Updated RCT Long-term Data and Meta-analyses for LM Revascularization

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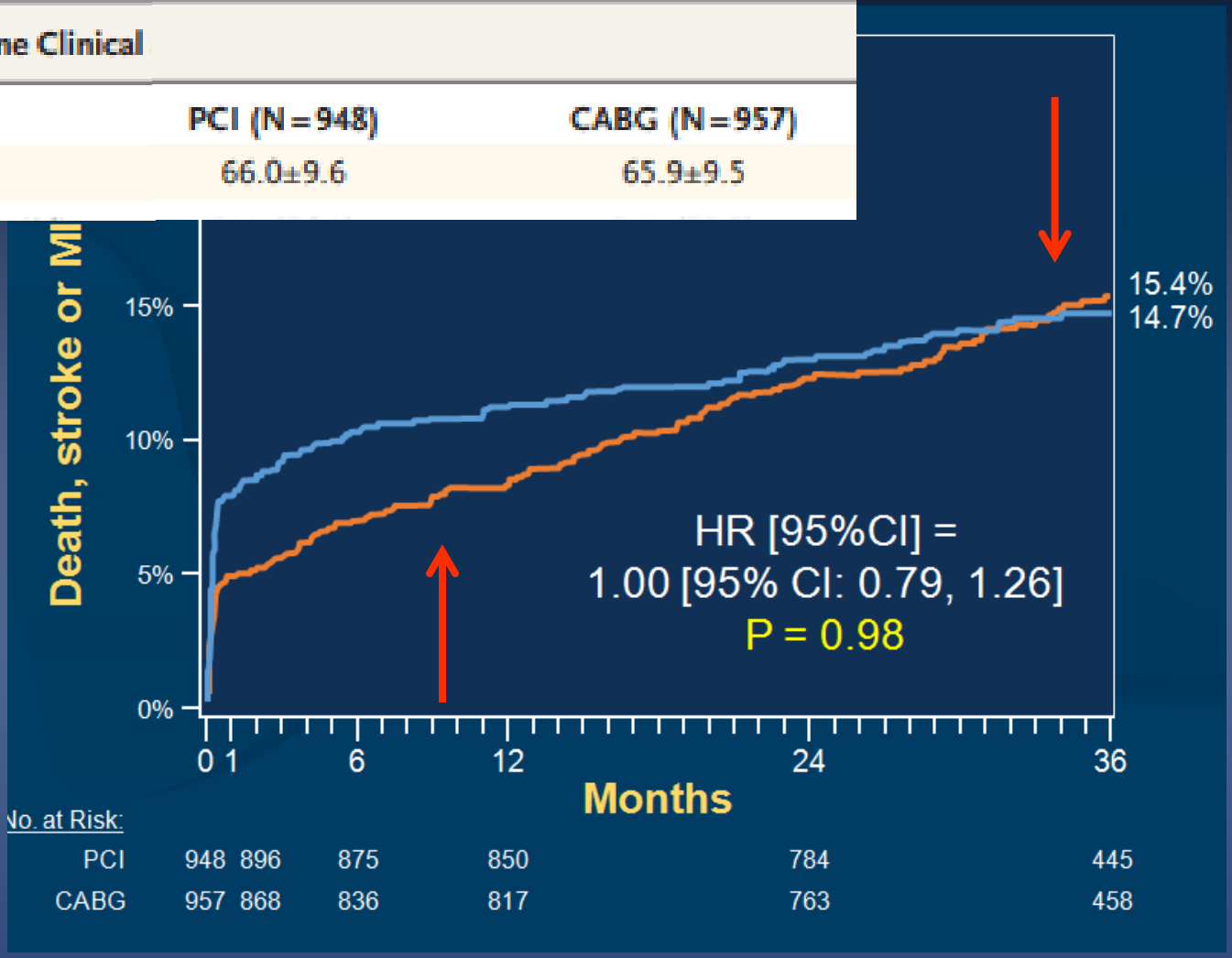
Disclosure

- None

EXCEL: 3-year follow up

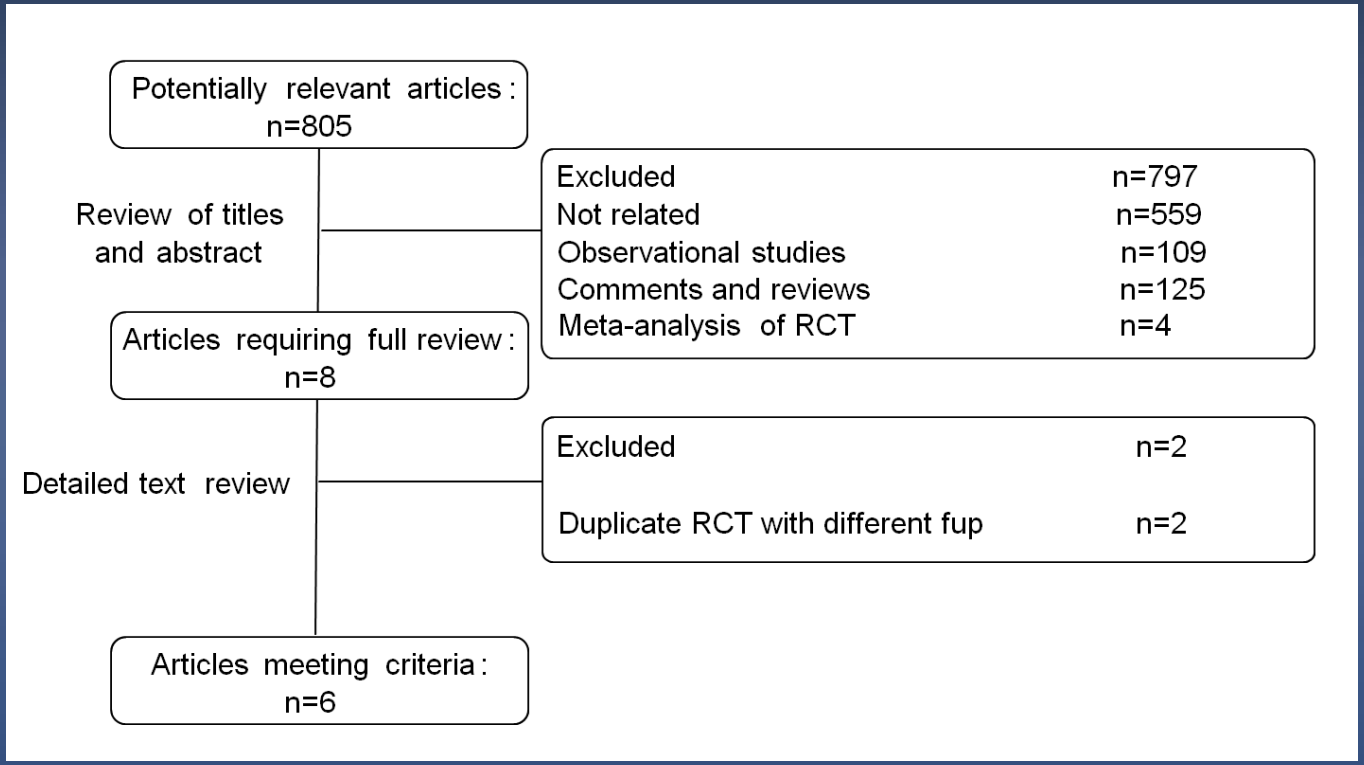
Table 1. Baseline Clinical

Characteristic	PCI (N=948)	CABG (N=957)
Age — yr	66.0±9.6	65.9±9.5



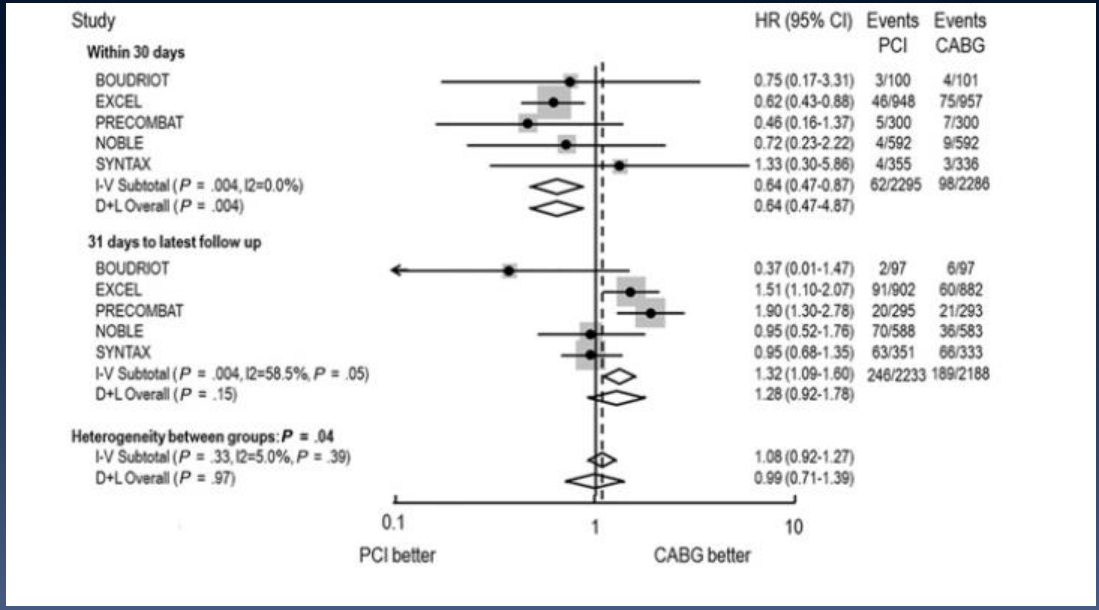
Stone et al; nejm 2016

Clinical outcomes with percutaneous coronary revascularization vs coronary artery bypass grafting surgery in patients with unprotected left main coronary artery disease: A meta-analysis of 6 randomized trials and 4,686 patients

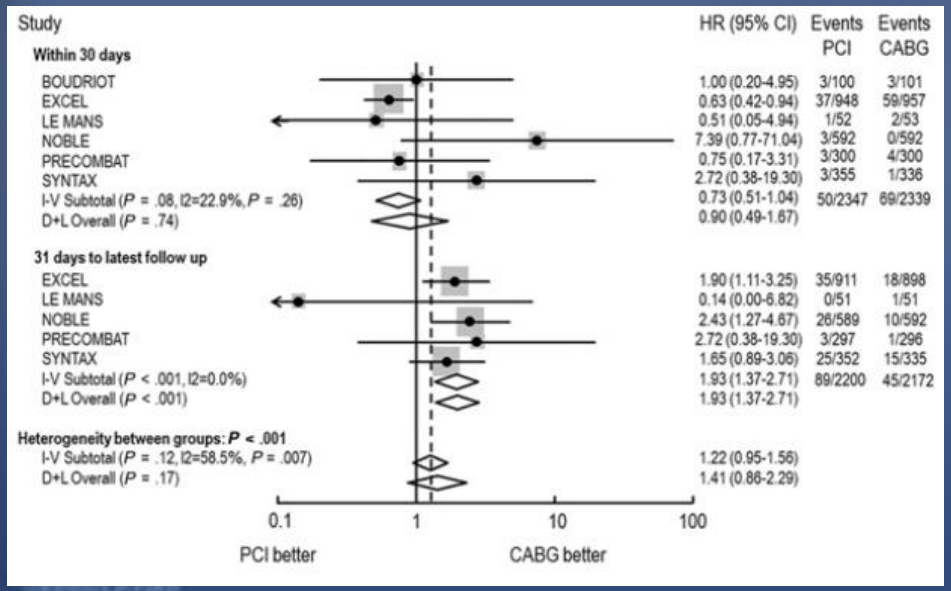


Palmerini et al; Am Heart J 2017

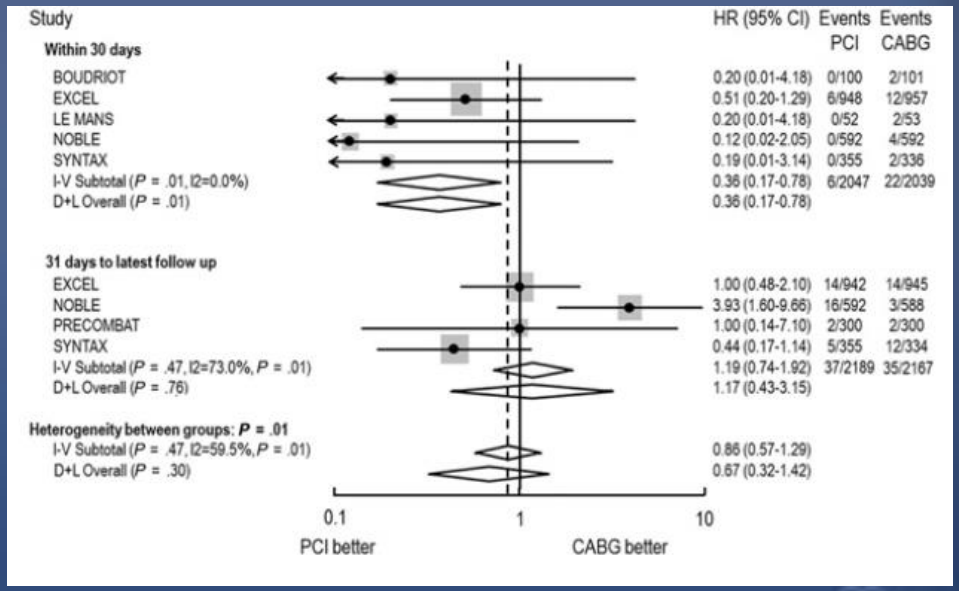
Death, MI, stroke



Myocardial infarction



Stroke

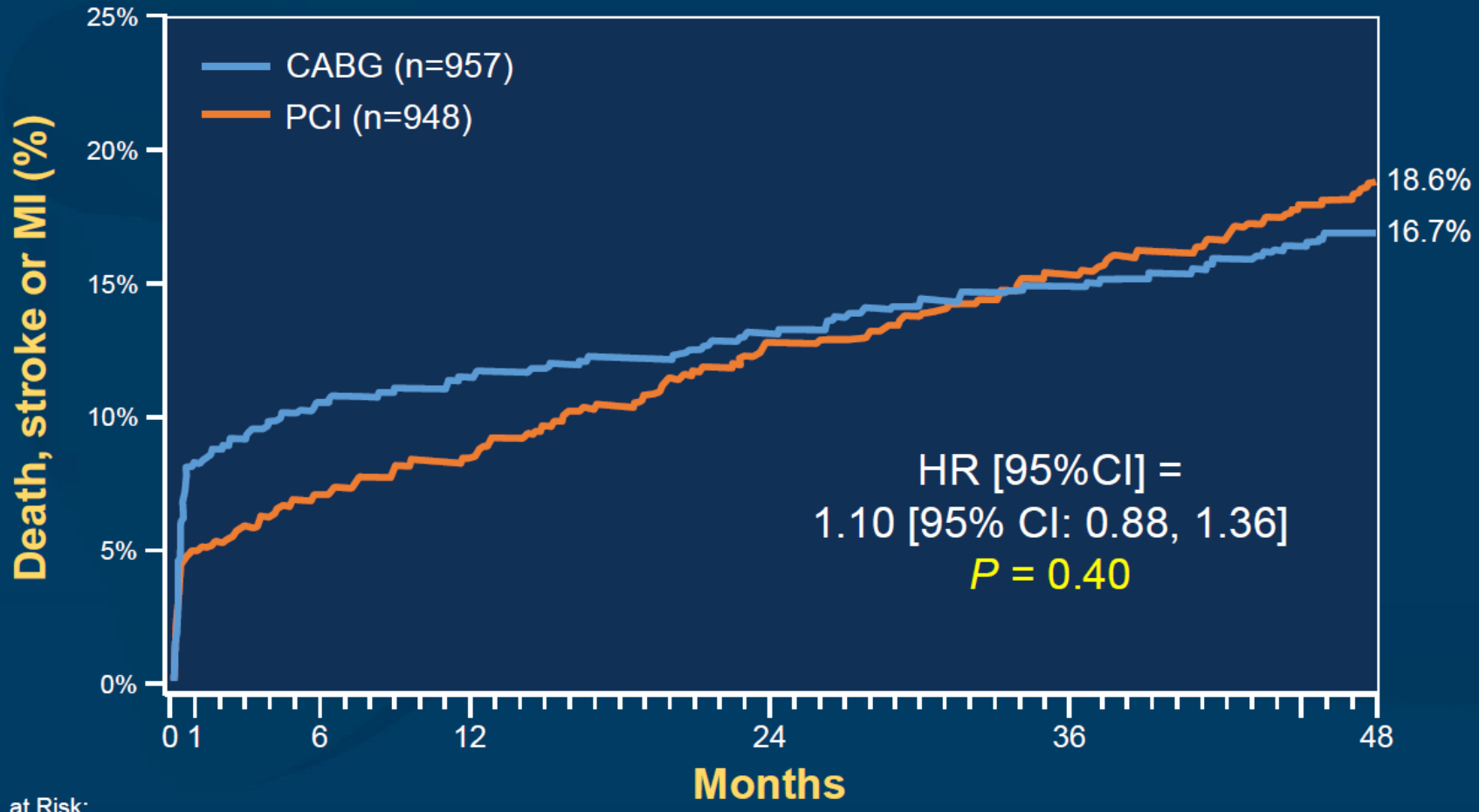


Palmerini et al; Am Heart J 2017

EXCEL

Primary Endpoint

Death, Stroke or MI at 4 Years

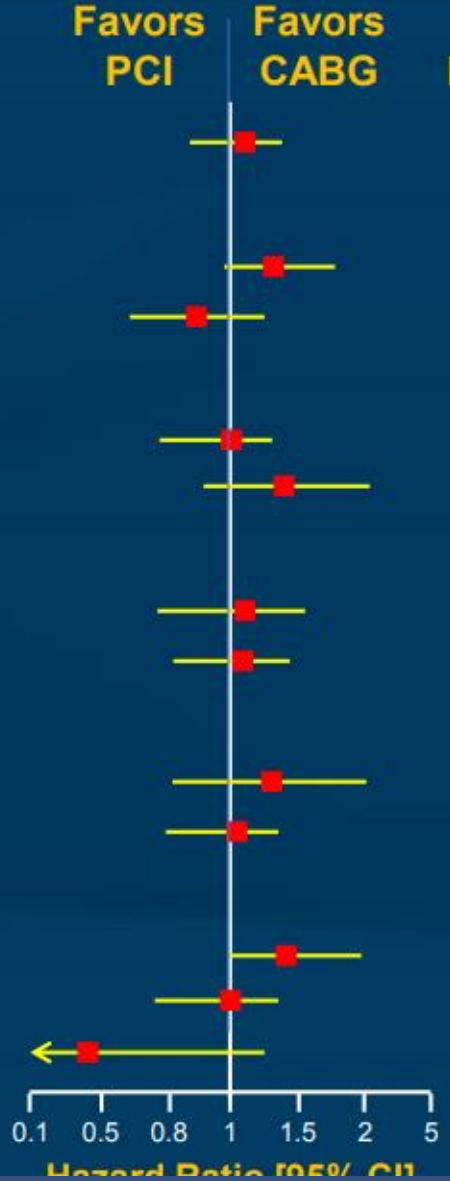


No. at Risk:

PCI	948	896	874	854	809	744	682
CABG	957	864	832	818	788	760	687

Stone, TCT 2018

Subgroup	PCI (N=948)	CABG (N=957)	HR [95% CI]	P (Int)
All patients	18.6%	16.7%	1.10 [0.88, 1.36]	
Age (median cutoff)				
- ≥67 years	22.7%	17.4%	1.31 [0.98, 1.76]	0.09
- <67 years	14.8%	15.9%	0.89 [0.64, 1.23]	
Sex				
- Male	17.3%	16.5%	1.01 [0.78, 1.30]	0.20
- Female	23.0%	17.3%	1.40 [0.91, 2.16]	
Diabetes mellitus				
- Yes	24.4%	21.7%	1.10 [0.76, 1.59]	0.98
- No	16.5%	14.8%	1.09 [0.83, 1.43]	
Chronic kidney disease				
- eGFR ≤60 ml/min	28.1%	22.0%	1.30 [0.82, 2.08]	0.42
- eGFR >60 ml/min	16.7%	15.5%	1.05 [0.81, 1.34]	
Geographic location				
- North America	20.3%	14.6%	1.40 [0.99, 2.00]	0.30
- Europe	18.0%	17.6%	1.00 [0.75, 1.33]	
- Other	9.6%	22.2%	0.37 [0.08, 1.21]	



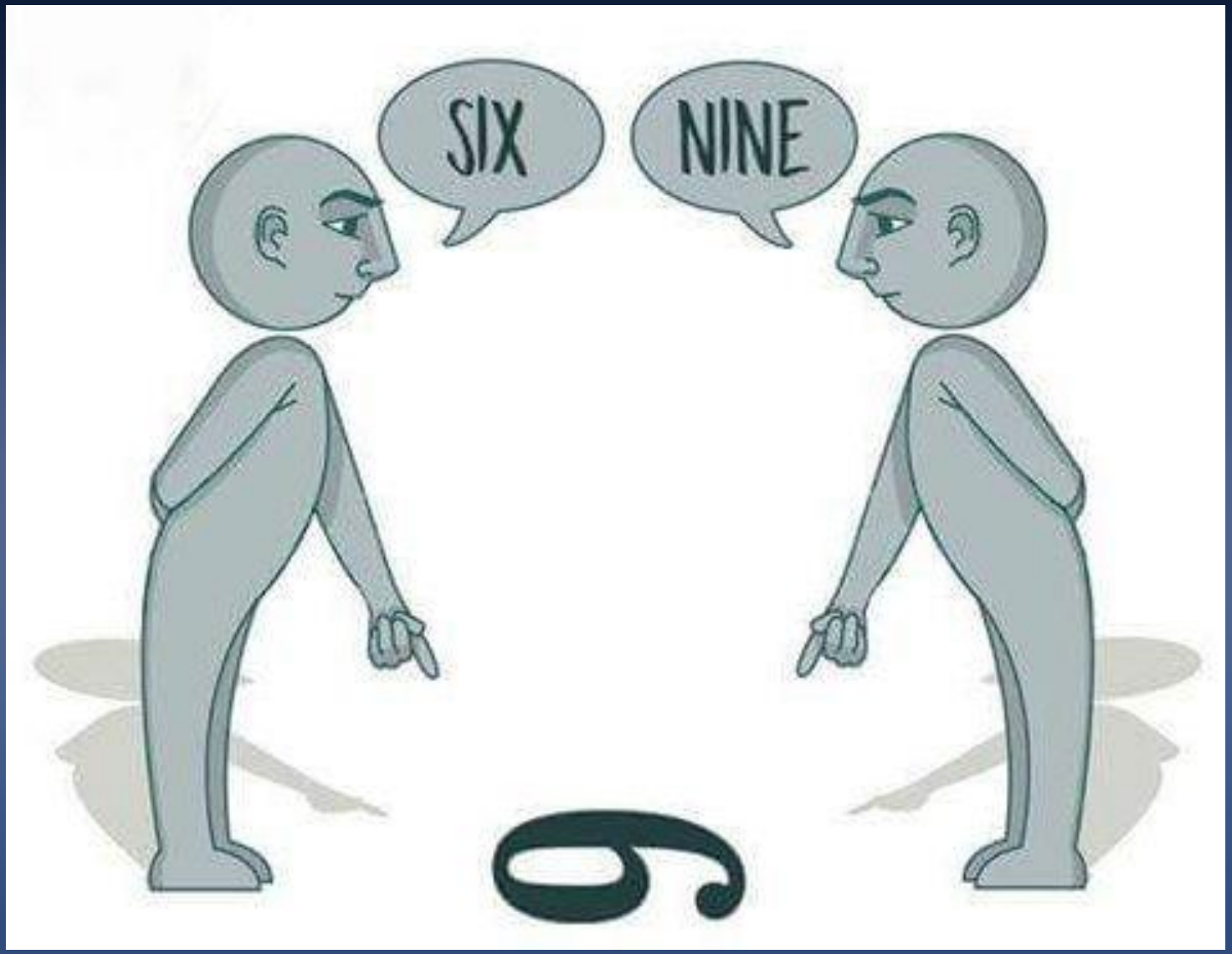
Stone, TCT 2018

Adjudicated outcomes at 4 years

	PCI (n=948)	CABG (n=957)	HR [95%CI]	P-value
Death, stroke or MI (1˚ endpoint)	18.6%	16.7%	1.10 [0.88, 1.36]	0.40
- Death	10.3%	7.4%	1.39 [1.02, 1.89]	0.04
- Definite cardiovascular	4.3%	3.6%	1.17 [0.74, 1.86]	0.50
- Definite non-cardiovascular	5.3%	3.3%	1.61 [1.01, 2.56]	0.04
- Undetermined cause	1.1%	0.7%	1.49 [0.53, 4.19]	0.45
- Stroke	2.6%	3.3%	0.76 [0.44, 1.31]	0.32
- MI	9.5%	8.8%	1.05 [0.77, 1.42]	0.76
- Peri-procedural	3.9%	6.1%	0.65 [0.43, 0.98]	0.04
- Spontaneous	5.7%	3.2%	1.77 [1.12, 2.82]	0.01
- STEMI	1.9%	2.8%	0.65 [0.35, 1.19]	0.16
- Non-STEMI	7.8%	6.3%	1.22 [0.86, 1.72]	0.26

Stone, TCT 2018

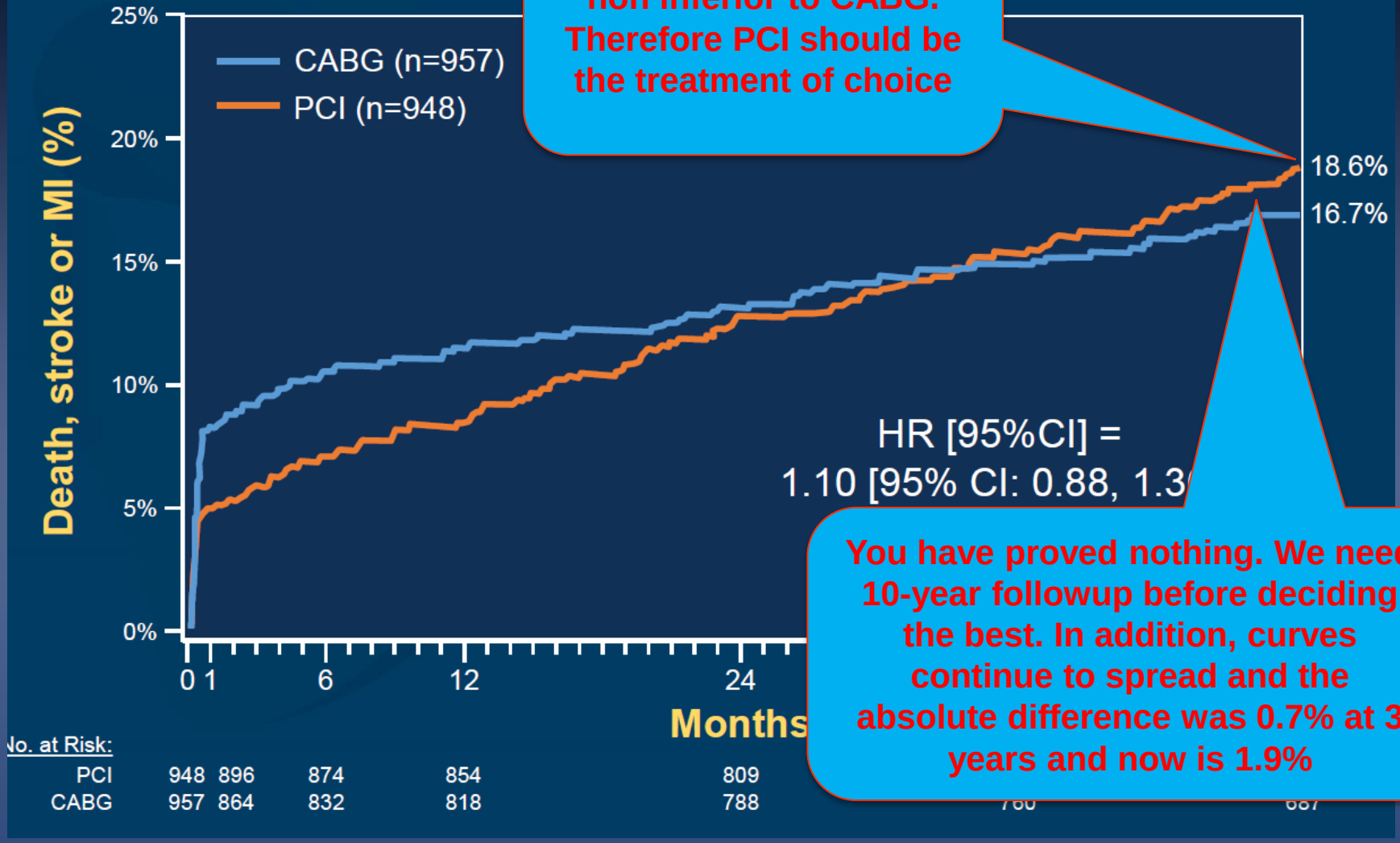
Rashomon effect



EXCEL

Primary Endpoint

Death, Str… Years



Look, at 4 year PCI is still non inferior to CABG. Therefore PCI should be the treatment of choice

You have proved nothing. We need 10-year followup before deciding the best. In addition, curves continue to spread and the absolute difference was 0.7% at 3 years and now is 1.9%

Stone, TCT 2018

Adjudicated outcomes at 4 years

Look, this is another proof that CABG reduces mortality compared to PCI

		G 57)	HR [95%CI]	P-value
Death, stroke or M			10 [0.88, 1.36]	0.40
- Death	10.3%	7.4%	1.39 [1.02, 1.89]	0.04
- Definite cardiovascular	4.3%	3.6%	1.17 [0.74, 1.86]	0.50
- Definite non-cardiovascular	5.3%	3.3%	1.61 [1.01, 2.56]	0.04
- Undetermined cause	1.1%	0.7%	1.49 [0.53, 4.19]	5
- Stroke	2.6%	3.3%	0.76 [0.44, 1.31]	
- MI	9.5%	8.8%	1.05 [0.77, 1.42]	
- Peri-procedural	3.9%	6.1%		
- Spontaneous	5.7%			
- STEMI	1.9%			
- Non-STEMI	7.8%			

This definetly the play of chance because cardiac mortality is similar and the difference is entirely driven by non-cardiovascular mortality

Stone, TCT 2018

Adjudicated outcomes at 4 years

	PCI (n=948)	CABG (n=957)	HR [95%CI]	P-value
Death, stroke, MI or IDR (2˚ endpoint)	28.0%	22.0%	1.27 [1.06, 1.53]	0.01
- Ischemia-driven revasc (IDR)	16.0%	9.2%	1.80 [1.37, 2.36]	<0.0001
- PCI	13.6%	8.4%	1.65 [1.24, 2.21]	0.0006
- CABG	3.8%	0.8%	4.84 [2.15, 10.92]	<0.0001
All revascularization	16.4%	9.4%	1.79 [1.37, 2.34]	<0.0001
Stent thrombosis, def/prob	1.8%	0.0%	-	<0.0001
- Definite	1.1%	0.0%	-	0.002
- Probable	0.7%	0.0%	-	0.01
- Early (0 - 30 days)	0.7%	0.0%	-	0.008
- Late (30 days – 1 year)	0.1%	0.0%	-	0.32
- Very late (1 year - 4 years)	0.9%	0.0%	-	0.005
Graft occlusion, symptomatic	0.0%	5.9%	-	<0.0001
Definite stent thrombosis or symptomatic graft occlusion	1.1%	5.9%	0.18 [0.09, 0.36]	<0.0001

Stone, TCT 2018

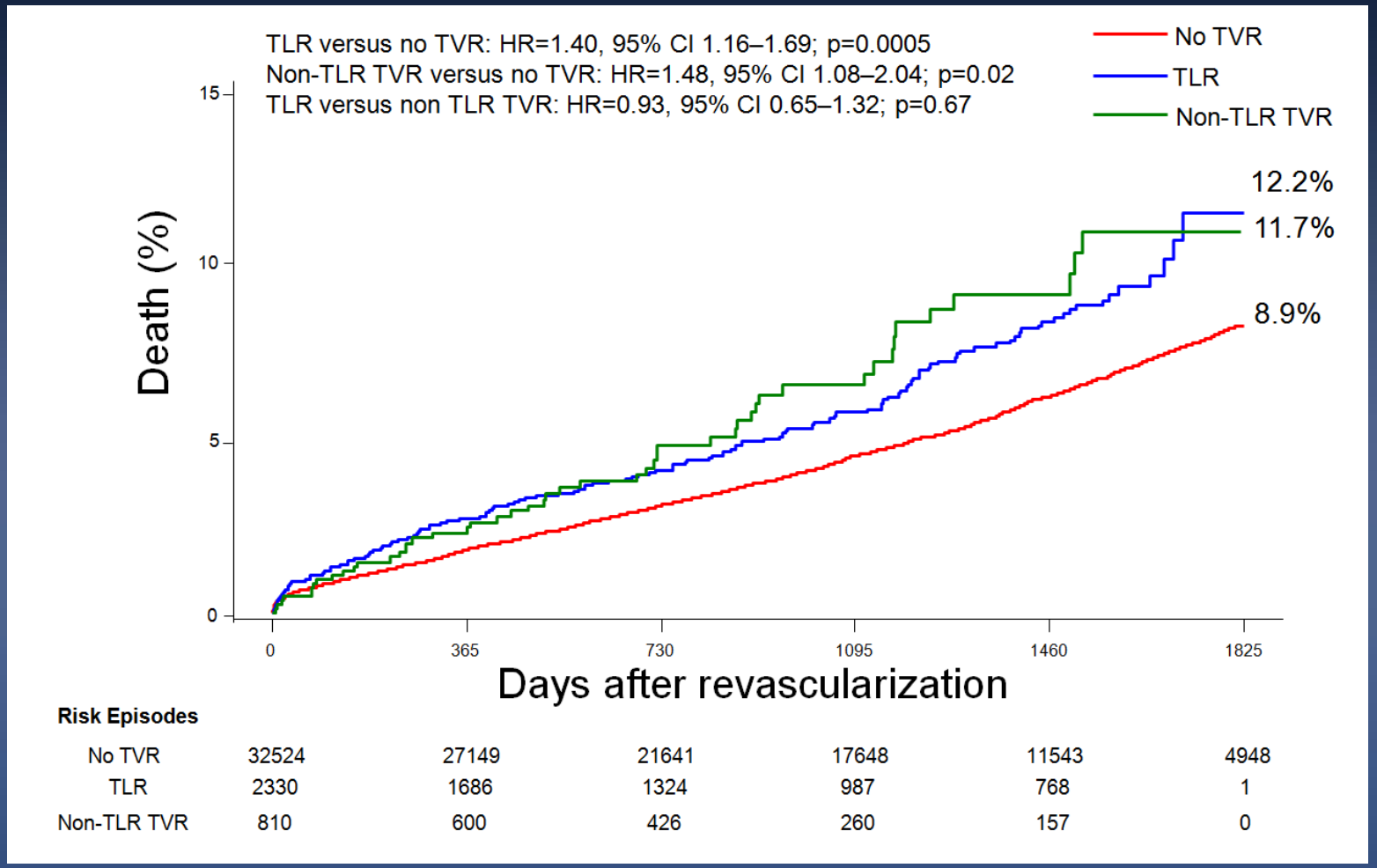
Mortality Following Nonemergent, Uncomplicated Target Lesion Revascularization After Percutaneous Coronary Intervention

An Individual Patient Data Pooled Analysis of 21 Randomized Trials and 32,524 Patients

Tullio Palmerini, MD,[a] Diego Della Riva, MD,[a] Giuseppe Biondi-Zoccai, MD, MSTAT,[b,c] Martin B. Leon, MD,[d,e] Patrick W. Serruys, MD, PHD,[f] Pieter C. Smits, MD,[g] Clemens von Birgelen, MD, PHD,[h] Ori Ben-Yehuda, MD,[d,e] Philippe Généreux, MD,[e,i,j] Antonio G. Bruno, MD,[a] Paul Jenkins, PHD,[e] Gregg W. Stone, MD[d,e]

JACC Int 2018

Simon Makuch analysis of mortality



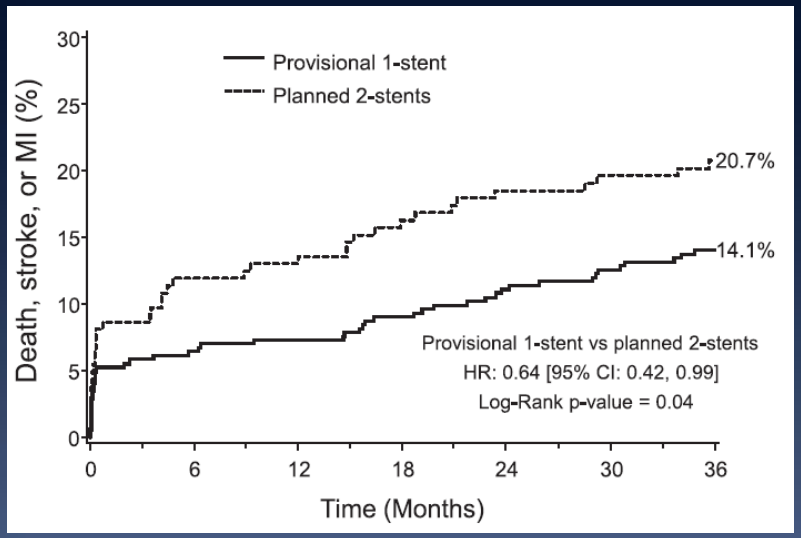
Palmerini et al; JACC Int 2018

Independent predictors of mortality

	HR (95% CI)	P value
TLR	1.23 (1.04-1.45)	0.02
Non-TLR TVR	1.23 (0.83-1.82)	0.31
MI or ST during fup	4.26 (3.16-5.74)	<0.0001
Age (per 1 year)	1.07 (1.07-1.08)	<0.0001
Diabetes	1.60 (1.46-1.76)	<0.0001
Male sex	1.16 (1.08-1.25)	<0.0001
Previous CABG	1.35 (1.21-1.52)	<0.0001
Previous MI	1.32 (1.23-1.40)	<0.0001
Presentation with MI	1.47 (1.23-1.75)	<0.0001

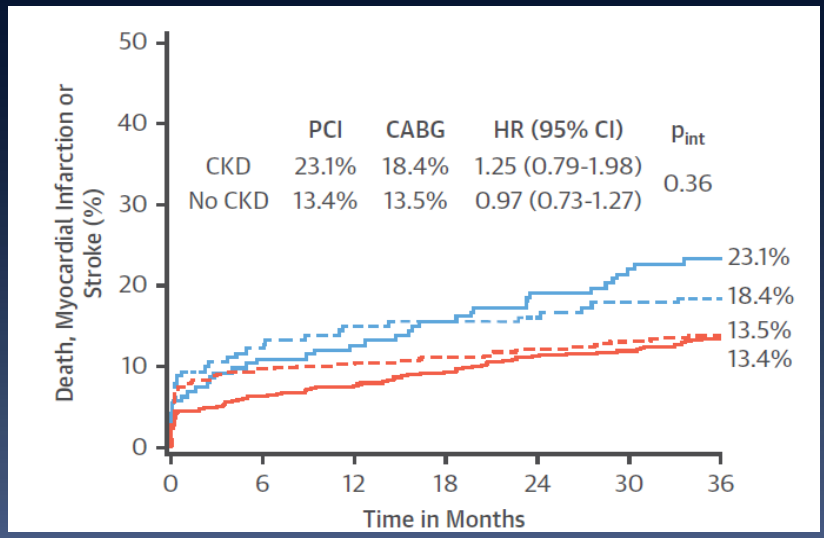
Palmerini et al; JACC Int 2018

Bifurcation technique



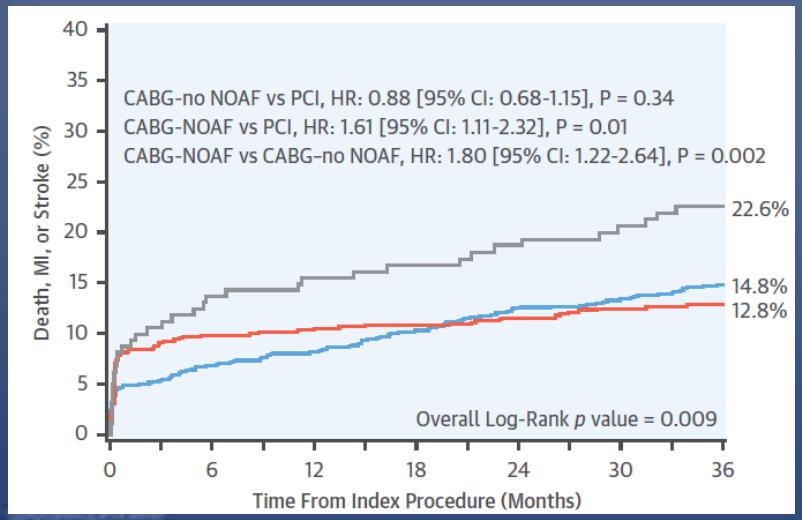
Kandzari et al; Circ Cv Int 2018

Chronic kidney disease



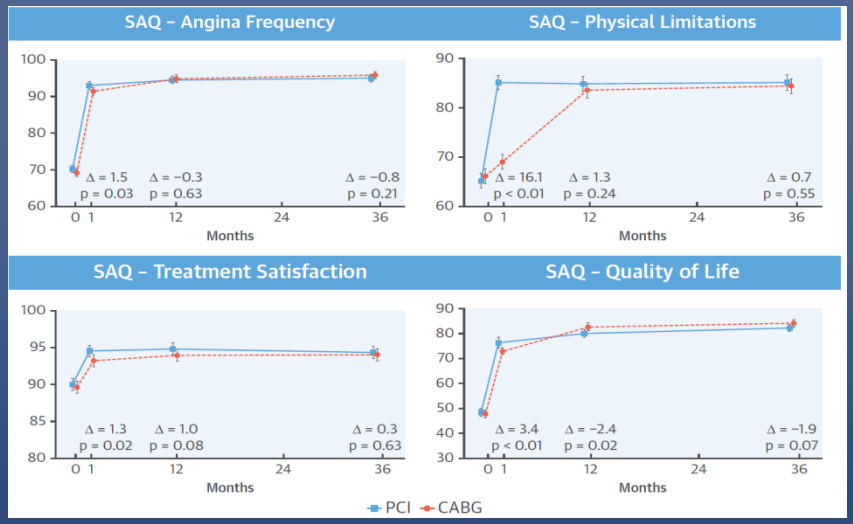
Giustino et al; JACC 2019

Atrial Fibrillation



Kosmidou et al; JACC 2018

Quality of life

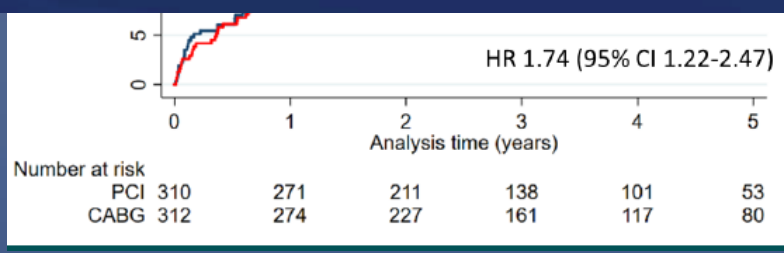


Baron et al; JACC 2018

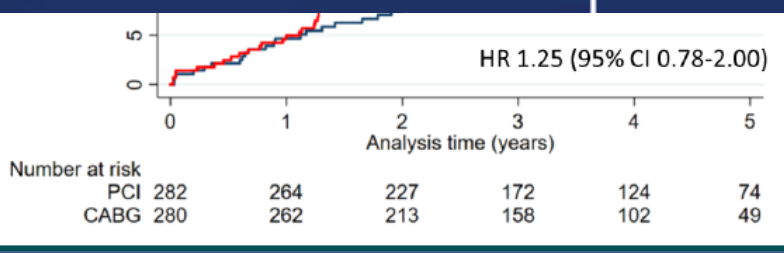
Updated analyses from NOBLE: analysis stratified by age

Subgroup	PCI (N=948)	CABG (N=957)	HR [95% CI]	Favors PCI	Favors CABG	P (Int)
All patients	15.4%	14.7%	1.00 [0.79, 1.26]			
Age (median cutoff)						
- ≥67 years	18.7%	15.0%	1.22 [0.89, 1.69]			0.07
- <67 years	12.2%	14.4%	0.78 [0.55, 1.11]			

67 years or older

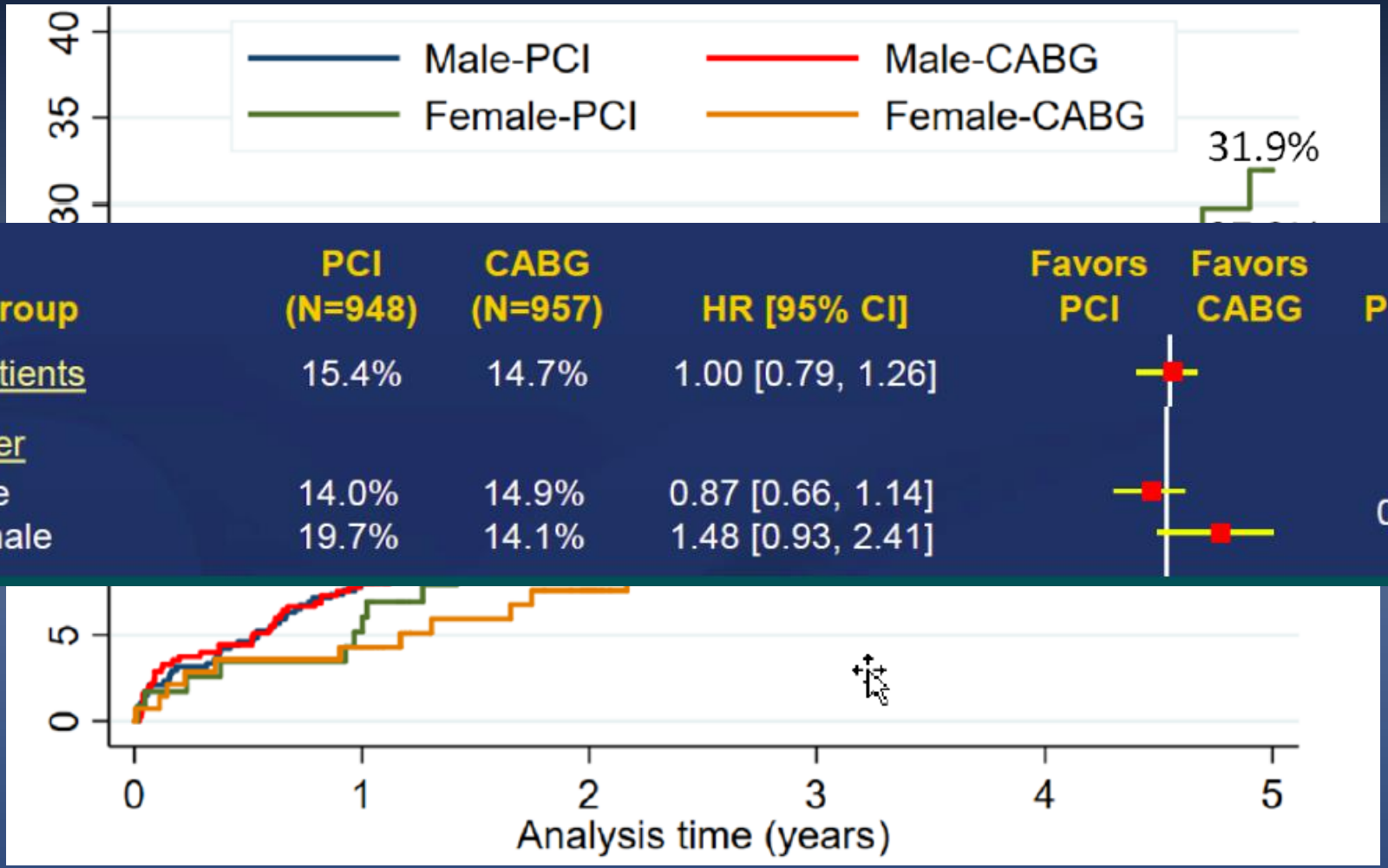


Younger than 67 years



Courtesy of Dr Christiansen

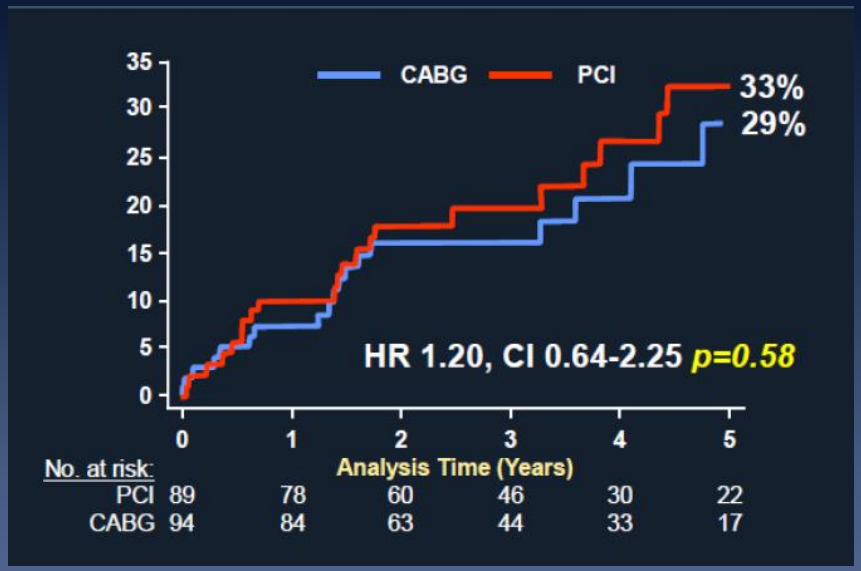
Updated analyses from NOBLE: analysis stratified by gender



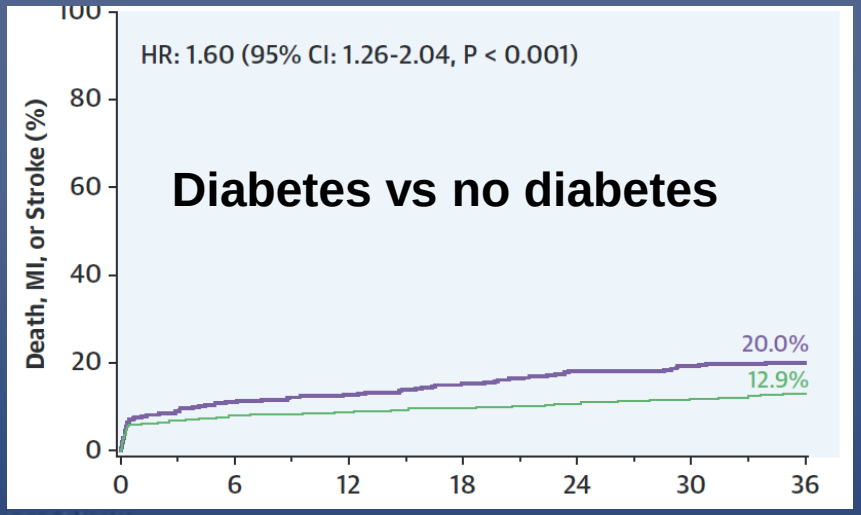
Subgroup	PCI (N=948)	CABG (N=957)	HR [95% CI]	Favors PCI	Favors CABG	P (Int)
All patients	15.4%	14.7%	1.00 [0.79, 1.26]			
Gender						
- Male	14.0%	14.9%	0.87 [0.66, 1.14]			0.06
- Female	19.7%	14.1%	1.48 [0.93, 2.41]			

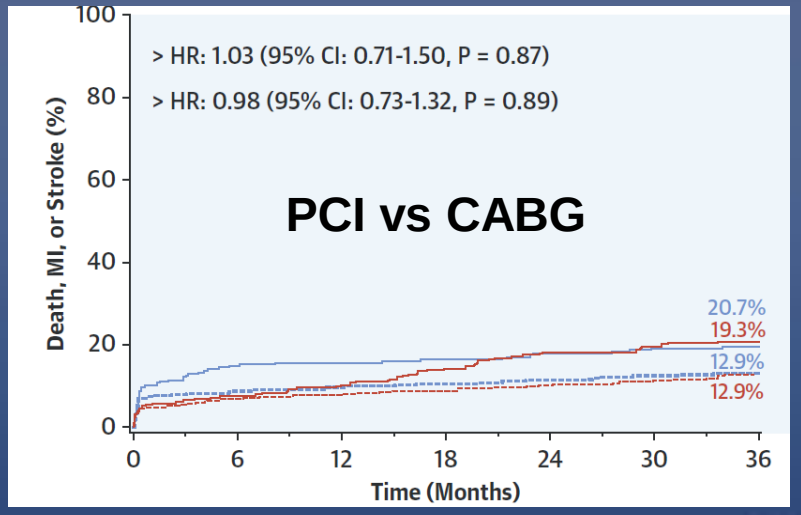
Courtesy of Dr Christiansen

PCI vs CABG in pts with diabetes



Christiansen; TCT 2016





Milojevic et al; JACC 2019

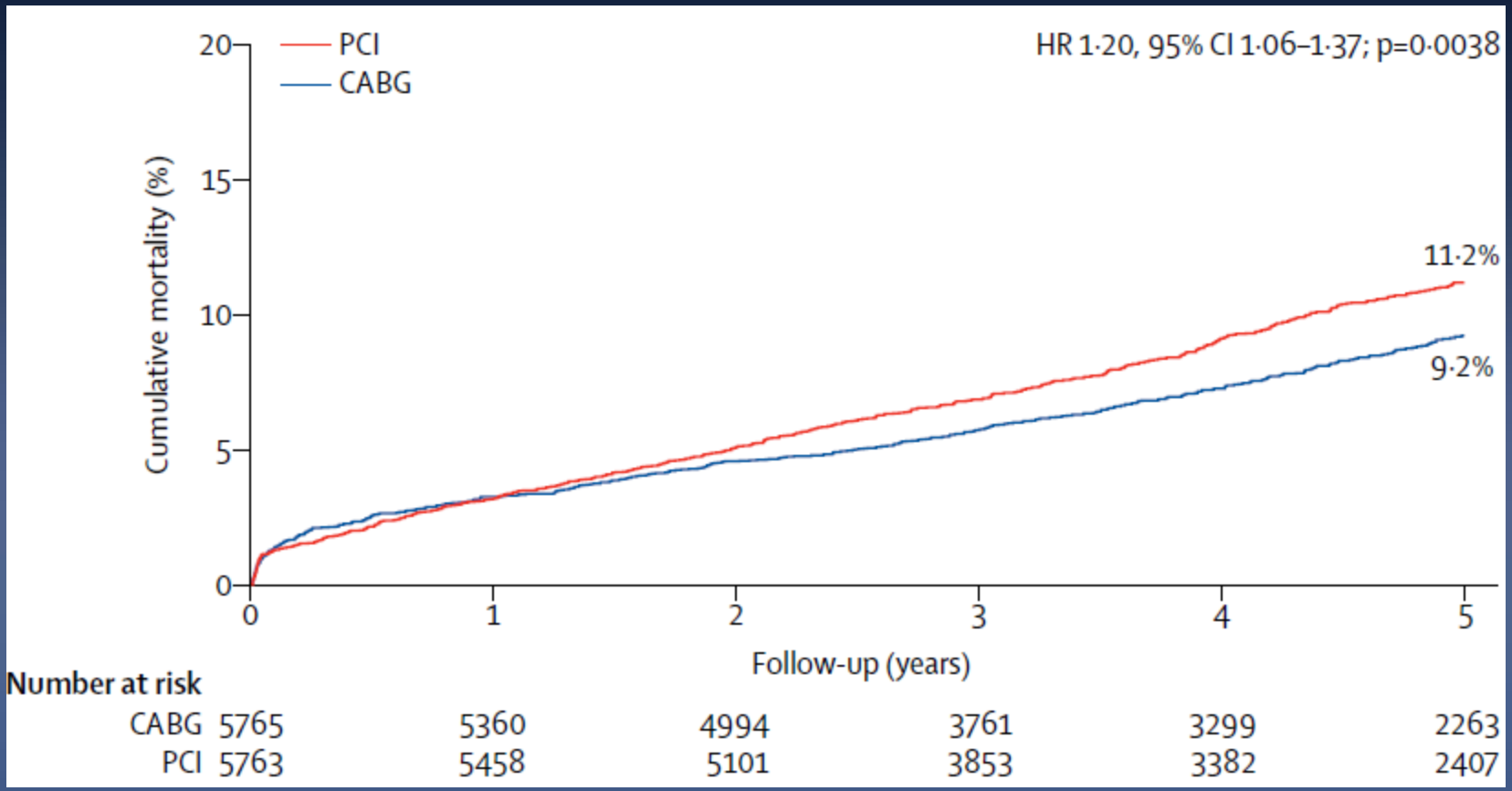
Mortality after coronary artery bypass grafting versus percutaneous coronary intervention with stenting for coronary artery disease: a pooled analysis of individual patient data

Stuart J Head, Milan Milojevic, Joost Daemen, Jung-Min Ahn, Eric Boersma, Evald H Christiansen, Michael J Domanski, Michael E Farkouh, Marcus Flather, Valentin Fuster, Mark A Hlatky, Niels R Holm, Whady A Hueb, Masoor Kamalesh, Young-Hak Kim, Timo Mäkikallio, Friedrich W Mohr, Grigorios Papageorgiou, Seung-Jung Park, Alfredo E Rodriguez, Joseph F Sabik 3rd, Rodney H Stables, Gregg W Stone, Patrick W Serruys, Arie Pieter Kappetein

Individual patient data
11 RCTs with 11,518 patients
BMS, I generation DES or II generation DES
Five year follow up

Head et al; Lancet 2018

All cause mortality

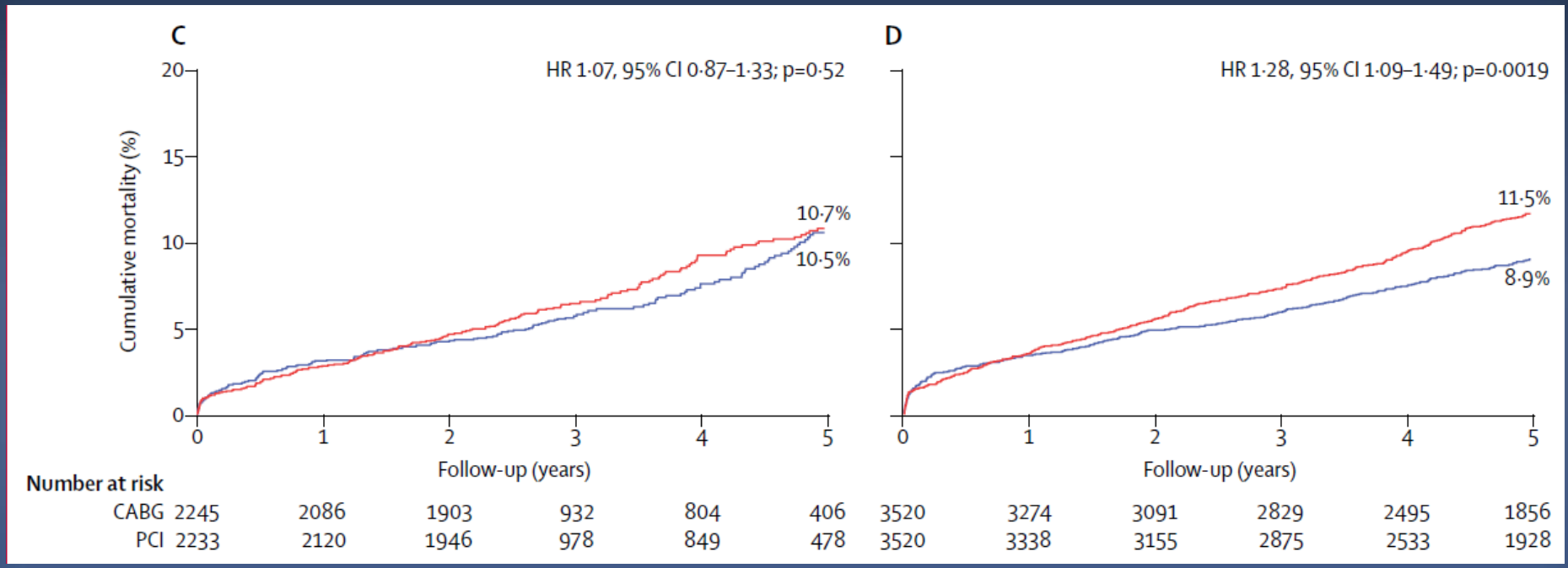


Head et al; Lancet 2018

Left main verus multivessel CAD

ULMCAD

Multivessel CAD

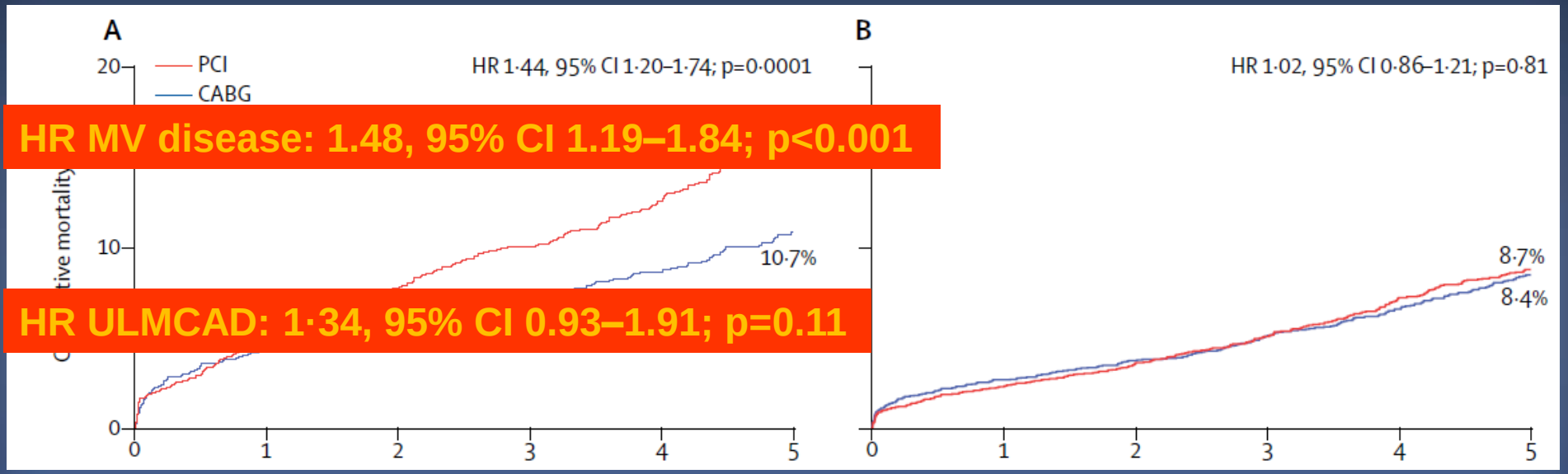


Head et al; Lancet 2018

Diabetes vs no diabetes stratified by MVCAD vs ULMCAD

Diabetes

No diabetes

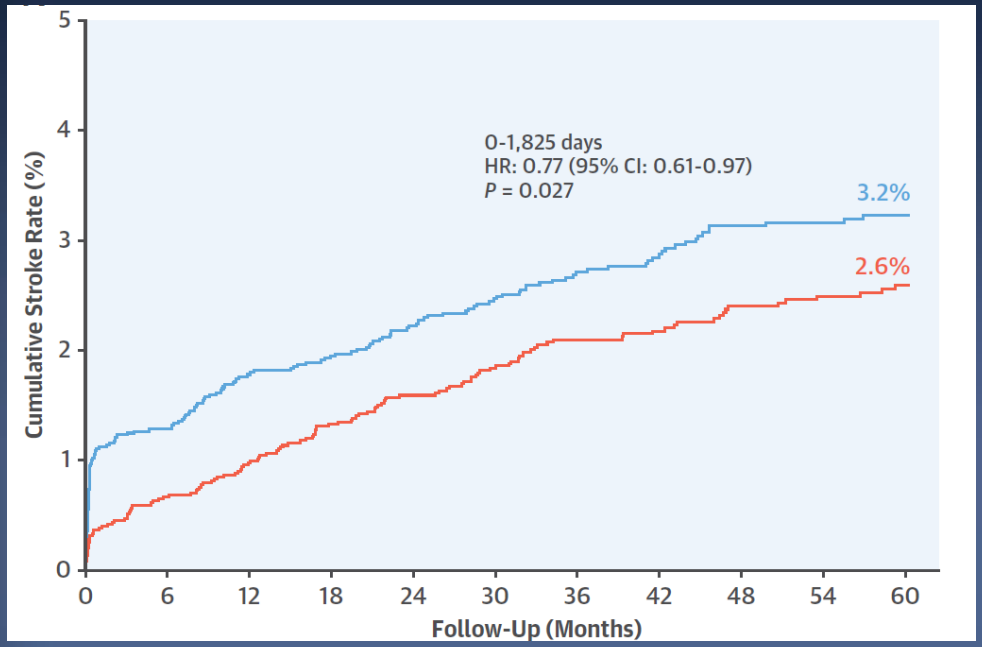


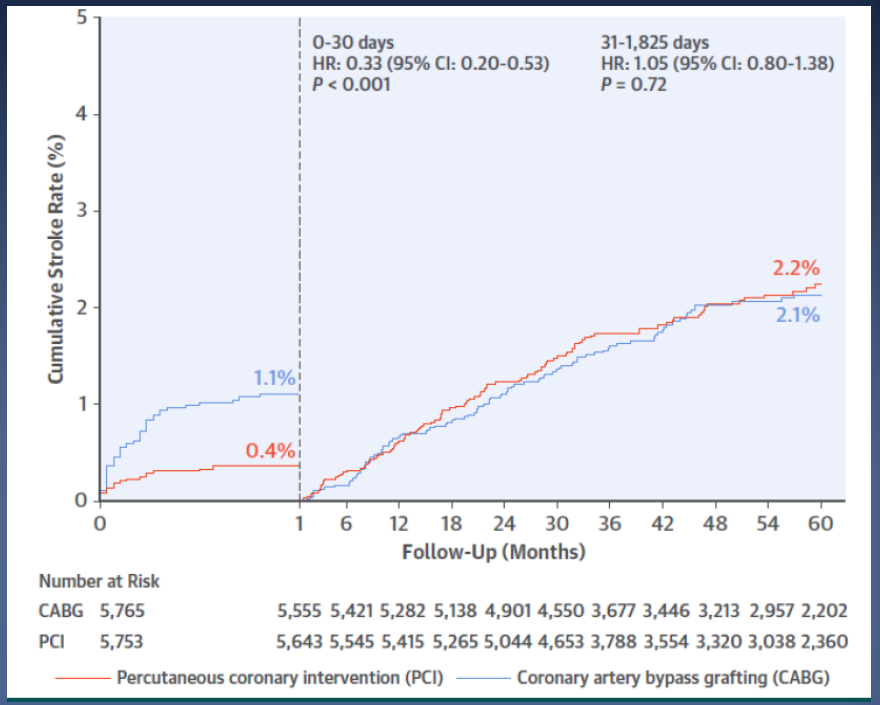
HR MV disease: 1.48, 95% CI 1.19–1.84; p<0.001

HR ULMCAD: 1·34, 95% CI 0.93–1.91; p=0.11

Head et al; Lancet 2018

Stroke with CABG vs PCI





Head et al; JACC 2018

Conclusions I

- Across RCTs and meta-analyses comparing CABG vs PCI for the treatment of ULMCA stenosis no significant difference in mortality, cardiac mortality, MI or stroke is apparent between the two strategies of revascularization up to 5-year follow up.

- PCI, however, is associated with higher rates of repeat revascularization compared with CABG.

Conclusions II

- **A significant interatction is apparent between treatment effect and time of follow up, such that the ischemic outcome rates are lower within the first 30 days, and higher from day 31 to the end of follow up with PCI compared with CABG.**

- **Longer-term follow-up (up to 10 years) is therefore required to determine the relative risk and benefit profile of PCI vs. CABG for the treatment of ULMCA stenosis.**