From PTCA to TAVR: Have We Fulfilled Gruentzig's Dream?

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CARDIOVASCULAR RESEARCH FOUNDATION
A Passion for Innovation

COLUMBIA UNIVERSITY MEDICAL CENTER
NewYork-Presbyterian

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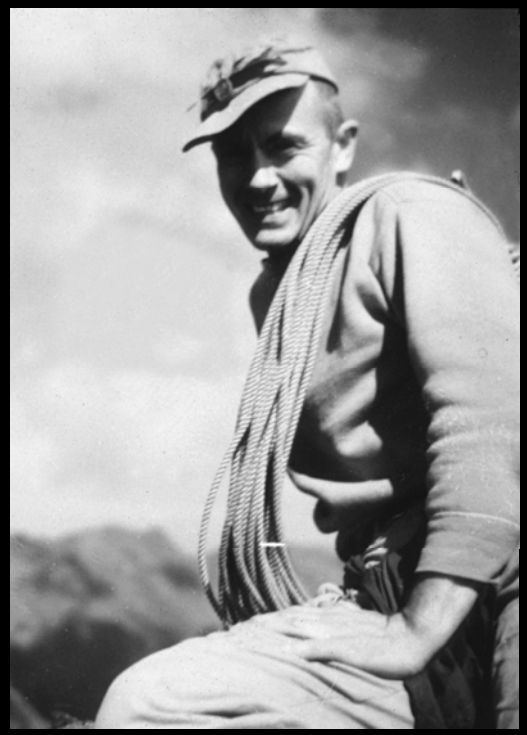
Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

Affiliation/Financial Relationship	Company
• Grant/Research Support	• Abbott, Boston Scientific, Edwards Lifesciences, Medtronic
• Consulting Fees/Honoraria	• Meril Lifescience, Angioscore, Micell, Symetis
• Major Stock Shareholder/Equity	• Caliber, Sadra, Claret, Coherex, Medinol, Valve Medical, Backbeat, Impulse Dynamic, Angiometrix, GDS, Mitralign, Apica

The Early Pioneers

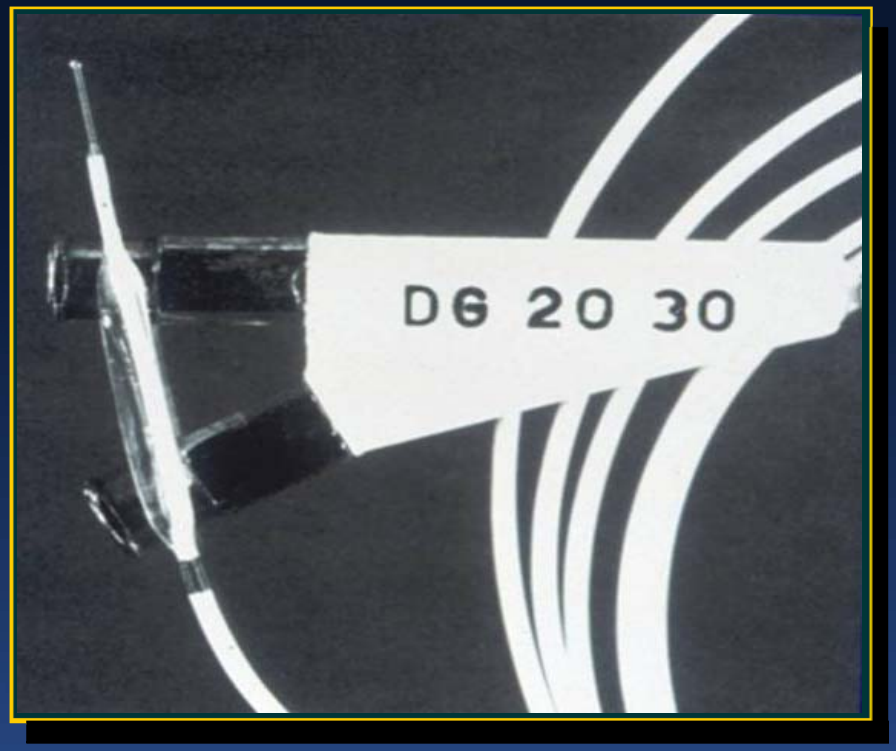
Forsmann

Sones

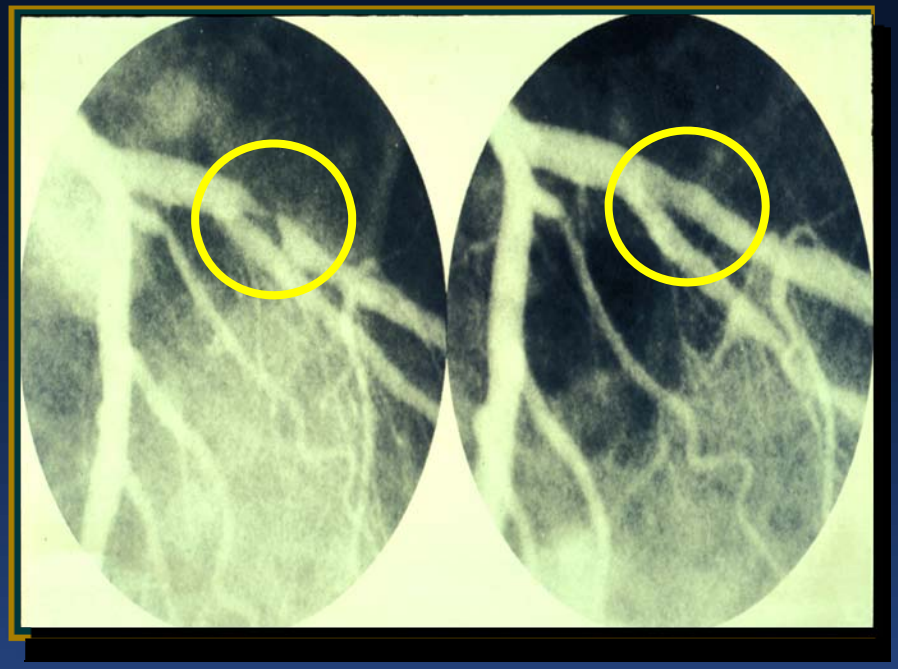


Dotter

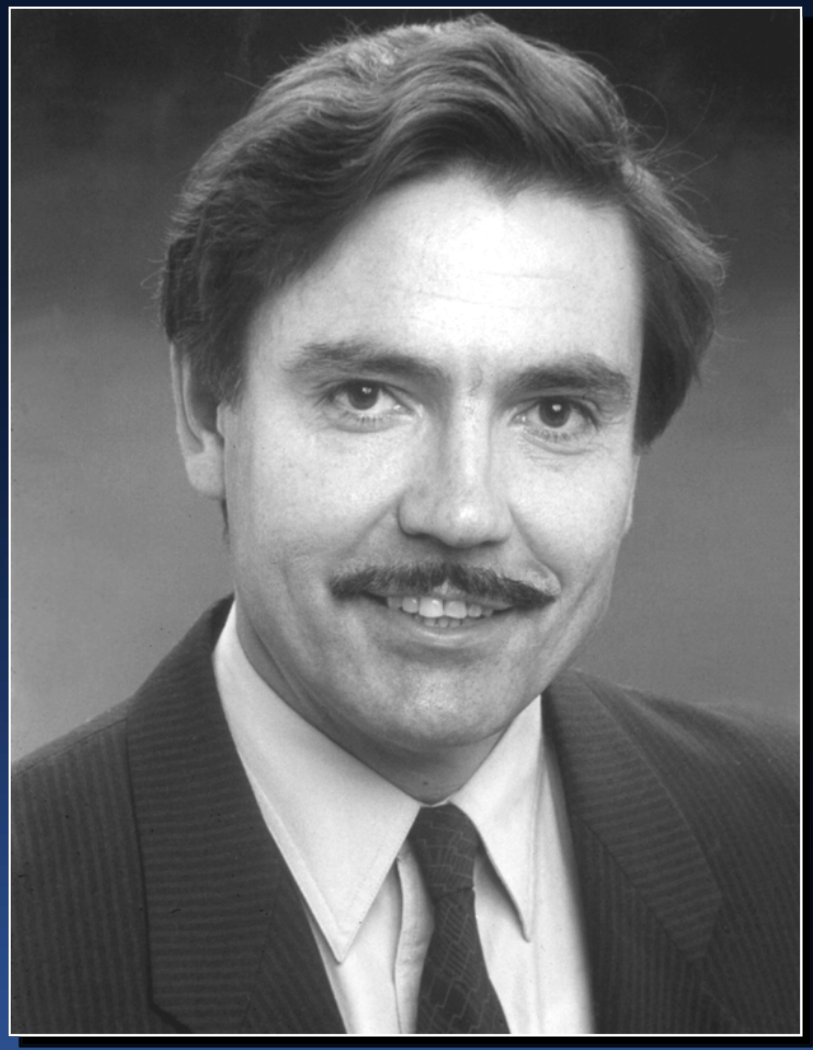
Andreas' Tools



Andreas' Results



The Founder of PTCA!



Andreas Gruentzig
1939 - 1985

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

Gruentzig's PTCA Principles…

- *SAFE* - minimize major complications (including abrupt closure and need for surgical backup)
- *PREDICTABLE* - consistent procedural results (in all lesions and all patients)
- *APPROPRIATE APPLICATION* - (1) only treat clinically significant lesions (e.g. measure trans-lesion gradients); (2) conservative expansion from simple to more complex lesion subsets
- *DEFINITIVE OUTCOMES* - (1) optimize acute angiographic results; (2) minimize restenosis
- *EVIDENCE-BASED MEDICINE* - committed to rigorous clinical research to identify complications and justify clinical applications (e,g, NHLBI PTCA Registry)

Gruentzig's PTCA Principles…

- *TECHNOLOGY INNOVATION* - relentless effort to improve all aspects of interventional device technology, advanced angiographic imaging, and cath lab milieu
- *MULTI-DISCIPLINARY APPROACH* - apply principle of less-invasive catheter-based treatment of remote lesions across different vascular beds and by different subspecialty therapists (ie. training and commitment overrides territorial specialist considerations)

From PTCA to TAVR

PTCA and Early Stents

The Saga of Balloon Angioplasty

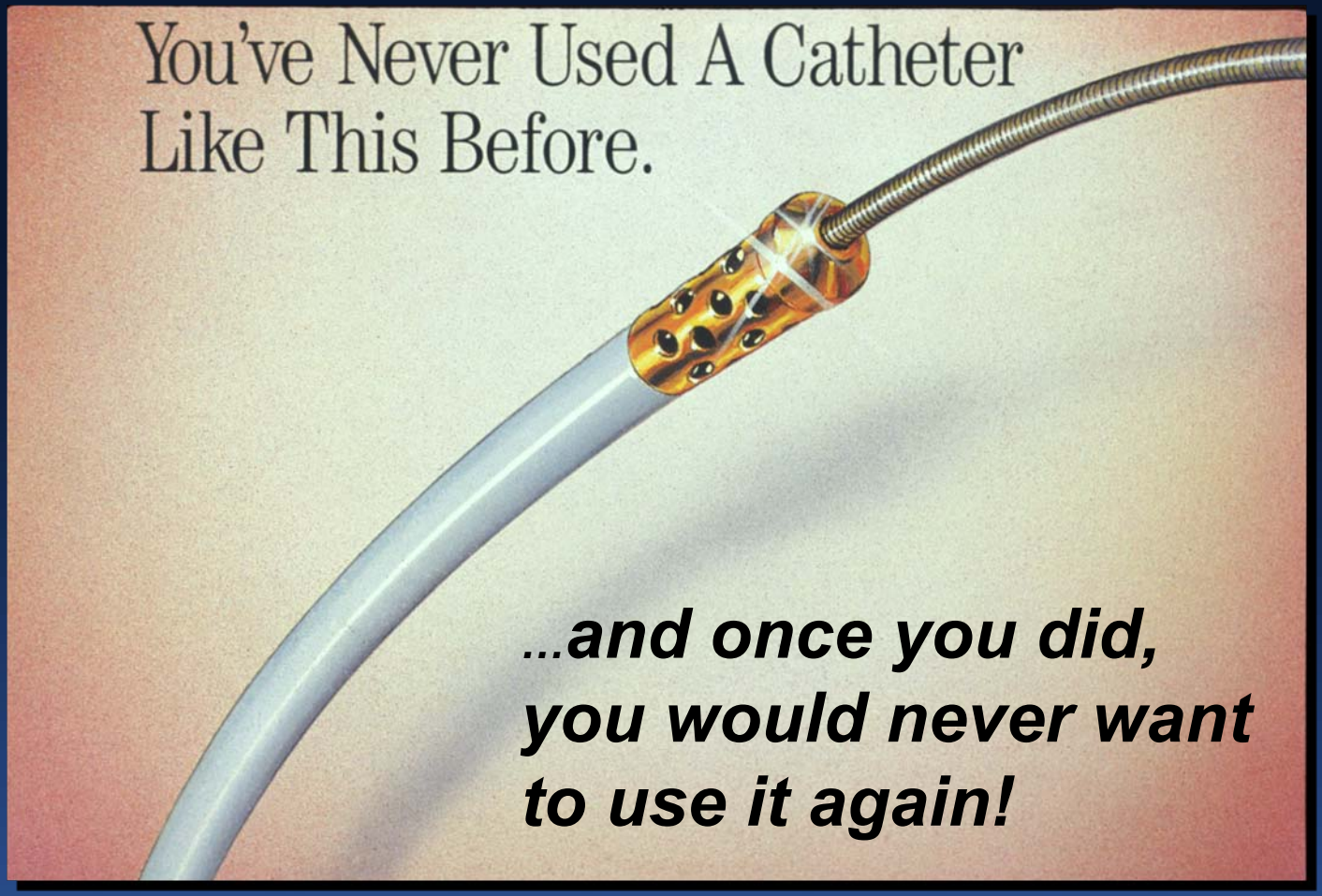
- ✓ Frequent dissections, recoil and poor angiographic outcomes
- ✓ Acute closure (surgical backup required)
- ✓ Ineffective in calcified (and other) lesions
- ✓ RESTENOSIS!!!

Not Good Enough!

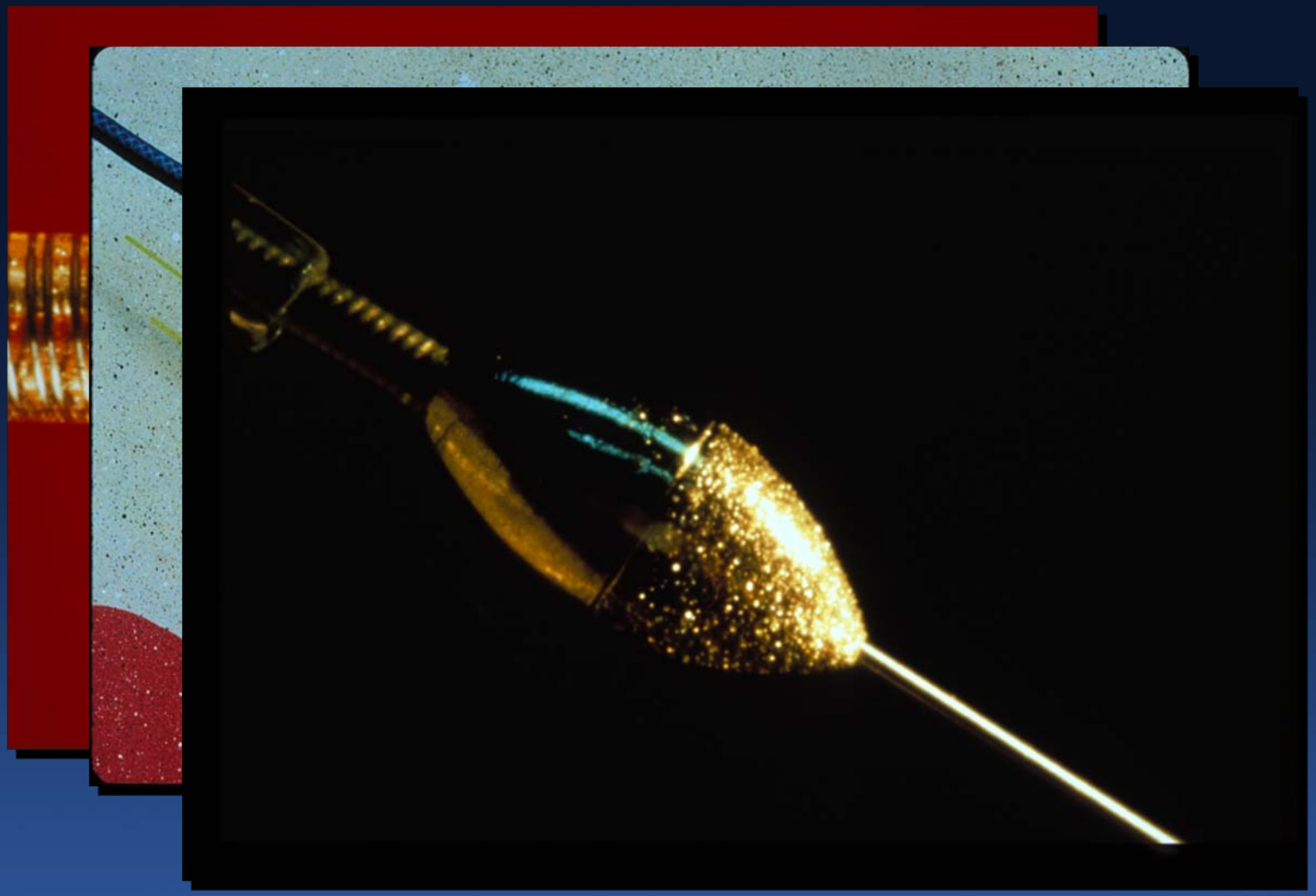
The "New Device" Era

- *Laser Angioplasty*
- *Atherectomy* (directional, rotational, and extraction)
- *Stents* (the early days)

Laser “Hot Tip” Catheter



Coronary Atherectomy

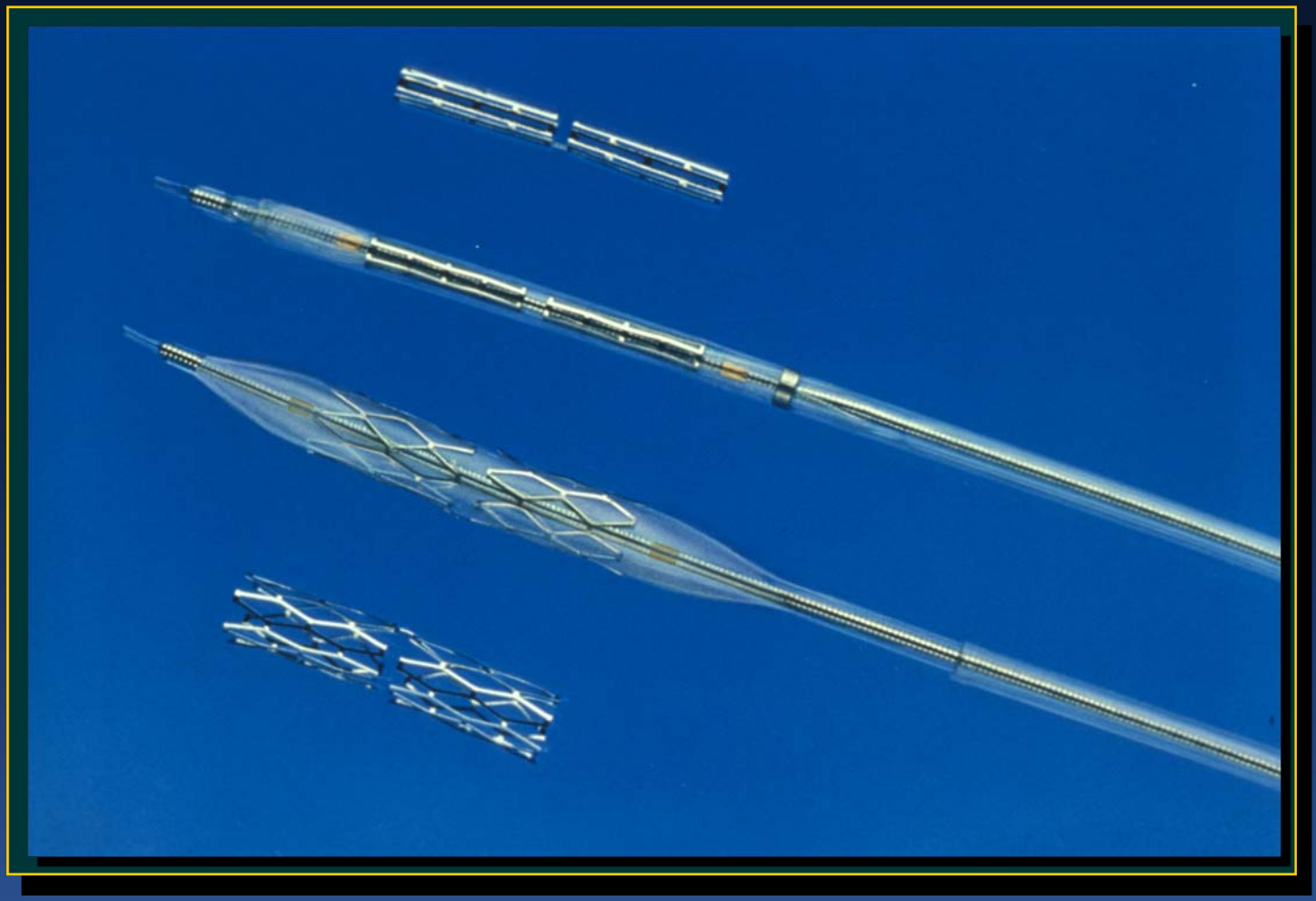


“New Device” Angioplasty Arrives

- ✓ *Frequent complications (incl. perforations)*
- ✓ *Some improvement in complex lesion subsets (e.g. calcified)*
- ✓ *Greater operator expertise required and more costly*
- ✓ *HIGHER RESTENOSIS!!!*

Still Not Good Enough!

The Palmaz-Schatz Stent



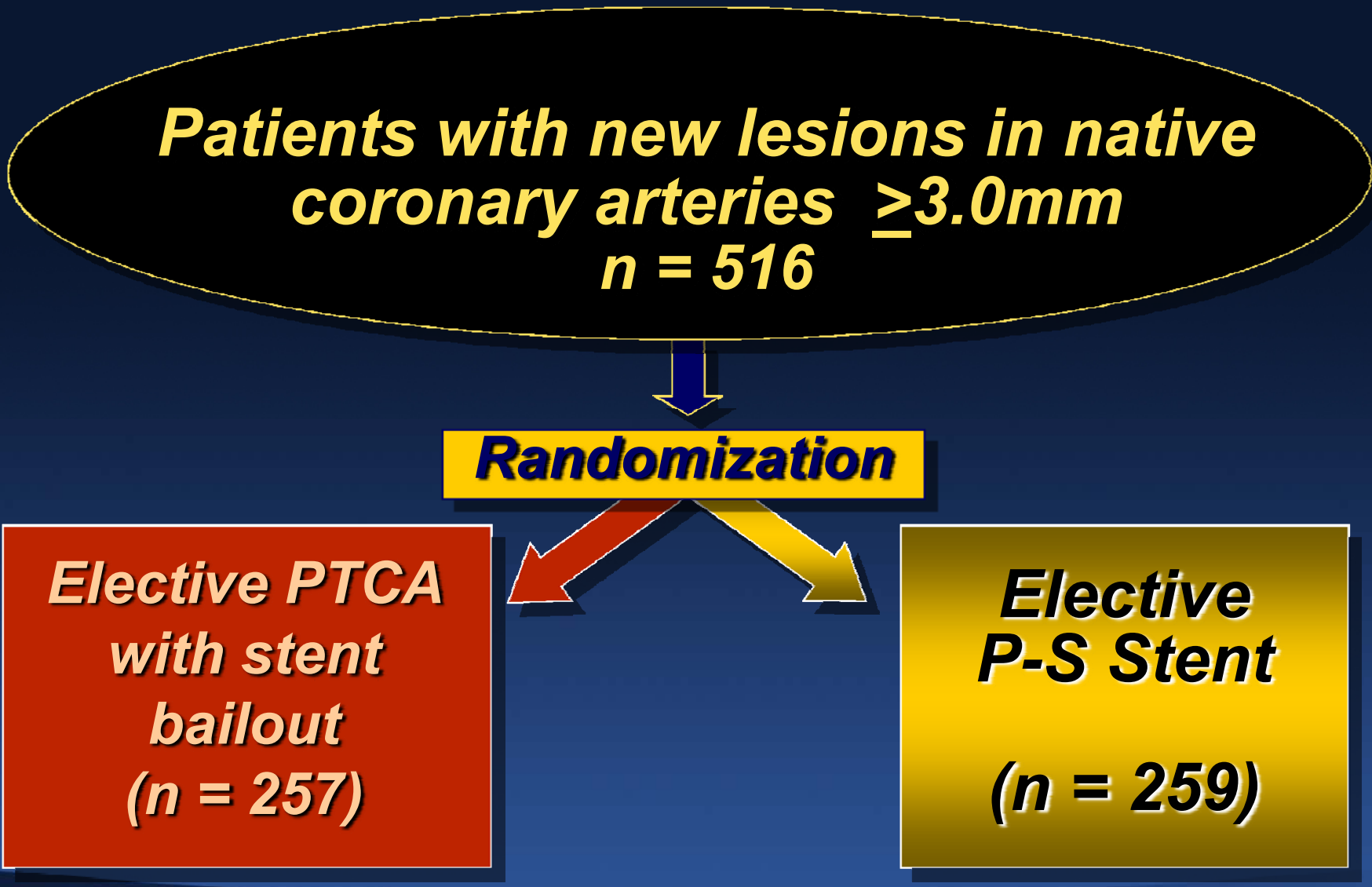
An Endovascular Scaffold

Early Days of Coronary Stents

First Palmaz-Schatz Stent in Human

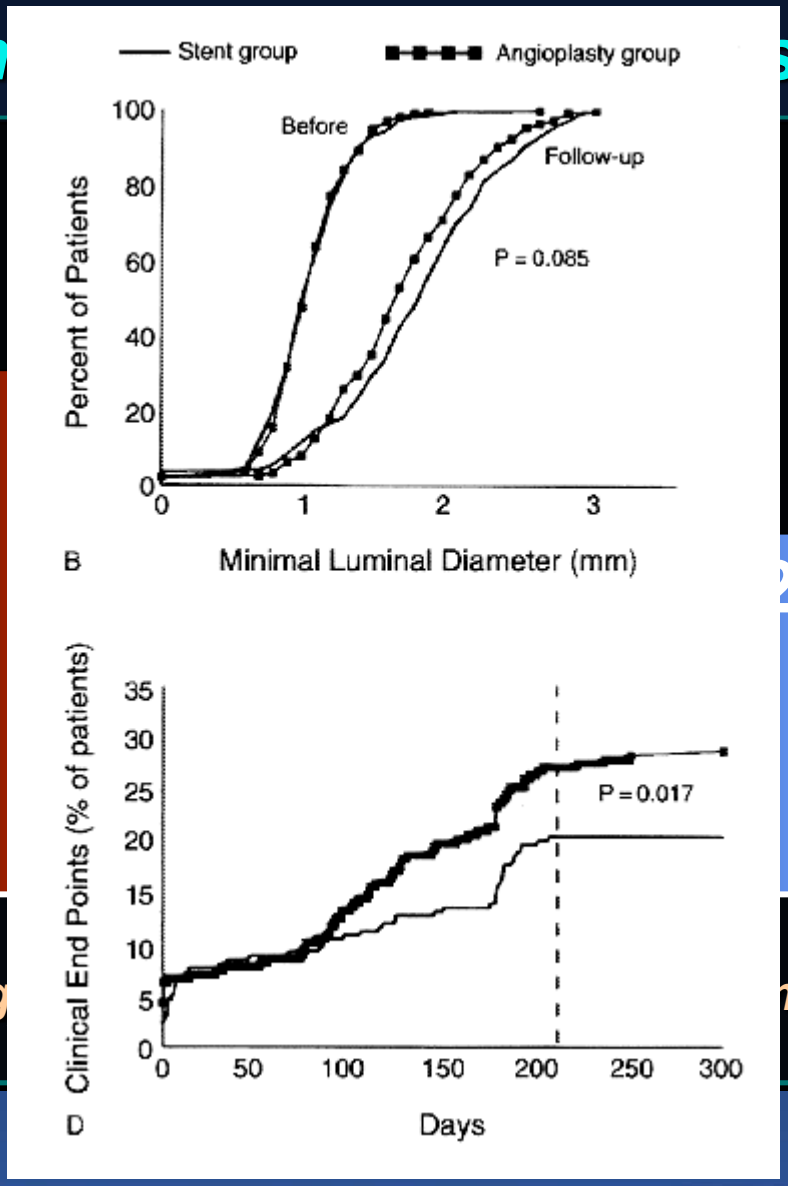
December 31st, 1987

BENESTENT I



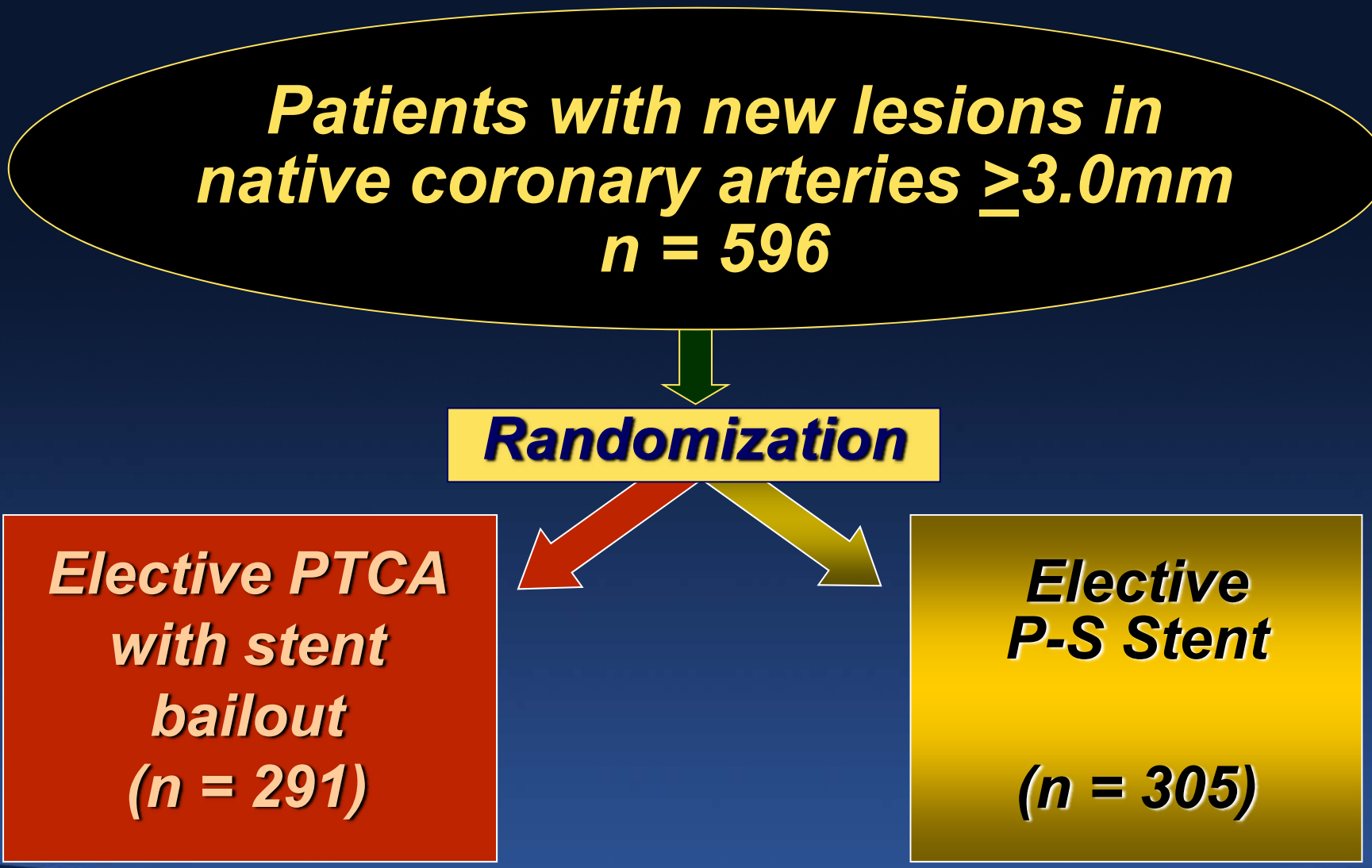
Serruys et al. NEJM;331:489, 1994

BENESTENT I



Serruys et al. NEJM;331:489, 1994

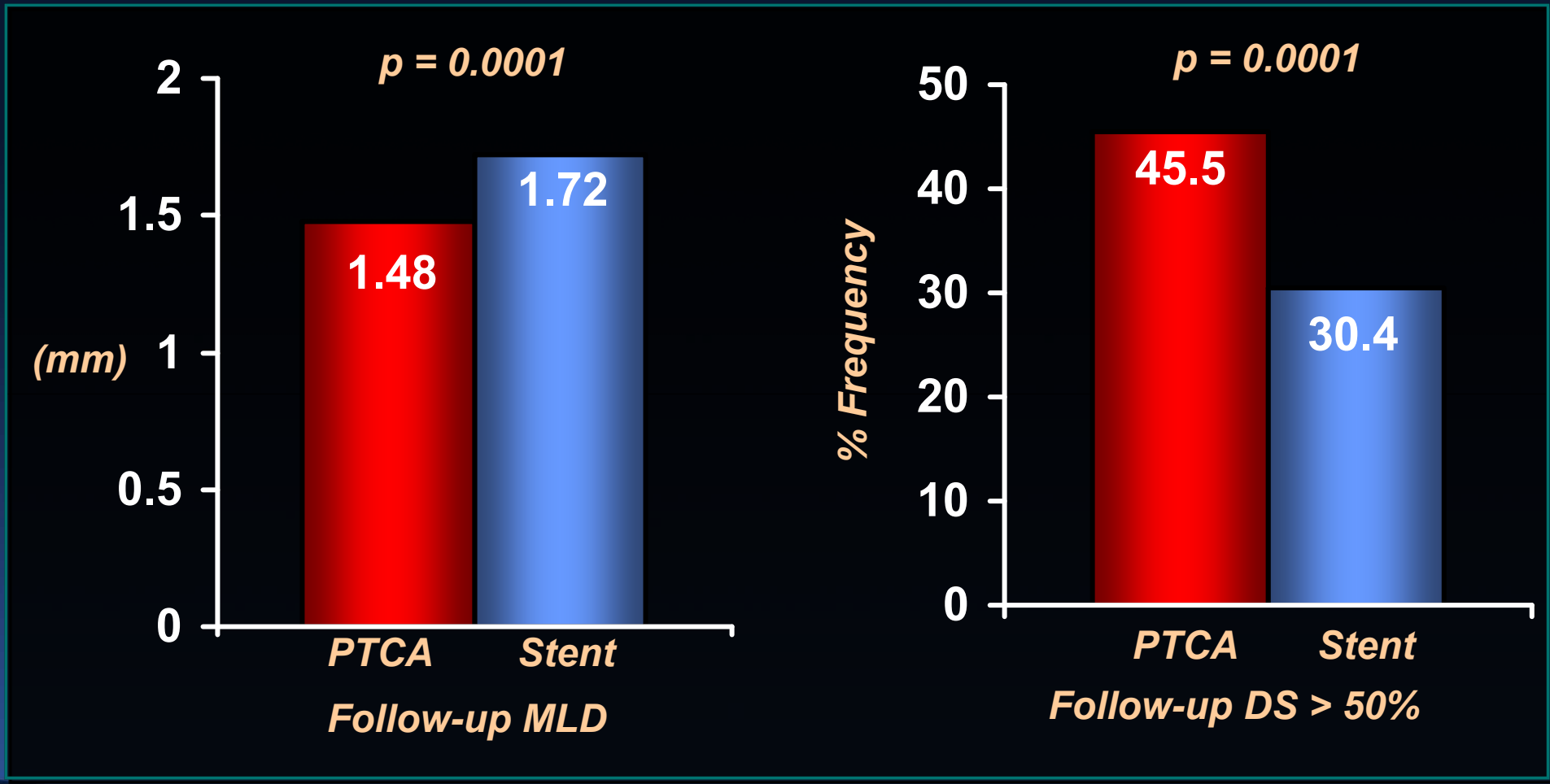
STRESS I & II Trials



Goldberg et al. NEJM;331:496, 1994

Late Clinical Outcomes: STRESS I + II

Follow-up Angiographic Findings n = 596



Finally, after 6 agonizing years of clinical studies

THE NATION'S NEWSPAPER

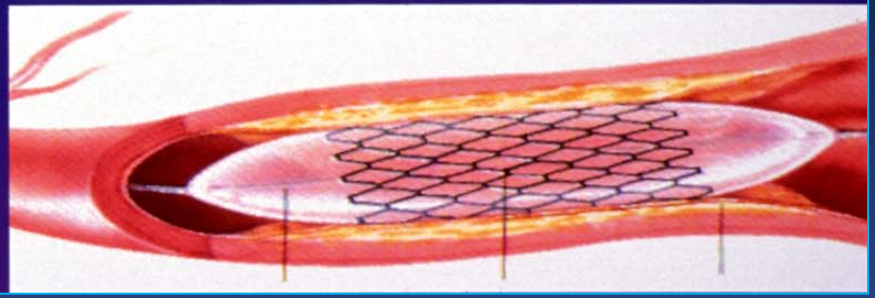
USA TODAY

NO. 1 IN THE USA . . . FIRST IN DAILY READERS

WEDNESDAY, AUGUST 3, 1994

NEWSLINE

FDA approves steel tube for clogged arteries



....and we're off and running!

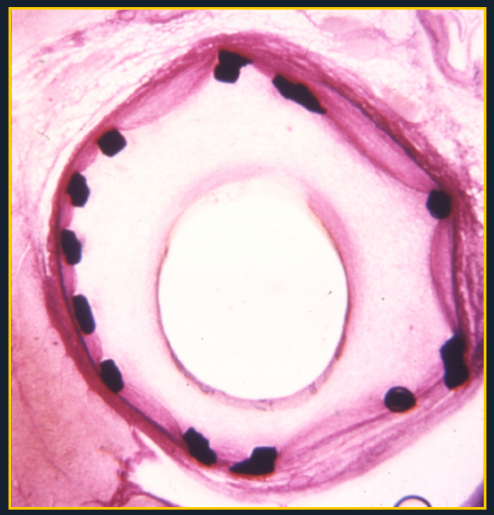
The Age of Empiricism

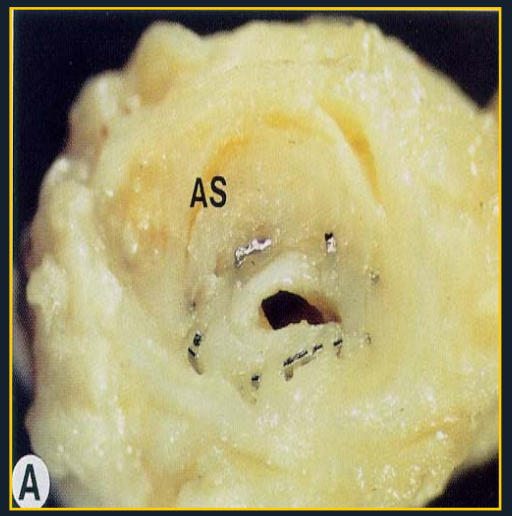
- In the early days of balloon PTCA (1977) thru the new device era, the determination of "clinical value" was assessed via case experiences, by "word of mouth", and non-rigorous observational studies.
- This "pseudo-surgical" approach resulted in overly simplistic and often incorrect impressions of many interventional device therapies.
- The FDA-approval of the Palmaz-Schatz coronary stent (1994), based upon randomized controlled trials (BENESTENT and STRESS), ushered a new era of evidence-based medicine in interventional cardiology!

From PTCA to TAVR

The DES Era

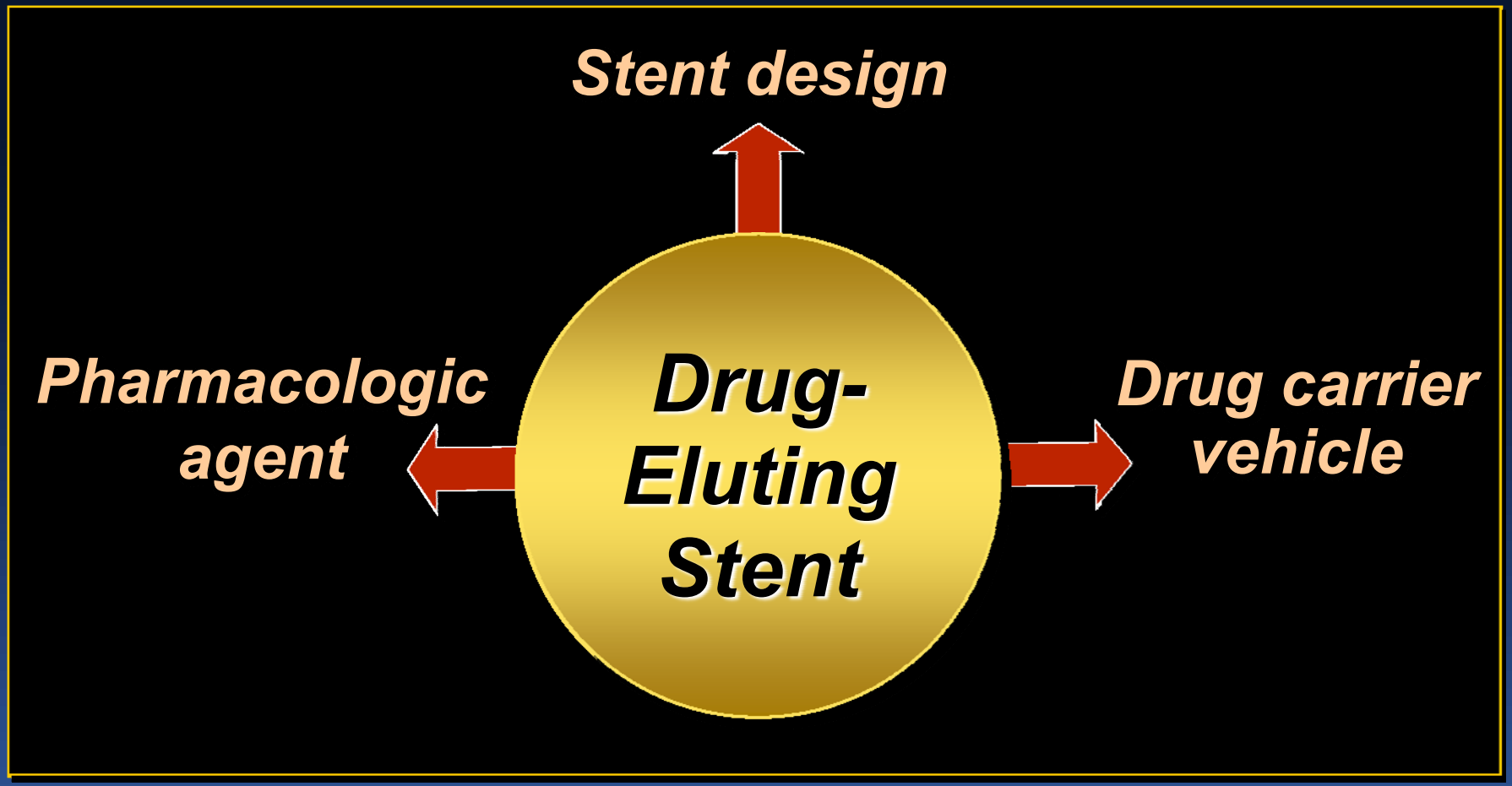
Bare Metal Stents….
the good, the bad, and the ugly!





Drug-Eluting Stents

Advanced Biotechnology Platform



First Generation DES

TAXUS

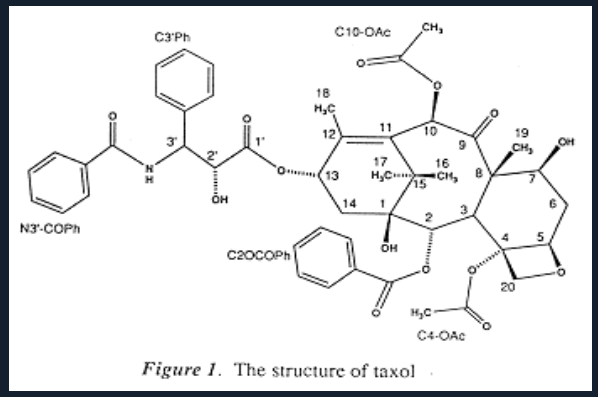
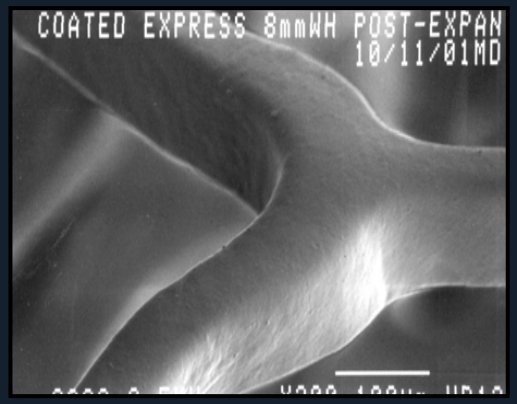


Figure 1. The structure of taxol

Paclitaxel

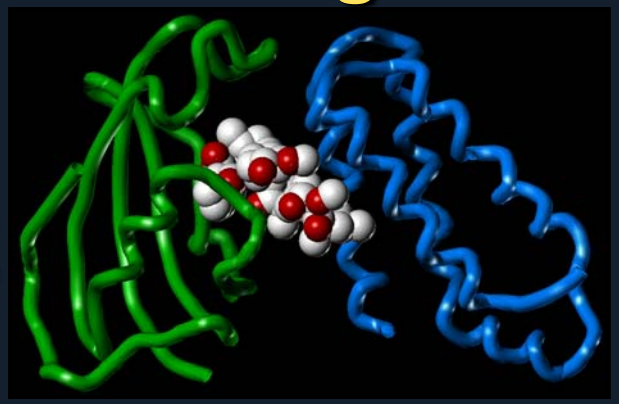


Polyolefin derivative

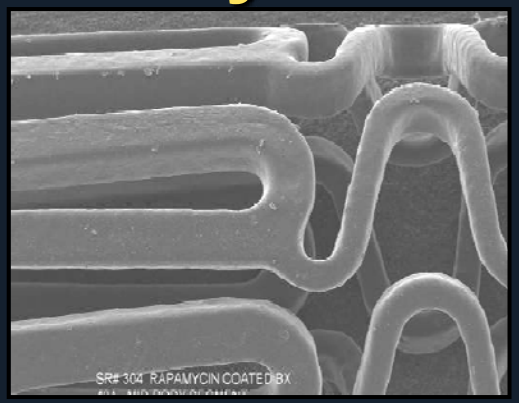
Express²

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

Cypher



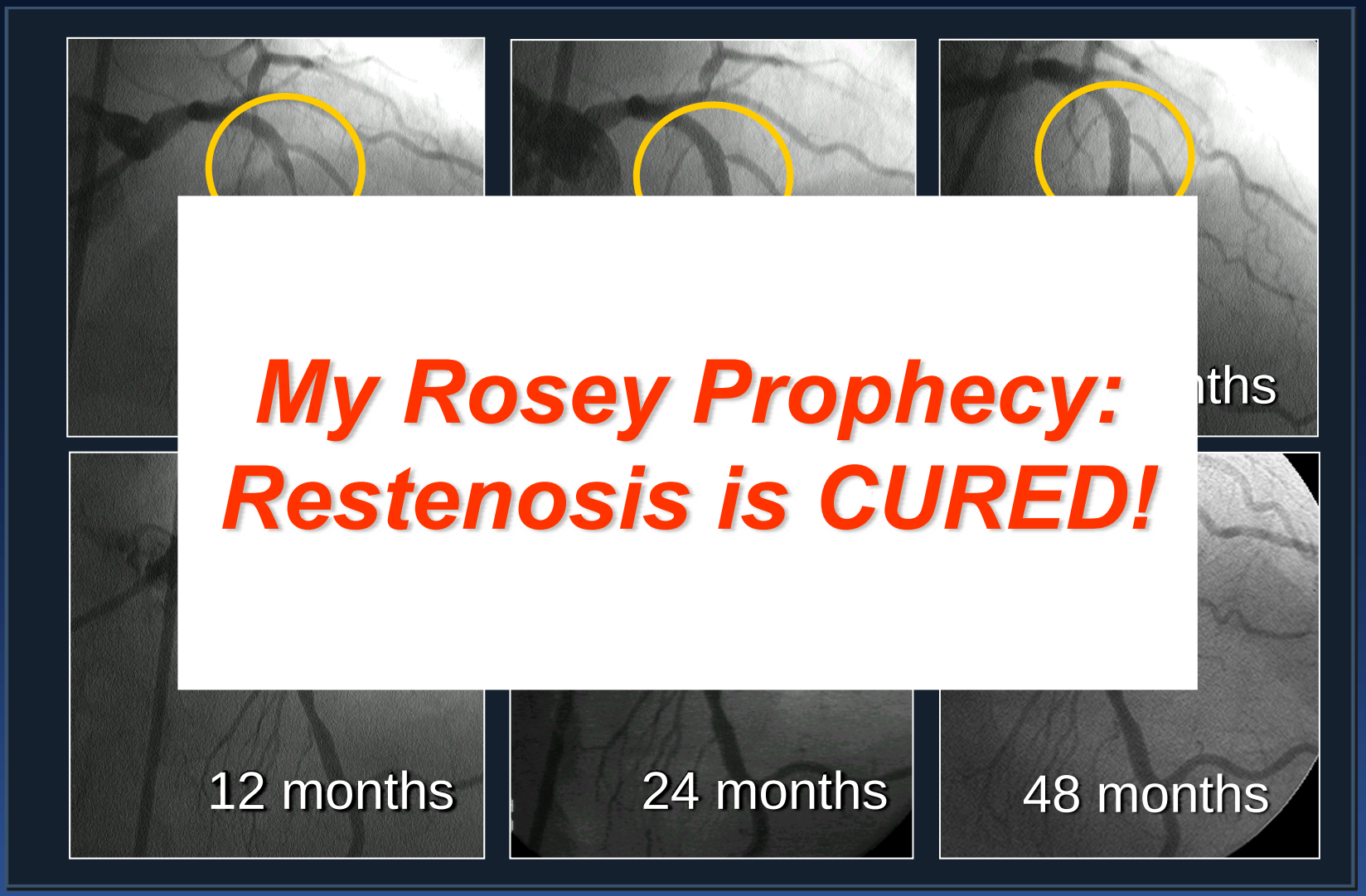
Sirolimus



PEVA + PBMA blend

BX Velocity

DES - A Transforming Technology

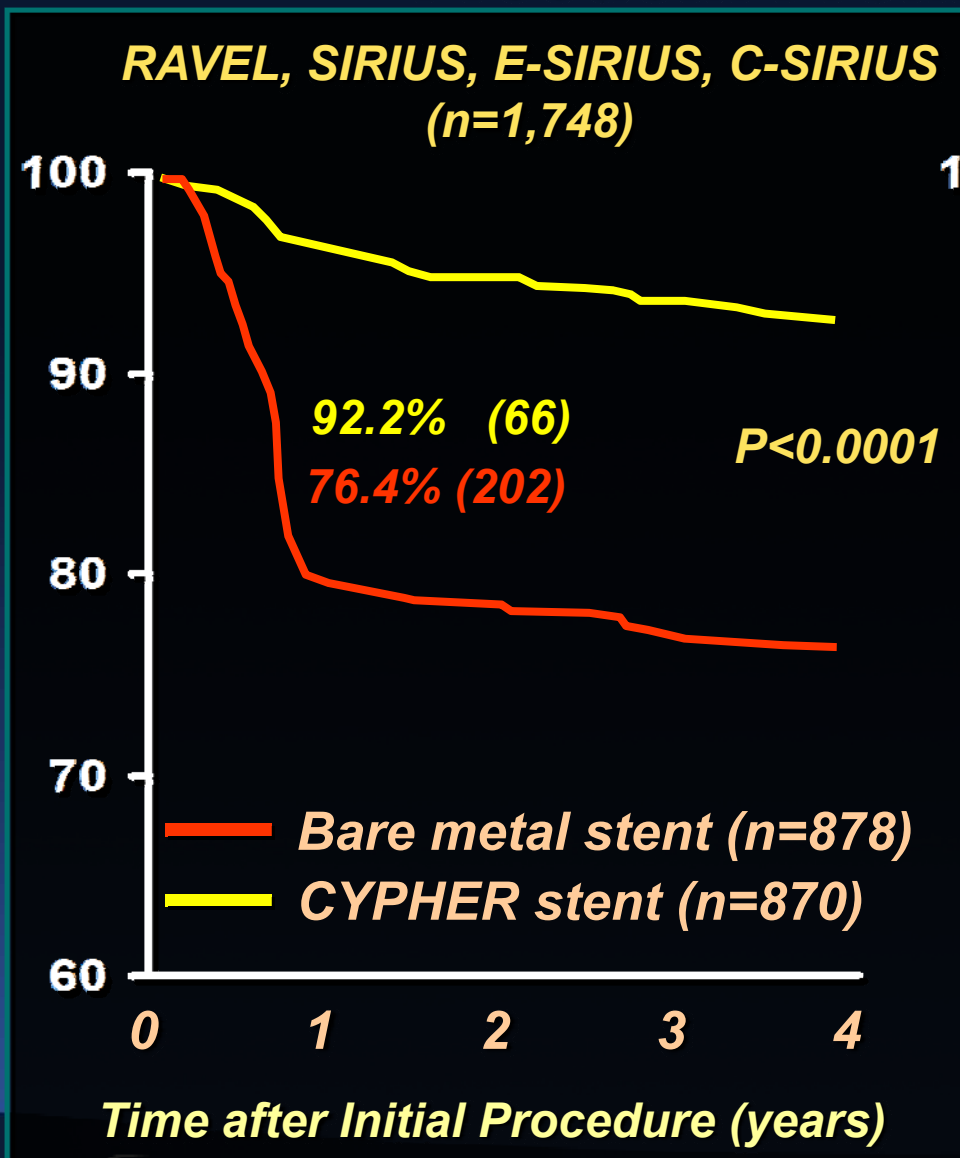


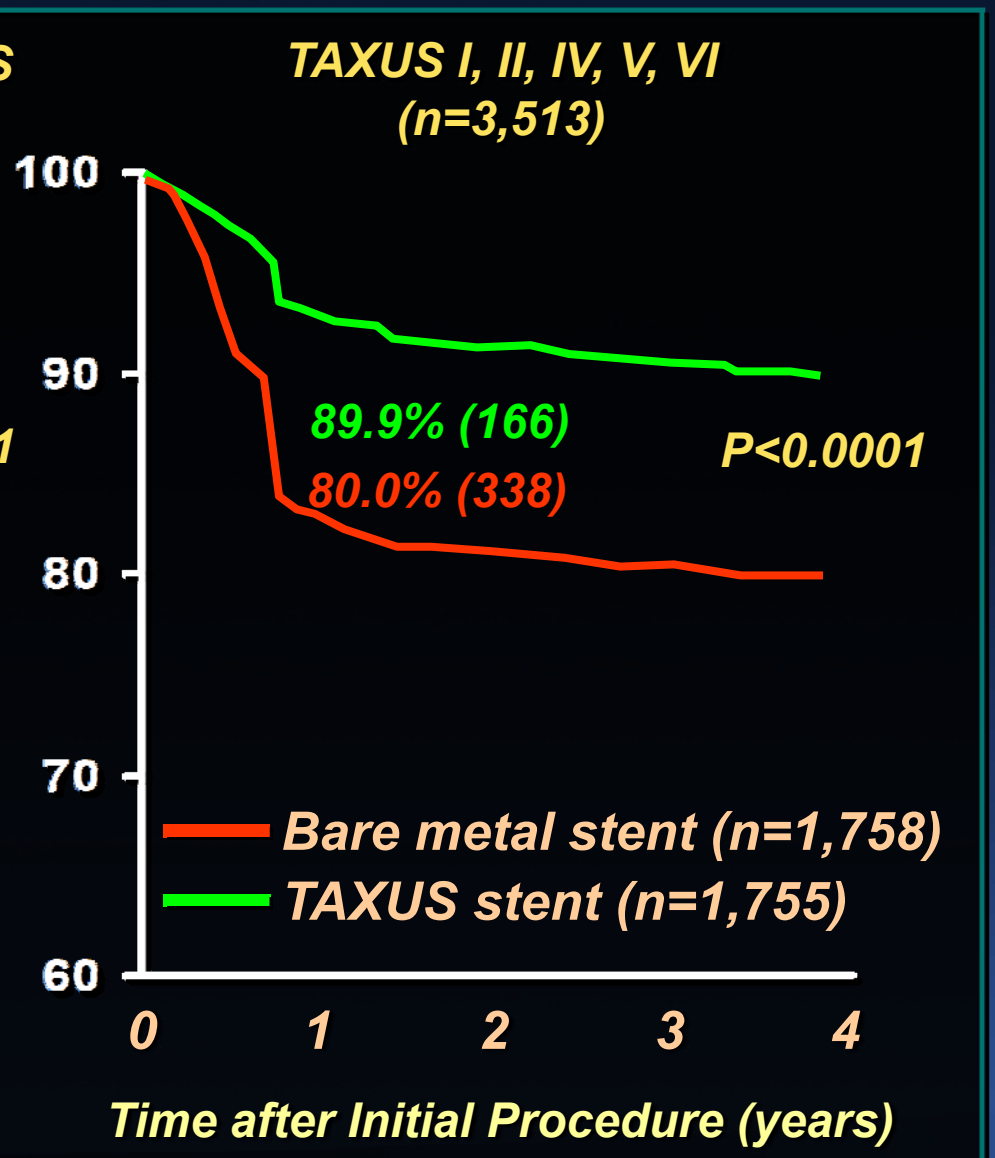
First-In-Man study with CYPHER

Sao Paulo, FU completed

9 Prospective, Double-Blind, Randomized Trials

Freedom From Ischemic TLR

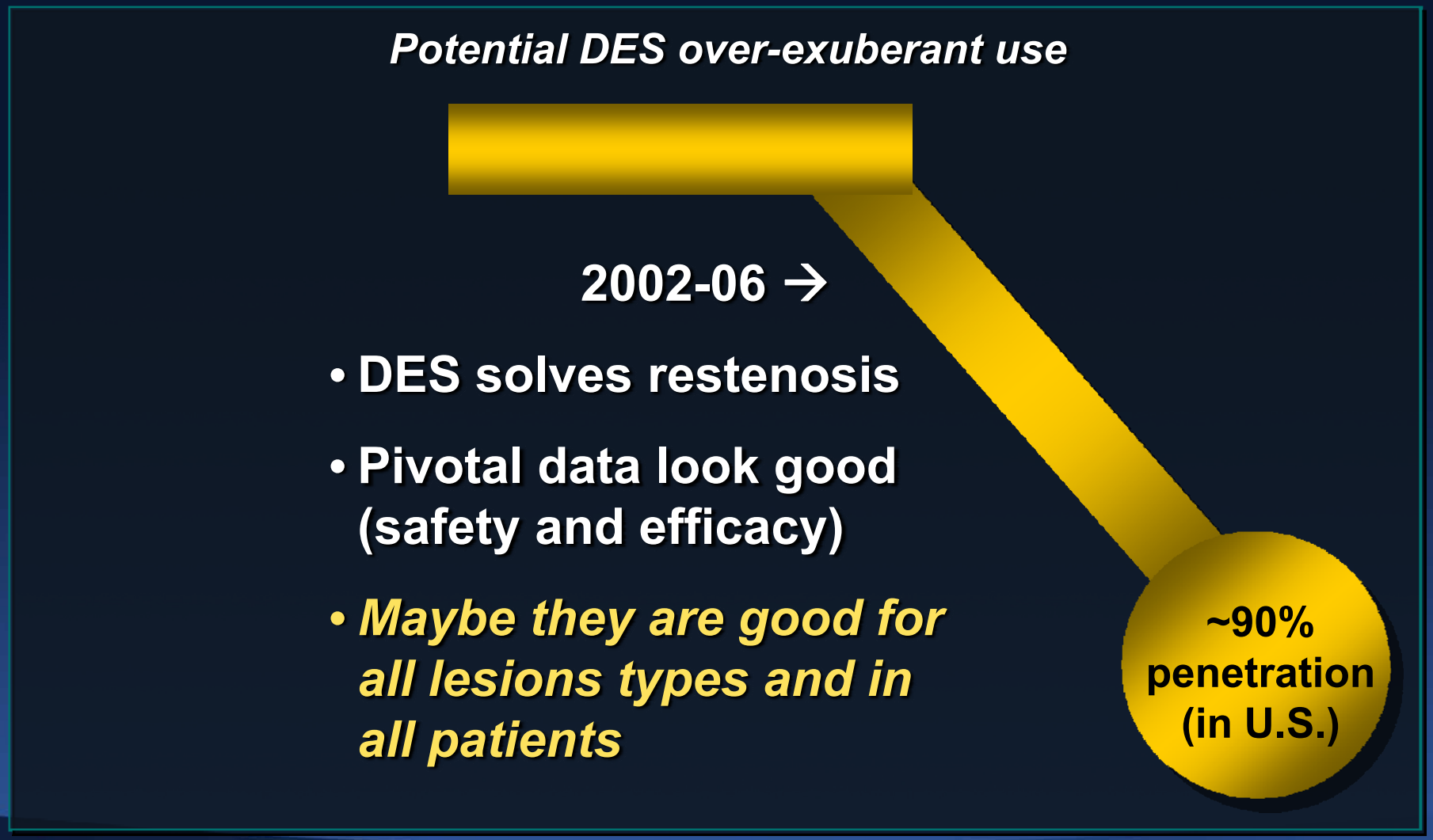




Independent CRF patient-level meta-analysis

The Early Days of DES

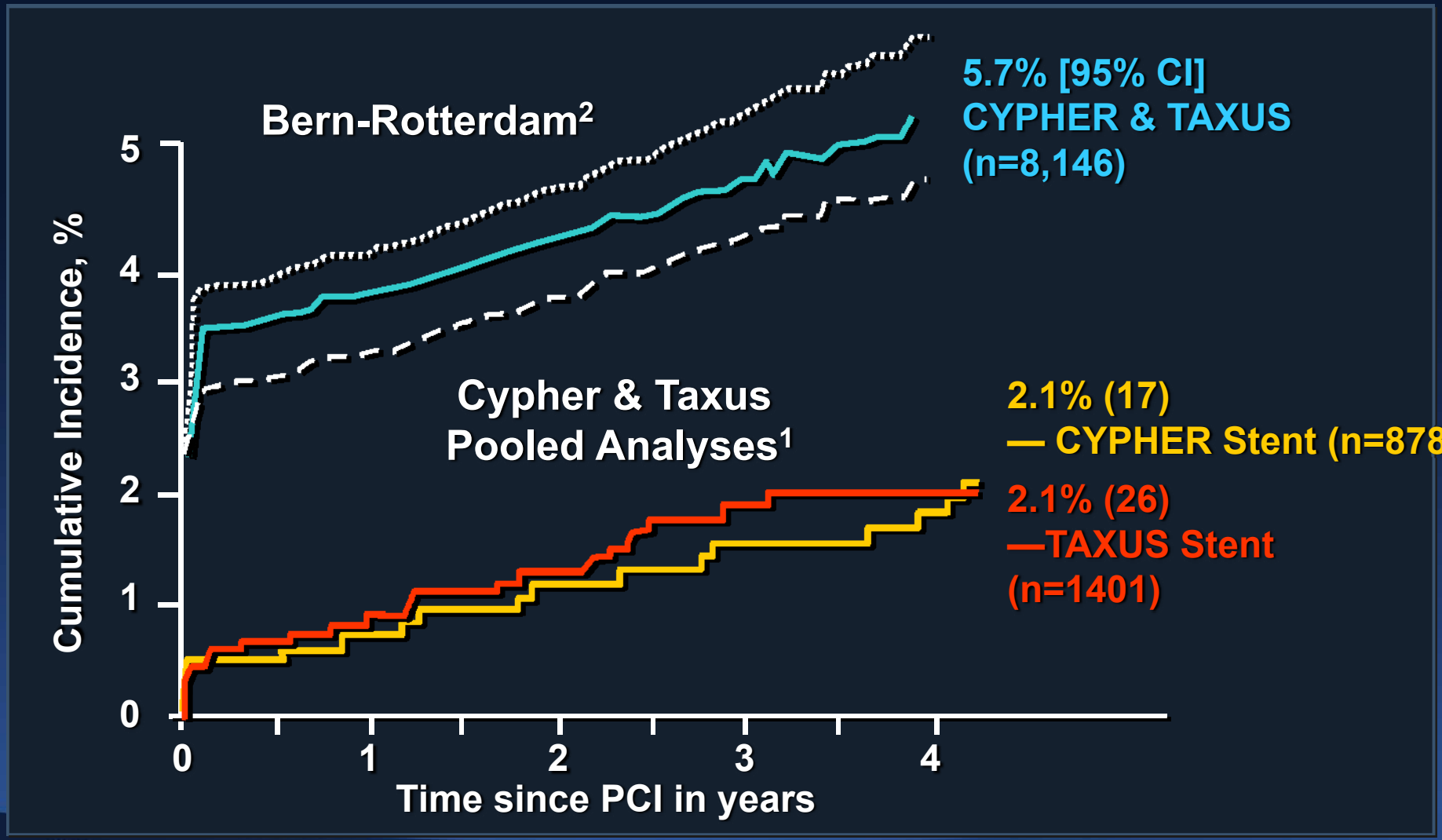
Belief, hope, and hyperbole > the evidence



Late DES thrombosis after discontinuation of antiplatelet therapy

McFadden EP et al. Lancet 2004; 364:1519–21

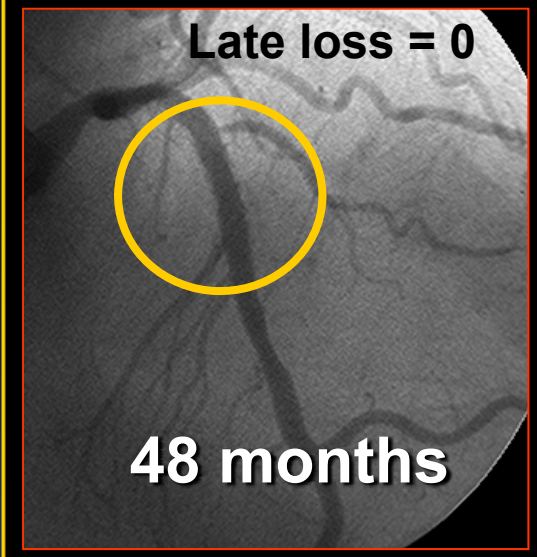
Cumulative Incidence of ARC Def/Prob ST over 4 yrs after DES (CYPHER & TAXUS)

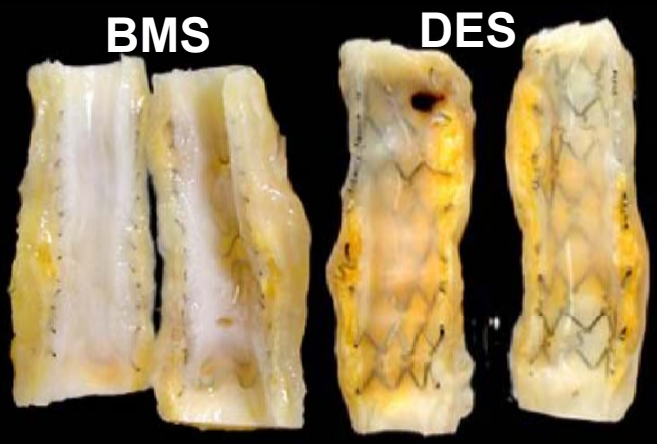


[1] Mauri et al; N Engl J Med 2007;356:1020-9

[2] Wenaweser et al; J Am Coll Cardiol 2008;52:1134-40

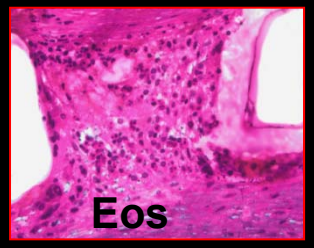
DES….the good, the bad, and the ugly!



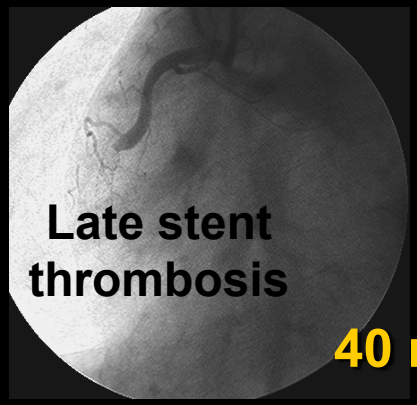


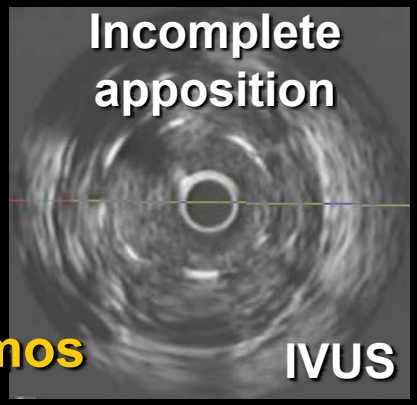
Delayed Healing!

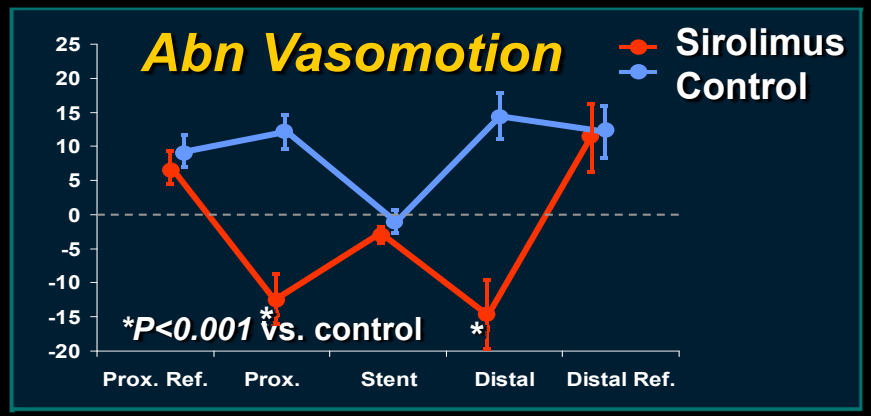
Angioscopy



Inflammation







The ESC Firestorm (August '06)

TUESDAY

ESC Congress News

EUROPEAN SOCIETY OF CARDIOLOGY®

WORLD HEART FEDERATION®

World Congress of Cardiology 2006

The unique meeting of the European Society of Cardiology Congress 2006 and the World Heart Federation's XVth World Congress of Cardiology

Do drug-eluting stents increase deaths?

TWO SEPARATE, independent meta-analyses, presented in Hot Line session I, suggest drug-eluting stents (DES) may increase death, Q-wave myocardial infarction (clinical surrogates of in-stent thrombosis) and cancer deaths, bringing the long-term safety of DES firmly into the spotlight. Discussant Salim Yusuf (McMaster University, Canada) hailed the data as one of the most important presentations to come out of this year's meeting.

"Six million people in the world have been implanted with DES, yet their long-term safety and efficacy is unknown," said Yusuf. "I've a feeling the data we're seeing today is only the tip of the iceberg. We need to encourage more public access to the data."

obtain this data from the manufacturer," said Nordmann. He speculated that the increase in cancer might be due to a rapid impairment of the immune system.

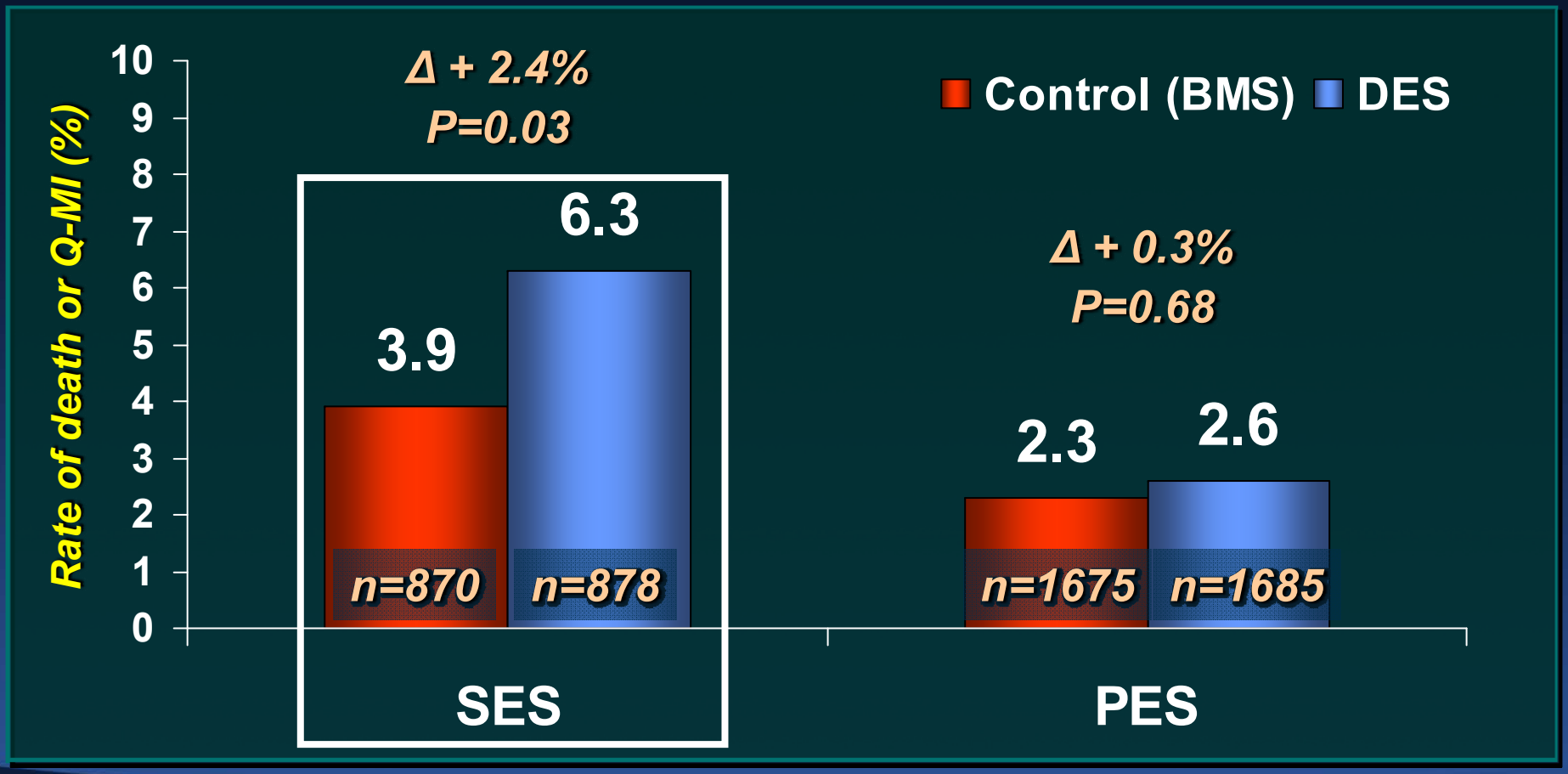
Yusuf widened the debate to include percutaneous coronary intervention (PCI). "The overuse of PCI is an insidious change in the culture of cardiology that needs to be reversed," he said. The use of PCI was established in MI, high-risk unstable angina and cardiogenic shock. However, its use in stable disease was a totally different question.

"There's no beneficial influence on mortality – PCI does nothing to prevent heart attack. All we are doing is providing short-term relief of chest pain. It's not re-stenosis that kills but the

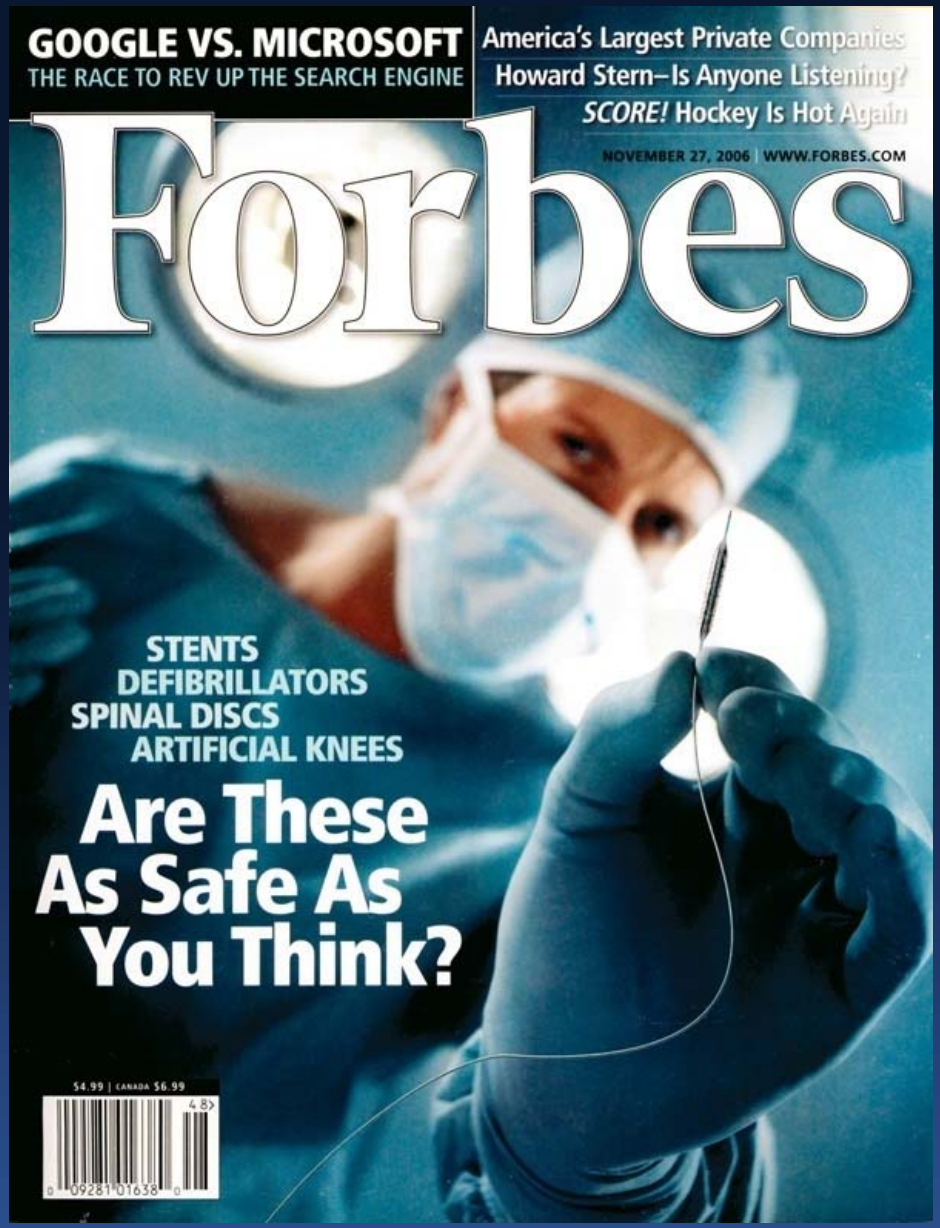
Incidence of Serious or Adverse Events

Death or Q-Wave MI

All randomized studies up to latest available follow-up



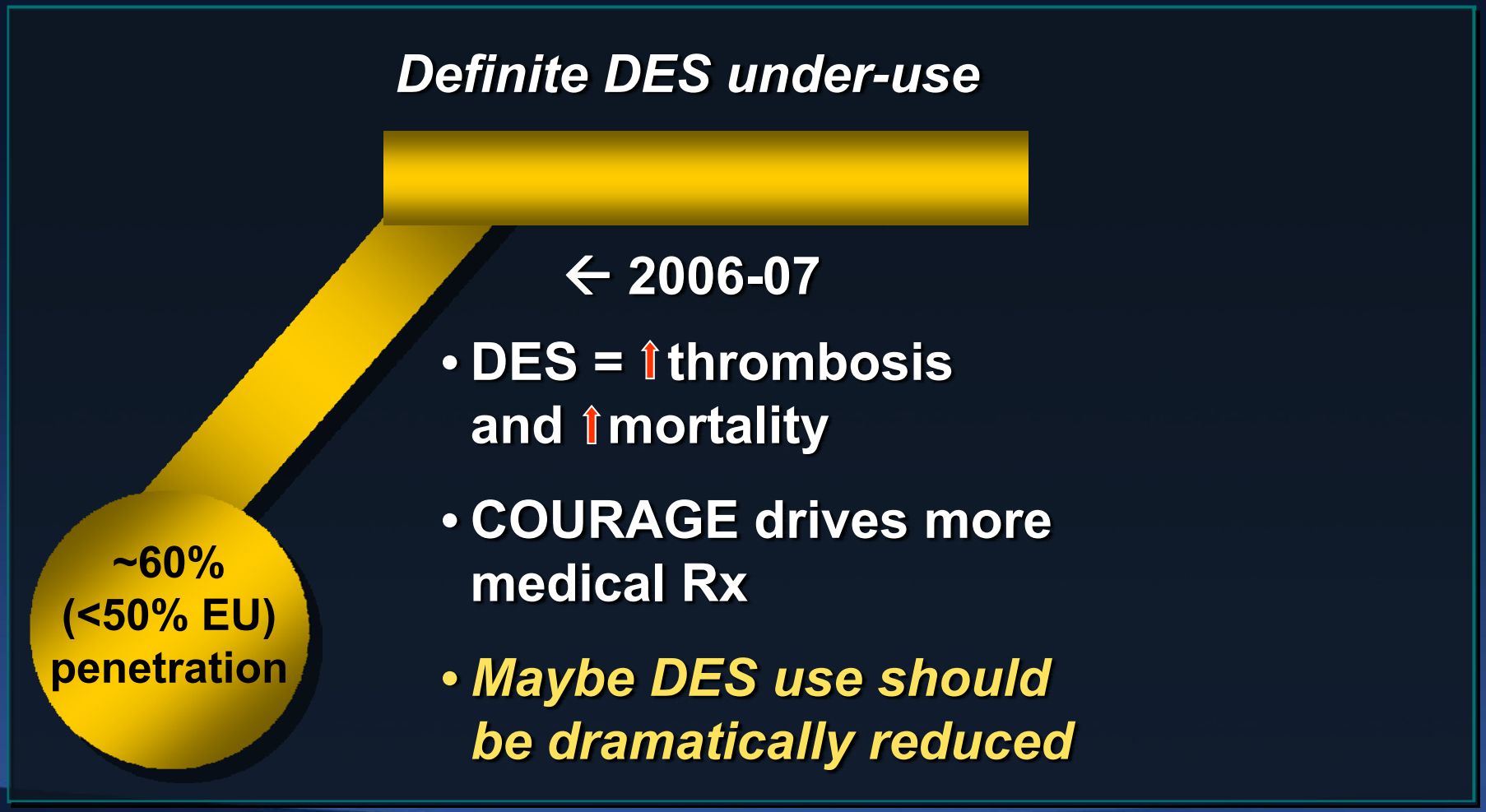
Camenzind E, ESC 2006



DES = "a million ticking time bombs"

The Dark Days of DES

Fear-based avoidance and distortions > the (true) evidence



DES Clinical Trials

Evidence-Based Medicine

Over 2,500 peer review manuscripts on DES clinical use have been published between 2002 and 2012!

Columbia / CRF
DES vs. BMS Meta-Analysis

Interventional Cardiology

Safety and Efficacy of Drug-Eluting and Bare Metal Stents

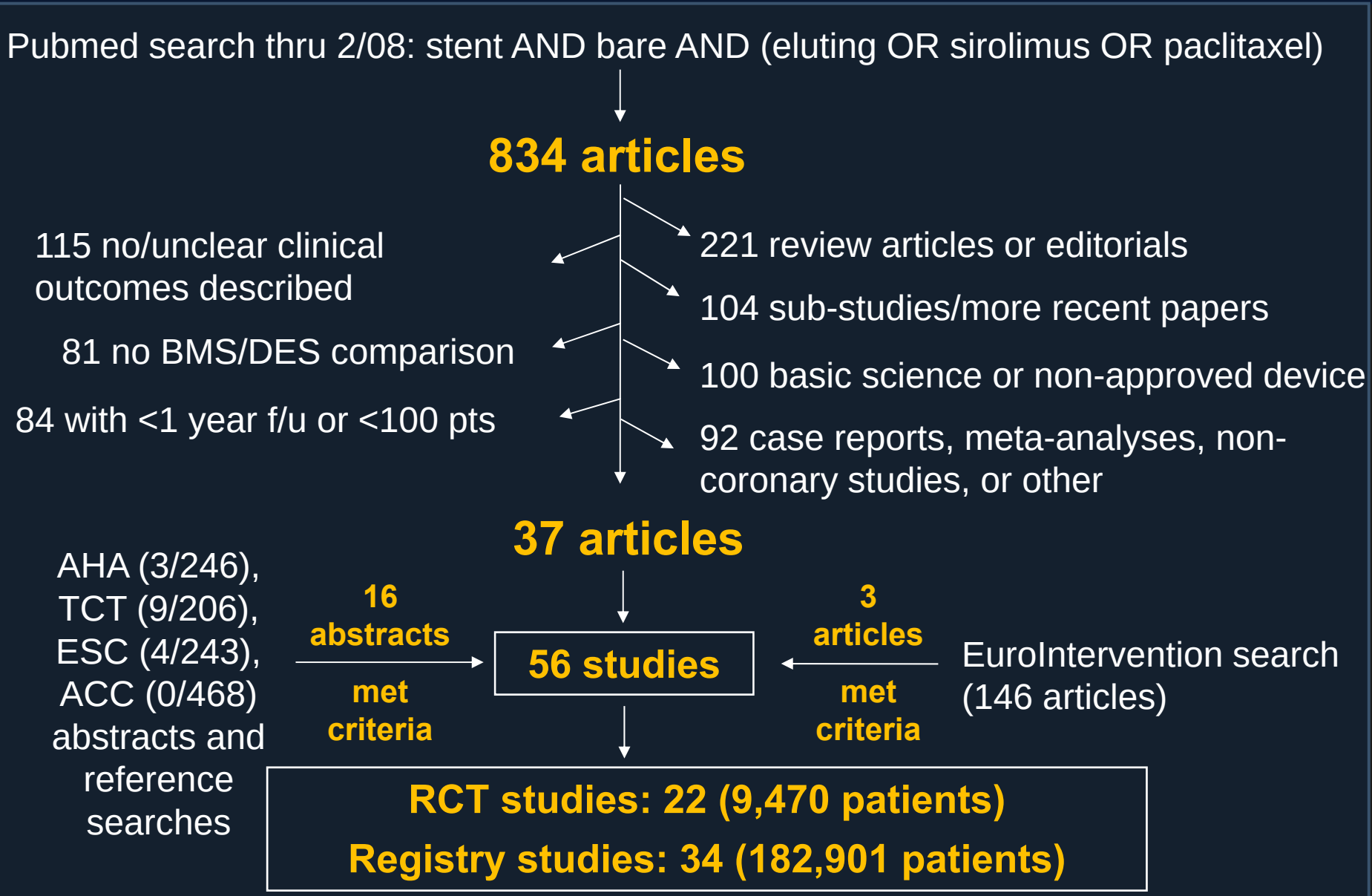
Comprehensive Meta-Analysis of Randomized Trials and Observational Studies

Ajay J. Kirtane, MD, SM; Anuj Gupta, MD; Srinivas Iyengar, MD; Jeffrey W. Moses, MD; Martin B. Leon, MD; Robert Applegate, MD; Bruce Brodie, MD; Edward Hannan, PhD; Kishore Harjai, MD; Lisette Okkels Jensen, MD; Seung-Jung Park, MD, PhD; Raphael Perry, MD; Michael Racz, PhD; Francesco Saia, MD, PhD; Jack V. Tu, MD, PhD; Ron Waksman, MD; Alexandra J. Lansky, MD; Roxana Mehran, MD; Gregg W. Stone, MD

The "definitive" DES efficacy/safety meta-analysis?

Circulation 2009;119: 3198-3206

Study Flow Diagram



Circulation 2009;119: 3198-3206

Summary: DES vs. BMS

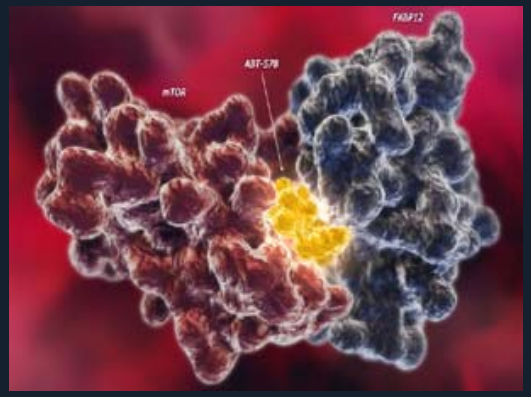
DES Treatment Effect Estimates

*P<0.05	Mortality	MI	TVR
RCTs	8,867 pts, 21 trials	8,850 pts, 20 trials	7,291 pts, 16 trials
- Fixed effects	3%↓	5%↓	-
- Random effects	-	-	55%↓*
Registries	161,595 pts, 31 studies	130,191 pts, 25 studies	74,154 pts, 18 studies
- Fixed effects	-	-	-
- Random effects	22%↓*	13%↓*	46%↓*

Circulation 2009;119: 3198-3206

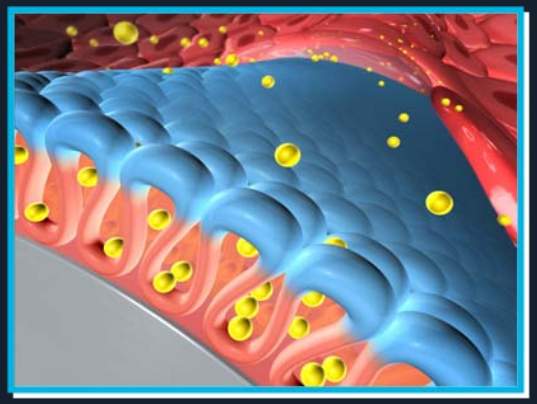
Second Generation DES

Resolute



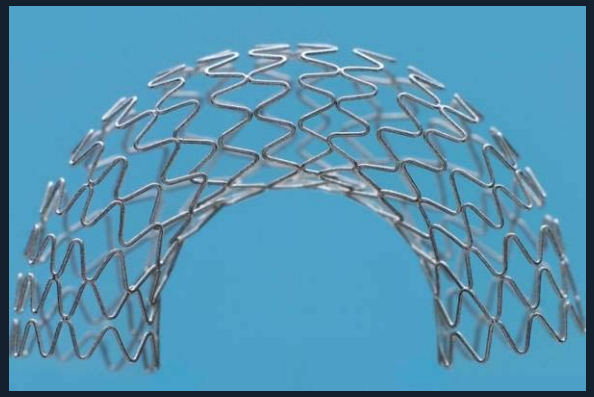
Zotarolimus

Drug



BioLinx copolymer

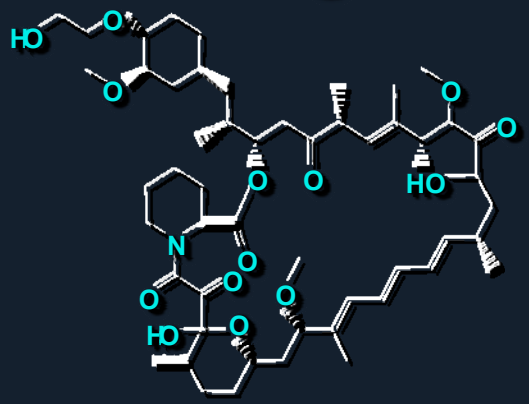
Polymer



Driver

Stent

Xience V*



Everolimus

VDF + HFP copolymer

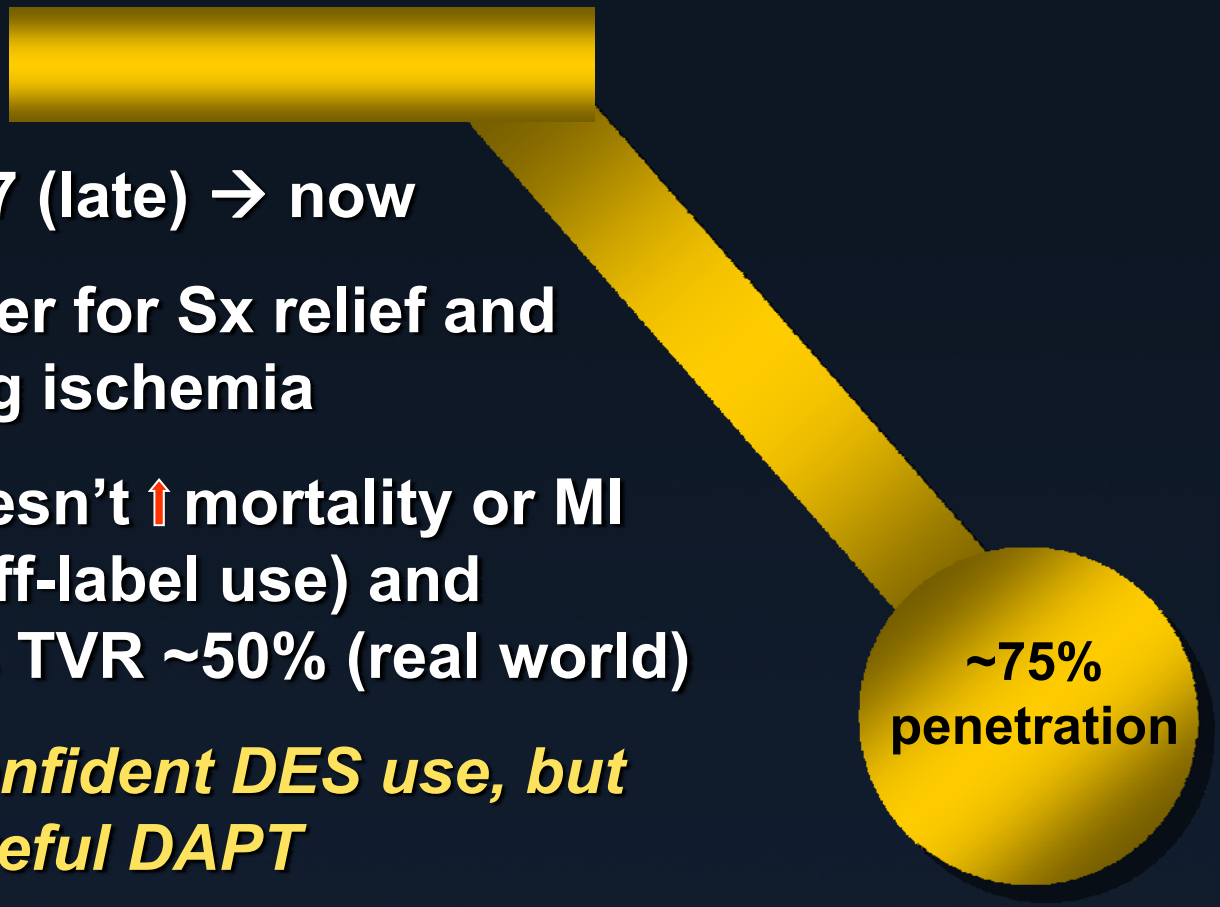
Vision

*AKA Promus

A Slow Return to DES "Normalcy"

Reliance on overwhelming evidence

Can we regrow the DES forest?



- **PCI better for Sx relief and reducing ischemia**
- **DES doesn't ⇧ mortality or MI (on or off-label use) and reduces TVR ~50% (real world)**
- ***More confident DES use, but with careful DAPT***

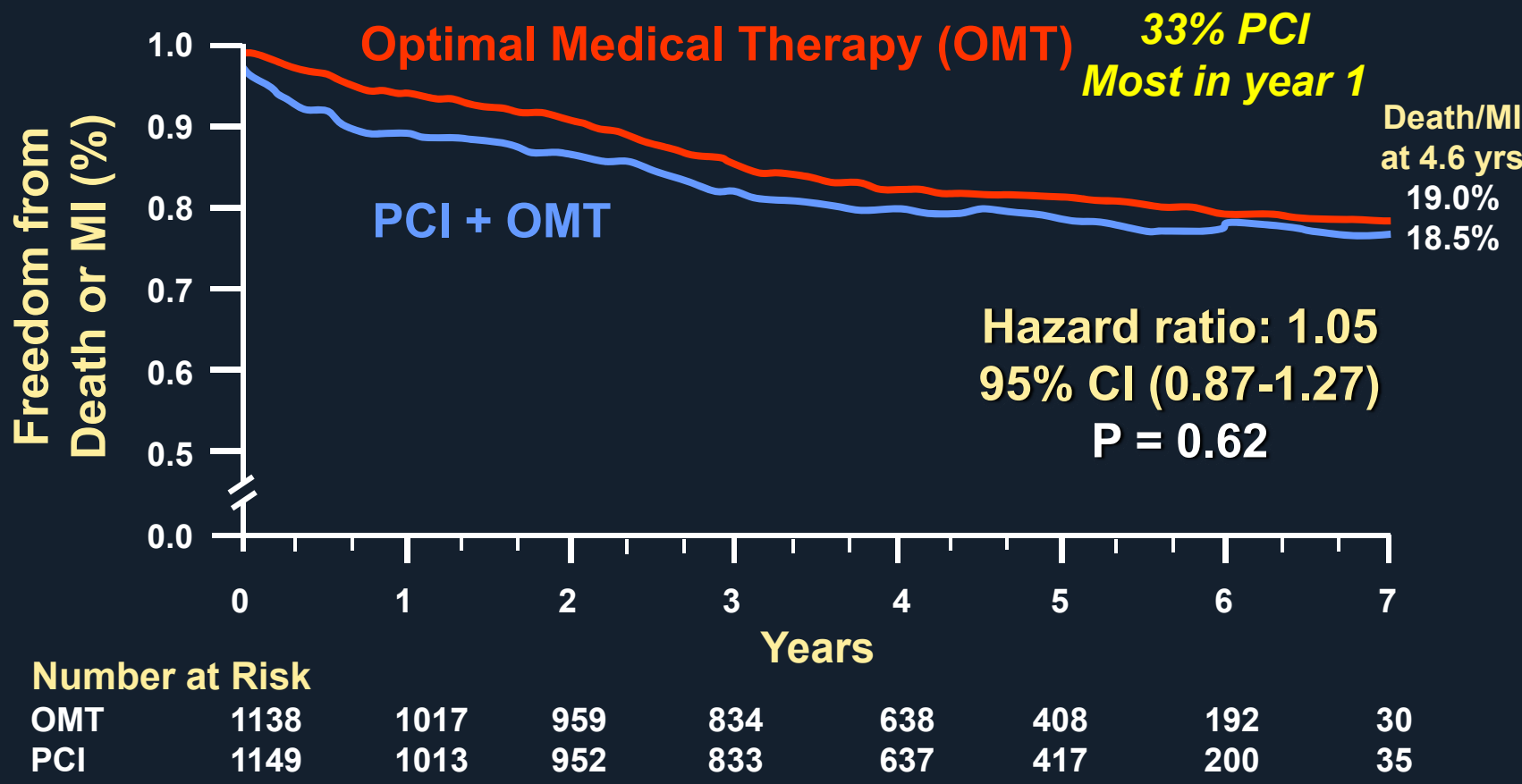
The Evolution to EBM

- The transition to evidence-based medicine has distinguished IC as a modern subspecialty, committed to scientific principles and the highest ethical standards of conduct.
- Undoubtedly, now and in the future, all new important therapies will require EBM validation, in the form of well conducted clinical trials.
- However, EBM is not perfect, and if the data are not interpreted in a balanced fashion, EBM can result in more confusion than clarification!
- Other factors beyond EBM must also be heavily weighed to optimize clinical decision-making.

From PTCA to TAVR

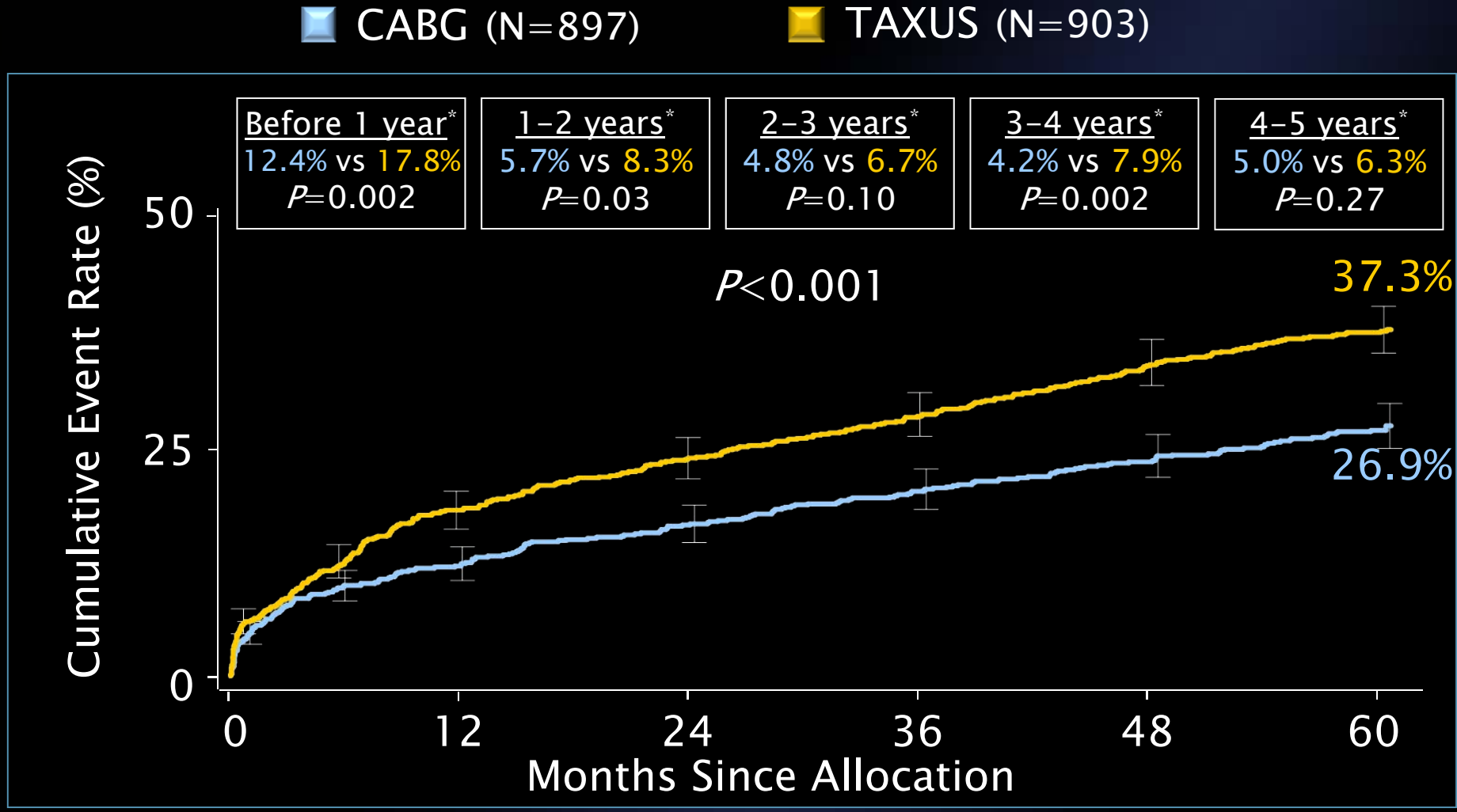
PCI in Stable CAD: COURAGE

Median FU 4.6 years (n=2,287)



Boden WE et al. NEJM 2007;356:1503-16

Primary Endpoint MACCE to 5 Years

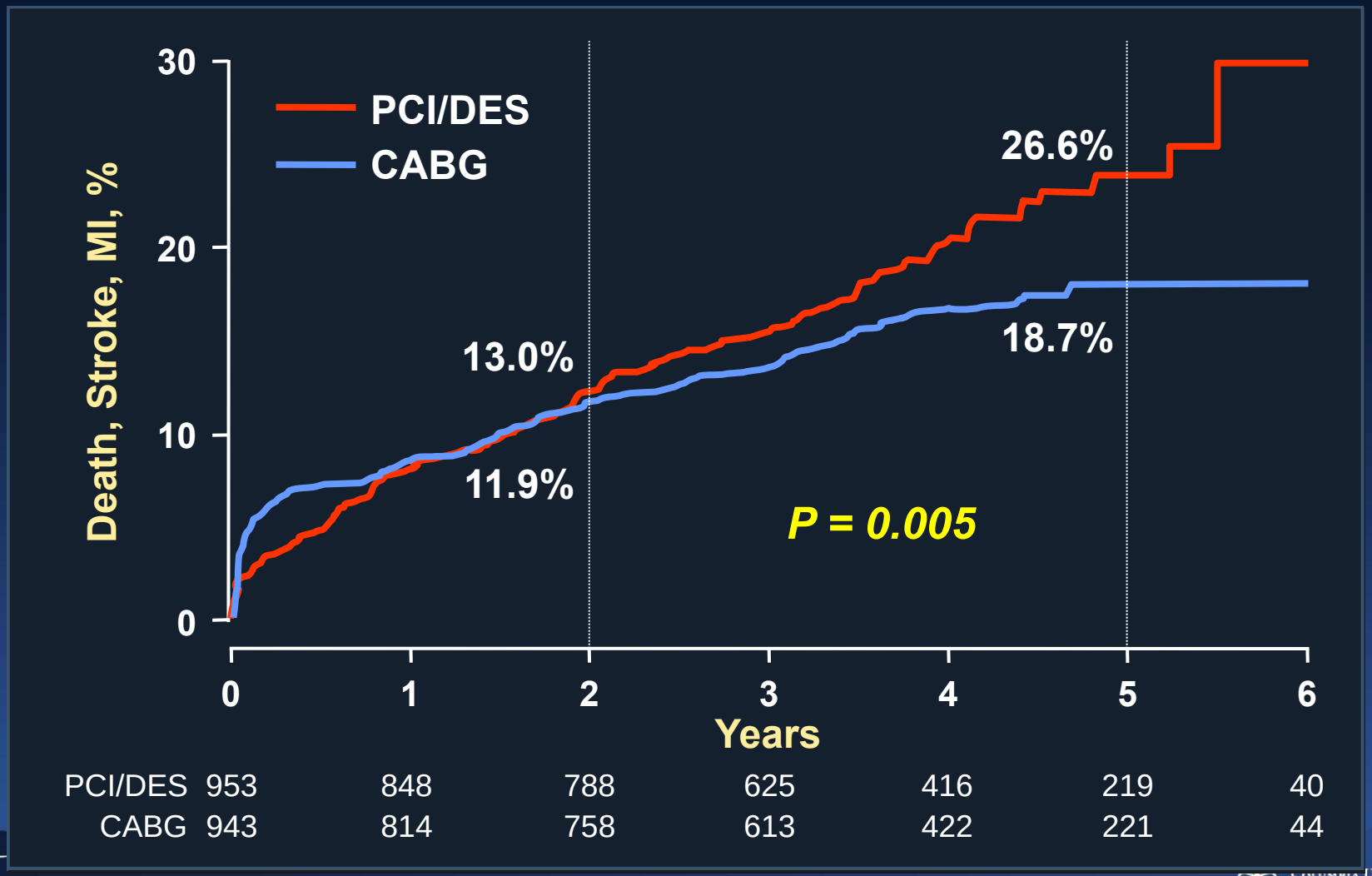


Cumulative KM Event Rate ± 1.5 SE; log-rank *P* value; *Binary rates

ITT population

FREEDOM: 1900 pts with diabetes +MVD randomized to SES/PES vs. CABG

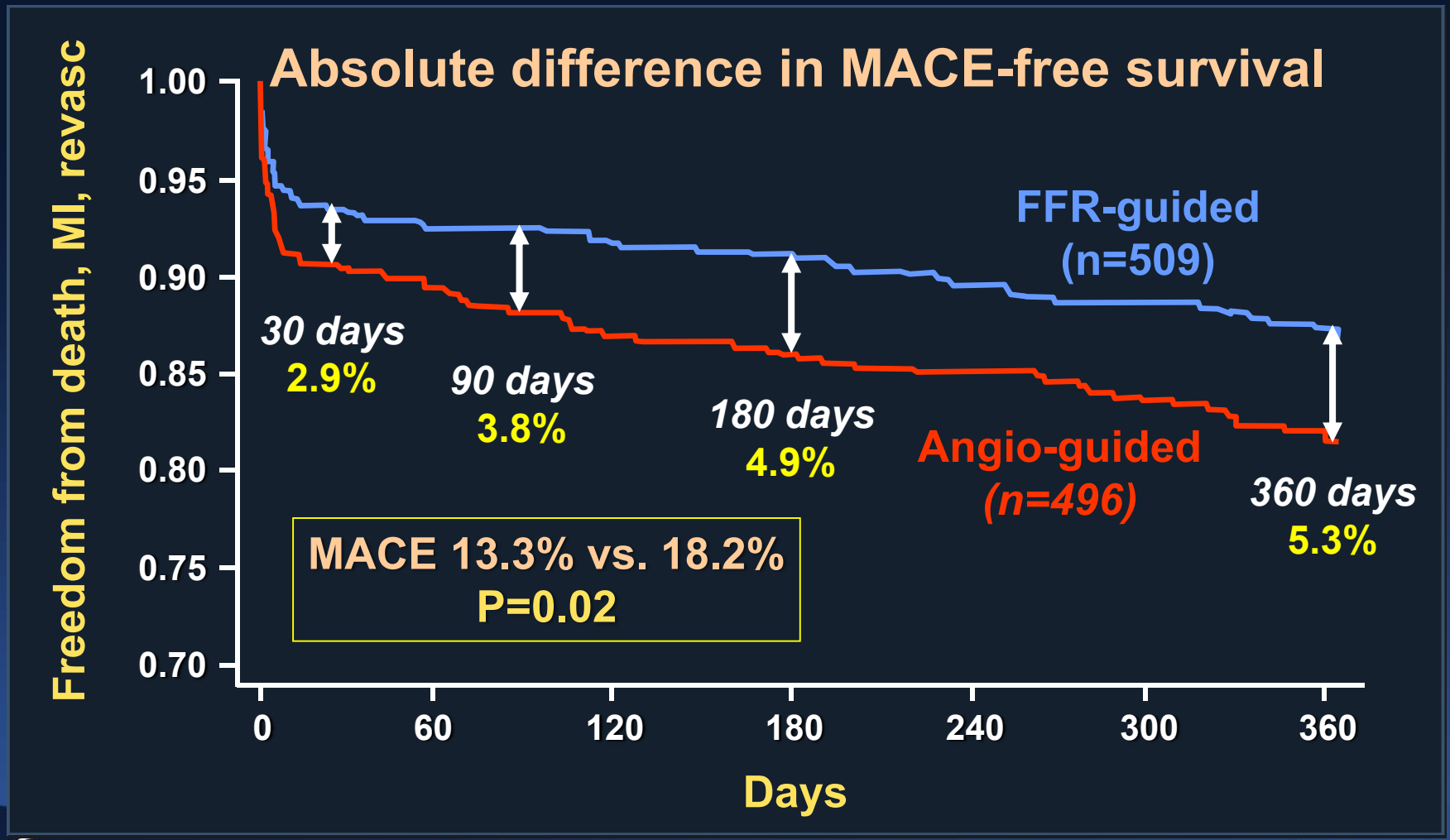
1° Endpoint: Death, Stroke, or MI



Farkouh ME et al. NEJM 2012

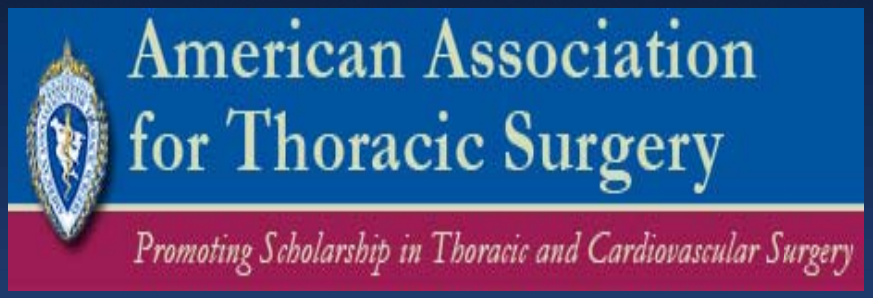
FAME: Primary Endpoint

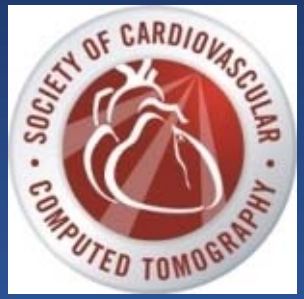
1005 pts with MVD undergoing PCI with DES were randomized to FFR-guided vs. angio-guided intervention



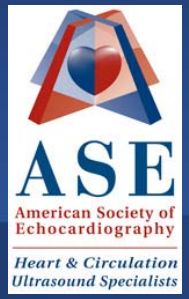
Tonino PAL et al. NEJM 2009;360:213–24

Appropriate Use Criteria for Coronary Revascularization Focused Update 2012





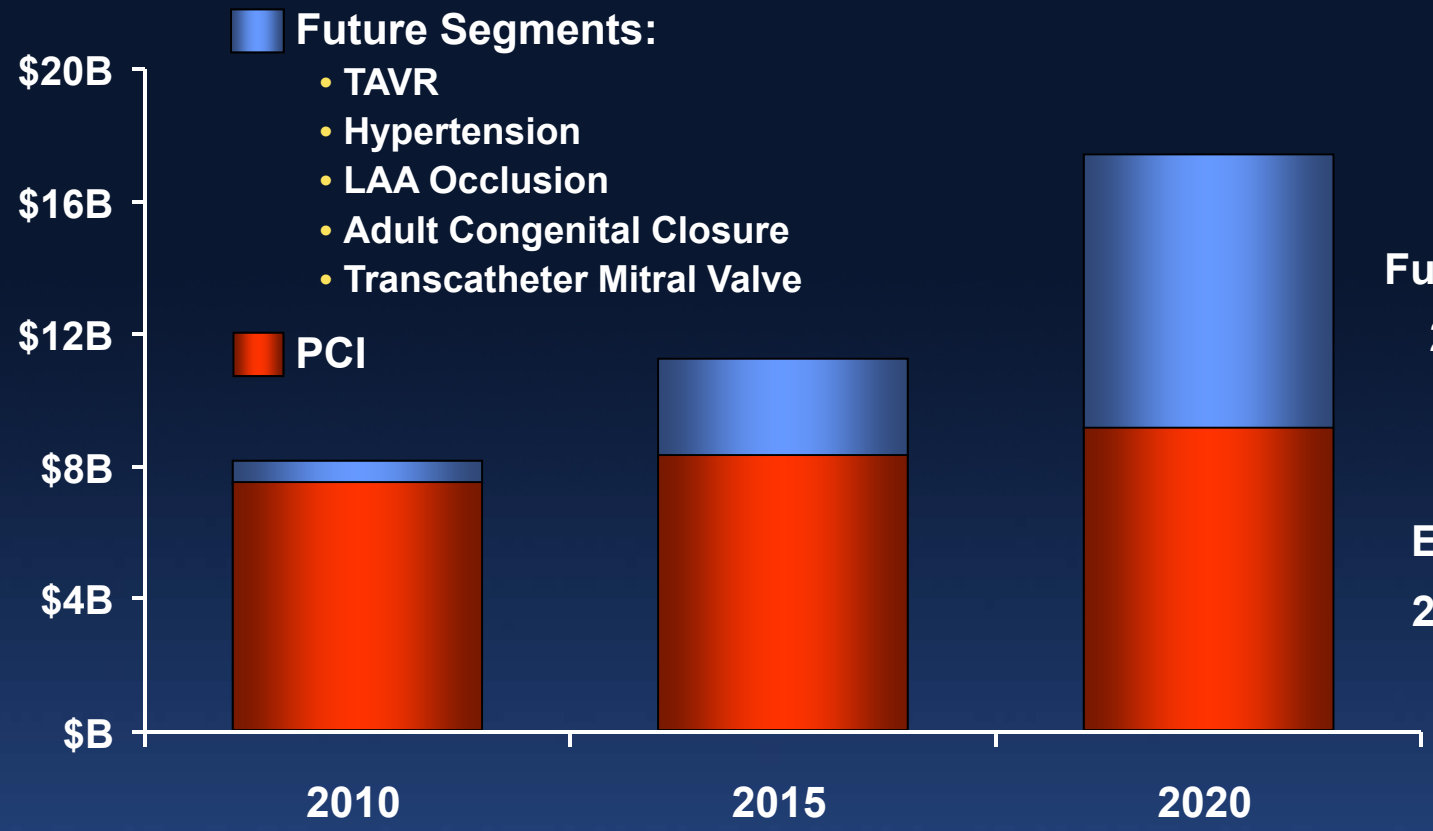
Endorsed by



CARDIOVASCULAR RESEARCH FOUNDATION
A Passion for Innovation

NEW YORK PRESBYTERIAN

WW Cardiology Market Trends



Future Segment CAGR
2010 – 2020 = 30%

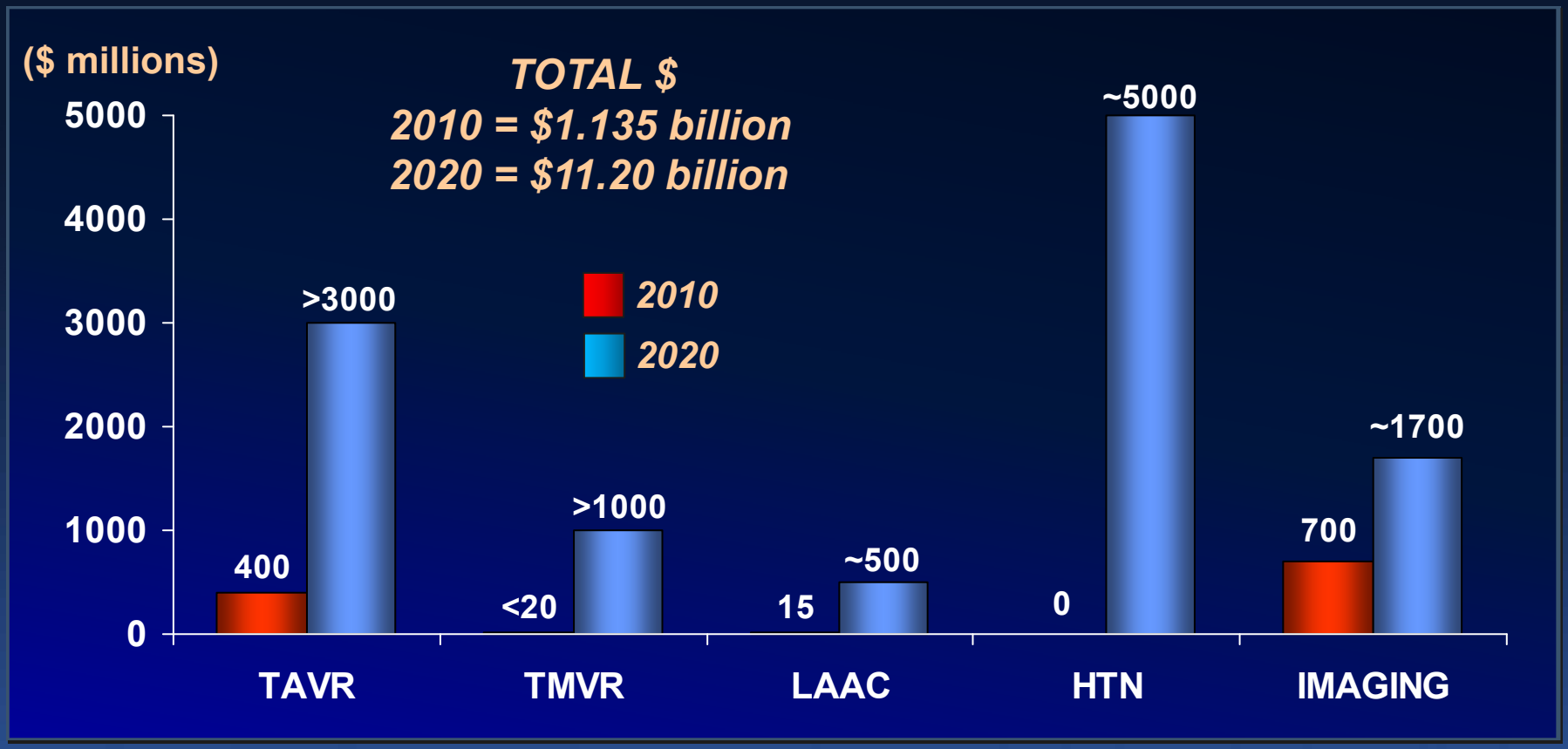
Existing PCI CAGR
2010 – 2020 = 1-3%

- 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

Source: Industry, May 2011

Selected Interventional Growth Markets

Projected Revenue Opportunities (2010-2020)



Source: Industry Investor Presentations

STRUCTURAL Heart Disease

What is it?

STRUCTURAL heart disease… "wastebasket" term referring to…

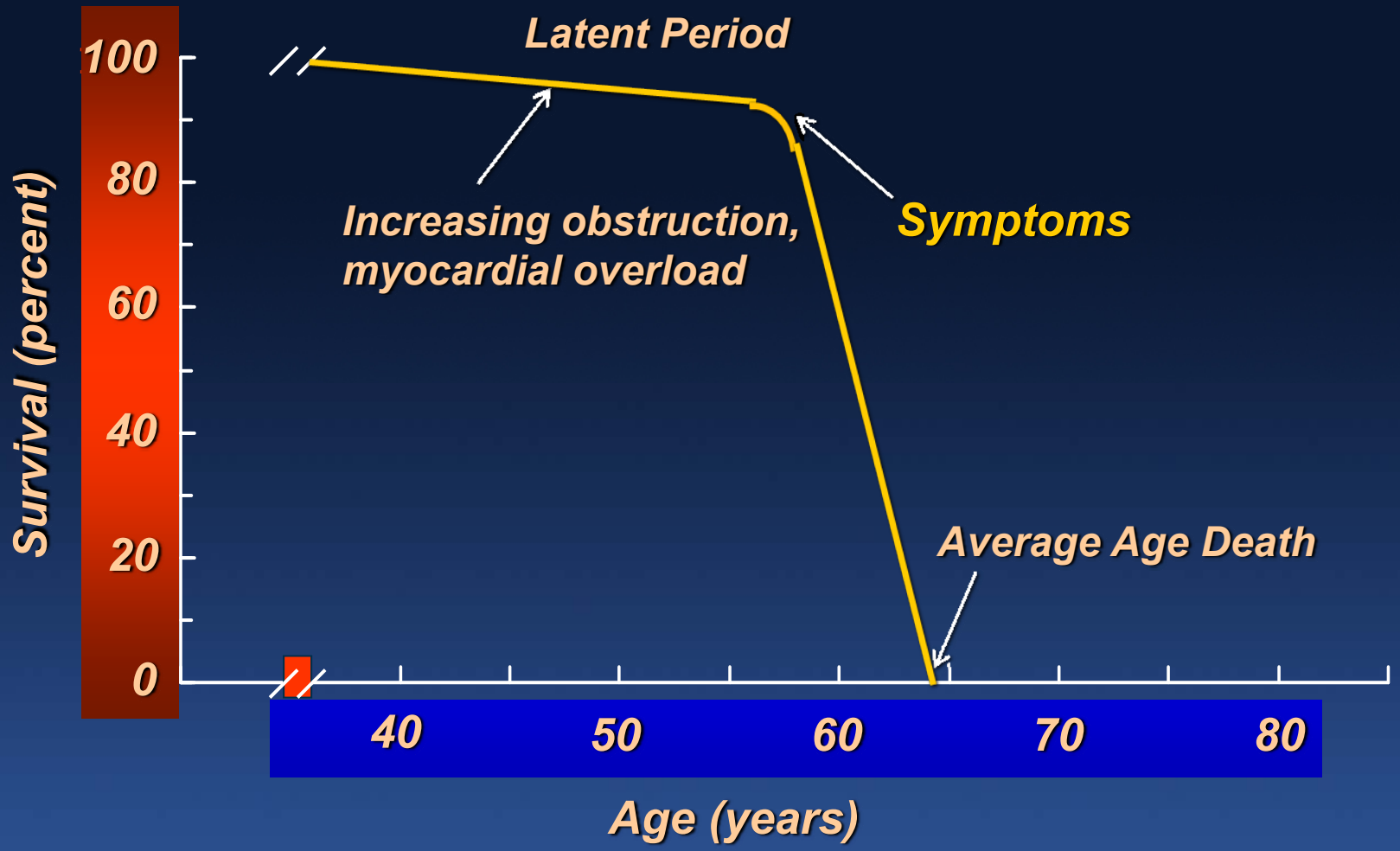
All catheter-based interventional therapies which are not associated with vascular pathology requiring "endoluminal" endovascular treatment.

STRUCTURAL Heart Disease

What is it?

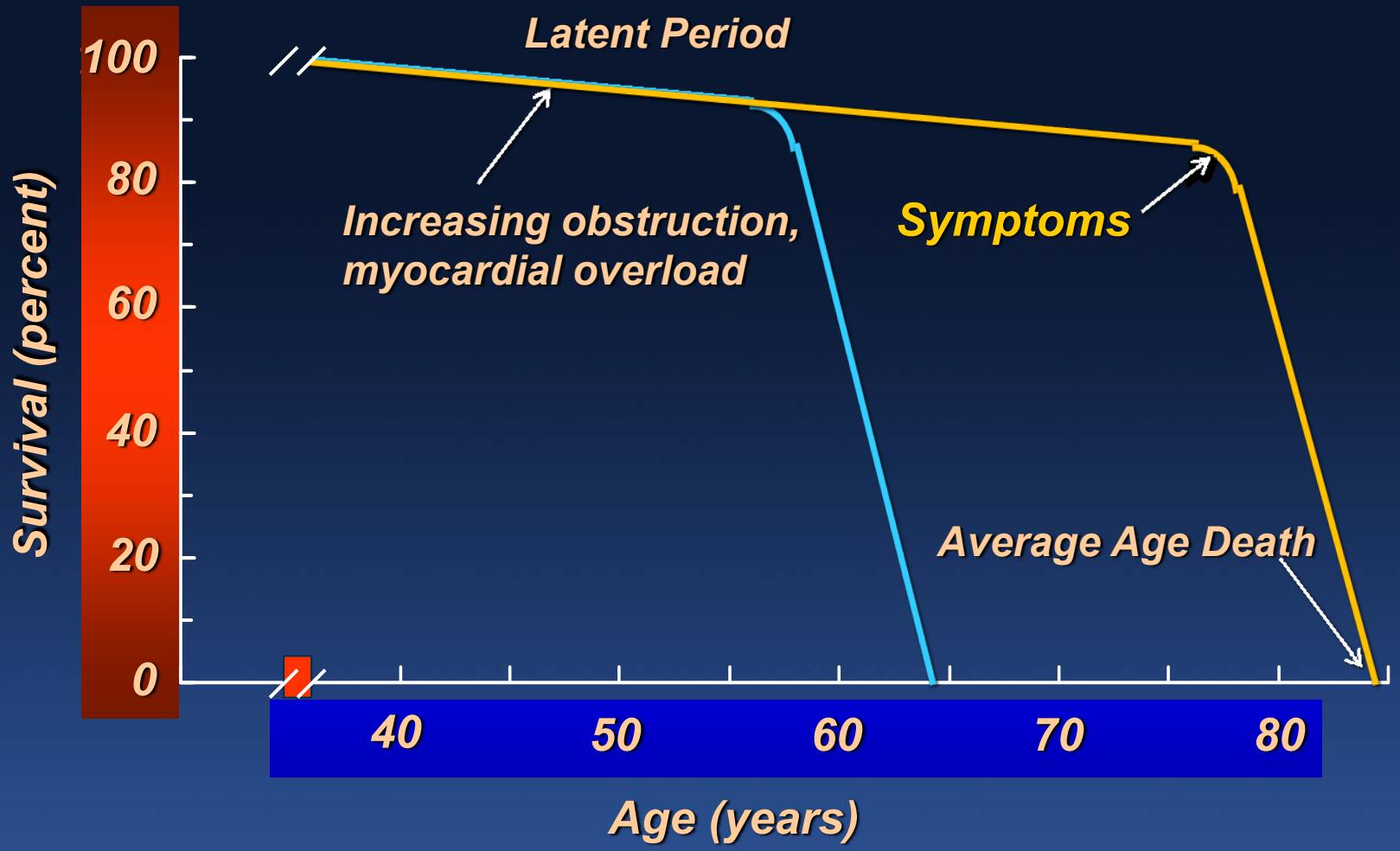
- Transcatheter valve therapies (esp. aortic and mitral)
- Left atrial appendage closure
- Adult congenital heart disease
- Renal denervation for hypertension (and other sympathetic overdrive syndromes)
- Heart failure and advanced hemodynamic support
- Out-of- the box concepts (from impotence to obesity to multiple sclerosis)

Natural History of Aortic Stenosis



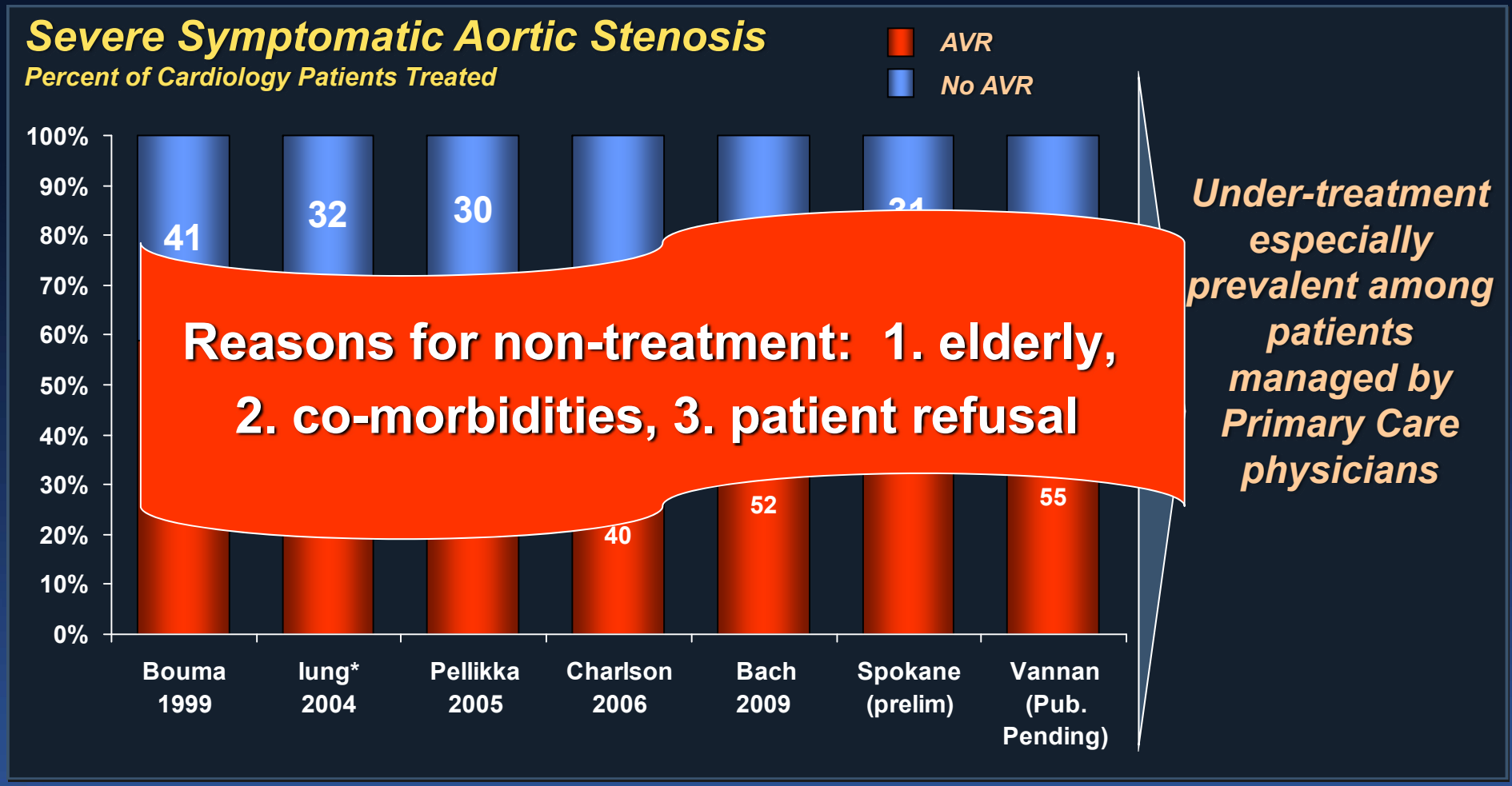
from Ross and Braunwald, Circulation 1968;38:V-61

Natural History of Aortic Stenosis



from Ross and Braunwald, Circulation 1968;38:V-61

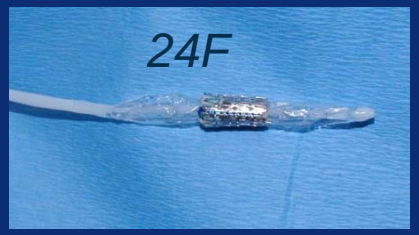
At Least 30% of Patients with Severe Symptomatic AS are "Untreated"!



PVT - The Foundation…

Percutaneous Valve Technologies
Aortic Heart Valve

Polyurethane



23mm max diameter

Bovine pericardium / Stainless steel stent

Dr. Alain Cribier
First-in-Man PIONEER

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION
American Heart Association. Learn and Live.

Percutaneous Transcatheter Implantation of an Aortic Valve Prosthesis for Calcific Aortic Stenosis

First Human Case Description

Alain Cribier, MD; Helene Eltchaninoff, MD; Assaf Bash, PhD; Nicolas Borenstein, MD; Christophe Tron, MD; Fabrice Bauer, MD; Genevieve Derumeaux, MD; Frederic Anselme, MD; François Laborde, MD; Martin B. Leon, MD

Conclusions— *Nonsurgical implantation of a prosthetic heart valve can be successfully achieved with immediate and midterm hemodynamic and clinical improvement.*

April 16, 2002

CARDIOVASCULAR RESEARCH FOUNDATION
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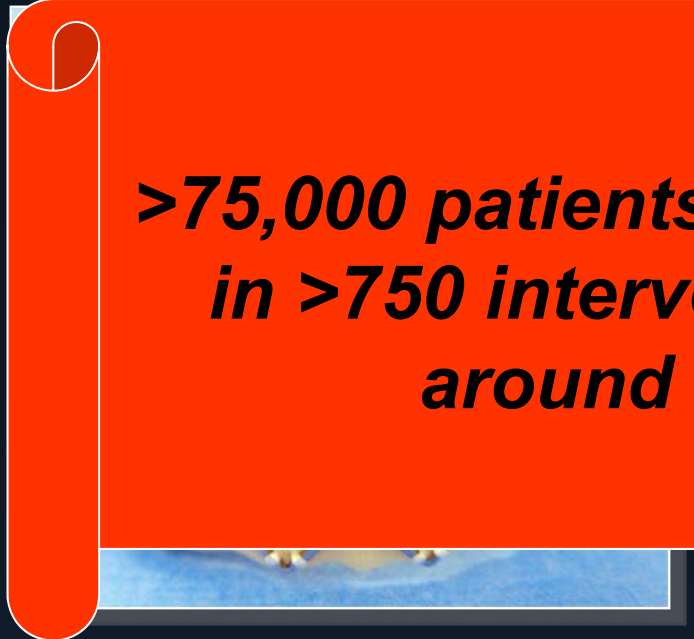
COLUMBIA UNIVERSITY MEDICAL CENTER
NewYork-Presbyterian

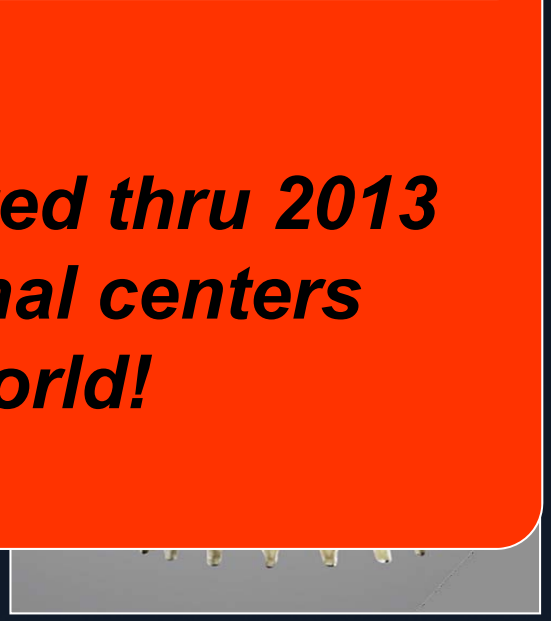
TAVR Arrives

Current Generation Devices

>75,000 patients treated thru 2013 in >750 interventional centers around the world!



Edwards Lifesciences



Medtronic CoreValve

Columbia University Medical Center Heart Valve Team

CARDIOVASCULAR RESEARCH FOUNDATION
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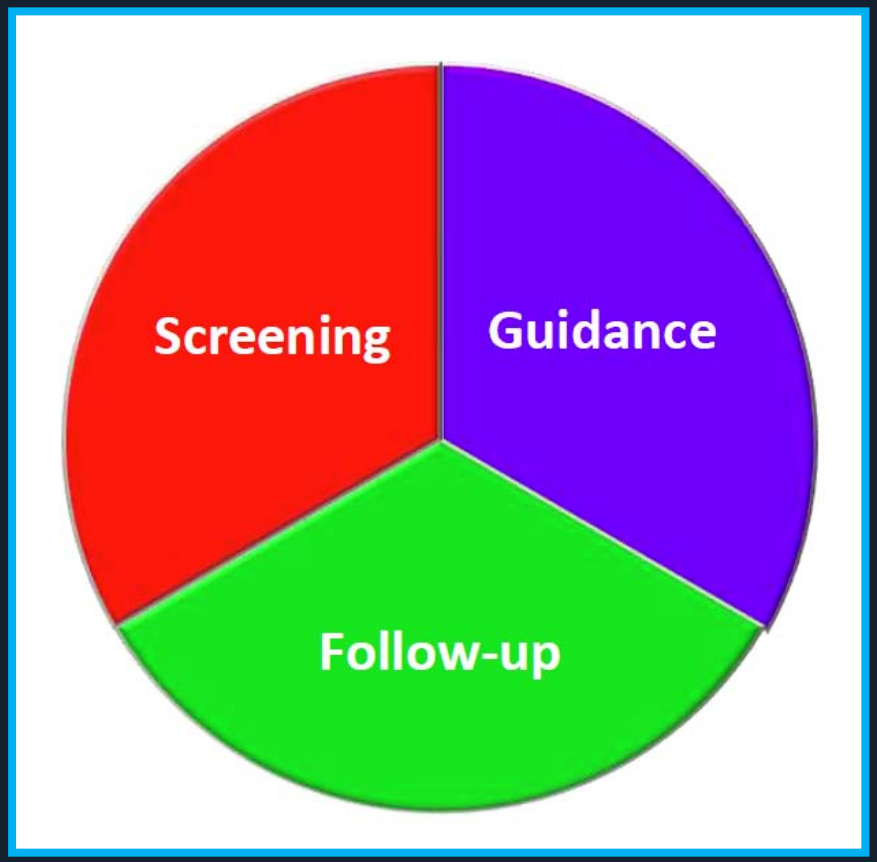
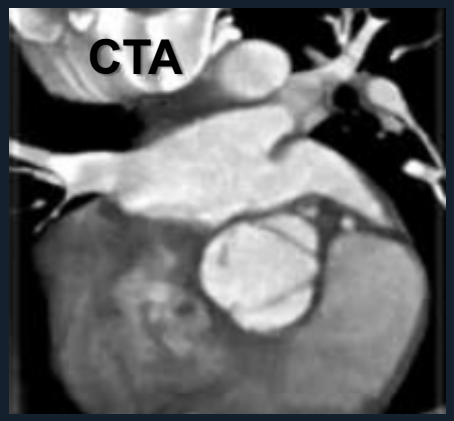
COLUMBIA UNIVERSITY MEDICAL CENTER
NewYork-Presbyterian

Adjunctive Imaging for TAVR

Multi-modality Imaging is the RULE

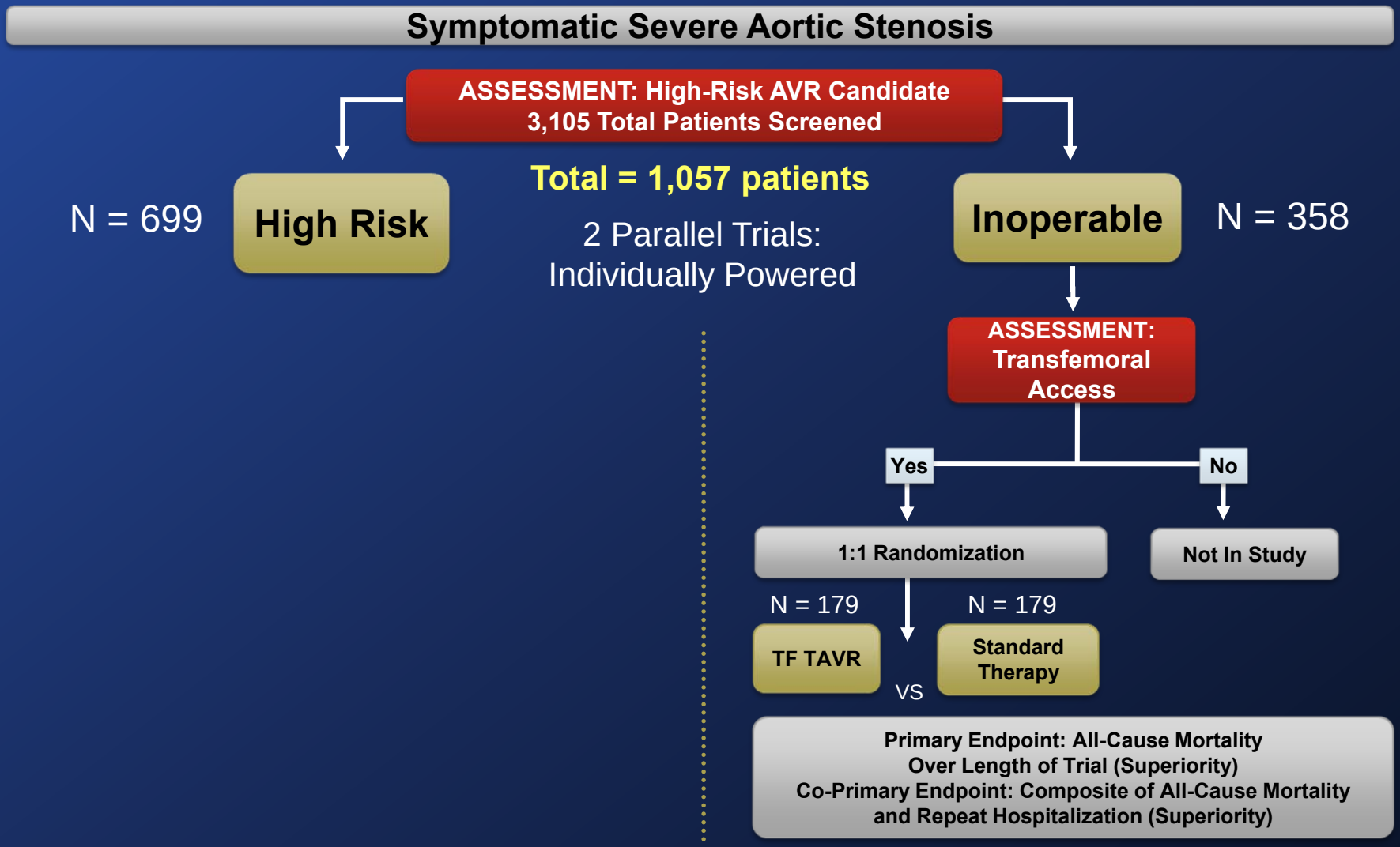




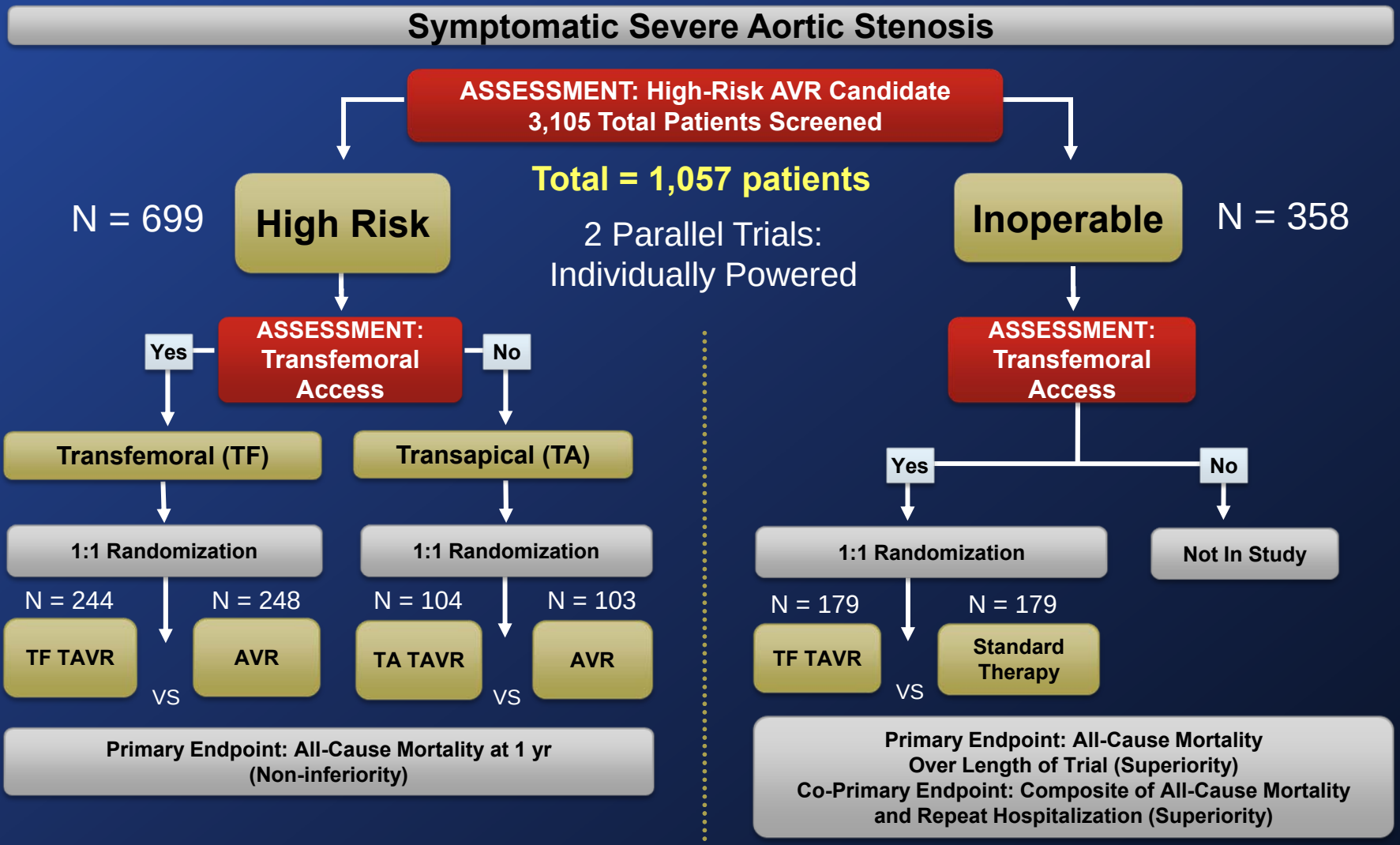
Adapted from: Lutz Buellesfeld

A Dedicated TAVR Milieu

PARTNER Study Design



PARTNER Study Design



The severe AS-T

- Old…very old…
- Frail…very frail
- Lots of co-morbidi
  - Prior CABG (poor
  - CKD
  - Severe COPD
  - PVD
  - Chronic AF
  - Cancer in remissi

But still enjoying life !

PARTNER Manuscripts in NEJM (October, 2010 – May, 2012)

THE PARTNER TRIAL

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 OCTOBER 21, 2010 VOL. 363 NO. 17

Transcatheter Aortic-Valve Implantation for Aortic Stenosis in Patients Who Cannot Undergo Surgery

Martin B. Leon, M.D., Craig R. Smith, M.D., Michael Mack, M.D., D. Craig Miller, M.D., Jeffrey W. Moses, M.D., Lars G. Svensson, M.D., Ph.D., E. Murat Tuzcu, M.D., John G. Webb, M.D., Gregory P. Fontana, M.D., Raj R. Makkar, M.D., David L. Brown, M.D., Peter C. Block, M.D., Robert A. Guyton, M.D., Augusto D. Pichard, M.D., Joseph E. Bavaria, M.D., Howard C. Herrmann, M.D., Pamela S. Douglas, M.D., John L. Petersen, M.D., Jodi J. Akin, M.S., William N. Anderson, Ph.D., Duolao Wang, Ph.D., and Stuart Pocock, Ph.D., for the PARTNER Trial Investigators*

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JUNE 9, 2011 VOL. 364 NO. 23

Transcatheter and Surgical Aortic-Valve Replacement in High-Risk Patients

Craig R. Smith, M.D., Martin B. Leon, M.D., Michael J. Mack, M.D., D. Craig Miller, M.D., Jeffrey W. Moses, M.D., Lars G. Svensson, M.D., Ph.D., E. Murat Tuzcu, M.D., John G. Webb, M.D., Gregory P. Fontana, M.D., Raj R. Makkar, M.D., Mathew Williams, M.D., Todd Dewey, M.D., Samir Kapadia, M.D., Vasilis Babaliaros, M.D., Vinod H. Thourani, M.D., Paul Corso, M.D., Augusto D. Pichard, M.D., Joseph E. Bavaria, M.D., Howard C. Herrmann, M.D., Jodi J. Akin, M.S., William N. Anderson, Ph.D., Duolao Wang, Ph.D., and Stuart J. Pocock, Ph.D., for the PARTNER Trial Investigators*

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Transcatheter Aortic-Valve Replacement for Inoperable Severe Aortic Stenosis

Raj R. Makkar, M.D., Gregory P. Fontana, M.D., Hasan Jilaihawi, M.D., Samir Kapadia, M.D., Augusto D. Pichard, M.D., Pamela S. Douglas, M.D., Vinod H. Thourani, M.D., Vasilis C. Babaliaros, M.D., John G. Webb, M.D., Howard C. Herrmann, M.D., Joseph E. Bavaria, M.D., Susheel Kodali, M.D., David L. Brown, M.D., Bruce Bowers, M.D., Todd M. Dewey, M.D., Lars G. Svensson, M.D., Ph.D., Murat Tuzcu, M.D., Jeffrey W. Moses, M.D., Matthew R. Williams, M.D., Robert J. Siegel, M.D., Jodi J. Akin, M.S., William N. Anderson, Ph.D., Stuart Pocock, Ph.D., Craig R. Smith, M.D., and Martin B. Leon, M.D., for the PARTNER Trial Investigators*

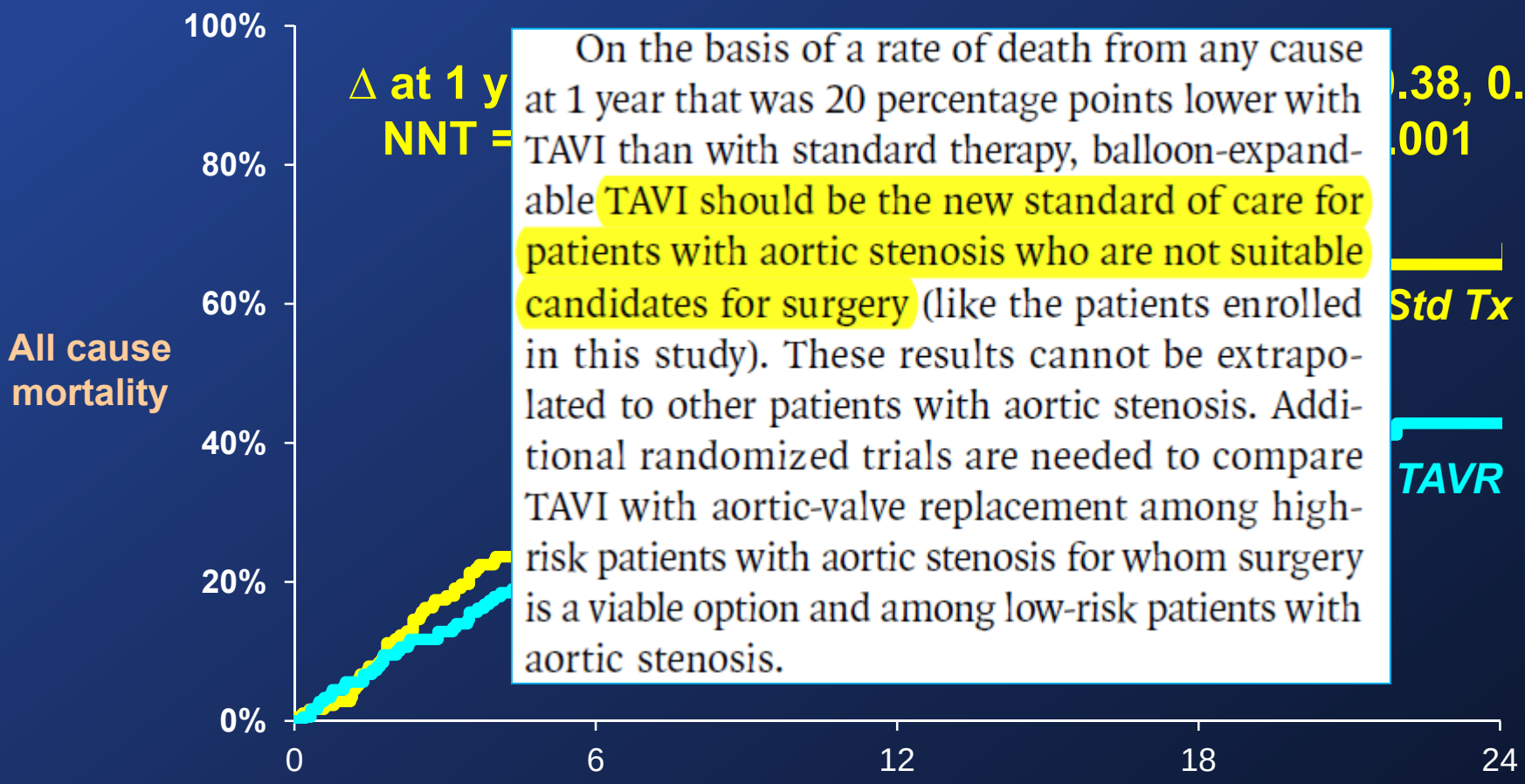
The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Two-Year Outcomes after Transcatheter or Surgical Aortic-Valve Replacement

Susheel K. Kodali, M.D., Mathew R. Williams, M.D., Craig R. Smith, M.D., Lars G. Svensson, M.D., Ph.D., John G. Webb, M.D., Raj R. Makkar, M.D., Gregory P. Fontana, M.D., Todd M. Dewey, M.D., Vinod H. Thourani, M.D., Augusto D. Pichard, M.D., Michael Fischbein, M.D., Wilson Y. Szeto, M.D., Scott Lim, M.D., Kevin L. Greason, M.D., Paul S. Teirstein, M.D., S. Chris Malaisrie, M.D., Pamela S. Douglas, M.D., Rebecca T. Hahn, M.D., Brian Whisenant, M.D., Alan Zajarias, M.D., Duolao Wang, Ph.D., Jodi J. Akin, M.S., William N. Anderson, Ph.D., and Martin B. Leon, M.D., for the PARTNER Trial Investigators*

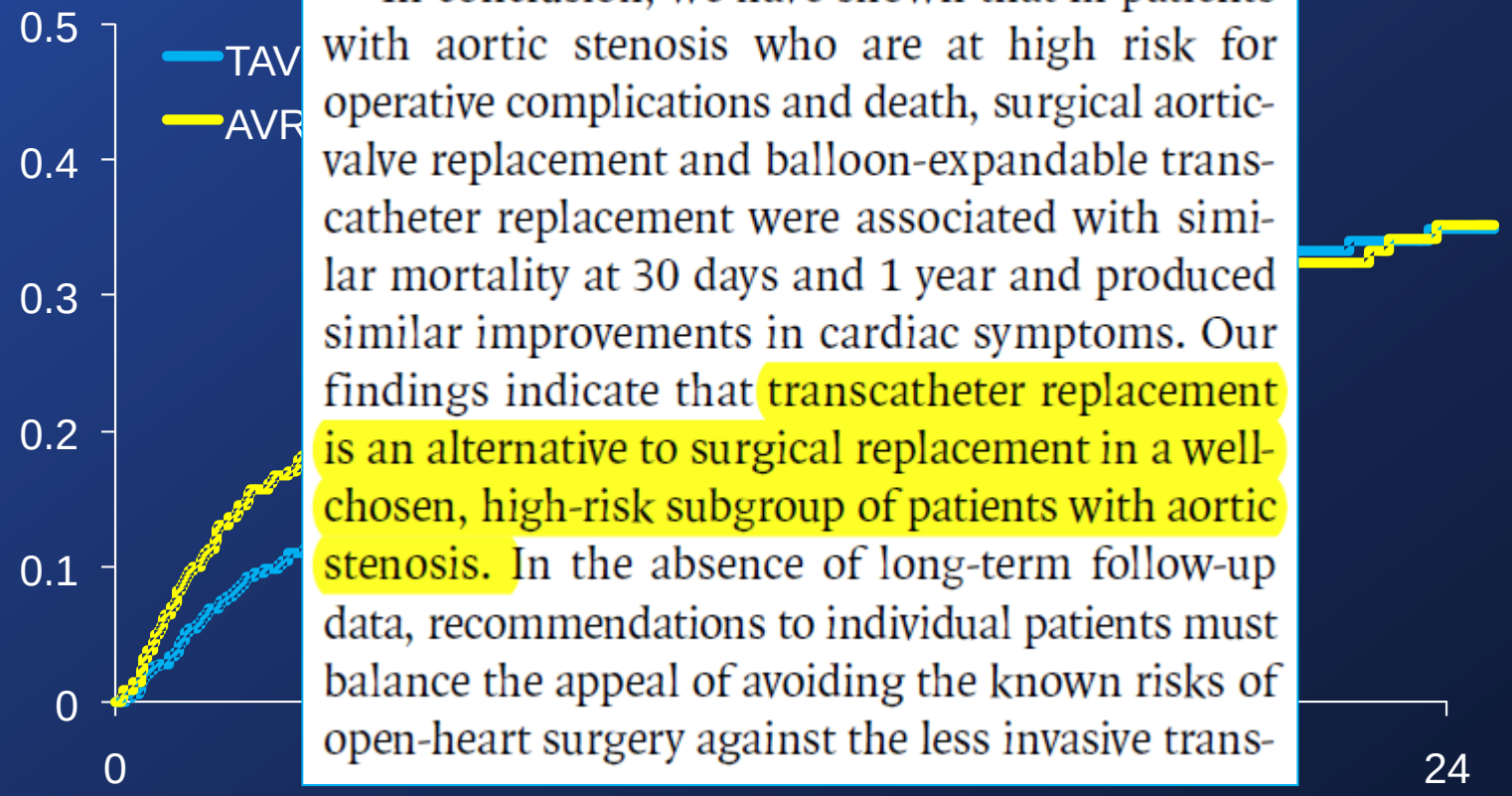
Primary Endpoint: All Cause Mortality



On the basis of a rate of death from any cause at 1 year that was 20 percentage points lower with TAVI than with standard therapy, balloon-expandable TAVI should be the new standard of care for patients with aortic stenosis who are not suitable candidates for surgery (like the patients enrolled in this study). These results cannot be extrapolated to other patients with aortic stenosis. Additional randomized trials are needed to compare TAVI with aortic-valve replacement among high-risk patients with aortic stenosis for whom surgery is a viable option and among low-risk patients with aortic stenosis.

Numbers at Risk					
Std Tx	179	121	85	56	24
TAVR	179	138	124	103	60

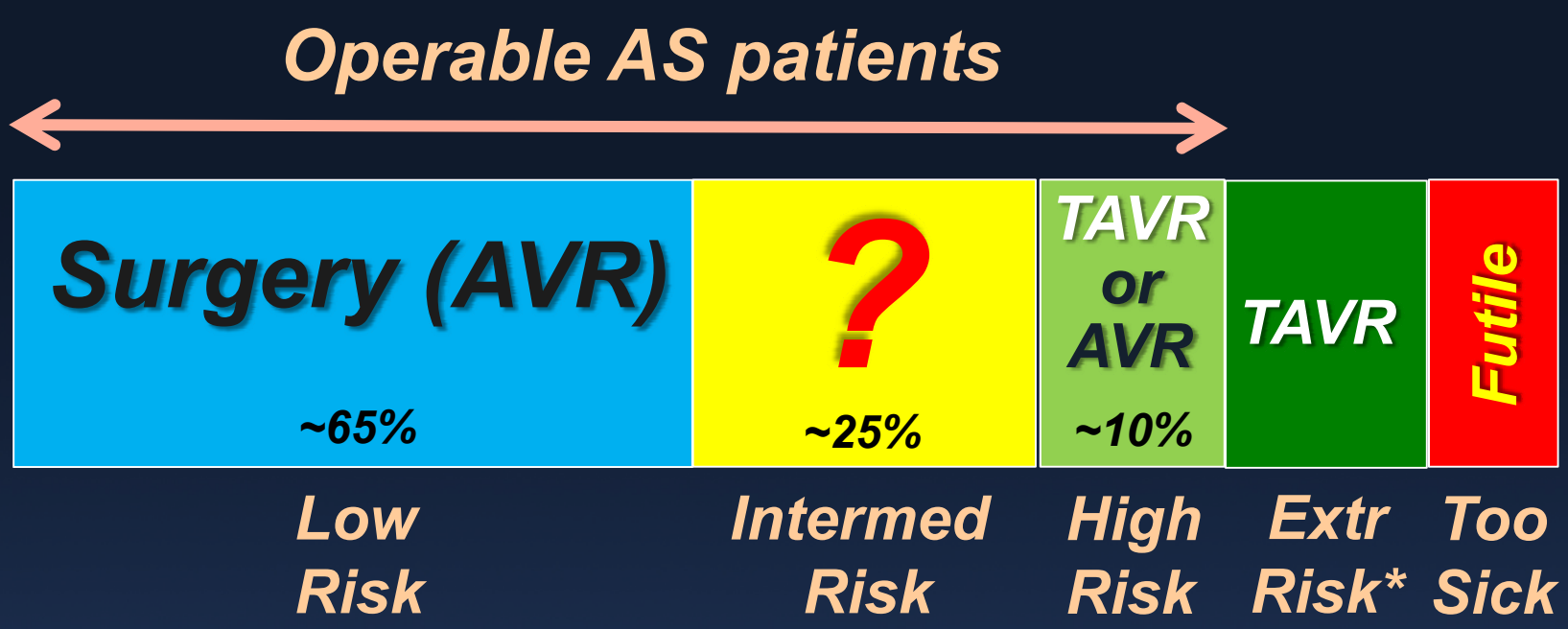
High-Risk Operable PARTNER Cohort
Primary Endpoint: All-Cause Mortality



In conclusion, we have shown that in patients with aortic stenosis who are at high risk for operative complications and death, surgical aortic-valve replacement and balloon-expandable transcatheter replacement were associated with similar mortality at 30 days and 1 year and produced similar improvements in cardiac symptoms. Our findings indicate that transcatheter replacement is an alternative to surgical replacement in a well-chosen, high-risk subgroup of patients with aortic stenosis. In the absence of long-term follow-up data, recommendations to individual patients must balance the appeal of avoiding the known risks of open-heart surgery against the less invasive trans-

No. at Risk			Months		
TAVR	348	298	260	147	67
AVR	351	252	236	139	65

TAVR Categories
(risk is a continuum)

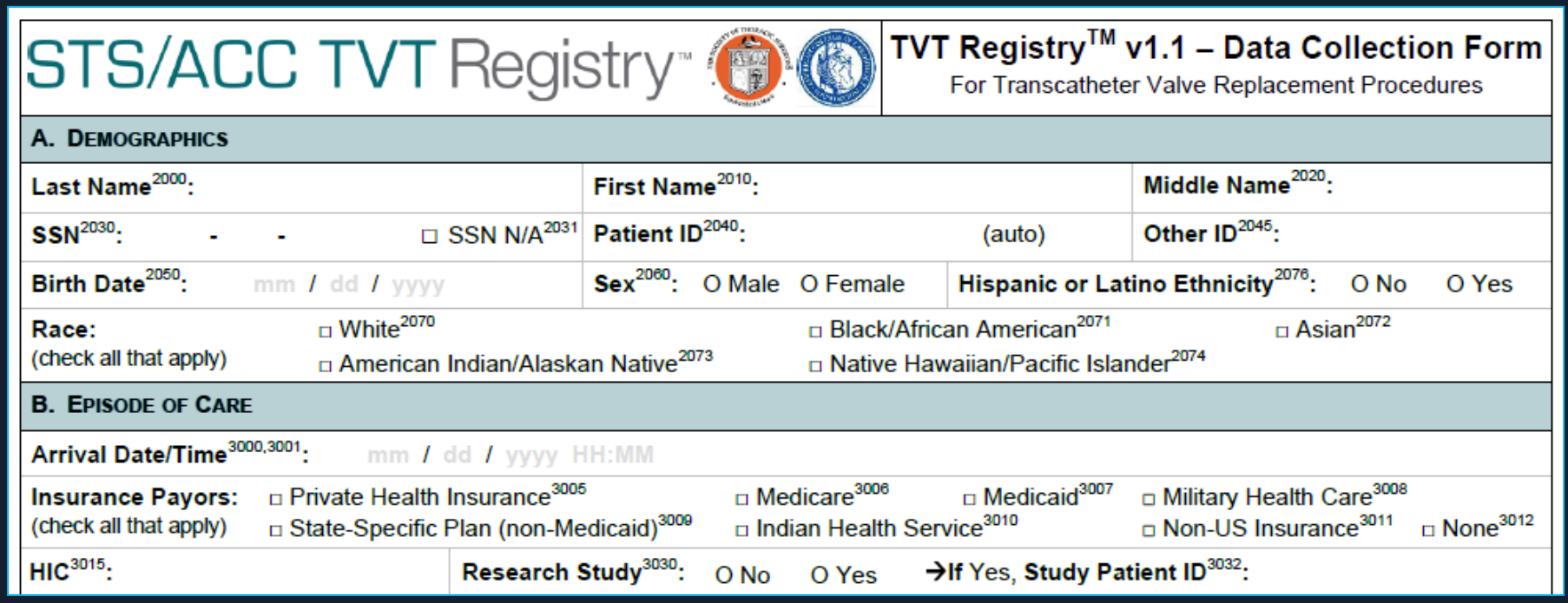


TAVR in 2013

irresponsible, reckless — *"equipoise"* — *OK* — *preferred* — *No*

* Extreme risk = "inoperable"

TVT U.S. National Registry



STS/ACC TVT Registry™

TVT Registry™ v1.1 – Data Collection Form
For Transcatheter Valve Replacement Procedures

A. Demographics

Last Name[2000]:	**First Name**[2010]:	**Middle Name**[2020]:
SSN[2030]: - - ☐ SSN N/A[2031]	**Patient ID**[2040]: (auto)	**Other ID**[2045]:
Birth Date[2050]: mm / dd / yyyy	**Sex**[2060]: O Male O Female	**Hispanic or Latino Ethnicity**[2076]: O No O Yes

Race: (check all that apply)
☐ White[2070] ☐ Black/African American[2071] ☐ Asian[2072]
☐ American Indian/Alaskan Native[2073] ☐ Native Hawaiian/Pacific Islander[2074]

B. Episode of Care

Arrival Date/Time[3000,3001]: mm / dd / yyyy HH:MM

Insurance Payors: (check all that apply)
☐ Private Health Insurance[3005] ☐ Medicare[3006] ☐ Medicaid[3007] ☐ Military Health Care[3008]
☐ State-Specific Plan (non-Medicaid)[3009] ☐ Indian Health Service[3010] ☐ Non-US Insurance[3011] ☐ None[3012]

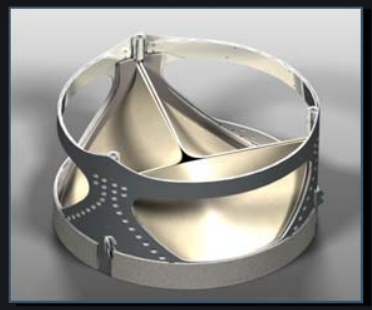
HIC[3015]: **Research Study**[3030]: O No O Yes →**If Yes, Study Patient ID**[3032]:

- **Comprehensive prospective observational database (7-page CRF)**
- **FU includes 30-days, 1-year (incl. QOL measures)**
- **TVT compliance linked to reimbursement**

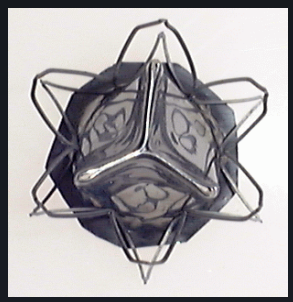
New TAVI Systems - *Transfemoral*

- Direct Flow
- Sadra
- St. Jude
- AorTx
- HLT
- EndoTech
- ABPS PercValve







TAVR… Fulfilling Gruentzig's Dream

- Favorable balance of safety and efficacy
- Treatment focuses on most appropriate high-risk patients
- Generalizable to the interventional community
- Rigorous evidence-based medicine clinical studies
- Innovative technology (incl. accessory devices)
- Emphasizes advanced imaging and a well characterized treatment milieu
- Multi-disciplinary collaborations (e.g. the Heart Valve Team)

From PTCA to TAVR

Final Thoughts

Heritage of Intervention

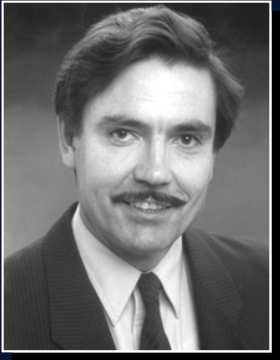
- **We believe that "less invasive" is better** (certainly for patients and also for the healthcare system in general; and less-invasive means catheter-based, non-surgical, whenever possible)
- **We are technology addicts** (esp. new gizmos which can shorten procedures, improve outcomes, and expand treatment indications)
- **We are passionate about experimental and clinical research and evidence-based medicine** (fundamental to every important therapy change and to the interventional device development process)

Heritage of Intervention

- **We rely heavily on adjunctive imaging - a visual subspecialty** (a growing trend…echo/IVUS, MR/CT, "fusion" imaging, and other new invasive imaging modalities)
- **We are passionate about the interface of clinical medicine and the rapid communication of ideas** (educational meetings, physician training, new IT developments, patient care initiatives, and marketing opportunities)
- **We have a vibrant entrepreneurial spirit**, are risk-takers, and rapidly embrace new therapies
- **We strongly support and promote global and multi-disciplinary collaborations**

Heritage of Intervention

- ***We have a cultural identity … innovation, strong industry partnerships, impatience leading to evolution and forward motion; we have a need to stimulate change and to continually re-invent ourselves, in pace with advances in bio-medical science and technology!***



What Would Andreas Think? of What's Become of Interventional Cardiology?

I think he would be…

Approving of the mandate to generate and utilize evidence-based medicine in clinical decision-making

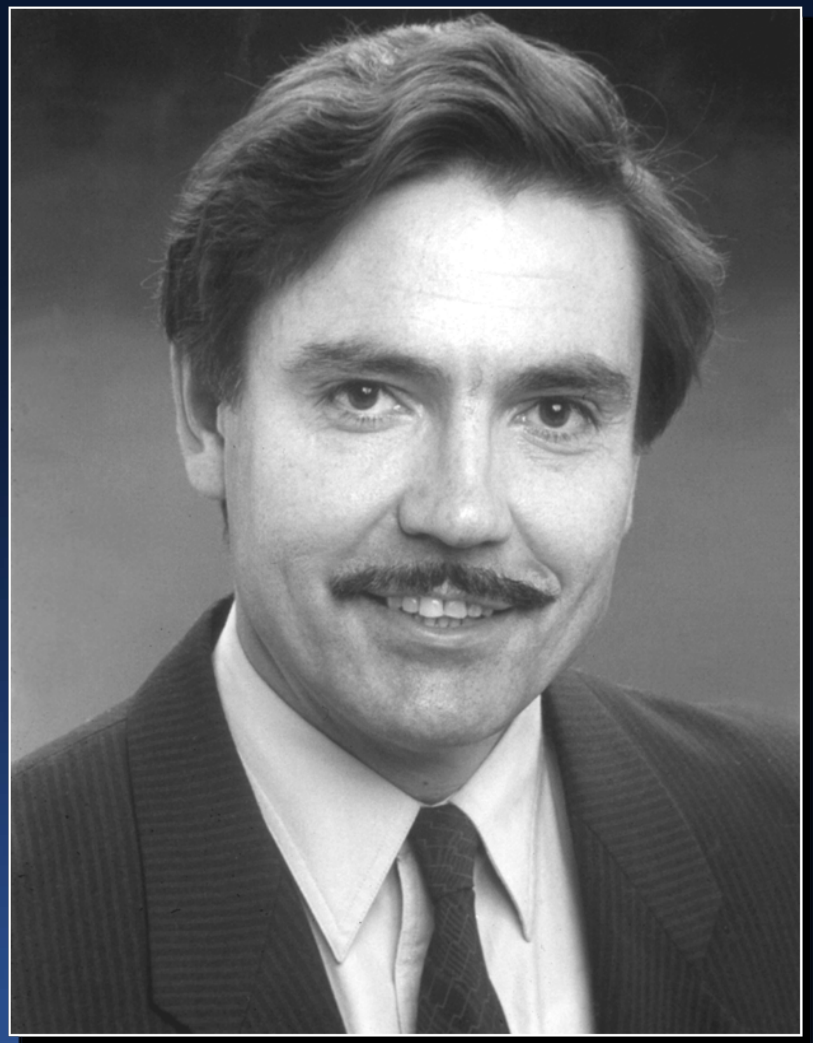
Ecstatic and overwhelmed with the technology explosion that has overcome many of the limitations of PTCA

Enthralled with the extension of catheter-based treatment to non-vascular disease states (e.g. structural/valvular)

Appalled with the sometimes inappropriate use of devices, and concerned about operators who don't practice with the highest standards of quality and ethics

Distressed by the myriad external social, economic and political forces that are interfering with the practice of medicine

Celebrating >30 Years!



Andreas Gruentzig
1939 - 1985

On the shoulders of pioneers, we've witnessed the birth of a subspecialty. Cardiovascular medicine has been forever transformed and patient outcomes have never been better!