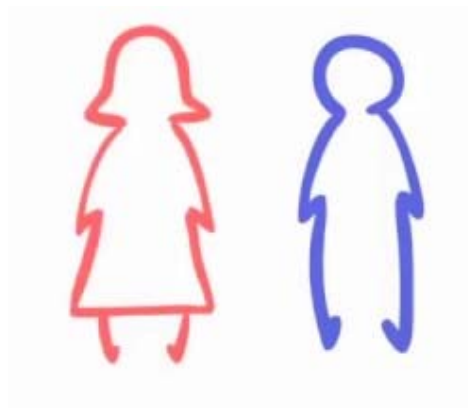# Influence of Sex on Coronary Anatomical and Physiologic Disease Burdens and Their Prognostic Implications
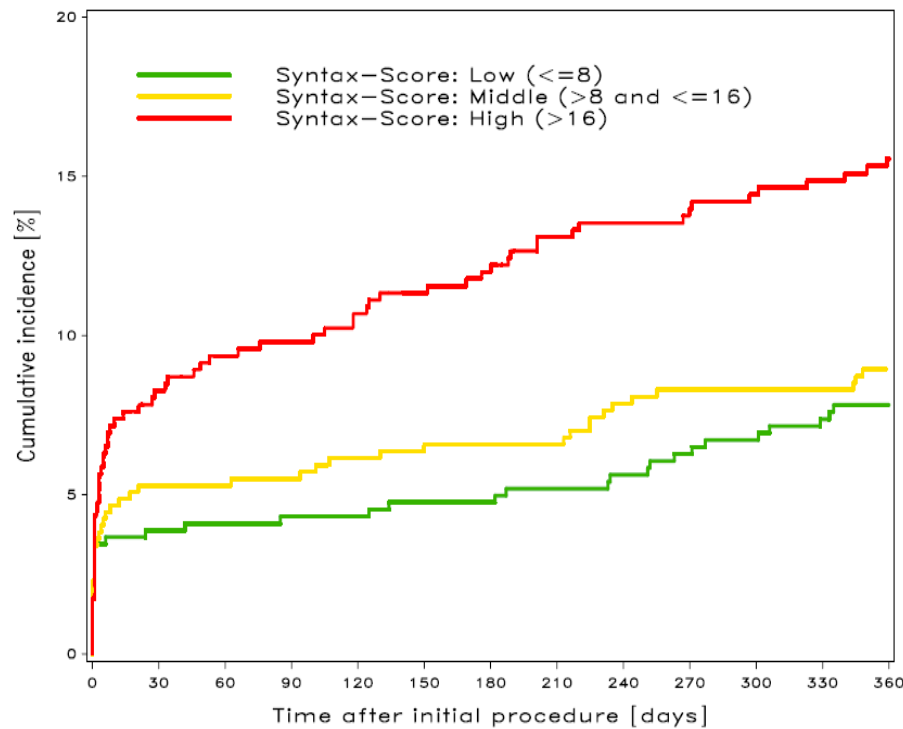
VHS Medical Center, Seoul, Korea

Chee Hae Kim, M.D.

Total Anatomical Disease Burden
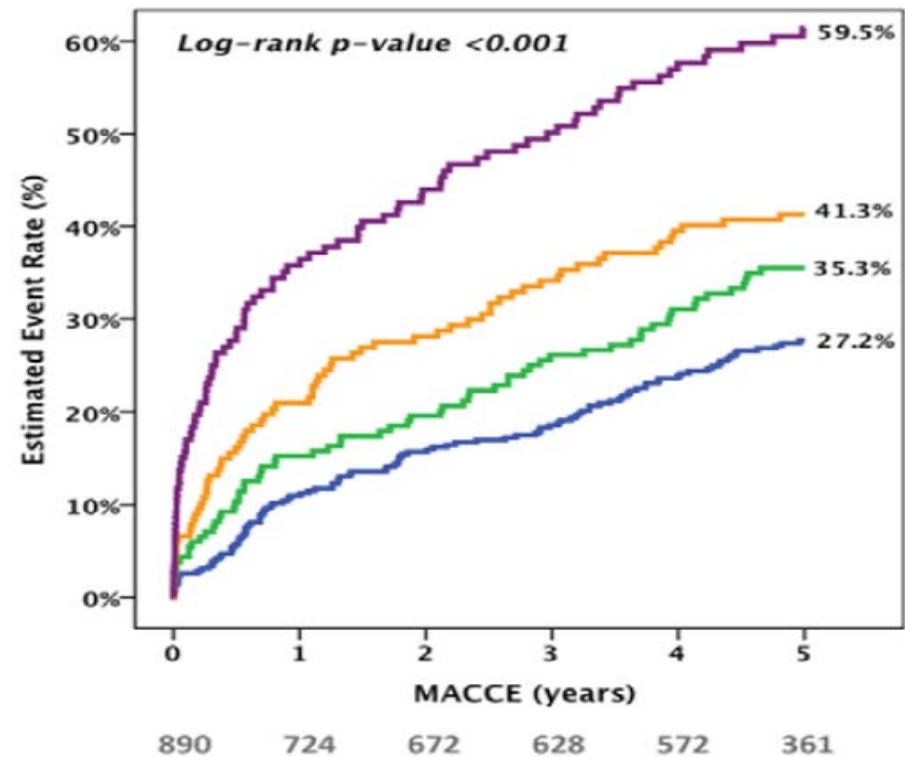
- Total atherosclerotic disease burden has a prognostic implication in patients with coronary artery disease.

SYNTAX score

Residual SYNTAX score

Wykrzykowska et al. JACC 2010;56:272-277.
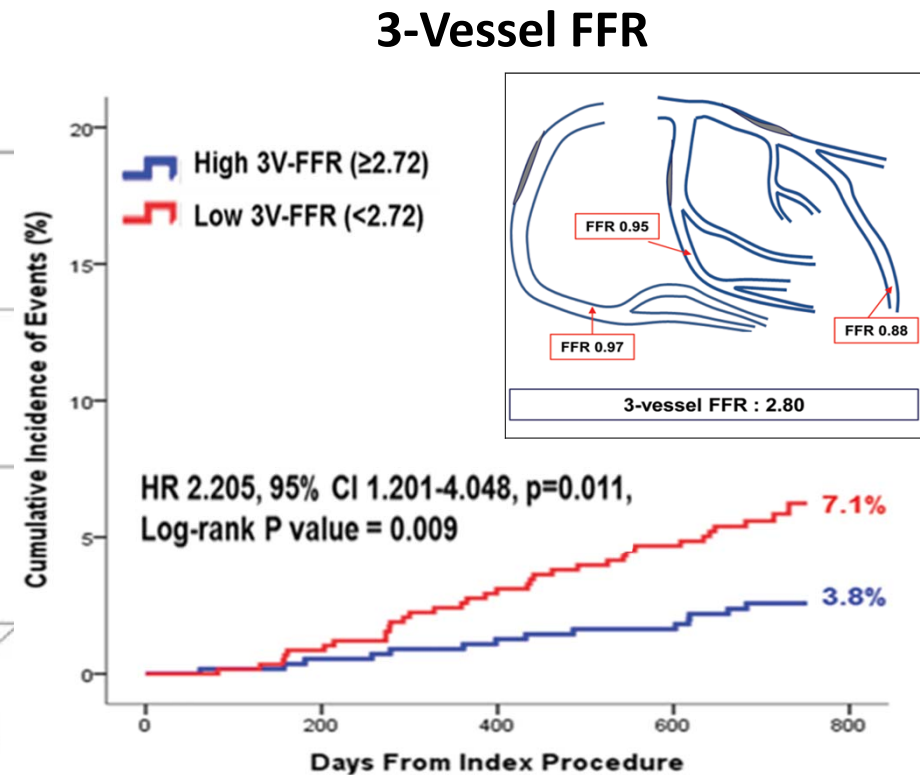
Farooq et al Circulation 2013;128:141-151.

Total Physiologic Disease Burden

- To overcome a limitation of angiography in defining ischemia, a concept of **total physiologic disease burden** has been suggested.

Functional SYNTAX score

3-Vessel FFR

Nam et al. JACC 2011;58:1211–8

Lee et al. EHJ 2017;39:945-951
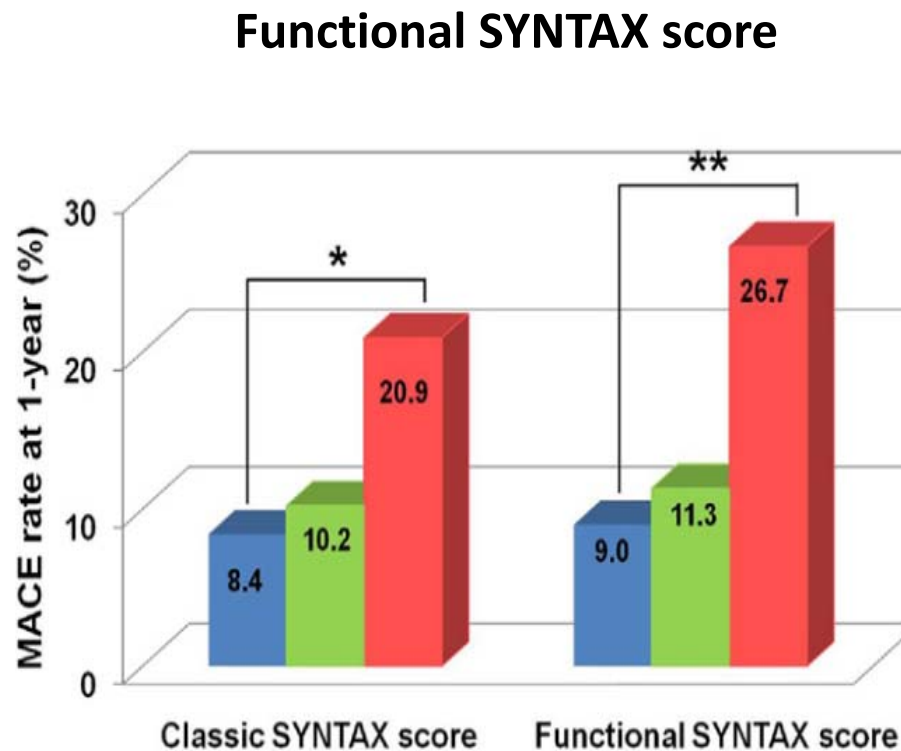
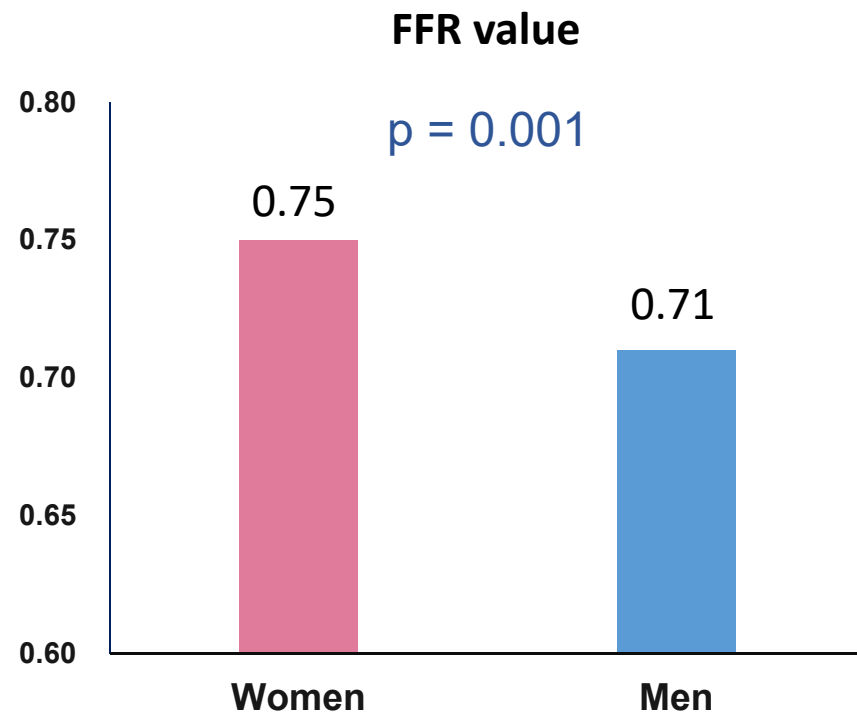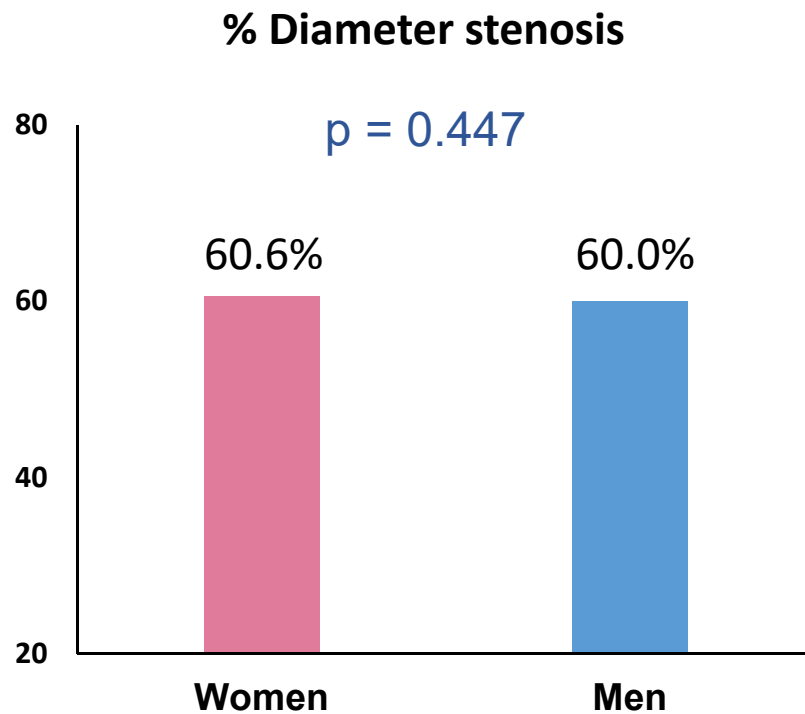# Is This a Significant Stenosis?

F/63, Stable Angina, HTN/DM (+/+)

M/71, Stable Angina, HTN/DM (+/+)

FFR in Women

- FAME substudy showed that mean FFR value was higher in women than in men.

% Diameter stenosis

p = 0.447

60.6%   60.0%

Women   Men

FFR value

p = 0.001

0.75   0.71

Women   Men

Kim et al. JACC intv 2012;5:1037-42

Is This a Significant Stenosis?

F/63, Stable Angina, HTN/DM (+/+)

M/71, Stable Angina, HTN/DM (+/+)

Different <u>anatomy-physiology relationship</u>

Different <u>total anatomy or physiologic disease burden</u>

Different <u>prognostic implication</u>
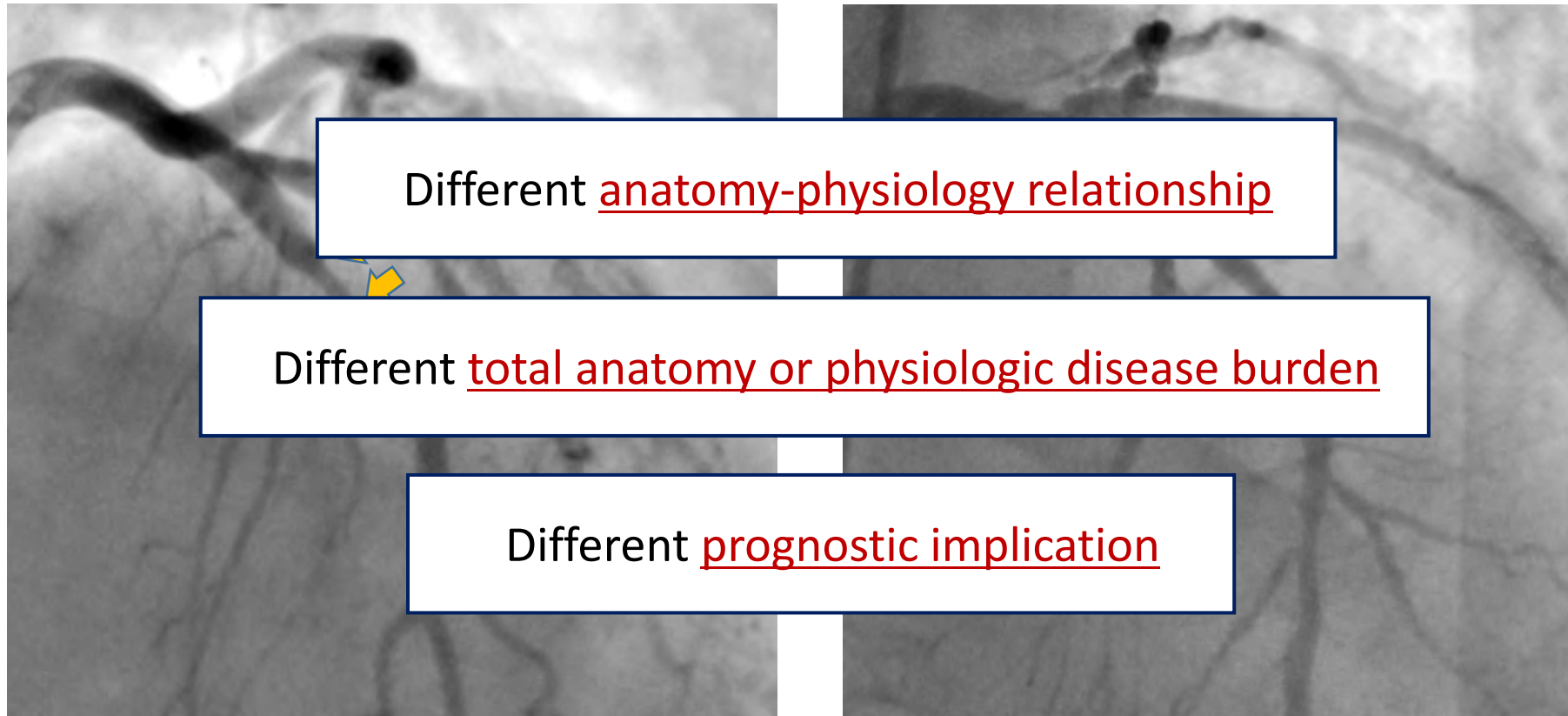
FFR 0.85

Insignificant

FFR 0.76

Significant

Objectives

- To compare anatomical and physiologic disease burden between women and men

- To evaluate the sex influence on prognostic implication of total anatomical and physiologic disease burden

Study Flow

Baseline Clinical Characteristics

Characteristics	Women (N=301)	Men (N=835)	p-value
Age, years	**65.0 ± 9.6**	**60.8 ± 9.7**	**<0.001**
Diabetes mellitus	107 (35.5%)	256 (30.7%)	0.119
Hypertension	**199 (66.1%)**	**490 (58.7%)**	**0.024**
Hypercholesterolemia	152 (50.5%)	445 (53.3%)	0.405
Current smoking	**22 (7.3%)**	**305 (36.5%)**	**<0.001**
Previous MI	21 (7.0%)	79 (9.5%)	0.192
Previous PCI	88 (29.2%)	272 (32.6%)	0.286
Clinical presentation			0.180
Stable angina	242 (80.4%)	640 (76.6%)	
Acute coronary syndrome	59 (19.6%)	195 (23.4%)	

Lesion Characteristics

Characteristics	Women (N=878)	Men (N=2,420)	p-value
Quantitative coronary angiography			
Reference vessel diameter, mm	**2.89 ± 0.57**	**3.03 ± 0.61**	**<0.001**
Minimum lumen diameter, mm	**1.66 ± 0.71**	**1.72 ± 0.72**	**0.044**
Diameter stenosis, %	43.3 ± 19.6	43.8 ± 19.1	0.530
Lesion length, mm	10.9 ± 9.0	11.2 ± 8.8	0.356
FFR	**0.89 ± 0.10**	**0.87 ± 0.11**	**<0.001**
FFR ≤ 0.80	**139 (16.8%)**	**502 (22.1%)**	**0.001**

Per-Vessel and Per-Patient Disease Burden

	Anatomical disease burden	Physiologic disease burden
Per-vessel	p = 0.530 — 43.3% (Women) vs 43.8% (Men), **% Diameter stenosis**	p < 0.001 — 0.89 (Women) vs 0.87 (Men), **Per-vessel FFR**
Per-patient	p = 0.098 — 10.3 (Women) vs 11.3 (Men), **SYNTAX score**	p < 0.001 — 2.72 (Women) vs 2.69 (Men), **3-Vessel FFR**
	p = 0.306 — 7.9 (Women) vs 8.4 (Men), **Residual SYNTAX score**	p < 0.001 — 3.3 (Women) vs 4.7 (Men), **Functional SYNTAX score**

Clinical Outcomes at 2 Years

2-Year MACE

HR 0.46, 95% CI 0.24-0.86, p = 0.049
HR_{adj} 0.53, 95% CI 0.23-1.24, p = 0.144

5.0%

2.3%
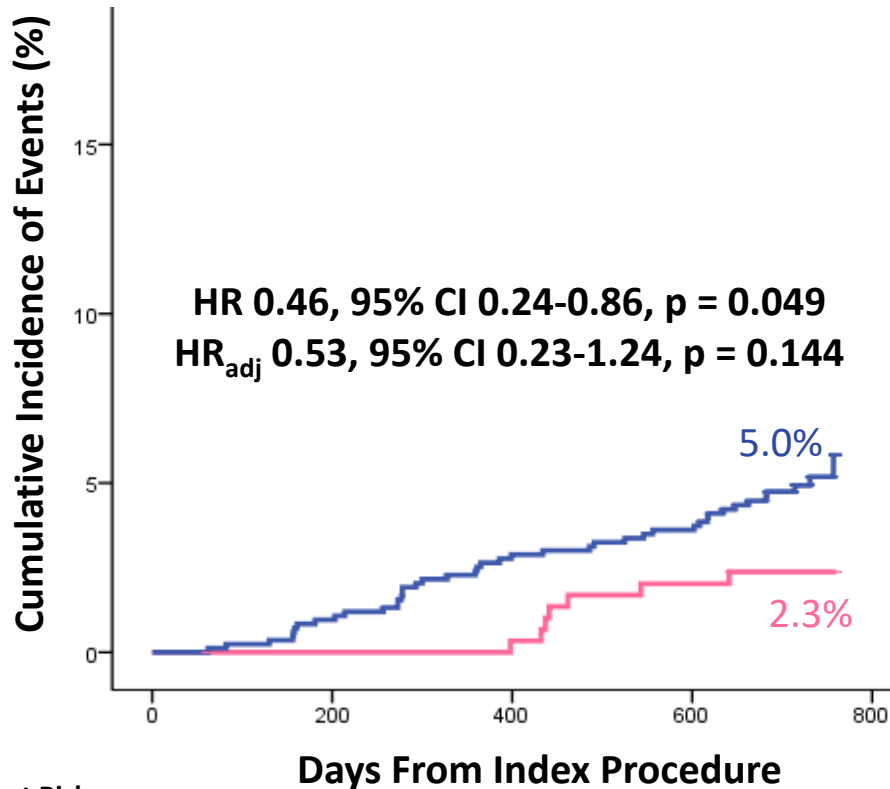
No. at Risk				
Women	300	300	296	290
Men	834	826	803	794

Mutivariable Cox Analysis

| Variable	Adjusted HR (95% CI)	p
Acute coronary syndrome	2.69 (1.47-4.91)	0.001
3-vessel FFR (by 0.10 decrease)	1.22 (1.02-1.47)	0.029
Residual SYNTAX score (by 1 increase)	1.05 (1.01-1.09)	0.018
Women	0.53 (0.23-1.24)	0.144
Age (by 10 years increase)	1.25 (0.91-1.71)	0.177
Hypertension	0.84 (0.46-1.53)	0.570
Diabetes mellitus	1.07 (0.59-1.97)	0.816
Previous myocardial infarction	1.78 (0.74-4.28)	0.198
Smoking	1.40 (0.75-2.61)	0.291
Hypercholesterolemia	1.09 (0.60-1.98)	0.77

Kim CH, Koo BK et al. JAHA 2019;8:e011002
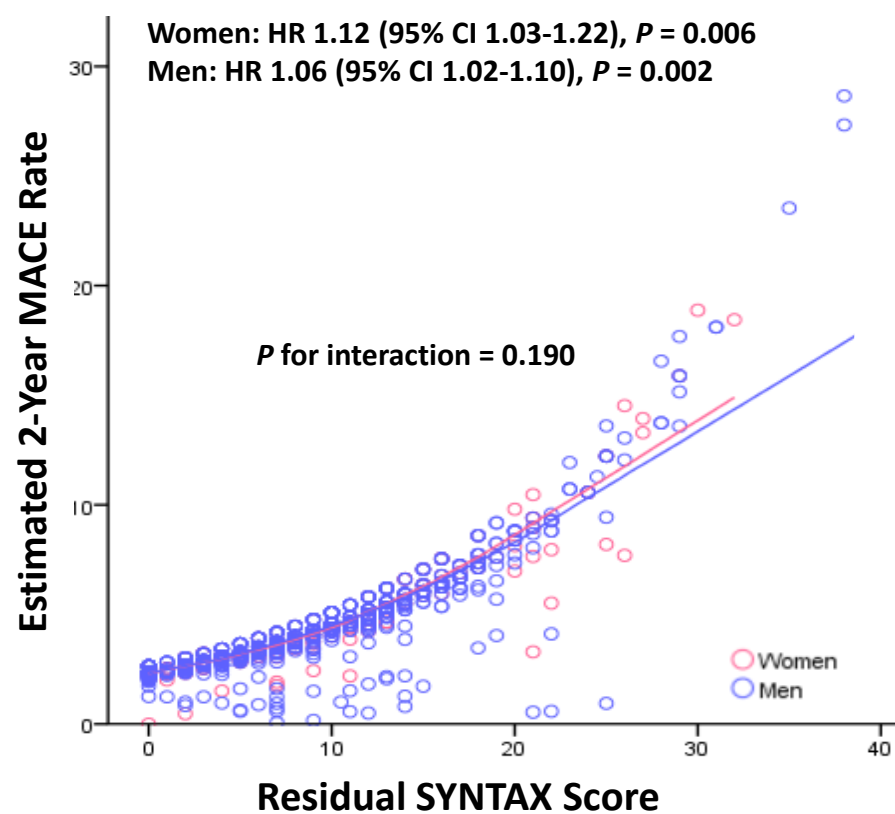
Sex was not an independent factor for clinical outcomes

Predictive Values of Total Disease Burden for MACE

Total anatomical disease burden

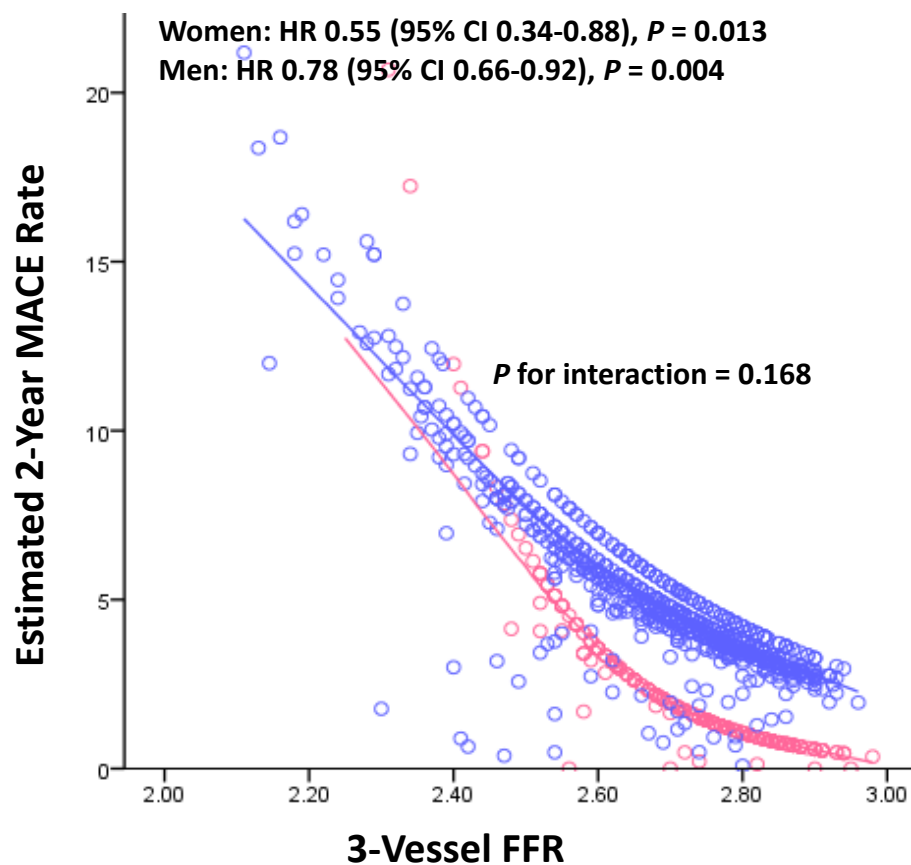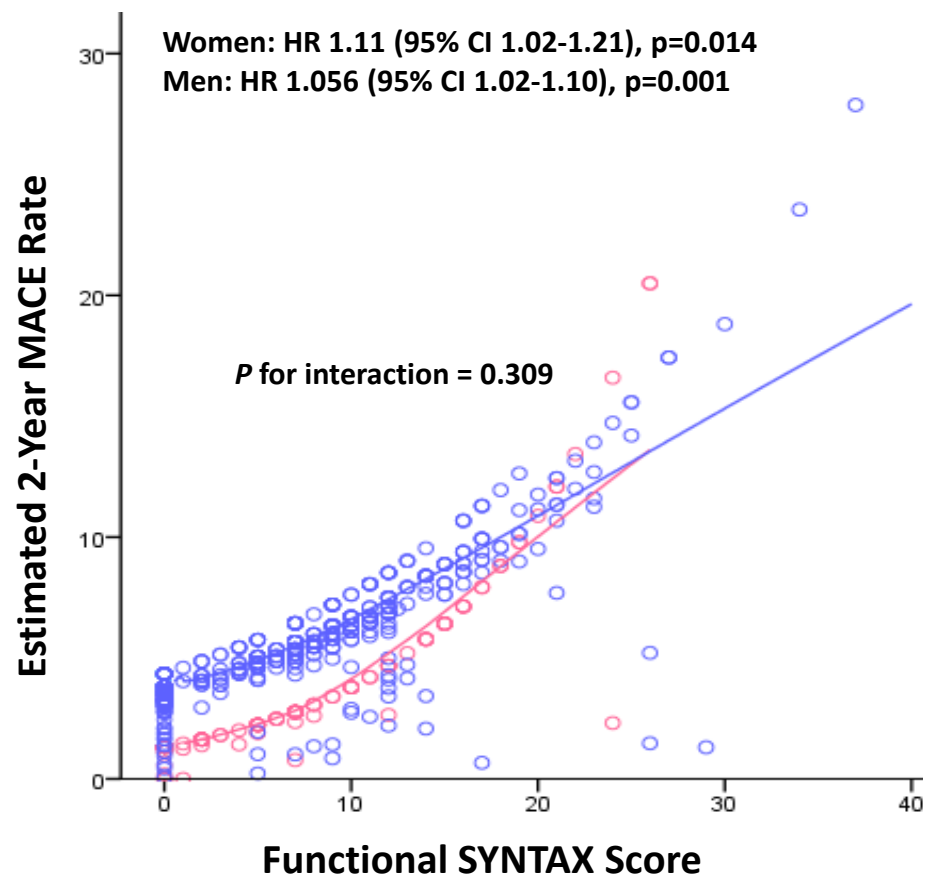Kim CH, Koo BK et al. JAHA 2019;8:e011002
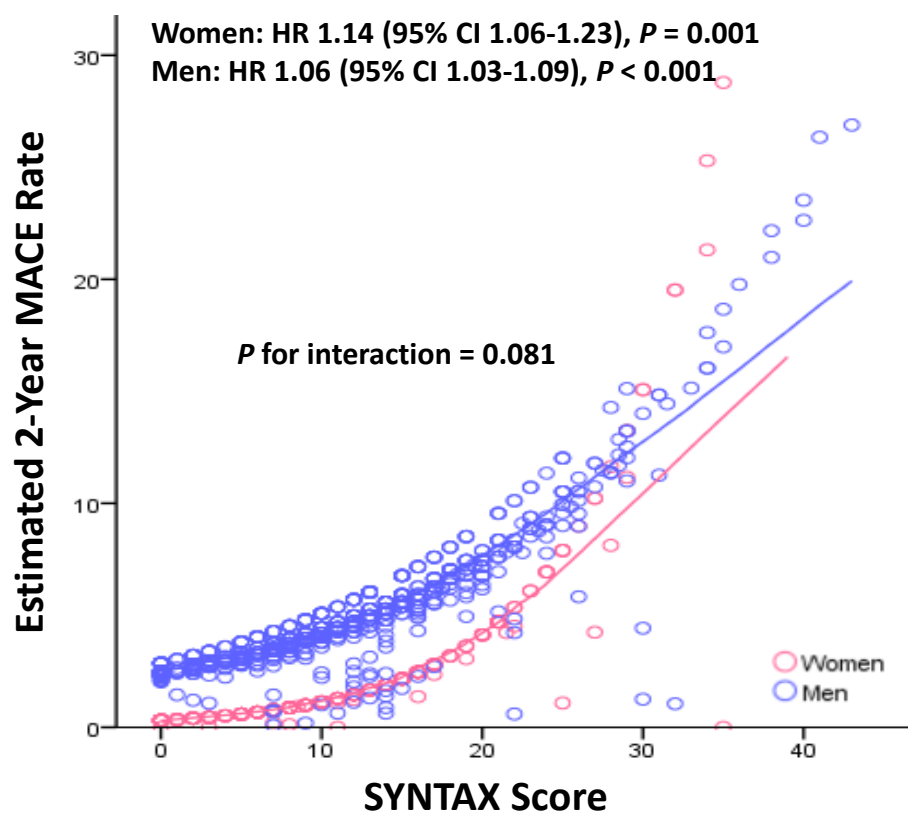
Predictive Values of Total Disease Burden for MACE

Total physiologic disease burden

3-Vessel FFR

Women: HR 0.55 (95% CI 0.34-0.88), *P* = 0.013
Men: HR 0.78 (95% CI 0.66-0.92), *P* = 0.004

P for interaction = 0.168

Functional SYNTAX Score

Women: HR 1.11 (95% CI 1.02-1.21), p=0.014
Men: HR 1.056 (95% CI 1.02-1.10), p=0.001

P for interaction = 0.309

Kim CH, Koo BK et al. JAHA 2019;8:e011002

Summary

- Per-vessel FFR value was higher in women than in men for the same stenosis severity.

- There was no sex difference in total anatomical disease burden, but total physiologic disease burden was lower in women.

- Women showed a lower MACE rate than men. However, sex was not an independent predictor for clinical outcomes after adjusting total disease burden.

- There was no sex influence on prognostic implications of total disease burden.

Conclusion

- Despite similar angiographic disease severity, both per-vessel and per-patient physiologic disease severity based on FFR was less in women than in men.

- There was no influence of patient sex on the prognostic implications of total anatomical and physiologic disease burden in patients with coronary artery disease.

Thank You for Your Attention