What's difference in DES?

Xience, Resolute, Synergy, Orsiro, Ultimaster, and DESyne

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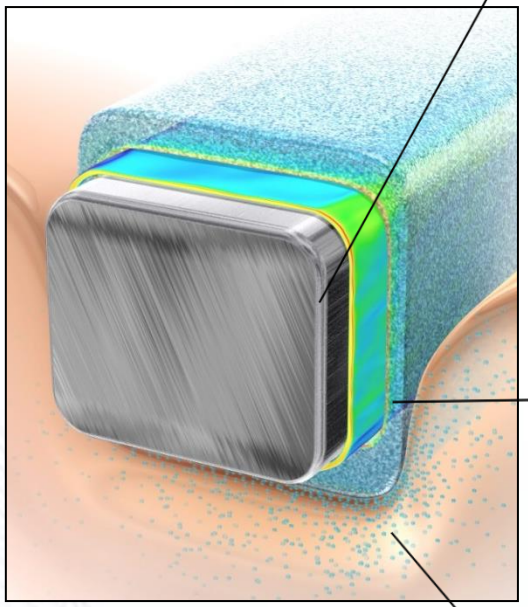
Disclosure

- I have nothing to disclose.

Metallic DES Evolution

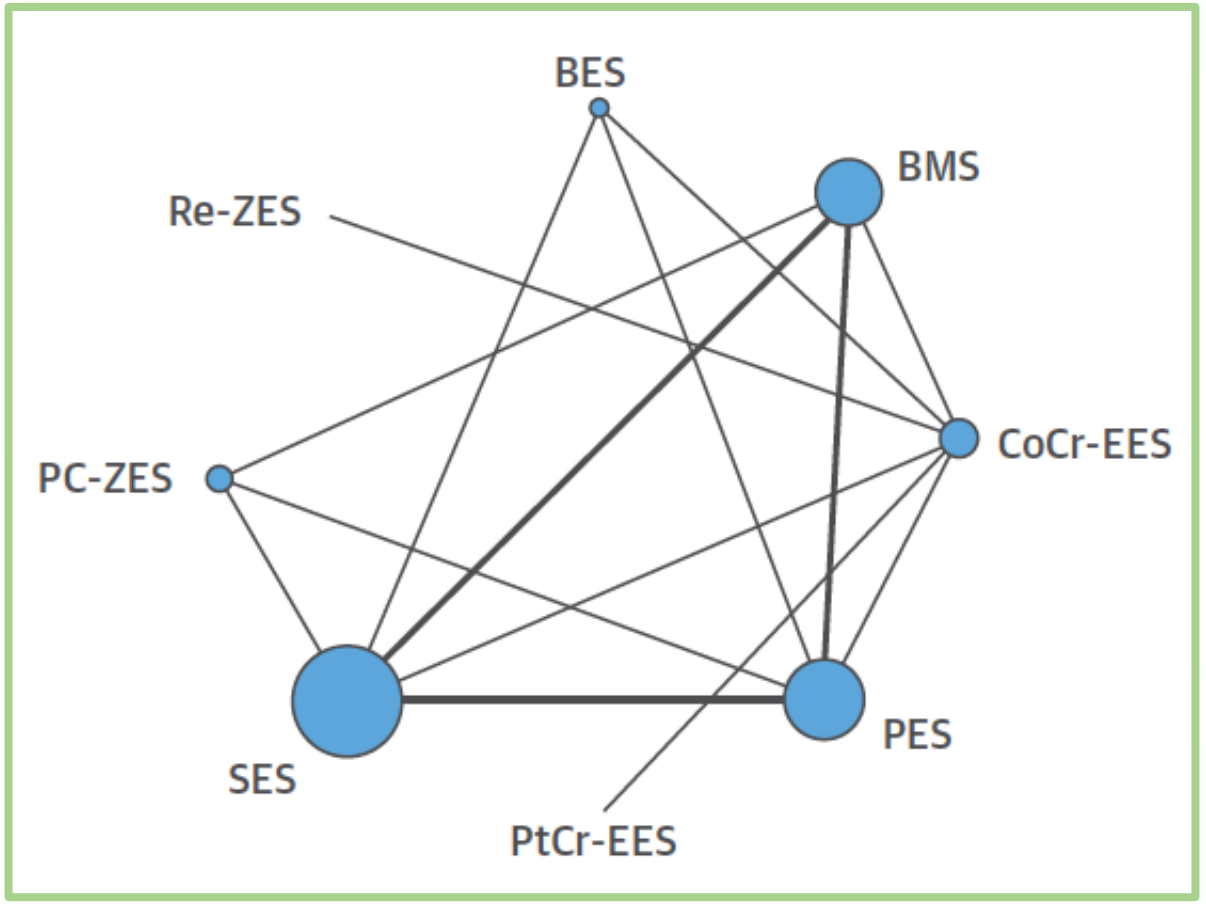


- Polymer modification
  - Non-biodegradable
    - PBMA/PEVA
    - SIBS
    - PC
    - BioLinks
    - PVDF-HFP
  - Biodegradable
    - PDLLA
    - PLGA
    - PLEC
  - No polymer
- Metalic platform
  Design modification
  - Cobalt Chromium
    - Thin strut
  - Stainless steel
    - Thick-strut
- Anti-proliferative Drug selection
  - Paclitaxel
  - Sirolimus

    Sirolimus
    Everolimus
    Zotarolimus
    Biolimus
    Picrolimus
    Myolimus...

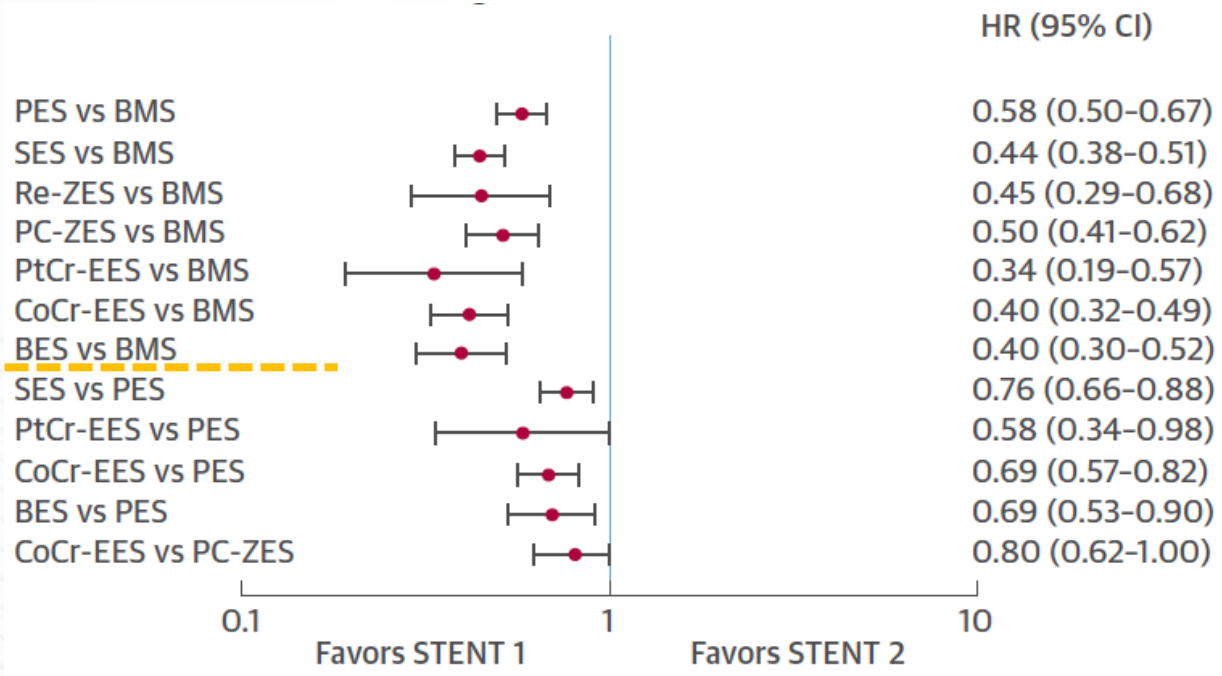
Updated Network Meta-Analysis including RCTs with at least 3 years FU

51 RCTs; 52,158 patients (median 3.8 yrs FU)

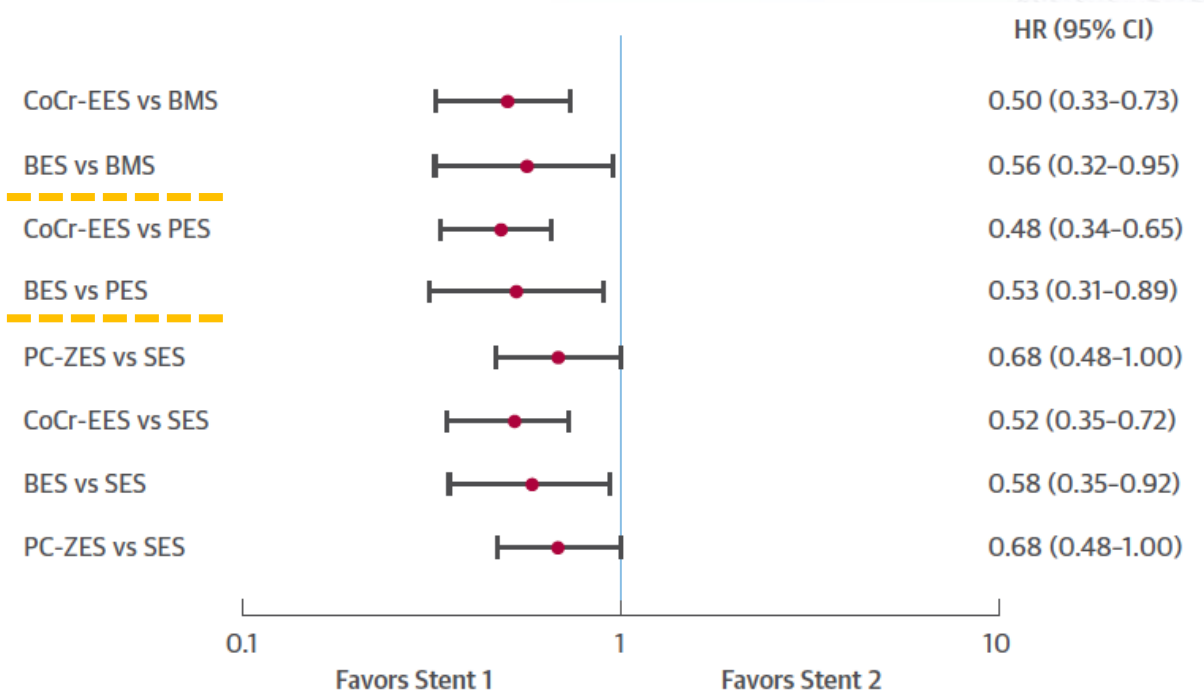


Palmerini et al. J AmColl Cardiol 2015;65:2496–507

Efficacy; TVR

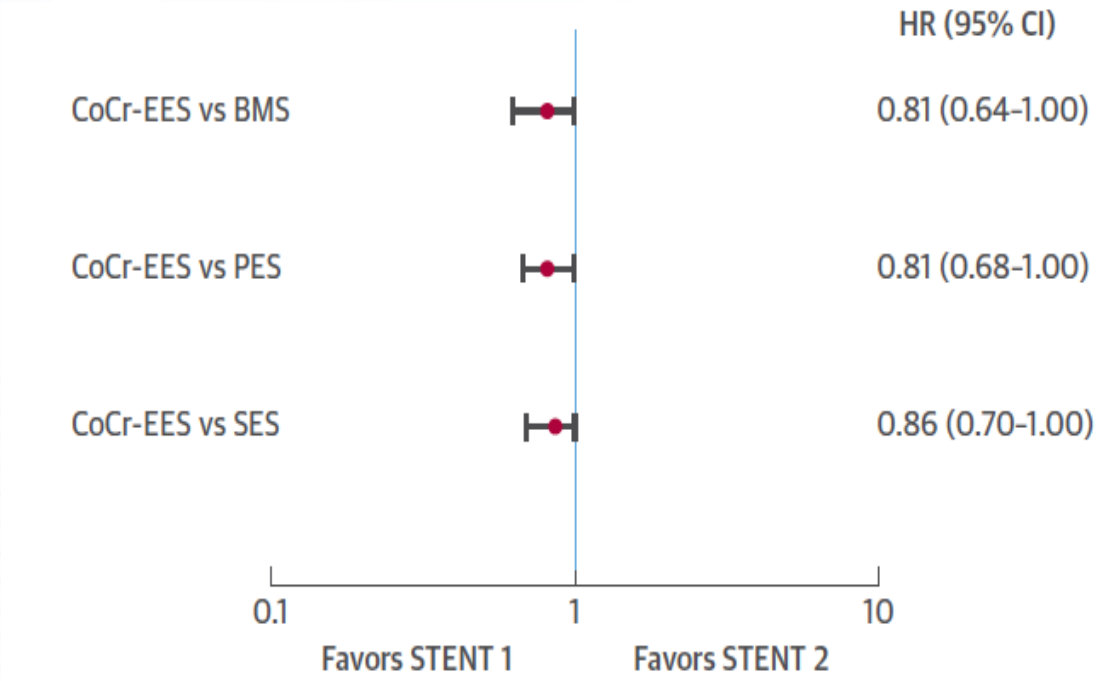


Safety; Definite or Probable ST

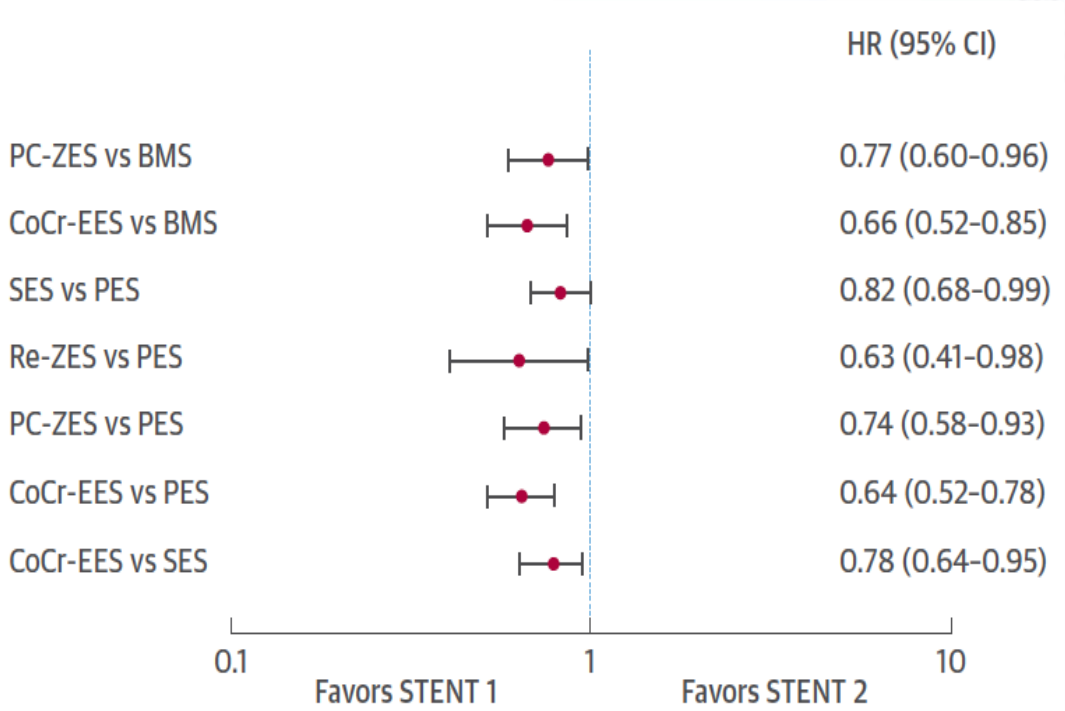


Palmerini et al. J AmColl Cardiol 2015;65:2496–507

Death



MI

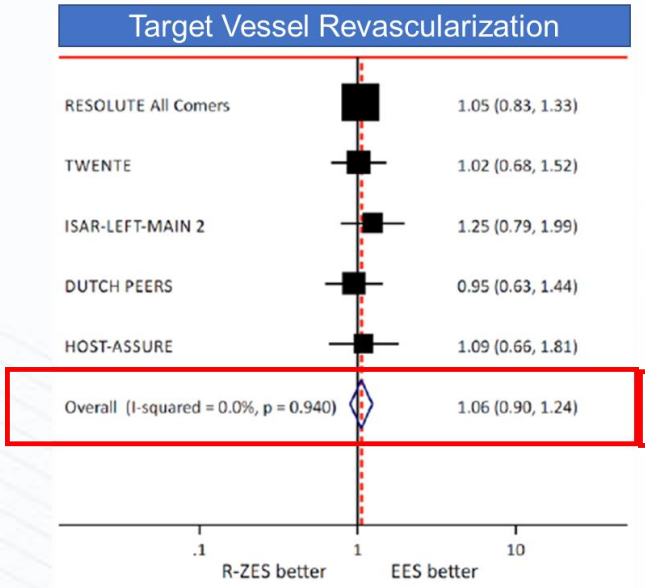


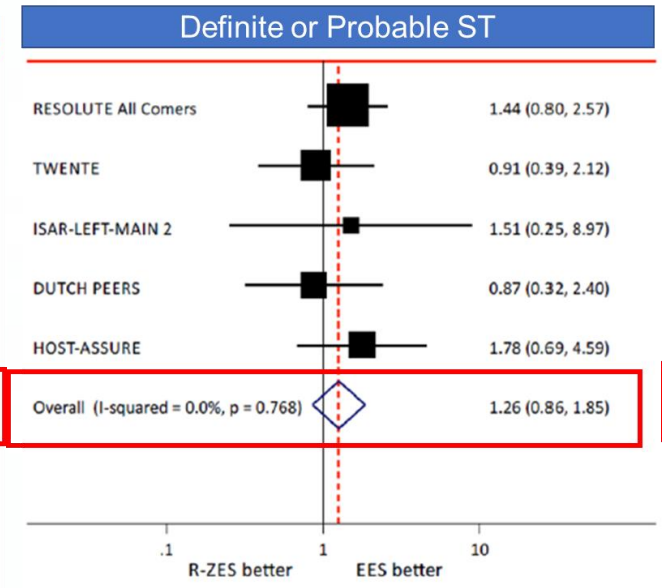
Palmerini et al. J AmColl Cardiol 2015;65:2496–507

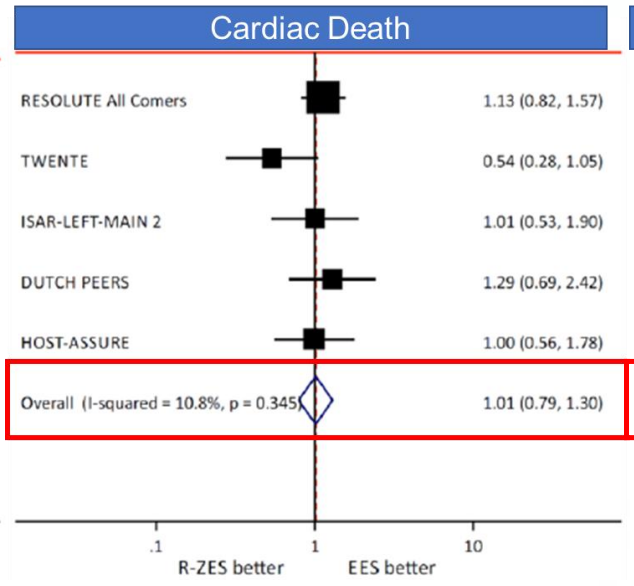
Are there any differences *between contemporary second-generation DES*?

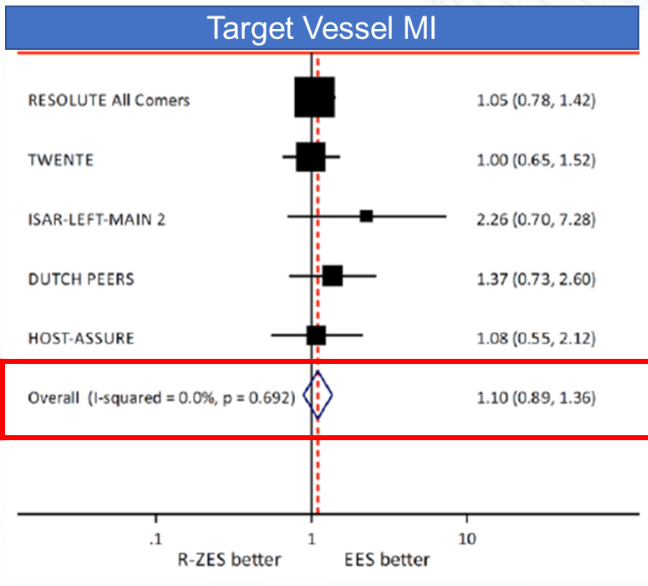
Resolute ZES vs. EES

Meta-analysis. 5 trials including 9899 patients.





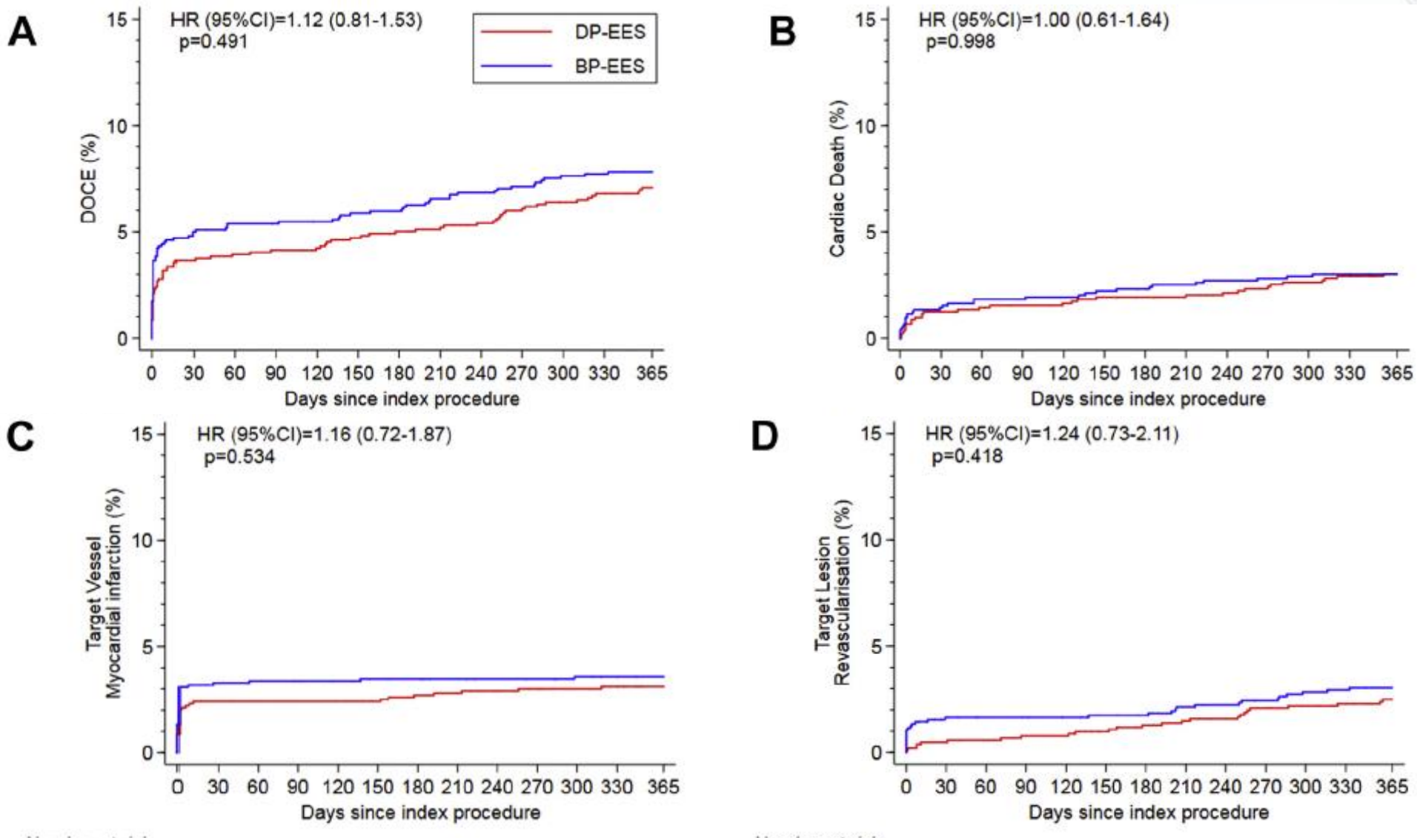




Circ Cardiovasc Interv. 2015;8:27-3427

BP EES (Synergy) vs. DP EES (Xience)

Propensity score matched 1041 patients in each group in all-comers population.



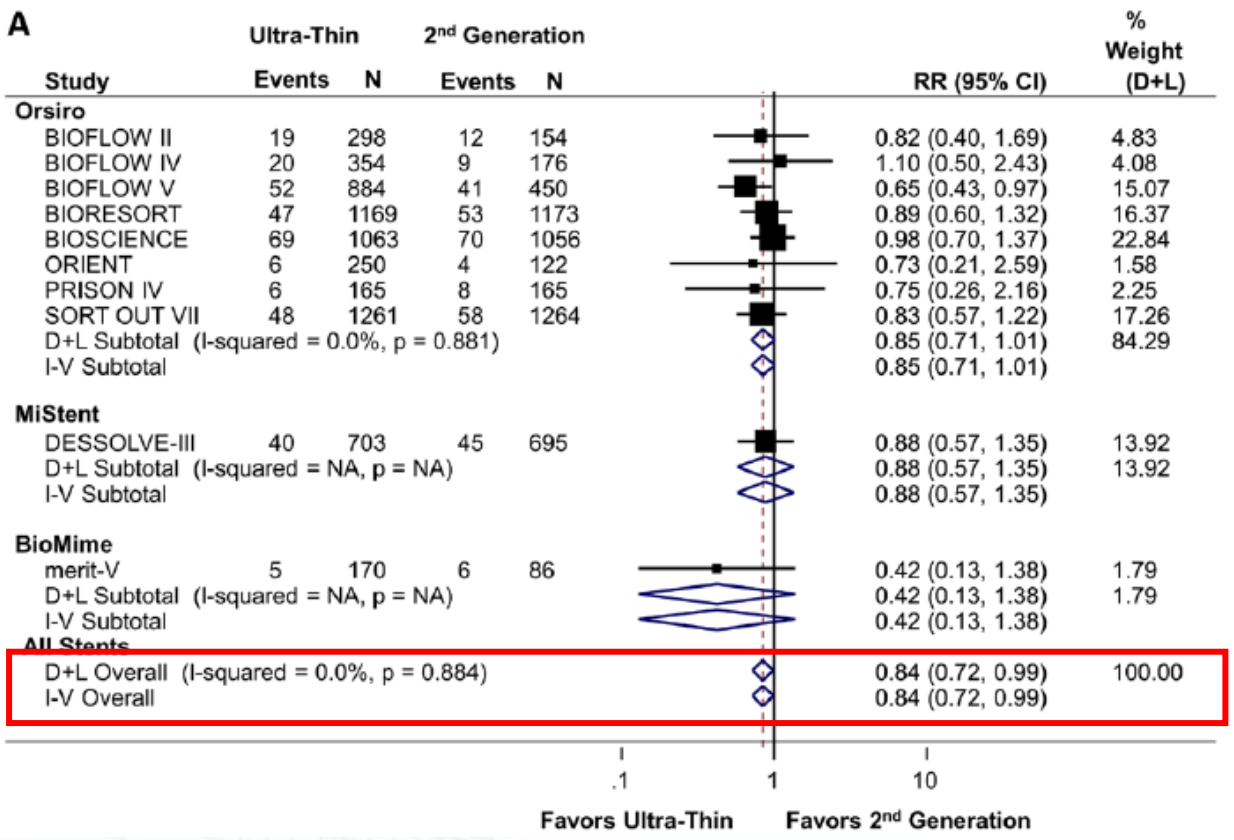
JACC Cardiovasc Interv. 2019;12(17):1665-1675

What about Orsiro, Ultimaster, and DESyne not included in the previous meta-analysis?

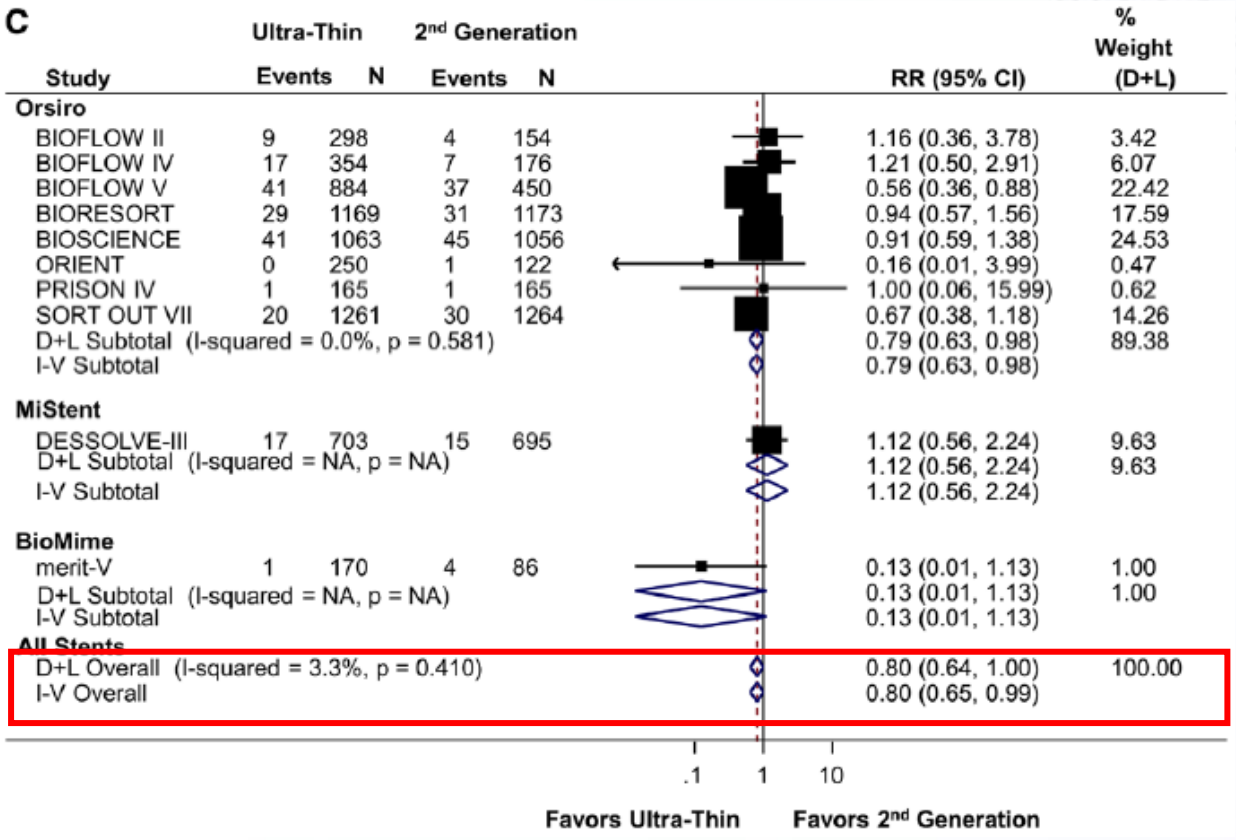
Ultrathin-strut DES vs. Conventional 2nd generation DES

10 trials including 11,658 patients. 1-year f/u

Target lesion failure at 1 year



Myocardial Infarction

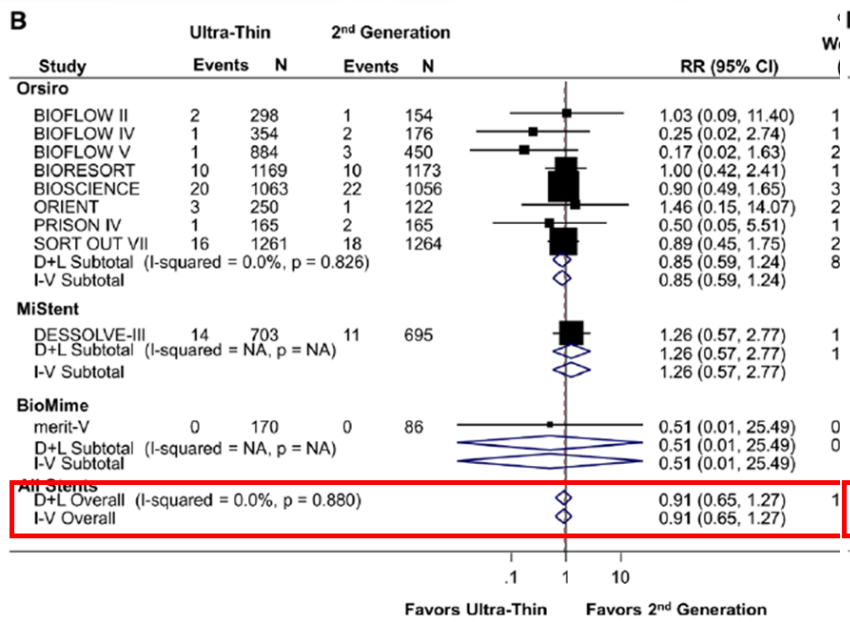


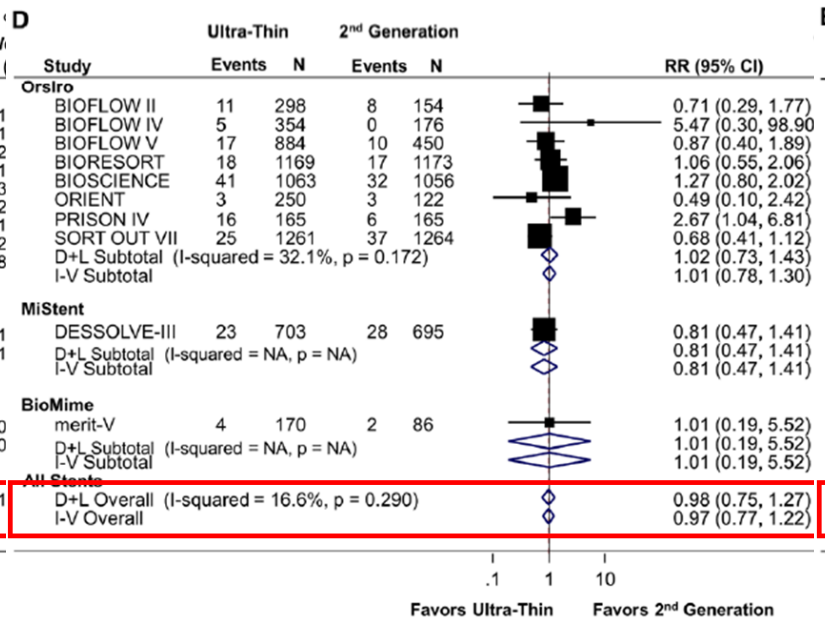
Circulation. 2018;138:2216–2226

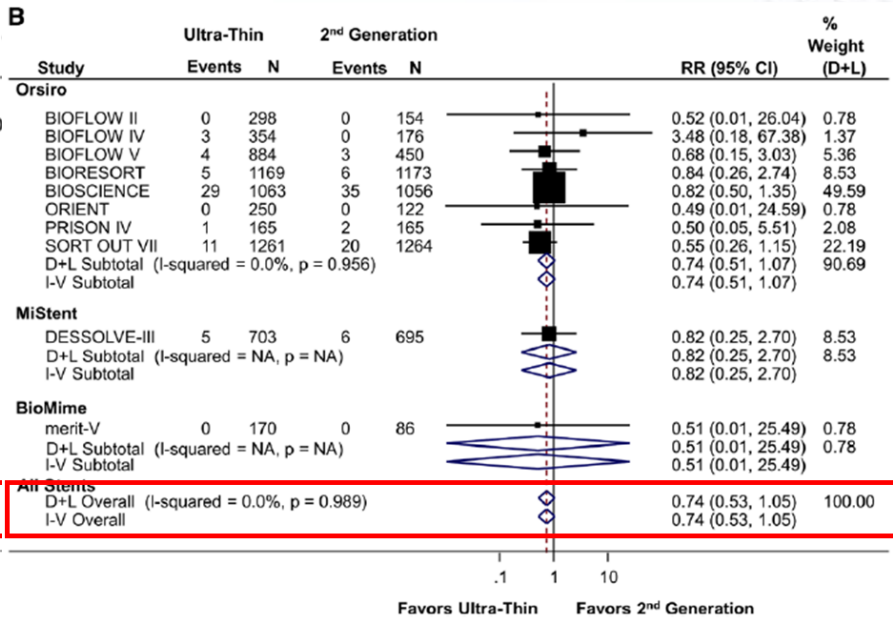
Ultrathin-strut DES vs. Conventional 2nd generation DES

10 trials including 11,658 patients. 1-year f/u

Cardiac Death	Ischemia-driven TLR	Definite or probable stent thrombosis



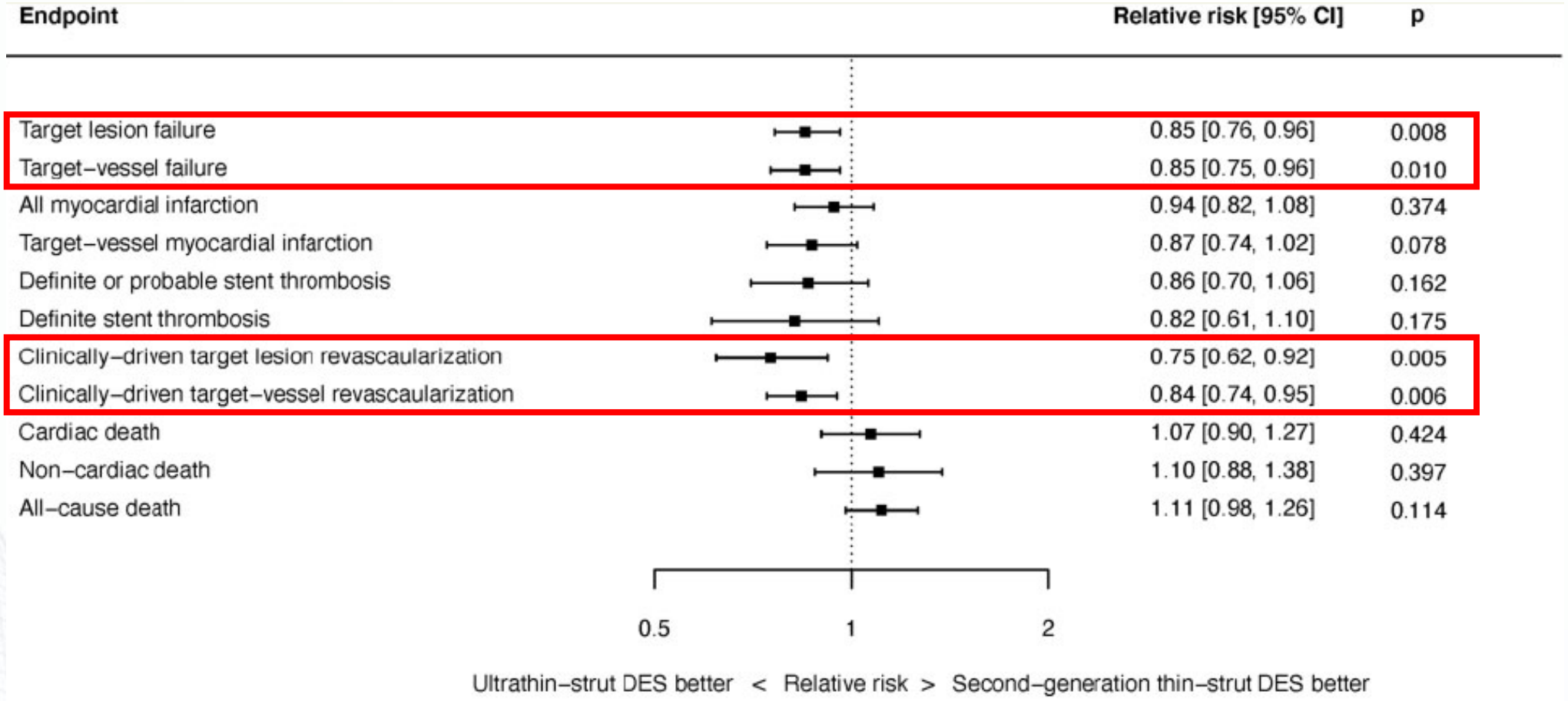




Circulation. 2018;138:2216–2226

Ultrathin-strut DES vs. Conventional 2nd generation DES

16 trials including 20,701 patients. Mean F/U of 2.5 years

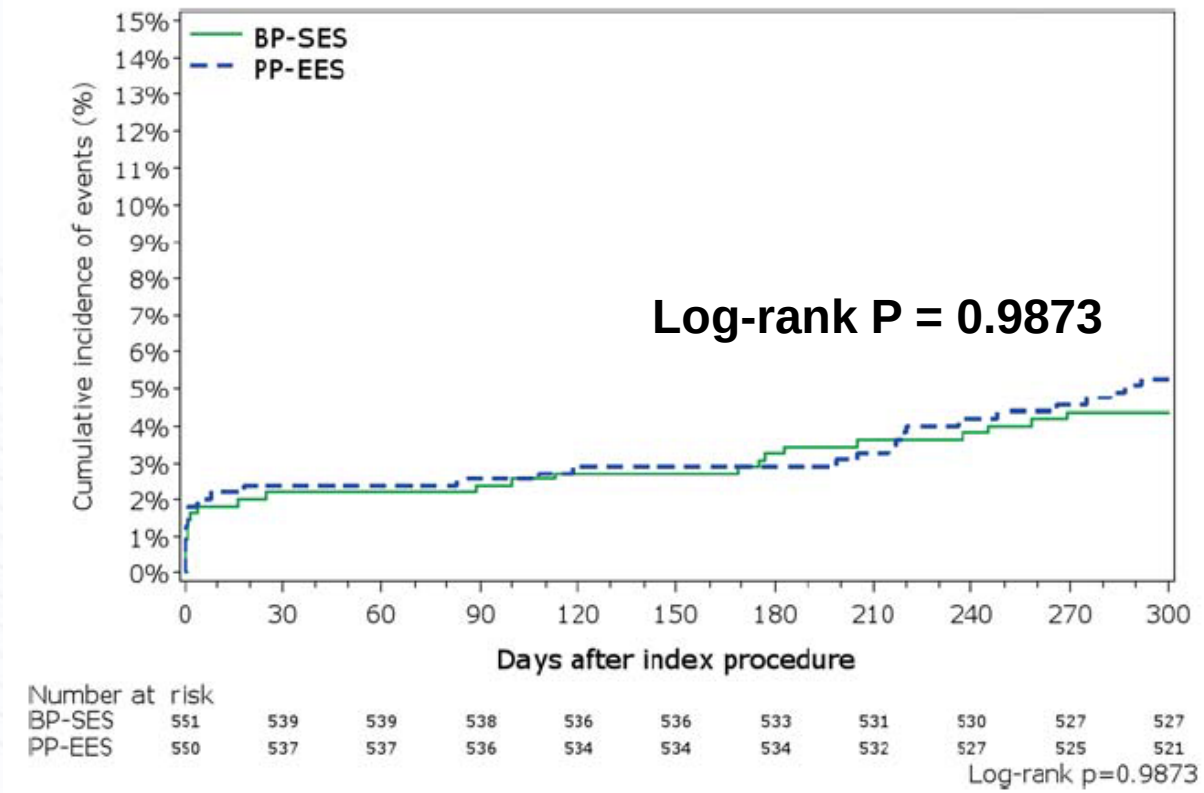


Eur Heart J. 2021;42(27):2643-2654

BP SES (Ultimaster) vs. DP EES (Xience)

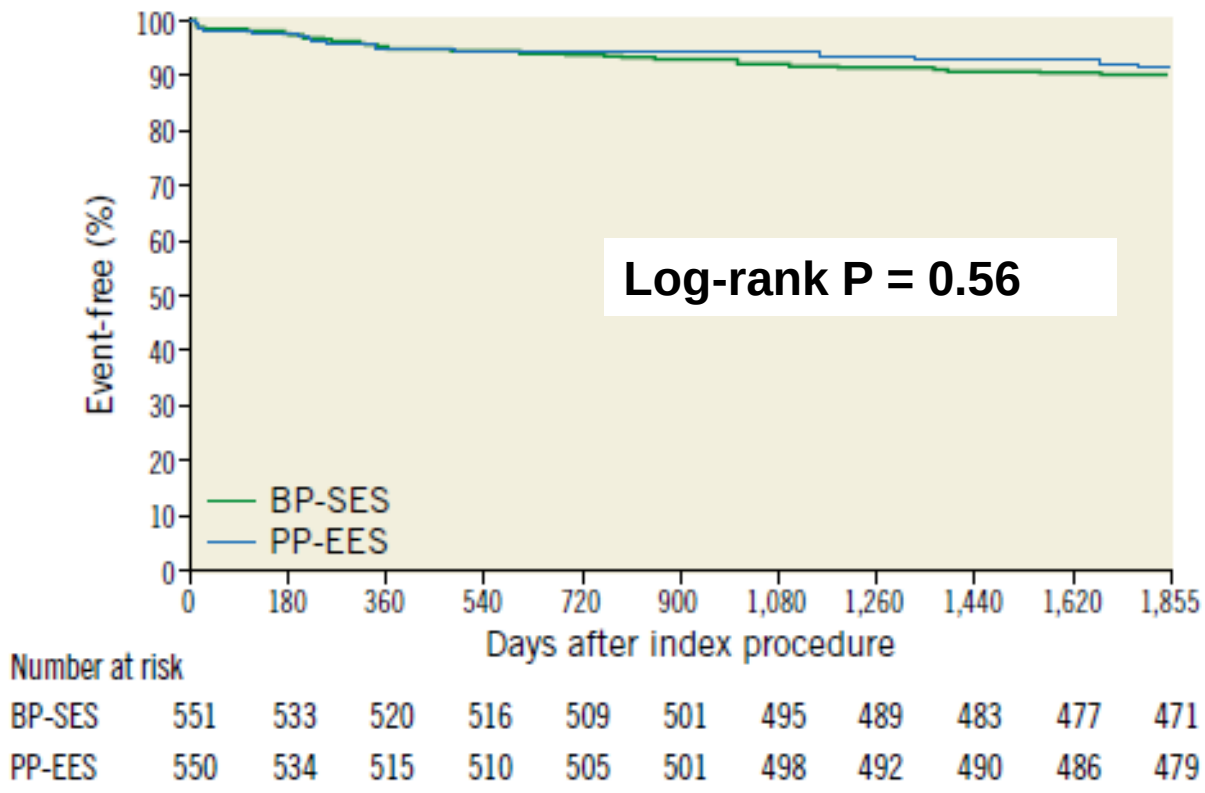
A randomized controlled trial including 1,123 patients

Target lesion failure at 9 months



Eur Heart J. 2014;35(30):2021-2031

Freedom from TLF at 5-year

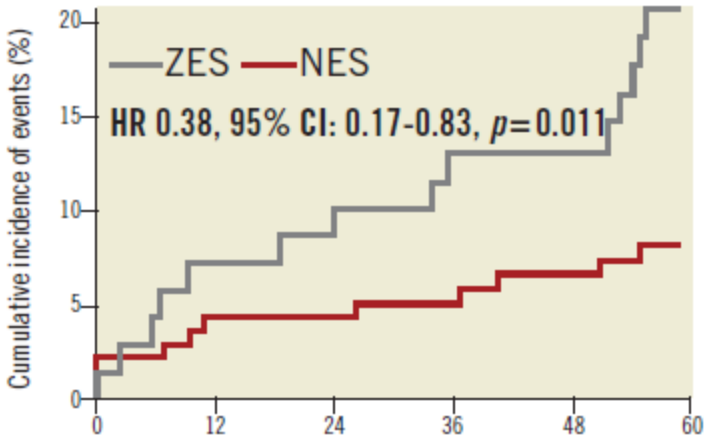


EuroIntervention 2018;14:e343-e351

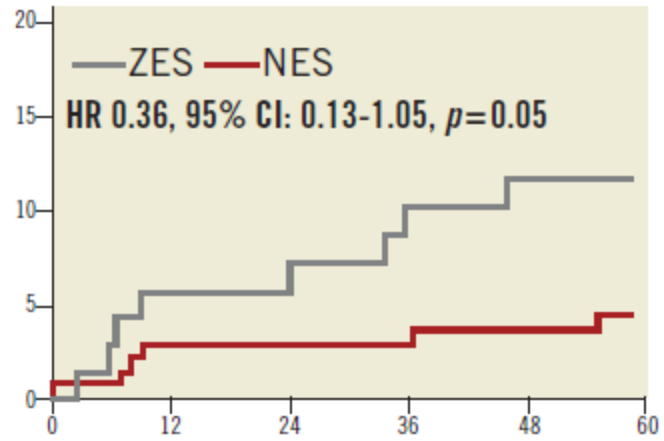
DESyne DP NES vs. Endeavor DP ZES

*A randomized multicenter trial including 210 patients. At **5-year** follow up.*

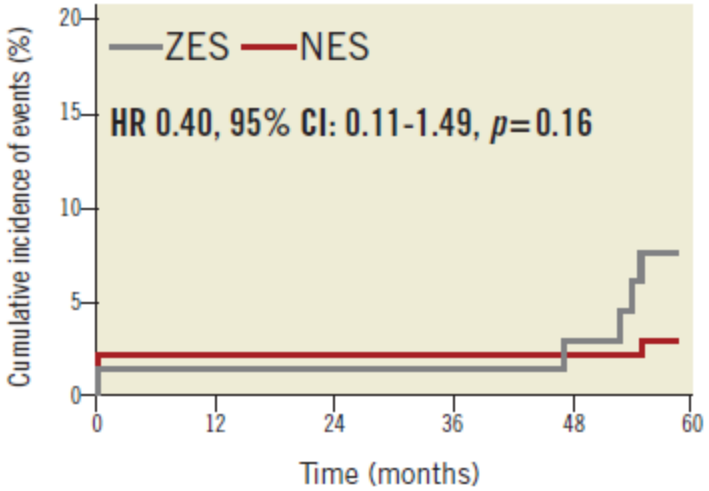
TLF; Composite of Cardiac death, MI, or TLR



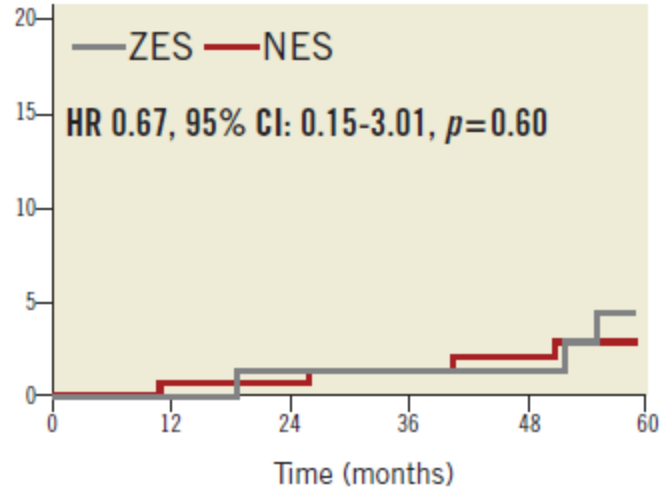
CI-TLR



TV-MI



Cardiac death



EuroIntervention 2018;14:e343-e351

Are there any differences in RCTs and Registry?

IRIS DES registry

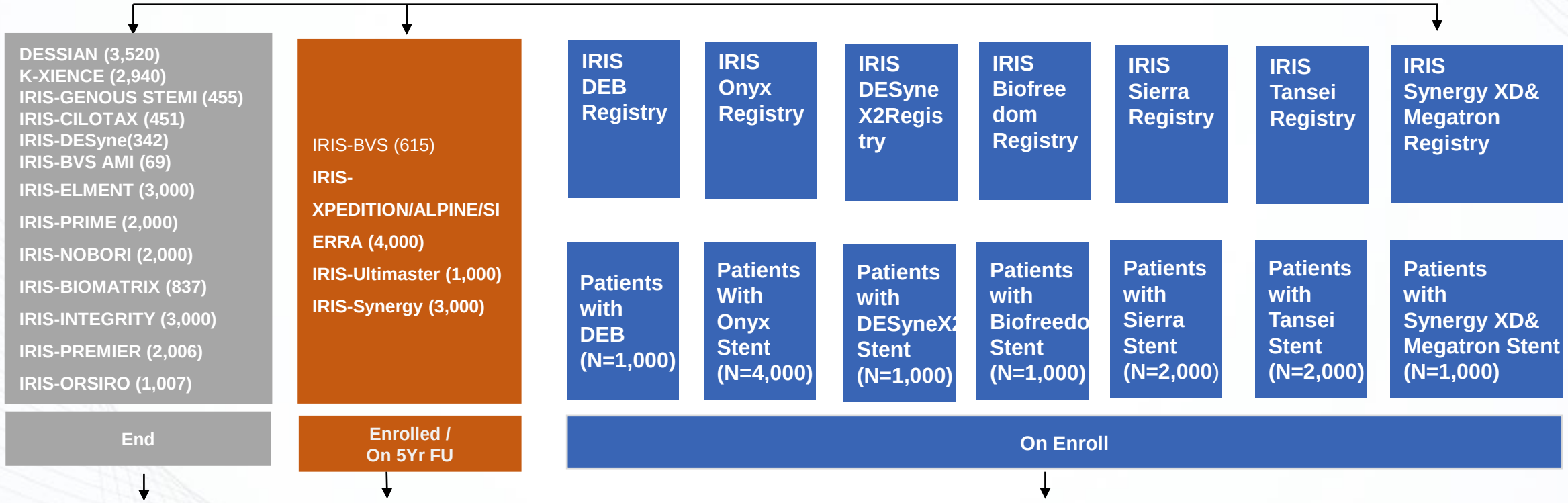
- Multicenter, Prospective, Real-world observational study
- To compare the safety and efficacy of the second- or newer-generation and the first-generation DES in everyday clinical practice
- ClinicalTrial.gov; NCT01186133

Evaluation of Effectiveness and Safety of the First, Second, and New Drug-Eluting Stents in Routine Clinical Practice;

IRIS-DES Registry

Consecutive PCI patients receiving New DES
without a mixture of other DES

Prospective Enrollment

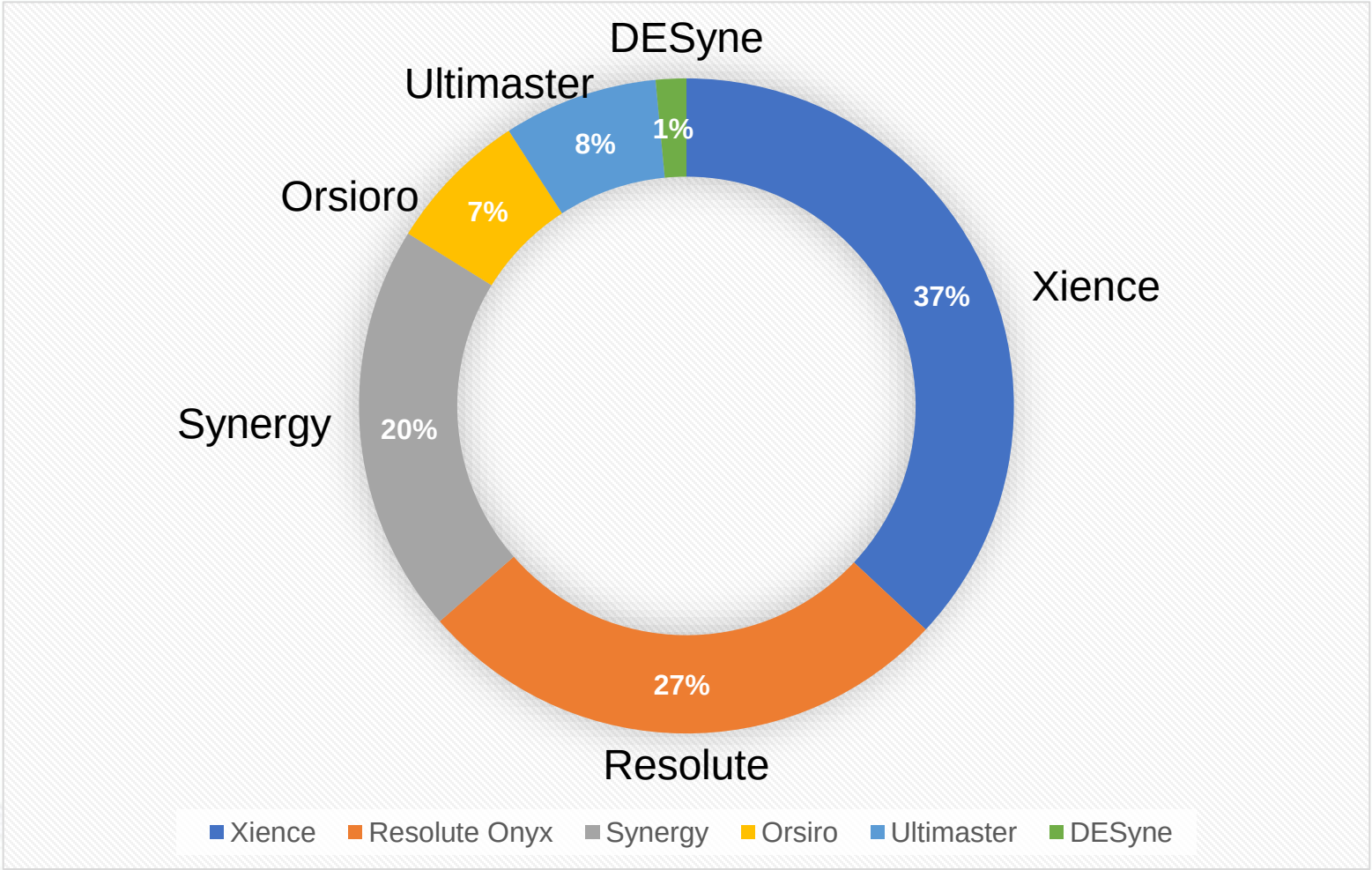


Clinical follow-up at 1-, 6-, and 12-months, 3 years, 5 years

***Primary end point: Composite of Death, MI, and TVR at 12-months**

IRIS DES registry

6 registry; 14,212 patients, median F/U of 3 years



Clinical Characteristics

Characteristics	Xience (n = 5252)	Resolute Onyx (n = 3784)	Synergy (n = 2877)	Orsiro (n = 1002)	Ultimaster Tansei (n = 1083)	DESyne X2 (n = 214)
Age, yr	64.61 ± 10.7	65.07 ± 10.9	65.83 ± 10.9	64.21 ± 10.9	65.42 ± 10.6	66.21 ± 10.3
Men	75.7%	74.7 %	73.1 %	75.8 %	73.3 %	71.0 %
BMI, kg/m^2	25.0 ± 4.9	24.9 ± 3.3	24.8 ± 3.3	25.5 ± 15.6	27.2 ± 6.2	24.6 ± 3.2
Diabetes	35.2 %	34.9 %	36.0 %	32.0 %	32.6 %	34.6 %
Hypertension	65.2 %	68.7 %	61.2 %	59.9 %	65.1 %	61.7 %
Dyslipidemia	78.0 %	75.4 %	65.7 %	60.9 %	72.8 %	81.3 %
Current smoker	25.5 %	25.7 %	23.0 %	27.9 %	28.0 %	17.8 %
Family history of CAD	6.8 %	5.9 %	3.8 %	5.4 %	6.0 %	6.1 %

Clinical Characteristics

Characteristics	Xience (n = 5252)	Resolute Onyx (n = 3784)	Synergy (n = 2877)	Orsiro (n = 1002)	Ultimaster Tansei (n = 1083)	DESyne X2 (n = 214)
Previous MI	6.3 %	5.0 %	6.9 %	6.2 %	5.3 %	6.1 %
Previous CHF	3.3 %	2.9 %	2.7 %	1.6 %	2.2 %	1.4 %
Previous PCI	17.1 %	16.5 %	18.5 %	11.7 %	14.0 %	10.7 %
Previous CABG	2.3 %	1.2 %	1.0 %	2.1 %	1.8 %	1.9 %
Renal failure	5.5 %	4.6 %	5.6 %	4.7 %	3.0 %	3.7 %
History of stroke	7.2 %	6.7 %	6.5 %	6.3 %	4.6 %	4.7 %
PVD	2.4 %	1.8 %	2.3 %	1.1 %	2.1 %	3.7 %
Chronic lung disease	2.0 %	2.4 %	2.0 %	1.7 %	2.0 %	0.5 %
Ejection fraction (%)	59.7 ± 10.9	58.6 ± 10.3	57.8 ± 10.6	58.0 ± 11.1	58.7 ± 10.8	59.7 ± 9.5

Lesion Characteristics

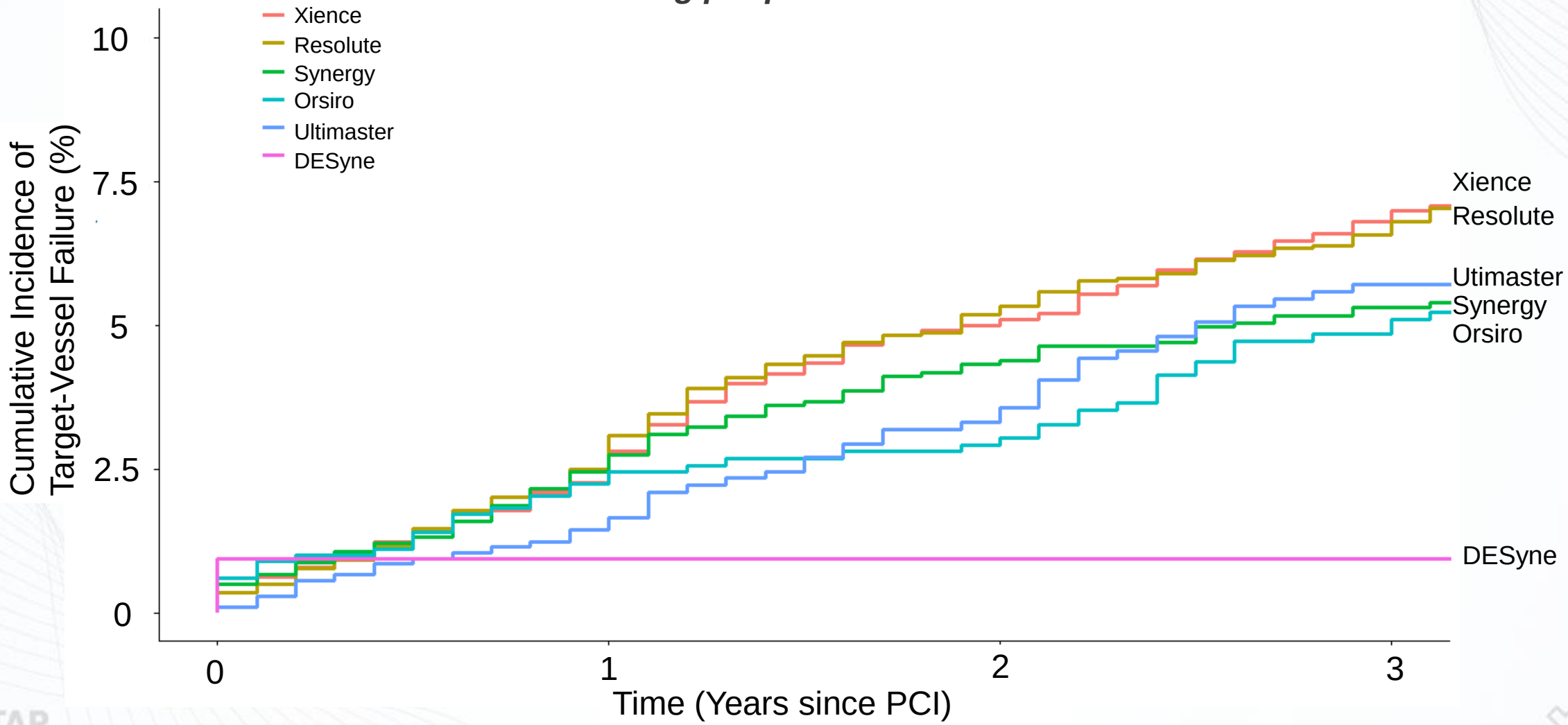
Characteristics	Xience (n = 5252)	Resolute Onyx (n = 3784)	Synergy (n = 2877)	Orsiro (n = 1002)	Ultimaster Tansei (n = 1083)	DESyne X2 (n = 214)
Treated Lesions						
1	68.7 %	70.3 %	68.4 %	70.4 %	70.8 %	66.8 %
2	23.2 %	23.0 %	23.6 %	23.1 %	22.7 %	23.8 %
3	6.9 %	5.5 %	6.5 %	4.9 %	5.4 %	7.9 %
>3	1.2 %	1.3 %	1.6 %	1.7 %	1.1 %	1.4 %
Location of treated lesion						
LM	10.5 %	8.7 %	6.1 %	8.2 %	6.7 %	6.5 %
LAD	69.6 %	64.3 %	62.9 %	63.1 %	66.0 %	72.9 %
LCX	27.6 %	27.4 %	29.6 %	27.8 %	27.1 %	33.6 %
RCA	36.2 %	36.9 %	36.6 %	34.3 %	35.1 %	30.8 %

Procedural Characteristics

Characteristics	Xience (n = 5252)	Resolute Onyx (n = 3784)	Synergy (n = 2877)	Orsiro (n = 1002)	Ultimaster Tansei (n = 1083)	DESyne X2 (n = 214)
Lesion type						
De novo	95.6 %	96.4 %	96.5 %	97.8 %	97.4 %	99.5 %
Restenotic	3.4 %	3.5 %	3.3 %	1.3 %	2.5 %	0.5 %
Number of Stents	1.7 ± 1.0	1.6 ± 0.9	1.6 ± 0.9	1.5 ± 0.8	1.6 ± 0.9	1.8 ± 1.1
Total Stent length (mm)	47.5 ± 32.8	42.3 ± 28.0	41.7 ± 28.6	34.7 ± 22.6	42.0 ± 28.6	50.9 ± 32.9
Mean Stent diameter (mm)	3.2 ± 0.4	3.2 ± 0.9	3.1 ± 0.8	3.1 ± 0.4	3.2 ± 0.4	3.1 ± 0.3
Use of IVUS	44.1 %	39.2 %	28.2 %	27.4 %	35.7 %	56.5 %

Unadjusted K-M curves for Target-Vessel Failure (TVF) according to DES type

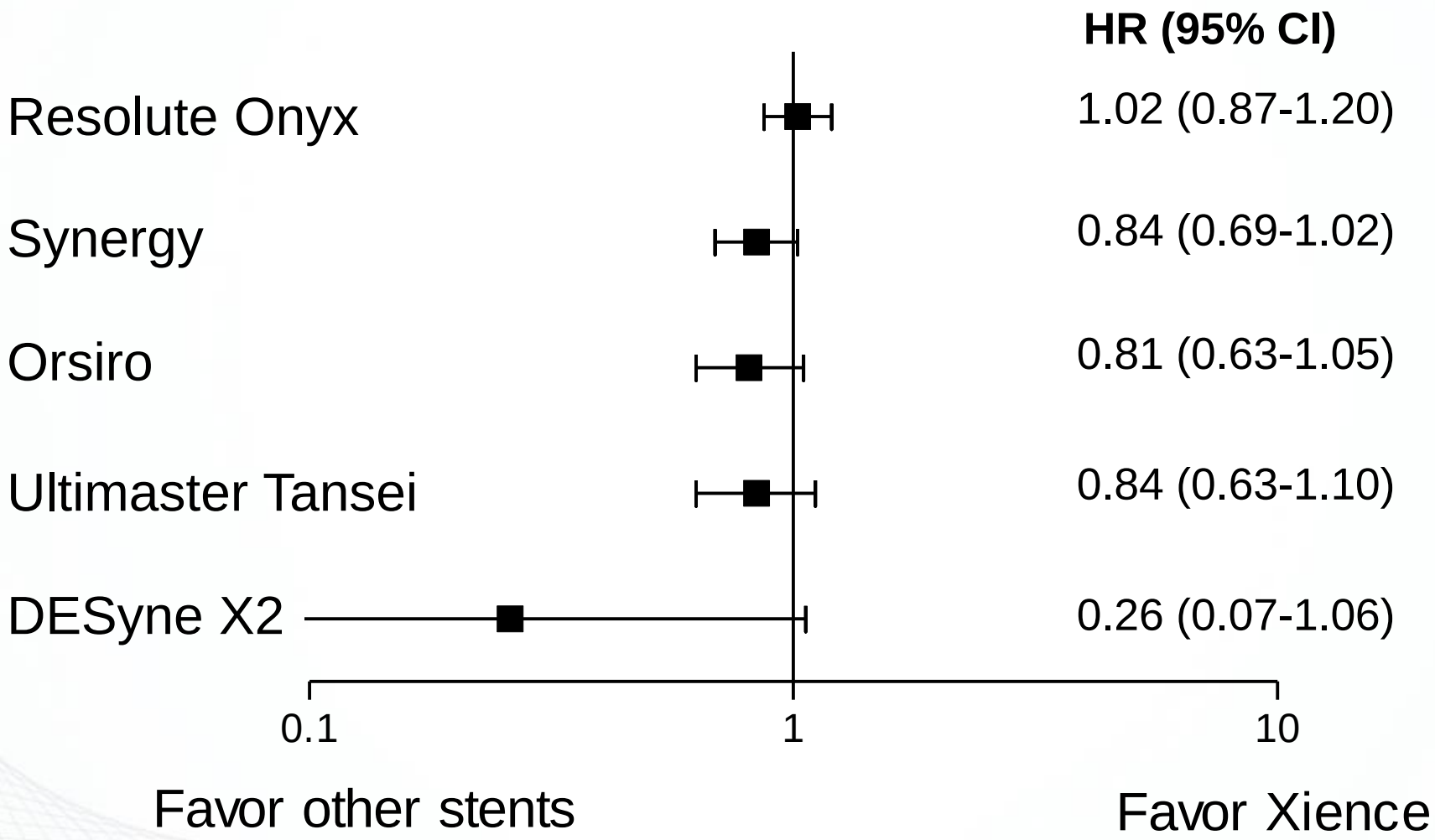
Excluding periprocedural MI



Adjusted HR: Target-Vessel Failure

(exclude periprocedural MI)

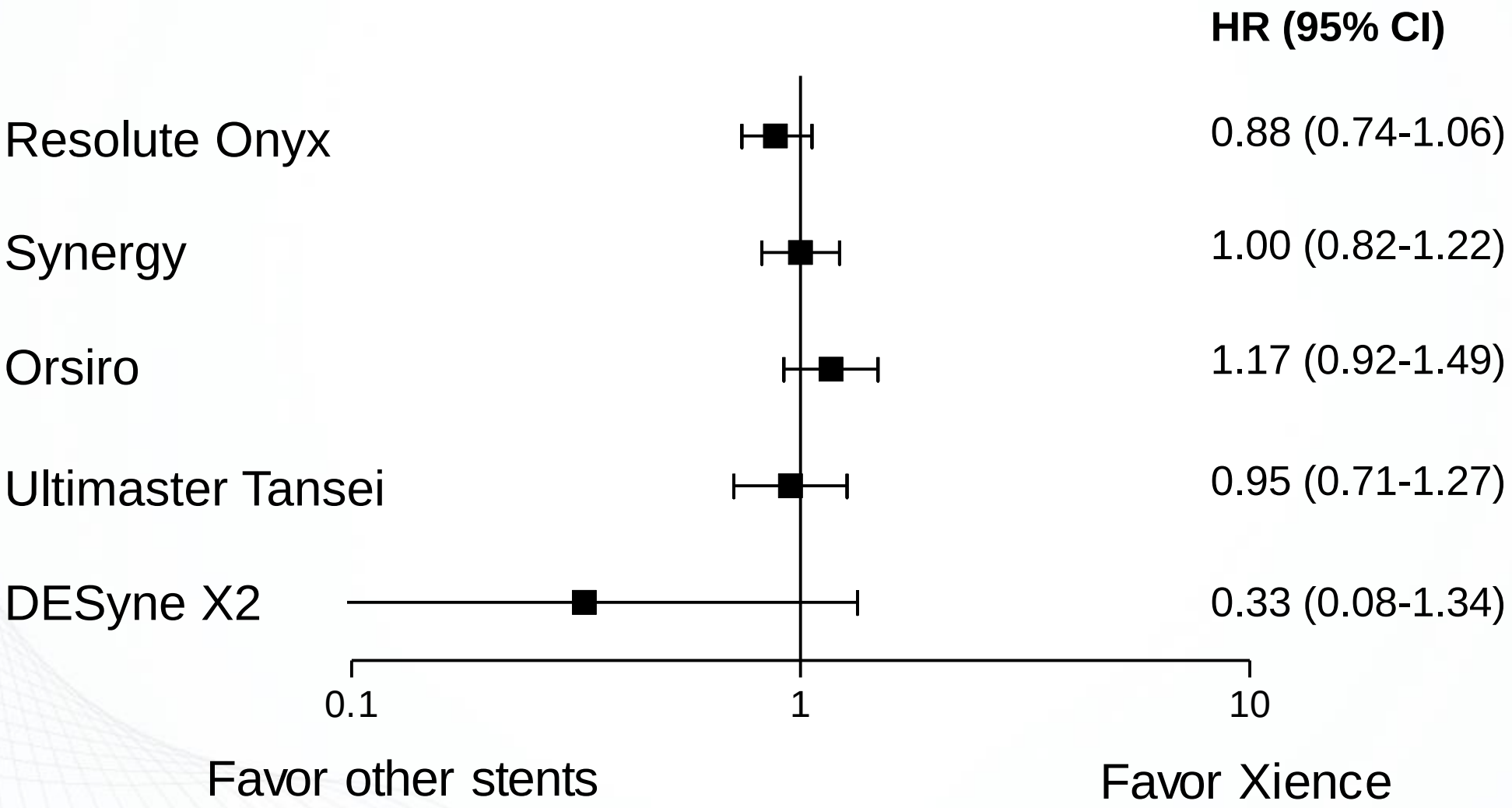
Adjustment using Multivariable Cox regression



TVF: composite of cardiac death, target-vessel MI, clinical driven TVR

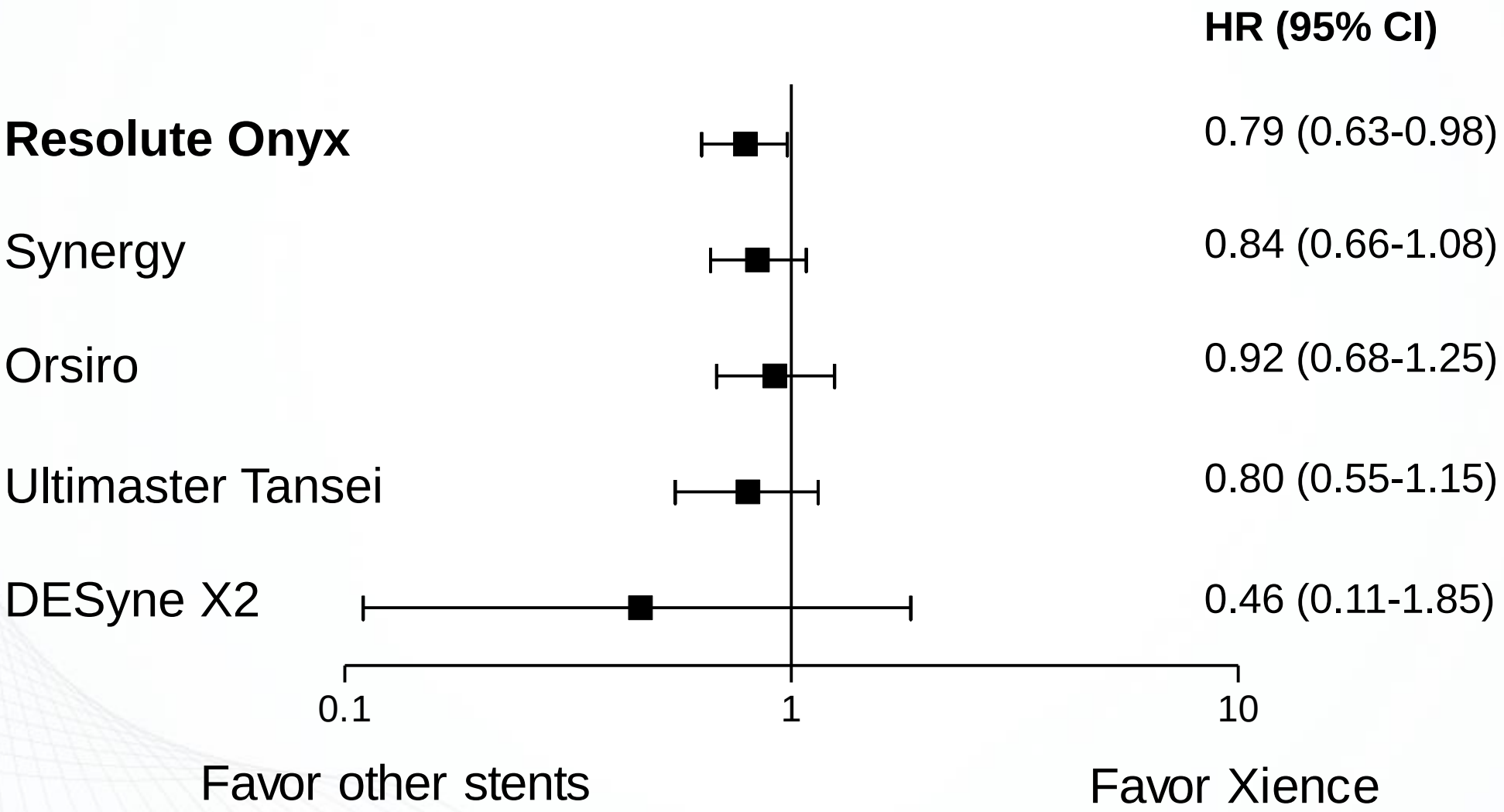
Adjusted HR: All-cause Death

Adjustment using Multivariable Cox regression



Adjusted HR: Cardiac Death

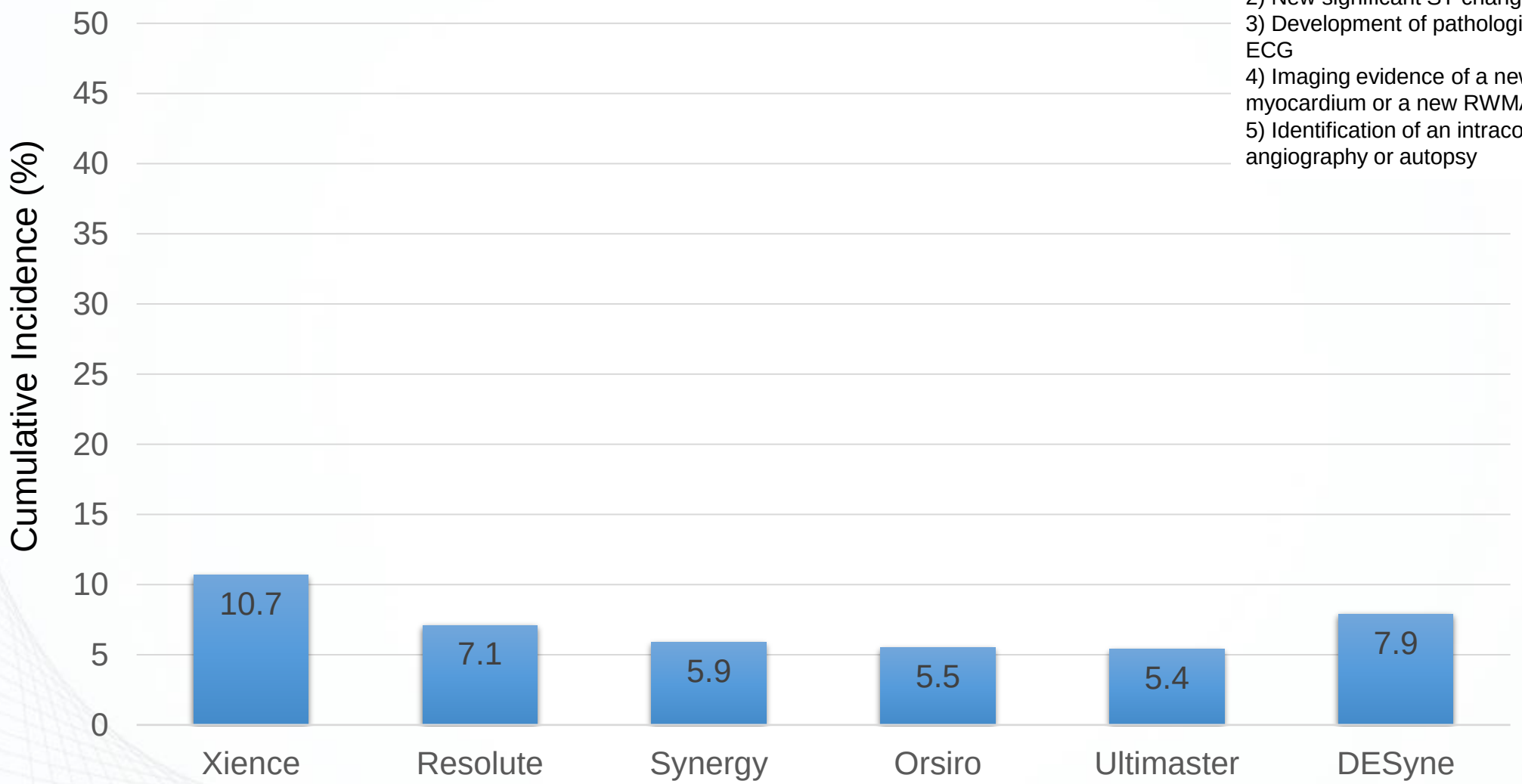
Adjustment using Multivariable Cox regression



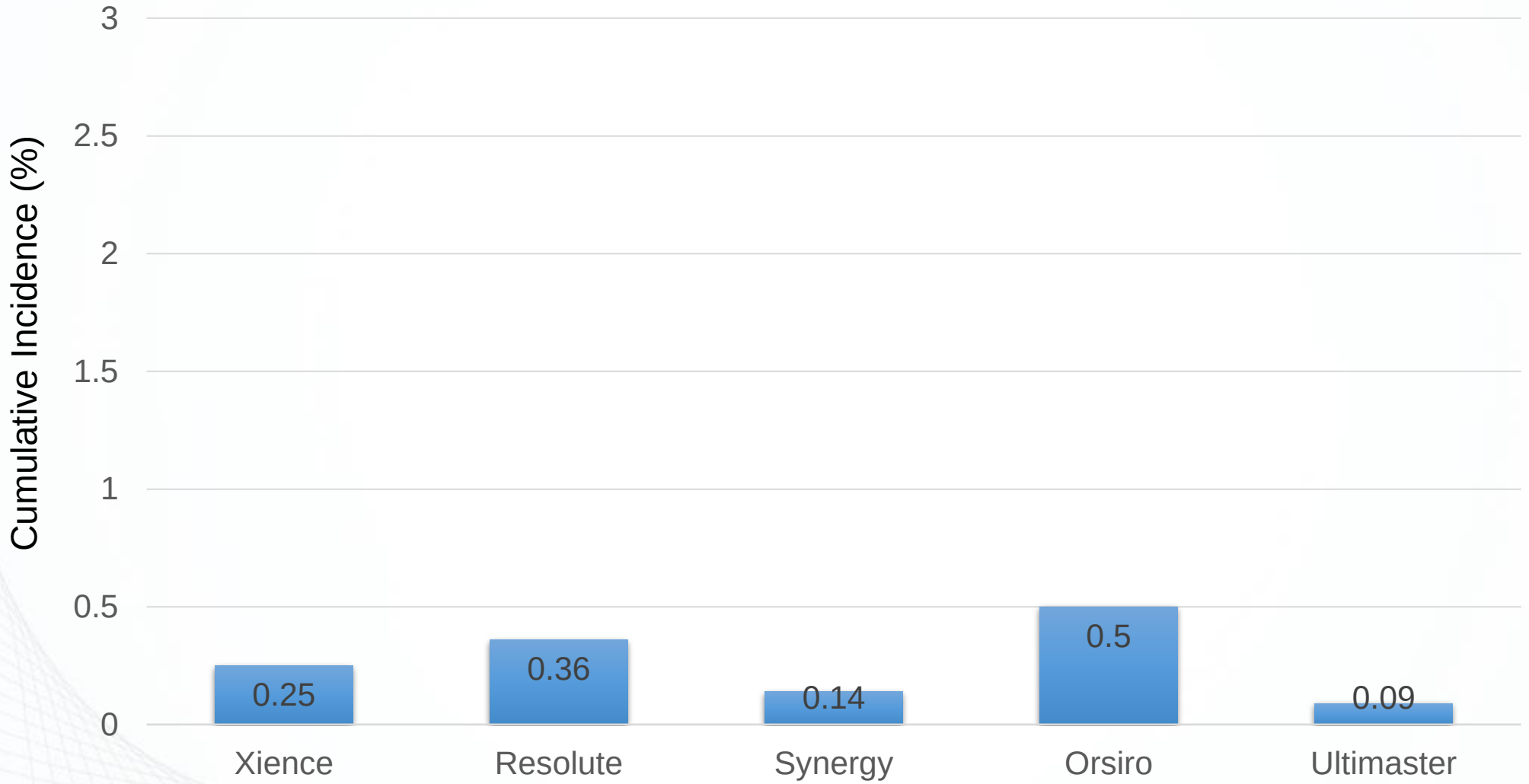
Periprocedural MI

***Definition of Periprocedural MI**

CK-MB >5 times after PCI + 1 of the followings;
1) Symptoms of myocardial ischemia
2) New significant ST changes or BBB on ECG
3) Development of pathological Q waves on ECG
4) Imaging evidence of a new loss of viable myocardium or a new RWMA
5) Identification of an intracoronary thrombus by angiography or autopsy

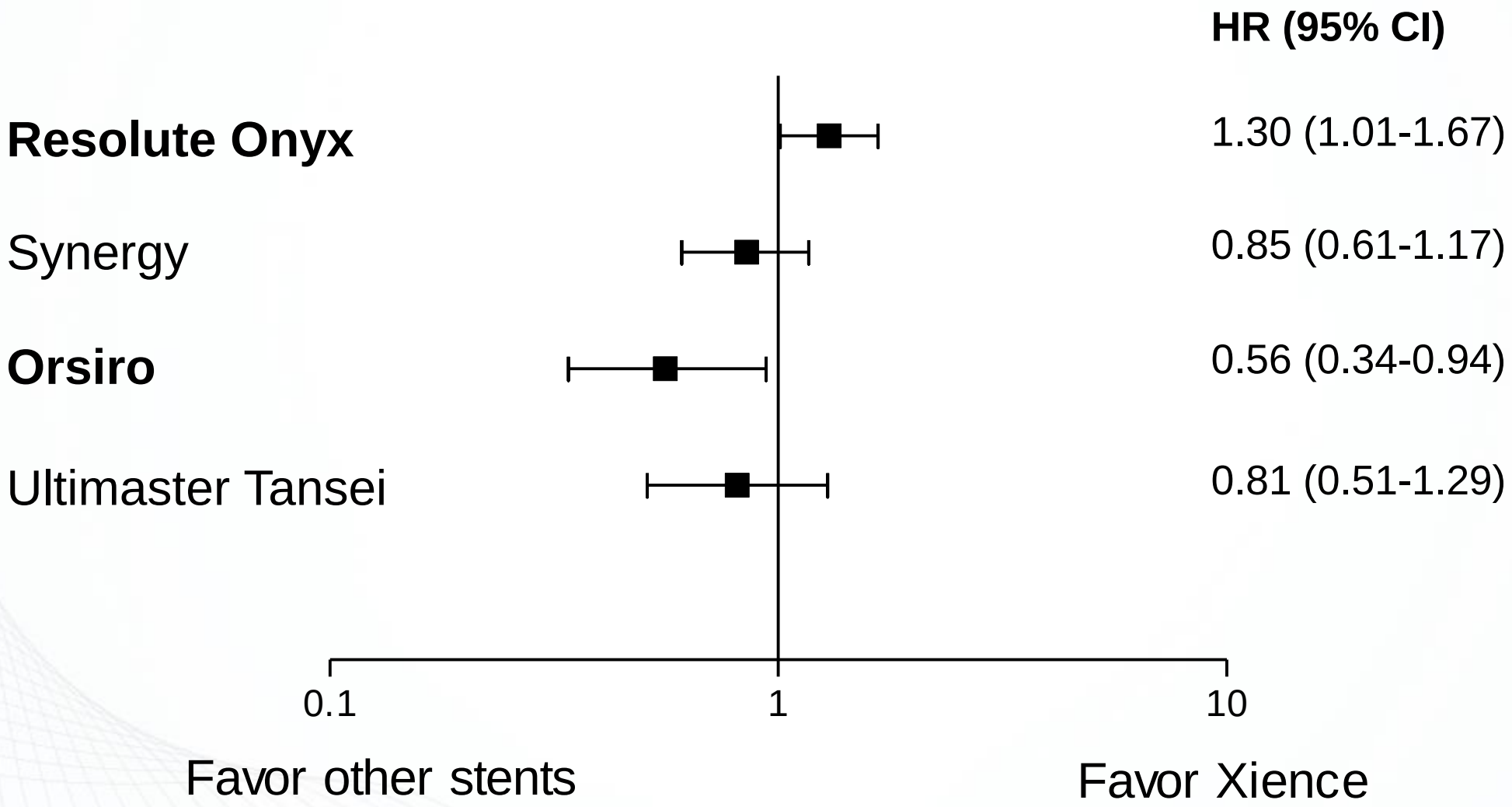


Definite or Probable ST



Adjusted HR: Target-Vessel Revascularization

Adjustment using Multivariable Cox regression



Conclusion

- Current second-generation DES showed better outcomes compared with first-generation DES and bare metal stents.
- Ultrathin-strut DES appears to be associated with lower rate of TLR compared with conventional thin-strut DES.
- In this contemporary PCI registry study, there was no remarkable between-stent difference with respect to clinically relevant efficacy and safety outcomes.
- We can choose any contemporary DES on the basis of clinical and lesion subsets combined with the physician's preference.