

Ομάδα Εργασίας Επεμβατικής Καρδιολογίας

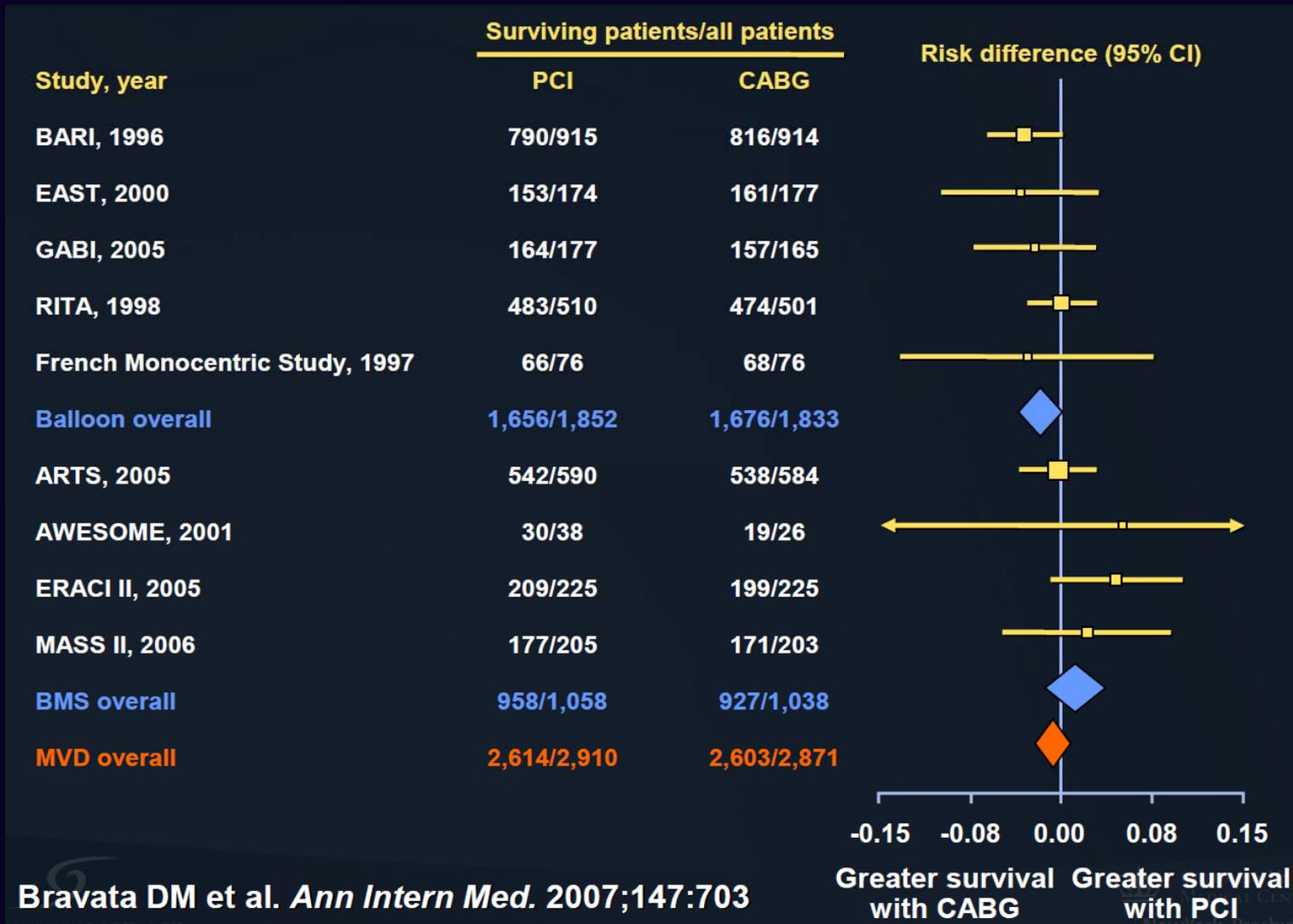
PCI σε ασθενείς με στεφανιαία νόσο πολλών αγγείων.

Επιλογή ασθενών, άμεση και απώτερη πρόγνωση.

Σ Χατζημιλιτιάδης , FACP, FACC
Αναπληρωτής Καθηγητής , Νοσοκομείο ΑΧΕΠΑ , Θεσσαλονίκη

PCI vs CABG TRIALS (I)

5-year survival with balloon angioplasty or stents (PCI) versus coronary artery bypass grafting (CABG) in patients with multivessel disease (MVD).

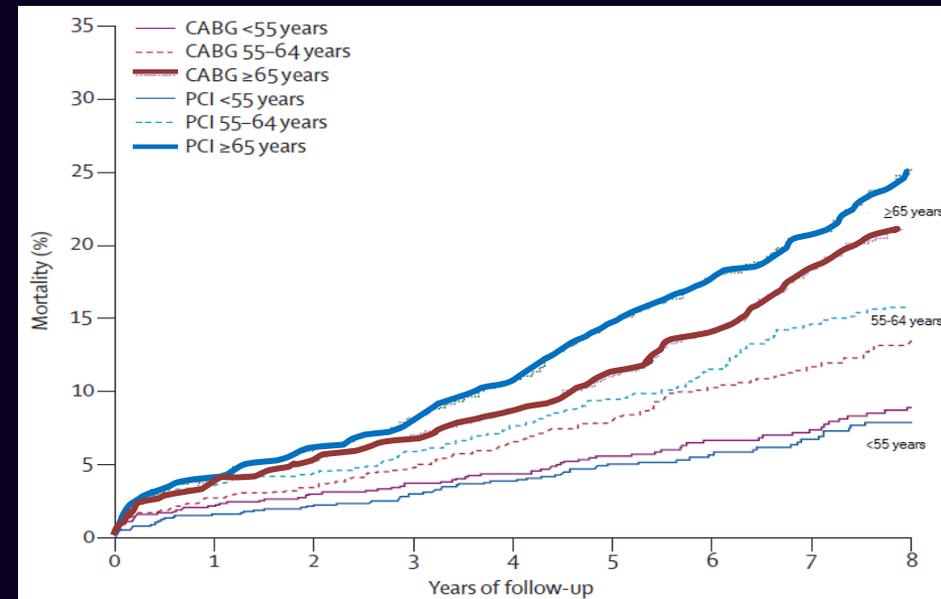
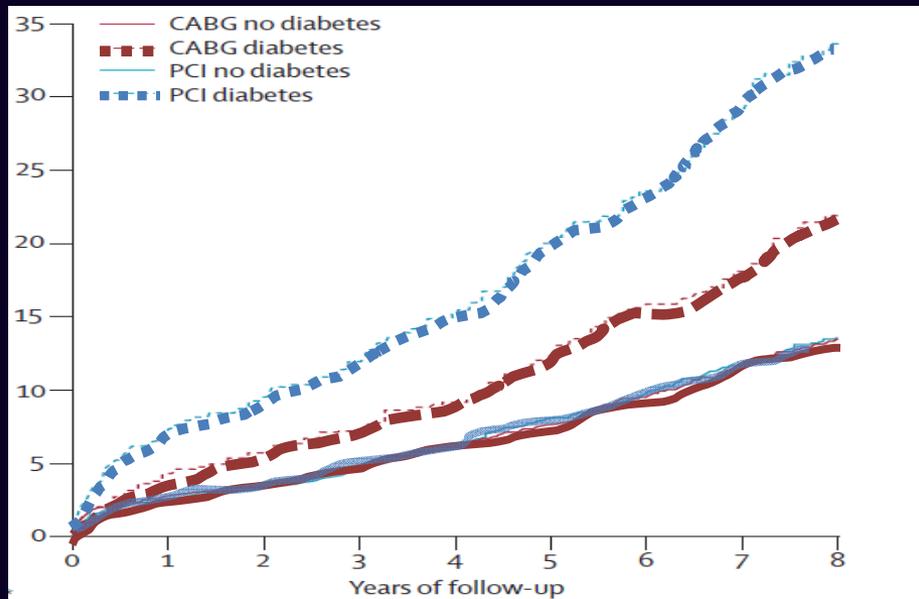


PCI (balloon/BMS) vs CABG TRIALS (II)

CABG compared with PCI for MV disease: a collaborative analysis of individual patient data from **ten randomised trials**.

Hlatky M et al, Lancet 2009; 373: 1190–97

Long-term mortality is similar after CABG and PCI in most patient subgroups with MV coronary artery disease, so choice of treatment should depend on patient preferences for other outcomes.

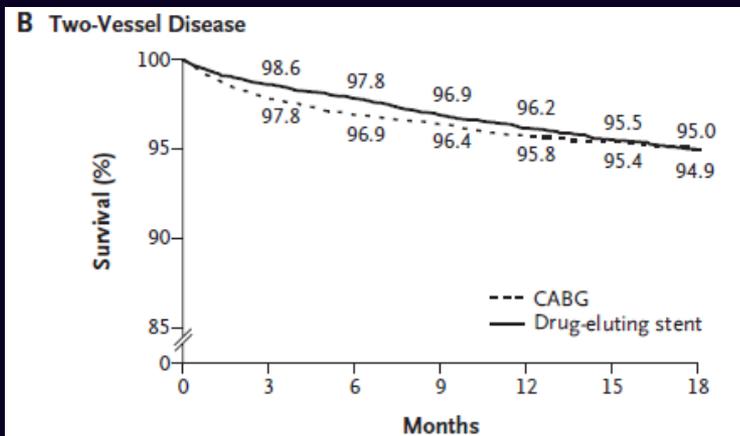


CABG might be a better option for patients with diabetes and patients aged 65 years or older because mortality was found to be lower in these subgroups.

DES vs CABG in multivessel disease

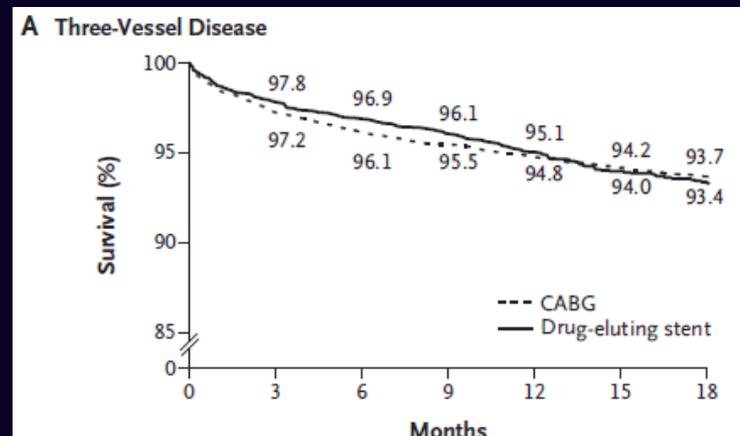
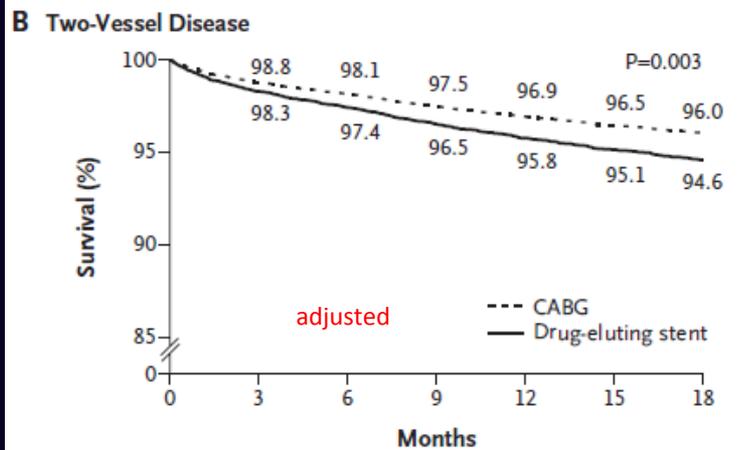
New York State Registry (Hannan EL et al: *NEJM* 358:331, 2008)

- Patients treated with DES or CABG from Oct. 1, 2003 to Dec. 31, 2004
- Patient exclusions: prior revascularization, LMCA, recent MI
- Endpoints – death within 30 days/18 months



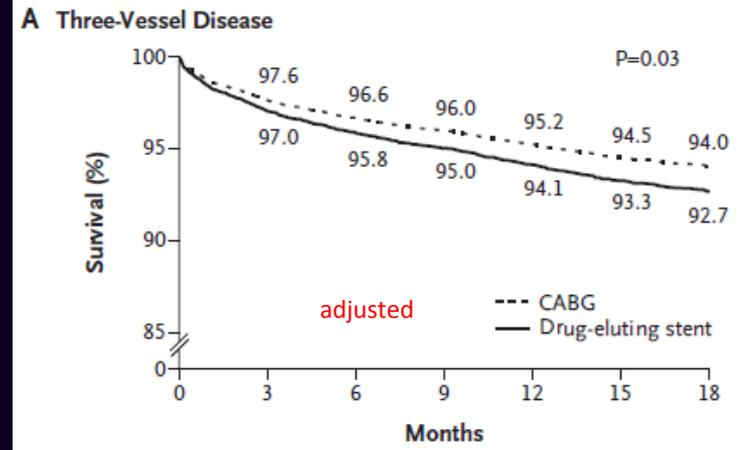
No. at Risk

	0	3	6	9	12	15	18
CABG	2235	2186	2166	2154	2141	1764	1350
Drug-eluting stent	7482	7377	7319	7250	7195	5651	4140



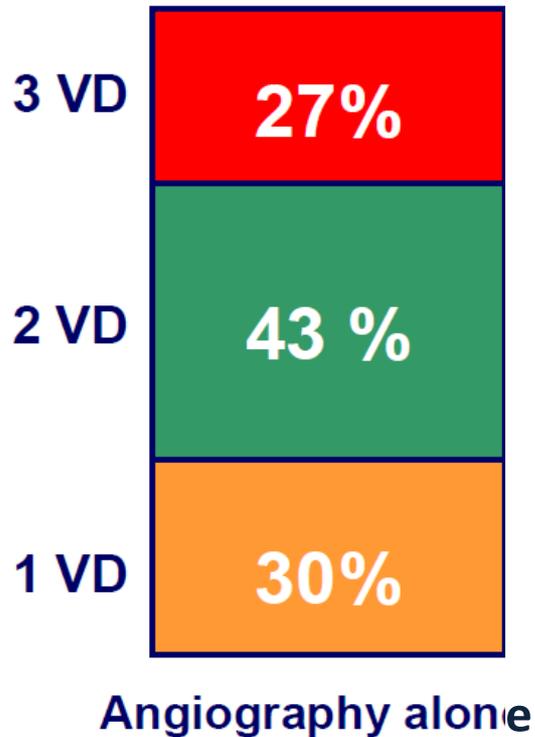
No. at Risk

	0	3	6	9	12	15	18
CABG	5202	5058	5001	4967	4931	4083	3139
Drug-eluting stent	2481	2427	2404	2384	2359	1819	1355

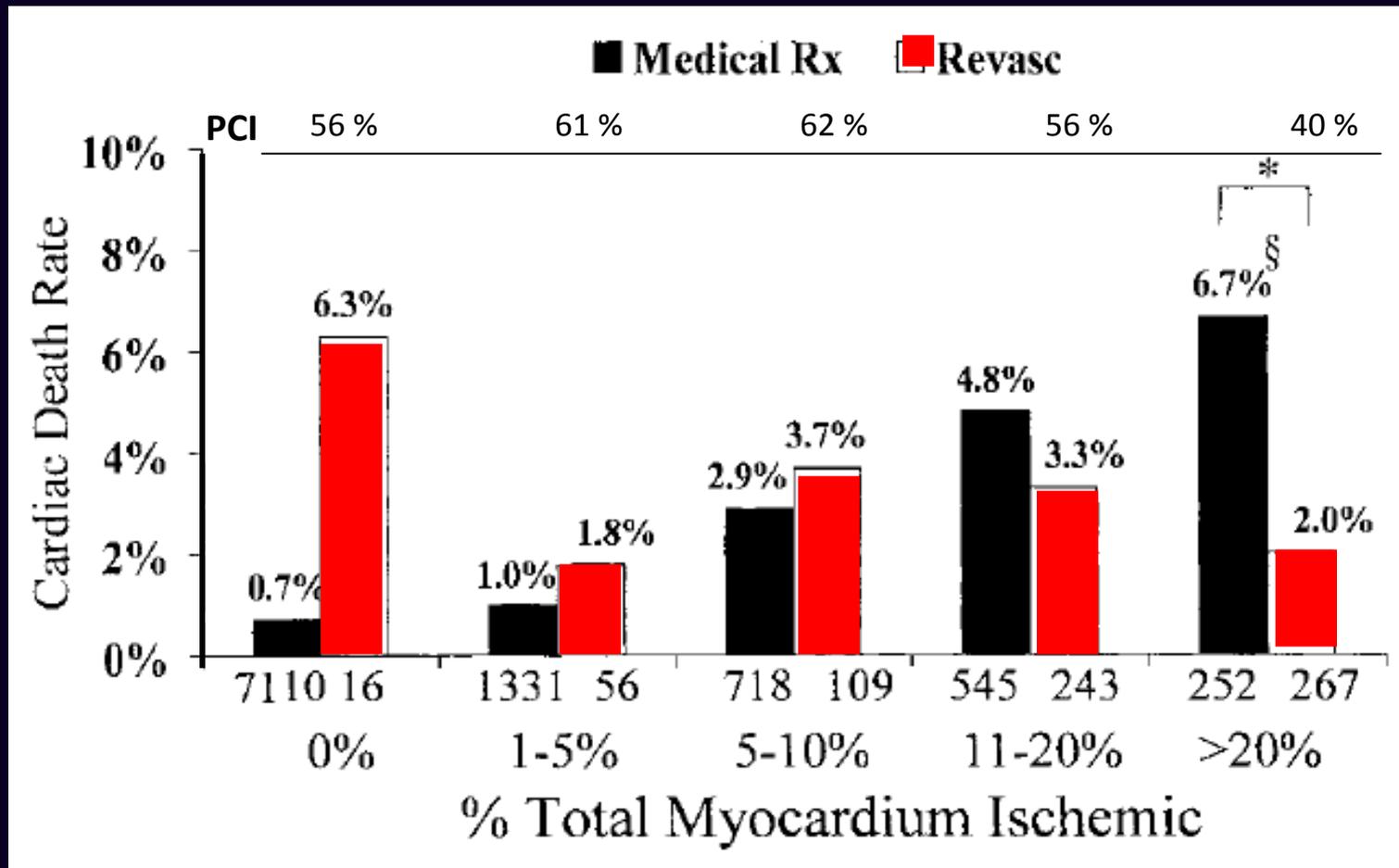


What is multivessel disease?

- 250 patients (471 lesions)
- If > 50% DS on angiography, FFR measurements *

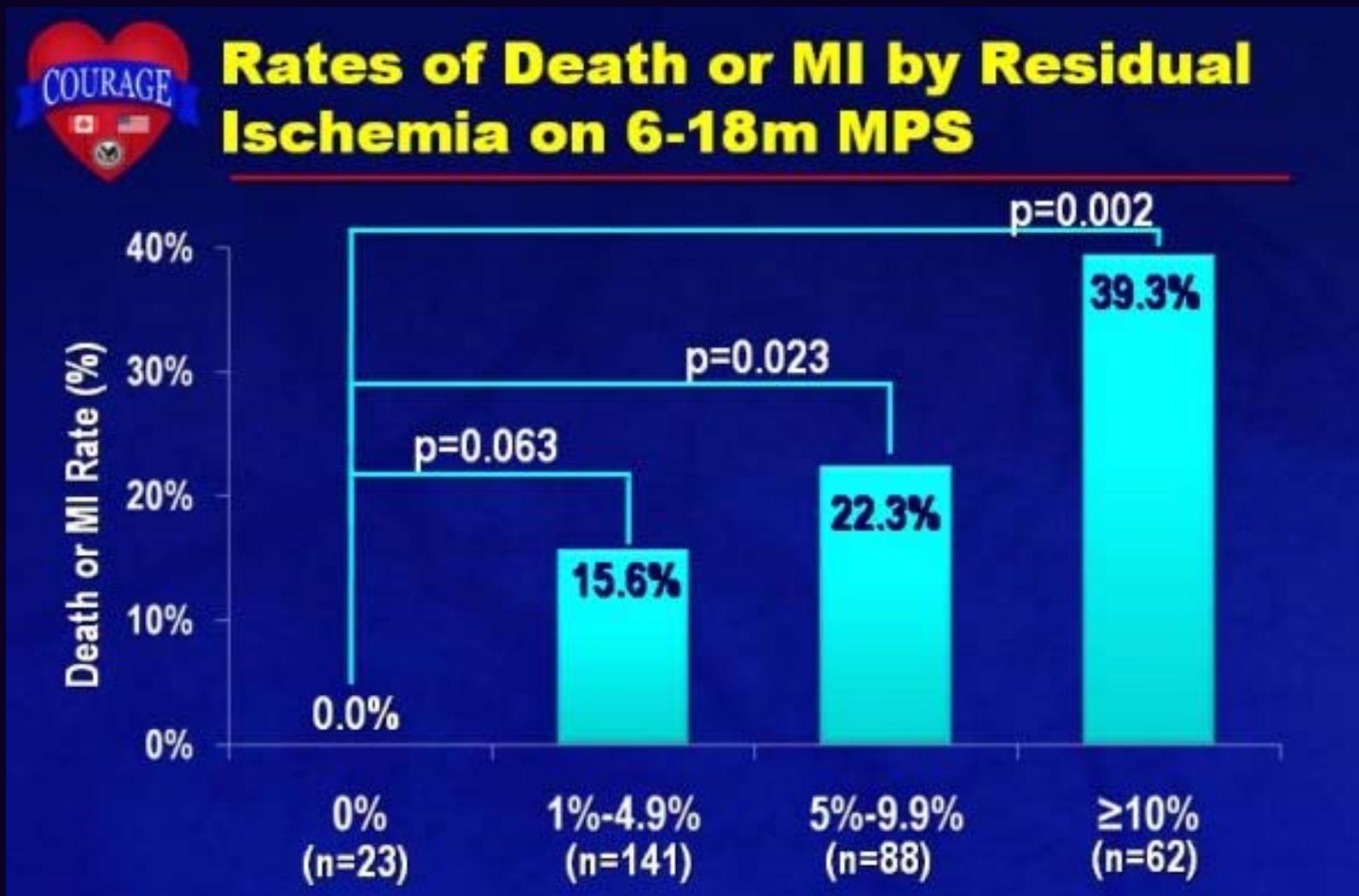


Ischemic burden and prognosis?



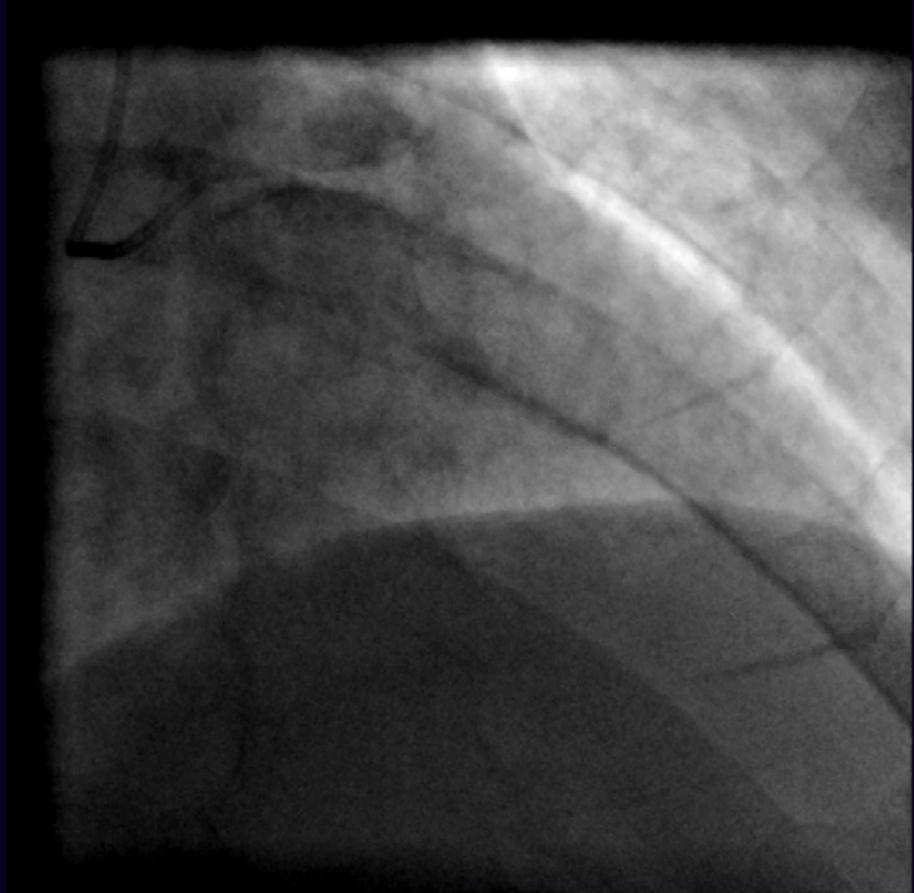
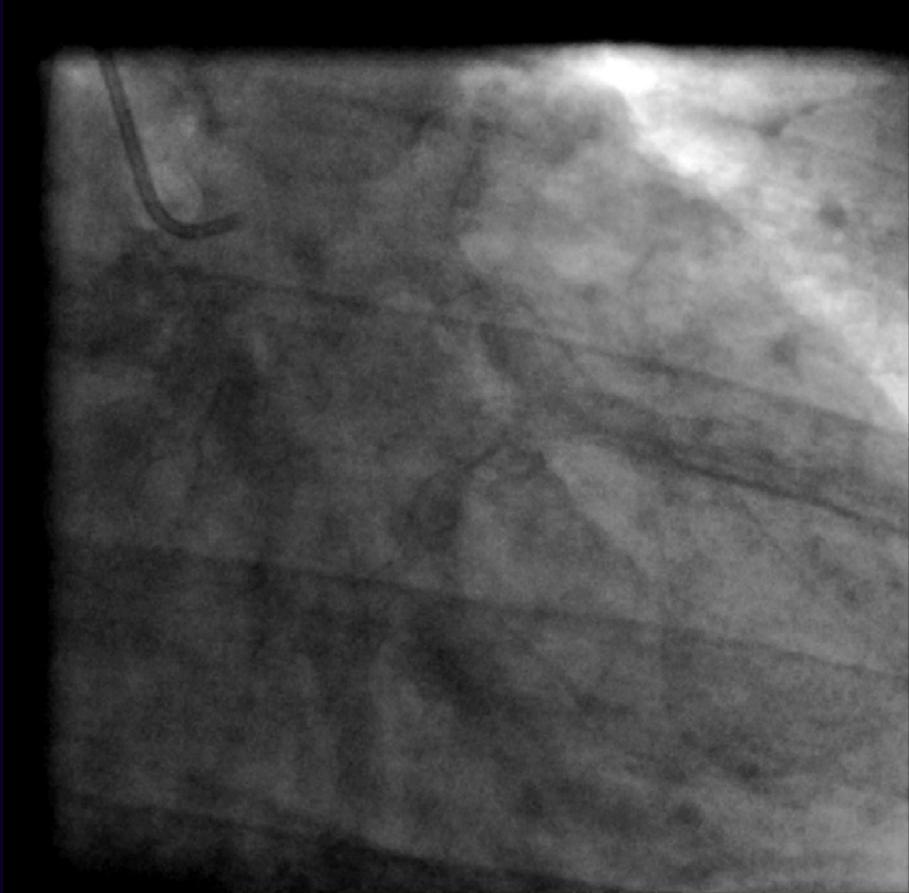
Revascularization compared with Medical Treatment in 10 627 consecutive patients with moderate to large amounts of inducible ischemia

Clinical Outcomes Utilizing Revascularization and Aggressive Drug Evaluation (COURAGE) Trial Nuclear Substudy : 3.6 y f/up after last myocardial perfusion SPECT (MPS)



Circulation. 2008;117:1283-1291.)

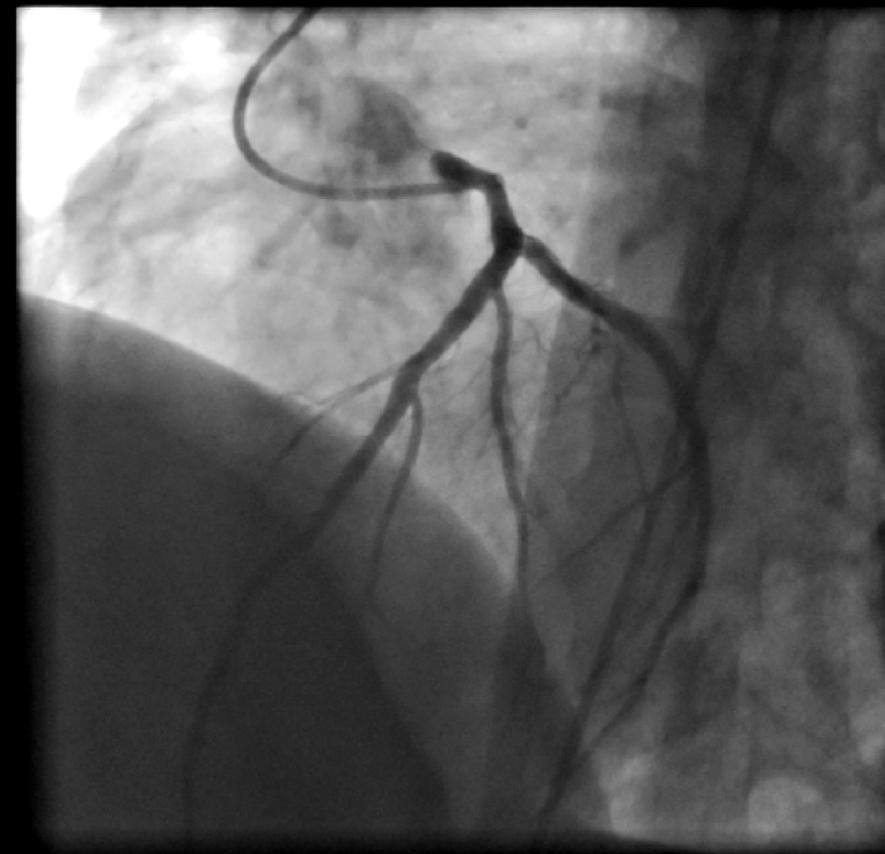
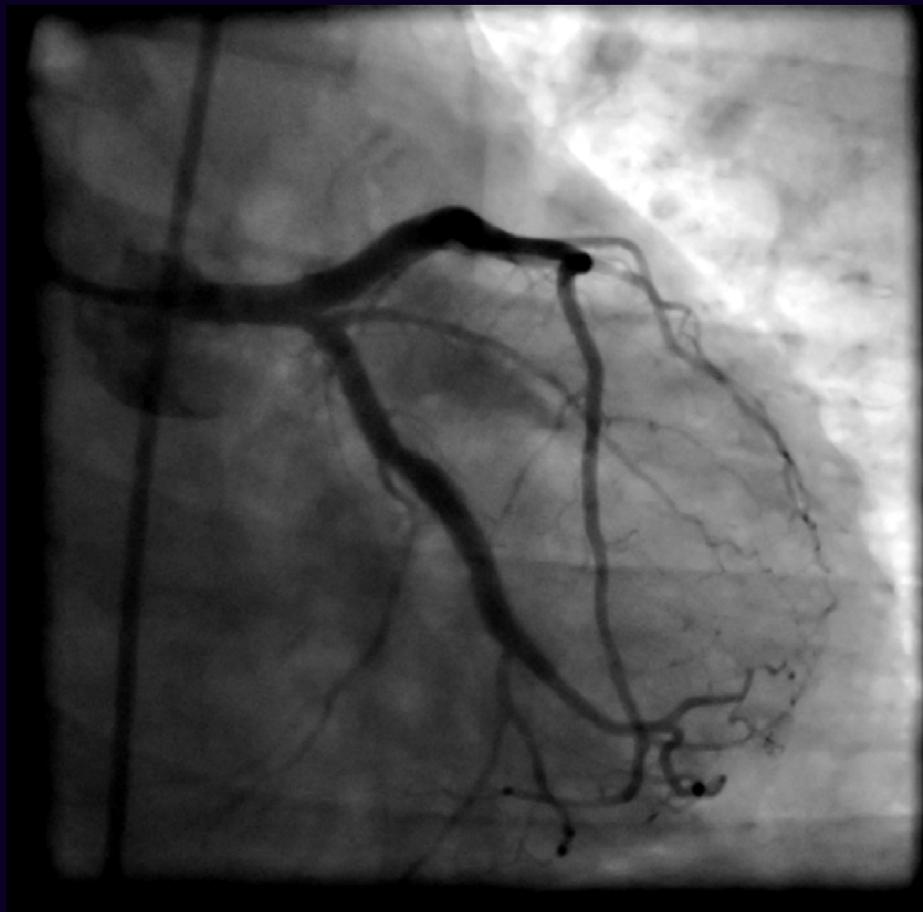
What type of multivessel disease can be considered appropriate for PCI?



**Complex angioplasties were being performed all along
but what is the justification?**



Selected cases with good long-term result is no proof of the concept of performing extensive PCI in MV disease



2 year follow-up

SYNTAX Trial Design



62 EU Sites

3/2005-4/2007



23 US Sites

De novo 3VD and/or LM (isolated, +1,2,3 VD)

Limited Exclusion Criteria

Previous interventions , Acute MI with CPK>2x, Concomitant cardiac surgery

Reasons for Registry Allocation

PCI Registry- CABG ineligible due to:

- Co-morbidities (70.7%)
- No graft material (9.1%)
- Small or poor quality of distal vessel (1.5%)
- Patient refused CABG (5.6%)
- Other (13.1%)

CABG Registry- PCI ineligible due to:

- Complex anatomy (70.9%)
- Untreatable CTO (22.0%)
- Unable to take anti-platelet medications (0.9%)
- Patient refused PCI (0.5%)
- Other (5.7%)

Left dominance



Right dominance



Points

■ +6

■ +5

■ +3.5

■ +2.5

■ +1.5

■ +1

■ +0.5

SYNTAX score

A lesion based scoring system

- A separate number calculated per lesion
- Summed to generate the total score

Please fill in the following variables :

4. Total occlusion (T.O.) (i)

- a. No
b. Yes

5. Trifurcation (i)

- a. No
b. Yes

6. Bifurcation (i)

- a. No
b. Yes

Medina 1,0,0

Medina 0,1,0

Medina 1,1,0

Medina 1,1,1

Medina 0,0,1

Medina 1,0,1

Medina 0,1,1

7. Aorto Ostial lesion

- a. No
b. Yes (i)

8. Severe Tortuosity (i)

- a. No
b. Yes

9. Length >20 mm (i)

- a. No
b. Yes

10. Heavy calcification (i)

- a. No
b. Yes

11. Thrombus (i)

- a. No
b. Yes

12. "Diffuse disease"/small vessels. (i)

- No
 Yes

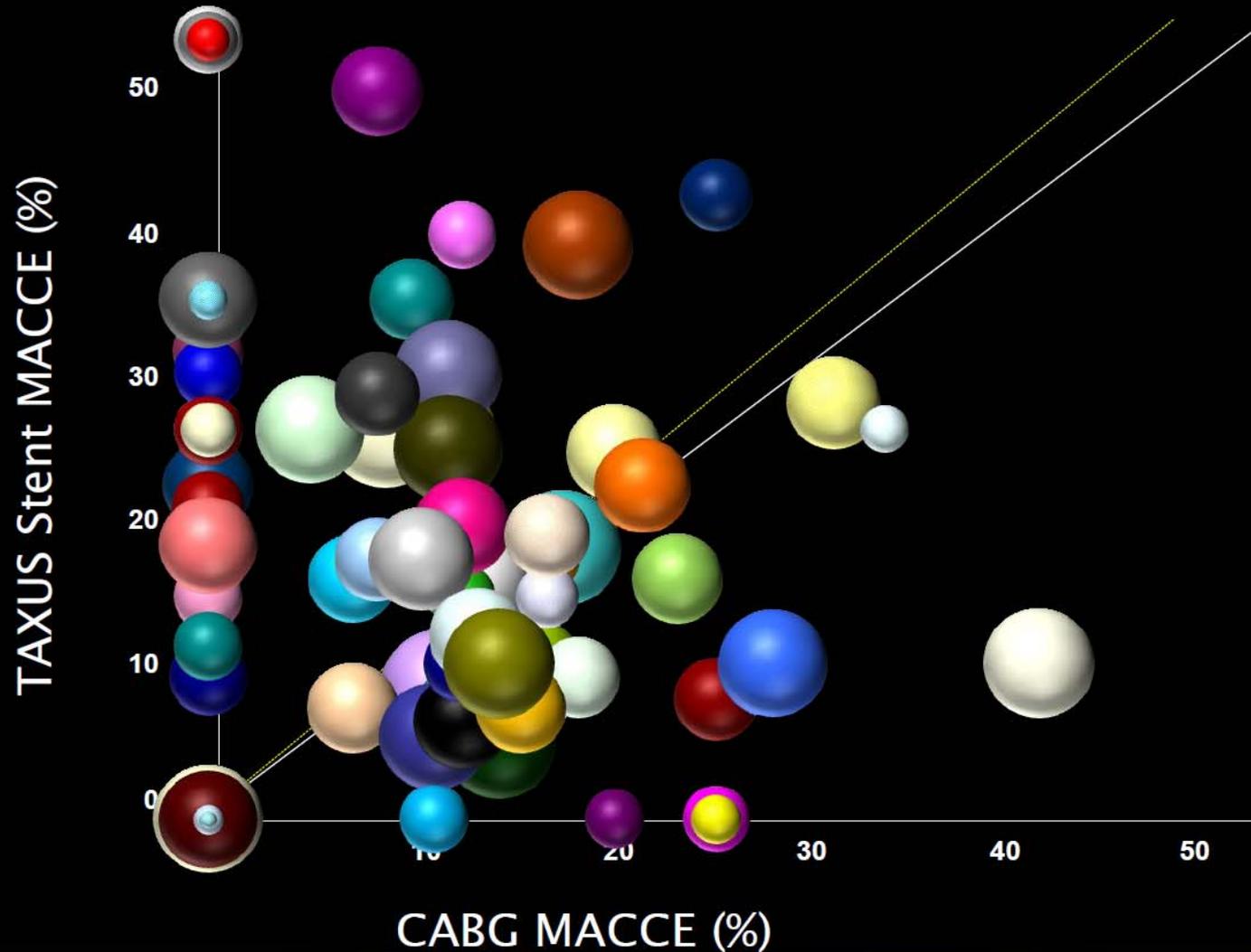
If Yes, specify **all** segment numbers irrespective of the presence or absence of a lesion.

	Segment numbers:	"Diffuse disease"/small vessels. (Present when at least 75% of the length of any segment(s) proximal to the lesion, at the site of the lesion or distal to the lesion has a vessel diameter of less than 2mm)
Left main	5	<input type="checkbox"/>
LAD proximal	6	<input type="checkbox"/>
LAD mid	7	<input type="checkbox"/>
LAD apical	8	<input type="checkbox"/>
First diagonal	9	<input type="checkbox"/>
Add. first diagonal	9a	<input type="checkbox"/>
Second diagonal	10	<input type="checkbox"/>
Add. second diagonal	10a	<input type="checkbox"/>
Proximal circumflex	11	<input type="checkbox"/>
Intermediate/anterolateral	12	<input type="checkbox"/>
Obtuse marginal	12a	<input type="checkbox"/>
Obtuse marginal	12b	<input type="checkbox"/>
Distal circumflex	13	<input type="checkbox"/>
Left posterolateral	14	<input type="checkbox"/>
Left posterolateral	14a	<input type="checkbox"/>
Left posterolateral	14b	<input type="checkbox"/>

Calculate Score



One-year MACCE rates per site CABG vs. TAXUS Express Stent



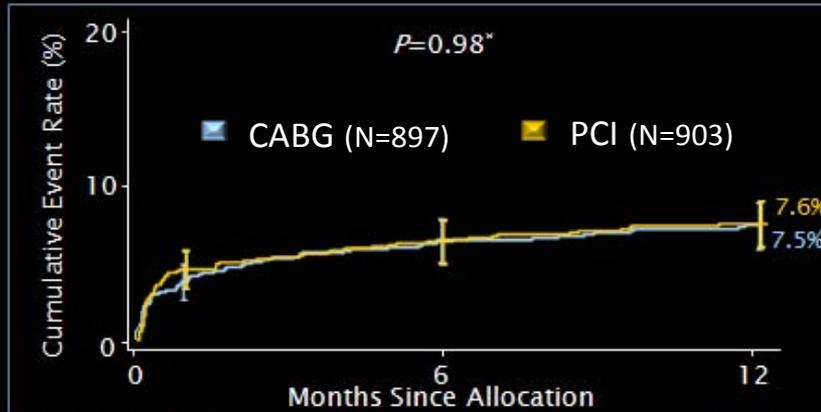
Size of circle adjusted for number of patients

Summary of 1-Year Results



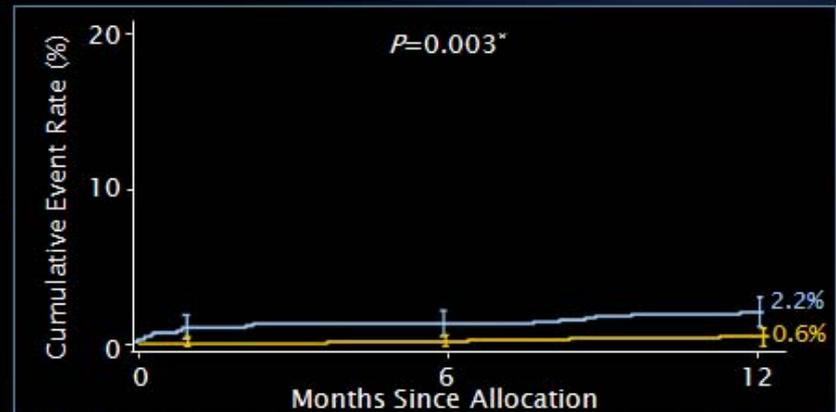
Death/CVA/MI

Stroke



KM Event Rate \pm 1.5 SE. *Fisher's Exact Test

ITT population

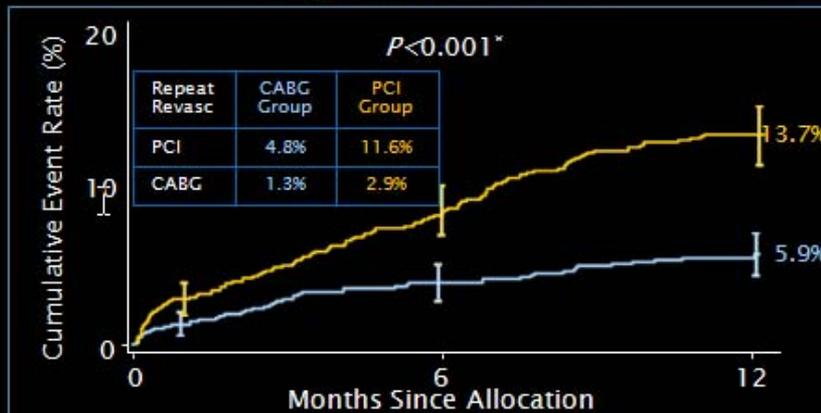


KM Event Rate \pm 1.5 SE. *Fisher exact test

ITT population

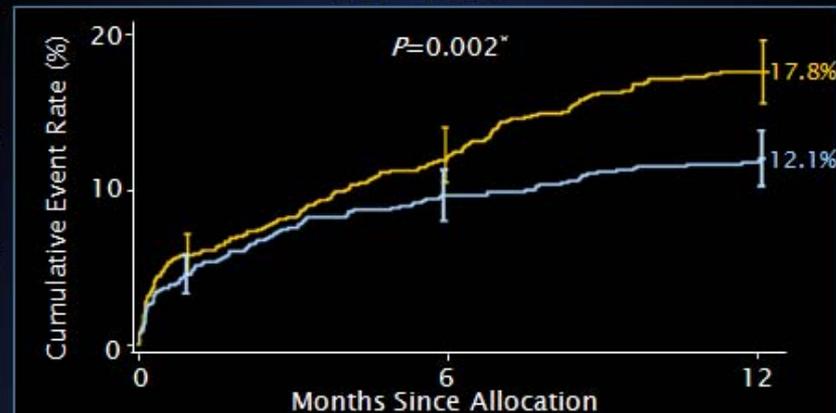
Repeat Revasc.

MACCE



KM Event Rate \pm 1.5 SE. *Fisher's Exact Test

ITT population



KM Event Rate \pm 1.5 SE. *Fisher exact test

ITT population

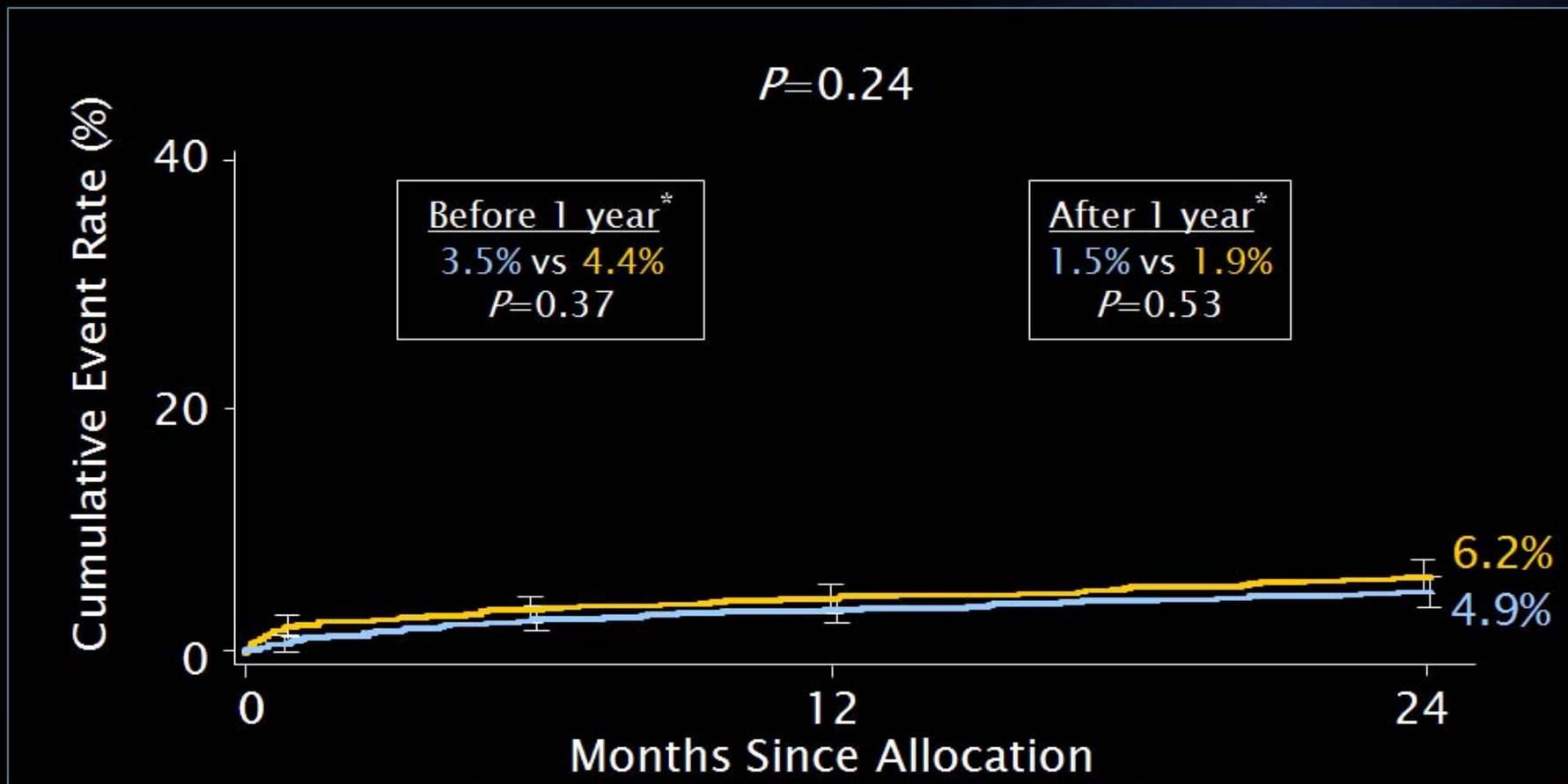
Non-inferiority was not met for 12-month MACCE

All-Cause Death to 2 Years



■ CABG (N=897)

■ TAXUS (N=903)



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

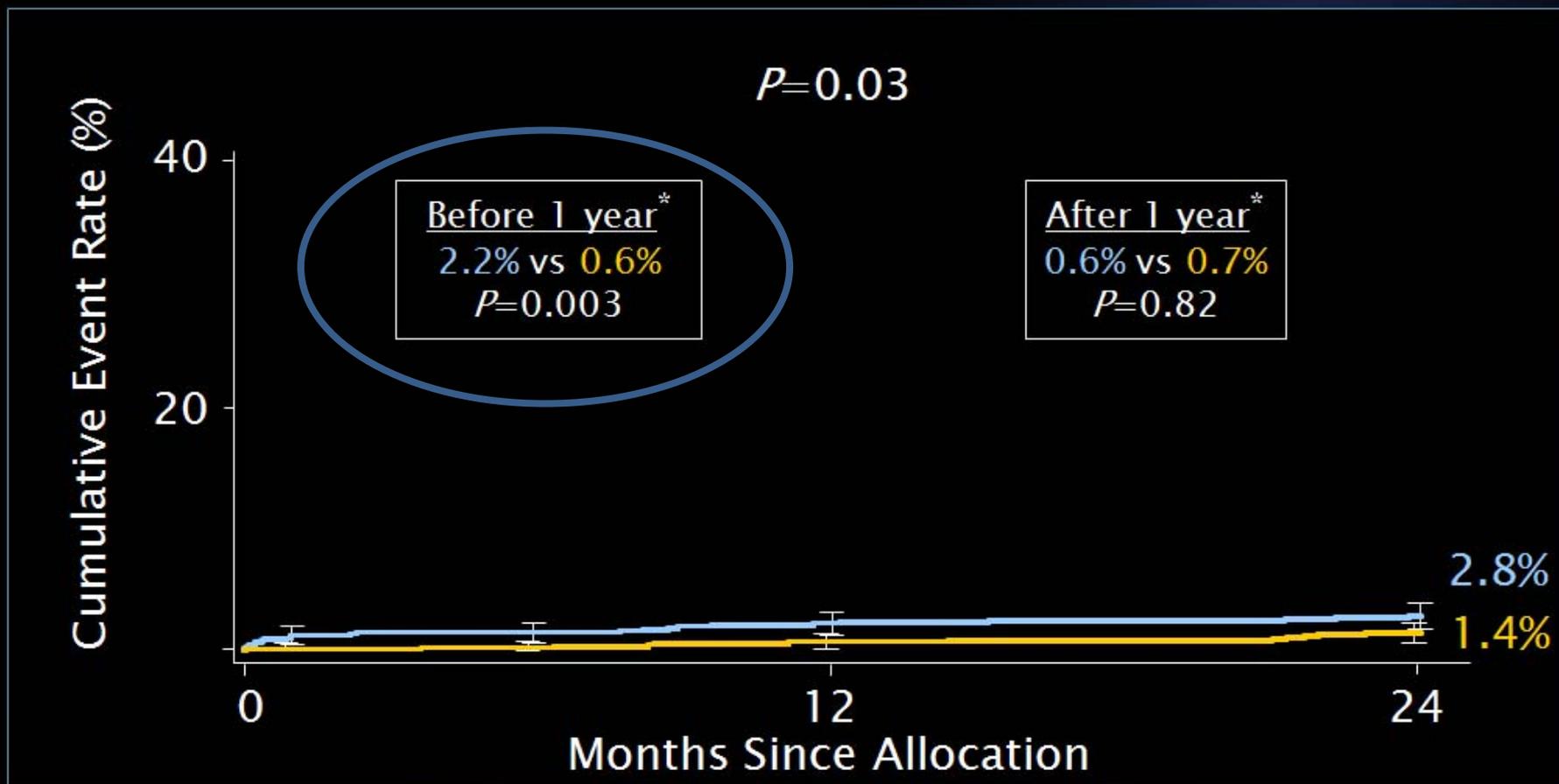
ITT population

CVA to 2 Years



■ CABG (N=897)

■ TAXUS (N=903)



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

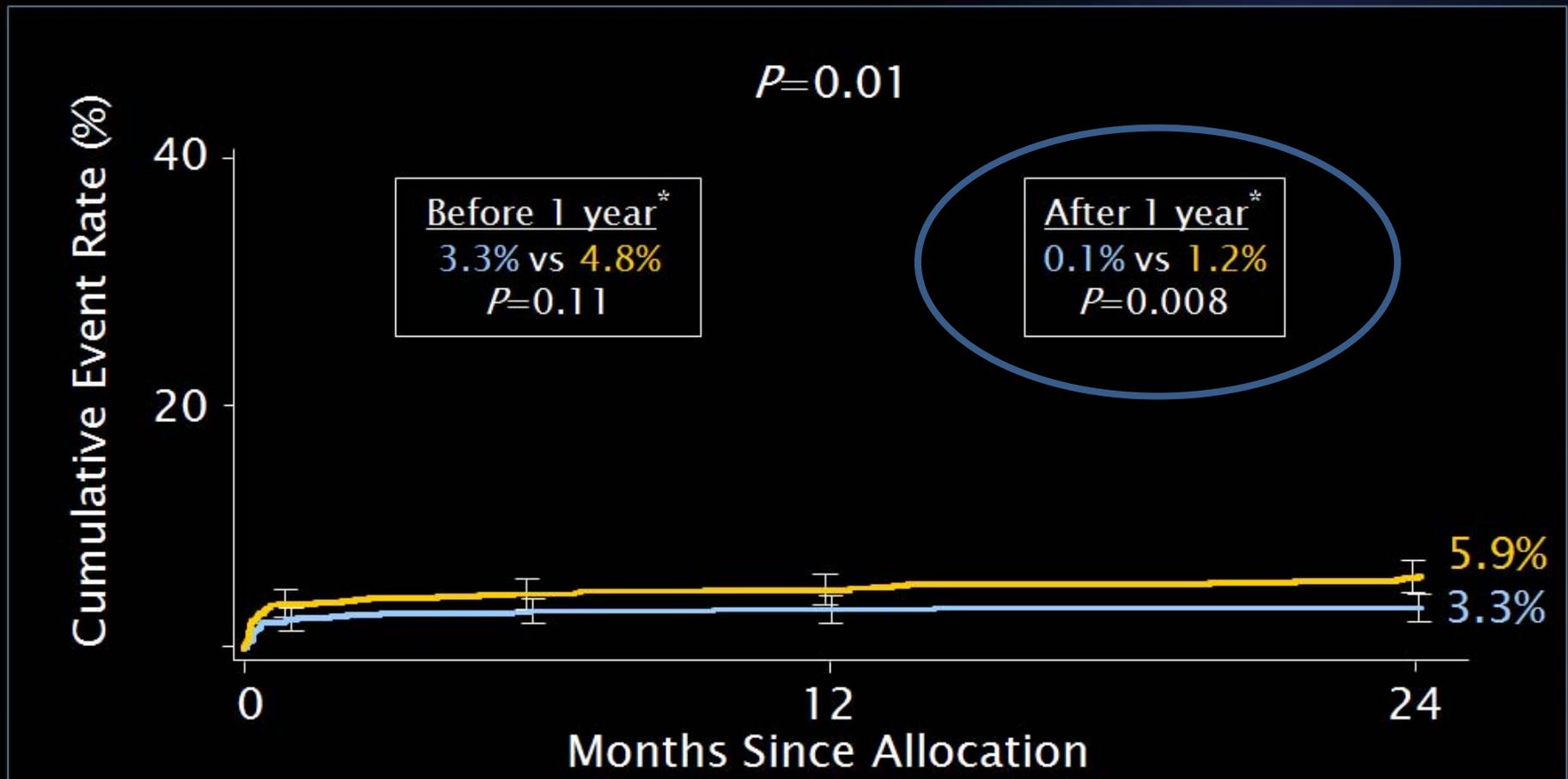
ITT population

Myocardial Infarction to 2 Years



■ CABG (N=897)

■ TAXUS (N=903)



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

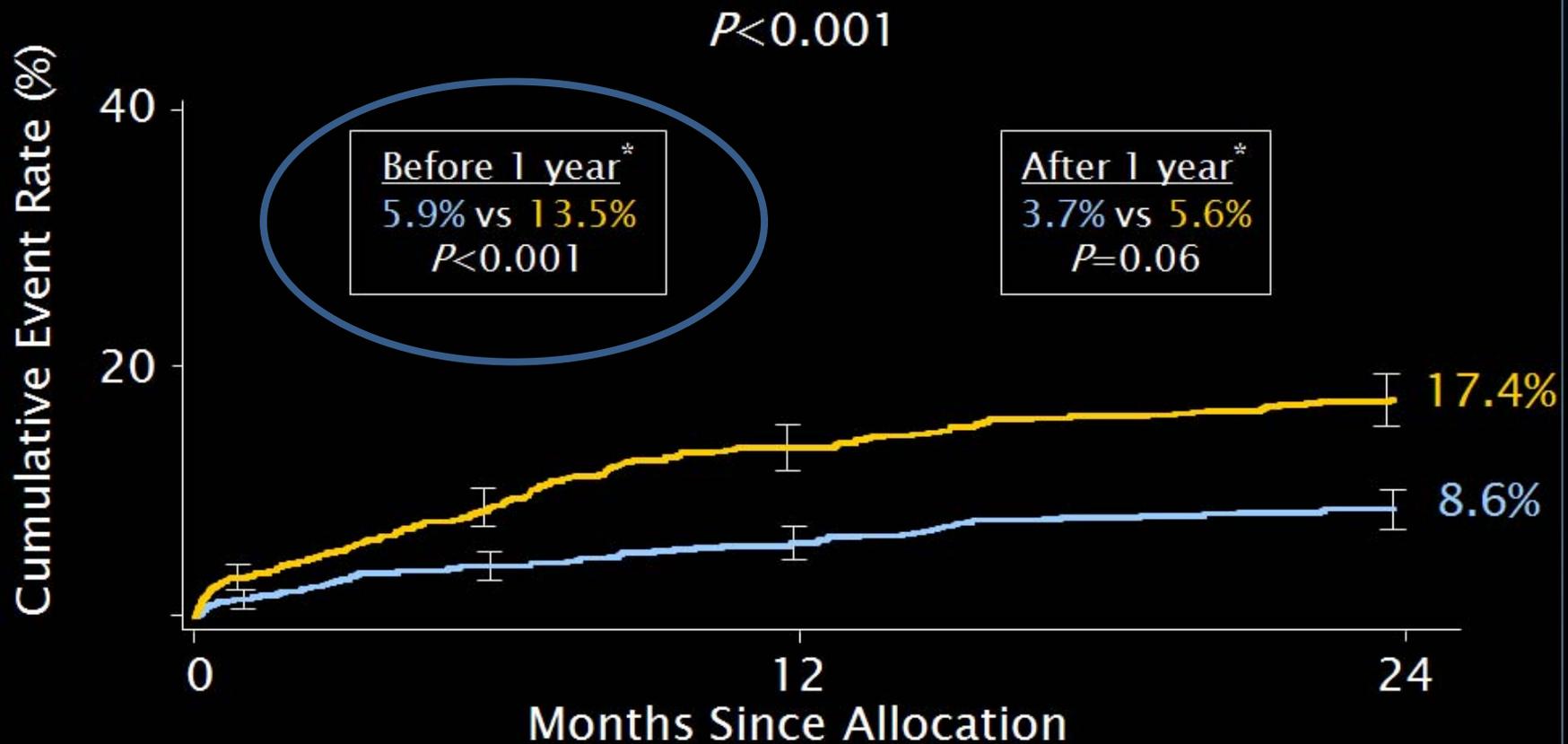
ITT population

Repeat Revascularization to 2 Years



■ CABG (N=897)

■ TAXUS (N=903)



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

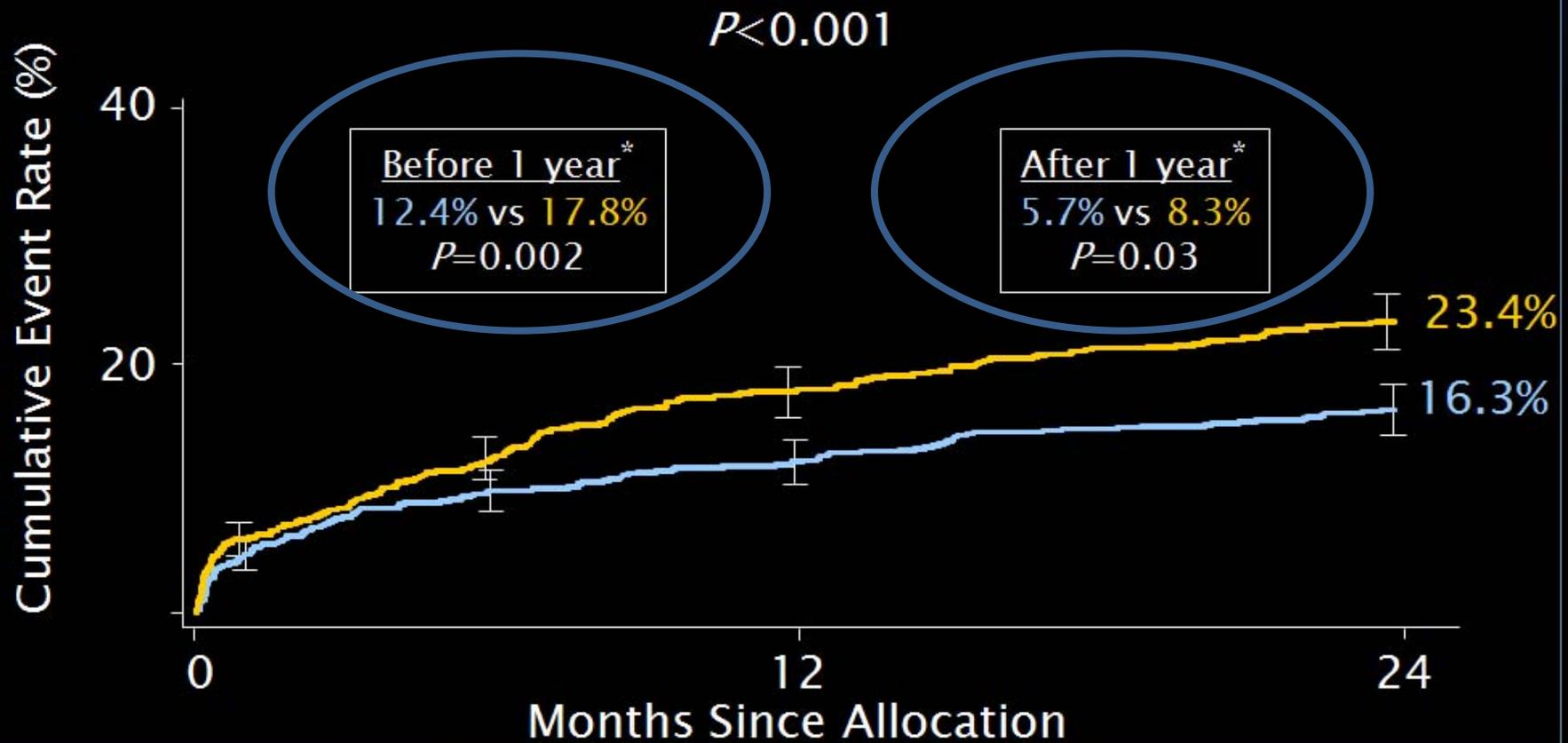
ITT population

MACCE to 2 Years



■ CABG (N=897)

■ TAXUS (N=903)



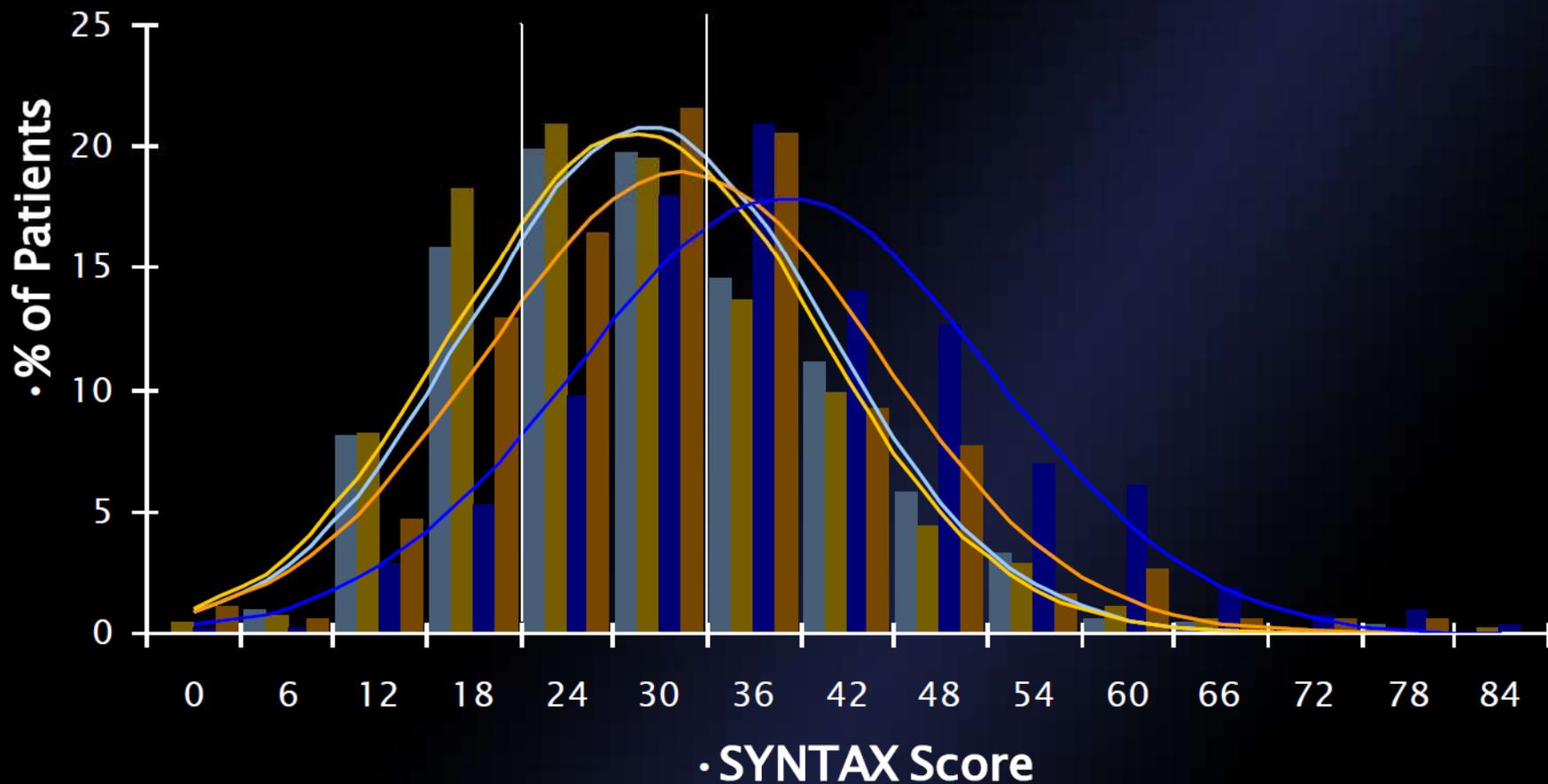
Cumulative KM Event Rate \pm 1.5 SE; log-rank P value; *Binary rates

ITT population

SYNTAX Score Distribution by Cohort and Treatment Group



 CABG RCT	26.7 ± 11.5	 CABG REGISTRY	35.5 ± 13.7
 PCI RCT	28.1 ± 12.4	 PCI REGISTRY	31.6 ± 12.3



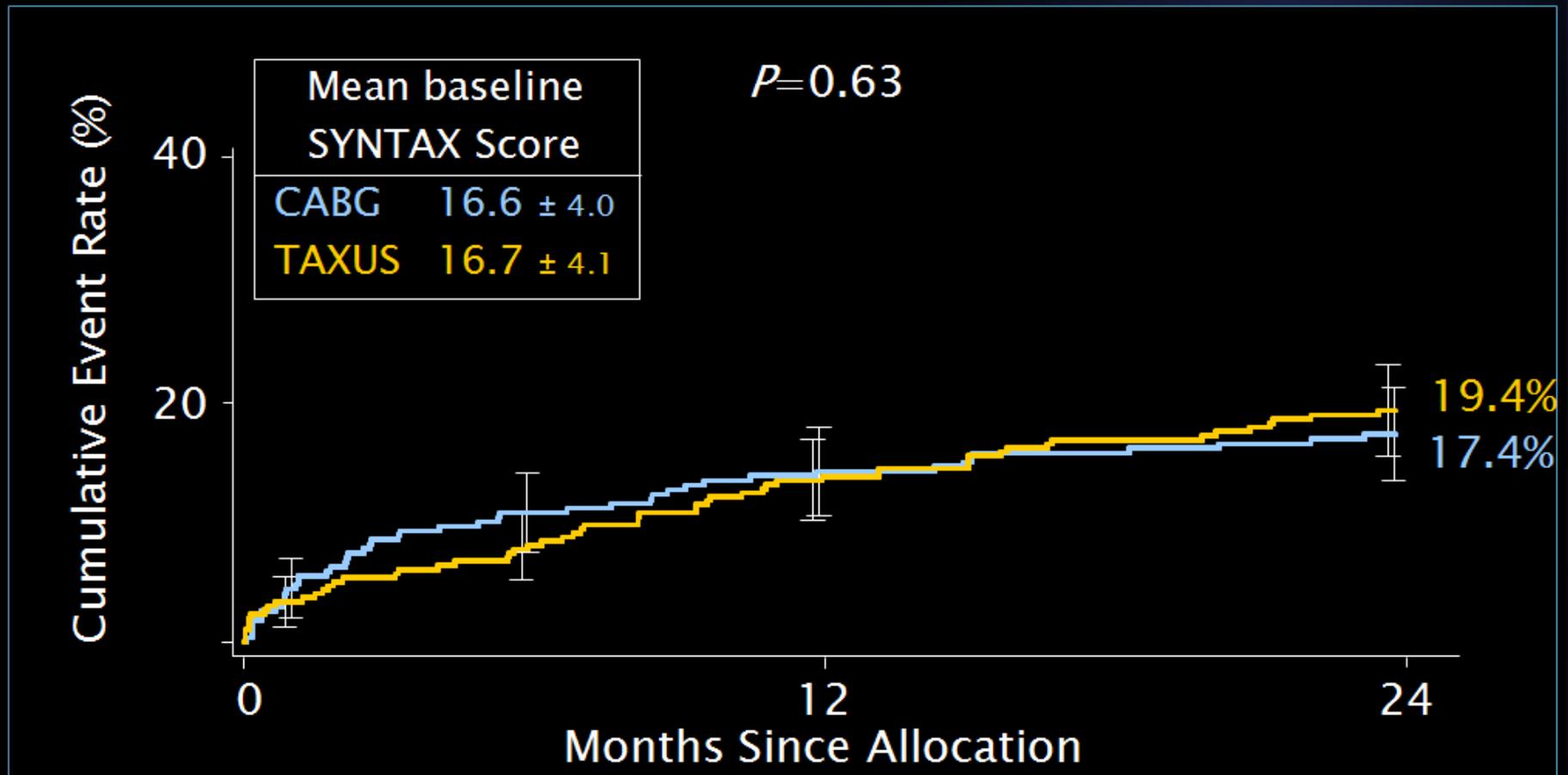
MACCE to 2 Years by SYNTAX Score Tercile

Low Scores (0-22)



■ CABG (N=275)

■ TAXUS (N=299)



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

Calculated by core laboratory; ITT population

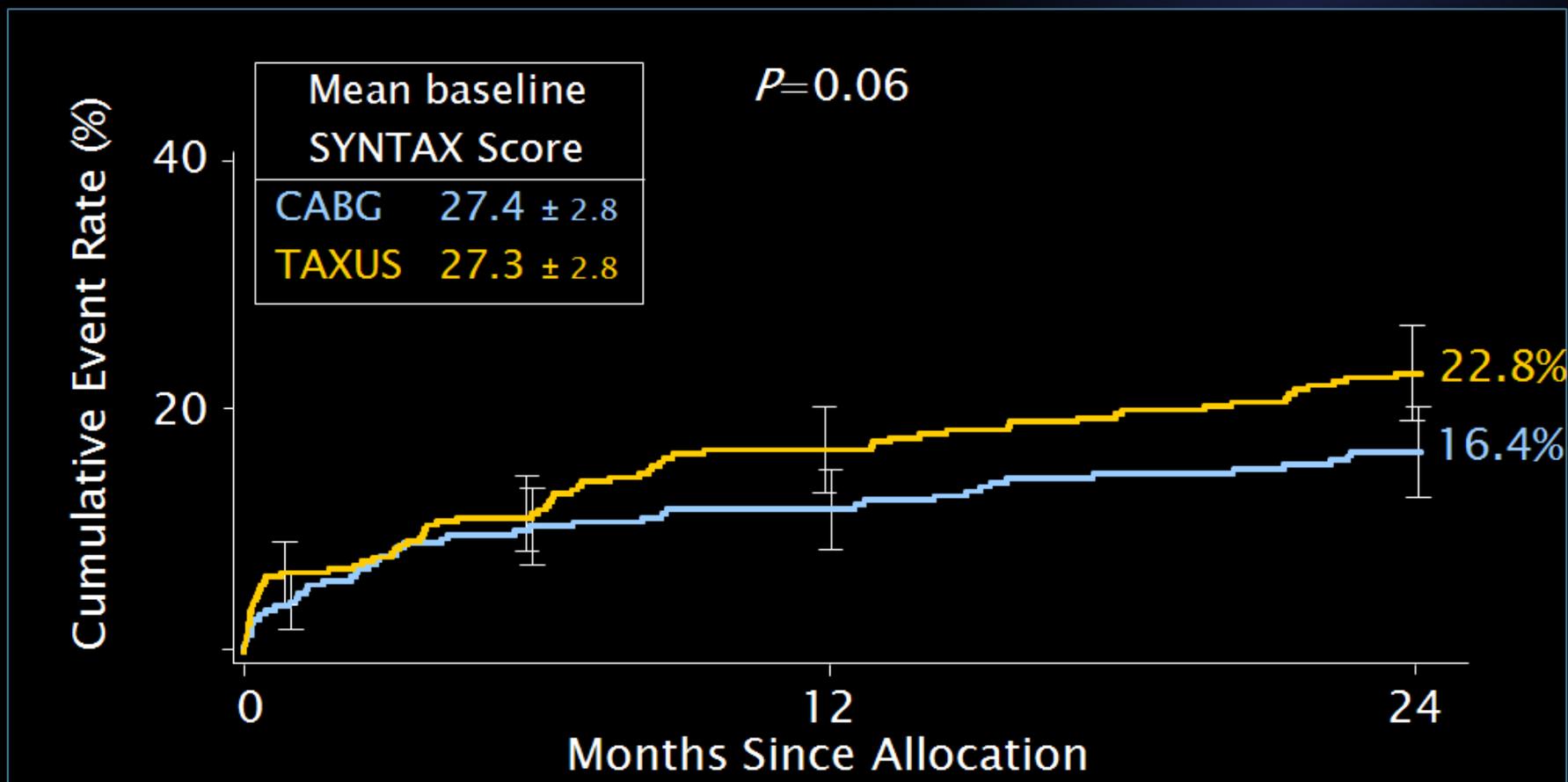
MACCE to 2 Years by SYNTAX Score Tercile

Intermediate Scores (23–32)



■ CABG (N=300)

■ TAXUS (N=310)



Cumulative KM Event Rate \pm 1.5 SE; log-rank P value

Calculated by core laboratory; ITT population

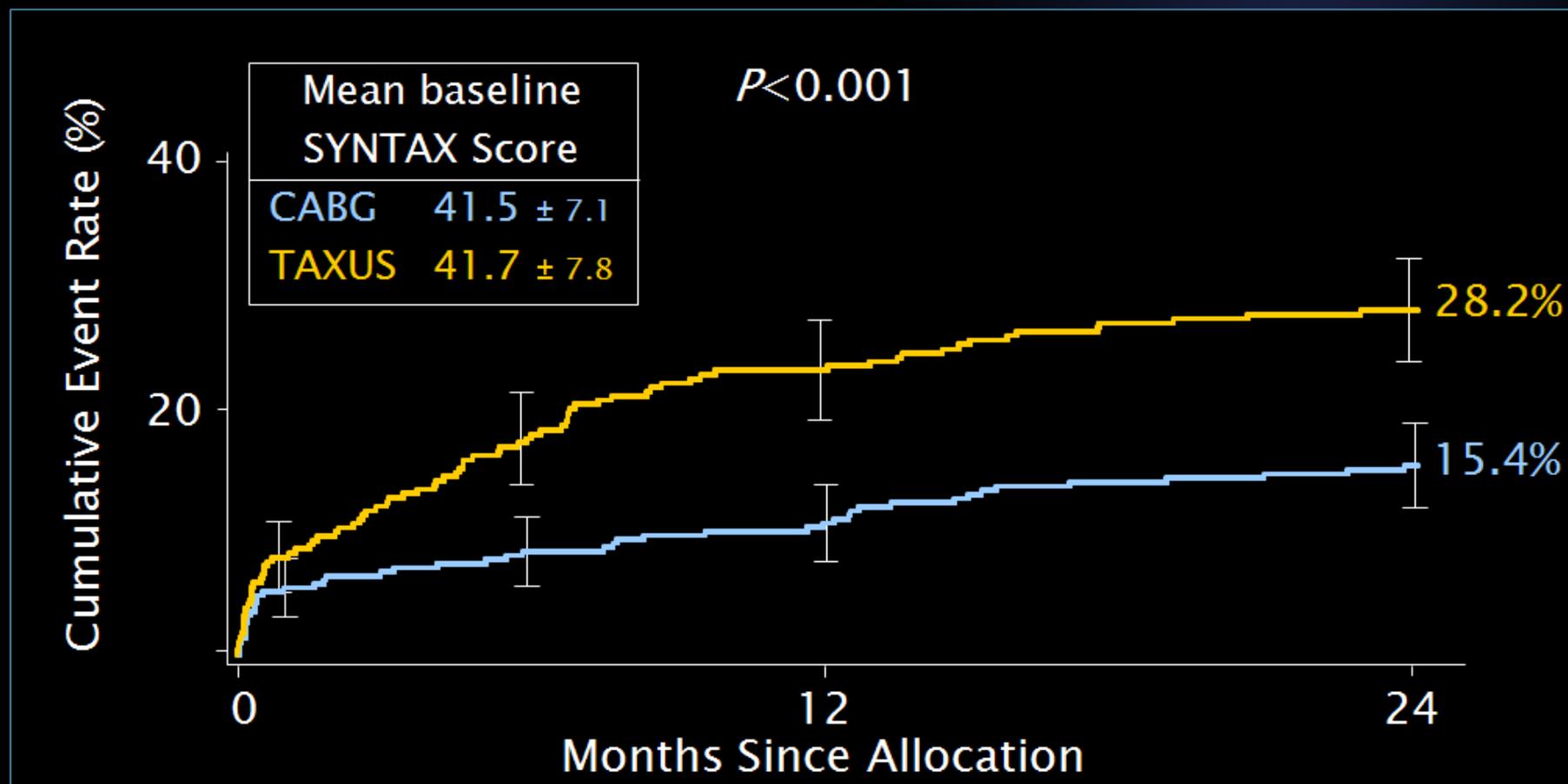
MACCE to 2 Years by SYNTAX Score Tercile



High Scores (≥ 33)

■ CABG (N=315)

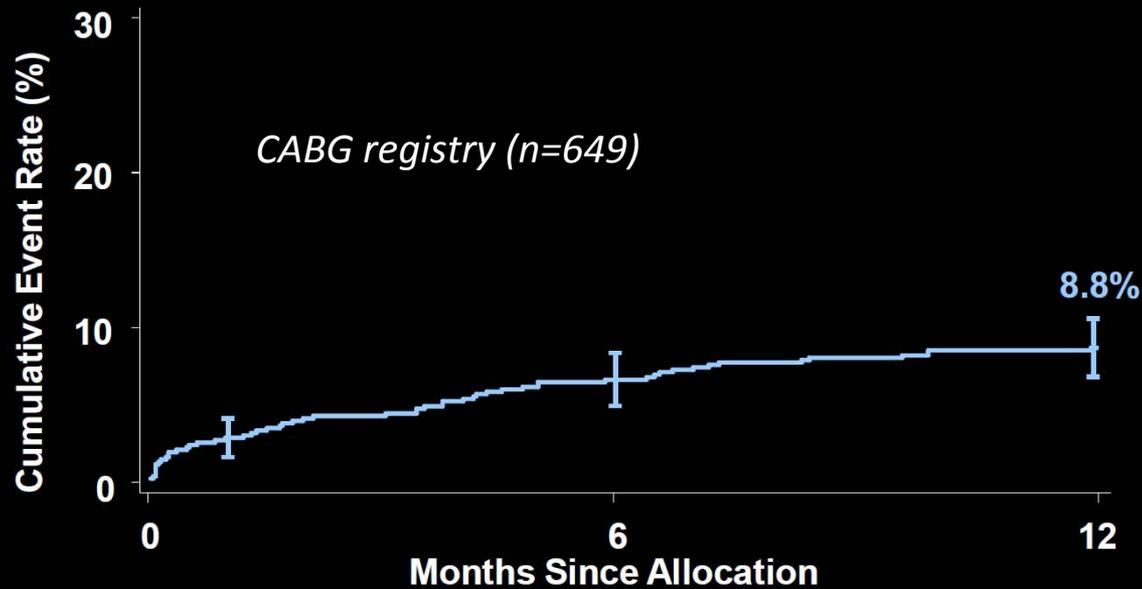
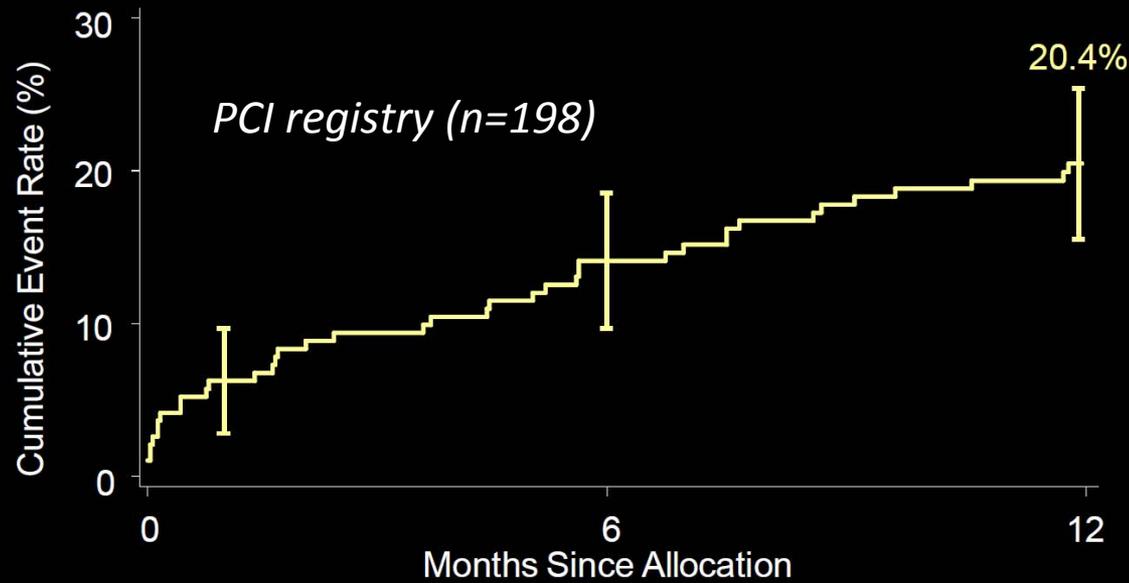
■ TAXUS (N=290)



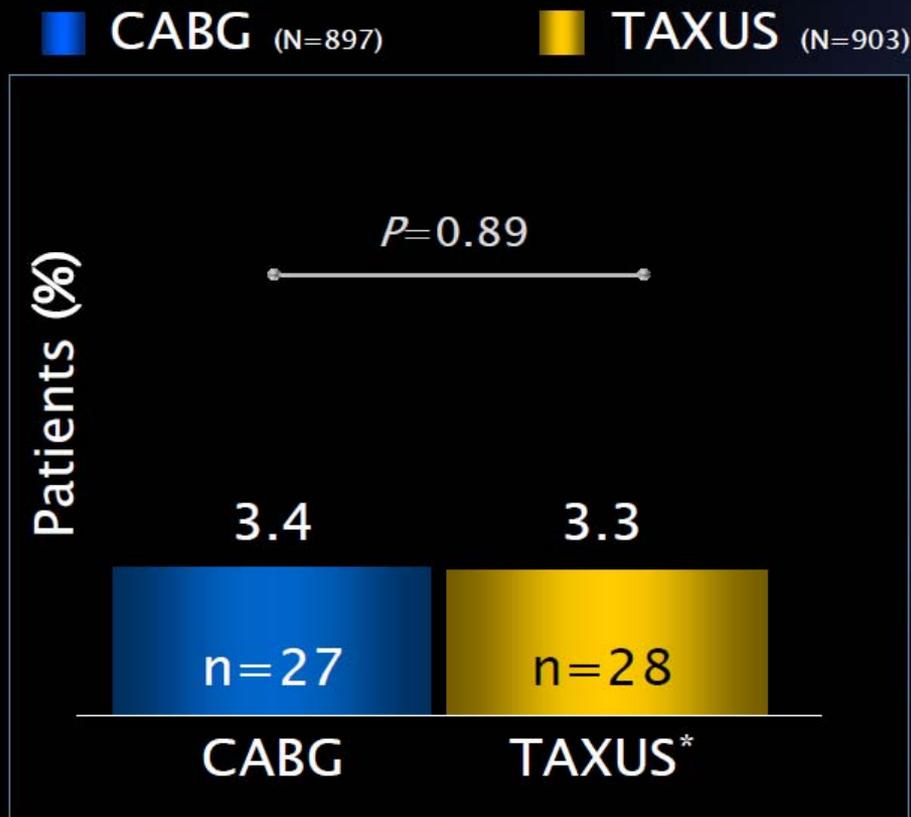
Cumulative KM Event Rate \pm 1.5 SE; log-rank P value

Calculated by core laboratory; ITT population

Overall MACCE to 12 months



Symptomatic Graft Occlusion & Stent Thrombosis to 12 Months

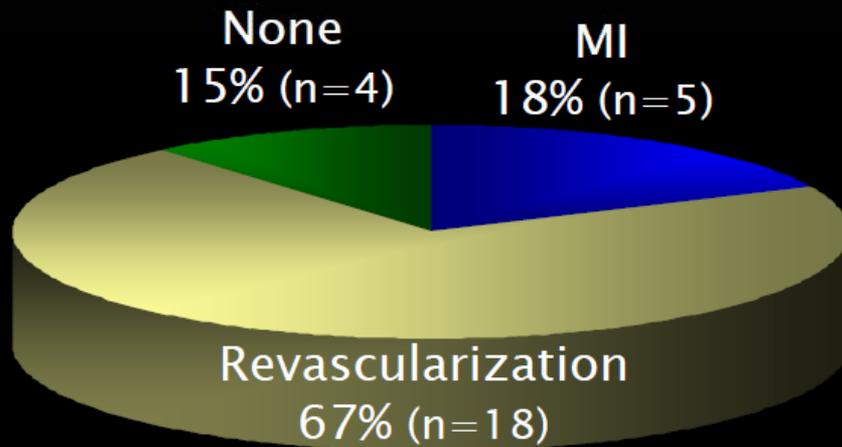


*4 Patients had >1 Per Protocol Stent Thrombosis in the PCI arm

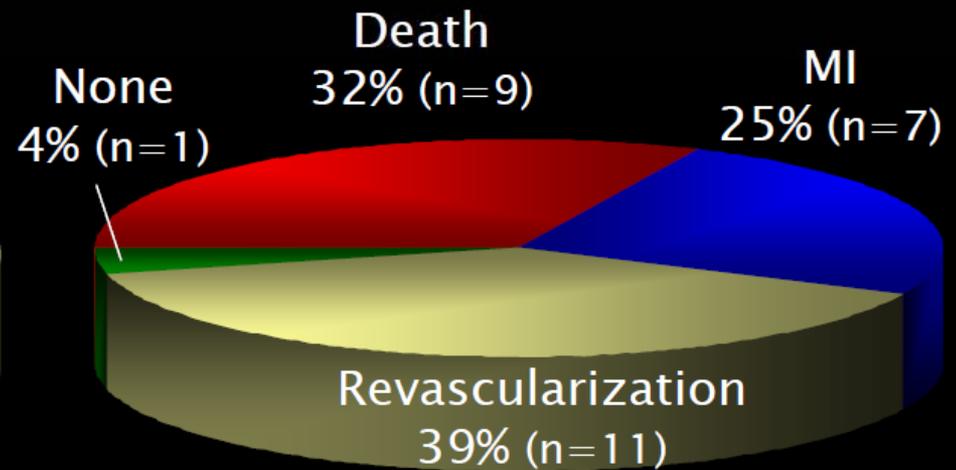
MACCE Events following ST/GO (Per Patient)



CABG
(n=27)



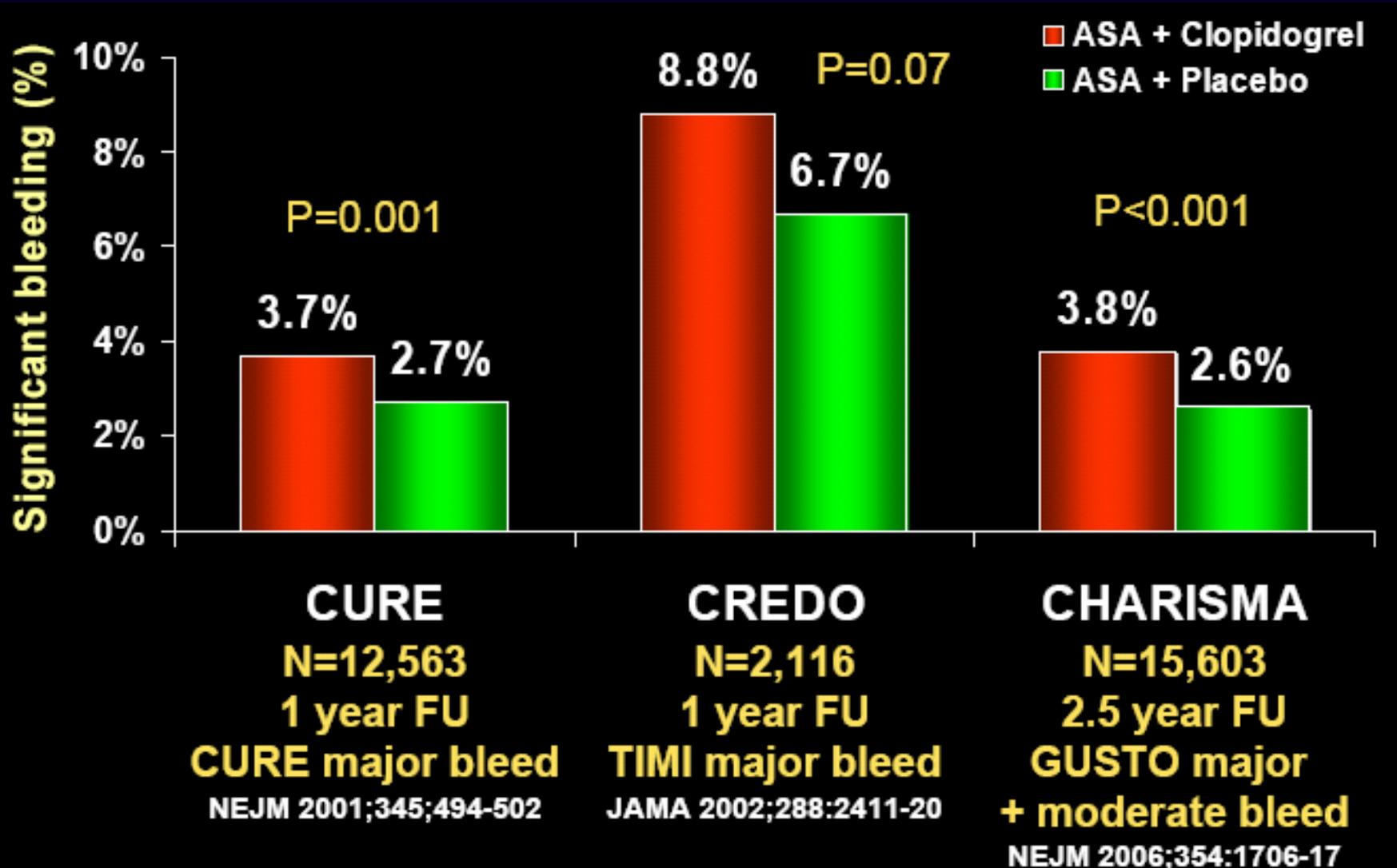
PCI
(n=28)



Incidence of Deep Sternal Infection

Study	Population	Single Mammary	Bilateral Mammary	Skeletonized Mammary
Endo, 2003	Non-diabetics	0.2%	0.4%	
De Paulis, 2005	All	1.1%	4.7%	3.3%
Crabtree, 2004	All	1.8%	2.2%	
Walkes, 2002	All	2.0%	4.4%	
Ioannidis, 2001	All	0.4%	1.3%	
Tavolacci, 2003	Diabetics	1.7%	10.1%	
Toumpoulis, 2006	Diabetics	1.2%	3.3%	
Momin, 2005	Diabetics	1.2%	3.2%	
Peterson, 2003	Diabetics		11%	1.8%
Savage, 2007	Diabetics	1.7%	2.8%	

Safety of Long Term Use of Clopidogrel : Three Large, Controlled Trials

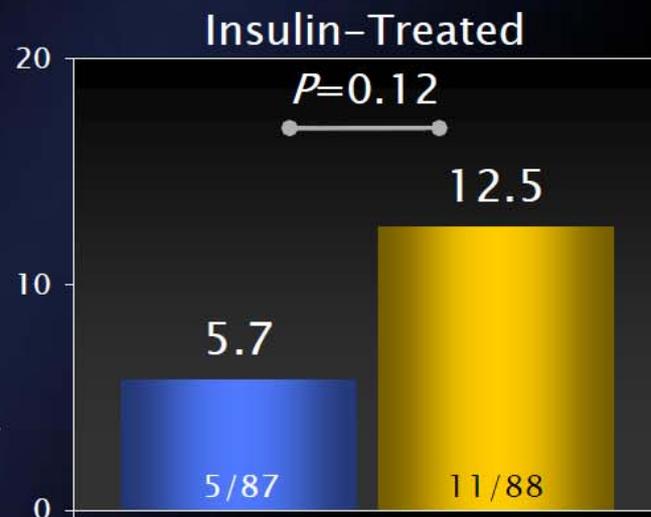
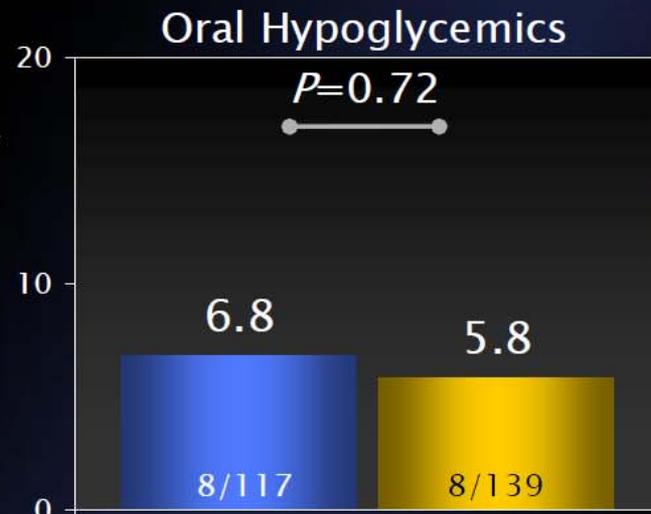
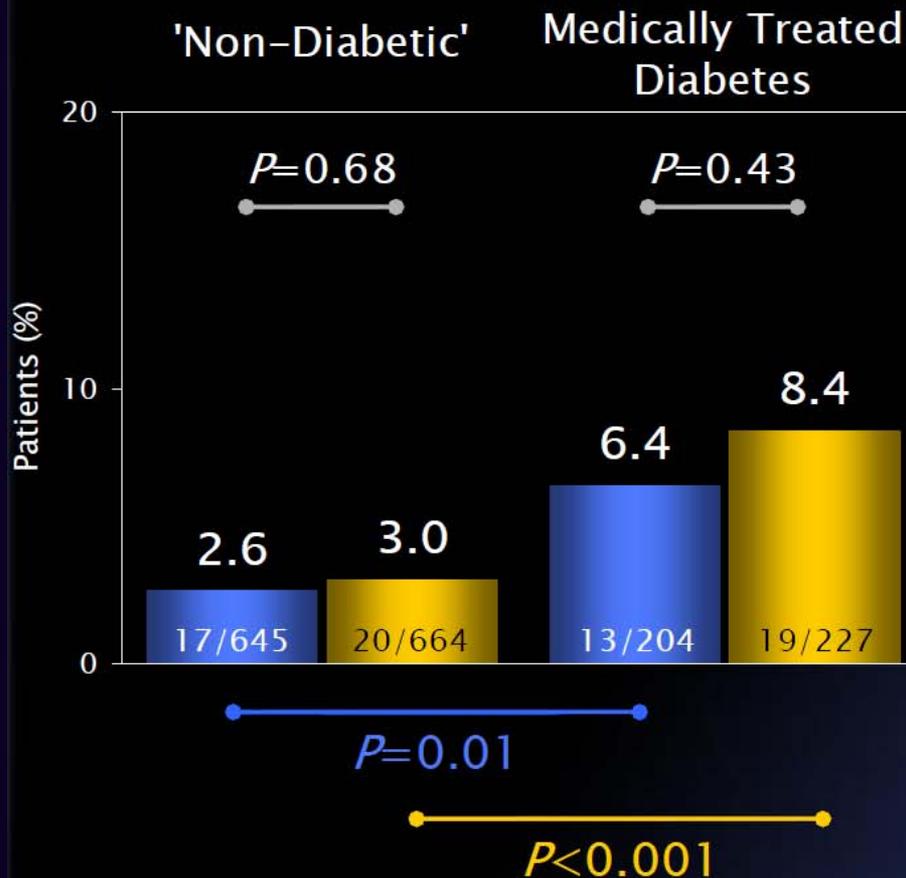


I Death (All-Cause) at 12 Months

SYNTAX

In DIABETICS

CABG TAXUS

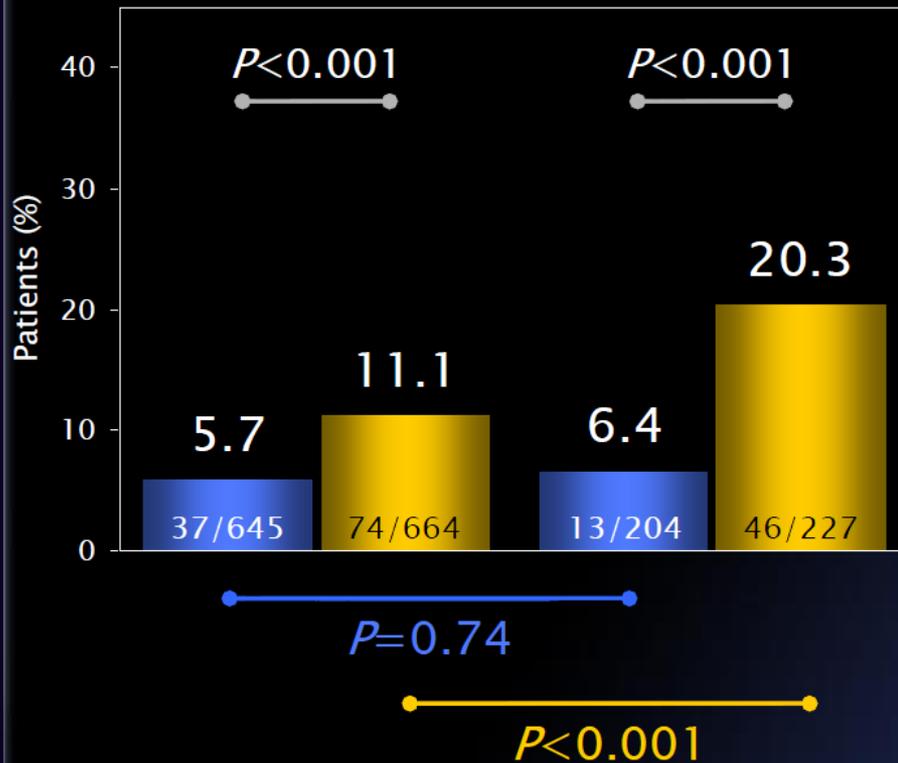


Revascularization at 12 Months Increased in Diabetes, Driving MACCE

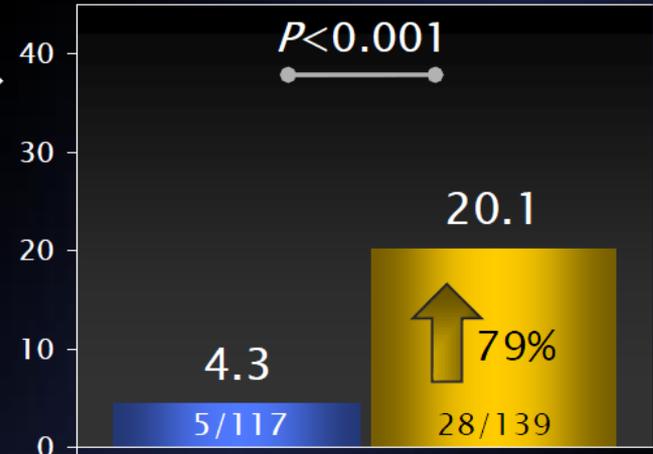


■ CABG ■ TAXUS

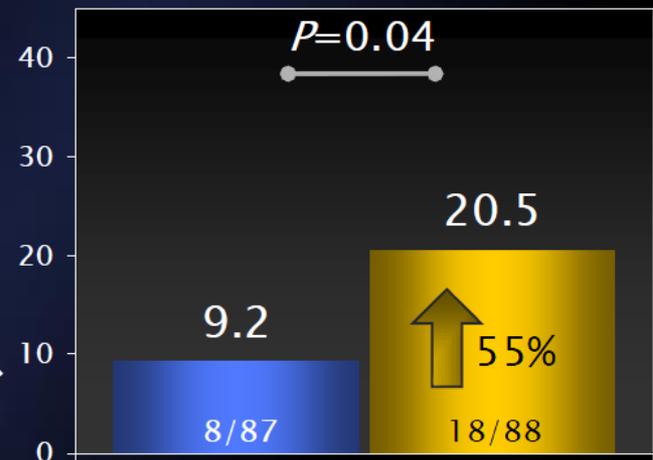
'Non-Diabetic' Medically Treated Diabetes



Oral Hypoglycemics



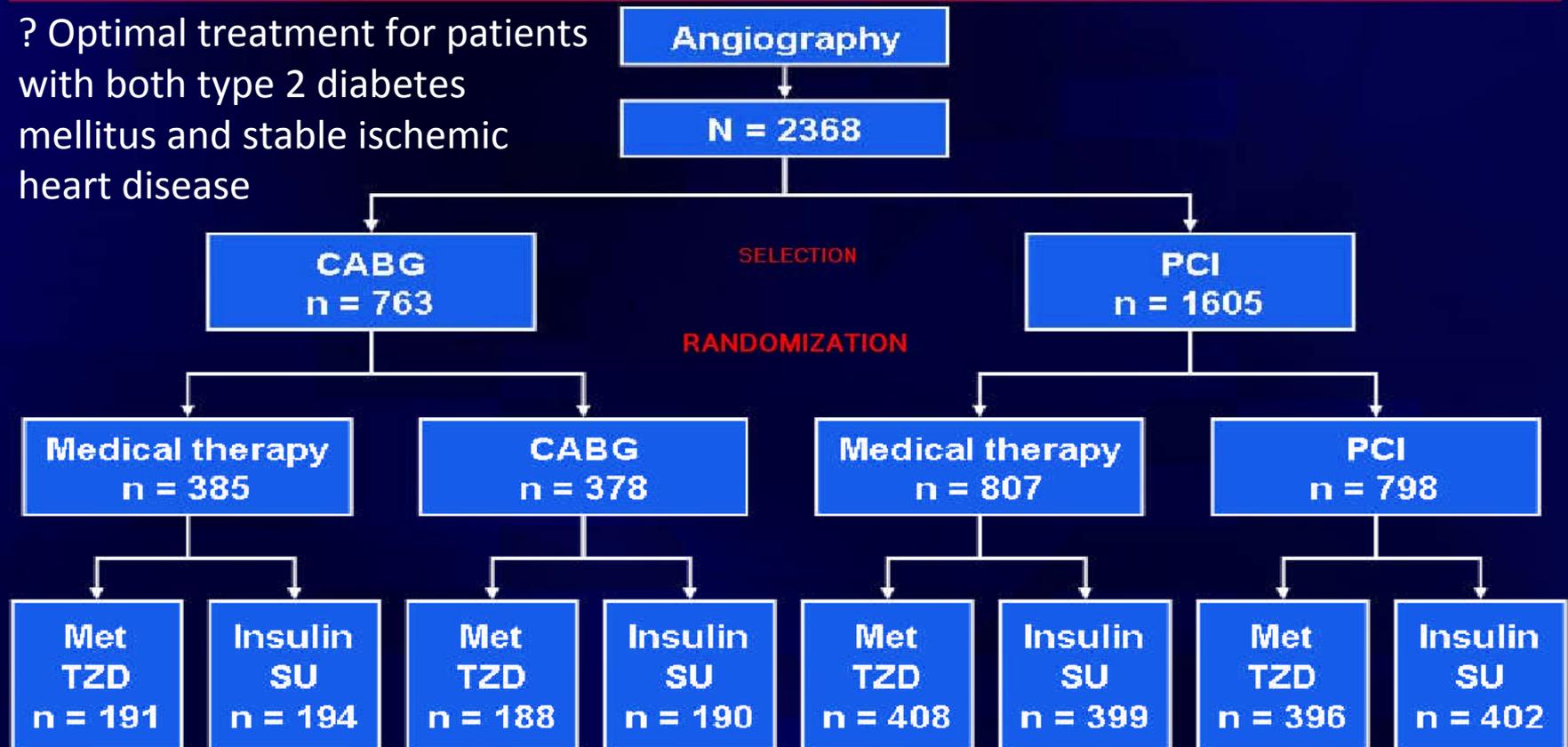
Insulin-Treated



Includes any revascularization (any vessel)

BARI 2D: Enrollment, randomization, and treatments

? Optimal treatment for patients with both type 2 diabetes mellitus and stable ischemic heart disease

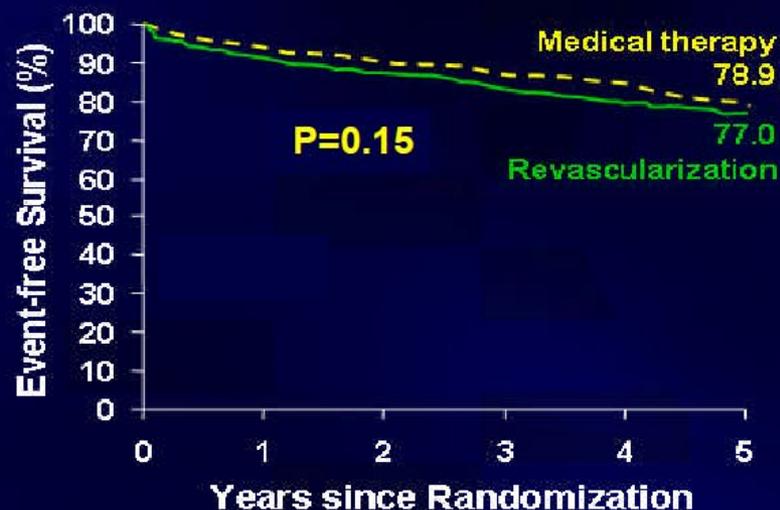


Met = metformin; TZD = thiazolidinedione;
SU = sulfonylurea

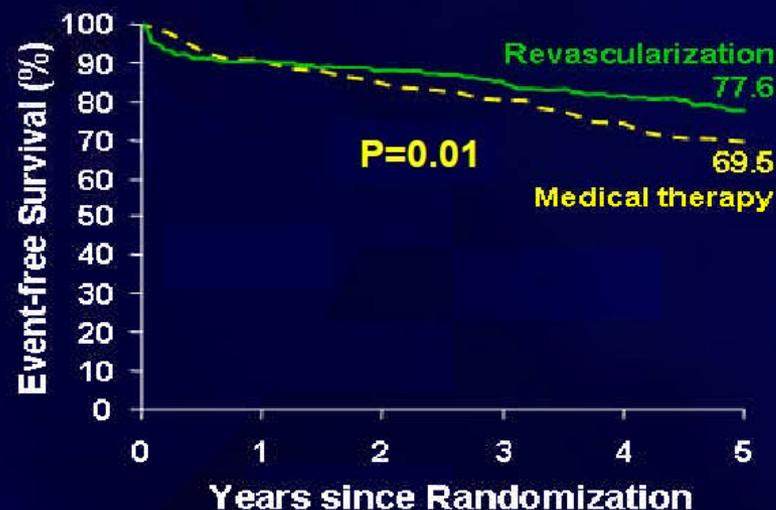
BARI 2D Study Group. *N Engl J Med.* 2009;360:2503-12.
Magee MF et al. *Am J Cardiol.* 2006;97(suppl):20G-30G.

BARI 2D: Death, MI, stroke for medical therapy vs type of revascularization

PCI



CABG



— Revascularization

- - - Medical therapy

BARI 2D Study Group. *N Engl J Med.* 2009;360:2503-12.

3 vessel disease	20%	52%
Significant LAD disease	10%	19%
Ejection Fraction	57 (11)	57 (11)

Randomized Comparison of Percutaneous Coronary Intervention With Coronary Artery Bypass Grafting in Diabetic Patients

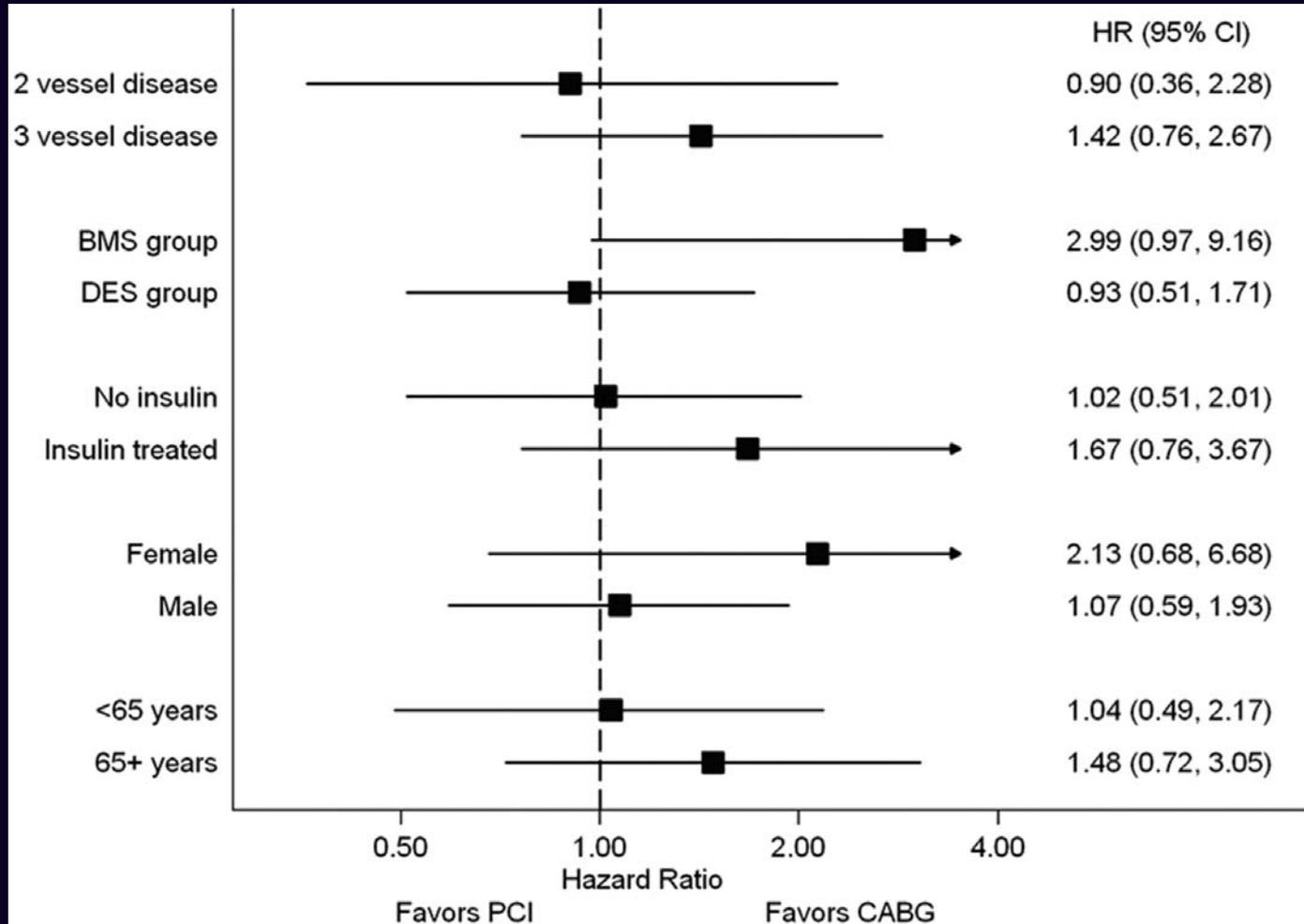
Results – adjudicated events – intention to treat analysis



Adjudicated events post randomisation	CABG (245)	PCI (251)	p value	OR and 95% CI
Death	3.3 % (8)	3.2% (8)	0.83	0.98 (0.36,2.64)
Non fatal MI	5.7% (14)	8.4% (21)	0.25	1.51 (0.75,3.03)
Non fatal stroke	2.5% (6)	0.4% (1)	0.09	0.16 (0.02,1.33)
Death, MI and stroke at one year – primary outcome	10.2% (25)	11.6% (29)	0.63	1.15 (0.65,2.03)
Further revascularisation	2.0% (5)	9.9% (25)	0.001	5.31 (2.00,14.11)
Composite outcome of death, MI, stroke, repeat revasc at 1 year	11.0%	17.5%	0.04	1.72 (1.02,2.87)

1-Year Results of the CARDia (Coronary Artery Revascularization in Diabetes) Trial

Forest Plot of Death, Myocardial Infarction, and Stroke in Key Subgroups



Kapur, A. et al. J Am Coll Cardiol 2010;55:432-440



Adverse Events at 2 Years

	Angio-Guided n = 496	FFR- Guided n = 509	P Value
Total no. of MACE	139	105	
Individual Endpoints			
Death	19 (3.8)	13 (2.6)	0.25
Myocardial Infarction	48 (9.7)	31 (6.1)	0.03
CABG or repeat PCI	61 (12.3)	53 (10.4)	0.35
Composite Endpoints			
Death or Myocardial Infarction	63 (12.7)	43 (8.4)	0.03
Death, MI, CABG, or re-PCI	110 (22.2)	90 (17.7)	0.07



Outcome of Deferred Lesions

513 Deferred Lesions in
509 FFR-Guided Patients

2 Years

31 Myocardial Infarctions

22
Peri-procedural

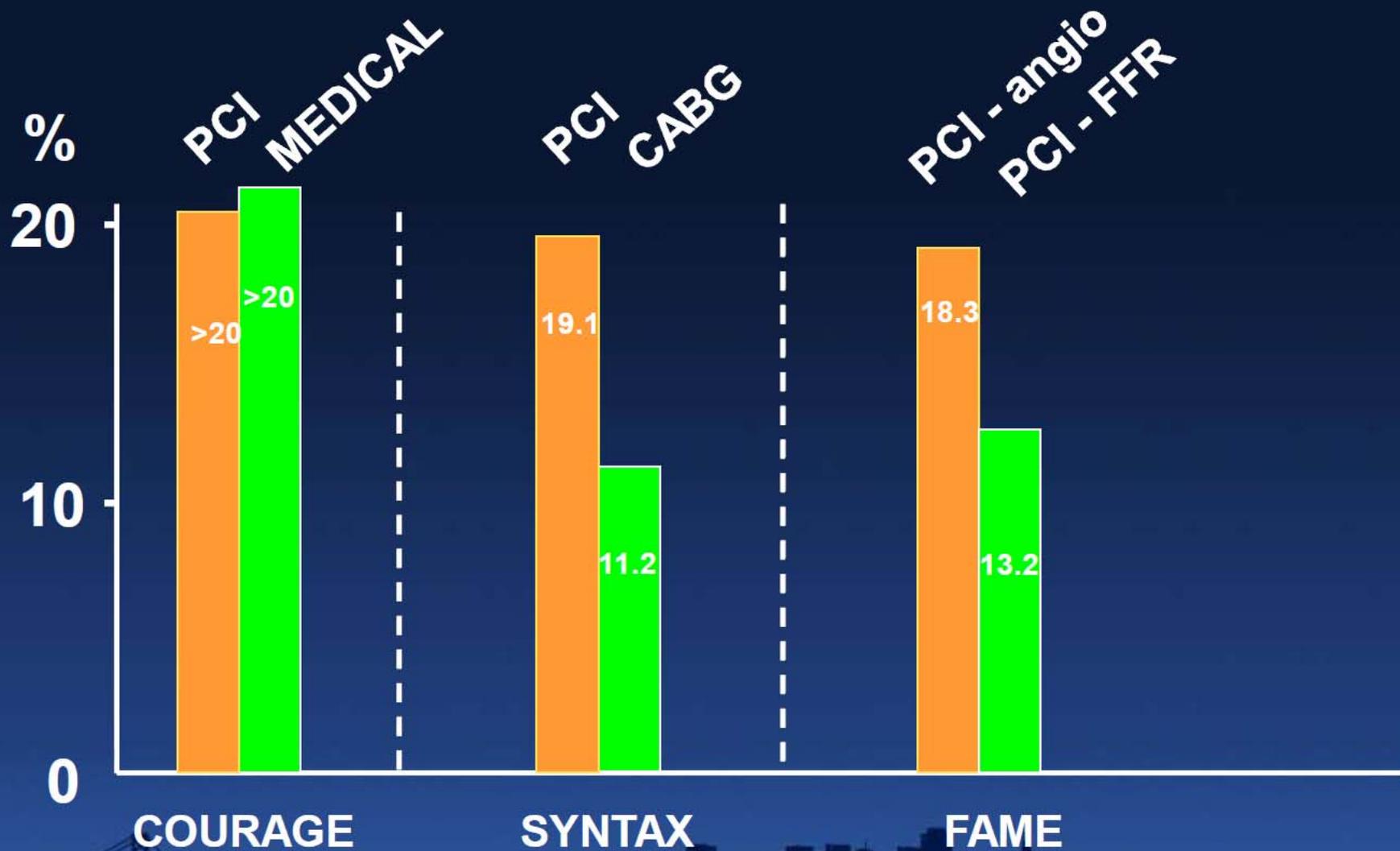
9
Late Myocardial Infarctions

8
Due to a New Lesion
or Stent-Related

1
Myocardial Infarction due to
an Originally Deferred Lesion

Only 1/513 or 0.2% of deferred
lesions resulted in a late
myocardial infarction

MACE in COURAGE, SYNTAX-3VD, and FAME STUDY



What is the best treatment option for my patient in 2009?

Incorporate lessons from SYNTAX, COURAGE, FAME, BARI 2D

Careful patient selection

Proven ischemia (FAME, COURAGE)

Avoid unnecessary interventions (COURAGE, FAME, BARI 2D)

Estimate clinical outcome based on the coronary anatomy (SYNTAX SCORE)?

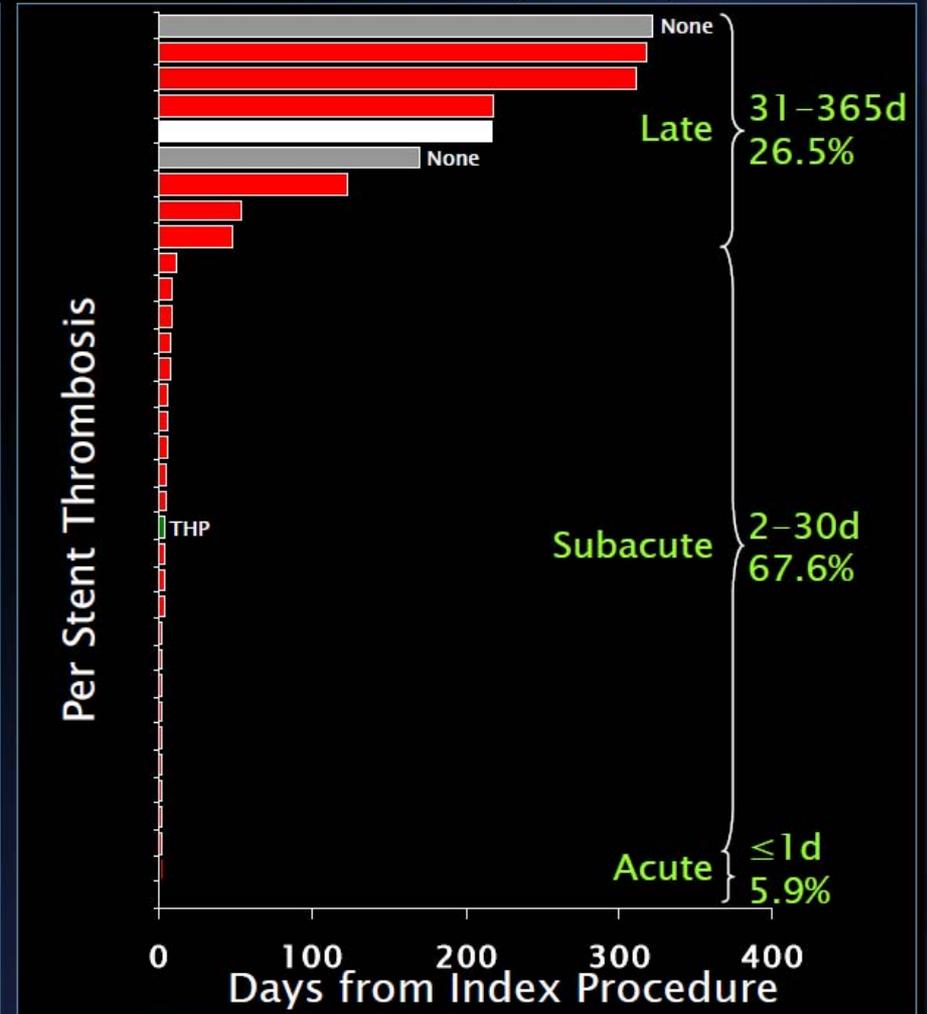
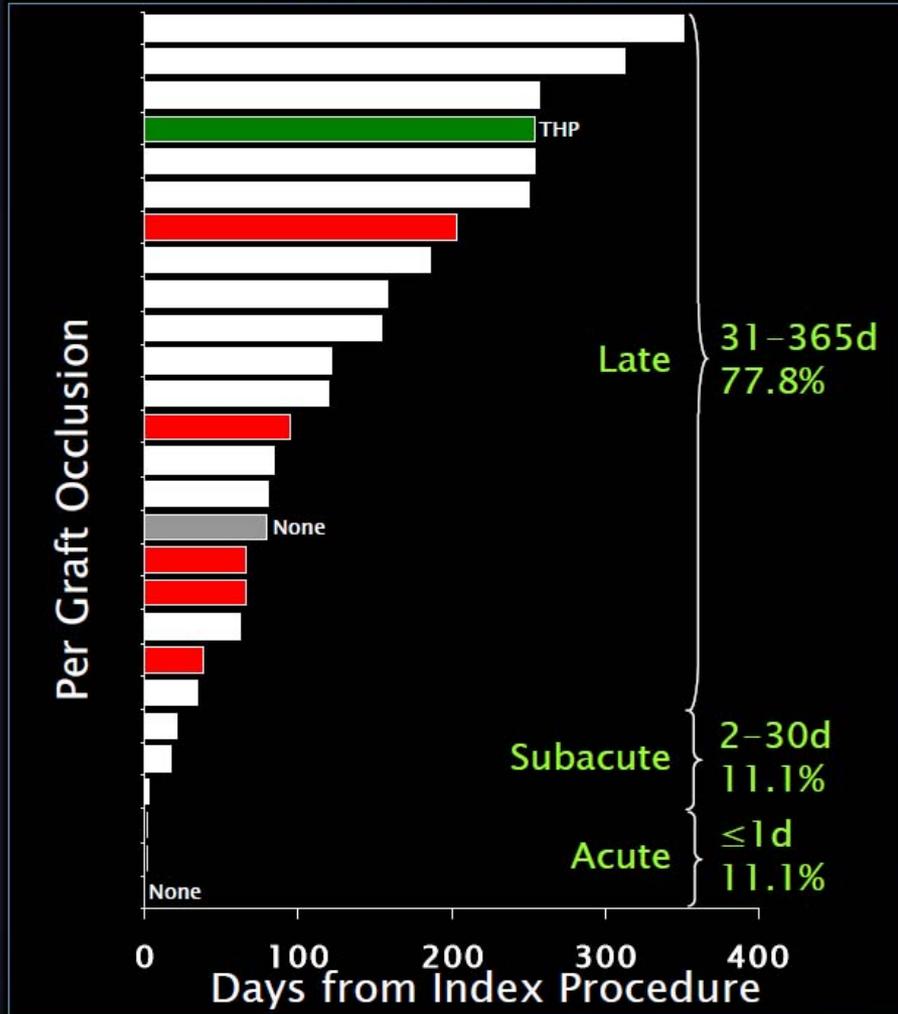


Timing of Event (per Graft or Stent)

SYNTAX

CABG Arm (n=27)

PCI Arm (n=34)



Drug(s) at time of event: Aspirin DAPT Thienopyridine only None