



TCTAP 2011

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# Evidence Based Medicine: Does BioMatrix Bring Patient Benefit?

## 3 Years/Subgroup Follow Up from LEADERS trial

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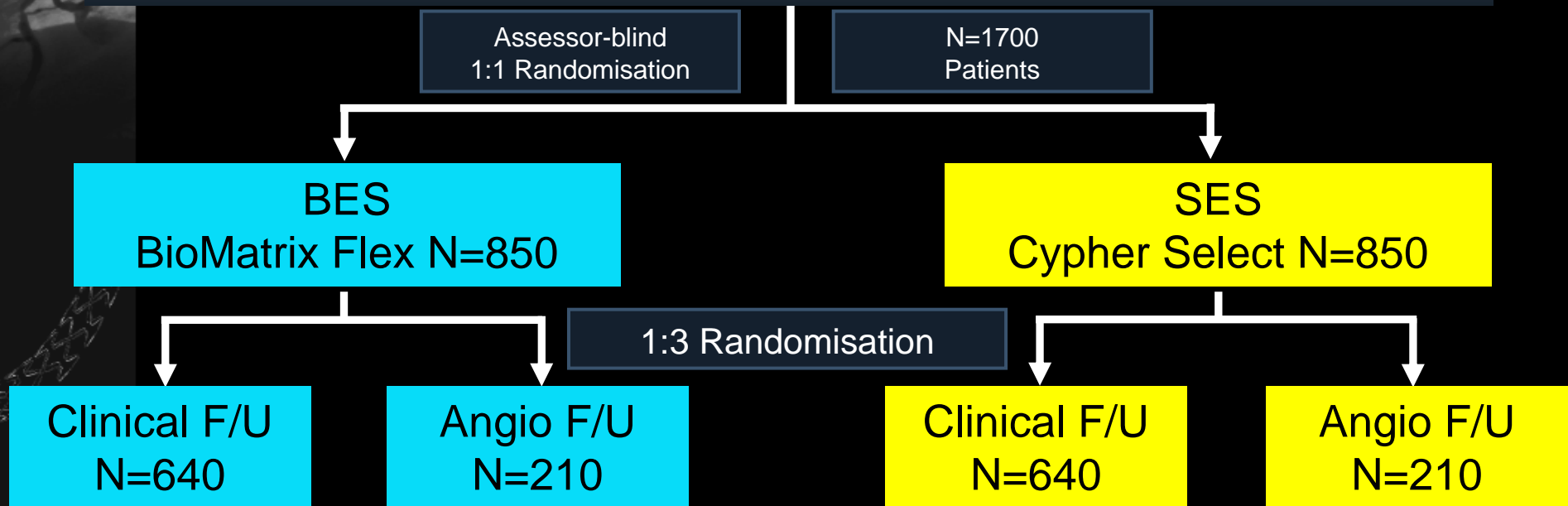
University Hospital Bonn, Germany

Stanford University, Palo Alto, California, USA



# Trial Design

## Stable and ACS Patients Undergoing PCI



**1° endpoint:**

**2° endpoints:**

**Angiographic study:**

**DAPT recommended for 12 month**

**CV death, MI, clinically-indicated TVR (9 months)**

Death, CV death, MI, TLR, TVR

Stent thrombosis according to ARC

In-stent % diameter stenosis

Late loss, binary restenosis

# Patient Eligibility

## *Inclusion Criteria*

### *Coronary artery disease*

- Stable angina
- Silent ischemia
- Acute coronary syndrome including UA, NSTEMI and STEMI

### *At least one lesion with*

- Diameter stenosis >50%
- RVD: 2.25-3.5 mm
- Number of lesions: no limitation
- Number of vessels: no limitation
- Lesion length: no limitation

### *Written informed consent*

## *Exclusion Criteria*

### *Known allergy to*

- Aspirin, clopidogrel, heparin, stainless steel, sirolimus, biolimus, contrast material

*Planned, elective surgery within 6 months of PCI unless dual APT could be maintained*

### *Pregnancy*

*Participation in another trial*

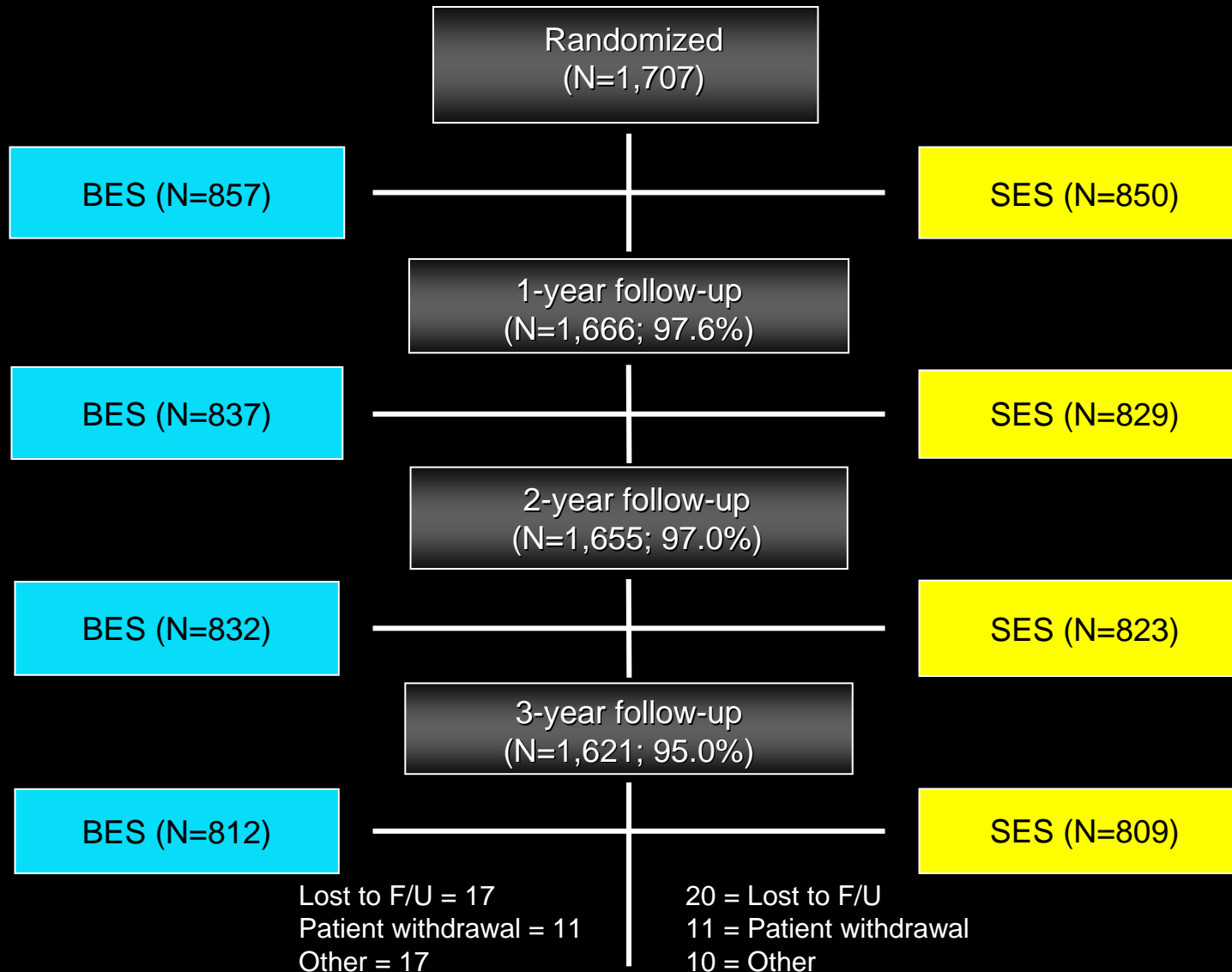
# Patient Demographics

	BES 857 Patients	SES 850 Patients
Age in years	65 ± 11	65 ± 11
Male gender	75%	75%
Arterial hypertension	74%	73%
<b>Diabetes mellitus</b>	26%	23%
- insulin-dependent	10%	9%
Hypercholesterolemia	65%	68%
Family history	40%	44%
Smoking	24%	25%
<b>Previous MI</b>	32%	33%
<b>Previous PCI</b>	36%	37%
- with drug-eluting stent	12%	14%
<b>Previous CABG</b>	11%	13%
Chronic stable angina	45%	44%

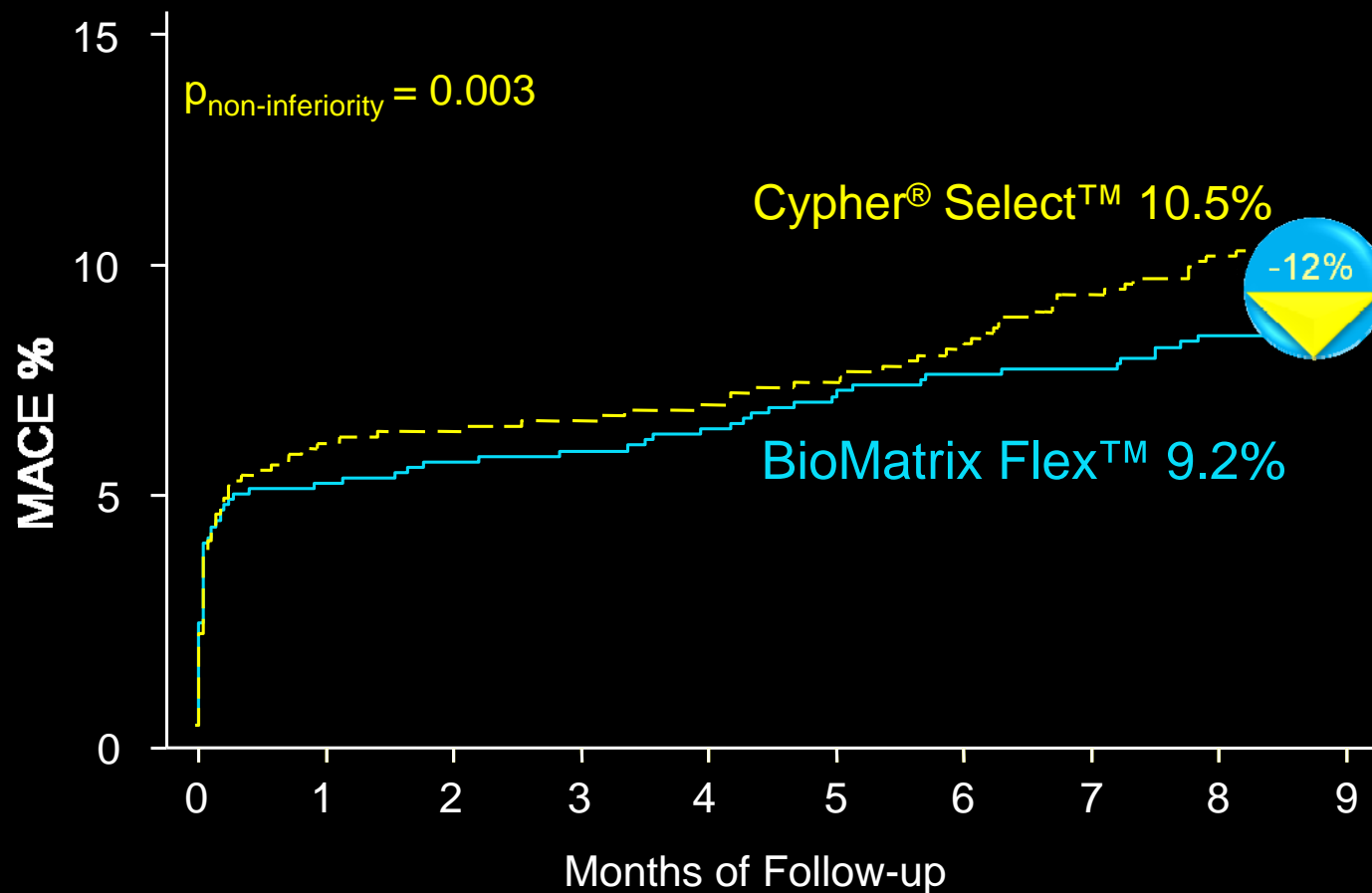
# Patient Characteristics

	BES 857 Patients	SES 850 Patients
<b>Acute coronary syndrome</b>	55%	56%
• Unstable angina	22%	21%
• Non-ST-elevation MI	17%	18%
• ST-elevation MI	16%	17%
Left ventricular ejection fraction	56 ± 11%	55 ± 12%
Number of lesions per patient	1.5 ± 0.7	1.4 ± 0.7
<b>Lesions per patient</b>		
• 1 lesion	63%	69%
• 2 lesions	29%	22%
• 3 lesions	7%	8%
• > 4 lesions	1%	2%
De novo lesions	92%	91%
Long lesions (>20 mm)	31%	27%
Small vessels (RVD <2.75 mm)	68%	67%
<b>Off label use</b>	81%	78%

# Patient Flow - Clinical



# Primary Endpoint MACE (Cardiac Death, MI and TVR) @ 9 Months



**BioMatrix Flex™ reached its primary endpoint**





Long Term Results

Proven Safety and Efficacy

3-year Outcomes

# MACE

3-year HR  
0.82 [0.65 to 1.03]  
P = 0.09\*

— BES  
— SES

1-year HR  
0.88 [0.66 to 1.17]  
P = 0.37\*

2-year HR  
0.84 [0.65 to 1.08]  
P = 0.18\*

19.0%

Δ 3.3%

15.4%

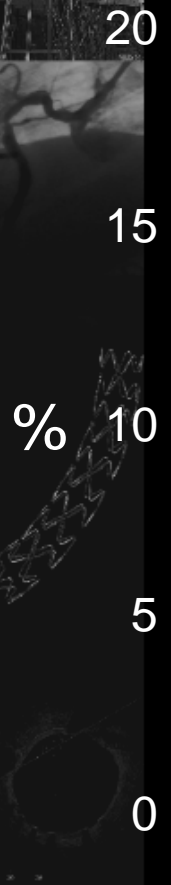
Δ 2.4%

15.7%

12.1%

Δ 1.4%

10.7%



Number at risk

	0	6	12	18	24	30	36
BES	857	851	761	743	729	712	668
SES	850	846	749	732	713	686	639

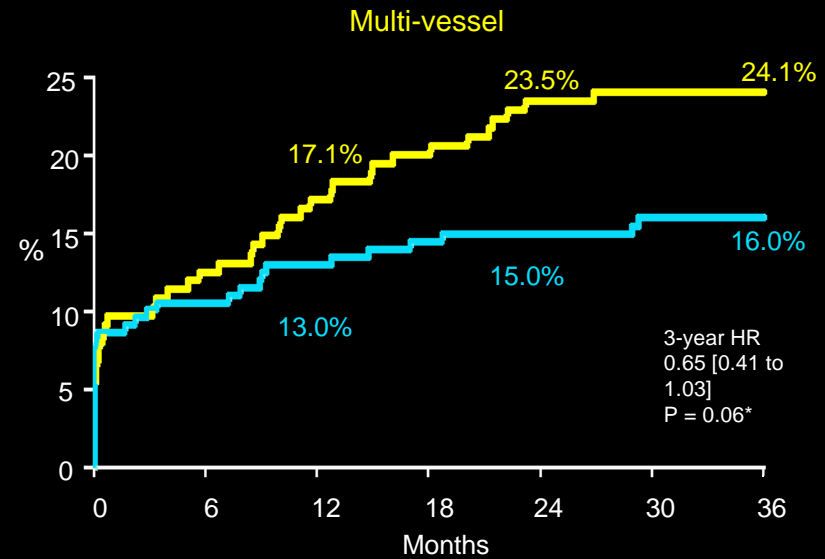
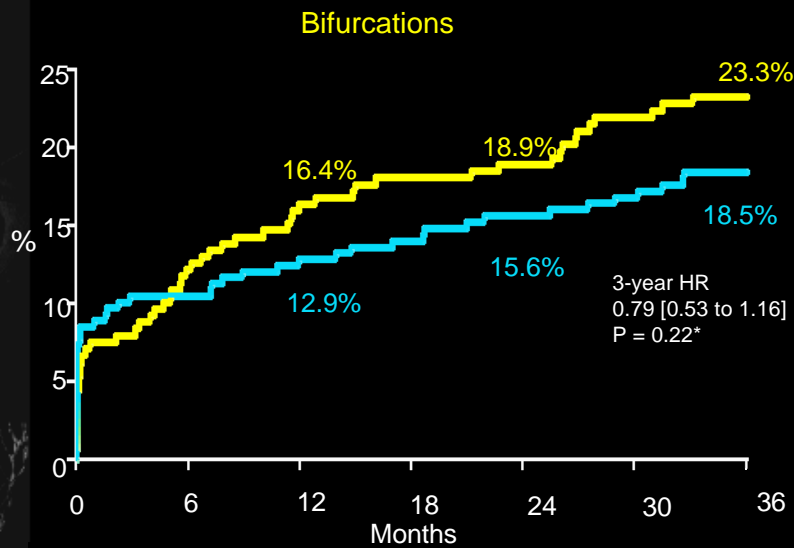
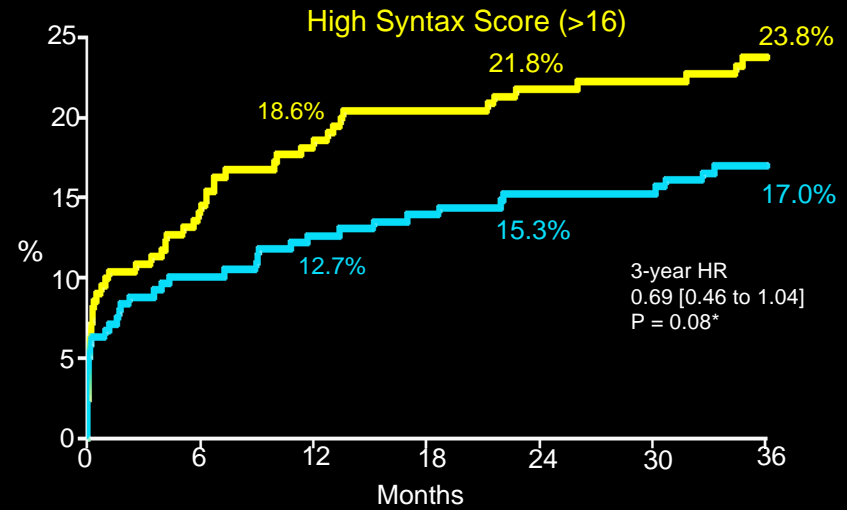
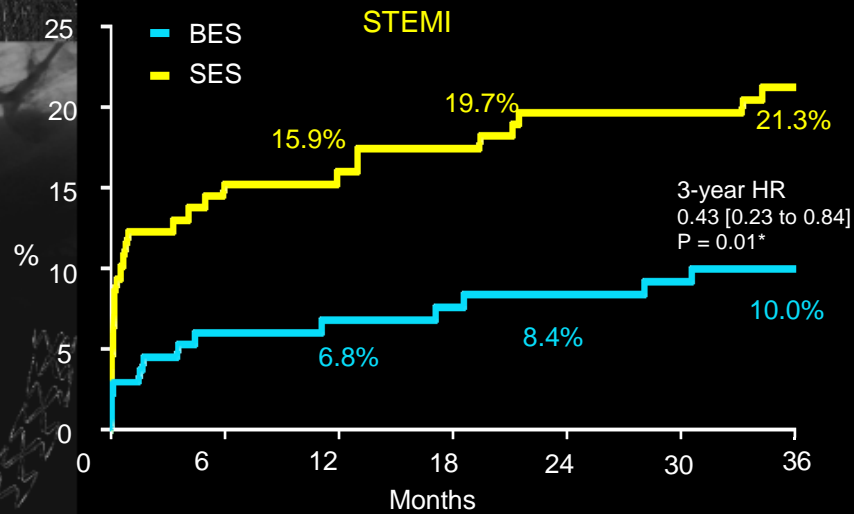
\* P values for superiority  
MACE = Cardiac Death, MI, or Clinically-Indicated TVR  
Serruys P.W., oral presentation, TCT 2010



# Advantages in Complex Patients

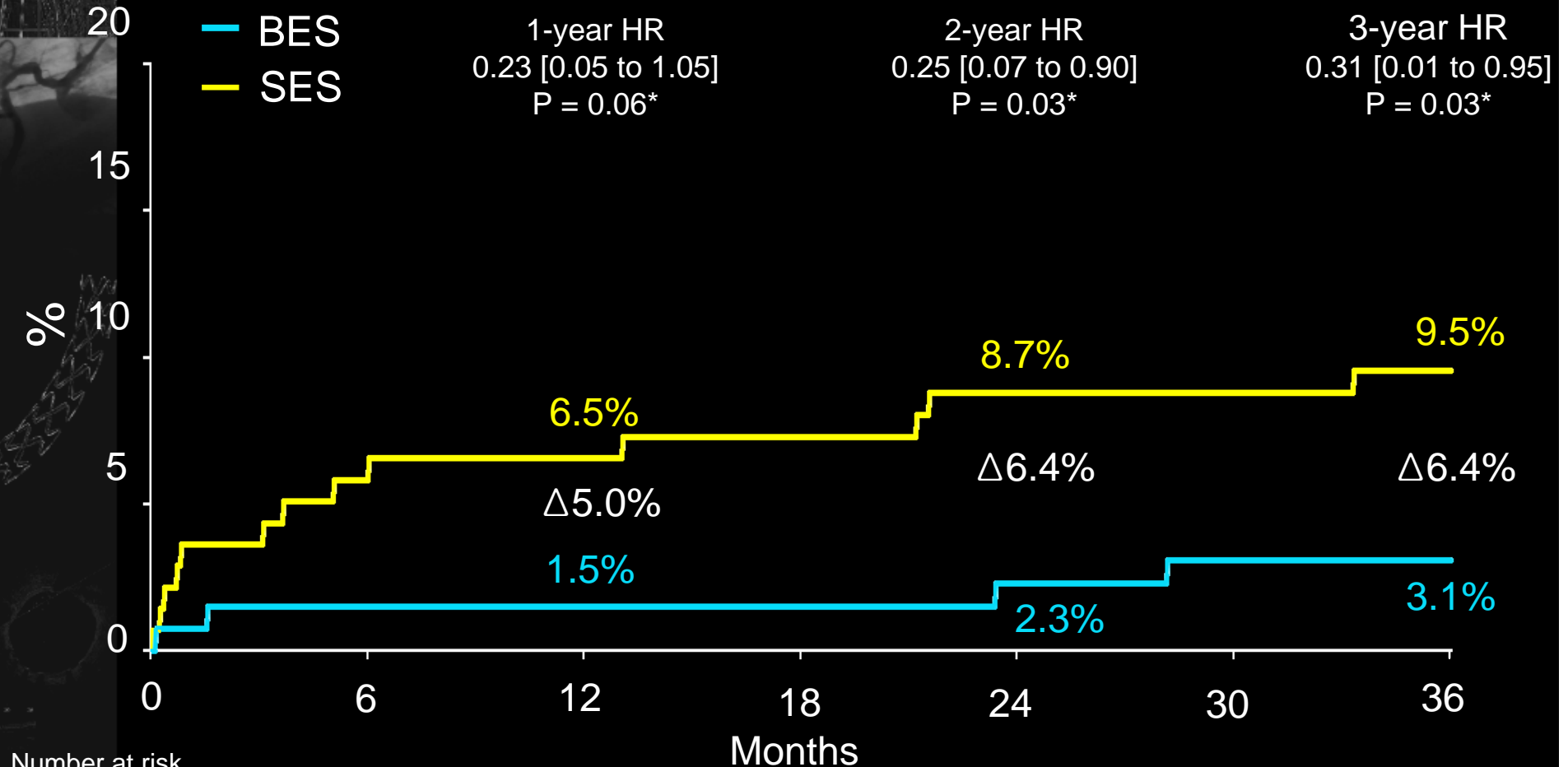
## 3-year Outcomes

# MACE in Complex Patients



\*P values for superiority  
Windecker, S., oral presentation, TCT 2010

# Cardiac Death STEMI

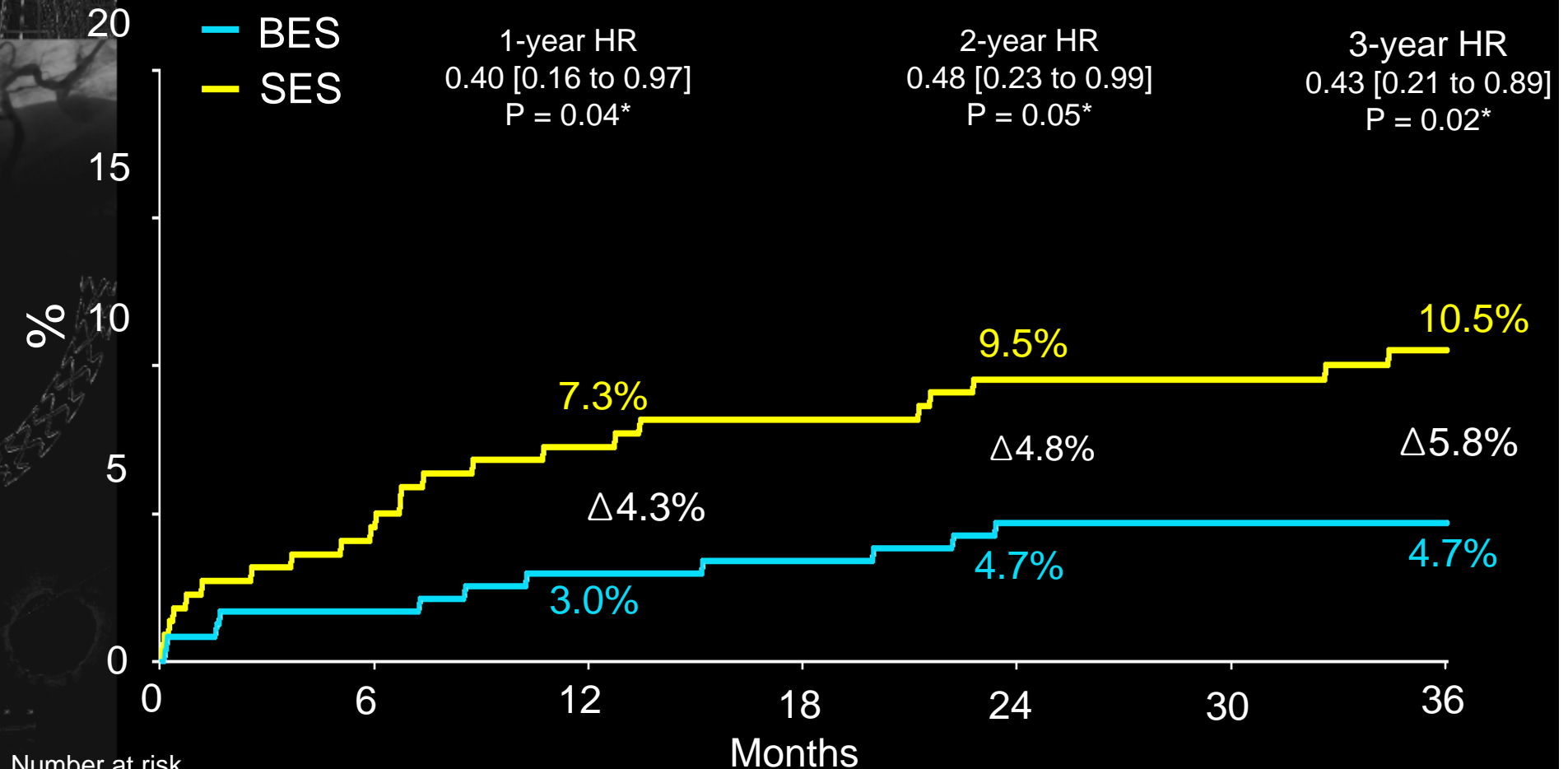


Number at risk

BES	135	132	127	127	126	124	115
SES	140	138	127	127	125	121	115

\*P values for superiority  
Windecker S., oral presentation, TCT 2010

# Cardiac Death in High Syntax Score (>16)



Number at risk

BES	239	238	228	226	224	220	213
SES	222	221	205	204	201	193	180

\*P values for superiority  
Serruys P.W., oral presentation, TCT 2010



# Very Late Stent Thrombosis

## Signs of Safety Benefits Beyond One Year

### 3-year Outcomes

# Definite Stent Thrombosis



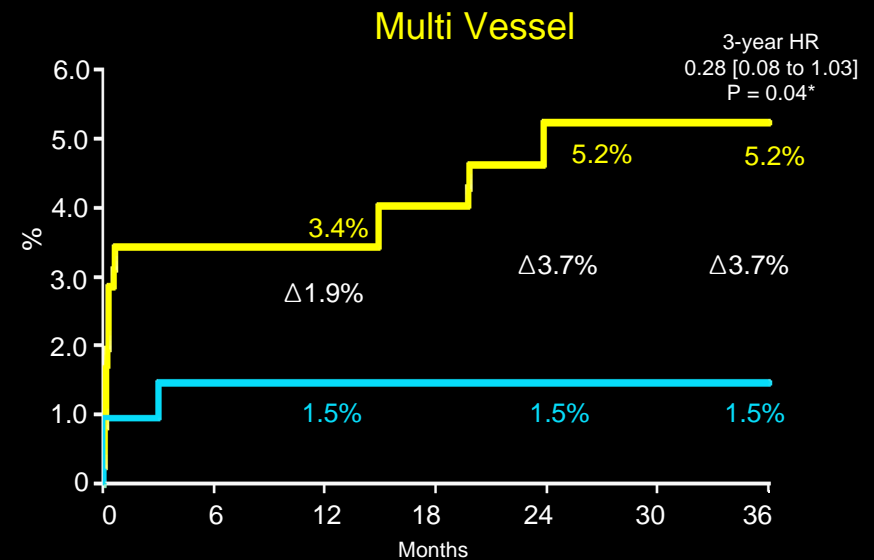
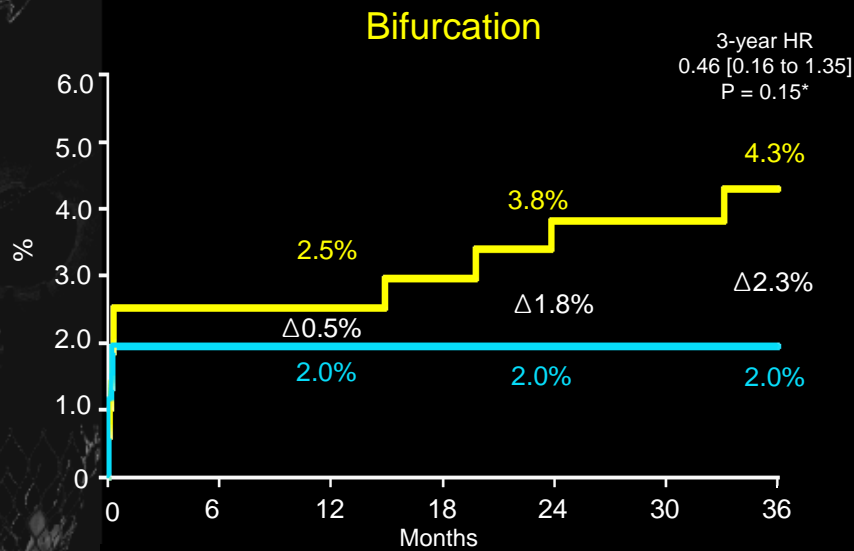
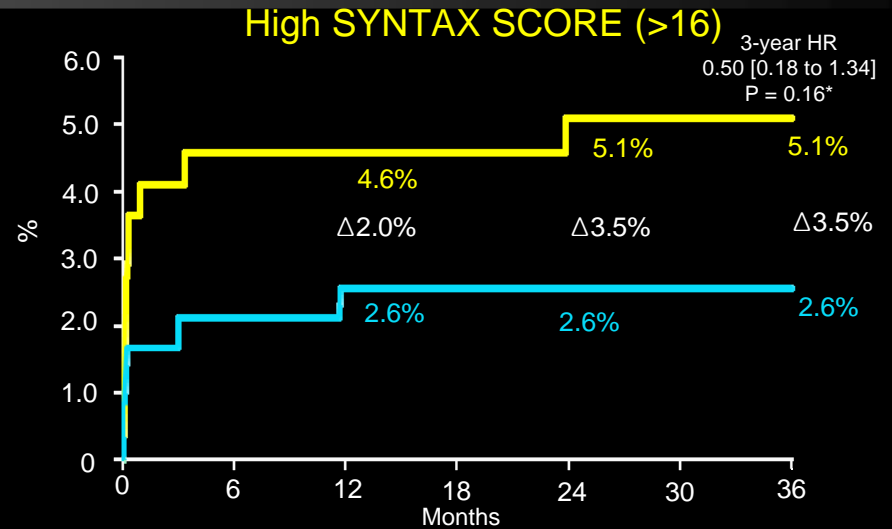
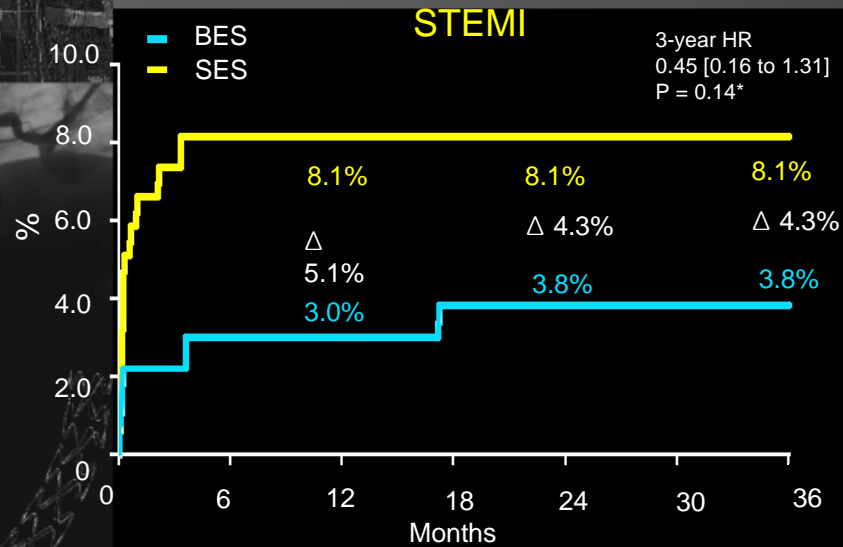
Number at risk

BES	857	846	808	797	787	774	732
SES	850	841	801	792	779	758	715

\*P values for superiority  
Serruys P.W., oral presentation, TCT 2010



# Definite ST in Complex Patients



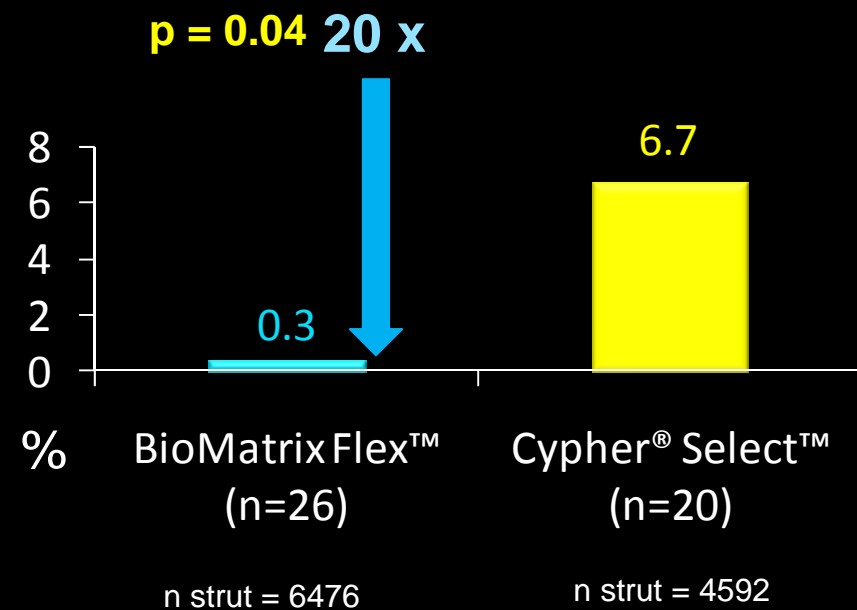
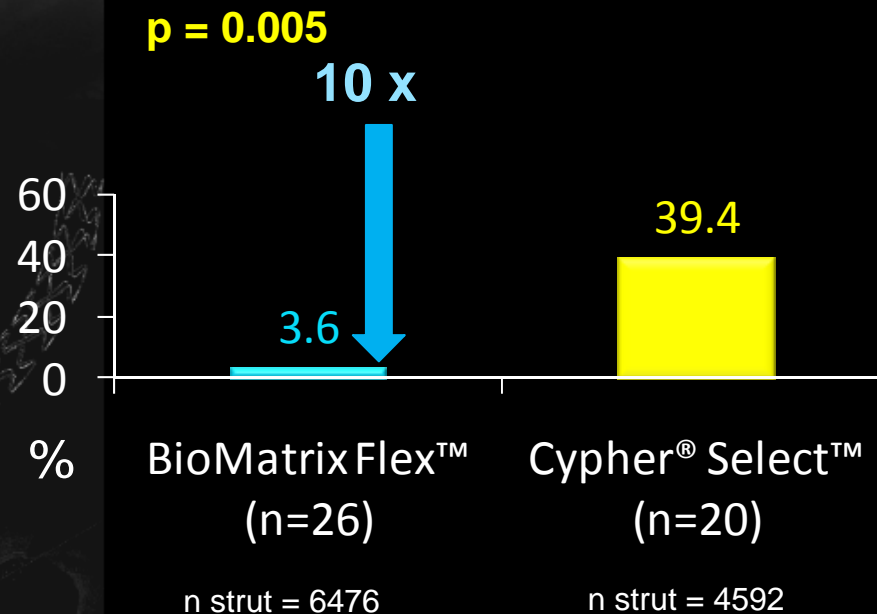
\*P values for superiority  
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# Superior Strut Coverage and Stent Apposition



Lesions with at least 5% uncovered struts

Lesions with at least 5% malapposed struts



The BioMatrix Flex™ stent with an abluminal biodegradable polymer achieved a 10 x better strut coverage and a 20 x better stent apposition vs. the Cypher® Select™ stent with a symmetric durable polymer at 9 months

# Conclusions

## *Overall population*

- Non-inferiority of BES vs SES in an all-comers population was sustained up to 3 years
- In the overall LEADERS population there were similar outcomes for BES and SES with respect to MACE, Cardiac Death, MI and clinically-indicated TVR
- The Kaplan-Meier curves for MACE continue to diverge showing lower event rates for BES

# Conclusions

## *Subgroup analysis*

- Biolimus eluting stent appears to offer an advantage in treating patients with complex CAD
  - Bifurcations
  - Multi-vessel disease
  - STEMI
  - High SYNTAX score

## *Very Late Stent Thrombosis*

- Although this was an all-comers study, definite very late stent thrombosis events were rare (BES 0.2% vs SES 0.9%  $P_{\text{Sup}} = 0.43$ )
- There were no VLST events in BES patients between 2 and 3 year clinical FU
- No VLST events in patients where a BES was implanted in native coronary arteries