Mortality after CABG versus PCIIndividual patient-data pooled analysis of 11,518 patients from 11 randomized trials

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Disclosure Statement of Financial Interest

Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

Affiliation/Financial Relationship	Company
• Employee	• Medtronic

Background

- *Numerous trial have compared CABG and PCI*
- *Multi-vessel disease*
- *Left Main disease*

No studies have been powered to detect a difference in

Mortality or Stroke

Search on July 19, 2017, using keywords “coronary artery bypass”, “percutaneous coronary intervention”, “stent”, and “random*”

MEDLINE (n=823) | EMBASE (n=709) | Cochrane (n=315)

19 trials

Excluded trials (n=7)
- *Non-LM SVD: SIMA trial, Diegeler et al, Thiele et al, Drenth et al, and Hong et al*
- *No 100% stent use: AWESOME trial*
- *Only 1-year follow-up: Boudriot et al, and CARDia trial*

Investigators contacted (n=12 trials)

Excluded trial (n=1)
- ***Unable to provide data: LE MANS trial[2]***

Included trials (n=11)
- ***ERACI II (n=450)***
- ***ARTS (n=1205)***
- ***MASS-II (n=408)***
- ***SoS (n=988)***
- ***SYNTAX (n=1800)***
- ***PRECOMBAT (n=600)***
- ***FREEDOM (n=1900)***
- ***VA CARDS (n=198)***
- ***BEST (n=880)***
- ***NOBLE (n=1184)***
- ***EXCEL (n=1905)***

Patients

1

- 11,518 patients were randomly assigned

2

- PCI n=5753
- CABG n=5765

3

- Mean SYNTAX score was 26·0 ± 9·5,
- 1798 patients (22·1%) having a SYNTAX score ≥33

4

- Mean follow-up of 3·8 ± 1·4 years,
- 976 deaths occurred.

Baseline Characteristics

	PCI (n=5753)	CABG (n=5765)
Age	64 ± 9·8	64 ± 9·9
Female sex	24%	24%
Diabetes	39%	38%
Insulin treated	13%	12%
Previous TIA or CVA	5%	6%
Previous MI	28%	28%
Moderate LVEF (30-49%)	15%	14%
Poor LVEF (<30%)	1%	1%
Three-vessel disease	59%	61%
Left main disease	39%	39%

Procedure Characteristics

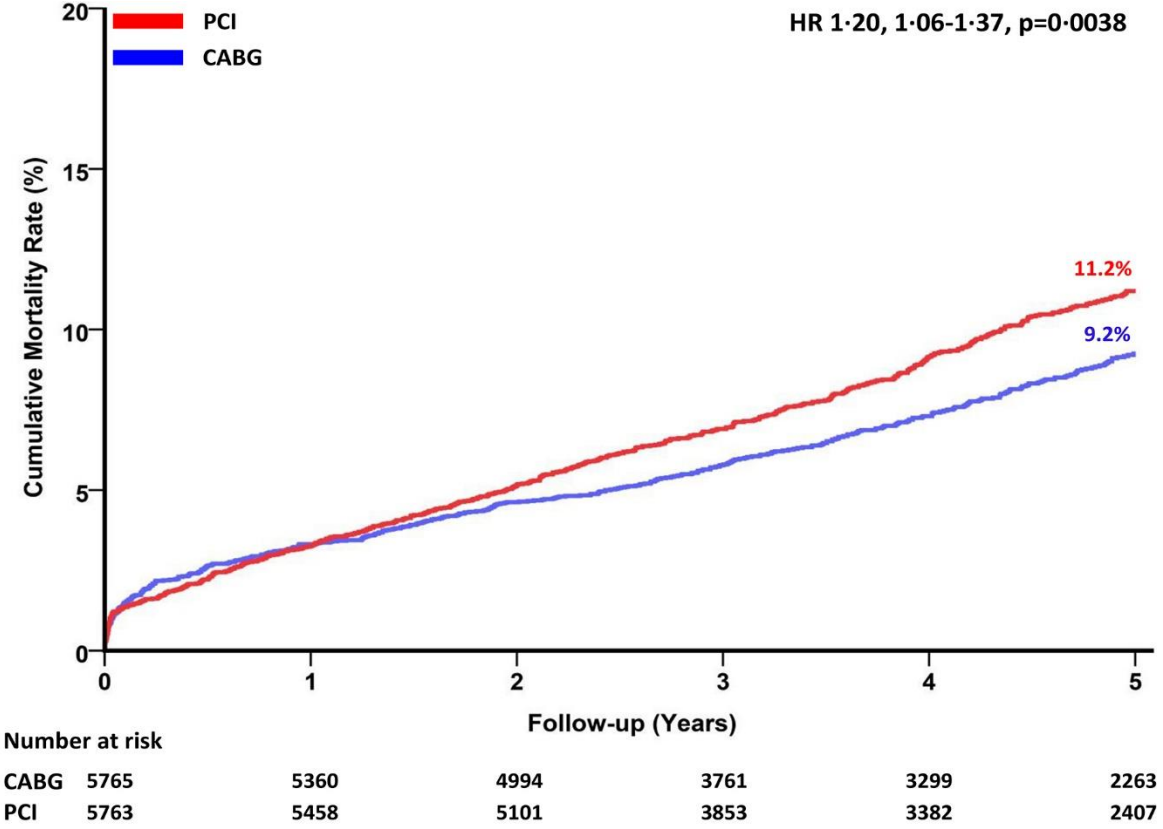
PCI – stents*		-
BMS	27%	-
DES	73%	-
First-generation DES	39%	-
Newer-generation DES	34%	-
PCI – number of stents	3·1 ± 2·0	-
CABG – LIMA use	-	96%
CABG – BIMA use	-	19%
CABG – off-pump	-	28%

Mortality Results

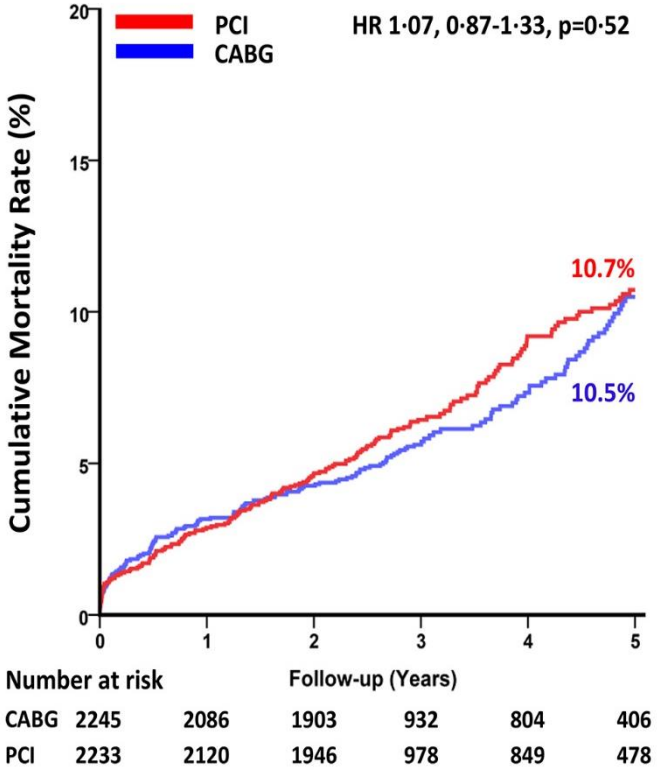
5 year overall

- ✝ PCI: 11·2%
  ✝ CABG: 9.2% → P=0·0038
- ✝PCI: 11·5%
  ✝ CABG: 8·9% → P=0·0019
- ✝PCI: 10·7%
  ✝ CABG: 10·5% → P=0·52

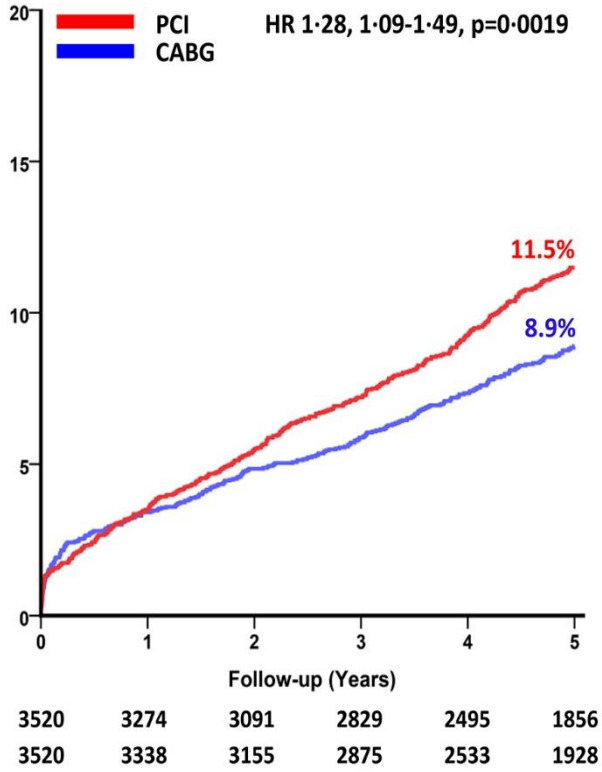
Overall Mortality PCI versus CABG



Left Main Disease

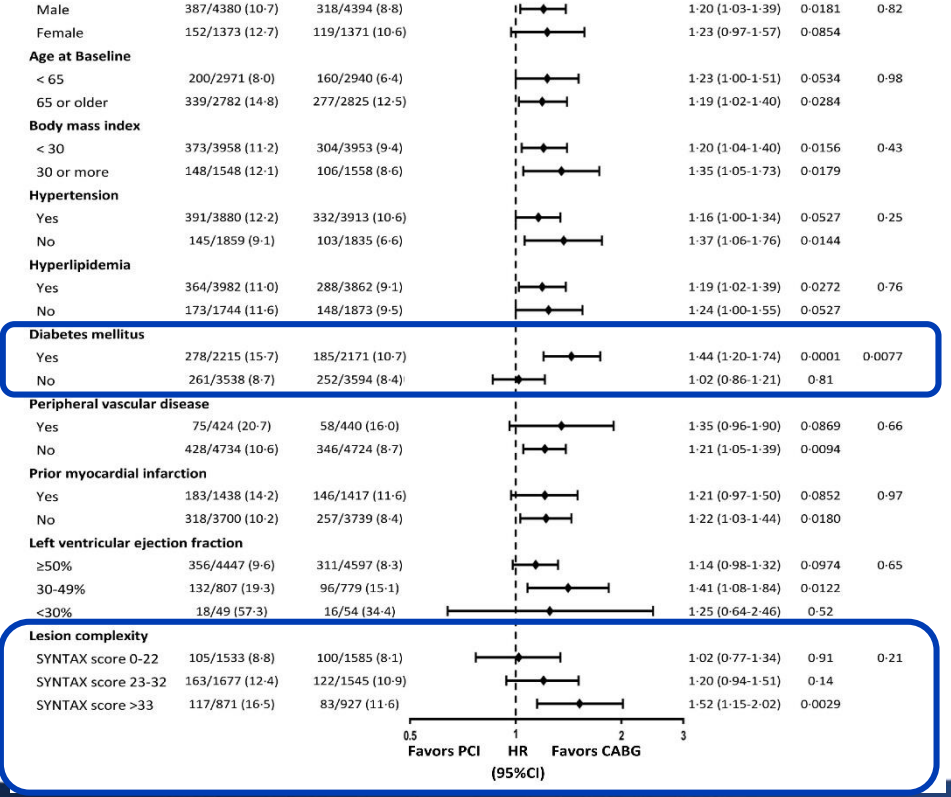


Multi-vessel Disease

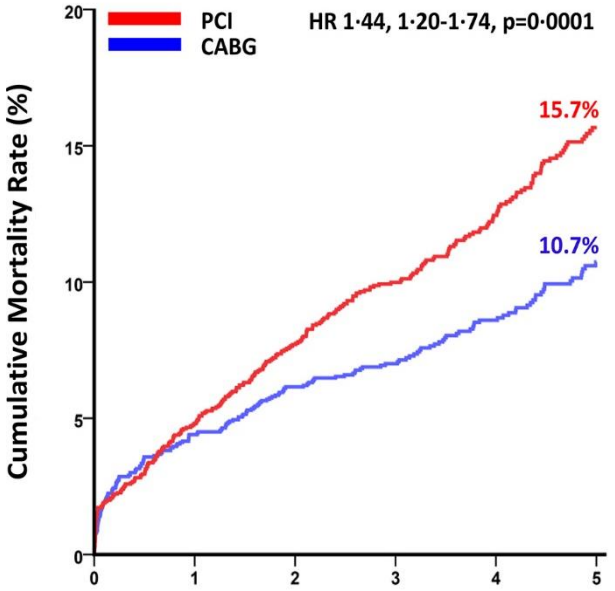


Subgroup analysis

Subgroups	PCI	CABG	HR (95% CI)	p-value	Interaction p-value
Sex					
Male	387/4380 (10·7)	318/4394 (8·8)	1·20 (1·03-1·39)	0·0181	0·82
Female	152/1373 (12·7)	119/1371 (10·6)	1·23 (0·97-1·57)	0·0854	
Age at Baseline					
< 65	200/2971 (8·0)	160/2940 (6·4)	1·23 (1·00-1·51)	0·0534	0·98
65 or older	339/2782 (14·8)	277/2825 (12·5)	1·19 (1·02-1·40)	0·0284	
Body mass index					
< 30	373/3958 (11·2)	304/3953 (9·4)	1·20 (1·04-1·40)	0·0156	0·43
30 or more	148/1548 (12·1)	106/1558 (8·6)	1·35 (1·05-1·73)	0·0179	
Hypertension					
Yes	391/3880 (12·2)	332/3913 (10·6)	1·16 (1·00-1·34)	0·0527	0·25
No	145/1859 (9·1)	103/1835 (6·6)	1·37 (1·06-1·76)	0·0144	
Hyperlipidemia					
Yes	364/3982 (11·0)	288/3862 (9·1)	1·19 (1·02-1·39)	0·0272	0·76
No	173/1744 (11·6)	148/1873 (9·5)	1·24 (1·00-1·55)	0·0527	
Diabetes mellitus					
Yes	278/2215 (15·7)	185/2171 (10·7)	1·44 (1·20-1·74)	0·0001	0·0077
No	261/3538 (8·7)	252/3594 (8·4)	1·02 (0·86-1·21)	0·81	
Peripheral vascular disease					
Yes	75/424 (20·7)	58/440 (16·0)	1·35 (0·96-1·90)	0·0869	0·66
No	428/4734 (10·6)	346/4724 (8·7)	1·21 (1·05-1·39)	0·0094	
Prior myocardial infarction					
Yes	183/1438 (14·2)	146/1417 (11·6)	1·21 (0·97-1·50)	0·0852	0·97
No	318/3700 (10·2)	257/3739 (8·4)	1·22 (1·03-1·44)	0·0180	
Left ventricular ejection fraction					
≥50%	356/4447 (9·6)	311/4597 (8·3)	1·14 (0·98-1·32)	0·0974	0·65
30-49%	132/807 (19·3)	96/779 (15·1)	1·41 (1·08-1·84)	0·0122	
<30%	18/49 (57·3)	16/54 (34·4)	1·25 (0·64-2·46)	0·52	
Lesion complexity					
SYNTAX score 0-22	105/1533 (8·8)	100/1585 (8·1)	1·02 (0·77-1·34)	0·91	0·21
SYNTAX score 23-32	163/1677 (12·4)	122/1545 (10·9)	1·20 (0·94-1·51)	0·14	
SYNTAX score >33	117/871 (16·5)	83/927 (11·6)	1·52 (1·15-2·02)	0·0029	



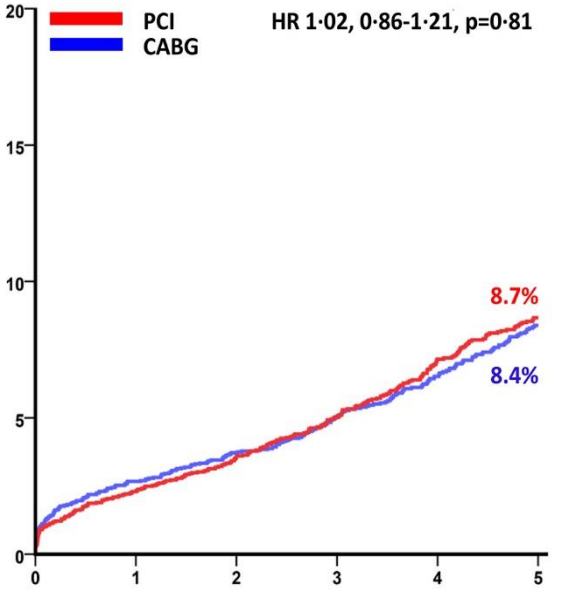
Diabetes



Number at risk

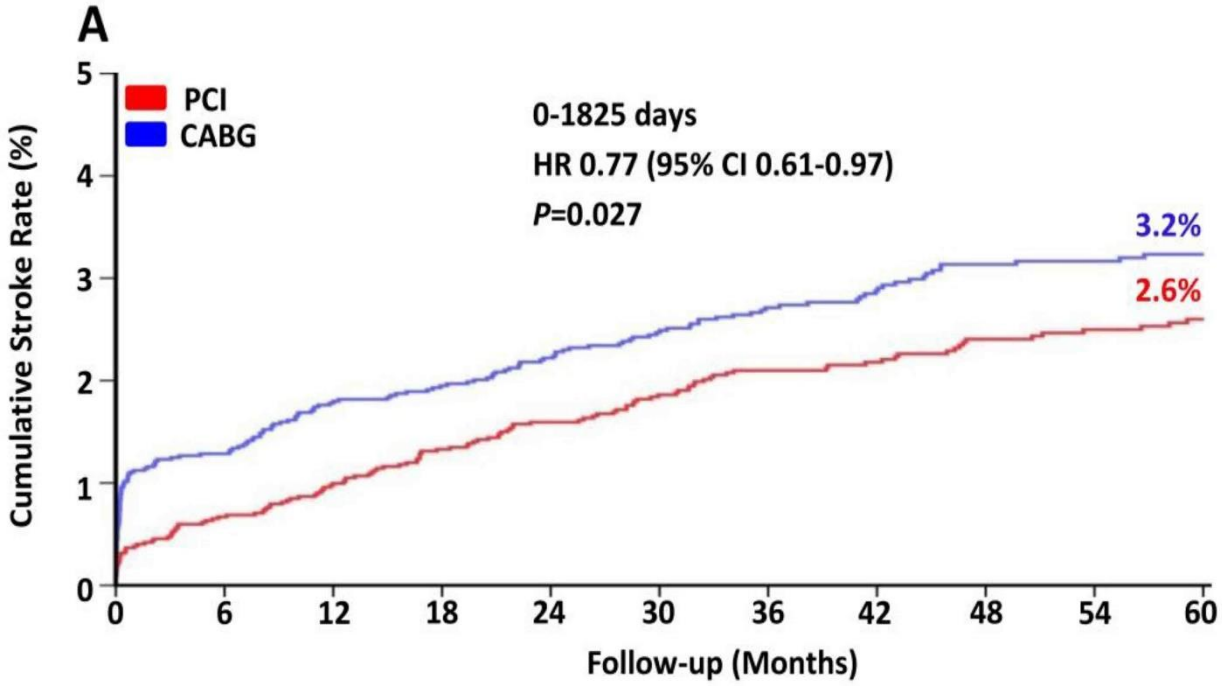
CABG	2171	1958	1786	1325	1044	629
PCI	2215	2041	1856	1376	1086	681

Non-Diabetes

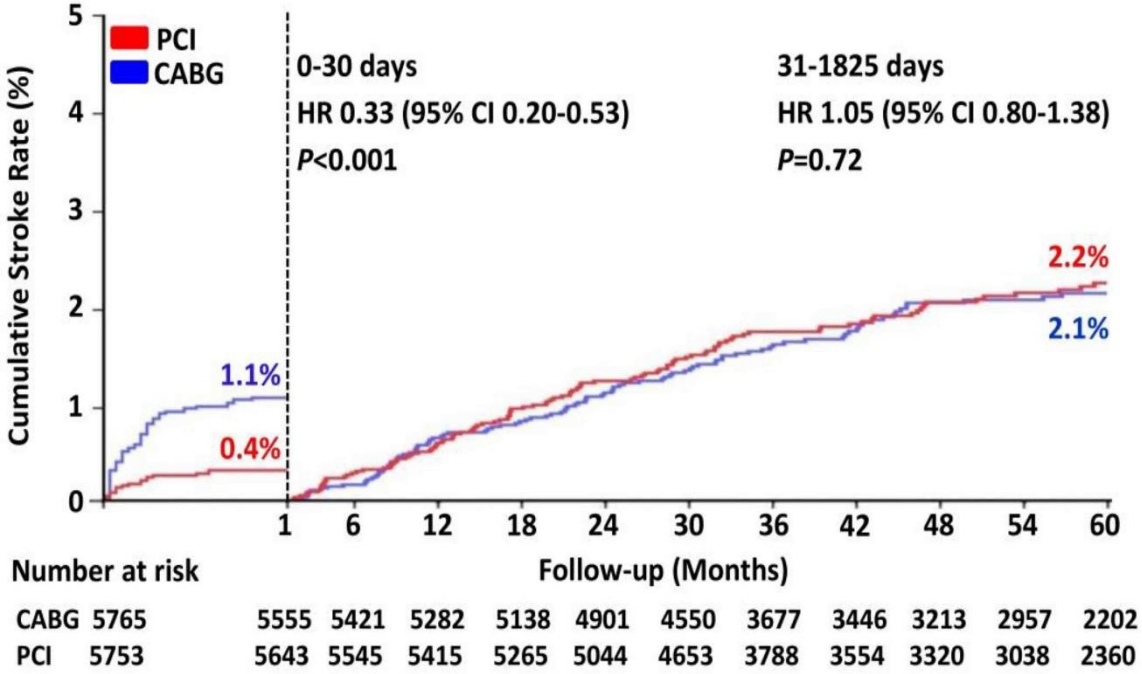


	3594	3402	3208	2436	2255	1633
	3538	3417	3245	2477	2296	1724

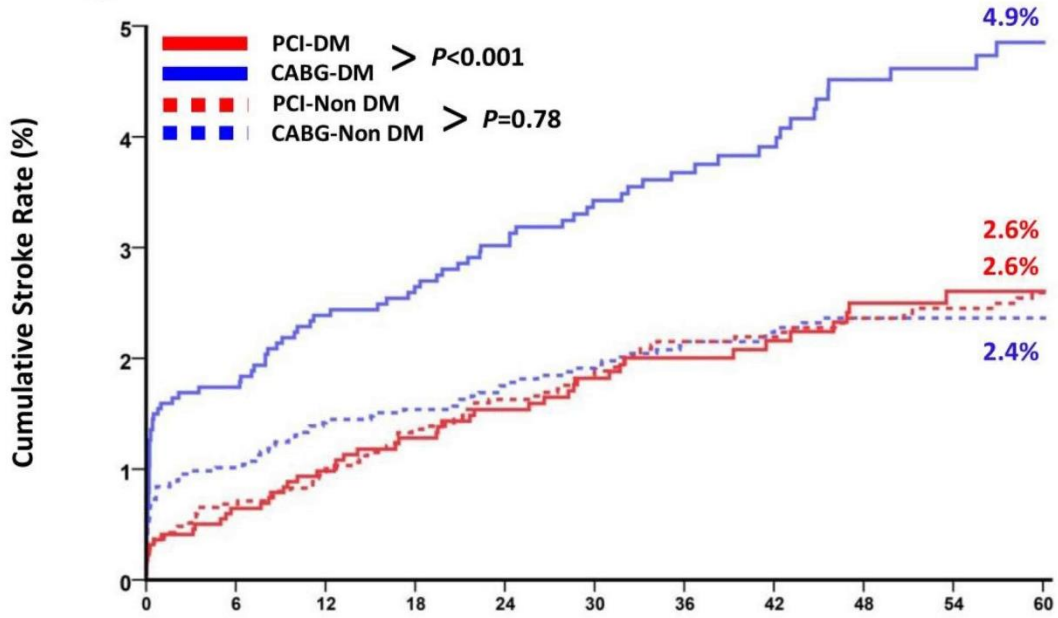
Stroke after CABG and PCI



Stroke after CABG or PCI
Landmark analysis



Stroke CABG and PCI
Diabetes versus non-Diabetes



Number at risk

CABG (DM)	2171	1986	1921	1862	1744	1579	1287	1141	1007	846	604
PCI (DM)	2215	2097	2025	1955	1842	1647	1354	1209	1068	890	671
CABG (Non-DM)	3594	3435	3361	3276	3157	2971	2390	2305	2206	2111	1599
PCI (Non-DM)	3536	3448	3390	3310	3202	3006	2434	2345	2252	2148	1690

Conclusions pooled analysis of 11,518 patients from 11 randomized trials

- Largest analysis of patients randomly assigned to PCI with stents or CABG
- Mortality significantly lower with CABG in patients with multivessel disease and diabetes, and high coronary lesion complexity
- Patients with left main disease and lower coronary lesion complexity have comparable survival with PCI and CABG
- Stroke risk is higher in patients with diabetes undergoing CABG