

Relationship Between FFR and Clinical Outcomes ; *Data from IRIS-FFR Registry*

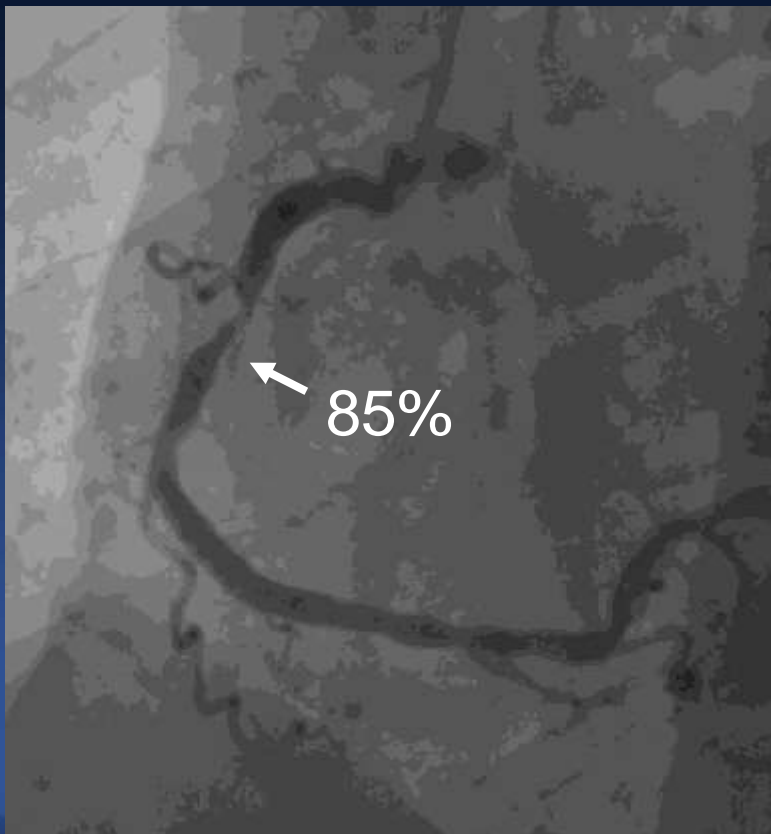
Seung-Jung Park, MD, PhD

Professor of Medicine, University of Ulsan College of Medicine,
Heart Institute, Asan Medical Center, Seoul, Korea

Defer !

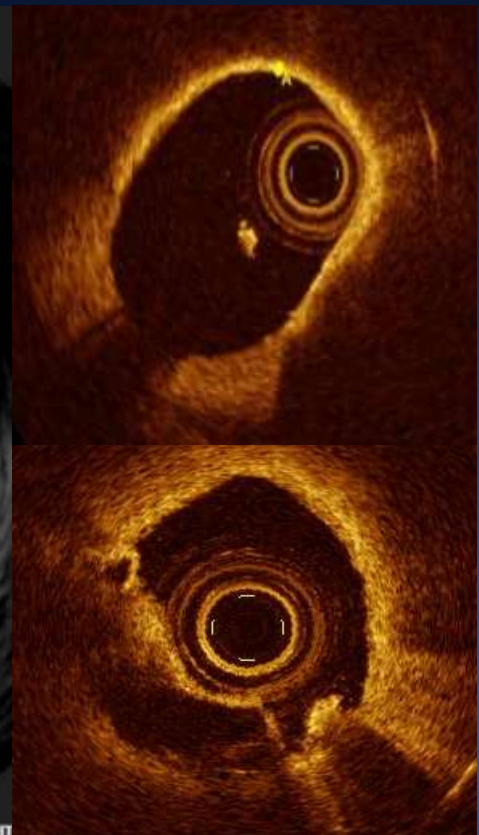
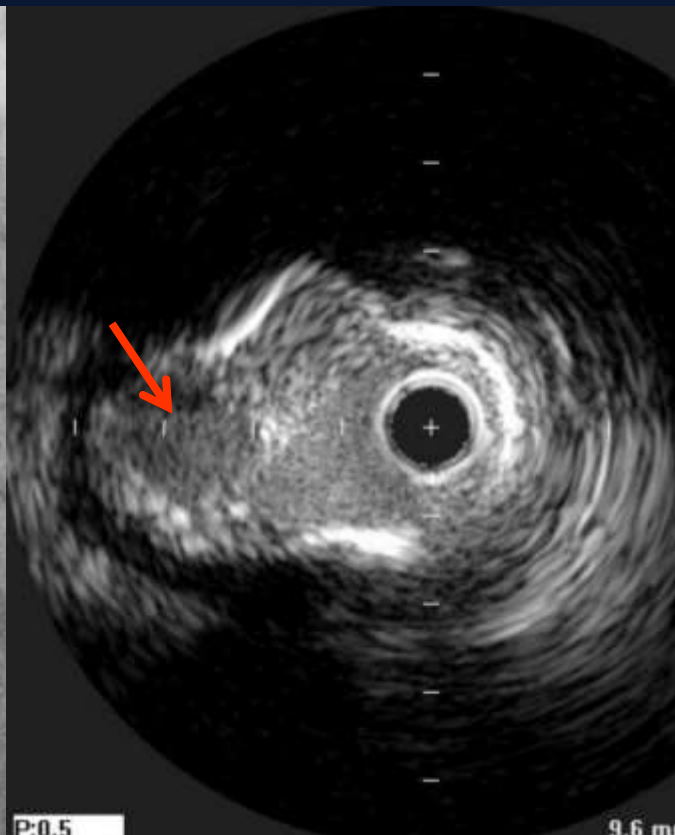
Tight Stenosis

Negative FFR, 0.84



Ruptured Plaque

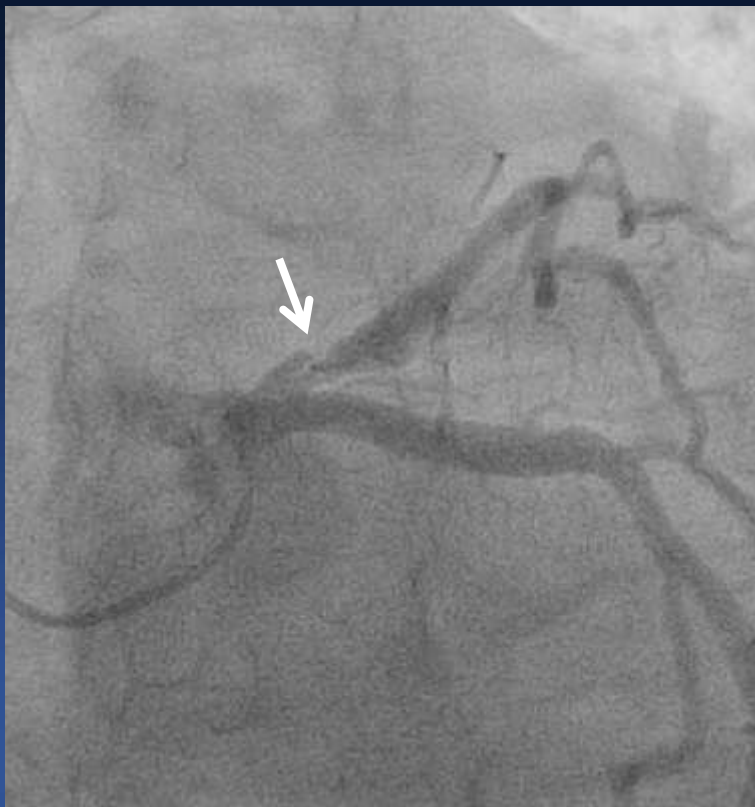
Rupture and Thrombus



Defer !

Vulnerable Plaque

Negative FFR, 0.89



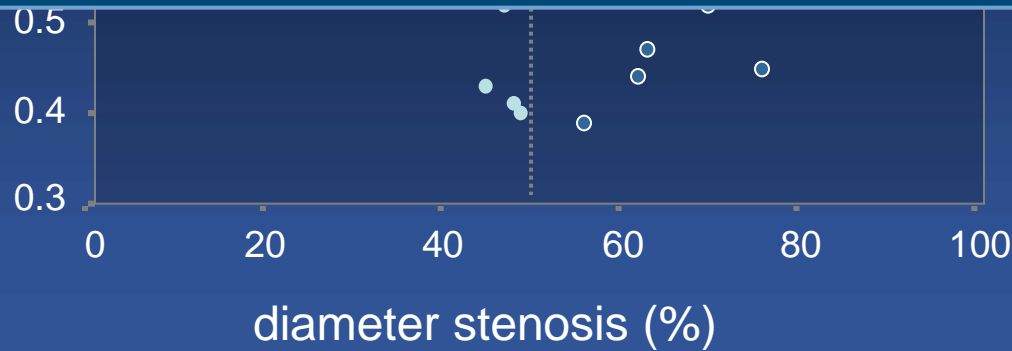
1066 Non-LM lesions, AMC data



We Just Defer !

Even in the Presence of Any Angiographically Proven Coronary Artery Disease.

non-significant
stenosis,
Positive FFR

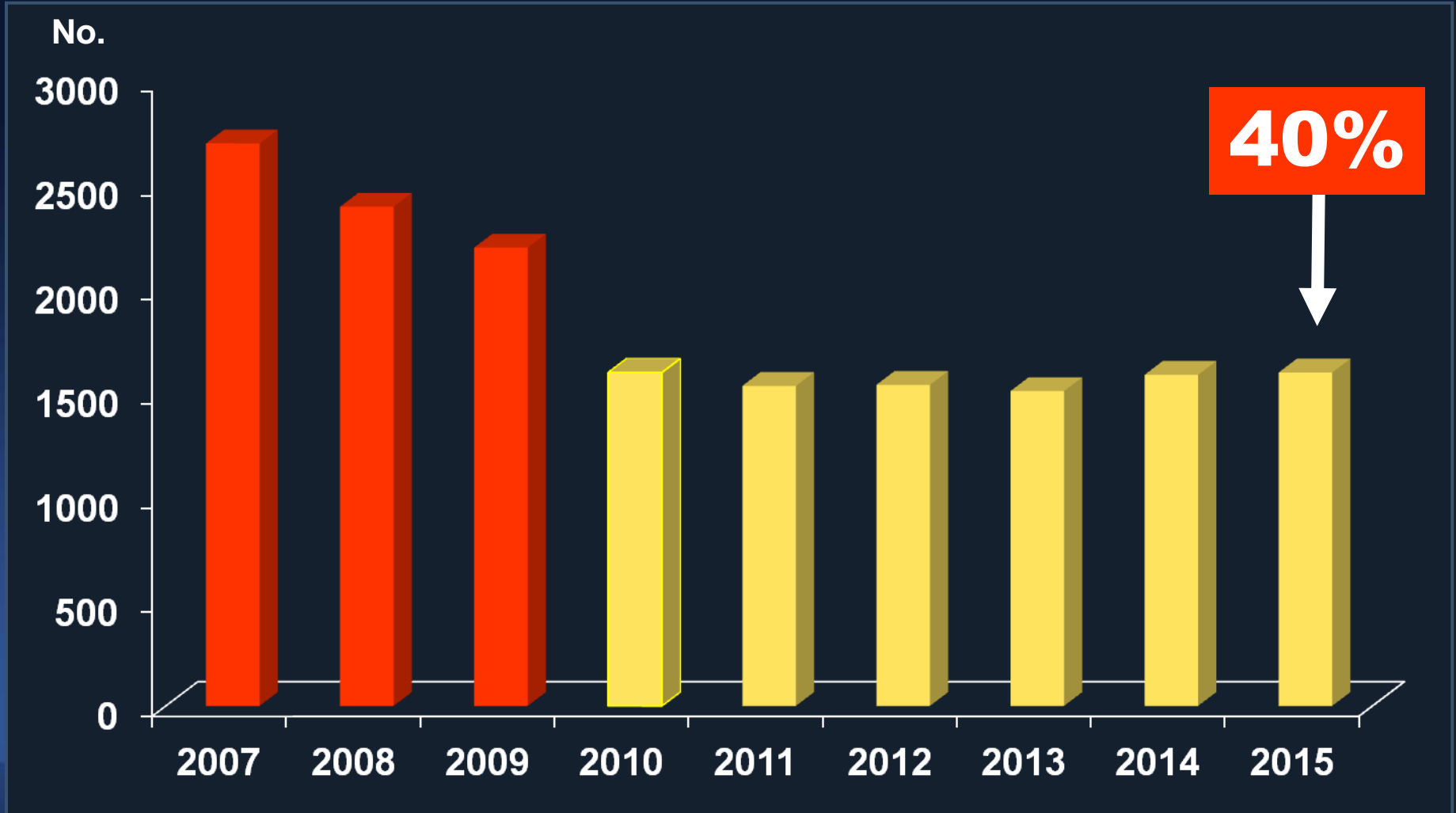


2013, ESC Guidelines

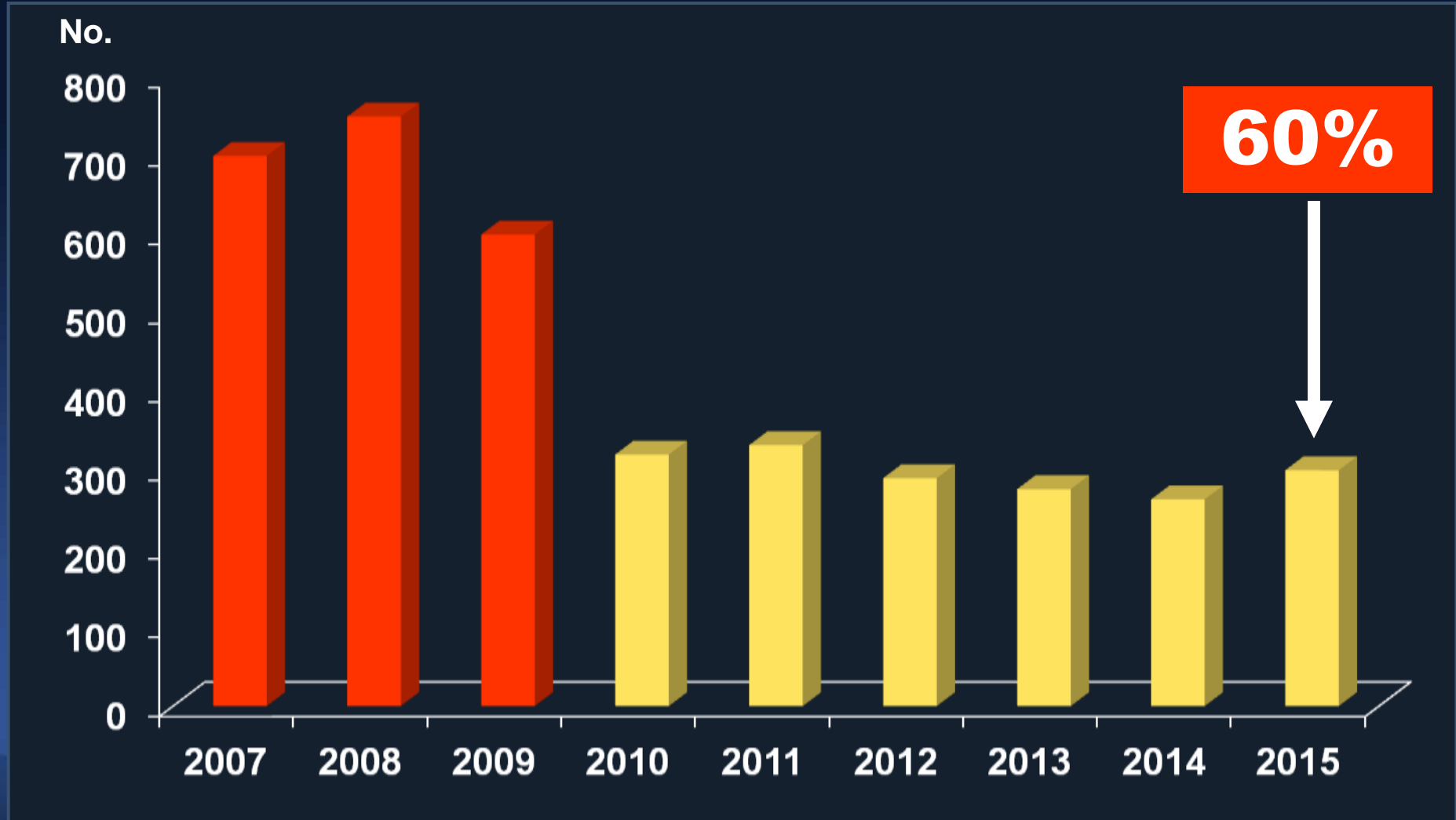
Recommendations	Class	Level
FFR is recommended to identify hemodynamically relevant coronary lesion(s) when evidence of ischemia is not available.	I	A
Revascularization of stenosis with FFR <0.80 is recommended in patients with angina symptoms or a positive stress test.	I	B
Revascularization of an angiographically intermediate stenosis without related ischemia or without FFR <0.80 is not recommended.	III	B

Impact of FFR In Real Practice

Our Practice Has Been Changed, PCI Decreased

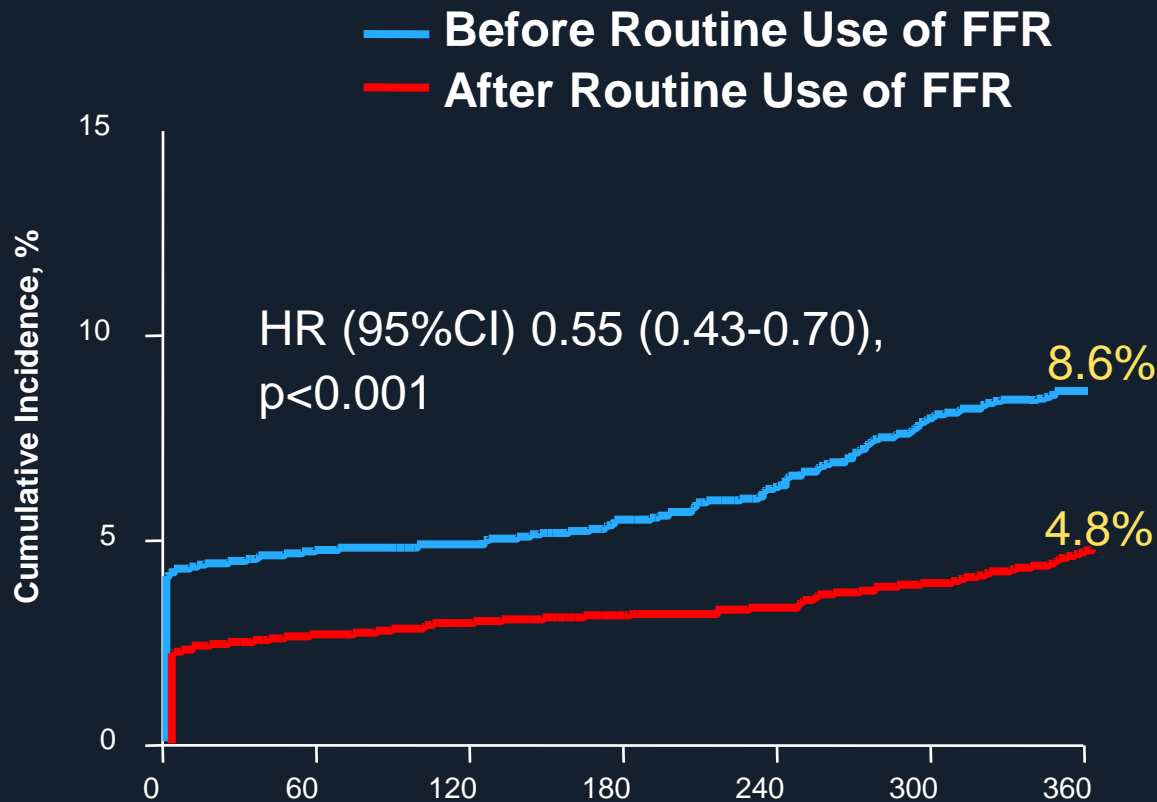


Our Practice Has Been Changed, CABG Decreased



PCI Outcomes

(Death, MI, or Repeat Revascularization)



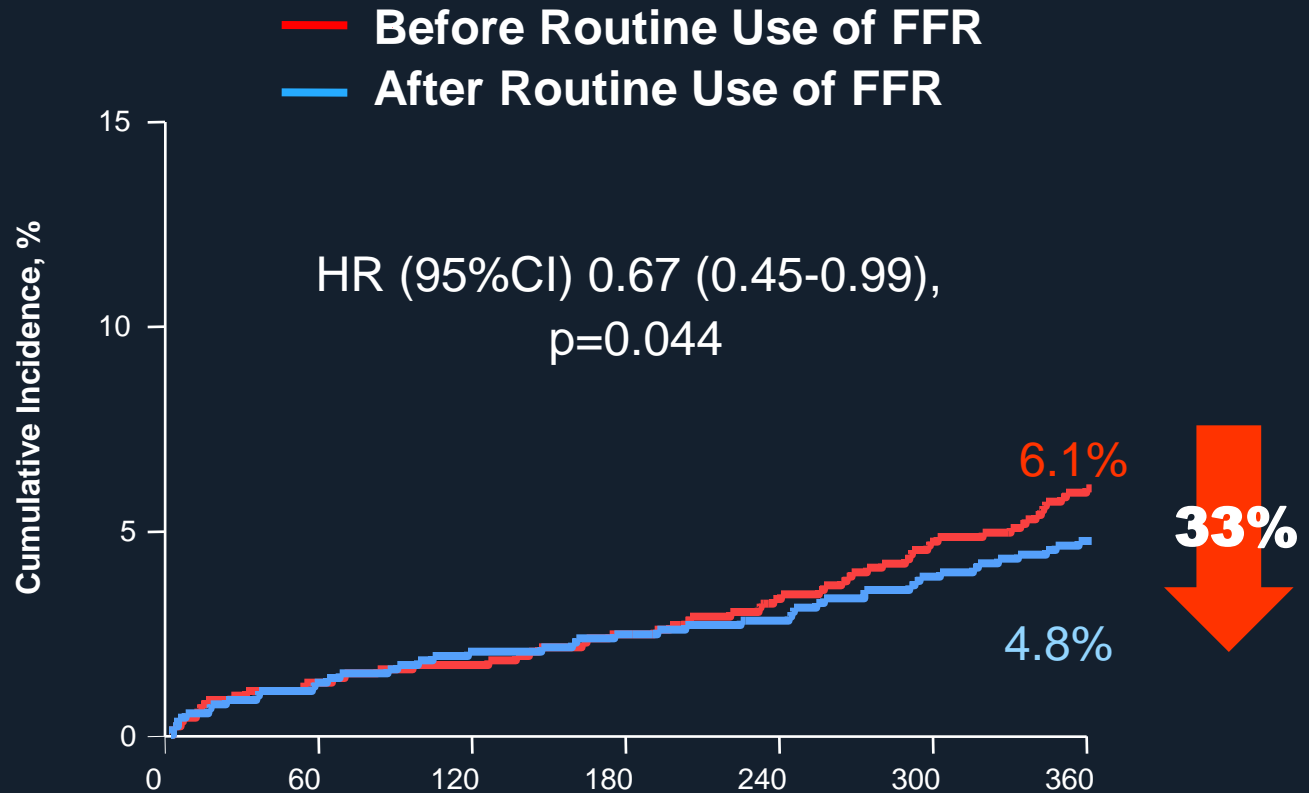
No. at Risk

	Days Since Procedure			
	0	60	180	360
Before Routine Use	2178	2066	2011	1960
After Routine Use	2178	2092	2067	2037

Propensity Score Matched Population

LM and 3 VD Treatment

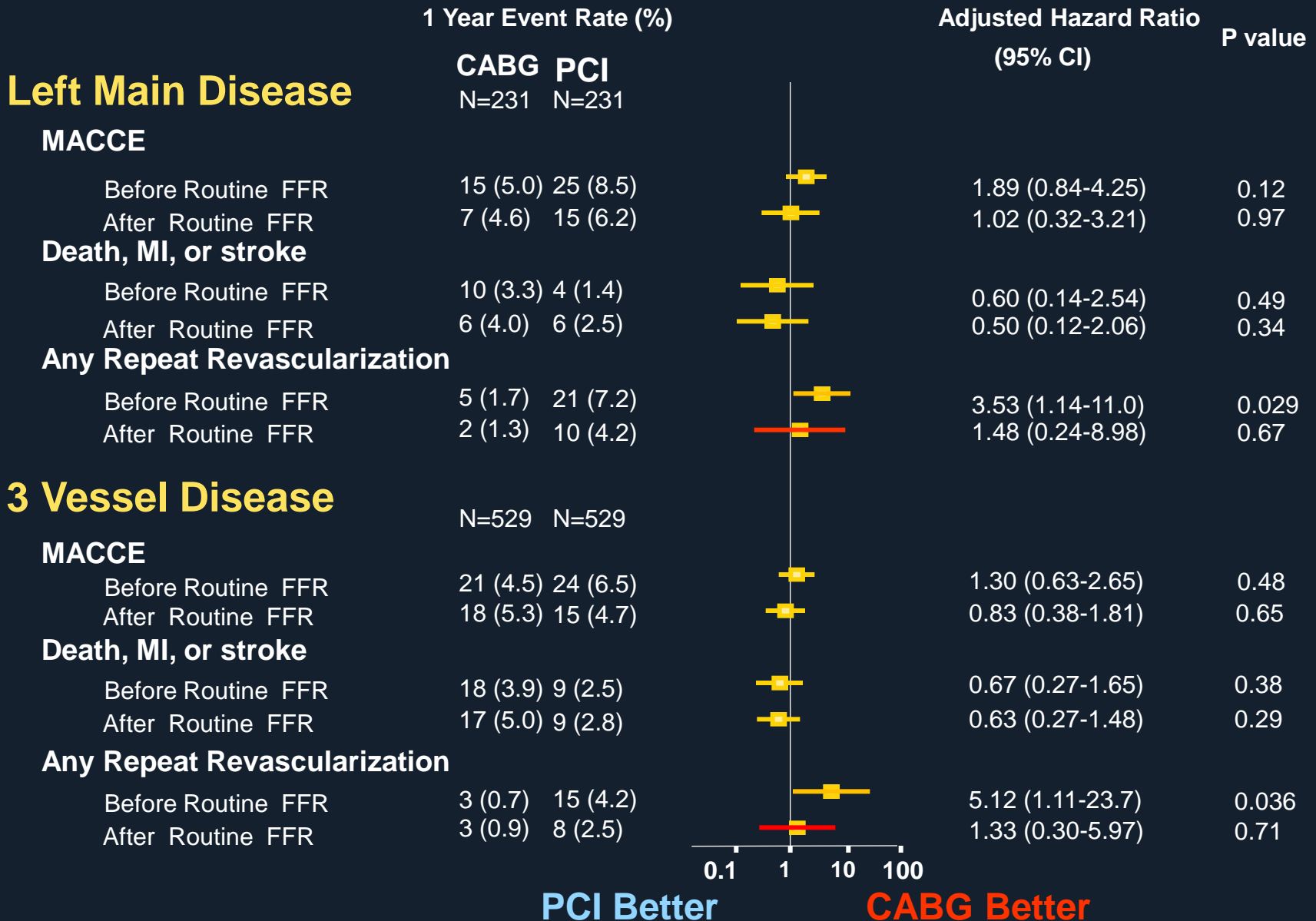
(Death, MI, Stroke or Repeat Revascularization)



No. at Risk

	0	60	120	180	240	300	360
Before Routine Use	917	901	883	857			
After Routine Use	917	898	886	869			

Subgroup Analysis



Impact of FFR, Summary

- 1. Overall clinical outcomes were improved after the routine use of FFR mainly due to reduced rate of repeat revascularization of PCI outcomes.*
- 2. FFR guided PCI showed similar clinical outcomes with concurrent CABG at 1 year.*

Is Deferral Really Safe ?

*The Natural History of FFR-Guided Coronary Intervention
Multicenter, Prospective Registry to Evaluate*

IRIS FFR Registry

Patients, N=10,000
with ≥ 1 FFR evaluated Lesions

Clinical Study
(N=10,000)

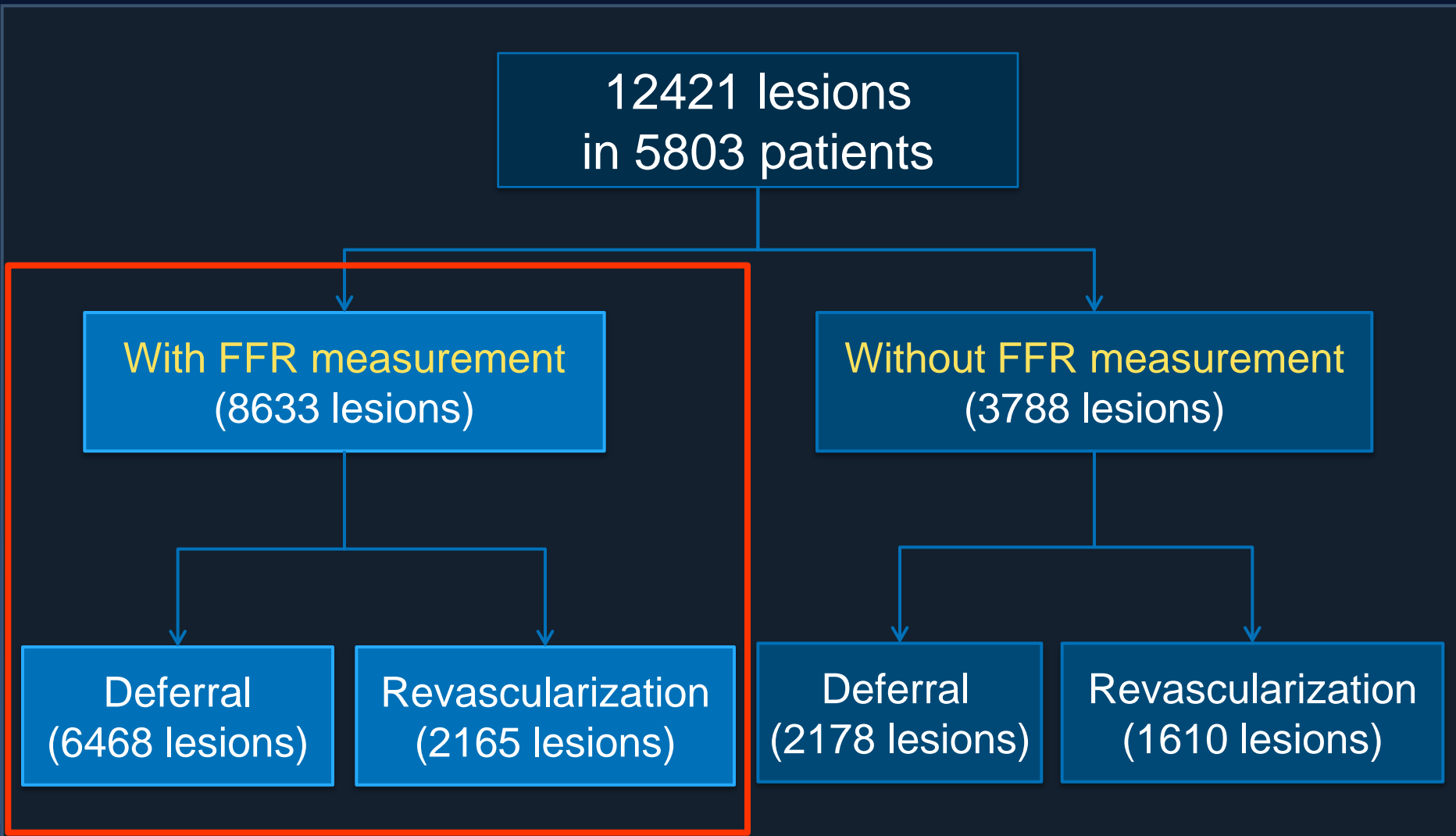
2 Years
Clinical F/U

Imaging Study
(n=1,200)

2 Years*
Imaging F/U
(IVUS, VH-
IVUS and OCT)

Primary Endpoint : 2 year TVF,
Target vessel related Cardiac Death, MI, and TVR

Lesion Treatment

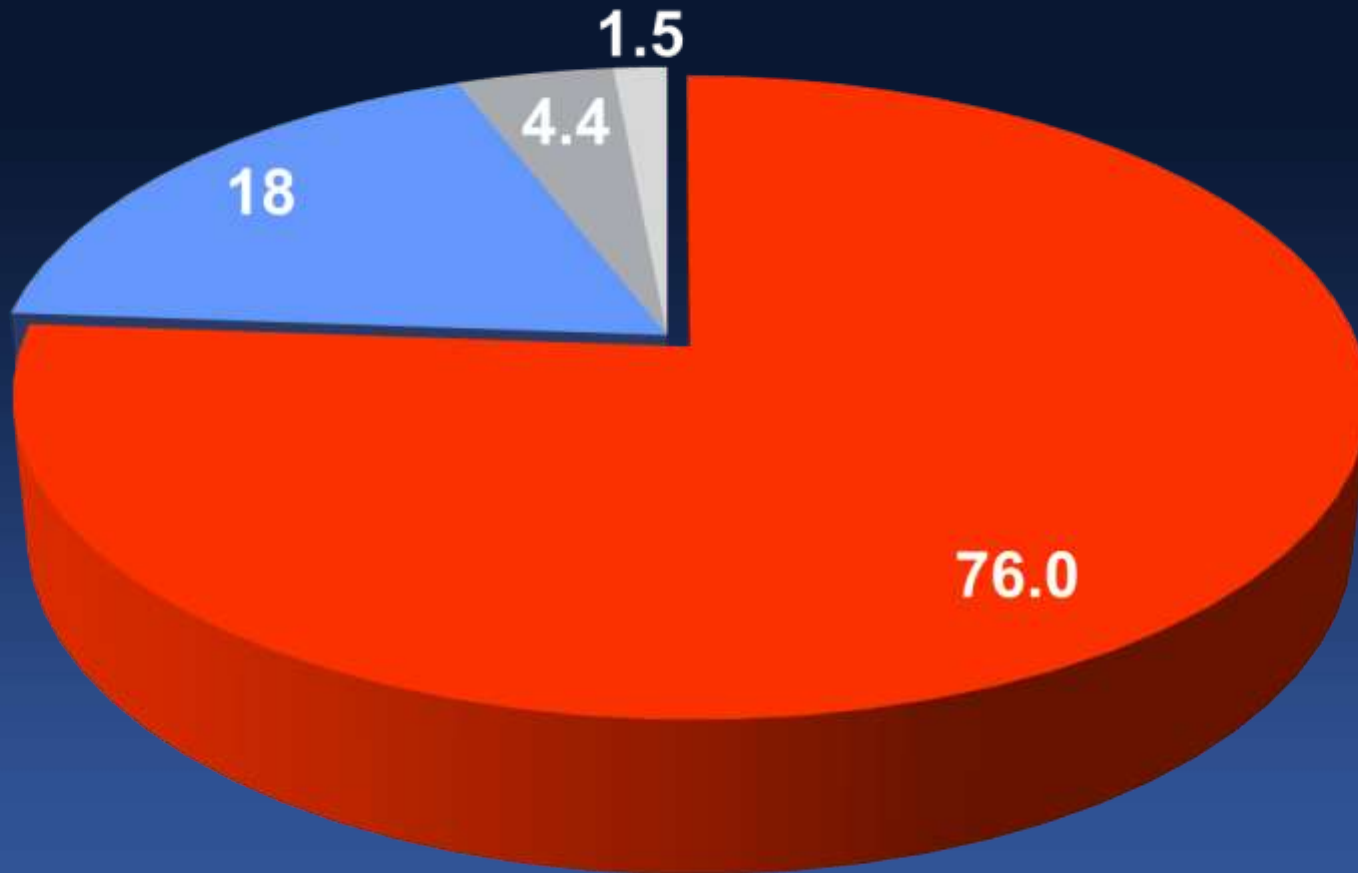


Patient Characteristics

Variables	N=5803
Age	63.9±9.7
Sex (men)	4151 (71.5%)
Diabetes	1795 (30.9%)
Hypertension	3665 (63.2%)
Current smoker	1392 (24.0%)
Hyperlipidemia	3481 (60.0%)
Previous myocardial infarction	377 (6.5%)
Previous PCI	1133 (19.5%)
Previous stroke	340 (5.9%)
Chronic renal failure	116 (2.0%)
Chronic lung disease	125 (2.2%)
Peripheral artery disease	139 (2.4%)
Family history	595 (10.3%)

Clinical Presentation

■ sAP or No symptom ■ uAP ■ NSTEMI ■ STEMI



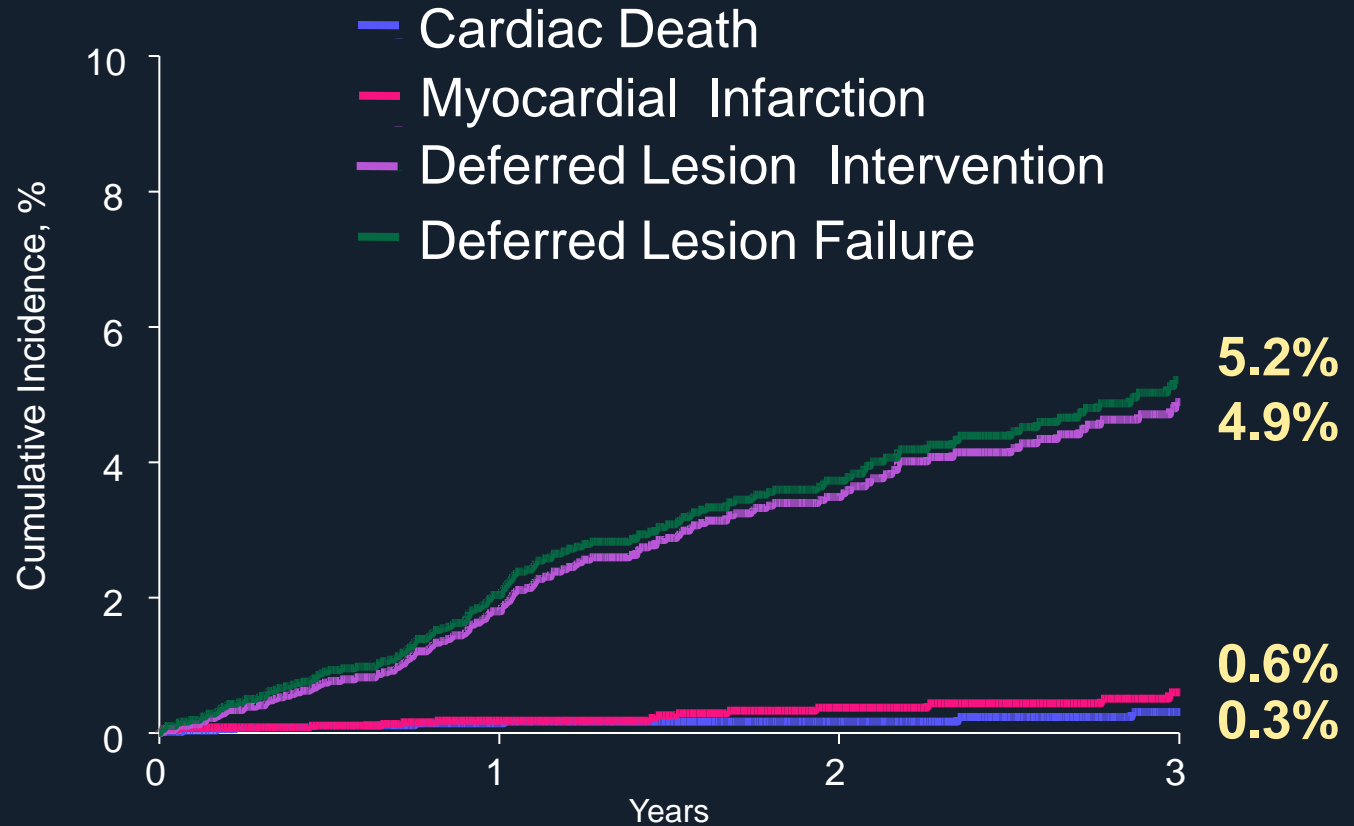
Lesion Characteristics

Variables	N=8633
Lesion territory	
Left main	345 (4.1%)
Left anterior descending artery	4372 (50.6%)
Left circumflex artery	2070 (24.0%)
Right coronary artery	1407 (16.3%)
ACC/AHA B2C lesion	4819 (55.8%)
Long lesion (>20mm)	3680 (42.6%)
Moderate to severe calcification	269 (3.1%)
Diameter stenosis	
30-50%	2659 (30.7%)
50-70%	4057 (47.0%)
70-99%	1854 (21.5%)

FFR

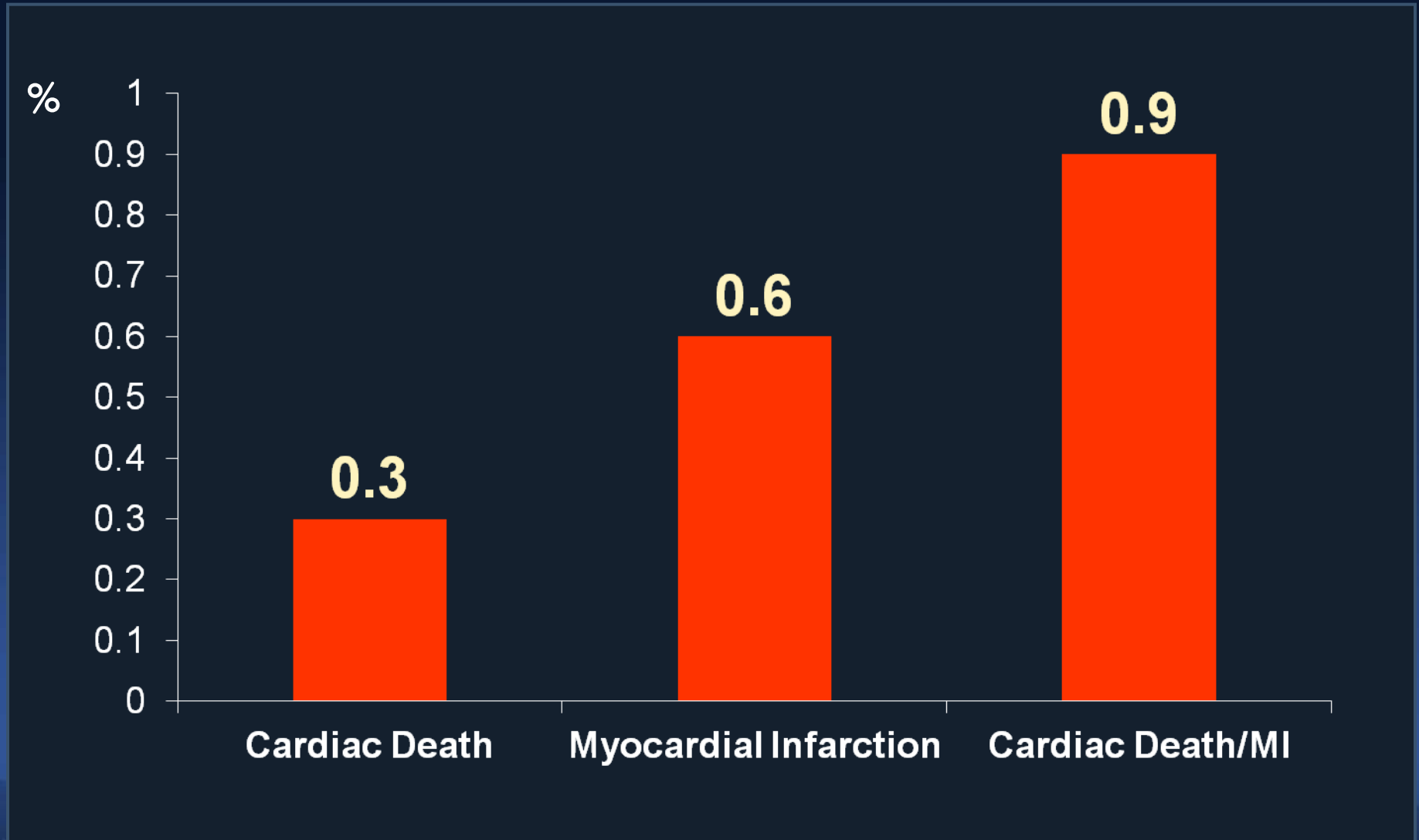
Variables	8633 lesions
Fractional flow reserve	
Mean	0.83±0.11
Median	0.85 (0.77, 0.91)
<0.75	1903 (22.1%)
0.75-0.80	1001 (11.6%)
>0.80	5729 (66.3%)
Route of adenosine	
Intravenous	7881 (91.3%)
Intracoronary	752 (8.7%)
Hyperemic Agent	
Adenonsine	8393 (97.2%)
Others	240 (2.8%)

3 Year Outcome of Deferred Lesion (per Patient)

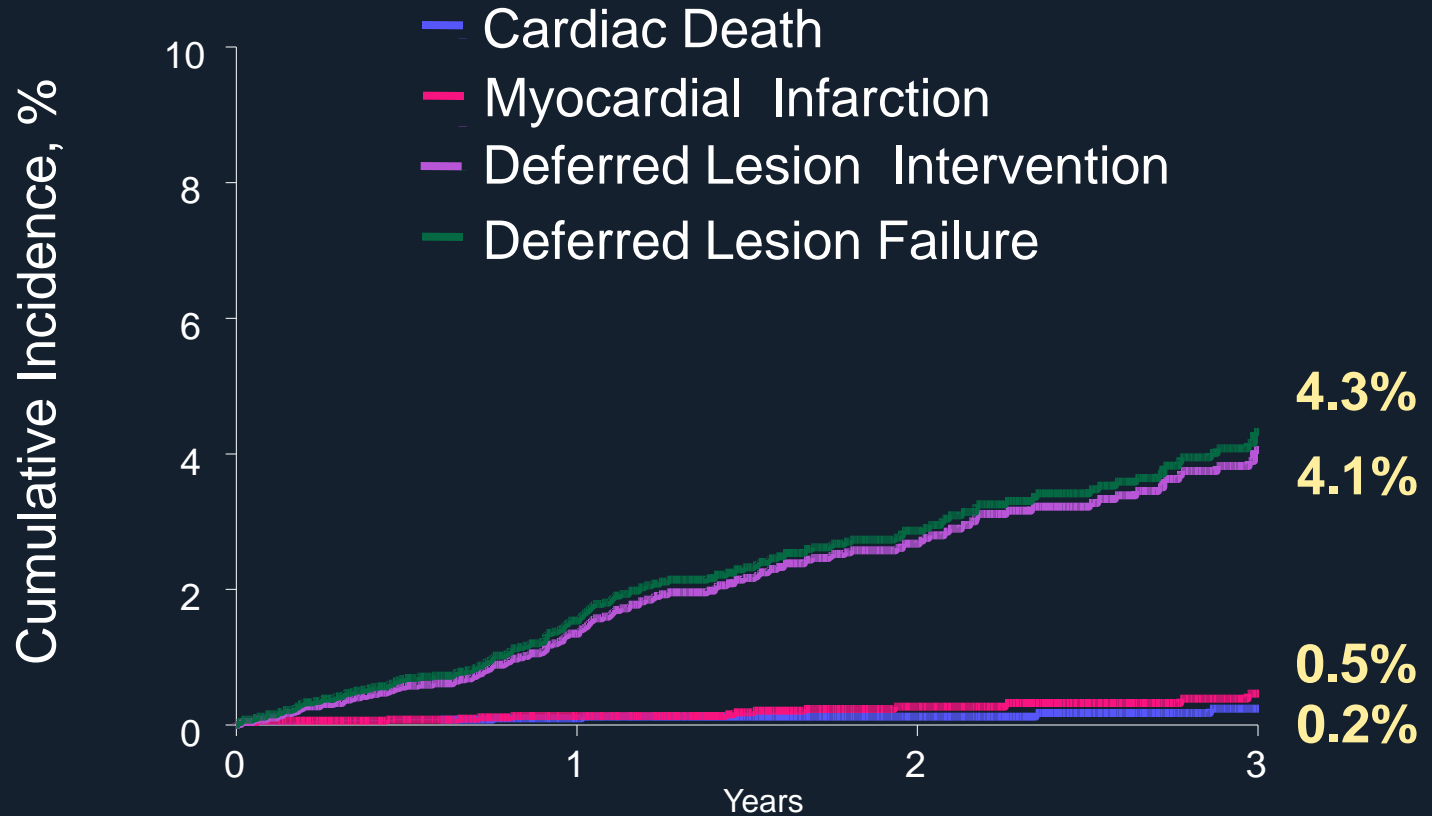


Cardiac Death	4608	3393	2069	1036
Myocardial Infarction	4608	3445	2107	1059
Deferred Lesion Intervention	4608	3337	1998	987
Deferred Lesion Failure	4608	3333	1996	987

3 Year Outcome of Deferred Lesion (per Patient)

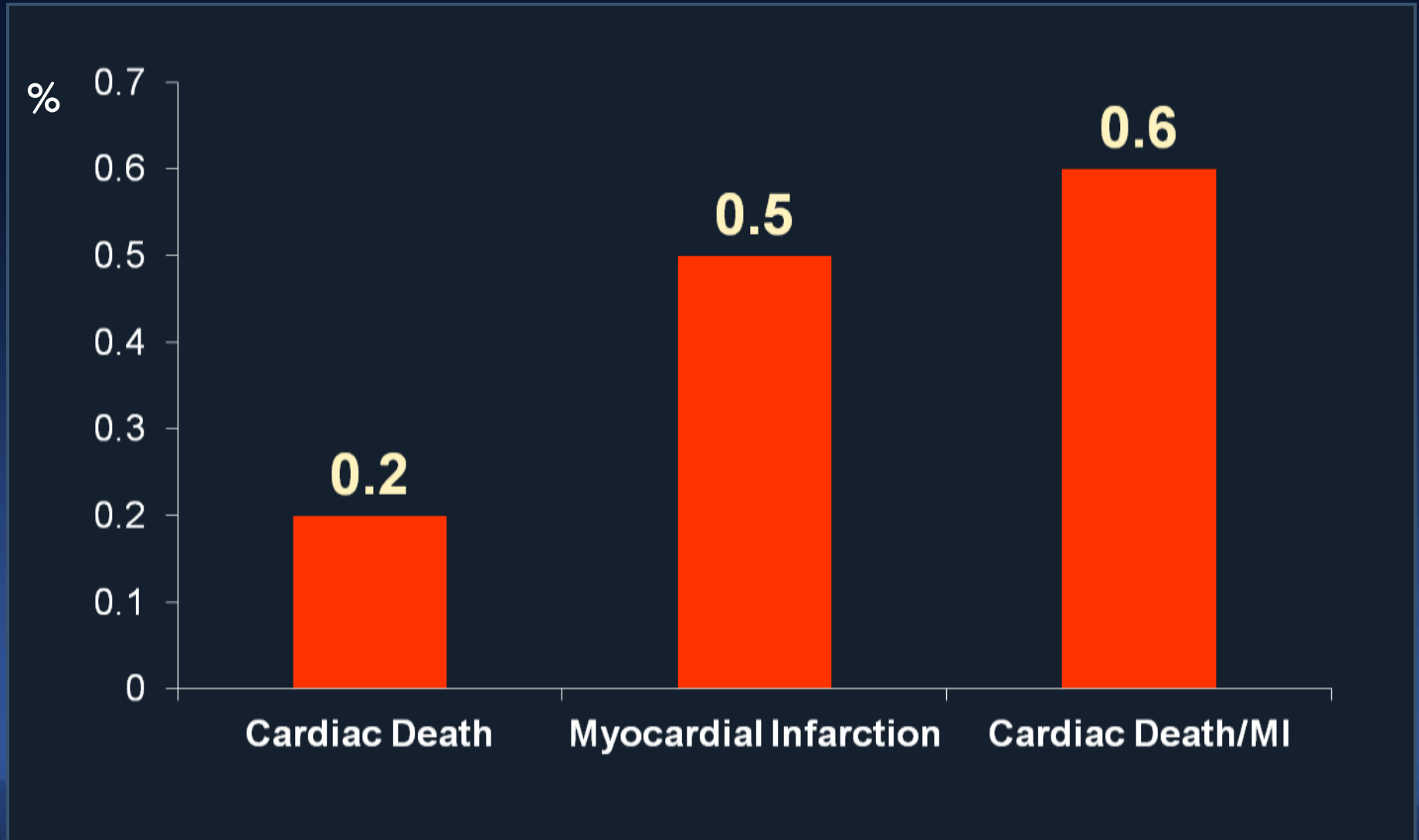


3 Year Outcome of Deferred Lesion (per Lesion)

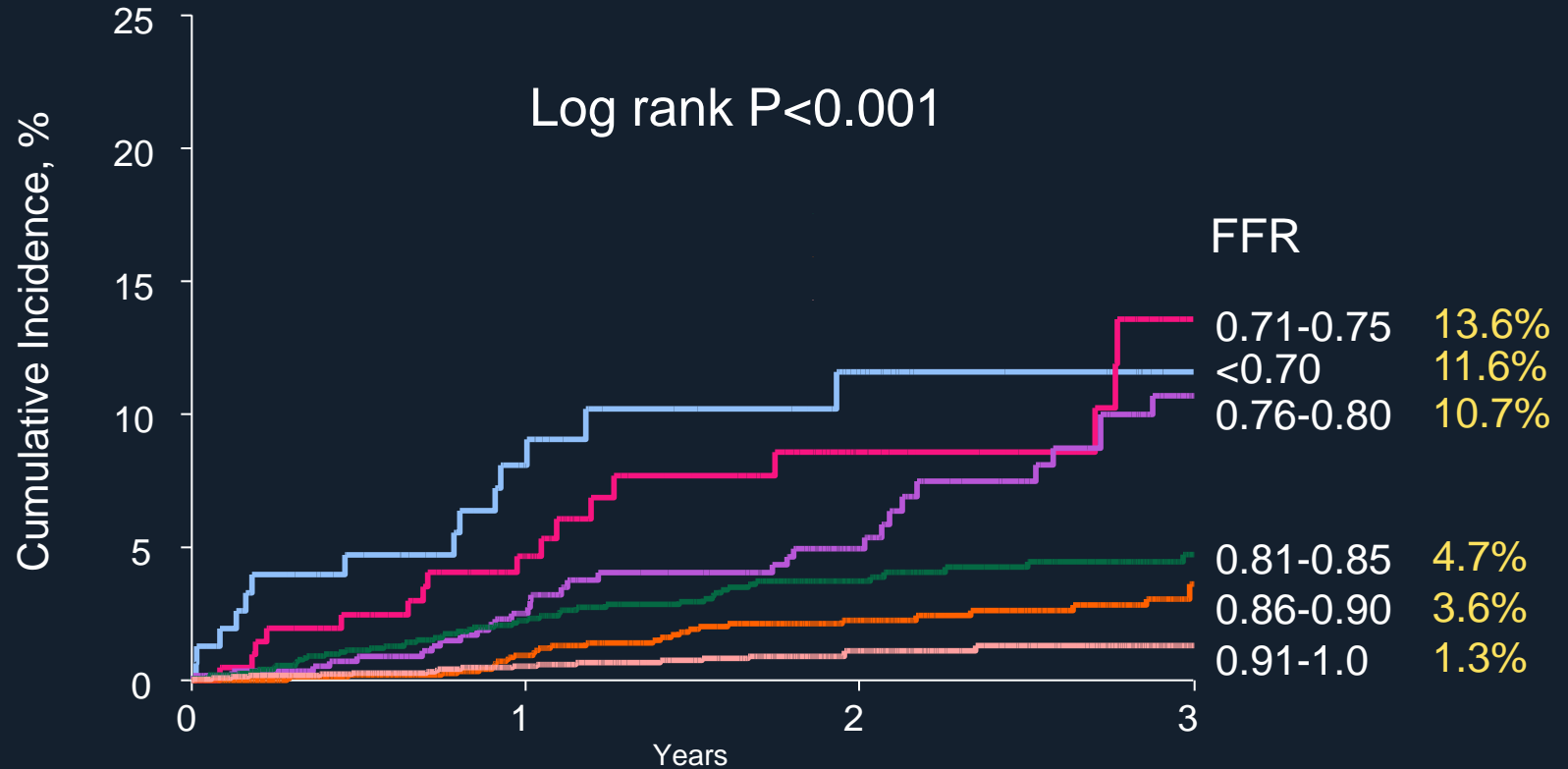


Cardiac Death	6468	4745	2675	1229
Myocardial Infarction	6468	4740	2669	1225
Deferred Lesion Intervention	6468	4685	2599	1174
Deferred Lesion Failure	6468	4681	2597	1174

3 Year Outcome of Deferred Lesion (per Lesion)

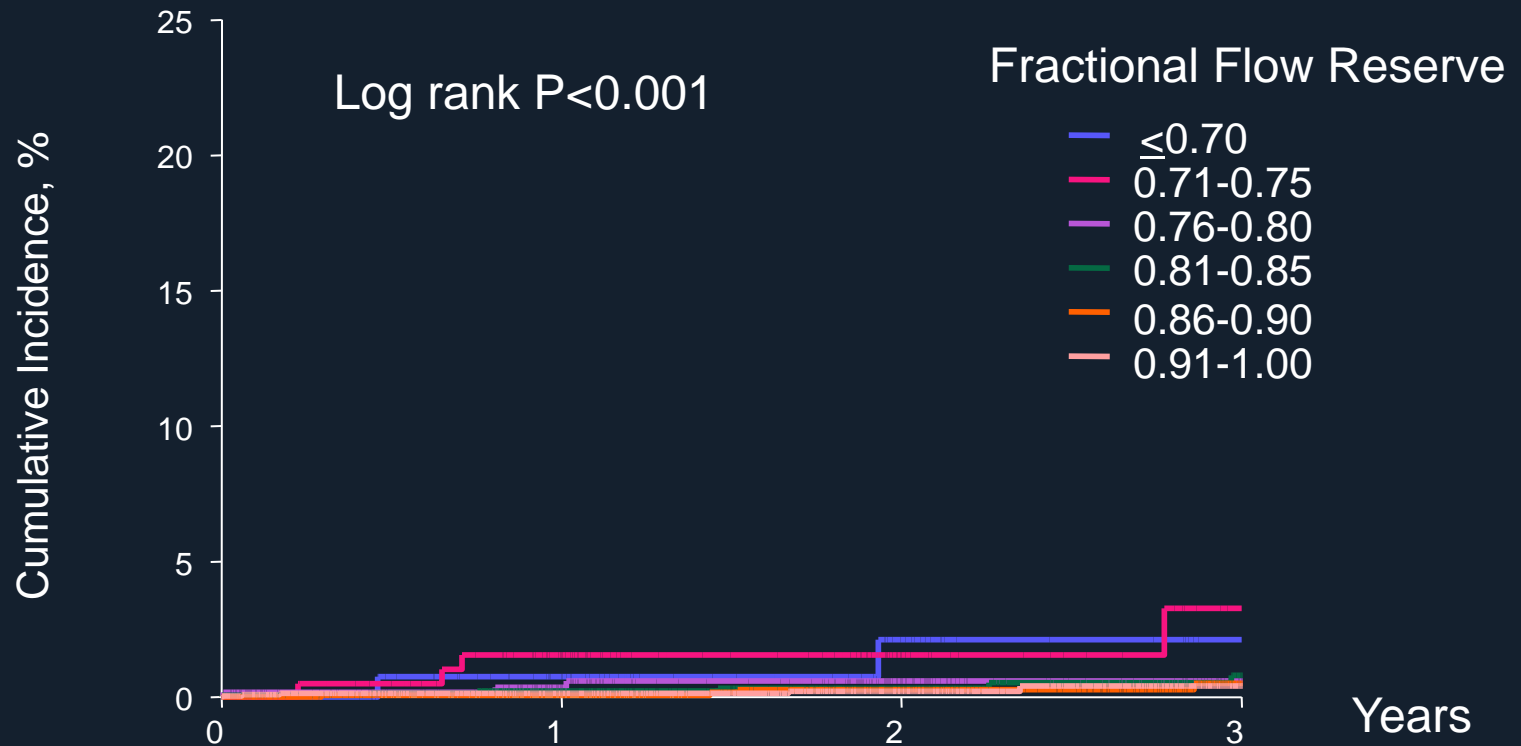


Deferred Lesion Failure



\leq				
0.70	156	99	56	27
0.71-0.75	212	155	73	43
0.76-0.80	596	430	240	110
0.81-0.85	1510	1088	656	333
0.86-0.90	1665	1214	696	338
0.91-1.0	2328	1695	877	328

Cardiac Death or MI

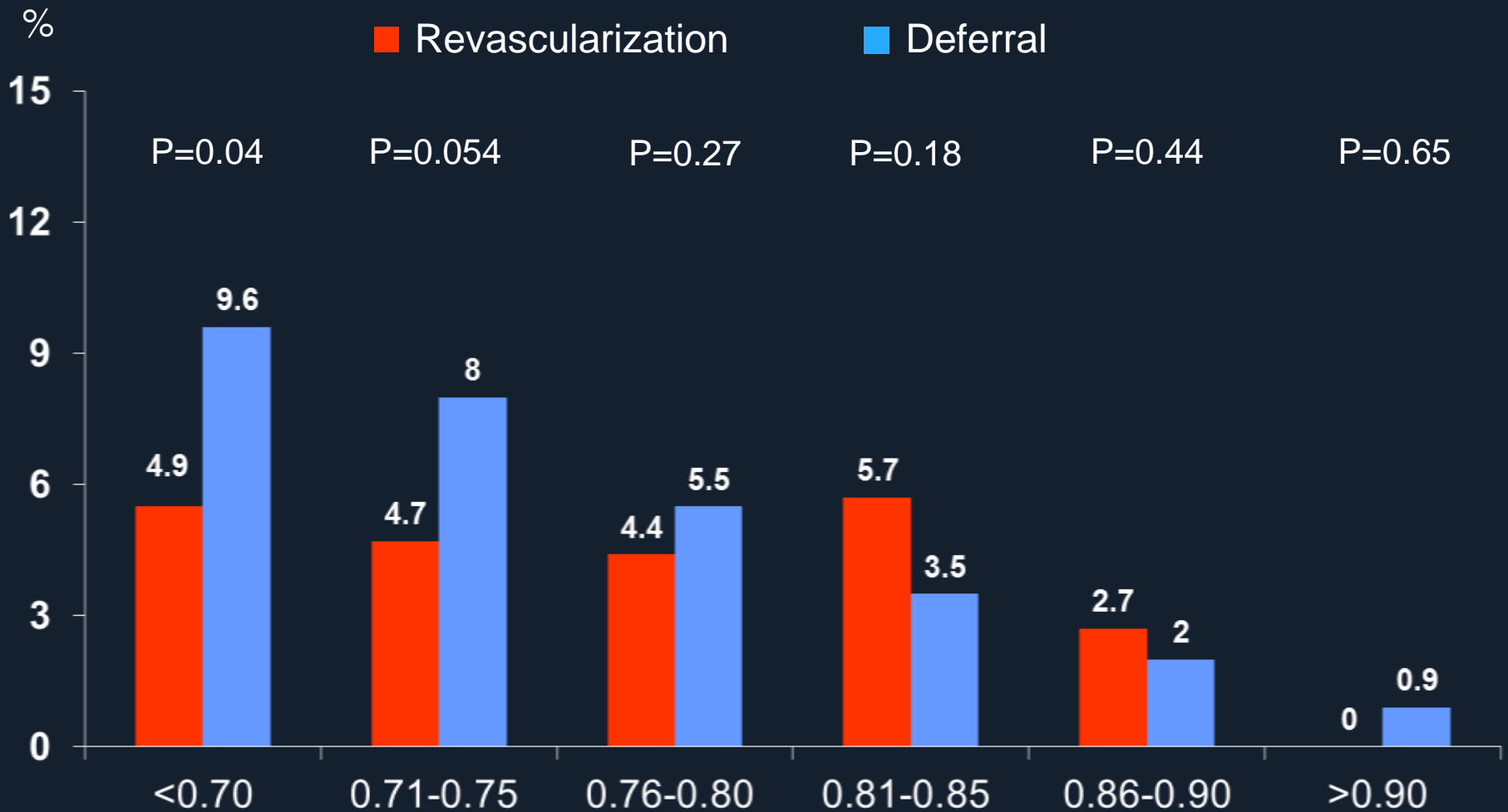


≤0.70	156	109	60	27
0.71-0.75	212	160	78	45
0.76-0.80	596	440	253	126
0.81-0.85	1510	1109	682	350
0.86-0.90	1665	1220	708	348
0.91-1.0	2328	1703	888	333

Adjusted Risk of Deferred Lesion Outcomes

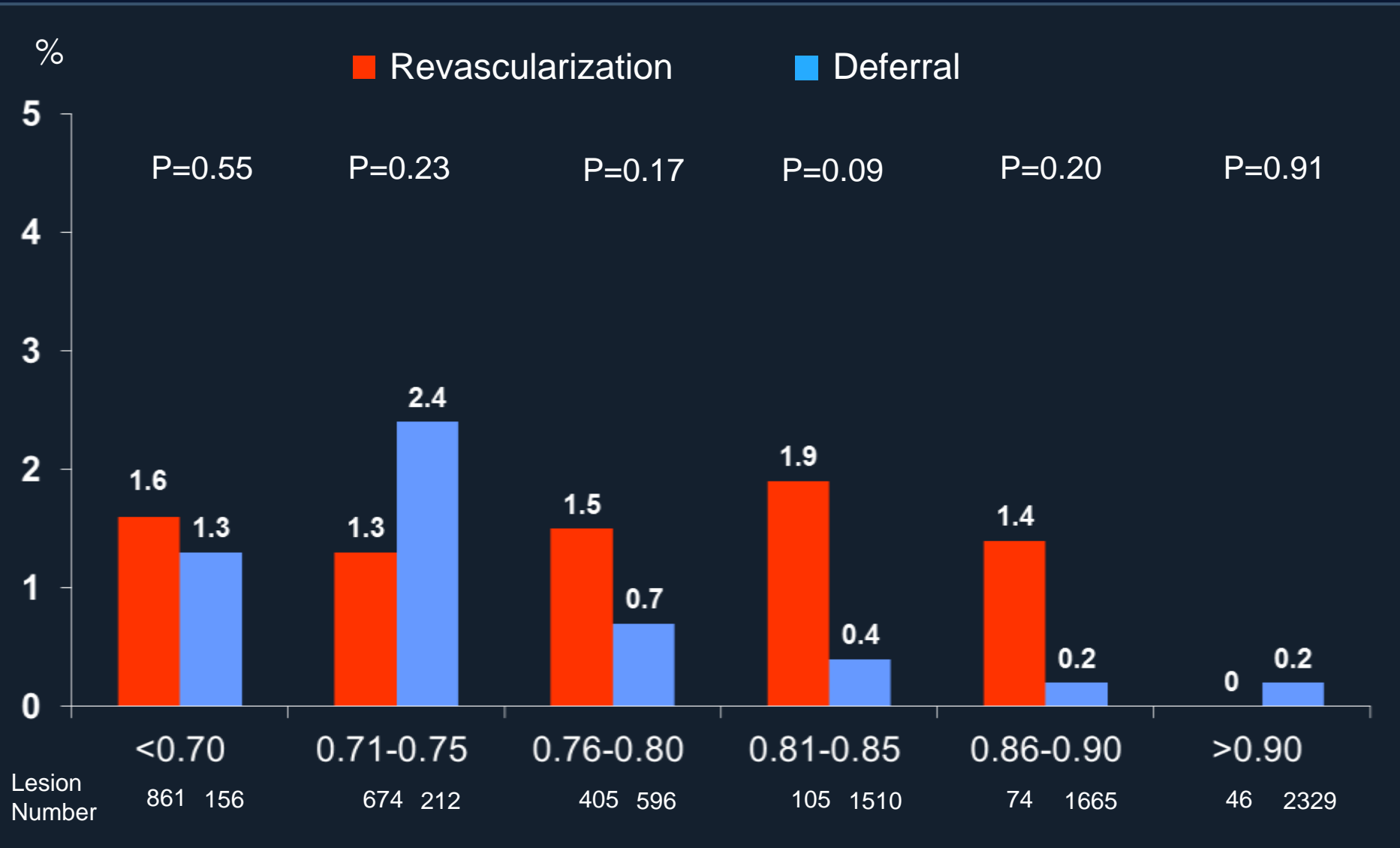
	FFR as categorical variables						
	<i>Hazard ratio (95% confidence interval)</i>						
<i>FFR</i>	≤0.70 (N=156)	0.71-0.75 (N=212)	0.76-0.80 (N=596)	0.81-0.85 (N=1510)	0.86-0.90 (N=1665)	0.91-1.00 (N=2329)	P for trend
Deferred lesion failure	4.17 (2.45 – 7.11)	3.72 (2.17 – 6.39)	3.85 (2.29 – 6.47)	2.91 (1.76 – 4.80)	1.69 (0.98 – 2.89)	1 Reference	< 0.001
Cardiac death	1.64 (0.21 – 12.8)	1.64 (0.21 – 12.9)	1.82 (0.29 – 11.4)	0.41 (0.03 – 5.36)	0.74 (0.11 – 4.96)	1 Reference	0.378
Myocardial infarction	6.97 (1.97 – 24.6)	6.42 (1.78 – 23.2)	4.91 (1.30 – 18.6)	2.70 (0.70 – 10.5)	1.03 (0.21 – 5.10)	1 Reference	< 0.001
Cardiac death or MI	5.59 (2.02 – 15.4)	5.18 (1.84 – 14.5)	3.76 (1.28 – 11.1)	1.95 (0.63 – 6.0)	1.06 (0.31 – 3.69)	1 Reference	< 0.001
Deferred lesion intervention	3.92 (2.18 – 7.05)	3.71 (2.06 – 6.70)	3.75 (2.12 – 6.63)	3.20 (1.86 – 5.50)	1.92 (1.07 – 3.44)	1 Reference	< 0.001

Deferred Lesion or Target Lesion Failure



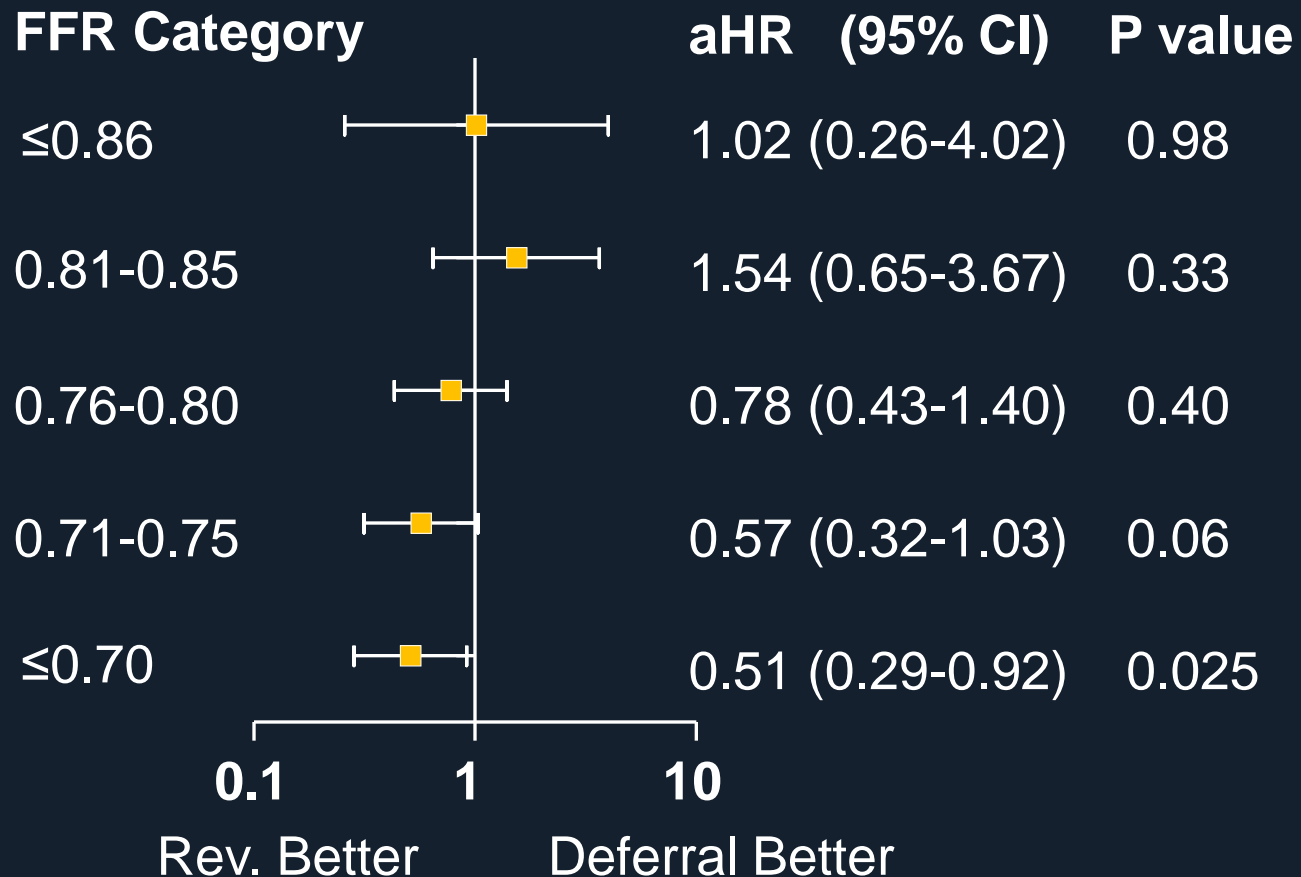
% from crude proportion

Cardiac Death or MI

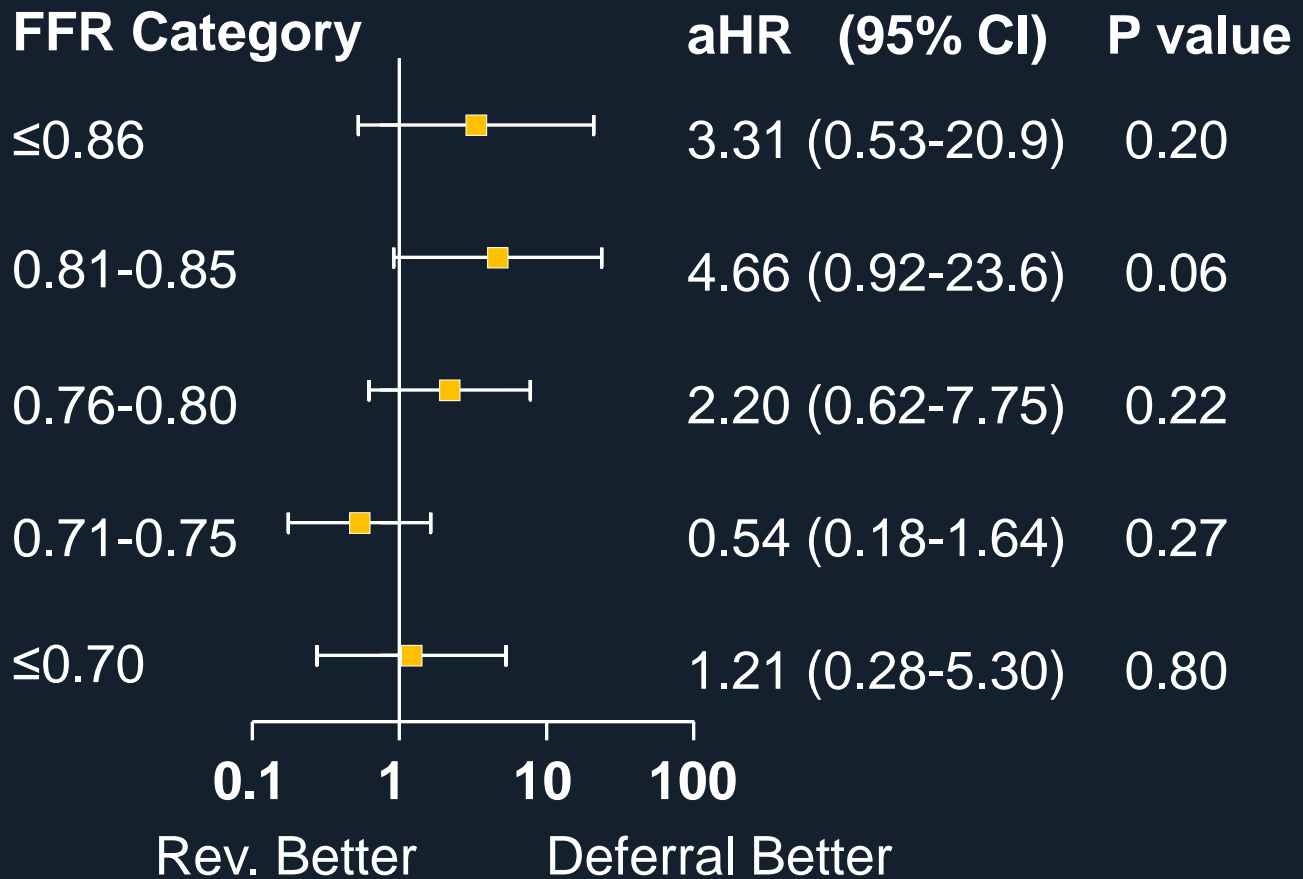


% from crude proportion

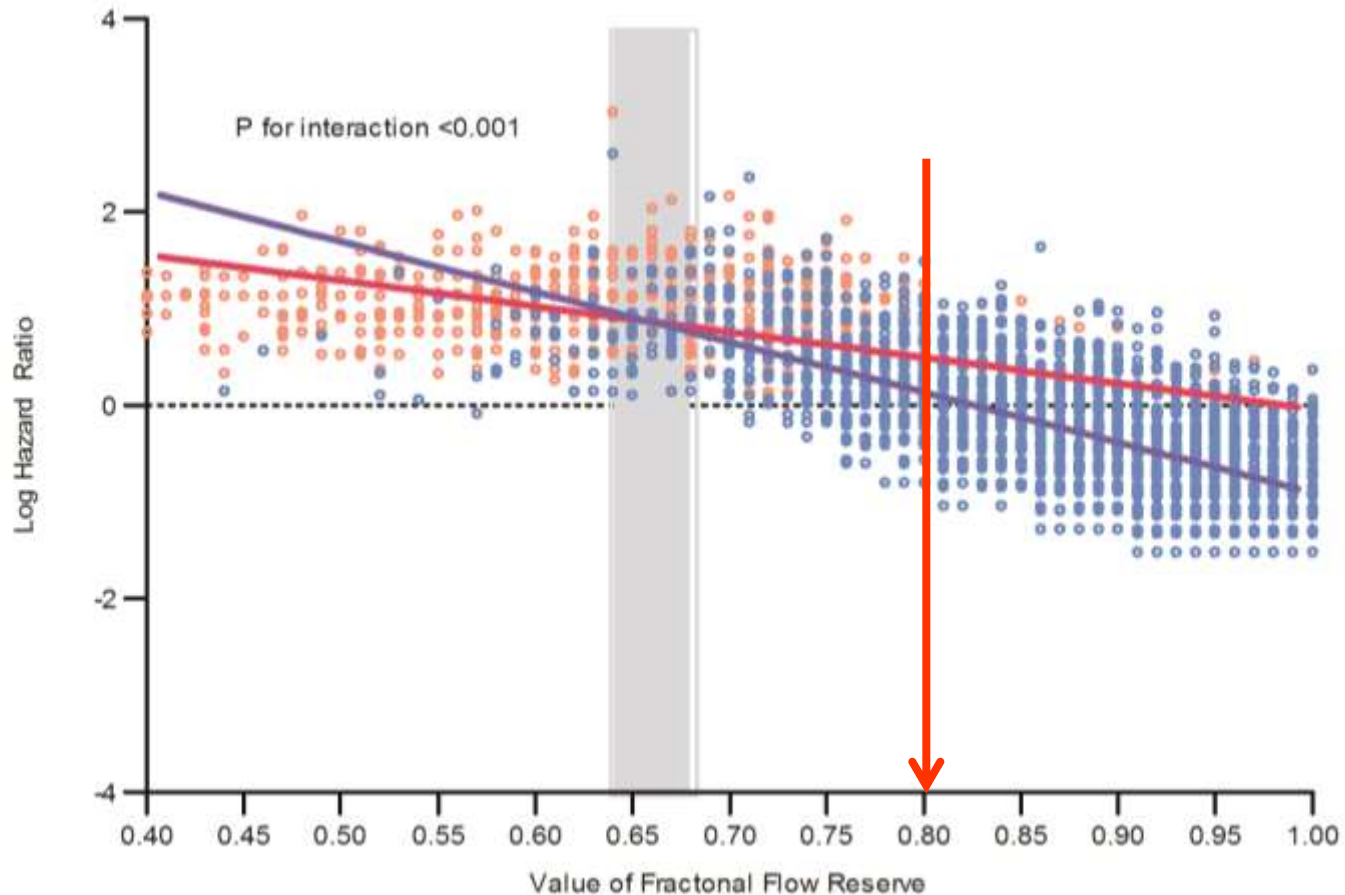
Lesion Failure Death, MI and RR



Cardiac Death and MI

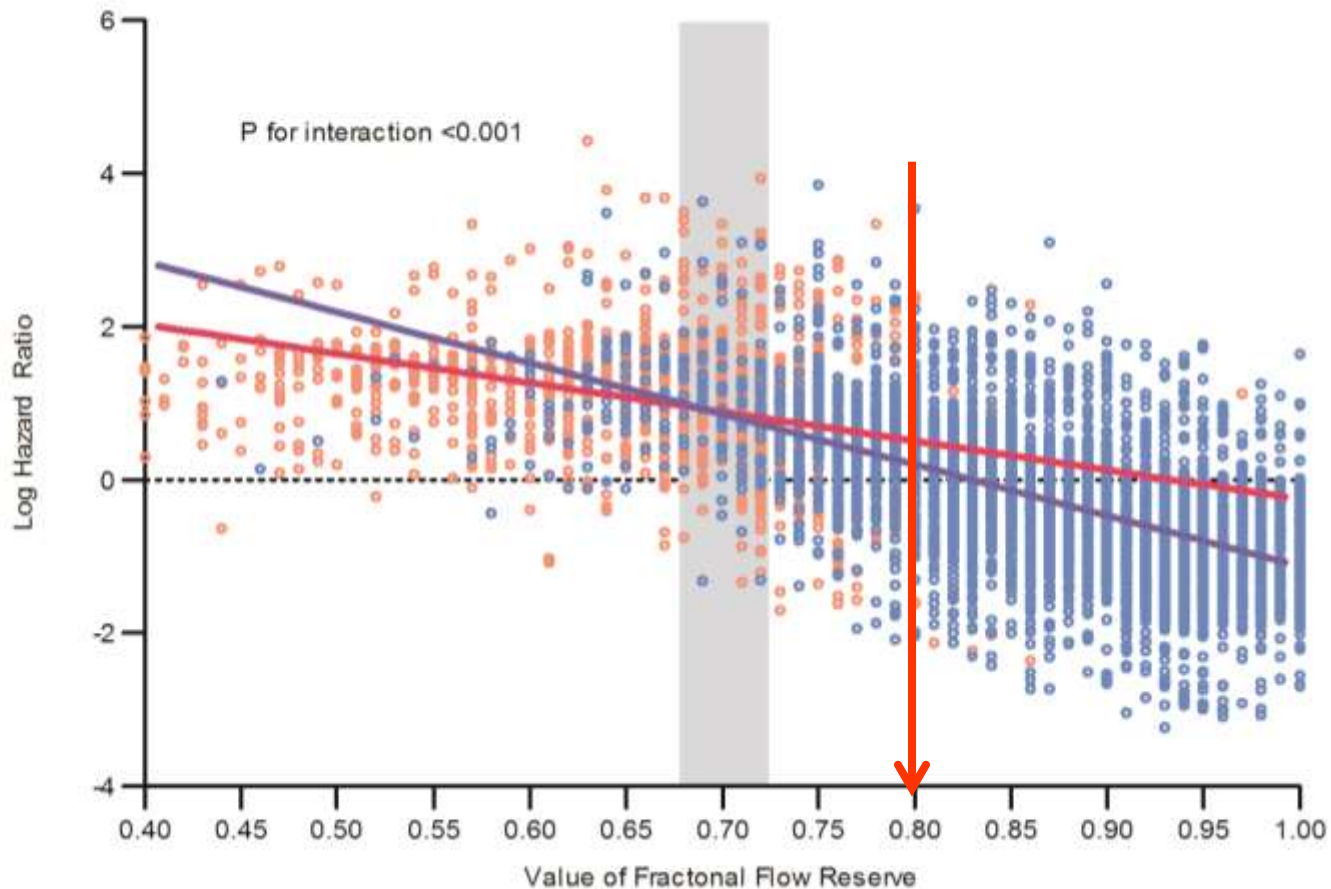


Deferred Lesion Failure *Adjusted*

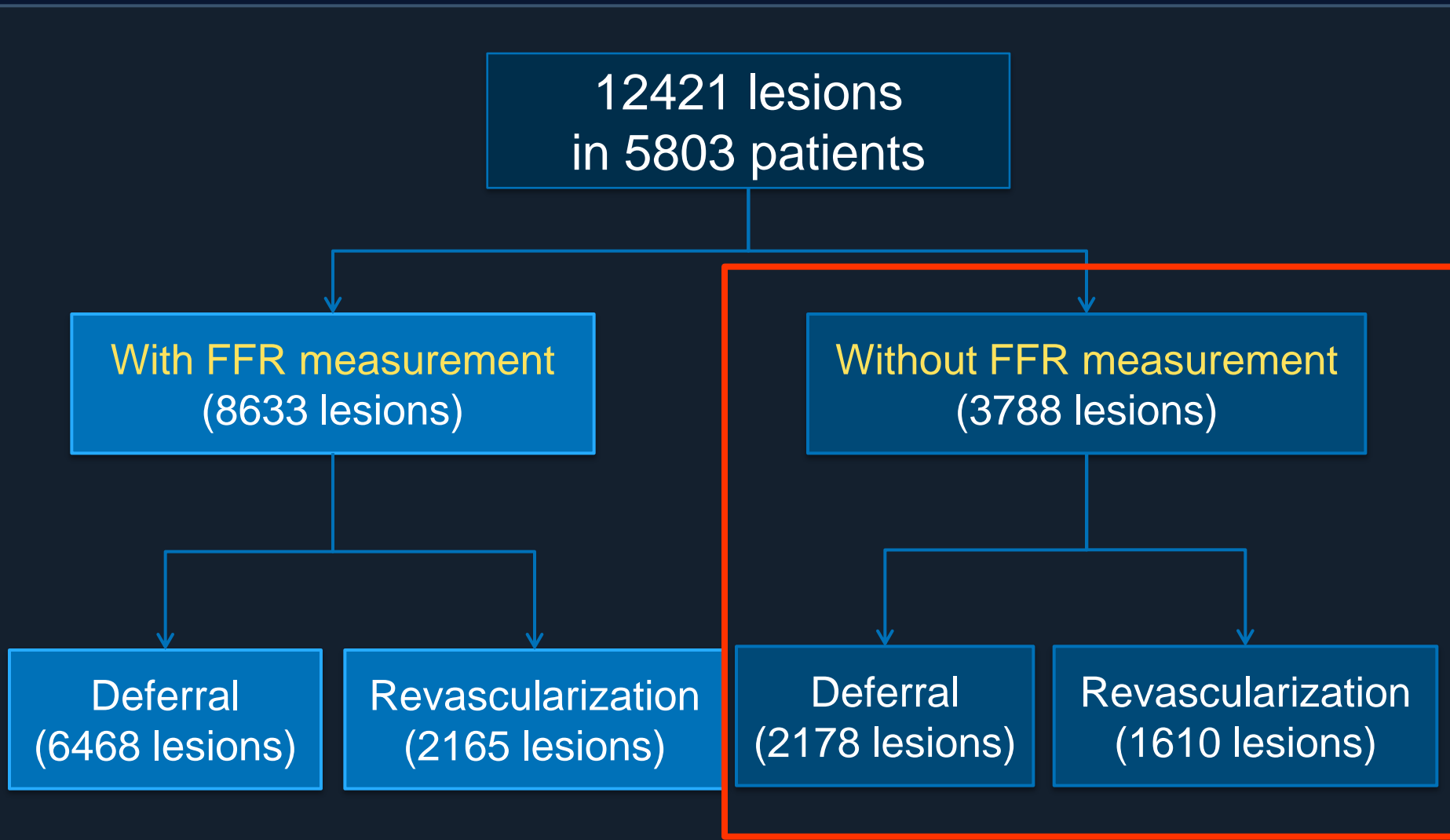


Cardiac Death or MI

Adjusted



Lesion Treatment

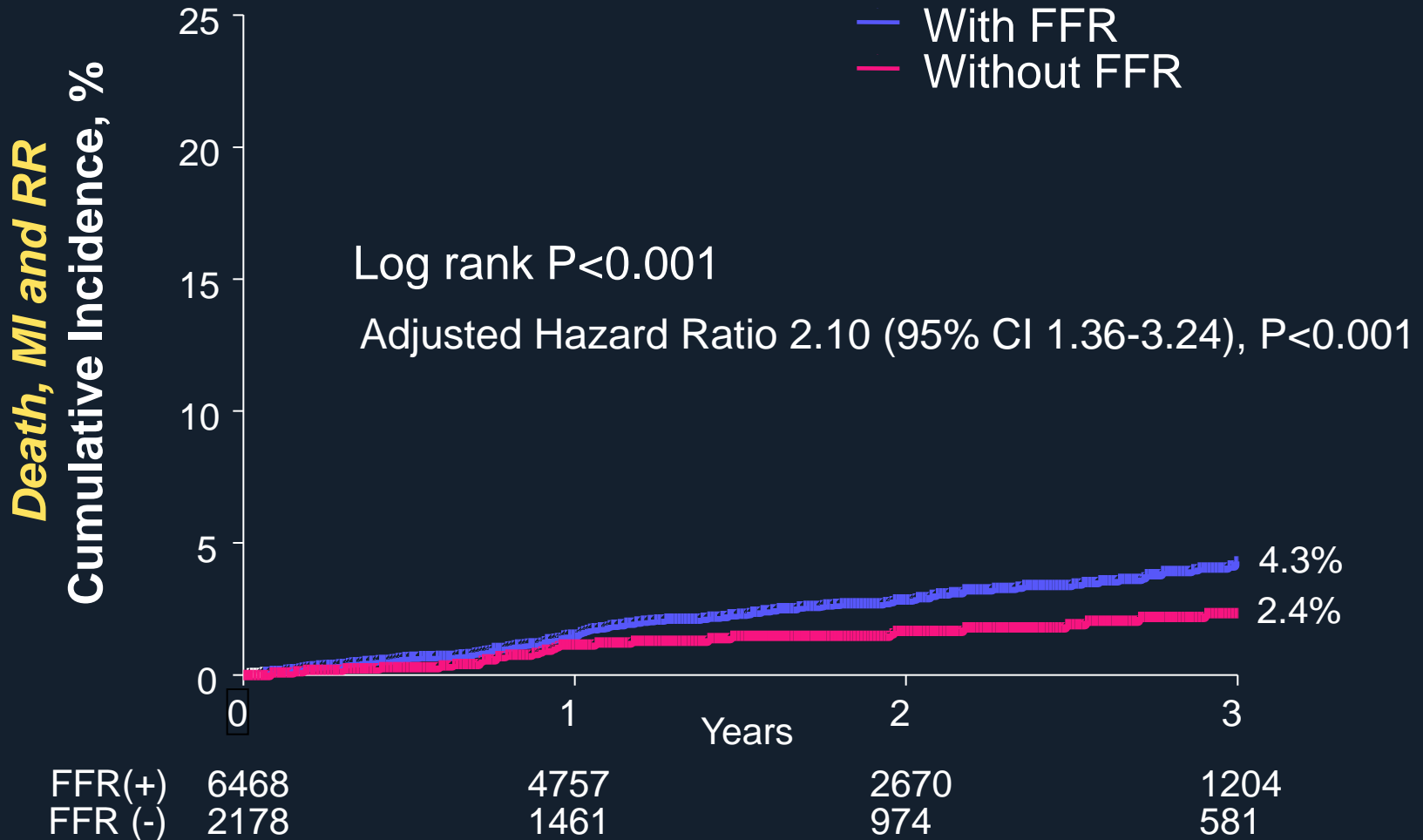


Lesion Characteristics

Deferred Lesion

	With FFR (N=6468)	Without FFR (N=2178)	P value
Lesion territory			<0.001
Left main	135 (2.1%)	36 (1.7%)	
Left anterior descending artery	3075 (47.5%)	370 (17.0%)	
Right coronary artery	1720 (26.6%)	512 (23.5%)	
Left circumflex artery	1186 (18.3%)	601 (27.6%)	
Others	352 (5.4%)	659 (30.3%)	
Lesion location			<0.001
Proximal	2588 (40.0%)	596 (27.4%)	
Mid	2245 (34.7%)	309 (14.2%)	
Distal	1635 (25.3%)	1273 (58.4%)	

Deferred Lesion

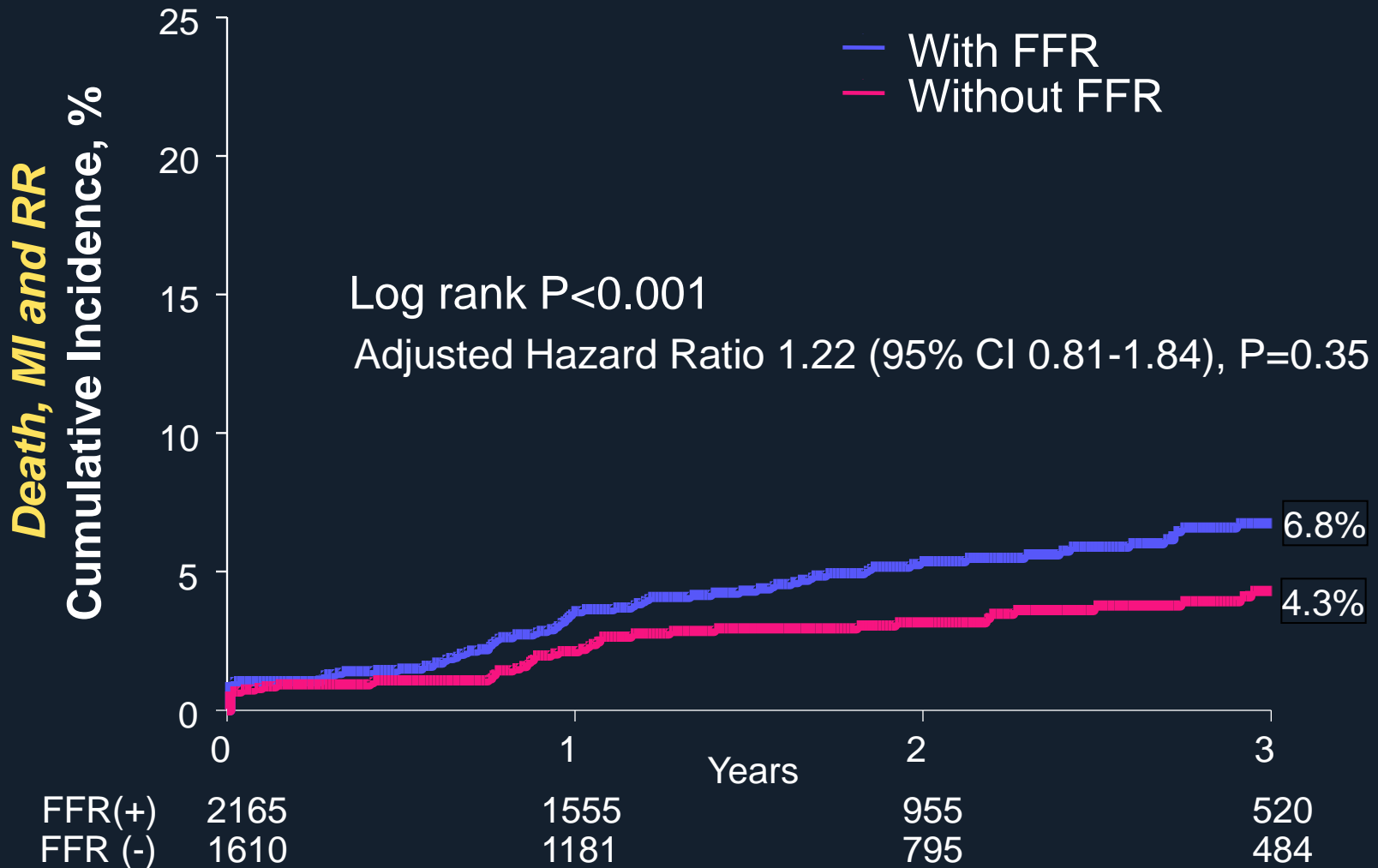


Lesion Characteristics

Revascularized Lesion

	With FFR (N=2165)	Without FFR (N=1610)	P value
Lesion territory			<0.001
Left main	219 (10.1%)	57 (3.5%)	
Left anterior descending artery	1297 (59.9%)	393 (24.4%)	
Right coronary artery	350 (16.2%)	517 (32.1%)	
Left circumflex artery	221 (10.2%)	433 (26.9%)	
Others	78 (3.6%)	210 (13.0%)	
Lesion location			<0.001
Proximal	1274 (58.8%)	710 (44.1%)	
Mid	580 (27.3%)	303 (18.8%)	
Distal	301 (13.9%)	597 (37.1%)	

Revascularized Lesion



Rule 1

**In Any Lesion
With FFR < 0.80**

Treat !
(Operator's discretion)

Rule 2

**In Any Lesion
With FFR > 0.80**

**Just Defer !
It's Safe and Good !**



Thank You !!

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