *Fulfills a growing clinical need* – stroke prevention in AF patients wo chronic anti-coagulation (esp. high stroke risk/high bleeding risk patients).
- *Multi-disciplinary heart team* – EP/IC operators, neurology, imaging specialists, and cardiologists
- *Requires adjunctive imaging (CT/echo)* for screening and procedural guidance
- *Structural interventional skills* necessary
- *Growing EBM validation* = clinical value proposition
- Many familiar issues: economics/reimbursement considerations, market development, competitive pharmacology (NOACs), and many new devices in the future.

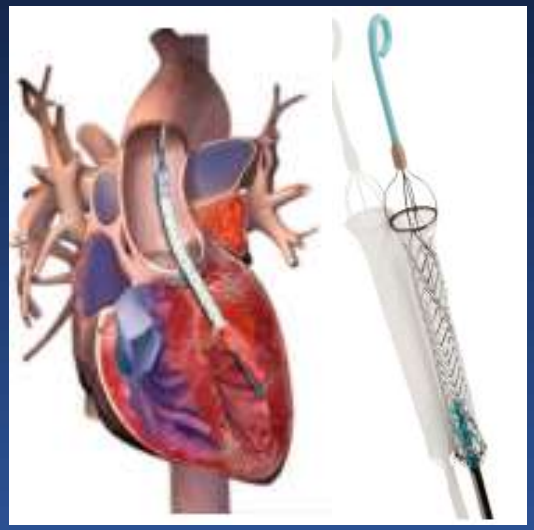
# Heart Failure Therapies
## *(The next "big breakthrough"?)*

- Heart failure is the major driver of mortality, morbidity, and cost in the CV arena, now and in the future!
- Requires a comprehensive multi-disciplinary and multi-factorial approach with greater emphasis on device-based diagnostics and novel therapies.
- The new specialty of *interventional heart failure* will require customized training spanning the range from pharmacotherapy to electrophysiology to advanced mechanical circulatory support and to other new interventional device approaches.

# Heart Failure Therapies
## *(The next "big breakthrough"?)*

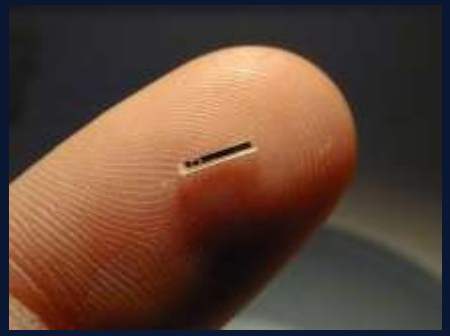
- Mechanical circulatory support
- Sensors to monitor therapy
- LV remodeling devices
- Contractility modulation
- Micro-VADs (interventional)
- Inter-atrial shunt implants
- Stem cell therapies

*Advanced catheter-based hemodynamic support devices are under-utilized and will be a mainstay of acute HF, shock therapy, and protected PCI in the future!*

*Thoratec PHP*

# Implantable Sensors for CHF



- **CardioMEMS**
- Simple PA artery implant
- Continuously monitors PA pressures (RF-powered, no battery)
- PA measurements by patients from home transmitted to a secure database and available to the physician for therapy changes

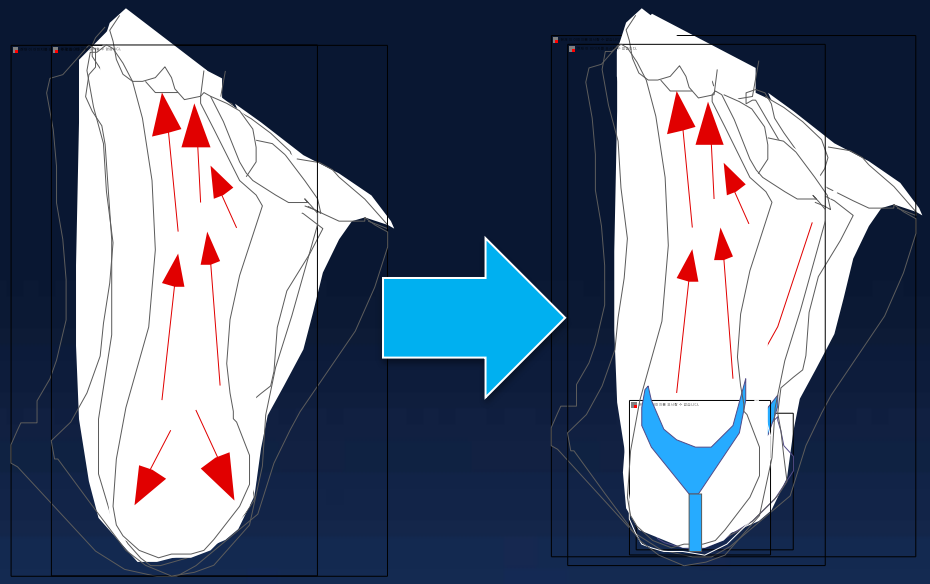
- **CHAMPION trial**
- Evaluate the safety and efficacy of the HF Pressure Measurement System in reducing heart failure (HF) related hospitalizations
- ***550 randomized pts with HF***
  - ***30% reduction in hosp at 6 mos***
  - ***38% reduction in hops over entire randomized period***

# Percutaneous Ventricular Restoration

## *Treatment Goal*

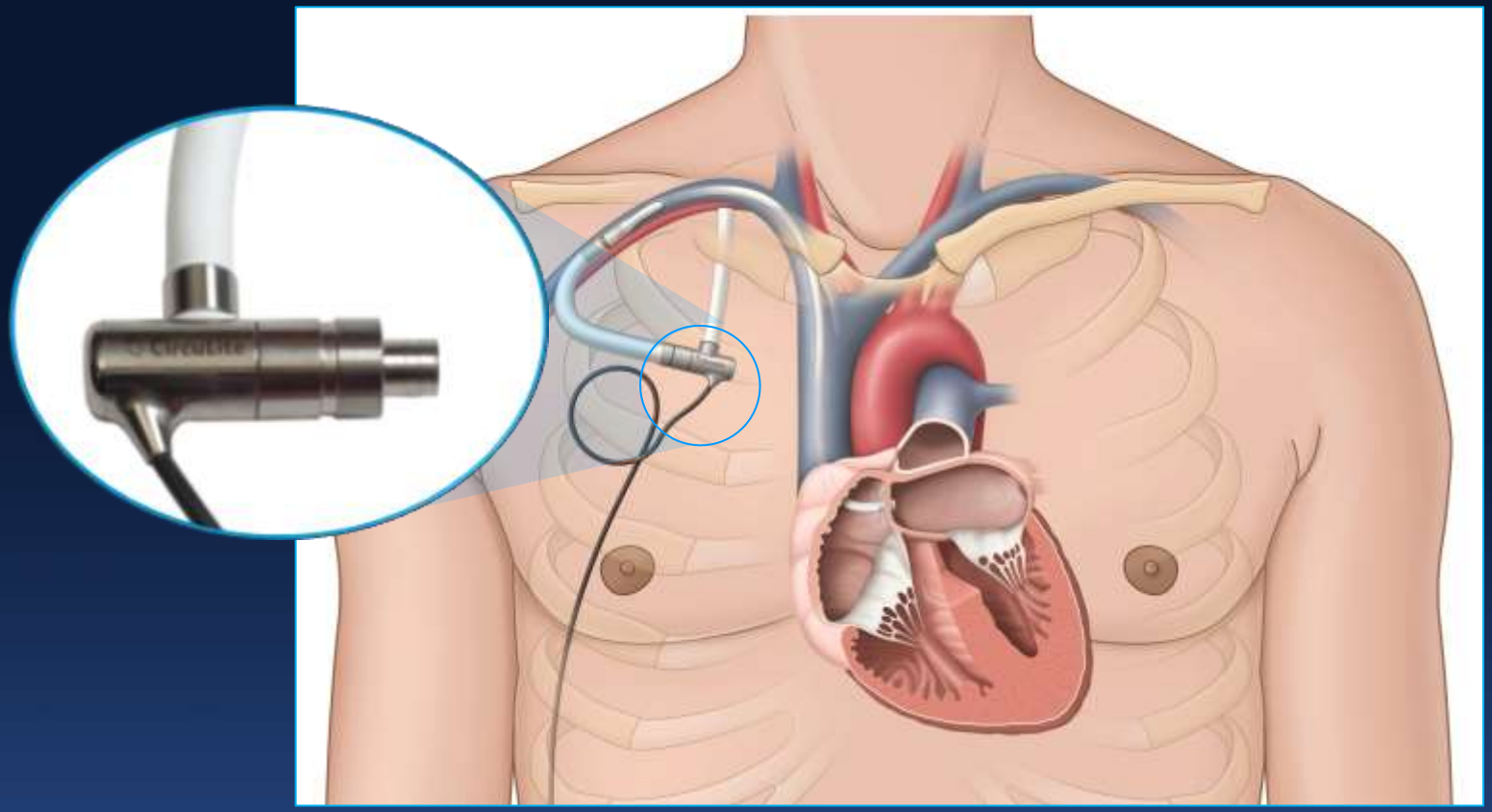
**Improve hemodynamics by:**

- Partition Scar
- LV Volumes Reduction
- LVED Pressure Reduction
- Restoring LV Conical Shape
- Not preventing Torsional Contraction
- Not causing arrhythmias



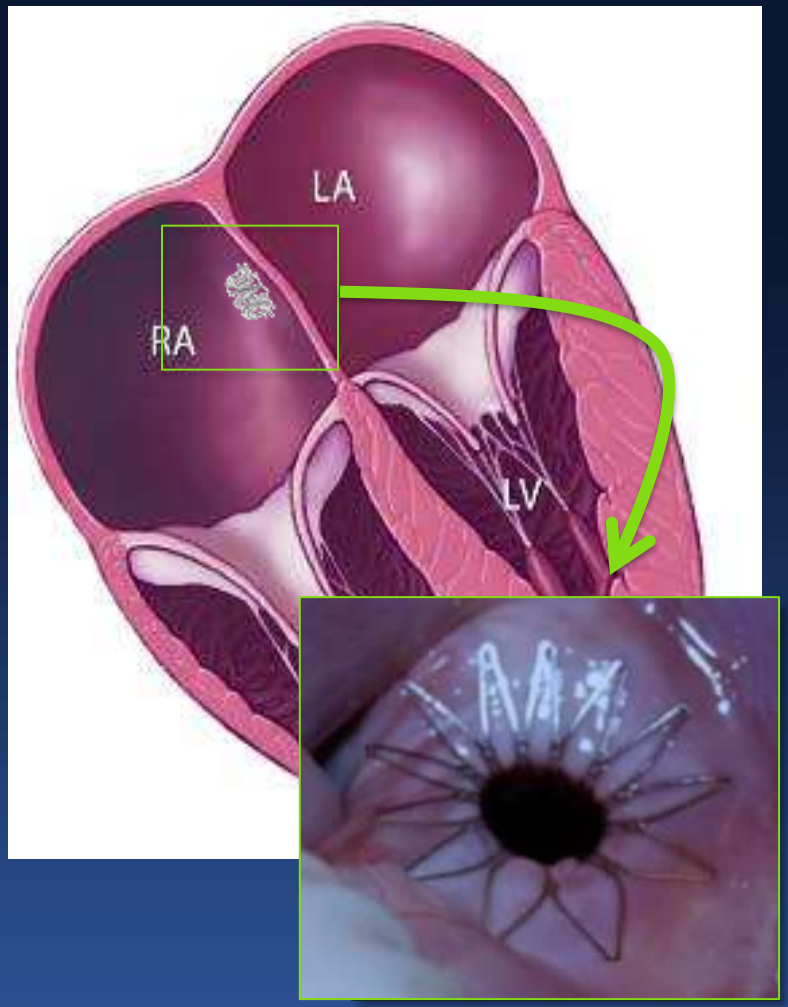
***Procedural aspects similar to a standard PCI***
***(Duration – 80 min / Flouroscopy time – 20 min)***

# CircuLite Micro-VAD System



- *Inflow cannula  transeptal in LA via the subclavian vein and RA by the interventional cardiologist*
- *Outflow graft attached to Subclavian Artery*

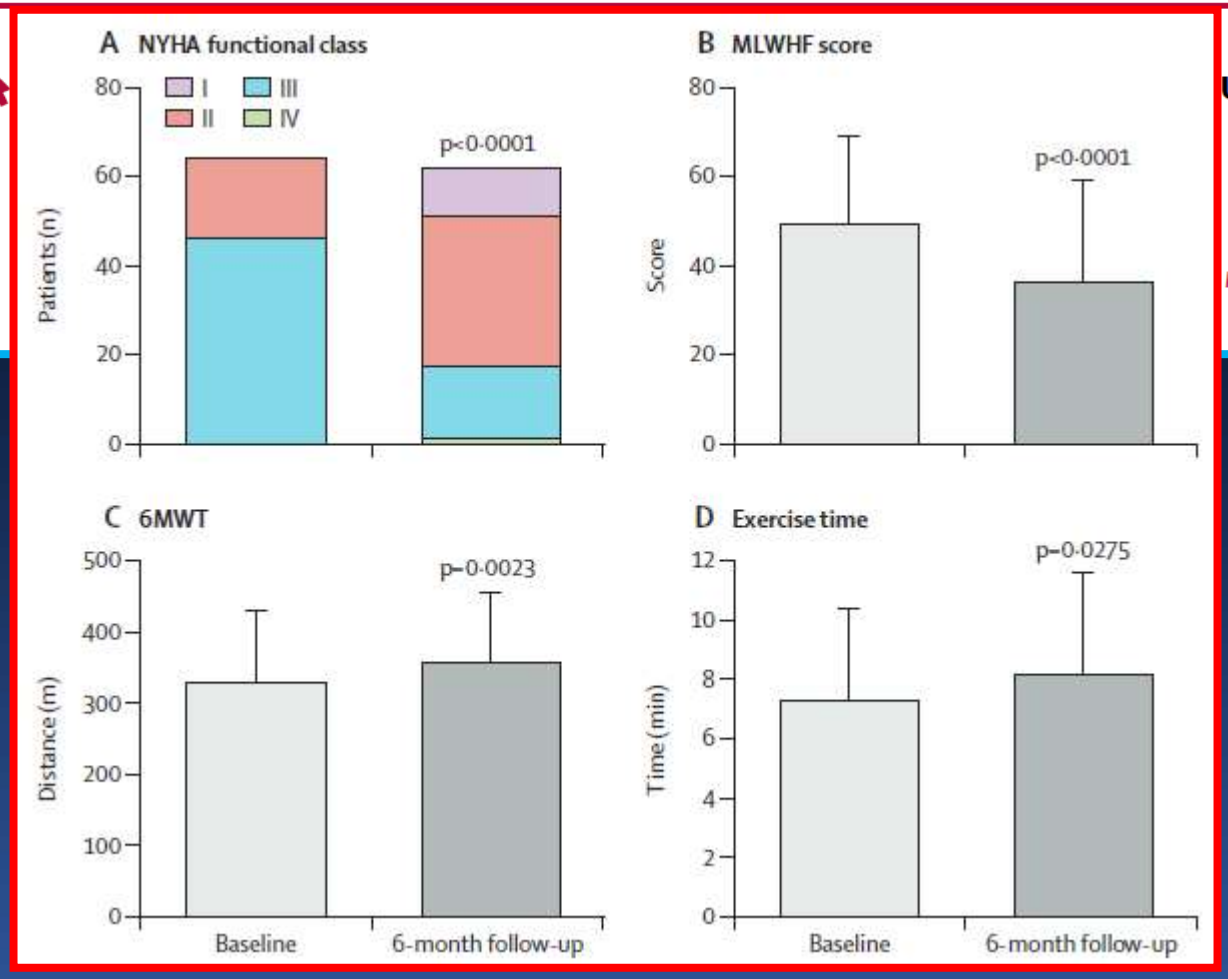
# Inter-Atrial Shunt Devices (IASD)
## *(Corvia and V-wave)*




- High LA pressures (LAp) and pulmonary congestion are the common link in both HFrf and HFpf
- Transcatheter implant to create permanent interatrial shunt to decompress the elevated Lap without reducing CO

*V-wave*

# Inter-Atrial Shunt Devices (IASD)
## *(Corvia - HFpEF)*



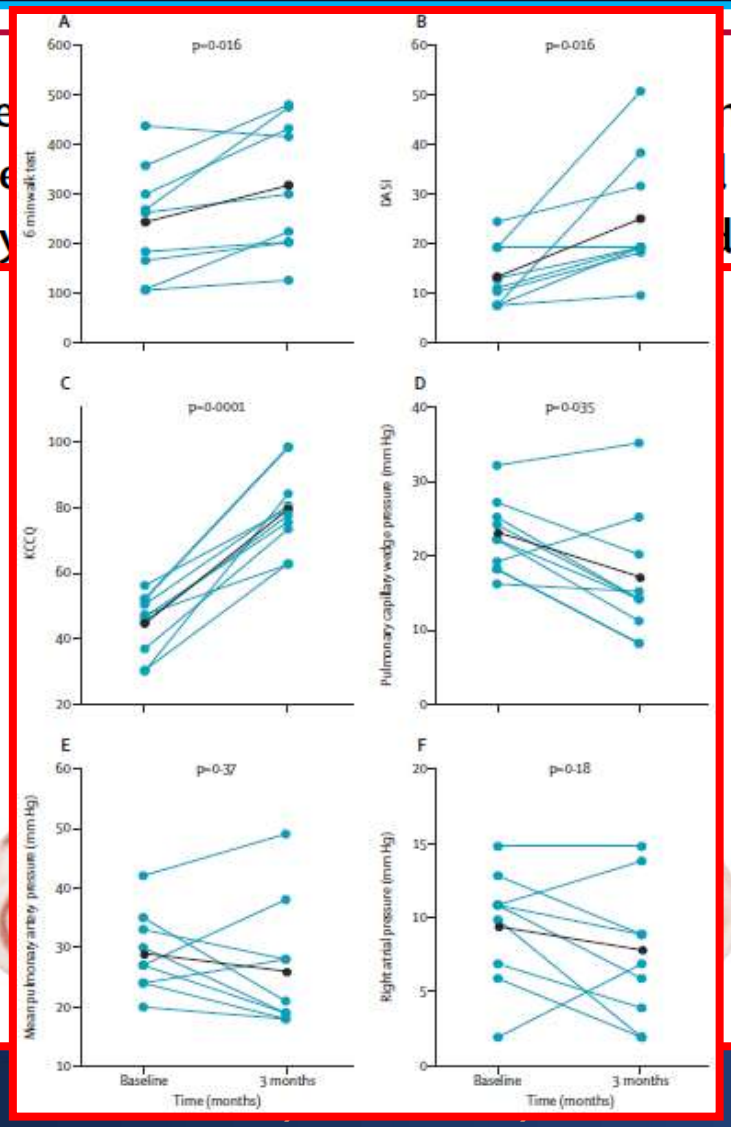

*Lancet 387; March 26, 2016*

# Inter-Atrial Shunt Devices (IASD)

## *(V-Wave - HFrEF)*

Unidire … nting for treatment
of patie … ejection fraction:
a safety … dy

Maria Del Tr … elo-Parada, Omar Abdul-Jawad Altisent,
Ander Regue …




Cardiovascular Research Foundation

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# IC 2016: An Evolving Landscape

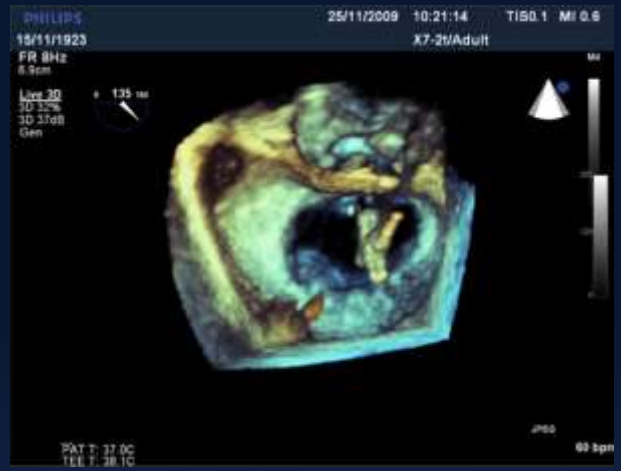
## Final Thoughts

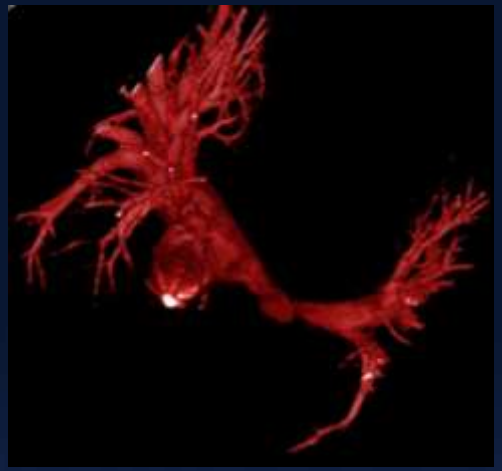
# The Structural Revolution

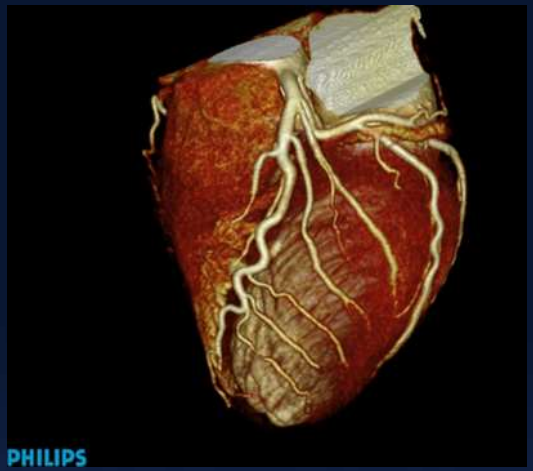
## *Special Skills and Common Features*

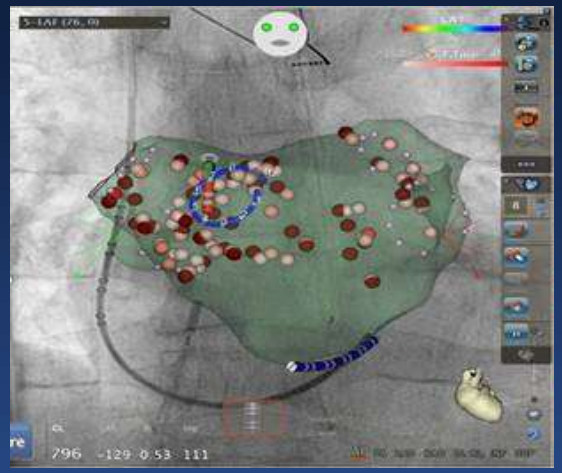
- *Intensely multi-disciplinary* – multiple heart team models (e.g. LAAC = EP, IC, imaging, neurology, and clinical cardiology).
- *Multi-modality imaging* for case screening and frequent TEE intra-procedural guidance.
- *Access and closure skills* – TS required and TA often necessary; endovascular experience for trans-vascular access/closure with large catheters (esp. important for complication management).
- *Interventional environment familiarity* (cath lab/hybrid OR and catheter/guidewire skills)

# 3D Imaging - The Path to Holography





- ***Advanced 3D acquisition technologies making high quality volumetric 3D a reality***
- ***Proven clinical value for structural interventions (3DTEE, 3DRA, 3D/4DCT, Electroanatomical maps)***

**Images: Courtesy of Philips Healthcare**

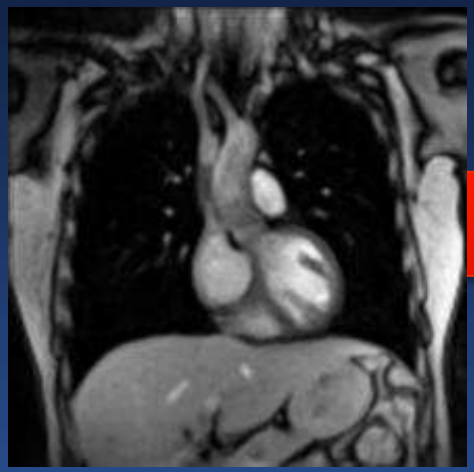
# First in Human - Holographic Images

- *Real time clinical holographic images*
- *16 yo girl with secundum ASD for transcatheter closure*

*Courtesy of E. Bruckheimer*

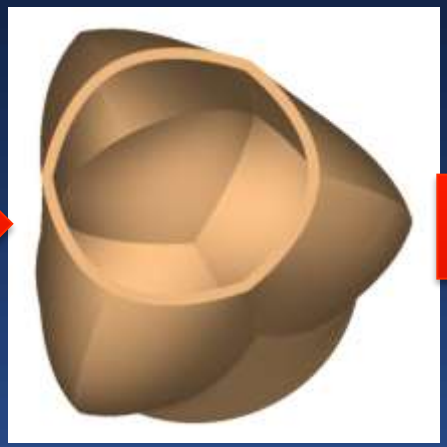
# 3D Bioprinting: The Unlimited Potential of Automated Tissue Engineering Processes

***Biocompatible Matrix*** + ***Cells*** + ***Cell friendly printing conditions***



***Patient Scan***

***Modeling Software***



***Solid Model File***

***3D-Bioplotter***

***Printed Valve***

**Daniel B. Spoon, MD**

Cardiovascular Research Foundation

Columbia University Medical Center
NewYork-Presbyterian

# Interventional Cardiology

## *The Next Decade!*

***There's never been a better time to be an interventional cardiologist!***

# Interventional Cardiology

## *The Next Decade!*

***Our Message:***
***ADAPT***
***and***
***EVOLVE!***

# The Future of IC

## *It's All About the Patients!*


*First Cypher S* *rst TAVR*