Prevention is Everything – A Look at Lipids and Cardiometabolics

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Disclosures

Advisory Boards: Novartis

Speakers Bureau: Arrowhead Pharmaceuticals, Ionis Pharmaceuticals

Stock: Eli Lilly, Arrowhead Pharmaceuticals

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Patient Case

- 64-year-old male with a strong family history of cardiovascular disease, hypercholesterolemia, hypertension, and diabetes presents to clinic for consultation after he was found to have a calcium score of 1246 (90th percentile for age, gender, race). He is currently asymptomatic.

- Medications
  - Rosuvastatin 20 mg daily
  - Aspirin 81 mg daily
  - Metformin 500 mg BID
  - Olmesartan 40 mg daily
  - Amlodipine 5 mg daily

- Physical Exam Unremarkable
- Labs
  - Lipid Panel
    - Total cholesterol 155 mg/dL
    - LDL-C 86 mg/dL
    - HDL-C 47 mg/dL
    - Triglycerides 90 mg/dL
  - Hemoglobin A1c 6.4%
  - Creatinine 1.24
  - Urine Albumin to Cr 35

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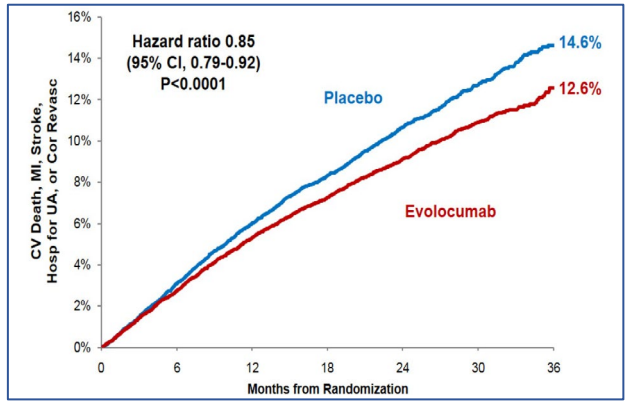
PCSK9 Inhibitors: Outcomes in Very High-Risk Individuals

FOURIER Evolocumab vs. Placebo

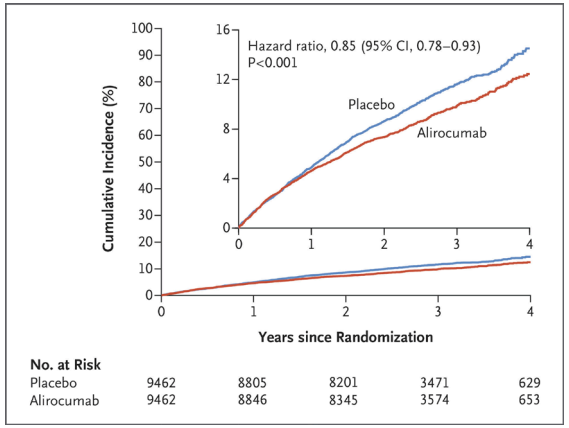
N=27,564 | Stable ASCVD | Median follow-up 2.2 yrs | Sabatine MS et al. NEJM 2017;376:1713–22



Primary MACE	MI	Stroke	CV Death
CV death, MI, stroke	4.4% vs 6.3%	2.2% vs 2.6%	No mortality benefit
HR 0.80 P<0.001	HR 0.73 P<0.001	HR 0.79 P=0.01	HR 1.05 NS

ODYSSEY OUTCOMES Alirocumab vs. Placebo

N=18,924 | Recent ACS | Median follow-up 2.8 yrs | Schwartz GG et al. NEJM 2018;379:2097–107



Primary MACE	Non-fatal MI	Ischemic stroke	All-cause death
CHD death, MI, stroke, UA	6.6% vs 7.6%	1.2% vs 1.6%	3.5% vs 4.1%
HR 0.85 P<0.001	HR 0.86 P=0.006	HR 0.73 P=0.01	HR 0.85 P=0.03

Key distinction: FOURIER (stable ASCVD) → reduced MACE but no mortality benefit · ODYSSEY OUTCOMES (recent ACS, higher-risk) → reduced MACE + significant all-cause mortality reduction (HR 0.85, P=0.03)

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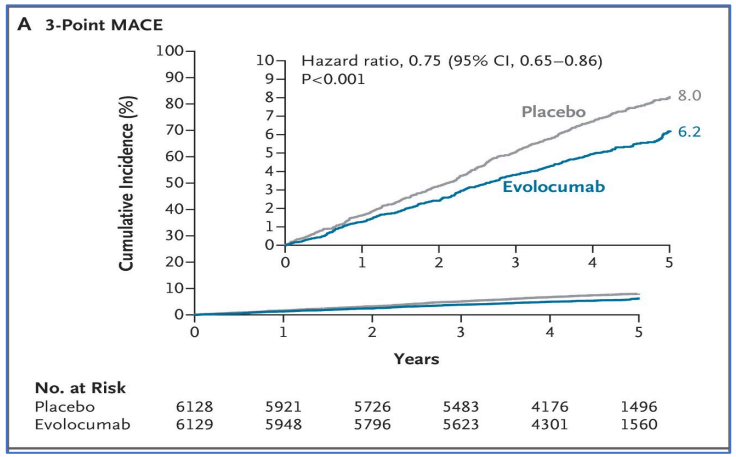
PCSK9 Inhibitors: Outcomes in High-Risk Individuals

VESALIUS-CV Evolocumab 140 mg Q2W vs. Placebo · N=12,257 · No prior MI or stroke · ASCVD or high-risk diabetes · LDL-C ≥90 mg/dL · Median follow-up 4.6 yrs

Bohula EA, Marston NA, et al. N Engl J Med. 2026;394(2):117–127. doi:10.1056/NEJMoa2514428. Published online Nov 8, 2025. AHA Scientific Sessions 2025.



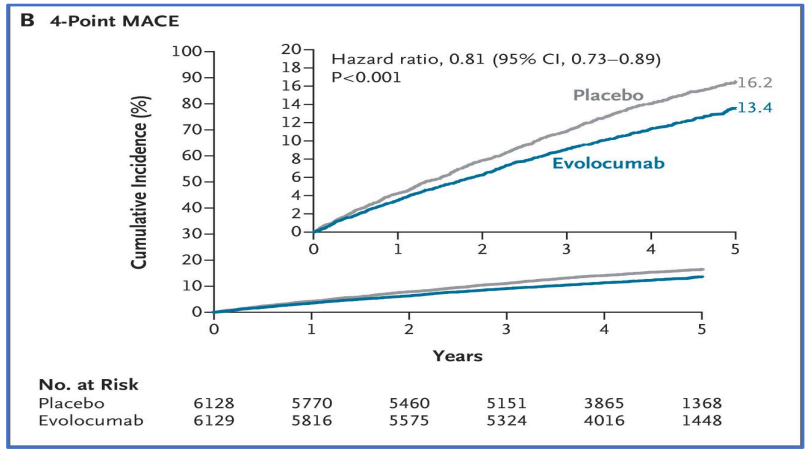


Table 2. Primary and Secondary End Points.*

End Point	Evolocumab (N=6129)	Placebo (N=6128)	Hazard Ratio (95% CI)	P Value
	no. (5-yr Kaplan–Meier estimate, %)			
Primary end points†				
3-Point MACE	336 (6.2)	443 (8.0)	0.75 (0.65–0.86)	<0.001
4-Point MACE	747 (13.4)	907 (16.2)	0.81 (0.73–0.89)	<0.001
Secondary end points‡				
Myocardial infarction, ischemic stroke, or ischemia-driven arterial revascularization	674 (12.2)	834 (15.0)	0.79 (0.72–0.88)	<0.001
Death from coronary heart disease, myocardial infarction, or ischemia-driven arterial revascularization	664 (11.9)	819 (14.6)	0.79 (0.72–0.88)	<0.001
Death from cardiovascular causes, myocardial infarction, or ischemic stroke	374 (6.8)	503 (9.1)	0.73 (0.64–0.84)	<0.001
Death from coronary heart disease or myocardial infarction	232 (4.2)	313 (5.6)	0.73 (0.62–0.87)	<0.001
Myocardial infarction	149 (2.7)	229 (4.1)	0.64 (0.52–0.79)	<0.001
Ischemia-driven arterial revascularization	561 (10.1)	699 (12.5)	0.79 (0.70–0.88)	<0.001
Death from coronary heart disease	105 (1.9)	117 (2.1)	0.89 (0.68–1.16)	0.39
Death from cardiovascular causes	156 (2.8)	195 (3.6)	0.79 (0.64–0.98)	NA
Death from any cause	434 (7.9)	539 (9.7)	0.80 (0.70–0.91)	NA
Ischemic stroke	115 (2.3)	144 (2.7)	0.79 (0.62–1.01)	NA

* Shown are the numbers of patients with a first event and the Kaplan–Meier estimate at 5 years in the intention-to-treat population, which included all the patients who had undergone randomization. NA denotes not applicable.
† The two primary end points were the composites of death from coronary heart disease, myocardial infarction, or ischemic stroke (3-point major adverse cardiac events [MACE]) and of 3-point MACE or ischemia-driven arterial revascularization (4-point MACE).
‡ Secondary end points are listed in the order of hierarchical testing (see the Supplementary Appendix). The widths of the confidence intervals for secondary end points that were not tested statistically were not adjusted for multiplicity and thus should not be used to infer treatment effect.

Population

No prior MI or stroke
ASCVD or high-risk diabetes
LDL-C ≥90 mg/dL on optimized LLT
43% women · Median age 66 yrs

LDL-C Reduction

Median LDL-C:
45 mg/dL (evo) vs 109 mg/dL (placebo)
~55% relative reduction

3-Point MACE (CHD death, MI, stroke)

6.2% vs 8.0%
HR 0.75 (0.65–0.86)
ARR 1.8% · P<0.001
↓25% RRR

4-Point MACE (+ revascularization)

13.4% vs 16.2%
HR 0.81 (0.73–0.89)
ARR 2.8% · P<0.001
↓19% RRR

MI (standalone)

2.7% vs 4.1%
HR 0.64 (0.52–0.79)
P<0.001
↓36% RRR

All-Cause Death

7.9% vs 9.7%
HR 0.80 (0.70–0.91)
Not in testing hierarchy
(numerically significant)

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PCSK9 Inhibitors: Outcomes in Individuals without Atherosclerosis

JAMA®

QUESTION Do high-risk primary prevention patients without known significant atherosclerosis and with diabetes benefit from intensive lowering of low-density lipoprotein cholesterol levels with PCSK9 inhibitor therapy?

CONCLUSION In high-risk patients without known significant atherosclerosis and with diabetes, the PCSK9 inhibitor evolocumab significantly reduced the risk of a first major cardiovascular event.

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POPULATION

2066 Females
1589 Males

Patients with no prior myocardial infarction or stroke and no known significant atherosclerosis, with diabetes and LDL-C level 90 mg/dL or greater

Median age: 65 years

LOCATIONS

774 Sites worldwide

INTERVENTION

12 257 Patients randomized
3655 Patients qualified for this substudy and were analyzed

1849
Evolocumab
Evolocumab (140 mg subcutaneously every 2 weeks)

1806
Placebo
Matching placebo

PRIMARY OUTCOME

Dual composites of coronary heart disease death, myocardial infarction, or ischemic stroke (3-P MACE) and 3-P MACE plus ischemia-driven arterial revascularization (4-P MACE)

FINDINGS

5-Year estimates of patients with 3-P MACE and 4-P MACE events

	Evolocumab	Placebo
3-P MACE	5.0%	7.1%
4-P MACE	7.6%	10.5%

Evolocumab statistically significantly reduced risk of a first major cardiovascular event:

3-P MACE: HR, 0.69 (95% CI, 0.52 to 0.91); *P*=.009
Between-group difference, 2.1% (95% CI, 0.4% to 3.8%)

4-P MACE: HR, 0.69 (95% CI, 0.55 to 0.86); *P*=.001
Between-group difference, 2.9% (95% CI, 0.9% to 4.9%)

Marston NA, Bohula EA, Bhatia AK, et al; VESALIUS-CV Investigators. Evolocumab to reduce first major cardiovascular events in patients without known significant atherosclerosis and with diabetes: results from the VESALIUS-CV trial. *JAMA*. Published online March 28, 2026. doi:10.1001/jama.2026.3277

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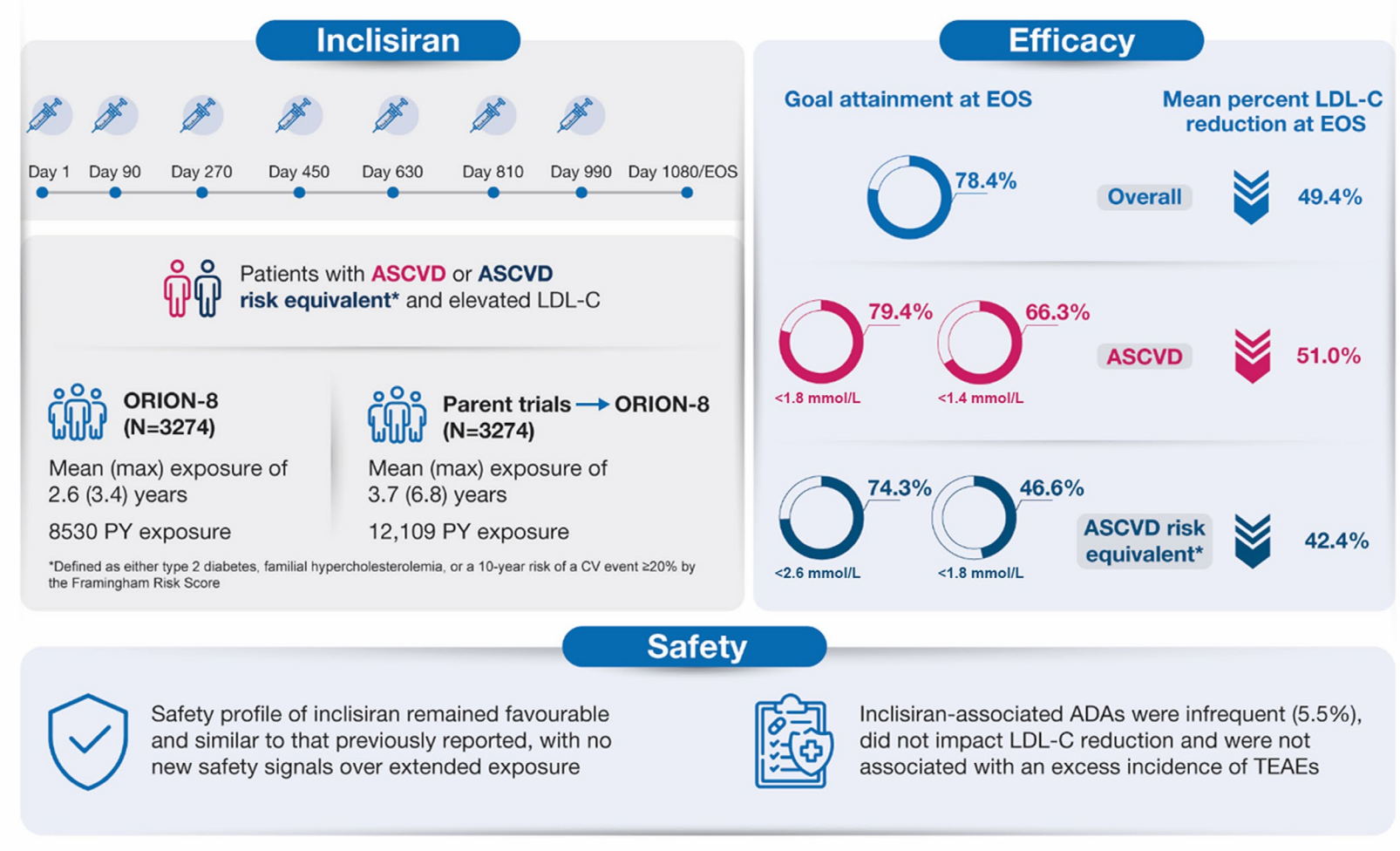
Inclisiran is a novel alternative technology to achieve LDL-C Lowering



Wright RS, et al. *Cardiovasc Res*, Volume 120, Issue 12, August 2024, Pages 1400–1410

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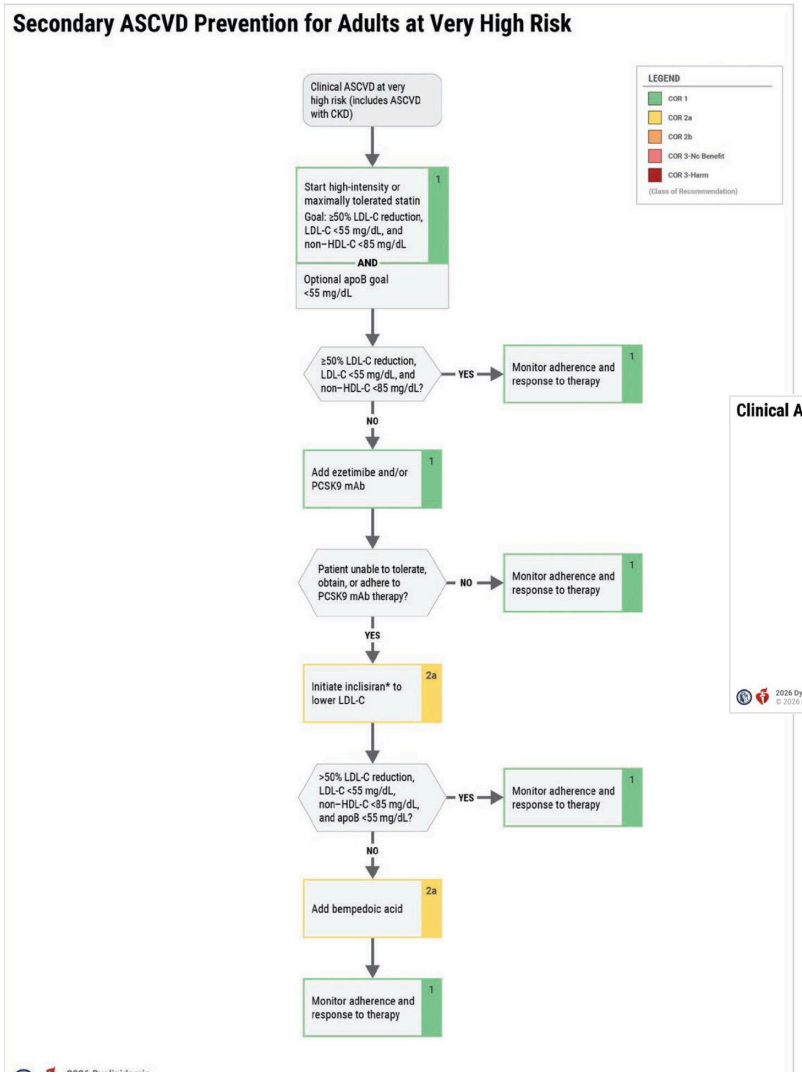
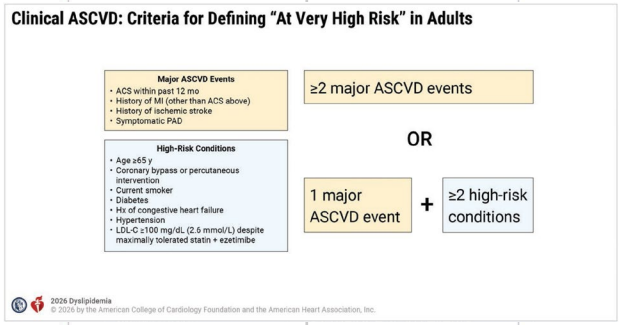
Secondary ASCVD Prevention — 2026 ACC/AHA Dyslipidemia Guideline

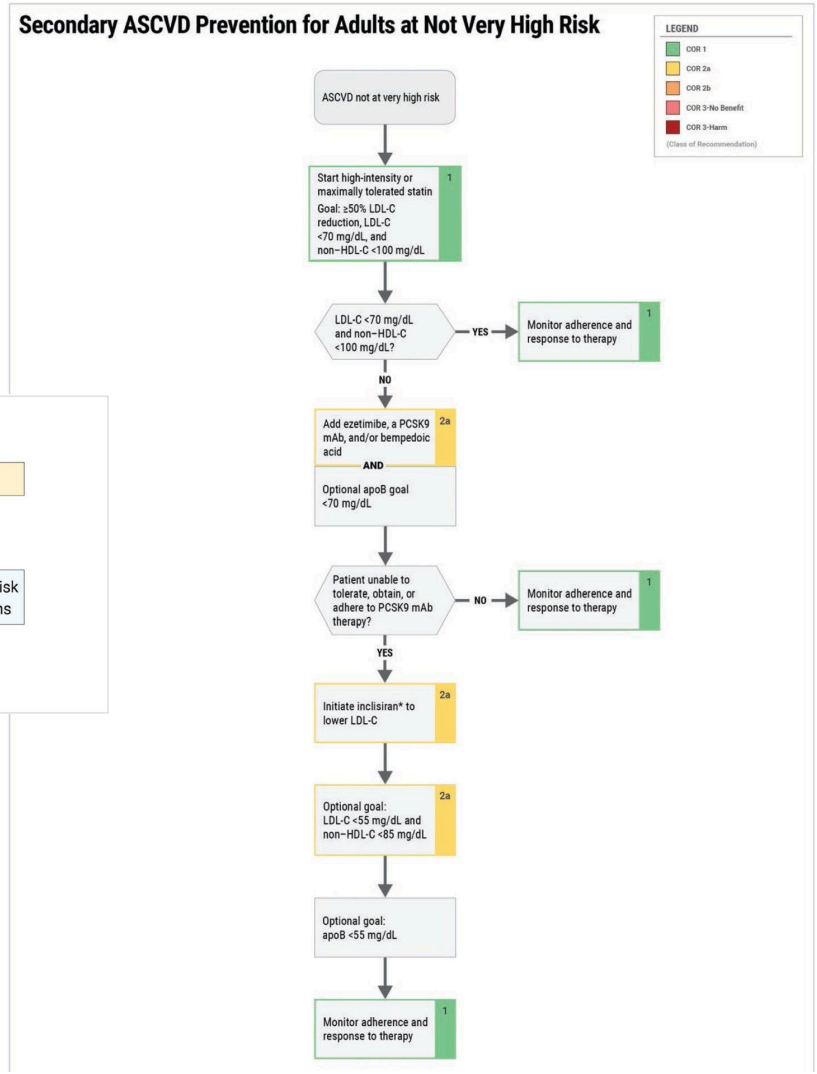
2026 ACC/AHA/AACVPR/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guideline on the Management of Dyslipidemia · Blumenthal RS et al. · JACC & Circulation, Published March 13, 2026 · doi:10.1016/j.jacc.2025.11.016

VERY HIGH RISK · LDL-C Goal <55 mg/dL · Non-HDL-C <85 mg/dL





NOT VERY HIGH RISK · LDL-C Goal <70 mg/dL · Non-HDL-C <100 mg/dL



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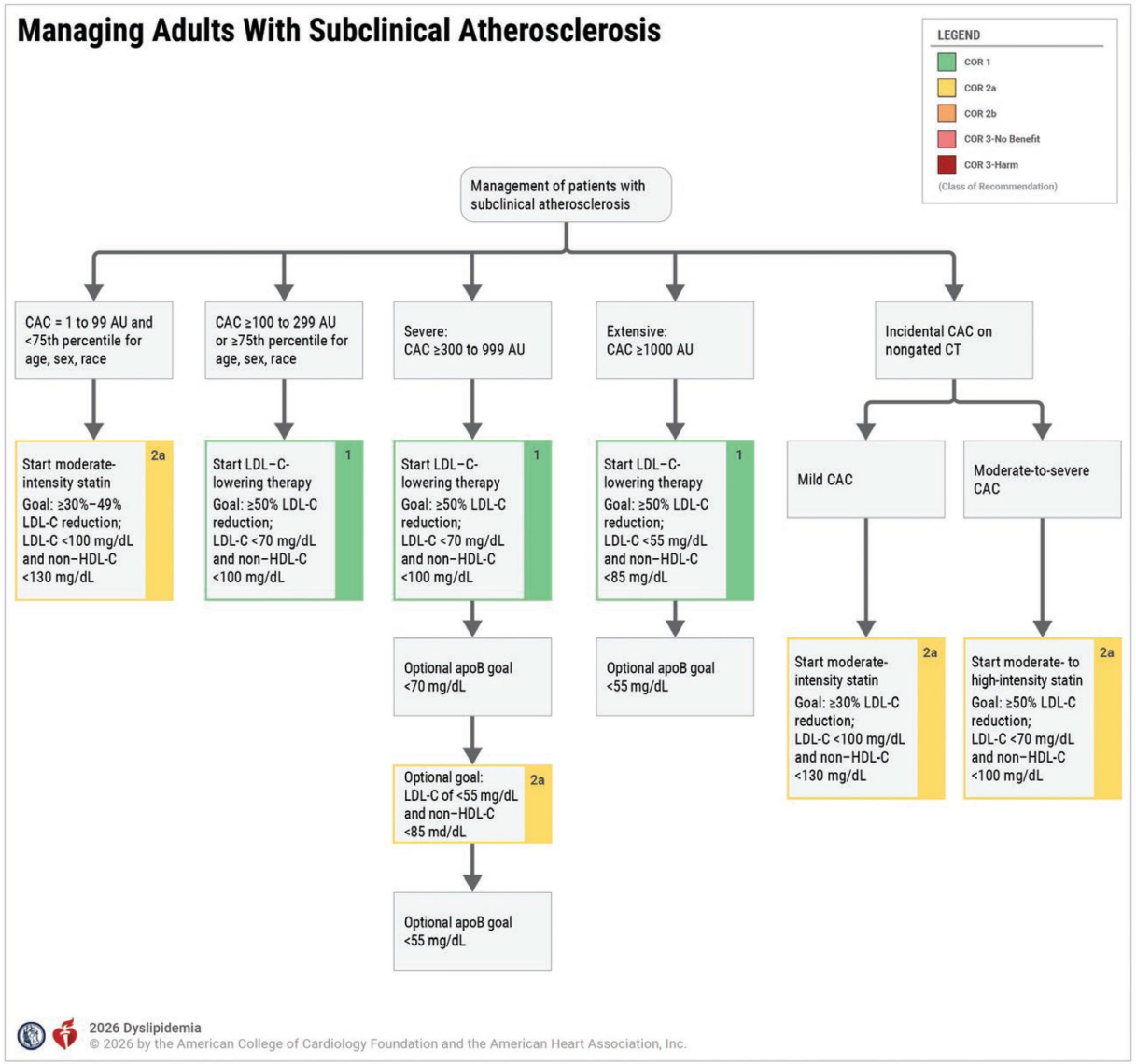
Managing Adults With Subclinical Atherosclerosis

2026 ACC/AHA/AACVPR/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guideline on the Management of Dyslipidemia · Blumenthal RS et al. · JACC & Circulation, Published March 13, 2026 · doi:10.1016/j.jacc.2025.11.016



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Lipoprotein(a)

- Patient has his Lp(a) checked due to his premature atherosclerosis and is found to have an Lp(a) of 393 nmol/L

Recommendations for Measurement of Lp(a)
Referenced studies that support recommendations are summarized in the Evidence Table.

COR	LOE	Recommendations
1	B-NR	1. In all adults, measurement of Lp(a) concentration is recommended at least once for ASCVD risk assessment.[1–4]
1	B-NR	2. In individuals with FH, premature ASCVD, or high Lp(a), cascade testing of first-degree family members for high Lp(a) concentration is recommended to identify those at increased ASCVD risk.[5–8]
1	B-NR	3. For individuals undergoing measurement of Lp(a), use of laboratories employing assays that are insensitive to apolipoprotein(a) [apo(a)] isoforms and traceable to official reference standard materials is recommended to more accurately measure Lp(a) and characterize ASCVD risk.[8–12]

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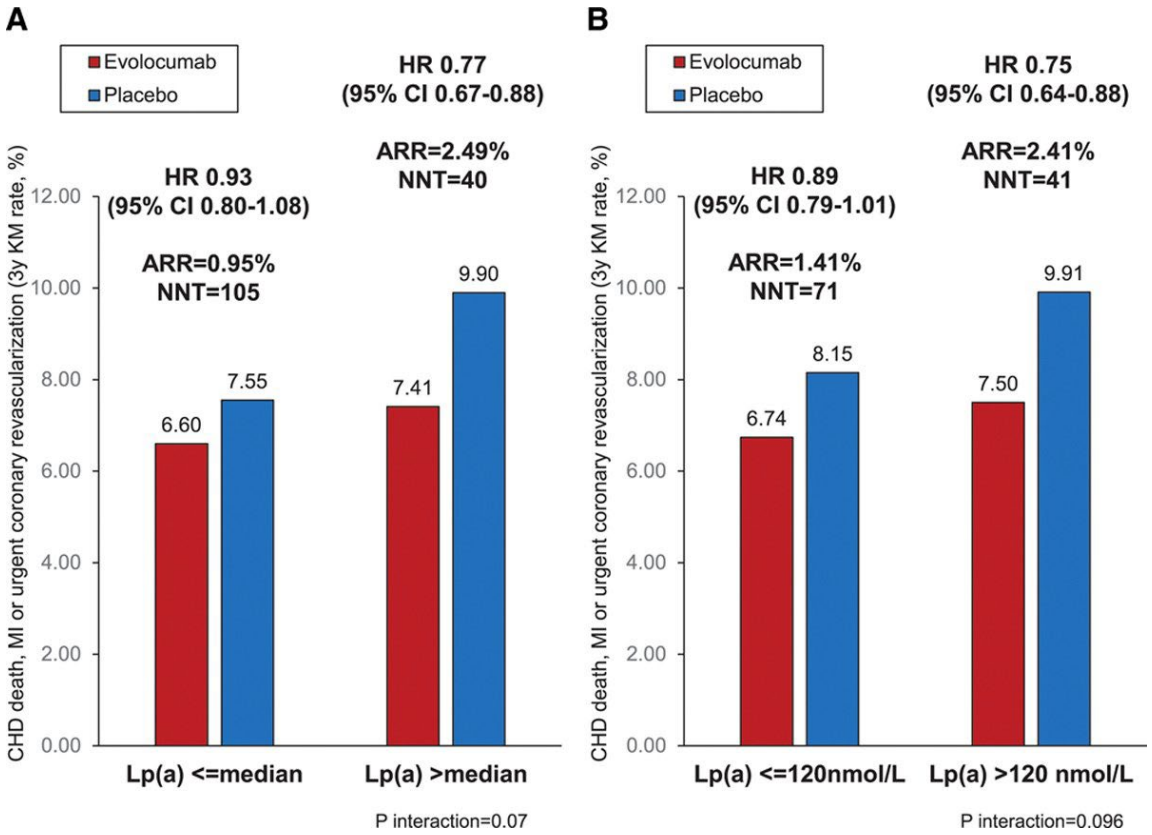
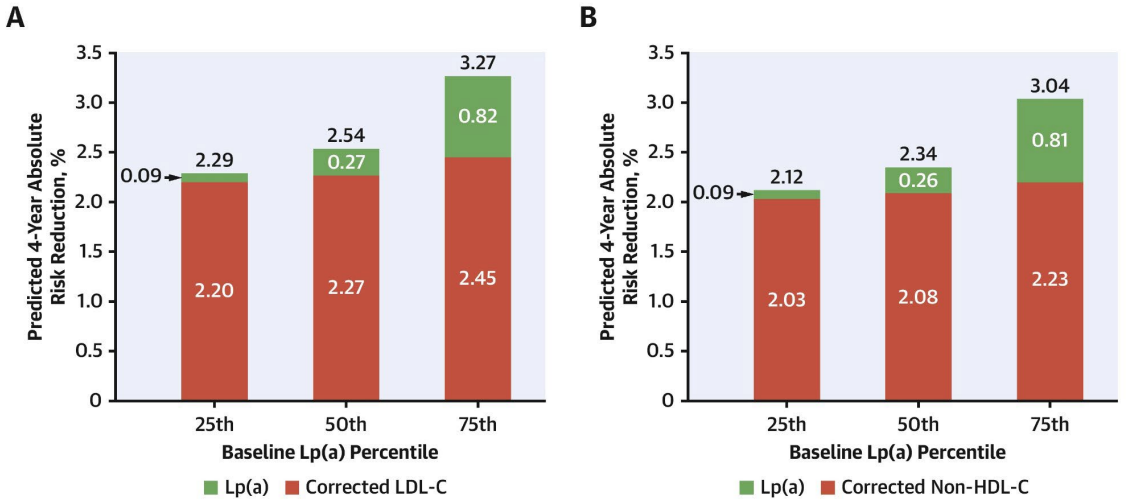
PCSK9 Inhibitors Deliver Greater Benefit in Patients with Higher Lp(a)

Evolocumab · FOURIER subanalysis · O'Donoghue M et al., Circulation 2019



Alirocumab · ODYSSEY OUTCOMES subanalysis · Bittner VA et al., JACC 2020;75(2):133–44

CENTRAL ILLUSTRATION: Relative Contributions of Changes in Concentrations of Corrected Low-Density Lipoprotein Cholesterol, Corrected Non-High-Density Lipoprotein Cholesterol, and Lipoprotein(a) to the Absolute Reduction in Major Adverse Cardiovascular Events in the Alirocumab Group



Bittner, V.A. et al. J Am Coll Cardiol. 2020;75(2):133-44.

Key message: Both evolocumab (FOURIER) and alirocumab (ODYSSEY) demonstrate greater absolute CV risk reduction in patients with elevated baseline Lp(a), consistent with dual LDL-C and Lp(a) lowering contributing to benefit.

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New Guidelines Recommend LDL-C Lowering in patients with high Lp(a)

Recommendations for the Approach to Patients With Elevated Lp(a) Referenced studies that support recommendations are summarized in the Evidence Table.

COR	LOE	Recommendations
1	B-NR	1. In all individuals with elevated Lp(a) (≥125 nmol/L or ≥50 mg/dL), optimal early control of modifiable cardiovascular risk factors is recommended to reduce ASCVD risk.[1–4]
1	B-R	2. In individuals with clinical ASCVD and elevated Lp(a) who have not achieved LDL-C and non–HDL-C treatment goals on maximally tolerated statin therapy, the addition of a PCSK9 mAb with proven cardiovascular benefit is recommended to achieve treatment goals and reduce ASCVD risk.[4–7]

Blumenthal RS, et al; JACC 2026

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Lp(a) Lowering Therapies on the Horizon

Malick W, et al; JACC 2023:81:1633-45

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Back to Patient

- Started on Evolocumab 140 mg every 2 weeks
- Repeat Labs in 2-3 months
  - Total cholesterol 100 mg/dL
  - LDL-C 39 mg/dL
  - HDL-C 47 mg/dL
  - Triglycerides 75 mg/dL
  - Lp(a) 275 nmol/L
- Potential candidate for Lp(a) primary prevention trial

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Summary

- Lower LDL-C is better particularly in patients with cardiovascular disease and/or at high risk for cardiovascular events
- There are many options to achieve lower LDL-C
- Everyone should have Lp(a) checked at least once, but even more so patients with established atherosclerotic disease
- Clinical trials will inform us on how Lp(a) lowering affects outcomes

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Coronary CT Angiography – The New Gold Standard

Himanshu Gupta, MD, FACC

Director, Cardiac Imaging

Director, Cardiovascular Disease Fellowship Program

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CAD: The Traditional Paradigm

- **Coronary artery disease (CAD)** has traditionally been framed as:
  - Epicardial coronary obstruction
  - Resulting in myocardial ischemia (supply–demand mismatch)

- **Limitations of the ischemia-centric model**
  - Ischemia represents late-stage disease
  - Misses biologically active, high-risk non-obstructive plaque
  - Limits opportunities for early prevention

- **Despite advances, CAD remains a leading global cause of death**, underscoring the need for earlier detection and intervention.

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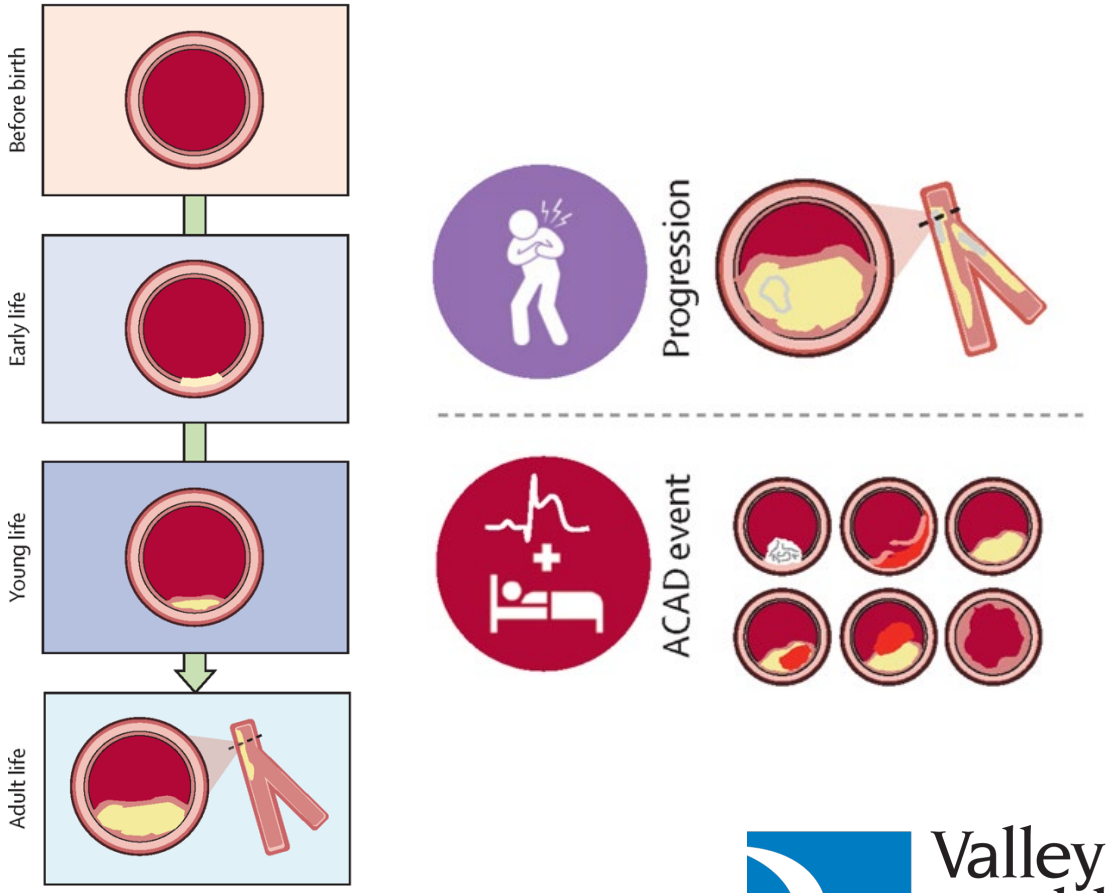
Zaman et al Lancet, 2025:405 (10486)

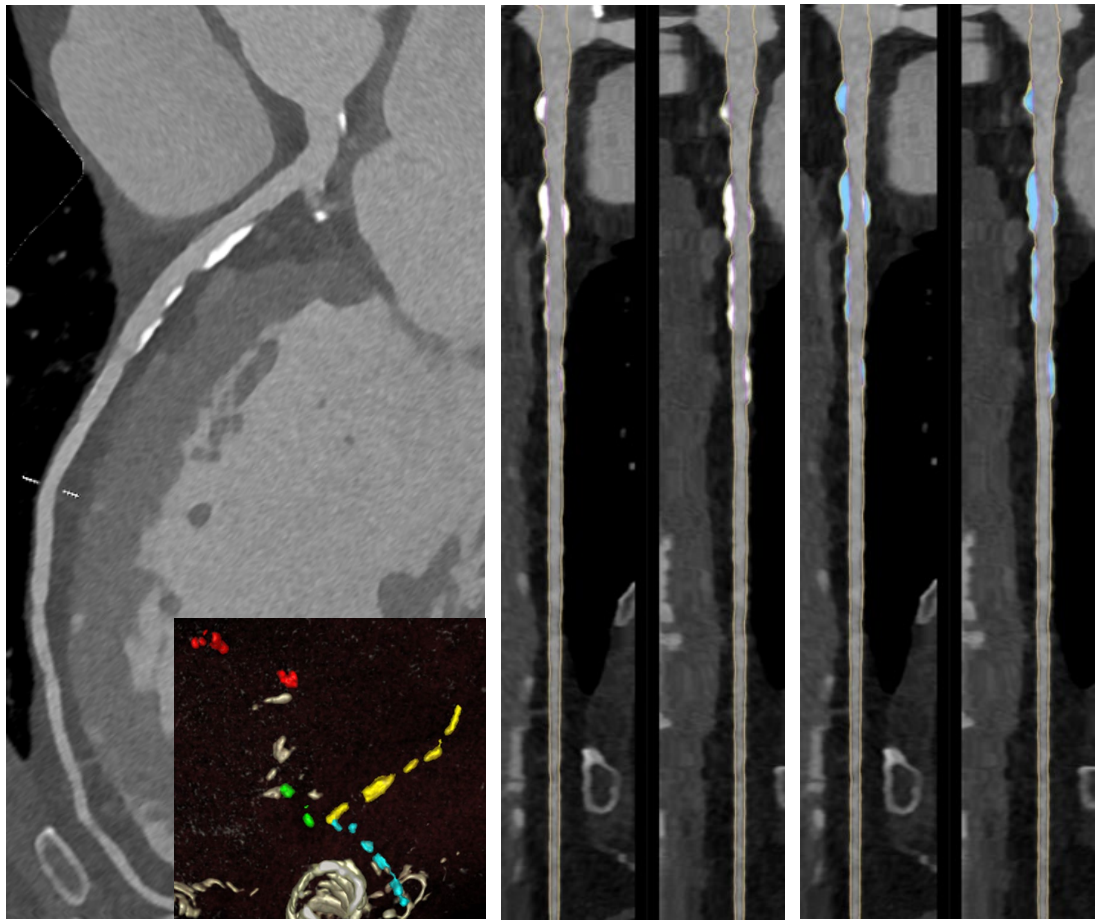
Screening for Atherosclerotic CAD

- **Shift in Strategy**
  - From event-based diagnosis
  - To early identification and modification of atherosclerosis
- **Opportunity**
  - Imaging-based detection of plaque burden before symptoms arise
- **Clinical implication**
  - Earlier detection allows prevention before ischemia develops



Zaman et al Lancet, 2025;405 (10486)

CCTA: Evolution of the "Gold Standard"



Ultrahigh resolution CT scan images with severe coronary artery calcification (color coded in green, yellow, blue and red). Corresponding images of LAD demonstrates mild stenosis that can be medically managed without ICA.

The Shift

- **ICA**: remains the therapeutic standard
- **CCTA**: Diagnostic reference for most stable and acute chest pain.

Advantages

- Detects both calcified and non-calcified plaque
- Assesses overall plaque burden
- Enables perivascular fat inflammation analysis

Implication

- CCTA enables precision prevention and may safely defer therapy in truly plaque-free individuals.

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SCOT-HEART – Long-Term Mortality Benefit

Key Results

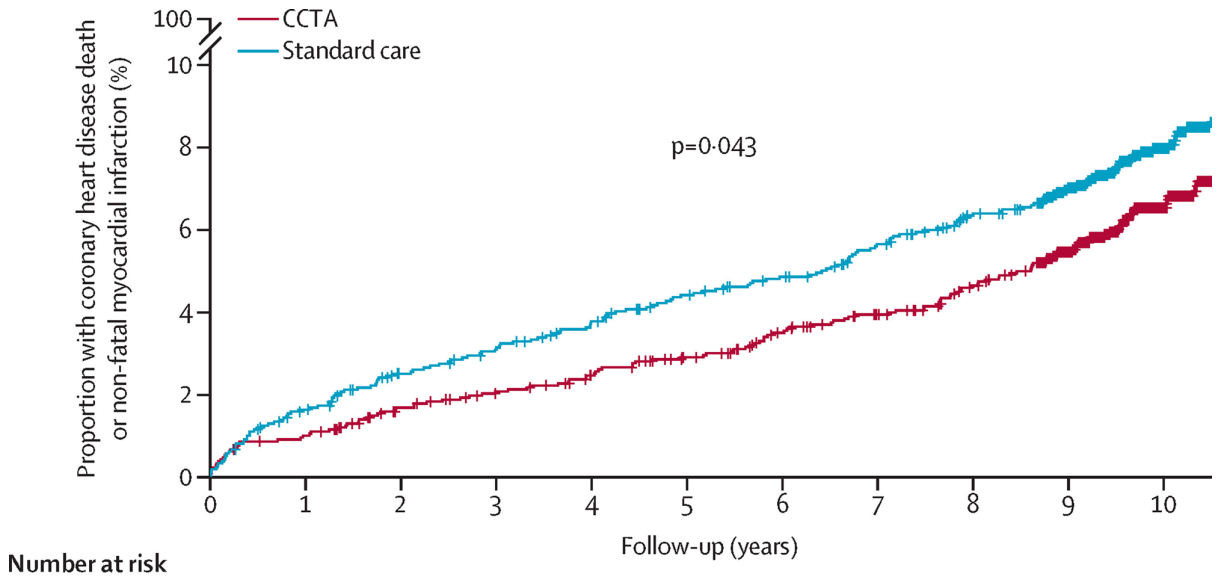
- **5 years**: 41% relative risk reduction in CHD death or non-fatal MI
- **10 years**: Sustained benefit (HR 0.79; p=0.043)

Mechanism

- Improved targeting of statins and aspirin
- Similar rates of ICA and revascularization
- Prevention—not procedures—drives benefit

Take-Home Message

- Identification of coronary atheroma by CCTA leads to durable improvements in outcomes
- Confirms CCTA as a disease-modifying diagnostic strategy



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Williams et al Lancet 2025; 405: 329–37

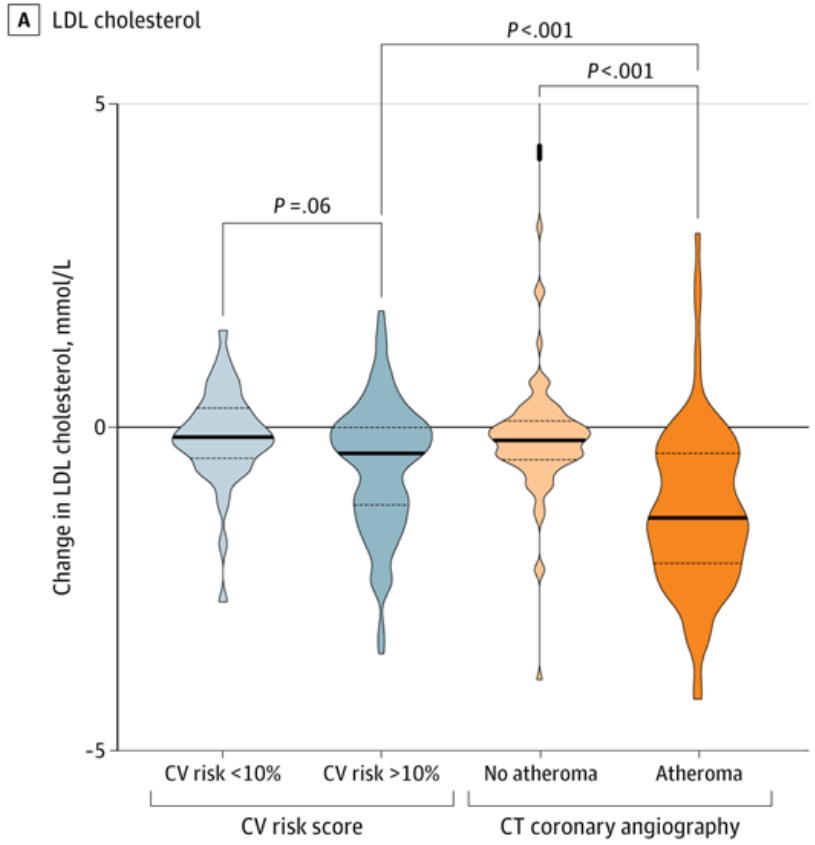
SCOT-HEART 2: CCTA Drives Behavior Change

CT-guided care leads to:

- Improved lifestyle adherence
- Higher acceptance of preventive therapies
- Similar statin use, but better patient engagement

Bottom Line

- “Seeing plaque changes patient behavior”



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McDermott et al JAMA Cardiol 2025;10;(8)

DISCHARGE Trial: CCTA as Gatekeeper

Design

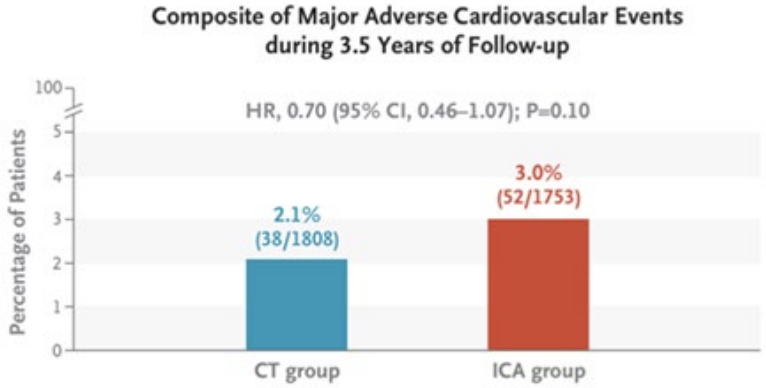
- CCTA vs. upfront ICA
- Stable chest pain, intermediate pre-test probability

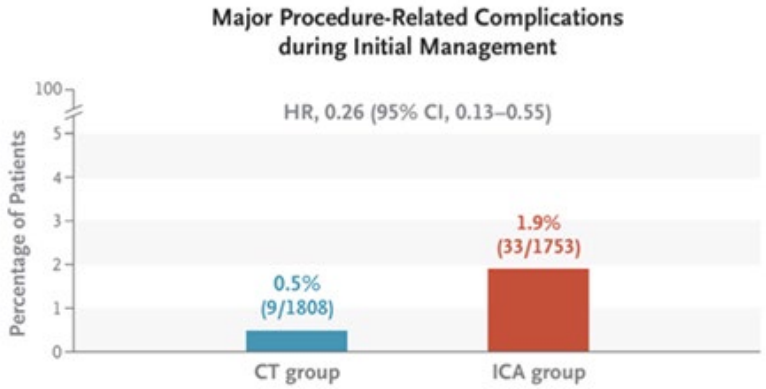
Findings

- No difference in MACE at 3.5 years
- 78% avoided ICA
- 74% reduction in procedure-related complications

Conclusion

- CCTA is safer and equally effective as an initial diagnostic strategy





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N Engl J Med. 2022;386(17)

Plaque Morphology: Beyond Stenosis

Why Stenosis Is Not Enough

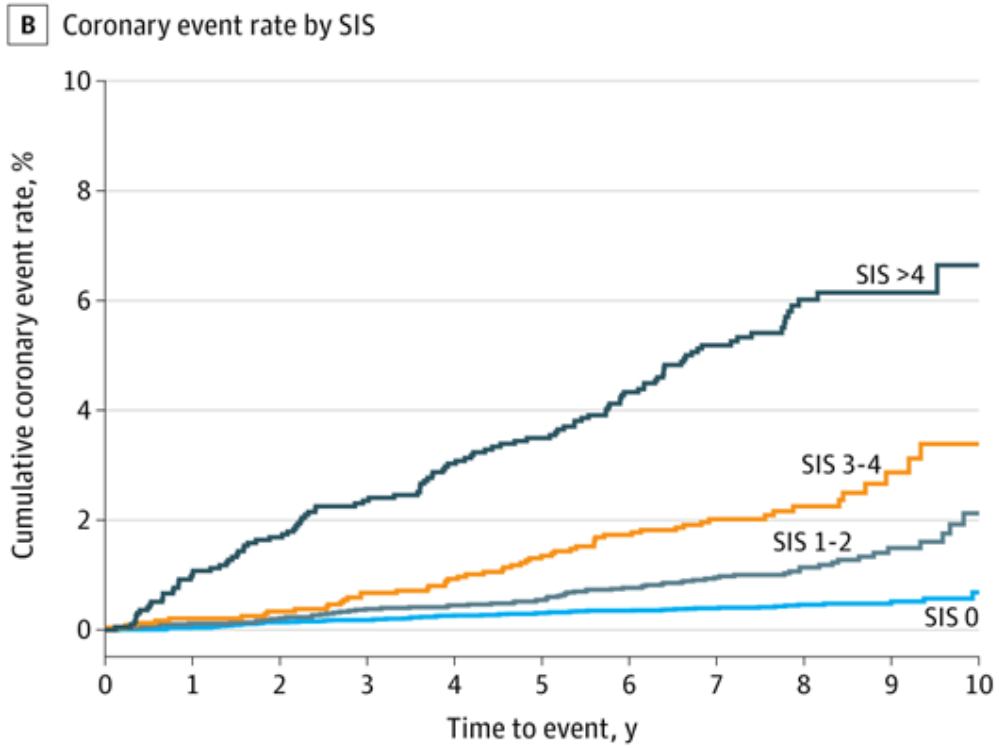
- Plaque volume and composition predict ACS better than % stenosis

Evidence

- Segment Involvement Score (SIS, number of segments with atherosclerosis) >4:HR 5.27 for coronary events

Clinical Pearl

- Non-obstructive plaque is not benign
- Early detection enables aggressive prevention before events occur



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Bergström et al JAMA 2026;335;(3)

FFR-CT – Adding Functional Clarity

What It Adds

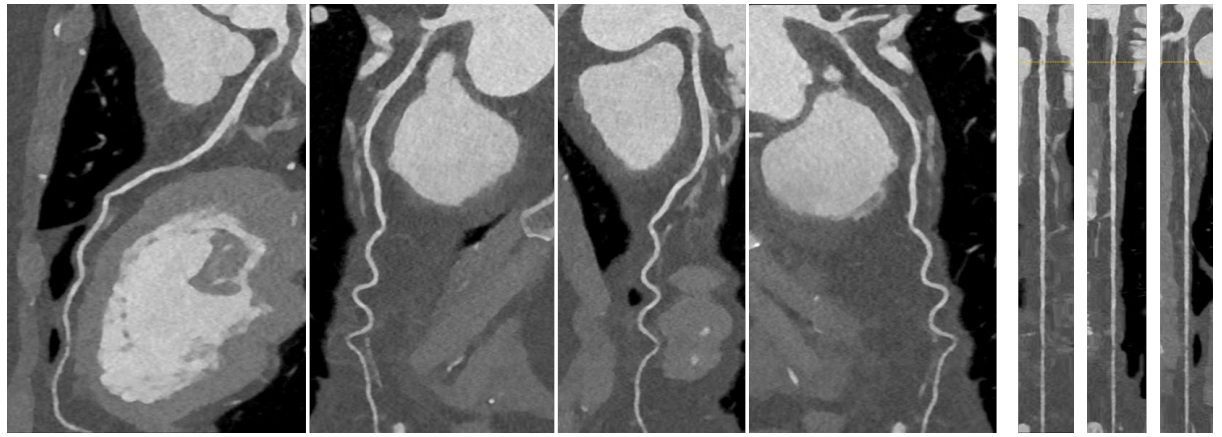
- Non-invasive assessment of lesion-specific ischemia

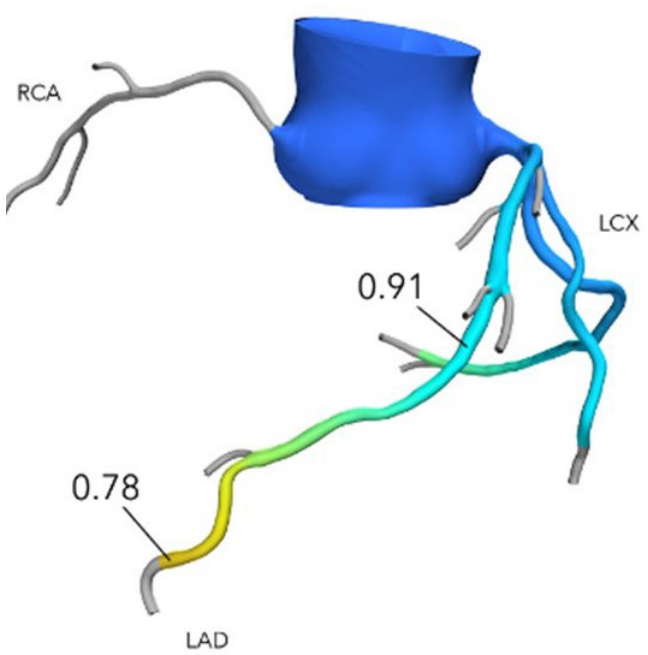
Clinical Value

- Reduces unnecessary invasive angiography
- Guides appropriate revascularization

Current Trend

- Increasing integration into routine CCTA workflows





AI & Machine Learning

Automation

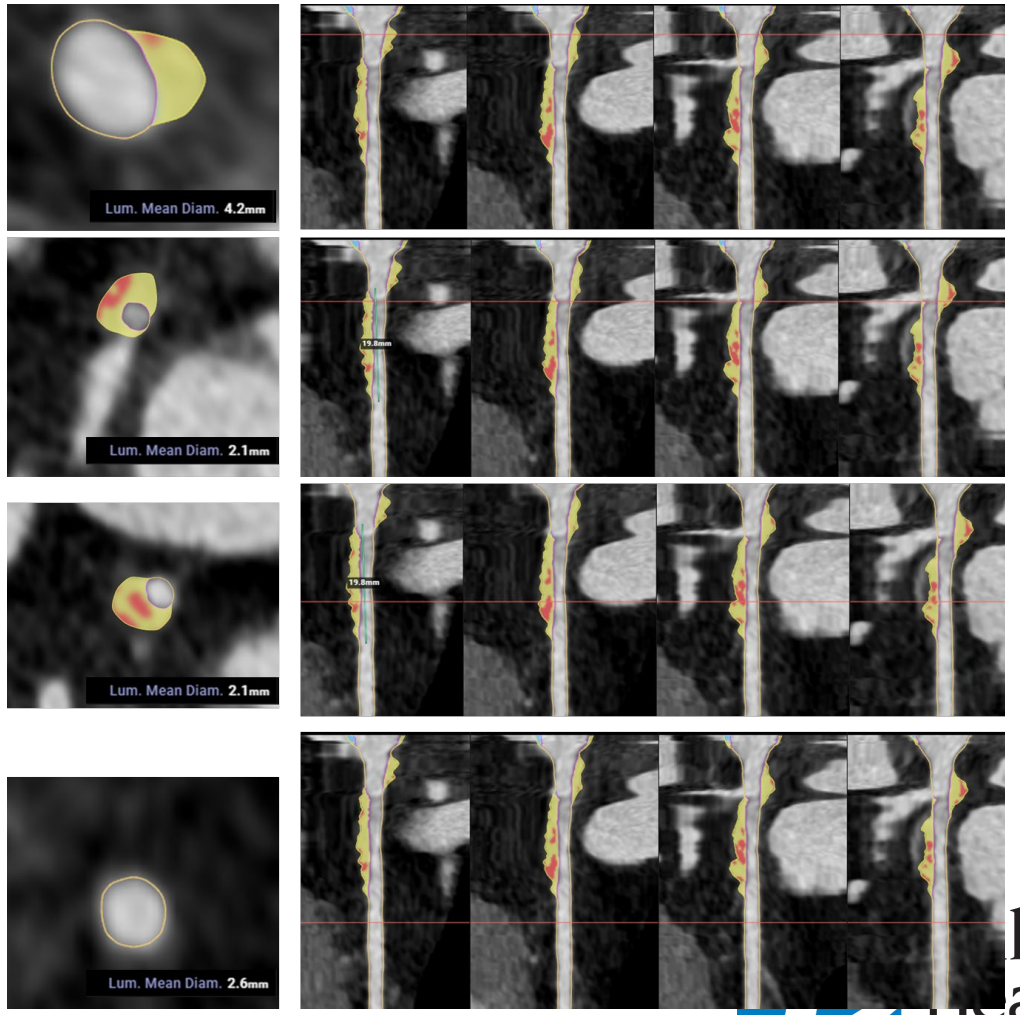
- Fully automated plaque and cardiac function analysis

Prediction

- AI-enabled plaque analysis improves prediction over traditional models
- AUC 0.84 vs. 0.78 for ACS prediction

Efficiency

- Drastically reduced analysis time



Koo et al JACC Cardiovasc Imaging . 2024 Sep;17(9)

Photon-Counting CT

Next Major Leap

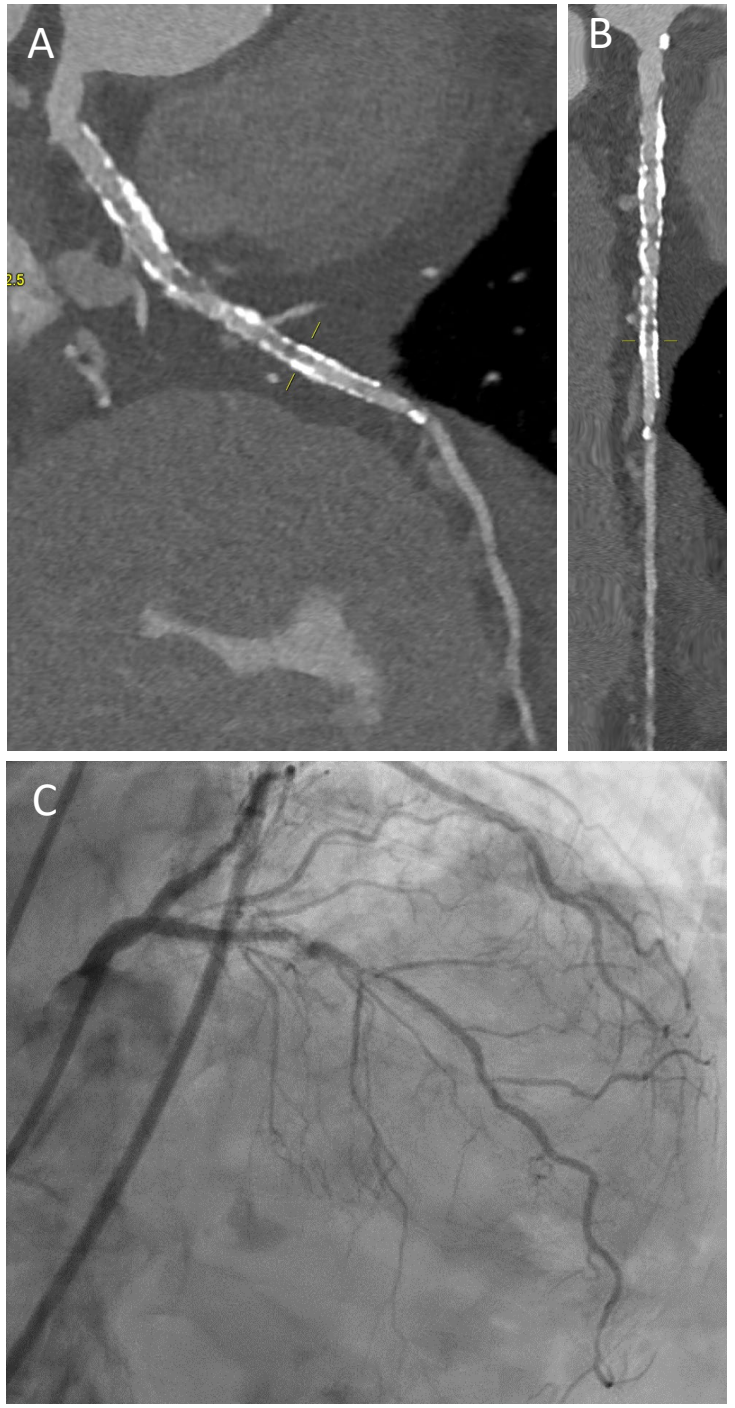
- Higher spatial resolution
- Reduced calcium blooming
- Superior iodine signal

Impact

- Improved stent evaluation
- More accurate plaque characterization

Clinical Implication

- PCCT closes the gap between anatomy and interventional planning



Ultrahigh resolution CT scan images of left anterior descending (LAD) coronary artery (curved and straightened reformats, A and B respectively) demonstrating severe in-stent stenosis of LAD that was confirmed on invasive angiogram(panel C).

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ACC/AHA Guidelines

Stable Chest Pain

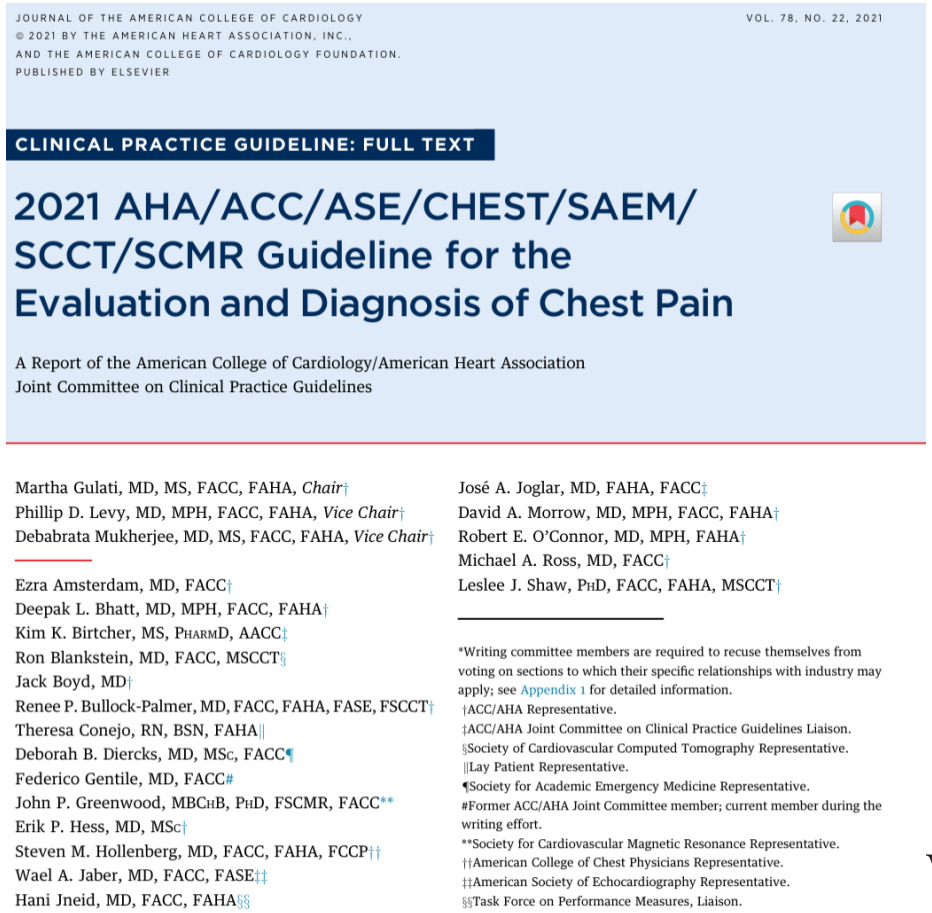
- Class I recommendation for CCTA

Acute Chest Pain

- Supports CCTA Rapid ED triage supported

Management Strategy

- Emphasizes GDMT before invasive angiography in stable CAD



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CLINICAL PRACTICE GUIDELINE: FULL TEXT

2021 AHA/ACC/ASE/CHEST/SAEM/ SCCT/SCMR Guideline for the Evaluation and Diagnosis of Chest Pain

A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines

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*Writing committee members are required to recuse themselves from voting on sections to which their specific relationships with industry may apply; see Appendix 1 for detailed information.
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||Lay Patient Representative.
¶Society for Academic Emergency Medicine Representative.
#Former ACC/AHA Joint Committee member; current member during the writing effort.
**Society for Cardiovascular Magnetic Resonance Representative.
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§§Task Force on Performance Measures, Liaison.

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Special Populations – TAVI and Pre-Op

TAVI

- CCTA safely rules out obstructive CAD
- Avoids ICA in a significant cohort

Pre-operative Assessment

- Reliable alternative before non-cardiac valve surgery
- No increase in MACE

Careful patient selection remains essential

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Conclusions

Key Messages

- CCTA is the primary diagnostic gatekeeper for CAD
- Plaque burden—not stenosis—is the key prognostic marker
- AI and photon-counting CT will define the next decade

Closing Thought

- Every stable patient deserves an anatomical assessment to optimize lifelong prevention.

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Percutaneous Coronary Revascularization-What's New?

Steffne Kunnirickal MD

Interventional Cardiology

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Coronary Physiology

Decision-Making for Revascularization		
1	**A**	6. In patients with CCD who have angina or an anginal equivalent, no previous evaluation for ischemia, and angiographically intermediate stenoses, the use of FFR or other proven nonhyperemic pressure ratios (eg, iFR) is recommended before proceeding with PCI.*[2,22,23]
Cost Value Statement: High Value	**B-NR**	7. In patients with CCD undergoing coronary angiography without previous stress testing, the use of invasive FFR to evaluate angiographically intermediate coronary stenoses before proceeding with PCI is a high economic value intervention.[24,25]

1A High Value Indication in ACC/AHA Guidelines

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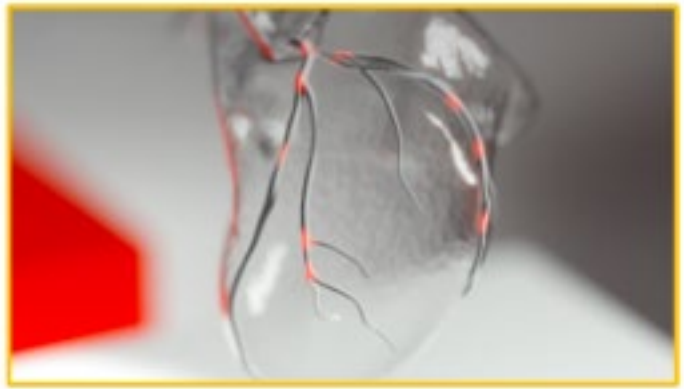
Angiography derived FFR

1 Optimal 2D Angiography

2 3D Model Reconstruction

3 Resistance Analysis



4 Comprehensive Physiological Assessment

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Commercially Available Platforms

- QFR (frame count–based flow)
- vFFR (3D + flow assumptions)
- FFRangio (AI + full tree analysis)

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Evidence Evolution

- **FAVOR III China 2021 (QFR vs angiography)**

- **FAVOR III Europe 2024 (QFR vs FFR)**

- **ALL-RISE & FAST III 2026 (FFR-angio, vFFR vs FFR)**

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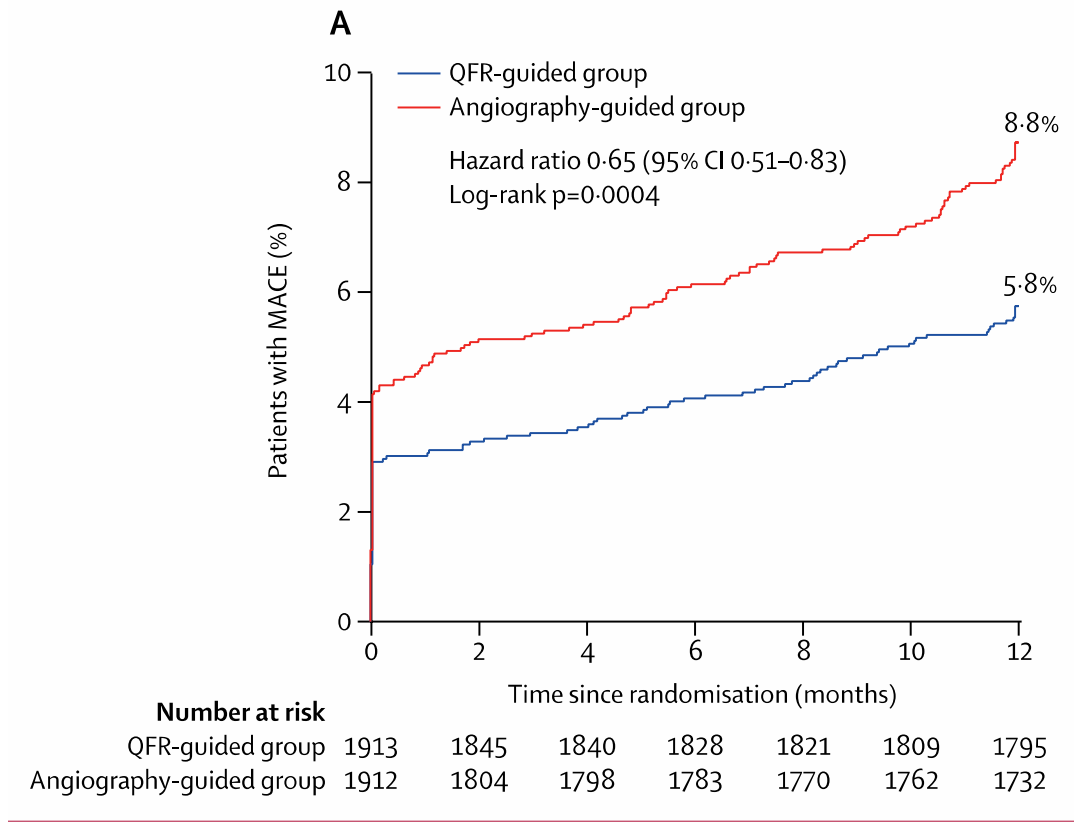
FAVOR III China 2021

- QFR-guided strategy improved 1-year clinical outcomes compared with standard angiography guidance



Stone, GW et al Lancet 2021;398:2149-59

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FAVOR III Europe 2024

QFR Falls Short

- QFR **failed to meet noninferiority** to FFR, with higher event rates (6.7% vs 4.2%)

- Further development needed to reach the established level of clinical value achieved with FFR

- QFR was granted IB indication in the 2024 ESC guidelines for CCS

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The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Angiography-Derived Fractional Flow Reserve to Guide PCI

W.F. Fearon,[1,2] A. Jeremias,[3,4] G. Witberg,[5,6] R. Al-Lamee,[7,8] D.J. Cohen,[3,4] A. Kaki,[9] R.P. Sharma,[1] R.W. Yeh,[10] B.M. Chehab,[11] M.C. Kim,[12] H. Otake,[13] R. Tayal,[14] H. Matsuo,[15] M. McEntegart,[16] A.K. Patel,[17] Y. Sandoval,[18] K.M. Al-Azizi,[19] K. Dan,[20] L. Razzouk,[21] S. Fournier,[22] A. Popma,[3] J.J. Popma,[3,10] D. Zhao,[3] B. Redfors,[3,23-25] M.V. Madhavan,[3,16] R. Kornowski,[5,6,26] M.B. Leon,[3,16] and A.J. Kirtane,[3,16] for the ALL-RISE Investigators*

To test whether FFRangio is comparable to conventional pressure wire-based assessment of intermediate lesions being considered for PCI

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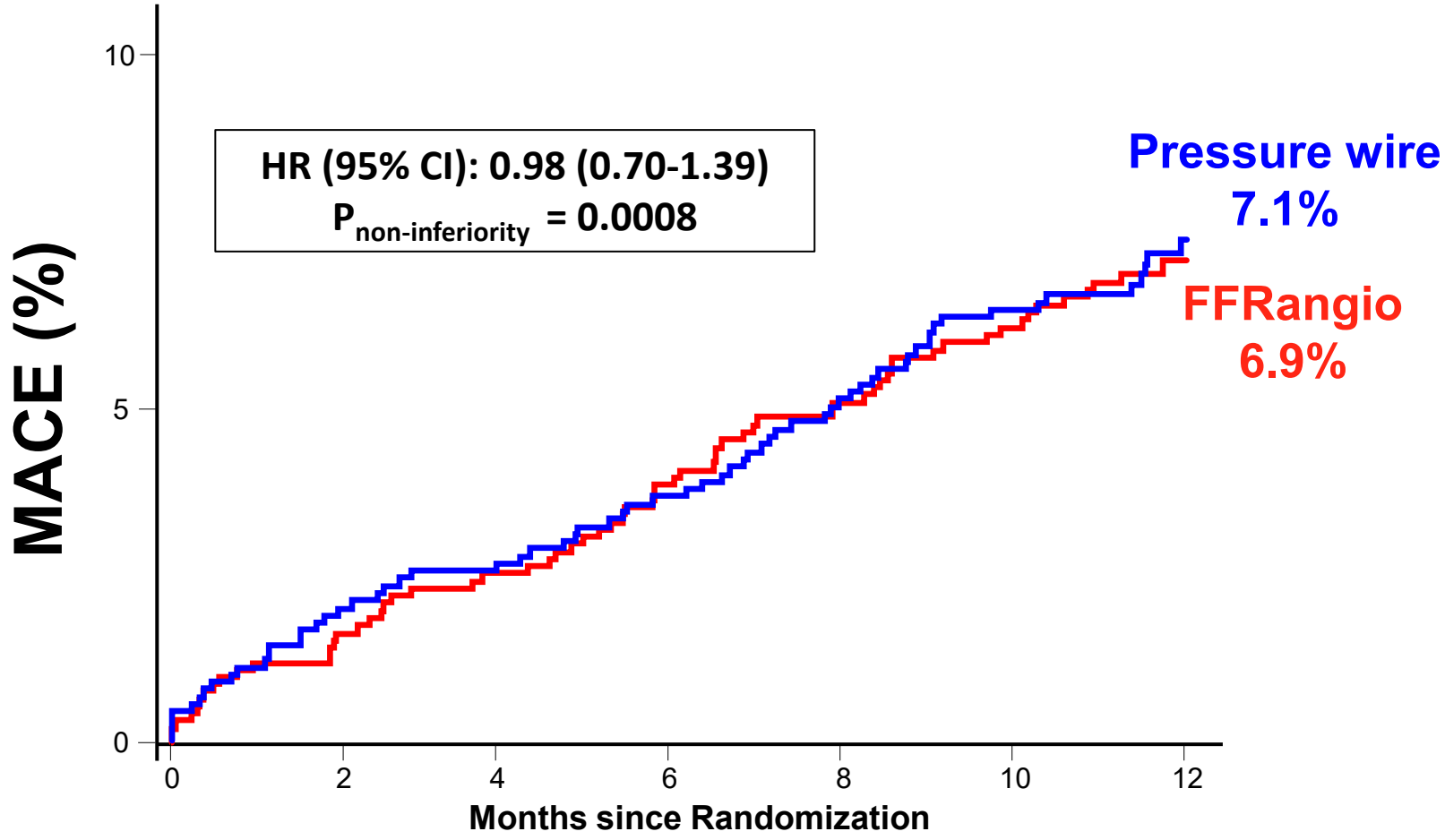
Primary Endpoint: 1-Year MACE

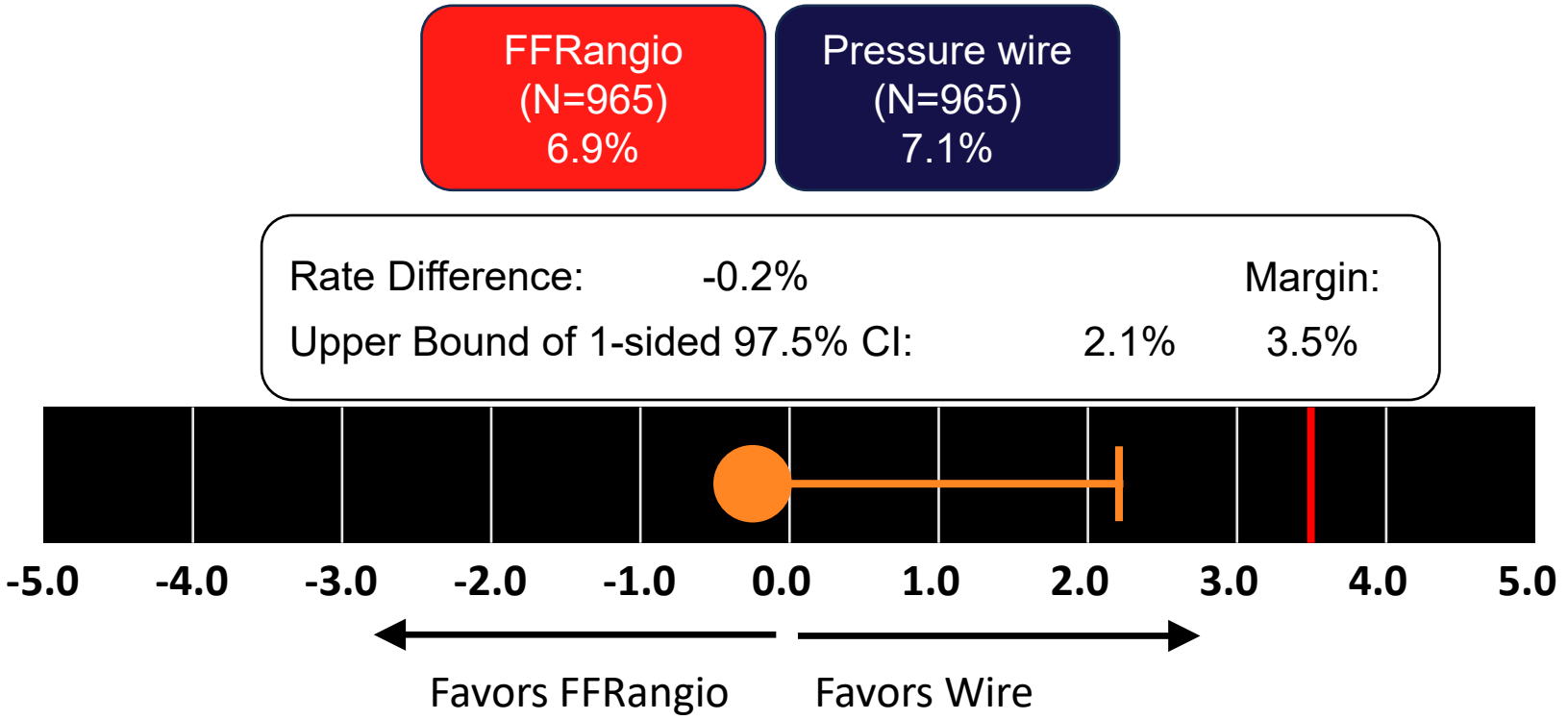


Number at risk

FFRangio-guided strategy	965	947	907	864*
Pressure wire-guided strategy	965	940	906	859*

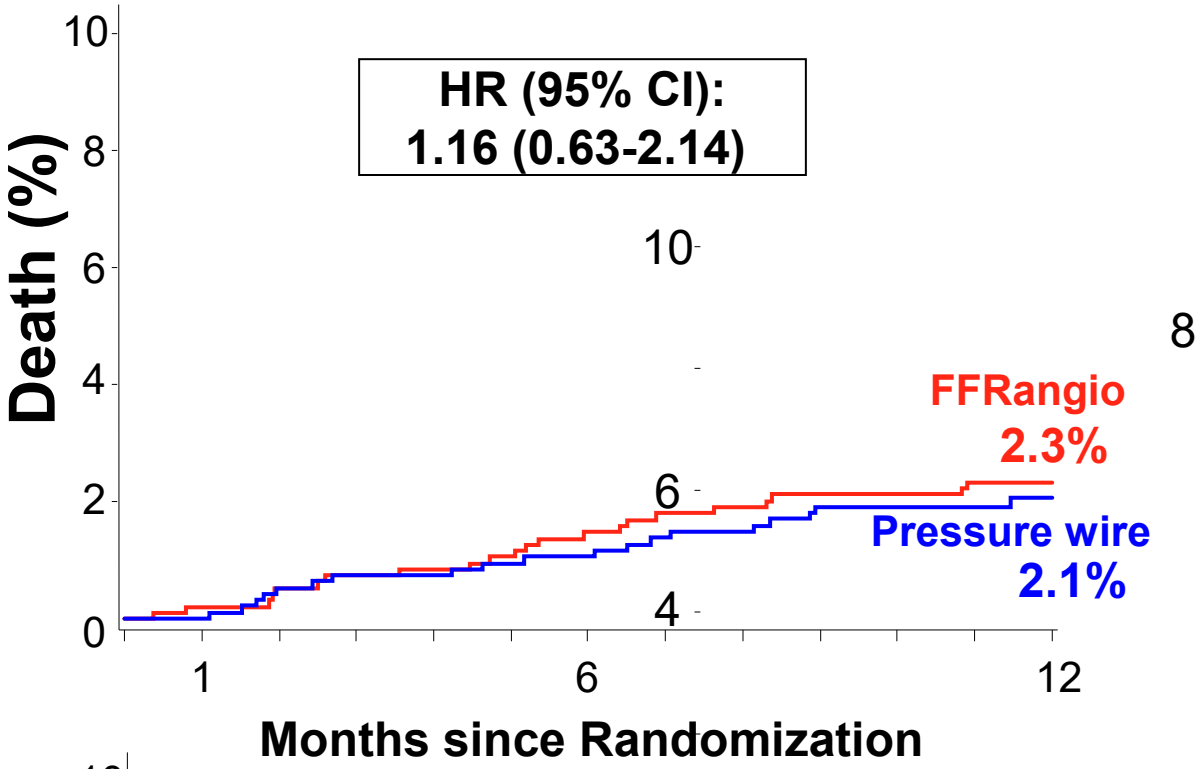
MACE: All-cause death, MI, or unplanned clinically-driven revascularization

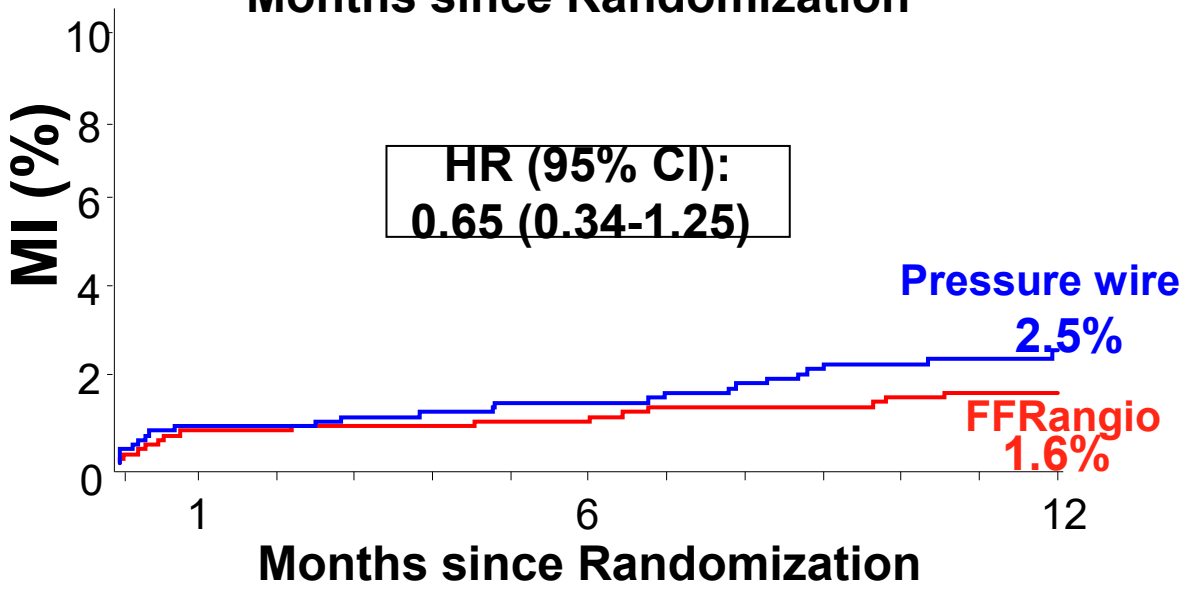
Primary Endpoint: 1-Year MACE

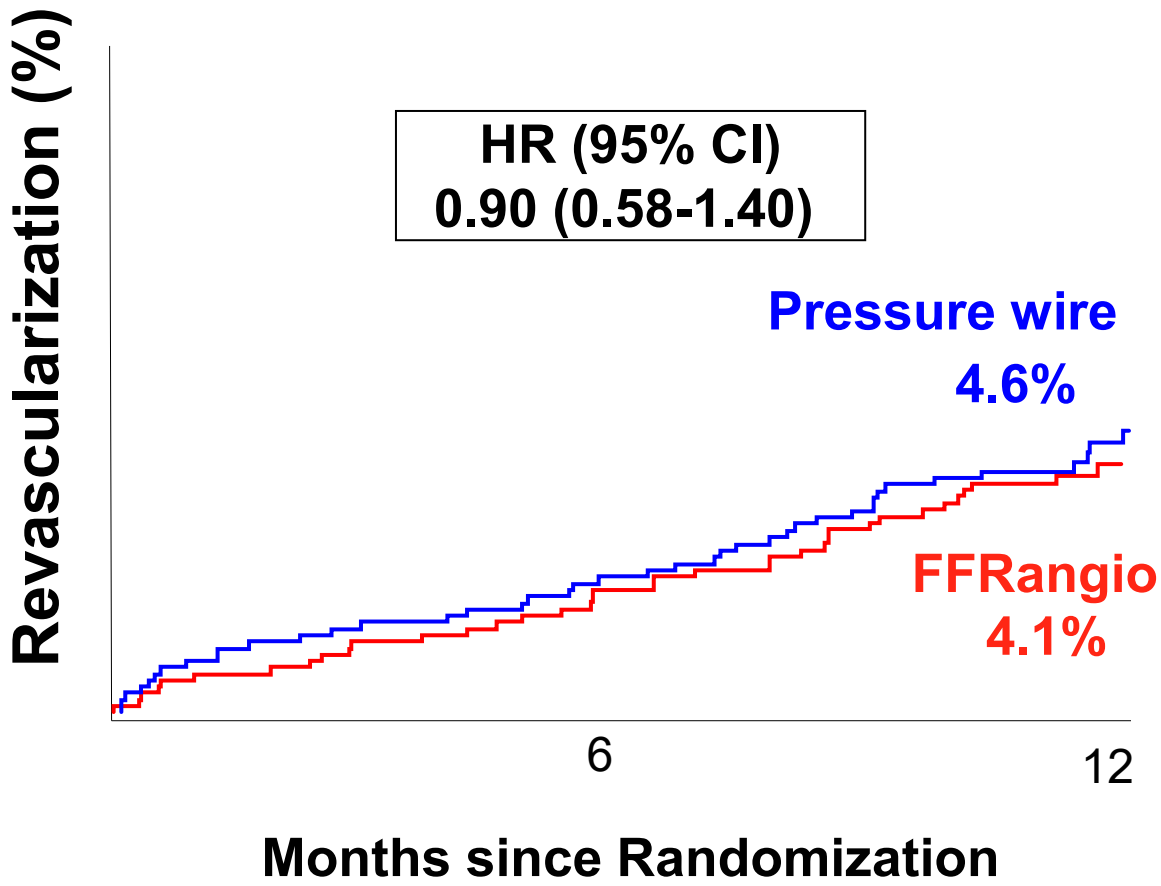


Non-inferiority p-value 0.0008

FFRangio met non-inferiority to pressure wire-based assessment


Death (%)
10
8
6
4
2
0
HR (95% CI):
1.16 (0.63-2.14)
FFRangio
2.3%
Pressure wire
2.1%
1
6
12
Months since Randomization


MI (%)
10
8
6
4
2
0
HR (95% CI):
0.65 (0.34-1.25)
Pressure wire
2.5%
FFRangio
1.6%
1
6
12
Months since Randomization


Revascularization (%)
HR (95% CI)
0.90 (0.58-1.40)
Pressure wire
4.6%
FFRangio
4.1%
6
12
Months since Randomization

Procedural Characteristics

(Patient Level)

	FFRangio (n=965) Median [25%,75%]	Pressure wire (n=965) Median [25%,75%]	Difference [25,75%]
Physiology assessment (min)	6.0 [4.0, 10.0]	8.0 [5.0, 15.0]	-2.0* [-3.0, -2.0]
Total contrast volume (mL)	100.0 [52, 145]	105.0 [72,150]	-14.0* [-20.0,-10.0]
Total fluoroscopy time (min)	9.0 [5.0, 17.0]	12.0 [8.0, 20.0]	-3.0* [-3.0,-2.0]
Total Procedure time (min)	39.0 [21.0, 62.0]	42.0 [29.0, 60.0]	-5.0* [-7.0,-3.0]

Trial Limitations

- Coronary anatomy had to be amenable to both pressure wire-based and FFRangio-based physiology measurements
- Only CCS/no biomarker elevation; CABG patients were excluded
- Trial-group assignment was unblinded
- FFRAngio was compared was to a mixed control group of FFR/NHPR, though this is representative of current clinical use of pressure wire-based physiology, and randomization was stratified

Trial Conclusion

- In this RCT powered to assess treatment guided by FFRangio compared with pressure wire:
  - Similar 1-yr MACE (6.9% vs. 7.1%), meeting non-inferiority
  - Shorter time to calculate FFRangio vs. pressure wire-based physiology
  - Shorter overall procedural and fluoroscopy times with lower contrast volume, despite a slightly higher rate of PCI

FAST III Trial

Published March 2026 in NEJM

- Multicenter European trial randomized patients with intermediate coronary lesions to vessel FFR (vFFR)-guided versus traditional FFR-guided revascularization.

Primary Results:

- vFFR-guided PCI was **noninferior** to FFR-guided PCI for the composite of death, MI, or revascularization at 1 year

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Limitations

- Accuracy is dependent on image quality
  - severe vessel overlap, extreme tortuosity, ostial lesions, bifurcation lesions, serial lesions may preclude analysis
- Physiological assumptions about microvascular resistance
- Trials excluded ACS patients and patients with prior CABG

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Practical Considerations

- Standard angiography alone should not be used to guide PCI decisions in intermediate lesions
- Not all angiography-derived methods are equivalent
- Excellent tool for increasing the adoption of physiology, but it is best viewed as a **screening and decision-support tool**
- FFR and iFR remain gold standards with Class 1A recommendations

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Surgical Coronary Revascularization, What Is New?

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Juan B Grau, MD

CABG in 2026 is not a different operation; it is a smarter one

1- Current Guidelines and current real-world reality

2- Why were the guidelines modified?

3 - Features and effects of arterial conduits

4 - Can you implement these changes with good results?

5 - Technical strategies: Case presentation

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Current Guidelines and current real-world reality

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CABG still matters — and the guidelines still support it

- Acceptable surgical-risk left main disease: CABG remains preferred in the 2024 ESC guidelines
- Multivessel disease with diabetes: CABG remains favored
- Both latest US and ESC CABG guidelines recommend more aggressive use of arterial grafts
- Radial artery is the preferred conduit for the second most important non-LAD target.

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The current reality of CABG conduits

- Choice of conduits has not changed in 32 years despite STS position papers and modifications in the European and American Guidelines

- STS reports < 11 % of CABG use more than one arterial graft . Worldwide 15-20%.

- Comparison: Over a similar time period, MV surgeons adapted to and adopted MV repair (>60%)

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Why were the guidelines modified?

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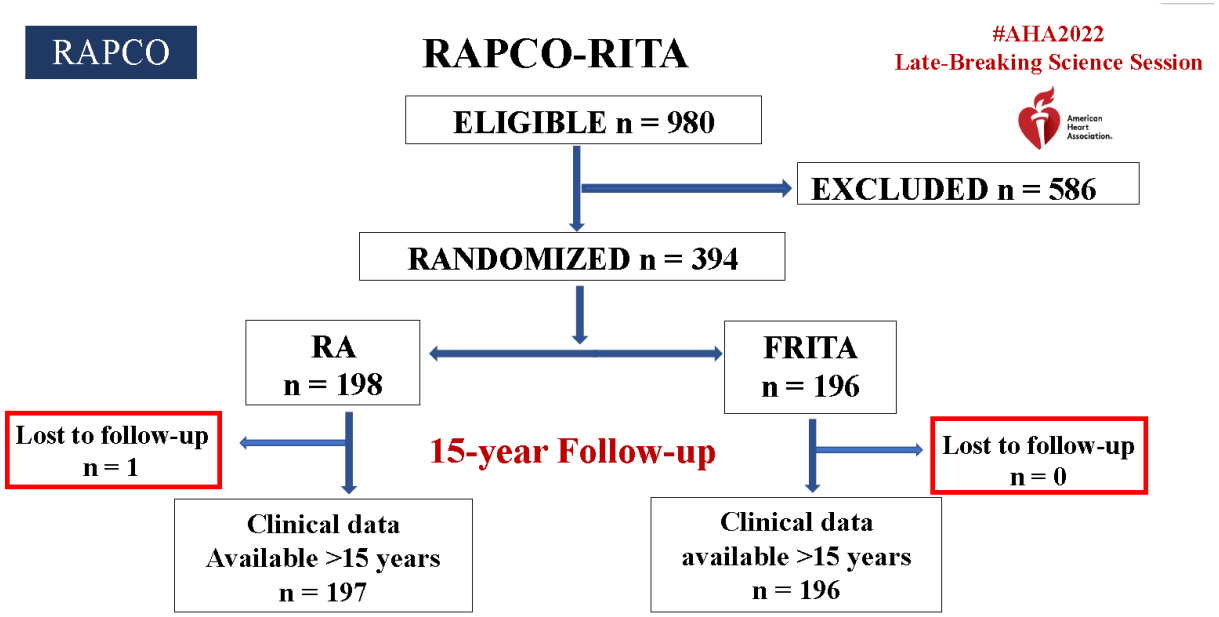
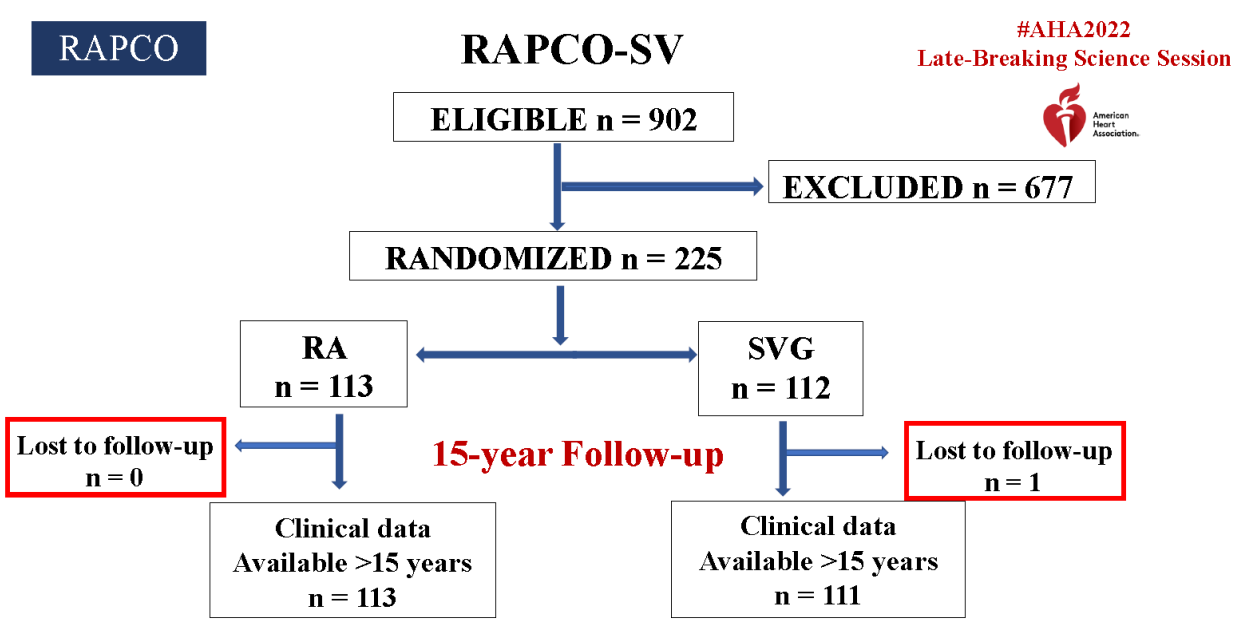
Radial artery – update from RAPCO





Courtesy of Dr. James Tatoulis, Melbourne Australia

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Radial artery – update from RAPCO

RAPCO

RAPCO
SUMMARY 15-YEAR RESULTS

#AHA2022
Late-Breaking Science Session

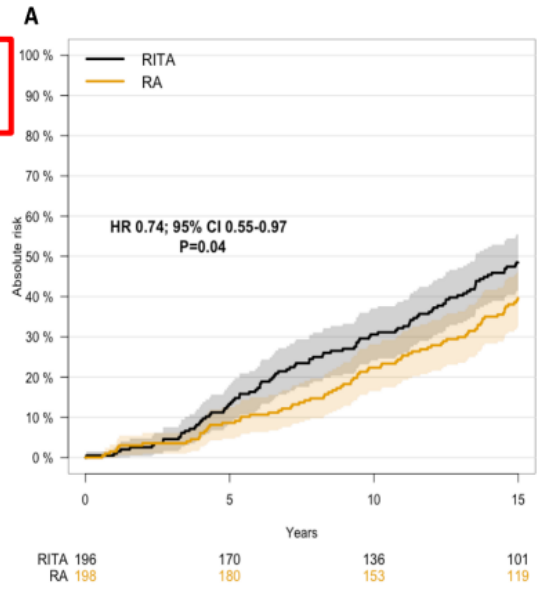
American Heart Association.

RAPCO-RITA

Absolute↓ 9%;
Relative↓ 26%

39% vs 48%
MACE

HR 0.74; p=0.04

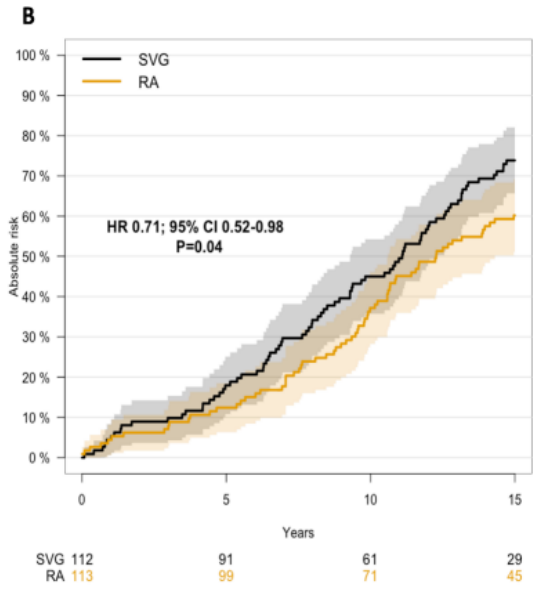


RAPCO-SV

Absolute↓ 13%;
Relative↓ 29%

60% vs 73%
MACE

HR 0.71; p=0.04



First single RCT to demonstrate **better clinical outcomes** using **RA grafting** compared with **both RITA and SV**

Courtesy of Dr. James Tatoulis, Melbourne Australia

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Summary

Literature on Arterial grafting

- Recent studies (RAPCO) suggests radial artery offers better outcomes than RITA or SVG.
- Plurality of studies show improved long-term event-free survival with use of arterial conduits
- No study has ever demonstrated a better survival using vein versus RIMA or Radial to complement the LITA
- Technical skill of the surgeon(s) can affect outcome of surgical trials

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Features and effects of arterial conduits

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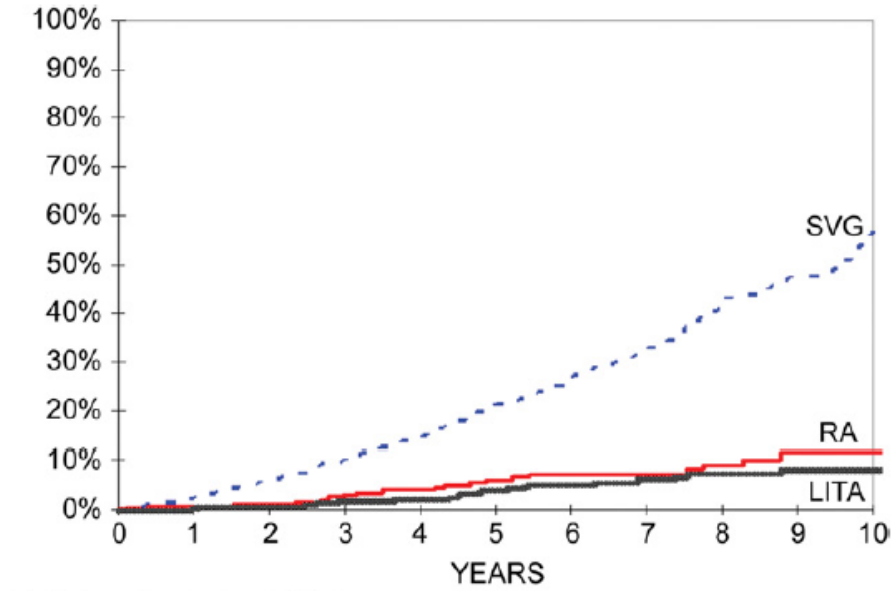
Progression of native coronary artery disease after CABG: arteries vs veins

CAD PROGRESSION

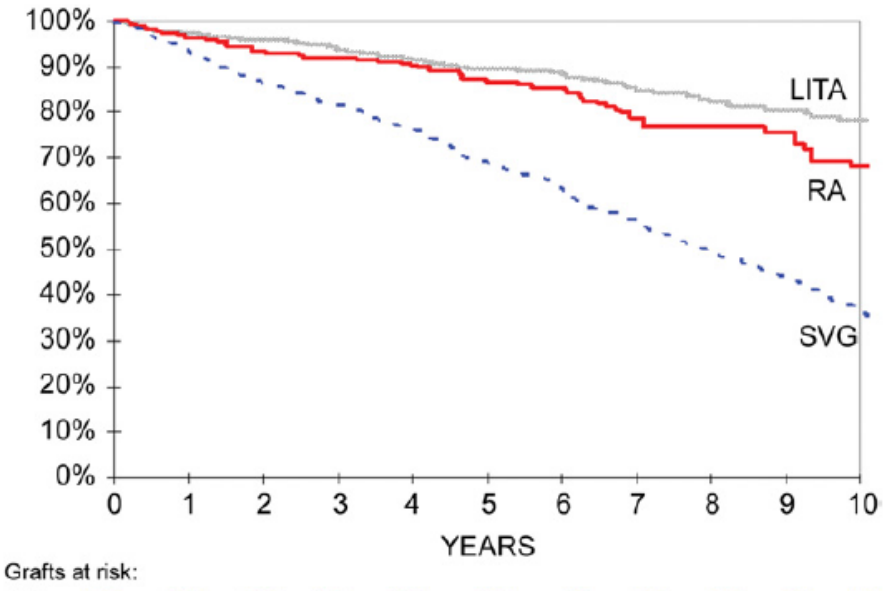


Territories with patent graft at risk:

SVG	1562	1354	1139	954	815	635	489	372	266	204	141
LITA	783	670	570	485	417	334	260	202	153	117	81
RA	420	339	277	238	208	178	154	119	98	64	48

Fig 2. Kaplan-Meier–estimated disease progression rates in all territories with patent conduits. (LITA = left internal thoracic artery; RA = radial artery; SVG = saphenous vein graft.)

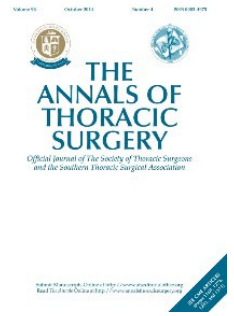
PATENCY



Grafts at risk:

SVG	1562	1354	1139	954	815	635	489	372	266	204	141
LITA	783	670	570	485	417	334	260	202	153	117	81
RA	420	339	277	238	208	178	154	119	98	64	48

Fig 4. Kaplan-Meier–estimated conduit patency rates. (LITA = left internal thoracic artery; RA = radial artery; SVG = saphenous vein graft.)



Dimitrova KR. Annals of Thoracic Surgery. 2012

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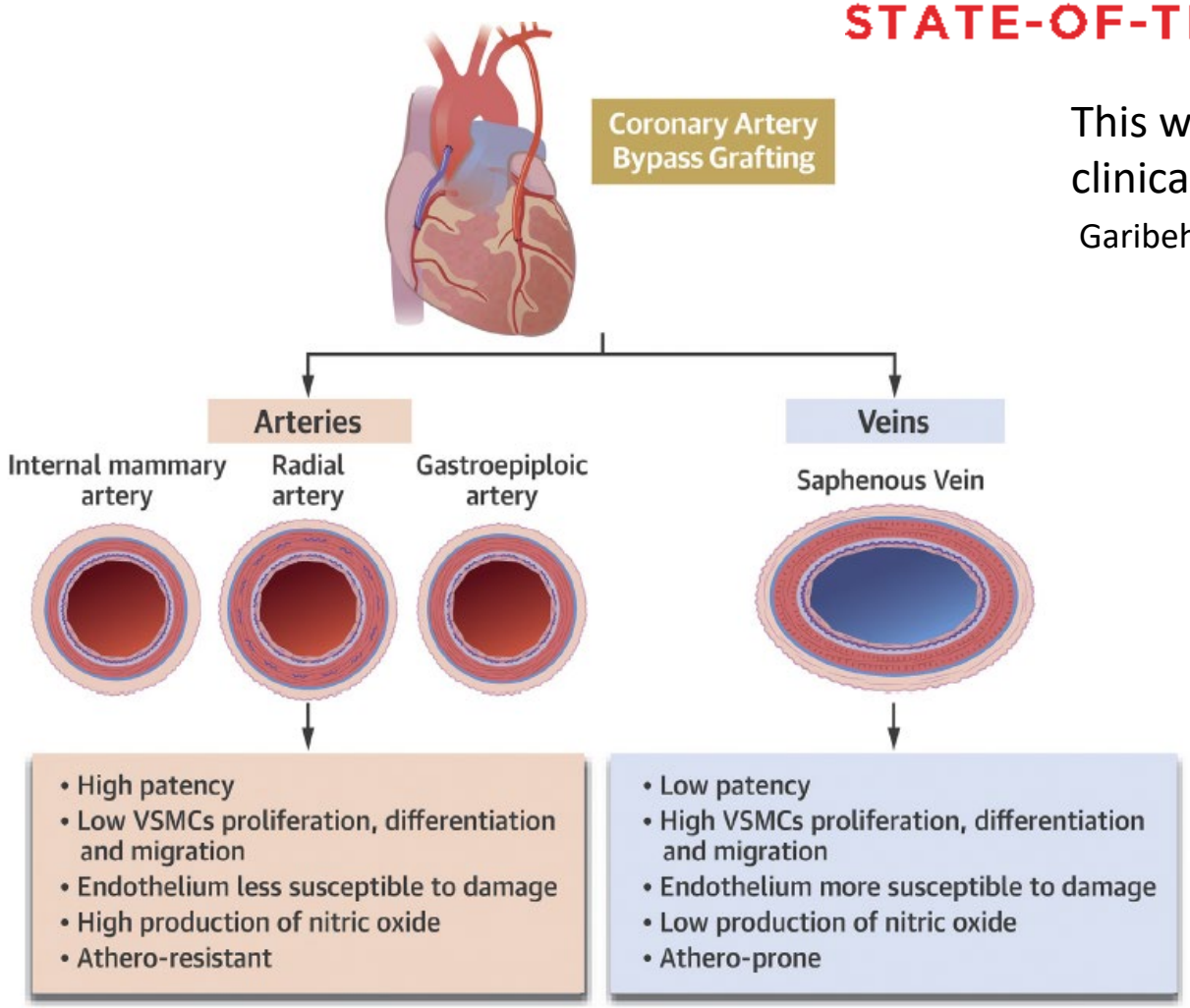
Conduits' Biology Regulates the Outcomes of Coronary Artery Bypass Grafting

STATE-OF-THE-ART REVIEW



This work stemmed from a clinical observation

Garibeh, Grau et al. JACC Basic Trans Science. 2021;6(4):388.

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Can you implement these changes with good results?

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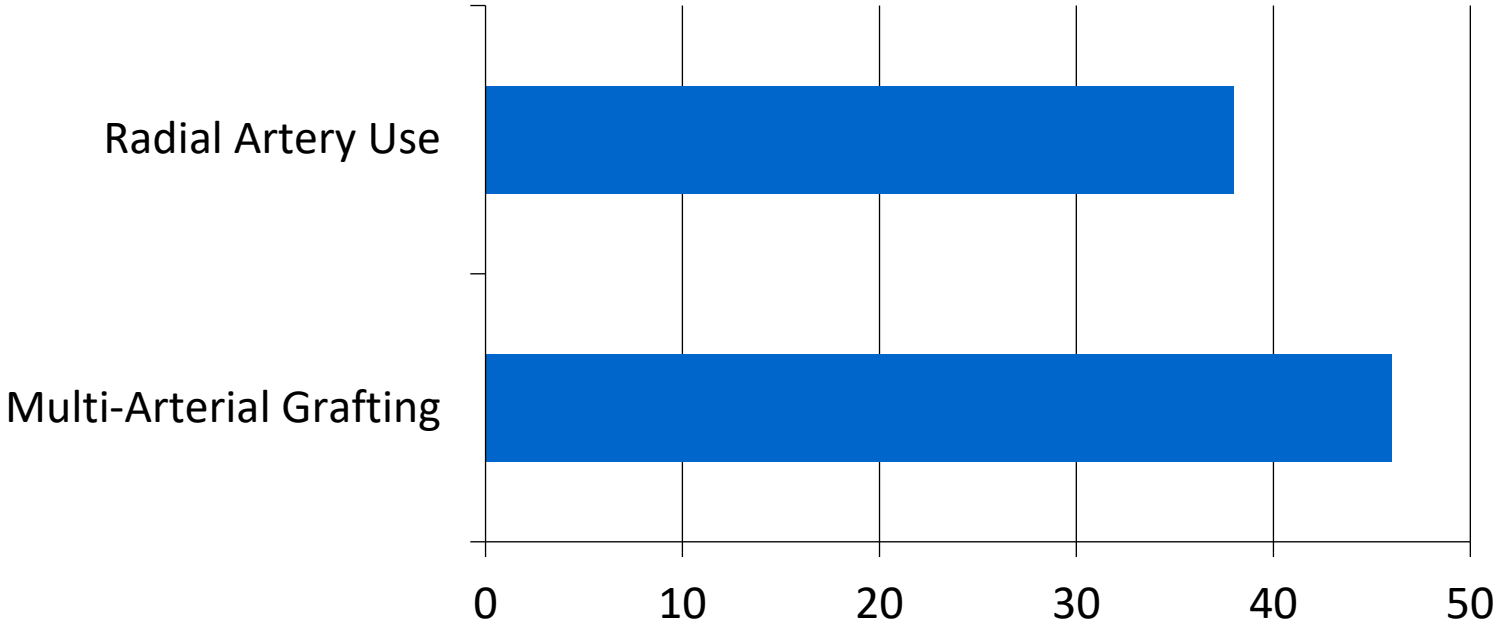
Sustained Multi-Arterial Grafting Performance

Valley Hospital Healthcare System | 3-Year Aggregate (2023–2025)



- Consistent, high-level adoption of multi-arterial grafting
- Robust radial artery utilization supporting durable outcomes
- Reflects institutional commitment to advanced coronary surgery

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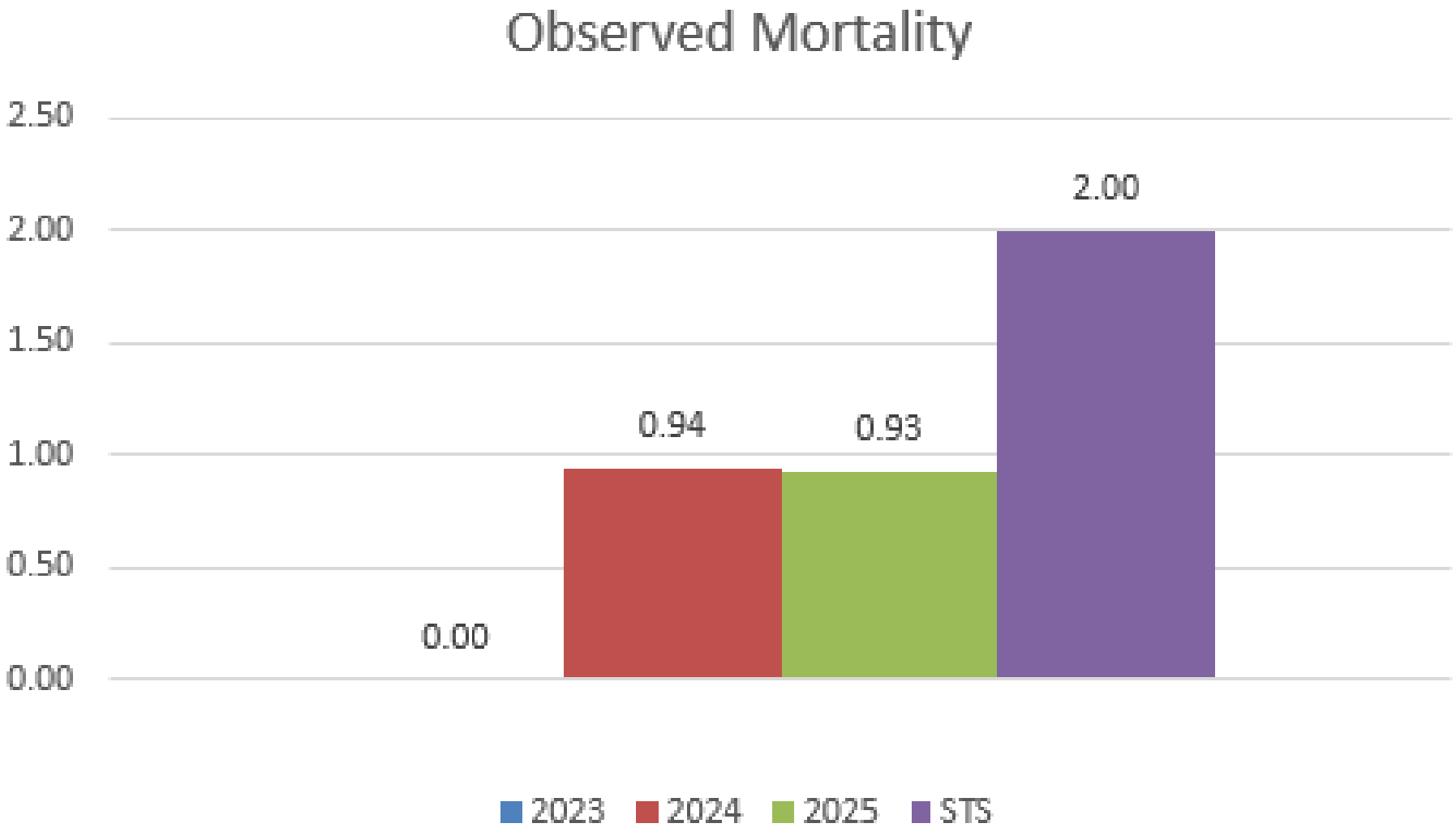
Valley Hospital Healthcare System | 3-Year Aggregate (2023–2025)
STS data score outcomes card



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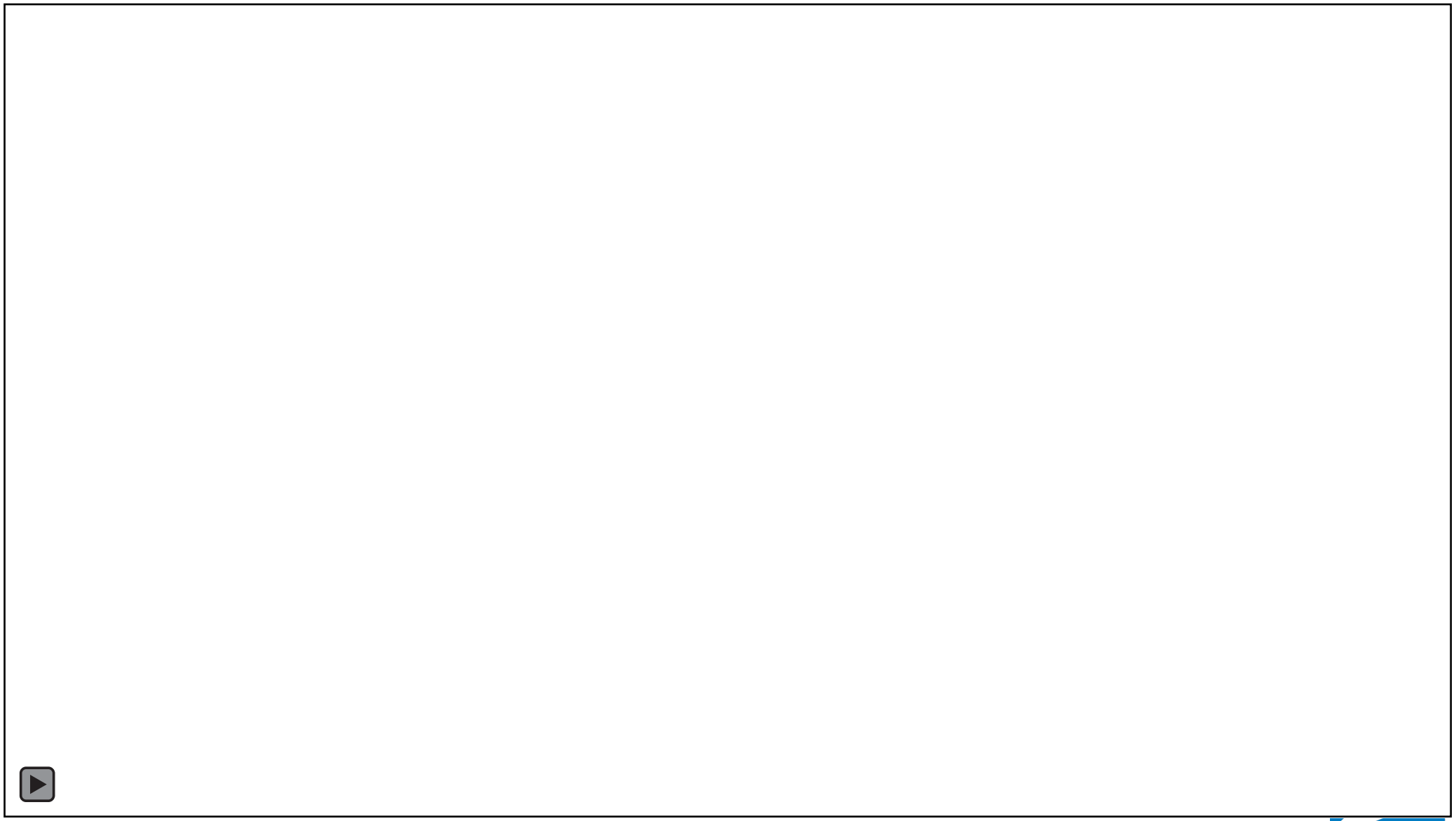
Case presentation: All arterial CABG



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Take home messages

“Cardiac surgery remains indispensable because it uniquely solves what no other therapy can—provided we continue to innovate and execute with discipline.”

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