Long-term Prognostic Impact of FFR After Coronary Stenting

Insights From International Post-PCI FFR Extended registry

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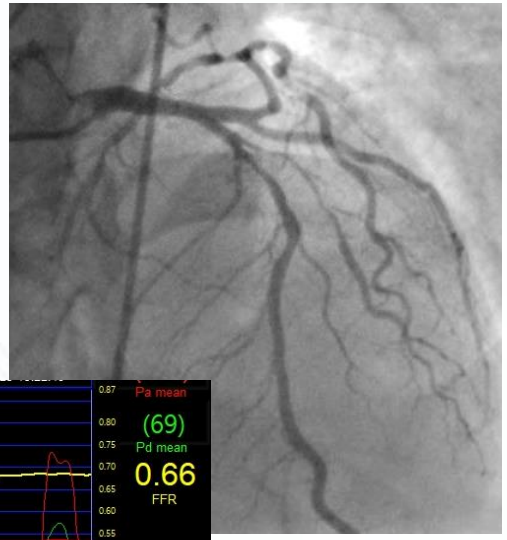
Post-PCI FFR

- Post-PCI FFR represents the degree of flow reduction due to residual disease in the coronary artery after (successful) stent implantation.



DES implantation, Successful?

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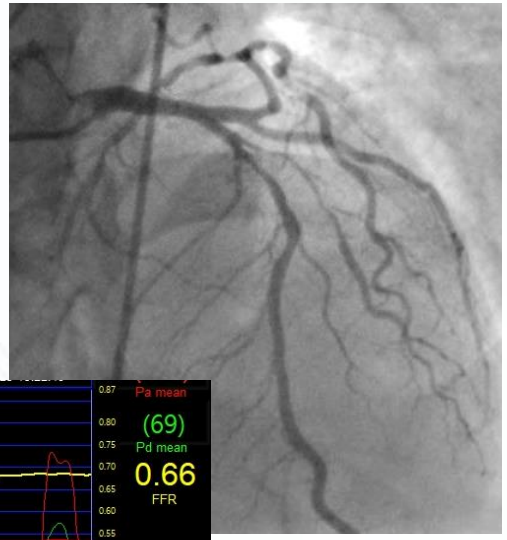
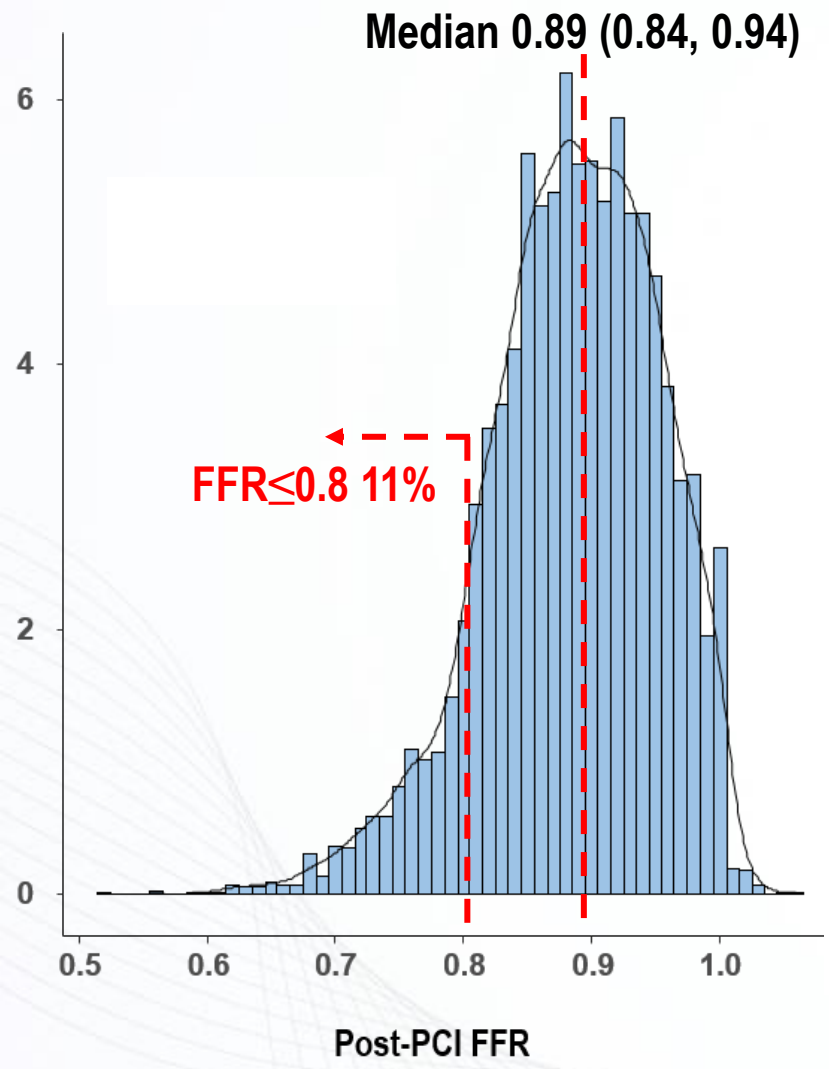
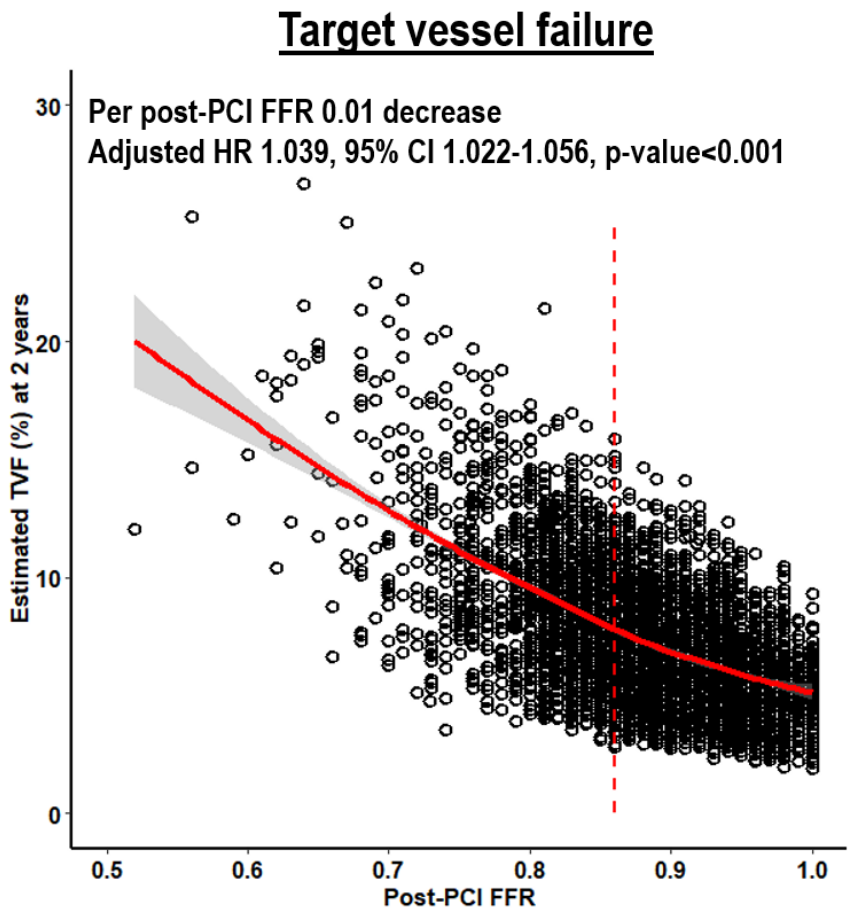
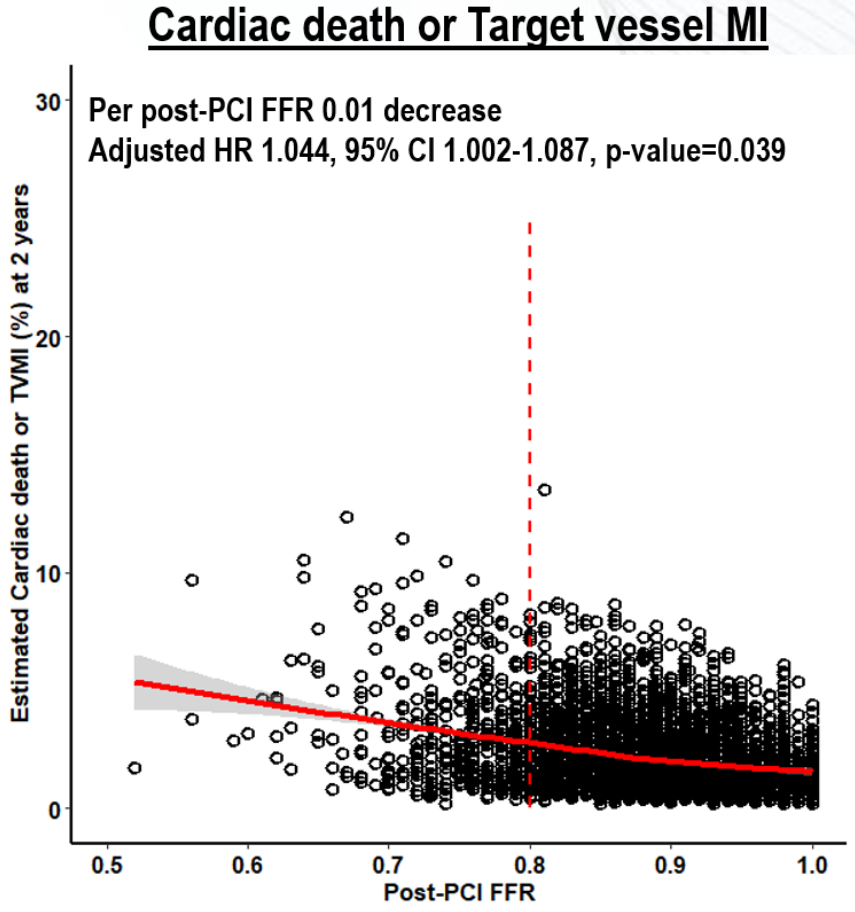


DES implantation, Successful?

Post-stent FFR, IPD meta-analysis (n=4825)







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Post-PCI FFR

- Post-PCI FFR represents the degree of flow reduction due to residual disease in the coronary artery after (successful) stent implantation.
- Low post-PCI FFR or sub-optimal physiologic results after stenting is not uncommon.
- Several previous studies have shown that low FFR after stenting is associated with higher risk of clinical events.
- **However, long-term prognostic impact of post-PCI FFR has not been well defined.**

Study Objectives

1. To evaluate the long-term prognostic impact of post-PCI FFR after 2nd G DES implantation
2. To investigate the long-term prognostic value of post-PCI FFR cut-off values
3. To investigate the location of revascularization according to post-PCI FFR value

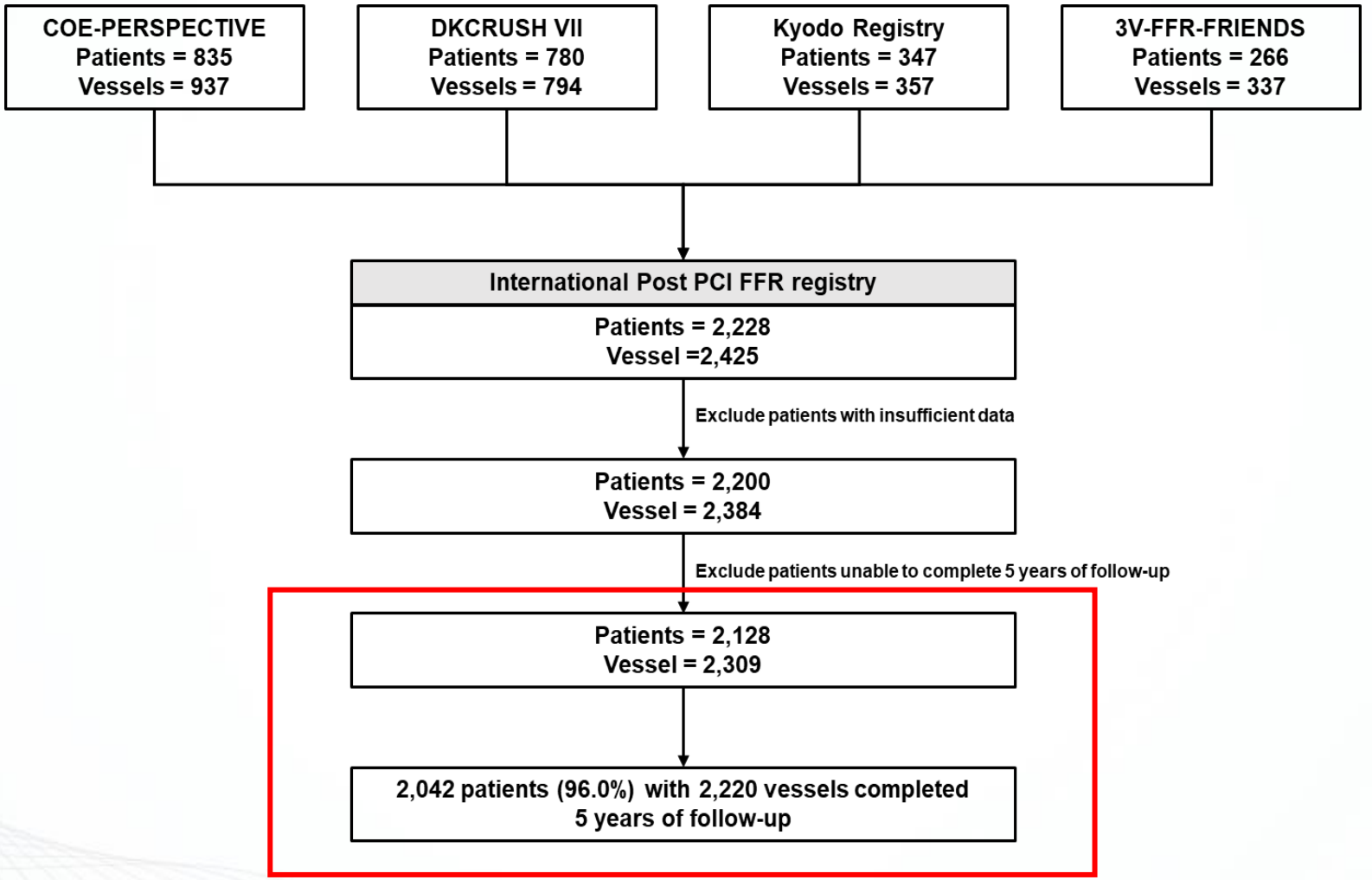
Study Population and Methods

- **Extended version of the International Post-PCI FFR registry** (NCT04684043)
  - 4 Asian registries from Korea, China and Japan
  - FFR measurement after angiographically successful 2nd generation DES implantation
  - 5-year follow-up clinical outcomes (till May 2021)
- **Primary outcome**
  - Target vessel failure (TVF): a composite of cardiac death, target vessel myocardial infarction and target vessel revascularization
  - Optimal cut-off value: 0.86 (from POST-PCI FLOW study*)
- **Secondary outcome**
  - Cardiac death or target vessel myocardial infarction
  - Optimal cut-off value: 0.80 (from POST-PCI FLOW study*)

* IPD meta-analysis, Hwang D, et al. JAMA Netw Open 2022

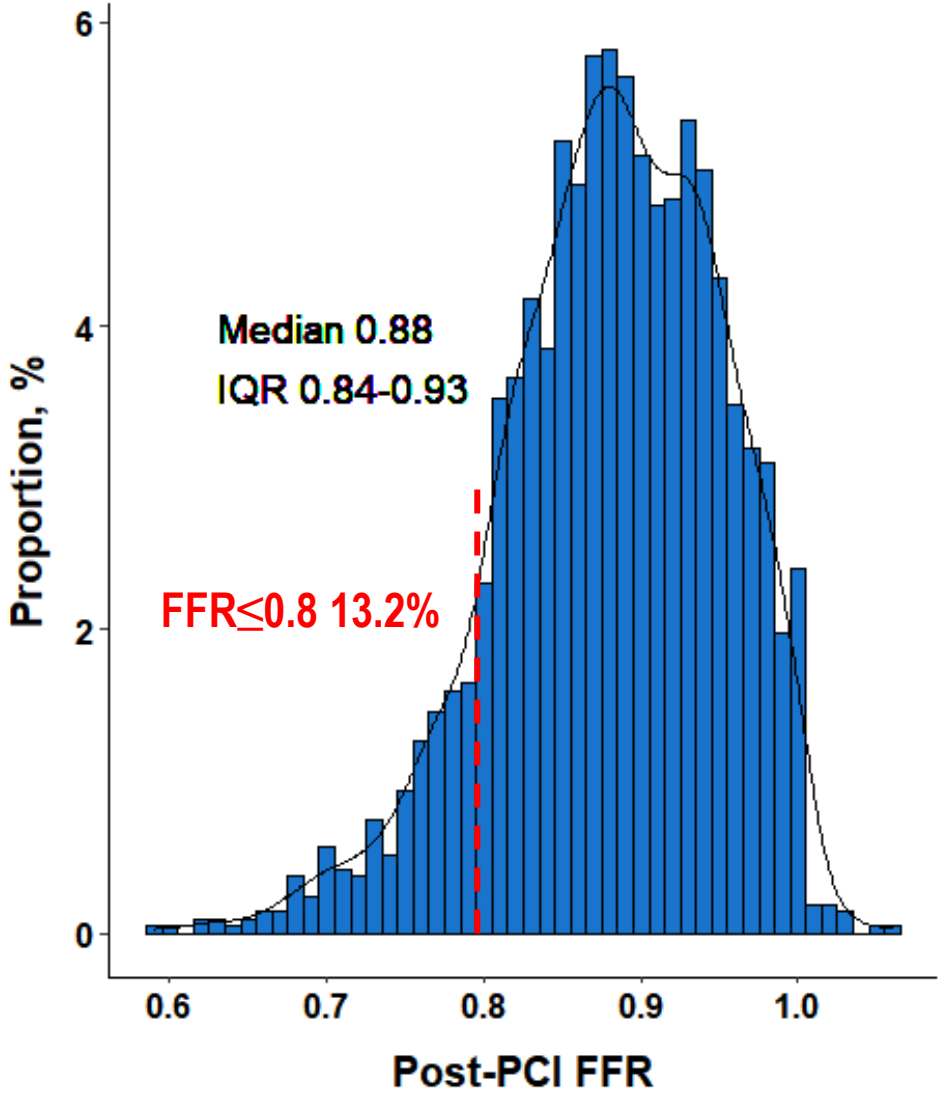
Study Population and Methods

International Post-PCI FFR Extended registry (NCT05672862)



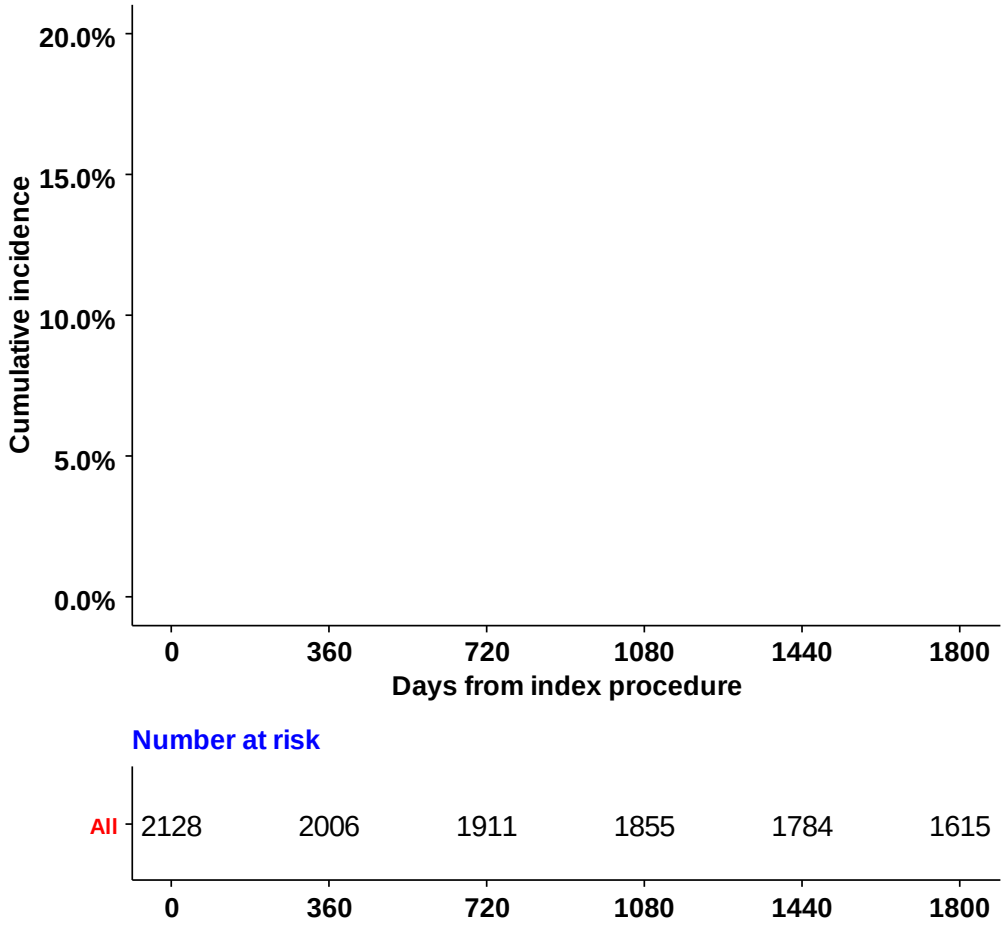
Baseline Characteristics

General characteristics	
Age, years	64.2±10.0
Male	1,628 (76.6%)
Cardiovascular risk factors	
Hypertension	1,429 (67.2%)
Diabetes mellitus	713 (33.6%)
Hypercholesterolemia	1,060 (49.9%)
Current smoker	641 (30.2%)
Clinical presentation	
Acute coronary syndrome	1,119 (52.7%)
Stable coronary artery disease	1,006 (47.3%)
Target vessel	
LAD	1,498 (70.4%)
LCX	250 (11.7%)
RCA	380 (17.9%)
QCA after stent implantation	
Reference vessel diameter, mm	3.0±0.5
Diameter stenosis, %	9.2±7.2
Total stent number	1.5±0.8
Total stent length, mm	32.3±15.8

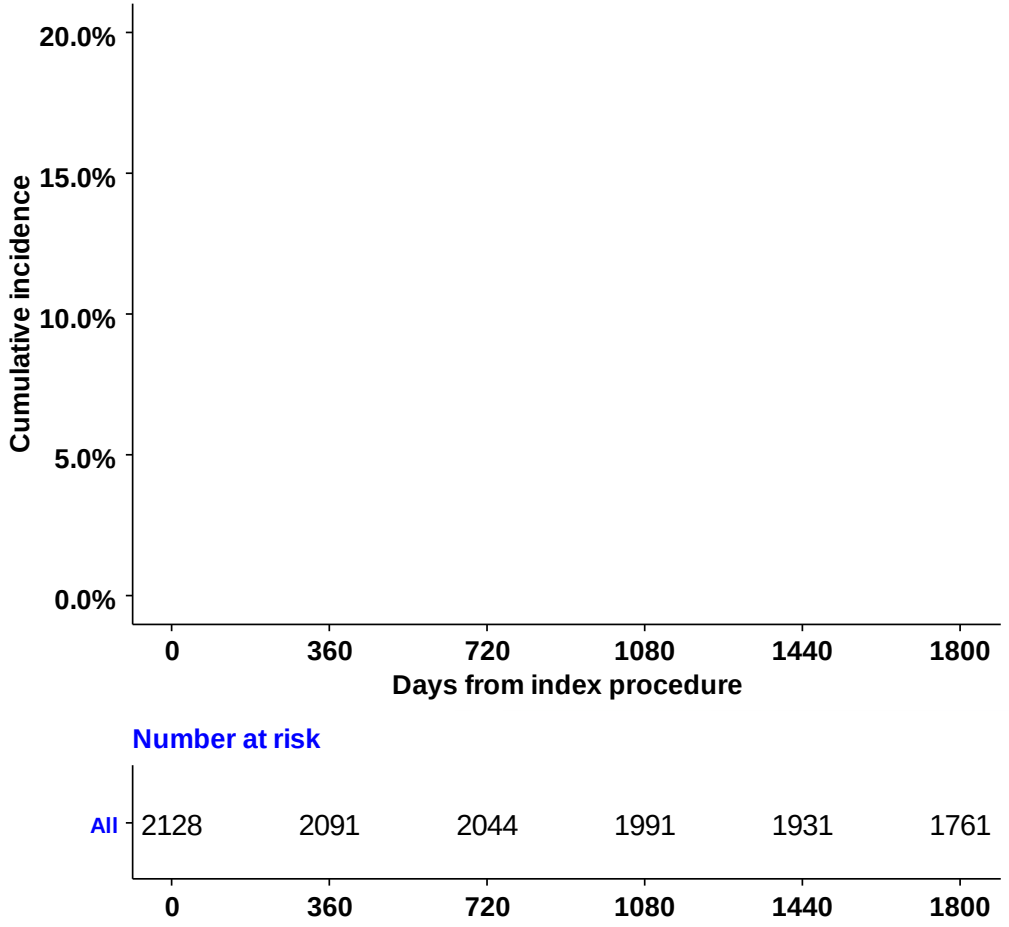


5-year clinical outcomes

Target vessel failure



Cardiac death or TVMI

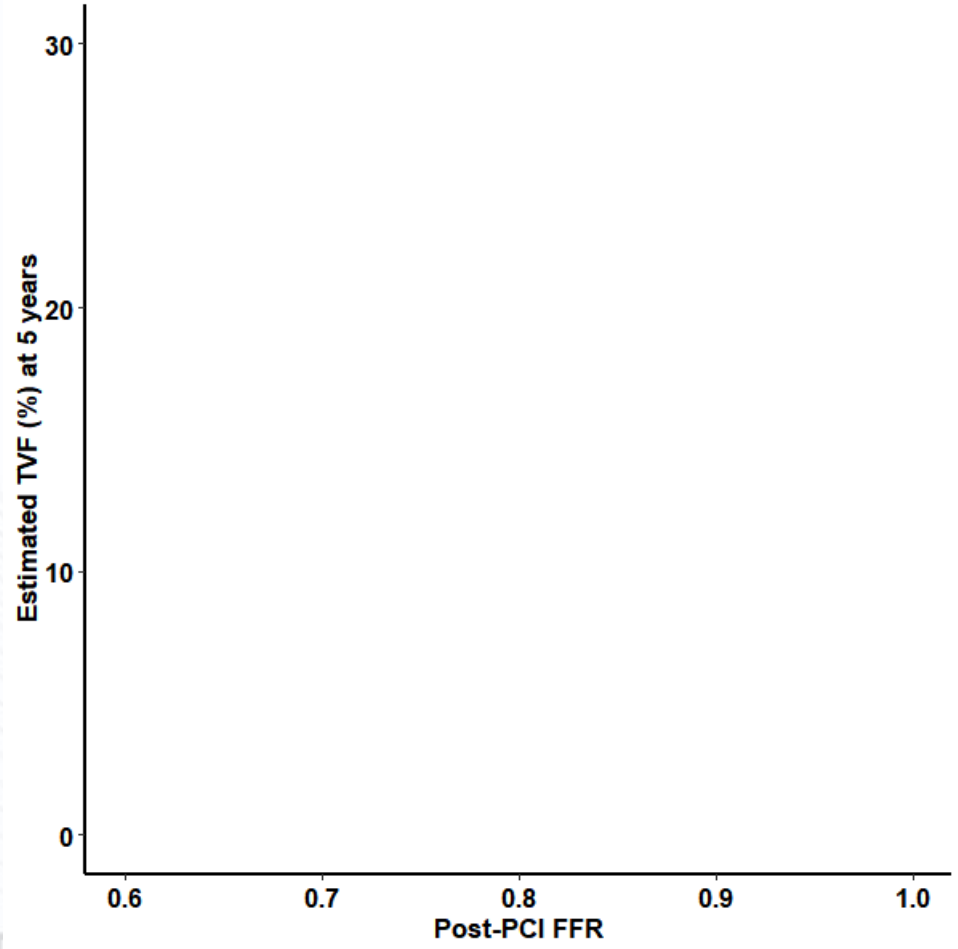


Predictors for clinical events

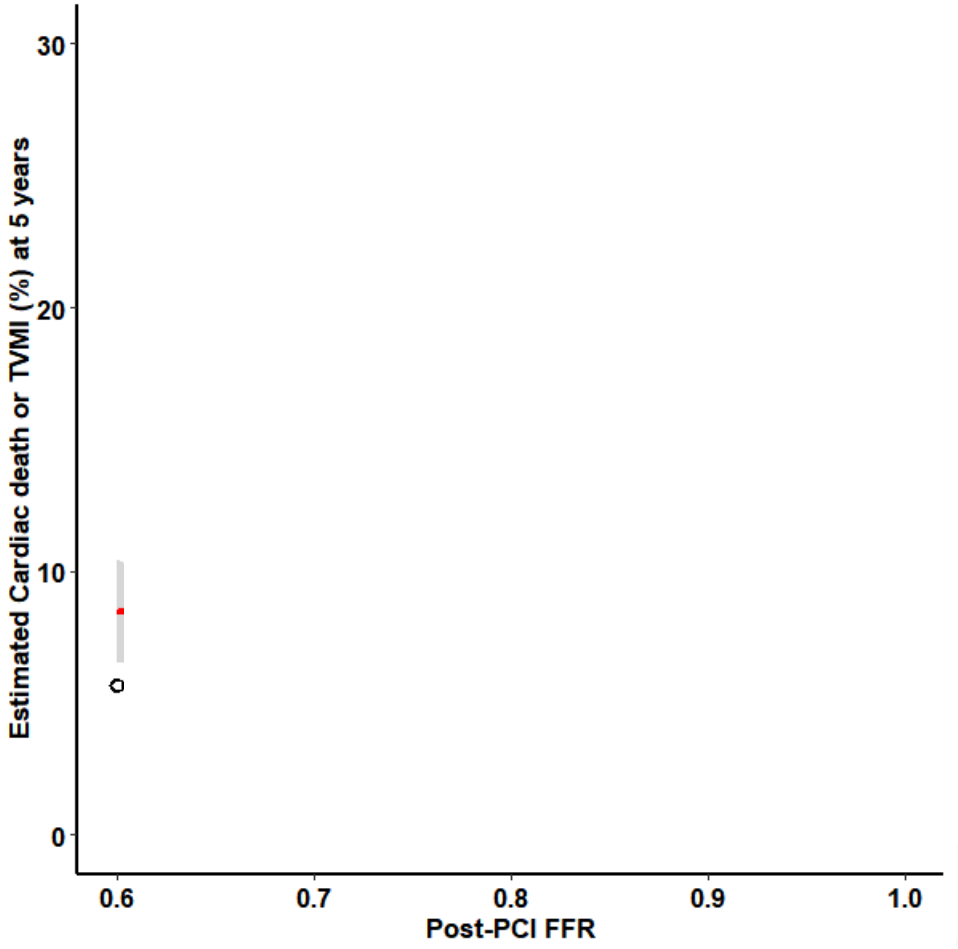
Target vessel failure	Adjusted HR (95% CI)	p-value
Post-stent FFR, every 0.01 decrease	1.05 (1.03-1.07)	<0.001
Age, every 1 year increase	1.02 (1.01-1.04)	0.001
Male	1.42 (1.03-1.97)	0.034
Diabetes mellitus	1.29 (1.00-1.68)	0.052
Cardiac death or TVMI	Adjusted HR (95% CI)	p-value
Post-stent FFR, every 0.01 decrease	1.04 (1.01-1.08)	0.015
Age, every 1 year increase	1.07 (1.05-1.10)	<0.001
Diabetes mellitus	1.69 (1.07-2.69)	0.026

Post-PCI FFR and Risk for clinical events

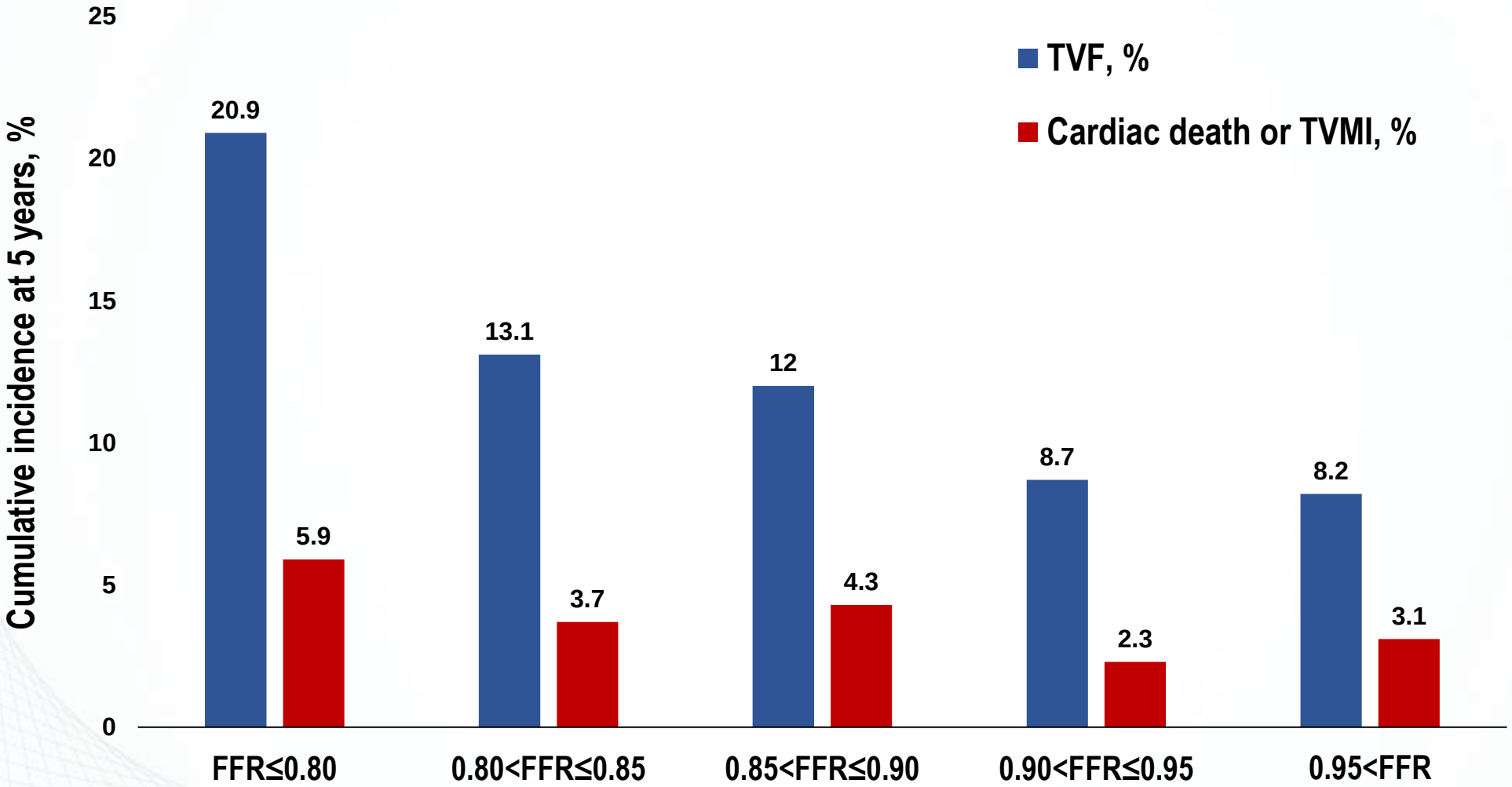
Target vessel failure



Cardiac death or TVMI

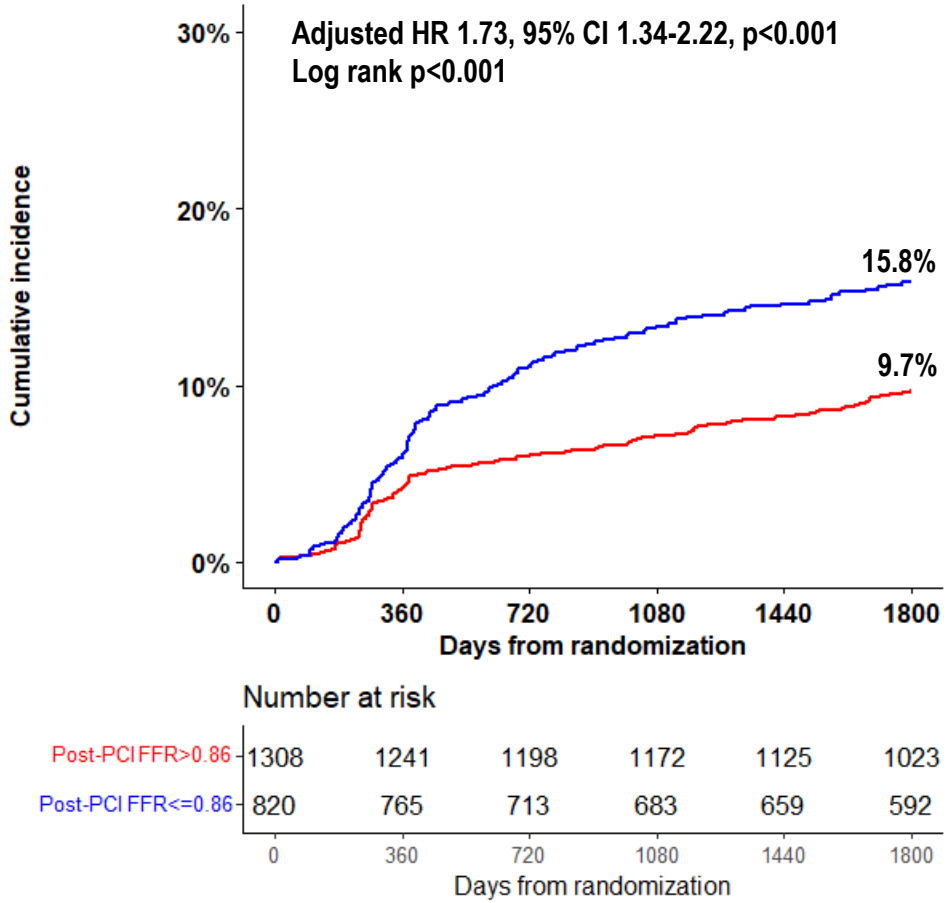


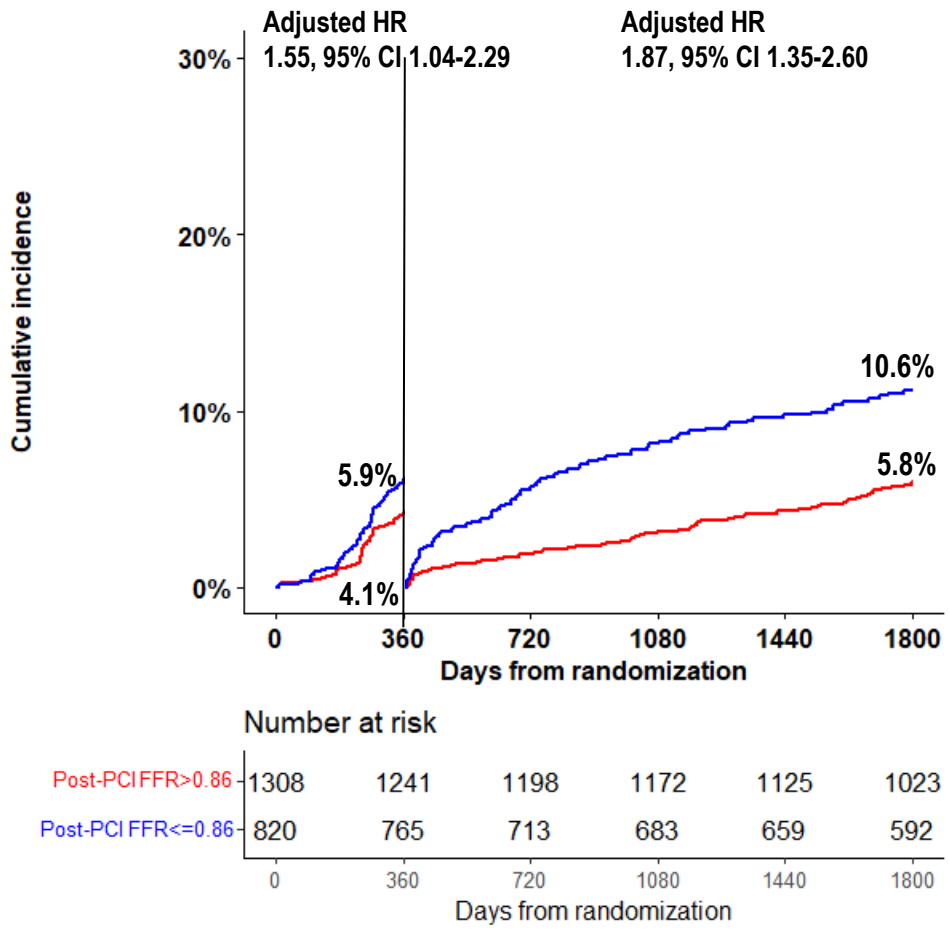
Post-PCI FFR and Risk of clinical events



Risk for clinical events according to optimal cut-off value

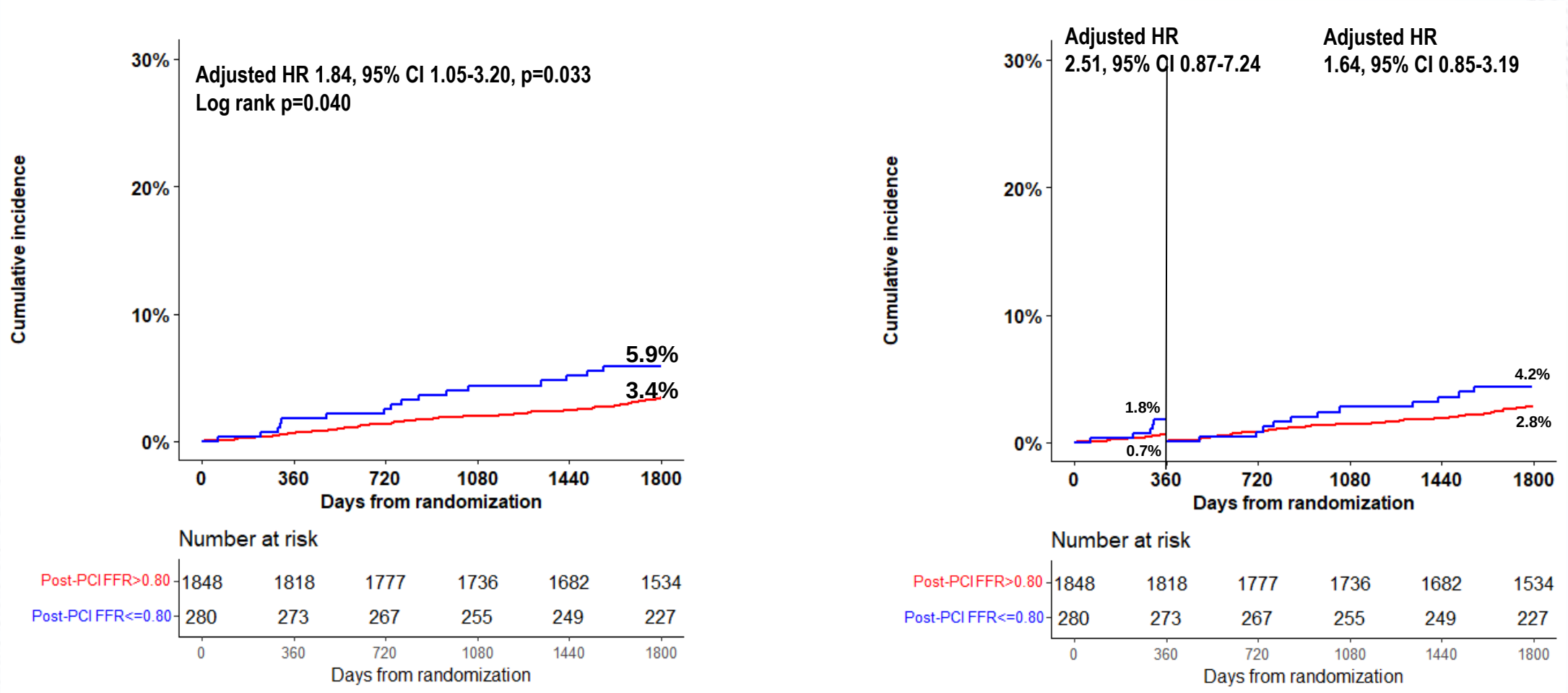
Target vessel failure





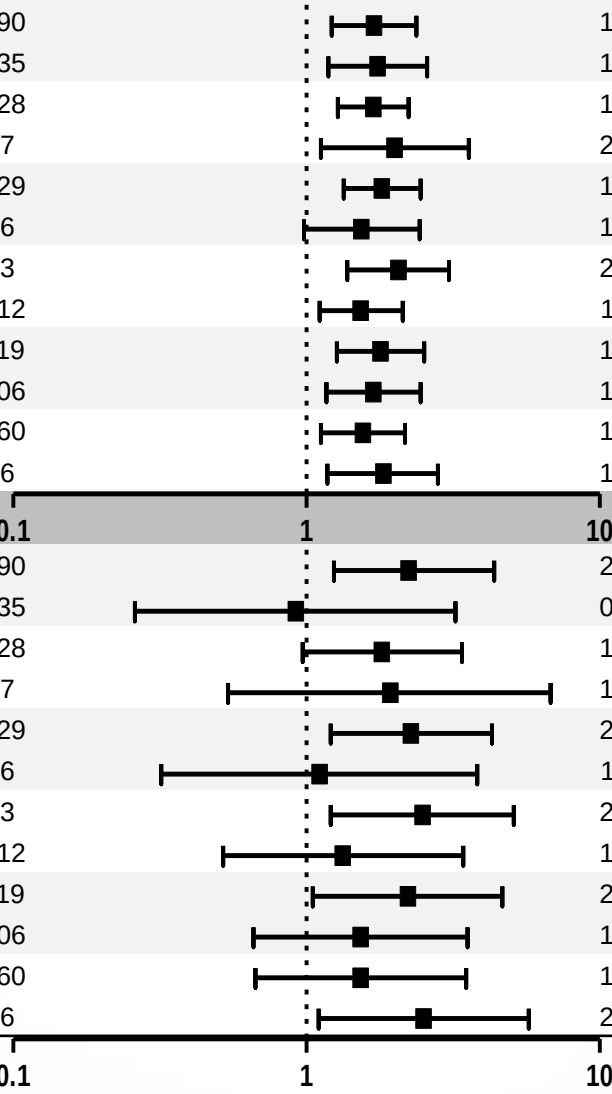
Risk for clinical events according to optimal cut-off value

Cardiac death or Target vessel MI

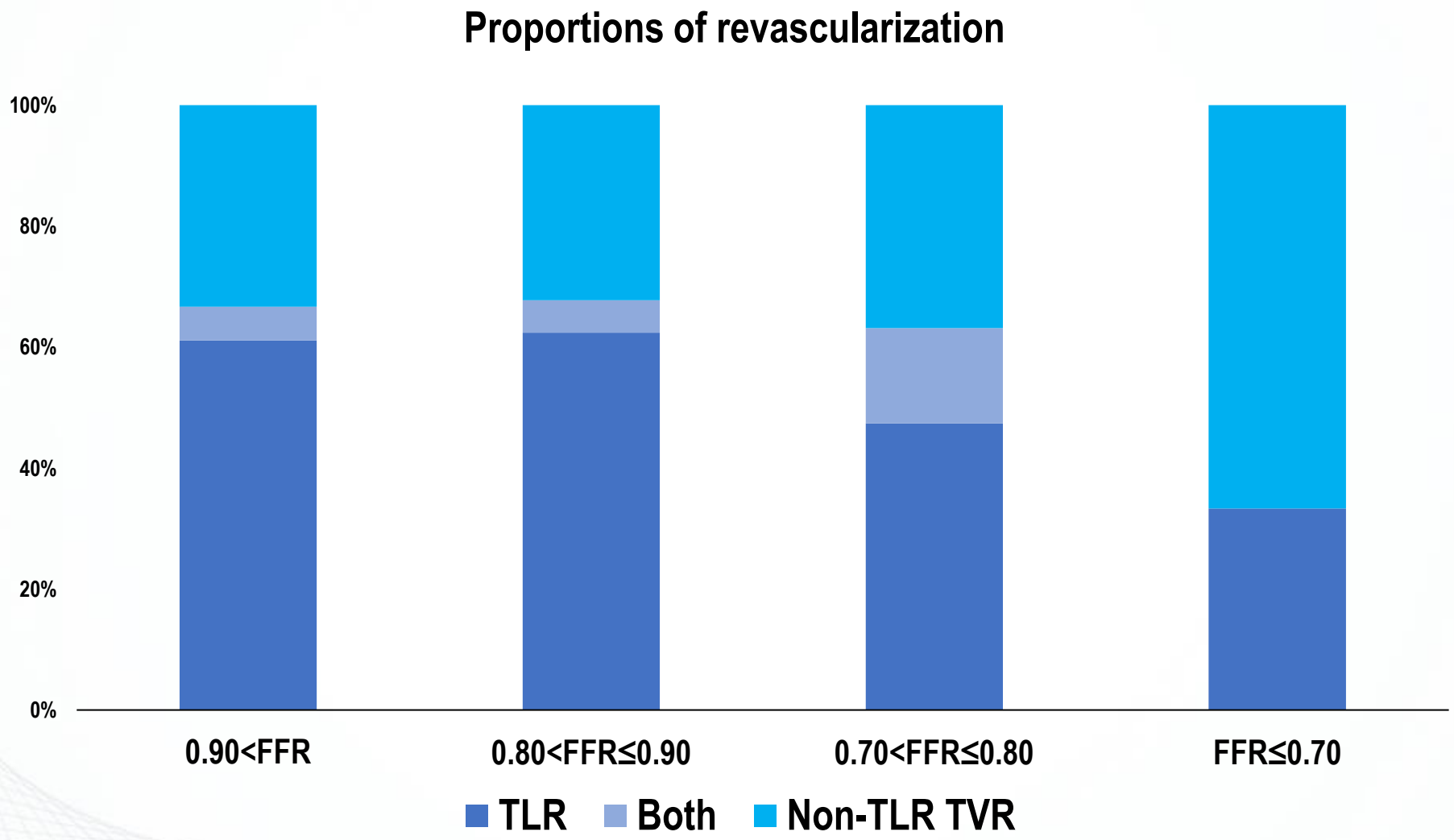


Risk for clinical events according to FFR in subgroups

	Patient number	Adjusted HR*(95% CI)	p-value	Interaction p-value
Target vessel failure (0.86)				
Age≥65 years	1,090	1.70 (1.22-2.37)	0.002	0.881
Age<65years	1,035	1.75 (1.19-2.58)	0.005	
Male	1,628	1.69 (1.28-2.23)	<0.001	0.927
Female	497	2.00 (1.12-3.58)	0.020	
With HTN	1,429	1.81 (1.34-2.45)	<0.001	0.562
Without HTN	696	1.54 (0.98-2.43)	0.061	
With DM	713	2.06 (1.38-3.06)	<0.001	0.261
Without DM	1,412	1.53 (1.11-2.13)	0.010	
ACS	1,119	1.79 (1.27-2.52)	<0.001	0.821
Non-ACS	1,006	1.69 (1.17-2.45)	0.005	
With Intracoronary imaging	1,160	1.56 (1.12-2.17)	0.008	0.424
Without Intracoronary imaging	816	1.83 (1.18-2.81)	0.006	
Cardiac death or TVMI (0.80)				
Age≥65 years	1,090	2.33 (1.24-4.37)	0.009	0.249
Age<65years	1,035	0.92 (0.26-3.22)	0.900	
Male	1,628	1.81 (0.97-3.39)	0.063	0.854
Female	497	1.93 (0.54-6.81)	0.309	
With HTN	1,429	2.27 (1.21-4.29)	0.011	0.226
Without HTN	696	1.11 (0.32-3.83)	0.873	
With DM	713	2.49 (1.21-5.10)	0.013	0.372
Without DM	1,412	1.33 (0.52-3.43)	0.552	
ACS	1,119	2.22 (1.05-4.66)	0.036	0.373
Non-ACS	1,006	1.53 (0.66-3.54)	0.326	
With Intracoronary imaging	1,160	1.53 (0.67-3.51)	0.315	0.379
Without Intracoronary imaging	816	2.51 (1.10-5.73)	0.029	



Location of revascularization according to post-PCI FFR



Summary

- Low post-PCI FFR was not uncommon.
- Post-PCI FFR was inversely associated with the 5-year risk of TVF and of cardiac death or MI, and was an independent predictor for 5-year clinical outcomes.
- Low post PCI FFR (≤0.86 for TVF, ≤ 0.80 for cardiac death or MI) was associated with the increased risk for both the short- and long-term clinical events. This finding was consistent in subgroups.
- As post-PCI FFR value decreased, events occurred more in non-stented segments.

Limitations

- The study population was from 4 different observational registries, and the inherent limitations of observational registry study should be considered.
- We could not evaluate the role of intracoronary imaging, such as OCT or IVUS on the post-stent FFR value and clinical outcomes.
- The data on pullback pressure recordings of post-PCI FFR were not available.
- Information regarding medical treatment was not available in this study.

Conclusions

- Low post-PCI FFR values are common after DES implantation, and independently associated with the long-term risk of TVF and of cardiac death or TVMI.

- These results indicate prognostic value of post-PCI physiologic assessment in patients with DES implantation.