

*National Cardiovascular Disease Database*

# ANNUAL REPORT OF THE NCVD-PCI REGISTRY YEAR 2010-2012



**NCVD PCI Chairman**  
**Dr. Rosli Mohd Ali**

**Editors :**  
**Dr. Wan Azman Wan Ahmad**  
**Dr. Sim Kui-Hian**



**CRC**  
MINISTRY OF HEALTH MALAYSIA  
*Research that matters to patients*

**NATIONAL CARDIOVASCULAR DISEASE  
DATABASE  
(NCVD)**

**Annual Report of the  
Percutaneous Coronary Intervention (PCI)  
Registry  
2010 - 2012**

Editors:

Wan Azman Wan Ahmad  
Sim Kui-Hian

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**National Cardiovascular Disease Database**

c/o National Heart Association of Malaysia  
Heart House, Level 1, Medical Academies of Malaysia  
210 Jalan Tun Razak  
50400 Kuala Lumpur  
MALAYSIA

Tel : (603) 4023 1500  
Fax : (603) 4023 9400  
Email : [ncvd@malaysianheart.org](mailto:ncvd@malaysianheart.org)  
Website : <http://www.acrm.org.my/ncvd>

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- National Heart Association of Malaysia (NHAM)
- Health Informatics Centre, Ministry of Health Malaysia
- Clinical Research Centre (CRC), Ministry of Health Malaysia
- The members of various expert panels
- Our source data providers

## **PREFACE**

The annual report of the NCVD-PCI registry year 2010-2012 is the third report since the inception of the PCI Registry in 2007. This report not only provides information on the interventional cardiology practice in the major cardiac centres in Malaysia but also information on the patients who underwent the interventional procedures. All these information are crucial fact rather than the usual guestimate for the practicing cardiac care staff (cardiologists, technicians, nurses, radiographers), the hospital administrators be it private or public, the policy makers, the patients advocates, the pharmaceutical and insurance industries not just for academic interest but also improvement on quality of care, better delivery of service and planning.

There are enormous data collected and this is not possible without the countless hours of medical and nursing staff uploading the information online from individual sites throughout Malaysia. Thank you very much for your effort, commitment, perseverance, enthusiasm for the last 8 years; they were truly beyond the call of duty. Our sincere gratitude to the writing committee headed by Prof Dr Wan Azman Wan Ahmad, spending many weekends pouring through the data, analyzing the figures and making the data into meaningful information. Thank you as your effort and commitment is truly a passion. Our sincere thanks to the NCVD secretariat in the Heart House for quietly working behind the scene, consistently following through and coordinating with the site investigators, the site coordinators, the writing committee, the statisticians, etc. Without you, the registry and report will not come together.

We strongly encourage everyone involved in the registry to fully utilize the enormous data in the registry and to publish in medical journals so that the information can be shared world wide; Malaysia can truly contribute to the practice of cardiology to the world.

Lastly, we would like to thank the National Heart Association of Malaysia, Clinical Research Centre (CRC), Ministry of Health Malaysia, Health Informatics Centre, Ministry of Health Malaysia and the medical industries for the unrestricted grant to make this costly registry a reality.

Thank you

**Prof Dr Sim Kui-Hian**  
Chairman  
NCVD Governance Board

**Tan Sri Dato' Seri Dr Robaayah Zambahari**  
Co-chairman  
NCVD Governance Board



## **FOREWORD**

This is the 3<sup>rd</sup> report for the NCVD-PCI Registry accounting for the period from 2010-2012. This report gives us an opportunity to compare the baseline characteristics, presentation, lesion complexity, device use and clinical outcome between these two periods 2007-2009 and 2010-2012.

The mean age for PCI remains approximately the same i.e. 57 years. Our PCI population is still younger than in the Western countries. Of concern 72% have three or more cardiovascular risk factors. Males still predominate females by 4:1.

In this report, more procedures were for stable coronary artery disease (CAD) as compared to acute coronary syndrome (65.2% vs. 56.4%). This may not be a true reflection as some stable CAD cases were PCI for patients post AMI. The door to balloon time has remained the same with a median of 90 min but what appears troubling is the delay in transferring patients to a hospital with catheterization lab facilities (180 min in 2007-2009 vs. 220 min in 2010-2012).

We continue to perform a high number of complex lesions (Type B2 and C lesions: 58.8% in 2007-2009 vs. 61.6% in 2010-2012). The use of drug eluting stent (DES) has increased over the years from 53.0% to 64.0%, reflecting the change in practice and possibly due to reduced cost of DES.

The procedural success rate remains high (96.8% vs. 95.3%). The mortality rate has continued to remain low both for in-hospital (1.8% vs. 1.1%) and 30-day outcome (1.7% vs. 2.3%), for the two periods 2007-2009 and 2010-2012.

I would like to thank Prof Dr Wan Azman and his team for the excellent work undertaking the writing of this report, NCVD secretariat for managing the registry and to all the participating hospitals and their staff for sending in data.

And I look forward to discussions that will be generated from this publication and future publications.

Thank you.

**Dato' Dr Rosli Mohd Ali**

Chairman

NCVD-Percutaneous Coronary Intervention (PCI) Registry



## NOTE FROM THE WRITING COMMITTEE CHAIRMAN

NCVD-PCI registry was established in 2007. Two reports were previously published; Annual report of the NCVD-PCI registry year 2007 and Annual report of the NCVD-PCI Registry year 2007-2009. The findings from this registry were published in the International Journal of Cardiology 2013 title 'The Journey of Malaysian NCVD-PCI Registry: A summary of three years report'. In this report 'Annual report of the NCVD-PCI Registry year 2010 -2012', data from 24459 patients, 26483 procedures and 34873 lesions over six year period from 16 data source providers were analysed. The data obtained in 2010-2012 (13750 patients) were compared with data obtained in 2007-2009 (10709 patients).

This is an overview of the four chapters of this report:

**Patient characteristics:** Patient characteristics remained similar between the 2007-2009 and 2010-2012 period. The mean age of patients who underwent PCI in Malaysia was 57.4 years (SD 10.3) which were much younger than those in Western registries. Nearly all patients had at least one known cardiovascular risk factor (98.0%) with high prevalence of hypertension and diabetes.

**Clinical Presentations and Investigations:** Almost 10.0% of patients who underwent PCI had chronic kidney disease (CKD) stage 3 to 5. About 40.0% of all cases had a history of ACS, and 59.6% of these were STEMI. The median door-to-balloon time for Primary PCI in STEMI was consistent at 90 minutes from the years 2007-2012

**Procedural Details:** Majority of PCI were performed as elective case (87.3%). Radial approach is becoming more popular (37.7% in 2007-2009 to 46.9% in 2010-2012). About 46.5% of PCI were performed in patients with multi-vessel disease. Complex lesions constituted a total of 62.7% among all lesions and 31.4% of the lesions had high risk characteristics. In stent restenosis and stent thrombosis were uncommon. There is an increasing trend of DES use (64%).

**Outcome:** The overall mortality rate for PCI is comparable to other registries. There were low incidences of periprocedural complications. Mortality prognosticators were older patients, clinical presentation & status of PCI, diabetics, females and hypertensive.

Another remarkable achievement and progress of our NCVD registry is collaboration with other registries. An example is 'The Asia-Pacific Evaluation of Cardiovascular Therapies (ASPECT) - Improving the quality of Cardiovascular Care in the Asia Pacific Region' published in the International Journal of Cardiology this year.

Last but not least, I would like to warmly welcome the newly appointed Writing Committee Members on board into our expanding team. We would like to thank everyone for their tireless effort, admirable determination and consistency in providing these data. In spite of various challenges and setbacks faced, we can be proud that we have achieved our goal to have our own national database. This forms a reliable benchmark to chart our performance through the years. The information collected and analyzed is essential as we aspire towards excellence through continuous improvement.

Thank you.

Yours sincerely,

**Prof Dr. Wan Azman Wan Ahmad**

On behalf of the NCVD Writing Committee Members



## ABBREVIATIONS

ACE	Angiotensin Converting Enzyme
ACS	Acute Coronary Syndrome
BMI	Body Mass Index
CABG	Coronary Artery Bypass Graft
CAD	Coronary Artery Disease
CATH	Catheterization
CCU	Coronary Care Unit
CK	Creatinine Kinase
CK-MB	Creatinine Kinase, MB Isoenzyme
CRC	Clinical Research Centre
CRF	Case Report Form
CVD	Cardiovascular Disease
DBMS	Database Management System
EDC	Electronic Data Capture
GP	Glycoprotein
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
IT/IS	Information Technology and Information System
JPN	Jabatan Pendaftaran Negara
LAB	Laboratory
LDL	Low Density Lipoprotein
LVEF	Left Ventricular Ejection Fraction
MOH	Ministry of Health
NCVD	National Cardiovascular Disease Database
NHAM	National Heart Association of Malaysia
NSTEMI	Non ST- Elevation Myocardial Infarction
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

## NCVD-PERCUTANEOUS CORONARY INTERVENTION (PCI) REGISTRY

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## CONTENTS

ACKNOWLEDGEMENTS.....	i
PREFACE.....	ii
FOREWORD.....	iii
NOTE FROM THE WRITING COMMITTEE CHAIRMAN.....	iv
ABBREVIATIONS.....	v
NCVD-PERCUTANEOUS CORONARY INTERVENTION (PCI) REGISTRY.....	vi
CONTENTS.....	vii
LIST OF TABLES.....	viii - xi
PATIENT CHARACTERISTICS.....	3
CLINICAL PRESENTATIONS & INVESTIGATIONS.....	25
PROCEDURAL SETTINGS .....	55
LESION CHARACTERISTICS.....	73
OUTCOME.....	105
APPENDIX A: DATA MANAGEMENT.....	128
APPENDIX B: STATISTICAL METHODS.....	131
APPENDIX C: PARTICIPATING CENTRE DIRECTORY.....	133
APPENDIX D: NOTE OF APPRECIATION.....	134
APPENDIX E: GLOSSARY.....	137
APPENDIX F: CASE REPORT FORM.....	141



## LIST OF TABLES

Table 2.1 Characteristics of patients who underwent PCI, NCVD-PCI Registry, 2007-2012....	6
Table 2.2 Distribution of patients by number of procedures, NCVD-PCI Registry, 2007-2012 .....	15
Table 2.3.1 Distribution of patients who underwent PCI, by SDP, NCVD-PCI Registry, 2007-2012 .....	15
Table 2.3.2 Distribution of PCI procedures performed by Source Data Providers (SDPs), NCVD-PCI Registry, 2007-2012.....	16
Table 2.4.1 Age-gender distribution of patients who underwent PCI, NCVD-PCI Registry, 2007-2012 .....	16
Table 2.4.2 Age-gender distribution of patients who underwent PCI, by ethnic group, NCVD-PCI Registry, 2007-2012 .....	17
Table 2.4.3 Age-gender distribution of patients who underwent PCI, by pre-morbid diabetes, NCVD-PCI Registry, 2007-2012.....	18
Table 2.4.4 Age-gender distribution of patients who underwent PCI, by pre-morbid hypertension, NCVD-PCI Registry, 2007-2012 .....	19
Table 2.4.5 Age-gender distribution of patients who underwent PCI, by pre-morbid dyslipidaemia, NCVD-PCI Registry, 2007-2012 .....	20
Table 2.4.6 Age-gender distribution of patients who underwent PCI, by family history of premature cardiovascular disease, NCVD-PCI Registry, 2007-2012 .....	21
Table 2.5.1 Presence of cumulative risk factors, NCVD-PCI Registry, 2007-2012.....	22
Table 2.5.2 Presence of cumulative risk factors by gender, NCVD-PCI Registry, 2007-2012 .....	22
Table 3.1 Patient clinical status at time of PCI procedure, NCVD-PCI Registry, 2007-2012..	28
Table 3.2.1 Time to treatment for STEMI, with transfer, by years, NCVD-PCI Registry, 2007-2012 .....	36
Table 3.2.2 Time to treatment for STEMI, without transfer, by years, NCVD-PCI Registry, 2007-2012 .....	37
Table 3.2.3 Summary of Time to treatment for STEMI, comparing patients with or without transfer, NCVD-PCI Registry, 2007-2012.....	38
Table 3.3 Comparison of heart rate according to PCI status, NCVD-PCI Registry, 2007-2012 .....	39
Table 3.4 Comparison of heart rate according to ACS subtypes, NCVD-PCI Registry, 2007-2012 .....	40

Table 3.5 Comparison of systolic blood pressure according to PCI status, NCVD-PCI Registry, 2007-2012.....	41
Table 3.6 Comparison of arterial blood pressure according to PCI status, NCVD-PCI Registry, 2007-2012 .....	41
Table 3.7 Comparison of TIMI risk index according to PCI status, NCVD-PCI Registry, 2007-2012 .....	42
Table 3.8 Comparison of ejection fraction according to PCI status, NCVD-PCI Registry, 2007-2012 .....	43
Table 3.9 Comparison of NYHA according to PCI status among patients with heart failure, NCVD-PCI Registry, 2007-2012.....	44
Table 3.10 Comparison of previous PCI according to PCI status, NCVD-PCI Registry, 2007-2012 .....	45
Table 3.11 Comparison of HbA1c according to PCI status, NCVD-PCI Registry, 2007-2012.....	45
Table 3.12 Comparison of baseline creatinine according to PCI status, NCVD-PCI Registry, 2007-2012 .....	46
Table 3.13 Comparison of GFR according to PCI status, NCVD-PCI Registry, 2007-2012 ..	47
Table 3.14 Comparison of TC according to PCI status, NCVD-PCI Registry, 2007-2012 .....	48
Table 3.15 Comparison of LDL according to PCI status, NCVD-PCI Registry, 2007-2012 ..	49
Table 3.16 Comparison of functional ischaemia according to PCI status, NCVD-PCI Registry, 2007-2012 .....	50
Table 3.17 Comparison of ECG according to ACS subtypes, NCVD-PCI Registry, 2007-2012 .....	51
Table 3.18 Comparison of IABP use according to ACS subtypes, NCVD-PCI Registry, 2007-2012 .....	51
 Table 4.1.1 PCI status of patients who underwent procedures, NCVD-PCI Registry, 2007-2012 .....	58
Table 4.1.2 Characteristics of PCI procedures performed, NCVD-PCI Registry, 2007-2012.....	59
Table 4.1.3 Comparison of STEMI and NSTEMI patients who received ad-hoc PCI, NCVD-PCI Registry, 2007-2012 .....	68
Table 4.1.4 Duration of Thienopyridine in patients who underwent PCI, NCVD-PCI Registry, 2007-2012 .....	69
Table 4.1.5 Access site of patients who underwent procedures, by PCI status, NCVD-PCI Registry, 2007-2012.....	70

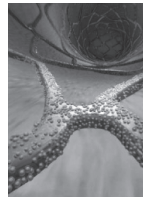
Table 4.2.1 Summary of location of lesions treated with Percutaneous Coronary Intervention, NCVD-PCI Registry, 2007-2012 .....	74
Table 4.2.2 Characteristics of lesions treated by PCI, NCVD-PCI Registry, 2007-2012 .....	76
Table 4.2.3 Prevalence of lesions according to American College of Cardiology (ACC) classifications, NCVD-PCI Registry, 2007-2012 .....	76
Table 4.2.4 Prevalence of high risk lesion type, NCVD-PCI Registry, 2007-2012 .....	77
Table 4.2.5 Comparison of TIMI flow grade by pre and post procedure, NCVD-PCI Registry, 2007-2012 .....	77
Table 4.2.6 Types of stents used, NCVD-PCI Registry, 2007-2012 .....	78
Table 4.2.7 Lesion characteristics for patients who undergone PCI, NCVD-PCI Registry, 2007-2012 .....	79
Table 4.2.8 Types of devices used during Percutaneous Coronary Intervention, NCVD-PCI Registry, 2007-2012 .....	82
Table 4.2.9 Types of post-procedure complications, NCVD-PCI Registry, 2007-2012 .....	83
Table 4.2.10 Types of prior stents used in in-stent restenosis, NCVD-PCI Registry, 2007-2012 .....	85
Table 4.2.11 Types of stents used in the in-stent restenosis, NCVD-PCI Registry, 2007-2012 .....	85
Table 4.2.12 Types of devices used in the in-stent restenosis, NCVD-PCI Registry, 2007-2012 .....	86
Table 4.2.13 Types of complications in post in-stent restenosis, NCVD-PCI Registry, 2007-2012 .....	86
Table 4.2.14 Types of lesions in left main stem procedure, NCVD-PCI Registry, 2007-2012 .....	88
Table 4.2.15 Characteristics of left main stem procedure, NCVD-PCI Registry, 2007-2012 .....	88
Table 4.2.16 Clinical presentation of left main stem, NCVD-PCI Registry, 2007-2012 .....	89
Table 4.2.17 TIMI flow prior to intervention in left main stem procedure, NCVD-PCI Registry, 2007-2012 .....	90
Table 4.2.18 Types of stents used in left main stem procedure, NCVD-PCI Registry, 2007-2012 .....	91
Table 4.2.19 Types of devices used in left main stem procedure, NCVD-PCI Registry, 2007-2012 .....	91
Table 4.2.20 Planned duration of dual antiplatelet therapy in left main stem procedure, NCVD-PCI Registry, 2007-2012 .....	92



Table 4.2.21 Lesion types in graft PCI, NCVD-PCI Registry, 2007-2012.....	92
Table 4.2.22 Summary of location of lesions treated with percutaneous coronary intervention and for lesion with description of CTO >3months only, NCVD-PCI Registry, 2007-2012....	94
Table 4.2.23 Characteristics of PCI procedures performed for lesion with description of CTO >3months only, NCVD-PCI Registry, 2007-2012.....	95
Table 4.2.24 Types of stents used for lesion with description of CTO >3months only, NCVD-PCI Registry, 2007-2012 .....	100
Table 4.2.25 Types of devices used during Percutaneous Coronary Intervention for lesion with description of CTO >3months only, NCVD-PCI Registry, 2007-2012.....	101
Table 4.2.26 Types of post procedure complications for lesion with description of CTO >3months only, NCVD-PCI Registry, 2007-2012.....	101
Table 4.2.27 Duration of Thienopyridine in patients who underwent PCI and lesion with description of CTO >3months only, NCVD-PCI Registry, 2007-2012.....	102
 Table 5.1 Summary of in-hospital outcome for patients who underwent PCI, NCVD-PCI Registry, 2007-2012.....	 106
Table 5.2 Overall outcome of patients who underwent PCI, NCVD-PCI Registry, 2007-2012 .....	111
Table 5.3 Overall outcome for patients who underwent PCI, by age group (years), NCVD-PCI Registry, 2007-2012.....	112
Table 5.4 Overall outcome of patients who underwent PCI, by gender, NCVD-PCI Registry, 2007-2012 .....	113
Table 5.5 Overall outcome of patients who underwent PCI, by pre-morbid diabetes, NCVD-PCI Registry, 2007-2012 .....	114
Table 5.6 Overall outcome of patients who underwent PCI, by pre-morbid hypertension, NCVD-PCI Registry, 2007-2012.....	115
Table 5.7 Overall outcome of patients who underwent PCI, by pre-morbid dyslipidaemia, NCVD-PCI Registry, 2007-2012.....	116
Table 5.8 Overall outcome of patients who underwent PCI, by PCI status, NCVD-PCI Registry, 2007-2012.....	117
Table 5.9 Overall outcome of patients who underwent PCI, by acute coronary syndrome, NCVD-PCI Registry, 2007-2012.....	118
Table 5.10 Medication for patients who underwent PCI, NCVD-PCI Registry, 2007-2012..	119



Table 5.11 Cause of death of patients who underwent PCI, NCVD-PCI Registry, 2007-2012 .....	120
Table 5.12 Location of death of patients who underwent PCI, NCVD-PCI Registry, 2007-2009 .....	121
Table 5.13 Outcome at discharge of patients who developed cardiogenic shock peri-procedure, NCVD-PCI Registry, 2007-2012 .....	121
Table 5.14 Outcome at discharge, by post PCI TIMI flow, NCVD-PCI Registry, 2007-2012 .....	122
Table 5.15 Outcome at discharge, by contrast volume used, NCVD-PCI Registry, 2007-2012 .....	123
Table 5.16 Summary of 30-day readmission status of patients who underwent PCI, NCVD-PCI Registry, 2007-2012 (N = total no. of procedures for 30-day follow-up) .....	123
Table 5.17 Procedural complications and clinical outcomes, according to PCI status, NCVD-PCI Registry, 2007-2012 .....	124
Table 5.18 Heart rate at presentation versus outcome, NCVD-PCI Registry, 2007-2012 .....	125
Table 5.19 Heart rate at presentation versus length of stay, NCVD-PCI Registry, 2007-2012 .....	125
Table 5.20 Prognostic factors for in-hospital mortality among patients who underwent PCI, NCVD-PCI Registry, 2007-2012 .....	126
Table 5.21 Prognostic factors for 30-days mortality among patients who underwent PCI, NCVD-PCI Registry, 2007-2012 (Multivariable analysis) .....	127



## CHAPTER 1 : **PATIENT CHARACTERISTICS**

Alan Fong Yean Yip<sup>1</sup> • Liew Houng Bang<sup>2</sup> • Ong Tiong Kiam<sup>1</sup> • Sim Kui Hian<sup>3</sup>

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*1 Pusat Jantung Hospital Umum Sarawak, Sarawak*

*2 Hospital Queen Elizabeth II, Sabah*

*3 National Heart Association of Malaysia*





## PATIENT CHARACTERISTICS

Alan Fong Yean Yip<sup>1</sup>, Liew Hounng Bang<sup>2</sup>, Ong Tiong Kiam<sup>1</sup>, Sim Kui Hian<sup>3</sup>

*1 Pusat Jantung Hospital Umum Sarawak, Sarawak, 2 Hospital Queen Elizabeth II, Sabah,*

*3 National Heart Association of Malaysia*

### Summary

1. Patient characteristics remained similar between the 2007-2009 and 2010-2012 period.
2. Nearly all patients had at least one known cardiovascular risk factor (98.0%); therefore to improve outcomes of PCI, patients should have optimal treatment of these risk factors post-procedure.
3. Comparing against other published data from the region, Malaysian patients were more likely to have hypertension and diabetes.
4. The mean age of patients who underwent PCI in Malaysia was 57.4 years (SD 10.3) which were much younger than those in western registries. More than 1 in 5 patients were under the age of 50.0 years.
5. More Malay and Indian patients, compared to the Chinese patients, were under the age of 50.0 years.

Data from 24,459 patients obtained over a six year period from 16 centres was analysed. The main source data providers were Institut Jantung Negara (58.1%), Pusat Jantung Hospital Umum Sarawak (11.3%) and Hospital Pulau Pinang (8.7%). [Table 2.3.1] The data on patient characteristics will be reported in two periods of three years: with data obtained between 2007-2009 (10709 patients), and data obtained between 2010-2012 (13750 patients).

The rationale for this was the main findings from 2007-2009 have been published<sup>1</sup>, and subsequent data from 2010-2012 would be compared with these. In total, of the 24459 patients, 91.7% had a single PCI procedure during these time period while the remaining had two or more. [Table 2.2]

The mean age of patients from 2007-2009 was 57.0 (SD 10.2) years, while those from 2010-2012 was 57.8 (SD 10.3) years. The largest group of patients in 2007-2009 and 2010-2012 were aged between 50 and 60 years old, 36.0% vs. 35.7%, respectively. The findings for patients aged below 50 years old were also similar: with 22.7% in 2007-2009, compared to 22.4% in 2010-2012. For gender status, 81.6% in 2007-2009 were male, compared to 82.4% in 2010-2012. [Table 2.1]

The distribution of patients from the major ethnic groups in 2007-2009 and 2010-2012 was similar for Malay, 47.6% vs. 49.0%, for Chinese, 23.9% vs. 22.7%, for Indian, 22.7% vs. 20.9%. The next major ethnic group was the Iban, with 2.0% in 2007-2009, compared to 3.1% in 2010-2012. [Table 2.1]

### Cardiovascular risk factors

In terms of active smokers, there was 18.8% in 2007-2009, to 23.0% in 2010-2012. For a family history of premature cardiovascular disease, there was 19.0% in 2007-2009, to 15.4% in 2010-2012. The mean body mass index were similar in 2007-2009 and 2010-2012, with 26.5 SD 4.2 and 26.7 SD 4.4, respectively. [Table 2.1]

For dyslipidaemia, there were 73.2% in 2007-2009, and 70.8% in 2010-2012. For hypertension, there was 73.4% in 2007-2009, and 72.8% in 2010-2012. For diabetes, there was 46.1% in 2007-2009, and 45.3% in 2010-2012. For those with a previous history of myocardial infarction, there was 41.0% in



2007-2009, and 46.2% in 2010-2012. For a previous history of known coronary artery disease, there was 55.2% in 2007-2009, and 55.0% in 2010-2012. [Table 2.1]

For new onset angina, there was 24.6% in 2007-2009, and 22.9% in 2010-2012. For congestive cardiac failure, there was 4.0% in 2007-2009, and 3.4% in 2010-2012. For those with chronic renal failure, there was 6.6% in 2007-2009, and 5.4% in 2010-2012. For those with a previous history of PCI, there was 20.2% in 2007-2009, and 20.4% in 2010-2012. Finally, for those with a previous history of CABG, there was 4.0% in both blocks of years. [Table 2.1]

In total, 98.6% of patients in 2007-2009, and 97.6% in 2010-2012, had at least one cardiovascular risk factor. [Table 2.5.1]

#### ***Age, gender and ethnicity, in 2007-2009***

Amongst males, in the Malay group, there was 29.1% who were under the age of 50.0 years. Among the Chinese and Indian groups, the corresponding numbers were 19.2% and 29.2%, respectively. Amongst females, in the Malay group, there was 15.4% who were under the age of 50.0 years. Among the Chinese and Indian groups, the corresponding numbers were 5.2% and 16.1%, respectively. [Table 2.4.2]

#### ***Age, gender and ethnicity, in 2010-2012***

Amongst males, in the Malay group, there was 26.9% who were under the age of 50.0 years. Among the Chinese and Indian groups, the corresponding numbers were 20.1% and 22.6%, respectively. Amongst females, in the Malay group, there was 12.9% who were under the age of 50.0 years. Among the Chinese and Indian groups, the corresponding numbers were 5.8% and 11.0%, respectively. [Table 2.4.2]

#### ***Comparative analysis with published data from the region on cardiovascular risk factors***

At a single tertiary centre registry in Singapore which recruited 7889 patients from a multi-ethnic population between 2002 and 2007, over 50.0% of patients were Chinese ethnicity, patients were approximately 57.0 years old; over 65.0% had hypertension, over 78.0% had dyslipidaemia, over 33.0% were diabetic, over 43.0% had a history of smoking<sup>2</sup>. From the Thai National Percutaneous Coronary Intervention Registry, amongst patients under 75.0 years old, the prevalence of risk factors were as follows: 68.5% had hypertension, 78.0% had dyslipidaemia, 37.7% had diabetes, 22.4% were active smokers<sup>3</sup>.

Another published report from the region was from the Melbourne Intervention Group, who examined data from 9204 patients recruited between 2004 and 2007. They found that the mean age was 64.6 years, with 64.3% having hypertension, 71.3% having dyslipidaemia, 24.0% having diabetes, and 22.5% being current smokers<sup>4</sup>. Therefore, from these publications, we noted that substantially more patients in our registry, compared to the Thai, Singaporean and Australian patients, were hypertensive and were diabetic. The high, and rising, prevalence of modifiable cardiovascular risk factors in Malaysia<sup>5</sup> is likely to account for a corresponding, even exponential rise, in patients who have advanced coronary disease requiring revascularisation, both with PCI and CABG.

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Table 2.1 Characteristics of patients who underwent PCI, NCVD-PCI Registry, 2007-2012

Year	2007-2009		2010		2011		2012		2010-2012		2007-2012	
Total no. of patients	10709		4157		4487		5106		13750		24459	
Demographics	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Age, Years												
N	10709		4157		4487		5106		13750		24459	
Mean (SD)	57.0 (10.2)		57.8 (10.2)		57.7 (10.3)		57.8 (10.5)		57.8 (10.3)		57.4 (10.3)	
Median (min, max)	57.0 (22.0, 95.0)		57.5 (22.6, 89.0)		57.8 (21.1, 87.5)		57.8 (21.4, 97.7)		57.7 (21.1, 97.7)		57.3 (21.1, 97.7)	
Age group, No. (%)												
20-<30	28	0.2	13	0.4	24	0.6	24	0.4	61	0.4	89	0.4
30-<40	423	4.0	144	3.5	168	3.7	220	4.4	532	3.8	955	4.0
40-<50	2161	20.1	785	18.8	805	18.0	907	17.8	2497	18.2	4658	19.0
50-<60	3857	36.0	1492	35.8	1616	36.0	1809	35.4	4917	35.7	8774	35.8
60-<70	2993	28.0	1193	28.6	1339	29.7	1470	28.8	4002	29.1	6995	28.6
70-<80	1169	11.0	481	11.6	490	11.0	617	12.0	1588	11.6	2757	11.2
≥80	78	0.7	49	1.3	45	1.0	59	1.2	153	1.2	231	1.0
Gender, No. (%)												
Male	8731	81.6	3399	81.8	3684	82.2	4259	83.4	11342	82.4	20073	82.0
Female	1978	18.4	758	18.2	803	17.8	847	16.6	2408	17.6	4386	18.0

Year	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	10709		4157		4487		5106		13750		24459	
Total no. of patients	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Ethnic group, No. (%)												
Malay	5108	47.6	2061	49.6	2194	48.8	2478	48.6	6733	49.0	11841	48.4
Chinese	2550	23.9	895	21.6	1031	23.1	1174	23.0	3100	22.7	5650	23.1
Indian	2430	22.7	924	22.2	934	20.9	1010	19.8	2868	20.9	5298	21.7
Orang asli	0	0	1	0.0	0	0	1	0.0	2	0.0	2	0.0
Kadazan dusun	43	0.4	30	0.8	39	0.8	79	1.6	148	1.0	191	0.8
Melanau	4	0.0	6	0.2	1	0.0	5	0.0	12	0.0	16	0.0
Murut	1	0.0	1	0.0	2	0.0	4	0.0	7	0.0	8	0.0
Bajau	40	0.4	16	0.4	16	0.4	30	0.6	62	0.4	102	0.4
Bidayuh	41	0.4	11	0.2	28	0.6	28	0.6	67	0.4	108	0.4
Iban	222	2.0	108	2.6	136	3.0	175	3.4	419	3.1	641	2.7
Punjabi	121	1.2	50	1.2	29	0.6	14	0.2	93	0.6	214	0.8
Other malaysian	87	0.8	27	0.6	45	1.0	69	1.4	141	1.0	228	1.0
Foreigner	54	0.6	23	0.6	27	0.6	31	0.6	81	0.7	135	0.7
Not available	5	0.0	4	0.0	5	0.2	8	0.2	17	0.2	22	0.0
Missing	3	0.0	0	0	0	0	0	0	0	0	3	0.0
Other coronary risk factors												
Smoking, No. (%)												
Never	4034	37.6	1689	40.6	1633	36.3	1527	30.0	4849	35.2	8883	36.3
Former (quit>30 days)	3018	28.2	1282	30.8	1282	28.5	1262	24.7	3826	27.8	6844	28.0
Current (any tobacco use within last 30 days)	2024	18.8	865	20.8	1001	22.4	1287	25.1	3153	23.0	5177	21.1
Not available	1597	15.0	321	7.8	571	12.8	1030	20.2	1922	14.0	3519	14.4

Year	2007-2009		2010		2011		2012		2010-2012		2007-2012	
Total no. of patients	10709		4157		4487		5106		13750		24459	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Family history of premature cardiovascular disease, No. (%)												
Yes	2027	19.0	793	19.1	684	15.2	647	12.6	2124	15.4	4151	17.0
No	7484	69.8	2904	69.8	3290	73.4	3738	73.2	9932	72.2	17416	71.2
Not known	1164	10.8	460	11.1	513	11.4	721	14.2	1694	12.4	2858	11.6
Missing	34	0.4	0	0	0	0	0	0	0	0	34	0.2
Body mass index (BMI), kgm <sup>-2</sup>												
N		8478		3538		3636		3954		11128		19606
Mean (SD)		26.5 (4.2)		26.9 (4.4)		26.5 (4.4)		26.5 (4.4)		26.7 (4.4)		26.6 (4.3)
Median (min,max)		26.1 (14.0, 48.0)		26.5 (14.9, 49.2)		26.0 (14.9, 49.9)		26.0 (15.0, 47.7)		26.2 (14.9, 49.9)		26.1 (14.0, 49.9)
Missing, No. (%)	2231	20.8	619	14.8	851	19.0	1152	22.6	2622	19.0	4853	19.8
BMI, kg/m <sup>2</sup> , No. (%)												
<18.5	117	1.0	43	1.1	54	1.2	75	1.4	172	1.3	289	1.2
18.5-23	1510	14.2	582	14.0	666	14.8	712	14.0	1960	14.2	3470	14.2
>23-<25	1652	15.4	606	14.6	698	15.6	770	15.0	2074	15.0	3726	15.2
25-<30	3610	33.8	1566	37.6	1520	33.8	1631	32.0	4717	34.4	8327	34.0
30-<35	1266	11.8	571	13.8	550	12.2	613	12.0	1734	12.6	3000	12.3
35-<40	265	2.4	128	3.0	113	2.6	123	2.4	364	2.7	629	2.6
≥40	58	0.6	42	1.1	35	0.8	30	0.6	107	0.8	165	0.7
Missing	2231	20.8	619	14.8	851	19.0	1152	22.6	2622	19.0	4853	19.8

Year	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	10709		4157		4487		5106		13750		24459	
Total no. of patients	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Co-morbidities</b>												
Dyslipidaemia, No. (%)												
Yes	7846	73.2	3183	76.6	3361	74.9	3192	62.6	9736	70.8	17582	71.8
No	2344	21.8	781	18.8	940	20.9	1613	31.6	3334	24.2	5678	23.2
Not known	482	4.6	193	4.6	186	4.2	301	5.8	680	5.0	1162	4.8
Missing	37	0.4	0	0	0	0	0	0	0	0	37	0.2
Hypertension, No. (%)												
Yes	7857	73.4	3089	74.3	3321	74.0	3611	70.8	10021	72.8	17878	73.0
No	2679	25.0	994	24.0	1084	24.2	1289	25.2	3367	24.5	6046	24.8
Not known	155	1.4	74	1.7	82	1.8	206	4.0	362	2.7	517	2.2
Missing	18	0.2	0	0	0	0	0	0	0	0	18	0.0
Diabetes, No. (%)												
Yes	4938	46.1	2008	48.3	2022	45.0	2197	43.0	6227	45.3	11165	45.7
No	5542	51.7	2053	49.3	2377	53.0	2673	52.4	7103	51.6	12645	51.6
Not known	208	2.0	96	2.4	88	2.0	236	4.6	420	3.1	628	2.7
Missing	21	0.2	0	0	0	0	0	0	0	0	21	0.0
Type of diabetes treatment, No. (%)												
OHA	3539	33.0	1456	35.0	1627	36.2	1773	34.8	4856	35.4	8395	34.4
Insulin	517	4.8	261	6.2	202	4.6	239	4.6	702	5.2	1219	5.0
OHA + insulin	199	1.8	163	4.0	117	2.6	100	2.0	380	2.8	579	2.4
Non pharmacology therapy	26	0.2	131	3.2	77	1.8	78	1.6	286	2.0	312	1.2

Year	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	10709		4157		4487		5106		13750		24459	
Total no. of patients	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Myocardial infarction history, No. (%)												
Yes	4391	41.0	1904	45.8	2195	49.0	2259	44.2	6358	46.2	10749	44.0
No	5870	54.8	2121	51.0	2179	48.5	2644	51.8	6944	50.6	12814	52.3
Not known	419	4.0	132	3.2	113	2.5	203	4.0	448	3.2	867	3.5
Missing	29	0.2	0	0	0	0	0	0	0	0	29	0.2
Documented coronary artery disease, No. (%)												
Yes	5911	55.2	2510	60.4	2763	61.6	2280	44.6	7553	55.0	13464	55.0
No	4610	43.0	1585	38.2	1649	36.8	2643	51.8	5877	42.7	10487	42.8
Not known	161	1.6	62	1.4	75	1.6	183	3.6	320	2.3	481	2.0
Missing	27	0.2	0	0	0	0	0	0	0	0	27	0.2
New onset angina (<2weeks), No. (%)												
Yes	2631	24.6	874	21.0	1054	23.4	1221	24.0	3149	22.9	5780	23.7
No	7867	73.4	3223	77.6	3372	75.2	3706	72.5	10301	74.9	18168	74.3
Not known	187	1.8	60	1.4	61	1.4	179	3.5	300	2.2	487	2.0
Missing	24	0.2	0	0	0	0	0	0	0	0	24	0.0
Congestive heart failure (2 weeks prior), No. (%)												
Yes	429	4.0	181	4.4	168	3.8	120	2.4	469	3.4	898	3.6
No	10058	94.0	3917	94.2	4252	94.8	4822	94.4	12991	94.4	23049	94.2
Not known	191	1.8	59	1.4	67	1.4	164	3.2	290	2.2	481	2.0
Missing	31	0.2	0	0	0	0	0	0	0	0	31	0.2

Year	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	10709		4157		4487		5106		13750		24459	
Total no. of patients	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Cerebrovascular disease, No. (%)												
Yes	163	1.6	47	1.2	73	1.6	69	1.4	189	1.4	352	1.5
No	10395	97.0	4053	97.4	4349	97.0	4878	95.5	13280	96.6	23675	96.8
Not known	129	1.2	57	1.4	65	1.4	159	3.1	281	2.0	410	1.7
Missing	22	0.2	0	0	0	0	0	0	0	0	22	0.0
Peripheral vascular disease, No. (%)												
Yes	111	1.0	29	0.6	35	0.8	30	0.6	94	0.6	205	0.8
No	10443	97.6	4072	98.0	4387	97.8	4920	96.4	13379	97.4	23822	97.4
Not known	130	1.2	56	1.4	65	1.4	156	3.0	277	2.0	407	1.6
Missing	25	0.2	0	0	0	0	0	0	0	0	25	0.2
Chronic renal failure (>200micromol), No. (%)												
Yes	709	6.6	285	6.9	234	5.2	213	4.2	732	5.4	1441	5.8
No	9850	92.0	3818	91.8	4185	93.2	4736	92.8	12739	92.6	22589	92.4
Not known	122	1.2	54	1.3	68	1.6	157	3.0	279	2.0	401	1.6
Missing	28	0.2	0	0	0	0	0	0	0	0	28	0.2
*Coronary artery disease, No. (%)												
Yes	8462	79.0	3496	84.1	3765	83.9	3867	75.8	11128	80.9	19590	80.1
No	2039	19.0	601	14.5	651	14.5	1074	21.0	2326	16.9	4365	17.8
Not known	208	2.0	60	1.4	71	1.6	165	3.2	296	2.2	504	2.1

\* Coronary artery disease is defined as "Yes" on any of the following co-morbidities: 1) History of myocardial infarction, 2) Documented CAD >50% stenosis, 3) New onset angina (less than 2 weeks)  
 Note: Not known in coronary artery disease includes patients who do not know their co-morbidities as well as missing data



Year	2007-2009		2010		2011		2012		2010-2012		2007-2012	
Total no. of patients	10709		4157		4487		5106		13750		24459	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Baseline investigation												
Baseline creatinine, mmol/L												
N	10188		3832		3911		4290		12033		22221	
Mean(SD)	120.1 (133.0)		115.3 (113.0)		114.1 (112.2)		113.2 (108.5)		114.1 (111.1)		116.9 (121.7)	
Median, (min,max)	96.0 (44.0, 6500.0)		92.0 (44.0, 1899.0)		90.0 (44.0, 1397.0)		90.0 (44.0, 1206.0)		90.0 (44.0, 1899.0)		93.0 (44.0, 6500.0)	
Not available, No. (%)	317	3.0	115	2.8	165	3.7	306	6.0	586	4.2	903	3.7
Missing, No. (%)	204	1.9	210	5.0	411	9.2	510	10.0	1131	8.2	1335	5.4
Baseline creatinine, mmol/L, No. (%)												
<100	5753	53.7	2339	56.2	2525	56.2	2790	54.6	7654	55.6	13407	54.8
100-199	3909	36.5	1296	31.2	1189	26.4	1275	25.0	3760	27.4	7669	31.4
≥200	526	4.9	197	4.8	197	4.5	225	4.4	619	4.6	1145	4.7
Not available	317	3.0	115	2.8	165	3.7	306	6.0	586	4.2	903	3.7
Missing	204	1.9	210	5.0	411	9.2	510	10.0	1131	8.2	1335	5.4
*Glomerular filtration rate (GFR), MDRD												
N	10181		3827		3907		4291		12025		22206	
Mean(SD)	71.5 (23.7)		74.7 (26.0)		76.3 (26.0)		77.1 (26.7)		76.1 (26.3)		74.0 (25.2)	
Median, (min,max)	72.7 (0.6, 173.9)		75.8 (2.4, 178.6)		77.6 (3.3, 191.1)		78.2 (2.9, 212.5)		77.2 (2.4, 212.5)		75.0 (0.6, 212.5)	
Missing, No. (%)	528	4.9	330	7.9	580	12.9	815	16.0	1725	12.5	2253	9.2

Year	2007-2009		2010		2011		2012		2010-2012		2007-2012	
Total no. of patients	10709		4157		4487		5106		13750		24459	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
*Glomerular filtration rate (GFR), MDRD, No. (%)												
<15	332	3.1	115	2.8	129	2.9	134	2.6	378	2.7	710	2.9
15-<30	216	2.0	92	2.2	81	1.8	99	1.9	272	2.0	488	2.1
30-<45	573	5.4	232	5.6	177	3.9	204	4.1	613	4.5	1186	4.8
45-<60	1605	15.0	540	13.0	507	11.4	528	10.3	1575	11.5	3180	13.0
≥60	7455	69.6	2848	68.5	3013	67.1	3326	65.1	9187	66.8	16642	68.0
Missing	528	4.9	330	7.9	580	12.9	815	16.0	1725	12.5	2253	9.2
**Total cholesterol, mmol/L												
N		4132		1776		1817		1488		5081		9213
Mean(SD)		4.5 (1.2)		4.4 (1.3)		4.4 (1.3)		4.4 (1.2)		4.4 (1.2)		4.5 (1.2)
Median, (min,max)		4.3 (2.1, 24.2)		4.2 (2.0, 23.0)		4.2 (2.0, 23.0)		4.2 (2.0, 12.5)		4.2 (2.0, 23.0)		4.3 (2.0, 24.2)
Not available, No. (%)	1557	26.4	534	21.2	625	22.6	505	22.2	1664	22.0	3221	24.0
Missing, No. (%)	222	3.8	200	8.0	321	11.6	287	12.6	808	10.6	1030	7.6
**LDL levels, mmol/L												
N		4113		1743		1812		1433		4988		9101
Mean(SD)		2.6 (1.1)		2.5 (1.1)		2.5 (1.0)		2.5 (1.2)		2.5 (1.1)		2.6 (1.1)
Median, (min,max)		2.4 (0.7, 18.0)		2.4 (0.8, 20.0)		2.4 (0.8, 17.0)		2.3 (0.8, 17.0)		2.3 (0.8, 20.0)		2.4 (0.7, 20.0)
Not available, No. (%)	1624	27.4	535	21.4	626	22.6	538	23.6	1699	22.4	3323	24.6
Missing, No. (%)	174	3.0	232	9.2	325	11.8	309	13.6	866	11.4	1040	7.8

Year	2007-2009		2010		2011		2012		2010-2012		2007-2012	
Total no. of patients	10709		4157		4487		5106		13750		24459	
Previous intervention	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Previous PCI, No. (%)												
Yes	2159	20.2	920	22.2	872	19.4	1002	19.6	2794	20.4	4953	20.3
No	8532	79.6	3237	77.8	3615	80.6	4104	80.4	10956	79.6	19488	79.7
Missing	18	0.2	0	0	0	0	0	0	0	0	18	0.0
Previous CABG, No. (%)												
Yes	430	4.0	207	5.0	152	3.4	184	3.6	543	4.0	973	4.0
No	10255	95.8	3950	95.0	4335	96.6	4922	96.4	13207	96.0	23462	96.0
Missing	24	0.2	0	0	0	0	0	0	0	0	24	0.0

\*Glomerular filtration rate calculated based on MDRD formula

\*\* Mean (SD) of Total Cholesterol, mmol/L and LDL levels, mmol/L is of the patients who had documented coronary artery disease

**Table 2.2 Distribution of patients by number of procedures, NCVD-PCI Registry, 2007-2012**

No. of patients in							
Year		2007-2009	2010	2011	2012	2010-2012	2007-2012
No. of procedures	1	10709	4157	4487	5106	13750	24459
	2	867	294	384	387	1065	1932
	3	41	11	15	18	44	85
	4	4	0	1	2	3	7
	<b>Total</b>	<b>11621</b>	<b>4462</b>	<b>4887</b>	<b>5513</b>	<b>14862</b>	<b>26483</b>

**Table 2.3.1 Distribution of patients who underwent PCI, by SDP, NCVD-PCI Registry, 2007-2012**

No.	Source data provider	2007-2009 Total no. of patients = 10709		2010-2012 Total no. of patients = 13750		2007-2012 Total no. of patients = 24459	
		No.	%	No.	%	No.	%
1	Pusat Perubatan Universiti Malaya	868	8.1	316	2.2	1184	4.8
2	Institut Jantung Negara	6431	60.0	7752	56.5	14183	58.1
3	Hospital Pulau Pinang	725	6.8	1374	10.1	2099	8.7
4	Hospital Umum Sarawak	1069	10.0	1654	12.1	2723	11.3
5	Hospital Sultanah Aminah	1023	9.5	754	5.4	1777	7.3
6	Hospital Sultanah Bahiyah	238	2.2	804	5.9	1042	4.2
7	Hospital Queen Elizabeth	242	2.2	203	1.4	445	1.8
8	Hospital Pakar KPJ Selangor	69	0.6	1	0.0	70	0.2
9	Hospital Serdang	12	0.2	136	1.0	148	0.6
10	Pusat Perubatan Universiti Kebangsaan Malaysia	20	0.2	0	0	20	0.0
11	Pusat Perubatan Mahkota	12	0.2	0	0	12	0.0
12	Hospital Sultanah Nur Zahirah	0	0	110	0.8	110	0.4
13	Hospital Tengku Ampuan Afzan	0	0	28	0.2	28	0.2
14	Pusat Perubatan Sime Darby	0	0	91	0.6	91	0.4
15	Pusat Jantung Hospital Queen Elizabeth 2	0	0	508	3.6	508	2.0
16	Hospital Pantai Ipoh	0	0	19	0.2	19	0.0
<b>Total</b>		<b>10709</b>	<b>100.0</b>	<b>13750</b>	<b>100.0</b>	<b>24459</b>	<b>100.0</b>

\* Each SDP started to contribute data at different time period

**Table 2.3.2 Distribution of PCI procedures performed by Source Data Providers (SDPs), NCVD-PCI Registry, 2007-2012**

No.	Source data provider	2007-2009 Total no. of patients = 11621		2010-2012 Total no. of patients = 14862		ALL Total no. of patients = 26483	
		No.	%	No.	%	No.	%
1	Pusat Perubatan Universiti Malaya	964	8.2	329	2.2	1293	4.8
2	Institut Jantung Negara	6919	59.6	8456	56.8	15375	58.0
3	Hospital Pulau Pinang	811	7.0	1558	10.4	2369	9.0
4	Hospital Umum Sarawak	1196	10.2	1756	11.8	2952	11.2
5	Hospital Sultanah Aminah	1108	9.6	794	5.4	1902	7.2
6	Hospital Sultanah Bahiyah	265	2.2	853	5.8	1118	4.2
7	Hospital Queen Elizabeth	243	2.0	210	1.4	453	1.8
8	Hospital Pakar KPJ Selangor	71	0.6	1	0.0	72	0.2
9	Hospital Serdang	12	0.2	136	1.0	148	0.6
10	Pusat Perubatan Universiti Kebangsaan Malaysia	20	0.2	0	0	20	0.0
11	Pusat Perubatan Mahkota	12	0.2	0	0	12	0.0
12	Hospital Sultanah Nur Zahirah	0	0	111	0.8	111	0.4
13	Hospital Tengku Ampuan Afzan	0	0	29	0.2	29	0.2
14	Pusat Perubatan Sime Darby	0	0	92	0.6	92	0.4
15	Pusat Jantung Hospital Queen Elizabeth 2	0	0	518	3.4	518	2.0
16	Hospital Pantai Ipoh	0	0	19	0.2	19	0.0
<b>Total</b>		<b>11621</b>	<b>100.0</b>	<b>14862</b>	<b>100.0</b>	<b>26483</b>	<b>100.0</b>

\* Each SDP started to contribute data at different time period

**Table 2.4.1 Age-gender distribution of patients who underwent PCI, NCVD-PCI Registry, 2007-2012**

Age group	2007-2009		2010-2012		2007-2012	
	Total no. of patients = 10709		Total no. of patients = 13750		Total no. of patients = 24459	
	Male	Female	Male	Female	Male	Female
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
20-<30	25 (0.2)	3 (0.2)	56 (0.4)	5 (0.2)	81 (0.4)	8 (0.2)
30-<40	391 (4.4)	32 (1.6)	501 (4.4)	31 (1.2)	892 (4.4)	63 (1.4)
40-<50	1947 (22.3)	214 (10.8)	2265 (20.0)	232 (9.6)	4212 (21.0)	446 (10.2)
50-<60	3272 (37.5)	585 (29.5)	4213 (37.1)	704 (29.3)	7485 (37.3)	1289 (29.4)
60-<70	2254 (25.9)	739 (37.3)	3100 (27.3)	902 (37.5)	5354 (26.7)	1641 (37.4)
70-<80	786 (9.1)	383 (19.4)	1101 (9.8)	487 (20.2)	1887 (9.4)	870 (19.8)
≥80	56 (0.6)	22 (1.2)	106 (1.0)	47 (2.0)	162 (0.8)	69 (1.6)
<b>Total</b>	<b>8731 (100.0)</b>	<b>1978 (100.0)</b>	<b>11342 (100.0)</b>	<b>2408 (100.0)</b>	<b>20073 (100.0)</b>	<b>4386 (100.0)</b>

Table 2.4.2 Age-gender distribution of patients who underwent PCI, by ethnic group, NCVD-PCI Registry, 2007-2012

Gender	Age group	2007-2009					2010-2012					2007-2012				
		Total no. of patients = 10709					Total no. of patients = 13750					Total no. of patients = 24459				
		Malay	Chinese	Indian	Others	Not Available	Malay	Chinese	Indian	Others	Not Available	Malay	Chinese	Indian	Others	Not Available
Male	20 < 30	No. (%)	5 (0.0)	6 (0.0)	4 (0.0)	0 (0.0)	33 (0.2)	6 (0.0)	11 (0.0)	6 (0.0)	0 (0.0)	43 (0.2)	11 (0.0)	17 (0.0)	10 (0.0)	0 (0.0)
	30 < 40	No. (%)	222 (2.6)	56 (1.0)	82 (0.4)	31 (0.0)	279 (2.4)	76 (0.6)	94 (0.8)	51 (0.4)	1 (0.0)	501 (2.4)	132 (0.6)	176 (0.8)	82 (0.4)	1 (0.0)
	40 < 50	No. (%)	1024 (11.8)	325 (3.8)	464 (5.4)	133 (1.6)	1212 (10.6)	427 (4.0)	415 (3.6)	208 (1.8)	3 (0.0)	2236 (11.2)	752 (3.8)	879 (4.4)	341 (1.7)	4 (0.0)
	50 < 60	No. (%)	1698 (19.5)	698 (8.0)	711 (8.2)	162 (1.8)	2180 (19.3)	817 (7.2)	921 (8.4)	291 (2.7)	4 (0.0)	3878 (19.5)	1515 (7.6)	1632 (8.3)	453 (2.3)	7 (0.0)
	60 < 70	No. (%)	1020 (11.6)	650 (7.5)	456 (5.2)	126 (1.4)	1426 (12.6)	823 (7.2)	645 (5.6)	200 (1.8)	6 (0.0)	2446 (12.2)	1473 (7.4)	1101 (5.5)	326 (1.7)	8 (0.0)
	70 < 80	No. (%)	317 (3.6)	256 (3.0)	164 (1.8)	49 (0.6)	494 (4.4)	345 (3.0)	195 (1.8)	66 (0.6)	1 (0.0)	811 (4.0)	601 (3.0)	359 (1.8)	115 (0.6)	1 (0.0)
	≥ 80	No. (%)	19 (0.2)	23 (0.2)	7 (0.0)	7 (0.0)	39 (0.4)	36 (0.4)	24 (0.2)	7 (0.0)	0 (0.0)	58 (0.2)	59 (0.2)	31 (0.2)	14 (0.0)	0 (0.0)
	Total	No. (%)	4310 (49.5)	2013 (23.1)	1890 (21.6)	512 (5.8)	5663 (49.9)	2530 (22.4)	2305 (20.4)	829 (7.3)	15 (0.0)	9973 (49.7)	4543 (22.6)	4195 (21.0)	1341 (6.7)	21 (0.0)
	20 < 30	No. (%)	3 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)	4 (0.2)	0 (0.0)	0 (0.0)	1 (0.0)	0 (0.0)	7 (0.2)	0 (0.0)	0 (0.0)	1 (0.0)	0 (0.0)
	30 < 40	No. (%)	18 (1.0)	3 (0.2)	11 (0.6)	0 (0.0)	19 (0.8)	3 (0.2)	5 (0.2)	3 (0.2)	1 (0.0)	37 (0.8)	6 (0.2)	16 (0.4)	3 (0.0)	1 (0.0)
Female	40 < 50	No. (%)	102 (5.2)	25 (1.2)	76 (3.8)	10 (0.6)	115 (4.8)	30 (1.2)	57 (2.4)	30 (1.2)	0 (0.0)	217 (5.0)	55 (1.2)	133 (3.0)	40 (1.0)	1 (0.0)
	50 < 60	No. (%)	268 (13.5)	120 (6.0)	160 (8.0)	37 (1.8)	359 (15.0)	115 (4.8)	177 (7.4)	53 (2.2)	0 (0.0)	627 (14.3)	235 (5.4)	337 (7.7)	90 (2.0)	2 (0.0)
	60 < 70	No. (%)	295 (15.0)	217 (11.0)	190 (9.5)	36 (1.8)	382 (15.7)	239 (10.0)	215 (9.0)	65 (2.5)	1 (0.0)	677 (15.5)	456 (10.5)	405 (9.3)	101 (2.5)	1 (0.0)
	70 < 80	No. (%)	109 (5.6)	160 (8.0)	98 (5.0)	16 (0.8)	182 (7.6)	166 (6.8)	90 (3.8)	49 (2.0)	0 (0.0)	291 (6.6)	326 (7.4)	188 (4.2)	65 (1.4)	0 (0.0)
	≥ 80	No. (%)	3 (0.2)	12 (0.6)	5 (0.2)	2 (0.2)	9 (0.4)	17 (0.8)	19 (0.8)	2 (0.0)	0 (0.0)	12 (0.2)	29 (0.6)	24 (0.6)	4 (0.0)	0 (0.0)
	Total	No. (%)	798 (40.7)	537 (27.0)	540 (27.1)	101 (5.2)	1070 (44.5)	570 (23.8)	563 (23.6)	203 (8.1)	2 (0.0)	1868 (42.6)	1107 (25.3)	1103 (25.2)	304 (6.9)	4 (0.0)

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

Table 2.4.3 Age-gender distribution of patients who underwent PCI, by pre-morbid diabetes, NCVI-PCI Registry, 2007-2012

Gender	Age group	2007-2009				2010-2012				2007-2012			
		Pre-morbid diabetes				Pre-morbid diabetes				Pre-morbid diabetes			
		Diabetic	Non Diabetic	Not known	Missing	Diabetic	Non Diabetic	Not known	Diabetic	Non Diabetic	Not known	Diabetic	Missing
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Male	20-<30	5 (0.0)	17 (0.2)	3 (0.0)	0 (0.0)	5 (0.0)	42 (0.4)	9 (0.0)	10 (0.0)	59 (0.2)	12 (0.0)	0 (0)	0 (0)
	30-<40	113 (1.2)	271 (3.2)	7 (0.0)	0 (0.0)	132 (1.2)	345 (3.0)	24 (0.2)	245 (1.2)	616 (3.0)	31 (0.2)	0 (0)	0 (0)
	40-<50	686 (7.8)	1226 (14.0)	33 (0.4)	2 (0.0)	798 (7.0)	1397 (12.4)	70 (0.6)	1484 (7.4)	2623 (13.0)	103 (0.6)	2 (0.0)	2 (0.0)
	50-<60	1484 (17.0)	1715 (19.7)	64 (0.8)	9 (0.2)	1890 (16.7)	2191 (19.5)	132 (1.2)	3374 (16.8)	3906 (19.5)	196 (1.1)	9 (0.0)	9 (0.0)
	60-<70	1032 (11.9)	1165 (13.4)	51 (0.6)	6 (0.0)	1458 (12.8)	1553 (13.6)	89 (0.8)	2490 (12.4)	2718 (13.7)	140 (0.6)	6 (0.0)	6 (0.0)
	70-<80	352 (4.0)	411 (4.8)	22 (0.2)	1 (0.0)	479 (4.2)	586 (5.2)	36 (0.4)	831 (4.2)	997 (5.1)	58 (0.2)	1 (0.0)	1 (0.0)
	≥80	20 (0.2)	34 (0.4)	2 (0.0)	0 (0.0)	47 (0.4)	55 (0.4)	4 (0.0)	67 (0.4)	89 (0.4)	6 (0.0)	0 (0)	0 (0)
	Total	3692 (42.1)	4839 (55.7)	182 (2.0)	18 (0.2)	4809 (42.3)	6169 (54.5)	364 (3.2)	8501 (42.4)	11008 (54.9)	546 (2.7)	18 (0.0)	18 (0.0)
	20-<30	1 (0.0)	2 (0.20)	0 (0.0)	0 (0.0)	1 (0.0)	4 (0.2)	0 (0.0)	2 (0.0)	6 (0.2)	0 (0)	0 (0)	0 (0)
	30-<40	21 (1.0)	11 (0.6)	0 (0.0)	0 (0.0)	17 (0.8)	12 (0.4)	2 (0.0)	38 (0.8)	23 (0.6)	2 (0.0)	0 (0)	0 (0)
Female	40-<50	158 (8.0)	53 (2.6)	2 (0.2)	1 (0.0)	120 (5.0)	101 (4.2)	11 (0.4)	278 (6.4)	154 (3.6)	13 (0.2)	1 (0.0)	1 (0.0)
	50-<60	386 (19.6)	189 (9.6)	9 (0.4)	1 (0.0)	446 (18.7)	246 (10.2)	12 (0.4)	832 (19.0)	435 (10.0)	21 (0.4)	1 (0.0)	1 (0.0)
	60-<70	465 (23.5)	266 (13.3)	7 (0.4)	1 (0.0)	546 (22.6)	338 (14.1)	18 (0.8)	1011 (23.1)	604 (13.9)	25 (0.6)	1 (0.0)	1 (0.0)
	70-<80	204 (10.4)	171 (8.6)	8 (0.4)	0 (0.0)	260 (10.8)	216 (9.0)	11 (0.4)	464 (10.6)	387 (8.8)	19 (0.4)	0 (0)	0 (0)
	≥80	11 (0.6)	11 (0.6)	0 (0.0)	0 (0.0)	28 (1.2)	17 (0.8)	2 (0.0)	39 (0.8)	28 (0.6)	2 (0.0)	0 (0)	0 (0)
	Total	1246 (63.1)	703 (35.5)	26 (1.4)	3 (0.0)	1418 (59.1)	934 (38.9)	56 (2.0)	2664 (60.7)	1637 (37.7)	82 (1.6)	3 (0.0)	3 (0.0)

Table 2.4.4 Age-gender distribution of patients who underwent PCI, by pre-morbid hypertension, NCVD-PCI Registry, 2007-2012

Gender	Age group	2007-2009				2010-2012				2007-2012			
		Pre-morbid hypertension				Pre-morbid hypertension				Pre-morbid hypertension			
		Hypertensive	Non-Hypertensive	Not Known	Missing	Hypertensive	Non-Hypertensive	Not Known	Missing	Hypertensive	Non-Hypertensive	Not Known	Missing
Male	20-<30	No. (%) 7 (0.0)	No. (%) 15 (0.2)	No. (%) 3 (0.0)	No. (%) 0 (0)	No. (%) 13 (0.2)	No. (%) 36 (0.4)	No. (%) 7 (0.0)	No. (%) 20 (0.0)	No. (%) 51 (0.2)	No. (%) 10 (0.0)	No. (%) 0 (0)	No. (%) 0 (0)
	30-<40	No. (%) 192 (2.2)	No. (%) 189 (2.2)	No. (%) 9 (0.2)	No. (%) 1 (0.0)	No. (%) 245 (2.2)	No. (%) 230 (2.0)	No. (%) 26 (0.2)	No. (%) 437 (2.2)	No. (%) 419 (2.0)	No. (%) 35 (0.2)	No. (%) 1 (0.0)	No. (%) 1 (0.0)
	40-<50	No. (%) 1186 (13.6)	No. (%) 731 (8.4)	No. (%) 29 (0.4)	No. (%) 1 (0.0)	No. (%) 1359 (12.0)	No. (%) 836 (7.4)	No. (%) 70 (0.6)	No. (%) 2545 (12.7)	No. (%) 1567 (7.8)	No. (%) 99 (0.4)	No. (%) 1 (0.0)	No. (%) 1 (0.0)
	50-<60	No. (%) 2363 (27.0)	No. (%) 851 (9.7)	No. (%) 51 (0.6)	No. (%) 7 (0.0)	No. (%) 2992 (26.4)	No. (%) 1110 (9.8)	No. (%) 111 (1.0)	No. (%) 5355 (26.7)	No. (%) 1961 (9.9)	No. (%) 162 (0.9)	No. (%) 7 (0.0)	No. (%) 7 (0.0)
	60-<70	No. (%) 1724 (19.7)	No. (%) 498 (5.8)	No. (%) 28 (0.4)	No. (%) 4 (0.0)	No. (%) 2419 (21.4)	No. (%) 605 (5.4)	No. (%) 76 (0.6)	No. (%) 4143 (20.7)	No. (%) 1103 (5.4)	No. (%) 104 (0.6)	No. (%) 4 (0.0)	No. (%) 4 (0.0)
	70-<80	No. (%) 640 (7.4)	No. (%) 130 (1.4)	No. (%) 15 (0.2)	No. (%) 1 (0.0)	No. (%) 891 (7.8)	No. (%) 177 (1.6)	No. (%) 33 (0.2)	No. (%) 1531 (7.7)	No. (%) 307 (1.6)	No. (%) 48 (0.2)	No. (%) 1 (0.0)	No. (%) 1 (0.0)
	≥80	No. (%) 49 (0.6)	No. (%) 6 (0.0)	No. (%) 1 (0.0)	No. (%) 0 (0)	No. (%) 79 (0.6)	No. (%) 26 (0.2)	No. (%) 1 (0.0)	No. (%) 128 (0.6)	No. (%) 32 (0.2)	No. (%) 2 (0.0)	No. (%) 0 (0)	No. (%) 0 (0)
	Total	No. (%) 6161 (70.5)	No. (%) 2420 (27.7)	No. (%) 136 (1.8)	No. (%) 14 (0.0)	No. (%) 7998 (70.6)	No. (%) 3020 (26.8)	No. (%) 324 (2.6)	No. (%) 14159 (70.6)	No. (%) 5440 (27.1)	No. (%) 460 (2.3)	No. (%) 14 (0.0)	No. (%) 14 (0.0)
	20-<30	No. (%) 1 (0.0)	No. (%) 2 (0.2)	No. (%) 0 (0)	No. (%) 0 (0)	No. (%) 4 (0.2)	No. (%) 1 (0.0)	No. (%) 0 (0)	No. (%) 5 (0.2)	No. (%) 3 (0.0)	No. (%) 0 (0)	No. (%) 0 (0)	No. (%) 0 (0)
	30-<40	No. (%) 20 (1.0)	No. (%) 12 (0.6)	No. (%) 0 (0)	No. (%) 0 (0)	No. (%) 19 (0.8)	No. (%) 10 (0.4)	No. (%) 2 (0.0)	No. (%) 39 (0.8)	No. (%) 22 (0.6)	No. (%) 2 (0.0)	No. (%) 0 (0)	No. (%) 0 (0)
Female	40-<50	No. (%) 167 (8.4)	No. (%) 44 (2.2)	No. (%) 1 (0.0)	No. (%) 2 (0.2)	No. (%) 171 (7.2)	No. (%) 51 (2.2)	No. (%) 10 (0.4)	No. (%) 338 (7.8)	No. (%) 95 (2.2)	No. (%) 11 (0.2)	No. (%) 2 (0.0)	No. (%) 2 (0.0)
	50-<60	No. (%) 487 (24.6)	No. (%) 90 (4.6)	No. (%) 7 (0.4)	No. (%) 1 (0.0)	No. (%) 582 (24.2)	No. (%) 113 (4.6)	No. (%) 9 (0.4)	No. (%) 1069 (24.4)	No. (%) 203 (4.6)	No. (%) 16 (0.4)	No. (%) 1 (0.0)	No. (%) 1 (0.0)
	60-<70	No. (%) 658 (33.2)	No. (%) 73 (3.6)	No. (%) 7 (0.4)	No. (%) 1 (0.0)	No. (%) 785 (32.6)	No. (%) 107 (4.4)	No. (%) 10 (0.4)	No. (%) 1443 (33.0)	No. (%) 180 (4.2)	No. (%) 17 (0.4)	No. (%) 1 (0.0)	No. (%) 1 (0.0)
	70-<80	No. (%) 344 (17.4)	No. (%) 35 (1.8)	No. (%) 4 (0.2)	No. (%) 0 (0)	No. (%) 424 (17.6)	No. (%) 57 (2.4)	No. (%) 6 (0.2)	No. (%) 768 (17.6)	No. (%) 92 (2.0)	No. (%) 10 (0.2)	No. (%) 0 (0)	No. (%) 0 (0)
	≥80	No. (%) 19 (1.0)	No. (%) 3 (0.2)	No. (%) 0 (0)	No. (%) 0 (0)	No. (%) 38 (1.6)	No. (%) 8 (0.4)	No. (%) 1 (0.0)	No. (%) 57 (1.2)	No. (%) 11 (0.2)	No. (%) 1 (0.0)	No. (%) 0 (0)	No. (%) 0 (0)
	Total	No. (%) 1696 (100.0)	No. (%) 259 (13.2)	No. (%) 19 (1.0)	No. (%) 4 (0.2)	No. (%) 2023 (84.2)	No. (%) 347 (14.4)	No. (%) 38 (1.4)	No. (%) 3719 (85.0)	No. (%) 606 (13.8)	No. (%) 57 (1.2)	No. (%) 4 (0.0)	No. (%) 4 (0.0)



Table 2.4.5 Age-gender distribution of patients who underwent PCI, by pre-morbid dyslipidaemia, NCVI-PCI Registry, 2007-2012

Gender	Age group	2007-2009				2010-2012				2007-2012			
		Pre-morbid dyslipidaemia				Pre-morbid dyslipidaemia				Pre-morbid dyslipidaemia			
		Yes	No	Not Known	Missing	Yes	No	Not Known		Yes	No	Not Known	Missing
Male	20-<30	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)		No. (%)	No. (%)	No. (%)	No. (%)
		13 (0.2)	9 (0.2)	3 (0.0)	0 (0)	24 (0.2)	21 (0.2)	11 (0.0)		37 (0.2)	30 (0.2)	14 (0.0)	0 (0)
	30-<40	282 (3.2)	92 (1.0)	16 (0.2)	1 (0.0)	310 (2.8)	159 (1.4)	32 (0.2)		592 (3.0)	251 (1.2)	48 (0.2)	1 (0.0)
	40-<50	1390 (16.0)	467 (5.4)	83 (1.0)	7 (0.0)	1513 (13.4)	630 (5.7)	122 (1.0)		2903 (14.4)	1097 (5.5)	205 (1.1)	7 (0.0)
	50-<60	2405 (27.5)	710 (8.1)	142 (1.6)	15 (0.2)	3055 (27.0)	955 (8.4)	203 (1.8)		5460 (27.2)	1665 (8.3)	345 (1.9)	15 (0.0)
	60-<70	1653 (19.0)	485 (5.6)	111 (1.2)	5 (0.0)	2234 (19.7)	722 (6.4)	144 (1.2)		3887 (19.4)	1207 (6.1)	255 (1.3)	5 (0.0)
Female	70-<80	585 (6.8)	162 (1.8)	38 (0.4)	1 (0.0)	758 (6.6)	281 (2.4)	62 (0.6)		1343 (6.6)	443 (2.2)	100 (0.4)	1 (0.0)
	≥80	43 (0.4)	12 (0.2)	1 (0.0)	0 (0)	62 (0.6)	39 (0.4)	5 (0.0)		105 (0.6)	51 (0.2)	6 (0.0)	0 (0)
	Total	6371 (73.1)	1937 (22.3)	394 (4.4)	29 (0.2)	7956 (70.3)	2807 (24.9)	579 (4.8)		14327 (71.4)	4744 (23.7)	973 (4.9)	29 (0.0)
	20-<30	3 (0.2)	0 (0)	0 (0)	0 (0)	2 (0.0)	3 (0.2)	0 (0)		5 (0.2)	3 (0.0)	0 (0)	0 (0)
	30-<40	24 (1.2)	5 (0.2)	3 (0.2)	0 (0)	19 (0.8)	10 (0.4)	2 (0.0)		43 (1.0)	15 (0.4)	5 (0.2)	0 (0)
	40-<50	167 (8.4)	35 (1.8)	10 (0.6)	2 (0.2)	161 (6.6)	53 (2.2)	18 (0.8)		328 (7.4)	88 (2.0)	28 (0.6)	2 (0.0)
Total	50-<60	460 (23.2)	106 (5.4)	16 (0.8)	3 (0.2)	529 (22.0)	151 (6.2)	24 (1.0)		989 (22.6)	257 (5.8)	40 (1.0)	3 (0.0)
	60-<70	544 (27.5)	161 (8.1)	32 (1.5)	2 (0.2)	680 (28.3)	183 (7.7)	39 (1.6)		1224 (28.0)	344 (7.8)	71 (1.6)	2 (0.0)
	70-<80	266 (13.4)	92 (4.6)	24 (1.1)	1 (0.0)	357 (14.8)	113 (4.6)	17 (0.8)		623 (14.2)	205 (4.6)	41 (1.0)	1 (0.0)
	≥80	11 (0.6)	8 (0.4)	3 (0.2)	0 (0)	32 (1.4)	14 (0.6)	1 (0.0)		43 (1.0)	22 (0.6)	4 (0.0)	0 (0)
	Total	1475 (74.5)	407 (20.5)	88 (4.4)	8 (0.6)	1780 (73.9)	527 (21.9)	101 (4.2)		3255 (74.4)	934 (21.2)	189 (4.4)	8 (0.0)

Table 2.4.6 Age-gender distribution of patients who underwent PCI, by family history of premature cardiovascular disease, NCVI-PCI Registry, 2007-2012

Gender	Age group	2007-2009					2010-2012					2007-2012				
		Family history of premature cardiovascular disease					Family history of premature cardiovascular disease					Family history of premature cardiovascular disease				
		Yes	No	Not Known	Missing		Yes	No	Not Known			Yes	No	Not Known	Missing	
		No. (%)	No. (%)	No. (%)	No. (%)		No. (%)	No. (%)	No. (%)			No. (%)	No. (%)	No. (%)	No. (%)	
Male	20-<30	8 (0.0)	14 (0.2)	3 (0.0)	0 (0)		17 (0.2)	30 (0.2)	9 (0.0)			25 (0.2)	44 (0.2)	12 (0.0)	0 (0)	
	30-<40	108 (1.2)	256 (3.0)	27 (0.4)	0 (0)		113 (1.0)	334 (3.0)	54 (0.4)			221 (1.2)	590 (3.0)	81 (0.4)	0 (0)	
	40-<50	441 (5.1)	1334 (15.2)	165 (1.8)	7 (0.0)		471 (4.2)	1544 (13.6)	250 (2.2)			912 (4.6)	2878 (14.4)	415 (2.0)	7 (0.0)	
	50-<60	629 (7.3)	2266 (26.0)	366 (4.2)	11 (0.2)		685 (6.0)	2996 (26.4)	532 (4.6)			1314 (6.6)	5262 (26.2)	898 (4.4)	11 (0.0)	
	60-<70	354 (4.1)	1635 (18.8)	258 (3.1)	7 (0.0)		381 (3.4)	2362 (20.8)	357 (3.2)			735 (3.6)	3997 (20.0)	615 (3.0)	7 (0.0)	
	70-<80	126 (1.4)	548 (6.2)	110 (1.2)	2 (0.0)		90 (0.8)	851 (7.6)	160 (1.4)			216 (1.0)	1399 (7.0)	270 (1.4)	2 (0.0)	
	≥80	4 (0.0)	43 (0.4)	9 (0.2)	0 (0)		6 (0.0)	88 (0.8)	12 (0.2)			10 (0.0)	131 (0.6)	21 (0.2)	0 (0)	
	Total	1670 (19.1)	6096 (69.8)	938 (10.9)	27 (0.2)		1763 (15.6)	8205 (72.4)	1374 (12.0)			3433 (17.2)	14301 (71.4)	2312 (11.4)	27 (0.0)	
	20-<30	0 (0)	3 (0.2)	0 (0)	0 (0)		2 (0.0)	3 (0.2)	0 (0)			2 (0.0)	6 (0.2)	0 (0)	0 (0)	
	30-<40	16 (0.8)	15 (0.8)	1 (0.0)	0 (0)		9 (0.4)	16 (0.6)	6 (0.2)			25 (0.6)	31 (0.8)	7 (0.2)	0 (0)	
Female	40-<50	56 (2.8)	129 (6.6)	28 (1.4)	1 (0.0)		51 (2.2)	143 (6.0)	38 (1.6)			107 (2.4)	272 (6.2)	66 (1.6)	1 (0.0)	
	50-<60	116 (5.8)	401 (20.2)	63 (3.2)	5 (0.2)		124 (5.2)	498 (20.6)	82 (3.4)			240 (5.4)	899 (20.3)	145 (3.4)	5 (0.2)	
	60-<70	117 (6.0)	545 (27.6)	76 (3.8)	1 (0.0)		129 (5.4)	647 (26.8)	126 (5.2)			246 (5.5)	1192 (27.1)	202 (4.5)	1 (0.0)	
	70-<80	50 (2.6)	278 (14.0)	55 (2.8)	0 (0)		43 (1.8)	385 (16.0)	59 (2.4)			93 (2.2)	663 (15.2)	114 (2.6)	0 (0)	
	≥80	2 (0.2)	17 (0.8)	3 (0.2)	0 (0)		3 (0.2)	35 (1.4)	9 (0.4)			5 (0.2)	52 (1.2)	12 (0.2)	0 (0)	
	Total	357 (18.2)	1388 (70.2)	226 (11.4)	7 (0.2)		361 (15.2)	1727 (71.6)	320 (13.2)			718 (16.3)	3115 (71.0)	546 (12.5)	7 (0.2)	

**Table 2.5.1 Presence of cumulative risk factors, NCVD-PCI Registry, 2007-2012**

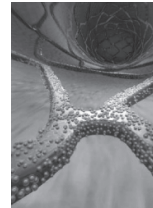
Presence of cumulative risk factors *	2007-2009		2010-2012		2007-2012	
	Total no. of patients = 10709		Total no. of patients = 13750		Total no. of patients = 24459	
	No.	%	No.	%	No.	%
None	154	1.4	329	2.4	483	2.0
1 risk factor	730	6.8	1068	7.8	1798	7.4
2 risk factors	2031	19.0	2358	17.2	4389	18.0
3 risk factors	3275	30.6	3975	28.9	7250	29.6
>3 risk factors	4519	42.2	6020	43.7	10539	43.0
<b>Total</b>	<b>10709</b>	<b>100.0</b>	<b>13750</b>	<b>100.0</b>	<b>24459</b>	<b>100.0</b>

\* Risk factors are defined as presence of 1) dyslipidaemia, 2) hypertension, 3) diabetes, 4) family history of premature cardiovascular disease, 5) smoking [current smokers & former smokers (quit more than 30 days)] and 6) obesity (BMI>=23.0)

**Table 2.5.2 Presence of cumulative risk factors by gender, NCVD-PCI Registry, 2007-2012**

Gender	Presence of cumulative risk factors *	2007-2009		2010-2012		2007-2012	
		Total no. of patients = 10709		Total no. of patients = 13750		Total no. of patients = 24459	
		No.	%	No.	%	No.	%
<b>Male</b>	None	122	1.4	266	2.4	388	2.0
	1 risk factor	599	6.8	883	7.8	1482	7.4
	2 risk factors	1605	18.4	1898	16.7	3503	17.4
	3 risk factors	2613	30.0	3174	28.0	5787	28.8
	>3 risk factors	3792	43.4	5121	45.1	8913	44.4
	<b>Total</b>	<b>8731</b>	<b>100.0</b>	<b>11342</b>	<b>100.0</b>	<b>20073</b>	<b>100.0</b>
<b>Female</b>	None	32	1.6	63	2.6	95	2.2
	1 risk factor	131	6.6	185	7.6	316	7.2
	2 risk factors	426	21.6	460	19.2	886	20.2
	3 risk factors	662	33.4	801	33.2	1463	33.4
	>3 risk factors	727	36.8	899	37.4	1626	37.0
	<b>Total</b>	<b>1978</b>	<b>100.0</b>	<b>2408</b>	<b>100.0</b>	<b>4386</b>	<b>100.0</b>

\* Risk factors are defined as presence of 1) dyslipidaemia, 2) hypertension, 3) diabetes, 4) family history of premature cardiovascular disease, 5) smoking [included current smokers & former smokers(quit more than 30 days)] and 6) obesity (BMI>=23.0)



## CHAPTER 2 : **CLINICAL PRESENTATIONS & INVESTIGATIONS**

Zubin Ibrahim<sup>1</sup> • Sazzli Kasim<sup>1</sup> • Lee Chuey Yan<sup>2</sup>

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*1 Faculty Of Medicine, University Technology MARA, Selangor*

*2 Hospital Sultanah Aminah, Johor*



## CLINICAL PRESENTATIONS & INVESTIGATIONS

Zubin Ibrahim<sup>1</sup>, Sazzli Kasim<sup>1</sup>, Lee Chuey Yan<sup>2</sup>

<sup>1</sup> Faculty of Medicine, Univeristy Technology MARA, Selangor

<sup>2</sup> Hospital Sultanah Aminah, Johor

### Summary

1. Heart rate, blood pressure and rhythm remains similar for the six years (2007- 2012).
2. The majority of patients who underwent PCI had normal eGFR, with similar trends from 2007-2012. However, almost 10% had CKD stage 3-5.
3. The majority of 2010-2012 patients (80.8%) had a low TIMI risk index.
4. There is a low percentage of ischemic testing done prior to PCI of elective patients.
5. In 2010-2012, 34.8% of PCIs were in patients with ACS, and 59.6% of these were STEMI PCIs. Anterior STEMI (55.2%) remains the predominant presentation for STEMI patients.
6. In 2010-2012 there are more patients who presented with Killip Class II and IV. The use of IABP has increased (1.8% in 2007-2009 to 3.0% in 2010-2012).
7. The median door-to-balloon time was consistent at 90 minutes from the years 2007-2012, however symptom-to-door and transfer time remain high.

This topic will deal with the clinical presentation and relevant investigations at the time of PCI for patients enrolled in the registry between 2007-2012. Overall, there were 11621 procedures in 2007-2009 and 14862 in 2010-2012.

Heart rate and blood pressure were recorded at the start of each procedure. TIMI risk index (TRI) were analyzed between low, intermediate and high (<30, 30-70 and >70) respectively. This index is predictive of 30-day and long-term mortality in acute coronary syndrome (ACS). Functional ischemia relates to information obtained from either stress testing or imaging pre-procedure. Time to treatment follows current practice standards.

Heart rate (HR) and blood pressure differs little over the six years with 81.0% of patients having a presenting HR of less than 90 in 2007-2009 and 80.0% in 2010-2012. [Table 3.1] When compared of heart rate according to PCI status there is a difference between those going for elective PCI compared to NSTEMI/UA and AMI. From the years 2010-2012, HR less than 60 is highest in patient going for elective PCI (21.5%) compared to patients going for AMI PCI (7.2%). In contrast patients undergoing AMI PCI, 17.8% had a HR greater than 100 compared to 2.6% for elective PCI. This trend is similar for the 2007-2009 periods. [Table 3.3]

The mean systolic blood pressure for the years 2010-2012, was 134.8mmHg (SD 24), and mean diastolic blood pressure was 75.8mmHg (SD 12). [Table 3.1]

The majority of our patients during the two periods had a low TIMI Risk Index (TRI) (84.1 vs. 80.8% respectively). Most of the PCI performed in our NCVD-PCI registry were in patients with a low 30-day and long-term mortality. [Table 3.1]

Baseline ECG shows that majority of patients were in sinus rhythm (87.0% vs. 86.2% respectively). Atrial fibrillation remains at 1.0% of all rhythms recorded for 2007-2012. This is certainly lower than the 6.2-7.9% of patients with atrial fibrillation seen in the GRACE registry<sup>1</sup>. [Table 3.1]

Renal function recorded shows a similar profile from 2007 to 2012. The median eGFR for STEMI was 76.9mls/min/1.73m<sup>2</sup> (SD 4.1-212.5), NSTEMI 76.1mls/min/1.73m<sup>2</sup> (SD 2.8-172.1) and elective PCI of 74.8mls/min/1.73m<sup>2</sup> (SD 0.6-207.4) for the year 2007-2012. [Table 3.13] When the renal function is subdivided into stages: there were 10,011 (67.4%) with a GFR of greater and equal to 60ml/min (normal renal function), 1690 (11.4%) 45 to 60ml/min, 665 (4.4%) 30 to 45 ml/min, 296 (2%) 15 to 30 ml/min and 404 (2.7%) less than 15ml/min (stage 5 of Chronic Kidney Disease) respectively, in patients who underwent PCI during the years 2010-2012. Collectively, our data show that in almost 10.0% of all subjects, PCI is performed in patients with CKD stage 3 to 5. These trends were similar in patients during the earlier 2007-2009 registry data. [Table 3.1]

During the years 2010-2012 functional ischemia testing was positive in 19.3% of patients who underwent elective PCI. A similar trend was seen for the years 2007-2009 with 18.9% having a positive ischemic testing prior to elective PCI. For the years 2007-2012, less than 25.0% of elective PCI recorded prior ischemic testing. This is lower than a published report and recommendations from international guidelines<sup>2,4</sup>. [Table 3.16]

PCI in patients with ACS was 34.8% in 2010-2012 compared to 43.6% in 2007-2009. Of the ACS subtypes, STEMI PCI predominates with an increasing trend, from 51.8% in 2007-2009 to 59.6% in 2010-2012, a difference of almost six percents between the two groups, giving a six-year average of 54.8%. Of these, 55.2% were anterior STEMI in 2010-2012. There is more PCI for UA patients in 2010-2012 at 12.4% compared to 9.8% in 2007-2009. There is a reducing trend for NSTEMI at 27.0% for 2010-2012 compared to 37.6% for 2007-2009. [Table 3.1]

The proportion of STEMI patients in Killip class I was similar during the two periods (33.8% in 2010-2012 vs. 38.1% in 2007-2009). There is a doubling of patients in Killip class II from 22.1% in 2007-2009 to 43.8% in 2010-2012. [Table 3.1]

For STEMI PCIs with recorded time to treatment, the median symptom-to-door time for 2010-2012 was 205 minutes and for 2007-2009 was 195 minutes. Median door-to-balloon time was consistent at 90 minutes for both 2007-2009 and 2010-2012. [Table 3.1]

Overall recorded transfer time for patients presenting to a non-cardiac centre remains long. In patients transferred in 2007-2009, the median time was 180 minutes. Those in 2010-2012 had a median time of 220 minutes. There was no improvement in symptom to door time in those patients transferred to a PCI centre, with 260 minutes in 2007-2009 and 271 minutes in 2010-2012. [Table 3.2.1]



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Table 3.1 Patient clinical status at time of PCI procedure, NCVS-PCI Registry, 2007-2012

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Clinical examination</b>												
Heart rate at presentation, beats/minute												
N		10732		4208		4399		4776		13383		24115
Mean (SD)		71.6 (15.7)		71.1 (15.3)		71.0 (16.5)		71.0 (16.3)		71.0 (16.1)		71.3 (15.9)
Median (min,max)		70.0 (25.0, 193.0)		69.5 (30.0, 175.0)		68.0 (29.0, 185.0)		68.0 (32.0, 188.0)		69.0 (29.0, 188.0)		69.0 (25.0, 193.0)
Missing, No. (%)	889	7.6	254	5.6	488	10.0	737	13.4	1479	10.0	2368	9.0
Heart rate at presentation, beats/minute, No. (%)												
<90	9404	81.0	3726	83.6	3917	80.2	4235	76.8	11878	80.0	21282	80.4
≥90	1328	11.4	482	10.8	482	9.8	541	9.8	1505	10.0	2833	10.6
Missing	889	7.6	254	5.6	488	10.0	737	13.4	1479	10.0	2368	9.0
Systolic blood pressure, mmHg												
N		10678		4143		4302		4714		13159		23837
Mean (SD)		138.4 (26.1)		137.3 (25.0)		133.9 (24.3)		133.3 (23.3)		134.8 (24.3)		136.4 (25.2)
Median (min,max)		137.0 (60.0, 230.0)		135.0 (62.0, 227.0)		131.0 (61.0, 227.0)		131.0 (63.0, 226.0)		132.0 (61.0, 227.0)		134.0 (60.0, 230.0)
Missing, No. (%)	943	8.1	319	7.2	585	12.0	799	14.5	1703	11.5	2646	10.0

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Systolic blood pressure, mmHg, No. (%)												
<90	130	1.1	35	0.8	39	0.8	57	1.0	131	0.8	261	1.0
≥90	10548	90.8	4108	92.0	4263	87.2	4657	84.5	13028	87.7	23576	89.0
Missing	943	8.1	319	7.2	585	12.0	799	14.5	1703	11.5	2646	10.0
Diastolic blood pressure, mmHg												
N		10681		4128		4287		4702		13117		23798
Mean (SD)		76.9 (13.0)		76.1 (12.7)		75.6 (12.5)		75.7 (12.5)		75.8 (12.5)		76.3 (12.8)
Median (min,max)		78.0 (10.0, 120.0)		76.0 (20.0, 120.0)		75.0 (18.0, 120.0)		76.0 (21.0, 120.0)		76.0 (18.0, 120.0)		76.0 (10.0, 120.0)
Missing, No. (%)	940	8.0	334	7.4	600	12.2	811	14.8	1745	11.8	2685	10.2
TIMI risk index (TRI)												
N		10485		4125		4273		4659		13057		23542
Mean (SD)		17.6 (7.9)		18.2 (7.9)		18.6 (8.4)		18.8 (8.4)		18.5 (8.3)		18.1 (8.1)
Median (min,max)		16.1 (2.8, 90.1)		16.9 (2.8, 105.2)		17.1 (2.7, 97.7)		17.3 (2.1, 91.1)		17.1 (2.1, 105.2)		16.6 (2.1, 105.2)
Missing, No. (%)	1136	9.8	337	7.6	614	12.6	854	15.5	1805	12.2	2941	11.2
TRI classification, No. (%)												
Low <30	9772	84.1	3820	85.6	3924	80.3	4263	77.4	12007	80.8	21779	82.2
Intermediate 30-70	702	6.1	303	6.8	346	7.1	391	7.1	1040	7.0	1742	6.6
High >70	11	0.0	2	0.0	3	0.0	5	0.0	10	0.0	21	0.0
Missing	1136	9.8	337	7.6	614	12.6	854	15.5	1805	12.2	2941	11.2

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Baseline ECG, No. (%)												
Sinus rhythm	10103	87.0	3997	89.6	4181	85.6	4626	84.0	12804	86.2	22907	86.4
Atrial fibrillation	107	1.0	59	1.4	36	0.8	54	1.0	149	1.0	256	1.0
2 <sup>nd</sup> /3 <sup>rd</sup> AVB	65	0.6	20	0.4	12	0.2	14	0.2	46	0.4	111	0.4
LBBB	58	0.4	23	0.6	9	0.2	17	0.4	49	0.4	107	0.4
RBBB	92	0.8	38	0.8	10	0.2	15	0.2	63	0.4	155	0.6
NYHA, No. (%)												
Total no. of procedures among patients with heart failure	464	100	192	100	178	100	135	100	505	100	969	100
NYHA I	133	28.6	64	33.4	60	33.8	49	36.3	173	34.2	306	31.6
NYHA II	224	48.3	105	54.6	82	46.0	52	38.7	239	47.4	463	47.8
NYHA III	76	16.5	18	9.4	24	13.4	12	8.8	54	10.6	130	13.4
NYHA IV	19	4.0	4	2.0	6	3.4	6	4.4	16	3.2	35	3.6
Not available	10	2.2	1	0.6	6	3.4	16	11.8	23	4.6	33	3.4
Missing	2	0.4	0	0	0	0	0	0	0	0	2	0.2
Functional ischaemia, No. (%)												
Positive	2088	18.0	754	16.9	741	15.2	1101	19.9	2596	17.5	4684	17.7
Negative	221	2.0	49	1.0	73	1.4	97	1.8	219	1.5	440	1.6
Equivocal	118	1.0	56	1.2	49	1.0	53	1.0	158	1.0	276	1.0
Not applicable	8997	77.4	3585	80.5	3959	81.0	4175	75.7	11719	78.8	20716	78.3
Missing	197	1.6	18	0.4	65	1.4	87	1.6	170	1.2	367	1.4

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Canadian cardiovascular score (CCS), No. (%)												
CCS 1	4140	35.6	1081	24.1	950	19.3	1364	24.8	3395	22.9	7535	28.4
CCS 2	4489	38.6	2363	53.0	2443	50.0	1945	35.2	6751	45.4	11240	42.4
CCS 3	548	4.8	286	6.4	251	5.2	255	4.6	792	5.4	1340	5.0
CCS 4	316	2.8	104	2.4	136	2.8	244	4.4	484	3.2	800	3.0
Asymptomatic	1357	11.6	505	11.3	661	13.5	688	12.4	1854	12.5	3211	12.2
Not available	527	4.6	72	1.6	299	6.2	790	14.4	1161	7.8	1688	6.4
Missing	244	2.0	51	1.2	147	3.0	227	4.2	425	2.8	669	2.6
Intra-aortic balloon pump (IABP), No. (%)												
Yes	211	1.8	103	2.4	166	3.4	168	3.1	437	3.0	648	2.4
No	11283	97.1	4328	97.0	4610	94.4	5231	94.8	14169	95.3	25452	96.2
Missing	127	1.1	31	0.6	111	2.2	114	2.1	256	1.7	383	1.4
Acute coronary syndrome (ACS), No. (%)												
Yes	5076	43.6	1691	37.8	1870	38.2	1619	29.4	5180	34.8	10256	38.7
No	6458	55.6	2771	62.2	3017	61.8	3894	70.6	9682	65.2	16140	60.9
Missing	87	0.8	0	0	0	0	0	0	0	0	87	0.4

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
ACS type, No. (%)												
STEMI	2632	51.8	965	57.0	1157	61.8	968	59.8	3090	59.6	5722	55.8
NSTEMI	1912	37.6	489	29.0	526	28.2	381	23.6	1396	27.0	3308	32.2
UA	495	9.8	231	13.6	177	9.4	237	14.6	645	12.4	1140	11.2
Not available	27	0.6	6	0.4	10	0.6	33	2.0	49	1.0	76	0.8
Missing	10	0.2	0	0	0	0	0	0	0	0	10	0.0
STEMI, No. (%)												
Anterior	1429	54.2	585	60.6	638	55.1	485	50.2	1708	55.2	3137	54.8
Non-anterior	845	32.2	329	34.0	405	35.0	337	34.8	1071	34.7	1916	33.5
Not available	90	3.4	7	0.8	22	1.9	20	2.0	49	1.7	139	2.5
Missing	268	10.2	44	4.6	92	8.0	126	13.0	262	8.4	530	9.2
Ejection fraction (EF) status												
N		4139		2038		1578		1875		5491		9630
Mean (SD)		51.8 (12.9)		51.7 (12.4)		51.2 (12.8)		51.5 (12.4)		51.5 (12.5)		51.6 (12.7)
Median (min,max)		53.0 (10.0, 80.0)		53.0 (15.0, 80.0)		53.0 (18.0, 79.0)		53.0 (14.0, 80.0)		53.0 (14.0, 80.0)		53.0 (10.0, 80.0)
Not available, No. (%)	7112	61.2	2233	50.0	2983	61.0	3276	59.4	8492	57.1	15604	59.0
Missing, No. (%)	370	3.2	191	4.2	326	6.6	362	6.6	879	6.0	1249	4.8

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Ejection fraction (EF) status, No. (%)												
<30	186	1.6	88	2.0	74	1.6	75	1.4	237	1.6	423	1.6
30-<45	955	8.2	491	11.0	386	7.9	426	7.8	1303	8.8	2258	8.6
45-<55	1103	9.4	515	11.6	386	7.9	498	9.0	1399	9.4	2502	9.3
≥55	1895	16.4	944	21.2	732	15.0	876	15.8	2552	17.1	4447	16.7
Not available	7112	61.2	2233	50.0	2983	61.0	3276	59.4	8492	57.1	15604	59.0
Missing	370	3.2	191	4.2	326	6.6	362	6.6	879	6.0	1249	4.8
Killip class, No. (%)												
Total no. of procedures among patients with STEMI	2632	100	965	100	1157	100	968	100	3090	100	5722	100
I	1003	38.1	266	27.6	346	30.0	431	44.6	1043	33.8	2046	35.9
II	582	22.1	522	54.0	583	50.3	250	25.8	1355	43.8	1937	33.9
III	61	2.3	18	1.8	13	1.2	25	2.6	56	1.8	117	2.0
IV	88	3.3	63	6.6	106	9.1	101	10.4	270	8.8	358	6.2
Not applicable/Not available	869	33.0	95	9.8	102	8.8	151	15.6	348	11.2	1217	21.2
Missing	29	1.2	1	0.2	7	0.6	10	1.0	18	0.6	47	0.8

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<b>STEMI : Time-to-treatment analysis</b>												
*Symptom-to-door time, minutes												
N		333		106		88		160		354		687
Mean (SD)		258.1 (205.9)		268.6 (232.9)		326.9 (242.9)		265.5 (231.5)		281.7 (235.6)		270.3 (221.8)
Median (min,max)		195.0 (10.0,1000.0)		177.5 (10.0, 1070.0)		252.5 (30.0, 1040.0)		190.5 (13.0, 1350.0)		205.0 (10.0, 1350.0)		197.0 (10.0, 1350.0)
Negative/zero, No. (%)	56	2.1	18	1.9	15	1.3	24	2.5	57	1.8	113	2.0
Not available, No. (%)	2243	85.2	841	87.2	1054	91.1	784	81.0	2679	86.7	4922	86.0
*Door-to-balloon time, minutes												
N		322		113		84		147		344		666
Mean (SD)		134.4 (138.8)		128.7 (124.7)		136.5 (133.3)		161.3 (190.7)		144.5 (158.3)		139.6 (149.2)
Median (min,max)		90.0 (5.0,870.0)		90.0 (11.0, 785.0)		93.5 (3.0, 754.0)		88.0 (11.0, 963.0)		90.0 (3.0, 963.0)		90.0 (3.0, 963.0)
Negative/zero, No. (%)	40	1.5	9	0.9	14	1.2	14	1.4	37	1.2	77	1.3
Not available, No. (%)	2270	86.2	843	87.4	1059	91.5	807	83.4	2709	87.7	4979	87.0
*Door-to-balloon time, minutes, No. (%)												
<90	159	6.1	54	5.6	39	3.4	75	7.7	168	5.4	327	5.7
≥90	163	6.2	59	6.1	45	3.9	72	7.5	176	5.7	339	5.9
Negative/zero, No. (%)	40	1.5	9	0.9	14	1.2	14	1.4	37	1.2	77	1.3
Not available	2270	86.2	843	87.4	1059	91.5	807	83.4	2709	87.7	4979	87.1

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
*Transfer time												
N		93		24		34		49		107		200
Mean (SD)		263.5 (236.7)		221.4 (165.8)		273.2 (182.4)		250.9 (165.2)		251.4 (170.4)		257.0 (203.5)
Median (min,max)		180.0 (15.0, 1260.0)		138.0 (42.0, 556.0)		242.0 (15.0, 940.0)		213.0 (25.0, 682.0)		220.0 (15.0, 940.0)		201.5 (15.0, 1260.0)
Negative/zero, No. (%)	50	1.9	9	0.9	22	1.9	40	4.1	71	2.3	121	2.1
Not available, No. (%)	2489	94.6	932	96.6	1101	95.2	879	90.8	2912	94.2	5401	94.4
Glomerular filtration rate (GFR), MDRD, No. (%)												
<15	368	3.2	118	2.6	143	2.8	143	2.6	404	2.7	772	2.9
15-<30	237	2.0	99	2.4	86	1.8	111	2.1	296	2.0	533	2.0
30-<45	620	5.3	247	5.5	196	4.0	222	4.0	665	4.4	1285	4.9
45-<60	1763	15.2	576	12.9	541	11.1	573	10.4	1690	11.4	3453	13.0
≥60	8068	69.4	3072	68.8	3321	68.0	3618	65.6	10011	67.4	18079	68.3
Missing	565	4.9	350	7.8	600	12.3	846	15.3	1796	12.1	2361	8.9

\* Only applicable to STEMI patients



**Table 3.2.1 Time to treatment for STEMI, with transfer, by years, NCVI-PCI Registry, 2007-2012**

Year	With transfer					
	2007	2008	2009	2010	2011	2012
Symptom- to -door time (minutes)						
N	50	37	32	23	46	68
Mean (SD)	315.8 (219.9)	327.4 (246.4)	277.5 (188.3)	292.3 (221.6)	391.6 (260.3)	319.9 (270.7)
Median (min,max)	267.5 (22.0, 881.0)	260.0 (44.0, 1000.0)	230.5 (13.0, 630.0)	210.0 (40.0, 720.0)	355.0 (45.0, 1040.0)	244.5 (13.0, 1350.0)
Door- to -balloon time (minutes)						
N	42	32	32	27	40	67
Mean (SD)	111.4 (110.9)	105.7 (153.0)	130.8 (166.0)	70.8 (57.1)	123.7 (146.7)	205.8 (249.2)
Median (min,max)	86.5 (5.0, 542.0)	58.0 (17.0, 680.0)	77.5 (10.0, 842.0)	60.0 (14.0, 316.0)	73.0 (10.0, 754.0)	88.0 (11.0, 963.0)
Transfer- to -PCI centre time (minutes)						
N	34	28	31	24	34	49
Mean (SD)	304.4 (277.3)	248.9 (213.1)	231.7 (207.8)	221.4 (165.8)	273.2 (182.4)	250.9 (165.2)
Median (min,max)	237.0 (15.0, 1260.0)	177.5 (15.0, 840.0)	155.0 (30.0, 855.0)	138.0 (42.0, 556.0)	242.0 (15.0, 940.0)	213.0 (25.0, 682.0)
Symptom- to -balloon time (minutes)						
N	40	32	29	20	35	80
Mean (SD)	409.9 (196.7)	366.3 (210.0)	376.9 (257.0)	321.8 (223.5)	454.4 (270.5)	431.7 (311.1)
Median (min,max)	389.0 (90.0, 806.0)	333.5 (63.0, 868.0)	265.0 (41.0, 967.0)	213.0 (90.0, 840.0)	390.0 (60.0, 1140.0)	332.5 (63.0, 1412.0)



Table 3.2.2 Time to treatment for STEMI, without transfer, by years, NCVD-PCI Registry, 2007-2012

Year	Without transfer					
	2007	2008	2009	2010	2011	2012
Symptom- to -door time (minutes)						
N	43	55	88	74	32	65
Mean (SD)	223.1 (183.4)	245.0 (194.0)	241.5 (206.2)	264.9 (243.6)	257.2 (191.0)	225.2 (203.7)
Median (min,max)	152.0 (22.0, 955.0)	191.0 (30.0, 802.0)	172.5 (10.0, 890.0)	170.0 (10.0, 1070.0)	233.5 (30.0, 690.0)	135.0 (15.0, 840.0)
Door- to -balloon time (minutes)						
N	39	52	96	76	34	52
Mean (SD)	126.6 (90.9)	162.5 (162.8)	135.2 (126.4)	142.4 (114.7)	160.6 (130.4)	147.8 (127.8)
Median (min,max)	104.0 (30.0, 498.0)	110.5 (7.0, 870.0)	94.0 (24.0, 639.0)	103.5 (13.0, 660.0)	130.5 (3.0, 608.0)	101.5 (30.0,650.0)
Symptom- to -balloon time (minutes)						
N	36	44	83	68	31	57
Mean (SD)	313.9 (167.6)	350.3 (209.4)	343.5 (216.9)	387.6 (257.0)	413.3 (233.8)	348.8 (195.1)
Median (min,max)	294.0 (84.0, 719.0)	301.0 (32.0, 945.0)	284.0 (43.0, 974.0)	323.5 (2.0, 1175.0)	375.0 (90.0, 1080.0)	285.0 (98.0,873.0)

**Table 3.2.3 Summary of Time to treatment for STEMI, comparing patients with or without transfer, NCVI-PCI Registry, 2007-2012**

Year	With transfer			Without transfer		
	2007-2009	2010-2012	2007-2012	2007-2009	2010-2012	2007-2012
Symptom- to -door time (minutes)						
N	119	137	256	186	171	357
Mean (SD)	309.1 (219.8)	339.3 (260.7)	325.3 (242.5)	238.3 (196.7)	248.4 (219.3)	243.1 (207.6)
Median (min,max)	260.0 (13.0, 1000.0)	271.0 (13.0, 1350.0)	263.5 (13.0, 1350.0)	180.0 (10.0, 955.0)	170.0 (10.0, 1070.0)	175.0 (10.0, 1070.0)
Door- to -balloon time (minutes)						
N	106	134	240	187	162	349
Mean (SD)	115.5 (141.3)	154.1 (202.0)	137.0 (178.4)	141.0 (131.5)	148.0 (121.8)	144.2 (127.0)
Median (min,max)	72.0 (5.0, 842.0)	76.5 (10.0, 963.0)	74.0 (5.0, 963.0)	101.0 (7.0, 870.0)	105.0 (3.0, 660.0)	104.0 (3.0, 870.0)
Transfer- to -PCI centre time (minutes)						
N	93	107	200	N/A	N/A	N/A
Mean (SD)	263.5 (236.7)	251.4 (170.4)	257.0 (203.5)	N/A	N/A	N/A
Median (min,max)	180.0 (15.0, 1260.0)	220.0 (15.0, 940.0)	201.5 (15.0, 1260.0)	N/A	N/A	N/A
Symptom- to -balloon time (minutes)						
N	101	135	236	163	156	319
Mean (SD)	386.6 (218.2)	421.3 (290.8)	406.4 (262.2)	338.8 (204.2)	378.5 (231.3)	358.2 (218.4)
Median (min,max)	360.0 (41.0, 967.0)	337.0 (60.0, 1412.0)	353.0 (41.0, 1412.0)	298.0 (32.0, 974.0)	322.0 (2.0, 1175.0)	300.0 (2.0, 1175.0)

Table 3.3 Comparison of heart rate according to PCI status, NCVD-PCI Registry, 2007-2012

Year	Heart rate (beats/min)	Elective		NSTEMI/UA		AMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007-2009 Total no. of procedures = 11621	<60	1925	18.3	62	11.8	55	9.4	7	28.0	2	13.4
	60-80	5876	56.2	251	47.8	195	33.5	12	48.0	7	46.7
	>80-100	1540	14.7	132	25.0	184	31.6	5	20.0	1	6.6
	>100	319	3.0	42	8.0	116	19.9	0	0	1	6.6
	Missing	812	7.8	39	7.4	33	5.6	1	4.0	4	26.7
	<b>Total</b>	<b>10472</b>	<b>100.0</b>	<b>526</b>	<b>100.0</b>	<b>583</b>	<b>100.0</b>	<b>25</b>	<b>100.0</b>	<b>15</b>	<b>100.0</b>
2010-2012 Total no. of procedures = 14862	<60	2704	21.5	124	14.2	101	7.2	0	0	0	0
	60-80	6706	53.4	441	50.6	486	34.2	0	0	1	50.0
	>80-100	1676	13.3	165	19.0	359	25.2	0	0	0	0
	>100	327	2.6	40	4.6	253	17.8	0	0	0	0
	Missing	1154	9.2	101	11.6	223	15.6	0	0	1	50.0
	<b>Total</b>	<b>12567</b>	<b>100.0</b>	<b>871</b>	<b>100.0</b>	<b>1422</b>	<b>100.0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>100.0</b>
2007-2012 Total no. of procedures = 26483	<60	4629	20.0	186	13.4	156	7.8	7	28.0	2	11.8
	60-80	12582	54.6	692	49.6	681	34.0	12	48.0	8	47.0
	>80-100	3216	14.0	297	21.2	543	27.0	5	20.0	1	5.9
	>100	646	2.8	82	5.8	369	18.4	0	0	1	5.9
	Missing	1966	8.6	140	10.0	256	12.8	1	4.0	5	29.4
	<b>Total</b>	<b>23039</b>	<b>100.0</b>	<b>1397</b>	<b>100.0</b>	<b>2005</b>	<b>100.0</b>	<b>25</b>	<b>100.0</b>	<b>17</b>	<b>100.0</b>

Table 3.4 Comparison of heart rate according to ACS subtypes, NCVI-PCI Registry, 2007-2012

Year	Heart rate (beats/min)	STEMI		NSTEMI		UA		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007-2009 Total no. of procedures = 11621	<60	371	14.0	351	18.4	86	17.4	5	18.5	2	20.0
	60-80	1382	52.6	1044	54.6	272	55.0	11	40.8	5	50.0
	>80-100	564	21.4	359	18.8	80	16.2	2	7.4	3	30.0
	>100	188	7.2	96	5.0	17	3.4	1	3.8	0	0
	Missing	127	4.8	62	3.2	40	8.0	8	29.5	0	0
	<b>Total</b>	<b>2632</b>	<b>100.0</b>	<b>1912</b>	<b>100.0</b>	<b>495</b>	<b>100.0</b>	<b>27</b>	<b>100.0</b>	<b>10</b>	<b>100.0</b>
2010-2012 Total no. of procedures = 14862	<60	456	14.8	285	20.4	121	18.7	3	6.2	0	0
	60-80	1411	45.5	734	52.6	309	48.0	15	30.6	0	0
	>80-100	603	19.6	227	16.2	90	14.0	7	14.2	0	0
	>100	308	10.0	55	4.0	23	3.6	1	2.0	0	0
	Missing	312	10.1	95	6.8	102	15.7	23	47.0	0	0
	<b>Total</b>	<b>3090</b>	<b>100.0</b>	<b>1396</b>	<b>100.0</b>	<b>645</b>	<b>100.0</b>	<b>49</b>	<b>100.0</b>	<b>0</b>	<b>0</b>
2007-2012 Total no. of procedures = 26483	<60	827	14.4	636	19.2	207	18.1	8	10.6	2	20.0
	60-80	2793	48.8	1778	53.7	581	51.0	26	34.2	5	50.0
	>80-100	1167	20.4	586	17.7	170	15.0	9	11.8	3	30.0
	>100	496	8.7	151	4.6	40	3.6	2	2.6	0	0
	Missing	439	7.7	157	4.8	142	12.3	31	40.8	0	0
	<b>Total</b>	<b>5722</b>	<b>100.0</b>	<b>3308</b>	<b>100.0</b>	<b>1140</b>	<b>100.0</b>	<b>76</b>	<b>100.0</b>	<b>10</b>	<b>100.0</b>



Table 3.5 Comparison of systolic blood pressure according to PCI status, NCVD-PCI Registry, 2007-2012

Year	Systolic BP (mmHg)	Elective	NSTEMI	STEMI	Not available	Missing
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2007-2009 Total no. of procedures = 11621	< 90	70 (0.7)	17 (3.2)	43 (7.3)	0 (0)	0 (0)
	≥ 90	9554 (91.2)	465 (88.4)	493 (84.6)	25 (100)	11 (73.3)
	Missing	848 (8.1)	44 (8.4)	47 (8.1)	0 (0)	4 (26.7)
	<b>Total</b>	<b>10472 (100.0)</b>	<b>526 (100.0)</b>	<b>583 (100.0)</b>	<b>25 (100.0)</b>	<b>15 (100.0)</b>
2010-2012 Total no. of procedures = 14862	< 90	51 (0.4)	13 (1.5)	67 (4.7)	0 (0)	0 (0)
	≥ 90	11183 (89.0)	738 (84.7)	1106 (77.8)	0 (0)	1 (50.0)
	Missing	1333 (10.6)	120 (13.8)	249 (17.5)	0 (0)	1 (50.0)
	<b>Total</b>	<b>12567 (100.0)</b>	<b>871 (100.0)</b>	<b>1422 (100.0)</b>	<b>0 (0)</b>	<b>2 (100.0)</b>
2007-2012 Total no. of procedures = 26483	< 90	121 (0.5)	30 (2.2)	110 (5.4)	0 (0)	0 (0)
	≥ 90	20737 (90.0)	1203 (86.1)	1599 (79.8)	25 (100)	12 (70.6)
	Missing	2181 (9.5)	164 (11.7)	296 (14.8)	0 (0)	5 (29.4)
	<b>Total</b>	<b>23039 (100.0)</b>	<b>1397 (100.0)</b>	<b>2005 (100.0)</b>	<b>25 (100.0)</b>	<b>17 (100.0)</b>

Table 3.6 Comparison of arterial blood pressure according to PCI status, NCVD-PCI Registry, 2007-2012

Year	Arterial blood pressure, mmHg	Elective	NSTEMI	STEMI	Not available	Missing
2007-2009 Total no. of procedures = 11621	N	9601	481	533	25	11
	Mean (SD)	97.8 (14.9)	94.2 (16.0)	92.8 (18.6)	97.6 (15.7)	102.7 (14.7)
	Median (min,max)	96.7 (46.7, 153.3)	94.3 (48.7, 145.3)	93.0 (43.3, 149.7)	101.0 (71.3, 124.7)	102.0 (77.3, 127.3)
	Missing, No. (%)	871 (8.3)	45 (8.6)	50 (8.6)	0 (0)	4 (26.7)
2010-2012 Total no. of procedures = 14862	N	11188	749	1162	0	1
	Mean (SD)	96.0 (13.7)	94.1 (15.0)	91.3 (17.6)	N/A	112.0 (.)
	Median (min,max)	95.3 (44.0, 155.0)	93.3 (56.3, 148.7)	91.0 (39.0, 150.0)	N/A	112.0 (112.0, 112.0)
	Missing, No. (%)	1379 (11.0)	122 (14.0)	260 (18.3)	0 (0)	1 (50.0)
2007-2012 Total no. of procedures = 26483	N	20789	1230	1695	25	12
	Mean (SD)	96.8 (14.3)	94.1 (15.4)	91.7 (18.0)	97.6 (15.7)	103.5 (14.2)
	Median (min,max)	96.3 (44.0, 155.0)	93.3 (48.7, 148.7)	91.7 (39.0, 150.0)	101.0 (71.3, 124.7)	104.3 (77.3, 127.3)
	Missing, No. (%)	2250 (9.8)	167 (12.0)	310 (15.5)	0 (0)	5 (29.4)

Table 3.7 Comparison of TIMI risk index according to PCI status, NCD-PCI Registry, 2007-2012

Year	TIMI Risk Index	Elective		NSTEMI		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007-2009 Total no. of procedures = 11621	Low (<30)	8915	85.1	406	77.2	419	71.9	21	84.0	11	73.3
	Intermediate (30-70)	530	5.1	64	12.2	105	18.0	3	12.0	0	0
	High (>70)	1	0.0	5	1.0	5	0.9	0	0	0	0
	Missing	1026	9.8	51	9.6	54	9.2	1	4.0	4	26.7
	<b>Total</b>	<b>10472</b>	<b>100.0</b>	<b>526</b>	<b>100.0</b>	<b>583</b>	<b>100.0</b>	<b>25</b>	<b>100.0</b>	<b>15</b>	<b>100.0</b>
2010-2012 Total no. of procedures = 14862	Low (<30)	10455	83.2	657	75.4	894	62.9	0	0	1	50.0
	Intermediate (30-70)	699	5.6	86	9.9	255	17.9	0	0	0	0
	High (>70)	1	0.0	2	0.2	7	0.5	0	0	0	0
	Missing	1412	11.2	126	14.5	266	18.7	0	0	1	50.0
	<b>Total</b>	<b>12567</b>	<b>100.0</b>	<b>871</b>	<b>100.0</b>	<b>1422</b>	<b>100.0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>100.0</b>
2007-2012 Total no. of procedures = 26483	Low (<30)	19370	84.1	1063	76.1	1313	65.5	21	84.0	12	70.6
	Intermediate (30-70)	1229	5.3	150	10.7	360	18.0	3	12.0	0	0
	High (>70)	2	0.0	7	0.5	12	0.5	0	0	0	0
	Missing	2438	10.6	177	12.7	320	16.0	1	4.0	5	29.4
	<b>Total</b>	<b>23039</b>	<b>100.0</b>	<b>1397</b>	<b>100.0</b>	<b>2005</b>	<b>100.0</b>	<b>25</b>	<b>100.0</b>	<b>17</b>	<b>100.0</b>

Table 3.8 Comparison of ejection fraction according to PCI status, NCVI-PCI Registry, 2007-2012

Year	Ejection fraction (EF)	Elective		NSTEMI		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007-2009 Total no. of procedures = 11621	<30	168	1.6	5	1.0	13	2.2	0	0	0	0
	30-<45	824	7.9	48	9.1	83	14.2	0	0	0	0
	45-<55	958	9.1	54	10.3	86	14.8	4	16.0	1	6.7
	≥55	1810	17.3	47	8.9	35	6.0	3	12.0	0	0
	Not available	6394	61.1	349	66.3	348	59.7	18	72.0	3	20.0
	Missing	318	3.0	23	4.4	18	3.1	0	0	11	73.3
	<b>Total</b>	<b>10472</b>	<b>100.0</b>	<b>526</b>	<b>100.0</b>	<b>583</b>	<b>100.0</b>	<b>25</b>	<b>100.0</b>	<b>15</b>	<b>100.0</b>
2010-2012 Total no. of procedures = 14862	<30	192	1.5	20	2.3	25	1.8	0	0	0	0
	30-<45	1082	8.6	72	8.3	149	10.5	0	0	0	0
	45-<55	1181	9.4	78	9.0	140	9.8	0	0	0	0
	≥55	2364	18.8	111	12.7	76	5.3	0	0	1	50.0
	Not available	7055	56.2	520	59.7	917	64.5	0	0	0	0
	Missing	693	5.5	70	8.0	115	8.1	0	0	1	50.0
	<b>Total</b>	<b>12567</b>	<b>100.0</b>	<b>871</b>	<b>100.0</b>	<b>1422</b>	<b>100.0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>100.0</b>
2007-2012 Total no. of procedures = 26483	<30	360	1.6	25	1.8	38	1.9	0	0	0	0
	30-<45	1906	8.3	120	8.6	232	11.6	0	0	0	0
	45-<55	2139	9.3	132	9.4	226	11.3	4	16.0	1	5.9
	≥55	4174	18.1	158	11.3	111	5.5	3	12.0	1	5.9
	Not available	13449	58.3	869	62.2	1265	63.1	18	72.0	3	17.6
	Missing	1011	4.4	93	6.7	133	6.6	0	0	12	70.6
	<b>Total</b>	<b>23039</b>	<b>100.0</b>	<b>1397</b>	<b>100.0</b>	<b>2005</b>	<b>100.0</b>	<b>25</b>	<b>100.0</b>	<b>17</b>	<b>100.0</b>



Table 3.9 Comparison of New York Heart Association classification according to PCI status among patients with heart failure, NCVS-PCI Registry, 2007-2012

Year	NYHA classification	Elective		NSTEMI		STEMI		Not available	
		No.	%	No.	%	No.	%	No.	%
2007-2009 Total no. of procedures = 464	NYHA I	123	30.2	4	15.4	5	17.2	1	100.0
	NYHA II	199	48.8	13	50.0	12	41.4	0	0
	NYHA III	67	16.4	4	15.4	5	17.2	0	0
	NYHA IV	9	2.2	4	15.4	6	20.7	0	0
	Not available	9	2.2	0	0	1	3.5	0	0
	Missing	1	0.2	1	3.8	0	0	0	0
2010-2012 Total no. of procedures = 505	<b>Total</b>	<b>408</b>	<b>100.0</b>	<b>26</b>	<b>100.0</b>	<b>29</b>	<b>100.0</b>	<b>1</b>	<b>100.0</b>
	NYHA I	154	36.4	10	18.5	9	32.2	0	0
	NYHA II	214	50.6	22	40.7	3	10.6	0	0
	NYHA III	33	7.8	14	25.9	7	25.0	0	0
	NYHA IV	2	0.5	5	9.3	9	32.2	0	0
	Not available	20	4.7	3	5.6	0	0	0	0
2007-2012 Total no. of procedures = 969	Missing	0	0	0	0	0	0	0	0
	<b>Total</b>	<b>423</b>	<b>100.0</b>	<b>54</b>	<b>100.0</b>	<b>28</b>	<b>100.0</b>	<b>0</b>	<b>0</b>
	NYHA I	277	33.3	14	17.5	14	24.6	1	100.0
	NYHA II	413	49.7	35	43.8	15	26.2	0	0
	NYHA III	100	12.0	18	22.5	12	21.2	0	0
	NYHA IV	11	1.3	9	11.3	15	26.2	0	0
2007-2012 Total no. of procedures = 969	Not available	29	3.5	3	3.8	1	1.8	0	0
	Missing	1	0.2	1	1.1	0	0	0	0
	<b>Total</b>	<b>831</b>	<b>100.0</b>	<b>80</b>	<b>100.0</b>	<b>57</b>	<b>100.0</b>	<b>1</b>	<b>100.0</b>

Table 3.10 Comparison of previous PCI according to PCI status, NCVD-PCI Registry, 2007-2012

Year	Previous PCI	Elective	NSTEMI	STEMI	Not available	Missing
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2007-2009 Total no. of procedures = 11621	Yes	2475 (23.6)	95 (18.1)	74 (12.7)	5 (20.0)	2 (13.3)
	No	7985 (76.3)	430 (81.7)	509 (87.3)	20 (80.0)	7 (46.7)
	Missing	12 (0.1)	1 (0.2)	0 (0)	0 (0)	6 (40.0)
	<b>Total</b>	<b>10472 (100.0)</b>	<b>526 (100.0)</b>	<b>583 (100.0)</b>	<b>25 (100.0)</b>	<b>15 (100.0)</b>
2010-2012 Total no. of procedures = 14862	Yes	3086 (24.6)	189 (21.7)	95 (6.7)	0 (0)	0 (0)
	No	9481 (75.4)	682 (78.3)	1327 (93.3)	0 (0)	2 (100)
	Missing	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	<b>Total</b>	<b>12567 (100.0)</b>	<b>871 (100.0)</b>	<b>1422 (100.0)</b>	<b>0 (0)</b>	<b>2 (100.0)</b>
2007-2012 Total no. of procedures = 26483	Yes	5561 (24.1)	284 (20.3)	169 (8.4)	5 (20.0)	2 (11.8)
	No	17466 (75.8)	1112 (79.6)	1836 (91.6)	20 (80.0)	9 (52.9)
	Missing	12 (0.1)	1 (0.1)	0 (0)	0 (0)	6 (35.3)
	<b>Total</b>	<b>23039 (100.0)</b>	<b>1397 (100.0)</b>	<b>2005 (100.0)</b>	<b>25 (100.0)</b>	<b>17 (100.0)</b>

Table 3.11 Comparison of HbA1c according to PCI status, NCVD-PCI Registry, 2007-2012

Year	HbA1c, mmol/L	Elective	NSTEMI	STEMI	Not available	Missing
2007-2009 Total no. of procedures = 11621	N	9	0	0	0	0
	Mean (SD)	8.3 (3.5)	N/A	N/A	N/A	N/A
	Median (min,max)	6.8 (5.2, 15.9)	N/A	N/A	N/A	N/A
	Missing, No. (%)	10463 (99.9)	526 (100)	583 (100)	25 (100)	15 (100)
2010-2012 Total no. of procedures = 14862	N	3483	142	139	0	0
	Mean (SD)	8.2 (16.8)	7.6 (2.1)	10.9 (19.4)	N/A	N/A
	Median (min,max)	7.0 (0.9, 908.0)	7.2 (4.0, 15.8)	7.3 (2.3, 165.0)	N/A	N/A
	Missing, No. (%)	9084 (72.3)	729 (83.7)	1283 (90.2)	0 (0)	2 (100)
2007-2012 Total no. of procedures = 26483	N	3492	142	139	0	0
	Mean (SD)	8.2 (16.8)	7.6 (2.1)	10.9 (19.4)	N/A	N/A
	Median (min,max)	7.0 (0.9, 908.0)	7.2 (4.0, 15.8)	7.3 (2.3, 165.0)	N/A	N/A
	Missing, No. (%)	19547 (84.8)	1255 (89.8)	1866 (93.1)	25 (100)	17 (100)

Table 3.12 Comparison of baseline creatinine according to PCI status, NCVI-PCI Registry, 2007-2012

Year	Baseline Creatinine, mmol/L	Elective	NSTEMI	STEMI	Not available	Missing
2007-2009 Total no. of procedures = 11621	N	10092	479	449	25	11
	Mean (SD)	121.2 (138.5)	123.7 (132.8)	109.0 (78.7)	156.0 (169.1)	103.5 (32.5)
	Median (min,max)	96.0 (44.0, 6500.0)	95.0 (49.0, 1533.0)	94.0 (44.0, 1222.0)	100.0 (60.0, 740.0)	105.0 (54.0, 182.0)
	Not available, No. (%)	198 (1.9)	34 (6.5)	112 (19.2)	0 (0)	0 (0)
	Missing, No. (%)	182 (1.7)	13 (2.5)	22 (3.8)	0 (0)	4 (26.7)
2010-2012 Total no. of procedures = 14862	N	11279	732	1054	0	1
	Mean (SD)	114.2 (112.6)	111.2 (92.8)	112.8 (93.9)	N/A	94.0 (.)
	Median (min,max)	90.0 (44.0, 1899.0)	90.0 (45.0, 1238.0)	91.5 (44.0, 1166.0)	N/A	94.0 (94.0, 94.0)
	Not available, No. (%)	396 (3.2)	48 (5.5)	169 (11.9)	0 (0)	0 (0)
	Missing, No. (%)	892 (7.1)	91 (10.4)	199 (14.0)	0 (0)	1 (50.0)
2007-2012 Total no. of procedures = 26483	N	21371	1211	1503	25	12
	Mean (SD)	117.5 (125.5)	116.2 (110.5)	111.6 (89.6)	156.0 (169.1)	102.8 (31.1)
	Median (min,max)	93.0 (44.0, 6500.0)	91.0 (45.0, 1533.0)	92.0 (44.0, 1222.0)	100.0 (60.0, 740.0)	100.0 (54.0, 182.0)
	Not available, No. (%)	594 (2.6)	82 (5.9)	281 (14.0)	0 (0)	0 (0)
	Missing, No. (%)	1074 (4.7)	104 (7.4)	221 (11.0)	0 (0)	5 (29.4)

**Table 3.13 Comparison of Glomerular Filtration Rate(GFR) according to PCI status, NCVD-PCI Registry, 2007-2012**

Year	Glomerular Filtration Rate (GFR)	Elective	NSTEMI	STEMI	Not available	Missing
2007-2009 Total no. of procedures = 11621	N	10092	479	449	25	11
	Mean (SD)	71.3 (23.6)	71.5 (25.6)	74.3 (25.2)	65.7 (26.8)	72.8 (20.8)
	Median (min,max)	72.5 (0.6, 173.9)	73.0 (3.2, 172.1)	75.5 (4.1, 141.5)	71.1 (6.9, 96.5)	68.4 (37.9, 111.1)
	Missing, No. (%)	380 (3.6)	47 (8.9)	134 (23.0)	0 (0)	4 (26.7)
2010-2012 Total no. of procedures = 14862	N	11279	732	1054	0	1
	Mean (SD)	76.1 (25.8)	75.7 (26.9)	76.7 (29.0)	N/A	77.4 (.)
	Median (min,max)	77.2 (2.4, 207.4)	78.2 (2.8, 160.3)	77.6 (4.3, 212.5)	N/A	77.4 (77.4, 77.4)
	Missing, No. (%)	1288 (10.2)	139 (16.0)	368 (25.9)	0 (0)	1 (50.0)
2007-2012 Total no. of procedures = 26483	N	21371	1211	1503	25	12
	Mean (SD)	73.8 (24.9)	74.0 (26.5)	76.0 (27.9)	65.7 (26.8)	73.2 (19.9)
	Median (min,max)	74.8 (0.6, 207.4)	76.1 (2.8, 172.1)	76.9 (4.1, 212.5)	71.1 (6.9, 96.5)	70.4 (37.9, 111.1)
	Missing, No. (%)	1668 (7.2)	186 (13.3)	502 (25.0)	0 (0)	5 (29.4)

Table 3.14 Comparison of Total Cholesterol according to PCI status, NCVD-PCI Registry, 2007-2012

Year	Total Cholesterol	Elective	NSTEMI	STEMI	Not available	Missing
2007-2009 Total no. of procedures = 11621	N	7211	262	271	12	6
	Mean (SD)	4.6 (1.2)	5.0 (1.3)	5.3 (1.4)	4.8 (1.0)	6.6 (5.6)
	Median (min,max)	4.4 (2.1, 24.2)	4.9 (2.1, 9.7)	5.1 (2.6, 11.1)	4.9 (3.1, 6.0)	4.5 (3.3, 18.0)
	Not available, No. (%)	2799 (26.7)	222 (42.2)	278 (47.7)	6 (24.0)	5 (33.3)
	Missing, No. (%)	462 (4.4)	42 (8.0)	34 (5.8)	7 (28.0)	4 (26.7)
2010-2012 Total no. of procedures = 14862	N	7883	471	596	0	1
	Mean (SD)	4.4 (1.2)	4.7 (1.5)	5.3 (1.7)	N/A	5.1 (.)
	Median (min,max)	4.2 (2.0, 23.0)	4.5 (2.0, 22.0)	5.2 (2.0, 23.0)	N/A	5.1 (5.1, 5.1)
	Not available, No. (%)	3088 (24.6)	262 (30.1)	545 (38.3)	0 (0)	0 (0)
	Missing, No. (%)	1596 (12.7)	138 (15.8)	281 (19.8)	0 (0)	1 (50.0)
2007-2012 Total no. of procedures = 26483	N	15094	733	867	12	7
	Mean (SD)	4.5 (1.2)	4.8 (1.5)	5.3 (1.6)	4.8 (1.0)	6.4 (5.2)
	Median (min,max)	4.3 (2.0, 24.2)	4.7 (2.0, 22.0)	5.2 (2.0, 23.0)	4.9 (3.1, 6.0)	4.9 (3.3, 18.0)
	Not available, No. (%)	5887 (25.6)	484 (34.6)	823 (41.0)	6 (24.0)	5 (29.4)
	Missing, No. (%)	2058 (8.9)	180 (12.9)	315 (15.7)	7 (28.0)	5 (29.4)

Table 3.15 Comparison of LDL according to PCI status, NCVD-PCI Registry, 2007-2012

Year	LDL cholesterol, mmol/L	Elective	NSTEMI	STEMI	Not available	Missing
2007-2009 Total no. of procedures = 11621	N	7198	271	267	15	5
	Mean (SD)	2.6 (1.2)	3.1 (1.1)	3.4 (1.2)	3.9 (4.0)	2.4 (1.0)
	Median (min,max)	2.5 (0.7, 19.0)	3.0 (1.0, 7.0)	3.2 (1.1, 9.6)	3.1 (1.2, 18.0)	2.5 (0.9, 3.5)
	Not available, No. (%)	2908 (27.8)	236 (44.9)	287 (49.2)	9 (36.0)	5 (33.3)
	Missing, No. (%)	366 (3.5)	19 (3.6)	29 (5.0)	1 (4.0)	5 (33.3)
2010-2012 Total no. of procedures = 14862	N	7708	463	559	0	1
	Mean (SD)	2.5 (1.1)	2.9 (1.4)	3.4 (1.4)	N/A	3.6 (.)
	Median (min,max)	2.3 (0.7, 20.0)	2.7 (0.8, 20.0)	3.3 (0.8, 16.0)	N/A	3.6 (3.6, 3.6)
	Not available, No. (%)	3153 (25.1)	265 (30.4)	558 (39.2)	0 (0)	0 (0)
	Missing, No. (%)	1706 (13.6)	143 (16.4)	305 (21.4)	0 (0)	1 (50.0)
2007-2012 Total no. of procedures = 26483	N	14906	734	826	15	6
	Mean (SD)	2.6 (1.1)	3.0 (1.3)	3.4 (1.4)	3.9 (4.0)	2.6 (1.0)
	Median (min,max)	2.4 (0.7, 20.0)	2.8 (0.8, 20.0)	3.3 (0.8, 16.0)	3.1 (1.2, 18.0)	2.8 (0.9, 3.6)
	Not available, No. (%)	6061 (26.3)	501 (35.9)	845 (42.1)	9 (36.0)	5 (29.4)
	Missing, No. (%)	2072 (9.0)	162 (11.6)	334 (16.7)	1 (4.0)	6 (35.3)

Table 3.16 Comparison of functional ischaemia according to PCI status, NCVD-PCI Registry, 2007-2012

Year	Functional ischaemia	Elective		NSTEMI		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007-2009 Total no. of procedures = 11621	Positive	1981	18.9	47	8.9	53	9.1	6	24.0	1	6.6
	Negative	210	2.0	5	1.0	5	0.9	1	4.0	0	0
	Equivocal	110	1.1	4	0.8	4	0.7	0	0	0	0
	Not applicable	8014	76.5	458	87.1	503	86.2	18	72.0	4	26.7
	Missing	157	1.5	12	2.2	18	3.1	0	0	10	66.7
	<b>Total</b>	<b>10472</b>	<b>100.0</b>	<b>526</b>	<b>100.0</b>	<b>583</b>	<b>100.0</b>	<b>25</b>	<b>100.0</b>	<b>15</b>	<b>100.0</b>
2010-2012 Total no. of procedures = 14862	Positive	2421	19.3	93	10.7	82	5.8	0	0	0	0
	Negative	188	1.5	8	0.9	23	1.6	0	0	0	0
	Equivocal	141	1.1	7	0.8	9	0.6	0	0	1	50.0
	Not applicable	9691	77.1	750	86.1	1277	89.8	0	0	1	50.0
	Missing	126	1.0	13	1.5	31	2.2	0	0	0	0
	<b>Total</b>	<b>12567</b>	<b>100.0</b>	<b>871</b>	<b>100.0</b>	<b>1422</b>	<b>100.0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>100.0</b>
007-2012 Total no. of procedures = 26483	Positive	4402	19.1	140	10.0	135	6.7	6	24.0	1	5.9
	Negative	398	1.8	13	0.9	28	1.4	1	4.0	0	0
	Equivocal	251	1.1	11	0.8	13	0.6	0	0	1	5.9
	Not applicable	17705	76.8	1208	86.5	1780	88.9	18	72.0	5	29.4
	Missing	283	1.2	25	1.8	49	2.4	0	0	10	58.8
	<b>Total</b>	<b>23039</b>	<b>100.0</b>	<b>1397</b>	<b>100.0</b>	<b>2005</b>	<b>100.0</b>	<b>25</b>	<b>100.0</b>	<b>17</b>	<b>100.0</b>

Table 3.17 Comparison of ECG according to ACS subtypes, NCVD-PCI Registry, 2007-2012

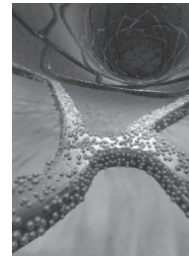
Year	ECG	STEMI		NSTEMI		UA		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007-2009 Total no. of procedures = 5076	Sinus rhythm	1866	36.8	1589	31.3	447	8.8	19	0.4	10	0.2
	Atrial fibrillation	21	0.4	22	0.4	6	0.1	0	0	0	0
	2 <sup>nd</sup> /3 <sup>rd</sup> AVB	40	0.8	5	0.1	4	0.1	0	0	0	0
	LBBB	8	0.2	6	0.1	3	0.1	0	0	0	0
	RBBB	10	0.2	24	0.5	9	0.2	0	0	0	0
2010-2012 Total no. of procedures = 5180	Sinus rhythm	2603	50.3	1213	23.4	506	9.8	27	0.5	0	0
	Atrial fibrillation	28	0.5	14	0.3	7	0.1	1	0.0	0	0
	2 <sup>nd</sup> /3 <sup>rd</sup> AVB	25	0.5	2	0.0	1	0.0	0	0	0	0
	LBBB	12	0.2	7	0.1	2	0.0	0	0	0	0
	RBBB	15	0.3	10	0.2	1	0.0	0	0	0	0
007-2012 Total no. of procedures = 10256	Sinus rhythm	4469	43.6	2802	27.3	953	9.3	46	0.4	10	0.1
	Atrial fibrillation	49	0.5	36	0.4	13	0.1	1	0	0	0
	2 <sup>nd</sup> /3 <sup>rd</sup> AVB	65	0.6	7	0.1	5	0.0	0	0	0	0
	LBBB	20	0.2	13	0.1	5	0.0	0	0	0	0
	RBBB	25	0.2	34	0.3	10	0.1	0	0	0	0

Table 3.18 Comparison of IABP use according to ACS subtypes, NCVD-PCI Registry, 2007-2012

Year	IABP	STEMI		NSTEMI		UA		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007-2009 Total no. of procedures = 5076	Yes	115	4.4	39	2.1	8	1.6	2	7.4	0	0
	No	2495	94.8	1857	97.1	481	97.2	24	88.9	9	90.0
	Missing	22	0.8	16	0.8	6	1.2	1	3.7	1	10.0
	<b>Total</b>	<b>2632</b>	<b>100.0</b>	<b>1912</b>	<b>100.0</b>	<b>495</b>	<b>100.0</b>	<b>27</b>	<b>100.0</b>	<b>10</b>	<b>100.0</b>
2010-2012 Total no. of procedures = 5180	Yes	283	9.2	52	3.7	21	3.3	5	10.2	0	0
	No	2756	89.2	1322	94.7	608	94.3	39	79.6	0	0
	Missing	51	1.6	22	1.6	16	2.4	5	10.2	0	0
	<b>Total</b>	<b>3090</b>	<b>100.0</b>	<b>1396</b>	<b>100.0</b>	<b>645</b>	<b>100.0</b>	<b>49</b>	<b>100.0</b>	<b>0</b>	<b>0</b>
007-2012 Total no. of procedures = 10256	Yes	398	6.9	91	2.8	29	2.5	7	9.2	0	0
	No	5251	91.8	3179	96.1	1089	95.5	63	82.9	9	90.0
	Missing	73	1.3	38	1.1	22	2.0	6	7.9	1	10.0
	<b>Total</b>	<b>5722</b>	<b>100.0</b>	<b>3308</b>	<b>100.0</b>	<b>1140</b>	<b>100.0</b>	<b>76</b>	<b>100.0</b>	<b>10</b>	<b>100.0</b>







## CHAPTER 3 : **PROCEDURAL SETTINGS**

Kumara Gurupparan Ganesan • Ika Faizura Mohd Nor  
Rosli Mohd Ali • Robaayah Zambahari

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*Institut Jantung Negara, Kuala Lumpur*



## PROCEDURAL SETTINGS

Kumara Guruparan Ganesan, Ika Faizura Mohd Nor, Rosli Mohd Ali, Robaayah Zambahari  
Institut Jantung Negara, Kuala Lumpur

### Summary

1. Majority of PCI performed in Malaysia from 2007-2012 were performed as Elective cases (87.0 %).
2. Femoral access remains the most common percutaneous entry; however, radial approach was becoming more popular (37.7% in 2007-2009 to 46.6% in 2010-2012).
3. About 46.5% of PCI were performed in multiple vessel disease and 46.1 % in single vessel disease.
4. From 2001-2012, the overall usage of GP IIb/IIIa blocker has declined from 5.9% to 3.9% (n=584) of patients
5. In both group of patient, Clopidogrel and Aspirin were the two most common antiplatelet therapies for patients undergoing angioplasty. In 2010-2012, there was an increase trend in using the 600 mg loading dose for Clopidogrel (9.8%) and longer duration for dual antiplatelet (67.9%).

This chapter discussed the procedural details and treatment received by patients who underwent Percutaneous Coronary Intervention (PCI) from 2007 to 2012. A total of 26,483 PCI procedures were performed during this six year period from 16 centers across Malaysia, mainly from Institut Jantung Negara (58.1%), Hospital Umum Sarawak (11.3%) and Hospital Pulau Pinang (8.7%).

Most of the PCI were performed as elective cases (87.0%). About 7.5% of the total procedures were performed for Acute Myocardial Infarction (AMI) and 5.3% were for NSTEMI/UA. [Table 4.1.1]

There has been a slight decrease in the percentage of elective cases from 90.1% in 2007-2009 to 84.6% in 2010-2012. Generally, there was a steady increase in the number of PCI done during index admission for ACS (STEMI, NSTEMI and UA) over the last 3 years at 11.0% in 2010, 14.5% in 2011 and 19.3% in 2012. [Table 4.1.1]

Elective PCI does not only encompass those with chronic stable angina. These elective procedures also include patients who have been treated for ACS in other peripheral hospitals, then referred for percutaneous coronary intervention. [Table 4.1.1]

For patients presented with STEMI, 7.6% had PCI done during the index admission. Of these, 38.3% were primary PCI. [Table 4.1.1] This is probably underreported as patients who presented with STEMI and had Primary PCI not during the office hours or the weekend, thus the data may not have been captured.

### *Procedural access, sheath size and closure*

The femoral approach was most popular for percutaneous entry for PCI which accounts for 52.3%, followed by radial which is 42.7% and 0.7% procedures were done via the brachial artery approach. There has been an increasing trend of radial approach from 37.7% during 2007-2009 compared to 46.6% from 2010 -2012, suggesting increasing operator preference for trans-radial approach over the recent years. [Table 4.1.2]

The most common size of sheath was 6 French at 81.8%, followed by 7 French at 13.0% and 8 French at 0.6%. [Table 4.1.2]

In terms of management of post procedure access closure, majority of the procedures (89.5%) were manually compressed. About 3.8% of access sites were closed with closure devices. [Table 4.1.2]

#### *PCI procedure*

In total, 46.5% of PCI were performed in multiple vessel disease, 46.1% in single vessel disease. [Table 4.1.2]

The mean fluoroscopy time was 20.4 minutes (SD 18.3) and median was 15.3 minutes. The mean and median fluoroscopy time have remained rather constant from 2007-2009 to 2010-2012. [Table 4.1.2]

In both periods, most of the contrasts used for these procedures were non-ionic at 91.5%. Only 0.9% was ionic. The mean contrast volume was 177.2 mls (SD 68.9). The mean volume of contrast used during 2007-2009 and 2010-2012 were almost similar at 176.9 mls and 177.5 mls. [Table 4.1.2]

### **Treatment of patients undergoing PCI**

#### *GP IIb/IIIa blocker.*

In 2007-2009, GP IIb/IIIa blocker was used in 5.9% of patients. About 45.8% of GP IIb/IIIa blocker were used prior to PCI, 43.9% during procedure and 10.3% after the PCI. [Table 4.1.2]

In 2010-2012, the overall usage of GP IIb/IIIa blocker has decline to 3.9% of patients. During this time frame, GP IIb/IIIa blocker was mainly use during PCI, 64.1%. Only 28.8% of GP IIb/IIIa blocker was used prior to PCI and 7.1% after PCI. [Table 4.1.2]

#### *Intravenous unfractionated Heparin infusion*

In term of intravenous unfractionated Heparin infusion, 91.9% were given in 2007-2009 and 97.8% were given in 2010-2012. In both periods, it was commonly given during the procedure, 81.1% and 79.4% respectively. [Table 4.1.2]

#### *Low Molecular Weight Heparin (LMWH)*

The use of LMWH has also drop in 2010-2012. In 2007-2009, 4.4% received LMWH as compared to 2.6% in 2010-2012. The majority, of these patients received LMWH prior to procedure, 88.9% and 85.2% respectively. [Table 4.1.2]

#### *Anti-platelets*

Aspirin and Clopidogrel were the two most common antiplatelet agents used in PCI in both periods of patients.

From 2007-2012, Aspirin was used in 97.4% of cases and Clopidogrel in 97.9% of cases. In more than 97% of cases, Clopidogrel and Aspirin were given prior to the procedure. [Table 4.1.2]

From 2007-2012, the most common loading dose for Clopidogrel was 300mg. This accounts for 52.6% in 2007-2009 and 28.9% in 2010-2012. However, in 2010-2012 there was an increasing trend of using higher loading dose of Clopidogrel (600 mg). In 2007-2009, only 5.8% of cases received a loading dose of 600mg as compared to 9.8% in 2010-2012. [Table 4.1.2]

About 41.6% of cases in 2007-2009, and 58.1% of cases in 2010-2012 received only 75mg prior to the PCI. In these instances, patients have been receiving long term Clopidogrel therapy prior to PCI. [Table 4.1.2]

Following PCI, the duration of Clopidogrel or Ticlopidine will depend on the clinical setting and the type of stents implanted.

There was an increasing trend of using Clopidogrel or Ticlopidine for 12 months duration, 67.9% in 2010-2012 vs. and 38.9% in 2007-2009. The increase trends in the duration of antiplatelets were likely to reflect the higher usage of Drug Eluting Stent in 2010-2012. Only 24.1% of cases in 2007-2009 and 13.8% of cases in 2010-2012 were planned for one month of Clopidogrel or Ticlopidine. [Table 4.1.2]

Table 4.1.1 PCI status of patients who underwent procedures, NCV D-PCI Registry, 2007-2012

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PCI status, No. (%)												
Elective	10472	90.1	3937	88.3	4179	85.5	4451	80.7	12567	84.6	23039	87.0
NSTEMI/UA	526	4.5	265	5.9	268	5.5	338	6.2	871	5.9	1397	5.3
AMI (STEMI)	583	5.1	260	5.8	440	9.0	722	13.1	1422	9.5	2005	7.5
Not available	25	0.2	0	0	0	0	0	0	0	0	25	0.1
Missing	15	0.1	0	0	0	0	2	0.0	2	0.0	17	0.1
Elective PCI, No. (%)	10472	90.1	3937	88.3	4179	85.5	4451	80.7	12567	84.6	23039	87.0
Staged PCI	2229	25.1	876	22.8	1023	25.1	983	22.6	2882	23.5	5111	24.2
Ad hoc PCI	6659	74.9	2960	77.2	3056	74.9	3371	77.4	9387	76.5	16046	75.8
NSTEMI/UA, No. (%)	526	4.5	265	5.9	268	5.5	338	6.2	871	5.9	1397	5.3
Urgent	526	100.0	97	37.3	76	29.2	125	38.3	298	35.2	824	60.1
Non-urgent	0	0	163	62.7	184	70.8	201	61.7	548	64.8	548	39.9
AMI (STEMI), No. (%)	583	5.1	260	5.8	440	9.0	722	13.1	1422	9.5	2005	7.5
Rescue	265	45.5	101	39.5	160	36.7	211	29.5	472	33.5	737	37.1
Facilitated	0	0	4	1.5	13	2.9	9	1.3	26	1.8	26	1.3
Primary	317	54.5	117	45.7	111	25.5	217	30.3	445	31.6	762	38.3
Delayed	0	0	34	13.3	152	34.9	278	38.9	464	33.1	464	23.3

Table 4.1.2 Characteristics of PCI procedures performed, NCVD-PCI Registry, 2007-2012

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
#Percutaneous entry, No. (%)												
Brachial	114	1.0	21	0.5	22	0.5	26	0.5	69	0.5	183	0.7
Radial	4380	37.7	1941	43.5	2086	42.7	2894	52.5	6921	46.6	11301	42.7
Femoral	6563	56.5	2438	54.6	2498	51.1	2358	42.8	7294	49.1	13857	52.3
French size, No. (%)												
5	136	1.2	60	1.3	13	0.3	40	0.7	113	0.8	249	0.9
6	9183	79.0	3663	82.1	4139	84.7	4682	84.9	12484	84.0	21667	81.8
7	1889	16.3	622	13.9	521	10.7	409	7.4	1552	10.4	3441	13.0
8	114	1.0	19	0.4	16	0.3	6	0.1	41	0.3	155	0.6
9	1	0.0	0	0	1	0.0	0	0	1	0.0	2	0.0
Others	3	0.0	3	0.1	2	0.0	1	0.0	6	0.0	9	0.0
Not available	202	1.7	60	1.4	17	0.3	51	1.0	128	0.9	330	1.3
Missing	93	0.8	35	0.8	178	3.7	324	5.9	537	3.6	630	2.4
Closure device, No. (%)												
No	10763	92.6	4179	93.7	4147	84.9	4613	83.7	12939	87.1	23702	89.5
Seal	287	2.5	57	1.3	54	1.1	114	2.1	225	1.5	512	1.9
Suture	235	2.0	65	1.5	104	2.1	90	1.6	259	1.7	494	1.9
Others	24	0.2	7	0.2	5	0.1	3	0.1	15	0.1	39	0.1
Not available	176	1.5	20	0.4	63	1.3	121	2.1	204	1.4	380	1.4
Missing	136	1.2	134	2.9	514	10.5	572	10.4	1220	8.2	1356	5.2



	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
#Extent of coronary disease, No. (%)												
Single vessel disease	5329	45.9	2348	52.6	2351	48.1	2170	39.4	6869	46.2	12198	46.1
Multiple vessel disease	6187	53.2	2023	45.3	1603	32.8	2509	45.5	6135	41.3	12322	46.5
Graft	130	1.1	66	1.5	22	0.5	74	1.3	162	1.1	292	1.1
Left main	82	0.7	30	0.7	15	0.3	44	0.8	89	0.6	171	0.6
Fluoroscopy time, min												
N		10138		4076		4216		4343		12635		22773
Mean (SD)		20.7 (19.3)		20.5 (16.8)		20.9 (18.5)		19.3 (16.7)		20.2 (17.3)		20.4 (18.3)
Median (min,max)		15.4 (2.0, 180.0)		15.6 (2.0, 174.4)		15.7 (2.0, 180.0)		14.5 (2.0, 173.0)		15.3 (2.0, 180.0)		15.3 (2.0, 180.0)
Not available, No. (%)	1290	11.1	145	3.2	223	4.6	564	10.2	932	6.3	2222	8.4
Missing, No. (%)	193	1.7	241	5.4	448	9.2	606	11.0	1295	8.7	1488	5.6
Fluoroscopy total dose, mGy												
N		4554		2533		2577		1863		6973		11527
Mean (SD)		717.0 (2629.4)		1718.6 (23912.2)		2421.8 (20057.0)		13079.5 (54826.6)		5013.8 (34393.3)		3316.3 (26882.6)
Median (min,max)		125.0 (3.2, 78539.0)		271.3 (1.2, 1199417.0)		220.0 (0.5, 684994.0)		456.0 (1.5, 931652.0)		282.9 (0.5, 1199417.0)		187.0 (0.5, 1199417.0)
Not available, No. (%)	6404	55.1	1354	30.3	973	19.9	1742	31.6	4069	27.4	10473	39.5
Missing, No. (%)	663	5.7	575	12.9	1337	27.4	1908	34.6	3820	25.7	4483	16.9

# Patients are allowed to have more than one type of category

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Contrast type, No. (%)												
Ionic	192	1.7	4	0.1	26	0.5	7	0.1	37	0.2	229	0.9
Non-ionic	9973	85.8	4358	97.6	4621	94.6	5273	95.6	14252	95.9	24225	91.5
Not available	1374	11.8	48	1.1	56	1.1	64	1.2	168	1.2	1542	5.8
Missing	82	0.7	52	1.2	184	3.8	169	3.1	405	2.7	487	1.8
Contrast volume, ml												
N		10263		4120		4340		4927		13387		23650
Mean (SD)		176.9 (66.4)		185.7 (71.5)		182.8 (70.9)		166.1 (68.6)		177.5 (70.8)		177.2 (68.9)
Median (min,max)		160.0 (15.0, 500.0)		170.0 (15.0, 500.0)		170.0 (30.0, 500.0)		150.0 (15.0, 500.0)		150.0 (15.0, 500.0)		150.0 (15.0, 500.0)
Not available, No. (%)	1240	10.7	171	3.8	210	4.3	270	4.9	651	4.4	1891	7.1
Missing, No. (%)	118	1.0	171	3.8	337	6.9	316	5.7	824	5.5	942	3.6
Thrombolytics prior to PCI procedure in STEMI, No. (%)												
Total no. of procedures among STEMI patients	2632	100.0	965	100.0	1157	100.0	968	100.0	3090	100.0	5722	100.0
Yes	514	19.5	146	15.1	257	22.2	341	35.2	744	24.1	1258	22.0
No	2112	80.3	819	84.9	900	77.8	627	64.8	2346	75.9	4458	77.9
Missing	6	0.2	0	0	0	0	0	0	0	0	6	0.1

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Duration of thrombolytics given prior to PCI procedure in STEMI, No. (%)												
<3 hrs	35	7.3	6	4.6	15	6.9	21	6.7	42	6.4	77	6.8
3-6 hrs	36	7.5	15	11.5	34	15.6	47	15.0	96	14.5	132	11.6
6-12 hrs	42	8.8	12	9.2	28	12.8	27	8.7	67	10.2	109	9.6
12-24 hrs	62	12.9	12	9.2	24	11.0	48	15.4	84	12.7	146	12.8
1-7 days	178	37.2	50	38.5	83	38.1	139	44.6	272	41.2	450	39.5
>7 days	126	26.3	35	27.0	34	15.6	30	9.6	99	15.0	225	19.7
Not available	13		4		3		6		13		26	
Missing	22		12		36		23		71		93	
IIb/IIIa Blockade, No. (%)												
Yes	691	5.9	151	3.4	208	4.3	225	4.1	584	3.9	1275	4.8
No	10885	93.7	4311	96.6	4679	95.7	5288	95.9	14278	96.1	25163	95
Missing	45	0.4	0	0	0	0	0	0	0	0	45	0.2
IIb/IIIa Blockade given status, No. (%)												
Prior	289	45.8	48	34.1	60	30.5	50	23.7	158	28.8	447	37.9
After	65	10.3	14	9.9	10	5.1	15	7.1	39	7.1	104	8.8
During	277	43.9	79	56.0	127	64.4	146	69.2	352	64.1	629	53.3
Not available	21		2		0		0		2		23	
Missing	39		8		11		14		33		72	

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Heparin, No. (%)												
Yes	10674	91.9	4399	98.6	4760	97.4	5372	97.4	14531	97.8	25205	95.2
No	919	7.9	63	1.4	127	2.6	141	2.6	331	2.2	1250	4.7
Missing	28	0.2	0	0	0	0	0	0	0	0	28	0.1
Heparin given status, No. (%)												
Prior	1932	18.6	600	13.8	1062	22.7	1269	24.1	2931	20.5	4863	19.7
After	27	0.3	2	0.0	3	0.1	3	0.1	8	0.1	35	0.1
During	8433	81.1	3743	86.2	3614	77.2	3999	75.8	11356	79.4	19789	80.2
Not available	35		1		2		2		5		40	
Missing	247		53		79		99		231		478	
LMWH, No. (%)												
Yes	512	4.4	102	2.3	120	2.5	161	2.9	383	2.6	895	3.4
No	11041	95.0	4360	97.7	4767	97.5	5352	97.1	14479	97.4	25520	96.4
Missing	68	0.6	0	0	0	0	0	0	0	0	68	0.2
LMWH given status, No. (%)												
Prior	423	87.4	79	80.6	99	87.6	127	86.4	305	85.2	728	86.5
After	31	6.4	6	6.1	3	2.7	13	8.8	22	6.1	53	6.3
During	30	6.2	13	13.3	11	9.7	7	4.8	31	8.7	61	7.2
Not available	2		0		0		1		1		3	
Missing	26		4		7		13		24		50	

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Ticlopidine, No. (%)												
Yes	351	3.1	88	2.0	47	1.0	56	1.0	191	1.3	542	2.0
No	11220	96.5	4374	98.0	4840	99.0	5457	99.0	14671	98.7	25891	97.8
Missing	50	0.4	0	0	0	0	0	0	0	0	50	0.2
Ticlopidine given status, No. (%)												
Prior	316	97.0	86	98.9	43	95.6	47	94.0	176	96.7	492	96.9
After	5	1.5	1	1.1	0	0	0	0	1	0.5	6	1.2
During	5	1.5	0	0	2	4.4	3	6.0	5	2.8	10	1.9
Not available	6		0		0		1		1		7	
Missing	19		1		2		5		8		27	
Aspirin, No. (%)												
Yes	11256	96.9	4300	96.4	4815	98.5	5417	98.3	14532	97.8	25788	97.4
No	338	2.9	162	3.6	72	1.5	96	1.7	330	2.2	668	2.5
Missing	27	0.2	0	0	0	0	0	0	0	0	27	0.1
Aspirin given status, No. (%)												
Prior	10629	98.4	4160	98.6	4625	98.4	5265	99.1	14050	98.7	24679	98.6
After	75	0.7	13	0.3	20	0.4	11	0.2	44	0.3	119	0.5
During	96	0.9	46	1.1	56	1.2	39	0.7	141	1.0	237	0.9
Not available	180		1		5		5		11		191	
Missing	276		80		109		97		286		562	

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Clopidogrel, No. (%)												
Yes	11389	98.0	4341	97.3	4792	98.1	5411	98.1	14544	97.9	25933	97.9
No	213	1.8	121	2.7	95	1.9	102	1.9	318	2.1	531	2.0
Missing	19	0.2	0	0	0	0	0	0	0	0	19	0.1
Clopidogrel given status, No. (%)												
Prior	10660	95.4	4220	98.0	4640	97.7	5287	98.9	14147	98.3	24807	97.0
After	294	2.7	54	1.3	42	0.9	14	0.3	110	0.8	404	1.6
During	215	1.9	30	0.7	65	1.4	41	0.8	136	0.9	351	1.4
Not available	152		5		2		19		26		178	
Missing	68		32		43		50		125		193	
Duration of clopidogrel given prior to PCI procedure, hrs, No. (%)												
<6	1841	18.5	800	19.8	1316	30.9	1915	38.2	4031	30.3	5872	25.3
6-24	2867	28.9	1016	25.1	1698	39.9	1904	38.1	4618	34.6	7485	32.2
>24-72	1788	18.0	1176	29.0	606	14.2	557	11.1	2339	17.6	4127	17.7
>72	3441	34.6	1058	26.1	639	15.0	633	12.6	2330	17.5	5771	24.8
Not available	460		41		78		98		217		677	
Missing	263		129		303		180		612		875	

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
First starting dose, mg, No. (%)												
75	4180	41.6	2267	56.8	2409	60.4	2711	57.1	7387	58.1	11567	50.8
300	5291	52.6	1364	34.2	954	23.9	1368	28.8	3686	28.9	8977	39.4
600	582	5.8	363	9.0	625	15.7	667	14.0	1655	13.0	2237	9.8
≥1200	1	0.0	0	0	0	0	5	0.1	5	0.0	6	0.0
Not available	886		44		58		199		301		1187	
Missing	449		303		746		461		1510		1959	
*Clopidogrel dose of STEMI patient, mg, No. (%)												
Total no. of PCI procedures among STEMI patients who are taking Clopidogrel.	2598	100.0	948	100.0	1138	100.0	945	100.0	3031	100.0	5629	100.0
75	956	40.3	544	60.2	637	63.2	304	37.1	1485	54.4	2441	47.8
300	1297	54.7	296	32.7	222	22.0	350	42.7	868	31.8	2165	42.5
600	119	5.0	64	7.1	149	14.8	165	20.1	378	13.8	497	9.7
≥1200	1	0.0	0	0	0	0	1	0.1	1	0.0	2	0.0
Not available	150		6		13		42		61		211	
Missing	75		38		117		83		238		313	
Fondaparinox, No. (%)												
Yes	1	0	96	2.2	162	3.3	323	5.9	581	3.9	582	2.2
No	604	5.2	4178	93.6	4449	91.1	4904	88.9	13531	91.0	14135	53.4
Missing	11016	94.8	188	4.2	276	5.6	286	5.2	750	5.1	11766	44.4

	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of procedures = 11621		Total no. of procedures = 4462		Total no. of procedures = 4887		Total no. of procedures = 5513		Total no. of procedures = 14862		Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Fondaparinux given status, No. (%)												
Prior	0	0	90	95.8	149	97.4	243	90.7	482	93.6	482	93.6
After	0	0	2	2.1	4	2.6	22	8.2	28	5.4	28	5.4
During	0	0	2	2.1	0	0	3	1.1	5	1.0	5	1.0
Not available	1		0		1		4		5		6	
Missing	0		2		8		51		61		61	
Planned duration of clopidogrel/ticlopidine, month, No. (%)												
1	2798	24.1	670	15	743	15.2	635	11.5	2048	13.8	4846	18.3
3	670	5.8	240	5.4	180	3.7	327	5.9	747	5.0	1417	5.4
6	1435	12.3	87	1.9	126	2.6	234	4.2	447	3.0	1882	7.1
12	4525	38.9	2990	67	3427	70.1	3677	66.7	10094	67.9	14619	55.2
>12	1297	11.2	302	6.8	117	2.4	58	1.2	477	3.2	1774	6.7
Not available	796	6.8	138	3.1	127	2.6	256	4.6	521	3.5	1317	4.9
Missing	100	0.9	35	0.8	167	3.4	326	5.9	528	3.6	628	2.4

\*Only applicable to STEMI patients who are taking Clopidogrel



**Table 4.1.3 Comparison of STEMI and NSTEMI patients who received ad-hoc PCI, NCVI-PCI Registry, 2007-2012**

Year	Cath/PCI same lab visit	STEMI		NSTEMI	
		No.	%	No.	%
2007-2009 Total no. of procedures = 1109	Yes	520	89.2	461	87.6
	No	58	9.9	60	11.4
	Missing	5	0.9	5	1.0
	<b>Total</b>	<b>583</b>	<b>100.0</b>	<b>526</b>	<b>100.0</b>
2010-2012 Total no. of procedures = 2293	Yes	1210	85.1	705	80.9
	No	167	11.7	151	17.3
	Missing	45	3.2	15	1.8
	<b>Total</b>	<b>1422</b>	<b>100.0</b>	<b>871</b>	<b>100.0</b>
2007-2012 Total no. of procedures = 3402	Yes	1730	86.3	1166	83.5
	No	225	11.2	211	15.1
	Missing	50	2.5	20	1.4
	<b>Total</b>	<b>2005</b>	<b>100.0</b>	<b>1397</b>	<b>100.0</b>



Table 4.1.4 Duration of Thienopyridine in patients who underwent PCI, NCVD-PCI Registry, 2007-2012

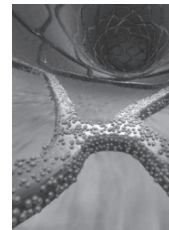
Year	Planned duration of clopidogrel/ ticlopidine (months)	#Intracoronary devices used					
		Balloon only		Drug eluting stent		Bare metal stent	
		No.	%	No.	%	No.	%
2007-2009 Total no. of lesions = 15848	1	353	27.6	124	1.6	2766	46.8
	3	68	5.3	191	2.5	471	8.0
	6	169	13.2	1110	14.3	662	11.2
	12	393	30.7	4649	59.8	1171	19.8
	>12	123	9.6	1278	16.4	474	8.0
	Not available	161	12.5	373	4.8	317	5.3
	Missing	14	1.1	48	0.6	52	0.9
	<b>Total</b>	<b>1281</b>	<b>100.0</b>	<b>7773</b>	<b>100.0</b>	<b>5913</b>	<b>100.0</b>
2010-2012 Total no. of lesions = 19025	1	235	19.4	175	1.4	1643	43.2
	3	74	6.1	242	1.9	396	10.4
	6	41	3.4	207	1.7	181	4.8
	12	707	58.5	10836	86.0	1301	34.1
	>12	33	2.7	512	4.1	60	1.6
	Not available	92	7.6	180	1.4	98	2.6
	Missing	27	2.3	445	3.5	124	3.3
	<b>Total</b>	<b>1209</b>	<b>100.0</b>	<b>12597</b>	<b>100.0</b>	<b>3803</b>	<b>100.0</b>
2007-2012 Total no. of lesions = 34873	1	588	23.6	299	1.5	4409	45.4
	3	142	5.7	433	2.1	867	8.9
	6	210	8.4	1317	6.5	843	8.7
	12	1100	44.2	15485	76.0	2472	25.4
	>12	156	6.3	1790	8.8	534	5.5
	Not available	253	10.2	553	2.7	415	4.3
	Missing	41	1.6	493	2.4	176	1.8
	<b>Total</b>	<b>2490</b>	<b>100.0</b>	<b>20370</b>	<b>100.0</b>	<b>9716</b>	<b>100.0</b>

<sup>#</sup>Patients are allowed to have more than one type of category

Table 4.1.5 Access site of patients who underwent procedures, by PCI status, NCVI-PCI Registry, 2007-2012

Year	#Percutaneous entry	PCI status											
		Elective		NSTEMI/UA		AMI		Not available		Missing		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
2007-2009 Total no. of procedures = 11621	Brachial	108	94.7	2	1.8	3	2.6	1	0.9	0	0	114	100.0
	Radial	4191	95.7	112	2.6	66	1.5	10	0.2	1	0.0	4380	100.0
	Femoral	5655	86.2	394	6.0	499	7.6	13	0.2	2	0.0	6563	100.0
2010-2012 Total no. of procedures = 14862	Brachial	59	85.5	5	7.2	5	7.3	0	0	0	0	69	100.0
	Radial	6187	89.4	332	4.8	401	5.8	0	0	1	0.0	6921	100.0
	Femoral	5820	79.8	509	7.0	964	13.2	0	0	1	0.0	7294	100.0
2007-2012 Total no. of procedures = 26483	Brachial	167	91.3	7	3.8	8	4.4	1	0.5	0	0	183	100.0
	Radial	10378	91.8	444	3.9	467	4.2	10	0.1	2	0.0	11301	100.0
	Femoral	11475	82.8	903	6.5	1463	10.6	13	0.1	3	0.0	13857	100.0

#Patients are allowed to have more than one type of category



## CHAPTER 4 : **LESION CHARACTERISTICS**

Ang Choon Chin • Sridhar Ganiga Srinivasaiah • Ahmad Syadi Mahmood  
Chee Kok Han • Wan Azman Wan Ahmad

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*Pusat Perubatan University Malaya, Kuala Lumpur*



## LESION CHARACTERISTICS

Ang Choon Chin, Sridhar Ganiga Srinivasaiah, Ahmad Syadi Mahmood, Chee Kok Han, Wan Azman Wan Ahmad

*Pusat Perubatan University Malaya, Kuala Lumpur*

### Summary

1. Both in stent restenosis (ISR) and stent thrombosis were uncommon; ISR constituted 4.7% of all lesions treated. The incidence of stent thrombosis was only 0.4%.
2. Complex lesions (Type B2 and Type C) constituted a total of 62.7% among all lesions. 31.4% of the lesions had high risk characteristics (ostial, bifurcation, totally occluded and thrombus).
3. There was a trend of increasing use of drug eluting stents (DES). In this registry, DES comprised 64.0% of all stents.
4. A high procedural success rate was observed (96.1%).
5. Among all patients with ISR, 44.9% of the lesions were noted in DES, followed by 35.8% in BMS. Majority of ISR (41.5%) were treated with balloon angioplasty (including cutting balloon), followed by DES and DEB in 37.9% and 29.9% respectively.
6. Usage of DEB for ISR was becoming more popular over the last couple of years.
7. An increase in number of LMS interventions (749 lesions) were noted, majority were successful and no reflow was noted in 1.5% of cases, usage of IVUS and IABP were less common.
8. There was an increasing trend of graft PCI in the recent years and majority were on SVG.
9. Large majority of CTO lesions were de-novo lesions, and they were treated more often with femoral approach and 6 French size sheath. DES usage was higher in CTO lesions. Overall success rate was 80.2%.

### Anatomical location of the lesion

From year 2007 to 2012, a total of 34873 lesions were treated with PCI. Among these lesions, the commonest vessel treated was left anterior descending artery (LAD; 47.7%), followed by right coronary artery (RCA; 30.0%) and left circumflex artery (LCx; 18.3%). Left main stem (2.2%) and bypass grafts (1.3%) constituted a small number. [Table 4.2.1]

The commonest lesion location treated was proximal LAD (33.3%), followed by proximal RCA (13.3%) and mid LAD (10.4%). Among lesions of bypass graft treated (total of 481 lesions), majority were in saphenous venous graft (423 lesions), followed by left internal mammary artery (51 lesions). Throughout the years of this registry, both the target vessel and target lesion location distribution remained consistent. [Table 4.2.1]

Table 4.2.1 Summary of location of lesions treated with Percutaneous Coronary Intervention, NCVI-PCI Registry, 2007-2012

Location of lesion	2007-2009 Total no. of lesions = 15848		2010 Total no. of lesions = 6088		2011 Total no. of lesions = 5977		2012 Total no. of lesions = 6960		2010-2012 Total no. of lesions = 19025		2007-2012 Total no. of lesions = 34873	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
None	1	0.0	0	0	1	0.1	1	0.0	2	0.1	3	0.0
Left main stem	287	1.8	152	2.5	147	2.5	163	2.4	462	2.5	749	2.2
Left anterior descending artery (LAD)	7592	47.9	2880	47.4	2874	48.0	3285	47.2	9039	47.4	16631	47.7
LAD proximal	5374	33.9	1966	32.3	2067	34.6	2197	31.6	6230	32.7	11604	33.3
LAD mid	1649	10.4	631	10.4	575	9.6	771	11.1	1977	10.4	3626	10.4
LAD distal	190	1.2	83	1.4	89	1.5	158	2.3	330	1.7	520	1.5
D1	343	2.2	188	3.1	127	2.1	140	2.0	455	2.4	798	2.3
D2	30	0.2	11	0.2	14	0.2	17	0.2	42	0.2	72	0.2
D3	6	0.0	1	0.0	2	0.0	2	0.0	5	0.0	11	0.0
Right coronary artery (RCA)	4688	29.6	1805	29.6	1804	30.2	2175	31.2	5784	30.4	10472	30.0
RCA proximal	2042	12.9	758	12.5	944	15.8	911	13.1	2613	13.7	4655	13.3
RCA mid	1566	9.9	593	9.7	509	8.5	683	9.8	1785	9.4	3351	9.6
RCA distal	798	5.0	336	5.5	261	4.4	453	6.5	1050	5.5	1848	5.3
PDA	145	0.9	49	0.8	31	0.5	72	1.0	152	0.8	297	0.9
PLV	137	0.9	69	1.1	59	1.0	56	0.8	184	1.0	321	0.9
Left circumflex artery (LCx)	2908	18.3	1147	18.9	1071	17.9	1244	17.9	3462	18.2	6370	18.3
LCx proximal	1186	7.5	518	8.5	559	9.4	619	8.9	1696	8.9	2882	8.3
LCx distal	1148	7.2	363	6.0	288	4.8	336	4.8	987	5.2	2135	6.1
OM1	442	2.8	195	3.2	194	3.2	229	3.3	618	3.2	1060	3.0
OM2	103	0.6	54	0.9	24	0.4	48	0.7	126	0.7	229	0.7
OM3	29	0.2	17	0.3	6	0.1	12	0.2	35	0.2	64	0.2
Graft	205	1.3	104	1.6	80	1.3	92	1.3	276	1.4	481	1.3
Saphenous vein graft	177	1.1	93	1.5	71	1.2	82	1.2	246	1.3	423	1.2
Left internal mammary artery graft	24	0.2	9	0.1	8	0.1	10	0.1	27	0.1	51	0.1
Right internal mammary artery graft	1	0.0	2	0.0	0	0	0	0	2	0.0	3	0.0
Radial artery graft	3	0.0	0	0	1	0.0	0	0	1	0.0	4	0.0
Missing	167	1.1	0	0	0	0	0	0	0	0	167	0.5



### ***Lesion characteristics***

The majority of the lesions treated in this registry were de novo type of lesion (93.3%). In-stent restenosis (ISR) constituted a total of 1618 lesions (4.7%). Acute stent thrombosis was rare (0.4%). The distribution of the type of lesions remained consistent throughout the years. [Table 4.2.2]

Most of the lesions treated were of Type C (36.9%), followed by Type B1 (25.8%), Type B2 (24.3%) and Type A (11.2%). Complex lesions (Type B2 and Type C) constituted a total of 62.7% among all lesions. [Table 4.2.3]

Among the lesions treated with PCI, about 31.4% were of high risk characteristics, such as ostial, bifurcation, totally occluded and thrombus. [Table 4.2.4] The distribution of lesion complexity had remained similar in the years of this registry. The cardiac centres involved have been treating high risk lesions with complex PCI.

Most of the lesions treated with PCI achieved TIMI-3 flow (at least 89.0%) after the procedure; compared to about 53.8% lesions only had TIMI-3 flow pre-procedure. [Table 4.2.5]

### ***Types of Stents and Devices used***

A total of 43839 stents were used in 34873 lesions treated with PCI. An average of 1.26 stent was used per lesion treated. Majority of the stents used were drug eluting stents (DES; 64.0%), and bare metal stents (BMS) constituted 15.7% of stents used. There were a marked increasing trend of DES usage and a decreasing trend of BMS usage, from year 2007 to 2012. After being commercially available, a small number of bio-absorbable stents (37 stents, 0.1%) were being used in the recent years. [Table 4.2.6]

Direct stenting was being performed in 11.9% of lesions treated. There was a marked decreasing trend of this technique. More lesions were treated with pre-dilatation instead in the recent years. The mean stent length was 29.4mm (SD 16.7mm), and the mean stent diameter was 3.0mm (SD 0.4mm). [Table 4.2.7]

Balloon angioplasty (POBA) was performed in 7.1% of lesions treated. There was a decreasing trend of this technique as well throughout the years. On the other hand, drug eluting balloon was getting more popular over the years, which had doubled from 3.0% in 2007-2009 to 6.3% in 2010-2012 among all lesions treated. [Table 4.2.8]

Adjunctive angioplasty devices were not commonly used during PCI, which include intravascular ultrasound (IVUS; 3.6%), cutting balloon (1.8%) and rotablator (0.9%). [Table 4.2.8]

There was a high success rate of PCI in this registry, which achieved 96.1% of all lesions. [Table 4.2.7]

### ***Lesion complication during PCI***

The commonest complication during PCI was vessel dissection, which constituted 3.2% of all lesions. No reflow occurred in 1.1% of all lesions, and majority of them were transient (78.2%). Acute closure and perforation were not common, which constituted 0.3% each. The number remained similar throughout the years. [Table 4.2.9]



Table 4.2.2 Characteristics of lesions treated by PCI, NCVDP-PCI Registry, 2007-2012

Types of lesions	2007-2009 Total no. of lesions = 15848		2010 Total no. of lesions = 6088		2011 Total no. of lesions = 5977		2012 Total no. of lesions = 6960		2010-2012 Total no. of lesions = 19025		2007-2012 Total no. of lesions = 34873	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
De novo	14749	93.1	5631	92.5	5595	93.6	6568	94.4	17794	93.5	32543	93.3
Restenosis (no prior stent)	34	0.2	15	0.2	14	0.2	2	0.0	31	0.2	65	0.2
Stent thrombosis	80	0.5	22	0.4	27	0.5	18	0.3	67	0.4	147	0.4
In-stent restenosis	743	4.7	353	5.8	227	3.8	295	4.2	875	4.6	1618	4.7
Not available	26	0.2	67	1.1	114	1.9	77	1.1	258	1.3	284	0.8
Missing	216	1.3	0	0	0	0	0	0	0	0	216	0.6
<b>Total</b>	<b>15848</b>	<b>100.0</b>	<b>6088</b>	<b>100.0</b>	<b>5977</b>	<b>100.0</b>	<b>6960</b>	<b>100.0</b>	<b>19025</b>	<b>100.0</b>	<b>34873</b>	<b>100.0</b>

Table 4.2.3 Prevalence of lesions according to American College of Cardiology (ACC) classifications, NCVDP-PCI Registry, 2007-2012

Types of lesions	2007-2009 Total no. of lesions = 15848		2010 Total no. of lesions = 6088		2011 Total no. of lesions = 5977		2012 Total no. of lesions = 6960		2010-2012 Total no. of lesions = 19025		2007-2012 Total no. of lesions = 34873	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
A	2011	12.7	648	10.6	615	10.3	652	9.4	1915	10.1	3926	11.2
B1	4198	26.5	1704	28.0	1568	26.2	1632	23.4	4904	25.8	9102	26.1
B2	3570	22.5	1570	25.8	1717	28.7	1342	19.3	4629	24.3	8199	23.5
C	5751	36.3	2114	34.7	1737	29.1	3253	46.7	7104	37.3	12855	36.9
Not available	118	0.7	52	0.9	340	5.7	81	1.2	473	2.5	591	1.7
Missing	200	1.3	0	0	0	0	0	0	0	0	200	0.6
<b>Total</b>	<b>15848</b>	<b>100.0</b>	<b>6088</b>	<b>100.0</b>	<b>5977</b>	<b>100.0</b>	<b>6960</b>	<b>100.0</b>	<b>19025</b>	<b>100.0</b>	<b>34873</b>	<b>100.0</b>

Table 4.2.4 Prevalence of high risk lesion type, NCVI-PCI Registry, 2007-2012

#Types of lesions	2007-2009 Total no. of lesions = 15848		2010 Total no. of lesions = 6088		2011 Total no. of lesions = 5977		2012 Total no. of lesions = 6960		2010-2012 Total no. of lesions = 19025		2007-2012 Total no. of lesions = 34873	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Ostial	1084	6.8	483	7.9	413	6.9	381	5.5	1277	6.7	2361	6.8
Bifurcation	1313	8.3	1046	17.2	434	7.3	492	7.1	1972	10.4	3285	9.4
Total occlusion	452	2.9	351	5.8	394	6.6	420	6.0	1165	6.1	1617	4.6
CTO>3mo	1138	7.2	510	8.4	534	8.9	444	6.4	1488	7.8	2626	7.5
Thrombus	532	3.4	197	3.2	156	2.6	195	2.8	548	2.9	1080	3.1

<sup>#</sup>Patients are allowed to have more than one type of category

Table 4.2.5 Comparison of TIMI flow grade by pre and post procedure, NCVI-PCI Registry, 2007-2012

TIMI Flow Grade	2007-2009 Total no. of lesions = 15848				2010-2012 Total no. of lesions = 19025				2007-2012 Total no. of lesions = 34873			
	Pre - Procedure		Post - Procedure		Pre - Procedure		Post - Procedure		Pre - Procedure		Post - Procedure	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
TIMI-0	1817	11.5	270	1.7	2479	13.0	386	2.0	4296	12.3	656	1.9
TIMI-1	1164	7.3	80	0.5	1329	7.0	49	0.3	2493	7.2	129	0.4
TIMI-2	3111	19.6	175	1.1	3546	18.7	176	0.9	6657	19.1	351	1.0
TIMI-3	9199	58.1	14743	93.0	9571	50.3	16307	85.7	18770	53.8	31050	89.0
Not available	37	0.2	41	0.3	346	1.8	313	1.7	383	1.1	354	1.0
Missing	520	3.3	539	3.4	1754	9.2	1794	9.4	2274	6.5	2333	6.7
<b>Total</b>	<b>15848</b>	<b>100.0</b>	<b>15848</b>	<b>100.0</b>	<b>19025</b>	<b>100.0</b>	<b>19025</b>	<b>100.0</b>	<b>34873</b>	<b>100.0</b>	<b>34873</b>	<b>100.0</b>

Table 4.2.6 Types of stents used, NCVD-PCI Registry, 2007-2012

Types of stents	2007-2009 Total no. of stents used = 20180		2010 Total no. of stents used = 7661		2011 Total no. of stents used = 7558		2012 Total no. of stents used = 8440		2010-2012 Total no. of stents used = 23659		2007-2012 Total no. of stents used = 43839	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Drug eluting stent	10652	52.8	5036	65.8	4636	61.3	5462	64.7	15134	64.0	25786	58.8
Bare metal stent	6640	32.9	1381	18.0	1219	16.1	1114	13.2	3714	15.7	10354	23.6
Bio-absorbable stent	8	0.1	1	0.0	4	0.1	24	0.3	29	0.1	37	0.1
Antibody coated	371	1.8	124	1.6	94	1.2	40	0.5	258	1.1	629	1.5
Others	583	2.9	334	4.4	843	11.2	1052	12.4	2229	9.4	2812	6.4
Drug eluting balloon stent	0	0	0	0	0	0	0	0	0	0	0	0
Bifurcated stent	0	0	0	0	0	0	0	0	0	0	0	0
Covered stent	9	0.0	3	0.0	1	0.0	0	0	4	0.0	13	0.0
Combo stent	0	0	0	0	0	0	0	0	0	0	0	0
No stent	1917	9.5	782	10.2	761	10.1	748	8.9	2291	9.7	4208	9.6
<b>Total</b>	<b>20180</b>	<b>100.0</b>	<b>7661</b>	<b>100.0</b>	<b>7558</b>	<b>100.0</b>	<b>8440</b>	<b>100.0</b>	<b>23659</b>	<b>100.0</b>	<b>43839</b>	<b>100.0</b>



Table 4.2.7 Lesion characteristics for patients who undergone PCL, NCV-D-PCI Registry, 2007-2012

	2007-2009 Total no. of lesions = 15848			2010 Total no. of lesions = 6088			2011 Total no. of lesions = 5977			2012 Total no. of lesions = 6960			2010-2012 Total no. of lesions = 19025			2007-2012 Total no. of lesions = 34873		
	No.	%		No.	%		No.	%		No.	%		No.	%		No.	%	
Pre-procedure stenosis																		
N			14588			6026			5765			6574			18365			32953
Mean(SD)			84.1 (12.4)			84.3 (12.1)			85.6 (12.2)			86.0 (11.7)			85.3 (12.0)			84.8 (12.2)
Median(min,max)			90.0 (0.0, 100.0)			85.0 (0.0, 100.0)			90.0 (0.0, 100.0)			90.0 (0.0, 100.0)			90.0 (0.0, 100.0)			90.0 (0.0, 100.0)
Missing, No. (%)			1260 (8.0)			62 (1.0)			212 (3.5)			386 (5.5)			660 (3.5)			1920 (5.5)
Post-procedure stenosis																		
N			14567			6001			5359			5639			16999			31566
Mean (SD)			3.9 (16.8)			4.5 (19.0)			5.1 (20.4)			4.7 (19.5)			4.8 (19.6)			4.3 (18.4)
Median (min,max)			0.0 (0.0, 100.0)			0.0 (0.0, 100.0)			0.0 (0.0, 100.0)			0.0 (0.0, 100.0)			0.0 (0.0, 100.0)			0.0 (0.0, 100.0)
Missing, No. (%)			1281 (8.1)			87 (1.4)			618 (10.3)			1321 (19.0)			2026 (10.6)			3307 (9.5)
Estimated lesion length, mm																		
N			13704			5819			5641			6569			18029			31733
Mean (SD)			23.5 (14.1)			24.1 (14.7)			24.0 (14.3)			23.2 (13.9)			23.7 (14.3)			23.6 (14.2)
Median (min,max)			20.0 (1.0, 99.0)			20.0 (4.0, 140.0)			20.0 (1.0, 115.0)			20.0 (1.0, 142.0)			20.0 (1.0, 142.0)			20.0 (1.0, 142.0)
Missing, No. (%)			2144 (13.5)			269 (4.4)			336 (5.6)			391 (5.6)			996 (5.2)			3140 (9.0)

	2007-2009 Total no. of lesions = 15848			2010 Total no. of lesions = 6088			2011 Total no. of lesions = 5977			2012 Total no. of lesions = 6960			2010-2012 Total no. of lesions = 19025			2007-2012 Total no. of lesions = 34873		
	No.	%		No.	%		No.	%		No.	%		No.	%		No.	%	
Lesion result, No. (%)																		
Successful	15110	95.3		5912	97.1		5768	96.5		6725	96.6		18405	96.8		33515	96.1	
Unsuccessful	499	3.2		169	2.8		203	3.4		223	3.2		595	3.1		1094	3.1	
Not available	12	0.1		7	0.1		6	0.1		12	0.2		25	0.1		37	0.1	
Missing	227	1.4		0	0		0	0		0	0		0	0		227	0.7	
*Stent length, mm																		
N		13839			5265			5176			6165			16606			30445	
Mean (SD)		29.5 (17.0)			30.0 (17.0)			29.7 (16.9)			28.3 (15.5)			29.3 (16.4)			29.4 (16.7)	
Median (min,max)		24.0 (8.0, 149.0)			24.0 (8.0, 141.0)			24.0 (8.0, 138.0)			24.0 (8.0, 166.0)			24.0 (8.0, 166.0)			24.0 (8.0, 166.0)	
Not available, No. (%)	2009	12.7		823	13.5		801	13.4		795	11.4		2419	12.7		4428	12.7	
**Stent diameter, mm																		
N		13807			5250			5135			6137			16522			30329	
Mean (SD)		3.0 (0.4)			3.0 (0.4)			3.0 (0.4)			3.0 (0.4)			3.0 (0.4)			3.0 (0.4)	
Median (min,max)		3.0 (2.0, 7.0)			3.0 (2.0, 5.0)			3.0 (2.0, 5.0)			3.0 (2.0, 5.0)			3.0 (2.0, 5.0)			3.0 (2.0, 7.0)	
Not available, No. (%)	2041	12.9		838	13.8		842	14.1		823	11.8		2503	13.2		4544	13.0	

\* Summation of stent length was used for lesions which were treated with more than one stent

\*\* Average of stent diameter was used for lesions which were treated with more than one stent



	2007-2009 Total no. of lesions = 15848			2010 Total no. of lesions = 6088			2011 Total no. of lesions = 5977			2012 Total no. of lesions = 6960			2010-2012 Total no. of lesions = 19025			2007-2012 Total no. of lesions = 34873		
	No.	%		No.	%		No.	%		No.	%		No.	%		No.	%	
Maximum balloon size used, mm																		
N		14144			5714			5352			6453			17519			31663	
Mean (SD)		3.1 (0.6)			3.1 (0.6)			3.1 (0.6)			3.1 (0.5)			3.1 (0.6)			3.1 (0.6)	
Median (min,max)		3.0 (1.0, 5.5)			3.0 (1.0, 6.0)			3.0 (1.0, 5.8)			3.0 (1.0, 6.0)			3.0 (1.0, 6.0)			3.0 (1.0, 6.0)	
Missing, No. (%)	1704	10.8		374	6.1		625	10.5		507	7.3		1506	7.9		3210	9.2	
Maximum stent/balloon deploy pressure, atm																		
N		14315			5683			5299			6255			17237			31552	
Mean (SD)		15.7 (3.9)			15.7 (4.0)			15.9 (4.2)			15.7 (4.1)			15.8 (4.1)			15.7 (4.0)	
Median (min,max)		16.0 (1.0, 30.0)			16.0 (2.0, 30.0)			16.0 (1.0, 30.0)			16.0 (3.0, 30.0)			16.0 (1.0, 30.0)			16.0 (1.0, 30.0)	
Missing, No. (%)	1533	9.7		405	6.7		678	11.3		705	10.1		1788	9.4		3321	9.5	
Direct stenting, No. (%)																		
Yes	2791	17.6		543	8.9		352	5.9		461	6.6		1356	7.1		4147	11.9	
No	12196	77.0		5284	86.8		5409	90.5		6260	90.0		16953	89.1		29149	83.6	
Not applicable	659	4.1		261	4.3		216	3.6		239	3.4		716	3.8		1375	3.9	
Missing	202	1.3		0	0		0	0		0	0		0	0		202	0.6	

Table 4.2.8 Types of devices used during Percutaneous Coronary Intervention, NCVD-PCI Registry, 2007-2012

#Intracoronary devices	2007-2009 Total no. of lesions = 15848		2010 Total no. of lesions = 6088		2011 Total no. of lesions = 5977		2012 Total no. of lesions = 6960		2010-2012 Total no. of lesions = 19025		2007-2012 Total no. of lesions = 34873	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Aspiration	0	0	123	2.0	174	2.9	226	3.2	523	2.7	523	1.5
Balloon only	1281	8.1	473	7.8	365	6.1	371	5.3	1209	6.4	2490	7.1
Drug eluting balloon	482	3.0	355	5.8	351	5.9	486	7.0	1192	6.3	1674	4.8
Drug eluting stent	7773	49.0	3934	64.6	3800	63.6	4863	69.9	12597	66.2	20370	58.4
Cutting balloon	334	2.1	123	2.0	100	1.7	88	1.3	311	1.6	645	1.8
IVUS	603	3.8	239	3.9	191	3.2	215	3.1	645	3.4	1248	3.6
Flowire	3	0.0	20	0.3	25	0.4	30	0.4	75	0.4	78	0.2
Rotablator	134	0.8	66	1.1	55	0.9	54	0.8	175	0.9	309	0.9
Bare metal stent	5913	37.3	1273	20.9	1304	21.8	1226	17.6	3803	20.0	9716	27.9
Distal embolic protection	64	0.4	15	0.2	22	0.4	39	0.6	76	0.4	140	0.4
Others	926	5.8	303	5.0	272	4.6	294	4.2	869	4.6	1795	5.1

*\* Patients are allowed to have more than one type of category*



Table 4.2.9 Types of post-procedure complications, NCVD-PCI Registry, 2007-2012

*Types of post-procedure complications	2007-2009 Total no. of lesions = 15848		2010 Total no. of lesions = 6088		2011 Total no. of lesions = 5977		2012 Total no. of lesions = 6960		2010-2012 Total no. of lesions = 19025		2007-2012 Total no. of lesions = 34873	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Dissection	687	4.3	240	3.9	91	1.5	84	1.2	415	2.2	1102	3.2
No reflow	197	1.2	60	1.0	46	0.8	65	0.9	171	0.9	368	1.1
Transient	131	75.3	46	82.1	35	79.5	53	81.5	134	81.2	265	78.2
Persistent	43	24.7	10	17.9	9	20.5	12	18.5	31	18.8	74	21.8
Not available/ Missing	23		4		2		0		6		29	
Acute closure	57	0.4	17	0.3	12	0.2	9	0.1	38	0.2	95	0.3
Perforation	49	0.3	23	0.4	12	0.2	10	0.1	45	0.2	94	0.3

\* Results only showed for number of patients who were reported to have the complications



### **In stent restenosis (ISR)**

From 2007-2012, a total of 1618 (4.7% of all lesions treated) in-stent restenosis (ISR) were noted in this registry. Majority of the reported ISR occurred in the native coronary artery (97.3%). ISR within the grafts occurred in 43 (2.7%) cases, out of which 3 cases were internal mammary artery grafts (LIMA-2, RIMA-1), nearly half of ISR (726 lesions, 44.9%) occurred in the previously implanted DES, followed by (579 lesions, 35.8%) ISR in BMS implantation. [Table 4.2.10]

The mean estimated length of the lesion was 22.7mm(SD 14.7). Among all the ISR, 14.3% of the cases was of TIMI 0 flow. TIMI 3 flow was seen only in 48.3% of cases prior to intervention. Nearly 90.8% achieved TIMI 3 flow after intervention, 2.1% were failed procedures.

About one third of patients (33.1%) with ISR presented as ACS. Majority of ISR (41.5%) were treated with balloon angioplasty (including cutting balloon), followed by DES and DEB in 43.2% and 29.9% respectively. Very few newer generation stents like antibody coated stents and others were used, however the usage of drug eluting balloons have become more popular over last five years (14.1% in 2007-2009 vs. 43.2% in 2010-2012). BMS were used in only 6.9% of cases. IVUS guidance was only used in 19.5%. [Table 4.2.11 and Table 4.2.12] The mean stent diameter was 3.0mm (SD 0.5) and the mean length was 29.5mm(SD 18.0).

Most of the lesions were successfully treated; however no reflow was noted in 0.7% of cases, and dissection in 2.2% of cases. [Table 4.2.13]

Table 4.2.10 Types of prior stents used in in-stent restenosis, NCVD-PCI Registry, 2007-2012

Types of prior stents used in ISR	2007-2009 Total no. of lesions = 743		2010 Total no. of lesions = 353		2011 Total no. of lesions = 227		2012 Total no. of lesions = 295		2010-2012 Total no. of lesions = 875		2007-2012 Total no. of lesions = 1618	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Drug eluting stent	287	38.6	168	47.6	112	49.3	159	53.9	439	50.2	726	44.9
Bare metal stent	338	45.5	124	35.1	51	22.5	66	22.4	241	27.5	579	35.8
Others	15	2.0	10	2.8	20	8.8	8	2.7	38	4.4	53	3.2
Not available	64	8.6	45	12.8	36	15.9	54	18.3	135	15.4	199	12.3
Missing	39	5.3	6	1.7	8	3.5	8	2.7	22	2.5	61	3.8
Total	743	100.0	353	100.0	227	100.0	295	100.0	875	100.0	1618	100.0

Table 4.2.11 Types of stents used in the in-stent restenosis, NCVD-PCI Registry, 2007-2012

Types of stents used in the ISR	2007-2009 Total no. of stents used = 855		2010 Total no. of stents used = 411		2011 Total no. of stents used = 267		2012 Total no. of stents used = 326		2010-2012 Total no. of stents used = 1004		2007-2012 Total no. of stents used = 1859	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Drug eluting stent	367	42.9	178	43.3	120	44.9	139	42.6	437	43.5	804	43.2
Bare metal stent	84	9.8	24	5.9	11	4.1	9	2.8	44	4.4	128	6.9
Bio-absorbable stent	1	0.1	0	0	0	0	0	0	0	0	1	0.1
Antibody coated	3	0.4	1	0.2	0	0	1	0.3	2	0.2	5	0.3
Others	24	2.8	7	1.7	21	7.9	32	9.8	60	6	84	4.5
Covered stent	1	0.1	1	0.2	0	0	0	0	1	0.1	2	0.1

Table 4.2.12 Types of devices used in the in-stent restenosis, NCVI-PCI Registry, 2007-2012

#Intracoronary devices used in ISR	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	No.	%	Total no. of lesions = 743	No.	%	Total no. of lesions = 353	No.	%	Total no. of lesions = 295	No.	%	Total no. of lesions = 1618
Drug eluting balloon	105	14.1		131	37.1		92	40.5	155	52.5	378	43.2
Balloon only	251	33.8		71	20.1		31	13.7	29	9.8	131	15.0
IVUS	130	17.5		84	23.8		48	21.1	53	18.0	185	21.1
Cutting balloon	146	19.7		75	21.2		32	14.1	37	12.5	144	16.5
Aspiration	0	0		1	0.3		9	4.0	7	2.4	17	1.9
Flowwire	0	0		2	0.6		0	0	2	0.7	4	0.5
Rotablator	4	0.5		3	0.8		3	1.3	0	0	6	0.7
Distal embolic protection	2	0.3		2	0.6		0	0	3	1.0	5	0.6
Others	33	4.4		8	2.3		9	4.0	18	6.1	35	4.0

\*Patients are allowed to have more than one type of category

Table 4.2.13 Types of complications in post in-stent restenosis, NCVI-PCI Registry, 2007-2012

*Types of complications in ISR	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	No.	%	Total no. of lesions = 743	No.	%	Total no. of lesions = 353	No.	%	Total no. of lesions = 295	No.	%	Total no. of lesions = 1618
Dissection	17	2.3		11	3.1		3	1.3	5	1.7	19	2.2
No reflow	4	0.5		6	1.7		0	0	1	0.3	7	0.8
Transient	4	100.0		5	83.3		0	0	1	100.0	6	85.7
Persistent	0	0		1	16.7		0	0	0	0	1	14.3
Acute closure	1	0.1		1	0.3		0	0	0	0	1	0.1
Perforation	3	0.4		4	1.1		2	0.9	0	0	6	0.7

\* Results only showed for patients with the complications



### PCI of Left Main Stem (LMS)

From 2007 to 2012, a total of 749 LMS interventions were performed. Most were denovo lesions and 6.4% were in stent restenosis. [Table 4.2.14] Majority of interventions were performed on unprotected LMS, only 94 cases (12.6%) were performed in patients with previous coronary artery bypass graft (CABG). [Table 4.2.15] The most common access was femoral artery (72.0%); however radial artery access was not uncommon (24.6%).

Majority of LMS interventions were elective cases (88.9%). About 11.0% of LMS cases presented with ACS, among them, 48.5% had STEMI and 39.8% had NSTEMI. Over the years we see an increasing trend of LMS interventions in ACS patients. [Table 4.2.16]

Mean pre-procedure stenosis was 80.9% (SD 14.6) with TIMI III flow in only 57.8% of cases, however post procedure 89.7% of cases achieved TIMI III flow and less than 1.0% achieved TIMI 0 to TIMI II flow. [Table 4.2.17]

The mean lesion length was 27.1mm (SD 17.5). Majority of the lesions were stented with DES (81.8%) [Table 4.2.18] and direct stenting technique was used in 8.0% of cases. The mean stent length was 33.6mm (SD 20.1), the use of longer stents might be due to stenting across the LAD or LCx.

Use of IVUS and IABP guided LMS intervention was uncommon; they were used in only 27.1% and 12.8% respectively. [Table 4.2.19] Despite intervention in unprotected LMS disease, majority of the LMS PCI were successful (98.4%). Complications such as dissection were noted in 7.5% of cases, followed by 1.5% of cases with no reflow.

About 85.0% of patients with LMS stenting received DAPT for 12 months or longer. DAPT were prescribed for 12 months in 59.0% of patients, and 25.2% of patients received DAPT for more than 12 months. [Table 4.2.20]

### PCI to the grafts

From 2007 to 2012, a total of 481 bypass graft PCI were performed, 88.0% of interventions were on SVG and the rest 10.6% were on LIMA. Majority of the lesions were de novo (89.0%) followed by 9.0% of ISR in grafts. [Table 4.2.21] There was an increasing trend in the number of interventions on bypass grafts.

The mean lesion length was 19.8mm(SD 12.0), distal embolic devices were used only in 96 (20.0%) lesions, majority were stented with DES (60.0%), followed by BMS (24.7%). The mean stent length was 25.5mm(SD 15.3) and diameter of 3.1mm(SD 0.6). TIMI III flow was achieved in 88.4% of patients without any major complications; however 2.1% of grafts PCI were unsuccessful.

Long term DAPT was prescribed to most of the patients, about 62.6% received DAPT for 12 months.

Table 4.2.14 Types of lesions in left main stem procedure, NCVS-PCI Registry, 2007-2012

Types of lesion in left main stem procedure	2007-2009 Total no. of lesions = 287		2010 Total no. of lesions = 152		2011 Total no. of lesions = 147		2012 Total no. of lesions = 163		2010-2012 Total no. of lesions = 462		2007-2012 Total no. of lesions = 749	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
De novo	262	91.3	137	90.1	140	95.2	154	94.5	431	93.3	693	92.5
Restenosis (no prior stent)	0	0	1	0.7	2	1.4	0	0	3	0.7	3	0.4
Stent thrombosis	1	0.3	0	0	1	0.7	0	0	1	0.2	2	0.3
In-stent restenosis	22	7.7	14	9.2	4	2.7	8	4.9	26	5.6	48	6.4
Previous DES	14	77.8	9	69.2	3	75.0	5	83.3	17	73.9	31	75.6
Previous BMS	4	22.2	4	30.8	1	25.0	1	16.7	6	26.1	10	24.4
Not available/Missing	4		1		0		2		3		7	
Not available	0	0	0	0	0	0	1	0.6	1	0.2	1	0.1
Missing	2	0.7	0	0	0	0	0	0	0	0	2	0.3

Table 4.2.15 Characteristics of left main stem procedure, NCVS-PCI Registry, 2007-2012

	2007-2009 Total no. of lesions = 287		2010 Total no. of lesions = 152		2011 Total no. of lesions = 147		2012 Total no. of lesions = 163		2010-2012 Total no. of lesions = 462		2007-2012 Total no. of lesions = 749	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Intra-aortic balloon pump (IABP), No. (%)												
Yes	38	13.2	17	11.2	27	18.4	14	8.6	58	12.6	96	12.8
No	249	86.8	135	88.8	117	79.6	148	90.8	400	86.6	649	86.6
Missing	0	0	0	0	3	2.0	1	0.6	4	0.8	4	0.6

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	2007-2009 Total no. of lesions = 287		2010 Total no. of lesions = 152		2011 Total no. of lesions = 147		2012 Total no. of lesions = 163		2010-2012 Total no. of lesions = 462		2007-2012 Total no. of lesions = 749	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Previous PCI, No. (%)												
Yes	80	27.9	49	32.2	37	25.2	44	27.0	130	28.1	210	28.0
No	207	72.1	103	67.8	110	74.8	119	73.0	332	71.9	539	72.0
Missing	0	0	0	0	0	0	0	0	0	0	0	0
Previous CABG, No. (%)												
Yes	44	15.3	18	11.8	14	9.5	18	11.0	50	10.8	94	12.6
No	243	84.7	134	88.2	133	90.5	145	89.0	412	89.2	655	87.4
Missing	0	0	0	0	0	0	0	0	0	0	0	0

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Table 4.2.16 Clinical presentation of left main stem, NCVI-PCI Registry, 2007-2012

Clinical presentation in left main stem procedure	2007-2009 Total no. of lesions = 287		2010 Total no. of lesions = 152		2011 Total no. of lesions = 147		2012 Total no. of lesions = 163		2010-2012 Total no. of lesions = 462		2007-2012 Total no. of lesions = 749	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PCI status												
Elective	262	91.3	133	87.5	129	87.8	142	87.1	404	87.4	666	88.9
NSSTEMI/UA	12	4.2	12	7.9	8	5.4	8	4.9	28	6.1	40	5.4
AMI	12	4.2	7	4.6	10	6.8	13	8	30	6.5	42	5.6
Not available	1	0.3	0	0	0	0	0	0	0	0	1	0.1

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Clinical presentation in left main stem procedure	2007-2009 Total no. of lesions = 287		2010 Total no. of lesions = 152		2011 Total no. of lesions = 147		2012 Total no. of lesions = 163		2010-2012 Total no. of lesions = 462		2007-2012 Total no. of lesions = 749	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Acute coronary syndrome												
Total	98	100.0	49	100.0	49	100.0	45	100.0	143	100.0	241	100.0
STEMI	46	46.9	19	38.8	29	59.2	22	48.9	70	49	116	48.1
NSTEMI	38	38.8	26	53.1	12	24.5	19	42.2	57	39.9	95	39.4
UA	13	13.3	4	8.1	8	16.3	3	6.7	15	10.5	28	11.6
Not available	1	1.0	0	0	0	0	1	2.2	1	0.6	2	0.9

Table 4.2.17 TIMI flow prior to intervention in left main stem procedure, NCDV-PCI Registry, 2007-2012

TIMI flow prior to intervention in left main stem procedure	2007-2009 Total no. of lesions = 287		2010 Total no. of lesions = 152		2011 Total no. of lesions = 147		2012 Total no. of lesions = 163		2010-2012 Total no. of lesions = 462		2007-2012 Total no. of lesions = 749	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
TIMI-0	24	8.4	18	11.8	10	6.8	15	9.2	43	9.3	67	8.9
TIMI-1	19	6.6	15	9.9	4	2.7	6	3.7	25	5.4	44	5.9
TIMI-2	61	21.3	36	23.7	25	17.0	27	16.6	88	19.0	149	19.9
TIMI-3	178	62.0	80	52.6	81	55.1	94	57.7	255	55.2	433	57.8
Not available	0	0	0	0	0	0	4	2.4	4	0.9	4	0.5
Missing	5	1.7	3	2.0	27	18.4	17	10.4	47	10.2	52	7.0

Table 4.2.18 Types of stents used in left main stem procedure, NCVD-PCI Registry, 2007-2012

Types of stent used in left main stem procedure	2007-2009 Total no. of stents used = 450		2010 Total no. of stents used = 219		2011 Total no. of stents used = 199		2012 Total no. of stents used = 227		2010-2012 Total no. of stents used = 645		2007-2012 Total no. of stents used = 1095	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Drug eluting stent	382	84.9	186	84.9	144	72.4	170	74.9	500	77.5	882	80.5
Bare metal stent	40	8.9	15	6.9	19	9.5	19	8.4	53	8.2	93	8.5
Bio-absorbable stent	0	0	0	0	0	0	0	0	0	0	0	0
Antibody coated	6	1.3	3	1.4	3	1.5	3	1.3	9	1.4	15	1.4
*Others	4	0.9	4	1.8	19	9.6	19	8.4	42	6.5	46	4.2
Covered stent	4	0.9	0	0	0	0	0	0	0	0	4	0.4

\* Stents which are not listed in the NCVD-PCI Stent List

Table 4.2.19 Types of devices used in left main stem procedure, NCVD-PCI Registry, 2007-2012

# Intracoronary devices used in left main stem procedure	2007-2009 Total no. of lesions = 287		2010 Total no. of lesions = 152		2011 Total no. of lesions = 147		2012 Total no. of lesions = 163		2010-2012 Total no. of lesions = 462		2007-2012 Total no. of lesions = 749	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Aspiration	0	0	1	0.7	3	2.0	1	0.6	5	1.1	5	0.7
Balloon only	11	3.8	3	2.0	10	6.8	5	3.1	18	3.9	29	3.9
Drug eluting balloon	11	3.8	19	12.5	6	4.1	13	8.0	38	8.2	49	6.5
Cutting balloon	18	6.3	3	2.0	1	0.7	1	0.6	5	1.1	23	3.1
IVUS	98	34.1	42	27.6	28	19.0	35	21.5	105	22.7	203	27.1
Flowire	0	0	0	0	0	0	1	0.6	1	0.2	1	0.1
Rotablator	13	4.5	7	4.6	7	4.8	9	5.5	23	5.0	36	4.8
Distal embolic protection	2	0.7	0	0	0	0	1	0.6	1	0.2	3	0.4
Others	13	4.5	5	3.3	4	2.7	8	4.9	17	3.7	30	4.0

#Patients are allowed to have more than one type of category



Table 4.2.20 Planned duration of dual antiplatelet therapy in left main stem procedure, NCVD-PCI Registry, 2007-2012

Planned duration of dual antiplatelet therapy in left main stem procedure (months)	2007-2009 Total no. of lesions = 287		2010 Total no. of lesions = 152		2011 Total no. of lesions = 147		2012 Total no. of lesions = 163		2010-2012 Total no. of lesions = 462		2007-2012 Total no. of lesions = 749	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	11	3.8	8	5.3	3	2.0	7	4.3	18	3.9	29	3.9
3	6	2.1	1	0.7	6	4.1	10	6.1	17	3.7	23	3.1
6	17	5.9	1	0.7	1	0.7	4	2.5	6	1.3	23	3.1
12	117	40.8	85	55.9	117	79.6	123	75.5	325	70.3	442	59
>12	118	41.1	52	34.2	13	8.9	6	3.7	71	15.4	189	25.2
Not available	18	6.3	4	2.6	4	2.7	5	3.0	13	2.8	31	4.1
Missing	0	0	1	0.6	3	2.0	8	4.9	12	2.6	12	1.6

Table 4.2.21 Lesion types in graft PCI, NCVD-PCI Registry, 2007-2012

Lesion type in graft PCI	2007-2009 Total no. of lesions = 205		2010 Total no. of lesions = 104		2011 Total no. of lesions = 80		2012 Total no. of lesions = 92		2010-2012 Total no. of lesions = 276		2007-2012 Total no. of lesions = 481	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
De novo	180	87.8	94	90.4	70	87.5	84	91.3	248	89.9	428	89.0
Restenosis (no prior stent)	4	1.9	0	0	0	0	0	0	0	0	4	0.8
Stent thrombosis	0	0	0	0	0	0	0	0	0	0	0	0
In-stent restenosis	17	8.3	10	9.6	8	10.0	8	8.7	26	9.4	43	9.0
Not available	1	0.5	0	0	2	2.5	0	0	2	0.7	3	0.6
Missing	3	1.5	0	0	0	0	0	0	0	0	3	0.6



### PCI of Chronic total occlusion (> 3 months)

A total of 2626 (7.5% of all lesions) chronic total occlusion > 3 months were noted in 2007-2012. Majority of CTO lesions involved left anterior descending artery (46.0%), followed by right coronary artery (39.0%) and left circumflex artery (12.9%). [Table 4.2.22] Large majority of CTO lesions were de-novo lesions which constituted 92.9%, and in-stent restenosis constituted 5.8%.

#### *Entry site and sheath*

For CTO PCI the femoral approach was preferred to radial approach (61.2% vs. 34.2%). Regarding the sheath used, majority of the procedures were performed using a 6 French sheath (70.9%), followed by 7 French (23.8%) and 8 French sheaths (1.1%). [Table 4.2.23]

#### *Types of Stents and Devices used*

Drug eluting stents were used more frequently in CTO lesions (68.9%), compared to bare metal stents (11.8%). [Table 4.2.24] Comparing with overall lesions treated in this registry, the percentage of DES used was also higher in CTO lesions (68.9% vs. 64.0%).

Adjunctive devices usage (intravascular ultrasound (4.3%), cutting balloon (1.0%) and rotablator (0.9%)) were low and similar to those in overall lesions. [Table 4.2.25]

#### *Results and complications*

About 4/5 (80.2%) of all CTO lesions were successfully treated with PCI. Mean stent length was 45.1mm (SD 24.2), and mean stent diameter was 2.8mm (SD 0.4). [Table 4.2.23] Complication for CTO PCI was uncommon with dissection (6.1%), followed by no reflow (2.1%) and perforation (0.8%). [Table 4.2.26]

#### *Duration of dual anti-platelet therapy (DAPT)*

Duration of DAPT varied depending on the intra-coronary devices used. For lesions treated with DES, 94.0% of patients were given at least 6 months of DAPT and 78.3% of patients were given for 12 months. For lesions treated with BMS, 53.2% of patients were given at least 6 months of DAPT, which was similar to those patients treated with balloon only (46.7%). [Table 4.2.28]

Table 4.2.22 Summary of location of lesions treated with percutaneous coronary intervention and for lesion with description of CTO &gt;3months only, NCVD-PCI Registry, 2007-2012

Location of lesion with CTO >3months	2007-2009 Total no. of lesions = 1138		2010 Total no. of lesions = 510		2011 Total no. of lesions = 534		2012 Total no. of lesions = 444		2010-2012 Total no. of lesions = 1488		2007-2012 Total no. of lesions = 2626	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Left main stem</b>	14	1.1	9	1.6	4	0.8	5	1.1	18	1.2	32	1.2
<b>Left anterior descending artery (LAD)</b>	542	47.7	230	45.1	248	46.3	187	42.0	665	44.8	1207	46.0
LAD proximal	421	37.0	180	35.3	203	38.0	136	30.6	519	34.9	940	35.8
LAD mid	110	9.7	47	9.2	37	6.9	45	10.1	129	8.7	239	9.1
LAD distal	3	0.3	1	0.2	4	0.7	5	1.1	10	0.7	13	0.5
D1	8	0.7	2	0.4	4	0.7	1	0.2	7	0.5	15	0.6
<b>Right coronary artery (RCA)</b>	431	37.9	200	39.3	208	39.0	185	41.8	593	39.8	1024	39.0
RCA proximal	232	20.4	105	20.6	136	25.5	118	26.6	359	24.1	591	22.5
RCA mid	134	11.8	60	11.8	52	9.7	42	9.5	154	10.3	288	11.0
RCA distal	54	4.7	24	4.7	16	3.0	19	4.3	59	4.0	113	4.3
PDA	7	0.6	4	0.8	2	0.4	2	0.5	8	0.5	15	0.6
PLV	4	0.4	7	1.4	2	0.4	4	0.9	13	0.9	17	0.6
<b>Left circumflex artery (LCx)</b>	143	12.6	64	12.6	71	13.3	62	14.0	197	13.3	340	12.9
LCX proximal	66	5.8	35	6.9	46	8.6	36	8.1	117	7.9	183	7.0
LCX distal	54	4.7	18	3.5	14	2.6	16	3.6	48	3.2	102	3.9
OM1	18	1.6	7	1.4	11	2.1	7	1.6	25	1.7	43	1.6
OM2	3	0.3	3	0.6	0	0	3	0.7	6	0.4	9	0.3
OM3	2	0.2	1	0.2	0	0	0	0	1	0.1	3	0.1
<b>Graft</b>	8	0.7	7	1.4	3	0.6	5	1.1	15	0.9	23	0.9
LIMA	1	0.1	1	0.2	1	0.2	0	0	2	0.1	3	0.1
SVG1	6	0.5	4	0.8	2	0.4	3	0.7	9	0.6	15	0.6
SVG2	1	0.1	1	0.2	0	0	1	0.2	2	0.1	3	0.1
SVG3	0	0	1	0.2	0	0	1	0.2	2	0.1	2	0.1



Table 4.2.23 Characteristics of PCI procedures performed for lesion with description of CTO &gt;3months only, NCDV-PCI Registry, 2007-2012

	2007-2009 Total no. of lesions = 1138		2010 Total no. of lesions = 510		2011 Total no. of lesions = 534		2012 Total no. of lesions = 444		2010-2012 Total no. of lesions = 1488		2007-2012 Total no. of lesions = 2626	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PCI status, No. (%)												
Elective	1090	95.8	465	91.2	500	93.6	406	91.4	1371	92.1	2461	93.7
NSTEMI/UA	26	2.3	28	5.5	22	4.1	19	4.3	69	4.7	95	3.6
AMI	20	1.7	17	3.3	12	2.3	19	4.3	48	3.2	68	2.6
Not available	0	0	0	0	0	0	0	0	0	0	0	0
Missing	2	0.2	0	0	0	0	0	0	0	0	2	0.1
#Percutaneous entry, No. (%)												
Brachial	17	1.5	4	0.8	4	0.7	4	0.9	12	0.8	29	1.1
Radial	349	30.7	196	38.4	174	32.6	180	40.5	550	37.0	899	34.2
Femoral	702	61.7	319	62.5	333	62.4	252	56.8	904	60.8	1606	61.2
French size, No. (%)												
5	17	1.5	9	1.8	2	0.4	4	0.9	15	1.0	32	1.2
6	766	67.3	367	72.0	393	73.6	337	75.9	1097	73.7	1863	80.0
7	309	27.2	117	22.9	118	22.1	72	16.2	307	20.6	616	23.5
8	23	2.0	4	0.8	3	0.5	0	0	7	0.5	30	1.1
Others	0	0	0	0	1	0.2	0	0	1	0.1	1	0.0
Not available	16	1.4	8	1.5	3	0.6	3	0.7	14	0.9	30	1.1
Missing	7	0.6	5	1.0	14	2.6	28	6.3	47	3.2	54	2.1

	2007-2009 Total no. of lesions = 1138		2010 Total no. of lesions = 510		2011 Total no. of lesions = 534		2012 Total no. of lesions = 444		2010-2012 Total no. of lesions = 1488		2007-2012 Total no. of lesions = 2626	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Closure device, No. (%)												
No	1057	92.9	482	94.5	466	87.3	378	85.1	1326	89.1	2383	90.7
Seal	40	3.5	14	2.7	10	1.9	10	2.3	34	2.3	74	2.8
Suture	10	0.9	4	0.8	6	1.1	11	2.5	21	1.4	31	1.2
Others	3	0.3	1	0.2	0	0	0	0	1	0.1	4	0.2
Not available	15	1.3	1	0.2	3	0.5	8	1.8	12	0.8	27	1.0
Missing	13	1.1	8	1.6	49	9.2	37	8.3	94	6.3	107	4.1
#Extent of coronary disease, No. (%)												
Single vessel disease	448	39.4	249	48.8	256	47.9	141	31.8	646	43.4	1094	41.7
Multiple vessel disease	680	59.8	253	49.6	159	29.8	237	53.4	649	43.6	1329	50.6
Graft	8	0.7	6	1.2	0	0	10	2.3	16	1.1	24	0.9
Left main	4	0.4	5	1.0	2	0.4	1	0.2	8	0.5	12	0.5
Fluoroscopy time, min												
N		968		487		498		351		1336		2304
Mean (SD)		31.1 (20.2)		32.5 (23.7)		31.0 (21.3)		33.6 (23.5)		32.2 (22.8)		31.8 (21.7)
Median (min, max)		26.8 (2.1, 147.0)		26.1 (2.4, 174.4)		26.5 (3.7, 178.0)		28.0 (2.0, 150.0)		26.8 (2.0, 178.0)		26.8 (2.0, 178.0)
Not available, No. (%)	156	13.7	9	1.8	12	2.2	37	8.3	58	3.9	214	8.1
Missing, No. (%)	14	1.2	14	2.7	24	4.5	56	12.6	94	6.3	108	4.1



	2007-2009 Total no. of lesions = 1138		2010 Total no. of lesions = 510		2011 Total no. of lesions = 534		2012 Total no. of lesions = 444		2010-2012 Total no. of lesions = 1488		2007-2012 Total no. of lesions = 2626	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Fluoroscopy total dose, mGy												
N		482		343		358		151		852		1334
Mean (SD)		1348.4 (5597.3)		5525.3 (64757.5)		1586.3 (5053.1)		20371.0 (88643.9)		6501.3 (55908.2)		4639.4 (44865.7)
Median (min,max)		190.5 (6.7, 78539.0)		501.1 (1.2, 1199417.0)		297.4 (0.9, 87493.0)		629.7 (28.7, 656032.0)		413.0 (0.9, 1199417.0)		280.0 (0.9, 1199417.0)
Not available, No. (%)	611	53.7	135	26.5	95	17.8	141	31.8	371	24.9	982	37.4
Missing, No. (%)	45	4.0	32	6.3	81	15.2	152	34.2	265	17.8	310	11.8
Contrast type, No. (%)												
Ionic	12	1.1	0	0	6	1.1	1	0.2	7	0.5	19	0.7
Non-ionic	961	84.4	505	99.0	504	94.4	421	94.8	1430	96.1	2391	91.1
Not available	159	14.0	3	0.6	5	0.9	6	1.4	14	0.9	173	6.6
Missing	6	0.5	2	0.4	19	3.6	16	3.6	37	2.5	43	1.6
Contrast volume, ml												
N		972		487		514		401		1402		2374
Mean (SD)		213.7 (79.8)		225.8 (92.7)		221.5 (84.6)		213.9 (91.7)		220.8 (89.6)		217.9 (85.8)
Median (min,max)		200.0 (18.0, 500.0)		200.0 (30.0, 500.0)		200.0 (50.0, 500.0)		200.0 (24.0, 500.0)		200.0 (24.0, 500.0)		200.0 (18.0, 500.0)
Not available, No. (%)	155	13.6	11	2.2	11	2.1	17	3.8	39	2.6	194	7.4
Missing, No. (%)	11	1.0	12	2.4	9	1.7	26	5.9	47	3.2	58	2.2

	2007-2009 Total no. of lesions = 1138		2010 Total no. of lesions = 510		2011 Total no. of lesions = 534		2012 Total no. of lesions = 444		2010-2012 Total no. of lesions = 1488		2007-2012 Total no. of lesions = 2626	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Thrombolytics prior to PCI procedure in STEMI, No. (%)												
Total no. of procedures among STEMI patients	220	100	97	100	120	100	42	100	259	100	479	100
Yes	14	6.4	8	8.2	8	6.7	5	11.9	21	8.1	35	7.3
No	206	93.6	89	91.8	112	93.3	37	88.1	238	91.9	444	92.7
Missing	0	0	0	0	0	0	0	0	0	0	0	0
Post-procedure stenosis												
N		1096		503		479		381		1363		2459
Mean (SD)		20.7 (39.2)		15.0 (34.7)		19.9 (39.3)		26.0 (43.2)		19.8 (39.0)		20.2 (39.1)
Median (min, max)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)
Missing, No. (%)	42	3.7	7	1.4	55	10.3	63	14.2	125	8.4	167	6.4
Estimated lesion length, mm												
N		916		465		478		362		1305		2221
Mean (SD)		35.2 (19.7)		36.0 (22.3)		34.3 (21.0)		35.0 (23.1)		35.1 (22.1)		35.1 (21.1)
Median (min, max)		30.0 (6.0, 99.0)		30.0 (8.0, 140.0)		30.0 (5.0, 115.0)		28.5 (5.0, 120.0)		30.0 (5.0, 140.0)		30.0 (5.0, 140.0)
Missing, No. (%)	222	19.5	45	8.8	56	10.5	82	18.5	183	12.3	405	15.4

	2007-2009 Total no. of lesions = 1138		2010 Total no. of lesions = 510		2011 Total no. of lesions = 534		2012 Total no. of lesions = 444		2010-2012 Total no. of lesions = 1488		2007-2012 Total no. of lesions = 2626	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Lesion result, No. (%)												
Successful	896	78.7	436	85.5	435	81.5	340	76.6	1211	81.4	2107	80.2
Unsuccessful	236	20.7	73	14.3	99	18.5	104	23.4	276	18.5	512	19.5
Not available	2	0.2	1	0.2	0	0	0	0	1	0.1	3	0.1
Missing	4	0.4	0	0	0	0	0	0	0	0	4	0.2
*Stent length, mm												
N		835		406		394		314		1114		1949
Mean (SD)		46.1 (23.5)		45.3 (25.1)		43.6 (24.1)		43.9 (24.7)		44.3 (24.6)		45.1 (24.2)
Median (min,max)		41.0 (8.0, 131.0)		38.0 (10.0, 141.0)		38.0 (8.0, 138.0)		36.5 (10.0, 152.0)		38.0 (8.0, 152.0)		38.0 (8.0, 152.0)
Not available, No. (%)	303	26.6	104	20.4	140	26.2	130	29.3	374	25.1	677	25.8
**Stent diameter, mm												
N		835		406		392		314		1112		1947
Mean (SD)		2.9 (0.4)		2.8 (0.4)		2.9 (0.4)		2.8 (0.4)		2.8 (0.4)		2.8 (0.4)
Median (min,max)		2.8 (2.3, 4.7)		2.8 (2.0, 4.5)		2.8 (2.3, 4.0)		2.8 (2.0, 4.5)		2.8 (2.0, 4.5)		2.8 (2.0, 4.7)
Not available, No. (%)	303	26.6	104	20.4	142	26.6	130	29.3	376	25.3	679	25.9
Maximum balloon size used, mm												
N		894		449		447		342		1238		2132
Mean (SD)		2.9 (0.6)		2.9 (0.6)		2.9 (0.6)		2.9 (0.6)		2.9 (0.6)		2.9 (0.6)
Median (min,max)		3.0 (1.3, 5.0)		3.0 (1.3, 5.0)		3.0 (1.0, 4.5)		3.0 (1.0, 5.0)		3.0 (1.0, 5.0)		3.0 (1.0, 5.0)
Missing, No. (%)	244	21.4	61	12.0	87	16.3	102	23.0	250	16.8	494	18.8



	2007-2009 Total no. of lesions = 1138		2010 Total no. of lesions = 510		2011 Total no. of lesions = 534		2012 Total no. of lesions = 444		2010-2012 Total no. of lesions = 1488		2007-2012 Total no. of lesions = 2626	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Maximum stent/balloon deploy pressure, atm												
N		869		440		421		321		1182		2051
Mean (SD)		16.2 (3.9)		16.0 (4.1)		16.5 (4.2)		16.7 (4.6)		16.4 (4.3)		16.3 (4.1)
Median (min, max)		16.0 (4.0, 29.0)		16.0 (4.0, 30.0)		16.0 (6.0, 30.0)		16.0 (4.0, 30.0)		16.0 (4.0, 30.0)		16.0 (4.0, 30.0)
Missing, No. (%)	269	23.6	70	13.7	113	21.2	123	27.7	306	20.6	575	21.9

#Patients are allowed to have more than one type of category

\* Summation of stent length was used for lesions which were treated with more than one stent

\*\* Average of stent diameter was used for lesions which were treated with more than one stent

Table 4.2.24 Types of stents used for lesion with description of CTO >3months only, NCVD-PCI Registry, 2007-2012

Types of stents for lesion with CTO >3mo	2007-2009 Total no. of stents used = 1764		2010 Total no. of stents used = 798		2011 Total no. of stents used = 801		2012 Total no. of stents used = 653		2010-2012 Total no. of stents used = 2252		2007-2012 Total no. of stents used = 4016	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Drug eluting stent	1142	64.7	601	75.3	578	72.2	446	68.3	1625	72.2	2767	68.9
Bare metal stent	277	15.7	79	9.9	62	7.7	54	8.3	195	8.7	472	11.8
Bio-absorbable stent	0	0	0	0	0	0	1	0.2	1	0	1	0
Antibody coated	14	0.8	10	1.3	9	1.1	2	0.3	21	0.9	35	0.9
*Others	32	1.8	6	0.8	17	2.1	22	3.4	45	2.0	77	1.9
Covered stent	1	0.1	0	0	0	0	0	0	0	0	1	0

\* Stents which are not listed in the NCVD-PCI Stent List

Table 4.2.25 Types of devices used during Percutaneous Coronary Intervention for lesion with description of CTO &gt;3months only, NCVI-PCI Registry, 2007-2012

#Intracoronary devices used for lesion with CTO >3months	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of lesions = 1138		Total no. of lesions = 510		Total no. of lesions = 534		Total no. of lesions = 444		Total no. of lesions = 1488		Total no. of lesions = 2626	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Balloon only	90	7.9	55	10.8	32	6.0	37	8.3	124	8.3	214	8.1
Drug eluting balloon	38	3.3	19	3.7	35	6.6	46	10.4	100	6.7	138	5.3
Drug eluting stent	640	56.2	351	68.8	348	65.2	287	64.6	986	66.3	1626	61.9
Cutting balloon	10	0.9	3	0.6	6	1.1	7	1.6	16	1.1	26	1.0
IVUS	50	4.4	21	4.1	22	4.1	20	4.5	63	4.2	113	4.3
Rotablator	6	0.5	11	2.2	5	0.9	2	0.5	18	1.2	24	0.9
Bare metal stent	207	18.2	54	10.6	42	7.9	35	7.9	131	8.8	338	12.9
Distal embolic protection	2	0.2	0	0	2	0.4	4	0.9	6	0.4	8	0.3
Others	254	22.3	65	12.7	91	17.0	94	21.2	250	16.8	504	19.2

#Patients are allowed to have more than one type of category

Table 4.2.26 Types of post procedure complications for lesion with description of CTO &gt;3months only, NCVI-PCI Registry, 2007-2012

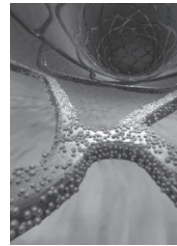
*Types of complication for lesion with CTO >3mo	2007-2009		2010		2011		2012		2010-2012		2007-2012	
	Total no. of lesions = 1138		Total no. of lesions = 510		Total no. of lesions = 534		Total no. of lesions = 444		Total no. of lesions = 1488		Total no. of lesions = 2626	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Dissection	99	8.7	38	7.5	13	2.4	9	2.0	60	4.0	159	6.1
No reflow	25	2.2	9	1.8	11	2.1	10	2.3	30	2.0	55	2.1
Transient	10	0.9	6	1.2	7	1.3	3	0.7	16	1.1	26	1.0
Persistent	9	0.8	2	0.4	2	0.4	7	1.6	11	0.7	20	0.8
Not available/ Missing	6		1		2		0		3		9	
Perforation	13	1.1	5	1.0	0	0	4	0.9	9	0.6	22	0.8

\* Results only showed for number of patients who were reported to have the complications

**Table 4.2.27 Duration of Thienopyridine in patients who underwent PCI and lesion with description of CTO >3months only, NCVD-PCI Registry, 2007-2012**

Year	Duration of clopidogrel/ticlopidine (months)	#Intracoronary devices used					
		Balloon only		Drug eluting stent		Bare metal stent	
		No.	%	No.	%	No.	%
2007-2009 Total no. of lesions = 1138	1	19	21.1	8	1.3	79	38.2
	3	8	8.9	5	0.8	13	6.3
	6	13	14.4	84	13.1	31	15.0
	12	24	26.7	422	65.9	60	29.0
	>12	7	7.8	98	15.3	11	5.3
	Not available	18	20.0	22	3.4	10	4.8
	Missing	1	1.1	1	0.2	3	1.4
	<b>Total</b>	<b>90</b>	<b>100.0</b>	<b>640</b>	<b>100.0</b>	<b>207</b>	<b>100.0</b>
2010-2012 Total no. of lesions = 1488	1	23	18.5	8	0.8	32	24.4
	3	11	8.9	7	0.7	11	8.4
	6	2	1.6	7	0.7	10	7.6
	12	49	39.5	851	86.3	66	50.4
	>12	5	4.0	67	6.8	2	1.5
	Not available	32	25.8	15	1.5	0	0
	Missing	2	1.7	31	3.2	10	7.7
	<b>Total</b>	<b>124</b>	<b>100.0</b>	<b>986</b>	<b>100.0</b>	<b>131</b>	<b>100.0</b>
2007-2012 Total no. of lesions = 2626	1	42	19.6	16	1.0	111	32.8
	3	19	8.9	12	0.7	24	7.1
	6	15	7.0	91	5.6	41	12.1
	12	73	34.1	1273	78.3	126	37.3
	>12	12	5.6	165	10.1	13	3.8
	Not available	50	23.4	37	2.3	10	3.1
	Missing	3	1.4	32	2.0	13	3.8
	<b>Total</b>	<b>214</b>	<b>100.0</b>	<b>1626</b>	<b>100.0</b>	<b>338</b>	<b>99.9</b>

#Patients are allowed to have more than one type of category



## CHAPTER 5 : **OUTCOME**

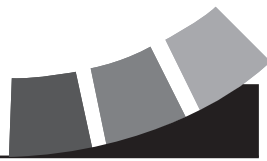
Omar Ismail<sup>1</sup> ● Oteh Maskon<sup>2</sup>

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*1 Hospital Pulau Pinang, Pulau Pinang*

*2 Universiti Kebangsaan Malaysia Medical Centre, Kuala Lumpur*





## OUTCOME

Omar Ismail<sup>1</sup>, Oteh Maskon<sup>2</sup>

*1 Hospital Pulau Pinang, Pulau Pinang*

*2 Universiti Kebangsaan Malaysia Medical Centre, Kuala Lumpur*

### Summary

1. Overall, the in-hospital mortality was low at 1.5% (1.1% in 2007-2009 vs 1.8% in 2010-2012), The overall 30-day mortality and one year mortality were 2% and 3.9% respectively.
2. The incidents of periprocedural complications were low. Periprocedure MI (based on clinical diagnosis) was 0.4% and emergency reintervention was 0.3%.
3. Mortality prognosticators were similar over the two cohorts (2007-2009 and 2010-2012) ie age, clinical presentation & status of PCI, diabetics, female and being hypertensive.

The overall in-hospital all cause mortality for the entire cohort for year 2007-2012 was 1.5% (1.8% in 2010-2012 vs. 1.1% in 2007- 2009). [Table 5.2] This was probably contributed by increasing number of non-elective (acute) PCI cases (15.5% vs. 9.2%). [Table 5.8] Majority of deaths were cardiac causes(78.2%), followed by 2.4% infection. [Table 5.11]

The occurrences of post-procedure complications were low; arrhythmia (0.6%), bleeding (0.5%), cardiogenic shock (0.4%), new renal impairment (0.2%) . The occurrences of periprocedural MI (0.4%), re-intervention (0.3%). There was no difference between the two periods. [Table 5.1]

Regarding medication, more than 90.0% of cases were on dual antiplatelet (aspirin and clopidogrel) at hospital discharge; however, decreased trend of DAPT usage at one year was observed (59.7%). [Table 5.10]

30-day readmissions for 2007-2012 were 5.6%. Most of the readmissions were for staged PCI(55.5%) Only 11.8% were due to recurrent angina and 1.8% of the readmissions were due to myocardial infarction. [Table 5.16]

Overall, mortality at discharge in 2007-2012 was higher in elderly patients (2.2%) compared to middle age (1.1%) and young patients (0.5%); by gender (2.1% in female vs. 1.4% male); by diabetes status (1.7% in diabetic vs. 1.0% in non-diabetic); by premorbid hypertension (1.4% in hypertensive vs. 1.2% in non-hypertensive) and by PCI status (8.8% in non-elective PCI vs. 0.5% in elective PCI). [Table 5.3, 5.4, 5.5, 5.6, and 5.8]

Table 5.1 Summary of in-hospital outcome for patients who underwent PCI, NCVI-PCI Registry, 2007-2012

	2007-2009 Total no. of procedures = 11621		2010 Total no. of procedures = 4462		2011 Total no. of procedures = 4887		2012 Total no. of procedures = 5513		2010-2012 Total no. of procedures = 14862		2007-2012 Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Periprocedural MI, No. (%) (based on clinical diagnosis)												
Yes	51	0.4	7	0.2	33	0.7	18	0.3	58	0.4	109	0.4
No	11465	98.7	4438	99.5	4834	98.9	5446	98.8	14718	99.0	26183	98.9
Not available	14	0.1	17	0.3	16	0.3	43	0.8	76	0.5	90	0.3
Missing	91	0.8	0	0	4	0.1	6	0.1	10	0.1	101	0.4
Emergency reintervention/PCI, No. (%)												
Yes	29	0.3	7	0.2	19	0.4	13	0.3	39	0.2	68	0.3
No	11494	98.9	4455	99.8	4864	99.5	5493	99.6	14812	99.7	26306	99.3
Missing	98	0.8	0	0	4	0.1	7	0.1	11	0.1	109	0.4
Bail-out CABG, No. (%)												
Yes	6	0.1	0	0	2	0.0	0	0	2	0.0	8	0.0
No	11524	99.2	4462	100.0	4881	99.9	5506	99.9	14849	99.9	26373	99.6
Missing	91	0.7	0	0	4	0.1	7	0.1	11	0.1	102	0.4
<b>Other complications</b>												
Cardiogenic shock (after procedure), No. (%)												
Yes	64	0.5	11	0.2	17	0.3	20	0.4	48	0.3	112	0.4
No	11466	98.7	4451	99.8	4866	99.6	5486	99.5	14803	99.6	26269	99.2
Missing	91	0.8	0	0	4	0.1	7	0.1	11	0.1	102	0.4

	2007-2009 Total no. of procedures = 11621		2010 Total no. of procedures = 4462		2011 Total no. of procedures = 4887		2012 Total no. of procedures = 5513		2010-2012 Total no. of procedures = 14862		2007-2012 Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Arrhythmia (VT/VF/Brady), No. (%)												
Yes	63	0.5	18	0.4	22	0.4	43	0.8	83	0.5	146	0.6
No	11467	98.7	4444	99.6	4861	99.5	5463	99.1	14768	99.4	26235	99.1
Missing	91	0.8	0	0	4	0.1	7	0.1	11	0.1	102	0.3
TIA/Stroke, No. (%)												
Yes	6	0.0	0	0	1	0.0	3	0.1	4	0.0	10	0.0
No	11525	99.2	4462	100.0	4882	99.9	5503	99.8	14847	99.9	26372	99.6
Missing	90	0.8	0	0	4	0.1	7	0.1	11	0.1	101	0.4
Tamponade, No. (%)												
Yes	6	0.0	0	0	3	0.0	8	0.1	11	0.1	17	0.0
No	11524	99.2	4462	100.0	4880	99.9	5498	99.8	14840	99.8	26364	99.6
Missing	91	0.8	0	0	4	0.1	7	0.1	11	0.1	102	0.4
Contrast reaction, No. (%)												
Yes	9	0.1	1	0.0	1	0.0	4	0.1	6	0.0	15	0.1
No	11519	99.1	4461	100.0	4882	99.9	5501	99.8	14844	99.9	26363	99.5
Missing	93	0.8	0	0	4	0.1	8	0.1	12	0.1	105	0.4
New onset/worsened heart failure, No. (%)												
Yes	12	0.1	2	0.0	0	0	7	0.1	9	0.1	21	0.1
No	11513	99.1	4460	100.0	4883	99.9	5499	99.8	14842	99.8	26355	99.5
Missing	96	0.8	0	0	4	0.1	7	0.1	11	0.1	107	0.4



	2007-2009 Total no. of procedures = 11621		2010 Total no. of procedures = 4462		2011 Total no. of procedures = 4887		2012 Total no. of procedures = 5513		2010-2012 Total no. of procedures = 14862		2007-2012 Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
New renal impairment, No. (%)												
Yes	18	0.2	2	0.0	13	0.3	16	0.3	31	0.2	49	0.2
No	11269	96.9	4398	98.6	4863	99.5	5477	99.3	14738	99.2	26007	98.2
Not available	239	2.1	62	1.4	7	0.1	13	0.3	82	0.5	321	1.2
Missing	95	0.8	0	0	4	0.1	7	0.1	11	0.1	106	0.4
Max post procedural rise in creatinine, No. (%)												
Yes	40	0.3	7	0.2	23	0.5	22	0.4	52	0.3	92	0.3
No	10966	94.4	4359	97.7	4822	98.7	5419	98.3	14600	98.2	25566	96.5
Not available	499	4.3	81	1.8	12	0.2	33	0.6	126	0.9	625	2.4
Missing	116	1.0	15	0.3	30	0.6	39	0.7	84	0.6	200	0.8
Max post procedural rise in creatinine results, micromol/L												
N		40		7		23		22		52		92
Mean (SD)		371.9 (215.2)		503.1 (614.6)		595.7 (812.0)		330.0 (174.2)		470.8 (597.6)		427.8 (471.6)
Median(min,max)		351.0 (86.0, 890.0)		324.0 (155.0, 1872.0)		497.0 (85.0, 4190.0)		327.5 (99.0, 865.0)		366.5 (85.0, 4190.0)		355.0 (85.0, 4190.0)
<b>Vascular complications</b>												
Bleeding, No. (%)												
Yes	79	0.6	15	0.3	15	0.3	28	0.5	58	0.4	137	0.5
No	11419	98.3	4447	99.7	4868	99.6	5478	99.4	14793	99.5	26212	99.0
Missing	123	1.1	0	0	4	0.1	7	0.1	11	0.1	134	0.5

	2007-2009 Total no. of procedures = 11621		2010 Total no. of procedures = 4462		2011 Total no. of procedures = 4887		2012 Total no. of procedures = 5513		2010-2012 Total no. of procedures = 14862		2007-2012 Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Type of bleeding, No. (%)												
Major	5	7.1	2	13.3	3	23.0	3	12.0	8	15.1	13	10.5
Minor	13	18.3	6	40.0	5	38.5	7	28.0	18	34.0	31	25.0
Minimal	53	74.6	7	46.7	5	38.5	15	60.0	27	50.9	80	64.5
Not available	4		0		2		3		5		9	
Missing	4		0		0		0		0		4	
Bleeding site, No. (%)												
Retroperitoneal	1	1.5	1	7.1	0	0	1	3.8	2	3.7	3	2.5
Percutaneous entry site	56	84.8	10	71.5	6	42.9	17	65.4	33	61.1	89	74.2
Others	9	13.7	3	21.4	8	57.1	8	30.8	19	35.2	28	23.3
Not available	6		1		1		1		3		9	
Missing	7		0		0		1		1		8	
Access site occlusion, No. (%)												
Yes	10	0.1	0	0	2	0.0	0	0	2	0.0	12	0.0
No	11510	99.0	4454	99.8	4868	99.6	5495	99.7	14817	99.7	26327	99.5
Missing	101	0.9	8	0.2	17	0.4	18	0.3	43	0.3	144	0.5
Loss distal pulse, No. (%)												
Yes	2	0.0	0	0	0	0	0	0	0	0	2	0.0
No	11514	99.1	4453	99.8	4871	99.7	5491	99.6	14815	99.7	26329	99.4
Missing	105	0.9	9	0.2	16	0.3	22	0.4	47	0.3	152	0.6

	2007-2009 Total no. of procedures = 11621		2010 Total no. of procedures = 4462		2011 Total no. of procedures = 4887		2012 Total no. of procedures = 5513		2010-2012 Total no. of procedures = 14862		2007-2012 Total no. of procedures = 26483	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Dissection, No. (%)												
Yes	30	0.3	1	0.0	3	0.1	3	0.0	7	0.1	37	0.1
No	11484	98.8	4449	99.7	4864	99.5	5490	99.6	14803	99.6	26287	99.3
Missing	107	0.9	12	0.3	20	0.4	20	0.4	52	0.3	159	0.6
Pseudoaneurysm, No. (%)												
Yes	8	0.0	2	0.0	2	0.0	5	0.1	9	0.0	17	0.1
No	11489	98.9	4441	99.6	4850	99.2	5476	99.3	14767	99.4	26256	99.1
Missing	124	1.1	19	0.4	35	0.8	32	0.6	86	0.6	210	0.8
Management of pseudoaneurysm, No. (%)												
Ultrasound compression	0	0	1	50.0	0	0	4	80.0	5	62.5	5	41.7
Surgery	1	25.0	0	0	0	0	0	0	0	0	1	8.3
Others	3	75.0	1	50.0	1	100.0	1	20.0	3	37.5	6	50.0
Not available	3		0		1		0		1		4	
Missing	1		0		0		0		0		1	



Table 5.2 Overall outcome of patients who underwent PCI, NCD-PCI Registry, 2007-2012

Year	*Outcome	Overall outcome									
		Outcome at discharge		**30-day		***6-month		****1-year			
		No.	%	No.	%	No.	%	No.	%	No.	%
2007-2009 Total no. of patients = 10709	Death	123	1.1	186	1.7	294	2.7	409	3.8		
	Alive	10586	98.9	10523	98.3	10415	97.3	10300	96.2		
	<b>Total</b>	<b>10709</b>	<b>100.0</b>	<b>10709</b>	<b>100.0</b>	<b>10709</b>	<b>100.0</b>	<b>10709</b>	<b>100.0</b>		
2010 Total no. of patients = 4157	Death	48	1.2	78	1.9	151	3.6	237	5.7		
	Alive	4109	98.8	4079	98.1	4006	96.4	3920	94.3		
	<b>Total</b>	<b>4157</b>	<b>100.0</b>	<b>4157</b>	<b>100.0</b>	<b>4157</b>	<b>100.0</b>	<b>4157</b>	<b>100.0</b>		
2011 Total no. of patients = 4487	Death	90	2.0	111	2.5	138	3.1	162	3.6		
	Alive	4397	98.0	4376	97.5	4349	96.9	4325	96.4		
	<b>Total</b>	<b>4487</b>	<b>100.0</b>	<b>4487</b>	<b>100.0</b>	<b>4487</b>	<b>100.0</b>	<b>4487</b>	<b>100.0</b>		
2012 Total no. of patients = 5106	Death	110	2.2	124	2.4	132	2.6	140	2.7		
	Alive	4996	97.8	4982	97.6	4974	97.4	4966	97.3		
	<b>Total</b>	<b>5106</b>	<b>100.0</b>	<b>5106</b>	<b>100.0</b>	<b>5106</b>	<b>100.0</b>	<b>5106</b>	<b>100.0</b>		
2010-2012 Total no. of patients = 13750	Death	248	1.8	313	2.3	421	3.1	539	3.9		
	Alive	13502	98.2	13437	97.7	13329	96.9	13211	96.1		
	<b>Total</b>	<b>13750</b>	<b>100.0</b>	<b>13750</b>	<b>100.0</b>	<b>13750</b>	<b>100.0</b>	<b>13750</b>	<b>100.0</b>		
2007-2012 Total no. of patients = 24459	Death	371	1.5	499	2.0	715	2.9	948	3.9		
	Alive	24088	98.5	23960	98.0	23744	97.1	23511	96.1		
	<b>Total</b>	<b>24459</b>	<b>100.0</b>	<b>24459</b>	<b>100.0</b>	<b>24459</b>	<b>100.0</b>	<b>24459</b>	<b>100.0</b>		

\*The outcome data has been derived based on data matching with National Death Register data

\*\* Including patients who died in hospital, \*\*\* Including patients who died in hospital &amp; 30-day, \*\*\*\* Including patients who died in hospital, 30-day and 6-month

Table 5.3 Overall outcome for patients who underwent PCI, by age group (years), NCVI-PCI Registry, 2007-2012

Year	*Outcome	Outcome at discharge			**30-day			***6-month			****1-year		
		Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2007-2009 Total no. of patients = 10709	Death	2 (0.4)	45 (0.7)	76 (1.8)	7 (1.6)	63 (1.0)	116 (2.7)	10 (2.2)	106 (1.8)	178 (4.2)	14 (3.1)	148 (2.5)	247 (5.8)
	Alive	448 (99.6)	5970 (99.3)	4168 (98.2)	443 (98.4)	5952 (99.0)	4128 (97.3)	440 (97.8)	5909 (98.2)	4066 (95.8)	436 (96.9)	5867 (97.5)	3997 (94.2)
	Total	450 (100.0)	6015 (100.0)	4244 (100.0)	450 (100.0)	6015 (100.0)	4244 (100.0)	450 (100.0)	6015 (100.0)	4244 (100.0)	450 (100.0)	6015 (100.0)	4244 (100.0)
2010-2012 Total no. of patients = 13750	Death	3 (0.5)	103 (1.4)	142 (2.5)	3 (0.5)	133 (1.8)	177 (3.1)	5 (0.8)	180 (2.4)	236 (4.1)	8 (1.4)	228 (3.1)	303 (5.3)
	Alive	589 (99.5)	7310 (98.6)	5603 (97.5)	589 (99.5)	7280 (98.2)	5568 (96.9)	587 (99.2)	7233 (97.6)	5509 (95.9)	584 (98.6)	7185 (96.9)	5442 (94.7)
	Total	592 (100.0)	7413 (100.0)	5745 (100.0)	592 (100.0)	7413 (100.0)	5745 (100.0)	592 (100.0)	7413 (100.0)	5745 (100.0)	592 (100.0)	7413 (100.0)	5745 (100.0)
2007-2012 Total no. of patients = 24459	Death	5 (0.5)	148 (1.1)	218 (2.2)	10 (1.0)	196 (1.5)	293 (2.9)	15 (1.4)	286 (2.1)	414 (4.1)	22 (2.1)	376 (2.8)	550 (5.5)
	Alive	1037 (99.5)	13280 (98.9)	9771 (97.8)	1032 (99.0)	13232 (98.5)	9696 (97.1)	1027 (98.6)	13142 (97.9)	9575 (95.9)	1020 (97.9)	13052 (97.2)	9439 (94.5)
	Total	1042 (100.0)	13428 (100.0)	9989 (100.0)	1042 (100.0)	13428 (100.0)	9989 (100.0)	1042 (100.0)	13428 (100.0)	9989 (100.0)	1042 (100.0)	13428 (100.0)	9989 (100.0)

\*The outcome data has been derived based on data matching with National Death Register data

\*\* Including patients who died in hospital, \*\*\* Including patients who died in hospital & 30-day, \*\*\*\*Including patients who died in hospital, 30-day and 6-month  
Young is defined as age from 20 to less than 40 years, middle-aged is defined as age between 40 to less than 60 years and elderly is defined as 60 years and above

Table 5.4 Overall outcome of patients who underwent PCI, by gender, NCVI-PCI Registry, 2007-2012

Year	*Outcome	Outcome at discharge						**30-day						***6-month						****1-year					
		Male			Female			Male			Female			Male			Female			Male			Female		
		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%	
2007-2009 Total no. of patients = 10709	Death	87	1.0		36	1.8		128	1.5		58	2.9		199	2.3		95	4.8		288	3.3		121	6.1	
	Alive	8644	99.0		1942	98.2		8603	98.5		1920	97.1		8532	97.7		1883	95.2		8443	96.7		1857	93.9	
	Total	8731	100.0		1978	100.0		8731	100.0		1978	100.0		8731	100.0		1978	100.0		8731	100.0		1978	100.0	
2010-2012 Total no. of patients = 13750	Death	194	1.7		54	2.2		242	2.1		71	2.9		325	2.9		96	4.0		406	3.6		133	5.5	
	Alive	11148	98.3		2354	97.8		11100	97.9		2337	97.1		11017	97.1		2312	96.0		10936	96.4		2275	94.5	
	Total	11342	100.0		2408	100.0		11342	100.0		2408	100.0		11342	100.0		2408	100.0		11342	100.0		2408	100.0	
2007-2012 Total no. of patients = 24459	Death	281	1.4		90	2.1		370	1.8		129	2.9		524	2.6		191	4.4		694	3.5		254	5.8	
	Alive	19792	98.6		4296	97.9		19703	98.2		4257	97.1		19549	97.4		4195	95.6		19379	96.5		4132	94.2	
	Total	20073	100.0		4386	100.0		20073	100.0		4386	100.0		20073	100.0		4386	100.0		20073	100.0		4386	100.0	

\*The outcome data has been derived based on data matching with National Death Register data

\*\* Including patients who died in hospital, \*\*\* Including patients who died in hospital &amp; 30-day, \*\*\*\* Including patients who died in hospital, 30-day and 6-month

Table 5.5 Overall outcome of patients who underwent PCI, by pre-morbid diabetes, NCVD-PCI Registry, 2007-2012

Year	*Outcome	Outcome at discharge				**30-day				***6-month				****1-year			
		Diabetic	Non-diabetic	Not known	Missing	Diabetic	Non-diabetic	Not known	Missing	Diabetic	Non-diabetic	Not known	Missing	Diabetic	Non-diabetic	Not known	Missing
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2007-2009 Total no. of patients = 10709	Death	76 (1.5)	38 (0.7)	8 (3.8)	1 (4.5)	115 (2.3)	60 (1.1)	10 (4.8)	1 (4.5)	195 (3.9)	87 (1.6)	11 (5.3)	1 (4.5)	272 (5.5)	123 (2.2)	13 (6.2)	1 (4.5)
	Alive	4862 (98.5)	5502 (99.3)	201 (96.2)	21 (95.5)	4823 (97.7)	5480 (98.9)	199 (95.2)	21 (95.5)	4743 (96.1)	5453 (98.4)	198 (94.7)	21 (95.5)	4666 (94.5)	5417 (97.8)	196 (93.8)	21 (95.5)
	Total	4938 (100.0)	5540 (100.0)	209 (100.0)	22 (100.0)	4938 (100.0)	5540 (100.0)	209 (100.0)	22 (100.0)	4938 (100.0)	5540 (100.0)	209 (100.0)	22 (100.0)	4938 (100.0)	5540 (100.0)	209 (100.0)	22 (100.0)
2010-2012 Total no. of patients = 13750	Death	113 (1.8)	91 (1.3)	44 (10.8)	0 (0)	153 (2.5)	115 (1.6)	45 (11.1)	0 (0)	218 (3.5)	156 (2.2)	47 (11.5)	0 (0)	284 (4.6)	206 (2.9)	49 (12.0)	0 (0)
	Alive	6119 (98.2)	7020 (98.7)	363 (89.2)	0 (0)	6079 (97.5)	6996 (98.4)	362 (88.9)	0 (0)	6014 (96.5)	6955 (97.8)	360 (88.5)	0 (0)	5948 (95.4)	6905 (97.1)	358 (88.0)	0 (0)
	Total	6232 (100.0)	7111 (100.0)	407 (100.0)	0 (0)	6232 (100.0)	7111 (100.0)	407 (100.0)	0 (0)	6232 (100.0)	7111 (100.0)	407 (100.0)	0 (0)	6232 (100.0)	7111 (100.0)	407 (100.0)	0 (0)
2007-2012 Total no. of patients = 24459	Death	189 (1.7)	129 (1.0)	52 (8.4)	1 (4.5)	268 (2.4)	175 (1.4)	55 (8.9)	1 (4.5)	413 (3.7)	243 (1.9)	58 (9.4)	1 (4.5)	556 (5.0)	329 (2.6)	62 (10.1)	1 (4.5)
	Alive	10981 (98.3)	12522 (99.0)	564 (91.6)	21 (95.5)	10902 (97.6)	12476 (98.6)	561 (91.1)	21 (95.5)	10757 (96.3)	12408 (98.1)	558 (90.6)	21 (95.5)	10614 (95.0)	12322 (97.4)	554 (89.9)	21 (95.5)
	Total	11170 (100.0)	12651 (100.0)	616 (100.0)	22 (100.0)	11170 (100.0)	12651 (100.0)	616 (100.0)	22 (100.0)	11170 (100.0)	12651 (100.0)	616 (100.0)	22 (100.0)	11170 (100.0)	12651 (100.0)	616 (100.0)	22 (100.0)

\*The outcome data has been derived based on data matching with National Death Register data

\*\* Including patients who died in hospital, \*\*\* Including patients who died in hospital &amp; 30-day, \*\*\*\*Including patients who died in hospital, 30-day and 6-month

Table 5.6 Overall outcome of patients who underwent PCI, by pre-morbid hypertension, NCD-PCI Registry, 2007-2012

Year	*Outcome	Outcome at discharge				**30-day				***6-month				****1-year			
		Hypertensive	Non-hypertensive	Not known	Missing	Hypertensive	Non-hypertensive	Not known	Missing	Hypertensive	Non-hypertensive	Not known	Missing	Hypertensive	Non-hypertensive	Not known	Missing
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2007-2009 Total no. of patients = 10709	Death	88 (1.1)	26 (1.0)	9 (5.8)	0 (0)	136 (1.7)	40 (1.5)	10 (6.5)	0 (0)	226 (2.9)	57 (2.1)	11 (7.1)	0 (0)	323 (4.1)	73 (2.7)	13 (8.4)	0 (0)
	Alive	7783 (98.9)	2638 (99.0)	146 (94.2)	19 (100.0)	7735 (98.3)	2624 (98.5)	145 (93.5)	19 (100.0)	7645 (97.1)	2607 (97.9)	144 (92.9)	19 (100.0)	7548 (95.9)	2591 (97.3)	142 (91.6)	19 (100.0)
	Total	7871 (100.0)	2664 (100.0)	155 (100.0)	19 (100.0)	7871 (100.0)	2664 (100.0)	155 (100.0)	19 (100.0)	7871 (100.0)	2664 (100.0)	155 (100.0)	19 (100.0)	7871 (100.0)	2664 (100.0)	155 (100.0)	19 (100.0)
2010-2012 Total no. of patients = 13750	Death	162 (1.6)	48 (1.4)	38 (10.7)	0 (0)	211 (2.1)	64 (1.9)	38 (10.7)	0 (0)	301 (3.0)	82 (2.4)	38 (10.7)	0 (0)	394 (3.9)	107 (3.2)	38 (10.7)	0 (0)
	Alive	9864 (98.4)	3322 (98.6)	316 (89.3)	0 (0)	9815 (97.9)	3306 (98.1)	316 (89.3)	0 (0)	9725 (97.0)	3288 (97.6)	316 (89.3)	0 (0)	9632 (96.1)	3263 (96.8)	316 (89.3)	0 (0)
	Total	10026 (100.0)	3370 (100.0)	354 (100.0)	0 (0)	10026 (100.0)	3370 (100.0)	354 (100.0)	0 (0)	10026 (100.0)	3370 (100.0)	354 (100.0)	0 (0)	10026 (100.0)	3370 (100.0)	354 (100.0)	0 (0)
2007-2012 Total no. of patients = 24459	Death	250 (1.4)	74 (1.2)	47 (9.2)	0 (0)	347 (1.9)	104 (1.7)	48 (9.4)	0 (0)	527 (2.9)	139 (2.3)	49 (9.6)	0 (0)	717 (4.0)	180 (3.0)	51 (10.0)	0 (0)
	Alive	17647 (98.6)	5960 (98.8)	462 (90.8)	19 (100.0)	17550 (98.1)	5930 (98.3)	461 (90.6)	19 (100.0)	17370 (97.1)	5895 (97.7)	460 (90.4)	19 (100.0)	17180 (96.0)	5854 (97.0)	458 (90.0)	19 (100.0)
	Total	17897 (100.0)	6034 (100.0)	509 (100.0)	19 (100.0)	17897 (100.0)	6034 (100.0)	509 (100.0)	19 (100.0)	17897 (100.0)	6034 (100.0)	509 (100.0)	19 (100.0)	17897 (100.0)	6034 (100.0)	509 (100.0)	19 (100.0)

\*The outcome data has been derived based on data matching with National Death Register data

\*\* Including patients who died in hospital, \*\*\* Including patients who died in hospital &amp; 30-day, \*\*\*\*Including patients who died in hospital, 30-day and 6-month



Table 5.7 Overall outcome of patients who underwent PCI, by pre-morbid dyslipidaemia, NCVI-PCI Registry, 2007-2012

Year	*Outcome	Outcome at discharge				**30-day				***6-month				****1-year			
		Dyslipidaemic	Non-dyslipidaemic	Not known	Missing	Dyslipidaemic	Non-dyslipidaemic	Not known	Missing	Dyslipidaemic	Non-dyslipidaemic	Not known	Missing	Dyslipidaemic	Non-dyslipidaemic	Not known	Missing
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2007-2012 Total no. of patients = 24459	Death	193 (1.1)	96 (1.7)	80 (7.0)	2 (5.0)	287 (1.6)	119 (2.1)	91 (8.0)	2 (5.0)	443 (2.5)	168 (3.0)	102 (8.9)	2 (5.0)	620 (3.5)	216 (3.8)	110 (9.6)	2 (5.0)
	Alive	17425 (98.9)	5562 (98.3)	1063 (93.0)	38 (95.0)	17331 (98.4)	5539 (97.9)	1052 (92.0)	38 (95.0)	17175 (97.5)	5490 (97.0)	1041 (91.1)	38 (95.0)	16998 (96.5)	5442 (96.2)	1033 (90.4)	38 (95.0)
	Total	9779 (100.0)	3308 (100.0)	663 (100.0)	0 (0)	9779 (100.0)	3308 (100.0)	663 (100.0)	0 (0)	9779 (100.0)	3308 (100.0)	663 (100.0)	0 (0)	9779 (100.0)	3308 (100.0)	663 (100.0)	0 (0)
2010-2012 Total no. of patients = 13750	Death	131 (1.3)	57 (1.7)	60 (9.0)	0 (0)	182 (1.9)	68 (2.1)	63 (9.5)	0 (0)	268 (2.7)	88 (2.7)	65 (9.8)	0 (0)	358 (3.7)	115 (3.5)	66 (10.0)	0 (0)
	Alive	9648 (98.7)	3251 (98.3)	603 (91.0)	0 (0)	9597 (98.1)	3240 (97.9)	600 (91)	0 (0)	9511 (97.3)	3220 (97.3)	598 (90.2)	0 (0)	9421 (96.3)	3193 (96.5)	597 (90.0)	0 (0)
	Total	7839 (100.0)	2350 (100.0)	480 (100.0)	40 (100.0)	7839 (100.0)	2350 (100.0)	480 (100.0)	40 (100.0)	7839 (100.0)	2350 (100.0)	480 (100.0)	40 (100.0)	7839 (100.0)	2350 (100.0)	480 (100.0)	40 (100.0)
2007-2009 Total no. of patients = 10709	Death	62 (0.8)	39 (1.7)	20 (4.2)	2 (5.0)	105 (1.3)	51 (2.2)	28 (5.8)	2 (5.0)	175 (2.2)	80 (3.4)	37 (7.7)	2 (5.0)	262 (3.3)	101 (4.3)	44 (9.2)	2 (5.0)
	Alive	7777 (99.2)	2311 (98.3)	460 (95.8)	38 (95.0)	7734 (98.7)	2299 (97.8)	452 (94.2)	38 (95.0)	7664 (97.8)	2270 (96.6)	443 (92.3)	38 (95.0)	7577 (96.7)	2249 (95.7)	436 (90.8)	38 (95.0)
	Total	7839 (100.0)	2350 (100.0)	480 (100.0)	40 (100.0)	7839 (100.0)	2350 (100.0)	480 (100.0)	40 (100.0)	7839 (100.0)	2350 (100.0)	480 (100.0)	40 (100.0)	7839 (100.0)	2350 (100.0)	480 (100.0)	40 (100.0)

\*The outcome data has been derived based on data matching with National Death Register data

\*\* Including patients who died in hospital

Table 5.8 Overall outcome of patients who underwent PCI, by PCI status, NCDVD-PCI Registry, 2007-2012

Year	*Outcome	Outcome at discharge				**30-day				***6-month				****1-year			
		Elective	Non-elective	Not available	Missing	Elective	Non-elective	Not available	Missing	Elective	Non-elective	Not available	Missing	Elective	Non-elective	Not available	Missing
2007-2009 Total no. of patients = 10709	Death	37 (0.4)	85 (8.7)	0 (0)	1 (8.3)	89 (0.9)	96 (9.8)	0 (0)	1 (8.3)	185 (1.9)	108 (11.0)	0 (0)	1 (8.3)	286 (3.0)	122 (12.4)	0 (0)	1 (8.3)
	Alive	9656 (99.6)	895 (91.3)	24 (100.0)	11 (91.7)	9604 (99.1)	884 (90.2)	24 (100.0)	11 (91.7)	9508 (98.1)	872 (89.0)	24 (100.0)	11 (91.7)	9407 (97.0)	858 (87.6)	24 (100.0)	11 (91.7)
	Total	9693 (100.0)	980 (100.0)	24 (100.0)	12 (100.0)	9693 (100.0)	980 (100.0)	24 (100.0)	12 (100.0)	9693 (100.0)	980 (100.0)	24 (100.0)	12 (100.0)	9693 (100.0)	980 (100.0)	24 (100.0)	12 (100.0)
2010-2012 Total no. of patients = 13750	Death	59 (0.5)	188 (8.8)	0 (0)	1 (50.0)	112 (1.0)	200 (9.4)	0 (0)	1 (50.0)	206 (1.8)	214 (10.0)	0 (0)	1 (50.0)	309 (2.7)	229 (10.7)	0 (0)	1 (50.0)
	Alive	11557 (99.5)	1944 (91.2)	0 (0)	1 (50.0)	11504 (99.0)	1932 (90.6)	0 (0)	1 (50.0)	11410 (98.2)	1918 (90.0)	0 (0)	1 (50.0)	11307 (97.3)	1903 (89.3)	0 (0)	1 (50.0)
	Total	11616 (100.0)	2132 (100.0)	0 (0)	2 (100.0)	11616 (100.0)	2132 (100.0)	0 (0)	2 (100.0)	11616 (100.0)	2132 (100.0)	0 (0)	2 (100.0)	11616 (100.0)	2132 (100.0)	0 (0)	2 (100.0)
2007-2012 Total no. of patients = 24459	Death	96 (0.5)	273 (8.8)	0 (0)	2 (14.3)	201 (0.9)	296 (9.5)	0 (0)	2 (14.3)	391 (1.8)	322 (10.3)	0 (0)	2 (14.3)	595 (2.8)	351 (11.3)	0 (0)	2 (14.3)
	Alive	21213 (99.5)	2839 (91.2)	24 (100.0)	12 (85.7)	21108 (99.1)	2816 (90.5)	24 (100.0)	12 (85.7)	20918 (98.2)	2790 (89.7)	24 (100.0)	12 (85.7)	20714 (97.2)	2761 (88.7)	24 (100.0)	12 (85.7)
	Total	21309 (100.0)	3112 (100.0)	24 (100.0)	14 (100.0)	21309 (100.0)	3112 (100.0)	24 (100.0)	14 (100.0)	21309 (100.0)	3112 (100.0)	24 (100.0)	14 (100.0)	21309 (100.0)	3112 (100.0)	24 (100.0)	14 (100.0)

\*The outcome data has been derived based on data matching with National Death Register data

\*\* Including patients who died in hospital

Table 5.9 Overall outcome of patients who underwent PCI, by acute coronary syndrome, NCDVD-PCI Registry, 2007-2012

Year	*Outcome	Outcome at discharge				**30-day				***6-month				****1-year			
		STEMI	NSTEMI	UA	Not available/ Missing	STEMI	NSTEMI	UA	Not available/ Missing	STEMI	NSTEMI	UA	Not available/ Missing	STEMI	NSTEMI	UA	Not available/ Missing
2007-2009 Total no. of ACS patients = 4629	Death	75 (3.2)	21 (1.2)	4 (0.9)	2 (5.7)	92 (3.9)	34 (1.9)	5 (1.1)	2 (5.7)	115 (4.8)	55 (3.1)	11 (2.4)	2 (5.7)	142 (6.0)	74 (4.2)	19 (4.2)	2 (5.7)
	Alive	2304 (96.8)	1739 (98.8)	451 (99.1)	33 (94.3)	2287 (96.1)	1726 (98.1)	450 (98.9)	33 (94.3)	2264 (95.2)	1705 (96.9)	444 (97.6)	33 (94.3)	2237 (94.0)	1686 (95.8)	436 (95.8)	33 (94.3)
	Total	2379 (100.0)	1760 (100.0)	455 (100.0)	35 (100.0)	2379 (100.0)	1760 (100.0)	455 (100.0)	35 (100.0)	2379 (100.0)	1760 (100.0)	455 (100.0)	35 (100.0)	2379 (100.0)	1760 (100.0)	455 (100.0)	35 (100.0)
2010-2012 Total no. of ACS patients = 4787	Death	168 (5.9)	28 (2.2)	8 (1.3)	4 (8.3)	185 (6.5)	36 (2.8)	11 (1.9)	4 (8.3)	206 (7.2)	55 (4.3)	15 (2.5)	4 (8.3)	231 (8.1)	74 (5.8)	18 (3.0)	4 (8.3)
	Alive	2700 (94.1)	1250 (97.8)	585 (98.7)	44 (91.7)	2683 (93.5)	1242 (97.2)	582 (98.1)	44 (91.7)	2662 (92.8)	1223 (95.7)	578 (97.5)	44 (91.7)	2637 (91.9)	1204 (94.2)	575 (97.0)	44 (91.7)
	Total	2868 (100.0)	1278 (100.0)	593 (100.0)	48 (100.0)	2868 (100.0)	1278 (100.0)	593 (100.0)	48 (100.0)	2868 (100.0)	1278 (100.0)	593 (100.0)	48 (100.0)	2868 (100.0)	1278 (100.0)	593 (100.0)	48 (100.0)
2007-2012 Total no. of ACS patients = 9416	Death	243 (4.6)	49 (1.6)	12 (1.1)	6 (7.2)	277 (5.3)	70 (2.3)	16 (1.5)	6 (7.2)	321 (6.1)	110 (3.6)	26 (2.5)	6 (7.2)	373 (7.1)	148 (4.9)	37 (3.5)	6 (7.2)
	Alive	5004 (95.4)	2989 (98.4)	1036 (98.9)	77 (95.8)	4970 (94.7)	2968 (97.7)	1032 (98.5)	77 (95.8)	4926 (93.9)	2928 (96.4)	1022 (97.5)	77 (95.8)	4874 (92.9)	2890 (95.1)	1011 (96.5)	77 (95.8)
	Total	5247 (100.0)	3038 (100.0)	1048 (100.0)	83 (100.0)	5247 (100.0)	3038 (100.0)	1048 (100.0)	83 (100.0)	5247 (100.0)	3038 (100.0)	1048 (100.0)	83 (100.0)	5247 (100.0)	3038 (100.0)	1048 (100.0)	83 (100.0)

\*The outcome data has been derived based on data matching with National Death Register data

\*\* Including patients who died in hospital



Table 5.10 Medication for patients who underwent PCI, NCVD-PCI Registry, 2007-2012

Year	#*Medication	Outcome at discharge		30-day		6-month		1-year	
		No.	%	No.	%	No.	%	No.	%
2007-2009 Total no. of alive patients = 10575	Aspirin	9867	93.3	6823	90.0	5383	84.0	4540	78.2
	Clopidogrel	9976	94.3	6355	83.8	4555	71.1	3402	58.6
	Ticlopidine	527	5.0	395	5.2	383	6.0	322	5.5
	**Dual antiplatelet	9622	91.0	6171	81.4	4308	67.2	3096	53.3
	Statin	9673	91.5	1671	22.0	5474	85.4	4735	81.5
	Beta blocker	7504	71.0	1214	16.0	4090	63.8	3537	60.9
	Ace inhibitor	5714	54.0	936	12.3	3025	47.2	2508	43.2
	ARB	1469	13.9	322	4.2	1153	18.0	1130	19.5
	Warfarin	111	1.0	8	0.1	45	0.7	41	0.7
	Others	7307	69.1	6493	85.6	4696	73.3	4121	70.9
2010-2012 Total no. of alive patients = 13500	Aspirin	12374	91.7	6131	82.9	4766	79.0	3817	75.8
	Clopidogrel	12319	91.3	5908	79.9	4172	69.1	2830	56.2
	Ticlopidine	330	2.4	197	2.7	173	2.9	144	2.9
	**Dual antiplatelet	11934	88.4	5728	77.5	4016	66.5	2645	52.5
	Statin	11785	87.3	5339	72.2	4704	77.9	3869	76.8
	Beta blocker	9014	66.8	3879	52.5	3552	58.8	2916	57.9
	Ace inhibitor	6612	49.0	2807	38.0	2344	38.8	1887	37.5
	ARB	1543	11.4	884	12.0	948	15.7	858	17.0
	Warfarin	155	1.1	55	0.7	44	0.7	26	0.5
	Others	9194	68.1	4886	66.1	3653	60.5	3150	62.5
2007-2012 Total no. of alive patients = 24075	Aspirin	22241	92.4	12954	86.5	10149	81.5	8357	77.0
	Clopidogrel	22295	92.6	12263	81.9	8727	70.1	6232	57.5
	Ticlopidine	857	3.6	592	4.0	556	4.5	466	4.3
	**Dual antiplatelet	21556	89.5	11899	79.4	8324	66.9	5741	52.9
	Statin	21458	89.1	7010	46.8	10178	81.8	8604	79.3
	Beta blocker	16518	68.6	5093	34.0	7642	61.4	6453	59.5
	Ace inhibitor	12326	51.2	3743	25.0	5369	43.1	4395	40.5
	ARB	3012	12.5	1206	8.1	2101	16.9	1988	18.3
	Warfarin	266	1.1	63	0.4	89	0.7	67	0.6
	Others	16501	68.5	11379	76.0	8349	67.1	7271	67.0

\*Available for those who are alive

\*\*Dual antiplatelet is combination of Aspirin and Clopidogrel or Ticlopidine

# Patients are allowed to have more than one type of category

Table 5.11 Cause of death of patients who underwent PCI, NCVD-PCI Registry, 2007-2012

Year	*Death cause	Outcome at discharge		**30-day		***6-month		****1-year	
		No.	%	No.	%	No.	%	No.	%
2007-2009 Total no. of patients = 123	Cardiac	99	80.4	124	66.7	152	51.7	180	44.0
	Renal	2	1.7	2	1.1	2	0.7	2	0.5
	Other	6	4.8	7	3.8	10	3.4	16	3.9
	Infection	3	2.5	3	1.6	3	1.0	3	0.7
	Neurological	2	1.7	2	1.1	2	0.7	2	0.5
	Vascular	1	0.8	1	0.5	1	0.3	1	0.2
	Pulmonary	0	0	0	0	0	0	0	0
	Non cardiac	0	0	6	3.2	12	4.1	15	3.7
	Not available	3	2.5	8	4.3	45	15.3	89	21.8
	Missing	7	5.6	33	17.7	67	22.8	101	24.7
	<b>Total</b>	<b>123</b>	<b>100.0</b>	<b>186</b>	<b>100.0</b>	<b>294</b>	<b>100.0</b>	<b>409</b>	<b>100.0</b>
2010-2012 Total no. of patients = 248	Cardiac	191	77.0	206	65.8	226	53.7	243	45.1
	Renal	0	0	0	0	0	0	0	0
	Other	9	3.7	11	3.5	11	2.6	15	2.8
	Infection	6	2.4	6	1.9	6	1.4	6	1.1
	Neurological	1	0.4	1	0.3	1	0.2	1	0.2
	Vascular	0	0	0	0	0	0	0	0
	Pulmonary	2	0.8	2	0.6	2	0.5	2	0.4
	Non cardiac	0	0	2	0.6	6	1.4	15	2.8
	Not available	9	3.7	16	5.1	38	9.0	51	9.5
	Missing	30	12.0	69	22.0	131	31.1	206	38.2
	<b>Total</b>	<b>248</b>	<b>100.0</b>	<b>313</b>	<b>100.0</b>	<b>421</b>	<b>100.0</b>	<b>539</b>	<b>100.0</b>
2007-2012 Total no. of patients = 371	Cardiac	290	78.2	330	66.1	378	52.9	423	44.6
	Renal	2	0.6	2	0.4	2	0.3	2	0.2
	Other	15	4.0	18	3.6	21	2.9	31	3.3
	Infection	9	2.4	9	1.8	9	1.3	9	0.9
	Neurological	3	0.8	3	0.6	3	0.4	3	0.3
	Vascular	1	0.2	1	0.2	1	0.1	1	0.1
	Pulmonary	2	0.6	2	0.4	2	0.3	2	0.2
	Non cardiac	0	0	8	1.6	18	2.5	30	3.2
	Not available	12	3.2	24	4.8	83	11.6	140	14.8
	Missing	37	10.0	102	20.4	198	27.7	307	32.4
	<b>Total</b>	<b>371</b>	<b>100.0</b>	<b>499</b>	<b>100.0</b>	<b>715</b>	<b>100.0</b>	<b>948</b>	<b>100.0</b>

\*The outcome data has been derived based on data matching with National Death Register data

\*\* Including patients who died in hospital

+ Patients may have more than one condition that caused death

Table 5.12 Location of death of patients who underwent PCI, NCVD-PCI Registry, 2007-2009

Year	2007-2009 Total no. of patients = 123		2010-2012 Total no. of patients = 248		2007-2012 Total no. of patients = 371	
Location of death	No.	%	No.	%	No.	%
In lab	13	10.6	21	8.5	34	9.2
Out of lab	100	81.3	187	75.4	287	77.4
Not available	3	2.4	7	2.8	10	2.7
Missing	7	5.7	33	13.3	40	10.7
<b>Total</b>	<b>123</b>	<b>100.0</b>	<b>248</b>	<b>100.0</b>	<b>371</b>	<b>100.0</b>

Table 5.13 Outcome at discharge of patients who developed cardiogenic shock peri-procedure, NCVD-PCI Registry, 2007-2012

Year	*Outcome	Cardiogenic shock peri-procedure					
		Yes		No		Missing	
		No.	%	No.	%	No.	%
2007-2009 Total no. of patients = 10709	Death	40	64.5	82	0.8	1	1.3
	Alive	22	35.5	10487	99.2	77	98.7
	<b>Total</b>	<b>62</b>	<b>100.0</b>	<b>10569</b>	<b>100.0</b>	<b>78</b>	<b>100.0</b>
2010-2012 Total no. of patients = 13750	Death	35	76.1	213	1.6	0	0
	Alive	11	23.9	13480	98.4	11	100.0
	<b>Total</b>	<b>46</b>	<b>100.0</b>	<b>13693</b>	<b>100.0</b>	<b>11</b>	<b>100.0</b>
2007-2012 Total no. of patients = 24459	Death	75	69.4	295	1.2	1	1.1
	Alive	33	30.6	23967	98.8	88	98.9
	<b>Total</b>	<b>108</b>	<b>100.0</b>	<b>24262</b>	<b>100.0</b>	<b>89</b>	<b>100.0</b>

\*The outcome data has been derived based on data matching with National Death Register data

Table 5.14 Outcome at discharge, by post PCI TIMI flow, NCVD-PCI Registry, 2007-2012

Year	*Outcome	Post PCI TIMI flow											
		0		1		2		3		Not available		Missing	
		No.	(%)	No.	%	No.	%	No.	%	No.	%	No.	%
2007-2009 Total no. of lesions = 15848	Death	13	4.8	5	6.3	14	8.0	126	0.9	1	2.4	5	0.9
	Alive	257	95.2	75	93.7	161	92.0	14617	99.1	40	97.6	534	99.1
	<b>Total</b>	<b>270</b>	<b>100.0</b>	<b>80</b>	<b>100.0</b>	<b>175</b>	<b>100.0</b>	<b>14743</b>	<b>100.0</b>	<b>41</b>	<b>100.0</b>	<b>539</b>	<b>100.0</b>
2010-2012 Total no. of lesions = 19025	Death	12	3.1	11	22.4	23	13.1	215	1.3	7	2.2	26	1.4
	Alive	374	96.9	38	77.6	153	86.9	16092	98.7	306	97.8	1768	98.6
	<b>Total</b>	<b>386</b>	<b>100.0</b>	<b>49</b>	<b>100.0</b>	<b>176</b>	<b>100.0</b>	<b>16307</b>	<b>100.0</b>	<b>313</b>	<b>100.0</b>	<b>1794</b>	<b>100.0</b>
2007-2012 Total no. of lesions = 34873	Death	25	3.8	16	12.4	37	10.5	341	1.1	8	2.3	31	1.3
	Alive	631	96.2	113	87.6	314	89.5	30709	98.9	346	97.7	2302	98.7
	<b>Total</b>	<b>656</b>	<b>100.0</b>	<b>129</b>	<b>100.0</b>	<b>351</b>	<b>100.0</b>	<b>31050</b>	<b>100.0</b>	<b>354</b>	<b>100.0</b>	<b>2333</b>	<b>100.0</b>

\*The outcome data has been derived based on data matching with National Death Register data

Table 5.15 Outcome at discharge, by contrast volume used, NCVD-PCI Registry, 2007-2012

Contrast volume, ml	2007-2009 Total no. of patients = 10709			2010-2012 Total no. of patients = 13750			ALL Total no. of patients = 24459		
	*Death	Alive	Total	*Death	Alive	Total	*Death	Alive	Total
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
≥300	8 (1.2)	644 (98.8)	652 (100.0)	30 (3.1)	926 (96.9)	956 (100.0)	38 (2.4)	1570 (97.6)	1608 (100.0)
<300	99 (1.1)	8717 (98.9)	8816 (100.0)	187 (1.6)	11242 (98.4)	11429 (100.0)	286 (1.4)	19959 (98.6)	20245 (100.0)
Not available	15 (1.3)	1117 (98.7)	1132 (100.0)	17 (2.8)	585 (97.2)	602 (100.0)	32 (1.8)	1702 (98.2)	1734 (100.0)
Missing	1 (0.9)	108 (99.1)	109 (100.0)	14 (1.8)	749 (98.2)	763 (100.0)	15 (1.7)	857 (98.3)	872 (100.0)

\*The outcome data has been derived based on data matching with National Death Register data

+Alive includes those transferred to another centres

Table 5.16 Summary of 30-day readmission status of patients who underwent PCI, NCVD-PCI Registry, 2007-2012 (N = total no. of procedures for 30-day follow-up)

	2007-2009		2010-2012		2007-2012	
	Total no. of procedures = 8318		Total no. of procedures = 8011		Total no. of procedures = 16329	
Readmission	No.	%	No.	%	No.	%
Yes	480	5.8	430	5.4	910	5.6
No	7789	93.6	7581	94.6	15370	94.1
Missing	49	0.6	0	0	49	0.3
Readmission reason, No. (%)						
CHF	7	1.5	10	2.3	17	1.9
AMI	7	1.5	9	2.1	16	1.8
Recurrent angina	63	13.1	44	10.2	107	11.8
Arrhythmia	1	0.2	0	0	1	0.1
PCI-planned	251	52.3	254	59.1	505	55.5
PCI-unplanned	14	2.9	1	0.2	15	1.6
CABG	5	1.0	7	1.6	12	1.3
Others	95	19.8	86	20.0	181	19.8
Not available	10	2.1	8	1.9	18	2.0
Missing	27	5.6	11	2.6	38	4.2
<b>Total</b>	<b>480</b>	<b>100.0</b>	<b>430</b>	<b>100.0</b>	<b>910</b>	<b>100.0</b>



Table 5.17 Procedural complications and clinical outcomes, according to PCI status, NCVI-PCI Registry, 2007-2012

*Complications and clinical outcomes	2007-2009 Total no. of patients = 10709						2010-2012 Total no. of patients = 13750						2007-2012 Total no. of patients = 24459					
	Effective		NSTEM I/UA		AMI		Missing		Effective		NSTEM I/UA		AMI		Missing		Effective	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Periprocedural MI	33	0.3	4	0.8	9	1.8	0	0	37	0.3	5	0.6	9	0.7	1	50.0	70	0.3
Emergency reintervention/PCI	16	0.2	4	0.8	5	1.0	0	0	18	0.2	5	0.6	12	0.9	1	50.0	34	0.2
Stent thrombosis	9	0.1	1	0.2	2	0.4	0	0	4	0.0	0	0	3	0.2	0	0	13	0.1
Dissection	8	0.1	0	0	0	0	0	0	3	0.0	2	0.2	1	0.1	0	0	11	0.1
Perforation	1	0.0	0	0	0	0	0	0	2	0.0	1	0.1	1	0.1	0	0	3	0.0
Bail-out CABG	4	0.0	0	0	2	0.4	0	0	1	0.0	0	0	1	0.1	0	0	5	0.0
Cardiogenic shock	22	0.2	7	1.5	33	6.5	0	0	15	0.1	8	1.0	23	1.7	0	0	37	0.2
Arrhythmia	38	0.4	6	1.3	17	3.4	1	8.3	28	0.2	11	1.4	40	3.0	0	0	66	0.3
TIA/stroke	4	0.0	2	0.4	0	0	0	0	2	0.0	0	0	2	0.2	0	0	6	0.0
Tamponade	5	0.1	0	0	1	0.2	0	0	7	0.1	2	0.2	1	0.1	0	0	12	0.1
Contrast reaction	6	0.1	0	0	3	0.6	0	0	5	0.0	0	0	1	0.1	0	0	11	0.1
New onset/worsen heart failure	6	0.1	1	0.2	5	1.0	0	0	4	0.0	1	0.1	3	0.2	0	0	10	0.0
New renal impairment	4	0.0	2	0.4	11	2.2	0	0	5	0.0	2	0.2	23	1.7	0	0	9	0.0
Bleeding	47	0.5	13	2.7	12	2.4	0	0	37	0.3	6	0.7	12	0.9	1	50.0	84	0.4
Access site occlusion	8	0.1	1	0.2	0	0	0	0	0	0	2	0.2	0	0	0	0	8	0.0
Loss of distal pulse	2	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.0
Dissection	23	0.2	0	0	4	0.8	0	0	6	0.1	0	0	1	0.1	0	0	29	0.1
Pseudoaneurysm	8	0.1	0	0	0	0	0	0	8	0.1	1	0.1	0	0	0	0	16	0.1

**Table 5.18 Heart rate at presentation versus outcome, NCVD-PCI Registry, 2007-2012**

Heart rate at presentation (beats/minute)	2007-2009 Total no. of patients = 10709		2010-2012 Total no. of patients = 13750		2007-2012 Total no. of patients = 24459	
	*Death	Alive	*Death	Alive	*Death	Alive
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
<90	64 (52.0)	8621 (81.5)	89 (35.8)	10846 (80.4)	153 (41.2)	19467 (80.8)
≥90	53 (43.1)	1156 (10.9)	112 (45.2)	1301 (9.6)	165 (44.5)	2457 (10.2)
Missing	6 (4.9)	809 (7.6)	47 (19.0)	1355 (10.0)	53 (14.3)	2164 (9.0)
<b>Total</b>	<b>123 (100.0)</b>	<b>10586 (100.0)</b>	<b>248 (100.0)</b>	<b>13502 (100.0)</b>	<b>371 (100.0)</b>	<b>24088 (100.0)</b>

\*Alive include those patients transferred to another centres

**Table 5.19 Heart rate at presentation versus length of stay, NCVD-PCI Registry, 2007-2012**

Length of stay	2007-2009 Total no. of patients = 10586			2010-2012 Total no. of patients = 13502			2007-2012 Total no. of patients = 24088		
	<90	90-180	Missing	<90	90-180	Missing	<90	90-180	Missing
N	8470	1139	786	10515	1256	1315	18985	2395	2101
Mean(SD)	4.6 (21.0)	7.2 (36.3)	5.4 (29.5)	4.3 (10.7)	6.5 (18.4)	6.5 (29.4)	4.4 (16.1)	6.8 (28.4)	6.1 (29.5)
Median, (min,max)	3.0 (1.0, 1098.0)	3.0 (1.0, 734.0)	3.0 (1.0, 734.0)	3.0 (1.0, 369.0)	3.0 (1.0, 370.0)	3.0 (1.0, 736.0)	3.0 (1.0, 1098.0)	3.0 (1.0, 734.0)	3.0 (1.0, 736.0)
Negative/zero, No. (%)	34 (0.4)	4 (0.3)	1 (0.1)	234 (2.2)	26 (2.0)	11 (0.8)	268 (1.4)	30 (1.2)	12 (0.6)
Missing, No. (%)	117 (1.4)	13 (1.1)	22 (2.7)	97 (0.9)	19 (1.5)	29 (2.1)	214 (1.1)	32 (1.3)	51 (2.4)

\*Alive include those patients transferred to another centres

**Table 5.20 Prognostic factors for in-hospital mortality among patients who underwent PCI, NCVD-PCI Registry, 2007-2012**

Factor	Total no. of patients = 23843				
	N	Hazard ratio	95% CI		*p-value
Age	23843	1.12	1.03	1.22	0.007
Age group					
20-<30 (ref)	87	1.00			
30-<40	933	5098506.00	53235.45	488000000.00	<0.001
40-<50	4539	6659671.00	223248.30	199000000.00	<0.001
50-<60	8565	1927293.00	137371.40	27000000.00	<0.001
60-<70	6819	901125.90	113036.90	7183744.00	<0.001
70-<80	2675	499425.80	108635.70	2295986.00	<0.001
≥80	225	359363.10	.	.	.
PCI status					
Elective (ref)	20801	1.00			
NSTEMI/UA	1227	2.13	0.88	5.18	0.096
AMI	1780	3.98	2.02	7.85	<0.001
**Hypertension					
No (ref)	6383	1.00			
Yes	17443	0.59	0.35	0.99	0.047
Killip class					
I (ref)	6234	1.00			
II	2936	2.36	1.13	4.93	0.022
III	200	2.41	0.87	6.67	0.090
IV	393	3.63	1.58	8.32	0.002
Left ventricular ejection fraction					
<30	386	2.77	1.11	6.93	0.029
30-50	3549	1.37	0.61	3.09	0.448
>50 (ref)	4649	1.00			
NYHA dyspnoea ≥3 or congestive heart failure					
No (ref)	22265	1.00			
Yes	1557	2.01	1.18	3.43	0.010
Cardiogenic shock					
No (ref)	23683	1.00			
Yes	105	4.80	2.40	9.63	<0.001
IABP					
No (ref)	22902	1.00			
Yes	604	2.53	1.27	5.05	0.009
Serum creatinine >200μmol/L					
No (ref)	20590	1.00			
Yes	1116	1.88	1.06	3.34	0.032

\* using Cox regression with backward stepwise variable selection

\*\* "No" category in these variables included "Not known" category



**Table 5.21 Prognostic factors for 30-days mortality among patients who underwent PCI, NCVD-PCI Registry, 2007-2012 (Multivariable analysis)**

Factor	Total no. of patients = 15169				
	N	Hazard ratio	95% CI		*p-value
Gender					
Male (ref)	12496	1.00			
Female	2673	2.36	1.35	4.12	0.003
PCI status					
Elective (ref)	13672	1.00			
NSTEMI/UA	675	1.61	0.57	4.54	0.370
AMI	803	1.11	0.27	4.64	0.885
Left ventricular ejection fraction					
<30	255	5.26	2.34	11.81	<0.001
30-50	2535	1.50	0.85	2.64	0.157
>50 (ref)	3420	1.00			
Serum creatinine >200µmol/L					
No (ref)	13303	1.00			
Yes	678	3.19	1.65	6.18	0.001

\* using Cox regression with backward stepwise variable selection

\*\* "No" category in these variables included "Not known" category

## APPENDIX A: DATA MANAGEMENT

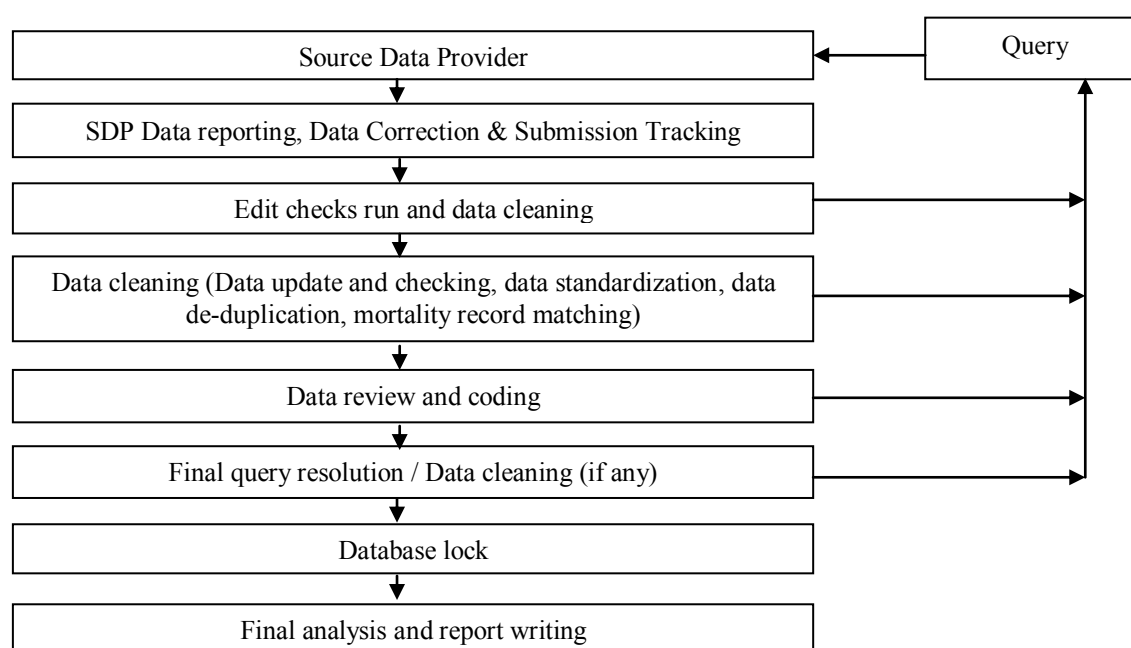
The National Cardiovascular Disease Database (NCVD) Registry maintains two different databases for cardiovascular diseases, i.e. for Acute Coronary Syndrome and Percutaneous Coronary Intervention. Data is stored in SQL Server due to the high volume of data accumulated throughout the years.

### Data sources

Source Data Providers (SDPs) of NCVD-PCI registry comprises of 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.



### 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 of 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 PCI, SDP submits NCVD-PCI Notification form on an ad-hoc basis whenever a procedure is performed. SDP also submits follow-up data at 30-day, 6-month and 12-month post notification date intervals. An alert page containing all the overdue submissions for follow-up at 30-day, 6-month and 12-month post notification date is available to users to ease them for 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 entire registry. The application will still detect a duplicate record if the same MyKad number is keyed in, should the step of searching patient be left out. This step is done to avoid duplicate records. For patients whose records already exist in the database, SDP



needs only to add a new PCI notification with basic patient particulars pre-filled, based on existing patient information in the database. PCI and ACS 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 functionality 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 and 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 tables and graphs manner. The aggregated data reports are typically presented in two manners, one as centre's own data aggregated data report and another as the registry's overall aggregated data report. In this way, the centre is able to compare itself against 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 of 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 is 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 request by user, correction of data based on checking via data query in eCRF or after receiving results for preliminary data analysis. During data standardization, 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*) database 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 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 that 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.

NCVD subscribes to co-location service with a high availability and highly secured Internet Data Centre at Cyberjaya in order to provide 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 are also provided such as usage and performance report, operating system maintenance and monitoring, bandwidth monitoring and systems health monitoring.



## APPENDIX B: STATISTICAL METHODS

The analysis described below was conducted on data collected in the NCVD-PCI registry from year 2007 to 2012. Inclusion criteria were all patients who had PCI procedures performed between 2007 to 2012 and were aged 20 years and above. In general, the unit of analysis was PCI procedures performed or treated lesions. However, for some results, a patient level analysis was conducted.

Statistical methods mainly involved descriptive analysis. For discrete data, we calculated frequency and percentage while for continuous data, the mean, standard deviation (SD), median, minimum and maximum values were calculated. One exception was a regression analysis performed to evaluate the prognostic factors for in-hospital mortality.

Missing data were reported for both discrete and continuous data. No statistical imputation was applied to replace the missing data. The outliers were set to missing based on the table below:

Name of the field	Acceptable range
Age	$\geq 20$ years old
Heart rate	25 – 200 beats per minute
Systolic blood pressure	60 – 230 mmHg
Diastolic blood pressure	10 – 120 mmHg
Height	130 – 250 cm
Weight	40 – 200 kg
Body Mass Index (BMI)	14 – 50 kgm <sup>-2</sup>
Serum Creatinine	$\geq 44.0$ micromol/L
Total Cholesterol (TC)	2.0 – 25.0 mmol/L
Low-Density Lipoprotein (LDL)	0.7 – 20.0 mmol/L
Ejection Fraction Status	10 – 80 %
Fluoroscopy time	2.0 – 180.0 minutes
Contrast volume	15.0 – 500.0 mL
Pre-stenosis	0 – 100 %
Post-stenosis	0 – 100 %
Estimated lesion length	1.0 – 150.0 mm
Stent length	8.0 – 50.0 mm
Stent diameter	2.00 – 7.00 mm
Maximum balloon size used	1.00 – 6.00 mm
Maximum stent/balloon deploy pressure	1 – 30 atm



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

***Chapter 2: Patient characteristics***

Patient characteristics are summarised in the Chapter 2. Numbers of patients in each year were determined based on their PCI procedure year. The results presented the patients' age, gender, ethnicity, coronary risk factors, comorbidities, lab investigations, previous interventions and other variables contained in the CRF.

***Chapter 3: Clinical presentations & investigations***

Chapter 3 included an analysis of the clinical presentations, baseline investigations, cardiac status such as NYHA and Killip class, Canadian Cardiovascular Score and IABP use at PCI procedure. 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 symptom-to-door and door-to-balloon time).

***Chapter 4: Procedural details***

The PCI procedural details included PCI procedural settings and lesion characteristics. The lesion characteristics, access site, location and lesion type, as well as stent types and complications were presented.

***Chapter 5: Outcome***

The overall in-hospital, all-cause mortality, post procedural complications, medications and patient outcome at discharge and follow-up (30-days, 6 months and 1-year) were presented in Chapter 5. 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 death date was not provided in the NRD dataset.



## APPENDIX C: PARTICIPATING CENTRE DIRECTORY

**SDP Code: 1001**

**Pusat Perubatan Universiti Malaya (*University Malaya Medical Centre*)**

*Department of Medicine, Lembah Pantai, 59100 KUALA LUMPUR*

**SDP Code: 1002**

**Institut Jantung Negara (*National Heart Institute*)**

*Department of Cardiology, 145 Jalan Tun Razak, 50400 KUALA LUMPUR*

**SDP Code: 1004**

**Hospital Pulau Pinang**

*Department of Cardiology, Jalan Residensi, 10990 PULAU PINANG*

**SDP Code: 1005**

**Pusat Jantung Hospital Umum Sarawak (*Sarawak General Hospital Heart Centre*)**

*Kota Samarahan Expressway, 94300 Kuching, SARAWAK*

**SDP Code: 1006**

**Hospital Sultanah Aminah**

*Department of Cardiology, Jalan Persiaran Abu Bakar Sultan, 80100 Johor Bahru, JOHOR*

**SDP Code: 1009**

**Hospital Sultanah Bahiyah**

*Department of Cardiology, KM 6, Jalan Langgar, 05460 Alor Setar, KEDAH*

**SDP Code: 1013**

**Hospital Sultanah Nur Zahirah**

*Department of Cardiology, Jalan Sultan Mahmud, 20400 Kuala Terengganu, TERENGGANU*

**SDP Code: 1015**

**Hospital Queen Elizabeth I**

*Department of Medicine, Locked Bag No. 2029, 88586 Kota Kinabalu, SABAH*

**SDP Code: 1016**

**Hospital Tengku Ampuan Afzan**

*Department of Cardiology, Jalan Tanah Putih, 25100 Kuantan, PAHANG*

**SDP Code: 1020**

**Hospital Serdang**

*Department of Cardiology, Jalan Puchong, 43000 Kajang, SELANGOR*

**SDP Code: 1024**

**Subang Jaya Medical Centre**

*1, Jalan SS 12/1A, 47500 Subang Jaya, SELANGOR*

**SDP Code: 1028**

**Hospital Queen Elizabeth II**

*Department of Cardiology, Lorong Bersatu, Off Jalan Damai, 88300 Luyang, Kota Kinabalu, SABAH*

**SDP Code: 1030**

**Pantai Hospital Ipoh**

*Jalan Tambun, 31400 Ipoh, PERAK*

## APPENDIX D: NOTE OF APPRECIATION

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### **Pusat Perubatan Universiti Malaya**

Dr Wan Azman Wan Ahmad  
Dr Imran Zainal Abidin  
Dr Chee Kok Han  
Dr Zulhilmi Yaakob  
Dr Ramesh Singh Arjan Singh  
Dr Abdul Wahab Undok  
Dr Sivarani R. M. Sathasivam  
Dr Nor Ashikin Md Sari  
Dr Mohammad Athar Sadiq  
Dr Alexander Loch  
Dr Ang Choon Chin  
Dr Ganiga Srinivasaiah Sridhar  
Dr Ahmad Syadi Mahmood Zuhdi  
Dr Muhammad Dzafir Ismail  
Yusliati Ahmad  
Zairani Abidin  
Chong Kun Jin  
Nur Azilah Abdul Rahman  
Mohd Zaki Mohd Ariff  
Mohd Saiful Lazmi Mohammad Fauzi  
Azrul Hisyam Yahaya  
Muhammad Khalini Abdul Halim  
Atikah Rossli  
Sthuwaiabah Aslamiah Ahmad Najdi  
Mohd Suhairi Mohamad  
Amierul Ameen Rosli  
Sinthu Bairavi Tharamalingam  
Syarnissa Ahmad Dahuri

### **Hospital Sultanah Aminah**

Dr Lee Chuey Yan  
Dr Benjamin Leo Cheang Leng  
Dr Gunasegaran Ramasamy  
Dr Kam Ji Yen  
Dr Stanley Lim Chin Yu  
Dr Ang Chin Yong  
Dr Ang Kai Ping  
Jorlah Rosni  
Norliza Abd Rahman  
Emeliani Md Rifin  
Siti Fatimah Abdullah Sangguro

### **Hospital Sultanah Bahiyah**

Dr Abd Syukur Bin Abdullah  
Dr BillyCh'ng Seng Keat  
Dr Ahmad Shukri b.Md Saad  
Dr Wan Faizal Wan Rahimi  
Dr Hasmannizar Abd Manap  
Napisah Shafie  
Che Kalsom Md Saad  
Rashida Omar  
Zarina Abdul Hamid

Khodijah Mat Isa  
Suryati Md Derus  
Salina Samsudin  
Noor Hafiza  
Sharmila Ismail  
Khairul Faizal  
Rashida Omar  
Aminah Yaakop

### **Hospital Pantai Ipoh**

Dr Philip Ho Yew Choong  
Dr Chan Chong Guan  
Dr Inderjit Singh Bagher Singh  
Dr Kevin Louis Joseph Martin Joseph  
Lily Theresa Pritham Koor

### **Hospital Pulau Pinang**

Dr Omar Ismail  
Dr Ainol Shareha Sahar  
Dr Muhamad Ali Sheikh Abdul Kader  
Dr Kong Poi Keong  
Dr Saravanan Krishinan  
Dr Mohamed Jahangir Abdul Wahab  
Dr Tieh Siaw Cheng  
Dr Ma Soot Keng  
Dr Shahul Hamid Ahmad Sha  
Dr Goh Chong Aik  
Dr Ng Jit Beng  
Ng Ghim Keow  
Hani Yusrina Abdullah  
Sadiana Kamari  
Syarwani Yusuf  
Mohd Azim Zulkifli  
Menaka Goindankuty  
Saraswathy Munusamy  
Hasnah Kechil  
Teh Tang Tong  
Gunachandran Veloo  
Firdaus Mohd Ali Kanabathy  
Nor Izzat Che Harun  
Nik Romizi Nik Mat  
Ahmad Muhaymin Fitri Othman  
Rusdi Idrus  
Muniswari Rati Arumugam  
Asnida Abdul Hak

### **Hospital Umum Sarawak**

Dr Sim Kui Hian  
Dr Ong Tiong Kiam  
Dr Alan Fong Yean Yip  
Dr Nor Hanim Mohd Amin  
Dr Yew Kuan Leong

Dr Khiew Ning Zan  
 Dr Tan Sian Kong  
 Dr Cham Yee Ling  
 Dr Chua Seng Keong  
 Dr Asri Said  
 Zalina Mat  
 Danny Day Dudu  
 Lily Dunstan Muda  
 Cynthia Nobert Meriter  
 Choo Siew Yin  
 Syamsukinah Abdullah  
 Ritem Gundek  
 Willson Johan  
 Rosnani Yusri  
 Zukhairi Bek  
 Tarmizi Tukimin  
 Felicia Limah John Ahad  
 Elizabeth Jong Hui Yen  
 Tan Ah Hong  
 Juriah Sulehan  
 Felicia Chin  
 Elizabeth Jega Jenggut

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Dr Liew Hounng Bang  
 Dr Phanindranath Mahadasa  
 Dr Rowland Chin Wee Ming  
 Dr Chu Chong Mow  
 Dr Ainun Jariah Mohd Sohor  
 Dr Khor How Kiat  
 Dr Jeremy Robert  
 Dr Toh Li Kwan  
 Dr Riaz Ahmed  
 Dr Nik Amin Nik Lah  
 Dr Ravi Subramaniam  
 Dr Mohd Khairi Othman  
 Dr Sahrin Saharudin  
 Dr Beh Boon cong  
 Dr Lee Yu Wei  
 Dr Mohanraj Jayakumar  
 Dr Yen Chia How  
 Siti Rahmah Idris  
 Litta Jacob  
 Juinie Minin  
 Angie Anthony  
 Siti Ainsah Razali  
 Fakri Hamzie Muhamad Yusof  
 Joyce Hiew  
 Nanthini Vijaykumaran  
 Maria Sofyana Mursin  
 Licina Chai @ Mohd Ridzuan  
 Leon Irwin Stephen  
 Dyann Viviann Jonius

#### **Institut Jantung Negara**

Dr Robaayah Zambahari  
 Dr Azhari Rosman  
 Dr Rosli Mohd Ali  
 Dr David Chew Soon Ping

Dr Razali Omar  
 Dr Mohd Nasir Muda  
 Dr Aizai Azan Abd Rahim  
 Dr Amin Ariff Nuruddin  
 Dr Azlan Hussin  
 Dr Ahmad Khairuddin Mohamed Yusof  
 Dr Shaiful Azmi Yahaya  
 Dr K Balachandran  
 Dr Sanjiv Joshi Hari Chand  
 Dr Surinder Kaur Khelae  
 Dr Lim Bee Chian  
 Dr Syahidah Syed Tamin  
 Dr Emily Tan Lay Koon  
 Dr Chiew Kean Shyong  
 Dr Al Fazir Omar  
 Dr Mahmood Sabrudin Zulkifli  
 Dr Lim Eu Jin  
 Dr Suhaimi Osman  
 Dr Azmee Mohd Ghazi  
 Dr Ayman Selim  
 Dr Shamruz Khan Akerem Khan  
 Dr Lau Gin Choy  
 Dr Jaideep Singh Sidhu  
 Dr Shahrul Zuraiddi Idris  
 Dr Tee Chee Hian  
 Dr Zulkeflee Muhammad  
 Dr Shakeel Ahmed Memon  
 Dr Hafidz Abd Hadi  
 Dr Akmal Hakim Arshad  
 Dr Teoh Chee Kiang  
 Dr Kumara Gurupparan  
 Dr Koh Kok Wei  
 Dr Beni Isman Rusani  
 Dr Ika Faizura Mohd Nor  
 Dr Shahrol Anuar Mohd Yasin  
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 Dr Alan Koay Choon Chern  
 Dr Mohan Ramachandran  
 Dr Barveen Aisya Abu Baker  
 Dr Yap Lok Bin  
 Dr Navin Sukilan  
 Dr Jayakhanthan Kolanthai Velu  
 Dr Yap Swee Hien  
 Dr Rafidah Abu Bakar  
 Dr Nandakumar Ramakrishnan  
 Dr Rubenthiran Navaratnam  
 Dr Ng Yau Piow  
 Jacqueline Lucy De Costa  
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 Siti Munirah Abd Razak  
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 Ameerah Jaafar  
 Nor'aini Kaimi  
 Noor Bashiroh Md Said  
 Siti Nurzalana Mohd Safari  
 Zulaikha Zainal  
 & Others members of Clinical Research  
 Department (indirectly involved, i.e.: follow up  
 call)

**Hospital Serdang**

Dr Abdul Kahar Abdul Ghapar  
Dr Koh Hui Beng  
Dr Diana Shahida  
Dr Norfaziela Jaafar  
Suhaila Abu Bakar  
Juliana Nyadong  
Norziliana Nordin  
Siti Salmor Talib

**Altus Solutions Sdn Bhd**

Lim Jie Ying  
Sebastian Thoo  
Amy R Porle  
Abdul Malik Tanjeng

**Azmi Burhani Consulting Sdn Bhd**

Siti Haryanie Abdul Aziz  
Yee Siau Lin

**Hospital Tengku Ampuan Afzan**

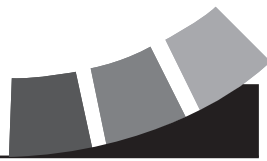
Dr Abdul Hadi Jaafar  
Dr Siti Khairani Zainal Abidin  
Dr Anwar Irawan Ruhani  
Dr Harris Ngow Abdullah  
Dr Shahidi Jamaludin  
Chooi Lee Ling  
Roslan Azali  
Wan Norazless Wan Majid  
Zuhaini Ismail  
Hasnah Hamat  
Noor Fauziah Muhammad  
Wan Norfaizah Wan Abdullah  
Issa Norhafizza Tajuddin  
Siti Nor Ashraf Ahmad Nori  
Marina Mohd Naw  
Mohammad Azhar Mat Saman  
Mohd Saiful Izad Shafuddin  
Syed Yusli Saiyed Ibrahim  
Ahmad Zamry Ahmad Kamil  
Suriana Abdulla

**Hospital Sultanah Nur Zahirah**

Dr Mohd Sapawi Mohamad  
Dr Zulkifli Mustapha  
Dr Ahmad Wazi Ramli  
Hidayah Omar  
Rina Muhamad  
Nafisah Othman  
Noor Asmaliza Ahmad

**Subang Jaya Medical Centre**

Dr Choo Gim Hooi  
Dr Hj Nik Ishak Wan Abdullah  
Dr Jeyamalar Rajadurai  
D. Kannan Pasamanickam  
Dr Lawrence Chan Hon Wah  
Dr Betty Teh Bee Tee  
Yen Sze Whey  
Chee Ai Lieng  
Divinashini Manogaran  
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Farizan Mohd



## APPENDIX E: GLOSSARY

Access site occlusion	Indicates whether an access site occlusion occurred at the site of percutaneous entry during the procedure or after the laboratory visit, but before any subsequent laboratory visits. This is defined as total obstruction of the artery usually by thrombus (but may have other causes) usually at the site of access, requiring surgical repair. Occlusions may be accompanied by absence of palpable pulse or Doppler.
Acute Coronary Syndrome (ACS)	Indicates if the patient is suffering from an ACS event. ACS encompasses clinical features comprising chest pain or overwhelming shortness of breath, defined by accompanying clinical, ECG and biochemical features. ACS comprises the following: <ul style="list-style-type: none"> <li>- Unstable Angina Pectoris (UAP)</li> <li>- NSTEMI</li> <li>- STEMI</li> </ul>
Bail-out CABG	Urgent / emergent CABG as a complication related to the index PCI (e.g. secondary to stent thrombosis, left main or TVR dissection, coronary perforation, unsuccessful INDEX PCI). This also applies to where the CABG was precipitated due to worsening, sudden chest pain, CHF, AMI or anatomy.
Bleeding	The person's episode of bleeding as described by the thrombolysis in myocardial infarction (TIMI) criteria. Indicate if bleeding occurred during or after the cath. lab visit until discharge. The bleeding should require a transfusion and/or prolong the hospital stay and/or cause a drop in haemoglobin > 3.0 gm/dl.
Body Mass Index (BMI)	A measurement of the relative percentages of fat and muscle mass in the human body, in which weight in kilograms is divided by height in meters and the result used as an index of obesity (kgm-2). This will be autocalculated by the system.
Canadian Cardiovascular Score (CCS)	Indicates the Canadian Cardiovascular Angina Classification Score (CCS) of a patient which is categorised as: <ul style="list-style-type: none"> <li>Class 0; Asymptomatic</li> <li>Class 1; Ordinary physical activity, such as walking or climbing the stairs does not cause angina. Angina may occur with strenuous, rapid or prolonged exertion at work or recreation.</li> <li>Class 2; There is slight limitation of ordinary activity. Angina may occur with moderate activity such as walking or climbing stairs rapidly, walking uphill, walking or climbing stairs after meals, in the cold, in the wind, or under emotional stress, or walking more than two blocks on the level, and climbing more than one flight of stairs at normal pace under normal conditions.</li> <li>Class 3; There is marked limitation of ordinary physical activity. Angina may occur after walking one or two blocks on the level or climbing one flight of stairs under normal conditions at a normal pace.</li> <li>Class 4; There is inability to carry on any physical activity without discomfort; angina may be present at rest.</li> </ul>

Cardiogenic shock	Indicates if the patient fulfilled the clinical criteria for cardiogenic shock as follows: <ul style="list-style-type: none"> <li>a. hypotension ( a systolic BP of &lt;90mmHg for at least 30 minutes or the need for supportive measures to maintain a systolic BP of &gt; 90mmHg).</li> <li>b. end-organ hypoperfusion (cool extremities or a urine output of less than 30ml/h, and a heart rate &gt;60 beats per minute).</li> <li>c. the haemodynamic criteria are a cardiac index of no more than 2.2l/min per square meter of body-surface area and a pulmonary-capillary wedge pressure of at least 15mmHg.</li> </ul>
Chronic renal failure	Indicates if the patient has a history and/or documented evidence and/or have undergone treatment for chronic renal failure. Includes all patients with creatinine 200 micromol/L.
Contralateral Injections	Injection of contrast injected in the opposite non-occluded vessel.
Current smoker	Patient who regularly smokes a tobacco product / products one or more times per day or has smoked within the 30 days prior to this admission.
Diabetes	Indicate if the patient has diabetes as documented by following: <ol style="list-style-type: none"> <li>1. A history of diabetes, regardless of duration of disease, or need for antidiabetic agents, or</li> <li>2. Fasting blood glucose &gt; 7.0mmol/L, or</li> <li>3. HbA1c &gt; 6.5mmol/L</li> </ol>
Direct stenting	Stent deployment without prior treatment of stenotic segment.
Dissection (post procedure)	Indicate for the treated segment (or for a significant side branch) if a dissection > 5 mm was observed during the PCI procedure. Dissection is defined as the appearance of contrast materials outside of the expected luminal dimensions of the target vessel and extending longitudinally beyond the length of the lesion.
Dissection (vascular)	Indicate whether a dissection occurred at the site of percutaneous entry during the procedure or after lab visit but before any subsequent lab visits. A dissection is defined as a disruption of an arterial wall resulting in splitting and separation of the intimal (subintimal) layers.
Documented CAD	Indicates if the patient has angiographically-proven coronary disease (stenosis > 50%) or has undergone percutaneous angioplasty (PCI) or coronary artery bypass graft (CABG) prior to this admission to the hospital.
Door to balloon time	The duration between time patient presented to the reporting centre to time of first intracoronary device used performed by the same centre. Applicable only to patients with STEMI undergoing urgent PCI.
Door to needle time	The duration between time patients presented to the reporting centre to time intravenous fibrinolytic therapy was administered or initiated by that same centre. Applicable only to STEMI patients receiving thrombolysis at the reporting centre.
Elective PCI	PCI performed for patients with stable CAD.
Emergency Reintervention/PCI	Indicate if the patient required an UNPLANNED PCI during hospitalization and prior to discharge that occurs as a complication related to the index PCI e.g., – stent thrombosis, dissection with target vessel occlusion ).
French size	The French size of the guiding catheter or guiding sheath used to cannulate the ostium of the coronary artery. The largest size used should be indicated.

Functional ischaemia	Indicate if the patient has functional ischaemia as indicated by a non-invasive test such as exercise or pharmacological stress test, radionuclide, echo, CT scan was done to rule out ischaemia. The test could be performed at this admission (prior to the PCI), or it could be a test that resulted in the admission.
Glomerular Filtration Rate (MDRD)	Glomerular filtration rate (GFR) is the volume of fluid filtered from the renal (kidney) glomerular capillaries into the Bowman's capsule per unit time calculated using the Modification of Diet in Renal Disease (MDRD) formula. $GFR_{MDRD} = 186 \times (\text{serum creatinine } (\mu\text{mol/L}) / 88.4)^{-1.154} \times \text{AGE}^{-0.203} \times (0.742 \text{ if female})$ . The unit is mL/min/1.73m <sup>2</sup> .
Intra Aortic Balloon Pump (IABP)	Indicates if an Intra Aortic Balloon Pump has been used during the procedure
Killip classification	Identifies the Killip class, as a measure of haemodynamics compromise, of the person at the time of presentation <b>Class I</b> includes individuals with no clinical signs of heart failure <b>Class II</b> includes individuals with rales in the lungs, an S3 gallop, and elevated jugular venous pressure <b>Class III</b> describes individuals with frank pulmonary oedema <b>Class IV</b> describes individuals in cardiogenic shock
Lesion code	Indicate the sites of lesion treated by PCI.
Lesion result	Indicate for the treated lesion whether the treatment was successful or unsuccessful.
Lesion type	The lesion type according to ACC/AHA guidelines that determines the complexity of the lesions thus determining the success rate and complication rates following PCI.
Loss of radial pulse	Indicate whether an acute loss of the pulse radial to the arterial access site occurred either by dissection, thrombus or distal embolization.
LVEF	The left ventricular ejection fraction as measured by the percentage of the blood emptied from the left ventricle at the end of the contraction. Indicate the EF status at time of PCI procedure. The most recent test within the last 6 months, including the current procedure and up to discharge following the procedure.
Medina Classification	It involves assigning a binary value (1,0) to each of the three components of a bifurcation (proximal region of main branch, distal region of main branch, and the side branch) depending whether there is more than (1) or less than (0) fifty percent lesion stenosis. If only proximal segment of the main branch has a significant lesion, it becomes Medina 1,0,0. If distal segment of main branch alone is involved, it becomes 0,1,0. Sole involvement of side branch is designated 0,0,1 and involvement of all the three is designated 1,1,1 and so on.
No Reflow	Indicate for the treated segment if there was a period where no flow was noted during the PCI procedure.



New York Heart Association	<p>Indicates the patient's NYHA classification as follows:</p> <ul style="list-style-type: none"> <li>I. Patient has cardiac disease but without resulting limitations of ordinary physical activity; Ordinary physical activity (e.g. walking several blocks or climbing stairs) does not cause undue fatigue or dyspnoea. Limiting symptoms may occur with marked exertion</li> <li>II. Patient has cardiac disease resulting in slight limitation of ordinary physical activity. Patient is comfortable at rest. Ordinary physical activity such as walking more than 2 blocks or climbing more than one flight of stairs results in limiting symptoms (e.g., fatigue or dyspnoea)</li> <li>III. Patient has cardiac disease resulting in marked limitation of physical activity. Patient is comfortable at rest. Less than ordinary physical activity (e.g., walking one to two level blocks or climbing one flight of stairs) causes fatigue or dyspnoea</li> <li>IV. Patient has dyspnoea at rest that increases with any physical activity. Patient has cardiac disease resulting in inability to perform any physical activity without discomfort. Symptoms may be present even at rest. If any physical activity is undertaken, discomfort is increased</li> </ul>
Percutaneous entry	Indicates the percutaneous entry location used to provide vascular access for the procedure.
Perforation	Indicate for the treated segment if a perforation occurred during the procedure.
Pre-stenosis	Indicate the % of most severe pre-procedure stenosis assessed. This does not include collateral circulation.
Pseudoaneurysm	Indicates whether a pseudoaneurysm occurred at the site of percutaneous entry during the procedure or after the laboratory visit but before any subsequent laboratory visits. This does not account for pseudoaneurysms noted after discharge. Pseudoaneurysm is defined as the occurrence of a disruption and dilation of the arterial wall without identification of the arterial wall layers at the site of the catheter entry, as demonstrated by arteriography or ultrasound.
Smoking status	Indicate if the patient has a history confirming any form of tobacco use in the past. This includes use of cigarettes / cigars / pipes/ tobacco chewing.
Status - Elective	PCI performed in patient with stable CAD either planned/staged PCI following coronary angiogram done earlier or PCI performed during the time of angiogram (ad-hoc).
Status - NSTEMI/UA	PCI for patients admitted with NSTEMI/UA
Status - STEMI	PCI for patient admitted with STEMI following different treatment strategies.
TIA / Stroke	Indicate if the patient experienced a Cerebrovascular Accident (CVA) noted during the cath lab visit or after lab visit until discharge (or before any subsequent lab visits), as documented by CT/MRI confirmation.
Time of first balloon inflation / stent / aspiration	Indicate the time of the intracoronary treatment device deployment.
TIMI Flow (Post)	Indicate the post-procedure TIMI flow down the treated vessel.
TIMI Flow (Pre)	Indicate the pre-procedure TIMI flow down the treated vessel.
Vascular perforation	Perforation of the peripheral vessel where the catheter/sheath/wire is being tracked.

## **APPENDIX F: CASE REPORT FORM**

# NATIONAL CARDIOVASCULAR DISEASE DATABASE- PCI REGISTRY NOTIFICATION FORM

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

For NCVD Use only:

ID:  /

Centre:

A. Centre Code:   Or Reporting centre name:  B. Date of Admission : (dd/mm/yy)

## SECTION 1 : DEMOGRAPHICS

1. Patient Name : *			
2. Local RN No: (if applicable)			
3. Identification Card * Number :	MyKad / MyKid: <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): <input type="text"/>	
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: * (write DOB as dd/mm/yy if age is known)	<input type="text"/> <input type="text"/> <input type="text"/> (dd/mm/yy)	6b. Age on admission: * <input type="text"/> (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="text"/> <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 M'sian, specify : <input type="text"/>		
8. Contact Number	(1): <input type="text"/>	(2): <input type="text"/>	
9. Admission Status:	<input type="radio"/> Referral for elective procedure <input type="radio"/> Self-referral <input type="radio"/> In-patient transfer (for more immediate procedure) <input type="radio"/> Other, specify : <input type="text"/>		

## 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. Medical history : *			
a) Dyslipidaemia <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known	e) Myocardial infarction history <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	f) Documented CAD <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known (Presence of stenosis & positive stress test)		
c) Diabetes <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	g) New onset angina (less than 2 weeks) <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known		
d) Family history of premature cardiovascular disease (< 55 years old if Male & 65 years old if Female) <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known	h) History of heart failure <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known		
	i) Cerebrovascular disease <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known		
	j) Peripheral vascular disease <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known		
	k) Chronic renal failure (> 200 umol (micromol)) <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known		

## SECTION 3 : CLINICAL EXAMINATION and BASELINE INVESTIGATION

1. Anthropometric :	a. Height: <input type="text"/> (cm) <input type="checkbox"/> Not Available	b. Weight: <input type="text"/> (kg) <input type="checkbox"/> Not Available	c. BMI: <input type="text"/> Auto Calculated
2. Heart rate (at start of PCI): <input type="text"/> (beats / min)	3. Blood pressure (at start of PCI): a. Systolic: <input type="text"/> (mmHg) b. Diastolic: <input type="text"/> (mmHg)		
4. Baseline creatinine : <input type="text"/> micromol/L <input type="checkbox"/> Not Available	5. Hb A1c: <input type="text"/> mmol/L		
6a. Total cholesterol: <input type="text"/> mmol/L <input type="checkbox"/> Not Available	6b. LDL levels: <input type="text"/> mmol/L <input type="checkbox"/> Not Available		
7. Baseline ECG : (check where applicable) <input type="checkbox"/> Sinus rhythm <input type="checkbox"/> Atrial Fibrillation <input type="checkbox"/> 2nd /3rd AVB <input type="checkbox"/> LBBB <input type="checkbox"/> RBBB			
8. Glomerular Filtration Rate (GFR):	a. MDRD: <input type="text"/> mL/min/1.73m <sup>2</sup>	b. Cockcroft-Gault: <input type="text"/> mL/min	

Formula:

GFR (Modification of Diet in Renal Disease (MDRD)) :  $186 \times (\text{serum creatinine}[\text{micromol/L}] / 88.4)^{-1.154} \times (\text{age})^{-0.203} \times (0.742 \text{ if female})$ GFR (Cockcroft-Gault formula) : Male :  $1.23 \times (140 - \text{Age}) \times \text{Weight (kg)} / \text{serum Creatinine (micromol/L)}$ Female :  $1.04 \times (140 - \text{Age}) \times \text{Weight (kg)} / \text{serum Creatinine (micromol/L)}$ 

## SECTION 4 : PREVIOUS INTERVENTIONS

1. Previous * PCI :	<input type="radio"/> Yes <input type="radio"/> No Date of most recent PCI (dd/mm/yy): <input type="text"/> / <input type="text"/> / <input type="text"/> <input type="checkbox"/> Not Available	2. Previous * CABG:	<input type="radio"/> Yes <input type="radio"/> No Date of most recent CABG (dd/mm/yy): <input type="text"/> / <input type="text"/> / <input type="text"/> <input type="checkbox"/> Not Available
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a. Patient Name :		b. Centre Code:	
c. Identification Card Number :		d. Local RN No (if applicable):	

  
**SECTION 5 : CARDIAC STATUS AT PCI PROCEDURE**

1. NYHA:	<input type="radio"/> NYHA I	<input type="radio"/> NYHA II	<input type="radio"/> NYHA III	<input type="radio"/> NYHA IV
2. Killip class : (STEMI & NSTEMI)	<input type="radio"/> I Asymptomatic	<input type="radio"/> II Left Heart Failure (LHF)	<input type="radio"/> III Acute Pulmonary Oedema (APO)	<input type="radio"/> IV Cardiogenic Shock
3. Functional ischaemia:	<input type="radio"/> Not applicable	<input type="radio"/> Positive	<input type="radio"/> Negative	<input type="radio"/> Equivocal
4. IABP:	<input type="radio"/> Yes	<input type="radio"/> No		
5. Acute Coronary * Syndrome:	<input type="radio"/> Yes → <input checked="" type="radio"/> STEMI → <input type="radio"/> Anterior <input type="radio"/> Non anterior	<input type="radio"/> NSTEMI	<input type="radio"/> UA	<input type="radio"/> No
6. Angina type:	<input type="radio"/> None	<input type="radio"/> Atypical	<input type="radio"/> Chronic Stable Angina	<input type="radio"/> Unstable angina
7. Canadian Cardiovascular Score (CCS):	<input type="radio"/> Asymptomatic	<input type="radio"/> CCS 1	<input type="radio"/> CCS 2	<input type="radio"/> CCS 3
	<input type="radio"/> CCS 4			
8. STEMI Event : (Please complete if <24 hours since onset of STEMI symptoms)	a) STEMI time of onset in 24 hr clock (hh:mm):	<input type="text"/> : <input type="text"/>	<input type="checkbox"/> Not Applicable	
	b) Time of arrival at first hospital (hh:mm) : (For patients transferred only)	<input type="text"/> : <input type="text"/>	<input type="checkbox"/> Not Applicable	
	c) Time of arrival at PCI hospital (hh:mm) :	<input type="text"/> : <input type="text"/>	<input type="checkbox"/> Not Applicable	
	d) Time of first balloon inflation/ stent/ aspiration (hh:mm) :	<input type="text"/> : <input type="text"/>	<input type="checkbox"/> Not Applicable	
9. EF Status (at time of PCI procedure) (Do not use '>' or '<' symbol)	<input type="text"/> %	<input type="checkbox"/> Not Available		

  
**SECTION 6 : CATH LAB VISIT**

1. Date of procedure:	<input type="text"/> / <input type="text"/> / <input type="text"/> (dd/mm/yy)																					
2. PCI status:	<input type="radio"/> Elective → <input type="radio"/> Staged PCI <input type="radio"/> Ad hoc	<input type="radio"/> AMI → <input type="radio"/> Rescue <input type="radio"/> Facilitated																				
	<input type="radio"/> NSTEMI/UA → <input type="radio"/> Urgent (within 24hrs) <input type="radio"/> Non-urgent	<input type="radio"/> Primary <input type="radio"/> Delayed PCI																				
3. Cath/PCI same lab visit:	<input type="radio"/> Yes	<input type="radio"/> No																				
4. Medication:	<table border="0"> <tr> <td>* a) Thrombolytics</td> <td><input type="radio"/> Yes → <input type="radio"/> &lt;3hrs <input type="radio"/> 3-6hrs <input type="radio"/> 6-12hrs <input type="radio"/> 12-24hrs <input type="radio"/> 1-7days <input type="radio"/> &gt;7days</td> </tr> <tr> <td>* b) IIb / IIIa Blockade</td> <td><input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No</td> </tr> <tr> <td>* c) Heparin</td> <td><input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No</td> </tr> <tr> <td>* d) LMWH</td> <td><input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No</td> </tr> <tr> <td>* e) Ticlopidine</td> <td><input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No</td> </tr> <tr> <td>* f) Bivalirudin</td> <td><input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No</td> </tr> <tr> <td>* g) Aspirin</td> <td><input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No</td> </tr> <tr> <td>* h) Clopidogrel</td> <td> <input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After  <input type="radio"/> &lt;6 hrs <input type="radio"/> 6-24 hrs <input type="radio"/> &gt;24 - 72 hrs <input type="radio"/> &gt;72 hrs  <input type="radio"/> No First / load dose: <input type="radio"/> 75mg <input type="radio"/> 300mg <input type="radio"/> 600mg <input type="radio"/> ≥ 1200mg </td> </tr> <tr> <td>* i) Fondaparinux</td> <td><input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No</td> </tr> </table>				* a) Thrombolytics	<input type="radio"/> Yes → <input type="radio"/> <3hrs <input type="radio"/> 3-6hrs <input type="radio"/> 6-12hrs <input type="radio"/> 12-24hrs <input type="radio"/> 1-7days <input type="radio"/> >7days	* b) IIb / IIIa Blockade	<input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No	* c) Heparin	<input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No	* d) LMWH	<input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No	* e) Ticlopidine	<input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No	* f) Bivalirudin	<input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No	* g) Aspirin	<input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No	* h) Clopidogrel	<input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> <6 hrs <input type="radio"/> 6-24 hrs <input type="radio"/> >24 - 72 hrs <input type="radio"/> >72 hrs <input type="radio"/> No First / load dose: <input type="radio"/> 75mg <input type="radio"/> 300mg <input type="radio"/> 600mg <input type="radio"/> ≥ 1200mg	* i) Fondaparinux	<input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No
* a) Thrombolytics	<input type="radio"/> Yes → <input type="radio"/> <3hrs <input type="radio"/> 3-6hrs <input type="radio"/> 6-12hrs <input type="radio"/> 12-24hrs <input type="radio"/> 1-7days <input type="radio"/> >7days																					
* b) IIb / IIIa Blockade	<input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No																					
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* g) Aspirin	<input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No																					
* h) Clopidogrel	<input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> <6 hrs <input type="radio"/> 6-24 hrs <input type="radio"/> >24 - 72 hrs <input type="radio"/> >72 hrs <input type="radio"/> No First / load dose: <input type="radio"/> 75mg <input type="radio"/> 300mg <input type="radio"/> 600mg <input type="radio"/> ≥ 1200mg																					
* i) Fondaparinux	<input type="radio"/> Yes → <input type="radio"/> Prior <input type="radio"/> During <input type="radio"/> After <input type="radio"/> No																					
5. Planned duration of clopidogrel/ticlopidine:	<input type="radio"/> 1 month <input type="radio"/> 6 months <input type="radio"/> >12 months	6a. Percutaneous entry:																				
	<input type="radio"/> 3 months <input type="radio"/> 12 months <input type="radio"/> Not Available	<input type="checkbox"/> Brachial <input type="checkbox"/> Femoral <input type="checkbox"/> Radial																				
6b. French size (Guiding catheter)	<input type="radio"/> 5 <input type="radio"/> 7 <input type="radio"/> 9	6c. Closure device:																				
	<input type="radio"/> 6 <input type="radio"/> 8 <input type="radio"/> Other,specify: _____	<input type="radio"/> No <input type="radio"/> Suture <input type="radio"/> Seal <input type="radio"/> Other,specify: _____																				
7. Extent of coronary * disease:	<input type="checkbox"/> Single vessel disease <input type="checkbox"/> Multiple vessel disease <input type="checkbox"/> Graft <input type="checkbox"/> Left Main																					
8a. Fluoroscopy time:	<input type="text"/> : <input type="text"/> minutes	8b. Total Dose:																				
	<input type="checkbox"/> Not Available	<input type="text"/> mGy <input type="checkbox"/> Not Available																				
9a. Contrast type :	<input type="radio"/> Ionic <input type="radio"/> Non-Ionic <input checked="" type="radio"/> HEXABRIX 320 <input type="radio"/> IOPAMIRO 300 <input type="radio"/> ULTRAVIST 370 <input type="radio"/> VISIPAQUE 320 <input type="radio"/> Other,specify: _____ <input type="radio"/> Other,specify: _____ <input type="radio"/> IOPAMIRO 370 <input type="radio"/> XENETIX 300 <input type="radio"/> OMNIPAQUE 300 <input type="radio"/> ULTRAVIST 300 <input type="radio"/> XENETIX 350 <input type="radio"/> OMNIPAQUE 350																					
9b. Contrast Volume :	<input type="text"/> ml <input type="checkbox"/> Not Available																					

a. Patient Name :		b. Centre Code:	
c. Identification Card Number :		d. Local RN No (if applicable):	

Instructions: 1. For skip lesion, please document as different lesions. Please check one lesion code per page (i.e.: for 2 lesions, please use 2 separate Section 7).  
 2. Documented Ramus Intermediate Lesions as lesion code 15.  
 3. For long lesion, please document as one single lesion.  
 4. Please document intervention involves sidebranch as a second lesion.

## SECTION 7: PCI PROCEDURE DETAILS

1. Total no. of lesion treated :

NATIVE	GRAFT																		
<p>Coronary segment number, lesion codes 1-17</p>	<p>Graft PCI lesion codes 18-25. Also record grafted native coronary vessel</p> <table border="1"> <thead> <tr> <th>Graft</th> <th>Target Vessel</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> 18 LIMA</td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> 19 RIMA</td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> 20 SVG 1</td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> 21 SVG 2</td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> 22 SVG 3</td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> 23 RAD 1</td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> 24 RAD 2</td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> 25 RAD 3</td> <td><input type="checkbox"/></td> </tr> </tbody> </table>	Graft	Target Vessel	<input type="checkbox"/> 18 LIMA	<input type="checkbox"/>	<input type="checkbox"/> 19 RIMA	<input type="checkbox"/>	<input type="checkbox"/> 20 SVG 1	<input type="checkbox"/>	<input type="checkbox"/> 21 SVG 2	<input type="checkbox"/>	<input type="checkbox"/> 22 SVG 3	<input type="checkbox"/>	<input type="checkbox"/> 23 RAD 1	<input type="checkbox"/>	<input type="checkbox"/> 24 RAD 2	<input type="checkbox"/>	<input type="checkbox"/> 25 RAD 3	<input type="checkbox"/>
Graft	Target Vessel																		
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<input type="checkbox"/> 23 RAD 1	<input type="checkbox"/>																		
<input type="checkbox"/> 24 RAD 2	<input type="checkbox"/>																		
<input type="checkbox"/> 25 RAD 3	<input type="checkbox"/>																		

Complete for all intervene. Complete and attach additional lesion column if necessary.

2. Lesion Code: * (1-25)	<input type="text"/> to <input type="text"/> (if applicable)																																										
3. Coronary lesion: *	<input type="radio"/> De novo <input type="radio"/> Stent thrombosis → a. Type: <input type="radio"/> Acute <input type="radio"/> Late <input type="radio"/> Sub acute <input type="radio"/> Very late <input type="radio"/> Restenosis (No prior stent) <input type="radio"/> In stent restenosis → b. Prior stent type: <input type="radio"/> DES <input type="radio"/> BMS <input type="radio"/> Others _____																																										
4. Lesion type: *	<input type="radio"/> A <input type="radio"/> B1 <input type="radio"/> B2 <input type="radio"/> C 5. Location in graft: (complete for graft PCI only) <input type="radio"/> Ostial <input type="radio"/> Proximal <input type="radio"/> Mid <input type="radio"/> Distal <input type="radio"/> Native <input type="radio"/> Anastomosis																																										
6. Lesion description: *	<input type="checkbox"/> Ostial <input type="checkbox"/> Total Occlusion <input type="checkbox"/> CTO > 3mo <input type="checkbox"/> Thrombus <input type="checkbox"/> Not Applicable <input type="checkbox"/> Bifurcation → a) Medina Classification: i) MB prox.: <input type="text"/> (autofill) <input type="radio"/> 0 <input type="radio"/> 1 ii) MB dist.: <input type="text"/> (autofill) <input type="radio"/> 0 <input type="radio"/> 1 iii) SB: <input type="text"/> (autofill) <input type="radio"/> 0 <input type="radio"/> 1 <small>(if intervention involved sidebranch, please record as a second lesion)</small>																																										
7. Pre-stenosis % :	<input type="text"/> TIMI Flow (pre): → <input type="radio"/> TIMI-0 <input type="radio"/> TIMI-1 <input type="radio"/> TIMI-2 <input type="radio"/> TIMI-3																																										
8. Post-stenosis % :	<input type="text"/> TIMI Flow (post): → <input type="radio"/> TIMI-0 <input type="radio"/> TIMI-1 <input type="radio"/> TIMI-2 <input type="radio"/> TIMI-3																																										
9. Estimated lesion length: mm	10. Acute closure: * <input type="radio"/> Yes <input type="radio"/> No																																										
11. Dissection: *	<input type="radio"/> Yes <input type="radio"/> No 12. Perforation: * <input type="radio"/> Yes <input type="radio"/> No																																										
13. No Reflow: *	<input type="radio"/> Yes → <input type="radio"/> Transient <input type="radio"/> Persistent <input type="radio"/> No 14. Lesion Result: * <input type="radio"/> Successful <input type="radio"/> Unsuccessful																																										
15. Stent details for lesion: *	<table border="1"> <thead> <tr> <th>a. Stent Code</th> <th>b. Length (mm)</th> <th>c. Diameter (mm)</th> <th>a. Stent Code</th> <th>b. Length (mm)</th> <th>c. Diameter (mm)</th> </tr> </thead> <tbody> <tr> <td>#1 <input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td>#4 <input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td colspan="3">Others, specify: _____</td> <td colspan="3">Others, specify: _____</td> </tr> <tr> <td>#2 <input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td>#5 <input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td colspan="3">Others, specify: _____</td> <td colspan="3">Others, specify: _____</td> </tr> <tr> <td>#3 <input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td>#6 <input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td colspan="3">Others, specify: _____</td> <td colspan="3">Others, specify: _____</td> </tr> </tbody> </table>	a. Stent Code	b. Length (mm)	c. Diameter (mm)	a. Stent Code	b. Length (mm)	c. Diameter (mm)	#1 <input type="text"/>	<input type="text"/>	<input type="text"/>	#4 <input type="text"/>	<input type="text"/>	<input type="text"/>	Others, specify: _____			Others, specify: _____			#2 <input type="text"/>	<input type="text"/>	<input type="text"/>	#5 <input type="text"/>	<input type="text"/>	<input type="text"/>	Others, specify: _____			Others, specify: _____			#3 <input type="text"/>	<input type="text"/>	<input type="text"/>	#6 <input type="text"/>	<input type="text"/>	<input type="text"/>	Others, specify: _____			Others, specify: _____		
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Others, specify: _____			Others, specify: _____																																								
16. Maximum balloon size / pressure:	a) Maximum balloon size used: <input type="text"/> mm b) Maximum stent / balloon deploy pressure: <input type="text"/> atm 17. Intracoronary devices used: <input type="checkbox"/> Aspiration <input type="checkbox"/> Cutting balloon <input type="checkbox"/> IVUS <input type="checkbox"/> Balloon only <input type="checkbox"/> DES <input type="checkbox"/> Rotablator <input type="checkbox"/> Bare Metal Stent <input type="checkbox"/> Flowwire <input type="checkbox"/> Other, specify: _____ <input type="checkbox"/> Drug Eluting Balloon <input type="checkbox"/> Distal Embolic Protection → <input type="radio"/> Filter <input type="radio"/> Balloon <input type="radio"/> Proximal																																										
	18. Direct stenting:- * <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not applicable																																										

a. Patient Name :		b. Centre Code:	
c. Identification Card Number :		d. Local RN No (if applicable):	

### SECTION 8 : PROCEDURAL COMPLICATION

1. Outcome:	a. <u>Periprocedural MI</u>	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Available											
	b. <u>Emergency Reintervention / PCI:</u>	<input type="radio"/> Yes <input type="radio"/> No <div style="border: 1px dashed black; padding: 5px;"> <table border="1"> <tr> <td>i) Stent thrombosis:</td> <td><input type="radio"/> Yes <input type="radio"/> No</td> </tr> <tr> <td>ii) Dissection:</td> <td><input type="radio"/> Yes <input type="radio"/> No</td> </tr> <tr> <td>iii) Perforation:</td> <td><input type="radio"/> Yes <input type="radio"/> No</td> </tr> <tr> <td>iv) Others, specify: _____</td> <td><input type="radio"/> Yes <input type="radio"/> No</td> </tr> </table> </div>	i) Stent thrombosis:	<input type="radio"/> Yes <input type="radio"/> No	ii) Dissection:	<input type="radio"/> Yes <input type="radio"/> No	iii) Perforation:	<input type="radio"/> Yes <input type="radio"/> No	iv) Others, specify: _____	<input type="radio"/> Yes <input type="radio"/> No			
	i) Stent thrombosis:	<input type="radio"/> Yes <input type="radio"/> No											
	ii) Dissection:	<input type="radio"/> Yes <input type="radio"/> No											
	iii) Perforation:	<input type="radio"/> Yes <input type="radio"/> No											
	iv) Others, specify: _____	<input type="radio"/> Yes <input type="radio"/> No											
	c. <u>Bail-out CABG</u>	<input type="radio"/> Yes <input type="radio"/> No											
	d. <u>Cardiogenic shock (after procedure)</u>	<input type="radio"/> Yes <input type="radio"/> No											
	e. <u>Arrhythmia (VT/VF/Brady)</u>	<input type="radio"/> Yes <input type="radio"/> No											
	f. <u>TIA / Stroke</u>	<input type="radio"/> Yes <input type="radio"/> No											
g. <u>Tamponade</u>	<input type="radio"/> Yes <input type="radio"/> No												
h. <u>Contrast reaction</u>	<input type="radio"/> Yes <input type="radio"/> No												
i. <u>New onset / worsened heart failure</u>	<input type="radio"/> Yes <input type="radio"/> No												
j. <u>New renal impairment</u>	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Available												
2. Vascular Complications:	k. Max post procedural rise in creatinine	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Available <div style="border: 1px solid black; padding: 5px;"> <table> <tr> <td>a)</td> <td>b) Date (dd/mm/yy):</td> <td>c) Autocalculate: (days)</td> </tr> <tr> <td><div style="border: 1px solid black; width: 40px; height: 20px; display: flex; align-items: center; justify-content: center;"> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> </div> </td> <td>micromol/L</td> <td><div style="border: 1px solid black; width: 40px; height: 20px; display: flex; align-items: center; justify-content: center;"> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> </div> </td> <td>/</td> <td><div style="border: 1px solid black; width: 40px; height: 20px; display: flex; align-items: center; justify-content: center;"> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> </div> </td> <td>/</td> <td><div style="border: 1px solid black; width: 40px; height: 20px; display: flex; align-items: center; justify-content: center;"> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> </div> </td> <td><div style="border: 1px solid black; width: 40px; height: 20px; display: flex; align-items: center; justify-content: center;"> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> </div> </td> </tr> </table> </div>	a)	b) Date (dd/mm/yy):	c) Autocalculate: (days)	<div style="border: 1px solid black; width: 40px; height: 20px; display: flex; align-items: center; justify-content: center;"> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> </div>	micromol/L	<div style="border: 1px solid black; width: 40px; height: 20px; display: flex; align-items: center; justify-content: center;"> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> </div>	/	<div style="border: 1px solid black; width: 40px; height: 20px; display: flex; align-items: center; justify-content: center;"> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> </div>	/	<div style="border: 1px solid black; width: 40px; height: 20px; display: flex; align-items: center; justify-content: center;"> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> </div>	<div style="border: 1px solid black; width: 40px; height: 20px; display: flex; align-items: center; justify-content: center;"> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> <div style="width: 10px; height: 10px; border: 1px solid black;"></div> </div>
	a)	b) Date (dd/mm/yy):	c) Autocalculate: (days)										
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	a. <u>Bleeding</u>	<input type="radio"/> Yes <input type="radio"/> No <div style="border: 1px solid black; padding: 5px;"> <input type="radio"/> Major (Any intracranial bleed or other bleeding ≥ 5g/dL Hb drop)  <input type="radio"/> Minor (Non-CNS bleeding with 3-5g/dL Hb drop)  <input type="radio"/> Minimal (Non-CNS bleeding, non-overt bleeding, &lt; 3g/dL Hb drop)                      Bleeding site:  <input type="radio"/> Retroperitoneal <input type="radio"/> Others, specify: _____  <input type="radio"/> Percutaneous entry site                 </div>											
	b. Access site occlusion	<input type="radio"/> Yes <input type="radio"/> No											
	c. Loss of distal pulse	<input type="radio"/> Yes <input type="radio"/> No											
d. Dissection	<input type="radio"/> Yes <input type="radio"/> No												
e. Pseudoaneurysm	<input type="radio"/> Yes <input type="radio"/> No <div style="border: 1px solid black; padding: 5px;"> <input type="radio"/> Ultrasound compression <input type="radio"/> Others, specify: _____  <input type="radio"/> Surgery                 </div>												

### SECTION 9 : OUTCOME AT DISCHARGE

1. Outcome:	<input type="radio"/> Alive	→	<u>a) Date of Discharge (dd/mm/yy):</u> <div style="border: 1px solid black; width: 60px; height: 20px; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; border: 1px solid black;"></div> </div>																																				
	<input type="radio"/> Death	→	<u>b) Medication:</u> <table border="1"> <thead> <tr> <th></th> <th>Yes</th> <th>No</th> <th></th> <th>Yes</th> <th>No</th> </tr> </thead> <tbody> <tr> <td>Aspirin</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>Ace Inhibitor</td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td>Clopidogrel</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>ARB</td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td>Ticlodipine</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>Warfarin</td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td>Statin</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>Others, specify: _____</td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td>Beta blocker</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Yes	No		Yes	No	Aspirin	<input type="radio"/>	<input type="radio"/>	Ace Inhibitor	<input type="radio"/>	<input type="radio"/>	Clopidogrel	<input type="radio"/>	<input type="radio"/>	ARB	<input type="radio"/>	<input type="radio"/>	Ticlodipine	<input type="radio"/>	<input type="radio"/>	Warfarin	<input type="radio"/>	<input type="radio"/>	Statin	<input type="radio"/>	<input type="radio"/>	Others, specify: _____	<input type="radio"/>	<input type="radio"/>	Beta blocker	<input type="radio"/>	<input type="radio"/>			
				Yes	No		Yes	No																															
			Aspirin	<input type="radio"/>	<input type="radio"/>	Ace Inhibitor	<input type="radio"/>	<input type="radio"/>																															
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Statin	<input type="radio"/>	<input type="radio"/>	Others, specify: _____	<input type="radio"/>	<input type="radio"/>																																		
Beta blocker	<input type="radio"/>	<input type="radio"/>																																					
<u>a) Date of Death (dd/mm/yy):</u> <div style="border: 1px solid black; width: 60px; height: 20px; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; border: 1px solid black;"></div> </div>																																							
			<u>b) Primary cause of death:</u> <table border="1"> <tbody> <tr> <td><input type="radio"/> Cardiac</td> <td><input type="radio"/> Renal</td> <td><input type="radio"/> Others, specify: _____</td> </tr> <tr> <td><input type="radio"/> Infection</td> <td><input type="radio"/> Neurological</td> <td></td> </tr> <tr> <td><input type="radio"/> Vascular</td> <td><input type="radio"/> Pulmonary</td> <td></td> </tr> </tbody> </table>	<input type="radio"/> Cardiac	<input type="radio"/> Renal	<input type="radio"/> Others, specify: _____	<input type="radio"/> Infection	<input type="radio"/> Neurological		<input type="radio"/> Vascular	<input type="radio"/> Pulmonary																												
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<input type="radio"/> Vascular	<input type="radio"/> Pulmonary																																						
			<u>c) Location of death:</u> <table border="1"> <tbody> <tr> <td><input type="radio"/> In Lab</td> <td><input type="radio"/> Out of Lab</td> </tr> </tbody> </table>	<input type="radio"/> In Lab	<input type="radio"/> Out of Lab																																		
<input type="radio"/> In Lab	<input type="radio"/> Out of Lab																																						
<input type="radio"/> Transferred to other centre:	→	<u>a) Date of transfer (dd/mm/yy):</u> <div style="border: 1px solid black; width: 60px; height: 20px; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; border: 1px solid black;"></div> <div style="width: 15px; height: 15px; border: 1px solid black;"></div> </div>																																					
		<u>b) Name of centre:</u> _____																																					

# NATIONAL CARDIOVASCULAR DISEASE DATABASE - PCI REGISTRY FOLLOW UP AT 30 DAYS

**Instruction:** This form is to be completed at patient follow up **after 30 days of 1st admission**. Following performed by telephone interview. Where check boxes ☐ are provided, check (✓) one or more boxes. Where radio buttons ☐ are provided, check (✓) one box only.

For NCVD Use only:

ID:

Centre:

<b>Ai. Name of Reporting centre:</b>			<b>Aii. Or Reporting centre code:</b>	
<b>B. Patient Name :</b>				
<b>C. Identification Card Number :</b>	MyKad / MyKid:	<input type="text"/>	-	<input type="text"/>
	Other ID document No:	<input type="text"/>	→	Specify type (eg. passport, armed force ID): <input type="text"/>
<b>D. Date of Follow Up:</b> (dd/mm/yy)	<input type="text"/> / <input type="text"/> / <input type="text"/>			

## SECTION 1 : OUTCOME

<b>1. Outcome:</b> *	<input type="radio"/> Alive →	<b>b) Medication:</b> <table border="1"> <thead> <tr> <th></th> <th>Yes</th> <th>No</th> <th>Unknown</th> </tr> </thead> <tbody> <tr> <td>Aspirin</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td>Clopidogrel</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td>Ticlopidine</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td>Others, specify:</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> </tbody> </table>		Yes	No	Unknown	Aspirin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Clopidogrel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Ticlopidine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Others, specify:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		Yes	No	Unknown																		
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	Ticlopidine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																		
Others, specify:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																			
<input type="radio"/> Death →	<b>* a) Date of Death (dd/mm/yy):</b> <input type="text"/> / <input type="text"/> / <input type="text"/> <b>b) Cause of death:</b> <table border="1"> <tbody> <tr> <td><input type="radio"/> Cardiac</td> </tr> <tr> <td><input type="radio"/> Non cardiac</td> </tr> <tr> <td><input type="radio"/> Others, specify: <input type="text"/></td> </tr> </tbody> </table>	<input type="radio"/> Cardiac	<input type="radio"/> Non cardiac	<input type="radio"/> Others, specify: <input type="text"/>																		
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<input type="radio"/> Others, specify: <input type="text"/>																						
<input type="radio"/> Transferred to other centre: →	<b>* a) Date of transfer (dd/mm/yy):</b> <input type="text"/> / <input type="text"/> / <input type="text"/> <b>b) Name of centre:</b> <input type="text"/>																					
<input type="radio"/> Lost to follow up →	<b>* a) Date of last follow up (dd/mm/yy):</b> <input type="text"/> / <input type="text"/> / <input type="text"/>																					
<b>2. Smoking Status:</b>	<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																					
<b>3. Readmission:</b> *	<input type="radio"/> Yes → <input type="radio"/> No	<b>a) Date of readmission (dd/mm/yy):</b> <input type="text"/> / <input type="text"/> / <input type="text"/> <b>b) Readmission location:</b> <input type="text"/> <b>c) Readmission Reason:</b> → <table border="1"> <tbody> <tr> <td><input type="radio"/> CHF</td> <td><input type="radio"/> Arrhythmia</td> <td><input type="radio"/> CABG</td> </tr> <tr> <td><input type="radio"/> AMI</td> <td><input type="radio"/> PCI – planned</td> <td><input type="radio"/> Others, specify</td> </tr> <tr> <td><input type="radio"/> Recurrent angina</td> <td><input type="radio"/> PCI – unplanned</td> <td><input type="text"/></td> </tr> </tbody> </table>	<input type="radio"/> CHF	<input type="radio"/> Arrhythmia	<input type="radio"/> CABG	<input type="radio"/> AMI	<input type="radio"/> PCI – planned	<input type="radio"/> Others, specify	<input type="radio"/> Recurrent angina	<input type="radio"/> PCI – unplanned	<input type="text"/>											
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## NCVD-PCI REGISTRY

### STENT LIST (JULY 2013)

<b>Drug-Eluting Stent (DES)</b>	Beacon	Janus
	Co Star	Taxus Liberte
	Coroflex Please	Xience
	Cypher	Cre8
	Endeavor	Others – <i>(for Other DES not listed here)</i>
	Infinium	

<b>Bare Metal Stent (BMS)</b>	ACS Pixel	Chrono	Liberte
	Atrium Flyer	Constant	Micro Driver
	Avantec Duraflex	Coroflex Blue	Multi-Link Frontier
	AVE (Non-driver)	Driver	Multi-Link Mini Vision
	BE 2	Express	Multi-Link Vision
	Biodiv SV	Flexmaster F1	Others – <i>(for Other BMS not listed here)</i>
	BX Velocity	Lekton Motion	

<b>Bio-absorbable Stent</b>	Biotronik
	Others – <i>(for Other Bio-absorbable Stent not listed here)</i>

<b>Antibody coated Stent</b>	Genous
	Others – <i>(for Other Antibody coated stent not listed here)</i>

<b>Drug Eluting Balloon Stent</b>	Dior	Protégé	Others - <i>(for Other DEB not listed here)</i>
	Pantera Lux	SeQuent Please	
	Pioneer	Danubio	

<b>Bifurcated Stent</b>	Axxess	Track	Others - <i>(for Other BS not listed here)</i>
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<b>Covered Stent</b>	Jostent Graft
	Others – <i>(for Other Covered Stent not listed here)</i>

<b>Combo Stent</b>	DES + Antibody coated
	BMS + DEB
	Others - <i>(for Other Combo Stent not listed here)</i>

<b>Others</b>	<i>(for Other Type of stent not listed here)</i>
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