

ENDEAVOR Program Overview

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Cardiovascular Research Foundation
New York City*

Angioplasty Summit 2009 – TCT Asia Pacific
April 22-24, 2009; Seoul, Korea



CARDIOVASCULAR RESEARCH
FOUNDATION



COLUMBIA UNIVERSITY
MEDICAL CENTER

NewYork-Presbyterian

The University Hospital of Columbia and Cornell

Presenter Disclosure Information for Angioplasty Summit 2009

Martin B. Leon, M.D.

Scientific Advisory Board or Equity:
Abbott, Boston Scientific, Cordis,
and Medtronic



Endeavor DES - 2009

Device Technology Overview

Clinical Trial Perspectives



Endeavor DES - 2009

Device Technology Overview



CARDIOVASCULAR RESEARCH
FOUNDATION



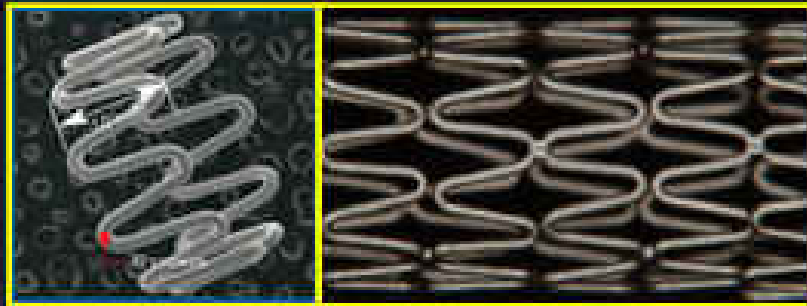
COLUMBIA UNIVERSITY
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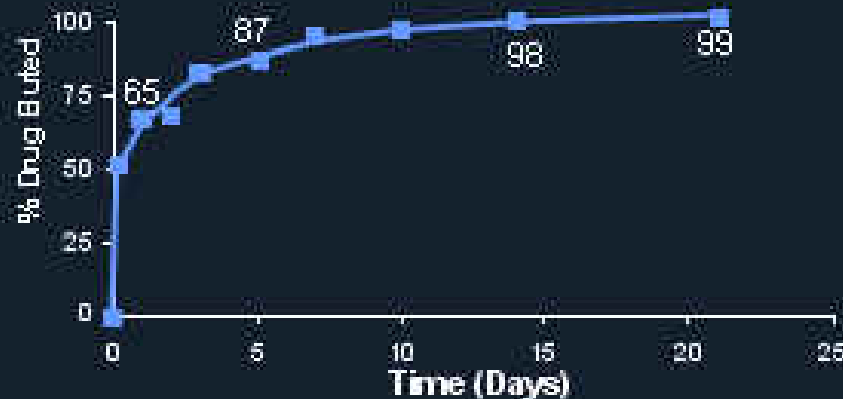
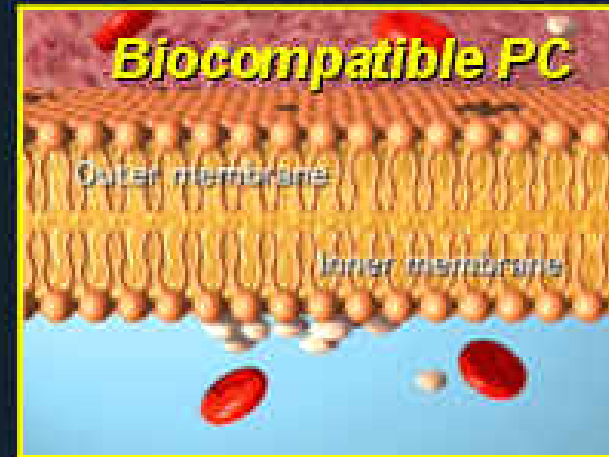
The University Hospital of Columbia and Cornell

ENDEAVOR Technology Considerations

Design Features



*Stent design = reduced injury
(rounded thin struts)*



Rapid drug elution

**PC Basecoat
($\approx 1\mu\text{m}$)**

**Drug Layer
90% Zotarolimus
10% PC ($\approx 2-4\mu\text{m}$)**



*Safe
formulation*

ENDEAVOR Technology Considerations

Animal Studies (rabbits and pigs)



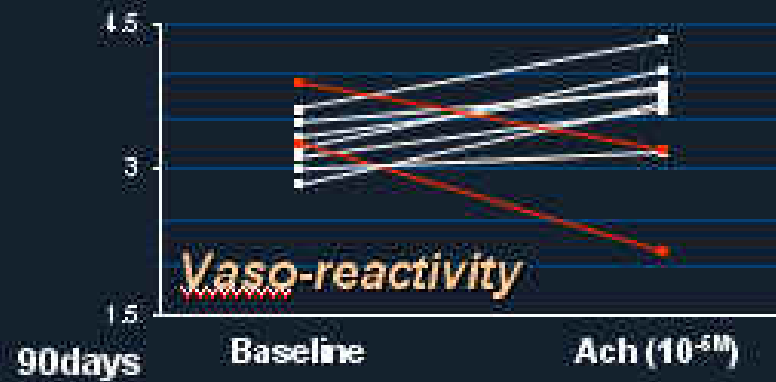
Histopathology



% of Struts Endothelialized



mm



ENDEAVOR Technology Considerations

Human Results

Angioscopy



ZES (n=14) vs. SES (n=16)
@ 8 mos FU
ZES improved neointimal coverage
(P=0.0004) and fewer thrombi
Awata et al; J Am Coll Cardiol 2008;52;789-90



541 ZES pts @ 8 mos FU
0.4% late incomplete apposition; no
positive remodeling; homogeneous
neointimal distribution
Fitzgerald et al; Stanford NUS core lab

OCT

44 overlapped ZES in 17 pts
@ 6 mos FU (24,076 struts analyzed)
ZES no malapposed or uncovered
struts; no intraluminal thrombus
Guagliumi et al; ESC 2008

Proximal to stent

Distal to stent

ZES (n=20) vs. SES (n=20) vs.
BMS (n=10); Ach infusions
@ 6 mos; ZES improved
endothelial function *vs* SES
(P<0.001) and similar to BMS
Kim et al; ACC 2008



Endeavor DES - 2008

Clinical Trial Perspectives



Important DES Attributes

Deliverability

Efficacy

Safety



Endeavor DES - 2009

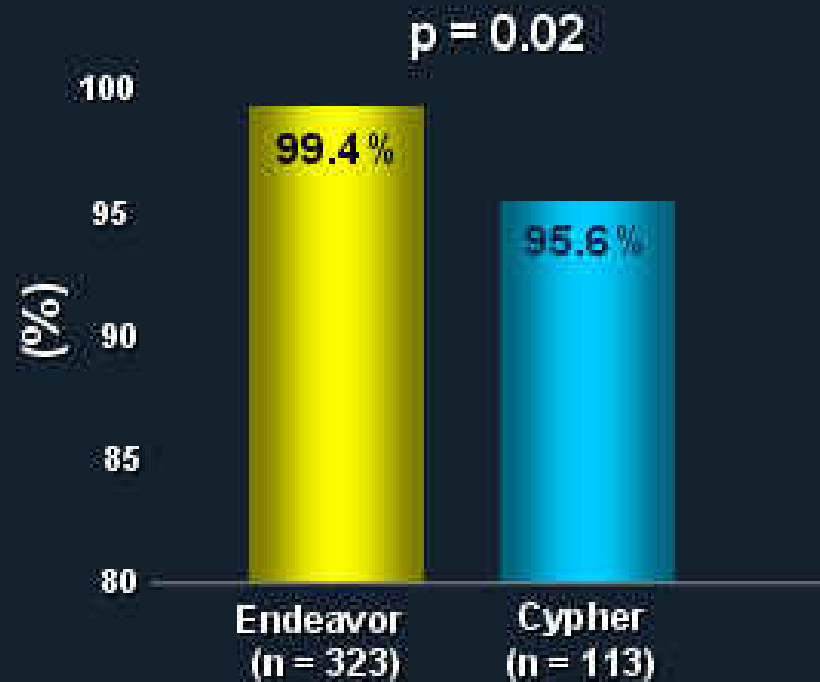
Deliverability



ENDEAVOR Deliverability

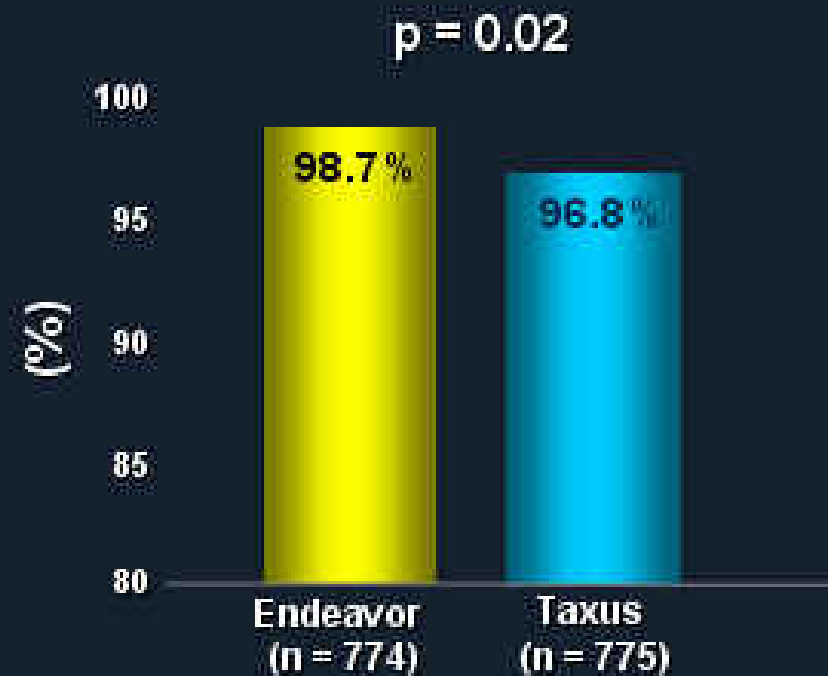
Procedural Success vs. Cypher and Taxus

ENDEAVOR III



Procedural Success

ENDEAVOR IV



Procedural Success








Endeavor Sprint Stent System

Crossing Profile and Deliverability

Low profile helps in treating the most challenging anatomy

Crossing Profile

Crossing Profile		Tip Seal Outside Diameter		
Endeavor Sprint	1.12 mm (0.0440 in.)		Endeavor Sprint	0.66 mm (0.026 in.)
Endeavor	1.12 mm (0.0440 in.)		Endeavor	0.76 mm (0.030 in.)
XIENCE	1.20 mm (0.0472 in.)		XIENCE	0.82 mm (0.032 in.)
Taxus Liberte	1.22 mm (0.0480 in.)		Taxus Liberte	0.86 mm (0.034 in.)
CYPHER SELECT Plus	1.29 mm (0.0508 in.)		CYPHER SELECT Plus	0.83 mm (0.032 in.)




FasTrac Tip

- Easier tracking and crossing
- Shorter 3-mm tip length
- Low-profile system



Fulcrum Balloon

- Softer
- Greater flexibility



Enhanced Proximal Shaft

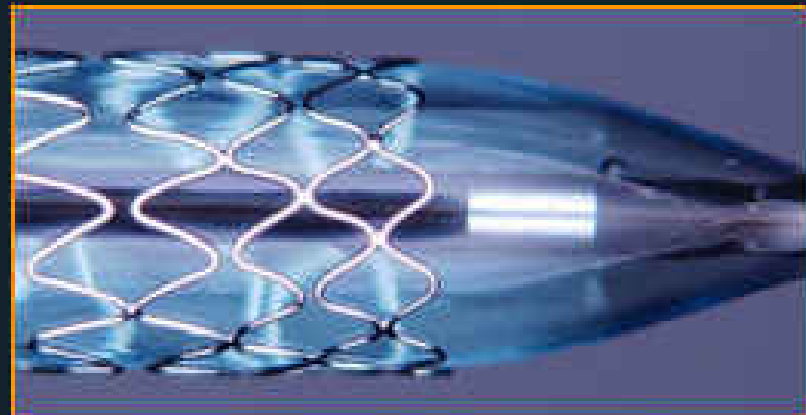
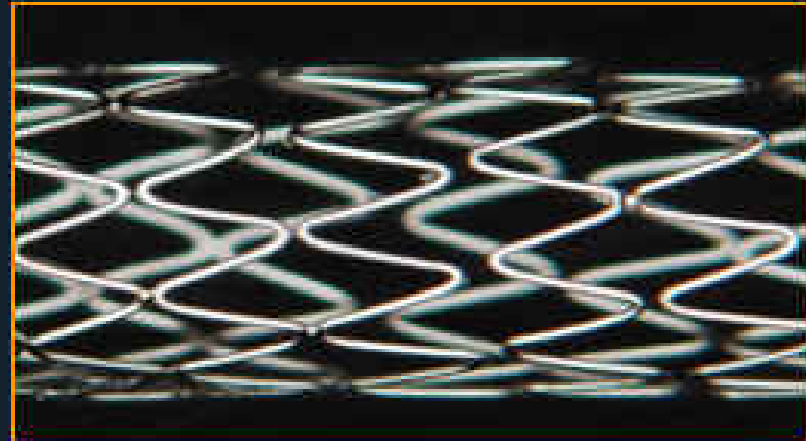
- Teflon coating increases lubricity
- Stiffening wire improves transition of force

Endeavor Stent Platform

Next Generation BMS and DES

Development Targets

- Continuous, sinusoidal design
- Thinner round struts
- Enhanced vessel scaffolding in tortuous vessels without compromising flexibility
- Increase range of available sizes



Endeavor DES - 2009

Deliverability

Endeavor is...

- more user-friendly (esp. Rx platform)
- very deliverable in complex lesions and challenging anatomy
- excellent sidebranch access



Endeavor DES - 2009

Efficacy



ENDEAVOR Clinical Trial Program

Enrollment Complete / In Follow Up		1yr	2yr	3yr	4yr	5yr
ENDEAVOR I	Single Arm First-in-Man (n = 100)					5yr
ENDEAVOR II	1:1 RCT vs. BMS (E = 598,D = 599) PK (n = 106)					4yr
ENDEAVOR II CA	Continued Access Single Arm (n = 296)					4yr
ENDEAVOR III	3:1 RCT vs. Cypher [®] (E = 323,C = 113)					3yr
ENDEAVOR IV	1:1 RCT vs. Taxus [®] (E = 773,T = 775)					2yr
ENDEAVOR PK	Pharmacokinetic Study (n = 43)					2yr
ENDEAVOR Japan	Single Arm (n = 99)					2yr
E-FIVE	Open Label Single Arm (n = 8300)					1yr
<hr/>						
<i>Enrolling / Planning</i>						
PROTECT	1:1 RCT vs. Cypher (E = 4400,C = 4400)					
ENDEAVOR SVS	Small Vessel Single Arm (n ≈ 250)					
PROTECT CA NA	Post Mkt Registry Single Arm (n ≥ 1000)					
E-Japan PMS	Post Mkt Registry Single Arm (n ≈ 2000)					



~24,000 patients
 ~\$250M
 Projected
 Investment

Endeavor II

Double Blind RCT vs. Driver BMS

PI: Jean Fajadet, Richard Kuntz and William Wijns

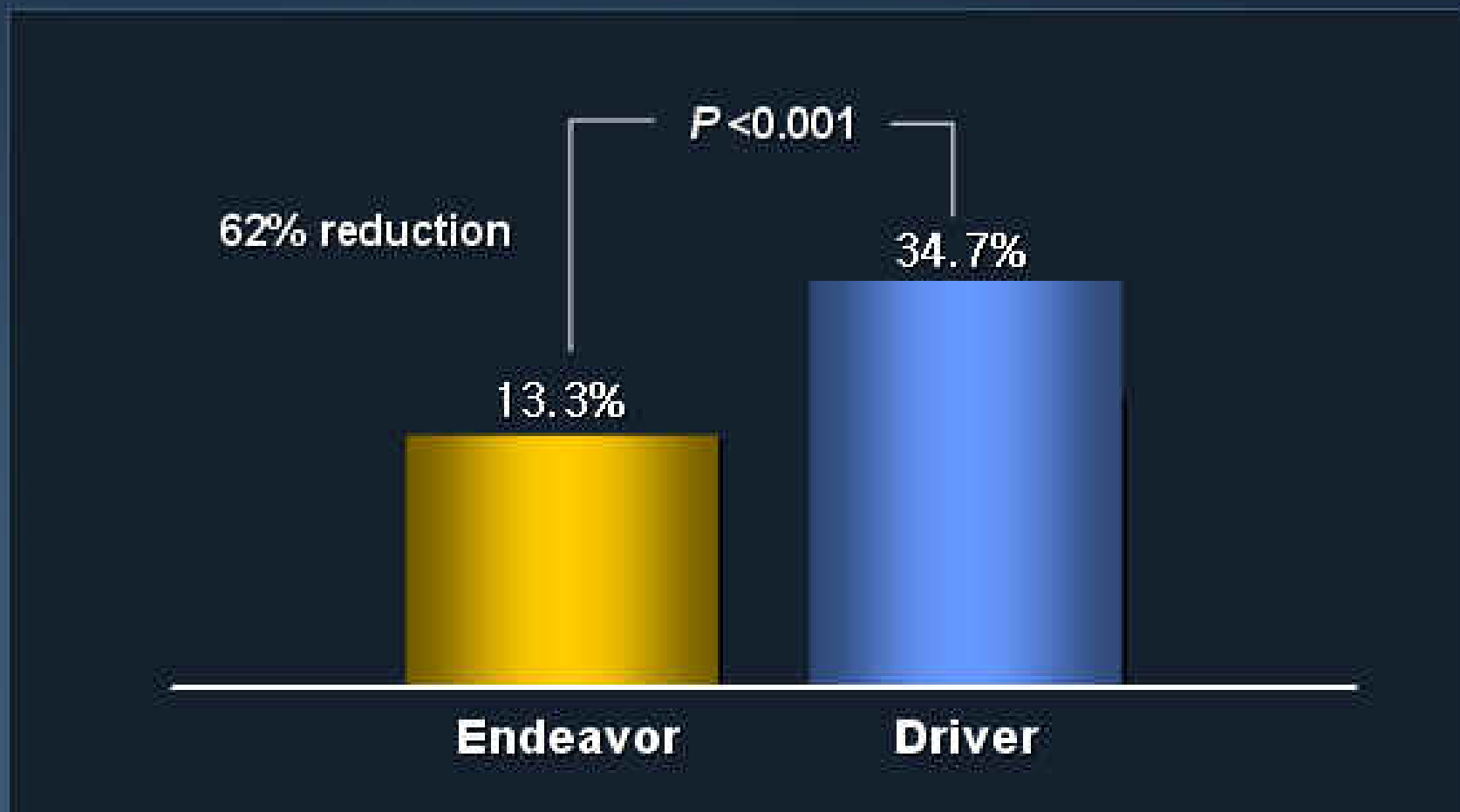


Primary Endpoint: TVF at 9 months
Secondary Endpoints: MACE at 30 days and 9 months, ABR at 8 months
Drug Therapy: ASA and Clopidogrel/Ticlid \geq 3 months
Zotarolimus Dose: 10 μ g per mm stent length



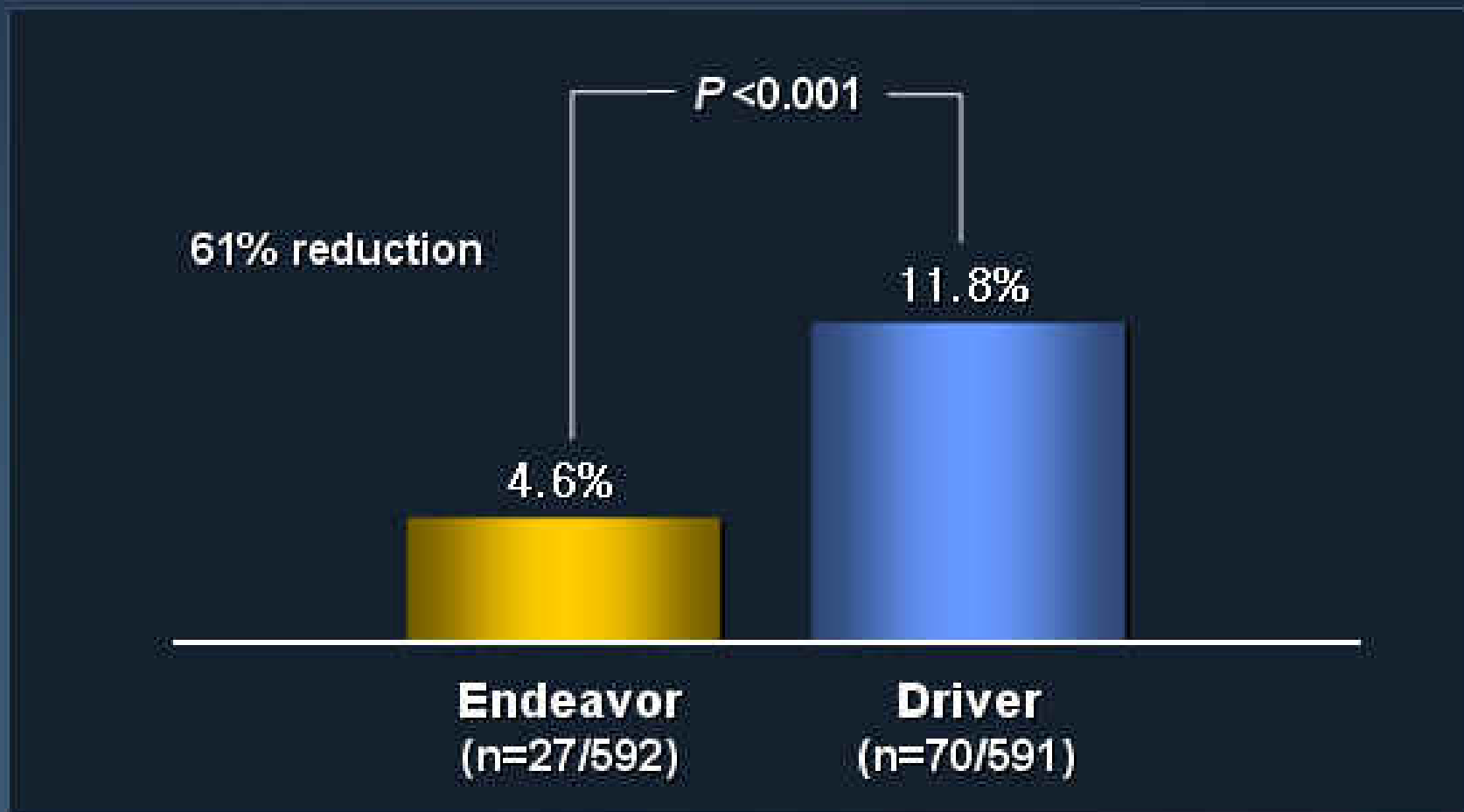
Endeavor II

In-seg Binary Restenosis at 8 mos



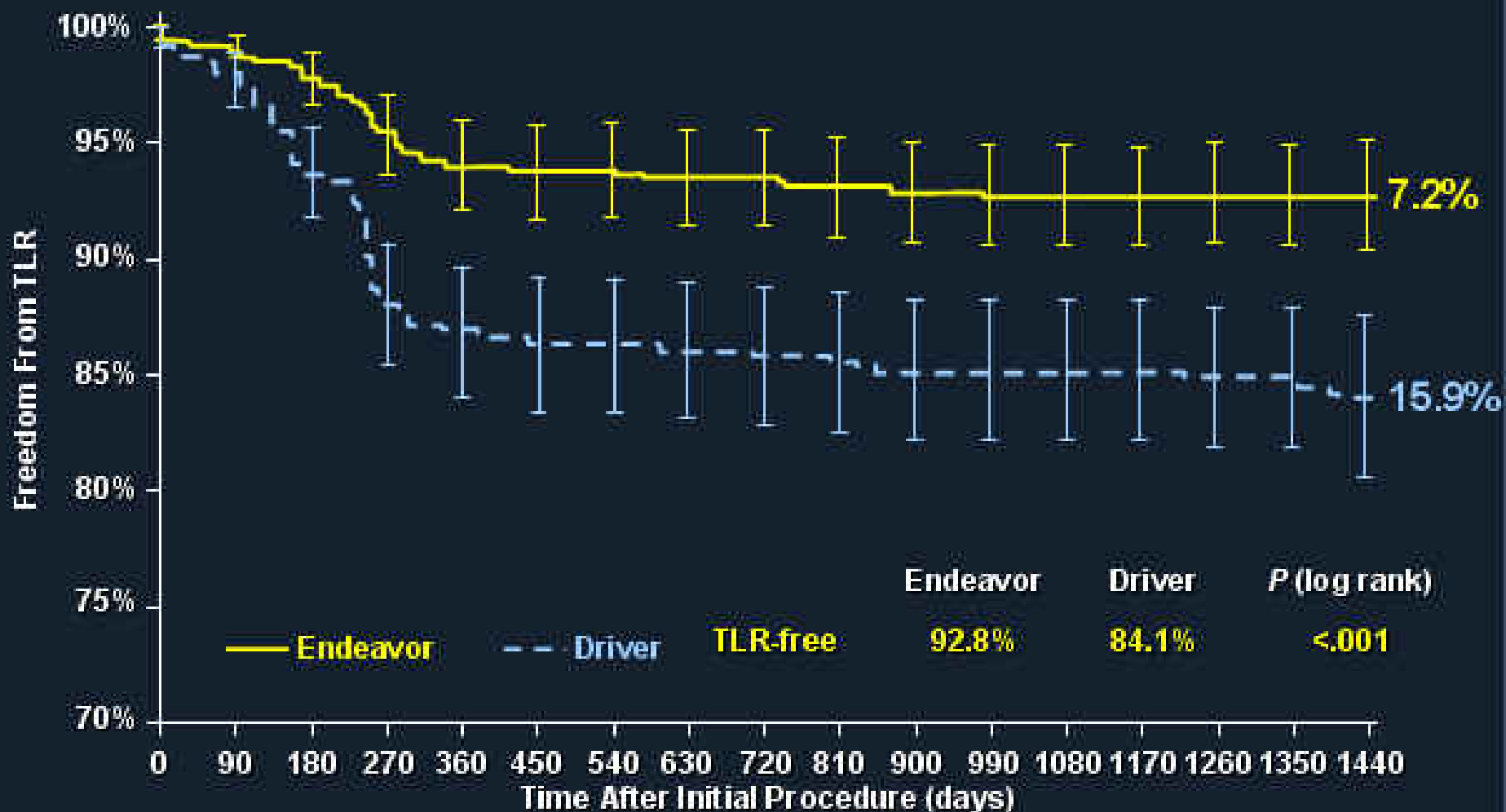
Endeavor II

TLR at 9 months



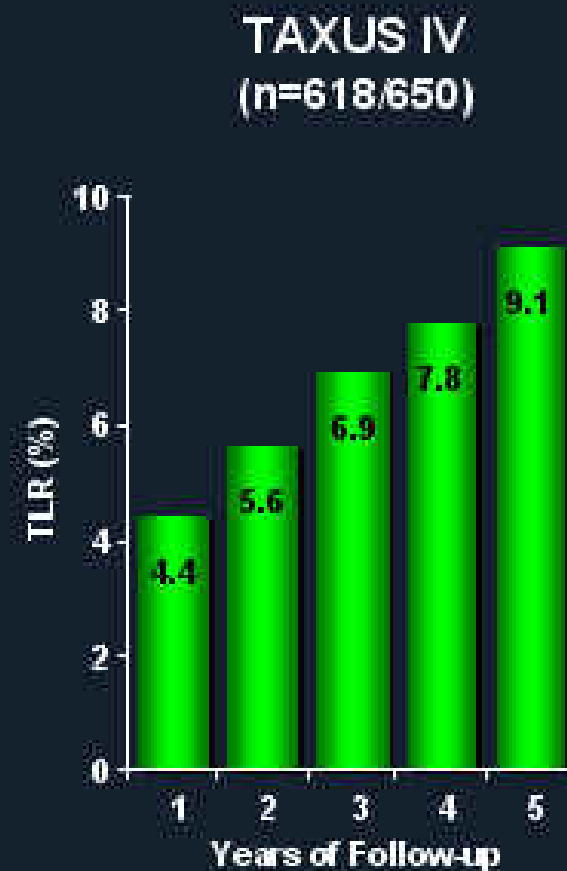
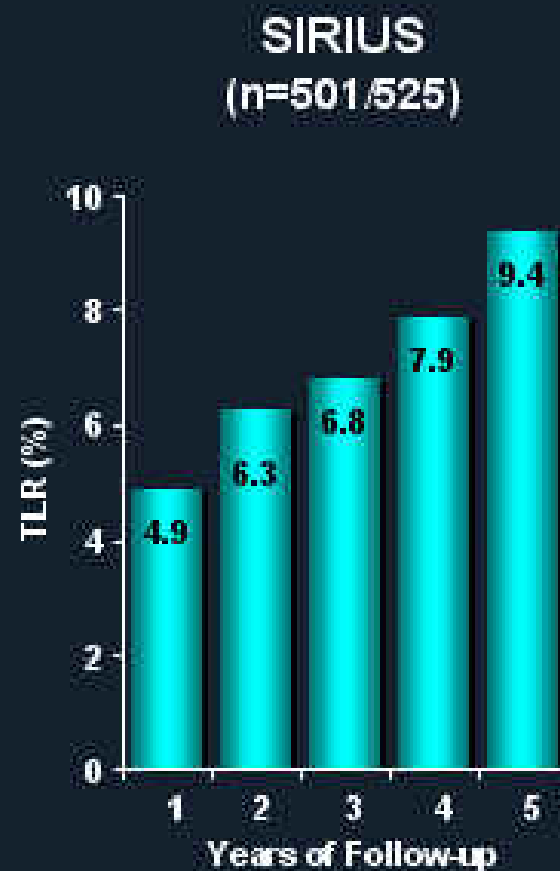
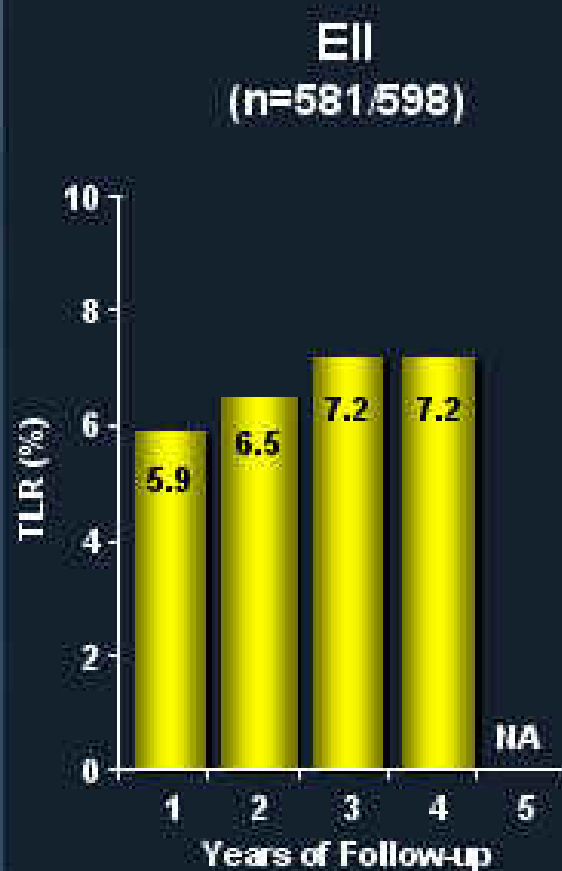
ENDEAVOR II

TLR thru 4 years



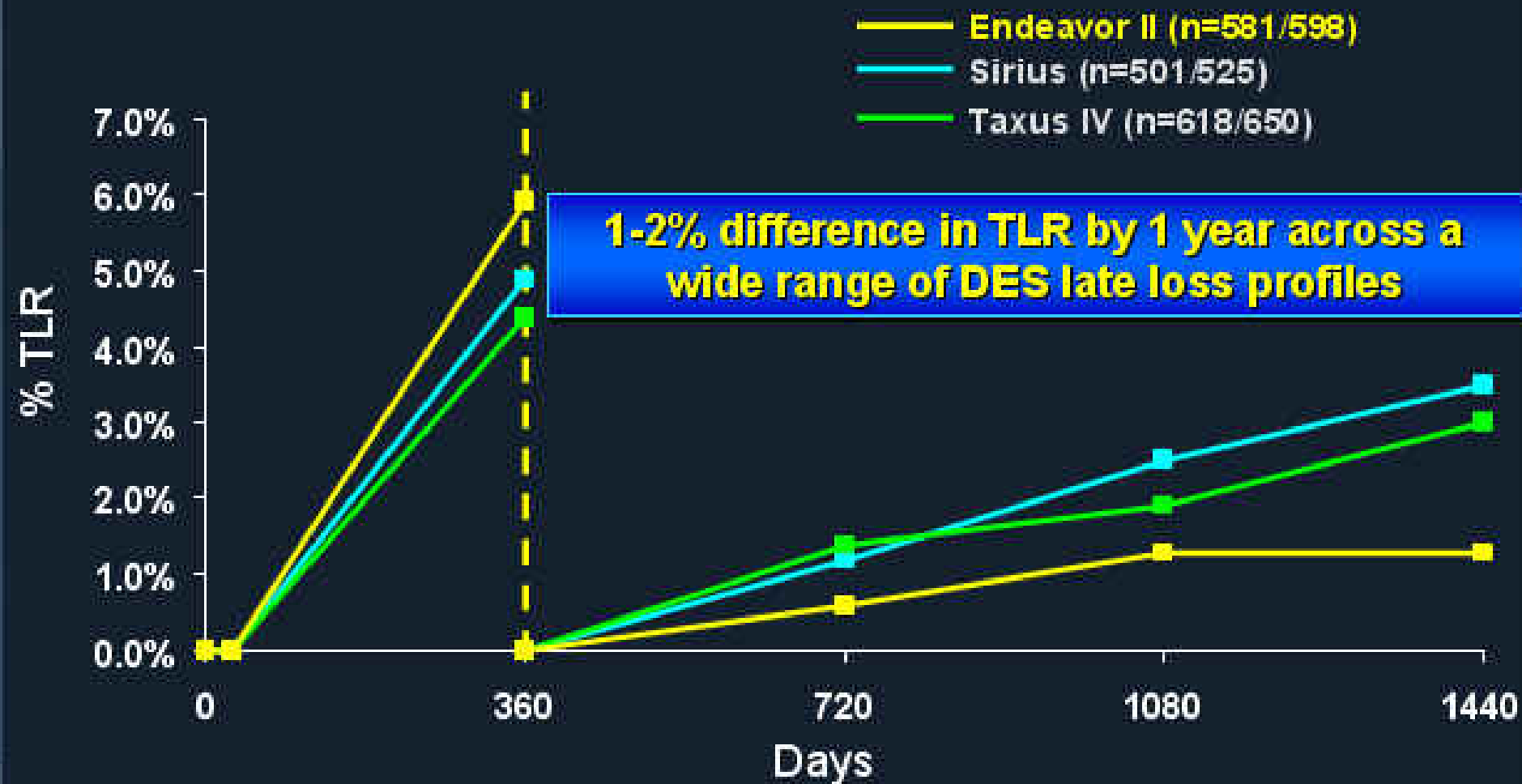
Pivotal Trials TLR - DES Arms

ENDEAVOR II, SIRIUS, and TAXUS IV



Pivotal Trials TLR - DES Arms

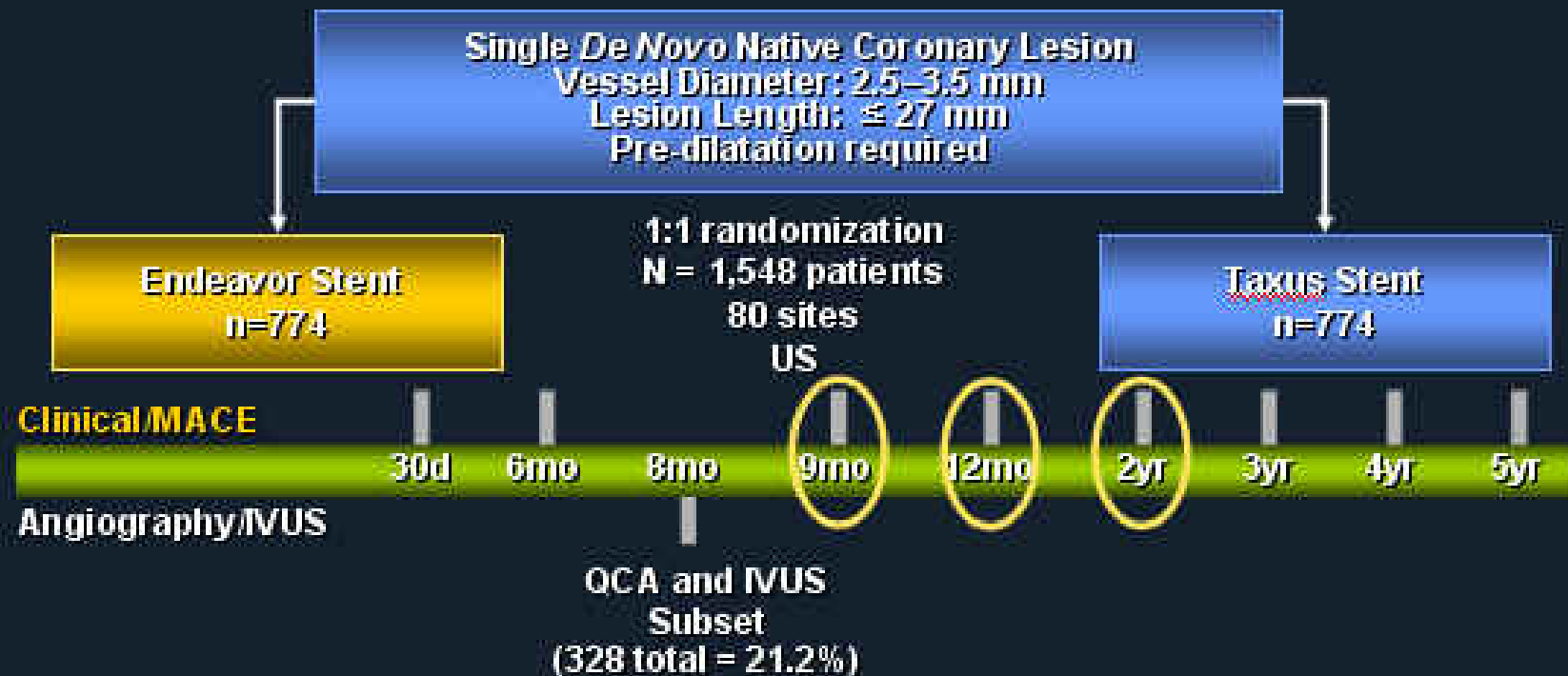
ENDEAVOR II, SIRIUS, and TAXUS IV



Endeavor IV

Single Blind RCT vs. Taxus DES

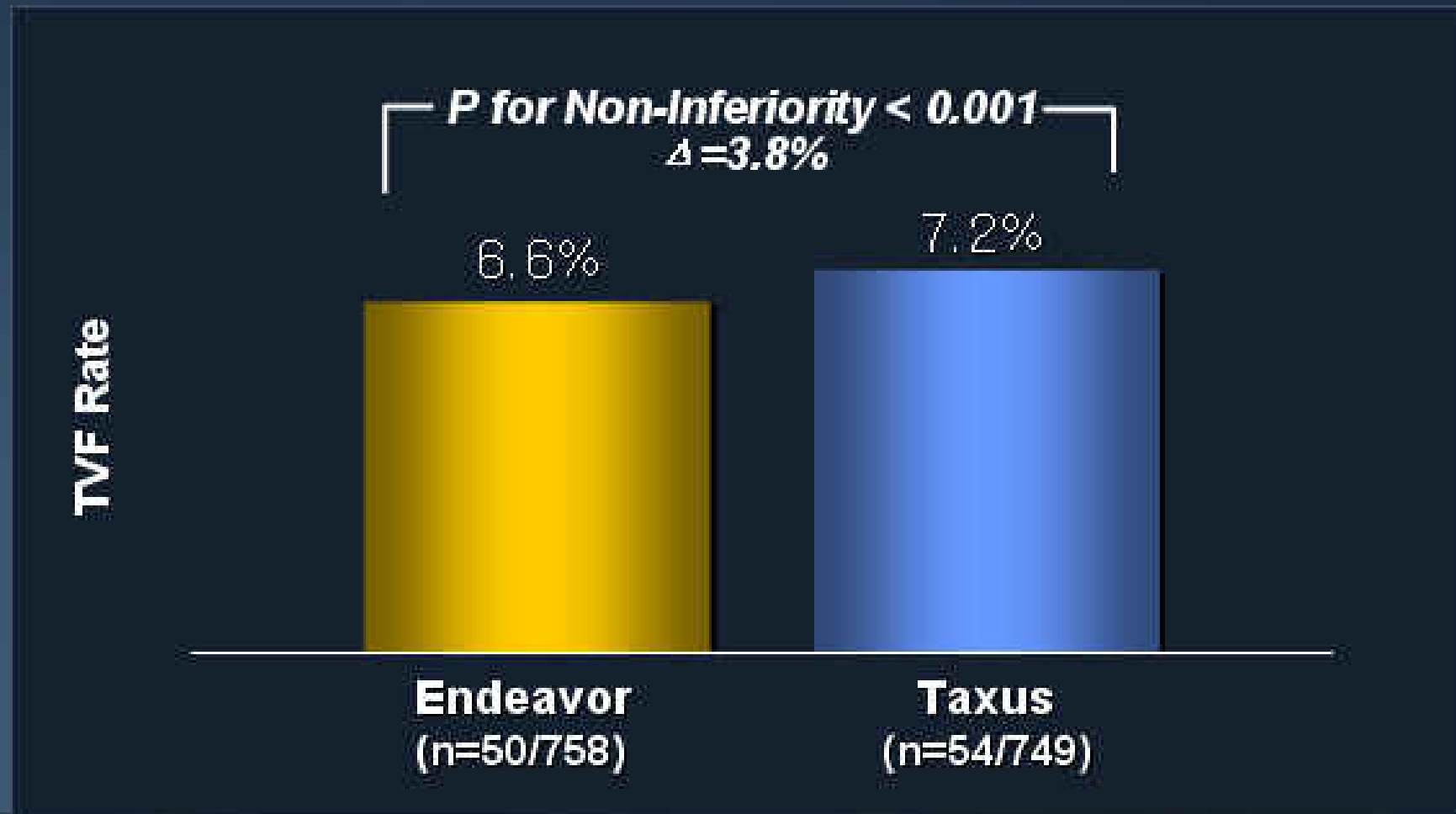
PI: Martin B. Leon



Primary Endpoint: TVF at 9 months
Secondary Endpoints: In-segment % DS at 8 months; TLR and TVR at 9 months
Drug Therapy: ASA and Clopidogrel/Ticlid >6 months
Zotarolimus Dose: 10 µg per mm stent length

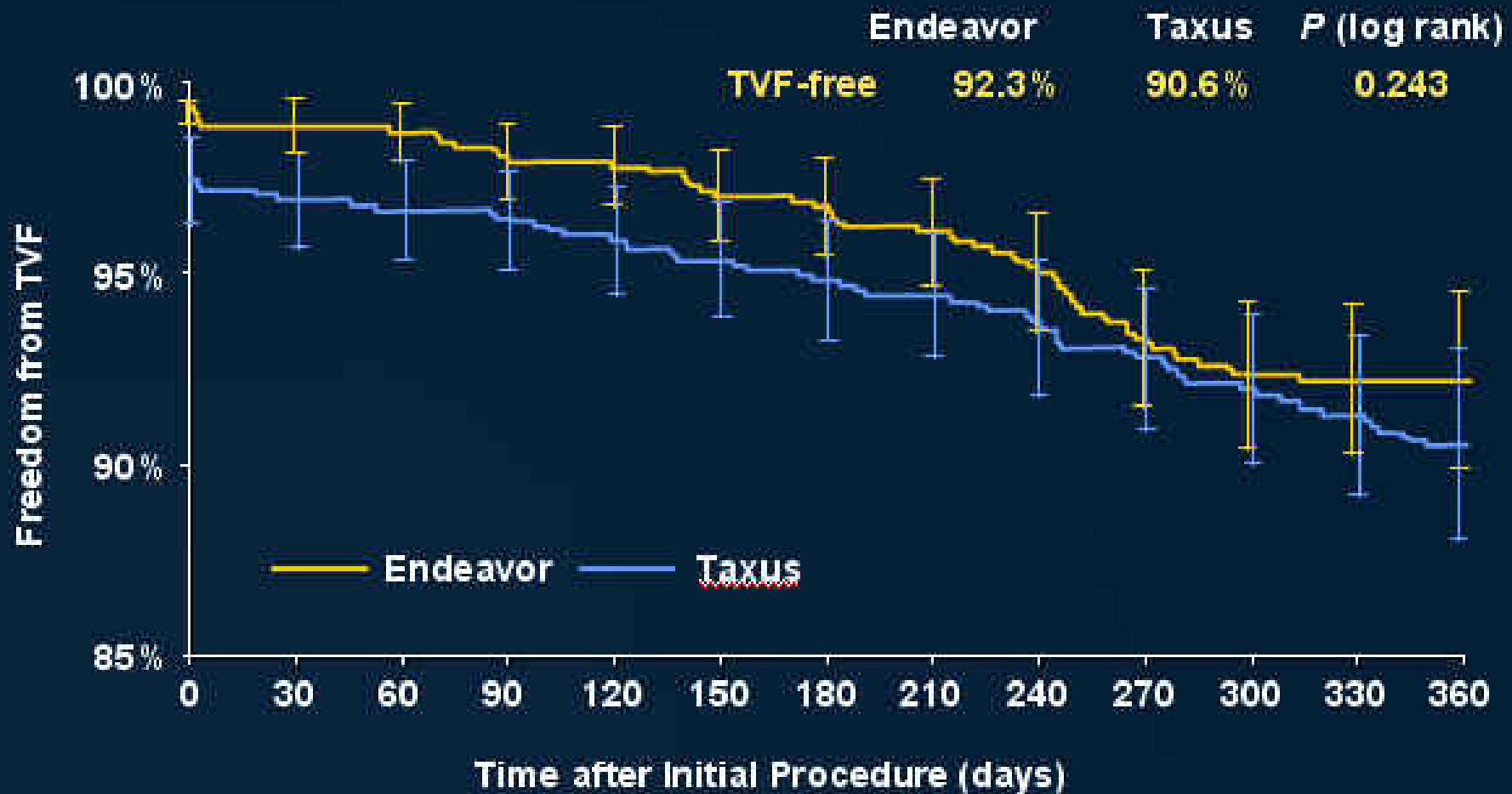
Endeavor IV – 1st Endpoint

TVF at 9 mos



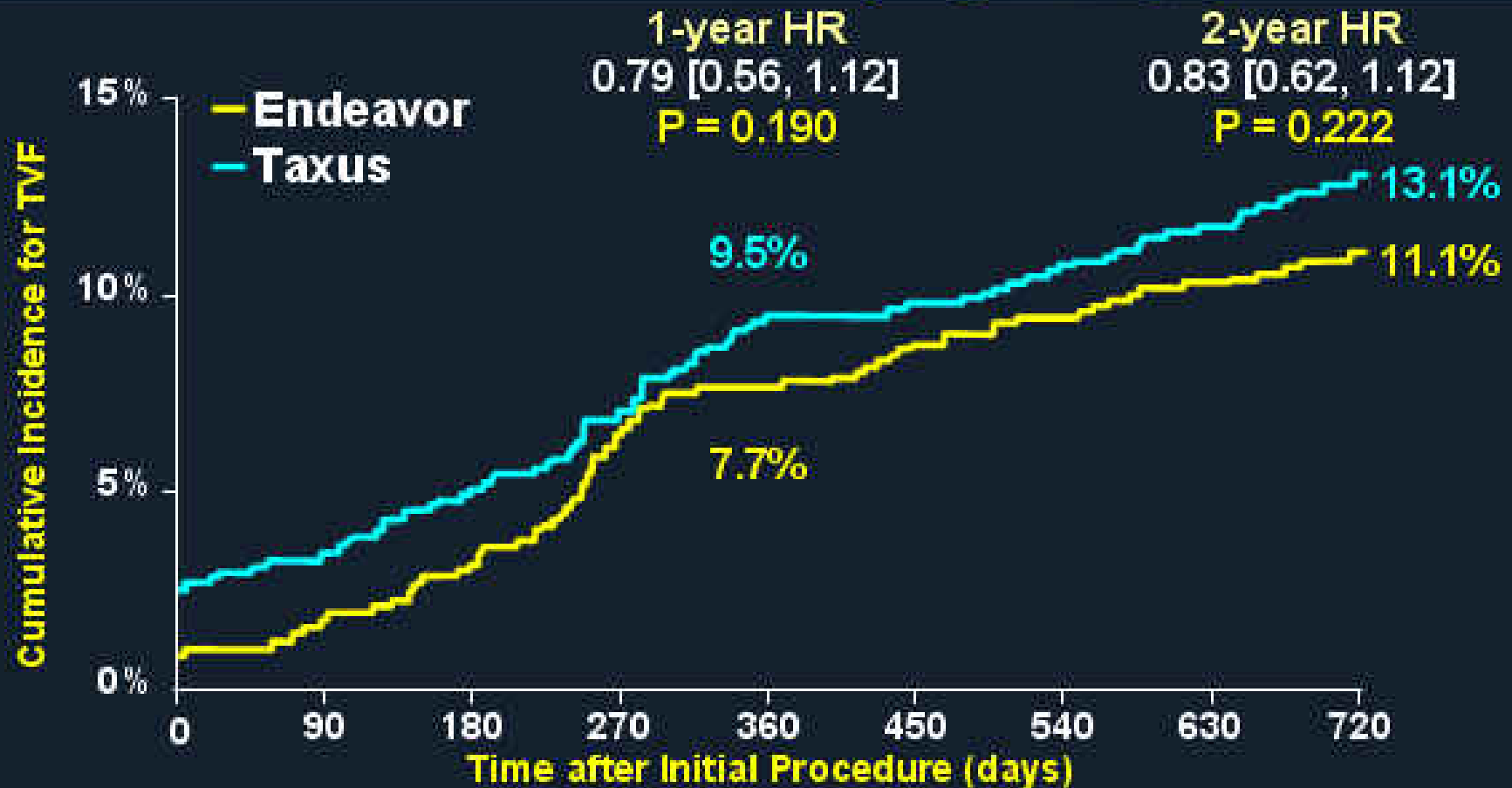
Endeavor IV

TVF Free Survival to 360 days



ENDEAVOR IV – 2yr FU

TVF to 24 months (1yr endpt)



Endeavor	773	769	749	736	700	674	653	645	635
Taxus	775	755	738	717	690	660	642	633	625



Endeavor IV

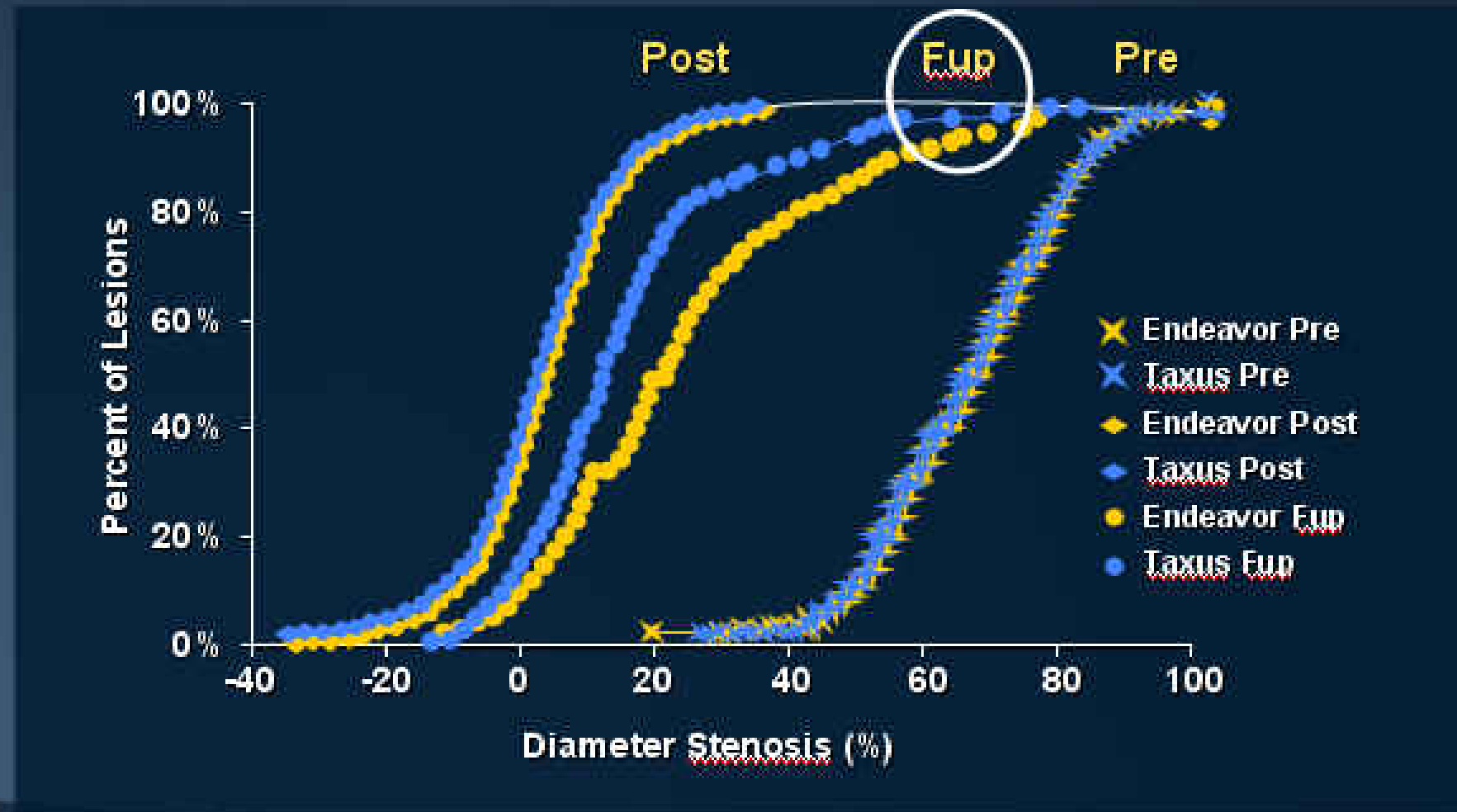
Angio Results at 8 mos (QCA)

	Endeavor (144 pts)	Taxus (135 pts)	P value
RVD (mm)	2.65 ± 0.47	2.68 ± 0.45	0.635
MLD (mm)			
In-stent	1.95 ± 0.61	2.25 ± 0.61	<0.001
In-segment% DS	1.80 ± 0.55	1.98 ± 0.56	0.008
% DS			
In-stent	26.41 ± 19.74	16.09 ± 17.99	<0.001
In-segment	32.28 ± 17.02	26.61 ± 15.52	0.004
Late loss (mm)			
In-stent	0.67 ± 0.49	0.42 ± 0.50	<0.001
In-segment	0.36 ± 0.47	0.23 ± 0.45	0.023



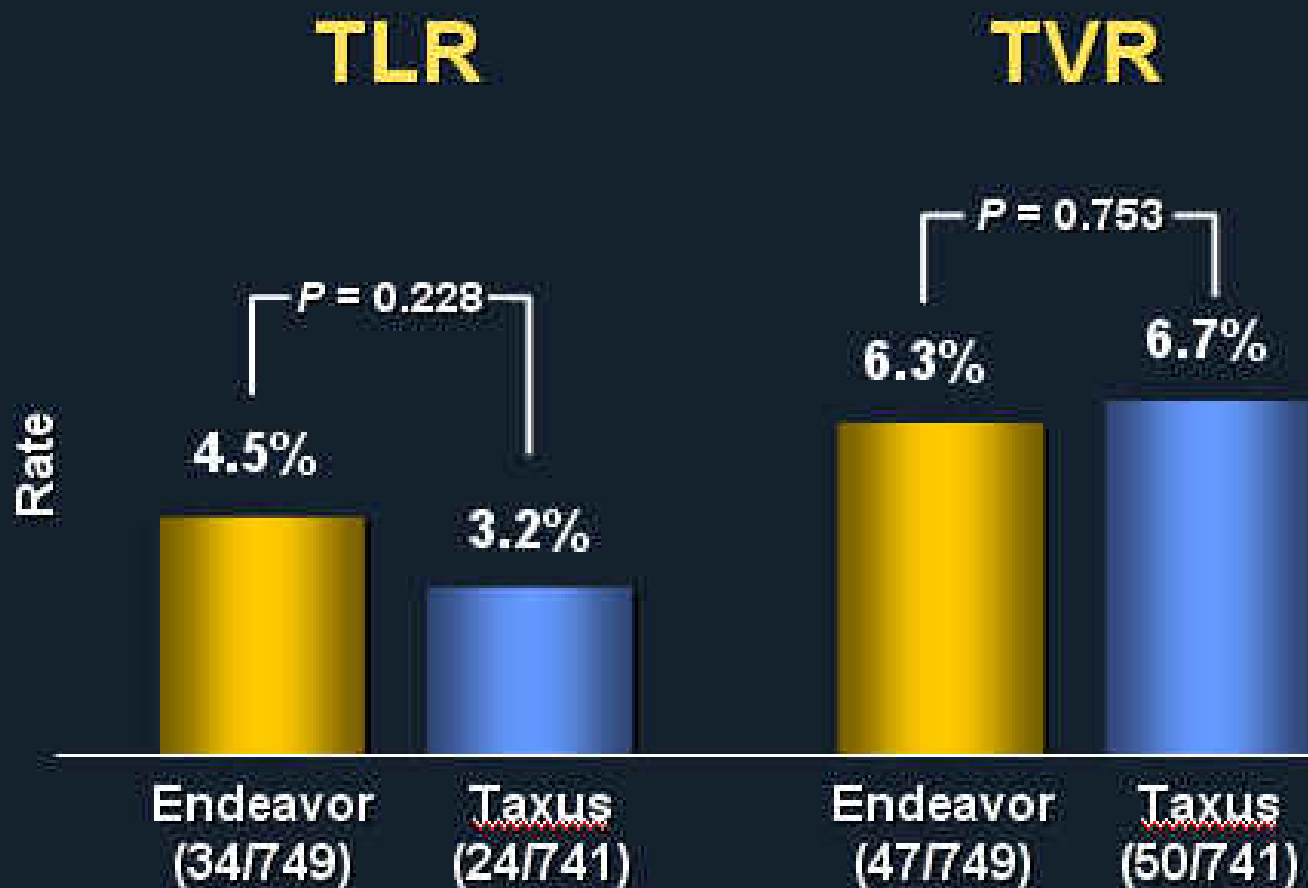
Endeavor IV

CFD of In-stent %DS at 8 months



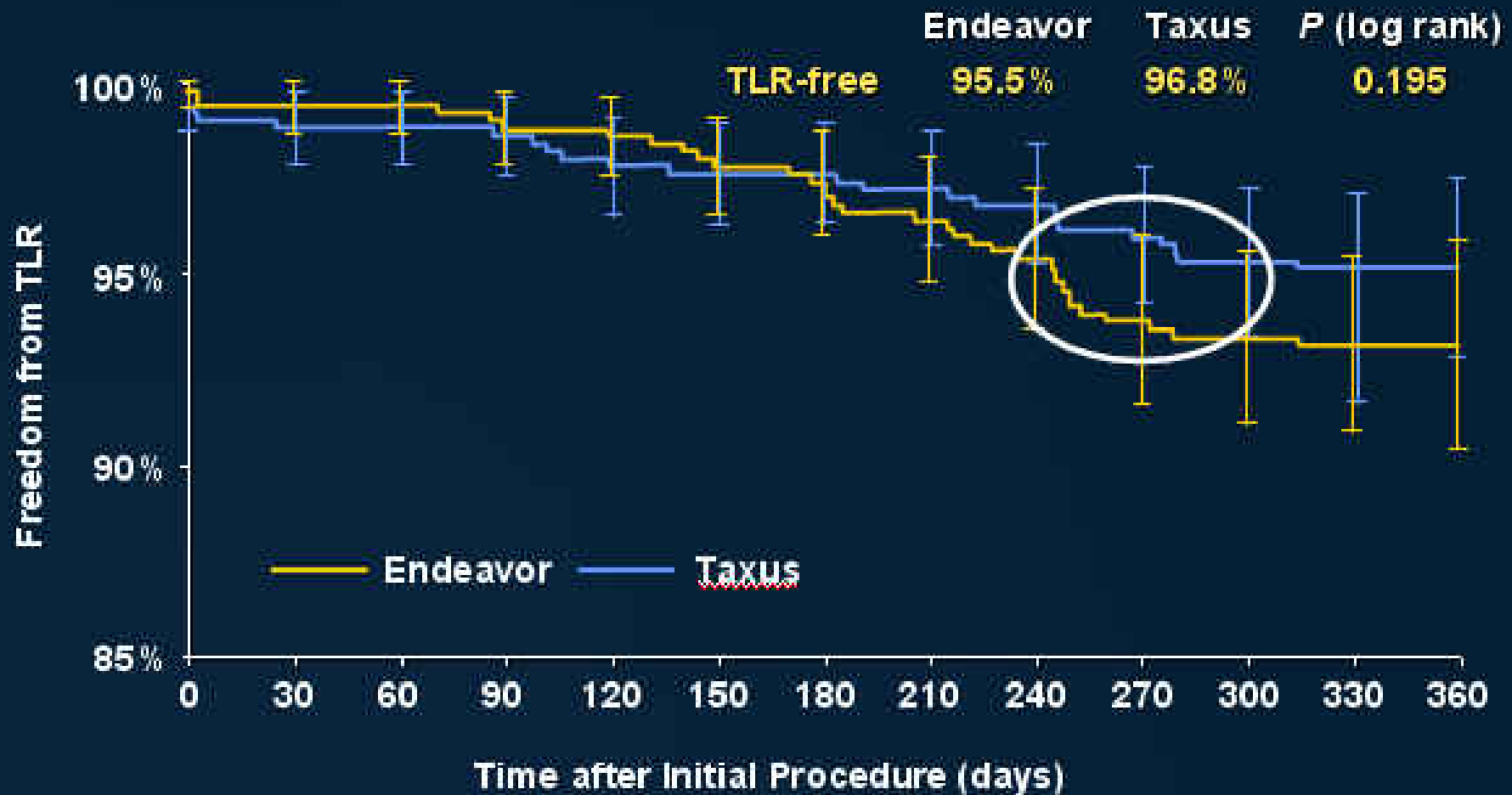
Endeavor IV

TLR and TVR at 12 months



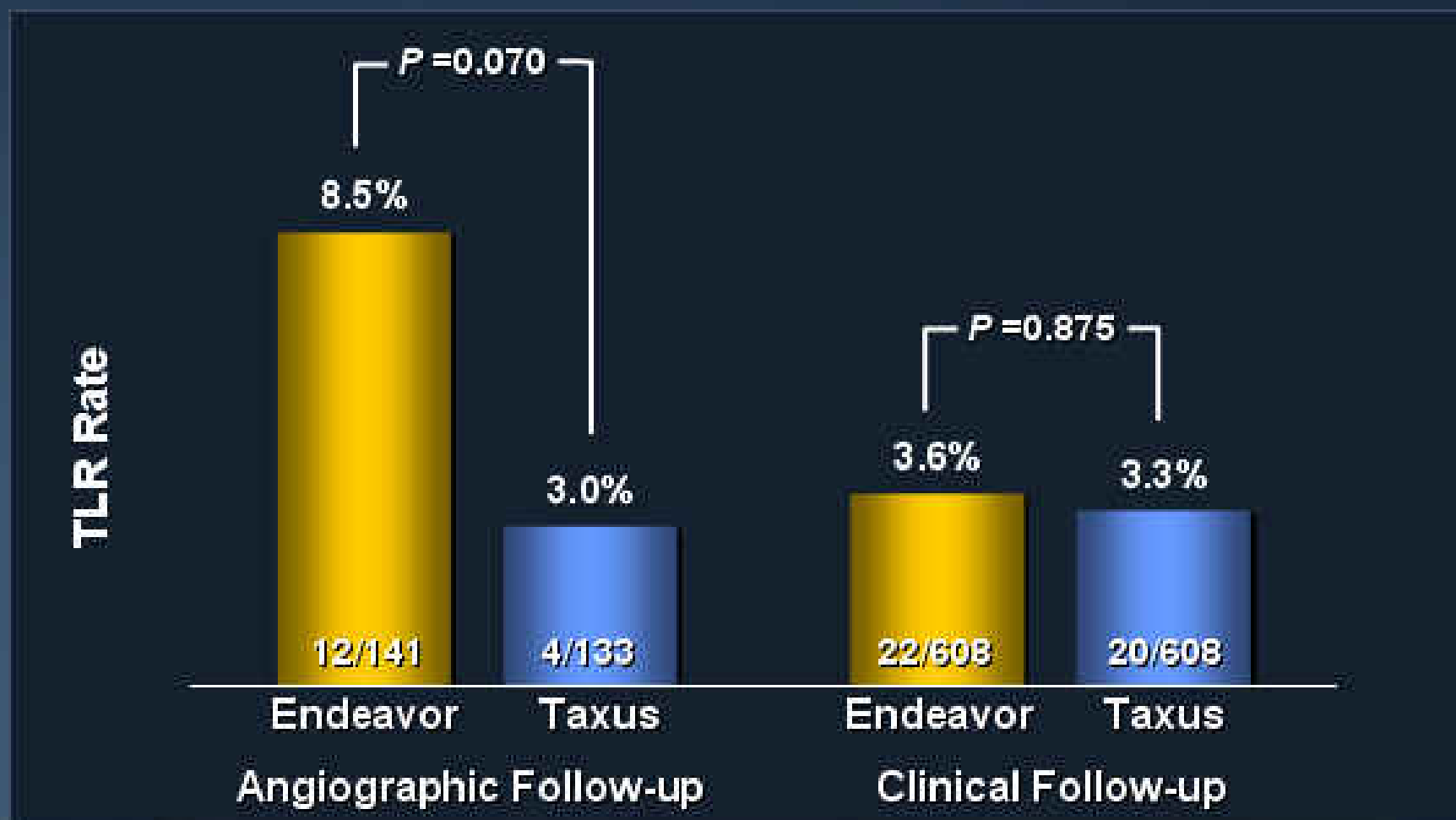
Endeavor IV

TLR Free Survival to 360 days



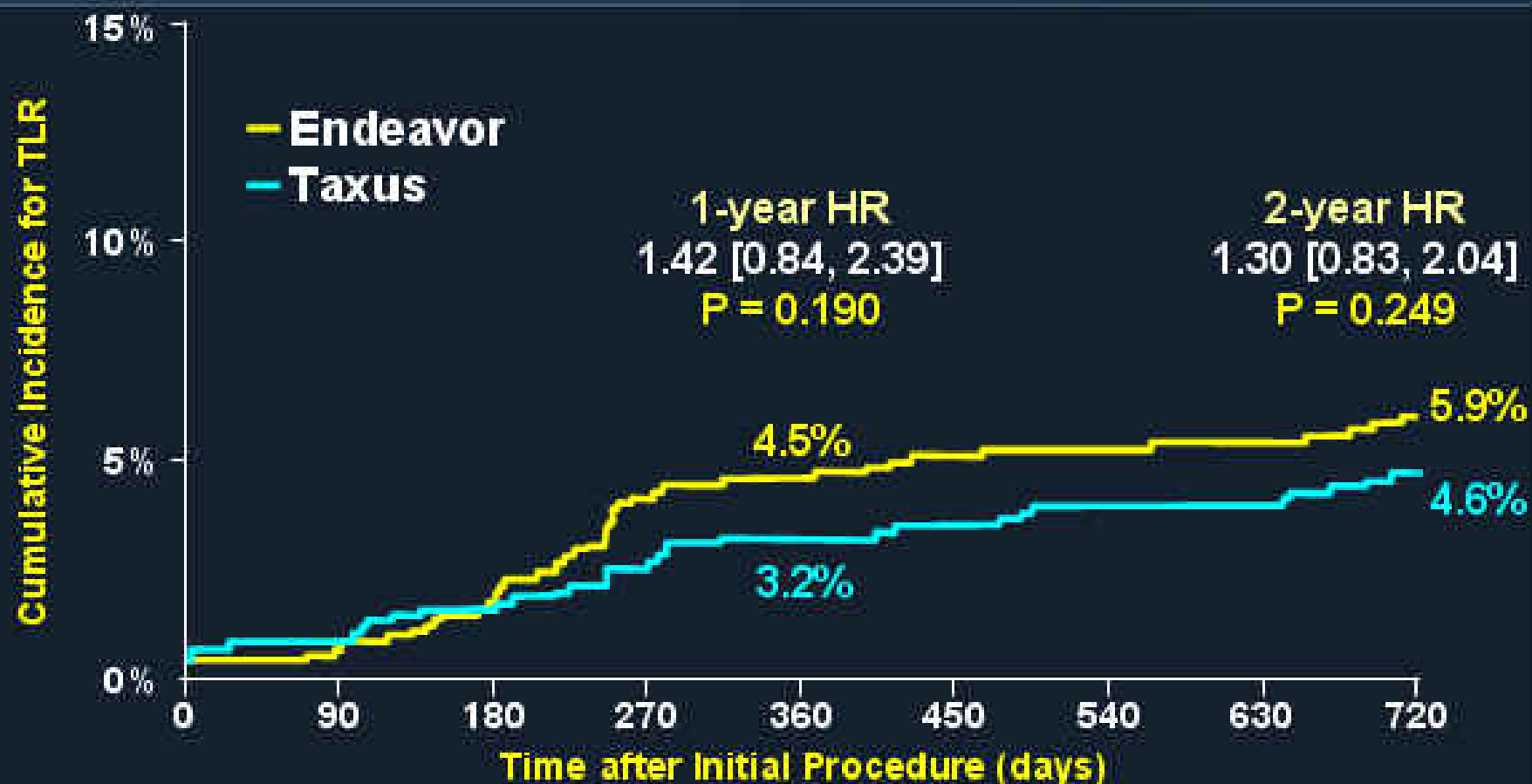
Endeavor IV

TLR by Angio FU at 12 mos



ENDEAVOR IV – 2yr FU

TLR to 24 months

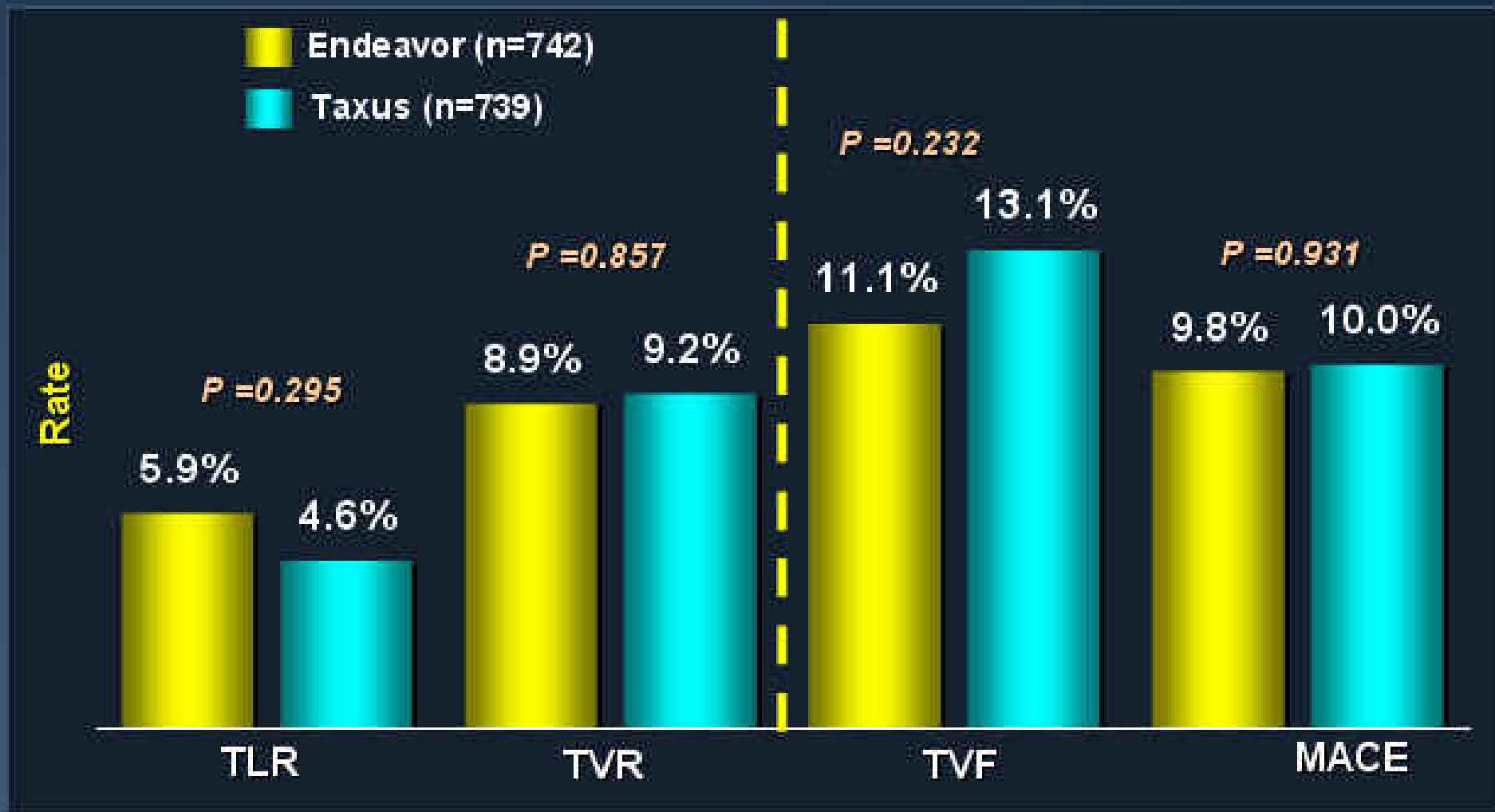


Endeavor	773	773	755	744	706	684	666	661	654
Taxus	775	771	757	740	708	687	668	663	660



ENDEAVOR IV – 2yr FU

Efficacy Endpoints to 24 months



Endeavor IV

TVF – Post Hoc Subgroup Analysis



Endeavor IV

TLR – Post Hoc Subgroup Analysis

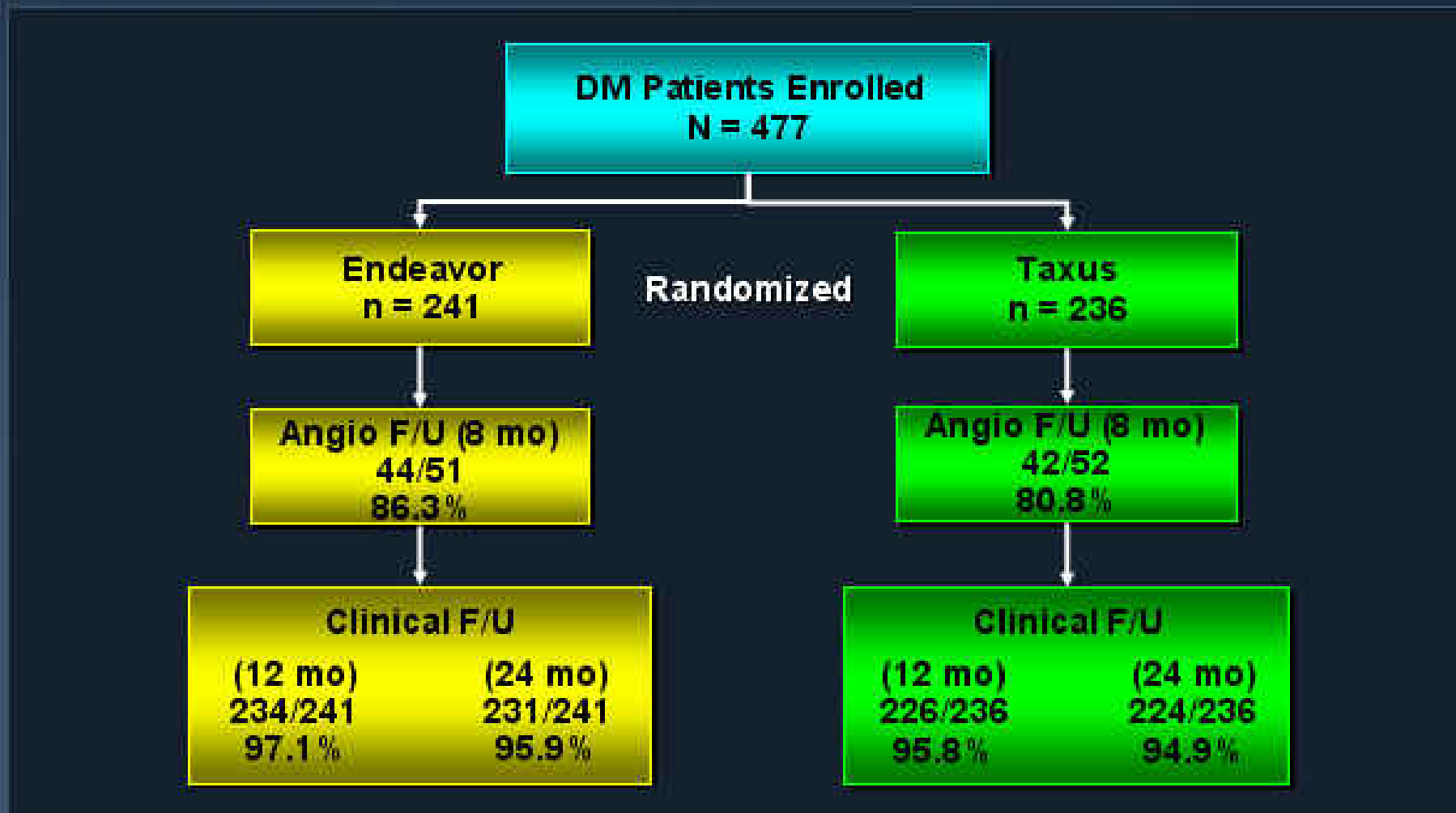


Endeavor IV

TVR – Post Hoc Subgroup Analysis



Endeavor IV Diabetes Diabetic Patient Flowchart



ENDEAVOR IV Diabetes

Angiographic Restenosis at 8 Months (QCA)

	DM			No DM		
	Endeavor N = 44	Taxus N = 42	p	Endeavor N = 100	Taxus N = 93	p
Binary Restenosis (%)						
In-segment	27.3	23.8	0.81	10.0	4.3	0.17
In-stent	25.0	16.7	0.43	8.1	2.2	0.10
In-segment Late Loss Mean ±SD	0.46 ±0.55	0.38 ±0.58	0.45	0.31 ±0.42	0.16 ±0.35	0.009
In-stent Late Loss Mean ±SD	0.81 ±0.58	0.56 ±0.66	0.07	0.61 ±0.44	0.35 ±0.39	<.001



ENDEAVOR IV Diabetes

Clinical Events at 24 Months

Diabetic Patients

	Endeavor N = 231	Taxus N = 224	p
Death (all) (%)	1.3 (3)	2.7 (6)	0.33
Cardiac Death	0.9 (2)	1.8 (4)	0.44
MI (all) (%)	0.9 (2)	2.7 (6)	0.17
Q Wave	0	0.4 (1)	0.49
Non-Q Wave	0.9 (2)	2.2 (5)	0.28
TLR (%)	8.7 (20)	6.7 (15)	0.48
TVR (non-TL) (%)	4.8 (11)	6.7 (15)	0.42
MACE (%)	9.5 (22)	10.7 (24)	0.76
TVF (%)	12.6 (29)	15.2 (34)	0.54

ENDEAVOR IV Diabetes

Stent Thrombosis at 24 Months

Diabetic Patients

	Endeavor N = 231	Taxus N = 224	p
Definite ST	0.9 (2)	0.9 (2)	1.00
Probable ST	0.4 (1)	0	1.00
Definite/Probable ST	1.3 (3)	0.9 (2)	1.00

Very Late Stent thrombosis (greater than 1 year):

- Endeavor: 0
- Taxus: 1 (definite)



ENDEAVOR IV Diabetes

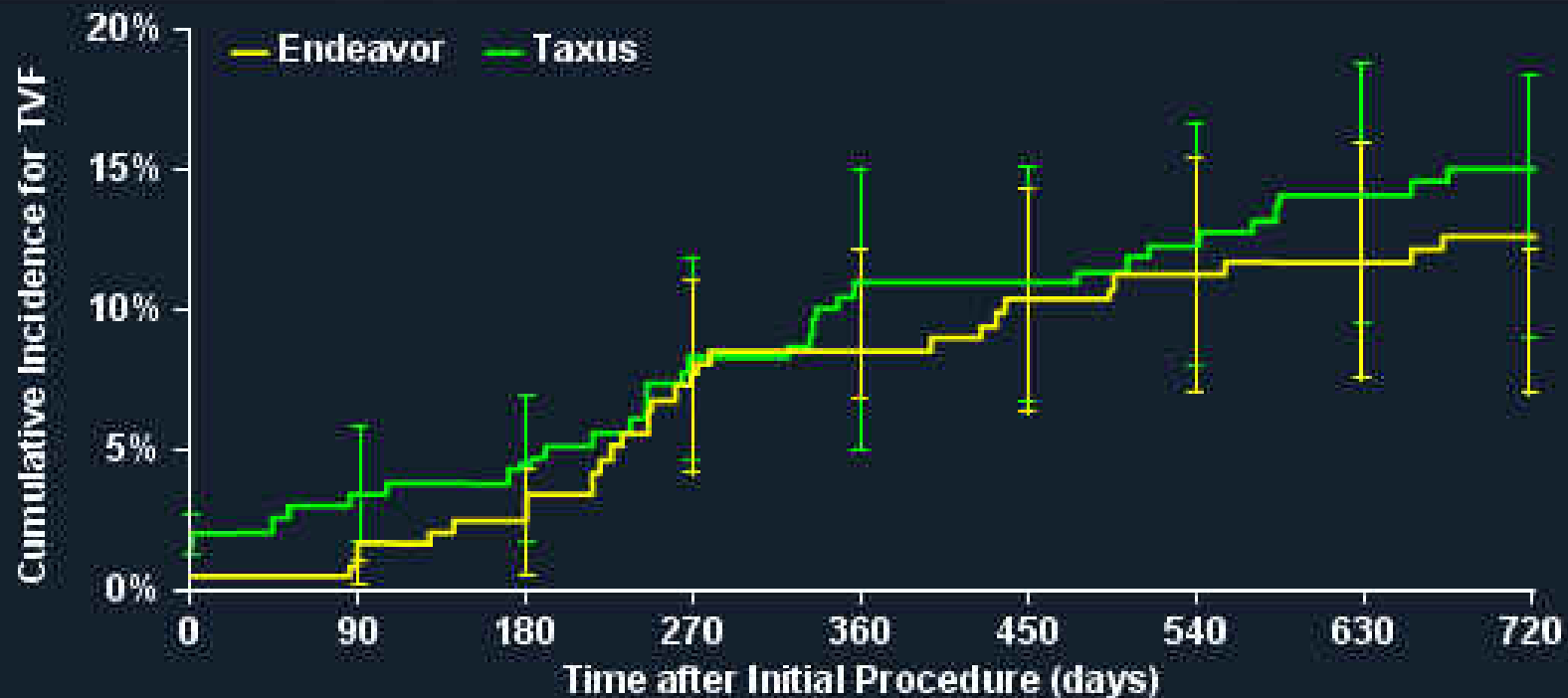
IDDM vs. Non-IDDM (24 months)

	IDDM			Non-IDDM		
	Endeavor N = 76	Taxus N = 58	p	Endeavor N = 155	Taxus N = 166	p
Death (all) (%)	1.3 (1)	1.7 (1)	1.00	1.3 (2)	3.0 (5)	0.45
Cardiac Death	1.3 (1)	0	1.00	0.6 (1)	2.4 (4)	0.37
MI (all) (%)	1.3 (1)	1.7 (1)	1.00	0.6 (1)	3.0 (5)	0.22
Q Wave	0	0		0	0.06 (1)	1.00
Non-Q Wave	1.3 (1)	1.7 (1)	1.00	0.6 (1)	2.4 (4)	0.37
TLR (%)	7.9 (6)	5.2 (3)	0.73	5.8 (9)	7.2 (12)	0.68
TVR (non-TL) (%)	2.6 (2)	5.2 (3)	0.65	5.8 (9)	7.2 (12)	0.66
MACE (%)	7.9 (6)	8.6 (5)	1.00	10.3 (16)	11.4 (19)	0.86
TVF (%)	9.2 (7)	12.1 (7)	0.78	14.2 (22)	16.3 (27)	0.64

144 IDDM (30.2% of E IV Diabetics)

ENDEAVOR IV Diabetes

TVF to 24 months

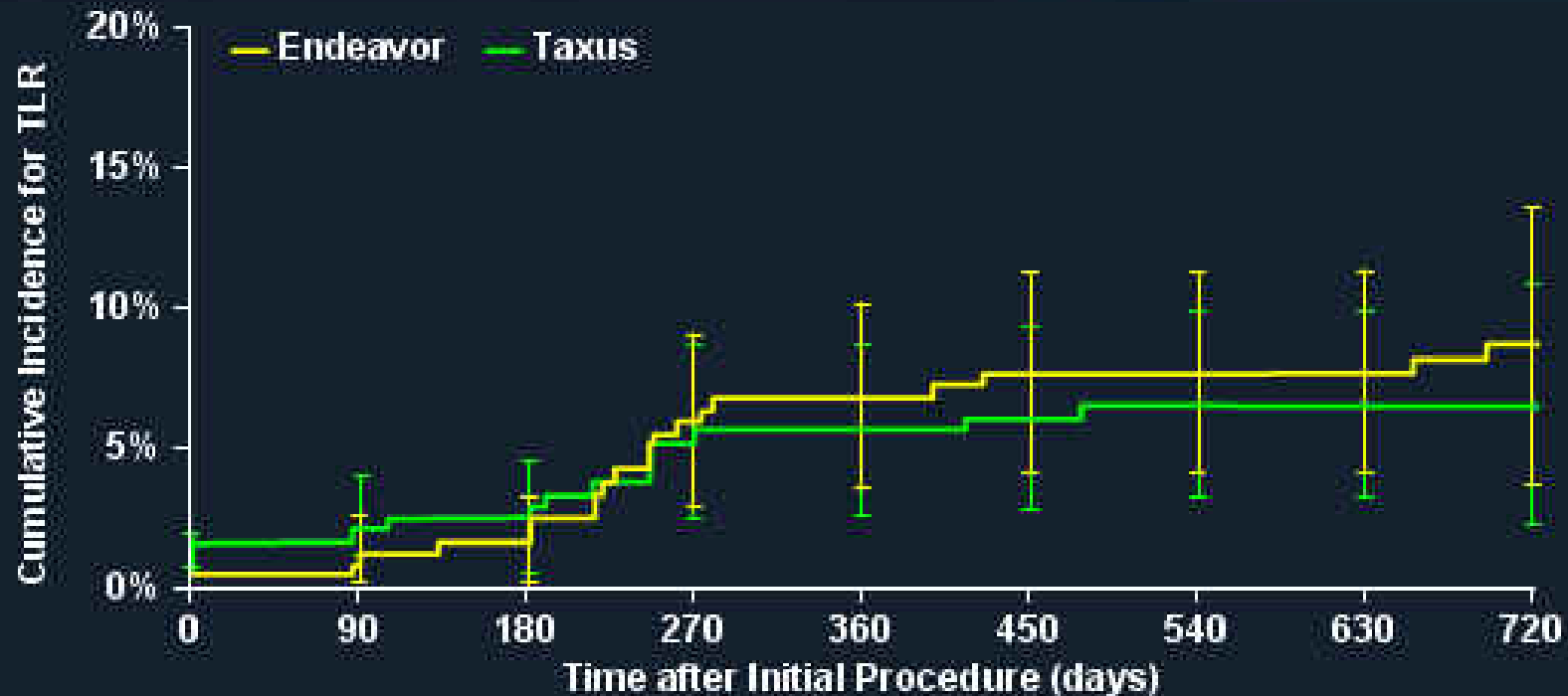


TVF	0	180	270	360	720
Endeavor					
# Entered	241	233	229	215	195
Taxus					
# Entered	236	225	219	206	188



ENDEAVOR IV Diabetes

TLR to 24 months

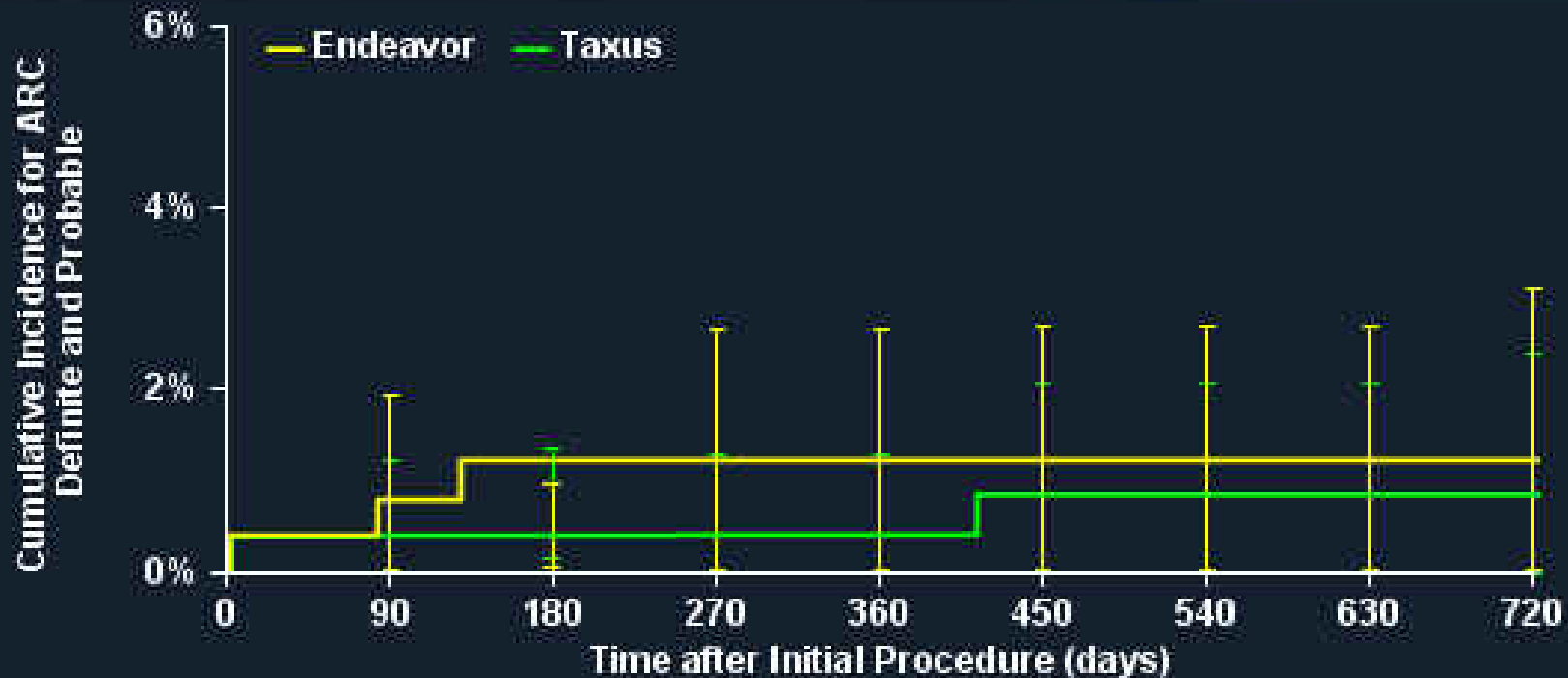


TLR	0	180	270	360	720
Endeavor					
# Entered	241	233	230	213	198
Taxus					
# Entered	236	227	221	203	194



ENDEAVOR IV Diabetes

ARC Stent Thrombosis to 24 months



ARC Definite and Probable	0	180	270	360	720
Endeavor					
# Entered	241	235	232	228	217
Taxus					
# Entered	236	231	227	223	214



Endeavor IV at 12 months

Multivariate TLR Predictors for All patients

Multiple Logistic Regression

Odds Ratio

P-Value

Diabetes

2.79 [1.604,4.867]

<.001

Multiple vs. Single
stents

3.11 [1.502,6.443]

0.002

LAD vs. Non LAD

1.83 [1.055,3.186]

0.032

Taxus vs. Endeavor

1.42
[0.834,2.420]

0.196



Endeavor IV at 12 months

Multivariate TLR Predictors for Endeavor and Taxus

Endeavor MV TLR Predictors

Odds Ratio

P-Value

Angiography FU

2.49 [1.196,5.136]

0.015

Taxus MV TLR Predictors

Odds Ratio

P-Value

Diabetes

3.76 [1.518,9.318]

0.004

**Multiple vs. Single
stents**

3.11 [1.502,6.443]

0.005

Age

1.06 [1.012,1.110]

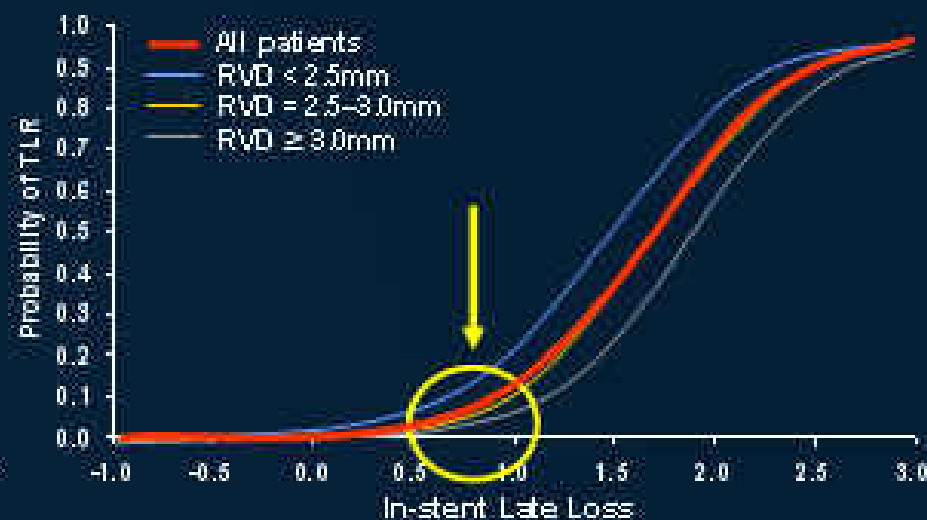
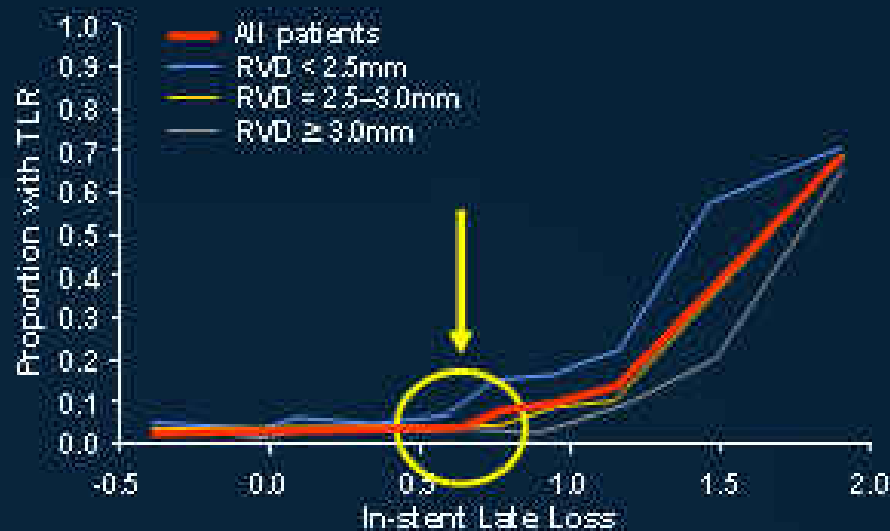
0.013



11 RCTs with Cypher, Taxus, Endeavor, and BMS (5381 pts)

Surrogate Angiographic Endpoints for Clinical Outcomes

LL vs. TLR – A monotonic but curvilinear relationship

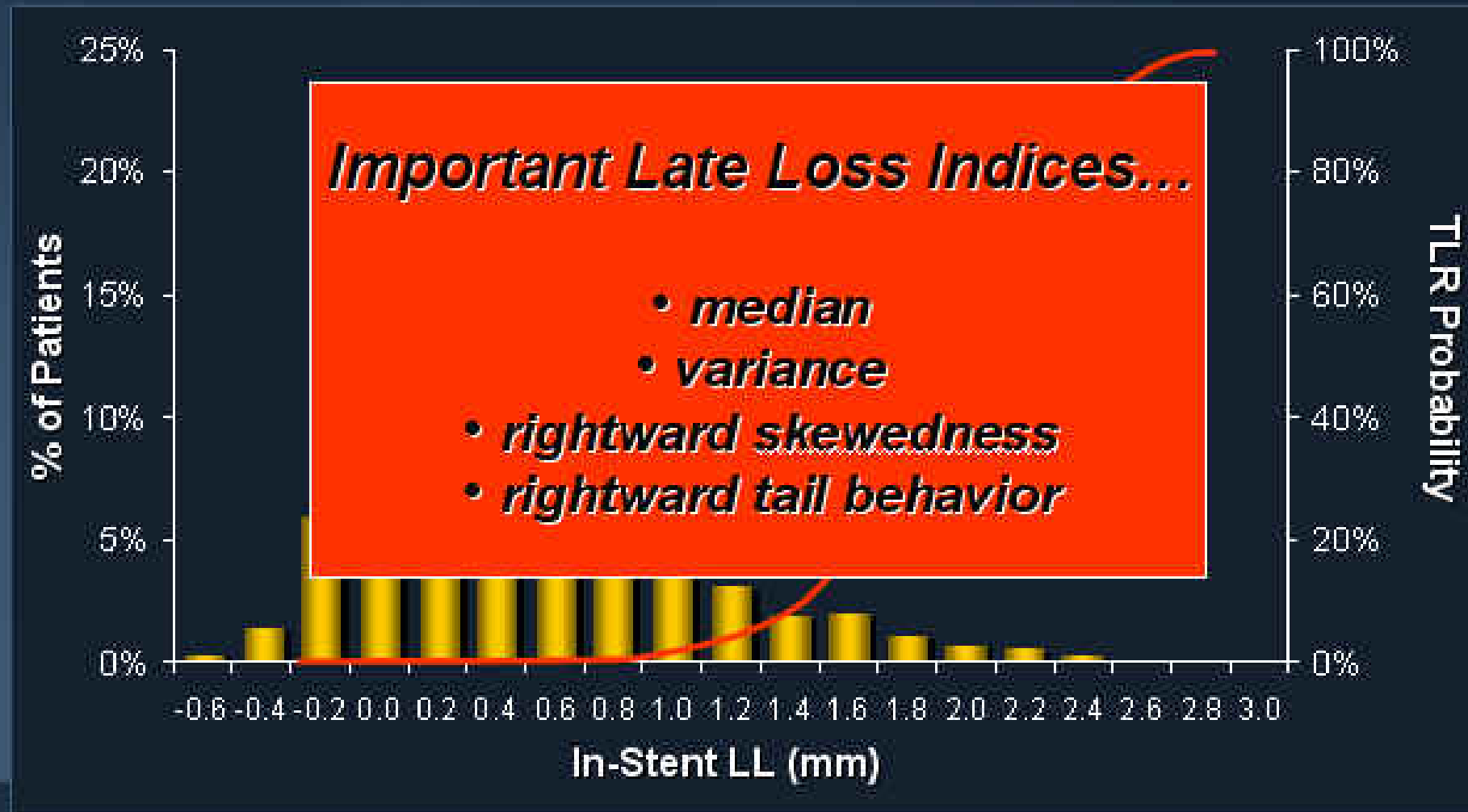


N 256 273 447 570 581 586 498 413 434 331 486 440



Endeavor In-Stent Late Loss

Endeavor II, II CA, III and IV



800 pts with angio FU at 8 mos

E-Five Registry

Prospective, Multicenter Registry

PI: Chaim Lotan, Ian Meredith and Martin Rothman

Single and Multiple Coronary Artery Lesions
Stent Diameters: 2.25-4.0 mm
Stent Length: 8/9-30 mm

N = 8,000 patients

N = 2,000 at 2 years

200 sites

Europe, Asia Pacific, Israel, New Zealand,
South America

Clinical/MACE



Primary Endpoint: MACE at 12 months

Secondary Endpoints: MACE at 30 days and 6 mo, stent thrombosis,
procedure success rate; device success rate; lesion success rate

Drug Therapy: ASA and clopidogrel ≥ 3 months

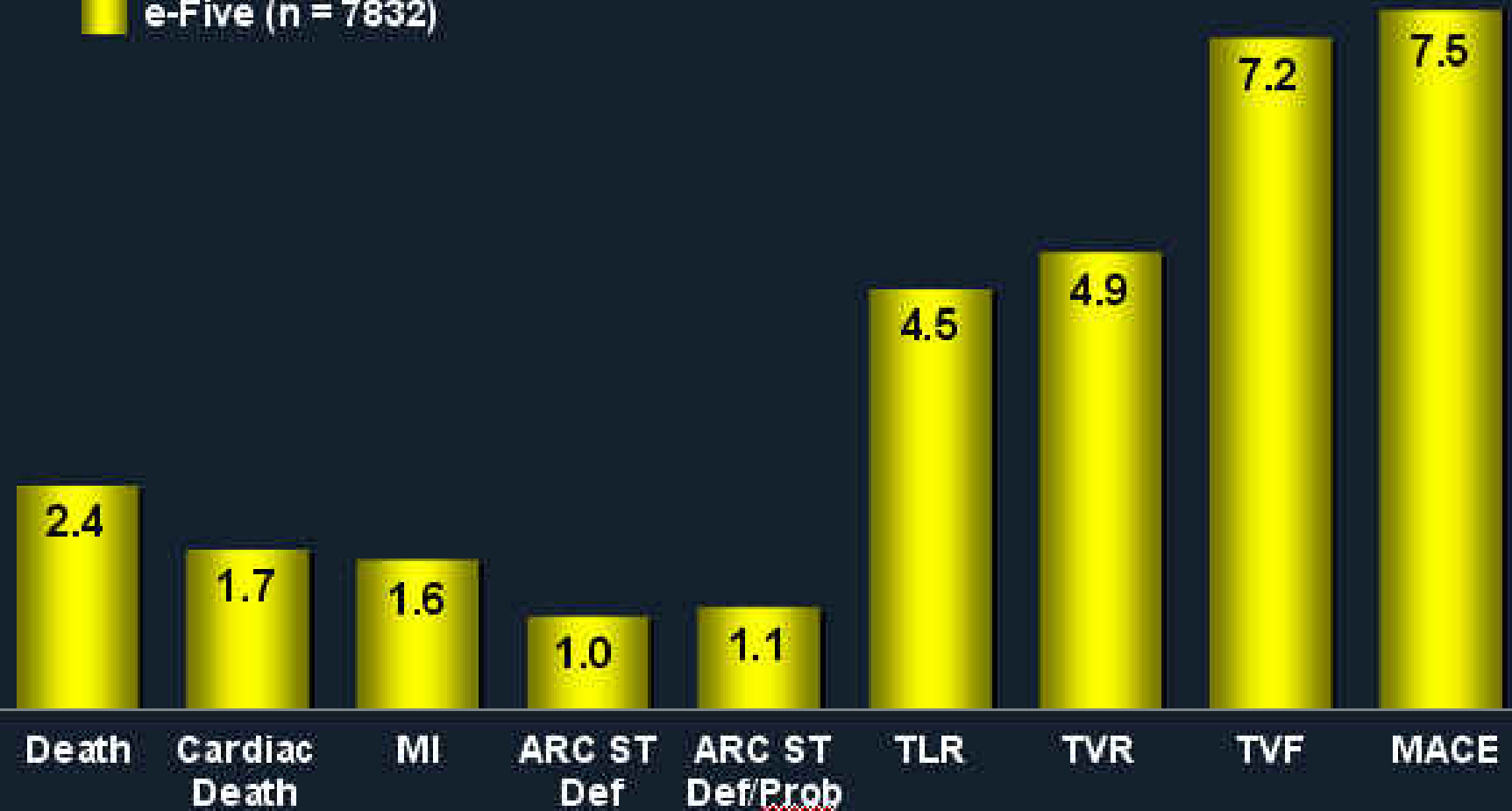
Zotarolimus Dose: 10 μg per mm stent length



E-Five Registry

Clinical Events to 12 mos

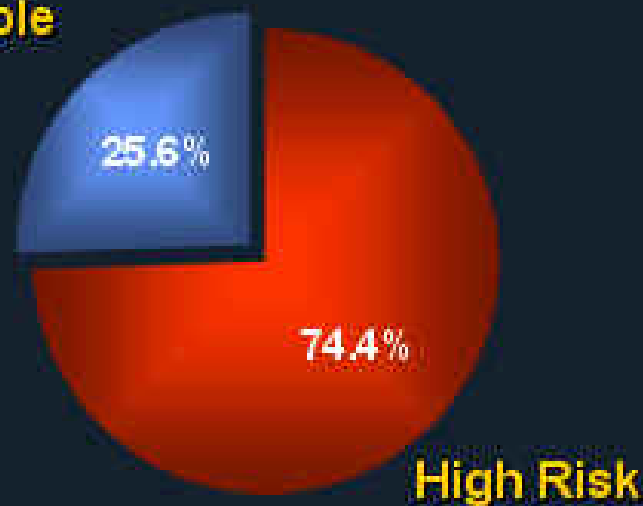
■ e-Five (n = 7832)



E-Five Registry

High Risk Patients and Lesions

Simple



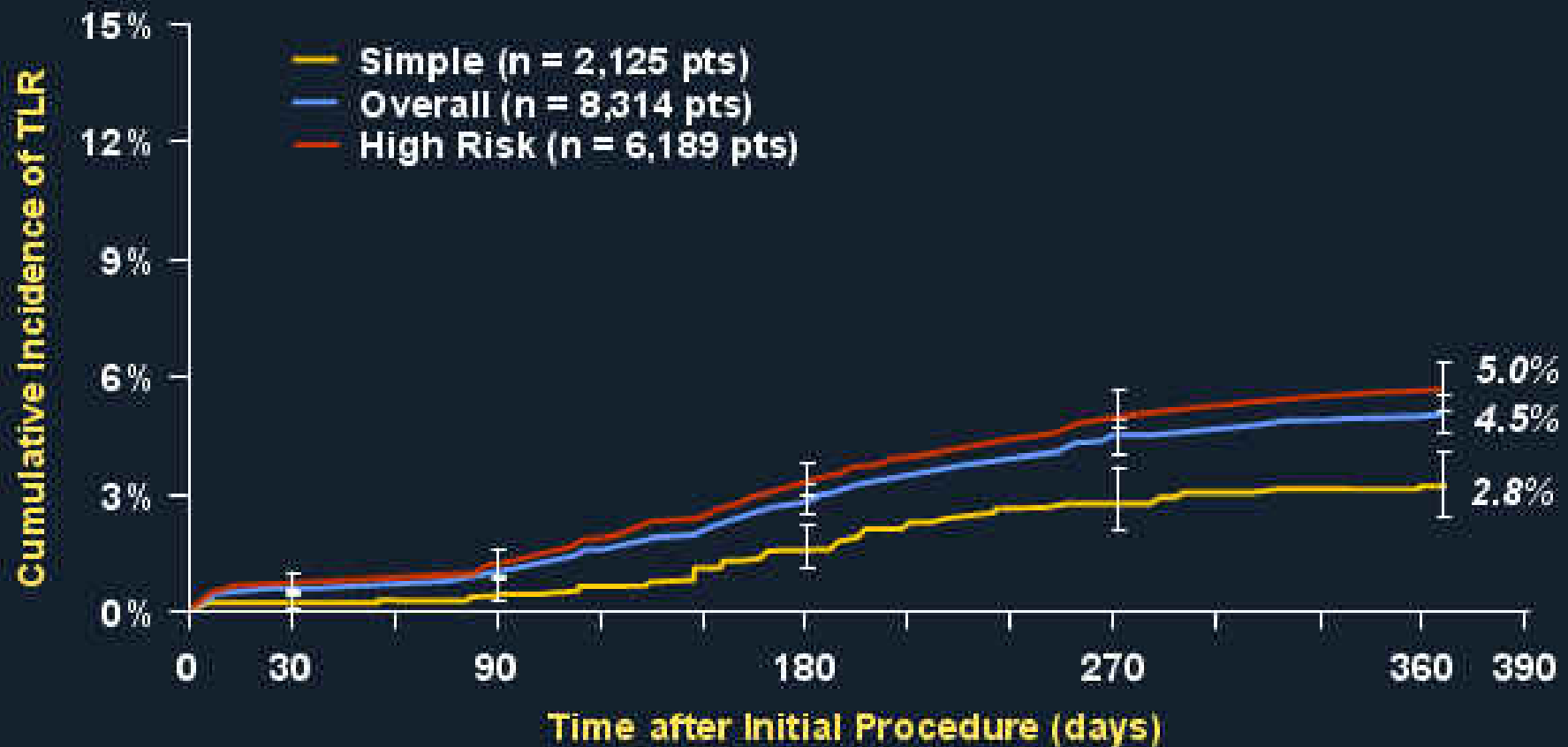
8314	6189	2125
Patients	High Risk	Simple

High Risk included patients with:

- AMI (<72 hrs) 13.9%
- Multivessel stenting 10.9%
- Long lesion (>27 mm) 16.6%
- Ostial lesion 5.8%
- Bifurcated lesion 18.9%
- In-stent restenosis 4.8%
- Graft stenting 1.8%
- Severe tortuosity 3.3%
- Small vessel (RVD<2.5 mm)OR
- Large vessel (RVD>3.5 mm) 18.3%
- Left main stenting 2.4%
- Moderate/severe Calcification 31.6%
- Moderate/severe renal impairment 5.3%

E-Five Registry – “High Risk”

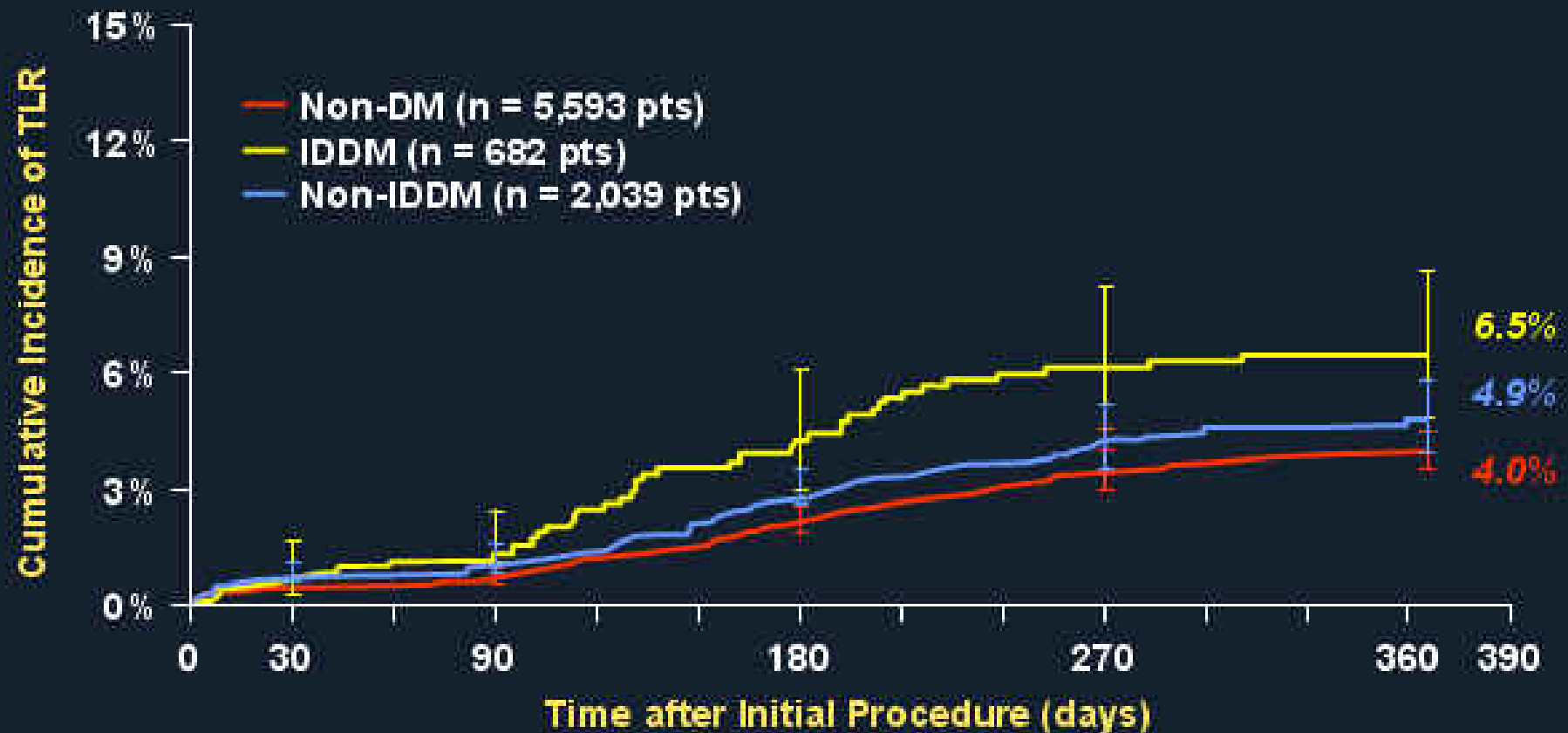
Cumulative TLR to 12 mos



TLR	0	30	180	270	360
Standard	2,125	2,122	2,038	2,057	1,832
Overall	8,314	8,239	8,036	7,877	7,549
High Risk	6,189	6,177	5,978	5,820	5,557

E-Five Registry – Diabetes

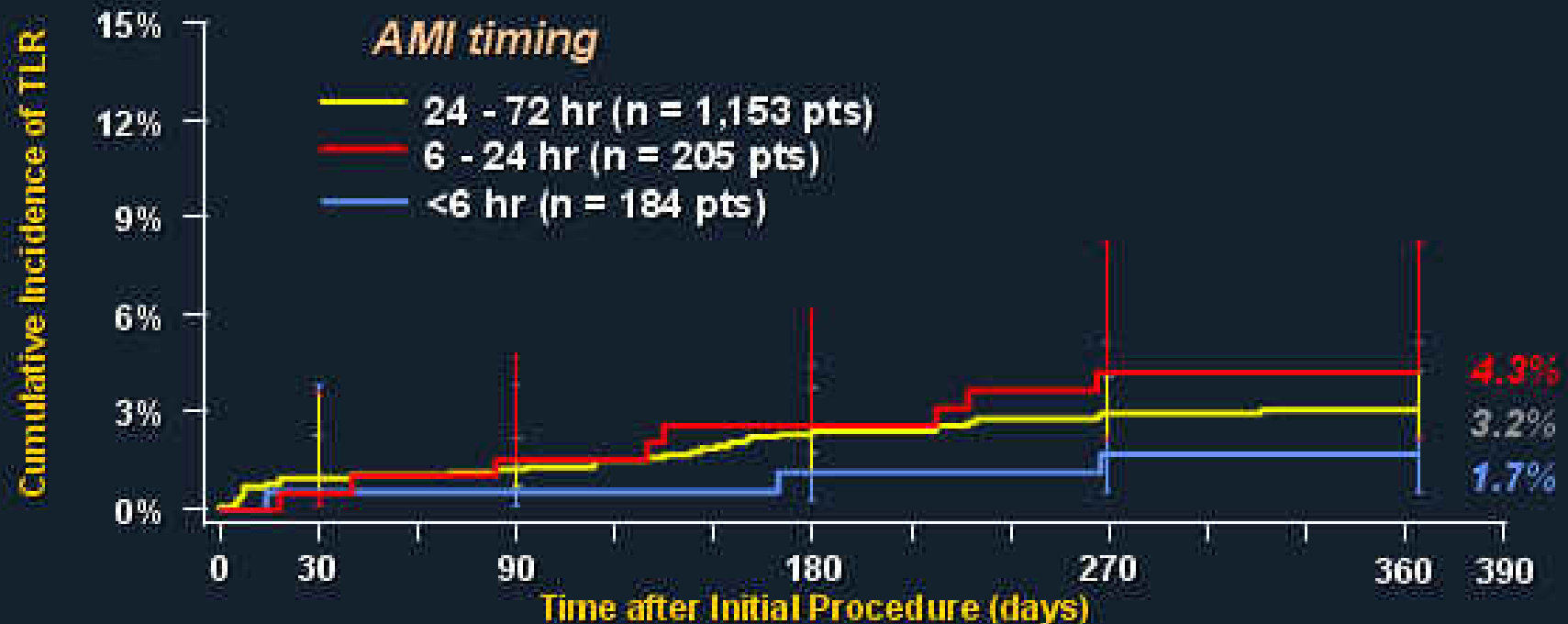
Cumulative TLR to 12 mos



TLR	0	30	180	270	360
Non-DM	5593	5593	5440	5328	5131
IDDM	682	680	652	624	582
Non-IDDM	2039	2036	1974	1925	1836

E-Five Registry – AMI

Cumulative TLR to 12 mos



TLR	0	30	180	270	390
AMI <72hr	1153	1147	1094	1071	1036
6-24hr	205	204	190	183	174
<6hr	184	184	175	173	172



E-Five Registry – 2 yrs

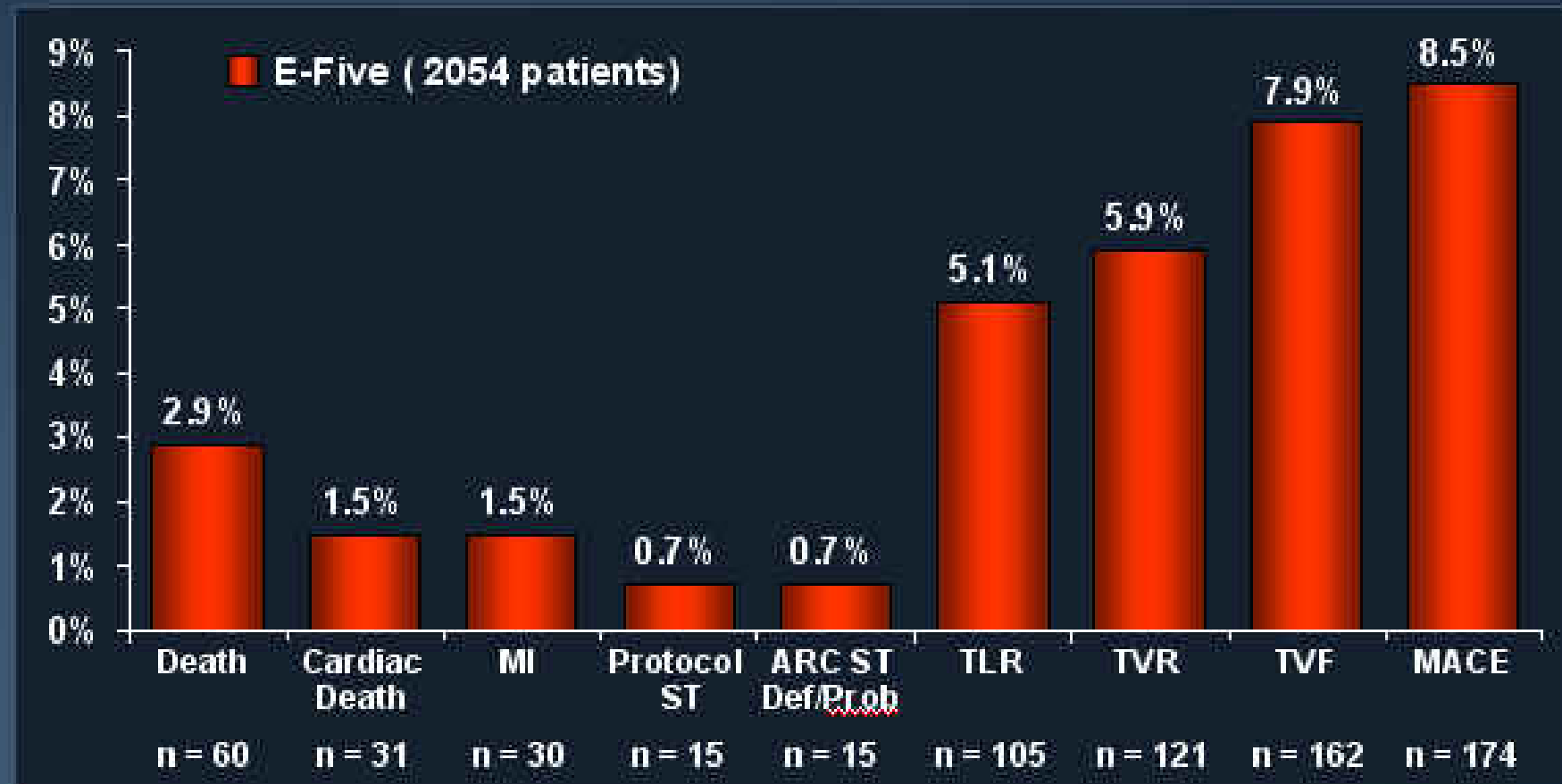
Patient Demographics

	All Patients N = 8314	2-Yr Subset N = 2116
Male (%)	76.7	77.3
Age (years)	63.3±11.1	62.1±11.0
Prior MI (%)	32.2	35.3
Non Q Wave	12.2	12.8
Q Wave	21.3	23.5
Prior PCI (%)	25.3	24.1
Prior CABG (%)	7.5	6.9
Diabetes Mellitus (%)	32.7	30.1
Acute Coronary Syndrome (%)	47.8	40.7
Recent MI (< 72 hours) (%)	13.9	11.4
Unstable Angina (%)	33.9	29.3
Moderate/Severe Renal Impairment* (%)	6.5	5.6

*Serum creatinine \geq 140 μ mol/L and
no renal transplant.

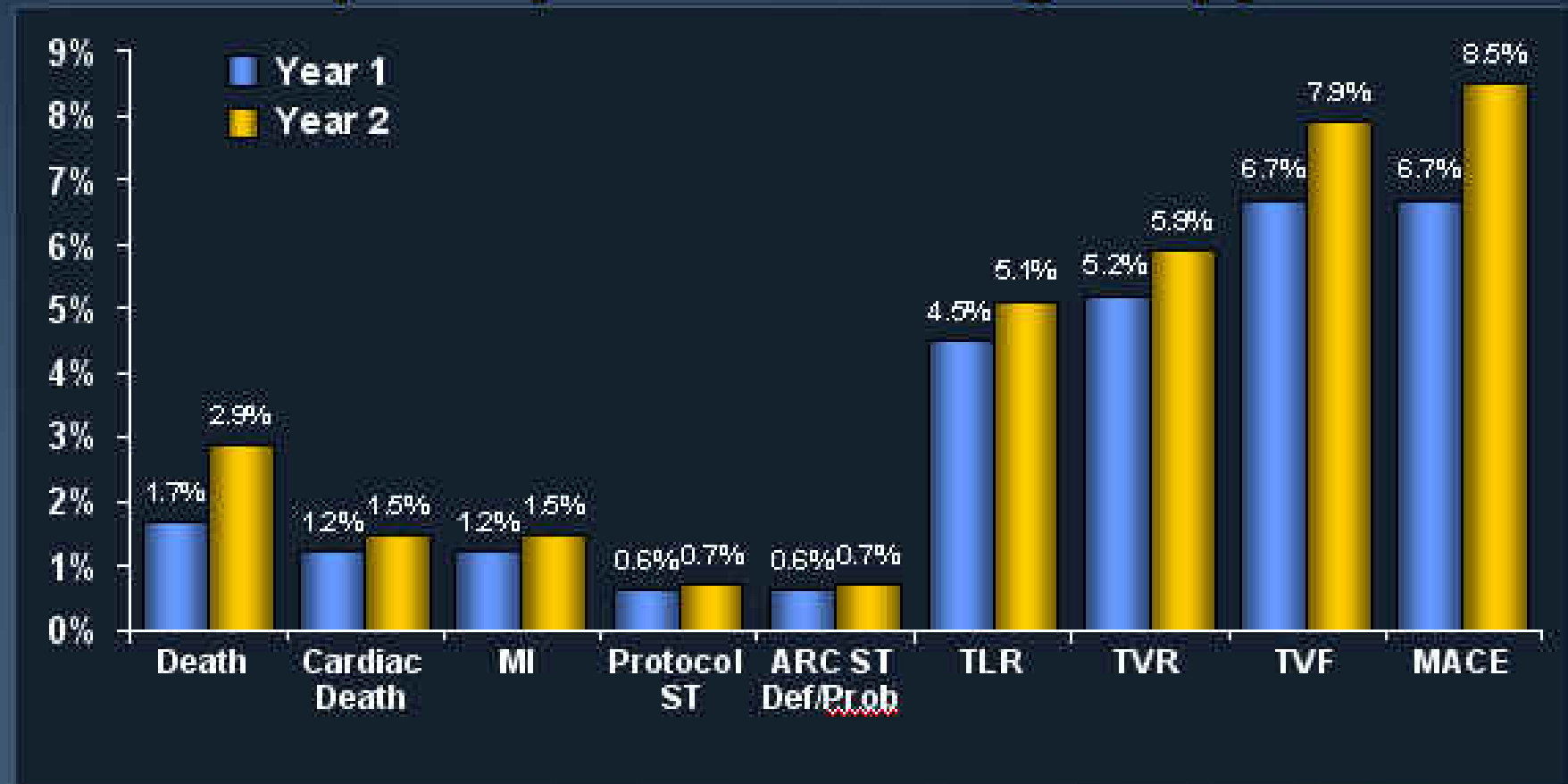
E-Five Registry – 2 yrs

Clinical Outcomes (Prespecified Subset)



E-Five Registry

Adverse Events Between 1-2 Years (Prespecified Subgroup)



ZEST - *Study Design*

All Comer requiring PCI with DES for coronary lesions
in 19 Centers of Korea
(Total 2,640 patients)

Randomize 1:1:1
stratified by 1) Sites, 2) Diabetes, 3) Long lesions (≥ 28 mm)

ENDEAVOR[®]
(N=880)

CYPER[®]
(N=880)

TAXUS Liberte[™]
(N=880)

Clinical follow-up at 12 months
Angiographic follow-up at 9 months



ZEST - *Baseline Characteristics*

Patients	ZES (n=883)	SES (n=878)	PES (n=884)	P value
Age (yr)	62±9	62±10	62±10	0.80
Male sex	586 (66)	591 (67)	582 (66)	0.80
Body mass index	25±3	25±3	25±3	0.88
Diabetes mellitus				
Any diabetes	268 (30)	247 (28)	245 (28)	0.42
Requiring insulin	32 (4)	33 (4)	36 (4)	0.88
Hypertension	552 (63)	517 (59)	540 (61)	0.29
Hyperlipidemia	466 (53)	451 (51)	446 (51)	0.62
Current smoker	236 (27)	256 (29)	243 (28)	0.51
Family history of CAD	48 (5)	44 (5)	52 (6)	0.72
n (%)				



ZEST - *Baseline Characteristics*

Patients	ZES (n=883)	SES (n=878)	PES (n=884)	P value
Clinical indication (%)				0.73
Silent ischemia	48 (5)	44 (5)	56 (6)	
Chronic stable angina	348 (39)	343 (39)	343 (39)	
Unstable angina	410 (46)	424 (48)	403 (46)	
NSTEMI	77 (9)	67 (8)	82 (9)	
Electrocardiographic findings				0.99
Sinus rhythm	850 (96)	849 (97)	854 (97)	
Atrial fibrillation	21 (2)	18 (2)	17 (2)	
Other	12 (1)	11 (1)	13 (1)	
n (%)				



ZEST - *Lesion Characteristics*

Lesions	ZES (n=1190)	SES (n=1218)	PES (n=1205)	P value
Location				0.39
LAD	622 (52)	645 (53)	611 (51)	
LCX	252 (21)	225 (19)	253 (21)	
RCA	316 (27)	348 (29)	340 (28)	
Coronary graft	0	0	1 (0.1)	
ACC-AHA B2 or C type	858 (72)	921 (76)	895 (74)	0.14
Total occlusion	68 (6)	76 (6)	96 (8)	0.07
Thrombus-containing	32 (3)	37 (3)	38 (3)	0.78
Bifurcation lesion	181 (15)	151 (12)	168 (14)	0.14
Ostial lesion	85 (7)	72 (6)	82 (7)	0.45
Restenotic lesion	5 (0.4)	12 (1)	13 (1)	0.16
n (%)				



ZEST - *Lesion Characteristics*

Lesions	ZES (n=1190)	SES (n=1218)	PES (n=1205)	P value
Calcification				0.76
None or mild	1129 (95)	1145 (94)	1132 (94)	
Moderate	40 (3)	43 (4)	46 (4)	
Severe	21 (2)	30 (3)	27 (2)	
Lesion length				0.09
<10 mm	73 (6)	71 (6)	61 (5)	
10-20 mm	466 (39)	444 (37)	504 (42)	
>20 mm	651 (55)	703 (58)	640 (53)	
n (%)				

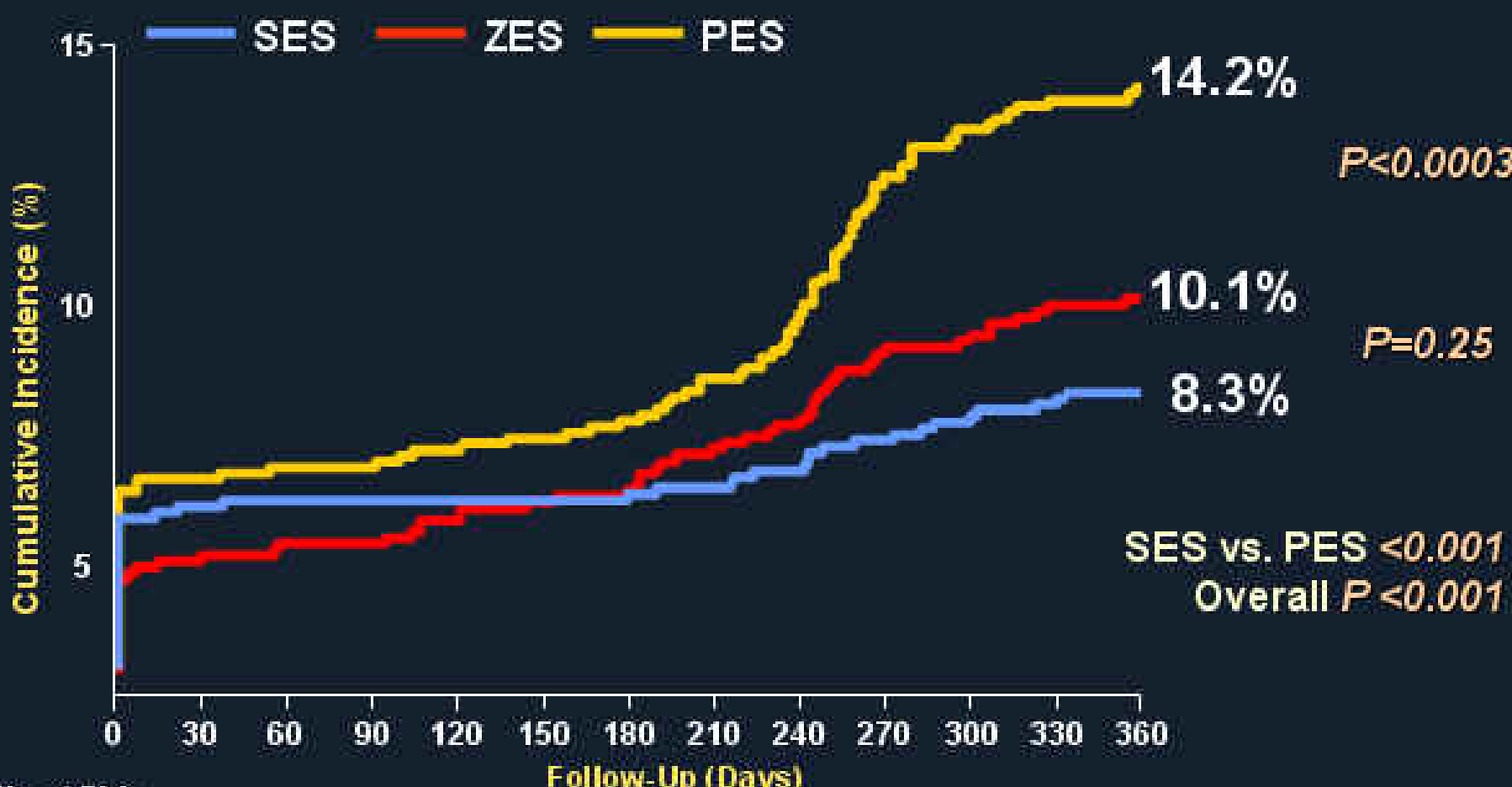


ZEST - *Procedure Characteristics*

Lesions	ZES (n=1190)	SES (n=1218)	PES (n=1205)	P value
No. of stents per lesion	1.2±0.4	1.2±0.4	1.2±0.4	0.35
No. of stents per patient	1.6±0.9	1.6±0.9	1.6±0.9	0.92
Length of stents per lesion	27.9±13.1	28.9±13.5	28.9±14.3	0.12
Length of stents per pt	39.7±26.8	38.3±24.3	38.9±25.2	0.45
Maximal stent diameter	3.4±0.7	3.4±0.7	3.5±0.6	0.03
Maximal pressure	16.3±4.2	16.3±4.1	16.2±4.2	0.95
Direct stenting	84 (7)	109 (9)	89 (7)	0.24
Use of IVUS	488 (41)	514 (42)	491 (41)	0.62
Use of glycoprotein IIb-IIIa inhibitors	19 (2)	15 (2)	14 (2)	0.64



ZEST - *Death, MI, Ischemia-driven TVR* (1ry endpoint at 12 mos)



	0	30	60	90	120	150	180	210	240	270	300	330	360
No. at Risk													
ZES	883			827			816		790				782
SES	878			816			813		802				792
PES	884			821			808		763				745

ZEST - MACE at 1 Month

N (%)	ZES (n=883)	SES (n=878)	PES (n=884)	P
Death	3 (0.3)	1 (0.1)	1 (0.1)	0.55
Cardiac	3 (0.3)	1 (0.1)	1 (0.1)	0.55
Noncardiac	0	0	0	NA
MI	44 (5.0)	54 (6.2)	60 (6.8)	0.27
Q-wave	3 (0.3)	3 (0.3)	3 (0.3)	1.00
Non-Q-wave	41 (4.6)	51 (5.8)	57 (6.4)	0.25
Death or MI	45 (5.1)	54 (6.2)	60 (6.8)	0.32
TLR	3 (0.3)	0	4 (0.5)	0.23
Percutaneous	3 (0.3)	0	4 (0.5)	0.23
Surgical	0	0	0	NA
TVR	3 (0.3)	0	4 (0.5)	0.23
Percutaneous	3 (0.3)	0	4 (0.5)	0.23
Surgical	0	0	0	NA
MACE*	45 (5.1)	54 (6.2)	60 (6.8)	0.32

* MACE: composite of death, MI, or ischemia-driven TVR

ZEST – MACE at 12 Mos

	ZES (n=883)	SES (n=878)	PES (n=884)	P
Death	6 (0.7)	7 (0.8)	10 (1.1)	0.57
Cardiac	5 (0.6)	3 (0.3)	5 (0.6)	0.74
Noncardiac	1 (0.1)	4 (0.5)	5 (0.6)	0.27
MI	47 (5.3)	55 (6.3)	62 (7.0)	0.30
Q-wave	5 (0.6)	3 (0.3)	5 (0.6)	0.74
Non-Q-wave	42 (4.8)	52 (5.9)	57 (6.4)	0.26
Death or MI	51 (5.8)	61 (6.9)	67 (7.6)	0.28
TLR	43 (4.9)	12 (1.4)	66 (7.5)	<0.001
Percutaneous	43 (4.9)	11 (1.3)	65 (7.4)	<0.001
Surgical	0	1 (0.1)	1 (0.1)	0.61
TVR	46 (5.2)	16 (1.8)	67 (7.6)	<0.001
Percutaneous	46 (5.2)	15 (1.7)	66 (7.5)	<0.001
Surgical	0	1 (0.1)	1 (0.1)	0.61
Primary end point*	90 (10.2)	73 (8.3)	125 (14.1)	<0.001

* Primary end point: composite of death, MI, or ischemia-driven TVR

N (%)

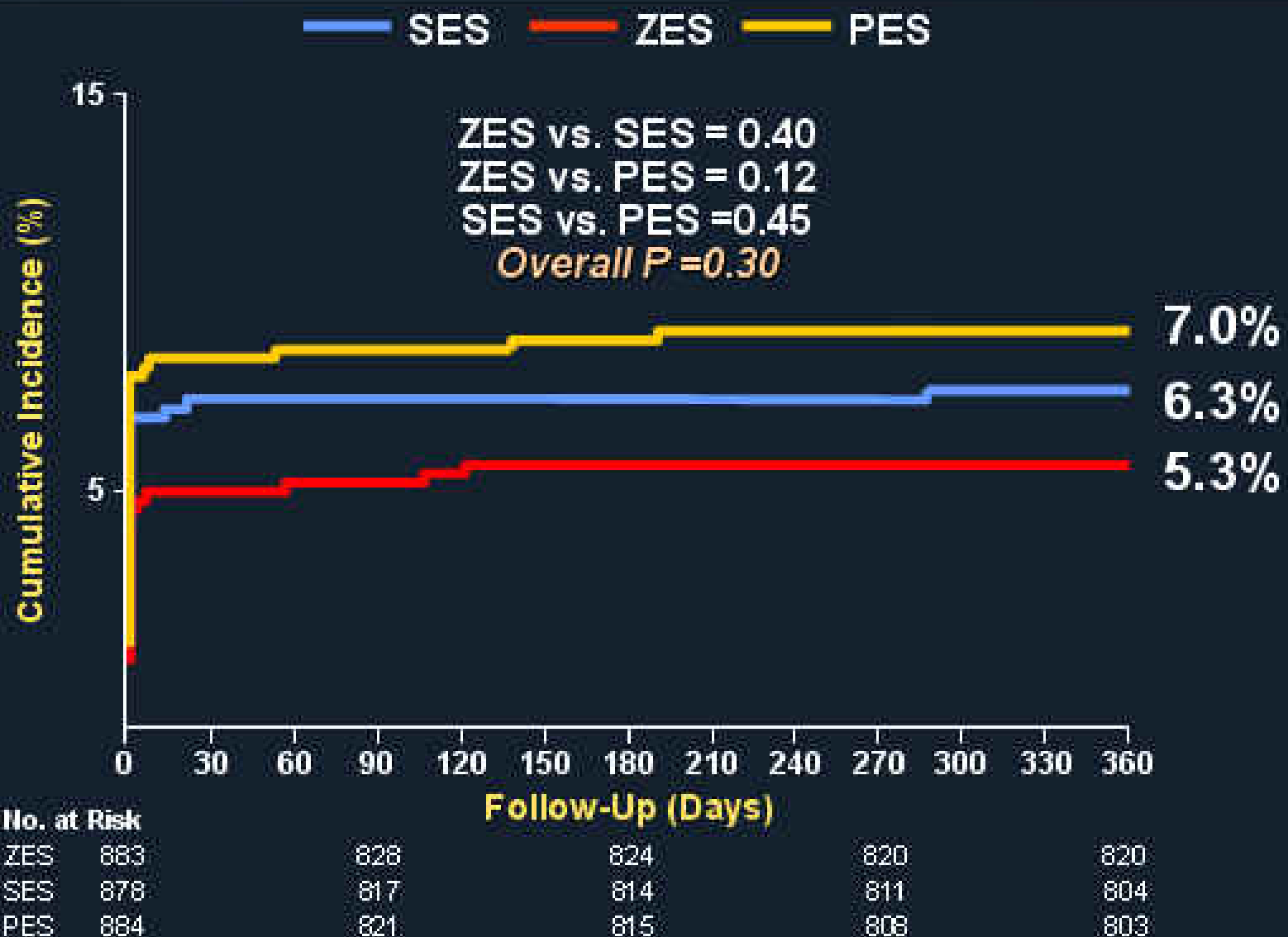
ZEST - *Death*



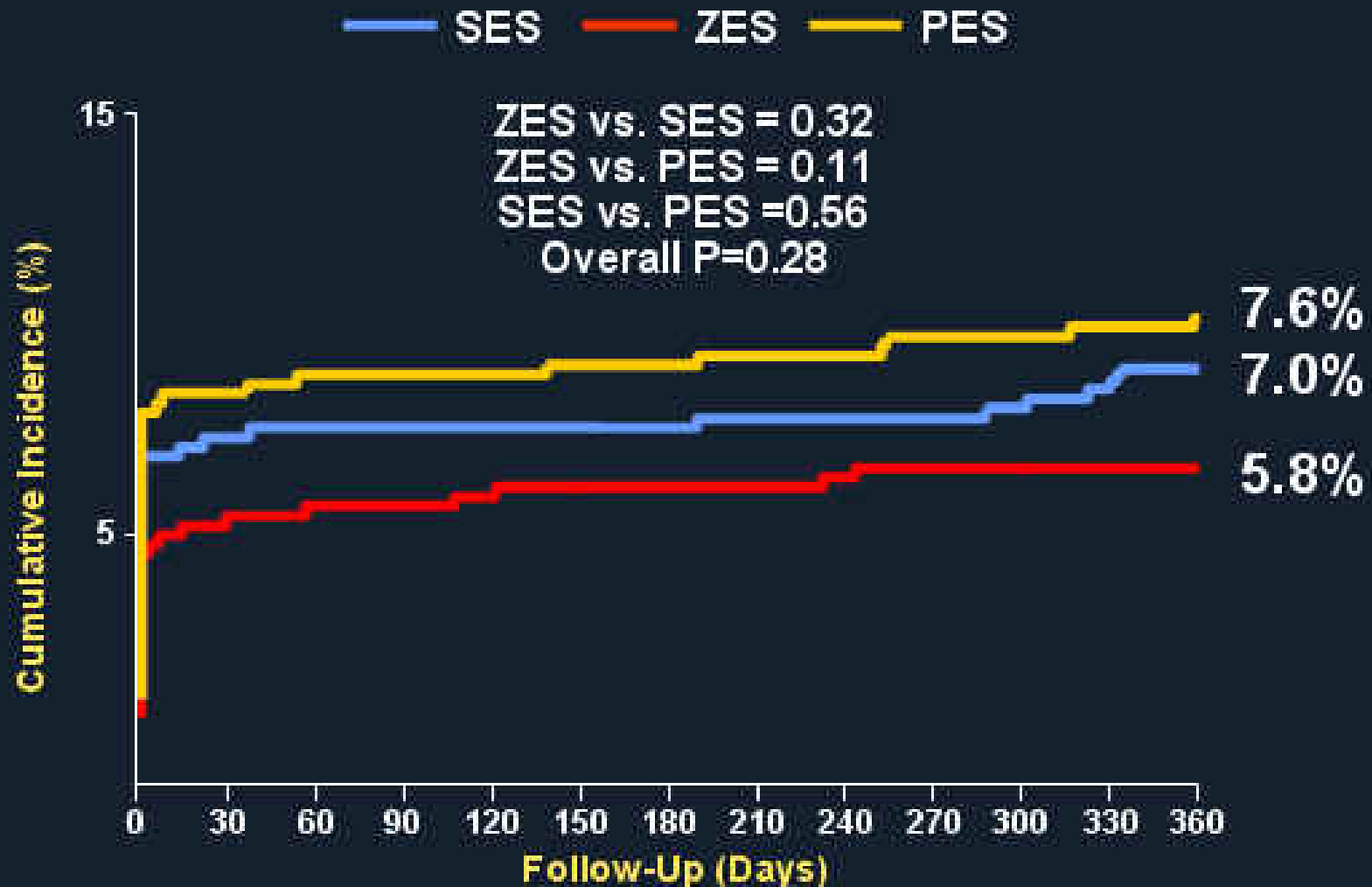
No. at Risk

ZES	883	871	869	864	864
SES	878	869	867	863	857
PES	884	880	873	865	859

ZEST – Myocardial Infarction



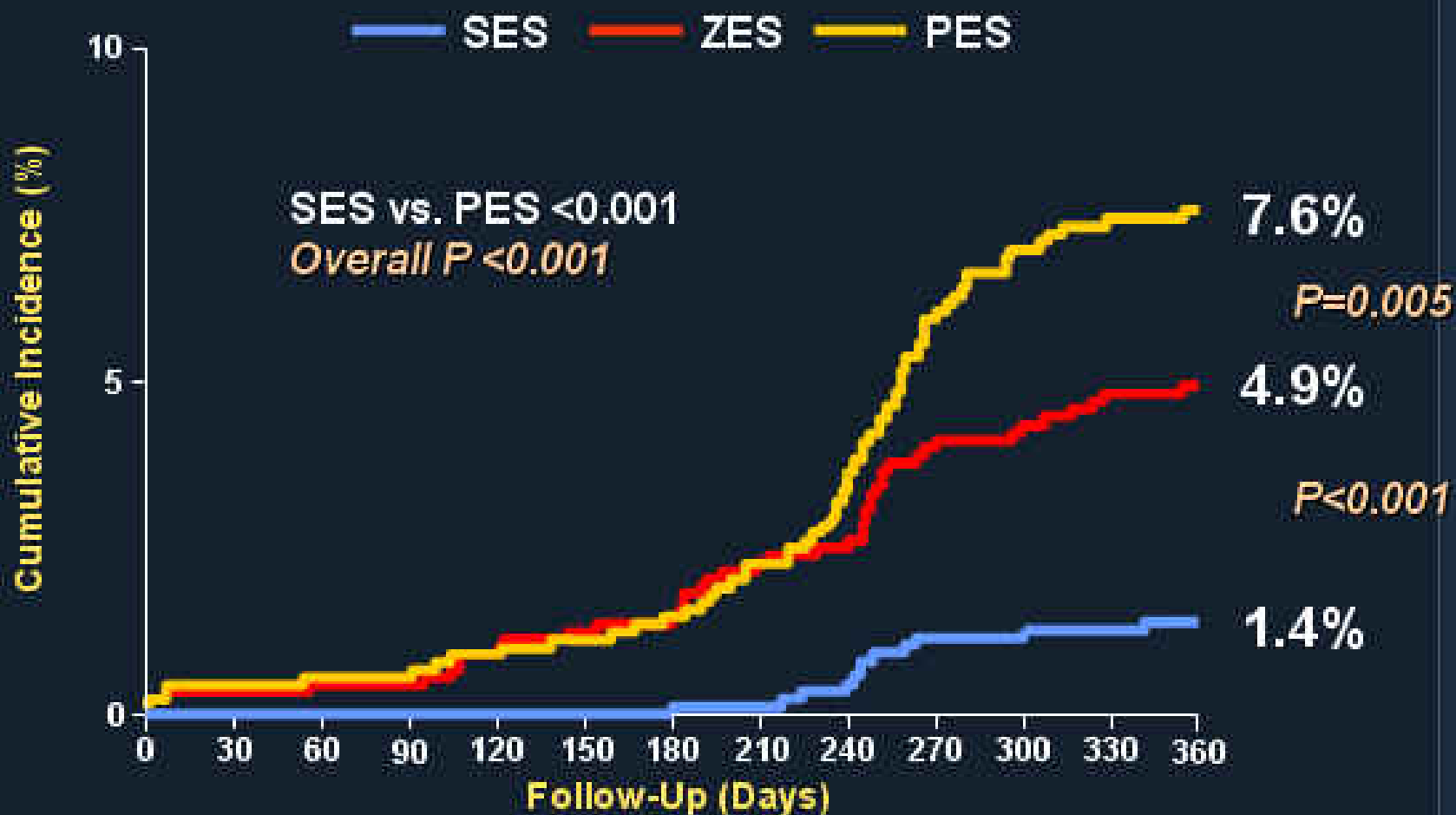
ZEST - *Death or MI*



No. at Risk

ZES	883	828	824	820	820
SES	878	817	814	811	804
PES	884	821	815	803	803

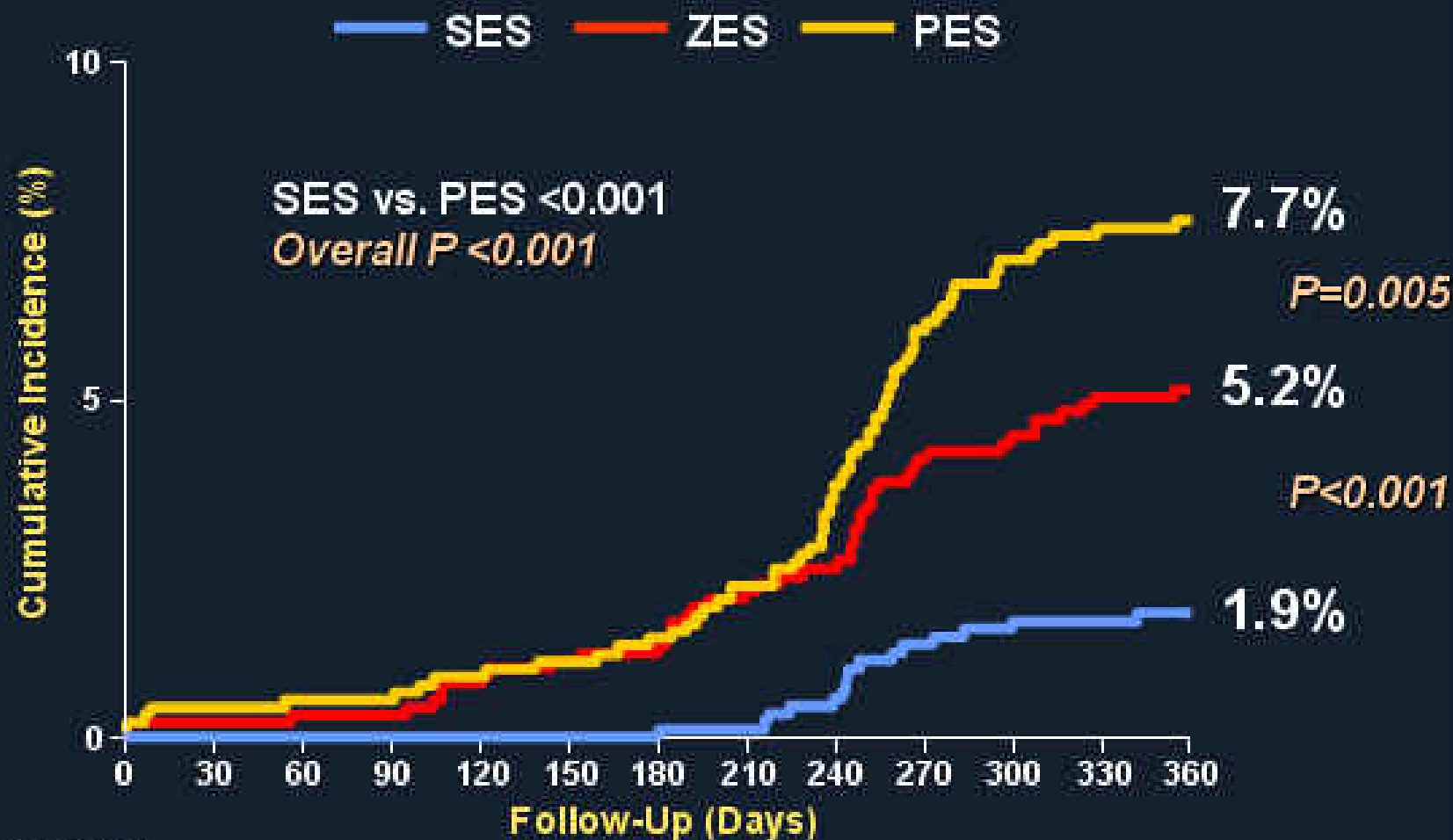
ZEST - *Ischemia Driven TLR*



No. at Risk

ZES	883	868	857	829	822
SES	878	869	866	853	845
PES	884	875	861	813	794

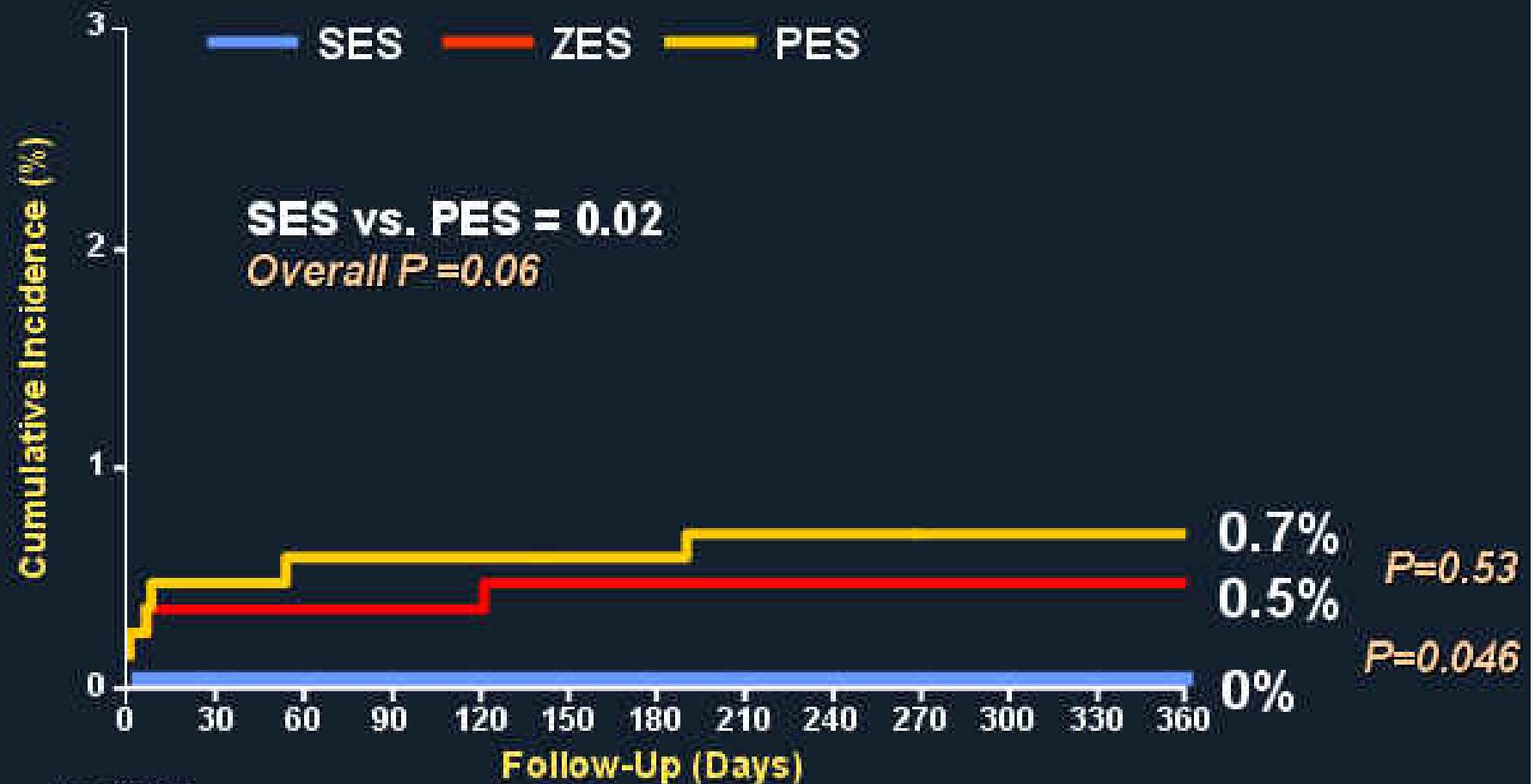
ZEST - *Ischemia Driven TVR*



No. at Risk

ZES	883	868	857	827	819
SES	878	869	866	851	841
PES	884	875	861	812	793

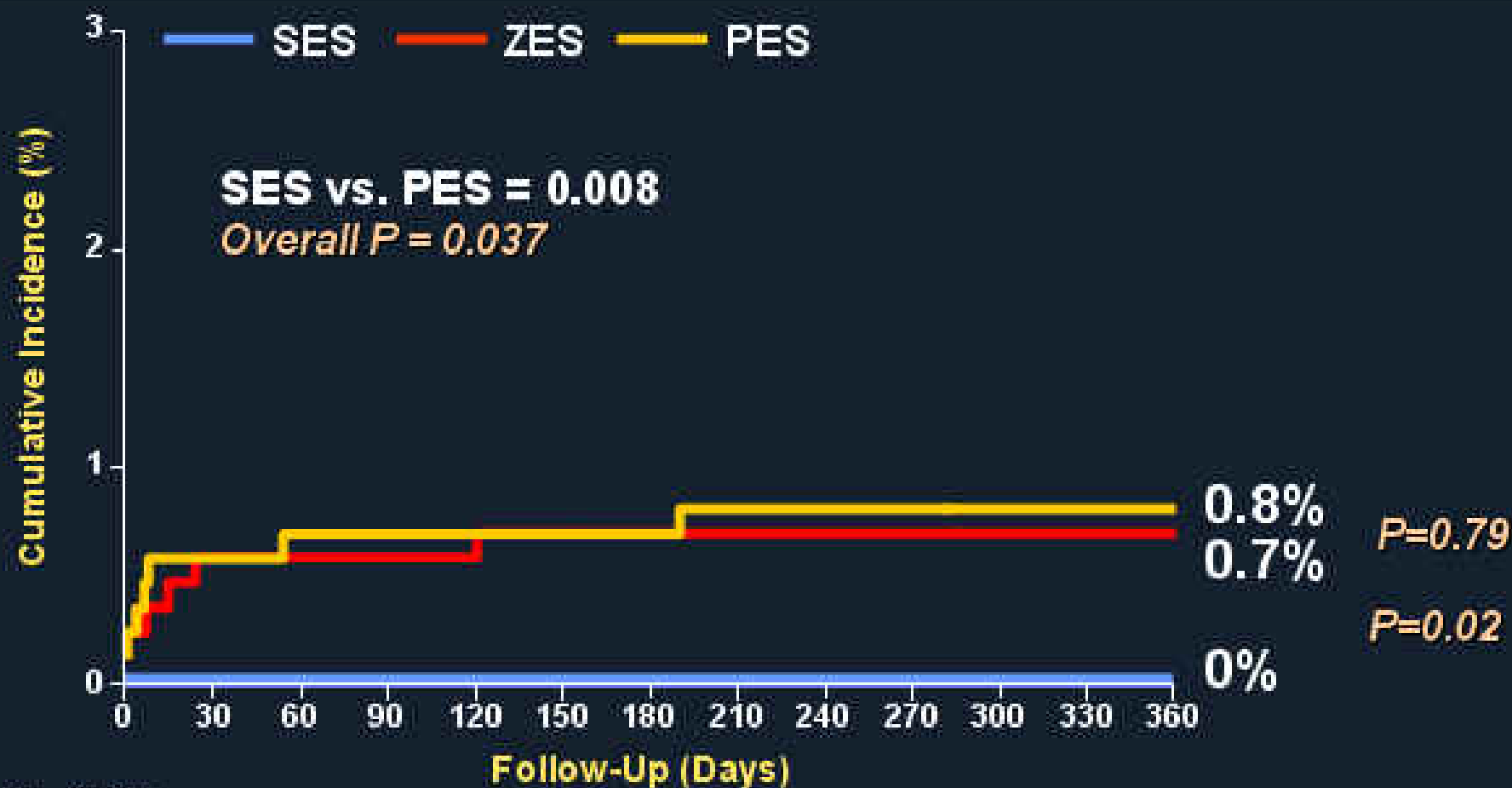
ZEST - *Stent Thrombosis* ARC Definite Criteria



No. at Risk	
ZES	883
SES	878
PES	884

869	866	861	861
869	867	863	857
875	868	859	853

ZEST - *Stent Thrombosis* ARC Definite or Probable Criteria



No. at Risk

ZES	883	869	866	861	861
SES	878	869	867	863	857
PES	884	875	868	859	853

Endeavor DES - 2009

Efficacy

Endeavor is...

- associated with higher angio late loss than SES, PES, & EES
- angiographic FU magnifies the “oculostenotic reflex” with ZES due to the higher late loss (E4)
- TLR/TVR frequency is durable over time cw SES/PES and similar to other DES (esp. PES – E4 and ZEST) even in high risk restenosis subgroups (e.g. E4 DM, E5, and ZEST) – await the outcomes of PROTECT



Endeavor DES - 2009

Safety



CARDIOVASCULAR RESEARCH
FOUNDATION



COLOMBIA UNIVERSITY
MEDICAL CENTER

NewYork-Presbyterian

The University Hospital of Columbia and Cornell



ODESSA

Prospective, Randomized, Controlled Study

Long lesions (> 20 mm in length) requiring stents in overlap

77 pts /189 stents Randomization 2:2:2:1

2.4 ± 0.6 stent/lesion

Cypher
N=22

Taxus
N=22

Endeavor
N=22

Liberté BMS
N=11

*Primary end-point: proportion of stent struts uncovered and/or malapposed at overlap in OCT at 6 month (BMS vs DES and among DES) **

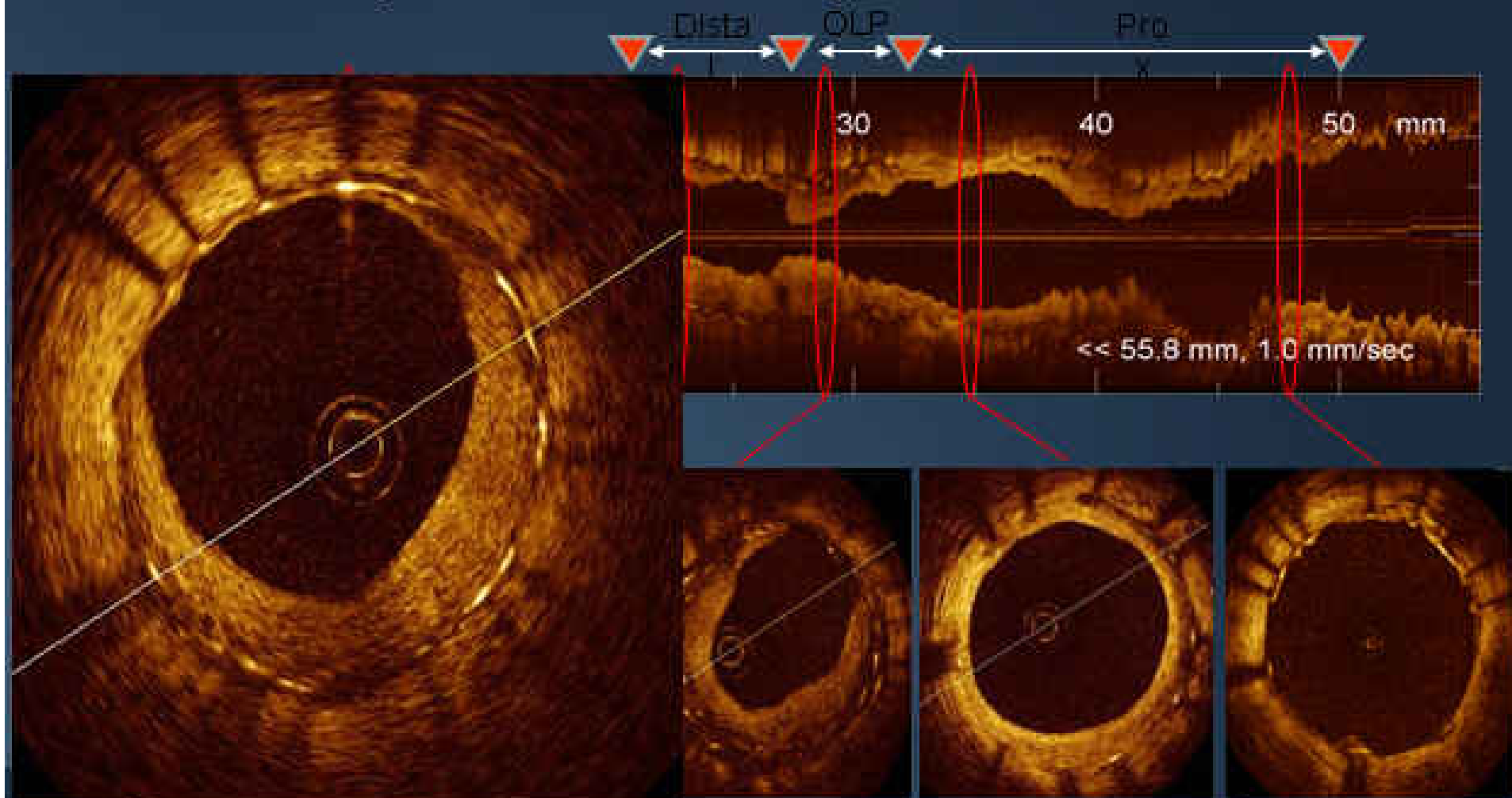
QCA, IVUS and OCT

*Independent Core Lab **BLIND** to the treatment assignment
University Hospitals Cardialysis Cleveland, OH*



Six Month OCT Analysis: 75/76 Eligible Patients

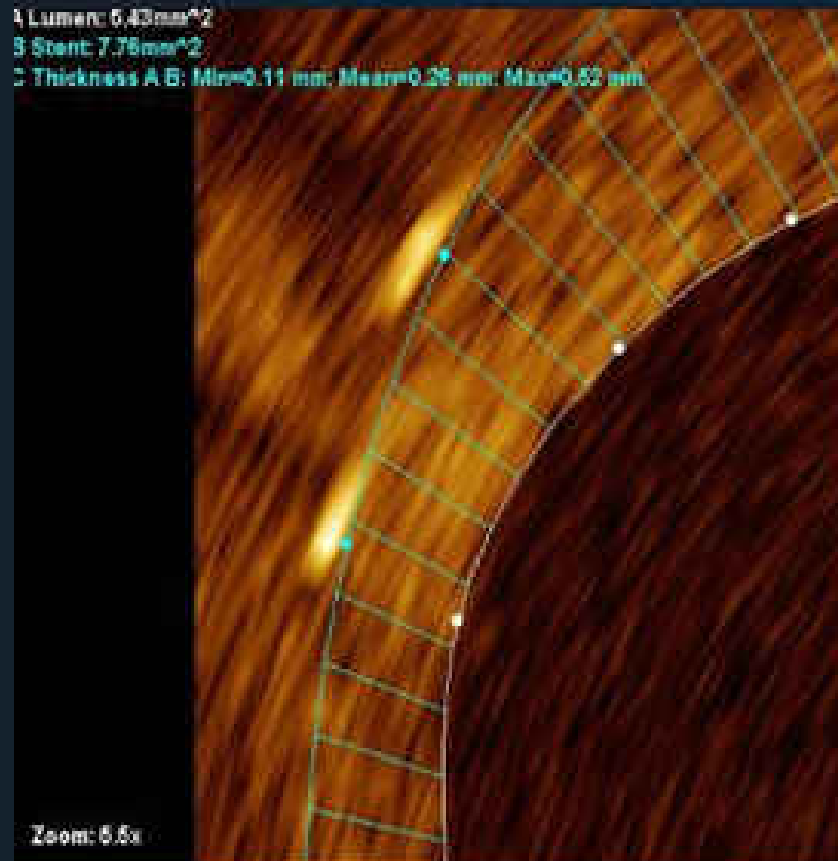
Analyzed: 250 stented segments every 0.3 mm
(6968 cross-sections), 53.047 struts



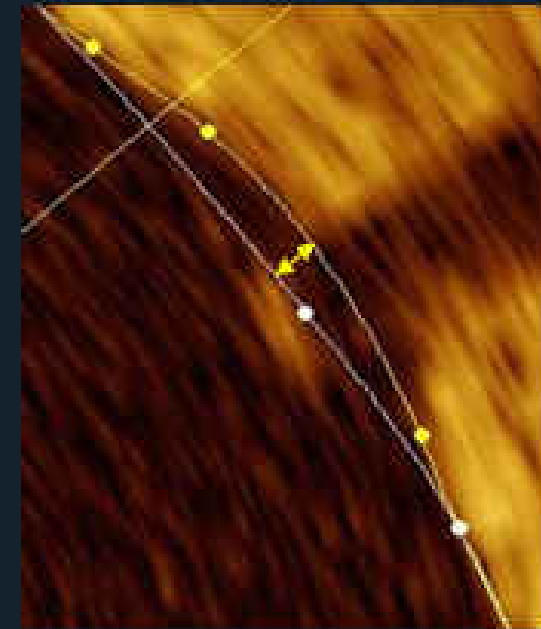
Quantitative Strut Level Analysis

Semi-Automated delineated contours at radial 1 degree increments

**Lumen Area, Stent Area,
Strut -Lumen distance**



Strut-wall Distance

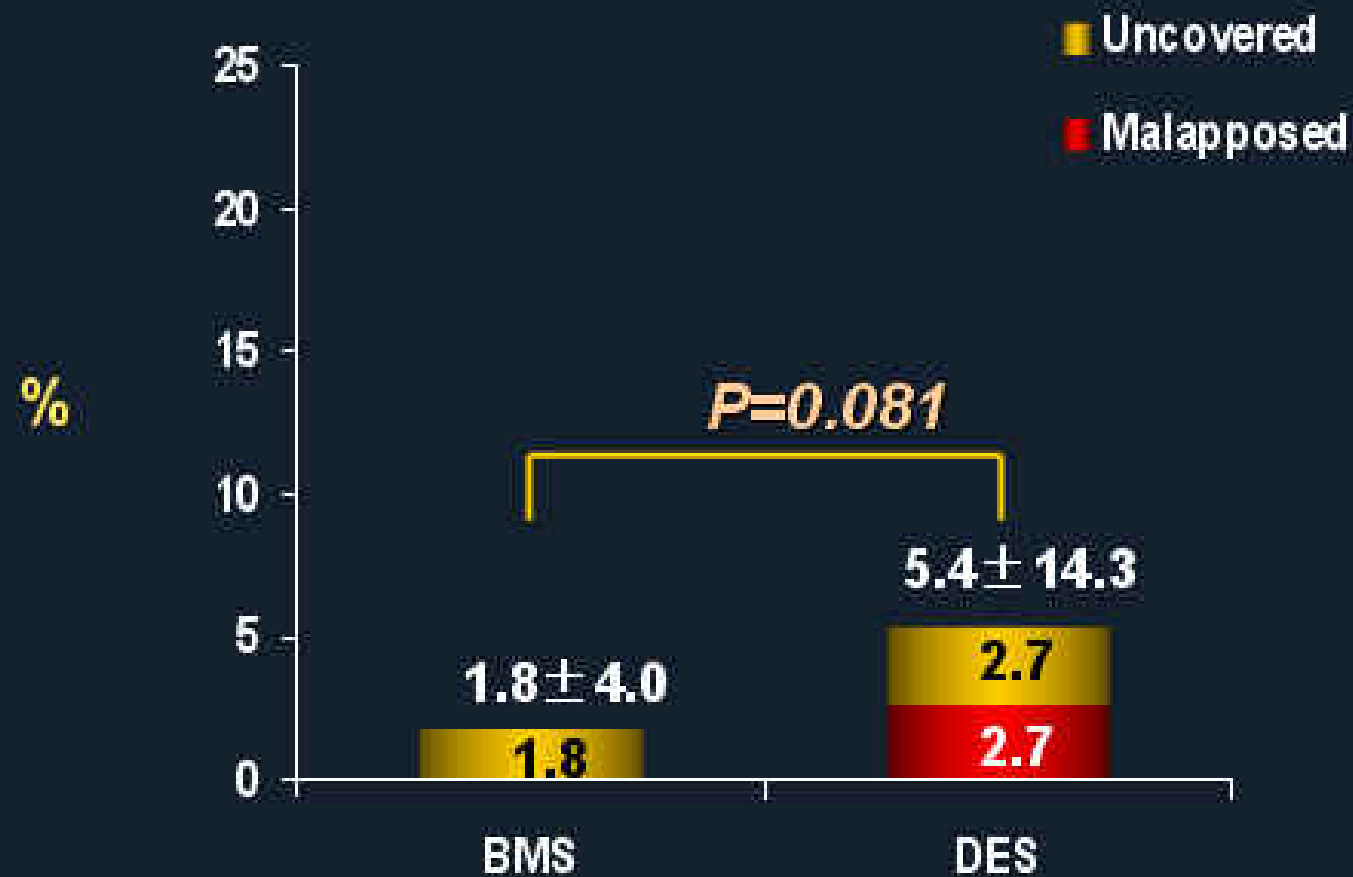


**Inter-observer variability:
39 frames, 333 struts**

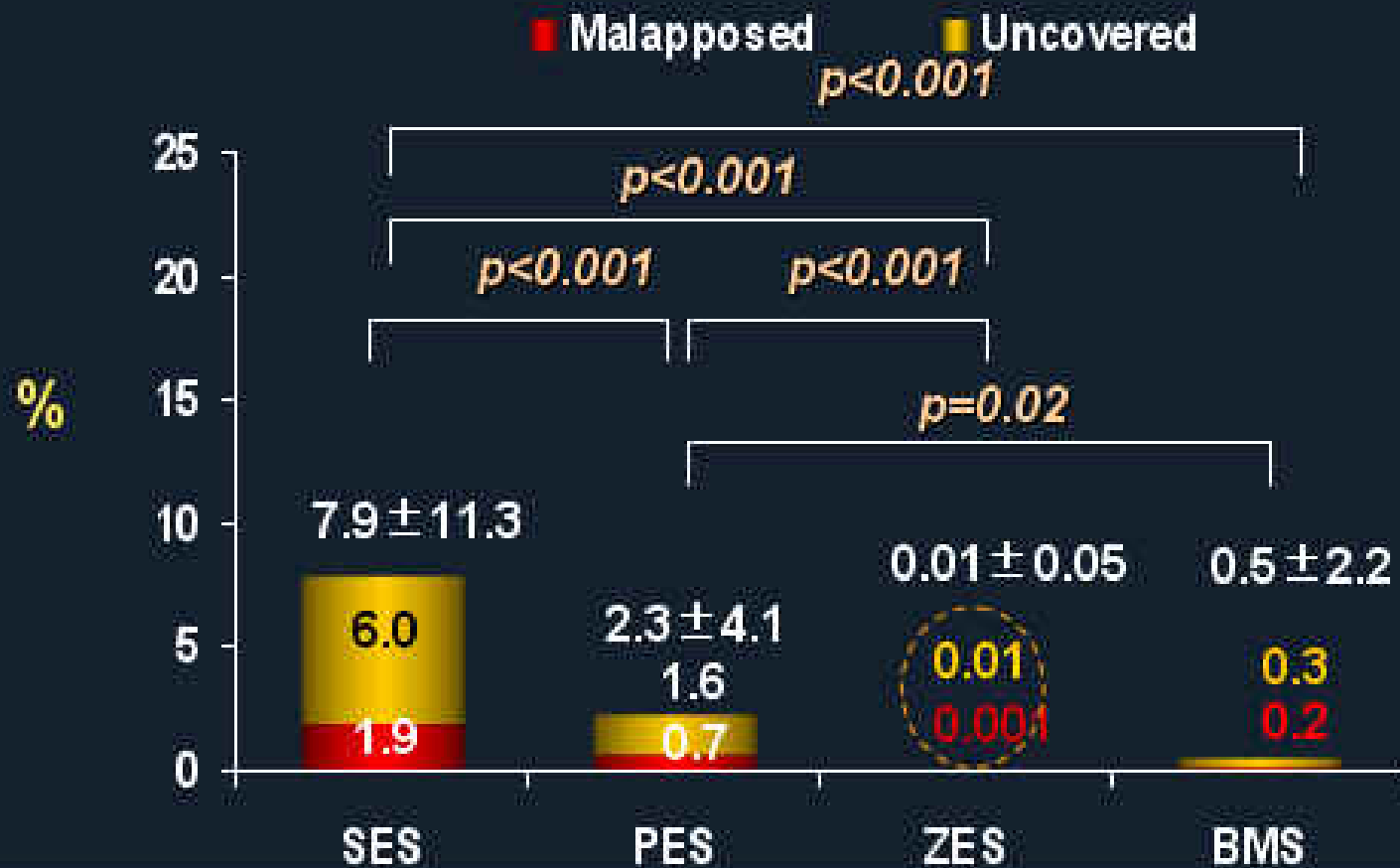
$R=0.997$

	<i>Observer 1</i>	<i>Observer 2</i>	<i>Delta</i>	<i>SD</i>
Strut-Lumen distance	0.38 ± 0.03	0.38 ± 0.03	0.00	0.02

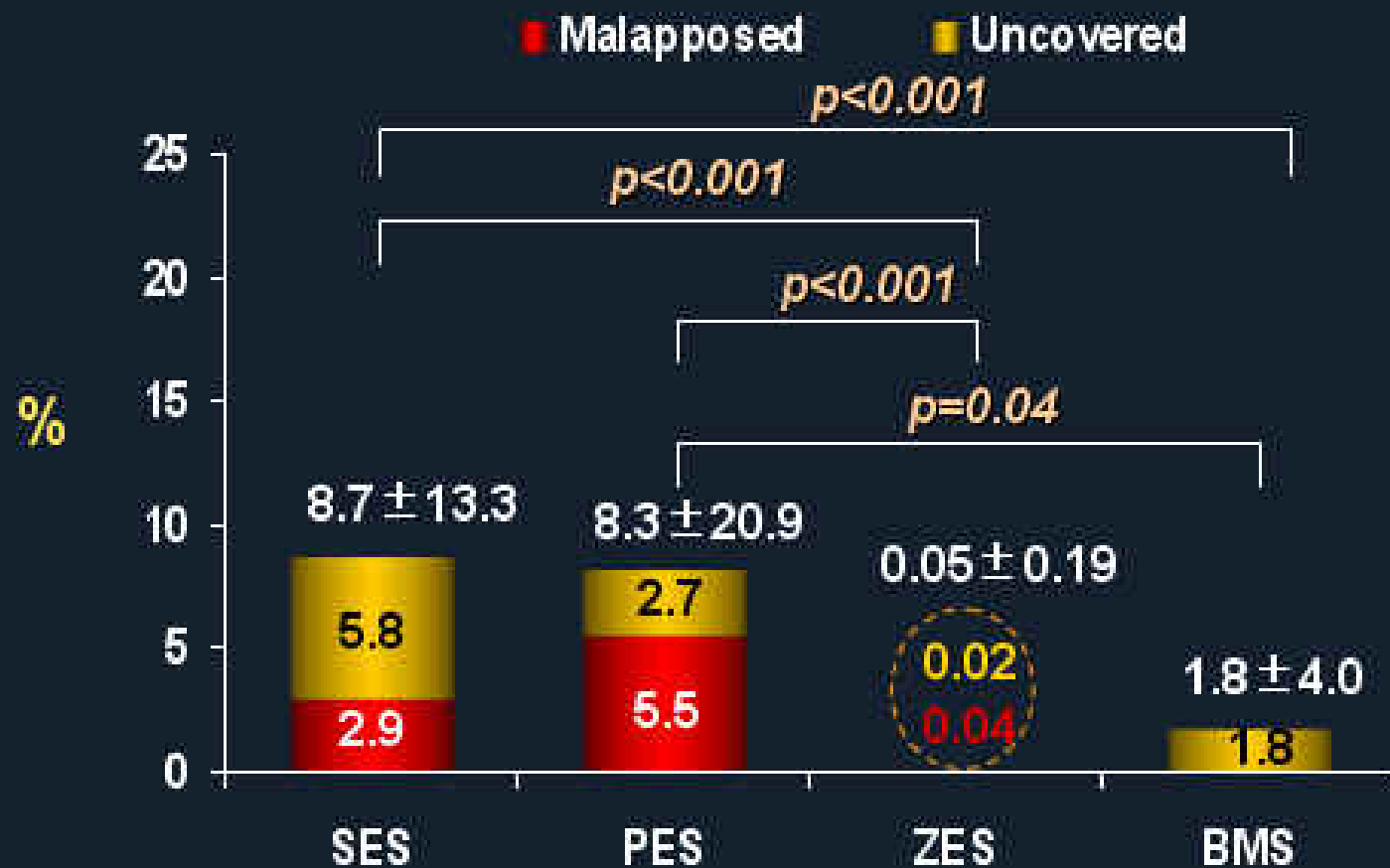
Primary Endpoint: Overlap Proportion of Uncovered and/or Malapposed *Struts in BMS vs DES*



Secondary Endpoint: Non-overlap Proportion of Uncovered and/or Malapposed *Struts by Stent Type*

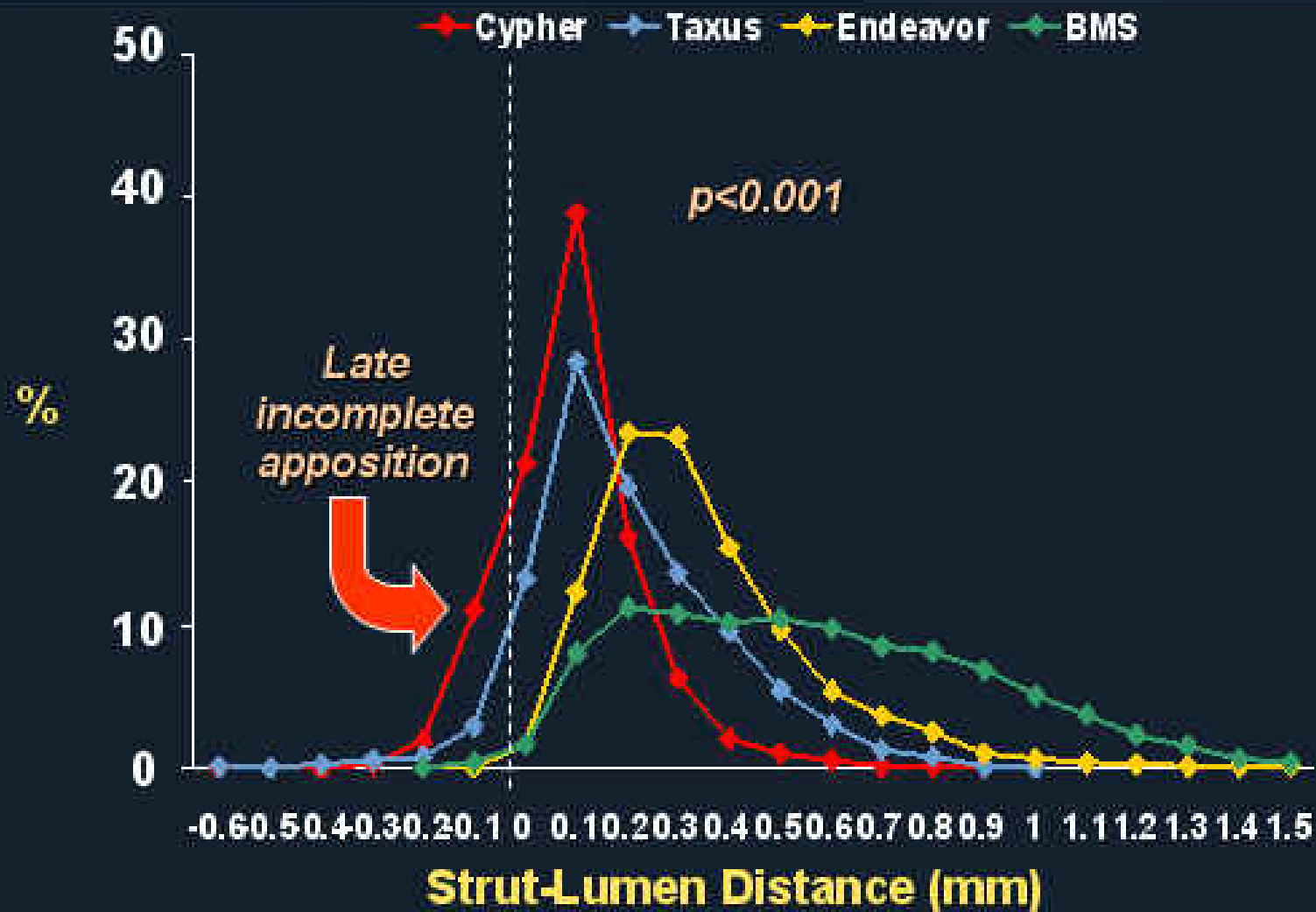


Secondary Endpoint: Overlap Proportion of Uncovered and/or Malapposed *Struts by Stent Type*



Strut Level Analysis

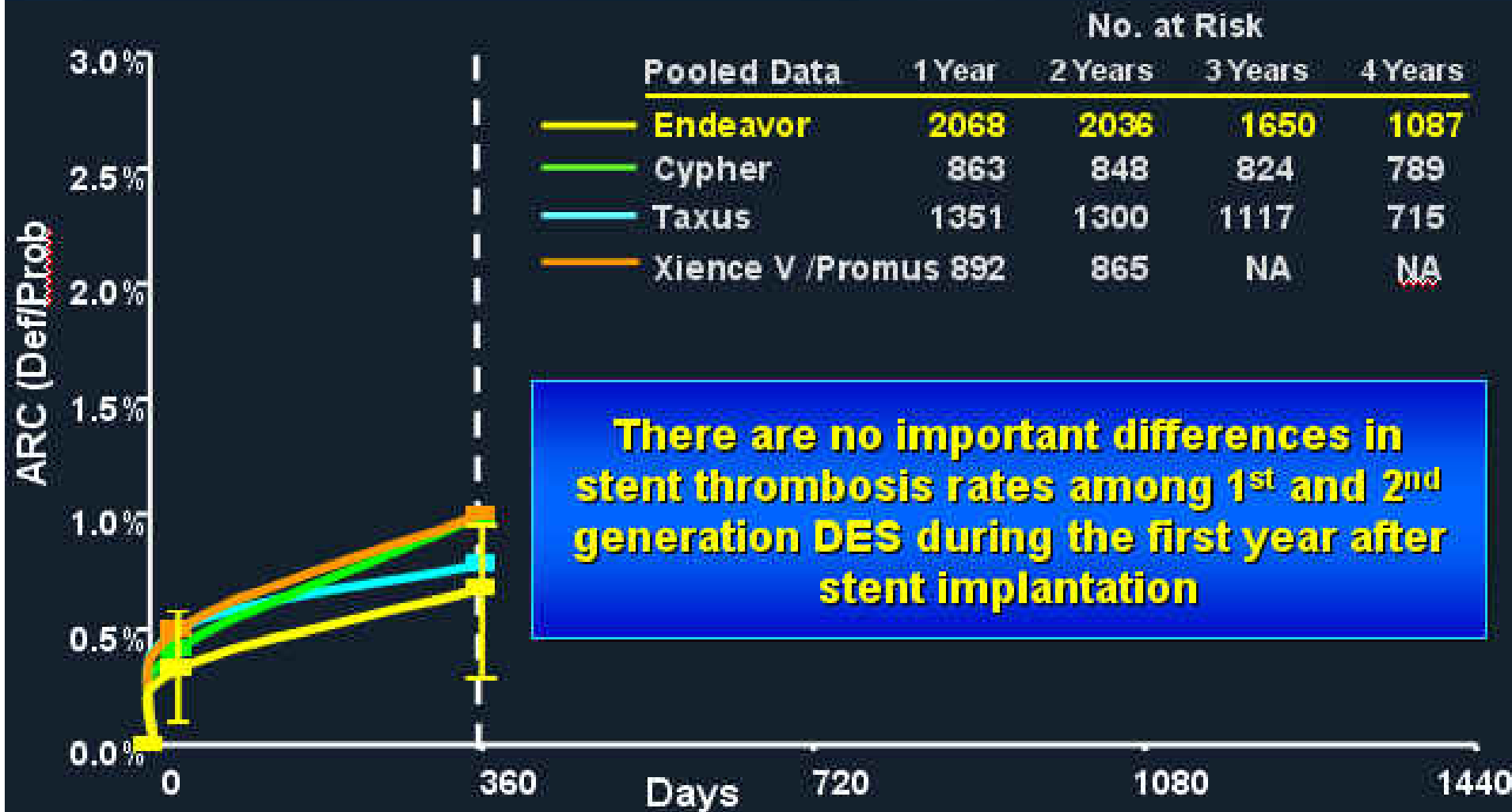
Frequency Distribution of Strut-Lumen Distance



Based on ANOVA test, Kruskal-Wallis test and generalized linear model with complex sample analysis (clustered)

DES In Perspective: LAST

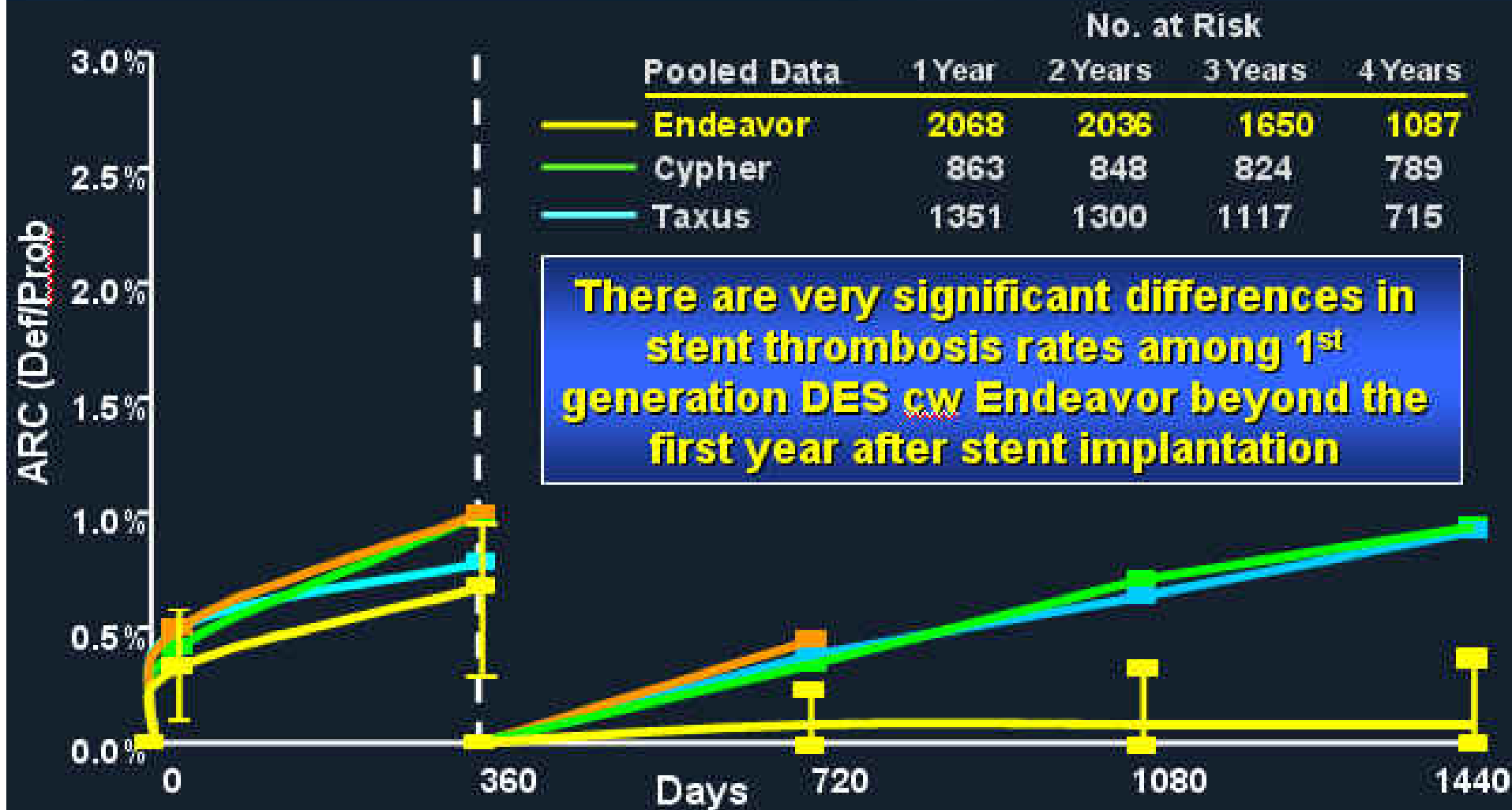
ARC Def/Prob ST Landmark Analysis



There are no important differences in stent thrombosis rates among 1st and 2nd generation DES during the first year after stent implantation

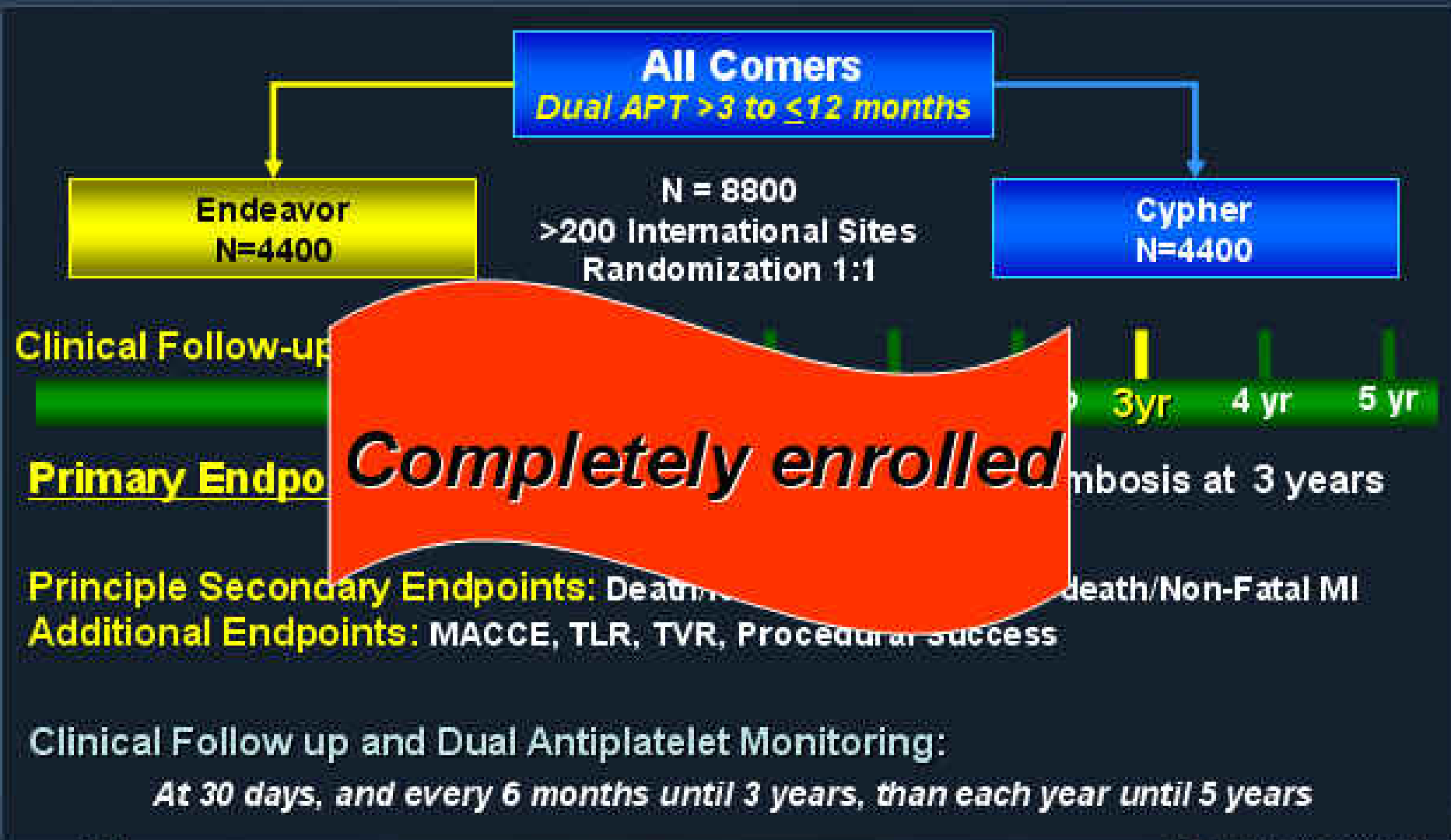
DES In Perspective: VLST

ARC Def/Prob ST Landmark Analysis



PROTECT

Worldwide RCT (Endeavor vs. Cypher)



Endeavor DES - 2009

Safety

Endeavor is...

- associated with improved pre-clinical safety evaluations
- favorable “surrogate” safety clinical findings (IVUS, OCT, angiography and vaso-reactivity)
- AND very low clinical safety endpoints (death and MI)
- AND very low stent thrombosis (esp. very late) – “BMS-like”



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TCT2009

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