



Euro Heart Survey Programme

ESC Quality Assurance Programme to Improve Cardiac Care in Europe

One-year Outcome of Patients with ACS in Europe

S. Behar, MD

**on behalf of the Survey Expert Committee and all investigators
participating in the Euro Heart Survey on
Acute Coronary Syndromes**

**Neufeld Cardiac Research Institute,
Sheba Medical Center, Tel Hashomer, Israel**



**Euro Heart Survey Symposium
WCC 2006, Barcelona, September 2006**

Background

- ♥ **Acute Coronary Syndrome (ACS)** has been the focus of extensive research throughout the last decades, generating **guidelines** from Scientific Societies, but the degree to which they are **implemented in the “real world”** of daily practice, **remains unclear.**

The EHS has conducted two ACS Surveys

ACS-I in 2000-2001

25 countries (103 centers)

ACS-II in 2004

32 countries (190 centers)

ACS-II Survey Objectives

1. To study the management and prognosis of patients with ACS in Europe.
2. To assess the extent to which guidelines and recommendations for the management of ACS are implemented in daily practice.
3. To evaluate the impact of different therapies on the outcome of ACS patients.
4. To compare the results of two Euro ACS Surveys performed at a 4-year interval.

ACS-II Survey Methods

Survey Period	3 - 10.2004
Inclusion criteria:	Case Report Form (CRF) completed for patients with a discharge diagnosis of ACS (UAP or MI)
Methods	<p>Data Management: Electronic CRF transmitted via internet to EHH, France</p> <p>Data Analysis: ISPHA, Neufeld Cardiac Research Institute, Sheba Medical Center, Israel</p>
# of Countries/Centers	32/190 30-50 pts/center
# of Included Patients	6385
Follow-up	1 Year

Participating Countries

Country	No. of Patients	Country	No. of Patients
Austria	119	Italy	710
Belgium	80	Lithuania	88
Bulgaria	212	Netherlands	619
Croatia	161	Poland	425
Cyprus	29	Portugal	337
Czech Republic	164	Romania	97
Denmark	30	Russia	90
Egypt	25	Serbia & Montenegro	177
Estonia	40	Slovenia	48
Finland	122	Spain	1034
France	394	Sweden	159
Georgia	64	Switzerland	50
Germany	56	Tunisia	32
Greece	383	Turkey	30
Hungary	70	Ukraine	65
Israel	592	United Kingdom	42

Characteristics of Hospitals in which Patients were Hospitalized

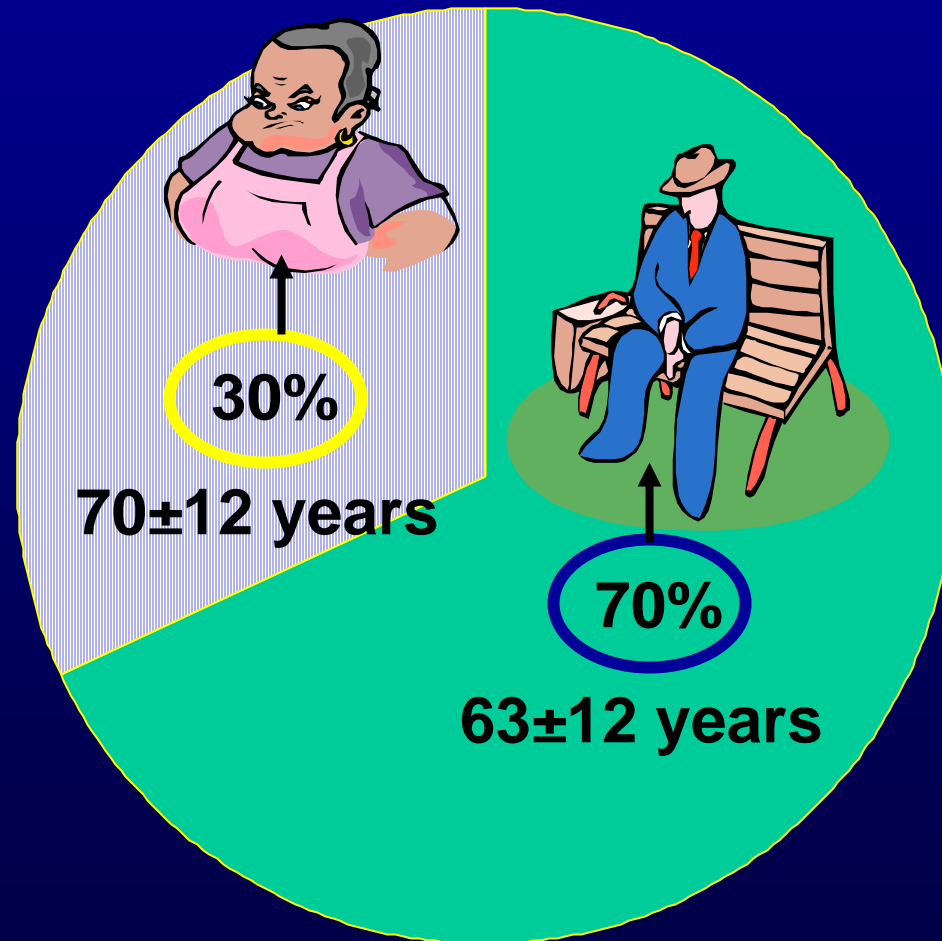
**ACS-II
6385 Pts**

**Academic
Institutions
53%**

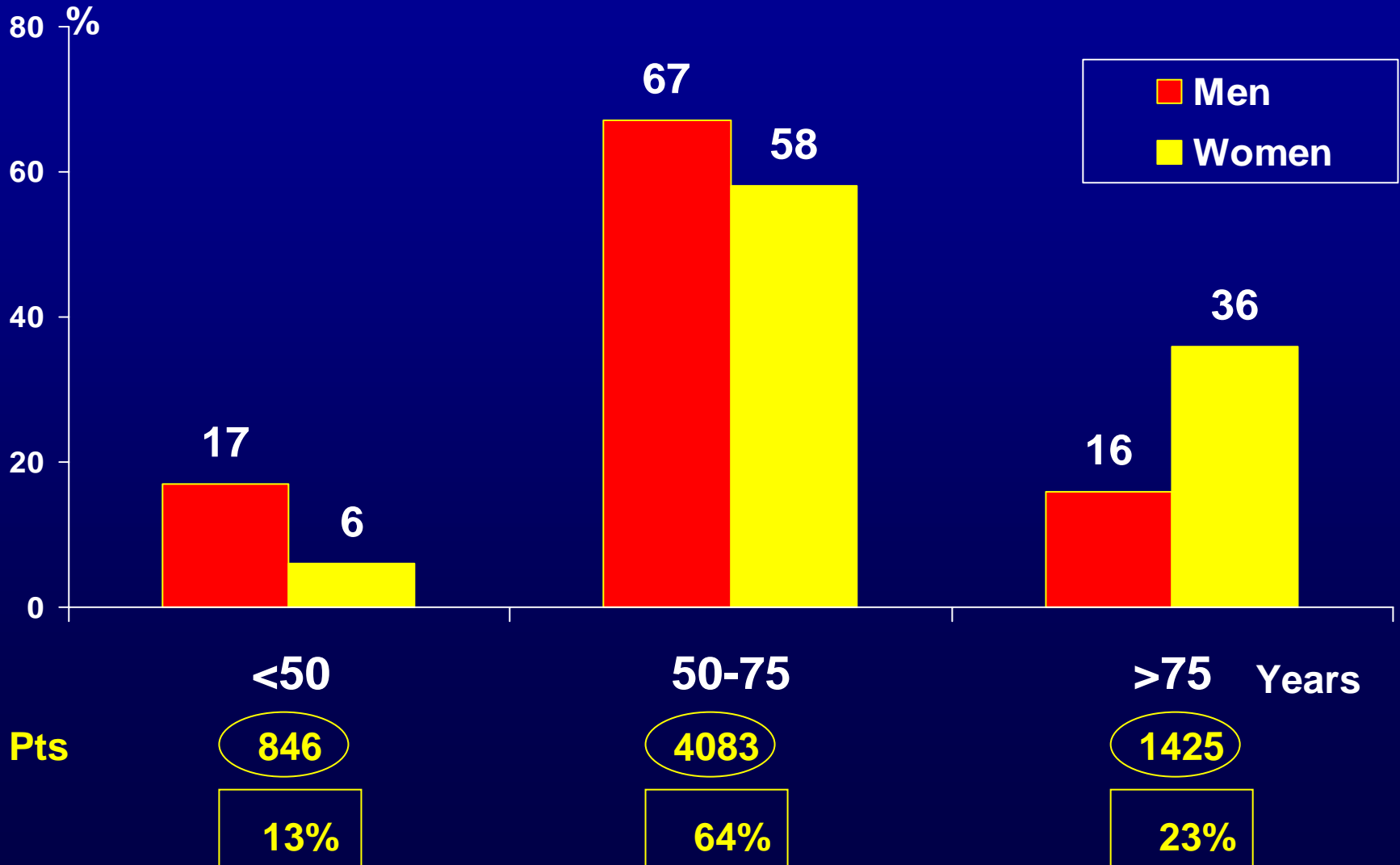
**On-site Cath.
Lab. Facilities
73%**

**On-site
Cardiac Surg.
37%**

Patient Demographics



Age Groups and Gender



Type of ACS on Admission

6385 Pts

STE ACS
3034 Pts
47%

63±13 yrs

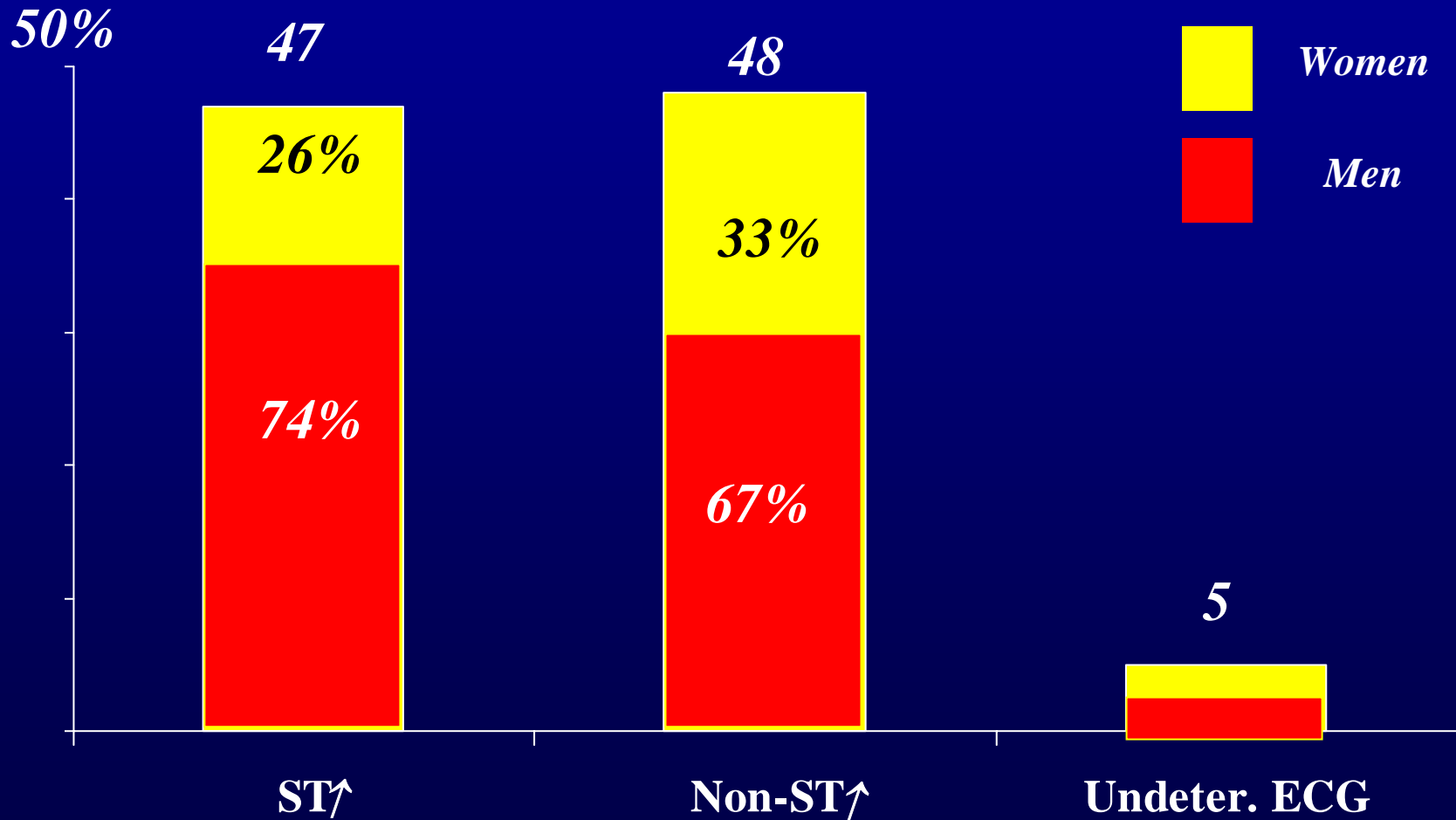
ACS with
Undeter. ECG
5%

74±10 yrs

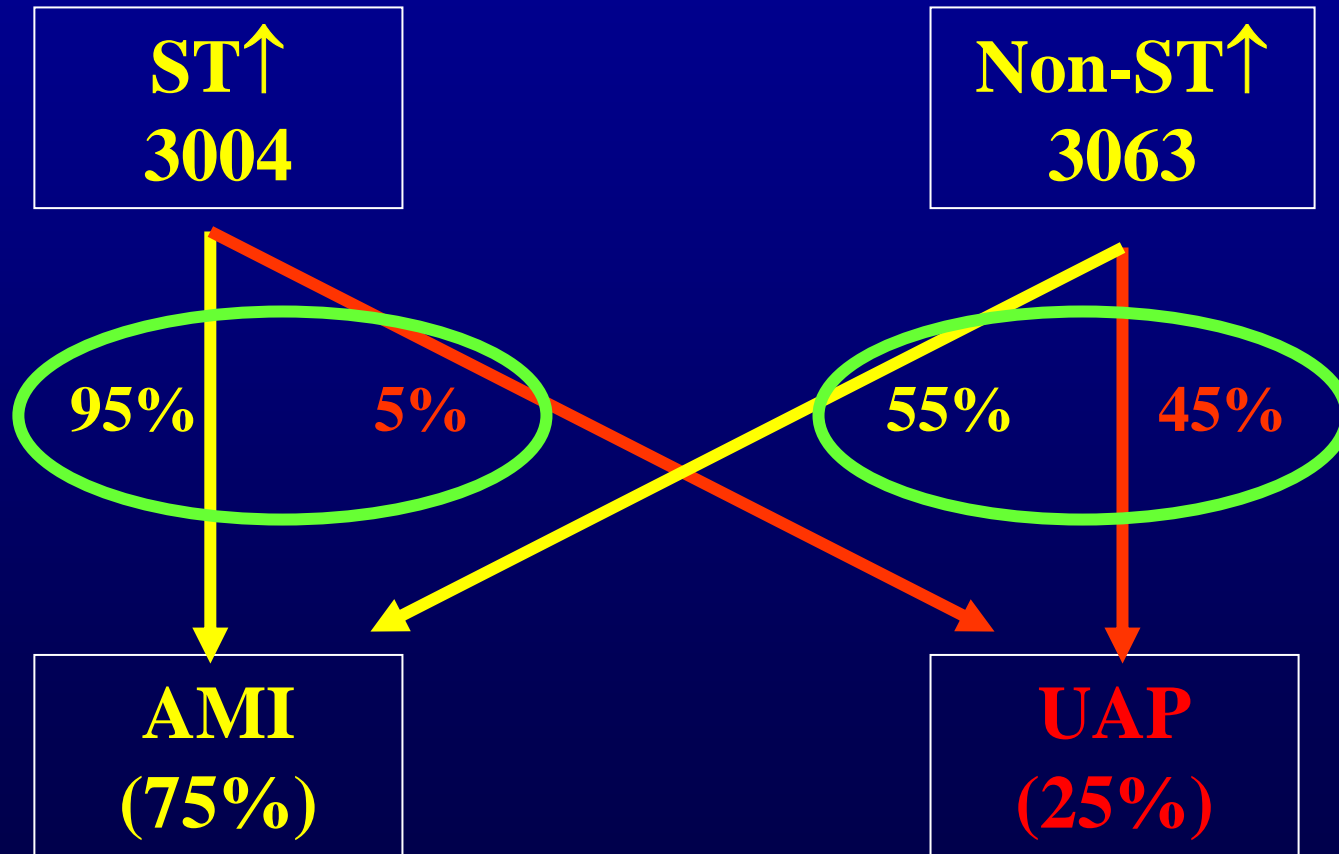
NSTE ACS
3063 Pts
48%

66±12 yrs

Age and Gender According to Type of ACS



Initial and Final Diagnosis



ACS-II – 1-Year Follow-up

	%
Complete Follow-up	87
Partial (<1 year)	9
Lost to follow-up	4

Baseline Characteristics of Hospital Survivors With and Without Complete 1-Year Follow-up

	YES	NO
Age (yrs)	64.8±12.8	64.3±12.8
Male (%)	70	69
Admission ECG (%)		
ST ↑	47	45
Non-ST ↑	48	50
Killip Class (%)		
I	79	77
≥II	21	23

Patients Use of Medications at 1-Year Follow-up

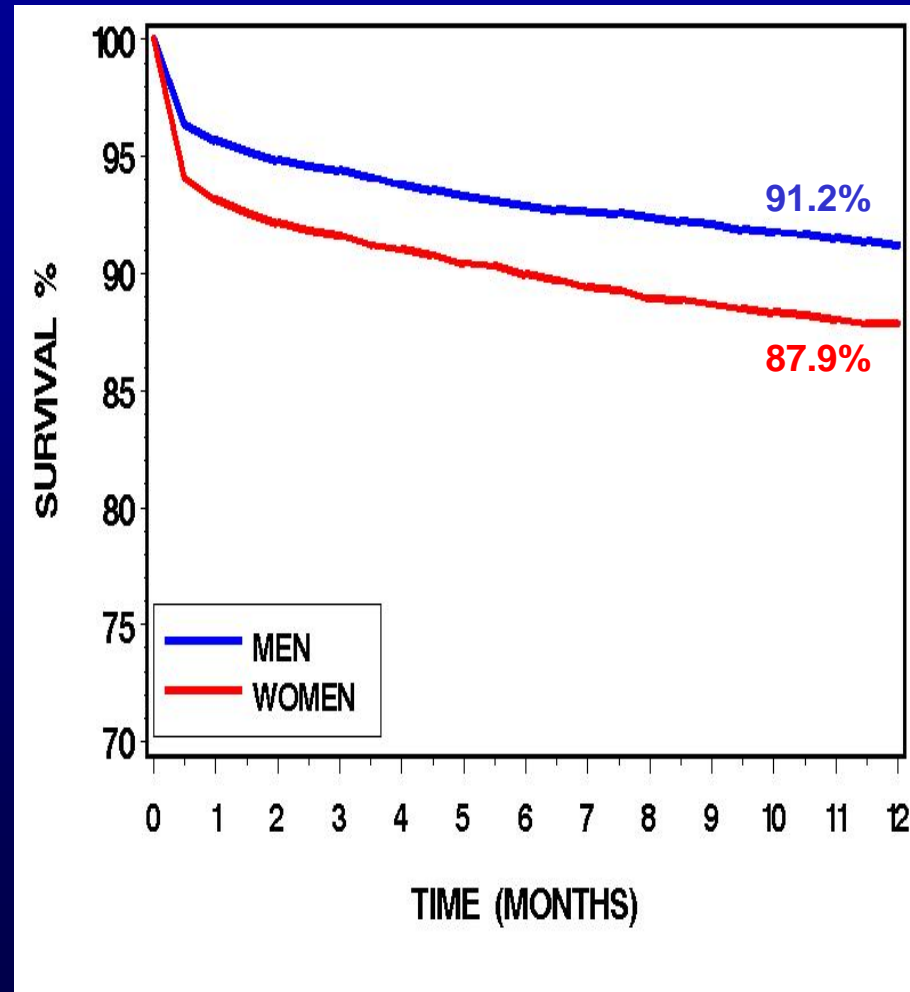
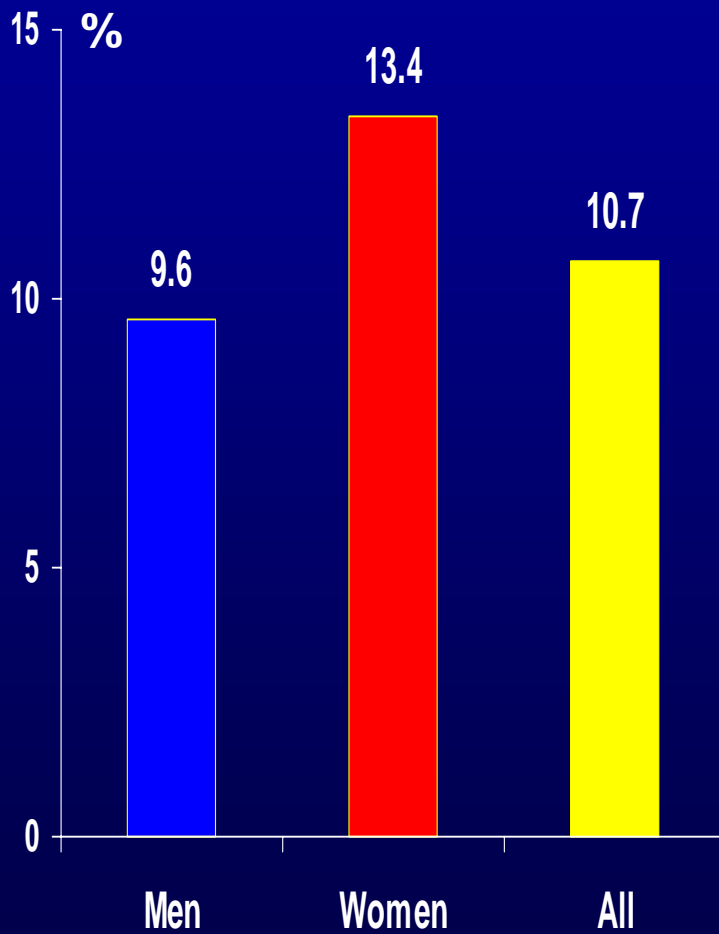
Drug	%
Aspirin	89
Ticlo/Clopidogrel	27
Anticoagulants	7
β -blockers	80
ACE-I/ARB	72
Statins	81

Event Rate and NYHA Class at 1-Year Follow-up

Event Rate	%
Rehospitalization	42
MI	3.7
Stroke	1.3
PCI	10.1
CABG	5.1

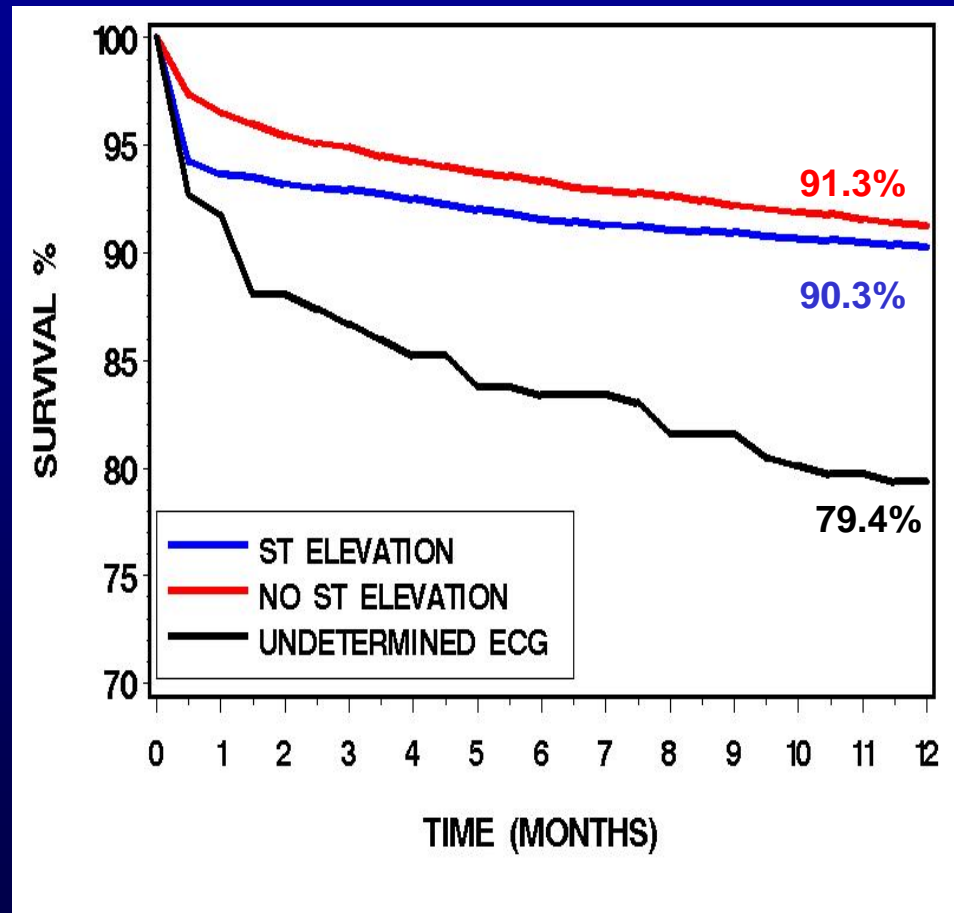
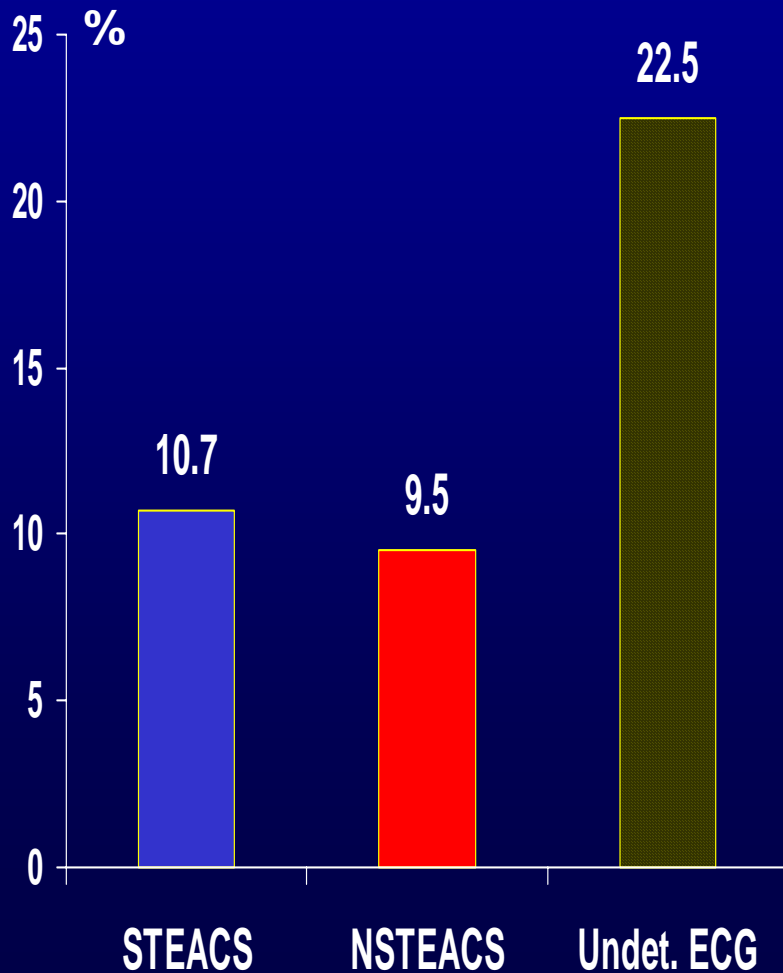
NYHA Class	%
I	73
II	22
III	4
IV	1

1-Year Mortality



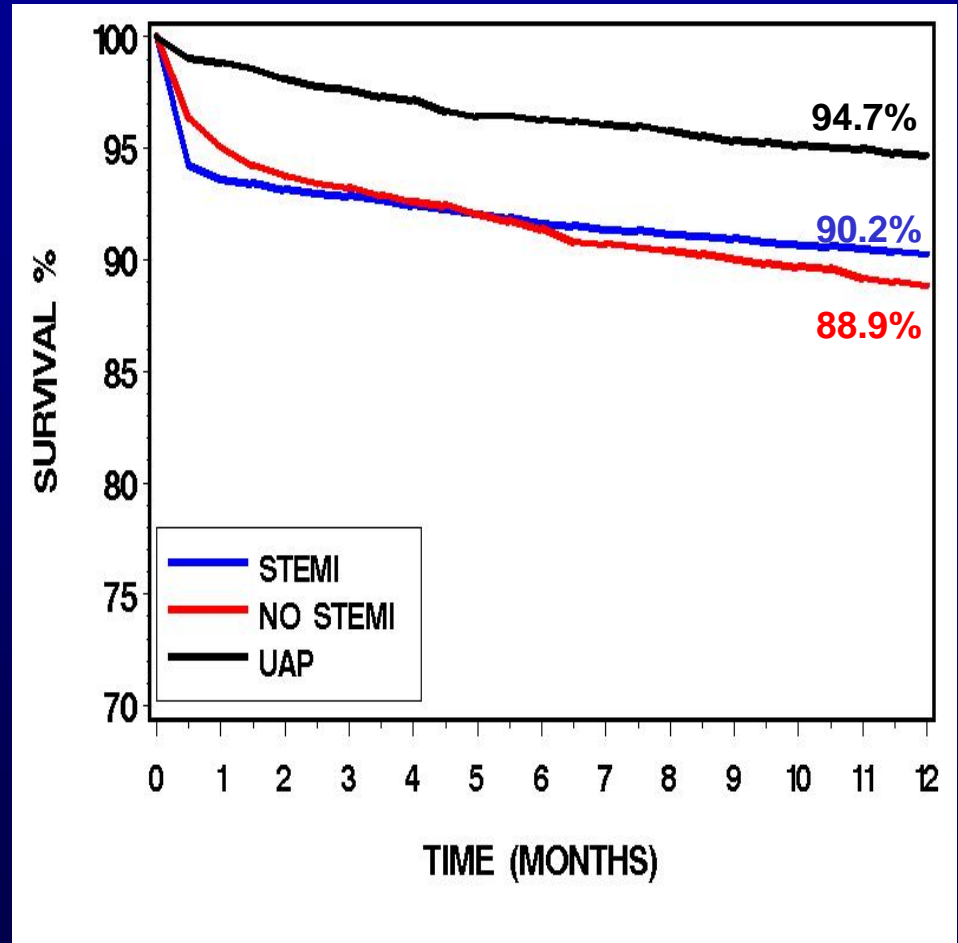
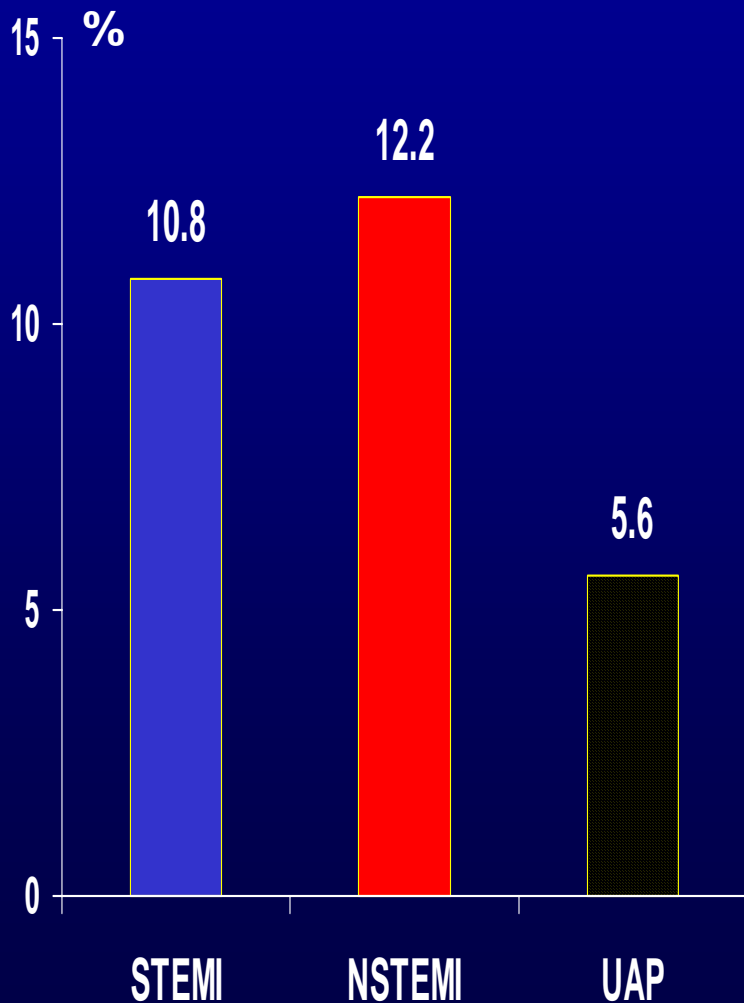
Kaplan-Meier Survival Curves

1-Year Mortality by Type of ACS on Admission



Kaplan-Meier Survival Curves

1-Year Mortality by Discharge Diagnosis



Kaplan-Meier Survival Curves

1-Year Prognosis

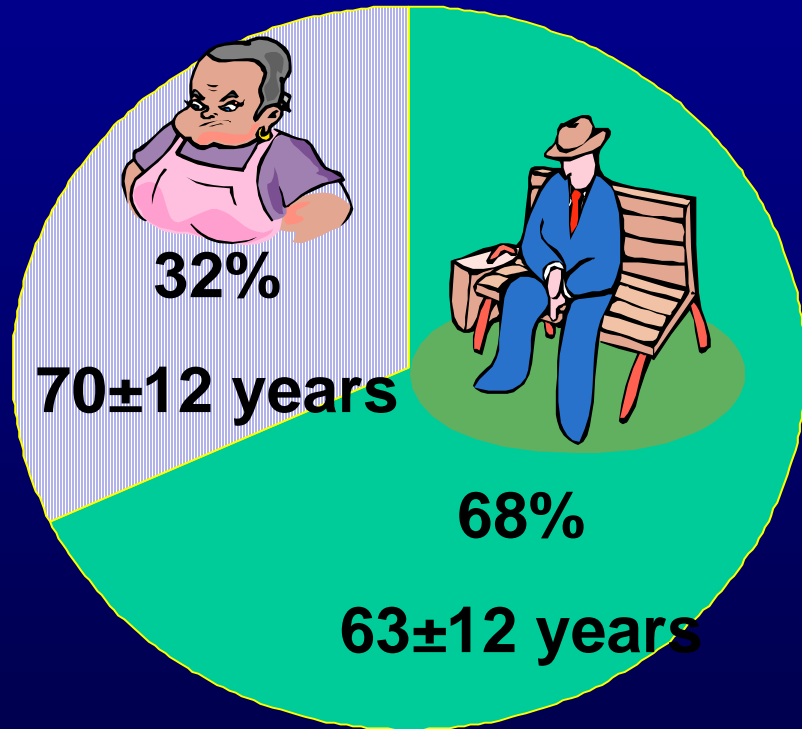
Independent Predictors of Death			Independent Contributors to Better Prognosis		
	HR	(95% CI)		HR	(95% CI)
Killip Class ≥ 2	2.51	(2.09-3.01)	B-Blockers	0.47	(0.40-0.56)
STEACS	1.64	(1.37-1.96)	ACE-I/ARB	0.52	(0.43-0.61)
CRF	1.52	(1.21-1.91)	Statins	0.56	(0.46-0.67)
Past MI	1.38	(1.15-1.66)	Aspirin	0.62	(0.47-0.80)
Diabetes	1.35	(1.13-1.61)	Clopidogrel	0.69	(0.56-0.84)
Age (1 yr)	1.04	(1.03-1.05)	Coron. Angio.	0.74	(0.60-0.92)

What Changed in the Management of ACS Patients Between 2000 to 2004?

Data from ACS-I and ACS-II

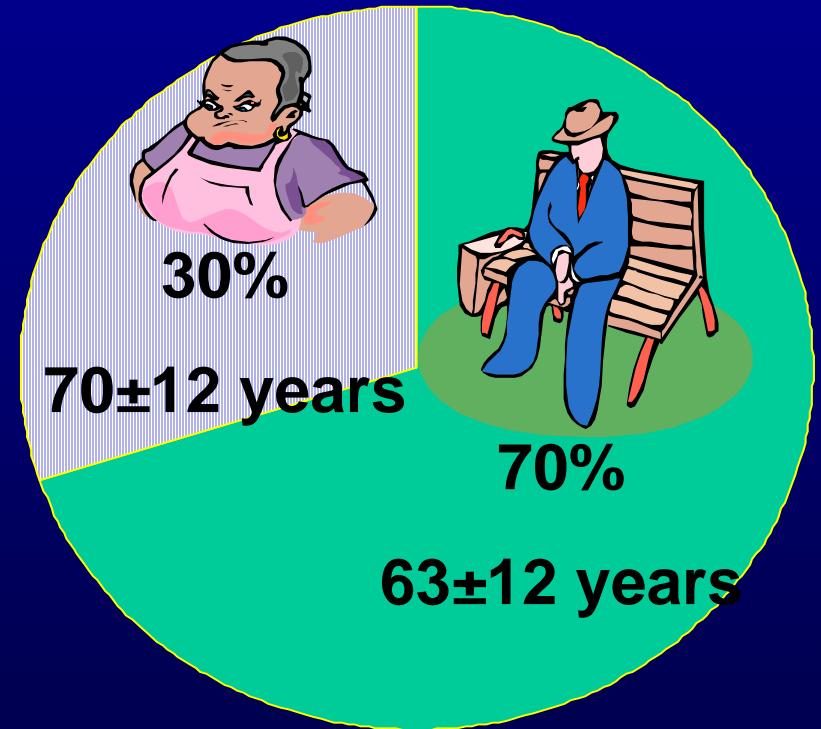
Patients Demographics

ACS-I



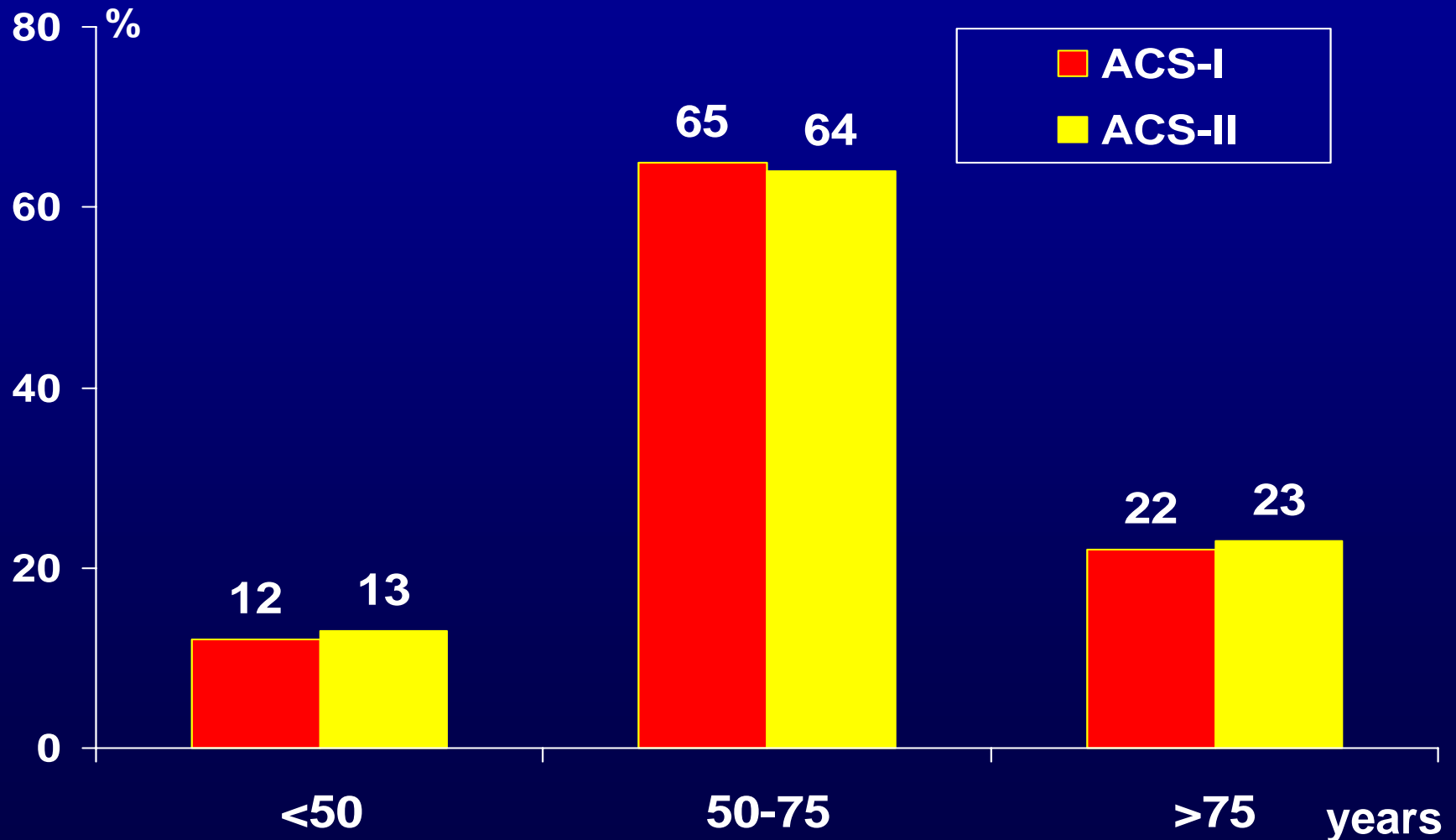
(n=10484)

ACS-II

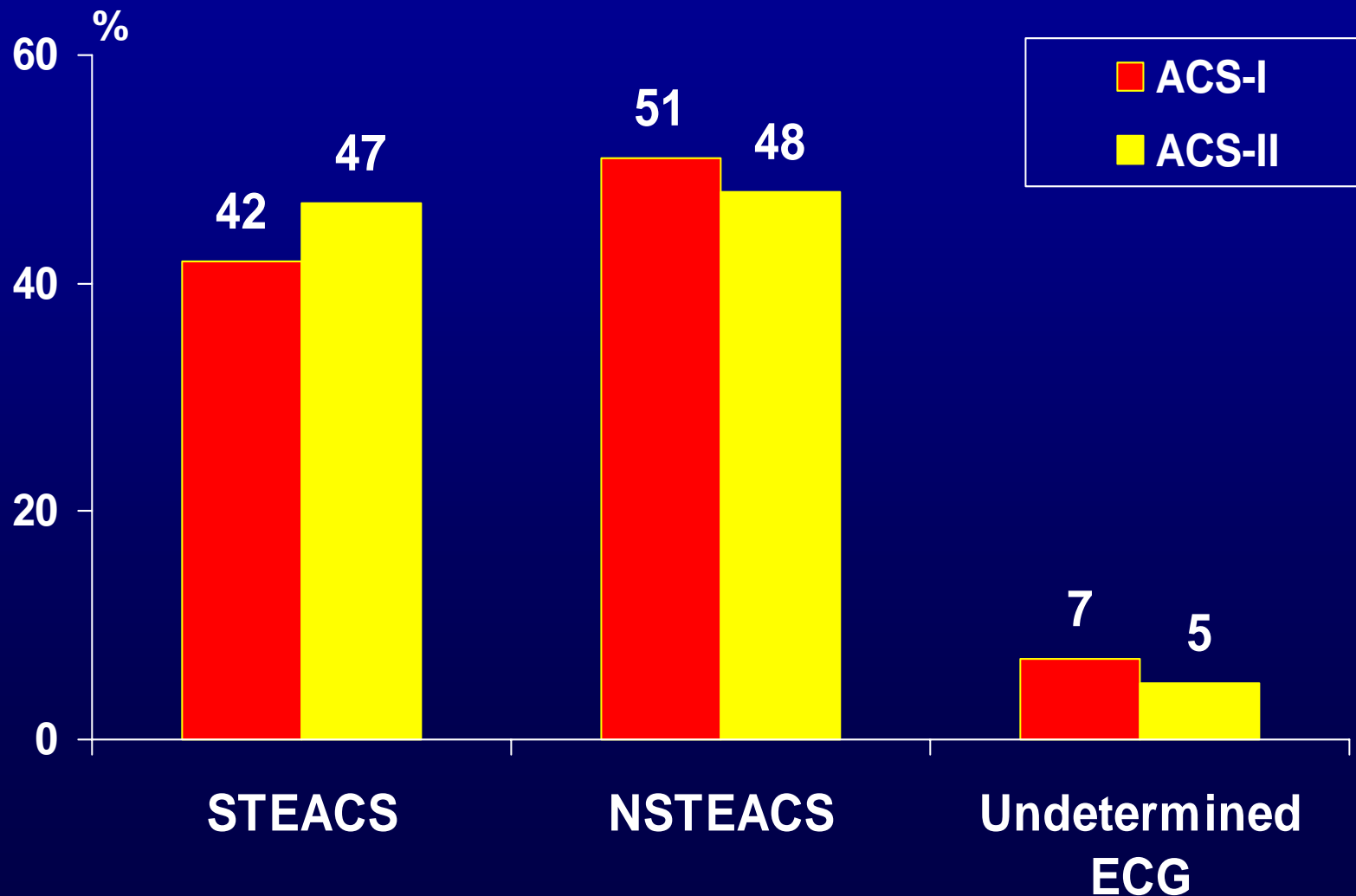


(n=6385)

Age Groups by Sex

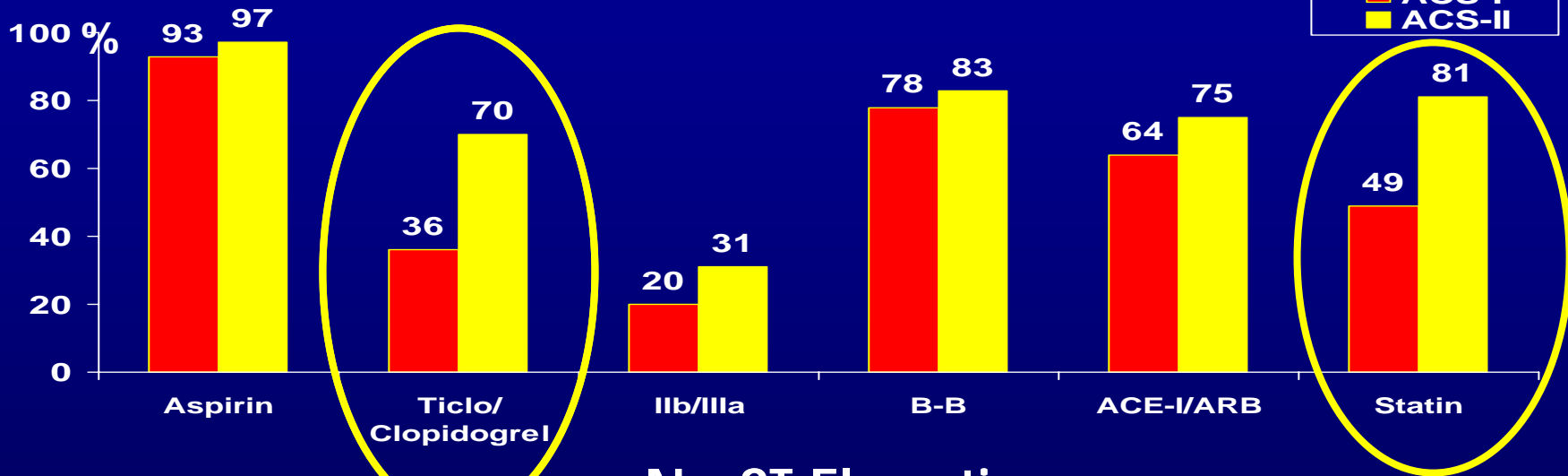


Admission ECG

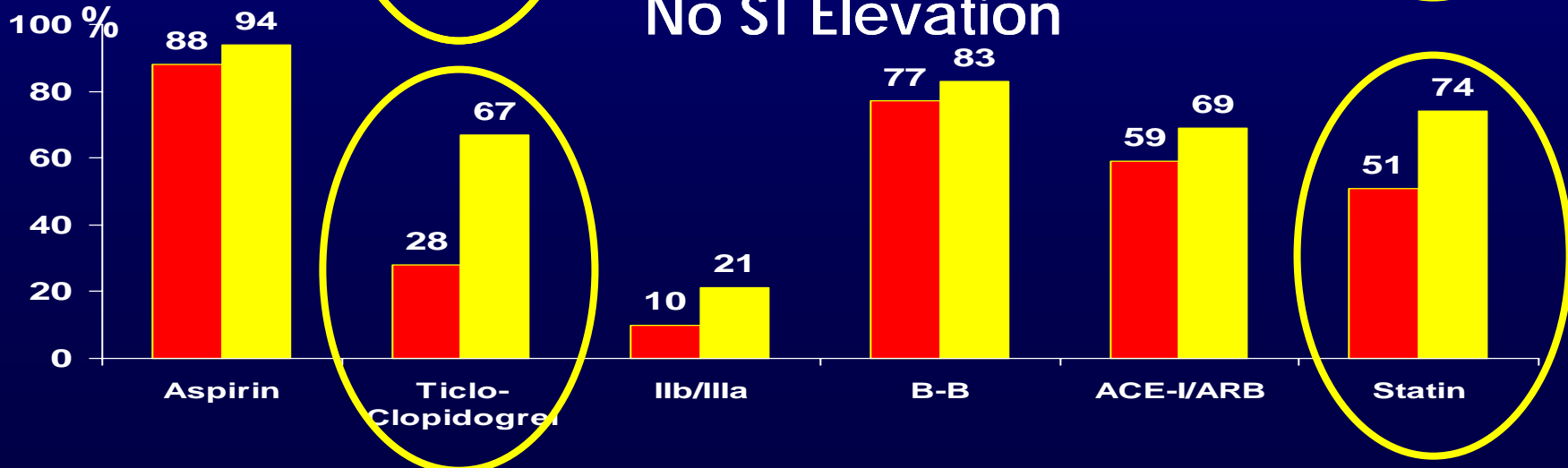


In-hospital Medical Therapy

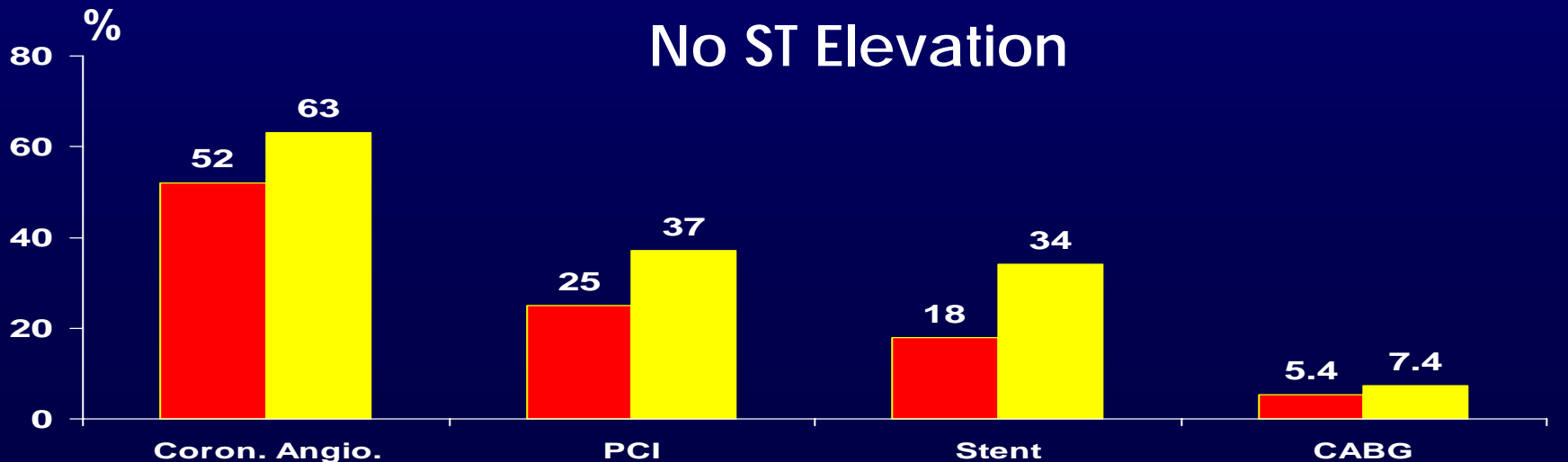
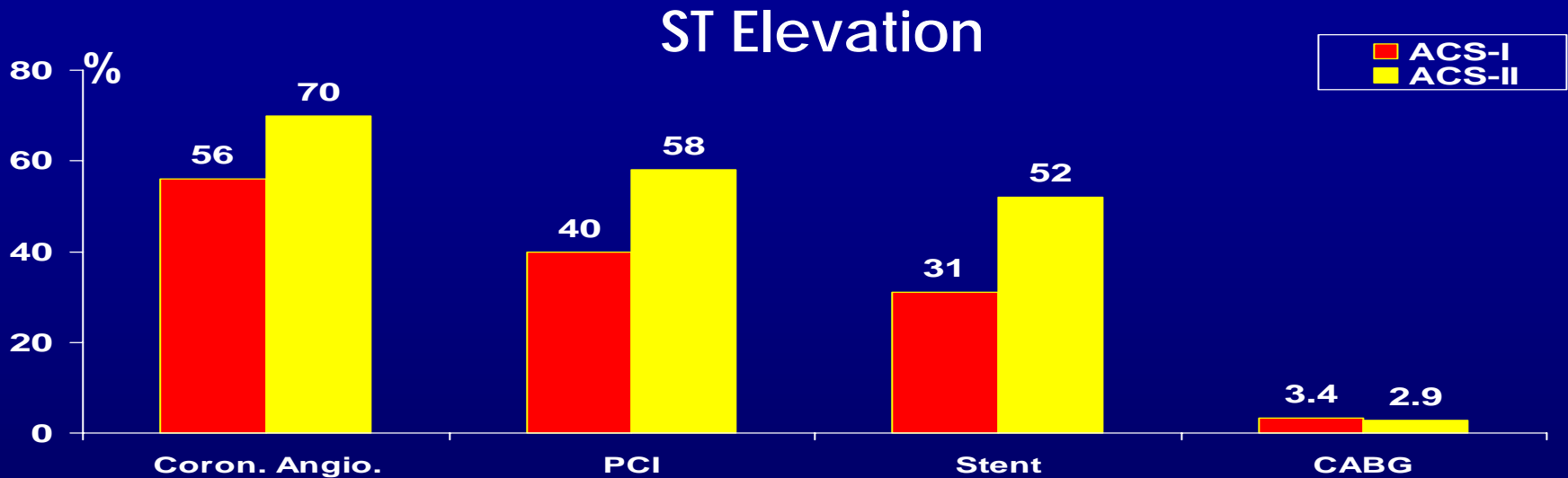
ST Elevation



No ST Elevation



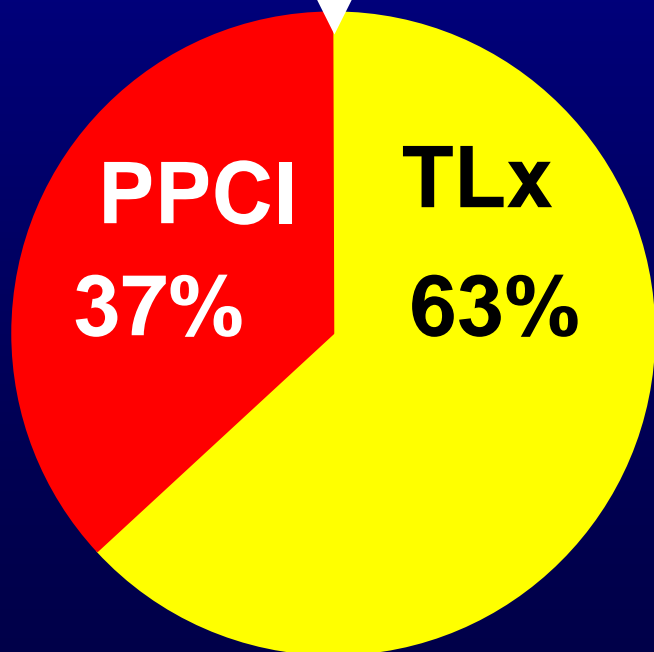
In-hospital Coronary Procedures



Primary Reperfusion for ST \uparrow ACS

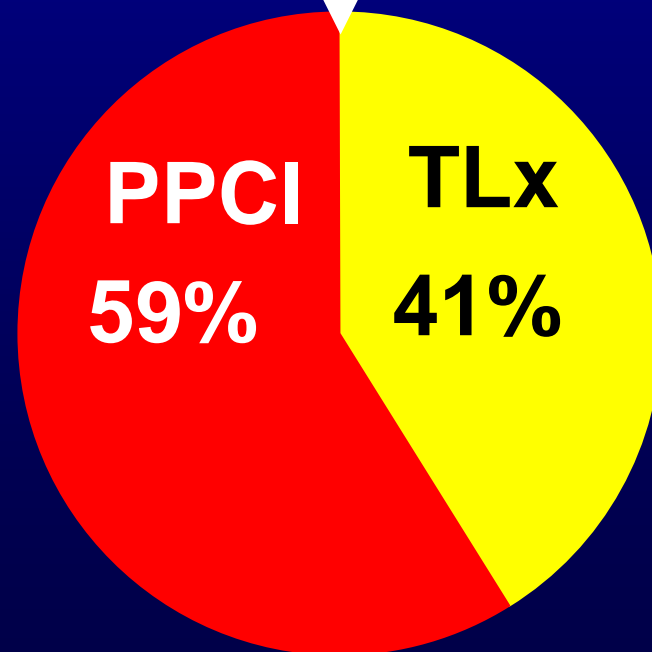
ACS-I

56%

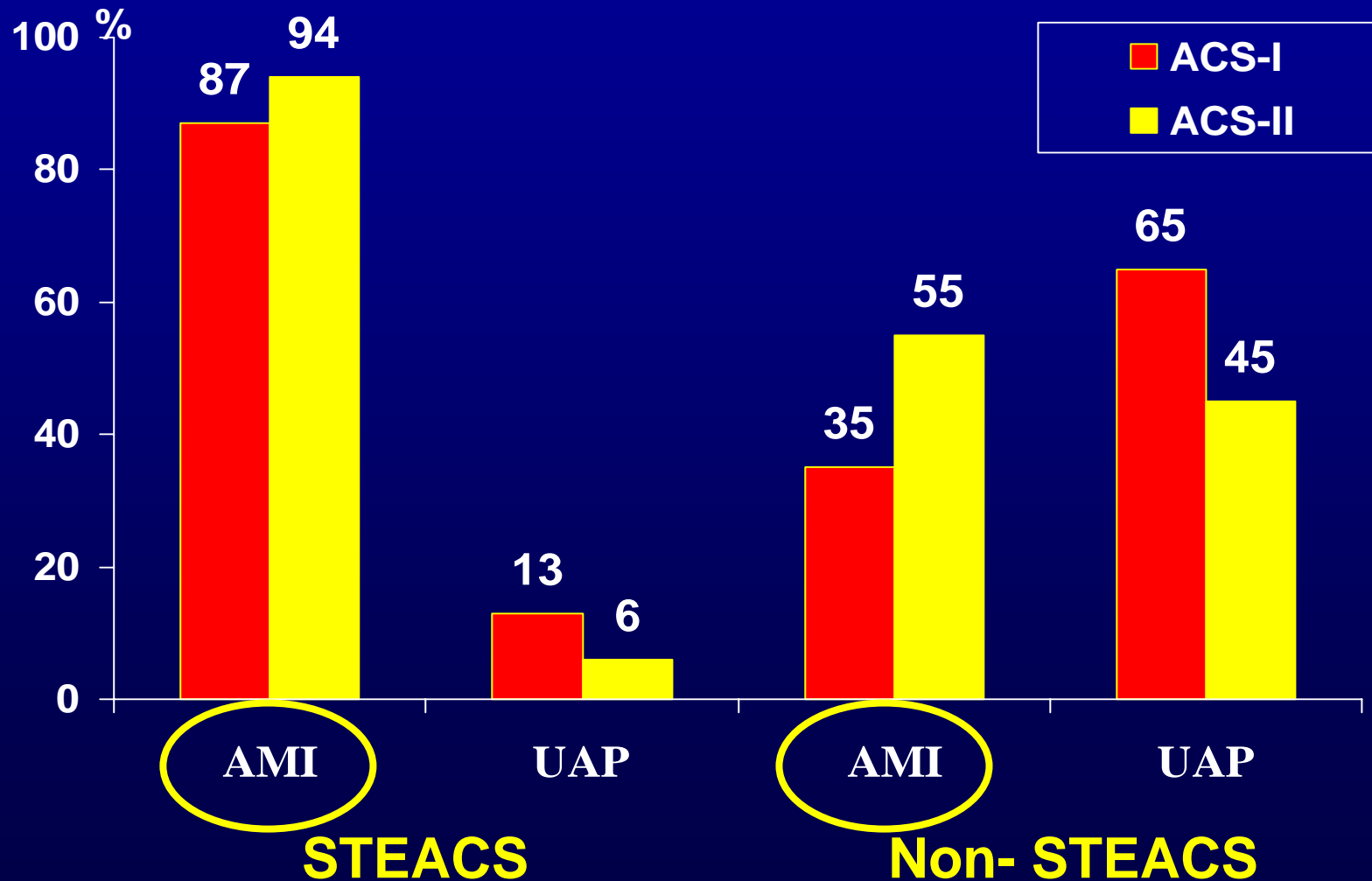


ACS-II

64%

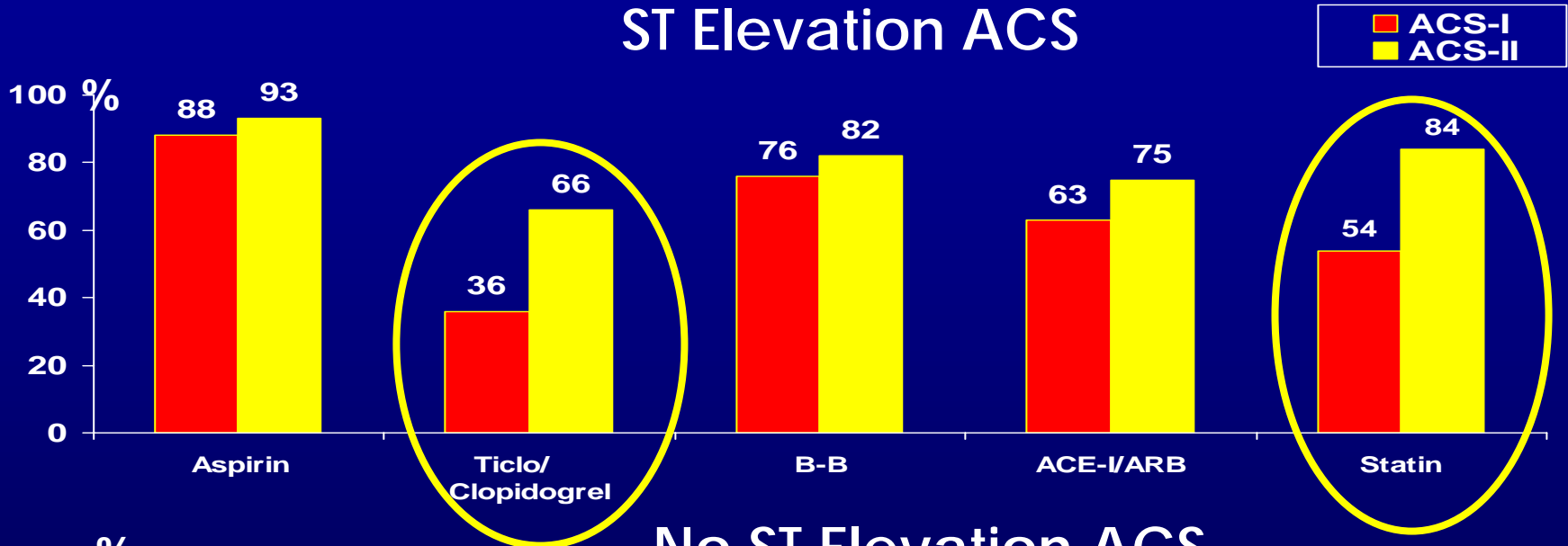


Discharge Diagnosis

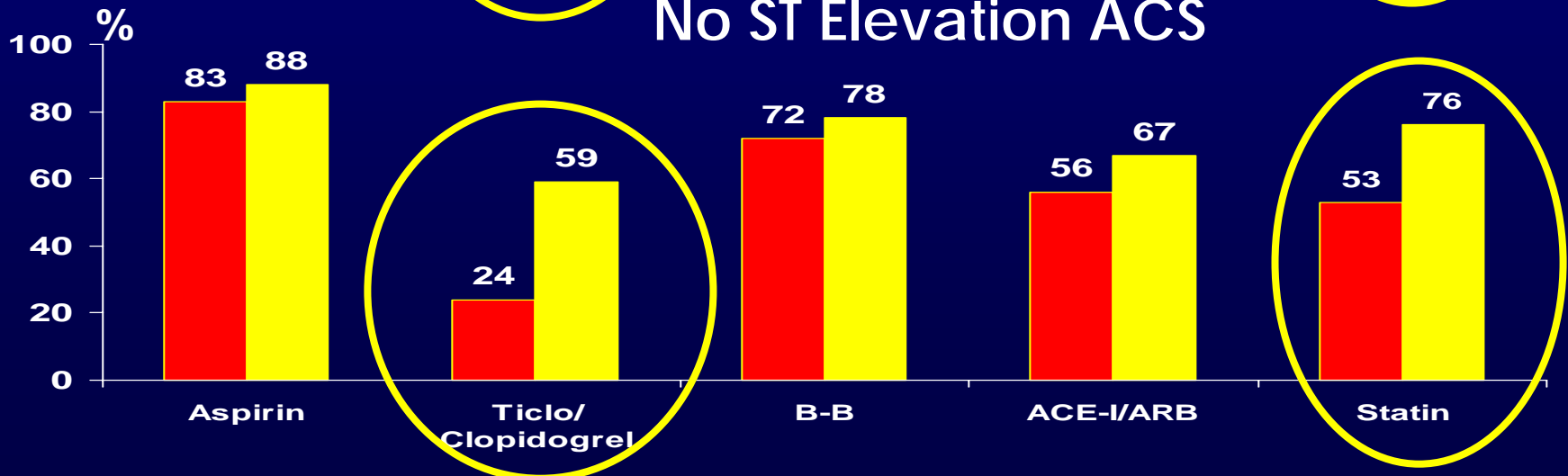


Treatment at Discharge

ST Elevation ACS

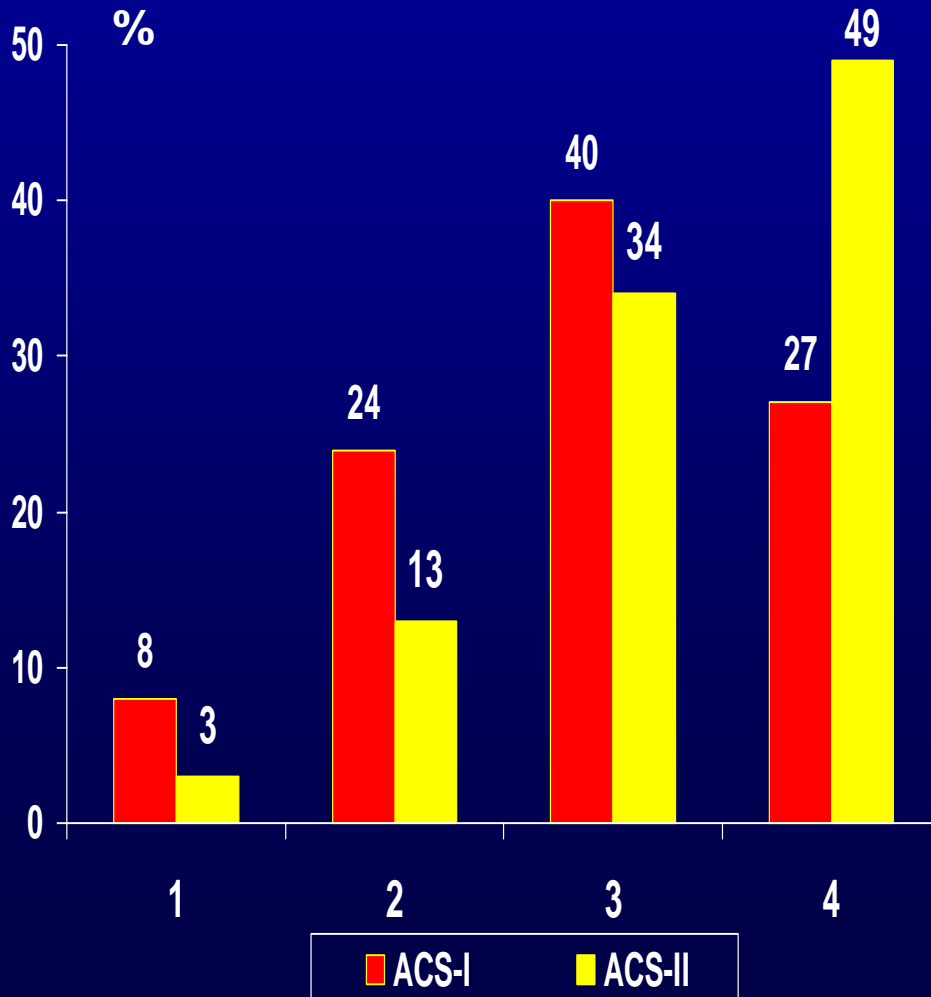


No ST Elevation ACS

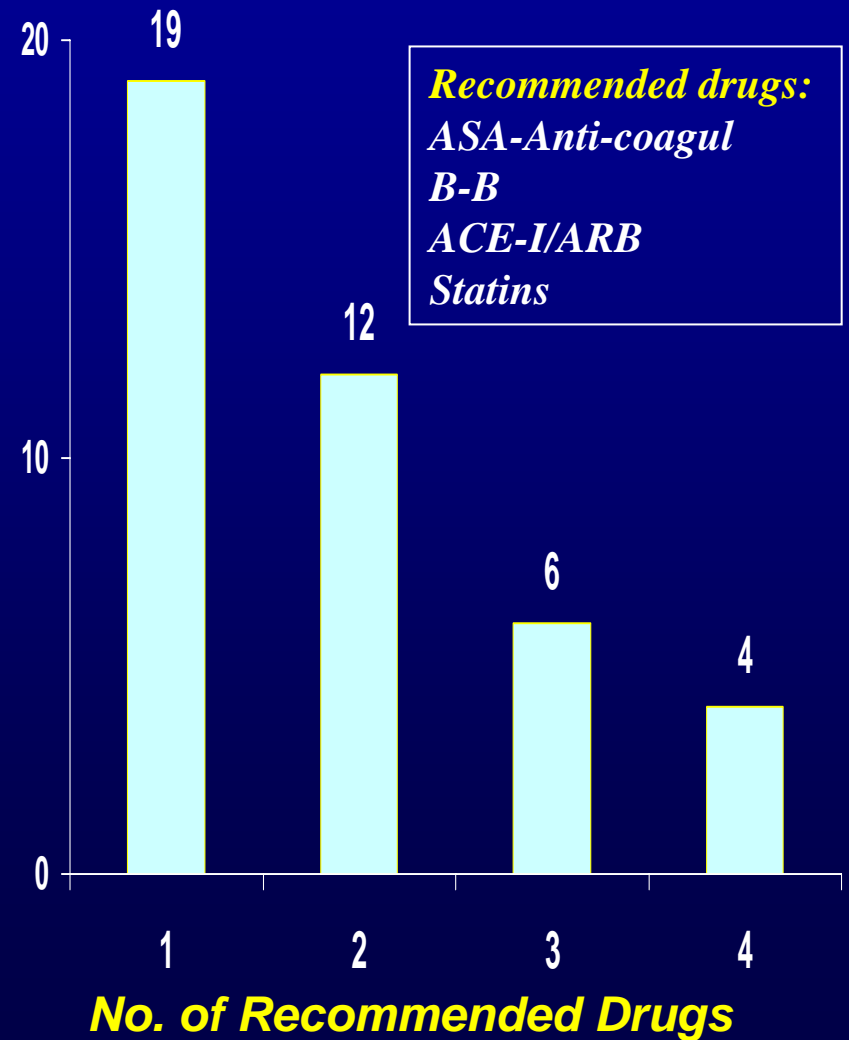


EHS – ACS-II

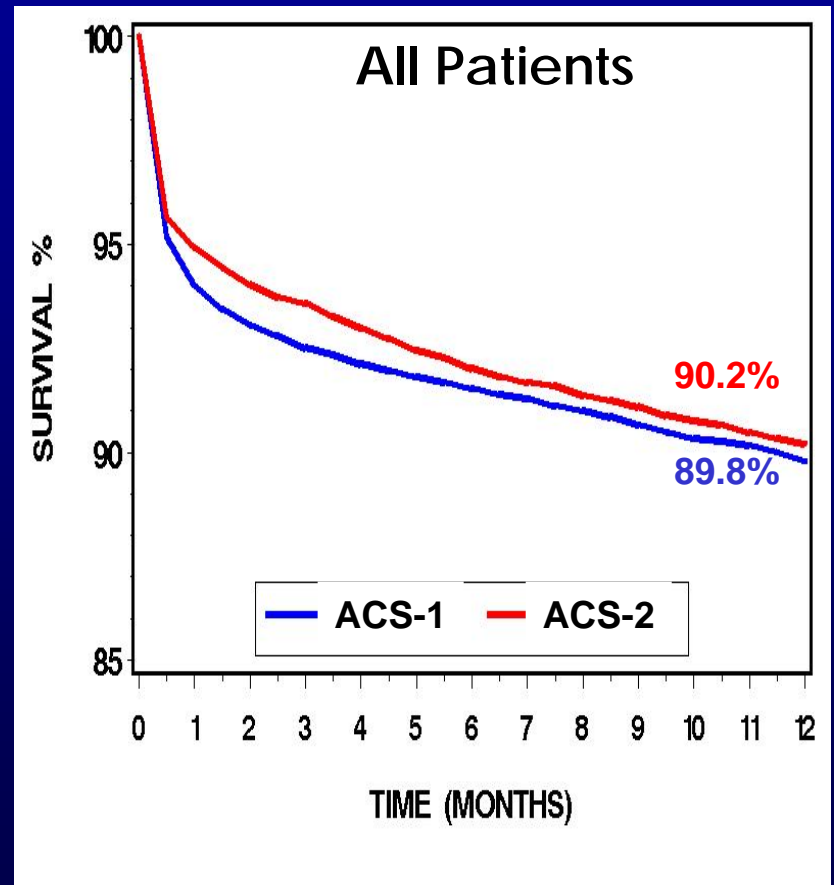
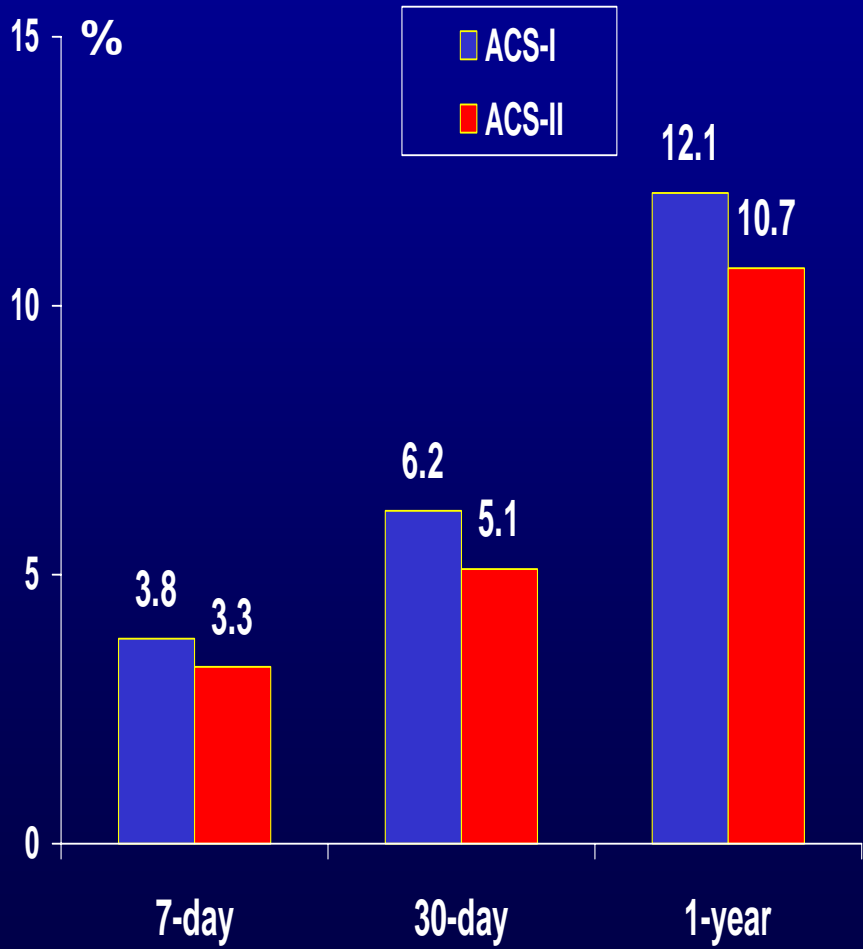
Number of Recommended Drugs at Discharge



1-Year Mortality by Number of Recommended Drugs Prescribed to Hospital Survivors – ACS-II



Mortality



Kaplan-Meier Survival Curves

Multivariable Analysis of Mortality

	ACS-I (n=10484)	ACS-II (n=6385)	P- Value
<i>In-hospital Mortality</i>			
n (%)	518 (4.9)	257 (4.0)	0.006
Adjusted OR* (95% CI)	1.0	0.86 (0.73-1.01)	0.07
<i>30-Day Mortality</i>			
n (%)	600 (6.2)	310 (5.1)	0.004
Adjusted OR* (95% CI)	1.0	0.85 (0.73-0.99)	0.04
<i>1-Year Mortality</i>			
n (%)	956 (12.1)	590 (10.7)	0.01
Adjusted OR* (95% CI)	1.0	0.91 (0.81-1.02)	0.12

* Adjusted for age, gender, past MI, diabetes, poast CVA, chronic renal failure, hypertension, current and poast smoking, Killip on admission, ECG

Conclusions

1. Two-thirds of patients with ACS were men and they were 7 years younger than women. The frequency of STEMI vs. NSTEMI in ACS patients hospitalized in Cardiac Departments was nearly equal.
2. Patients admitted with ST[↑] ACS ended with the diagnosis of AMI, while those presenting with NST[↑] ACS frequently had the discharge diagnosis of UA.
3. Primary reperfusion for STEMI increased moderately from 56 to 64% in the second survey, with a shift towards increasing use of Primary PCI.

Conclusions

4. Better adherence to management and treatment guidelines were noted in ACS-II vs. ACS-I, conducted in 2000, particularly in 34 centers which participated in both surveys.
5. **The major limitation** of both ACS surveys is that the data represent the **characteristics, management and outcome** of the patients of the participating centers only, and **cannot be generalized**.
6. **Therefore, more centers in each country** should be encouraged to join the Euro Heart Survey Program in order to increase the countries' **representativeness in the Euro Heart Surveys/Registries Program**.

• ACS-II EXPERT COMMITTEE

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Marteen Simoons – Past Chairman, Euro Heart Survey Program

PARTICIPATING COUNTRIES

Country	No. of Patients	Country	No. of Patients
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Germany	56	Tunisia	32
Greece	383	Turkey	30
Hungary	70	Ukraine	65
Israel	592	United Kingdom	42

EXTRA

Background (1)

- ♥ **Acute Coronary Syndromes (ACS)**
which include persistent ST-segment elevation MI (**STEMI**), Non-ST-segment elevation MI (**NSTEMI**) and Unstable Angina (**UA**), are the most frequent reason for cardiac hospitalizations and the **major cause of cardiovascular morbidity and mortality in Europe.**

Background (3)

- ♥ The **First Euro Heart Survey on ACS** was conducted in 25 European countries **in 2000-2001**.
- ♥ Due to changes in the **definition of AMI**, **pharmacological advances** and **refinement of mechanical procedures**, a **second ACS survey (ACS-II)** was conducted in 32 EHS member countries **in 2004**.

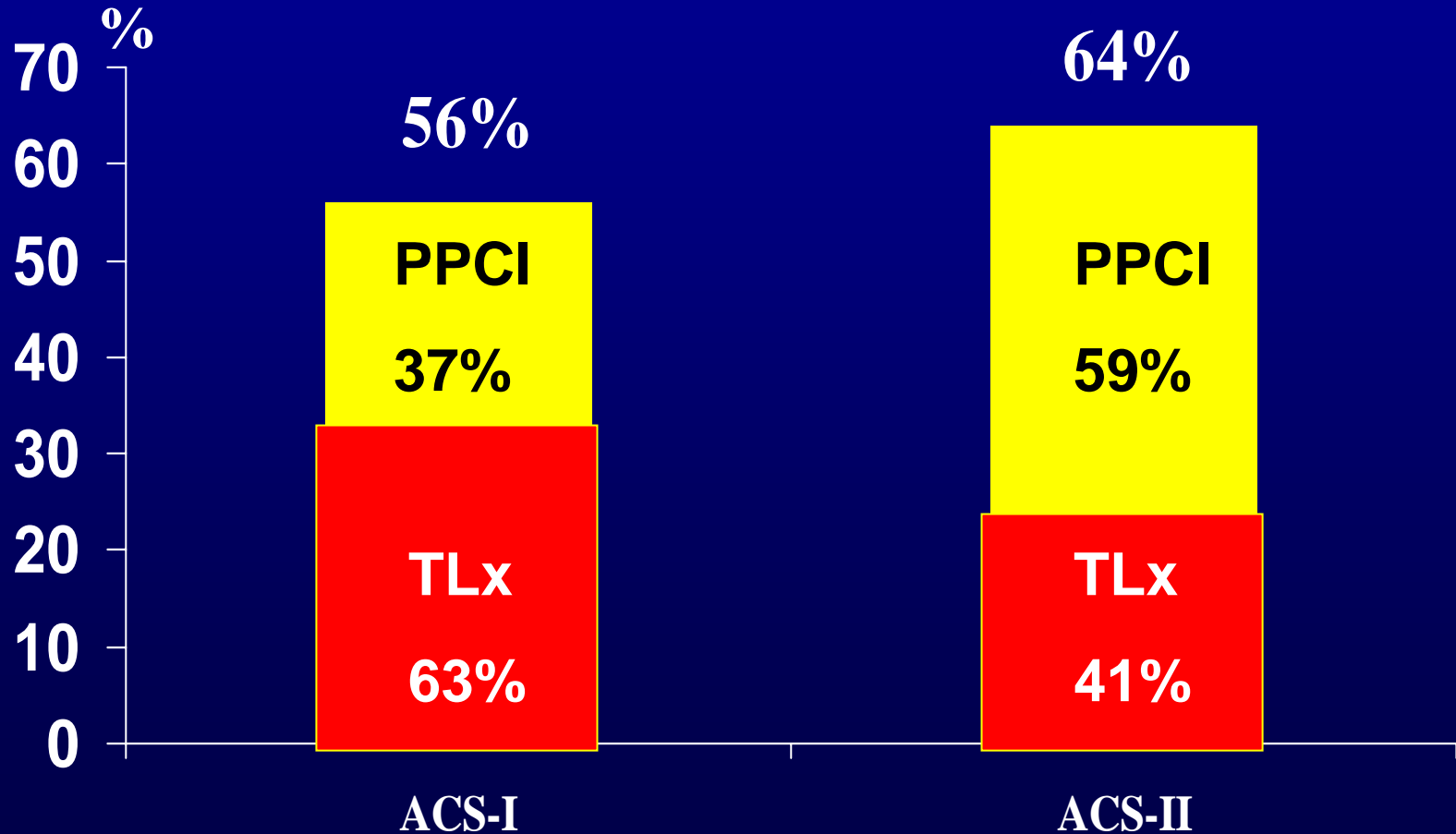
Place of Hospitalization

	Proportion of Patients Hospitalized in Respective Medical Institutions		
	Academic Institutions (%)	Cath. Lab. Facilities (%)	On-site Cardiac Surgery (%)
ACS-I (2000)	65	77	57
ACS-II (2004)	53	73	37

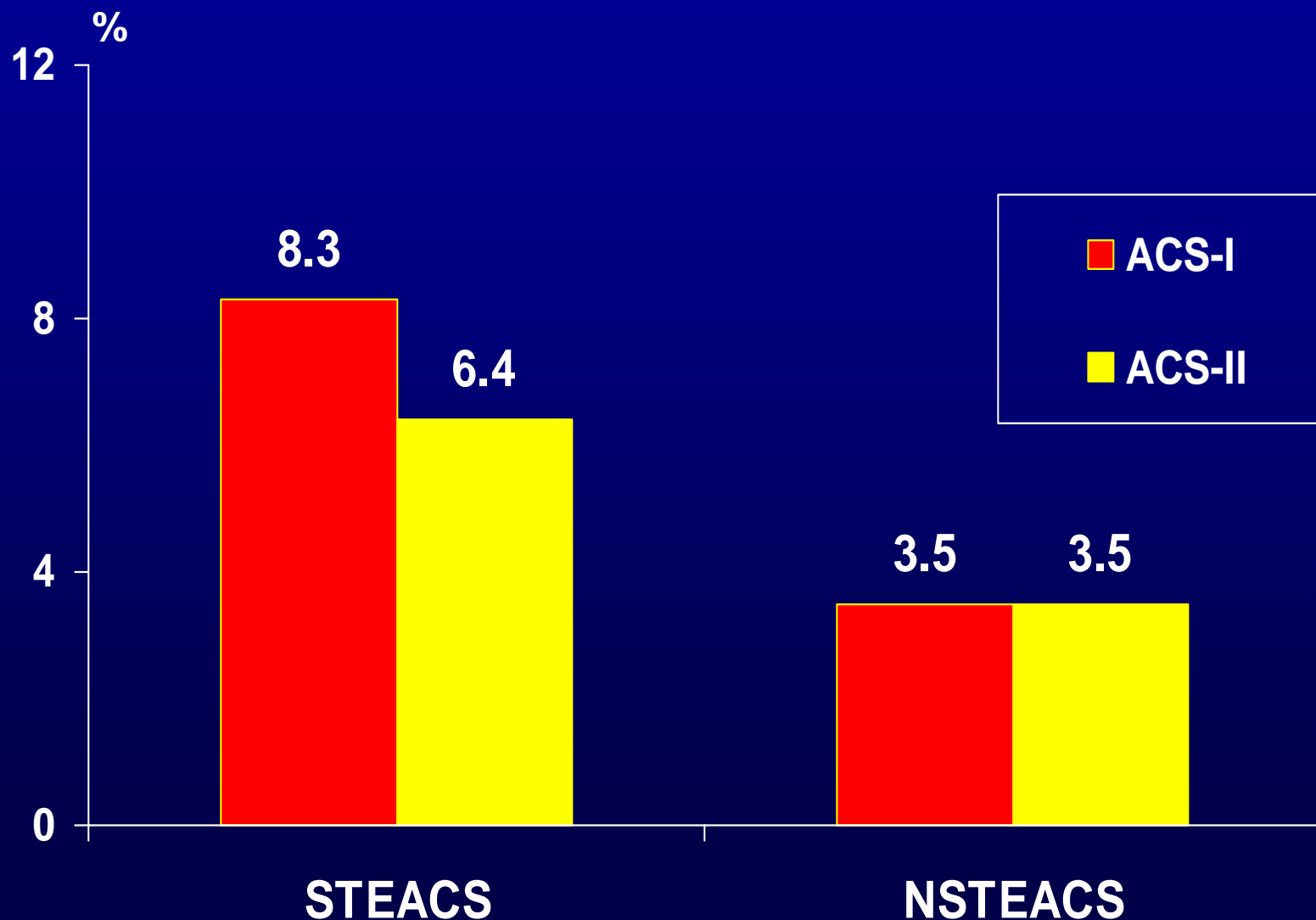
Mode of Transportation to Hospital

	ACS-I %	ACS-II %
Mobile ICCU	25	23
Regular Ambulance	41	38
Independent (Private car)	29	37
In-patient	5	2

Rate and Type of Primary Reperfusion for STEMI



30-Day Mortality by Type of ACS



Regional Variations Patient Characteristics

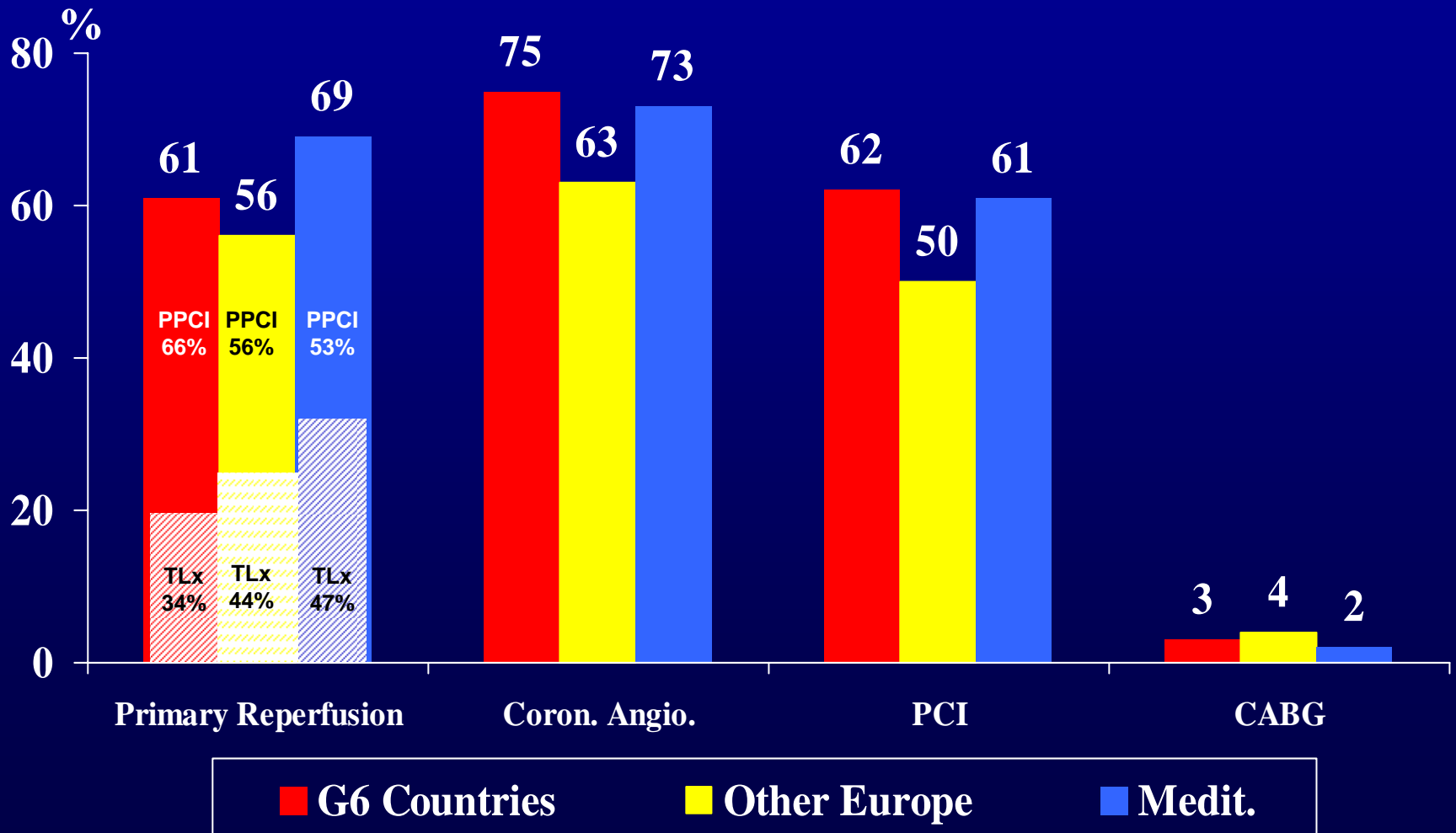
	G6 Countries N=2576 (%)	Other Europe N=2395 (%)	Mediterr. Basin N=1385 (%)
Age (yrs) mean±SD	65.6 ±12.6	64.6 ±12.7	63.2 ±13.1
Gender (M/F)	72/28	65/35	75/25
Previous MI	22	25	23
Diabetes	25	22	29
Current Smokers	35	36	39

Regional Variations Type of ACS and Discharge Diagnosis

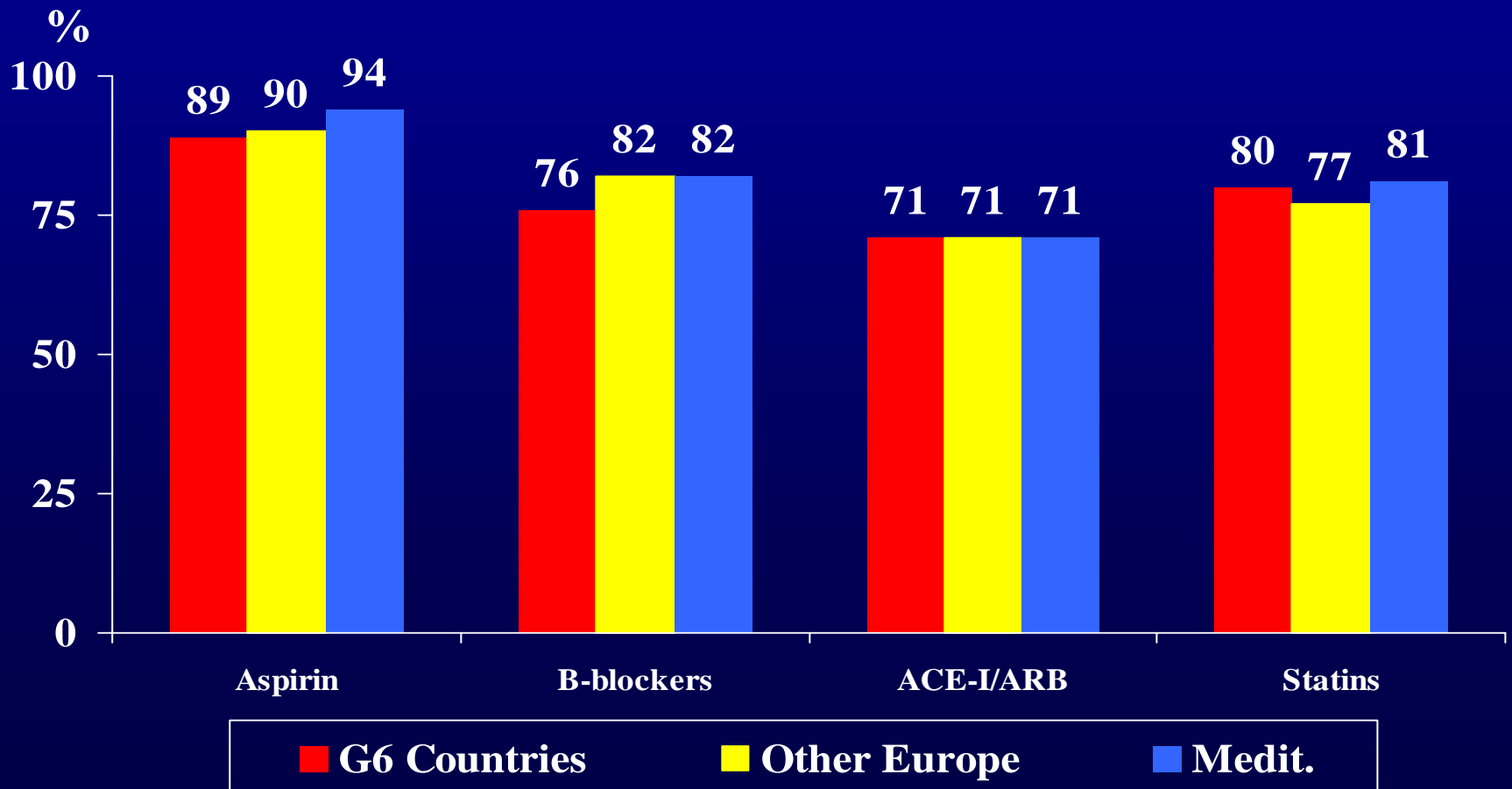
	G6 Countries N=2576 (%)	Other Europe N=2395 (%)	Mediterr. Basin N=1385 (%)
ST↑	48	47	48
Non ST↑	42	48	47
Undetermined ECG	10	5	5
Discharge diagnosis			
AMI	77	70	79
UAP	23	30	21

Regional Variations

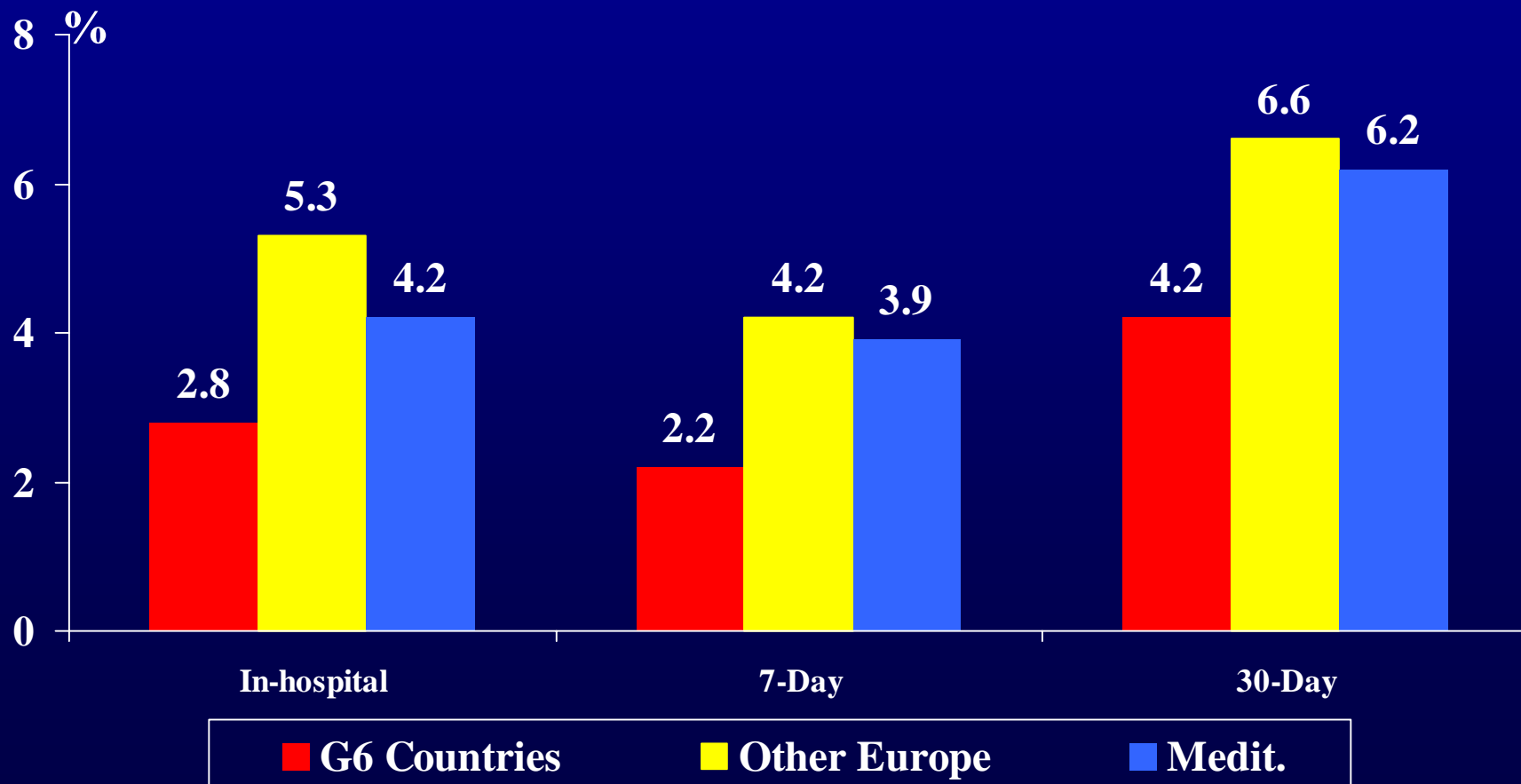
Reperfusion and Coronary Interventions for ST \uparrow ACS



Regional Variations Treatment at Discharge



Regional Variations Crude Mortality Rates



Comparison with Other Registries

STE ACS - Patients Characteristics

	ACS-II (EHS)	GRACE (Eur Count)	NRMI (N. Amer.)	ACSIS (Israel)
# Pts	6356	6505	1247*	5536
ST ↑ (%)	48	42	29	48
Period	2004	1999-2002	2000-2002	2004
Men/Women	74/26	72/28	60/40	74/26
Age (mean)	65±13	64±13	69	62±13

* Hospitals

Comparison with Other Registries

STE ACS Treatment

	ACS-II	GRACE	NRMI	ACSIS
ADMISSION:				
Aspirin	97	94	88	96
β-blockers	83	79	78	83
ACE-I	75	68	36	74
DISCHARGED:				
Aspirin	93	90	89	95
β-blockers	82	73	83	82
ACE-I	74	64	58	74
Statins	83	49	87	85

Comparison with Other Registries STE ACS Reperfusion

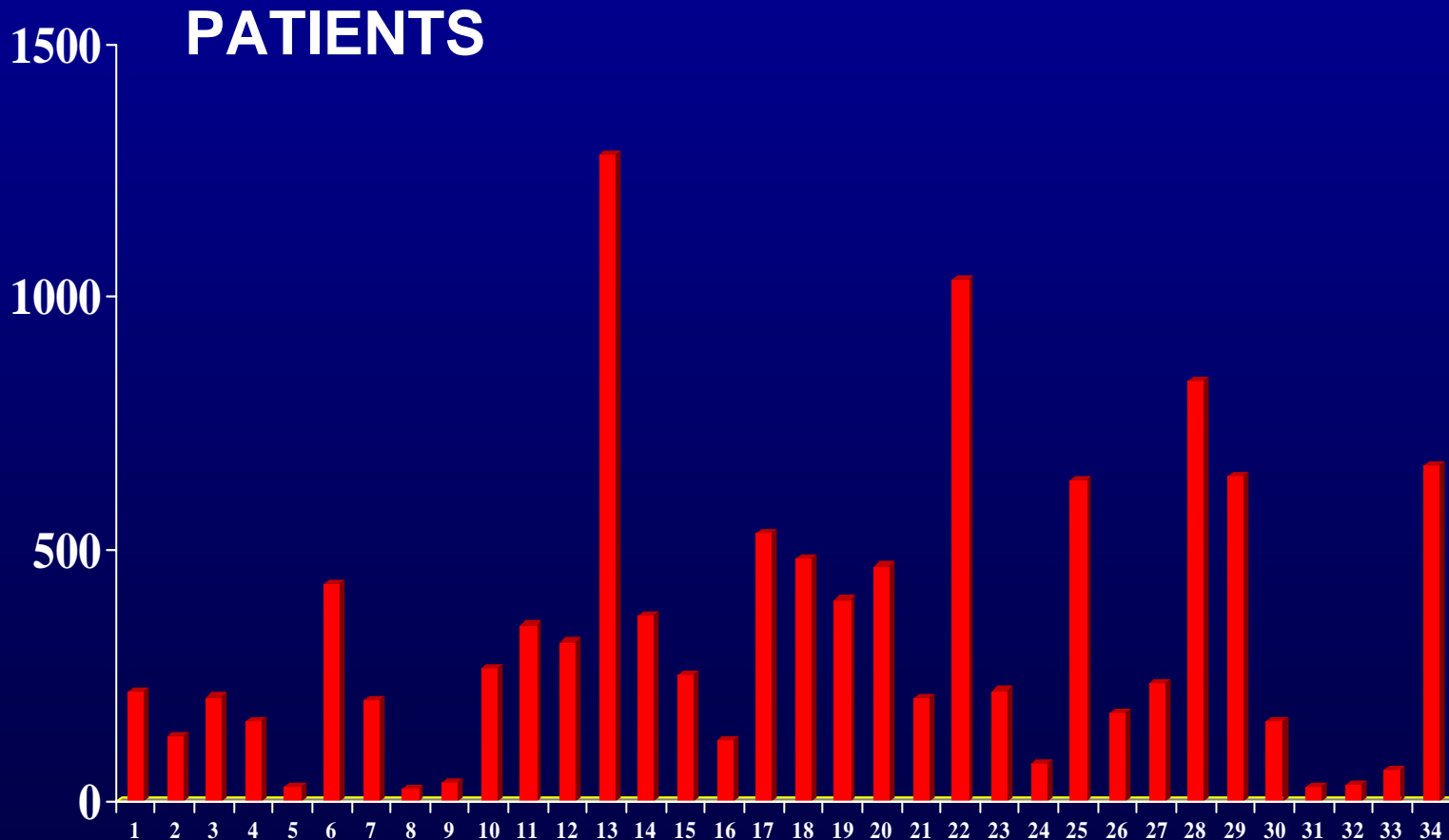
	ACS-II	GRACE	NRMI	ACSIS
Prim. Reperf.	61	65		60
PPCI	36	29		41
TLx	25	39		19
Coron. Angio.	70	53	75	81
PCI	57	47	54	70
CABG	3	3	9	3

Comparison with Other Registries STE ACS - Mortality

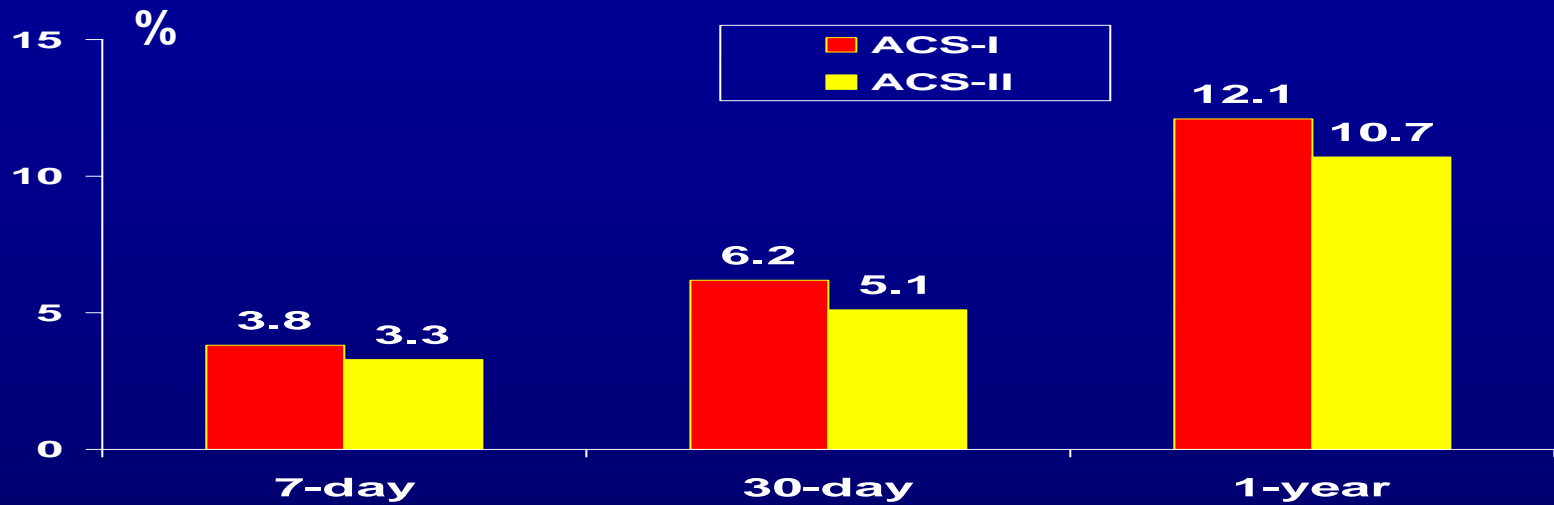
	ACS-II	GRACE	NRMI	ACSIS
In-hospital	4.0	7.8	14.3	5.5
7-day	4.4	--	--	4.6
30-day	5.1	12.1*	--	6.7

* 6 months

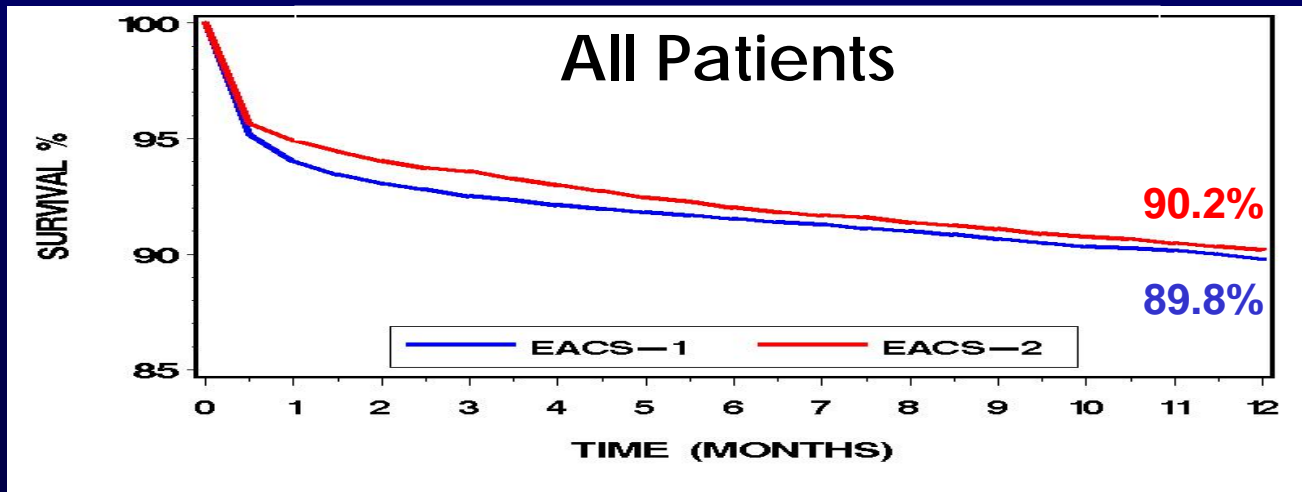
PARTICIPATING COUNTRIES



Mortality



Kaplan-Meier Survival Curves



1-Year Death Among STEMI Patients by Use of Primary Reperfusion

Primary Reperfusion	No.	%
PPCI	1001	7.3
TLx	682	8.5
No Primary Reperfusion	924	16.1
All	2607	10.7

1-Year Death Among NSTEMI Patients by Use of Coronary Angiography

Coronary Angiography	No.	%
≤ 24 hours from admission	574	4.5
> 24 hours (late)	995	5.6
Not done during the index hospitalization	914	17.3
All	2483	9.5

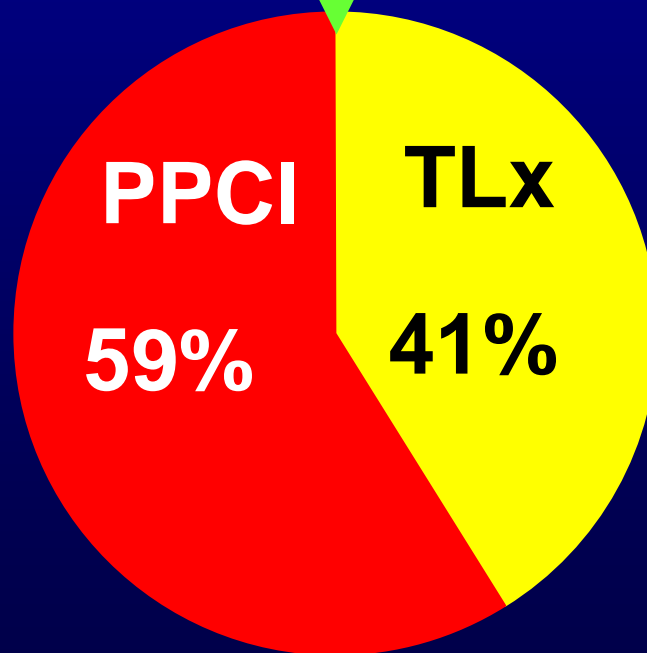
Participation in Clinical Trials and 1-Year Death

Participation in Clinical Trials	No.	%
Yes	445	6.5
No	4719	11.2

Primary Reperfusion for STE ACS

N=3004 Pts

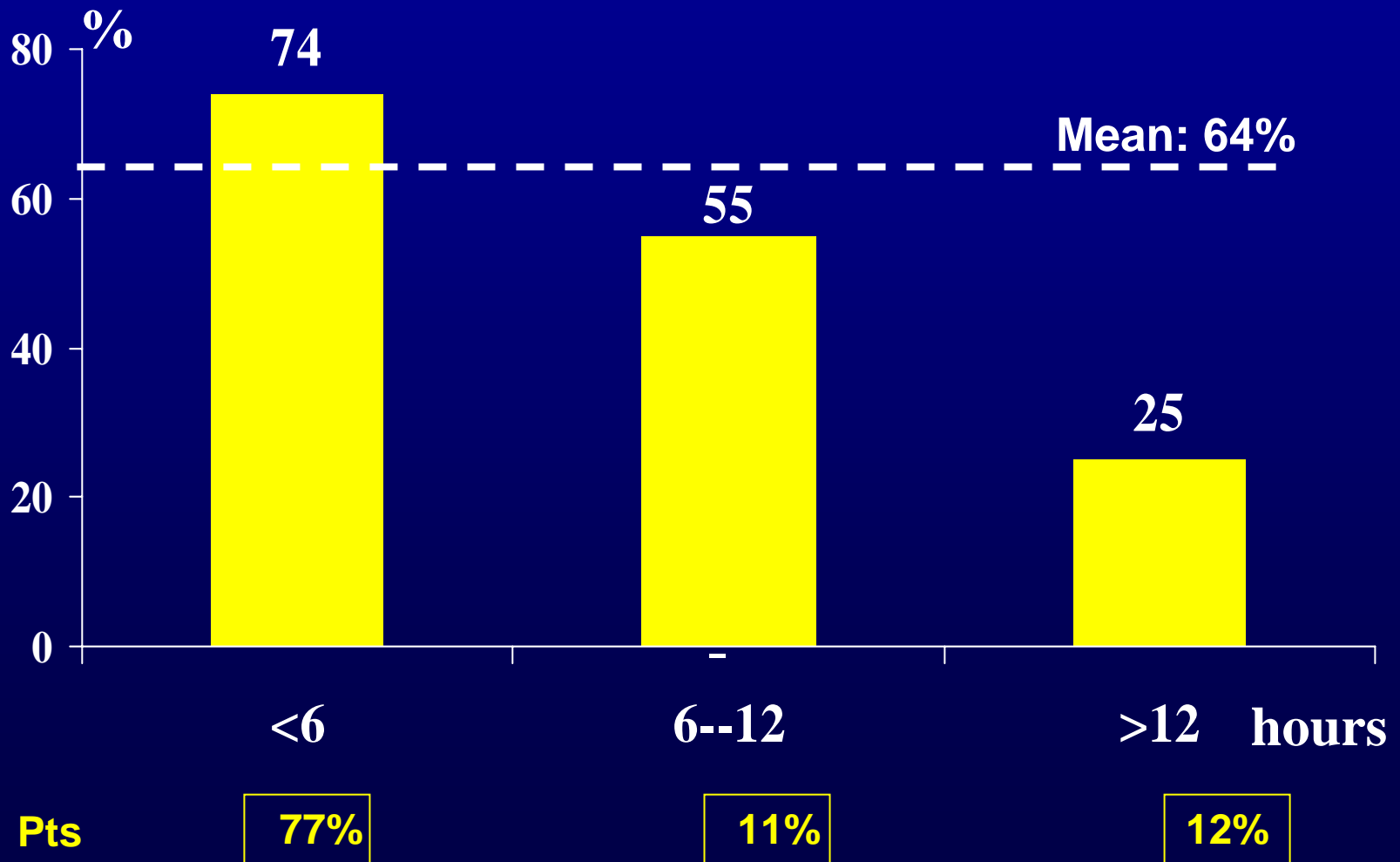
64%



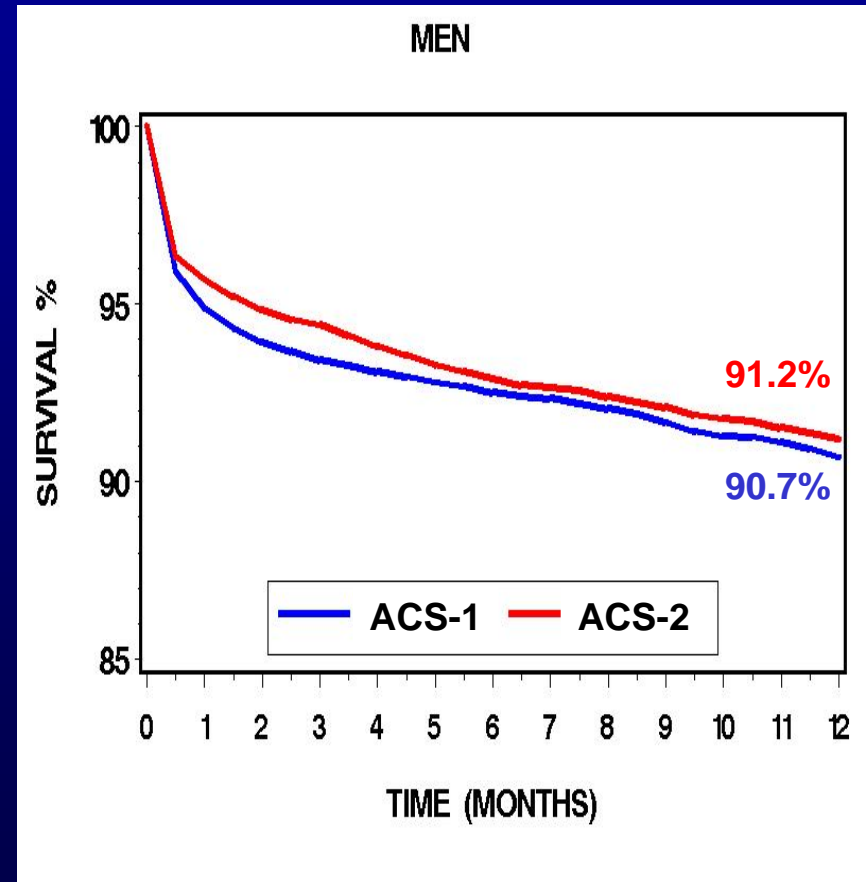
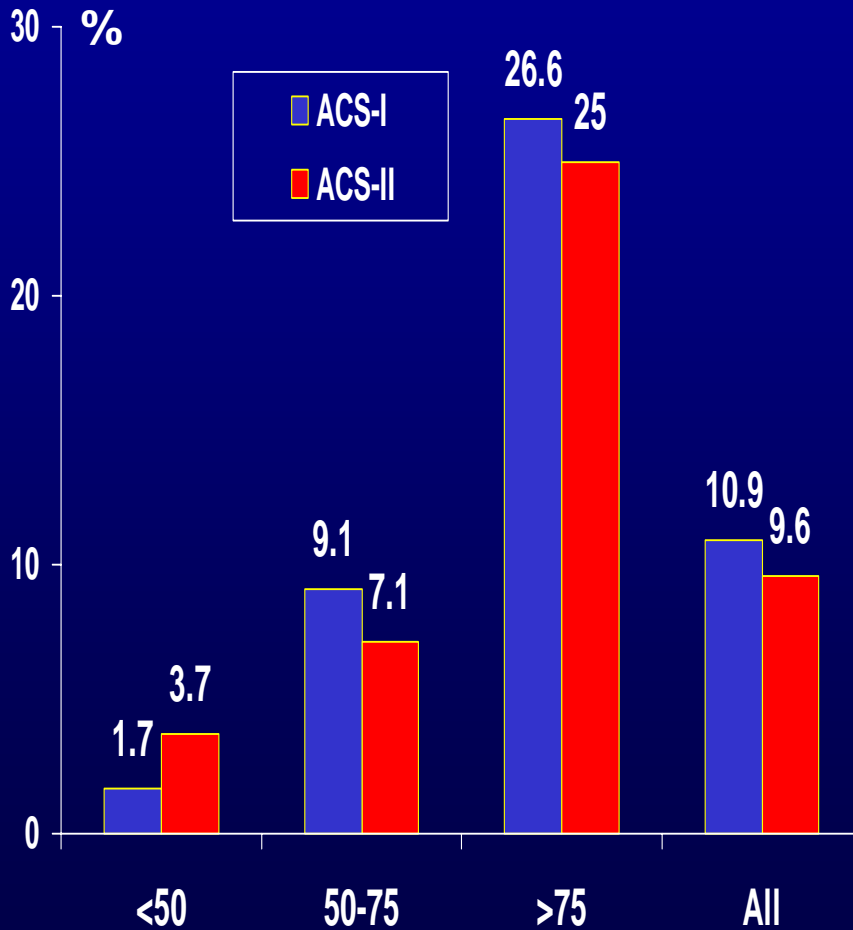
STE ACS - Reasons for not Using Primary Reperfusion

	Women (n=361) (%)	Men (n=723) (%)
Late arrival	27	31
Early ST resolution	12	12
Uncertain diagnosis	9	12
TLx/PCI-contraindicated	8	6
Advanced age	6	2
Other	29	27
Missing	9	10

Rate of Primary Reperfusion by Time Delay from Onset to Hospital Arrival

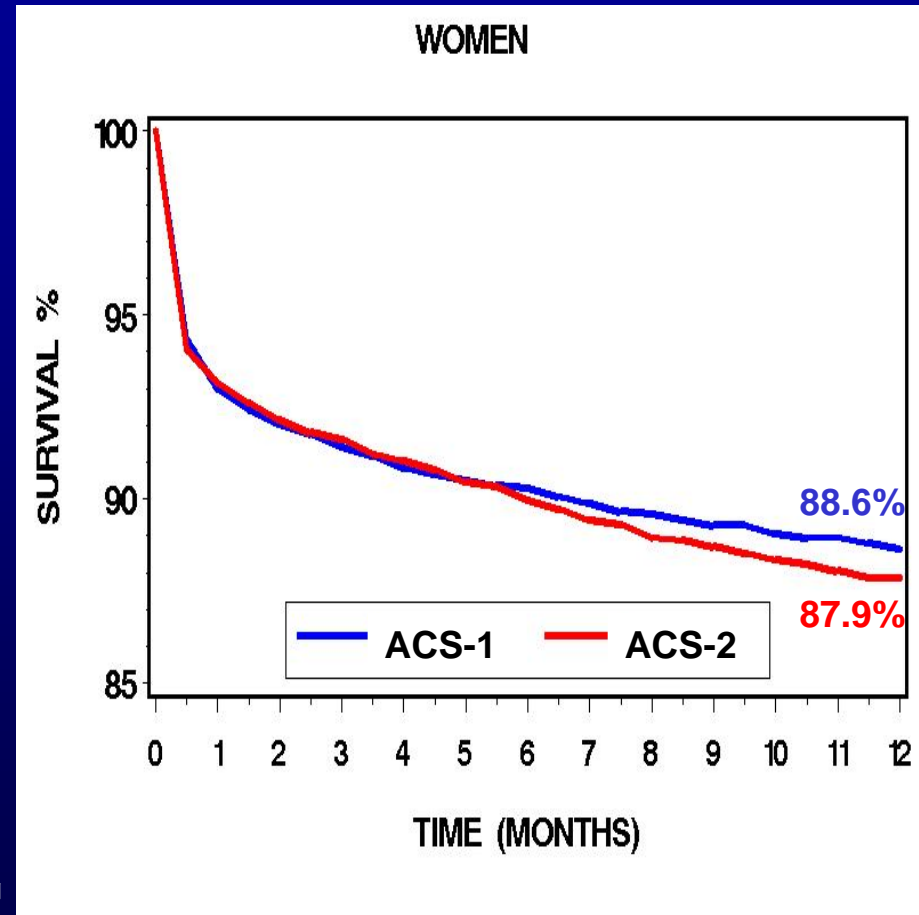
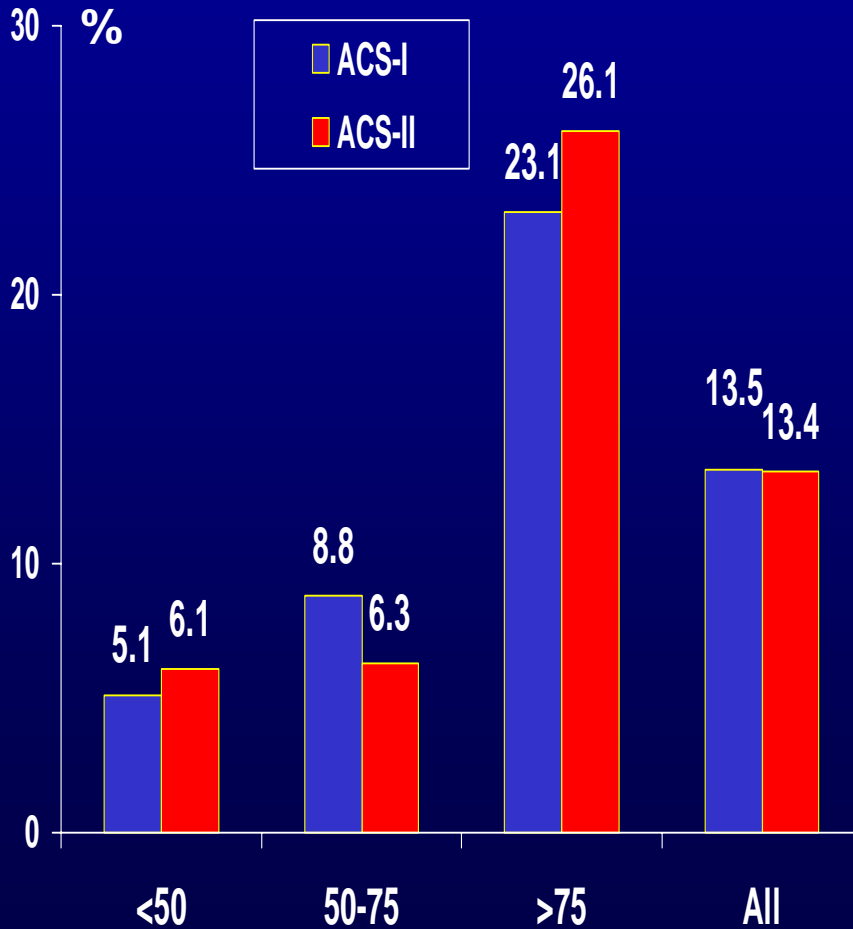


1-Year Death - Men



Kaplan-Meier Survival Curves

1-Year Death - Women



Kaplan-Meier Survival Curves

1-Year Death by Disability Status on Admission

Disability Status	No.	%
Normal	3351	6.8
Mild Disability	895	17.6
Severe Disability	326	32.8