PLATFORM

Prospective **L**ongitudin**A**l **T**rial of **F**FFR_{CT} **O**utcome and **R**esource I**M**pacts

Clinical outcomes of FFR_{CT}-guided diagnostic strategies versus usual care in patients with suspected coronary artery disease

Pamela S. Douglas, Gianluca Pontone, Mark A. Hlatky, Manesh R. Patel, Campbell Rogers, Bernard De Bruyne

On behalf of the PLATFORM Investigators

Supported by HeartFlow Inc, Redwood, CA, USA

Duke Clinical Research Institute

HeartFlow

Background and Aim

- The optimal evaluation of new onset stable chest pain is uncertain. Ideally, testing will clarify the diagnosis and direct subsequent care while maximizing efficiency and safety.
- The recent PROMISE and SCOT-HEART trials compared anatomic and functional strategies, finding that CTA improved processes of care. However, CTA also increased rates of invasive catheterization and revascularization with no significant reduction in events.
- Fractional Flow Reserve derived from CTA (FFR_{CT}) may address these limitations by providing both functional and anatomic data.
- **STUDY AIM:** To determine whether use of a CTA/FFR_{CT} guided strategy, as compared to standard practice, will reduce the rate of invasive angiograms that show no obstructive CAD, without increasing the occurrence of major cardiac events.

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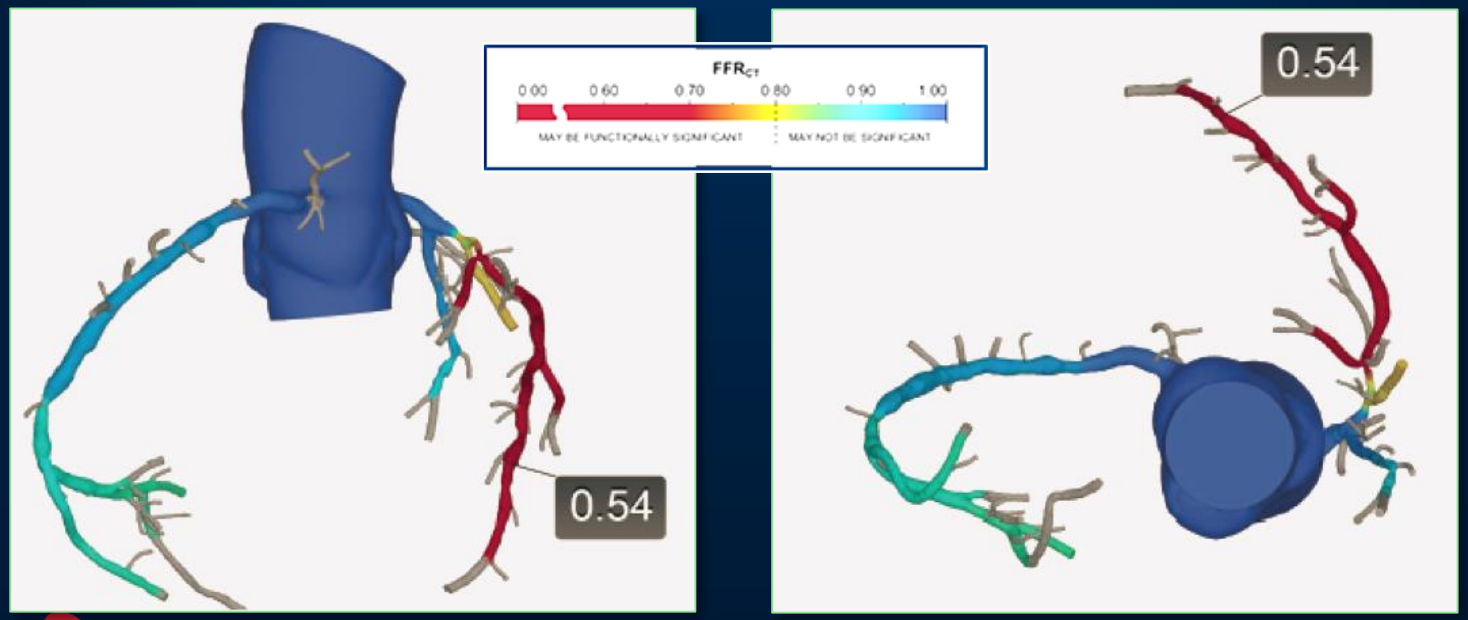
Fractional Flow Reserve by CTA (FFR_{CT})

- Routine CTA images are segmented and analysed quantitatively
- 3D coronary blood flow is modelled using computational fluid dynamics
- Maximal hyperemia is simulated to derive pressure and flow data, expressed as numeric values similar to invasive FFR evaluation
- FFR_{CT} has been validated against invasively measured FFR



Hemodynamically significant LAD lesion by FFR_{CT}

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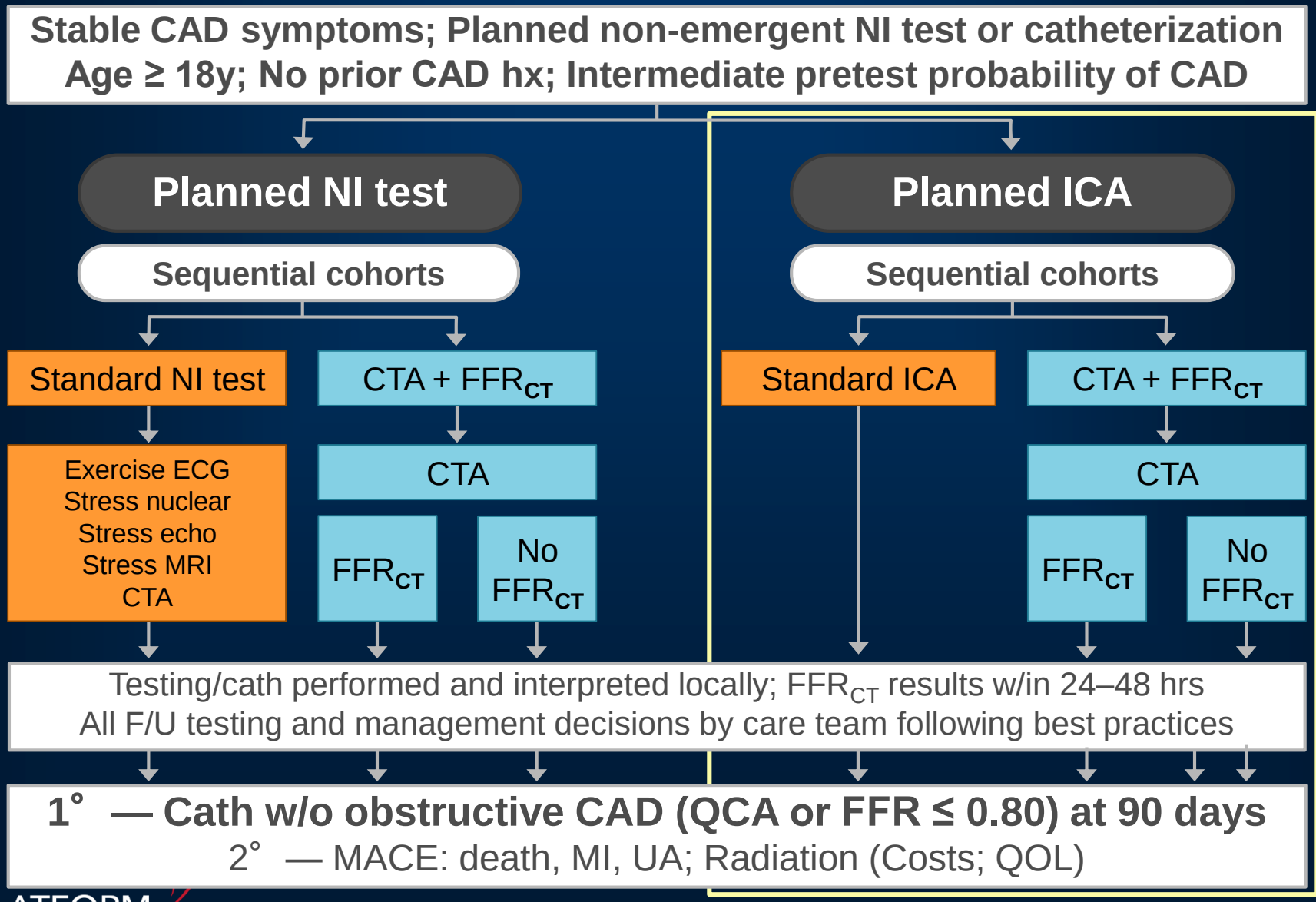
PLATFORM Trial Design



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Endpoints and Statistical Analyses

- For the primary endpoint of the rate of ICA without finding obstructive CAD, a sample size was used which provided 90% power to detect a 50% reduction with FFR_{CT} guided care, using a one-sided Wald test for a risk difference < 0 with an α error = 0.025
  - Absence of obstructive CAD was determined by a blinded central laboratory
  - Three sensitivity analyses performed: Propensity-matched, Best practices, Analyzable images; Primary endpoint also assessed using site read data
- Safety endpoints: MACE adjudicated by blinded CEC
- All treatment comparisons were performed as allocated (ITT)
- All statistical assessments were independently confirmed by Duke Clinical Research Institute

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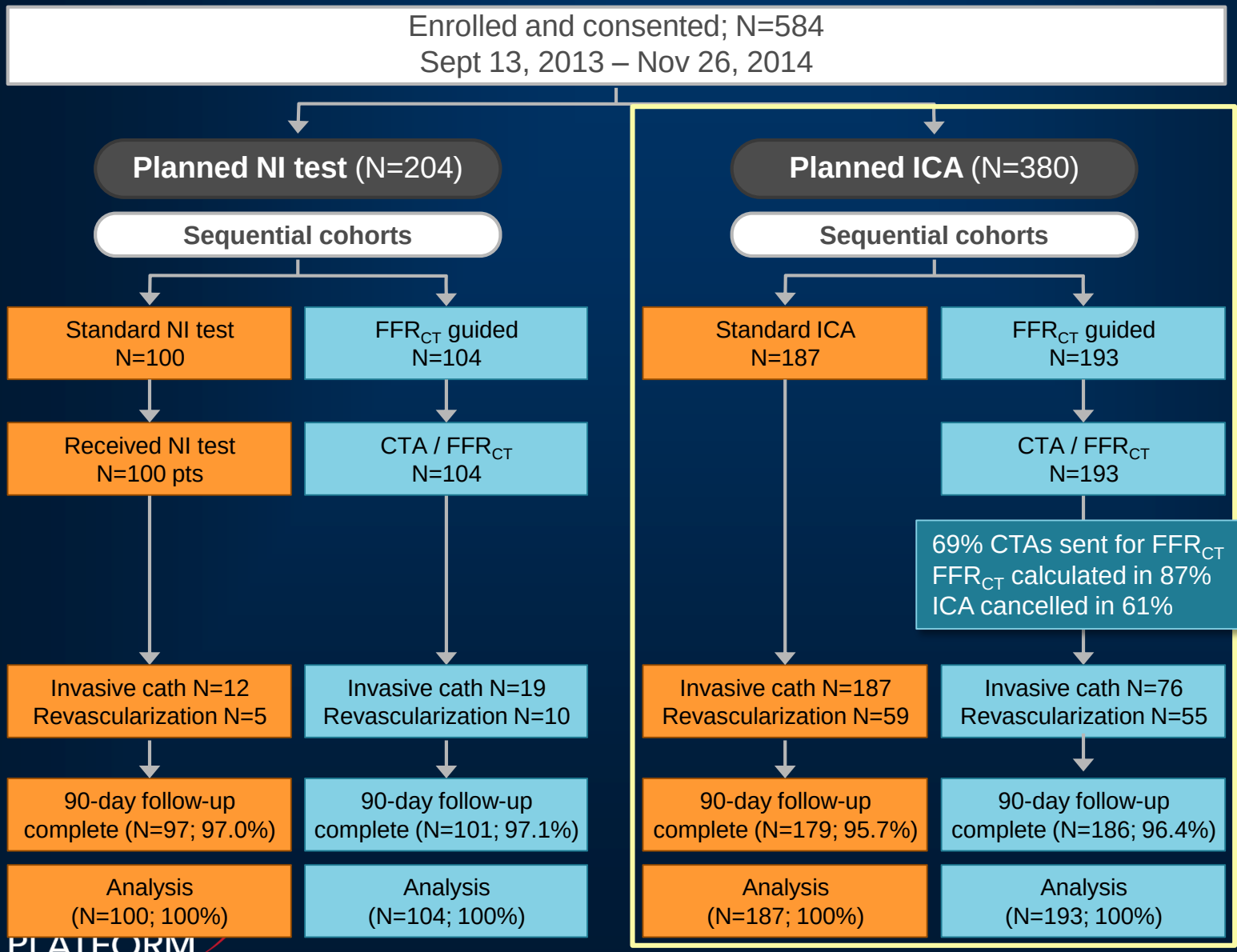
Cohort Assignment and Follow-up



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Baseline Characteristics

	Planned NI Test N=204			Planned ICA N=380		
	Usual care strategy N=100	**FFR_{CT} strategy** N=104	**P value**	**Usual care strategy** N=187	**FFR_{CT} strategy** N=193	**P value**
Demographics						
Age — mean ± SD, yr	57.9±10.7	59.5±9.3	0.25	63.4±10.9	60.7±10.2	0.02
Female sex — no. (%)	34(34.0)	44 (42.3)	0.22	79 (42.2)	74 (38.3)	0.44
Racial/ethnic minority — no. (%)	5 (5.0)	0 (0.0)	0.06	2 (1.1)	1 (0.5)	0.60
Cardiac risk factors						
Hypertension — no. (%)	38 (38.0)	57 (54.8)	0.02	111 (59.4)	111 (57.5)	0.72
Diabetes — no. (%)	8 (8.0)	6 (5.8)	0.52	36 (19.3)	30 (15.5)	0.33
Dyslipidemia — no. (%)	22 (22.0)	28 (26.9)	0.49	76 (40.6)	77 (39.9)	0.81
Tobacco use — no. (%)	52(52.0)	59 (56.7)	0.50	103 (55.1)	101 (52.3)	0.59
Pre-test probability CAD — ±SD, **%** (Updated Diamond and Forrester)	44.5±15.3	45.3±16.8	0.89	51.7±16.7	49.4±17.2	0.26
Statin use — no. (%)	24 (24.0)	29 (27.9)	0.58	83 (44.4)	77 (39.9)	0.37
Angina — no. (% typical / atypical)	99 (99.0)	98 (94.2)	0.02	174 (93.0)	187 (96.9)	0.09

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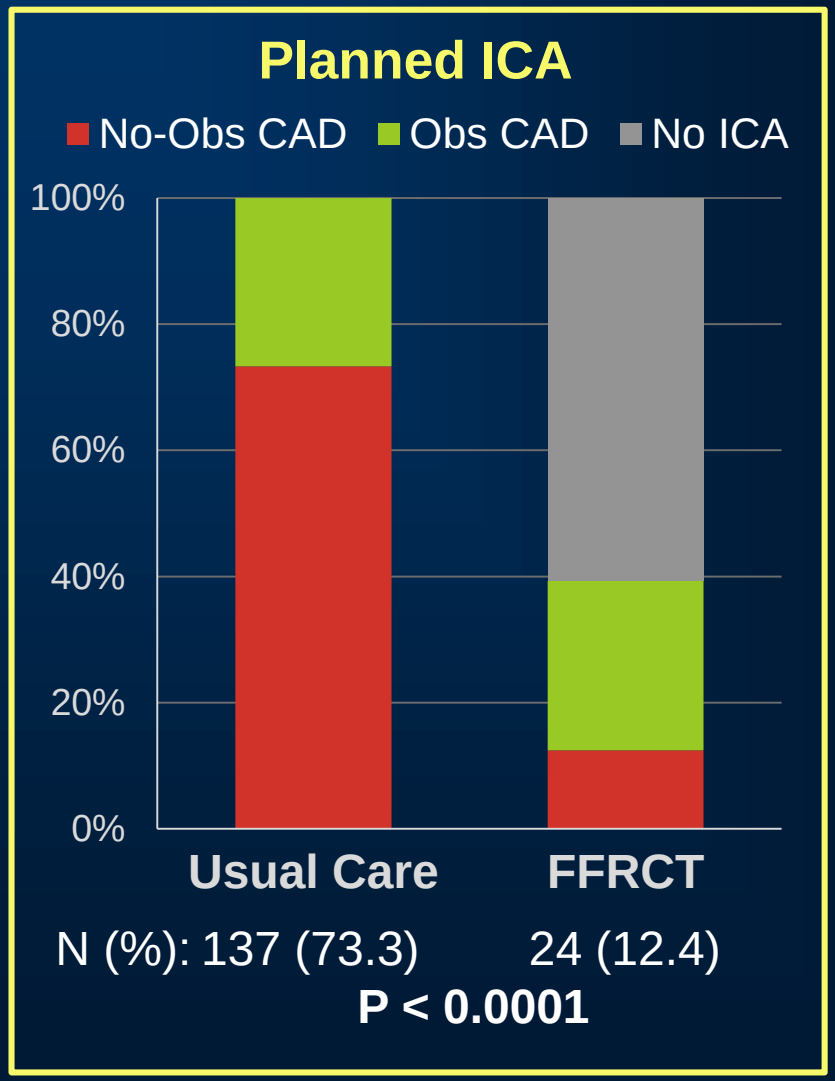
Primary Endpoint
Invasive Catheterization w/o Obstructive CAD

Similar results in all pre-specified subgroups and cohorts

- Site-read ICA w/o obstructive CAD 57% usual care; 9% FFR_{CT}
- Age, sex, race, diabetes, pretest probability of CAD, country
- Propensity matched cohort
- Best practices cohort
- Adequate image cohort



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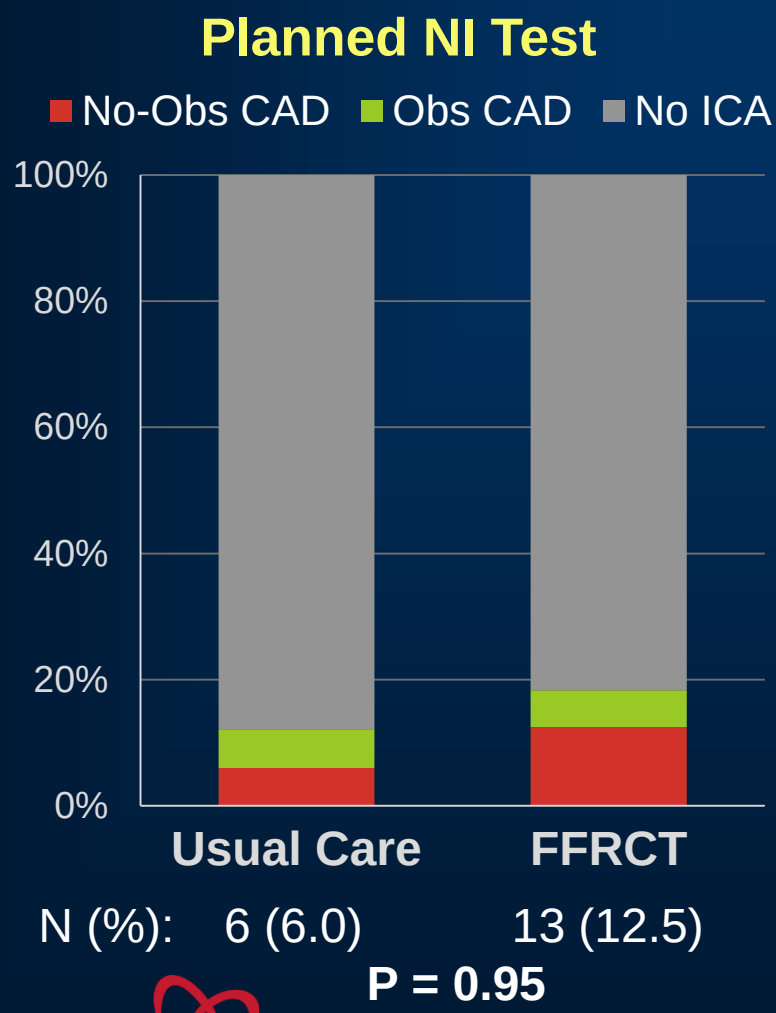

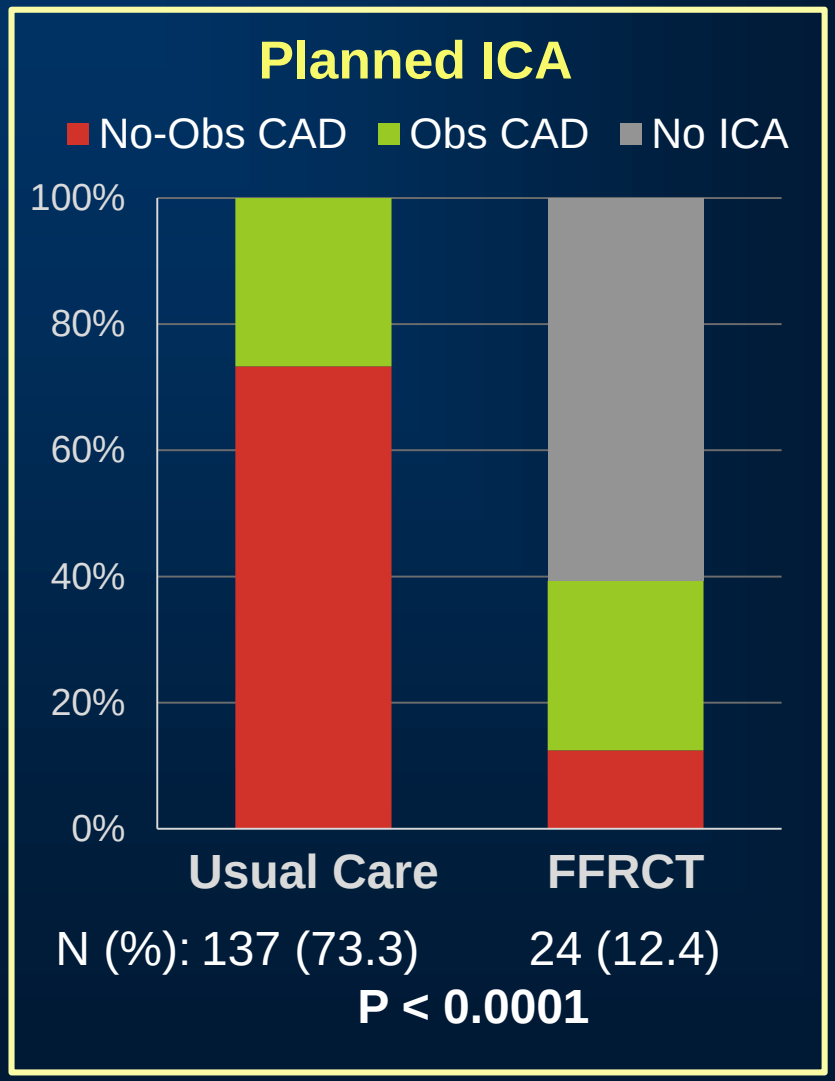

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Safety Endpoints and Data at Revascularization

	Planned NI Test N=204			Planned ICA N=380		
	Usual care strategy N=100	**FFR_{CT} strategy** N=104	**P value**	**Usual care strategy** N=187	**FFR_{CT} strategy** N=193	**P value**
SAFETY: MACE — no. (%)	**0**	**0**		**0**	**2 (1.0)**	**NA**
SAFETY: RADIATION EXPOSURE (enrolment to 90 days)						
Mean ± SD, mSv	**5.8 ± 7.1**	**8.8 ± 9.9**	**0.0002**	**9.4 ± 4.9**	**9.9 ± 8.7**	**0.20**
FUNCTIONAL DATA AT REVASCULARIZATION						
PCI or CABG – no.	**5**	**10**	**0.29**	**59**	**55**	**0.58**
Functional data available	**100%**	**90%**	**1.0**	**51%**	**96%**	**<0.0001**

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Summary

- PLATFORM enrolled a symptomatic, intermediate risk population for whom testing is currently recommended
- Use of CT/FFR_{CT} in patients with planned invasive catheterization was associated with a reduction in the rate of finding no obstructive CAD at ICA, from 73% to 12%
  - Similar results in all subgroups
  - No differences in MACE or radiation exposure
  - No differences in revascularization rates
- Use of FFR_{CT} resulted in cancellation of 61% of ICAs and doubled the availability of functional data at PCI/CABG

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Conclusion

Among patients with planned ICA, use of a combined anatomic AND functional strategy employing CTA/FFR_{CT} was safe and improved patient selection for invasive catheterization

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Results Published Online Today in EHJ

European Heart Journal
doi:10.1093/eurheartj/ehv444

FASTTRACK
ESC Hot Line

Clinical outcomes of fractional flow reserve by computed tomographic angiography-guided diagnostic strategies vs. usual care in patients with suspected coronary artery disease: the prospective longitudinal trial of FFRct: outcome and resource impacts study

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doi: 10.1093/eurheartj/ehv444
eurheartj.oxfordjournals.org

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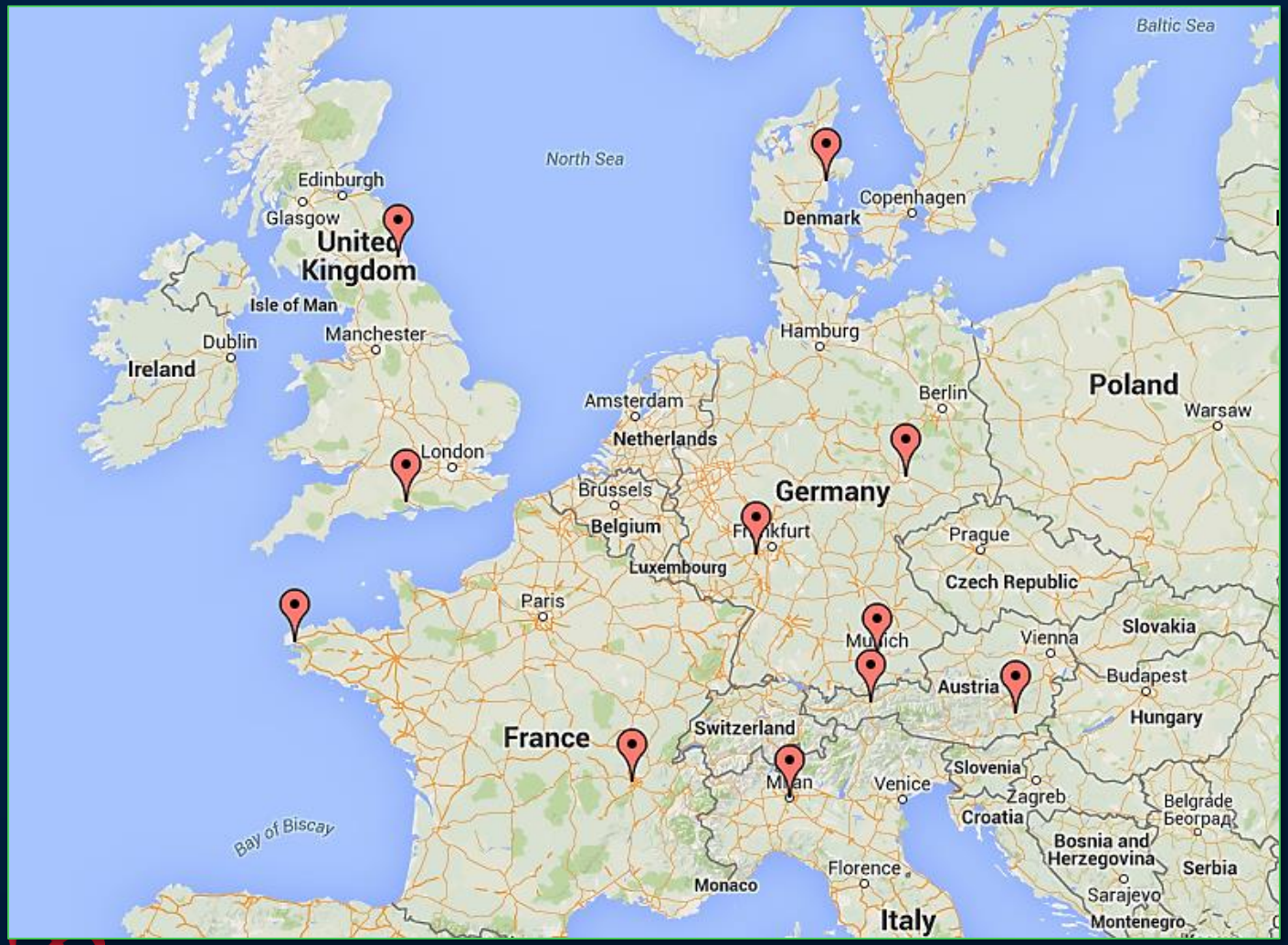
to PLATFORM Patients and Sites…



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…and to the PLATFORM Team

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