

ACSIS 2021

**Acute Coronary Syndrome Israeli Survey
March-April 2021**

SURVEY FINDINGS AND TEMPORAL TRENDS 2010 - 2021

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



The Israel
Heart Society



The Israeli Center for
Cardiovascular
Research



The Israeli Center for
Disease Control, the
Ministry of Health



Booklet ACSIS 2024

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Introduction

We are proud to present you with the ACSIS 2024 survey results. This survey, is a biennial tradition since it was launched in 1992 by Prof. Shlomo Behar.

The ACSIS survey provides a state-of-the-art representation of the characteristics, management, and outcome of patients presenting with an acute coronary syndrome (ACS) in Israel. This survey is a source of pride for the Israeli cardiology community.

ACSYS 2024 was carried out during March-April 2024 by the Israeli working group on Acute Cardiac Care of the Israel Heart Society, and the Israeli Center for Cardiovascular Research (ICCR) in cooperation with the Israeli Center for Disease Control (ICDC) and Israel Society of Intensive Care Nursing.

During this 2-month period, detailed data was collected in all intensive cardiac care units (ICCU) and cardiology wards in all public hospitals in Israel, and included 1801 consecutive ACS patients admitted and diagnosed with ACS.

The ACSIS 2024 findings expand on prior surveys by showing a continuous improvement in in-hospital, 1 month, as well as 1-year mortality throughout the last decade.

ACSYS data is used continuously for high-quality scientific research which is published in the major journals in the field.

We thank the Israeli Center for Disease Control (ICDC) as well as the pharmaceutical industry in their continuing unconditional support of this important survey.

Finally, we would like to thank and recommend the dedication of all the study coordinators and staff members of all ICCU's and Cardiology wards for their dedicated time and effort in collecting the data.

Prof. Roy Beigel	Dr. Katia Orvin
Chairman	Secretary

Israeli working-group on Acute Cardiac Care

Message from the Israel Heart Society

The Israel Heart Society is proud to present the final results of the ACSIS 2024 survey.

ACSYS is a biannual survey conducted over a 2 months period in all coronary care units operating in Israel and includes all ACS patients admitted during the survey period. The survey has been conducted since 2000. Over this long period it has provided invaluable insights into the characteristics, management and outcome of our patients. The survey allows quality indicators for individual centers, has produced numerous scientific papers and allows important analyses of long-term trends in ACS.

The 2024 ACSIS survey follows in the footsteps of previous surveys and extends the observations yet more. The data presented here are of great interest to anyone interested in the epidemiology and management of ACS in Israel and globally. We would like to thank the ACSIS steering committee, led by the ACC WG for their very thorough work in organizing this survey and preparing the data for presentation and for our many industry partners who supported this great effort.

We trust you will find these data important and interesting.

Prof. Ofer Amir	Dr. Arik Wolak
President	Secretary General

The Israel Heart Society

The ACSIS 2024 survey was generously supported by an unrestricted grant by the following companies:



Chapter 1: Acute Coronary Syndrome (ACS) in Cardiology

1.1 Distribution of Patients with ACS by Electrocardiogram (ECG) on Admission

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

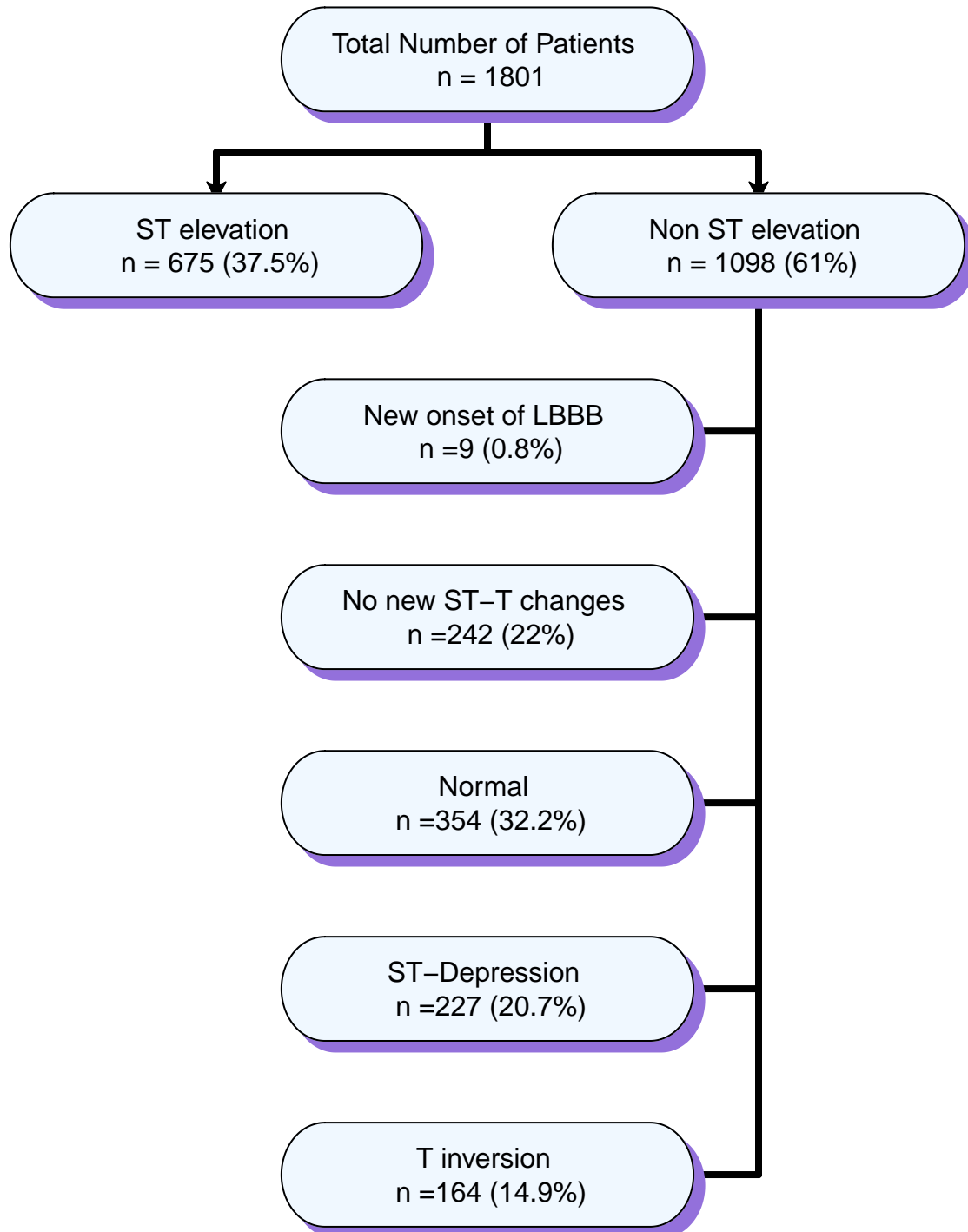


Figure 1.1.b: Distribution of Patients with ACS by Discharge Diagnosis

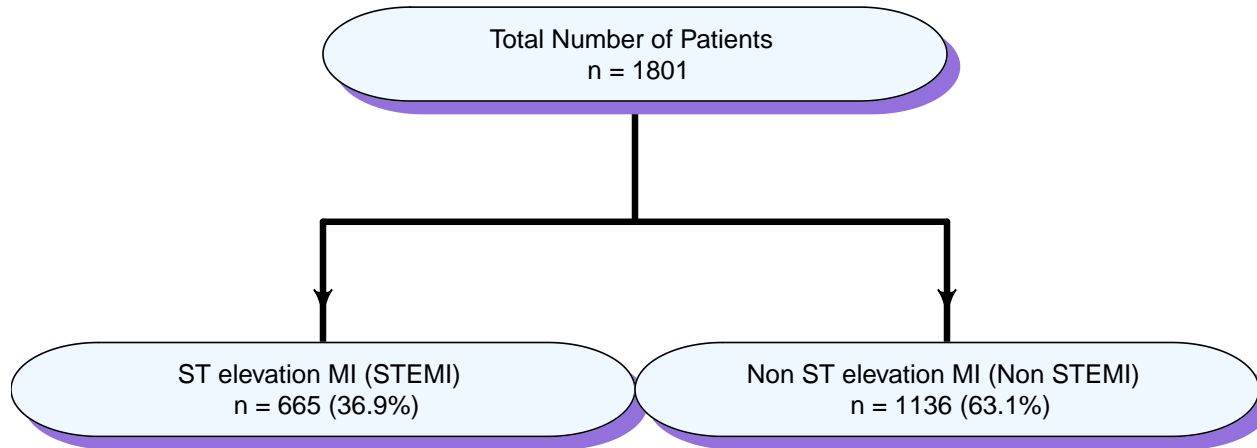
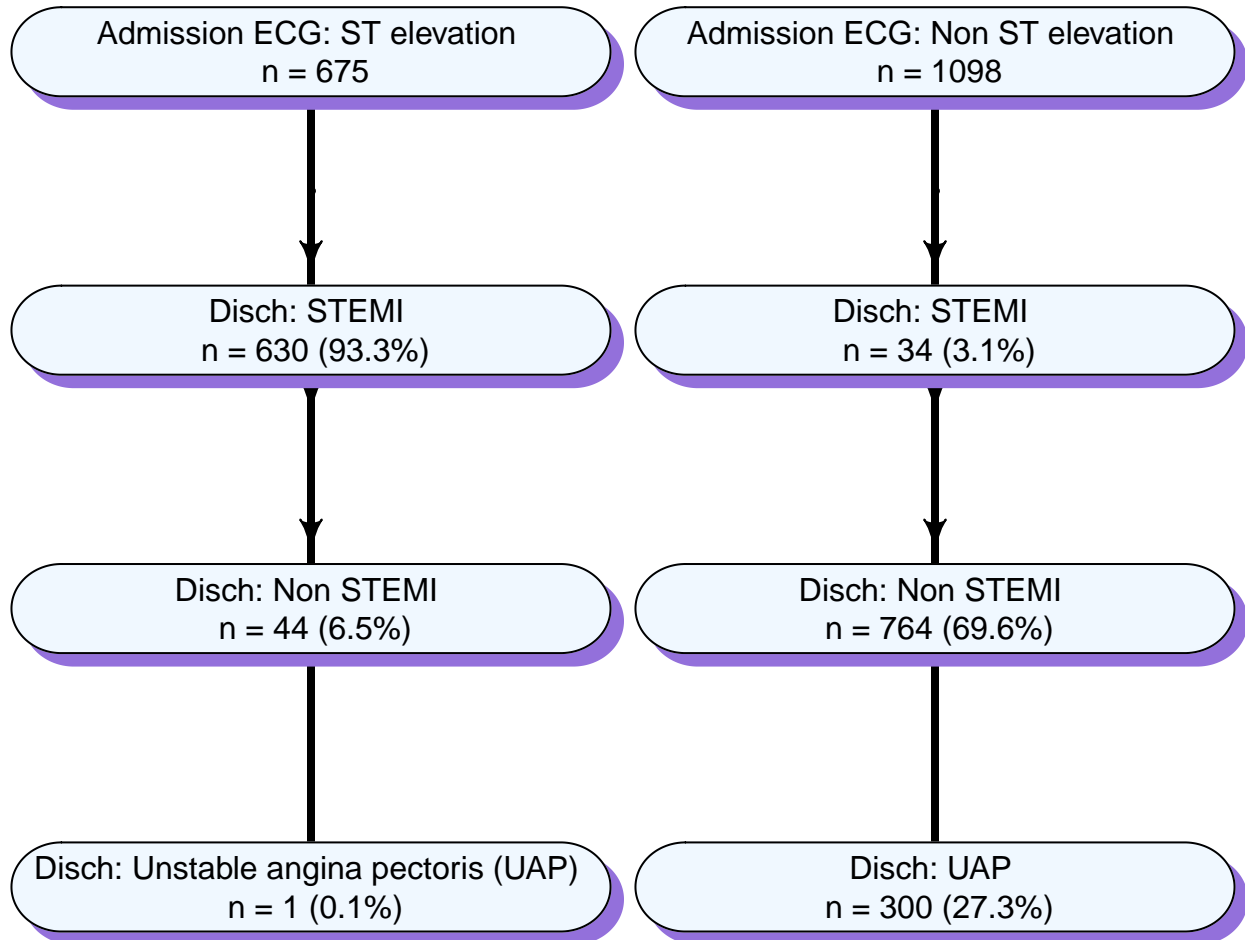


Figure 1.1.c: Admission versus Discharge Diagnosis



1.2 Demographic Characteristics

1.2.1 Age Distribution by ECG on Admission

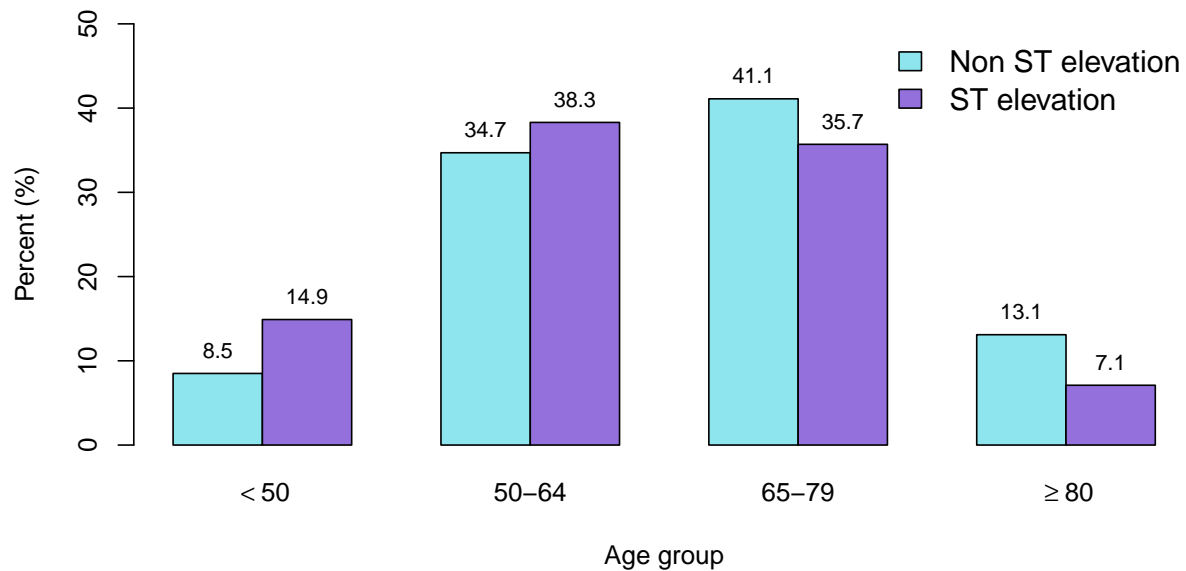
Patients with ST elevation were younger (mean age: 62.6 ± 12.1) than those with non ST elevation (mean age: 66.1 ± 11.9), and the age distribution of patients with ST elevation indicated a greater proportion of younger patients (55.4% were aged < 65 years) than that of patients with non ST elevation (44.4% aged < 65 years).

Table 1.1: Age Distribution by ECG on Admission

	Total	Non ST elevation	ST elevation	p-value
n	1801	1098	675	
Age groups (%)				<0.001
< 50	206 (11.4)	96 (8.7)	105 (15.6)	
50-64	669 (37.1)	391 (35.6)	269 (39.9)	
65-79	723 (40.1)	463 (42.2)	251 (37.2)	
≥ 80	203 (11.3)	148 (13.5)	50 (7.4)	
Age (mean(sd))	64.75 (12.11)	66.07 (11.87)	62.64 (12.13)	<0.001

Percentages are calculated out of available data

Figure 1.2: Age Distribution by ECG on Admission



1.2.2 Age Distribution by Gender

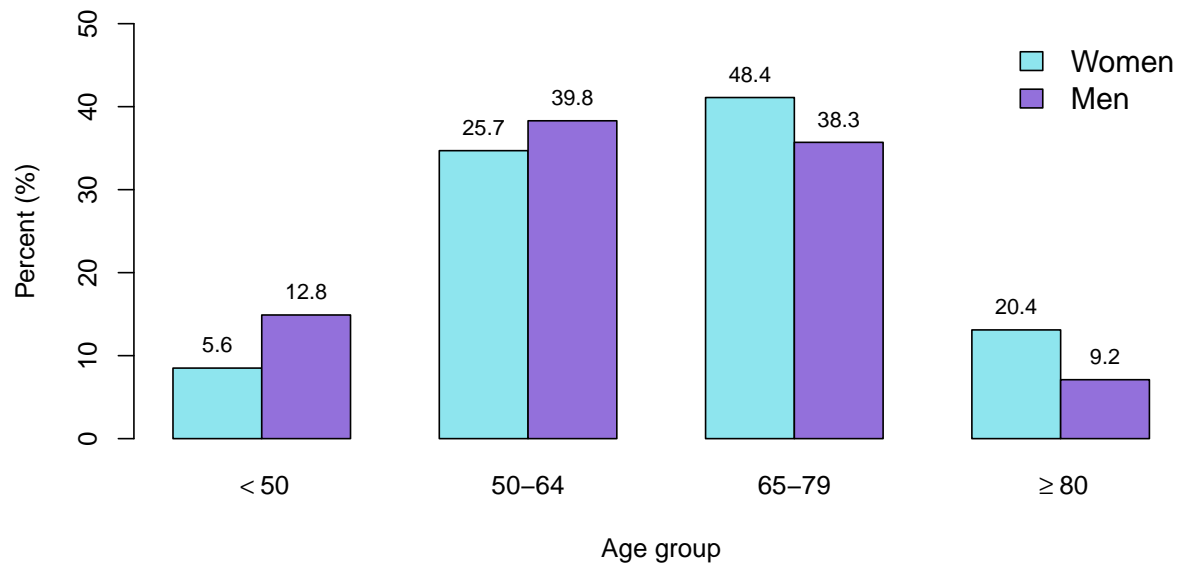
The age distribution of male patients was significantly different from that of female patients. The majority of men (52.6%) were in the younger age groups (< 65) and only 9.2% were aged 80 or above. 12.8% of men were less than 50 years old. By contrast, the majority of the female patients were in the older age groups ≥ 65 (68.7%). The number of women under the age of 50 was significantly lower than of their male counterparts (5.6%), and 20.4% were aged 80 or above.

Table 1.2: Age Distribution by Gender

	Total	Women	Men	p-value
n	1801	339	1461	
Age groups (%)				<0.001
< 50	206 (11.4)	19 (5.6)	187 (12.8)	
50-64	669 (37.1)	87 (25.7)	581 (39.8)	
65-79	723 (40.1)	164 (48.4)	559 (38.3)	
≥ 80	203 (11.3)	69 (20.4)	134 (9.2)	
Age (mean(sd))	64.75 (12.11)	69.87 (11.63)	63.57 (11.91)	<0.001

Percentages are calculated out of available data

Figure 1.3: Age Distribution by Gender



1.2.3 Gender Distribution

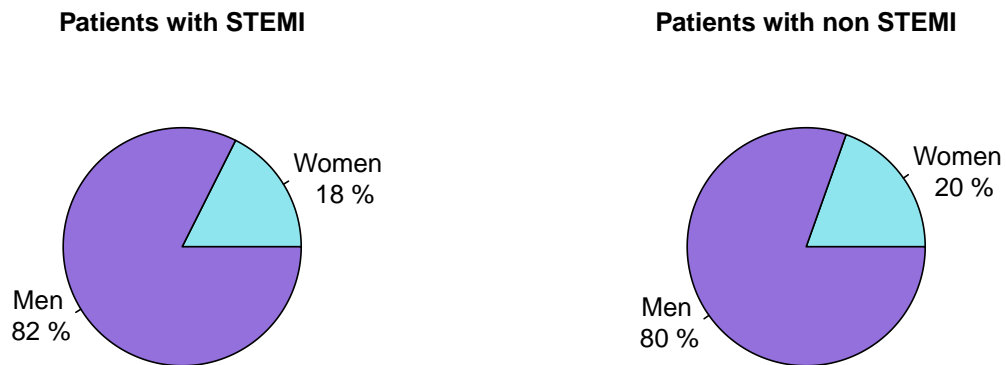
For both STEMI and Non STEMI patients we observed a clear male predominance.

Table 1.3: Gender Distribution

	Total	Non STEMI	STEMI	p-value
n	1801	1136	665	
Women (%)	339 (18.8)	222 (19.6)	117 (17.6)	0.334
Men (%)	1461 (81.2)	913 (80.4)	548 (82.4)	

Percentages are calculated out of available data

Figure 1.4: Gender Distribution



1.3 Cardiovascular History

1.3.1 Cardiovascular History

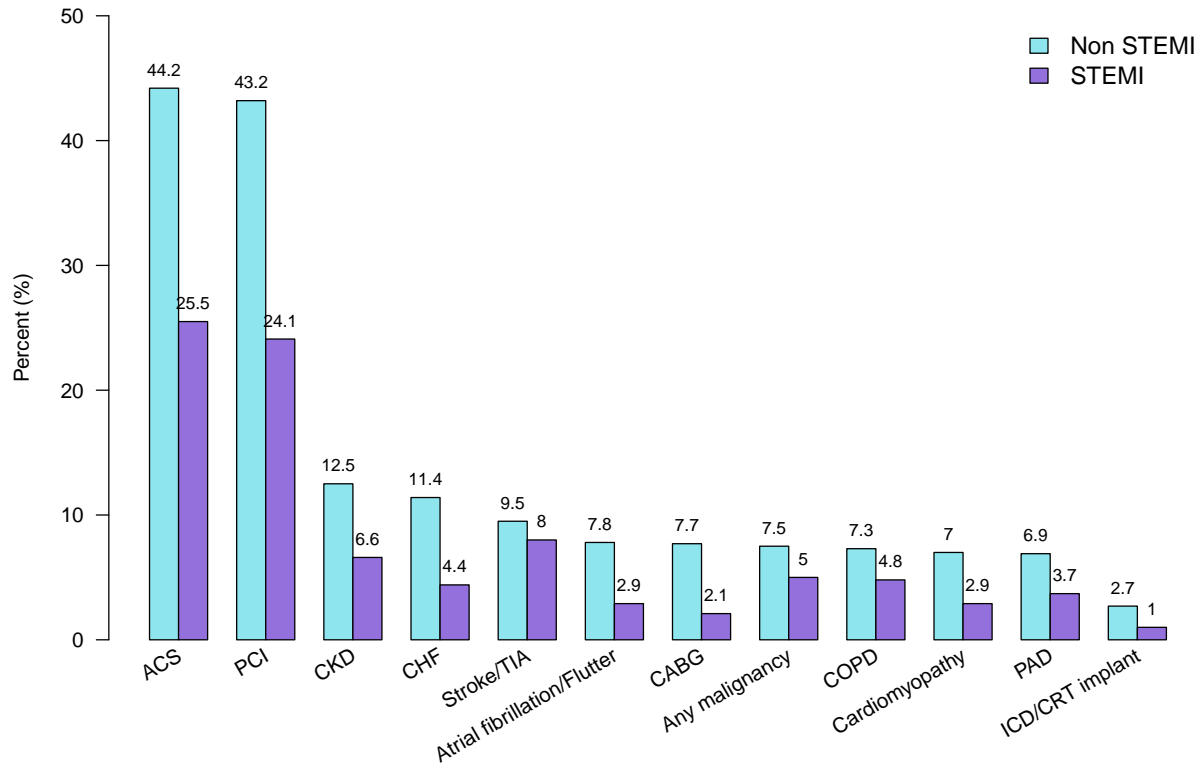
A history of ACS, cardiomyopathy, congestive heart failure (CHF), chronic renal failure, peripheral artery disease (PAD) and atrial fibrillation were significantly more frequent among patients with non STEMI. Similarly, more patients with non STEMI had undergone percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG) prior to hospitalization.

Table 1.4: Prior Cardiovascular History

	Total	Non STEMI	STEMI	p-value
n	1801	1136	665	
ACS (%)	659 (37.2)	490 (44.2)	169 (25.5)	<0.001
CABG (%)	100 (5.6)	86 (7.7)	14 (2.1)	<0.001
PCI (%)	640 (36.0)	480 (43.2)	160 (24.1)	<0.001
Cardiomyopathy (%)	97 (5.5)	78 (7.0)	19 (2.9)	<0.001
CHF (%)	156 (8.8)	127 (11.4)	29 (4.4)	<0.001
Chronic Kidney Disease (CKD) (%)	183 (10.3)	139 (12.5)	44 (6.6)	<0.001
PAD (%)	100 (5.7)	76 (6.9)	24 (3.7)	0.007
Stroke/Transient ischemic attack (TIA) (%)	158 (8.9)	105 (9.5)	53 (8.0)	0.330
Chronic Obstructive Pulmonary Disease (COPD) (%)	113 (6.4)	81 (7.3)	32 (4.8)	0.049
Atrial fibrillation/Flutter (%)	106 (6.0)	87 (7.8)	19 (2.9)	<0.001
Implantable cardioverter-defibrillators (ICD)/Cardiac resynchronization therapy (CRT) implant (%)	34 (2.1)	28 (2.7)	6 (1.0)	0.021
Any malignancy (%)	108 (6.5)	76 (7.5)	32 (5.0)	0.066
Thyroid disease (%)	72 (4.4)	52 (5.1)	20 (3.2)	0.080

Percentages are calculated out of available data

Figure 1.5: Cardiovascular history



1.3.2 Risk Factors

Current smoking was more prevalent among patients presenting with STEMI, while other risk factors were generally more prevalent among patients presenting with non STEMI. No difference were found in the prevalence of family history of coronary artery disease (CAD) or in newly diagnosed diabetes.

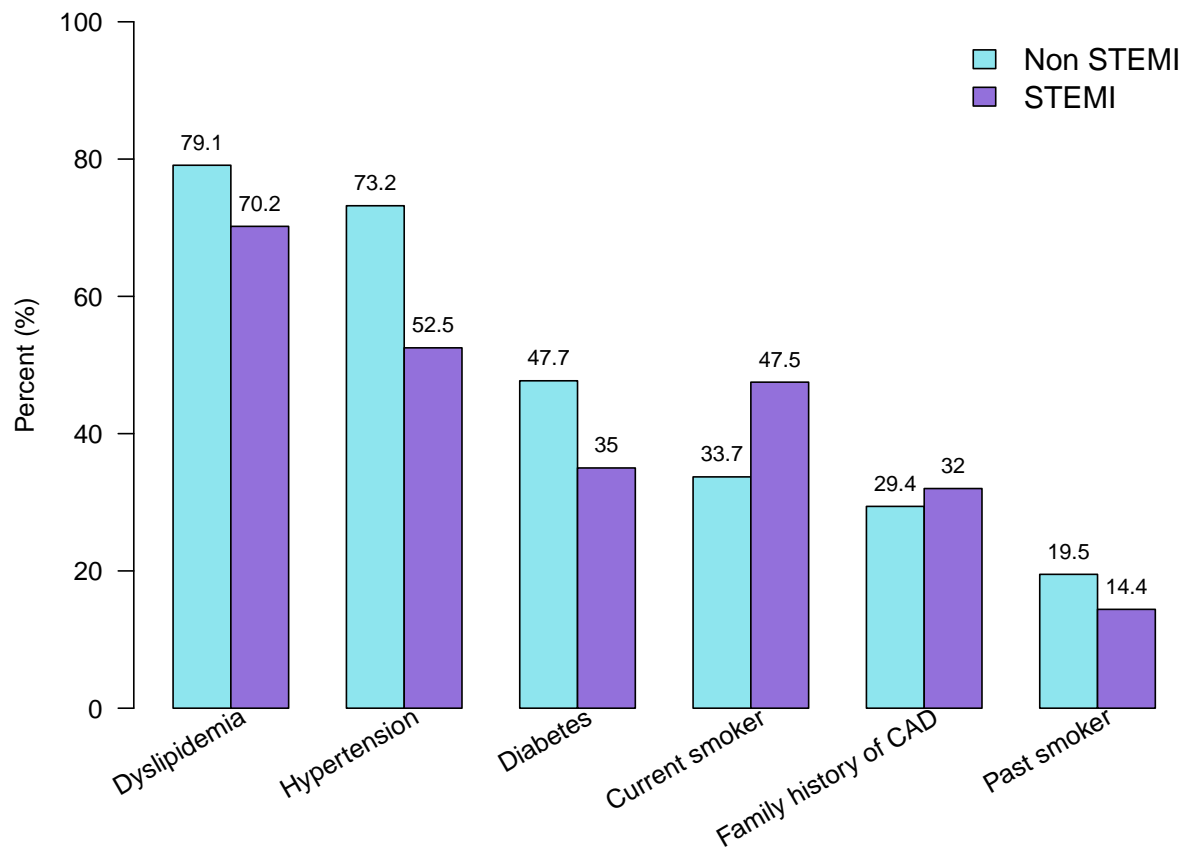
Table 1.5: Risk Factors

	Total	Non STEMI	STEMI	p-value
n	1801	1136	665	
Hypertension (%)	1159 (65.4)	811 (73.2)	348 (52.5)	<0.001
Diabetes (%)	764 (43.0)	531 (47.7)	233 (35.0)	<0.001
* Newly diagnosed (%)	31 (4.1)	18 (3.4)	13 (5.6)	0.225
Dyslipidemia (%)	1341 (75.8)	876 (79.1)	465 (70.2)	<0.001
Current smoker (%)	699 (38.8)	383 (33.7)	316 (47.5)	<0.001
Past smoker (%)	317 (17.6)	221 (19.5)	96 (14.4)	0.008
Family history of CAD (%)	449 (30.4)	271 (29.4)	178 (32.0)	0.309

Percentages are calculated out of available data

Newly diagnosed expressed as percentage of total patients with specific risk factor

Figure 1.6: Risk Factors



1.4 Prior Chronic Treatment

Prior to the index hospitalization, a higher proportion of patients with non STEMI (41.5%) were being treated with aspirin compared to those with STEMI (26.9%). Other drugs in common use were Angiotensin-Converting-Enzyme (ACE) Inhibitors and Angiotensin Receptor Blockers (ARB), Beta Blockers, lipid-lowering drugs (primarily statins) and diuretics all of which were in use more frequently among patients presenting with non STEMI. 7.9% of patients with non STEMI and 2.4% of those with STEMI were being treated with clopidogrel.

Table 1.6: Prior Chronic Treatment

	Total	Non STEMI	STEMI	p-value
n	1801	1136	665	
Anti-platelets				
Aspirin (%)	651 (36.1)	472 (41.5)	179 (26.9)	<0.001
P2Y12 (%)	166 (9.2)	135 (11.9)	31 (4.7)	<0.001
Clopidogrel (%)	106 (5.9)	90 (7.9)	16 (2.4)	<0.001
Prasugrel (%)	28 (1.6)	20 (1.8)	8 (1.2)	0.468
Ticagrelor (%)	32 (1.8)	25 (2.2)	7 (1.1)	0.111
Anticoagulants				
Oral anticoagulants ¹ (%)	88 (4.9)	71 (6.2)	17 (2.6)	0.001
Direct oral anticoagulation (DOAC) ² (%)	80 (4.4)	64 (5.6)	16 (2.4)	0.002
Warfarin (%)	9 (0.5)	8 (0.7)	1 (0.2)	0.207
Dabigatran (%)	4 (0.2)	2 (0.2)	2 (0.3)	0.981
Rivaroxaban (%)	14 (0.8)	9 (0.8)	5 (0.8)	1.000
Apixaban (%)	62 (3.4)	53 (4.7)	9 (1.4)	<0.001
Other				
ACE-I (%)	336 (18.7)	249 (21.9)	87 (13.1)	<0.001
ARB (%)	248 (13.8)	175 (15.4)	73 (11.0)	0.010
Beta Blockers (%)	447 (24.8)	335 (29.5)	112 (16.8)	<0.001
Calcium channel blockers (CCB) (%)	223 (12.4)	171 (15.1)	52 (7.8)	<0.001
Nitrates (%)	23 (1.3)	22 (1.9)	1 (0.2)	0.002
Diuretics (%)	116 (6.4)	98 (8.6)	18 (2.7)	<0.001
Antihyperglycemic drugs ³ (%)	275 (15.3)	196 (17.3)	79 (11.9)	0.003
Statins ⁴ (%)	670 (37.2)	480 (42.3)	190 (28.6)	<0.001
Ezetimibe (%)	167 (9.3)	130 (11.4)	37 (5.6)	<0.001

¹ Oral anticoagulants include: Warfarin, Dabigatran, Rivaroxaban, Apixaban

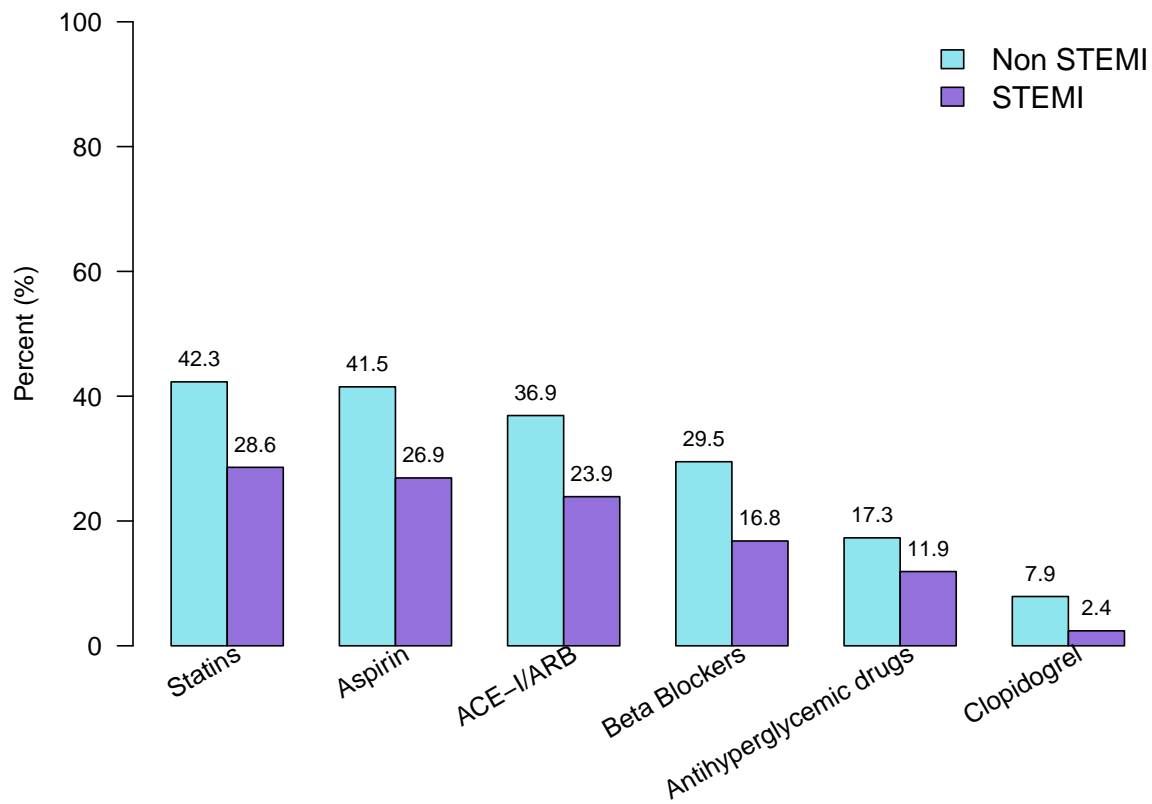
² Direct Oral anticoagulants include: Dabigatran, Rivaroxaban, Apixaban

³ Antihyperglycemic drugs include: Glibenclamide, Glipizide, Glimepiride, Metformin, Sitagliptine, Saxagliptine, Vidagliptine, Linagliptine, Exenatide, Liraglutide, Dapagliflozin, Acarbose, Meglitinides, TZDs, Rosiglitazone

⁴ Statins include: Simvastatin, Pravastatin, Atorvastatin, Rosuvastatin

* Percentages are calculated out of available data

Figure 1.7: Prior Chronic Treatment



1.5 Transportation, Pre-Admission and Admission Information

1.5.1 Mode of Transportation by ECG on Admission

41.4% of all patients arrived at the hospital by means of private transportation. Patients with ST elevation were more frequently transported to hospital with mobile intensive care unit (MICU), and patients with non ST elevation arrived more frequently by means of private transportation.

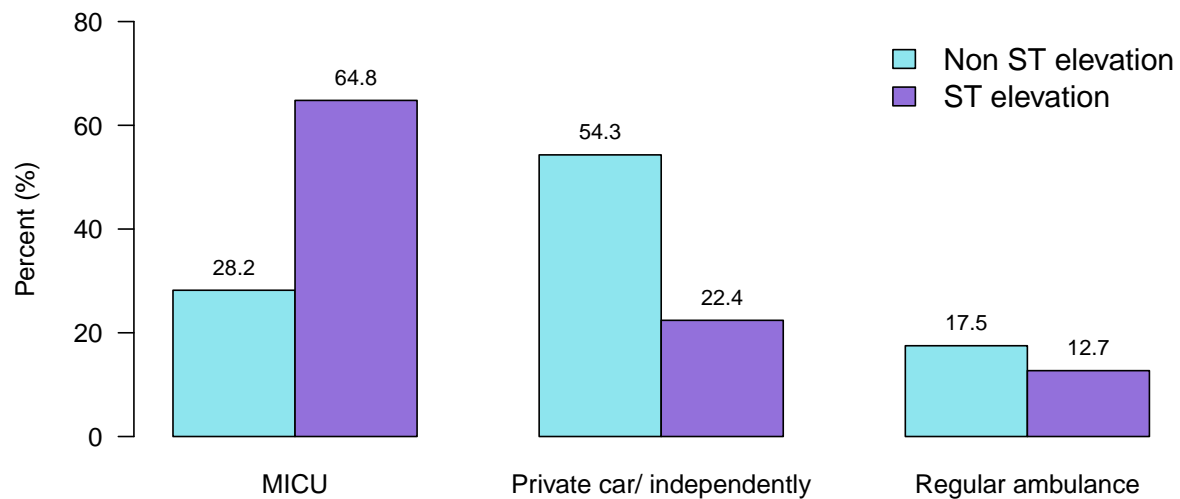
Table 1.7: Mode of Transportation by ECG on Admission

	Total	Non ST elevation	ST elevation
n ¹	1475	875	597
MICU (%)	634 (43.0)	247 (28.2)	387 (64.8)
Private car/ independently (%)	610 (41.4)	475 (54.3)	134 (22.4)
Regular ambulance (%)	231 (15.7)	153 (17.5)	76 (12.7)

p-value <0.001

¹ Excluded in-patients

Figure 1.8: Mode of Transportation by ECG on Admission



1.5.2 Mode of Transportation by Gender

43% of patients, both men and women, arrived by means of a MICU. Women were more frequently transported to hospital with regular ambulance and men arrived more frequently by means of private transportation.

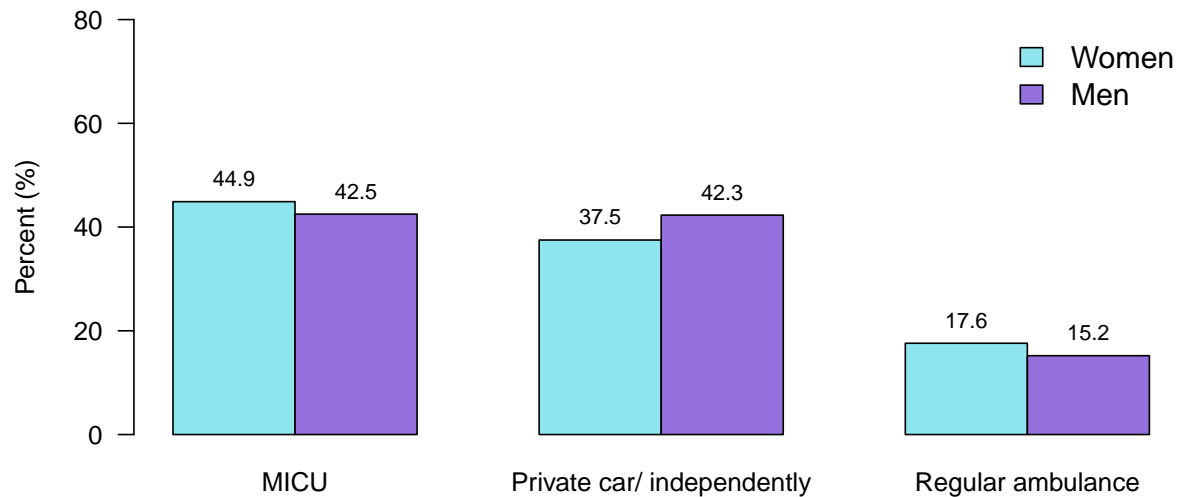
Table 1.8: Mode of Transportation by Gender

	Total	Women	Men
n ¹	1475	272	1202
MICU (%)	634 (43.0)	122 (44.9)	511 (42.5)
Private car/ independently (%)	610 (41.4)	102 (37.5)	508 (42.3)
Regular ambulance (%)	231 (15.7)	48 (17.6)	183 (15.2)

p-value = 0.312

¹ Excluded in-patients

Figure 1.9: Mode of Transportation by gender

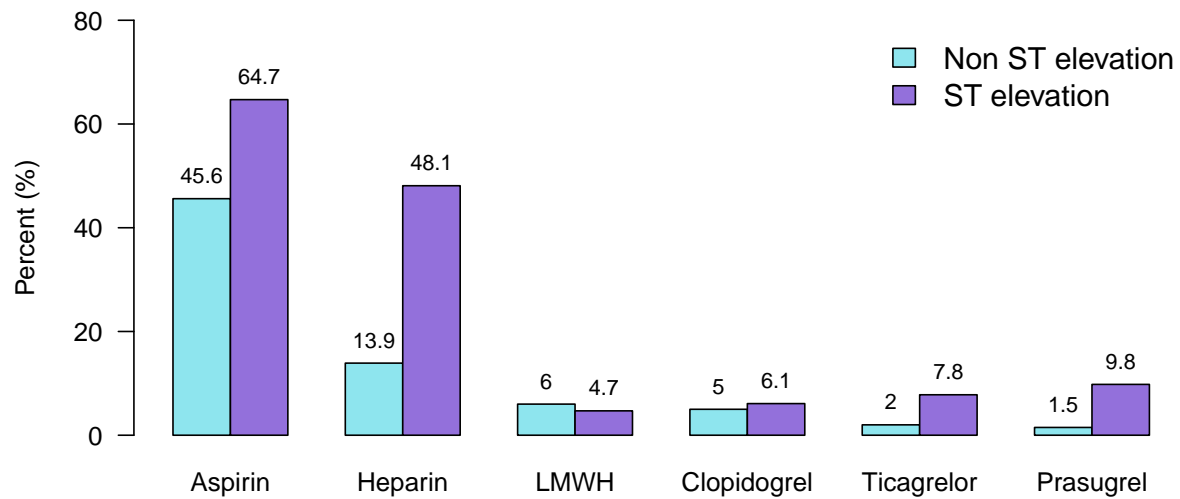


1.5.3 Drugs administered at the Emergency Department (ED)

Table 1.9: Drugs administered at the ED

	Total	Non ST elevation	ST elevation	p-value
n	1801	1098	675	
Aspirin (%)	655 (49.8)	464 (45.6)	191 (64.7)	<0.001
Clopidogrel (%)	69 (5.2)	51 (5.0)	18 (6.1)	0.554
Prasugrel (%)	44 (3.3)	15 (1.5)	29 (9.8)	<0.001
Ticagrelor (%)	43 (3.3)	20 (2.0)	23 (7.8)	<0.001
Heparin (%)	284 (21.6)	142 (13.9)	142 (48.1)	<0.001
Low Molecular Weight Heparin (LMWH) (%)	75 (5.7)	61 (6.0)	14 (4.7)	0.503

Figure 1.10: Drugs administered at the ED



1.5.4 Ward of First Arrival by ECG on Admission

Most patients with ACS present to the ED. However, a higher number of patients with ST elevation presented directly to the intensive cardiac care unit (ICCU) and the catheterization laboratory than those with non ST elevation.

Table 1.10: Ward of First Arrival by ECG on Admission

	Total	Non ST elevation	ST elevation
n	1801	1098	675
Directly to cardiology ward (%)	20 (1.1)	19 (1.7)	0 (0.0)
Directly to cath lab (%)	200 (11.3)	16 (1.5)	183 (27.1)
Directly to ICCU (%)	227 (12.8)	34 (3.1)	193 (28.6)
Directly to internal medicine ward (%)	5 (0.3)	4 (0.4)	1 (0.1)
ED (%)	1315 (74.0)	1018 (92.7)	295 (43.7)
Other (%)	10 (0.6)	7 (0.6)	3 (0.4)
Patients arrived by MICU			
n	634	247	387
Directly to cardiology ward (%)	1 (0.2)	1 (0.4)	0 (0.0)
Directly to cath lab (%)	146 (23.0)	3 (1.2)	143 (37.0)
Directly to ICCU (%)	167 (26.3)	13 (5.3)	154 (39.8)
Directly to internal medicine ward (%)	2 (0.3)	1 (0.4)	1 (0.3)
ED (%)	316 (49.8)	229 (92.7)	87 (22.5)
Other (%)	2 (0.3)	0 (0.0)	2 (0.5)

Difference in ward of first arrival, ST elevation vs. non ST elevation, $p < 0.001$

1.5.5 First Ward of Admission

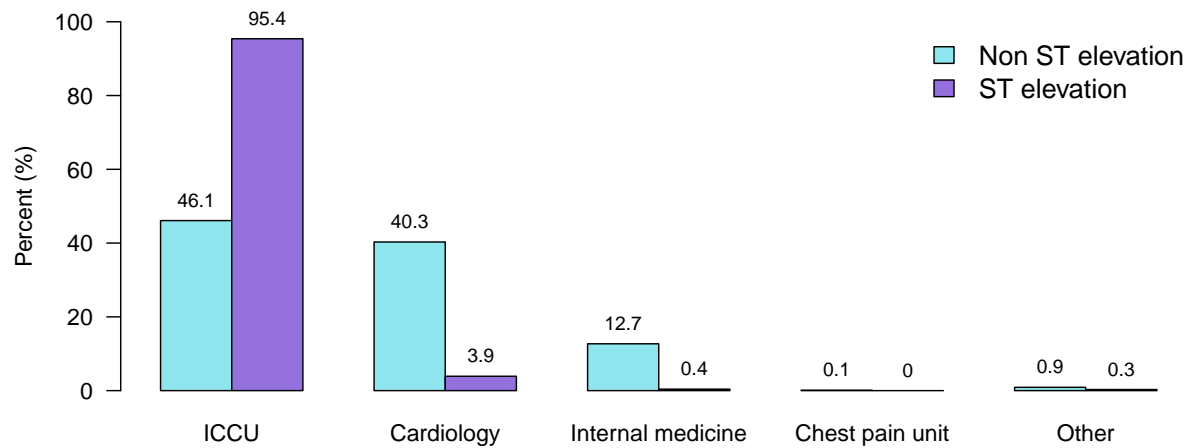
As expected, the majority of patients presenting with ST elevation were hospitalized in the ICCU (95.4%). 46.1% of the patients who presented with non ST elevation were admitted to the ICCU and an additional 40.3% to a cardiology department, with the remaining 12.7% being admitted to internal medicine departments.

Table 1.11: First Ward of Hospitalization

	Total	Non ST elevation	ST elevation
n	1801	1098	675
ICCU (%)	1152 (64.8)	506 (46.1)	644 (95.4)
Cardiology (%)	468 (26.3)	442 (40.3)	26 (3.9)
Internal medicine (%)	144 (8.1)	139 (12.7)	3 (0.4)
Chest pain unit (%)	1 (0.1)	1 (0.1)	0 (0.0)
Other (%)	12 (0.7)	10 (0.9)	2 (0.3)

Difference in first ward of hospitalization, ST elevation vs. non ST elevation, $p < 0.001$

Figure 1.11: First Ward of Hospitalization



1.5.6 Time from Symptom Onset to Hospital Arrival, by ECG on Admission

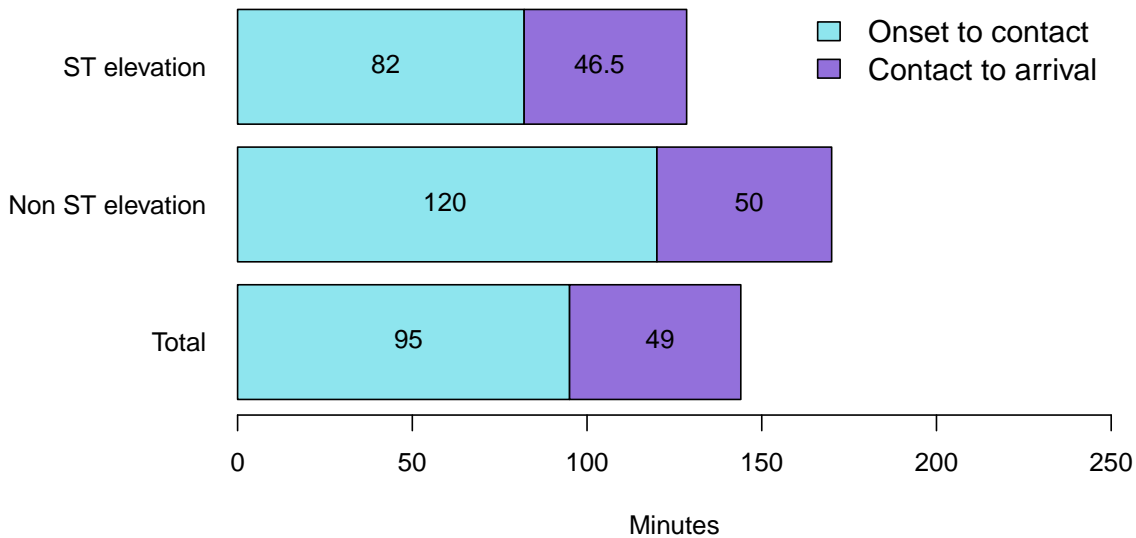
All time frames were significantly shorter for patients with ST elevation. Patients with ST elevation sought help earlier when compared to patients with non ST elevation.

Table 1.12: Time (minutes) from Symptom Onset to Admission, by ECG on Admission

	Total	Non ST elevation	ST elevation	p-value
n ¹	1037	509	503	
Onset to first medical contact, minutes (median [IQR])	95.00 [40.00, 287.00]	120.00 [49.75, 483.25]	82.00 [30.00, 191.50]	<0.001
First medical contact to arrival, minutes (median [IQR])	49.00 [32.00, 75.00]	50.00 [34.00, 86.75]	46.50 [30.00, 70.00]	0.007
Onset to arrival, minutes (median [IQR])	153.00 [86.00, 380.00]	186.00 [96.75, 587.50]	138.00 [78.00, 257.00]	<0.001

¹ Excluded in-patients or patients whose first medical contact was in ED

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



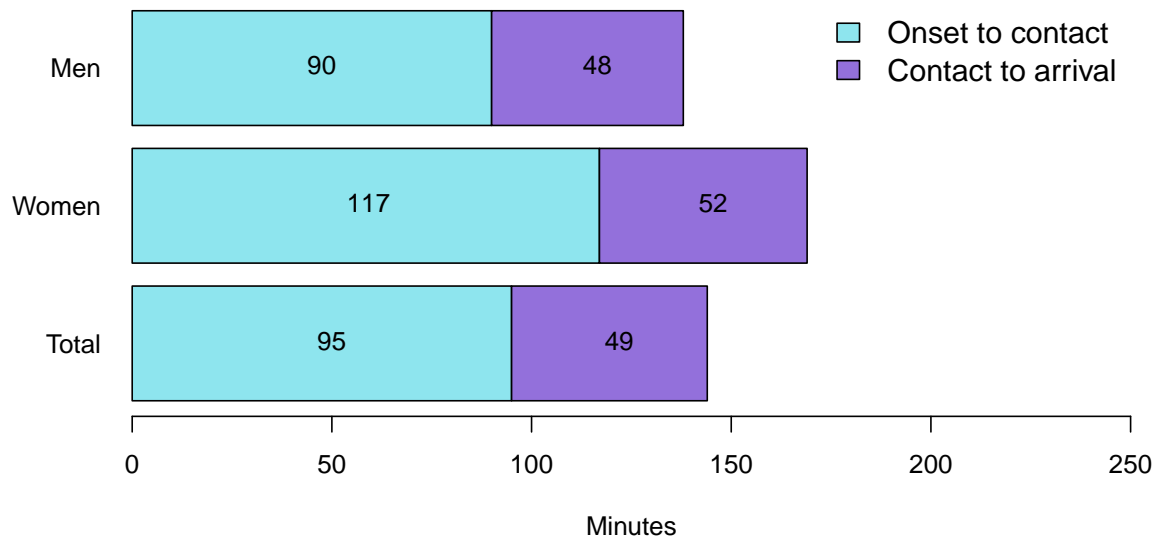
1.5.7 Time from Symptom Onset to Hospital Arrival, by gender

Table 1.13: Time (minutes) from Symptom Onset to Admission by gender

	Total	Women	Men	p-value
n ¹	1037	199	837	
Onset to first medical contact, minutes (median [IQR])	95.00 [40.00, 287.00]	117.00 [38.25, 389.50]	90.00 [40.00, 270.00]	0.501
First medical contact to arrival, minutes (median [IQR])	49.00 [32.00, 75.00]	52.00 [38.00, 73.00]	48.00 [31.00, 76.00]	0.193
Onset to arrival, minutes (median [IQR])	153.00 [86.00, 380.00]	172.00 [92.00, 414.75]	148.00 [86.00, 371.00]	0.348

¹ Excluded in-patients or patients whose first medical contact was in ED

Figure 1.13: Median Length of Time from Symptom Onset to Admission



1.5.8 First Medical Contact

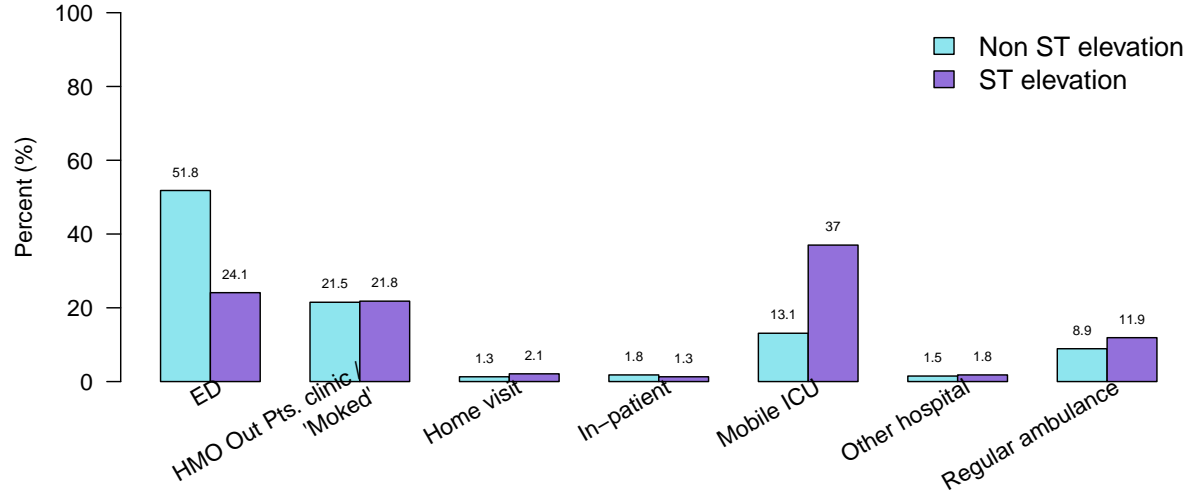
41.3% of patients had the first medical contact at the ED and about 21.6% at a Health maintenance organization (HMO) primary clinic/“Moked”. For an additional 22.2% the primary medical contact was with MICU. Patients with ST elevation were more likely to have their first medical contact with a MICU (37%) than those with non ST elevation (13.1%).

Table 1.14: First Medical Contact

	Total	Non ST elevation	ST elevation
n	1801	1098	675
ED (%)	734 (41.3)	569 (51.8)	163 (24.1)
HMO Out Pts. clinic / 'Moked' (%)	384 (21.6)	236 (21.5)	147 (21.8)
Home visit (%)	28 (1.6)	14 (1.3)	14 (2.1)
In-patient (%)	30 (1.7)	20 (1.8)	9 (1.3)
Mobile ICU (%)	394 (22.2)	144 (13.1)	250 (37.0)
Other hospital (%)	29 (1.6)	17 (1.5)	12 (1.8)
Regular ambulance (%)	178 (10.0)	98 (8.9)	80 (11.9)

Difference in location of first medical contact, ST elevation vs. non ST elevation, $p < 0.001$

Figure 1.14: First Medical Contact



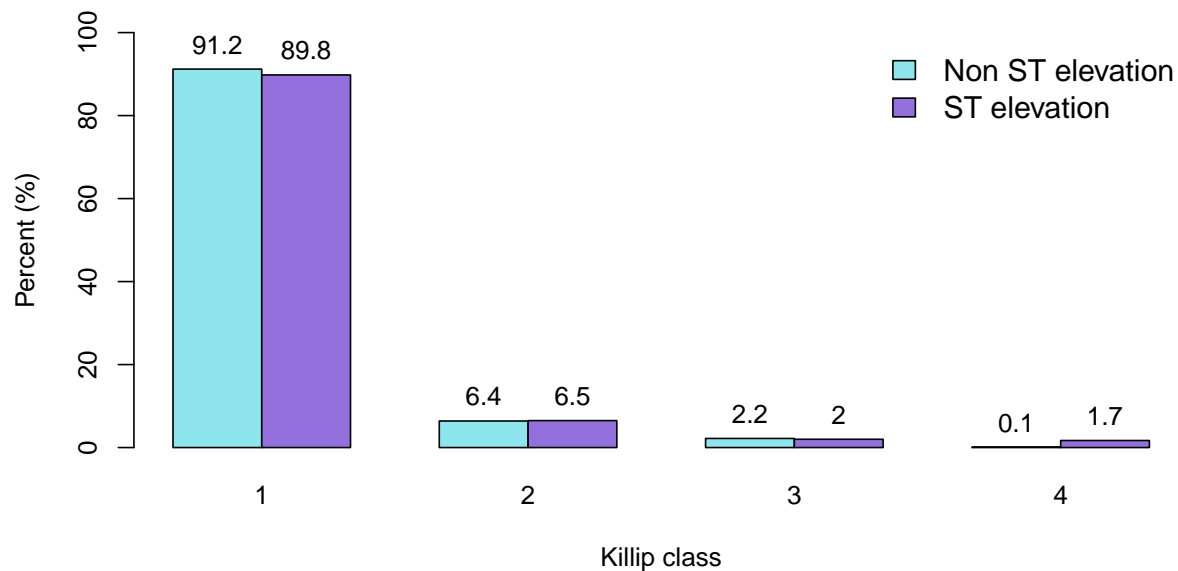
1.5.9 Presenting Symptoms and Killip Class

Typical angina was significantly more frequent in patients presenting with ST elevation (81.9%) than those presenting with non ST elevation (69%). However, atypical chest pain was more common in patients presenting with non ST elevation (11.1%) than in those with ST elevation (8.3%). Also dyspnea was more common in patients with non ST elevation (21.9%) than those with ST elevation (14.8%).

Table 1.15: Presenting Symptoms at First Medical Contact

	Total	Non ST elevation	ST elevation	p-value
n	1801	1098	675	
Typical angina (%)	1315 (73.0)	758 (69.0)	553 (81.9)	<0.001
Atypical chest pain (%)	178 (9.9)	122 (11.1)	56 (8.3)	0.067
Syncope (%)	39 (2.2)	22 (2.0)	17 (2.5)	0.582
Aborted Sudden Cardiac Death (SCD) (%)	10 (0.6)	3 (0.3)	7 (1.0)	0.079
Palpitations (%)	30 (1.7)	23 (2.1)	6 (0.9)	0.080
Dyspnea (%)	342 (19.0)	240 (21.9)	100 (14.8)	<0.001
Abdominal pain (%)	87 (4.8)	46 (4.2)	41 (6.1)	0.095

Figure 1.15: Killip Class on Admission



1.5.10 Pre-Hospital Treatment (before ED arrival)

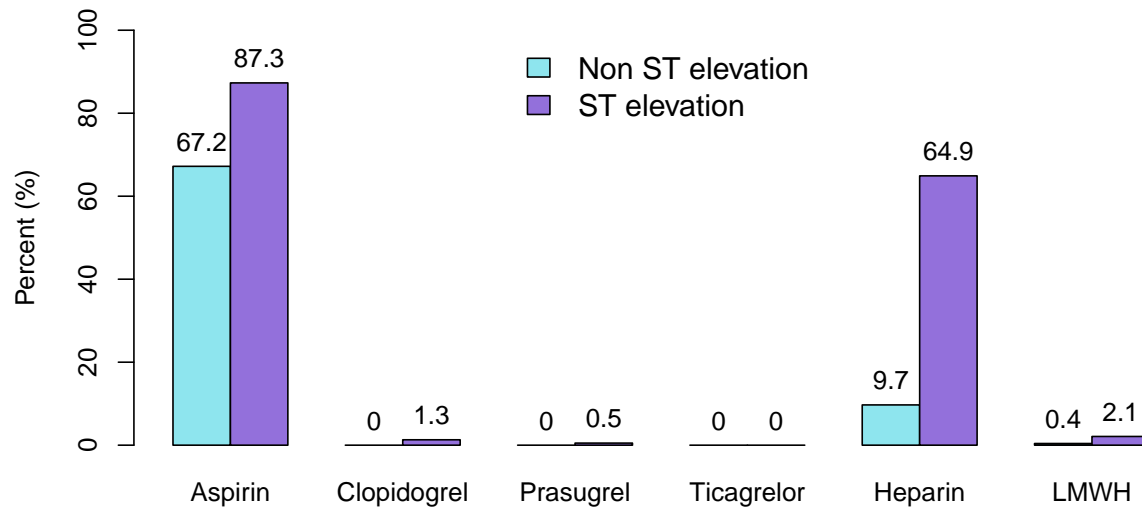
At first medical contact, patients with ST elevation were significantly more likely to receive therapy with aspirin and heparin than patients with non ST elevation.

Table 1.16 Pre-Hospitalization Treatment

	Total	Non ST elevation	ST elevation	p-value
n ¹	865	400	463	
Aspirin (%)	504 (79.5)	166 (67.2)	338 (87.3)	<0.001
Clopidogrel (%)	5 (0.8)	0 (0.0)	5 (1.3)	0.182
Prasugrel (%)	2 (0.3)	0 (0.0)	2 (0.5)	0.685
Ticagrelor (%)	0 (0.0)	0 (0.0)	0 (0.0)	NA
Heparin (%)	275 (43.4)	24 (9.7)	251 (64.9)	<0.001
LMWH (%)	9 (1.4)	1 (0.4)	8 (2.1)	0.167

¹ Only MICU and regular ambulance patients were included

Figure 1.16: Pre-Hospitalization Treatment

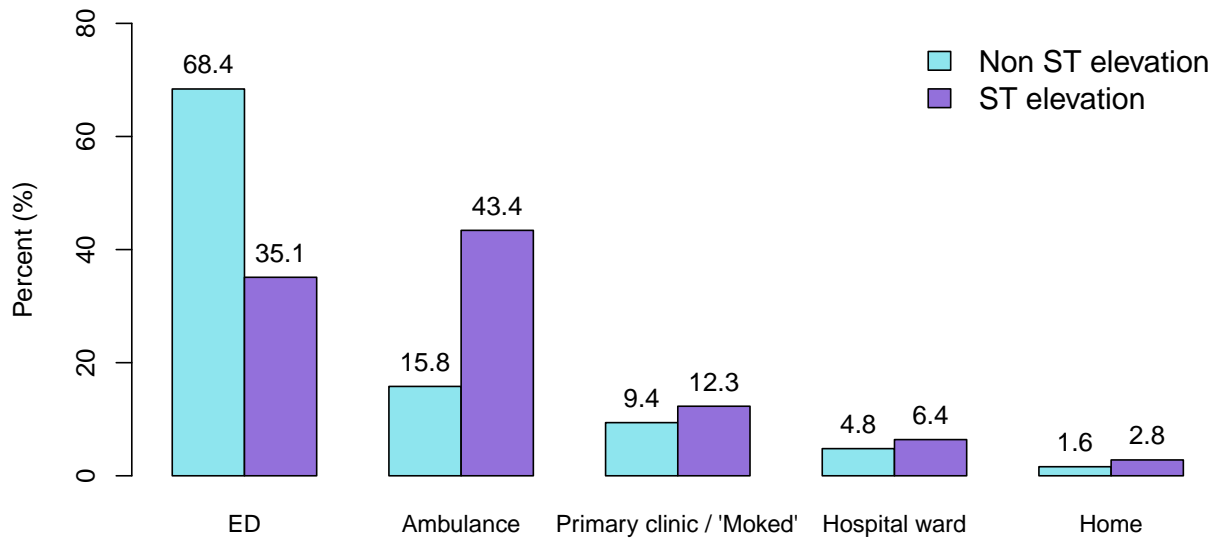


1.6 First Recorded ECG

1.6.1 Location of First ECG Recording

68.4% of patients presenting with non ST elevation and 35.1% of patients presenting with ST elevation had their first ECG recorded in the emergency department (ED). With respect to the remaining patients, 46.2% of patients with ST elevation and 17.4% of those with non ST elevation had the first ECG performed either at home or in an ambulance, and about 11% in both groups had it performed in a primary clinic.

Figure 1.17: Location of First ECG Recording



1.6.2 First ECG Rhythm

About 93% of patients presented with a normal sinus rhythm (NSR). 3.1% of patients with ST elevation and 3.8% of those without ST elevation, presented with atrial fibrillation.

Table 1.17: First ECG Rhythm

	Total	Non ST elevation	ST elevation
n	1801	1098	675
NSR (%)	1554 (93.4)	977 (94.0)	575 (92.4)
Atrial fibrillation (%)	59 (3.5)	40 (3.8)	19 (3.1)
Ventricular Tachycardia (VT)/ Ventricular Fibrillation (VF) (%)	21 (1.3)	7 (0.7)	14 (2.3)
High degree (2nd / 3rd) Atrioventricular (AV) Block (%)	15 (0.9)	6 (0.6)	9 (1.4)
Asystole (%)	1 (0.1)	0 (0.0)	1 (0.2)
Other (%)	13 (0.8)	9 (0.9)	4 (0.6)

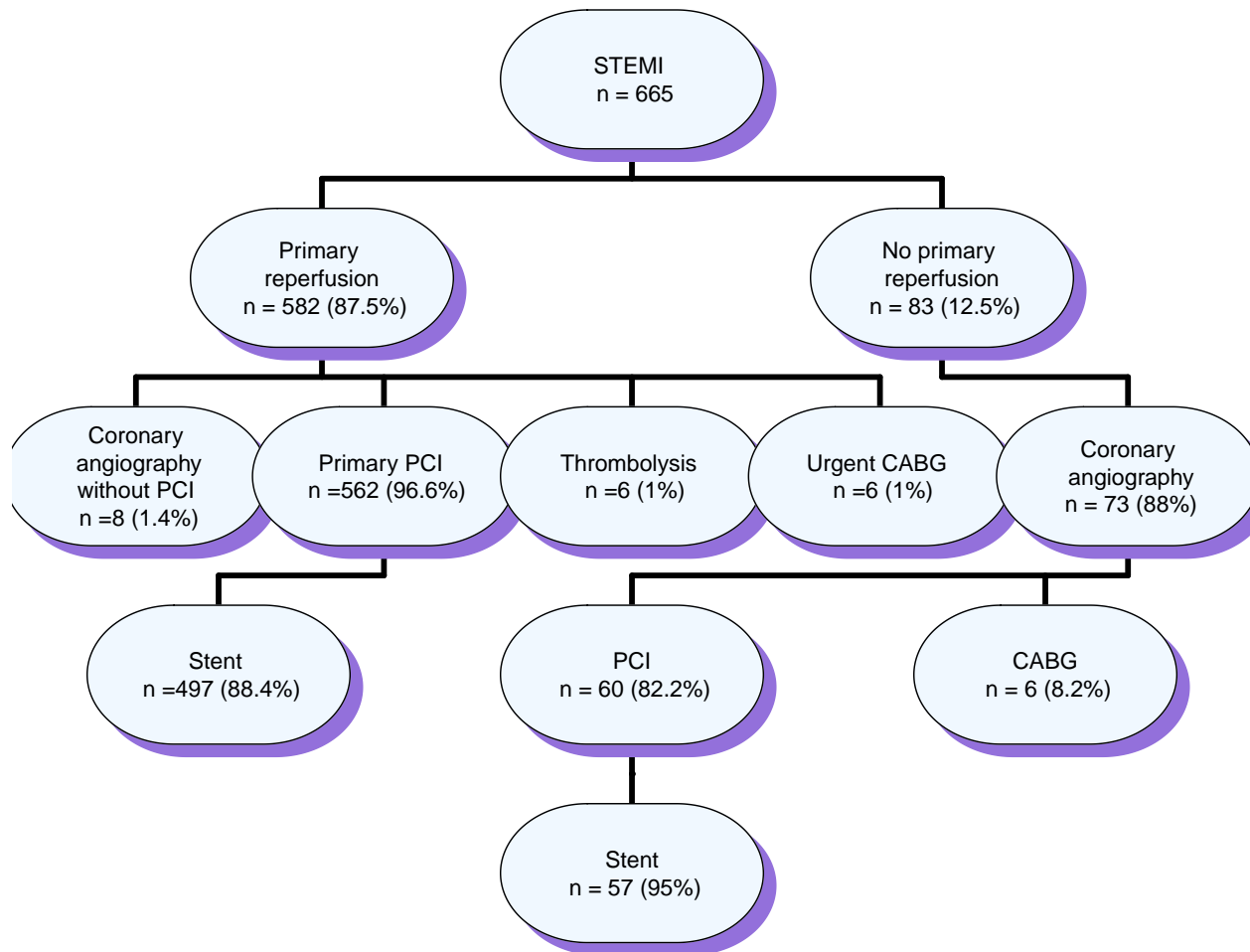
Difference in first ECG rhythm, ST elevation vs. non ST elevation, p 0.018

1.7 Primary Reperfusion

1.7.1 Primary Reperfusion Therapy in Patients with STEMI

87.5% of patients with STEMI underwent primary reperfusion within 12 hours from onset of symptoms, mainly primary PCI. In 88.4% of these cases, stents were deployed. Of the remaining 12.5% which did not undergo primary reperfusion, 88% eventually underwent coronary angiography. Of these, 90% underwent revascularization.

Figure 1.18: Primary Reperfusion in Patients with ST Elevation



1.7.2 Length of Time from Arrival to Primary Reperfusion

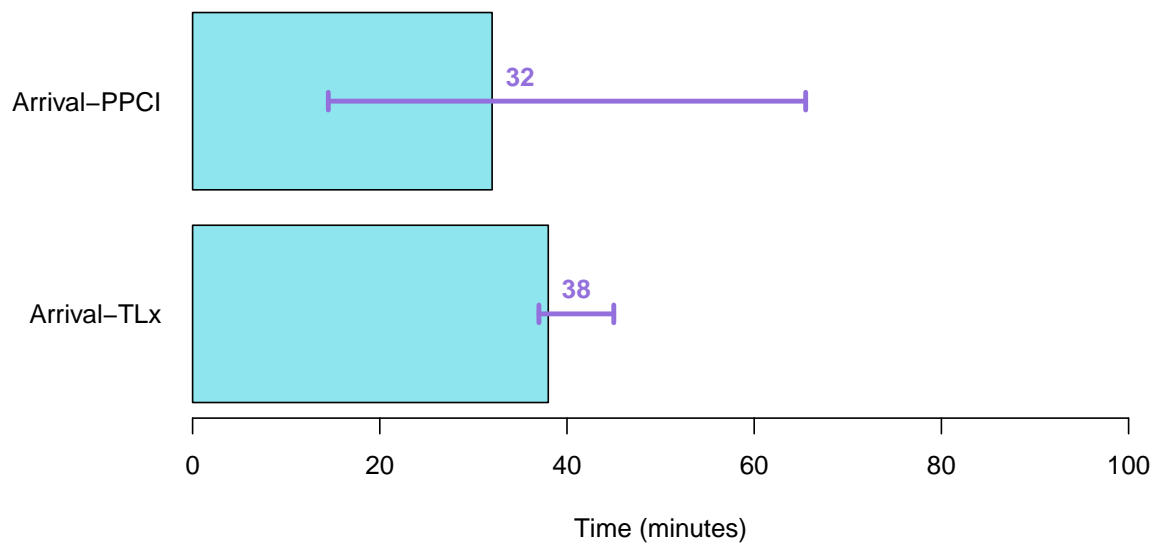
The median time from arrival to primary reperfusion was less than one hour (38 minutes).

There were no patients who undergo thrombolysis.

Table 1.18: Length of Time (minutes) from Arrival to Reperfusion

	N	Time in minutes (median [IQR])
From arrival to thrombolysis (TLx)	5	38.00 [37.00, 45.00]
From arrival to primary PCI (PPCI)	483	32.00 [14.50, 65.50]

Figure 1.19: Length of Time from Arrival to Reperfusion
(Median, 25%–75%)



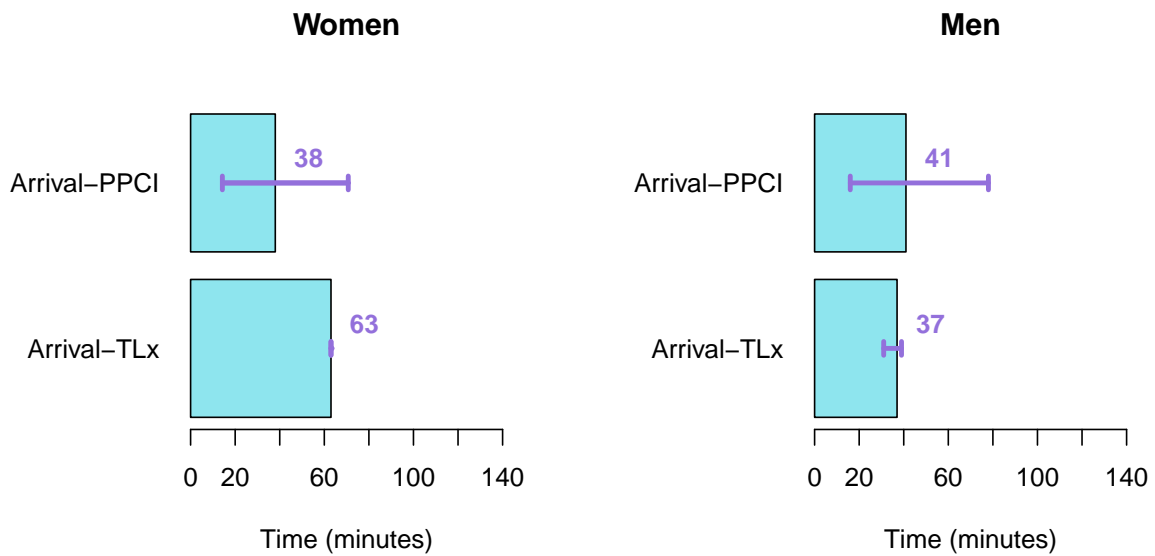
1.7.3 Length of Time from Arrival to Primary Reperfusion, by Gender

The time delay from arrival to primary reperfusion was shorter for women compared to men.

Table 1.19: Length of Time (minutes) from Arrival to Reperfusion, by gender

	Women		Men		p-value
	Time in minutes (median [IQR])	N	Time in minutes (median [IQR])	N	
From arrival to thrombolysis	63.24 [63.24, 63.24]	1	37.5 [31.5 , 39.75]	4	0.157
From arrival to primary PCI	38 [14.25, 70.75]	90	41 [16.5 , 78]	451	0.517

Figure 1.20: Length of Time from Arrival to Reperfusion by gender
(Median, 25%–75%)



1.7.4 Use of drugs and protective devices during Primary PCI

Table 1.20: Drugs and Protective Devices during Primary Reperfusion

	Overall
n	582
IIB/IIIA antagonists (%)	145 (24.9)
Bivalirudin (%)	13 (2.2)
Aspiration device (%)	44 (7.6)

1.7.5 Primary PCI / Coronary Angiography

Table 1.21: Vascular access during Primary Reperfusion

	Overall
n	582
Vascular access	
Femoral	46 (8.3)
Radial	506 (91.0)
Both	4 (0.7)

1.7.6 Thrombolysis in Myocardial Infarction (TIMI) Grade Flow of Infarct-Related Artery (IRA) During Primary PCI

In 61.5% of cases, a TIMI flow grade of zero was observed on first injection to the Infarct Related Artery (IRA). Following revascularization, a TIMI grade flow of 3 was achieved in the majority of patients (93%).

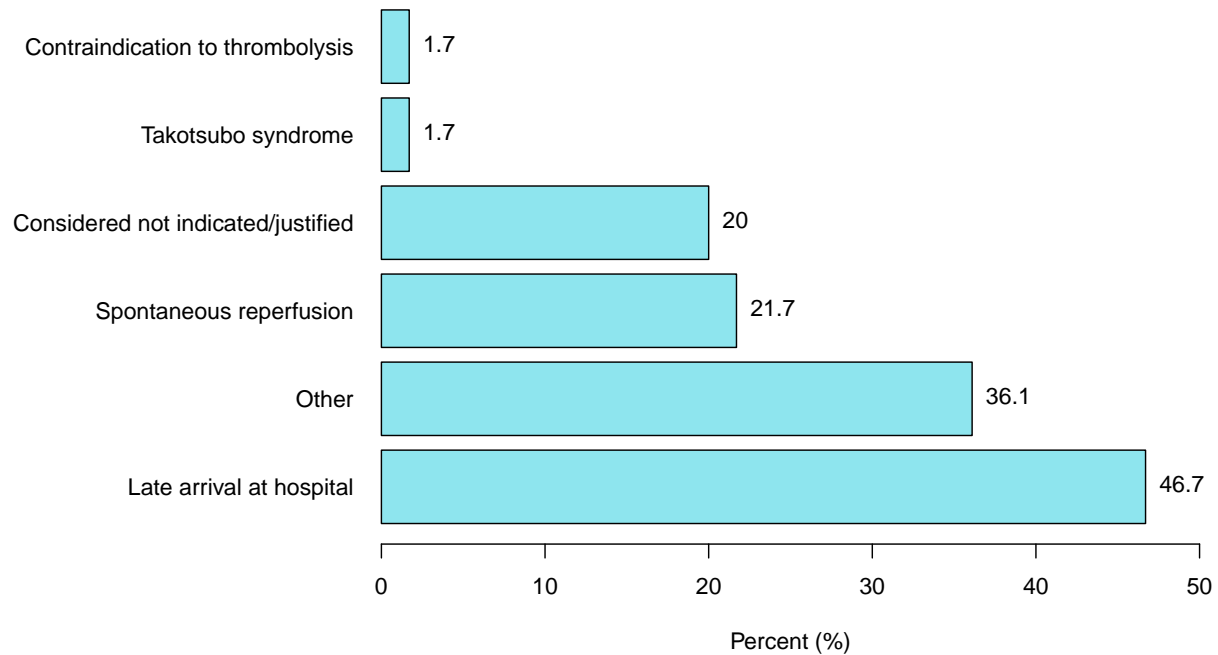
Table 1.22: TIMI Grade Flow of IRA Before and After Revascularization

	Before revascularization (%)	After revascularization (%)
n	488	542
0	300 (61.5)	11 (2.0)
1	71 (14.5)	3 (0.6)
2	53 (10.9)	24 (4.4)
3	64 (13.1)	504 (93.0)

1.7.7 Reasons for Not Performing Primary Reperfusion

12.5% of patients presenting with STEMI did not receive primary reperfusion therapy. In 21.7% the reason was spontaneous reperfusion, in 46.7% the reason was late arrival at the hospital, and in 20% of cases primary reperfusion was considered not indicated.

Figure 1.21: Reasons for Not Performing Primary Reperfusion
Number of Patients = 83



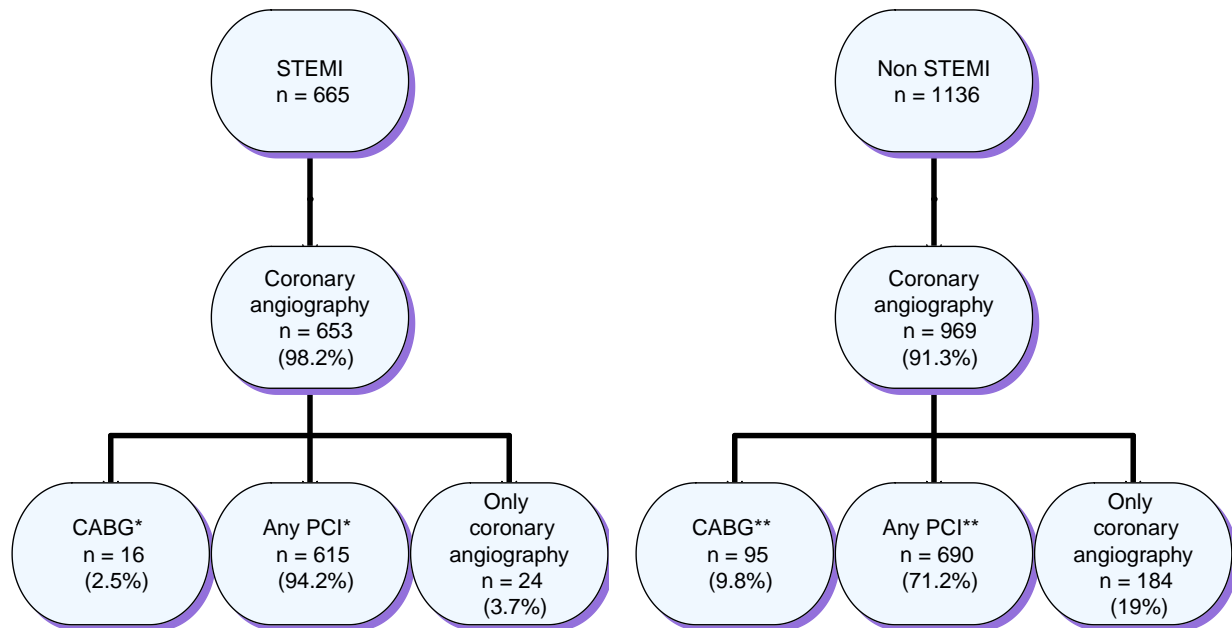
- There were no patients that died before decision or any patient refusal.

1.8 Coronary Interventions and Procedures during Hospitalization

1.8.1 Coronary Angiography and Interventions

Patients with STEMI were more likely than those with non STEMI to undergo coronary angiography and PCI. CABG during hospitalization was performed more frequently in patients with non STEMI.

Figure 1.22: In-Hospital Cardiac Interventions and Procedures



*2 patients underwent both CABG and PCI;

** 2 patients underwent both CABG and PCI.

1.8.2 Coronary Angiography (*excluding primary PCI*)

Table 1.23: Vascular access during coronary angiography

	Overall
n	1191
Coronary angiography	1045 (89.6)
Vascular access:	
Femoral	50 (5.0)
Radial	950 (94.4)
Both	6 (0.6)

1.8.3 Other Procedures During Hospitalization

Patients with STEMI were more likely to receive Direct-Current (DC) shocks, resuscitation, mechanical ventilation, intra-aortic balloon pump (IABP) and temporary pacemaker than those with non STEMI.

Table 1.24: Other Procedures

	Total	Non STEMI	STEMI	p-value
n	1801	1136	665	
DC shock (%)	55 (3.1)	18 (1.6)	37 (5.6)	<0.001
Resuscitation (%)	39 (2.2)	13 (1.2)	26 (3.9)	<0.001
Mechanical ventilation (%)				0.018
Invasive	48 (2.7)	21 (1.9)	27 (4.1)	
Non invasive	43 (2.4)	25 (2.3)	18 (2.7)	
Intra-Aortic Balloon Pump (IABP) (%)	18 (1.1)	4 (0.4)	14 (2.2)	0.001
Dialysis (%)	9 (0.5)	8 (0.7)	1 (0.2)	0.197
ICD/CRT (%)	13 (0.7)	8 (0.7)	5 (0.8)	1.000
Permanent pacemaker (%)	10 (0.6)	8 (0.7)	2 (0.3)	0.413
Temporary pacemaker (%)	14 (0.8)	3 (0.3)	11 (1.7)	0.004
Temperature control (%)	3 (0.2)	0 (0.0)	3 (0.5)	0.099

1.9 Ejection Fraction

Ejection fraction (EF) was determined in 98.6% of patients with STEMI and in 91.1% of those with non STEMI. EF was normal in a larger proportion of patients with non STEMI (50.7%) than in patients with STEMI (20.9%). 29.8% of patients with STEMI and 15.1% of patients with non STEMI presented with an EF < 40%.

Table 1.25: Ejection Fraction

	Total	Non STEMI	STEMI	p-value
n	1801	1136	665	
EF determined (%)	1592 (94.0)	957 (91.1)	635 (98.6)	<0.001
EF (range) (%)				<0.001
Normal (55-65%)	617 (38.9)	485 (50.7)	132 (20.9)	
Preserved (50-54%)	195 (12.3)	115 (12.0)	80 (12.7)	
Mild (40-49%)	444 (28.0)	212 (22.2)	232 (36.7)	
Moderate (30-39%)	240 (15.1)	101 (10.6)	139 (22.0)	
Severe (< 30%)	92 (5.8)	43 (4.5)	49 (7.8)	

Note:

EF range percentages are calculated out of patients who had documented EF

1.10 In-Hospital Complications

Cardiogenic shock, CHF mild-moderate, Stent thrombosis (definite/probable/possible), ventricular fibrillation (VF) were more frequent in patients with STEMI.

Table 1.26: In-Hospital Complications

	Total	Non STEMI	STEMI	p-value
n	1801	1136	665	
CHF mild-moderate (Killip-2) (%)	178 (10.1)	90 (8.2)	88 (13.3)	0.001
Pulmonary edema (Killip-3) (%)	60 (3.4)	33 (3.0)	27 (4.1)	0.275
Cardiogenic shock (Killip-4) (%)	43 (2.4)	12 (1.1)	31 (4.7)	<0.001
Hemodynamically significant RV infarction (%)	7 (0.4)	3 (0.3)	4 (0.6)	0.493
Re-MI (%)	11 (0.6)	7 (0.6)	4 (0.6)	1.000
Post MI angina/re-ischemia (%)	19 (1.1)	13 (1.2)	6 (0.9)	0.769
Stent thrombosis (definite/probable/possible) (%)	11 (0.6)	3 (0.3)	8 (1.2)	0.035
Free wall rupture (%)	3 (0.2)	1 (0.1)	2 (0.3)	0.654
Tamponade (%)	1 (0.1)	1 (0.1)	0 (0.0)	1.000
MR Moderate-severe (%)	25 (1.4)	11 (1.0)	14 (2.1)	0.086
Pericarditis (%)	12 (0.7)	5 (0.5)	7 (1.1)	0.231
Sustained VT (>125 bpm) (%)	16 (0.9)	8 (0.7)	8 (1.2)	0.434
VF (%)	33 (1.9)	7 (0.6)	26 (3.9)	<0.001
New AF (%)	59 (3.3)	36 (3.2)	23 (3.5)	0.919
High degree (2nd / 3rd) AVB (%)	22 (1.2)	10 (0.9)	12 (1.8)	0.148
Asystole (%)	13 (0.7)	7 (0.6)	6 (0.9)	0.719
TIA (%)	4 (0.2)	3 (0.3)	1 (0.2)	1.000
Stroke (%)	6 (0.3)	3 (0.3)	3 (0.5)	0.831
CVA/TIA in hospital (%)	10 (0.6)	6 (0.5)	4 (0.6)	1.000
Acute renal injury (%)	72 (4.3)	46 (4.5)	26 (4.0)	0.786
Sepsis (%)	24 (1.4)	13 (1.3)	11 (1.7)	0.589
Bleeding (%)	11 (0.7)	7 (0.7)	4 (0.6)	1.000
Minor bleeding (%)	9 (0.5)	5 (0.5)	4 (0.6)	0.980
Blood transfusions (%)	6 (0.4)	5 (0.5)	1 (0.2)	0.497

1.11 In-Hospital Medical Treatment

Aspirin, P2Y12 inhibitors, Prasugrel, Ticagrelor, Oral anticoagulants, ACE-I, Beta-Blockers, Digoxin, CCB, NSAIDS, Statins, Ezetimibe and Antihyperglycemic (only among diabetic patients) were more frequently used in patients with STEMI. Clopidogrel was more frequently used among patients with non STEMI.

All other recommended drugs were similarly given to both groups.

Table 1.27: In-Hospital Medical Treatment

	Total	Non STEMI	STEMI	p-value
n	1801	1136	665	
Anti-platelets				
Aspirin (%)	1412 (78.4)	853 (75.1)	559 (84.1)	<0.001
P2Y12 inhibitors (%)	1237 (68.7)	703 (61.9)	534 (80.3)	<0.001
Clopidogrel (%)	395 (21.9)	304 (26.8)	91 (13.7)	<0.001
Prasugrel (%)	491 (27.3)	186 (16.4)	305 (45.9)	<0.001
Ticagrelor (%)	384 (21.3)	226 (19.9)	158 (23.8)	0.061
Anticoagulants				
Oral anticoagulants ¹ (%)	109 (6.1)	57 (5.0)	52 (7.8)	0.021
Warfarin (%)	22 (1.2)	12 (1.1)	10 (1.5)	0.541
Dabigatran (%)	0 (0.0)	0 (0.0)	0 (0.0)	NA
Rivaroxaban (%)	10 (0.6)	4 (0.4)	6 (0.9)	0.235
Apixaban (%)	81 (4.5)	44 (3.9)	37 (5.6)	0.120
Other				
ACE-I (%)	850 (76.9)	706 (74.6)	144 (90.0)	<0.001
ARB (%)	34 (3.0)	31 (3.2)	3 (1.9)	0.486
Spironolactone (%)	217 (12.0)	139 (12.2)	78 (11.7)	0.807
Beta Blockers (%)	787 (43.7)	413 (36.4)	374 (56.2)	<0.001
Digoxin (%)	227 (12.6)	100 (8.8)	127 (19.1)	<0.001
CCB (%)	796 (44.2)	415 (36.5)	381 (57.3)	<0.001
Amiodarone (%)	5 (0.3)	2 (0.2)	3 (0.5)	0.544
Other Anti-Arrhythmic (%)	148 (8.2)	103 (9.1)	45 (6.8)	0.104
Nitrates (%)	52 (2.9)	28 (2.5)	24 (3.6)	0.210
Diuretics (%)	7 (0.4)	2 (0.2)	5 (0.8)	0.133
Proton-Pump Inhibitors (PPI) (%)	86 (4.8)	60 (5.3)	26 (3.9)	0.229
H2 Blockers (%)	186 (10.3)	117 (10.3)	69 (10.4)	1.000
NSAIDS (%)	815 (45.3)	450 (39.6)	365 (54.9)	<0.001
Colchicine (%)	20 (1.1)	15 (1.3)	5 (0.8)	0.380
Steroids (%)	29 (1.6)	19 (1.7)	10 (1.5)	0.936
IV inotropic agent (%)	3 (0.9)	1 (0.4)	2 (1.7)	0.568
Antihyperglycemic ² (%)	175 (22.2)	96 (17.9)	79 (31.3)	<0.001
Statins (%)	1033 (57.4)	576 (50.7)	457 (68.7)	<0.001
Ezetimibe (%)	379 (21.0)	194 (17.1)	185 (27.8)	<0.001

¹ Oral anticoagulants include warfarin, dabigatran, rivaroxaban and apixaban

² Only among diabetic patients

1.12 Duration of Hospitalization

Table 1.28: Length of Stay in ICCU/Cardiology and Total Hospital Stay

	Total	Non STEMI	STEMI
n	1801	1136	665
No. of days in ICCU/Cardiology (median [IQR])	3 [2 , 4]	3 [2 , 4]	3 [3 , 5]
Total hospital days (median [IQR])	3 [2 , 5]	3 [2 , 4]	3 [3 , 5]

1.13 Discharge

1.13.1 Medical Treatment on Discharge

Aspirin, P2Y12 inhibitors (mainly prasugrel), ACE-I, Spironolactone, beta-blockers, statins and ezetimibe were more often prescribed for patients with STEMI and Antihyperglycemic, Glucagon-Like Peptide-1 receptor agonists (GLP1-RA) were more often prescribed among diabetic STEMI patients.

Clopidogrel, CCB, nitrates, diuretics and PPI were prescribed more often for patients with non STEMI. All other recommended drugs were similarly given to both groups.

Table 1.29.a: Medical Treatment on Discharge among Hospital Survivors

	Total	Non STEMI	STEMI	p-value
n	1751	1099	652	
Anti-platelets				
Aspirin (%)	1347 (76.9)	819 (74.5)	528 (81.0)	0.002
P2Y12 inhibitors (%)	1300 (74.2)	761 (69.2)	539 (82.7)	<0.001
Clopidogrel (%)	403 (23.0)	323 (29.4)	80 (12.3)	<0.001
Prasugrel (%)	514 (29.4)	206 (18.7)	308 (47.2)	<0.001
Ticagrelor (%)	383 (21.9)	232 (21.1)	151 (23.2)	0.346
Anticoagulants				
Oral anticoagulants ¹ (%)	131 (7.5)	84 (7.6)	47 (7.2)	0.810
Warfarin (%)	8 (0.5)	6 (0.5)	2 (0.3)	0.726
Dabigatran (%)	0 (0.0)	0 (0.0)	0 (0.0)	NA
Rivaroxaban (%)	12 (0.7)	7 (0.6)	5 (0.8)	0.985
Apixaban (%)	111 (6.3)	71 (6.5)	40 (6.1)	0.866
Other				
ACE-I (%)	759 (43.3)	417 (37.9)	342 (52.5)	<0.001
ARB (%)	344 (19.6)	231 (21.0)	113 (17.3)	0.069
Spironolactone (%)	257 (14.7)	122 (11.1)	135 (20.7)	<0.001
Beta Blockers (%)	1072 (61.2)	623 (56.7)	449 (68.9)	<0.001
Digoxin (%)	5 (0.3)	2 (0.2)	3 (0.5)	0.554
CCB (%)	257 (14.7)	194 (17.7)	63 (9.7)	<0.001
Amiodarone (%)	52 (3.0)	35 (3.2)	17 (2.6)	0.588
Other Anti-Arrhythmic (%)	6 (0.3)	3 (0.3)	3 (0.5)	0.822
Nitrates (%)	49 (2.8)	42 (3.8)	7 (1.1)	0.001
Diuretics (%)	230 (13.1)	163 (14.8)	67 (10.3)	0.008
PPI (%)	1046 (59.7)	625 (56.9)	421 (64.6)	0.002
H2 Blockers (%)	23 (1.3)	18 (1.6)	5 (0.8)	0.183
Colchicine (%)	34 (1.9)	19 (1.7)	15 (2.3)	0.510
Steroids (%)	4 (1.2)	2 (0.9)	2 (1.8)	0.890
Antihyperglycemic ² (%)	315 (40.4)	201 (37.7)	114 (46.3)	0.028
Glucagon-Like Peptide-1 receptor agonists (GLP1-RA) ² (%)	40 (5.3)	21 (4.0)	19 (8.4)	0.023
Sodium-Glucose Cotransporter-2 (SGLT2) Inhibitors ² (%)	312 (17.8)	186 (16.9)	126 (19.3)	0.228
Statins (%)	1426 (81.4)	878 (79.9)	548 (84.0)	0.036
Ezetimibe (%)	504 (28.8)	289 (26.3)	215 (33.0)	0.003

¹ Oral anticoagulants include warfarin, dabigatran, rivaroxaban and apixaban

² Only among diabetic patients

1.13.2 Discharge Destination

Table 1.29.b: Discharge Destination

	Total	Non STEMI	STEMI
n	1751	1099	652
Discharged to:			
Home	1555 (89.0)	980 (89.3)	575 (88.3)
Internal medicine	65 (3.7)	34 (3.1)	31 (4.8)
Cardiothoracic surgery	75 (4.3)	59 (5.4)	16 (2.5)
Other hospital	26 (1.5)	17 (1.5)	9 (1.4)
Other ward	20 (1.1)	4 (0.4)	16 (2.5)
Nursing home	7 (0.4)	3 (0.3)	4 (0.6)

1.14 Mortality and Major Adverse Cardiac Event (MACE)

1.14.1 Rates of Mortality and MACE by discharge diagnosis

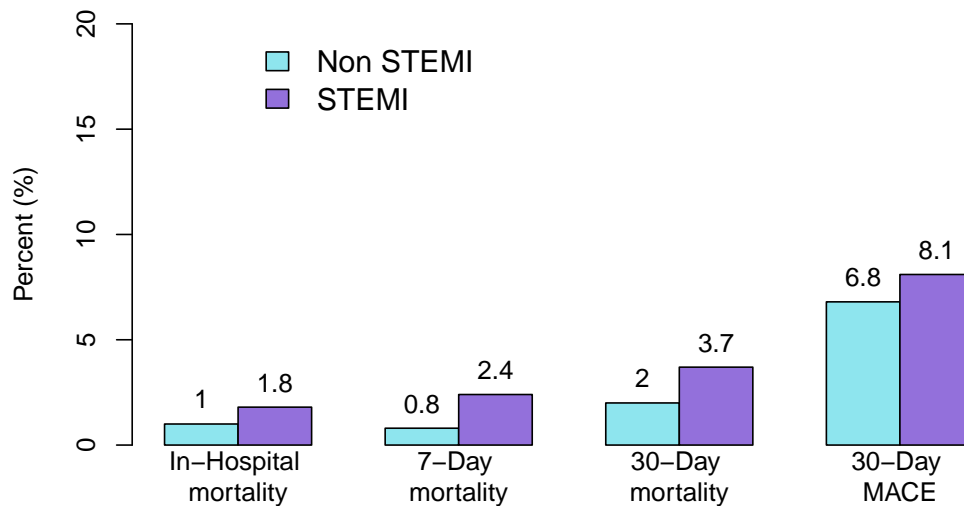
7-days mortality was significantly higher for patients with STEMI compared to those with non STEMI. MACE (Major Adverse Cardiac Events), which included recurrent MI or UAP, recurrent ischemia, stent thrombosis, ischemic stroke, urgent revascularization (follow-up) or death occurring within 30 days from hospitalization, was not significantly different in patients with and without STEMI.

Table 1.30: Unadjusted Rates of 7-Day, 30-Day and 1-year mortality, 30-Day MACE¹

	Total	Non STEMI	STEMI	p-value
n	1801	1136	665	
In-hospital mortality (%)	23 (1.3)	11 (1.0)	12 (1.8)	0.210
7-day mortality (%)	18 (1.4)	6 (0.8)	12 (2.4)	0.037
30-day mortality (%)	32 (2.7)	14 (2.0)	18 (3.7)	0.109
MACE ¹ (%)	88 (7.3)	48 (6.8)	40 (8.1)	0.427

¹ Definition of MACE includes: recurrent MI, recurrent ischemia, stent thrombosis, ischemic stroke, urgent revascularization (follow-up), UAP or death occurring within 30 days from hospitalization

Figure 1.23: Unadjusted Rates of In-Hospital, 7-Day & 30-Day Mortality and 30-Day MACE



After adjustment for age and other risk factors, 7-day mortality rates were significantly higher for patients with STEMI compared to those with non STEMI.

Table 1.31: Mortality Rates by Discharge Diagnosis Adjusted for Age and Other Risk Factors

	Odds Ratio (OR) (STEMI vs. Non STEMI) with 95% Confidence Intervals (CI)	
	Age adjusted	Risk factors adjusted ¹
In-Hospital	1.98 (0.86,4.61)	3.31 (0.74,17.66)
7-Days	3.13 (1.19,9.1)	6.04 (1.25,45.01)
30-Days	2.12 (1.04,4.42)	4.9 (1.68,16.66)
MACE ²	1.3 (0.84,2.03)	1.4 (0.81,2.43)

¹ Adjusted for age, gender, past ACS, diabetes, hypertension, killip class ≥ 2 , any angiography

² Definition includes: recurrent MI, recurrent ischemia, stent thrombosis, ischemic stroke, urgent revascularization (follow-up) or death occurring within 30 days from hospitalization

1.14.2 Rates of Mortality and MACE by Gender

Table 1.32: Unadjusted Rates of In-Hospital Mortality, 7-Day Mortality, 30-Day Mortality and 30-Day MACE, by Gender

	Total	Women	Men	p-value
n	1801	339	1461	
In-hospital mortality (%)	23 (1.3)	5 (1.5)	18 (1.3)	0.933
7-day mortality (%)	18 (1.4)	4 (1.7)	14 (1.4)	0.954
30-day mortality (%)	32 (2.7)	6 (2.7)	26 (2.7)	1.000
MACE ¹ (%)	88 (7.3)	25 (11.0)	63 (6.5)	0.026

¹ Definition includes: recurrent MI, recurrent ischemia, stent thrombosis, ischemic stroke, urgent revascularization (follow-up), UAP or death occurring within 30 days from hospitalization

Table 1.33: Odds Ratios for Mortality and MACE by Gender Adjusted for Age and Other Risk Factors

	OR (Women vs. Men) with 95% CI	
	Age Adjusted	Risk factors Adjusted ¹
In-Hospital mortality	1.06 (0.34,2.74)	1.15 (0.16,5.64)
7-Days mortality	1.23 (0.34,3.59)	1.36 (0.18,6.7)
30-Days mortality	0.81 (0.29,1.92)	0.32 (0.05,1.26)
MACE ²	1.63 (0.97,2.67)	1.42 (0.75,2.59)

¹ Adjusted for age, past ACS, diabetes, hypertension, killip class ≥ 2 , any angiography

² Definition includes: recurrent MI, recurrent ischemia, stent thrombosis, ischemic stroke, urgent revascularization (follow-up), UAP or death occurring within 30 days from hospitalization.

1.15 Re-Hospitalization within 90 Days of Admission

Re-hospitalization rates for patients with STEMI and non STEMI were similar. Differences in reasons for re-hospitalization were not statistically significant.

Table 1.34: Re-Hospitalization within 90 Days of Admission

	Total	Non STEMI	STEMI	p-value
All patients				
n	1751	1099	652	
Re-hospitalization ¹ (%)	319 (27.8)	190 (27.9)	129 (27.6)	0.954
Re-hospitalized patients only				
n	320	191	129	
Scheduled (%)	143 (45.7)	85 (45.2)	58 (46.4)	0.928
Scheduled due to cardiac reason (%)	138 (97.2)	81 (95.3)	57 (100.0)	0.253
Non-Scheduled (%)	170 (54.3)	103 (54.8)	67 (53.6)	0.928
Non-Scheduled due to cardiac reason (%)	91 (53.5)	61 (59.2)	30 (44.8)	0.091

¹ Re-hospitalization among hospital survivors

[1] Telephone Clinic visit Medical record
Levels: Clinic visit Medical record Telephone

1.16 Detailed 90-Day Follow-Up Clinical Data

This is the second time we performed 90 days follow up survey. We performed this survey in order to evaluate patient's adherence to treatment and life-style changes recommendations.

Ninety-day follow-up were performed for 1168 (65%) patients. Of which 644 (55%) were contacted by phone, 96 (8%) by clinical visits Most of the patients were asymptomatic and in NYHA Class I.

Very few patients were treated with angiotensin receptor-neprilysin inhibitors (ARNI'S) or SGLT-2i (non-diabetic). Most of the patients were receiving potent statins and only 1% were on PCSK-9i. For diabetic patients, 35% of patients were receiving SGLT-2 but very few patients were on GLP1-RA.

Table 1.35: Medical Treatment at 90-Day Follow-Up

	Overall
n	1168
Aspirin (%)	875 (79.6)
Clopidogrel (%)	277 (25.2)
Prasugrel (%)	371 (33.8)
Ticagrelor (%)	246 (22.4)
Apixaban (%)	86 (7.8)
Dabigatran (%)	1099 (100.0)
Rivaroxaban (%)	7 (0.6)
Warfarin (%)	7 (0.6)
Enoxaparin (%)	14 (1.3)
ACE-I (%)	480 (43.7)
ARB's (%)	240 (21.8)
ARNI (%)	28 (2.5)
Spironolactone (%)	184 (16.7)
Beta blockers (%)	707 (64.3)
Digoxin (%)	4 (0.4)
CCB (%)	177 (16.1)
Diuretics (%)	159 (14.5)
PPI's (%)	689 (62.7)
Dapagliflozin (Forxiga) for non diabetic (%)	37 (5.8)
Empagliflozin (Jardiance) for non diabetic (%)	34 (5.3)

¹ Statins include: Simvastatin, Pravastatin, Atorvastatin, Rosuvastatin

Table 1.36: Diabetes Medications in 90-Day Follow-Up

	Overall
n	764
Insulin SC (%)	112 (24.3)
Glibenclamide (Gluben) (%)	461 (100.0)
Glipizide (Gluco-Rite) (%)	461 (100.0)
Glimepiride (Amaryl) (%)	2 (0.4)
Metformin (Glucophage) (%)	127 (27.5)
Sitagliptine (Januvia) (%)	16 (3.5)
Saxagliptine (Onglyza) (%)	461 (100.0)
Vidagliptine (Galvus) (%)	3 (0.7)
Linagliptine (Trajenta) (%)	5 (1.1)
Exenatide (Byetta, Budyreon) (%)	461 (100.0)
Liraglutide (Victoza) (%)	5 (1.1)
Dulaglutide (Trulicity) (%)	28 (6.1)
Semaglutide (Ozempic) (%)	25 (5.4)
Dapagliflozin (Forxiga) (%)	55 (11.9)
Empagliflozin (Jardiance) (%)	110 (23.9)
Acrabose (Prandase) (%)	461 (100.0)
Meglinptides (Repaglinide, Novonorm) (%)	3 (0.7)
TZDs (Pioglitazone - actos, Rosiglitazone - Avandia) (%)	3 (0.7)

Concerning life-style modification, 24% of patients reported to perform regular weekly exercise and 39% patients reported about diet change. Smoking cessation was reported in 183 (42%) of the patients who were active smokers during the index hospitalization.

Despite the recommendation for cardiac rehabilitation programs, only 39% of patients were actively participating or scheduled.

Chapter 2: Temporal Trends 2010-2021

Temporal Trends in Characteristics, Management, and Outcome of Patients with ACS in Cardiology: 2010-2021

2.1 Patients' Characteristics

Table 2.1: Patients' Characteristics

	2010	2013	2016	2018	2021	p for trend
n	1779	1885	1791	1778	1750	
Gender (Male) (%)	1378 (77.5)	1453 (77.1)	1414 (79.0)	1427 (80.3)	1391 (79.5)	<0.001
Age (%)						0.01
≤ 50	272 (15.3)	297 (15.8)	246 (13.7)	260 (14.6)	244 (13.9)	
50-75	1158 (65.1)	1195 (63.4)	1162 (64.9)	1158 (65.2)	1200 (68.6)	
> 75	349 (19.6)	393 (20.8)	382 (21.3)	357 (20.1)	306 (17.5)	
Age (mean (sd))	63.64 (12.67)	63.97 (12.91)	64.67 (12.82)	64.28 (12.69)	64.20 (12.31)	0.011

2.2 Cardiovascular (CV) History and Risk Factors

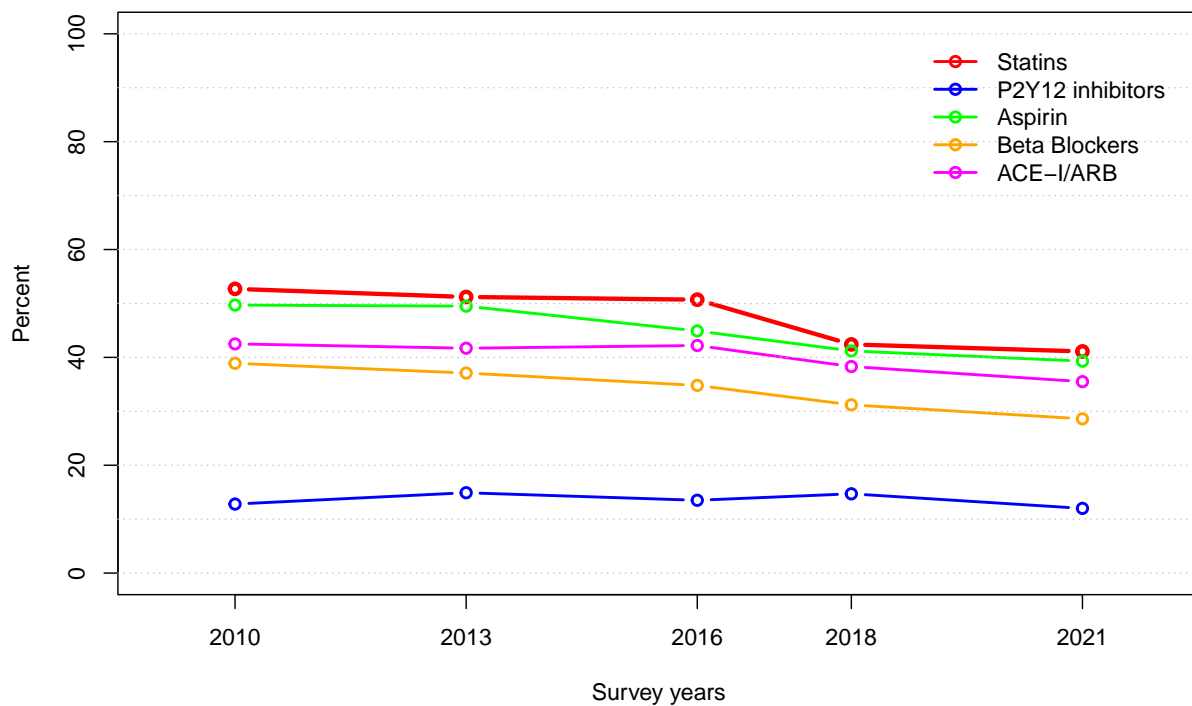
Table 2.2.a: Cardiovascular History and Risk Factors

	2010	2013	2016	2018	2021	p for trend
n	1779	1885	1791	1778	1750	
CV history						
MI (%)	32.0	30.4	37.2	38.8	37.3	<0.001
Prior PCI (%)	33.8	34.2	33.4	35.2	34.9	0.104
CABG (%)	10.0	9.1	8.8	9.1	7.3	<0.001
CHF (%)	8.5	7.9	6.7	10.4	7.1	0.577
Stroke/TIA (%)	8.2	8.4	8.2	9.2	8.8	0.196
Chronic renal failure (%)	12.0	12.6	11.4	11.4	10.5	0.024
Peripheral Vascular Disease (PVD) (%)	8.2	7.1	6.0	7.8	7.3	0.073
Risk factors						
Hypertension (%)	66.0	66.1	64.7	67.3	63.4	0.403
Diabetes (%)	38.0	39.1	41.5	41.8	42.4	<0.001
Dyslipidemia (%)	75.3	75.9	72.7	71.0	70.4	0.096
Current smoker (%)	38.4	39.3	38.5	43.0	41.3	0.152
Past smoker (%)	24.7	20.6	21.1	18.7	18.9	<0.001
Family History of CAD (%)	31.2	28.8	33.4	34.0	28.9	0.806

Table 2.2.b: Prior Chronic Treatment

	2010	2013	2016	2018	2021	p for trend
n	1779	1885	1791	1778	1750	
Aspirin (%)	49.7	49.5	44.9	41.2	39.3	<0.001
P2Y12 inhibitors (%)	12.8	14.9	13.5	14.7	12.0	<0.001
Clopidogrel (%)	25.2	22.9	16.4	16.6	10.5	<0.001
Prasugrel (%)	0.0	1.0	1.3	1.1	1.5	<0.001
Ticagrelor (%)	0.0	0.5	1.5	3.0	1.7	<0.001
Beta Blockers (%)	38.9	37.1	34.8	31.2	28.6	<0.001
ACE-I/ARB (%)	42.5	41.7	42.2	38.3	35.5	<0.001
Statins (%)	52.7	51.2	50.7	42.4	41.1	<0.001
Lipid Lowering Drugs (LLDs) (%)	53.5	51.8	50.7	43.0	41.5	<0.001
Digoxin (%)	0.7	0.7	0.3	0.2	0.2	<0.001
Diuretic (%)	18.4	15.6	13.5	10.7	6.6	<0.001
Nitrates (%)	7.8	5.5	3.7	3.5	1.1	<0.001

Figure 2.1: Trends in Prior Chronic Treatment



2.3 Admission Information

2.3.1 Initial Ward of Hospitalization

Table 2.3: Initial Ward of Hospitalization

	2010	2013	2016	2018	2021	2024
n	1779	1885	1791	1778	1750	1755
Ward (%)						
Cardiology/ICCU	89.0	84.8	86.8	86.4	88.3	91.0
Internal Medicine	9.4	13.5	12.3	12.4	10.5	0.0
internal Medicine Ward	0.0	0.0	0.0	0.0	0.0	8.3
Other	1.5	1.8	0.9	1.1	1.2	0.7

p for trend 0.272

2.3.2.a ECG on Admission

Table 2.4: ECG on Admission

	2010	2013	2016	2018	2021
n	1779	1885	1791	1778	1750
ST elevation	43.6	39.7	39.8	39.7	40.3
Non ST elevation	56.4	60.3	60.2	60.3	59.7

p for trend 0.023

2.3.2.b Diagnosis at Discharge

Table 2.5: Diagnosis at Discharge

	2010	2013	2016	2018	2021
n	1779	1885	1791	1778	1750
Non STEMI	57.3	61.4	60.5	61.2	60.0
STEMI	42.7	38.6	39.5	38.8	40.0

p for trend 0.036

2.3.3 Killip Class on Admission

[1] 2010 2013 2016 2018 2021 2024

[1] 1 4 2 3 <NA>

Levels: 1 2 3 4

Table 2.6: Killip Class on Admission

	2010	2013	2016	2018	2021
n	1779	1885	1791	1778	1750
Killip class (%)					
1	87.2	87.6	90.5	87.4	85.2
2	6.7	7.1	5.6	6.8	10.0
3	4.3	3.3	2.5	3.7	3.0
4	1.8	1.9	1.4	2.1	1.7

p for trend 0.02

2.4 Primary Reperfusion Therapy in Patients with ST elevation

Figure 2.2: Primary Reperfusion among Patients with ST elevation

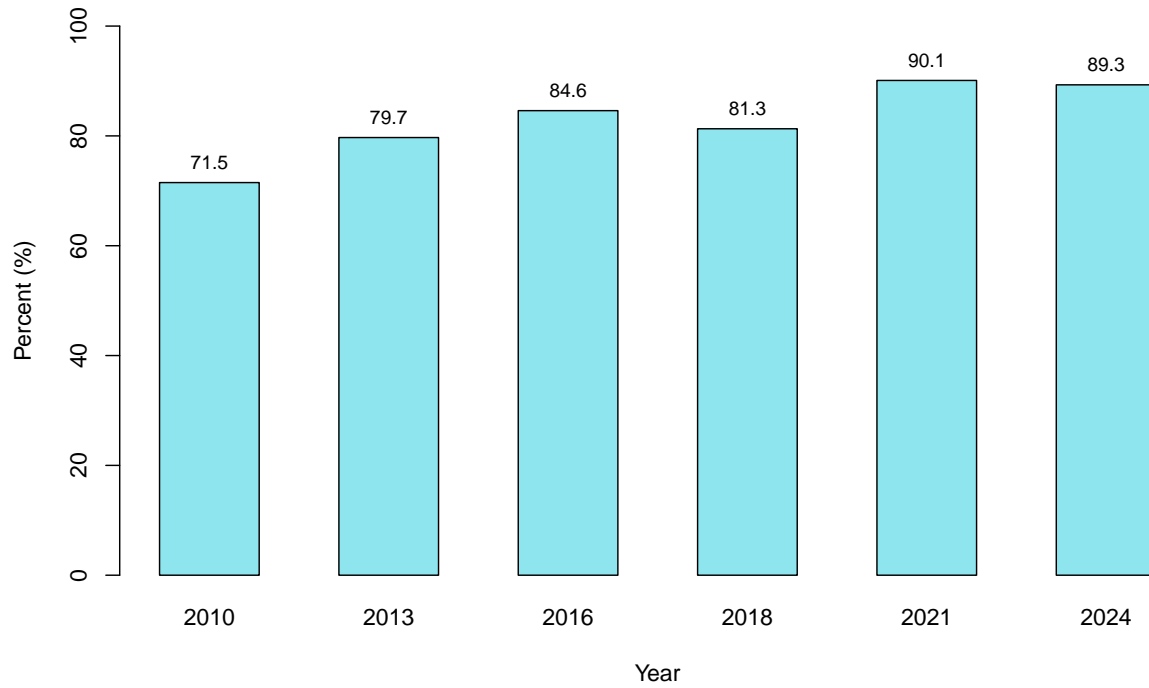
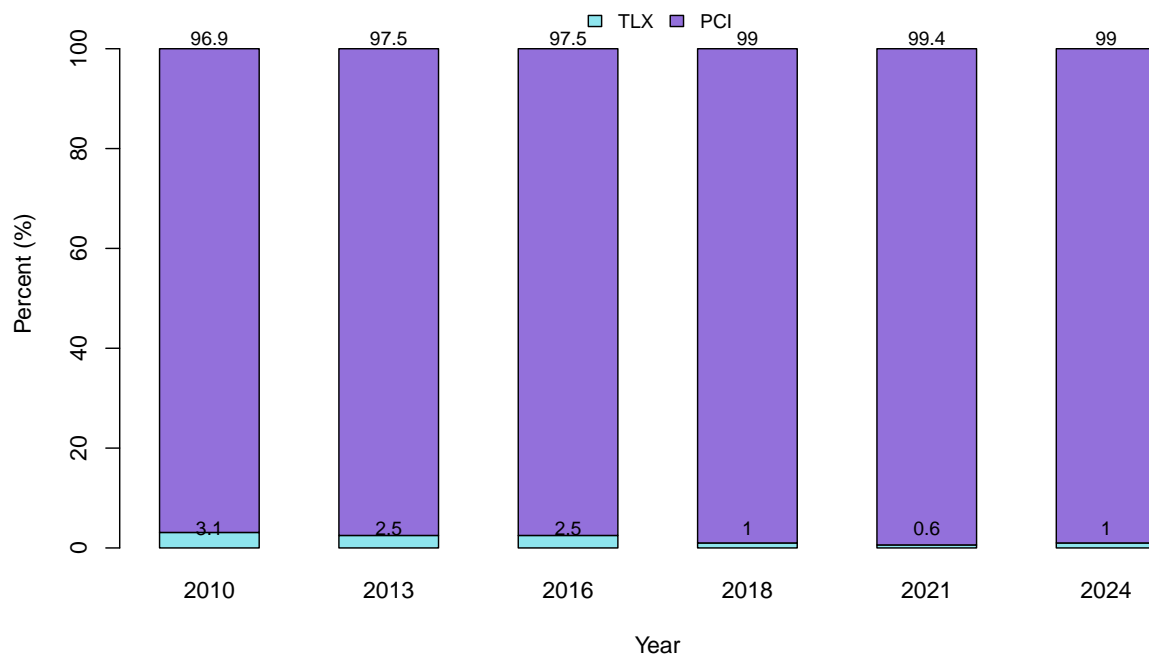


Figure 2.3: Type of Primary Reperfusion among Patients with ST Elevation



2.4.1 Primary PCI / Coronary Angiography

Table 2.7.1: Vascular access during Primary Reperfusion

	2010	2013	2016	2018	2021
n	555	596	603	574	635
Vascular access, n (%):					
Femoral	374 (72.3)	225 (39.5)	126 (21.6)	113 (20.2)	89 (14.4)
Radial	143 (27.7)	345 (60.5)	449 (76.9)	437 (78.2)	519 (83.8)
Both	0 (0.0)	0 (0.0)	9 (1.5)	9 (1.6)	11 (1.8)

2.4.2 Coronary angiography (*excluding primary PCI*)

Table 2.7.2: Vascular access during coronary angiography

	2010	2013	2016	2018	2021
n (excluding primary PCI)	1260	1317	1226	1229	1048
Coronary angiography, n (%)	1057 (84.0)	1080 (82.1)	1079 (88.2)	1093 (88.9)	913 (87.2)
Vascular access, n (%):					
Femoral	0 (NaN)	0 (NaN)	176 (16.4)	91 (11.5)	79 (8.8)
Radial	0 (NaN)	0 (NaN)	882 (82.0)	679 (85.5)	811 (90.1)
Both	0 (NaN)	0 (NaN)	18 (1.7)	24 (3.0)	10 (1.1)

2.5 Time Intervals in STEMI Patients

Table 2.8.1: Primary reperfusion among STEMI patients

	2010	2013	2016	2018	2021	
n	760	727	708	690	700	
Primary reperfusion, n (%)	540 (71.1)	573 (78.8)	582 (82.2)	550 (79.7)	635 (90.7)	58

Table 2.8.2: Time Intervals in STEMI reperfused patients in PPCI (minutes)

	2010	2013	2016	2018	2021	p for trend
n	503	536	544	526	610	
Symptom onset to ED arrival (median [IQR])	111.00 [68.50, 213.50]	129.00 [74.00, 242.25]	117.00 [70.00, 195.00]	120.00 [75.00, 212.00]	121.50 [71.00, 324.75]	0.005
ED arrival to primary PCI (door to balloon) (median [IQR])	65.00 [36.50, 109.50]	66.00 [35.00, 101.00]	50.00 [25.25, 84.75]	48.00 [25.25, 79.00]	39.00 [14.00, 74.25]	<0.001
Onset to balloon (median [IQR])	195.00 [130.00, 331.00]	196.50 [140.00, 350.00]	170.00 [120.00, 287.00]	178.00 [120.00, 277.50]	175.00 [104.00, 422.00]	0.336
Door to balloon \leq 90 min. (%)	326 (66.9)	345 (70.6)	406 (79.0)	367 (82.3)	456 (82.0)	<0.001

Table 2.9: Time Intervals (minutes) in STEMI reperfused patient in PPCI, by gender

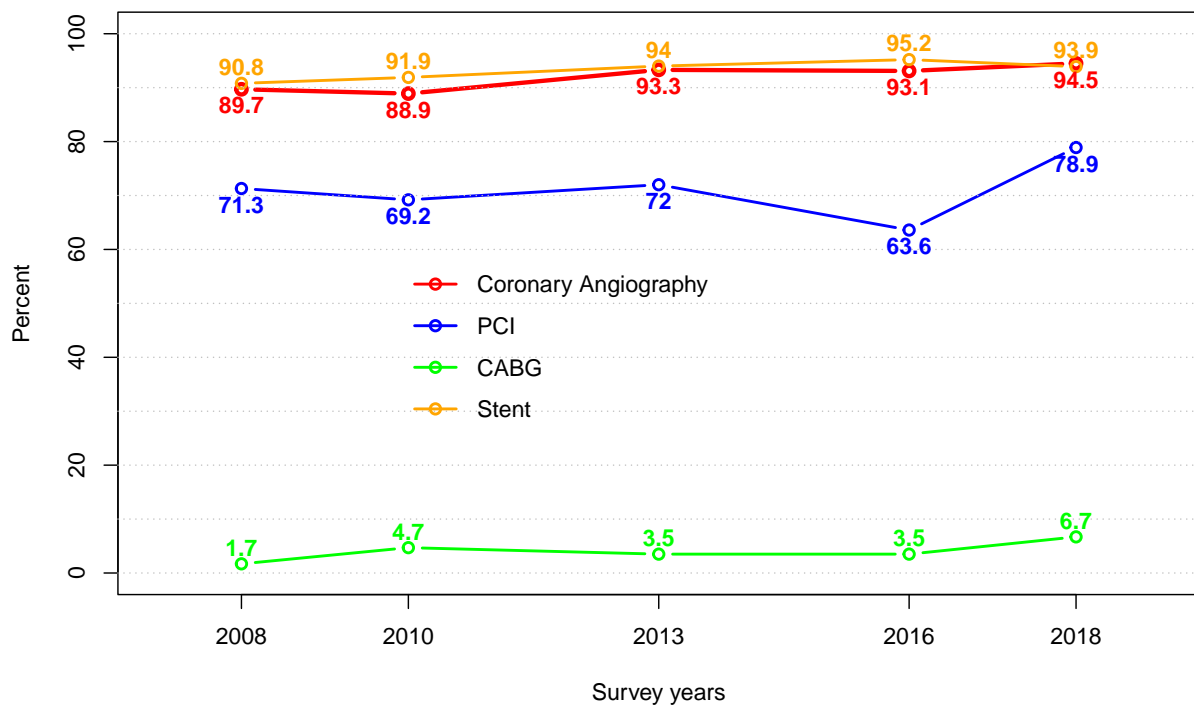
	2010	2013	2016	2018	2021	p for trend
Men						
n	409	449	440	442	501	
Symptom onset to ED arrival (median [IQR])	110.00 [66.00, 210.00]	126.00 [70.00, 239.00]	117.00 [65.00, 191.00]	119.50 [70.75, 214.00]	119.50 [68.00, 297.50]	0.016
ED arrival to primary PCI (door to balloon) (median [IQR])	64.00 [36.00, 101.00]	66.00 [35.00, 101.50]	49.00 [25.00, 83.00]	46.50 [25.00, 73.00]	36.00 [11.25, 71.75]	<0.001
Onset to balloon (median [IQR])	188.00 [124.75, 322.25]	195.00 [135.00, 345.00]	165.00 [115.00, 270.00]	172.00 [116.00, 269.75]	166.00 [100.00, 375.50]	0.666
Women						
n	94	87	104	84	109	
Symptom onset to ED arrival (median [IQR])	127.00 [86.00, 240.00]	147.00 [87.00, 330.00]	118.00 [91.00, 227.75]	125.00 [79.00, 200.00]	162.50 [91.75, 411.25]	0.139
ED arrival to primary PCI (door to balloon) (median [IQR])	78.50 [40.00, 133.50]	62.00 [30.75, 98.25]	58.50 [29.25, 92.00]	58.00 [28.00, 104.00]	50.50 [19.25, 85.00]	0.002
Onset to balloon (median [IQR])	249.00 [154.00, 369.00]	212.00 [152.00, 385.00]	188.00 [144.00, 385.00]	190.00 [150.00, 300.00]	227.00 [137.00, 549.75]	0.217

2.6 Procedures during Hospitalization

Table 2.10 Procedures during Hospitalization

	2010	2013	2016	2018	2021	p for trend
n	1779	1885	1791	1778	1750	
Coronary Angiography (%)	89.7	88.9	93.3	93.1	94.5	<0.001
Any PCI (%)	71.3	69.2	72.0	63.6	78.9	<0.001
Stent (%)	90.8	91.9	94.0	95.2	93.9	0.101
CABG (%)	1.7	4.7	3.5	3.5	6.7	<0.001
IABP (%)	4.6	2.3	2.2	2.0	1.9	<0.001

Figure 2.4: Trends in Procedures Performed During Hospitalization



2.7 In-Hospital Complications

Table 2.11: In-Hospital Complications

	2010	2013	2016	2018	2021	p for trend
n	1779	1885	1791	1778	1750	
Re-MI (%)	1.1	1.0	0.5	0.6	1.1	0.407
Post MI angina/Re-ischemia (%)	2.0	2.0	1.3	1.2	1.3	0.003
Sub-Acute Stent Thrombosis (%)	0.6	0.8	0.7	0.3	0.6	0.694
Mild-moderate CHF (Killip 2) (%)	7.8	6.1	5.9	7.4	8.5	<0.001
Pulmonary edema (Killip 3) (%)	4.9	4.4	3.1	3.3	3.7	0.012
Cardiogenic shock (Killip 4) (%)	3.1	3.3	2.0	3.1	3.2	0.44
Free wall rupture (%)	0.1	0.1	0.2	0.1	0.2	0.392
Tamponade (%)	0.3	0.0	0.2	0.2	0.4	0.882
Moderate-severe MR (%)	1.7	2.1	1.1	0.8	1.8	0.275
Sustained VT (%)	1.3	1.3	1.1	1.1	1.3	0.381
High degree (2nd / 3rd) AVB (%)	2.1	1.5	1.4	1.5	1.0	0.016
Primary VF (%)	1.9	1.2	1.3	1.3	1.4	0.257
Secondary VF (%)	0.6	0.5	0.6	0.5	0.7	0.709
Asystole (%)	1.9	1.9	1.3	2.0	1.9	0.058
TIA (%)	0.1	0.2	0.1	0.3	0.2	0.205
Stroke (%)	0.5	0.6	0.5	0.5	0.3	0.24
Acute renal injury (%)	6.1	4.6	5.1	4.9	6.7	0.662
Bleeding (%)	2.4	0.9	1.8	2.8	2.3	0.294

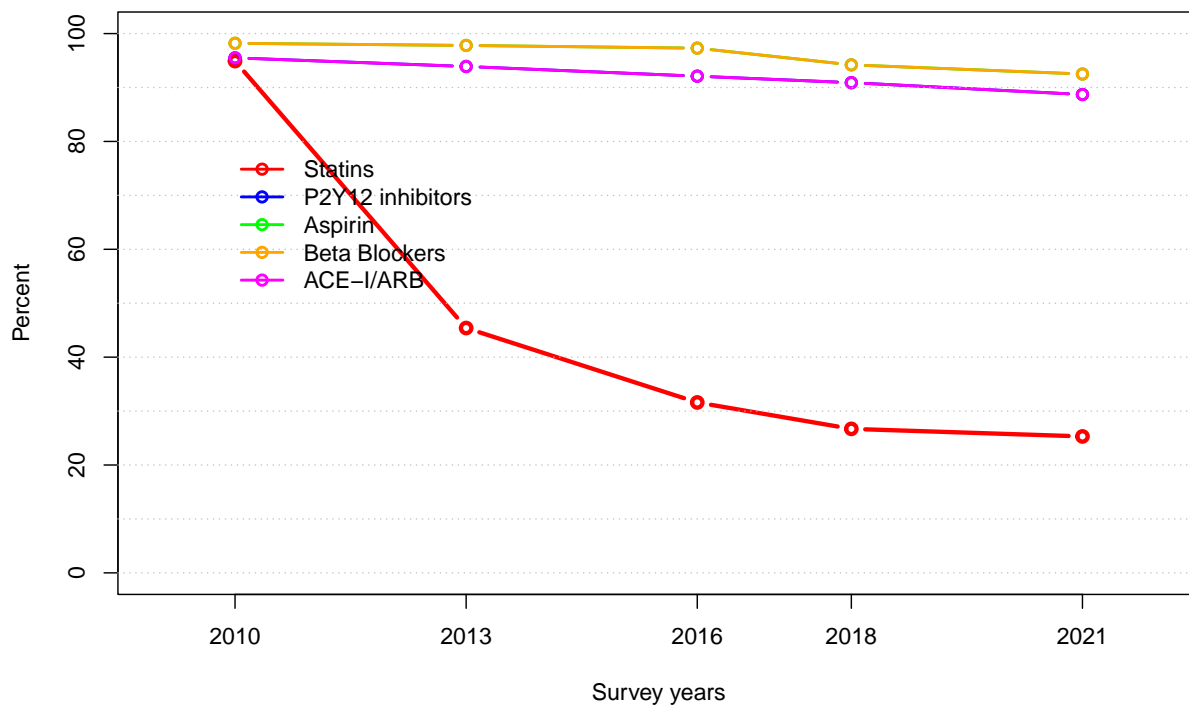
2.8 In-Hospital Treatment

Table 2.12: In-Hospital Treatment

	2010	2013	2016	2018	2021	p for trend
n	1779	1885	1791	1778	1750	
Aspirin (%)	98.2	97.8	97.3	94.2	92.5	<0.001
P2Y12 inhibitors (%)	95.5	93.9	92.1	90.9	88.7	<0.001
Clopidogrel (%)	94.9	45.4	31.6	26.7	25.3	<0.001
Prasugrel (%)	0.3	30.1	25.6	19.5	26.9	<0.001
Ticagrelor (%)	0.3	18.4	35.0	44.7	36.6	<0.001
Beta Blockers (%)	98.2	97.8	97.3	94.2	92.5	<0.001
ACE-I/ARB (%)	95.5	93.9	92.1	90.9	88.7	<0.001
Statins (%)	94.9	45.4	31.6	26.7	25.3	<0.001
LLDs (%)	0.3	30.1	25.6	19.5	26.9	<0.001
Digoxin (%)	0.3	18.4	35.0	44.7	36.6	<0.001
Diuretic (%)	98.2	97.8	97.3	94.2	92.5	<0.001
Nitrates (%)	95.5	93.9	92.1	90.9	88.7	<0.001

¹ Anticoagulants include warfarin, LMWH and DOACs in the years applicable

Figure 2.5: Trends in Hospital Treatment



2.9 Medical Treatment on Discharge

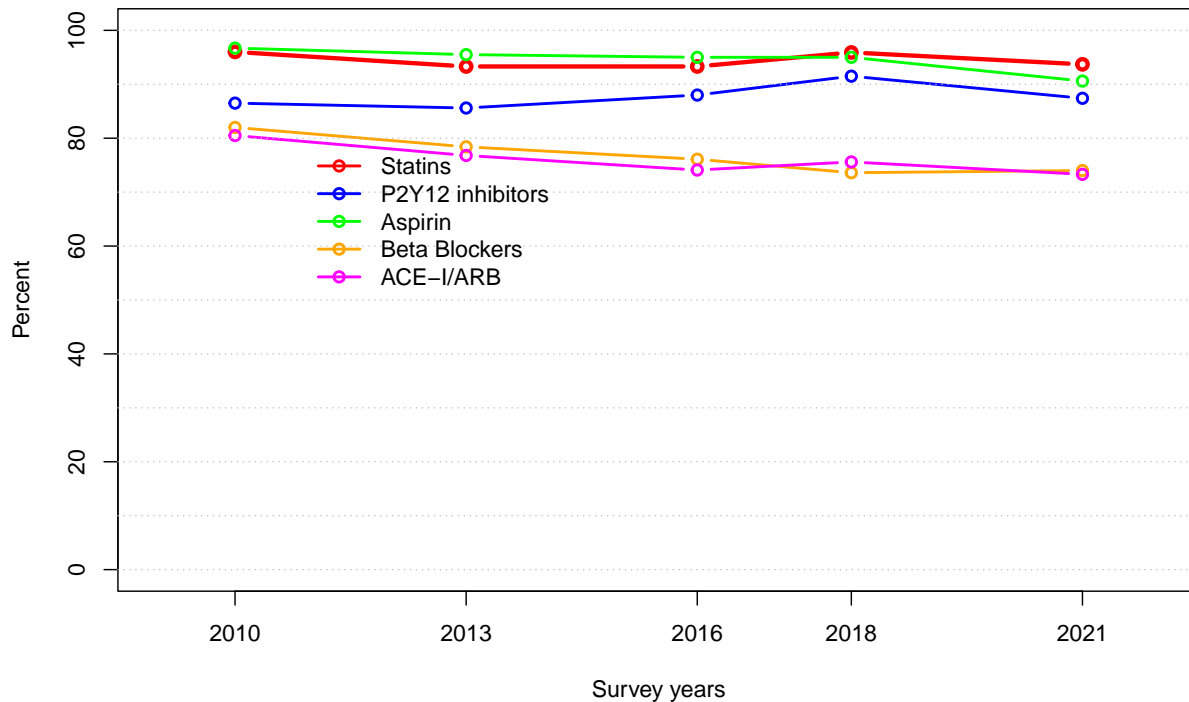
Table 2.13: Medical Treatment on Discharge among Hospital Survivors

	2010	2013	2016	2018	2021	p for trend
n	1741	1848	1761	1726	1709	
Aspirin (%)	96.7	95.5	95.0	95.0	90.6	<0.001
Beta Blockers (%)	82.0	78.4	76.1	73.6	74.0	<0.001
P2Y12 inhibitors (%)	86.5	85.6	88.0	91.5	87.4	<0.001
Clopidogrel (%)	85.9	42.5	31.9	26.4	25.6	<0.001
Prasugrel (%)	0.3	27.7	24.9	20.0	27.0	<0.001
Ticagrelor (%)	0.3	15.4	31.2	45.1	34.8	<0.001
ACE-I/ARB (%)	80.5	76.8	74.1	75.6	73.3	<0.001
Statins (%)	96.0	93.3	93.3	95.9	93.7	<0.001
LLDs (%)	96.2	93.5	93.3	94.6	94.6	<0.001
Digoxin (%)	1.0	0.9	1.1	0.5	0.2	<0.001
Diuretic (%)	22.5	19.6	18.5	16.5	13.8	<0.001
Nitrates (%)	6.7	7.6	4.4	5.6	3.3	<0.001
GLP-1 ¹ (%)	0.0	0.0	0.5	1.0	2.0	<0.001

¹ Only among diabetic patients

² Anticoagulants include warfarin, LMWH and DOACs in the years applicable

Figure 2.6: Medical Treatment in Discharge among Hospital Survivors



2.10 Short and long Term Outcomes

Table 2.14: Rates of Mortality and MACE¹

	2010	2013	2016	2018	2021	p for trend
n	1779	1885	1791	1778	1750	
Mortality						
In-hospital	2.1	2.0	1.7	2.9	2.2	0.506
7-day	2.2	1.8	1.6	2.7	1.9	0.59
30-day	4.2	3.7	3.0	4.3	2.5	0.012
1 year	8.1	8.3	7.8	8.9	5.4	0.011
MACE¹						
30-day MACE	10.3	10.4	8.9	8.4	9.8	0.01

¹ 30 day MACE: Death/UAP/MI/Ischemia/CVA/Stent thrombosis/Follow-up urg. revasc.

Figure 2.7: Rates of Mortality and 30-day MACE

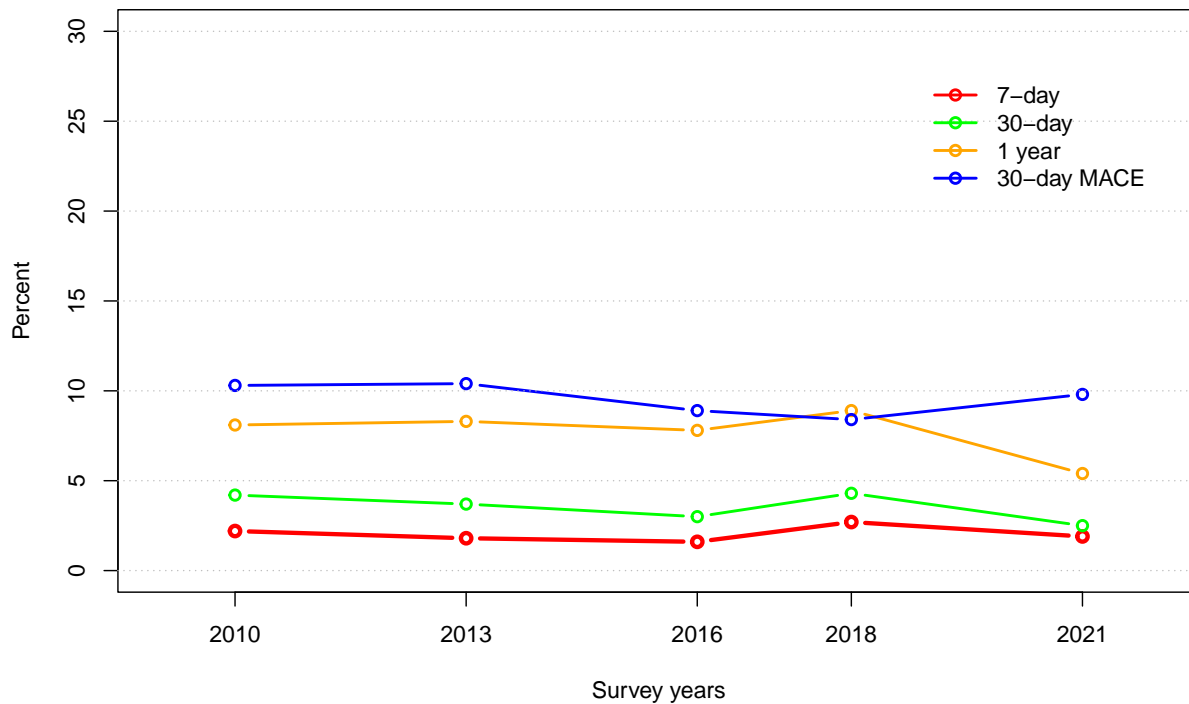


Table 2.15: Rates of Mortality and MACE¹ by Gender

	2010	2013	2016	2018	2021	p for trend
–Men–						
n	1378	1453	1414	1427	1391	
Mortality						
In-hospital	2.0	1.5	1.3	2.5	1.8	0.579
7-day	1.9	1.3	1.2	2.1	1.7	0.948
30-day	3.6	2.7	2.2	3.5	2.3	0.224
1 year	6.9	6.9	6.8	7.2	4.7	0.042
MACE¹						
30-day	9.2	9.3	7.9	7.3	9.7	0.085
–Women–						
n	401	432	377	351	359	
Mortality						
In-hospital	2.5	3.5	3.2	4.6	3.9	0.923
7-day	3.2	3.3	2.9	5.1	2.8	0.572
30-day	6.2	7.0	6.1	7.6	3.3	0.023
1 year	12.3	12.9	11.6	15.8	8.1	0.237
MACE¹						
30-day	14.2	14.1	12.7	13.1	10.3	0.084

¹ 30 day MACE: Death/UAP/MI/Ischemia/CVA/Stent thrombosis/Follow-up urg. revasc.

Figure 2.8: Rates of Mortality and 30-day MACE by gender

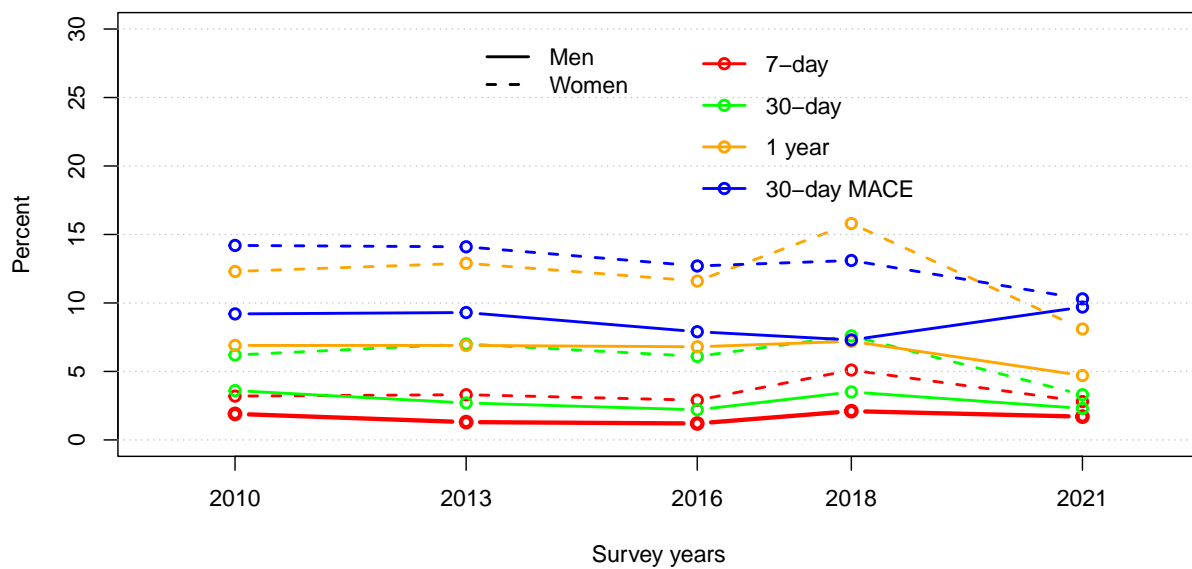


Table 2.16: Rates of Mortality and MACE¹ by Discharge Diagnosis

	2010	2013	2016	2018	2021	p for trend
STEMI						
n	760	727	708	690	700	
Mortality						
In-hospital	3.3	3.3	3.1	3.8	3.3	0.236
7-day	3.6	3.6	3.3	3.6	3.1	0.297
30-day	5.3	5.0	5.0	5.7	4.0	0.177
1 year	8.8	8.7	8.1	10.8	5.6	0.138
MACE¹						
30-day	11.6	12.2	10.9	9.2	8.7	0.003
Non STEMI						
n	1019	1158	1083	1088	1050	
Mortality						
In-hospital	1.3	1.1	0.7	2.4	1.5	0.56
7-day	1.2	0.6	0.5	2.1	1.1	0.495
30-day	3.4	2.9	1.8	3.4	1.5	0.025
1 year	7.6	8.0	7.6	7.7	5.3	0.042
MACE¹						
30-day	9.4	9.2	7.6	8.0	10.6	0.431

¹ 30 day MACE: Death/UAP/MI/Ischemia/CVA/Stent thrombosis/Follow-up urg. revasc.

Figure 2.9: Rates of Mortality and 30-day MACE by Discharge Diagnosis

