Asia Pacific BioMatrix™ Clinical Results

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TRIALS	Primary end point	Design (n=sample size)	Results & F/up durations
STEALTH PK	Safety & PK	Single arm registry (n=27)	Confirmation of BA9 PK (30 days & 6 mos). BA9 safe
STEALTH FIM	Safety & efficacy	RCT vs. BMS (n=120)	6 mos in lesion LL 0.14 ± 0.45 vs 0.40 ± 0.41 mm (BMS); similar clinical safety
BEACON I Registry	Safety & efficacy	Single arm registry (n=292)	TVR (6 mos) 2.1%, MACE 3.8% (1 mo), 6.5%(1 yr), no stent thrombosis
Biomatrix Single Centre (Thailand)	Safety & efficacy	Single arm registry, more complex lesions (n=169)	At 2 yr: death 8.28%, MI 6.50%, TLR 7.69%
Biomatrix Single Centre (Indonesia)	Safety & efficacy	Single arm registry, real world cases (n=302)	Instent LL 0.16 mm, BAR 3.1%; At 2 yr: death 1%, MI 0.3%, TLR 2%, MACE 3%
BEACON II Registry	Safety & efficacy	Single arm registry (n=497)	At 30 days: Death 0.6%, MI 0.8%, tlr 0.6%, early stent thrombosis 0.6%, MACE 1.6%
NOBORI I	Instent (ISt) LL at 9 mos	RCT "NOBORI" vs. TAXUS (n=120)	ISt LL 0.15 ± 0.27 vs. 0.32 ± 0.33 mm (TAXUS). More effective in ↓ neointimal proliferation. ↓ MACE 59%
NOBORI CORE	Instent (ISt) Late Loss (LL) at 9 mos	RCT "NOBORI" vs. Cypher (n=107)	Similar LL & MACE rates, but better recovery in endothelial function
LEADERS	Cardiac death, MI, or clinically-indicated TVR	RCT, Biomatrix vs. Cypher select, real world (except LM)	Biomatrix was noninferior in efficacy & safety vs. Cypher select

BEACON I Registry *(PI: T.H. Koh)*

Prospective, Multi-Center, Electronic Registry

De Novo /Restenotic Native Coronary Artery Lesions
Multi-lesion / Multi-vessel
- **Vessel Diameters: ≥ 2.50 - ≤ 4.0 mm**
- **Stent Diameters: 2.5 – 4.0 mm**
- **Lesion Length: ≥ 10 mm - ≤ 28 mm**
- **Stent Lengths: 8 – 28 mm**

8 & 12 mm Lengths for Bail-out only
Predilatation preferred

Biomatrix® I
N=292
Evaluable

10 sites in Asia

Clinical Follow-up

30 d | **6 mo** | **9 mo** | **12 mo**

Primary Endpoint:	TVR at 6 months
Key Secondary Endpoints:	MACE at 30 days, 6 & 12 mo Device & Procedure (Clinical) Success Clinically driven TLR & TVF at 9 & 12 mo Device, Lesion & Procedural Success
Antiplatelet therapy at Investigators Discretion	

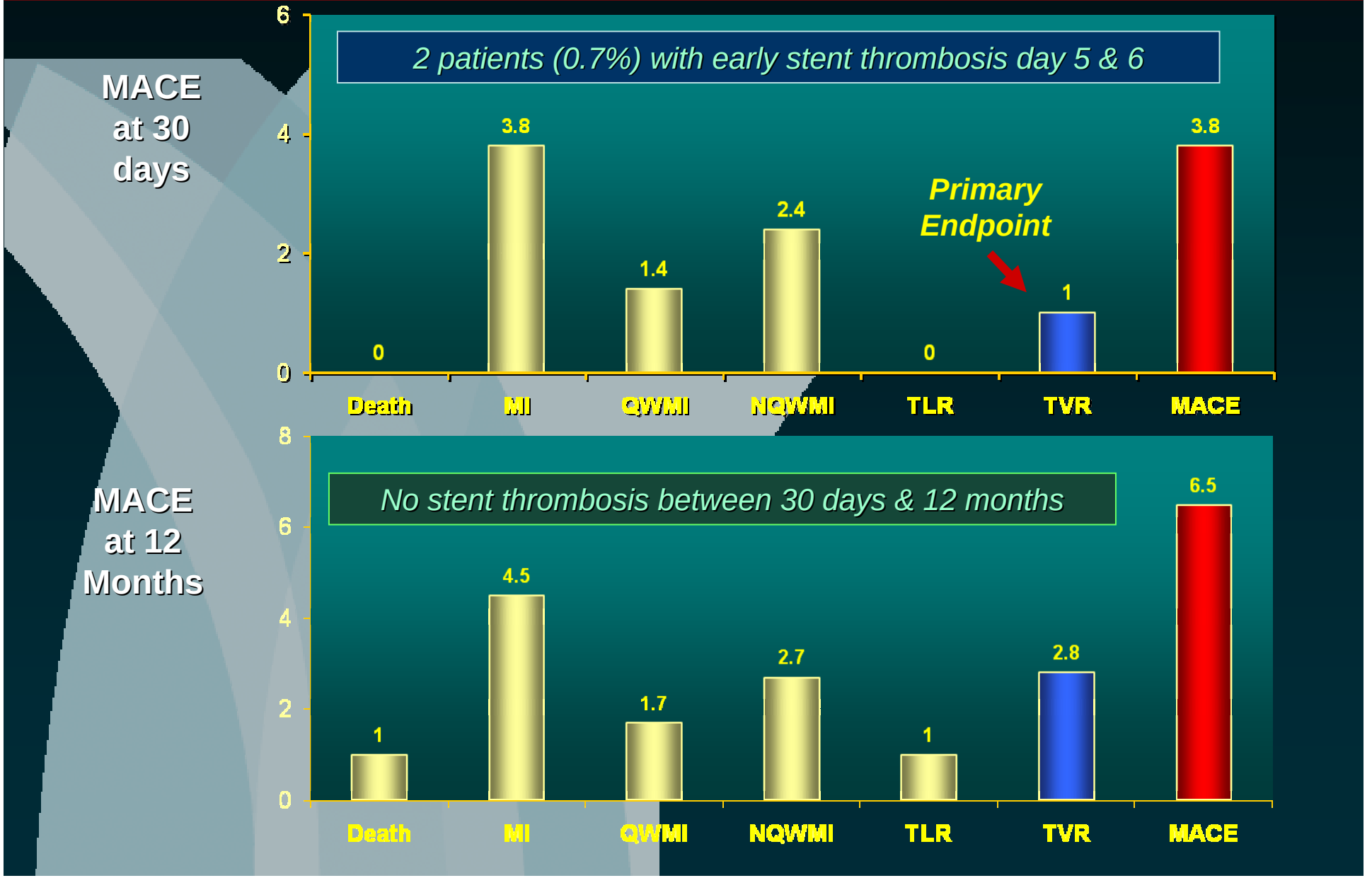
BEACON I Registry – Lesion Characteristics

(n=393 target lesion)

	Count	%
Bifurcation lesions	56	14.2
Moderate/severe calcifications	22	5.6
Lesions ≥ 24 mm	51	13.0
Small vessel ≤ 2.5 mm	137	34.9
CTO*	22	5.6
De novo lesions	387	98.5
Restenosis lesions	6	1.5

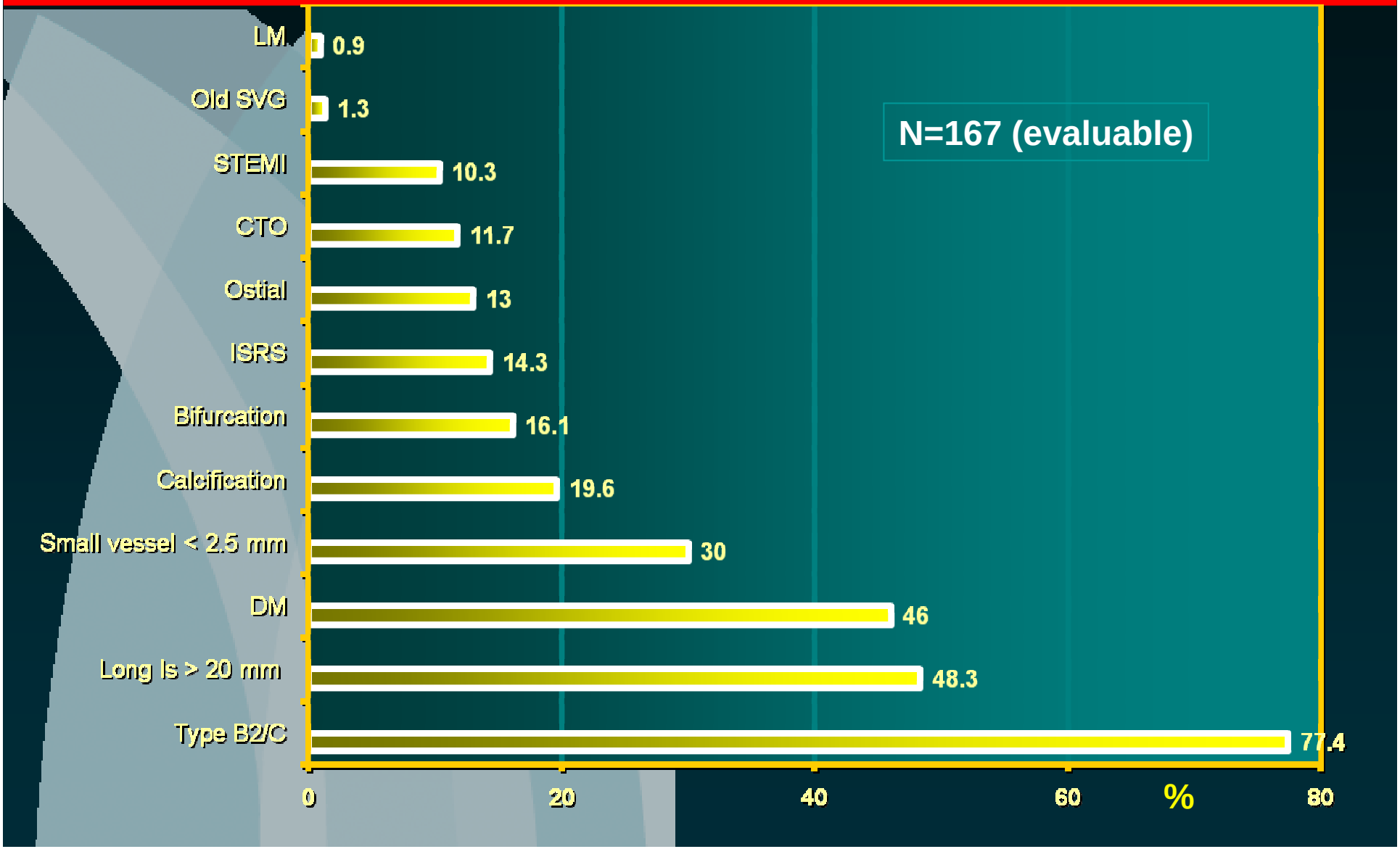
* CTO & any other 100% occluded lesions were not recommended as target lesion (as per protocol – treatment strategy)

BEACON I Registry – Clinical Events



Biomatrix Single Center Registry (Thailand):

Real World Patients *(PI: Tresukol D)*



Biomatrix Single Center Registry (Thailand):

Real World Patients *(PI: Tresukol D)*

	3-month N=164	6-month N=161	12-month N=158	24-month N=153	Total
Death	3 (1.8%)*	3 (1.9%)	3 (1.9%)	**5 (3.3%)**	14/169 **(8.28%)**
MI (Q/NQW MI)	0 (0%) / **11 (6.7%)**	-	-	**-**	11/169 **(6.50%)**
TLR	1 (0.6%) (CABG)	1 (0.6%)	9 (5.7%)	**2 (1.3%)**	13/169 **(7.69%)**
TVR	-	2 (1.2%)	7 (4.4%)	**-**	9/169 **(5.33%)**
Non-TVR(other v)	-	1	11 (7.0%)	**7**	19/169 **(11.24%)**
Exit study by uncross	2	-	-	**-**	2/169 **(1.18%)**
Loss to Follow-up	1	-	-	**-**	1/169 **(0.59%)**

1 case Death and TLR in the same Pt → TLR (CABG) and Death by Sepsis

Biomatrix Single Center Registry (Indonesia)

Real World Patients *(PI: T. Santoso)*

Background:

- Previous trials (mostly in selected patients) have shown that biodegradable polymer based Biolimus A9 - eluting stent (Biomatrix™) is safe and efficacious
- In this study we prospectively assessed the safety and efficacy of Biomatrix™ in real world cases

Biomatrix Single Center Registry (Indonesia)

Real World Patients *(PI: T. Santoso)*

Prospective, Single Center Registry

Real world cases

Exclusions:

- **Contraindications to anti-platelets**
- **Patients with short life expectancy & serious concomitant disease (advanced cancer, etc)**
- **Lack of patient's consent**

Biomatrix® I
N=302 pts

Medistra Hospital

Clinical Follow-up

30 d | **6 mo** | **9 mo** | **12 mo** | **24 mo**

Angiographic Follow-up at 6 mo
(Dr. A. Wong & T.H. Koh, NHC, Singapore)

Primary Endpoint:	TVR at 6 & 12 months
Key Secondary Endpoints:	MACE at 30 days, 6 & 12 mo In-segment late loss & restenosis at 6 mo
Antiplatelet therapy	ASA indefinitely (unless contraindicated) Clopidogrel 300 mg (loading), then 75 mg for 6 months

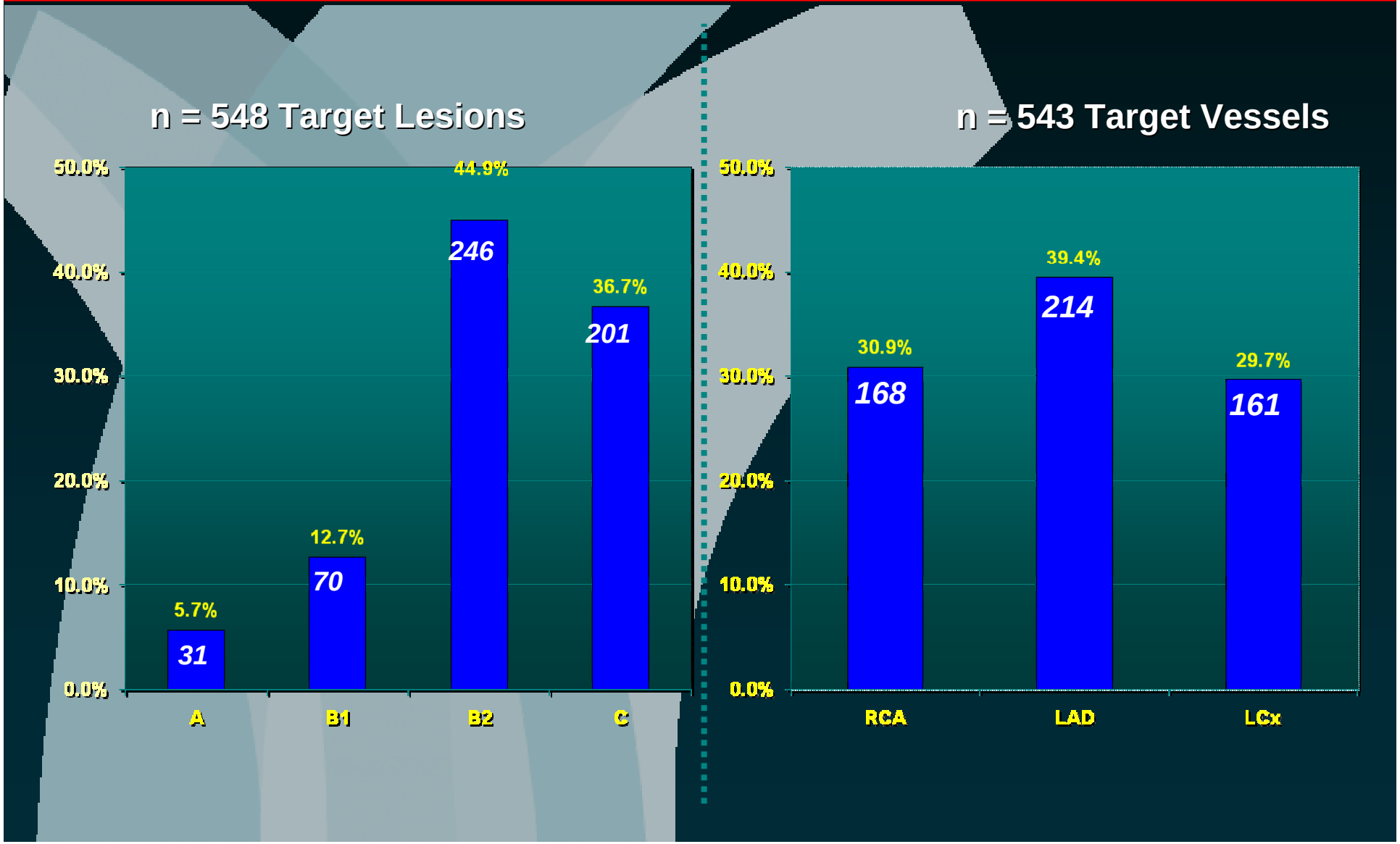
Patient & Procedure Characteristics

No of patients	302
No of lesions	548
No of stents	588
Male:female ratio	210/92
Mean age (years)	59.5 ± 10.0
Clinical diagnoses:	
▪ Stable angina (AP)	136 (45%)
▪ Unstable AP	62 (20.5%)
▪ Acute myocardial infarction (MI)	13 (4.3%)
▪ Recent AMI	13 (14.3%)
▪ Silent ischemia	78 (25.8%).

▪ Device Success	100.0%*
▪ Lesion Success	99.8% **
▪ Procedure Success	99.3% *

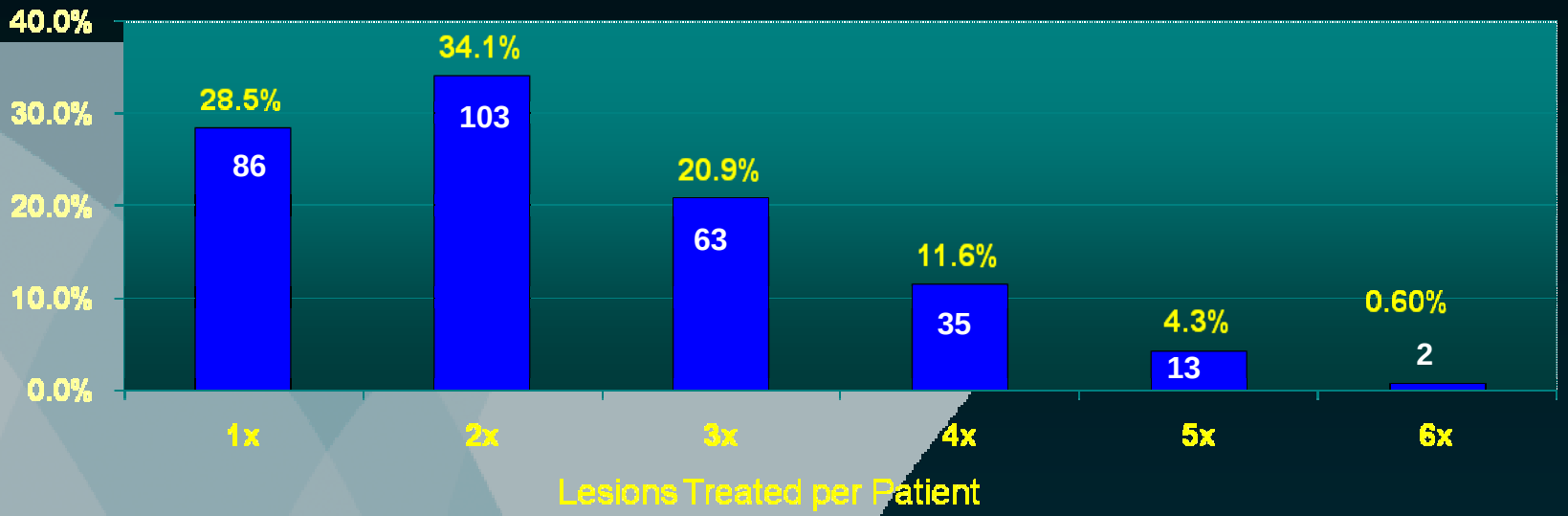
*Target Lesions ; ** All Lesions; Device Success: achievement of <50% residual in-segment % DS with assigned stent. Lesion Success: achievement of <50% residual in-segment % diameter stenosis; Procedure Success: device success & without 30-day MACE.

Target Lesion: Grade & Location

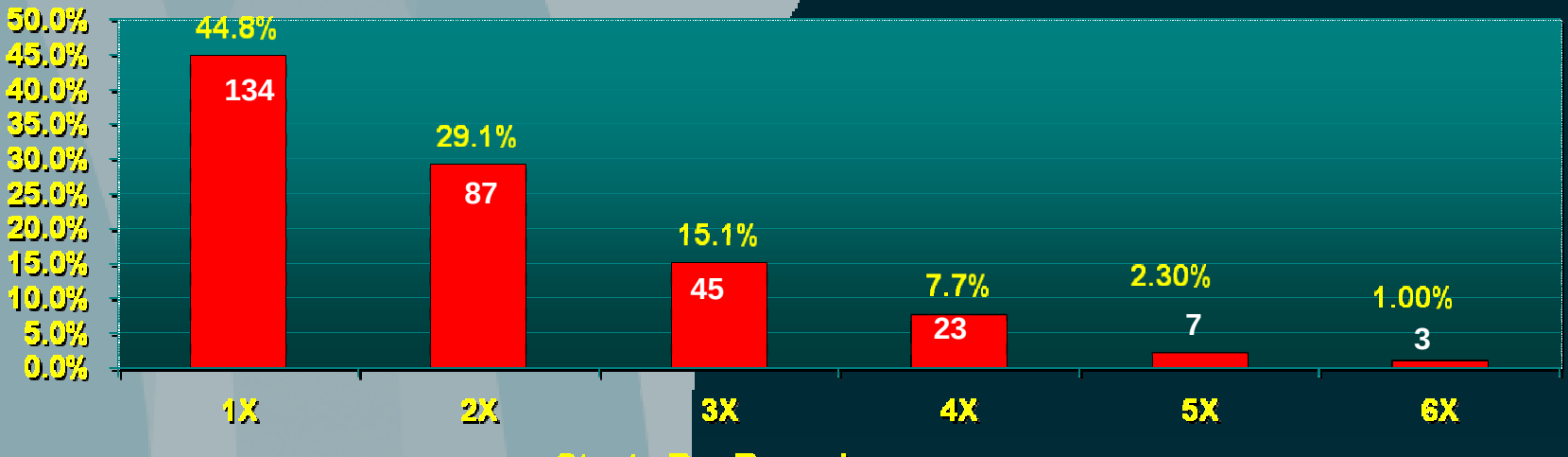


No of Treated Lesions & No of Stents

Total Patients = 302; Total Lesions Treated = 698



Mean # of Lesions per Patient: 2.31 / Mean # of Stents per Patient: 1.95



Biomatrix™ stents were implanted in the following complex patient & lesion types

Types B2/C	393 (79.5%)
Multivessel disease (± LM stenosis)	183 (60.1%)
Small vessel < 2.5 mm	154 (51.0%)
Long lesion (> 25 mm)	114 (37.7%)
Calcification	97 (32.1%)
Diabetes mellitus	83 (27.5%)
Bifurcation lesion	69 (22.8%)
Chronic total occlusion	29 (9.6%)
Thrombus	18 (6.0%)
LM stenosis	16 (5.3%)
Old saphenous vein graft	12 (4%)
Instent restenosis	10 (3.3%).

QCA Analysis at 6 Months

(independent QCA lab – NHC, Singapore)
(Dr. Aaron Wong, Prof. Koh Tian-Hai)

QCA analysis:

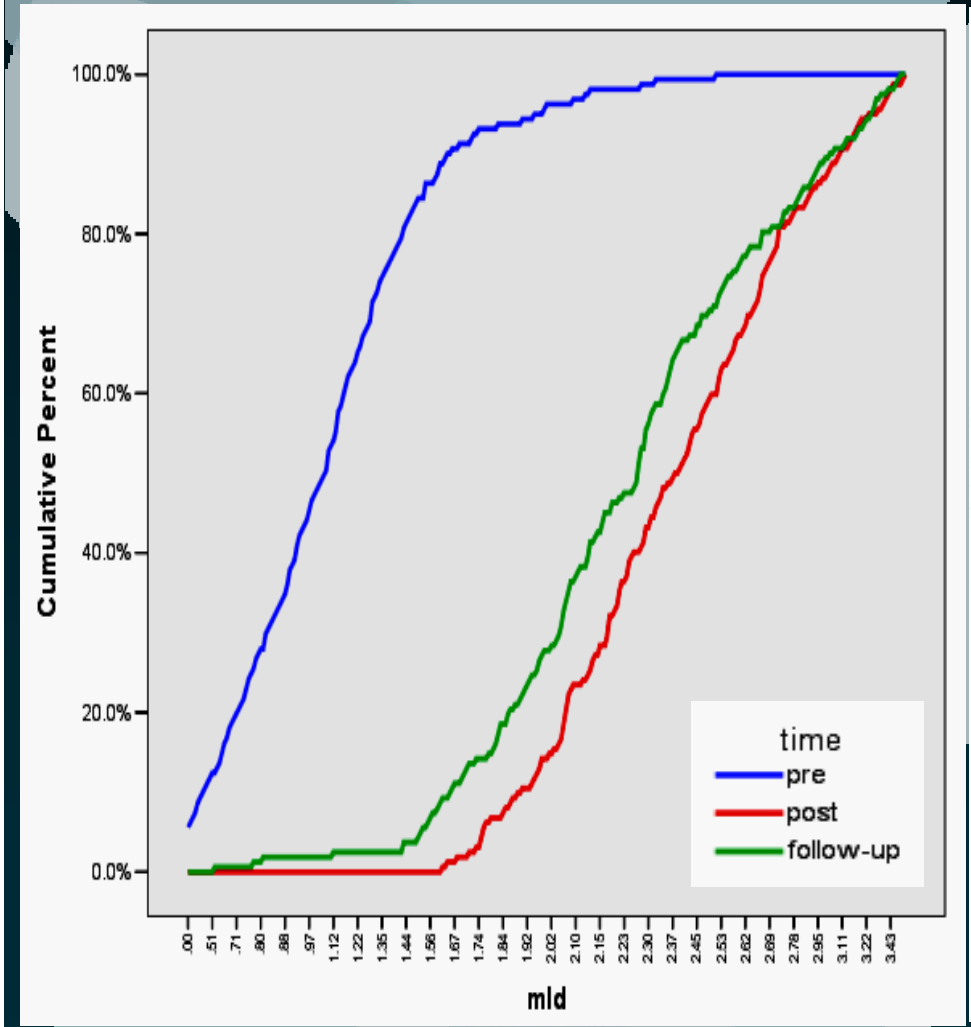
- 104 pts with 163 lesions and 198 stents

Lesion length	16.5 mm
Stent size	2.98 mm
Stent length	24.0 mm

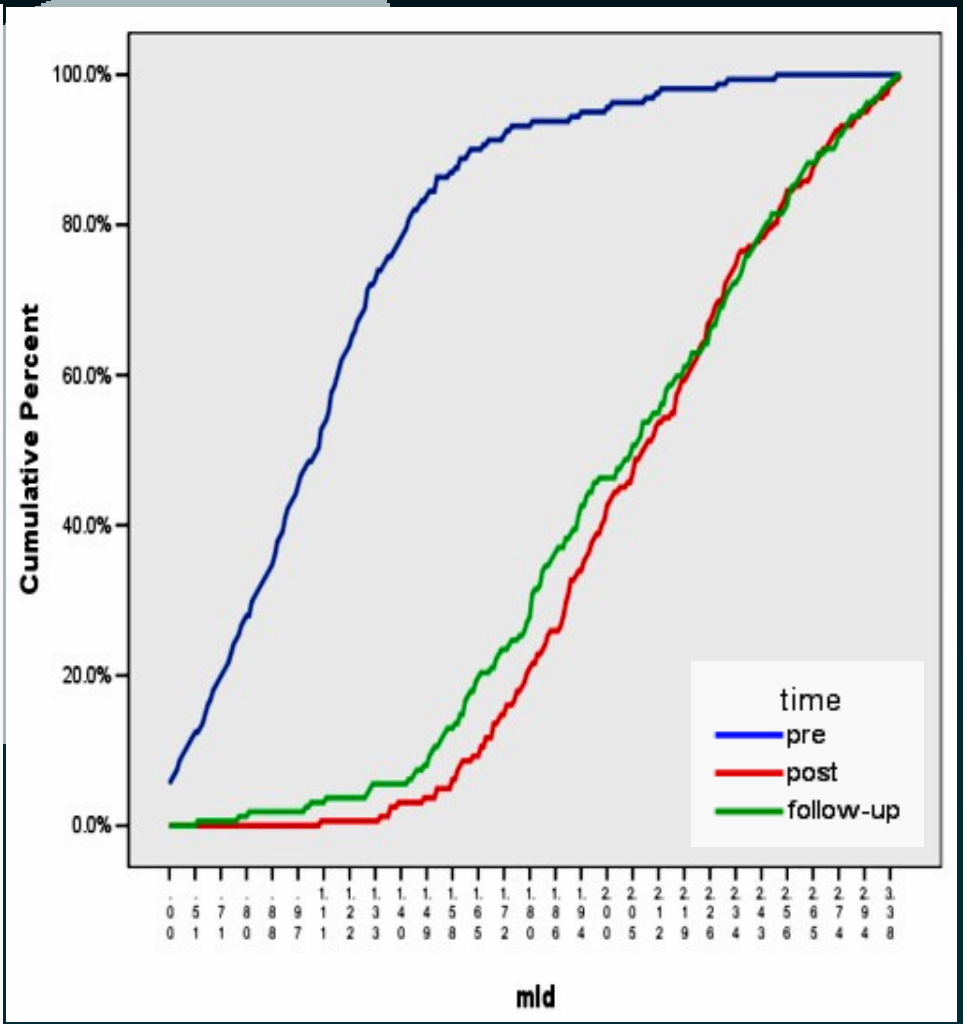
	Pre-procedural	Post-procedural	Follow-up
RVD, mm	2.63	2.65	2.68
MLD, mm	1.05	2.14	2.07
DS, %	60.2	19.0	22.8
Stent MLD, mm	--	2.44	2.28
In-stent DS, %	--	7.7	15.1
Late loss, mm			
- In segment	--	--	0.07
- In-stent	--	--	0.16
Restenosis (n lesion=163)			
- In-segment	--	--	7 (4.3%)
- In-stent	--	--	5 (3.1%)
Restenosis (n patient=104)			
- In-segment	--	--	6 (5.8%)
- In-stent	--	--	5 (4.8%)

Cumulative Frequency Curve

In-stent



In-segment



Hierarchical MACE

Event	0-30 days	31-160 days	160- 360 days	361-720 days	Cumulative
N (Cumulative)	302 (100%)	302 (100%)	302 (100%)	196 (64.9%)	302 (100%)
MACE (%)	2 (0.7%)	1 (0.3%)	2 (0.7%)	4 (2.0%)	9 (3.0%)
Death					
- Cardiac Death	2 (0.7%)	1 (0.3%)	0	0	3 (1.0%)
- Non-Cardiac Death	0	0	4 (1.3%)	0	4 (1.3%)
Q wave MI	0	1 (0.3%)	0	0	1 (0.3%)
TLR					
- CABG	0	0	0	0	0
- PCI	0	0	2 (0.7%)	4 (2.0%)	6 (2.0%)
ARC Definite ST	0	0	0	0	0
ARC Probable ST	1 (0.3%)	0	0	0	1 (0.3%)

BEACON II Clinical Registry *(PI: KOH Tian-Hai)*

Prospective, multi-centre, observational, data registry
Assessing clinical outcomes

Vessel Diameters: ≥2.5 – ≤4.0 mm
Stent Diameters: 2. 5 – 4.0 mm
Native coronary arteries and SVG
No limit to lesion length
No limit to number of treated lesions or vessels

BioMatrix™
N = 497

12 Asia Pacific Sites

Clinical Follow-Up

30 d | **3 mo** | **6 mo** | **12 mo** | **2-5 yr**

Primary Endpoint	**MACE at 12 months**
Key Secondary Endpoints	Ischemia driven TLF & TLR at 12 m Rates of stent thrombosis MACE at 30d, 3m, 6m, 12m, & 2-5 yr
Antiplatelet therapy	Recommended for 6 months (highly recommended for 12 months)

BEACON II Clinical Registry

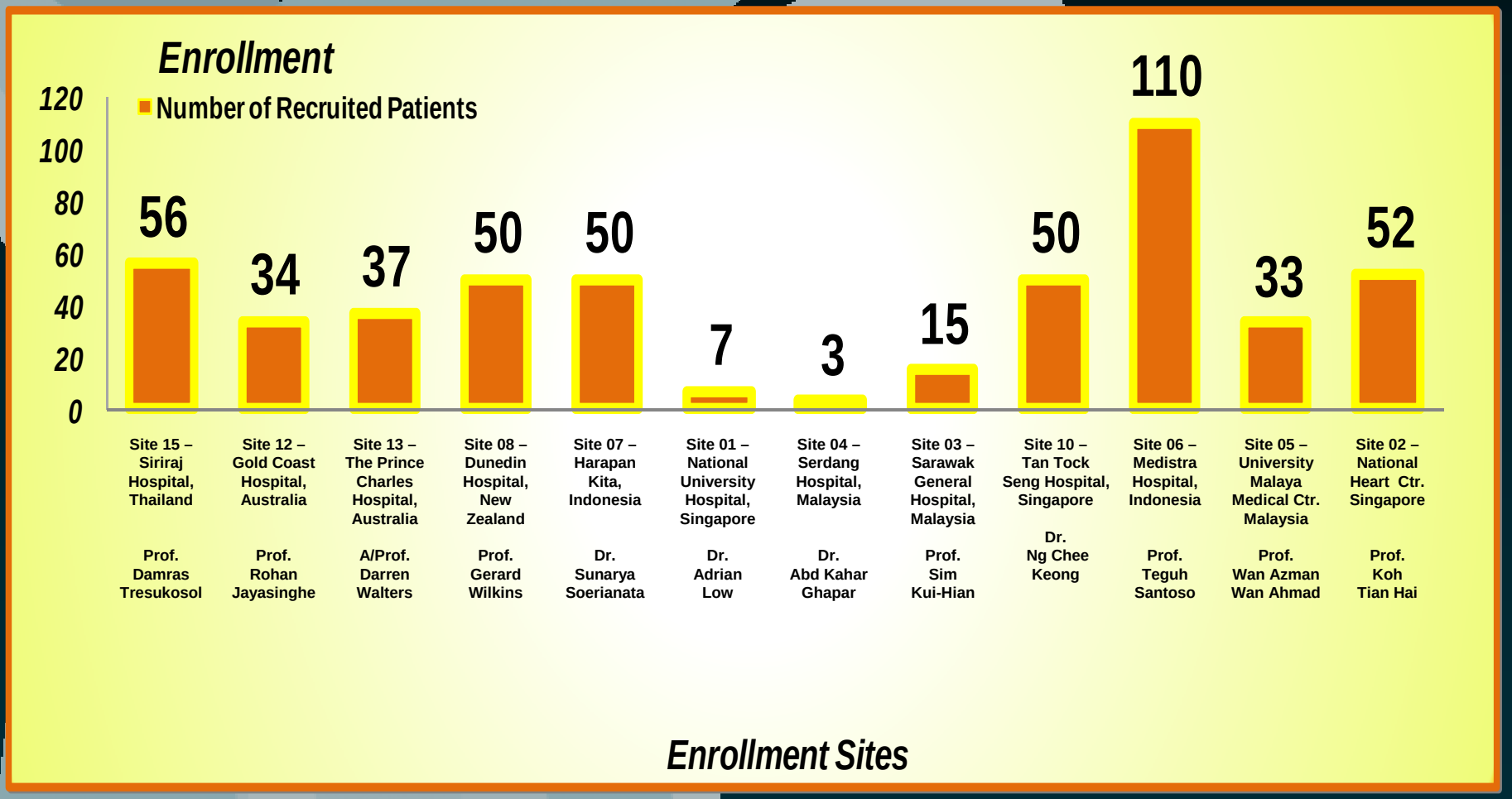
Inclusion Criteria

- Age ≥ 18
- Diagnosis of stable angina, unstable angina or silent ischemia
- Presence of one or more coronary artery stenosis > 50% in a native coronary artery or a SVG
- No limit to the number of treated lesions, number of vessels or lesion length).

Exclusion Criteria

- Pregnant or breast feeding woman
- Intolerance to aspirin, clopidogrel & ticlopidine, heparin, bivalirudin, stainless steel, contrast agent (that can not be adequately premedicated), parylene, poly-lactic acid (PLA), or Biolimus A9 (or its analogues).
- Inability to provide consent
- Lesion located in a protected or unprotected Left Main Coronary Artery
- Patients considered for non-registry DES implant during procedure

BEACON II Clinical Registry



BEACON II Clinical Registry:
Cardiovascular Risk factors

	n = 497 pts
Gender (♂:♀)	80.3%:19.7%
Age (years)	59.6 (29-88)
Diabetes	31.4%
Hypertension	61.6%
Hypercholesterolemia	70.0%
History of Smoking	43.3%
Family History of CAD	25.4%
Prior MI	37.0%
Previous PCI	27.0%
Previous CABG	5.4%

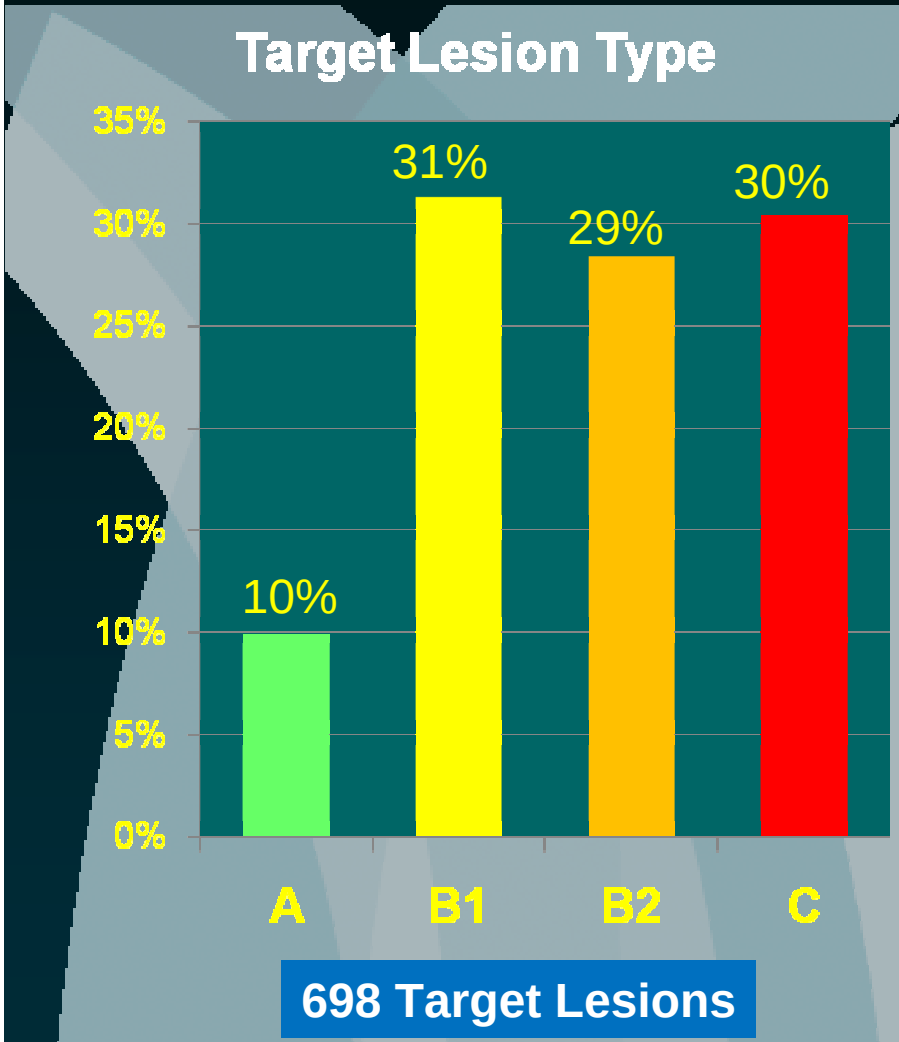
BEACON II Clinical Registry:
Patient Demographics

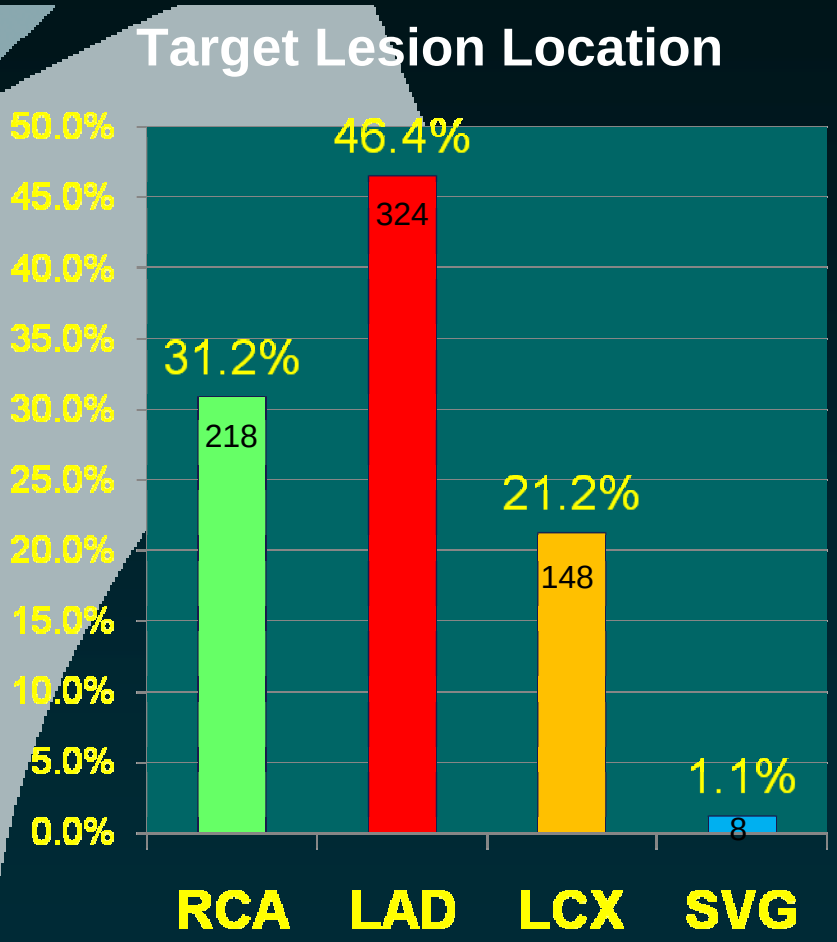
	n = 497 pts
Stable Angina	53.9%
Unstable Angina	30.4%
CCS Class	
I	28.6%
II	40.0%
III	20.9%
IV	10.5%
LVEF	52.4 ±14.1 %
LVEF < 30%	3.6%

BEACON II Clinical Registry:
Patient Demographics

	n = 698 Target Lesions	
	Count	%
Bifurcation Lesion (side branch > 2mm)	97	13.9%
with moderate/severe calcification	32	4.6%
Moderate/Severe Calcification	165	23.6%
Lesions ≥ 24 mm	174	24.9%
CTO	68	9.7%
De Novo Lesions	658	94.3%
Restenotic Lesions	40	5.7%

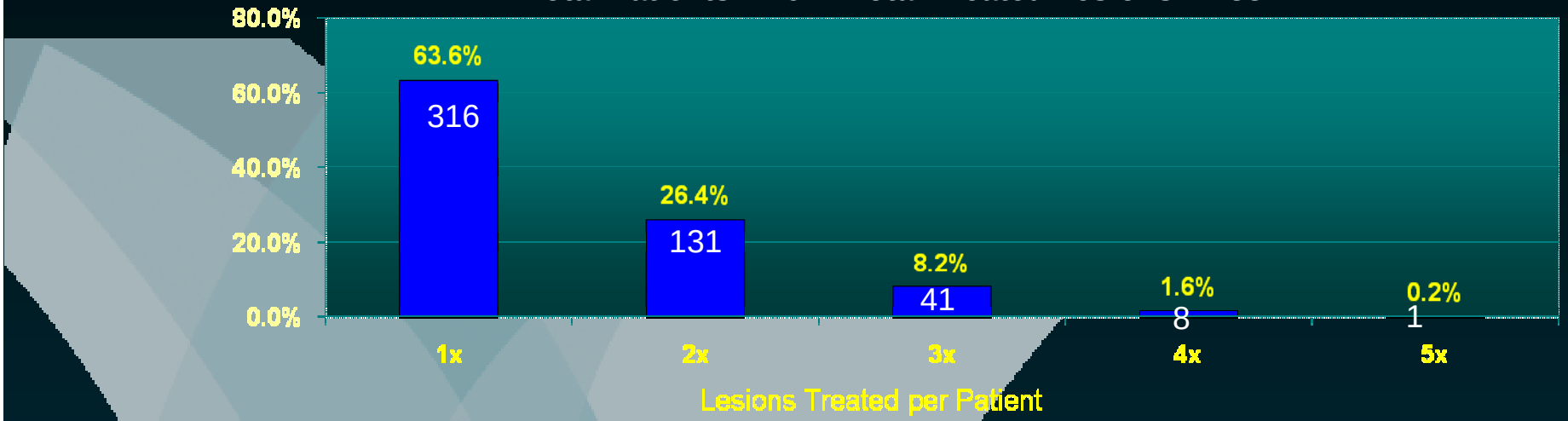
BEACON II Clinical Registry:
Target Lesion Type & Location



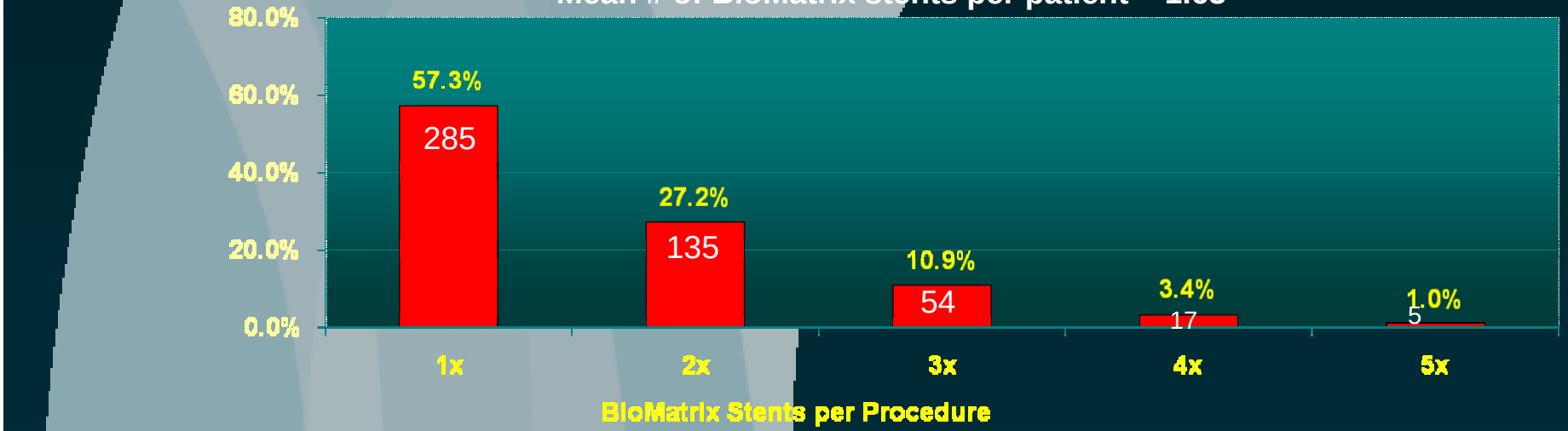


BEACON II Clinical Registry:
No of Treated Lesions & No of Stents

Total Patients = 497 Total Treated Lesions = 738



Mean # of target lesions per patient = 1.40
Mean # of BioMatrix stents per patient = 1.63



1 patient did not have any BioMatrix stent implanted.

BEACON II Clinical Registry:
Procedure Characteristics

Stent Length	19.29 (± 5.95)
Lesion Length	18.83 (± 9.74)
Stents per Lesion	1.16
IIb/IIIa Inhibitor Use (%)	10.9%
Device Success	99.6%
Lesion Success	99.6%
Procedure Success	99.2%

Device Success: achievement of <30% residual in-stent DS using the BioMatrix DES.
Lesion Success: achievement of <30% residual in-stent DS of the target lesion using any PCI method
Procedure Success: achievement of <30% residual in-stent DS using any PCI method, without the occurrence of in-hospital MACE.

Hierarchical MACE

Events	0 - 30 Days		Total Pts.
	In-Hospital	Out of Hospital	
MACE (%)	3 (0.6%)	5 (1.0%)	8 (1.6%)
Death	1 (0.2%)	2 (0.4%)	3 (0.6%)
Cardiac Death	1 (0.2%)	2 (0.4%)	3 (0.6%)
Non-Cardiac Death[4]	0	0	0
Myocardial Infarction	1 (0.2%)	3 (0.6%)	4 (0.8%)
Q Wave	0	2 (0.4%)[2]	2 (0.4%)
Non - Q Wave	1 (0.2%)	1 (0.2%)	2 (0.4%)
TLR	1 (0.2%)	2 (0.4%)	3 (0.6%)
PCI	1 (0.2%)	2 (0.4%)[2]	3 (0.6%)
CABG	0	0	0
Early Thrombosis[1]	1 (0.2%)	3 (0.6%)[3]	3 (0.6%)

MACE defined as a composite of cardiac death, MI (Q and Non-Q wave) or ischemia driven TLR

[1] Per **ARC defined** as angiographically documented stent/target vessel thrombus occurring within 30 days post-PCI

[2] Two pts were adjudicated with 2 events – MI and TLR. 8 pts 10 events; [3] One pt had 2 thrombus events. 3 pts 4 incidences

[4] One pt was adjudicated as Non-Cardiac death & causality was not registry device, target vessel or index PCI related & not included in this analysis

CEC Adjudication

MACE Events

Pt. #	Event	# Days Post-procedure	CEC Adjudication		
			Device Related	Target Vessel Related	Procedure Related
05-018	Death where Cardiac Cause can not be Excluded	18	Probably Related*	Probably Related*	Probably Related*
05-024	Non-cardiac Death	13	Not Related	Not Related	Not Related
06-012	Cardiac Death due to Chronic Heart Failure/Multiple Organ Failure	24	Not Related	Related	Not Related
08-005	Q-wave MI, Thrombus, TLR & TVR	7	Related	Related	Related
08-005	Thrombus	14	Unknown**	Unknown**	Unknown**
08-027	Non-Q wave MI	0	Not Related	Related	Related
10-023	Thrombus, TLR & TVR	0	Related	Related	Related
12-004	Anterior Q-wave MI, Thrombus TLR & TVR	4	Related	Related	Related
13-004	Non-Q wave MI TVR	8	Related	Related	Related
15-035	Cardiac Death, Inferior MI	1	Not Related	Not Related	Related

*** CEC adjudicated as Causality is Unknown but, probably device, target vessel and procedure related.**
**** CEC adjudicated as Causality could not be determined between Registry Device or BMS implanted at index procedure.**

Biomatrix™ Clinical Experience

	STEALTH N=80					STEALTH PK N=27		LEADERS N=857		BEACON N=292		BEACON II N=497
	30 day	12 mos	2 yr	3 yr	4 yr	30 day	9 mos	9 mos	12 mos	30 day	12 mos	30 day
MACE	3.8%	5.1%	6.5%	9.2%	11.0%	0.0%	0.0%	9.2%	10.7%	3.8%	6.5%	1.6%
DEATH	0.0%	1.3%	2.6%	3.9%	4.1%	0.0%	0.0%	2.6%	3.2%	0.0%	1.0%	0.6%
Cardiac Death	0.0%	0.0%	1.3%	2.6%	2.7%	0.0%	0.0%	1.6%	2.1%	0.0%	1.0%	0.6%
Non-Cardiac Death	0.0%	1.3%	1.3%	1.3%	1.4%	0.0%	0.0%	1.0%	1.1%	0.0%	0.0%	0.0%
MI	2.6%	2.6%	2.6%	3.9%	5.5%	0.0%	0.0%	5.8%	5.8%	3.8%	4.5%	0.8%
Q-wave MI	1.3%	1.3%	1.3%	1.3%	1.4%	0.0%	0.0%	0.5%	0.5%	1.4%	1.7%	0.4%
Non-Q wave MI	1.3%	1.3%	1.3%	2.6%	4.1%	0.0%	0.0%	5.3%	5.4%	2.4%	2.7%	0.4%
TLR	1.3%	1.3%	2.6%	3.9%	4.1%	0.0%	0.0%	5.4%	5,3%	0.0%	1.0%	0.6%
PCI	1.3%	1.3%	2.6%	3.9%	4.1%	0.0%	0.0%	---	---	0.0%	1.0%	0.6%
CABG	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	---	---	0.0%	0.0%	0.0%
Early Thrombosis	1.3%	1.3%	1.3%	1.3%	1.3%	0.0%	NA	1.6%	1.6%	0.7%	0.7%	0.8%
Late Thrombosis	NA	0.0%	0.0%	0.0%	0.0%	NA	0.0%	0.2%	0.4%	NA	0.0%	NA
Very Late Thrombosis	NA	NA	0.0%	0.0%	0.0%	NA	NA	NA	NA	NA	NA	NA

Total of 1753 pts Overall Experience. 45% (789/1753) Asia-Pacific Population Experience.

ARC definition for ST used in LEADERS and BEACON II
STEALTH, STEALTH PK & BEACON definition for ST is Early ≤ 30 days, Late > 30 days post procedure

BEACON II Clinical Registry:
Conclusions

- The 30 Day results of the BEACON II Clinical Registry further confirms that the BioMatrix™ abluminal Drug-Eluting Stent with a biodegradable stent is safe and effective for use in patients across a **broader clinical base**.

- Asia-Pacific population
- All-comer patients following local standard medical practice
- Multi-vessel, multi-lesions and no limit to lesion length

- Further long term follow-up in the registry could show the benefit of stents largely independent of patient and lesion characteristics (12 mo f.up – SINGLIVE 2010)

BIOMATRIX™: Conclusion

The use of Biomatrix™ stent in real world patients has been demonstrated to be safe and efficacious up to 24 month follow-up with a low incidence of MACE,TLR, stent thrombosis as well as low late loss and restenosis.


Thank You