Azərbaycan
Kardiologiya
Cəmiyyəti

Optimal medical therapy

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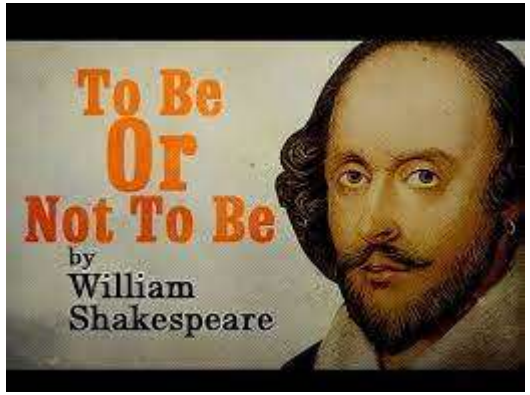
Vice-President of Azerbaijan Society of Cardiology

No disclosures

Revasc or not revasc



Highlights

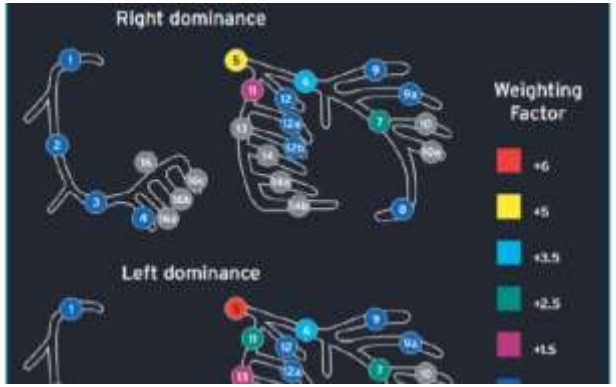
- Why to revascularize?
- Physiological targets for revascularization
- Is viability the way to improve prognosis ?
- Or what do we know about viability?

What are the goals of revasc ?

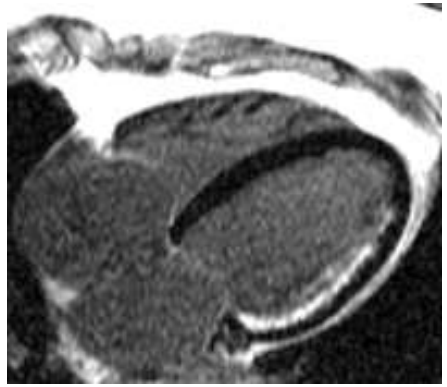
- Symptomatic (eg angina, HF symptoms)
- Prognostic (survival, HF hospitalisations,…)

Risk – benefit

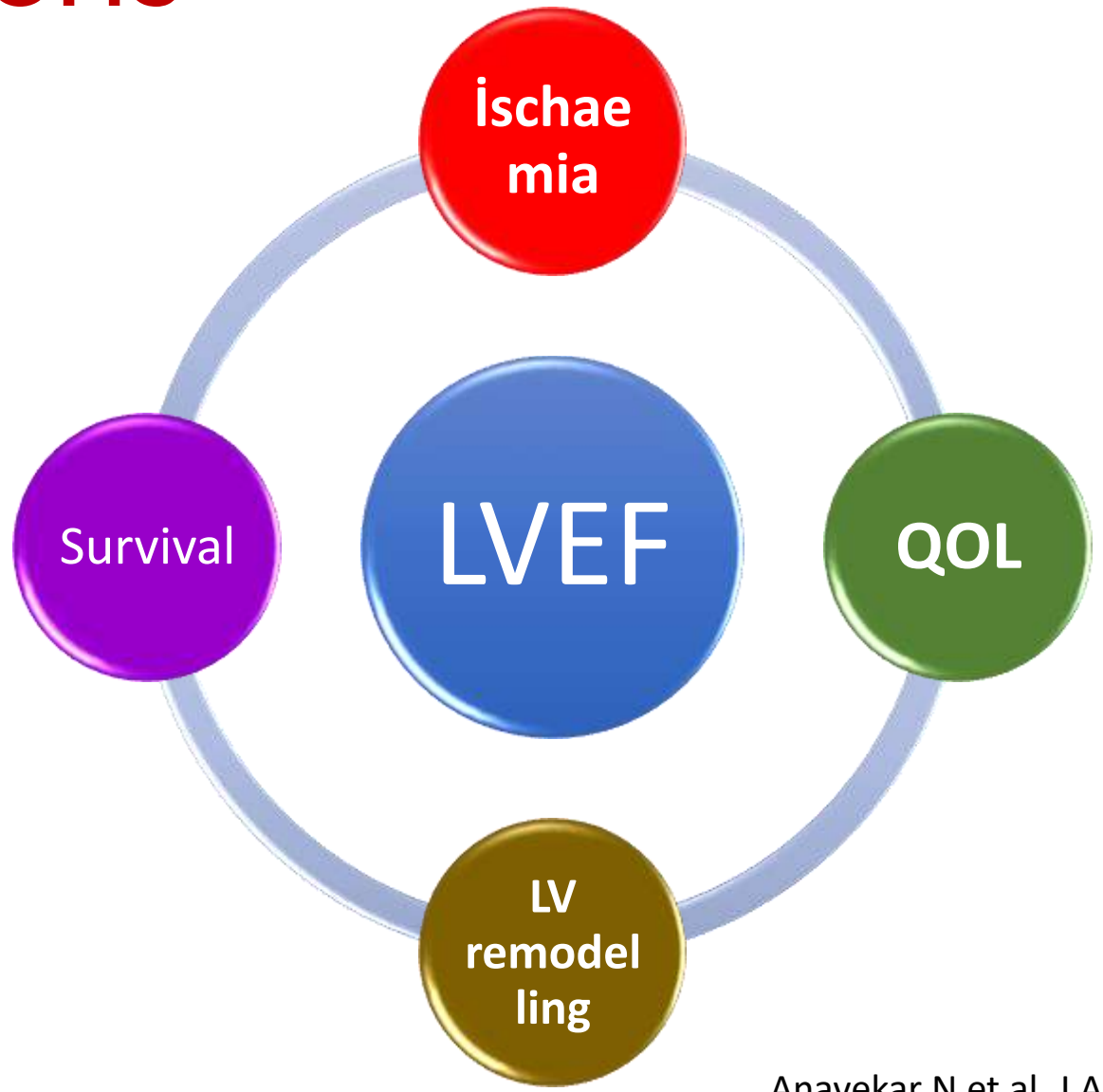
Successful revascularization



- ✓Coronary anatomy
- ✓LVEF
- ✓Ischemia
- ✓Viability
- ✓Comorbidity

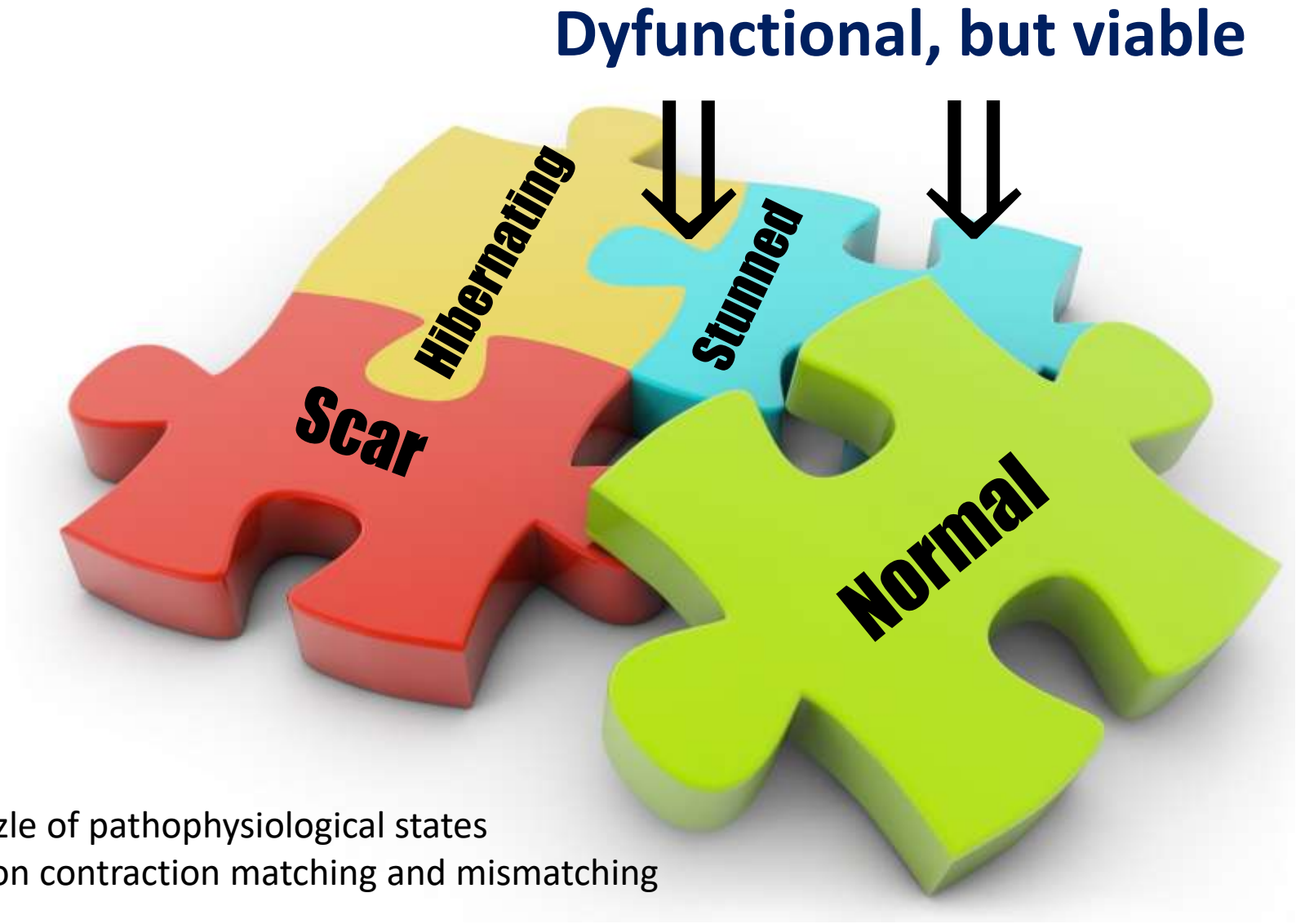


Expectations



Anavekar N et al. J Am Coll Cardiol 2016;67:2874–87

Physiological targets of revasc



ICM consists of a puzzle of pathophysiological states
that relate to perfusion contraction matching and mismatching

What the guidelines say?

Recommendations on revascularizations in patients with chronic heart failure and systolic left ventricular dysfunction (ejection fraction ≤35%)

Recommendations	Class[a]	Level[b]
In patients with severe LV systolic dysfunction and coronary artery disease suitable for intervention, myocardial revascularization is recommended.[81,250]	I	B
CABG is recommended as the first revascularization strategy choice in patients with multivessel disease and acceptable surgical risk.[68,81,248,255]	I	B
In patients with one- or two-vessel disease, PCI should be considered as an alternative to CABG when complete revascularization can be achieved.	IIa	C
In patients with three-vessel disease, PCI should be considered based on the evaluation by the Heart Team of the patient's coronary anatomy, the expected completeness of revascularization, diabetes status, and comorbidities.	IIa	C
LV aneurysmectomy during CABG should be considered in patients with NYHA class III/IV, large LV aneurysm, large thrombus formation, or if the aneurysm is the origin of arrhythmias.	IIa	C
Surgical ventricular restoration during CABG may be considered in selected patients treated in centres with expertise.[252–254,256,257]	IIb	B

ESC Guidelines: for Revascularisation & for Heart Failure

Heart Failure 2021

	Class[a]	Level[b]
CABG should be considered as the first-choice revascularization strategy, in patients suitable for surgery, especially if they have diabetes and for those with multivessel disease.[581,587,588,590]	IIa	B
Coronary revascularization should be considered to relieve persistent symptoms of angina (or an angina-equivalent) in patients with HFrEF, CCS, and coronary anatomy suitable for revascularization, despite OMT including anti-anginal drugs.	IIa	C
In LVAD candidates needing coronary revascularization, CABG should be avoided, if possible.	IIa	C
Coronary revascularization may be considered to improve outcomes in patients with HFrEF, CCS, and coronary anatomy suitable for revascularization, after careful evaluation of the individual risk to benefit ratio, including coronary anatomy (i.e. proximal stenosis >90% of large vessels, stenosis of left main or proximal LAD), comorbidities, life expectancy, and patient's perspectives.	IIb	C B?
PCI may be considered as an alternative to CABG, based on Heart Team evaluation, considering coronary anatomy, comorbidities, and surgical risk.	IIb	C

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Revascularisation 2018

	Class[a]	Level[b]
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hould be lass III/ us for- gin of	IIa	C
ng CABG nts 2–254,	IIb	B

Class I	Evidence and/or general agreement that a given treatment or procedure is beneficial, useful, effective.	Is recommended or is indicated
Class II	Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure.	
Class IIa	Weight of evidence/opinion is in favour of usefulness/efficacy.	Should be considered
Class IIb	Usefulness/efficacy is less well established by evidence/opinion.	May be considered
Class III	Evidence or general agreement that the given treatment or procedure is not useful/effective, and in some cases may be harmful.	Is not recommended

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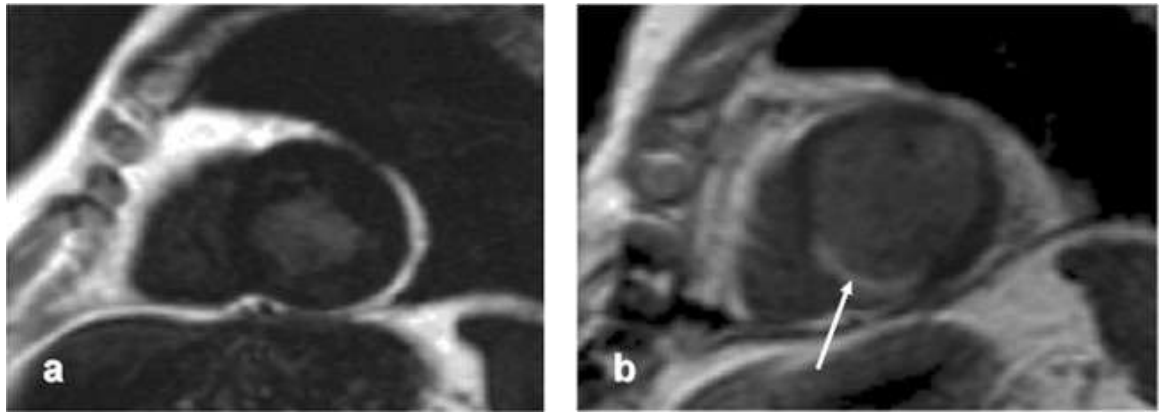
Iatrogenic Myocardial Infarction

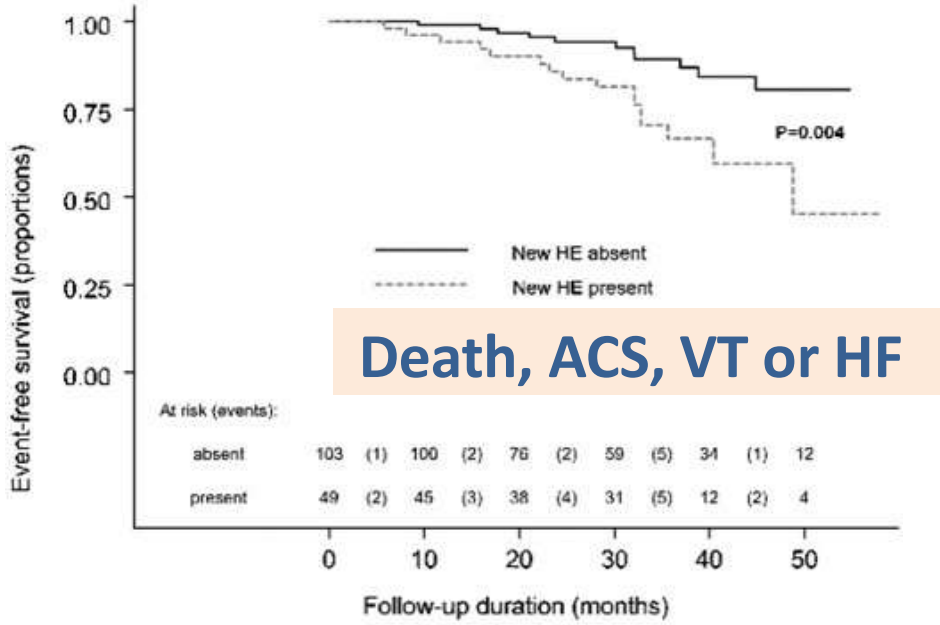
(CABG / PCI – just a controlled myocardial infarction?)

- **How Common?**
  - **32%**
- **Does it matter?**
  - **Three-fold increase in adverse events**



Prognostic value of coronary revascularisation-related myocardial injury: a cardiac magnetic resonance imaging study

K Rahimi,[1] A P Banning,[2] A S H Cheng,[3] T J Pegg,[4] T D Karamitsos,[4] K M Channon,[2] S Darby,[1] D P Taggart,[5] S Neubauer,[6] J B Selvanayagam[7]

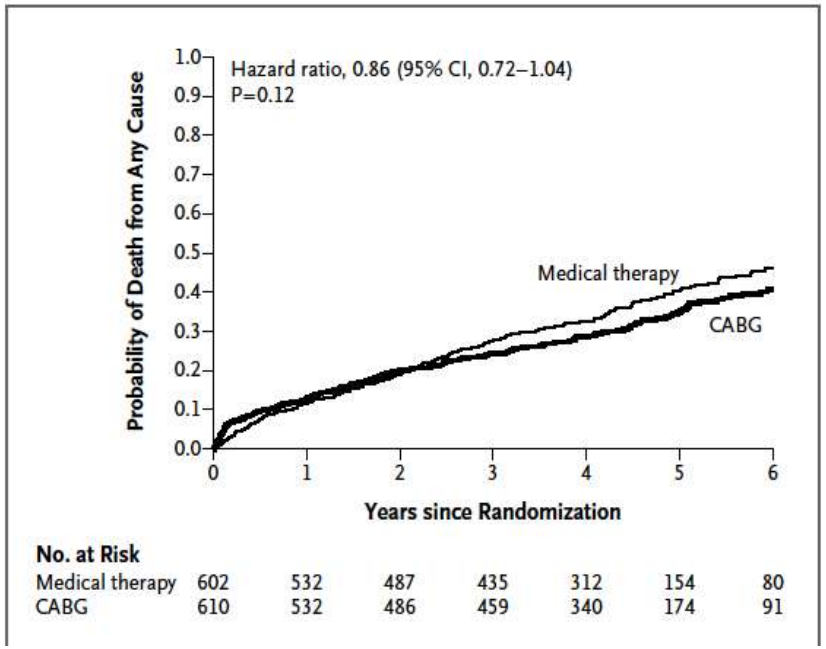


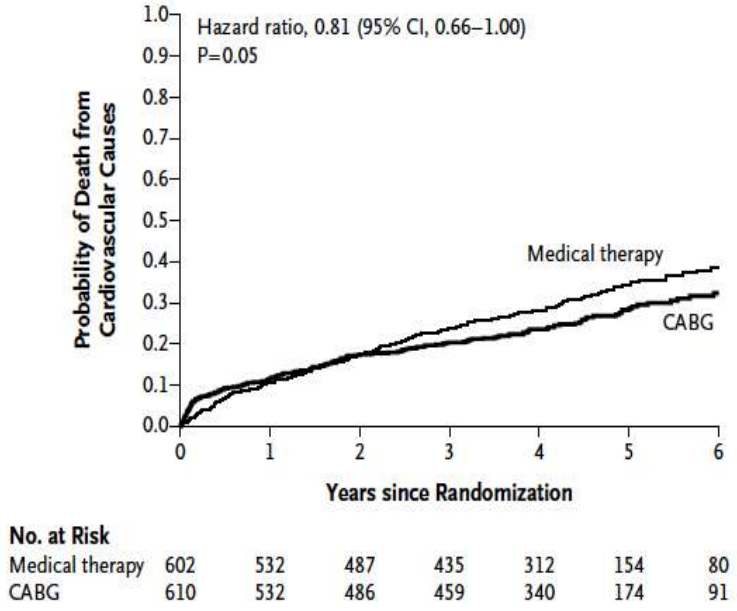
Death, ACS, VT or HF

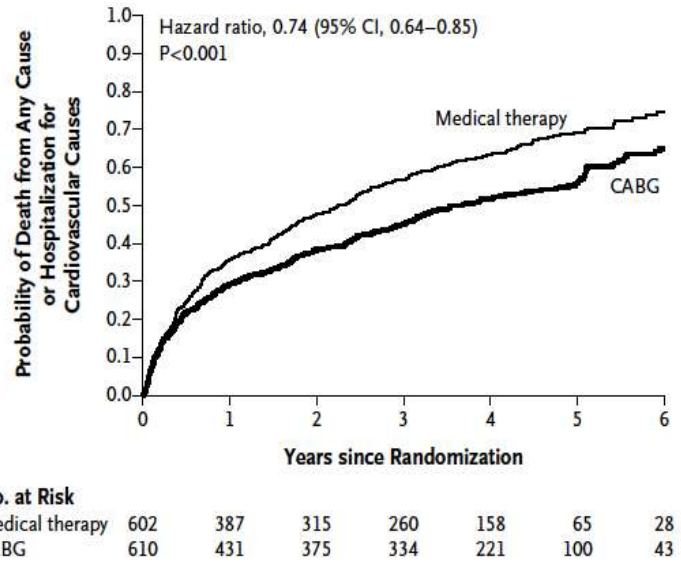
Conclusions: Myocardial injury during PCI or CABG, identified by DE-CMR, adversely affects clinical outcome. This suggests the benefits from revascularisation could partially be offset by new myocardial injury caused by the intervention itself.

Heart 2009;**95**:1937–1943. doi:10.1136/hrt.2009.173302

Improvement of Prognosis – STICH



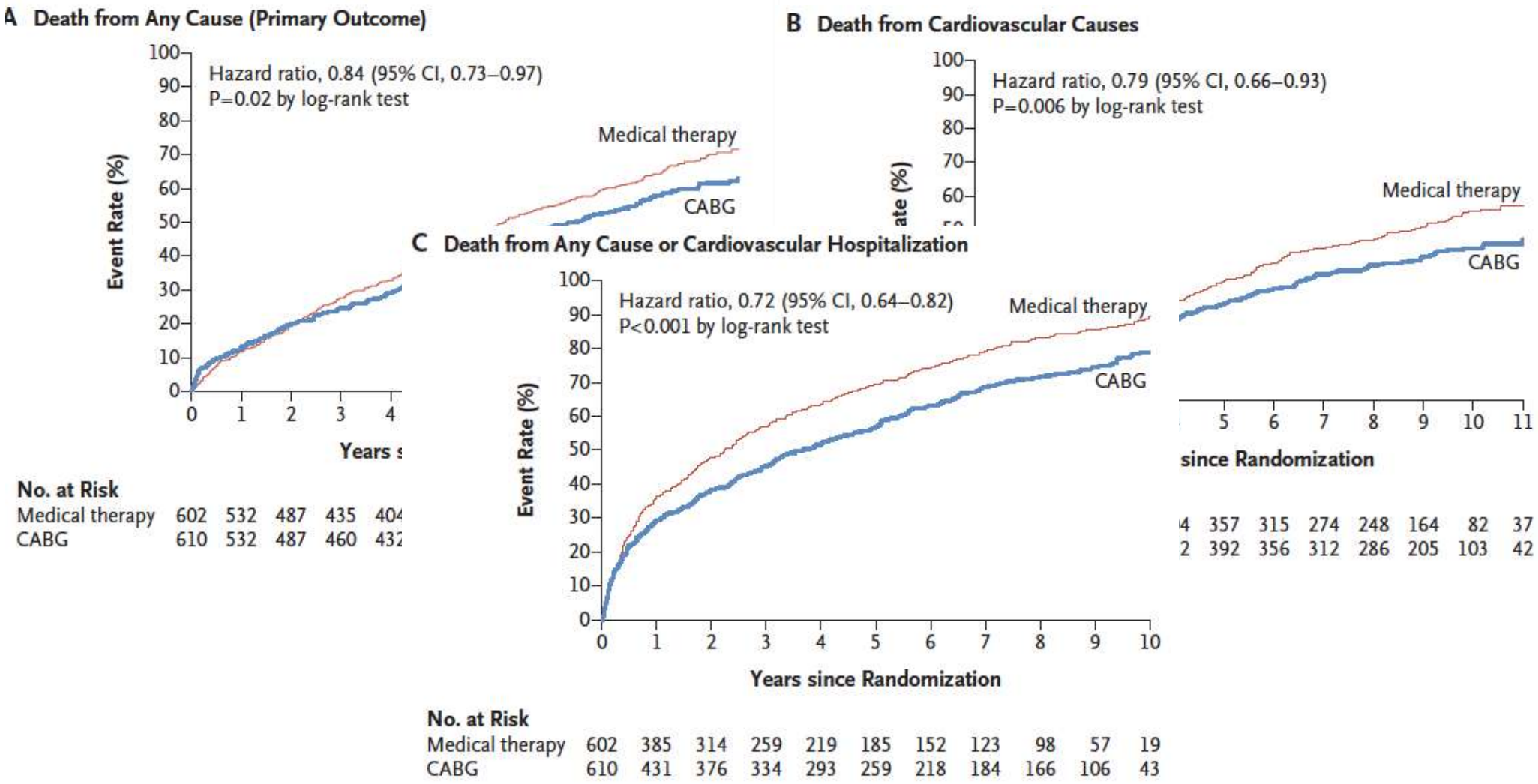




Revascularization by CABG is superior to optimal medical therapy

Velazquez et al, NEJM 2011;364:1607-1616

Improvement of Prognosis – STICHES

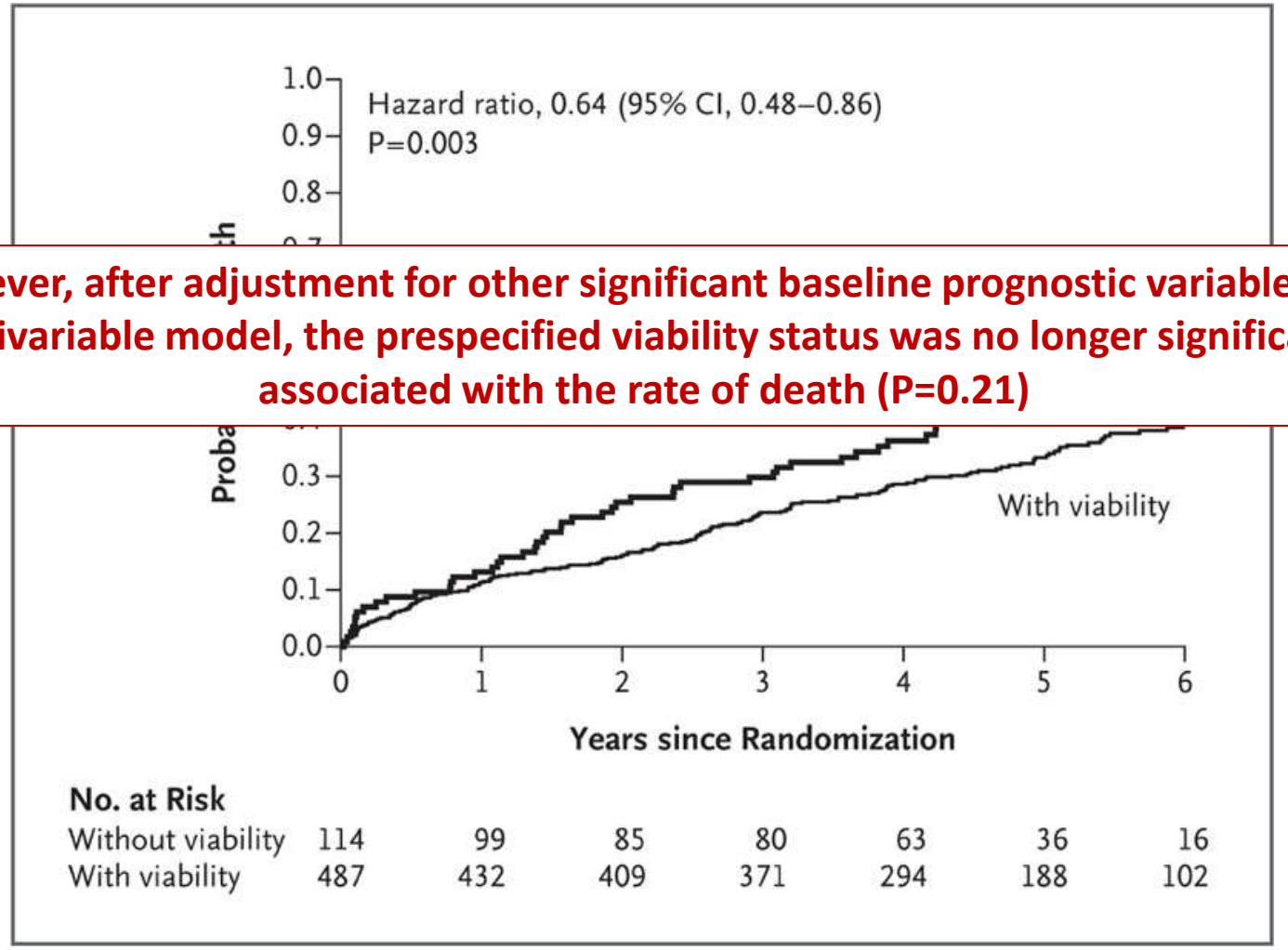


Velazquez et al. NEJM 2016;374:1511-1520

STICH: Myocardial Viability Sub-study

Kaplan–Meier Analysis of the Probability of Death, According to Myocardial Viability Status

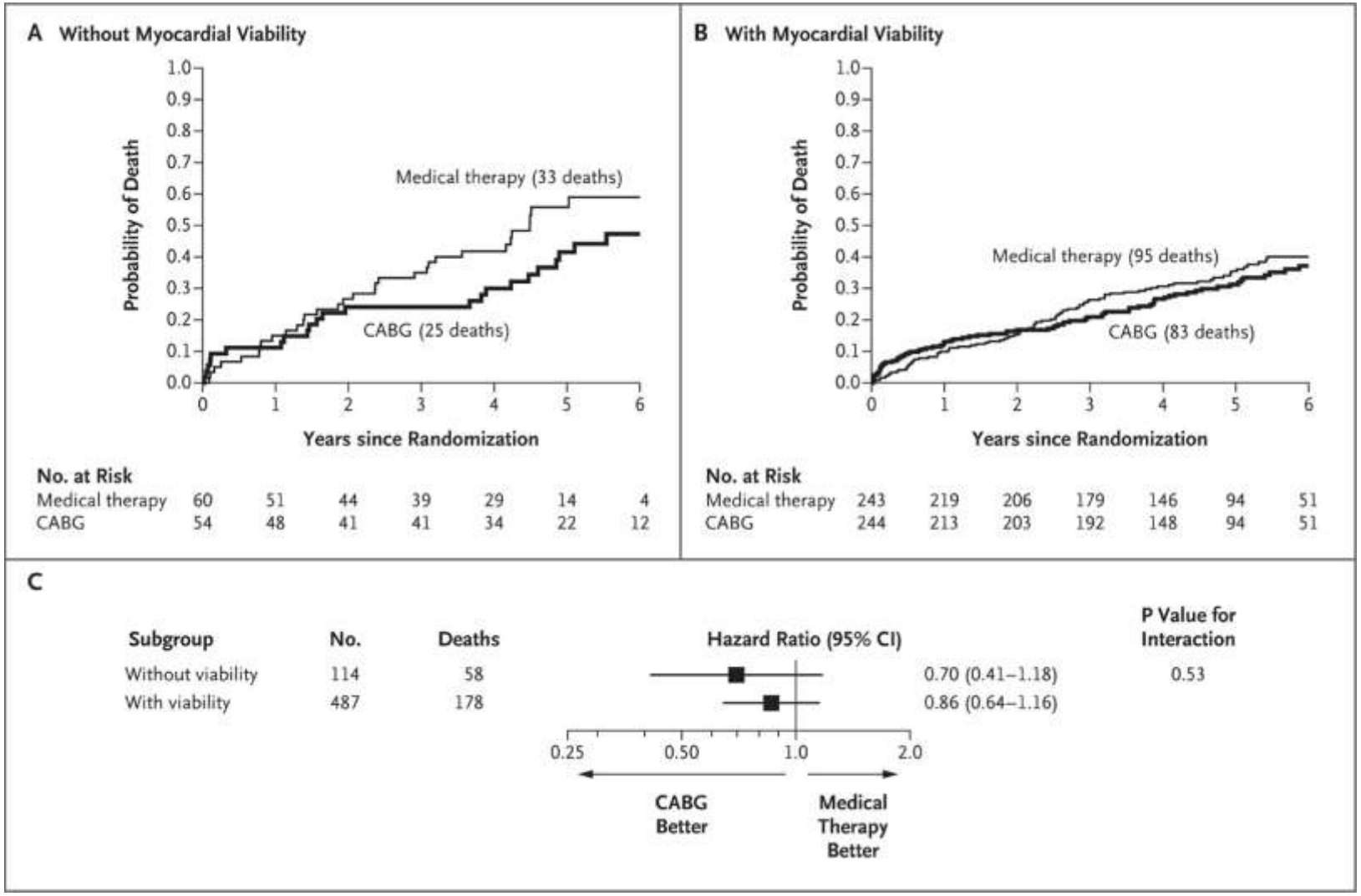
Patients with viable myocardium had lower overall rates of death than those without viable myocardium



However, after adjustment for other significant baseline prognostic variables in a multivariable model, the prespecified viability status was no longer significantly associated with the rate of death (P=0.21)

Bonow RO et al. N Engl J Med 2011;364:1617-1625.

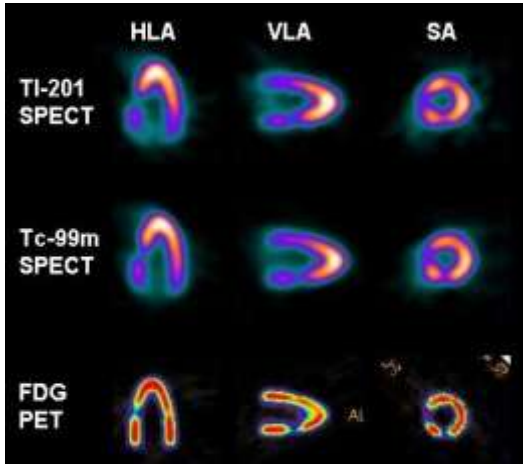
STICH: Myocardial Viability Sub-study



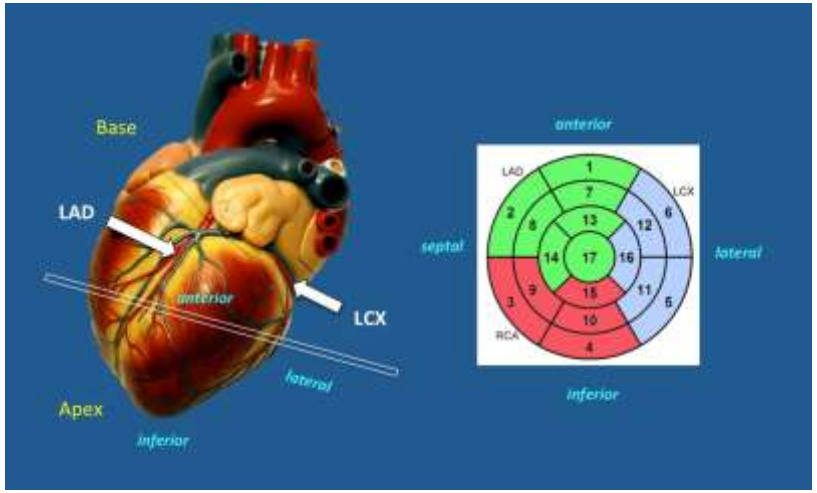
Bonow RO et al. N Engl J Med 2011;364:1617-1625.

STICH
viability tests

SPECT



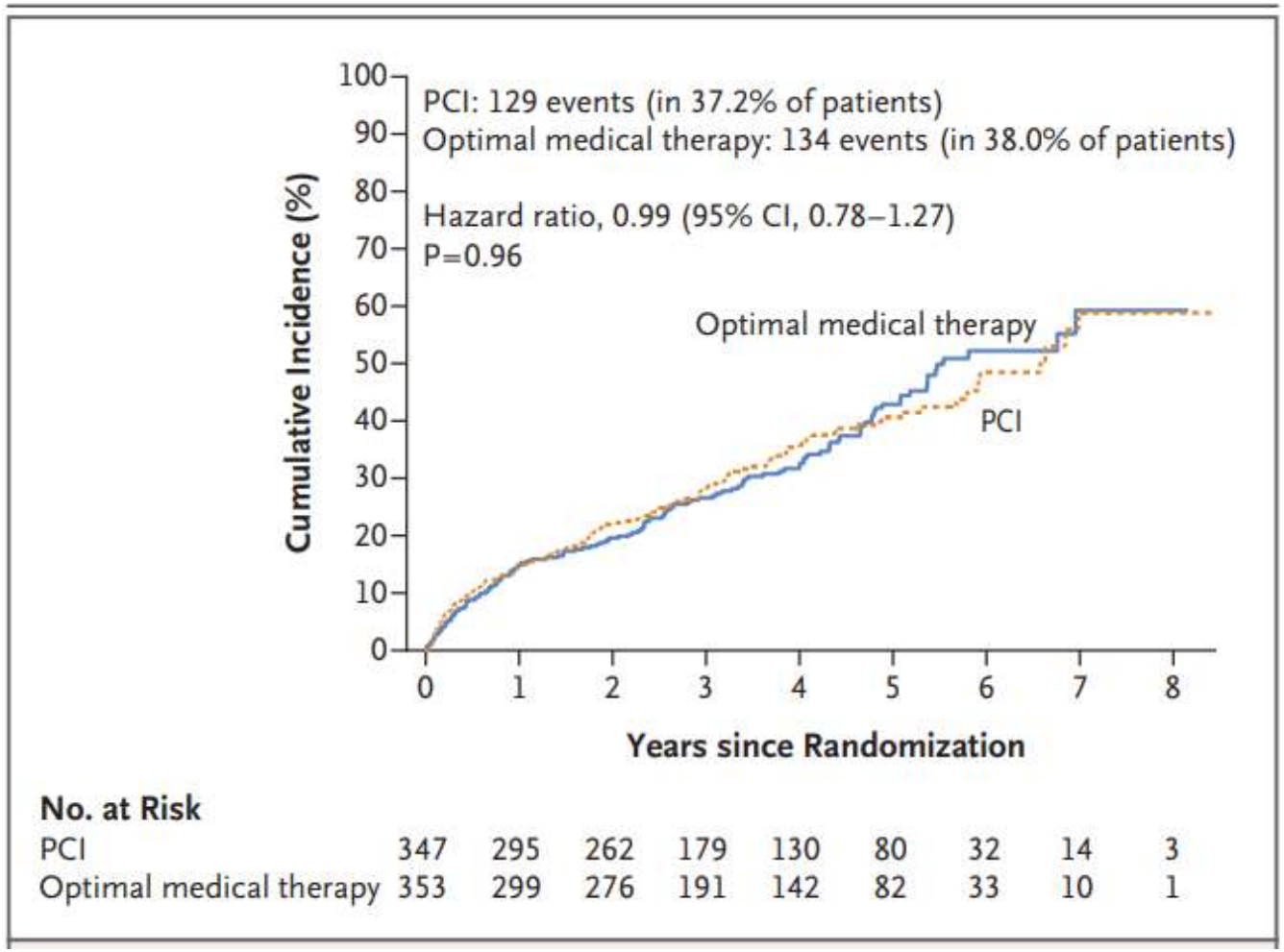
Dobutamine Stress-echocardiography



Revasc for Ischemic ventricular dysfunction (REVIVED trial)

REVIVED
REVASCULARISATION FOR ISCHAEMIC VENTRICULAR DYSFUNCTION

Primary Endpoint



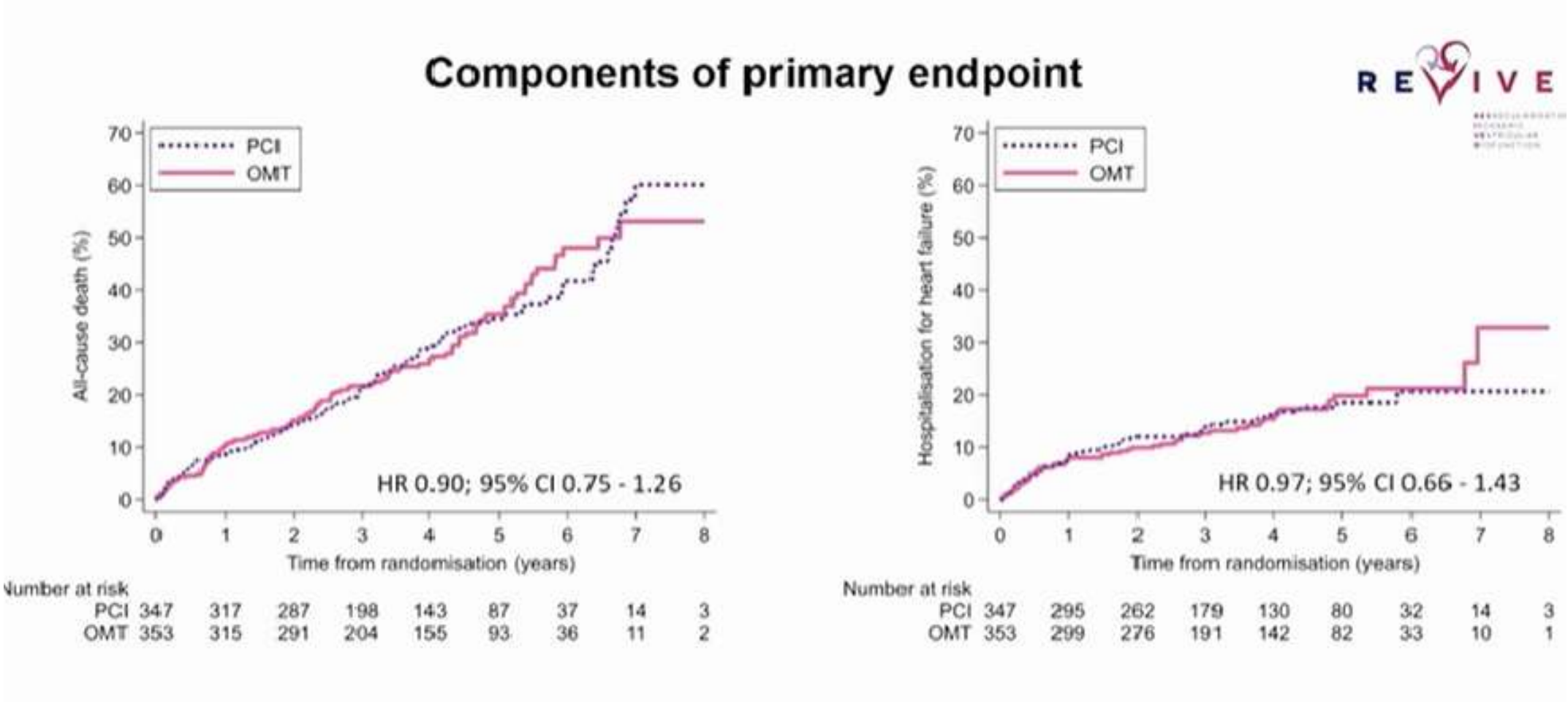
129 Events (37.2%)

134 Events (38.0%)

Hazard Ratio 0.99
95% CI 0.78 - 1.27
p=0.96

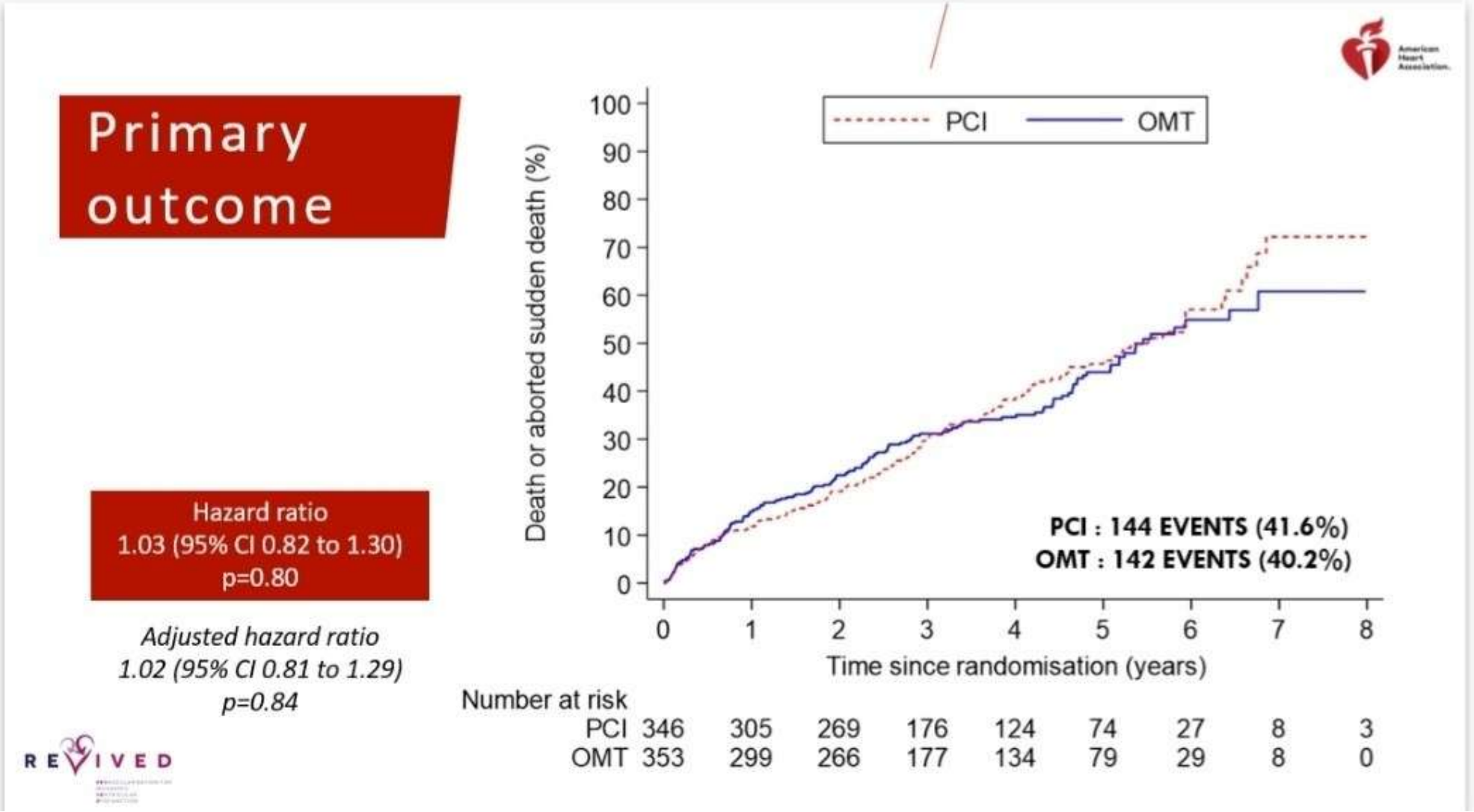
Perera et al. N Engl J Med. 2022;387:1351-1360

REVIVED : RCT on PCI versus OMT in CHF



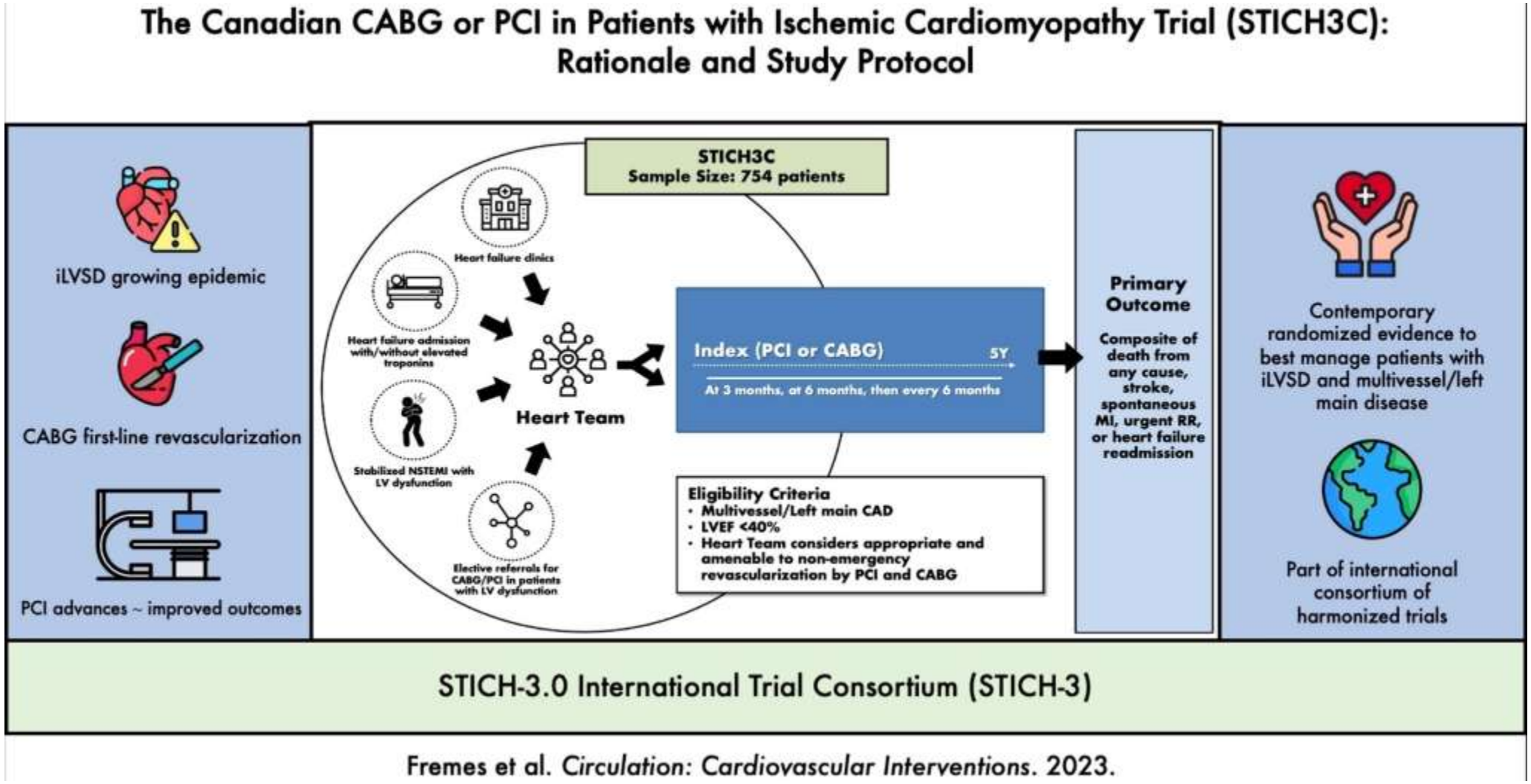
Perera et al. N Engl J Med. 2022;387:1351-1360

Arrhythmia-Reduction



Perera et al. Circulation 2023;epub

Upcoming RCTs – STICH-3



Fremes et al. *Circulation: Cardiovascular Interventions*. 2023.

Fremes et al. Circ Interv 2023;16:e012527

Differing Definitions of Viability

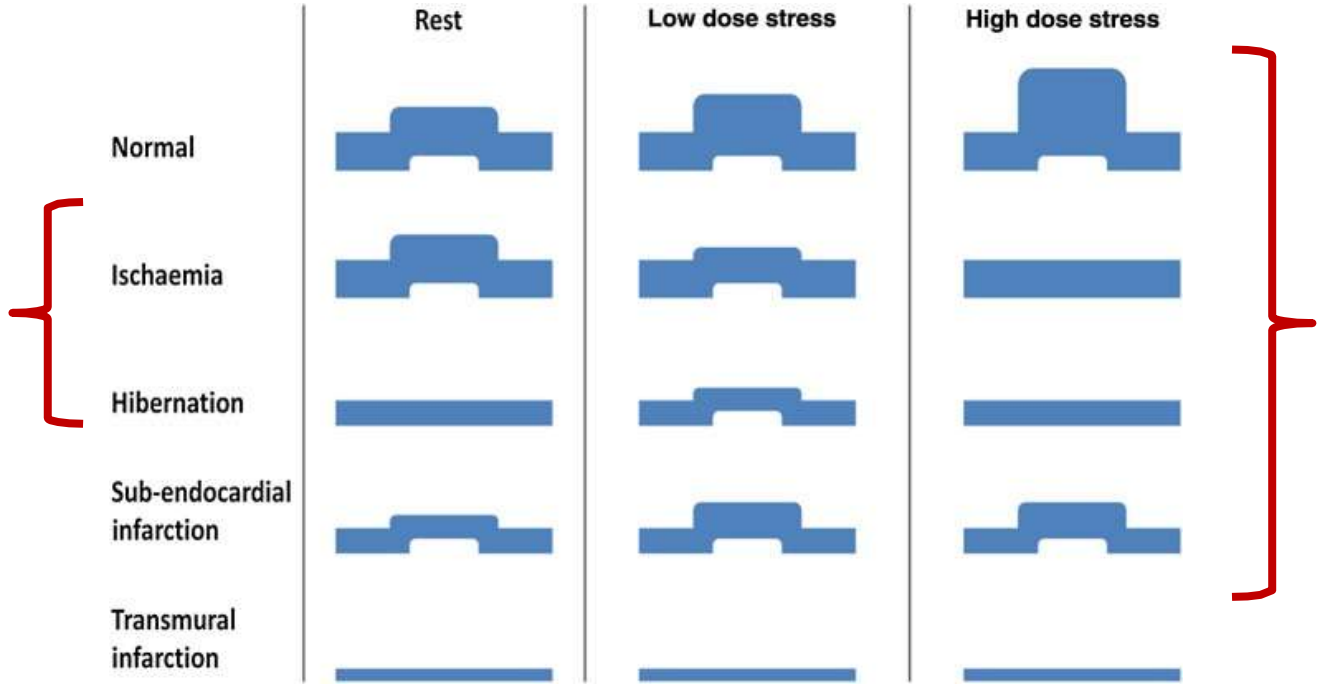
European Heart Journal (2017) 38, 942–954
doi:10.1093/eurheartj/ehw140

Clinical update

Taxonomy of segmental myocardial systolic dysfunction

Adam K. McDiarmid[1], Pierpaolo Pellicori[2], John G. Cleland[2], and Sven Plein[1]*

REVIVED



STICH

Coronary revascularization for patients with heart failure and coronary artery disease: a systematic review and meta-analysis of randomized trials

Search

PubMed, Ovid, Cochrane Central Register of Controlled Trials (CENTRAL)

From 1st January 2001 to 22nd November 2022

Trials

5 RCTs
2,842 patients
Mean age (range): 60 to 70 years; 85 % men

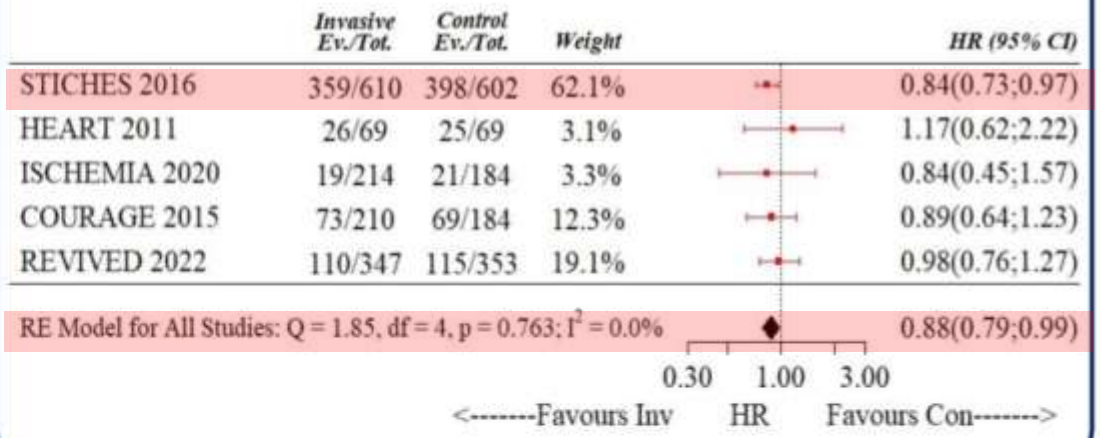
Intervention

Medical therapy

VS

Revascularization
PCI CABG
+
Medical therapy

Findings: All-cause mortality



Conclusions

For patients with chronic HF and CAD enrolled in RCTs, the effect of coronary revascularization on all-cause mortality was, on average, modest (hazard ratio 0.88) and not robust (upper 95% CI close to 1.00).

ESC European Society of Cardiology
European Journal of Heart Failure (2023)
doi:10.1002/ejhf.2911

Panel A: All-cause mortality

	Invasive Ev./Tot.	Control Ev./Tot.	Weight	HR (95% CI)
STICHES 2016	359/610	398/602	62.1%	0.84(0.73;0.97)
HEART 2011	26/69	25/69	3.1%	1.17(0.62;2.22)
ISCHEMIA 2020	19/214	21/184	3.3%	0.84(0.45;1.57)
COURAGE 2015	73/210	69/184	12.3%	0.89(0.64;1.23)
REVIVED 2022	110/347	115/353	19.1%	0.98(0.76;1.27)
RE Model for All Studies: Q = 1.85, df = 4, p = 0.763; I^2 = 0.0%				0.88(0.79;0.99)

Panel B: Cardiovascular mortality

	Invasive Ev./Tot.	Control Ev./Tot.	Weight	HR (95% CI)
STICHES 2016	247/610	297/602	75.1%	0.79(0.67;0.93)
ISCHEMIA 2020	14/214	19/184	4.1%	0.69(0.34;1.39)
REVIVED 2022	76/347	88/353	20.8%	0.88(0.65;1.20)
RE Model for All Studies: Q = 0.55, df = 2, p = 0.758; I^2 = 0.0%				0.80(0.70;0.93)

Panel C: Hospitalization for heart failure or all-cause mortality

	Invasive Ev./Tot.	Control Ev./Tot.	Weight	HR (95% CI)
STICHES 2016	404/610	450/602	62.3%	0.81(0.71;0.93)
ISCHEMIA 2020	25/214	27/184	7.8%	0.88(0.51;1.52)
REVIVED 2022	129/347	134/353	30.0%	0.99(0.77;1.27)
RE Model for All Studies: Q = 1.92, df = 2, p = 0.382; I^2 = 23.7%				0.87(0.74;1.01)

Panel D: Hospitalization for heart failure

	Invasive Ev./Tot.	Control Ev./Tot.	Weight	HR (95% CI)
STICHES 2016	157/610	201/602	61.1%	0.71(0.57;0.89)
ISCHEMIA 2020	8/214	9/184	6.8%	0.91(0.35;2.39)
REVIVED 2022	51/347	54/353	32.1%	0.97(0.66;1.43)
RE Model for All Studies: Q = 1.97, df = 2, p = 0.374; I^2 = 25.6%				0.80(0.62;1.03)

NB: trials could not be blinded.

- **This may influence endpoints requiring adjudication.**

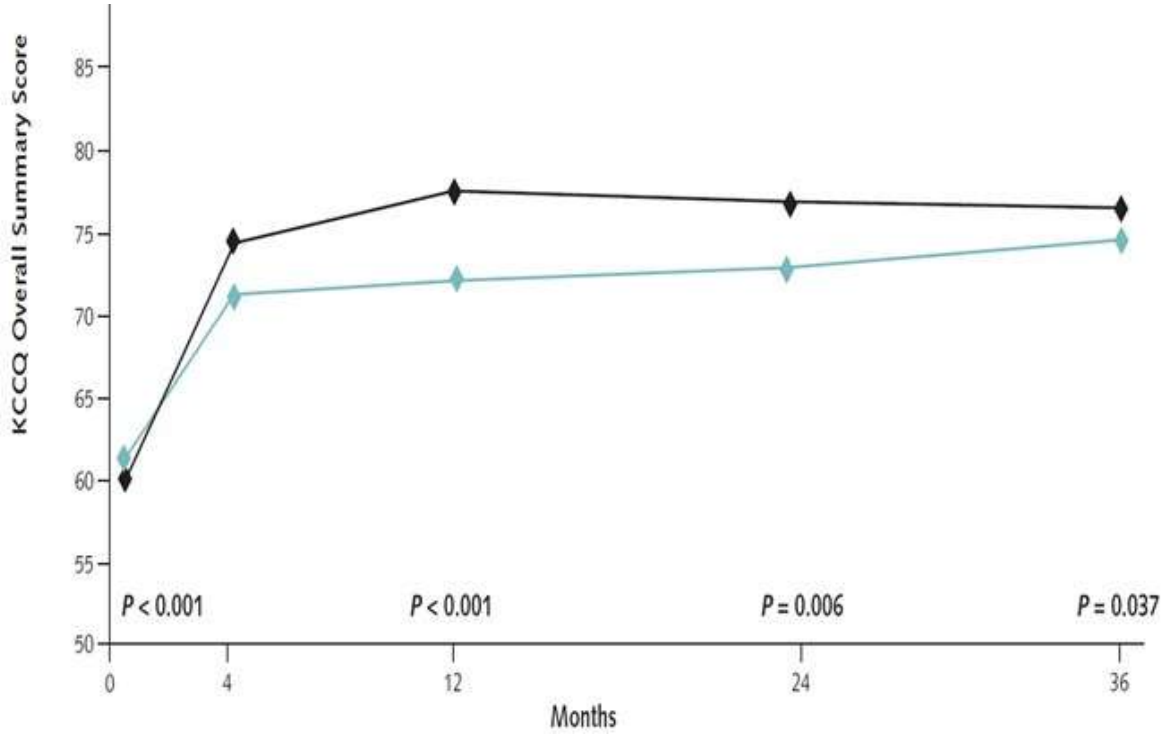
STICH Trial

Some improvement in quality of life

No improvement in symptoms other than angina

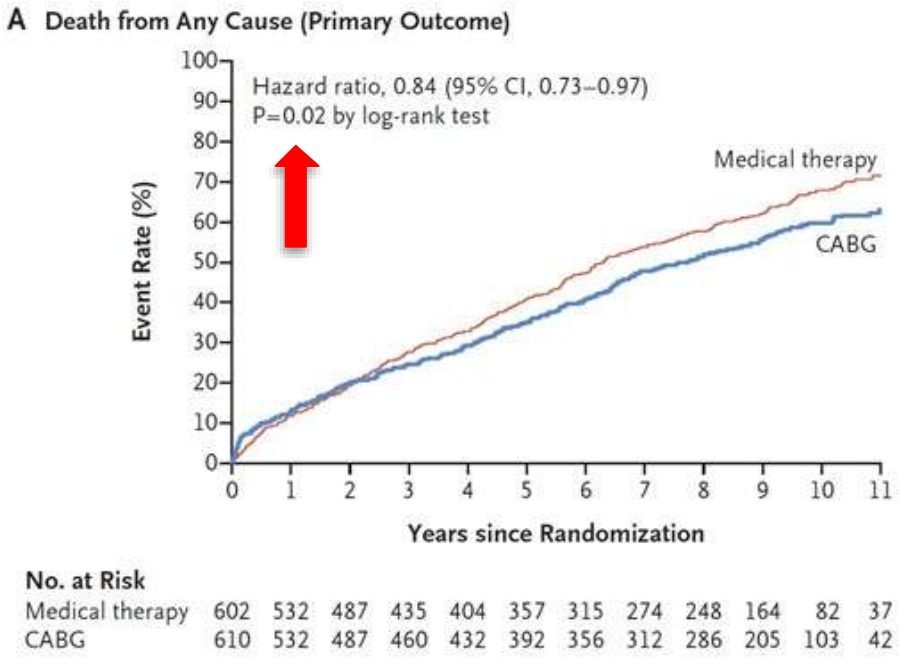
No improvement in exercise capacity

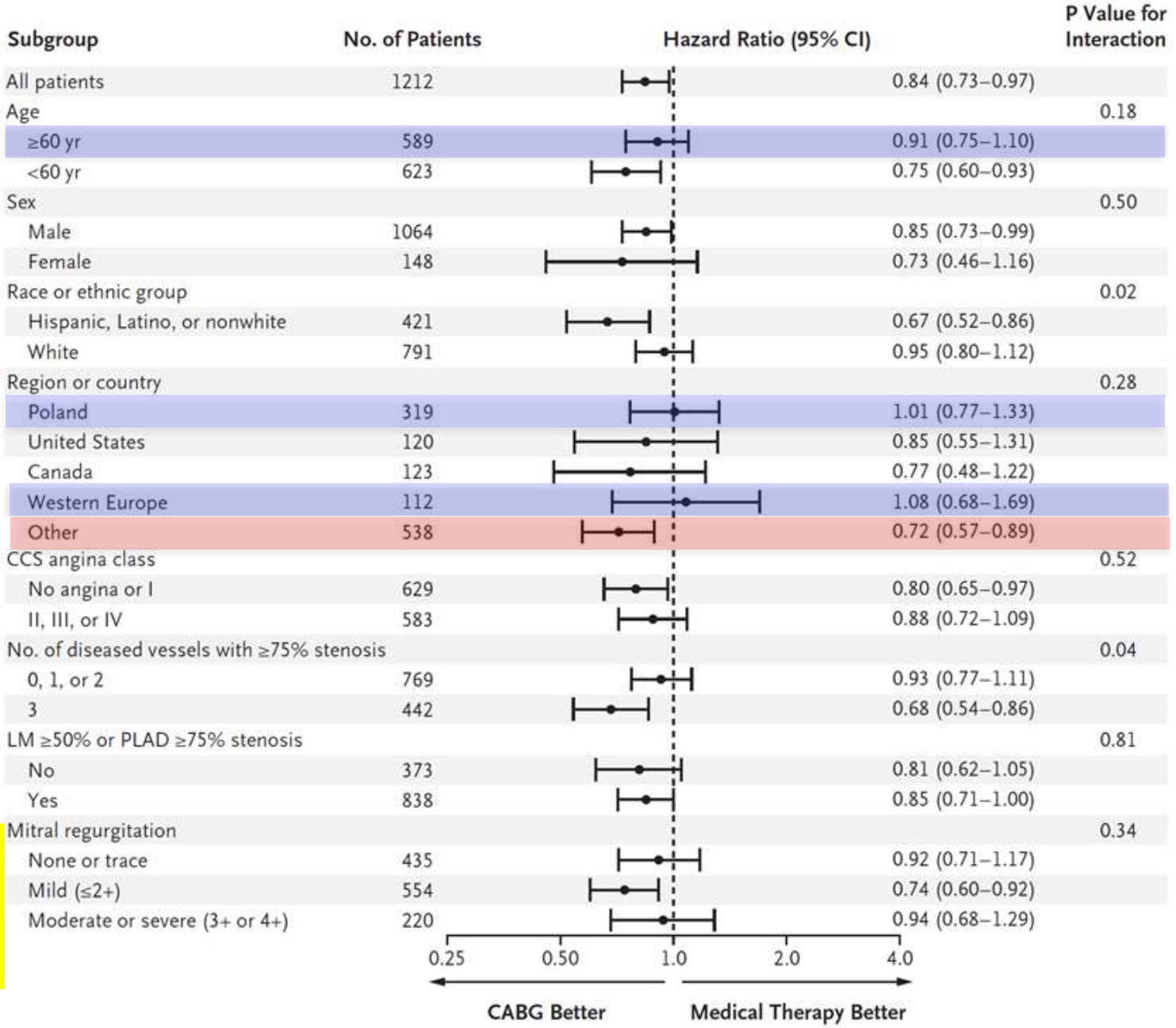
No improvement in left ventricular function



STICHES: NEJM 2016

No adjustment for multiple 'looks'



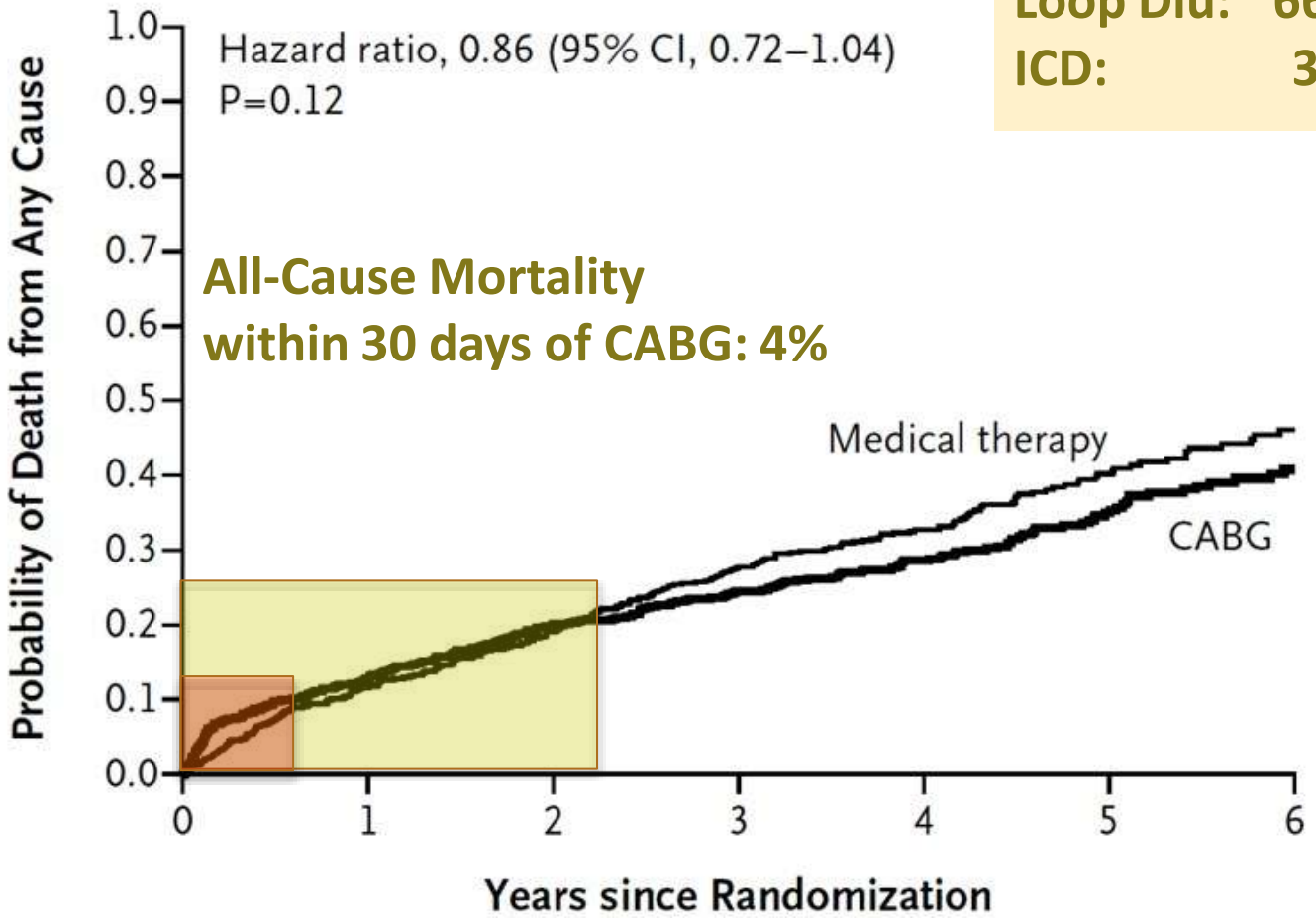


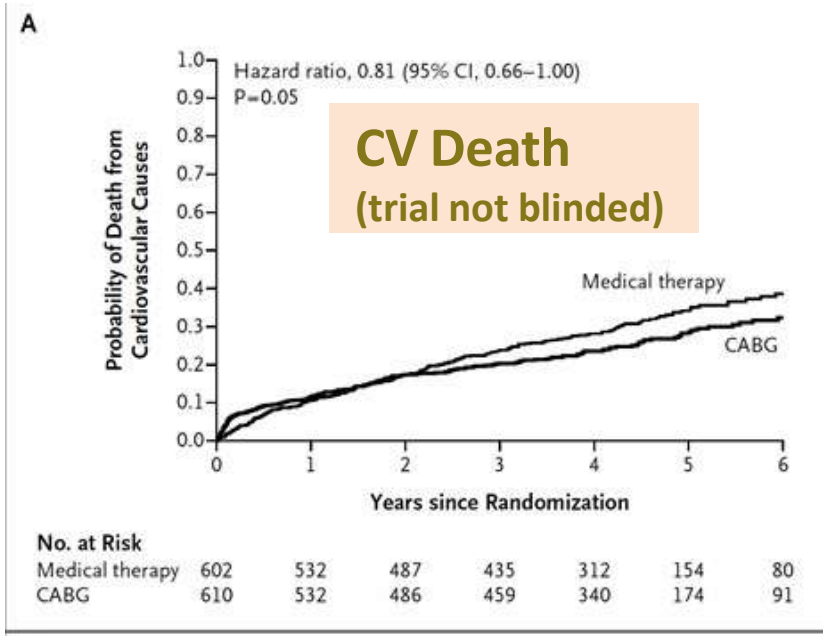
Small benefit: for 100 CABG –

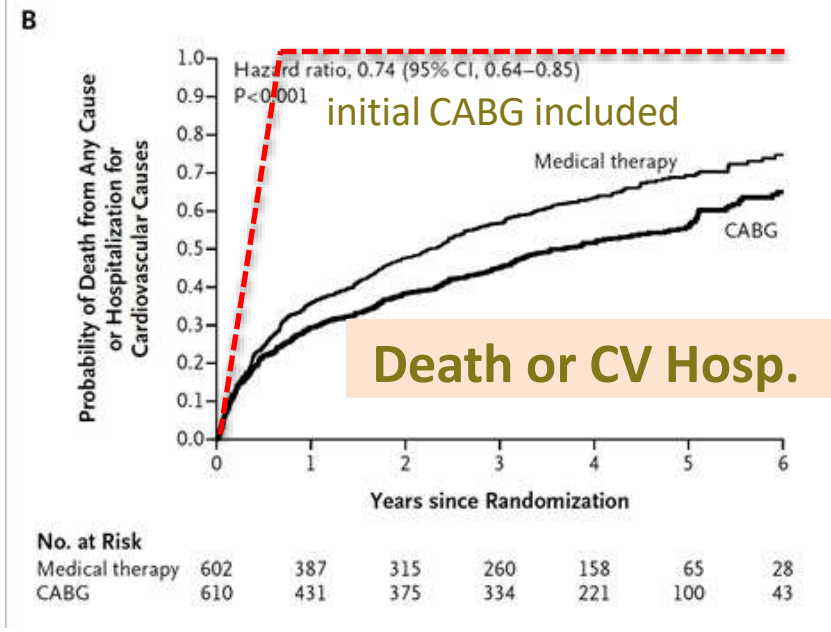
- **4 peri-operative deaths**
- **After 10 years, CABG will have made no difference to the outcome of 90 patients**

STICH: NEJM 2011

Age: (median) 60 yrs
Women: 12%
White: 67%
Loop Diu: 66%
ICD: 3%



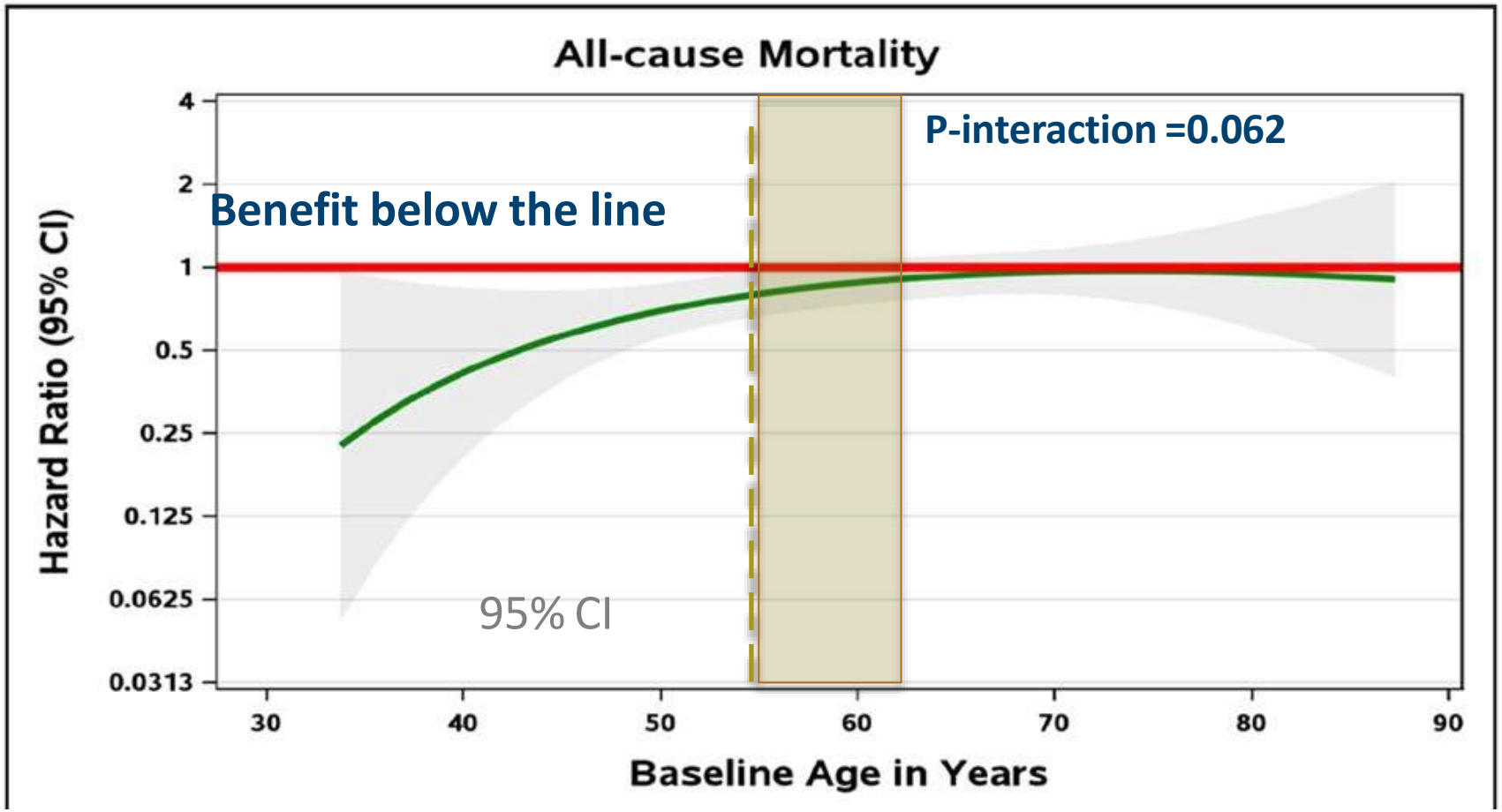


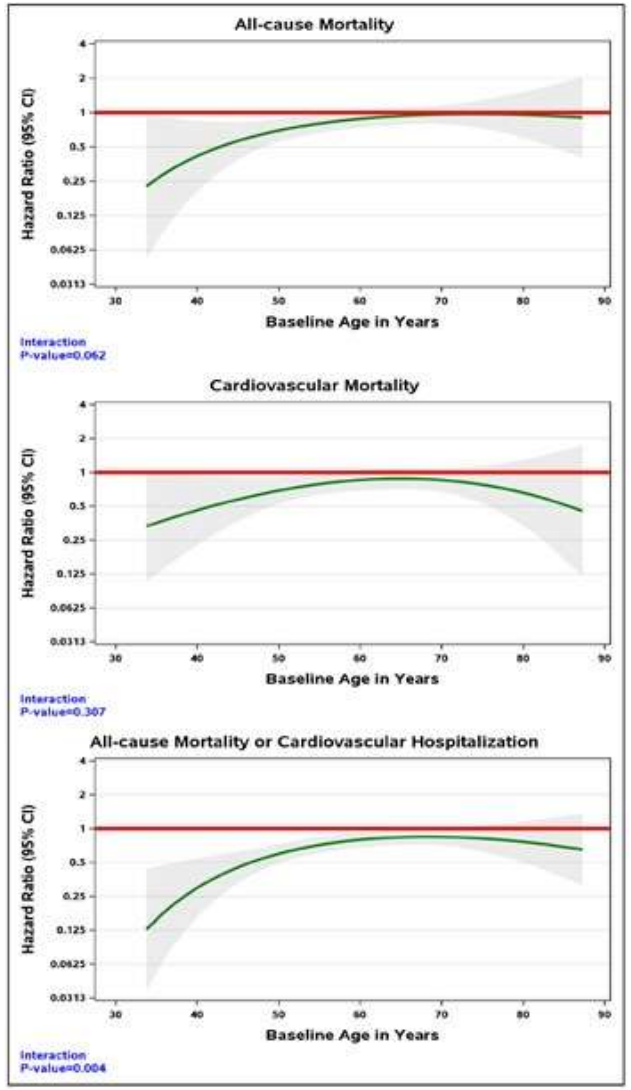


STICHES

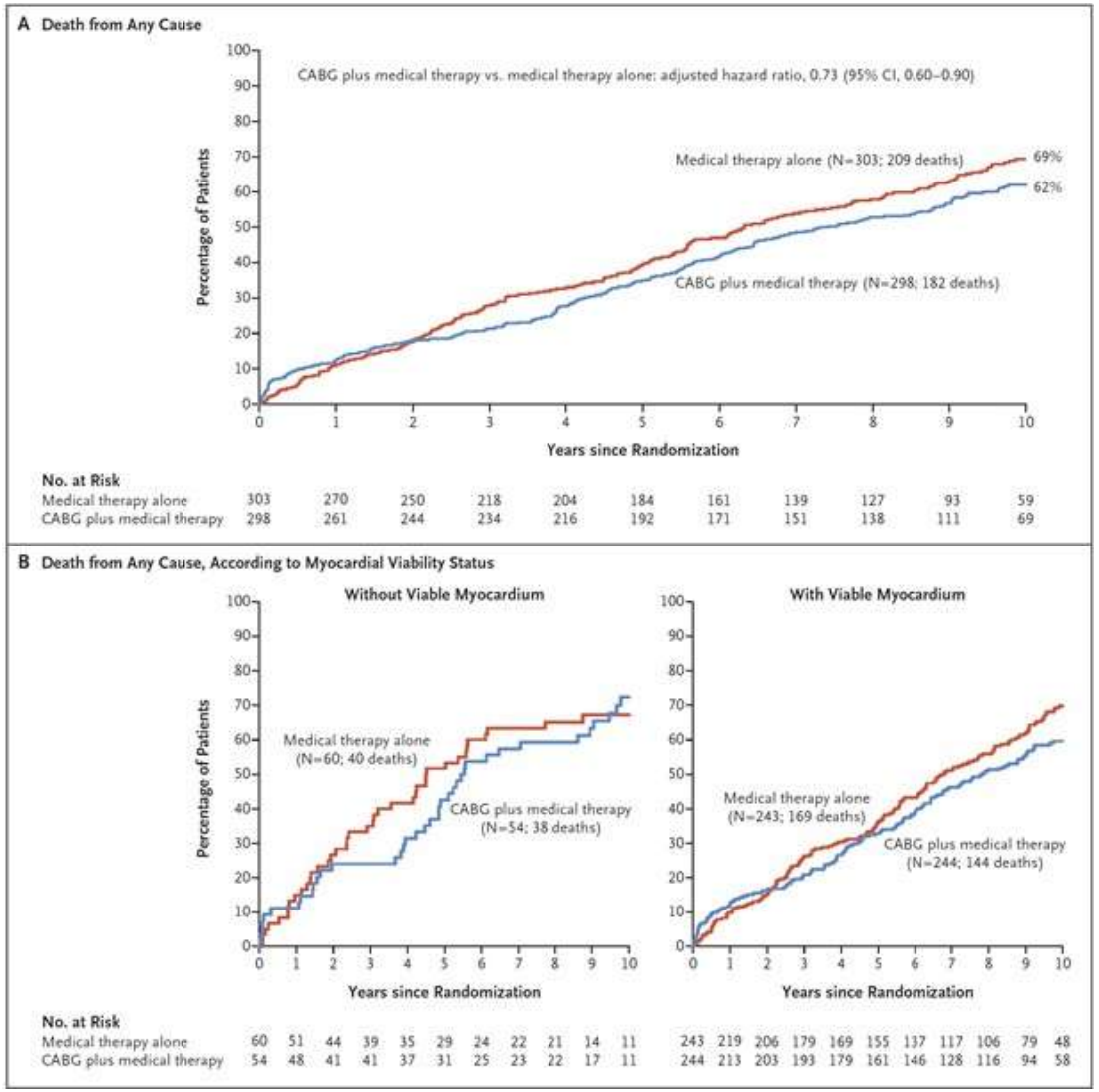
You must live a long time to benefit from CABG.

Patients with HFrEF aged >55 years might not.



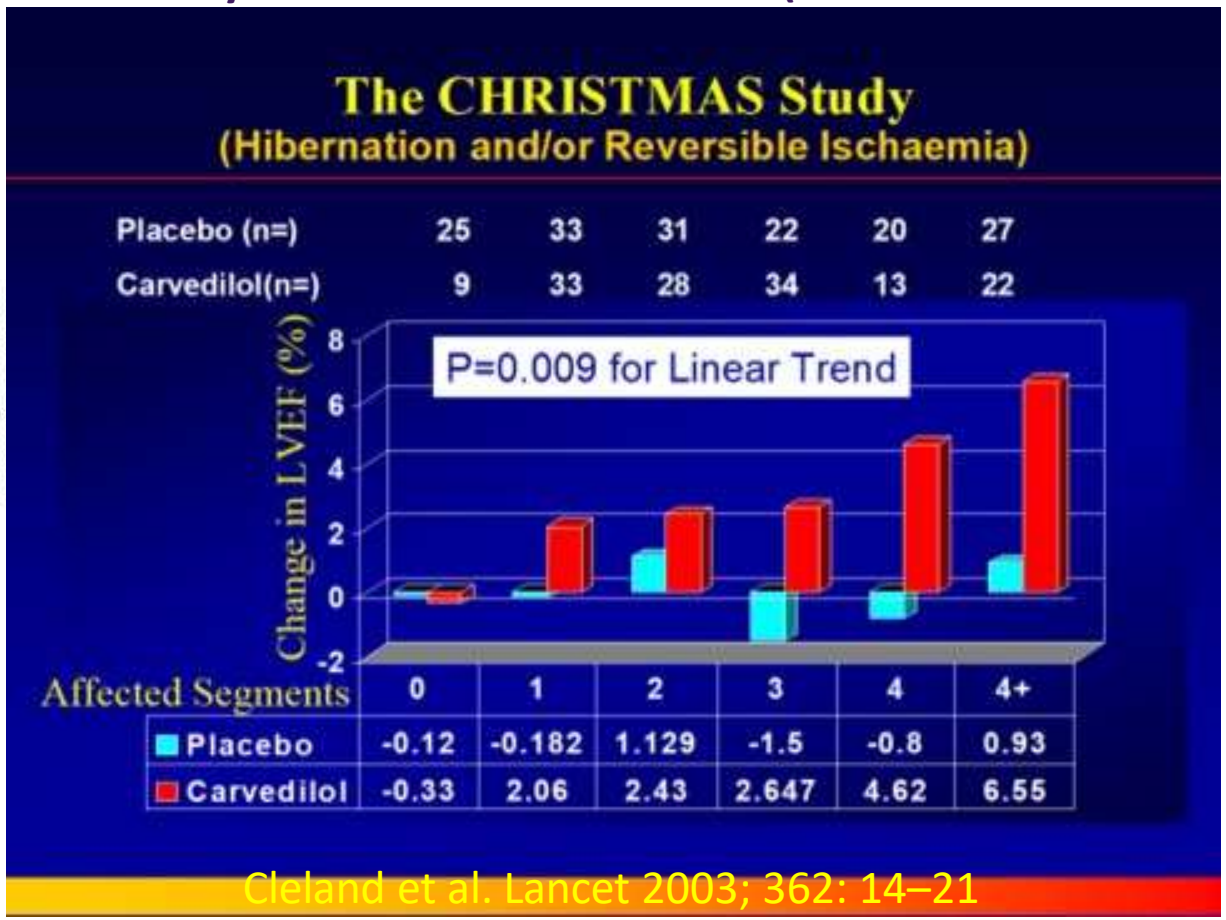


STICHES: Myocardial Viability Sub-study



Paired LVEF

- **Viability - LVEF↑ ~2% at 4 months (with or without CABG)**
- **No viability – LVEF ↓ 1% at 4 months (with or without CABG)**



N Engl J Med 2019;381:739-48.
DOI: 10.1056/NEJMoa1807365

Conclusions

- No good evidence that revascularization ~~(anatomical)~~ of chronic 'stable' coronary artery disease improves outcome whether or not
  - LVEF is Reduced
  - Myocardial viability / ischaemia
  - Diagnosis of Heart Failure
- Most patients with heart failure
  - Are aged >70 years
  - Patients with heart failure are at high risk – bad things happen to them

Future

Maybe - Functional revascularization