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ACSIS 2008 Acute Coronary Syndrome Israeli Survey

Publication 319

ACSIS 2008

Acute Coronary Syndrome Israeli Survey

March 15 - May 15, 2008 - National Survey

SURVEY FINDINGS AND TEMPORAL TRENDS

The Israel Heart Society

The Working Group on Intensive Cardiac Care of the Israel Heart Society

The Working Group on Interventional Cardiology of the Israel Heart Society

The Israel Society for the Prevention of Heart Attacks

Publication 319

The Israel Center for Disease Control (ICDC)
Ministry of Health

April 2009

ACSIS 2008

Acute Coronary Syndrome, Israel 2008

Survey Associates

The Israel Heart Society (IHS)

The Working Group on Intensive Cardiac Care
The Working Group on Interventional Cardiology

The Israel Center for Disease Control (ICDC), Ministry of Health

The Israel Society for the Prevention of Heart Attacks

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The survey was conducted with the support of:

The Israel Medical Association (IMA)
The Israel Center for Disease Control (ICDC)
The Israel Society for the Prevention of Heart Attacks (ISPHA)

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Introduction

Dear Friends,

We are proud to present this comprehensive summary of the results of the 2008 ACSIS registry, performed by the ISPHA under the leadership of Prof. Shlomo Behar. The survey was organized by the Working Group on Intensive Cardiac Care, led by Prof. Arie Roth and Dr. Shaul Atar, and under the auspices of the Israel Heart Society .

The ACSIS program has been the most significant cardiology survey in Israel since 1992. By performing surveys every 2 years we are able to detect temporal changes in the presentation and management of patients with acute coronary syndromes and to use the information to improve the care of cardiac patients.

Careful analysis of the results of the ACSIS surveys demonstrates a significant improvement in patient care in cardiac intensive and intermediate care units over the years, increasing use of revascularization techniques, better adherence to guidelines and an impressive decrease in mortality from acute MI, this despite the fact that the patients are older and sicker than ever before!

The Israel Heart Society is extremely proud of the excellent cooperation between each and every cardiology department in Israel, which yielded this very high and complete level of information, unavailable in most developed countries.

We would like to recognize and thank all those dedicated individuals who worked so hard to make this project a reality. In 26 medical centers in Israel, physicians, nurses and coordinators worked day and night, not only to provide the best medical care for patients with acute MI and acute coronary syndromes, but also to collect the information that is summarized here. We are grateful to each and every one of them.

The registry could not have materialized without the support of the Israel Ministry of Health, represented by the Israel CDC, and without generous support from industry, for which we are all very grateful. We are also grateful for the support provided by the Israel Medical Association, chaired by Dr. Yoram Belashar and Adv. Lea Vafner.

Many thanks indeed to all those who contributed to this project. We trust that this booklet will provide interesting and exciting information on the management of acute coronary syndromes in Israel.

Prof. Basil Lewis
President
Israel Heart Society

Prof. D Zahger
General Secretary
Israel Heart Society

Message from the Israel Working Group on Intensive Cardiac Care

Dear Colleagues,

It gives us special pleasure to present the results of the bi-annual ACSIS survey, which has become a tradition since it was launched in 1992.

The results reflect the steady improvement in the care and state-of-the-art management of patients who present with acute coronary syndrome in the acute cardiac care units in Israeli medical institutions.

The 2008 ACSIS survey used an innovative form of data collection that was implemented for the first time. It was based on electronic data management and entirely free of paperwork. This could not have been accomplished without the dedicated and committed help of all the leaders of the participating centers, with the financial support provided by our colleagues and supporters from the pharmaceutical industry and the Ministry of Health.

Special thanks are extended to the living spirit and the outstanding leadership of Prof. Shlomo Behar and his staff at The Israel Society for the Prevention of Heart Attacks.

Prof. Arie Roth
Chairman
The Israel Working Group
on Intensive Cardiac Care

Dr. Shaul Atar
Secretary
The Israel Working Group
on Intensive Cardiac Care

Background

The present brochure presents data from the 9th Biennial National Survey on Acute Coronary Syndromes (ACSIS 2008), which was carried out in all ICCU's and Cardiac Departments in Israel.

The biennial surveys, which have been carried out since 1992, have made it possible for the Israel Heart Society, the Israel Center for Disease Control and the Israel Society for the Prevention of Heart Attacks, to follow and evaluate trends in management of patients with ACS in the country.

The great innovation of the current survey is the use of electronic CRF's and data transmission via the Internet, which was achieved with the collaboration of e-Med, allowing the Steering Committee to assess the first results of the survey only 3 months after its completion.

The changes in management during the last two decades are considerable, and so is the improvement in outcome: we have observed a striking reduction in early and late mortality respectively, between the first survey (1992) and the latest survey (2008). As one can see in the present brochures, the medical and management improvements were observed even since the 2000 survey.

During the past decade we have observed a steady increase in the recommendation of medications and a shifting of type of reperfusion therapy from thrombolysis to primary PCI. It should be emphasized that 22 out of the 26 medical centers treating ACS patients in Israel are equipped with catheterization facilities, and there are 10 active cardiac surgery departments in the country, allowing all ACS patients access to modern treatment, independent of their region of residence.

National and international Surveys and Registries have been recognized as essential tools for quality control, for the improvement of patient management, for the assessment of implementation of guidelines in the community, for research and for medical education.

We would like to thank the staff members of all CCU's and Intermediate Wards of all Cardiac Departments, the Israel Center for Disease Control, the e-Med company and the staff of the Coordinating Center of ISPHA, who together have contributed to the success of ACSIS for the benefit of cardiac research and the improvement of medical care of patients with ACS in Israel.

Prof. S. Behar, Survey Coordinator
Israel Society for the Prevention of Heart Attacks
Neufeld Cardiac Research Institute
Sheba Medical Center, Tel Hashomer, Israel

Participating centers

Afula - Central Hae'mek; **Ashkelon** - Barzilai; **Be'er Ya'aqov** - Assaf Harofeh; **Be'er Sheva** - Soroka; **Eilat** - Josephtal; **Hadera** - Hillel Yaffe; **Haifa** - B'nei-Zion, Rambam, Carmel; **Holon** - Wolfson; **Jerusalem** - Bikur Holim, Sha'arei Zedek, Hadassah Mount Scopus, Hadassah Ein Kerem; **Kfar Saba** - Meir; **Nahariyah** - Western Galilee; **Nazareth** - EMMS Hospital, Holy Family; **Netanya** - Laniado; **Petah Tikva** - Rabin Beilinson, Rabin Golda, **Ramat Gan** - Sheba; **Rehovot** - Kaplan; **Tel Aviv** - Sourasky; **Tiberias** - Poriah; **Zefat** - Rebecca Sieff

Foreword

This booklet is the fifth in a series of publications which describe and analyze the results of the National ACS Israeli Survey. This survey (ACSIS 2008) was conducted by the Working Groups on Intensive Cardiac Care and on Interventional Cardiology of the Israel Heart Society, with the support and collaboration of the Israel Center for Disease Control, Ministry of Health. The conducting of the study, data management and analysis were carried out at the coordinating center of the Israel Society for the Prevention of Heart Attacks (ISPHA).

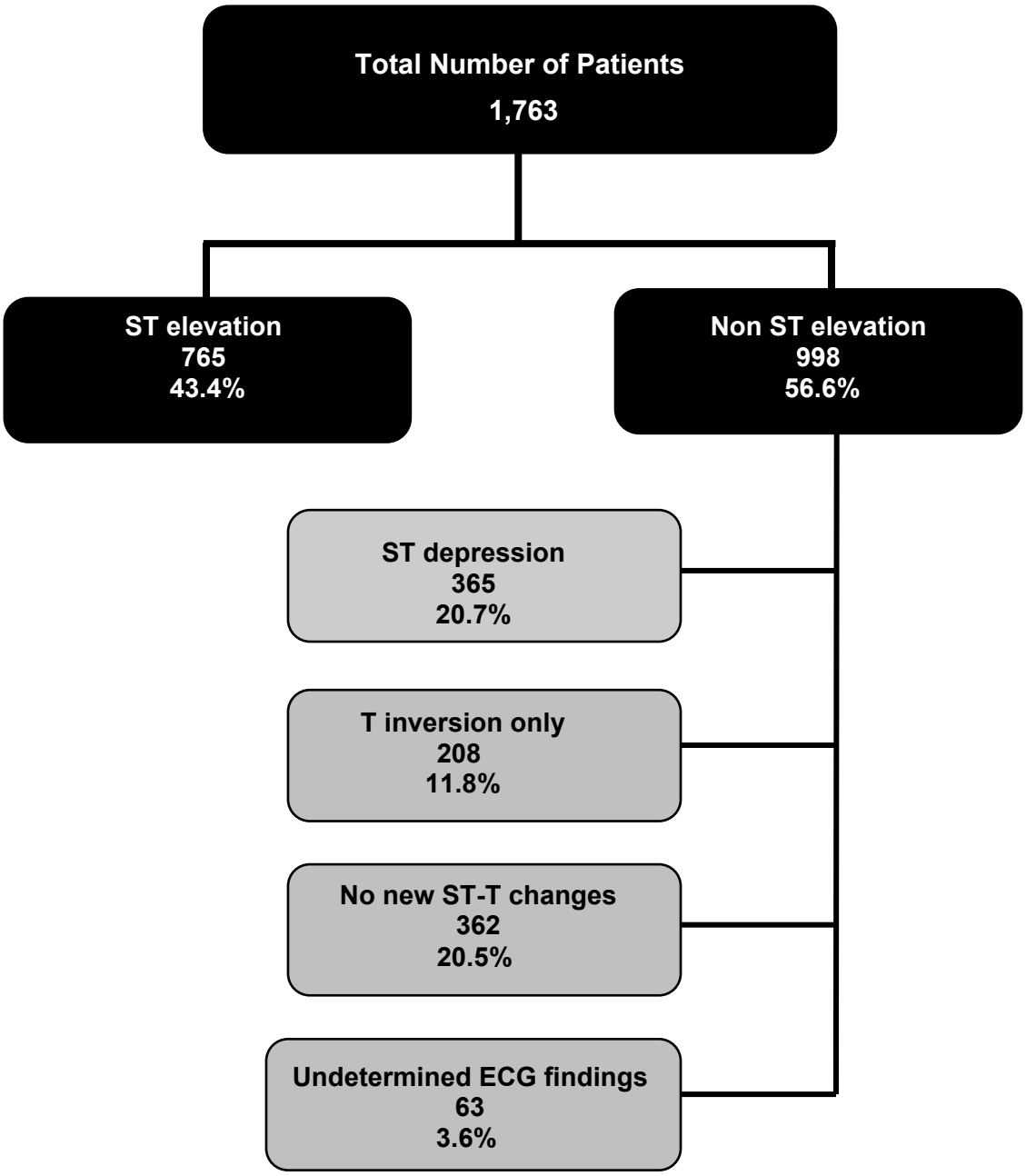
The data in this publication relate to all patients with ACS who were hospitalized in cardiology departments and intensive coronary care wards in 26 medical centers operating in Israel, for a two-month period from mid-March to mid-May, 2008. The first chapter presents data comparing characteristics, care and outcome of patients who presented with ST elevation, with patients who presented without ST elevation. Successive chapters present a comparison of patients with discharge diagnosis of AMI compared to those diagnosed with UAP, and selected gender differences in characteristics, management and outcome. The final chapter presents an analysis of trends with regard to selected findings of national ACSIS surveys conducted between 2000-2008.

Chapter 1:
Acute Coronary Syndrome by ECG on Admission

1.1 Distribution of Patients with ACS by ECG on Admission

A greater proportion of patients with ACS presented with Non-ST elevation (56.6%) than with ST elevation (43.4%). Approximately one-fifth of patients presented with ST depression and a similar proportion with no new ST-T changes. Twelve percent of patients presented with T inversion only, and for 3.6% of patients, the admission ECG was undetermined.

Figure 1.1: Distribution of Patients with ACS by ECG on Admission



1.2 Demographic Characteristics

1.2.1 Age Distribution

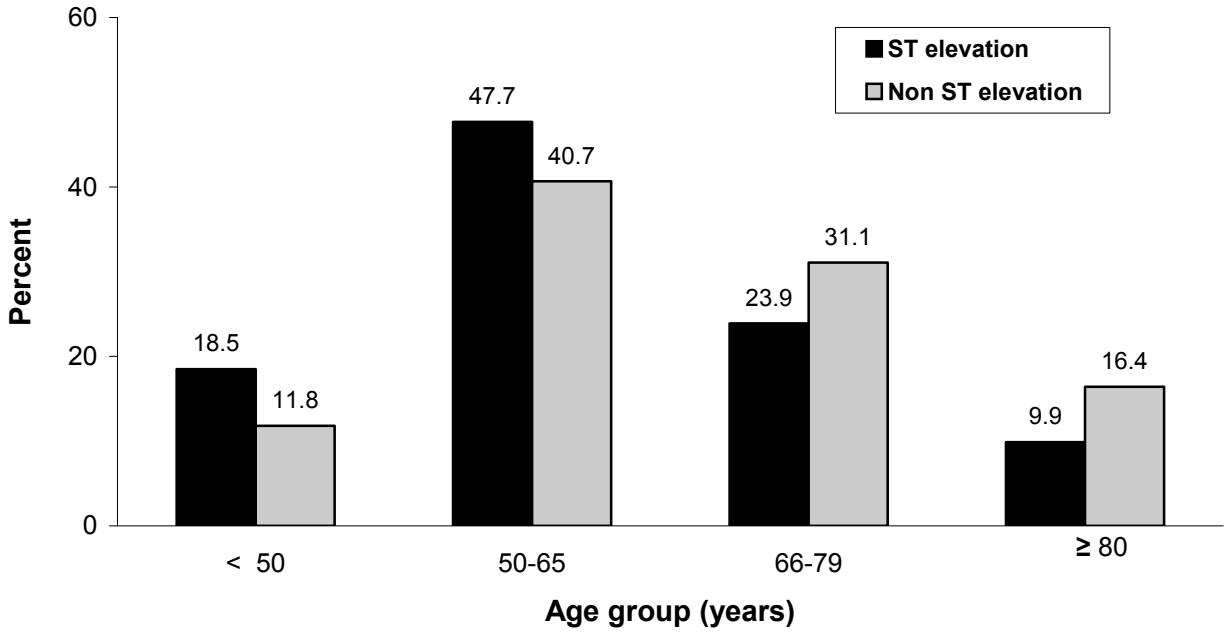
Patients with ST elevation were somewhat younger (mean age: 61.0) than those with non-ST elevation (mean age: 65.1), and the age distribution of patients with ST elevation indicated a greater proportion of younger patients (≤65 years) than that of patients with non-ST elevation.

Table 1.1: Age Distribution

Age group* (years)	ST ↑ (N=765)		Non ST ↑ (N=998)		Total (N=1,763)	
	n	%	n	%	n	%
< 50	141	18.5	118	11.8	259	14.7
50-65	365	47.7	406	40.7	771	43.7
66-79	183	23.9	310	31.1	493	28.0
≥ 80	76	9.9	164	16.4	240	13.6
Mean age ± SD*	61.01 ± 12.99		65.07 ± 13.13		63.31± 13.22	

*p<0.01

Figure 1.2: Age Distribution



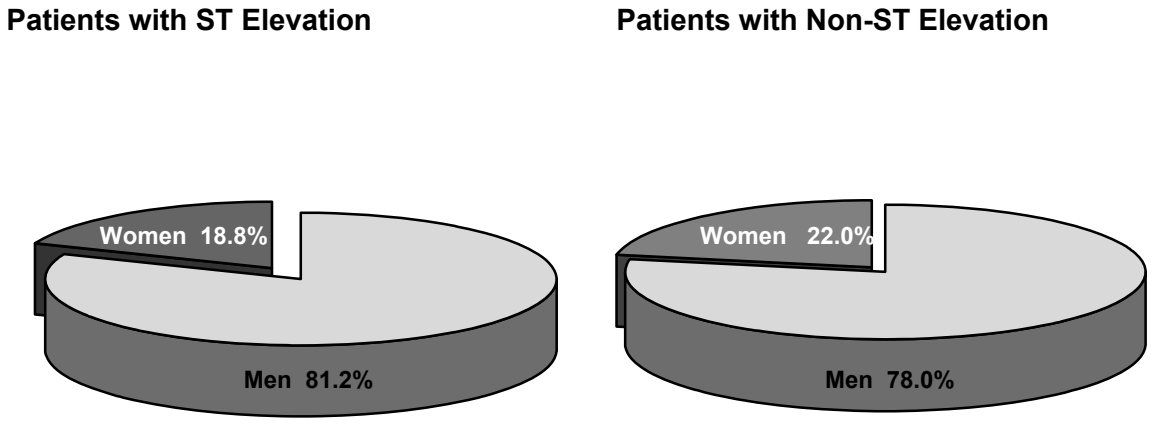
1.2.2 Sex Distribution

In both types of ACS, men predominated (≈ 80%), however the proportion of women was slightly higher in patients with non-ST elevation than in those with ST elevation (22.0% compared with 18.8%).

Table 1.2: Sex Distribution

Sex	ST ↑ (N=765)		Non ST ↑ (N=998)		Total (N=1,763)	
	n	%	n	%	n	%
Men	621	81.2	778	78.0	1,399	79.4
Women	144	18.8	220	22.0	364	20.6

Figure 1.3: Sex Distribution



1.3 Cardiovascular History and Risk Factors

1.3.1 Cardiovascular History

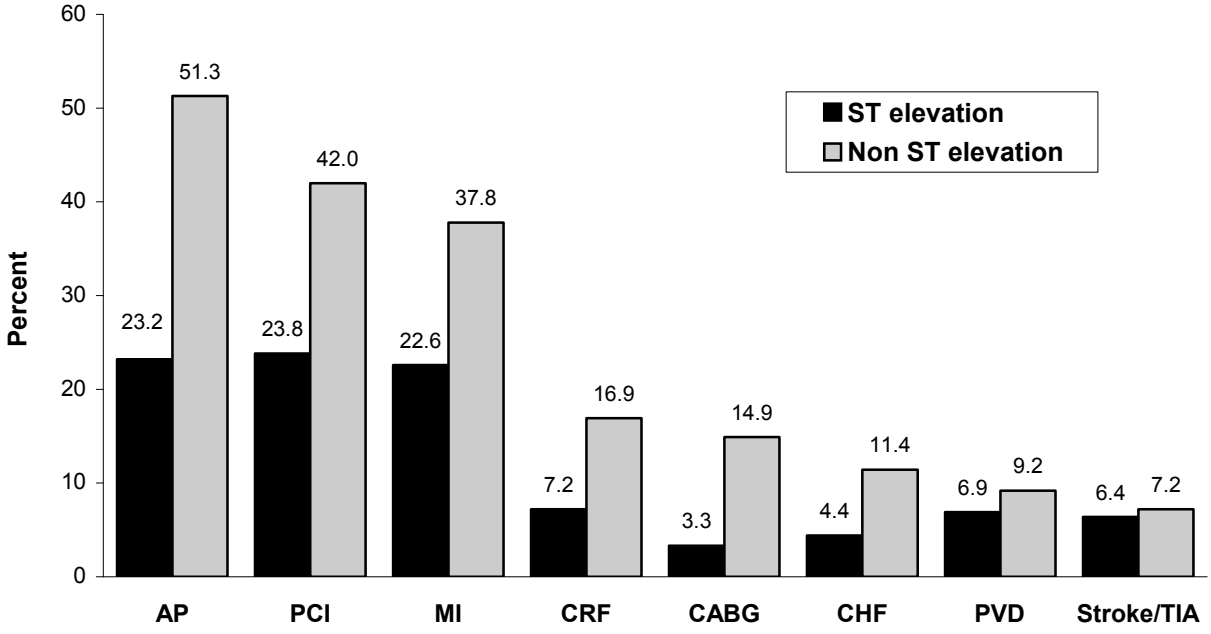
A history of MI, AP, chronic heart failure and chronic renal failure was significantly more frequent among patients with no ST elevation. Similarly, more patients with no ST elevation had undergone PCI or CABG prior to hospitalization. No difference was found with respect to history of stroke or PVD.

Table 1.3: Cardiovascular History

CV history	ST ↑ (N=765) %	Non ST ↑ (N=998) %	Total (N=1,763) %
MI*	22.6	37.8	31.2
AP*	23.2	51.3	39.1
PCI*	23.8	42.0	34.1
CABG*	3.3	14.9	9.9
CHF*	4.4	11.4	8.4
Stroke/TIA	6.4	7.2	6.9
Chronic renal failure (CRF)*	7.2	16.9	12.7
PVD	6.9	9.2	8.2

*p<0.05

Figure 1.4: Cardiovascular History*



* All graphs are presented according to descending order of patients with Non-ST elevation

1.3.2 Risk Factors

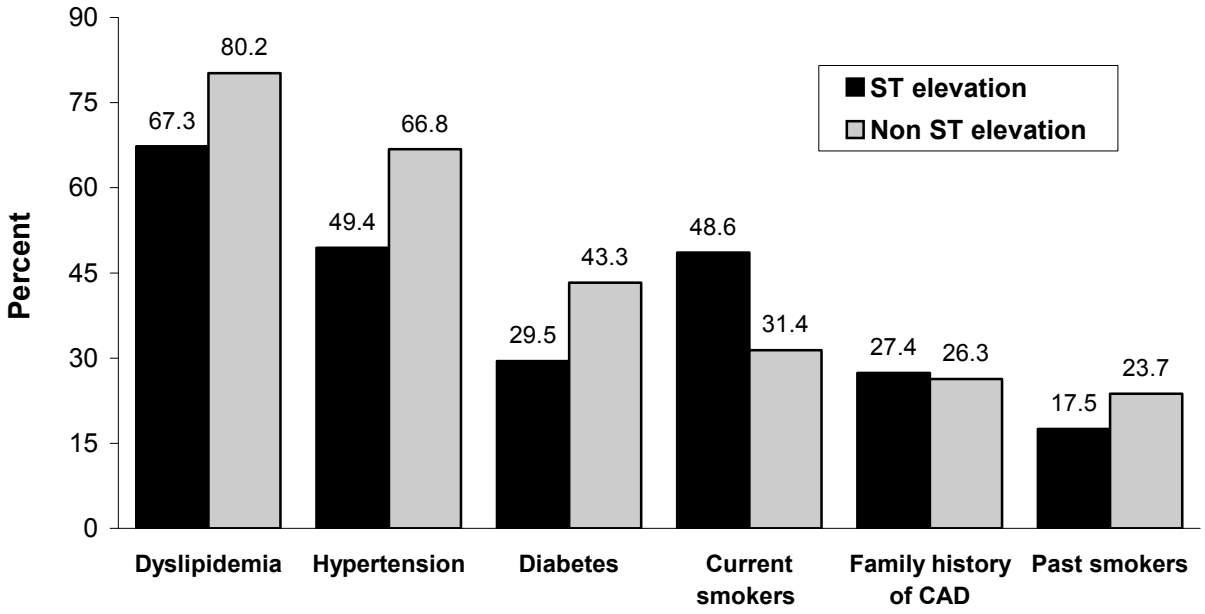
Except for current smoking, risk factors were more prevalent among patients with non-ST elevation. The percentage of newly diagnosed diabetes and dyslipidemia was higher among those with ST elevation, while the percentage of newly diagnosed hypertension was slightly higher among patients without ST elevation.

Table 1.4: Risk Factors

Risk factors	ST ↑ (N=765) %	Non ST ↑ (N=998) %	Total (N=1,763) %
Hypertension *	**49.4**	**66.8**	**59.2**
Newly diagnosed**	2.9	3.5	3.3
Diabetes*	**29.5**	**43.3**	**37.3**
Newly diagnosed**	6.4	3.3	4.4
Dyslipidemia *	**67.3**	**80.2**	**74.6**
Newly diagnosed**	18.5	9.2	12.9
Current smokers*	**48.6**	**31.4**	**38.9**
Past smokers*	**17.5**	**23.7**	**21.0**
Family history of CAD	**27.4**	**26.3**	**26.8**

*p<0.05; ** newly diagnosed expressed as percentage of total patients with specific risk factor

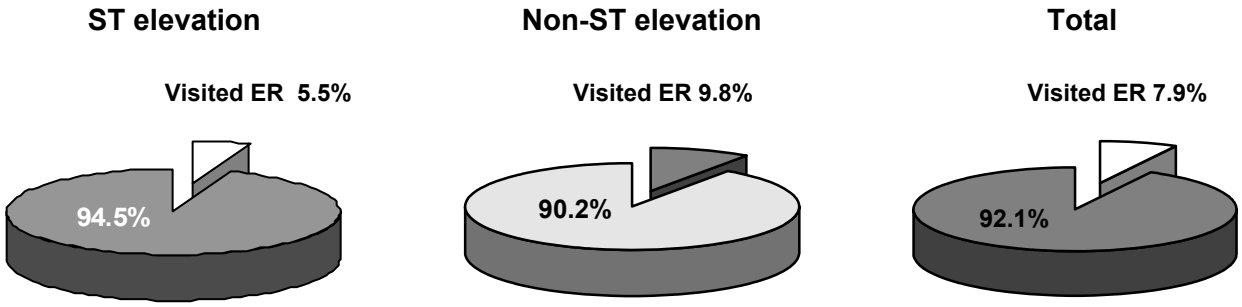
Figure 1.5: Risk Factors



1.3.3 Visit to ER during the Month Preceding Hospitalization

Patients without ST elevation were more likely to have visited the ER during the month preceding hospitalization (9.8%) than patients with ST elevation (5.5%).

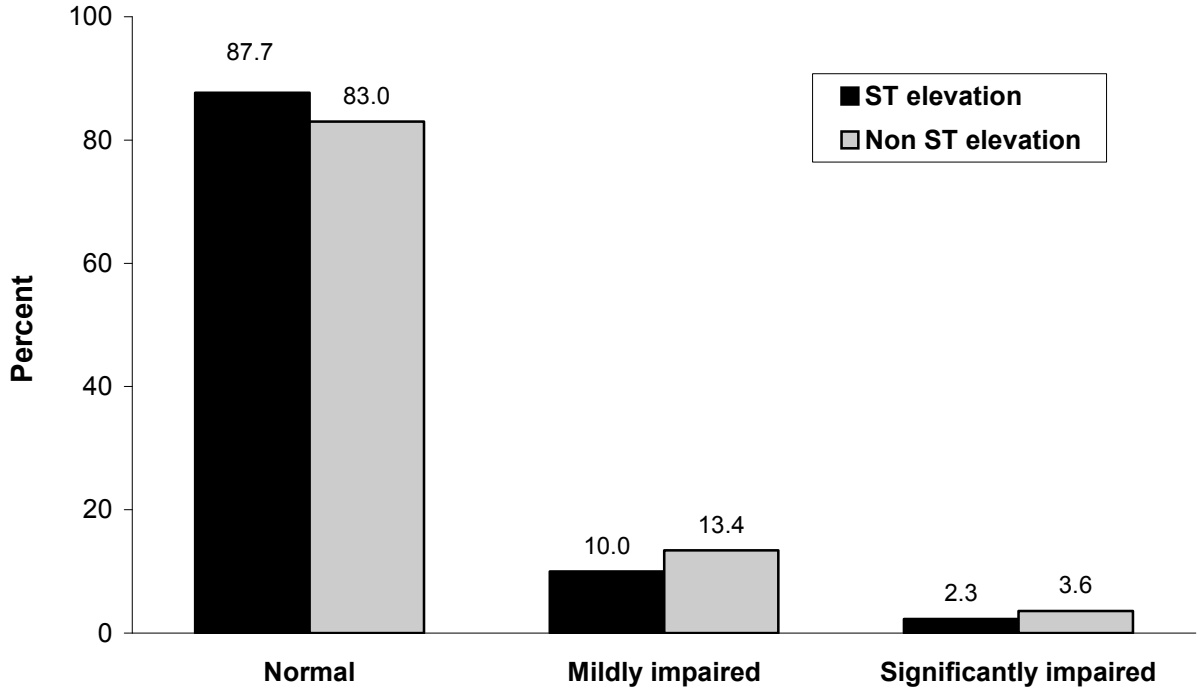
Figure1. 7: Visit to ER during Preceding Month



1.3.4 Patient's General Functional Level on Admission

For over 80% of patients, functional level was normal. Overall, the functional level of patients with ST elevation was slightly higher than those with no ST elevation.

Figure 1.8: Patient's General Functional Level



1.4 Prior Chronic Treatment

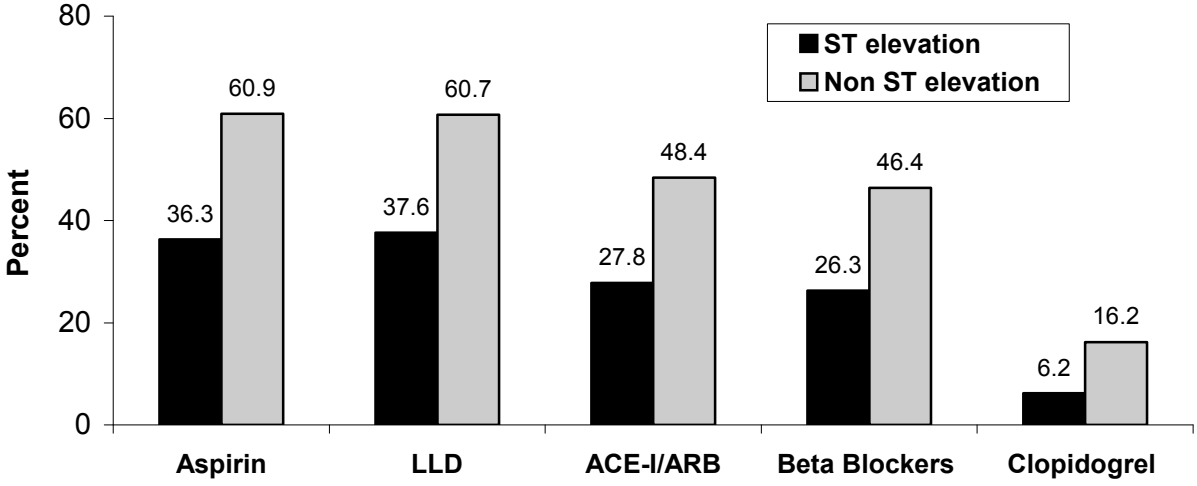
Approximately 61% of patients with no ST elevation and 36% of those with ST elevation were being treated with aspirin before hospitalization. Other drugs in common use were ACE inhibitors and ARB, beta blockers, lipid-lowering drugs, hypoglycemic drugs and calcium antagonists, all of which were in use more frequently among patients with no ST elevation.

Table 1.5: Prior Chronic Treatment

Prior chronic treatment*	ST ↑ (N=765) %	Non ST ↑ (N=998) %	Total (N=1,763) %
Aspirin	36.3	60.9	50.3
Anticoagulants	3.0	5.1	4.2
Clopidogrel	6.2	16.2	11.9
ACE inhibitor	23.4	39.1	32.3
ARB	4.9	10.3	8.0
ACE-I/ARB	27.8	48.4	39.5
Aldosterone receptor	0.4	1.8	1.2
Beta Blockers	26.3	46.4	37.7
Digoxin	0.4	1.3	0.9
Diuretics	11.4	24.3	18.7
Insulin	4.1	10.1	7.5
Hypoglycemic drugs	16.3	27.4	22.6
Statins	36.5	59.5	49.5
Fibrate	3.2	5.1	4.3
Ezetimibe	0.5	1.6	1.1
LLD	37.6	60.7	50.7
Calcium antagonists	16.4	26.4	22.1
Nitrates	4.0	14.1	9.7
Other drugs	30.5	46.9	39.8

*p<0.05

Figure 1.9: Prior Chronic Treatment



1.5 Transportation, Pre-Admission and Admission Information

1.5.1 Mode of Transportation

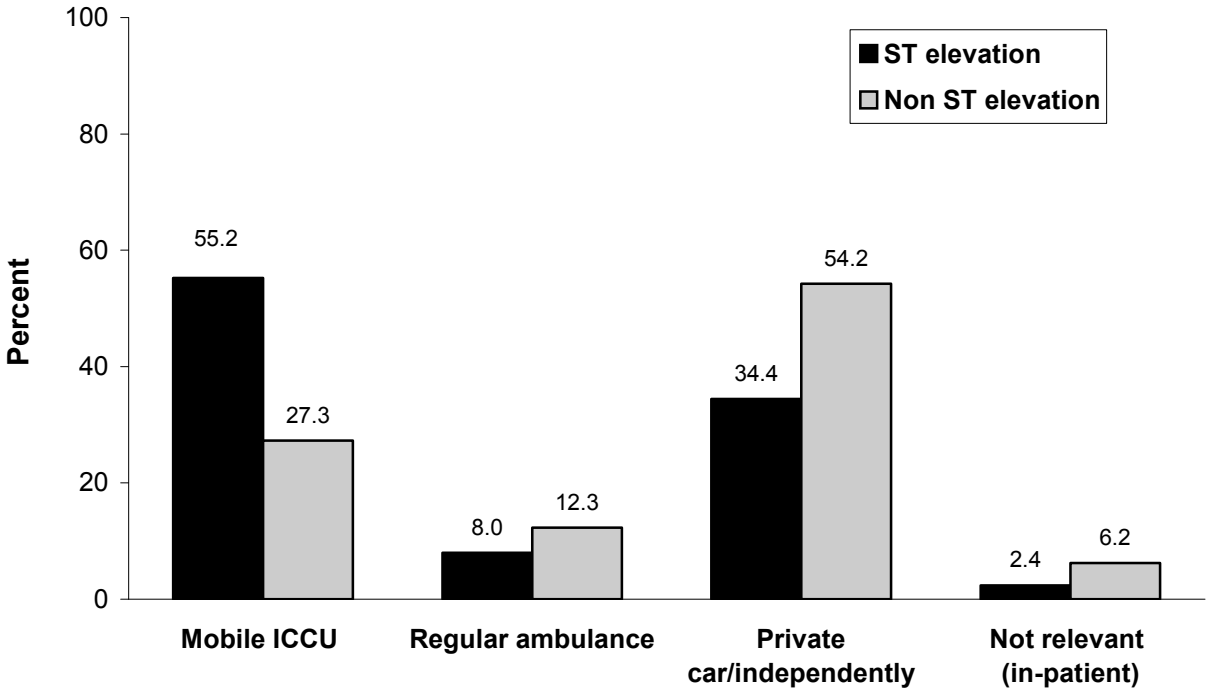
Patients with ST elevation were more frequently transported to hospital with mobile CCU, and patients with no ST elevation arrived more frequently by means of private transportation.

Table 1.6: Mode of Transportation

Transport to hospital*	ST ↑ (N=764) (%)	Non ST ↑ (N=996) (%)	Total (N=1,763) (%)
Mobile ICCU	55.2	27.3	39.4
Regular ambulance	8.0	12.3	10.4
Private car/independently	34.4	54.2	45.6
Not relevant (in-patient)	2.4	6.2	4.6

*p<0.05

Figure 1.10: Mode of Transportation



1.5.2 Patient Location on Onset

The most frequent location at the time of ACS onset was a private residence (81% of all patients). Patients with no ST elevation were somewhat more likely to experience onset of ACS at a private residence, and patients with ST elevation were more likely to experience onset at work or in a public place.

Table 1.7: Location on Onset

Location*	ST ↑ (N=765) (%)	Non ST ↑ (N=998) (%)	Total (N=1,763) (%)
Private residence	77.5	83.3	80.7
Public place	9.1	6.8	7.8
Medical facility	3.5	4.1	3.8
Work place	7.8	3.3	5.3
Other	2.1	2.5	2.4

*difference in location on onset of ACS, ST elevation vs. Non-ST elevation, p<0.05

1.5.3 First Arrival

The ward of first arrival for 97% of patients with no ST elevation and 76% of those with ST elevation was the ER. Patients with ST elevation were more likely to be taken directly to the CCU or the catheterization laboratory than patients without ST elevation.

Table 1.8: First Arrival

First arrival at*	ST ↑ (N=765) (%)	Non ST ↑ (N=998) (%)	Total (N=1,763) (%)
ER	76.0	96.7	87.7
CCU	16.5	2.8	8.8
Catheterization laboratory	7.5	0.5	3.5

*difference in ward of first arrival, ST elevation vs. Non-ST elevation, p<0.05

1.5.4 First Ward of Hospitalization

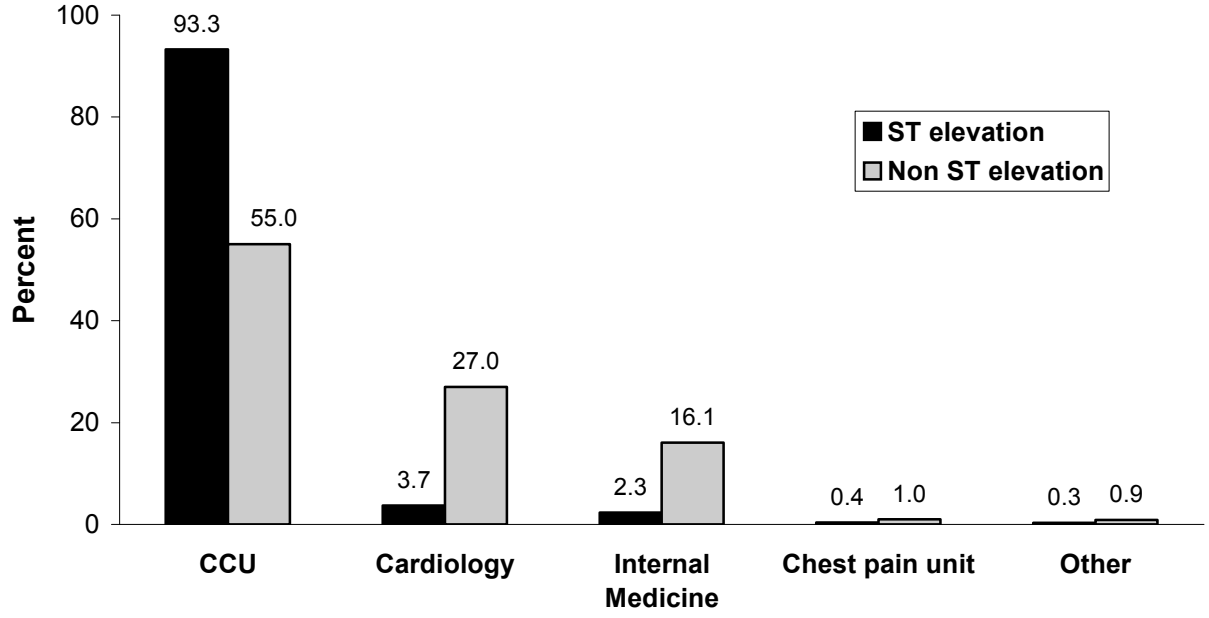
As expected, the patients presenting with ST elevation were more often hospitalized in the CCU (93%). Those presenting with no ST elevation were more frequently admitted to Cardiology and 16% of the latter patients were first admitted to Internal Medicine Departments and thereafter transferred to Cardiac wards within 24 hours.

Table 1.9: First Ward of Hospitalization

First ward*	ST ↑ (N=765) (%)	Non ST ↑ (N=998) (%)	Total (N=1,763) (%)
CCU	93.3	55.0	71.6
Cardiology	3.7	27.0	16.9
Chest pain unit	0.4	1.0	0.7
Internal medicine	2.3	16.1	10.2
Other	0.3	0.9	0.6

*difference in first ward of hospitalization, ST elevation vs. Non-ST elevation, p<0.05

Figure 1.11: First Ward of Hospitalization



1.5.5 Length of Time from Symptom Onset to Admission

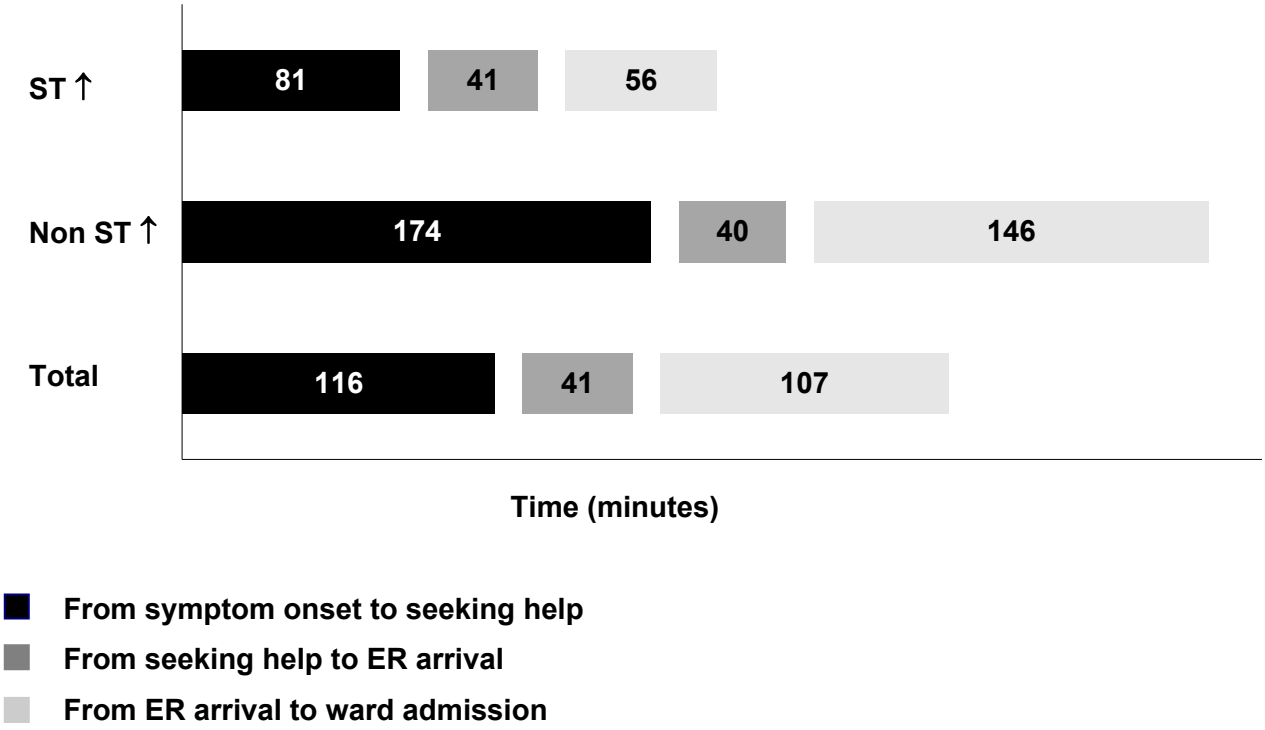
Patients with ST elevation sought help more rapidly in comparison with their counterparts with no ST elevation. In addition, the time elapsing between ER arrival and first ward admission was more than twice as long for patients with no ST elevation, in comparison with patients presenting with ST elevation.

Table 1.10: Length of Time from Symptom Onset to Admission

	Length of time (minutes)								
	ST ↑			Non ST ↑			Total		
	No.	Median	(25%-75%)	No.	Median	(25%-75%)	No.	Median	(25%-75%)
From symptom onset to seeking help*	646	81	(33-210)	644	174	(60-682)	1,290	116	(45-390)
From seeking help to ER arrival*	673	41	(0-63)	785	40	(0-73)	1,458	41	(0-68)
From ER arrival to first ward admission*	743	56	(20-123)	951	146	(80-233)	1,694	107	(44-193)

*p<0.05

Figure 1.12: Median Length of Time from Symptom Onset to Admission (minutes)



1.5.6 First Medical Contact

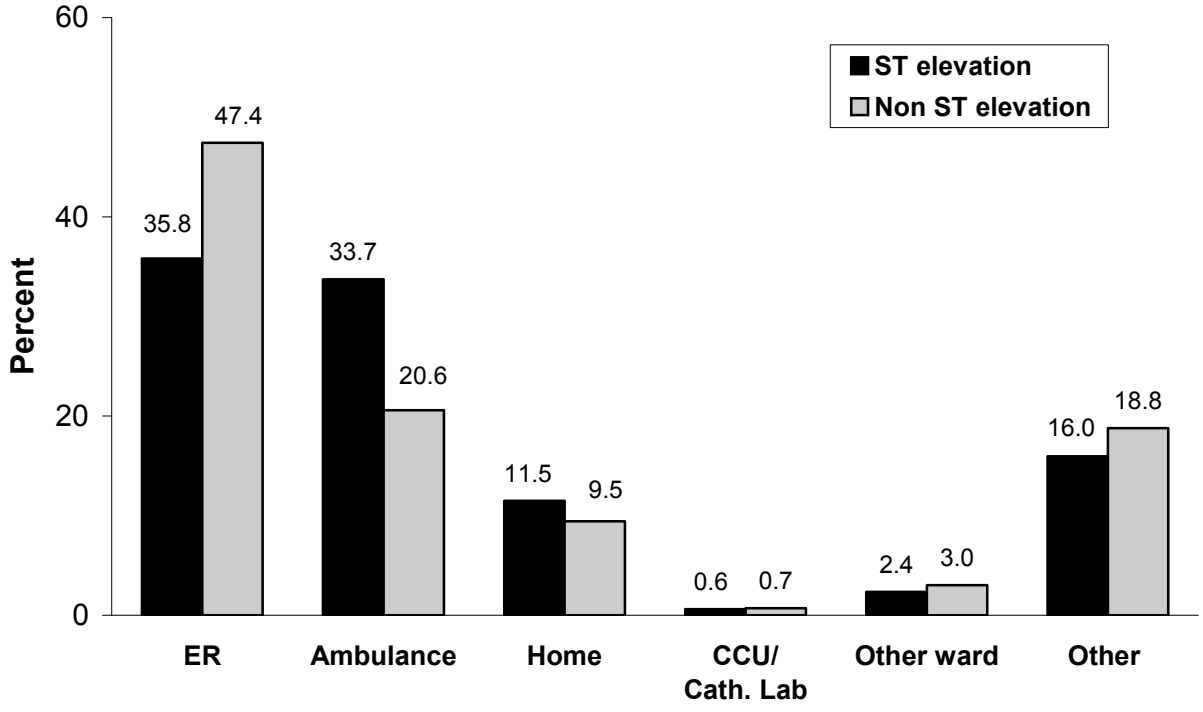
A greater proportion of patients with ST elevation (33.7%) than those with no ST elevation (20.6%) experienced their first medical contact in the ambulance. Patients without ST elevation were more likely to experience their first medical contact in the ER (47.4%) than patients with ST elevation (35.8%).

Table 1.11: First Medical Contact

First medical contact:*	ST ↑ (N=765) (%)	Non ST ↑ (N=998) (%)	Total (N=1,763) (%)
Home	11.5	9.5	10.3
Ambulance	33.7	20.6	26.3
ER	35.8	47.4	42.4
CCU/ Catheterization laboratory	0.6	0.7	0.7
Other ward	2.4	3.0	2.7
Other**	16.0	18.8	17.6

*difference in place of first medical contact, ST elevation vs. Non-ST elevation, p<0.05
** refers largely to patients whose first medical contact was in a primary care setting

Figure 1.13: First Medical Contact



1.5.7 Presenting Symptoms and Killip Class

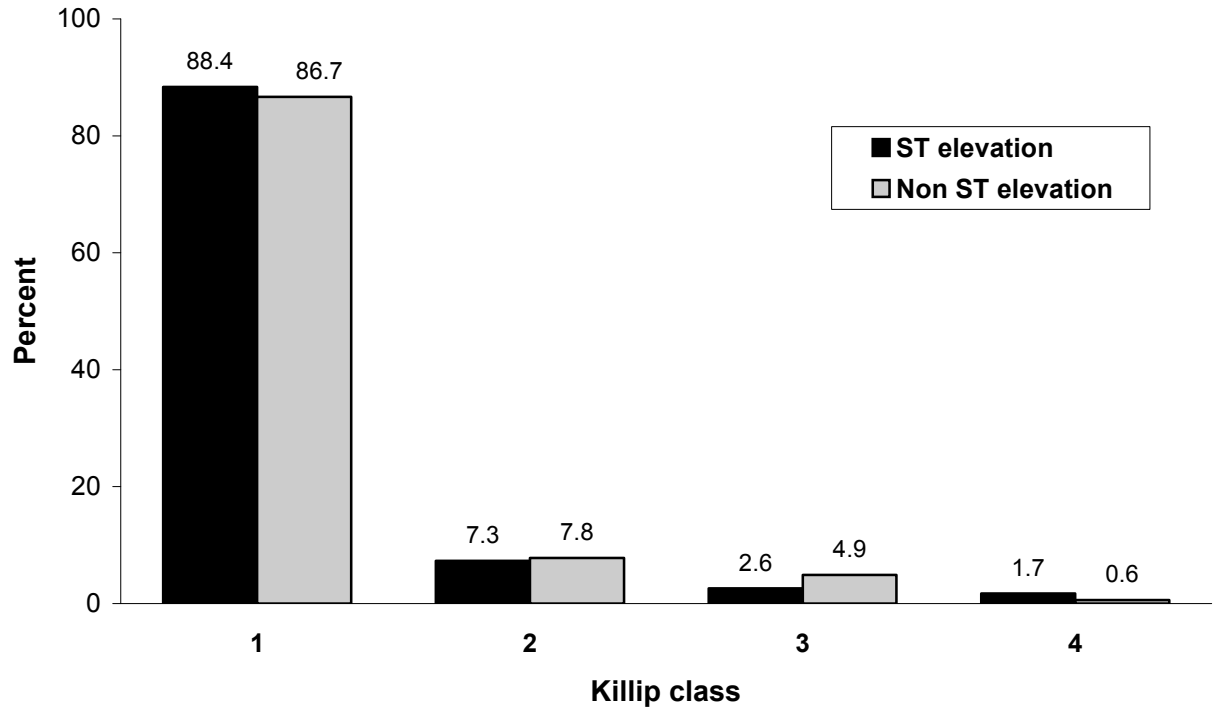
Typical angina was more frequent in patients presenting with ST elevation. Atypical chest pain and dyspnea were relatively more frequent in patients with no ST elevation. Killip Class on admission was similar in the two groups. The large majority of patients in both groups were admitted with Killip Class 1.

Table 1.12: Presenting Symptoms at First Medical Contact

Symptoms	ST ↑ (N=765) %	Non ST ↑ (N=998) %	Total (N=1,763) %
Typical angina*	89.7	83.1	85.9
Atypical chest pain*	6.1	11.4	9.1
Syncope/Aborted SCD	3.5	2.3	2.8
Arrhythmia	4.8	3.6	4.1
Dyspnea*	24.2	30.6	27.8
Other	14.9	14.7	14.8

*p<0.05

Figure 1.14: Killip Class on Admission



1.5.8 Treatment at First Contact

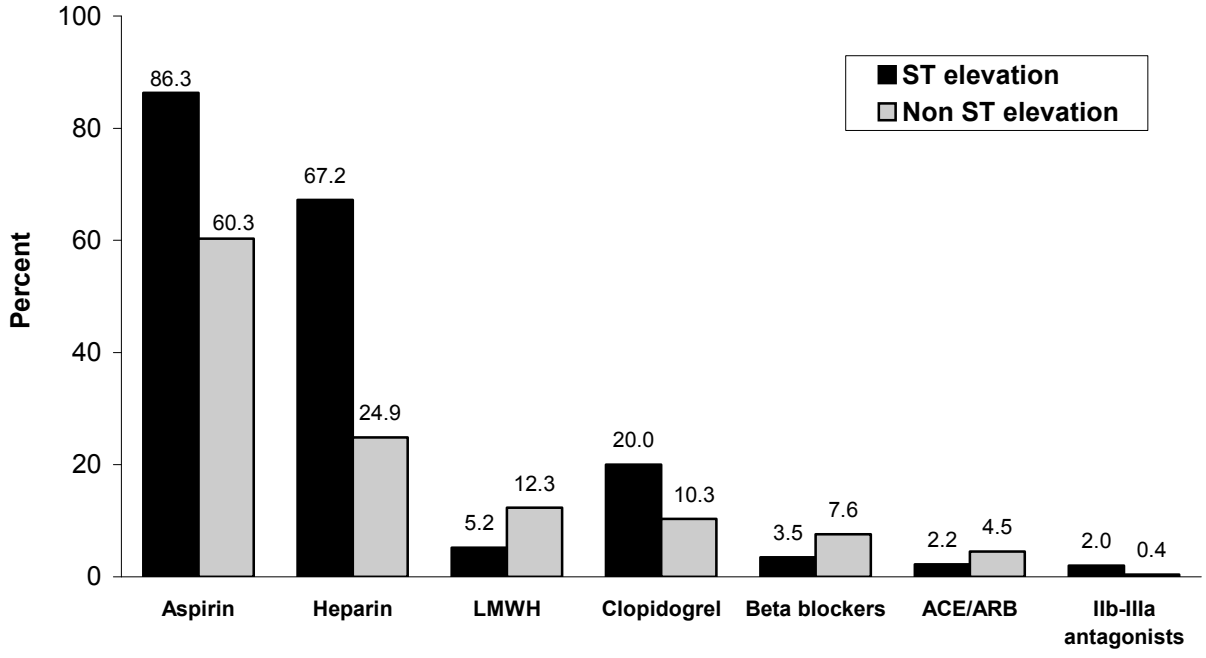
At first medical contact, patients with ST elevation were more likely than those without ST elevation to receive aspirin, clopidogrel, unfractionated or regular heparin, IIb/IIIa antagonists and narcotics than patients with no ST elevation. Those with no ST elevation received more beta blockers, diuretics, LMW heparin and ACE-I/ARB.

Table 1.13: Treatment at First Medical Contact

Treatment	ST ↑ (N=765) %	Non ST ↑ (N=998) %	Total (N=1,763) %
Aspirin*	86.3	60.3	71.6
Clopidogrel*	20.0	10.3	14.5
Beta Blockers*	3.5	7.6	5.8
Diuretics*	4.1	10.4	7.7
ACE-I*	2.0	4.1	3.2
ARB	0.3	0.4	0.3
ACE-I/ARB*	2.2	4.5	3.5
Heparin unfractionated/regular)*	67.2	24.9	43.3
LMW heparin (fractionated)*	5.2	12.3	9.2
IIb/IIIa antagonists*	2.0	0.4	1.1
Narcotics*	34.1	9.9	20.4
Nitrates*	43.4	33.8	37.9
Antiarrhythmics	2.9	2.2	2.5

*p<0.05

Figure 1.15: Treatment at First Medical Contact

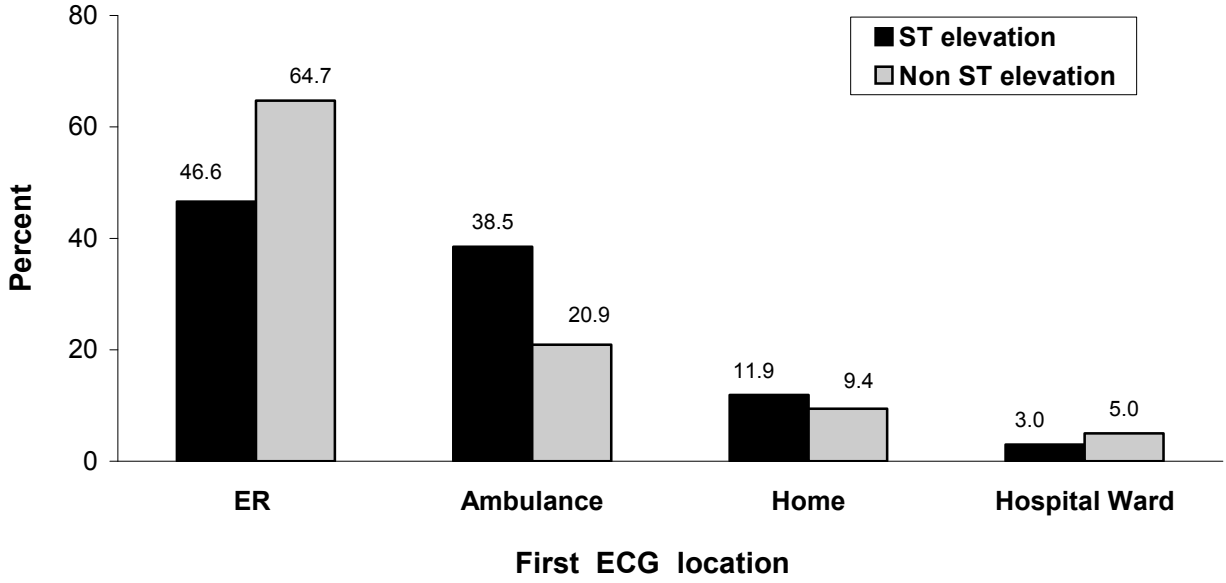


1.6 First Recorded ECG

1.6.1 Location of First ECG Recording

A larger proportion of patients with ST elevation than those with no ST elevation had their first ECG measurement in the ambulance or at home. For almost two-thirds of patients presenting with no ST elevation and close to half of patients presenting with ST elevation, the initial ECG was performed in the ER.

Figure 1.16: Location of First ECG



1.6.2 First ECG Rhythm

Over 90% of patients, both with and without ST elevation, presented with a normal sinus rhythm. Four percent of patients presented with AF.

Table 1.14: First ECG Rhythm

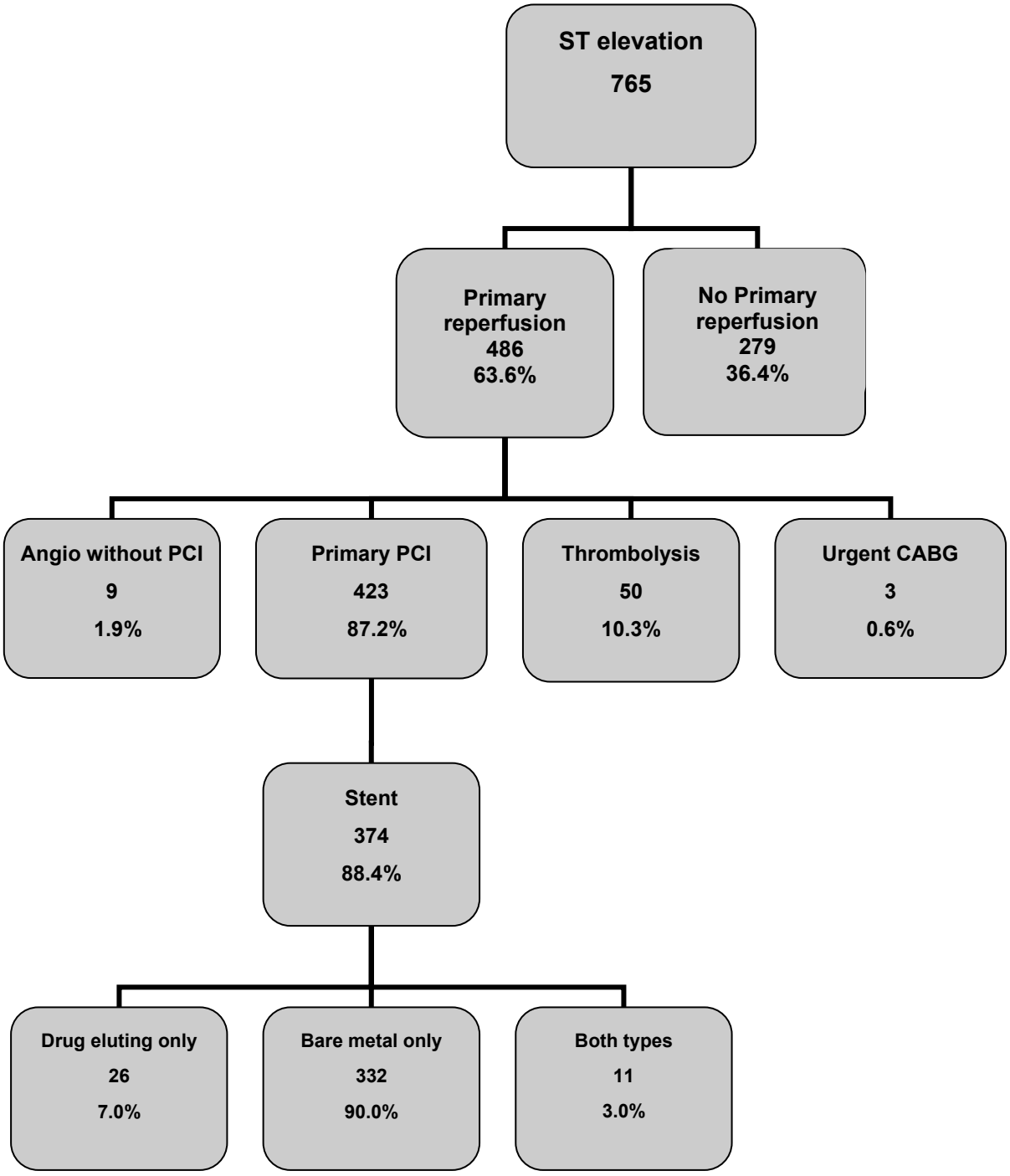
Rhythm	ST ↑ (N=765) %	Non ST ↑ (N=998) %	Total (N=1,763) %
NSR	92.3	91.7	91.9
AF	3.5	4.6	4.1
SVT	0.1	0.3	0.2
VT/VF	0.3	0.4	0.3
Other	3.8	3.0	3.4

1.7 Primary Reperfusion Therapy in Patients with ST Elevation

1.7.1 Primary Reperfusion

Close to two-thirds of patients with ST elevation underwent primary reperfusion within 12 hours from onset. Of these, the majority underwent primary PCI (87.2%) and in almost 90% of these cases, stents were employed, principally bare metal stents.

Figure 1.17: Primary Reperfusion in Patients with ST Elevation



1.7.2 Use of Drugs and Protective Devices during Primary PCI

Close to 90% of patients received clopidogrel during primary PCI, over two-thirds received IIb/IIIa antagonists and protective/aspiration devices were employed in 29.3% of cases.

Table 1.15: Drugs and Protective Devices during PCI

Drugs and protective devices	N=423	
	Number	%
Clopidogrel	375	88.7
IIb/IIIa antagonists	288	68.1
Angiomax	17	4.0
Protective/Aspiration device	124	29.3

1.7.3 TIMI Grade Flow

Following primary PCI, a TIMI grade flow of 3 was achieved in the majority of patients (87.5%).

Table 1.16: TIMI Grade Flow before and after primary PCI

TIMI grade flow	Before revascularization (%) N=423	After revascularization (%) N=423
0	57.1	3.6
1	14.5	0.7
2	13.0	8.2
3	15.4	87.5

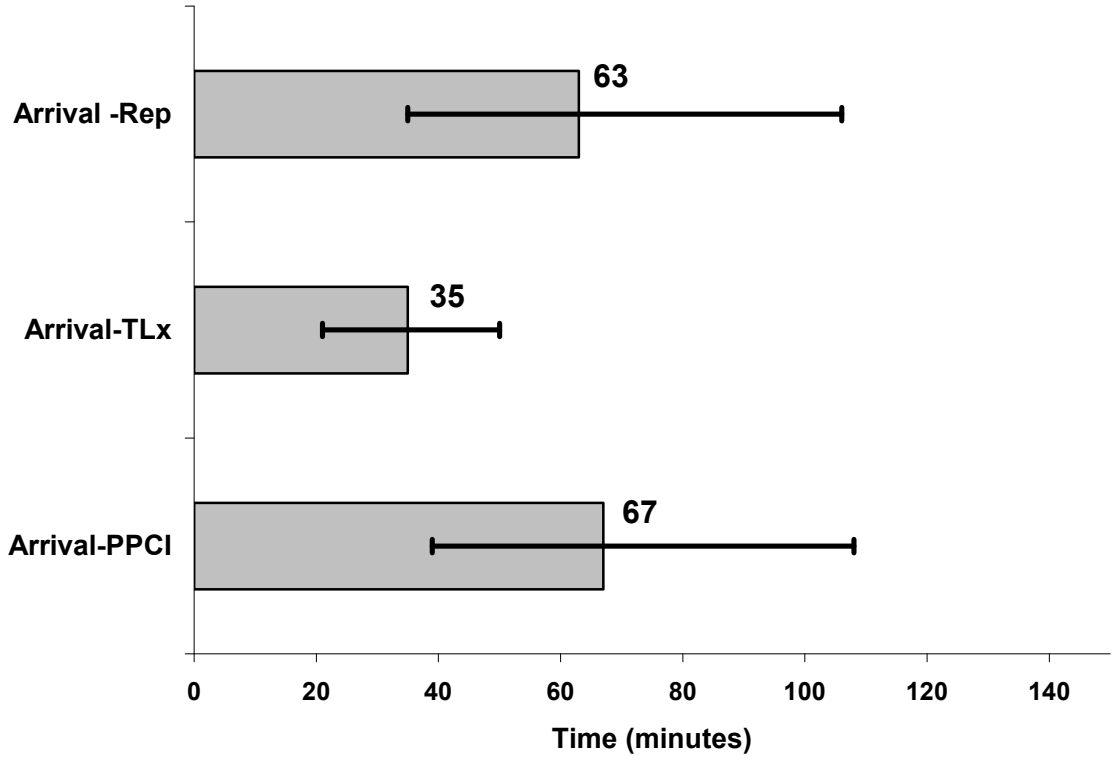
1.7.4 Length of Time from Arrival to Primary Reperfusion

The median time from arrival to primary reperfusion was relatively short, for both primary PCI and thrombolysis. The median length of time for thrombolysis was shorter than for primary PCI.

Table 1.17: Length of Time from Arrival to Reperfusion

	Length of time for ST ↑ patients (minutes)	
	Median	**(25%-75%)**
From arrival to reperfusion	63	35-106
From arrival to thrombolysis	35	21-50
From arrival to primary PCI	67	39-108

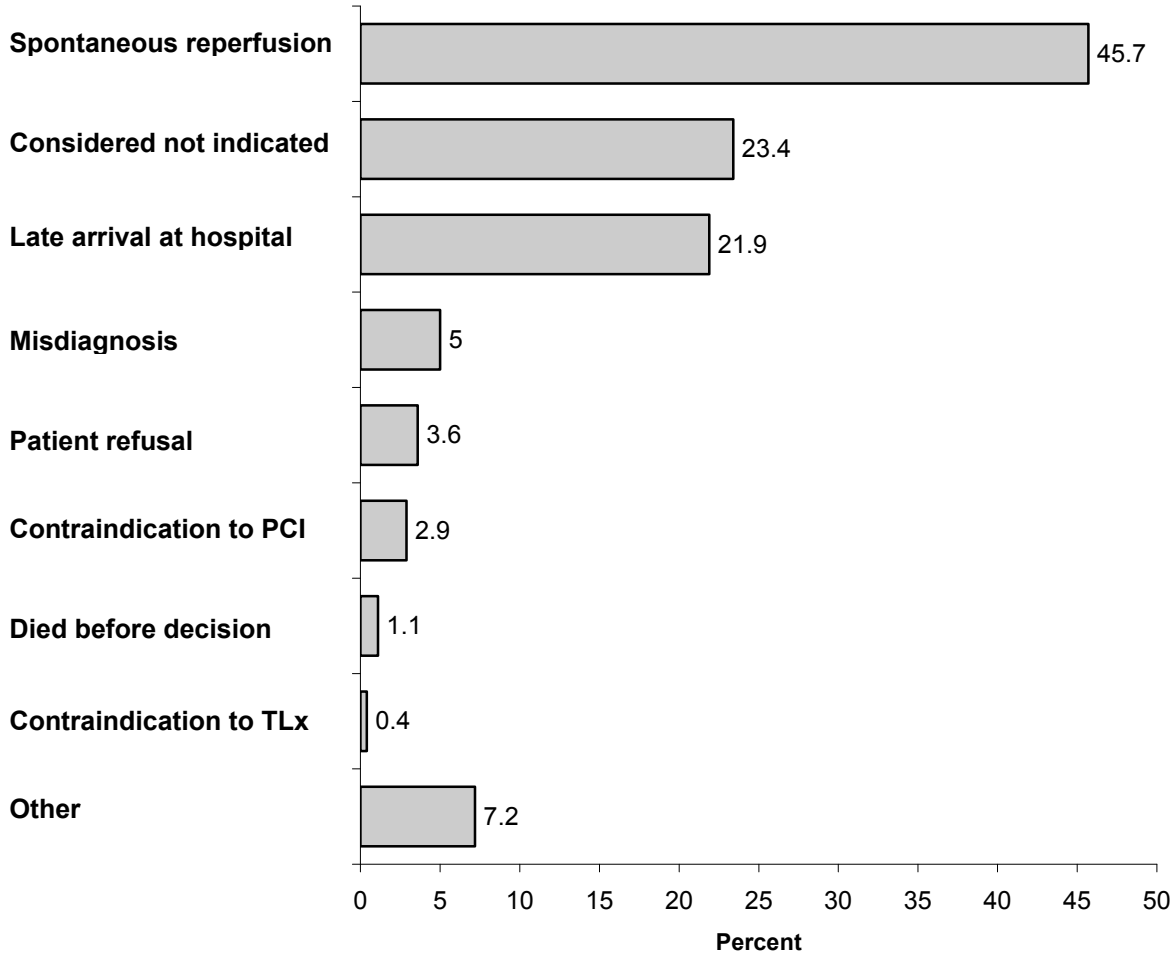
Figure 1.18: Length of Time from Arrival to Reperfusion (Median, 25%-75%)



1.7.5 Reasons for Not Performing Primary Reperfusion

Thirty-six percent of patients presenting with ST elevation did not receive primary reperfusion therapy. In the majority of cases (45.7%), the reason for not performing primary reperfusion was "spontaneous" reperfusion. In 23.4% of cases, primary reperfusion was considered not indicated, and in almost 22% of cases the reason was late arrival at the hospital.

Figure 1.19: Reason for Not Performing Primary Reperfusion

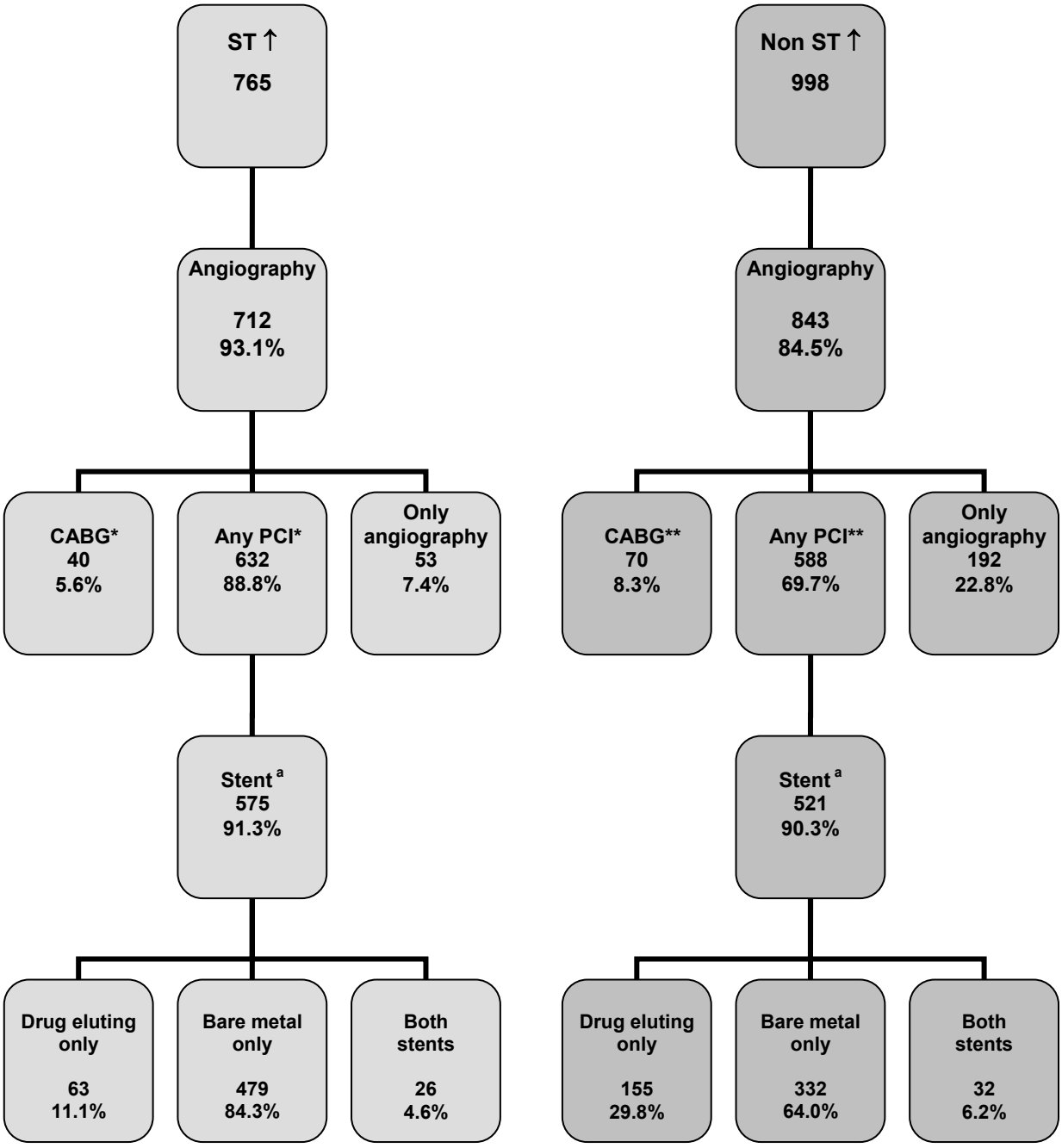


1.8 Coronary Interventions and Procedures during Hospitalization

1.8.1 Coronary Angiography and Interventions

Patients with ST elevation were more likely than those with no ST elevation to undergo coronary angiography and PCI. CABG during hospitalization was performed more frequently in patients with no ST elevation. Stents were employed with equal frequency in both groups, however drug-eluting stents were used more frequently in patients without ST elevation than in patients with ST elevation.

Figure 1.20: In-Hospital Cardiac Interventions and Procedures



* 13 patients underwent both CABG and PCI; ** 7 patients underwent both CABG and PCI
a. For a small number of patients type of stent is unknown

1.8.2 Other Procedures

Patients with ST elevation were more likely to receive CPR, DC shock, ventilation, IA balloon and temporary pacemaker than those with no ST elevation. Patients with no ST elevation were more likely to undergo stress test/SPECT than those with ST elevation.

Table 1.19: Other Procedures

Procedure	ST ↑ (N=765) %	Non ST ↑ (N=998) %	Total (N=1,763) %
DC shock*	5.2	1.3	3.0
Resuscitation (CPR)*	4.8	1.3	2.8
Ventilation*	6.7	2.9	4.5
IA Balloon*	8.0	2.4	4.8
ECHO	88.7	72.2	79.4
EPS*	0.8	0.0	0.3
Stress test/SPECT*	0.3	3.2	1.9
Permanent pacemaker	0.7	0.4	0.5
Temporary pacemaker*	4.7	0.8	2.5
Hypothermia for anoxic brain damage	0.0	0.1	0.1

*p<0.05

1.9 Ejection Fraction

Ejection fraction (EF) was determined in close to 85% of patients with ST elevation and in approximately 78% of those with no ST elevation. EF was normal in a larger proportion of patients with no ST elevation than in patients with ST elevation. Twenty-two percent of patients presented with EF <40%.

Table 1.20: Ejection Fraction

Ejection fraction*	ST ↑ (N=765) %	Non ST ↑ (N=998) %	Total (N=1,763) %
EF determined	84.4	77.7	80.6
Normal (≥50%)	38.1	57.0	48.4
Mild (40-49%)	36.0	23.3	29.1
Moderate (30-39%)	19.0	12.5	15.4
Severe (<30%)	6.9	7.2	7.1

*difference in EF, ST elevation vs. Non-ST elevation, p<0.05
*p<0.05

1.10 In-Hospital Complications

Hemodynamic and electrical complications were more frequent in patients with ST elevation.

Table 1.21: In-Hospital Complications

Complications	ST ↑ (N=765) (%)	Non ST ↑ (N=998) (%)	Total (N=1,763) (%)
CHF mild-moderate (Killip 2)*	9.3	6.4	7.7
Pulmonary edema (Killip 3)	6.9	6.4	6.6
Cardiogenic shock (Killip 4) *	4.6	1.4	2.8
Hemodynamically significant RVI *	2.6	0.3	1.3
Re-MI	1.4	1.5	1.5
Post MI angina /re-ischemia	2.6	4.3	3.6
Sub-acute stent thrombosis*	1.7	0.5	1.0
Free wall rupture*	1.3	0.1	0.6
Pericarditis	0.8	0.2	0.5
Tamponade*	0.9	0.2	0.5
VSD*	0.7	0.1	0.3
Moderate-severe MR	1.7	1.6	1.6
RBBB (new onset) *	2.1	0.7	1.3
LBBB (new onset)	0.3	1.0	0.7
High degree AVB*	4.4	0.5	2.2
Sustained VT*	2.7	0.6	1.5
Primary VF*	3.3	0.2	1.5
Secondary VF *	2.5	0.5	1.4
AF	6.1	4.9	5.4
Asystole*	3.1	1.2	2.0
TIA	0.0	0.3	0.2
Stroke	0.9	0.4	0.6
CVA/TIA in hospital	0.9	0.7	0.8
Acute renal failure	5.2	3.9	4.5
Major bleeding	1.7	1.5	1.6
Infection	4.4	4.2	4.3

*$p<0.05$

1.11 In-Hospital Medical Treatment

Regular heparin, clopidogrel and IIb/IIIa antagonists were more frequently used in patients with ST elevation. LMW heparin was more frequently used among patients with no ST elevation. Both groups of patients were equally treated with aspirin, Beta-blockers, and lipid-lowering drugs.

Table 1.22: In-Hospital Medical Treatment

Treatment	ST ↑ (N=765) (%)	Non ST ↑ (N=998) (%)	Total (N=1,763) (%)
Aspirin	97.9	97.4	97.6
Warfarin	4.7	3.7	4.2
Heparin (unfractionated/regular)*	47.1	28.7	36.7
LMW heparin (fractionated)*	39.9	57.8	50.0
Clopidogrel*	91.8	86.5	88.8
ACE-I*	71.4	65.6	68.1
ARB*	4.6	10.5	7.9
ACE-I/ARB	74.8	74.7	74.8
IIb/IIIa antagonists*	48.9	17.3	31.0
Aldosterone receptor antagonist	5.9	3.9	4.8
Beta Blockers	83.0	81.4	82.1
IV inotropic agent*	5.1	1.9	3.3
Digoxin	2.5	1.9	2.2
Diuretics*	24.4	33.1	29.3
Insulin*	11.3	17.3	14.7
Hypoglycemic drugs (Oral)*	10.7	18.4	15.1
Statins	93.9	93.3	93.5
Fibrate	4.7	6.3	5.6
Ezetimibe*	0.4	1.9	1.3
LLD	95.3	94.2	94.7
Calcium antagonists*	10.2	26.8	19.6
Nitrates*	23.0	31.2	27.6

*p<0.05

1.12 Duration of Hospitalization

The median length of stay in CCU was similar in both groups. Median length of total hospital stay was longer in patients with ST elevation (5 days) than in those with no ST elevation (4 days).

Table 1.23: Length of Stay in CCU and Total Hospital Stay

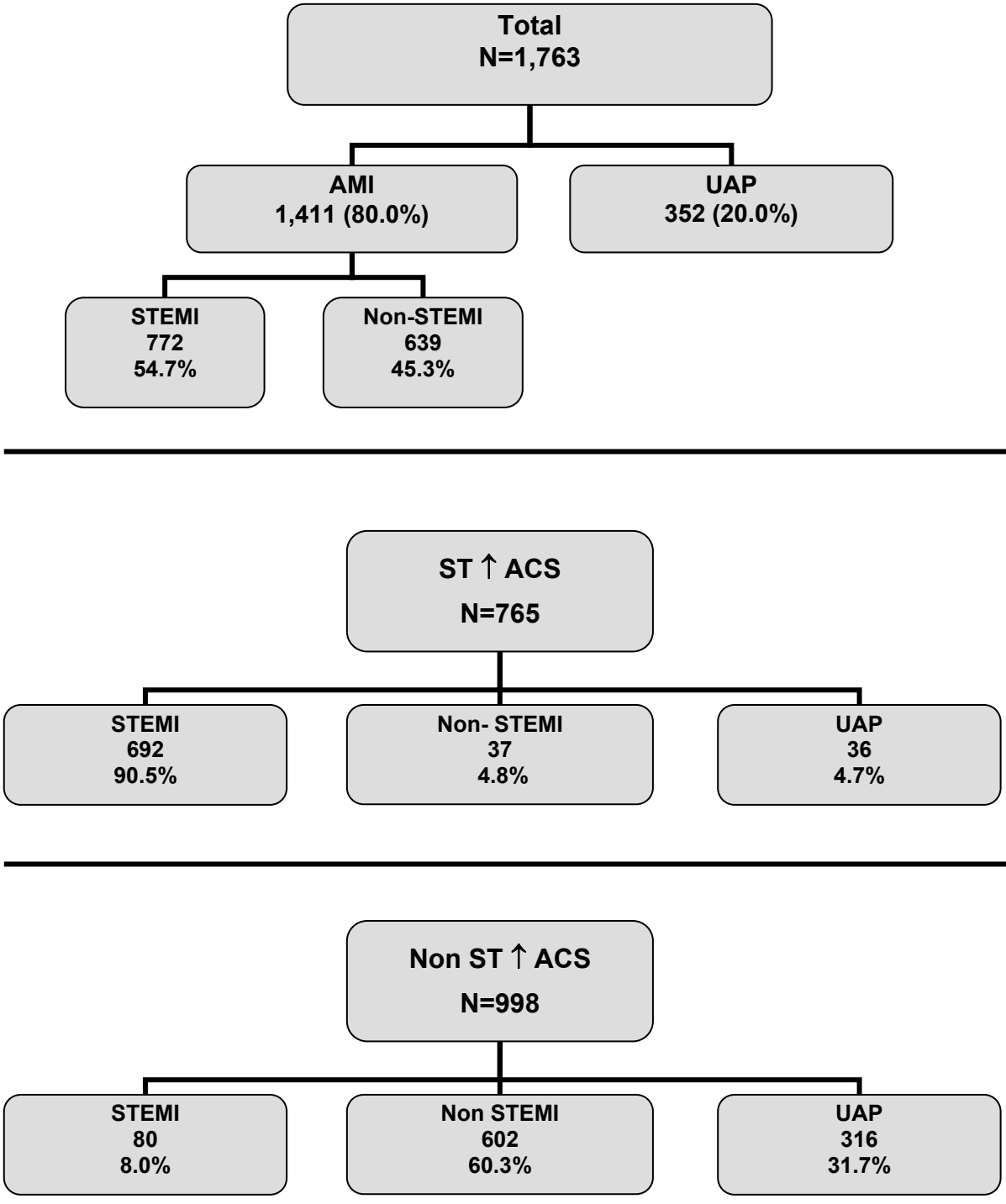
Length of stay (days)	ST ↑ (N=765)		Non ST ↑ (N=998)		Total (N=1,763)	
	Median	(25%-75%)	Median	(25%-75%)	Median	(25%-75%)
No. of days in CCU	4.0	(3-6)	4.0	(2-5)	4.0	(3-5)
Total days in Hospital	5.0	(4-7)	4.0	(3-6)	5.0	(3-6)

1.13 Discharge Diagnosis

1.13.1 Discharge Diagnosis

Eighty percent of patients were discharged with a diagnosis of AMI, and 20% with a diagnosis of UAP. Over 90% of patients presenting with ST elevation were diagnosed on discharge with STEMI. Among patients presenting with no ST elevation, the most frequent diagnosis on discharge (60%) was Non-STEMI. A further 31.7% were diagnosed with UAP, and 8% were diagnosed on discharge with STEMI.

Figure 1.24: Discharge Diagnosis



1.13.2 Type of MI

A greater proportion of patients with ST elevation (94%) than those with no ST elevation (86.3%) were diagnosed with type 1 MI, and a greater proportion of patients with no ST elevation (8.3%) than those with ST elevation were diagnosed with MI type 2.

Table 1.25: Type of MI

Type*	ST ↑ (N=765) (%)	Non ST ↑ (N=998) (%)	Total (N=1,763) (%)
1	94.0	86.3	90.3
2	2.5	8.3	5.3
3	0.0	0.3	0.1
4A	1.7	2.9	2.3
4B	1.8	1.8	1.8
5	0.0	0.4	0.2

*p<0.05

New Universal Definition of AMI

The new universal definition of myocardial infarction[1] was released on October 19th 2007 by the Global Task Force convened jointly by the European Society of Cardiology, the American College of Cardiology and the American Heart Association, together with the World Heart Federation. The revised definition expands and updates the 2000 consensus document on myocardial infarction.

Classification	Description
1	Spontaneous MI related to ischemia due to a primary coronary event such as plaque erosion and/or rupture, fissuring or dissection
2	MI secondary to ischemia due to an imbalance of oxygen supply and demand, as from coronary spasm or embolism, anemia, arrhythmias, hypertension or hypotension
3	Sudden unexpected cardiac death, including cardiac arrest, often with symptoms suggesting ischemia with new ST-segment elevation; new left bundle branch block; or pathologic or angiographic evidence of fresh coronary thrombus, in the absence of reliable biomarker findings
4A	MI associated with PCI
4B	MI associated with documented in-stent thrombosis
5	MI associated with CABG surgery

[1] Thygesen K et al. *Circulation* 2007;116(22):2634-53. Epub 2007 Oct 19.

1.14 Medical Treatment on Discharge

Clopidogrel was more often prescribed for patients with ST elevation. Diuretics, insulin, oral hypoglycemics, calcium antagonists and nitrates were prescribed more often for patients with no ST elevation. All other recommended drugs were similarly given to both groups.

Table 1.26: Medical Treatment on Discharge among Hospital Survivors

Recommended treatment	ST ↑ (N=765) (%)	Non ST ↑ (N=998) (%)	Total (N=1,763) (%)
Discharged patients % (n)	96.3 (n=737)	98.4% (n=982)	97.5% (n=1,719)
Aspirin	97.0	95.5	96.2
Warfarin	5.6	4.7	5.1
LMW*	9.9	7.2	8.4
Clopidogrel*	87.1	74.3	79.8
ACE-inhibitors*	71.6	64.3	67.4
ARB*	5.6	10.2	8.2
ACE-I/ARB	76.8	74.2	75.3
Aldosterone	6.5	4.4	5.3
Beta Blockers	83.4	80.7	81.9
IV inotropic agent	0.4	0.1	0.2
Digoxin	1.4	1.5	1.5
Diuretics*	18.6	27.9	23.9
Insulin*	6.1	10.5	8.6
Hypoglycemic drugs*	13.8	21.4	18.2
Statins*	94.2	91.4	92.6
Fibrate*	4.3	7.3	6.0
Ezetimibe*	0.7	2.3	1.6
LLD*	95.2	92.4	93.6
Calcium antagonists*	11.8	25.8	19.8
Nitrates*	4.6	11.7	8.6
Other drugs	60.4	60.7	60.6

* $p<0.05$

1.15 Re-Hospitalization within 30 Days of Admission

The re-hospitalization rates for patients with and without ST elevation were similar. Patients with no ST elevation were more likely to be rehospitalized for a scheduled procedure than those with ST elevation.

Table 1.27: Re-Hospitalization* within 30 Days of Admission

	ST ↑ (N=702) (%)	Non ST ↑ (N=941) (%)	Total (N=1,643) (%)
Re-hospitalization % (n)	17.2% (121)	18.8% (177)	18.1% (298)
Reason for Re-hospitalization			
Scheduled	28.1	40.6	35.5
Urgent cardiac event	43.8	41.1	42.2
Non-cardiac hospitalization	28.1	18.3	22.3

* Rehospitalization among hospital survivors

1.16 Mortality and Major Adverse Coronary Event (MACE)

After adjustment for age and other risk factors, 7-day mortality rates were 5 times higher and 30-day mortality rates were three times higher for patients with ST elevation than for those with non ST elevation. Rates of Major Adverse Coronary Event (MACE), which includes recurrent MI, recurrent ischemia, stent thrombosis, ischemic stroke, urgent revascularization (follow-up) or death occurring within 30 days from hospitalization, were more than 50% higher for patients with ST elevation than those with non-ST elevation, after adjustment for age and other risk factors.

Figure 1.24: Unadjusted Rates of 7-Day Mortality, 30-Day Mortality and MACE

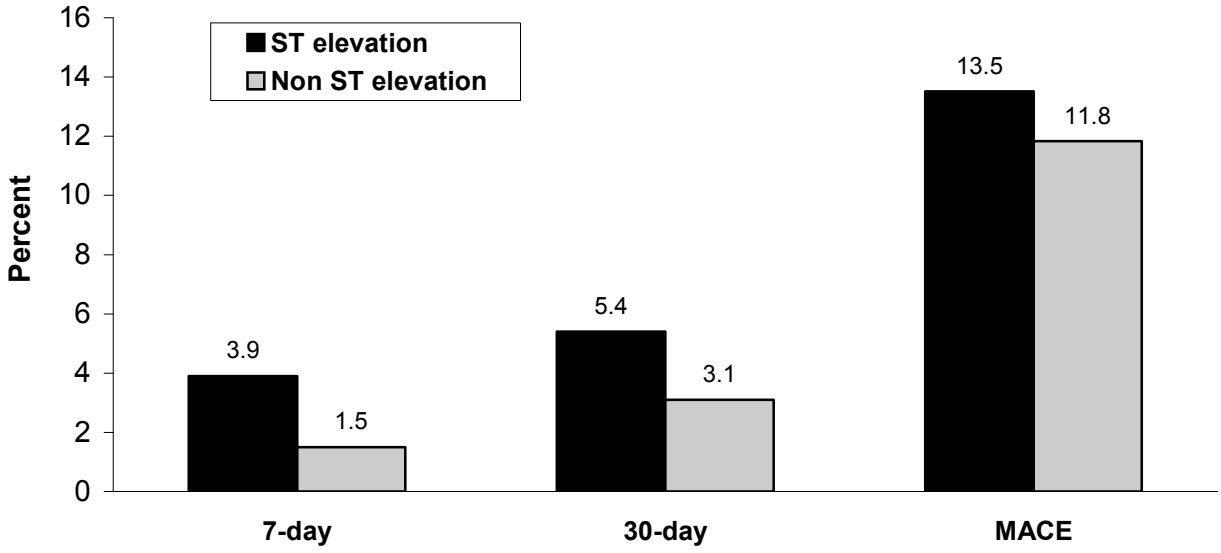


Table 1.28: Mortality Rates by ECG on Admission Adjusted for Age and Other Risk Factors

	ST ↑ (N=765)* (%)	Non ST ↑ (N=998)* (%)	Age-Adjusted OR (95% CI)	OR** (95% CI)
7-day	4.6	1.3	3.70 (1.95-7.05)	5.03 (2.44-10.40)
30-day	6.4	2.7	2.51 (1.53-4.13)	2.96 (1.69-5.20)
MACE* **	15.0	11.2	1.41 (1.05-1.89)	1.53 (1.12-2.09)

* age adjusted

** adjusted for age, gender, past MI, diabetes, hypertension, Killip class≥2, any angiography

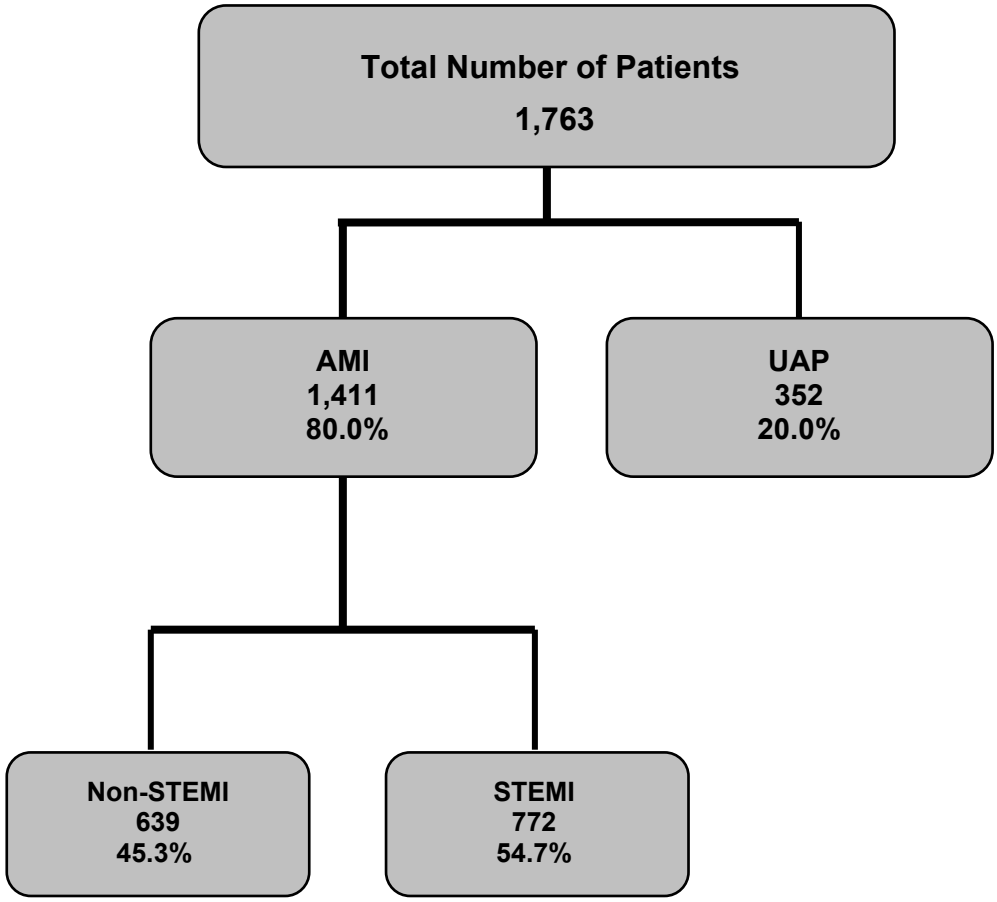
*** definition includes: recurrent MI, recurrent ischemia, stent thrombosis, ischemic stroke, urgent revascularization (follow-up) or death occurring within 30 days from hospitalization.

Chapter 2:
Acute Coronary Syndrome by Discharge Diagnosis

2.1 Distribution of Patients with ACS by Discharge Diagnosis

Eighty percent of patients with ACS were diagnosed on discharge with AMI, and 20% with UAP. Among patients with a diagnosis of AMI on discharge, approximately 55% were STEMI and approximately 45% were Non-STEMI.

Figure 2.1: Distribution of Patients by Discharge Diagnosis



2.2 Demographic Characteristics

2.2.1 Age Distribution

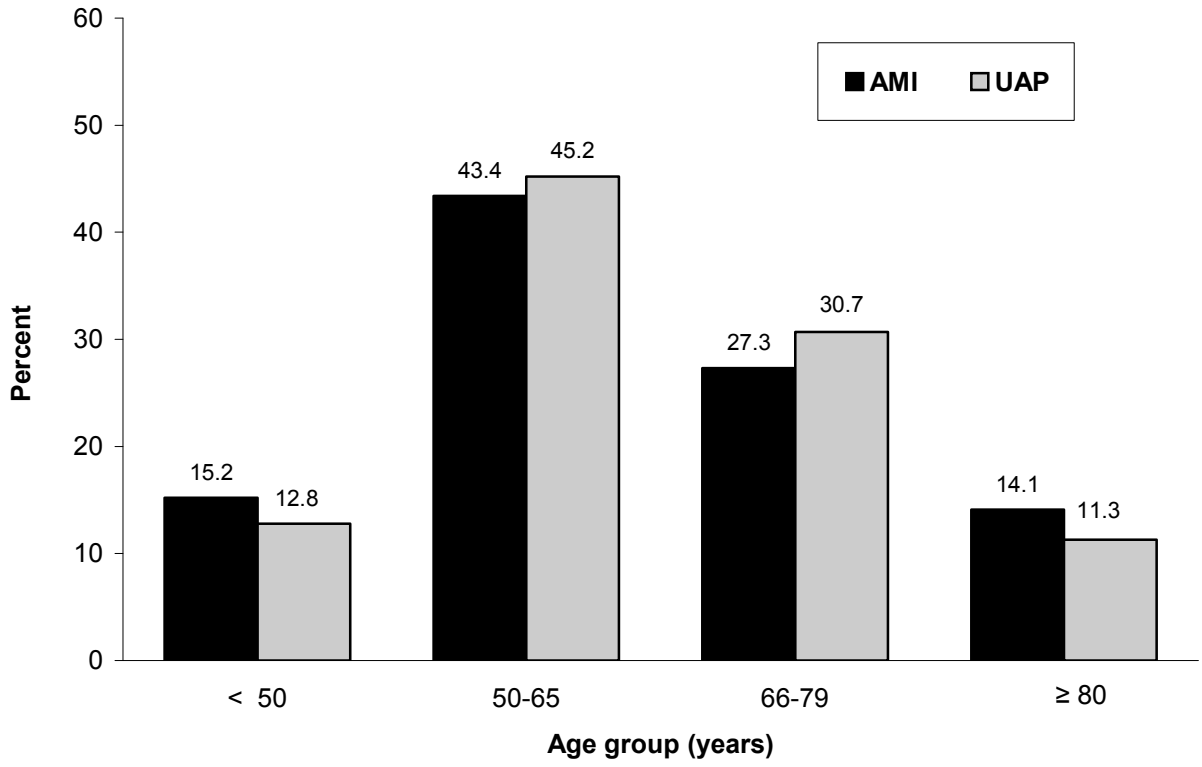
The mean age and the age distributions of patients discharged with AMI and with UAP were similar. Among AMI patients, those with ST elevation were younger (mean age: 61.2) than those with non-ST elevation (mean age: 65.9).

Table 2.1: Age Distribution**

Age group* (years)	AMI			UAP
	STEMI (N=772)	Non-STEMI (N=639)	Total (N=1,411)	(N=352)
< 50	18.8	10.8	15.2	12.8
50-65	47.3	38.7	43.4	45.2
66-79	23.3	32.1	27.3	30.7
≥ 80	10.6	18.5	14.1	11.3
Mean age ± SD*	61.2± 13.3	65.9± 13.3	63.3± 13.5	63.3± 12.1

* STEMI vs Non-STEMI; p<0.001
** Values in the tables represent percentages

Figure 2.2: Age Distribution



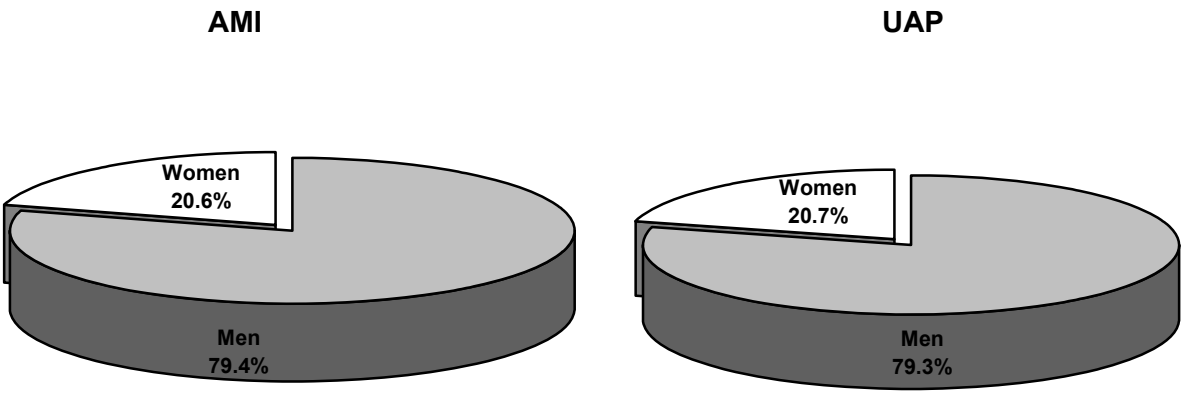
2.2.2 Sex Distribution

The sex distribution was similar among patients diagnosed with AMI and UAP. Among AMI patients, the proportion of women was slightly higher in patients with Non-STEMI than in patients with STEMI.

Table 2.2: Sex Distribution

Sex	AMI			UAP
	STEMI (N=772)	Non-STEMI (N=639)	Total (N=1,411)	(N=352)
Men	81.1	77.3	79.4	79.3
Women	18.9	22.7	20.6	20.7

Figure 2.3: Sex Distribution



2.3 Cardiovascular History and Risk Factors

2.3.1 Cardiovascular History

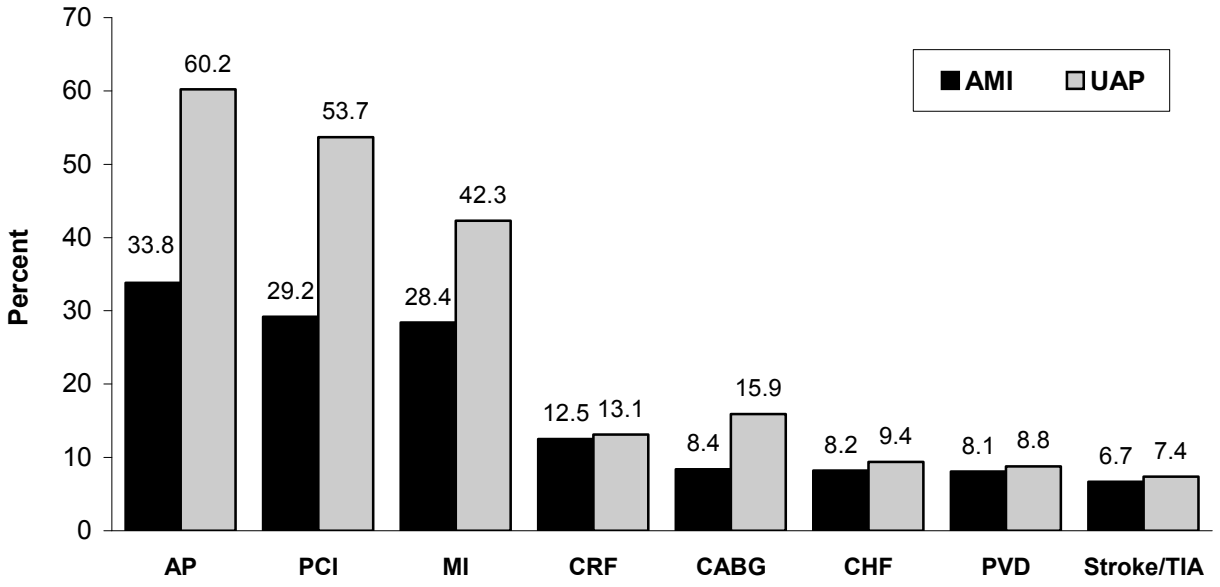
Patients diagnosed with UAP were more likely to have a history of previous angina and MI than patients diagnosed with AMI, and were more likely to have undergone PCI or CABG prior to the current event than those with AMI. Among AMI patients, those with Non-STEMI were more likely to have a history of MI, angina, chronic heart failure, chronic renal failure, and PVD than those with STEMI, and to have undergone PCI or CABG in the past.

Table 2.3: Cardiovascular History

CV history	AMI			UAP
	STEMI (N=772)	Non-STEMI (N=639)	Total (N=1,411)	(N=352)
MI[a,b]	21.5	36.7	28.4	42.3
AP[a,b]	23.4	46.4	33.8	60.2
PCI[a,b]	22.7	37.1	29.2	53.7
CABG[a,b]	3.1	14.7	8.4	15.9
CHF[a]	4.3	12.8	8.2	9.4
Stroke/TIA	5.8	7.8	6.7	7.4
Chronic renal failure[a]	7.5	18.6	12.5	13.1
PVD [a]	6.5	10.0	8.1	8.8

a: STEMI vs Non-STEMI, p<0.05; b: AMI vs UAP, p<0.05

Figure 2.4: Cardiovascular History*



* All graphs are presented according to descending order of patients with AMI

2.3.2 Risk Factors

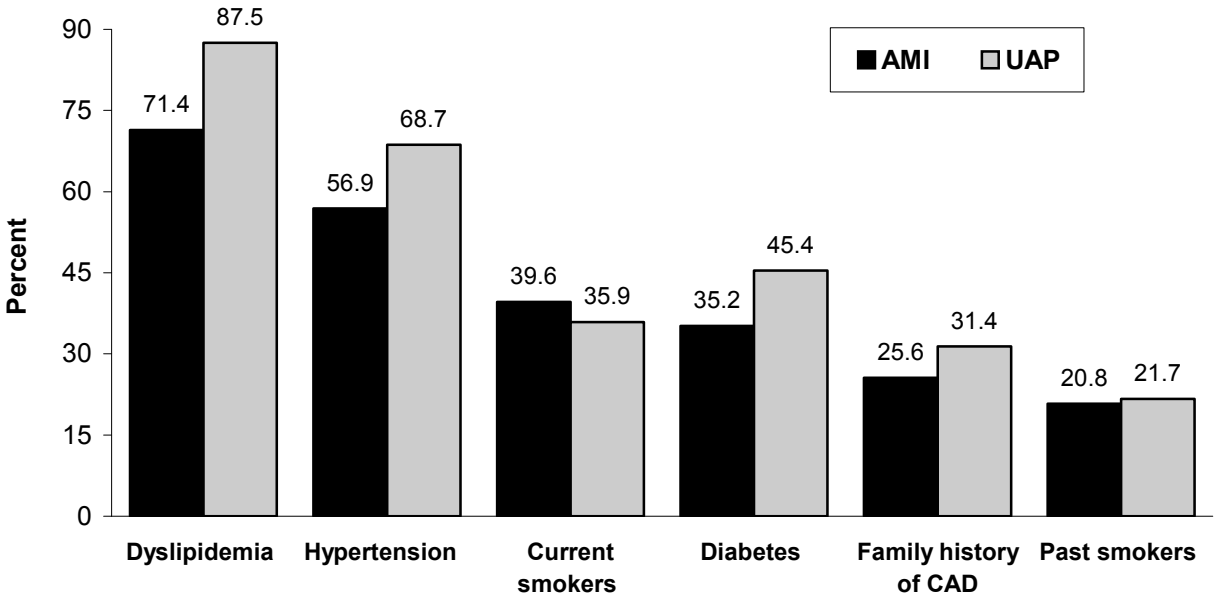
Hypertension, diabetes, dyslipidemia and family history of CAD were more prevalent among patients diagnosed with UAP than patients diagnosed with AMI. The proportion of newly diagnosed hypertension, diabetes and dyslipidemia was higher among patients with AMI than those with UAP. The prevalence of hypertension, diabetes and dyslipidemia was higher among Non-STEMI patients than STEMI patients. Current smoking was more prevalent among STEMI patients, and past smoking was more prevalent among Non-STEMI patients.

Table 2.4: Risk Factors

Risk factors	AMI			UAP
	STEMI (N=772)	Non-STEMI (N=639)	Total (N=1,411)	(N=352)
Hypertension [a,b]	**48.8**	**66.6**	**56.9**	**68.7**
Newly diagnosed *	3.5	3.3	3.4	2.9
Diabetes [a,b]	**27.4**	**44.8**	**35.2**	**45.4**
Newly diagnosed *	6.8	3.6	4.9	2.6
Dyslipidemia [a,b]	**66.4**	**77.4**	**71.4**	**87.5**
Newly diagnosed *	19.4	10.2	14.9	6.3
Current smokers [a]	**47.7**	**29.9**	**39.6**	**35.9**
Past smokers [a]	**17.2**	**25.2**	**20.8**	**21.7**
Family history of CAD [b]	**27.4**	**23.4**	**25.6**	**31.4**

a: STEMI vs Non-STEMI, p<0.05; b: AMI vs UAP, p<0.05; ** newly diagnosed expressed as percentage of total patients with specific risk factor

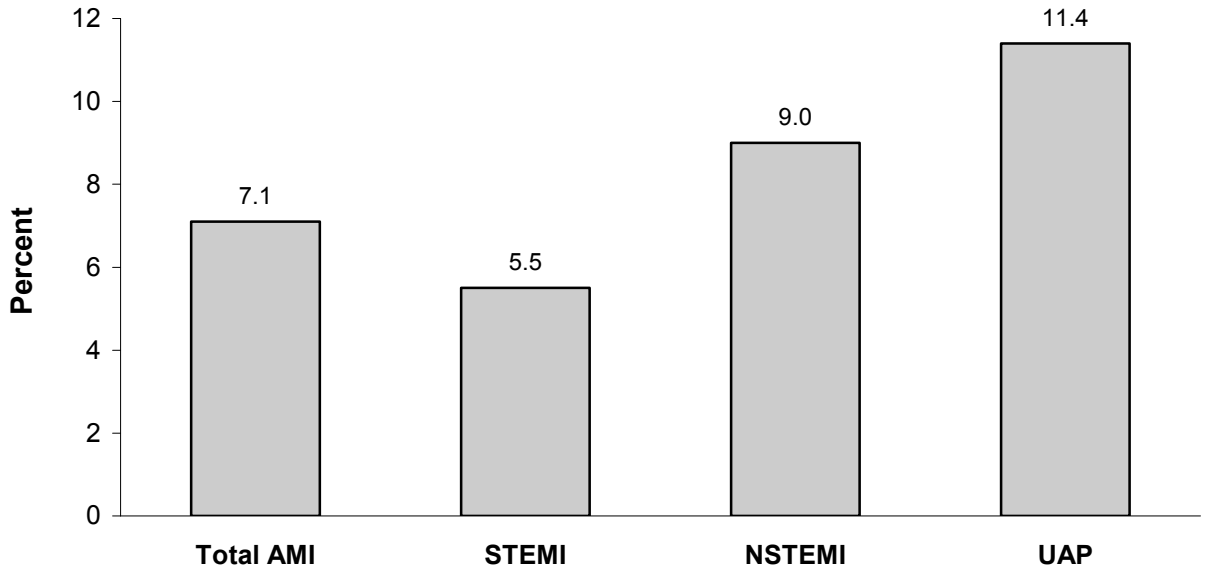
Figure 2.5: Risk Factors



2.3.3 Visit to ER during the Month Preceding Hospitalization

Patients with UAP were more likely to have visited the ER during the preceding month than those with MI. A greater proportion of Non-STEMI patients had visited the ER than STEMI patients in the month preceding the index hospitalization.

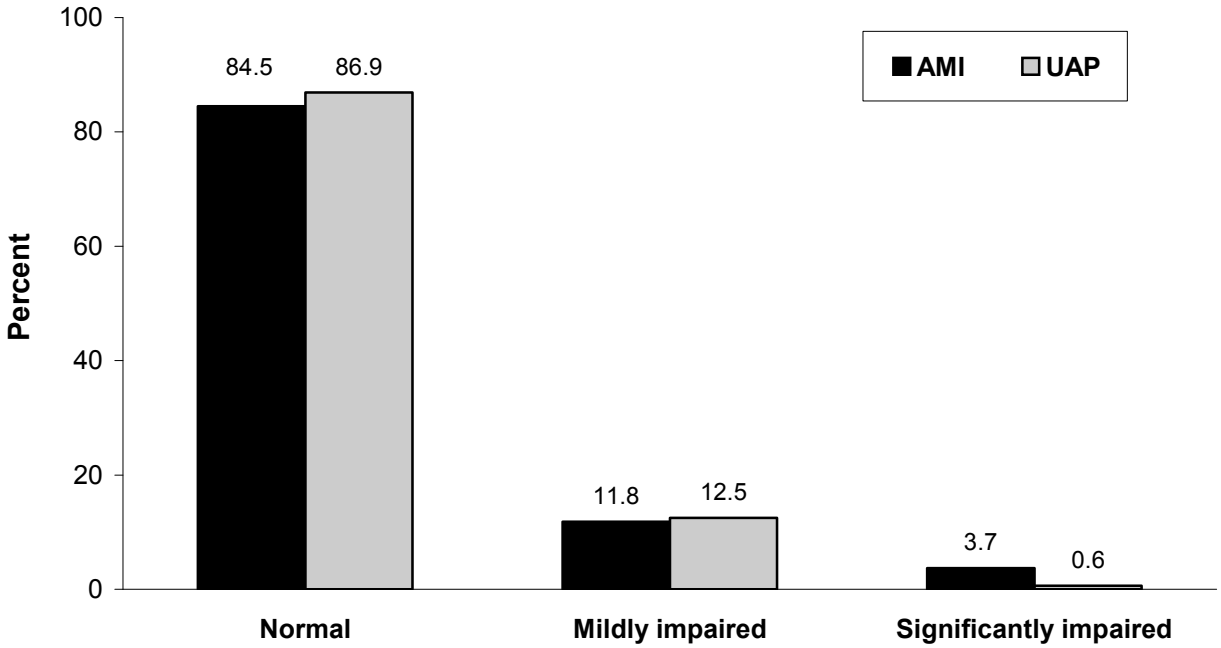
Figure 2.6: Visit to ER during Preceding Month



2.3.4 Patient's General Functional Level

Functional level was similar among AMI and UAP patients. The functional level of the majority of patients (85% of AMI patients and 87% of UAP patients) was normal.

Figure 2.7: Patient's General Functional Level



2.4 Pre-Admission and Admission Information

2.4.1 First Medical Contact

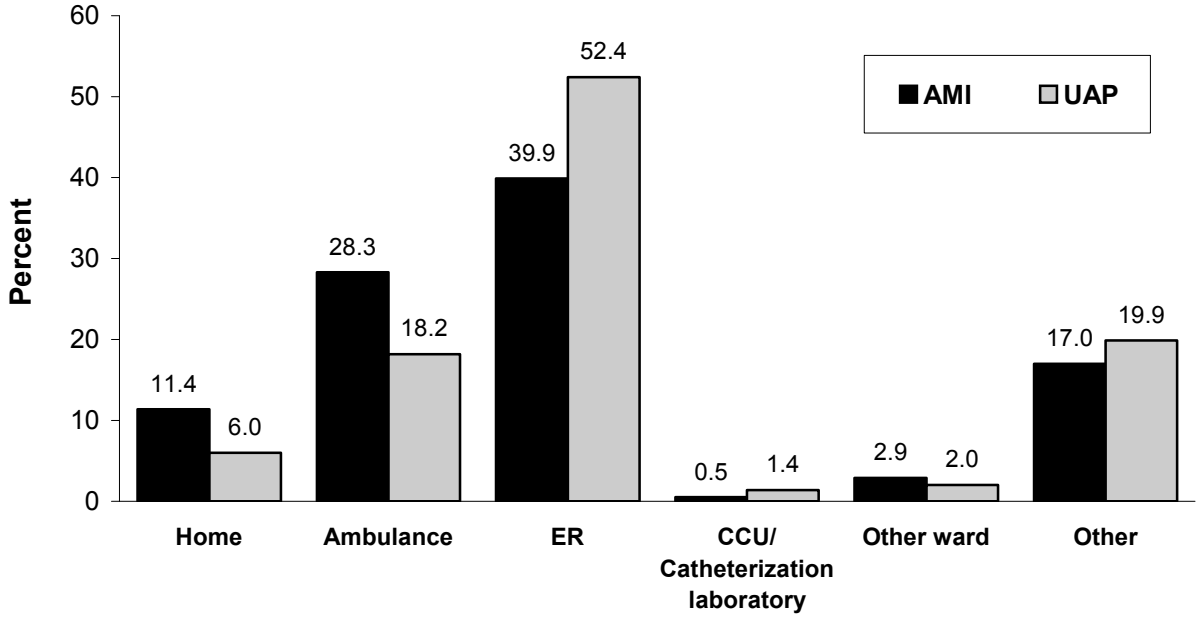
For approximately 40% of AMI patients and 52.4% of UAP patients, the first medical contact was in the ER. A greater proportion of AMI than UAP patients experienced their first medical contact in the ambulance. STEMI patients were more likely than Non-STEMI patients to experience their first medical contact in the ambulance.

Table 2.5: First Medical Contact *

First medical contact a,b	AMI			UAP
	STEMI (N=772)	Non-STEMI (N=639)	Total (N=1,411)	(N=352)
Home	12.1	10.7	11.4	6.0
Ambulance	33.0	22.6	28.3	18.2
ER	36.0	44.6	39.9	52.4
CCU/ Catheterization laboratory	0.7	0.3	0.5	1.4
Other ward	2.4	3.4	2.9	2.0
Other **	15.8	18.4	17.0	19.9

*difference in place of first medical contact; a: STEMI vs Non-STEMI, p<0.05; b: AMI vs UAP, p<0.05
** refers largely to patients whose first medical contact was in a primary care setting

Figure 2.8: First Medical Contact



2.4.2 Presenting Symptoms

Presenting symptoms were similar among patients diagnosed with AMI and UAP, with the exception of arrhythmia, which was more frequent among patients with AMI. Non-STEMI patients were more likely to present with dyspnea and with atypical chest pain than were STEMI patients.

Table 2.6: Presenting Symptoms at First Medical Contact

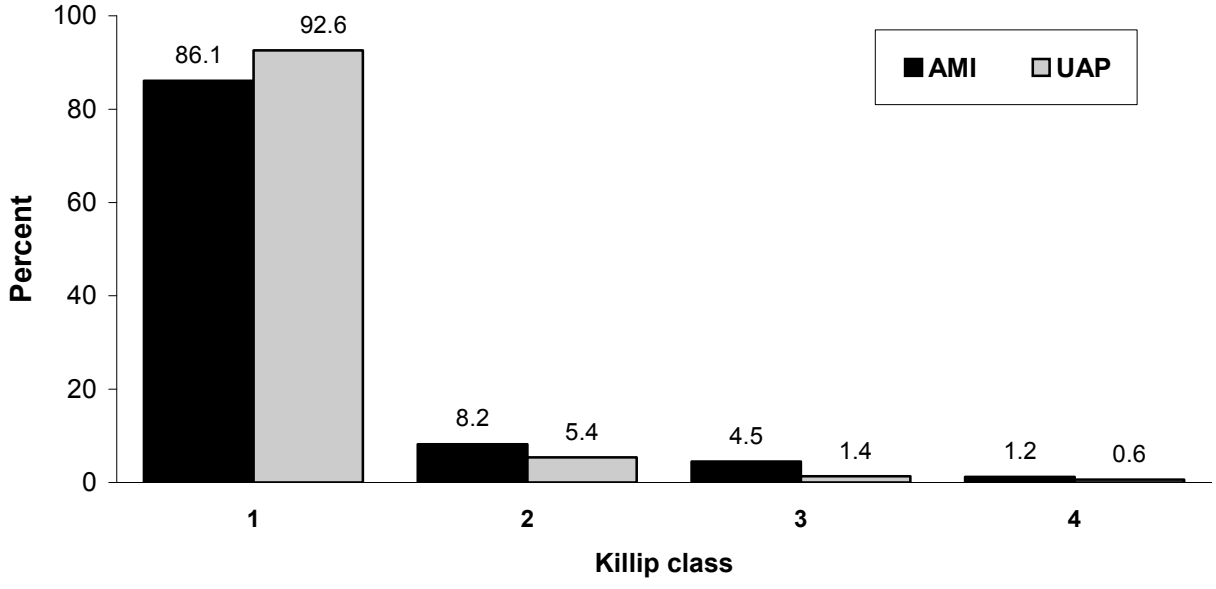
Symptoms	AMI			UAP
	STEMI (N=772)	Non-STEMI (N=639)	Total (N=1,411)	(N=352)
Typical angina[a]	88.6	83.1	86.1	85.2
Atypical chest pain[a]	7.0	10.5	8.6	11.4
Syncope/Aborted SCD	3.5	1.9	2.8	3.1
Arrhythmia[b]	5.2	3.9	4.6	2.3
Dyspnea[a]	24.4	33.0	28.3	25.9
Other[b]	15.7	16.3	15.9	10.2

a: STEMI vs Non-STEMI, p<0.05; b: AMI vs UAP, p<0.05

2.4.3 Killip Class

Patients with AMI were more likely than those with UAP to present with Killip class ≥2.

Figure 2.9: Killip Class on Admission in all Patients



2.4.4 Treatment from Onset to Hospitalization

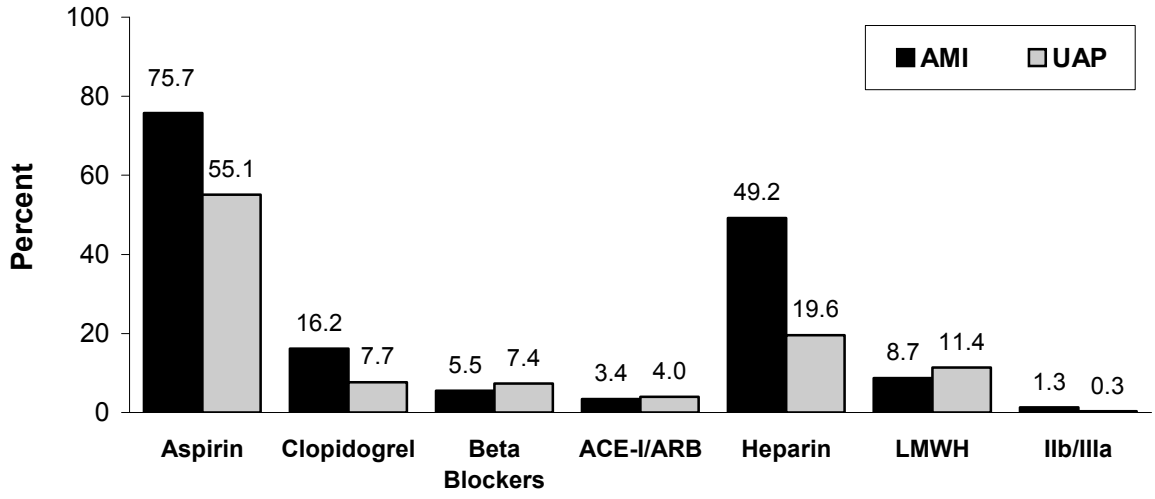
Patients with AMI were more likely than those with UAP to be treated with aspirin, clopidogrel, heparin and narcotics between onset and hospitalization. Among AMI patients, those with STEMI were more frequently treated with aspirin, clopidogrel, heparin, IIb/IIIa antagonists, narcotics and nitrates, and those with Non-STEMI received beta blockers and LMW heparin more frequently than those with STEMI.

Table 2.7: Treatment from Onset to Hospitalization

Treatment	AMI			UAP
	STEMI (N=772)	Non-STEMI (N=639)	Total (N=1,411)	(N=352)
Aspirin[a,b]	86.0	63.2	75.7	55.1
Clopidogrel[a,b]	19.7	12.1	16.2	7.7
Beta Blockers[a]	4.3	6.9	5.5	7.4
Diuretics[a]	3.9	11.7	7.4	8.5
ACE-I[a]	2.2	4.1	3.0	3.7
ARB	0.4	0.3	0.4	0.3
ACE-I/ARB	2.6	4.4	3.4	4.0
Heparin[a,b]	64.0	31.3	49.2	19.6
LMW heparin (fractionated) [a]	6.1	11.9	8.7	11.4
IIb/IIIa antagonists[a]	2.1	0.3	1.3	0.3
Narcotics[a,b]	33.3	11.7	23.5	8.0
Nitrates[a]	43.0	33.3	38.6	35.2
Antiarrhythmics	2.7	3.0	2.8	1.1

a: STEMI vs Non-STEMI, p<0.05; b: AMI vs UAP, p<0.05

Figure 2.10: Treatment from Onset to Hospitalization

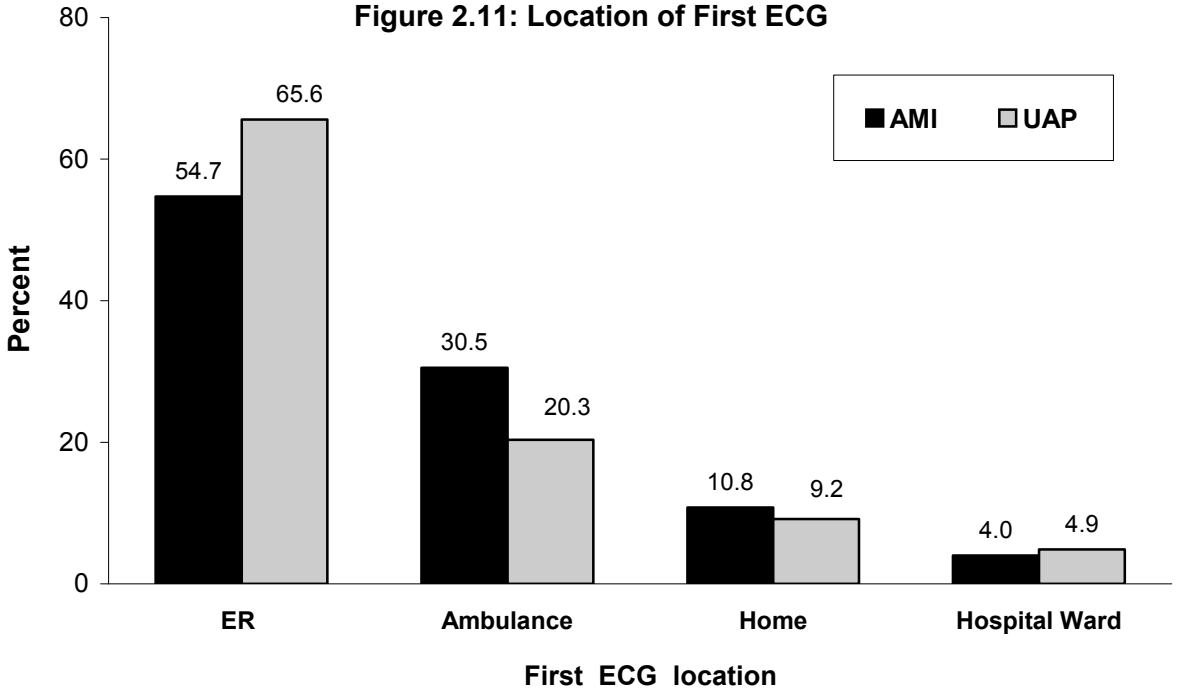


2.5 First Recorded ECG

2.5.1 Location of First ECG Recording

For the majority of patients (55% of AMI patients and 65.6% of UAP patients) the initial ECG was performed in the ER. A larger proportion of AMI patients (31%) than UAP patients (20.3%) underwent their first ECG in the ambulance.

Figure 2.11: Location of First ECG



2.5.2 First ECG Rhythm

The great majority of both AMI (92%) and UAP patients (93%) presented with normal sinus rhythm.

Table 2.8: First ECG Rhythm

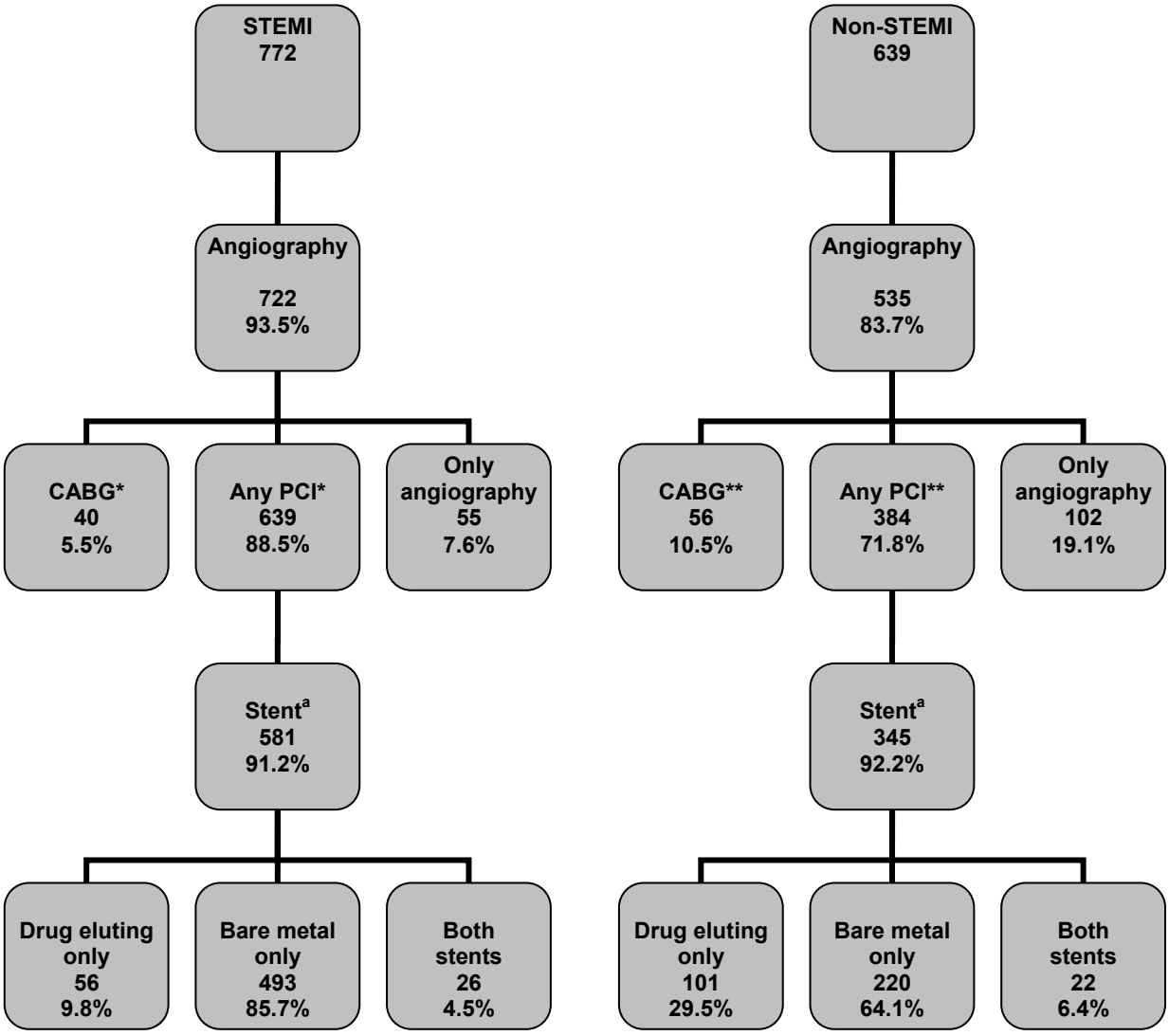
ECG rhythm	AMI			UAP
	STEMI (N=772)	Non-STEMI (N=639)	Total (N=1,411)	(N=352)
NSR	92.2	91.1	91.7	92.9
AF	3.8	4.7	4.2	4.0
SVT	0.0	0.3	0.1	0.6
VT/VF	0.5	0.2	0.4	0.3
Other	3.5	3.7	3.6	2.2

2.6 Coronary Interventions and Procedures during Hospitalization

2.6.1 Coronary Angiography and Interventions

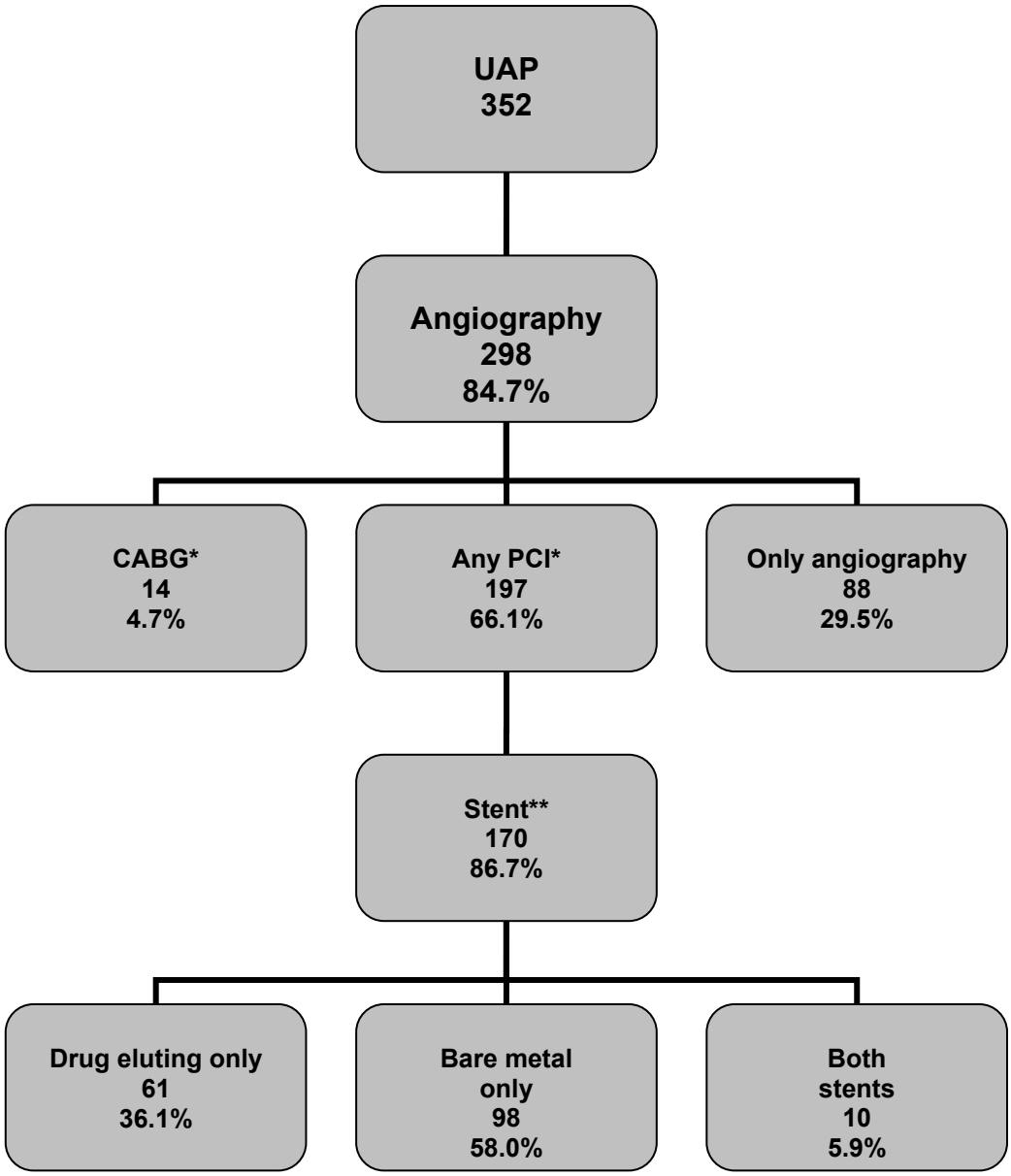
Among AMI patients, those with STEMI were more likely than those with non STEMI to undergo coronary angiography and PCI. CABG was performed more frequently among Non-STEMI patients than those with STEMI. Patients with UAP underwent cardiac interventions with less frequency than AMI patients. For the majority of patients, bare metal stents were employed. However, almost one third of Non STEMI and UAP patients received drug-eluting stents.

Figure 2.12: In-Hospital Cardiac Interventions and Procedures among AMI Patients



* 12 patients underwent both CABG and PCI; ** 7 patients underwent both CABG and PCI
a. For a small number of patients type of stent is unknown

Figure 2.12-cont.: In-Hospital Cardiac Interventions and Procedures among UAP Patients



* One patient underwent both CABG and PCI; ** for one patient, type of stent is unknown

2.6.2 Other Procedures

Most procedures (DC shock, CPR, ventilation, IA balloon, ECHO and temporary pacemaker) were administered with greater frequency to patients with AMI than those with UAP. Stress tests were administered more frequently to patients with UAP than to those with AMI. Patients with STEMI underwent procedures more frequently than those with Non-STEMI.

Table 2.9: Other Procedures

Procedures	AMI			UAP
	STEMI (N=772)	Non-STEMI (N=639)	Total (N=1,411)	(N=352)
DC shock[a]	5.3	0.9	3.3	1.7
Resuscitation (CPR)[a,b]	5.2	1.4	3.5	0.3
Ventilation[a,b]	6.7	4.1	5.5	0.6
IA Balloon[a,b]	8.2	3.3	6.0	0.3
ECHO[a,b]	90.0	78.1	84.6	58.5
EPS[a]	0.6	0.0	0.4	0.3
Stress test/SPECT[a,b]	0.3	1.3	0.7	6.8
Permanent pacemaker	0.5	0.6	0.6	0.3
Temporary pacemaker[a,b]	4.8	1.1	3.1	0.0
Hypothermia for anoxic brain damage	0.0	0.2	0.1	0.0

a: STEMI vs Non-STEMI, p<0.05; b: AMI vs UAP, p<0.05

2.7 Ejection Fraction

Ejection fraction was determined in 83.1% of patients with AMI and in 70.1 percent of patients with UAP. A greater proportion of UAP patients presented with normal EF. Among AMI patients, normal EF was more frequent among those with Non-STEMI.

Table 2.10: Ejection Fraction

Ejection fraction	AMI			UAP
	STEMI (N=772)	Non-STEMI (N=639)	Total (N=1,411)	(N=352)
EF determined (%)	86.5	79.1	83.1	70.1
Normal (≥50%)	37.6	52.9	44.2	68.6
Mild (40-49%)	36.0	26.1	31.8	16.3
Moderate (30-39%)	19.7	12.4	16.5	10.1
Severe (<30%)	6.7	8.6	7.5	5.0

2.8 In-Hospital Complications

Hemodynamic and electrical complications were more frequent in patients with AMI than those with UAP. Among AMI patients these complications were more frequent in STEMI vs Non-STEMI patients.

Table 2.11: In-Hospital Complications

Complications	AMI			UAP
	STEMI (N=772)	Non-STEMI (N=639)	Total (N=1,411)	(N=352)
CHF mild-moderate (Killip 2) [b]	9.2	7.4	8.4	4.8
Pulmonary edema (Killip 3) [b]	6.6	9.1	7.7	2.3
Cardiogenic shock (Killip 4) [a,b]	4.7	2.0	3.5	0.0
Hemodynamically significant RVI [a,b]	2.6	0.5	1.6	0.0
Re-MI [b]	2.1	1.4	1.8	0.3
Post MI angina /re-ischemia [b]	3.5	5.2	4.3	0.9
Sub-acute stent thrombosis [b]	1.7	0.8	1.3	0.0
Free wall rupture [a]	1.4	0.0	0.8	0.0
Pericarditis	0.9	0.2	0.6	0.0
Tamponade [a]	1.0	0.2	0.6	0.0
VSD	0.5	0.3	0.4	0.0
Moderate-severe MR [b]	1.8	2.2	2.0	0.3
RBBB (new onset)	1.9	1.1	1.6	0.3
LBBB (new onset)	0.5	0.9	0.7	0.6
High degree AVB [a,b]	4.4	0.6	2.7	0.3
Sustained VT [a,b]	2.8	0.6	1.8	0.3
Primary VF [a,b]	3.5	0.0	1.9	0.0
Secondary VF [a]	2.5	0.5	1.6	0.6
AF	6.2	5.3	5.8	4.0
Asystole [a,b]	3.4	1.4	2.5	0.3
TIA	0.1	0.3	0.2	0.0
Stroke	0.9	0.6	0.8	0.0
CVA/TIA in hospital	1.0	0.9	1.0	0.0
Acute renal failure	5.6	4.2	5.0	2.6
Major bleeding	1.9	1.7	1.8	0.6
Infection [b]	5.1	4.7	4.9	2.0

a: STEMI vs Non-STEMI, $p<0.05$; b: AMI vs UAP, $p<0.05$

2.9 In-Hospital Medical Treatment

Almost all AMI and UAP patients received aspirin, and approximately 94% of both groups received lipid-lowering drugs. AMI patients were more likely than UAP patients to receive unfractionated or regular heparin, clopidogrel and ACE Inhibitors/ARB. Hypoglycemic drugs and calcium antagonists were more frequently prescribed for UAP patients.

Table 2.12: In-Hospital Treatment

Treatment	AMI			UAP
	STEMI (N=772)	Non-STEMI (N=639)	Total (N=1,411)	(N=352)
Aspirin	97.4	97.8	97.6	97.7
Warfarin	4.7	4.1	4.4	3.1
Heparin (unfractionated/regular) [a,b]	48.1	29.5	39.7	24.6
LMW heparin (fractionated) [a]	41.3	61.4	50.4	48.6
Clopidogrel [a,b]	92.4	87.6	90.2	83.2
ACE-I [b]	71.8	69.1	70.6	58.2
ARB [a,b]	4.7	10.1	7.1	11.1
ACE-I/ARB [b]	75.6	77.4	76.4	68.2
IIb/IIIa antagonists [a,b]	50.0	19.9	36.4	9.7
Aldosterone receptor antagonist [a]	6.2	3.6	5.0	3.7
Beta Blockers	82.5	83.5	83.0	78.7
IV inotropic agent [a,b]	5.2	2.7	4.0	0.3
Digoxin	2.3	2.5	2.4	1.1
Diuretics [a]	24.4	34.4	28.9	31.0
Insulin [a]	10.3	19.4	14.4	15.7
Hypoglycemic drugs (Oral) [a,b]	9.5	18.6	13.6	21.0
Statins	93.9	93.3	93.6	93.2
Fibrate [b]	4.7	5.5	5.1	8.0
Ezetimibe [a,b]	0.4	1.4	0.9	2.9
LLD	95.3	94.2	94.8	94.0
Calcium antagonists [a,b]	12.1	22.2	16.7	31.4
Nitrates [a]	23.1	31.0	26.7	31.3
Other drugs	70.9	69.3	70.2	71.0

a: STEMI vs Non-STEMI, $p<0.05$; b: AMI vs UAP, $p<0.05$

2.10 Duration of Hospitalization

The median length of stay in the CCU was one day longer for patients with AMI (4 days) than for those with UAP (3 days). Median length of total hospital stay was two days longer for AMI patients than UAP patients.

Table 2.13: Length of Stay in CCU

Days	AMI			UAP
	STEMI (N=772)	Non-STEMI (N=639)	Total (N=1,411)	(N=352)
Median	4.0	4.0	4.0	3.0
Interquartile range (25%-75%)	(3.0-6.0)	(3.0-5.0)	(3.0-6.0)	(2.0-4.0)

Table 2.14: Length of Total Hospital Stay

Days	AMI			UAP
	STEMI (N=772)	Non-STEMI (N=639)	Total (N=1,411)	(N=352)
Median	5.0	5.0	5.0	3.0
Interquartile range (25%-75%)	(4.0-7.0)	(3.0-6.0)	(4.0-7.0)	(2.0-5.0)

2.11 Medical Treatment on Discharge

Most of the "recommended drugs"* were given more frequently to AMI patients.

Diuretics, insulin, hypoglycemic drugs, nitrates and calcium antagonists were prescribed more frequently for patients with UAP.

Table 2.15: Medical Treatment on Discharge among Hospital Survivors

Recommended treatment	AMI			UAP
	STEMI (N=742)	Non-STEMI (N=625)	Total (N=1,367)	(N=352)
Aspirin	96.8	96.0	96.4	95.2
Warfarin	5.7	5.2	5.4	3.7
LMW heparin [b]	9.8	8.4	9.2	5.2
Clopidogrel [a,b]	87.1	76.2	82.1	70.9
ACE-inhibitors [a,b]	72.5	66.5	69.8	58.5
ARB [a]	5.3	10.3	7.6	10.6
ACE/ARB [b]	77.3	76.8	77.1	68.5
Aldosterone [a]	6.9	3.6	5.4	5.2
Beta Blockers [b]	83.4	82.5	83.0	77.5
IV inotropic agent	0.4	0.2	0.3	0.0
Digoxin	1.2	2.3	1.7	0.6
Diuretics [a,b]	17.9	28.5	22.8	28.4
Insulin [a,b]	5.4	10.6	7.8	11.7
Hypoglycemic drugs [a,b]	12.5	21.6	16.7	23.9
Statins [a]	94.2	90.7	92.6	92.6
Fibrate [b]	4.3	6.3	5.2	9.2
Ezetimibe [a]	0.8	2.1	1.4	2.3
LLD [a]	95.6	91.3	93.6	93.8
Calcium antagonists [a,b]	12.3	22.0	16.7	31.9
Nitrates [a,b]	4.3	11.4	7.6	12.9
Other drugs	58.8	62.2	60.4	61.4

a: STEMI vs Non-STEMI, $p<0.05$; b: AMI vs UAP, $p<0.05$

* Heparin, clopidogrel, ACE/ARB, beta bockers and lipid-lowering drugs

2.12 Re-Hospitalization within 30 Days of Admission

Re-hospitalization rates were higher for patients with AMI (18.9%) than for those with UAP (15.3%). AMI patients were more likely to be rehospitalized following an urgent cardiac event (43.7%), and UAP patients were more likely to be rehospitalized for a scheduled procedure (51% of all rehospitalizations).

Table 2.16: Re-hospitalization within 30 Days of Admission

	AMI			UAP
	STEMI (N=742)	Non-STEMI (N=625)	Total (N=1,367)	(N=352)
Rehospitalized (%)	18.0	19.9	18.9	15.3
Reason for Re-hospitalization				
Scheduled	26.8	38.1	32.2	51.0
Urgent Cardiac event	44.9	42.4	43.7	35.3
Non-cardiac hospitalization	28.3	19.5	24.1	13.7

2.13 Mortality and Major Adverse Coronary Event (MACE)

Unadjusted 7-day and 30-day mortality rates were considerably higher for patients diagnosed with AMI than for those diagnosed with UAP, and highest among those with STEMI. After adjustment for age and other risk factors, 7-day mortality rates were 4 times higher for AMI than UAP patients (although statistical significance was borderline) and 30-day mortality was almost 7 times higher for AMI patients. Among AMI patients, 7-day mortality rates were 4.6 times higher and 30-day mortality was 2.5 times higher among those with STEMI compared with Non-STEMI patients.

Unadjusted rates of Major Adverse Conorary Event (MACE), which includes recurrent MI, recurrent ischemia, stent thrombosis, ischemic stroke, urgent revascularization (follow-up) or death occurring within 30 days from admission, were 3 times higher for patients diagnosed with AMI than those diagnosed with UAP. Among AMI patients, unadjusted rates of MACE were similar among STEMI and Non-STEMI patients, however after adjustment for age and other risk factors, MACE was found to be 1.5 times higher in STEMI patients.

Figure 2.13: Unadjusted 7-Day and 30-Day Mortality Rates

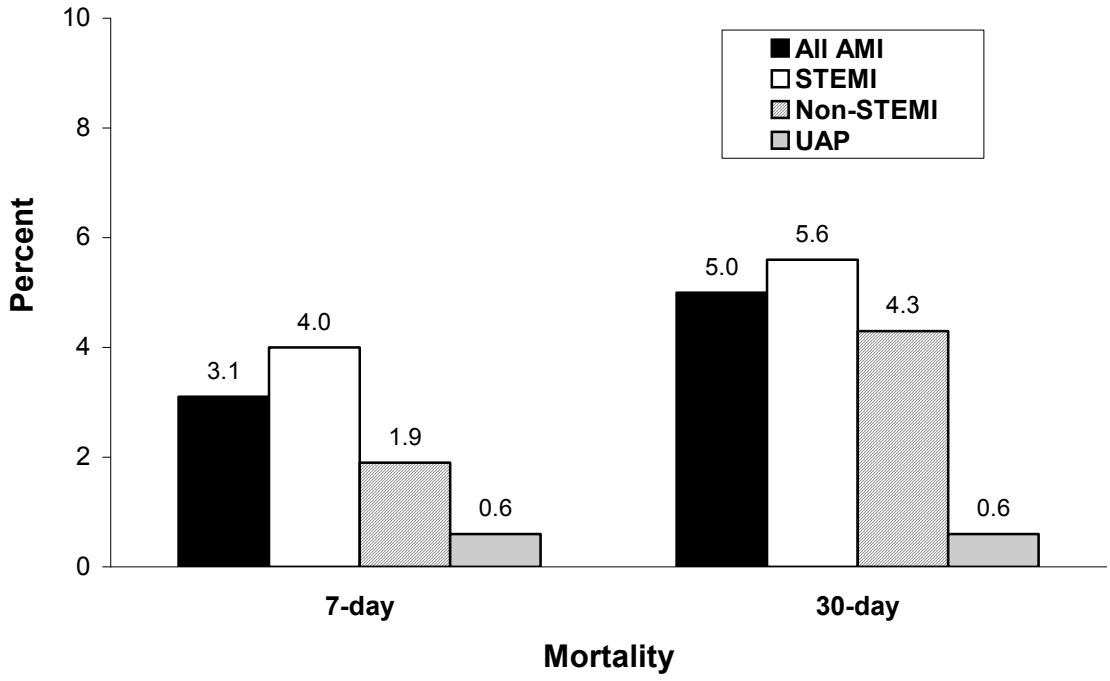


Figure 2.14: Unadjusted Rates of MACE

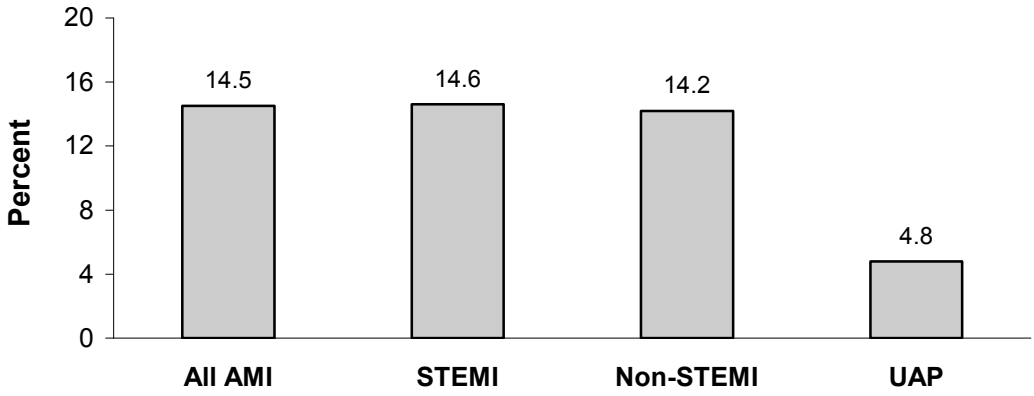


Table 2.17: Rates of Mortality and MACE by Discharge Diagnosis Adjusted for Age and Other Risk Factors

	All AMI (N=1,411)* (%)	UAP (N=352)* (%)	Age-Adjusted OR (95% CI)	Risk Factor Adjusted OR** (95% CI)
7-day	3.0	0.6	5.19 (1.24-21.6)	4.09 (0.97-17.3)
30-day	4.9	0.6	8.70 (2.11-35.9)	6.85 (1.63-28.7)
MACE* **	14.4	5.0	3.35 (2.00-5.59)	3.29 (1.96-5.54)

* age adjusted
** adjusted for age, gender, past MI, diabetes, hypertension, Killip class≥2, any angiography
*** definition includes: recurrent MI, recurrent ischemia, stent thrombosis, ischemic stroke, urgent revascularization (follow-up) or death occurring within 30 days from hospitalization.

.

Table 2.18: AMI patients: Rates of Mortality and MACE by Type of MI Adjusted for Age and Other Risk Factors

	STEMI (N=772)* (%)	Non STEMI (N=639)* (%)	Age-Adjusted OR (95% CI)	Risk Factor Adjusted OR** (95% CI)
7-day	4.7	1.6	3.07 (1.54-6.13)	4.60 (2.08-10.20)
30-day	6.6	3.5	1.92 (1.15-3.21)	2.53 (1.39-4.61)
MACE* **	16.2	13.2	1.28 (0.94-1.74)	1.52 (1.09-2.12)

* age adjusted
** adjusted for age, gender, past MI, diabetes, hypertension, Killip class≥2, any angiography
*** definition includes: recurrent MI, recurrent ischemia, stent thrombosis, ischemic stroke, urgent revascularization (follow-up) or death occurring within 30 days from hospitalization.

Chapter 3:
Acute Coronary Syndrome by Sex

3.1 Sex Distribution and Mean Age

Of the 1,763 patients in the ACSIS 2008 study population, 79.4% (1,399) were men and 20.6% (364) were women. Male patients with ACS were, on average, 9.2 years younger than female patients (mean ages: 61.4 and 70.6, respectively).

Table 3.1: Sex Distribution and Mean Age

Sex	N	%	Mean age ± SD
Men	1,399	79.4	61.4 ± 12.7
Women	364	20.6	70.6 ± 12.8
Total	1,763	100.0	63.3 ± 13.2

3.2 Age Distribution in Men and Women

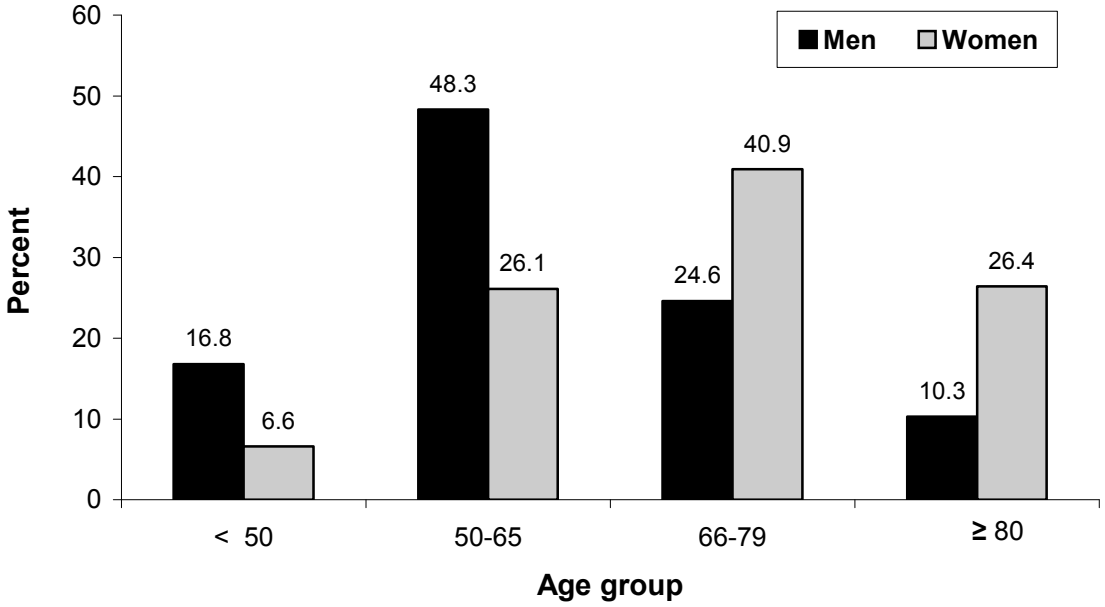
The age distribution of male patients was significantly different from that of female patients. The majority of men (65.1%) were in the younger age groups (≤65) and only 10.3% were aged 80 or above. 16.8% of men were less than 50 years old. By contrast, the majority of women (67.3%) were in the older age groups (>65), and 26.4% were aged 80 or above. Only 6.6% of women were under age 50.

Table 3.2: Age Distribution

Age group* (years)	Men		Women		Total	
	n	%	n	%	N	%
< 50	235	16.8	24	6.6	259	14.7
50-65	676	48.3	95	26.1	771	43.7
66-79	344	24.6	149	40.9	493	28.0
≥ 80	144	10.3	96	26.4	240	13.6
Total	1,399	100.0	364	100.0	1763	100.0

* $p<0.05$

Figure 3.1: Age Distribution



3.3 Cardiovascular History and Risk Factors

3.3.1 Cardiovascular History

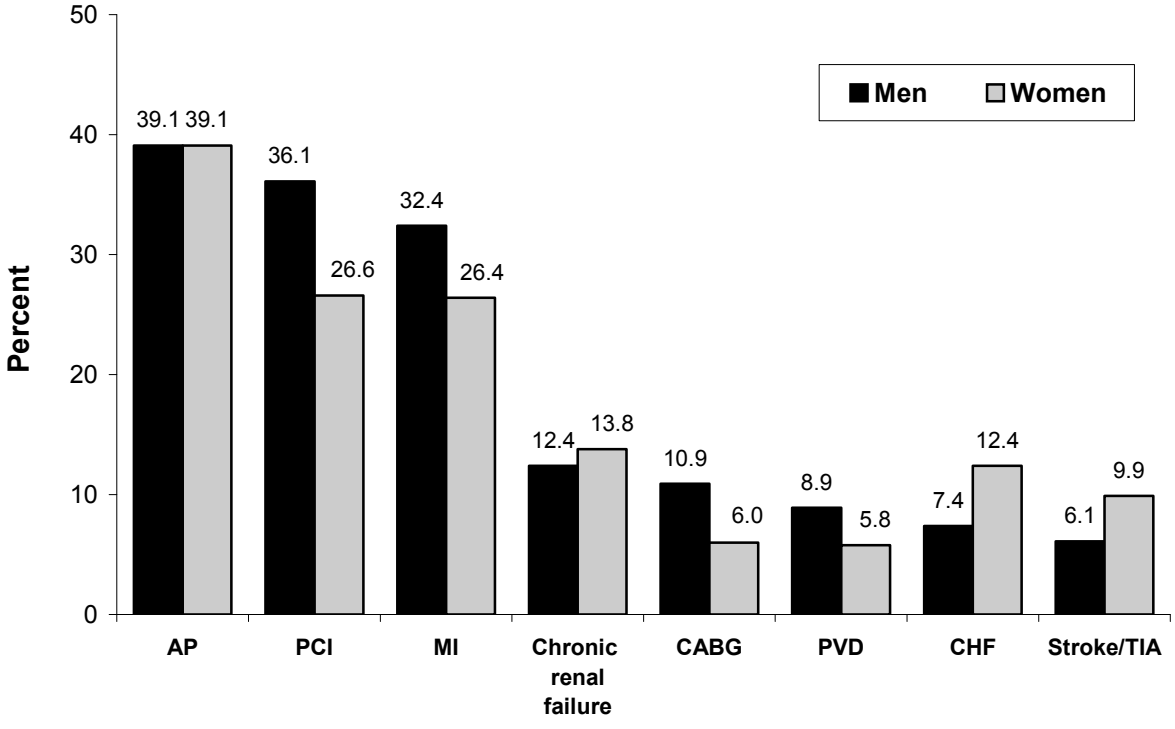
Almost one-third of male patients (32.4%) and over one quarter of female patients (26.4%) had a history of prior MI, and 39.1% of both male and female patients had a history of angina pectoris. Men were more likely than women to have undergone PCI or CABG. Women were more likely than men to have a history of stroke or TIA, and a history of heart failure than men.

Table 3.3: Cardiovascular History

CV history	Men (N=1,399) %	Women (N=364) %
MI*	32.4	26.4
AP	39.1	39.1
Stroke/TIA*	6.1	9.9
CHF*	7.4	12.4
PCI*	36.1	26.6
CABG*	10.9	6.0
Chronic renal failure (CRF)	12.4	13.8
PVD	8.9	5.8

*p<0.05

Figure 3.2: Cardiovascular History



3.3.2. Risk Factors

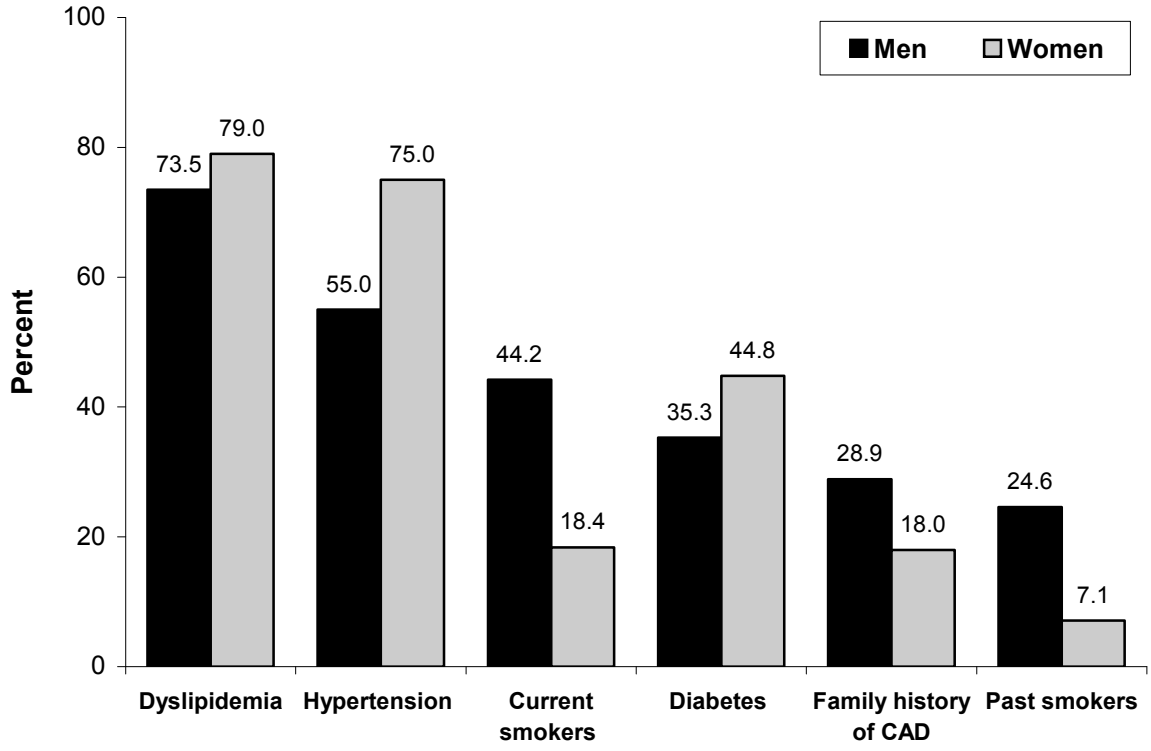
Dyslipidemia was the most prevalent risk factor in both men and women (73.5% of men and 79% of women). Hypertension and diabetes were found to be more prevalent in women, while family history of CAD, past and current smoking were more prevalent among men (Figure 3.3). The proportions of newly diagnosed dyslipidemia, hypertension and diabetes were higher in men with these risk factors than in women (Figure 3.4).

Table 3.4: Risk Factors

Risk factors	Men (N=1,399) %	Women (N=364) %
Dyslipidemia	73.5	79.0
Hypertension*	55.0	75.0
Diabetes*	35.3	44.8
Current smokers*	44.2	18.4
Past smokers*	24.6	7.1
Family history of CAD*	28.9	18.0

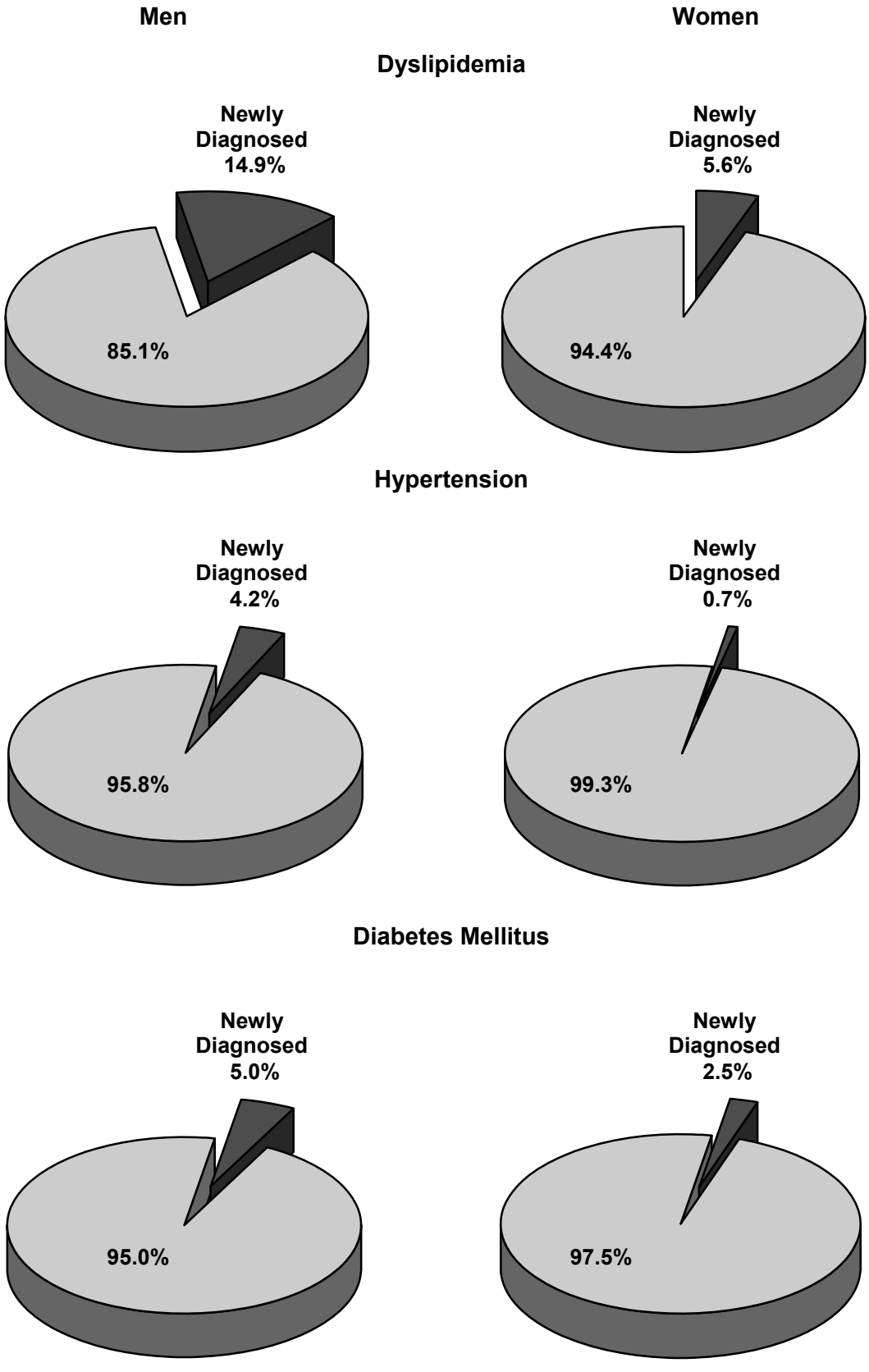
*p<0.05

Figure 3.3: Risk Factors



3.3.2.1 Newly Diagnosed Risk Factors

Figure 3.4: Newly Diagnosed Risk Factors*

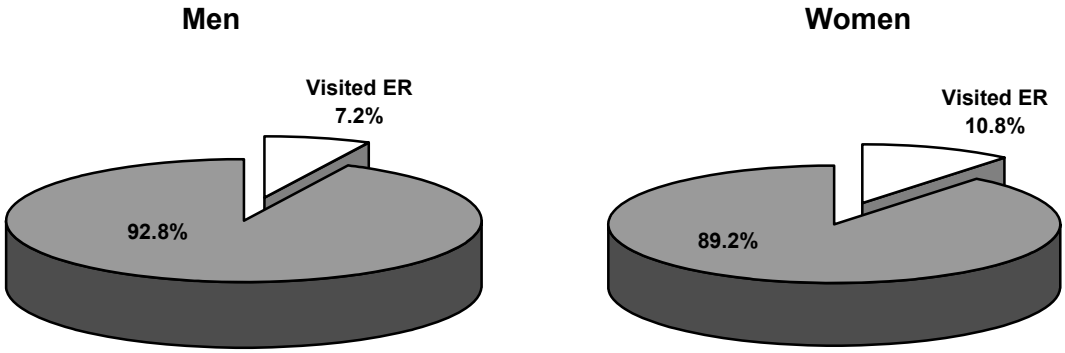


*as percentage of patients with risk factor

3.3.3 Visit to ER during the Month Preceding Hospitalization

7.2% of male patients and 10.8% of female patients had visited the ER during the month preceding hospitalization.

Figure 3.5: Visit to ER during Preceding Month



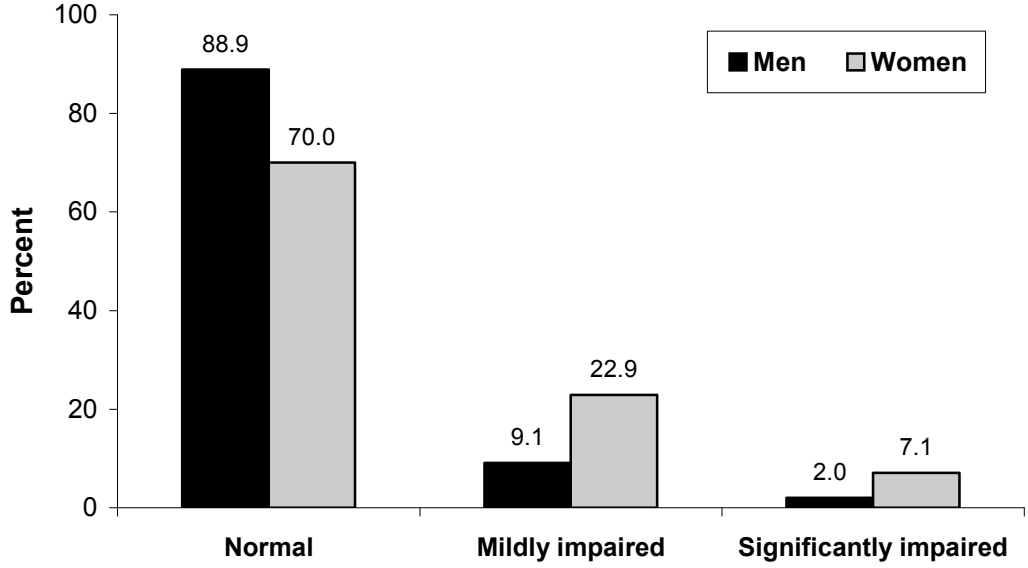
3.3.4 Patient's General Functional Level

The functional level of male patients was significantly higher than that of female patients. Over 30% of women had some functional impairment, as compared with 11.1% of men.

Table 3.5: General Functional Level

Functional level	Men (N=1,399) %	Women (N=364) %
Normal	88.9	70.0
Mildly impaired	9.1	22.9
Significantly impaired	2.0	7.1

Figure 3.6: General Functional Level



3.4 Prior Chronic Treatment

Approximately 50% of both men and women were being treated with aspirin at the time of the event. Other drugs in common use were ACE inhibitors and ARB, beta blockers, lipid lowering drugs and oral hypoglycemic drugs. Women were more likely than men to be treated with anticoagulants, ACE-I/ARB, beta blockers, diuretics, insulin, hypoglycemic drugs, nitrates and calcium antagonists (Table 3.6).

Table 3.6: Prior Medical Treatment

Treatment	Men (N=1,399) %	Women (N=364) %
Aspirin	49.4	53.7
Anticoagulants*	3.7	6.1
Clopidogrel	12.6	9.1
ACE-I	29.6	42.7
ARB	7.0	11.6
ACE-I/ARB*	35.9	53.4
Aldosterone receptor antagonist	1.2	1.4
Beta Blockers*	34.8	49.0
Digoxin	0.7	1.7
Diuretics*	16.4	27.5
Insulin*	6.3	12.1
Hypoglycemic drugs (Oral)*	20.9	28.8
Statins*	46.8	59.9
Fibrate	4.3	4.1
Ezetimibe	1.3	0.6
All lipid lowering drugs*	48.0	61.3
Calcium antagonists*	19.4	32.5
Nitrates*	8.9	12.7
Other drugs*	35.6	55.8

*$p<0.05$

3.5 Transportation, Pre-admission and Admission Information

3.5.1 Mode of Transportation

Close to half of all male patients (48.4%) and 35.1% of women patients reached the hospital by private transportation. Approximately 40% of patients, both men and women, arrived by means of mobile CCU units. Women were more likely than men to arrive by regular ambulance.

Table 3.7: Mode of Transportation

Mode of transportation to hospital	Men (N=1,399) %	Women (N=364) %
Mobile CCU	39.1	40.9
Regular ambulance	9.1	15.5
Private car/independently	48.4	35.1
Not relevant (in-patient)	3.5	8.6

3.5.2 First Arrival

No differences were found between men and women with respect to the first ward of arrival (Emergency Room for 87.7% of both men and women).

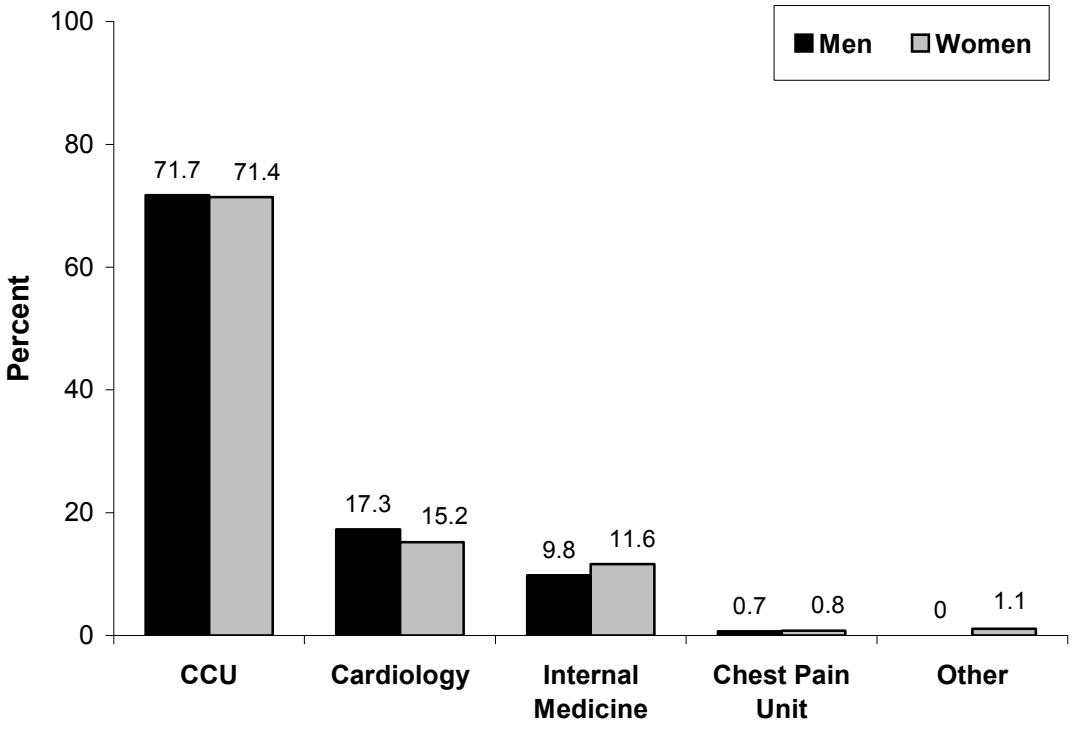
Table 3.8: First Arrival

Ward of First Arrival	Men (N=1,399) %	Women (N=364) %
Emergency Room (ER)	87.7	87.7
Direct to CCU	8.5	10.0
Catheterization Laboratory	3.9	2.2

3.5.3 First Ward of Hospitalization

For the majority of patients, the first ward of hospitalization was the Coronary Care Unit. No differences were found between men and women with regard to first ward of hospitalization.

Figure 3.7: First Ward of Hospitalization



3.5.4. Length of Time from Symptom Onset to Admission

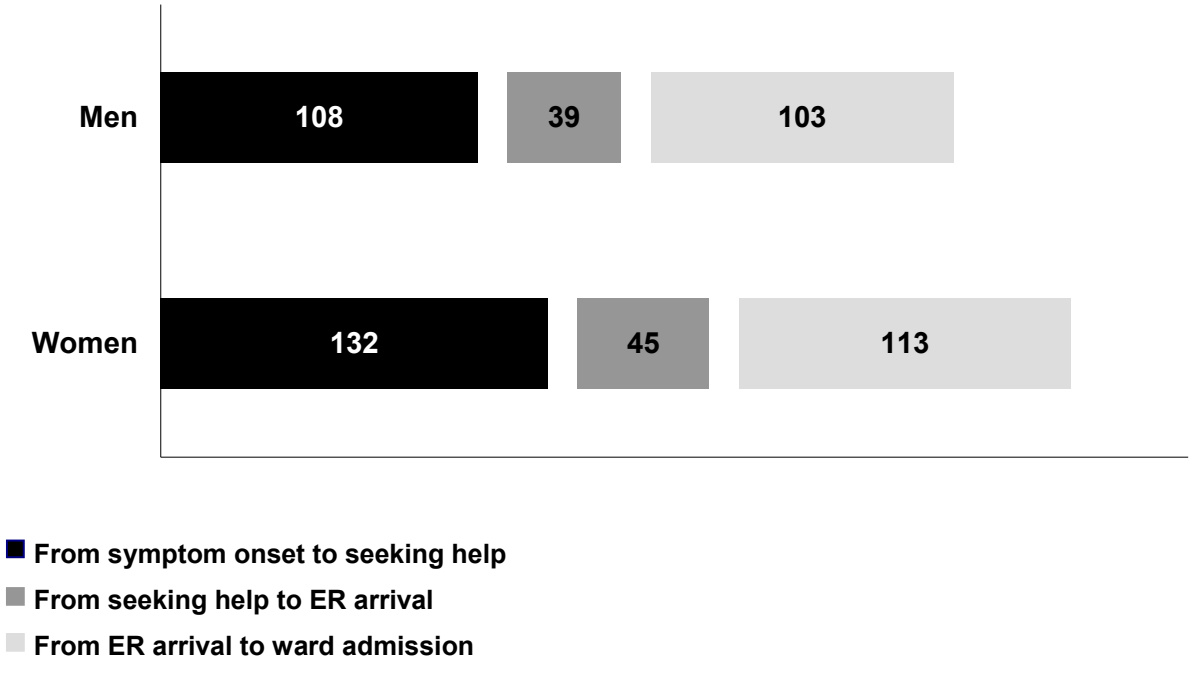
The median time interval elapsing between symptom onset and help-seeking was longer for women with ACS (132 minutes) than for men (108 minutes); however this difference was not statistically significant. Transportation time to hospital was rather similar for men and women. The median time elapsing between arrival at the emergency room and admission to the ward was similar for women and men. For 25% of both men and women, this time delay was greater than 3 hours.

Table 3.9: Length of Time from Symptom Onset to Admission

	Length of time (minutes)					
	Men (N=1,399)			Women (N=364)		
	n*	Median	25%-75%	n*	Median	25%-75%
Symptom onset to seeking help	1,038	108	45-383	252	132	48-426
Seeking help to ER arrival**	1,161	39	0-65	297	45	15-79
ER arrival to first ward of admission	1,349	103	42-191	345	113	50-201

* number of patients for whom data was available
* *p<0.05

Figure 3.8: Median Length of Time from Symptom Onset to Admission (minutes)



3.5.5 First Medical Contact

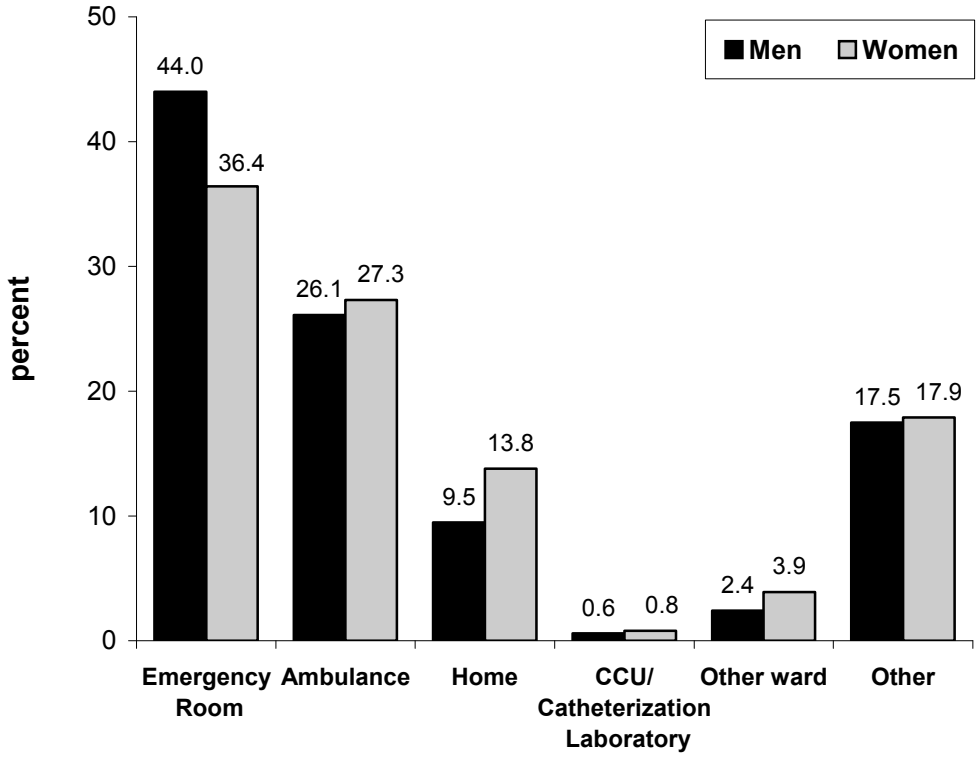
Men were somewhat more likely than women to experience their first medical contact in the emergency room, and women were more likely than men to experience their first medical contact at home.

Table 3.10: First Medical Contact

First medical contact*	Men (N=1,399) %	Women (N=364) %
Home	9.5	13.8
Ambulance	26.1	27.3
Emergency Room	44.0	36.4
CCU/Catheterization Laboratory	0.6	0.8
Other ward	2.4	3.9
Other**	17.5	17.9

*p<0.05 for M/F difference
** refers largely to patients whose first medical contact was in a primary care setting

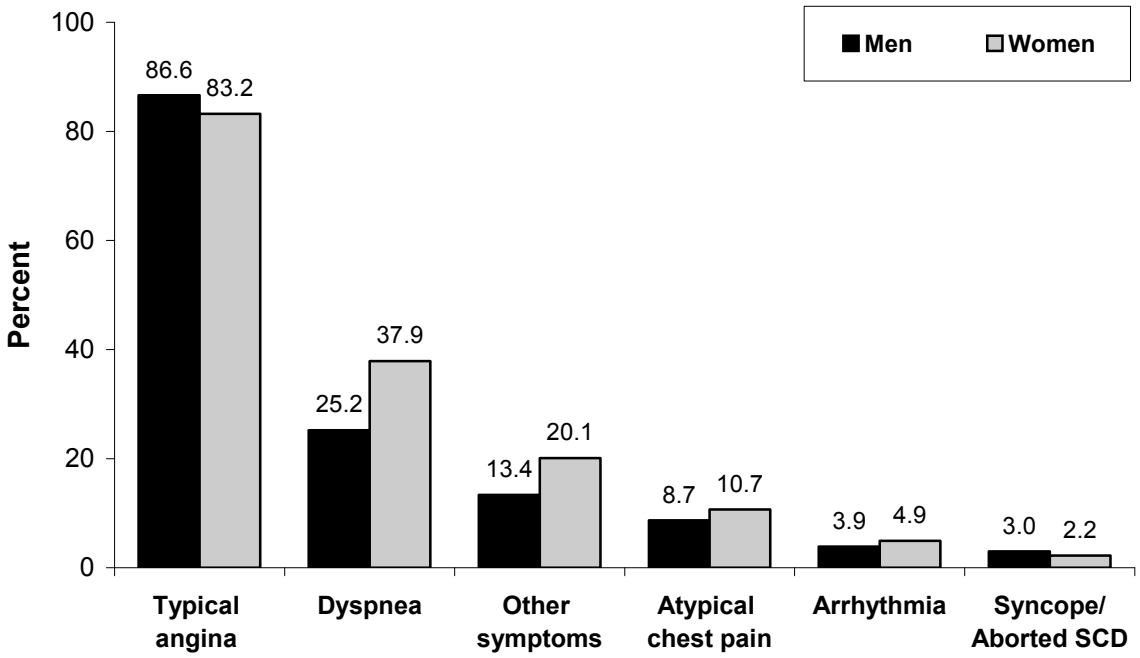
Figure 3.9: First Medical Contact



3.5.6 Presenting Symptoms and Killip Class

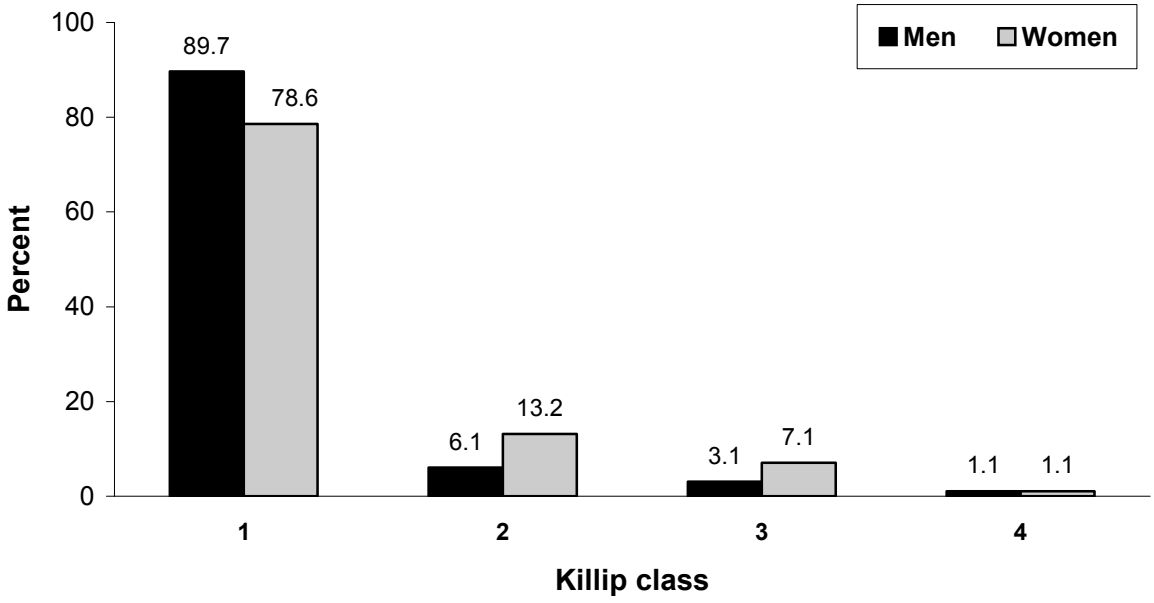
Over 80% of patients arriving at the emergency room presented with typical angina (86.6% of men and 83.2% of women). Women were more likely to present with dyspnea than men; with respect to other symptoms, no significant gender differences were observed.

Figure 3.10: Presenting Symptoms



Male patients generally presented with a lower Killip class than women. Killip class >2 was almost twice as frequent among women (8.2%) as among men (4.2%)

Figure 3.11: Killip Class on Admission



3.5.7 Treatment at First Medical Contact

Almost three-quarters of men and almost two-thirds of women received aspirin at their first medical contact. In addition, close to half of the men and more than one third of the women received regular or unfractionated heparin, and 14.7% of men and 14% of women received clopidogrel. Nitrates were administered to 38.4% of men and 36.3% of women.

Table 3.11: Treatment at First Medical Contact

Treatment	Men (N=1,399) %	Women (N=364) %
Aspirin*	73.1	65.7
Clopidogrel	14.7	14.0
Heparin (unfractionated/regular)*	44.7	37.6
LMW heparin (fractionated)	8.9	10.4
IIb/IIIa antagonists	1.0	1.4
Beta Blockers	5.7	6.3
Diuretics*	6.4	12.4
ACE-I*	2.7	4.9
ARB	0.4	0.3
ACE-I/ARB*	3.1	5.2
Narcotics	20.7	19.5
Nitrates	38.4	36.3
Antiarrhythmics	2.4	3.0

*p<0.05

3.6 First recorded ECG

3.6.1 Location of First ECG

For the majority of both men and women, the first ECG was performed in the emergency room (for 57.7% of men and 53.9% of women). For 28.7% of men and 27.8% of women, the first ECG was performed in the ambulance.

Table 3.12: Location of First ECG

Location of first ECG	Men (N=1,399) (%)	Women (N=364) (%)
Home	10.0	12.2
Ambulance	28.7	27.8
Emergency Room	57.7	53.9
Hospital Ward	3.6	6.1

3.6.2 ECG on Admission

A slightly higher proportion of male patients (45%) were admitted with ST elevation than female patients (40%)

Table 3.13: ECG on Admission

ECG on admission	Men		Women	
	n	%	n	%
ST elevation	621	44.5	144	39.6
Non-ST elevation	778	55.5	220	60.4
Total	1,399	100.0	364	100.0

3.6.3 First ECG Rhythm

Over 90% of men and 88.7% of women presented with normal sinus rhythm. Atrial fibrillation was more frequent in women than in men.

Table 3.14: First ECG Rhythm

ECG rhythm*	Men (N=1,399) %	Women (N=364) %
NSR	92.7	88.7
AF	3.6	6.3
SVT	0.1	0.8
VT/VF	0.4	0.3
Other	3.2	3.9

*p<0.05 for M/F difference

3.7 Primary Reperfusion Therapy in Patients with ST Elevation

3.7.1 Primary Reperfusion

Forty-five percent of men and 40% of women presented with ST elevation (see Figures 3.12A,3.12B). Of men who presented with ST elevation on admission, 64.9% underwent primary reperfusion; of women presenting with ST elevation, 57.6% underwent primary reperfusion. Rates of primary PCI and thrombolysis were similar for men and women, as were rates of stents and the distribution of bare metal and drug-eluting stents. Stents were used for almost 90% of both men and women undergoing primary PCI.

Figure 3.12A: Reperfusion in Men with ST Elevation

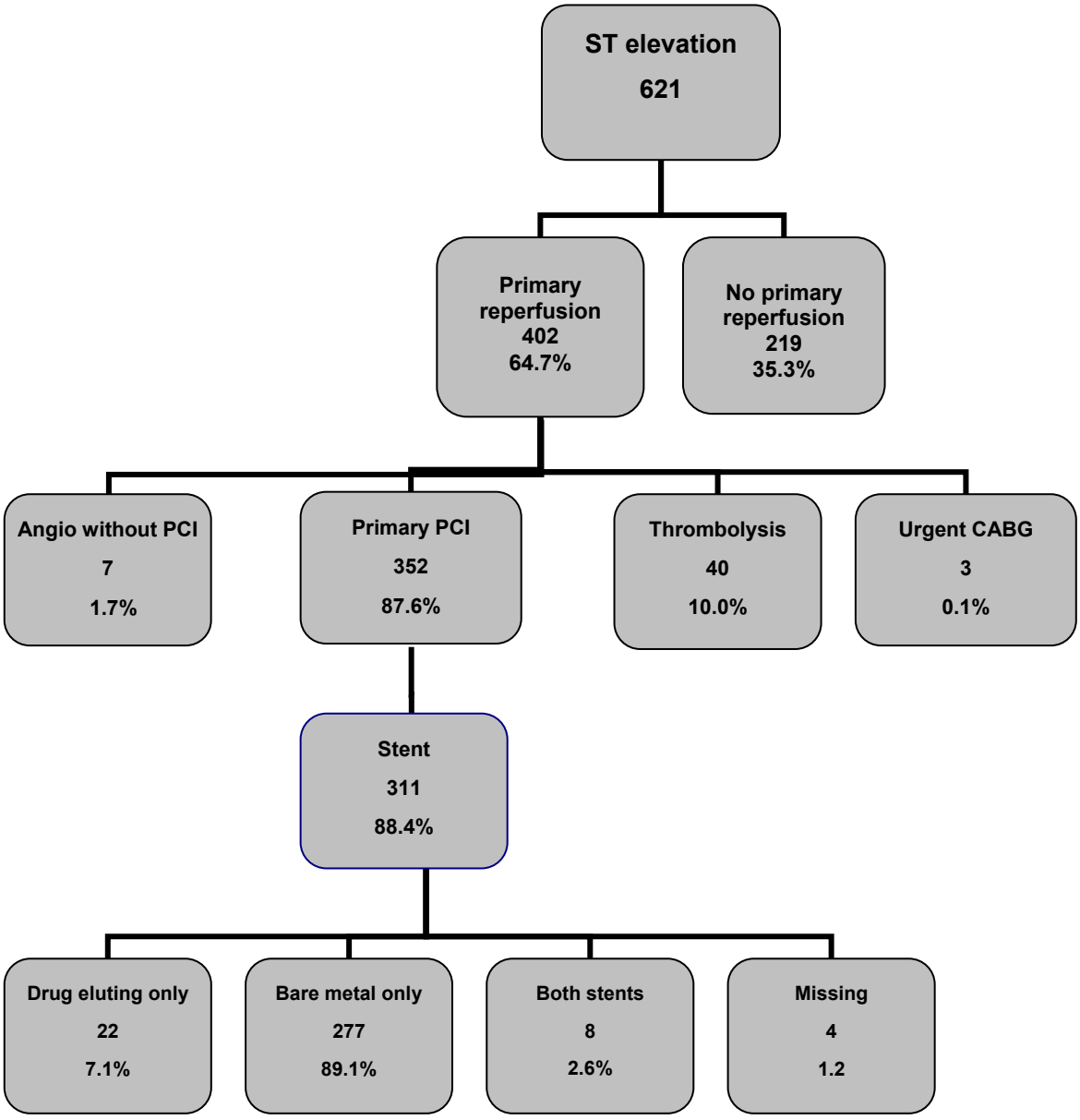
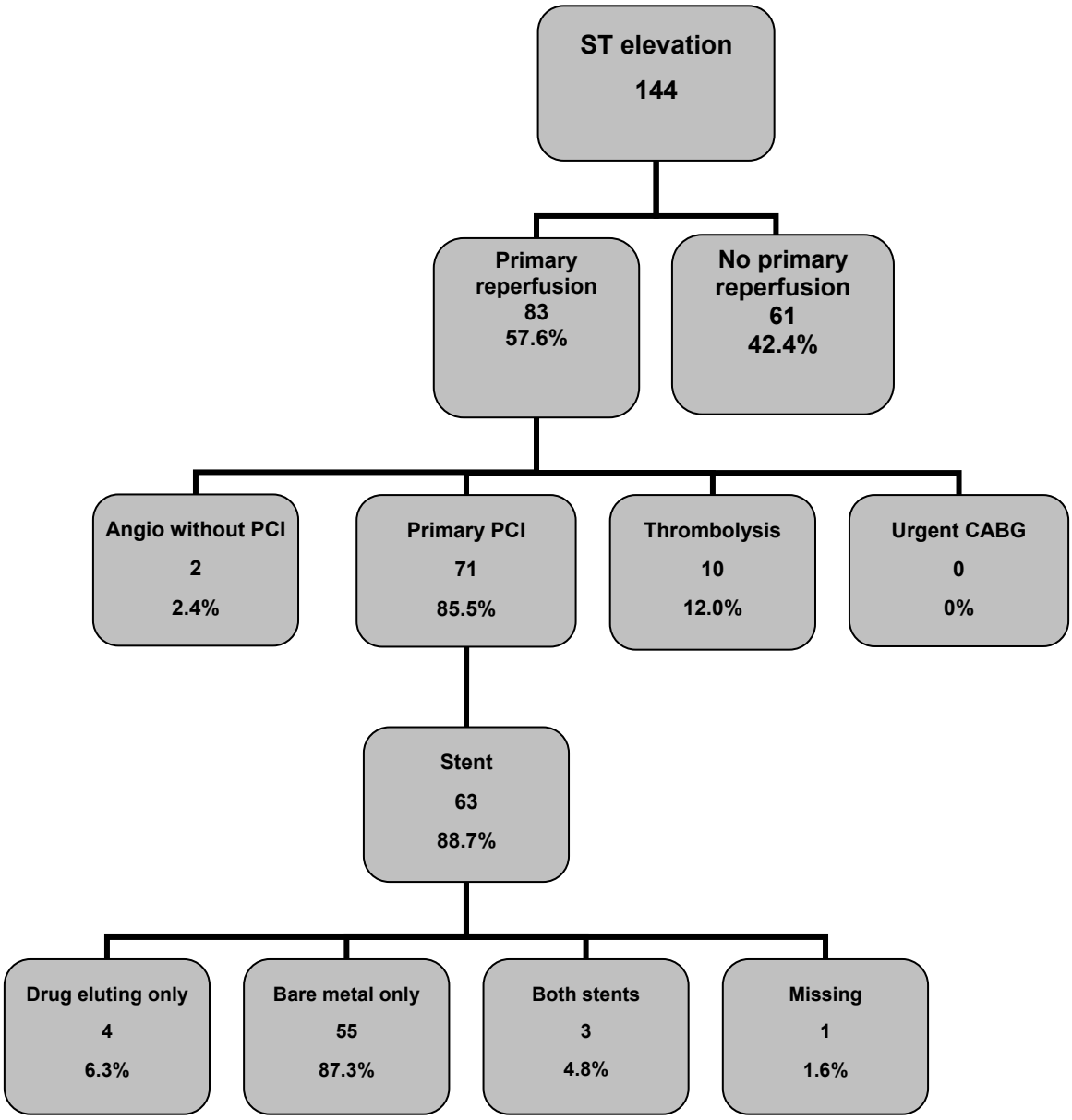


Figure 3.12B: Reperfusion in Women with ST Elevation



3.7.2 Reasons for Not Performing Primary Reperfusion

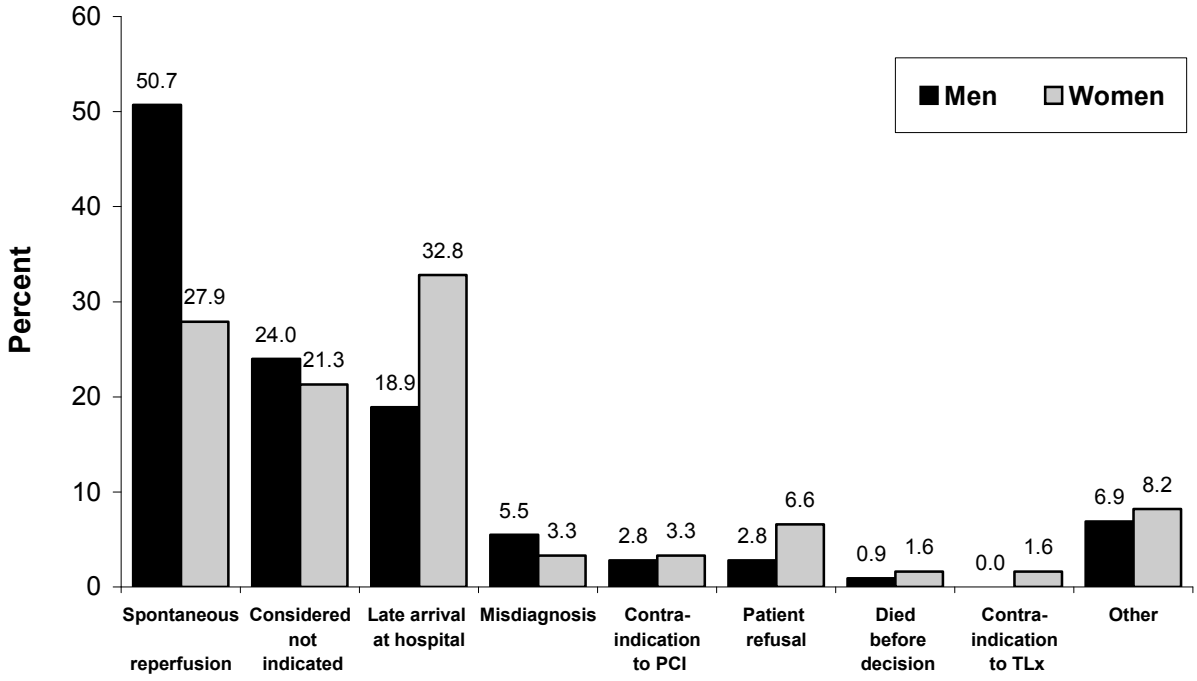
Among patients with ST elevation, the main reasons for not undergoing primary reperfusion were "spontaneous" reperfusion and late arrival at the hospital. Spontaneous reperfusion was almost twice as frequent among men (50.7%) as among women (27.9%). Late arrival at the hospital was more frequently cited as the reason for not performing primary reperfusion among women (32.8%) as compared with men (18.9%).

Table 3.15: Reasons for No Primary Reperfusion among Patients with ST Elevation

Reason	Men (n=219) %	Women (n=61) %
Spontaneous reperfusion*	50.7	27.9
Late arrival at hospital*	18.9	32.8
Misdiagnosis	5.5	3.3
Contraindication to TLx	0.0	1.6
Contraindication to PCI	2.8	3.3
Considered not indicated	24.0	21.3
Died before decision	0.9	1.6
Patient refusal	2.8	6.6
Other	6.9	8.2

*p<0.05

Figure 3.13: Reasons for No Primary Reperfusion among Patients with ST Elevation



3.7.3 Use of Medications and Protective Devices during Primary PCI

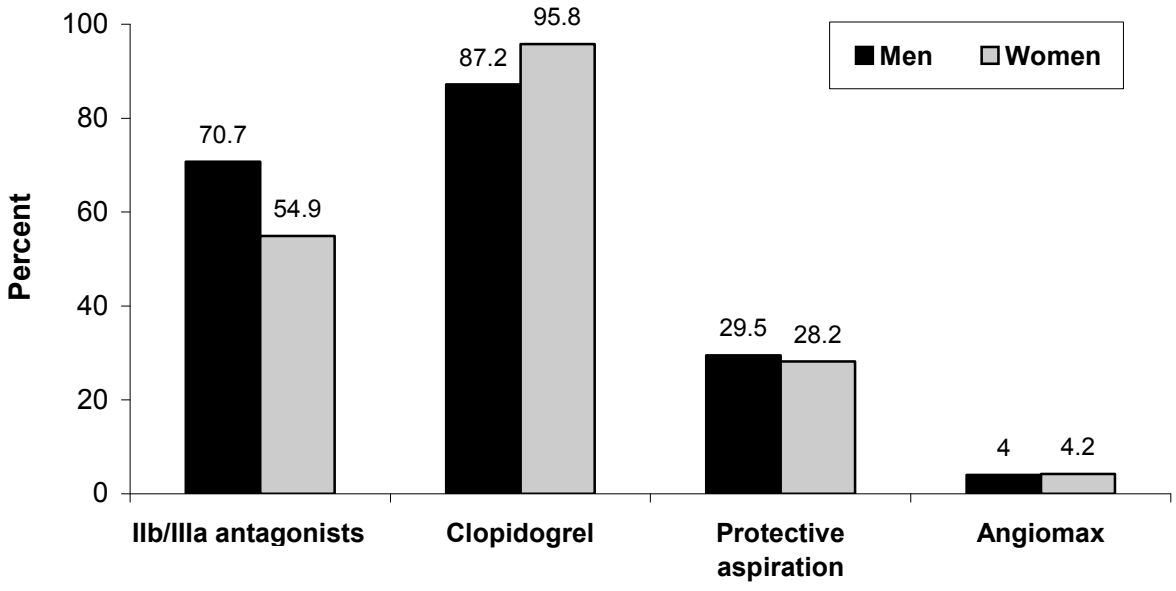
Men were more likely than women to be treated with IIb/IIIa antagonists during PCI, and women had somewhat higher rates of treatment with Clopidogrel (although for both men and women rates were high). Angiomax and protective aspiration were employed equally for men and women.

Table 3.16: Other Medications and Protective Devices Used during Primary PCI

Medication/protective device	Men (N=352) %	Women (N=71) %
IIb/IIIa antagonists*	70.7	54.9
Clopidogrel*	87.2	95.8
Angiomax	4.0	4.2
Protective aspiration	29.5	28.2

*p<0.05

Figure 3.14: Other Medications and Protective Devices Used during Primary PCI



3.7.4 TIMI Grade Flow

Following primary PCI, for approximately 88% of both men and women a maximum TIMI grade flow of 3 was achieved.

Table 3.17: TIMI Grade Flow before Primary PCI

TIMI before primary PCI	Men (N=352) (%)	Women (N=71) (%)
0	55.9	62.9
1	16.2	5.7
2	12.5	15.7
3	15.4	15.7

Table 3.18: TIMI Grade Flow after Primary PCI

TIMI after primary PCI	Men (N=352) (%)	Women (N=71) (%)
0	2.9	7.4
1	0.6	1.5
2	9.3	2.9
3	87.2	88.2

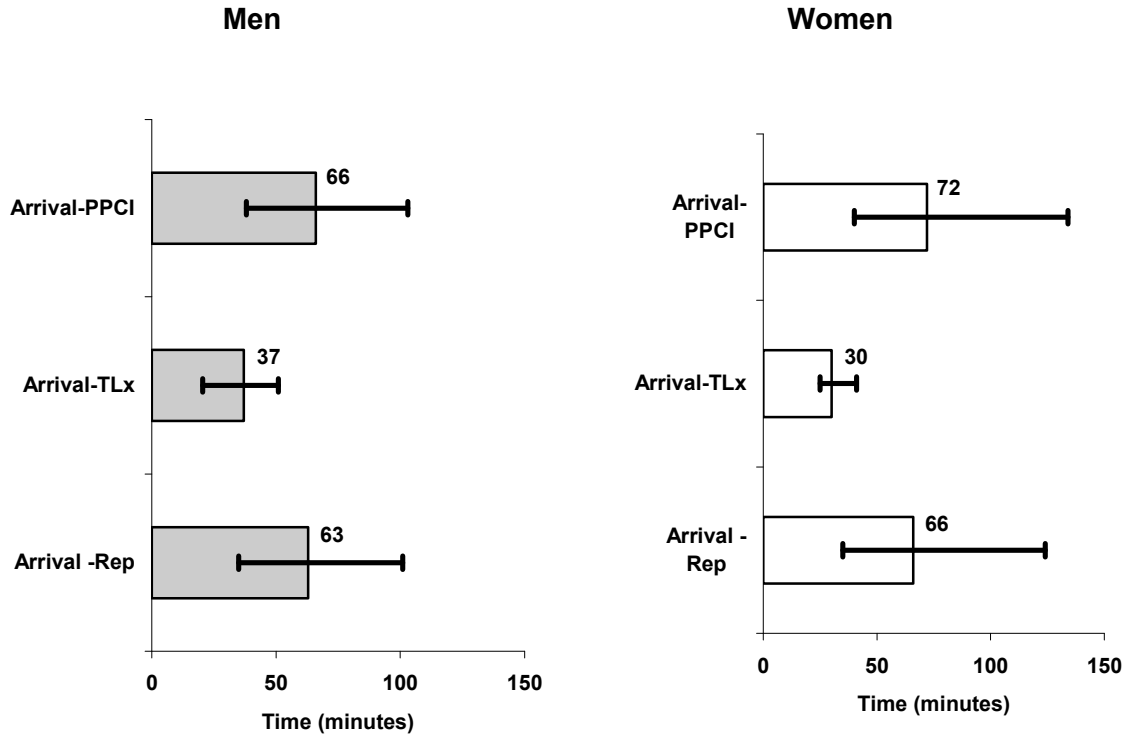
3.7.5 Length of Time from Arrival to Primary Reperfusion

No significant differences were found between men and women with respect to the time delay between arrival and primary reperfusion.

Table 3.19: Length of Time from Arrival to Primary Reperfusion

	Length of time (minutes)			
	Men N=389		Women N=78	
	Median	(25%-75%)	Median	(25%-75%)
From arrival to reperfusion	63	(35-101)	66	(35-124)
From arrival to thrombolysis	37	(20.5-51)	30	(25-41)
From arrival to primary PCI	66	(38-103)	72	(40-134)

Figure 3.15: Length of Time from Arrival to Primary Reperfusion

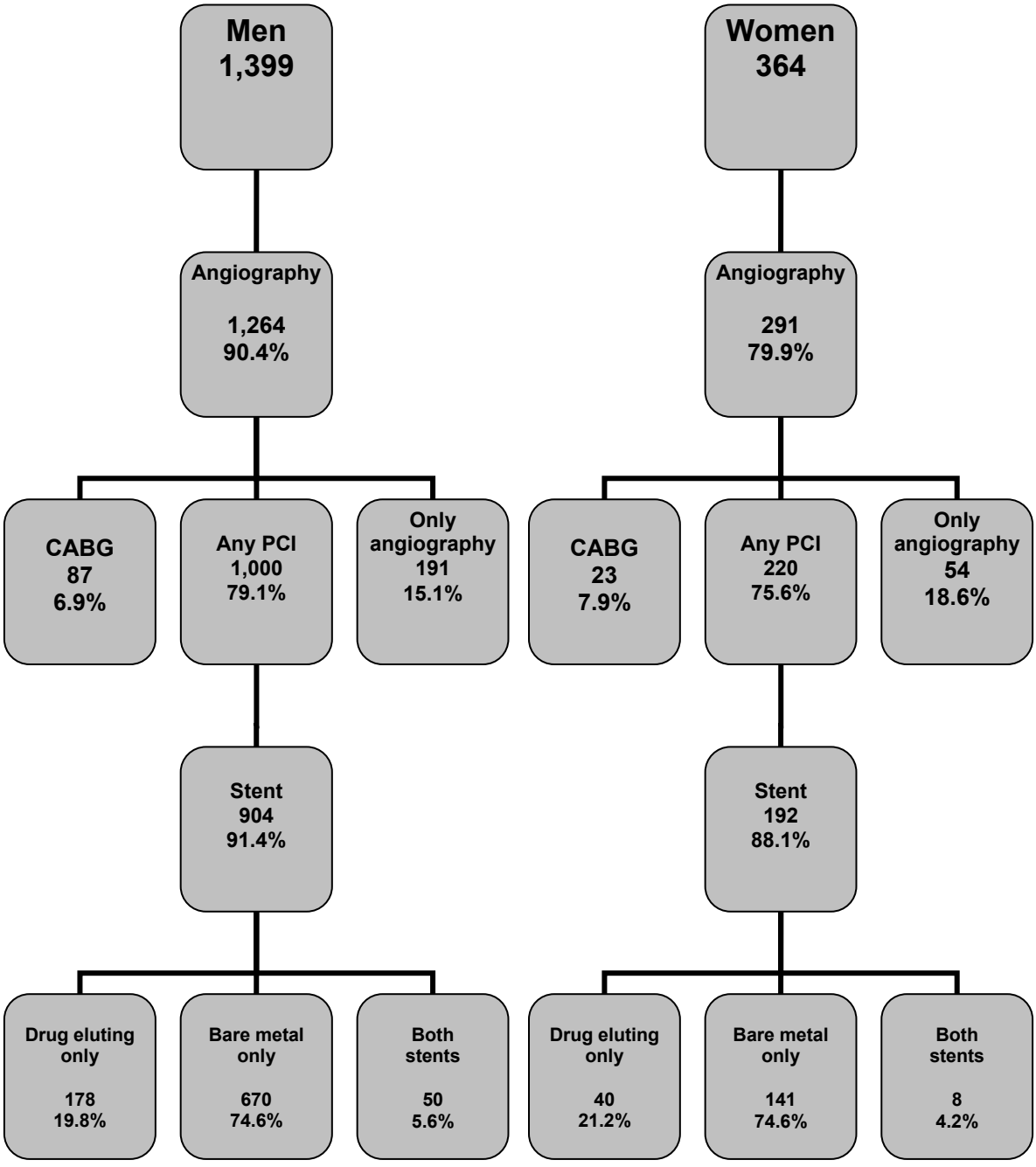


3.8 Coronary Interventions and Procedures during Hospitalization

3.8.1 Cardiac Interventions and Procedures during Hospitalization

A slightly higher percentage of men (90%) than women (80%) underwent angiography during hospitalization. Rates of other cardiac interventions and procedures were similar for men and women.

Figure 3.16: Cardiac Interventions and Procedures during hospitalization



3.8.2 Other Procedures

Women were more likely than men to require CPR and ventilation. Rates of other procedures were similar for men and women.

Table 3.20: Other Procedures

Procedure	Men (n=1,399) %	Women (n=364) %
DC Shock	2.7	4.1
Resuscitation (CPR)*	2.4	4.4
Ventilation*	4.0	6.6
IA Balloon	4.5	6.1
ECHO	78.8	81.8
EPS	0.4	0.3
Stress test / SPECT	2.0	1.7
Permanent pacemaker	0.4	0.8
Temporary pacemaker	2.4	3.0
Hypothermia for anoxic brain damage	0.1	0.0

*p<0.05

3.9 Ejection Fraction

Ejection fraction was determined in 81% of both men and women. The distribution of EF was rather similar in men and women. However, for 26.6% of women vs. 21.4% of men, the EF was <40%.

Table 3.21: Ejection Fraction

Ejection fraction	Men (N=1,399) %	Women (N=364) %
EF determined (%)	**80.6**	**80.7**
Normal (≥50%)	48.9	46.4
Mild (40-49%)	29.7	27.0
Moderate (30-39%)	14.5	19.0
Severe (<30%)	6.9	7.6

3.10 In-Hospital Complications

In-hospital complications occurred, on the whole, more frequently among women. For example: CFH and pulmonary edema; re-infarction; sub-acute stent thrombosis, free wall rupture, tamponade, moderate to severe MR, high degree AVB, atrial fibrillation, acute renal failure, major bleeding and infection.

Table 3.22: In-Hospital Complications

Complication	Men (N=1,399) %	Women (N=364) %
CHF mild-moderate (Killip 2)*	6.6	11.8
Pulmonary edema (Killip 3)*	5.4	11.5
Cardiogenic shock (Killip 4)	2.4	4.1
Hemodynamically significant RVI	1.3	1.4
Re-MI*	1.4	1.7
Post MI angina /re-ischemia	3.3	4.7
Sub-acute stent thrombosis*	0.6	2.5
Free wall rupture*	0.2	2.2
Pericarditis	0.4	0.8
Tamponade*	0.3	1.4
VSD	0.2	0.8
Moderate-severe MR*	1.1	3.6
RBBB (new onset)	1.4	1.1
LBBB (new onset)	0.6	1.1
High degree AVB*	1.9	3.6
Sustained VT	1.5	1.6
Primary VF	1.4	2.2
Secondary VF	1.4	1.1
AF*	4.6	8.5
Asystole	2.1	1.9
TIA	0.2	0.0
Stroke	0.5	1.1
CVA/Stroke in hospital	0.7	1.1
Acute renal failure*	3.9	6.9
Major bleeding*	1.3	2.7
Infection*	3.7	6.6

*p<0.05

3.11 In-Hospital Medical Treatment

Close to 100% of men and 96% of women received aspirin, and over 90% received lipid-lowering drugs. In-hospital medications were, on the whole, similar for men and for women. Men were more likely than women to receive clopidogrel and IIb/IIIa antagonists, and women were more likely to receive ARB, diuretics and insulin.

Table 3.23: In-Hospital Medical Treatment

Treatment	Men (N=1,399) %	Women (N=364) %
Aspirin*	98.1	95.9
Warfarin or other anticoagulants	4.1	4.4
Heparin (unfractionated/regular)	37.7	32.9
LMW heparin (fractionated)	50.7	47.4
Clopidogrel*	90.1	84.0
ACE-I	68.3	67.4
ARB*	6.9	11.9
ACE-I/ARB	74.1	77.3
IIb/IIIa antagonists*	33.1	23.1
Aldosterone receptor antagonist	4.4	6.4
Beta Blockers	82.0	82.4
IV inotropic agent	3.2	3.6
Digoxin*	1.8	3.6
Diuretics*	25.8	42.9
Insulin*	13.2	20.4
Hypoglycemic drugs (Oral)	14.7	16.5
Statins*	84.3	90.7
Fibrate	5.3	6.9
Ezetimibe	1.3	1.1
All lipid lowering drugs*	95.4	92.0
Calcium antagonists	18.7	22.9
Nitrates	27.2	29.1
Other drugs	69.5	73.6

*p<0.05

3.12 Duration of Hospitalization

The median length of stay in the intensive coronary care unit was similar for men and women (4 days). Median length of overall hospital stay was also similar for men and for women (5 days).

Table 3.24: Length of Hospital Stay

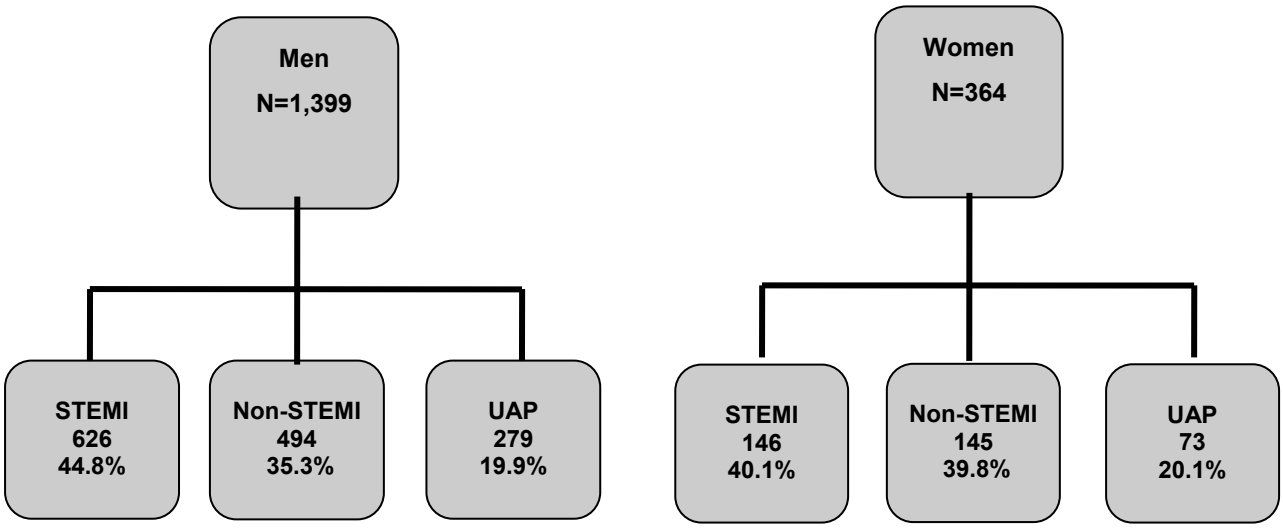
Length of stay (days)	Men N=1,399		Women N=364	
	Median	25%-75%	Median	25%-75%
No. of days in CCU	4.0	3.0-5.0	4.0	3.0-6.0
Total days in hospital	5.0	3.0-6.0	5.0	3.0-7.0

3.13 Discharge Diagnosis

3.13.1 Discharge Diagnosis

Approximately 80% of both men and women patients were discharged with a diagnosis of AMI, and approximately 20% of both men and women with UAP. A slightly larger proportion of men were diagnosed with STEMI, and a slightly larger proportion of women with Non-STEMI.

Figure 3.17: Discharge Diagnosis



3.13.2 Type of MI

Approximately 90% of both men and women were diagnosed with Type 1 MI. Slightly more women than men were diagnosed with Type 2 MI. (See **Chapter 1.13.2: A New Universal Definition of MI)**

Table 3.25: Type of MI

Type of MI	Men (N=1,120) %	Women (N=291) %
1	90.8	88.4
2	4.8	7.0
3	0.2	0.0
4A	2.5	1.4
4B	1.7	2.1
5	0.0	1.1

3.14 Medical Treatment on Discharge

On discharge, male patients were somewhat more likely to be treated with Clopidogrel and lipid-lowering drugs than women patients, and women patients were more likely to be treated with diuretics and insulin; otherwise, recommended medical treatment on discharge was similar for men and women.

Table 3.26: Medical Treatment on Discharge among Hospital Survivors

Recommended treatment	Men (n=1,373) %	Women (n=346) %
Aspirin*	96.6	94.2
Warfarin or other anticoagulants	4.8	6.4
LMW heparin (fractionated)	8.5	7.8
Clopidogrel*	81.4	73.6
ACE-I*	68.7	62.3
ARB*	7.3	11.9
ACE-I/ARB	75.7	74.1
Aldosterone receptor antagonist	5.0	6.7
Beta Blockers	81.9	81.5
IV inotropic agent	0.1	0.6
Digoxin	1.4	1.7
Diuretics*	21.1	35.0
Insulin*	7.8	11.6
Hypoglycemic drugs (oral)	17.3	21.7
Statins*	93.9	87.6
Fibrate	6.0	6.1
Ezetimibe	1.5	1.7
All lipid lowering drugs*	94.8	89.0
Calcium antagonists*	18.6	24.3
Nitrates	8.5	9.2
Other drugs*	58.7	67.9

*$p<0.05$

3.15 Re-hospitalization within 30 Days of Admission

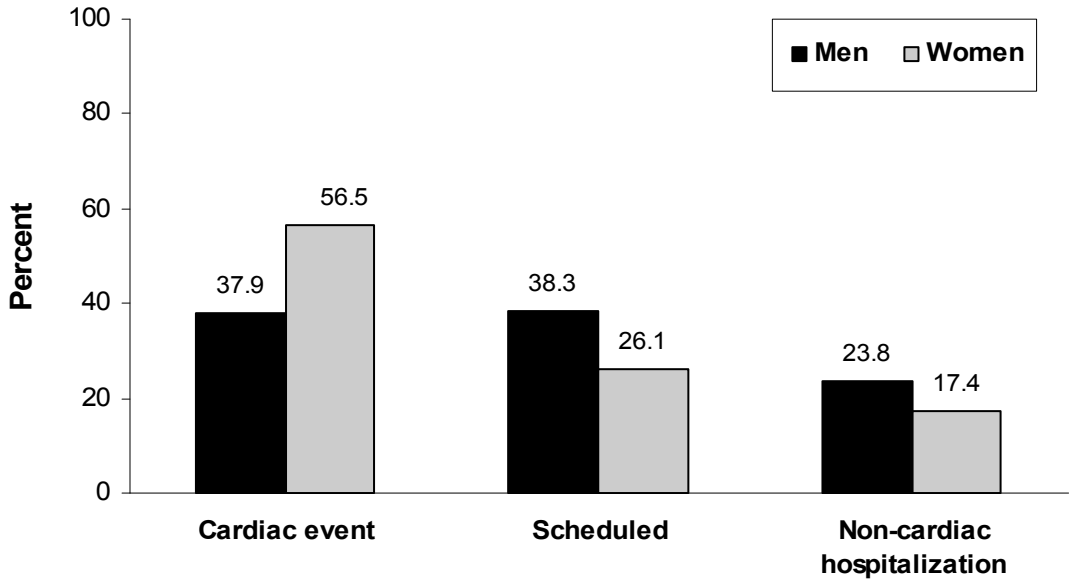
Rehospitalization rates were slightly higher for women (21.4%) than for men (17.3%). A greater proportion of women were hospitalized following urgent cardiac events, and a greater proportion of men were rehospitalized for scheduled procedures and for non-cardiac reasons.

Table 3.27: Rehospitalization within 30 Days of Admission: Reasons

	Men (n=1373) %	Women (n=346) %
Rehospitalized (%)	**17.3**	**21.4**
Reason for rehospitalization*		
Scheduled	38.3	26.1
Urgent Cardiac event	37.9	56.5
Non-cardiac hospitalization	23.8	17.4

**p<0.05 for M/F difference*

Figure 3.18: Reasons for Rehospitalization within 30 Days of Admission



3.16 Mortality and Major Adverse Coronary Event (MACE)

Unadjusted 7-day and 30-day mortality rates were almost twice as high in women as in men, as were unadjusted rates of Major Adverse Coronary Events (MACE), which include recurrent MI, recurrent ischemia, stent thrombosis, ischemic stroke, urgent revascularization (follow-up) or death occurring within 30 days from discharge. After adjustment for age and additional risk factors associated with poor outcome, no gender differences in 7-day mortality, 30-day mortality or MACE were observed.

Table 3.28: Unadjusted Rates of 7-Day Mortality, 30-Day Mortality and MACE

Mortality	Men (n=1,399) %	Women (n=364) %
7-day*	2.0	4.7
30-day*	3.2	7.7
MACE*	10.8	19.2

* p<0.05

Table 3.29: Rates of Mortality and MACE by Sex, Adjusted for Age and Other Risk Factors

	Men* (n=1,143) %	Women* (n=389) %	Age-Adjusted OR (95% CI) (Women vs Men)	Risk factor Adjusted OR** (95% CI)
7-day	2.3	3.3	1.31 (0.69-2.50)	0.92 (0.45-1.88)
30-day	3.6	5.4	1.34 (0.80-2.25)	1.01 (0.57-1.80)
MACE***	11.5	14.9	1.38 (0.99-1.92)	1.24 (0.88-1.74)

* age adjusted
** adjusted for age, gender, past MI, diabetes, hypertension, Killip class≥2, any angiography
*** definition includes: recurrent MI, recurrent ischemia, stent thrombosis, ischemic stroke, urgent revascularization (follow-up) or death occurring within 30 days from hospitalization.

Chapter 4:
Temporal Trends in Characteristics, Management and Outcome of Patients with ACS in Israel: 2000-2008

4.1 Introduction

In this chapter, we present trends in the characteristics and management of patients with ACS hospitalized in Cardiology Departments and ICCU's in Israel since 2000, and evaluate the impact of these changes on clinical outcome and mortality. The data are derived from the biennial national surveys (ACSIS) which have been performed since 1992 in all 25 cardiac departments in Israel by the Working Group of Intensive Cardiac Care of the Israel Heart Society, the Israel Center for Disease Control and the Israel Society for the Prevention of Heart Attacks. In each survey, the study population included all patients with ACS hospitalized during a two-month period (generally February and March).

4.2 Patient Characteristics

The number of patients hospitalized with ACS in Cardiology and Intensive Care Units increased between the ACSIS surveys 2000-2006. In ACSIS 2008 there was a 15% decrease in the number of patients compared to 2006. The reason for this decrease is unknown. The gender and age distributions were similar until 2004; in 2006 a slight increase was noted in the proportion of male patients, and this trend continued in 2008. In addition, the survey population was slightly younger in 2006 and 2008 than in previous years.

Table 4.1: Patient Characteristics

Year	2000	2002	2004	2006	2008
No. of patients	1,795	2,049	2,094	2,077	1,763
Sex (%)					
Men	75.0	76.2	74.0	77.4	79.4
Women	25.0	23.8	26.0	22.6	20.6
Age (years) (%)					
<50	15.0	13.7	14.3	15.1	14.7
50-75	62.4	64.5	62.4	64.4	65.9
>75	22.6	21.8	23.3	20.5	19.4
Mean age ±SD	63.9 ± 13.2	64.1 ± 13.0	64.2 ± 13.3	63.4 ± 13.0	63.3±13.2

4.3 Cardiovascular History and Risk Factors

Between 2000-2008, an increase was observed in the proportion of patients with ACS who had undergone prior PCI. The proportion of patients with a prior history of MI and CRF increased, as did the prevalence of risk factors such as hypertension, diabetes, dyslipidemia, family history of CAD and smoking.

Table 4.2: Cardiovascular History and Risk Factors

	2000 N=1,795 %	2002 N=2,049 %	2004 N=2,094 %	2006 N=2,077 %	2008 N=1,763 %
CV history					
MI*	29.7	27.2	27.7	30.2	31.2
AP*	40.3	36.7	29.8	42.7	39.1
PCI*	18.7	19.2	21.0	28.1	34.1
CABG	8.8	10.1	11.1	11.3	9.9
CHF	8.1	7.1	7.4	8.7	8.4
CVA/TIA	7.2	8.6	8.1	8.8	6.9
CRF*	8.2	8.4	9.6	12.7	12.7
PVD*	10.3	9.7	7.0	10.4	8.2
Risk factors					
Hypertension*	48.0	50.5	56.6	59.9	59.2
Diabetes*	32.2	32.0	32.4	33.3	37.3
Dyslipidemia*	52.0	54.3	49.4	65.8	74.6
Current smokers*	35.3	33.2	34.2	38.1	38.9
Past smokers*	19.2	15.1	12.9	24.1	21.0
Family history of CAD*	21.1	18.4	18.6	27.0	26.8

*$p<0.05$

4.4 Admission Information

4.4.1 First Ward of Hospitalization

The proportion of patients who were admitted to Internal Medicine wards prior to being transferred to Cardiology wards was between 15-18% during the years 2000-2006. In 2008 this proportion had declined to 10%.

Table 4.3: First Ward of Hospitalization

Ward*	2000 N=1,795 %	2002 N=2,049 %	2004 N=2,094 %	2006 N=2,077 %	2008 N=1,763 %
Cardiology/CCU	83.4	80.6	81.3	80.0	89.2
Internal Medicine	15.5	17.2	16.4	18.4	10.2
Other	1.1	2.2	2.3	1.6	0.6

*p<0.05

4.4.2 ECG on Admission

Between 2000-2008, the percentage of patients with ST elevation on admission declined significantly, with a parallel increase in the percentage of patients with non-ST elevation.

Table 4.4: ECG on Admission

Admission ECG*	2000 N=1,795 %	2002 N=2,049 %	2004 N=2,094 %	2006 N=2,077 %	2008 N=1,763 %
ST elevation	56.1	49.4	48.9	43.2	43.4
Non ST elevation	40.7	47.4	47.9	51.7	53.0
Undetermined ECG finding	3.2	3.2	3.2	5.1	3.6

*p<0.05

4.4.3 Killip Class on Admission

The Killip class distribution remained relatively unchanged between 2000-2004. In 2006 a slightly larger proportion of patients presented with Killip Class 1, and this trend continued in 2008.

Table 4.5: Killip Class on Admission

Killip class*	2000 N=1,795 %	2002 N=2,049 %	2004 N=2,094 %	2006 N=2,077 %	2008 N=1,763 %
1	81.6	79.1	77.9	82.4	87.4
2	10.4	11.9	13.8	10.4	7.6
3	5.5	7.2	7.1	5.7	3.9
4	2.5	1.8	1.2	1.5	1.1

*p<0.05

4.5 Primary Reperfusion Therapy in Patients with ST Elevation

Between 2000-2008, a 12.6% increase was observed in rates of primary reperfusion among patients with ST elevation. The use of thrombolysis declined markedly in favor of primary PCI.

Figure 4.1: Primary Reperfusion among Patients with ST Elevation

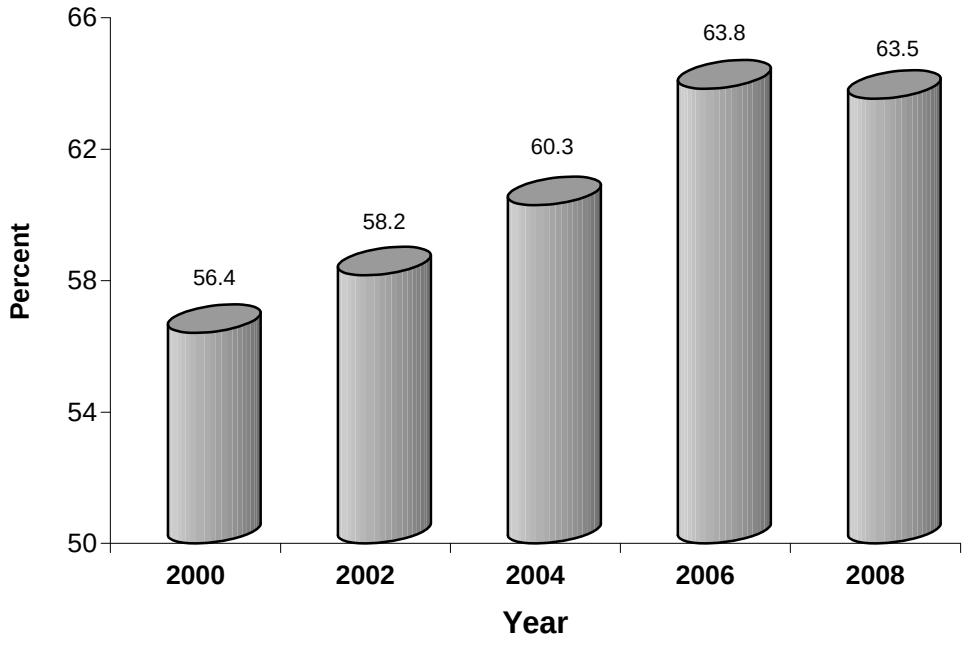
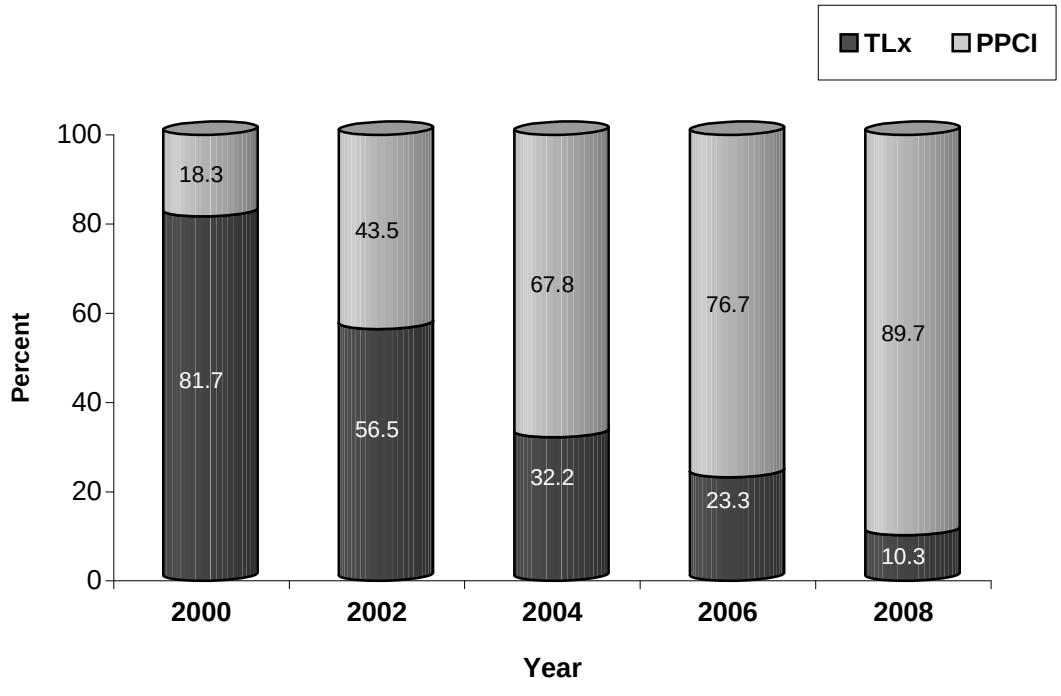


Figure 4.2: Type of Primary Reperfusion among Patients with ST Elevation



4.6 Time Intervals

The median time interval elapsing between symptom onset and help-seeking did not change significantly between 2000 and 2008. The median time interval between arrival and primary PCI decreased, and a decrease was also observed in the time elapsing between arrival and thrombolytic treatment, most notably between 2006-2008.

Table 4.6: Time Intervals

Time interval	2000 N=1,795 Median (25%-75%)	2002 N=2,049 Median (25%-75%)	2004 N=2,094 Median (25%-75%)	2006 N=2,077 Median (25%-75%)	2008 N=1,763 Median (25%-75%)
From symptom onset to ER arrival	160 (80-460)	176 (87-480)	165 (90-392)	181 (88-492)	170 (87-486)
From arrival to TLx	59 (36-85)	53 (37-75)	51 (34-75)	53 (34-75)	35 (21-50)
From arrival to primary PCI	81 (45-131)	92 (54-155)	76 (42-137)	70 (83-115)	69 (39-112)

4.7 Procedures during Hospitalization in CCU

The use of coronary angiography, PCI, stents and echocardiography increased steadily between 2000-2006, while the use of CABG declined between 2000-2008.

Table 4.7: In-Hospital Procedures

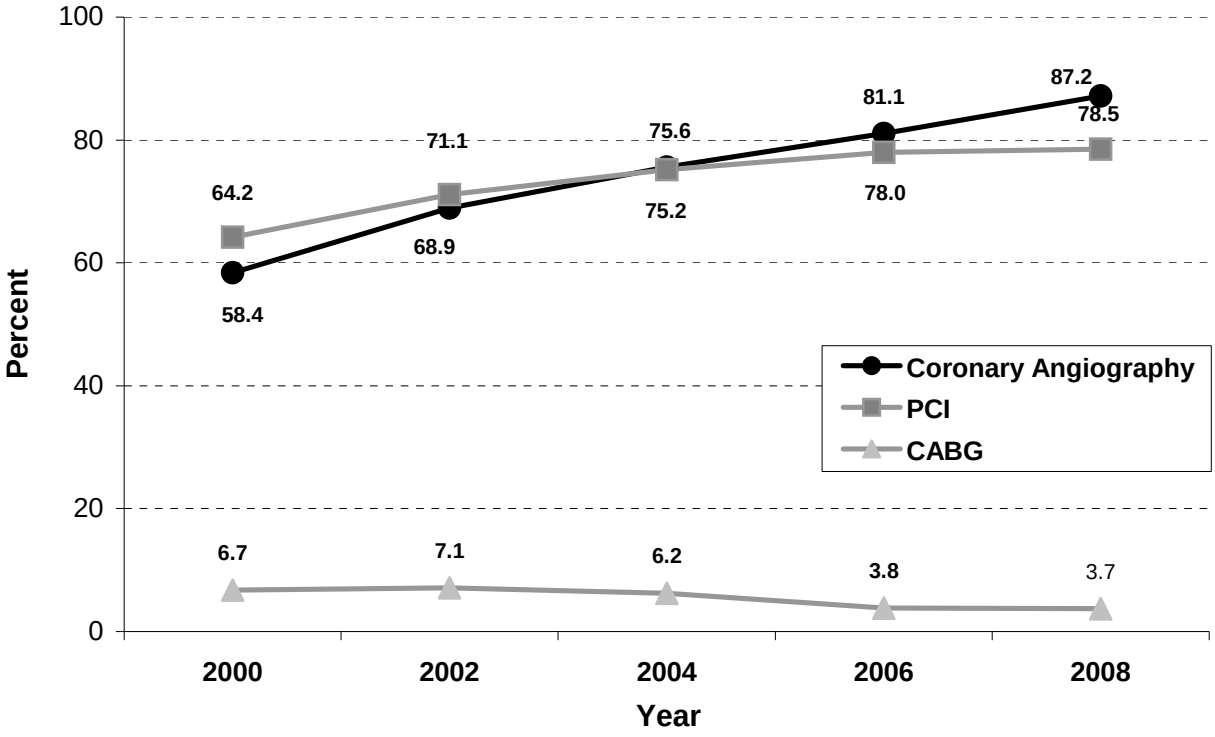
Procedure	2000 N=1,795 %	2002 N=2,049 %	2004 N=2,094 %	2006 N=2,077 %	2008 N=1,763 %
Coronary Angiography*	58.4	68.9	75.6	81.1	87.2
Any PCI(1)*	64.2	71.1	75.2	78.0	78.5
Stent(2)*	73.7	81.4	86.3	91.5	90.8
CABG*	6.7	7.1	6.2	3.8	3.7
IABP	4.8	4.4	3.5	4.8	4.8
Echocardiography*	69.7	68.5	79.0	84.4	79.4

(1) Percent of all patients undergoing angiography

(2) Percent of all patients undergoing PCI

*p<0.05

Figure 4.3: Trends In-Hospital Procedures



4.8 In-Hospital Complications

Between 2000-2008, there has been a decline in the frequency of most in-hospital complications, such as re-infarction, post-MI angina, heart failure, AVB, right- and left- BBB, primary VF, asystole and acute renal failure.

Table 4.8: In-Hospital Complications

	2000 N=1,795 %	2002 N=2,049 %	2004 N=2,094 %	2006 N=2,077 %	2008 N=1,763 %
Re-MI*	2.5	1.9	1.0	1.8	1.5
Post MI angina / Re-ischemia*	13.8	6.7	5.5	6.2	3.6
CHF mild-moderate (Killip 2)*	18.5	10.4	6.8	12.5	7.7
Pulmonary edema (Killip 3)*	10.7	8.9	7.3	9.2	6.6
Cardiogenic shock (Killip 4)*	5.3	3.8	3.2	4.2	2.8
Free wall rupture	0.8	0.4	0.6	0.2	0.6
Tamponade	0.6	0.1	0.3	0.2	0.5
Moderate-severe MR*	3.8	2.3	0.7	3.2	1.6
RBBB*	6.8	4.0	0.5	1.9	1.3
LBBB*	3.6	2.0	0.3	0.9	0.7
Sustained VT	2.5	1.6	1.7	2.4	1.5
High degree (2-30) AVB*	4.2	3.0	2.1	2.5	2.2
Primary VF*	3.6	2.6	1.5	2.5	1.5
Secondary VF*	1.2	0.5	0.6	1.1	1.4
Asystole*	4.0	2.0	1.7	2.6	2.0
TIA	0.3	0.1	0.1	0.4	0.2
Stroke	0.9	0.8	0.7	0.6	0.6
Acute renal failure*	7.9	8.6	6.8	5.4	4.5

*p<0.05

4.9 In-Hospital Treatment

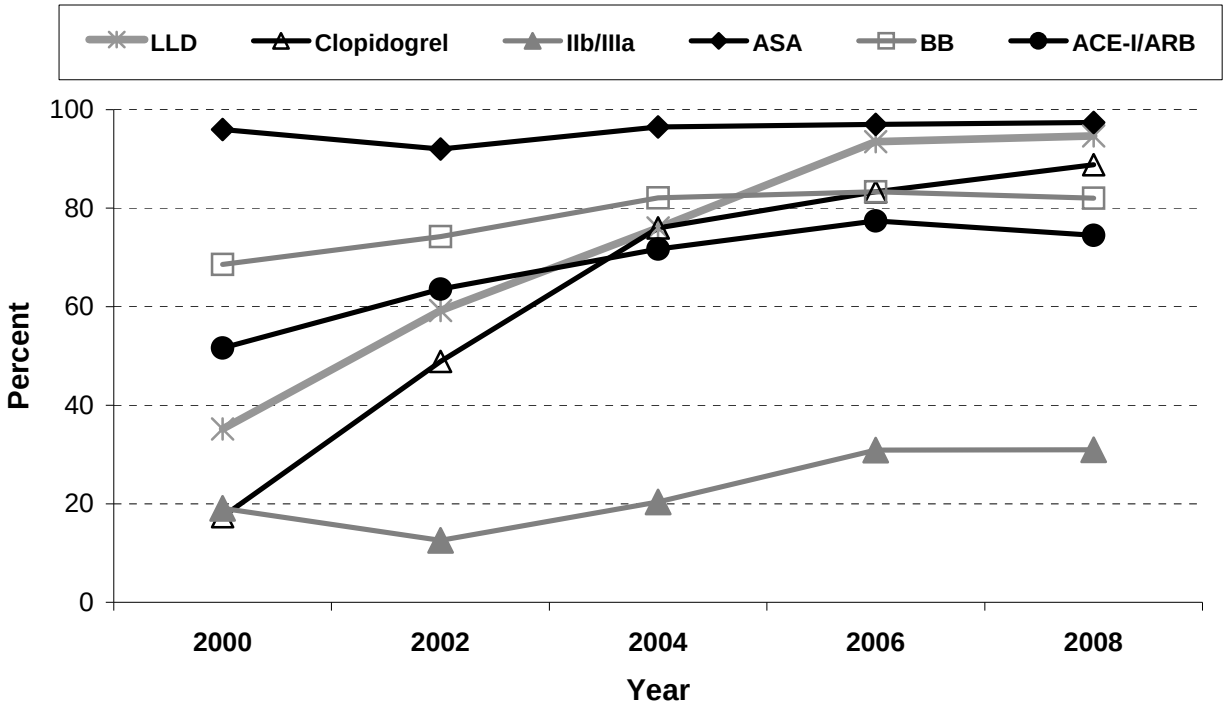
There has been a dramatic increase over the years in the use of Clopidogrel and lipid-lowering drugs. In addition, there has been an increase in the use of fractionated heparin, IIb/IIIa antagonists, beta blockers and ACE inhibitors.

Table 4.9: In-Hospital Treatment

Trearment	2000 N=1,795 %	2002 N=2,049 %	2004 N=2,094 %	2006 N=2,077 %	2008 N=1,763 %
Aspirin*	96.0	92.0	96.5	97.0	97.4
Heparin (unfractionated/regular)*	75.3	53.5	50.1	59.8	58.9
LMW heparin (fractionated)*	25.3	48.2	61.8	58.1	53.9
Clopidogrel*	17.4	48.9	76.0	83.3	88.8
IIb/IIIa antagonists*	19.1	12.6	20.4	30.9	31.0
Beta Blockers*	68.6	74.2	82.1	83.3	82.0
ACE-I/ARB*	51.6	63.6	71.7	77.4	74.5
LLD*	35.2	59.2	76.0	93.5	94.7
Digoxin	3.3	2.3	3.4	2.7	2.2
Diuretic*	28.3	24.8	30.2	29.9	29.3

*p<0.05

Fig 4.4: Trends in Hospital Treatment



4.10 Medical Treatment on Discharge

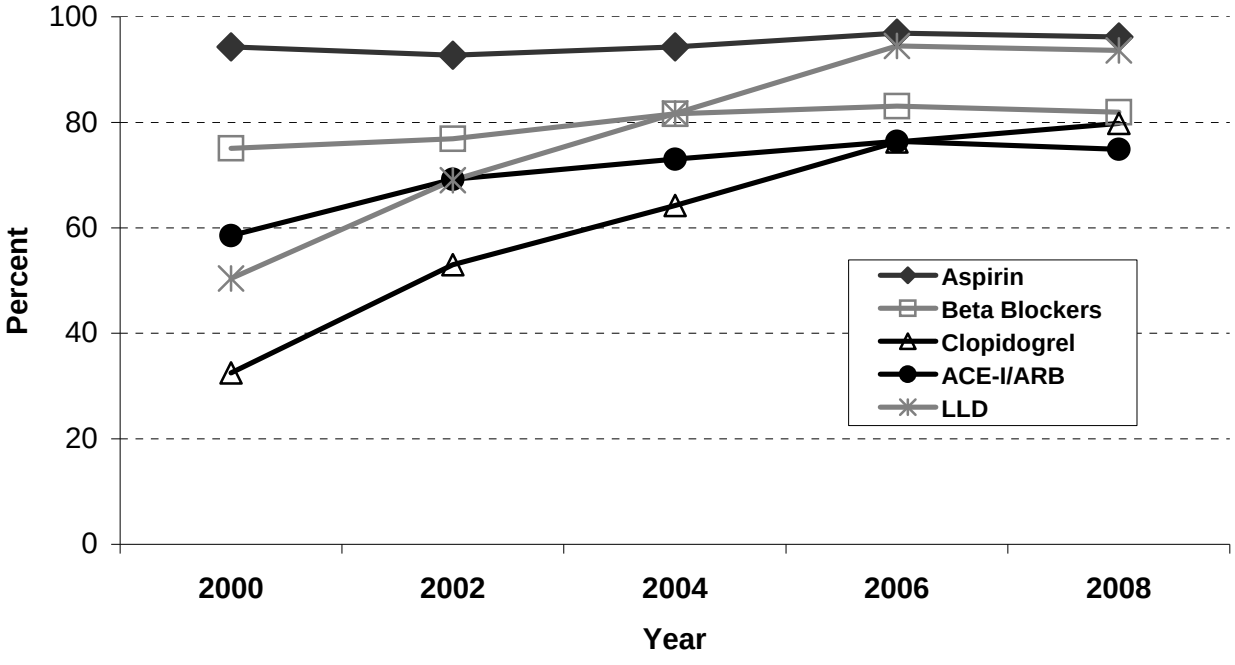
The recommended use of aspirin on discharge has reached 97% in recent years. There has been a marked increase in the recommended use of medications such as beta blockers and ACE inhibitors, while the most dramatic increases have occurred in the use of LLD and clopidogrel.

Table 4.10: Medical Treatment on Discharge among Hospital Survivors

	2000 N=1,795 %	2002 N=2,049 %	2004 N=2,094 %	2006 N=2,077 %	2008 N=1,763 %
Survivors (%)	94.8	96.5	96.8	97.2	97.5
Medical Treatment					
Aspirin*	94.3	92.7	94.3	96.9	96.2
Beta Blockers*	75.1	76.9	81.6	83.1	81.9
Clopidogrel*	32.5	53.0	64.2	76.3	79.8
ACE-I/ARB*	58.5	69.2	73.0	76.4	74.9
LLD*	50.4	69.0	81.7	94.5	93.6
Diuretic	23.0	21.2	23.2	23.0	23.9
Digoxin*	3.5	2.3	2.5	2.1	1.5

*p<0.05

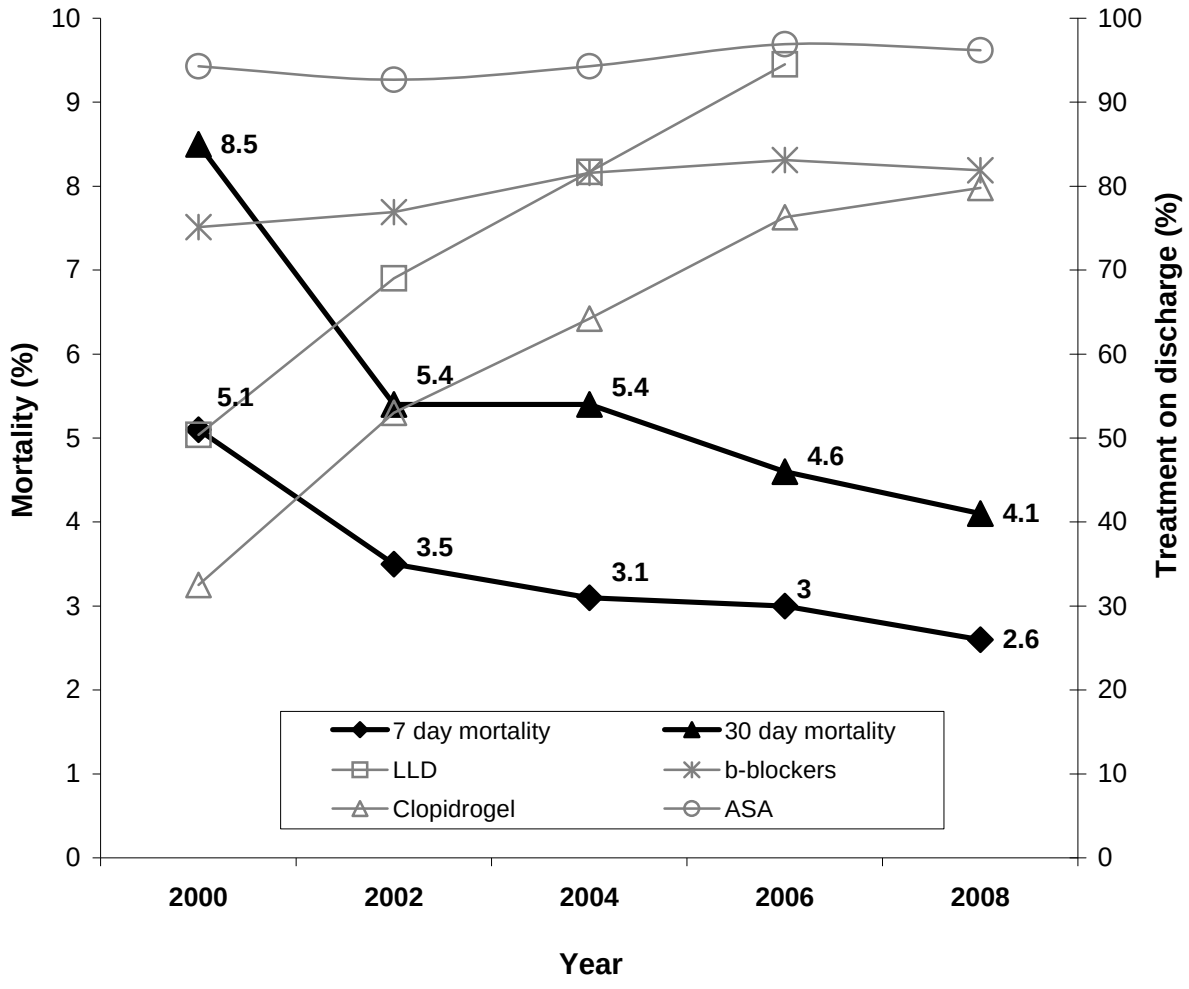
Figure 4.5: Medical Treatment on Discharge among Hospital Survivors



4.11 Medical Treatment and Mortality

The increase in the use of aspirin, clopidogrel, beta-blockers and lipid-lowering drugs has been accompanied by a dramatic decrease in 7-day and 30-day mortality. This decrease was most marked between 2000-2002; however, mortality rates continued to decrease in subsequent years.

Figure 4.6: Recommended Medications and Mortality



4.12 Short and Long Term Outcomes

All outcome measures indicate a marked improvement, with the trends observed between 2000 and 2006 continuing in 2008. Between 2000-2008, a 50% decline was observed in both 7-day and 30-day mortality rates and in rates of MACE. Rates of one-year mortality declined by 27% between 2000 and 2006, and it is hoped that follow-up mortality data will indicate a continuation of this trend.

Table 4.11: Rates of Mortality and MACE

Outcome	2000 N=1,795 %	2002 N=2,049 %	2004 N=2,094 %	2006 N=2,077 %	2008 N=1,763 %
Mortality*					
7-day	5.1	3.5	3.1	3.0	2.6
30-day	8.5	5.4	5.4	4.6	4.1
1 year	13.5	10.9	11.1	9.8	NA
MACE*	26.6	18.6	14.6	15.8	12.5

*p for trend <0.001

Concluding Remarks

The present brochure summarizes the data from ACSIS 2008, the 9th Biennial National Survey on Acute Coronary Syndromes. It is the result of a fruitful ongoing collaboration between the Israel Heart Society, the Israel Society for the Prevention of Heart Attacks and the Israel Center for Disease Control.

The use of electronic forms and web transmission made it possible this year to report the first results as soon as three months after the completion of data collection.

As the authors point out, there are marked improvements in the management and outcome of patients with ACS even in the last decade. The results of this survey clearly demonstrate the high quality of care provided in all the intensive care units in Israel, using modern technology, advanced therapies, and better than ever adherence to clinical guidelines.

Of special note is the finding that the total number of patients with coronary disease in the present survey is 15% lower than in previous surveys. This may be a chance finding; alternatively, it may reflect a decline in the prevalence of coronary disease or better care of coronary patients in the community, or it may be some combination of these factors. The next ACSIS survey, which will take place in 2010, will answer some of these questions.

The database created by the surveys is a unique resource that should be carefully maintained. It allows for the identification of time trends in management and outcomes of patients with ACS in Israel, and for comparison with other countries. In addition, each medical center can evaluate its activities over the years and compare itself with other participating centers.

I would like to congratulate the teams of the Intensive and Intermediate Care Units for making this survey a success. In addition, I would like to thank the Survey Coordinator and all the working groups for their continuous efforts to make this an ongoing process. It is well recognized that ACSIS has a significant impact on the improvement of the quality of health care. We look forward to our continued and fruitful cooperation in the building of this important database.

Tamy Shohat MD, MPH
Acting Director, Israel Center for Disease Control
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Appendix

THE ISRAELI NATIONAL SURVEY – ACSIS 2008 - STUDY GROUP PARTICIPATING CENTERS AND RESEARCH TEAMS

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Rabin Medical Center, Golda Campus, Petah Tikva	A. Battler, MD; E. Rehavia, MD; B. Napah, MD
Rambam Medical Center, Haifa	W. Markievicz, MD; H. Hammerman, MD; R. Dragu, MD: F. Mondrian, RN: T. Arditi, RN
Rivka-Ziv Medical Center, Zefat	A. Marmor, MD ; I. Nordkin, MD
Shaare Zedek Medical Center, Jerusalem	D. Tzivoni, MD; J. Balkin, MD: P. Schwartz
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List of Abbreviations

ACE-I	ACE-Inhibitor
ACS	Acute Coronary Syndrome
AF	Atrial Fibrillation
AMI	Acute Myocardial Infarction
AP	Angina Pectoris
ARB	Angiotensin II Antagonist
ASA	Aspirin
AVB	Atrial Ventricular Block
BB	Beta Blocker
CABG	Coronary Artery Bypass Graft
CAD	Coronary Artery Disease
CHF	Chronic Heart Failure
CI	Confidence Interval
CRF	Chronic Renal Failure
CVA	Cerebrovascular Accident
ECG	Electro-cardiogram
ER	Emergency Room
IABP	Intra-aortic Balloon Pump
ICCU	Intensive Coronary Care Unit
LBBB	Left Bundle Branch Block
LLD	Lipid-lowering drugs
LMWH	Low Molecular Weight Heparin
MACE	Major Adverse Coronary Event
MI	Myocardial Infarction
MR	Mitral Regurgitation
OR	Odds Ratio
PCI	Percutaneous Coronary Intervention
PPCI	Primary Percutaneous Coronary Intervention
PVD	Peripheral Vascular Disease
RBBB	Right Bundle Branch Block
RVI	Right Ventricular Infarction
SCD	Sudden Cardiac Death
TIA	Transient Ischemic Attack
TLx	Thrombolytic therapy
UAP	Unstable Angina Pectoris
VF	Ventricular Fibrillation
VSD	Ventricular Septum Defect
VT	Ventricular Tachycardia

THE WORKING GROUP ON INTENSIVE CARDIAC CARE - ISRAEL HEART SOCIETY
In Cooperation with THE WORKING GROUP ON INTERVENTIONAL CARDIOLOGY

Acute Coronary Syndrome Israeli Survey - 2008

This form should be completed for all patients with ACS (AMI or Unstable AP) admitted to CCU/Cardiology between 16.3.2008 and 15.5.2008.

Center |___|___| *Ward |___|___| Patient # |___|___|___|___|

Hospitalization #: |___|

Initials: |___|___| 1st family

(reporting department)*

1. Demographics, History and Risk Factors:

Year of Birth: 19|___|___| **Sex:** ☐ 1 M ☐ 2 F

Origin: ☐ 1 Israeli Jew ☐ 2 Israeli Arab ☐ 3 Other Israeli ☐ 4 Tourist ☐ 5 other

Height |___|___|___| *cm* **Weight** |___|___|___| *kg* **Waist Circumference:** |___|___|___| *cm*

Kupat Holim: ☐ 1 Clalit ☐ 2 Maccabi ☐ 3 Meuhedet ☐ 4 Leumit ☐ 5 Other: _____

Emergency/Telemedicine Service Subscription:

○ 0 No ☐ 1 Yes *specify*: ☐ 1 SHAHAL ☐ 2 NATALI ☐ 3 Other: _____

Prior Cardiovascular History:

	No	Yes
MI.....	○ 0	☐ 1
Prior AP ≥24 *hours*	○ 0	☐ 1
CABG	○ 0	☐ 1
PCI	○ 0	☐ 1
CHF	○ 0	☐ 1
Chronic renal failure	○ 0	☐ 1
PVD.....	○ 0	☐ 1
Stroke/TIA	○ 0	☐ 1

Risk Factors for CAD:

	No	Yes	Newly diagnosed
Dyslipidemia	○ 0	☐ 1	☐
Family history of CAD .	○ 0	☐ 1	
Smoking*:			
○ 0 Never ☐ 1 Past ☐ 2 Current			
Hypertension	○ 0	☐ 1	☐
Diabetes:	○ 0	☐ 1	☐
☐ 1 Type 1 ☐ 2 Type 2			

** Past= stopped more than 6 months before admission; Current=Stopped less than 6 month before admission*

Prior visit to ER during the last month: ○ 0 No ☐ 1 Yes

Reason: ☐ Cardiovascular *(specify below)*

☐ Other *specify*: _____

Visit for cardiovascular complains during the previous week: ○ 0 No ☐ 1 Yes

Patient's General Function Level: ☐ 1 Normal ☐ 2 Mildly impaired ☐ 3 Significantly impaired

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Prior Chronic Treatment : List all drugs administrated during the last month

			Total daily dose		Treatment stopped during the month preceding the event?
	No Yes	**Trade Name** *(specify one per line)*	**Dose**	**Unit**	**No Yes**
Aspirin……	○0 □1				○0 □1
Anticoagulants:					
Warfarin or other oral anticoagulants ……	○0 □1				○0 □1
Clopidogrel ……	○0 □1				○0 □1
ACE-I ……	○0 □1				○0 □1
ARB ……	○0 □1				○0 □1
Aldosterone receptor antagonist……	○0 □1				○0 □1
Beta blockers……	○0 □1				○0 □1
Digoxin……	○0 □1				○0 □1
Diuretic ……	○0 □1	**1.**			○0 □1
		2.			○0 □1
Insulin……	○0 □1				○0 □1
Hypoglycemic drugs (Oral) ……	○0 □1	**1.**			○0 □1
		2.			○0 □1
Statins ……	○0 □1				○0 □1
Fibrate ……	○0 □1				○0 □1
Ezetimibe ……	○0 □1				○0 □1
Calcium antagonist……	○0 □1				○0 □1
Nitrates……	○0 □1				○0 □1
Other drug ……	○0 □1	**1.**			○0 □1
		2.			○0 □1
		3.			○0 □1

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2. Onset, Transportation and Admission Information:

day month hour min NA

Symptom Onset..... |__|__| / |__|__| /2008 ⊖ |__|__|:|__|__| △ 2

Patient location at onset: ☐ 1 Private residence ☐ 2 Public place ☐ 3 Medical facility:_____

☐ 4 Work place ☐ 5 Other: _____

First Call for Medical Attention for index ACS..... |__|__| / |__|__| /2008 ⊖ |__|__|:|__|__| △ 2

First Arrival to: ☐ 1 ER ☐ 2 Directly to CCU ☐ 3 Directly to catheterization laboratory

..... |__|__| / |__|__| /2008 ⊖ |__|__|:|__|__| △ 2

1st Hospitalized in: ☐ 1 CCU ☐ 2 Cardiology ☐ 3 Chest pain unit ☐ 4 Internal medicine ☐ 5 Other

..... |__|__| / |__|__| /2008 ⊖ |__|__|:|__|__| △ 2

If 1st ward was not CCU/Cardiology:

Date Transferred to CCU / Cardiology: ..... |__|__| / |__|__| /2008 ⊖ |__|__|:|__|__| △ 2

Mode of Transportation:

☐ 1 Mobile ICCU *specify below*

☐ 1 MADA ☐ 2 SHAHAL ☐ 3 NATALI

☐ 2 Regular ambulance

☐ 3 Private car / independently

☐ 4 Not relevant (*e.g.* in-patient)

Specify--->

Reason ambulance not used:

☐ 1 Ambulance not available

☐ 2 Advice from medical staff

☐ 3 Patient's decision

☐ 4 Other

3. Vital Signs and Management on First Medical Contact:

First medical contact at:

☐ 1 Home ☐ 2 Ambulance ☐ 3 ER ☐ 4 CCU/Cath lab ☐ 5 Other ward ☐ 6 Other:_____

Presenting Symptoms: ☐ Typical angina ☐ Atypical chest pain

☐ Syncope/ aborted SCD ☐ Arrhythmia

☐ Dyspnea ☐ Other: _____

Killip class: 1 2 3 4 **Heart Rate** (*beats/minute*): |__|__|__| **Temperature** (*°C*): |__|__|.|__

Blood Pressure (*mmHg*): **Systolic** |__|__|__| / **Diastolic** |__|__|__|

Treatment before hospitalization: *check all drugs before admittance to ward (include treatment in ER)*

☐ Aspirin:..... |__|__|__| *mg*	☐ Heparin	☐ Nitrates
☐ Clopidogrel ..|__|__|__| *mg*	☐ LMWH	☐ CPR/ DC shock
☐ Beta blockers	☐ GP IIb/IIIa antagonists	☐ ECG
☐ Diuretics	☐ Narcotics	☐ Antiarrhythmics
☐ ACE-I	☐ ARB	

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ECG : *First ECG recorded* |__|__| / |__|__| /2008 (day / month) ⊕ |__|__|:|__|__| (hour / min)

Measured at: ☐1 Home ☐2 Ambulance ☐3 ER ☐4 Hosp. ward

ECG Rhythm: ☐1 NSR ☐2 AF ☐3 SVT ☐4 VT/VF ☐5 Other: _____

ECG Pattern:

☐1 ST-elevation ☐2 ST-depression ☐3 T inversion only ☐4 No new ST- T changes

☐5 Undetermined ECG findings *(LBBB, Pacing, Severe LVH)*

4. Primary Reperfusion Therapy in STEMI Patients:

Primary Reperfusion: ○0 No ☐1 Yes *(specify one below)*

Type of Reperfusion: ☐1 Thrombolysis ☐2 Primary PCI ☐3 Urgent CABG

☐4 Angio without PCI *(open artery)*

Date and Time: |__|__| / |__|__| /2008 (day / month) ⊕ |__|__| :|__|__| (hour / min) *(Angio/PCI-Complete No. of vessels in section 5)*

I. For Thrombolytic Therapy (TLx):

TLx Agent : ☐1 STK ☐2 tPA **Was TLx judged to be clinically successful?** ○0 No ☐1 Yes

II. For Primary PCI :

Infarct Related Artery *(check one)*: ☐1 LM ☐2 LAD ☐3 LCX ☐4 RCA ☐5 SVG ☐6 Unknown

PCI for Additional Lesions: ○0 Not required

☐1 In same procedure ☐2 Separate procedure ☐3 After discharge

(Complete details in section 5)

TIMI grade flow –before revascularizaion *(First injection)*: [0] [1] [2] [3]

Primary PCI With Use of:

☐ **IIb/IIIa Antagonist:** ☐1 Reopro ☐2 Integrilin ☐3 Aggrastat

Date & time: |__|__| / |__|__| /2008 (day / month) |__|__| :|__|__| (hour / min)

Started: ☐1 Before PCI ☐2 During/after PCI

☐ **Clopidogrel →**

Loading Dose:	→|__|__|__| *mg*	
Date & time:	|__|__| / |__|__| /2008 (day / month)	|__|__| :|__|__| (hour / min)
Started:	☐1 Before PCI	☐2 During/after PCI

☐ **Angiomax**

☐ **Stent**

Type:	**N° of Bare metal:** |__|	**N° of Drug Eluting:** |__|
Trade name: *(Check all)*	☐ Driver ☐ Visom ☐ Liberte ☐ Yokon ☐ Titan ☐ Prokinetic ☐ Blazer ☐ Other	☐ Cypher ☐2 Taxus ☐ Endeavor ☐ Xience ☐ Other

☐ **Protective/Aspiration Device**

TIMI grade flow -following the procedure: [0] [1] [2] [3]

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Reasons for not Performing Primary Reperfusion *(TLx or PCI)* **for ST Elevation or New LBBB**

(check all that apply):

- ☐ Spontaneous reperfusion
- ☐ Late arrival at hospital
- ☐ Misdiagnosis
- ☐ Contraindication to TLx
- ☐ Contraindication to PCI
- ☐ Considered not indicated
- ☐ Died before decision
- ☐ Patient refusal
- ☐ Other *specify* _____

5. Additional Cardiac Interventions and Procedures in CCU/Cardiology:

Coronary Angiography *(excluding primaryPCI):* ○0 No ☐1 Yes

If yes specify: ☐1 Event Driven ☐2 Ward policy

Date: |__|__| / |__|__| / 2008 ⊕ |__|__|:|__|__|
day month hour minutes

If no specify the reason for not performing coronary angiography:

☐1 Contradication ☐2 Not indicated ☐3 Patient's refusal ☐4 Scheduled after discharge

Was Coronary Angiography Followed by Intervention? ○0 No ☐1 Yes *(specify below)*

☐ **PCI** *(excluding primary)*

To *(check all)*: ☐ LM ☐ LAD ☐ LCX ☐ RCA ☐ SVG ☐ Unknown

With Use of:

☐ **IIb/IIIa Antagonist:**	☐1 Reopro	☐2 Integrilin	☐3 Aggrastat
	Started:	☐1 Before PCI	☐2 During/after PCI
☐ **Clopidogrel →**	**Loading Dose:** →|__|__|__| *mg*		
	Started:	☐1 Before PCI	☐2 During/after PCI
☐ **Angiomax**			
☐ **Stent**	**Type:**	**N° Bare:** |__|	**N° Drug Eluting:** |__|
	Trade name:	☐ Driver ☐ Visom ☐ Liberte ☐ Yokon ☐ Titan ☐ Prokinetic ☐ Blazer ☐ Other	☐ Cypher ☐2 Taxus ☐ Endeavor ☐ Xience ☐ Other

☐ **Protective/Aspiration Device**

☐ **CABG** **Date:** |__|__| / |__|__| / 2008

Number of Diseased Vessels *(according to any angiography)*: |__|__|
(0=None, 1, 2, 3, 4=Main left, 99=Unknown)

EF Determined? ○0 No ☐1 Yes *(specify below)*

By: ☐1 Echo ☐2 Ventricolography ☐3 Radionuclear scan

EF: |__|__| % ☐1 Normal (≥50%) ☐2 Mild (40-49%) ☐3 Moderate (30-39%) ☐4 Severe (<30%)

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Other Procedures:	No	Yes		No	Yes		No	Yes
DC shock ……	○0	□1	Echo ……	○0	□1	Permanent pace maker	○0	□1
Resuscitation (CPR)…	○0	□1	EPS ……	○0	□1	Temporary pacemaker	○0	□1
Ventilation ……	○0	□1	AICD ……	○0	□1	Hypothermia for anoxic brain damage	○0	□1
IA Balloon ……	○0	□1	Stress test /SPECT.	○0	□1			

6. In Hospital Complications:

	No	Yes		No	Yes
CHF mild-moderate (Killip-2)……	○0	□1	High degree (2-3°) AVB ……	○0	□1
Pulmonary edema (Killip-3) ……	○0	□1	Sustained VT *(>125 bpm)* …….	○0	□1
Cardiogenic shock (Killip-4) ……	○0	□1	Primary VF ……	○0	□1
Hemodynamically significant RVI...	○0	□1	Secondary VF ……	○0	□1
Re-MI ……	○0	□1	AF ……	○0	□1
Post MI angina/re-ischemia ……	○0	□1	Asystole ……	○0	□1
Sub-acute stent thrombosis ……	○0	□1	TIA ……	○0	□1
Free wall rupture ……	○0	□1	Stroke: ……	○0	□1
Pericarditis ……	○0	□1	□ Hemorrhagic		
Tamponade ……	○0	□1	□ Ischemic		
VSD ……	○0	□1	Acute renal failure ……	○0	□1
MR Moderate – severe ……	○0	□1	Major bleeding ……	○0	□1
RBBB (new onset) ……	○0	□1	□ Blood transfusions		
LBBB (new onset) ……	○0	□1	Infection ……	○0	□1
			Other ……	○0	□1

7. Laboratory Tests

CK *maximal value*: …… |__|__|__|__|__| *IU/L* **Elevated** ? ○0 No □1 Yes △2 NA

CK-MB% ……|__|__|

CK-MB Mass Value *(max)*: |__|__|__|__| *ng/ml* **Elevated** ? ○0 No □1 Yes △2 NA

Troponin I *(max)*: ……|__|__|__|__| *ng/ml* **Elevated** ? ○0 No □1 Yes △2 NA

Troponin T *(max)*: ……|__|__|__|__| *ng/ml* **Elevated** ? ○0 No □1 Yes △2 NA

Lipid profiles: *first measurement*

Cholesterol-: Total..|__|__|__| *Unit:* ___ **LDL**|__|__|__| *Unit:* ___ **HDL** |__|__|. |__| *Unit:* ___
Triglycerides……|__|__|__| *Unit:* ___

Creatinine *(max)* …|__|__|__| *Unit:* ___ **Glucose:** |__|__|__| *Unit:* ___ *(First measurement)*

Hb… |__|__|.|__| *Unit:* ___ *(First measurement)* **WBC:** |__|__|__|__|__| *Unit:* ___ *(First measurement)*

Center Ward Patient #

8. Medical Treatment List all drugs administrated in hospital and/or recommended at discharge. Exclude clinical trial drugs.

	In Hospital				At Discharge			
			Total daily dose				Total daily dose	
	No Yes	Trade Name	Dose	Unit	No Yes	Trade Name	Dose	Unit
Aspirin	○0 □1				○0 □1			
Anticoagulants:								
Warfarin or other oral anticoagulants	○0 □1				○0 □1			
UF Heparin	○0 □1							
LMW heparin	○0 □1				○0 □1			
Clopidogrel	○0 □1				○0 □1			
ACE-I	○0 □1				○0 □1			
ARB	○0 □1				○0 □1			
Aldosterone receptor antagonist	○0 □1				○0 □1			
Beta blockers	○0 □1				○0 □1			
IV inotropic agent	○0 □1				○0 □1			
Digoxin	○0 □1				○0 □1			
Diuretic	○0 □1	1.			○0 □1			
		2.			○0 □1			
Insulin	○0 □1				○0 □1			
Hypoglycemic drugs (Oral)	○0 □1	1.			○0 □1			
		2.			○0 □1			
Statins	○0 □1				○0 □1			
Fibrate	○0 □1				○0 □1			
Ezetimibe	○0 □1				○0 □1			
Calcium antagonist	○0 □1				○0 □1			
Nitrates	○0 □1				○0 □1			
Other	○0 □1	1.			○0 □1			
		2.			○0 □1			
		3.			○0 □1			

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Participation in a Clinical Trial: ○0 No ☐1 Yes **Name of Trial** : _____

9. Discharge from CCU/Cardiology department

Note: information after the patient was discharged from CCU/cardiology or transfered to another ward should be recorded on the 30 day follow-up page

Status at Discharge :

☐0 Alive → **Discharge Date:** |__|__| / |__|__| /2008

Discharged to:
- ☐1 Internal Medicine
- ☐2 Cardiothoracic Surgery
- ☐3 Other Ward
- ☐4 Convalescence facility/unit
- ☐5 Home
- ☐6 Other

Plavix recommended: ○0 No ☐1 Yes **for number of month:** |__|__|

☐1 Deceased → **Date of Death:** |__|__| / |__|__| /2008

Cause of Death: ☐0 Non-cardiac ☐1 Cardiac

Death was: ☐0 Non-sudden ☐1 Sudden

Discharge Diagnosis: ☐1 STE MI ☐2 NSTEMI ☐3 UAP

Type of AMI: |__|__|

Type 1	Spontaneous MI related to ischemia due to primary coronary event such as plaque erosion and /or rupture, fissuring or dissection	**Type 4a**	MI associated with PCI
Type 2	MI secondary to ischemia due to either increased oxygen demand or decreased supply., e.g coronary artery spam, coronary embolism, anemia, arrhythmias, hypertension or hypotension	**Type 4b**	MI associated with stent thrombosis as documented by angiography or at autopsy
Type 3	Sudden unexpected cardiac death, including cardiac arrest, often with symptoms suggestive of myocardial ischemia, accompanied by presumably new ST elevation or new LBBB, or evidence of fresh thrombus in a coronary artery by angiography and/or at autopsy, but death occurring before blood samples could be obtained, or at a time before the appearance of cardiac biomarkers in the blood	**Type 5**	MI associated with CABG

ECG Findings:

Location: ☐ Anterior ☐ Inferior ☐ Right ventricle ☐ Lateral ☐ Posterior ☐ Undetermined

Q-Waves: ○0 No ☐1 Yes

Comments: _____

Name of Physician: _____ **Signature:** _____

Date: |__|__| / |__|__| /2008

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THE WORKING GROUP ON INTENSIVE CARDIAC CARE - ISRAEL HEART SOCIETY
In Cooperation with THE WORKING GROUP ON INTERVENTIONAL CARDIOLOGY

Acute Coronary Syndrome Israeli Survey - 2008

30-Day Follow-up *(from 1st day of admission)*

Do not record on this form events/ procedures that took place during the index hospitalization and were already recorded on the main form

Center | Ward | Patient #

Initials |__|__|

Date of Contact: |__|__| / |__|__| / 2008 (*day* / *month*)

At the Time of Contact Patient was:

☐ 1 Still in hospital ☐ 2 Discharged from hospital *(specify below)* ☐ 3 Deceased in hospital

Date hospital Discharge: |__|__| / |__|__| /2008

Re-Hospitalisation Within 30 Days from Admission: ○ 0 No ☐ 1 Yes *(specify below)*

Date of First Re-Hospitalisation: |__|__| / |__|__| / 2008 (*day* / *month*)

First Re-Hospitalization was: ☐ 1 Scheduled ☐ 2 Cardiac event driven ☐ 3 Non cardiac hospitalization

Events After Discharge from Cardiology *(Check all that apply)*

	No Yes	Day/Month	Re-Hospitalization No Yes
Re- UAP…	○ 0 ☐ 1	|__|__| / |__|__|	○ 0 ☐ 1
Re-MI……	○ 0 ☐ 1	|__|__| / |__|__|	○ 0 ☐ 1
Angina ….	○ 0 ☐ 1	|__|__| / |__|__|	○ 0 ☐ 1
CHF …….	○ 0 ☐ 1	|__|__| / |__|__|	○ 0 ☐ 1
Arrhythmia	○ 0 ☐ 1	|__|__| / |__|__|	○ 0 ☐ 1
	Specify: _____		
Stent thrombosis	○ 0 ☐ 1	|__|__| / |__|__|	○ 0 ☐ 1
Pericarditis	○ 0 ☐ 1	|__|__| / |__|__|	○ 0 ☐ 1
Other…….	○ 0 ☐ 1	*Specify* _____	

Procedures After Discharge from Cardiology *(Check all that apply)*

	No Yes	Day/Month	Scheduled No Yes
Cor. angiography	○ 0 ☐ 1	|__|__| / |__|__|	○ 0 ☐ 1
PCI……..	○ 0 ☐ 1	|__|__| / |__|__|	○ 0 ☐ 1
CABG ……	○ 0 ☐ 1	|__|__| / |__|__|	○ 0 ☐ 1
EPS……..	○ 0 ☐ 1	|__|__| / |__|__|	○ 0 ☐ 1
New pacemaker ..	○ 0 ☐ 1	|__|__| / |__|__|	○ 0 ☐ 1
New AICD ……..	○ 0 ☐ 1	|__|__| / |__|__|	○ 0 ☐ 1
Other……	○ 0 ☐ 1	*Specify* _____	

Referral to Rehabilitation Program : ○ 0 No ☐ 1 Yes

Participating in a Rehabilitation Program : ○ 0 No ☐ 1 Yes

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30-Day Follow-up evidence based Treatment: List of drugs used at 30-days:

			Total daily dose	
	No Yes	**Trade Name** *(specify one per line)*	**Dose**	**Unit**
Aspirin……	○0 □1			
Clopidogrel ……..	○0 □1			
ACE-I ……	○0 □1			
ARB ……	○0 □1			
Beta blockers……	○0 □1			
Statins ……	○0 □1			

Status at the End of 30 days from the First Day of Hospitalization:

□0 Alive

□1 Deceased *specify:* **Date of Death:** |__|__| / |__|__| /2008

Cause of Death: □1 Cardiac □0 Non-cardiac □ Unknown

Death was: □1 Sudden □0 Non-sudden □ Unknown

Name of Physician: _____ **Signature:** _____

Date: |__|__| / |__|__| /2008