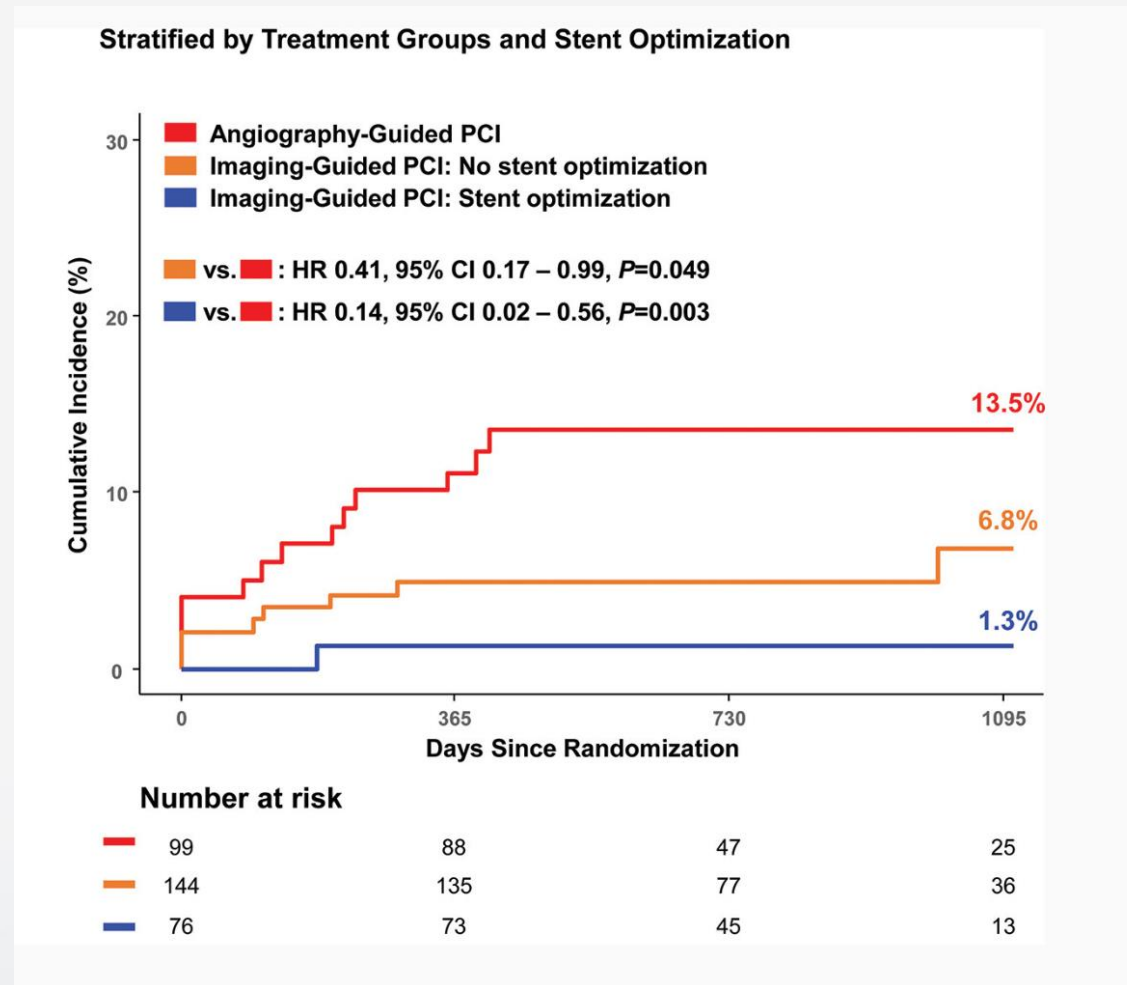


Rule of 5-6-7-8 for Bifurcation PCI: It Is Time to Change in 2024

Jung-Min Ahn, MD.

Division of Cardiology, Asan Medical Center,
University of Ulsan College of Medicine, Seoul, Korea

PCI Optimization Matters

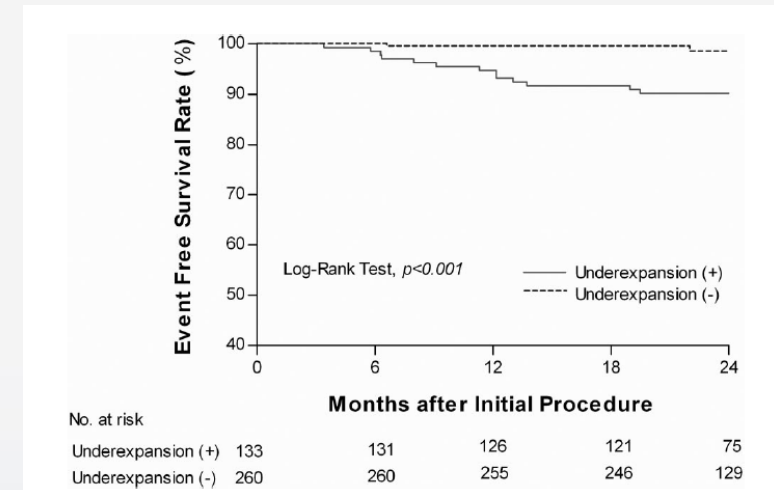
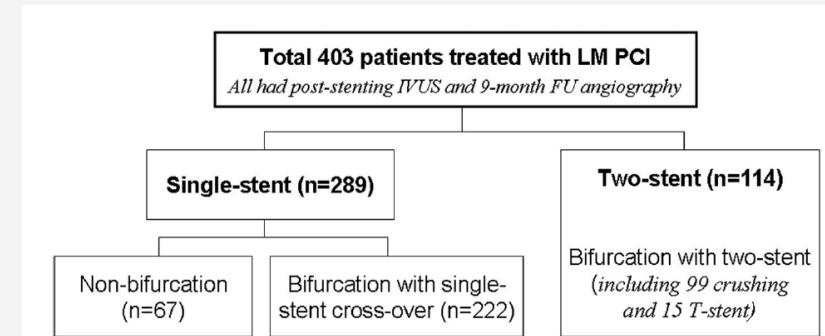
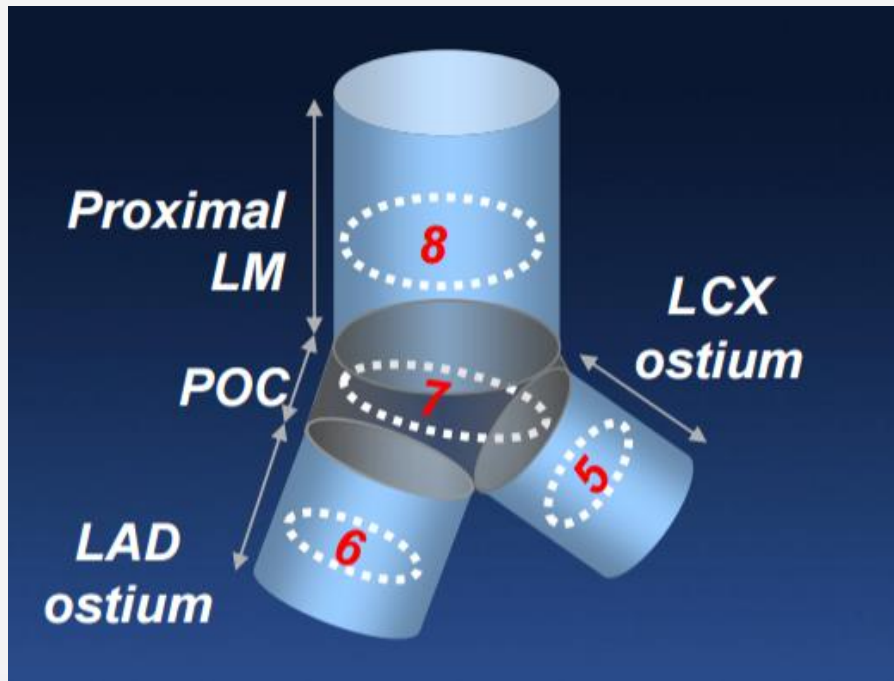


CTO subgroup analysis from RENOVATE Trial. Circulation. 2023;148:903–905

De We Have Optimization Criteria for LM PCI ?

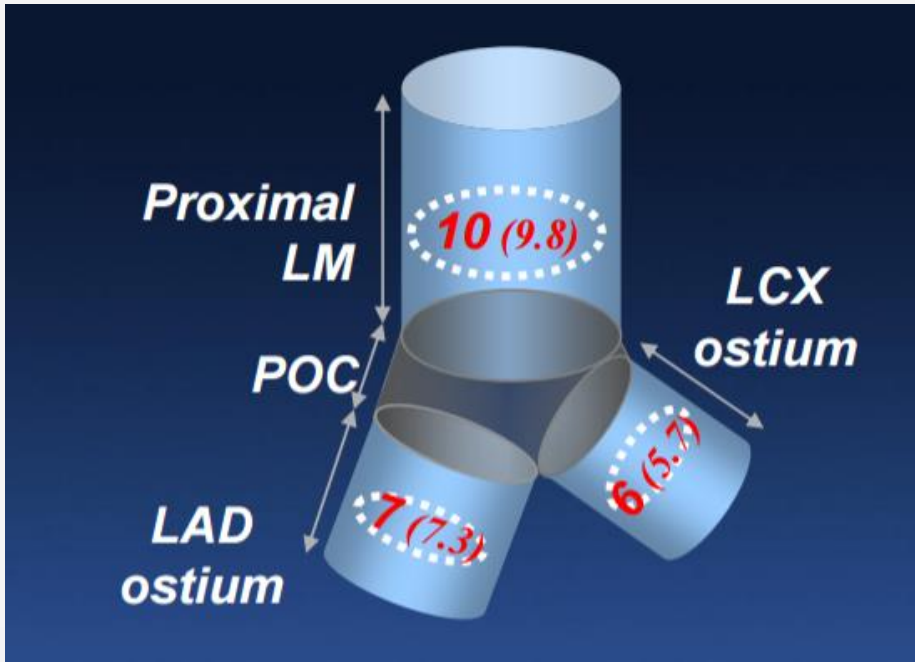
LM IVUS MSA Criteria (“5-6-7-8”)

Asan Medical Center Criteria



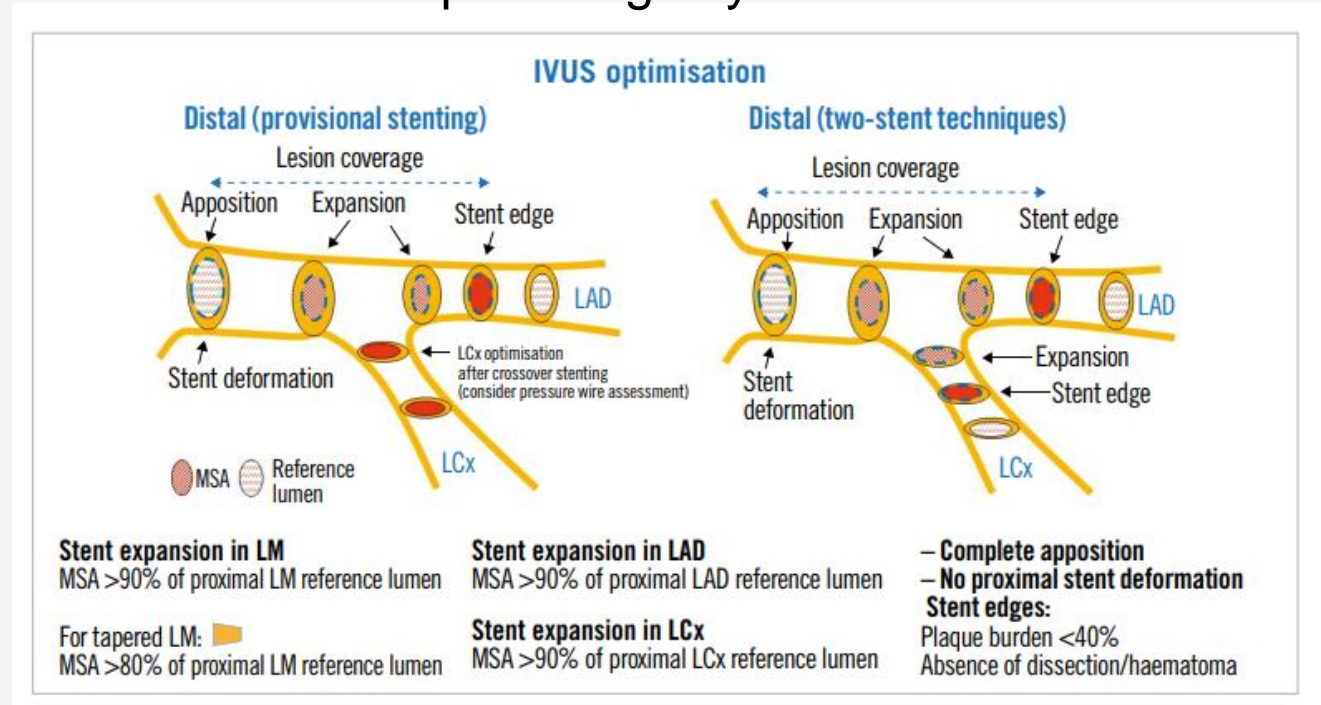
LM IVUS MSA Criteria

EXCEL Criteria



EXCEL Trial Analysis
A. Maehara TCT 2018

Spain Registry Criteria



EuroIntervention. 2020 Jun 25;16(3):210-217

- How to Optimize the LM Stent Results?

Two Stenting

Optimal MSA Criteria For LM Crush Technique Based on Long-Term (5-Year) Clinical Outcomes

292 Patients

- Treated By Crush Technique
- Complete IVUS Imaging

35 MACES at 5 Years

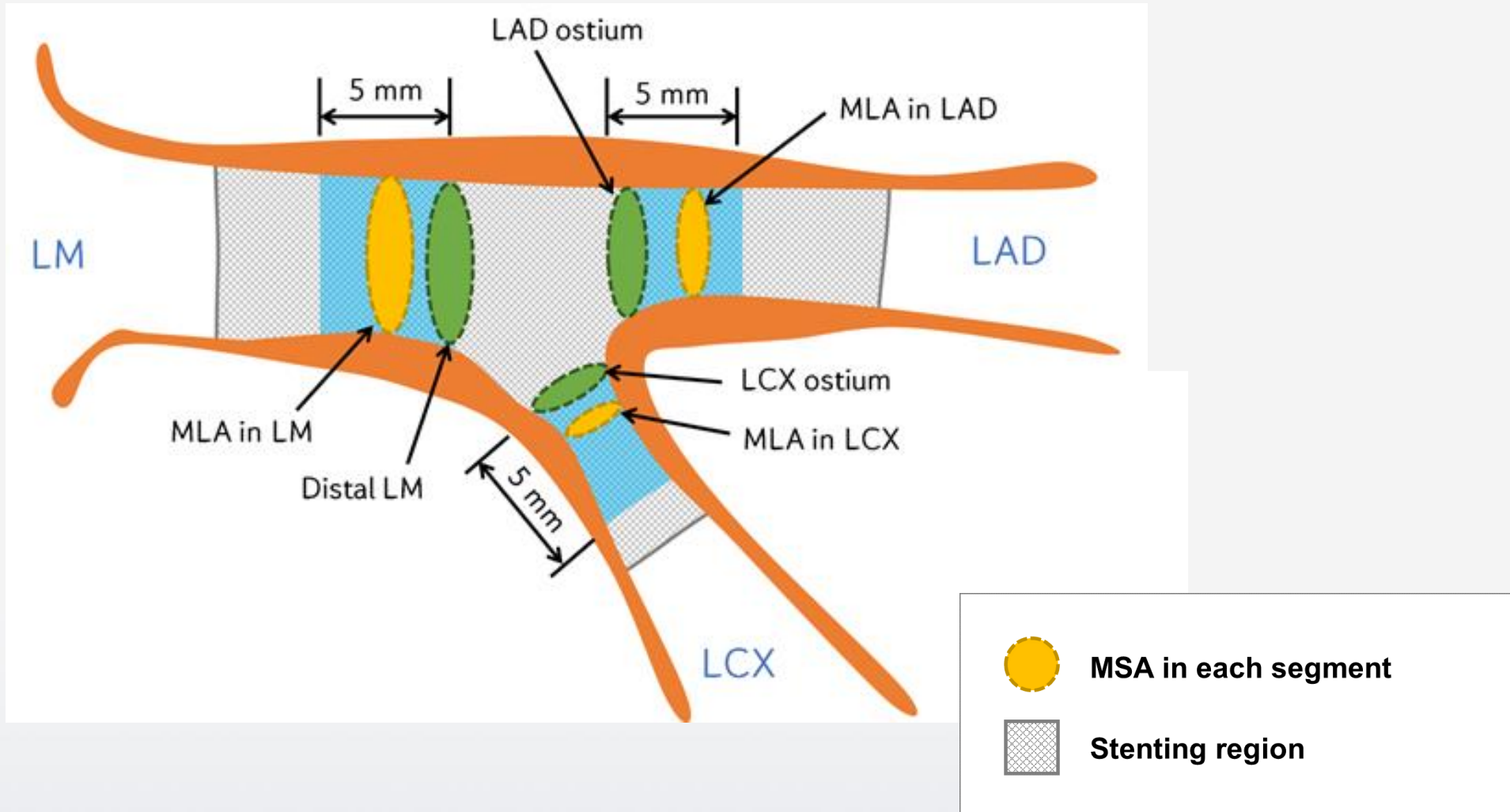
Patients with unprotected LM bifurcation lesion who underwent upfront two-stent technique from March 2005 to Dec 2019 (N=479)

Excluded, N = 187

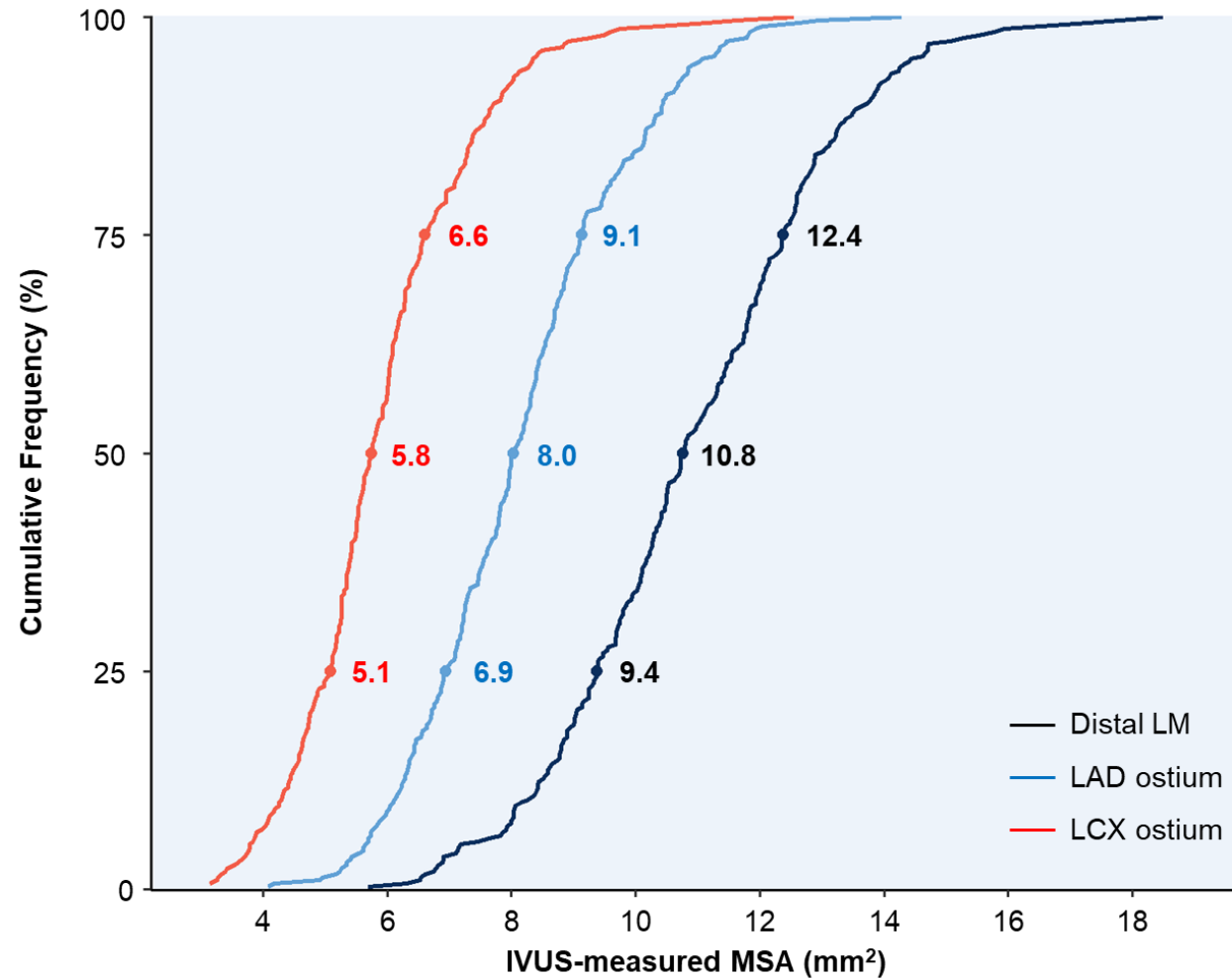
- 5 patient underwent simultaneous kissing stents
- 15 patients underwent classic T-stenting
- 88 patients without IVUS-guidance
- 18 patients without poststenting IVUS from LAD-pullback
- 61 patients without poststenting IVUS from LCX-pullback

Patients who underwent two-stent PCI with crush technique and had complete poststenting IVUS images from both LAD and LCX pullback (N=292)

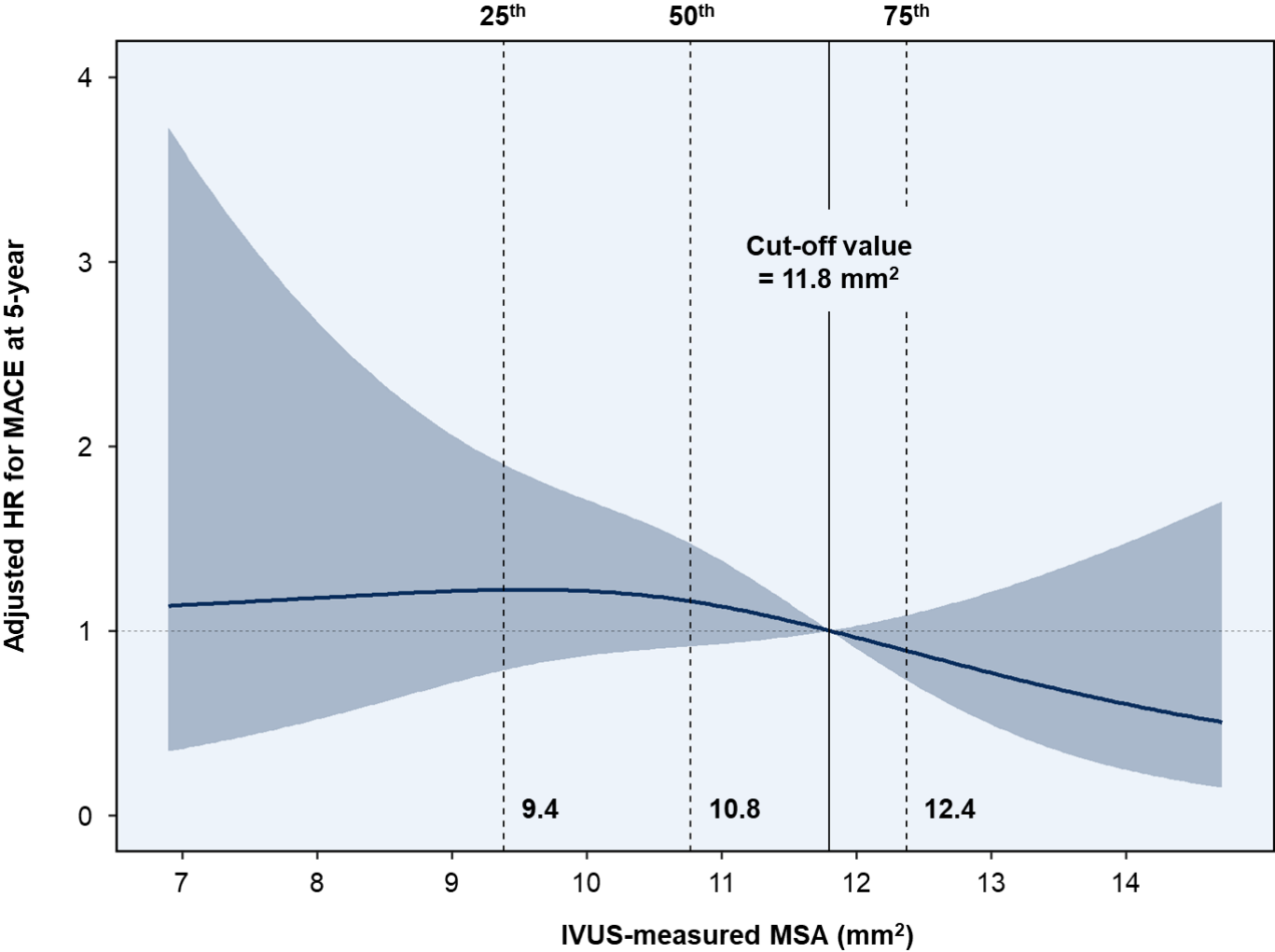
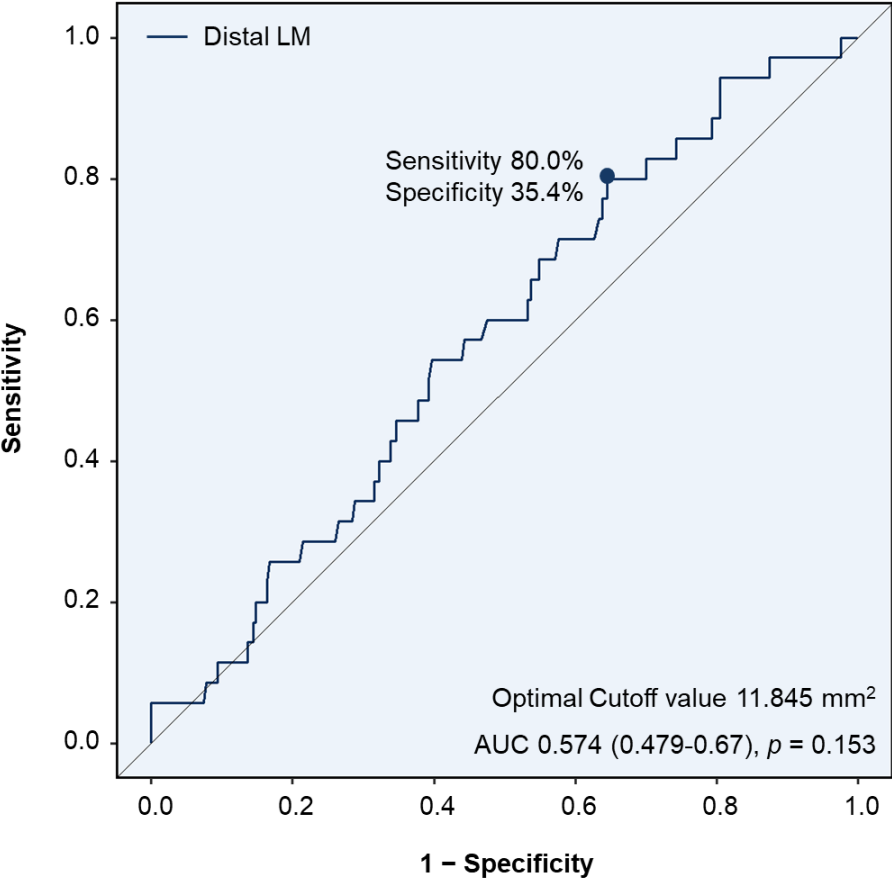
Distribution of MSA



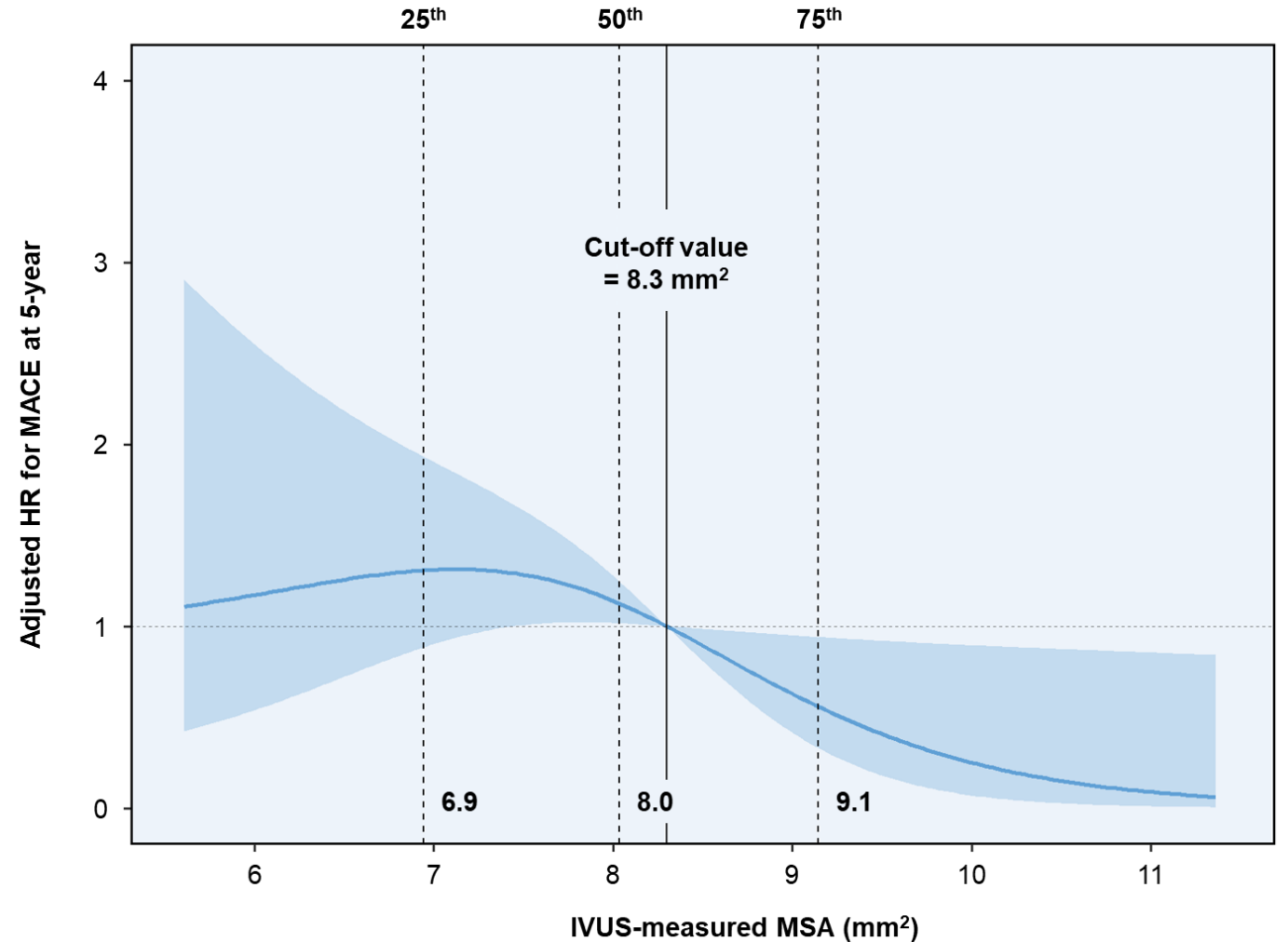
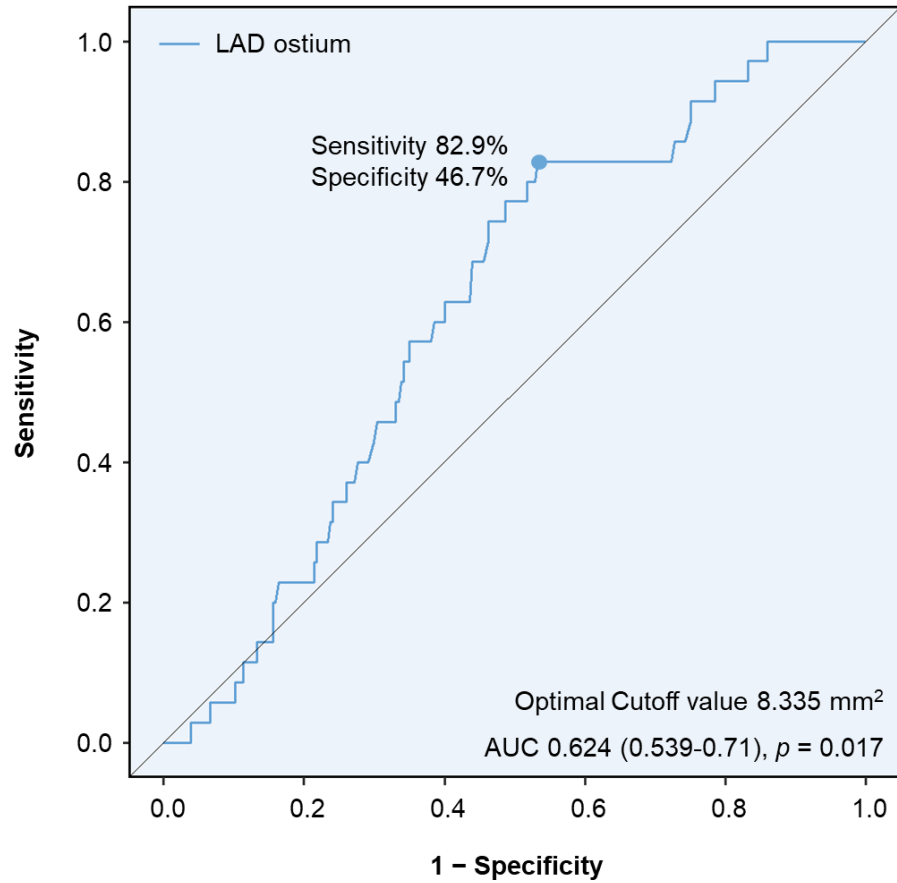
Distribution of MSA



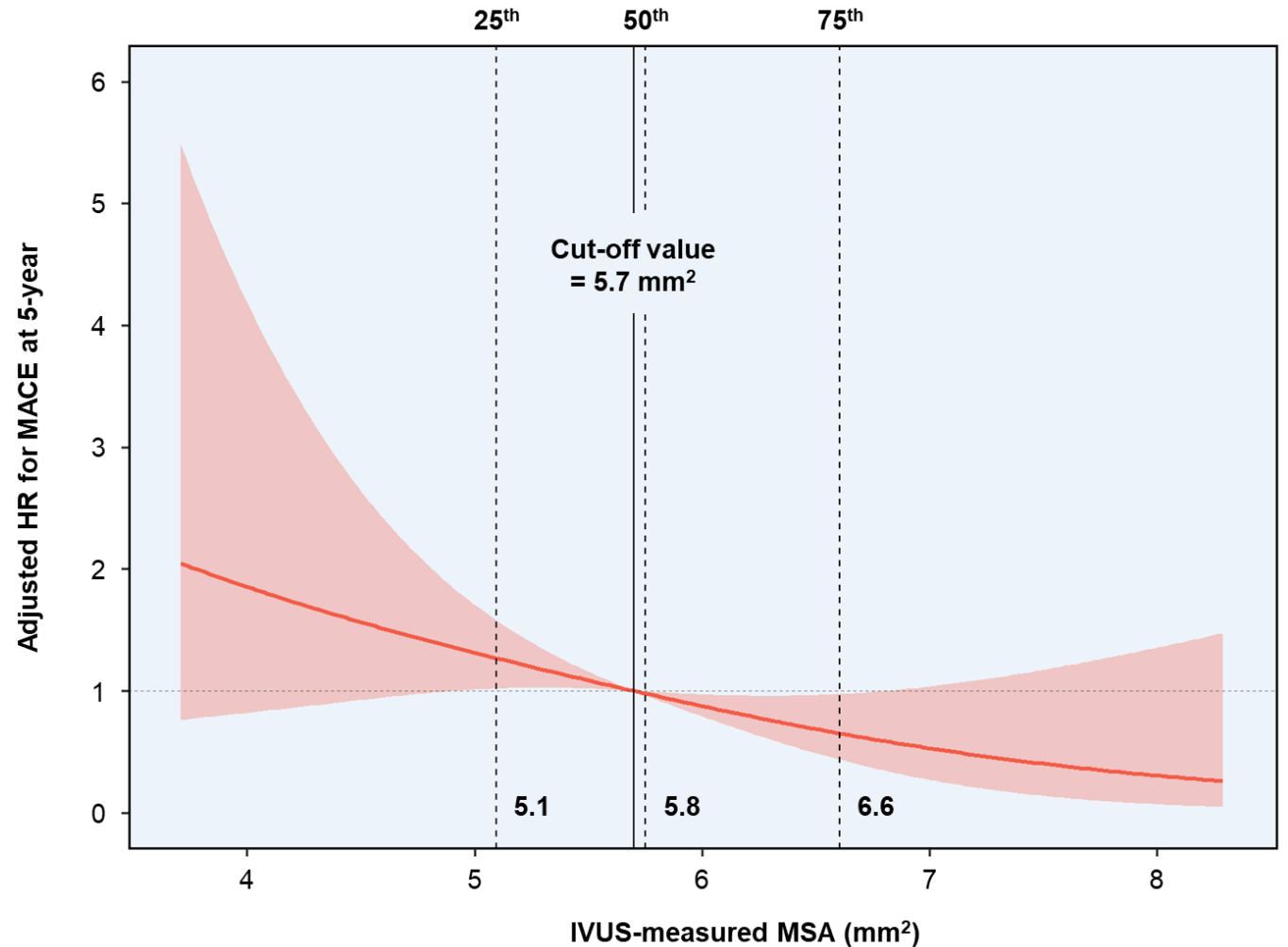
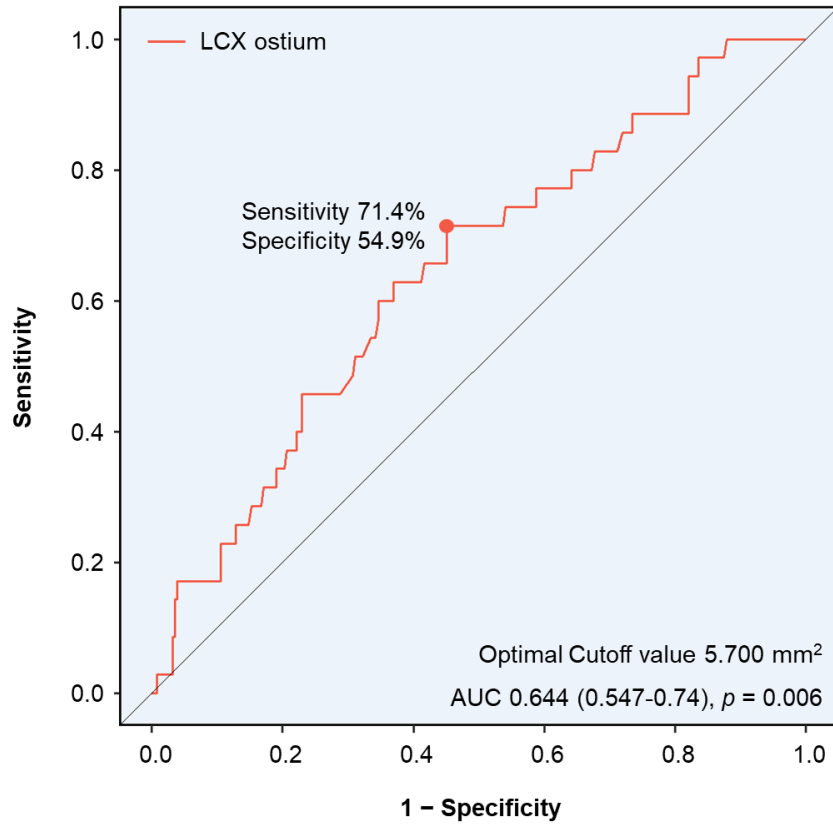
Relationship between distal LM MSA and MACEs



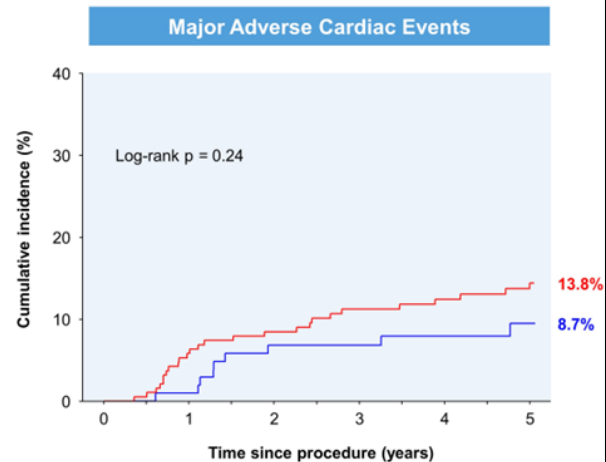
Relationship between LAD ostial MSA and MACEs



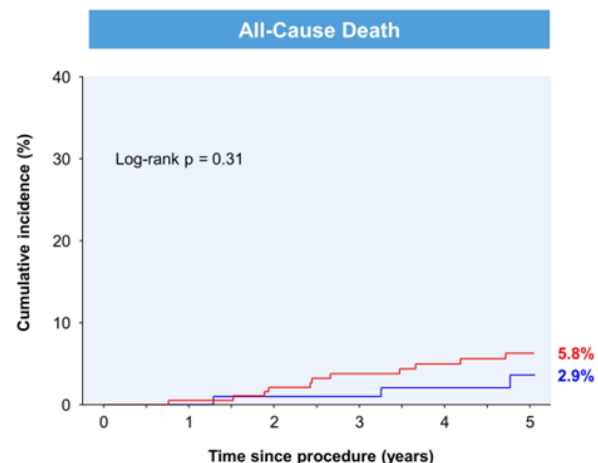
Relationship between **LCX ostial MSA** and **MACEs**



LM < 11.8 mm²: 64.7%

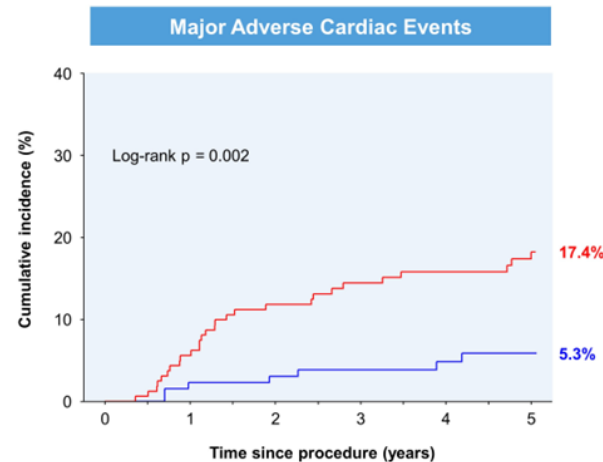


No. at risk	0	1	2	3	4	5
LM MSA < 11.8 mm ²	189	178	173	155	141	125
LM MSA ≥ 11.8 mm ²	103	102	94	87	67	56

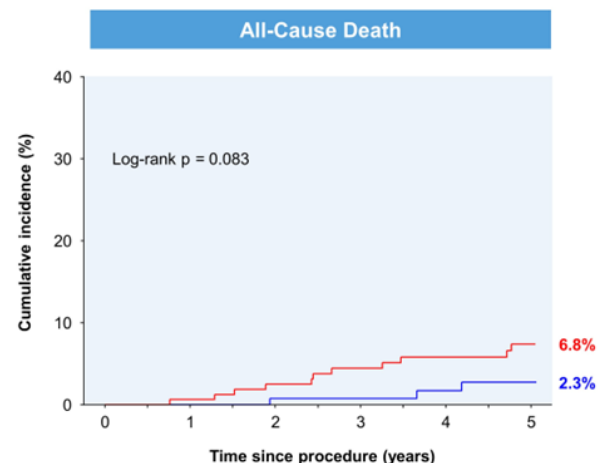


No. at risk	0	1	2	3	4	5
LM MSA < 11.8 mm ²	189	188	185	168	152	135
LM MSA ≥ 11.8 mm ²	103	103	100	93	72	60

LAD < 8.3 mm²: 55.1%

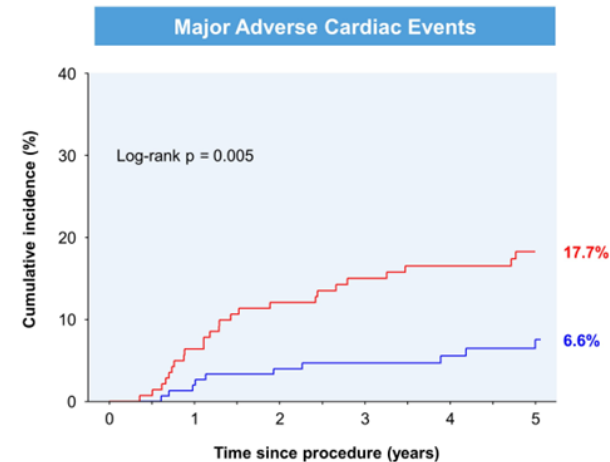


No. at risk	0	1	2	3	4	5
LAD MSA < 8.3 mm ²	161	152	142	128	114	98
LAD MSA ≥ 8.3 mm ²	131	128	125	114	94	83

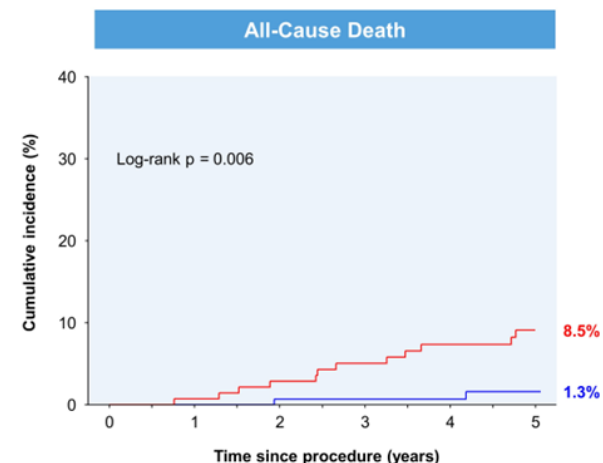


No. at risk	0	1	2	3	4	5
LAD MSA < 8.3 mm ²	161	160	157	143	128	111
LAD MSA ≥ 8.3 mm ²	131	131	128	118	96	84

LCX < 5.7 mm²: 48.3%

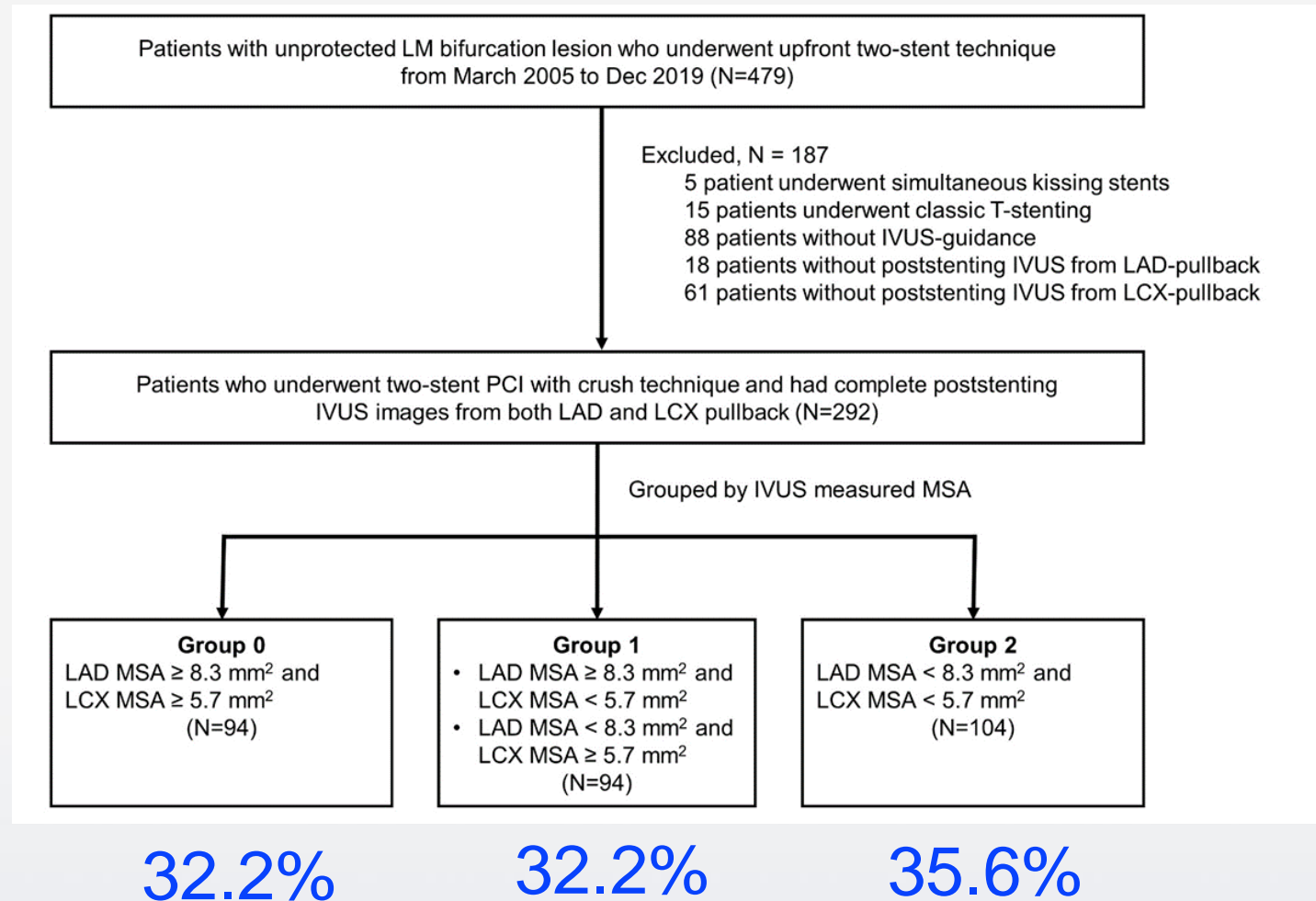


No. at risk	0	1	2	3	4	5
LCX MSA < 5.7 mm ²	141	132	124	114	103	93
LCX MSA ≥ 5.7 mm ²	151	148	143	128	105	88



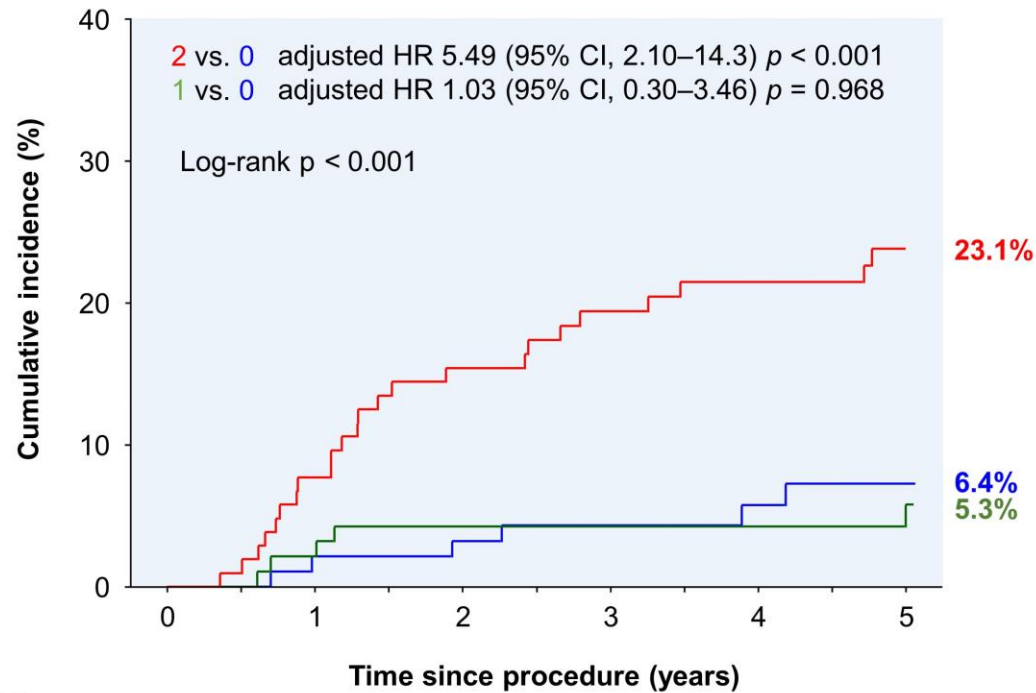
No. at risk	0	1	2	3	4	5
LCX MSA < 5.7 mm ²	141	140	137	127	114	103
LCX MSA ≥ 5.7 mm ²	151	151	148	134	110	92

Incidence of Under-expansion of LM Segments and Outcomes



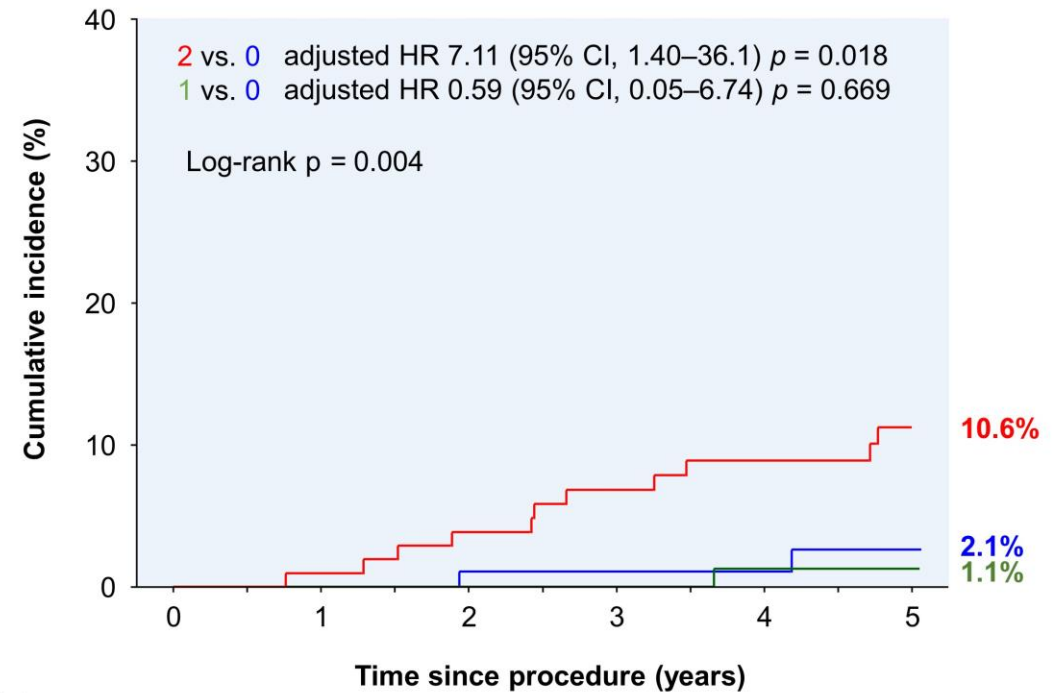
Incidence of Under-expansion of LM Segments and Outcomes

Major Adverse Cardiac Events



No. at risk		0	1	2	3	4	5
—	Group 2	104	96	88	79	73	64
—	Group 1	94	92	90	84	71	63
—	Group 0	94	92	89	79	64	54

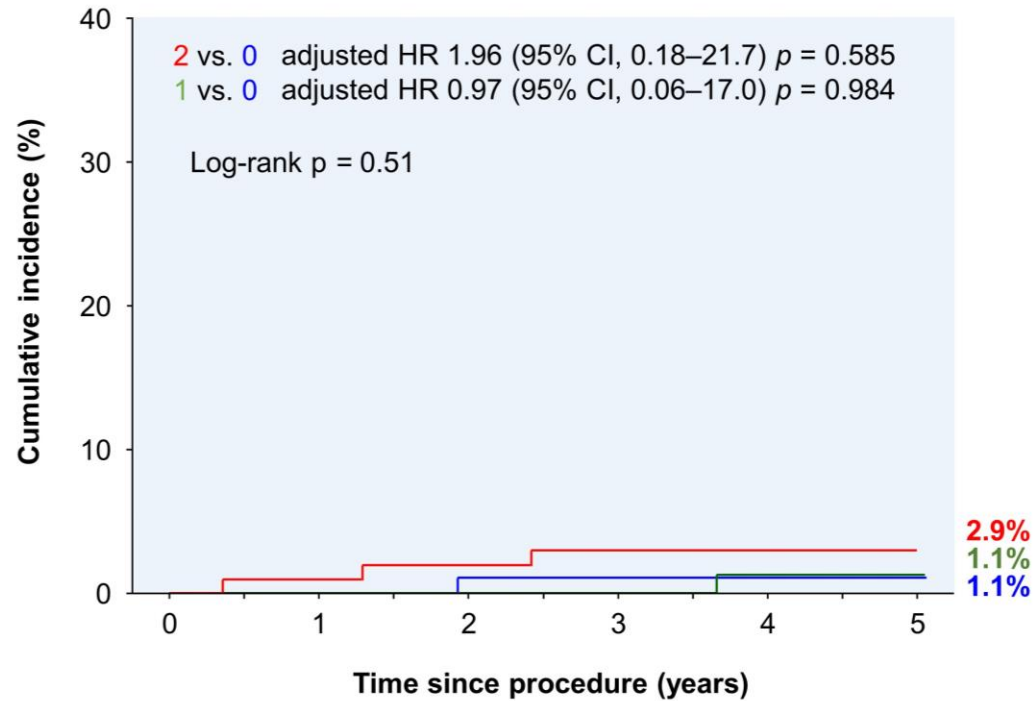
All-Cause Death



No. at risk		0	1	2	3	4	5
—	Group 2	104	103	100	91	84	74
—	Group 1	94	94	94	88	74	66
—	Group 0	94	94	91	82	66	55

Incidence of Under-expansion of LM Segments and Outcomes

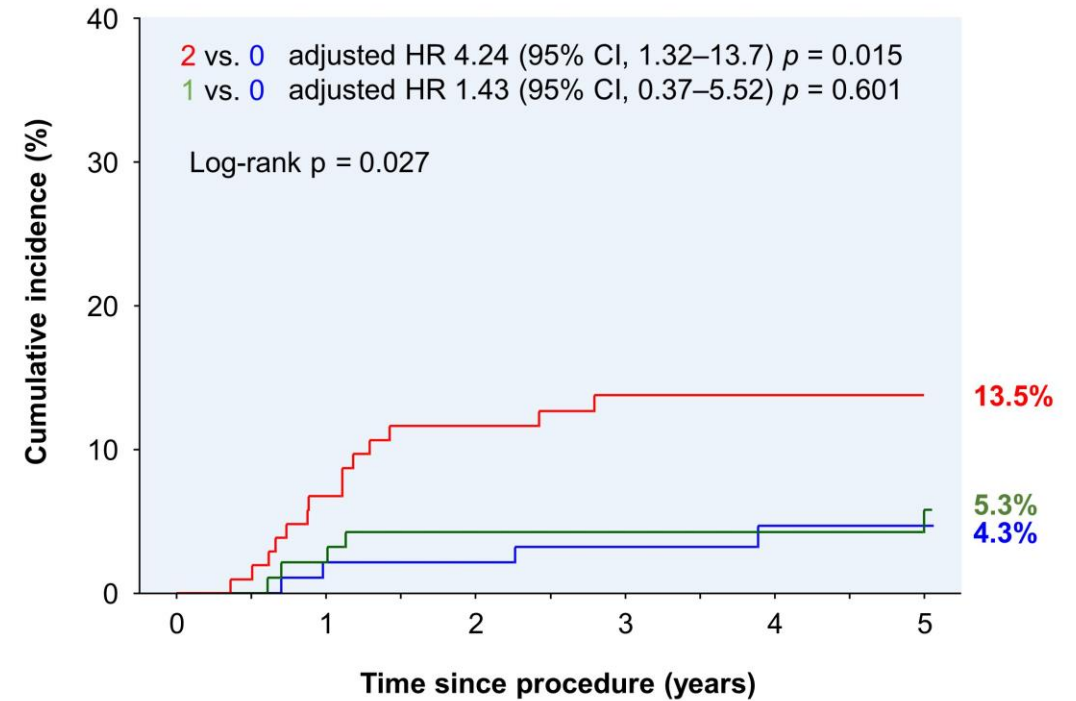
Myocardial Infarction



No. at risk

— Group 2	104	102	98	89	82	72
— Group 1	94	94	94	88	74	66
— Group 0	94	94	90	81	65	54

Target Lesion Revascularization



No. at risk

— Group 2	104	96	88	79	73	64
— Group 1	94	92	90	84	71	63
— Group 0	94	92	90	80	65	55

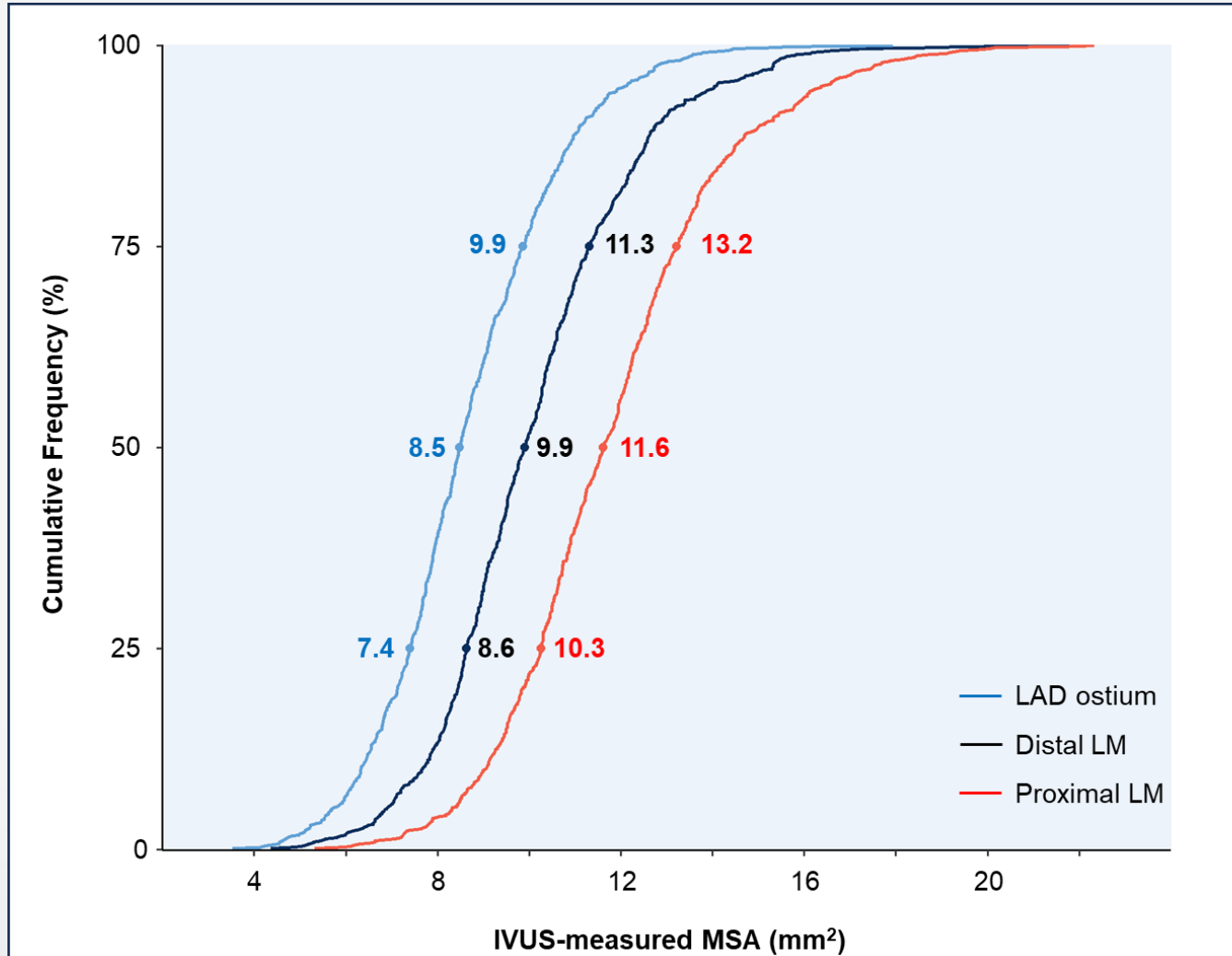
- How to Optimize the LM Stent Results?

Provisional Stenting

Methods

- We identified 879 consecutive patients with LM bifurcation stenosis who were treated using **single-stent crossover** stenting with 2nd generation DES at **Asan Medical Center** between March 2005 and September 2022.
- MSA within the ostial LAD, distal LM, and distal and proximal segment of the stent.
- 5-year MACE, including **all-cause death, myocardial infarction, and target lesion revascularization** related to LM stenosis.

IVUS-measured Minimal Stent Area

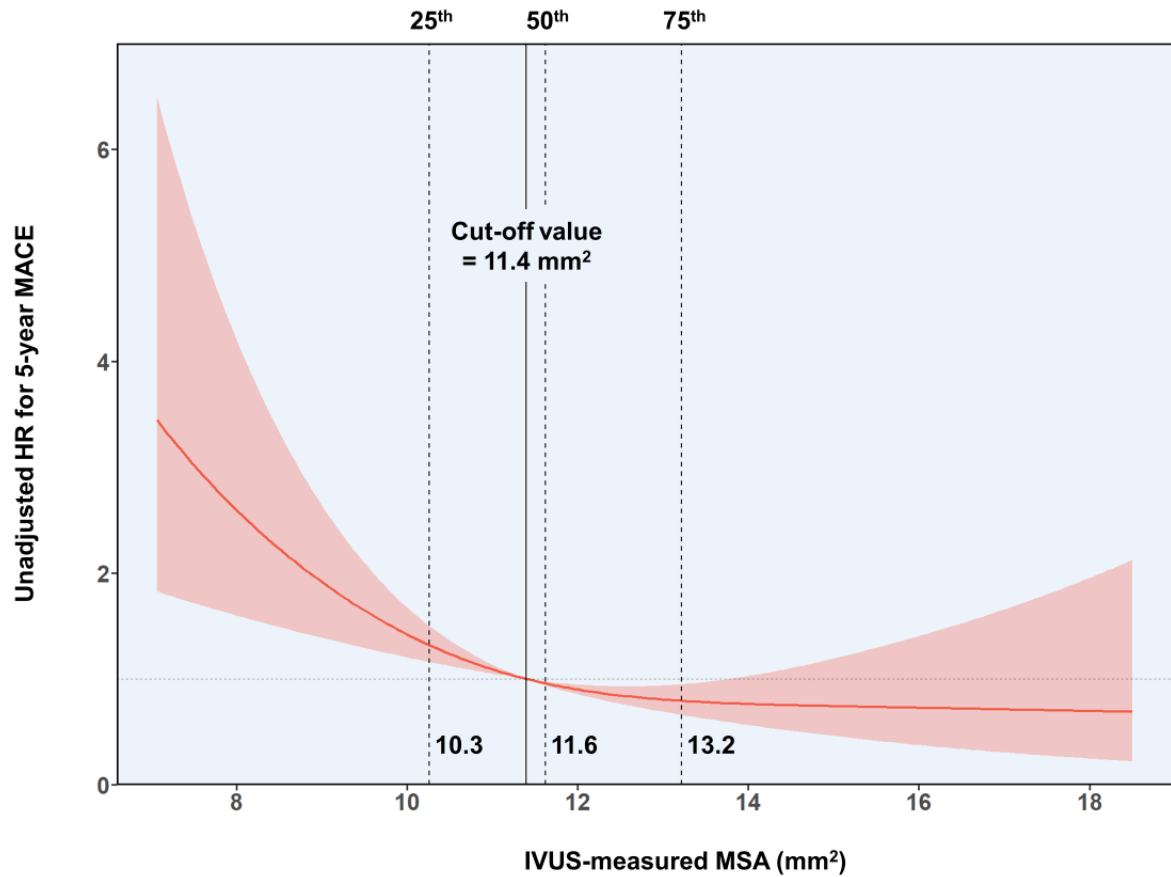


- N = 829
- 64.2 ± 10.2 years
- Male, 655 (79.0%)
- Diabetes, 295 (35.6%)

Proximal LM Minimal Stent Area (**11.4mm²**)

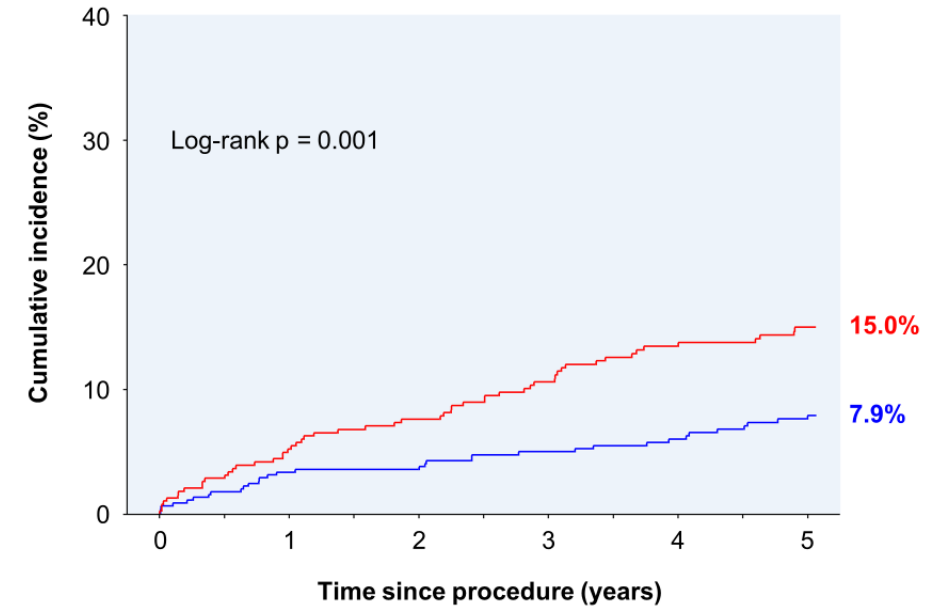
A

Proximal LM



A

Major Adverse Cardiac Events

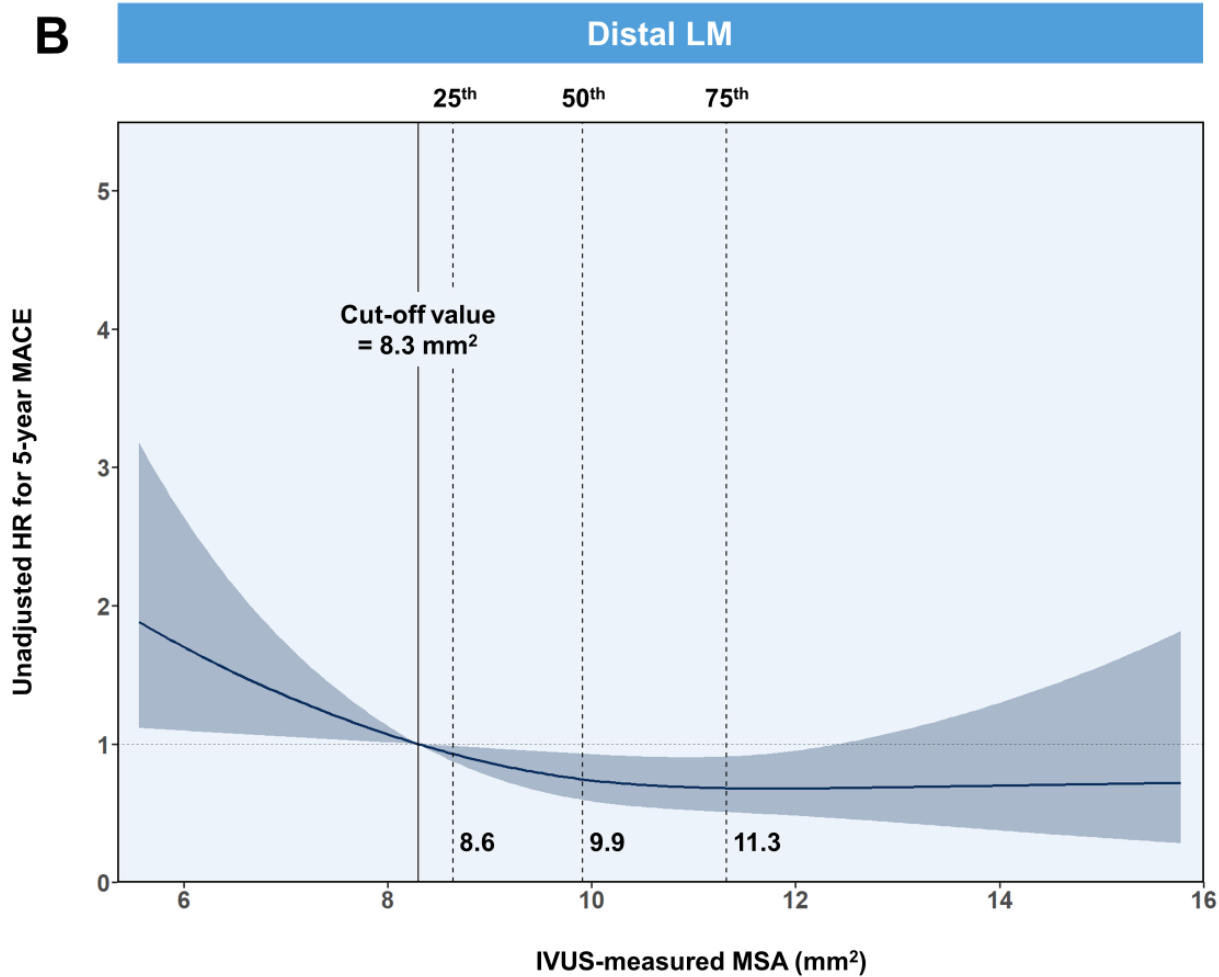


No. at risk

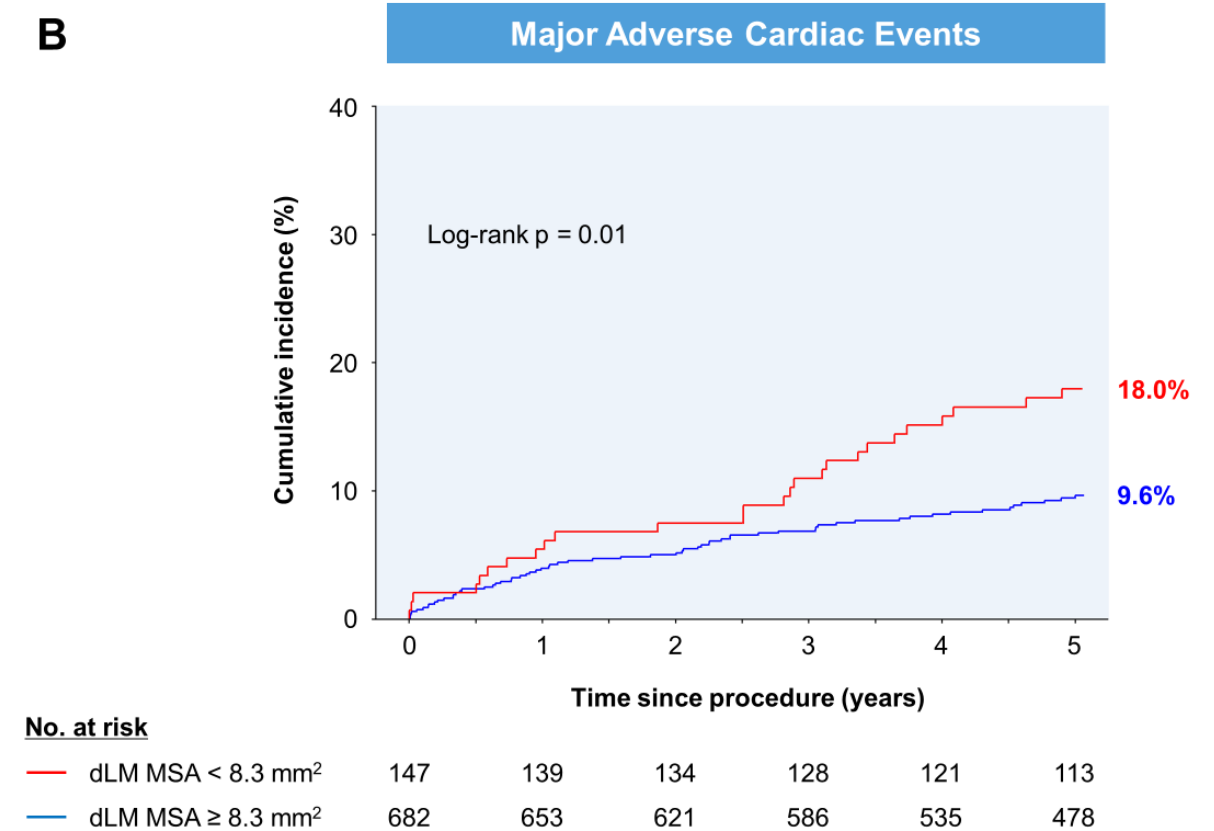
pLM MSA < 11.4 mm ²	383	363	340	322	294	269
pLM MSA ≥ 11.4 mm ²	446	429	415	392	362	322

Distal LM Minimal Stent Area (8.3mm^2)

B

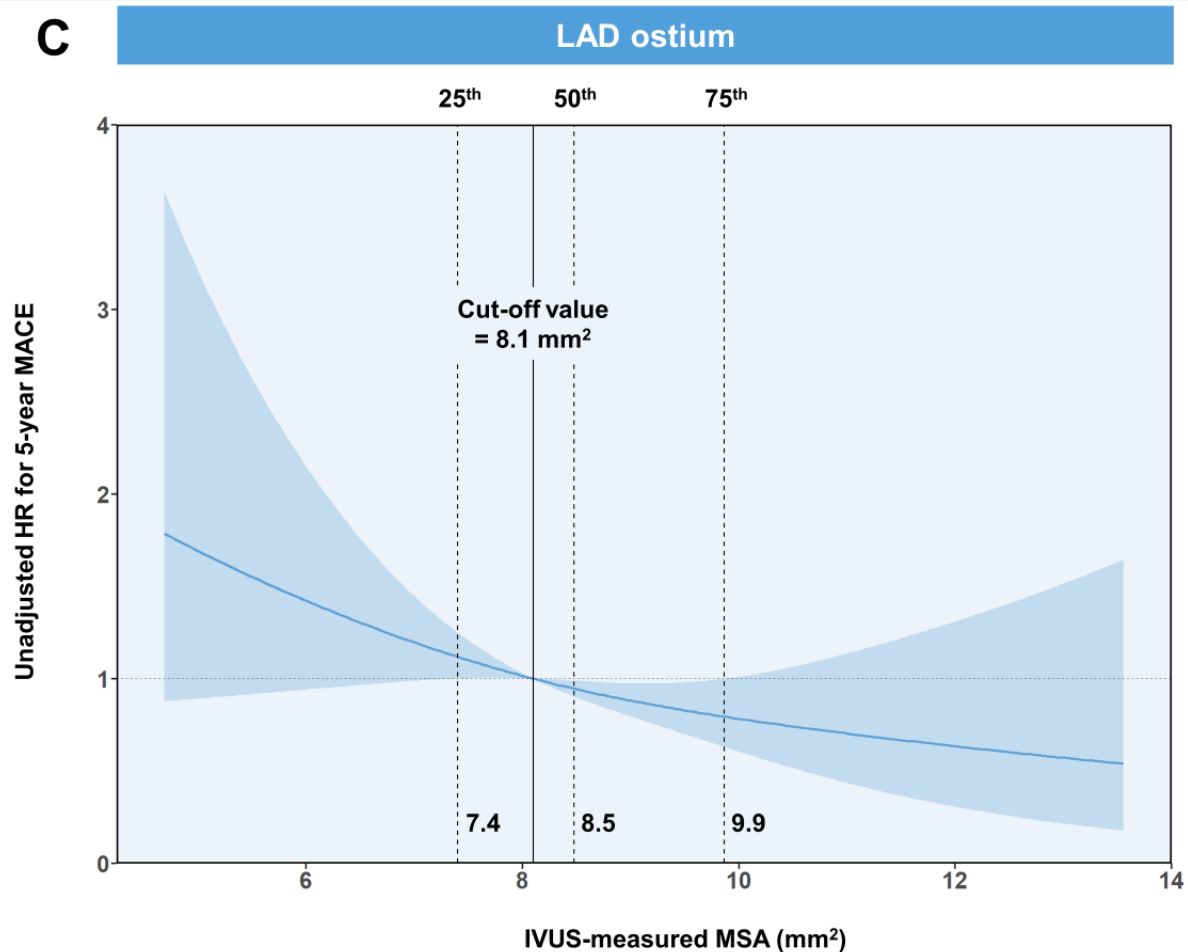


B

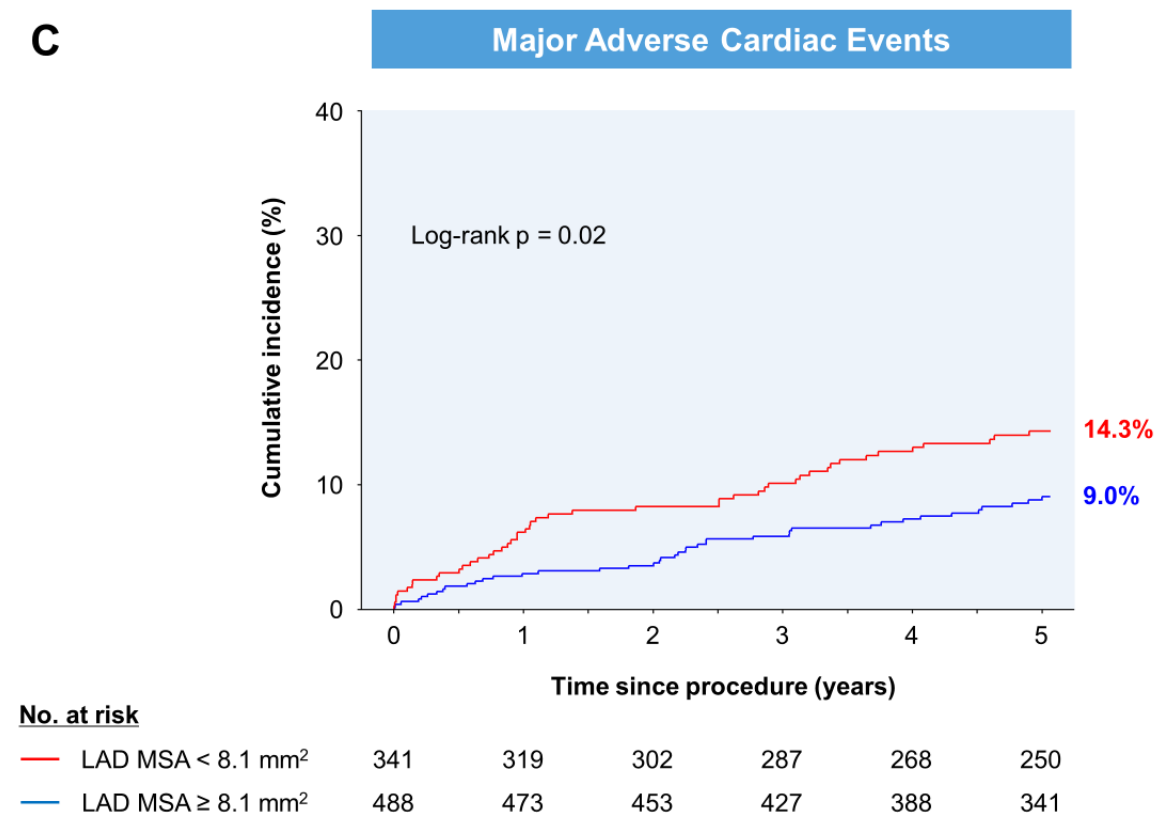


LAD Ostium Minimal Stent Area (**8.2mm²**)

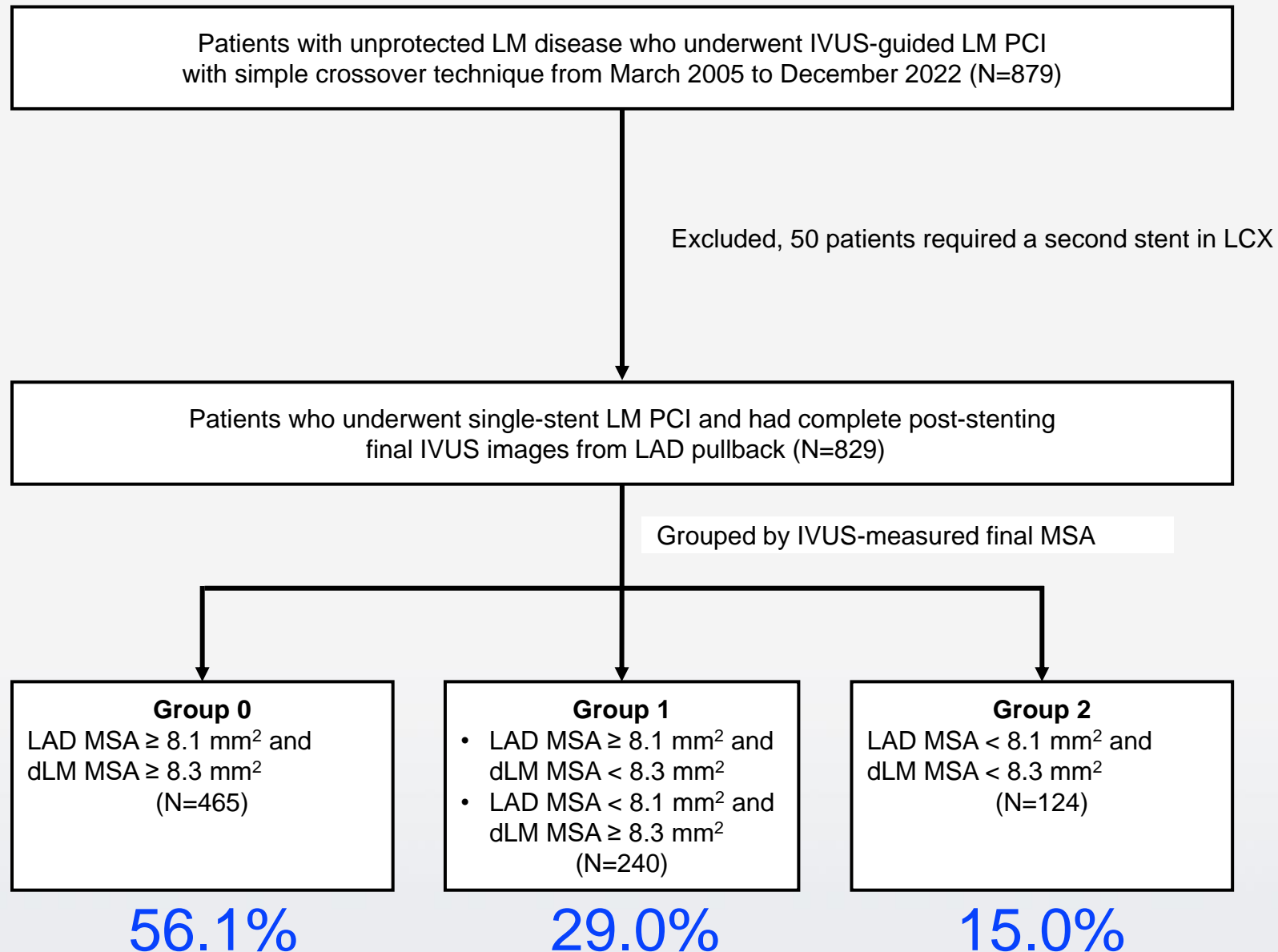
C



C



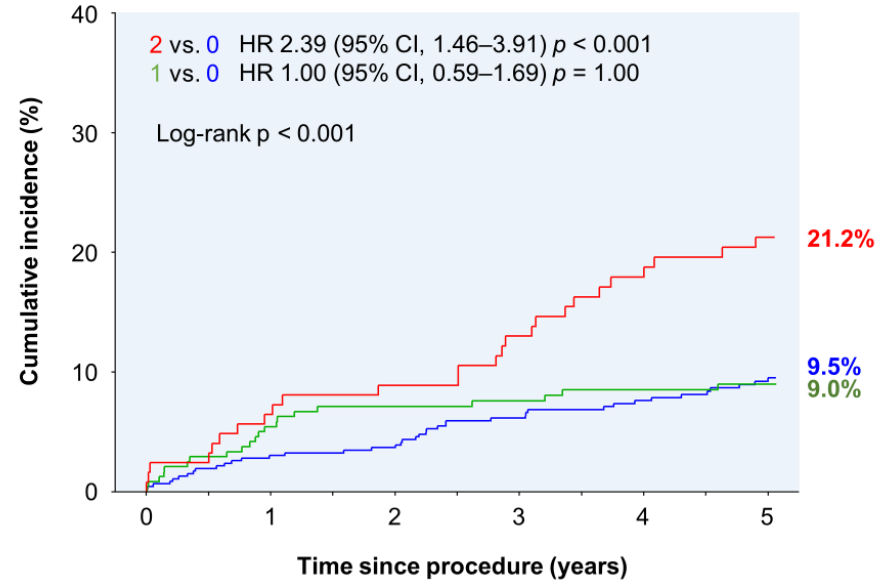
Incidence of Under-expansion of LM Segments and Outcomes



Incidence of Under-expansion of LM Segments and Outcomes

A

Major Adverse Cardiac Events

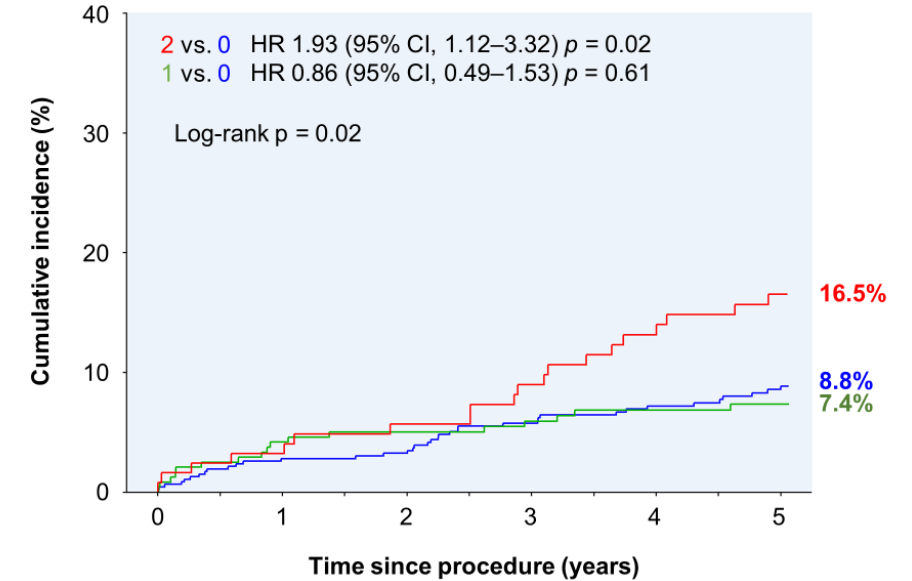


No. at risk

— Group 2	124	116	111	106	99	92
— Group 1	240	226	214	203	191	179
— Group 0	465	450	430	405	366	320

B

All-Cause Death

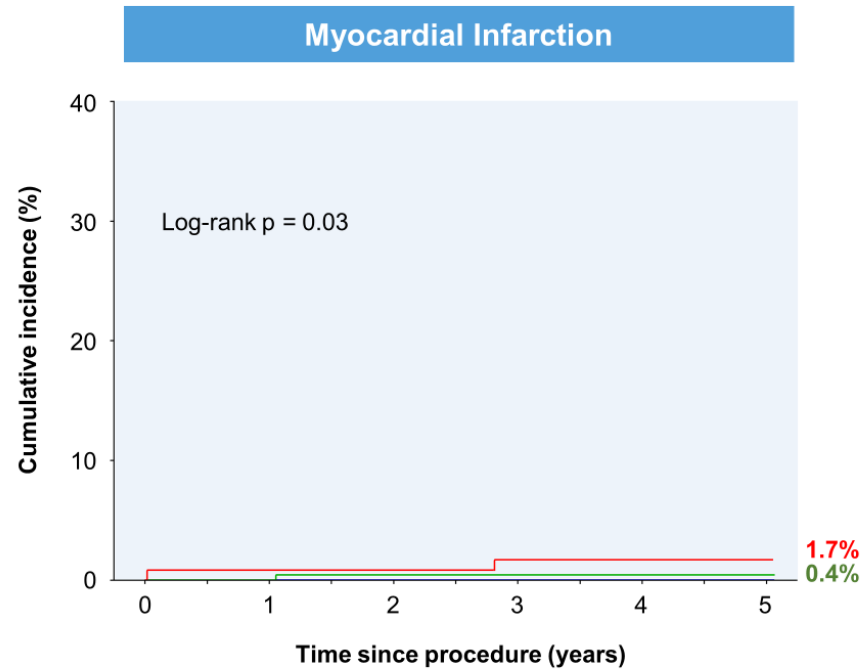


No. at risk

— Group 2	124	120	114	110	103	96
— Group 1	240	229	218	206	194	182
— Group 0	465	451	432	405	366	320

Incidence of Under-expansion of LM Segments and Outcomes

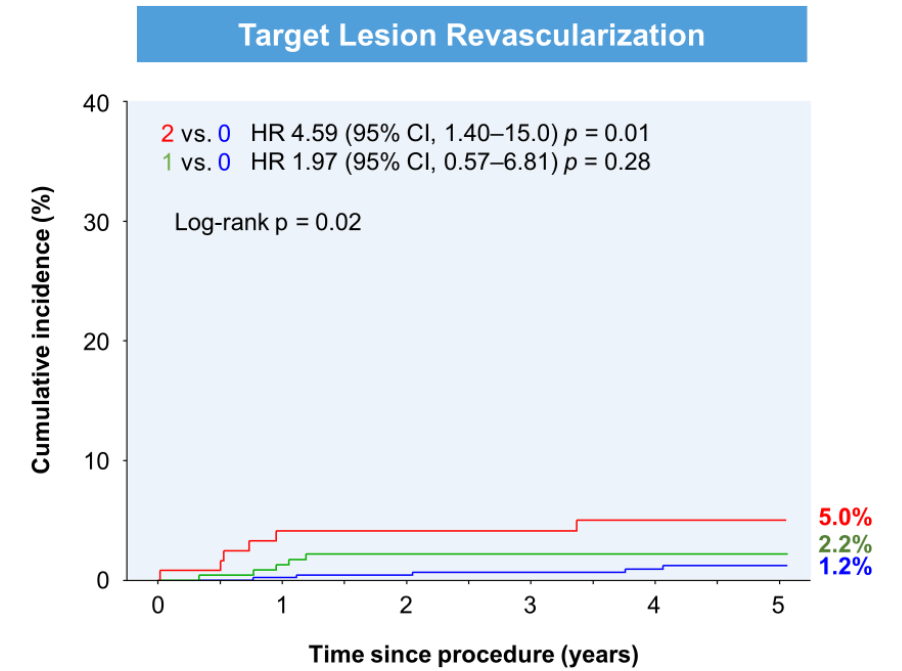
C



No. at risk

— Group 2	124	120	114	109	102	95
— Group 1	240	229	217	205	193	181
— Group 0	465	451	432	405	366	320

D

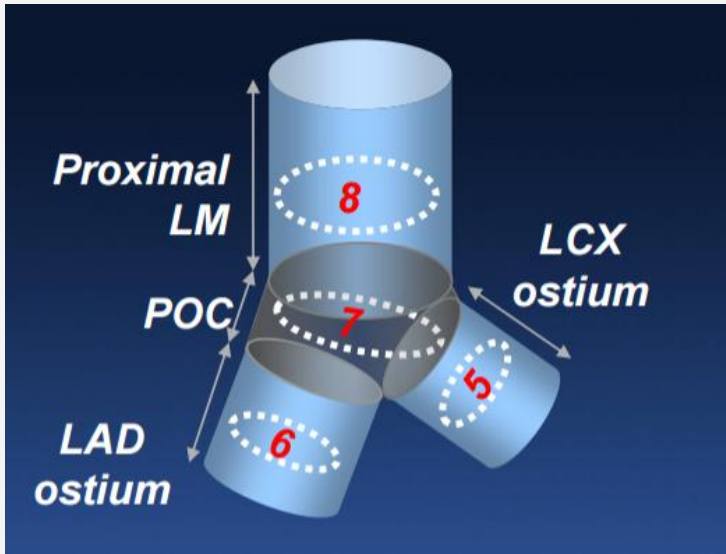


No. at risk

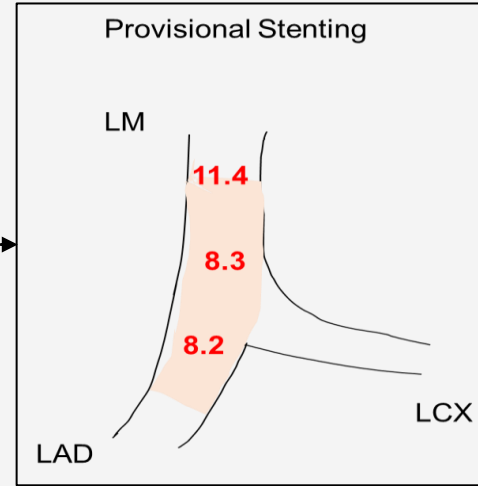
— Group 2	124	116	111	107	100	93
— Group 1	240	226	214	203	191	179
— Group 0	465	450	430	405	366	320

New IVUS MSA for LM Bifurcation Stenting

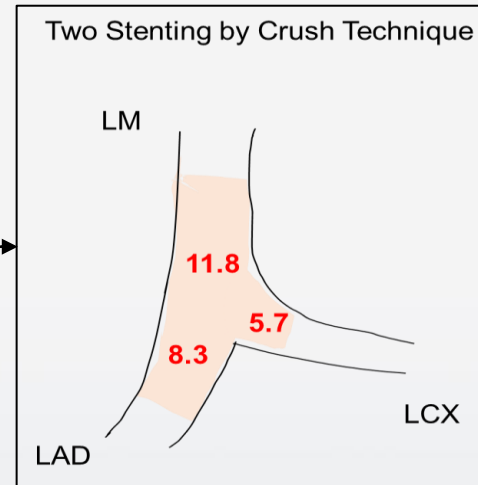
9 Mo ISR



One stenting



Two stenting



5 Year MACE

“5-6-7-8”



“6-8-11”

Summary

- Intracoronary Imaging has an important roles in LM PCI optimization.
- Imaging itself is not associated with better outcomes. Additional effort for more optimal stenting based on coronary imaging may lead to better stent and patients' outcomes.
- “5-6-7-8” was based on 9 months ISR, and would be minimal requirement.
- New criteria “6-8-11” was based on the 5 year-MACE, would be the target goal to achieve.