Revascularization in Diabetics with Multivessel Disease

A Population-based Evaluation of Outcomes

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American Heart Association, Orlando
November 10, 2015

BC CENTRE FOR
Improved Cardiovascular Health
EVIDENCE FOR CHANGE

Cardiac Services BC
An agency of the Provincial Health Services Authority

UBC

Background

151 million
2000

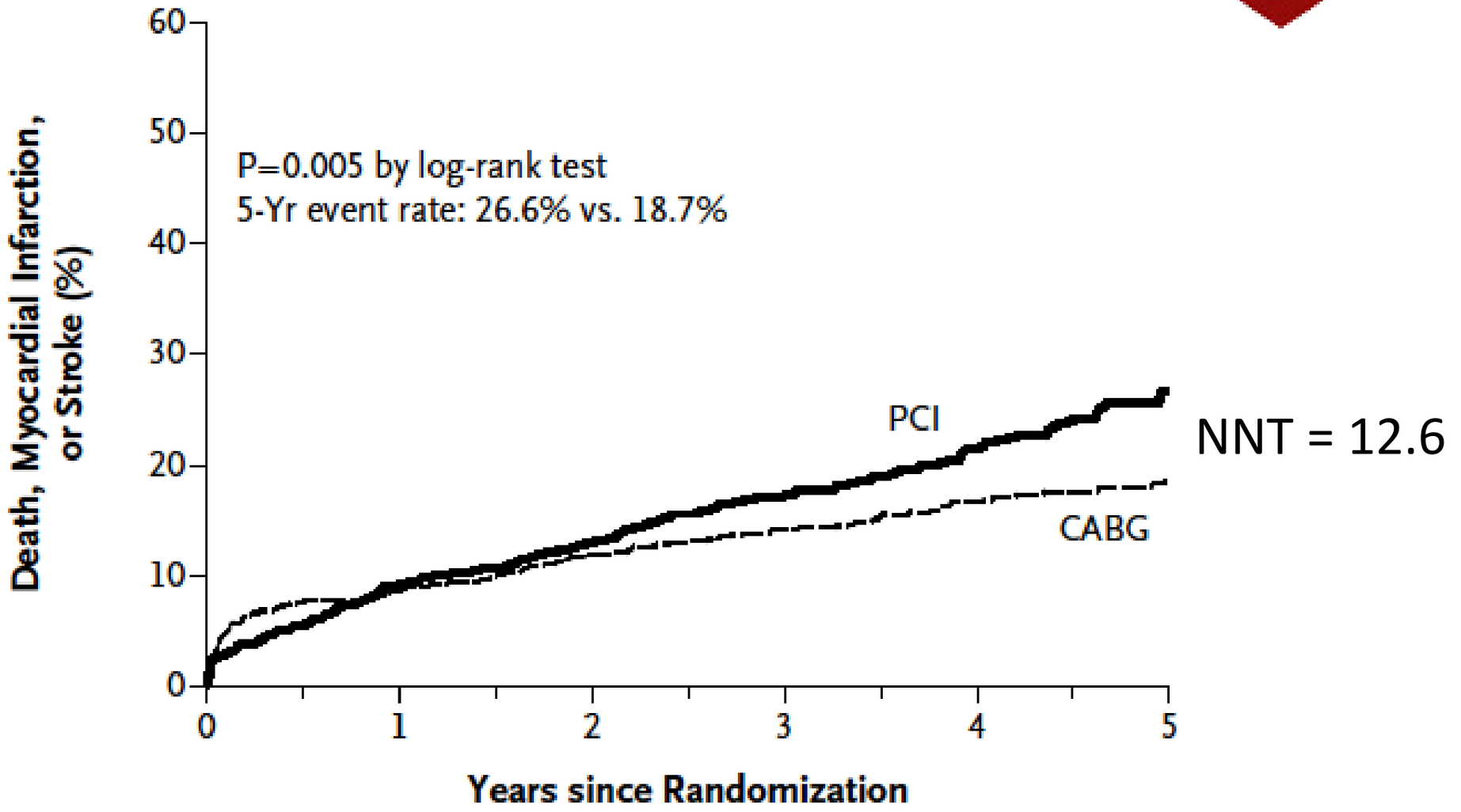
387 million
2014

592 million
2035

- Projected deaths from DM and its complications are expected to rise by 50% in the next 10 years
- Diffuse coronary artery disease is a common presentation in patients with DM
- Selecting the optimal revascularization strategy is key to improving outcomes in this population

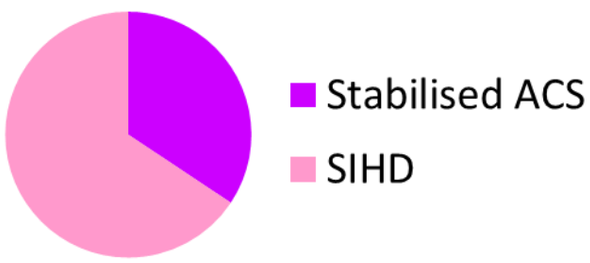
IDF. Diabetes Atlas. Second Edition 2003; Fifth Edition, 2014

FREEDOM MACCE at 5-Years



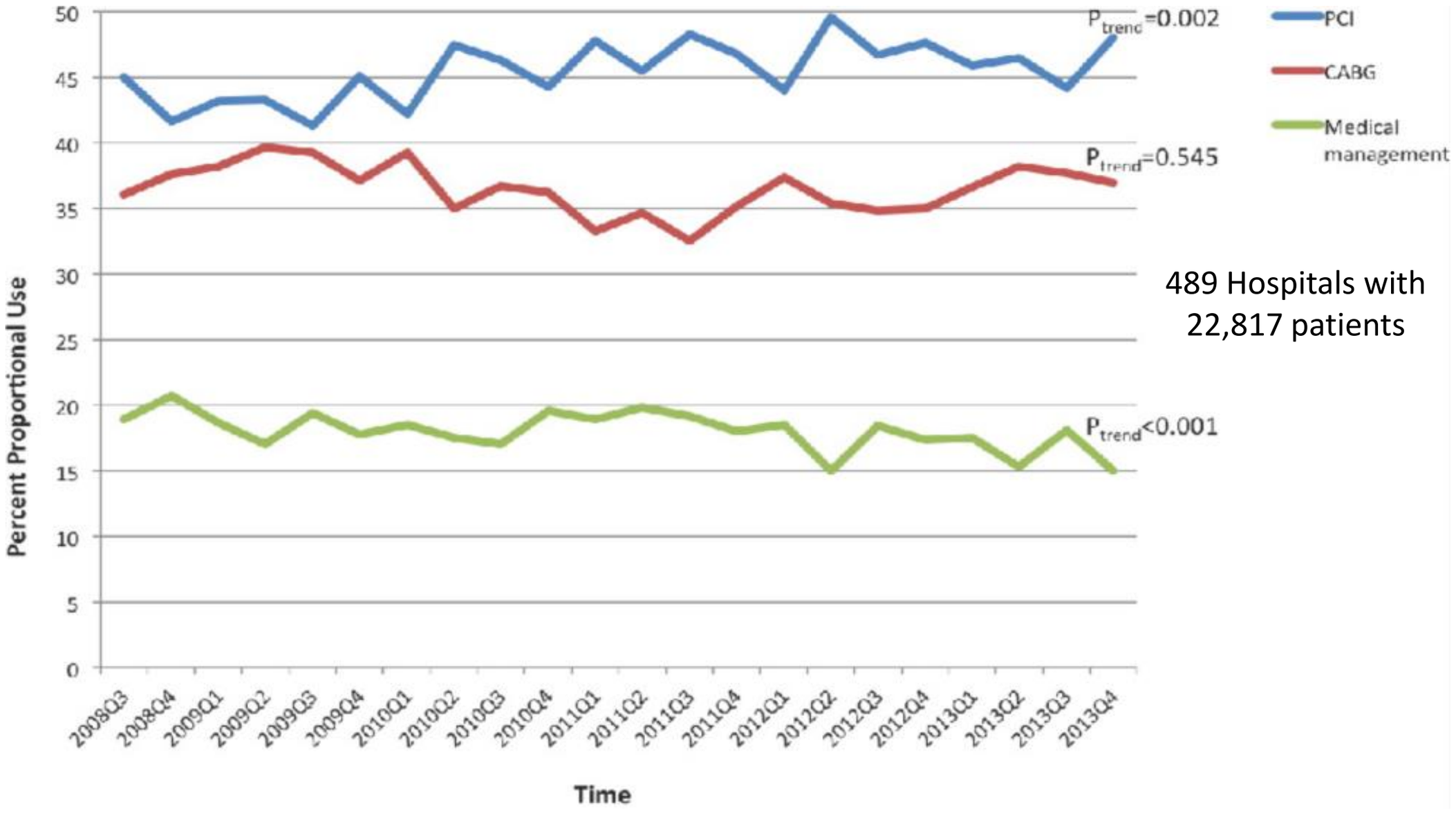
No. at Risk

PCI	953	848	788	625	416	219
CABG	947	814	758	613	422	221



N Engl J Med 2012;367:2375-84

Trends in NSTEMI Management with DM patients with MV-CAD (NCDR – ACTION)



489 Hospitals with 22,817 patients

A. Pandey et al ACC 2015 (abstract)

Aim

To assess the practice patterns and outcomes in a real-world population with DM and multi-vessel disease undergoing PCI or isolated CABG in the province of British Columbia, Canada between October 1, 2007 and January 31, 2014

BRITISH COLUMBIA | Vital Statistics Agency

Cardiac Services BC
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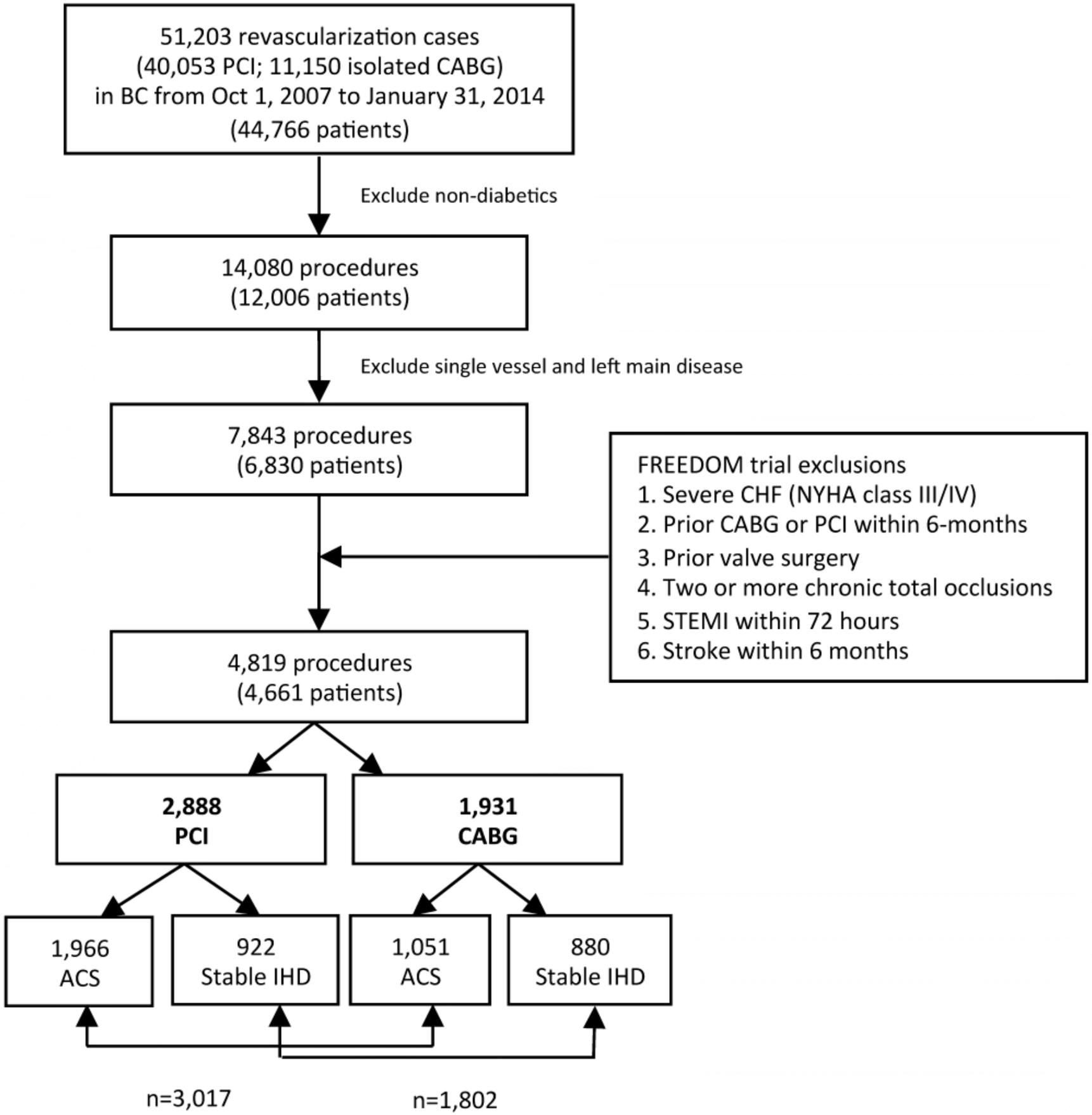
Study Cohort



ACS = stabilized ACS

Outcomes

Primary

- First occurrence of a major cardiac/cerebrovascular adverse event after revascularization (MACCE)
    - All-cause mortality, non-fatal MI, non-fatal stroke

Secondary

- Individual components of MACCE
    - Plus repeat revascularization
    - Plus MACCE and repeat revascularization

Definitions

- Validated ICD-10 codes for MI and stroke
- Death from Vital Statistics database
- Repeat revascularization from provincial procedure database

Statistical Analyses

- Group comparisons
  - Chi-square test for categorical variables; Student's t-test for continuous variable

- Outcome Analyses
  - Short term (30 days): Logistic regression
  - Long term (31 days – 5 years): Cox proportional hazards
  - MACCE models adjusted for baseline demographic and clinical variables
  - Potential augmentation of revascularization impact on MACCE assessed with interaction term (acuity x procedure)

- Event Rates
  - Kaplan-Meier rates expressed as percentages, accounting for follow-up time

Baseline Characteristics by Revascularization Mode

Characteristic	PCI (n=2888)	CABG (n=1931)
Age (years) mean ± SD	67.3 ± 10.8	65.2 ± 9.0
Sex, Female (%)	28.0	22.8
Hypertension (%)	88.1	91.8
Pulmonary Disease (%)	16.5	12.0
Renal Insufficiency (%)	7.1	6.9
3-vessel Disease (%)	28.2	64.3
Proximal LAD (%)	23.6	45.0
Stabilized ACS (%)	68.1	54.4
Urgency – Elective (%)	29.9	41.1
Ejection Fraction > 50%	56.9	66.1

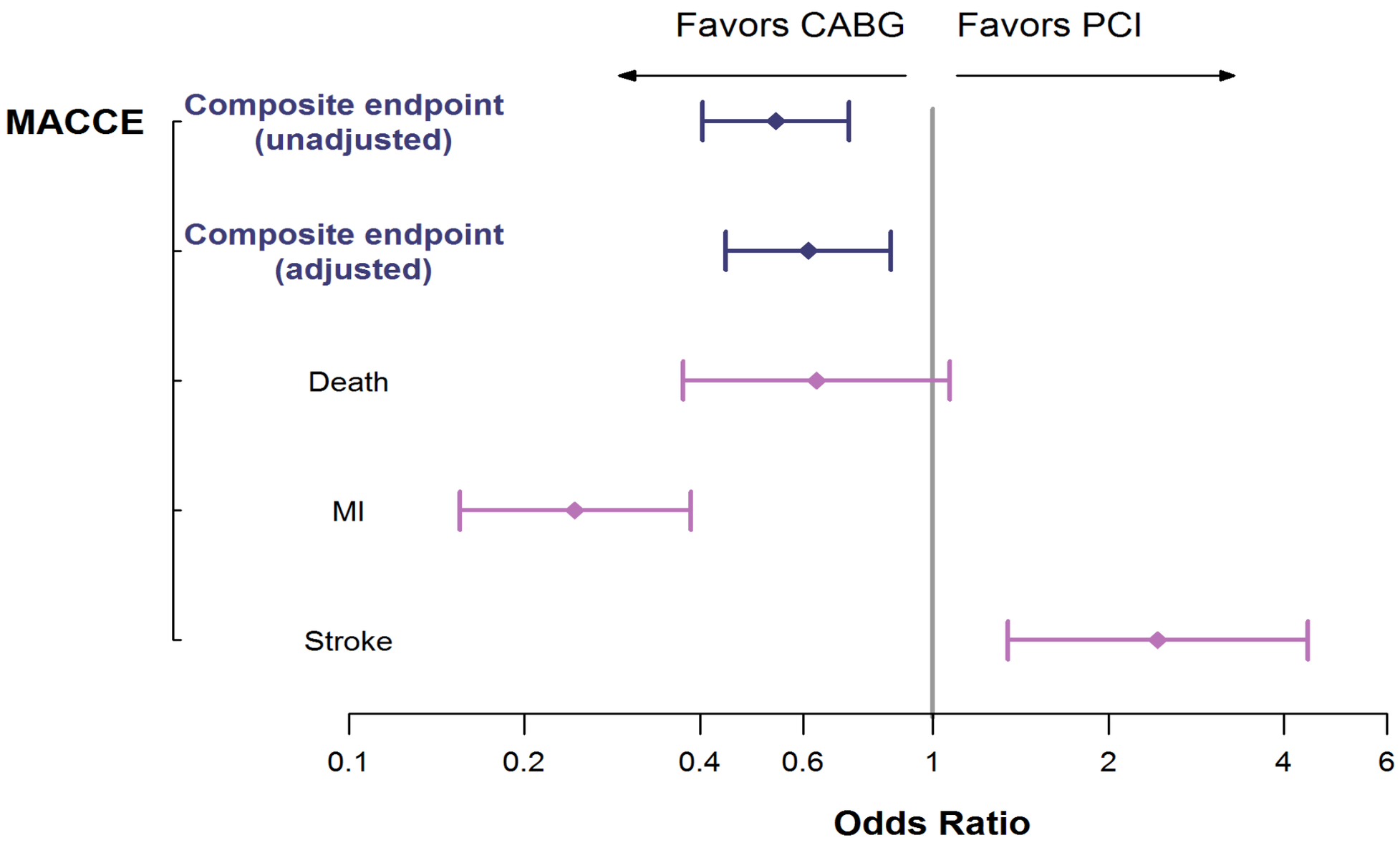
All p<0.01 except renal disease; p = 0.81

Baseline Characteristics by Presentation Acuity

Characteristic	Stabilized ACS (n=3017)	Stable IHD (n=1802)
Age (years) mean ± SD	66.8 ± 10.6	66.0 ± 9.3
Sex, Female (%)	28.3	22.0
Hypertension (%)	88.6	91.3
Pulmonary Disease (%)	15.5	13.2
Renal Insufficiency (%)	7.9	5.5
3-vessel Disease (%)	43.0	42.2
Proximal LAD (%)	31.8	32.8
CCS III/IV (%)	95.2	22.1
Urgency – Elective (%)	2.0	88.7
Ejection Fraction > 50%	54.4	71.1

All p<0.01 except 3-vessel; p = 0.60 and pulmonary disease; p = 0.03

Short Term Outcomes (30-day)



MACCE adjusted for age, sex, presentation (Stabilized ACS vs. Stable IHD), urgency (emergent, urgent vs. elective), EF (>50%, 30-50%, <30%), PAD, renal insufficiency, liver/GI disease and disease severity (3 vs. 2-vessel).

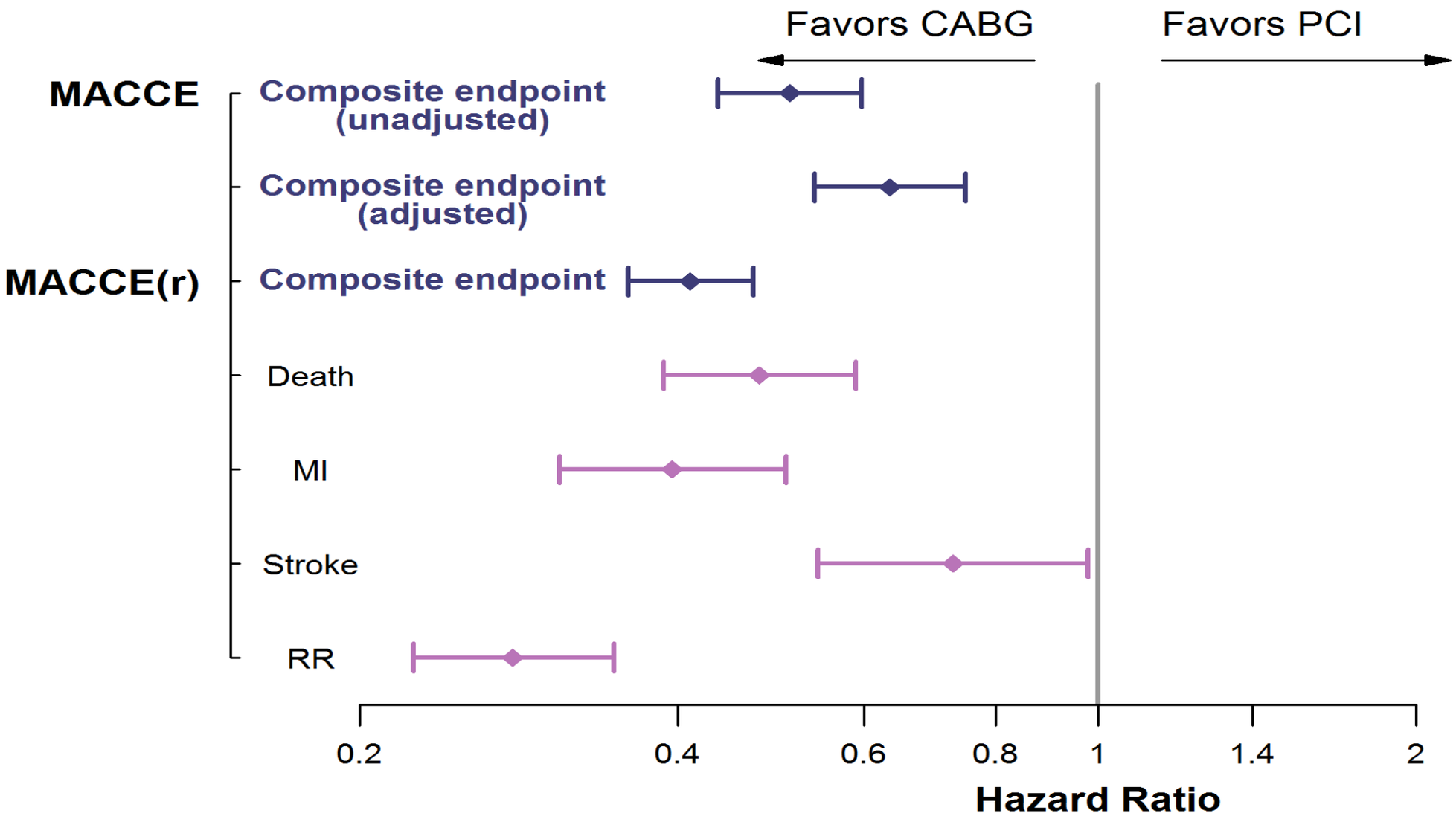
Impact of Acuity at Presentation

30-day (Short term)									
Overall			Stabilized ACS			Stable IHD			
PCI n=2888	CABG n=1931	p-value	PCI n=1966	CABG n=1051	p-value	PCI n=922	CABG n=880	p-value	p-value interaction
6.2%	3.4%	<0.01	8.3%	4.4%	<0.01	1.5%	2.3%	0.30	<0.01

31-day to 5 years (long term)									
Overall			Stabilized ACS			Stable IHD			
PCI n=2710	CABG n=1865	p-value	PCI n=1802	CABG n=1005	p-value	PCI n=908	CABG n=860	p-value	p-value interaction
31.2%	17.9%	<0.01	34.7%	21.4%	<0.01	24.2%	13.8%	<0.01	0.51

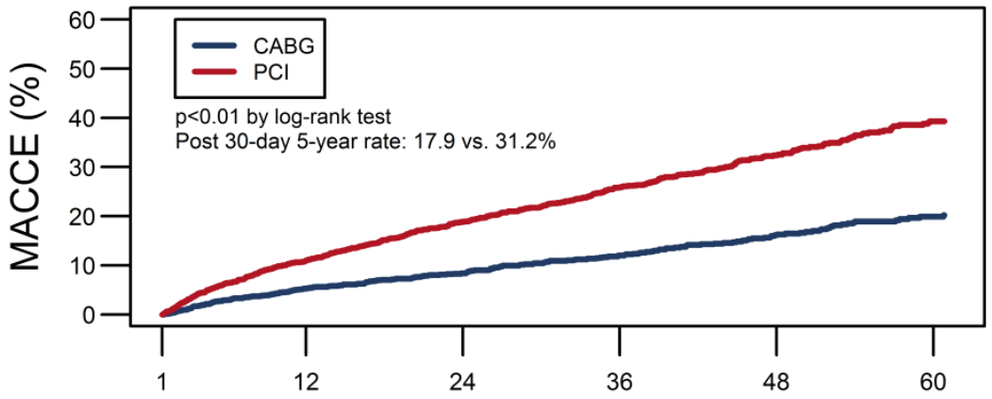
Rates (%) from Kaplan Meier curves

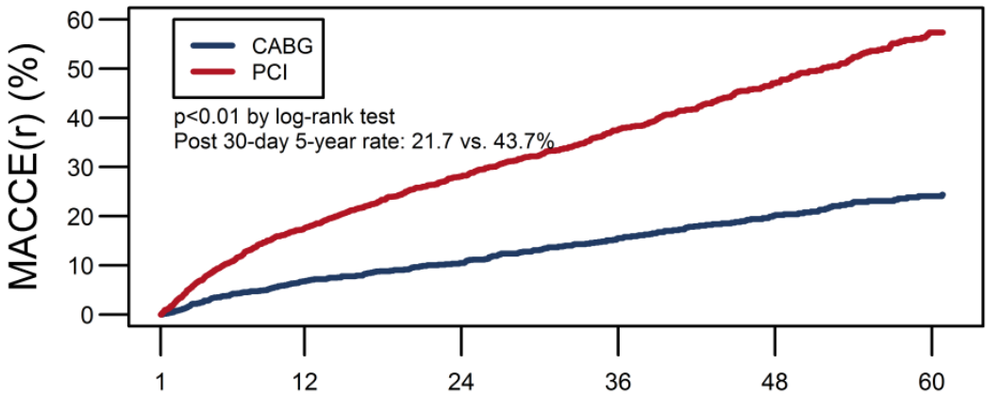
Long Term Outcomes (31-day to 5 years)

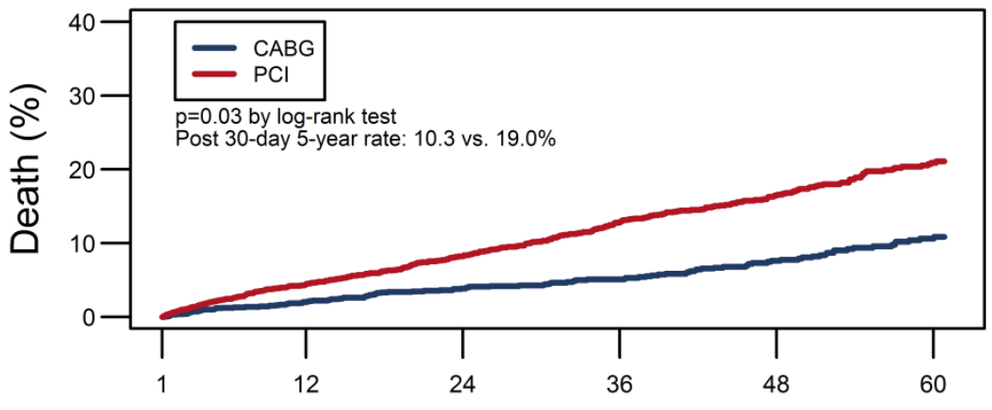


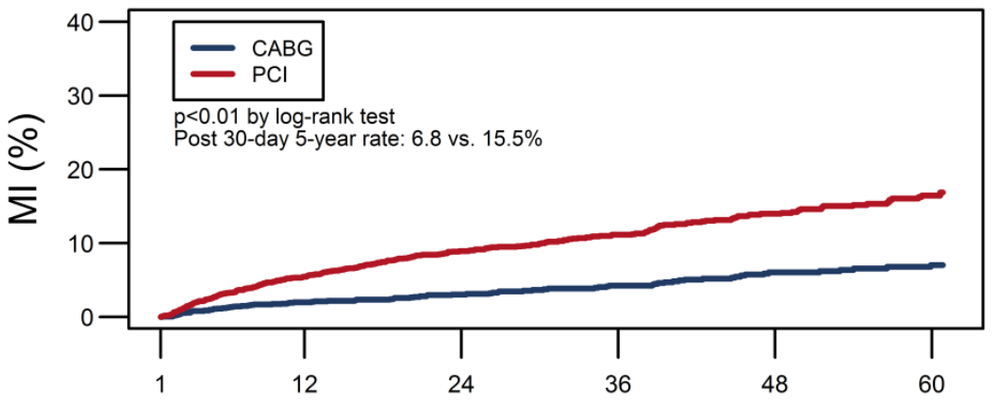
MACCE adjusted for age, sex, presentation (Stabilized ACS vs. Stable IHD), urgency (emergent, urgent vs. elective), EF (>50%, 30-50%, <30%), PAD, renal insufficiency, liver/GI disease and disease severity (3 vs. 2-vessel).

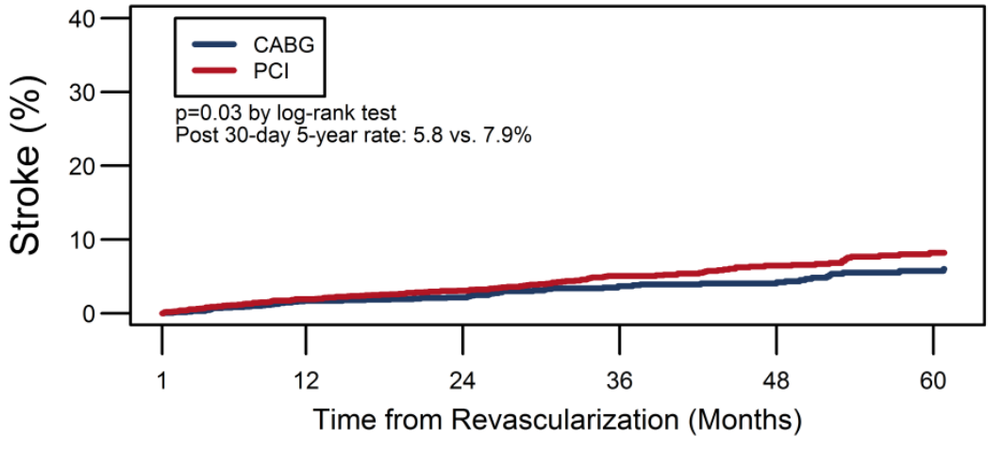
Secondary Outcomes (long-term post revasc)

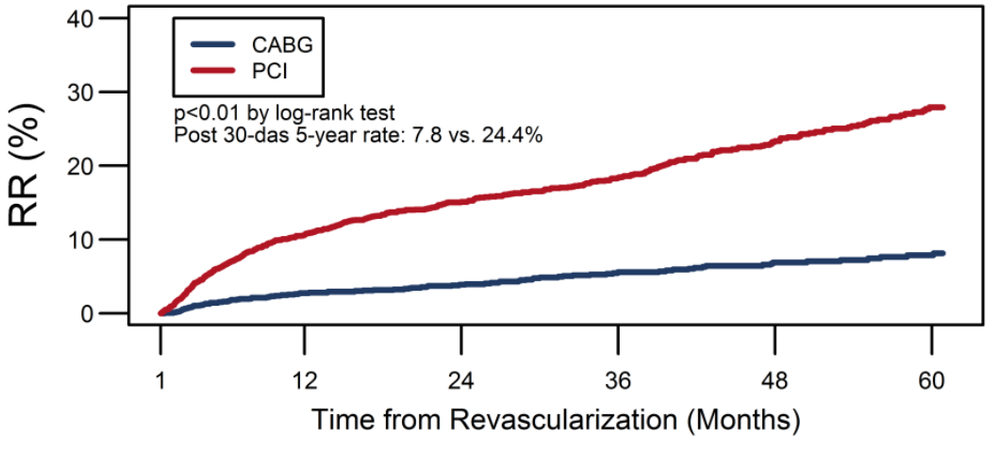












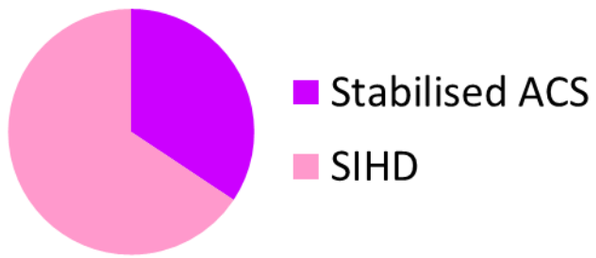
Results

Limitations

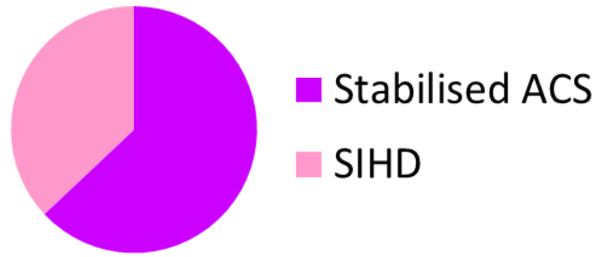
- Observational nature
- Important differences between PCI and CABG cohorts at baseline. Inverse probability weighting analysis underway
- Potential survival bias with CABG cohort
- Limited data on complexity of anatomy, completeness of revascularization

Conclusions

- Death and MI and other serious complications were significantly lower in CABG patients.
  - Consistent with findings of the FREEDOM Trial

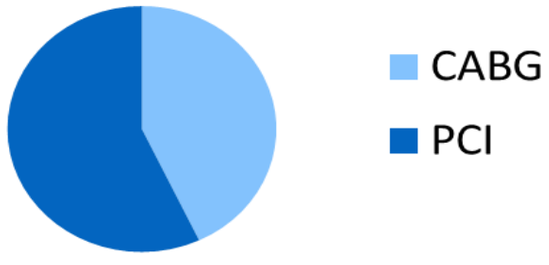


FREEDOM Trial

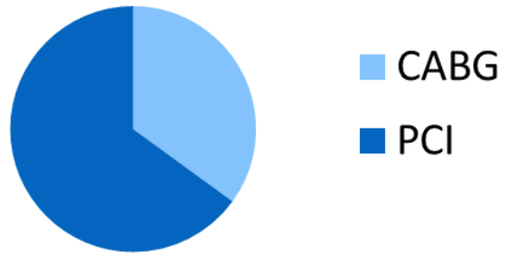


BC Cohort

- CABG in stabilized ACS patients with diabetes mellitus and multivessel disease worthy of consideration



NCDR-ACTION (Abstract)



BC Cohort