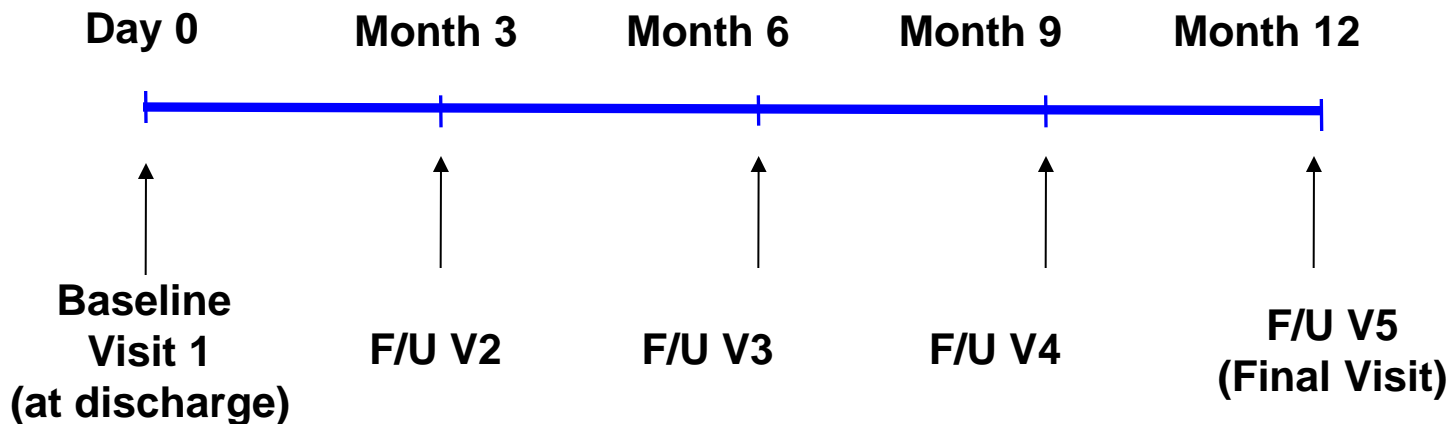# Taiwan ACS Registry – Focus on Antiplatelet Therapy

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Jack JCR 2013

Study Design (2008-2010)

- **Actual/ Target patient number: 3183 / 3000**
- **Site number: 39**
  - **Each site will recruit 50~200 patients** (competitive recruitment)
- **Visit schedule: 5 visits per patient**

Day 0	Month 3	Month 6	Month 9	Month 12

Baseline Visit 1 (at discharge) — **F/U V2** — **F/U V3** — **F/U V4** — **F/U V5 (Final Visit)**

- **Treatment: This is a non-interventional registry**

Study Population

- **3183 patients were enrolled from October 2008 to January 2010.**

2%

STEMI

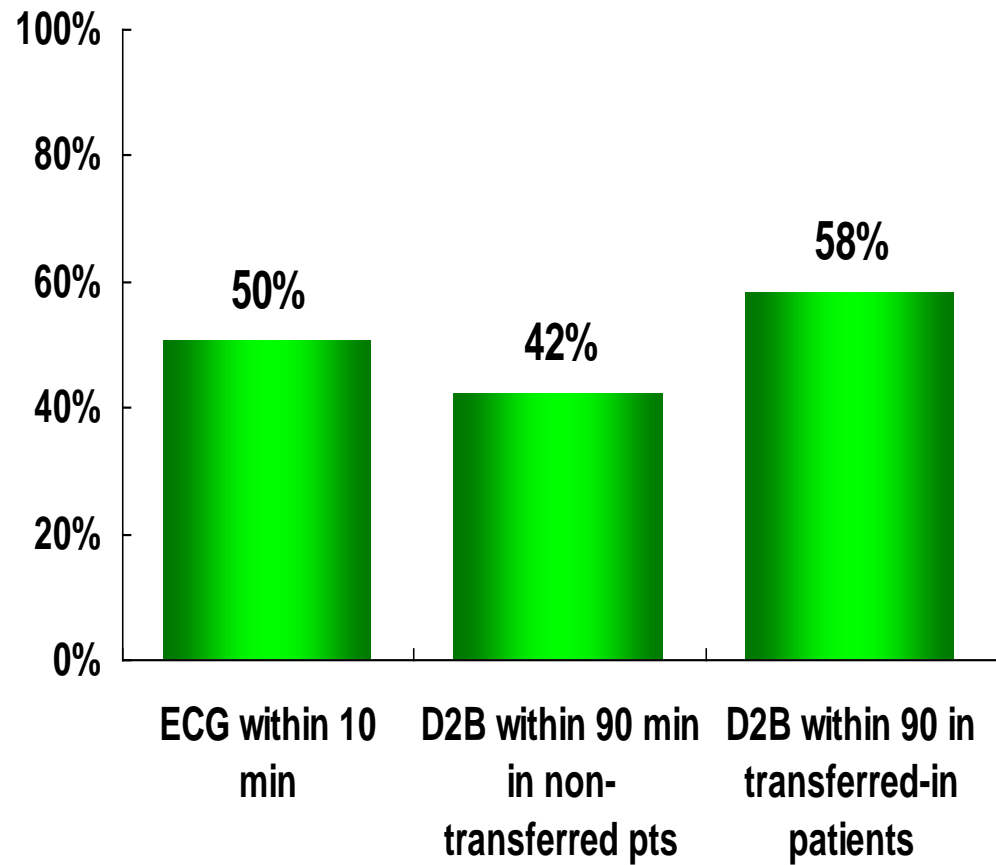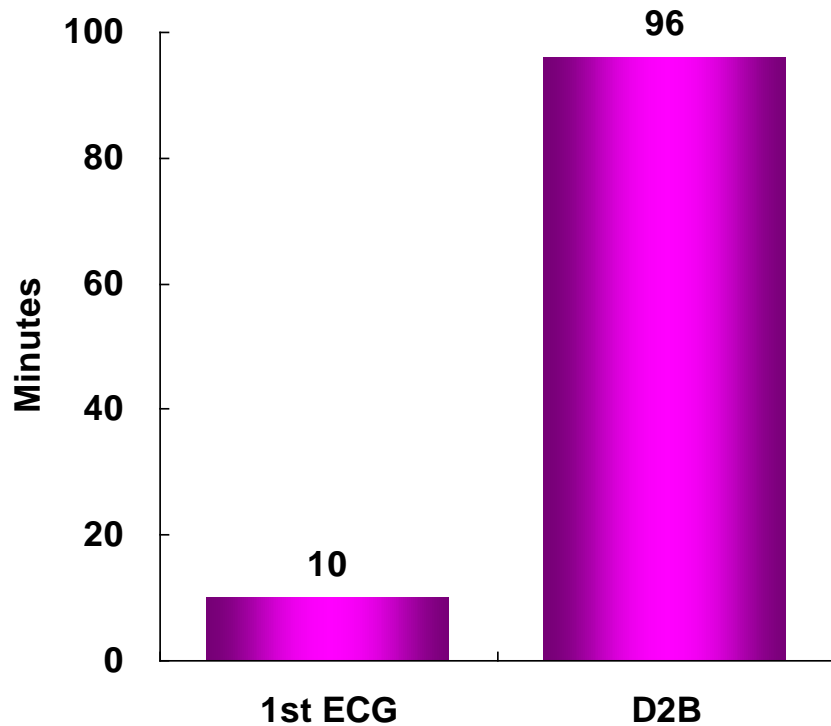**NSTEMI**

UA

Others *

12%

52%

34%
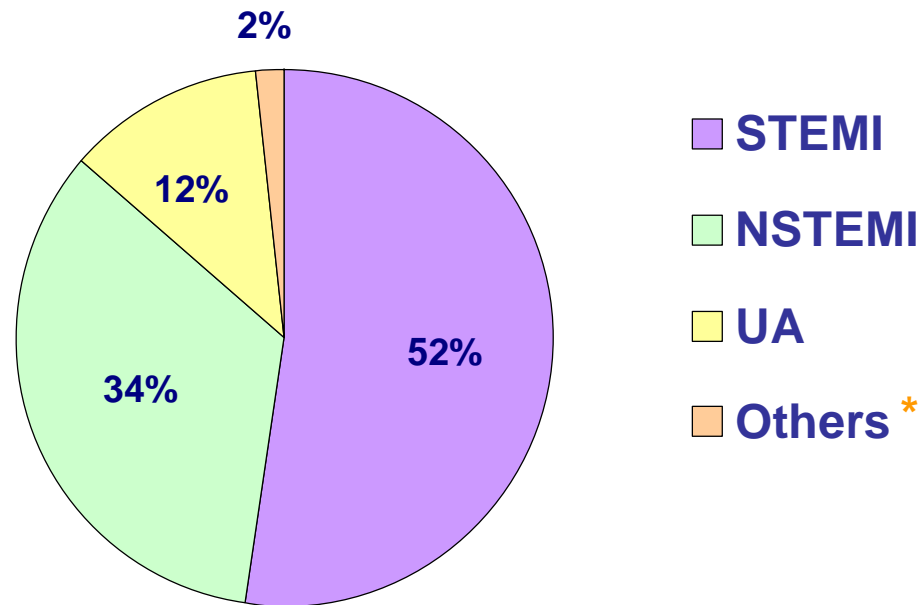
* atypical chest pain: 15; stable angina: 15; CHF: 10; arrhythmia: 5; pericardial disease= 1; Prinzmetal angina: 1; myocardial failure: 1; pneumonia and acute resp. failure: 1; complicated 2nd AV block: 1; acute cholangitis: 1; death: 1

Baseline Characteristics

	Taiwan ACS FS N=3183
Mean age ± SD (yrs)	63 ± 14
Female gender (%)	22
Hypertension (%)	64
Dyslipidemia (%)	39
Diabetes (%)	36
Prior MI (%)	10
Prior CHF (%)	5
Prior PCI (%)	17
Prior CABG (%)	3

Hospital Cardiac Interventions

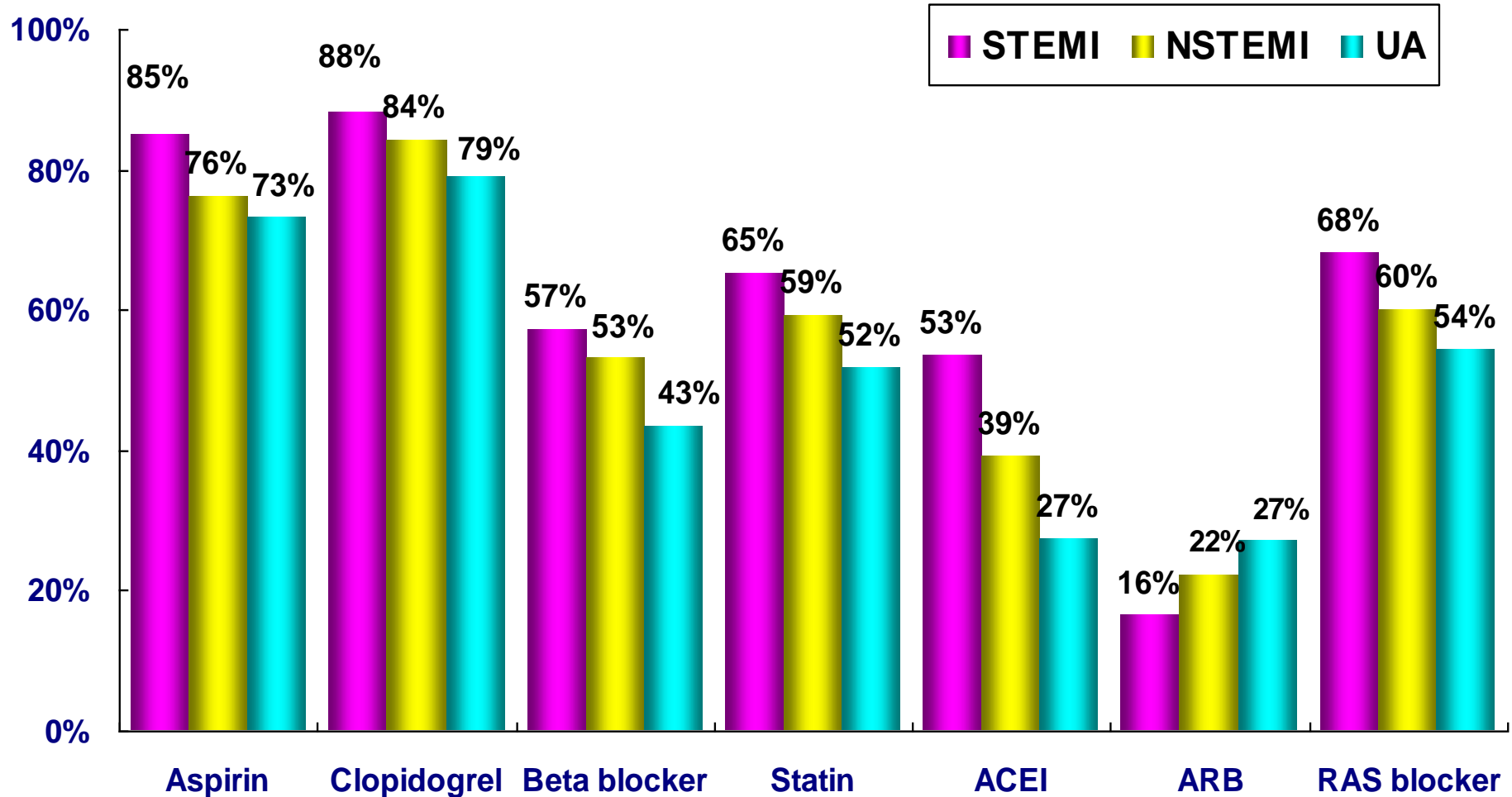|	Taiwan ACS FS N=3183
Cardiac angiogram (%)	94
Reperfusion in STEMI (%)	82
PCI (%)	84
CABG (%)	3

Time of In-hospital Procedures –
PPCI population

Time to in-hospital procedures is expressed in median value

Discharge Medications –
Total patients by diagnosis

P<0.01 for all comparisons between STEMI, Non-STEMI and UA

Treatments at Discharge

2007

n	STEMI 13,862	NSTEMI 11,316	UA 12,509
	%	%	%
ACE inhibitors	67	56	52
Aspirin	92	89	88
β-blockers	78	76	72
Ca^{2+} blockers	10	20	31
Statins	63	59	57
Warfarin	8	7	7

- **Total no. of patient data analyzed: 2544 (80%)**

- **Classified by discharge diagnosis:**

  - **STEMI (n=1358, 53.4%)**

  - **Non-STEMI (n=844, 33.2%)**

  - **Unstable Angina (n=322, 12.7%)**

  - **Others (n=20, 0.8%)**

12-Month Medications –
Total patients by diagnosis
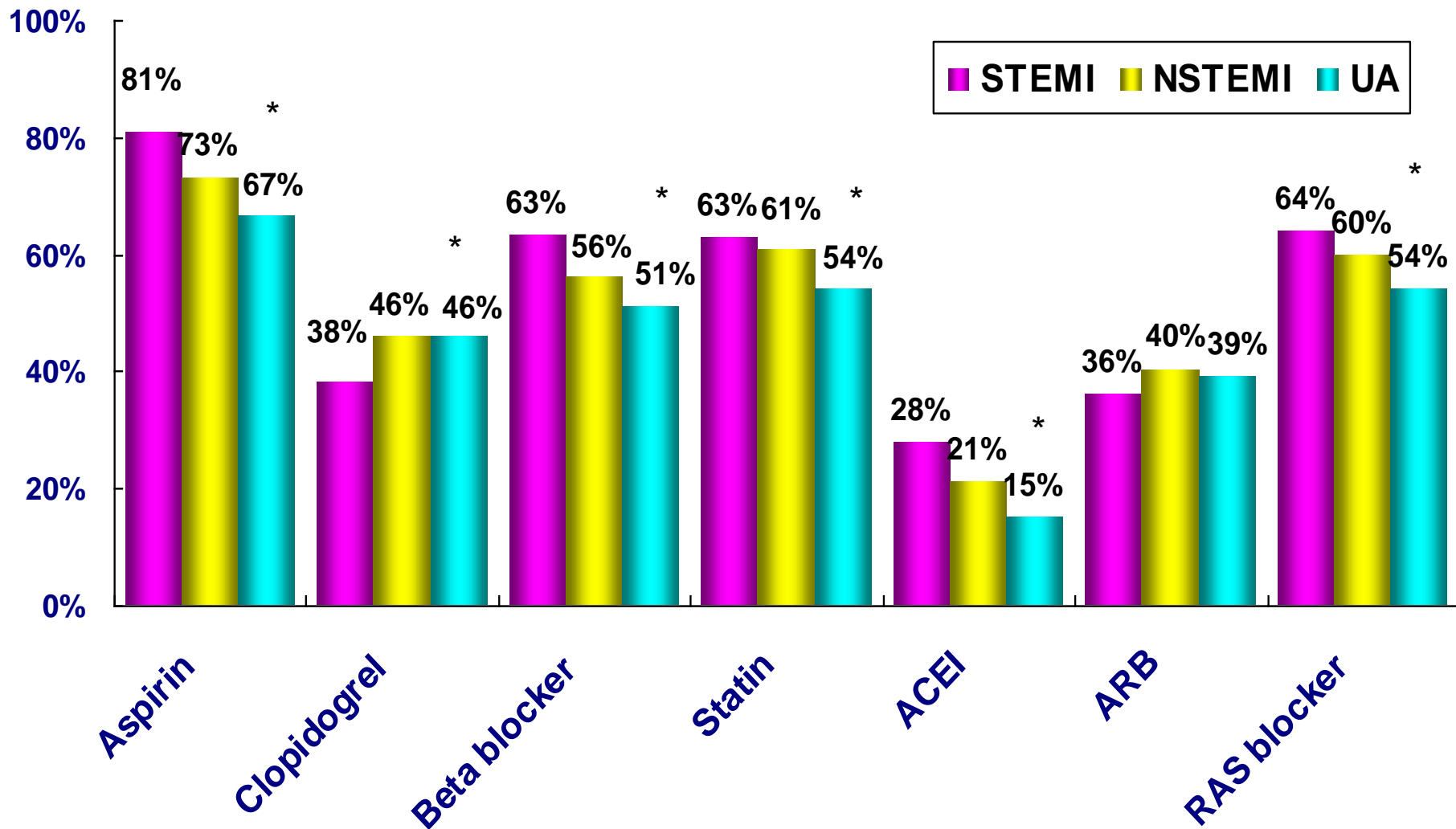
* P<0.01 for comparison between STEMI, Non-STEMI and UA

Outcomes from Enrollment to 12-Month

Cumulative event (%)	STEMI	Non-STEMI	UA	Total#
Death	6.1%	10.1%	6.2% *	7.5%
Rehospitalization	41.9%	44.5%	37.8%	42.3%
Stroke	1.6%	2.5%	2.2%	2.0%
MI	4.7%	6.4%	0.9% *	4.8%
Repeat revasc.	7.3%	6.6%	7.5%	7.1%
PCI	18.9%	16.8%	14.8%	17.7%
CABG	1.0%	2.6%	1.6% *	1.6%
Death/MI/Stroke	11.1%	16.8%	8.0% *	12.7%
Any of the above	44.8%	48.0%	40.5%	45.4%

excluding "other" diagnosis

* P<0.01 for comparison between STEMI, Non-STEMI and UA

Survival by Diagnosis
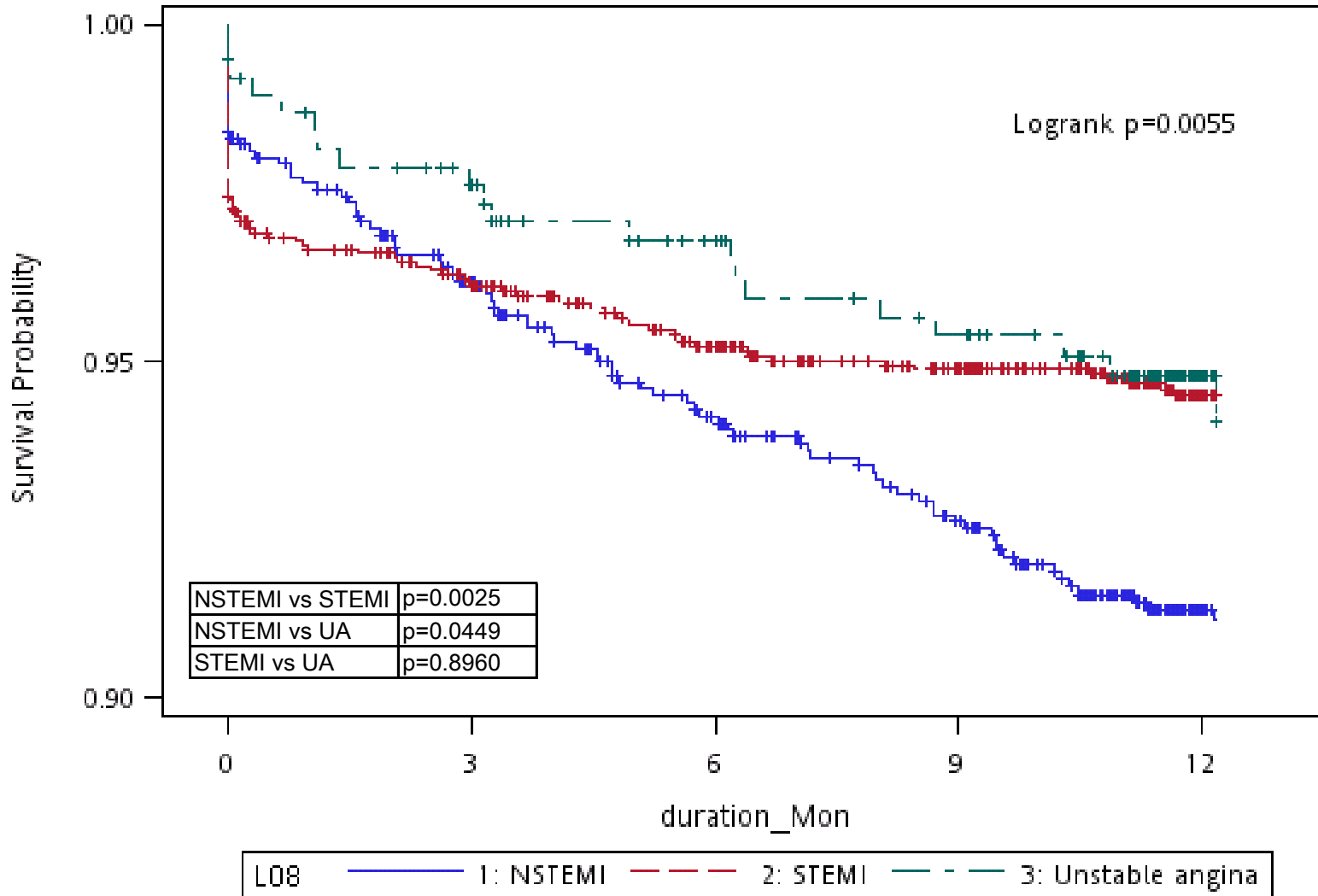
Predictors of 12-Month Death/MI/Stroke

Variable	OR#	95% CI	P-value
Medical history			
Chronic renal failure	4.54	2.62, 7.85	<0.01
PAD	2.43	1.38, 4.29	<0.01
Prior heart failure	1.93	1.31, 2.86	<0.01
History of AF	1.68	1.02, 2.76	0.04
Cerebrovascular accident	1.49	1.07, 2.07	0.019
Diabetes	1.3	1.02, 1.65	0.033
In-hospital procedure/event			
In-hospital bleeding	3.87	2.14, 6.99	<0.01
New-onset ventricular arrhythmia	3.43	2.28, 5.16	<0.01
LVEF (abnormal)	2.16	1.64, 2.84	<0.01
New-onset atrial fibrillation	1.98	1.17, 3.35	0.011
Angiogram	1.4	1.05, 1.89	0.024
Final diagnosis NSTEMI	1.38	1.09, 1.76	<0.01
Medications			
Any antiplatelet therapy discontinuation	1.94	1.44, 2.63	<0.01
Aspirin and clopidogrel < 9 months	1.5	1.04, 2.17	0.031

Statistical method: Logistic regression
#Odds ratio (OR) were adjusted for age and sex.

Predictors of 12-Month Death/MI/Stroke

Variable		OR#	95% CI	P-value
Risk factor	Family history	0.61	0.40, 0.92	0.019
Procedures				
	PCI	0.71	0.53, 0.94	0.017
	Stenting	0.59	0.45, 0.76	<0.01
	DES only	0.55	0.39, 0.78	<0.01
Medications				
	ACE/ARB at discharge	0.66	0.48, 0.91	0.01
	Beta-blocker at discharge	0.65	0.51, 0.83	<0.01
	Statin at discharge	0.65	0.51, 0.83	<0.01
	Aspirin at discharge	0.35	0.27, 0.45	<0.01
	Clopidogrel at discharge	0.34	0.26, 0.44	<0.01

Statistical method: Logistic regression
#Odds ratio (OR) were adjusted for age and sex.

KAMIR registry (Korea)

STEMI were younger, more likely to be men and had poorer left ventricular function with a higher incidence of cardiac death compared to patients with NSTEMI

	STEMI (n=5,110)	NSTEMI (n=3,315)	p
12-month MACE, n (%)			
Cardiac death	630 (12.3)	315 (9.5)	0.009
Non-cardiac death	67 (1.3)	61 (1.8)	0.681
Myocardial infarction	51 (1.0)	63 (1.9)	0.072
Repeat PCI	389 (7.6)	210 (6.3)	0.110
Target vessel revascularization	69 (1.5)	42 (1.4)	0.516
Non-target vessel revascularization	190 (3.7)	94 (2.8)	0.227
Target lesion revascularization	138 (2.7)	79 (2.3)	0.574
Coronary artery bypass grafting	25 (0.5)	27 (0.8)	0.132
Composite MACE	1162 (22.7)	676 (20.4)	0.121

PCI: percutaneous coronary intervention, STEMI: ST-segment elevation myocardial infarction, NSTEMI: non-ST-segment elevation myocardial infarction, MACEs: major adverse cardiac events

Doo Sun Sim, et al. *Korean Circ J 2009;39:297-303*

KAMIR registry (Korea)

The in-hospital and 1-month survival rates were higher in patients with NSTEMI than in patients with STEMI. However, 12-month survival rate was not different between patients with NSTEMI and STEMI.

Doo Sun Sim, et al. *Korean Circ J 2009;39:297-303*

PACIFC registry (Japan)
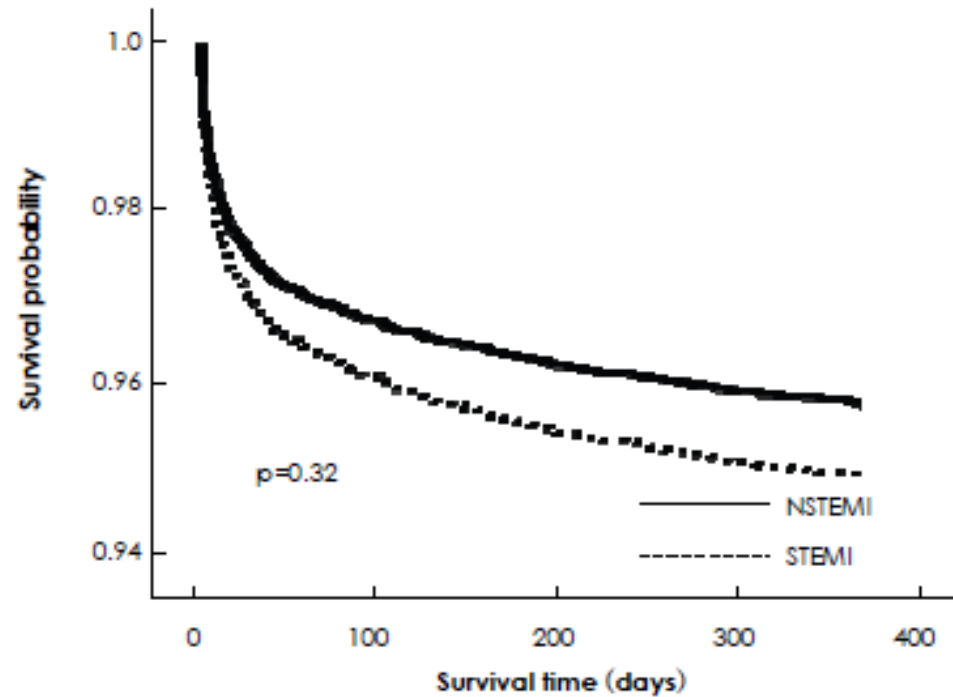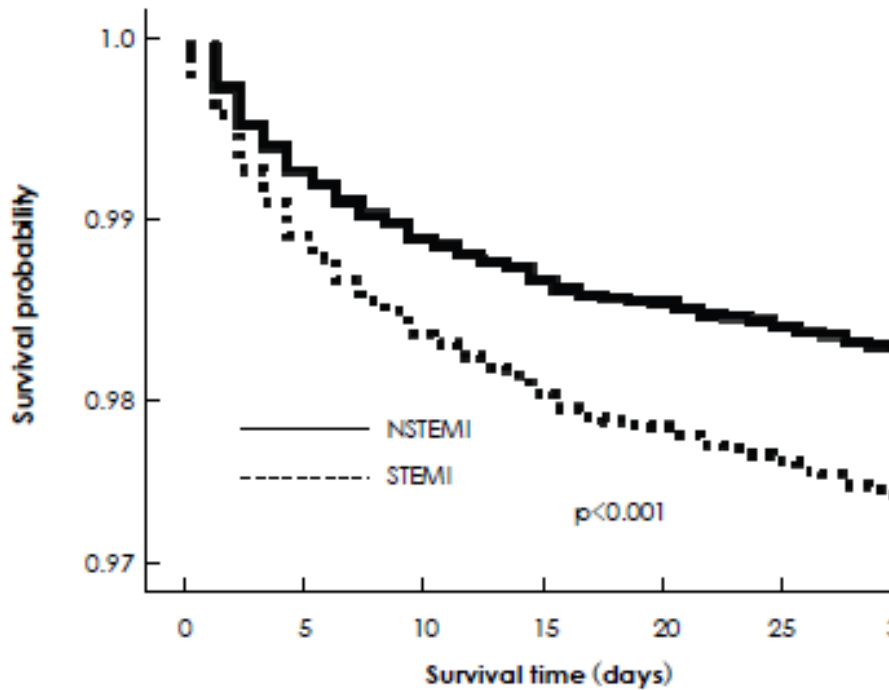
More patients with STEMI tended to receive DAPT than NSTE-ACS. only 62.9% and 50.5% of patients continued to receive DAPT after 1 year and 2 years.

Table 2. Hospital and Post-Discharge Treatments

Treatment	Hospital				After discharge	
	Total (n=3,597)	STEMI (n=2,135)	NSTE-ACS (n=1,462)	P-value[†]	1-year total (n=3,351)	2-year total (n=3,228)
PCI (total)	93.5	95.6	90.4	<0.001	–	–
POBA	16.6	15.6	18.1	0.128		
BMS	62.2	73.4	45.9	<0.001	–	–
DES	30.2	21.0	43.5	<0.001	–	–
PCI success rate[‡]	93.9	92.1	96.7	<0.001	–	–
CABG	2.4	1.0	4.4	<0.001	–	–
Pharmacological therapies, %						
Anti-platelet agents (total)	99.3	99.3	99.3	0.948	92.2	84.7
Monotherapy	6.7	5.0	9.2	<0.001	29.3	34.2
DAPT	87.7	88.5	86.7		62.9	50.5
DAPT to monotherapy	4.9	5.9	3.4			
Oral anticoagulants	10.5	11.7	8.8	0.005	9.1	8.8
Anti-hypertensives agents	91.6	93.5	88.9	<0.001	86.3	79.4
ACEI/ARBs	78.5	83.1	71.8	<0.001	70.8	63.6
β-blockers	49.5	54.7	42.0	<0.001	46.9	42.8
Calcium inhibitors	28.8	20.6	40.9	<0.001	33.8	33.5
Anti-arrhythmic drugs	8.9	11.2	5.4	<0.001	4.1	3.8
Statins	77.8	80.4	73.9	<0.001	75.0	69.5
PPIs	57.8	62.7	50.6	<0.001	50.9	47.8
Oral anti-diabetic drugs	22.5	22.0	23.2	0.408	23.9	22.3

Hiroyuki Daida, et al. *Circ J 2013; 77: 934 – 943*

ACACIA registry (Australia)

Kaplan–Meier survival curves for patients discharged with a coronary diagnosis

Stable angina · Unstable angina · STEMI · NSTEMI

Log rank, $P < 0.001$
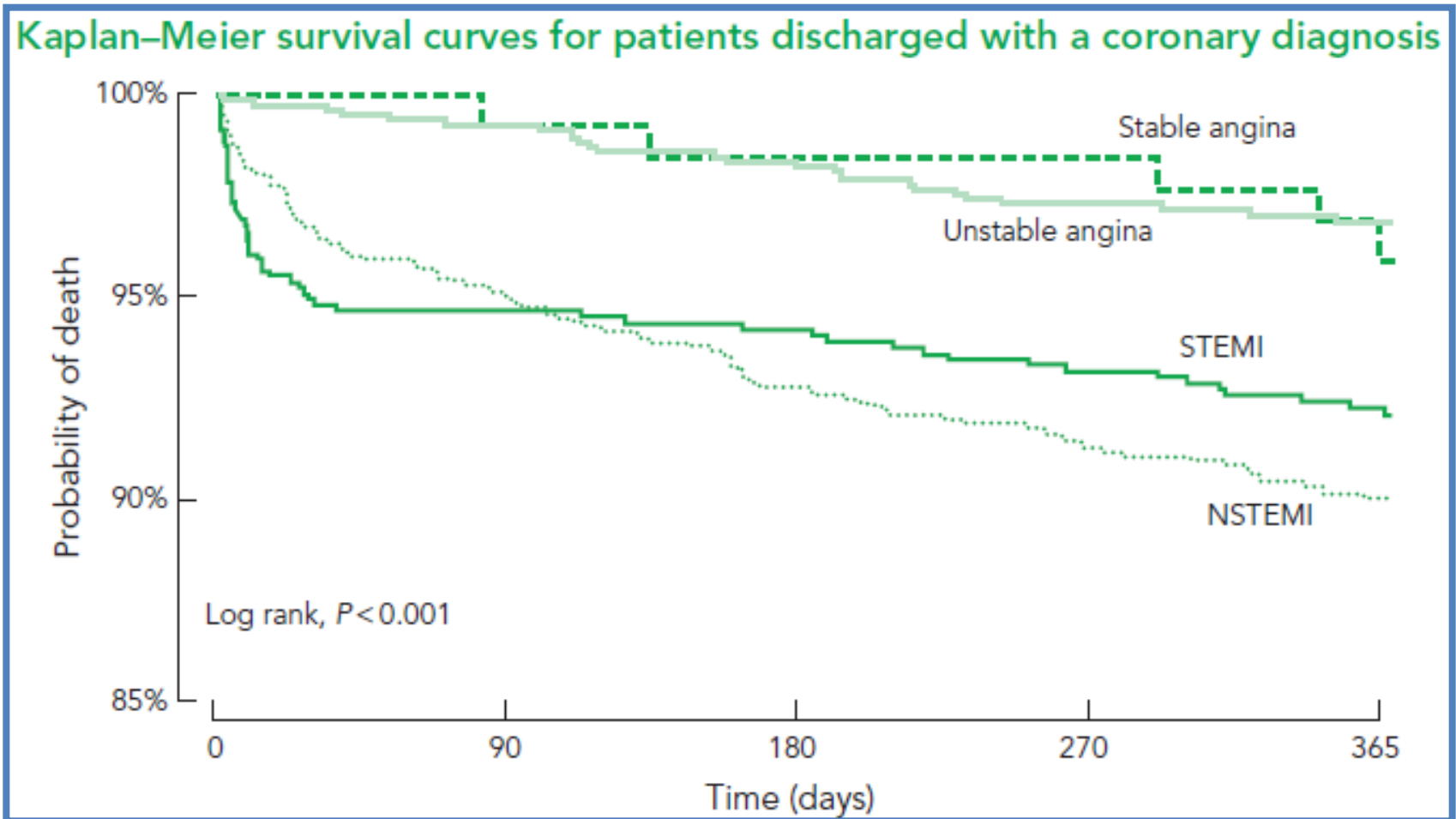
Chew D, et al. *Med J Aust* 2008; 188(12):691-7

TABLE 2 Cardiovascular Events and Procedures After Discharge

After Discharge to 1 yr	All Patients (n = 4,220)	QMI (n = 1,140)	NQMI (n = 1,350)	UAP (n = 1,730)	p Value*
Death	7.2%	6.5%	10%	5.4%	<0.0001
Nonfatal myocardial infarction	2.9%	2.7%	3.7%	2.6%	0.17
UAP	8.0%	5.8%	6.4%	11%	<0.0001
Angiography	14%	15%	13%	14%	0.40
Percutaneous coronary intervention	6.8%	6.6%	6.6%	7.2%	0.82
Coronary bypass surgery	3.9%	4.3%	4.3%	3.3%	0.33

*Three-group comparison.

Yan AT et al. *Am J Cardiol* 2004;94:25–29

Medications Use –
from discharge to 12-month FU

Survival and Guidelines Adherence
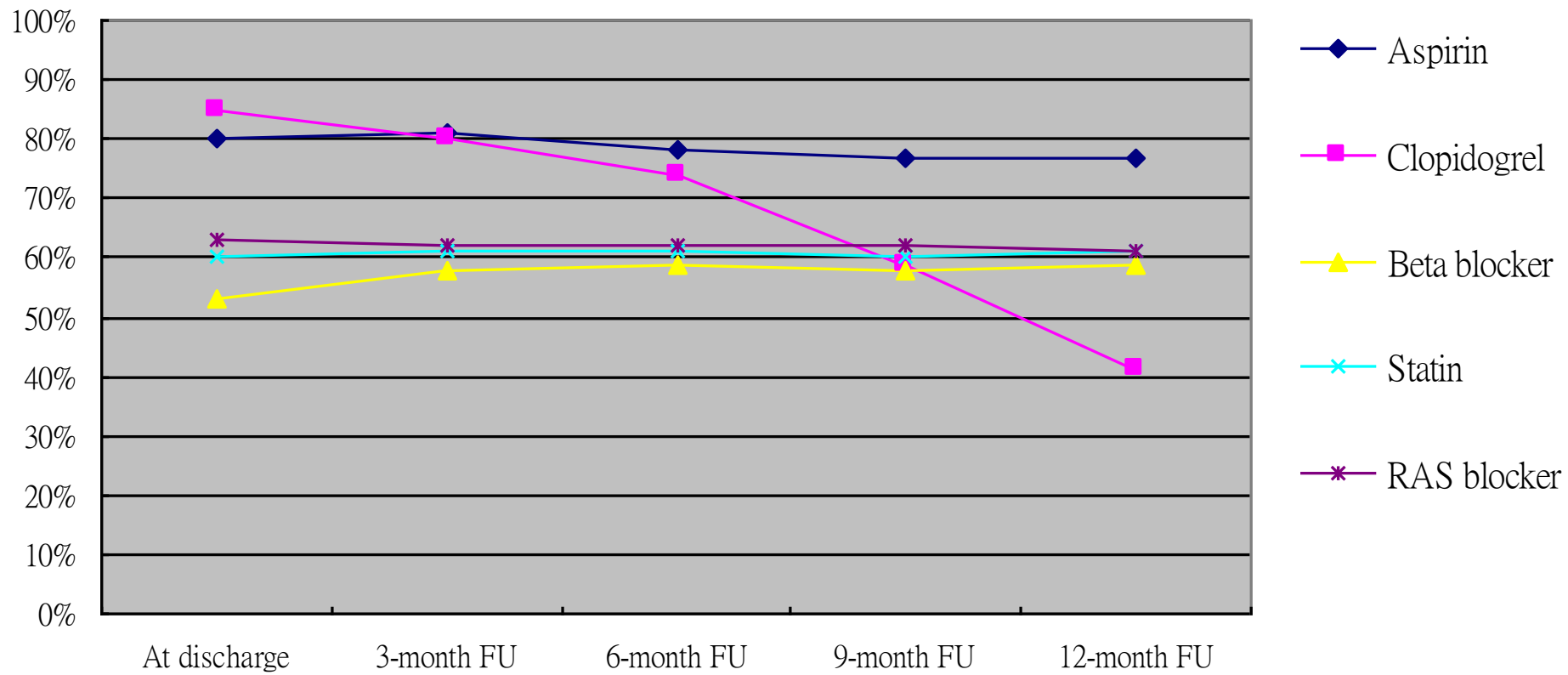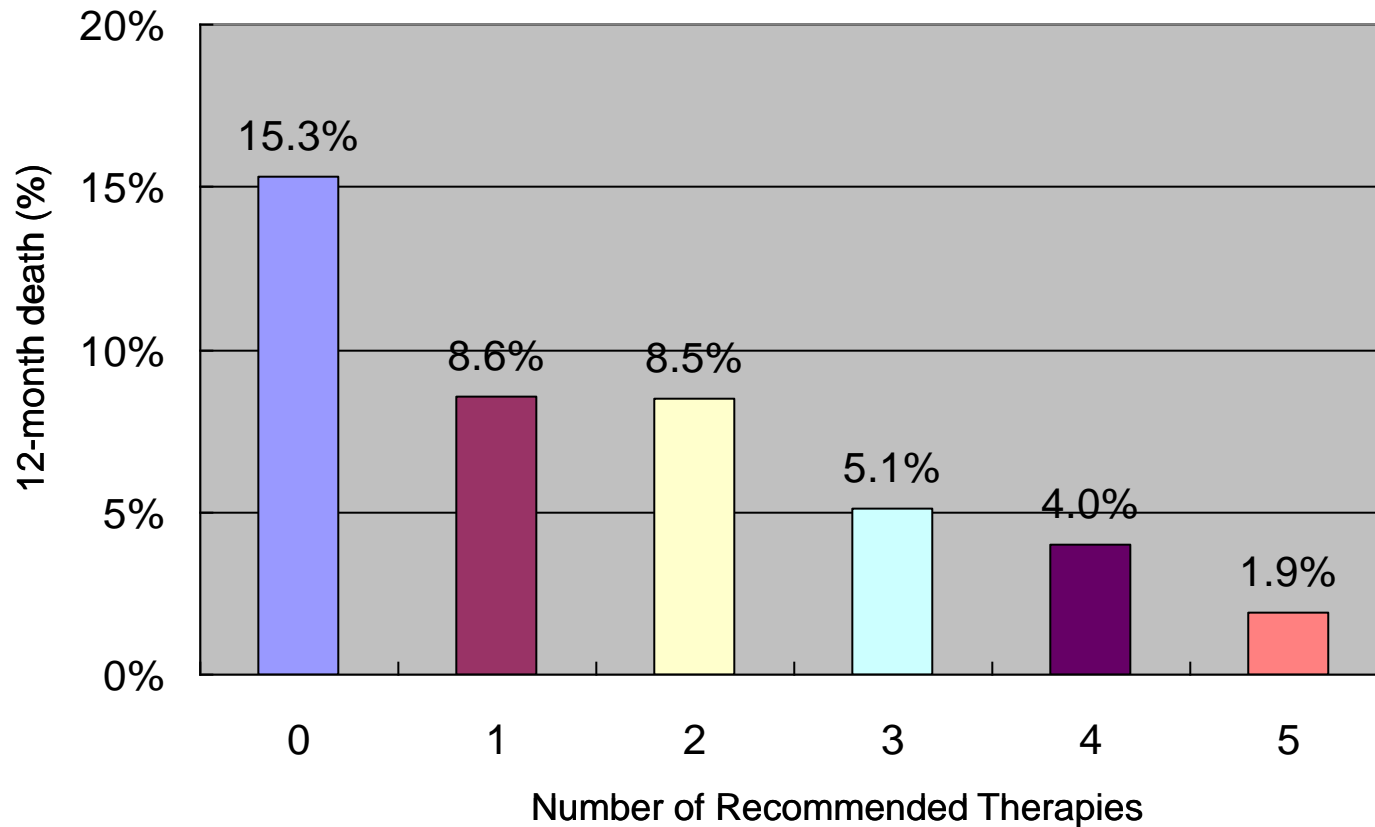
Recommended therapies include aspirin, clopidogrel, beta-blocker, statin, ACEI or ARB

Antiplatelet Medications Use
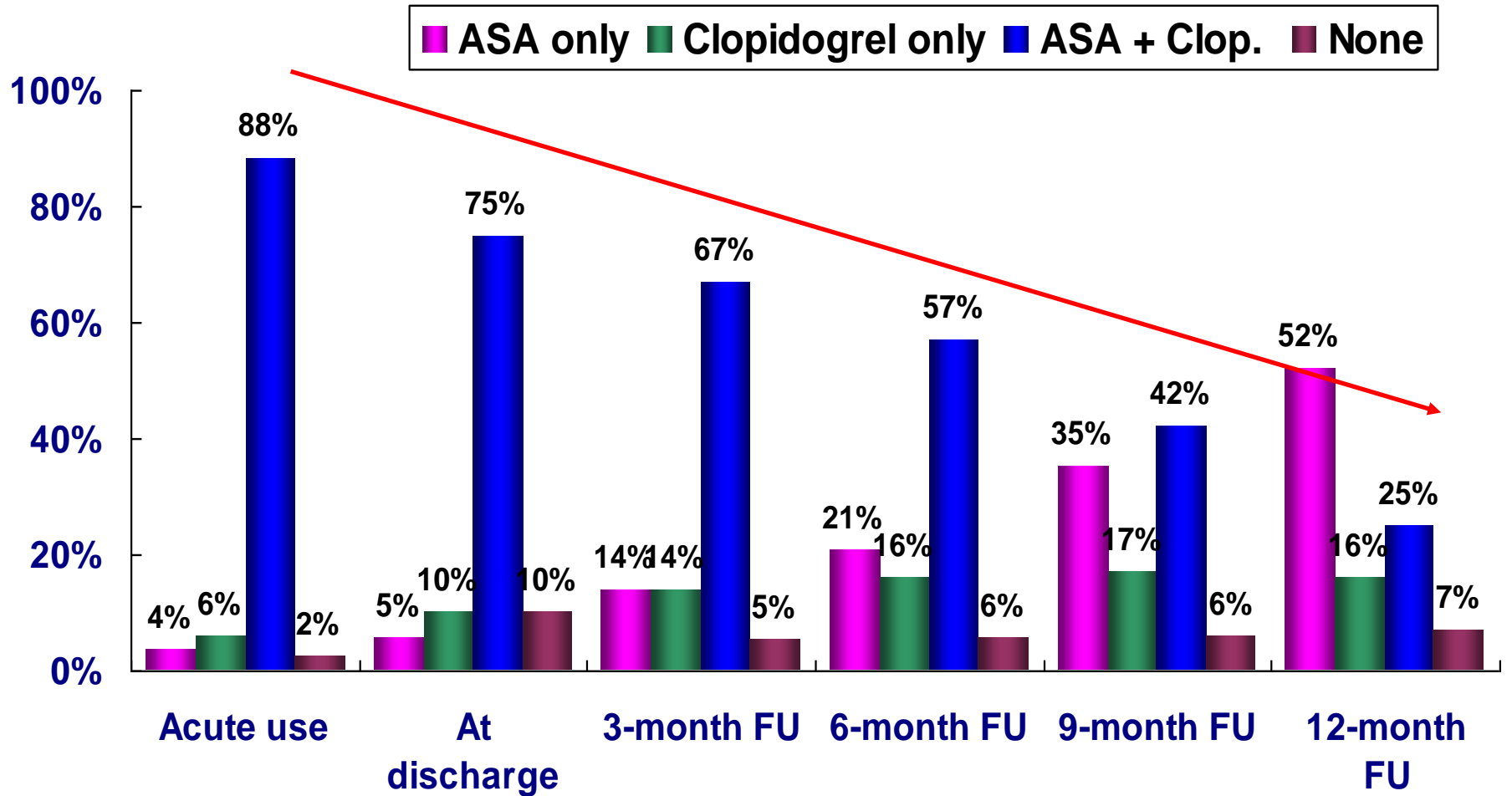
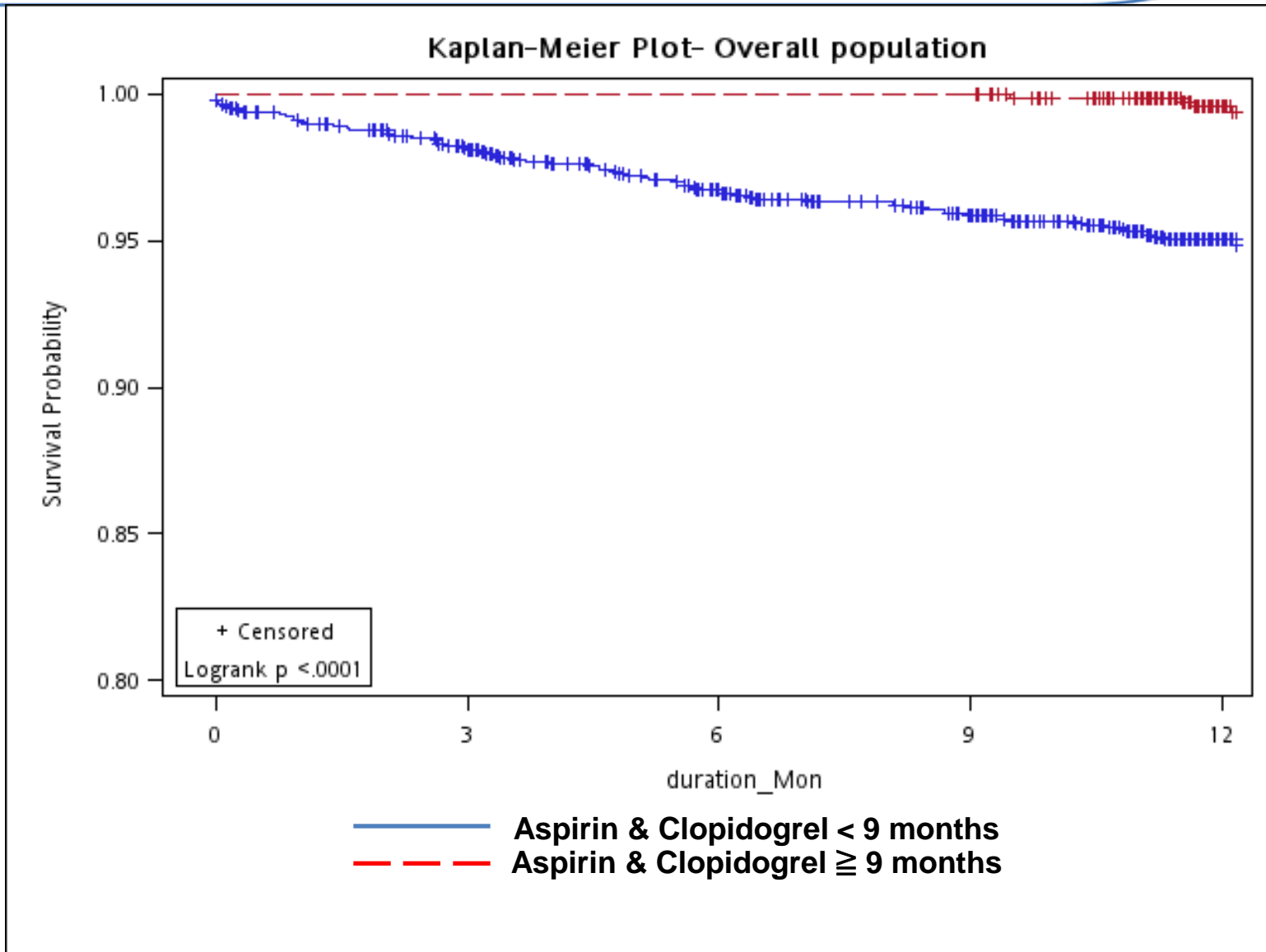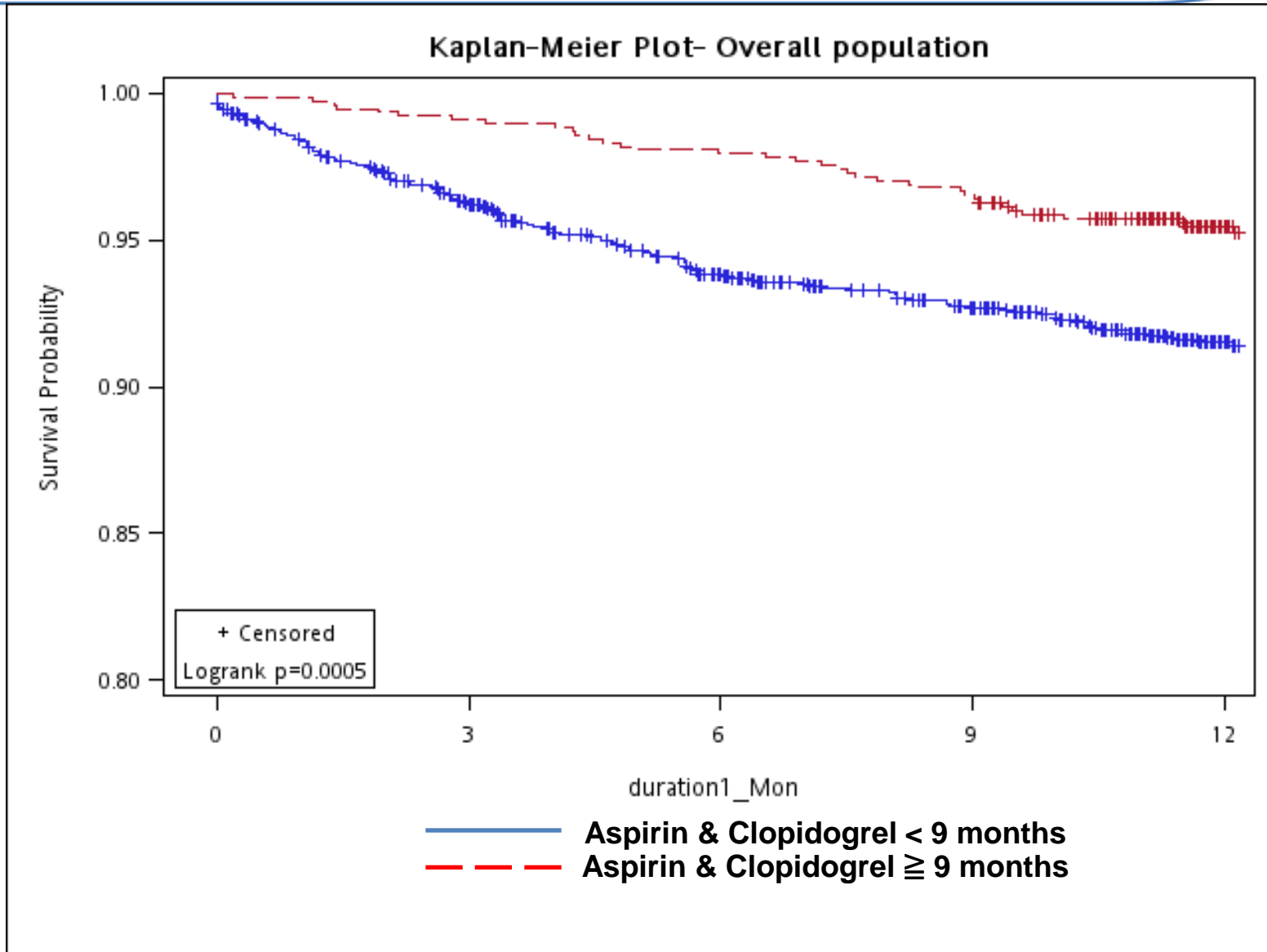# Reasons of Clopidogrel Discontinuation

Early discontinuation of clopidogrel within 9 months (n=1162)	
BNHI regulations	41.0%
Doctor decision	25.4%
Unknown	16.2%
BMS implantation	5.0%
Death	3.4%
Cost	3.0%
Adverse events	1.7%
Change to other antiplatelet	1.3%
Patient decision	1.3%
Surgery	0.5%
DES implantation	0.3%
Warfarin use	0.3%
Bleeding	0.3%
Co-morbidities	0.3%

Death according to Duration of DAPT ≧ 9 months vs < 9 months – Overall ACS

Kaplan–Meier Plot– Overall population

Kaplan–Meier Plot– Overall population

+ Censored
Logrank p=0.0005

Aspirin & Clopidogrel < 9 months
Aspirin & Clopidogrel ≧ 9 months

Predictors of Aspirin + Clopidogrel < 9 months

	OR# (95%CI)
PCI	0.51 (0.36, 0.72)
Stenting	0.61 (0.46, 0.80)
BMS only	1.87 (1.56, 2.22)
DES only	0.36 (0.30, 0.44)
aspirin chronic use	0.73 (0.58, 0.92)
clopidogrel chronic use	0.60 (0.44, 0.83)
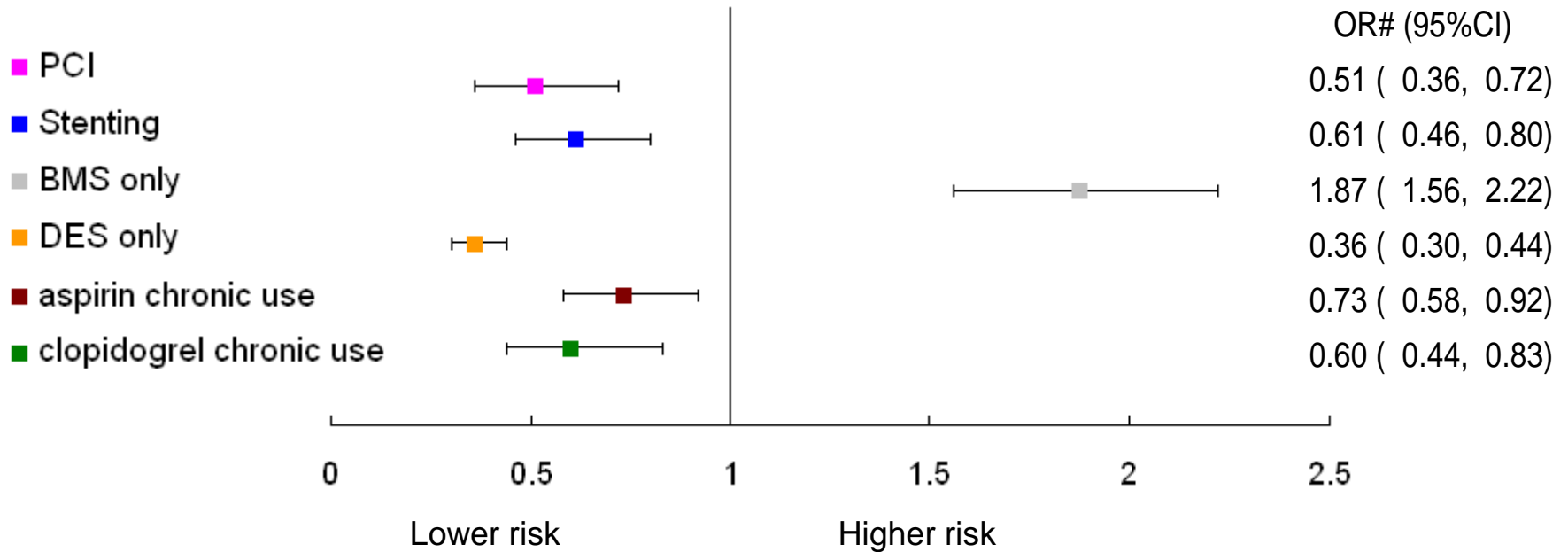
Statistical method: Logistic regression
#Odds ratio (OR) were adjusted for age and sex.

- 7.5% of ACS patients will die within one year.

  - Mortality was higher in NSTEMI (10.1%) than UA (6.2%) and STEMI (6.1%).

- Usage of evidence based medications were sub-optimal.

  - In particular, DAPT: clopidogrel + aspirin declined dramatically from 75% at discharge to 25% at 1 year, replaced by aspirin only.

- Usage of evidence-based medications is associated with a reduction in 12-month clinical events (death/MI/stroke).

- DAPT for 9 months or longer was associated with lower 1-year mortality.

- Reasons for clopidogrel discontinuation were mainly BNHI regulations (41%) and doctor decision (25%).

Taiwan Hospital Accreditation 2011

DX
- ECG
- Cardiac enzymes
- LDL

TX
- DAP
- β-blocker
- PPCI
- RASI
- Statin

FU
- In-Hospital Mortality
- Readmission (%)
- Return to ICU (24H)
- Return to ES (72H)

ED
- Rehabilitation
- Mx education
- Smoking cessation
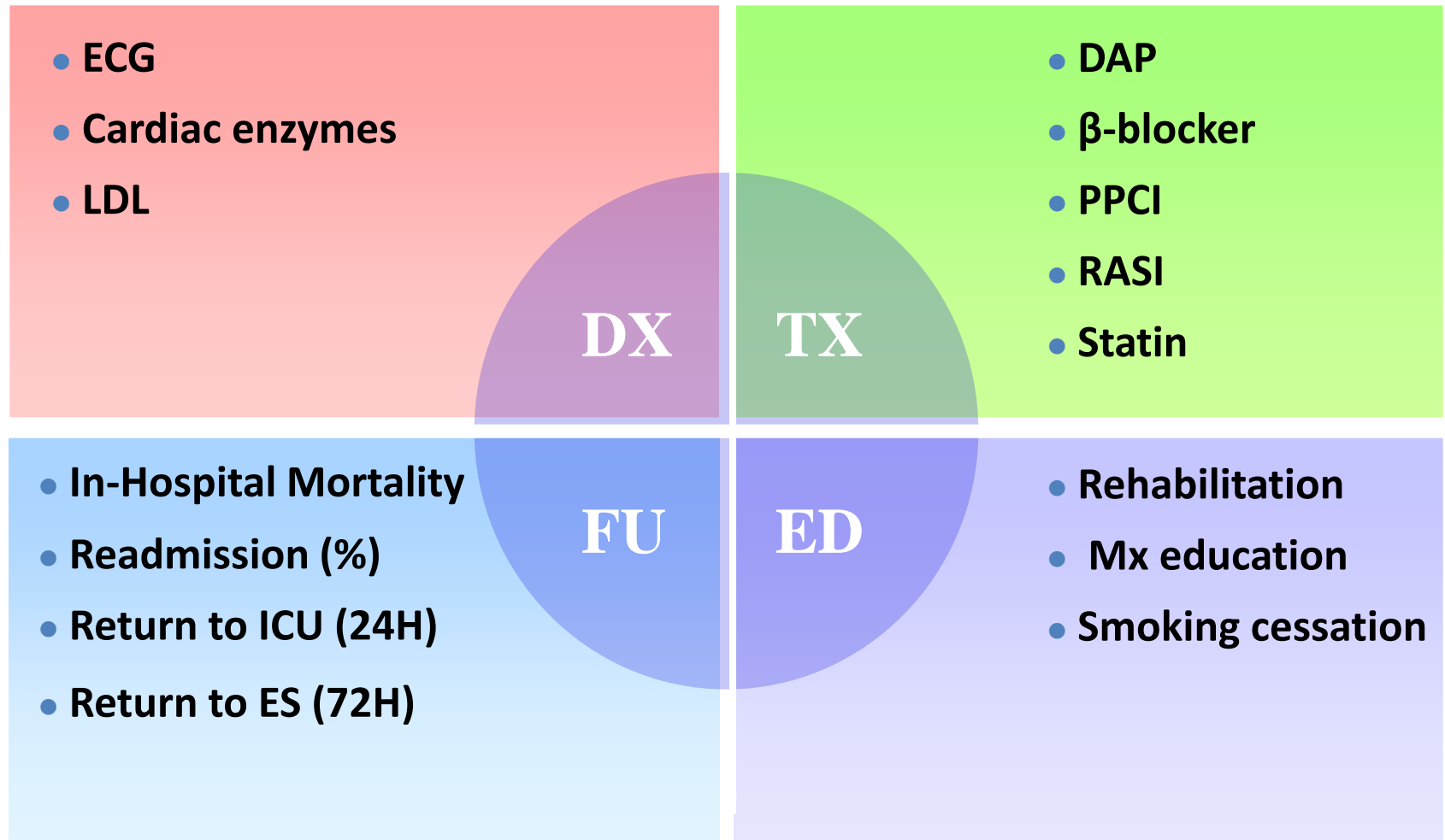
STENT Registry

Observational Study of Dual Antiplatelet Therapy

in Taiwanese Patients with Acute Coronary Syndrome

Undergoing Stent Placement

2012-2013

Baseline Characteristics

Variable	STENT Registry				ACS-FS Registry
	STEMI	NSTEMI	UA	Total	Total
Age (years)*	59.3 (13.3)	64.7 (13.5)	64.9 (12.2)	61.5 (13.5)	63.1 (13.6)
Gender (male)	84%	76%	88%	82%	78%
BMI (kg/m^2)*	25.7 (3.8)	25.2 (4.1)	25.8(3.1)	25.5 (3.8)	25.4 (3.9)
Killip Class					
I	65.9%	60.2%	79.2%	65.1%	61.4%
II	18.4%	16.7%	16.7%	17.8%	18.0%
III/IV	15.7%	18.5%	4.2%	17.1%	20.6%

Final Diagnosis
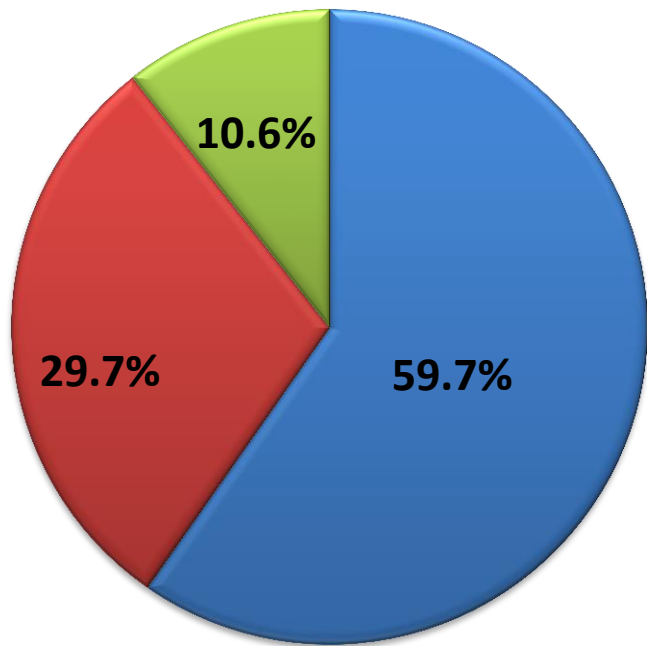
STEMI
NSTEMI
UA
Others

STENT Registry
N=526
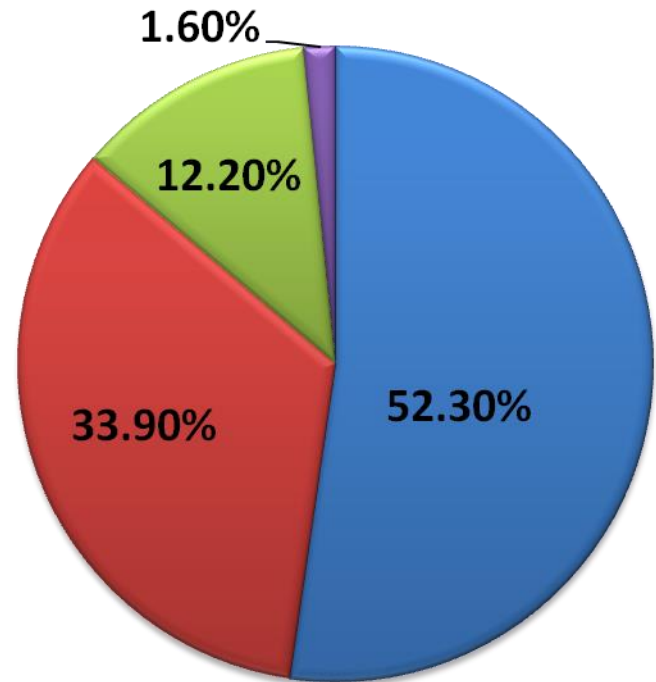
ACS-FS Registry
N=3183
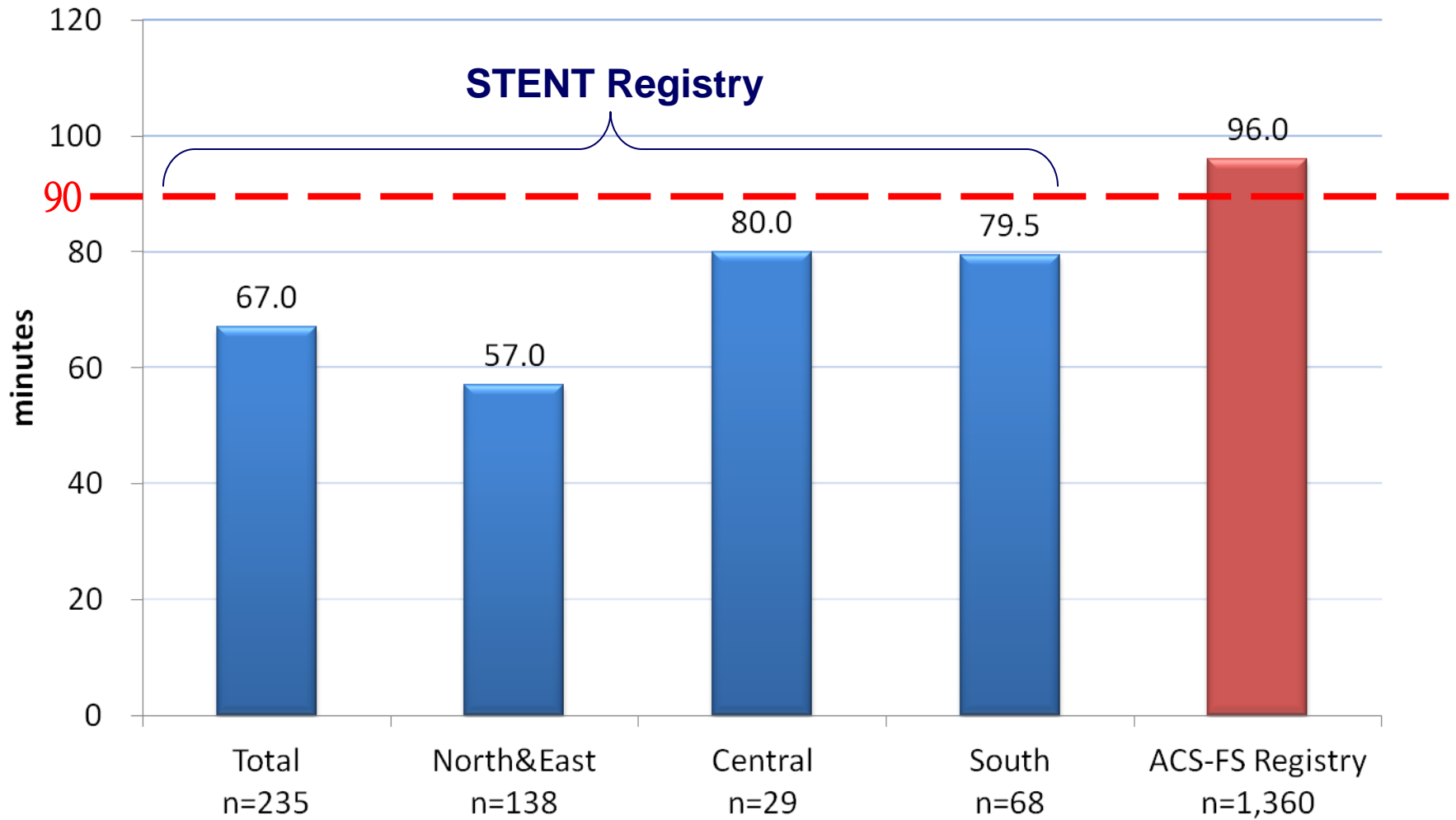
Primary Angioplasty – STEMI
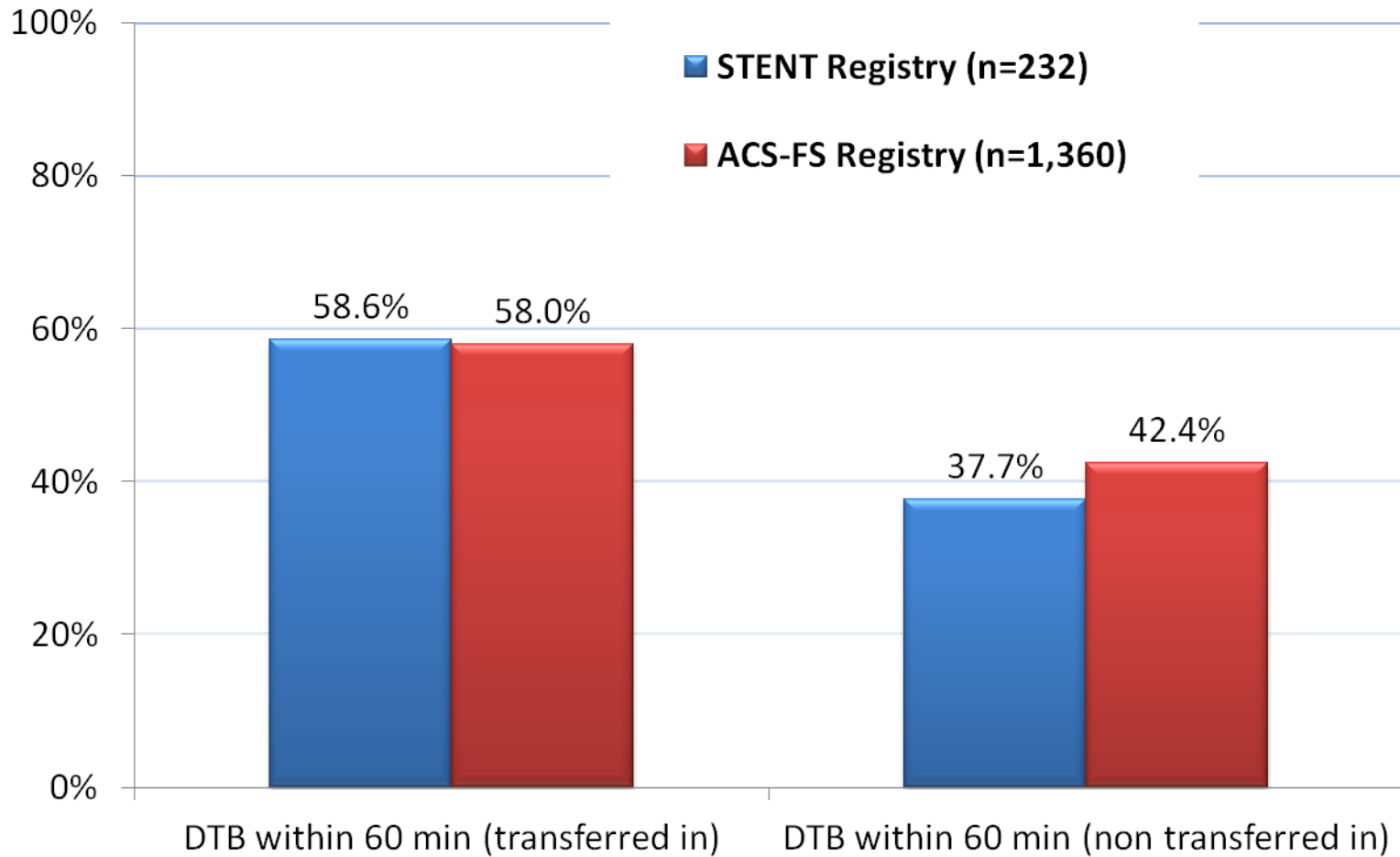
DTB = 1st Door to Balloon for primary PCI

In-hospital Medications Use
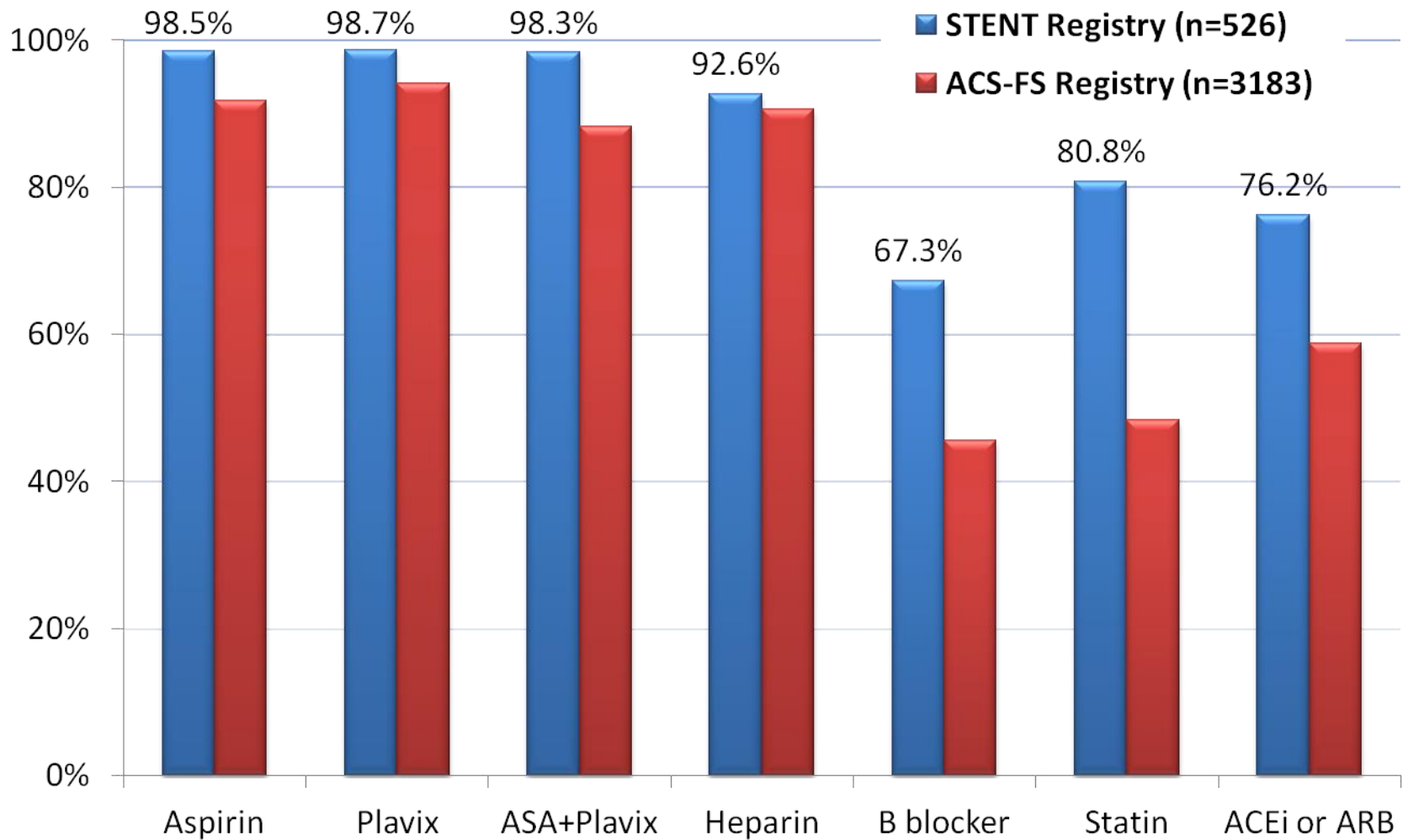

* ACS-FS Registry: medications use within the first 24 hours

STENT Registry: Antiplatelet Use - Plavix

Variable	Total	STEMI	NSTEMI	UA
Loading Dose given %	96.2%	95.5%	98.1%	94.6%
- median dose (mg)	300	300	300	300
- given before PCI %				
> 24hrs	21.6%	6.4%	46.4%	36.5%
12-24hrs	7.6%	2.7%	14.6%	15.4%
2-12hrs	10.0%	9.1%	10.0%	15.4%
< 2 hrs	52.9%	76.0%	23.8%	5.8%
- on table	4.0%	2.4%	1.3%	21.2%
- after PCI	3.8%	3.4%	4.0%	5.8%

In-Hospital Outcomes

STENT Registry: Conclusion
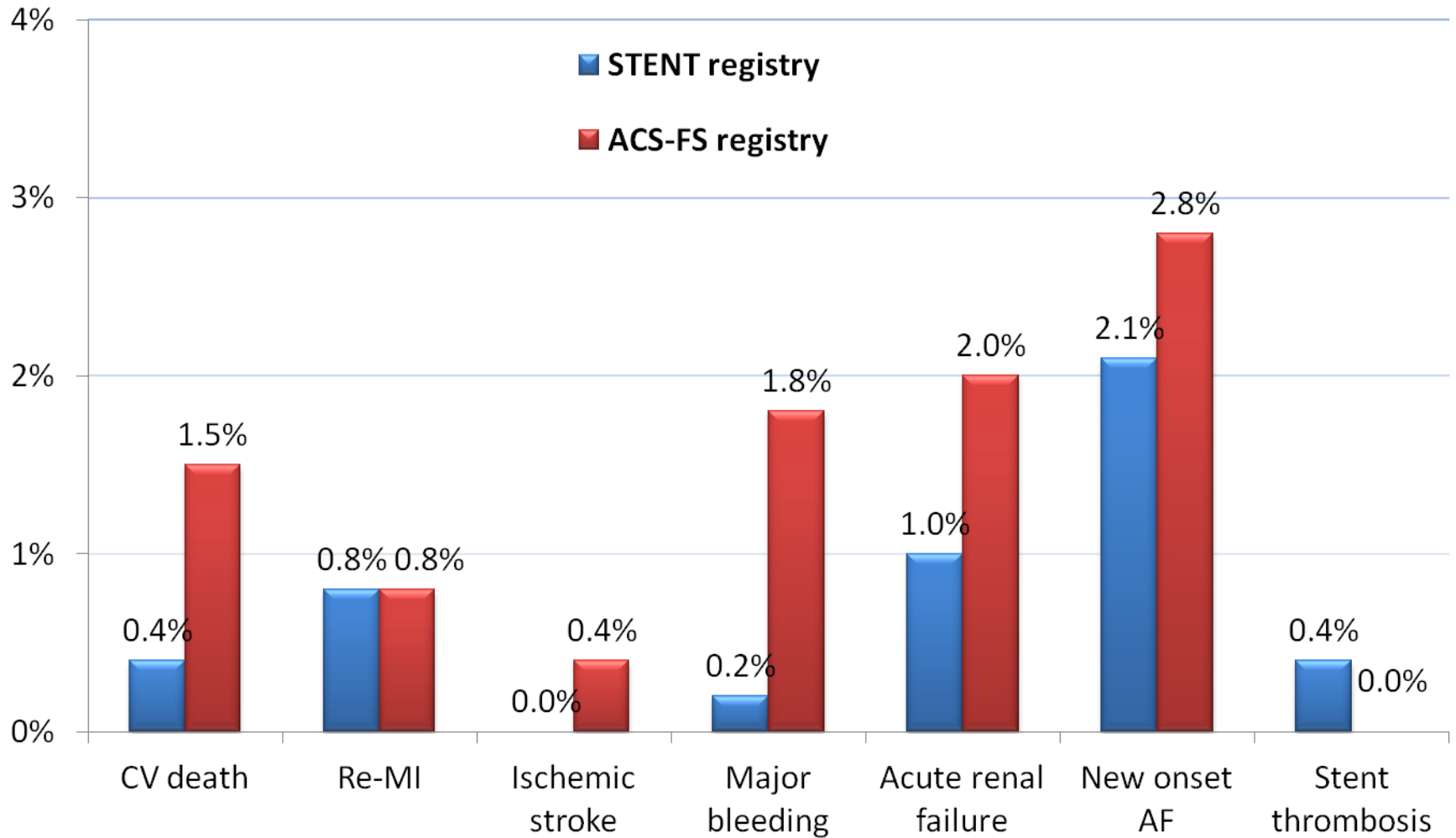
- **More than 50% of subjects are STEMI patients.**

- **Compared with the data of ACS-FS registry, the median DTB time is shortened and the medication prescription rates are increasing but still sub-optimal from guideline recommendation.**

- **The study population is "ACS patients *with stent placement* are treated with Aspirin and Plavix after intervention". ACS patients with cardiac angiography or POBA only are not eligible.**

- **Strongly recommend to recruit eligible patients *in a consecutive manne*r to avoid selection bias.**

THANKS