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What Is Complex PCI, Do Outcomes Depend on Complexity Type and Number?

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Disclosures

- Research Grants from Abbott, Biosensors, Terumo, Medtronic
- Consulting with Daiichi Sankyo, Terumo, Pfizer

Renumeration for:

- Senior Clinical Editor of TCTMD
- Associate Editor of Circ Cardiovascular Interventions

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What is complex PCI ?

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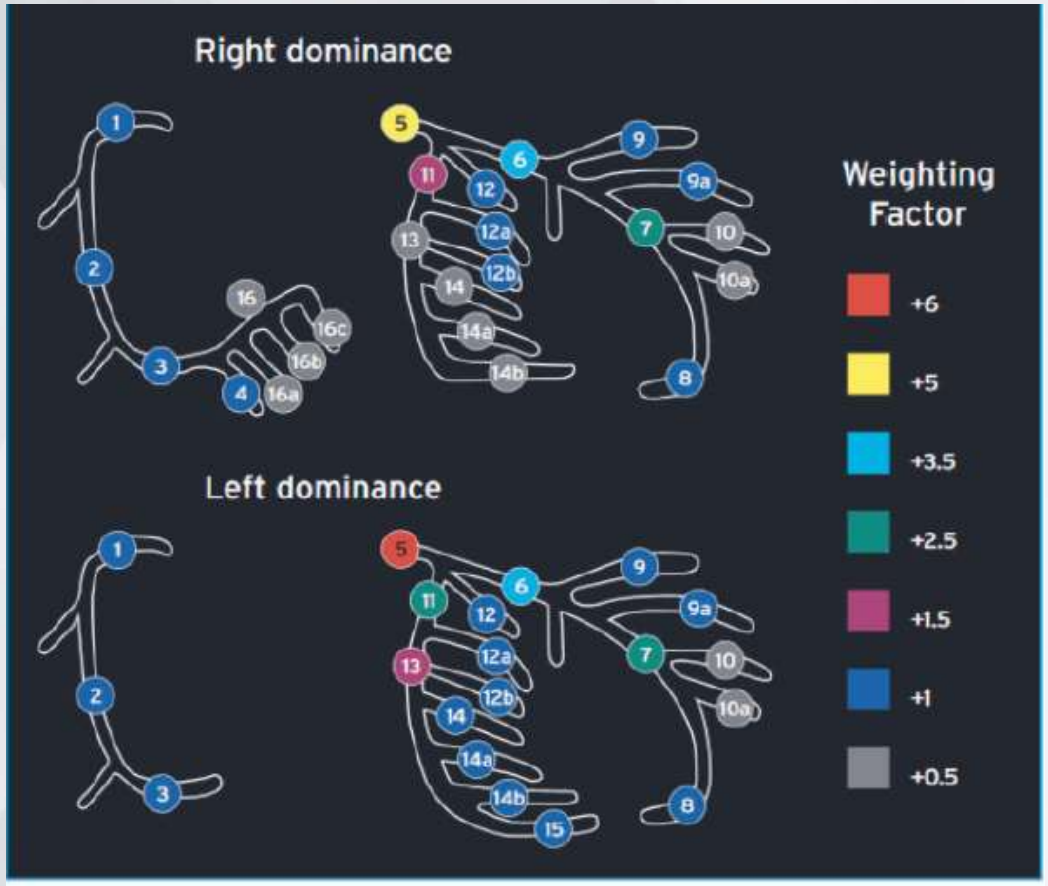
ESC European Society of Cardiology
European Heart Journal (2019) 40, 87–165
doi:10.1093/eurheartj/ehy394
ESC/EACTS GUIDELINES

2018 ESC/EACTS Guidelines on myocardial revascularization

The Task Force on myocardial revascularization of the European Society of Cardiology (ESC) and European Association for Cardio-Thoracic Surgery (EACTS)

Developed with the special contribution of the European Association for Percutaneous Cardiovascular Interventions (EAPCI)



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What is complex PCI ?

CORE CURRICULUM

WILEY

SCAI position statement on optimal percutaneous coronary interventional therapy for complex coronary artery disease

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Jennifer A. Tremmel MD, MS, FSCAI[10] | Alexander G. Truesdell MD, FSCAI[11] |
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Catheterization and Cardiovascular Interventions, Volume: 96, Issue: 2, Pages: 346-362, First published: 14 May 2020, DOI: (10.1002/ccd.28994)

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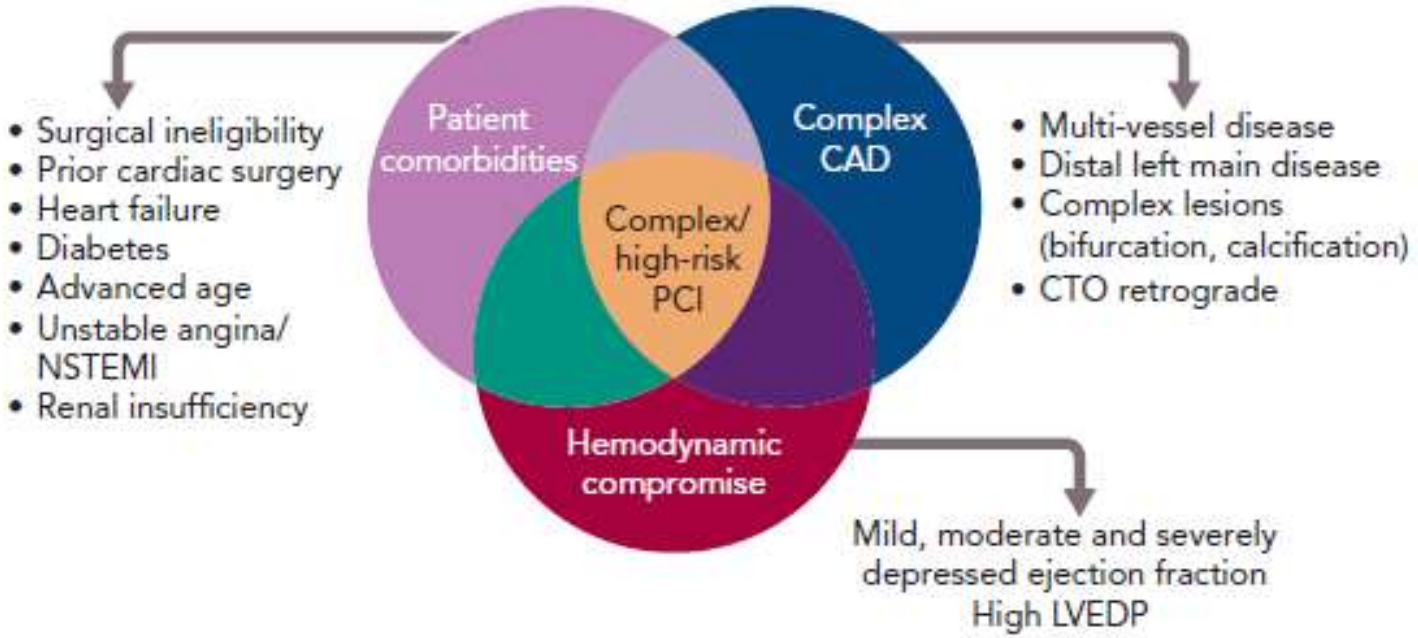
CHIP: Complex Higher Risk (and Indicated) Patients

Figure 1: Growing Population of Complex And High-risk Patients Who Could Benefit From Hemodynamic Support



CAD = coronary artery disease; CTO = chronic total occlusion; LVEDP = left ventricular end-diastolic pressure; NSTEMI = non-ST elevation MI; PCI = percutaneous coronary intervention. Adapted with permission from Abiomed 'Protected PCI' Clinical Dossier 2020.

Kirtane 2016

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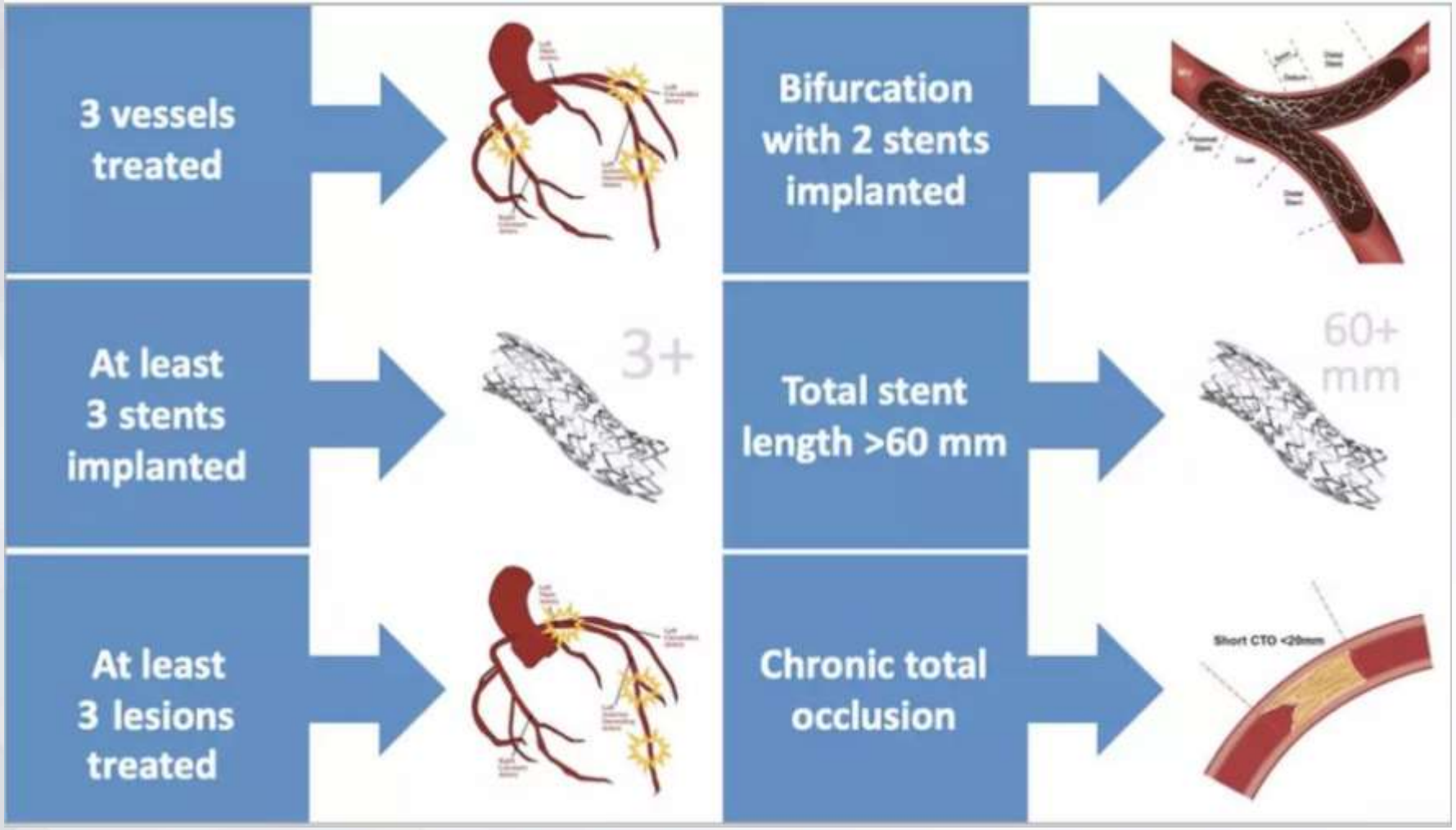
By lesion characteristics

ESC European Society of Cardiology
ESC GUIDELINES

2017 ESC focused update on dual antiplatelet therapy in coronary artery disease developed in collaboration with EACTS

The Task Force for dual antiplatelet therapy in coronary artery disease of the European Society of Cardiology (ESC) and of the European Association for Cardio-Thoracic Surgery (EACTS)



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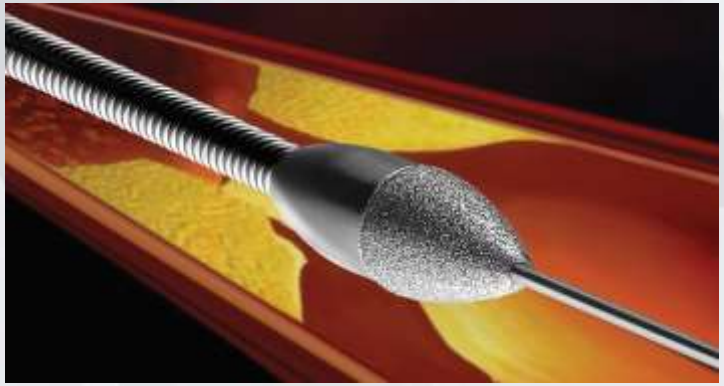
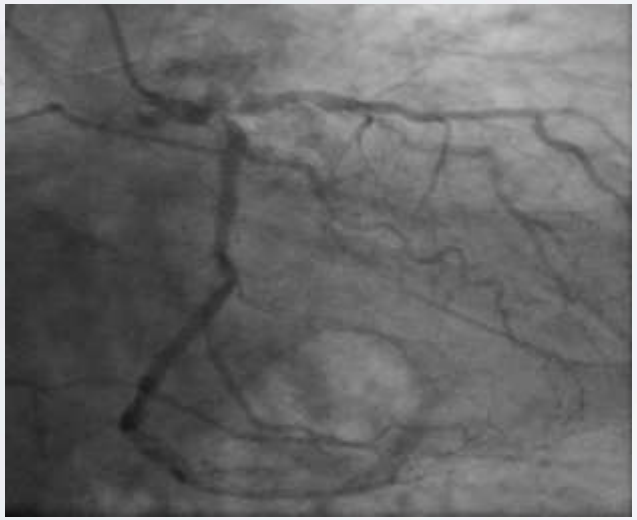
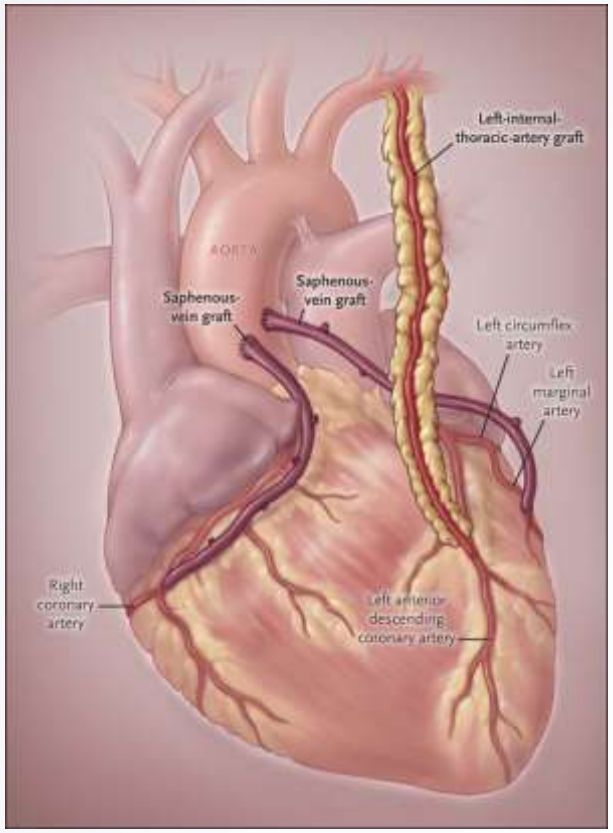
Complex PCI



Rotablation



Left main



SVG disease

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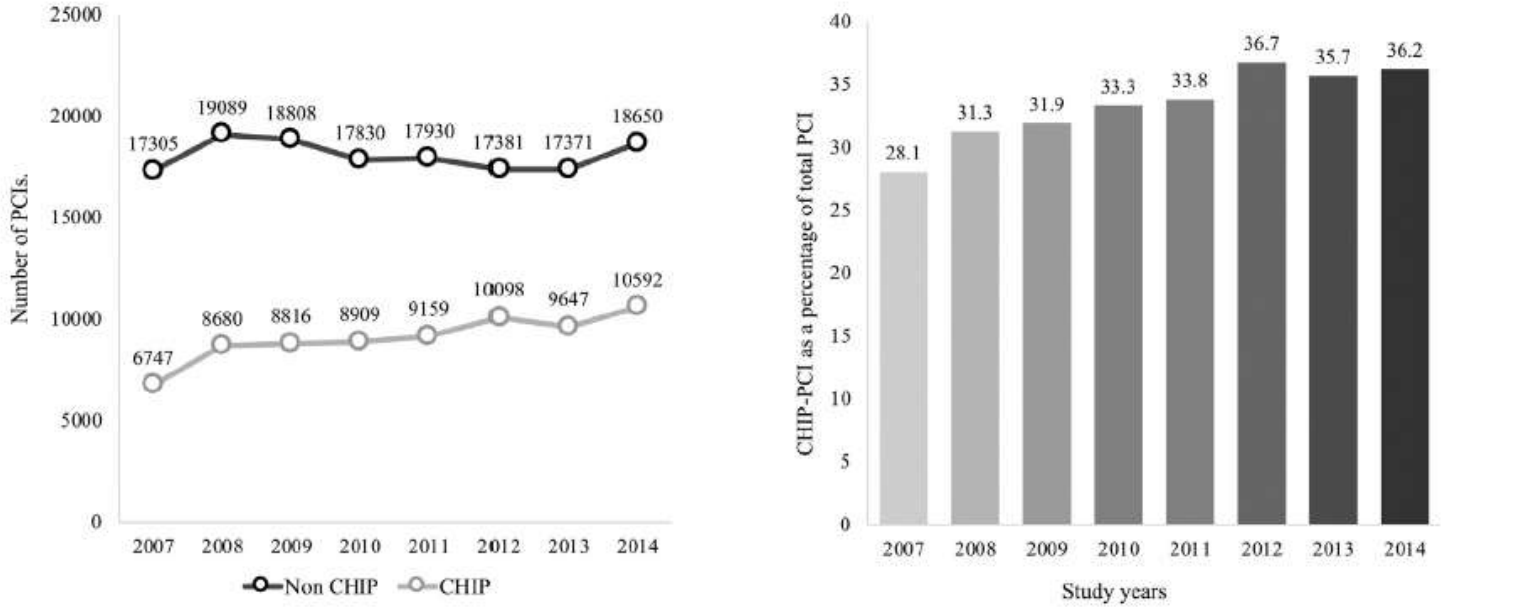
Complex high-risk and indicated percutaneous coronary intervention for stable angina: Does operator volume influence patient outcome?

Tim Kinnaird, MD,[a] Sean Gallagher, MD,[a] James C. Spratt, MD,[b] Peter Ludman, MD,[c] Mark de Belder, MD,[d] Samuel Copt, PhD,[e] Richard Anderson, MD,[a] Simon Walsh, MD,[f] Colm Hanratty, MD,[f] Nick Curzen, PhD,[g] Adrian Banning, MD,[h] and Mamas Mamas, DPhil[i,j] *Cardiff, London, Birmingham, Middlesbrough, Belfast, Southampton, Oxford, Stoke-on-Trent, UK; and Morges, Switzerland*

Figure 1



Left, Absolute numbers of CHIP-PCI and non-CHIP-PCI plotted by study years ($P < .001$ for both trends); Right, CHIP-PCI plotted as a percentage of total PCI performed in England and Wales 2007-14 ($P < .001$ for trend).

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Complex PCI

Limited data on the prevalence and clinical outcomes of complex lesions in the real world, and whether the clinical outcomes from individual complex features vary either by type or by number

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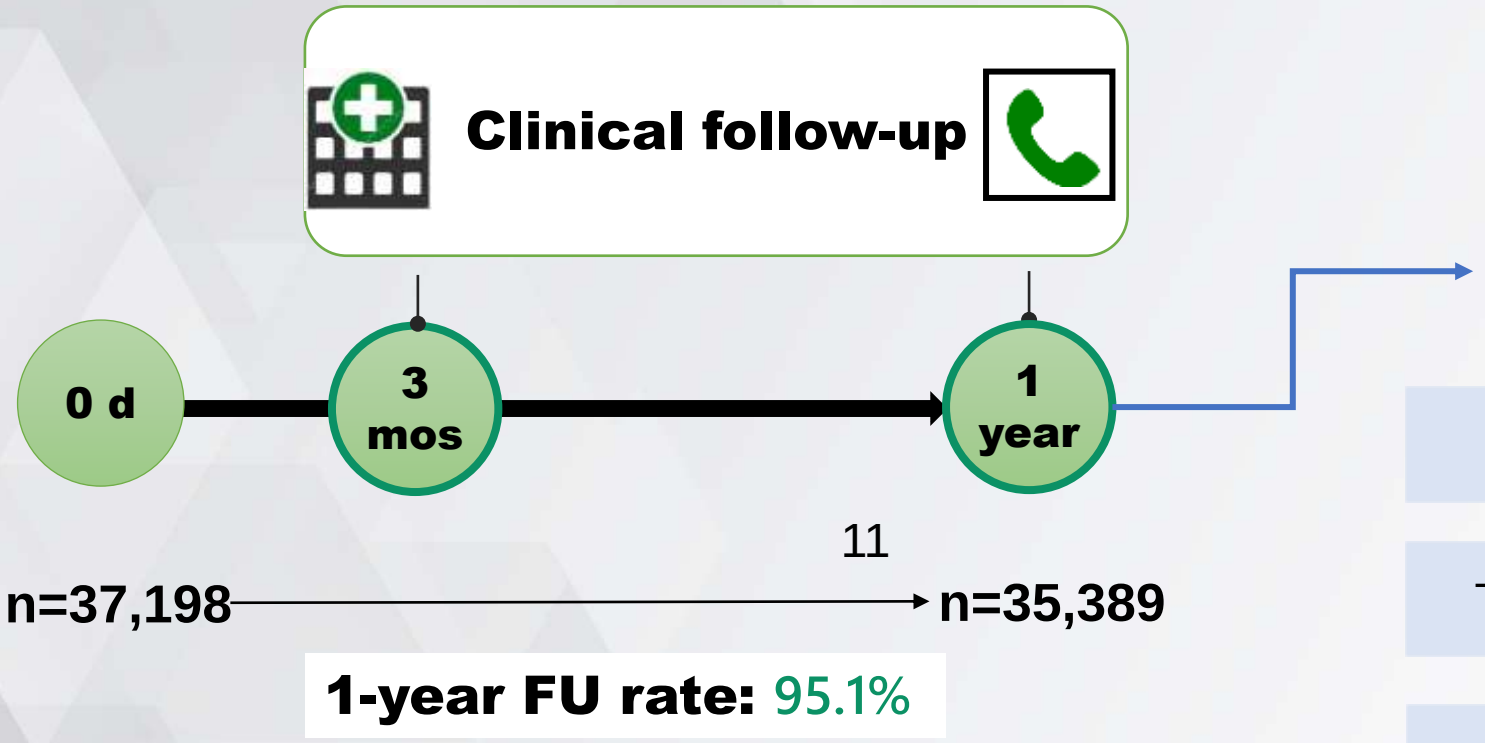
Which dataset did we use ?
e-Ultimaster registry

Unselected patients with coronary artery disease,
representing everyday practice from large geographic area

4 continents
50 countries
378 hospitals



1-year FU rate: 95.1%

PRIMARY ENDPOINT
Target lesion failure

- Cardiac death
- Target vessel related myocardial infarction
- Clinically-driven target lesion revascularization

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Impact of coronary lesion complexity in percutaneous coronary intervention: one-year outcomes from the large, multicentre e-Ultimaster registry

Mohamed O. Mohamed[1], MRCP; Jawed Polad[2], MD; David Hildick-Smith[3], MD, FRCP; Olivier Bizeau[4], MD; Ruslan K. Baisebenov[5], MD; Marco Roffi[6], MD; Andres Iñiguez-Romo[7], MD; Bernard Chevalier[8], MD; Clemens von Birgelen[9], MD, PhD; Ariel Roguin[10], MD, PhD; Adel Aminian[11], MD; Michael Angioi[12], MD; Mamas A. Mamas[1]*, DPhil, MRCP; on behalf of the e-Ultimaster investigators

Complex PCI: presence of at least one procedural characteristic: [1,2]

- multivessels treated
- ≥ 3 stents implanted
- ≥ 3 lesions treated
- bifurcation PCI with ≥ 2 stents
- total stent length> 60 mm
- chronic total occlusion (CTO)

All patients implanted with Ultimaster DES

Ultimaster DES	
Platform	Strut thickness (**80 µm**) Co-Cr Open cell design
Drug Carrier	PDLLA-PCL copolymer resorbed within **3-4 months**
Coating	Abluminal **gradient coating** technology
Drug	**Sirolimus** 3.9 µg/mm stent length

1. Valgimigli et al. Eur Heart J 2018;39:213-260
2. Giustino et al. J Am Coll Cardiol 2016;68:1851-1864

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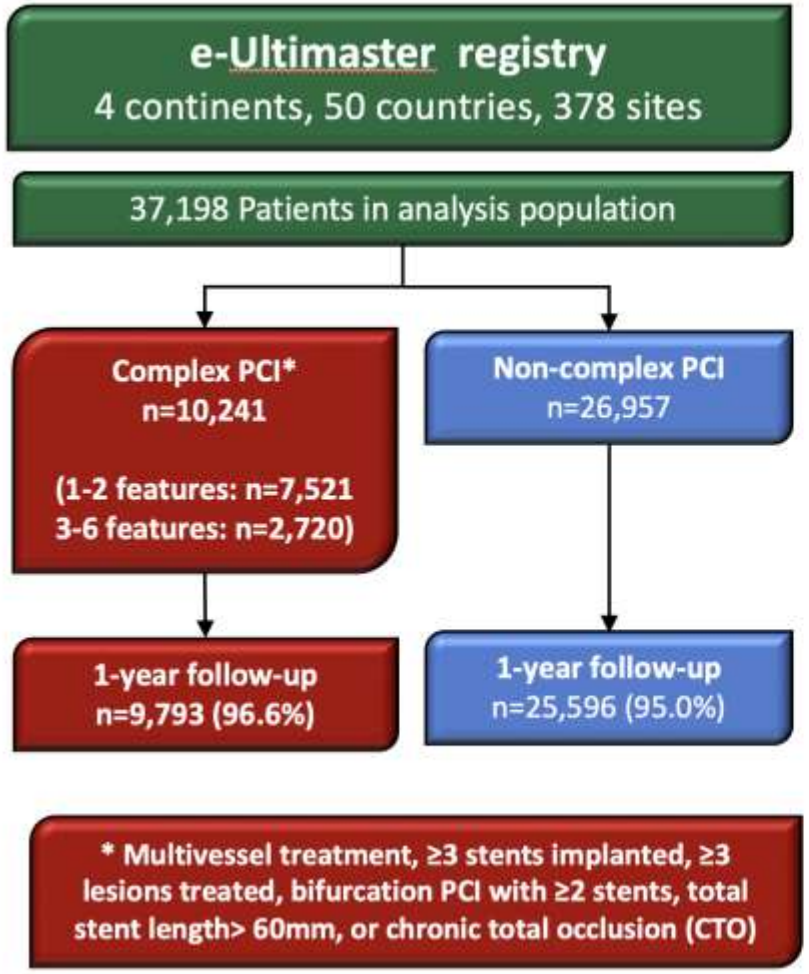

	Prevalence of complex PCI in total population
Any complex feature	27.5%
1-2 complex features	20.2%
3-6 complex features	7.3%
Multivessel treatment	16.3%
≥ 3 Stents implanted	12.3%
≥ 3 Lesions treated	5.2%
Bifurcation PCI with ≥2 stents	2.7%
Total stent length> 60mm	8.8%
Chronic total occlusion	4.9%

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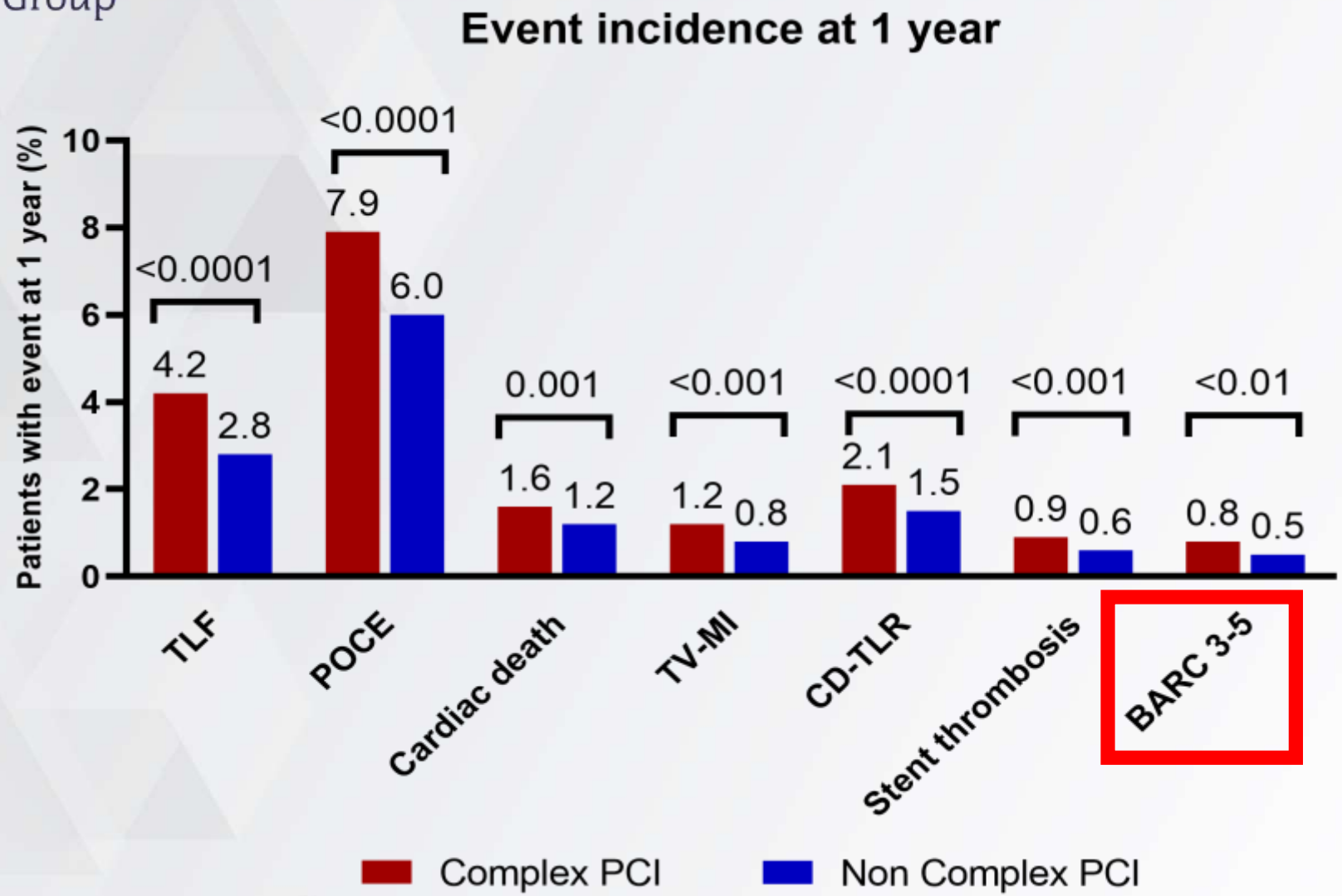
Crude events at 1 year



*** Complex PCI: MV treatment, ≥3 stents implanted, ≥3 lesions treated, bifurcation PCI with ≥2 stents, total stent length> 60mm, or CTO**

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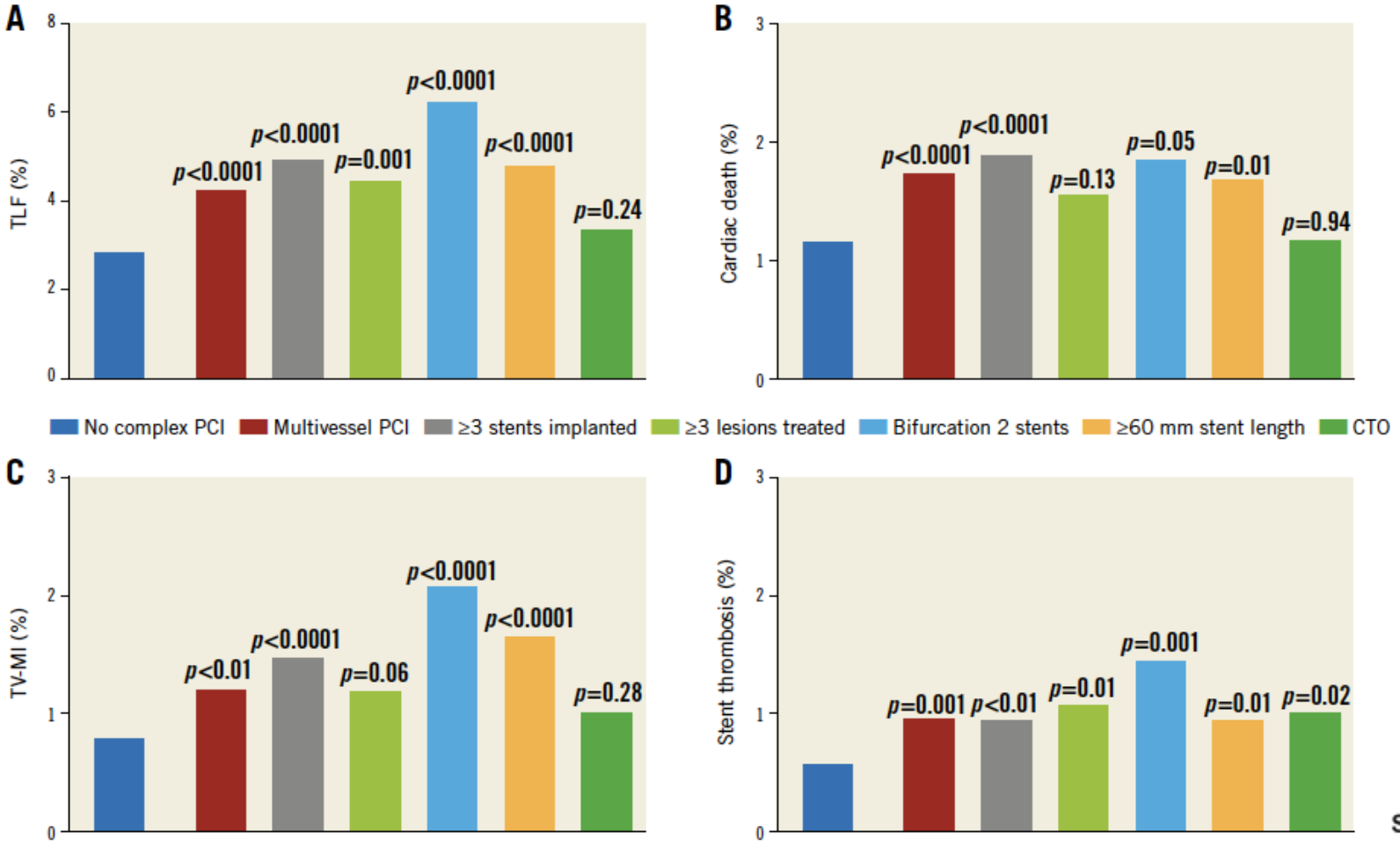
Outcomes for individual complex factors



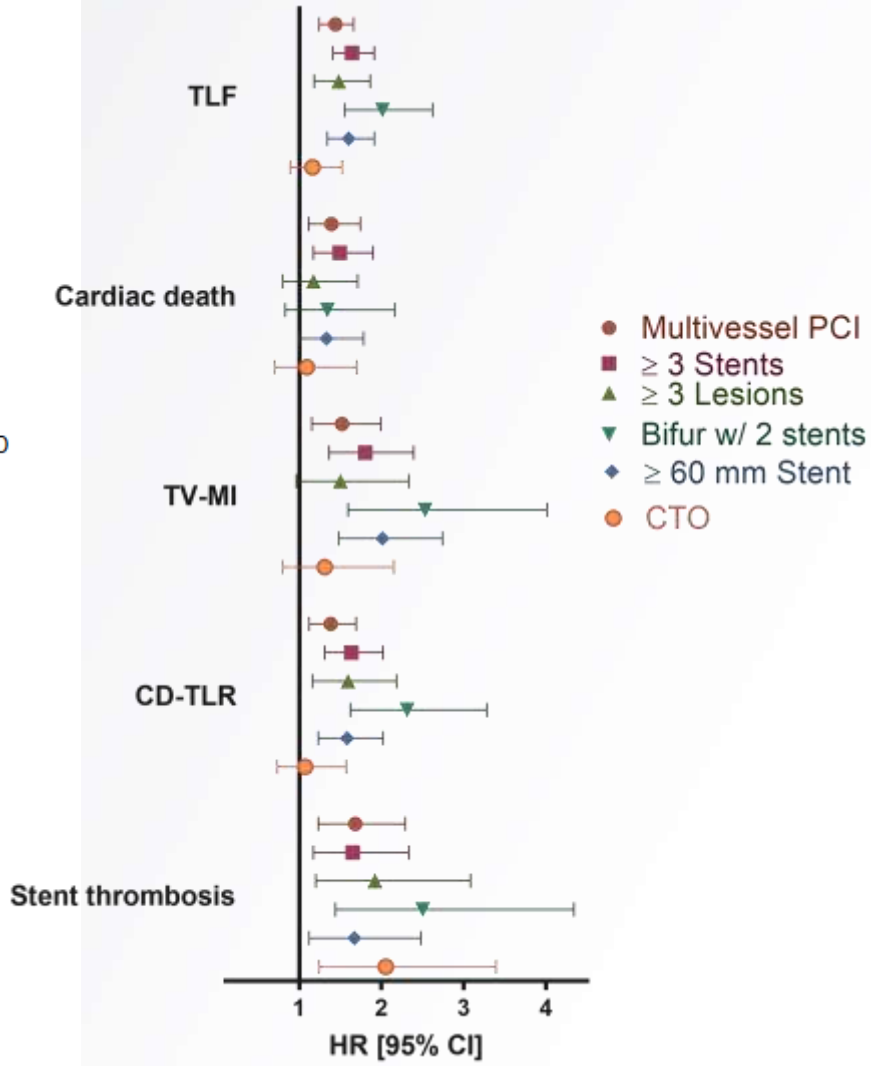


Figure 4. *Crude rates at one year for individual complex risk factors. A) TLF. B) Cardiac death. C) Target vessel MI. D) Definite/probable stent thrombosis. All p-values refer to comparison with the non-complex PCI group. TLF: target lesion failure; TV-MI: target vessel myocardial infarction*

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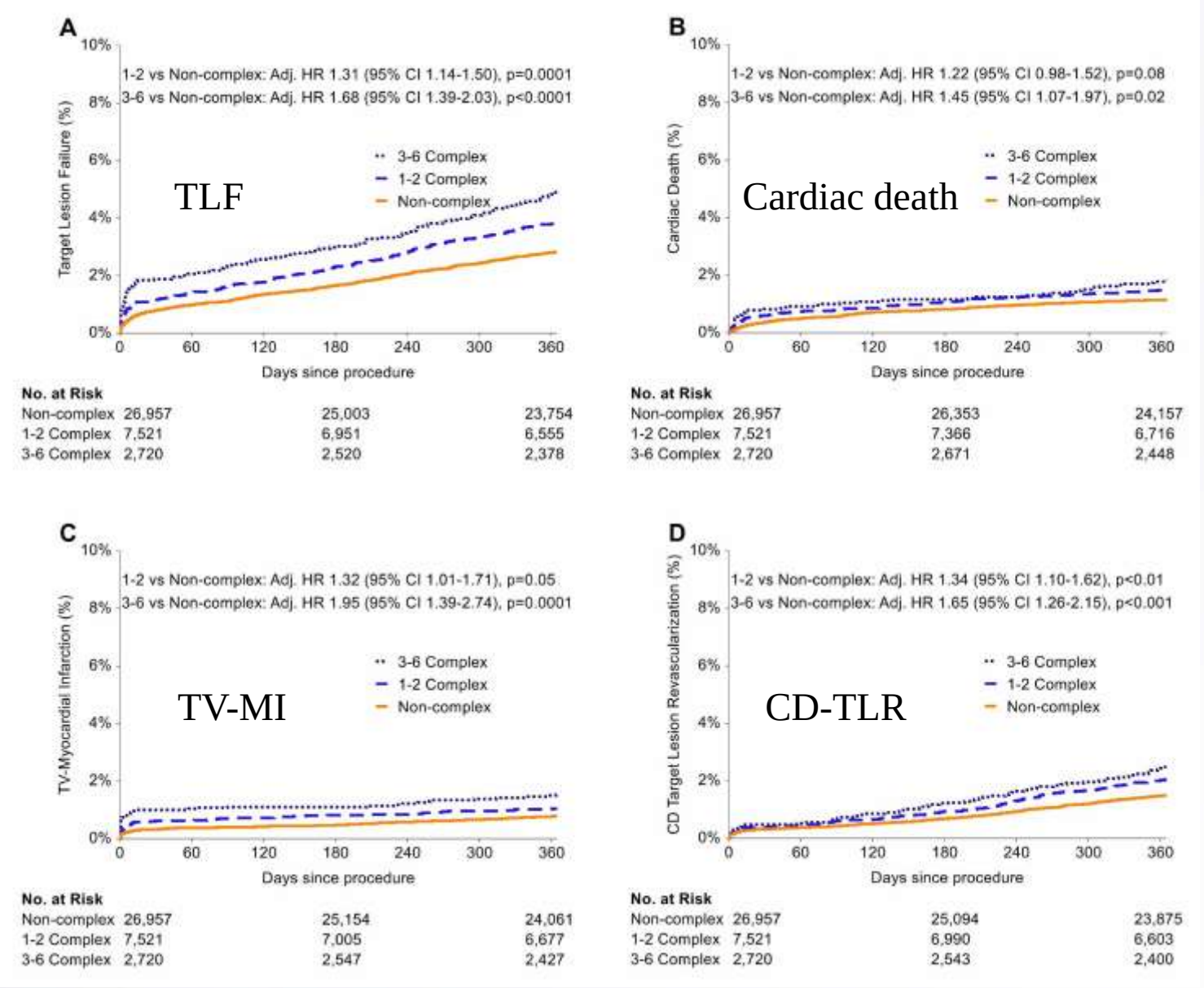
Outcomes by no. of complex features



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Conclusion / Take-home Message

- Complex PCI can be defined in many ways, mainly relate to procedural risk and future risk of ischemic events
  - Distribution / extent of disease
  - Lesion characteristics
  - Patient comorbidities
  - Patient haemodynamics

- Outcomes depend on both type and number of complex features