CABG vs PCI in left main what does the randomized data really tell us?

Prof Adrian Banning

Oxford , United Kingdom

Disclosure

- Potential conflicts of interest
- Unrestricted institutional grant for fellowship from Boston Scientific
- Speaker fees
  - Bosoton, Medtronic, Abbott Vascular, Miracor

The PCI vs CABG data for left main

- History
- Syntax
  - Multivessel and left main
- The left main trials
  - Excel, Precombat, Noble (compare and contrast)
  - Meta analysis
- Conclusions

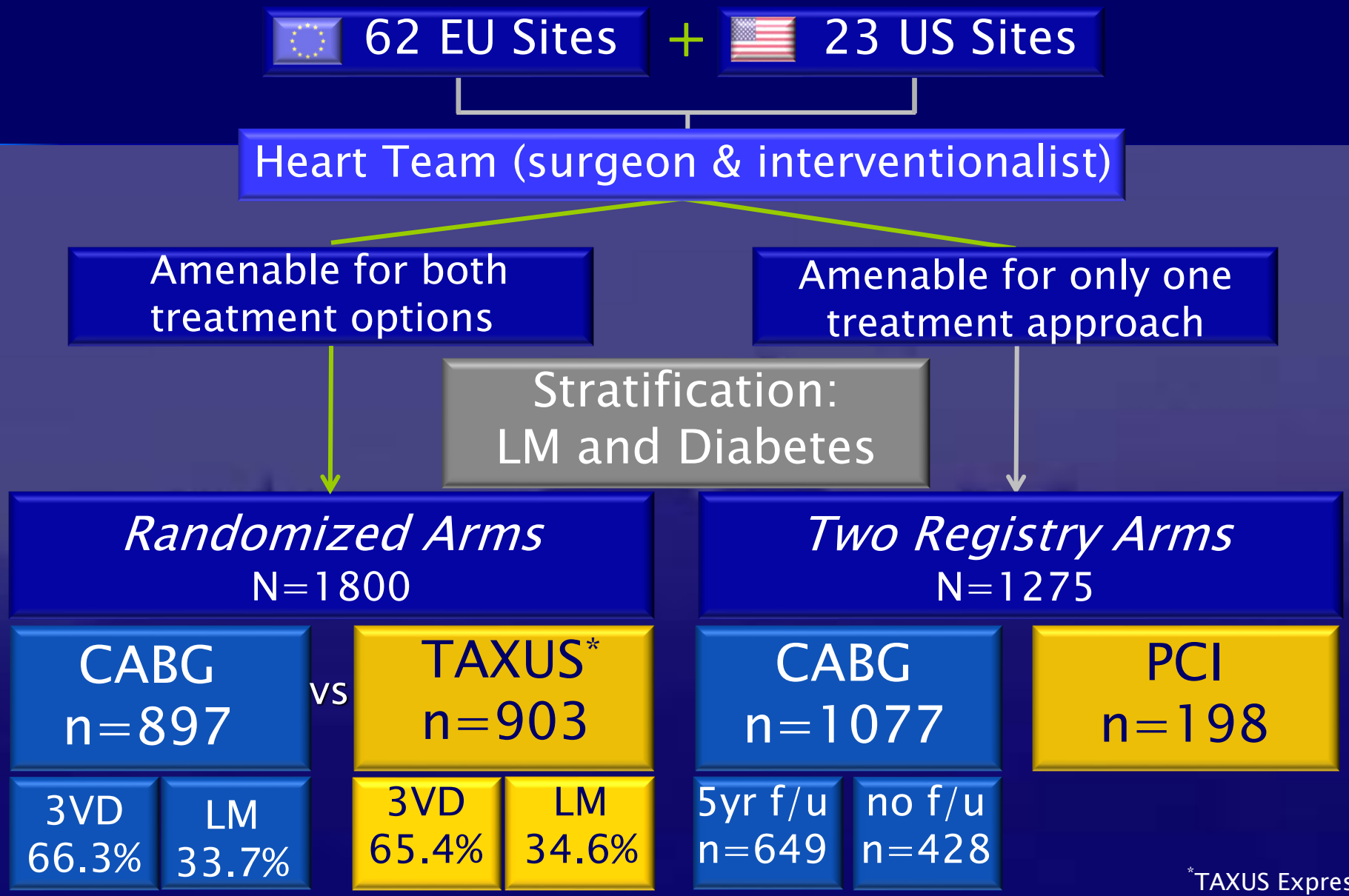
No stents used

Stents used

Trial	Clinical Parameters: Mortality & MI	Angina Relief	Repeat Revascularization	Angio Endpoints	Cost Assessment
GABI	**PCI**	**PCI**	Repeat Revascularization	No ifference	n/a
EAST	No difference	**CABG**		**CABG**	**PCI**
RITA	No difference	**CABG**		n/a	n/a
ERACI	No difference	**CABG**		n/a	PCI
CABRI	No difference	**CABG**		n/a	n/a
BARI	No difference	n/a		n/a	n/a
MASS-2	**CABG (MI)**	n/a		n/a	No difference
AWESOME	No difference	No difference		n/a	n/a
ERACI-2	PCI	n/a		CABG	No difference
SoS	**CABG (Mortality)**	**CABG**		n/a	n/a
ARTS	No difference	n/a	**CABG**	n/a	**PCI**

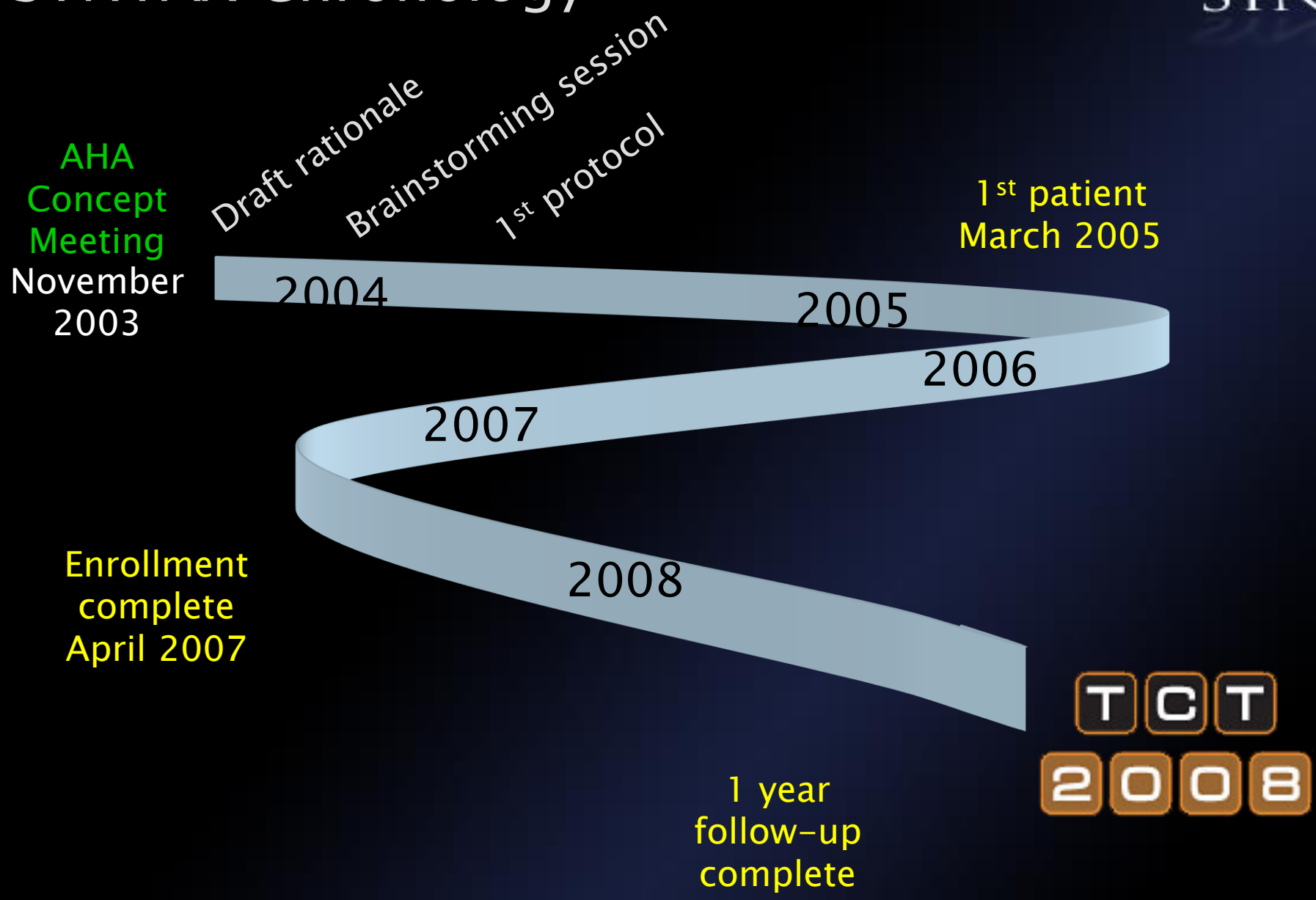
Significant decrease of revascularization expected with DES

SYNTAX Trial Design

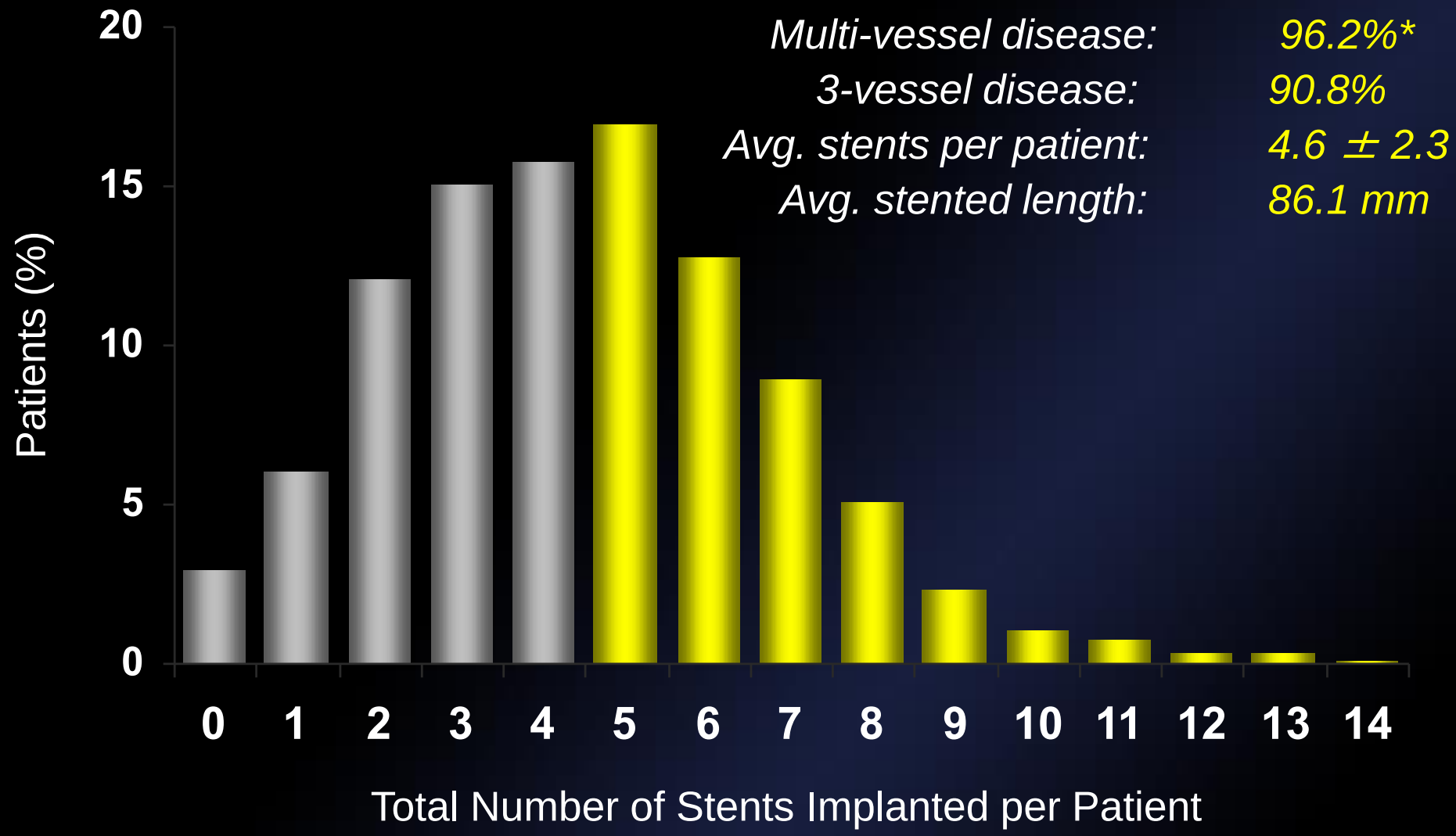


*TAXUS Express

SYNTAX Chronology



Stent Number and Length Higher in the SYNTAX Trial

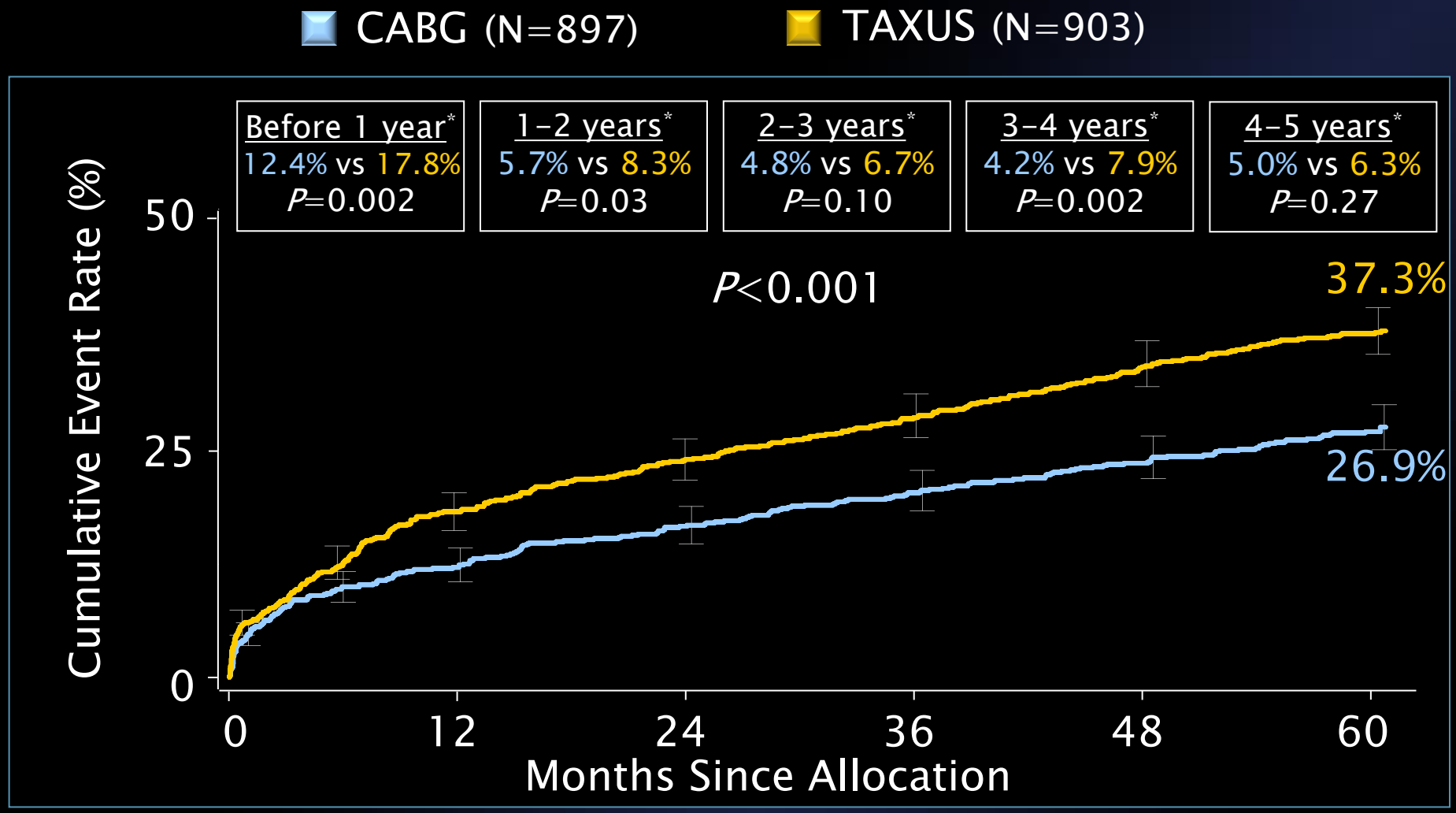


Multi-vessel disease:	*96.2%**
3-vessel disease:	*90.8%*
Avg. stents per patient:	*4.6 ± 2.3*
Avg. stented length:	*86.1 mm*

*3VD+LM/3VD+LM/2VD+LM/1VD

Source: See Glossary

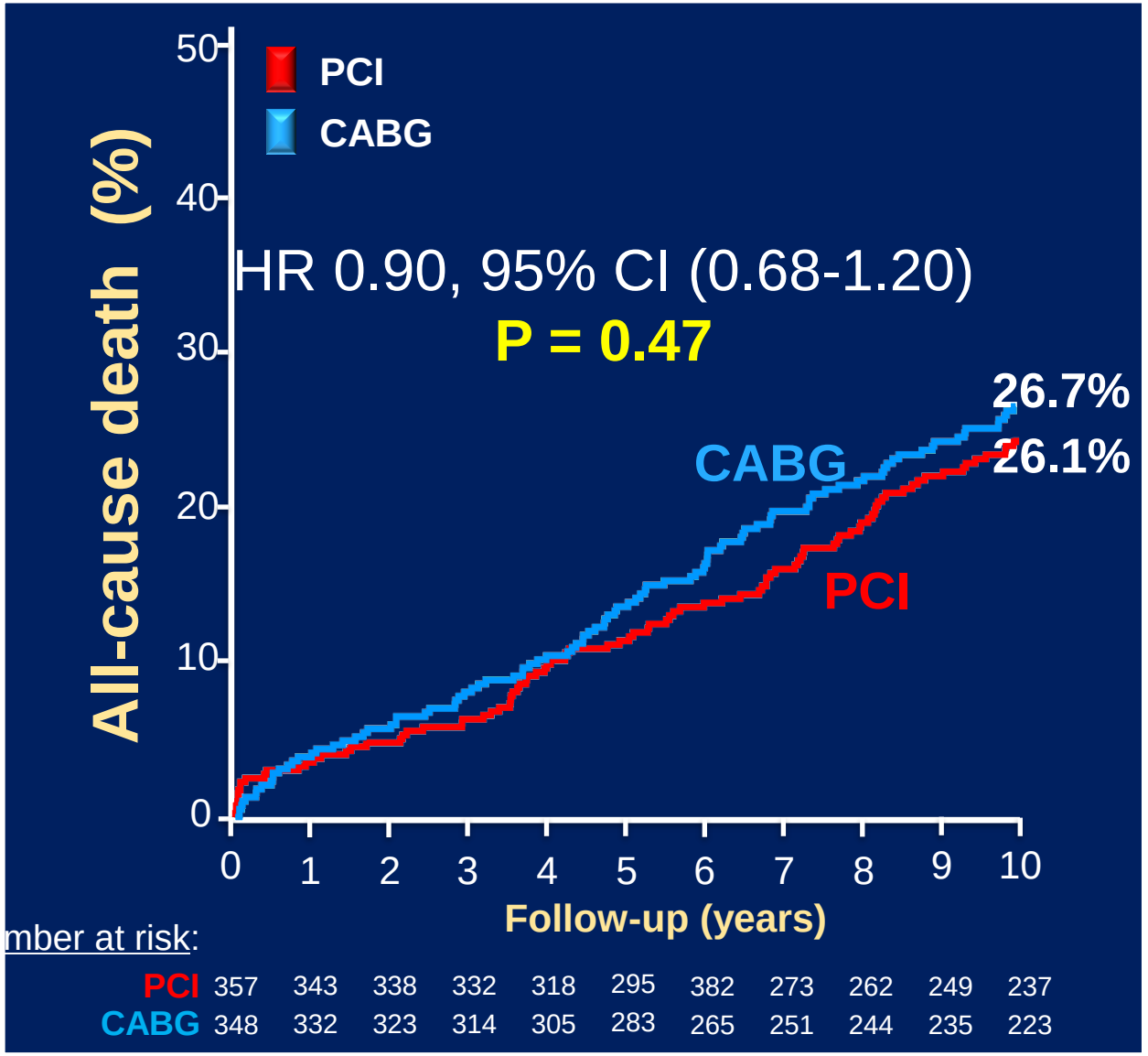
MACCE to 5 Years

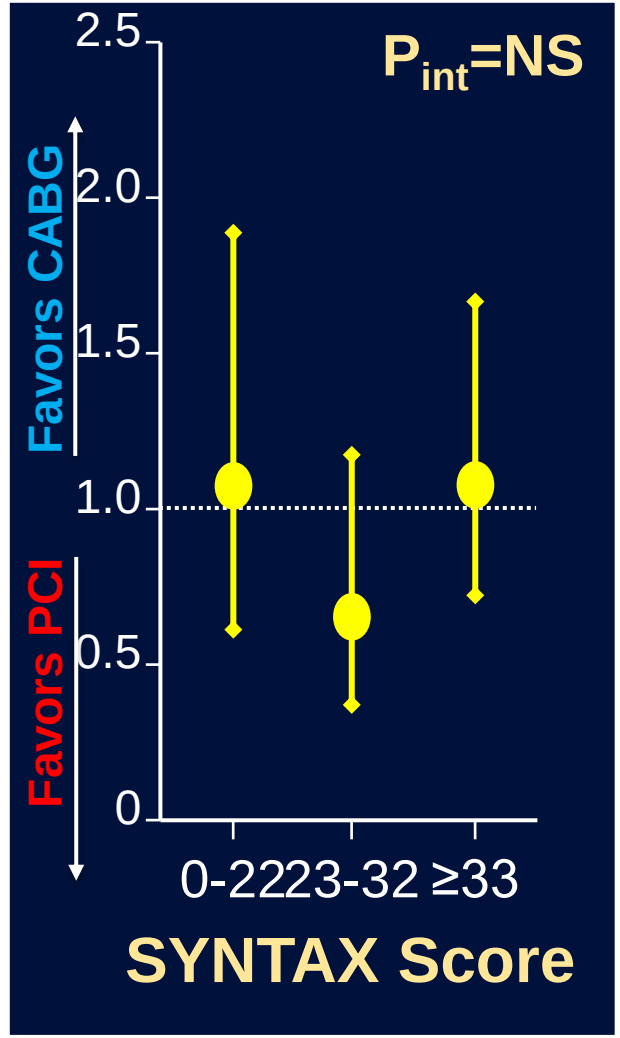


Cumulative KM Event Rate ± 1.5 SE; log-rank *P* value;*Binary rates

ITT population

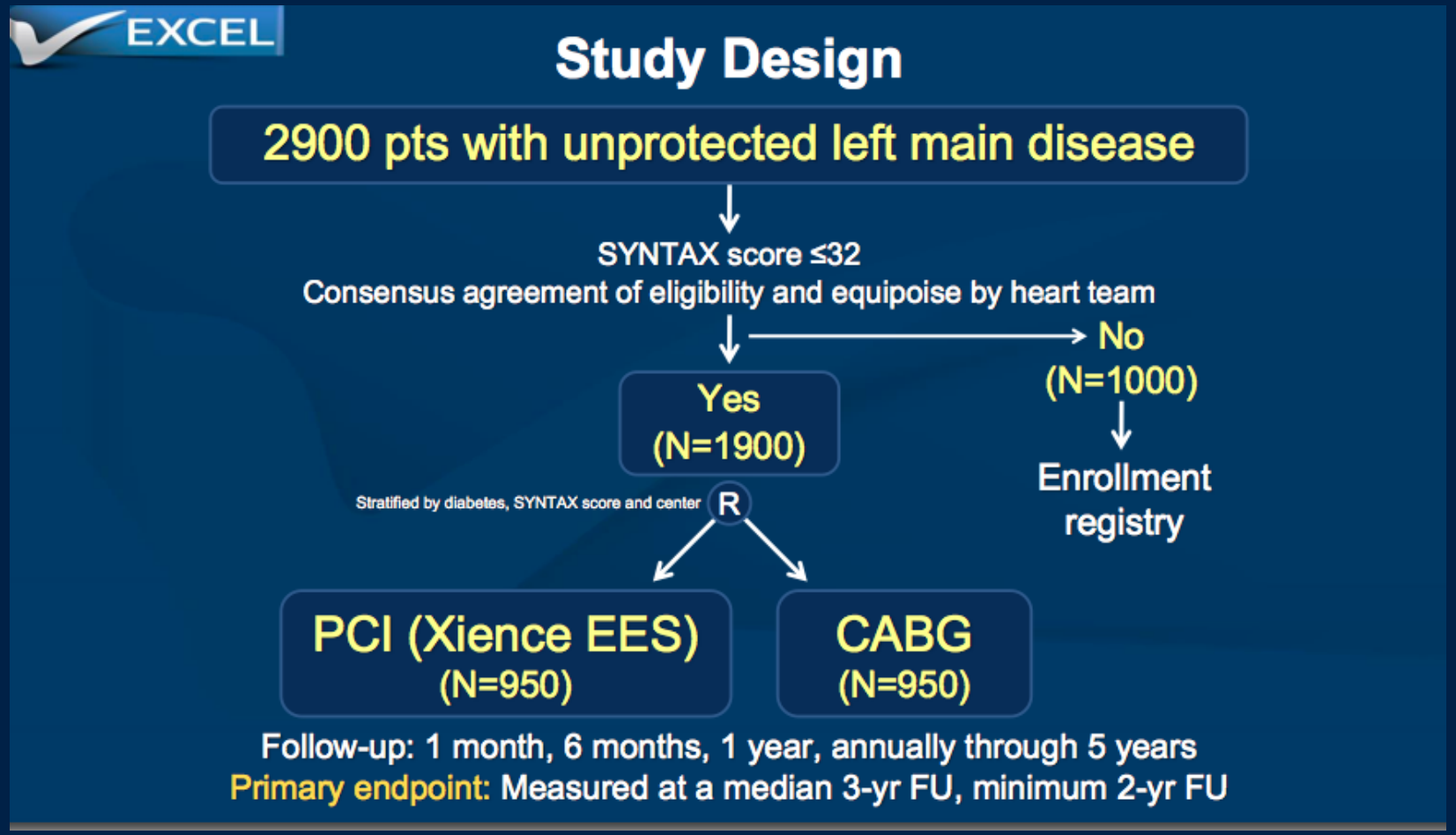
SYNTAX Left Main at 10 Years: Mortality



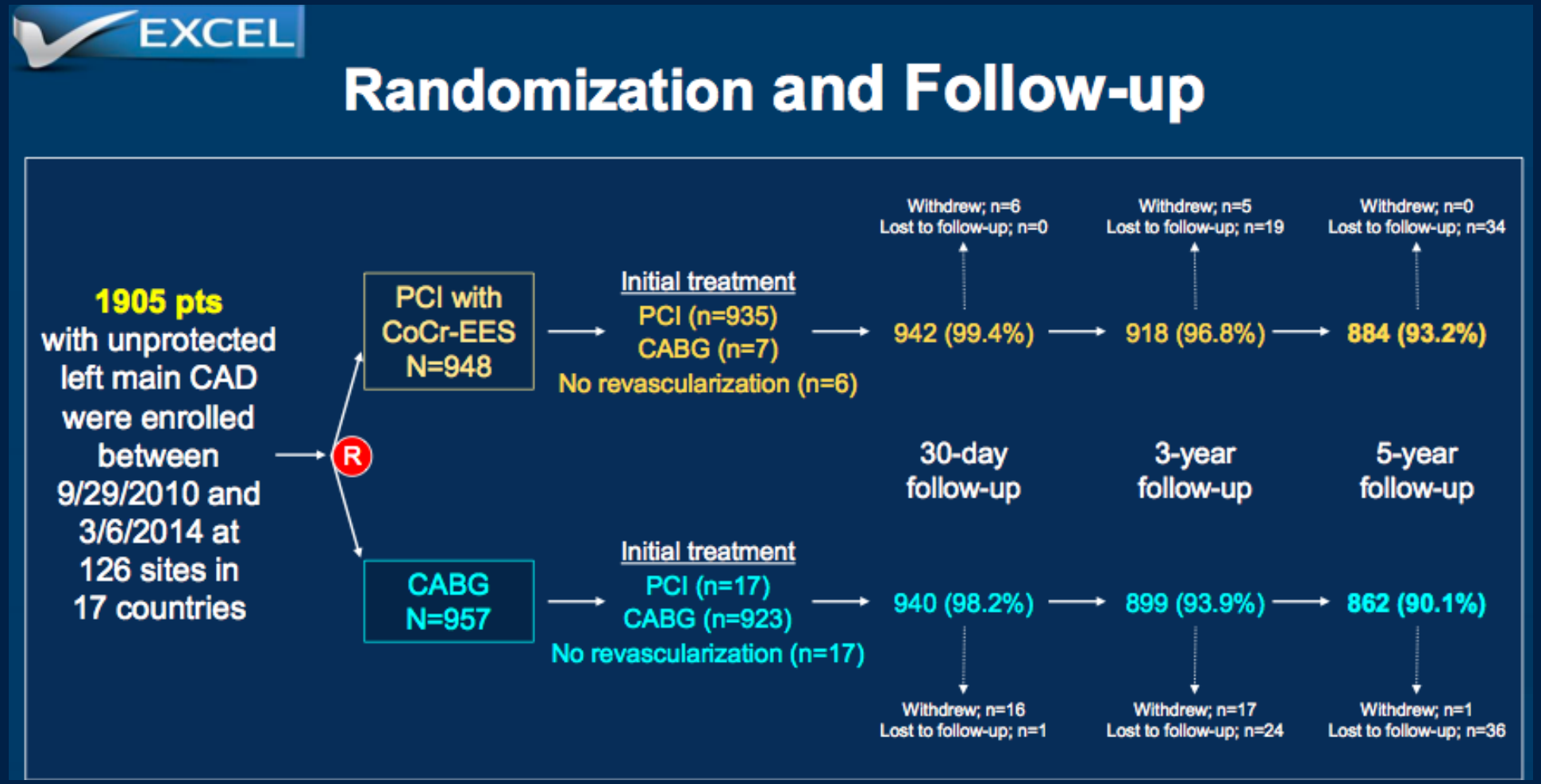


	SYNTAX	EXCEL	NOBLE
All-comers	Yes	No	No
Patient population	LM/3VD	LM	LM
SYNTAX score	Any	≤ 32	Low
Primary endpoint*	Death/MI/CVA/TVR	Death/MI/CVA	Death/MI/CVA/TVR
Follow up	1 year	3 year (median)	3 year (median)
IVUS	Infrequent	Recommended	Recommended
FFR guidance	Infrequent	Recommended	Recommended
Stent	PES	EES	BES recommended
Angio FU	At discretion	Not recommended	Not recommended

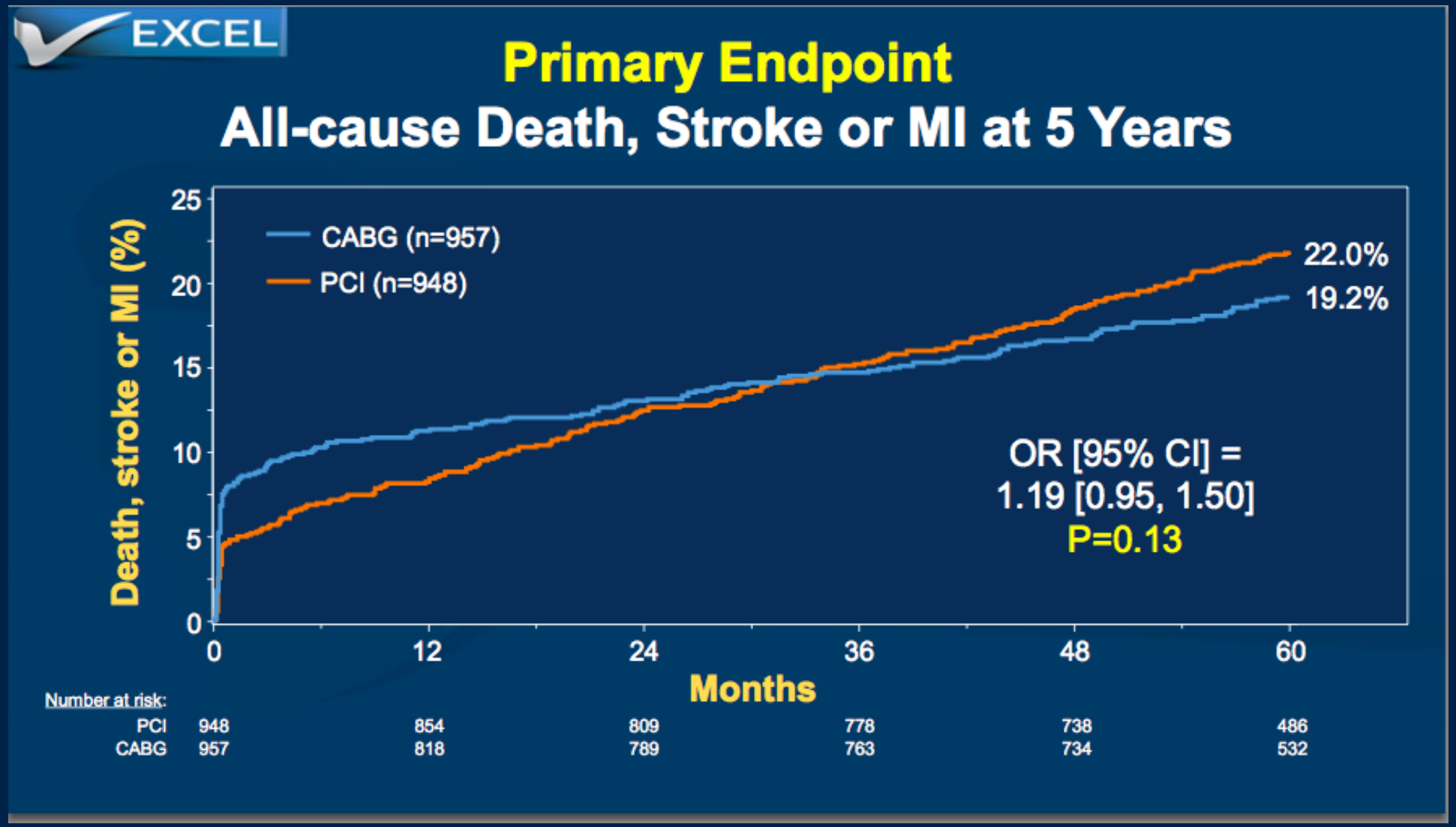
Excel 5yrs
– sample size / endpoint 3 yrs



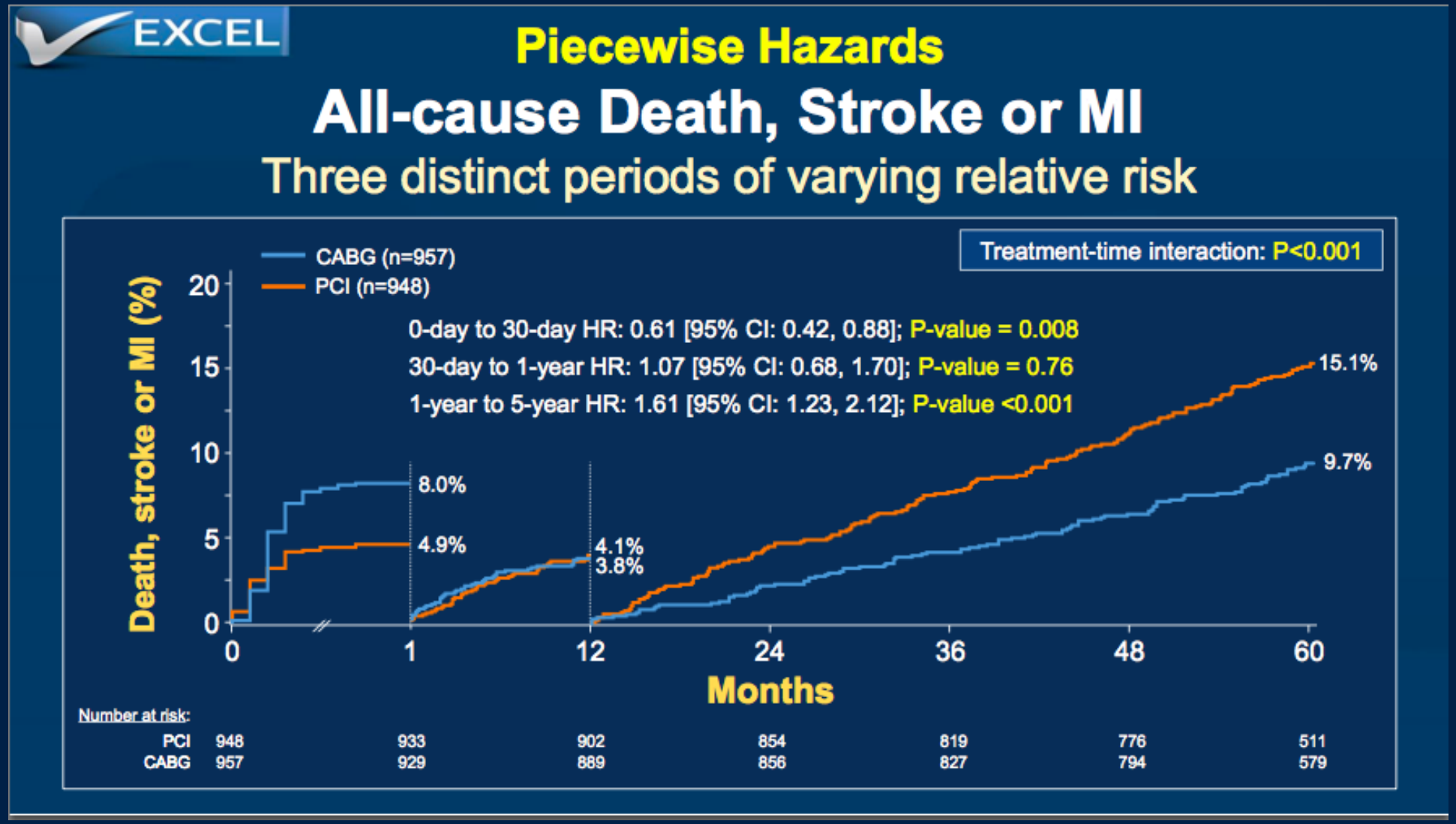
Excel 5yrs- good follow up



Excel 5yrs- no statistical difference



Excel 5yrs- 3 phases



Excel 5yrs- death and MI rates

EXCEL

Primary Endpoint at 5 Years

All-cause Death, Stroke or MI after Multiple Imputation to Account for Missing Follow-up Data

Population	Kaplan-Meier rate (n events)		
	PCI	CABG	Odds ratio [95% CI]
All-cause death, stroke or MI	21.8%	19.5%	1.15 [0.92, 1.45]
- All-cause death	13.0%	10.1%	1.32 [0.99, 1.77]
- Stroke	3.1%	3.7%	0.83 [0.48, 1.44]
- Myocardial infarction	10.2%	9.6%	1.08 [0.79, 1.46]

Event rates are binary proportions. Odds ratios and 95% confidence intervals were estimated from time offset logistic regression.

Excel 5yrs-

EXCEL

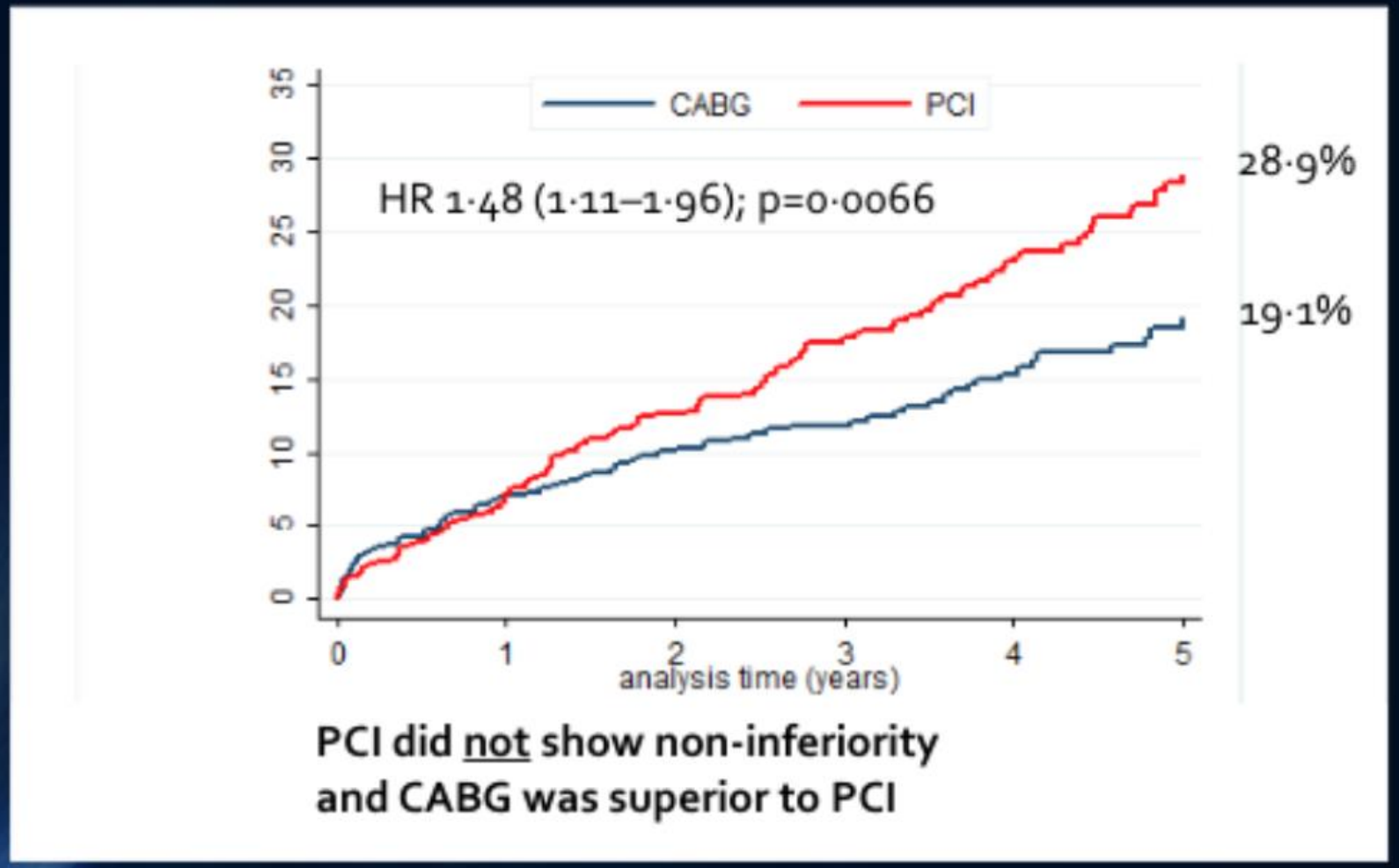
Conclusions

- In the EXCEL trial, treatment of patients with LMCAD and visually-assessed low or intermediate SYNTAX scores with CoCr-EES resulted in similar rates of the clinically meaningful composite outcome of death, stroke or MI at 5 years
- The early benefits of PCI due to reduced peri-procedural risk were attenuated by the greater number of events occurring during follow-up with CABG, such that at 5 years the cumulative mean time free from adverse events was similar with both treatments

NOBLE

Remember it's a different endpoint to Excel

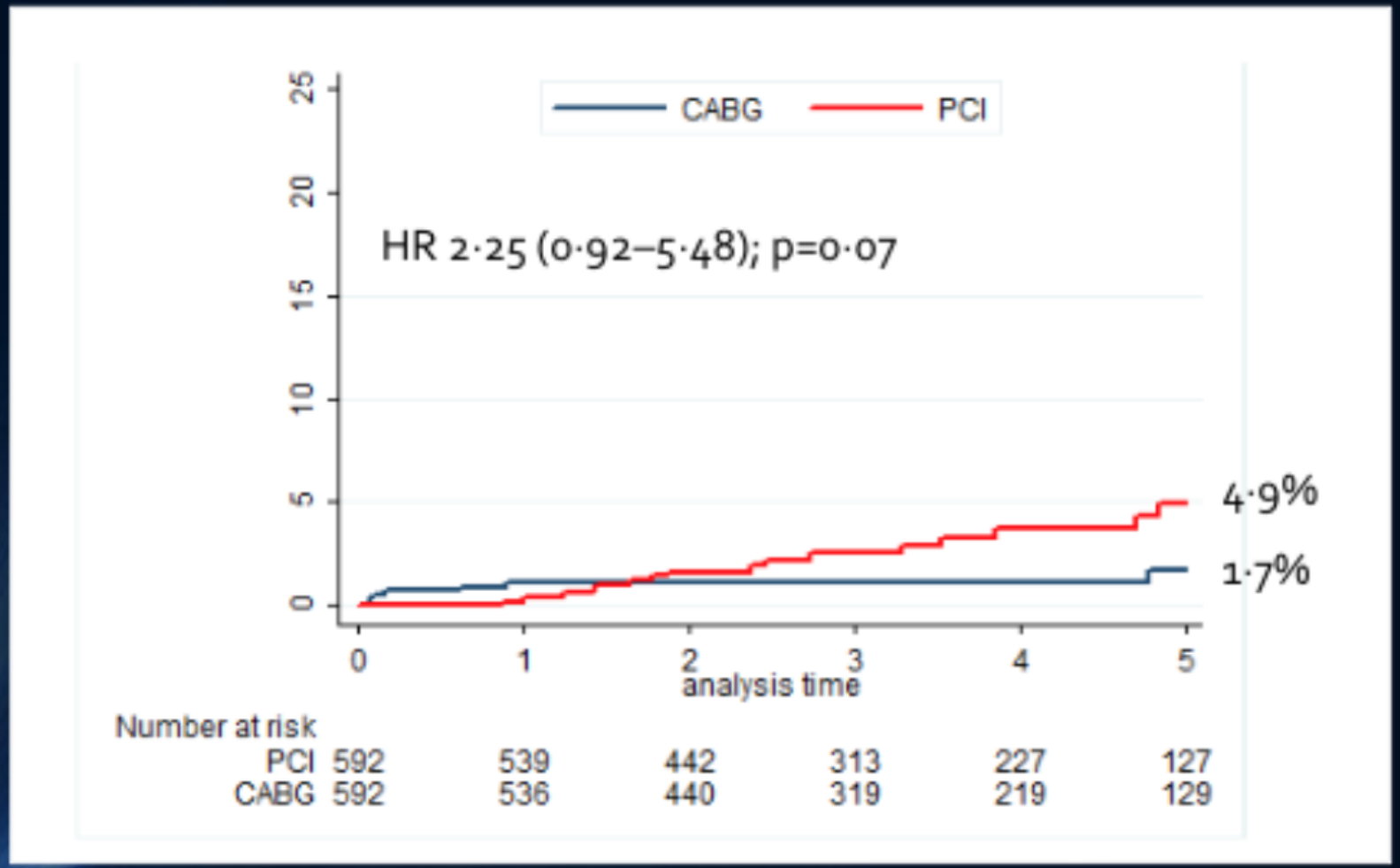
Results
Primary endpoint: MACCE



PCI did not show non-inferiority and CABG was superior to PCI

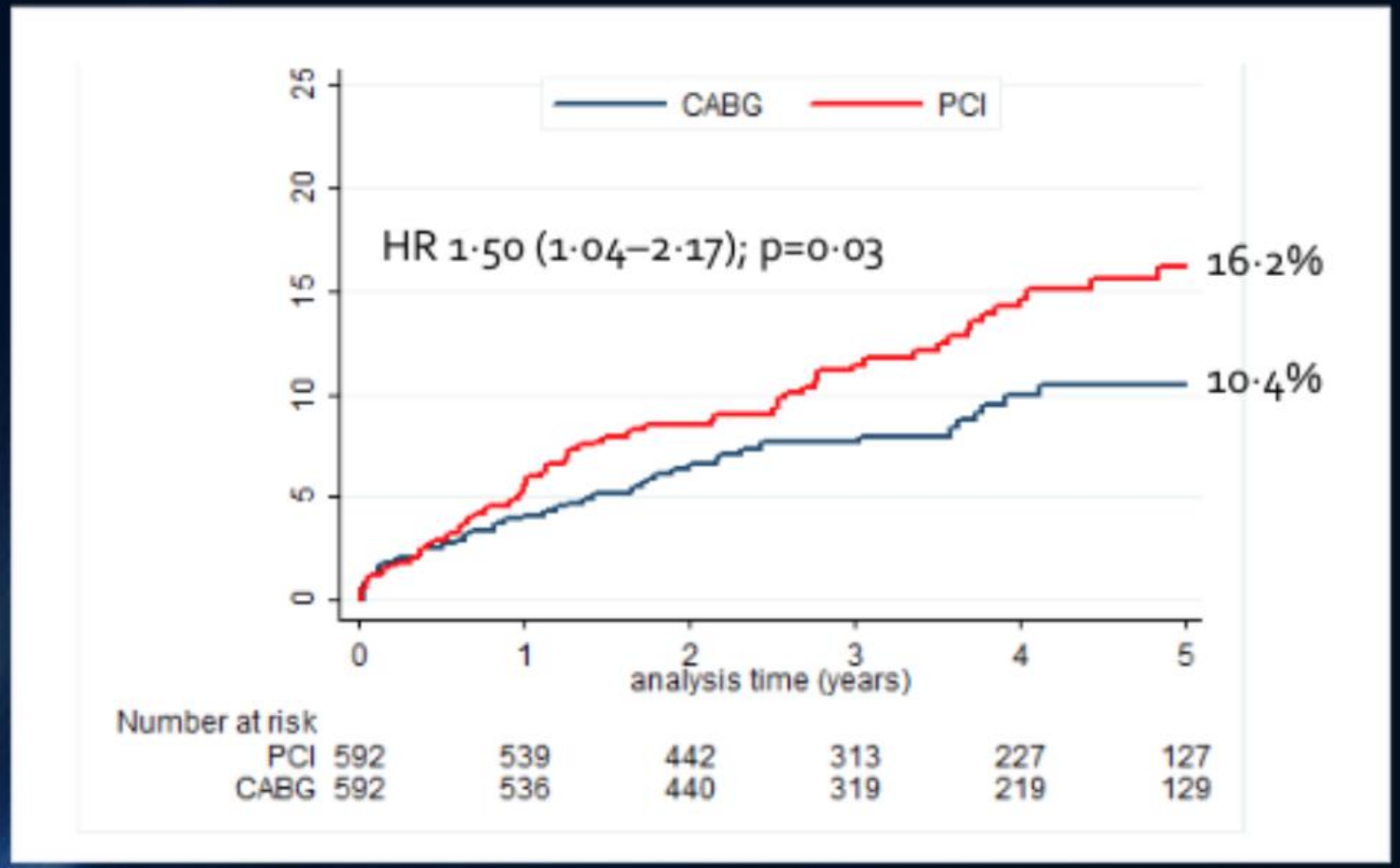
Results
Stroke

Mmmmm don't understand that !



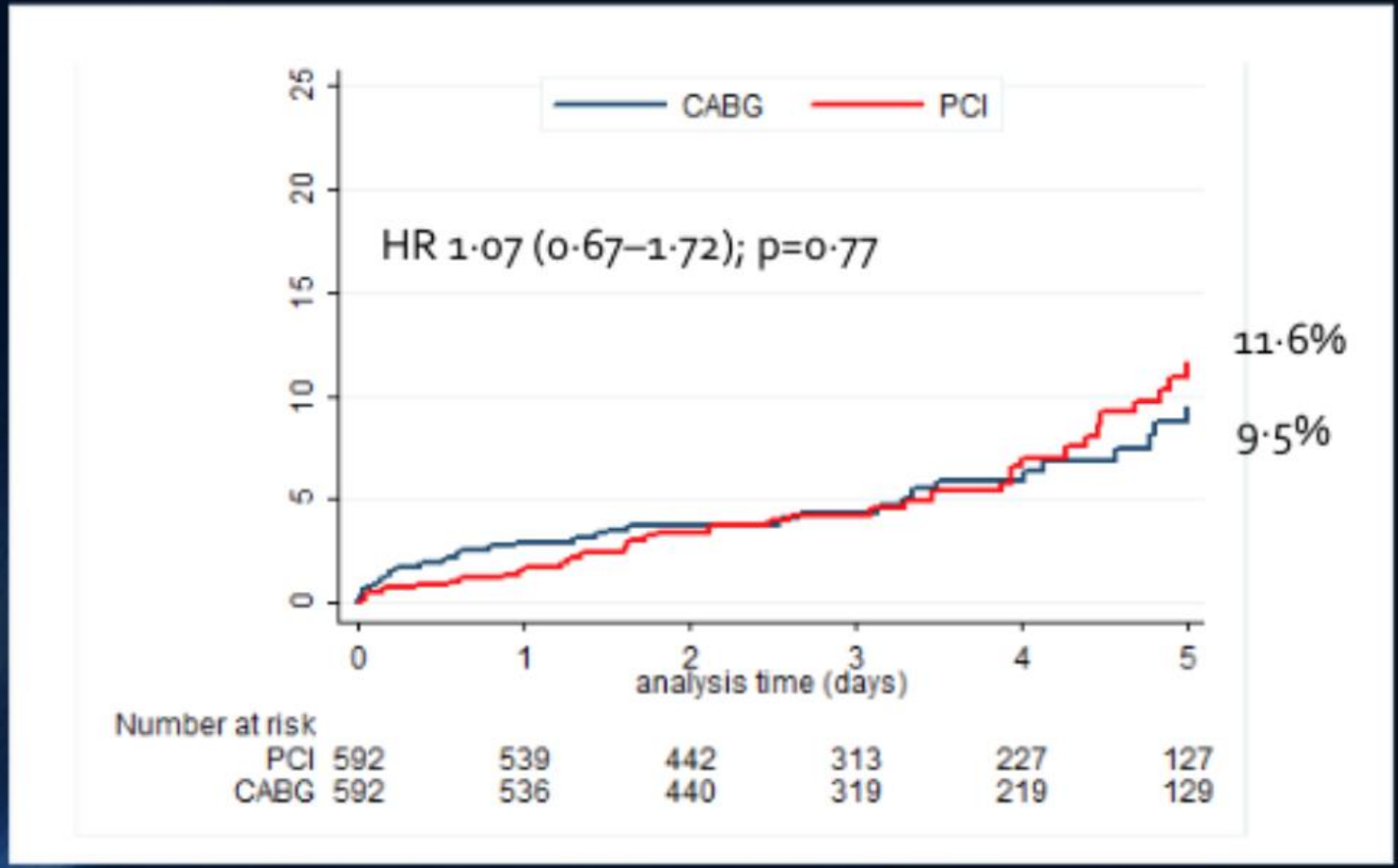
Results
Total repeat revascularization

Favours surgery – a bit

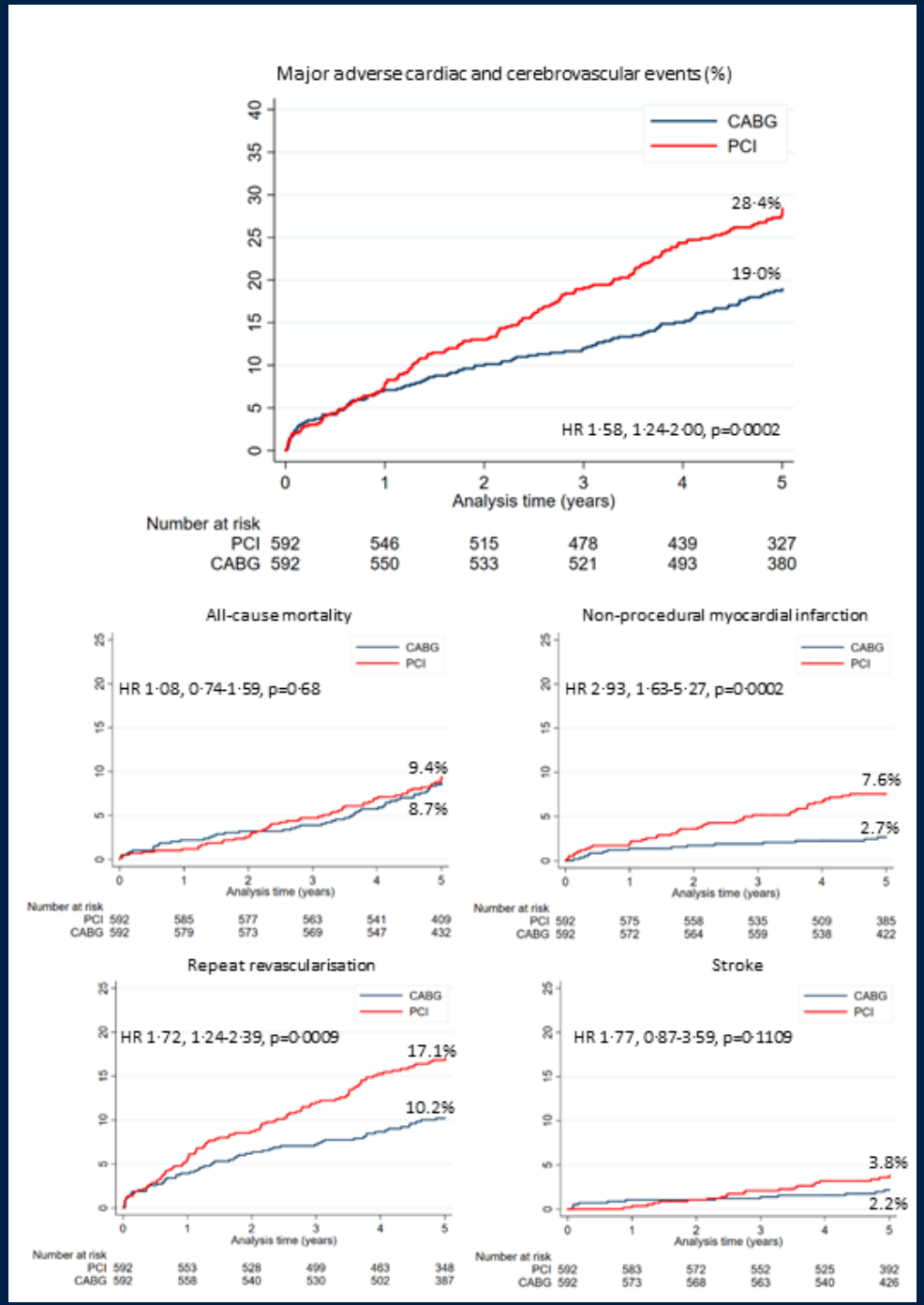


Results
All-cause mortality

It's the same



Noble 5 yr


Major adverse cardiac and cerebrovascular events (%)
CABG
PCI
28·4%
19·0%
HR 1·58, 1·24-2·00, p=0·0002
Analysis time (years)
Number at risk
PCI 592 546 515 478 439 327
CABG 592 550 533 521 493 380
All-cause mortality
HR 1·08, 0·74-1·59, p=0·68
9.4%
8.7%
Number at risk
PCI 592 585 577 563 541 409
CABG 592 579 573 569 547 432
Non-procedural myocardial infarction
HR 2·93, 1·63-5·27, p=0·0002
7.6%
2.7%
Number at risk
PCI 592 575 558 535 509 385
CABG 592 572 564 559 538 422
Repeat revascularisation
HR 1·72, 1·24-2·39, p=0·0009
17.1%
10.2%
Number at risk
PCI 592 553 528 499 463 348
CABG 592 558 540 530 502 387
Stroke
HR 1·77, 0·87-3·59, p=0·1109
3.8%
2.2%
Number at risk
PCI 592 583 572 552 525 392
CABG 592 573 568 563 540 426

Percutaneous coronary intervention with drug-eluting stents versus coronary artery bypass grafting in left main coronary artery disease: an individual patient data meta-analysis

Marc S Sabatine, Brian A Bergmark*, Sabina A Murphy, Patrick T O'Gara, Peter K Smith, Patrick W Serruys, A Pieter Kappetein, Seung-Jung Park, Duk-Woo Park, Evald H Christiansen, Niels R Holm, Per H Nielsen, Gregg W Stone, Joseph F Sabik, Eugene Braunwald*

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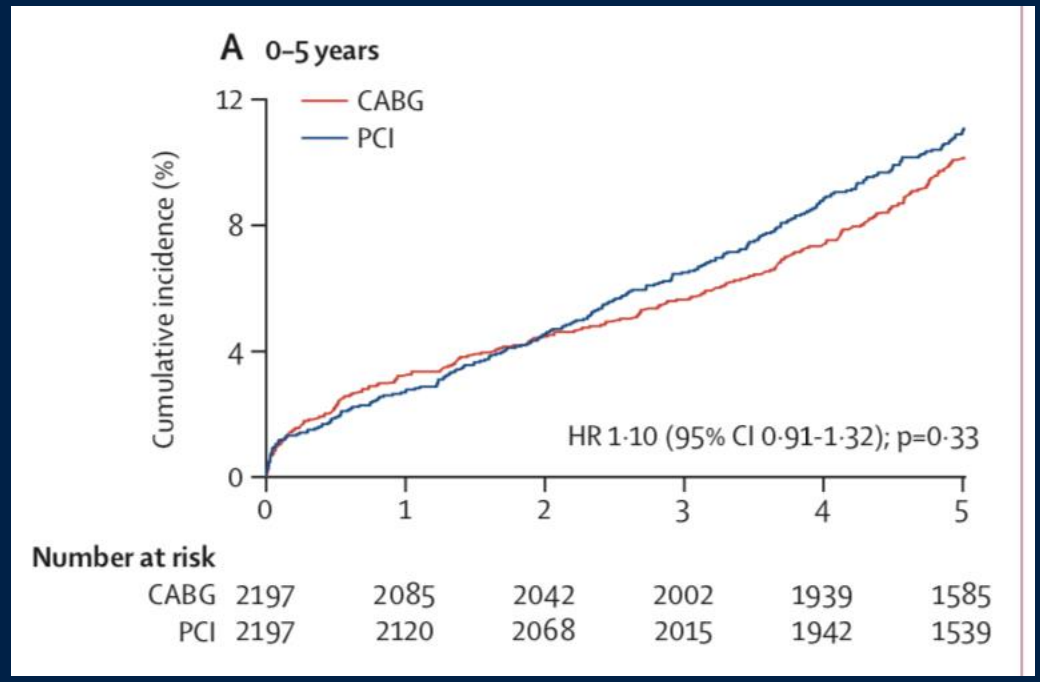
Patient level: Syntax Noble Precombat and Excel

	Pooled (n=4394)	PCI (n=2197)	CABG (n=2197)
Demographics			
Age, years	66 (59–73)	66 (59–73)	66 (59–72)
Age ≥65 years	2496 (56·8%)	1223 (55·7%)	1273 (57·9%)
Sex			
Female	1023 (23·3%)	514 (23·4%)	509 (23·2%)
Male	3371 (76·7%)	1683 (76·6%)	1688 (76·8%)

SYNTAX score†	25·0 (18·0–31·0); n=4358	25·0 (19·0–31·0); n=2187	24·0 (18·0–31·0); n=2171
SYNTAX score group			
≤22	1778/4358 (40·8%)	864/2187 (39·5%)	914/2171 (42·1%)
23–32	1627/4358 (37·3%)	858/2187 (39·2%)	769/2171 (35·4%)
≥33	953/4358 (21·9%)	465/2187 (21·3%)	488/2171 (22·5%)

www.thelancet.com **https://doi.org/10.1016/S01406736(21)02334-5**

Patient level: Syntax Noble Precombat and Excel



All cause Death at 5yrs p 0.33

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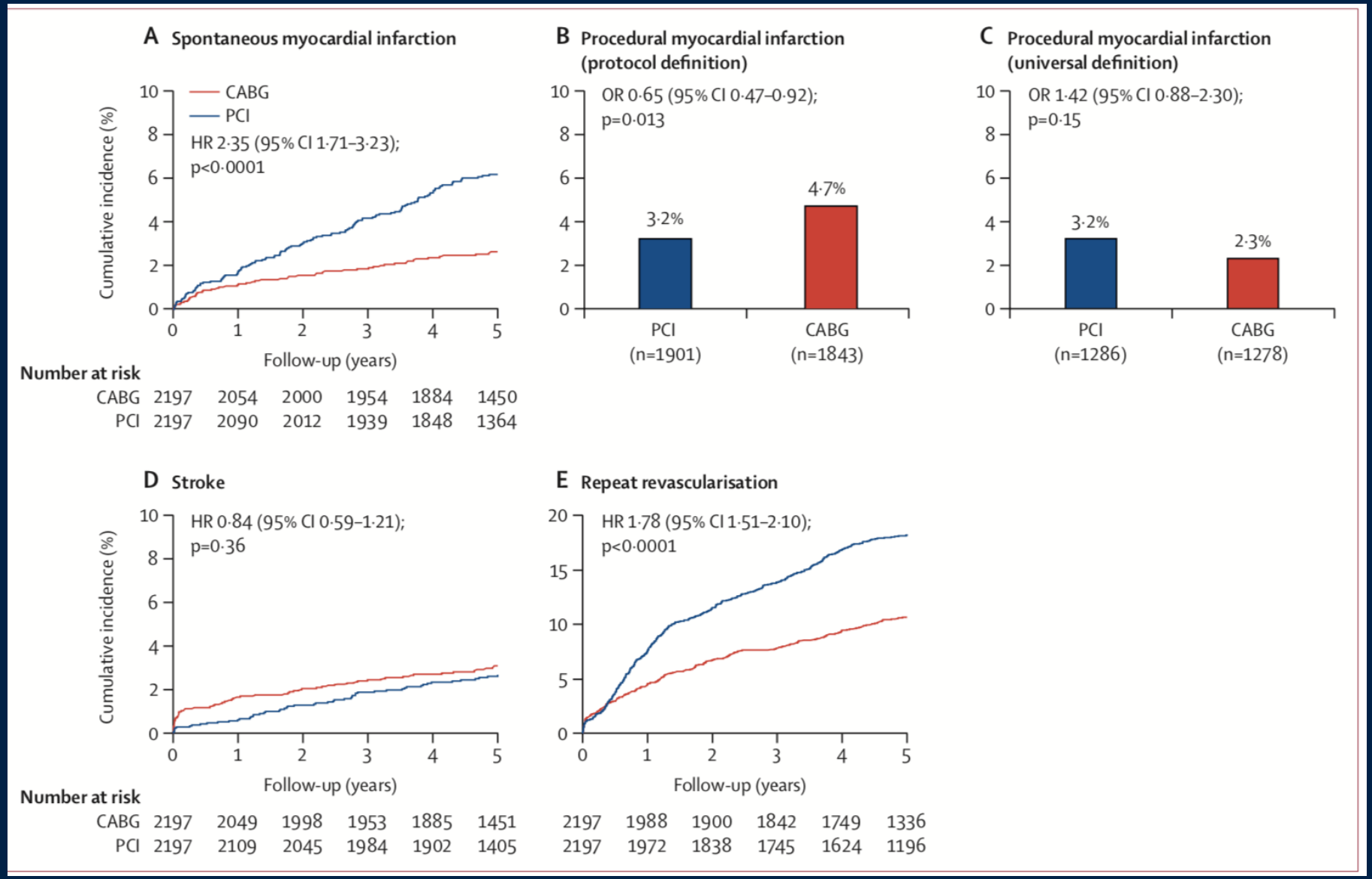
Patient level: Syntax Noble Precombat and Excel



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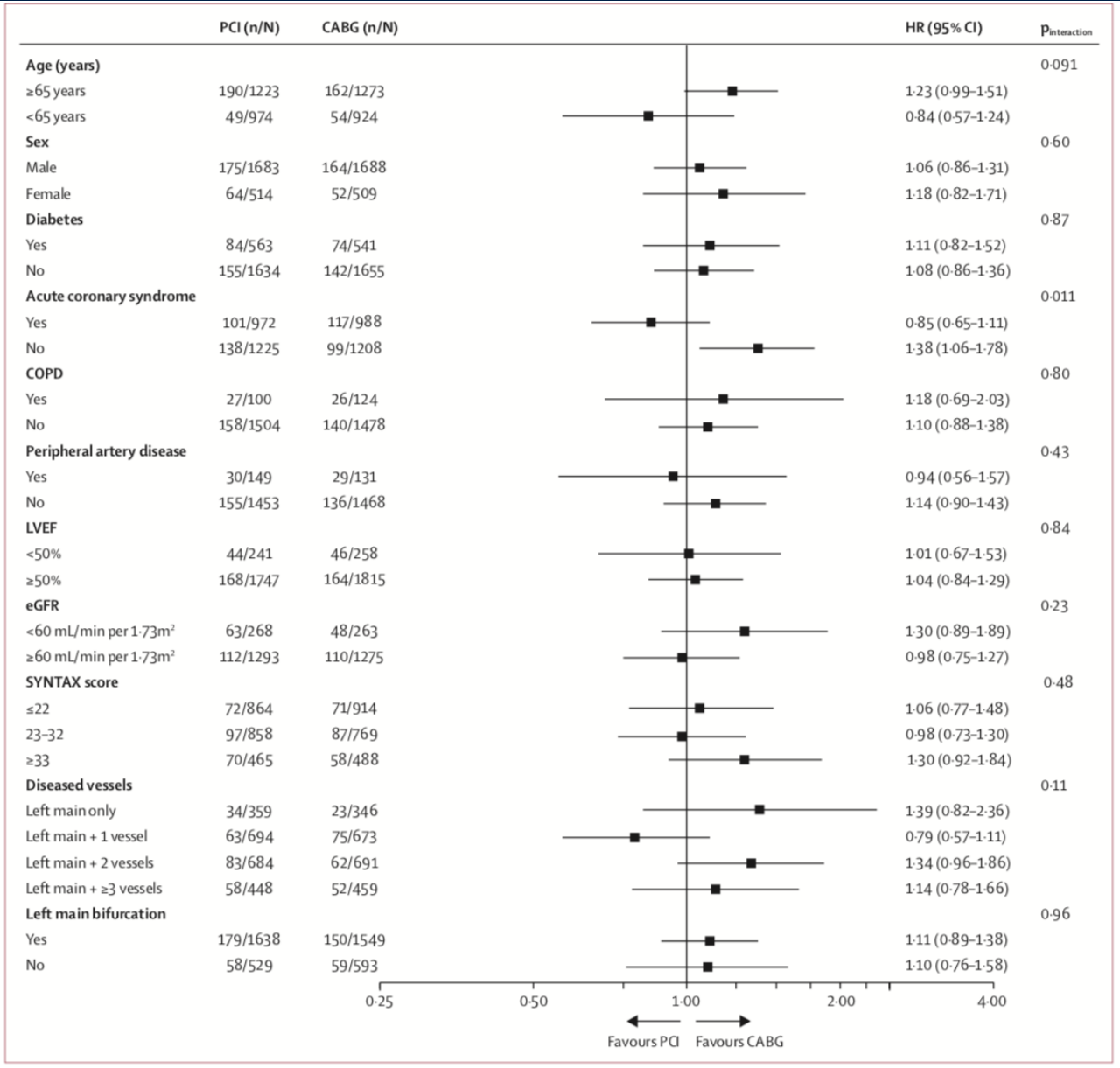

	PCI (n/N)	CABG (n/N)	HR (95% CI)	$P_{interaction}$
Age (years)				0·091
≥65 years	190/1223	162/1273	1·23 (0·99–1·51)	
<65 years	49/974	54/924	0·84 (0·57–1·24)	
Sex				0·60
Male	175/1683	164/1688	1·06 (0·86–1·31)	
Female	64/514	52/509	1·18 (0·82–1·71)	
Diabetes				0·87
Yes	84/563	74/541	1·11 (0·82–1·52)	
No	155/1634	142/1655	1·08 (0·86–1·36)	
Acute coronary syndrome				0·011
Yes	101/972	117/988	0·85 (0·65–1·11)	
No	138/1225	99/1208	1·38 (1·06–1·78)	
COPD				0·80
Yes	27/100	26/124	1·18 (0·69–2·03)	
No	158/1504	140/1478	1·10 (0·88–1·38)	
Peripheral artery disease				0·43
Yes	30/149	29/131	0·94 (0·56–1·57)	
No	155/1453	136/1468	1·14 (0·90–1·43)	
LVEF				0·84
<50%	44/241	46/258	1·01 (0·67–1·53)	
≥50%	168/1747	164/1815	1·04 (0·84–1·29)	
eGFR				0·23
<60 mL/min per 1·73m²	63/268	48/263	1·30 (0·89–1·89)	
≥60 mL/min per 1·73m²	112/1293	110/1275	0·98 (0·75–1·27)	
SYNTAX score				0·48
≤22	72/864	71/914	1·06 (0·77–1·48)	
23–32	97/858	87/769	0·98 (0·73–1·30)	
≥33	70/465	58/488	1·30 (0·92–1·84)	
Diseased vessels				0·11
Left main only	34/359	23/346	1·39 (0·82–2·36)	
Left main + 1 vessel	63/694	75/673	0·79 (0·57–1·11)	
Left main + 2 vessels	83/684	62/691	1·34 (0·96–1·86)	
Left main + ≥3 vessels	58/448	52/459	1·14 (0·78–1·66)	
Left main bifurcation				0·96
Yes	179/1638	150/1549	1·11 (0·89–1·38)	
No	58/529	59/593	1·10 (0·76–1·58)	

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Conclusions PCI vs CABG

"Debate" about merits of PCI vs CABG may be unhelpful

Very very few patients are really in *equipoise*
Local expertise and patient opinion are relevant and important

Review the patient clinically
Review the angiogram carefully
Asses the ischaemic potential and the expectation of complete revascularization

…. And make the decision together with the patient and the surgeon