# Functional versus Culprit-only Revascularization in Elderly Patients with Myocardial Infarction and Multivessel Disease: the FIRE Trial

## 2019 Update in intracoronary physiology

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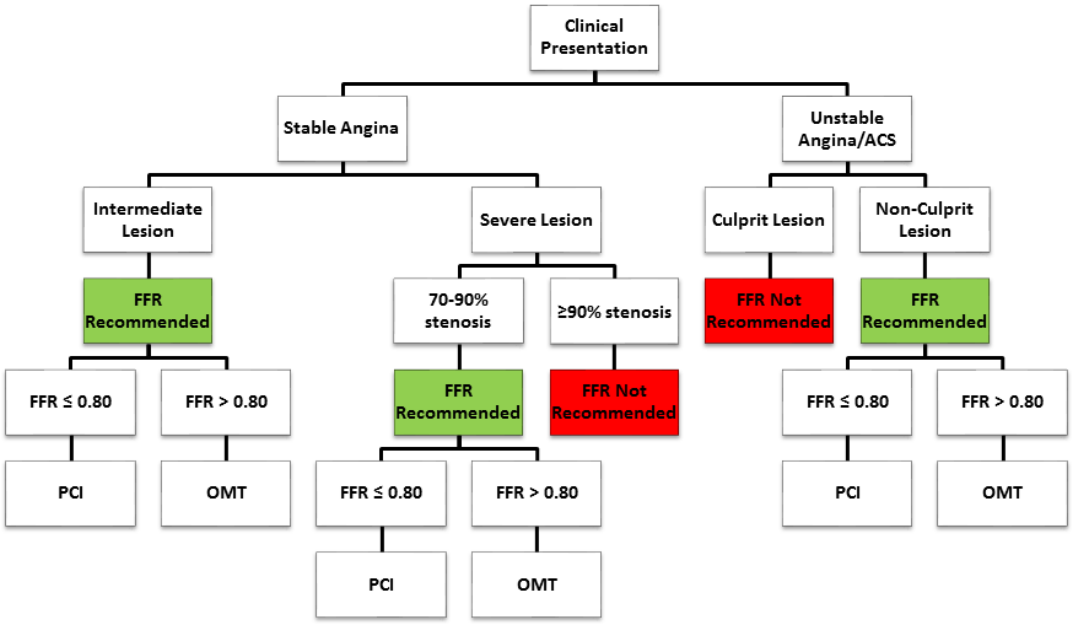
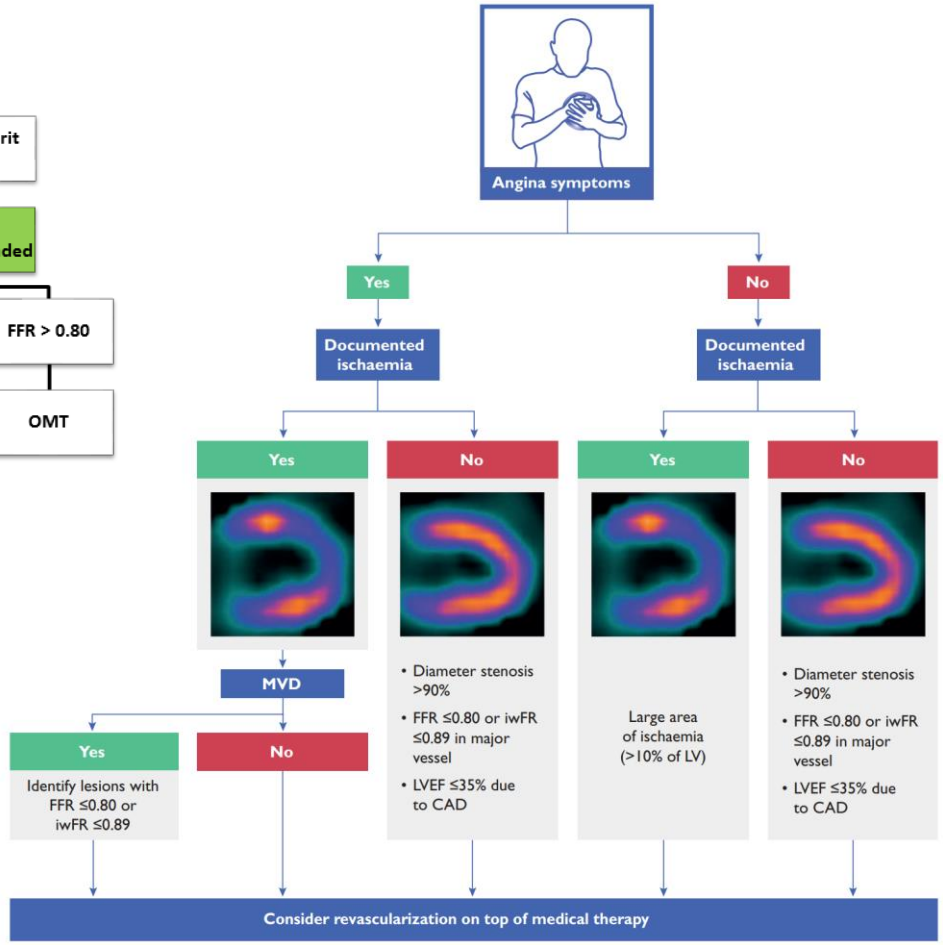
- EX LABORE FRUCTUS -

# Current evidence for Intracoronary Physiology




**Gold standard for lesion assessment before revascularization**

ESC guidelines

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# News from Intracoronary Physiology

- FFR or iFR or QFR to «map» the vessel
- New data for more applications:
  - Post-PCI
  - Reduced LVEF
- Improvement in the management of MVD

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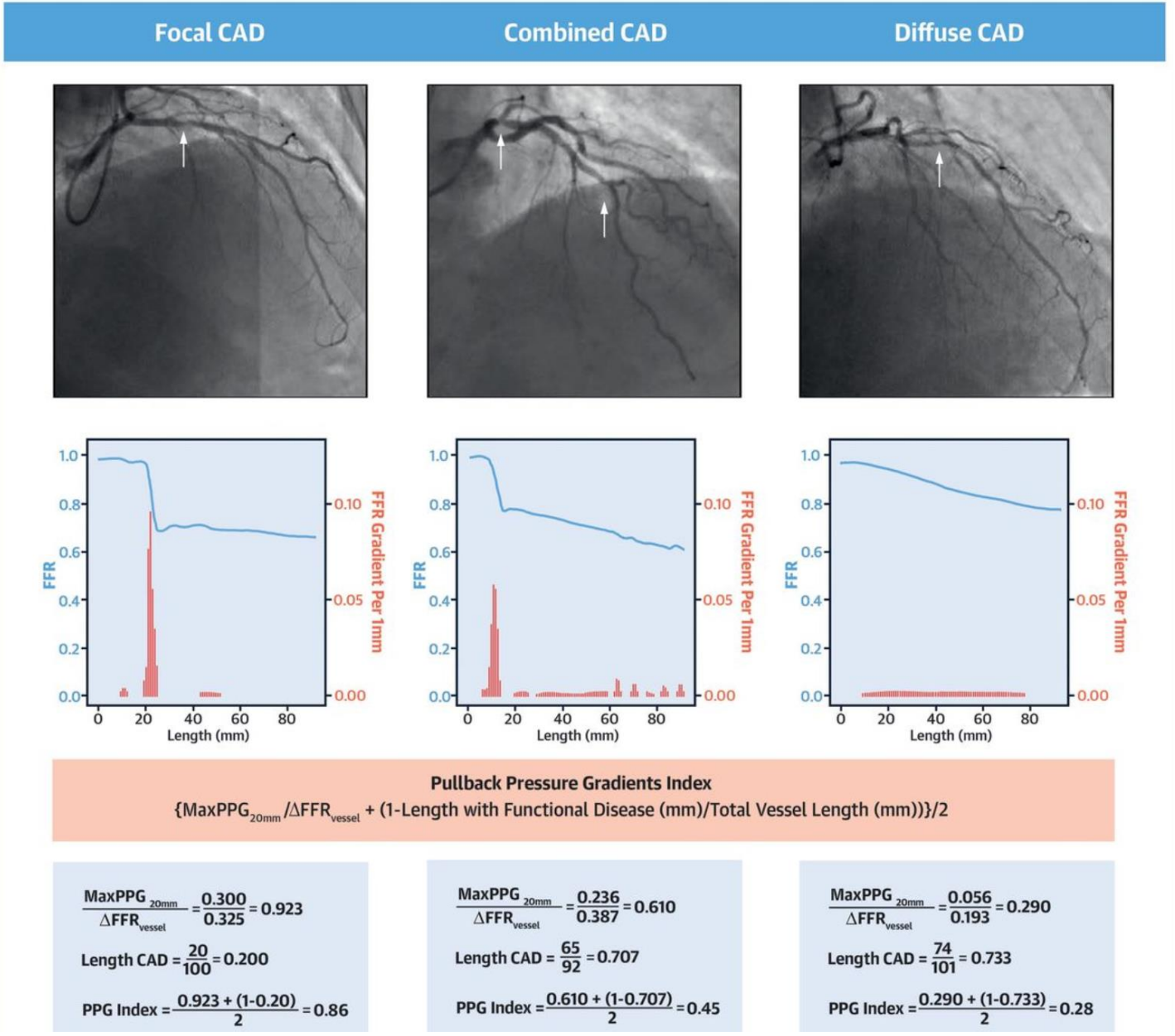
# Pullback Pressure Gradient Index - FFR -

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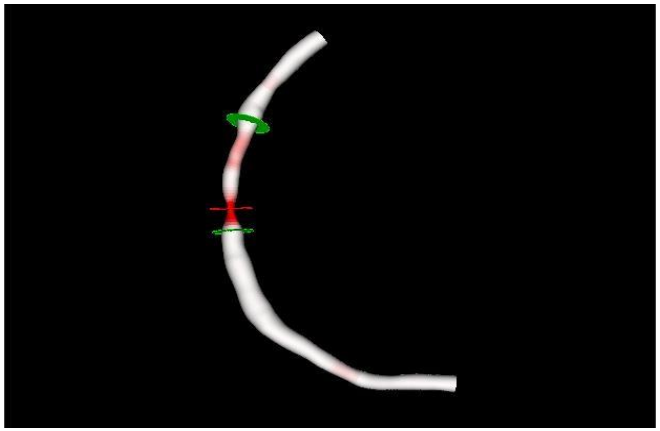
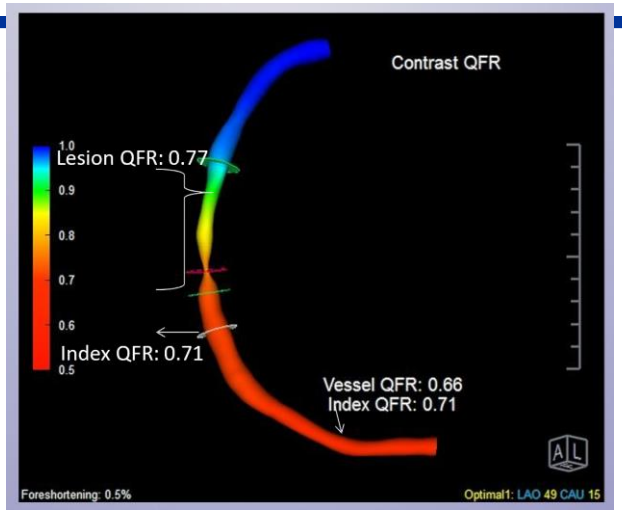
# Quantitative Flow Ratio






## 3D QCA

3D vessel modelling by QAngioXA 3D is the backbone for the PCI procedure:

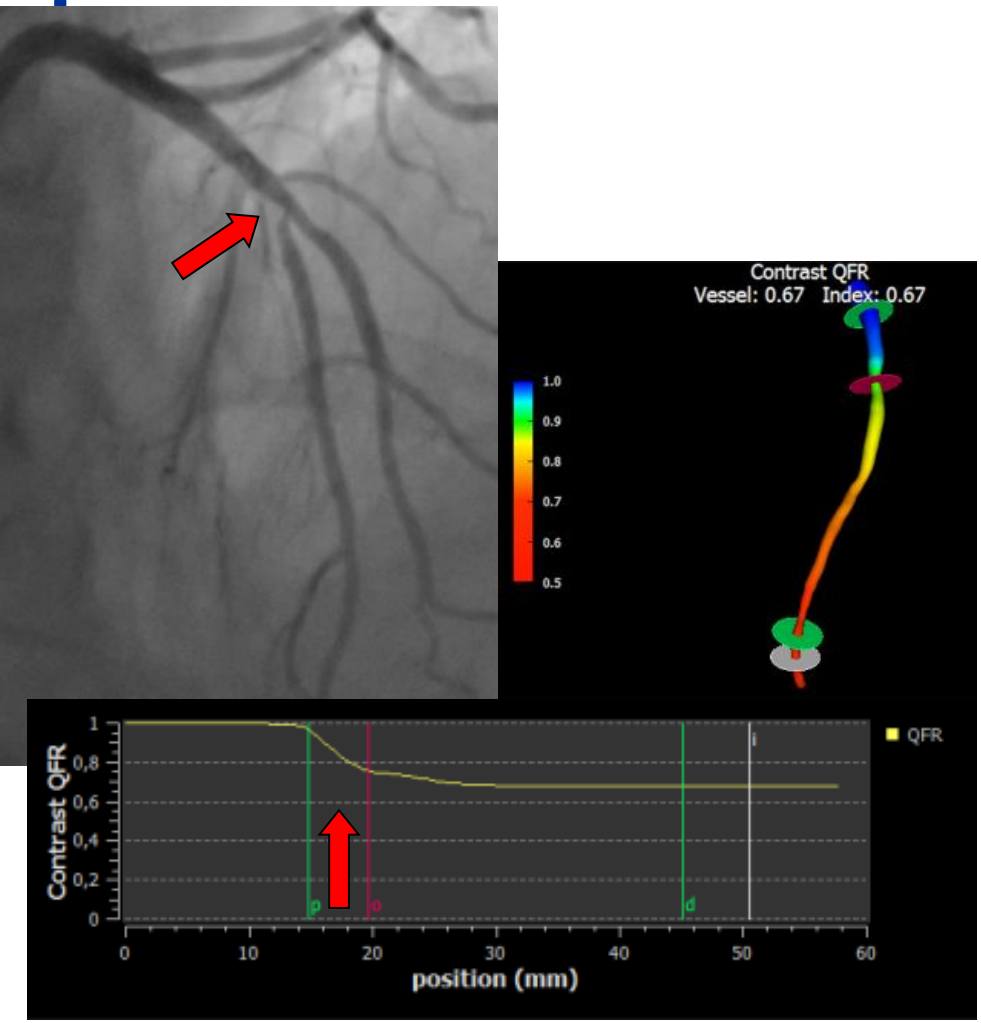
- Allows the calculation of the functional significance parameter QFR *and* the QFR pullback curve
- Optimal viewing angle for PCI
- Precise stent sizing
- Co-registration with OCT or IVUS

- Three modelling methods
  - Fixed flow QFR
  - Basal/Rest QFR
  - Hyperaemic QFR

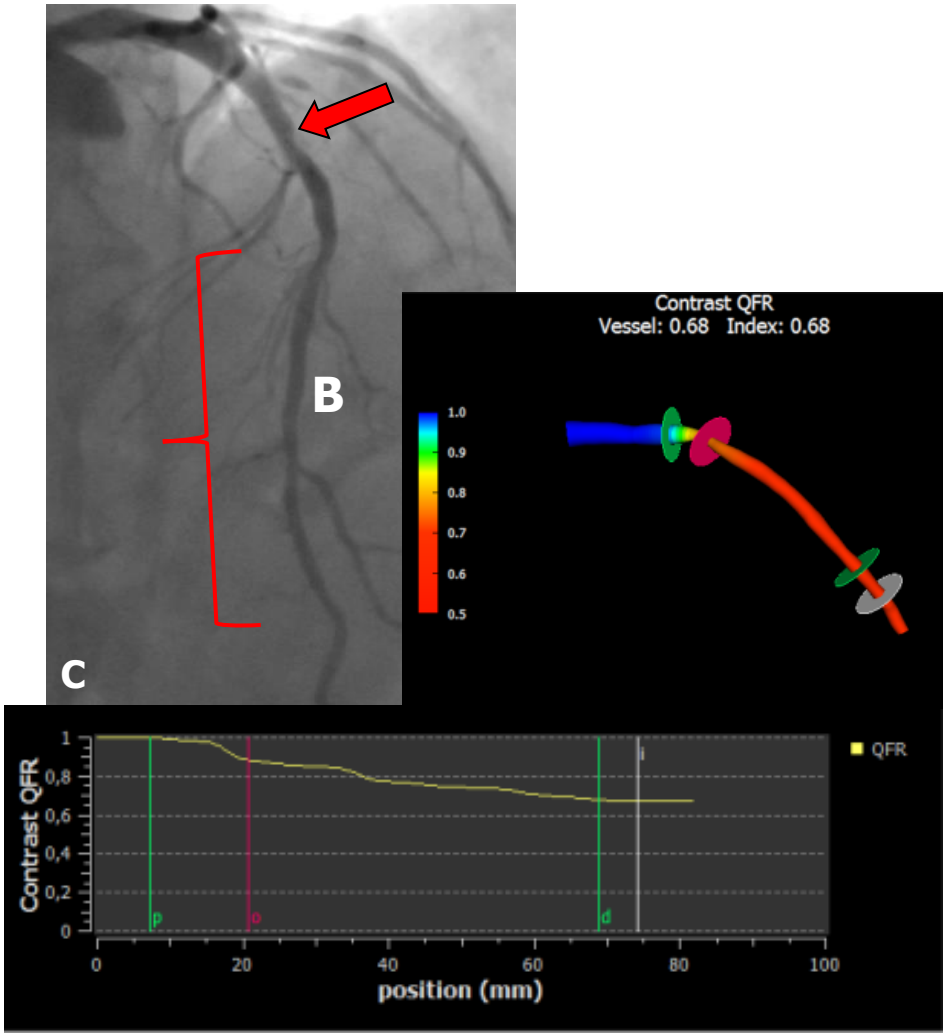
In all cases we model the hyperaemic condition of the flow. So we mimic the FFR condition and NOT the Pd/Pa or iFR

- Fixed Flow QFR
  - Is taking into account an empirical flow through the vessel of interest (in hyperemic situation)
  - Fast and easiest, but larger variability than other methods
- <u>Contrast QFR:</u>
  - Is using the flow velocity in normal coronary angiograms to determine the flow
- <u>Hyperemic QFR:</u>
  - Is using the flow velocity in hyperemic coronary angiograms (with adenosine) to determine the flow

# Quantitative Flow Ratio




Focal disease




Focal + diffuse disease

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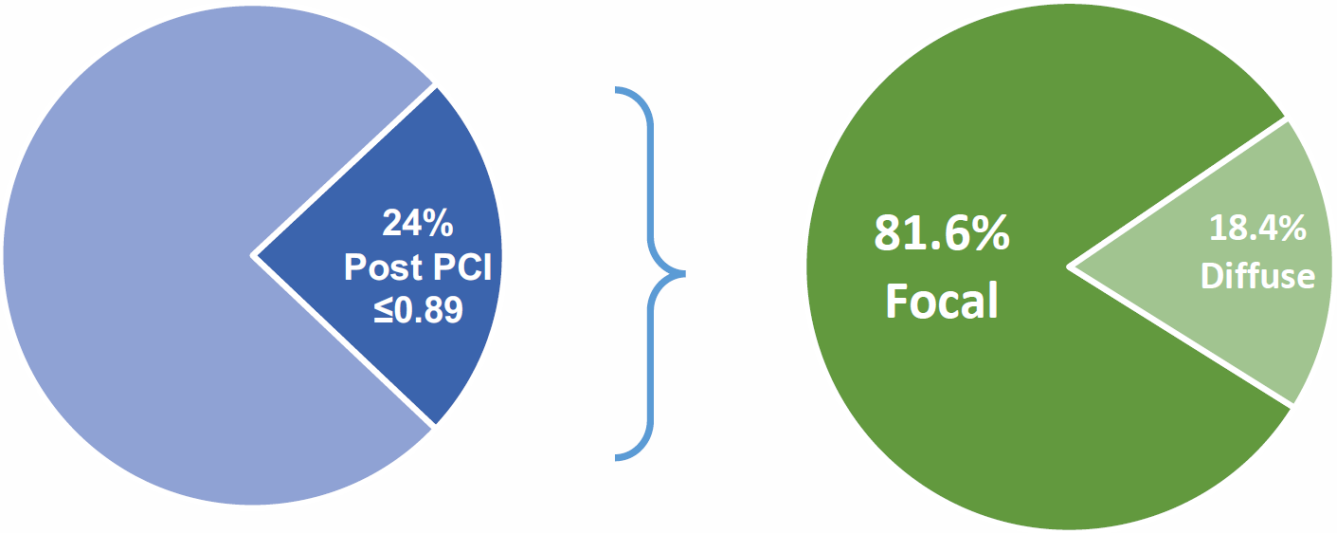
# Post-PCI iFR - DEFINE PCI

## Primary Study Endpoint

480 Patients with Angiographically Successful PCI and qualified iFR pullbacks

24% Residual Ischemia (112 patients with Post PCI iFR≤0.89)




Focal defined as step-up of ≥0.03 units in < 15 mm segment
Diffuse defined as > 15 mm segment

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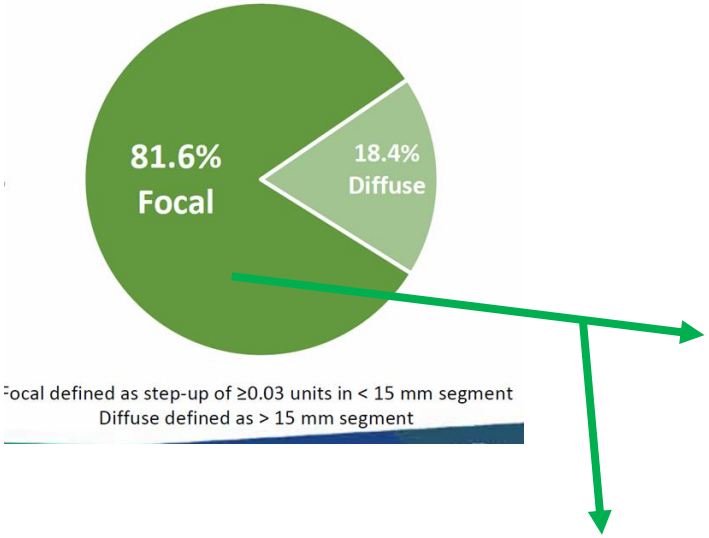
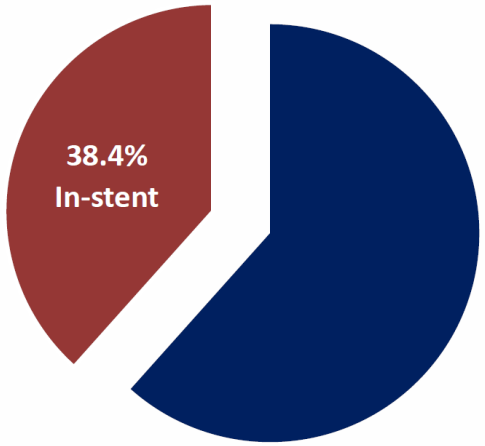
# Post-PCI iFR - DEFINE PCI




Focal Instent

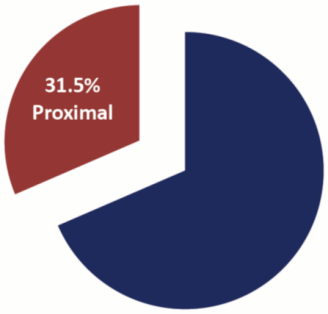
## Integrazione con IVUS e OCT

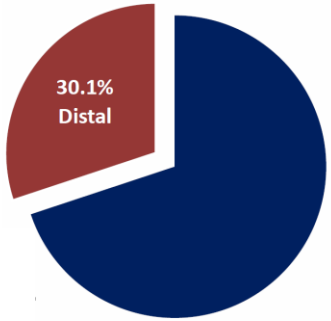



## «Physiology miss»

**Better plan of PCI procedure with «preventive» Physiology map of the vessel**

Focal Outside Stent

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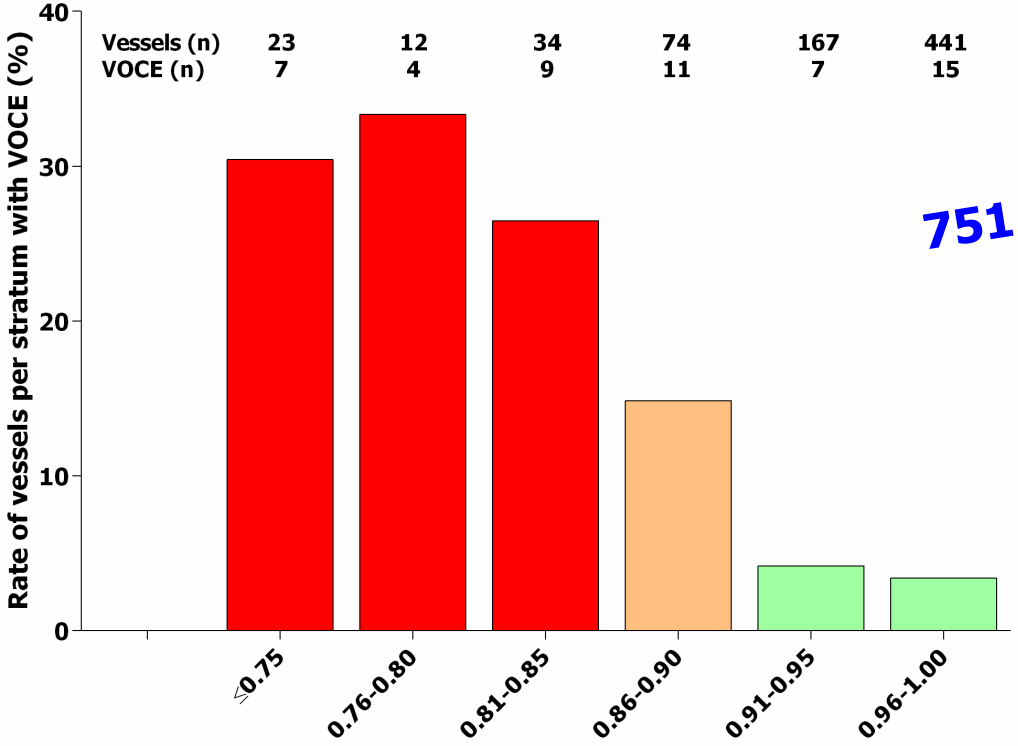
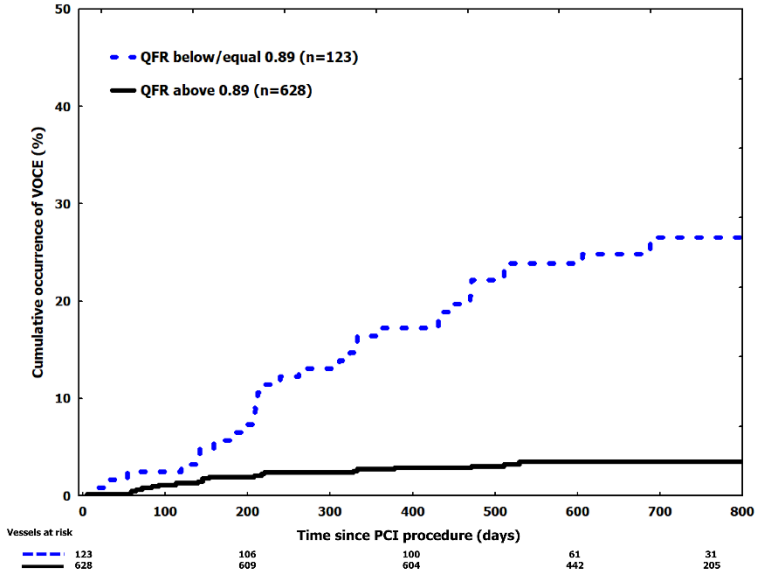
# Post-PCI QFR – HAWKEYE trial




**751 coronary lesions treated with stent in 602 patient**

**- Analysis per vessel -**

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# Post-PCI QFR – HAWKEYE trial

***Revascularization with successful stent implantation***

***Post-PCI measurement of QFR***

***QFR value >0.89***

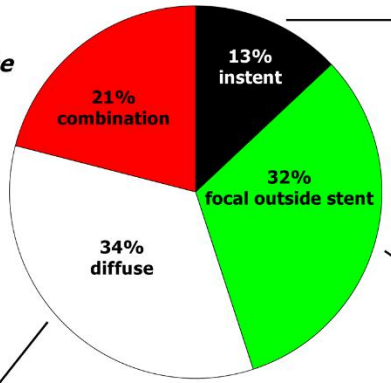
*Low rate of adverse events and need of repeat revascularization*

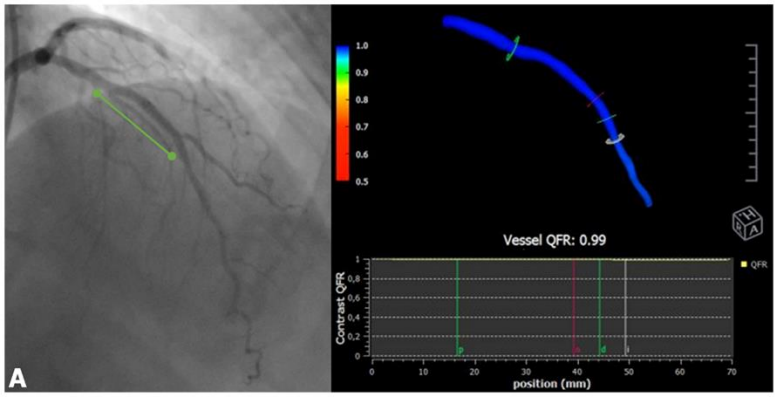
***QFR value ≤0.89***

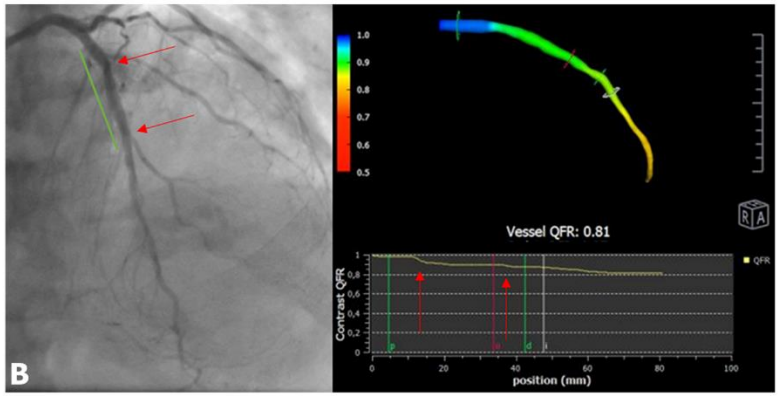
*3-time increase in the risk of VOCE*

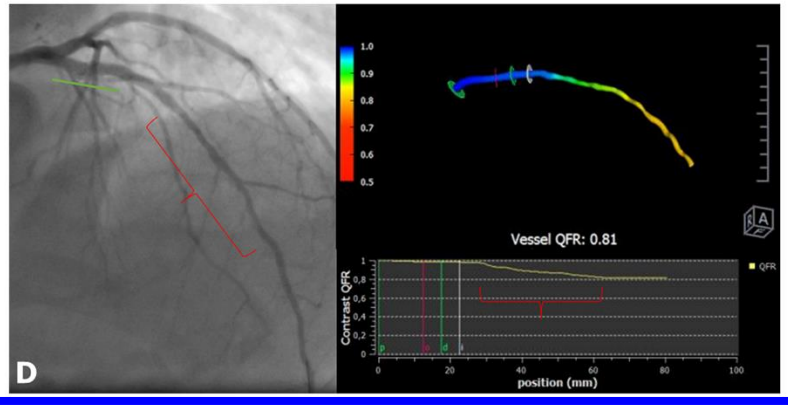
*Adjusted HR 2.91, 95%CI 1.63-5.19*

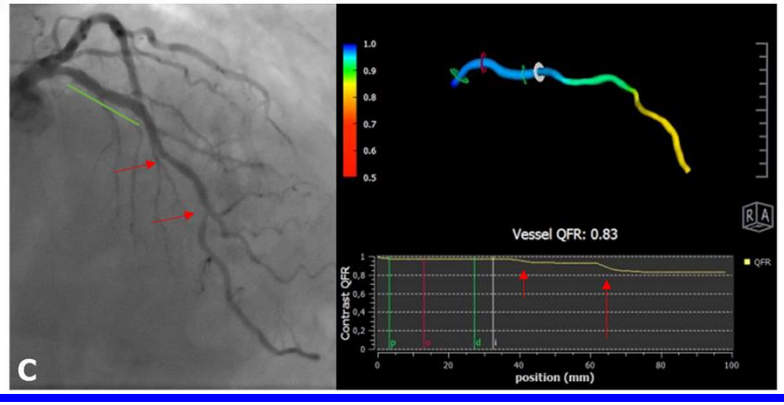
***Identification of the site of QFR drop***

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# News from Intracoronary Physiology

- **FFR or iFR or QFR to «map» the vessel**
- **New data for more applications:**
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  - **Reduced LVEF**
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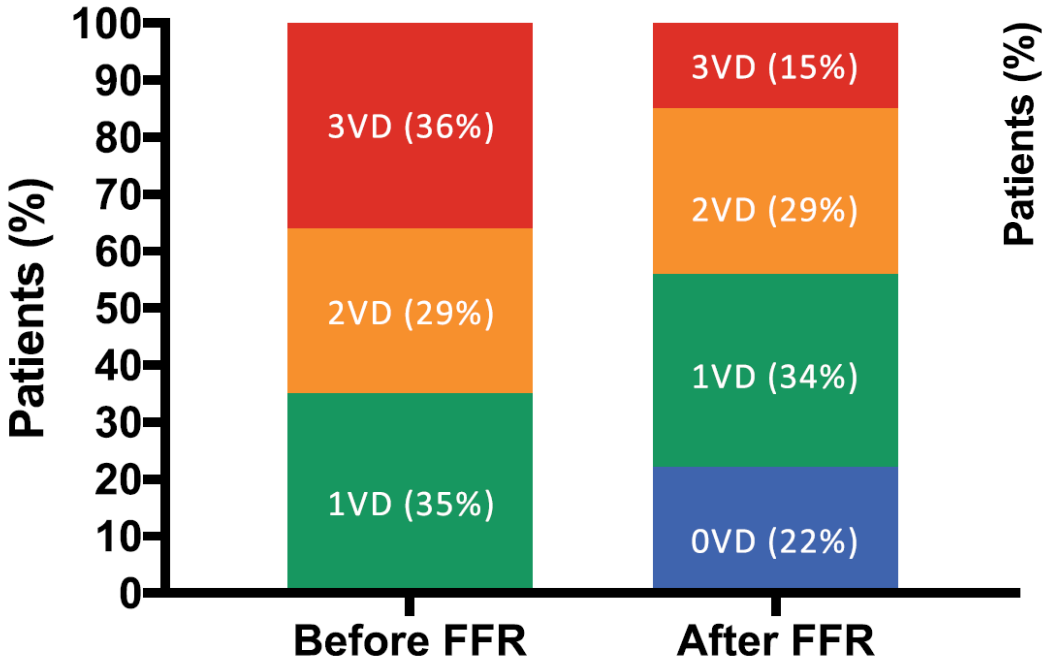
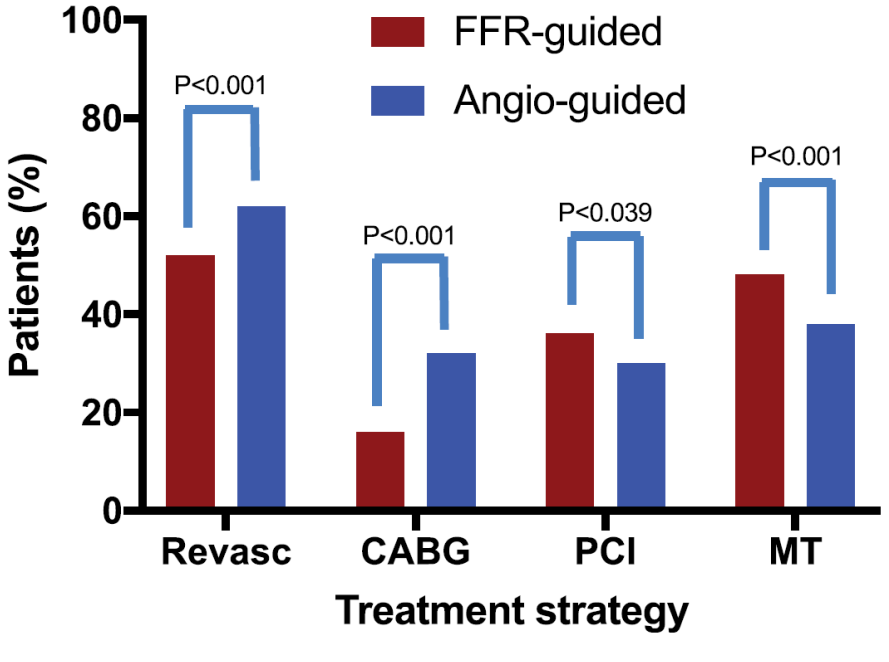
# Reduced LVEF

Nevertheless, there is no available data on the safety and on the long-term impact of an FFR-guided management strategy in patients with left ventricular systolic dysfunction. Therefore, we retrospectively evaluated the real-world impact of FFR on revascularization decisions and 5 years of clinical outcomes in patients with reduced LVEF and associated CAD.

**433 patients with LVEF <50% undergoing FFR-guided PCI vs. 2399 patients with angio-guided PCI**

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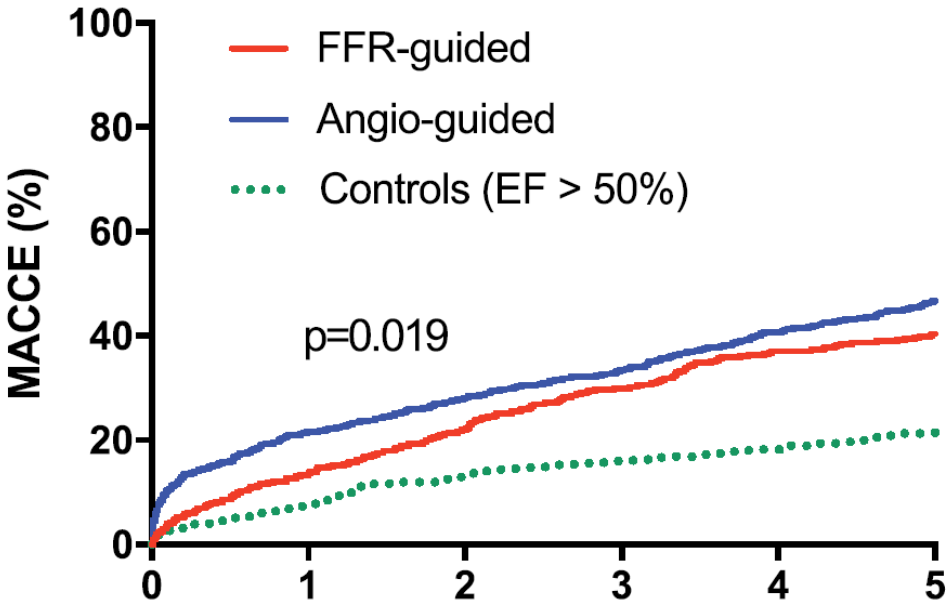
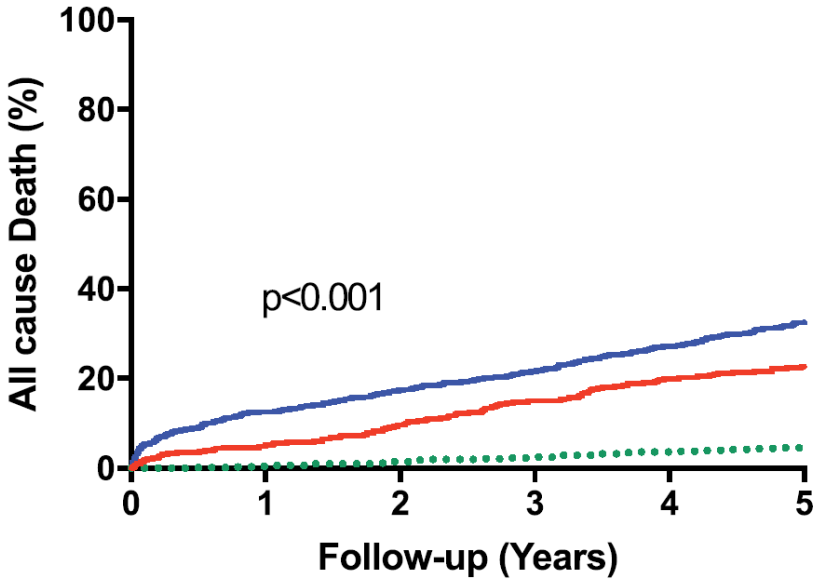
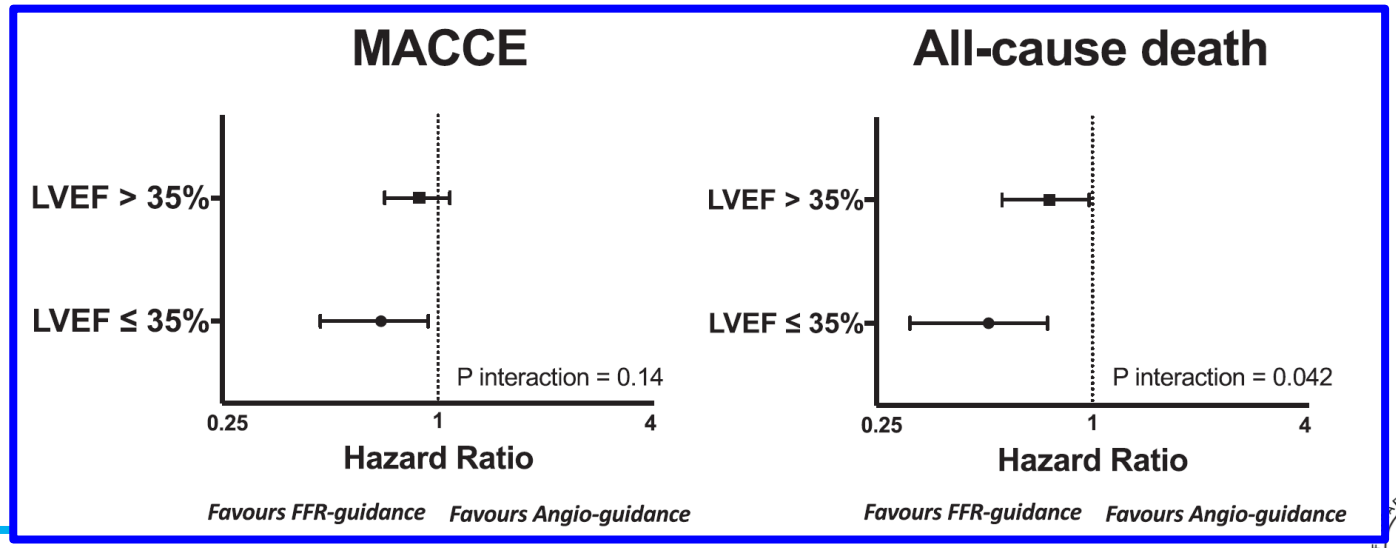
# Reduced LVEF

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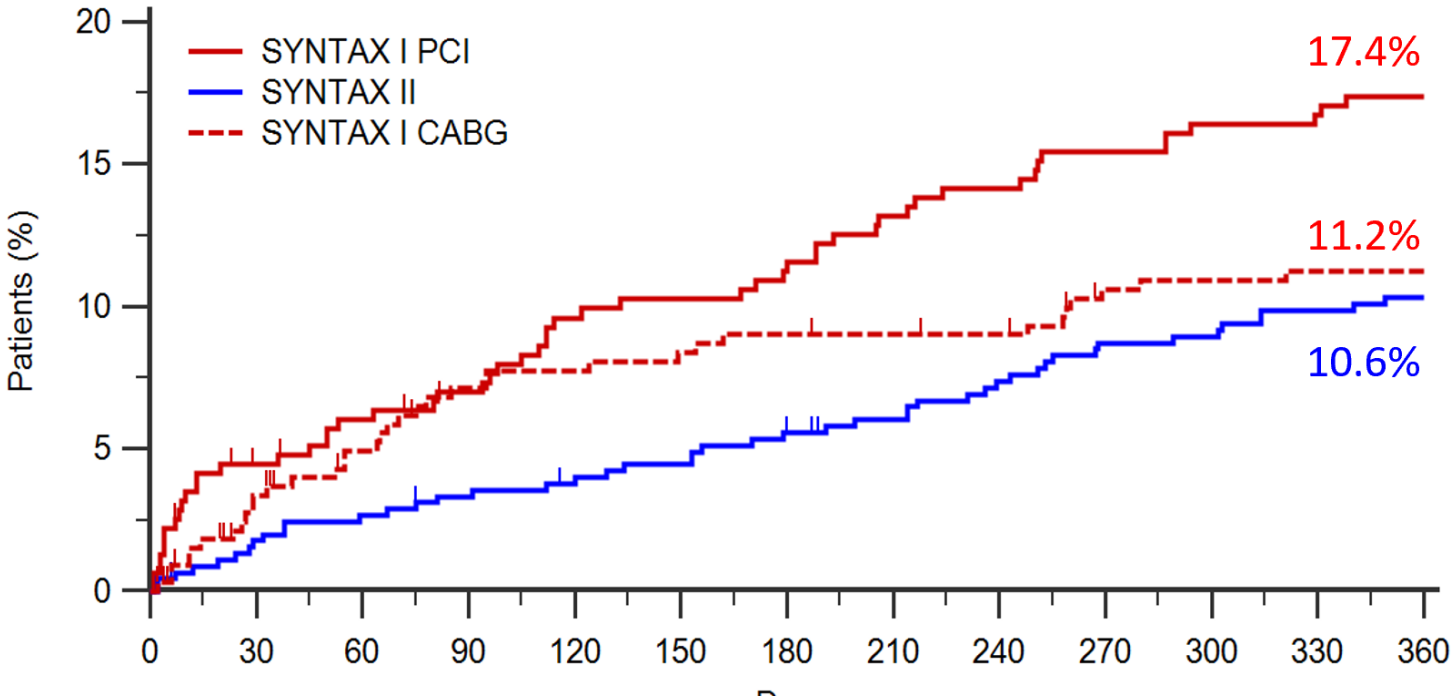
# The SYNTAX II trial

## MACCE SYNTAX II and SYNTAX I PCI / CABG

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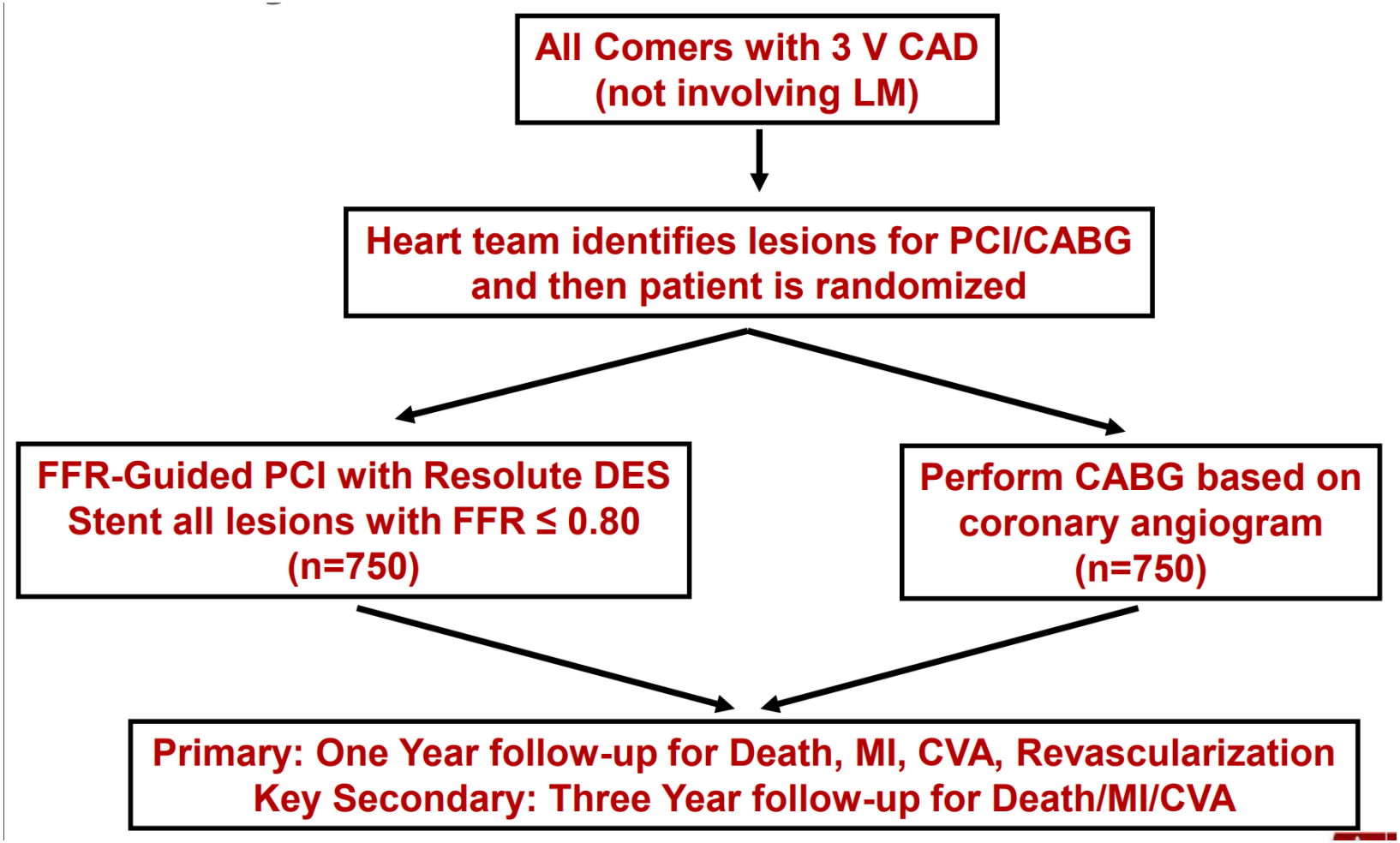
# The FAME 3 trial

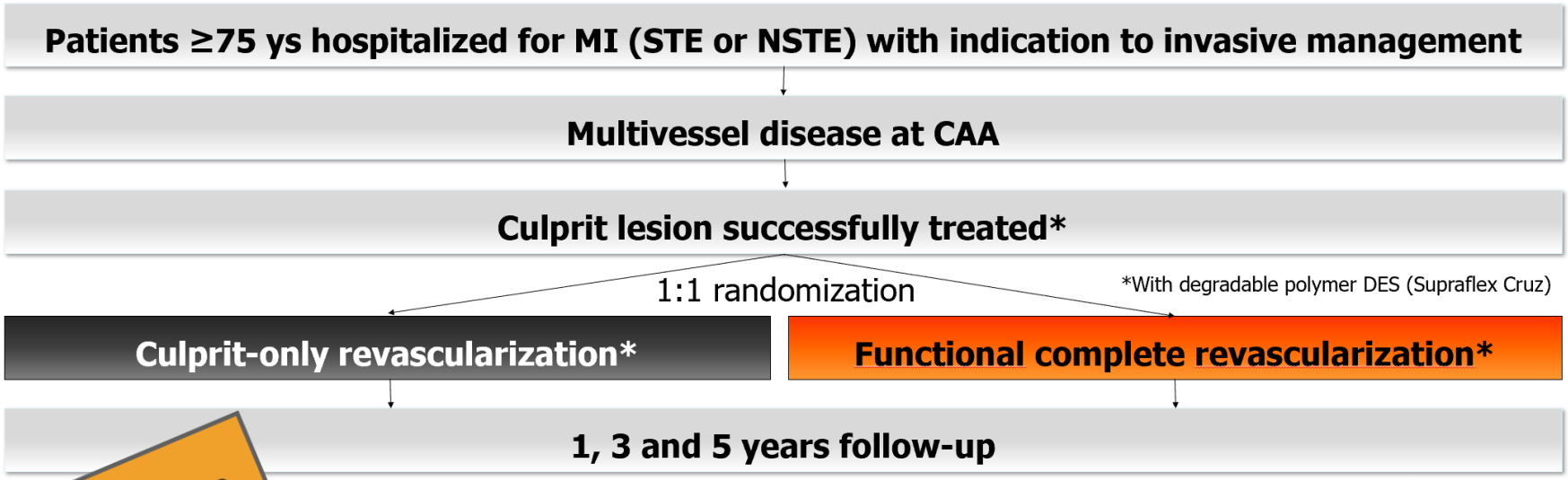


# The FIRE trial

www.thefiretrial.com

theFIRE_trial

**All comers, prospective, randomized, multicenter, open-label trial with blinded adjudicated evaluation of outcomes (PROBE).**




**Sample Size 1400 patients**

**Primary endpoint at 1 -year:**

**all-cause death, any MI, stroke, revascularization**

FIRE TRIAL

# Conclusions

- **Despite 30 years of RCTs and registries intracoronary physiology is underused**
- **We must defeat the operator's confidence in visual assessment alone**
- **Intracoronary Physiology applications are growing and permit a better planning and outcome of PCI procedures, also in challeging scenario**

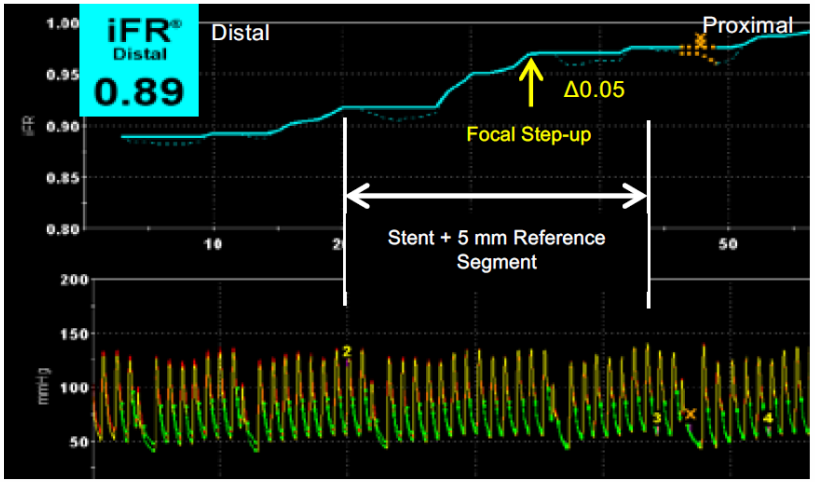
THIS IS NOT THE END.
We are moving toward a grand and glorious finish.

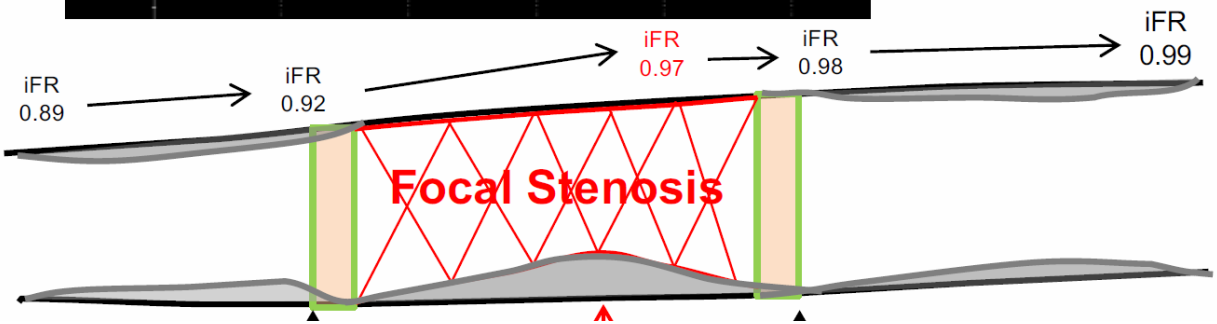
# Post-PCI iFR - DEFINE PCI

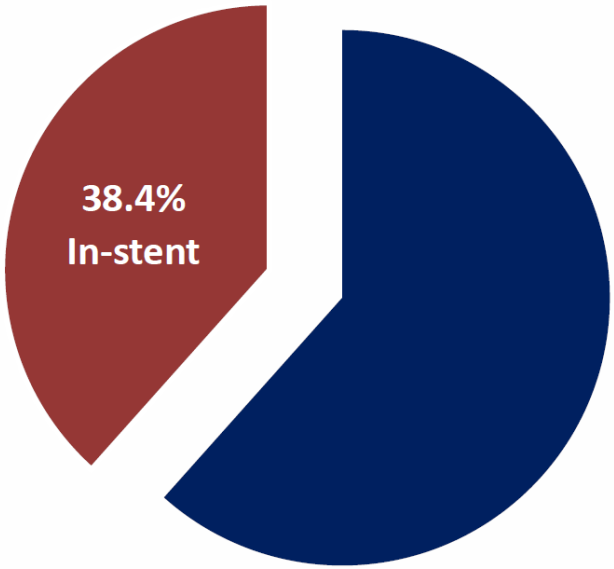
**Integrazione con IVUS e OCT**

## Focal Residual Pressure Gradient in-stent

Among the 93 vessels with focal disease, there were 146 segments (stent, proximal or distal) that had significant residual pressure gradients

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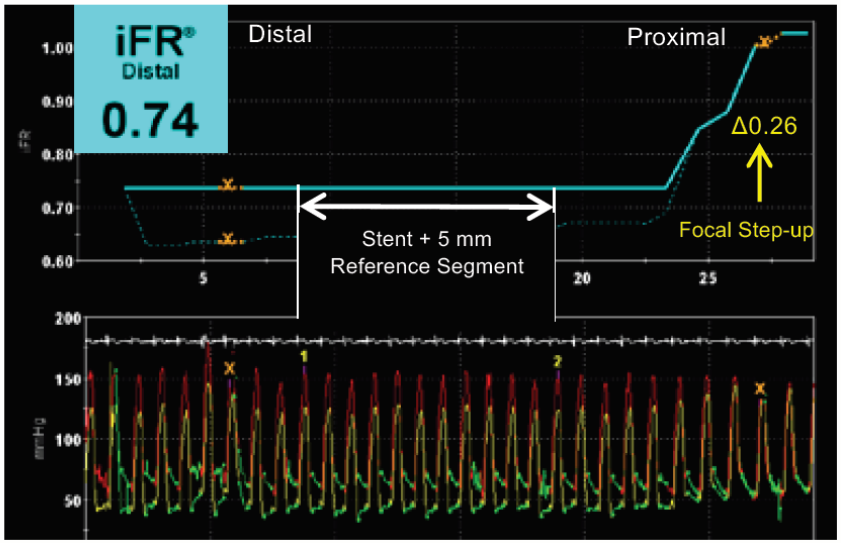
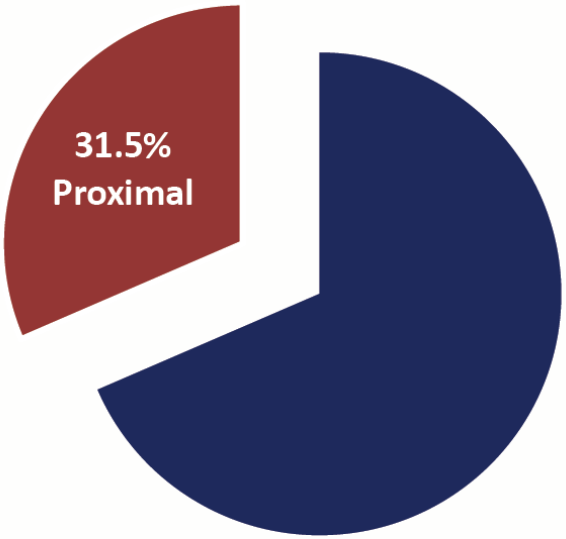
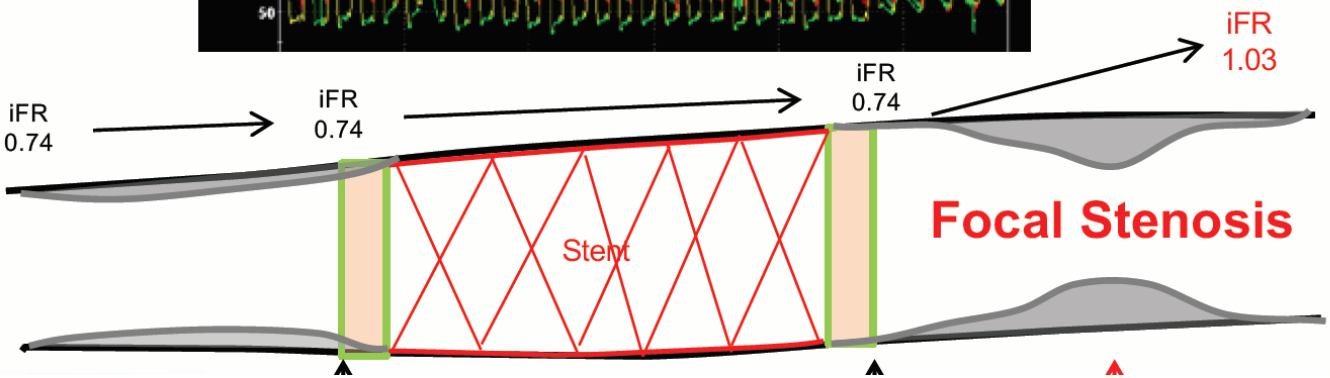
# Post-PCI iFR - DEFINE PCI

## Focal Residual Pressure Gradient Prox to stent

'Physiologic miss' occurred in 31.5% of focal lesions proximally

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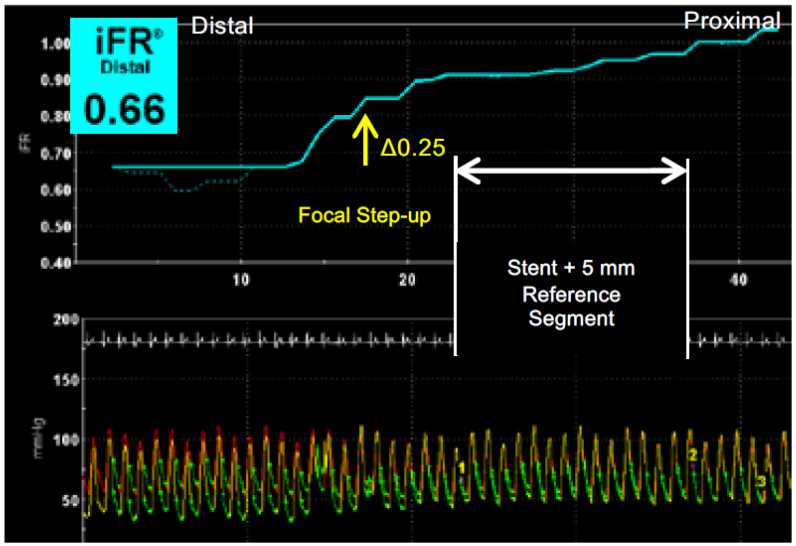
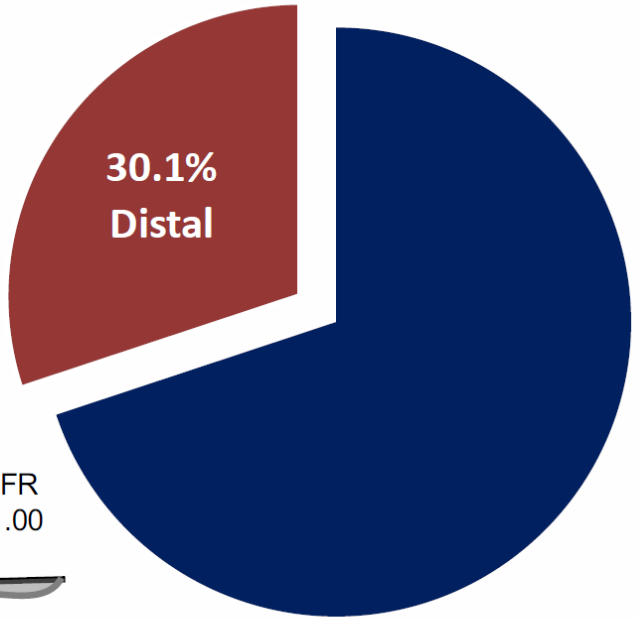
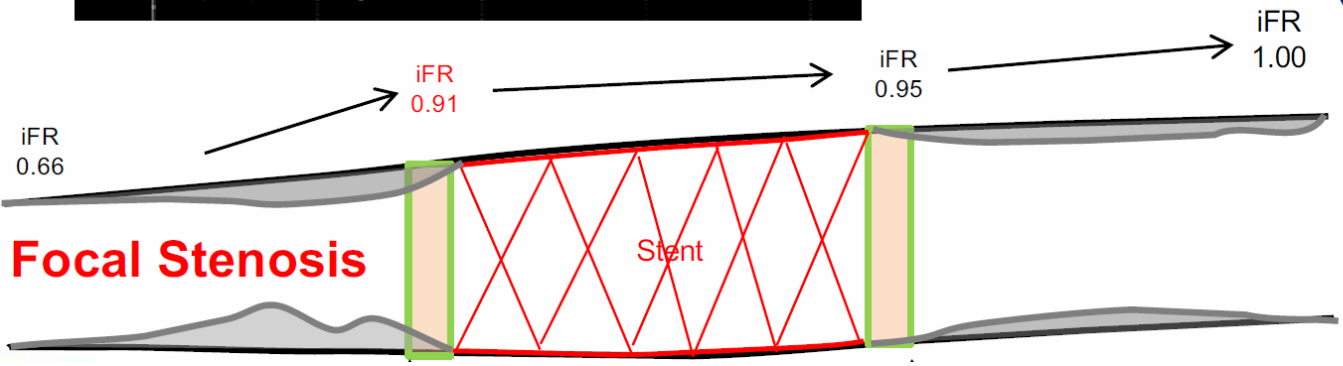
# Post-PCI iFR - DEFINE PCI

## Focal Residual Pressure Gradient Distal to stent

'Physiologic miss' occurred in 30.1% of focal lesions distally

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