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Editor: Dr Wan Azman Wan Ahmad



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Dr Wan Azman Wan Ahmad

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PREFACE

The 2020–2021 Report of the National Cardiovascular Disease – Acute Coronary Syndrome (NCVD-ACS) Registry is the 8th Report since its inception in 2006. Over the last 15 years, we gained great insight into ACS in Malaysia – including patient profiles, clinical presentations, clinical management, and prognosis.

This Report is unique, capturing data during the COVID-19 pandemic, illustrating the commitment of centres across Malaysia that continued to provide care for ACS during this challenging time. Also, it demonstrates the perseverance to continue contributing data to this Registry, from which this Report is built on.

As we emerge from the COVID-19 pandemic, valuable lessons were learnt, notwithstanding the way we manage ACS cases during and after the pandemic. The NCVD-ACS has been very much a part of this learning journey – generating data, valuable clinical information, and peer-reviewed publications. Data from the NCVD ACS Registries are now incorporated into National Clinical Practice Guidelines, making them more relevant to the local clinical setting.

This Report continues to reflect the immense work from across Malaysia, from all the contributing source data providers (SDPs) – sites from both public and private sectors. From that commitment together with our team from Heart House and the Writing Committee led by Prof Dr Wan Azman Wan Ahmad, we can generate this valuable Report. I would like to thank Prof Dr Wan Azman and all those who contributed time and energy, beyond their clinical duties, to put the Report together. This Report will be a valuable resource for healthcare providers, policy makers and other stakeholders.

I acknowledge the efforts of the previous NCVD Governance Board and Steering Committee of the NCVD ACS Registry, who provided leadership, including during the pandemic.

We also thank the Ministry of Health Malaysia, who provided invaluable support and resources, together with the National Heart Association of Malaysia, to sustain this Registry, which is one of the oldest and largest Registries for ACS in Asia. Our Registry will play a greater role beyond our borders, and this 8th Report will continue to champion this effort.

Thank you.

Dr. Alan Fong Yean Yip
Chairman, NCVD Governance Board

FOREWORD

In medical science, knowledge is power. It is through the diligent collection and analysis of data that we gain insights, uncover patterns, and ultimately improve patients' outcomes. The National Acute Coronary Syndrome (ACS) registry stands as proof to our commitment to better understand and manage one of the most prevalent and critical cardiovascular diseases worldwide.

The compilation of data within this registry is not merely a compilation of numbers and statistics. It reflects our collective efforts as healthcare professionals across Malaysia. It is a testament to the dedication of clinicians, researchers, administrators, and policymakers who have tirelessly worked to enhance our understanding of ACS and improve the care provided to those affected.

I would like to extend my deepest gratitude to all who have contributed to this registry and to the efforts of those who continue to advance the field of cardiology. May this report serve as both a testament to our progress and roadmap for our future endeavours. Together let us move forward with determination and unwavering commitment to excellence in cardiovascular care.

Thank you.

Dr. Ahmad Syadi Mahmood Zuhdi

Chairman, Steering Committee, NCVD-ACS Registry

NOTE FROM THE WRITING COMMITTEE CHAIRMAN

The present report (the 8th report) is on 15,162 patients admitted with ACS from 23 source data providers (SDPs) between 2020 and 2021. For the 2018 and 2019 report, we had 20,605 patients with ACS as reported by SDPs, thus indicating a decrease of 26.4% in the present cohort. In some hospitals, there was a marked reduction of patients entered in the SDP database. Though this reduction could be partly due to COVID-19 between the year of 2020 and 2021, we noted that many of the people previously involved with the NCVD had retired, was transferred, been promoted or had other reasons for no longer participating. Thus, we need new blood and new champions for this important endeavour.

The NHAM Council will have the NCVD rejuvenation meeting on 2nd May 2024, Thursday at KL Convention Centre in conjunction with the NHAM 2024 Congress. During the congress, we will present five abstracts which were generated from this ACS report. This report provided us the opportunities to compare the differences in the clinical presentation, treatment, and outcome between the eras of COVID-19 pandemic (2020–2021 cohort) and the pre COVID-19 pandemic (2018–2019 cohort). Many interesting findings were observed in this report.

The highlight of this report were as follows:

Cardiac services:

In 2021, the number and density of registered cardiologists in the National Specialist Register, Malaysia increased from 305 (9.4 pmp) in the previous report to 334 (10.3 pmp). There was still an uneven distribution of cardiologists and cardiac catheterisation laboratories across the country. About 80.2% of our cardiologists were in private practice. Only 12.6% were under the Ministry of Health and 6.6% were under the Ministry of Higher Education. Similarly 78.5% of cardiac catheterisation laboratories were in the private sector. The highest density of cardiologists were in the Klang Valley while Perlis, Negeri Sembilan and Malacca still have no cardiologists in the public sector.

Patient characteristics:

Patients who presented with ACS remained young, with a significant proportion (25.6%) under the age of 50 years. Patients presenting with STEMI were younger than patients presenting with NSTEMI or UA. Majority of patients presenting with ACS were male (79.4%) which was comparable to the previous cohort. There was a high prevalence of hypertension, dyslipidaemia and diabetes in this cohort, comparable with the previous cohort.

Clinical presentations:

Malaysian ACS patients in 2020–2021 demonstrated a notable shift in clinical presentations, with a higher prevalence of high-risk NSTEMI and unstable angina cases, particularly among elderly and female patients. The impact of the COVID-19 pandemic was evident, influencing treatment approaches such as increased fibrinolytic therapy usage and slight delays in timely STEMI treatment. Diabetes and hypertension emerged as prevalent comorbidities, with distinct clinical characteristics and implications for management. Elderly patients have higher prevalence of Killip IV MI compared to younger patients (17.5% vs. 9.4%) which indicate increased vulnerability of elderly patients to more severe ACS complications. More women presented with Killip IV MI, which was consistent with the previous cohort.

Treatment:

The COVID-19 pandemic has led to an increment in the number of thrombolysis concurrent with a decrease in primary PCI both in PCI centres and non-PCI centres. Although DTB time for primary PCI was slightly delayed compared to pre-COVID-19 era, it was reassuring to know that DTN time was not delayed for fibrinolytic therapy.

Outcome:

The mortality rates at discharge, 30 days, and 1 year were seen to be higher during the COVID period compared to pre-COVID period (7.7% vs. 6.7%, 10.2% vs. 9.3%, and 18.9% vs. 17.8%, respectively) . The mortality rates

increased across all age groups, ethnicities, genders, and ACS categories in the COVID period compared to the pre-COVID period. Both diabetic and hypertensive patient groups displayed an escalating trend in mortality rates compared to the pre COVID period, indicating a poorer prognosis than their non-diabetic/non-hypertensive counterparts.

Patients admitted to PCI-capable centres exhibited better outcomes than those admitted to non-PCI-capable centres, a trend consistent with the pre-COVID period. The STEMI patients had the poorest outcomes during in-hospital and at 30-days, however, at 1-year, NSTEMI patients had the most adverse outcomes. There was a significant reduction in mortality rate among STEMI patients treated with PCI compared to those treated non-invasively.

The findings of this study provide valuable insights into the impact of COVID on clinical presentation as well as on the service delivery, management and outcome of ACS patients. Certainly, the findings help in our plans to improve ACS care in Malaysia particularly if other pandemics occur. I would like to thank all the SDPs for the untiring effort and admirable determination in contributing data. Last but not least, I would like to acknowledge all the writing committee members for the publication of this report.

Prof Dato' Dr. Wan Azman Wan Ahmad

Chairman, NCVD Writing Committee

ABBREVIATIONS

ACE	Angiotensin Converting Enzyme
ACS	Acute Coronary Syndrome
ARB	Angiotensin receptor blockers
BMI	Body Mass Index
CABG	Coronary Artery Bypass Graft
CAD	Coronary Artery Disease
CCU	Coronary Care Unit
CK	Creatinine Kinase
CK-MB	Creatinine Kinase, Muscle and Brain
CRC	Clinical Research Centre
CRF	Case Report Form
CVD	Cardiovascular Disease
DAPT	Dual antiplatelet therapy
DBMS	Database Management System
DTB	Door-to-Balloon
DTN	Door-to-Needle
EDC	Electronic Data Capture
GP	Glycoprotein
HbA _{1c}	Glycated Haemoglobin
HDL	High Density Lipoprotein
HDU	High Dependency Unit
HIC	Health Informatics Centre
ICT	Information and Communication Technology
ICU	Intensive Care Unit
IJN	Institut Jantung Negara
IQR	Interquartile Range
IT/IS	Information Technology and Information System
JPN	Jabatan Pendaftaran Negara
LDL	Low Density Lipoprotein
LMWH	Low Molecular Weight Heparin
LV	Left Ventricular
LVEF	Left Ventricular Ejection Fraction
MI	Myocardial Infarction
MOH	Ministry of Health
NCVD	National Cardiovascular Disease Database
NHAM	National Heart Association of Malaysia
NSTEMI	Non-ST-Elevation Myocardial Infarction
OHA	Oral Hypoglycaemic Agent
PCI	Percutaneous Coronary Intervention
PMP	Per Million Population
RCC	Registry Coordinating Centre
SAP	Statistical Analysis Plan
SD	Standard Deviation
SDP	Source Data Provider
STEMI	ST-Elevation Myocardial Infarction
TIMI	Thrombolysis In Myocardial Infarction
TnI	Troponin I
TnT	Troponin T
UA	Unstable Angina
WHR	Waist-Hip Ratio

NCVD-ACUTE CORONARY SYNDROME (ACS) REGISTRY MEMBERS

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CHAPTER 1: PROVISION OF CORONARY CARE SERVICES IN MALAYSIA

CHAPTER 1: PROVISION OF CORONARY CARE SERVICES IN MALAYSIA

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Summary

1. In 2021, the number and density of registered cardiologists in the National Specialist Registry, Malaysia increased from 305 (9.4 pmp) to 334 (10.3 pmp).
2. The density of cardiologist per million populations was still low compared to more developed countries.
3. There is an uneven distribution of cardiologists and cardiac catheterisation labs across the country despite numerous improvement measures.

Introduction

Cardiovascular disease (CVD) is an important healthcare challenge for Malaysia in modern times. More citizens are being diagnosed with CVD than recorded in the past. Symptoms are emerging earlier in life and many patients present with life-threatening acute coronary syndrome (ACS) below the age of 50 years. This is an alarming trend, mainly attributed to the rising prevalence of established CVD risk factors and an increasingly ageing population.

Coronary care services in Malaysia has expanded significantly in recent years catering for an increasing number of ACS patients. As diagnostic cardiac biomarkers and interventional therapeutics advances, the number of patients diagnosed with ACS increases. The demand for intervention and angioplasty increases, especially in high risk non ST-elevation-ACS cases along with its beneficial long-term outcomes compared to medical therapy alone in this group of patients.

According to the report from the Department of Statistics Malaysia in 2021, ischaemic heart disease remains the principal cause of death among Malaysians at 18.4%¹. Men and women across the three major ethnic groups; namely Bumiputra, Chinese, and Indian above the age of 41 years old were equally affected. Data from the Monica registries found that mortality rate at one year was higher among recurrent cases than among incident cases (14% vs. 8%, respectively) which are independent of age and sex. The same trend was found for mortality at 28 days (9% vs. 5%, respectively)². Lacking effective measures to mitigate the national incidence of CVD, which include improving health ownership, developing and adhering to consistent standards of care, and expanding access to optimal treatment options including innovative medicines, we expect the number of CVD-related deaths to reach approximately 31,000 cases annually by 2025, representing approximately 55% of all non-communicable diseases-related deaths in the country³.

An equal distribution of coronary care services between different states should be a priority in the next few years. The geographical distribution of these centres should also be considered if we are to embark on a nationwide primary Percutaneous Coronary Intervention (PCI) programme in order to ensure timely interventions to those who presented with STEMI. With improvements in the availability and accessibility of coronary care services to all Malaysians regardless of their hugely diverse social and economic background, it is hoped that the management of ACS nationwide may improve cardiovascular outcomes.

The provision of cardiology healthcare to the Malaysian population is yet to develop to match the needs of the high cardiovascular (CV)-related disease burden. The Coronary Care Unit (CCU) are specialised units to treat critically ill patients for close monitoring, pre-procedural, and post-procedural care, providing the highest level of care and equipment. Invasive/Interventional Cardiac Laboratories (ICL) are reserved for revascularisation procedures via angioplasty, electrophysiological procedure such as pacemaker implantation, and others

including intra-arterial balloon pump. The availability of CCU and ICL in both public and private healthcare means the availability of life-saving service to the population suffering from life-threatening CV diseases.

Number and Density of Cardiologists in Malaysia

The number of registered cardiologists in 2021 under the National Specialist Registry totaled 334, an increase of 29 from the previous report⁴. [Table 1.1] Most cardiologists (80.2%) were employed by the private sector while only 19.8% were attached to the public sector (Ministry of Health [MOH] and Ministry of Higher Education [MOHE]). The increment was attributed to the private sector while the number of cardiologists serving the public sector remained the same as the previous report. This reflects the need for more effort to increase the number of cardiology trainees under the MOH and boost retention initiatives to keep these trainees under the public system after they complete their training. The number and density of cardiologists in Malaysia in 2021 was 10.3 per million population (pmp).

Cardiologists were still focused in the central region of Wilayah Persekutuan Kuala Lumpur with the highest density of 47.8 pmp, a decrease from previous reports, followed by Pulau Pinang with a density of 23.6 pmp and Melaka with a density of 13.9 pmp. Majority of the states showed an increase in the density of cardiologists pmp except for Perlis (which still has no representative). Melaka showed the highest reduction from 4.26 to 3.86 cardiologists pmp. The density of cardiologists per million populations is still low compared to more developed countries. There is still an uneven distribution of cardiologists and cardiac catheterisation labs across the country despite numerous improvement measures taken by the authorities. These trends certainly indicate the need for an action plan to increase the number of cardiologists in the east coast of Peninsular Malaysia as well as in East Malaysia.

In our NCVD-ACS report 2011–2013⁵, we targeted ten cardiologists pmp. Over the last 10 years, there were increased recruitments of cardiology fellows at MOH, Institut Jantung Negara (IJN) and MOHE Universities. Although we almost achieved our target, the uneven distributions of cardiologists between public and private sectors and between regions are a problem.

In China, the ratio of cardiologists to population in 2011 was 19 pmp⁶. Europe has long surpassed Asian countries more than 20 years ago with the reported mean ratio of 58 cardiologists pmp across EU countries in 2000⁷. A study done by MedAxiom in 2013 on the cardiology workforce across United States revealed between 180.8 and 421.5 cardiologists for 100,000 populations⁸.

Number and Density of Catheterisation Laboratories in Malaysia

The national density of PCI-capable hospitals increased to 2.89 pmp from 2.55 pmp which reflects an increase in the number of catheterisation laboratories in parallel with the increase in population size. [Table 1.2] The majority of these laboratories are in the private sector comprising 95 hospitals or 78.5% of total hospitals with catheterisation laboratories. Sabah remained as the state with the lowest number in density of catheterisation laboratories in the country with 0.86 pmp. [Table 1.3]

Number of public and private hospitals with catheterisation laboratories were highest in Selangor and WP Putrajaya; 20 (2.81 pmp), followed by WP Kuala Lumpur; 19 (9.67 pmp), Pulau Pinang; 9 (5.17 pmp), and Johor; 8 (1.99 pmp). In most states, the number of private catheterisation laboratories were more than public ones, except for Pahang and Kelantan. Perlis had no catheterisation laboratories, while Melaka and Negeri Sembilan only had catheterisation laboratories in private hospitals. Terengganu had its first private hospital with catheterisation laboratory in 2021. [Table 1.3]

In WP Kuala Lumpur, there were 31 ICL (15.78 pmp), 26 in private and 5 in public hospitals. In Selangor and WP Putrajaya, there were 26 ICL (3.65 pmp). Lowest ICL to population ratio were in Kelantan (1.66 pmp), Terengganu (1.71 pmp), Sabah and WP Labuan (0.86 pmp), and no catheterisation laboratories in Perlis. Public catheterisation laboratories should be strongly considered in these states in the near future to meet the increasing demands for public cardiology services. [Table 1.3]

Number of CCU Beds in Government Hospitals in Malaysia

The population of Malaysia as of 2021 was 32,576,300 – with the most populated states being Selangor and WP Putrajaya; 7,129,900 followed by Johor; 4,020,000⁹. Fully equipped CCU beds in public hospitals total up to 262 beds, with 228 beds under MOH and 34 beds under MOHE. This is a ratio of 8.04 pmp. The states with the highest CCU beds were Negeri Sembilan with 14.1 beds pmp, followed by WP Kuala Lumpur and Kelantan with 13.24 beds pmp each, whereas the state with the lowest number of CCU beds was Sarawak with only 3.24 beds pmp. [Table 1.4]

If we were to further divide this into regions, the central region (Perak, Selangor, WP Putrajaya, WP Kuala Lumpur and Negeri Sembilan) had 44.4 beds pmp, the northern region (Pulau Pinang, Kedah and Perlis) had 30.1 beds pmp, the southern region (Johor and Melaka) had 12.7 beds pmp, the East Coast (Kelantan, Terengganu and Pahang) had 26.6 beds pmp, and finally East Malaysia (Sabah, WP Labuan, Sarawak) had 6.95 beds pmp. The low number of CCU beds in East Malaysia reflects the geographical challenges that these states have despite having a large population base.

Despite the increase in cardiovascular disease and its related mortality, there are limited numbers of CCU beds in public hospitals nationwide. Acute coronary patients may still be managed in high dependency units or the general wards with cardiac monitoring. In the future, as the population and demand for coronary care services and coronary intervention increases, we will need to consider expanding the number of CCU beds and even considering the innovation of separate units for the management of patients after primary or complex percutaneous coronary interventions.

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Table 1.1 Number and density of cardiologists in Malaysia by state and sector, 2021

State	Public sector	Private sector	Total*	Population in Malaysia (2021)**	Per 10,000 population	Per million population
Perlis	0	0	0	287,600	0.000	0.000
Kedah	4	10	14	2,151,700	0.065	6.506
Pulau Pinang	8	33	41	1,740,000	0.236	23.563
Perak	2	15	17	2,515,800	0.068	6.757
Selangor & WP Putrajaya	15	63	78	7,129,900	0.109	10.940
WP Kuala Lumpur	16	78	94	1,964,000	0.479	47.862
Negeri Sembilan	0	7	7	1,204,200	0.058	5.813
Melaka	0	14	14	1,004,500	0.139	13.937
Johor	3	19	22	4,020,000	0.055	5.473
Pahang	4	5	9	1,601,500	0.056	5.620
Kelantan	4	3	7	1,812,300	0.039	3.862
Terengganu	1	2	3	1,170,700	0.026	2.563
Sabah & WP Labuan	2	7	9	3,508,600	0.026	2.565
Sarawak	7	12	19	2,465,600	0.077	7.706
Malaysia	66	268	334	32,576,300	0.103	10.253

*From National Specialist Register, whoever met the criteria of 1st and/or 2nd specialty as Cardiology

**From Department of Statistics, Malaysia (www.dosm.gov.my)

Note:

1. Public sector includes MOH, MOHE and MOD hospitals

2. No. of cardiologists from MOHE: PPUM (10), HCTM UKM (4), UiTM (2), HUSM (2), IIUM (2), UNIMAS (1), UPM(1)

3. No. of cardiologists from MOD (2)

4. No. of cardiologists from MOH (42)

5. The added total may differ due to rounding.

Table 1.2 Number and density of hospital with catheterisation laboratory in Malaysia by state and sector, 2021

State	Public sector	Private sector	Total	Population in Malaysia (2019)*	Per 10,000 population	Per million population
Perlis	0	0	0	287,600	0.000	0.000
Kedah	1	5	6	2,151,700	0.028	2.788
Pulau Pinang	1	8	9	1,740,000	0.052	5.172
Perak	1	5	6	2,515,800	0.024	2.385
Selangor & WP Putrajaya	2	18	20	7,129,900	0.028	2.805
WP Kuala Lumpur	3	16	19	1,964,000	0.097	9.674
Negeri Sembilan	0	4	4	1,204,200	0.033	3.322
Melaka	0	4	4	1,004,500	0.040	3.982
Johor	1	7	8	4,020,000	0.020	1.990
Pahang	2	2	4	1,601,500	0.025	2.498
Kelantan	2	1	3	1,812,300	0.017	1.655
Terengganu	1	1	2	1,170,700	0.017	1.708
Sabah & WP Labuan	1	2	3	3,508,600	0.009	0.855
Sarawak	1	5	6	2,465,600	0.024	2.433
Malaysia	16	78	94	32,576,300	0.029	2.886

*From Department of Statistics, Malaysia (www.dosm.gov.my)

Note:

1. Public sector includes MOH, MOHE and MOD hospitals

2. The added total may differ due to rounding.

Table 1.3 Number and density of catheterisation laboratories in Malaysia by state and sector, 2021

State	Public sector	Private sector	Total	Population in Malaysia (2021)*	Per 10,000 population	Per million population
Perlis	0	0	0	250,000	0.000	0.00
Kedah	1	5	6	2,170,000	0.028	2.76
Pulau Pinang	2	11	13	1,770,000	0.073	7.34
Perak	1	4	5	2,510,000	0.020	1.99
Selangor & WP Putrajaya	4	19	23	6,610,000	0.035	3.48
WP Kuala Lumpur	5	20	25	1,780,000	0.140	14.04
Negeri Sembilan	0	3	3	1,130,000	0.027	2.65
Melaka	0	4	4	930,000	0.043	4.30
Johor	2	6	8	3,760,000	0.021	2.13
Pahang	2	2	4	1,670,000	0.024	2.40
Kelantan	2	1	3	1,880,000	0.016	1.60
Terengganu	1	0	1	1,240,000	0.008	0.81
Sabah & WP Labuan	1	2	3	4,000,000	0.008	0.75
Sarawak	3	4	7	2,810,000	0.025	2.49
Malaysia	24	81	105	32,520,000	0.032	3.23

*From Department of Statistics, Malaysia (www.dosm.gov.my)

Note:

1. Public sector includes MOH, MOHE and MOD hospitals
2. No. of catheterisation labs in MOHE: PPUM (3), HCTM UKM (1), UiTM (1), HUSM (1), IIUM (1)
3. No. of catheterisation lab in MOD (1)
4. No. of catheterisation lab in MOH (16)
4. The added total may differ due to rounding.

Table 1.4 Number of CCU beds in MOH and MOHE hospitals by state, 2021

State	Number of CCU beds in MOH hospitals	Number of CCU beds in MOHE hospitals	Total number of CCU beds	Population in Malaysia (2021)*	Number of CCU beds per 10,000 population	Number of CCU beds per million population
Perlis	4		4	287,600	0.14	13.91
Kedah	20		20	2,151,700	0.09	9.29
Pulau Pinang	12		12	1,740,000	0.07	6.90
Perak	20		20	2,515,800	0.08	7.95
Selangor & WP Putrajaya	55	10	65	7,129,900	0.09	9.12
WP Kuala Lumpur	8	18	26	1,964,000	0.13	13.24
Negeri Sembilan	17		17	1,204,200	0.14	14.12
Melaka	6		6	1,004,500	0.06	5.97
Johor	27		27	4,020,000	0.07	6.72
Pahang	16		16	1,601,500	0.10	9.99
Kelantan	18	6	24	1,812,300	0.13	13.24
Terengganu	4		4	1,170,700	0.03	3.42
Sabah & WP Labuan	13		13	3,508,600	0.04	3.71
Sarawak	8		8	2,465,600	0.03	3.24
Malaysia	228	34	262	32,576,300	0.08	8.04

*From Department of Statistics, Malaysia (www.dosm.gov.my)

Note: The added total may differ due to rounding.

CHAPTER 2: PATIENT CHARACTERISTICS

CHAPTER 2: PATIENT CHARACTERISTICS

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Summary

1. Malaysian patients who presented with ACS were young. The mean age at admission was 58.5 (12.6) years. A quarter (25.6%) of the patients were under age of 50 years.
2. Of the three major ethnic groups, over a quarter of Malay and Indian patients presenting with ACS were below the age of 50 years.
3. Patients presenting with STEMI (mean age of 56.0 years) were comparatively younger than patients presenting with NSTEMI (61.6 years) or unstable angina (60.2 years).
4. Seventy-nine-point-four percent (79.4%) of patients presenting with ACS were male; 86.5% of patients with STEMI, 74.8% with NSTEMI and 68.5% with unstable angina were males. This was comparable to the previous NCVD-ACS registry cohorts.
5. There were high prevalences of hypertension, dyslipidaemia and diabetes in this cohort, comparable with previous cohorts of the NCVD-ACS registry.

Introduction

There was a total of 15,162 patients admitted with acute coronary syndrome (ACS) between 2020 and 2021 and obtained from 23 source data providers (SDP). [Table 2.1] The numbers were slightly lower in the era of the COVID-19 pandemic with Hospital Serdang showing a marked reduction from 13.3% to 3.6% compared with data published from the previous NCVD-ACS annual report (2018–2019)¹. [Table 2.2]

Of the patients admitted with ACS in 2020–2021, 50.3% were ST elevation myocardial infarction (STEMI), 30.4% were non-STEMI (NSTEMI) and 19.3% were unstable angina (UA). Compared to the previous cohort, there were marked increase in patients presenting with STEMI (50.3% vs. 43.4%) while there was decrease in the proportion of patients with NSTEMI (30.4% vs. 32.1%) and UA (19.3% vs. 24.6%) in the era of COVID-19 pandemic. [Table 2.6]

This cohort of admission is similar to our neighbouring country, Singapore, during the COVID-19 pandemic in which there is marked reduction in NSTEMI admission from 814 before the pandemic to 722 during the pandemic ($p=0.025$)². However, there was no difference in the number of STEMI admission before and during the COVID-19 period (408 vs. 340; $p=0.076$)². It is deemed that STEMI patients experience more severe symptoms that urge them to seek urgent medical attention in contrast with NSTEMI patients who experience symptoms that are less intense and are tolerated by patients, resulting in them not from presenting to hospital for the fear of being exposed to COVID-19.

Age and Gender

The mean (SD) age at admission was 58.5 (12.6) years (similar to the previous cohort) with 25.6% of patients under the age of 50 years (vs. 24.5% in the previous cohort) and 79.4% of the male gender (vs. 79.2% in the previous cohort). [Table 2.1] Among the males, 28.7% were under the age of 50 years (vs. 27.6% in the previous cohort). Among the female patients, 14.0% were under the age of 50 years (vs. 12.7% in the previous cohort). [Table 2.3]

In the STEMI subgroup, the mean (SD) age at presentation was 56.0 (12.0) years, 86.5% were male, and 31.4% were under the age 50 years. In the NSTEMI subgroup, the mean age (SD) at presentation was 61.6 (12.6) years, 74.8% were male, and 18.6% were under the age of 50 years. In the UA subgroup, the mean age (SD) at presentation was 60.1 (12.6) years, 68.5% were male, and 21.5% were under the age of 50 years. [Table 2.7]

The means of age at presentation for ACS and its subgroups, the gender distribution, and the proportion of young patients (under the age of 50 years) were similar to the previous cohort. In the under the age of 40 years who presented with ACS group, there was a small increase in the number of patients compared with the previous cohort (7.8% vs. 7.5%). [Table 2.1]

The median age of STEMI patients in the Malaysian cohort was markedly younger than the Singaporean cohort of acute myocardial infarction (AMI) in year 2021 (56 years old vs. 62.7 years old) whereby about 76% of the Singaporean cohort were aged 60 years or above in year 2021³⁻⁴. The Malaysian cohort which has STEMI patients who were younger poses significant economic impact, as majority of them were males who are the breadwinner of the family.

Cardiovascular Risk Factors

Between 2020 and 2021, 94.2% of patients presenting with ACS had at least one of the common cardiovascular risk factors (CVRF), with 22.5% having one, 30.0% having two, 26.7% having three and 14.9% having three or more risk factors. [Table 2.5]

Of these CVRF, 62.1% had hypertension, 44.6% had diabetes, 40.6% had dyslipidaemia, 38.0% had body mass index (BMI) more than 27.4, 37.0% were current smoker, 24.1% had a previously documented coronary artery stenosis >50%, 13.2% had previous history of myocardial infarction, 10.9% had a positive family history of cardiovascular disease, 8.5% had history of renal disease, 4.8% had chronic stable angina, 73.8% had new onset angina (within 2 weeks to onset of index ACS event), 4.5% had history of heart failure prior to presentation, 2.7% had chronic lung disease, 3.4% had a history of cerebrovascular disease, 0.6% had known peripheral vascular disease. [Table 2.1]

Compared to previous cohort, there were fewer patients with chronic stable angina (4.8% vs. 5.3%), and fewer patients with new onset angina within two weeks from index ACS presentation (73.8% vs. 76.2%). However, there generally were increasing trends of other CVRF including current smokers (37.0% vs. 34.2%), obesity BMI >27.4 (38.0% vs. 36.5%), dyslipidaemia (40.6% vs. 36.7%), and hypertension (62.1% vs. 61.9%). The other profiles of patients presenting with ACS were similar. [Table 2.1]

Ethnic Differences

The three major ethnic groups which are Malay, Chinese, and Indian form the majority of Malaysian population that contributed to this ACS cohort.

In years 2020 and 2021, the Malays formed 53.3% (vs. 52.1% in the previous cohort), Chinese formed 20.4% (vs. 21.4%) and Indians 16.0% (vs. 15.9%) of the patients who presented to the SDPs with ACS. [Table 2.1]

The proportions of ethnicity in the different ACS subgroups remained similar to the previous cohort. In the STEMI subgroup, the proportion was 57.9% Malay (slightly increased vs. 55.6% in the previous cohort), 15.9% Chinese (slightly reduced vs. 17.1% in the previous cohort), 14.8 % Indian (vs. 14.7% , i.e. similar to previous cohort). In the NSTEMI subgroup, the proportion was 49.2% Malay (vs. 47.7%), 24.9% Chinese (vs. 24.9%), and 15.3% Indian (vs. 15.9%). In the UA subgroup, the proportion was 48.0% Malay (vs. 51.8%), 25.1% Chinese (vs. 24.4%) and 20.3% Indian (vs. 17.6%). [Table 2.7]

These findings were similar to the previous cohort and consistently the Malays were more likely to present with STEMI while the Chinese were more likely to present with NSTEMI and unstable angina whereas Indian were more likely to present with UA. [Table 2.7]

For Malays who presented with ACS in this cohort, 29.3% of males and 16.4% of females were under the age of 50 years. For the Indians, 27.3% of males and 13.5% of females were under the age of 50 years. These cohorts were both higher than the Chinese, where 18.2% of males and 6.4% of females were under the age of 50 years on presentation for ACS. [Table 2.4.1]

The Malays formed the majority of patients presenting with ACS. Within each major ethnic group, the proportion of young patients (under the age of 50 years) from each gender presenting with ACS were similar to that of the previous cohort. Chinese patients had a substantially lower proportion of young patients presenting with ACS compared to the Malays and the Indians.

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Table 2.1 Characteristics of patients with ACS, NCVD-ACS Registry, 2020–2021

Year	2018–2019	2020	2021	2020–2021
Total	20,605	7,846	7,316	15,162
DEMOGRAPHICS				
Age, years				
N	20,605	7,846	7,316	15,162
Mean (SD)	58.7 (12.4)	58.5 (12.5)	58.5 (12.6)	58.5 (12.6)
Median (min, max)	58.9 (20.6, 98.5)	59.0 (20.9, 100.4)	58.7 (20.3, 98.3)	58.8 (20.3, 100.4)
IQR	17.1	17.5	17.9	17.7
Age group, No. (%)				
20<30	185 (0.9)	73 (0.9)	53 (0.7)	126 (0.8)
30<40	1,365 (6.6)	563 (7.2)	501 (6.8)	1,064 (7.0)
40<50	3,511 (17.0)	1,345 (17.1)	1,352 (18.5)	2,697 (17.8)
50<60	5,987 (29.1)	2,202 (28.1)	2,043 (27.9)	4,245 (28.0)
60<70	5,732 (27.8)	2,210 (28.2)	2,000 (27.3)	4,210 (27.8)
70<80	2,943 (14.3)	1,140 (14.5)	1,042 (14.2)	2,182 (14.4)
≥80	882 (4.3)	313 (4.0)	325 (4.4)	638 (4.2)
Gender, No. (%)				
Male	16,312 (79.2)	6,248 (79.6)	5,798 (79.3)	12,046 (79.4)
Female	4,293 (20.8)	1,598 (20.4)	1,518 (20.7)	3,116 (20.6)
Ethnic group, No. (%)				
Malay	10,743 (52.1)	4,243 (54.1)	3,840 (52.5)	8,083 (53.3)
Chinese	4,407 (21.4)	1,587 (20.2)	1,509 (20.6)	3,096 (20.4)
Indian	3,251 (15.9)	1,209 (15.4)	1,215 (16.6)	2,424 (16.0)
Orang Asli	20 (0.1)	8 (0.1)	4 (0.1)	12 (0.1)
Kadazan Dusun	319 (1.6)	87 (1.1)	88 (1.2)	175 (1.2)
Melanau	9 (0.0)	4 (0.1)	6 (0.1)	10 (0.1)
Murut	20 (0.1)	10 (0.1)	13 (0.2)	23 (0.2)
Bajau	233 (1.1)	66 (0.8)	83 (1.1)	149 (1.0)
Bidayuh	195 (1.1)	91 (1.2)	92 (1.3)	183 (1.2)
Iban	340 (1.7)	145 (1.8)	131 (1.8)	276 (1.8)
Punjabi	68 (0.3)	29 (0.4)	23 (0.3)	52 (0.3)
Other Malaysian	445 (2.2)	115 (1.5)	125 (1.7)	240 (1.6)
Foreigner	555 (2.7)	252 (3.2)	187 (2.6)	439 (2.9)

Year	2018–2019	2020	2021	2020–2021
Total	20,605	7,846	7,316	15,162
OTHER CORONARY RISK FACTORS				
Smoking, No. (%)				
Never	8,002 (38.8)	2,990 (38.1)	3,029 (41.4)	6,019 (39.7)
Former (quit > 30 days)	3,854 (18.7)	1,292 (16.5)	1,172 (16.0)	2,464 (16.3)
Current (any tobacco use within last 30 days)	7,049 (34.2)	3,044 (38.8)	2,560 (35.0)	5,604 (37.0)
Not available	1,699 (8.3)	520 (6.6)	555 (7.6)	1,075 (7.1)
Missing	1	0	0	0
Family history of premature cardiovascular disease, No. (%)				
Yes	2,322 (11.5)	929 (12.0)	694 (9.6)	1,623 (10.9)
No	14,584 (72.0)	5,796 (75.1)	5,564 (77.2)	11,360 (76.1)
Unknown	3,327 (16.4)	988 (12.8)	947 (13.1)	1,935 (13.0)
Missing	362	133	111	244
BMI, kg/m², No. (%)				
N	8,072	2,803	2,950	5,753
Mean (SD)	26.6 (4.8)	26.8 (4.6)	26.8 (4.8)	26.8 (4.7)
Median (min, max)	26.0 (14.8, 49.8)	26.1 (14.6, 49.6)	26.0 (14.5, 48.9)	26.1 (14.5, 49.6)
IQR	5.6	5.6	5.5	5.6
Not available (%)	9,726 (47.2)	4,166 (53.1)	3,328 (45.5)	7,494 (49.4)
Missing (%)	2,807 (13.6)	877 (11.2)	1,038 (14.2)	1,915 (12.6)
BMI, kg/m², No. (%)				
<18.5	156 (1.9)	40 (1.4)	43 (1.5)	83 (1.4)
18.5–22.9	1,580 (19.6)	494 (17.6)	527 (17.9)	1,021 (17.7)
23.0–27.4	3,394 (42.1)	1,196 (42.7)	1,268 (43.0)	2,464 (42.8)
>27.4	2,942 (36.5)	1,073 (38.3)	1,112 (37.7)	2,185 (38.0)
Not available	9,726	4,166	3,328	7,494
Missing	2,807	877	1,038	1,915
WHR				
N	3,090	1,358	1,296	2,654
Mean (SD)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)
Median (min, max)	1.0 (0.7, 2.0)	1.0 (0.7, 1.8)	1.0 (0.7, 2.5)	1.0 (0.7, 2.5)
IQR	0.1	0.1	0.1	0.1
Not available (%)	12,939 (62.8)	5,201 (66.3)	4,419 (60.4)	9,620 (63.4)
Missing (%)	4,576 (22.2)	1,287 (16.4)	1,601 (21.9)	2,888 (19.0)

Year	2018–2019	2020	2021	2020–2021
Total	20,605	7,846	7,316	15,162
WHR, No. (%)				
Men	2,498	1,138	1,074	2,212
≤1.0	1,689 (67.6)	823 (72.3)	765 (71.2)	1,588 (71.8)
>1.0	809 (32.4)	315 (27.7)	309 (28.8)	624 (28.2)
Not available	10,204	4,052	3,458	7,510
Missing	3,574	1,058	1,266	2,324
Women	592	220	222	442
≤0.85	33 (5.6)	15 (6.8)	10 (4.5)	25 (5.7)
>0.85	559 (94.4)	205 (93.2)	212 (95.5)	417 (94.3)
Not available	2,699	1,149	961	2,110
Missing	1,002	229	335	564
Waist circumference, cm				
N	2,917	1,246	1,220	2,466
Mean (SD)	93.2 (11.2)	92.5 (10.7)	94.0 (11.5)	93.2 (11.1)
Median (min, max)	92.0 (70.0, 130.0)	91.0 (70.0, 128.0)	93.0 (70.0, 130.0)	92.0 (70.0, 130.0)
IQR	15.0	14.0	14.0	15.0
Not available (%)	12,920 (62.7)	5,192 (66.2)	4,405 (60.2)	9,597 (63.3)
Missing (%)	4,768 (23.1)	1,408 (17.9)	1,691 (23.1)	3,099 (20.4)
Waist circumference, cm, No. (%)				
Men	2,373	1,049	1,016	2,065
≤90	1,076 (45.3)	514 (49.0)	431 (42.4)	945 (45.8)
>90	1,297 (54.7)	535 (51.0)	585 (57.6)	1,120 (54.2)
Not available	10,225	4,044	3,447	7,491
Missing	3,714	1,155	1,335	2,490
Women	544	197	204	401
≤80	80 (14.7)	29 (14.7)	25 (12.3)	54 (13.5)
>80	464 (85.3)	168 (85.3)	179 (87.7)	347 (86.5)
Not available	2,695	1,148	958	2,106
Missing	1,054	253	356	609
CO-MORBIDITY				
Dyslipidaemia, No. (%)				
Yes	7,438 (36.7)	3,068 (39.8)	2,986 (41.4)	6,054 (40.6)
No	11,060 (54.6)	4,254 (55.2)	3,848 (53.4)	8,102 (54.3)
Unknown	1,745 (8.6)	391 (5.1)	371 (5.1)	762 (5.1)
Missing	362	133	111	244

Year	2018–2019	2020	2021	2020–2021
Total	20,605	7,846	7,316	15,162
Hypertension, No. (%)				
Yes	12,535 (61.9)	4,811 (62.4)	4,453 (61.8)	9,264 (62.1)
No	6,658 (32.9)	2,723 (35.3)	2,525 (35.0)	5,248 (35.2)
Unknown	1,050 (5.2)	179 (2.3)	227 (3.2)	406 (2.7)
Missing	362	133	111	244
Diabetes, No. (%)				
Yes	8,940 (44.2)	3,459 (44.8)	3,199 (44.4)	6,658 (44.6)
No	10,062 (49.7)	4,038 (52.4)	3,751 (52.1)	7,789 (52.2)
Unknown	1,241 (6.1)	216 (2.8)	255 (3.5)	471 (3.2)
Missing	362	133	111	244
Type of diabetes treatment, No. (%)				
OHA	4,158 (59.8)	1,759 (60.1)	1,748 (64.7)	3,507 (62.3)
Insulin	1,244 (17.9)	449 (15.4)	386 (14.3)	835 (14.8)
OHA + Insulin	661 (9.5)	363 (12.4)	278 (10.3)	641 (11.4)
Non pharmacology therapy	895 (12.9)	354 (12.1)	291 (10.8)	645 (11.5)
Missing	1,982	534	496	1,030
Fasting blood glucose, mmol/L				
N	12,979	5,485	4,775	10,260
Mean (SD)	8.1 (3.9)	8.1 (3.9)	8.0 (3.8)	8.1 (3.8)
Median (min, max)	6.7 (3.0, 49.0)	6.9 (3.0, 46.5)	6.7 (3.0, 43.0)	6.8 (3.0, 46.5)
IQR	3.8	3.8	3.5	3.6
Not available	5,140 (25.0)	1,833 (23.4)	1,792 (24.5)	3,625 (23.9)
Missing	2,486 (12.1)	528 (6.7)	749 (10.2)	1,277 (8.4)
Myocardial infarction history, No. (%)				
Yes	2,693 (13.3)	1,018 (13.2)	948 (13.2)	1,966 (13.2)
No	16,545 (81.7)	6,436 (83.4)	5,902 (81.9)	12,338 (82.7)
Unknown	1,004 (5.0)	259 (3.4)	355 (4.9)	614 (4.1)
Missing	363	133	111	244
Documented CAD > 50% stenosis, No. (%)				
Yes	4,906 (24.2)	1,852 (24.0)	1,741 (24.2)	3,593 (24.1)
No	14,139 (69.9)	5,650 (73.3)	5,130 (71.2)	10,780 (72.3)
Unknown	1,197 (5.9)	211 (2.7)	334 (4.6)	545 (3.7)
Missing	363	133	111	244

Year	2018–2019	2020	2021	2020–2021
Total	20,605	7,846	7,316	15,162
Chronic angina (onset more than 2 weeks ago), No. (%)				
Yes	1,062 (5.3)	349 (4.5)	360 (5.0)	709 (4.8)
No	18,564 (91.7)	7,253 (94.0)	6,641 (92.2)	13,894 (93.1)
Unknown	615 (3.0)	111 (1.4)	204 (2.8)	315 (2.1)
Missing	364	133	111	244
New onset angina (less than 2 weeks ago), No. (%)				
Yes	15,431 (76.2)	5,807 (75.3)	5,208 (72.3)	11,015 (73.8)
No	4,459 (22.0)	1,830 (23.7)	1,878 (26.1)	3,708 (24.9)
Unknown	352 (1.7)	76 (1.0)	119 (1.7)	195 (1.3)
Missing	363	133	111	244
Heart failure, No. (%)				
Yes	961 (4.8)	315 (4.1)	357 (5.0)	672 (4.5)
No	18,689 (92.3)	7,290 (94.5)	6,633 (92.1)	13,923 (93.3)
Unknown	592 (2.9)	108 (1.4)	215 (3.0)	323 (2.2)
Missing	363	133	111	244
Chronic lung disease, No. (%)				
Yes	572 (2.8)	211 (2.7)	186 (2.6)	397 (2.7)
No	19,063 (94.2)	7,391 (95.8)	6,806 (94.5)	14,197 (95.2)
Unknown	607 (3)	111 (1.4)	213 (3.0)	324 (2.2)
Missing	363	133	111	244
Renal disease, No. (%)				
Yes	1,671 (8.3)	639 (8.3)	628 (8.7)	1,267 (8.5)
No	17,992 (88.9)	6,967 (90.3)	6,381 (88.6)	13,348 (89.5)
Unknown	579 (2.9)	107 (1.4)	196 (2.7)	303 (2.0)
Missing	363	133	111	244
Cerebrovascular disease, No. (%)				
Yes	633 (3.1)	256 (3.3)	248 (3.4)	504 (3.4)
No	19,037 (94.1)	7,356 (95.4)	6,763 (93.9)	14,119 (94.6)
Unknown	572 (2.8)	101 (1.3)	194 (2.7)	295 (2.0)
Missing	363	133	111	244
Peripheral vascular disease, No. (%)				
Yes	108 (0.5)	46 (0.6)	41 (0.6)	87 (0.6)
No	19,526 (96.5)	7,554 (97.9)	6,957 (96.6)	14,511 (97.3)
Unknown	608 (3.0)	113 (1.5)	207 (2.9)	320 (2.1)
Missing	363	133	111	244

Year	2018–2019	2020	2021	2020–2021
Total	20,605	7,846	7,316	15,162
No co-morbidity (None of the above), No. (%)				
Yes	362 (1.8)	133 (1.7)	111 (1.5)	244 (1.6)
No	20,243 (98.2)	7,713 (98.3)	7,205 (98.5)	14,918 (98.4)
*Coronary artery disease, No. (%)				
Yes	17,216 (83.6)	6,625 (84.4)	5,983 (81.8)	12,608 (83.2)
No	3,389 (16.5)	1,221 (15.6)	1,333 (18.2)	2,554 (16.8)

*Coronary artery disease is defined as "Yes" to any of the following co-morbidities: 1) History of myocardial infarction, 2) Documented CAD, 3) Chronic angina (onset more than 2 weeks ago), 4) New onset angina (less than 2 weeks)

Note: 'Unknown' includes patients who do not know their co-morbidities status

Table 2.2 Distribution of patients with ACS by Source Data Providers (SDPs), NCVD-ACS Registry, 2020–2021

Year	2018–2019		2020		2021		2020–2021	
N	20,605		7,846		7,316		15,162	
Name of SDP	No.	%	No.	%	No.	%	No.	%
Hospital Pulau Pinang	2,686	13.0	870	11.1	691	9.5	1561	10.3
Hospital Serdang	2,733	13.3	208	2.7	334	4.6	542	3.6
Hospital Sultanah Aminah	1,114	5.4	538	6.9	483	6.6	1021	6.7
Institut Jantung Negara	623	3.0	235	3.0	313	4.3	548	3.6
Hospital Tengku Ampuan Afzan	1,429	6.9	503	6.4	464	6.3	967	6.4
Pusat Jantung Sarawak	2,171	10.5	841	10.7	854	11.7	1695	11.2
Hospital Kuala Lumpur	1,397	6.8	388	5.0	502	6.9	890	5.9
Pusat Perubatan Universiti Malaya	821	4.0	713	9.1	780	10.7	1493	9.9
Hospital Queen Elizabeth II	1,130	5.5	361	4.6	427	5.8	788	5.2
Hospital Sultanah Bahiyah	1,339	6.5	673	8.6	451	6.2	1124	7.4
Hospital Raja Permaisuri Bainun	1,252	6.1	496	6.3	792	10.8	1288	8.5
Hospital Sultanah Nur Zahirah	878	4.3	176	2.2	204	2.8	380	2.5
Hospital Melaka	434	2.1	190	2.4	193	2.6	383	2.5
Hospital Tuanku Fauziah	244	1.2	141	1.8	96	1.3	237	1.6
Hospital Raja Perempuan Zainab II	380	1.8	320	4.1	60	8.0	380	2.5
Hospital Tuanku Ja'afar	170	0.8	211	2.7	15	0.2	226	1.5
Hospital Queen Elizabeth I	152	0.7	12	0.2	3	0.0	15	0.1
Hospital Canselor Tuanku Muhriz UKM	1,103	5.4	646	8.2	274	3.8	920	6.1
UiTM Sungai Buloh Campus	67	0.3	0	0	50	0.7	50	1.4
Oriental Melaka Straits Medical Centre	130	0.6	100	1.3	109	1.5	209	1.4
Hospital Duchess of Kent	60	0.3						
KPJ Penang Specialist Hospital	94	0.5	83	1.1	84	1.2	167	1.1
Pantai Hospital Penang	198	1.0	141	1.8	133	1.8	274	1.8
Pantai Hospital Laguna Merbok					4	0.1	4	0.0

Note: Each SDP started contributing data at different time periods

Table 2.3 Age-gender distribution of patients with ACS, NCVD-ACS Registry, 2020–2021

Year	2018–2019		2020		2021		2020–2021	
Gender	Male	Female	Male	Female	Male	Female	Male	Female
Age group	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
20–<30	169 (1.0)	16 (0.4)	66 (1.1)	7 (0.4)	46 (0.8)	7 (0.5)	112 (0.9)	14 (0.4)
30–<40	1,261 (7.7)	104 (2.4)	517 (8.3)	46 (2.9)	455 (7.8)	46 (3.0)	972 (8.1)	92 (3.0)
40–<50	3,085 (18.9)	426 (9.9)	1,182 (18.9)	163 (10.2)	1,186 (20.5)	166 (10.9)	2,368 (19.7)	329 (10.6)
50–<60	4,984 (30.6)	1,003 (23.4)	1,861 (29.8)	341 (21.3)	1,712 (29.5)	331 (21.8)	3,573 (29.7)	672 (21.6)
60–<70	4,349 (26.7)	1,383 (32.2)	1,694 (27.1)	516 (32.3)	1,536 (26.5)	464 (30.6)	3,230 (26.8)	980 (31.5)
70–<80	1,977 (12.1)	966 (22.5)	761 (12.2)	379 (23.7)	688 (11.9)	354 (23.3)	1,449 (12.0)	733 (23.5)
≥80	487 (3.0)	395 (9.2)	167 (2.7)	146 (9.1)	175 (3.0)	150 (9.9)	342 (2.8)	296 (9.5)
Total	16,312 (100.0)	4,293 (100.0)	6,248 (100.0)	1,598 (100.0)	5,798 (100.0)	1,518 (100.0)	12,046 (100.0)	3,116 (100.0)

Table 2.4.1 Age-gender distribution of patients with ACS by ethnic group, NCVD-ACS Registry, 2020–2021

Year	Ethnic group	2018–2019						2020						2021						
		Malay		Chinese		Indian		Malay		Chinese		Indian		Malay		Chinese		Indian		
Gender	Age group	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)						
Male	20-<30	90 (1.0)	11 (0.3)	24 (1.0)	44 (2.4)	36 (1.0)	3 (0.2)	10 (1.1)	17 (2.5)	29 (0.9)	3 (0.3)	7 (0.8)	7 (1.1)	65 (1.0)	6 (0.3)	6 (1.0)	6 (1.0)	6 (1.0)	24 (1.8)	
	30-<40	737 (8.5)	94 (2.8)	182 (7.7)	248 (13.3)	312 (9.0)	43 (3.5)	57 (6.5)	105 (15.3)	267 (8.6)	42 (3.7)	42 (7.2)	7 (12.5)	81 (12.5)	579 (8.8)	85 (3.6)	85 (6.9)	85 (6.9)	186 (13.9)	
	40-<50	1,650 (19.0)	442 (13.1)	483 (20.3)	510 (27.3)	187 (18.7)	3 (13.7)	169 (19.2)	200 (29.2)	637 (20.5)	172 (15.0)	175 (19.5)	7 (31.1)	202 (19.5)	1,281 (31.1)	341 (14.3)	341 (19.4)	341 (19.4)	402 (30.1)	
	50-<60	2,756 (31.7)	914 (27.0)	822 (34.5)	492 (26.4)	1,080 (31.3)	313 (25.4)	268 (30.5)	200 (29.2)	956 (30.8)	299 (26.1)	277 (30.8)	42 (27.7)	180 (27.7)	2,036 (31.1)	612 (25.7)	545 (30.7)	545 (30.7)	380 (28.5)	
	60-<70	2,298 (26.5)	1,055 (31.2)	615 (25.8)	381 (20.4)	938 (27.2)	371 (30.1)	263 (30.0)	122 (17.8)	814 (26.2)	337 (29.4)	247 (27.5)	138 (21.2)	175 (21.2)	708 (26.7)	510 (29.7)	510 (28.7)	510 (28.7)	260 (19.5)	
	70-<80	961 (11.1)	659 (19.5)	200 (8.4)	157 (8.4)	382 (11.1)	243 (11.1)	99 (11.3)	37 (11.3)	336 (5.4)	216 (5.4)	104 (10.8)	32 (18.8)	718 (18.8)	459 (11.6)	718 (4.9)	459 (11.0)	459 (11.0)	69 (5.2)	
	≥80	190 (2.2)	208 (6.2)	54 (2.3)	35 (1.9)	92 (1.7)	92 (1.7)	12 (7.5)	4 (1.4)	64 (0.6)	4 (2.1)	77 (6.7)	24 (2.7)	10 (2.7)	123 (1.5)	169 (1.5)	169 (1.9)	169 (1.9)	14 (1.0)	
	Total	8,082 (100.0)	3,383 (100.0)	2,380 (100.0)	1,867 (100.0)	3,451 (100.0)	1,234 (100.0)	878 (100.0)	685 (100.0)	3,103 (100.0)	1,146 (100.0)	899 (100.0)	650 (100.0)	6,554 (100.0)	2,380 (100.0)	1,777 (100.0)	1,335 (100.0)	1,335 (100.0)	1,335 (100.0)	
	20-<30	6 (0.3)	3 (0.3)	5 (0.6)	2 (0.6)	0 (0.4)	1 (0.3)	1 (0.6)	1 (0.6)	1 (0.8)	1 (0.4)	1 (0.6)	1 (0.6)	1 (0.3)	1 (1.0)	1 (0.4)	1 (0.4)	1 (0.4)	2 (0.9)	
	30-<40	68 (3.3)	6 (0.6)	17 (2.0)	13 (3.9)	29 (3.7)	3 (0.8)	15 (1.5)	74 (7.4)	5 (7.4)	9 (3.7)	7 (1.9)	7 (1.9)	27 (3.2)	10 (2.0)	2 (2.0)	2 (2.0)	2 (2.0)	11 (4.9)	
	40-<50	232 (11.3)	45 (4.4)	109 (10.9)	95 (12.1)	54 (12.1)	17 (4.8)	17 (10.3)	34 (13.1)	16 (12.5)	16 (12.5)	16 (12.5)	16 (12.5)	35 (11.1)	23 (22.5)	188 (22.5)	33 (12.3)	33 (12.3)	39 (17.4)	
	50-<60	532 (25.8)	134 (31.1)	241 (27.7)	96 (28.5)	192 (24.2)	47 (13.3)	74 (22.4)	28 (23.0)	45 (25.1)	78 (12.4)	45 (12.4)	78 (12.4)	78 (24.7)	23 (22.5)	377 (24.7)	92 (12.8)	92 (12.8)	51 (22.8)	
	60-<70	694 (33.7)	298 (29.1)	302 (34.7)	89 (26.4)	279 (35.2)	98 (27.8)	106 (32.0)	33 (27.0)	239 (32.4)	95 (32.4)	95 (32.4)	95 (32.4)	100 (31.6)	30 (29.4)	518 (33.9)	193 (33.9)	193 (33.9)	63 (28.1)	
	70-<80	403 (19.6)	336 (32.8)	161 (18.5)	66 (19.6)	162 (20.5)	111 (31.4)	80 (24.2)	26 (21.3)	149 (20.2)	71 (20.2)	71 (20.2)	71 (20.2)	115 (22.5)	19 (22.5)	311 (22.5)	151 (22.5)	151 (22.5)	45 (22.8)	
	≥80	126 (6.1)	202 (19.7)	50 (5.7)	17 (5.0)	31 (3.9)	76 (21.5)	30 (9.1)	9 (7.4)	42 (5.7)	83 (22.9)	21 (6.6)	4 (6.6)	4 (6.6)	4 (22.2)	4 (22.2)	159 (22.2)	51 (7.9)	51 (7.9)	13 (5.8)
	Total	2,061 (100.0)	1,024 (100.0)	871 (100.0)	337 (100.0)	792 (100.0)	353 (100.0)	331 (100.0)	122 (100.0)	737 (100.0)	363 (100.0)	102 (100.0)	1,529 (100.0)	716 (100.0)	647 (100.0)	224 (100.0)				

*Others' includes Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, other Malaysian, and Foreigner

Table 2.4.2 Age-gender distribution of patients with ACS by pre-morbid diabetes, NCVD-ACS Registry, 2020–2021

Pre-morbid diabetes	Year	2018–2019						2020						2021						2020–2021						
		Diabetic			Non Diabetic			Diabetic			Unknown			Diabetic			Unknown			Diabetic			Non Diabetic			
		Gender	Age group	No. (%)	No. (%)	Gender	Age group	No. (%)	No. (%)	Gender	Age group	No. (%)	No. (%)	Gender	Age group	No. (%)	No. (%)	Gender	Age group	No. (%)	No. (%)	Gender	Age group	No. (%)	No. (%)	
Male	20–<30	17 (0.3)	123 (1.5)	17 (0.2)	5 (1.7)	57 (1.7)	1 (0.5)	5 (0.2)	5 (1.2)	38 (1.2)	3 (1.3)	38 (1.2)	3 (1.3)	10 (0.2)	95 (1.4)	4 (0.9)	95 (1.4)	4 (0.9)								
	30–<40	216 (3.4)	850 (10.0)	144 (13.0)	93 (3.7)	380 (11.1)	29 (14.5)	81 (3.5)	332 (10.5)	28 (12.4)	174 (3.6)	28 (12.4)	712 (10.8)	712 (10.8)	57 (13.4)	57 (13.4)	57 (13.4)									
	40–<50	904 (14.1)	1,844 (21.7)	245 (22.2)	366 (14.6)	733 (21.4)	48 (24.0)	380 (16.5)	706 (22.2)	69 (22.2)	746 (15.5)	69 (15.5)	1,439 (21.8)	1,439 (21.8)	117 (27.5)	117 (27.5)	117 (27.5)									
	50–<60	2,017 (31.5)	2,537 (29.9)	343 (31.0)	764 (30.5)	1,006 (29.4)	55 (27.5)	692 (27.5)	938 (30.0)	58 (29.6)	1,456 (25.8)	58 (25.8)	1,944 (30.3)	1,944 (30.3)	113 (26.6)	113 (26.6)	113 (26.6)									
	60–<70	2,078 (32.5)	2,007 (23.6)	223 (20.2)	827 (33.0)	805 (23.5)	41 (20.5)	727 (31.6)	746 (23.5)	46 (20.4)	1,554 (32.3)	46 (32.3)	1,551 (23.5)	1,551 (23.5)	87 (20.5)	87 (20.5)	87 (20.5)									
	70–<80	965 (15.1)	886 (10.4)	100 (9.1)	382 (15.3)	351 (10.2)	22 (11.0)	349 (15.2)	311 (9.8)	20 (8.9)	731 (15.2)	20 (8.9)	662 (10.0)	662 (10.0)	42 (9.9)	42 (9.9)	42 (9.9)									
	≥80	207 (3.2)	242 (2.9)	33 (3.0)	67 (2.7)	95 (2.8)	4 (2.0)	69 (3.0)	103 (3.2)	1 (0.4)	136 (2.8)	1 (0.4)	198 (3.0)	198 (3.0)	5 (1.2)	5 (1.2)	5 (1.2)									
	Total	6,404 (100.0)	8,489 (100.0)	1,105 (100.0)	2,504 (100.0)	3,427 (100.0)	200 (100.0)	2,303 (100.0)	3,174 (100.0)	225 (100.0)	4,807 (100.0)	4,807 (100.0)	6,601 (100.0)	6,601 (100.0)	425 (100.0)											
	20–<30	5 (0.2)	10 (0.6)	1 (0.7)	2 (0.2)	5 (0.8)	0 (0)	1 (0.1)	5 (0.9)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
	30–<40	32 (1.3)	64 (4.1)	6 (4.4)	21 (2.2)	22 (3.6)	1 (6.3)	21 (2.3)	24 (4.2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
	40–<50	202 (8.0)	193 (12.3)	19 (14.0)	81 (8.5)	75 (12.3)	3 (18.8)	85 (9.5)	72 (12.5)	8 (12.5)	85 (12.5)	8 (12.5)	72 (12.5)	72 (12.5)	11 (12.4)	11 (12.4)										
	50–<60	636 (25.1)	327 (20.8)	28 (20.6)	214 (22.4)	120 (19.6)	4 (25.0)	207 (23.1)	114 (19.8)	4 (19.8)	421 (13.3)	4 (13.3)	234 (22.7)	234 (22.7)	8 (17.4)	8 (17.4)										
	60–<70	917 (36.2)	421 (26.8)	33 (24.3)	335 (35.1)	173 (28.3)	3 (18.8)	295 (32.9)	155 (26.9)	12 (40.0)	630 (34.0)	12 (34.0)	328 (27.6)	328 (27.6)	15 (32.6)	15 (32.6)										
	70–<80	573 (22.6)	358 (22.8)	31 (23.9)	228 (24.1)	147 (24.1)	2 (22.5)	221 (24.7)	127 (22.0)	2 (22.0)	449 (24.3)	2 (24.3)	274 (23.1)	274 (23.1)	4 (8.7)	4 (8.7)										
	≥80	171 (6.7)	200 (12.7)	18 (13.2)	74 (7.7)	69 (11.3)	3 (18.8)	66 (7.4)	80 (13.9)	4 (13.9)	140 (7.6)	4 (7.6)	149 (12.5)	149 (12.5)	7 (15.2)	7 (15.2)										
	Total	2,536 (100.0)	1,573 (100.0)	136 (100.0)	955 (100.0)	611 (100.0)	16 (100.0)	896 (100.0)	577 (100.0)	30 (100.0)	1,851 (100.0)	30 (100.0)	1,188 (100.0)	1,188 (100.0)	46 (100.0)											

Table 2.4.3 Age-gender distribution of patients with ACS by pre-morbid hypertension, NCVd-ACS Registry, 2020–2021

Pre-morbid hypertension	Year	2018–2019		2020		2021		2020–2021	
		Hypertensive		Hypertensive		Hypertensive		Hypertensive	
		Gender	Age group	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Male	20–<30	28	110 (1.9)	19 (2.0)	14 (0.4)	47 (2.0)	2 (1.2)	7 (1.6)	3 (1.5)
	30–<40	397	679 (11.7)	134 (10.2)	157 (4.4)	320 (13.4)	25 (15.3)	137 (4.2)	25 (12.6)
	40–<50	1,306	1,471 (14.1)	216 (25.3)	527 (14.7)	575 (24.0)	45 (27.6)	546 (16.6)	550 (24.9)
	50–<60	2,755	1,837 (29.8)	305 (31.6)	1,024 (32.2)	755 (28.6)	46 (31.6)	946 (28.2)	687 (28.7)
	60–<70	2,930	1,188 (31.7)	190 (20.4)	1,159 (20.1)	488 (32.4)	26 (20.4)	1,013 (16.0)	406 (30.7)
	70–<80	1,465	419 (15.9)	67 (7.2)	567 (7.1)	171 (15.9)	17 (7.2)	518 (10.4)	147 (15.7)
	≥80	358	108 (3.9)	16 (1.9)	129 (1.9)	35 (1.7)	2 (1.5)	128 (1.2)	44 (3.9)
	Total	9,239	5,812 (100.0)	947 (100.0)	3,577 (100.0)	2,391 (100.0)	163 (100.0)	3,295 (100.0)	2,209 (100.0)
Female	20–<30	5	10 (0.2)	1 (1.1)	1 (1.0)	1 (0.1)	6 (1.8)	0 (0)	1 (0.1)
	30–<40	41	54 (1.2)	7 (6.4)	18 (6.8)	25 (7.5)	1 (6.3)	18 (6.3)	5 (7.9)
	40–<50	247	147 (7.5)	20 (17.4)	98 (19.4)	58 (17.5)	3 (18.8)	95 (8.2)	60 (18.8)
	50–<60	742	226 (22.5)	23 (26.7)	255 (22.3)	80 (20.7)	3 (24.1)	233 (18.8)	86 (20.1)
	60–<70	1,112	237 (33.7)	22 (28.0)	422 (21.4)	86 (34.2)	3 (25.9)	386 (18.8)	68 (33.3)
	70–<80	823	119 (25.0)	20 (14.1)	313 (19.4)	60 (25.4)	4 (18.1)	297 (25.0)	52 (25.6)
	≥80	326	53 (9.9)	10 (6.3)	127 (19.7)	17 (10.3)	2 (5.1)	128 (12.5)	20 (11.1)
	Total	3,296	846 (100.0)	103 (100.0)	1,234 (100.0)	332 (100.0)	16 (100.0)	1,158 (100.0)	29 (100.0)

Table 2.4.4 Age-gender distribution of patients with ACS by pre-morbid dyslipidaemia, NCVD-ACS Registry, 2020–2021

Year	Pre-morbid dyslipidaemia	2018–2019				2020				2021				2020–2021			
		Dyslipidaemia Non Unknown	Dyslipidaemia Unknown	Dyslipidaemia Non Unknown													
Gender	Age group	No. (%)	No. (%)	No. (%)													
Male	20–<30	19 (0.4)	116 (1.3)	22 (1.5)	53 (1.5)	4 (1.2)	10 (0.4)	33 (1.0)	3 (0.9)	16 (0.4)	86 (1.3)	7 (1.1)	86 (1.3)	7 (1.1)	86 (1.3)	7 (1.1)	
	30–<40	231 (4.2)	819 (9.1)	160 (10.8)	350 (10.0)	109 (12.9)	92 (4.1)	312 (9.9)	37 (11.5)	201 (4.4)	662 (10.0)	80 (12.2)	662 (10.0)	80 (12.2)	662 (10.0)	80 (12.2)	
	40–<50	783 (14.3)	1,896 (21.0)	314 (21.1)	328 (14.3)	740 (21.2)	79 (15.4)	344 (23.7)	728 (25.9)	83 (14.8)	672 (14.8)	162 (24.7)	1,468 (22.1)	162 (24.7)	1,468 (22.1)	162 (24.7)	
	50–<60	1,624 (29.7)	2,807 (31.1)	466 (31.4)	694 (30.2)	1,034 (29.6)	97 (29.0)	672 (30.1)	89 (29.4)	89 (27.7)	1,366 (30.1)	186 (28.4)	1,961 (29.5)	186 (28.4)	1,961 (29.5)	186 (28.4)	
	60–<70	1,757 (32.1)	2,203 (24.4)	348 (31.4)	732 (31.8)	866 (24.8)	75 (22.5)	684 (30.7)	765 (24.3)	70 (21.8)	1,416 (31.2)	145 (22.1)	1,631 (24.5)	145 (22.1)	1,631 (24.5)	145 (22.1)	
	70–<80	854 (15.6)	960 (10.6)	137 (9.2)	367 (15.9)	360 (10.3)	28 (8.4)	339 (15.2)	305 (9.7)	36 (9.7)	706 (11.2)	665 (15.6)	665 (10.0)	665 (10.0)	665 (10.0)	665 (10.0)	
	≥80	207 (3.8)	236 (2.6)	39 (2.6)	65 (2.8)	93 (2.7)	8 (2.4)	90 (4.0)	80 (2.5)	3 (0.9)	155 (3.4)	111 (2.6)	173 (2.6)	111 (1.7)	173 (2.6)	111 (1.7)	
	Total	5,475 (100.0)	9,037 (100.0)	1,486 (100.0)	2,301 (100.0)	3,496 (100.0)	334 (100.0)	2,231 (100.0)	3,150 (100.0)	321 (100.0)	4,532 (100.0)	6,646 (100.0)	6,646 (100.0)	6,646 (100.0)	6,646 (100.0)	6,646 (100.0)	
Female	20–<30	6 (0.3)	9 (0.4)	1 (0.4)	0 (0)	6 (0)	1 (0.8)	0 (1.8)	0 (0)	6 (0.9)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
	30–<40	21 (1.1)	69 (3.4)	12 (4.6)	10 (1.3)	33 (4.4)	1 (1.8)	14 (1.9)	29 (4.2)	2 (4.0)	24 (4.0)	3 (1.6)	62 (4.3)	3 (2.8)	62 (4.3)	3 (2.8)	
	40–<50	138 (7.0)	245 (12.1)	31 (12.0)	55 (7.2)	97 (12.8)	7 (12.3)	65 (8.6)	88 (12.6)	120 (24.0)	120 (7.9)	185 (12.7)	19 (12.7)	185 (12.7)	19 (12.7)	185 (12.7)	
	50–<60	468 (23.8)	452 (22.3)	71 (27.4)	159 (20.7)	168 (22.2)	11 (19.3)	164 (21.7)	149 (21.3)	12 (24.0)	323 (21.2)	317 (21.8)	317 (21.5)	317 (21.5)	317 (21.5)	317 (21.5)	
	60–<70	681 (34.7)	619 (30.6)	71 (27.4)	272 (35.5)	220 (29.0)	19 (33.3)	245 (32.5)	199 (36.0)	18 (34.0)	517 (34.0)	37 (28.8)	419 (28.8)	37 (28.8)	419 (28.8)	37 (28.8)	
	70–<80	461 (23.5)	454 (22.4)	47 (18.2)	199 (25.9)	166 (21.9)	12 (21.1)	184 (24.4)	163 (23.4)	3 (6.0)	383 (25.2)	15 (22.6)	329 (14.0)	15 (14.0)	329 (14.0)	15 (14.0)	
	≥80	188 (9.6)	175 (8.7)	26 (10.0)	72 (9.4)	68 (9.0)	6 (10.5)	83 (11.0)	64 (9.2)	3 (6.0)	155 (10.2)	9 (9.1)	132 (8.4)	9 (8.4)	132 (8.4)	9 (8.4)	
	Total	1,963 (100.0)	2,023 (100.0)	259 (100.0)	767 (100.0)	758 (100.0)	57 (100.0)	698 (100.0)	755 (100.0)	50 (100.0)	1,522 (100.0)	107 (100.0)	1,456 (100.0)	1,456 (100.0)	1,456 (100.0)	1,456 (100.0)	

Table 2.4.5 Age-gender distribution of patients with ACS by family history of premature cardiovascular disease, NCVD-ACS Registry, 2020–2021

Year	Family history of premature cardiovascular disease	2018–2019						2020						2021						2020–2021					
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Male	Gender	Age group	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)				
	20–<30	29 (1.5)	108 (0.9)	20 (0.8)	9 (1.2)	50 (1.1)	4 (0.6)	6 (1.0)	37 (0.8)	3 (0.4)	15 (1.1)	15 (1.1)	166 (12.5)	3 (5.9)	87 (12.5)	7 (7.5)	7 (0.5)	7 (0.5)	7 (0.5)	7 (0.5)	7 (0.5)	7 (0.5)			
	30–<40	211 (11.0)	822 (7.1)	177 (7.1)	89 (7.1)	361 (7.8)	52 (7.2)	77 (13.4)	321 (7.3)	43 (5.9)	166 (12.5)	43 (5.9)	682 (41.0)	43 (5.9)	682 (41.0)	95 (5.5)									
	40–<50	493 (25.7)	2,114 (18.3)	386 (15.4)	200 (26.6)	853 (18.3)	94 (13.1)	158 (27.5)	861 (19.6)	136 (18.6)	358 (27.0)	136 (18.6)	1,714 (18.9)	136 (18.6)	1,714 (18.9)	230 (15.8)									
	50–<60	603 (31.4)	3,554 (30.7)	740 (29.5)	227 (30.1)	1,388 (29.8)	210 (29.2)	183 (31.9)	1,288 (29.3)	217 (29.6)	410 (30.9)	217 (30.9)	2,676 (29.6)	217 (30.9)	2,676 (29.6)	427 (29.4)									
	60–<70	434 (22.6)	3,193 (27.6)	681 (27.2)	166 (22.0)	1,298 (27.9)	209 (29.0)	123 (21.4)	1,194 (27.2)	202 (27.6)	289 (21.8)	1,194 (27.2)	202 (27.6)	289 (21.8)	411 (27.5)										
	70–<80	128 (6.7)	1,425 (12.3)	398 (15.9)	51 (6.8)	583 (12.5)	121 (16.8)	24 (4.2)	557 (12.7)	99 (13.5)	75 (5.7)	99 (5.7)	1,140 (12.6)	75 (5.7)	1,140 (12.6)	220 (15.2)									
	≥80	24 (1.3)	352 (3.0)	106 (4.2)	11 (1.5)	125 (2.7)	30 (4.2)	3 (0.5)	138 (3.1)	32 (4.4)	14 (1.1)	138 (4.4)	263 (2.9)	14 (1.1)	263 (2.9)	62 (4.3)									
	Total	1,922 (100.0)	11,568 (100.0)	2,508 (100.0)	753 (100.0)	4,658 (100.0)	720 (100.0)	574 (100.0)	4,396 (100.0)	732 (100.0)	1,327 (100.0)	1,327 (100.0)	9,054 (100.0)	9,054 (100.0)	9,054 (100.0)	1,452 (100.0)									
Female	20–<30	2 (0.5)	13 (0.4)	1 (0.1)	3 (1.7)	3 (0.3)	1 (0.4)	1 (0.4)	1 (0.8)	4 (0.3)	4 (0.5)	1 (0.3)	4 (0.5)	1 (0.5)	4 (0.5)	2 (0.3)									
	30–<40	18 (4.4)	72 (2.4)	12 (1.5)	9 (5.1)	32 (2.8)	3 (1.1)	4 (3.3)	32 (2.7)	9 (4.2)	13 (4.4)	9 (4.2)	64 (2.8)	13 (4.4)	64 (2.8)	12 (2.5)									
	40–<50	59 (14.4)	285 (9.5)	70 (8.6)	32 (18.2)	102 (9.0)	25 (9.3)	21 (17.5)	127 (10.9)	17 (7.9)	53 (17.9)	17 (7.9)	229 (9.9)	53 (9.9)	229 (9.9)	42 (8.7)									
	50–<60	120 (29.3)	703 (23.3)	168 (20.5)	44 (25.0)	239 (21.0)	55 (20.5)	38 (31.7)	240 (20.5)	47 (21.9)	82 (21.9)	47 (21.9)	479 (20.8)	82 (20.8)	479 (20.8)	102 (21.1)									
	60–<70	135 (32.9)	972 (32.2)	264 (32.2)	47 (36.7)	381 (33.5)	83 (31.0)	33 (27.5)	358 (30.7)	71 (33.0)	80 (27.0)	71 (27.0)	739 (32.0)	80 (32.0)	739 (32.0)	154 (31.9)									
	70–<80	63 (15.4)	704 (23.3)	195 (20.5)	36 (23.8)	271 (23.8)	70 (26.1)	20 (16.7)	283 (24.2)	47 (21.9)	56 (18.9)	47 (18.9)	554 (24.0)	56 (24.0)	554 (24.0)	117 (24.2)									
	≥80	13 (3.2)	267 (8.9)	109 (13.3)	5 (2.8)	110 (9.7)	31 (11.6)	3 (2.5)	23 (10.6)	23 (10.7)	8 (2.7)	8 (2.7)	234 (10.1)	8 (10.1)	234 (10.1)	54 (11.2)									
	Total	410 (100.0)	3,016 (100.0)	819 (100.0)	176 (100.0)	1,138 (100.0)	268 (100.0)	120 (100.0)	1,168 (100.0)	215 (100.0)	296 (100.0)	215 (100.0)	2,306 (100.0)	2,306 (100.0)	2,306 (100.0)	483 (100.0)									

Table 2.4.6 Age-gender distribution of patients with ACS by smoking status, NCVD-ACS Registry, 2020–2021

Year	2018–2019						2020						2021						2020–2021	
	Smoking status		Never		Former		Never		Former		Never		Former		Never		Former		Never	
Gender	Age group	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)						
Male	20–<30	29 (0.7)	15 (0.4)	119 (1.7)	6 (0.5)	12 (0.7)	5 (0.4)	48 (1.6)	1 (0.3)	6 (0.4)	3 (0.3)	32 (1.3)	5 (1.1)	18 (0.5)	5 (0.5)	18 (0.5)	8 (0.3)	80 (1.5)	8 (0.3)	6 (0.7)
	30–<40	204 (4.7)	198 (5.3)	803 (11.6)	56 (4.2)	68 (4.2)	77 (6.2)	354 (11.9)	18 (4.5)	82 (4.8)	54 (4.7)	296 (11.8)	23 (5.2)	150 (4.5)	131 (4.5)	150 (4.5)	131 (5.5)	650 (11.8)	650 (11.8)	41 (4.9)
	40–<50	611 (14.1)	523 (14.0)	1,805 (26.0)	146 (11.0)	201 (12.4)	157 (12.6)	784 (26.3)	40 (10.1)	226 (13.3)	185 (16.2)	703 (27.9)	72 (16.2)	427 (12.9)	342 (14.3)	427 (12.9)	342 (14.3)	1,487 (27.0)	1,487 (27.0)	112 (13.3)
	50–<60	1,053 (29.0)	1,053 (28.2)	2,328 (33.6)	350 (26.4)	433 (26.8)	352 (28.2)	986 (33.0)	90 (22.7)	468 (27.6)	318 (27.8)	806 (32.0)	120 (32.0)	901 (27.0)	670 (27.2)	901 (27.0)	670 (27.2)	1,792 (32.6)	1,792 (32.6)	210 (25.0)
	60–<70	1,354 (31.3)	1,183 (31.7)	1,396 (20.1)	416 (31.4)	534 (33.0)	408 (32.6)	617 (20.7)	135 (34.1)	512 (30.2)	367 (32.1)	538 (21.4)	119 (26.8)	1,046 (31.6)	775 (32.4)	1,046 (31.6)	775 (32.4)	1,155 (32.4)	1,155 (32.4)	254 (30.2)
	70–<80	680 (15.7)	592 (15.9)	421 (6.1)	283 (21.3)	290 (17.9)	208 (16.6)	173 (5.8)	90 (22.7)	299 (17.7)	180 (15.7)	122 (4.8)	87 (19.6)	589 (17.8)	388 (16.2)	589 (17.8)	388 (16.2)	295 (16.2)	295 (16.2)	177 (21.1)
	≥80	193 (4.5)	165 (4.4)	59 (0.9)	59 (5.3)	70 (4.9)	79 (3.4)	43 (0.8)	23 (0.8)	22 (5.6)	100 (5.9)	38 (3.3)	19 (0.8)	179 (4.1)	81 (5.4)	179 (4.1)	81 (5.4)	42 (3.4)	42 (3.4)	40 (4.8)
	Total	4,324 (100.0)	3,729 (100.0)	6,931 (100.0)	1,327 (100.0)	1,617 (100.0)	1,250 (100.0)	2,985 (100.0)	396 (100.0)	1,693 (100.0)	1,145 (100.0)	2,516 (100.0)	444 (100.0)	3,310 (100.0)	2,395 (100.0)	5,501 (100.0)	840 (100.0)	5,501 (100.0)	840 (100.0)	5,501 (100.0)

Year	2018-2019						2020						2021						2020-2021	
	Smoking status		Gender		Age group		Former Never		Former Never		Current Never		Former Never		Current Never		Former Never		Available Not Available	
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Female																				
20-<30	13 (0.4)	2 (1.6)	0 (0)	1 (0.3)	6 (0.4)	0 (0)	0 (0)	0 (0.8)	1 (0.4)	6 (3.7)	1 (0)	0 (0)	0 (0)	0 (0.4)	0 (0)	12 (1.4)	1 (1.4)	0 (0)	0 (0)	1 (0.4)
30-<40	92 (2.5)	1 (0.8)	7 (5.9)	4 (1.1)	39 (2.8)	0 (0)	7 (11.9)	0 (0)	37 (2.8)	0 (0)	6 (13.6)	3 (2.7)	3 (2.7)	3 (2.8)	3 (2.8)	76 (0)	0 (0)	13 (12.6)	3 (1.3)	3 (1.3)
40-<50	363 (9.9)	14 (11.2)	21 (17.8)	28 (7.5)	135 (9.8)	5 (11.9)	18 (30.5)	5 (4.0)	136 (10.2)	3 (11.1)	12 (27.3)	3 (11.1)	12 (27.3)	12 (13.5)	12 (13.5)	271 (10.0)	8 (11.6)	30 (11.6)	8 (29.1)	20 (8.5)
50-<60	878 (23.9)	27 (21.6)	23 (19.5)	75 (20.2)	301 (21.9)	11 (26.2)	13 (22.0)	16 (12.9)	299 (22.4)	6 (22.2)	10 (22.7)	10 (22.7)	10 (22.7)	10 (14.4)	10 (14.4)	600 (22.1)	17 (24.6)	23 (22.3)	32 (13.6)	23 (13.6)
60-<70	1,215 (33.0)	37 (29.6)	28 (23.7)	103 (27.7)	449 (32.7)	12 (28.6)	8 (13.6)	47 (37.9)	419 (31.4)	6 (22.2)	7 (15.9)	7 (15.9)	7 (15.9)	7 (28.8)	7 (28.8)	868 (32.0)	18 (26.1)	15 (26.1)	15 (22.3)	15 (13.6)
70-<80	815 (22.2)	27 (21.6)	29 (24.6)	95 (25.5)	325 (23.7)	10 (23.8)	10 (16.9)	34 (27.4)	308 (23.1)	7 (25.9)	6 (13.6)	6 (25.9)	6 (13.6)	6 (29.7)	6 (29.7)	633 (24.6)	33 (23.4)	17 (23.4)	16 (15.5)	16 (15.5)
≥80	302 (8.2)	17 (13.6)	10 (8.5)	66 (17.7)	118 (8.6)	4 (9.5)	3 (5.1)	21 (16.9)	131 (14.8)	4 (14.8)	3 (6.8)	3 (6.8)	3 (6.8)	12 (10.8)	12 (10.8)	249 (9.2)	8 (11.6)	6 (5.8)	6 (5.8)	33 (14.0)
Total	3,678 (100.0)	125 (100.0)	118 (100.0)	372 (100.0)	1,373 (100.0)	42 (100.0)	59 (100.0)	124 (100.0)	1,336 (100.0)	27 (100.0)	44 (100.0)	111 (100.0)	27 (100.0)	69 (100.0)	69 (100.0)	103 (100.0)	235 (100.0)	103 (100.0)	235 (100.0)	103 (100.0)

Table 2.5 Presence of cumulative risk factors*, NCVD-ACS Registry, 2020–2021

Year	2018–2019		2020		2021		2020–2021	
Total	20,605		7,846		7,316		15,162	
Presence of cumulative risk factors*	No.	%	No.	%	No.	%	No.	%
None	1,347	6.5	436	5.6	448	6.1	884	5.8
1 risk factor	4,869	23.6	1,769	22.5	1,649	22.5	3,418	22.5
2 risk factors	6,090	29.6	2,321	29.6	2,228	30.5	4,549	30.0
3 risk factors	5,290	25.7	2,120	27.0	1,928	26.4	4,048	26.7
>3 risk factors	3,009	14.6	1,200	15.3	1,063	14.5	2,263	14.9

*Risk factors are defined as presence of dyslipidaemia, hypertension, diabetes, family history of premature cardiovascular disease, smoking or obesity

Table 2.6 Summary of type of cardiac presentation for patients with ACS, NCVD-ACS Registry, 2020–2021

Year	2018–2019		2020		2021		2020–2021	
Total	20,605		7,846		7,316		15,162	
Acute coronary syndrome stratum	No.	%	No.	%	No.	%	No.	%
STEMI	8,936	43.4	4,153	52.9	3,474	47.5	7,627	50.3
NSTEMI	6,603	32.1	2,244	28.6	2,359	32.2	4,603	30.4
Unstable angina (UA)	5,066	24.6	1,449	18.5	1,483	20.3	2,932	19.3

Note: Percentage is to the nearest decimal point

Table 2.7 Characteristics of patients with ACS by ACS stratum, NCVD-ACS Registry, 2020–2021

Year	2018–2019				2020				2021				2020–2021		
ACS Stratum	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA
Total	8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (52.9)	2,244 (28.6)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)			
DEMOGRAPHICS															
Age, years															
N	8,936	6,603	5,066	4,153	2,244	1,449	3,474	2,359	1,483	7,627	4,603	2,932			
Mean (SD)	56.2 (12.1)	61.4 (12.1)	59.4 (12.1)	56.2 (12.1)	61.5 (12.6)	60.6 (12.4)	55.9 (11.9)	61.7 (12.6)	59.7 (12.7)	56.0 (12.0)	61.6 (12.6)	60.1 (12.6)			
Median (min, max)	56.3 (20.6, 94.1)	61.5 (22.8, 98.6)	59.8 (21.1, 94.1)	56.3 (20.9, 100.4)	61.8 (21.6, 96.1)	61.7 (21.6, 95.0)	56.0 (20.3, 95.6)	62.3 (23.7, 98.3)	60.3 (21.7, 95.5)	56.2 (20.3, 100.4)	62.1 (20.9, 98.3)	60.8 (21.6, 95.5)			
IQR	16.7	16.3	17.4	17.0	17.1	17.3	17.0	17.1	17.1	18.0	17.0	17.1	17.5		
Age group, No. (%)															
20–<30	122 (1.4)	23 (0.4)	40 (0.8)	50 (1.2)	15 (0.7)	8 (0.6)	36 (1.0)	14 (0.6)	3 (0.2)	86 (1.1)	29 (0.6)	11 (0.4)			
30–<40	751 (8.4)	276 (4.2)	338 (6.7)	377 (9.1)	105 (4.7)	81 (5.6)	295 (8.5)	105 (4.5)	101 (6.8)	672 (8.8)	210 (4.6)	182 (6.2)			
40–<50	1,853 (20.7)	866 (13.1)	792 (15.6)	860 (20.7)	290 (12.9)	195 (13.5)	781 (22.5)	328 (13.9)	243 (16.4)	1,641 (16.4)	618 (21.5)	438 (13.4)			
50–<60	2,830 (31.7)	1,771 (26.8)	1,386 (27.4)	1,255 (30.2)	565 (25.2)	382 (26.4)	1,095 (31.5)	566 (24.0)	566 (25.8)	382 (25.8)	2,350 (30.8)	1,131 (24.6)	764 (26.1)		
60–<70	2,230 (25.0)	2,052 (31.1)	1,450 (28.6)	1,085 (26.1)	684 (30.5)	441 (30.4)	844 (24.3)	721 (30.6)	435 (29.3)	1,929 (25.3)	1,405 (30.5)	876 (29.9)			
70–<80	917 (10.3)	1,210 (18.3)	816 (16.1)	436 (10.5)	438 (19.5)	266 (18.4)	338 (9.7)	461 (19.5)	243 (16.4)	774 (16.4)	899 (10.1)	509 (19.5)			
≥80	233 (2.6)	405 (6.1)	244 (4.8)	90 (2.2)	147 (6.6)	76 (5.2)	85 (2.4)	164 (7.0)	76 (5.1)	175 (2.3)	311 (6.8)	152 (5.2)			
Gender, No. (%)															
Male	7,736 (86.6)	4,958 (75.1)	3,618 (71.4)	3,592 (86.5)	1,662 (74.1)	994 (68.6)	3,002 (86.4)	1,783 (75.6)	1,013 (68.3)	6,594 (86.5)	3,445 (74.8)	2,007 (68.5)			
Female	1,200 (13.4)	1,645 (24.9)	1,448 (28.6)	561 (13.5)	582 (25.9)	455 (31.4)	472 (13.6)	576 (24.4)	470 (31.7)	1,033 (13.5)	1,158 (25.2)	925 (31.5)			

Year	ACS Stratum	2018–2019				2020				2021			
		STEMI	NSTEMI	UA									
Total		8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (28.6)	2,244 (47.5)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)
Ethnic group, No. (%)													
Malay		4,967 (55.6)	3,151 (47.7)	2,625 (51.8)	2,429 (58.5)	1,111 (49.5)	703 (48.5)	1,984 (57.1)	1,153 (48.9)	703 (47.4)	4,413 (57.9)	2,264 (49.2)	1,406 (48.0)
Chinese		1,529 (17.1)	1,642 (24.9)	1,236 (24.4)	667 (16.1)	561 (25.0)	359 (24.8)	545 (15.7)	587 (24.9)	377 (25.4)	1,212 (15.9)	1,148 (24.9)	736 (25.1)
Indian		1,311 (14.7)	1,049 (15.9)	891 (17.6)	592 (14.3)	322 (14.3)	295 (20.4)	534 (15.4)	381 (16.2)	300 (20.2)	1,126 (14.8)	703 (15.3)	595 (20.3)
Orang Asli		15 (0.2)	5 (0.1)	0 (0)	5 (0.1)	3 (0.1)	0 (0)	3 (0.1)	1 (0.0)	0 (0)	8 (0.1)	4 (0.1)	0 (0)
Kadazan Dusun		152 (1.7)	106 (1.6)	61 (1.2)	36 (0.9)	41 (1.8)	10 (0.7)	45 (1.3)	24 (1.0)	19 (1.3)	81 (1.1)	65 (1.4)	29 (1.0)
Melanau		1 (0.0)	7 (0.1)	1 (0.0)	1 (0.0)	2 (0.1)	1 (0.1)	3 (0.1)	0 (0)	0 (0)	4 (0.1)	5 (0.1)	1 (0.0)
Murut		6 (0.1)	10 (0.2)	4 (0.1)	3 (0.1)	4 (0.2)	3 (0.2)	9 (0.3)	3 (0.1)	1 (0.1)	12 (0.2)	7 (0.2)	4 (0.1)
Bajau		138 (1.5)	62 (0.9)	33 (0.7)	35 (0.8)	23 (1.0)	8 (0.6)	53 (1.5)	24 (1.0)	6 (0.4)	88 (1.2)	47 (1.0)	14 (0.5)
Bidayuh		67 (0.8)	107 (1.6)	21 (0.4)	38 (0.9)	40 (1.8)	13 (0.9)	37 (1.1)	41 (1.7)	14 (0.9)	75 (1.0)	81 (1.8)	27 (0.9)
Iban		106 (1.2)	184 (2.8)	50 (1.0)	66 (1.6)	57 (2.5)	22 (1.5)	56 (1.6)	57 (2.4)	18 (1.2)	122 (1.6)	114 (2.5)	40 (1.4)
Punjabi		31 (0.4)	23 (0.4)	14 (0.3)	19 (0.5)	8 (0.4)	2 (0.1)	13 (0.4)	6 (0.3)	4 (0.3)	32 (0.4)	14 (0.3)	6 (0.2)
Other Malaysian		223 (2.5)	146 (2.2)	76 (1.5)	70 (1.7)	29 (1.3)	16 (1.1)	61 (1.8)	40 (1.7)	24 (1.6)	131 (1.7)	69 (1.5)	40 (1.4)
Foreigner		390 (4.4)	111 (1.7)	54 (1.1)	192 (4.6)	43 (1.9)	17 (1.2)	131 (3.8)	39 (1.7)	17 (1.1)	323 (4.2)	82 (1.8)	34 (1.2)
OTHER CORONARY RISK FACTORS													
Smoking, No. (%)													
Never		2,757 (30.9)	2,944 (44.6)	2,301 (45.4)	1,274 (30.7)	991 (44.2)	725 (50.0)	1,143 (32.9)	1,106 (46.9)	780 (52.6)	2,417 (31.7)	2,097 (45.6)	1,505 (51.3)
Former (quit >30 days)		1,371 (15.3)	1,348 (20.4)	1,135 (22.4)	616 (14.8)	406 (18.1)	270 (18.6)	440 (12.7)	437 (18.5)	295 (19.9)	1,056 (13.8)	843 (18.3)	565 (19.3)
Current (any tobacco use within last 30 days)		4,371 (48.9)	1,659 (25.1)	1,019 (20.1)	2,120 (51.0)	647 (28.8)	277 (19.1)	1,682 (48.4)	600 (25.4)	278 (18.7)	3,802 (49.8)	1,247 (27.1)	555 (18.9)
Not available		437 (4.9)	652 (9.9)	610 (12.0)	143 (3.4)	200 (8.9)	177 (12.2)	209 (6.0)	216 (9.2)	130 (8.8)	352 (4.6)	416 (9.0)	307 (10.5)
Missing		0	0	1	0	0	0	0	0	0	0	0	0

Year	2018–2019						2020						2021						2020–2021					
	ACS Stratum	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA														
Total	8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (52.9)	2,244 (28.6)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)												
Family history of premature CVD ⁺ , No. (%)																								
Yes	845 (9.7)	839 (12.8)	648 (13.0)	486 (12.0)	271 (12.2)	172 (12.0)	326 (9.6)	213 (9.1)	155 (10.5)	812 (10.9)	484 (10.6)	327 (11.3)												
No	6,652 (76.4)	4,599 (70.3)	3,333 (66.8)	3,196 (78.7)	1,600 (72.1)	1,000 (69.8)	2,711 (79.9)	1,757 (75.0)	1,096 (74.5)	5,907 (79.3)	3,357 (73.6)	2,096 (72.2)												
Unknown	1,215 (14.0)	1,100 (16.8)	1,012 (20.3)	380 (9.4)	348 (15.7)	260 (18.2)	354 (10.4)	373 (15.9)	220 (15.0)	734 (9.8)	721 (15.8)	480 (16.5)												
Missing	224	65	73	91	25	17	83	16	12	174	41	29												
BMI, kg/m2, No. (%)																								
N	3,657	2,900	1,515	1,825	665	313	1,742	769	439	3,567	1,434	752												
Mean (SD)	26.3 (4.5)	26.6 (4.8)	27.2 (5.1)	26.7 (4.6)	26.8 (4.6)	27.1 (4.6)	26.7 (4.7)	26.7 (4.8)	27.1 (5.1)	26.7 (4.7)	26.7 (4.7)	27.1 (4.9)												
Median (min, max)	25.5 (15.0, 49.8)	26.0 (15.0, 49.6)	26.4 (14.8, 48.9)	26.0 (14.6, 49.6)	26.3 (16.9, 48.7)	26.6 (16.6, 48.7)	26.0 (14.5, 48.7)	25.8 (16.1, 48.9)	26.3 (14.6, 48.9)	26.0 (14.5, 49.6)	26.0 (14.5, 49.6)	26.0 (14.6, 48.9)	26.4 (14.6, 46.1)											
IQR	5.3	5.8	5.9	5.3	5.7	6.3	5.4	5.4	5.9	5.7	5.3	5.9												
Not available (%)	4,279 (47.9)	2,757 (41.8)	2,690 (53.1)	1,878 (45.2)	1,257 (56.0)	1,031 (71.2)	1,211 (34.9)	1,213 (51.4)	904 (61.0)	3,089 (40.5)	2,470 (53.7)	1,935 (66.0)												
Missing (%)	1,000 (11.2)	946 (14.3)	861 (17.0)	450 (10.8)	322 (14.3)	105 (7.2)	521 (15.0)	377 (16.0)	140 (9.4)	971 (12.7)	699 (15.2)	245 (8.4)												
BMI, kg/m2, No. (%)																								
<18.5	59 (1.6)	68 (2.3)	29 (1.9)	27 (1.5)	7 (1.1)	6 (1.9)	27 (1.5)	8 (1.0)	8 (1.8)	54 (1.5)	15 (1.0)	14 (1.9)												
18.5–22.9	761 (20.8)	570 (19.7)	249 (16.4)	315 (17.3)	124 (18.6)	55 (17.6)	300 (17.2)	156 (20.3)	71 (16.2)	615 (17.2)	280 (17.2)	126 (16.8)												
23.0–27.4	1,579 (43.2)	1,189 (41.0)	626 (41.3)	805 (44.1)	275 (41.4)	116 (37.1)	762 (43.7)	319 (41.5)	187 (42.6)	1,567 (43.9)	594 (41.4)	303 (40.3)												
>27.4	1,258 (34.4)	1,073 (40.3)	611 (37.2)	678 (38.9)	259 (43.5)	136 (37.5)	653 (37.2)	286 (39.4)	173 (37.3)	1,331 (38.0)	545 (38.0)	309 (41.1)												
Not available	4,279	2,757	2,690	1,878	1,257	1,031	1,211	1,213	904	3,089	2,470	1,935												
Missing	1000	946	861	450	322	105	521	377	140	971	699	245												

Year	2018–2019						2020						2021						
	ACS Stratum	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA
Total	8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (52.9)	2,244 (28.6)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)							
WHR																			
N	1,890	947	253	903	330	125	687	415	194	1,590	745	319							
Mean (SD)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)							
Median (min, max)	1.0 (0.7, 2.0)	1.0 (0.7, 1.7)	1.0 (0.8, 2.0)	1.0 (0.7, 1.8)	1.0 (0.8, 1.5)	1.0 (0.8, 1.1)	1.0 (0.8, 1.3)	1.0 (0.7, 2.5)	1.0 (0.8, 1.7)	1.0 (0.7, 1.7)	1.0 (0.8, 1.8)	1.0 (0.7, 2.5)							
IQR	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1							
Not available (%)	5,484 (61.4)	3,932 (59.6)	3,523 (69.5)	2,504 (60.3)	1,495 (66.6)	1,202 (83.0)	1,944 (56.0)	1,427 (60.5)	1,048 (70.7)	4,448 (58.3)	2,922 (63.5)	2,250 (76.7)							
Missing (%)	1,562 (17.5)	1,724 (26.1)	1,290 (25.5)	746 (18.0)	419 (18.7)	122 (8.4)	843 (24.3)	517 (21.9)	241 (16.3)	1,589 (20.8)	936 (20.3)	363 (12.4)							
WHR, No. (%)																			
Men	1,667	690	141	788	257	93	604	330	140	1,392	587	233							
≤1.0	1,159 (69.5)	430 (62.3)	100 (70.9)	590 (74.9)	164 (63.8)	69 (74.2)	469 (77.6)	214 (64.8)	82 (58.6)	1,059 (76.1)	378 (64.4)	151 (64.8)							
>1.0	508 (30.5)	260 (37.7)	41 (29.1)	198 (25.1)	93 (36.2)	24 (25.8)	135 (22.4)	116 (35.2)	58 (41.4)	333 (23.9)	209 (35.6)	82 (35.2)							
Not available	4,694	2,975	2,571	2,149	1,081	822	1,669	1,068	721	3,818	2,149	1,543							
Missing	1,375	1,293	906	655	324	79	729	385	152	1,384	709	231							
Women	223	257	112	115	73	32	83	85	54	198	158	86							
≤0.85	4 (1.8)	13 (5.1)	16 (14.3)	11 (9.6)	1 (1.4)	3 (9.4)	5 (6.0)	2 (2.4)	3 (5.6)	16 (8.1)	3 (1.9)	6 (7.0)							
>0.85	219 (98.2)	244 (94.9)	96 (85.7)	104 (90.4)	72 (98.6)	29 (90.6)	78 (94.0)	83 (97.6)	51 (94.4)	182 (91.9)	155 (98.1)	80 (93.0)							
Not available	790	957	355	414	380	275	359	327	630	773	707								
Missing	187	431	384	91	95	43	114	132	89	205	227	132							

Year	2018–2019				2020				2021			
	ACS Stratum	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI
Total	8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (52.9)	2,244 (28.6)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)
Waist circumference, cm												
N	1,779	898	240	824	306	116	648	392	180	1,472	698	296
Mean (SD)	92.5 (10.9)	94.2 (11.5)	94.5 (12.0)	92.0 (10.6)	93.7 (10.7)	92.8 (10.5)	94.4 (11.4)	93.5 (11.3)	92.8 (12.5)	94.1 (11.0)	94.1 (11.0)	93.2 (11.8)
Median (min, max)	92.0 (70.0, 130)	94.0 (70.0, 130.0)	94.0 (70.0, 130.0)	90.0 (70.0, 128.0)	92.5 (70.0, 121.0)	90.5 (72.0, 127.0)	93.0 (70.0, 130.0)	93.5 (70.0, 130.0)	92.0 (70.0, 128.0)	93.0 (70.0, 130.0)	93.0 (70.0, 130.0)	92.0 (70.0, 128.0)
IQR	14.0	15.0	15.0	14.0	13.3	14.0	14.5	14.5	15.8	14.0	14.0	15.8
Not available (%)	5,475 (61.3)	3,925 (59.4)	3,520 (69.5)	2,498 (60.1)	1,493 (66.5)	1,201 (82.9)	1,936 (55.7)	1,424 (60.4)	1,045 (70.5)	4,434 (58.1)	2,917 (63.4)	2,246 (76.6)
Missing (%)	1,682 (18.8)	1,780 (27.0)	1,306 (25.8)	831 (20.0)	445 (19.8)	132 (9.1)	890 (25.6)	543 (23.0)	258 (17.4)	1,721 (22.6)	988 (21.5)	390 (13.3)
Waist circumference, cm, No. (%)												
Men	1,574	663	136	723	237	89	571	314	131	1,294	551	220
≤90	757 (48.1)	264 (39.8)	55 (40.4)	368 (50.9)	101 (42.6)	45 (50.6)	242 (42.4)	129 (41.1)	60 (45.8)	610 (47.1)	230 (41.7)	105 (47.7)
>90	817 (51.9)	399 (60.2)	81 (59.6)	355 (49.1)	136 (57.4)	44 (49.4)	329 (57.6)	185 (58.9)	71 (54.2)	684 (52.9)	321 (58.3)	115 (52.3)
Not available	4,686	2,970	2,569	2,144	1,079	821	1,664	1,065	718	3,808	2,144	1,539
Missing	1,476	1,325	913	725	346	84	767	404	164	1,492	750	248
Women	205	235	90	101	69	27	77	78	49	178	147	76
≤80	36 (17.6)	30 (12.8)	14 (13.5)	17 (16.8)	8 (11.6)	4 (14.8)	12 (15.6)	9 (11.5)	4 (8.2)	29 (16.3)	17 (11.6)	8 (10.5)
>80	169 (82.4)	205 (87.2)	90 (86.5)	84 (83.2)	61 (88.4)	23 (85.2)	65 (84.4)	69 (88.5)	45 (91.8)	149 (83.7)	130 (88.4)	68 (89.5)
Not available	789	955	951	354	414	380	272	359	327	626	773	707
Missing	206	455	393	106	99	48	123	139	94	229	238	142

Year	2018–2019				2020				2021				
	ACS Stratum	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	
Total	8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	52.9	4,153 (28.6)	2,244 (18.5)	1,449 (47.5)	3,474 (32.2)	2,359 (20.3)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)
CO-MORBIDITY													
Dyslipidaemia, No. (%)													
Yes	2,220 (25.5)	2,805 (42.9)	2,413 (48.3)	1,240 (30.5)	1,051 (47.4)	777 (54.3)	1,049 (30.9)	1,107 (47.2)	830 (56.4)	2,289 (30.7)	2,158 (47.3)	1,607 (55.4)	
No	5,467 (62.8)	3,298 (50.4)	2,295 (46.0)	2,568 (63.2)	1,069 (48.2)	617 (43.1)	2,149 (63.4)	1,130 (48.2)	569 (38.7)	4,717 (63.3)	2,199 (48.2)	1,186 (40.9)	
Unknown	1,025 (11.8)	435 (6.7)	285 (5.7)	254 (6.3)	99 (4.5)	38 (2.7)	193 (5.7)	106 (4.5)	72 (4.9)	447 (6.0)	205 (4.5)	110 (3.8)	
Missing	224	65	73	91	25	17	83	16	12	174	41	29	
Hypertension, No. (%)													
Yes	4,307 (49.4)	4,643 (71.0)	3,585 (71.8)	2,138 (52.6)	1,607 (72.4)	1,066 (74.4)	1,712 (50.5)	1,688 (72.0)	1,053 (71.6)	3,850 (51.7)	3,295 (72.2)	2,119 (73.0)	
No	3,744 (43.0)	1,663 (25.4)	1,251 (25.1)	1,800 (44.3)	575 (25.9)	348 (24.3)	1,554 (45.8)	604 (25.8)	367 (24.9)	3,354 (45.0)	1,179 (25.8)	715 (24.6)	
Unknown	661 (7.6)	232 (3.6)	157 (3.1)	124 (3.1)	37 (1.7)	18 (1.3)	125 (3.7)	51 (2.2)	51 (3.5)	249 (3.3)	88 (1.9)	69 (2.4)	
Missing	224	65	73	91	25	17	83	16	12	174	41	29	
Diabetes, No. (%)													
Yes	3,197 (36.7)	3,448 (52.7)	2,295 (46.0)	1,595 (39.3)	1,179 (53.1)	685 (47.8)	1,313 (38.7)	1,214 (51.8)	672 (45.7)	2,908 (39.0)	2,293 (52.5)	1,357 (46.7)	
No	4,805 (55.2)	2,797 (42.8)	2,460 (49.3)	2,325 (57.2)	989 (44.6)	724 (50.6)	1,937 (57.1)	1,070 (45.7)	744 (50.6)	4,262 (57.2)	2,059 (45.1)	1,468 (50.6)	
Unknown	710 (8.2)	293 (4.5)	238 (4.8)	142 (3.5)	51 (2.3)	23 (1.6)	141 (4.2)	59 (2.5)	55 (3.7)	283 (3.8)	110 (2.4)	78 (2.7)	
Missing	224	65	73	91	25	17	83	16	12	174	41	29	

Year	2018–2019					2020					2021		
	ACS Stratum	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA
Total	8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (52.9)	2,244 (28.6)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)	
Type of diabetes treatment, No. (%)													
OHA	1,638 (61.5)	1,481 (57.3)	1,039 (60.8)	823 (60.2)	564 (57.6)	372 (64.4)	718 (65.1)	647 (64.2)	383 (64.7)	1,541 (62.4)	1,211 (60.9)	755 (64.5)	
Insulin	416 (15.6)	551 (21.3)	277 (16.2)	182 (13.3)	186 (19.0)	81 (14.0)	131 (11.9)	169 (16.8)	86 (14.5)	313 (12.7)	355 (17.9)	167 (14.3)	
OHA + Insulin	194 (7.3)	256 (9.9)	211 (12.3)	146 (10.7)	141 (14.4)	76 (13.1)	106 (9.6)	103 (10.2)	69 (11.7)	252 (10.2)	244 (12.3)	145 (12.4)	
Non pharmacology therapy	417 (15.7)	295 (11.4)	183 (10.7)	216 (15.8)	89 (9.1)	49 (8.5)	148 (13.4)	89 (8.8)	54 (9.1)	364 (14.7)	178 (9.0)	103 (8.8)	
Missing	532	865	585	228	199	107	210	206	80	438	405	187	
Fasting blood glucose, mmol/L													
N	6,014	4,087	2,878	3,060	1,482	943	2,419	1,424	932	5,479	2,906	1,875	
Mean (SD)	8.5 (4.0)	8.0 (3.8)	7.4 (3.6)	8.5 (4.0)	7.9 (3.7)	7.2 (3.4)	8.5 (4.1)	7.8 (3.6)	7.2 (3.3)	8.5 (4.0)	7.8 (3.7)	7.2 (3.3)	
Median (min, max)	7.0 (3.0, 42.9)	6.7 (3.0, 49.0)	6.0 (3.0, 48.0)	7.2 (3.0, 46.0)	7.0 (3.0, 46.5)	6.1 (3.0, 39.4)	7.0 (3.1, 40.7)	6.6 (3.2, 43.0)	6.0 (3.0, 24.6)	7.1 (3.0, 46.0)	6.6 (3.0, 46.5)	6.0 (3.0, 39.4)	
IQR	3.9	3.8	2.9	3.9	3.6	2.9	4.0	3.4	2.7	3.9	3.5	2.8	
Not available (%)	1,666 (18.6)	1,857 (28.1)	1,617 (31.9)	732 (17.6)	637 (28.4)	464 (32.0)	635 (18.3)	689 (29.2)	468 (31.6)	1,367 (17.9)	1,326 (17.9)	932 (31.8)	
Missing (%)	1,256 (14.1)	659 (10.0)	571 (11.3)	361 (8.7)	125 (5.6)	42 (2.9)	420 (12.1)	246 (10.4)	83 (5.6)	781 (10.2)	371 (8.1)	125 (4.3)	
Myocardial infarction history, No. (%)													
Yes	795 (9.1)	1,106 (16.9)	792 (15.9)	422 (10.4)	406 (18.3)	190 (13.3)	289 (8.5)	425 (18.1)	234 (15.9)	711 (9.5)	831 (18.2)	424 (14.6)	
No	7,466 (85.7)	5,152 (78.8)	3,927 (87.0)	3,532 (82.2)	1,727 (77.8)	1,177 (82.2)	3,000 (88.5)	1,782 (76.1)	1,120 (87.6)	6,532 (76.1)	3,509 (76.9)	2,297 (79.1)	
Unknown	451 (5.2)	280 (4.3)	273 (5.5)	108 (2.7)	86 (3.9)	65 (4.5)	102 (3.0)	136 (5.8)	117 (8.0)	210 (2.8)	222 (4.9)	182 (6.3)	
Missing	224	65	74	91	25	17	83	16	12	174	41	29	

Year	ACS Stratum	2018–2019				2020				2021			
		STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA
Total	8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (52.9)	2,244 (28.6)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)	
Documented CAD > 50% stenosis, No. (%)													
Yes	922 (10.6)	1,983 (30.3)	2,001 (40.1)	464 (11.4)	714 (32.2)	674 (47.1)	379 (11.2)	746 (31.8)	616 (41.9)	843 (11.3)	1,460 (32.0)	1,290 (44.4)	
No	7,280 (83.6)	4,196 (64.2)	2,663 (53.4)	3,504 (86.3)	1,430 (64.4)	716 (50.0)	2,899 (85.5)	1,476 (63.0)	755 (51.3)	6,403 (85.9)	2,906 (63.7)	1,471 (50.7)	
Unknown	510 (5.9)	359 (5.5)	328 (6.6)	94 (2.3)	75 (3.4)	42 (2.9)	113 (3.3)	121 (5.2)	100 (6.8)	207 (2.8)	196 (4.3)	142 (4.9)	
Missing	224	65	74	91	25	17	83	16	12	174	41	29	
Chronic angina (onset more than 2 weeks ago), No. (%)													
Yes	258 (3.0)	464 (7.1)	340 (6.8)	102 (2.5)	159 (7.2)	88 (6.1)	82 (2.4)	166 (7.1)	112 (7.6)	184 (2.5)	325 (7.1)	200 (6.9)	
No	8,182 (93.9)	5,900 (90.2)	4,482 (89.8)	3,911 (96.3)	2,029 (91.4)	1,313 (91.7)	3,237 (95.5)	2,102 (89.7)	1,302 (88.5)	7,148 (95.9)	4,131 (90.6)	2,615 (90.1)	
Unknown	271 (3.1)	174 (2.7)	170 (3.4)	49 (1.2)	31 (1.4)	31 (2.2)	72 (2.1)	75 (3.2)	57 (3.9)	121 (1.6)	106 (2.3)	88 (3.0)	
Missing	225	65	74	91	25	17	83	16	12	174	41	29	
New onset angina (less than 2 weeks ago), No. (%)													
Yes	6,789 (77.9)	4,972 (76.1)	3,670 (73.5)	3,164 (77.9)	1,641 (74.0)	1,002 (70.0)	2,530 (74.6)	1,710 (73.0)	968 (65.8)	5,694 (76.4)	3,351 (73.5)	1,970 (67.9)	
No	1,806 (20.7)	1,449 (22.2)	1,204 (24.1)	871 (21.4)	556 (25.1)	403 (28.1)	819 (24.2)	591 (25.2)	468 (31.8)	1,690 (22.7)	1,147 (25.1)	871 (30.0)	
Unknown	117 (1.3)	117 (1.8)	118 (2.4)	27 (0.7)	22 (1.0)	27 (1.9)	42 (1.2)	42 (1.8)	35 (2.4)	69 (0.9)	64 (1.4)	62 (2.1)	
Missing	224	65	74	91	25	17	83	16	12	174	41	29	

Year	2018–2019				2020				2021			
	ACS Stratum	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI
Total	8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (52.9)	2,244 (28.6)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)
Heart failure, No. (%)												
Yes	150 (1.7)	589 (9.0)	222 (4.5)	75 (1.8)	174 (7.8)	66 (4.6)	59 (1.7)	199 (8.5)	99 (6.7)	134 (1.8)	373 (8.2)	165 (5.7)
No	8,293 (95.2)	5,799 (88.7)	4,597 (92.1)	3,940 (97.0)	2,013 (93.4)	1,337 (96.0)	2,061 (88.0)	1,317 (89.5)	7,195 (96.5)	4,074 (89.3)	2,654 (91.4)	
Unknown	269 (3.1)	150 (2.3)	173 (3.5)	47 (1.2)	32 (1.4)	29 (2.0)	77 (2.3)	83 (3.5)	55 (3.7)	124 (1.7)	115 (2.5)	84 (2.9)
Missing	224	65	74	91	25	17	83	16	12	174	41	29
Chronic lung disease, No. (%)												
Yes	118 (1.4)	289 (4.4)	165 (3.3)	53 (1.3)	101 (4.6)	57 (4.0)	38 (1.1)	87 (3.7)	61 (4.1)	91 (1.2)	188 (4.1)	118 (4.1)
No	8,322 (95.5)	6,090 (93.2)	4,651 (93.2)	3,961 (97.5)	2,085 (94.0)	1,345 (93.9)	3,273 (96.5)	2,174 (92.8)	1,359 (92.4)	7,234 (97.1)	4,259 (93.4)	2,704 (93.1)
Unknown	272 (3.1)	159 (2.4)	176 (3.5)	48 (1.2)	33 (1.5)	30 (2.1)	80 (2.4)	82 (3.5)	51 (3.5)	128 (1.7)	115 (2.5)	81 (2.8)
Missing	224	65	74	91	25	17	83	16	12	174	41	29
Renal disease, No. (%)												
Yes	330 (3.8)	949 (14.5)	392 (7.9)	151 (3.7)	343 (15.5)	145 (10.1)	117 (3.5)	387 (16.5)	124 (8.4)	268 (3.6)	730 (16.0)	269 (9.3)
No	8,125 (93.3)	5,439 (83.2)	4,429 (88.7)	3,861 (95.1)	1,846 (83.2)	1,260 (88.0)	3,197 (94.3)	1,885 (80.5)	1,299 (88.3)	7,058 (94.7)	3,731 (81.8)	2,559 (88.2)
Unknown	257 (3.0)	151 (2.3)	171 (3.4)	50 (1.2)	30 (1.4)	27 (1.9)	77 (2.3)	71 (3.0)	48 (3.3)	127 (1.7)	101 (2.2)	75 (2.6)
Missing	224	65	74	91	25	17	83	16	12	174	41	29
Cerebrovascular disease, No. (%)												
Yes	195 (2.2)	281 (4.3)	157 (3.2)	74 (1.8)	113 (5.1)	69 (4.8)	65 (1.9)	123 (5.2)	60 (4.1)	139 (1.9)	236 (5.2)	129 (4.4)
No	8,263 (94.9)	6,109 (93.4)	4,665 (93.5)	3,944 (97.1)	2,076 (93.6)	1,336 (93.3)	3,255 (96.0)	2,147 (91.6)	1,361 (92.5)	7,199 (96.6)	4,223 (92.6)	2,697 (92.9)
Unknown	254 (2.9)	148 (2.3)	170 (3.4)	44 (1.1)	30 (1.4)	27 (1.9)	71 (2.1)	73 (3.1)	50 (3.4)	115 (1.5)	103 (2.3)	77 (2.7)
Missing	224	65	74	91	25	17	83	16	12	174	41	29

Year	ACS Stratum	2018–2019				2020				2021				2020–2021		
		STEMI	NSTEMI	UA	STEMI	NSTEMI	UA									
Total		8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (52.9)	2,244 (28.6)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)			
Peripheral vascular disease, No. (%)																
Yes		29 (0.3)	54 (0.8)	25 (0.5)	4 (0.1)	28 (1.3)	14 (1.0)	9 (0.3)	27 (1.2)	5 (0.3)	13 (0.2)	55 (1.2)	19 (0.7)			
No		8,421 (96.7)	6,318 (96.6)	4,787 (95.9)	4,009 (98.7)	2,156 (97.2)	1,389 (97.0)	3,306 (97.5)	2,235 (95.4)	1,416 (96.3)	7,315 (98.1)	4,391 (96.3)	2,805 (96.6)			
Unknown		262 (3.0)	166 (2.5)	180 (3.6)	49 (1.2)	35 (1.6)	29 (2.0)	76 (2.2)	81 (3.5)	50 (3.4)	125 (1.7)	116 (2.5)	79 (2.7)			
Missing		224	65	74	91	25	17	83	16	12	174	41	29			
No co-morbidity (None of the above), No. (%)																
Yes		224 (2.5)	65 (1.0)	73 (1.4)	91 (2.2)	25 (1.1)	17 (1.2)	83 (2.4)	16 (0.7)	12 (0.8)	174 (2.3)	41 (0.9)	29 (1.0)			
No		8,712 (97.5)	6,538 (99.0)	4,993 (98.6)	4,062 (97.8)	2,219 (98.9)	1,432 (98.8)	3,391 (97.6)	2,343 (99.3)	1,471 (99.2)	7,453 (97.7)	4,562 (99.1)	2,903 (99.0)			
*Coronary artery disease, No. (%)																
Yes		7,235 (81.0)	5,660 (85.7)	4,321 (85.3)	3,399 (81.8)	1,959 (87.3)	1,267 (87.4)	2,709 (78.0)	2,015 (85.4)	1,259 (84.9)	6,108 (80.1)	3,974 (86.3)	2,526 (86.2)			
No		1,701 (19.0)	943 (14.3)	745 (14.7)	754 (18.2)	285 (12.7)	182 (12.6)	765 (22.0)	344 (14.6)	224 (15.1)	1,519 (19.9)	629 (13.7)	406 (13.8)			

*Coronary artery disease is defined as "Yes" to any of the following co-morbidities: 1) History of myocardial infarction, 2) Documented CAD, 3) Chronic angina (onset more than 2 weeks ago), 4) New onset angina (less than 2 weeks)

Note: Percentage is to the nearest decimal point

Table 2.8 Age-gender distribution of patients with ACS by ACS stratum, NCVD-ACS Registry, 2020–2021

Year	ACS stratum	2018–2019				2020				2021				2020–2021			
		STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	
N	8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (52.9)	2,244 (18.5)	1,449 (47.5)	3,474 (32.2)	2,359 (20.3)	1,483 (50.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)					
Gender	Age group	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.		
	20-<30	116 (1.5)	20 (0.4)	33 (0.9)	47 (1.3)	12 (0.7)	7 (0.7)	32 (1.1)	12 (0.7)	2 (0.2)	79 (1.2)	24 (0.7)	9 (0.4)				
	30-<40	713 (9.2)	252 (5.1)	296 (8.2)	353 (9.8)	91 (5.5)	73 (7.3)	279 (9.3)	101 (5.7)	75 (7.4)	632 (9.6)	192 (5.6)	148 (7.4)				
	40-<50	1,712 (22.1)	765 (15.4)	608 (16.8)	785 (21.9)	249 (15.0)	148 (14.9)	717 (23.9)	283 (15.9)	186 (18.4)	1,502 (22.8)	532 (15.4)	334 (16.6)				
	50-<60	2,522 (32.6)	1,416 (28.6)	1,046 (28.9)	1,128 (31.4)	450 (27.1)	283 (28.5)	981 (32.7)	464 (26.0)	267 (26.4)	2,109 (32.0)	914 (26.5)	550 (27.4)				
	60-<70	1,845 (23.9)	1,499 (30.2)	1,005 (27.8)	898 (25.0)	501 (30.1)	295 (29.7)	693 (29.7)	540 (30.3)	303 (29.9)	1,591 (24.1)	1,041 (30.2)	598 (29.8)				
	70-<80	680 (8.8)	792 (16.0)	505 (14.0)	321 (8.9)	287 (17.3)	153 (15.4)	249 (8.3)	296 (16.6)	143 (14.1)	570 (8.6)	583 (16.9)	296 (14.7)				
	≥80	148 (1.9)	214 (4.3)	125 (3.4)	60 (1.7)	72 (4.3)	35 (3.5)	51 (1.7)	87 (4.9)	37 (3.7)	111 (1.7)	159 (4.6)	72 (3.6)				
	Total	7,736 (100.0)	4,958 (100.0)	3,618 (100.0)	3,592 (100.0)	1,662 (100.0)	994 (100.0)	3,002 (100.0)	1,783 (100.0)	1,013 (100.0)	6,594 (100.0)	3,445 (100.0)	2,007 (100.0)				
	20-<30	6 (0.5)	3 (0.2)	7 (0.5)	3 (0.5)	3 (0.5)	1 (0.2)	4 (0.8)	2 (0.3)	1 (0.2)	7 (0.7)	5 (0.4)	2 (0.2)				
	30-<40	38 (3.2)	24 (1.5)	42 (2.9)	24 (4.3)	14 (2.4)	8 (1.8)	16 (3.4)	4 (0.7)	26 (5.5)	40 (3.9)	18 (1.6)	34 (3.7)				
	40-<50	141 (11.8)	101 (6.1)	184 (12.7)	75 (13.4)	41 (7.0)	47 (10.3)	64 (13.6)	45 (7.8)	57 (12.1)	139 (13.5)	86 (7.4)	104 (11.2)				
	50-<60	308 (25.7)	355 (21.6)	340 (23.5)	127 (22.6)	115 (19.8)	99 (21.8)	114 (24.2)	102 (17.7)	115 (24.5)	241 (23.3)	217 (18.7)	214 (23.1)				
	60-<70	385 (32.1)	553 (33.6)	445 (30.7)	187 (33.3)	183 (31.4)	146 (32.1)	151 (32.0)	181 (31.4)	132 (28.1)	338 (32.7)	364 (31.4)	278 (30.1)				
	70-<80	237 (19.8)	418 (25.4)	311 (21.5)	115 (20.5)	151 (25.9)	113 (24.8)	89 (18.9)	165 (28.6)	100 (21.3)	204 (19.7)	316 (27.3)	213 (23.0)				
	≥80	85 (7.1)	191 (11.6)	119 (8.2)	30 (5.3)	75 (12.9)	41 (9.0)	34 (7.2)	77 (13.4)	39 (8.3)	64 (6.2)	152 (13.1)	80 (8.6)				
	Total	1,200 (100.0)	1,645 (100.0)	1,448 (100.0)	561 (100.0)	582 (100.0)	455 (100.0)	472 (100.0)	576 (100.0)	470 (100.0)	1,033 (100.0)	1,158 (100.0)	925 (100.0)				

CHAPTER 3: CLINICAL PRESENTATIONS & INVESTIGATIONS

CHAPTER 3: CLINICAL PRESENTATIONS & INVESTIGATIONS

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Summary

1. Malaysian ACS patients in 2020–2021 cohort showed more patients presented with high risk NSTEMI and UA cases with higher Killip classes, especially in elderly and women.
2. The LVEF was lower in STEMI and NSTEMI group compared to UA.
3. The COVID-19 pandemic influenced the increase in fibrinolytic therapy with slight decrease of timely STEMI treatment in current cohort of patients.
4. Malaysia's 2020–2021 ACS patients showed a slight increase in diabetic prevalence (43.9% vs. 42.5%). The high proportion of diabetes, especially in STEMI patients, demonstrates that diabetes was a major comorbidity and a potential contributor to delayed diagnosis and worse initial presentation (higher Killip classes, longer pain-to-needle times). However, the cholesterol control was better in the diabetic group.
5. The current cohort showed that nearly 70% of ACS patients were hypertensive, with better cholesterol but poorer diabetic control and potentially delayed treatment, highlighting the challenges in managing concomitant ACS and hypertension.
6. The dyslipidaemic group showed better cholesterol control and marginally better LV function, but higher rate of STEMI presentation, and longer pain-to-needle-time compared to the non-dyslipidaemic groups.

The clinical presentation of Acute Coronary Syndrome (ACS) was stratified based on the TIMI risk score. In STEMI patients, a TIMI score of ≥ 6 indicates high risk, correlating with increased 30-day mortality ($>16.1\%$)¹. The current 2020–2021 cohort had a 21.5% high-risk population, compared to 22.7% in 2018–2019. [Table 3.7]

Among the NSTEMI and UA groups, the TIMI score of 5 and above correlates with all-cause mortality, recurrent MI or severe ischaemia requiring urgent revascularisation at 14 days of more than 26.0%². In the present cohort, 9.0% were high-risk (TIMI ≥ 5) compared to 6.4% in the previous cohort. [Table 3.7]

In the STEMI subgroup, Killip classification at presentation remained an important clinical parameter to determine prognosis. The current cohorts showed higher proportion of patients presented with Killip III and IV (22.5% vs. 20.5%). [Table 3.1]

Elderly patients presented with Killip class IV more frequently than middle-aged and young patients (17.5% vs. 13.2% vs. 9.4%, respectively). [Table 3.2] However, unlike the previous cohort, fewer male patients presented with Killip class IV compared to females (14.4% vs. 16.2%, respectively). [Table 3.3]

The mean heart rates were 83.4, 86.4, and 80.1 bpm for STEMI, NSTEMI, and UA subgroups, respectively. Blood pressure was generally lower in the STEMI subgroup compared to NSTEMI and UA, with mean systolic blood pressures of 134.8 mmHg, 142.1 mmHg, and 144.6 mmHg. [Table 3.1]

The UA and NSTEMI subgroups had higher mean pulse pressures compared to STEMI (63.6 mmHg, 60.0 mmHg, and 52.4 mmHg). Similar patterns were observed for heart rates, blood pressure, and pulse pressure in the previous cohort. [Table 3.1]

Most of the STEMI patients presented with anterior location ECG abnormalities, similar to the previous cohort (50.9% vs. 51.5%). True posterior and right ventricle location ECG changes were slightly higher in the 2020–2021 cohort compared to the previous cohort (14.3% vs. 12.0%). [Table 3.1]

Approximately two-thirds of STEMI patients, half of NSTEMI patients, and one-third of UA patients underwent an echocardiogram with LVEF assessment at the participating hospitals. The 2020–2021 cohort was similar to the 2018–2019 cohort of patients in terms of LVEF assessment rates (STEMI: 68.4% vs. 63.7%, NSTEMI: 55.7% vs. 53.6%) except for UA: 37.0% vs. 29.1%. [Table 3.1]

The mean LVEF were 44.8% in STEMI, 45.3% in NSTEMI and 52.3% in UA subgroups. About 35.0% of STEMI, 46.0% of NSTEMI, and 69.7% of UA patients had LVEF of more than 50.0%. [Table 3.1]

The 2020–2021 cohort showed the increased use of fibrinolytic therapy compared to the previous cohort (44.5% vs. 37.8%). However, the proportion of STEMI patients achieving a pain-to-needle time of less than 180 minutes was slightly lower in the 2020–2021 cohort (42.8% vs. 45.7%). [Table 3.1]

Discussion

From our latest data, despite the challenges during the COVID-19 pandemic, there was still a slight decrease in high-risk STEMI patients (TIMI >6). This suggests potential improvements in early detection and treatment, possibly due to increased public and healthcare provider awareness³. However, we see a concerning rise in the proportion of high-risk NSTEMI and UA patients (TIMI ≥ 5) and more severe ACS (Killip III and IV NSTEMI/STEMI). This could be due to delayed presentations due to fear of COVID-19, pandemic-related healthcare disruptions, or resource limitations⁴⁻⁵.

In addition, the higher prevalence of Killip class IV among elderly patients compared to younger patients (17.5% vs. 9.4%) showed the increased vulnerability of elderly patients to more severe ACS complications⁶⁻⁷. This finding highlights the need for age-specific management strategies, including preventive measures, early risk assessment, and prompt intervention due to the non-specific presentation of ACS in the elderly among healthcare providers⁶⁻⁷.

Moreover, the persistently higher group of women presented with Killip IV MI, which was consistent with the previous study showed that women continued to have longer system delays and receive less aggressive pharmacotherapies and invasive treatments with poorer outcomes⁸.

Besides, the current data also showed an increased use of fibrinolysis in the 2020–2021 COVID-19 pandemic era. This may be attributed to the severe resource limitations, systems delays, and the inability to provide primary percutaneous coronary intervention in a timely fashion during the COVID-19 pandemic. This was consistent with the general worldwide trend⁹⁻¹⁰.

Diabetes Mellitus

Clinical Characteristics

About 44.6% of the ACS patients were diabetic. The highest incidence was seen in STEMI (43.7%) followed by NSTEMI (35.9%) and unstable angina (20.4%). [Table 3.4]

The ACS patients with diabetes mellitus had higher systolic blood pressure (median 139.0 mmHg vs. 135.0 mmHg), lower diastolic pressure (median 81.1 mmHg vs. 82.8 mmHg), wider pulse pressure (median 57.0

mmHg vs. 52.0 mmHg) and more tachycardia (median 84 beats/min vs. 80 beats/min) compared to non-diabetic patients. [Table 3.4]

Generally, cholesterol was better controlled in the diabetic group vs. non-diabetic group except for the marginally higher triglyceride level in the diabetic group (median total cholesterol 4.6 mmol/L vs. 5.2 mmol/L; HDL-C 1.0 mmol/L vs. 1.1 mmol/L; LDL-C 2.7 mmol/L vs. 3.3 mmol/L and triglycerides 1.5 mmol/L vs. 1.4 mmol/L). [Table 3.4]

The level of HbA1c on presentation was higher in the diabetic group (median 8.4 mmol/L vs. 6.0 mmol/L). In addition, diabetic patients were more ill in the acute setting (Killip classes III and IV; 23.6% vs. 17.0%), with lower LVEF (median 45.0% vs. 46%), and longer pain-to-needle time (median 219.0 minutes vs. 210.0 minutes). [Table 3.4]

In diabetic patients, the anterior leads (36.2%), followed by inferior leads (32.4%) and lateral leads (median 28.3%) were the commonest locations of ECG abnormalities. For non-diabetic patients, the commonest locations were anterior leads (40.7%), followed by inferior leads (median 35.4%) and lateral leads (median 26.7%). [Table 3.4]

Discussion

The current cohort showed that approximately 43.9% of the ACS patients were diabetic, which was significantly higher than the reported national prevalence of diabetes¹¹. This indicates that diabetes is an important comorbidity among ACS patients in Malaysia, especially those with NSTEMI and unstable angina, where the reported incidence was the highest.

Our cohort also demonstrated that diabetes patients tend to present with more severe symptoms, higher Killip classes and longer pain-to-needle times, which all may contribute to delay in diagnosis and eventually may increase the risk of ACS complications.

Interestingly, the control of cholesterol is generally better in the diabetic group, except for a marginally higher triglyceride level. This observation may be explained by the more commonly used lipid-lowering medication in the diabetic group which is recommended by the Malaysia's local and international guidelines¹²⁻¹⁴.

Hypertension

Clinical Characteristics

Sixty-two point one percent of ACS patients were hypertensive. More hypertensive patients presented with STEMI, followed by NSTEMI, and UA (41.6%, 35.6%, and 22.9% respectively). [Table 3.5]

Hypertensive patients had higher systolic blood pressure (median 141.0 mmHg vs. 131.0 mmHg), diastolic blood pressure (median 81.0 mmHg vs. 80.0 mmHg), wider pulse pressure (median 58.0 mmHg vs. 49.0 mmHg), and more tachycardia (median 82 beats/min vs. 80 beats/min) compared to non-hypertensive patients. [Table 3.5]

Similar percentages of patients presented with Killip classes III and IV (21.2% vs. 18.1%) and LVEF (median 45.0% vs. 45.0%) between the hypertensive and non-hypertensive groups. [Table 3.5]

The control of hypercholesterolaemia was generally better in the hypertensive group. However, diabetic control was poorer in the hypertensive group (HbA1c median 7.1 mmol/L vs. 6.5 mmol/L) with longer pain-to-needle time (median 218 min vs. 210 min) compared to the non-hypertensive group. [Table 3.5] In the hypertensive cohort, anterior leads (35.6%), followed by inferior leads (median 31.4%) and lateral leads (median 28.1%) were the commonest locations of ECG abnormalities. While in the non-hypertensive group, the commonest

involvement was anterior leads (median 44.0%), followed by inferior leads (median 38.5%) and lateral leads (median 26.3%). [Table 3.5]

Discussion

Our report showed that up to 68% of the ACS patients were hypertensive, which was significantly higher than the reported national prevalence of hypertension¹⁵. This suggest the importance of hypertension as a risk factor for ACS among Malaysians, particularly those with NSTEMI and UA, where the incidence was highest.

Besides, hypertensive patients with ACS demonstrated higher systolic and diastolic blood pressures, wider pulse pressure and more tachycardia compared to the non-hypertensive counterparts, which showed the known cardiovascular effect of hypertension.

Despite these differences, the hypertensive and non-hypertensive groups showed comparable Killip classes and LVEF. This suggest that hypertension alone may not be solely attributable to the severity of ACS.

We also found that the control of hypercholesterolaemia was better in the hypertensive group which may be explained by the recommended early initiation of lipid-lowering therapy in this group of patients¹²⁻¹⁴. However, the control of diabetes was poorer in the hypertensive group, as indicated by the higher level of HbA1c.

Moreover, hypertensive patients also reported longer pain-to-needle time. All these findings suggest the complexity of managing ACS in hypertensive patients, particularly patients with concomitant diabetes¹³. We suggest that there is an urgent need to perform a larger scale randomised controlled trial (RCT) to comprehensively address and ascertain the factors associated with these observations.

Dyslipidaemia

Clinical Characteristics

The STEMI groups had a higher rate of medical history of dyslipidaemia (37.8%) compared to NSTEMI (35.6%) and unstable angina (26.5%). Hypercholesterolaemia was better controlled in the dyslipidaemic group compared to the non-dyslipidaemic group with better LVEF (median 46.0% vs. 45.0%). [Table 3.6]

Patients with dyslipidaemia had marginally higher systolic BP (median 139.0 mmHg vs. 136.0 mmHg), wider pulse pressure (median 56.0 mmHg vs. 52.0 mmHg) and poorer diabetic control (HbA1c median 7.1% vs. 6.8%) than those without dyslipidaemia. [Table 3.6]

The non-dyslipidaemic group had higher diastolic pressure (median 81.0 mmHg vs. 80.0 mmHg) and were more severely ill (Killip III & IV; 20.4 % vs. 18.8%) compared to the dyslipidaemic group. [Table 3.6]

Dyslipidaemic patients more commonly presented with anterior and inferior ECG changes (34.8% and 29.9%, respectively), followed by lateral leads (28.2%). Similarly, the non-dyslipidaemic group commonly presented with anterior leads (41.3%), followed by inferior leads (37.0%), and lateral leads (27.0%). [Table 3.6]

Dyslipidaemic patients had a marginally longer pain-to-needle time (median 215 min vs. 210 min) compared to non-dyslipidaemic patients. [Table 3.6]

Discussion

Similar to hypertension and diabetes, the prevalence of dyslipidaemia among ACS patients in Malaysia was higher compared to the general population^{12,15}. This further underscores the significance of dyslipidaemia as a risk factor for the ACS cohort, consistent with both previous local and international reports¹⁴⁻¹⁵.

In general, the dyslipidaemic group of patients showed better control of hypercholesterolaemia, marginally better LV function and higher systolic blood pressure, and wider pulse pressure. These findings may be attributed to the protective and pleiotropic effect of statin prescription in patients with a known history of dyslipidaemia¹⁶.

Moreover, the non-dyslipidaemic group were more severely ill with a higher proportion of Killip III and IV patients which again, may be due to the higher prescription of lipid-lowering therapy in the counterpart group. However, this hypothesis should be tested in a larger scale or better-planned study.

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Table 3.1 Cardiac presentation of patients with ACS by ACS stratum, NCVD-ACS Registry, 2020–2021

Year	2018–2019				2020				2021				2020–2021	
	STEMI	NSTEMI	UA	STEMI	NSTEMI									
ACS stratum														
Total	8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (52.9)	2,244 (28.6)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)		
Systolic blood pressure, mmHg														
N	8,931	6,600	5,064	4,153	2,242	1,447	3,474	2,359	1,483	7,627	4,601	2,930		
Mean (SD)	133.7 (28.3)	141.9 (29.1)	143.1 (25.4)	134.9 (28.2)	142.3 (29.3)	145.8 (26.9)	134.6 (27.8)	141.9 (29.1)	143.5 (24.8)	134.8 (28.0)	142.1 (28.0)	144.6 (25.9)		
Median (min, max)	132.0 (51.0, 251.0)	139.0 (69.0, 269.0)	141.0 (51.0, 256.0)	133.0 (69.0, 269.0)	139.0 (60.0, 268.0)	144.0 (60.0, 262.0)	133.0 (50.0, 257.0)	139.0 (60.0, 270.0)	142.0 (69.0, 246.0)	133.0 (50.0, 269.0)	139.0 (60.0, 270.0)	143.0 (60.0, 262.0)		
IQR	36.0	37.0	33.0	36.0	39.0	35.0	36.0	36.0	36.0	32.0	36.0	37.0	34.0	
Missing (%)	5 (0.1)	3 (0.1)	2 (0.0)	0 (0)	2 (0.1)	2 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.0)	2 (0.1)	
Diastolic blood pressure, mmHg														
N	8,930	6,598	5,065	4,150	2,242	1,449	3,474	2,358	1,482	7,624	4,600	2,931		
Mean (SD)	81.5 (18.0)	81.6 (17.9)	81.2 (15.3)	82.6 (18.3)	82.1 (17.4)	81.2 (15.7)	82.0 (17.7)	82.1 (17.7)	81.1 (14.8)	82.3 (18.0)	82.1 (17.5)	81.1 (15.3)		
Median (min, max)	80.0 (18.0, 165.0)	80.0 (11.0, 170.0)	80.0 (21.0, 166.0)	82.0 (20.0, 170.0)	80.0 (18.0, 165.0)	80.0 (40.0, 168.0)	81.0 (22.0, 168.0)	80.0 (30.0, 164.0)	80.0 (40.0, 150.0)	81.0 (20.0, 170.0)	80.0 (18.0, 165.0)	80.0 (40.0, 168.0)		
IQR	22.0	21.0	19.0	24.0	21.0	21.0	24.0	21.0	19.0	24.0	22.0	20.0		
Missing (%)	6 (0.1)	5 (0.1)	1 (0.0)	3 (0.1)	2 (0.1)	0 (0)	0 (0)	1 (0.0)	1 (0.1)	3 (0.0)	3 (0.1)	1 (0.0)		
Pulse pressure, mmHg														
N	8,756	6,307	4,832	4,145	2,240	1,445	3,472	2,354	1,481	7,617	4,594	2,926		
Mean (SD)	51.2 (16.8)	58.0 (18.3)	59.8 (17.5)	52.4 (18.4)	60.2 (21.6)	64.8 (21.7)	52.5 (18.5)	59.8 (21.8)	62.4 (20.3)	52.4 (18.5)	60.0 (21.7)	63.6 (21.0)		
Median (min, max)	49.0 (3.0, 100.0)	57.0 (4.0, 100.0)	58.0 (5.0, 100.0)	50.0 (4.0, 136.0)	57.0 (2.0, 150.0)	62.0 (15.0, 159.0)	50.0 (2.0, 157.0)	56.0 (3.0, 154.0)	59.0 (16.0, 155.0)	57.0 (2.0, 157.0)	57.0 (2.0, 154.0)	61.0 (15.0, 159.0)		
IQR	23.0	25.0	23.0	25.0	23.0	28.0	30.0	23.0	30.0	27.0	23.0	29.0	28.0	
Missing (%)	180 (2.0)	296 (4.5)	234 (4.6)	8 (0.2)	4 (0.2)	4 (0.3)	2 (0.1)	5 (0.2)	2 (0.1)	10 (0.1)	9 (0.2)	6 (0.2)		

Year	ACS stratum	2018–2019				2020				2021				2020–2021		
		STEMI	NSTEMI	UA	STEMI	NSTEMI	UA									
Total		8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (52.9)	2,244 (28.6)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)			
Heart rate at presentation, beats/min																
N		8,852	6,,227	4,768	4,101	2,181	1,422	3,390	2,268	1,461	7,491	4,449	2,883			
Mean (SD)		82.6 (20.8)	86.7 (21.4)	80.1 (17.7)	83.6 (21.0)	86.4 (21.4)	79.9 (18.3)	83.1 (19.9)	86.3 (21.3)	80.3 (17.7)	83.4 (20.5)	86.4 (21.3)	80.1 (18.0)			
Median (min, max)		80.0 (20.0, 195.0)	84.0 (21.0, 200.0)	78.0 (20.0, 197.0)	82.0 (20.0, 199.0)	84.0 (22.0, 194.0)	78.0 (20.0, 180.0)	81.0 (25.0, 194.0)	84.0 (29.0, 200.0)	79.0 (30.0, 190.0)	81.0 (20.0, 199.0)	84.0 (22.0, 200.0)	78.0 (20.0, 190.0)			
IQR		27.0	27.0	21.0	28.0	21.0	26.0	23.0	25.0	27.0	22.0	27.0	26.0	22.0		
Missing (%)		84 (0.9)	376 (5.7)	298 (5.9)	52 (1.3)	63 (2.8)	27 (1.9)	84 (2.4)	91 (3.9)	22 (1.5)	136 (1.8)	154 (3.3)	49 (1.7)			
Number of distinct episodes of angina in the past 24 hours, No. (%)																
0–2		3,512 (44.9)	2,080 (39.0)	1,556 (41.0)	1,477 (40.6)	505 (26.3)	318 (24.2)	1,306 (44.9)	534 (27.7)	384 (29.5)	2,783 (42.5)	1,039 (27.0)	702 (26.8)			
>2		134 (1.7)	196 (3.7)	137 (3.6)	82 (2.3)	35 (1.8)	33 (2.5)	41 (1.4)	113 (5.9)	64 (4.9)	123 (1.9)	148 (3.9)	97 (3.7)			
Not available		4,169 (53.4)	3,052 (57.3)	2,098 (55.3)	2,079 (57.1)	1,377 (71.8)	964 (73.3)	1,562 (53.7)	1,280 (66.4)	854 (65.6)	3,641 (55.6)	2,657 (69.1)	1,818 (69.5)			
Missing		1,121	1,275	1,275	515	327	134	565	432	181	1,080	759	315			
Killip classification code, No. (%)																
I		5,452 (63.4)	3,194 (73.8)	2,200 (88.1)	2,342 (60.2)	661 (63.5)	267 (85.0)	2,101 (64.8)	766 (70.9)	467 (92.1)	4,443 (62.3)	1,427 (67.2)	734 (89.4)			
II		1,389 (16.2)	552 (12.8)	228 (9.1)	621 (16.0)	178 (17.1)	31 (9.9)	464 (14.3)	143 (13.2)	23 (4.5)	1,085 (15.2)	321 (15.1)	54 (6.6)			
III		444 (5.2)	328 (7.6)	44 (1.8)	218 (5.6)	77 (7.4)	9 (2.9)	140 (4.3)	80 (7.4)	10 (2.0)	358 (5.0)	157 (7.4)	19 (2.3)			
IV		1,313 (15.3)	253 (5.9)	26 (1.0)	707 (18.2)	125 (12.0)	7 (2.2)	539 (16.6)	92 (8.5)	7 (1.4)	1,246 (17.5)	217 (10.2)	14 (1.7)			
Not stated/ inadequately described		0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)			
Not available		338	2,276	2,568	265	1,203	1,135	230	1,278	976	495	2,481	2,111			

Year		2018–2019				2020				2021				2020–2021			
ACS stratum		STEMI	NSTEMI	UA	STEMI	NSTEMI	UA										
Total		8936 (43.4)	6603 (32.1)	5066 (24.6)	4,153 (52.9)	2,244 (28.6)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)				
Total cholesterol, mmol/L																	
N		6,553	4,465	3,216	3,337	1,625	1,003	2,734	1,622	1,015	6,071	3,247	2,018				
Mean (SD)		5.3 (1.4)	4.8 (1.5)	4.6 (1.3)	5.3 (1.5)	4.9 (1.5)	4.5 (1.3)	5.3 (1.4)	4.8 (1.5)	4.6 (1.3)	5.3 (1.4)	4.8 (1.5)	4.5 (1.3)				
Median (min, max)		5.2 (2.0, 23.0)	4.6 (2.0, 15.1)	4.4 (2.0, 14.8)	5.3 (2.0, 16.5)	4.8 (2.0, 14.9)	4.3 (2.0, 11.6)	5.3 (2.0, 12.6)	4.5 (2.0, 10.0)	4.4 (2.0, 12.6)	5.3 (2.0, 16.2)	4.7 (2.0, 16.5)	4.7 (2.0, 11.6)				
IQR		1.8	1.9	1.7	1.9	2.0	1.8	1.9	2.0	1.9	1.9	2.0	1.9	2.0	1.9		
Test not done (%)		1,350 (15.1)	1,576 (23.9)	1,390 (27.4)	548 (13.2)	528 (23.5)	411 (28.4)	481 (13.8)	544 (23.1)	396 (26.7)	1,029 (13.5)	1,072 (23.3)	807 (27.5)				
Missing (%)		1,033 (11.6)	562 (8.5)	460 (9.1)	268 (6.5)	91 (4.1)	35 (2.4)	259 (7.5)	193 (8.2)	72 (4.9)	527 (6.9)	284 (6.2)	107 (3.6)				
HDL-C, mmol/L																	
N		6,373	4,350	3,180	3,314	1,594	1,000	2,701	1,578	1,005	6,015	3,172	2,005				
Mean (SD)		1.1 (0.3)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)				
Median (min, max)		1.1 (0.5, 4.8)	1.0 (0.5, 4.7)	1.0 (0.5, 4.9)	0.5 (0.5, 4.5)	0.5 (0.5, 5.0)	0.5 (0.5, 5.0)	0.5 (0.5, 4.8)	0.5 (0.5, 5.0)	0.5 (0.5, 5.0)	0.5 (0.5, 4.9)	0.5 (0.5, 4.8)	0.5 (0.5, 5.0)	1.1 (0.5, 5.0)			
IQR		0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4		
Test not done (%)		1,392 (15.6)	1,606 (24.3)	1,404 (27.7)	559 (13.5)	544 (24.2)	412 (28.4)	490 (14.1)	564 (23.9)	403 (27.2)	1,049 (13.8)	1,108 (24.1)	815 (27.8)				
Missing (%)		1,171 (13.1)	647 (9.8)	482 (9.5)	280 (6.7)	106 (4.7)	37 (2.6)	283 (8.1)	217 (9.2)	75 (5.1)	563 (7.4)	323 (7.0)	112 (3.8)				
LDL-C, mmol/L																	
N		6,454	4,453	3,177	3,312	1,615	996	2,718	1,608	995	6,030	3,223	1,991				
Mean (SD)		3.4 (1.3)	3.0 (1.3)	2.7 (1.2)	3.5 (1.3)	3.1 (1.3)	2.6 (1.1)	3.4 (1.2)	3.0 (1.3)	2.7 (1.2)	3.4 (1.3)	3.0 (1.3)	2.7 (1.2)				
Median (min, max)		3.3 (0.5, 13.8)	2.8 (0.5, 12.8)	2.6 (0.5, 11.4)	3.4 (0.5, 13.3)	2.9 (0.5, 8.2)	2.4 (0.6, 8.7)	3.4 (0.5, 11.1)	2.7 (0.5, 12.4)	2.5 (0.6, 7.3)	3.4 (0.5, 13.3)	2.8 (0.5, 12.4)	2.5 (0.6, 8.7)				
IQR		1.7	1.8	1.5	1.7	1.8	1.6	1.7	1.8	1.6	1.7	1.8	1.6	1.7	1.8		
Test not done (%)		1,430 (16.0)	1,611 (24.4)	1,420 (28.0)	577 (13.9)	543 (24.2)	420 (29.0)	504 (14.5)	567 (24.0)	415 (28.0)	1,081 (14.2)	1,110 (24.1)	835 (28.5)				
Missing (%)		1,052 (11.8)	539 (8.2)	469 (9.3)	264 (6.4)	86 (3.8)	33 (2.3)	252 (7.3)	184 (7.8)	73 (4.9)	516 (6.8)	270 (5.9)	106 (3.6)				

Year	2018–2019						2020						2021						2020–2021	
	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI
ACS stratum																				UA
Total	8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (52.9)	2,244 (28.6)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)								
Triglycerides, mmol/L																				
N	6,426	4,479	3,180	3,330	1,627	991	2,718	1,610	1,008	6,048	3,237	1,999								
Mean (SD)	1.8 (1.1)	1.7 (1.0)	1.7 (1.1)	1.8 (1.1)	1.6 (0.9)	1.7 (1.2)	1.7 (1.0)	1.7 (1.1)	1.7 (1.1)	1.8 (1.1)	1.8 (1.0)	1.7 (1.2)								
Median (min, max)	1.5 (0.5, 14.3)	1.4 (0.5, 12.9)	1.4 (0.5, 13.0)	1.5 (0.5, 14.1)	1.4 (0.5, 14.3)	1.4 (0.5, 14.3)	1.5 (0.5, 13.3)	1.5 (0.5, 13.3)	1.4 (0.5, 12.4)	1.4 (0.5, 13.0)	1.5 (0.5, 14.1)	1.4 (0.5, 14.3)								
IQR	1.0	0.9	0.9	1.0	0.9	1.0	0.9	1.0	0.9	0.9	1.0	1.0								
Test not done (%)	1,379 (15.4)	1,579 (23.9)	1,404 (27.7)	556 (13.4)	530 (23.6)	411 (28.4)	496 (14.3)	552 (23.4)	403 (27.2)	1,052 (13.8)	1,082 (23.5)	814 (27.8)								
Missing (%)	1,131 (12.7)	545 (8.3)	482 (9.5)	267 (6.4)	87 (3.9)	47 (3.2)	260 (7.5)	197 (8.4)	72 (4.9)	527 (6.9)	284 (6.2)	119 (4.1)								
HbA1c, mmol/L																				
N	1,286	879	717	839	503	439	874	487	431	1,713	990	870								
Mean (SD)	8.1 (3.2)	8.5 (3.5)	8.0 (3.2)	8.1 (3.6)	8.2 (3.3)	7.7 (2.5)	8.1 (3.8)	7.8 (2.7)	7.9 (3.1)	8.1 (3.7)	8.0 (3.1)	7.8 (2.8)								
Median (min, max)	7.1 (4.0, 31.0)	7.5 (4.4, 32.0)	7.0 (4.1, 32.0)	7.0 (4.0, 32.0)	7.1 (4.0, 31.1)	6.8 (4.3, 20.1)	6.6 (4.3, 32.0)	7.0 (4.0, 30.0)	7.0 (4.5, 31.0)	6.8 (4.0, 32.0)	6.8 (4.0, 31.1)	7.1 (4.3, 31.0)								
IQR	3.7	3.7	3.1	3.7	3.1	2.8	3.5	2.7	2.7	3.7	3.0	2.7								
Test not done (%)	5,123 (57.3)	4,266 (64.6)	3,191 (63.0)	2,197 (52.9)	1,268 (56.5)	835 (57.6)	1,630 (46.9)	1,343 (56.9)	851 (57.4)	3,827 (50.2)	2,611 (56.7)	1,686 (57.5)								
Missing (%)	2,527 (28.3)	1,458 (22.1)	1,158 (22.9)	1,117 (26.9)	473 (21.1)	175 (12.1)	970 (27.9)	529 (22.4)	201 (13.6)	2,087 (27.4)	1,002 (21.8)	376 (12.8)								
LVEF, %																				
N	5,692	3,542	1,475	2,914	1,332	422	2,301	1,271	506	5,215	2,603	928								
Mean (SD)	44.6 (11.1)	45.9 (13.5)	53.9 (14.0)	45.2 (11.2)	45.3 (12.9)	52.0 (13.8)	44.3 (10.9)	45.4 (13.1)	52.6 (13.2)	44.8 (11.1)	45.4 (13.0)	52.3 (13.5)								
Median (min, max)	45.0 (5.0, 87.4)	47.0 (5.0, 89.0)	55.0 (5.1, 88.0)	45.0 (8.6, 80.0)	55.0 (6.7, 86.0)	45.0 (10.0, 86.0)	46.6 (8.7, 82.0)	55.0 (5.9, 87.1)	45.0 (5.8, 87.0)	45.0 (5.1, 88.0)	46.0 (5.9, 87.1)	55.0 (5.8, 87.0)								
IQR	12.0	20.0	19.0	10.0	20.0	15.0	12.0	20.0	15.0	11.0	20.0	15.0								
Test not done (%)	2,183 (24.4)	2,380 (36.0)	2,806 (55.4)	988 (23.8)	854 (38.1)	990 (68.3)	895 (25.8)	929 (39.4)	927 (62.5)	1,883 (24.7)	1,783 (38.7)	1,917 (65.4)								
Missing (%)	1,061 (11.9)	681 (10.3)	785 (15.5)	251 (6.0)	58 (2.6)	37 (2.6)	278 (8.0)	159 (6.7)	50 (3.4)	529 (6.9)	217 (4.7)	87 (3.0)								

Year	ACS stratum	2018–2019				2020				2021				2020–2021		
		STEMI	NSTEMI	UA	STEMI	NSTEMI	UA									
Total		8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (52.9)	2,244 (28.6)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)			
LVEF, No. (%)																
≤40		2,152 (37.8)	1,247 (35.2)	291 (19.7)	1,015 (34.8)	490 (36.8)	84 (19.9)	869 (37.8)	470 (37.0)	96 (19.0)	1,884 (36.1)	960 (36.9)	180 (19.4)			
41–49		1,575 (27.7)	645 (18.2)	142 (9.6)	853 (29.3)	237 (17.8)	41 (9.7)	652 (28.3)	208 (16.4)	60 (11.9)	1,505 (28.9)	445 (17.1)	101 (10.9)			
≥50		1,965 (34.5)	1,650 (46.6)	1,042 (70.6)	1,046 (35.9)	605 (45.4)	297 (70.4)	780 (33.9)	593 (46.7)	350 (69.2)	1,826 (35.0)	1,198 (46.0)	647 (69.7)			
Missing		3,244	3,061	3,591	1,239	912	1,027	1,173	1,088	977	2,412	2,000	2,004			
ECG, No. (%)																
Inferior leads		4,199 (47.0)	1,412 (21.4)	736 (14.5)	2,059 (49.6)	537 (23.9)	195 (13.5)	1,716 (49.4)	495 (21.0)	188 (12.7)	3,775 (49.5)	1,032 (22.4)	383 (13.1)			
Anterior leads		4,604 (51.5)	1,723 (26.1)	903 (17.8)	2,072 (49.9)	719 (32.0)	279 (19.3)	1,811 (52.1)	753 (31.9)	269 (18.1)	3,883 (50.9)	1,472 (32.0)	548 (18.7)			
Lateral leads		2,058 (23.0)	2,495 (37.8)	1,099 (21.7)	1,006 (24.2)	878 (39.1)	333 (23.0)	836 (24.1)	818 (34.7)	249 (16.8)	1,842 (24.2)	1,696 (36.8)	582 (19.8)			
True posterior		628 (7.0)	149 (2.3)	93 (1.8)	383 (9.2)	36 (1.6)	18 (1.2)	243 (1.2)	36 (7.0)	10 (1.5)	626 (0.7)	72 (8.2)	28 (1.6)	110 (1.0)		
Right ventricle		448 (5.0)	62 (0.9)	21 (0.4)	250 (6.0)	18 (0.8)	10 (0.7)	214 (6.2)	17 (0.7)	11 (0.7)	464 (6.1)	35 (0.8)	21 (0.7)			
None		96 (1.1)	1,702 (25.8)	2,175 (42.9)	78 (1.9)	465 (20.7)	721 (49.8)	50 (1.4)	556 (23.6)	769 (51.9)	128 (1.7)	1,021 (22.2)	1,490 (50.8)			
Not stated/inadequately described		132 (1.5)	513 (7.8)	556 (11.0)	56 (1.3)	221 (9.8)	136 (9.4)	45 (1.3)	266 (11.3)	154 (10.4)	101 (1.3)	487 (10.6)	290 (9.9)			

Year	2018–2019						2020						2021						2020–2021					
	ACS stratum	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA					
Total	8,936 (43.4)	6,603 (32.1)	5,066 (24.6)	4,153 (52.9)	2,244 (28.6)	1,449 (18.5)	3,474 (47.5)	2,359 (32.2)	1,483 (20.3)	7,627 (50.3)	4,603 (30.4)	2,932 (19.3)												
Total number of STEMI patients who were given fibrinolytic therapy at the reporting centre	3,381 (37.8)			1,895 (45.6)				1,499 (43.1)			3,394 (44.5)													
Pain-to-needle time, min (*symptom to treatment)																								
N	2,734			1,556				1,196			2,752													
Mean (SD)	285.5 (251.8)			276.8 (227.2)				304.7 (261.9)			288.9 (243.2)													
Median (min, max)	200.0 (25.0, 1,440.0)			210.0 (15.0, 1440.0)				220.0 (15.0, 1440.0)			210.0 (15.0, 1440.0)													
IQR	217.0			200.0				245.0			220.0													
Missing	647 (19.1)			339 (17.9)				303 (20.2)			642 (18.9)													
Pain-to-needle time, No. (%)																								
≤180 min	1,249 (45.7)			670 (43.1)				509 (42.6)			1,179 (42.8)													
>180 min	1,485 (54.3)			886 (56.9)				687 (57.4)			1,573 (57.2)													
Missing	647			339				303			642													

*Symptom to treatment is the time difference between onset of ACS symptom and when patient was given fibrinolytic therapy

Table 3.2 Cardiac presentation of patients with ACS by age group (years), NCVD-ACS Registry, 2020–2021

Year	2018–2019			2020			2021			2020–2021		
	Young	Middle-aged	Elderly									
ACS stratum												
Total	1,550 (7.5)	9,498 (46.1)	9,557 (46.4)	636 (8.1)	3,547 (45.2)	3,663 (46.7)	554 (7.6)	3,395 (46.4)	3,367 (46.0)	1,190 (7.8)	6,942 (45.8)	7,030 (46.4)
ACS stratum, No. (%)												
STEMI	873 (56.3)	4,683 (49.3)	3,380 (35.4)	427 (67.1)	2,115 (59.6)	1,611 (44.0)	331 (59.7)	1,876 (55.3)	1,267 (37.6)	758 (63.7)	3,991 (57.5)	2,878 (40.9)
NSTEMI	299 (19.3)	2,637 (27.8)	3,667 (38.4)	120 (18.9)	855 (24.1)	1,269 (34.6)	119 (21.5)	894 (26.3)	1,346 (40.0)	239 (20.1)	1,749 (25.2)	2,615 (37.2)
UA	378 (24.4)	2,178 (22.9)	2,510 (26.3)	89 (14.0)	577 (16.3)	783 (21.4)	104 (18.8)	625 (18.4)	754 (22.4)	193 (16.2)	1,202 (17.3)	1,537 (21.9)
Systolic blood pressure, mmHg												
N	1,550	9,494	9,551	636	3,545	3,661	554	3,395	3,367	1,190	6,940	7,028
Mean (SD)	135.7 (25.7)	138.2 (28.0)	139.7 (28.8)	137.1 (26.4)	138.2 (28.0)	140.2 (29.6)	135.0 (24.6)	138.3 (27.4)	139.8 (28.9)	136.1 (25.6)	138.2 (25.6)	140.0 (27.7)
Median (min, max)	132.5 (64.0, 251.0)	135.0 (51.0, 269.0)	138.0 (51.0, 260.0)	135.0 (56.0, 255.0)	136.0 (54.0, 268.0)	138.0 (55.0, 269.0)	132.5 (65.0, 243.0)	136.0 (53.0, 270.0)	138.0 (50.0, 253.0)	133.0 (56.0, 255.0)	136.0 (53.0, 255.0)	138.0 (50.0, 269.0)
IQR	31.0	36.0	37.0	32.5	38.0	39.0	28.0	34.0	37.0	31.0	36.0	38.0
Missing (%)	0 (0)	4 (0.0)	6 (0.1)	0 (0)	2 (0.1)	2 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.0)	2 (0.0)
Diastolic blood pressure, mmHg												
N	1,550	9,489	9,554	636	3,543	3,662	554	3,393	3,367	1,190	6,936	7,029
Mean (SD)	84.2 (17.2)	83.9 (17.4)	78.5 (16.8)	86.2 (18.6)	84.7 (17.3)	79.1 (17.1)	85.4 (18.0)	84.2 (17.0)	79.0 (16.7)	85.9 (18.3)	84.4 (17.2)	79.1 (16.9)
Median (min, max)	83.0 (33.0, 165.0)	83.0 (11.0, 166.0)	77.0 (18.0, 170.0)	86.0 (33.0, 154.0)	84.0 (32.0, 168.0)	78.0 (18.0, 170.0)	84.0 (22.0, 162.0)	83.0 (25.0, 164.0)	78.0 (24.0, 168.0)	85.0 (22.0, 162.0)	84.0 (25.0, 168.0)	84.0 (18.0, 170.0)
IQR	22.0	22.0	20.0	23.0	22.0	21.0	23.0	21.0	23.0	21.0	22.0	21.0
Missing (%)	0 (0)	9 (0.1)	3 (0)	0 (0)	4 (0.1)	1 (0.0)	0 (0)	2 (0.1)	0 (0)	0 (0)	6 (0.1)	1 (0.0)

Year	2018–2019				2020				2021				2020–2021	
	Young	Middle-aged	Elderly	Middle-aged	Elderly									
ACS stratum														
Total	1,550 (7.5)	9,498 (46.1)	9,557 (46.4)	636 (8.1)	3,547 (45.2)	3,663 (46.7)	554 (7.6)	3,395 (46.4)	3,367 (46.0)	1,190 (7.8)	6,942 (45.8)	7,030 (46.4)		
Pulse pressure, mmHg														
N	1,525	9,293	9,077	635	3,538	3,657	554	3,390	3,363	1,189	6,928	7,020		
Mean (SD)	50.5 (15.4)	53.1 (17.0)	58.6 (18.5)	51.0 (16.6)	53.6 (18.8)	61.1 (22.1)	49.5 (15.2)	54.0 (18.9)	60.9 (21.7)	50.3 (16.0)	53.8 (18.9)	61.0 (21.9)		
Median (min, max)	49.0 (5.0, 100.0)	51.0 (3.0, 100.0)	58.0 (8.0, 132.0)	49.0 (6.0, 132.0)	51.0 (8.0, 150.0)	59.0 (2.0, 159.0)	47.0 (2.0, 120.0)	51.0 (3.0, 157.0)	58.0 (6.0, 154.0)	48.0 (2.0, 132.0)	51.0 (3.0, 157.0)	59.0 (2.0, 159.0)		
IQR	20.0	23.0	27.0	20.0	24.0	30.0	19.0	24.0	29.0	20.0	24.0	30.0		
Missing (%)	25 (1.6)	205 (2.2)	480 (5.0)	1 (0.2)	9 (0.3)	6 (0.2)	0 (0)	5 (0.1)	4 (0.1)	1 (0.1)	14 (0.2)	10 (0.1)		
Heart rate at presentation, beats/min														
N	1,506	9,192	9,149	628	3,481	3,595	542	3,298	3,279	1,170	6,779	6,874		
Mean (SD)	84.7 (18.7)	83.0 (19.6)	83.4 (21.6)	86.4 (18.8)	83.7 (20.1)	83.3 (21.7)	85.7 (18.5)	84.0 (19.7)	82.8 (20.6)	86.1 (18.6)	83.8 (19.9)	83.1 (21.2)		
Median (min, max)	83.0 (40.0, 180.0)	81.0 (20.0, 200.0)	80.0 (36.0, 176.0)	84.0 (20.0, 199.0)	82.0 (20.0, 194.0)	80.0 (22.0, 199.0)	84.0 (42.0, 200.0)	81.0 (30.0, 194.0)	80.0 (25.0, 194.0)	84.0 (36.0, 200.0)	82.0 (20.0, 194.0)	80.0 (22.0, 199.0)		
IQR	24.0	24.0	27.0	26.0	26.0	27.0	25.0	25.0	26.0	25.0	26.0	27.0		
Missing (%)	44 (2.8)	306 (3.2)	408 (4.3)	8 (1.3)	66 (1.9)	68 (1.9)	12 (2.2)	97 (2.9)	88 (2.6)	20 (1.7)	163 (2.3)	156 (2.2)		
Episodes of angina in past 24 hours, No. (%)														
0–2	583 (45.5)	3,393 (43.4)	3,172 (40.5)	226 (40.3)	1,103 (35.8)	971 (30.1)	201 (42.7)	1,103 (38.7)	920 (32.7)	427 (41.4)	2,206 (37.2)	1,891 (31.3)		
>2	36 (2.8)	211 (2.7)	220 (2.8)	20 (3.6)	63 (2.0)	67 (2.1)	13 (2.8)	90 (3.2)	115 (4.1)	33 (3.2)	153 (2.6)	182 (3.0)		
Not available	662 (51.7)	4,210 (53.9)	4,447 (56.7)	315 (62.1)	1,913 (67.9)	2,192 (54.6)	257 (58.2)	1,660 (63.2)	1,779 (55.4)	572 (60.2)	3,573 (65.7)	3,971 (65.7)		
Missing	269	1,684	1,718	75	468	433	83	542	553	158	1,010	986		

Year		2018–2019				2020				2021				2020–2021	
		Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Middle-aged	Elderly
ACS stratum															
Total	1,550 (7.5)	9,498 (46.1)	9,557 (46.4)	636 (8.1)	3,547 (45.2)	3,663 (46.7)	554 (7.6)	3,395 (46.4)	3,367 (46.0)	1,190 (7.8)	6,942 (45.8)	7,030 (46.4)			
Killip classification code, No. (%)															
I	1,030 (82.7)	5,445 (73.9)	4,371 (64.2)	370 (77.2)	1,685 (65.9)	1,215 (55.1)	310 (80.1)	1,725 (71.8)	1,299 (63.6)	680 (78.5)	3,410 (68.8)	2,514 (59.2)			
II	99 (8.0)	909 (12.3)	1,161 (17.1)	50 (10.4)	378 (14.8)	402 (18.2)	30 (7.8)	300 (12.5)	300 (14.7)	80 (9.2)	678 (13.7)	702 (16.5)			
III	25 (2.0)	286 (3.9)	505 (7.4)	16 (3.9)	128 (5.0)	160 (7.2)	7 (1.8)	93 (3.9)	130 (6.4)	23 (2.7)	221 (4.5)	290 (6.8)			
IV	92 (7.4)	733 (9.9)	767 (11.3)	43 (9.0)	366 (14.3)	430 (19.5)	40 (10.3)	284 (11.8)	314 (15.4)	83 (9.6)	650 (13.1)	744 (17.5)			
Not stated/ inadequately described	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)			
Not available	304	2,125	2,753	157	990	1,456	167	993	1,324	324	1,983	2,780			
Total cholesterol, mmol/L															
N	1,100	6,710	6,424	531	2,754	2,680	431	2,549	2,391	962	5,303	5,071			
Mean (SD)	5.4 (1.5)	5.2 (1.5)	4.6 (1.4)	5.6 (1.6)	5.3 (1.5)	4.7 (1.5)	5.5 (1.7)	5.2 (1.4)	4.7 (1.4)	5.6 (1.6)	5.3 (1.4)	4.7 (1.4)			
Median (min, max)	5.3 (2.0, 15.6)	5.1 (2.0, 23.0)	4.5 (2.0, 15.1)	5.4 (2.0, 14.9)	5.2 (2.0, 16.5)	4.6 (2.0, 14.4)	5.4 (2.0, 16.2)	5.2 (2.0, 12.4)	4.5 (2.0, 12.6)	5.4 (2.0, 16.2)	5.2 (2.0, 16.5)	4.6 (2.0, 14.4)			
IQR	1.8	1.9	1.8	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0			
Test not done (%)	287 (18.5)	1,814 (19.1)	2,215 (23.2)	70 (11.0)	618 (17.4)	799 (21.8)	91 (16.4)	599 (17.6)	731 (21.7)	161 (13.5)	1,217 (17.5)	1,530 (21.8)			
Missing (%)	163 (10.5)	974 (10.3)	918 (9.6)	35 (5.5)	175 (4.9)	184 (5.0)	32 (5.8)	247 (7.3)	245 (7.3)	67 (5.6)	422 (6.1)	429 (6.1)			
HDL-C, mmol/L															
N	1,076	6,544	6,283	526	2,718	2,664	417	2,501	2,366	943	5,219	5,030			
Mean (SD)	1.0 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.2 (0.4)	1.0 (0.3)	1.1 (0.4)	1.2 (0.4)	1.0 (0.3)	1.1 (0.4)	1.2 (0.4)	1.2 (0.4)			
Median (min, max)	1.0 (0.5, 4.7)	1.0 (0.5, 4.9)	1.1 (0.5, 4.7)	1.0 (0.5, 5.0)	1.0 (0.5, 4.8)	1.0 (0.5, 5.0)	1.1 (0.5, 4.3)	1.0 (0.5, 5.0)	1.0 (0.5, 4.9)	1.1 (0.5, 5.0)	1.0 (0.5, 5.0)	1.0 (0.5, 5.0)	1.1 (0.5, 5.0)		
IQR	0.4	0.3	0.4	0.3	0.3	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.4		
Test not done (%)	292 (18.8)	1,848 (19.5)	2,262 (23.7)	71 (11.2)	629 (17.7)	815 (22.2)	94 (17.0)	615 (18.1)	748 (22.2)	165 (13.9)	1,244 (17.9)	1,563 (22.2)			
Missing (%)	182 (11.7)	1,106 (11.6)	1,012 (10.6)	39 (6.1)	200 (5.6)	184 (5.0)	43 (7.8)	279 (8.2)	253 (7.5)	82 (6.9)	479 (6.9)	437 (6.2)			

Year	2018–2019				2020				2021				2020–2021		
	Young	Middle-aged	Elderly	Middle-aged	Elderly										
ACS stratum															
Total	1,550 (7.5)	9,498 (46.1)	9,557 (46.4)	636 (8.1)	3,547 (45.2)	3,663 (46.7)	554 (7.6)	3,395 (46.4)	3,367 (46.0)	1,190 (7.8)	6,942 (45.8)	7,030 (46.4)			
LDL-C, mmol/L															
N	1,078	6,616	6,390	516	2,725	2,682	421	2,521	2,379	937	5,246	5,061			
Mean (SD)	3.5 (1.3)	3.3 (1.3)	2.8 (1.2)	3.7 (1.5)	3.4 (1.3)	2.9 (1.2)	3.6 (1.4)	3.3 (1.3)	2.9 (1.2)	3.6 (1.4)	3.4 (1.3)	2.9 (1.2)			
Median (min, max)	3.4 (0.5, 13.8)	3.2 (0.5, 12.5)	2.7 (0.6, 12.8)	3.5 (0.5, 9.9)	3.4 (0.5, 12.1)	2.8 (0.5, 11.1)	3.5 (0.5, 8.3)	3.3 (0.5, 12.4)	2.7 (0.5, 13.3)	3.5 (0.5, 13.3)	3.3 (0.5, 9.9)	2.7 (0.5, 12.4)			
IQR	1.5	1.7	1.7	1.9	1.8	1.7	1.7	1.7	1.7	1.8	1.8	1.7	1.7		
Test not done (%)	310 (20.0)	1,890 (19.9)	2,261 (23.7)	83 (13.1)	644 (18.2)	813 (22.2)	101 (18.2)	632 (18.6)	753 (22.4)	184 (15.5)	1,276 (18.4)	1,566 (22.3)			
Missing (%)	162 (10.5)	992 (10.4)	906 (9.5)	37 (5.8)	178 (5.0)	168 (4.6)	32 (5.8)	242 (7.1)	235 (7.0)	69 (5.8)	420 (6.1)	403 (5.7)			
Triglycerides, mmol/L															
N	1,086	6,652	6,347	534	2,745	2,669	424	2,532	2,380	958	5,277	5,049			
Mean (SD)	2.0 (1.4)	1.9 (1.2)	1.5 (0.9)	2.1 (1.5)	1.9 (1.2)	1.5 (0.8)	2.1 (1.6)	1.8 (1.1)	1.5 (0.9)	2.1 (1.5)	1.9 (1.1)	1.5 (0.8)			
Median (min, max)	1.6 (0.5, 14.0)	1.6 (0.5, 14.3)	1.3 (0.5, 13.5)	1.7 (0.5, 14.1)	1.6 (0.5, 14.3)	1.3 (0.5, 10.6)	1.7 (0.5, 13.3)	1.3 (0.5, 12.4)	1.5 (0.5, 13.0)	1.3 (0.5, 14.1)	1.7 (0.5, 14.1)	1.6 (0.5, 14.3)	1.3 (0.5, 13.0)		
IQR	1.1	1.0	0.8	1.2	1.0	0.7	1.0	1.0	1.0	0.8	1.1	1.0	0.8		
Test not done (%)	290 (18.7)	1,831 (19.4)	2,241 (23.5)	70 (11.0)	621 (17.5)	806 (22.0)	98 (17.7)	613 (18.1)	740 (22.0)	168 (14.1)	1,234 (17.8)	1,546 (22.0)			
Missing (%)	174 (11.2)	1,015 (10.7)	969 (10.1)	32 (5.0)	181 (5.1)	188 (5.1)	32 (5.1)	250 (5.8)	247 (7.4)	64 (7.3)	431 (5.4)	435 (6.2)			
HbA1c, mmol/L															
N	209	1,316	1,357	134	751	896	141	829	822	275	1,580	1,718			
Mean (SD)	7.2 (3.1)	8.5 (3.5)	8.1 (3.1)	7.4 (3.1)	8.4 (3.7)	7.9 (3.0)	8.0 (4.5)	8.2 (3.7)	7.7 (2.8)	7.7 (3.9)	8.3 (3.7)	7.8 (2.9)			
Median (min, max)	6.0 (4.2, 32.0)	7.4 (4.0, 31.0)	7.2 (4.1, 32.0)	6.3 (4.2, 31.0)	7.1 (4.0, 32.0)	7.0 (4.5, 32.0)	6.1 (4.4, 32.0)	6.8 (4.0, 31.0)	6.8 (4.2, 32.0)	6.2 (4.2, 32.0)	7.0 (4.0, 32.0)	7.0 (4.0, 32.0)			
IQR	2.6	4.3	3.1	3.3	3.9	2.8	3.8	3.6	2.4	3.4	3.9	2.6			
Test not done (%)	943 (60.8)	5,729 (60.3)	5,908 (61.8)	342 (53.8)	1,950 (55.0)	2,008 (54.8)	295 (53.2)	1,737 (51.2)	1,792 (53.2)	637 (53.5)	3,687 (53.1)	3,800 (54.1)			
Missing (%)	398 (25.7)	2,453 (25.8)	2,292 (24.0)	160 (25.2)	846 (23.9)	759 (20.7)	118 (21.3)	829 (24.4)	753 (22.4)	278 (23.4)	1,675 (24.1)	1,512 (21.5)			

Year		2018–2019				2020				2021				2020–2021	
		Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Middle-aged	Elderly
ACS stratum															
Total	1,550 (7.5)	9,498 (46.1)	9,557 (46.4)	636 (8.1)	3,547 (45.2)	3,663 (46.7)	554 (7.6)	3,395 (46.4)	3,367 (46.0)	1,190 (7.8)	6,942 (45.8)	7,030 (46.4)			
Left ventricular ejection fraction, %															
N	819	5,028	4,862	404	2,189	2,075	331	1,928	1,819	735	4,117	3,894			
Mean (SD)	48.4 (12.0)	46.6 (12.6)	45.6 (13.0)	46.7 (12.0)	46.3 (11.8)	45.2 (12.4)	48.6 (11.3)	45.9 (12.0)	44.9 (12.5)	47.5 (11.7)	46.1 (11.9)	45.1 (12.4)			
Median (min, max)	50.0 (5.0, 89.0)	46.1 (5.0, 87.0)	45.0 (5.2, 90.0)	47.0 (5.4, 77.0)	45.0 (5.1, 83.0)	45.0 (6.7, 88.0)	50.0 (10.0, 78.2)	45.0 (5.9, 83.0)	45.0 (5.8, 87.1)	48.4 (5.4, 78.2)	45.0 (5.9, 83.0)	45.0 (5.1, 88.0)			
IQR	15.0	15.0	20.0	15.0	15.0	18.2	12.0	15.0	20.0	15.0	15.0	15.0			
Test not done (%)	536 (34.6)	3,294 (34.7)	3,539 (37.0)	200 (31.4)	1,192 (33.6)	1,440 (39.3)	193 (34.8)	1,225 (36.1)	1,333 (39.6)	393 (33.0)	2,417 (34.8)	2,773 (39.4)			
Missing (%)	195 (12.6)	1,176 (12.4)	1,156 (12.1)	32 (5.0)	166 (4.7)	148 (4.0)	30 (5.4)	242 (7.1)	215 (6.4)	62 (5.2)	408 (5.9)	363 (5.2)			
ECG, No. (%)															
Inferior leads	520 (33.6)	3,058 (32.2)	2,769 (29.0)	229 (36.0)	1,331 (37.5)	1,231 (33.6)	215 (38.8)	1,171 (34.5)	1,013 (30.1)	444 (37.3)	2,502 (36.0)	2,244 (31.9)			
Anterior leads	605 (39.0)	3,458 (36.4)	3,167 (33.1)	275 (43.2)	1,418 (40.0)	1,377 (37.6)	221 (39.9)	1,401 (41.3)	1,211 (36.0)	496 (41.7)	2,819 (40.6)	2,588 (36.8)			
Lateral leads	340 (21.9)	2,412 (25.4)	2,900 (30.3)	160 (25.2)	927 (26.1)	1,130 (30.8)	119 (21.5)	833 (24.5)	951 (28.2)	279 (23.4)	1,760 (25.4)	2,081 (29.6)			
True posterior	60 (3.9)	402 (4.2)	408 (4.3)	34 (5.3)	211 (5.9)	192 (5.2)	28 (5.1)	160 (4.7)	101 (3.0)	62 (5.2)	371 (5.3)	293 (4.2)			
Right ventricle	43 (2.8)	253 (2.7)	235 (3.3)	21 (3.3)	140 (3.9)	117 (3.2)	21 (3.8)	135 (4.0)	86 (2.6)	42 (3.5)	275 (4.0)	203 (2.9)			
None	285 (18.4)	1,764 (18.6)	1,924 (20.1)	105 (16.5)	527 (14.9)	632 (17.3)	94 (17.0)	559 (16.5)	722 (21.4)	199 (16.7)	1,086 (15.6)	1,354 (19.3)			
Not stated/ inadequately described	75 (4.8)	502 (5.3)	624 (6.5)	28 (4.4)	161 (4.5)	224 (6.1)	29 (5.2)	191 (5.6)	245 (7.3)	57 (4.8)	352 (5.1)	469 (6.7)			

Year		2018–2019				2020				2021				2020–2021		
		Young	Middle-aged	Elderly	Young	Middle-aged	Elderly									
ACS stratum																
Total		1,550 (7.5)	9,498 (46.1)	9,557 (46.4)	636 (8.1)	3,547 (45.2)	3,663 (46.7)	554 (7.6)	3,395 (46.4)	3,367 (46.0)	1,190 (7.8)	6,942 (45.8)	7,030 (46.4)			
Total number of STEMI patients who were given fibrinolytic therapy at reporting centre		353 (22.8)	1,783 (18.8)	1,245 (13.0)	192 (30.2)	977 (27.5)	726 (19.8)	147 (26.5)	860 (25.3)	492 (14.6)	339 (28.5)	1,837 (26.5)	1,218 (17.3)			
Pain-to-needle time, min (*symptom to treatment)																
N		312	1,456	966	160	819	577	120	707	369	280	1,526	946			
Mean (SD)		2,833.3 (257.7)	2,811.9 (252.9)	2,911.6 (248.4)	260.0 (219.2)	276.0 (227.6)	282.7 (229.0)	317.3 (309.5)	293.9 (251.5)	321.3 (264.3)	284.5 (262.7)	284.3 (239.0)	297.7 (243.9)			
Median (min, max)		195.0 (25.0, 1,410.0)	195.0 (30.0, 1,440.0)	210.0 (25.0, 1,365.0)	182.5 (24.0, 1,350.0)	205.0 (15.0, 1,440.0)	205.0 (15.0, 1,370.0)	210.0 (25.0, 1,430.0)	220.0 (15.0, 1,385.0)	210.0 (15.0, 1,430.0)	240.0 (15.0, 1,440.0)	195.0 (15.0, 1,430.0)	207.0 (15.0, 1,440.0)	220.0 (15.0, 1,440.0)		
IQR		215.0	215.0	209.0	233.5	205.0	190.0	248.0	235.0	260.0	235.0	223.0	219.0			
Missing (%)		41 (11.6)	327 (18.3)	279 (22.4)	32 (16.7)	158 (16.2)	149 (20.5)	27 (18.4)	153 (17.8)	123 (25.0)	59 (17.4)	311 (16.9)	272 (22.3)			
Pain-to-needle time, No (%)																
≤180 min		145 (46.5)	691 (47.5)	413 (42.8)	80 (50.0)	361 (44.1)	229 (39.7)	52 (43.3)	322 (45.5)	135 (36.6)	132 (47.1)	683 (44.8)	364 (38.5)			
>180 min		167 (53.5)	765 (52.5)	553 (57.3)	80 (50.0)	458 (55.9)	348 (60.3)	68 (56.7)	385 (54.5)	234 (63.4)	148 (52.9)	843 (55.2)	582 (61.5)			
Missing		41	327	279	32	158	149	27	153	123	59	311	272			

*Symptom to treatment is the time difference between onset of ACS symptom and when patient was given fibrinolytic therapy

Note:

1. Young is defined as age 20 to less than 40 years, middle-aged is defined as age 40 to less than 60 years, and elderly is defined as 60 years and above
2. Percentage is to the nearest decimal point

Table 3.3 Cardiac presentation of patients with ACS by gender, NCVD-ACS Registry, 2020–2021

Year	2018–2019		2020		2021		2020–2021	
ACS stratum	Male	Female	Male	Female	Male	Female	Male	Female
Total	16,312 (79.2)	4,293 (20.8)	6,248 (79.6)	1,598 (20.4)	5,798 (79.3)	1,518 (20.7)	12,046 (79.4)	3,116 (20.6)
ACS stratum, No. (%)								
STEMI	7,736 (47.4)	1,200 (28.0)	3,592 (57.5)	561 (35.1)	3,002 (51.8)	472 (31.1)	6,594 (54.7)	1,033 (33.2)
NSTEMI	4,958 (30.4)	1,645 (38.3)	1,662 (26.6)	582 (36.4)	1,783 (30.8)	576 (37.9)	3,445 (28.6)	1,158 (37.2)
UA	3,618 (22.2)	1,448 (33.7)	994 (15.9)	455 (28.5)	1,013 (17.5)	470 (31.0)	2,007 (16.7)	925 (29.7)
Systolic blood pressure, mmHg								
N	16,307	4,288	6,245	1,597	5,798	1,518	12,043	3,115
Mean (SD)	137.7 (27.8)	142.5 (29.3)	137.9 (27.9)	143.7 (30.8)	137.4 (27.0)	143.8 (30.7)	137.6 (27.5)	143.7 (30.7)
Median (min, max)	135.0 (51.0, 269.0)	141.0 (52.0, 266.0)	136.0 (55.0, 269.0)	141.0 (54.0, 262.0)	135.0 (50.0, 270.0)	142.0 (62.0, 260.0)	136.0 (50.0, 270.0)	141.0 (54.0, 262.0)
IQR			37.0	38.0	34.0	40.0	35.0	39.0
Missing (%)	5 (0.0)	5 (0.1)	3 (0.1)	1 (0.1)	0 (0)	0 (0)	3 (0.0)	1 (0.0)
Diastolic blood pressure, mmHg								
N	16,302	4,291	6,243	1,598	5,796	1,518	12,039	3,116
Mean (SD)	82.0 (17.4)	79.2 (17.1)	82.8 (17.5)	80.0 (17.8)	82.6 (17.1)	79.1 (17.0)	82.7 (17.3)	79.5 (17.5)
Median (min, max)	81.0 (18.0, 170.0)	78.0 (11.0, 165.0)	81.0 (18.0, 170.0)	78.0 (32.0, 168.0)	81.0 (24.0, 168.0)	78.0 (22.0, 158.0)	81.0 (18.0, 170.0)	78.0 (22.0, 168.0)
IQR			21.0	22.0	22.0	22.0	22.0	21.0
Missing (%)	10 (0.1)	2 (0.1)	5 (0.1)	0 (0)	2 (0.0)	0 (0)	7 (0.1)	0 (0)
Pulse pressure, mmHg								
N	15,865	4,030	6,236	1,594	5,790	1,517	12,026	3,111
Mean (SD)	54.2 (17.4)	60.1 (19.0)	55.1 (19.5)	63.9 (23.2)	54.8 (19.1)	64.8 (23.2)	55.0 (19.3)	64.4 (23.2)
Median (min, max)	52.0 (3.0, 100.0)	59.0 (3.0, 100.0)	53.0 (2.0, 159.0)	61.0 (11.0, 149.0)	52.0 (2.0, 157.0)	62.0 (12.0, 155.0)	52.0 (2.0, 159.0)	61.0 (11.0, 155.0)
IQR			28.0	25.0	31.0	25.0	32.0	31.0
Missing (%)	447 (2.7)	263 (6.1)	12 (0.2)	4 (0.3)	8 (0.1)	1 (0.1)	20 (0.2)	5 (0.2)

Year	2018–2019			2020			2021			2020–2021		
ACS stratum	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Female	
Total	16,312 (79.2)	4,293 (20.8)	6,248 (79.6)	1,598 (20.4)	5,798 (79.3)	1,518 (20.7)	12,046 (79.4)	3,116 (20.6)				
Heart rate at presentation, beats/min												
N	15,720	4,127	6,136	1,568	5,646	1,473	11,782	3,041				
Mean (SD)	82.6 (20.3)	86.0 (20.9)	83.2 (20.6)	86.0 (21.1)	82.9 (19.7)	85.9 (21.2)	83.1 (20.2)	85.9 (21.1)				
Median (min, max)	80.0 (20.0, 200.0)	84.0 (30.0, 192.0)	80.0 (20.0, 199.0)	84.0 (30.0, 198.0)	80.0 (25.0, 200.0)	83.0 (26.0, 194.0)	80.0 (20.0, 200.0)	84.0 (26.0, 198.0)				
IQR	25.0	26.0	26.0	26.0	25.0	27.0	26.0	27.0				
Missing (%)	592 (3.6)	166 (3.9)	112 (1.8)	30 (1.9)	152 (2.6)	45 (3.0)	264 (2.2)	75 (2.4)				
Episodes of angina in past 24 hours, No. (%)												
0–2	5,793 (43.0)	1,355 (39.3)	1,900 (34.9)	400 (28.2)	1,837 (37.8)	387 (30.2)	3,737 (36.3)	787 (29.1)				
>2	368 (2.7)	99 (2.9)	125 (2.3)	25 (1.8)	168 (3.5)	50 (3.9)	293 (2.8)	75 (2.8)				
Not available	7,326 (54.3)	1,993 (57.8)	3,425 (62.8)	995 (70.1)	2,850 (58.7)	846 (65.9)	6,275 (60.9)	1,841 (68.1)				
Missing	2,825	846	798	178	943	235	1,741	413				
Killip classification code, No. (%)												
I	8,953 (71.1)	1,893 (67.0)	2,783 (63.3)	487 (57.5)	2,755 (69.1)	579 (68.4)	5,538 (66.1)	1,066 (63.0)				
II	1,707 (13.6)	462 (16.4)	701 (15.9)	129 (15.2)	525 (13.2)	105 (12.4)	1,226 (14.6)	234 (13.8)				
III	620 (4.9)	196 (6.9)	244 (5.6)	60 (7.1)	171 (4.3)	59 (7.0)	415 (5.0)	119 (7.0)				
IV	1,317 (10.5)	275 (9.7)	668 (15.2)	171 (20.2)	535 (13.4)	103 (12.2)	1,203 (14.4)	274 (16.2)				
Not stated/ inadequately described	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)				
Not available	3,715	1,467	1,852	751	1,812	672	3,664	1,423				

Year	2018–2019			2020			2021			2020–2021		
ACS stratum	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Female	
Total	16,312 (79.2)	4,293 (20.8)	6,248 (79.6)	1,598 (20.4)	5,798 (79.3)	1,518 (20.7)	12,046 (79.4)	3,116 (20.6)				
Total cholesterol, mmol/L												
N	11,437	2,797	4,833	1,132	4,266	1,105		9,099		2,237		
Mean (SD)	5.0 (1.4)	4.9 (1.5)	5.1 (1.4)	5.0 (1.6)	5.0 (1.4)	4.9 (1.5)		5.1 (1.4)		4.9 (1.5)		
Median (min, max)	4.9 (2.0, 23.0)	4.8 (2.0, 14.2)	5.0 (2.0, 14.9)	4.8 (2.0, 16.5)	5.0 (2.0, 16.2)	4.7 (2.0, 12.6)		5.0 (2.0, 16.2)		4.7 (2.0, 16.5)		
IQR	2.0	1.8	2.0	2.0	1.9	1.9		2.0		1.9		
Test not done (%)	3,202 (19.6)	1,114 (26.0)	1,091 (17.5)	396 (24.8)	1,113 (19.2)	308 (20.3)		2,204 (18.3)		704 (22.6)		
Missing (%)	1,673 (10.3)	382 (8.9)	324 (5.2)	70 (4.4)	419 (7.2)	105 (6.9)		743 (6.2)		175 (5.6)		
HDL-C, mmol/L												
N	11,155	2,748	4,794	1,114	4,200	1,084		8,994		2,198		
Mean (SD)	1.1 (0.3)	1.2 (0.4)	1.1 (0.4)	1.2 (0.4)	1.1 (0.4)	1.2 (0.4)		1.1 (0.4)		1.2 (0.4)		
Median (min, max)	1.0 (0.5, 4.9)	1.1 (0.5, 4.9)	1.0 (0.5, 5.0)	1.2 (0.5, 3.6)	1.0 (0.5, 5.0)	1.2 (0.5, 4.9)		1.0 (0.5, 5.0)		1.2 (0.5, 4.9)		
IQR	0.3	0.5	0.3	0.4	0.3	0.4		0.3		0.3		
Test not done (%)	3,279 (20.1)	1,123 (26.2)	1,108 (17.7)	407 (25.5)	1,141 (19.7)	316 (20.8)		2,249 (18.7)		723 (23.2)		
Missing (%)	1,878 (11.5)	422 (9.8)	346 (5.5)	77 (4.8)	457 (7.9)	118 (7.8)		803 (6.7)		195 (6.3)		
LDL-C, mmol/L												
N	11,302	2,782	4,794	1,129	4,234	1,087		9,028		2,216		
Mean (SD)	3.1 (1.3)	3.0 (1.3)	3.2 (1.3)	3.1 (1.4)	3.2 (1.3)	3.0 (1.3)		3.2 (1.3)		3.0 (1.3)		
Median (min, max)	3.0 (0.5, 13.8)	2.8 (0.5, 11.8)	3.2 (0.5, 13.3)	2.9 (0.5, 12.1)	3.1 (0.5, 12.4)	2.8 (0.5, 10.6)		3.1 (0.5, 13.3)		2.8 (0.5, 12.1)		
IQR	1.8	1.6	1.8	1.8	1.8	1.7		1.8		1.8		
Test not done (%)	3,326 (20.4)	1,135 (26.4)	1,138 (18.2)	402 (25.2)	1,161 (20.0)	325 (21.4)		2,299 (19.1)		727 (23.3)		
Missing (%)	1,684 (10.3)	376 (8.8)	316 (5.1)	67 (4.2)	403 (7.0)	106 (7.0)		719 (6.0)		173 (5.6)		

Year	2018–2019				2020				2020–2021			
ACS stratum	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Total	16,312 (79.2)	4,293 (20.8)	6,248 (79.6)	1,598 (20.4)	5,798 (79.3)	1,518 (20.7)	12,046 (79.4)	3,116 (20.6)				
Triglycerides, mmol/L												
N	11,310	2,775	4,818	1,130	4,246		1,090		9,064		2,220	
Mean (SD)	1.7 (1.1)	1.7 (1.0)	1.7 (1.1)	1.6 (0.9)	1.7 (1.1)		1.6 (1.0)		1.7 (1.1)		1.6 (1.0)	
Median (min, max)	1.5 (0.5, 14.3)	1.4 (0.5, 13.0)	1.5 (0.5, 14.3)	1.4 (0.5, 10.6)	1.5 (0.5, 13.3)		1.4 (0.5, 12.4)		1.5 (0.5, 14.3)		1.4 (0.5, 12.4)	
IQR	0.9	0.9	0.9	0.8	0.9		0.9		0.9		0.8	
Test not done (%)	3,239 (19.9)	1,123 (26.2)	1,097 (17.6)	400 (25.0)	1,133 (19.5)		318 (20.9)		2,230 (18.5)		718 (23.0)	
Missing (%)	1,763 (10.8)	395 (9.2)	333 (5.3)	68 (4.3)	419 (7.2)		110 (7.2)		752 (6.2)		178 (5.7)	
HbA1c, mmol/L												
N	2,227	655	1,334	447	1,356		436		2,690		883	
Mean (SD)	8.1 (3.4)	8.4 (2.9)	7.9 (3.3)	8.4 (3.3)	7.8 (3.3)		8.5 (3.6)		7.9 (3.3)		8.4 (3.5)	
Median (min, max)	7.1 (0.4, 32.0)	7.6 (4.1, 22.9)	6.8 (4.0, 32.0)	7.3 (4.9, 31.0)	6.7 (4.0, 32.0)		7.5 (4.5, 30.0)		6.8 (4.0, 32.0)		7.4 (4.5, 31.0)	
IQR	3.5	3.9	3.2	3.5	2.8		3.7		3.0		3.7	
Test not done (%)	9,902 (60.7)	2,678 (62.4)	3,464 (55.4)	836 (52.3)	3,039 (52.4)		785 (51.7)		6,503 (54.0)		1,621 (52.0)	
Missing (%)	4,183 (25.6)	960 (22.4)	1,450 (23.2)	315 (19.7)	1,403 (24.2)		297 (19.6)		2,853 (23.7)		612 (19.6)	
LVEF, %												
N	8,695	2,014	3,817	851	3,325		753		7,142		1,604	
Mean (SD)	45.9 (12.7)	48.1 (13.1)	45.5 (11.9)	47.4 (12.7)	45.0 (12.0)		48.8 (12.9)		45.3 (11.9)		48.0 (12.8)	
Median (min, max)	45.0 (5.0, 90.0)	50.0 (5.2, 84.0)	45.0 (5.1, 88.0)	48.0 (5.5, 86.7)	45.0 (5.8, 87.0)		50.0 (6.6, 87.1)		45.0 (5.1, 88.0)		50.0 (5.5, 87.1)	
IQR	17.0	15.0	16.0	15.0	17.0		16.0		17.0		15.0	
Test not done (%)	5,582 (34.2)	1,787 (41.6)	2,144 (34.3)	688 (43.1)	2,076 (35.8)		675 (44.5)		4,220 (35.0)		1,363 (43.7)	
Missing (%)	2,035 (12.5)	492 (11.5)	287 (4.6)	59 (3.7)	397 (6.8)		90 (5.9)		684 (5.7)		149 (4.8)	

Year	2018–2019			2020			2021			2020–2021		
ACS stratum	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Female	
Total	16,312 (79.2)	4,293 (20.8)	6,248 (79.6)	1,598 (20.4)	5,798 (79.3)	1,518 (20.7)	12,046 (79.4)	3,116 (20.6)				
ECG, No. (%)												
Inferior leads	5,128 (31.4)	1,219 (28.4)	2,297 (36.8)	494 (30.9)	1,973 (34.0)	426 (28.1)	4,270 (35.4)	920 (29.5)				
Anterior leads	5,886 (36.1)	1,344 (31.3)	2,500 (40.0)	570 (35.7)	2,310 (39.8)	523 (34.5)	4,810 (39.9)	1,093 (35.1)				
Lateral leads	4,337 (26.6)	1,315 (30.6)	1,688 (27.0)	529 (33.1)	1,487 (25.6)	416 (27.4)	3,175 (26.4)	945 (30.3)				
True posterior	679 (4.2)	191 (4.5)	339 (5.4)	98 (6.1)	245 (4.2)	44 (2.9)	584 (4.8)	142 (4.6)				
Right ventricle	440 (2.7)	91 (2.1)	234 (3.7)	44 (2.8)	206 (3.6)	36 (2.4)	440 (3.7)	80 (2.6)				
None	3,052 (18.7)	921 (21.5)	940 (15.0)	324 (20.3)	1,003 (17.3)	372 (24.5)	1,943 (16.1)	696 (22.3)				
Not stated/ inadequately described	887 (5.4)	314 (7.3)	314 (5.0)	99 (6.2)	351 (6.1)	114 (7.5)	665 (5.5)	213 (6.8)				
Total number of STEMI patients who were given fibrinolytic therapy at reporting centre	2,971 (18.2)	410 (9.6)	1,676 (26.8)	219 (13.7)	1,298 (22.4)	201 (13.2)	2,974 (24.7)	420 (13.5)				
Pain-to-needle time, min (*symptom to treatment)												
N	2,426	308	1,384	172	1,055		141	2,439	313			
Mean (SD)	277.2 (246.3)	351.1 (283.8)	265.9 (219.6)	364.7 (265.4)	301.4 (262.2)	329.4 (258.7)	281.3 (239.6)	348.8 (262.6)				
Median (min, max)	195.0 (25.0, 1,440.0)	255.0 (26.0, 1,340.0)	200.0 (15.0, 1440.0)	280.0 (15.0, 1240.0)	210.0 (15.0, 1440.0)	255.0 (30.0, 1320.0)	207.0 (15.0, 1440.0)	270.0 (15.0, 1320.0)				
IQR	210.0	297.5	195.0	302.5	240.0	260.0	215.0	290.0				
Missing (%)	545 (18.3)	102 (24.9)	292 (17.4)	47 (21.5)	243 (18.7)	60 (29.9)	535 (18.0)	107 (25.5)				
Pain-to-needle time, No (%)												
≤180 min	1,141 (47.0)	108 (35.1)	624 (45.1)	46 (26.7)	461 (43.7)	48 (34.0)	1,085 (44.5)	94 (30.0)				
>180 min	1,285 (53.0)	200 (64.9)	760 (54.9)	126 (73.3)	594 (56.3)	93 (66.0)	1,354 (55.5)	219 (70.0)				
Missing	545	102	292	47	243	60	535	107				

*Symptom to treatment is the time difference between onset of ACS symptom and when patient was given fibrinolytic therapy

Note:

1. Not all participating centres performed Troponin T or Troponin I tests

2. Percentage is to the nearest decimal point

Table 3.4 Cardiac presentation of patients with ACS by pre-morbid diabetes, NCVd-ACS Registry, 2020–2021

Year	2018–2019				2020				2021				2020–2021	
Diabetes status	Diabetic	Non-diabetic	Unknown	Non-diabetic	Unknown									
Total	8,940 (43.4)	10,062 (48.8)	1,241 (6.0)	3,459 (44.1)	4,038 (51.5)	216 (2.8)	3,199 (43.7)	3,751 (51.3)	255 (3.5)	6,658 (43.9)	7,789 (51.4)	471 (3.1)		
ACS stratum, No. (%)														
STEMI	3,197 (35.8)	4,805 (47.8)	710 (46.1)	1,595 (57.2)	2,325 (65.7)	142 (41.0)	1,313 (51.6)	1,937 (55.3)	141 (43.7)	2,908 (43.7)	4,262 (54.7)	283 (60.1)		
NSTEMI	3,448 (38.6)	2,797 (27.8)	293 (23.6)	1,179 (34.1)	989 (24.5)	51 (23.6)	1,214 (37.9)	1,070 (28.5)	59 (23.1)	2,393 (35.9)	2,059 (26.4)	110 (23.4)		
UA	2,295 (25.7)	2,460 (24.5)	238 (19.2)	685 (19.8)	724 (17.9)	23 (10.6)	672 (21.0)	744 (19.8)	55 (21.6)	1,357 (20.4)	1,468 (18.8)	78 (16.6)		
Systolic blood pressure, mmHg														
N	8,937	10,057	1,240	3,456	4,037	216	3,199	3,751	255	6,655	7,788	471		
Mean (SD)	140.5 (28.8)	137.8 (27.7)	133.8 (29.7)	141.4 (27.7)	137.4 (25.9)	141.1 (27.7)	134.7 (29.0)	137.2 (26.7)	134.9 (29.7)	141.3 (29.4)	137.3 (27.2)	134.8 (28.0)		
Median (min, max)	138.0 (54.0, 269.0)	136.0 (51.0, 266.0)	130.0 (59.0, 241.0)	139.0 (54.0, 269.0)	135.0 (55.0, 268.0)	131.0 (70.0, 230.0)	139.0 (60.0, 270.0)	135.0 (55.0, 251.0)	131.0 (53.0, 257.0)	139.0 (54.0, 270.0)	135.0 (55.0, 268.0)	131.0 (53.0, 257.0)		
IQR	37.0	35.0	35.0	40.0	36.0	30.0	37.0	34.0	38.0	38.0	35.0	35.0		
Missing (%)	3 (0.0)	5 (0.1)	1 (0.1)	3 (0.1)	1 (0.0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (0.1)	1 (0.0)	0 (0)		
Diastolic blood pressure, mmHg														
N	8,935	10,056	1,240	3,458	4,034	216	3,198	3,750	255	6,656	7,784	471		
Mean (SD)	80.7 (17.1)	82.2 (17.5)	80.5 (17.4)	81.4 (17.5)	82.8 (17.6)	83.2 (16.6)	80.8 (17.0)	82.8 (17.2)	82.9 (18.5)	81.1 (17.3)	82.8 (17.4)	83.0 (17.6)		
Median (min, max)	80.0 (20.0, 170.0)	81.0 (11.0, 166.0)	80.0 (23.0, 163.0)	80.0 (18.0, 170.0)	81.0 (31.0, 168.0)	81.0 (33.0, 133.0)	80.0 (22.0, 164.0)	82.0 (24.0, 168.0)	80.0 (25.0, 150.0)	80.0 (18.0, 170.0)	82.0 (24.0, 168.0)	81.0 (25.0, 150.0)		
IQR	21.0	22.0	21.0	22.0	22.0	21.0	20.0	22.0	24.0	21.0	22.0	22.0		
Missing (%)	5 (0.1)	6 (0.1)	1 (0.1)	1 (0.0)	4 (0.1)	0 (0)	1 (0.0)	0 (0)	1 (0.0)	2 (0.0)	5 (0.1)	0 (0)		

Year		2018–2019				2020				2021				2020–2021		
		Diabetic	Non-diabetic	Unknown	Non-diabetic	Unknown										
Diabetes status																
Total		8,940 (43.4)	10,062 (48.8)	1,241 (6.0)	3,459 (44.1)	4,038 (51.5)	216 (2.8)	3,199 (43.7)	255 (51.3)	3,751 (3.5)	6,658 (43.9)	7,789 (51.4)	471 (31)			
Pulse pressure, mmHg																
N		8,551	9,779	1,206	3,453	4,028	216	3,194	3,747	255	6,647	7,775	471			
Mean (SD)		57.5 (18.4)	54.1 (17.4)	60.1 (16.4)	54.6 (19.3)	51.5 (17.7)	60.3 (21.6)	54.4 (19.0)	52.0 (18.7)	60.2 (21.8)	54.5 (19.2)	51.8 (18.3)				
Median (min, max)		56.0 (3.0, 100.0)	52.0 (3.0, 100.0)	50.0 (9.0, 100.0)	57.0 (2.0, 159.0)	52.0 (2.0, 150.0)	50.0 (20.0, 123.0)	57.0 (4.0, 155.0)	51.0 (2.0, 143.0)	49.0 (15.0, 157.0)	57.0 (2.0, 159.0)	52.0 (2.0, 150.0)	50.0 (15.0, 157.0)			
IQR		26.0	25.0	22.0	30.0	25.0	21.0	30.0	25.0	22.0	30.0	25.0	21.0			
Missing (%)		389 (4.4)	283 (92.8)	35 (2.8)	6 (0.2)	10 (0.2)	0 (0)	5 (0.2)	4 (0.1)	0 (0)	11 (0.2)	14 (0.2)	0 (0)			
Heart rate at presentation, beats/min																
N		8,639	9,638	1,219	3,397	3,961	214	3,117	3,651	245	6,514	7,612	459			
Mean (SD)		86.3 (20.8)	81.0 (19.9)	80.8 (20.5)	86.5 (21.1)	81.5 (20.0)	83.3 (21.4)	85.6 (20.4)	82.0 (19.7)	82.8 (19.0)	86.1 (20.8)	81.7 (19.9)	83.0 (20.1)			
Median (min, max)		84.0 (21.0, 200.0)	79.0 (20.0, 199.0)	78.0 (30.0, 199.0)	85.0 (20.0, 186.0)	79.0 (22.0, 199.0)	80.5 (39.0, 169.0)	84.0 (25.0, 194.0)	80.0 (29.0, 200.0)	80.0 (43.0, 170.0)	84.0 (20.0, 194.0)	80.0 (22.0, 200.0)	80.0 (39.0, 170.0)			
IQR		26.0	24.0	24.0	27.0	26.0	28.0	26.0	24.0	24.0	26.0	24.5	25.0			
Missing (%)		301 (3.4)	434 (4.2)	22 (1.8)	62 (1.8)	77 (1.9)	2 (0.9)	82 (2.6)	100 (2.7)	10 (3.9)	144 (2.2)	177 (2.3)	12 (2.5)			
Episodes of angina in past 24 hours, No. (%)																
0–2		2,924 (40.0)	3,690 (45.0)	441 (40.8)	899 (29.5)	1,270 (36.3)	88 (43.6)	900 (33.5)	1,226 (39.4)	73 (31.2)	1,799 (31.4)	2,496 (37.8)	161 (36.9)			
>2		216 (3.0)	229 (2.8)	18 (1.7)	68 (2.2)	75 (2.1)	3 (1.5)	103 (3.8)	104 (3.3)	10 (4.3)	171 (3.0)	179 (2.7)	13 (3.0)			
Not available		4,171 (57.1)	4,283 (52.2)	623 (68.2)	2,078 (61.5)	2,149 (55.0)	111 (61.5)	1,686 (57.3)	1,782 (62.7)	151 (64.5)	3,764 (65.6)	3,931 (59.5)	262 (60.1)			
Missing		1,629	1,860	159	414	544	14	510	639	21	924	1,183	35			

Year		2018–2019				2020				2021				2020–2021	
Diabetes status		Diabetic	Non-diabetic	Unknown	Diabetic	Non-diabetic	Unknown	Diabetic	Non-diabetic	Unknown	Diabetic	Non-diabetic	Unknown	Non-diabetic	Unknown
Total		8,940 (43.4)	10,062 (48.8)	1,241 (6.0)	3,459 (44.1)	4,038 (51.5)	216 (2.8)	3,199 (43.7)	3,751 (51.3)	255 (3.5)	6,658 (43.9)	7,789 (51.4)	471 (31)		
Killip classification code, No. (%)															
I		4,125 (65.3)	5,785 (74.4)	729 (70.4)	1,220 (56.6)	1,888 (67.0)	95 (57.6)	1,289 (65.0)	1,856 (72.2)	121 (67.2)	2,509 (60.6)	3,744 (69.5)	216 (62.6)		
II		1,064 (16.8)	922 (11.9)	151 (14.6)	364 (16.9)	418 (14.8)	28 (17.0)	287 (14.5)	307 (12.0)	26 (14.4)	651 (15.7)	725 (13.5)	54 (15.7)		
III		463 (7.3)	302 (3.9)	33 (3.2)	174 (8.1)	118 (4.2)	8 (4.2)	130 (6.6)	92 (6.6)	6 (3.6)	304 (3.3)	210 (7.3)	14 (3.9)		
IV		666 (10.5)	763 (9.8)	123 (11.9)	399 (18.5)	394 (14.0)	34 (20.6)	278 (14.0)	314 (12.2)	27 (15.0)	677 (16.3)	708 (13.1)	61 (17.7)		
Not stated/inadequately described		0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
Not available		2,622	2,290	205	1,302	1,220	51	1,215	1,182	75	2,517	2,402	126		
Total cholesterol, mmol/L															
N		6,047	7,087	847	2,551	3,139	169	2,305	2,805	189	4,856	5,944	358		
Mean (SD)		4.7 (1.5)	5.1 (1.4)	5.4 (1.5)	4.8 (1.5)	5.2 (1.4)	5.5 (1.3)	4.7 (1.4)	5.2 (1.4)	5.7 (1.5)	4.8 (1.5)	5.2 (1.4)	5.6 (1.4)		
Median (min, max)		4.5 (2.0, 16.7)	5.0 (2.0, 15.6)	5.3 (2.3, 15.0)	4.6 (2.0, 16.5)	5.2 (2.0, 14.9)	5.5 (2.9, 10.2)	4.6 (2.0, 12.6)	5.1 (2.0, 16.2)	5.5 (2.7, 9.7)	4.6 (2.0, 16.5)	5.2 (2.0, 16.2)	5.5 (2.7, 10.2)		
IQR		1.9	1.8	1.9	2.0	1.9	1.6	1.6	1.9	1.9	2.2	1.9	1.9		
Test not done (%)		2,080 (23.3)	1,942 (19.3)	237 (19.3)	756 (21.9)	672 (16.6)	42 (19.4)	678 (21.2)	665 (17.7)	49 (19.2)	1,434 (21.5)	1,337 (17.2)	91 (19.3)		
Missing (%)		813 (9.1)	1,033 (10.3)	157 (12.7)	227 (4.4)	152 (5.6)	5 (2.3)	216 (6.8)	281 (7.5)	17 (6.7)	368 (5.5)	508 (6.5)	22 (4.7)		
HDL-C, mmol/L															
N		5,903	6,933	823	2,530	3,106	169	2,258	2,766	189	4,788	5,872	358		
Mean (SD)		1.1 (0.4)	1.1 (0.4)	1.1 (0.3)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.2 (0.6)	1.1 (0.4)	1.1 (0.4)	1.2 (0.5)		
Median (min, max)		1.0 (0.5, 4.9)	1.1 (0.5, 4.9)	1.1 (0.5, 3.8)	1.0 (0.5, 5.0)	1.1 (0.5, 4.9)	1.1 (0.6, 5.0)	1.0 (0.5, 5.0)	1.0 (0.5, 4.8)	1.1 (0.6, 4.9)	1.0 (0.5, 5.0)	1.1 (0.5, 4.9)	1.1 (0.6, 5.0)		
IQR		0.4	0.3	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.3	0.4	0.4		
Test not done (%)		2,111 (23.6)	1,991 (19.8)	238 (19.2)	764 (22.1)	691 (17.1)	43 (19.9)	698 (21.8)	680 (18.1)	49 (19.2)	1,462 (22.0)	1,371 (17.6)	92 (19.5)		
Missing (%)		926 (10.4)	1,138 (11.3)	180 (14.5)	165 (4.8)	241 (6.0)	4 (1.9)	243 (7.6)	305 (8.1)	17 (6.7)	408 (6.1)	546 (7.0)	21 (4.5)		

Year	2018–2019				2020				2021				2020–2021		
	Diabetic	Non-diabetic	Unknown	Non-diabetic	Unknown										
Diabetes status															
Total	8,940 (43.4)	10,062 (48.8)	1,241 (6.0)	3,459 (44.1)	4,038 (51.5)	216 (2.8)	3,199 (43.7)	3,751 (51.3)	255 (3.5)	6,658 (43.9)	7,789 (51.4)	471 (3.1)			
LDL-C, mmol/L															
N	5,990	7,013	838	2,526	3,124	167	2,270	2,787	191	4,796	5,911	358			
Mean (SD)	2.9 (1.3)	3.3 (1.3)	2.9 (1.3)	3.4 (1.3)	3.6 (1.2)	2.8 (1.2)	3.6 (1.2)	3.3 (1.3)	3.7 (1.3)	2.9 (1.3)	3.3 (1.3)	3.7 (1.3)			
Median (min, max)	2.7 (0.5, 12.8)	3.2 (0.5, 13.8)	3.5 (0.5, 11.0)	2.8 (0.5, 12.1)	3.3 (0.5, 13.3)	3.5 (1.0, 7.6)	2.7 (0.5, 12.4)	3.2 (0.5, 11.1)	3.6 (0.7, 7.0)	2.7 (0.5, 12.4)	3.3 (0.5, 13.3)	3.6 (0.7, 7.6)			
IQR	1.7	1.6	1.7	1.7	1.8	1.7	1.7	1.7	1.7	1.9	1.8	1.8			
Test not done (%)	2,139 (23.9)	2,011 (20.0)	247 (19.9)	784 (22.7)	695 (17.2)	44 (20.4)	718 (22.4)	689 (18.4)	49 (19.2)	1,502 (22.6)	1,384 (17.8)	93 (19.7)			
Missing (%)	811 (9.1)	1,038 (10.3)	156 (12.6)	149 (4.3)	219 (5.4)	5 (2.3)	211 (6.6)	275 (7.3)	15 (5.9)	360 (5.4)	494 (6.3)	20 (4.2)			
Triglycerides, mmol/L															
N	6,003	7,010	824	2,549	3,124	169	2,292	2,786	188	4,841	5,910	357			
Mean (SD)	1.8 (1.2)	1.7 (1.0)	1.8 (1.1)	1.8 (1.2)	1.7 (1.0)	1.9 (1.4)	1.8 (1.1)	1.8 (1.1)	1.6 (1.0)	1.7 (0.8)	1.8 (1.2)	1.7 (1.0)			
Median (min, max)	1.5 (0.5, 14.3)	1.4 (0.5, 14.0)	1.5 (0.5, 14.2)	1.4 (0.5, 14.3)	1.4 (0.5, 13.1)	1.4 (0.6, 14.1)	1.6 (0.5, 14.1)	1.5 (0.5, 13.0)	1.5 (0.5, 13.3)	1.4 (0.5, 14.5)	1.5 (0.5, 14.3)	1.5 (0.5, 14.3)	1.5 (0.5, 14.1)		
IQR	1.0	0.9	1.0	1.0	0.9	1.1	1.0	1.0	0.9	0.9	1.0	0.8			
Test not done (%)	2,098 (23.5)	1,963 (19.5)	240 (19.3)	757 (21.9)	680 (16.8)	43 (19.9)	692 (21.6)	675 (18.0)	53 (20.8)	1,449 (21.8)	1,355 (17.4)	96 (20.4)			
Missing (%)	839 (9.4)	1,089 (10.8)	177 (14.3)	153 (4.4)	234 (5.8)	4 (1.9)	215 (6.7)	290 (7.7)	14 (5.5)	368 (5.5)	524 (6.7)	18 (3.8)			
HbA1c, mmol/L															
N	1,584	1,063	177	967	721	61	910	796	65	1,877	1,517	126			
Mean (SD)	9.3 (2.9)	6.9 (3.4)	9.0 (2.8)	6.9 (3.6)	7.1 (3.9)	9.1 (2.9)	6.8 (3.5)	6.6 (1.7)	9.0 (2.8)	6.9 (3.6)	6.9 (3.0)				
Median (min, max)	8.8 (4.0, 32.0)	6.0 (4.1, 32.0)	8.5 (4.2, 28.0)	6.0 (4.7, 22.8)	6.0 (4.0, 32.0)	5.9 (4.9, 31.0)	8.4 (4.5, 31.0)	6.0 (4.0, 32.0)	5.9 (4.8, 31.6)	8.4 (4.5, 31.0)	6.0 (4.0, 32.0)	5.9 (4.8, 31.0)			
IQR	3.7	1.2	1.8	3.6	1.2	1.1	3.6	1.1	1.6	3.5	1.1	1.4			
Test not done (%)	5,241 (58.6)	6,380 (63.4)	745 (60.0)	1,768 (51.1)	2,327 (57.6)	129 (59.7)	1,573 (49.2)	2,045 (54.5)	134 (52.5)	3,341 (50.2)	4,372 (56.1)	263 (55.8)			
Missing (%)	2,115	2,619	319	724	990	26	716	910	56	1,440	1,900	82			

Year	(23.7)	(26.0)	(25.7)	(20.9)	(24.5)	(12.0)	(22.4)	(24.3)	(22.0)	(21.6)	(24.4)	(17.4)	
2018–2019				2020				2021				2020–2021	
Diabetes status	Diabetic	Non-diabetic	Unknown	Diabetic	Non-diabetic	Unknown	Diabetic	Non-diabetic	Unknown	Diabetic	Non-diabetic	Unknown	
Total	8,940 (43.4)	10,062 (48.8)	1,241 (6.0)	3,459 (44.1)	4,038 (51.5)	216 (2.8)	3,199 (43.7)	3,751 (51.3)	255 (3.5)	6,658 (43.9)	7,789 (51.4)	471 (3.1)	
LVEF, %													
N	4563	5,349	624	1,967	2,504	138	1,757	2,162	114	3,724	4,666	252	
Mean (SD)	45.0 (13.2)	47.2 (12.4)	46.7 (12.1)	44.5 (12.2)	46.8 (11.9)	45.4 (12.5)	44.7 (12.6)	46.5 (11.9)	44.8 (11.7)	44.6 (12.4)	46.7 (11.9)	45.2 (12.1)	
Median (min, max)	45.0 (5.0, 90.0)	47.2 (5.0, 87.4)	47.5 (5.0, 82.0)	45.0 (5.4, 81.0)	47.0 (5.4, 88.0)	45.0 (10.0, 73.0)	45.0 (6.6, 87.1)	45.0 (5.9, 83.0)	45.0 (5.8, 77.0)	45.0 (5.5, 87.1)	46.0 (5.4, 88.0)	45.0 (5.8, 77.0)	
IQR	20.0	15.0	16.0	18.0	15.0	16.0	20.0	15.0	14.0	19.0	15.0	14.4	
Test not done (%)	3,351 (37.5)	3,488 (34.7)	383 (30.9)	1,351 (39.1)	1,341 (33.2)	70 (32.4)	1,246 (38.9)	1,323 (35.3)	123 (48.2)	2,597 (39.0)	2,664 (34.2)	193 (41.0)	
Missing (%)	1,026 (11.5)	1,225 (12.2)	234 (18.9)	141 (4.1)	193 (4.8)	8 (3.7)	196 (6.1)	266 (7.1)	18 (7.1)	337 (5.1)	459 (5.9)	26 (5.5)	
ECG, No. (%)													
Inferior leads	2,629 (29.4)	3,209 (31.9)	404 (32.6)	1,163 (33.6)	1,482 (36.7)	93 (43.1)	993 (31.0)	1,277 (34.0)	84 (32.9)	2,156 (32.4)	2,759 (35.4)	177 (37.6)	
Anterior leads	2,886 (32.3)	3,687 (36.6)	505 (40.7)	1,281 (37.0)	1,623 (40.2)	100 (46.3)	1,131 (35.4)	1,548 (41.3)	105 (41.2)	2,412 (36.2)	3,171 (40.7)	205 (43.5)	
Lateral leads	2,753 (30.8)	2,521 (25.1)	309 (24.9)	1,000 (28.9)	1,134 (28.1)	51 (23.6)	885 (27.7)	946 (25.2)	54 (21.2)	1,885 (28.3)	2,080 (26.7)	105 (22.3)	
True posterior	329 (3.7)	481 (4.8)	46 (3.7)	189 (5.5)	227 (5.6)	11 (5.1)	111 (3.5)	160 (4.3)	14 (5.5)	300 (4.5)	387 (5.0)	25 (5.3)	
Right ventricle	190 (2.1)	295 (2.9)	41 (3.3)	112 (3.2)	151 (3.7)	8 (3.7)	99 (3.1)	130 (3.5)	9 (3.5)	211 (3.2)	281 (3.6)	17 (3.6)	
None	1848 (20.7)	1884 (18.7)	193 (15.6)	597 (17.3)	624 (15.5)	26 (12.0)	658 (20.6)	660 (17.6)	41 (16.1)	1,255 (18.8)	1,284 (16.5)	67 (14.2)	
Not stated/inadequately described	534 (6.0)	553 (5.5)	75 (6.0)	201 (5.8)	192 (4.8)	14 (6.5)	219 (6.8)	20 (5.8)	20 (7.8)	420 (6.3)	411 (5.3)	34 (7.2)	

Year	2018–2019				2020				2021				2020–2021			
Diabetes status	Diabetic	Non-diabetic	Unknown	Diabetic	Non-diabetic	Unknown	Diabetic	Non-diabetic	Unknown	Diabetic	Non-diabetic	Unknown	Diabetic	Non-diabetic	Unknown	
Total	8,940 (43.4)	10,062 (48.8)	1,241 (6.0)	3,459 (44.1)	4,038 (51.5)	216 (2.8)	3,199 (43.7)	3,751 (51.3)	255 (3.5)	6,658 (43.9)	7,789 (51.4)	471 (3.1)				
Total number of STEMI patients who were given fibrinolytic therapy at reporting centre	1,221 (13.7)	1,837 (18.3)	208 (21.0)	728 (26.3)	1,062 (20.8)	45 (17.2)	551 (22.8)	855 (20.4)	52 (19.2)	1,279 (24.6)	1,917 (24.6)	97 (20.6)				
Pain-to-needle time, min (*symptom to treatment)																
N	951	1,506	171	582	877	42	408	705	44	990	1,582	86				
Mean (SD)	311.4 (264.6)	275.4 (251.4)	265.5 (211.0)	289.3 (234.5)	267.5 (220.8)	294.6 (231.4)	319.1 (261.8)	299.5 (268.2)	308.3 (214.9)	301.6 (246.4)	281.7 (243.5)	301.6 (221.9)				
Median (min, max)	220.0 (25.0, 1,440.0)	190.0 (25.0, 1,430.0)	200.0 (40.0, 1,090.0)	210.0 (30.0, 1350.0)	208.0 (65.0, 1095.0)	215.0 (15.0, 1440.0)	244.0 (15.0, 1385.0)	210.0 (15.0, 1440.0)	232.5 (50.0, 870.0)	219.0 (15.0, 1385.0)	210.0 (15.0, 1440.0)	222.5 (50.0, 1095.0)				
IQR	255.0	197.0	199.0	238.0	195.0	215.0	287.5	220.0	295.0	260.0	200.0	252.0				
Missing (%)	270 (22.1)	331 (18.0)	37 (17.8)	146 (20.1)	185 (17.4)	3 (6.7)	143 (26.0)	150 (17.5)	8 (15.4)	289 (22.6)	335 (17.5)	11 (11.3)				
Pain-to-needle time, No (%)																
≤180 min	386 (40.6)	730 (48.5)	78 (45.6)	245 (42.1)	386 (44.0)	17 (40.5)	165 (40.4)	309 (43.8)	16 (36.4)	410 (41.4)	695 (43.9)	33 (38.4)				
>180 min	565 (59.4)	776 (51.5)	93 (54.4)	337 (57.9)	491 (56.0)	25 (59.5)	243 (59.6)	396 (56.2)	28 (63.6)	580 (58.6)	887 (56.1)	53 (61.6)				
Missing	270	331	37	146	185	3	143	150	8	289	335	11				

*Symptom to treatment is the time difference between onset of ACS symptom and when patient was given fibrinolytic therapy

Note:

1. Not all participating centres performed Troponin T or Troponin I tests

2. Percentage is to the nearest decimal point

Table 3.5 Cardiac presentation of patients with ACS by pre-morbid hypertension, NCVD-ACS Registry, 2020–2021

Year	Hypertension status	2018–2019		2020		2021		2020–2021	
		Hyperensive Non- Unknown	Hyperensive Unknown	Hyperensive Non- Unknown	Hyperensive Unknown	Hyperensive Non- Unknown	Hyperensive Non- Unknown	Hyperensive Non- Unknown	Hyperensive Non- Unknown
Total	12,535 (60.8)	6,658 (32.3)	1,050 (5.1)	4,811 (61.3)	2,723 (34.7)	179 (2.3)	4,453 (60.9)	2,525 (34.5)	227 (3.1)
ACS stratum, No. (%)									
STEMI	4,307 (34.4)	3,744 (56.2)	661 (63.0)	2,138 (44.4)	1,800 (66.1)	124 (69.3)	1,712 (38.4)	1,554 (61.5)	125 (55.1)
NSTEMI	4,643 (37.0)	1,663 (25.0)	232 (22.1)	1,607 (33.4)	575 (21.1)	37 (20.7)	1,688 (37.9)	604 (23.9)	51 (22.5)
UA	3,585 (28.6)	1,251 (18.8)	157 (15.0)	1,066 (22.2)	348 (12.8)	18 (10.1)	1,053 (23.6)	367 (14.5)	51 (22.5)
Systolic blood pressure, mmHg									
N	12,528	6,657	1,049	4,808	2,722	179	4,453	2,525	227
Mean (SD)	142.8 (29.0)	132.4 (25.5)	131.2 (26.6)	142.7 (29.7)	133.2 (25.9)	132.7 (24.5)	142.3 (29.0)	133.3 (24.9)	132.6 (27.4)
Median (min, max)	141.0 (51.0, 269.0)	130.0 (51.0, 266.0)	128.0 (59.0, 247.0)	141.0 (54.0, 269.0)	132.0 (60.0, 262.0)	130.0 (70.0, 230.0)	141.0 (53.0, 270.0)	131.0 (55.0, 251.0)	128.0 (55.0, 257.0)
IQR	37.0	33.0	32.0	38.5	34.0	28.0	36.0	32.0	37.0
Missing (%)	7 (0.1)	1 (0.0)	1 (0.1)	3 (0.1)	1 (0.0)	0 (0)	0 (0)	0 (0)	3 (0.0)
Diastolic blood pressure, mmHg									
N	12,527	6,654	1,050	4,807	2,722	179	4,451	2,525	227
Mean (SD)	82.2 (17.8)	80.2 (16.4)	79.7 (17.0)	82.5 (18.1)	81.5 (16.6)	83.6 (18.2)	82.1 (17.6)	81.6 (16.4)	81.9 (17.6)
Median (min, max)	81.0 (11.0, 170.0)	79.0 (20.0, 166.0)	79.0 (23.0, 163.0)	81.0 (18.0, 168.0)	80.0 (31.0, 162.0)	80.0 (33.0, 170.0)	81.0 (25.0, 168.0)	80.0 (32.0, 153.0)	81.0 (18.0, 141.0)
IQR	22.0	20.0	20.0	23.0	22.0	21.0	22.0	21.0	23.0
Missing (%)	8 (0.1)	4 (0.1)	0 (0)	4 (0.1)	1 (0.0)	0 (0)	2 (0.0)	0 (0)	6 (0.1)

Year	Hypertension status	2018–2019			2020			2021			2020–2021		
		Hyperensive Non-hypertensive	Hyperensive Unknown	Hyperensive Non-hypertensive	Hyperensive Non-hypertensive	Hyperensive Unknown	Hyperensive Non-hypertensive						
Total		12,535 (60.8)	6,658 (32.3)	1,050 (5.1)	4,811 (61.3)	2,723 (34.7)	179 (2.3)	4,453 (60.9)	2,525 (34.5)	227 (3.1)	9,264 (61.1)	5,248 (34.6)	406 (2.7)
Pulse pressure, mmHg													
N		11,960	6,549	1,027	4,800	2,718	179	4,448	2,521	227	9,248	5,239	406
Mean (SD)		58.2 (18.4)	51.3 (16.3)	50.6 (15.5)	60.2 (21.7)	51.8 (17.7)	49.1 (15.9)	60.2 (21.4)	51.7 (17.3)	50.8 (17.8)	60.2 (21.6)	51.8 (17.5)	50.0 (16.9)
Median (min, max)		57.0 (4.0, 100.0)	50.0 (3.0, 100.0)	50.0 (2.0, 159.0)	58.0 (4.0, 130.0)	49.0 (20.0, 116.0)	57.0 (3.0, 155.0)	49.0 (2.0, 136.0)	58.0 (15.0, 157.0)	49.0 (2.0, 159.0)	58.0 (2.0, 136.0)	49.0 (2.0, 136.0)	49.0 (15.0, 157.0)
IQR		26.0	21.0	21.0	29.5	21.0	21.0	29.0	21.0	20.0	29.0	21.0	20.0
Missing (%)		575 (4.6)	109 (1.6)	23 (2.2)	11 (0.2)	5 (0.2)	0 (0)	5 (0.1)	4 (0.2)	0 (0)	16 (0.2)	9 (0.2)	0 (0)
Heart rate at presentation, beats/min													
N		12,063	6,401	1,032	4,721	2,675	176	4,327	2,468	218	9,048	5,143	394
Mean (SD)		84.2 (20.7)	82.1 (20.0)	81.2 (20.6)	84.4 (20.8)	82.8 (20.5)	82.4 (21.5)	84.0 (20.3)	82.9 (19.9)	82.8 (18.9)	84.2 (20.6)	82.9 (20.2)	82.6 (20.1)
Median (min, max)		82.0 (20.0, 200.0)	80.0 (20.0, 197.0)	78.0 (25.0, 199.0)	82.0 (22.0, 199.0)	80.0 (20.0, 198.0)	80.0 (39.0, 169.0)	82.0 (25.0, 194.0)	80.0 (33.0, 200.0)	80.0 (39.0, 140.0)	82.0 (22.0, 199.0)	80.0 (20.0, 140.0)	80.0 (20.0, 169.0)
IQR		26.0	25.0	23.0	27.0	27.0	27.0	25.5	26.0	25.0	22.0	26.0	25.0
Missing (%)		472 (3.8)	257 (3.9)	18 (1.7)	90 (1.9)	48 (1.8)	3 (1.7)	126 (2.8)	57 (2.3)	9 (4.0)	216 (2.3)	105 (2.0)	12 (3.0)
Episodes of angina in past 24 hours, No. (%)													
0–2		4,303 (41.9)	2,407 (44.4)	345 (38.1)	1,285 (30.3)	896 (38.4)	76 (46.3)	1,269 (34.0)	865 (41.3)	65 (31.1)	2,554 (32.0)	1,761 (39.7)	141 (37.8)
>2		307 (3.0)	140 (2.6)	16 (1.8)	96 (2.3)	46 (2.0)	4 (2.4)	155 (4.2)	54 (2.6)	8 (3.8)	251 (3.1)	100 (2.3)	12 (3.2)
Not available		5,661 (55.1)	2,871 (53.0)	545 (60.2)	2,860 (67.4)	1,394 (59.7)	84 (51.2)	2,307 (61.8)	1,176 (65.1)	136 (64.8)	5,167 (58.0)	2,570 (58.0)	220 (59.0)
Missing (%)		2,264	1,240	144	570	387	15	722	430	18	1,292	817	33

Year	Hypertension status	2018–2019		2020		2020–2021	
		Hypertensive	Non-hypertensive	Hypertensive	Non-hypertensive	Hypertensive	Non-hypertensive
Total	12,535 (60.8)	6,658 (32.3)	1,050 (5.1)	4,811 (61.3)	2,723 (34.7)	179 (2.3)	4,453 (60.9)
Killip classification code, No. (%)							
I	6,074 (68.7)	3,944 (73.1)	621 (70.0)	1,758 (59.8)	1,369 (66.5)	76 (54.7)	1,879 (68.2)
II	1,383 (15.6)	629 (11.7)	125 (14.1)	493 (16.8)	289 (20.1)	28 (14.0)	365 (13.2)
III	577 (6.5)	199 (3.7)	22 (2.5)	219 (7.4)	73 (3.5)	8 (5.8)	160 (5.8)
IV	812 (9.2)	621 (11.5)	119 (13.4)	471 (16.0)	329 (19.4)	27 (16.0)	353 (12.8)
Not stated/ inadequately described	0 (0)	0 (0)	0 (0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Not available	3,689	1,265	163	1,870	663	40	1,696
Total cholesterol, mmol/L							
N	8,493	4,777	711	3,533	2,186	140	3,163
Mean (SD)	4.7 (1.4)	5.2 (1.4)	5.5 (1.5)	4.8 (1.4)	5.4 (1.5)	5.6 (1.3)	4.7 (1.4)
Median (min, max)	4.6 (2.0, 16.7)	5.2 (2.0, 15.6)	5.4 (2.3, 15.0)	4.7 (2.0, 16.5)	5.4 (2.0, 14.9)	5.5 (3.2, 10.2)	4.6 (2.0, 12.6)
IQR	1.9	1.8	0.2	2.0	1.8	1.6	1.8
Test not done (%)	2,861 (22.8)	1,197 (18.0)	201 (19.1)	1,038 (21.6)	398 (14.6)	34 (19.0)	978 (22.0)
Missing (%)	1,181 (9.4)	684 (10.3)	138 (13.1)	240 (5.0)	139 (5.1)	5 (2.8)	312 (7.0)

Year	2018–2019						2020						2020–2021						
	Hypertension status			Unknown			Unknown			Unknown			Unknown			Unknown			
	Hypertensive	Non-hypertensive	Non-hypertensive	Hypertensive	Non-hypertensive	Unknown	Hypertensive	Non-hypertensive	Unknown	Hypertensive	Non-hypertensive	Unknown	Hypertensive	Non-hypertensive	Unknown	Hypertensive	Non-hypertensive	Unknown	
Total	12,535 (60.8)	6,658 (32.3)	1,050 (5.1)	4,811 (61.3)	2,723 (34.7)	179 (2.3)	4,453 (60.9)	2,525 (34.5)	227 (3.1)	9,264 (61.1)	5,248 (34.6)	406 (2.7)							
HDL-C, mmol/L																			
N	8,310	4,662	687	3,513	2,152	140	3,113	1,934	166	6,626	4,086	306							
Mean (SD)	1.1 (0.4)	1.1 (0.4)	1.1 (0.3)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.2 (0.4)	1.1 (0.4)	1.1 (0.4)	1.2 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	
Median (min, max)	1.0 (0.5, 4.9)	1.0 (0.5, 4.9)	1.0 (0.5, 3.8)	1.1 (0.5, 5.0)	1.1 (0.5, 4.4)	1.1 (0.6, 4.1)	1.1 (0.5, 4.9)	1.1 (0.5, 5.0)	1.1 (0.6, 5.0)	1.1 (0.6, 3.9)	1.1 (0.5, 5.0)	1.1 (0.5, 5.0)	1.1 (0.6, 4.1)	1.1 (0.6, 4.1)	1.1 (0.6, 4.1)	1.1 (0.6, 4.1)	1.1 (0.6, 4.1)	1.1 (0.6, 4.1)	
IQR	0.4 (0.3)	0.4 (0.3)	0.3 (0.3)	0.4 (0.3)	0.3 (0.3)	0.4 (0.3)	0.4 (0.3)	0.4 (0.3)	0.4 (0.4)	0.4 (0.4)	0.4 (0.4)	0.4 (0.4)	0.4 (0.4)	0.4 (0.4)	0.4 (0.4)	0.4 (0.4)	0.4 (0.4)	0.4 (0.4)	
Test not done (%)	2,909 (23.2)	1,231 (18.5)	200 (19.1)	1,047 (21.8)	416 (15.3)	35 (19.6)	1,003 (22.5)	379 (15.0)	45 (19.8)	2,050 (22.1)	2,050 (22.1)	80 (19.7)							
Missing (%)	1,316 (10.5)	765 (11.5)	163 (15.5)	251 (5.2)	155 (5.7)	4 (2.2)	337 (7.6)	212 (8.4)	16 (7.0)	588 (6.3)	588 (6.3)	20 (4.9)							
LDL-C, mmol/L																			
N	8,425	4,710	706	3,514	2,164	139	3,133	1,944	171	6,647	4,108	310							
Mean (SD)	2.9 (1.2)	3.4 (1.3)	3.6 (1.3)	3.0 (1.3)	3.5 (1.3)	3.6 (1.2)	2.9 (1.2)	3.5 (1.2)	3.5 (1.2)	2.9 (1.2)	2.9 (1.2)	3.5 (1.3)	3.7 (1.3)						
Median (min, max)	2.7 (0.5, 12.8)	3.3 (0.5, 13.8)	3.6 (0.5, 11.0)	2.8 (0.5, 8.7)	3.5 (0.6, 13.3)	3.5 (1.3, 6.9)	3.6 (0.5, 12.4)	2.7 (0.5, 11.1)	3.5 (0.5, 11.1)	3.5 (0.5, 11.1)	3.5 (0.5, 12.4)	3.5 (0.5, 13.3)	3.5 (0.7, 7.0)	3.7 (0.7, 7.0)					
IQR	1.6 (1.7)	1.7 (1.7)	1.7 (1.7)	1.7 (1.7)	1.7 (1.7)	1.7 (1.7)	1.6 (1.6)	1.6 (1.6)	1.6 (1.6)	1.9 (1.9)	1.9 (1.9)	1.7 (1.7)	1.7 (1.7)	1.8 (1.8)					
Test not done (%)	2,943 (23.5)	1,248 (18.7)	206 (19.6)	1,063 (22.1)	425 (15.6)	35 (19.6)	1,016 (22.8)	395 (15.6)	45 (19.8)	2,079 (22.4)	2,079 (22.4)	80 (19.7)							
Missing (%)	1,167 (9.3)	700 (10.5)	138 (13.1)	234 (4.9)	134 (4.9)	5 (2.8)	304 (6.8)	186 (7.4)	11 (4.8)	538 (5.8)	538 (5.8)	16 (3.9)							
Triglycerides, mmol/L																			
N	8,420	4,724	693	3,520	2,182	140	3,139	1,959	168	6,659	4,141	308							
Mean (SD)	1.7 (1.1)	1.7 (1.2)	1.8 (1.2)	1.7 (1.1)	1.8 (1.1)	1.9 (1.1)	1.7 (1.1)	1.7 (1.1)	1.7 (1.1)	1.7 (1.1)	1.7 (1.1)	1.8 (1.1)	1.8 (1.1)	1.8 (1.1)					
Median (min, max)	1.4 (0.5, 14.0)	1.4 (0.5, 14.3)	1.4 (0.5, 14.2)	1.5 (0.5, 14.3)	1.4 (0.5, 13.1)	1.5 (0.6, 6.9)	1.6 (0.6, 6.9)	1.4 (0.5, 13.0)	1.4 (0.5, 13.0)	1.4 (0.5, 13.3)	1.4 (0.5, 13.3)	1.4 (0.5, 13.3)	1.4 (0.5, 13.3)	1.4 (0.5, 13.3)	1.4 (0.5, 13.3)	1.4 (0.5, 13.3)	1.4 (0.5, 13.3)	1.4 (0.5, 13.3)	
IQR	0.9 (0.9)	1.1 (0.9)	0.9 (1.1)	0.9 (1.1)	1.0 (1.0)	1.1 (1.1)	0.9 (1.1)	0.9 (1.1)	0.9 (1.1)	1.0 (1.0)	0.9 (1.0)	0.9 (1.0)	0.9 (1.0)	0.9 (1.0)	0.9 (1.0)	0.9 (1.0)	0.9 (1.0)	0.9 (1.0)	
Test not done (%)	2,892 (23.1)	1,210 (18.2)	199 (19.0)	1,039 (21.6)	406 (14.9)	35 (19.6)	998 (22.4)	375 (14.9)	47 (20.7)	2,037 (22.0)	2,037 (22.0)	82 (14.9)							
Missing (%)	1,223 (9.8)	724 (10.9)	158 (15.1)	252 (5.2)	135 (5.0)	4 (2.2)	316 (7.1)	191 (7.6)	12 (5.3)	568 (6.1)	568 (6.1)	16 (3.9)							

Year	2018–2019						2020						2020–2021					
	Hypertension status			Unknown			Unknown			Unknown			Unknown			Unknown		
	Hypertensive	Non-hypertensive	Non-hypertensive	Hypertensive	Non-hypertensive	Non-hypertensive	Hypertensive	Non-hypertensive	Non-hypertensive	Hypertensive	Non-hypertensive	Non-hypertensive	Hypertensive	Non-hypertensive	Non-hypertensive	Hypertensive	Non-hypertensive	Non-hypertensive
Total	12,535 (60.8)	6,658 (32.3)	1,050 (5.1)	4,811 (61.3)	2,723 (34.7)	179 (2.3)	4,453 (60.9)	2,525 (34.5)	227 (3.1)	9,264 (61.1)	5,248 (34.6)	406 (2.7)						
HbA1c, mmol/L																		
N	1,889	765	170	1,158	536	55	1,126	577	68	2,284	1,113	123						
Mean (SD)	8.4 (3.2)	8.0 (3.7)	7.3 (3.1)	8.0 (2.7)	8.3 (4.2)	7.4 (4.2)	8.0 (3.1)	8.0 (4.0)	7.1 (2.1)	8.0 (2.9)	8.1 (4.1)	7.2 (3.2)						
Median (min, max)	7.5 (4.0, 32.0)	6.7 (4.1, 32.0)	6.1 (4.2, 28.0)	7.1 (4.0, 31.0)	6.8 (4.1, 32.0)	6.8 (4.9, 31.0)	7.0 (4.0, 32.0)	7.0 (4.3, 32.0)	6.3 (4.8, 11.8)	7.1 (2.1)	8.0 (2.9)	8.1 (4.1)						
IQR	3.6	3.7	2.8	3.1	4.1	1.8	3.0	3.0	3.3	3.0	3.1	3.7	2.4					
Test not done (%)	7,724 (61.6)	4,037 (60.6)	605 (57.6)	2,619 (54.4)	1,502 (55.2)	103 (57.5)	2,348 (52.7)	1,290 (51.1)	114 (50.2)	4,967 (53.6)	2,792 (53.2)	217 (53.4)						
Missing (%)	2,922 (23.3)	1,856 (27.9)	275 (26.2)	1,034 (21.5)	685 (25.2)	21 (11.7)	979 (22.0)	658 (26.1)	45 (19.8)	2,013 (21.7)	1,343 (25.6)	66 (16.3)						
LVEF, %																		
N	6,365	3,655	516	2,727	1,768	114	2,458	1,471	104	5,185	3,239	218						
Mean (SD)	46.3 (13.1)	46.2 (12.3)	45.5 (11.8)	45.8 (12.5)	46.0 (11.4)	43.9 (12.3)	45.7 (12.5)	45.7 (11.8)	45.1 (12.7)	45.7 (12.5)	45.8 (11.6)	44.4 (12.5)						
Median (min, max)	46.0 (5.0, 90.0)	45.5 (5.0, 89.0)	45.0 (5.0, 89.0)	45.0 (5.5, 88.0)	45.0 (5.4, 88.0)	45.0 (10.0, 70.0)	45.0 (10.0, 87.1)	45.0 (5.9, 83.0)	45.0 (5.8, 77.0)	45.0 (5.5, 88.0)	45.0 (5.4, 83.0)	45.0 (5.8, 77.0)						
IQR	18.0	15.0	17.0	14.8	16.0	18.0	14.0	17.0	18.0	14.0	17.0	14.0	16.0					
Test not done (%)	4,744 (37.9)	2,150 (32.3)	328 (31.2)	1,883 (39.1)	820 (30.1)	59 (33.0)	1,723 (38.7)	861 (34.1)	108 (47.6)	3,606 (38.9)	1,681 (32.0)	167 (41.1)						
Missing (%)	1,426 (11.4)	853 (12.8)	206 (19.6)	201 (4.2)	135 (5.0)	6 (3.4)	272 (6.1)	193 (7.6)	15 (6.6)	473 (5.1)	328 (6.3)	21 (5.2)						

Year	2018–2019				2020				2020–2021			
	Hypertension status		Non-hypertensive		Hypertensive		Non-hypertensive		Hypertensive		Non-hypertensive	
Total	12,535	6,658	1,050	4,811	2,723	179	4,453	2,525	227	9,264	5,248	406
ECG, No. (%)	(60.8)	(32.3)	(5.1)	(61.3)	(34.7)	(2.3)	(60.9)	(34.5)	(3.1)	(61.1)	(34.6)	(2.7)
Inferior leads	3,561	2,309	372	1,586	1,079	73	1,341	941	72	2,927	2,020	145
Anterior leads	3,965	2,659	454	1,740	1,178	86	1,559	1,129	96	3,299	2,307	182
Lateral leads	3,729	1,608	246	1,401	744	40	1,198	635	52	2,599	1,379	92
True posterior	477	340	39	234	185	8	148	125	12	382	310	20
Right ventricle	283	202	4	161	105	5	134	95	9	295	200	14
None	2,722	1,067	136	887	338	22	983	335	41	1,870	673	63
Not stated/inadequately described	831 (6.6)	269 (4.0)	62 (5.9)	293 (6.1)	102 (3.7)	12 (6.7)	330 (7.4)	112 (4.4)	16 (7.0)	623 (6.7)	(20.2)	(15.5)
Total number of STEMI patients who were given fibrinolytic therapy at reporting centre	1,615	1,458	193	951	846	38	60	698	719	41	41	1,649
Pain-to-needle time, min (*symptom to treatment)	(12.9)	(21.9)	(18.4)	(19.8)	(31.1)	(21.2)	(45.1)	(15.7)	(28.5)	(18.1)	(36.9)	(17.8)
N	1,293	1,178	157	778	688	35	543	581	33	1,321	1,269	68
Mean (SD)	298.1 (261.9)	278.8 (249.9)	271.0 (221.1)	278.0 (225.7)	276.4 (228.8)	254.4 (208.2)	322.5 (266.8)	295.6 (265.8)	243.8 (152.4)	296.3 (244.3)	285.2 (246.5)	249.2 (182.0)
Median (min, max)	210.0 (25.0, 1,440.0)	190.0 (25.0, 1,410.0)	200.0 (45.0, 1,120.0)	210.0 (15.0, 1,350.0)	210.0 (15.0, 1,440.0)	195.0 (15.0, 1095.0)	240.0 (15.0, 1430.0)	210.0 (15.0, 1440.0)	190.0 (50.0, 549.0)	218.0 (15.0, 1430.0)	210.0 (50.0, 1440.0)	195.0 (1095.0)
IQR	230.0	210.0	190.0	213.0	205.0	165.0	280.0	230.0	240.0	239.0	215.0	202.5
Missing (%)	322 (19.9)	280 (19.2)	36 (18.7)	173 (18.2)	158 (18.7)	3 (7.9)	155 (22.2)	138 (19.2)	8 (19.5)	328 (19.9)	296 (18.9)	11 (13.9)

Year	2018–2019			2020			2021			2020–2021		
	Hypertension status	Hyperensive Non-hyperensive	Unknown	Hyperensive Non-hyperensive	Unknown	Hyperensive Non-hyperensive	Unknown	Hyperensive Non-hyperensive	Unknown	Hyperensive Non-hyperensive	Unknown	Hyperensive Non-hyperensive
Total	12,535 (60.8)	6,658 (32.3)	1,050 (5.1)	4,811 (61.3)	2,723 (34.7)	179 (2.3)	4,453 (60.9)	2,525 (34.5)	227 (3.1)	9,264 (61.1)	5,248 (34.6)	406 (2.7)
Total number of STEMI patients who were given fibrinolytic therapy at reporting centre	1,615 (12.9)	1,458 (21.9)	193 (18.4)	951 (19.8)	846 (31.1)	38 (21.2)	60 (45.1)	698 (15.7)	719 (28.5)	41 (18.1)	41 (36.9)	1,649 (17.8)
Pain-to-needle time, min (*symptom to treatment)												
Pain-to-needle time, No (%)												
≤180 min	554 (42.9)	570 (48.4)	70 (44.6)	331 (42.5)	302 (43.9)	15 (42.9)	215 (39.6)	259 (44.6)	16 (48.5)	546 (41.3)	561 (44.2)	31 (45.6)
>180 min	739 (57.2)	608 (51.6)	87 (55.4)	447 (57.5)	386 (56.1)	20 (57.1)	328 (60.4)	322 (55.4)	17 (51.5)	775 (58.7)	708 (55.8)	37 (54.4)
Missing	322	280	36	173	158	3	155	138	8	328	296	11

*Symptom to treatment is the time difference between onset of ACS symptom and when patient was given fibrinolytic therapy
Note: Not all participating centres performed Troponin T or Troponin I tests

Table 3.6 Cardiac presentation of patients with ACS by pre-morbid dyslipidaemia, NCVD-ACS Registry, 2020–2021

Year	Dyslipidaemia status	2018–2019		2020		2021		2020–2021	
		Dyslipidaemia Non-dyslipidaemia	Unknown						
Total	7,438 (36.1)	11,060 (53.7)	1,745 (8.5)	3,068 (39.1)	4,254 (54.2)	391 (5.0)	2,986 (40.8)	3,848 (52.6)	371 (5.1)
ACS stratum, No. (%)									
STEMI	2,220 (29.9)	5,467 (49.4)	1,025 (58.7)	1,240 (40.4)	2,568 (60.4)	254 (35.1)	1,049 (55.8)	2,149 (55.8)	193 (52.0)
NSTEMI	2,805 (37.7)	3,298 (29.8)	1,051 (24.9)	1,069 (24.3)	99 (25.1)	99 (25.3)	1,107 (37.1)	1,130 (29.4)	106 (28.6)
UA	2,413 (32.4)	2,295 (20.8)	285 (16.3)	777 (14.5)	617 (14.5)	38 (9.7)	830 (27.8)	569 (14.8)	72 (19.4)
Systolic blood pressure, mmHg									
N	7,436	11,055	1,743	3,066	4,252	391	2,986	3,848	371
Mean (SD)	140.4 (27.6)	138.1 (28.4)	135.5 (29.6)	140.6 (28.5)	138.1 (28.8)	137.4 (27.8)	140.3 (27.8)	137.9 (27.6)	137.0 (31.4)
Median (min, max)	138.0 (54.0, 260.0)	136.0 (51.0, 269.0)	132.0 (59.0, 266.0)	139.0 (60.0, 269.0)	136.0 (54.0, 268.0)	135.0 (70.0, 233.0)	138.0 (53.0, 270.0)	136.0 (55.0, 260.0)	135.0 (55.0, 257.0)
IQR	36.0	37.0	35.0	37.0	35.0	38.0	35.0	36.0	35.0
Missing (%)	2 (0.0)	5 (0.1)	2 (0.1)	2 (0.1)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.0)
Diastolic blood pressure, mmHg									
N	7435	11053	1743	3,066	4,251	391	2,984	3,848	371
Mean (SD)	80.6 (16.7)	82.0 (17.7)	81.0 (17.7)	81.4 (17.1)	82.6 (17.8)	83.9 (18.5)	80.9 (16.8)	82.5 (17.2)	83.4 (19.6)
Median (min, max)	79.0 (29.0, 170.0)	81.0 (11.0, 166.0)	80.0 (23.0, 163.0)	80.0 (18.0, 170.0)	81.0 (32.0, 168.0)	82.0 (33.0, 156.0)	80.0 (25.0, 168.0)	82.0 (22.0, 162.0)	81.0 (30.0, 170.0)
IQR	20.0	22.0	21.0	21.0	22.0	24.0	20.0	23.0	26.0
Missing (%)	3 (0.04)	7 (0.1)	2 (0.1)	3 (0.1)	2 (0.1)	0 (0)	0 (0)	4 (0.1)	3 (0.0)

Year	2018–2019			2020			2021			2020–2021		
	Dyslipidaemia	No- dylipidaemia	Unknown									
Dyslipidaemia status												
Total	7,438 (36.1)	11,060 (53.7)	1,745 (8.5)	3,068 (39.1)	4,254 (54.2)	391 (5.0)	2,986 (40.8)	3,848 (52.6)	371 (5.1)	6,054 (39.9)	8,102 (53.4)	762 (5.0)
Pulse pressure, mmHg												
N	7,137	10,727	1,627	3,064	4,243	390	2,981	3,844	371	6,045	8,087	761
Mean (SD)	57.7 (18.1)	54.6 (17.7)	52.3 (17.1)	59.3 (21.1)	55.6 (20.4)	53.7 (19.3)	59.4 (21.0)	55.4 (19.8)	53.6 (20.3)	59.4 (21.1)	55.5 (20.1)	53.6 (19.8)
Median (min, max)	56.0 (5.0, 100.0)	53.0 (3.0, 100.0)	50.0 (2.0, 159.0)	57.0 (4.0, 150.0)	53.0 (4.0, 150.0)	51.0 (15.0, 123.0)	56.0 (4.0, 155.0)	52.0 (2.0, 147.0)	50.0 (15.0, 157.0)	56.0 (2.0, 159.0)	52.0 (2.0, 150.0)	51.0 (15.0, 157.0)
IQR	26.0	25.0	22.0	28.5	26.0	24.0	28.0	26.0	24.0	29.0	26.0	24.0
Missing (%)	301 (4.1)	333 (3.0)	73 (4.2)	4 (0.1)	11 (0.3)	1 (0.3)	5 (0.2)	4 (0.1)	0 (0)	9 (0.1)	15 (0.2)	1 (0.1)
Heart rate at presentation, beats/min												
N	7,176	10,613	1,707	3,004	4,185	383	2,913	3,746	354	5,917	7,931	737
Mean (SD)	83.3 (20.5)	83.3 (20.3)	83.7 (21.5)	83.3 (20.2)	84.1 (21.1)	84.0 (21.1)	83.3 (20.1)	83.7 (20.0)	85.2 (20.1)	83.3 (20.2)	83.9 (20.6)	84.6 (20.6)
Median (min, max)	81.0 (21.0, 200.0)	81.0 (20.0, 197.0)	80.0 (25.0, 199.0)	80.5 (20.0, 187.0)	82.0 (22.0, 199.0)	81.0 (35.0, 169.0)	82.0 (25.0, 194.0)	82.0 (26.0, 200.0)	81.0 (30.0, 161.0)	82.0 (20.0, 194.0)	82.0 (22.0, 200.0)	81.0 (30.0, 169.0)
IQR	26.0	25.0	26.0	25.0	28.0	27.0	26.0	25.0	26.0	25.0	26.0	27.0
Missing (%)	262 (3.5)	447 (4.0)	38 (2.2)	64 (2.1)	69 (1.6)	8 (2.0)	73 (2.4)	102 (2.7)	17 (4.6)	137 (2.3)	171 (2.1)	25 (3.3)
Episodes of angina in past 24 hours, No. (%)												
0–2	2,814 (45.0)	3,662 (41.7)	579 (37.2)	847 (31.4)	1,285 (34.9)	125 (34.8)	887 (34.9)	1,208 (38.2)	104 (31.4)	1,734 (33.1)	2,493 (36.4)	229 (33.2)
>2	197 (3.2)	239 (2.7)	27 (1.7)	67 (2.5)	72 (2.0)	7 (1.9)	113 (4.5)	91 (2.9)	13 (3.9)	180 (3.4)	163 (2.4)	20 (2.9)
Not available	(51.8)	3,238 (55.6)	4,887 (61.1)	952 (66.1)	2,326 (63.2)	227 (63.2)	1,538 (60.6)	1,867 (59.0)	214 (64.7)	3,323 (63.5)	4,193 (61.2)	441 (63.9)
Missing	1,189	2,272	187	369	571	32	448	682	40	817	1,253	72

Year	Dyslipidaemia status	2018–2019			2020			2021			2020–2021		
		Dyslipidaemia Non- dyslipidaemia	Dyslipidaemia Unknown	Dyslipidaemia Unknown	Dyslipidaemia Non- dyslipidaemia	Dyslipidaemia Unknown	Dyslipidaemia Unknown	Dyslipidaemia Non- dyslipidaemia	Dyslipidaemia Unknown	Dyslipidaemia Non- dyslipidaemia	Dyslipidaemia Unknown		
Total	7,438 (36.1)	11,060 (53.7)	1,745 (8.5)	3,068 (39.1)	4,254 (54.2)	391 (5.0)	2,986 (40.8)	3,848 (52.6)	371 (5.1)	6,054 (39.9)	8,102 (53.4)	762 (5.0)	
Killip classification code, No. (%)													
I	3,593 (70.5)	6,100 (71.2)	946 (64.9)	1,144 (62.7)	1,885 (62.6)	174 (57.4)	1,248 (71.1)	1,850 (68.0)	168 (65.4)	2,392 (66.8)	3,735 (65.1)	342 (61.1)	
II	778 (15.3)	1,122 (13.1)	237 (16.3)	295 (16.2)	464 (15.4)	51 (16.8)	219 (12.5)	366 (13.5)	35 (13.6)	514 (14.4)	830 (14.5)	86 (15.4)	
III	319 (6.3)	414 (4.8)	65 (4.5)	137 (7.5)	141 (4.7)	22 (7.3)	102 (5.8)	115 (4.2)	11 (4.3)	239 (6.7)	256 (4.5)	33 (5.9)	
IV	408 (8.0)	935 (10.9)	209 (14.3)	248 (13.6)	523 (17.4)	56 (18.5)	186 (10.6)	390 (14.3)	43 (16.7)	434 (12.1)	913 (15.9)	99 (17.7)	
Not stated/inadequately described	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
Not available	2,340	2,489	288	1,244	1,241	88	1,231	1,127	114	2,475	2,368	202	
Total cholesterol, mmol/L													
N	5,122	7,698	1,161	2,269	3,300	290	2,147	2,891	261	4,416	6,191	551	
Mean (SD)	4.7 (1.5)	5.0 (1.4)	5.3 (1.5)	4.8 (1.5)	5.2 (1.5)	5.5 (1.5)	4.7 (1.4)	5.1 (1.4)	5.6 (1.5)	4.8 (1.5)	5.2 (1.4)	5.5 (1.4)	
Median (min, max)	4.5 (2.0, 14.8)	4.9 (2.0, 16.7)	5.3 (2.0, 15.0)	4.6 (2.0, 13.1)	5.1 (2.0, 16.5)	5.1 (2.1, 10.2)	4.6 (2.0, 12.6)	5.1 (2.0, 16.2)	5.5 (2.0, 10.6)	4.6 (2.0, 13.1)	5.1 (2.0, 16.5)	5.5 (2.0, 10.6)	
IQR	1.9	1.8	1.9	2.0	1.9	1.7	1.7	1.9	1.9	2.0	1.9	1.8	
Test not done (%)	1,683 (22.6)	2,200 (19.9)	376 (21.6)	642 (20.9)	744 (17.5)	84 (21.5)	648 (21.7)	661 (17.2)	83 (22.4)	1,290 (21.3)	1,405 (17.3)	167 (21.9)	
Missing (%)	633 (8.5)	1,162 (10.5)	208 (11.9)	157 (5.1)	210 (4.9)	17 (4.3)	191 (6.4)	296 (7.7)	27 (7.3)	348 (5.7)	506 (6.2)	44 (5.8)	

Year	2018–2019						2020						2020–2021						
	Dyslipidaemia status			Non-dyslipidaemia			Dyslipidaemia			Non-dyslipidaemia			Dyslipidaemia			Non-dyslipidaemia			
Total	7,438 (36.1)	11,060 (53.7)	1,745 (8.5)	3,068 (39.1)	4,254 (54.2)	391 (5.0)	2,986 (40.8)	3,848 (52.6)	371 (5.1)	6,054 (39.9)	8,102 (53.4)	762 (5.0)							
HDL-C, mmol/L																			
N	5,015	7,520	1,124	2,256	3,261	288	2,121	2,834	258	4,377	6,095	546							
Mean (SD)	1.1 (0.4)	1.1 (0.3)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	1.2 (0.4)	1.1 (0.4)	1.1 (0.4)							
Median (min, max)	1.0 (0.5, 4.9)	1.0 (0.5, 4.9)	1.0 (0.5, 3.8)	1.1 (0.5, 5.0)	1.1 (0.5, 4.8)	1.1 (0.6, 5.0)	1.1 (0.5, 4.9)	1.1 (0.5, 5.0)	1.1 (0.5, 5.0)	1.1 (0.6, 5.0)	1.1 (0.5, 5.0)	1.1 (0.5, 5.0)	1.1 (0.6, 5.0)						
IQR	0.4	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4						
Test not done (%)	1,713 (23.0)	2,252 (20.4)	375 (21.5)	649 (21.2)	764 (18.0)	85 (21.0)	663 (22.2)	681 (17.7)	83 (22.4)	1,312 (21.7)	1,445 (17.8)	1,445 (22.0)							
Missing (%)	710 (9.6)	1,288 (11.7)	246 (14.1)	163 (5.3)	229 (5.4)	18 (4.6)	202 (6.8)	333 (8.7)	30 (8.1)	365 (8.1)	562 (6.0)	562 (6.9)	48 (6.3)						
LDL-C, mmol/L																			
N	5,067	7,625	1,149	2,251	3,278	288	2,134	2,852	262	4,385	6,130	550							
Mean (SD)	2.9 (1.3)	3.2 (1.3)	2.9 (1.3)	3.3 (1.3)	3.6 (1.3)	2.9 (1.3)	3.3 (1.3)	3.6 (1.3)	2.9 (1.3)	3.3 (1.3)	3.3 (1.3)	3.6 (1.3)							
Median (min, max)	2.6 (0.5, 11.9)	3.1 (0.5, 13.8)	3.4 (0.5, 11.4)	2.7 (0.5, 9.6)	3.3 (0.5, 13.3)	3.5 (0.8, 8.7)	2.7 (0.5, 12.4)	3.2 (0.5, 11.1)	3.6 (0.7, 6.6)	2.7 (0.5, 12.4)	3.2 (0.5, 12.4)	3.2 (0.5, 13.3)	3.5 (0.7, 8.7)						
IQR	1.7	1.7	1.7	1.8	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.7	1.7						
Test not done (%)	1,745 (23.5)	2,268 (20.5)	384 (22.0)	666 (21.7)	772 (18.1)	85 (21.7)	670 (22.4)	703 (18.3)	83 (22.4)	1,336 (22.1)	1,475 (18.2)	1,475 (22.0)							
Missing (%)	626 (8.4)	1,167 (10.6)	212 (12.2)	151 (4.9)	204 (4.8)	18 (4.6)	182 (6.1)	293 (7.6)	26 (7.0)	333 (5.5)	497 (6.1)	497 (5.8)							

Year		2018–2019				2020				2020–2021			
		Dyslipidaemia	Non-dyslipidaemia	Unknown	Dyslipidaemia	Non-dyslipidaemia	Unknown	Dyslipidaemia	Non-dyslipidaemia	Unknown	Dyslipidaemia	Non-dyslipidaemia	Unknown
Dyslipidaemia status													
Total	7,438 (36.1)	11,060 (53.7)	1,745 (8.5)	3,068 (39.1)	4,254 (54.2)	391 (5.0)	2,986 (40.8)	3,848 (52.6)	371 (5.1)	6,054 (39.9)	8,102 (53.4)	762 (5.0)	
Triglycerides, mmol/L													
N	5,098	7,608	1,131	2,268	3,286	288	2,138	2,870	258	4,406	6,156	546	
Mean (SD)	1.7 (1.1)	1.8 (1.2)	1.7 (1.1)	1.7 (1.1)	1.8 (1.1)	1.7 (1.0)	1.7 (1.1)	1.8 (1.0)	1.7 (1.0)	1.7 (1.1)	1.7 (1.1)	1.8 (1.1)	
Median (min, max)	1.5 (0.5, 14.0)	1.4 (0.5, 14.3)	1.5 (0.5, 14.2)	1.4 (0.5, 13.1)	1.4 (0.5, 6.9)	1.6 (0.5, 13.0)	1.4 (0.5, 13.3)	1.4 (0.5, 8.8)	1.5 (0.5, 14.3)	1.4 (0.5, 14.3)	1.4 (0.5, 13.3)	1.4 (0.5, 8.8)	
IQR	0.9	0.9	1.0	1.0	0.9	1.1	0.9	0.9	1.0	0.9	0.9	0.9	1.1
Test not done (%)	1,696 (22.8)	2,225 (20.1)	380 (21.8)	641 (20.9)	753 (17.7)	86 (22.0)	657 (22.0)	676 (17.6)	87 (23.5)	1,298 (21.4)	1,429 (17.6)	1,429 (22.7)	
Missing (%)	644 (8.7)	1,227 (11.1)	234 (13.4)	159 (5.2)	215 (5.1)	17 (4.3)	191 (6.4)	302 (7.8)	26 (7.0)	350 (5.8)	517 (6.4)	517 (5.6)	
HbA1c, mmol/L													
N	1,166	1,420	238	768	892	89	765	909	97	1,533	1,801	186	
Mean (SD)	8.4 (3.3)	8.2 (3.4)	7.6 (2.9)	8.1 (2.7)	8.1 (3.7)	7.6 (3.8)	8.0 (3.1)	8.0 (3.7)	7.0 (1.9)	8.0 (2.9)	8.1 (3.7)	7.3 (3.0)	
Median (min, max)	7.4 (4.1, 32.0)	7.1 (4.0, 32.0)	6.5 (4.2, 28.0)	7.3 (4.0, 31.0)	6.9 (4.1, 32.0)	6.0 (4.9, 31.0)	7.0 (4.3, 32.0)	6.7 (4.3, 32.0)	6.1 (4.0, 12.9)	7.1 (4.0, 32.0)	6.8 (4.1, 32.0)	6.1 (4.0, 31.0)	
IQR	3.6	3.7	3.1	3.3	3.5	3.5	3.2	3.0	2.4	3.1	3.3	3.3	
Test not done (%)	4,689 (63.0)	6,630 (60.0)	1,047 (52.8)	1,620 (55.5)	2,361 (62.1)	243 (53.7)	1,602 (50.8)	1,956 (52.3)	194 (53.2)	3,222 (53.3)	4,317 (57.3)	4,317 (57.3)	
Missing (%)	1,583 (21.3)	3,010 (27.2)	460 (26.4)	680 (22.2)	1,001 (23.5)	59 (15.1)	619 (20.7)	983 (25.5)	80 (21.6)	1,299 (21.5)	1,984 (24.5)	1,984 (18.2)	

Year	Dyslipidaemia status	2018–2019				2020				2020–2021			
		Dyslipidaemia	Non-dyslipidaemia	Unknown	Dyslipidaemia	Non-dyslipidaemia	Unknown	Dyslipidaemia	Non-dyslipidaemia	Unknown	Dyslipidaemia	Non-dyslipidaemia	Unknown
Total	7,438 (36.1)	11,060 (53.7)	1,745 (8.5)	3,068 (39.1)	4,254 (54.2)	391 (5.0)	2,986 (40.8)	3,848 (52.6)	371 (5.1)	6,054 (39.9)	8,102 (53.4)	762 (5.0)	
LVEF, %													
N	3,730	5,886	920	1,726	2,642	241	1,585	2,270	178	3,311	4,912	419	
Mean (SD)	47.2 (13.2)	45.9 (12.5)	44.4 (12.6)	46.1 (12.6)	45.7 (11.7)	44.8 (12.3)	46.3 (13.2)	45.4 (11.5)	44.0 (11.8)	46.2 (12.9)	45.6 (11.6)	44.5 (12.1)	
Median (min, max)	48.7 (5.0, 90.0)	45.0 (5.0, 87.4)	45.0 (5.0, 82.0)	45.1 (5.4, 80.0)	45.0 (5.4, 88.0)	45.0 (10.0, 73.0)	46.0 (5.9, 87.1)	45.0 (6.6, 87.0)	45.0 (5.8, 79.0)	46.0 (5.5, 87.1)	46.0 (5.5, 88.0)	45.0 (5.4, 79.0)	
IQR	16.3	15.3	20.0	17.0	14.0	14.0	18.0	17.0	13.0	17.0	17.0	14.4	14.0
Test not done	2,978 (40.0)	3,719 (33.6)	525 (30.0)	1,223 (39.9)	1,410 (33.1)	129 (33.0)	1,235 (41.4)	1,297 (33.7)	160 (43.1)	2,458 (43.1)	2,458 (40.6)	2,707 (33.7)	289 (33.4)
Missing (%)	730 (9.8)	1,455 (13.2)	300 (17.2)	119 (3.9)	202 (3.9)	21 (4.7)	166 (5.4)	281 (5.6)	281 (7.3)	33 (8.9)	285 (4.7)	483 (6.0)	54 (7.1)
ECG, No. (%)													
Inferior leads	2,059 (27.7)	3,574 (32.3)	609 (34.9)	963 (31.4)	1,615 (38.0)	160 (40.9)	845 (28.3)	1,385 (36.0)	124 (33.4)	1,808 (29.9)	3,000 (37.0)	284 (37.3)	
Anterior leads	2,251 (30.3)	4,118 (37.2)	709 (40.6)	1,086 (35.4)	1,737 (40.8)	181 (46.3)	1,020 (46.3)	1,611 (34.2)	153 (41.9)	2,106 (41.2)	3,148 (34.8)	334 (41.3)	(43.8)
Lateral leads	2,256 (30.3)	2,886 (26.1)	441 (25.3)	889 (29.0)	1,200 (28.2)	96 (24.6)	816 (27.3)	984 (25.6)	85 (22.9)	1,705 (28.2)	2,184 (27.0)	181 (23.8)	
True posterior	261 (3.5)	515 (4.7)	80 (4.6)	153 (5.0)	251 (5.0)	23 (5.9)	104 (5.9)	164 (3.5)	17 (4.3)	257 (4.6)	415 (4.2)	40 (5.1)	
Right ventricle	159 (2.1)	299 (2.7)	68 (3.9)	86 (2.8)	166 (3.9)	19 (4.9)	83 (2.8)	141 (3.7)	14 (3.8)	169 (2.8)	307 (3.8)	33 (4.3)	
None	1,686 (22.7)	1,996 (18.1)	243 (20.5)	630 (13.4)	572 (11.5)	45 (24.4)	729 (24.4)	570 (14.8)	60 (16.2)	1,359 (22.4)	1,142 (14.1)	105 (13.8)	
Not stated/ inadequately described	539 (7.3)	529 (4.8)	94 (5.4)	175 (5.0)	214 (5.7)	18 (4.6)	224 (7.5)	202 (5.2)	32 (8.6)	399 (6.6)	416 (5.1)	50 (6.6)	(6.6)

Year	Dyslipidaemia status	2018–2019				2020				2021				2020–2021					
		Dyslipidaemia Non-	Dyslipidaemia Unknown																
Total	7,438 (36.1)	11,060 (53.7)	1,745 (8.5)	3,068 (39.1)	4,254 (54.2)	391 (5.0)	2,986 (40.8)	3,848 (52.6)	371 (5.1)	6,054 (39.9)	8,102 (53.4)	762 (5.0)	762 (5.0)	762 (5.0)	762 (5.0)	762 (5.0)	762 (5.0)		
Total number of STEMI patients who were given fibrinolytic therapy at reporting centre	837 (11.3)	2,087 (18.9)	342 (19.6)	539 (17.6)	1,193 (28.0)	103 (26.3)	453 (15.2)	929 (24.1)	76 (20.5)	992 (16.4)	2,122 (26.2)	179 (23.5)	179 (23.5)	179 (23.5)	179 (23.5)	179 (23.5)	179 (23.5)		
Pain-to-needle time, min (*symptom to treatment)																			
N	693	1,653	282	455	961	85	350	744	63	805	1,705	148							
Mean (SD)	299.1 (271.5)	282.7 (248.5)	289.8 (245.2)	266.5 (215.3)	280.0 (230.8)	294.2 (238.1)	311.8 (243.9)	306.0 (278.9)	287.7 (182.9)	286.2 (229.1)	291.3 (253.2)	291.4 (215.7)							
Median (min, max)	200.0 (25.0, 1,430.0)	195.0 (25.0, 1,440.0)	210.0 (30.0, 1,395.0)	200.0 (15.0, 1240.0)	210.0 (15.0, 1440.0)	210.0 (15.0, 1245.0)	240.0 (30.0, 1440.0)	240.0 (30.0, 1320.0)	240.0 (15.0, 1440.0)	215.0 (50.0, 825.0)	215.0 (15.0, 1320.0)	210.0 (30.0, 1440.0)	210.0 (30.0, 1245.0)						
IQR	240.0	215.0	213.0	205.0	200.0	215.0	260.0	250.0	260.0	260.0	228.0	225.0							
Missing (%)	144 (17.2)	434 (20.8)	60 (17.5)	84 (15.6)	232 (19.4)	18 (17.5)	103 (22.7)	185 (19.9)	13 (17.1)	187 (18.9)	417 (19.7)	31 (17.3)							
Pain-to-needle time, No. (%)																			
≤180 min	312 (45.0)	762 (46.1)	120 (42.6)	204 (44.8)	411 (42.8)	33 (38.8)	131 (37.4)	336 (45.2)	23 (36.5)	335 (41.6)	747 (43.8)	56 (37.8)							
>180 min	381 (55.0)	891 (53.9)	162 (57.5)	251 (55.2)	550 (57.2)	52 (61.2)	219 (62.6)	408 (54.8)	40 (63.5)	470 (58.4)	958 (56.2)	92 (62.2)							
Missing	144	434	60	84	232	18	103	185	13	187	417	31							

*Symptom to treatment is the time difference between onset of ACS symptom and when patient was given fibrinolytic therapy.

Note:

1. Not all participating centres performed Troponin T or Troponin I tests

2. Percentage is to the nearest decimal point

Table 3.7 TIMI risk score of patients with ACS by ACS stratum, NCVD-ACS Registry, 2020–2021

Year	2018–2019						2020						2021						2020–2021	
	ACS stratum		STEMI		NSTEMI/UA		STEMI		NSTEMI/UA		STEMI		NSTEMI/UA		STEMI		NSTEMI/UA		2020–2021	
Total	8,936		11,669		4,153		3,693		3,474		3,842		3,627		7,535					
TIMI Risk Score, No. (%)	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	82	0.9	1,223	10.5	23	0.6	258	7.0	40	1.2	281	7.3	63	0.8	539	7.2				
1	762	8.6	2,638	22.6	382	9.2	668	18.1	330	9.5	739	19.2	712	9.3	1,407	18.7				
2	1,884	21.1	3,056	26.2	794	19.1	861	23.3	791	22.8	991	25.8	1,585	20.8	1,852	24.6				
3	1,629	18.3	2,465	21.1	752	18.1	900	24.4	625	18.0	924	24.0	1,377	18.1	1,824	24.2				
4	1,324	14.9	1,544	13.2	657	15.8	660	17.9	536	15.4	578	15.0	1,193	15.6	1,238	16.4				
5	1,214	13.6	604	5.2	581	14.0	285	7.7	469	13.5	258	6.7	1,050	13.8	543	7.2				
6	703	7.9	128	1.1	374	9.0	57	1.5	252	7.3	69	1.8	626	8.2	126	1.7				
7	644	7.2	9	0.1	304	7.3	4	0.1	238	6.9	2	0.1	542	7.1	6	0.1				
8	290	3.3			121	2.9			87	2.5			208	2.7						
9	220	2.5			86	2.1			56	1.6			142	1.9						
10	111	1.3			48	1.2			32	0.9			80	1.0						
11	25	0.3			16	0.4			9	0.3			25	0.3						
12	19	0.2			11	0.3			7	0.2			18	0.2						
13	4	0.0			4	0.1			2	0.1			6	0.1						

CHAPTER 4: TREATMENT

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Summary

1. More elderly patients were admitted to the CCUs and they had a longer stay compared to younger patients.
2. The number of patients administered with thrombolytic therapy has increased compared to the previous cohort. This trend was seen even in the PCI capable centres.
3. Up to 98% of STEMI and 96.7% of NSTEMI patients received DAPT. The STEMI patients and younger patients were more likely to be prescribed ticagrelor.
4. Non-statin lipid-lowering therapy usage had almost doubled in the current cohort compared to the previous cohort across all spectrums of ACS in keeping with the guidelines which recommend combination lipid-lowering therapy.
5. The use of beta blocker upon discharge was 72.1% for STEMI, 70.6% for NSTEMI and 66.3% for UA. The usage of beta blockers was higher among STEMI compared to NSTE-ACS, a trend that differs from the previous cohort.
6. There was a drop in the usage of ACE inhibitor upon discharge across the ACS spectrum in 2020–2021 compared to the previous cohort.
7. Seventy-six point three percent of STEMI patients who presented to non-PCI-capable centres received fibrinolytic therapy.
8. Fifteen point four percent of STEMI patients presenting to PCI-capable centres underwent primary PCI, a reduction of 7.5% compared to previous cohort.
9. The median door-to-needle (DTN) time was 40 minutes, similar to the previous cohort; and 39.7% achieved DTN time of less than 30 minutes. However more than 60.3% did not achieve this target.
10. The median door-to-device (balloon) (DTB) time had increased to 69.5 minutes compared to 67 minutes to the previous cohort; and 63.6% achieved DTB time of less than 90 minutes.

Pattern of Admission

The median days of admission were five days each for STEMI and NSTEMI and three days for UA. These rates were similar to the previous cohort. [Table 4.1]

Median days of admission in CCU were in the range of 2 to 3 days, similar to the 2018–2019 cohort. Median days in ICU and CICU were in the range of 2 to 3 days, similar to the 2018–2019 cohort. [Table 4.1]

Overall, females had longer mean duration of stay in the hospital or in critical care units. [Table 4.3 and Table 4.7] When compared by age, the elderly age group across all the ACS spectrums stayed longer (mean duration of stay) in the hospital and all CCUs. More elderly were also admitted to the CCUs. [Table 4.2 and Table 4.6]

There were no differences in the numbers of days spent in hospital or critical care units among all three major ethnic groups (Malay, Chinese and Indians). [Table 4.4 and Table 4.8]

Pharmacological Therapy

Comparing to the previous cohort (2018–2019), there was an increase in the number of patients who received fibrinolytic therapy (70.4% vs. 64.5%). [Table 4.1] Even in the PCI capable centres, the number of patients administered with thrombolytic therapy increased compared to previous cohort. The majority of fibrinolytic therapy were administered at non-PCI-capable centres compared to PCI-capable centres. This increment in thrombolytic therapy could be due to the COVID-19 pandemic during year 2020–2021¹.

Patients admitted for unstable angina had higher pre-admission aspirin usage (56.2% in 2020–2021 and 61.0% in 2018–2019) compared to those who were admitted for STEMI (16.6% in 2020–2021 and 15.9% in 2018–2019) and NSTEMI (43.8% in 2020–2021 and 48.9% in 2018–2019). [Table 4.1]

Patients with unstable angina or NSTEMI had a history of angina or prior admission for ACS, thus they were on aspirin. Whereas for STEMI, patients are experiencing their first admission or presentation, hence they were not on any aspirin pre-admission.

Most of the patients (>91.0%) were prescribed with aspirin and an ADP antagonist during admission in both the STEMI and NSTEMI groups. [Table 4.1] Upon discharge, only 83.9% of patients with NSTEMI were prescribed with aspirin compared to 91.2 % who received ADP antagonist. [Table 4.1] These were patients with either aspirin allergy, high bleeding risk, gastritis, or were unable to tolerate aspirin, thus they were only discharged with a single antiplatelet (ADP antagonist). However, more than 90.0% of patients with STEMI were prescribed with aspirin and an ADP antagonist upon discharge.

Fewer patients received aspirin for UA in 2020–2021 (84.8%) compared to ADP antagonist (95.7%). [Table 4.1] The usage of aspirin was similar to the previous cohort (2018–2019). There were no differences in aspirin and ADP antagonist uses across all ACS strata among different gender, age and ethnicity groups.

A decrease in the usage of ADP antagonist upon discharge was seen between the two cohorts in patients with NSTEMI (91.2% vs. 94.3%) and unstable angina (85.1% vs. 92.2%). [Table 4.1] Unstable angina patients were deemed to be at lower ischaemic risk compared to STEMI and NSTEMI. Thus, when these patients had high bleeding risk e.g. anaemia or thrombocytopenia or they developed any minor bleeding e.g. haematuria, their ADP receptor antagonist was stopped prior to discharge.

The ADP antagonist available in Malaysia were clopidogrel and ticagrelor. In general, clopidogrel was used much more extensively due to the cheaper cost whereas ticagrelor usage was mainly reserved for patients with higher ischaemic risk.

There were much higher usages of ticagrelor among STEMI patients at admission (STEMI 16.0% vs. NSTEMI 6.7% vs. UA 5.3%) and upon discharge (STEMI 17.8% vs. NSTEMI 7.6% vs. UA 4.9%). Clopidogrel usage was similar as the previous cohort. [Table 4.1]

Younger patients with STEMI were prescribed more ticagrelor at admission and upon discharge as compared to the elderly. [Table 4.2] Interestingly, when comparing between ethnicity, Indians who suffered from STEMI were more likely to be prescribed ticagrelor at admission (26.0%) and upon discharge (27.8%). [Table 4.4] This trend was also replicated in the Indian ethnicity group suffering from NSTE-ACS. Gender-wise, there was no difference between groups.

Usage of fondaparinux for STEMI was increased in the present cohort compared to the previous cohort (74.2% vs. 71.8%). There was a decrease in the use of fondaparinux in the present cohort compared to the previous cohort for NSTEMI (69.9% vs. 76.8 %) and UA (82% vs. 72.6%). [Table 4.1] There were no differences in age and ethnicity groups.

Females were prescribed with less fondaparinux across the ACS spectrum. For STEMI, fondaparinux usage was 69.6% for female vs. 74.9% for males. For NSTE-ACS, fondaparinux usage was 68.1% for females vs. 72.1% for male. A similar trend was seen in the previous cohort.

There was also an increase in the use of low molecular weight heparin (LMWH) in the present cohort compared to the previous cohort for STEMI (16.0% vs. 11.4%). There was no difference in the usage of LMWH for NSTEMI and UA in the previous and present cohorts. [Table 4.1]

During admission, statins were prescribed in more than 90% for those admitted for ACS. More than 88% of patients were discharged with statin across all the ACS spectrums. There was an increase in the use of other lipid lowering agents during admission for STEMI (3.7 % vs. 1.7 %) and NSTEMI (3.8% vs. 2.6%) compared to the previous cohort. A similar trend was seen in prescription of other lipid lowering agents upon discharge. [Table 4.1] This rise is in keeping with the current recommended guidelines which encourage combination lipid-lowering therapy of statin and non-statin therapy to achieve a lower target LDL level. For STEMI, statin prescription upon admission and discharge between previous and current cohorts remained the same across all ethnicity and age groups. [Table 4.2 and Table 4.4] However, for the NSTEMI and UA groups, there were reductions in the prescription of statin between the previous cohort and the current cohort for both admission and discharge across all ethnicity but most prominently among the middle-age group. [Table 4.6 and Table 4.8]

Prescription of beta blockers upon discharge were higher in the STEMI group compared to NSTEMI and UA (72.1% vs. 70.6% vs. 66.3%). This observation was different from the previous cohort. [Table 4.1] This could be due to more aggressive uptitration of beta blockers (guideline-directed medical therapy) as fewer patients received primary PCI due to the COVID-19 pandemic. The use of beta blockers was consistent among the different age and gender groups.

There was a drop in the admission usage of ACE inhibitors in NSTEMI and UA groups in the current cohort compared to the previous cohort (47.2% vs. 58.1% for NSTEMI and 50.6% vs. 66.9% for UA). An opposite trend was seen upon discharge, whereby ACE inhibitors were prescribed more in the STEMI group compared to the NSTEMI and UA groups (59.4% vs. 53.0% vs. 53.8%), respectively. As more patients with STEMI had impaired LV function, they were prescribed with an ACE inhibitor as per guideline recommendation.

The ACE inhibitors were less prescribed for elderly patients in the current cohort, similar to the previous cohort. [Table 4.2 & Table 4.6] There were no differences in ACE inhibitor use among the ethnic groups and genders.

The use of diuretics was higher in NSTEMI compared to STEMI (33.8% vs. 22.0%). A similar trend was observed in the previous cohort, indicating that patients with NSTEMI presented with a more decompensated heart failure. [Table 4.1]

More females were given diuretics during admission compared to males across the ACS spectrum. [Table 4.3 and Table 4.7] For STEMI, the usage in females were 25.6% vs. 21.4% in males. [Table 4.3] For NSTE-ACS, the usage in females were 31.8% vs. 26.6% in males. [Table 4.7] A similar trend was seen in the previous cohort.

Middle-aged and elderly patients required more diuretics on admission and at discharge compared to the younger patients. There was no difference in diuretic usage among the ethnicity groups.

The use of calcium antagonist was similar with the previous cohort. The usage of calcium antagonist in the STEMI group was significantly lower compared to the NSTEMI and UA groups (4.8% vs. 15.9% vs. 17.6% respectively). Similar findings were noted in the previous cohort. [Table 4.1]

The use of calcium antagonist was also lower in young patients compared to middle-aged and elderly (3.2% vs. 3.7% vs. 6.8%). A similar trend was noted in the previous cohort. [Table 4.2] This data was consistent with hypertension being more common in elderly patients.

During admission, more patients were prescribed with insulin compared to oral hypoglycaemic agent (OHA) for STEMI (29.1% vs. 20.9%). The opposite was seen when these STEMI patients were discharged (OHA 29.9% vs. insulin 17.0%). [Table 4.1] This is according to the standard of care of patients being given insulin rather than OHA for hyperglycaemia during an acute event upon admission for STEMI,

On the contrary, more patients admitted for UA were prescribed with OHA compared to NSTEMI or STEMI (29.4% vs. 26.2% vs. 20.9%). A similar trend was noted in the previous cohort. [Table 4.1] The use of insulin and OHA were highest in the Indian ethnic group, and among the middle-aged and elderly groups. More patients were discharged with OHA compared to insulin in all subgroups (STEMI, NSTEMI, UA, ethnic groups, and age groups). [Table 4.2, Table 4.4, Table 4.6 and Table 4.8]

The use of antiarrhythmic drugs was consistent in 2018–2019 and 2020–2021. Fewer patients in the STEMI group were prescribed with anti-arrhythmic drugs at discharge compared to at admission. [Table 4.1]

Otherwise, there were no significant gender differences in terms of prescription of medication across the ACS spectrum.

Revascularisation

There was a total of 7,627 cases of STEMI reported during the period of 2020–2021, which was a reduction of 14.6% compared to the previous cohort in 2018–2019.

In general, 70.4% of them received fibrinolytic therapy, which was a slight increase of 6.5% compared to the previous cohort. [Table 4.1]

There was a marked reduction in primary PCI, 13.5% compared to 20.0% in 2018–2019. This was most likely due to the effect of COVID-19 on healthcare.

Patients who missed fibrinolytic therapy were similar in both cohorts, 12.2% (2020–2021) vs. 12.2% (2018–2019). This showed that despite the wide availability of thrombolysis, many patients still present late to the nearest healthcare facility. Some of these missed thrombolysis cases could be due to late diagnosis or misdiagnosis by healthcare personnel.

Majority of patients who missed fibrinolytic therapy were elderly (14.4% in 2020–2021 vs. 14.7% in 2018–2019) and female (16.1% in 2020–2021 vs. 16.0% in 2018–2019). [Table 4.2 and Table 4.3] This is probably due to the atypical presentation of myocardial infarction in these two groups.

About 3.5% STEMI patients were not prescribed fibrinolytic therapy due to contraindications. Only 0.4% of patients refused fibrinolytic therapy in 2020–2021. [Table 4.1]

Non-PCI Capable Centre

For STEMI, 80.0% of patients presented to a non-PCI-capable centre received fibrinolytic therapy as their reperfusion strategy. [Table 4.9]

Nineteen percent of patients did not receive any form of reperfusion; 15.2% of which was due to missed MI, 3.4% had contra-indication for thrombolysis, and 0.4% refused any form of reperfusion therapy.

A small percentage of 0.9% patients were transferred to a PCI-capable centre for primary angioplasty, which is a slight reduction from the earlier cohort (1.3%). [Table 4.9]

PCI Capable Centre

For STEMI patients who presented to a PCI-capable centre, 40.3% had fibrinolytic therapy as their primary reperfusion strategy, this was an increase of 7.0% compared to the previous cohort.

Fifteen point four percent underwent primary PCI, and this was a reduction of 7.5% compared to the previous cohort in 2018–2019. This reduction was most likely due to the effect of COVID-19 and the policy of thrombolysis first during the COVID-19 era.

This finding was also echoed in the study “*Impact of COVID-19 on Acute MI and Percutaneous Coronary Intervention Rates and Outcomes in South East Asia and the Middle East*” - Journal of Asian Pacific Society of Cardiology 2022 by Paul Jie Wern Tern et al². and another study in Beijing, China “*Impact of COVID-19 pandemic on STEMI undergoing primary PCI treatment in Beijing, China*” by Xuhe Gong et al³.

About 28.6% had fibrinolytic therapy given at a different centre and was transferred to a PCI-capable centre either due to haemodynamic instability, for rescue PCI, or as part of the pharmaco-invasive strategy.

Almost 15.6% did not receive any form of reperfusion; 11.7% of which was due to missed thrombolysis, 3.5% had contraindication for thrombolysis, and 0.4% refused any form of reperfusion therapy. [Table 4.9]

During index hospitalisation, there was a decrease in in-patient PCIs compared to the earlier cohort (60.4% vs. 61.3%), and 1.5% had CABG for STEMI. [Table 4.9]

Primary PCI for STEMI patients is still low even in PCI-capable centre and pre-COVID time. This is an area which needs improvement. More robust policy and facility upgrades will be required to reverse this trend in the future. On top of that, adequate manpower and more well-equipped coronary catheterisation labs will help in reversing this trend.

Door-to-Needle Time

The median door-to-needle (DTN) time was 40 minutes. The median DTN time of less than 30 minutes was similar to the previous cohort (39.7% vs. 39.8%). This was also the same as the earlier cohort in 2016–2017⁴. The DNT time of >30 min comprises 60.3% of patients. [Table 4.5] Effective coordination and communication between first medical contact (FMC), Emergency Department physician, and cardiologist would be essential to reverse this trend in the future.

Door-to-Balloon Time

The median door-to-balloon (DTB) time was 69.5 minutes. About 63.6% achieved DTB of less than 90 minutes, which was a reduction compared to the previous cohort (66.7%). Here, DTB performs better than DTN as more than 60% of patients were able to achieve DTB time of <90 min. [Table 4.5]

Although the percentage can be improved, a new strategy may need to be implemented to increase number of patients who are able to achieve DTN time of < 30 min.

NSTEMI and Unstable Angina

About 27.0% of NSTEMI and 12.5% of UA had PCI during the index hospitalisation, whereas 1.8% of NSTEMI and 1.1% of UA patients had CABG during the index hospitalisation. [Table 4.1]

Age

In STEMI, middle-aged group had higher number of PCI compared to the young and the elderly (55.7% vs. 56.6% vs. 46.4%, respectively). [Table 4.2]

In NSTEMI and UA, there were increased percentages of PCI across all age groups compared to the previous cohort, young: 22.5% vs. 14.6%; middle-aged: 25.9% vs. 21.7%; elderly: 17.9% vs. 14%. [Table 4.6]

Gender

In the STEMI group, there was an overall increase in both genders undergoing in-patient PCI during index hospitalisation compared to the earlier report. Although it was predominated by males (53.1% vs.

46.9%), there were more females, in terms of percentage, who had undergone primary angioplasty compared to males (15.6% vs. 13.2%). [Table 4.3]

As for NSTEMI and UA, there was a preponderance of males (23.9% males vs. 14.7% females). [Table 4.7]

There was an increase for PCI during the index hospitalisation for NSTEMI and UA compared to the earlier cohort. (male: 23.9% vs. 19.3%; female: 14.7% vs. 11.5%. [Table 4.7]

Ethnicity

In the STEMI group, there were more Chinese (18.3%) undergoing primary angioplasty compared to Malay (12.8%), Indian (18.0%) and other ethnicities (5.1%). [Table 4.4]

However, there was an overall increase in PCI during index hospitalisation among the Malays compared to the previous cohort (53.9% vs. 51.4%,). Among the other ethnicities, there were slight reductions, as follows; Chinese (52.7% vs. 55.7%), Indian (49.0% vs. 54.3%), and other ethnicities (47.9% vs. 50.1%) compared to the earlier report. [Table 4.4]

In NSTEMI and UA, there were increases in the percentage of Malay, Chinese and other ethnicities (except for Indian) undergoing PCI during index hospitalization compared with the previous cohort: Malay (22.4% vs. 16.4%), Chinese (19.2% vs. 16.3%), Indian (14.0% vs. 16.9%) and Others (35.3% vs. 23.8%). [Table 4.8]

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Table 4.1 Summary of treatments for patients with ACS by ACS stratum, NCVD-ACS Registry, 2020–2021

Year	2018–2019				2020				2021				2020–2021			
	ACS stratum	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA
Total	8,936	6,603	5,066	4,153	2,244	1,449	3,474	2,359	1,483	7,627	4,603	2,932				
^Total admission days																
N	8,924	6,591	5,052	4,150	2,241	1,448	3,471	2,359	1,481	7,621	4,600	2,929				
Mean (SD)	5.6 (5.1)	6.3 (6.4)	4.4 (4.0)	5.8 (5.3)	6.2 (6.1)	4.4 (3.8)	5.8 (5.5)	6.4 (6.6)	4.5 (4.3)	5.8 (5.4)	6.3 (6.4)	4.4 (4.0)				
Median (min, max)	(1.0, 87.0)	5.0 (1.0, 92.0)	5.0 (1.0, 92.0)	3.0 (1.0, 86.0)	5.0 (1.0, 98.0)	3.0 (1.0, 43.0)	5.0 (1.0, 87.0)	5.0 (1.0, 85.0)	3.0 (1.0, 49.0)	5.0 (1.0, 87.0)	5.0 (1.0, 98.0)	5.0 (1.0, 49.0)				
IQR	3.0	4.0	2.0	3.0	4.0	2.0	3.0	4.0	2.0	3.0	4.0	2.0				
Missing (%)	12 (0.1)	12 (0.2)	14 (0.3)	3 (0.1)	3 (0.1)	1 (0.1)	3 (0.1)	0 (0)	2 (0.1)	6 (0.1)	3 (0.1)	3 (0.1)				
Number of days in CCU																
N	3,957	990	164	2,024	440	57	1,174	380	58	3,198	820	115				
Mean (SD)	2.9 (2.6)	4.3 (3.7)	3.4 (3.1)	3.3 (2.6)	4.1 (3.6)	2.6 (1.8)	3.3 (2.7)	4.5 (4.0)	3.7 (5.0)	3.3 (2.7)	4.3 (3.8)	3.2 (3.8)				
Median (min, max)	(1.0, 30.0)	2.0 (1.0, 25.0)	3.0 (1.0, 23.0)	2.0 (1.0, 28.0)	3.0 (1.0, 29.0)	2.0 (1.0, 10.0)	3.0 (1.0, 25.0)	3.0 (1.0, 27.0)	2.0 (1.0, 30.0)	3.0 (1.0, 28.0)	3.0 (1.0, 29.0)	3.0 (1.0, 30.0)				
IQR	3.0	3.0	2.0	2.0	3.0	2.0	2.0	2.0	3.0	3.0	2.0	3.0				
No admission to CCU, %	4,979 (55.7)	5,613 (85.0)	4,902 (96.8)	2,129 (51.3)	1,804 (80.4)	1,392 (96.1)	2,300 (66.2)	1,979 (83.9)	1,425 (96.1)	4,429 (58.1)	3,783 (82.2)	2,817 (96.1)				
Number of days in ICU/CICU																
N	77	70	12	63	36	4	53	31	12	116	67	16				
Mean (SD)	3.5 (4.0)	3.9 (4.0)	3.2 (1.6)	4.3 (4.3)	3.1 (2.5)	1.8 (1.5)	3.3 (2.4)	3.7 (4.2)	1.9 (0.8)	3.9 (3.6)	3.4 (3.4)	1.9 (1.0)				
Median (min, max)	(1.0, 25.0)	2.0 (1.0, 22.0)	2.5 (1.0, 7.0)	3.0 (1.0, 26.0)	3.0 (1.0, 16.0)	1.0 (1.0, 4.0)	1.0 (1.0, 13.0)	2.0 (1.0, 21.0)	2.0 (1.0, 3.0)	3.0 (1.0, 26.0)	3.0 (1.0, 21.0)	3.0 (1.0, 4.0)				
IQR	3.0	2.0	1.5	3.0	1.0	1.5	2.0	2.0	1.5	2.0	2.0	1.5				
No admission to ICU/CICU, %	8,859 (99.1)	6,533 (98.9)	5,054 (98.5)	4,090 (98.4)	2,208 (99.7)	1,445 (98.5)	3,421 (98.7)	2,328 (99.1)	1,470 (98.5)	7,511 (98.5)	4,536 (98.5)	2,915 (99.4)				
Missing (%)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.1)	0 (0)	0 (0)	1 (0.0)				

Year	ACS stratum	2018-2019				2020				2021				2020-2021	
		STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI
Total	8,936	6,603	5,066	4,153	2,244	1,449	3,474	2,359	1,483	7,627	4,603	2,932	7,627	4,603	2,932
Fibrinolytic therapy, No. (%)															
Given at this centre	3,381 (38.6)			1,895 (46.1)				1,499 (44.0)				3,394 (45.1)			
Given at another centre prior to transfer	2,264 (25.9)			1,089 (26.5)				815 (23.9)				1,904 (25.3)			
Not given-Proceeded directly to primary angioplasty	1,748 (20.0)			497 (12.1)				519 (15.2)				1,016 (13.5)			
Not given-Missed thrombolysis	1,066 (12.2)			476 (11.6)				439 (12.9)				915 (12.2)			
Not given-Patient refusal	19 (0.2)			16 (0.4)				16 (0.5)				32 (0.4)			
Not given-Contraindicated	276 (3.2)			142 (3.5)				122 (3.6)				264 (3.5)			
Not applicable	87			19				34				53			
Not available	70			19				30				49			
Cardiac catheterisation, No. (%)															
Yes	5,201 (58.2)	2,456 (37.2)	1,052 (20.8)	2,312 (55.7)	905 (40.3)	349 (24.1)	2,249 (64.7)	1,001 (42.4)	392 (26.4)	4,561 (59.8)	1,906 (41.4)	741 (25.3)			
No	3,706 (41.5)	4,128 (62.5)	4,004 (79.1)	1,820 (43.8)	1,327 (59.1)	1,097 (75.7)	1,200 (34.5)	1,347 (57.1)	1,087 (73.3)	3,020 (39.6)	2,674 (58.1)	2,184 (74.5)			
Number transferred to another centre	28 (0.3)	17 (0.3)	8 (0.2)	21 (0.5)	12 (0.5)	3 (0.2)	25 (0.7)	11 (0.5)	4 (0.3)	46 (0.6)	23 (0.5)	7 (0.2)			
Missing	1	2	2	0	0	0	0	0	0	0	0	0			

Year	ACS stratum	2018–2019				2020				2021				2020–2021			
		STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	
Total	8,936	6,603	5,066	4,153	2,244	1,449	3,474	2,359	1,483	7,627	4,603	2,932					
PCI, No. (%)																	
Yes	3,983 (52.4)	1,374 (22.0)	448 (10.2)	1,740 (48.3)	562 (26.7)	161 (11.4)	1,706 (57.0)	605 (27.4)	190 (13.7)	3,446 (52.3)	1,167 (27.0)	351 (12.5)					
No	3,618 (47.6)	4,807 (77.7)	3,951 (89.6)	1,860 (51.6)	1,543 (73.2)	1,247 (88.1)	1,284 (42.9)	1,598 (72.4)	1,176 (85.1)	3,144 (47.7)	3,141 (72.8)	2,423 (86.6)					
Not applicable	4 (0.1)	7 (0.1)	11 (0.3)	2 (0.1)	2 (0.1)	8 (0.6)	3 (0.1)	5 (0.2)	16 (1.2)	5 (0.1)	7 (0.2)	24 (0.9)					
Missing	1,331	415	656	551	137	33	481	151	101	1,032	288	134					
CABG, No. (%)																	
Yes	74 (1.0)	113 (1.8)	49 (1.1)	40 (1.2)	41 (1.9)	17 (1.2)	41 (1.4)	35 (1.6)	15 (1.1)	81 (1.3)	76 (1.8)	32 (1.1)					
No	7,063 (98.7)	6,029 (97.9)	4,402 (98.6)	3,405 (98.5)	2,069 (97.7)	1,406 (98.6)	2,787 (98.4)	2,124 (97.7)	1,385 (98.2)	6,192 (98.5)	4,193 (97.7)	2,791 (98.4)					
Not applicable	16 (0.2)	16 (0.3)	14 (0.3)	11 (0.3)	8 (0.4)	3 (0.2)	5 (0.2)	14 (0.6)	11 (0.8)	16 (0.3)	22 (0.5)	14 (0.5)					
Missing	1,783	445	601	697	126	23	641	186	72	1,338	312	95					
Pre-admission aspirin use, No. (%)																	
Yes	1,377 (15.9)	3,115 (48.9)	2,933 (61.0)	722 (17.7)	982 (44.6)	860 (60.4)	516 (15.2)	984 (43.1)	753 (52.0)	1,238 (16.6)	1,966 (43.8)	1,613 (56.2)					
No	7,310 (84.2)	3,256 (51.1)	1,874 (39.0)	3,353 (82.3)	1,219 (55.4)	563 (39.6)	2,875 (84.8)	1,299 (56.9)	696 (48.0)	6,228 (83.4)	2,518 (56.2)	1,259 (43.8)					
Missing	249	232	259	78	43	26	83	76	34	161	119	60					
Pharmacological therapy given during admission, No. (%)																	
Aspirin	8,417	5,935	4,175	3,853	1,991	1,147	3,152	2,046	1,254	7,005	4,037	2,401					
* ADP antagonist	8,722	6,276	4,715	4,034	2,136	1,361	3,373	2,222	1,387	7,407	4,358	2,748					
Clopidogrel	7,974	6,059	4,591	3,700	2,015	1,290	3,013	2,130	1,349	6,713	4,145	2,639					
	(90.5)	(94.6)	(95.1)	(90.4)	(92.1)	(90.8)	(88.3)	(93.1)	(93.6)	(89.5)	(92.6)	(92.2)					

Year	ACS stratum	2018–2019				2020				2021				2020–2021			
		STEMI	NSTEMI	UA	STEMI	NSTEMI	UA										
Total	8,936	6,603	5,066	4,153	2,244	1,449	3,474	2,359	1,483	7,627	4,603	2,932	4,603	2,932	4,603	2,932	
Pharmacological therapy given during admission, No. (%)																	
Ticagrelor	1,172 (15.6)	283 (6.1)	144 (4.6)	465 (14.3)	144 (7.4)	82 (6.1)	484 (18.0)	113 (5.9)	58 (4.5)	949 (16.0)	257 (6.7)	140 (5.3)	257 (6.7)	140 (5.3)	257 (6.7)		
GP receptor inhibitor	116 (1.6)	20 (0.4)	11 (0.4)	56 (1.7)	11 (0.6)	3 (0.2)	83 (3.1)	14 (0.7)	3 (0.2)	139 (2.4)	25 (0.7)	6 (0.2)	25 (0.7)	6 (0.2)	25 (0.7)		
Unfractionated heparin	1,198 (16.2)	144 (3.1)	109 (3.5)	444 (13.7)	45 (2.3)	18 (1.3)	431 (16.1)	35 (1.9)	13 (1.0)	875 (14.8)	80 (2.1)	31 (1.2)	80 (2.1)	31 (1.2)	80 (2.1)		
LMWH	843 (11.4)	1,236 (25.1)	609 (18.4)	519 (15.8)	552 (27.6)	292 (21.6)	436 (16.1)	491 (25.0)	200 (15.4)	955 (16.0)	1,043 (16.0)	492 (18.5)	1,043 (16.0)	492 (18.5)	1,043 (16.0)		
Fondaparinux	5907 (71.8)	4,557 (76.8)	3,707 (82.0)	2,924 (74.6)	1,448 (68.5)	977 (69.7)	2,392 (73.6)	1,544 (71.4)	1,046 (75.7)	5,316 (74.2)	2,992 (69.9)	2,023 (72.7)	2,992 (69.9)	2,023 (72.7)	2,992 (69.9)		
Oral antiocoagulant (e.g. Warfarin)	126 (1.7)	147 (3.2)	110 (3.5)	49 (1.5)	45 (2.3)	28 (2.1)	47 (1.8)	47 (1.8)	29 (2.2)	96 (1.6)	131 (3.4)	57 (2.2)	131 (3.4)	57 (2.2)	131 (3.4)		
Beta blocker	4,329 (55.3)	4,130 (70.5)	3,138 (74.5)	2,130 (58.6)	1,301 (62.3)	865 (62.1)	1,834 (61.2)	1,331 (63.5)	845 (61.7)	3,964 (59.8)	2,632 (62.9)	1,710 (61.9)	2,632 (62.9)	1,710 (61.9)	2,632 (62.9)		
ACE inhibitor	3,648 (46.8)	3,340 (58.1)	2,782 (66.9)	1,701 (47.9)	987 (47.8)	721 (51.9)	1,463 (49.6)	955 (46.6)	665 (49.3)	3,164 (48.6)	1,942 (47.2)	1,386 (50.6)	1,942 (47.2)	1,386 (50.6)	1,942 (47.2)		
Angiotensin II receptor blocker	184 (2.5)	305 (6.6)	236 (7.5)	101 (3.1)	132 (6.8)	122 (9.1)	131 (4.9)	146 (7.7)	105 (8.1)	232 (3.9)	278 (7.2)	227 (8.6)	278 (7.2)	227 (8.6)	278 (7.2)		
Statins	7,796 (91.3)	5,909 (94.2)	4,476 (93.7)	3,731 (93.0)	1,971 (90.8)	1,264 (88.8)	3,142 (93.7)	2,061 (92.2)	1,293 (90.5)	6,873 (93.3)	4,032 (91.5)	2,557 (89.6)	4,032 (91.5)	2,557 (89.6)	4,032 (91.5)		
Other lipid lowering agent	127 (1.7)	122 (2.6)	126 (4.0)	110 (3.4)	70 (3.6)	38 (2.8)	109 (4.1)	77 (4.1)	68 (5.3)	219 (3.7)	147 (3.8)	106 (4.0)	147 (3.8)	106 (4.0)	147 (3.8)		
Diuretics	1,608 (21.4)	2,090 (40.9)	875 (25.8)	787 (23.3)	703 (34.5)	256 (19.0)	561 (20.3)	663 (33.2)	220 (16.9)	1,348 (22.0)	1,366 (33.8)	476 (17.9)	1,366 (33.8)	476 (17.9)	1,366 (33.8)		
Calcium antagonist	296 (4.1)	934 (19.7)	714 (21.9)	146 (4.5)	308 (15.8)	249 (18.4)	139 (5.2)	308 (16.1)	216 (16.7)	285 (4.8)	616 (15.9)	465 (17.6)	616 (15.9)	465 (17.6)	616 (15.9)		
Oral hypoglycaemic agent	1,260 (17.0)	1,577 (31.5)	1,330 (38.0)	649 (19.8)	531 (26.7)	423 (31.0)	611 (22.3)	500 (25.8)	367 (27.8)	1,260 (20.9)	1,031 (26.2)	790 (29.4)	1,031 (26.2)	790 (29.4)	1,031 (26.2)		
Insulin	1,700 (22.4)	1,539 (30.4)	787 (23.3)	1,015 (29.4)	623 (30.4)	277 (20.4)	818 (28.7)	628 (31.4)	315 (24.0)	1,833 (29.1)	1,251 (30.9)	592 (22.1)	1,251 (30.9)	592 (22.1)	1,251 (30.9)		
Anti-arrhythmic agent	285 (3.9)	251 (5.4)	104 (3.3)	123 (3.8)	64 (3.3)	17 (1.3)	106 (4.0)	79 (4.2)	30 (2.3)	229 (3.9)	143 (3.7)	47 (1.8)	143 (3.7)	47 (1.8)	143 (3.7)		

Year	ACS stratum	2018–2019			2020			2021			2020–2021		
		STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA
Total	8,936	6,603	5,066	4,153	2,244	1,449	3,474	2,359	1,483	7,627	4,603	2,932	
#Pharmacological therapy given at discharge, No (%)													
Aspirin	6,888 (91.7)	4,944 (89.9)	3,690 (83.2)	3,194 (92.2)	1,597 (84.3)	1,020 (74.2)	2,482 (89.8)	1,577 (83.5)	1,074 (79.9)	5,676 (91.1)	3,174 (83.9)	2,094 (77.0)	
*ADP antagonist	7,435 (97.2)	5,417 (94.3)	4,241 (92.2)	3,416 (96.9)	1,749 (91.6)	1,171 (84.4)	2,857 (96.3)	1,798 (90.9)	1,180 (85.8)	6,273 (96.6)	3,547 (91.2)	2,351 (85.1)	
Clopidogrel	6,477 (85.6)	5,150 (90.1)	4,080 (89.1)	2,973 (85.1)	1,596 (83.9)	1,093 (79.0)	2,434 (83.0)	1,695 (86.3)	1,123 (82.0)	5,407 (84.2)	3,291 (85.1)	2,216 (80.5)	
Ticagrelor	1,204 (18.5)	266 (6.3)	— (4.3)	132 (16.1)	471 (9.2)	162 (5.7)	76 (19.8)	484 (19.8)	103 (6.0)	52 (4.1)	955 (17.8)	265 (7.6)	128 (4.9)
Fondaparinux	146 (2.3)	133 (3.1)	97 (3.1)	66 (2.3)	70 (4.0)	60 (4.5)	52 (2.2)	72 (4.2)	36 (2.9)	118 (2.2)	142 (4.1)	96 (3.7)	
Oral antiocoagulant (e.g. Warfarin)	218 (3.4)	223 (5.3)	132 (4.2)	63 (2.2)	60 (3.4)	50 (3.7)	77 (3.2)	100 (5.8)	42 (3.3)	140 (2.7)	160 (4.6)	92 (3.5)	
Beta blocker	5,153 (71.0)	4,185 (76.7)	3,245 (75.9)	2,362 (70.8)	1,306 (70.2)	913 (66.7)	2,047 (73.7)	1,363 (71.1)	882 (65.9)	4,409 (72.1)	2,669 (70.6)	1,795 (66.3)	
ACE inhibitor	4,342 (60.3)	3,405 (64.0)	2,897 (68.6)	1,899 (58.5)	979 (53.3)	754 (55.2)	1,646 (60.6)	995 (52.8)	691 (52.5)	3,545 (59.4)	1,974 (53.0)	1,445 (53.8)	
Angiotensin II receptor blocker	230 (3.6)	337 (7.9)	282 (9.0)	133 (4.6)	139 (7.9)	149 (11.2)	171 (7.2)	149 (8.6)	118 (9.4)	304 (5.8)	288 (8.2)	267 (10.3)	
Statins	7,078 (93.3)	5,303 (93.8)	4,355 (93.4)	3,206 (92.8)	1,708 (90.2)	1,216 (86.9)	2,742 (93.6)	1,781 (90.3)	1,239 (89.3)	5,948 (93.2)	3,489 (90.3)	2,455 (88.1)	
Other lipid lowering agent	154 (2.4)	141 (3.3)	149 (4.8)	106 (3.6)	71 (4.0)	47 (3.5)	117 (4.9)	89 (5.2)	64 (5.1)	223 (4.2)	160 (4.6)	111 (4.3)	
Diuretics	1,151 (17.5)	1,633 (35.9)	803 (24.1)	473 (15.9)	474 (26.4)	221 (16.5)	314 (12.9)	431 (24.3)	185 (14.5)	787 (14.6)	905 (25.4)	406 (15.5)	
Calcium antagonist	255 (3.9)	919 (21.1)	748 (22.9)	130 (4.5)	297 (16.8)	254 (19.0)	106 (4.5)	289 (16.7)	235 (18.6)	236 (4.5)	586 (16.8)	489 (18.8)	
Oral hypoglycaemic agent	1,721 (25.8)	1,702 (36.7)	1,379 (39.2)	864 (28.8)	576 (32.1)	460 (33.9)	784 (31.2)	549 (30.8)	408 (31.4)	1,648 (29.9)	1,125 (31.4)	868 (32.7)	
Insulin	861 (13.0)	1,101 (24.3)	680 (20.5)	522 (17.3)	371 (20.6)	211 (15.6)	414 (16.7)	374 (21.1)	214 (16.6)	936 (17.0)	745 (20.9)	425 (16.1)	
Anti-arrhythmic agent	133 (2.1)	144 (3.4)	84 (2.7)	54 (1.9)	29 (1.7)	18 (1.3)	45 (1.9)	37 (2.2)	23 (1.8)	99 (1.9)	66 (1.9)	41 (1.6)	

^aTotal admission days is derived from Outcome date–Admission date + I

^bExcluded notifications of patients who died at discharge

* Ticlopidine, clopidogrel, prasugrel, and ticagrelor are grouped as ADP antagonist.

Table 4.2 Treatments for patients with STEMI by age group (years), NCVD-ACS Registry, 2020–2021

Year	2018–2019						2020						2021						2020–2021					
Age group	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-age	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly						
Total	873	4,683	3,380	427	2,115	1,611	331	1,876	1,267	758	3,991	2,878												
Total admission days																								
N	871	4,678	3,375	427	2,113	1,610	331	1,874	1,266	758	3,987	2,876												
Mean (SD)	4.9 (3.8)	5.3 (4.8)	6.1 (5.8)	5.3 (4.1)	5.4 (5.3)	6.4 (5.6)	5.3 (4.6)	5.4 (4.3)	6.5 (6.9)	5.3 (4.3)	5.4 (4.9)	6.4 (6.2)												
Median (min, max)	4.0 (1.0, 57.0)	4.0 (1.0, 68.0)	5.0 (1.0, 87.0)	4.0 (1.0, 34.0)	5.0 (1.0, 86.0)	5.0 (1.0, 54.0)	4.0 (1.0, 55.0)	4.0 (1.0, 62.0)	5.0 (1.0, 87.0)	4.0 (1.0, 55.0)	4.0 (1.0, 86.0)	4.0 (1.0, 87.0)												
IQR	2.0	3.0	4.0	3.0	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0												
Missing (%)	2 (0.2)	5 (0.1)	5 (0.2)	0 (0)	2 (0.1)	1 (0.1)	0 (0)	2 (0.1)	1 (0.1)	0 (0)	0 (0)	4 (0.1)	2 (0.1)											
Number of days in CCU																								
N	358	046	553	204	1,024	796	100	637	437	304	1,661	1,233												
Mean (SD)	2.6 (1.9)	2.8 (2.4)	3.2 (3.0)	3.2 (2.4)	3.1 (2.3)	3.6 (3.0)	3.2 (2.4)	3.1 (2.6)	3.5 (2.9)	3.2 (2.4)	3.1 (2.4)	3.6 (3.0)												
Median (min, max)	2.0 (1.0, 17.0)	2.0 (1.0, 26.0)	2.0 (1.0, 30.0)	2.0 (1.0, 20.0)	3.0 (1.0, 21.0)	3.0 (1.0, 28.0)	3.0 (1.0, 21.0)	3.0 (1.0, 24.0)	3.0 (1.0, 25.0)	3.0 (1.0, 20.0)	3.0 (1.0, 24.0)	3.0 (1.0, 28.0)												
IQR	2.0	2.0	3.0	2.5	2.5	3.0	3.0	2.0	2.0	3.0	2.0	2.0												
No admission to CCU, %	515 (59.0)	2,637 (56.3)	1,827 (54.1)	223 (52.2)	1,091 (51.6)	815 (50.6)	231 (69.8)	1,239 (66.0)	830 (65.5)	454 (59.9)	2,330 (58.4)	1,645 (57.2)												
Missing (%)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)												
Number of days in ICU/CICU																								
N	5	39	33	7	39	17	8	32	13	15	71	30												
Mean (SD)	1.4 (0.5)	2.8 (2.0)	4.6 (5.5)	3.1 (1.7)	3.8 (3.5)	5.9 (6.0)	2.1 (1.1)	3.0 (1.6)	4.9 (3.8)	2.6 (1.5)	3.4 (2.8)	5.5 (5.1)												
Median (min, max)	1.0 (1.0, 2.0)	2.0 (1.0, 12.0)	3.0 (1.0, 25.0)	3.0 (1.0, 6.0)	3.0 (1.0, 21.0)	5.0 (1.0, 26.0)	2.0 (1.0, 4.0)	3.0 (1.0, 8.0)	3.0 (2.0, 13.0)	2.0 (1.0, 6.0)	3.0 (1.0, 21.0)	4.0 (1.0, 26.0)												
IQR	1.0	2.0	4.0	2.0	2.0	3.0	2.0	1.5	3.0	3.0	2.0	4.0												
No admission to ICU/CICU, %	868 (99.4)	4,644 (99.2)	3,347 (99.0)	420 (98.4)	2,076 (98.2)	1,594 (98.9)	323 (97.6)	1,844 (98.3)	1,254 (99.0)	743 (98.0)	3,920 (98.2)	2,848 (99.0)												
Missing (%)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)												

Year	2018–2019				2020				2021				2020–2021	
	Age group	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-age	Elderly	Young	Middle-aged	Elderly	
Total	873	4,683	3,380	427	2,115	1,611	331	1,876	1,267	758	3,991	2,878		
Fibrinolytic therapy, No. (%)														
Given at this centre	353 (41.3)	1,783 (38.9)	1,245 (45.5)	192, (46.6)	977 (45.5)	726 (45.2)	147 (45.2)	860 (46.5)	492 (39.9)	339 (45.4)	1,837 (46.5)	1,218 (43.0)		
Given at another centre prior to transfer	218 (25.5)	1,251 (27.3)	795 (24.0)	123 (29.1)	575 (27.4)	391 (24.5)	82 (25.2)	428 (23.1)	305 (24.7)	205 (27.4)	1,003 (25.4)	696 (24.6)		
Not given-Proceeded directly to primary angioplasty	172 (20.1)	940 (20.5)	636 (19.2)	48 (11.4)	254 (12.1)	195 (12.2)	61 (18.8)	283 (15.3)	175 (14.2)	109 (14.6)	537 (13.6)	370 (13.1)		
Not given-Missed thrombolysis	90 (10.5)	489 (10.7)	487 (14.7)	46 (10.9)	219 (10.4)	211 (13.2)	27 (8.3)	215 (11.6)	197 (16.0)	73 (9.8)	434 (11.0)	408 (14.4)		
Not given-Patient refusal	2 (0.2)	7 (0.2)	10 (0.3)	1 (0.2)	6 (0.3)	9 (0.6)	1 (0.3)	6 (0.3)	9 (0.7)	2 (0.3)	12 (0.3)	18 (0.6)		
Not given- Contraindicated	20 (2.3)	114 (2.5)	142 (4.3)	12 (2.8)	66 (3.1)	64 (4.0)	7 (2.2)	59 (3.2)	56 (4.5)	19 (2.5)	125 (3.2)	120 (4.2)		
Not applicable	9	43	35	3	10	6	4	14	16	7	24	22		
Not available	5	41	24	2	8	9	2	11	17	4	19	26		
Missing	4	15	6	0	0	0	0	0	0	0	0	0		
Cardiac catheterisation, No. (%)														
Yes	526 (60.3)	2,871 (61.3)	1,804 (53.4)	248 (58.1)	1,234 (58.3)	830 (68.0)	225 (51.5)	1,266 (67.5)	758 (59.8)	473 (62.4)	2,500 (62.6)	1,588 (55.2)		
No	345 (39.5)	1,800 (38.4)	1,561 (46.2)	176 (41.2)	875 (41.4)	769 (47.7)	103 (31.1)	597 (31.8)	500 (39.5)	279 (36.8)	1,472 (36.9)	1,269 (44.1)		
Number transferred to another centre	2 (0.2)	12 (0.3)	14 (0.4)	3 (0.7)	6 (0.3)	12 (0.7)	3 (0.9)	13 (0.7)	9 (0.7)	6 (0.8)	19 (0.5)	21 (0.7)		
Missing	0	0	1	0	0	0	0	0	0	0	0	0		

Year	2018–2019				2020				2021				2020–2021	
	Age group	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Elderly
Total	873	4,683	3,380	427	2,115	1,611	331	1,876	1,267	758	3,991	2,878		
PCI, No. (%)														
Yes	393 (52.3)	2,208 (55.4)	1,382 (48.2)	193 (52.0)	939 (43.2)	608 (62.4)	181 (60.3)	979 (50.6)	546 (56.6)	374 (56.6)	1,918 (55.7)	1,154 (46.4)		
No	359 (47.7)	1,778 (44.6)	1,481 (51.7)	178 (48.0)	883 (48.4)	799 (56.7)	109 (37.6)	642 (39.6)	533 (49.4)	287 (43.4)	1,525 (43.4)	1,332 (53.5)		
Not applicable	0 (0)	1 (0.0)	3 (0.1)	0 (0)	1 (0.1)	1 (0.1)	0 (0)	2 (0.1)	1 (0.1)	0 (0)	3 (0.1)	2 (0.1)		
Missing	121	696	514	56	292	203	41	253	187	97	545	390		
CABG, No. (%)														
Yes	1 (0.1)	33 (0.9)	40 (1.5)	2 (0.6)	17 (1.0)	21 (1.6)	1 (0.4)	16 (1.0)	24 (2.4)	3 (0.5)	33 (1.0)	45 (1.9)		
No	713 (99.3)	3,713 (98.9)	2,637 (98.3)	352 (98.9)	1,723 (98.6)	1,330 (98.3)	272 (99.6)	1,526 (98.8)	989 (97.4)	624 (99.2)	3,249 (98.7)	2,319 (97.9)		
Not applicable	4 (0.6)	7 (0.2)	5 (0.2)	2 (0.6)	7 (0.4)	2 (0.1)	0 (0)	3 (0.2)	2 (0.2)	2 (0.3)	10 (0.3)	4 (0.2)		
Missing	155	930	698	71	368	258	58	331	252	129	699	510		
Pre-admission aspirin use, No. (%)														
Yes	60 (7.1)	654 (14.3)	663 (20.2)	36 (8.5)	351 (17.0)	335 (21.1)	25 (7.6)	250 (13.7)	241 (19.5)	61 (8.1)	601 (15.4)	576 (20.4)		
No	787 (92.9)	3,909 (85.7)	2,614 (79.8)	387 (91.5)	1,712 (83.0)	1,254 (78.9)	302 (92.4)	1,581 (86.3)	992 (80.5)	689 (91.9)	3,293 (84.6)	2,246 (79.6)		
Missing	26	120	103	4	52	22	4	45	34	8	97	56		
Pharmacological therapy given during admission, No. (%)														
Aspirin	825 (96.3)	4,428 (96.2)	3,164 (96.1)	405 (96.4)	1,962 (95.1)	1,486 (94.3)	304 (94.7)	1,701 (94.8)	1,147 (95.2)	709 (95.7)	3,663 (94.9)	2,633 (94.7)		
* ADP antagonist	855 (98.7)	4,585 (98.6)	3,282 (98.3)	418 (99.3)	2,056 (98.3)	1,560 (97.7)	323 (98.2)	1,819 (98.0)	1,231 (98.5)	741 (98.8)	3,875 (98.2)	2,791 (98.0)		

Year	2018–2019				2020				2021				2020–2021		
	Age group	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly		
Total	873	4,683	3,380	427	2,115	1,611	331	1,876	1,267	758	3,991	3,991	2,878		
Pharmacological therapy given during admission, No. (%)															
Clopidogrel	776 (90.0)	4,196 (90.8)	3,002 (90.2)	374 (89.0)	1,877 (90.3)	1,449 (91.0)	279 (85.1)	1,615 (87.8)	1,119 (90.0)	653 (87.3)	3,492 (89.1)	2,568 (90.6)			
Ticagrelor	126 (16.6)	624 (15.9)	422 (14.9)	68 (19.7)	238 (14.5)	159 (12.6)	52 (9.9)	275 (19.0)	157 (16.0)	120 (19.8)	513 (16.6)	316 (14.1)			
GP receptor inhibitor	14 (1.9)	62 (1.6)	40 (1.5)	10 (2.9)	30 (1.8)	16 (1.3)	10 (3.9)	52 (3.7)	21 (2.2)	20 (3.3)	82 (2.7)	37 (1.7)			
Unfractionated heparin	115 (15.6)	633 (16.4)	450 (16.1)	65 (18.8)	232 (14.3)	147 (11.7)	42 (16.2)	248 (17.3)	141 (14.4)	107 (17.7)	480 (15.7)	288 (12.9)			
LMWH	55 (7.5)	366 (9.5)	422 (15.0)	47 (13.7)	233 (14.1)	239 (18.7)	32 (12.2)	216 (14.9)	188 (19.0)	79 (13.1)	449 (14.5)	427 (18.8)			
Fondaparinux	610 (75.2)	3,161 (73.4)	2,136 (68.8)	307 (74.7)	1,514 (76.0)	1,03 (72.8)	240 (77.4)	1,302 (74.2)	850 (71.9)	547 (75.9)	2,816 (75.1)	1,953 (72.4)			
Oral anticoagulant (e.g. Warfarin)	9 (1.2)	71 (1.9)	46 (1.7)	8 (2.4)	22 (1.4)	19 (1.5)	5 (1.9)	22 (1.5)	20 (2.1)	13 (2.2)	44 (1.4)	39 (1.8)			
Beta blocker	457 (59.1)	2,359 (57.6)	1,513 (51.2)	250 (64.9)	1,120 (60.6)	760 (54.2)	199 (66.3)	1,005 (62.0)	630 (58.6)	449 (65.5)	2,125 (61.2)	1,390 (56.1)			
ACE inhibitor	371 (48.1)	2,014 (49.4)	1,263 (42.9)	186 (49.9)	919 (50.7)	596 (43.6)	157 (54.9)	830 (51.8)	476 (44.7)	343 (52.0)	1,749 (51.2)	1,072 (44.1)			
Angiotensin II receptor blocker	15 (2.1)	85 (2.2)	84 (3.0)	15 (4.3)	35 (2.2)	51 (4.1)	11 (4.2)	74 (5.2)	46 (4.7)	26 (4.3)	109 (3.6)	97 (4.3)			
Statins	758 (91.4)	4,111 (91.9)	2,927 (90.3)	387 (94.2)	1,918 (93.9)	1,426 (91.5)	302 (94.1)	1,708 (93.7)	1,132 (93.6)	689 (94.1)	3,626 (93.8)	2,558 (92.4)			
Other lipid lowering agent	17 (2.3)	65 (1.7)	45 (1.6)	12 (3.5)	58 (3.5)	40 (3.1)	11 (4.3)	63 (4.4)	35 (3.6)	23 (3.8)	121 (3.9)	75 (3.3)			
Diuretics	88 (11.9)	732 (18.8)	788 (27.5)	46 (13.0)	337 (19.9)	404 (30.4)	36 (13.6)	255 (17.3)	270 (26.4)	82 (13.3)	592 (18.6)	674 (28.7)			
Calcium antagonist	22 (3.0)	134 (3.5)	140 (5.1)	9 (2.6)	55 (3.4)	82 (6.5)	10 (3.8)	59 (4.1)	70 (7.1)	19 (3.2)	114 (3.7)	152 (6.8)			
Oral hypoglycaemic agent	92 (12.5)	704 (18.2)	464 (16.5)	42 (12.2)	348 (20.9)	259 (20.4)	48 (18.2)	337 (22.9)	226 (22.6)	90 (14.8)	685 (21.8)	485 (21.3)			
Insulin	89 (11.9)	908 (23.0)	703 (24.3)	57 (16.2)	521 (29.7)	437 (32.3)	49 (18.4)	431 (28.1)	338 (32.3)	106 (17.2)	952 (28.9)	775 (32.3)			
Anti-arrhythmic agent	29 (3.9)	145 (3.8)	111 (4.0)	9 (2.6)	55 (3.4)	59 (4.7)	10 (3.8)	43 (3.0)	53 (5.4)	19 (3.1)	98 (3.2)	112 (5.0)			

Year	2018–2019				2020				2021				2020–2021	
	Age group	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	
Total	873	4,683	3,380	427	2,115	1,611	331	1,876	1,267	758	3,991	2,878		
#Pharmacological therapy given at discharge, No (%)														
Aspirin	708 (91.9)	3,757 (92.5)	2,423 (90.4)	363 (92.8)	1,682 (92.6)	1,149 (91.4)	256 (90.1)	1,400 (90.5)	826 (88.4)	619 (91.7)	3,082 (91.6)	1,975 (90.1)		
*ADP antagonist	748 (96.0)	4,039 (97.5)	2,648 (97.0)	387 (97.5)	1,792 (97.2)	1,237 (96.2)	287 (96.3)	1,598 (96.7)	972 (95.7)	674 (97.0)	3,390 (97.0)	2,209 (96.0)		
Clopidogrel	646 (83.7)	3,528 (86.2)	2,303 (85.3)	332 (84.5)	1,550 (85.0)	1,091 (85.4)	237 (80.1)	1,348 (82.8)	849 (84.4)	569 (82.6)	2,898 (83.9)	1,940 (85.0)		
Ticagrelor	127 (18.6)	664 (18.9)	413 (17.7)	59 (17.7)	261 (17.2)	151 (14.1)	51 (20.6)	291 (21.3)	142 (17.1)	110 (19.0)	552 (19.2)	293 (15.4)		
Fondaparinux	19 (2.8)	75 (2.2)	52 (2.3)	10 (3.0)	34 (2.3)	22 (2.1)	5 (2.0)	28 (2.1)	19 (2.3)	15 (2.6)	62 (2.2)	41 (2.2)		
Oral anticoagulant (e.g. Warfarin)	21 (3.1)	107 (3.1)	90 (3.9)	9 (2.7)	26 (1.7)	28 (2.6)	11 (4.5)	30 (2.3)	36 (4.4)	20 (3.5)	56 (2.0)	64 (3.4)		
Beta blocker	535 (71.0)	2,809 (71.7)	1,809 (69.9)	274 (72.7)	1,254 (72.3)	834 (68.2)	223 (78.0)	1,152 (70.9)	672 (74.6)	497 (70.9)	2,406 (75.0)	1,506 (73.4)		
ACE inhibitor	441 (58.7)	2,458 (63.3)	1,443 (56.3)	225 (62.0)	1,007 (59.3)	667 (56.2)	176 (64.9)	933 (61.5)	537 (57.7)	401 (63.2)	1,940 (60.3)	1,204 (56.9)		
Angiotensin II receptor blocker	16 (2.3)	118 (3.4)	96 (4.2)	18 (5.4)	57 (3.8)	58 (5.4)	16 (6.6)	89 (6.7)	66 (8.0)	34 (5.9)	146 (5.2)	124 (6.6)		
Statin	722 (92.8)	3,834 (93.6)	2,522 (93.0)	358 (91.8)	1,688 (93.3)	1,160 (92.5)	282 (94.9)	1,544 (94.4)	916 (91.9)	640 (93.2)	3,232 (93.8)	2,076 (92.2)		
Other lipid lowering agent	23 (3.4)	79 (2.3)	52 (2.3)	11 (3.3)	62 (4.1)	33 (3.1)	12 (4.9)	66 (5.0)	39 (4.8)	23 (4.0)	128 (4.5)	72 (3.8)		
Diuretics	57 (8.3)	563 (16.0)	531 (22.5)	32 (9.6)	210 (13.6)	231 (21.1)	19 (7.7)	146 (10.8)	149 (17.8)	51 (8.8)	356 (12.3)	380 (19.6)		
Calcium antagonist	13 (1.9)	126 (3.6)	116 (5.0)	9 (2.8)	52 (3.5)	69 (6.4)	7 (2.9)	43 (3.3)	56 (6.9)	16 (2.8)	95 (3.4)	125 (6.6)		
Oral hypoglycaemic agent	125 (18.1)	977 (27.2)	619 (25.9)	67 (20.1)	470 (29.9)	327 (29.8)	60 (24.0)	449 (32.0)	275 (31.9)	127 (21.8)	919 (30.9)	602 (30.8)		
Insulin	41 (5.9)	489 (13.7)	331 (14.0)	36 (10.8)	290 (18.3)	196 (17.8)	27 (10.9)	227 (16.5)	160 (18.8)	63 (10.8)	517 (17.5)	356 (18.2)		
Anti-arrhythmic agent	15 (2.2)	71 (2.1)	47 (2.0)	4 (1.2)	25 (1.7)	25 (2.4)	4 (1.7)	21 (1.6)	20 (2.4)	8 (1.4)	46 (1.6)	45 (2.4)		

^aTotal admission days is derived from Outcome date-Admission date + I

^bExcluded notifications of patients who died at discharge

* Ticlopidine, clopidogrel, prasugrel, and ticagrelor are grouped as ADP antagonist.

Note: Young is defined as age 20 to less than 40 years, middle-aged is defined as age 40 to less than 60 years and elderly is defined as 60 years and above

Table 4.3 Treatments for patients with STEMI by gender, NCVD-ACS Registry, 2020–2021

Year	2018–2019				2020				2021			
	Gender	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Total		7,736	1,200	3,592		561	3,002	472		6,594		1,033
Total admission days												
N	7,727	1,197	3,589	561	3,000	471	6,589					1,032
Mean (SD)	5.5 (5.1)	6.0 (5.2)	5.7 (5.2)	6.3 (5.9)	5.8 (5.5)	6.0 (5.0)	5.7 (5.4)					6.1 (5.5)
Median (min, max)	5.0 (1.0, 87.0)	5.0 (1.0, 66.0)	5.0 (1.0, 86.0)	5.0 (1.0, 61.0)	4.0 (1.0, 87.0)	5.0 (1.0, 50.0)	5.0 (1.0, 87.0)					5.0 (1.0, 61.0)
IQR	3.0	4.0	3.0	4.0	3.0	4.0	3.0					4.0
Missing (%)	9 (0.1)	3 (0.3)	3 (0.1)	0 (0)	2 (0.1)	1 (0.2)	5 (0.1)					1 (0.1)
Number of days in CCU												
N	3,435	522	1,750	274	1,009		165			2,759		439
Mean (SD)	2.9 (2.5)	3.2 (3.0)	3.2 (2.5)	3.7 (3.3)	3.3 (2.7)		3.1 (2.4)			3.3 (2.6)		3.5 (3.0)
Median (min, max)	2.0 (1.0, 30.0)	2.0 (1.0, 23.0)	3.0 (1.0, 22.0)	3.0 (1.0, 28.0)	3.0 (1.0, 25.0)		2.0 (1.0, 15.0)			3.0 (1.0, 25.0)		3.0 (1.0, 28.0)
IQR	2.0	3.0	2.0	3.0	2.0		3.0			2.0		2.0
No admission to CCU, %	4,301 (55.6)	678 (56.5)	1,842 (51.3)	287 (51.2)	1,993 (66.4)		307 (65.0)			3,835 (58.2)		594 (57.5)
Missing (%)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)		0 (0)			0 (0)		0 (0)
Number of days in ICU/CICU												
N	65	12	56	7	47		6			103		13
Mean (SD)	3.8 (4.2)	2.1 (1.7)	3.9 (3.4)	7.1 (8.5)	3.5 (2.6)		2.3 (1.0)			3.7 (3.0)		4.9 (6.6)
Median (min, max)	3.0 (1.0, 25.0)	2.0 (1.0, 7.0)	3.0 (1.0, 21.0)	4.0 (1.0, 26.0)	3.0 (1.0, 13.0)		3.0 (1.0, 3.0)			3.0 (1.0, 21.0)		3.0 (1.0, 26.0)
IQR	2.0	1.0	2.5	4.0	2.0		2.0			2.0		1.0
No admission to ICU/CICU, %	7,671 (99.2)	1,188 (99.0)	3,536 (98.4)	554 (98.8)	2,955 (98.4)		466 (98.7)			6,491 (98.4)		1,020 (98.7)
Missing (%)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)		0 (0)			0 (0)		0 (0)

Year	Gender	2018–2019		2020		2021		2020–2021	
		Male	Female	Male	Female	Male	Female	Male	Female
Total		7,736	1,200	3,592	561	3,002	472	6,594	1,033
Fibrinolytic therapy, No. (%)									
Given at this centre	2,971 (39.2)	410 (35.2)	1,676 (47.1)	219 (39.6)	1,298 (44.0)	201 (43.7)	2,974 (45.7)	420 (41.5)	
Given at another centre prior to transfer	2,007 (26.5)	257 (22.0)	963 (27.0)	126 (22.8)	729 (24.7)	86 (18.7)	1,692 (26.0)	212 (20.9)	
Not given-Proceeded directly to primary angioplasty	1,506 (19.9)	242 (20.8)	412 (11.6)	85 (15.4)	446 (15.1)	73 (15.9)	858 (13.2)	158 (15.6)	
Not given-Missed thrombolysis	880 (11.6)	186 (16.0)	382 (10.7)	94 (17.0)	370 (12.5)	69 (15.0)	752 (11.5)	163 (16.1)	
Not given-Patient refusal	15 (0.2)	4 (0.3)	14 (0.4)	2 (0.4)	13 (0.4)	3 (0.7)	27 (0.4)	5 (0.5)	
Not given-Contraindicated	209 (2.8)	67 (5.8)	115 (3.2)	27 (4.9)	94 (3.2)	28 (6.1)	209 (3.2)	55 (5.4)	
Not applicable	73	14	15	4	32	2	47	6	
Not available	55	15	15	4	20	10	35	14	
Missing	20	5	0	0	0	0	0	0	
Cardiac catheterisation, No. (%)									
Yes	4,558 (59.9)	643 (53.6)	2,020 (56.2)	292 (52.0)	1,975 (65.8)	274 (58.1)	3,995 (60.6)	566 (54.8)	
No	3,157 (40.8)	549 (45.8)	1,554 (43.3)	266 (47.4)	1,005 (33.5)	195 (41.3)	2,559 (38.8)	461 (44.6)	
Number transferred to another centre	20 (0.3)	8 (0.7)	18 (0.5)	3 (0.5)	22 (0.7)	3 (0.6)	40 (0.6)	6 (0.6)	
Missing	1	0	0	0	0	0	0	0	

Year	Gender	2018–2019		2020		2021		2020–2021	
		Male	Female	Male	Female	Male	Female	Male	Female
Total		7,736	1,200	3,592	561	3,002	472	6,594	1,033
PCI, No. (%)									
Yes		3,489 (52.9)	494 (48.8)	1,527 (49.1)	213 (43.2)	1,498 (57.9)	208 (51.4)	3,025 (53.1)	421 (46.9)
No		3,101 (47.0)	517 (51.1)	1,581 (50.9)	279 (56.6)	1,089 (42.1)	195 (48.1)	2,670 (46.9)	474 (52.8)
Not applicable		3 (0.1)	1 (0.1)	1 (0.0)	1 (0.2)	1 (0.0)	2 (0.5)	2 (0.0)	3 (0.3)
Missing		1143	188	483	68	414	67	897	135
CABG, No. (%)									
Yes		62 (1.0)	12 (1.3)	34 (1.1)	6 (1.3)	39 (1.6)	2 (0.5)	73 (1.3)	8 (0.9)
No		6,137 (98.8)	926 (98.6)	2,938 (98.5)	467 (98.5)	2,400 (98.2)	387 (99.2)	5,338 (98.4)	854 (98.8)
Not applicable		15 (0.2)	1 (0.1)	10 (0.3)	1 (0.2)	4 (0.2)	1 (0.3)	14 (0.3)	2 (0.2)
Missing		1,522	261	610	87	559	82	1,169	169
Pre-admission aspirin use, No. (%)									
Yes		1,172 (15.6)	205 (17.4)	619 (17.6)	103 (18.6)	442 (15.1)	74 (15.9)	1,061 (16.5)	177 (17.4)
No		6,339 (84.4)	971 (82.6)	2,903 (82.4)	450 (81.4)	2,485 (84.9)	390 (84.1)	5,388 (83.5)	840 (82.6)
Missing		225	24	70	8	75	8	145	16
Pharmacological therapy given during admission, No. (%)									
Aspirin		7,304 (96.2)	1,113 (95.7)	3,349 (95.3)	504 (92.6)	2,722 (94.7)	430 (96.2)	6,071 (95.0)	934 (94.2)
*ADP antagonist		7,566 (98.6)	1,156 (97.5)	3,495 (98.3)	539 (97.5)	2,918 (98.2)	455 (98.1)	6,413 (98.3)	994 (97.7)
Clopidogrel		6,913 (90.6)	1,061 (89.7)	3,206 (90.6)	494 (89.5)	2,607 (88.3)	406 (88.3)	5,813 (89.6)	900 (88.9)
Ticagrelor		1,024 (15.7)	148 (15.0)	402 (14.3)	63 (14.4)	421 (18.1)	63 (17.2)	823 (16.0)	126 (15.7)
GP receptor inhibitor		104 (1.6)	12 (1.3)	49 (1.8)	7 (1.6)	76 (3.3)	7 (1.9)	125 (2.5)	14 (1.8)

Year	2018–2019			2020			2021			2020–2021		
Gender	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Total	7,736	1,200	3,592	561	3,002	472	6,594	1,033				
Pharmacological therapy given during admission, No. (%)												
Unfractionated heparin	1,038 (16.2)	160 (16.4)	387 (13.8)	57 (13.0)	366 (15.9)	65 (17.9)	753 (14.8)	122 (15.3)				
LMWH	708 (11.0)	135 (13.8)	416 (14.7)	103 (22.9)	355 (15.2)	81 (21.8)	771 (14.9)	184 (22.4)				
Fondaparinux	5,166 (72.5)	741 (67.6)	2,556 (75.2)	368 (70.9)	2,097 (74.5)	295 (68.1)	4,653 (74.9)	663 (69.6)				
Oral anticoagulant (e.g. Warfarin)	113 (1.8)	13 (1.4)	42 (1.5)	7 (1.6)	42 (1.8)	5 (1.4)	84 (1.7)	12 (1.5)				
Beta blocker	3,764 (55.6)	565 (53.8)	1,860 (59.0)	270 (55.9)	1,608 (61.7)	226 (57.5)	3,468 (60.2)	496 (56.6)				
ACE inhibitor	3,222 (47.6)	426 (41.4)	1,494 (48.6)	207 (43.4)	1,278 (49.9)	185 (47.3)	2,772 (49.2)	392 (45.2)				
Angiotensin II receptor blocker	159 (2.5)	25 (2.6)	85 (3.1)	16 (3.7)	107 (4.7)	24 (6.6)	192 (3.8)	40 (5.0)				
Statins	6,775 (91.6)	1,021 (89.3)	3,232 (93.3)	499 (91.4)	2,724 (93.7)	418 (93.5)	5,956 (93.5)	917 (92.3)				
Other lipid lowering agent	112 (1.8)	15 (1.6)	99 (3.5)	11 (2.5)	91 (3.9)	18 (4.9)	190 (3.7)	29 (3.6)				
Diuretics	1,326 (20.4)	282 (28.1)	647 (22.3)	140 (29.7)	484 (20.3)	77 (20.4)	1,131 (21.4)	217 (25.6)				
Calcium antagonist	242 (3.8)	54 (5.6)	119 (4.3)	27 (6.2)	112 (4.9)	27 (7.4)	231 (4.5)	54 (6.7)				
Oral hypoglycaemic agent	1,022 (15.9)	238 (24.1)	533 (18.8)	116 (26.1)	487 (20.7)	124 (32.0)	1,020 (19.6)	240 (28.9)				
Insulin	1,304 (19.9)	396 (38.0)	780 (26.3)	235 (47.7)	630 (25.8)	188 (46.0)	1,410 (26.1)	423 (46.9)				
Anti-arrhythmic agent	254 (4.0)	31 (3.2)	100 (3.6)	23 (5.2)	98 (4.3)	8 (2.2)	198 (3.9)	31 (3.9)				
#Pharmacological therapy given at discharge, No. (%)												
Aspirin	6,067 (91.9)	821 (90.3)	2,811 (92.9)	383 (87.6)	2,175 (89.8)	307 (89.8)	4,986 (91.5)	690 (88.6)				
*ADP antagonist	6,543 (97.3)	892 (96.2)	2,995 (97.3)	421 (94.0)	2,501 (96.3)	356 (96.5)	5,496 (96.8)	777 (95.1)				
Clopidogrel	5,700 (85.8)	777 (84.4)	2,605 (85.4)	368 (82.7)	2,134 (83.1)	300 (82.4)	4,739 (84.4)	668 (82.6)				
Ticagrelor	1,064 (18.5)	140 (17.8)	418 (16.4)	53 (14.0)	424 (19.9)	60 (19.4)	842 (18.0)	113 (16.4)				

Year	Gender	2018–2019		2020		2021		2020–2021	
		Male	Female	Male	Female	Male	Female	Male	Female
Total		7,736	1,200	3,592	561	3,002	472	6,594	1,033
#Pharmacological therapy given at discharge, No. (%)									
Fondaparinux		134 (2.3)	12 (1.6)	56 (2.2)	10 (2.7)	49 (2.4)	3 (1.0)	105 (2.3)	13 (1.9)
Oral anticoagulant (e.g. Warfarin)		199 (3.5)	19 (2.5)	52 (2.1)	11 (2.9)	67 (3.2)	10 (3.3)	119 (2.6)	21 (3.1)
Beta blocker		4,520 (71.0)	633 (71.0)	2,058 (71.0)	304 (69.9)	1,797 (74.1)	250 (71.0)	3,855 (72.4)	554 (70.4)
ACE inhibitor		3,833 (60.6)	509 (58.2)	1,667 (59.0)	232 (55.0)	1,446 (60.9)	200 (58.1)	3,113 (59.9)	432 (56.4)
Angiotensin II receptor blocker		204 (3.6)	26 (3.3)	120 (4.8)	13 (3.4)	142 (6.8)	29 (9.5)	262 (5.7)	42 (6.1)
Statin		6,222 (93.4)	856 (92.9)	2,796 (92.9)	410 (92.3)	2,404 (93.7)	338 (93.1)	5,200 (93.2)	748 (92.7)
Other lipid lowering agent		142 (2.5)	12 (1.5)	95 (3.7)	11 (2.9)	99 (4.7)	18 (5.9)	194 (4.2)	29 (4.2)
Diuretics		972 (16.8)	179 (22.5)	402 (15.5)	71 (18.3)	270 (12.7)	44 (14.1)	672 (14.3)	115 (16.5)
Calcium antagonist		215 (3.8)	40 (5.1)	114 (4.5)	16 (4.2)	84 (4.0)	22 (7.2)	198 (4.3)	38 (5.6)
Oral hypoglycaemic agent		1,410 (24.1)	311 (37.9)	718 (27.5)	146 (37.3)	648 (29.6)	136 (41.7)	1,366 (28.5)	282 (39.3)
Insulin		638 (11.0)	223 (27.5)	389 (14.9)	133 (32.5)	324 (15.0)	90 (28.0)	713 (15.0)	223 (30.5)
Anti-arrhythmic agent		127 (2.2)	6 (0.8)	48 (1.9)	6 (1.6)	40 (1.9)	5 (1.7)	88 (1.9)	11 (1.6)

[^]Total admission days is derived from Outcome date-Admission date + 1

#Excluded notifications of patients who died at discharge
*Ticlopidine, clopidogrel, prasugrel, and ticagrelor are grouped as ADP antagonist.

Table 4.4 Treatments for patients with STEMI by ethnic group, NCVD-ACS Registry, 2020–2021

Year	ACS stratum	2018–2019				2020				2021				2020–2021				
		Malay	Chinese	Indian	Others													
Total	4,967	1,529	1,311	1,129	2,429	667	592	465	1,984	545	534	411	4,413	1,212	1,126	876		
Total admission days																		
N	4,958	1,528	1,311	1,127	2,428	665	592	465	1,984	544	533	410	4,412	1,209	1,125	875		
Mean (SD)	5.7 (4.9)	5.6 (4.9)	5.5 (4.7)	5.2 (4.4)	5.7 (4.4)	5.8 (5.0)	5.9 (5.6)	5.7 (5.3)	5.8 (4.9)	5.7 (5.9)	6.1 (6.5)	5.6 (6.1)	5.7 (5.0)	5.7 (5.0)	5.8 (5.7)	6.0 (5.9)	5.6 (6.3)	
Median (min, max)	5.0 (1.0, 87.0)	5.0 (1.0, 68.0)	5.0 (1.0, 66.0)	4.0 (1.0, 57.0)	4.0 (1.0, 67.0)	5.0 (1.0, 86.0)	5.0 (1.0, 85.0)	5.0 (1.0, 85.0)	5.0 (1.0, 85.0)	5.0 (1.0, 85.0)	5.0 (1.0, 87.0)	4.0 (1.0, 71.0)	4.0 (1.0, 70.0)	4.0 (1.0, 70.0)	4.0 (1.0, 70.0)	4.0 (1.0, 86.0)	4.0 (1.0, 87.0)	4.0 (1.0, 85.0)
IQR	3.0	3.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Missing (%)	9 (0.2)	1 (0.1)	0 (0)	2 (0.2)	1 (0.2)	0 (0)	2 (0.3)	1 (0.3)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.2)	1 (0.2)	1 (0.2)	1 (0.2)	1 (0.1)	
Number of days in CCU																		
N	2,288	615	451	603	1,207	294	274	249	605	203	174	192	1,812	497	448	441		
Mean (SD)	3.0 (2.7)	2.8 (2.8)	2.9 (2.2)	3.0 (2.3)	3.3 (2.7)	3.1 (2.3)	3.8 (2.8)	3.0 (2.1)	3.3 (2.8)	2.9 (2.5)	3.5 (3.0)	3.3 (2.4)	3.3 (2.7)	3.0 (2.4)	3.0 (2.7)	3.7 (2.9)	3.1 (2.2)	
Median (min, max)	2.0 (1.0, 29.0)	2.0 (1.0, 30.0)	2.0 (1.0, 19.0)	2.0 (1.0, 20.0)	2.0 (1.0, 28.0)	2.0 (1.0, 18.0)	2.5 (1.0, 18.0)	3.0 (1.0, 17.0)	3.0 (1.0, 17.0)	3.0 (1.0, 17.0)	3.0 (1.0, 21.0)	2.0 (1.0, 24.0)	3.0 (1.0, 25.0)	3.0 (1.0, 25.0)	3.0 (1.0, 25.0)	3.0 (1.0, 25.0)	3.0 (1.0, 25.0)	3.0 (1.0, 25.0)
IQR	3.0	2.0	3.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	3.0	2.0	
No admission to CCU, %	2,679 (53.9)	914 (59.8)	860 (65.6)	526 (46.6)	1,222 (50.3)	373 (55.9)	318 (53.7)	216 (46.5)	1,379 (69.5)	342 (62.8)	360 (67.4)	219 (53.3)	715 (58.9)	678 (59.0)	715 (60.2)	435 (49.7)		

Year	ACS stratum	2018-2019				2020				2021				2020-2021			
		Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others
Total	4,967	1,529	1,311	1,129	2,429	667	592	465	1,984	545	534	411	4,413	1,212	1,126	876	
Number of days in ICU/CICU																	
N	42	15	15	5	34	13	13	3	36	7	10	0	70	20	23	3	
Mean (SD)	3.3 (3.1)	2.8 (2.7)	2.8 (2.7)	7 (10.4)	4.4 (5.1)	3.8 (2.5)	4.2 (3.4)	6.3 (4.5)	3.8 (2.8)	2.6 (1.3)	2.3 (1.1)	0.0 (0.0)	4.1 (4.1)	3.4 (2.2)	3.3 (2.8)	6.3 (4.5)	
Median (min, max)	2.5 (1.0, 18.0)	2.0 (1.0, 16.0)	2.0 (1.0, 16.0)	1.0 (1.0, 12.0)	3.0 (1.0, 25.0)	3.0 (1.0, 26.0)	3.0 (1.0, 10.0)	6.0 (2.0, 13.0)	3.0 (1.0, 11.0)	2.0 (1.0, 13.0)	2.5 (1.0, 5.0)	0.0 (0.0, 4.0)	0.0 (0.0, 4.0)	3.0 (1.0, 26.0)	3.0 (1.0, 10.0)	3.0 (1.0, 13.0)	6.0 (2.0, 11.0)
IQR	3.0	3.0	1.0	6.0	3.0	3.0	2.0	9.0	3.0	1.0	2.0	0.0	3.0	2.5	2.0	9.0	
No admission to ICU/CICU, %	4,925 (99.2)	1,514 (99.0)	1,296 (98.9)	1,124 (98.9)	2,395 (99.6)	654 (98.6)	579 (98.1)	462 (97.8)	1,948 (98.2)	538 (98.7)	524 (98.1)	411 (100.0)	4,343 (98.4)	1,192 (98.3)	1,103 (98.0)	873 (99.7)	
Fibrinolytic therapy, No. (%)																	
Given at this centre	1,947 (39.9)	556 (37.5)	490 (38.4)	388 (34.9)	1,089 (45.1)	293 (44.6)	302 (51.8)	211 (45.6)	862 (44.3)	237 (44.5)	227 (43.2)	173 (42.7)	1,951 (44.7)	530 (44.6)	529 (47.7)	384 (44.2)	
Given at another centre prior to transfer	1,306 (26.8)	283 (19.1)	219 (17.2)	456 (41.0)	724 (30.0)	112 (17.0)	112 (19.2)	141 (30.5)	487 (25.0)	100 (18.8)	95 (18.1)	95 (18.1)	133 (32.8)	1,211 (27.8)	212 (17.8)	207 (18.7)	274 (31.6)
Not given-Proceeded directly to primary angioplasty	912 (18.7)	354 (23.9)	367 (28.7)	115 (10.3)	260 (10.8)	124 (18.9)	87 (14.9)	26 (5.6)	296 (15.2)	93 (17.5)	112 (21.3)	18 (4.4)	556 (12.8)	217 (18.3)	199 (18.0)	44 (5.1)	
Not given-Missed thrombolysis	561 (11.5)	228 (15.4)	166 (13.0)	111 (10.0)	248 (10.3)	101 (15.4)	60 (10.3)	67 (14.5)	237 (12.2)	76 (14.3)	67 (12.8)	59 (14.6)	485 (11.1)	177 (14.9)	127 (11.5)	126 (14.5)	
Not given-Patient refusal	8 (0.2)	6 (0.4)	2 (0.2)	3 (0.3)	11 (0.5)	2 (0.3)	1 (0.3)	1 (0.3)	1 (0.2)	9 (0.5)	4 (0.8)	3 (0.6)	0 (0)	20 (0.5)	6 (0.5)	5 (0.5)	1 (0.1)
Not given-Contraindicated	147 (3.0)	56 (3.8)	33 (2.6)	40 (3.6)	80 (3.3)	25 (3.8)	20 (3.7)	17 (3.4)	57 (4.1)	22 (4.0)	21 (4.1)	22 (4.0)	137 (5.4)	47 (3.1)	41 (4.0)	39 (3.7)	44 (4.5)

Year	ACS stratum	2018-2019				2020				2021				2020-2021			
		Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others
Total	4,967	1,529	1,311	1,129	2,429	667	592	465	1,984	545	534	411	4,413	1,212	1,126	876	
Fibrinolytic therapy, No. (%)																	
Not applicable	46	24	7	10	7	4	1	17	9	3	5	24	16	7	6		
Not available	28	13	24	5	10	3	5	1	19	4	6	1	29	7	11	2	
Missing	12	9	3	1	0	0	0	0	0	0	0	0	0	0	0	0	
Cardiac catheterisation, No. (%)																	
Yes	2,743 (55.2)	1,001 (65.5)	816 (62.2)	641 (56.8)	1,340 (55.2)	424 (63.6)	325 (54.9)	223 (48.0)	1,266 (63.8)	382 (70.1)	350 (65.5)	251 (61.1)	2,606 (59.1)	806 (66.5)	675 (59.9)	474 (54.1)	
No	2,211 (44.5)	525 (34.3)	525 (37.2)	487 (42.8)	1,075 (36.1)	241 (44.4)	263 (51.8)	241 (35.3)	701 (35.3)	162 (29.7)	177 (33.1)	160 (38.9)	1,776 (40.2)	403 (33.3)	440 (39.1)	401 (45.8)	
Number transferred to another centre	12 (0.2)	3 (0.2)	8 (0.6)	5 (0.4)	14 (0.6)	2 (0.3)	4 (0.3)	1 (0.7)	17 (0.2)	1 (0.9)	1 (0.2)	7 (1.3)	0 (0)	31 (0.7)	3 (0.2)	11 (1.0)	
Missing	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PCI, No. (%)																	
Yes	2,112 (51.4)	738 (55.7)	611 (54.3)	522 (50.1)	1,059 (50.5)	291 (49.6)	206 (41.6)	184 (43.5)	978 (58.1)	272 (56.4)	249 (57.5)	207 (52.5)	2,037 (53.9)	563 (52.7)	455 (49.0)	391 (47.9)	
No	1,999 (48.6)	588 (44.3)	513 (45.6)	518 (49.7)	1,037 (50.4)	296 (49.5)	289 (58.4)	238 (56.3)	704 (41.8)	183 (43.6)	187 (42.3)	1741 (47.5)	506 (46.0)	472 (47.3)	425 (52.0)		
Not applicable	1 (0.0)	0 (0)	1 (0.1)	2 (0.2)	1 (0.1)	0 (0)	0 (0)	1 (0.2)	2 (0.1)	0 (0)	1 (0.2)	0 (0)	3 (0.1)	0 (0)	1 (0.1)	1 (0.1)	
Missing	855	203	186	87	332	80	97	42	300	63	101	17	632	143	198	59	

Year	2018-2019				2020				2021				2020-2021				
	ACS stratum	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others
Total	4,967	1,529	1,311	1,129	2,429	667	592	465	1,984	545	534	411	4,413	1,212	1,126	876	
CABG, No. (%)																	
Yes	50 (1.3)	9 (0.7)	6 (0.6)	9 (0.9)	24 (1.2)	5 (1.1)	5 (1.6)	2 (0.5)	24 (1.5)	8 (1.7)	7 (1.7)	2 (0.5)	48 (1.4)	17 (1.6)	12 (1.4)	4 (0.5)	
No	3,750 (98.4)	1,261 (99.2)	1,038 (99.1)	1,014 (98.5)	1,947 (98.3)	569 (98.7)	465 (98.8)	424 (98.3)	1,550 (98.3)	453 (98.0)	402 (99.2)	382 (98.4)	3,497 (98.3)	1,022 (98.4)	867 (98.4)	806 (99.0)	
Not applicable	11 (0.3)	1 (0.1)	3 (0.3)	1 (0.1)	6 (0.3)	1 (0.2)	1 (0.2)	3 (0.7)	3 (0.2)	0 (0)	1 (0.2)	1 (0.3)	9 (0.3)	1 (0.1)	2 (0.2)	4 (0.5)	
Missing	1,156	258	264	105	452	88	121	36	407	84	124	26	859	172	245	62	
Pre-admission aspirin use, No. (%)																	
Yes	782 (16.2)	226 (15.2)	268 (21.2)	101 (9.1)	452 (19.1)	101 (15.3)	117 (20.0)	52 (11.2)	303 (15.8)	60 (11.2)	120 (22.9)	33 (8.1)	755 (17.6)	161 (13.5)	237 (21.4)	85 (9.8)	
No	4,039 (83.8)	1,265 (84.8)	997 (78.8)	1,009 (90.9)	1,916 (80.9)	558 (84.7)	467 (80.0)	412 (88.8)	1,620 (84.2)	477 (88.8)	405 (77.1)	373 (91.9)	3,536 (82.4)	1,035 (86.5)	872 (86.5)	785 (90.2)	
Missing	146	38	46	19	61	8	8	1	61	8	9	5	122	16	17	6	
Pharmacological therapy given during admission, No. (%)																	
Aspirin	4,625 (95.7)	1,448 (96.0)	1,248 (96.8)	1,096 (97.5)	2,218 (94.1)	626 (94.6)	555 (95.5)	454 (94.1)	1,763 (95.4)	502 (95.1)	490 (98.0)	397 (94.1)	3,981 (94.9)	1,128 (95.3)	1,045 (98.3)	851	
*ADP antagonist	4,845 (98.5)	1,493 (98.6)	1,280 (98.6)	1,104 (98.0)	2,358 (98.4)	645 (97.1)	575 (98.3)	456 (98.5)	1,920 (98.1)	534 (98.9)	515 (97.7)	404 (98.5)	4,278 (98.2)	1,179 (97.9)	1,090 (98.0)	860 (98.5)	
Clopidogrel	4,452 (91.1)	1,337 (88.7)	1,106 (85.7)	1,079 (95.9)	2,172 (91.1)	580 (87.7)	503 (86.3)	445 (96.3)	1,720 (88.6)	476 (88.6)	419 (80.1)	398 (97.1)	3,892 (90.0)	1,056 (88.1)	922 (83.4)	843 (96.7)	
Ticagrelor	638 (16.3)	226 (23.8)	276 (3.0)	32 (14.5)	260 (16.5)	95 (21.9)	98 (21.9)	12 (2.8)	269 (18.3)	81 (18.6)	11 (30.5)	11 (2.9)	529 (16.2)	176 (26.0)	221 (26.0)	23 (2.9)	

Year	ACS stratum	2018-2019				2020				2021				2020-2021			
		Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others
Total	4,967	1,529	1,311	1,129	2,429	667	592	465	1,984	545	534	411	4,413	1,212	1,126	876	
Pharmacological therapy given during admission, No. (%)																	
GP receptor inhibitor	61 (1.6)	24 (1.8)	21 (1.9)	10 (0.9)	32 (1.8)	9 (1.6)	7 (1.6)	8 (1.9)	50 (3.5)	11 (2.6)	20 (5.0)	2 (0.5)	82 (2.5)	20 (2.0)	27 (3.2)	10 (1.2)	
Unfractionated heparin	754 (19.5)	179 (13.3)	216 (19.4)	49 (4.5)	286 (15.9)	62 (10.9)	73 (16.5)	23 (5.4)	264 (18.1)	54 (12.4)	102 (25.4)	11 (2.9)	550 (16.9)	116 (11.5)	175 (20.7)	34 (4.2)	
LMWH	440 (11.4)	206 (15.2)	119 (10.6)	78 (7.3)	283 (15.6)	125 (21.7)	63 (14.1)	48 (11.1)	249 (16.8)	85 (19.5)	73 (17.8)	29 (7.7)	532 (17.8)	210 (16.1)	136 (20.8)	77 (9.5)	
Fondaparinux	3,236 (71.8)	939 (66.4)	806 (67.7)	926 (83.2)	1,687 (74.5)	435 (67.7)	428 (76.4)	374 (82.9)	1,341 (73.2)	353 (68.8)	352 (71.0)	346 (85.0)	3,028 (73.9)	788 (68.2)	780 (73.9)	720 (83.9)	
Oral anticoagulant (e.g. Warfarin)	64 (1.7)	24 (1.8)	21 (1.9)	17 (1.6)	30 (1.7)	8 (1.4)	7 (1.6)	4 (0.9)	24 (1.6)	8 (0.9)	6 (1.7)	6 (1.9)	54 (1.5)	54 (2.4)	16 (1.7)	13 (1.6)	
Beta blocker	2,160 (51.9)	741 (53.0)	682 (58.1)	746 (68.5)	1,175 (57.4)	336 (54.0)	340 (65.1)	279 (63.0)	989 (59.9)	278 (59.9)	290 (61.2)	277 (70.3)	2,164 (58.5)	614 (58.5)	630 (55.8)	556 (66.4)	
ACE inhibitor	1,849 (44.6)	611 (44.2)	526 (45.2)	662 (60.2)	954 (47.8)	255 (41.5)	265 (52.5)	227 (51.5)	779 (47.5)	218 (47.4)	229 (49.9)	237 (60.3)	1,733 (47.7)	473 (44.0)	494 (51.2)	464 (55.6)	
Angiotensin II receptor blocker	84 (2.2)	34 (2.6)	28 (2.5)	38 (3.5)	58 (3.3)	20 (3.5)	17 (3.8)	6 (1.4)	73 (5.0)	13 (3.0)	28 (7.0)	17 (4.5)	131 (4.0)	33 (3.3)	45 (5.3)	23 (2.9)	
Statin	4,308 (91.2)	1,318 (89.4)	1,115 (90.7)	1,055 (94.5)	2,161 (93.3)	604 (91.7)	533 (92.9)	433 (93.7)	1,779 (93.5)	496 (93.9)	474 (91.9)	393 (96.8)	3,940 (93.4)	1,100 (92.7)	1,007 (92.4)	826 (95.2)	
Other lipid lowering agent	80 (2.1)	22 (1.7)	21 (1.9)	4 (0.4)	81 (4.4)	16 (2.8)	11 (2.5)	2 (0.5)	74 (5.0)	9 (2.1)	23 (5.7)	3 (0.8)	155 (4.7)	25 (2.5)	34 (4.0)	5 (0.6)	
Diuretics	847 (21.6)	256 (18.7)	257 (22.7)	248 (23.0)	445 (22.5)	133 (23.7)	125 (26.4)	84 (19.5)	317 (21.0)	91 (20.2)	58 (22.6)	762 (15.3)	224 (22.5)	220 (21.5)	142 (24.6)	142 (17.5)	
Calcium antagonist	158 (4.2)	60 (4.5)	51 (4.6)	27 (2.5)	84 (4.7)	21 (3.7)	30 (6.7)	11 (2.6)	77 (5.3)	21 (4.9)	17 (6.0)	161 (4.5)	42 (5.0)	54 (4.2)	28 (6.3)	28 (3.5)	

Year	ACS stratum	2018-2019				2020				2021				2020-2021			
		Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others
Total	4,967	1,529	1,311	1,129	2,429	667	592	465	1,984	545	534	411	4,413	1,212	1,126	876	
Pharmacological therapy given during admission, No. (%)																	
Oral hypoglycaemic agent	639 (16.5)	197 (14.7)	301 (26.6)	123 (11.4)	335 (18.4)	99 (17.2)	148 (32.2)	67 (15.6)	339 (22.5)	63 (14.4)	142 (33.9)	67 (17.8)	674 (20.3)	162 (20.0)	290 (33.0)	134 (16.6)	
Insulin	995 (24.8)	220 (16.1)	359 (31.3)	126 (11.7)	613 (20.6)	119 (31.4)	224 (45.0)	59 (13.8)	477 (30.4)	83 (18.6)	199 (44.0)	59 (15.4)	1,090 (31.0)	202 (19.7)	423 (44.5)	118 (14.5)	
Anti-arrhythmic agent	134 (3.5)	48 (3.6)	45 (4.1)	58 (3.7)	67 (4.2)	24 (4.0)	15 (3.4)	17 (3.9)	57 (3.9)	16 (3.8)	14 (3.5)	19 (5.1)	124 (3.8)	40 (4.0)	29 (3.4)	36 (4.5)	
#Pharmacological therapy given at discharge, No. (%)																	
Aspirin	3,746 (91.4)	1,163 (90.5)	1,004 (91.3)	975 (94.9)	1,808 (90.9)	519 (92.7)	463 (93.5)	404 (96.2)	1,389 (89.3)	374 (90.1)	367 (87.8)	352 (93.4)	3,197 (90.2)	893 (91.6)	830 (90.9)	756 (94.9)	
*ADP antagonist	4,097 (97.4)	1,260 (97.1)	1,088 (97.8)	990 (96.0)	1,984 (95.4)	538 (95.4)	485 (96.8)	409 (96.7)	1,626 (96.6)	431 (96.6)	429 (94.5)	371 (97.1)	3,610 (97.0)	969 (95.9)	914 (95.7)	780 (96.9)	
Clopidogrel	3,557 (85.6)	1,091 (85.1)	870 (79.0)	959 (93.3)	1,721 (81.4)	454 (81.4)	405 (81.7)	393 (93.1)	1,374 (82.6)	369 (82.6)	326 (84.1)	365 (72.9)	3,095 (95.5)	823 (84.1)	731 (82.5)	738 (77.5)	
Ticagrelor	665 (19.8)	224 (19.0)	275 (27.7)	40 (16.9)	273 (18.1)	92 (16.9)	90 (18.1)	16 (22.5)	274 (20.6)	77 (19.8)	124 (33.5)	9 (2.5)	169 (18.5)	169 (18.9)	214 (27.8)	25 (3.3)	
Fondaparinux	82 (2.5)	22 (1.9)	21 (2.2)	21 (2.1)	38 (2.4)	8 (1.6)	12 (3.1)	8 (2.0)	30 (2.3)	8 (2.7)	8 (2.3)	4 (1.1)	68 (2.3)	18 (2.1)	20 (2.7)	12 (1.6)	
Oral anticoagulant (e.g. Warfarin)	108 (3.3)	41 (3.5)	26 (2.7)	43 (4.3)	8 (2.7)	7 (1.6)	5 (1.8)	5 (1.3)	45 (3.5)	15 (4.0)	3 (0.9)	3 (0.9)	88 (76.5)	23 (71.3)	10 (67.1)	19 (76.7)	
Beta blocker	2,701 (69.5)	877 (71.9)	780 (78.2)	795 (69.4)	1,312 (65.0)	354 (78.1)	377 (76.9)	319 (73.7)	1,135 (69.8)	300 (75.1)	326 (76.5)	286 (71.3)	2,447 (67.1)	654 (76.7)	703 (60.5)	605 (76.7)	
ACE inhibitor	2,322 (60.2)	733 (56.3)	604 (58.5)	683 (58.6)	1,074 (60.5)	289 (53.5)	279 (60.5)	257 (62.1)	902 (59.8)	228 (54.8)	265 (62.9)	251 (59.1)	1,976 (67.7)	517 (59.1)	544 (61.7)	508 (64.7)	

Year	ACS stratum	2018-2019				2020				2021				2020-2021			
		Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others
Total	4,967	1,529	1,311	1,129	2,429	667	592	465	1,984	545	534	411	4,413	1,212	1,126	876	
#Pharmacological therapy given at discharge, No. (%)																	
Angiotensin II receptor blocker	122 (3.7)	40 (3.4)	32 (3.3)	36 (3.6)	80 (5.0)	25 (5.1)	20 (5.2)	8 (7.0)	92 (7.0)	21 (5.6)	40 (11.2)	18 (5.1)	172 (5.9)	46 (5.3)	60 (5.3)	26 (3.5)	
Statins	3,896 (93.7)	1,188 (92.0)	1,017 (94.9)	977 (93.1)	1,837 (91.1)	513 (93.1)	458 (93.1)	398 (93.1)	1,549 (93.4)	411 (93.0)	417 (92.7)	365 (96.1)	3,386 (93.2)	924 (91.9)	875 (92.9)	763 (94.8)	
Other lipid lowering agent	87 (2.6)	32 (2.7)	22 (2.3)	13 (1.3)	73 (4.4)	18 (3.6)	11 (2.8)	4 (1.0)	73 (5.6)	20 (5.3)	19 (5.3)	5 (5.4)	146 (1.4)	38 (4.9)	30 (4.3)	9 (4.1)	
Diuretics	557 (16.4)	196 (16.5)	180 (18.1)	218 (21.9)	256 (15.4)	82 (16.3)	77 (18.8)	58 (14.5)	178 (13.4)	43 (11.2)	53 (14.6)	40 (11.2)	434 (14.5)	125 (14.1)	130 (16.8)	98 (12.9)	
Calcium antagonist	125 (3.8)	55 (4.7)	37 (3.8)	38 (3.8)	79 (4.9)	19 (3.8)	22 (5.6)	10 (2.5)	57 (4.4)	15 (4.0)	17 (4.8)	17 (4.0)	136 (14.1)	34 (4.7)	39 (4.7)	27 (3.6)	
Oral hypoglycaemic agent	924 (26.6)	258 (21.7)	371 (36.5)	168 (16.8)	464 (27.7)	122 (24.2)	191 (45.5)	87 (21.8)	448 (32.3)	77 (19.9)	182 (47.4)	77 (21.6)	912 (29.8)	199 (22.3)	373 (46.4)	164 (21.7)	
Insulin	527 (15.3)	88 (7.4)	191 (19.1)	55 (5.5)	321 (19.0)	51 (10.2)	119 (27.9)	31 (7.8)	242 (17.9)	31 (8.1)	105 (27.5)	31 (10.1)	563 (18.5)	82 (9.3)	224 (27.7)	67 (8.9)	
Anti-arrhythmic agent	61 (1.8)	17 (1.5)	22 (2.3)	33 (3.0)	21 (1.3)	15 (3.0)	10 (2.6)	8 (2.0)	27 (2.1)	3 (0.8)	6 (1.7)	9 (2.6)	48 (1.7)	18 (2.1)	16 (2.1)	17 (2.3)	

^aTotal admission days is derived from Outcome date-Admission date + I

^bExcluded notifications of patients who died at discharge

*Ticlopidine, clopidogrel, prasugrel, and ticagrelor are grouped as ADP antagonist.

Note: "Others" includes Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, other Malaysian, and Foreigner

Table 4.5 Door-to-needle and balloon time distribution for patients with STEMI by year, NCVD-ACS Registry, 2020–2021

ACS stratum	STEMI only			
Year	2018–2019	2020	2021	2020–2021
STEMI (Total)	8,936	4,153	3,474	7,627
*Door-to-needle time, min	3,381	1,895	1,499	3,394
N	3,233	1,818	1,414	3,232
Mean (SD)	100.6 (184.9)	82.3 (152.3)	91.6 (180.5)	86.4 (165.3)
Median (min, max)	41.0 (1.0, 1,440.0)	40.0 (1.0, 1,435.0)	40.0 (1.0, 1,415.0)	40.0 (1.0, 1,435.0)
IQR	68.0	53.0	46.0	47.0
Not available	148 (4.4)	77 (4.1)	85 (5.7)	162 (4.8)
Door-to-needle time, No. (%)[#]				
≤30 min	1,287 (39.8)	716 (39.4)	566 (40.0)	1,282 (39.7)
>30 min	1,946 (60.2)	1,102 (60.6)	848 (60.0)	1,950 (60.3)
Missing	148	77	85	162
**Door-to-balloon time, min	1,436	392	430	822
N	1,148	350	368	718
Mean (SD)	89.8 (85.4)	117.3 (120.0)	94.5 (91.6)	105.6 (107.0)
Median (min, max)	67.0 (2.0, 720.0)	75.0 (4.0, 713.0)	65.5 (5.0, 711.0)	69.5 (4.0, 713.0)
IQR	60.5	87.0	60.5	73.0
Not available	288 (20.1)	42 (10.7)	62 (14.4)	104 (12.7)
Door-to-balloon time, No. (%)[#]				
≤90 min	766 (66.7)	204 (58.3)	253 (68.8)	457 (63.6)
>90 min	382 (33.3)	146 (41.7)	115 (31.3)	261 (36.4)
Missing	288	42	62	104

*Door-to-needle time only available for STEMI patients who were given fibrinolytic therapy

**Door-to-balloon time only available for STEMI patients who had urgent PCI procedure

#Regrouping based on the 2019 Malaysian's STEMI CPG guideline

Table 4.6 Treatments for patients with NSTEMI/UA by age group (years), NCVD-ACS Registry, 2020–2021

Year	2018–2019			2020			2021			2020–2021		
Age group	Young	Middle-aged	Elderly									
Total	667	4,943	6,201	209	1,432	2,052	223	1,519	2,100	432	2,951	4,152
Total admission days												
N	675	4,803	6,165	209	1,429	2,051	223	1,517	2,100	432	2,946	4,151
Mean (SD)	4.4 (3.6)	5.1 (5.1)	5.9 (6.0)	4.0 (2.5)	5.0 (4.5)	6.0 (6.1)	4.7 (4.7)	5.3 (5.6)	6.1 (6.2)	4.3 (3.8)	5.1 (5.1)	6.1 (6.2)
Median (min, max)	(1.0, 48.0)	(1.0, 92.0)	(1.0, 92.0)	(1.0, 24.0)	(1.0, 47.0)	(1.0, 98.0)	(1.0, 46.0)	(1.0, 85.0)	(1.0, 84.0)	(1.0, 46.0)	(1.0, 85.0)	(1.0, 98.0)
IQR	2.0	2.0	3.0	2.0	2.0	4.0	2.0	2.0	3.0	2.0	2.0	3.0
Missing (%)	2 (0.3)	12 (0.3)	12 (0.2)	0 (0)	3 (0.2)	1 (0.1)	0 (0)	2 (0.1)	0 (0)	0 (0)	5 (0.2)	1 (0.0)
Number of days in CCU												
N	47	401	706	26	189	282	29	157	252	55	346	534
Mean (SD)	2.5 (1.3)	3.8 (3.3)	4.5 (3.9)	3.0 (2.7)	3.6 (3.0)	4.2 (3.8)	3.5 (2.4)	4.1 (3.8)	4.6 (4.5)	3.3 (2.6)	3.8 (3.4)	4.4 (4.1)
Median (min, max)	(1.0, 7.0)	(1.0, 25.0)	(1.0, 25.0)	(1.0, 14.0)	(1.0, 29.0)	(1.0, 29.0)	(1.0, 9.0)	(1.0, 23.0)	(1.0, 30.0)	(1.0, 14.0)	(1.0, 29.0)	(1.0, 30.0)
IQR	1.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	3.0	3.0
No admission to CCU, %	630 (93.1)	4,414 (91.7)	5,471 (88.6)	183 (87.6)	1,243 (86.8)	1,770 (86.3)	194 (87.0)	1,362 (89.7)	1,848 (88.0)	377 (87.3)	2,605 (88.3)	3,618 (87.1)
Number of days in ICU/CICU												
N	5	48	29	2	25	13	3	26	14	5	51	27
Mean (SD)	2.0 (0.7)	3.1 (2.4)	5.1 (5.3)	1.5 (0.7)	2.7 (1.1)	3.8 (3.9)	6.3 (8.4)	2.6 (1.4)	3.8 (5.1)	4.4 (6.5)	2.6 (1.3)	3.8 (4.5)
Median (min, max)	(1.0, 3.0)	(1.0, 11.0)	(1.0, 22.0)	(1.0, 2.0)	(1.0, 5.0)	(1.0, 16.0)	(1.0, 3.0)	(1.0, 6.0)	(1.0, 21.0)	(1.0, 16.0)	(1.0, 6.0)	(1.0, 21.0)
IQR	0.0	1.5	3.0	1.0	1.0	2.0	15.0	1.0	2.0	1.0	1.0	3.0
No admission to ICU/CICU, %	672 (99.3)	4,767 (99.0)	6,148 (99.5)	207 (99.0)	1,407 (98.3)	2,039 (99.4)	220 (98.7)	1,493 (98.3)	2,085 (99.3)	427 (98.8)	2,900 (98.3)	4,124 (99.3)
Missing (%)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.1)	0 (0)	0 (0)	1 (0.0)	1 (0.0)

Year	2018-2019			2020			2021			2020-2021	
Age group	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged
Total	667	4,943	6,201	209	1,432	2,052	223	1,519	2,100	432	2,951
Cardiac catheterisation, No. (%)											
Yes	192 (28.4)	1,693 (35.2)	1,623 (26.3)	82 (39.2)	565 (39.5)	607 (29.6)	79 (35.4)	634 (41.7)	680 (32.4)	161 (37.3)	1,199 (40.6)
No	483 (71.3)	3,112 (64.6)	4,537 (73.5)	126 (60.3)	861 (60.1)	1,437 (70.0)	142 (63.7)	879 (57.9)	1,413 (67.3)	268 (62.0)	1,740 (59.0)
Number transferred to another centre	2 (0.3)	9 (0.2)	14 (0.2)	1 (0.5)	6 (0.4)	8 (0.4)	2 (0.9)	6 (0.4)	7 (0.3)	3 (0.7)	12 (0.4)
Missing	0	1	3	0	0	0	0	0	0	0	0
PCI, No. (%)											
Yes	87 (14.6)	947 (21.7)	788 (14.0)	49 (24.4)	343 (25.0)	331 (17.0)	45 (20.7)	380 (26.8)	370 (18.9)	94 (22.5)	723 (25.9)
No	511 (85.5)	3,418 (78.2)	4,829 (85.8)	152 (75.6)	1,022 (74.5)	1,616 (82.8)	171 (78.8)	1,026 (72.4)	1,577 (80.7)	323 (77.3)	2,048 (73.4)
Not applicable	0 (0)	6 (0.1)	12 (0.2)	0 (0)	6 (0.4)	4 (0.2)	1 (0.5)	12 (0.8)	8 (0.4)	1 (0.2)	18 (0.6)
Missing	79	444	548	8	61	101	6	101	145	14	162
CABG, No. (%)											
Yes	2 (0.3)	71 (1.6)	89 (1.6)	1 (0.5)	28 (2.0)	29 (1.5)	3 (1.4)	23 (1.6)	24 (1.2)	4 (1.0)	53 (1.4)
No	590 (98.7)	4,308 (98.1)	5,533 (98.2)	200 (99.0)	1,351 (97.6)	1,924 (98.3)	212 (98.1)	1,376 (97.5)	1,921 (98.2)	412 (98.6)	2,727 (97.5)
Not applicable	6 (1.0)	12 (0.3)	12 (0.2)	1 (0.5)	5 (0.4)	5 (0.3)	1 (0.5)	13 (0.9)	11 (0.6)	2 (0.5)	16 (0.4)
Missing	79	424	543	7	48	94	7	107	144	14	155
Pre-admission aspirin use, No. (%)											
Yes	245 (37.7)	2,340 (50.6)	3,463 (58.7)	64 (31.2)	653 (46.4)	1,125 (55.9)	60 (27.4)	644 (43.6)	1,033 (50.7)	124 (29.2)	1,297 (45.0)
No	405 (62.3)	2,283 (49.4)	2,442 (41.4)	141 (68.8)	754 (53.6)	887 (44.1)	159 (72.6)	832 (56.4)	1,004 (49.3)	300 (70.8)	1,586 (55.0)
Missing	27	192	272	4	25	40	4	43	63	8	68

Year	2018-2019			2020			2021			2020-2021	
	Age group	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young
Total	667	4,943	6,201	209	1,432	2,052	223	1,519	2,100	432	2,951
Pharmacological therapy given during admission, No. (%)											4,152
Aspirin	579 (92.9)	4,188 (91.8)	5,343 (91.8)	175 (88.8)	1,209 (86.6)	1,754 (87.4)	184 (86.4)	1,298 (89.4)	1,818 (90.8)	359 (87.6)	2,507 (88.0)
*ADP antagonist	625 (97.8)	4,557 (97.1)	5,809 (94.5)	189 (96.6)	1,357 (96.4)	1,951 (94.6)	209 (96.4)	1,418 (96.4)	1,982 (96.4)	398 (94.5)	2,775 (96.5)
Clopidogrel	607 (95.6)	4,386 (94.7)	5,657 (86.6)	174 (90.5)	1,263 (92.8)	1,868 (91.4)	201 (92.6)	1,355 (94.0)	1,923 (94.0)	375 (89.1)	2,618 (91.6)
Ticagrelor	19 (4.7)	212 (6.8)	196 (4.6)	19 (10.6)	114 (9.0)	93 (5.0)	11 (5.8)	81 (6.5)	79 (4.5)	30 (8.1)	195 (7.7)
GP receptor inhibitor	3 (0.8)	13 (0.4)	15 (0.4)	0 (0)	5 (0.4)	9 (0.5)	2 (1.0)	10 (0.8)	5 (0.3)	2 (0.5)	15 (0.6)
Unfractionated heparin	8 (2.0)	120 (3.9)	125 (2.9)	2 (1.1)	28 (2.2)	33 (1.8)	0 (0)	21 (1.7)	27 (1.5)	2 (0.5)	49 (2.0)
LMWH	55 (13.2)	569 (17.3)	1,221 (27.0)	29 (16.2)	254 (19.7)	561 (29.8)	20 (10.5)	220 (17.4)	451 (25.0)	49 (25.0)	474 (18.5)
Fondaparinux	524 (85.9)	3,608 (83.2)	4,132 (75.1)	150 (77.7)	980 (72.2)	1,295 (65.9)	174 (81.3)	1,035 (74.4)	1,381 (71.2)	324 (79.6)	2,015 (73.3)
Oral anticoagulant (e.g. Warfarin)	10 (2.5)	65 (2.1)	182 (4.3)	4 (2.3)	27 (2.1)	42 (2.3)	8 (4.1)	34 (2.8)	73 (4.2)	12 (3.3)	61 (2.4)
Beta blocker	377 (69.2)	3,127 (74.8)	3,764 (70.5)	113 (60.1)	861 (63.8)	1,192 (61.3)	128 (62.1)	904 (66.3)	1,144 (60.3)	241 (61.2)	1,765 (65.1)
ACE inhibitor	370 (66.9)	2,739 (66.5)	3,013 (57.6)	102 (54.3)	717 (53.8)	889 (46.0)	108 (53.2)	675 (50.9)	837 (44.7)	210 (53.7)	1,392 (52.3)
Angiotensin II receptor blocker	16 (4.0)	175 (5.6)	350 (8.2)	8 (4.5)	85 (6.7)	161 (8.7)	8 (4.2)	80 (6.4)	163 (9.2)	16 (4.3)	165 (6.6)
Statins	568 (92.1)	4,287 (94.4)	5,530 (93.9)	182 (91.9)	1,250 (89.8)	1,803 (90.0)	183 (85.9)	1,320 (91.1)	1,851 (92.4)	365 (88.8)	2,570 (90.5)
Other lipid lowering agent	19 (4.7)	111 (3.6)	118 (2.8)	1 (0.6)	51 (4.0)	56 (3.0)	12 (6.3)	47 (3.8)	86 (4.9)	13 (3.5)	98 (3.9)
Diuretics	80 (18.7)	921 (27.4)	1,964 (41.7)	25 (14.0)	291 (22.2)	643 (33.9)	22 (11.3)	279 (21.7)	582 (31.9)	47 (12.6)	570 (22.0)
											3,654 (32.9)

Year	2018-2019				2020				2021				2020-2021	
	Age group	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Total
Total	667	4,943	6,201	209	1,432	2,052	223	1,519	2,100	432	2,951	4,152		
Pharmacological therapy given during admission, No. (%)														
Calcium antagonist	46 (11.3)	546 (17.0)	1,056 (24.0)	18 (10.1)	188 (14.7)	351 (19.0)	19 (9.9)	176 (14.1)	329 (18.6)	37 (10.0)	364 (14.4)	680 (18.8)		
Oral hypoglycaemic agent	83 (19.5)	1,230 (35.5)	1,594 (34.5)	35 (19.6)	368 (28.3)	551 (29.3)	30 (15.6)	361 (28.2)	476 (26.6)	65 (17.5)	729 (28.3)	1,027 (28.0)		
Insulin	54 (12.7)	934 (27.3)	1,338 (29.1)	33 (18.1)	314 (23.8)	553 (29.0)	28 (14.6)	356 (27.6)	559 (30.6)	61 (16.3)	670 (25.7)	1,112 (29.8)		
Anti-arrhythmic agent	16 (4.0)	131 (4.2)	208 (4.9)	2 (1.1)	26 (2.1)	53 (2.9)	1 (0.5)	42 (3.4)	66 (3.8)	3 (0.8)	68 (2.7)	119 (3.3)		
#Pharmacological therapy given at discharge, No. (%)														
Aspirin	490 (87.2)	3,640 (87.2)	4,504 (86.6)	149 (78.8)	1,041 (80.2)	1,427 (75.5)	151 (80.1)	1,068 (82.0)	1,432 (82.7)	300 (77.1)	2,109 (81.1)	2,859 (81.4)		
* ADP antagonist	543 (91.9)	4,094 (94.0)	5,021 (93.0)	155 (81.2)	1,163 (89.0)	1,602 (89.0)	169 (81.3)	1,197 (89.3)	1,612 (89.3)	324 (81.2)	2,360 (89.2)	3,214 (89.1)		
Clopidogrel	516 (87.9)	3,887 (89.7)	4,827 (89.9)	135 (70.7)	1,049 (80.8)	1,505 (83.8)	158 (76.7)	1,114 (83.9)	1,546 (85.9)	293 (73.8)	2,163 (82.4)	3,051 (84.8)		
Ticagrelor	25 (6.4)	192 (6.4)	181 (4.6)	21 (12.1)	112 (9.2)	105 (6.2)	11 (6.0)	77 (6.5)	67 (4.2)	32 (9.0)	189 (7.9)	172 (5.2)		
Fondaparinux	14 (3.5)	108 (3.6)	108 (2.7)	11 (6.4)	59 (4.8)	60 (3.5)	6 (3.3)	34 (2.9)	68 (4.2)	17 (4.8)	93 (3.9)	128 (3.9)		
Oral anticoagulant (e.g. Warfarin)	12 (3.1)	95 (3.2)	248 (6.3)	3 (1.7)	32 (2.6)	75 (4.4)	7 (3.8)	48 (4.1)	87 (5.4)	10 (2.8)	80 (3.3)	162 (4.9)		
Beta blocker	402 (72.4)	3,193 (75.7)	3,835 (67.9)	125 (69.8)	894 (68.0)	1,200 (62.7)	126 (71.5)	924 (67.8)	1,195 (65.2)	251 (70.7)	1,818 (67.9)	2,395 (67.9)		
ACE inhibitor	373 (68.4)	2,840 (70.5)	3,089 (62.2)	108 (59.0)	735 (58.1)	890 (50.7)	106 (54.4)	716 (56.4)	864 (49.7)	214 (56.6)	1,451 (57.2)	1,754 (50.2)		
Angiotensin II receptor blocker	21 (5.3)	207 (6.9)	391 (9.8)	10 (5.6)	103 (8.5)	175 (10.3)	12 (6.3)	88 (7.5)	167 (10.3)	22 (6.0)	191 (8.0)	342 (10.3)		

Year	2018-2019			2020			2021			2020-2021		
	Age group	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged
Total	667	4,943	6,201	209	1,432	2,052	223	1,519	2,100	432	2,951	4,152
Pharmacological therapy given during admission, No. (%)												
Statin	531 (89.8)	4,066 (93.9)	5,061 (93.8)	170 (87.2)	1,150 (88.5)	1,604 (89.3)	176 (85.9)	1,213 (89.7)	1,631 (90.5)	346 (86.5)	2,363 (89.1)	3,235 (89.9)
Other lipid lowering agent	21 (5.3)	130 (4.3)	139 (3.5)	3 (1.7)	54 (4.4)	61 (3.6)	10 (5.4)	55 (4.7)	88 (5.5)	13 (3.6)	109 (4.5)	149 (4.5)
Diuretics	77 (18.3)	793 (24.8)	1,566 (36.7)	23 (13.0)	236 (19.0)	436 (25.3)	16 (8.5)	205 (17.0)	395 (23.9)	39 (10.7)	441 (18.0)	831 (24.6)
Calcium antagonist	52 (12.9)	556 (17.9)	1,059 (25.8)	18 (10.2)	177 (14.5)	356 (20.9)	18 (9.8)	169 (14.3)	337 (20.7)	36 (10.0)	346 (14.4)	693 (20.8)
Oral hypoglycaemic agent	86 (20.6)	1,315 (38.9)	1,680 (38.6)	37 (20.9)	401 (32.3)	598 (34.5)	29 (15.4)	392 (32.0)	536 (32.1)	66 (18.1)	793 (32.1)	1,134 (33.3)
Insulin	47 (11.3)	735 (22.7)	999 (23.8)	18 (10.2)	220 (17.7)	344 (19.8)	17 (9.1)	236 (19.4)	335 (20.2)	35 (9.6)	456 (18.6)	679 (20.0)
Anti-arrhythmic agent	10 (2.6)	88 (2.9)	130 (3.3)	0 (0)	17 (1.4)	30 (1.8)	0 (0)	22 (1.9)	38 (2.4)	0 (0)	39 (1.6)	68 (2.1)

^aTotal admission days is derived from Outcome date-Admission date + 1

*Excluded notifications of patients who died at discharge

*Ticlopidine, clopidogrel, prasugrel, and ticagrelor are grouped as ADP antagonist.

Note: Young is defined as age 20 to less than 40 years, middle-aged is defined as age 40 to less than 60 years and elderly is defined as 60 years and above

Table 4.7 Treatments for patients with NSTEMI/UA by gender, NCVD-ACS Registry, 2020–2021

Year	2018–2019		2020		2021		2020–2021	
Gender	Male	Female	Male	Female	Male	Female	Male	Female
Total	8,576	3,093	2,656	1,037	2,796	1,046	5,452	2,083
Total admission days								
N	8,555	3,088	2,653	1,036	2,795	1,045	5,448	2,081
Mean (SD)	5.4 (5.5)	5.7 (5.6)	5.3 (5.4)	5.9 (5.3)	5.6 (5.9)	6.0 (6.0)	5.5 (5.7)	5.9 (5.7)
Median (min, max)	4.0 (1.0, 92.0)	4.0 (1.0, 81.0)	4.0 (1.0, 98.0)	4.0 (1.0, 47.0)	4.0 (1.0, 85.0)	4.0 (1.0, 66.0)	4.0 (1.0, 98.0)	4.0 (1.0, 66.0)
IQR	3.0	3.0	3.0	4.0	3.0	3.0	3.0	3.0
Missing (%)	21 (0.2)	5 (0.2)	3 (0.1)	1 (0.1)	1 (0.0)	1 (0.1)	4 (0.1)	2 (0.1)
Number of days in CCU								
N	840	314	364	133	307	131	671	264
Mean (SD)	4.1 (3.6)	4.4 (3.7)	3.9 (3.4)	4.1 (3.5)	4.3 (4.2)	4.5 (3.9)	4.1 (3.8)	4.3 (3.7)
Median (min, max)	3.0 (1.0, 25.0)	3.0 (1.0, 25.0)	3.0 (1.0, 29.0)	3.0 (1.0, 21.0)	3.0 (1.0, 30.0)	3.0 (1.0, 23.0)	3.0 (1.0, 30.0)	3.0 (1.0, 23.0)
IQR	3.0	3.0	3.0	3.0	3.0	4.0	3.0	3.0
No admission to CCU, %	7,736 (90.2)	2,779 (89.9)	2,292 (86.3)	904 (87.2)	2,489 (89.0)	915 (87.5)	4,781 (87.7)	1,819 (87.3)
Number of days in ICU/CICU								
N	68	14	33	7	33	10	66	17
Mean (SD)	3.8 (3.9)	3.8 (3.2)	3.1 (2.6)	2.6 (1.0)	2.8 (2.7)	4.7 (5.9)	2.9 (2.6)	3.8 (4.6)
Median (min, max)	3.0 (1.0, 22.0)	2.5 (1.0, 11.0)	3.0 (1.0, 16.0)	3.0 (1.0, 4.0)	2.0 (1.0, 16.0)	3.0 (1.0, 21.0)	2.0 (1.0, 16.0)	3.0 (1.0, 21.0)
IQR	2.0	4.0	1.0	1.0	1.0	3.0	1.0	2.0
No admission to ICU/CICU, %	8,508 (99.2)	3,079 (99.6)	2,623 (98.8)	1,030 (99.3)	2,762 (98.8)	1,036 (99.0)	5,385 (98.8)	2,066 (99.2)
Missing (%)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.0)	0 (0)	1 (0.0)	0 (0)

Year	2018–2019				2020				2021				2020–2021			
Gender	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Total	8,576	3,093	2,656		1,037	2,796		1,046		5,452		2,083				
Cardiac catheterisation, No. (%)																
Yes	2,786 (32.5)	722 (23.3)	980 (36.9)	274 (26.4)	1,075 (38.4)	318 (30.4)	2,055 (37.7)	592 (28.4)								
No	5,769 (67.3)	2,363 (76.4)	1,668 (62.8)	756 (72.9)	1,712 (61.2)	722 (69.0)	3,380 (62.0)	1,478 (71.0)								
Number transferred to another centre	17 (0.2)	8 (0.3)	8 (0.3)	7 (0.7)	9 (0.3)	6 (0.6)	17 (0.3)	13 (0.6)								
Missing	4	0	0	0	0	0	0	0								
PCI, No. (%)																
Yes	1,489 (19.3)	333 (11.5)	586 (23.2)	137 (13.7)	641 (24.5)	154 (15.8)	1,227 (23.9)	291 (14.7)								
No	6,203 (80.6)	2,555 (88.2)	1,930 (76.5)	860 (86.1)	1,960 (74.9)	814 (83.6)	3,890 (75.7)	1,674 (84.8)								
Not applicable	8 (0.1)	10 (0.4)	8 (0.3)	2 (0.2)	15 (0.6)	6 (0.6)	23 (0.4)	8 (0.4)								
Missing	876	195	132	38	180	72	312	110								
CABG, No. (%)																
Yes	130 (1.7)	32 (1.1)	47 (1.9)	11 (1.1)	40 (1.5)	10 (1.0)	87 (1.7)	21 (1.1)								
No	7,585 (98.1)	2,846 (98.4)	2,482 (97.8)	993 (98.7)	2,549 (97.7)	960 (98.6)	5,031 (97.7)	1,953 (98.6)								
Not applicable	17 (0.2)	13 (0.5)	9 (0.4)	2 (0.2)	21 (0.8)	4 (0.4)	30 (0.6)	6 (0.3)								
Missing	844	202	118	31	186	72	304	103								
Pre-admission aspirin use, No. (%)																
Yes	4,469 (54.4)	1,579 (53.3)	1,318 (50.6)	524 (51.5)	1,302 (48.0)	435 (42.6)	2,620 (49.3)	959 (47.0)								
No	3,748 (45.6)	1,382 (46.7)	1,288 (49.4)	494 (48.5)	1,409 (52.0)	586 (57.4)	2,697 (50.7)	1,080 (53.0)								
Missing	359	132	50	19	85	25	135	44								

Year	2018–2019			2020			2021			2020–2021		
Gender	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Total	8,576	3,093	2,656		1,037		2,796		1,046		5,452	2,083
Pharmacological therapy given during admission, No. (%)												
Aspirin	7,429 (91.9)	2,681 (92.8)	2,261 (87.3)	877 (86.7)	2,422 (90.7)	878 (88.0)	4,683 (89.0)					1,755 (87.4)
* ADP antagonist	8,106 (97.6)	2,885 (97.0)	2,524 (96.7)	973 (95.6)	2,631 (96.4)	978 (96.0)	5,155 (96.6)					1,951 (95.8)
Clopidogrel	7,827 (94.7)	2,823 (95.1)	2,366 (91.2)	939 (92.6)	2,540 (93.5)	939 (92.7)	4,906 (92.4)					1,878 (92.6)
Ticagrelor	335 (5.8)	92 (4.5)	182 (7.7)	44 (4.7)	128 (5.5)	43 (4.9)	310 (6.6)					87 (4.8)
GP receptor inhibitor	21 (0.4)	10 (0.5)	12 (0.5)	2 (0.2)	14 (0.6)	3 (0.3)	26 (0.6)					5 (0.3)
Unfractionated heparin	209 (3.7)	44 (2.1)	51 (2.2)	12 (1.3)	34 (1.5)	14 (1.6)	85 (1.8)					26 (1.4)
LMWH	1,235 (20.5)	610 (27.7)	532 (22.1)	312 (33.0)	498 (21.0)	193 (21.5)	1,030 (21.6)					505 (27.4)
Fondaparinux	6,241 (80.5)	2,023 (74.8)	1,797 (70.9)	628 (63.8)	1,894 (73.2)	696 (72.6)	3,691 (72.1)					1,324 (68.1)
Oral anticoagulant (e.g. Warfarin)	177 (3.11)	80 (3.9)	58 (2.5)	15 (1.6)	94 (4.1)	21 (2.4)	152 (3.3)					36 (2.0)
Beta blocker	5,319 (72.2)	1,949 (72.3)	1,538 (61.5)	628 (64.2)	1,612 (64.1)	564 (59.4)	3,150 (62.8)					1,192 (61.9)
ACE inhibitor	4,604 (63.1)	1,518 (58.1)	1,236 (49.9)	472 (48.3)	1,189 (48.2)	431 (46.2)	2,425 (49.0)					903 (47.3)
Angiotensin II receptor blocker	354 (6.2)	187 (9.0)	167 (7.0)	87 (9.4)	171 (7.4)	80 (9.1)	338 (7.2)					167 (9.3)
Statin	7,625 (94.1)	2,760 (93.7)	2,333 (90.3)	902 (89.4)	2,462 (92.3)	892 (89.4)	4,795 (91.3)					1,794 (89.4)
Other lipid lowering agent	185 (3.2)	63 (3.1)	80 (3.4)	28 (3.0)	102 (4.4)	43 (4.9)	182 (3.9)					71 (3.9)
Diuretics	2,068 (33.2)	897 (39.5)	635 (26.2)	324 (33.8)	616 (25.8)	267 (29.2)	1,251 (26.0)					591 (31.6)
Calcium antagonist	1,086 (18.5)	562 (26.3)	381 (16.0)	176 (18.9)	339 (14.6)	185 (20.8)	720 (15.3)					361 (19.9)
Oral hypoglycaemic agent	2,036 (32.7)	871 (38.2)	666 (27.7)	288 (30.3)	595 (25.2)	272 (30.3)	1,261 (26.4)					560 (30.3)
Insulin	1,526 (24.8)	800 (34.8)	555 (22.8)	345 (35.4)	599 (25.1)	344 (37.1)	1,154 (24.0)					689 (36.2)
Anti-arrhythmic agent	263 (4.6)	92 (4.5)	60 (2.5)	21 (2.3)	81 (3.5)	28 (3.2)	141 (3.0)					49 (2.7)

Year	2018–2019				2020				2021				2020–2021				
Gender	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
Total	8,576	3,093	2,656		1,037		2,796		1,046		5,452		2,083				
#Pharmacological therapy given at discharge, No. (%)																	
Aspirin	6,372 (86.9)	2,262 (87.1)	1,917 (80.9)	700 (78.0)	1,975 (83.4)	676 (78.2)	3,892 (82.1)	1,376 (78.1)									
* ADP antagonist	7,186 (94.1)	2,472 (91.4)	2,161 (90.3)	759 (83.9)	2,208 (90.0)	770 (85.6)	4,369 (90.1)	1,529 (84.7)									
Clopidogrel	6,846 (90.2)	2,384 (88.3)	1,973 (82.8)	716 (79.3)	2,079 (85.4)	739 (82.3)	4,052 (84.1)	1,455 (80.8)									
Ticagrelor	317 (5.9)	81 (4.2)	187 (8.4)	51 (6.0)	125 (5.8)	30 (3.7)	312 (7.1)	81 (4.9)									
Fondaparinux	180 (3.3)	50 (2.6)	106 (4.7)	24 (2.8)	74 (3.4)	34 (4.2)	180 (4.1)	58 (3.5)									
Oral anticoagulant (e.g. Warfarin)	252 (4.7)	103 (5.3)	80 (3.6)	30 (3.5)	118 (5.4)	24 (3.0)	198 (4.5)	54 (3.2)									
Beta blocker	5,462 (76.5)	1,968 (76.0)	1,586 (67.8)	633 (71.0)	1,666 (70.0)	579 (65.9)	3,252 (68.9)	1,212 (68.5)									
ACE inhibitor	4,774 (67.8)	1,528 (61.0)	1,277 (55.0)	456 (51.6)	1,262 (54.0)	424 (49.1)	2,539 (54.5)	880 (50.4)									
Angiotensin II receptor blocker	415 (7.6)	204 (10.4)	197 (8.8)	91 (10.7)	191 (8.7)	76 (9.4)	388 (8.8)	167 (10.0)									
Statin	7,111 (93.8)	2,547 (93.1)	2,124 (89.2)	800 (87.9)	2,226 (90.6)	794 (87.8)	4,350 (89.9)	1,594 (87.9)									
Other lipid lowering agent	217 (4.0)	73 (3.8)	85 (3.8)	33 (3.8)	116 (5.4)	37 (4.6)	201 (4.6)	70 (4.2)									
Diuretics	1,704 (29.5)	732 (34.8)	468 (20.6)	227 (26.2)	445 (20.1)	171 (20.6)	913 (20.3)	398 (23.5)									
Calcium antagonist	1,111 (19.9)	556 (27.5)	367 (16.4)	184 (21.3)	348 (16.0)	176 (21.5)	715 (16.2)	360 (21.4)									
Oral hypoglycaemic agent	2,179 (36.5)	902 (41.3)	723 (31.8)	313 (35.8)	666 (29.7)	291 (34.6)	1,389 (30.7)	604 (35.2)									
Insulin	1,147 (20.0)	634 (29.9)	349 (15.4)	233 (26.4)	379 (17.1)	209 (24.9)	728 (16.2)	442 (25.6)									
Anti-arrhythmic agent	164 (3.0)	64 (3.3)	36 (1.6)	11 (1.3)	40 (1.9)	20 (2.5)	76 (1.7)	31 (1.9)									

^aTotal admission days is derived from Outcome date-Admission date + 1

[#]Exclude notifications of patients who died at discharged

^{*}Ticlopidine, clopidogrel, prasugrel and ticagrelor are grouped as ADP antagonist.

Table 4.8 Treatments for patients with NSTEMI/UA by ethnic group, NCVD-ACS Registry, 2020–2021

Year	ACS stratum	2018–2019				2020				2021				2020–2021			
		Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others
Total	5,776	2,878	1,940	1,075	1,814	920	617	342	1,856	964	681	341	3,670	1,884	1,298	683	
~Total admission days																	
N	5,768	2,870	1,937	1,068	1,811	919	617	342	1,854	964	681	341	3,665	1,883	1,298	683	
Mean (SD)	(5.6) (5.9)	5.4 (5.5)	5.4 (5.2)	4.9 (4.3)	5.4 (5.0)	5.8 (5.5)	5.7 (6.1)	4.7 (6.0)	6.0 (6.3)	5.6 (5.9)	5.7 (5.5)	4.7 (3.5)	5.7 (5.7)	5.7 (5.7)	5.7 (5.8)	4.7 (4.9)	
Median (min, max)	4.0 (1.0, 92.0)	4.0 (1.0, 92.0)	4.0 (1.0, 55.0)	4.0 (1.0, 52.0)	4.0 (1.0, 52.0)	4.0 (1.0, 57.0)	4.0 (1.0, 70.0)	4.0 (1.0, 98.0)	4.0 (1.0, 85.0)	4.0 (1.0, 84.0)	4.0 (1.0, 85.0)	4.0 (1.0, 57.0)	4.0 (1.0, 33.0)	4.0 (1.0, 85.0)	4.0 (1.0, 84.0)	4.0 (1.0, 70.0)	
IQR	3.0	3.0	3.0	2.0	3.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	
Missing (%)	8 (0.1)	8 (0.3)	3 (0.2)	7 (0.7)	3 (0.2)	1 (0.1)	0 (0)	0 (0)	0 (0)	2 (0.1)	0 (0)	0 (0)	0 (0)	5 (0.1)	1 (0.1)	0 (0)	0 (0)
Number of days in CCU																	
N	586	245	130	193	260	115	63	59	221	93	69	55	481	208	132	114	
Mean (SD)	4.6 (4.0)	3.7 (3.3)	4.3 (3.4)	3.5 (3.0)	3.8 (4.9)	4.6 (2.7)	3.8 (1.9)	3.3 (4.3)	4.8 (4.9)	4.4 (3.8)	4.1 (1.6)	2.8 (3.7)	4.3 (4.9)	4.5 (4.9)	4.0 (3.3)	3.1 (1.8)	
Median (min, max)	3.0 (1.0, 25.0)	3.0 (1.0, 23.0)	3.5 (1.0, 23.0)	3.0 (1.0, 25.0)	3.0 (1.0, 29.0)	3.0 (1.0, 22.0)	3.0 (1.0, 14.0)	3.0 (1.0, 8.0)	3.0 (1.0, 25.0)	3.0 (1.0, 30.0)	3.0 (1.0, 25.0)	3.0 (1.0, 8.0)	3.0 (1.0, 25.0)	3.0 (1.0, 30.0)	3.0 (1.0, 25.0)	3.0 (1.0, 8.0)	
IQR	3.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0	4.0	3.0	3.0	2.0	3.0	3.0	3.0	2.0	
No admission to CCU, %	5,190 (89.9)	2,633 (91.5)	1,810 (93.3)	882 (82.1)	1,554 (85.7)	805 (87.5)	554 (89.8)	283 (82.7)	1,635 (88.1)	871 (90.4)	612 (89.9)	286 (83.9)	3,189 (86.9)	1,676 (89.0)	1,166 (89.8)	569 (83.3)	

Year	2018–2019				2020				2021				2020–2021			
	ACS stratum	Malay	Chinese	Indian	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others
Total	5,776	2,878	1,940	1,075	1,814	920	617	342	1,856	964	681	341	3,670	1,884	1,298	683
Number of days in ICU/CICU																
N	37	21	18	6	24	7	8	1	25	6	11	1	49	13	19	2
Mean (SD)	3.4 (2.4)	5.4 (6.0)	2.6 (2.3)	3.5 (2.2)	2.9 (1.1)	3.9 (5.4)	2.6 (1.7)	2.0 (0.0)	3.3 (3.9)	1.8 (0.8)	3.5 (4.3)	6.0 (0.0)	3.1 (2.8)	2.9 (0.0)	3.2 (4.0)	3.2 (4.0)
Median (min, max)	3.0 (1.0, 11.0)	3.0 (1.0, 22.0)	2.0 (1.0, 10.0)	3.0 (1.0, 7.0)	3.0 (1.0, 16.0)	3.0 (1.0, 5.0)	2.5 (1.0, 5.0)	2.0 (2.0, 2.0)	3.0 (1.0, 21.0)	2.0 (1.0, 3.0)	2.0 (1.0, 16.0)	6.0 (6.0, 6.0)	3.0 (1.0, 21.0)	2.0 (1.0, 16.0)	2.0 (1.0, 16.0)	2.0 (1.0, 16.0)
IQR	2.0 (2.0)	3.0 (2.0)	2.0 (3.0)	1.5 (2.0)	2.0 (3.0)	3.0 (2.0)	2.0 (2.0)	3.0 (2.0)	3.0 (3.0)	0.0 (0.0)	1.0 (0.0)	1.0 (0.0)	1.0 (0.0)	1.0 (0.0)	1.0 (0.0)	1.0 (0.0)
No admission to ICU/CICU, %	5,739 (99.4)	2,857 (99.3)	1,922 (99.1)	1,069 (99.4)	1,790 (98.7)	913 (99.2)	609 (98.7)	341 (99.7)	1,830 (98.6)	958 (99.4)	670 (98.4)	340 (99.7)	3,620 (98.6)	1,871 (99.3)	1,279 (98.5)	681 (99.7)
Missing (%)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cardiac catheterisation, No. (%)																
Yes	1,562 (27.1)	914 (31.8)	602 (31.0)	430 (40.0)	654 (36.1)	278 (30.2)	146 (23.7)	176 (51.5)	652 (35.1)	373 (38.7)	177 (26.0)	191 (56.0)	1,306 (35.6)	651 (34.6)	323 (24.9)	367 (53.7)
No	4,196 (72.7)	1,961 (68.2)	1,332 (68.7)	643 (59.8)	1,153 (63.6)	641 (69.7)	665 (75.4)	165 (48.2)	1,194 (64.3)	591 (61.3)	499 (73.3)	150 (44.0)	2,347 (64.0)	1,232 (65.4)	964 (74.3)	315 (46.1)
Number transferred to another centre	15 (0.3)	2 (0.1)	6 (0.3)	2 (0.2)	7 (0.4)	1 (0.1)	6 (0.1)	1 (0.3)	1 (0.5)	0 (0)	5 (0.7)	0 (0)	17 (0.5)	1 (0.1)	11 (0.8)	1 (0.1)
Missing	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Year	2018–2019				2020				2021				2020–2021			
	ACS stratum	Malay	Chinese	Indian	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others
Total	5,776	2,878	1,940	1,075	1,814	920	617	342	1,856	964	681	341	3,670	1,884	1,298	683
PCI, No. (%)																
Yes	812 (16.4)	448 (16.3)	316 (16.9)	246 (23.8)	399 (23.2)	139 (15.7)	76 (12.9)	109 (33.9)	367 (21.6)	209 (22.7)	96 (15.1)	123 (36.7)	766 (22.4)	348 (19.2)	172 (14.0)	232 (35.3)
No	4,126 (83.4)	2,304 (83.6)	1,542 (82.7)	786 (76.2)	1,319 (76.6)	746 (84.0)	513 (86.8)	212 (65.8)	1,327 (78.2)	702 (76.2)	534 (84.0)	211 (63.0)	2,646 (77.4)	1,448 (80.0)	1,047 (85.3)	423 (64.4)
Not applicable	8 (0.2)	3 (0.1)	7 (0.4)	0 (0)	4 (0.2)	3 (0.3)	1 (0.3)	2 (0.3)	4 (0.2)	10 (1.1)	6 (0.9)	1 (0.9)	8 (0.3)	13 (0.2)	8 (0.7)	2 (0.3)
Missing	830	123	75	43	92	32	26	20	158	43	45	6	250	75	71	26
CABG, No. (%)																
Yes	88 (1.8)	35 (1.3)	26 (1.4)	13 (1.3)	36 (2.1)	16 (1.8)	5 (0.8)	1 (0.3)	27 (1.6)	8 (0.9)	13 (2.1)	2 (0.6)	63 (1.8)	24 (1.3)	18 (1.5)	3 (0.4)
No	4,901 (98.1)	2,708 (98.4)	1,822 (98.2)	1,000 (98.3)	1,687 (97.6)	876 (98.1)	583 (98.8)	329 (98.8)	1,686 (97.9)	880 (97.8)	606 (97.4)	337 (99.4)	3,373 (97.7)	1,756 (97.9)	1,189 (98.1)	666 (99.1)
Not applicable	9 (0.2)	9 (0.3)	8 (0.4)	4 (0.4)	5 (0.3)	1 (0.1)	2 (0.3)	3 (0.1)	10 (0.9)	12 (0.6)	3 (1.3)	0 (0.5)	15 (0.5)	13 (0.4)	5 (0.7)	3 (0.4)
Missing	778	126	84	58	86	27	27	9	133	64	59	2	219	91	86	11
Pre-admission aspirin use, No. (%)																
Yes	3,010 (54.5)	1,494 (54.3)	1,125 (60.4)	419 (40.2)	894 (50.5)	472 (51.8)	329 (54.3)	147 (43.6)	857 (47.7)	403 (42.8)	316 (48.2)	161 (47.6)	1,751 (49.1)	875 (47.2)	645 (51.1)	308 (45.6)
No	2,509 (45.5)	1,258 (45.7)	739 (39.7)	624 (59.8)	876 (49.5)	439 (48.2)	277 (45.7)	190 (56.4)	940 (52.3)	538 (57.2)	340 (51.8)	177 (52.4)	1,816 (50.9)	977 (52.8)	617 (48.9)	367 (54.4)
Missing	257	126	76	32	44	9	11	5	59	23	25	3	103	32	36	8

Year	2018–2019				2020				2021				2020–2021			
	ACS stratum	Malay	Chinese	Indian	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others
Total	5,776	2,878	1,940	1,075	1,814	920	617	342	1,856	964	681	341	3,670	1,884	1,298	683
Pharmacological therapy given during admission, No. (%)																
Aspirin	5,002	2,460	1,661	987	1,557	764	519	298	1,588	827	592	293	3,145	1,591	1,111	591
* ADP antagonist	5,473	2,693	1,816	1,009	1,708	872	588	329	1,729	909	644	327	3,437	1,781	1,232	656
Clopidogrel	5,298	2,607	1,748	997	1,611	836	536	322	1,665	876	615	323	3,276	1,712	1,151	645
Ticagrelor	217	111	86	13	114	40	66	6	89	39	40	3	203	79	106	9
GP receptor inhibitor	13	7	6	5	9	3	2	0	10	2	1	4	19	5	3	4
Unfractionated heparin	169	29	43	12	39	5	14	5	31	5	10	2	70	10	24	7
LMWH	896	568	268	113	394	281	131	38	360	193	106	32	754	474	237	70
Fondaparinux	4,084	1,909	1,468	803	1,218	518	430	259	1,208	649	497	236	2,426	1,167	927	495
Oral anticoagulant (e.g. Warfarin)	122	78	24	33	28	31	2	12	51	34	13	17	79	65	15	29
Beta blocker	3,377	1,847	1,367	677	1,039	524	379	224	993	537	416	230	2,032	1,061	795	454
ACE inhibitor	2,874	1,455	1,206	587	839	368	307	194	718	386	331	185	1,557	754	638	379
Angiotensin II receptor blocker	211	176	83	71	100	51	27	114	69	37	31	214	145	88	58	683

Year	2018–2019				2020				2021				2020–2021			
	ACS stratum	Malay	Chinese	Indian	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others
Total	5,776	2,878	1,940	1,075	1,814	920	617	342	1,856	964	681	341	3,670	1,884	1,298	683
Pharmacological therapy given during admission, No. (%)																
Statin	5,127	2,554	1,727	977	1,574	810	532	319	1,581	851	597	325	3,155	1,661	1,129	644
Other lipid lowering agent	131	61	32	24	60	23	18	7	67	38	35	5	127	61	53	12
Diuretics	1,484	749	468	264	474	251	156	78	414	232	169	68	888	483	325	146
Calcium antagonist	751	483	222	192	265	151	92	49	240	141	78	65	505	292	170	114
Oral hypoglycaemic agent	1,308	678	679	242	439	209	228	78	392	190	213	72	831	399	441	150
Insulin	1,169	432	580	145	455	177	220	48	443	184	257	59	898	361	477	107
Anti-arrhythmic agent	195	75	48	37	38	29	11	3	53	32	14	10	91	61	25	13
Pharmacological therapy given at discharged, No. (%)																
Aspirin	4,241	2,097	1,424	872	1,284	617	452	264	1,253	659	485	254	2,537	1,276	937	518
*ADP antagonist	4,777	2,329	1,665	887	1,419	698	505	298	1,414	747	532	285	2,833	1,445	1,037	583
Clopidogrel	4,553	2,233	1,574	870	1,298	660	442	289	1,325	710	501	282	2,623	1,370	943	571
Ticagrelor	206	86	90	16	125	40	65	8	84	36	32	3	209	76	97	11

Year	2018–2019				2020				2021				2020–2021			
	ACS stratum	Malay	Chinese	Indian	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others
Total	5,776	2,878	1,940	1,075	1,814	920	617	342	1,856	964	681	341	3,670	1,884	1,298	683
Pharmacological therapy given at discharged, No. (%)																
Fondaparinux	109 (3.4)	51 (2.5)	40 (3.4)	30 (3.3)	66 (4.5)	28 (3.6)	29 (5.6)	7 (2.1)	50 (3.7)	28 (3.6)	23 (4.4)	7 (3.7)	116 (4.1)	56 (4.2)	52 (3.6)	14 (5.0)
Oral antiocoagulant (e.g. Warfarin)	161 (5.0)	108 (5.2)	28 (2.4)	58 (6.4)	52 (3.6)	36 (4.6)	3 (0.6)	19 (5.8)	69 (5.1)	42 (5.3)	13 (2.5)	18 (5.7)	121 (4.3)	78 (5.0)	16 (5.0)	37 (5.8)
Beta blocker	3,537 (77.4)	1,823 (73.2)	1,360 (80.0)	710 (73.0)	1,083 (69.4)	518 (64.9)	382 (70.6)	236 (71.5)	1,054 (69.3)	560 (67.1)	400 (69.7)	231 (70.4)	2,137 (69.3)	1,078 (66.1)	782 (66.1)	467 (71.0)
ACE inhibitor	3,037 (68.0)	1,454 (59.6)	1,212 (72.4)	599 (62.3)	874 (56.8)	364 (45.6)	299 (55.4)	196 (59.6)	780 (52.6)	385 (46.9)	337 (58.5)	184 (57.0)	1,654 (54.8)	749 (46.3)	636 (46.3)	380 (58.3)
Angiotensin II receptor blocker	244 (7.5)	197 (9.5)	93 (8.0)	85 (9.3)	117 (8.0)	87 (9.0)	55 (11.2)	29 (10.6)	125 (8.8)	71 (9.2)	41 (9.0)	30 (7.8)	242 (9.3)	158 (8.5)	96 (10.1)	59 (9.1)
Statin	4,746 (94.4)	2,367 (92.3)	1,636 (94.0)	909 (92.4)	1,419 (88.9)	719 (88.8)	483 (87.3)	303 (91.3)	1,412 (89.4)	764 (89.4)	529 (88.6)	315 (95.7)	2,831 (89.1)	1,483 (89.1)	1,012 (89.1)	618 (93.5)
Other lipid lowering agent	157 (4.9)	68 (3.3)	39 (3.3)	26 (2.9)	66 (4.5)	23 (2.9)	20 (3.8)	9 (2.8)	79 (5.9)	35 (5.9)	33 (4.5)	33 (6.3)	6 (1.9)	145 (5.1)	58 (3.7)	53 (5.1)
Diuretics	1,190 (33.5)	617 (28.7)	383 (30.7)	246 (26.6)	329 (21.9)	182 (23.2)	116 (22.2)	68 (20.6)	279 (20.1)	163 (20.3)	116 (21.6)	116 (18.0)	58 (21.0)	608 (21.8)	345 (21.0)	232 (19.3)
Calcium antagonist	791 (23.4)	469 (22.1)	212 (17.7)	195 (21.2)	275 (18.6)	139 (17.8)	86 (16.6)	51 (15.5)	254 (18.7)	136 (18.7)	77 (14.6)	77 (17.2)	57 (14.6)	275 (17.9)	163 (17.5)	108 (15.6)
Oral hypoglycaemic agent	1,445 (39.7)	691 (31.5)	254 (49.7)	490 (27.3)	210 (32.7)	252 (26.6)	84 (47.2)	116 (25.6)	446 (31.8)	204 (25.3)	227 (41.0)	80 (24.8)	936 (41.0)	414 (32.2)	479 (26.0)	164 (44.1)
Insulin	891 (25.6)	320 (15.0)	454 (34.5)	116 (12.6)	312 (20.7)	94 (12.0)	140 (26.5)	36 (11.0)	286 (20.6)	103 (20.6)	144 (12.9)	103 (26.4)	144 (17.1)	598 (20.6)	197 (12.4)	284 (26.4)
Anti-arrhythmic agent	116 (3.6)	63 (3.1)	24 (2.1)	25 (1.7)	11 (1.4)	7 (1.4)	4 (1.4)	30 (1.2)	15 (1.9)	8 (1.5)	7 (1.5)	7 (1.5)	26 (2.2)	15 (2.0)	11 (1.7)	11 (1.4)

^a Total admission days is derived from Outcome date-Admission date + I

^b Excluded notifications of patients who died at discharge

*Ticlopidine, clopidogrel, prasugrel, and ticagrelor are grouped as ADP antagonist.

Note: "Others" includes Orang Asli, Kadazan, Melayu, Bidayuh, Iban, other Malaysian, and Foreigner

Table 4.9 Treatments for patients with ACS by type of participating centres, NCVD-ACS Registry, 2020–2021

Year	ACS stratum	2018–2019				2020–2021			
		STEMI	NSTEMI	Unstable Angina	STEMI	NSTEMI	Unstable Angina		
PCI-Capable Centre		Yes No. (%)	No No. (%)	Yes No. (%)	No No. (%)	Yes No. (%)	No No. (%)	Yes No. (%)	No No. (%)
Total	7,736	1,200	5,593	1,010	4,819	247	6,630	997	3,949
Fibrinolytic therapy, No (%)								654	2,832
Given at this centre	2,515 (33.3)	866 (72.8)					2,633 (40.3)	761 (76.3)	
Given at another centre prior to transfer	2,224 (29.4)	40 (3.4)					1,867 (28.6)	37 (3.7)	
Not given-Proceeded directly to primary angioplasty	1,732 (22.9)	16 (1.3)					1,007 (15.4)	9 (0.9)	
Not given-Missed thrombolysis	847 (11.2)	219 (18.4)					763 (11.7)	152 (15.2)	
Not given-Patient refusal	16 (0.2)	3 (0.3)					28 (0.4)	4 (0.4)	
Not given-Contraindicated	230 (3.0)	46 (3.9)					230 (3.5)	34 (3.4)	
Not applicable	84 63 25	3 7 0					53 49 0	0 0 0	
Missing							0	0	
PCI, No (%)									
Yes	3,931 (61.3)	52 (4.4)	1,353 (26.1)	21 (2.1)	448 (10.8)	0 (0)	3,388 (60.4)	58 (5.9)	1,134 (30.8)
No	2,484 (38.7)	1,134 (95.4)	3,832 (73.8)	975 (97.7)	3,708 (89.0)	243 (99.6)	2,214 (39.5)	930 (93.9)	2,541 (69.0)
Not applicable	1 (0.0)	3 (0.3)	5 (0.1)	2 (0.2)	10 (0.2)	1 (0.4)	3 (0.1)	2 (0.2)	6 (0.2)
Missing	1,320	11	403	12	653	3	1,025	7	268
CABG, No (%)									
Yes	74 (1.2)	0 (0)	113 (2.2)	0 (0)	49 (1.2)	0 (0)	81 (1.5)	0 (0)	76 (2.1)
No	5,930 (98.6)	1,133 (99.6)	5,063 (97.6)	966 (99.8)	4,172 (98.5)	230 (99.6)	5,208 (98.2)	984 (99.7)	3,564 (97.4)
Not applicable	11 (0.2)	4 (0.4)	14 (0.3)	2 (0.2)	13 (0.3)	1 (0.4)	13 (0.2)	3 (0.3)	19 (0.5)
Missing	1,721	62	403	42	585	16	1,328	10	290

Year	ACS stratum	2020						2021					
		STEMI			NSTEAMI			Unstable Angina			NSTEAMI		
PCI-Capable Centre	Yes	No	Yes	No	No.	No.	Yes	No	No.	No.	No.	No.	No.
Total	3,555	598	1,927	317	1,422	27	3,075	399	2,022	337	1,410	73	
Fibrinolytic therapy, No (%)													
Given at this centre	1,431 (40.7)	464 (77.6)							1,202 (39.9)	297 (74.4)			
Given at another centre prior to transfer	1,065 (30.3)	24 (4.0)							802 (26.6)	13 (3.3)			
Not given-Proceeded directly to primary angioplasty	494 (14.0)	3 (0.5)							513 (17.0)	6 (1.5)			
Not given-Missed thrombolysis	393 (11.2)	83 (13.9)							370 (12.3)	69 (17.3)			
Not given-Patient refusal	13 (0.4)	3 (0.5)							15 (0.5)	1 (0.3)			
Not given-Contraindicated	121 (3.4)	21 (3.5)							109 (3.6)	13 (3.3)			
Not applicable	19	0							34	0			
Not available	19	0							30	0			
Missing	0	0							0	0			
PCI, No (%)													
Yes	1,720 (57.2)	20 (3.4)	545 (30.3)	17 (5.5)	161 (11.6)	0 (0.0)	1,668 (64.2)	38 (9.7)	589 (31.2)	16 (5.0)	190 (14.4)	0 (0.0)	0 (0.0)
No	1,284 (42.7)	576 (96.5)	1,250 (69.6)	293 (94.2)	1,221 (87.8)	26 (100.0)	930 (35.8)	354 (90.1)	1,291 (68.5)	307 (95.0)	1,117 (84.4)	59 (100.0)	59 (100.0)
Not applicable	1 (0.03)	1 (0.2)	1 (0.1)	1 (0.3)	8 (0.6)	0 (0.0)	2 (0.1)	1 (0.3)	5 (0.3)	0 (0.0)	16 (1.2)	0 (0.0)	0 (0.0)
Missing	550	1	131	6	32	1	475	6	137	14	87	14	
CABG, No (%)													
Yes	40 (1.4)	0 (0.0)	41 (2.3)	0 (0.0)	17 (1.2)	0 (0.0)	41 (1.7)	0 (0.0)	35 (1.9)	0 (0.0)	15 (1.1)	0 (0.0)	0 (0.0)
No	2,817 (98.3)	588 (99.7)	1,771 (97.4)	298 (99.3)	1,380 (98.6)	26 (100.0)	2,391 (98.2)	396 (99.7)	1,793 (97.4)	331 (99.7)	1,325 (98.1)	60 (100.0)	60 (100.0)
Not applicable	9 (0.3)	2 (0.3)	6 (0.3)	2 (0.7)	3 (0.2)	0 (0.0)	4 (0.2)	1 (0.3)	13 (0.7)	1 (0.3)	11 (0.8)	0 (0.0)	0 (0.0)
Missing	689	8	109	17	22	1	639	2	181	5	59	13	

Table 4.10.1 ACS patients by TIMI Risk Score, NCVD-ACS Registry, 2020–2021

TIMI risk score	Year			
	2016–2017	2018	2019	2018–2019
NSTEMI/UA				
(0–1)	3,861 (33.1)	926 (25.1)	1,020 (26.6)	1,946 (25.8)
(2–4)	7,065 (60.6)	2,421 (65.6)	2,493 (64.9)	4,914 (65.2)
(5–7)	741 (6.4)	346 (9.4)	329 (8.6)	675 (9.0)
STEMI				
(0–2)	2,728 (30.6)	1,199 (28.9)	1,161 (33.4)	2,360 (30.9)
(3–4)	2,953 (33.1)	1,409 (33.9)	1,161 (33.4)	2,570 (33.7)
(5–7)	2,561 (28.7)	1,259 (30.3)	959 (27.6)	2,218 (29.1)
(>7)	669 (7.5)	286 (6.9)	193 (5.6)	479 (6.3)

Table 4.10.2 Cardiac catheterisation for ACS patients by TIMI Risk Score, NCVD-ACS Registry, 2020–2021

Year	2018–2019		2020		2021		2020–2021	
	Cardiac catheterisation		Cardiac catheterisation		Cardiac catheterisation		Cardiac catheterisation	
TIMI risk score	Yes %	No %	Yes %	No %	Yes %	No %	Yes %	No %
NSTEMI/UA								
(0–1)	1,371 (39.1)	2,479 (40.0)	10 (25.0)	1 (33.8)	424 (20.5)	497 (33.3)	5 (33.4)	465 (22.6)
(2–4)	1,985 (56.6)	5,064 (62.3)	13 (75.0)	3 (59.5)	746 (68.7)	1,666 (60.0)	9 (59.7)	832 (67.9)
(5–7)	152 (4.3)	587 (7.2)	2 (8.0)	0 (0)	84 (6.7)	261 (10.8)	1 (6.7)	96 (6.9)
STEMI								
(0–2)	1,783 (34.3)	940 (25.5)	5 (17.9)	0 (0)	765 (33.1)	431 (23.7)	3 (14.3)	861 (38.3)
(3–4)	1,805 (34.7)	1,139 (30.9)	8 (28.6)	1 (100.0)	857 (37.1)	542 (29.8)	10 (47.6)	765 (34.0)
(5–7)	1,354 (26.1)	1,194 (32.4)	13 (46.4)	0 (0)	590 (25.5)	661 (36.3)	8 (38.1)	551 (24.5)
(>7)	255 (4.9)	412 (11.2)	2 (7.1)	0 (0)	100 (4.3)	186 (10.2)	0 (0)	72 (3.2)
Missing								
Transfer								
No.								
Missing								
Yes								
No.								
Missing								
Transfer								
No.								
Missing								
Yes								
No.								
Missing								

CHAPTER 5: OUTCOME

CHAPTER 5: OUTCOME

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Summary

1. In the 2020–2021 period, the all-cause mortality rates for in-hospital, 30-day, and 1-year stood at 7.7%, 10.2%, and 18.9%, respectively. The mortality rates appeared higher than the preceding 2018–2019 cohort.
2. Across all time intervals, the elderly age group exhibited the most unfavorable outcomes, with mortality rates doubling in comparison to the middle-aged group and at least tripling when compared to the young-age group.
3. Similar to the previous cohort, the Indian ethnic group demonstrated the most favorable outcomes when contrasted with the Malay and Chinese ethnic groups. Notably, females experienced a more adverse outcome than males, with this distinction being particularly pronounced at the 1-year mark.
4. Both diabetic and hypertensive patient groups displayed an escalating trend in mortality rates compared to the previous cohort, indicating a poorer prognosis than their non-diabetic/non-hypertensive counterparts.
5. While the disparity in outcomes between dyslipidaemic and non-dyslipidaemic patients was not statistically significant, there was an observed increase in mortality rates compared to the 2018–2019 cohort.
6. Patients admitted to PCI-capable centres exhibited better outcomes than those admitted to non-PCI-capable centres, a trend consistent with the previous cohort.
7. Among acute coronary syndrome (ACS) patients, ST-elevation myocardial infarction (STEMI) patients had the poorest outcomes during in-hospital and at 30-day periods. However, at one year, non-ST-elevation myocardial infarction (NSTEMI) patients exhibited the most adverse outcomes.
8. A noteworthy finding was a significant reduction in mortality rates among STEMI patients treated with percutaneous coronary intervention (PCI) compared to those treated non-invasively.

In-hospital, 30-day, and 1-year Mortality Outcomes among Patients Diagnosed with ACS in 2020–2021 (COVID-19 Pandemic Era) Compared to 2018–2019 (Pre-Pandemic Era)

The number of patients admitted for ACS was higher in the pre-pandemic period (20,604) than in the pandemic period (15,162). However, the mortality rates at discharge, 30 days, and one year after diagnosis were higher during the pandemic period (7.7% vs. 6.7%, 10.2% vs. 9.3%, and 18.9% vs. 17.8%, respectively). [Table 5.1]

The mortality rates increased across all age groups, ethnicities, genders, and ACS categories in the pandemic period compared to the pre-pandemic period. [Table 5.2, Table 5.3 and Table 5.4] Among the comorbidities, diabetes and hypertension were associated with higher mortality rates at all time points than those without these comorbidities. However, the mortality rates did not differ markedly

between the two periods for these comorbidities. Dyslipidaemia had no effect on mortality in either period. [Table 5.5, Table 5.6 and Table 5.7]

The PCI centres had lower mortality rates at all time points than non-PCI centres in both periods (7.3% vs. 10.6% for in-hospital; 9.7% vs. 15.0% for 30 days; and 18.0% vs. 26.5% for 1-year mortality). However, the mortality rates did show a higher trend during the pandemic period compared with the pre-pandemic period. [Table 5.8]

The STEMI group had higher mortality rates than NSTEMI and UA at discharge and at 30 days (9.4% and 12.1% vs. 8.5% and 11.9% for NSTEMI, vs. 1.7% and 3.0% for UA). However, NSTEMI had higher mortality rates than STEMI and UA at one year (25.4% vs. 18.0% and 11.1%, respectively). [Table 5.9]

Fibrinolytic therapy had no substantial effect on in-hospital mortality for STEMI cases (9.4% vs. 9.6% for those who received and did not receive the therapy, respectively). However, fibrinolytic therapy was associated with slightly lower mortality rates at 30 days and at 1 year after discharged for STEMI cases. There was no major difference in mortality rates between the two periods for patients who had fibrinolytic therapy and those who did not. [Table 5.10.1]

Percutaneous coronary intervention was associated with lower mortality rates at all time points for STEMI cases than those who did not receive PCI (3.4% vs. 15.7% for in-hospital, 4.9% vs. 20.1% for 30-day, and 9.1% vs. 27.9% for 1-year mortality). Moreover, the mortality rates were lower in the pandemic period than in the pre-pandemic period for all the STEMI patients in both the PCI and non-PCI groups. [Table 5.10.2]

Coronary artery bypass grafting (CABG) had no effect on mortality rates at any time point for STEMI cases compared to those who did not undergo CABG. However, the number of patients who underwent CABG was low in both periods (74 in the pre-pandemic period and 81 in the pandemic period). [Table 5.10.3]

Pre-admission aspirin use was paradoxically associated with higher mortality rates at all time points for STEMI cases than those who did not use pre-admission aspirin. [Table 5.10.4]

Percutaneous coronary intervention was associated with lower mortality rates at all time points for NSTEMI/UA cases than those who did not receive PCI (2.0% vs. 6.5% for in-hospital; 3.2% vs. 9.4% for 30 days and 9.2% vs. 22.3% for one year). However, the mortality rates did not differ significantly between the two periods for either group of NSTEMI/UA cases. [Table 5.11.1]

Coronary artery bypass grafting had no effect on mortality rates at any time point for NSTEMI/UA cases compared to those who did not undergo CABG. However, the number of patients who underwent CABG was low in both periods (162 in the pre-pandemic period and 108 in the pandemic period). [Table 5.11.2]

Patients with NSTEMI/UA who used aspirin before admission had lower mortality rates than those who did not use aspirin before admission at in-hospital and 30-day intervals in both cohorts. However, patients with NSTEMI/UA had higher mortality rates than those who did not use aspirin before admission at 1-year interval in both cohorts. [Table 5.11.3]

The in-hospital mortality among STEMI patients was influenced by the following prognostic factors: Killip classification (hazard ratio [HR] 1.92 for III and 4.84 for IV, $P<0.001$), PCI (HR 1.76, $P<0.001$), TIMI risk score (HR 2.31 for 3–4, 4.57 for 5–7, and 6.45 for >7, $P<0.001$), and hypertension (HR 1.27, $P<0.012$). [Table 5.12.1]

The 30-day mortality for STEMI patients was influenced by the following prognostic factors: Killip classification (HR 1.83 for III and 4.45 for IV, $P<0.001$), PCI (HR 1.69, $P<0.001$), and TIMI risk score (HR 1.69 for 3–4, 3.33 for 5–7, and 4.50 for >7, $P<0.001$). [Table 5.12.2]

However, diagnostic coronary angiogram without PCI (HR 0.48, $P<0.001$), active smoking (HR 0.75, $P<0.001$), and family history of premature cardiovascular disease (HR 0.74, $P<0.001$) were associated with lower 30-day mortality, possibly due to more aggressive medical management for these high-risk patients. [Table 5.12.2]

The 1-year mortality post STEMI was influenced by the following prognostic factors: age (HR 1.48 for 40–<60 years old and 1.71 for >60 years old, $P<0.05$), Killip classification (HR 1.78 for III, and 3.13 for IV, $P<0.001$), TIMI risk score (HR 2.00 for 3–4, 3.44 for 5–7, and 4.76 for >7, $P<0.001$), fibrinolytic therapy (HR 0.79, $P<0.05$), active smoking (HR 0.85, $P<0.05$), family history of premature cardiovascular disease (HR 0.68, $P<0.05$), diabetes (HR 1.23, $P<0.001$), and hypertension (HR 1.36, $P<0.001$). [Table 5.12.3]

The in-hospital mortality among NSTEMI/UA patients was influenced by the following prognostic factors: Killip classification (HR 3.17 for II, 8.93 for III and 20.99 for IV, $P<0.001$), TIMI risk score (HR 1.91 for 5–7, $P<0.05$), dyslipidaemia (HR 0.77, $P<0.05$), and diabetes (HR 1.54, $P<0.001$). [Table 5.12.4]

The 30-day mortality for NSTEMI/UA patients was influenced by the following prognostic factors: age (HR 2.38 for 40–<60 years old and 3.13 for >60 years old, $P<0.05$), Killip classification (HR 3.49 for II, 7.17 for III, and 13.09 for IV, $P<0.001$), TIMI risk score (HR 1.40 for 2–4 and 1.79 for 5–7, $P<0.05$), diabetes (HR 1.50, $P<0.001$), and dyslipidaemia (HR 0.79, $P<0.05$). Smoking status (former and current smoker) was not a significant prognostic factor ($P=0.186$ and 0.816 , respectively). [Table 5.12.5]

The 1-year mortality for NSTEMI/UA patients was influenced by the following prognostic factors: age (HR 1.52 for 40–<60 years old and 2.43 for >60 years old, $P<0.05$), Killip classification (HR 5.56 for IV, $P<0.001$), TIMI risk score (HR 1.24 for 2–4 and 1.50 for 5–7, $P<0.05$), PCI (HR 0.66, $P<0.001$), cardiac catheterisation (HR 0.62, $P<0.001$), family history of premature cardiovascular disease (HR 0.73, $P<0.05$), diabetes (HR 1.55, $P<0.001$), and heart failure (HR 1.58, $P<0.001$). Smoking status (former and current smoker) was not a significant prognostic factor ($P=0.533$ and 0.987 , respectively). [Table 5.12.6]

Discussion

This chapter compared the mortality rates of patients admitted for acute coronary syndrome (ACS) registered in the National Cardiovascular Disease Database (NCVD) in Malaysia during the pre-pandemic (2018–2019) and pandemic (2020–2021) periods. The results showed higher trend of mortality rates at in-hospital, 30-day, and 1-year intervals during the pandemic period.

However, the mortality rates varied according to the patient characteristics and treatment modalities. The elderly, females, diabetics, and hypertensives had higher mortality rates than their counterparts. The Indian ethnic group had the lowest mortality rate among the ethnic groups.

The patients admitted to PCI-capable centres had better outcomes than those admitted to non-PCI-capable centres. The STEMI patients had the highest mortality rate initially, but NSTEMI patients surpassed them at 1-year. Percutaneous coronary intervention was associated with a lower mortality rate than non-invasive treatment for STEMI patients.

These findings are consistent with some of the previous studies that reported similar mortality rates and risk factors for ACS patients in Malaysia and other countries¹. However, some of the findings are novel or contradictory to the existing literature, such as the lower mortality rate of the Indian ethnic group, the paradoxical effect of pre-admission aspirin use, and the shift of mortality from STEMI to NSTEMI at one year.

The lack of major difference in the mortality rates between the two cohorts (2020-2021 vs. 2018-2019) may indicate that the pandemic did not have a significant impact on the quality of care and outcomes of ACS patients in Malaysia. This may be attributed to the effective implementation of the national guidelines and protocols for managing ACS patients during the pandemic².

However, the variation in the mortality rates according to the patient characteristics and treatment modalities may reflect the disparities and challenges in the access, availability, and affordability of the health care services and resources for different groups of patients. For instance, the lower mortality rate of the Indian ethnic group may be explained by their higher utilisation of PCI and cardiac catheterisation than other ethnic groups. Likely explained by the possible assumption of higher mortality risk among the Indian ethnic group³.

The paradoxical effect of pre-admission aspirin use may be explained by the higher severity of illness among the patients who were started on aspirin who had higher mortality. The shift of mortality from STEMI to NSTEMI at one year may be explained by the higher prevalence of comorbidities and complications among NSTEMI patients than STEMI patients⁴.

The findings of this study have important implications for the clinical practice and public health policy in Malaysia and other countries. They provide valuable insights into the impact of the pandemic on the management and outcomes of ACS patients, and highlight the need for continuous monitoring and evaluation of the quality of care and service delivery for different groups of patients. They also suggest the potential benefits of PCI and cardiac catheterisation for reducing the mortality rate of ACS patients..

Furthermore, these findings contribute to the existing knowledge on the risk factors and prognostic factors of ACS patients, and reveal some unexpected or contradictory associations, such as the pre-admission aspirin use and the shift of mortality from STEMI to NSTEMI at one year. These findings may stimulate further research to explore the underlying mechanisms and causal relationships of these associations.

The analysis has some limitations that should be acknowledged. First, it is a retrospective observational study that relies on the data collected from the NCVD-ACS Registry, which may have some limitations in the data completeness. Second, it does not control for the confounding factors that may affect the mortality rates of ACS patients, such as the severity of symptoms, the time to treatment, the adherence to medication, and the lifestyle factors. Third, it does not examine the long-term outcomes and quality of life of ACS patients beyond one year after diagnosis. Therefore, future research should address these limitations by conducting prospective, randomised, and controlled trials to compare the effectiveness and safety of different treatment modalities for ACS patients.

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Table 5.1 Outcomes for patients with ACS by year, NCVD-ACS Registry, 2020–2021

Year	2018–2019			2020			2021			2020–2021		
	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing
Outcome	No.	19,216	1,388	1	7,198	648	0	6,803	513	0	14,001	1,161
Outcome at discharge	%	93.3	6.7	0.0	91.7	8.3		93.0	7.0		92.3	7.7
30-day	No.	18,235	1,874	496	6,809	821	216	6,459	692	165	13,268	1,513
%		90.7	9.3	0.0	89.2	10.8		90.3	9.7		89.8	10.2
1-year	No.	16,503	3,577	525	6,164	1,456	226	5,807	1,337	172	11,971	2,793
%		82.2	17.8	0.0	80.9	19.1		81.3	18.7		81.1	18.9

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow-ups includes patients who died in-hospital

Table 5.2 Overall outcomes for patients with ACS by age group (years), NCVD-ACS Registry, 2020–2021

Year	2018–2019			2020			2021			2020–2021		
	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing
Outcome	No.	1,513 (97.6)	37 (2.4)	0	618 (97.2)	18 (2.8)	0	536 (96.8)	18 (3.2)	0	1,154 (97.0)	36 (3.0)
Young	No. (%)	9,057 (95.4)	441 (4.6)	0	3,322 (93.7)	225 (6.3)	0	3,224 (95.0)	171 (5.0)	0	6,546 (94.3)	396 (5.7)
In-hospital	No. (%)	8,646 (90.5)	910 (9.5)	1	3,258 (88.9)	405 (11.1)	0	3,043 (90.4)	324 (9.6)	0	6,301 (89.6)	729 (10.4)
Middle-aged	No. (%)	1,366 (96.4)	51 (3.6)	133	553 (96.0)	23 (4.0)	60	497 (96.3)	19 (3.7)	38	1,050 (96.2)	42 (3.8)
Elderly	No. (%)	8,620 (93.7)	584 (6.4)	294	3,146 (92.0)	275 (8.0)	126	3,053 (93.0)	231 (7.0)	111	6,199 (92.5)	506 (7.5)
30-day	No. (%)	8,249 (86.9)	1,239 (13.1)	69	3,110 (85.6)	523 (14.4)	30	2,909 (86.8)	442 (13.2)	16	6,019 (86.2)	965 (13.8)
1-year	No. (%)	1,327 (93.9)	87 (6.2)	136	536 (93.4)	38 (6.6)	62	478 (93.0)	36 (7.0)	40	1,014 (93.2)	74 (6.8)
Middle-aged	No. (%)	8,095 (88.1)	1,092 (11.9)	311	2,935 (85.9)	480 (14.1)	132	2,870 (87.5)	411 (12.5)	114	5,805 (86.7)	891 (13.3)
Elderly	No. (%)	7,981 (74.7)	2,398 (25.3)	78	2,693 (74.2)	938 (25.8)	32	2,459 (73.4)	890 (26.6)	18	5,152 (73.8)	1,828 (26.2)

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow-ups includes patients who died in-hospital; 3. Young is defined as age 20 to less than 40 years, middle-aged is defined as age 40 to less than 60 years and elderly is defined as 60 years and above

Table 5.3 Overall outcomes for patients with ACS by ethnicity, NCVD-ACS Registry, 2020–2021

Year	2018–2019				2020				2021				
	Outcome		Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died
Malay	No. (%)	9,951 (92.6)	792 (7.4)	0	3,877 (91.4)	366 (8.6)	0	3,549 (92.4)	291 (7.6)	0	7,426 (91.9)	657 (8.1)	0
Chinese	No. (%)	4,104 (93.1)	303 (6.9)	0	1,432 (90.2)	155 (9.8)	0	1,390 (92.1)	119 (7.9)	0	2,822 (91.1)	274 (8.9)	0
Indian	No. (%)	3,069 (94.4)	182 (5.6)	0	1,121 (92.7)	88 (7.3)	0	1,141 (93.9)	74 (6.1)	0	2,262 (93.3)	162 (6.7)	0
Others	No. (%)	2,092 (95.0)	111 (5.0)	1	768 (95.2)	39 (4.8)	0	723 (96.1)	29 (3.9)	0	1,491 (95.6)	68 (4.4)	0
In-hospital													
Malay	No. (%)	9,679 (90.2)	1,054 (9.8)	10	3,790 (89.3)	452 (10.7)	1	3,447 (89.8)	391 (10.2)	2	7,237 (89.6)	843 (10.4)	3
Chinese	No. (%)	3,984 (90.5)	420 (9.5)	3	1,380 (87.0)	206 (13.0)	1	1,347 (89.3)	161 (10.7)	1	2,727 (88.1)	367 (11.9)	2
Indian	No. (%)	2,985 (92.1)	256 (7.9)	10	1,096 (90.7)	113 (9.3)	0	1,113 (91.8)	100 (8.2)	2	2,209 (91.2)	213 (8.8)	2
Others	No. (%)	1,587 (91.7)	144 (8.3)	473	543 (91.6)	50 (8.4)	214	552 (92.2)	40 (6.8)	160	1,095 (92.4)	90 (7.6)	374
30-day													
Malay	No. (%)	8,778 (81.8)	1,953 (18.2)	12	3,447 (81.3)	795 (18.7)	1	3,098 (80.7)	740 (19.3)	2	6,545 (81.0)	1,535 (19.0)	3
Chinese	No. (%)	3,560 (80.8)	844 (19.2)	3	1,219 (76.9)	367 (23.1)	1	1,200 (79.6)	308 (20.4)	1	2,419 (78.2)	675 (21.8)	2
Indian	No. (%)	2,725 (84.1)	516 (15.9)	10	996 (82.4)	213 (17.6)	0	999 (82.4)	214 (17.6)	2	1,995 (82.4)	427 (17.6)	2
Others	No. (%)	1,440 (84.5)	264 (15.5)	500	502 (86.1)	81 (13.9)	224	510 (87.2)	75 (12.8)	167	1,012 (86.6)	156 (13.4)	391
1-year													

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow-ups includes patients who died in-hospital; 3. "Others" includes Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, other Malaysian and Foreigner

Table 5.4 Overall outcomes for patients with ACS by gender, NCVD-ACS Registry, 2020–2021

Year	2018–2019				2020				2021				2020–2021	
	Outcome		Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing
In-hospital	Male	No. (%)	15,289 (93.7)	1,022 (6.3)	1	5,760 (92.2)	488 (7.8)	0	5,422 (93.5)	376 (6.5)	0	11,182 (92.8)	864 (7.2)	0
	Female	No. (%)	3,927 (91.5)	366 (8.5)	0	1,438 (90.0)	160 (10.0)	0	1,381 (91.0)	137 (9.0)	0	2,819 (90.5)	297 (9.5)	0
30-day	Male	No. (%)	14,489 (91.3)	1,382 (8.7)	441	5,436 (89.8)	616 (10.2)	196	5,138 (91.0)	508 (9.0)	152	10,574 (90.4)	1,124 (9.6)	348
	Female	No. (%)	3,746 (88.4)	492 (11.6)	55	1,373 (87.0)	205 (13.0)	20	1,321 (87.8)	184 (12.2)	13	2,694 (87.4)	389 (12.6)	33
1-year	Male	No. (%)	13,231 (83.5)	2,613 (16.5)	468	4,980 (82.4)	1,064 (17.6)	204	4,663 (82.7)	977 (17.3)	158	9,643 (82.5)	2,041 (17.5)	362
	Female	No. (%)	3,272 (77.2)	964 (22.8)	57	1,184 (75.1)	392 (24.9)	22	1,144 (76.1)	360 (23.9)	14	2,328 (75.6)	752 (24.4)	36

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow-ups includes patients who died in-hospital

Table 5.5 Overall outcomes for patients with ACS by pre-morbid diabetes, NCVD-ACS Registry, 2020–2021

Year	2018–2019				2020				2021				2020–2021			
	Outcome	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing			
In Hospital	Diabetic	No. (%)	8,164 (91.3)	776 (8.7)	3,085 (89.2)	374 (10.8)	0	2,905 (90.8)	294 (9.2)	0	5,990 (90.0)	668 (10.0)	0			
	Non-Diabetic	No. (%)	9,569 (95.1)	492 (4.9)	1	3,791 (93.9)	247 (6.1)	0	3,557 (94.8)	194 (5.2)	0	7,348 (94.3)	441 (5.7)	0		
	Not known	No. (%)	1,150 (92.7)	91 (7.3)	0	196 (90.7)	20 (9.3)	0	241 (94.5)	14 (5.5)	0	437 (92.8)	34 (7.2)	0		
	Missing	No. (%)	333 (92.0)	29 (8.0)	0	126 (94.7)	7 (5.3)	0	100 (90.1)	11 (9.9)	0	226 (92.6)	18 (7.4)	0		
30-day	Diabetic	No. (%)	7,764 (88.0)	1,062 (12.0)	114 (86.2)	2,924 (13.8)	468 (87.1)	67 (87.1)	2,752 (12.9)	406 (12.9)	41	5,676 (86.7)	874 (13.3)	108		
	Non-Diabetic	No. (%)	9,107 (93.2)	666 (6.8)	289 (91.8)	3,589 (8.2)	321 (8.2)	128 (93.0)	3,386 (7.0)	256 (7.0)	109	6,975 (92.4)	577 (7.6)	237		
	Not known	No. (%)	1,069 (90.8)	109 (9.3)	63 (89.3)	184 (10.7)	22 (10.7)	10 (93.5)	230 (6.5)	16 (6.5)	9	414 (91.6)	38 (8.4)	19		
	Missing	No. (%)	295 (88.9)	37 (11.1)	30 (91.8)	112 (91.8)	10 (8.2)	11 (86.7)	91 (86.7)	14 (13.3)	6	203 (89.4)	24 (10.6)	17		
1-year	Diabetic	No. (%)	6,720 (76.2)	2,101 (23.8)	119 (74.5)	2,525 (74.5)	862 (25.5)	72 (74.7)	2,357 (74.7)	797 (25.3)	45	4,882 (74.6)	1,659 (25.4)	117		
	Non-Diabetic	No. (%)	8,520 (87.4)	1,232 (12.6)	310 (86.0)	3,358 (14.0)	548 (14.0)	132 (86.5)	3,148 (13.5)	491 (13.5)	112	6,506 (86.2)	1,039 (13.8)	244		
	Not known	No. (%)	990 (84.2)	186 (15.8)	65 (84.9)	174 (15.1)	31 (15.1)	11 (87.8)	216 (12.2)	30 (12.2)	9	390 (86.5)	61 (13.5)	20		
	Missing	No. (%)	273 (82.5)	58 (17.5)	31 (87.7)	107 (12.3)	15 (12.3)	11 (87.7)	86 (18.1)	19 (18.1)	6	193 (85.0)	34 (15.0)	17		

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow-ups includes patients who died in-hospital

Table 5.6 Overall outcomes for patients with ACS by pre-morbid hypertension, NCVD-ACS Registry, 2020–2021

Year	Outcome	2018–2019			2020			2021			2020–2021		
		Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing
	Hypertensive	No. (%)	11,639 (92.9)	895 (7.1)	4,366 (90.8)	445 (9.2)	0	4,095 (92.0)	358 (8.0)	0	8,461 (91.3)	803 (8.7)	0
	Non-Hypertensive	No. (%)	6,275 (94.3)	383 (5.8)	2,542 (93.4)	181 (6.6)	0	2,396 (94.9)	129 (5.1)	0	4,938 (94.1)	310 (5.9)	0
	Not known	No. (%)	969 (92.3)	81 (7.7)	164 (91.6)	15 (8.4)	0	212 (93.4)	15 (6.6)	0	376 (92.6)	30 (7.4)	0
	Missing	No. (%)	333 (92.0)	29 (8.1)	126 (94.7)	7 (5.3)	0	100 (90.1)	11 (9.9)	0	226 (92.6)	18 (7.4)	0
	Hypertensive	No. (%)	11,133 (90.1)	1,229 (9.9)	173 (88.1)	565 (11.9)	82 (11.9)	3,903 (88.7)	497 (11.3)	53 (11.3)	8,067 (88.4)	1,062 (11.6)	135
	Non-Hypertensive	No. (%)	5,906 (92.0)	515 (8.0)	237 (91.2)	2,379 (8.8)	230 (91.2)	114 (93.2)	2,265 (6.8)	164 (6.8)	4,644 (92.2)	394 (7.8)	210
	Not known	No. (%)	901 (90.6)	93 (9.4)	56 (90.6)	154 (90.6)	16 (9.4)	9 (92.2)	200 (7.8)	17 (7.8)	10 (91.5)	354 (8.5)	19
	Missing	No. (%)	295 (88.9)	37 (11.1)	30 (91.8)	112 (82.2)	10 (82.2)	11 (86.7)	91 (13.3)	14 (13.3)	6 (89.4)	203 (10.6)	24 (10.6)
	Hypertensive	No. (%)	9,836 (79.6)	2,515 (20.4)	184 (77.4)	3,657 (22.6)	1,069 (22.6)	85 (77.7)	3,417 (22.3)	978 (22.3)	58 (77.6)	7,074 (77.6)	2,047 (22.4)
	Non-Hypertensive	No. (%)	5,557 (86.8)	849 (13.3)	252 (86.6)	2,253 (13.4)	350 (13.4)	120 (87.3)	2,118 (12.7)	309 (12.7)	98 (86.9)	4,371 (86.9)	659 (13.1)
	Not known	No. (%)	837 (84.4)	155 (15.6)	58 (87.0)	147 (13.0)	22 (13.0)	10 (85.7)	186 (14.3)	31 (14.3)	10 (86.3)	333 (86.3)	53 (13.7)
	Missing	No. (%)	273 (82.5)	31 (17.5)	107 (87.7)	15 (12.3)	11 (12.3)	86 (81.9)	19 (18.1)	6 (18.1)	193 (85.0)	34 (15.0)	17

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow ups includes patients who died in-hospital

Table 5.7 Overall outcomes for patients with ACS by pre-morbid dyslipidaemia, NCVD-ACS Registry, 2020–2021

Year	Outcome	2018–2019			2020			2021			2020–2021			
		Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	
	Dyslipidaemic	No. (%)	7,037 (94.6)	402 (5.4)	106 (92.1)	2,825 (7.9)	243 (6.3)	0 (93.7)	2,797 (6.3)	189 (6.3)	0 (92.9)	5,622 (92.9)	432 (7.1)	0
	Non-Dyslipidaemic	No. (%)	9,667 (92.8)	749 (7.2)	145 (91.9)	3,908 (8.1)	346 (92.9)	0 (92.9)	3,573 (7.1)	275 (7.1)	0 (92.3)	7,481 (92.3)	621 (7.7)	0
In Hospital	No.	2,067	194	43	339	52	0	333	38	0	672	90	0	
	Not known	No. (%)	(91.4)	(8.6)	(86.7)	(13.3)	0	(89.8)	(10.2)	0	(88.2)	(11.8)	0	
	Missing	No. (%)	847 (94.4)	53 (5.9)	17	126 (94.7)	7 (5.3)	0	100 (90.1)	11 (9.9)	0	226 (92.6)	18 (7.4)	0
30-day	No.	6,721	606	218	2,721	313	34	2,692	267	27	5,413	580	61	
	Dyslipidaemic	No. (%)	(91.7)	(8.3)	(89.7)	(10.3)	34	(91.0)	(9.0)	27	(90.3)	(9.7)	61	
	Non-Dyslipidaemic	No. (%)	9,067 (89.9)	1,019 (10.1)	475	3,659 (89.2)	442 (10.8)	153	3,363 (90.2)	365 (9.8)	120	7,022 (89.7)	807 (10.3)	273
Not known	No. (%)	1,922 (88.3)	254 (11.7)	128	317 (85.0)	56 (15.0)	18	313 (87.2)	46 (12.8)	12	630 (86.1)	102 (13.9)	30	
	Missing	No. (%)	759 (91.2)	73 (8.8)	85	112 (91.8)	10 (8.2)	11	91 (86.7)	14 (13.3)	6	203 (89.4)	24 (10.6)	17
1-year	No.	6,035	1,292	218	2,416	614	38	2,399	559	28	4,815	1,173	66	
	Dyslipidaemic	No. (%)	(82.4)	(17.6)	(79.7)	(20.3)	38	(81.1)	(18.9)	28	(80.4)	(19.6)	66	
	Non-Dyslipidaemic	No. (%)	8,283 (82.1)	1,803 (17.9)	475	3,348 (81.7)	749 (18.3)	157	3,040 (81.7)	682 (18.3)	126	6,388 (81.7)	1,431 (18.3)	283
	Not known	No. (%)	1,765 (81.1)	411 (18.9)	128	293 (79.0)	78 (21.0)	20	282 (78.6)	77 (21.4)	12	575 (78.8)	155 (21.2)	32
	Missing	No. (%)	702 (84.4)	130 (15.6)	85	107 (87.7)	15 (12.3)	11	86 (81.9)	19 (18.1)	6	193 (85.0)	34 (15.0)	17

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow-ups includes patients who died in-hospital

Table 5.8 Overall outcomes for patients by types of centre, NCVD-ACS Registry, 2020–2021

Year	2018–2019						2020						2021					
	Outcome		Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	
In-hospital	PCI Centre	No. (%)	16,995 (93.7)	1,153 (6.4)	0	6,373 (92.3)	531 (7.7)	0	6,062 (93.2)	445 (6.8)	0	12,435 (92.7)	976 (7.3)	0				
	Non-PCI Centre	No. (%)	2,221 (90.4)	235 (9.6)	1	825 (87.6)	117 (12.4)	0	741 (91.6)	68 (8.4)	0	1,566 (89.4)	185 (10.6)	0				
30-day	PCI Centre	No. (%)	16,266 (91.3)	1,552 (8.7)	330	6,086 (90.0)	679 (10.0)	139	5,809 (90.8)	592 (9.2)	106	11,895 (90.3)	1,271 (9.7)	245				
	Non-PCI Centre	No. (%)	1,969 (86.0)	322 (14.1)	166	723 (83.6)	142 (16.4)	77	650 (86.7)	100 (13.3)	59	1,373 (85.0)	242 (15.0)	136				
1-year	PCI Centre	No. (%)	14,787 (83.1)	3,003 (16.9)	358	5,536 (82.0)	1,219 (18.0)	149	5,248 (82.1)	1,146 (17.9)	113	10,784 (82.0)	2,365 (18.0)	262				
	Non-PCI Centre	No. (%)	1,716 (74.9)	574 (25.1)	167	628 (72.6)	237 (27.4)	77	559 (74.5)	191 (25.5)	59	1,187 (73.5)	428 (26.5)	136				

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow ups includes patients who died in-hospital

Table 5.9 Overall outcomes for patients with ACS by ACS stratum, NCVD-ACS Registry, 2020–2021

Year	2018–2019						2020						2021					
	Outcome		Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	
In-hospital	STEMI	No. (%)	8,106 (90.7)	830 (9.3)	0	3,740 (90.1)	413 (9.9)	0	3,169 (91.2)	305 (8.8)	0	6,909 (90.6)	718 (9.4)	0				
	NSTEMI	No. (%)	6,117 (92.7)	485 (7.4)	1	2,029 (90.4)	215 (9.6)	0	2,181 (92.5)	178 (7.5)	0	4,210 (91.5)	393 (8.5)	0				
30-day	UA	No. (%)	4,993 (98.6)	73 (1.4)	0	1,429 (98.6)	20 (1.4)	0	1,453 (98.0)	30 (2.0)	0	2,882 (98.3)	50 (1.7)	0				
	STEMI	No. (%)	7,560 (87.9)	1,037 (12.1)	339	3,484 (87.3)	506 (12.7)	163	2,975 (88.7)	380 (11.3)	119	6,459 (87.9)	886 (12.1)	282				
1-year	NSTEMI	No. (%)	5,803 (89.3)	697 (10.7)	103	1,930 (87.5)	276 (12.5)	38	2,065 (88.7)	263 (11.3)	31	3,995 (88.1)	539 (11.9)	69				
	UA	No. (%)	4,872 (97.2)	140 (2.8)	54	1,395 (97.3)	39 (2.7)	15	1,419 (96.7)	49 (3.3)	15	2,814 (97.0)	88 (3.0)	30				
In-hospital	STEMI	No. (%)	7,015 (81.8)	1,563 (18.2)	358	3,253 (81.7)	730 (18.3)	170	2,763 (82.4)	590 (17.6)	121	6,016 (82.0)	1,320 (18.0)	291				
	NSTEMI	No. (%)	4,949 (76.2)	1,547 (23.8)	107	1,635 (74.1)	570 (25.9)	39	1,742 (75.0)	581 (25.0)	36	3,377 (74.6)	1,151 (25.4)	75				
1-year	UA	No. (%)	4,539 (90.7)	467 (9.3)	60	1,276 (89.1)	156 (10.9)	17	1,302 (88.7)	166 (11.3)	15	2,578 (88.9)	322 (11.1)	32				

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow ups includes patients who died in-hospital

Table 5.10.1 Overall outcomes for patients with STEMI by fibrinolytic therapy, NCVD-ACS Registry, 2020–2021

Year	Outcome	2018–2019			2020			2021			2020–2021		
		Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing
Yes	No.	5,125 (90.8)	520 (9.2)	0	2,688 (90.1)	296 (9.9)	0	2,114 (91.4)	200 (8.6)	0	4,802 (90.6)	496 (9.4)	0
No	No.	2,815 (90.5)	294 (9.5)	0	1,015 (89.7)	116 (10.3)	0	999 (91.1)	97 (8.9)	0	2,014 (90.4)	213 (9.6)	0
Not applicable	No.	80 (92.0)	7 (8.1)	0	19 (100.0)	0 (0)	0	32 (94.1)	2 (5.9)	0	51 (96.2)	2 (3.8)	0
Not available	No.	86 (90.5)	9 (9.5)	0	18 (94.7)	1 (5.3)	0	24 (80.0)	6 (20.0)	0	42 (85.7)	7 (14.3)	0
Yes	No.	4,719 (88.1)	640 (11.9)	286 (87.6)	2,502 (87.6)	353 (12.4)	129 (88.8)	1,968 (88.8)	247 (11.2)	99 (11.2)	4,470 (88.2)	600 (11.8)	228
No	No.	2,680 (87.6)	378 (12.4)	51 (86.2)	947 (86.2)	151 (13.8)	33 (88.8)	957 (88.8)	121 (11.2)	18 (11.2)	1,904 (87.5)	272 (12.5)	51
Not applicable	No.	77 (89.5)	9 (10.5)	1	18 (94.7)	1 (5.3)	0	29 (87.9)	4 (12.1)	1	47 (90.4)	5 (9.6)	1
Not available	No.	84 (89.4)	10 (10.6)	1	17 (94.4)	1 (5.6)	1	21 (72.4)	8 (27.6)	1	38 (80.9)	9 (19.1)	2
Yes	No.	4,401 (82.3)	944 (17.7)	300 (82.0)	2,337 (82.0)	514 (18.0)	133 (83.1)	1,839 (83.1)	374 (16.9)	101 (16.9)	4,176 (82.5)	888 (17.5)	234
No	No.	2,463 (80.7)	590 (19.3)	56 (80.5)	882 (80.5)	213 (19.5)	36 (81.4)	878 (81.4)	200 (18.6)	18 (18.6)	1,760 (81.0)	413 (19.0)	54
Not applicable	No.	74 (86.1)	12 (14.0)	1	17 (89.5)	2 (10.5)	0	28 (84.8)	5 (15.2)	1	45 (86.5)	7 (13.5)	1
Not available	No.	77 (81.9)	17 (18.1)	1	17 (94.4)	1 (5.6)	1	18 (62.1)	11 (37.9)	1	35 (74.5)	12 (25.5)	2

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow-ups includes patients who died in-hospital

Table 5.10.2 Overall outcomes for patients with STEMI by PCI at admission, NCVD-ACS Registry, 2020–2021

Year	Outcome	2018–2019			2020			2021			2020–2021			
		Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	
In-hospital	Yes	No. (%)	3,748 (94.1)	235 (5.9)	0 (95.9)	1,669 (4.1)	71 (2.7)	0 (97.3)	1,660 (2.7)	46 (2.7)	0 (96.6)	3,329 (3.4)	117 (3.4)	0
	No	No. (%)	3,167 (87.5)	451 (12.5)	0 (85.2)	1,584 (14.8)	276 (82.9)	0 (17.1)	1,065 (82.9)	219 (17.1)	0 (84.3)	2,649 (15.7)	495 (15.7)	0
Not applicable	Yes	No. (%)	3 (75.0)	1 (25.0)	0 (50.0)	1 (50.0)	1 (50.0)	0 (100.0)	3 (0)	0 (0)	0 (0)	4 (80.0)	1 (20.0)	0
	No	No. (%)	1,188 (89.3)	143 (10.7)	0 (88.2)	486 (11.8)	65 (91.7)	0 (8.3)	441 (91.7)	40 (8.3)	0 (89.8)	927 (10.2)	105 (10.2)	0
30-day	Yes	No. (%)	3,646 (92.4)	300 (7.6)	37 (94.0)	1,624 (94.0)	103 (6.0)	13 (3.9)	1,633 (96.1)	66 (3.9)	7 (95.1)	3,257 (4.9)	169 (4.9)	20
	No	No. (%)	2,786 (83.0)	569 (17.0)	263 (81.0)	1,399 (19.0)	328 (19.0)	133 (78.2)	929 (21.8)	259 (21.8)	96 (79.9)	2,328 (20.1)	587 (20.1)	229
Not applicable	Yes	No. (%)	2 (66.7)	1 (33.3)	1 (50.0)	1 (50.0)	1 (50.0)	0 (100.0)	3 (0)	0 (0)	0 (0)	4 (80.0)	1 (20.0)	0
	No	No. (%)	1,126 (87.1)	167 (13.0)	38 (86.1)	460 (86.1)	74 (13.9)	17 (13.9)	410 (11.8)	55 (11.8)	16 (8.1)	870 (12.9)	129 (12.9)	33
1-year	Yes	No. (%)	3,470 (88.1)	471 (12.0)	42 (90.3)	1,557 (90.3)	167 (9.7)	16 (9.7)	1,554 (91.5)	144 (8.5)	8 (90.9)	3,111 (9.1)	311 (9.1)	24
	No	No. (%)	2,506 (74.9)	838 (25.1)	274 (73.8)	1,272 (73.8)	451 (26.2)	137 (26.2)	825 (69.5)	362 (30.5)	97 (30.5)	2,097 (72.1)	813 (27.9)	234
Not applicable	Yes	No. (%)	2 (66.7)	1 (33.3)	1 (50.0)	1 (50.0)	0 (50.0)	2 (66.7)	1 (33.3)	0 (33.3)	0 (60.0)	3 (40.0)	2 (40.0)	0
	No	No. (%)	1,037 (80.4)	253 (19.6)	41 (79.2)	423 (79.2)	111 (20.8)	17 (20.8)	382 (82.2)	83 (17.8)	16 (17.8)	805 (80.6)	194 (19.4)	33

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow-ups includes patients who died in-hospital

Table 5.10.3 Overall outcomes for patients with STEMI by coronary artery bypass graft at admission, NCVD-ACS Registry, 2020–2021

Year	Outcome	2018–2019				2020				2021				2020–2021		
		Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing
In-hospital	Yes	No. (%)	70 (94.6)	4 (5.4)	0	37 (92.5)	3 (7.5)	0	37 (90.2)	4 (9.8)	0	74 (91.4)	7 (8.6)	0	74 (91.4)	7 (8.6)
	No	No. (%)	6,427 (91.0)	636 (9.0)	0	3,073 (90.2)	332 (9.8)	0	2,546 (91.4)	241 (8.6)	0	5,619 (90.7)	573 (9.3)	0	5,619 (90.7)	573 (9.3)
	Not applicable	No. (%)	14 (87.5)	2 (12.5)	0	11 (100.0)	0 (0)	0	3 (60.0)	2 (40.0)	0	14 (87.5)	2 (12.5)	0	14 (87.5)	2 (12.5)
	Not available	No. (%)	1,595 (89.5)	188 (10.5)	0	619 (88.8)	78 (11.2)	0	583 (91.0)	58 (9.0)	0	1,202 (89.8)	136 (10.2)	0	1,202 (89.8)	136 (10.2)
	Yes	No. (%)	66 (89.2)	8 (10.8)	0	36 (90.0)	4 (10.0)	0	37 (90.2)	4 (9.8)	0	73 (90.1)	8 (9.9)	0	73 (90.1)	8 (9.9)
	No	No. (%)	5,969 (88.1)	805 (11.9)	289 (11.9)	2,852 (87.5)	409 (12.5)	144 (88.9)	2,383 (88.9)	299 (11.1)	105 (88.1)	5,235 (88.1)	708 (11.9)	249	5,235 (88.1)	708 (11.9)
	Not applicable	No. (%)	13 (86.7)	2 (13.3)	1	10 (100.0)	0 (0)	1	2 (40.0)	3 (60.0)	0	12 (80.0)	3 (20.0)	1	12 (80.0)	3 (20.0)
	Not available	No. (%)	1,512 (87.2)	222 (12.8)	49 (12.8)	586 (86.3)	93 (13.7)	18 (86.3)	553 (88.2)	74 (11.8)	14 (87.2)	1,139 (87.2)	167 (12.8)	32	1,139 (87.2)	167 (12.8)
	Yes	No. (%)	61 (82.4)	13 (17.6)	0	31 (77.5)	9 (22.5)	0	33 (80.5)	8 (19.5)	0	64 (79.0)	17 (21.0)	0	64 (79.0)	17 (21.0)
	No	No. (%)	5,540 (82.0)	1,217 (18.0)	306 (18.0)	2,670 (82.1)	584 (17.9)	151 (82.5)	2,211 (17.5)	469 (17.5)	107 (82.3)	4,881 (82.3)	1,053 (17.7)	258	4,881 (82.3)	1,053 (17.7)
	Not applicable	No. (%)	13 (86.7)	2 (13.3)	1	10 (100.0)	0 (0)	1	2 (40.0)	3 (60.0)	0	12 (80.0)	3 (20.0)	1	12 (80.0)	3 (20.0)
	Not available	No. (%)	1,401 (80.9)	331 (19.1)	51 (19.1)	542 (79.8)	137 (20.2)	18 (20.2)	517 (17.5)	110 (82.5)	14 (81.1)	1,059 (81.1)	247 (18.9)	32	1,059 (81.1)	247 (18.9)

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow-ups includes patients who died in-hospital

Table 5.10.4 Overall outcomes for patients with STEMI by pre-admission aspirin use, NCVD-ACS Registry, 2020–2021

Year	2018–2019				2020				2021				2020–2021		
	Outcome	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing		
In-hospital	Yes	No. (%)	1,232 (89.5)	145 (10.5)	0	621 (86.0)	101 (14.0)	0	462 (89.5)	54 (10.5)	0	1,083 (87.5)	155 (12.5)	0	
	No	No. (%)	6,647 (90.9)	663 (9.1)	0	3,046 (90.8)	307 (9.2)	0	2,630 (91.5)	245 (8.5)	0	5,676 (91.1)	552 (8.9)	0	
	Missing	No. (%)	227 (91.2)	22 (8.8)	0	73 (93.6)	5 (6.4)	0	77 (92.8)	6 (7.2)	0	150 (93.2)	11 (6.8)	0	
30-day	Yes	No. (%)	1,175 (87.0)	176 (13.0)	26	591 (83.2)	119 (16.8)	12	441 (86.1)	71 (13.9)	4	1,032 (84.5)	190 (15.5)	16	
	No	No. (%)	6,170 (88.1)	836 (11.9)	304	2,822 (88.1)	380 (11.9)	151	2,461 (89.1)	302 (10.9)	112	5,283 (88.6)	682 (11.4)	263	
	Missing	No. (%)	215 (89.6)	25 (10.4)	9	71 (91.0)	7 (9.0)	0	73 (91.3)	7 (8.8)	3	144 (91.1)	14 (8.9)	3	
1-year	Yes	No. (%)	1,049 (77.7)	302 (22.4)	26	530 (74.8)	179 (25.2)	13	399 (77.9)	113 (22.1)	4	929 (76.1)	292 (23.9)	17	
	No	No. (%)	5,775 (82.7)	1,212 (17.4)	323	2,656 (83.1)	540 (16.9)	157	2,298 (83.2)	463 (16.8)	114	4,954 (83.2)	1,003 (16.8)	271	
	Missing	No. (%)	191 (79.6)	49 (20.4)	9	67 (85.9)	11 (14.1)	0	66 (82.5)	14 (17.5)	3	133 (84.2)	25 (15.8)	3	

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow-ups includes patients who died in-hospital

Table 5.11.1 Overall outcomes for patients with NSTEMI/UA by PCI at admission, NCVD-ACS Registry, 2020–2021

Year	2018–2019				2020				2021				2020–2021		
	Outcome	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing		
Yes	No. (%)	1,781 (97.8)	41 (2.3)	0	705 (97.5)	18 (2.5)	0	782 (98.4)	13 (1.6)	0	1,487 (98.0)	31 (2.0)	0		
No	No. (%)	8,324 (95.1)	433 (4.9)	1	2,597 (93.1)	193 (6.9)	0	2,605 (93.9)	169 (6.1)	0	5,202 (93.5)	362 (6.5)	0		
Not applicable	No. (%)	18 (100.0)	0 (0)	0	10 (100.0)	0 (0)	0	20 (95.2)	1 (4.8)	0	30 (96.8)	1 (3.2)	0		
Not available	No. (%)	987 (92.2)	84 (7.8)	0	146 (85.9)	24 (14.1)	0	227 (90.1)	25 (9.9)	0	373 (88.4)	49 (11.6)	0		
Yes	No. (%)	1,736 (96.1)	71 (3.9)	15	696 (96.8)	23 (3.2)	4	765 (96.7)	26 (3.3)	4	1,461 (96.8)	49 (3.2)	8		
No	No. (%)	7,975 (92.5)	649 (7.5)	134	2,481 (90.4)	262 (9.6)	47	2,481 (90.7)	253 (9.3)	40	4,962 (90.6)	515 (9.4)	87		
Not applicable	No. (%)	17 (94.4)	1 (5.6)	0	10 (100.0)	0 (0)	0	20 (95.2)	1 (4.8)	0	30 (96.8)	1 (3.2)	0		
Not available	No. (%)	947 (89.1)	116 (10.9)	8	138 (82.1)	30 (17.9)	2	218 (87.2)	32 (12.8)	2	356 (85.2)	62 (14.8)	4		
Yes	No. (%)	1,636 (90.6)	169 (9.4)	17	651 (90.5)	68 (9.5)	4	719 (91.0)	71 (9.0)	5	1,370 (90.8)	139 (9.2)	9		
No	No. (%)	6,989 (81.1)	1,627 (18.9)	142	2,133 (77.8)	607 (22.2)	50	2,118 (77.6)	612 (22.4)	44	4,251 (77.7)	1,219 (22.3)	94		
Not applicable	No. (%)	17 (94.4)	1 (5.6)	0	10 (100.0)	0 (0)	0	19 (90.5)	2 (9.5)	0	29 (93.5)	2 (6.5)	0		
Not available	No. (%)	846 (79.6)	217 (20.4)	8	117 (69.6)	51 (30.4)	2	188 (75.2)	62 (24.8)	2	305 (73.0)	113 (27.0)	4		

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow-ups includes patients who died in-hospital

Table 5.11.2 Overall outcomes for patients with NSTEMI/UA by coronary artery bypass graft at admission, NCVD-ACS Registry, 2020–2021

Year	2018–2019				2020				2021				2020–2021		
	Outcome	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing		
Yes	No. (%)	154 (95.1)	8 (4.9)	0	56 (96.6)	2 (3.4)	0	49 (98.0)	1 (2.0)	0	105 (97.2)	0 (2.8)	3	0	
No	No. (%)	9,973 (95.6)	457 (4.4)	1	3,261 (93.8)	214 (6.2)	0	3,328 (94.8)	181 (5.2)	0	6,589 (94.3)	395 (5.7)	0	0	
Not applicable	No. (%)	29 (96.7)	1 (3.3)	0	11 (100.0)	0 (0)	0	23 (92.0)	2 (8.0)	0	34 (94.4)	2 (5.6)	0	0	
Not available	No. (%)	954 (91.2)	92 (8.8)	0	130 (87.2)	19 (12.8)	0	234 (90.7)	24 (9.3)	0	364 (89.4)	43 (10.6)	0	0	
Yes	No. (%)	145 (90.6)	15 (9.4)	2	56 (96.6)	2 (3.4)	0	48 (96.0)	2 (4.0)	0	104 (96.3)	4 (3.7)	0	0	
No	No. (%)	9,594 (93.3)	695 (6.8)	142 (9.5)	3,133 (8.5)	290 (8.5)	52 (9.2)	3,190 (7.9)	274 (7.9)	45 (7.9)	6,323 (91.8)	564 (8.2)	97	97	
Not applicable	No. (%)	26 (92.9)	2 (7.1)	2	11 (100.0)	0 (0)	0	22 (88.0)	3 (12.0)	0	33 (91.7)	3 (8.3)	0	0	
Not available	No. (%)	910 (87.9)	125 (12.1)	11 (84.5)	125 (15.5)	23 (15.5)	1 (87.2)	224 (87.2)	33 (12.8)	1 (86.2)	349 (86.2)	56 (13.8)	2	2	
Yes	No. (%)	132 (83.5)	26 (16.5)	4	50 (86.2)	8 (13.8)	0	43 (86.0)	7 (14.0)	0	93 (86.1)	15 (13.9)	0	0	
No	No. (%)	8,509 (82.8)	1,772 (17.2)	150 (80.2)	2,743 (19.8)	677 (19.8)	55 (80.6)	2,789 (19.4)	670 (19.4)	50 (80.4)	5,532 (80.4)	1,347 (19.6)	105	105	
Not applicable	No. (%)	25 (89.3)	3 (10.7)	2	10 (90.9)	1 (9.1)	0	20 (80.0)	5 (20.0)	0	30 (83.3)	6 (16.7)	0	0	
Not available	No. (%)	822 (79.4)	213 (20.6)	11	108 (73.0)	40 (27.0)	1	192 (74.7)	65 (25.3)	1	300 (74.1)	105 (25.9)	2	2	

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow-ups includes patients who died in-hospital

Table 5.11.3 Overall outcomes for patients with NSTEMI/UA by pre-admission aspirin use, NCVD-ACS Registry, 2020–2021

Year	2018–2019				2020				2021				2020–2021		
	Outcome	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing	Alive	Died	Missing		
In-hospital															
Yes	No. (%)	5,797 (95.9)	251 (4.2)	0	1,727 (93.8)	115 (6.2)	0	1,649 (94.9)	88 (5.1)	0	3,376 (94.3)	203 (5.7)	0		
No	No. (%)	4,842 (94.4)	287 (5.6)	1	1,664 (93.4)	118 (6.6)	0	1,886 (94.5)	109 (5.5)	0	3,550 (94.0)	227 (6.0)	0		
Missing	No. (%)	471 (95.9)	20 (4.1)	0	67 (97.1)	2 (2.9)	0	99 (90.0)	11 (10.0)	0	166 (92.7)	13 (7.3)	0		
30-day															
Yes	No. (%)	5,603 (93.3)	401 (6.7)	44	1,673 (91.4)	157 (8.6)	12	1,584 (91.9)	140 (8.1)	13	3,257 (91.6)	297 (8.4)	25		
No	No. (%)	4,625 (92.0)	401 (8.0)	104	1,585 (91.0)	156 (9.0)	41	1,802 (91.8)	160 (8.2)	33	3,387 (91.5)	316 (8.5)	74		
Missing	No. (%)	447 (92.7)	35 (7.3)	9	67 (97.1)	2 (2.9)	0	98 (89.1)	12 (10.9)	0	165 (92.2)	14 (7.8)	0		
1-year															
Yes	No. (%)	4,902 (81.7)	1,098 (18.3)	48	1,440 (78.7)	389 (21.3)	13	1,376 (79.8)	348 (20.2)	13	2,816 (79.3)	737 (20.7)	26		
No	No. (%)	4,204 (83.7)	817 (16.3)	109	1,415 (81.4)	324 (18.6)	43	1,581 (80.8)	376 (19.2)	38	2,996 (81.1)	700 (18.9)	81		
Missing	No. (%)	382 (79.4)	99 (20.6)	10	56 (81.2)	13 (18.8)	0	87 (79.1)	23 (20.9)	0	143 (79.9)	36 (20.1)	0		

Note: 1. The outcome data is derived based on data matching with the National Death Register; 2. Outcome at follow ups includes patients who died in-hospital

Table 5.12.1 Prognostic factors for death in hospital among STEMI patients, NCVD-ACS Registry, 2020–2021 (Multivariable Analysis)

Year	Factors	2018–2019				2020–2021			
		N	Hazard ratio	95% CI	^ p-value	N	Hazard ratio	95% CI	^ p-value
	Age group, years								
20–<40 (ref)	614	1.00							
40–<60	3,575	0.91	0.60	1.37	0.640				
≥60	2,723	1.13	0.75	1.71	0.559				
	Gender								
Male (ref)	5,979	1.00							
Female	933	1.26	1.01	1.57	0.041				
	Ethnic group*								
Malay (ref)	3,927								
Chinese	1,256								
Indian	1,072								
*Others	657								
	Killip classification								
I (ref)	4,163	1.00							
II	1,111	1.27	0.94	1.72	0.123	900	0.98	0.70	1.38
III	358	2.30	1.64	3.22	<0.001	294	1.92	1.34	2.75
IV	1,033	5.54	4.31	7.13	<0.001	1,015	4.84	3.75	6.26
Not stated/inadequately described/missing	247	1.99	1.26	3.14	0.003	447	1.51	1.02	2.23
	PCI								
No (ref)	3,128								
Yes	3,784								

Year	Factors	2018–2019			2020–2021				
		N	Hazard ratio	95% CI	^p-value	N	Hazard ratio	95% CI	^p-value
Cardiac catheterisation									
No (ref)	2,473	1.00				3,905	1.00		
Yes	4,439	0.62	0.52	0.74	<0.001	2,269	0.42	0.31	0.58 < 0.001
TIMI risk score									
0–2 (ref)	2,119	1.00				1,961	1.00		
3–4	2,263	2.78	1.75	4.38	<0.001	2,045	2.31	1.50	3.56 < 0.001
5–7	1,991	5.02	3.16	7.98	<0.001	1,765	4.57	2.97	7.02 < 0.001
>7	539	9.00	5.48	14.75	<0.001	403	6.45	4.05	10.25 < 0.001
Fibrinolytic therapy									
Not given (ref)	2,735	1.00							
Given	4,177	0.85	0.72	1.00	0.053				
Smoking									
Never (ref)	2,148	1.00				1,972	1.00		
Former (quit >30 days)	1,070	0.91	0.70	1.18	0.460	860	0.96	0.75	1.23 0.730
Current (any tobacco use within last 30 days)	3,326	0.83	0.67	1.04	0.106	3,041	0.76	0.62	0.92 0.005
Unknown	368	1.52	1.15	2.01	0.003	301	1.36	0.99	1.86 0.058
Family history of premature cardiovascular disease									
No (ref)	5,179					712	1.00		
Yes	691					4,813	0.70	0.52	0.96 0.024
Unknown	1,042					649	1.32	1.03	1.70 0.031

Year	Factors	2018–2019				2020–2021			
		N	Hazard ratio	95% CI	^p-value	N	Hazard ratio	95% CI	^p-value
Dyslipidaemia									
No (ref)	4,257	1.00							
Yes	1,856	0.97	0.81	1.17	0.744				
Unknown	799	1.42	1.07	1.90	0.017				
Hypertension									
No (ref)	2,900					3,231	1.00		
Yes	3,488					2,743	1.27	1.05	1.52
Unknown	524					200	1.26	0.72	0.012
Diabetes									
No (ref)	3,759	1.00							
Yes	2,593	1.45	1.22	1.73	<0.001				
Unknown	560	0.94	0.64	1.40	0.766				
Heart failure									
No (ref)	6,558								
Yes	126								
Unknown	228								

* Others' includes Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, other Malaysian, and Foreigner

^using Cox regression with backward stepwise variable selection

Table 5.12.2 Prognostic factors for death within 30 days among STEMI patients, NCVD-ACS Registry, 2018–2019 (Multivariable analysis)

Year	2018–2019						2020–2021		
	Factors	N	Hazard ratio	95% CI	^p-value	N	Hazard ratio	95% CI	^p-value
Age group, years									
20–<40 (ref)	614	1.00							
40–<60	3,575	0.96	0.66	1.38	0.820				
≥60	2,723	1.24	0.86	1.79	0.260				
Gender									
Male (ref)	5,979	1.00							
Female	933	1.26	1.03	1.53	0.022				
Ethnic group									
Malay (ref)	3,927					3,688	1.00		
Chinese	1,256					1,054	1.20	0.99	1.45 0.068
Indian	1,072					920	0.84	0.67	1.05 0.127
* Others	657					512	1.14	0.82	1.57 0.434
Killip classification code									
I (ref)	4,163	1.00				3,518	1.00		
II	1,111	1.21	0.94	1.55	0.136	900	1.19	0.89	1.57 0.242
III	358	2.01	1.50	2.67	<0.001	294	1.83	1.32	2.53 <0.001
IV	1,033	4.18	3.38	5.17	<0.001	1,015	4.45	3.54	5.58 <0.001
Not stated/inadequately described	247	1.63	1.09	2.41	0.016	447	1.51	1.07	2.12 0.019

Year	Factors	2018–2019				2020–2021			
		N	Hazard ratio	95% CI	^p-value	N	Hazard ratio	95% CI	^p-value
	PCI								
No (ref)	3,128					3,365	1.00		
Yes	3,784					2,809	1.69	1.27	2.25 <0.001
	Cardiac catheterisation								
No (ref)	2,473	1.00				3,905	1.00		
Yes	4,439	0.62	0.53	0.72	<0.001	2,269	0.48	0.37	0.63 <0.001
	TIMI risk score								
0–2 (ref)	2,119	1.00				1,961	1.00		
3–4	2,263	2.29	1.62	3.23	<0.001	2,045	1.69	1.20	2.38 0.003
5–7	1,991	3.88	2.72	5.52	<0.001	1,765	3.33	2.37	4.67 <0.001
>7	539	7.23	4.92	10.65	<0.001	403	4.50	3.08	6.57 <0.001
	Fibrinolytic therapy								
Not given (ref)	2,735	1.00							
Given	4,177	0.83	0.71	0.96	0.013				
	Smoking								
Never (ref)	2,148	1.00				1,972	1.00		
Former (quit >30 days)	1,070	0.92	0.73	1.16	0.491	860	0.96	0.77	1.20 0.720
Current (any tobacco use within last 30 days)	3,326	0.89	0.73	1.08	0.250	3,041	0.75	0.63	0.90 0.002
Unknown	368	1.59	1.23	2.06	<0.001	301	1.33	1.00	1.77 0.054

Year	Factors	N	2018-2019			2020-2021		
			Hazard ratio	95% CI	^p-value	N	Hazard ratio	95% CI
Family history of premature cardiovascular disease								
No (ref)	5,179	1.00				712	1.00	
Yes	691	0.79	0.58	1.07	0.122	4,813	0.74	0.56
Unknown	1,042	0.83	0.67	1.02	0.082	649	1.14	0.89
Dyslipidaemia								
No (ref)	4,257	1.00				1,968	1.00	
Yes	1,856	1.04	0.88	1.22	0.663	3,848	0.91	0.77
Unknown	799	1.40	1.07	1.83	0.013	358	1.42	1.01
Hypertension								
No (ref)	2,900					3,231	1.00	
Yes	3,488					2,743	1.31	1.09
Unknown	524					200	0.86	0.39
Diabetes								
No (ref)	3,759	1.00				2,438	1.00	
Yes	2,593	1.45	1.24	1.69	<0.001	3,507	1.22	1.04
Unknown	560	0.89	0.62	1.28	0.540	229	1.09	0.55
Heart failure								
No (ref)	6,558	1.00						
Yes	126	1.06	0.74	1.51	0.771			
Unknown	228	1.85	1.32	2.60	<0.001			

*Others' includes Orang Asli, Kadazan, Melanau, Murni, Bajau, Bidayuh, Iban, other Malaysian, and Foreigner
 ^using Cox regression with backward stepwise variable selection

Table 5.12.3 Prognostic factors for death within one year among STEMI patients, NCVD-ACS Registry, 2020–2021 (Multivariable analysis)

Year	Factors	2018–2019				2020–2021			
		N	Hazard ratio	95% CI	^p-value	N	Hazard ratio	95% CI	^p-value
Age group, years									
20–<40 (ref)	614	1.00				550	1.00		
40–<60	3,575	1.03	0.77	1.39	0.836	3,161	1.48	1.04	2.10
≥60	2,723	1.39	1.03	1.88	0.033	2,378	1.71	1.20	2.44
Gender									
Male (ref)	5,979								
Female	933								
Ethnic group									
Malay (ref)	3,927								
Chinese	1,256								
Indian	1,072								
*Others	657								
Killip classification code									
I (ref)	4,163	1.00				3,474	1.00		
II	1,111	1.30	1.08	1.56	0.006	894	1.12	0.91	1.38
III	358	1.75	1.39	2.19	<0.001	292	1.78	1.39	2.28
IV	1,033	3.03	2.55	3.59	<0.001	1,010	3.13	2.62	3.74
Not stated/inadequately described	247	1.75	1.31	2.33	<0.001	419	1.27	0.97	1.66
									0.080

Year	Factors	2018-2019				2020-2021			
		N	Hazard ratio	95% CI	^ p-value	N	Hazard ratio	95% CI	^ p-value
	PCI								
No (ref)	3,128	1.00				2,771	1.00		
Yes	3,784	0.74	0.61	0.89	0.002	3,318	1.74	1.40	2.16 <0.001
	Cardiac catheterisation								
No (ref)	2,473	1.00				3,845	1.00		
Yes	4,439	0.77	0.64	0.93	0.006	2,244	0.60	0.49	0.74 <0.001
	TIMI risk score								
0-2 (ref)	2,119	1.00				1,921	1.00		
3-4	2,263	2.09	1.64	2.67	<0.001	2,021	2.00	1.54	2.58 <0.001
5-7	1,991	3.36	2.61	4.33	<0.001	1,746	3.44	2.64	4.49 <0.001
>7	539	6.45	4.84	8.59	<0.001	401	4.76	3.48	6.50 <0.001
	Fibrinolytic therapy								
Not given (ref)	2,735	1.00				4,137	1.00		
Given	4,177	0.78	0.69	0.88	<0.001	1,952	0.79	0.69	0.91 0.001
	Smoking								
Never (ref)	2,148	1.00				1,939	1.00		
Former (quit >30 days)	1,070	0.89	0.75	1.05	0.169	849	1.05	0.88	1.25 0.591
Current (any tobacco use within last 30 days)	3,326	0.85	0.73	0.97	0.018	3,011	0.85	0.73	0.98 0.027
Unknown	368	1.25	1.01	1.54	0.038	290	1.31	1.02	1.69 0.036

Year	Factors	2018–2019				2020–2021			
		N	Hazard ratio	95% CI	^p-value	N	Hazard ratio	95% CI	^p-value
Family history of premature cardiovascular disease									
No (ref)	5,179					701	1.00		
Yes	691					4,752	0.68	0.54	0.86
Unknown	1,042					636	0.94	0.76	1.15
Dyslipidaemia									
No (ref)	4,257	1.00				1,932	1.00		
Yes	1,856	0.93	0.82	1.07	0.311	3,802	0.93	0.81	1.07
Unknown	799	1.29	1.03	1.61	0.027	355	1.47	1.09	1.97
Hypertension									
No (ref)	2900					3,178	1.00		
Yes	3488					2,715	1.36	1.17	1.58
Unknown	524					196	0.98	0.49	1.96
Diabetes									
No (ref)	3759	1.00				2,405	1.00		
Yes	2593	1.53	1.34	1.74	<0.001	3,460	1.23	1.08	1.40
Unknown	560	1.10	0.70	1.73	0.688	224	1.02	0.55	1.91
Heart failure									
No (ref)	6558	1.00							
Yes	126	1.14	0.86	1.52	0.369				
Unknown	228	1.41	1.07	1.86	0.016				

* Others' includes Orang Asli, Kadazan, Melanau, Murni, Bajau, Bidayuh, Iban, other Malaysian, and Foreigner
 ^using Cox regression with backward stepwise variable selection

Table 5.12.4 Prognostic factors for death in hospital among NSTEMI/UA patients, NCVD-ACS Registry, 2020–2021 (Multivariable analysis)

Year	2018–2019				2020–2021				
	Factors	N	Hazard ratio	95% CI	^p-value	N	Hazard ratio	95% CI	^p-value
Age group, years									
20–<40 (ref)	553	1.00				408	1.00		
40–60	4,241	4.33	1.60	11.72	0.004	2,841	1.63	0.79	0.185
≥60	5,545	5.60	2.08	15.09	0.001	4,095	2.05	1.00	0.051
Gender									
Male (ref)	7,502								
Female	2,837								
Ethnic group									
Malay (ref)	4,897					3,619	1.00		
Chinese	2,726					1,867	1.22	0.98	1.53
Indian	1,839					1,291	0.74	0.56	0.99
*Others	877					567	0.71	0.39	1.32
Killip classification code									
I (ref)	4,618	1.00				2,112	1.00		
II	628	3.30	2.20	4.97	0.009	369	3.17	1.88	5.36
III	322	13.17	9.30	18.67	<0.001	173	8.93	5.50	<0.001
IV	218	40.62	29.54	55.85	<0.001	221	20.99	14.03	<0.001
Not stated/inadequately described	4,553	2.67	2.01	3.56	<0.001	4,469	2.34	1.62	3.38

Year	Factors	2018–2019				2020–2021			
		N	Hazard ratio	95% CI	^p-value	N	Hazard ratio	95% CI	^p-value
	PCI								
No (ref)	8,552								
Yes	1,787								
	Cardiac catheterisation								
No (ref)	7,010	1.00			4,745	1.00			
Yes	3,329	0.41	0.32	0.54	<0.001	2,599	0.25	0.18	0.35
									<0.001
	TIMI risk score								
0–2 (ref)	3,397	1.00				1,849	1.00		
3–4	6,272	1.81	1.41	2.33	<0.001	4,826	1.36	1.01	1.81
5–7	670	3.35	2.33	4.82	<0.001	669	1.91	1.28	2.85
									0.040
	Smoking								
Never (ref)	4,742					3,519	1.00		
Former (quit >30 days)	2,128					1,392	0.95	0.72	1.26
Current (any tobacco use within last 30 days)	2,325					1,727	1.06	0.81	1.40
Unknown	1,144					706	1.58	1.20	2.08
									0.001
	Family history of premature cardiovascular disease								
No (ref)	7,032								
Yes	1,387								
Unknown	1,920								

Year	Factors	2018–2019				2020–2021			
		N	Hazard ratio	95% CI	^p-value	N	Hazard ratio	95% CI	^p-value
Dyslipidaemia									
No (ref)	4,932	1.00				3,310	1.00		
Yes	4,835	0.67	0.54	0.82	<0.001	3,727	0.77	0.62	0.96
Unknown	572	1.64	1.22	2.20	0.001	307	1.85	1.18	2.90
Hypertension									
No (ref)	2,574								
Yes	7,459								
Unknown	306								
Diabetes									
No (ref)	4,725					3,459	1.00		
Yes	5,196					3,702	1.54	1.24	1.93
Unknown	418					183	0.91	0.44	1.87
Heart failure									
No (ref)	9,308								
Yes	746								
Unknown	285								

* Others' includes Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, other Malaysian, and Foreigner
 ^using Cox regression with backward stepwise variable selection

Table 5.12.5 Prognostic factors for death within 30 days among NSTEMI/UA patients, NCVD-ACS Registry, 2020–2021 (Multivariable analysis)

Year	2018–2019				2020–2021				
	Factors	N	Hazard ratio	95% CI	^p-value	N	Hazard ratio	95% CI	^p-value
Age group, years									
20–<40 (ref)	553	1.00				408	1.00		
40–<60	4,241	2.71	1.39	5.30	0.003	2,841	2.38	1.17	4.85 0.017
≥60	5,545	3.97	2.04	7.71	<0.001	4,095	3.13	1.54	6.37 0.002
Gender									
Male (ref)	7,502								
Female	2,837								
Ethnic group									
Malay (ref)	4,897					3,619	1.00		
Chinese	2,726					1,867	1.25	1.04	1.51 0.020
Indian	1,839					1,291	0.79	0.62	1.00 0.046
*Others	877					567	0.94	0.61	1.45 0.782
Killip classification code									
I (ref)	4,618	1.00				2,112	1.00		
II	628	2.01	1.48	2.74	<0.001	369	3.49	2.40	5.07 <0.001
III	322	6.43	4.88	8.45	<0.001	173	7.17	4.91	10.49 <0.001
IV	218	19.63	15.35	25.10	<0.001	221	13.09	9.45	18.14 <0.001
Not stated/inadequately described	4,553	1.68	1.38	2.04	<0.001	4,469	1.90	1.44	2.50 <0.001

Year	Factors	2018–2019				2020–2021			
		N	Hazard ratio	95% CI	^p-value	N	Hazard ratio	95% CI	^p-value
	PCI								
No (ref)	8,552								
Yes	1,787								
	Cardiac catheterisation								
No (ref)	7,010	1.00			4,745	1.00			
Yes	3,329	0.53	0.44	0.65	<0.001	2,599	0.38	0.30	4.77 <0.001
	TIMI risk score								
0–2 (ref)	3,397	1.00				1,849	1.00		
3–4	6,272	1.62	1.33	1.98	<0.001	4,826	1.40	1.09	1.79 0.008
5–7	670	2.46	1.81	3.35	<0.001	669	1.79	1.27	2.52 0.001
	Smoking								
Never (ref)	4,742					3,519	1.00		
Former (quit >30 days)	2,128					1,392	0.85	0.67	1.08 0.186
Current (any tobacco use within last 30 days)	2,325					1,727	1.03	0.82	1.29 0.816
Unknown	1,144					706	1.49	1.18	1.89 0.001
	Family history of premature cardiovascular disease								
No (ref)	7,032								
Yes	1,387								
Unknown	1,920								

Year	Factors	2018–2019				2020–2021			
		N	Hazard ratio	95% CI	^p-value	N	Hazard ratio	95% CI	^p-value
Dyslipidaemia									
No (ref)	4,932	1.00				3,310	1.00		
Yes	4,835	0.64	0.55	0.76	<0.001	3,727	0.79	0.66	0.94
Unknown	572	1.47	1.07	2.01	0.016	307	1.59	1.05	2.41
Hypertension									
No (ref)	2,574								
Yes	7,459								
Unknown	306								
Diabetes									
No (ref)	4,725	1.00				3,459	1.00		
Yes	5,196	1.31	1.11	1.54	0.002	3,702	1.50	1.25	1.80
Unknown	418	0.99	0.63	1.55	0.948	183	0.75	0.38	1.49
Heart failure									
No (ref)	9,308	1.00				6,618	1.00		
Yes	746	1.41	1.14	1.75	0.002	532	1.44	1.14	1.82
Unknown	285	0.96	0.62	1.48	0.846	194	1.07	0.66	1.74

*Others' includes Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, other Malaysian, and Foreigner
^using Cox regression with backward stepwise variable selection

Table 5.12.6 Prognostic factors for death within one year among NSTEMI/UA patients, NCVD-ACS Registry, 2020–2021 (Multivariable analysis)

Year	2018–2019				2020–2021				^p-value
	Factors	N	Hazard ratio	95% CI	^p-value	N	Hazard ratio	95% CI	
Age group, years									
20–<40 (ref)	553	1.00				396	1.00		
40–<60	4,241	2.18	1.47	3.21	<0.001	2,670	1.52	1.03	2.26 0.037
≥60	5,545	3.49	2.37	5.14	<0.001	3,846	2.43	1.64	3.60 <0.001
Gender									
Male (ref)	7,502								
Female	2,837								
Ethnic group									
Malay (ref)	4,897	1.00				3,276	1.00		
Chinese	2,726	1.00	0.90	1.12	0.955	1,779	1.10	0.97	1.25 0.135
Indian	1,839	0.81	0.71	0.93	0.002	1,212	0.79	0.68	0.93 0.004
*Others	877	0.91	0.75	1.01	0.311	545	0.80	0.61	1.06 0.116
Killip classification code									
I (ref)	4,618	1.00				1,921	1.00		
II	628	2.03	1.71	2.42	<0.001	328	2.19	1.73	2.77 <0.001
III	322	3.64	3.01	4.41	<0.001	155	4.03	3.12	5.20 <0.001
IV	218	9.41	7.79	11.38	<0.001	182	5.56	4.38	7.06 <0.001
Not stated/inadequately described	4,553	1.42	1.27	1.59	<0.001	4,326	1.19	1.02	1.39 0.024

Year	Factors	2018–2019				2020–2021			
		N	Hazard ratio	95% CI	^ p-value	N	Hazard ratio	95% CI	^ p-value
	PCI								
No (ref)	8,552	1.00				5,423	1.00		
Yes	1,787	0.80	0.65	0.98	0.027	1,489	0.66	0.53	0.83 <0.001
	Cardiac catheterisation								
No (ref)	7,010	1.00				4,426	1.00		
Yes	3,329	0.65	0.56	0.75	<0.001	2,486	0.62	0.52	0.73 <0.001
	TIMI risk score								
0–2 (ref)	3,397	1.00				1,730	1.00		
3–4	6,272	1.55	1.36	1.76	<0.001	4,544	1.24	1.05	1.46 0.010
5–7	670	2.10	1.72	2.55	<0.001	638	1.50	1.20	1.87 <0.001
	Smoking								
Never (ref)	4,742					3,314	1.00		
Former (quit >30 days)	2,128					1,312	0.95	0.82	1.11 0.533
Current (any tobacco use within last 30 days)	2,325					1,615	1.00	0.86	1.17 0.987
Unknown	1,144					671	1.28	1.08	1.53 0.006
	Family history of premature cardiovascular disease								
No (ref)	7,032	1.00				5,037	1.00		
Yes	1,387	0.73	0.62	0.87	<0.001	769	0.73	0.58	0.91 0.006
Unknown	1,920	0.89	0.79	1.01	0.070	1,106	1.16	1.00	1.35 0.055

Year	Factors	2018–2019				2020–2021			
		N	Hazard ratio	95% CI	^ p-value	N	Hazard ratio	95% CI	^ p-value
Dyslipidaemia									
No (ref)	4,932	1.00							
Yes	4,835	0.73	0.66 – 0.81	<0.001					
Unknown	572	1.19	0.95 – 1.49	0.131					
Hypertension									
No (ref)	2,574								
Yes	7,459								
Unknown	306								
Diabetes									
No (ref)	4,725	1.00				3,271	1.00		
Yes	5,196	1.51	1.36 – 1.68	<0.001	3,487	1.55	1.37 – 1.75	<0.001	
Unknown	418	1.12	0.83 – 1.52	0.459	154	1.01	0.62 – 1.63	0.975	
Heart failure									
No (ref)	9,308	1.00				6,242	1.00		
Yes	746	1.64	1.43 – 1.88	<0.001	507	1.58	1.35 – 1.85	<0.001	
Unknown	285	1.13	0.85 – 1.50	0.403	163	0.88	0.60 – 1.29	0.883	

*Others' includes Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, other Malaysian, and Foreigner
 ^using Cox regression with backward stepwise variable selection

APPENDIX A: DATA MANAGEMENT

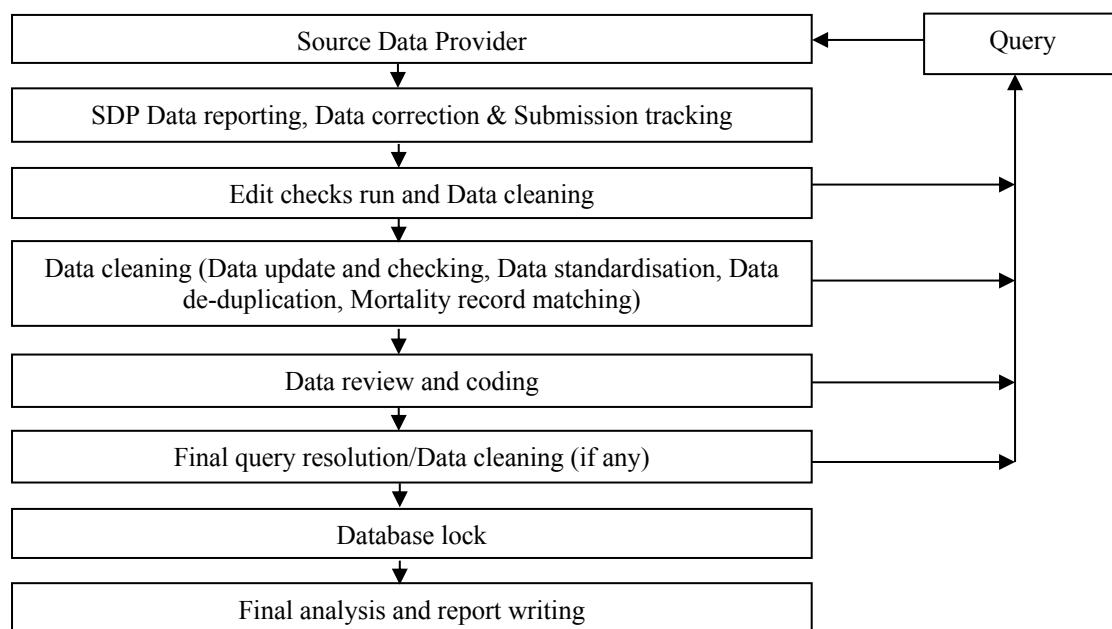
The National Cardiovascular Disease Database (NCVD) Registry maintains two different databases for cardiovascular diseases, i.e. for Acute Coronary Syndrome and Percutaneous Coronary Intervention. Data is stored in SQL Server due to the high volume of data accumulated throughout the years.

Data sources

Source Data Providers (SDPs) of the NCVD-ACS Registry comprise all major hospitals who have participated in the registry, throughout Malaysia.

Data flow process

This section describes the data management flow process of the National Cardiovascular Disease Database Registry.



SDP Data reporting, Data correction and Submission tracking

Data reporting by SDP is done via Web Applications e-Case Report Forms.

There are a number of data security features that are designed into the NCVD web application (eCRF) such as web owner authentication, 2-level user authentication (user name and password authentication and a Short Messaging System (SMS) of authorisation code via mobile phone authentication), access control, data encryption, session management to automatically log off the application, audit trail and data backup and disaster recovery plan.

For ACS, SDP submits NCVD-ACS notification form on an ad-hoc basis whenever a patient is admitted for an ACS event. The SDP also submits follow-up data at 30-days and 12-months post notification date intervals. An alert page containing all the overdue submissions for follow-up at 30-days and 12-months post notification date is available to users to ease submissions tracking.

Prior to registering a patient record, a verification process is done by using the search functionality to search if the patient already exists in the registry. The application will still detect a duplicate record if the same MyKad number is keyed in, should the step of searching a patient is not done. This step is

done to avoid duplicate records. For patients whose records already exist in the database, the SDP needs to only add a new ACS notification as the basic patient particulars are pre-filled, based on existing patient information in the database. The ACS and PCI registries share the same patient list.

There are a few in-built functionalities at the data entry page that serve to improve data quality. One such function is auto calculation function to reduce human error, in calculations. There is also an inconsistency check functionality that disables certain fields and prompts the user, if the value entered is out of range.

A real time data query page is also available via the web application to enable users to check which non-compulsory data is missing, out of range or inconsistent. A link is provided on the data query page for user to click on to resolve the query for the particular patient.

Real time reports are also provided in the web application. The aggregated data reports are presented in the form of tables and graphs. The aggregated data reports are typically presented in two forms, one as the centre's own aggregated data report and another as the registry's overall aggregated data report. In this way, the centre can be compared with the overall registry's average.

Data download function is also available in the web application to allow users to download their own centre's data from all the forms entered, for their own further analyses. The data are downloadable as Text - tab delimited (.txt) format, Microsoft excel workbook (.xls) and as Comma separated value (.csv) format.

Edit checks run and Data cleaning

Edit checks are performed periodically by the registry manager to identify missing compulsory data, out of range values, inconsistency of data, invalid values and errors with de-duplication. Data cleaning is then performed based on the results of edit checks. Data update and data checking of the dataset is performed when there is a query of certain fields as and when necessary. It could be due to a request by the user, correction of data based on checking via data query in eCRF or after receiving results for preliminary data analysis. During data standardisation, missing data are handled based on derivation from existing data. Data de-duplication is also performed to identify duplicate records in the database that might have been missed out by SDPs. Finally, record matching against the National Death Register (*Jabatan Pendaftaran Negara*) is performed to verify the mortality status of the patient.

Final query resolution / data cleaning / database lock

A final edit check run is performed to ensure that the data is clean. All queries will be resolved before the database is locked, to ensure data quality and integrity. The final dataset is subsequently locked and exported to the statistician for analysis.

Data analysis

Please refer to the Statistical Analysis Method section for further details.

Data release policy

One of the primary objectives of the registry is to make data available to the cardiovascular healthcare providers, policy makers and researchers. The registry would appreciate if users acknowledge the registry for the use of the data. Any request for data that requires a computer run must be made in writing (by e-mail, fax, or registered mail) accompanied with a Data Release Application Form and signed Data Release Agreement Form. These requests need prior approval by the Advisory Board before data can be released.

Registry ICT infrastructure and Data centre

The operation of the NCVD is supported by an extensive ICT infrastructure to ensure operational efficiency and effectiveness.

The NCVD subscribes to co-location service with a high availability and highly secured Internet Data Centre at Cyberjaya in order to provide the NCVD with quality assured Internet Hosting services and state-of-the-art physical and logical security features without having to invest in costly data centre setup internally. Physical security features implemented includes state-of-the-art security features such as anti-static raised flooring, fire protection with smoke and heat alarm warning system, biometric security access, video camera surveillance system, uninterrupted power supply, environmental control, etc.

Other managed security services include patch management of the servers, antivirus signature monitoring and update, firewall traffic monitoring and intrusion detection, security incidence response, data backup service done on a daily, weekly and monthly basis, data recovery simulation to verify that the backup works, which is done at least once yearly, network security scan and penetration test done on a half-yearly basis, security policy maintenance, maintenance and monitoring of audit trail of user access, etc. Managed system services such as usage and performance report, operating system maintenance and monitoring, bandwidth monitoring, and systems health monitoring are also provided.

APPENDIX B: STATISTICAL METHODS

The statistical analysis described below was conducted on data collected in the NCVD-ACS Registry from year 2020 to 2021.

The inclusion criteria were:

- All patients who had ACS procedures performed between 2020 and 2021
- All patients who are aged 20 years and above

The exclusion criteria were:

- All patients with unknown or missing ACS stratum, ethnic group and age
- All patients with the final diagnosis of either stable angina or non-cardiac condition

Statistical methods for most chapters involved descriptive analysis. For categorical and discrete data, we calculated frequency and percentage. For continuous data, the mean, standard deviation (SD), median, minimum and maximum values were calculated. An exception to this was the survival analyses, which were performed to evaluate the prognostic factors for in-hospital, 30-day and 1-year mortality in Chapter 5. In univariate analysis, variables with the p value less than 0.25 and clinically significance were included in the models. Backward stepwise method was used to obtain the preliminary main effect model.

For all variables, percentages were only calculated for categories listed in the CRFs.

Missing data were reported for categorical, discrete and continuous data. No statistical imputation was applied to replace missing data. However, to avoid illogical ranges in continuous data, outliers were set to missing data based on acceptable range, as presented in a table below:

Fields	Acceptable Range
Age	≥20 years
Height	130–250 cm
Weight	30–200 kg
BMI	14–50 kgm ⁻²
WHR	0.7–3.0
Waist Circumference	70–130 cm
Hip Circumference	80–200 cm
Fasting Blood Glucose	3.0–50.0 mmol/L
Systolic Blood Pressure	50–270 mmHg
Diastolic Blood Pressure	10–170 mmHg
Pulse Pressure	1–160 mmHg
Heart Rate	20–200 beats/min
Number of Distinct Episodes of Angina	≤20 (0 = no episodes)
Total Cholesterol	2.0–25.0 mmol/L
HDL-C	0.5–5.0 mmol/L
LDL-C	0.5–20.0 mmol/L
HbA1c	4.0–32.0 %
Triglycerides	0.5–15.0 mmol/L

Fields	Acceptable Range
Left Ventricular Ejection Fraction	5.0–90.0 %
Total Admission	1–100 days
Number of Days in CCU	1–30 days
Number of Days in ICU/CICU	1–30 days
Pain-to-Needle time	15–1440 minutes
Door-to-Needle Time	1–1440 minutes
Door-to-Balloon Time	1–720 minutes

The data was analysed based on the focus of each report chapter as described below.

Patient Characteristics

Patient characteristics were summarised in Chapter 2. Number of patients in each year was determined based on their admission year due to ACS. The results presented the patients' age, gender, ethnicity, coronary risk factors, co-morbidities and other variables in the CRF.

Cardiac Presentation

Chapter 3 includes an analysis of the clinical presentations, baseline investigations, electrocardiography, clinical diagnosis at admission, fibrinolytic therapy and invasive therapeutic procedures. An analysis of STEMI time-to-treatment was performed in which we excluded any illogical values of time-to-treatment (such as negative values for pain-to-needle time and door-to-balloon time).

Treatment

Summary of treatments is presented in Chapter 4. The summary of treatments includes duration of hospitalisation, admission days in CCU and ICU, types of treatment and pharmacological therapy given during admission.

Clinical Outcomes

The patient outcomes at discharge, 30-day and 1-year follow-up are presented by their ACS stratum, by pre-morbid conditions and types of treatment. In order to evaluate the status of alive or deceased, individual patients were matched against the status provided by the Malaysian National Registration Department (NRD). Patients were considered as alive at the time of follow-up if the date of their death was not provided in the NRD dataset. Prognostic factors for in-hospital, 30-day and 1-year mortality were also presented in Chapter 5.

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APPENDIX E: CASE REPORT FORM

NATIONAL CARDIOVASCULAR DISEASE DATABASE (ACS REGISTRY) NOTIFICATION FORM

For NCVD Use only:

Centre: _____

ID: _____

Instruction: Complete this form to notify all ACS admissions at your centre to NCVD ACS Registry. Where check boxes are provided, please check () one or more boxes. Where radio buttons are provided, check () only one option.

A. Reporting Centre: _____**B. Date of Admission (dd/mm/yy):**

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SECTION 1: DEMOGRAPHICS

1. Patient Name: (as per MyKad / Other ID)					2. Hospital RN:																																																															
3. Identification Card Number:	MyKad: <table border="1" style="display: inline-table; width: 100px; height: 20px;"><tr><td> </td><td> </td></tr></table> - <table border="1" style="display: inline-table; width: 100px; height: 20px;"><tr><td> </td><td> </td></tr></table> - <table border="1" style="display: inline-table; width: 100px; height: 20px;"><tr><td> </td><td> </td></tr></table>																																																															Old IC No.:				
Other ID Document No.:	→			Specify type: (eg. Passport, armed force ID)																																																																
4. Gender:	<input type="radio"/> Male	<input type="radio"/> Female			5. Nationality:	<input type="radio"/> Malaysian	<input type="radio"/> Non Malaysian																																																													
6a. Date of birth: (dd/mm/yy)	<table border="1" style="display: inline-table; width: 100px; height: 20px;"><tr><td> </td><td> </td></tr></table> (write DOB as 01/01/yy if age is known)																							6b. Age on admission:	<table border="1" style="display: inline-table; width: 100px; height: 20px;"><tr><td> </td><td> </td></tr></table> (auto calculate)																																											
7. Ethnic Group:	<input type="radio"/> Malay	<input type="radio"/> Punjabi	<input type="radio"/> Melanau	<input type="radio"/> Bidayuh			<input type="radio"/> Foreigner, specify country of origin:																																																													
	<input type="radio"/> Chinese	<input type="radio"/> Orang Asli	<input type="radio"/> Murut	<input type="radio"/> Iban																																																																
	<input type="radio"/> Indian	<input type="radio"/> Kadazan Dusun	<input type="radio"/> Bajau	<input type="radio"/> Other Malaysian, specify:																																																																
8. Contact Number:	(1):			(2):																																																																

SECTION 2 : STATUS BEFORE EVENT

1. Smoking status:	<input type="radio"/> Never	<input type="radio"/> Former (quit >30 days)	<input type="radio"/> Current (any tobacco use within last 30 days)	<input type="radio"/> Not Available
2. Status of Aspirin use:	<input type="radio"/> Never	<input type="radio"/> Used less than 7 days previously	<input type="radio"/> Used more than or equal to 7 days previously	
3. Medical history:				
a) Dyslipidaemia	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Not known	g) Chronic Angina (≥ 2 weeks) <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known
b) Hypertension	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Not known	h) New onset angina (<2 weeks) <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known
c) Diabetes	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Not known	i) History of heart failure <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known
	↓	<input type="checkbox"/> OHA <input type="checkbox"/> Insulin <input type="checkbox"/> Non pharmacology therapy/diet therapy		j) Chronic lung disease <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known
d) Family history of premature cardiovascular disease <i>(1st degree relative with either MI or stroke; <55 y/o if Male & <65 y/o if Female)</i>	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Not known	k) Chronic renal disease <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known <i>[>200 $\mu\text{mol}/(\text{micromol})$ serum creatinine]</i>
e) Myocardial Infarction History	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Not known	l) Cerebrovascular disease <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known
f) Documented CAD	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Not known	m) Peripheral vascular disease <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known
				n) None of the above <input type="checkbox"/>

SECTION 3 : ONSET

1a. Date of onset of ACS symptoms:	<table border="1" style="display: inline-table; width: 100px; height: 20px;"><tr><td> </td><td> </td></tr></table> (dd/mm/yy)																					1b. Time of onset of ACS symptoms: (24 hr format)	<table border="1" style="display: inline-table; width: 100px; height: 20px;"><tr><td> </td><td> </td></tr></table> (hh:mm)																					<input type="checkbox"/> Not Available
2a. Date patient presented:	<table border="1" style="display: inline-table; width: 100px; height: 20px;"><tr><td> </td><td> </td></tr></table> (dd/mm/yy)																					2b. Time patient presented: (24 hr format)	<table border="1" style="display: inline-table; width: 100px; height: 20px;"><tr><td> </td><td> </td></tr></table> (hh:mm)																					<input type="checkbox"/> Not Available
3. Was patient transferred from another centre?	<input type="radio"/> Yes <input type="radio"/> No																																											

SECTION 4 : CLINICAL PRESENTATION & EXAMINATION

1. Number of distinct episodes of angina in past 24h:		<input type="checkbox"/> Not Available	2. Heart rate at presentation:	<table border="1" style="display: inline-table; width: 100px; height: 20px;"><tr><td> </td><td> </td></tr></table> beats / min																				
3. Blood pressure at presentation:	a. Systolic:	mmHg	b. Diastolic:	mmHg																				
4. Anthropometric: <i>(if not measured, please tick as 'Not Available')</i>	a. Height:	(cm)	<input type="checkbox"/> Not Available	BMI: WHR:	<i>(auto calculate)</i> <i>(auto calculate)</i>																			
	b. Weight:	(cm)	<input type="checkbox"/> Not Available																					
	c. Waist Circumference:	(cm)	<input type="checkbox"/> Not Available																					
	d. Hip Circumference:	(cm)	<input type="checkbox"/> Not Available																					
5. Killip classification:	<input type="radio"/> Killip I <i>(no clinical signs of heart failure)</i> <input type="radio"/> Killip II <i>(rales or crackles in the lungs, an S₃, and elevated jugular venous pressure)</i> <input type="radio"/> Killip III <i>(frank acute pulmonary oedema)</i> <input type="radio"/> Killip IV <i>(cardiogenic shock or hypotension [measured as systolic blood pressure <90 mmHg], and evidence of peripheral vasoconstriction [oliguria, cyanosis or sweating])</i> <input type="radio"/> Not Applicable/ Not Available																							

a. Patient Name:		b. Reporting Centre:	
c. Identification Card No.:		d. Hospital RN:	

SECTION 5: BASELINE INVESTIGATION (values obtained within 48 hours from admission)

		Absolute Value	Unit	Reference Upper Limit	Check (✓) if not done
1. Peak CK-MB:			Unit/L		<input type="radio"/> Not done
2. Peak CK:			Unit/L		<input type="radio"/> Not done
3. Peak Troponin:	a. T n T:	<input type="radio"/> +ve <input type="radio"/> -ve OR <input type="text"/>	ng/mL or mcg/L		<input type="radio"/> Not done
	b. T n I:	<input type="radio"/> +ve <input type="radio"/> -ve OR <input type="text"/>	ng/mL or mcg/L		<input type="radio"/> Not done
4. Lipid Profile (Fasting):	a. Total Cholesterol:		mmol/L		<input type="radio"/> Not done
	b. HDL-C:		mmol/L		<input type="radio"/> Not done
	c. LDL-C:		mmol/L		<input type="radio"/> Not done
	d. Triglyceride:		mmol/L		<input type="radio"/> Not done
5. Fasting blood glucose:			mmol/L		<input type="radio"/> Not done
6. HbA1c			mmol/L		<input type="radio"/> Not done
7. Left Ventricular Ejection Fraction:		%			<input type="radio"/> Not done

SECTION 6: ELECTROCARDIOGRAPHY (ECG)

1. ECG abnormalities type: <i>(Check one or more boxes)</i>	<input type="checkbox"/> ST-segment elevation ≥ 1mm (0.1mV) in ≥ 2 contiguous limb leads <input type="checkbox"/> ST-segment elevation ≥ 2mm (0.2mV) in ≥ 2 contiguous frontal leads or chest leads <input type="checkbox"/> ST-segment depression ≥ 0.5mm (0.05mV) in ≥ 2 contiguous leads <input type="checkbox"/> T-wave inversion ≥ 1mm (0.1mV)	<input type="checkbox"/> Bundle branch block (BBB) <input type="checkbox"/> Non-specific <input type="checkbox"/> None <input type="checkbox"/> Not stated/ inadequately described
2. ECG abnormalities location: <i>(Check one or more boxes)</i>	<input type="checkbox"/> Inferior leads: II, III, aVF <input type="checkbox"/> Anterior leads: V1 to V4 <input type="checkbox"/> Lateral leads: I, aVL, V5 to V6 <input type="checkbox"/> True posterior: V1, V2	<input type="checkbox"/> Right ventricle: ST elevation in lead V4R <input type="checkbox"/> None <input type="checkbox"/> Not stated/ inadequately described

SECTION 7: CLINICAL DIAGNOSIS AT ADMISSION

1. Acute Coronary Syndrome stratum:	<input type="radio"/> STEMI	<input type="radio"/> NSTEMI	<input type="radio"/> Unstable Angina (UA)
2a. TIMI Risk Score for NSTEMI/ UA:	<input type="text"/> (auto calculate)	2b. TIMI Risk Score for STEMI:	<input type="text"/> (auto calculate)

SECTION 8: FIBRINOLYTIC THERAPY *(Following Section is applicable for STEMI only)*

1. Fibrinolytic therapy status:	<input type="radio"/> Given at this centre → <i>(Please proceed to number 2 and 3 below)</i> <input type="radio"/> Given at another centre prior to transfer here <input type="radio"/> Not given—proceeded directly to primary angioplasty <input type="radio"/> Not given—missed thrombolysis <input type="radio"/> Not given—patient refusal <input type="radio"/> Not given—contraindicated
Fill in (2) and (3) only if you check 'Given at this centre' in no. (1) above	<input type="radio"/> Streptokinase <input type="radio"/> Others (t-PA, r-PA, TNK t-PA)
2. Fibrinolytic drug used:	<input type="radio"/> Streptokinase <input type="radio"/> Others (t-PA, r-PA, TNK t-PA)
3. Intravenous fibrinolytic therapy:	a. Date: <input type="text"/> / <input type="text"/> / <input type="text"/> b. Time: <i>(in 24 hr format)</i> <input type="text"/> : <input type="text"/> <i>(hh:mm)</i>
4. Door to Needle time:	<input type="text"/> (minutes) <i>Auto calculated—(time patient presented to time of fibrinolytic therapy given)</i>

SECTION 9: INVASIVE THERAPEUTIC PROCEDURES

1. Did patient undergo cardiac catheterization on this admission at your centre?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> No-transferred to another centre
2. Did patient undergo Percutaneous Coronary intervention (PCI) on this admission?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not applicable a. For STEMI → <input type="radio"/> Urgent → <input type="radio"/> Primary PCI <input type="radio"/> Rescue PCI <input type="radio"/> Facilitated PCI <input type="radio"/> Elective → <input type="radio"/> Routine hospital practice? <input type="radio"/> Yes <input type="radio"/> No b. For NSTEMI/UA → <input type="radio"/> Urgent <input type="radio"/> Elective → <input type="radio"/> Routine hospital practice? <input type="radio"/> Yes <input type="radio"/> No
3. First balloon inflation (for STEMI-Urgent PCI only):	a. Date: <input type="text"/> / <input type="text"/> / <input type="text"/> b. Time: <i>(in 24 hr format)</i> <input type="text"/> : <input type="text"/> <i>(hh:mm)</i>
4. Door to balloon time (for STEMI-Urgent PCI only):	<input type="text"/> (minutes) <i>Auto calculated—(time patient presented to time of first angio balloon inflation)</i>
5. Did patient undergo CABG on this admission?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not applicable

a. Patient Name:		b. Reporting Centre:	
c. Identification Card No.:		d. Hospital RN:	

SECTION 10: PHARMACOLOGICAL THERAPY

Group	Given during admission		Given at discharge	
1. ASA	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
2. Ticlopidine	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
3. Clopidogrel	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
4. Prasugrel	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
5. Ticagrelor	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
6. Other antiplatelet	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
7. GP receptor inhibitor	<input type="radio"/> Yes	<input type="radio"/> No		
8. Unfrac heparin	<input type="radio"/> Yes	<input type="radio"/> No		
9. LMWH	<input type="radio"/> Yes	<input type="radio"/> No		
10. Fondaparinux	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
11. Oral anticoagulant (eg. Warfarin)	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
12. Beta blocker	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
13. ACE inhibitor	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
14. Angiotensin II receptor blocker	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
15. Statin	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
16. Other lipid lowering agent	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
17. Diuretics	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
18. Calcium antagonist	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
19. Oral hypoglycaemic agent	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
20. Insulin	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No
21. Anti-arrhythmic agent	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input type="radio"/> No

SECTION 11 : IN HOSPITAL OUTCOME

1. Number of overnight stays:	a. CCU (days):	
	b. ICU/CICU (days):	
2. Outcome:	<input type="radio"/> Discharged	a) Date: (dd/mm/yy) <input type="text"/> / <input type="text"/> / <input type="text"/>
	<input type="radio"/> Transferred to another centre	a) Date: (dd/mm/yy) <input type="text"/> / <input type="text"/> / <input type="text"/> b) Name of centre: <input type="text"/>
	<input type="radio"/> Died	a) Date: (dd/mm/yy) <input type="text"/> / <input type="text"/> / <input type="text"/> b) Cause of death: <input type="radio"/> Cardiac <input type="radio"/> Non Cardiac
	3. Total number of overnight stays:	(auto calculate)
4. Final diagnosis at discharge:	<input type="radio"/> STEMI <input type="radio"/> NSTEMI <input type="radio"/> UA <input type="radio"/> Non Cardiac / Non ACS	
5. Bleeding Complication: (TIMI criteria)	<input type="radio"/> Major (<i>Any intracranial bleed or other bleeding $\geq 5\text{g/dL}$ Hb drop</i>) <input type="radio"/> Minor (<i>Non-CNS bleeding with 3-5g/dL Hb drop</i>) <input type="radio"/> Minimal (<i>Non-CNS bleeding, non-overt bleeding, < 3g/dL Hb drop</i>) <input type="radio"/> None <input type="radio"/> Not stated / Inadequately described	

**NATIONAL CARDIOVASCULAR DISEASE DATABASE (ACS REGISTRY)
FOLLOW UP FORM**

Instruction: This form is to be completed at patient follow-up at specified duration (30 days / 12 months) after admission. Following may be performed by telephone interview or clinic visit.

For NCVD use only:

Centre:

ID

Where check boxes are provided, please check () one or more boxes. Where radio buttons are provided, check () only one option.

A. Reporting Centre:			
B. Patient Name:			
C. Identification Card Number:	MyKad: <input type="text"/> - <input type="text"/> - <input type="text"/>	Old IC: <input type="text"/>	
	Other ID document No.: <input type="text"/>	Specify type: (eg. Passport, armed force ID)	
D. Date of Follow Up:	<input type="text"/> (dd/mm/yy)	E. Type of Follow Up:	<input type="radio"/> 30 days <input type="radio"/> 12 months

SECTION 1: OUTCOME

1. Outcome	<input type="radio"/> Alive			
	<input type="radio"/> Died	→ a. Date of death: <input type="text"/> (dd/mm/yy)	b. Cause of death: <input type="radio"/> Cardiac <input type="radio"/> Non Cardiac <input type="radio"/> Other, specify: _____	
	<input type="radio"/> Transferred to another centre	→ a. Date : <input type="text"/> (dd/mm/yy)	b. Name of centre: <input type="text"/>	
	<input type="radio"/> Lost to Follow Up	→ a. Date : <input type="text"/> (dd/mm/yy)		
2. Cardiovascular Readmission:	<input type="checkbox"/> ACS	→ a. Date: <input type="text"/> (dd/mm/yy)	b. ACS Stratum: <input type="radio"/> STEMI <input type="radio"/> NSTEMI <input type="radio"/> UA	
	<input type="checkbox"/> Heart Failure	→ a. Date : <input type="text"/> (dd/mm/yy)		
	<input type="checkbox"/> Revascularization	→ a. Type: <input type="checkbox"/> PCI Date: <input type="text"/> (dd/mm/yy) <input type="checkbox"/> CABG Date: <input type="text"/> (dd/mm/yy)		→ <input type="radio"/> Urgent <input type="radio"/> Elective
	<input type="checkbox"/> Stroke	→ a. Date : <input type="text"/> (dd/mm/yy)		→ <input type="radio"/> Urgent <input type="radio"/> Elective

SECTION 2: CLINICAL HISTORY AND EXAMINATION (OPTIONAL)

1. Angina status: (CCS classification)	<input type="radio"/> None <input type="radio"/> CCS I <input type="radio"/> CCS II <input type="radio"/> CCS III <input type="radio"/> CCS IV	
2. Functional capacity: (NYHA classification)	<input type="radio"/> None <input type="radio"/> NYHA I <input type="radio"/> NYHA II <input type="radio"/> NYHA III <input type="radio"/> NYHA IV	
3. Blood Pressure:	a. Systolic: mmHg	b. Diastolic: mmHg
4. Anthropometric:	a. Weight: kg	b. Waist circumference: cm
	c. Hip circumference: cm	

SECTION 3: INVESTIGATIONS (OPTIMAL)

1. Lipid Profile:	a. Total Cholesterol: mmol/L	b. HDL-C: mmol/L
	c. LDL-C: mmol/L	d. Triglycerides: mmol/L
2. Left Ventricular Ejection Fraction:	%	3. HbA1c mmol/L

SECTION 4: MEDICATION (OPTIONAL)

Group	Given	Group	Given
1. ASA	<input type="radio"/> Yes <input type="radio"/> No	12. Beta Blocker	<input type="radio"/> Yes <input type="radio"/> No
2. Ticlopidine	<input type="radio"/> Yes <input type="radio"/> No	13. ACE inhibitor	<input type="radio"/> Yes <input type="radio"/> No
3. Clopidogrel	<input type="radio"/> Yes <input type="radio"/> No	14. Angiotensin II receptor blocker	<input type="radio"/> Yes <input type="radio"/> No
4. Prasugrel	<input type="radio"/> Yes <input type="radio"/> No	15. Statin	<input type="radio"/> Yes <input type="radio"/> No
5. Ticagrelor	<input type="radio"/> Yes <input type="radio"/> No	16. Other lipid lowering agent	<input type="radio"/> Yes <input type="radio"/> No
6. Other antiplatelet	<input type="radio"/> Yes <input type="radio"/> No	17. Diuretics	<input type="radio"/> Yes <input type="radio"/> No
7. GP receptor inhibitor	<input type="radio"/> Yes <input type="radio"/> No	18. Calcium antagonists	<input type="radio"/> Yes <input type="radio"/> No
8. Heparin	<input type="radio"/> Yes <input type="radio"/> No	19. Oral Hypoglycaemic Agent	<input type="radio"/> Yes <input type="radio"/> No
9. LMWH	<input type="radio"/> Yes <input type="radio"/> No	20. Insulin	<input type="radio"/> Yes <input type="radio"/> No
10. Fondaparinux	<input type="radio"/> Yes <input type="radio"/> No	21. Anti-arrhythmic agent	<input type="radio"/> Yes <input type="radio"/> No
11. Oral anticoagulant agent (eg. Warfarin)	<input type="radio"/> Yes <input type="radio"/> No		

SECTION 5: REHABILITATION AND COUNSELLING (OPTIONAL)

1. Was patient referred to cardiac rehabilitation?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Applicable
2. Has patient stopped smoking?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Applicable