

# Left Main Disease Reasons for PCI

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# Why PCI should be the default treatment of LMD?



PCI more procedural advantages than CABG



Evidence clearly supports PCI for LMD



PCI (but not CABG) is continuously improving

**We have to offer always the less invasive option**



# PCI has much more advantages than CABG

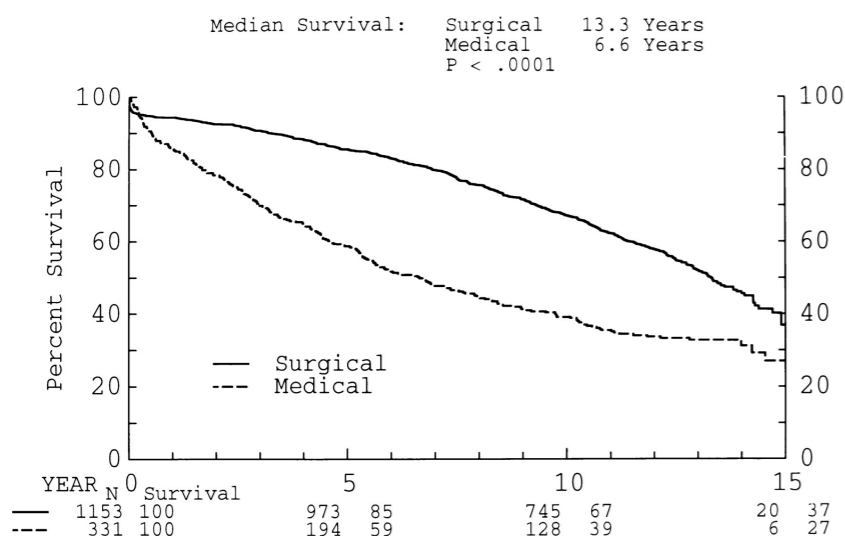
## CABG for Left Main

### PRO

- A longer history.
- First trials vs OMT.
- Frequently, more complete revascularization.

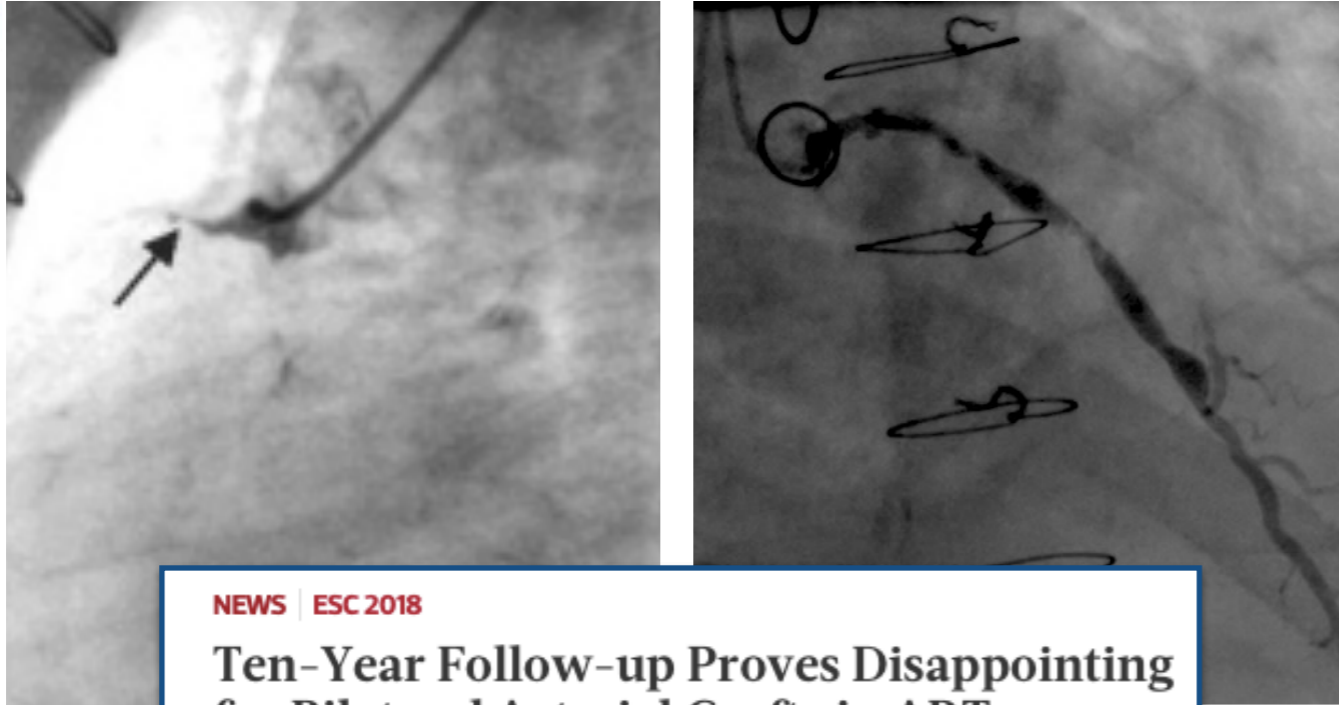
### CON

- SVG disease.
- Quick progression of proximal disease.
- Usually, last chance.
- Longer hospital stay.
- Clearly more aggressive.
- Waiting list (no “ad-hoc”).





# PCI has much more advantages than CABG



NEWS | ESC 2018

## Ten-Year Follow-up Proves Disappointing for Bilateral Arterial Grafts in ART

Earlier results from the trial were also neutral, raising hopes that a decade of data would be the charm. Despite these findings, some see signs.



By Shelley Wood | August 26, 2018



**M**UNICH, Germany (UPDATED)—Surgeons expecting to see a win for bilateral internal-thoracic artery (ITA) grafts at the 10-year mark in the Arterial Revascularization Trial (ART) will be disappointed today.

Complications usually not included in primary end-point







PCI has much more advantages than CABG

## PCI for LEFT MAIN

### PRO

- Much less invasive.
- Possible ad-hoc.
- Wider availability.
- Quick return to normal life.
- No last opportunity.



### CON

- More TVR.
- Stent restenosis.
- Stent thrombosis.

Almost solved with DES

Very infrequent with 2nd DES

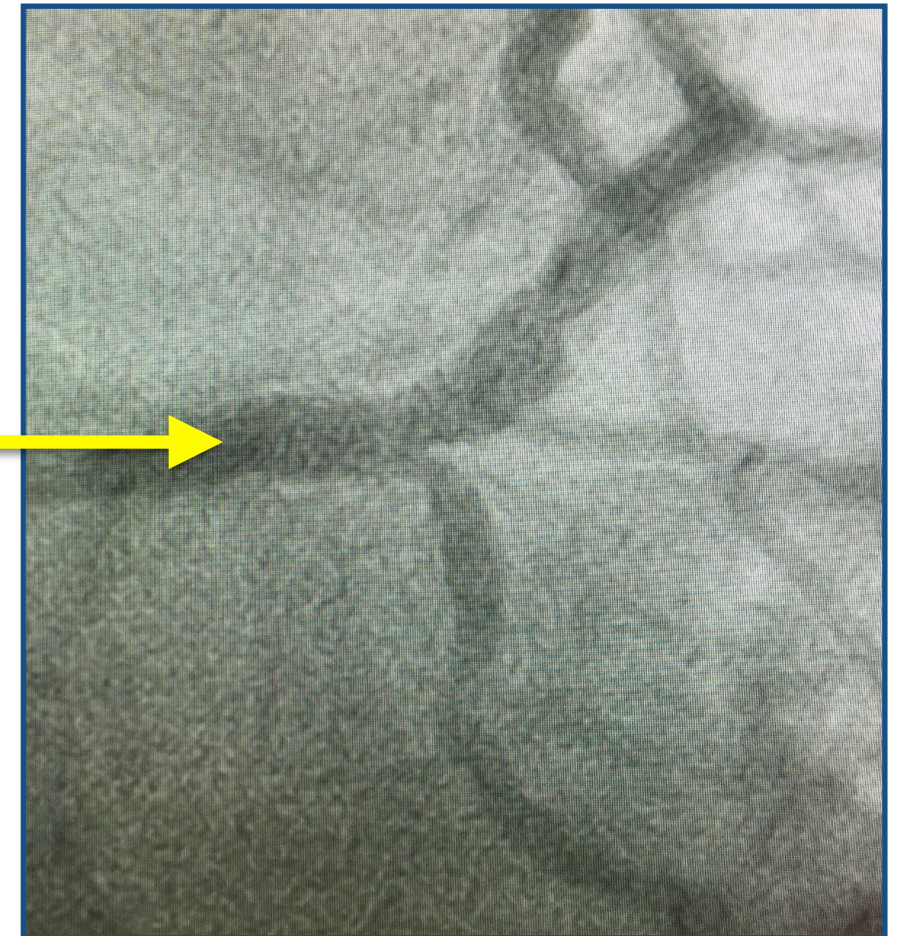
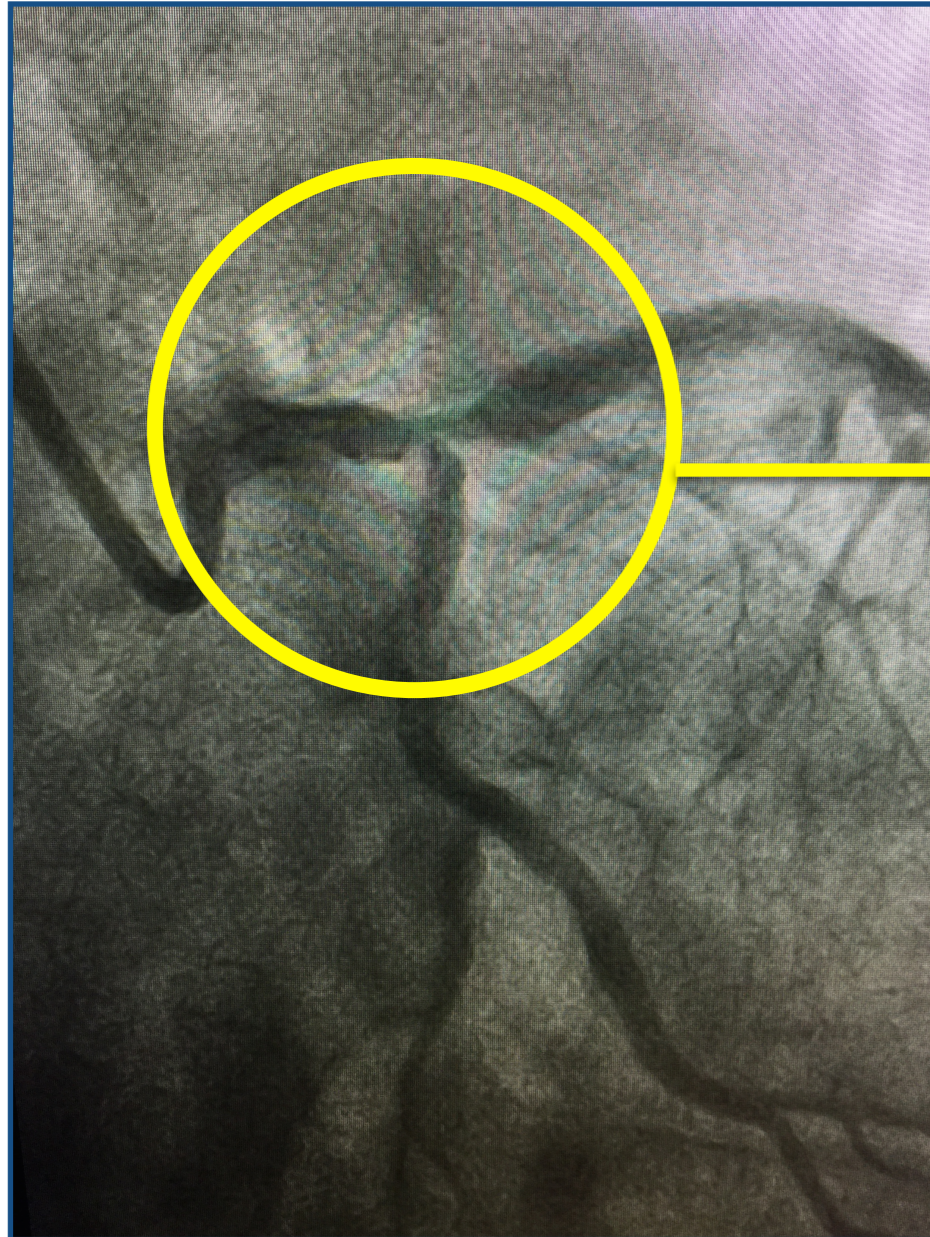
**What would be TVR after CABG if treatment after graft failure was not so difficult?**





# PCI has much more advantages than CABG

PCI for LMD is usually an easy, quick procedure



- Radial approach.
- PCI with DES.
- Total time: 20 min.
- 24 h discharge.

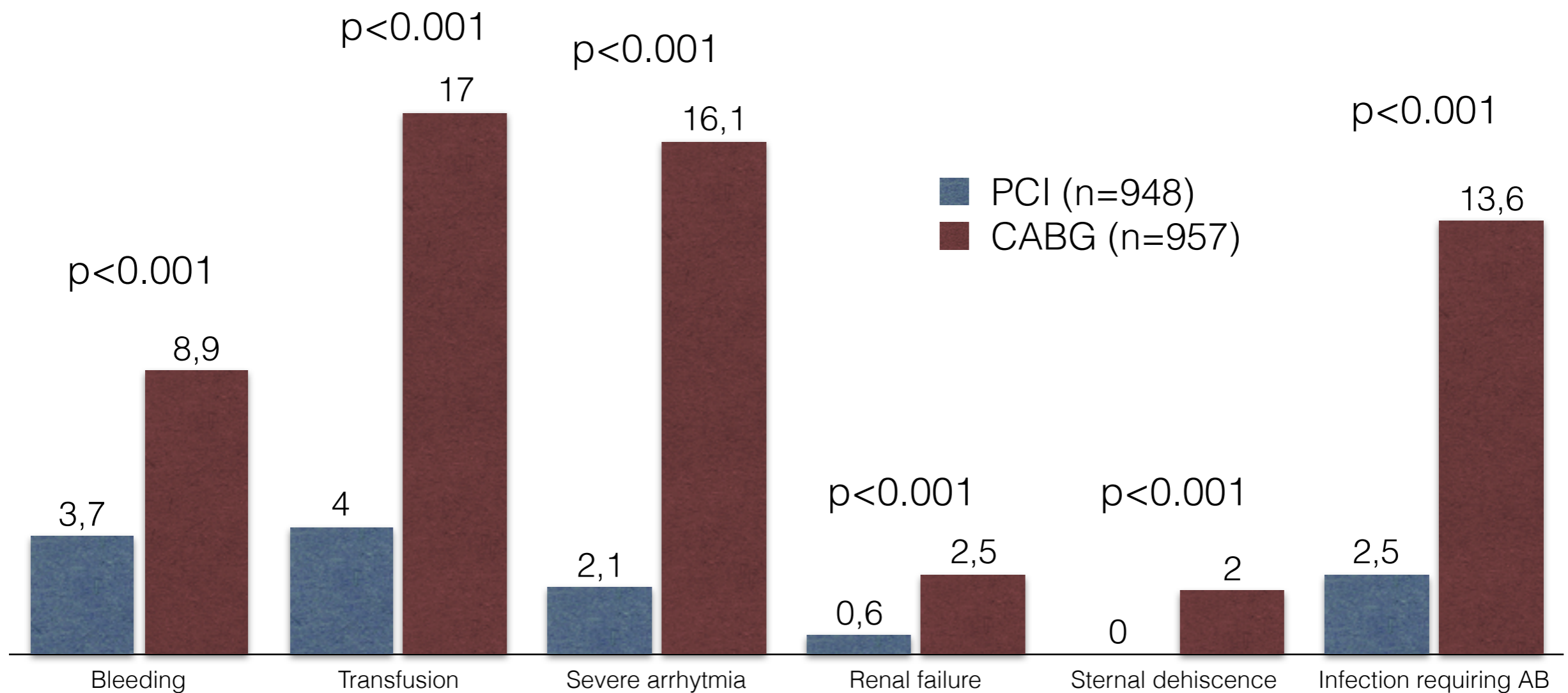




# PCI has much more advantages than CABG

## EXCEL trial.

### Peri-procedural (30 d) complications (%)



Stone GW et al. N Engl J Med 2016;375:2223-35



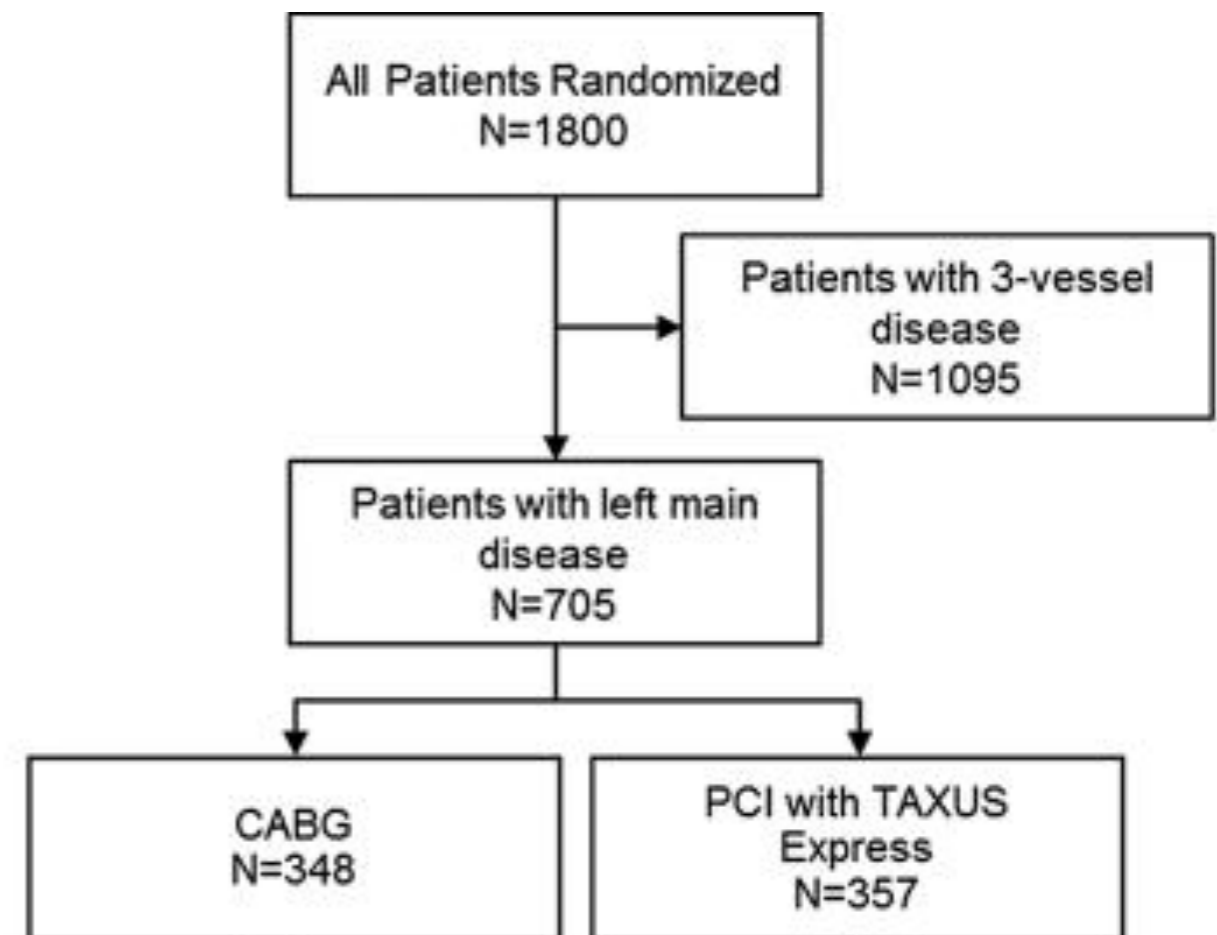
Evidence clearly supports PCI for LMD

**In few years, PCI for LMD has completely changed**

### Guidelines ESC 2012

Subset of CAD by anatomy	Favours CABG	Favours PCI
Left main (isolated or IVD, ostium/shaft)	IA	IIa B
Left main (isolated or IVD, distal bifurcation)	IA	IIb B
Left main + 2VD or 3VD, SYNTAX score $\leq 32$	IA	IIb B
Left main + 2VD or 3VD, SYNTAX score $\geq 33$	IA	III B

### The SYNTAX trial



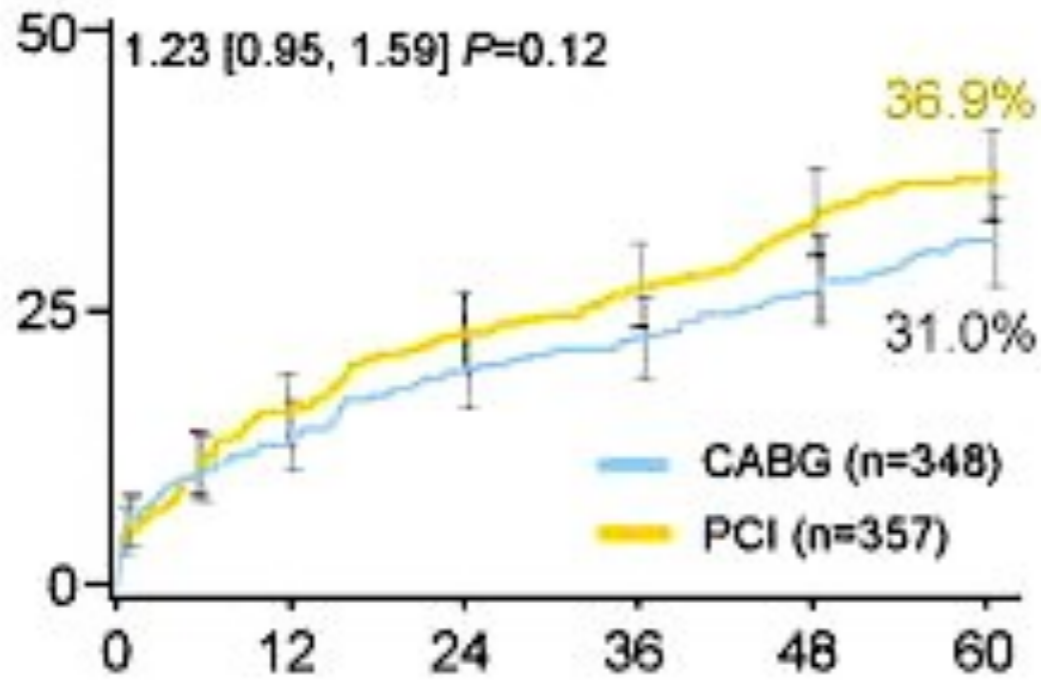
Serruys PW, et al. N Engl J Med 2009;360:961-72  
Mohr FW, et al. Lancet 2013;381:629-38.  
Morice MC, et al. Circulation 2014;129:2388-94.



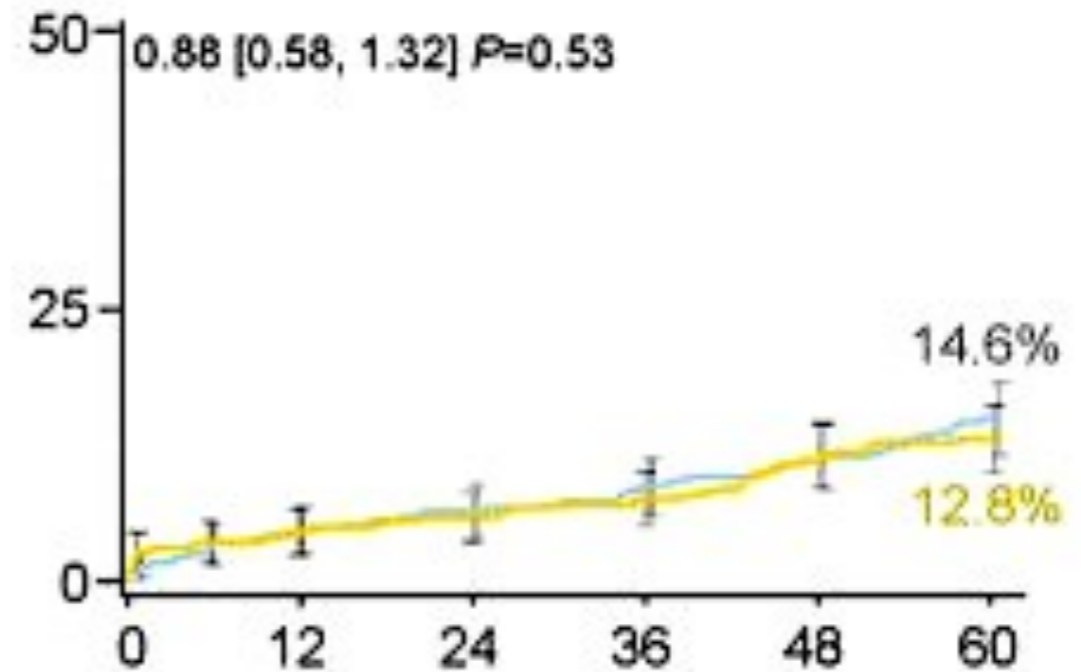


# LMD in SYNTAX trial: 5-yr follow-up

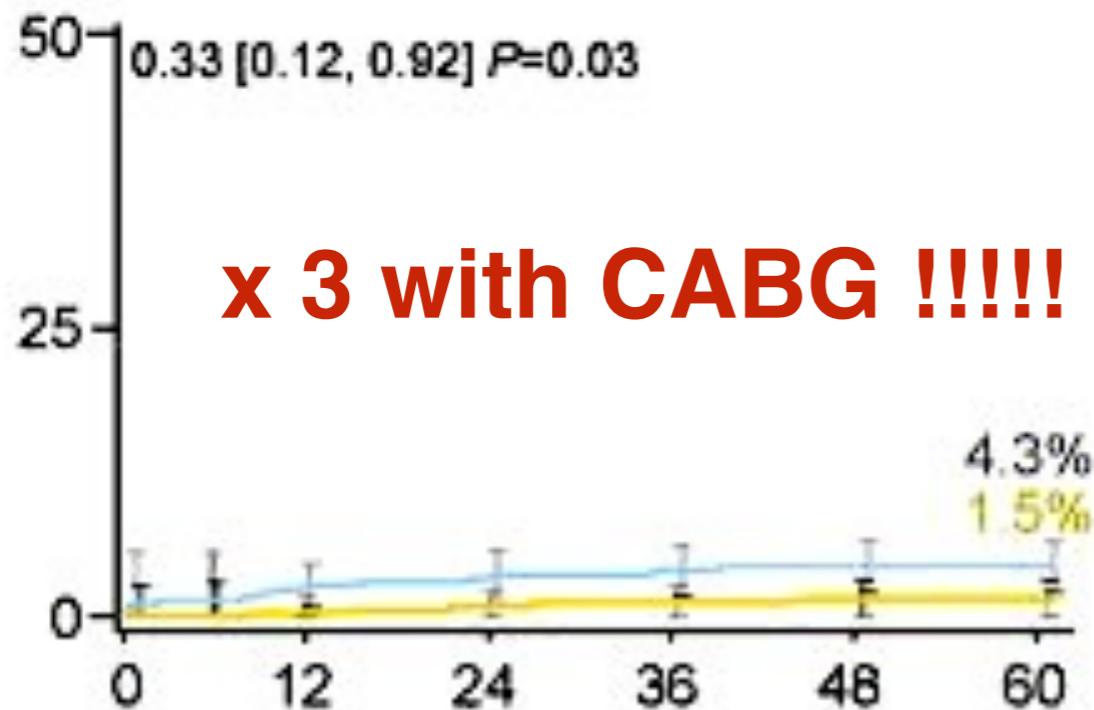
## MACCE



## All-cause Death

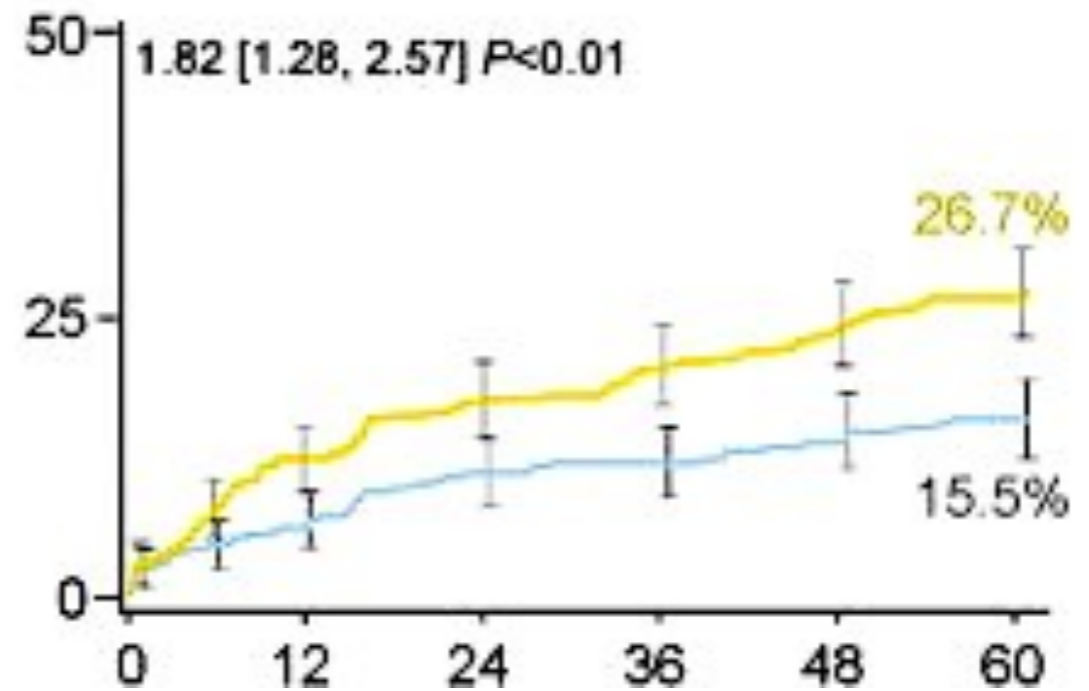


## Stroke



**x 3 with CABG !!!!!**

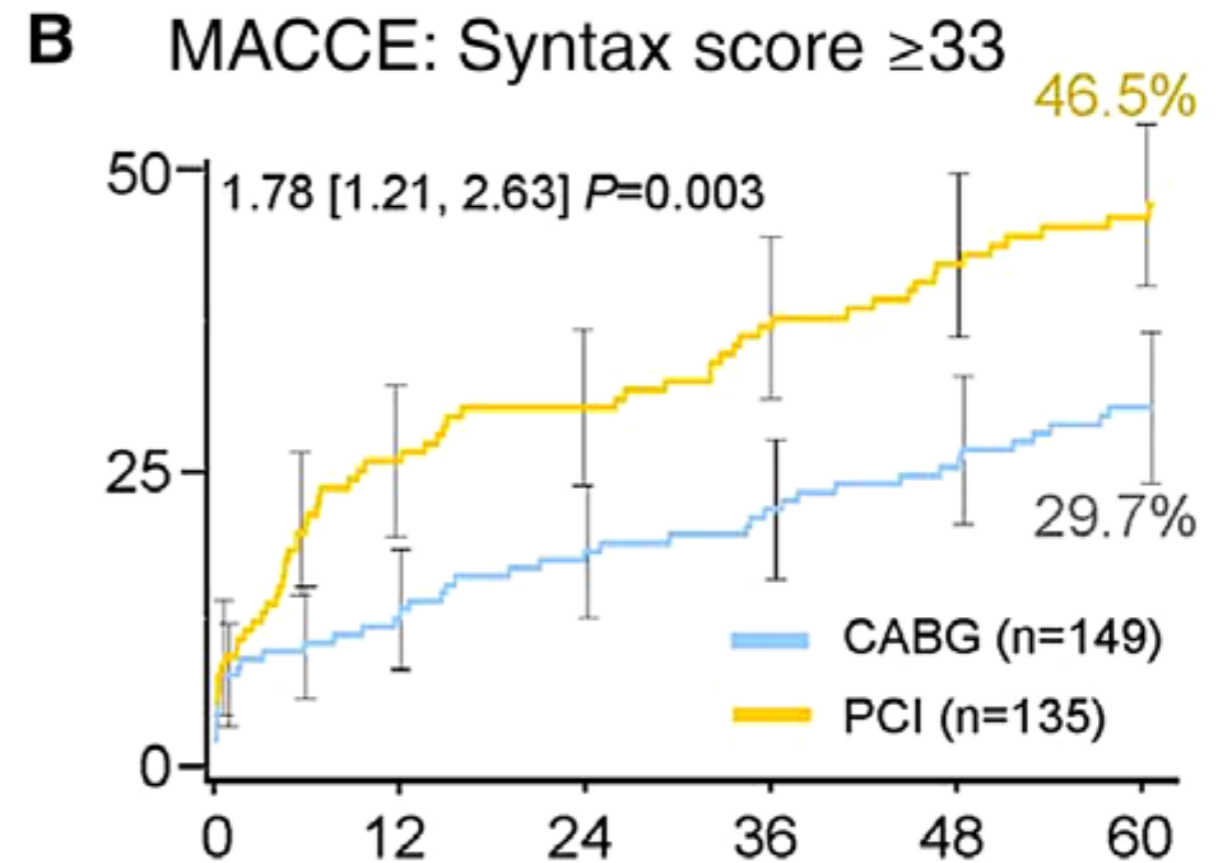
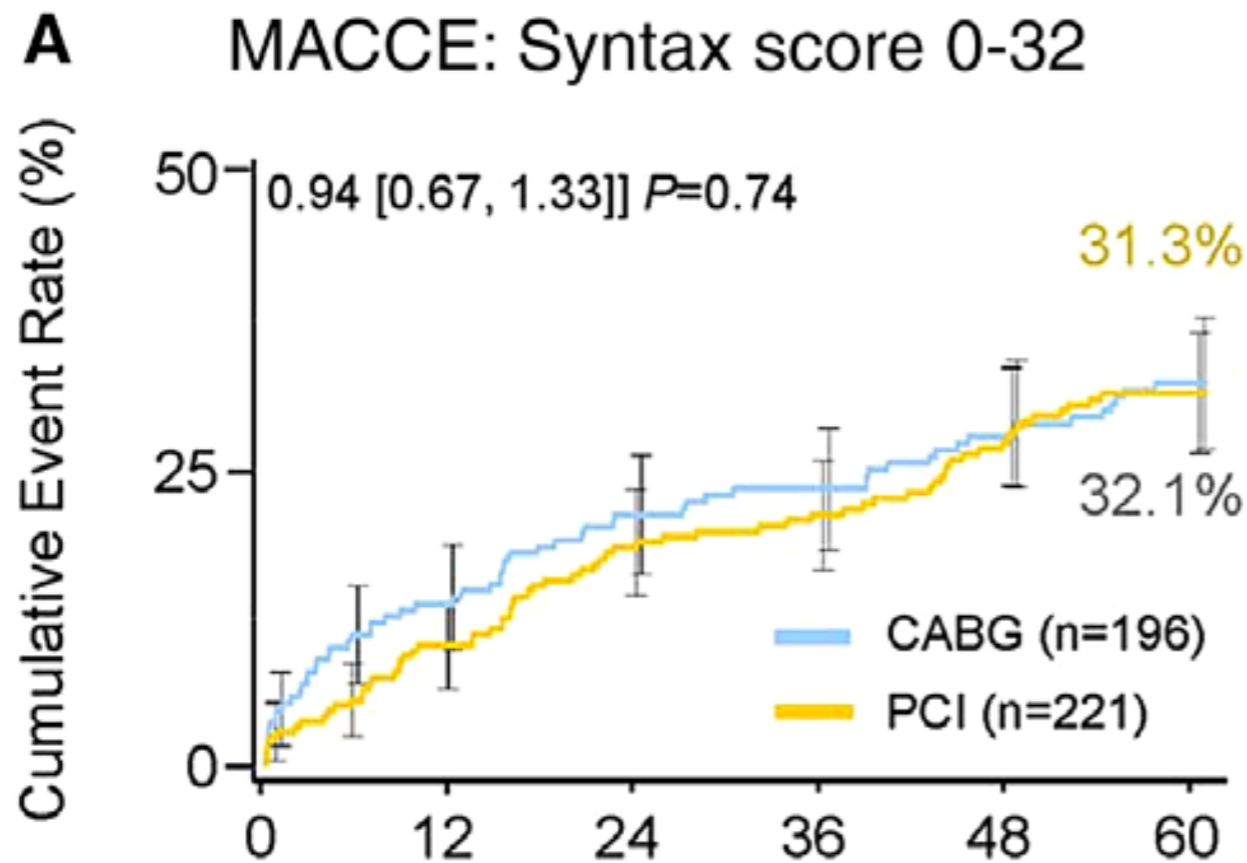
## Repeat Revascularization





Evidence clearly supports PCI for LMD

## SYNTAX 5-yr. Left main subgroups

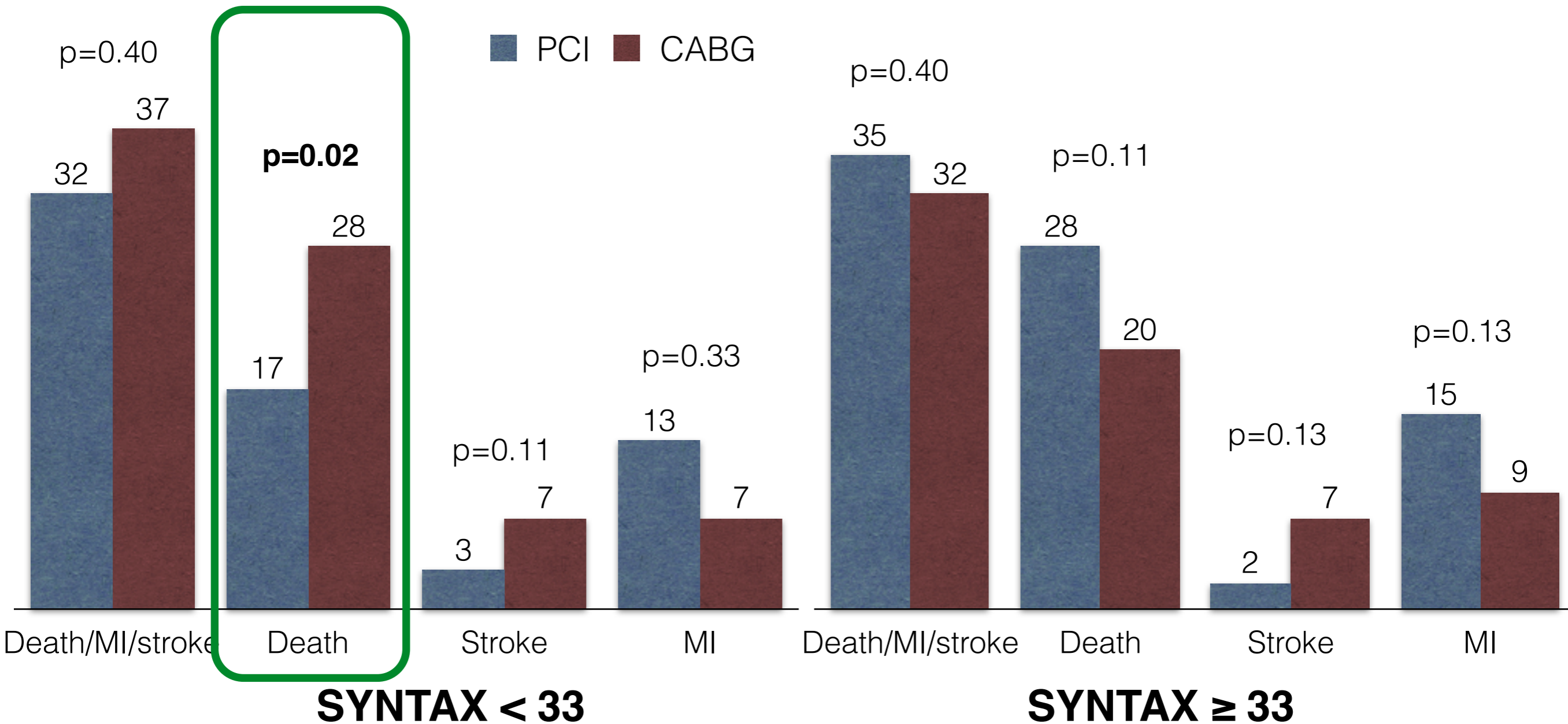




Evidence clearly supports PCI for LMD

## SYNTAX 5-yr. Left main subgroups

Nuestro paciente





# Evidence clearly supports PCI for LMD

## Guidelines ESC 2014

Recommendations according to extent of CAD	CABG		PCI		Ref <sup>c</sup>
	Class <sup>a</sup>	Level <sup>b</sup>	Class <sup>a</sup>	Level <sup>b</sup>	
Left main disease with a SYNTAX score ≤ 22.	I	B	I	B	17,134,170
Left main disease with a SYNTAX score 23–32.	I	B	IIa	B	17
Left main disease with a SYNTAX score >32.	I	B	III	B	17

SYNTAX  
5 years

Windecker S, et al. Eur Heart J 2014; 35, 2541–2619

## Guidelines ESC 2018

Left main CAD				
Left main disease with low SYNTAX score (0 - 22). <sup>69,121,122,124,145–148</sup>	I	A	I	A
Left main disease with intermediate SYNTAX score (23 - 32). <sup>69,121,122,124,145–148</sup>	I	A	IIa	A
Left main disease with high SYNTAX score (≥33). <sup>c 69,121,122,124,146–148</sup>	I	A	III	B

Neumann FJ, et al. Eur Heart J 2018.



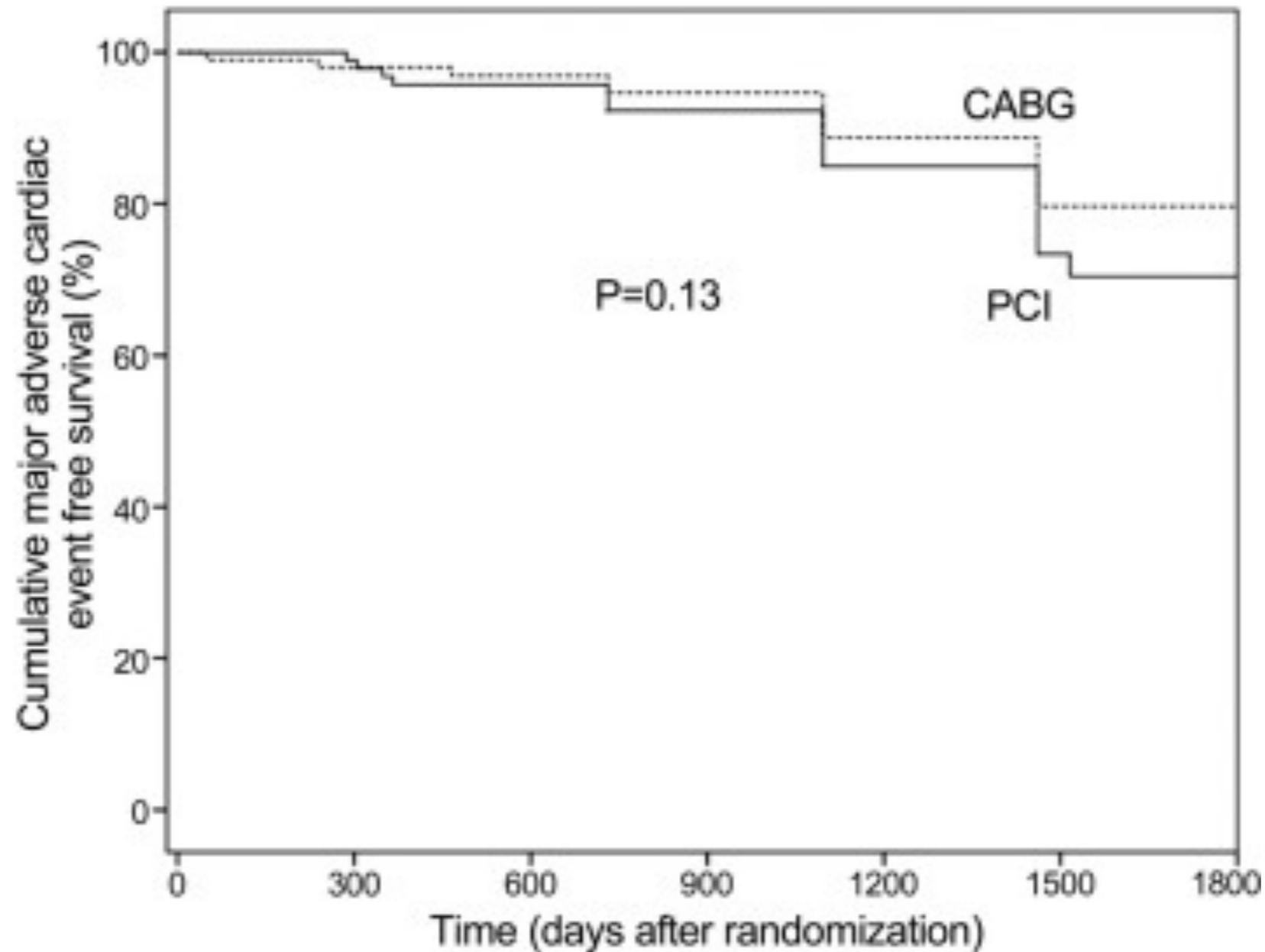




# Evidence clearly supports PCI for LMD

201 patients with LMD, randomized to CABG vs PCI (Cypher stent)

MACE: death, MI, revascularization

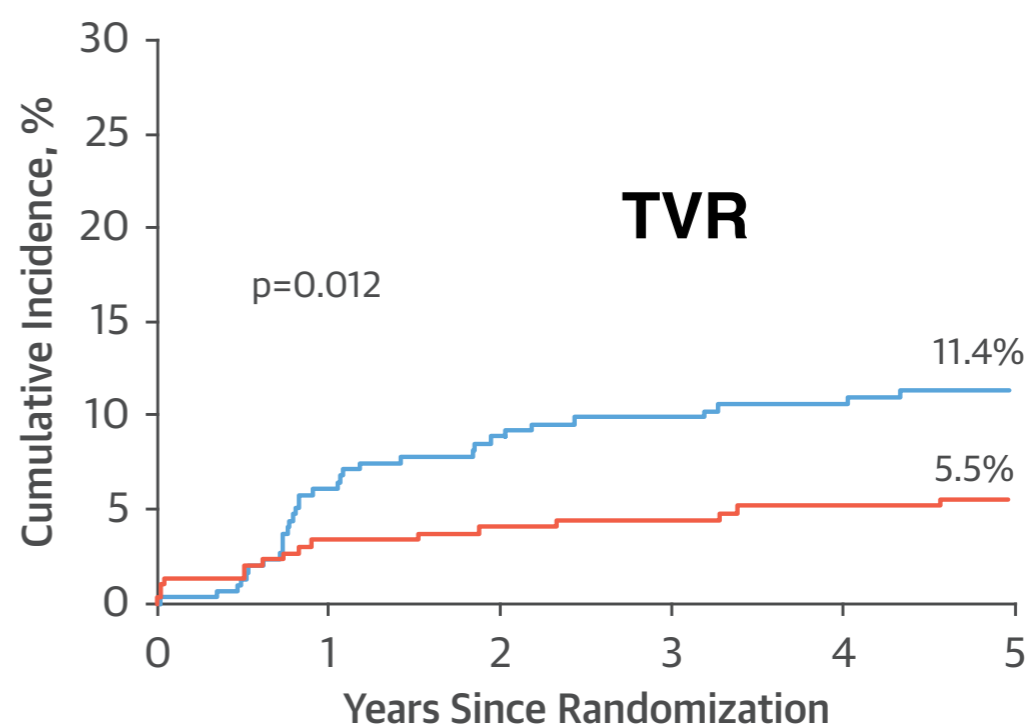
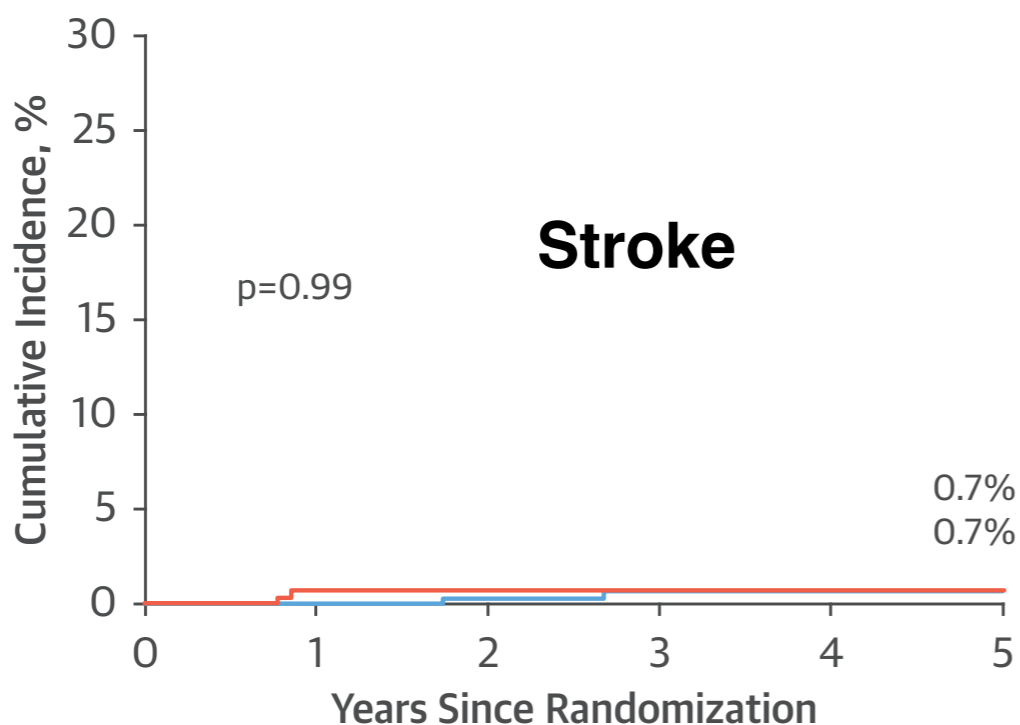
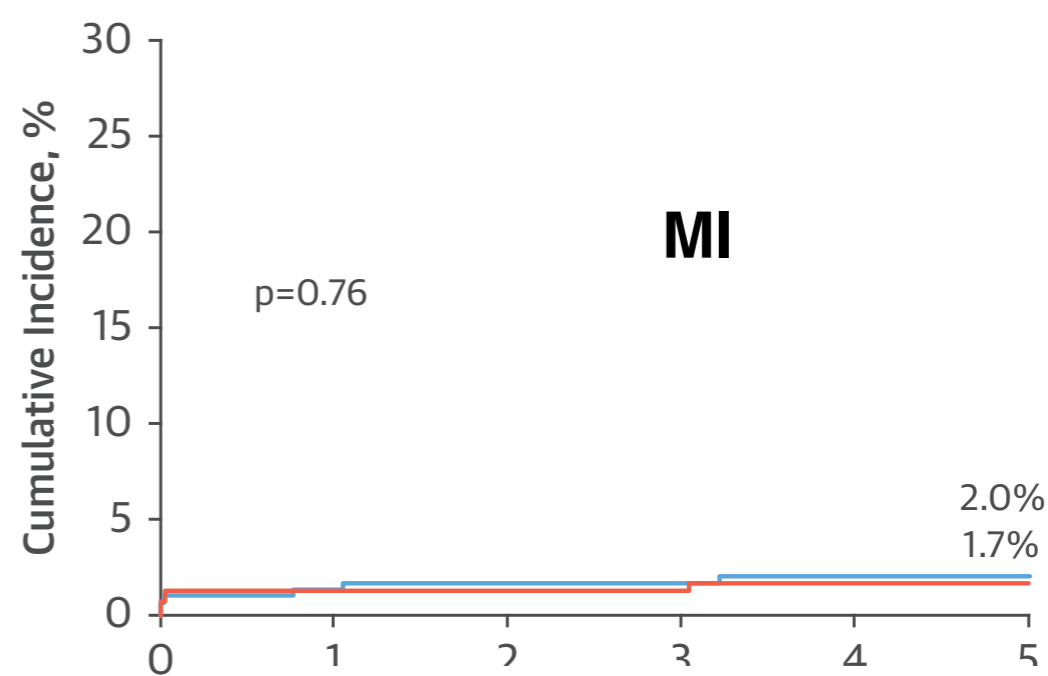
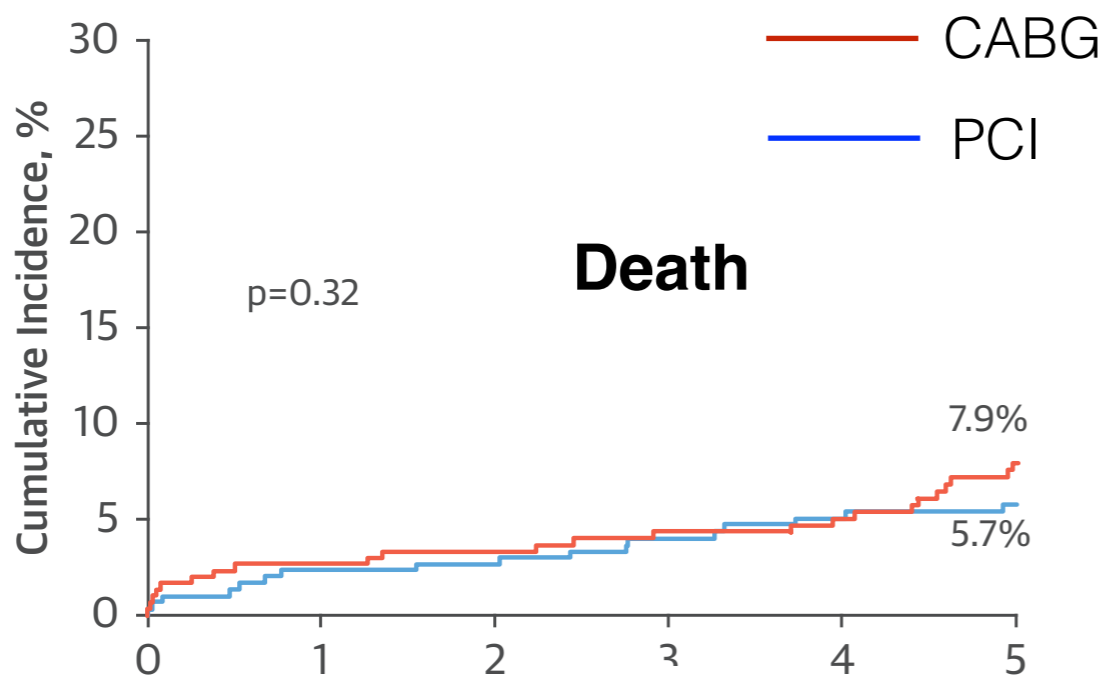




# Evidence clearly supports PCI for LMD

## PRECOMBAT

600 patients with LMD, randomized to CABG vs PCI (Cypher stent)



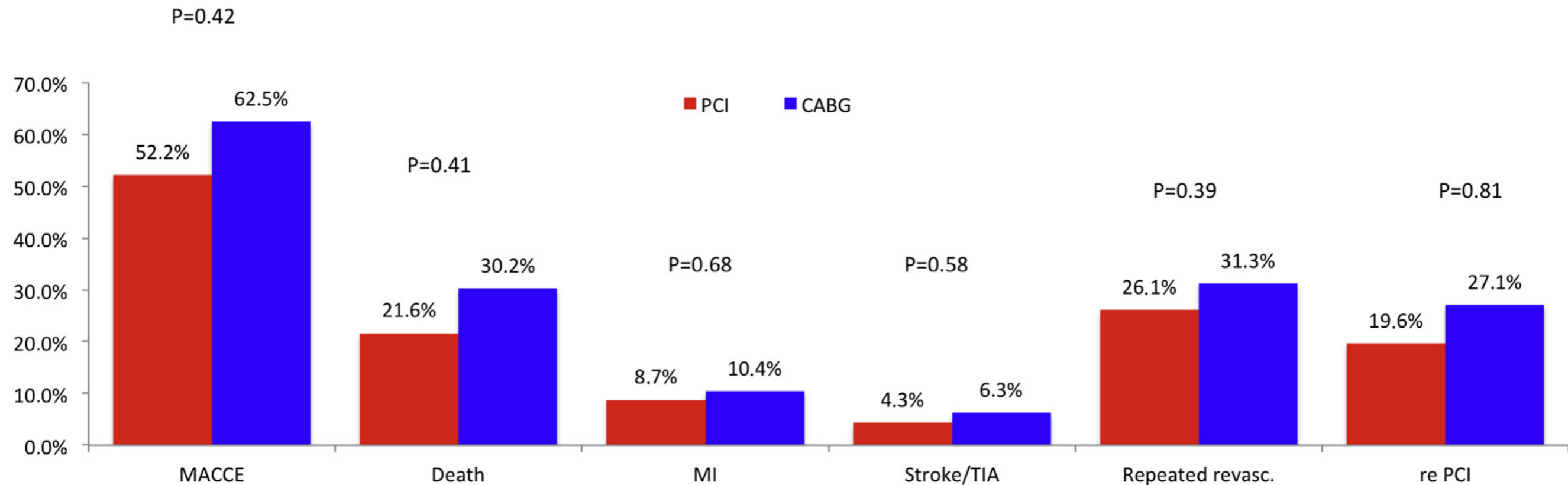


# Evidence clearly supports PCI for LMD

## LEMANS

105 patients with LMD, randomized to CABG vs PCI (2/3 BMS)

10-year follow-up



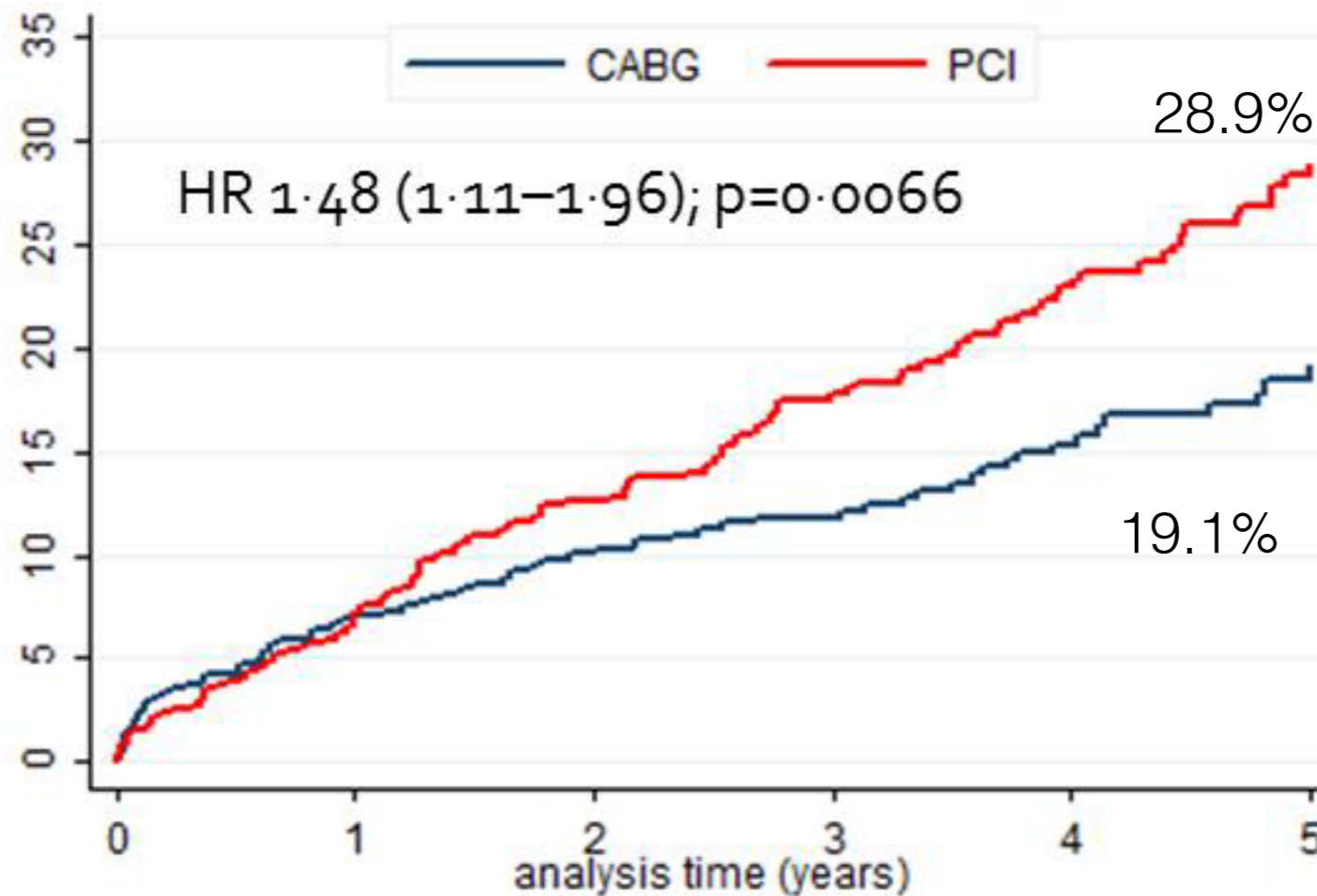




# NOBLE trial

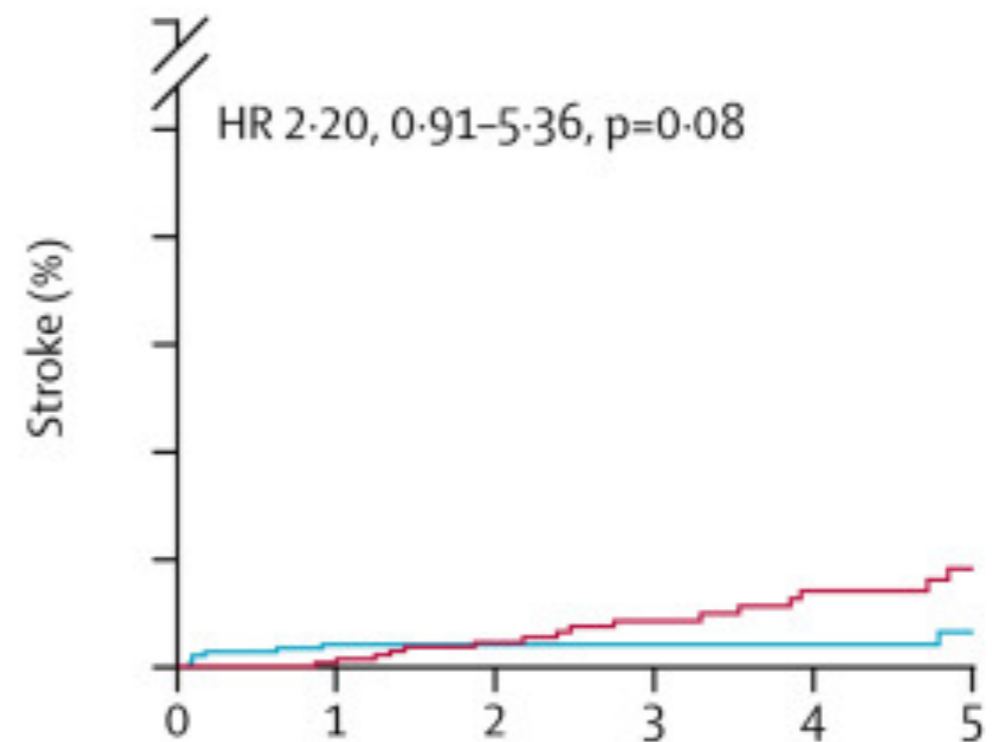
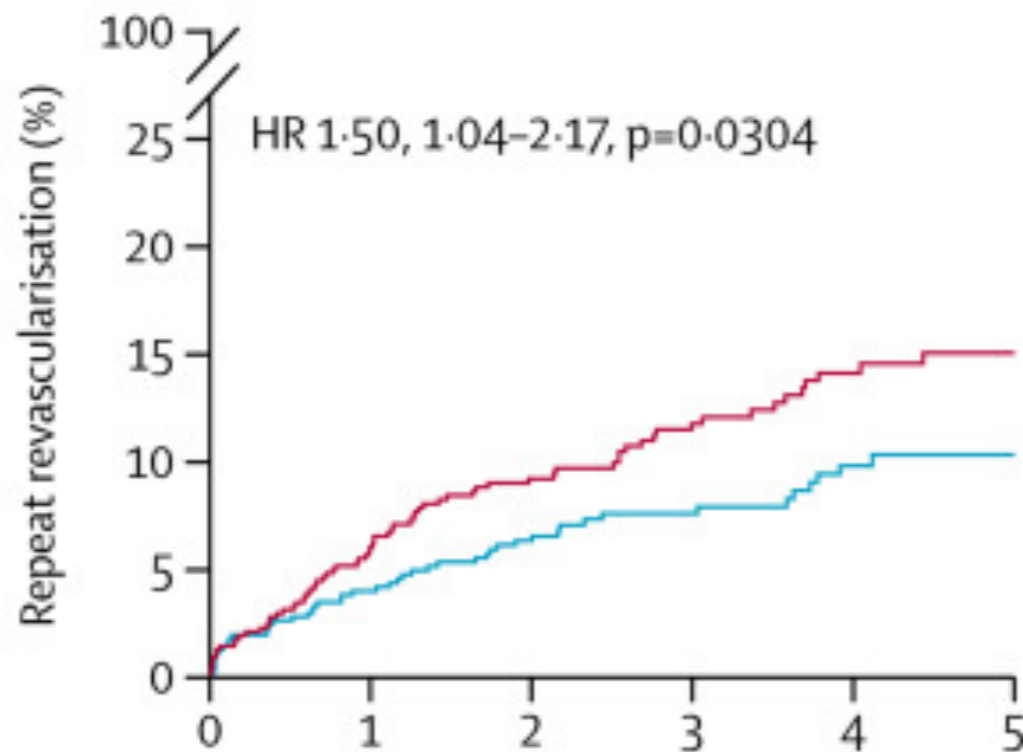
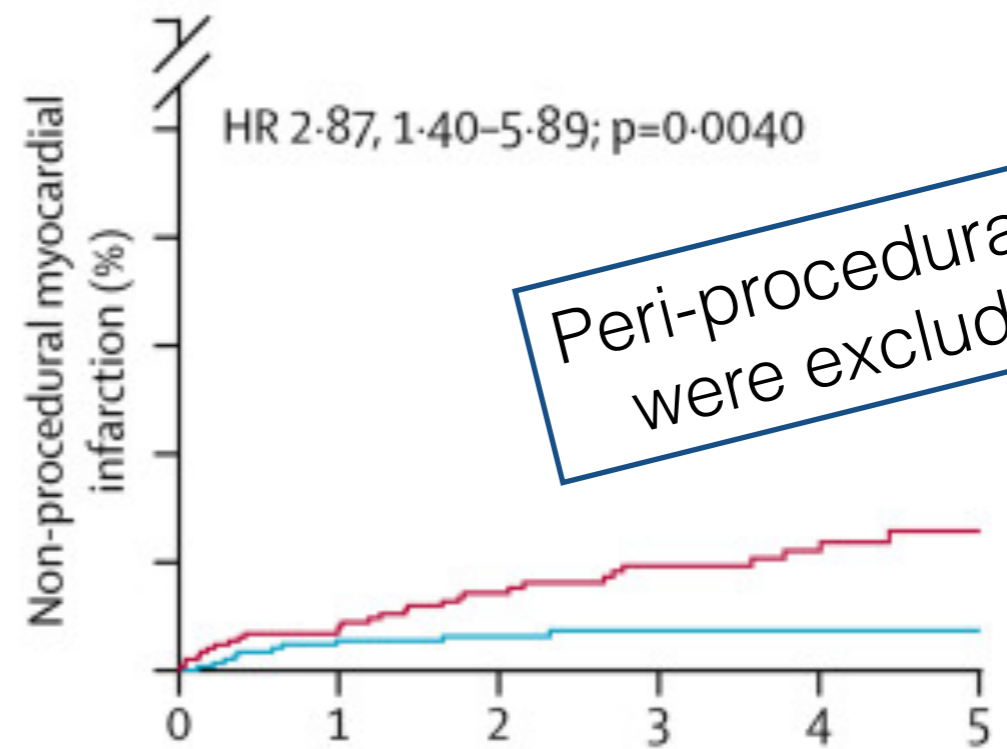
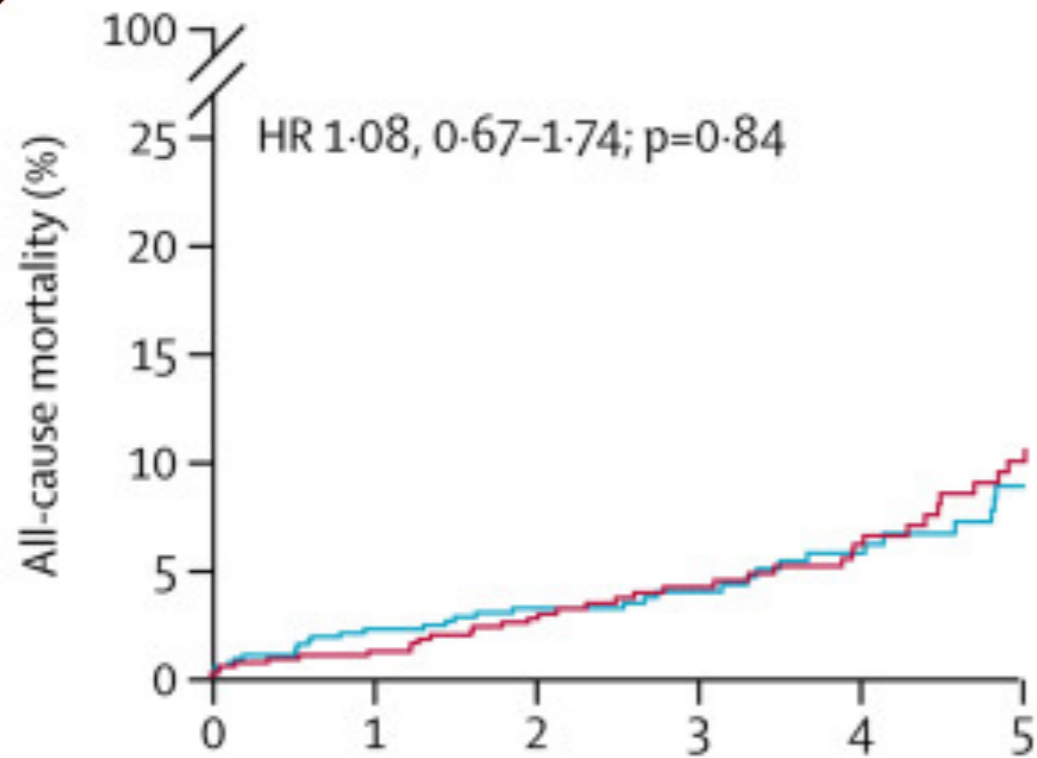
1,201 patients with LMD, randomized to CABG vs PCI (mostly BES)

MACCE (death/MI/stroke/TVR)





# NOBLE trial





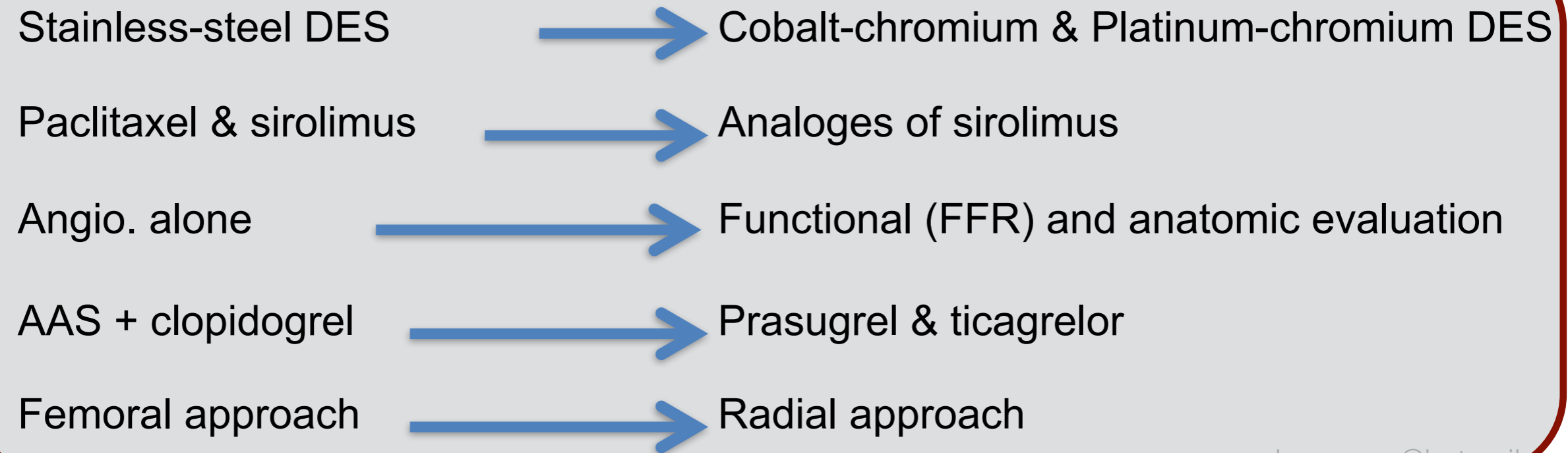
1st Phone



1st IPAD



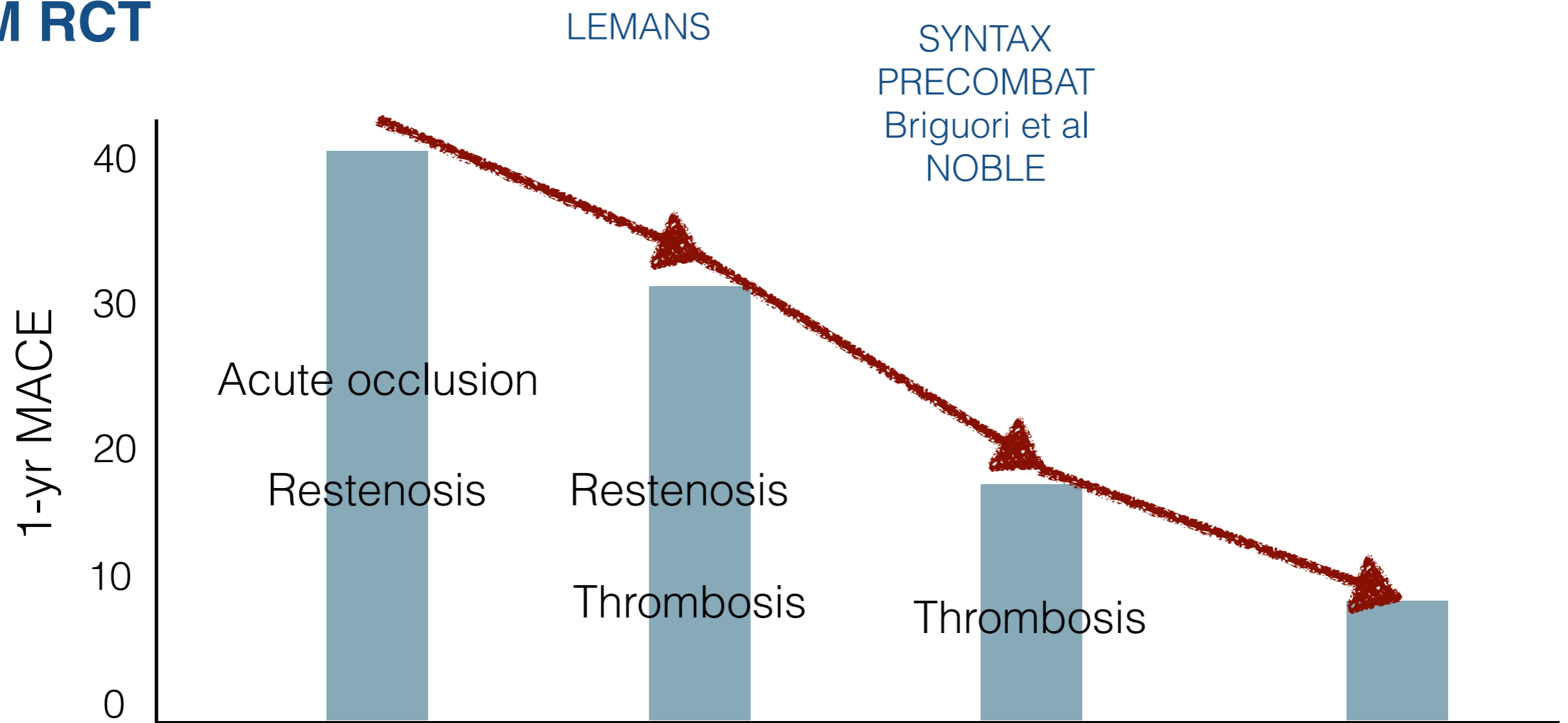
SYNTAX recruitment



# The history of PCI: clinical events

PTCA	BMS	DES-1	DES-2
1977-1994	1995-2001	2002-2008	2009-today

## LM RCT



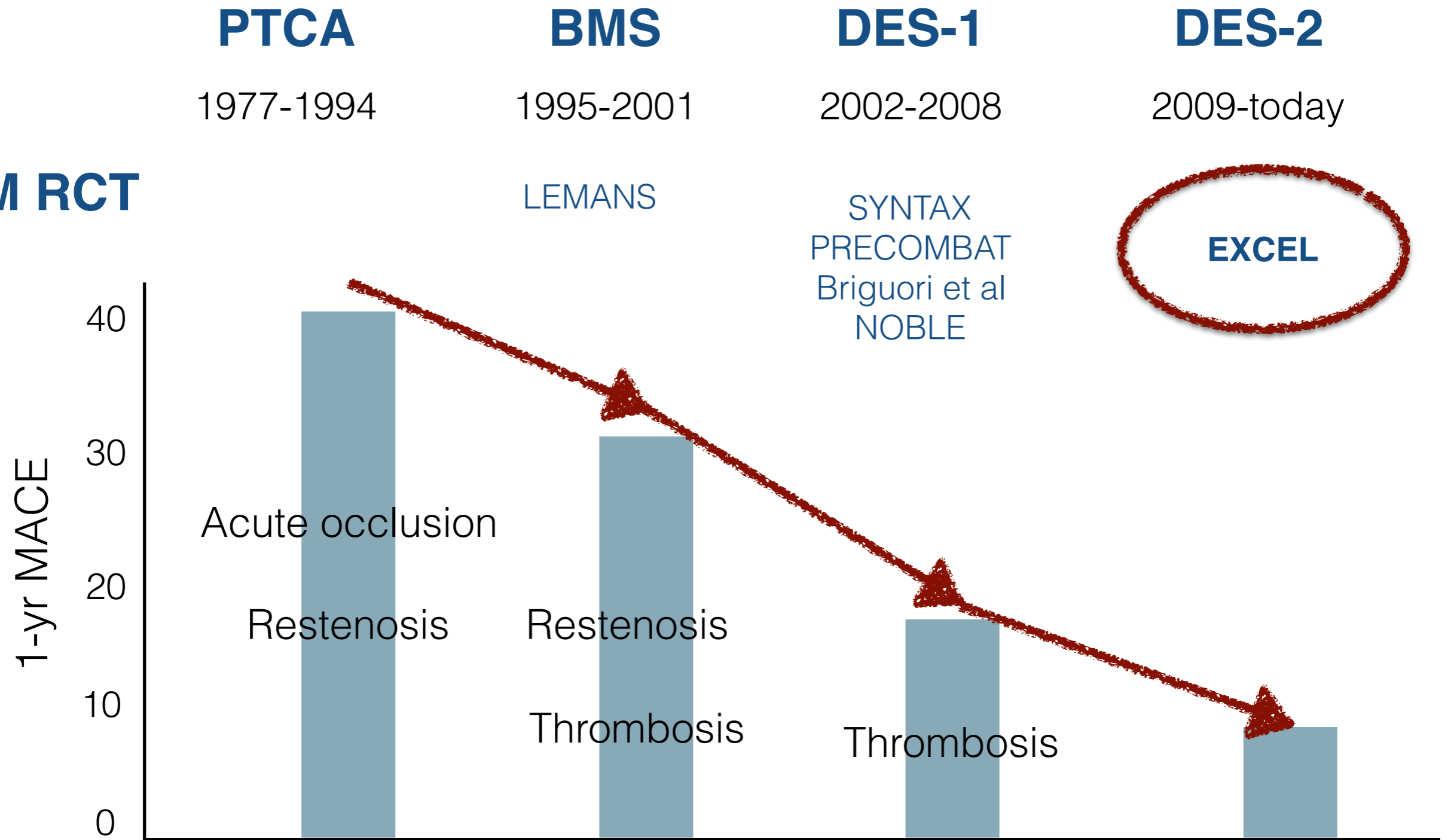
Serruys PW, et al. N Engl J Med 1994;331:489-95.  
 Stone GW, et al. JAMA. 2008;299:1903-13.  
 Moreno R, et al. Am J Cardiol. 2007;99:621-5.  
 Moreno R, et al. Eur Heart J. 2007;28:1583-91.

Morice MC, et al. N Engl J Med. 2002;346:1773-80.  
 Moreno R. Rev Esp Cardiol. 2005;58:842-62.  
 Moreno R, et al. J Am Coll Cardiol. 2005;45:954-9.  
 Moreno R, et al. EuroIntervention. 2011;6:1003-10.



# The history of PCI: clinical events

## LM RCT

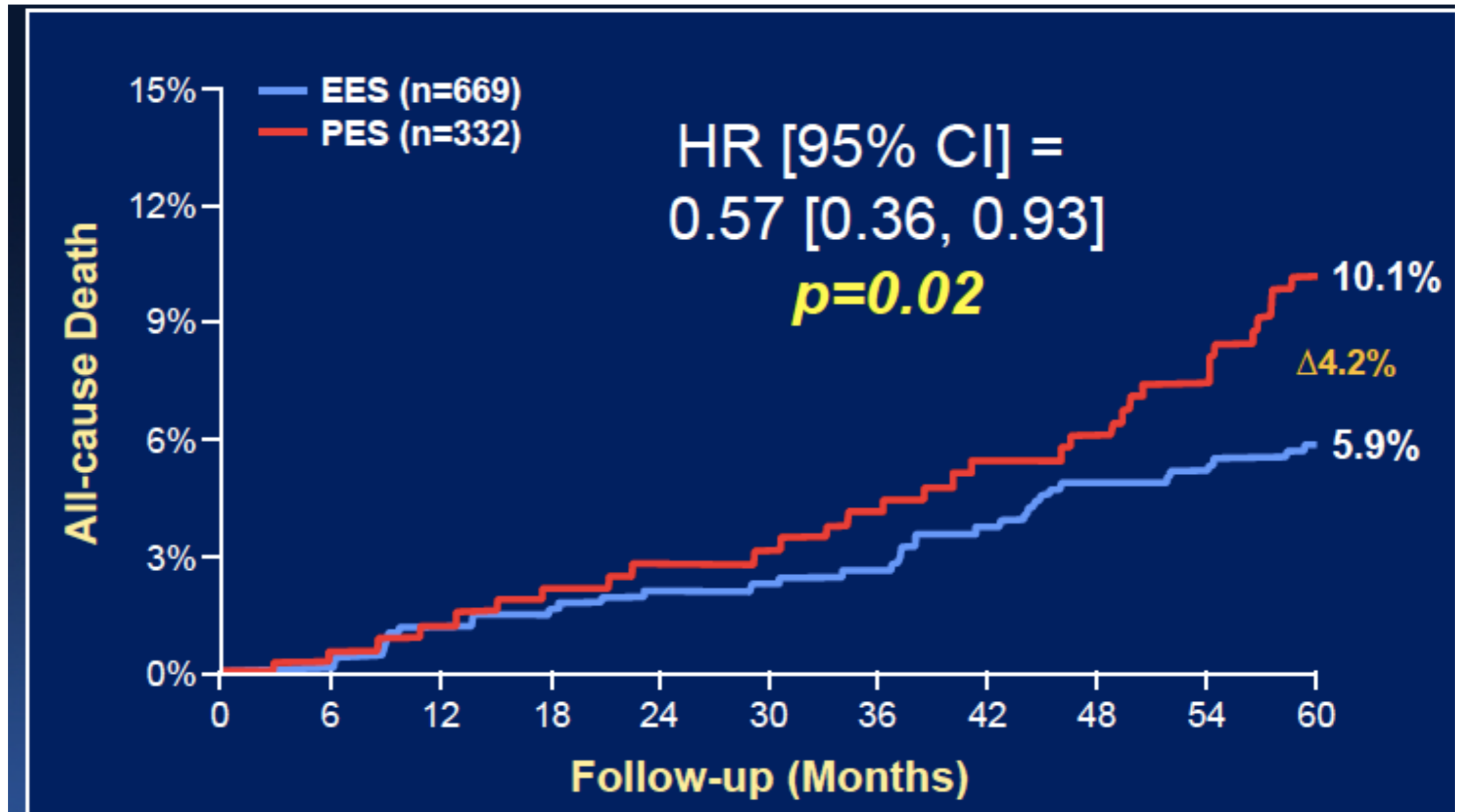


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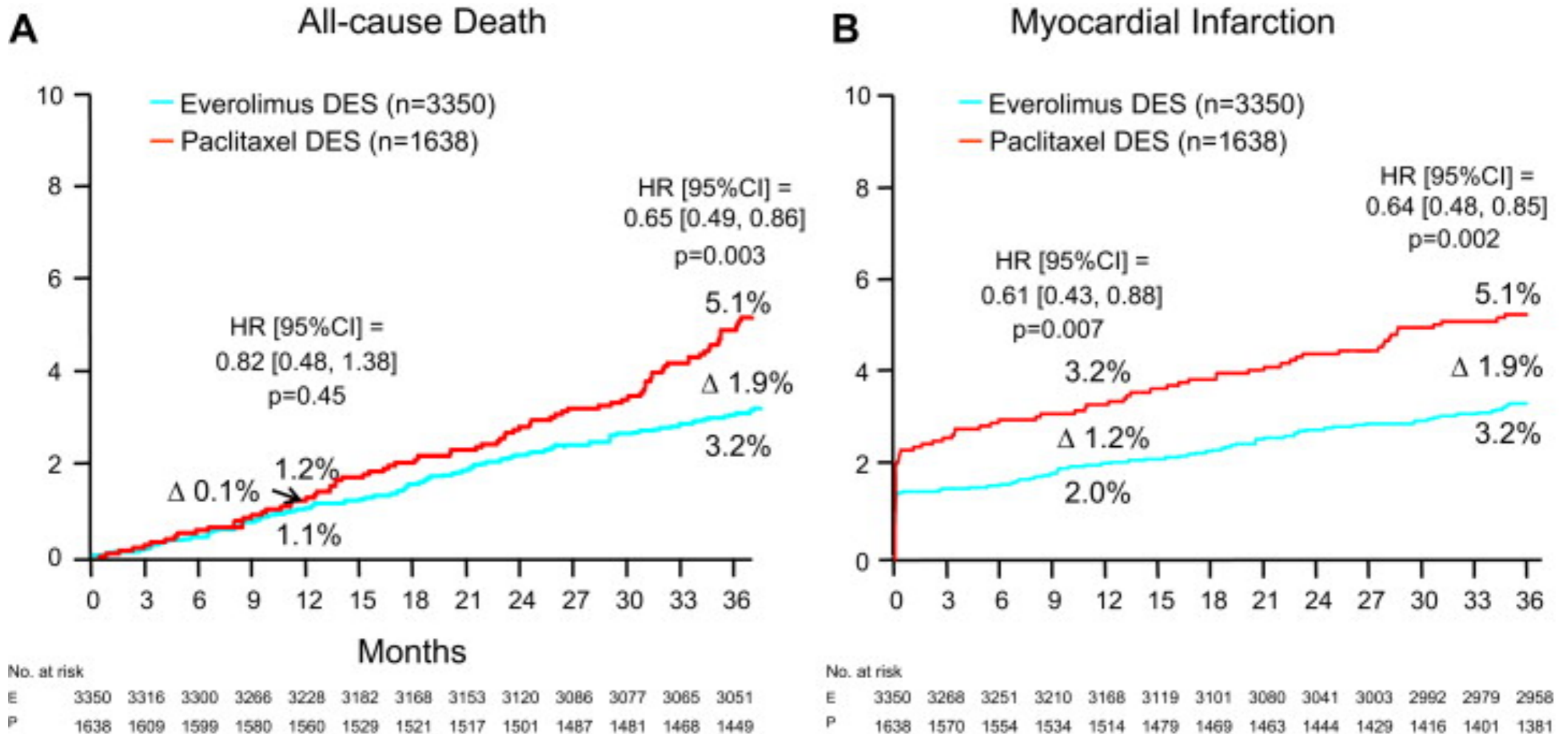
# The benefit of second-generation DES

## 5-Year Survival Benefit of 2<sup>nd</sup> generation DES: SPIRIT III



# The benefit of second-generation DES

## Meta-analysis from the SPIRIT trials





# Study Design

2900 pts with unprotected left main disease

↓  
SYNTAX score  $\leq 32$

Consensus agreement of eligibility and equipoise by heart team

↓  
Yes  
(N=1900)

→ No  
(N=1000)

↓  
Enrollment  
registry

Stratified by diabetes, SYNTAX score and center

R

PCI (Xience EES)  
(N=950)

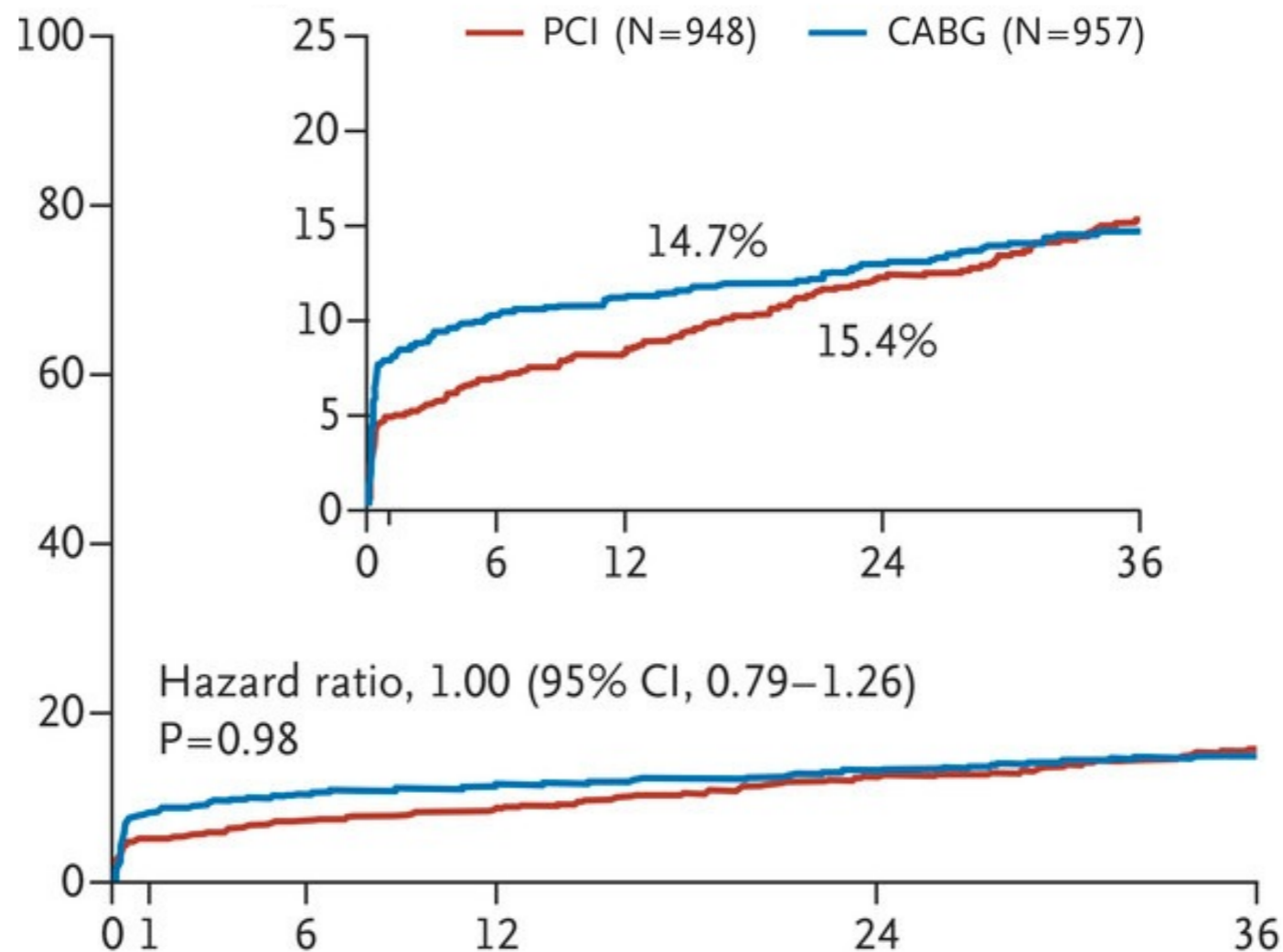
CABG  
(N=950)

Follow-up: 1 month, 6 months, 1 year, annually through 5 years

Primary endpoint: Measured at a median 3-yr FU, minimum 2-yr FU

# EXCEL

Primary end-point (%):  
Death, MI, stroke.



	PCI (N=948)		CABG (N=957)		Hazard Ratio (95% CI)	P Value for Interaction
	Events/total patients	Event rate	Events/total patients	Event rate		
≤22	28/294	10.3	46/364	13.3	0.71 (0.44–1.13)	0.49
23–32	65/391	17.6	55/345	16.5	1.02 (0.71–1.47)	
≥33	37/229	16.9	30/217	14.3	1.15 (0.71–1.87)	

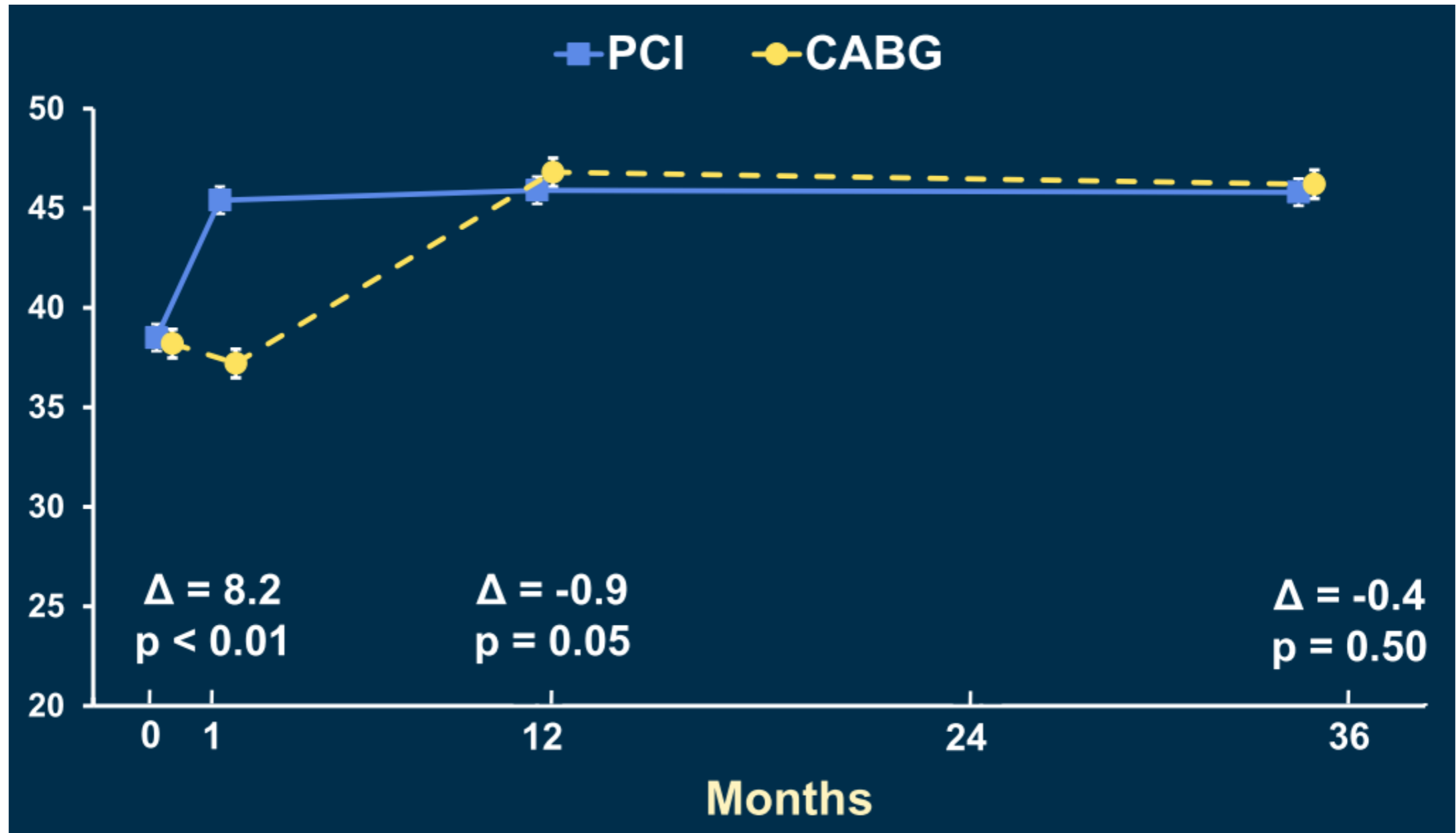
0.1    0.5    0.8    1.0    1.5    2.0    5.0

← PCI Better                      CABG Better →



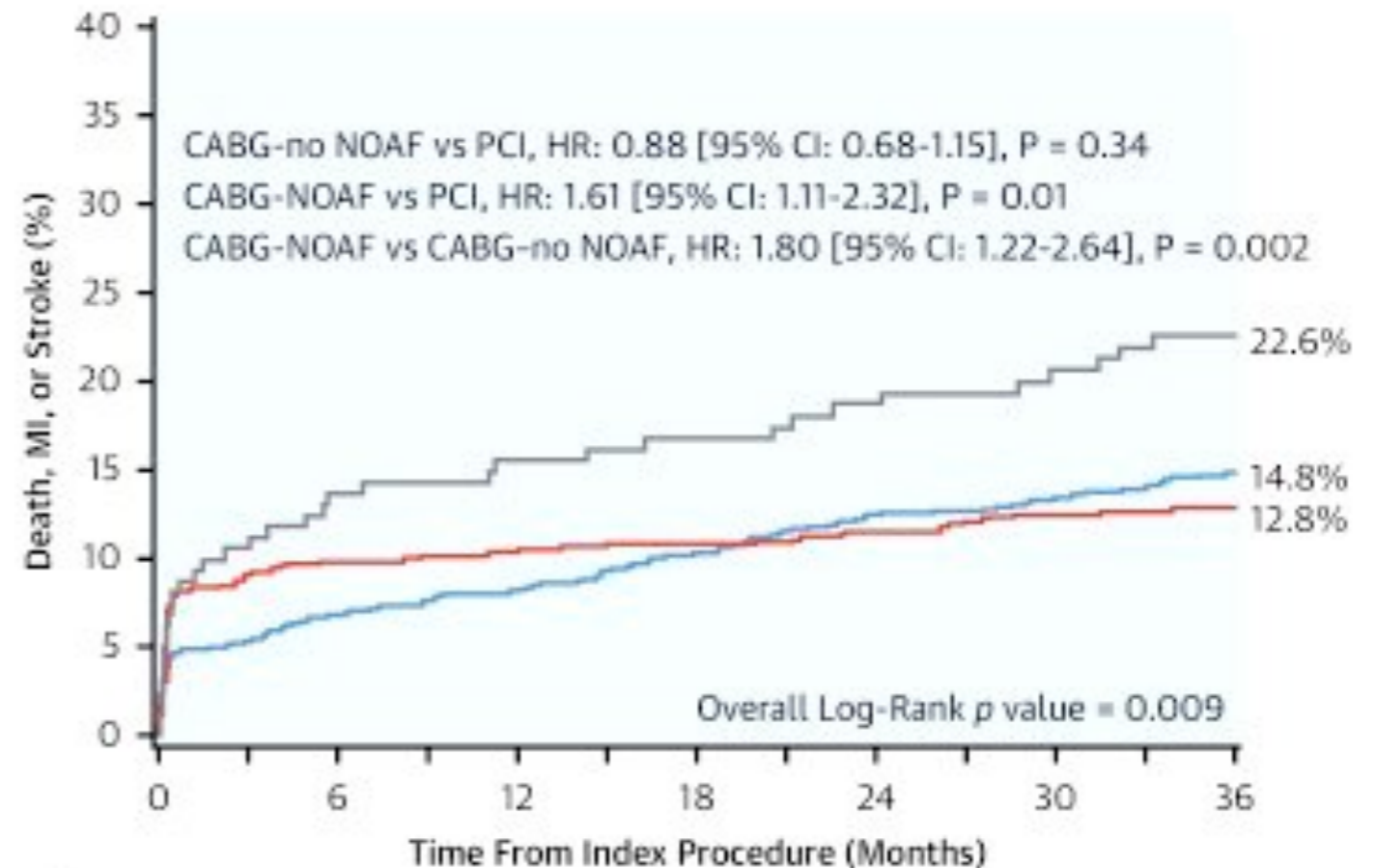
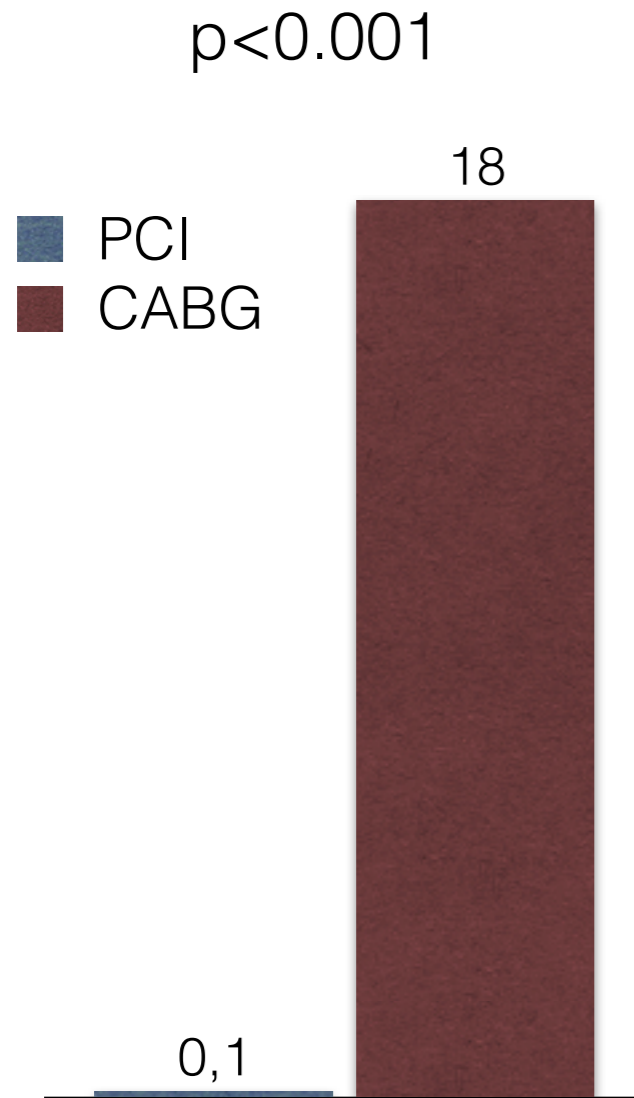
# EXCEL: quality of life

## SF-12 Physical summary scale



All revascularization at 3 yr: 12.9% vs 7.6% <0.001

# EXCEL: new-onset AF after revascularization

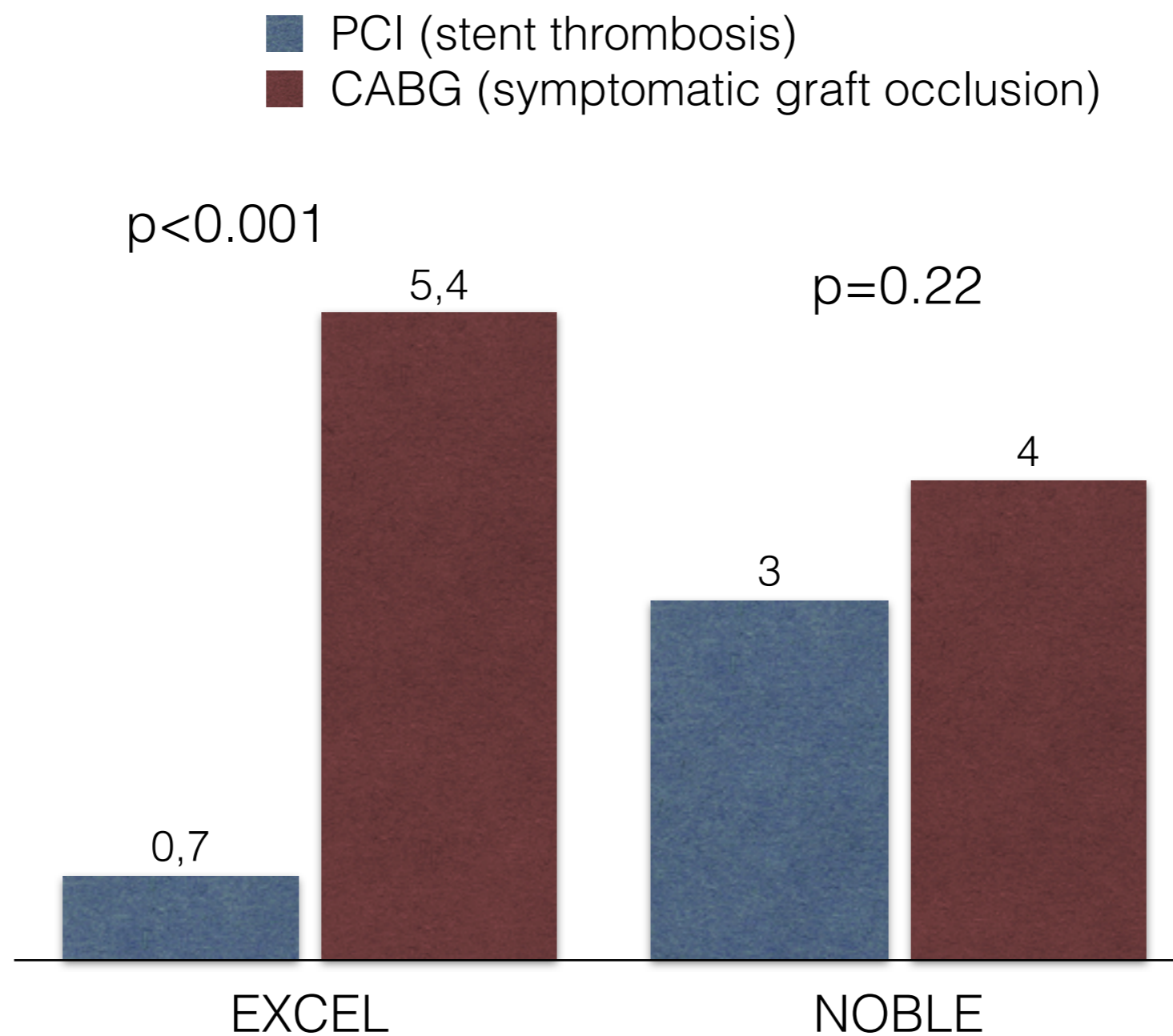


Number at risk

All PCI	919	855	837	811	789	773	696
CABG, no NOAF	732	652	641	632	627	609	553
CABG, NOAF	161	139	136	130	127	122	111

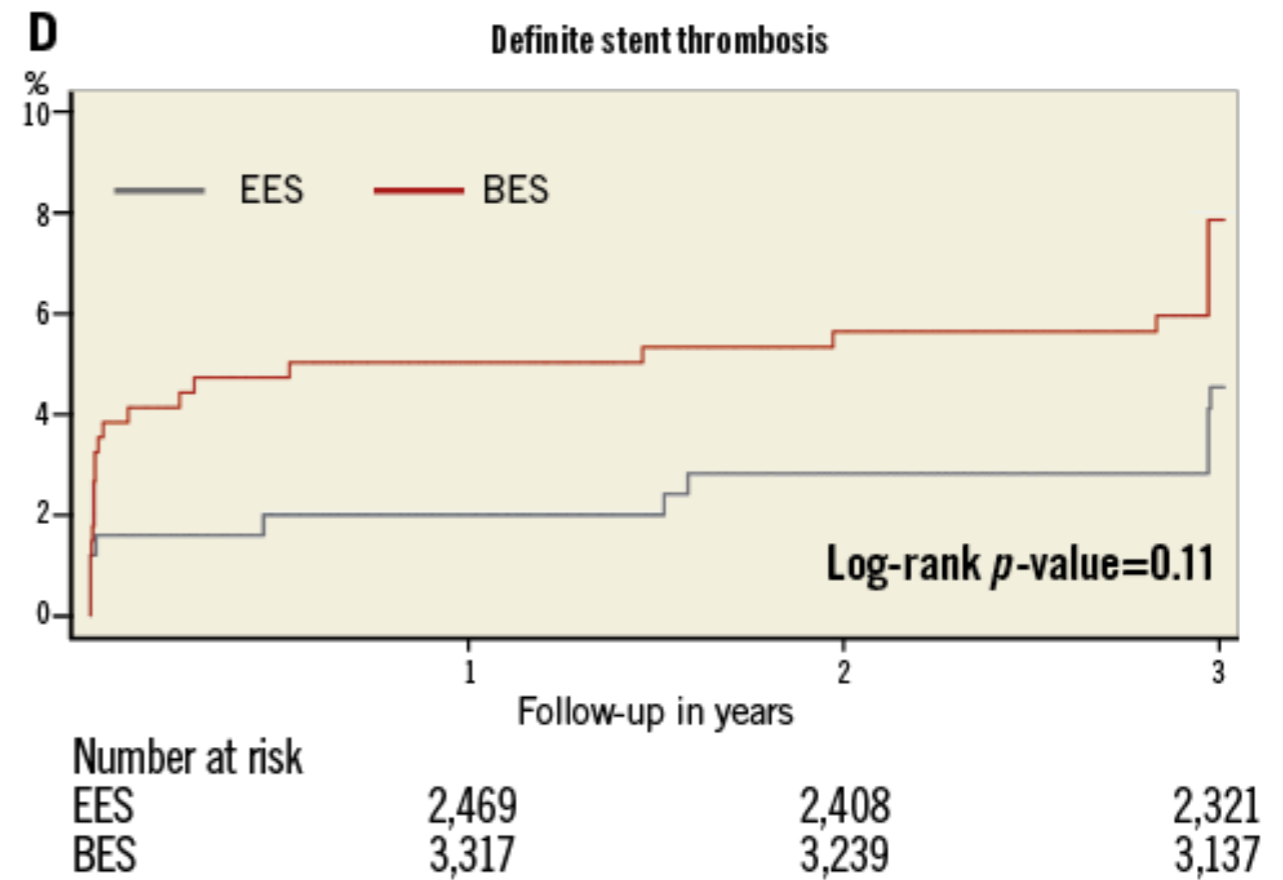
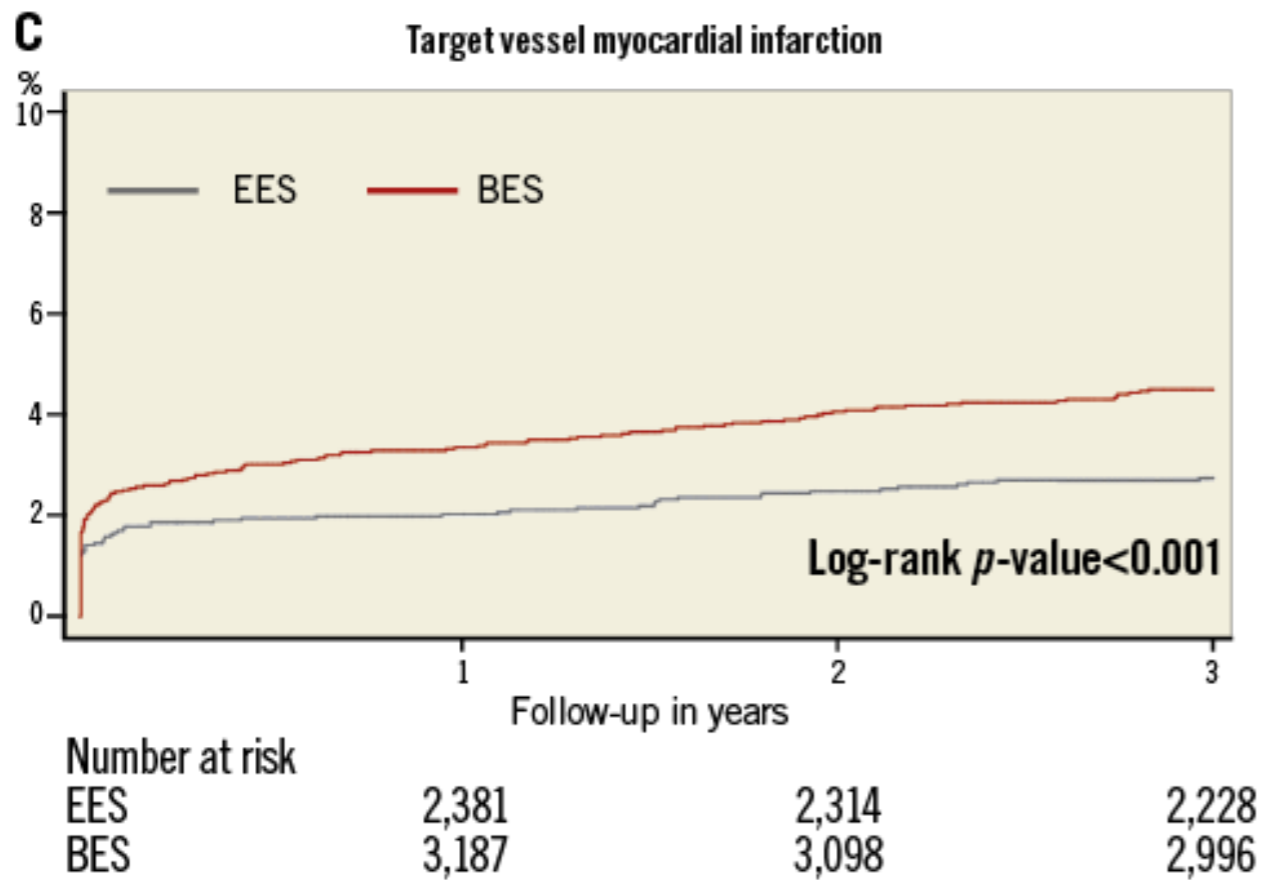
— All PCI — CABG, no NOAF — CABG, NOAF

# Definitive stent thrombosis vs symptomatic graft occlusion



## NOBLE and EXCEL: is this a controversy between 2 different types of DES?

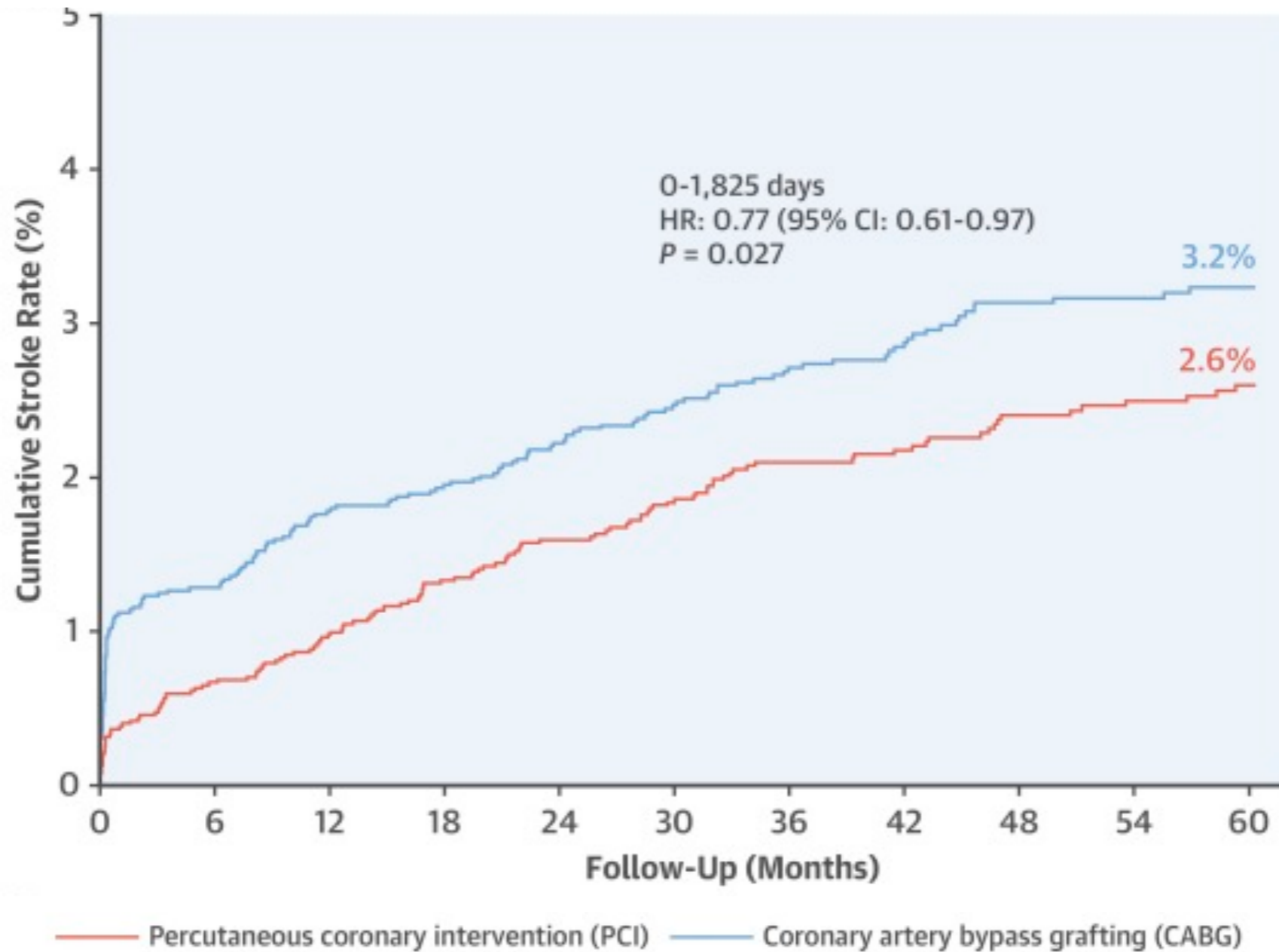
all-comers NEXT and COMPARE II clinical trials randomly assigned 5,942 patients to BP-BES (N=3,412) or DP-EES (N=2,530).





# Stroke after PCI vs CABG

Meta-analysis from 11 RCT (11,518)



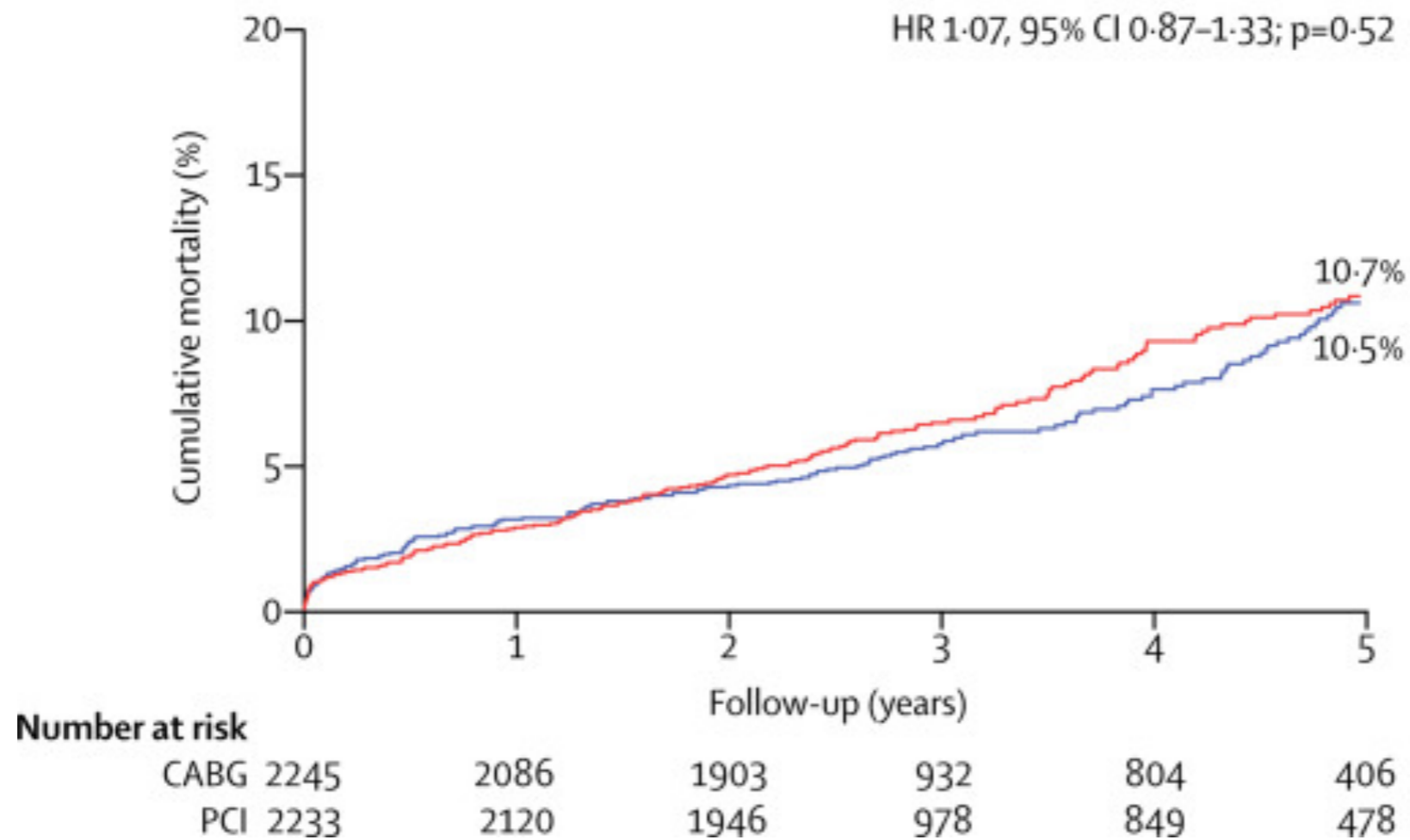


# MORTALITY

**Meta-analysis from 11 RCT (11,518)  
comparing PCI and CABG**

This is what really matters

4,478 (38.9%) with LMD

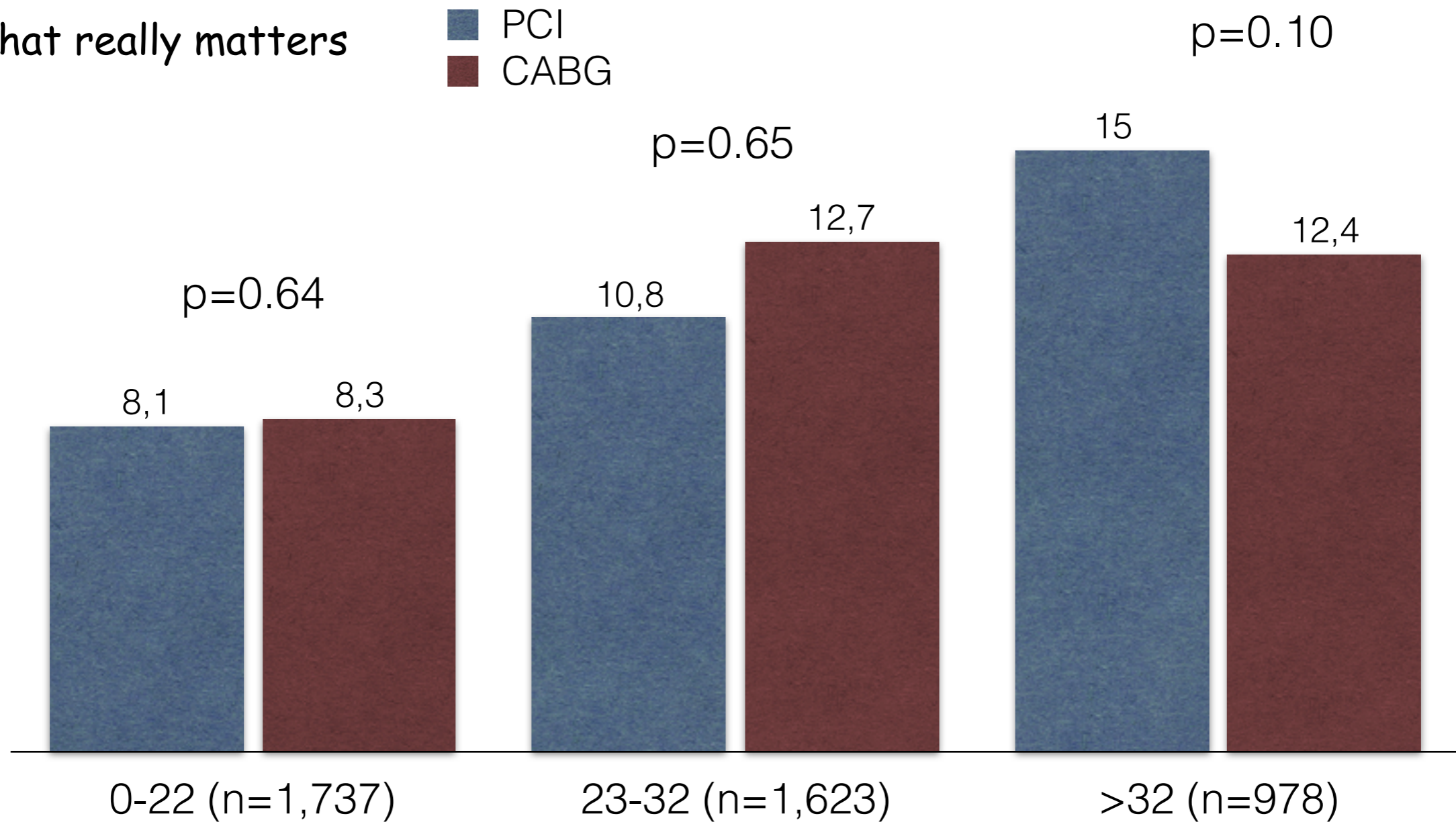




This is what really matters

## Meta-analysis from 11 RCT (11,518) comparing PCI and CABG

4,478 (38.9%) with LMD

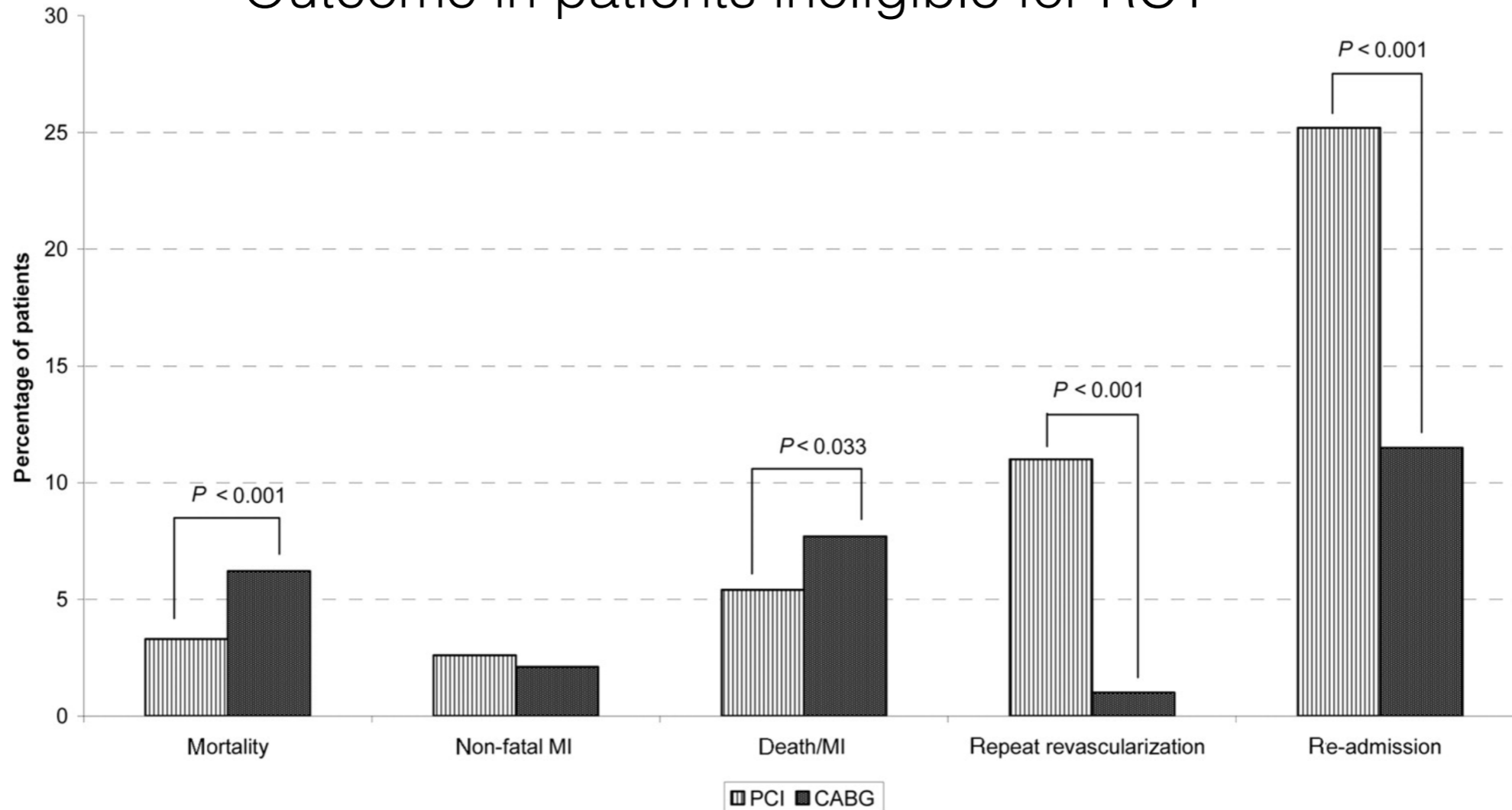


# What happens in real life?

## Euro HEART Survey on revascularization

Only 36% of patients are eligible for RCT

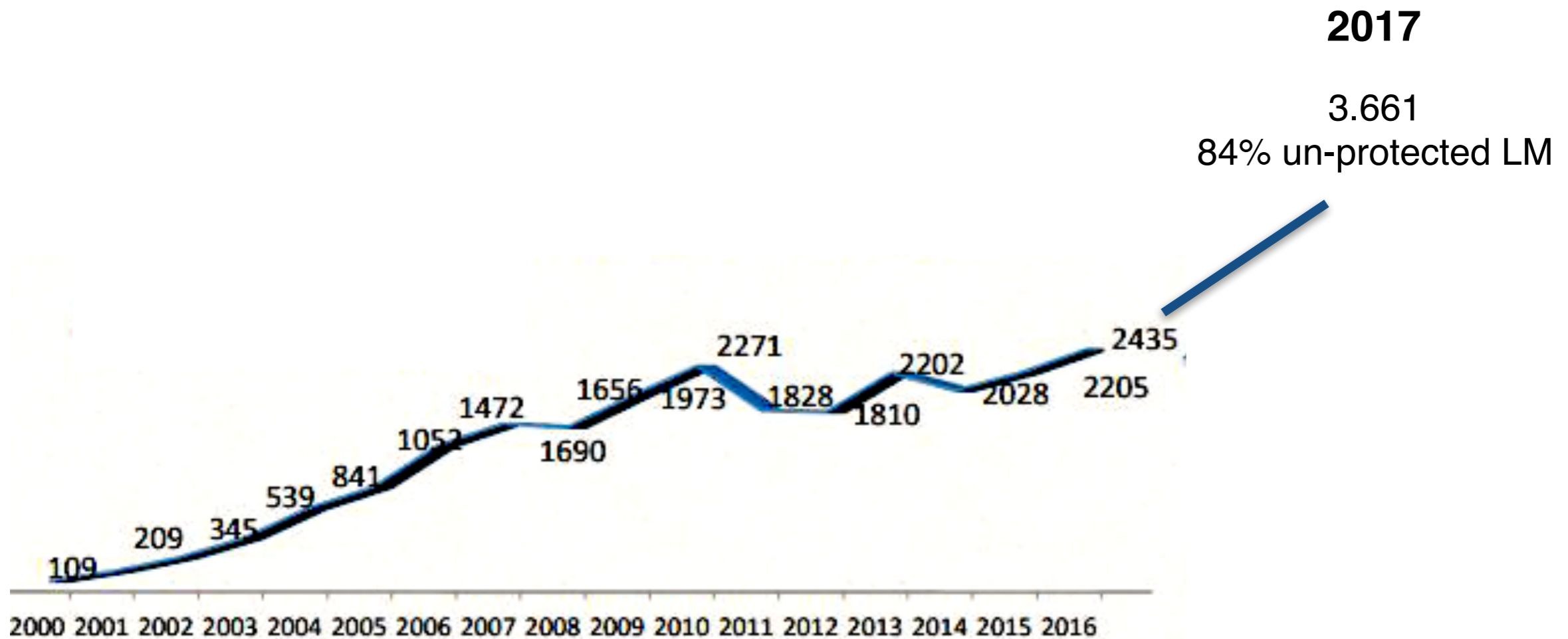
Outcome in patients ineligible for RCT





# What happens in real life?

## Data in Spain



## PCI vs CABG in Left Main Disease

- **Similar mortality** at long term for both strategies.
- **PCI: less invasive**, earlier recovery (QOL).
- **PCI: less complications** (renal failure, stroke, arrhythmia, bleeding, infection, etc).
- CABG: less new revascularizations. But!
  - NNT is  $\approx 20$ .
  - Symptomatic graft occlusion is more frequent than ST  
(graft occlusion usually not treated).
- So, the majority of LM cases should be treated with PCI.
- Which cases could be left for surgery in the current era (second-generation DES)? Those with Syntax score  $\geq 33$  AND low surgical risk.

# A proposal for LMD

## SYNTAX SCORE

