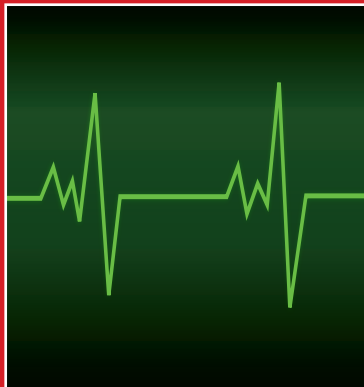
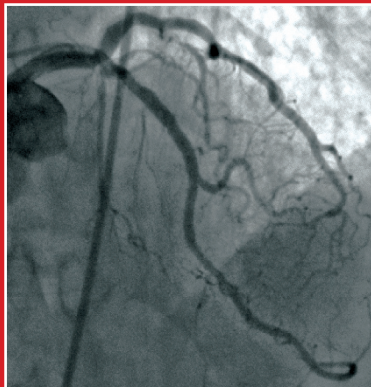


*National Cardiovascular Disease Database*

# ANNUAL REPORT OF THE NCVD - PCI REGISTRY *year 2007-2009*



**Editors:**

**Wan Azman Wan Ahmad**

**Sim Kui-Hian**



MOH/S/CRC/20.11 (AR)

**NATIONAL CARDIOVASCULAR DISEASE DATABASE  
(NCVD)**

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

**2007 - 2009**

**Editors:**

**Wan Azman Wan Ahmad  
Sim Kui-Hian**

**A publication of the  
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- Clinical Research Centre (CRC), Malaysia
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- The members of various expert panels
- Our source data providers
- Focal Imagery Photography ([www.focalimagery.carbonmade.com](http://www.focalimagery.carbonmade.com))

## **MESSAGE FROM DIRECTOR-GENERAL OF HEALTH MALAYSIA**

Since the introduction of percutaneous coronary intervention (PCI) registry in Malaysia in 1983, PCI has been extensively practised and developed, keeping pace with advanced technologies worldwide.

In recognition of the importance of a nation-wide record for PCI, the NCVD-PCI registry was introduced and the first report was published in 2009, which covered comprehensive information including patient characteristics, lesion, procedural details and outcome.

As a continuation of their sincere effort, the National Cardiovascular Disease Database team has now published the PCI registry report for the year 2007 to 2009. The current data provide more comprehensive information regarding the practice of PCI in Malaysia. It will undoubtedly contribute to the future planning and funding of cardiac care services.

I would like to express my appreciation to the National Cardiovascular Disease Database team for the production and publication of the PCI registry report 2007-2009. I would like to thank the Clinical Research Centre, National Institute of Health, Malaysia and the National Heart Association of Malaysia for co-ordinating and supporting this registry.

I hope this report will help to improve the over-all cardiac service and research in Malaysia.

Thank you.

**Dato' Dr. Hasan Bin Abdul Rahman**  
Director-General of Health Malaysia  
Ministry of Health Malaysia



## **PREFACE**

The first NCVD-PCI (National Cardiovascular Disease Database-Percutaneous Coronary Intervention) report was published in 2009, which covered information regarding the practice of PCI in Malaysia. The report became a useful resource for senior and junior researchers and writers publishing in this area.

We are glad to declare that the NCVD team now presents PCI the registry report for the year 2007 to 2009, which provides more comprehensive and comparative analysis of data. More than 10,000 patients data and 15, 498 lesions treated are reported in this registry. This report provides the benchmark for our PCI practice and identifies areas for improvement. Together with the Malaysians Clinical Practice Guidelines Management of Percutaneous Coronary Intervention (PCI) 2009, we will be well-placed to improve our standard of care for our patients with coronary heart disease.

We would like to express our sincere thanks to the Clinical Research Centre (CRC) network of Ministry of Health, Malaysia and the National Heart Association of Malaysia for the financial support. Our heartfelt acknowledgement to all investigators, research officers, doctors, nurses, paramedical staff, statisticians and last, but not the least, all the dedicated members of writing committee who have spent hours of their time, intellect and energy in producing this report.

We are looking forward to more participation from researchers, investigators, doctors, and medical students, and we hope to see even more research publications from them as a result of this report.

Thank you.

**Prof Dr Sim Kui-Hian**  
Chairman  
NCVD Governance Board  
President  
National Heart Association of Malaysia

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

## FOREWORD

In comparison to the 1st earlier NCVD-PCI Report 2007 published in 2009, in NCVD-PCI Report 2007 - 2009 we now have a three year database. The number of PCI procedures are more and we can now make some comparisons of the practice and outcome over the years studied. I stand by what I wrote previously that I look forward to more publications in the future to allow us to see the trends in the patient population, differences in the devices used and our PCI outcomes.

It is of some concern to note that close to a quarter of our patients are below the age of 50 years and the mean age is lower than what is seen in the West. Our diabetic population has been consistently higher, hovering at about 46%. It is good to know, however, that our complication rate is persistently low, especially with the in-hospital mortality of about 1% only.

I am happy to note an increase in the number of participating centres from eight (8) in 2007 to 11 in 2009. They have added to the data collection that we had. I would also like to encourage all centres to maintain their registry and keep sending the data on-line. The trend that we are seeing is the improved rate of follow-up data over 6 and 12 months following PCI. This is important. Outcome over at least the medium term allows us to analyse the durability of this modality of treatment.

I would like to thank Prof Dr Wan Azman and his team for the excellent undertaking; and also to Dr Liew Houn Bang (secretary of this registry), Ms Gunavathy Selvaraj and Ms Noor Amirah Muhamad for continuing to manage the registry and to all the participating centres and their staff for sending in the data.

Please do keep up the good work!

Thank you.

**Dato' Dr Rosli Mohd Ali**

Chairman

NCVD-Percutaneous Coronary Intervention (PCI) Registry

## NOTE FROM THE WRITING COMMITTEE CHAIRMAN

It has been thirty years since Andreas Gruentzig, acclaimed as the father of Interventional Cardiology, performed the first balloon angioplasty in Zurich, Switzerland. Six years later, Associate Professor Dr. Singham and Dr. Anuar Masduki performed the first coronary angioplasty in 1983 in Malaysia. Since then, percutaneous coronary intervention (PCI) has expanded rapidly at the Institut Jantung Negara, Ministry of Health Hospitals, university hospitals and private hospitals.

The annual report of NCVD-PCI registry for the year 2007 was published in 2009. The remarkable points in first annual NCVD-PCI report included the young age of patients, high prevalence of cardiovascular risk factors, prolonged door-to-balloon time, good practice of pharmacotherapy and good clinical outcome.

We have now published the NCVD-PCI registry report 2007-2009, which provides a more comprehensive and logical analysis of data. This report is divided into five chapters and important summary points have been highlighted after each chapter. We believe that this report will provide valuable information to minimize the gap that exists between clinical guidelines and real practice.

I would like to acknowledge all those who have contributed to this report through their hard work, perseverance and dedication.

Thank you.

**Prof. Dr. Wan Azman Wan Ahmad**

Chairman

NCVD Medical Writing and Publication Committee



## ABBREVIATIONS

ACS	Acute Coronary Syndrome
AMI	Acute Myocardial Infarction
BMI	Body Mass Index
BMS	Bare Metal Stent
CABG	Coronary Artery Bypass Graft
CAD	Coronary Artery Disease
CCU	Coronary Care Unit
CHF	Chronic Heart Failure
CKD	Chronic Kidney Disease
CRC	Clinical Research Centre
CRF	Case Report Form
CTO	Chronic Total Occlusion
CV	Cardiovascular
DBMS	Database Management System
DES	Drug Eluting Stent
EDC	Electronic Data Capture
EF	Ejection Fraction
GFR	Glomerular Filtration Rate
HDU	High Dependency Unit
ICL	Intervention Catheterisation Lab
ICT	Information and Communication Technology
ICU	Intensive Care Unit
ISR	In-Stent Restenosis
IT/IS	Information Technology and Information System
JPN	Jabatan Pendaftaran Negara
LIMA	Left Internal Mammary Artery Graft
LMS	Left Main Stem
MI	Myocardial Infarction
MOH	Ministry of Health
NCVD	National Cardiovascular Disease Database
NHAM	National Heart Association of Malaysia
NHEWS	National Healthcare Establishment and Workforce Survey
NMDS	National Medical Device Survey
NSTEMI	Non ST- Elevation Myocardial Infarction
OHA	Oral Hypoglycemic Agent
PCI	Percutaneous Coronary Intervention
RIMA	Right Internal Mammary Artery Graft
SAP	Statistical Analysis Plan
SD	Standard Deviation
SDP	Source Data Provider
STEMI	ST– Elevation Myocardial Infarction
TRI	TIMI Risk Index
WP	Wilayah Persekutuan

## NCVD-PCI REGISTRY

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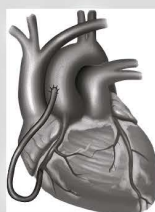
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## CHAPTER 1: CARDIAC SERVICES IN MALAYSIA

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Several studies have shown that patients with cardiac problems have improved outcomes if part of their care is provided by cardiologists.<sup>1-3</sup> In this chapter, a hospital was considered as providing cardiac services when there were either resident cardiologist(s) or visiting cardiologist(s) (regardless of the frequency of visits) within the establishment. Therefore, our data did not include hospitals offering basic cardiology services (e.g. exercise stress-test, echocardiogram) and cardiac care unit (CCU) managed by physicians. Meanwhile, "CCU services" was defined as having either dedicated CCU or combined ICU/CCU within a hospital offering care for cardiac patients. We have also excluded fellows and trainee cardiologists from being considered as consultant cardiologists and cardiac surgeons. Density for each indicator was calculated based on the Malaysian population data in 2009.

A total of 90 hospitals out of 341 surveyed provided cardiac services, equivalent to an overall density of 0.03 per 10000 population. This varied from 0.01 in Sabah and WP Labuan to 0.09 in WP Kuala Lumpur. Disproportionate distribution of cardiac services was apparent especially between West and East Malaysia and in West Malaysia among states in West Coast and East Coast (Table 1.1).

Fifty-one hospitals in Malaysia which offered cardiac services also provided CCU services with a general density of 0.02 hospital per 10000 population. The majority of these were private hospitals (64.7%). The highest density was observed in WP Kuala Lumpur (0.05 per 10000 population), in contrast to only 0.01 per 10000 in Kedah, Johor, Pahang, Sarawak and nil in Terengganu (Table 1.2). In these 51 hospitals, a total of 355 CCU beds were reported, of which 65.6% beds were found in private hospitals. The overall density was 0.13 bed per 10000 population. Highest density of bed was again in WP Kuala Lumpur at 0.56 bed per 10000 population (Table 1.3).

It should be noted that there were at least 21 hospitals with physician-run CCUs (data not shown) which were not included in Tables 10.2 and 10.3 as they did not fulfil the criteria of 'providing cardiac services'. An example is in the states of Terengganu where there were CCU services<sup>4</sup> but was reported as null as they were operated by physicians. In addition, some hospitals provided CCU services from mixed facilities (combinations of CCU, ICU, and HDU) which could have caused inaccuracy in the data. In 2007, a total of 73 dedicated CCUs were reported in Malaysia.<sup>4</sup>

A total of 51 out of the 90 hospitals offering cardiac services had catheterisation laboratory (cath lab) within their establishments, most of which were private hospitals. This was higher than that reported in 2007 (36 hospitals) by NMDS<sup>4</sup>. The ratio of cath lab service to 10000 population was 0.02. Among all states in Malaysia, the highest density was 0.06 for WP Kuala Lumpur (10 hospitals), Pulau Pinang (7 hospitals) and Melaka (3 hospitals) as opposed to the absence of catheterisation lab in Perlis and Terengganu (Table 1.4).



The NHEWS 2009 had identified 175 cardiologists throughout the country (0.06 per 10000 population). The highest density of cardiologists was found in WP Kuala Lumpur (0.30 per 10000 population), followed by Pulau Pinang (0.15) and Melaka (0.14). This reflected that the higher density of hospitals with cardiac services were located within these three areas. On the contrary, the lowest number of cardiologists was found in Perlis (0), followed by Negeri Sembilan (0.01 per 10000 population) (Table 1.5). Overall our density of cardiologists was much lower than that recommended by the British Cardiac Society (0.53 – 0.84 per 10000 population).<sup>5</sup> In comparison, numbers of cardiologists in developed countries were 0.18 per 10000 population in England (2005)<sup>5</sup>, 0.23 per 10000 population in Singapore (2006)<sup>6</sup> and 0.56 per 10000 population in US (2008).<sup>7</sup>

Similarly, the density of cardiac surgeons in Malaysia was 0.02 per 10000 population, which was about 3 times less than that in England (0.056 per 10000 population in 2009).<sup>8, 9</sup> This number also varied between different regions and states, with the highest numbers recorded in WP Kuala Lumpur (0.10 per 10000 population) and lowest in East Coast of West Malaysia and East Malaysia (0 – 0.01 per 10000 population) (Table 1.6).

In a nutshell, all five indicators described above clearly illustrate the concentration of cardiac services in the West Coast of Peninsular Malaysia where there are bigger cities and larger populations. Most of the services are dominated by the private healthcare service providers. The proposal to set up at least one heart centre for every state (except Perlis) will hopefully address this uneven distribution of cardiac services within the country by 2020. On the other hand, addressing the issue of reimbursement for academic and public cardiologists will perhaps prevent brain drain to the private sector. Producing an adequate number of well-trained cardiologists and cardiothoracic surgeons who will devote themselves to prevention, early accurate diagnosis, and cost-effective treatment of cardiovascular disease will hopefully eliminate arteriosclerotic cardiovascular disease and many of its deadly complications.

### Limitations

1. Hospitals with resident cardiologist(s) and visiting cardiologist(s) were reported together as providing “cardiac services” which might not reflect the actual extent of the service. Some visiting cardiologists could have been running only outpatient clinic and on a not-so-frequent basis (e.g. once in two months).
2. The survey did not differentiate dedicated CCUs with CCUs run in combination with ICUs and / or HDUs and did not include hospitals without consultant cardiologists, which could contribute to under-reporting of total CCU beds available in the country. Pediatric cardiologists were also not included and should be included in future reports as part of the cardiac service providers.



## Summary

1. There is an uneven distribution of cardiac services reported between regions and sectors.
2. Compared with developed countries, there is still much room for improvements in cardiac services in our country.
3. Timely establishment of new regional centres and intensifying training programmes are mandatory in view of the ever increasing disease burden.

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**Table 1.1 Number and Density of Hospitals Providing Cardiac Services in Malaysia by State and Sector, 2009**

State	Sector	Number	Per 10000 population
Malaysia	Public	21	-
Malaysia	Private	69	-
<b>Malaysia</b>	<b>Total</b>	<b>90</b>	<b>0.03</b>
Perlis	Public	1	-
Perlis	Private	0	-
<b>Perlis</b>	<b>Total</b>	<b>1</b>	<b>0.04</b>
Kedah	Public	1	-
Kedah	Private	5	-
<b>Kedah</b>	<b>Total</b>	<b>6</b>	<b>0.03</b>
Pulau Pinang	Public	1	-
Pulau Pinang	Private	8	-
<b>Pulau Pinang</b>	<b>Total</b>	<b>9</b>	<b>0.06</b>
Perak	Public	2	-
Perak	Private	5	-
<b>Perak</b>	<b>Total</b>	<b>7</b>	<b>0.03</b>
Selangor & WP Putrajaya	Public	2	-
Selangor & WP Putrajaya	Private	13	-
<b>Selangor &amp; WP Putrajaya</b>	<b>Total</b>	<b>15</b>	<b>0.03</b>
WP Kuala Lumpur	Public	3	-
WP Kuala Lumpur	Private	13	-
<b>WP Kuala Lumpur</b>	<b>Total</b>	<b>16</b>	<b>0.09</b>
Negeri Sembilan	Public	1	-
Negeri Sembilan	Private	3	-
<b>Negeri Sembilan</b>	<b>Total</b>	<b>4</b>	<b>0.04</b>
Melaka	Public	1	-
Melaka	Private	4	-
<b>Melaka</b>	<b>Total</b>	<b>5</b>	<b>0.07</b>
Johor	Public	3	-
Johor	Private	7	-
<b>Johor</b>	<b>Total</b>	<b>10</b>	<b>0.03</b>
Pahang	Public	1	-
Pahang	Private	2	-
<b>Pahang</b>	<b>Total</b>	<b>3</b>	<b>0.02</b>
Terengganu	Public	1	-
Terengganu	Private	1	-
<b>Terengganu</b>	<b>Total</b>	<b>2</b>	<b>0.02</b>
Kelantan	Public	2	-
Kelantan	Private	1	-
<b>Kelantan</b>	<b>Total</b>	<b>3</b>	<b>0.02</b>
Sabah & WP Labuan	Public	1	-
Sabah & WP Labuan	Private	2	-
<b>Sabah &amp; WP Labuan</b>	<b>Total</b>	<b>3</b>	<b>0.01</b>
Sarawak	Public	1	-
Sarawak	Private	5	-
<b>Sarawak</b>	<b>Total</b>	<b>6</b>	<b>0.02</b>

**Table 1.2 Number and Density of CCUs in Hospitals with Cardiac Services in Malaysia by State and Sector, 2009**

State	Sector	Number	Per 10000 population
Malaysia	Public	18	-
Malaysia	Private	33	-
<b>Malaysia</b>	<b>Total</b>	<b>51</b>	<b>0.02</b>
Perlis	Public	1	-
Perlis	Private	0	-
<b>Perlis</b>	<b>Total</b>	<b>1</b>	<b>0.04</b>
Kedah	Public	1	-
Kedah	Private	0	-
<b>Kedah</b>	<b>Total</b>	<b>1</b>	<b>0.01</b>
Pulau Pinang	Public	1	-
Pulau Pinang	Private	6	-
<b>Pulau Pinang</b>	<b>Total</b>	<b>7</b>	<b>0.04</b>
Perak	Public	1	-
Perak	Private	4	-
<b>Perak</b>	<b>Total</b>	<b>5</b>	<b>0.02</b>
Selangor & WP Putrajaya	Public	2	-
Selangor & WP Putrajaya	Private	7	-
<b>Selangor &amp; WP Putrajaya</b>	<b>Total</b>	<b>9</b>	<b>0.02</b>
WP Kuala Lumpur	Public	3	-
WP Kuala Lumpur	Private	6	-
<b>WP Kuala Lumpur</b>	<b>Total</b>	<b>9</b>	<b>0.05</b>
Negeri Sembilan	Public	1	-
Negeri Sembilan	Private	1	-
<b>Negeri Sembilan</b>	<b>Total</b>	<b>2</b>	<b>0.02</b>
Melaka	Public	1	-
Melaka	Private	2	-
<b>Melaka</b>	<b>Total</b>	<b>3</b>	<b>0.04</b>
Johor	Public	2	-
Johor	Private	2	-
<b>Johor</b>	<b>Total</b>	<b>4</b>	<b>0.01</b>
Pahang	Public	1	-
Pahang	Private	1	-
<b>Pahang</b>	<b>Total</b>	<b>2</b>	<b>0.01</b>
Terengganu	Public	0	-
Terengganu	Private	0	-
<b>Terengganu</b>	<b>Total</b>	<b>0</b>	<b>0</b>
Kelantan	Public	2	-
Kelantan	Private	1	-
<b>Kelantan</b>	<b>Total</b>	<b>3</b>	<b>0.02</b>
Sabah & WP Labuan	Public	1	-
Sabah & WP Labuan	Private	0	-
<b>Sabah &amp; WP Labuan</b>	<b>Total</b>	<b>1</b>	<b>0</b>
Sarawak	Public	1	-
Sarawak	Private	3	-
<b>Sarawak</b>	<b>Total</b>	<b>4</b>	<b>0.02</b>

**Table 1.3: Number and Density of CCU Beds in Hospital with Cardiac Services in Malaysia by State and Sector, 2009**

State	Sector	Number	Per 10,000 population
Malaysia	Public	122	-
Malaysia	Private	233	-
<b>Malaysia</b>	<b>Total</b>	<b>355</b>	<b>0.13</b>
Perlis	Public	4	-
Perlis	Private	0	-
<b>Perlis</b>	<b>Total</b>	<b>4</b>	<b>0.17</b>
Kedah	Public	8	-
Kedah	Private	0	-
<b>Kedah</b>	<b>Total</b>	<b>8</b>	<b>0.04</b>
Pulau Pinang	Public	7	-
Pulau Pinang	Private	50	-
<b>Pulau Pinang</b>	<b>Total</b>	<b>57</b>	<b>0.36</b>
Perak	Public	8	-
Perak	Private	15	-
<b>Perak</b>	<b>Total</b>	<b>23</b>	<b>0.09</b>
Selangor & WP Putrajaya	Public	17	-
Selangor & WP Putrajaya	Private	54	-
<b>Selangor &amp; WP Putrajaya</b>	<b>Total</b>	<b>71</b>	<b>0.14</b>
WP Kuala Lumpur	Public	22	-
WP Kuala Lumpur	Private	73	-
<b>WP Kuala Lumpur</b>	<b>Total</b>	<b>95</b>	<b>0.56</b>
Negeri Sembilan	Public	8	-
Negeri Sembilan	Private	3	-
<b>Negeri Sembilan</b>	<b>Total</b>	<b>11</b>	<b>0.11</b>
Melaka	Public	6	-
Melaka	Private	13	-
<b>Melaka</b>	<b>Total</b>	<b>19</b>	<b>0.25</b>
Johor	Public	11	-
Johor	Private	6	-
<b>Johor</b>	<b>Total</b>	<b>17</b>	<b>0.05</b>
Pahang	Public	6	-
Pahang	Private	5	-
<b>Pahang</b>	<b>Total</b>	<b>11</b>	<b>0.07</b>
Terengganu	Public	0	-
Terengganu	Private	0	-
<b>Terengganu</b>	<b>Total</b>	<b>0</b>	<b>0</b>
Kelantan	Public	15	-
Kelantan	Private	8	-
<b>Kelantan</b>	<b>Total</b>	<b>23</b>	<b>0.14</b>
Sabah & WP Labuan	Public	5	-
Sabah & WP Labuan	Private	0	-
<b>Sabah &amp; WP Labuan</b>	<b>Total</b>	<b>5</b>	<b>0.02</b>
Sarawak	Public	5	-
Sarawak	Private	6	-
<b>Sarawak</b>	<b>Total</b>	<b>11</b>	<b>0.04</b>



**Table 1.4: Number and Density of Hospital with Catheterisation Laboratory in Malaysia by State and Sector, 2009**

State	Sector	Number	Per 10,000 population
Malaysia	Public	9	-
Malaysia	Private	42	-
<b>Malaysia</b>	<b>Total</b>	<b>51</b>	<b>0.02</b>
Perlis	Public	0	-
Perlis	Private	0	-
<b>Perlis</b>	<b>Total</b>	<b>0</b>	<b>0</b>
Kedah	Public	1	-
Kedah	Private	3	-
<b>Kedah</b>	<b>Total</b>	<b>4</b>	<b>0.02</b>
Pulau Pinang	Public	1	-
Pulau Pinang	Private	6	-
<b>Pulau Pinang</b>	<b>Total</b>	<b>7</b>	<b>0.04</b>
Perak	Public	0	-
Perak	Private	3	-
<b>Perak</b>	<b>Total</b>	<b>3</b>	<b>0.01</b>
Selangor & WP Putrajaya	Public	1	-
Selangor & WP Putrajaya	Private	8	-
<b>Selangor &amp; WP Putrajaya</b>	<b>Total</b>	<b>9</b>	<b>0.02</b>
WP Kuala Lumpur	Public	2	-
WP Kuala Lumpur	Private	8	-
<b>WP Kuala Lumpur</b>	<b>Total</b>	<b>10</b>	<b>0.06</b>
Negeri Sembilan	Public	0	-
Negeri Sembilan	Private	1	-
<b>Negeri Sembilan</b>	<b>Total</b>	<b>1</b>	<b>0.01</b>
Melaka	Public	0	-
Melaka	Private	3	-
<b>Melaka</b>	<b>Total</b>	<b>3</b>	<b>0.04</b>
Johor	Public	1	-
Johor	Private	3	-
<b>Johor</b>	<b>Total</b>	<b>4</b>	<b>0.01</b>
Pahang	Public	1	-
Pahang	Private	1	-
<b>Pahang</b>	<b>Total</b>	<b>2</b>	<b>0.01</b>
Terengganu	Public	0	-
Terengganu	Private	0	-
<b>Terengganu</b>	<b>Total</b>	<b>0</b>	<b>0</b>
Kelantan	Public	1	-
Kelantan	Private	1	-
<b>Kelantan</b>	<b>Total</b>	<b>2</b>	<b>0.01</b>
Sabah & WP Labuan	Public	0	-
Sabah & WP Labuan	Private	1	-
<b>Sabah &amp; WP Labuan</b>	<b>Total</b>	<b>1</b>	<b>0</b>
Sarawak	Public	1	-
Sarawak	Private	4	-
<b>Sarawak</b>	<b>Total</b>	<b>5</b>	<b>0.02</b>

**Table 1.5 Number and Density of Cardiologist in Malaysia by State and Sector, 2009**

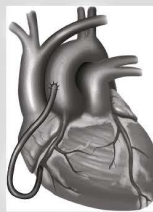
State	Sector	Number	Per 10,000 population
Malaysia	Public	32	-
Malaysia	Private	143	-
<b>Malaysia</b>	<b>Total</b>	<b>175</b>	<b>0.06</b>
Perlis	Public	0	-
Perlis	Private	0	-
<b>Perlis</b>	<b>Total</b>	<b>0</b>	<b>0</b>
Kedah	Public	1	-
Kedah	Private	3	-
<b>Kedah</b>	<b>Total</b>	<b>4</b>	<b>0.02</b>
Pulau Pinang	Public	5	-
Pulau Pinang	Private	19	-
<b>Pulau Pinang</b>	<b>Total</b>	<b>24</b>	<b>0.15</b>
Perak	Public	0	-
Perak	Private	11	-
<b>Perak</b>	<b>Total</b>	<b>11</b>	<b>0.05</b>
Selangor & WP Putrajaya	Public	6	-
Selangor & WP Putrajaya	Private	25	-
<b>Selangor &amp; WP Putrajaya</b>	<b>Total</b>	<b>31</b>	<b>0.06</b>
WP Kuala Lumpur	Public	8	-
WP Kuala Lumpur	Private	43	-
<b>WP Kuala Lumpur</b>	<b>Total</b>	<b>51</b>	<b>0.3</b>
Negeri Sembilan	Public	0	-
Negeri Sembilan	Private	1	-
<b>Negeri Sembilan</b>	<b>Total</b>	<b>1</b>	<b>0.01</b>
Melaka	Public	0	-
Melaka	Private	11	-
<b>Melaka</b>	<b>Total</b>	<b>11</b>	<b>0.14</b>
Johor	Public	3	-
Johor	Private	7	-
<b>Johor</b>	<b>Total</b>	<b>10</b>	<b>0.03</b>
Pahang	Public	1	-
Pahang	Private	2	-
<b>Pahang</b>	<b>Total</b>	<b>3</b>	<b>0.02</b>
Terengganu	Public	0	-
Terengganu	Private	2	-
<b>Terengganu</b>	<b>Total</b>	<b>2</b>	<b>0.02</b>
Kelantan	Public	3	-
Kelantan	Private	3	-
<b>Kelantan</b>	<b>Total</b>	<b>6</b>	<b>0.04</b>
Sabah & WP Labuan	Public	2	-
Sabah & WP Labuan	Private	4	-
<b>Sabah &amp; WP Labuan</b>	<b>Total</b>	<b>6</b>	<b>0.02</b>
Sarawak	Public	3	-
Sarawak	Private	12	-
<b>Sarawak</b>	<b>Total</b>	<b>15</b>	<b>0.06</b>



**Table 1.6 Number and Density of Cardiac Surgeons in Malaysia by State and Sector, 2009**

State	Sector	Number	Per 10,000 population
Malaysia	Public	18	-
Malaysia	Private	37	-
<b>Malaysia</b>	<b>Total</b>	<b>55</b>	<b>0.02</b>
Perlis	Public	0	-
Perlis	Private	0	-
<b>Perlis</b>	<b>Total</b>	<b>0</b>	<b>0</b>
Kedah	Public	0	-
Kedah	Private	0	-
<b>Kedah</b>	<b>Total</b>	<b>0</b>	<b>0</b>
Pulau Pinang	Public	3	-
Pulau Pinang	Private	6	-
<b>Pulau Pinang</b>	<b>Total</b>	<b>9</b>	<b>0.06</b>
Perak	Public	0	-
Perak	Private	1	-
<b>Perak</b>	<b>Total</b>	<b>1</b>	<b>0</b>
Selangor & WP Putrajaya	Public	6	-
Selangor & WP Putrajaya	Private	10	-
<b>Selangor &amp; WP Putrajaya</b>	<b>Total</b>	<b>16</b>	<b>0.03</b>
WP Kuala Lumpur	Public	3	-
WP Kuala Lumpur	Private	14	-
<b>WP Kuala Lumpur</b>	<b>Total</b>	<b>17</b>	<b>0.1</b>
Negeri Sembilan	Public	0	-
Negeri Sembilan	Private	0	-
<b>Negeri Sembilan</b>	<b>Total</b>	<b>0</b>	<b>0</b>
Melaka	Public	0	-
Melaka	Private	5	-
<b>Melaka</b>	<b>Total</b>	<b>5</b>	<b>0.07</b>
Johor	Public	3	-
Johor	Private	0	-
<b>Johor</b>	<b>Total</b>	<b>3</b>	<b>0.01</b>
Pahang	Public	0	-
Pahang	Private	0	-
<b>Pahang</b>	<b>Total</b>	<b>0</b>	<b>0</b>
Terengganu	Public	0	-
Terengganu	Private	0	-
<b>Terengganu</b>	<b>Total</b>	<b>0</b>	<b>0</b>
Kelantan	Public	2	-
Kelantan	Private	0	-
<b>Kelantan</b>	<b>Total</b>	<b>2</b>	<b>0.01</b>
Sabah & WP Labuan	Public	0	-
Sabah & WP Labuan	Private	0	-
<b>Sabah &amp; WP Labuan</b>	<b>Total</b>	<b>0</b>	<b>0</b>
Sarawak	Public	1	-
Sarawak	Private	1	-
<b>Sarawak</b>	<b>Total</b>	<b>2</b>	<b>0.01</b>





## **CHAPTER 2: PATIENT CHARACTERISTICS**

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Clinical data from 10602 patients who underwent percutaneous coronary intervention (PCI) between 2007 and 2009 were obtained and analysed from 11 SDPs across the country.

### General

The mean age of patients undergoing PCI in Malaysia was  $57 \pm 10$  years, and this was consistent across the 3 years. The majority of patients (64.0%) were aged between 50 and 70 years old, but it was notable that 24.4% of patients were aged less than 50 years old. A total of 81.5% of patients were male. For the male gender 22.3% and for the female gender 10.7% were under the age of 50 years. The ethnic distribution of patients who had undergone PCI generally reflected national demographics of the SDPs: Malay (47.5%), Chinese (23.9%), Indian (22.8%) and Iban (2%) (Table 2.1).

### Cardiovascular risk factors and pre-morbid status

The most prevalent modifiable risk factors in descending order were as follows; hypertension (73.6%), dyslipidaemia (73.4%), diabetes (46.2%) and 46.0% were with smoking habit (18.6 % were current smokers and 28.5% were former smokers). Patients with positive family history of premature cardiovascular disease (CVD) were 19.1% (Table 2.1). The pattern of cardiovascular (CV) risk factors was similar across for the three years, and it was notable that 42.5% of patients had more than three CV risk factors at the time of the PCI procedure (Table 2.6).

About 41.5% of patients had a prior history of myocardial infarction, 56.5% had a prior history of coronary artery disease and, significantly, 24.5% had new onset angina. Only 4% had a history of congestive cardiac failure, 1.5% previous cerebrovascular disease and 1.0% with peripheral vascular disease. About 6.6% of patients had chronic renal impairment, 23.2% had had a previous PCI procedure, and 4.1% had a previous CABG operation. We noted that the mean body mass index (BMI) for patients undergoing PCI was  $27 \pm 4$  kg/m<sup>2</sup>. 37.8% of patients had a GFR 30-60 ml/min, while 6.9% had a GFR of <30 ml/min. Mean serum total cholesterol was  $5.0 \pm 1.0$  mmol/l, with serum LDL  $3.0 \pm 1.0$  mmol/l (Table 2.1)

### The PCI

Between 2007 and 2009, 92.2% patients had a single PCI procedure. Repeat procedures ranged from 2 to 4 times per patient (Table 2.2).

### Comment

In general, the majority of patients undergoing PCI in Malaysia were male and over the age of 50 years old, and had multiple CV risk factors at the time of the procedure. This reflects a similar population of those in the NCVD-ACS Registry<sup>1</sup>, although it was notable that a significant number of patients undergoing PCI procedures in Malaysia were diabetic and had a previous history of myocardial infarction. The latter observation could be explained by an elective referral process from the various district hospitals and urban healthcare centres to the tertiary referral centres where the PCI procedures were undertaken.

While it was unsurprising that the mean serum total cholesterol and LDL levels were not significantly elevated, we do note that there were notable figures of 6.9% of patients with severe renal impairment undergoing PCI in Malaysia. This could be as a result of the number of patients with diabetic and/or hypertensive nephropathy, both risk factors being prevalent, both in the general population in Malaysia<sup>2</sup> and from the NCVD-ACS Registry Report<sup>1</sup>.

In comparison, the large North American National Cardiovascular Disease Registry, PCI (NCDR-PCI), examined data from 181,755 procedures performed between January 2004 and March 2006, and subsequently, 285,440 procedures between March 2006 and March 2007. Malaysian patients were younger, had more of the male gender, and a greater prevalence of some established cardiovascular risk factors (US: mean age range 63.9-64.1 years, 66% male; 31.5-32.6% diabetes; 29.1-27.3% had a prior history of myocardial infarction).<sup>3</sup> These findings were similar to Australian data from the Melbourne Interventional Group Registry, which examined data from April 2004 to June 2006, involving 4417 patients. (Australia: mean age 64.9 years, 73% male; 23.0% diabetes; 28.9% with a prior history of myocardial infarction >7 days prior to PCI).<sup>4</sup>

Therefore, with the rising prevalence of CV risk factors in Malaysia, it is expected that the numbers of PCI in Malaysia will rise accordingly. There is a need for better cardiovascular healthcare awareness, more access to healthcare providers and more PCI centres in the country.



## Summary

1. Compared to the registries of developed countries, Malaysian patients undergoing PCI were much younger at presentation. The mean age of the patients undergoing PCI in Malaysia was 57 years, and 24.4% of the number of total patients were aged below 50 years.
2. More than 98% of our patients undergoing PCI had at least one cardiovascular risk factor and 72% had three or more risk factors.
3. A significant number of our patients had renal impairment at the time of procedure: 37.8% had stage 3 and 6.9% had stage 4 or 5 of chronic kidney disease (CKD).

## References

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**Table 2.1 Characteristics of patients who underwent PCI, NCVD-PCI Registry, 2007-2009**

	2007		2008		2009		All	
	No.	%	No.	%	No.	%	No.	%
<b>Demographics</b>								
Age, Years								
N	3618		3374		3610		10602	
Mean(SD)	57 (10)		57 (10)		57 (10)		57 (10)	
Median (min,max)	57 (23,89)		57 (24,95)		57 (22,91)		57 (22,95)	
Age group, No. (%)								
20-<30	14	0.4	6	0.2	14	0.4	6	0.2
30-<40	140	3.9	133	3.9	140	3.9	133	3.9
40-<50	718	19.8	681	20.2	718	19.8	681	20.2
50-<60	1337	37.0	1240	36.8	1337	37.0	1240	36.8
60-<70	1009	27.9	914	27.1	1009	27.9	914	27.1
70-<80	374	10.3	376	11.1	374	10.3	376	11.1
≥80	26	0.7	24	0.7	26	0.7	24	0.7
Gender, No. (%)								
Male	2936	81.1	2768	82.0	2933	81.2	8637	81.5
Female	682	18.9	606	18.0	677	18.8	1965	18.5
Ethnic group, No. (%)								
Malay	1696	46.9	1595	47.3	1740	48.2	5031	47.5
Chinese	909	25.1	844	25.0	779	21.6	2532	23.9
Indian	858	23.7	722	21.4	838	23.2	2418	22.8
Orang Asli	0	0	0	0	0	0	0	0
Kadazan Dusun	1	0	24	0.7	18	0.5	43	0.4
Melanau	0	0	1	0	3	0.1	4	0
Murut	0	0	0	0	1	0	1	0
Bajau	0	0	16	0.5	24	0.7	40	0.4
Bidayuh	12	0.3	14	0.4	15	0.4	41	0.4
Iban	56	1.5	70	2.1	96	2.7	222	2.1
Punjabi	43	1.2	31	0.9	42	1.2	116	1.1
Other Malaysian	24	0.7	32	0.9	32	0.9	88	0.8
Foreigner	14	0.4	21	0.6	19	0.5	54	0.5
Not Available	1	0	4	0.1	3	0.1	8	0.1
Missing	4	0.1	0	0	0	0	0	0
<b>Other coronary risk factors</b>								
Smoking, No. (%)								
Never	1334	36.9	1214	36.0	1468	40.7	4016	37.9
Former (quit>30 days)	1040	28.7	864	25.6	1117	30.9	3021	28.5
Current (any tobacco use within last 30 days)	577	15.9	683	20.2	714	19.8	1974	18.6
Not Available	636	17.6	612	18.1	311	8.6	1559	14.7
Missing	31	0.9	1	0	0	0	32	0.3

Table 2.1 Characteristics of patients who underwent PCI, NCVD-PCI Registry, 2007-2009

	2007		2008		2009		All	
	No.	%	No.	%	No.	%	No.	%
Family history of premature cardiovascular disease, No. (%)								
Yes	592	16.4	511	15.1	917	25.4	2020	19.1
No	2579	71.3	2372	70.3	2482	68.8	7433	70.1
Not known	414	11.4	490	14.5	211	5.8	1115	10.5
Missing	33	0.9	1	0	0	0	34	0.3
Body Mass Index (BMI), kgm <sup>-2</sup>								
N	2925		2805		3374		9104	
Mean(SD)	26 (4)		26 (4)		27 (4)		27 (4)	
Median (min,max)	26 (15,49)		26 (14,47)		26 (14,48)		26 (14,49)	
BMI, kg/m <sup>-2</sup> , No. (%)								
<18.5	38	1	50	2	40	1	128	1
18.5-23	556	19	509	18	569	17	1634	18
>23-<25	574	20	568	20	642	19	1784	20
25-<30	1239	42	1153	41	1457	43	3849	42
30-<35	415	14	427	15	522	15	1364	15
35-<40	83	3	81	3	118	3	282	3
≥40	20	1	17	1	26	1	63	1
Co-morbidities								
Dyslipidaemia, No. (%)								
Yes	2772	76.6	2367	70.2	2641	73.2	7780	73.4
No	677	18.7	859	25.5	797	22.1	2333	22.0
Not known	132	3.6	147	4.4	172	4.8	451	4.3
Missing	37	1	1	0	0	0	38	0.4
Hypertension, No. (%)								
Yes	2691	74.4	2419	71.7	2691	74.5	7801	73.6
No	863	23.9	898	26.6	877	24.3	2638	24.9
Not known	48	1.3	56	1.7	42	1.2	146	1.4
Missing	16	0.4	1	0	0	0	17	0.2
Diabetes, No. (%)								
Yes	1654	45.7	1524	45.2	1716	47.5	4894	46.2
No	1891	52.3	1782	52.8	1814	50.2	5487	51.8
Not Known	54	1.5	67	2.0	80	2.2	201	1.9
Missing	19	0.5	1	0	0	0	20	0.2

**Table 2.1 Characteristics of patients who underwent PCI, NCVD-PCI Registry, 2007-2009**

	2007		2008		2009		All	
	No.	%	No.	%	No.	%	No.	%
Type of diabetes treatment, No. (%)								
OHA	1233	74.5	1162	76.2	1104	64.3	3499	71.5
Insulin	154	9.3	150	9.8	208	12.1	512	10.5
OHA + Insulin	30	1.8	75	4.9	99	5.8	204	4.2
Not Known	237	14.3	137	9.0	305	17.8	679	13.9
Myocardial infarction history, No. (%)								
Yes	1256	34.7	1313	38.9	1828	50.6	4397	41.5
No	2160	59.7	1926	57.1	1701	47.1	5787	54.6
Not known	174	4.8	134	4.0	81	2.2	389	3.7
Missing	28	0.8	1	0	0	0	29	0.3
Documented Coronary Artery Disease, No. (%)								
Yes	1981	54.8	1801	53.4	2209	61.2	5991	56.5
No	1557	43.0	1510	44.8	1371	38.0	4438	41.9
Not known	55	1.5	62	1.8	30	0.8	147	1.4
Missing	25	0.7	1	0	0	0	26	0.2
New onset angina (<2weeks), No. (%)								
Yes	829	22.9	726	21.5	1046	29	2601	24.5
No	2704	74.7	2573	76.3	2536	70.2	7813	73.7
Not known	63	1.7	74	2.2	28	0.8	165	1.6
Missing	22	0.6	1	0	0	0	23	0.2
Congestive Heart Failure (2weeks prior), No. (%)								
Yes	118	3.3	111	3.3	194	5.4	423	4.0
No	3407	94.2	3187	94.5	3380	93.6	9974	94.1
Not known	63	1.7	75	2.2	36	1	174	1.6
Missing	30	0.8	1	0	0	0	31	0.3
Cerebrovascular disease, No. (%)								
Yes	58	1.6	51	1.5	51	1.4	160	1.5
No	3506	96.9	3270	96.9	3530	97.8	10306	97.2
Not known	33	0.9	52	1.5	29	0.8	114	1.1
Missing	21	0.6	1	0	0	0	22	0.2



Table 2.1 Characteristics of patients who underwent PCI, NCVD-PCI Registry, 2007-2009

	2007		2008		2009		All	
	No.	%	No.	%	No.	%	No.	%
Peripheral vascular disease, No. (%)								
Yes	35	1.0	34	1.0	38	1.1	107	1.0
No	3525	97.4	3285	97.4	3544	98.2	10354	97.7
Not known	34	0.9	54	1.6	28	0.8	116	1.1
Missing	24	0.7	1	0	0	0	25	0.2
Chronic renal failure (>200micromol), No. (%)								
Yes	214	5.9	208	6.2	278	7.7	700	6.6
No	3345	92.5	3114	92.3	3306	91.6	9765	92.1
Not known	31	0.9	51	1.5	26	0.7	108	1.0
Missing	28	0.8	1	0	0	0	29	0.3
* Coronary artery disease, No. (%)								
Yes	2725	75.3	2660	78.8	3108	86.1	8493	80.1
No	813	22.5	639	18.9	475	13.2	1927	18.2
Not known	80	2.2	75	2.2	27	0.7	182	1.7
Missing	0	0	0	0	0	0	0	0
<b>Baseline investigation</b>								
Baseline creatinine, mmol/L								
N	3415		3224		3457		10096	
Mean(SD)	124 (123)		116 (103)		118 (114)		119 (114)	
Median, (min,max)	98 (46,1280)		95 (47,1225)		94 (44,1268)		96 (44,1280)	
Not Available	53	2	74	2	71	2	198	2
Missing	150	4	76	2	82	2	308	3
Baseline creatinine, mmol/L								
<100 mmol/L	1820	50	1851	55	2031	56	5702	54
100 – 199 mmol/L	1402	39	1226	36	1248	35	3876	37
> 200 mmol/L	193	5	147	4	178	5	518	5
Not Available	53	2	74	2	71	2	198	2
Missing	150	4	76	2	82	2	308	3
Glomerular filtration rate (GFR) <sup>†</sup> , mL/min								
N	2681		2575		3144		8400	
Mean(SD)	63 (25)		65 (24)		66 (26)		64 (25)	
Median, (min,max)	61 (4,198)		64 (4,165)		24 (3,202)		63 (3,202)	
Missing	937	26	798	24	466	13	2201	21

Table 2.1 Characteristics of patients who underwent PCI, NCVD-PCI Registry, 2007-2009

	2007		2008		2009		All	
	No.	%	No.	%	No.	%	No.	%
<sup>†</sup> Glomerular filtration rate (GFR), mL/min								
≥90	307	11.5	332	12.9	478	15.2	1117	13.3
60-<90	1103	41.1	1127	43.8	1301	41.4	3531	42.0
30-<60	1062	39.6	960	37.3	1154	36.7	3176	37.8
15-<30	119	4.4	95	3.7	118	3.8	332	4.0
<15	90	3.4	61	2.4	93	3.0	244	2.9
<b>**Total cholesterol, mmol/L</b>								
N	1149		1281		1719		4149	
Mean(SD)	5 (1)		5 (1)		5 (1)		5 (1)	
Median, (min,max)	4 (3,24)		4 (3,10)		4 (3,12)		4 (3,24)	
Not Available	770	40	438	26	380	18	1588	28
Missing	62	3	82	5	110	5	254	4
<b>**LDL levels, mmol/L</b>								
N	1128		1261		1726		4115	
Mean(SD)	3 (1)		3 (1)		3 (1)		3 (1)	
Median, (min,max)	2 (1,18)		2 (1,8)		2 (1,16)		2 (1,18)	
Not Available	793	41	450	26	419	20	1662	29
Missing	60	3	90	5	64	3	214	4
<b>Previous Intervention</b>								
Previous PCI, No. (%)								
Yes	824	22.8	742	22.0	892	24.7	2458	23.2
No	2783	76.9	2631	78.0	2718	75.3	8132	76.7
Missing	11	0.3	1	0	0	0	12	0.1
Previous CABG, No. (%)								
Yes	132	3.6	159	4.7	140	3.9	431	4.1
No	3472	96.0	3214	95.3	3470	96.1	10156	95.8
Missing	14	0.4	1	0	0	0	15	0.1

*\*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) Chronic angina (onset more than 2 weeks ago), 4) New onset angina (less than 2 weeks)*

*Note: 'Not known' includes patients who do not know their co-morbidities as well as missing data*

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

*<sup>†</sup>Glomerular filtration rate calculated based on Cockcroft-Gault formula*



**Table 2.2 Distribution of patients by number of procedures, NCVD-PCI Registry, 2007-2009**

No. of Procedures	No. of patients in 2007	No. of patients in 2008	No. of patients in 2009	Total no. of patients
1	3618	3374	3610	10602
2	295	264	292	851
3	14	13	14	41
4	1	3	0	4

**Table 2.3.1 Distribution of patients who underwent PCI, by SDP, NCVD-PCI Registry, 2007-2009**

No.	Source Data Providers	2007		2008		2009		All	
		No.	%	No.	%	No.	%	No.	%
1	Pusat Perubatan Universiti Malaya	330	9.1	178	5.3	360	10.0	868	8.2
2	Institut Jantung Negara	2156	59.6	2058	61.0	2221	61.5	6435	60.7
3	Hospital Pulau Pinang	445	12.3	216	6.4	50	1.4	711	6.7
4	Hospital Umum Sarawak	336	9.3	355	10.5	378	10.5	1069	10.1
5	Hospital Sultanah Aminah	318	8.8	303	9.0	400	11.1	1021	9.6
6	Hospital Sultanah Bahiyah	0	0	112	3.3	36	1.0	148	1.4
7	Hospital Queen Elizabeth	0	0	120	3.6	122	3.4	242	2.3
8	Hospital Pakar KPJ Selangor	12	0.3	26	0.8	30	0.8	68	0.6
9	Hospital Serdang	5	0.1	2	0.1	1	0	8	0.1
10	Pusat Perubatan Universiti Kebangsaan Malaysia	16	0.4	4	0.1	0	0	20	0.2
11	Pusat Perubatan Mahkota	0	0	0	0	12	0.3	12	0.1
<b>Total</b>		<b>3618</b>	<b>99.9</b>	<b>3374</b>	<b>100.1</b>	<b>3610</b>	<b>100</b>	<b>10602</b>	<b>100</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, 2007-2009**

No.	Source Data Providers	2007		2008		2009		All	
		No.	%	No.	%	No.	%	No.	%
1	Pusat Perubatan Universiti Malaya	376	10	188	5	400	10	964	8
2	Institut Jantung Negara	2311	59	2204	60	2404	61	6919	60
3	Hospital Pulau Pinang	502	13	243	7	53	1	798	7
4	Hospital Umum Sarawak	377	10	409	11	410	10	1196	10
5	Hospital Sultanah Aminah	325	8	333	9	447	11	1105	10
6	Hospital Sultanah Bahiyah	0	0	124	3	37	1	161	1
7	Hospital Queen Elizabeth	0	0	121	3	122	3	243	2
8	Hospital Pakar KPJ Selangor	15	0	26	1	30	1	71	1
9	Hospital Serdang	6	0	2	0	1	0	9	0
10	Pusat Perubatan Universiti Kebangsaan Malaysia	16	0	4	0	0	0	20	0
11	Pusat Perubatan Mahkota	0	0	0	0	12	0	12	0
<b>Total</b>		<b>3928</b>	<b>100</b>	<b>3654</b>	<b>99</b>	<b>3916</b>	<b>98</b>	<b>11498</b>	<b>99</b>

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

Table 2.4.1 SDP-ethnicity distribution of patients who underwent PCI by year, NCVD-PCI Registry (row percent)

No.	Source Data Provider	2007						2008						2009					
		Ethnic group						Ethnic group						Ethnic group					
		Malay	Chinese	Indian	*Others	Not Available	Total	Malay	Chinese	Indian	*Others	Not Available	Total	Malay	Chinese	Indian	*Others	Not Available	Total
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
1	PPUM	133 (40.3)	70 (21.2)	115 (34.8)	11 (3.3)	1 (0.3)	330 (100)	66 (37.1)	45 (25.3)	62 (34.8)	4 (2.2)	1 (0.6)	178 (100)	139 (38.6)	85 (23.6)	130 (36.1)	5 (1.4)	1 (0.3)	360 (100)
2	IUN	1165 (54.0)	374 (17.3)	562 (26.1)	55 (2.6)	0 (0)	2156 (100)	1140 (55.4)	347 (16.9)	511 (24.8)	58 (2.8)	2 (0.1)	2058 (100)	1244 (56.0)	333 (15.0)	581 (26.2)	63 (2.8)	0 (0)	2221 (100)
3	HPP	182 (40.9)	156 (35.1)	100 (22.5)	5 (1.1)	2 (0.4)	445 (100)	80 (37.0)	76 (35.2)	58 (26.9)	2 (0.9)	0 (0)	216 (100)	25 (50.0)	10 (20.0)	15 (30.0)	0 (0)	0 (0)	50 (100)
4	HUS	72 (21.4)	187 (55.7)	3 (0.9)	72 (21.4)	2 (0.6)	336 (100)	78 (22.0)	186 (52.4)	2 (0.6)	89 (25.1)	0 (0)	355 (100)	95 (25.1)	156 (41.3)	5 (1.3)	122 (32.3)	0 (0)	378 (100)
5	HSA	125 (39.3)	113 (35.5)	73 (23.0)	7 (2.2)	0 (0)	318 (100)	124 (40.9)	107 (35.3)	72 (23.8)	0 (0)	0 (0)	303 (100)	177 (44.3)	129 (32.3)	91 (22.8)	3 (0.8)	0 (0)	400 (100)
6	KPJ SSH	5 (50.0)	3 (25.0)	3 (25.0)	0 (0)	0 (0)	12 (100)	20 (76.9)	4 (15.4)	2 (7.7)	0 (0)	0 (0)	26 (100)	20 (66.7)	1 (3.3)	9 (30.0)	0 (0)	0 (0)	30 (100)
7	HS	3 (60.0)	1 (20.0)	1 (20.0)	0 (0)	0 (0)	5 (100)	1 (50.0)	0 (0)	1 (50.0)	0 (0)	0 (0)	2 (100)	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	1 (100)
8	PPUKM	10 (62.5)	5 (31.3)	1 (6.3)	0 (0)	0 (0)	16 (100)	2 (50.0)	2 (50.0)	0 (0)	0 (0)	0 (0)	4 (100)						
9	HQE							11 (9.2)	51 (42.5)	2 (1.7)	56 (46.7)	0 (0)	120 (100)	10 (8.2)	50 (41.0)	4 (3.3)	56 (45.9)	2 (1.6)	122 (100)
10	HSB							73 (65.2)	26 (23.2)	12 (10.7)	0 (0)	1 (0.9)	112 (100)	29 (80.6)	3 (8.3)	3 (8.3)	1 (2.8)	0 (0)	36 (100)
11	MMC													0 (0)	12 (100)	0 (0)	0 (0)	0 (0)	12 (100)

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

**Note:**

<b>Abbreviation</b>	<b>Name of the Hospital</b>
PPUM	Pusat Perubatan Universiti Malaya
IJN	Institut Jantung Negara
HPP	Hospital Pulau Pinang
HUS	Hospital Umum Sarawak
HSA	Hospital Sultanah Aminah
HSB	Hospital Sultanah Bahiyah
HQE	Hospital Queen Elizabeth
KPJ SSH	Hospital Pakar KPJ Selangor ( <i>KPJ Selangor Specialist Hospital</i> )
HS	Hospital Serdang
PPUKM	Pusat Perubatan Universiti Kebangsaan Malaysia
MMC	Pusat Perubatan Mahkota ( <i>Mahkota Medical Centre</i> )

**Table 2.4.2 SDP-ethnicity distribution of patients who underwent PCI, NCVD-PCI Registry, 2007-2009 (row percent)**

No.	Source Data Provider	Ethnic group					
		Malay	Chinese	Indian	*Others	Not Available	Total
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
1	Pusat Perubatan Universiti Malaya	338 (38.9)	200 (23.0)	307 (35.4)	20 (2.3)	3 (0.3)	868 (100)
2	Institut Jantung Negara	3549 (55.2)	1054 (16.4)	1654 (25.7)	176 (2.7)	2 (0)	6435 (100)
3	Hospital Pulau Pinang	287 (40.4)	242 (34.0)	173 (24.3)	7 (1.0)	2 (0.3)	711 (100)
4	Hospital Umum Sarawak	245 (22.9)	529 (49.5)	10 (0.9)	283 (26.5)	2 (0.2)	1069 (100)
5	Hospital Sultanah Aminah	426 (41.7)	349 (34.2)	236 (23.1)	10 (1.0)	0 (0)	1021 (100)
6	Hospital Sultanah Bahiyah	102 (68.9)	29 (19.6)	15 (10.1)	1 (0.7)	1 (0.7)	148 (100)
7	Hospital Queen Elizabeth	21 (8.7)	101 (41.7)	6 (2.5)	112 (46.3)	2 (0.8)	242 (100)
8	Hospital Pakar KPJ Selangor	46 (67.6)	8 (11.8)	14 (20.5)	0 (0)	0 (0)	68 (100)
9	Hospital Serdang	5 (62.5)	1 (12.5)	2 (25.0)	0 (0)	0 (0)	8 (100)
10	Pusat Perubatan Universiti Kebangsaan Malaysia	12 (60.0)	7 (35.0)	1 (5.0)	0 (0)	0 (0)	20 (100)
11	Pusat Perubatan Mahkota	0 (0)	12 (100)	0 (0)	0 (0)	0 (0)	12 (100)

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



**Table 2.4.3 SDP-gender distribution of patients who underwent PCI, NCVD-PCI Registry, 2007-2009 (row percent)**

Year	No.	Source Data Provider	Gender					
			Male		Female		Total	
			No.	%	No.	%	No.	%
2007	1	Pusat Perubatan Universiti Malaya	237	71.8	93	28.2	330	100
	2	Institut Jantung Negara	1742	80.8	414	19.2	2156	100
	3	Hospital Pulau Pinang	347	78	98	22	445	100
	4	Hospital Umum Sarawak	304	90.5	32	9.5	336	100
	5	Hospital Sultanah Aminah	276	86.8	42	13.2	318	100
	6	Hospital Pakar KPJ Selangor	11	91.7	1	8.3	12	100
	7	Hospital Serdang	4	80	1	20	5	100
	8	Pusat Perubatan Universiti Kebangsaan Malaysia	15	93.8	1	6.3	16	100
2008	1	Pusat Perubatan Universiti Malaya	131	73.6	47	26.4	178	100
	2	Institut Jantung Negara	1702	82.7	356	17.3	2058	100
	3	Hospital Pulau Pinang	165	76.4	51	23.6	216	100
	4	Hospital Umum Sarawak	300	84.5	55	15.5	355	100
	5	Hospital Sultanah Aminah	239	78.9	64	21.1	303	100
	6	Hospital Sultanah Bahiyah	100	89.3	12	10.7	112	100
	7	Hospital Queen Elizabeth	103	85.8	17	14.2	120	100
	8	Hospital Pakar KPJ Selangor	23	88.5	3	11.5	26	100
	9	Hospital Serdang	2	100	0	0	2	100
	10	Pusat Perubatan Universiti Kebangsaan Malaysia	3	75	1	25	4	100
2009	1	Pusat Perubatan Universiti Malaya	3	75	1	25	4	100
	2	Institut Jantung Negara	272	75.6	88	24.4	360	100
	3	Hospital Pulau Pinang	1807	81.4	414	18.6	2221	100
	4	Hospital Umum Sarawak	40	80	10	20	50	100
	5	Hospital Sultanah Aminah	298	78.8	80	21.2	378	100
	6	Hospital Sultanah Bahiyah	338	84.5	62	15.5	400	100
	7	Hospital Queen Elizabeth	33	91.7	3	8.3	36	100
	8	Hospital Pakar KPJ Selangor	109	89.3	13	10.7	122	100
	9	Hospital Serdang	25	83.3	5	16.7	30	100
	10	Pusat Perubatan Mahkota	0	0	1	100	1	100
All	1	Pusat Perubatan Universiti Malaya	640	73.7	228	26.3	868	100
	2	Institut Jantung Negara	5251	81.6	1184	18.4	6435	100
	3	Hospital Pulau Pinang	552	77.6	159	22.4	711	100
	4	Hospital Umum Sarawak	902	84.4	167	15.6	1069	100
	5	Hospital Sultanah Aminah	853	83.5	168	16.5	1021	100
	6	Hospital Sultanah Bahiyah	133	89.9	15	10.1	148	100
	7	Hospital Queen Elizabeth	212	87.6	30	12.4	242	100
	8	Hospital Pakar KPJ Selangor	59	86.8	9	13.2	68	100
	9	Hospital Serdang	6	75	2	25	8	100
	10	Pusat Perubatan Universiti Kebangsaan Malaysia	18	90	2	10	20	100
	11	Pusat Perubatan Mahkota	11	91.7	1	8.3	12	100



**Table 2.5 Age-gender distribution of patients who underwent PCI, NCVD-PCI Registry, 2007-2009**

Year	Age Group	Gender			
		Male		Female	
		No.	%	No.	%
2007	20-<30	12	0.4	2	0.3
	30-<40	135	4.6	5	0.7
	40-<50	640	21.8	78	11.4
	50-<60	1132	38.6	205	30.1
	60-<70	750	25.5	259	38.0
	70-<80	247	8.4	127	18.6
	≥80	20	0.7	6	0.9
	<b>Total</b>	<b>2936</b>	<b>100</b>	<b>682</b>	<b>100</b>
2008	20-<30	5	0.2	1	0.2
	30-<40	122	4.4	11	1.8
	40-<50	624	22.5	57	9.4
	50-<60	1073	38.8	167	27.6
	60-<70	677	24.5	237	39.1
	70-<80	249	9	127	21
	≥80	18	0.7	6	1
	<b>Total</b>	<b>2768</b>	<b>100</b>	<b>606</b>	<b>100</b>
2009	20-<30	8	0.3	0	0
	30-<40	131	4.5	15	2.2
	40-<50	659	22.5	75	11.1
	50-<60	1025	34.9	212	31.3
	60-<70	808	27.5	236	34.9
	70-<80	285	9.7	129	19.1
	≥80	17	0.6	10	1.5
	<b>Total</b>	<b>2933</b>	<b>100</b>	<b>677</b>	<b>100</b>
All	20-<30	25	0.3	3	0.2
	30-<40	388	4.5	31	1.6
	40-<50	1923	22.3	210	10.7
	50-<60	3230	37.4	584	29.7
	60-<70	2235	25.9	732	37.3
	70-<80	781	9	383	19.5
	≥80	55	0.6	22	1.1
	<b>Total</b>	<b>8637</b>	<b>100</b>	<b>1965</b>	<b>100</b>

**Table 2.5.1.1 Age-gender distribution of patients who underwent PCI, by ethnic group, NCVD-PCI Registry, 2007**

Year	Gender	Age Group	Ethnic group									
			Malay		Chinese		Indian		Others*		Not Available	
			No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
2007	Male	20-<30	4	(0.1)	5	(0.2)	2	(0.1)	1	(0)	0	(0)
		30-<40	76	(2.6)	17	(0.6)	36	(1.2)	6	(0.2)	0	(0)
		40-<50	338	(11.5)	114	(3.9)	163	(5.6)	25	(0.9)	0	(0)
		50-<60	582	(19.8)	257	(8.8)	243	(8.3)	48	(1.6)	2	(0.1)
		60-<70	314	(10.7)	246	(8.4)	159	(5.4)	30	(1.0)	1	(0)
		70-<80	98	(3.3)	82	(2.8)	59	(2.0)	8	(0.3)	0	(0)
		≥80	8	(0.3)	6	(0.2)	4	(0.1)	2	(0.1)	0	(0)
		<b>Total</b>	1420	(48.4)	727	(24.8)	666	(22.7)	120	(4.1)	3	(0.1)
	Female	20-<30	2	(0.3)	0	(0)	0	(0)	0	(0)	0	(0)
		30-<40	2	(0.3)	0	(0)	3	(0.4)	0	(0)	0	(0)
		40-<50	36	(5.3)	8	(1.2)	28	(4.1)	5	(0.7)	1	(0.1)
		50-<60	96	(14.1)	45	(6.6)	55	(8.1)	9	(1.3)	0	(0)
		60-<70	102	(15)	73	(10.7)	72	(10.6)	11	(1.6)	1	(0.1)
		70-<80	36	(5.3)	53	(7.8)	34	(5.0)	4	(0.6)	0	(0)
		≥80	2	(0.3)	3	(0.4)	0	(0)	1	(0.1)	0	(0)
		<b>Total</b>	276	(40.5)	182	(26.7)	192	(28.2)	30	(4.4)	2	(0.3)

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

**Table 2.5.1.2 Age-gender distribution of patients who underwent PCI, by ethnic group, NCVD-PCI Registry, 2008**

Year	Gender	Age Group	Ethnic group									
			Malay		Chinese		Indian		Others*		Not Available	
			No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
2008	Male	20-<30	2	(0.1)	0	(0)	1	(0)	2	(0.1)	0	(0)
		30-<40	68	(2.5)	20	(0.7)	21	(0.8)	13	(0.5)	0	(0)
		40-<50	328	(11.8)	103	(3.7)	145	(5.2)	48	(1.7)	0	(0)
		50-<60	549	(19.8)	249	(9.0)	218	(7.9)	55	(2.0)	2	(0.1)
		60-<70	306	(11.1)	195	(7.1)	128	(4.6)	48	(1.7)	0	(0)
		70-<80	109	(3.9)	85	(3.1)	39	(1.4)	15	(0.5)	1	(0)
		≥80	6	(0.2)	7	(0.3)	3	(0.1)	2	(0.1)	0	(0)
		<b>Total</b>	1368	(49.4)	659	(23.8)	555	(20.1)	183	(6.6)	3	(0.1)
	Female	20-<30	1	(0.2)	0	(0)	0	(0)	0	(0)	0	(0)
		30-<40	4	(0.7)	2	(0.3)	5	(0.8)	0	(0)	0	(0)
		40-<50	26	(4.3)	6	(1.0)	23	(3.8)	2	(0.3)	0	(0)
		50-<60	76	(12.5)	31	(5.1)	50	(8.3)	10	(1.7)	0	(0)
		60-<70	81	(13.4)	86	(14.2)	60	(9.9)	10	(1.7)	0	(0)
		70-<80	38	(6.3)	57	(9.4)	27	(4.5)	4	(0.7)	1	(0.2)
		≥80	1	(0.2)	3	(0.5)	2	(0.3)	0	(0)	0	(0)
		<b>Total</b>	227	(37.5)	185	(30.5)	167	(27.6)	26	(4.3)	1	(0.2)

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

**Table 2.5.1.3 Age-gender distribution of patients who underwent PCI, by ethnic group, NCVD-PCI Registry, 2009**

Year	Gender	Age Group	Ethnic group									
			Malay		Chinese		Indian		Others*		Not Available	
			No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
2009	Male	20-<30	4	(0.1)	0	(0)	3	(0.1)	1	(0)	0	(0)
		30-<40	77	(2.6)	17	(0.6)	25	(0.9)	12	(0.4)	0	(0)
		40-<50	336	(11.5)	108	(3.7)	155	(5.3)	60	(2.0)	0	(0)
		50-<60	531	(18.1)	188	(6.4)	247	(8.4)	57	(1.9)	2	(0.1)
		60-<70	392	(13.4)	202	(6.9)	166	(5.7)	47	(1.6)	1	(0)
		70-<80	109	(3.7)	87	(3.0)	63	(2.1)	26	(0.9)	0	(0)
		≥80	4	(0.1)	10	(0.3)	0	(0)	3	(0.1)	0	(0)
		<b>Total</b>	<b>1453</b>	<b>(49.5)</b>	<b>612</b>	<b>(20.9)</b>	<b>659</b>	<b>(22.5)</b>	<b>206</b>	<b>(7)</b>	<b>3</b>	<b>(0.1)</b>
	Female	20-<30	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
		30-<40	11	(1.6)	1	(0.1)	3	(0.4)	0	(0)	0	(0)
		40-<50	38	(5.6)	11	(1.6)	23	(3.4)	3	(0.4)	0	(0)
		50-<60	96	(14.2)	44	(6.5)	55	(8.1)	17	(2.5)	0	(0)
		60-<70	107	(15.8)	56	(8.3)	57	(8.4)	16	(2.4)	0	(0)
		70-<80	35	(5.2)	49	(7.2)	38	(5.6)	7	(1.0)	0	(0)
		≥80	0	(0)	6	(0.9)	3	(0.4)	1	(0.1)	0	(0)
		<b>Total</b>	<b>287</b>	<b>(42.4)</b>	<b>167</b>	<b>(24.7)</b>	<b>179</b>	<b>(26.4)</b>	<b>44</b>	<b>(6.5)</b>	<b>0</b>	<b>(0)</b>

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

**Table 2.5.1.4 Age-gender distribution of patients who underwent PCI, by ethnic group, NCVD-PCI Registry, 2007-2009**

Year	Gender	Age Group	Ethnic group									
			Malay		Chinese		Indian		Others*		Not Available	
			No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
All	Male	20-<30	10	(0.1)	5	(0.1)	6	(0.1)	4	(0)	0	(0)
		30-<40	221	(2.6)	54	(0.6)	82	(0.9)	31	(0.4)	0	(0)
		40-<50	1002	(11.6)	325	(3.8)	463	(5.4)	133	(1.5)	0	(0)
		50-<60	1662	(19.2)	694	(8.0)	708	(8.2)	160	(1.9)	6	(0.1)
		60-<70	1012	(11.7)	643	(7.5)	453	(5.2)	125	(1.4)	2	(0)
		70-<80	316	(3.7)	254	(2.9)	161	(1.9)	49	(0.6)	1	(0)
		≥80	18	(0.2)	23	(0.3)	7	(0.1)	7	(0.1)	0	(0)
		<b>Total</b>	<b>4241</b>	<b>(49.1)</b>	<b>1998</b>	<b>(23.1)</b>	<b>1880</b>	<b>(21.8)</b>	<b>509</b>	<b>(5.9)</b>	<b>9</b>	<b>(0.1)</b>
	Female	20-<30	3	(0.2)	0	(0)	0	(0)	0	(0)	0	(0)
		30-<40	17	(0.9)	3	(0.2)	11	(0.6)	0	(0)	0	(0)
		40-<50	100	(5.1)	25	(1.3)	74	(3.8)	10	(0.5)	1	(0.1)
		50-<60	268	(13.6)	120	(6.1)	160	(8.1)	36	(1.8)	0	(0)
		60-<70	290	(14.8)	215	(10.9)	189	(9.6)	37	(1.9)	1	(0.1)
		70-<80	109	(5.5)	159	(8.1)	99	(5.0)	15	(0.8)	1	(0.1)
		≥80	3	(0.2)	12	(0.6)	5	(0.3)	2	(0.1)	0	(0)
		<b>Total</b>	<b>790</b>	<b>(40.2)</b>	<b>534</b>	<b>(27.2)</b>	<b>538</b>	<b>(27.4)</b>	<b>100</b>	<b>(5.1)</b>	<b>3</b>	<b>(0.2)</b>

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



**Table 2.5.2 Age-gender distribution of patients who underwent PCI, by pre-morbid diabetes, NCVD-PCI Registry, 2007-2009**

Year	Gender	Age Group	Pre-morbid diabetes					
			Diabetic		Non-Diabetic		Not Known	
			No.	%	No.	%	No.	%
2007	Male	20-<30	2	0.1	9	0.3	1	0
		30-<40	42	1.4	93	3.2	0	0
		40-<50	229	7.8	401	13.7	10	0.3
		50-<60	503	17.1	606	20.6	23	0.8
		60-<70	343	11.7	387	13.2	20	0.7
		70-<80	98	3.3	142	4.8	7	0.2
		≥80	5	0.2	15	0.5	0	0
		<b>Total</b>	<b>1222</b>	<b>41.6</b>	<b>1653</b>	<b>56.3</b>	<b>61</b>	<b>2.1</b>
	Female	20-<30	1	0.1	1	0.1	0	0
		30-<40	2	0.3	3	0.4	0	0
		40-<50	55	8.1	21	3.1	2	0.3
		50-<60	140	20.5	61	8.9	4	0.6
		60-<70	164	24	93	13.6	2	0.3
		70-<80	67	9.8	56	8.2	4	0.6
		≥80	3	0.4	3	0.4	0	0
		<b>Total</b>	<b>432</b>	<b>63.3</b>	<b>238</b>	<b>34.9</b>	<b>12</b>	<b>1.8</b>
2008	Male	20-<30	1	0	3	0.1	1	0
		30-<40	36	1.3	83	3	3	0.1
		40-<50	214	7.7	400	14.4	10	0.4
		50-<60	477	17.2	576	20.8	20	0.7
		60-<70	306	11.1	354	12.8	17	0.6
		70-<80	113	4.1	129	4.7	7	0.3
		≥80	8	0.3	10	0.4	0	0
		<b>Total</b>	<b>1155</b>	<b>41.7</b>	<b>1555</b>	<b>56.2</b>	<b>58</b>	<b>2.1</b>
	Female	20-<30	0	0	1	0.2	0	0
		30-<40	8	1.3	3	0.5	0	0
		40-<50	45	7.4	11	1.8	1	0.2
		50-<60	105	17.3	59	9.7	3	0.5
		60-<70	146	24.1	86	14.2	5	0.8
		70-<80	63	10.4	63	10.4	1	0.2
		≥80	2	0.3	4	0.7	0	0
		<b>Total</b>	<b>369</b>	<b>60.9</b>	<b>227</b>	<b>37.5</b>	<b>10</b>	<b>1.7</b>

Table 2.5.2 Age-gender distribution of patients who underwent PCI, by pre-morbid diabetes, NCVD-PCI Registry, 2007-2009

Year	Gender	Age Group	Pre-morbid diabetes					
			Diabetic		Non-Diabetic		Not Known	
			No.	%	No.	%	No.	%
2009	Male	20-<30	2	0.1	5	0.2	1	0
		30-<40	37	1.3	92	3.1	2	0.1
		40-<50	235	8	408	13.9	16	0.5
		50-<60	483	16.5	514	17.5	28	1
		60-<70	377	12.9	415	14.1	16	0.5
		70-<80	138	4.7	138	4.7	9	0.3
		≥80	7	0.2	8	0.3	2	0.1
		<b>Total</b>	<b>1279</b>	<b>43.6</b>	<b>1580</b>	<b>53.9</b>	<b>74</b>	<b>2.5</b>
	Female	20-<30	0	0	0	0	0	0
		30-<40	11	1.6	4	0.6	0	0
		40-<50	53	7.8	22	3.2	0	0
		50-<60	142	21	67	9.9	3	0.4
		60-<70	150	22.2	85	12.6	1	0.1
		70-<80	74	10.9	53	7.8	2	0.3
		≥80	7	1	3	0.4	0	0
		<b>Total</b>	<b>437</b>	<b>64.5</b>	<b>234</b>	<b>34.6</b>	<b>6</b>	<b>0.9</b>
All	Male	20-<30	5	0.1	17	0.2	3	0
		30-<40	115	1.3	268	3.1	5	0.1
		40-<50	678	7.8	1209	14	36	0.4
		50-<60	1463	16.9	1696	19.6	71	0.8
		60-<70	1026	11.9	1156	13.4	53	0.6
		70-<80	349	4	409	4.7	23	0.3
		≥80	20	0.2	33	0.4	2	0
		<b>Total</b>	<b>3656</b>	<b>42.3</b>	<b>4788</b>	<b>55.4</b>	<b>193</b>	<b>2.2</b>
	Female	20-<30	1	0.1	2	0.1	0	0
		30-<40	21	1.1	10	0.5	0	0
		40-<50	153	7.8	54	2.7	3	0.2
		50-<60	387	19.7	187	9.5	10	0.5
		60-<70	460	23.4	264	13.4	8	0.4
		70-<80	204	10.4	172	8.8	7	0.4
		≥80	12	0.6	10	0.5	0	0
		<b>Total</b>	<b>1238</b>	<b>63</b>	<b>699</b>	<b>35.6</b>	<b>28</b>	<b>1.4</b>



**Table 2.5.3 Age-gender distribution of patients who underwent PCI, by pre-morbid hypertension, NCVD-PCI Registry, 2007-2009**

Year	Gender	Age Group	Pre-morbid hypertension					
			Hypertensive		Non-Hypertensive		Not Known	
			No.	%	No.	%	No.	%
2007	Male	20-<30	3	0.1	7	0.2	2	0.1
		30-<40	74	2.5	59	2	2	0.1
		40-<50	398	13.6	233	7.9	9	0.3
		50-<60	823	28	290	9.9	19	0.6
		60-<70	580	19.8	156	5.3	14	0.5
		70-<80	208	7.1	34	1.2	5	0.2
		≥80	17	0.6	3	0.1	0	0
		<b>Total</b>	<b>2103</b>	<b>71.6</b>	<b>782</b>	<b>26.6</b>	<b>51</b>	<b>1.7</b>
	Female	20-<30	1	0.1	1	0.1	0	0
		30-<40	4	0.6	1	0.1	0	0
		40-<50	58	8.5	17	2.5	3	0.4
		50-<60	170	24.9	31	4.5	4	0.6
		60-<70	237	34.8	19	2.8	3	0.4
		70-<80	114	16.7	10	1.5	3	0.4
		≥80	4	0.6	2	0.3	0	0
		<b>Total</b>	<b>588</b>	<b>86.2</b>	<b>81</b>	<b>11.9</b>	<b>13</b>	<b>1.9</b>
2008	Male	20-<30	2	0.1	2	0.1	1	0
		30-<40	55	2	63	2.3	4	0.1
		40-<50	358	12.9	255	9.2	11	0.4
		50-<60	760	27.4	295	10.7	18	0.7
		60-<70	512	18.5	155	5.6	10	0.4
		70-<80	197	7.1	46	1.7	6	0.2
		≥80	16	0.6	2	0.1	0	0
		<b>Total</b>	<b>1900</b>	<b>68.6</b>	<b>818</b>	<b>29.6</b>	<b>50</b>	<b>1.8</b>
	Female	20-<30	0	0	1	0.2	0	0
		30-<40	7	1.2	4	0.7	0	0
		40-<50	50	8.3	7	1.2	0	0
		50-<60	137	22.6	28	4.6	2	0.3
		60-<70	209	34.5	25	4.1	3	0.5
		70-<80	112	18.5	13	2.1	2	0.3
		≥80	4	0.7	2	0.3	0	0
		<b>Total</b>	<b>519</b>	<b>85.6</b>	<b>80</b>	<b>13.2</b>	<b>7</b>	<b>1.2</b>

**Table 2.5.3 Age-gender distribution of patients who underwent PCI, by pre-morbid hypertension, NCVD-PCI Registry, 2007-2009**

Year	Gender	Age Group	Pre-morbid hypertension					
			Hypertensive		Non-Hypertensive		Not Known	
			No.	%	No.	%	No.	%
2009	Male	20-<30	2	0.1	6	0.2	0	0
		30-<40	62	2.1	66	2.3	3	0.1
		40-<50	426	14.5	224	7.6	9	0.3
		50-<60	748	25.5	260	8.9	17	0.6
		60-<70	626	21.3	179	6.1	3	0.1
		70-<80	234	8	47	1.6	4	0.1
		≥80	15	0.5	1	0	1	0
		<b>Total</b>	<b>2113</b>	<b>72</b>	<b>783</b>	<b>26.7</b>	<b>37</b>	<b>1.3</b>
	Female	20-<30	0	0	0	0	0	0
		30-<40	10	1.5	5	0.7	0	0
		40-<50	55	8.1	20	3	0	0
		50-<60	178	26.3	32	4.7	2	0.3
		60-<70	207	30.6	26	3.8	3	0.4
		70-<80	118	17.4	11	1.6	0	0
		≥80	10	1.5	0	0	0	0
		<b>Total</b>	<b>578</b>	<b>85.4</b>	<b>94</b>	<b>13.9</b>	<b>5</b>	<b>0.7</b>
All	Male	20-<30	7	0.1	15	0.2	3	0
		30-<40	191	2.2	188	2.2	9	0.1
		40-<50	1182	13.7	712	8.2	29	0.3
		50-<60	2331	27	845	9.8	54	0.6
		60-<70	1718	19.9	490	5.7	27	0.3
		70-<80	639	7.4	127	1.5	15	0.2
		≥80	48	0.6	6	0.1	1	0
		<b>Total</b>	<b>6116</b>	<b>70.8</b>	<b>2383</b>	<b>27.6</b>	<b>138</b>	<b>1.6</b>
	Female	20-<30	1	0.1	2	0.1	0	0
		30-<40	21	1.1	10	0.5	0	0
		40-<50	163	8.3	44	2.2	3	0.2
		50-<60	485	24.7	91	4.6	8	0.4
		60-<70	653	33.2	70	3.6	9	0.5
		70-<80	344	17.5	34	1.7	5	0.3
		≥80	18	0.9	4	0.2	0	0
		<b>Total</b>	<b>1685</b>	<b>85.8</b>	<b>255</b>	<b>13</b>	<b>25</b>	<b>1.3</b>

**Table 2.5.4 Age-gender distribution of patients who underwent PCI, by pre-morbid dyslipidaemia, NCVD-PCI Registry, 2007-2009**

Year	Gender	Age Group	Pre-morbid dyslipidaemia					
			Yes		No		Not Known	
			No.	%	No.	%	No.	%
2007	Male	20-<30	7	0.2	3	0.1	2	0.1
		30-<40	103	3.5	31	1.1	1	0
		40-<50	481	16.4	132	4.5	27	0.9
		50-<60	864	29.4	214	7.3	54	1.8
		60-<70	576	19.6	136	4.6	38	1.3
		70-<80	195	6.6	41	1.4	11	0.4
		≥80	14	0.5	6	0.2	0	0
		<b>Total</b>	<b>2240</b>	<b>76.3</b>	<b>563</b>	<b>19.2</b>	<b>133</b>	<b>4.5</b>
	Female	20-<30	2	0.3	0	0	0	0
		30-<40	4	0.6	0	0	1	0.1
		40-<50	62	9.1	10	1.5	6	0.9
		50-<60	164	24	32	4.7	9	1.3
		60-<70	202	29.6	46	6.7	11	1.6
		70-<80	94	13.8	24	3.5	9	1.3
		≥80	4	0.6	2	0.3	0	0
		<b>Total</b>	<b>532</b>	<b>78</b>	<b>114</b>	<b>16.7</b>	<b>36</b>	<b>5.3</b>
2008	Male	20-<30	2	0.1	2	0.1	1	0
		30-<40	79	2.9	35	1.3	8	0.3
		40-<50	426	15.4	177	6.4	21	0.8
		50-<60	760	27.4	268	9.7	45	1.6
		60-<70	472	17.1	171	6.2	34	1.2
		70-<80	180	6.5	58	2.1	11	0.4
		≥80	17	0.6	1	0	0	0
		<b>Total</b>	<b>1936</b>	<b>69.9</b>	<b>712</b>	<b>25.7</b>	<b>120</b>	<b>4.3</b>
	Female	20-<30	1	0.2	0	0	0	0
		30-<40	8	1.3	2	0.3	1	0.2
		40-<50	43	7.1	11	1.8	3	0.5
		50-<60	131	21.6	31	5.1	5	0.8
		60-<70	163	26.9	61	10.1	13	2.1
		70-<80	84	13.9	38	6.3	5	0.8
		≥80	1	0.2	4	0.7	1	0.2
		<b>Total</b>	<b>431</b>	<b>71.1</b>	<b>147</b>	<b>24.3</b>	<b>28</b>	<b>4.6</b>

**Table 2.5.4 Age-gender distribution of patients who underwent PCI, by pre-morbid dyslipidaemia, NCVD-PCI Registry, 2007-2009**

Year	Gender	Age Group	Pre-morbid dyslipidaemia					
			Yes		No		Not Known	
			No.	%	No.	%	No.	%
2009	Male	20-<30	4	0.1	4	0.1	0	0
		30-<40	95	3.2	29	1	7	0.2
		40-<50	472	16.1	153	5.2	34	1.2
		50-<60	754	25.7	224	7.6	47	1.6
		60-<70	600	20.5	169	5.8	39	1.3
		70-<80	206	7	64	2.2	15	0.5
		≥80	11	0.4	5	0.2	1	0
		<b>Total</b>	<b>2142</b>	<b>73</b>	<b>648</b>	<b>22.1</b>	<b>143</b>	<b>4.9</b>
	Female	20-<30	0	0	0	0	0	0
		30-<40	12	1.8	2	0.3	1	0.1
		40-<50	60	8.9	13	1.9	2	0.3
		50-<60	163	24.1	44	6.5	5	0.7
		60-<70	174	25.7	52	7.7	10	1.5
		70-<80	85	12.6	34	5	10	1.5
		≥80	5	0.7	4	0.6	1	0.1
		<b>Total</b>	<b>499</b>	<b>73.7</b>	<b>149</b>	<b>22</b>	<b>29</b>	<b>4.3</b>
All	Male	20-<30	13	0.2	9	0.1	3	0
		30-<40	277	3.2	95	1.1	16	0.2
		40-<50	1379	16	462	5.3	82	0.9
		50-<60	2378	27.5	706	8.2	146	1.7
		60-<70	1648	19.1	476	5.5	111	1.3
		70-<80	581	6.7	163	1.9	37	0.4
		≥80	42	0.5	12	0.1	1	0
		<b>Total</b>	<b>6318</b>	<b>73.2</b>	<b>1923</b>	<b>22.3</b>	<b>396</b>	<b>4.6</b>
	Female	20-<30	3	0.2	0	0	0	0
		30-<40	24	1.2	4	0.2	3	0.2
		40-<50	165	8.4	34	1.7	11	0.6
		50-<60	458	23.3	107	5.4	19	1
		60-<70	539	27.4	159	8.1	34	1.7
		70-<80	263	13.4	96	4.9	24	1.2
		≥80	10	0.5	10	0.5	2	0.1
		<b>Total</b>	<b>1462</b>	<b>74.4</b>	<b>410</b>	<b>20.9</b>	<b>93</b>	<b>4.7</b>

**Table 2.5.5 Age-gender distribution of patients who underwent PCI, by family history of premature cardiovascular disease, NCVD-PCI Registry, 2007-2009**

Year	Gender	Age Group	Family history of premature cardiovascular disease					
			Yes		No		Not Known	
			No.	%	No.	%	No.	%
2007	Male	20-<30	3	0.1	7	0.2	2	0.1
		30-<40	39	1.3	89	3	7	0.2
		40-<50	145	4.9	432	14.7	63	2.1
		50-<60	175	6	817	27.8	140	4.8
		60-<70	86	2.9	570	19.4	94	3.2
		70-<80	30	1	165	5.6	52	1.8
		≥80	0	0	17	0.6	3	0.1
		<b>Total</b>	<b>478</b>	<b>16.3</b>	<b>2097</b>	<b>71.4</b>	<b>361</b>	<b>12.3</b>
	Female	20-<30	0	0	2	0.3	0	0
		30-<40	4	0.6	1	0.1	0	0
		40-<50	19	2.8	46	6.7	13	1.9
		50-<60	38	5.6	148	21.7	19	2.8
		60-<70	41	6	185	27.1	33	4.8
		70-<80	12	1.8	94	13.8	21	3.1
		≥80	0	0	6	0.9	0	0
		<b>Total</b>	<b>114</b>	<b>16.7</b>	<b>482</b>	<b>70.7</b>	<b>86</b>	<b>12.6</b>
2008	Male	20-<30	1	0	3	0.1	1	0
		30-<40	31	1.1	76	2.7	15	0.5
		40-<50	118	4.3	440	15.9	66	2.3
		50-<60	170	6.1	750	27.1	153	5.5
		60-<70	76	2.7	485	17.6	116	4.2
		70-<80	26	0.9	184	6.6	39	1.4
		≥80	1	0	13	0.5	4	0.1
		<b>Total</b>	<b>423</b>	<b>15.3</b>	<b>1951</b>	<b>70.5</b>	<b>394</b>	<b>14.2</b>
	Female	20-<30	0	0	1	0.2	0	0
		30-<40	2	0.3	8	1.3	1	0.2
		40-<50	11	1.8	36	5.9	10	1.7
		50-<60	32	5.3	102	16.8	33	5.4
		60-<70	28	4.6	177	29.2	32	5.3
		70-<80	14	2.3	93	15.3	20	3.3
		≥80	1	0.2	4	0.7	1	0.2
		<b>Total</b>	<b>88</b>	<b>14.5</b>	<b>421</b>	<b>69.5</b>	<b>97</b>	<b>16</b>



**Table 2.5.5 Age-gender distribution of patients who underwent PCI, by family history of premature cardiovascular disease, NCVD-PCI Registry, 2007-2009**

Year	Gender	Age Group	Family history of premature cardiovascular disease					
			Yes		No		Not Known	
			No.	%	No.	%	No.	%
2009	Male	20-<30	3	0.1	5	0.2	0	0
		30-<40	38	1.3	89	3	4	0.1
		40-<50	181	6.2	445	15.2	33	1.1
		50-<60	281	9.6	674	23	70	2.4
		60-<70	196	6.7	571	19.5	41	1.4
		70-<80	67	2.3	199	6.8	19	0.6
		≥80	3	0.1	12	0.4	2	0.1
		<b>Total</b>	<b>769</b>	<b>26.2</b>	<b>1995</b>	<b>68</b>	<b>169</b>	<b>5.8</b>
	Female	20-<30	0	0	0	0	0	0
		30-<40	7	1	8	1.2	0	0
		40-<50	24	3.5	47	6.9	4	0.6
		50-<60	44	6.5	154	22.7	14	2.1
		60-<70	49	7.2	177	26.1	10	1.5
		70-<80	23	3.4	94	13.9	12	1.8
		≥80	1	0.1	7	1	2	0.3
		<b>Total</b>	<b>148</b>	<b>21.9</b>	<b>487</b>	<b>71.9</b>	<b>42</b>	<b>6.2</b>
All	Male	20-<30	7	0.1	15	0.2	3	0
		30-<40	108	1.3	254	2.9	26	0.3
		40-<50	444	5.1	1317	15.2	162	1.9
		50-<60	626	7.2	2241	25.9	363	4.2
		60-<70	358	4.1	1626	18.8	251	2.9
		70-<80	123	1.4	548	6.3	110	1.3
		≥80	4	0	42	0.5	9	0.1
		<b>Total</b>	<b>1670</b>	<b>19.3</b>	<b>6043</b>	<b>70</b>	<b>924</b>	<b>10.7</b>
	Female	20-<30	0	0	3	0.2	0	0
		30-<40	13	0.7	17	0.9	1	0.1
		40-<50	54	2.7	129	6.6	27	1.4
		50-<60	114	5.8	404	20.6	66	3.4
		60-<70	118	6	539	27.4	75	3.8
		70-<80	49	2.5	281	14.3	53	2.7
		≥80	2	0.1	17	0.9	3	0.2
		<b>Total</b>	<b>350</b>	<b>17.8</b>	<b>1390</b>	<b>70.7</b>	<b>225</b>	<b>11.5</b>

**Table 2.5.6 Age-gender distribution of patients who underwent PCI, by smoking status, NCVD-PCI Registry, 2007-2009**

Year	Gender	Age Group	Smoking status							
			Never		Former (quit more than 30 days)		Current (any tobacco use within last 30 days)		Unknown	
			No.	%	No.	%	No.	%	No.	%
2007	Male	20-<30	1	0	4	0.1	6	0.2	1	0
		30-<40	19	0.6	42	1.4	52	1.8	22	0.7
		40-<50	137	4.7	209	7.1	198	6.7	96	3.3
		50-<60	310	10.6	413	14.1	188	6.4	221	7.5
		60-<70	219	7.5	262	8.9	91	3.1	178	6.1
		70-<80	78	2.7	82	2.8	22	0.7	65	2.2
		≥80	5	0.2	10	0.3	2	0.1	3	0.1
		<b>Total</b>	<b>769</b>	<b>26.2</b>	<b>1022</b>	<b>34.8</b>	<b>559</b>	<b>19</b>	<b>586</b>	<b>20</b>
	Female	20-<30	2	0.3	0	0	0	0	0	0
		30-<40	4	0.6	0	0	1	0.1	0	0
		40-<50	60	8.8	3	0.4	3	0.4	12	1.8
		50-<60	170	24.9	3	0.4	4	0.6	28	4.1
		60-<70	218	32	8	1.2	8	1.2	25	3.7
		70-<80	106	15.5	4	0.6	2	0.3	15	2.2
		≥80	5	0.7	0	0	0	0	1	0.1
		<b>Total</b>	<b>565</b>	<b>82.8</b>	<b>18</b>	<b>2.6</b>	<b>18</b>	<b>2.6</b>	<b>81</b>	<b>11.9</b>
2008	Male	20-<30	0	0	2	0.1	3	0.1	0	0
		30-<40	13	0.5	34	1.2	65	2.3	10	0.4
		40-<50	138	5	178	6.4	225	8.1	83	3
		50-<60	284	10.3	346	12.5	243	8.8	200	7.2
		60-<70	199	7.2	208	7.5	100	3.6	170	6.1
		70-<80	74	2.7	76	2.7	32	1.2	67	2.4
		≥80	5	0.2	5	0.2	1	0	7	0.3
		<b>Total</b>	<b>713</b>	<b>25.8</b>	<b>849</b>	<b>30.7</b>	<b>669</b>	<b>24.2</b>	<b>537</b>	<b>19.4</b>
	Female	20-<30	1	0.2	0	0	0	0	0	0
		30-<40	9	1.5	0	0	2	0.3	0	0
		40-<50	46	7.6	2	0.3	1	0.2	8	1.3
		50-<60	140	23.1	2	0.3	1	0.2	24	4
		60-<70	199	32.8	5	0.8	8	1.3	25	4.1
		70-<80	100	16.5	6	1	2	0.3	19	3.1
		≥80	6	1	0	0	0	0	0	0
		<b>Total</b>	<b>501</b>	<b>82.7</b>	<b>15</b>	<b>2.5</b>	<b>14</b>	<b>2.3</b>	<b>76</b>	<b>12.5</b>

Table 2.5.6 Age-gender distribution of patients who underwent PCI, by smoking status, NCVD-PCI Registry, 2007-2009

Year	Gender	Age Group	Smoking status							
			Never		Former (quit more than 30 days)		Current (any tobacco use within last 30 days)		Unknown	
			No.	%	No.	%	No.	%	No.	%
2009	Male	20-<30	3	0.1	0	0	5	0.2	0	0
		30-<40	24	0.8	48	1.6	56	1.9	3	0.1
		40-<50	132	4.5	233	7.9	248	8.5	46	1.6
		50-<60	305	10.4	389	13.3	230	7.8	101	3.4
		60-<70	275	9.4	311	10.6	144	4.9	78	2.7
		70-<80	123	4.2	109	3.7	19	0.6	34	1.2
		≥80	7	0.2	8	0.3	0	0	2	0.1
		<b>Total</b>	<b>869</b>	<b>29.6</b>	<b>1098</b>	<b>37.4</b>	<b>702</b>	<b>23.9</b>	<b>264</b>	<b>9</b>
	Female	20-<30	0	0	0	0	0	0	0	0
		30-<40	13	1.9	0	0	1	0.1	1	0.1
		40-<50	65	9.6	6	0.9	1	0.1	3	0.4
		50-<60	194	28.7	2	0.3	1	0.1	15	2.2
		60-<70	208	30.7	8	1.2	5	0.7	15	2.2
		70-<80	111	16.4	3	0.4	3	0.4	12	1.8
		≥80	8	1.2	0	0	1	0.1	1	0.1
		<b>Total</b>	<b>599</b>	<b>88.5</b>	<b>19</b>	<b>2.8</b>	<b>12</b>	<b>1.8</b>	<b>47</b>	<b>6.9</b>
All	Male	20-<30	4	0	6	0.1	14	0.2	1	0
		30-<40	56	0.6	124	1.4	173	2	35	0.4
		40-<50	407	4.7	620	7.2	671	7.8	225	2.6
		50-<60	899	10.4	1148	13.3	661	7.7	522	6
		60-<70	693	8	781	9	335	3.9	426	4.9
		70-<80	275	3.2	267	3.1	73	0.8	166	1.9
		≥80	17	0.2	23	0.3	3	0	12	0.1
		<b>Total</b>	<b>2351</b>	<b>27.2</b>	<b>2969</b>	<b>34.4</b>	<b>1930</b>	<b>22.3</b>	<b>1387</b>	<b>16.1</b>
	Female	20-<30	3	0.2	0	0	0	0	0	0
		30-<40	26	1.3	0	0	4	0.2	1	0.1
		40-<50	171	8.7	11	0.6	5	0.3	23	1.2
		50-<60	504	25.6	7	0.4	6	0.3	67	3.4
		60-<70	625	31.8	21	1.1	21	1.1	65	3.3
		70-<80	317	16.1	13	0.7	7	0.4	46	2.3
		≥80	19	1	0	0	1	0.1	2	0.1
		<b>Total</b>	<b>1665</b>	<b>84.7</b>	<b>52</b>	<b>2.6</b>	<b>44</b>	<b>2.2</b>	<b>204</b>	<b>10.4</b>

**Table 2.5.7 Age-gender distribution of patients who underwent PCI, by new onset of angina, NCVD-PCI Registry, 2007-2009**

Year	Gender	Age Group	New onset of angina					
			Yes		No		Unknown	
			No.	%	No.	%	No.	%
2007	Male	20-<30	4	0.1	8	0.3	0	0
		30-<40	29	1	105	3.6	1	0
		40-<50	146	5	486	16.6	8	0.3
		50-<60	256	8.7	856	29.2	20	0.7
		60-<70	165	5.6	562	19.1	23	0.8
		70-<80	69	2.4	172	5.9	6	0.2
		≥80	4	0.1	14	0.5	2	0.1
		<b>Total</b>	<b>673</b>	<b>22.9</b>	<b>2203</b>	<b>75</b>	<b>60</b>	<b>2</b>
	Female	20-<30	0	0	2	0.3	0	0
		30-<40	1	0.1	3	0.4	1	0.1
		40-<50	15	2.2	59	8.7	4	0.6
		50-<60	45	6.6	156	22.9	4	0.6
		60-<70	60	8.8	187	27.4	12	1.8
		70-<80	33	4.8	90	13.2	4	0.6
		≥80	2	0.3	4	0.6	0	0
		<b>Total</b>	<b>156</b>	<b>22.9</b>	<b>501</b>	<b>73.5</b>	<b>25</b>	<b>3.7</b>
2008	Male	20-<30	2	0.1	2	0.1	1	0
		30-<40	30	1.1	89	3.2	3	0.1
		40-<50	131	4.7	482	17.4	11	0.4
		50-<60	200	7.2	851	30.7	22	0.8
		60-<70	136	4.9	527	19	14	0.5
		70-<80	62	2.2	180	6.5	7	0.3
		≥80	7	0.3	10	0.4	1	0
		<b>Total</b>	<b>568</b>	<b>20.5</b>	<b>2141</b>	<b>77.3</b>	<b>59</b>	<b>2.1</b>
	Female	20-<30	0	0	1	0.2	0	0
		30-<40	3	0.5	7	1.2	1	0.2
		40-<50	15	2.5	40	6.6	2	0.3
		50-<60	43	7.1	121	20	3	0.5
		60-<70	60	9.9	170	28.1	7	1.2
		70-<80	34	5.6	90	14.9	3	0.5
		≥80	3	0.5	3	0.5	0	0
		<b>Total</b>	<b>158</b>	<b>26.1</b>	<b>432</b>	<b>71.3</b>	<b>16</b>	<b>2.6</b>



Table 2.5.7 Age-gender distribution of patients who underwent PCI, by new onset of angina, NCVD-PCI Registry, 2007-2009

Year	Gender	Age Group	New onset of angina					
			Yes		No		Unknown	
			No.	%	No.	%	No.	%
2009	Male	20-<30	2	0.1	6	0.2	0	0
		30-<40	41	1.4	90	3.1	0	0
		40-<50	190	6.5	464	15.8	5	0.2
		50-<60	306	10.4	710	24.2	9	0.3
		60-<70	203	6.9	599	20.4	6	0.2
		70-<80	89	3	195	6.6	1	0
		≥80	10	0.3	7	0.2	0	0
		<b>Total</b>	<b>841</b>	<b>28.7</b>	<b>2071</b>	<b>70.6</b>	<b>21</b>	<b>0.7</b>
	Female	20-<30	0	0	0	0	0	0
		30-<40	5	0.7	10	1.5	0	0
		40-<50	16	2.4	59	8.7	0	0
		50-<60	62	9.2	150	22.2	0	0
		60-<70	70	10.3	164	24.2	2	0.3
		70-<80	48	7.1	76	11.2	5	0.7
		≥80	4	0.6	6	0.9	0	0
		<b>Total</b>	<b>205</b>	<b>30.3</b>	<b>465</b>	<b>68.7</b>	<b>7</b>	<b>1</b>
All	Male	20-<30	8	0.1	16	0.2	1	0
		30-<40	100	1.2	284	3.3	4	0
		40-<50	467	5.4	1432	16.6	24	0.3
		50-<60	762	8.8	2417	28	51	0.6
		60-<70	504	5.8	1688	19.5	43	0.5
		70-<80	220	2.5	547	6.3	14	0.2
		≥80	21	0.2	31	0.4	3	0
		<b>Total</b>	<b>2082</b>	<b>24.1</b>	<b>6415</b>	<b>74.3</b>	<b>140</b>	<b>1.6</b>
	Female	20-<30	0	0	3	0.2	0	0
		30-<40	9	0.5	20	1	2	0.1
		40-<50	46	2.3	158	8	6	0.3
		50-<60	150	7.6	427	21.7	7	0.4
		60-<70	190	9.7	521	26.5	21	1.1
		70-<80	115	5.9	256	13	12	0.6
		≥80	9	0.5	13	0.7	0	0
		<b>Total</b>	<b>519</b>	<b>26.4</b>	<b>1398</b>	<b>71.1</b>	<b>48</b>	<b>2.4</b>



**Table 2.6.0 Presence of cumulative risk factors, NCVD-PCI Registry, 2007-2009**

Presence of cumulative risk factors *	2007		2008		2009		ALL	
	No.	%	No.	%	No.	%	No.	%
None	51	1.4	54	1.6	44	1.2	149	1.4
1 risk factor	232	6.4	252	7.5	240	6.6	724	6.8
2 risk factors	697	19.3	721	21.4	603	16.7	2021	19.1
3 risk factors	1184	32.7	1076	31.9	942	26.1	3202	30.2
>3 risk factors	1454	40.2	1271	37.7	1781	49.3	4506	42.5

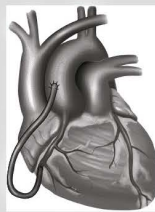
\* Risk factors are defined as presence of dyslipidaemia, hypertension, diabetes, family history of premature cardiovascular disease, smoking and obesity

**Table 2.6.1 Presence of cumulative risk factors by gender, NCVD-PCI Registry, 2007-2009**

Gender	Presence of cumulative risk factors *	2007		2008		2009		ALL	
		No.	%	No.	%	No.	%	No.	%
Male	None	39	1.3	43	1.6	34	1.2	116	1.3
	1 risk factor	185	6.3	205	7.4	200	6.8	590	6.8
	2 risk factors	562	19.1	570	20.6	465	15.9	1597	18.5
	3 risk factors	948	32.3	877	31.7	729	24.9	2554	29.6
	>3 risk factors	1202	40.9	1073	38.8	1505	51.3	3780	43.8
Female	None	12	1.8	11	1.8	10	1.5	33	1.7
	1 risk factor	47	6.9	47	7.8	40	5.9	134	6.8
	2 risk factors	135	19.8	151	24.9	138	20.4	424	21.6
	3 risk factors	236	34.6	199	32.8	213	31.5	648	33
	>3 risk factors	252	37	198	32.7	276	40.8	726	36.9

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





## CHAPTER 3: CLINICAL PRESENTATIONS & INVESTIGATIONS

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Patient's heart rate (HR) and blood pressure were recorded at the beginning of the procedure. For all patients over the years 2007 to 2009, the mean heart rate was 72 (SD 16) beats per minute, mean systolic blood pressure (SBP) was 138 mm Hg (SD 26), and mean diastolic blood pressure (DBP) was 77 mm Hg (SD 13) (Table 3.1).

Thrombolysis in myocardial infarction (TIMI) risk index is derived from age, heart rate and SBP, i.e.  $TIMI\ risk\ index = [HR \times (age/10)^2] / SBP$ . The three strata of risk categories are: low (<30), intermediate (30-70) and high (>70). This simple risk index provides important information about mortality in patients with acute coronary syndrome (ACS). The majority of cases in this cohort (93%) had low TIMI risk index (<30) (Table 3.1).

Eighty-seven percent of patients were in sinus rhythm; atrial fibrillation was noted in 1% of cases. New York Heart Association (NYHA) classes for the cohort were as follows: class I, 68%; class II, 25%; class III, 2% and class IV, 0.7%. Canadian Cardiology Society Score (CCS) for the cohort were class I, 36%; class II, 39%; class III, 5% and class IV, 3%.

Mean left ventricular ejection fraction was 52% (SD 13) and 46% of all patients had EF  $\geq$  55% at the time of procedure (Table 3.1).

44% of all patients had a history of ACS and among those, 52% were ST-elevation myocardial infarction (STEMI), 38% were non-ST-elevation myocardial infarction (NSTEMI) about 10% were unstable angina (UA) patients. Among the STEMI patients, 54% were anterior MI (Table 3.1).

Time-to-treatment analysis of STEMI patients revealed a median symptom-to-door time of 120 minutes, median door-to-balloon time of 90 minutes and median transfer time of 180 minutes. About 50% all STEMI patients had door-to-balloon time less than 90 minutes (Table 3.1).

STEMI patients presented to non-cardiac centers had a median transfer-to-PCI time of 98 minutes. However, compared to STEMI without transfer, the door-to-balloon time was shorter (Table 3.2).

The above mentioned findings had an almost similar trend over three years.

### Summary

1. The majority of patients (93%) undergoing PCI had low TIMI risk index (<30) at presentation.
2. 44% of all cases had a history of acute coronary syndrome, more than 50% of ACS was STEMI cases and more than 50% of STEMI were anterior MI.
3. Door-to-balloon time for STEMI was still higher than the recommended guidelines in many of the cases.



**Table 3.1 Patient clinical status at time of PCI procedure, NCVD-PCI Registry, 2007-2009**

	2007 Total No. of Procedures =3928		2008 Total No. of Procedures =3654		2009 Total No. of Procedures =3916		ALL Total No. of Procedures =11498	
	No.	%	No.	%	No.	%	No.	%
<b>Clinical examination</b>								
<b>Heart rate at presentation, beats/minute</b>								
N	3631		3174		3815		10620	
Mean(SD)	71 (16)		71 (16)		72 (16)		72 (16)	
Median, (min,max)	69 (25,181)		69 (26,193)		70 (32,167)		70 (25,193)	
Missing	297	8	480	13	101	3	878	8
<b>Heart rate at presentation, beats/minute, No. (%)</b>								
< 90	3185	88	2814	89	3299	86	9298	88
≥ 90	446	12	360	11	516	14	1322	12
<b>Systolic blood pressure, mmHg</b>								
N	3630		3147		3795		10572	
Mean(SD)	140 (26)		139 (27)		136 (25)		138 (26)	
Median, (min,max)	139 (62,227)		137 (60,230)		134 (60,230)		137 (60,230)	
Missing	298	8	507	14	121	3	926	8
<b>Systolic blood pressure, mmHg, No. (%)</b>								
< 90	45	1	43	1	42	1	130	1
≥ 90	3585	99	3104	99	3753	99	10442	99
<b>Diastolic blood pressure, mmHg (n=3626)</b>								
N	3633		3145		3797		10575	
Mean(SD)	77 (13)		77 (13)		77 (13)		77 (13)	
Median, (min,max)	78 (13,120)		78 (16,120)		78 (10,120)		78 (10,120)	
Missing	295	8	509	14	119	3	923	8
<b>TIMI Risk Index (TRI)</b>								
N	3533		3068		3778		10379	
Mean(SD)	17.00 (8.00)		17.00 (8.00)		18.00 (8.00)		18.00 (8.00)	
Median (min,max)	16 (3,90)		16 (4,87)		17 (3,77)		16 (3,90)	
Missing	395	11	586	19	138	4	1119	11
<b>TRI Classification, No. (%)</b>								
Low <30	3322	94	2863	93	3482	92	9667	93
Intermediate 30-70	205	6	202	7	294	8	701	7
High >70	6	0	3	0	2	0	11	0

Table 3.1 Patient clinical status at time of PCI procedure, NCVD-PCI Registry, 2007-2009

	2007 Total No. of Procedures =3928		2008 Total No. of Procedures =3654		2009 Total No. of Procedures =3916		ALL Total No. of Procedures =11498	
	No.	%	No.	%	No.	%	No.	%
Baseline ECG, No. (%)								
Sinus rhythm	3358	85	3140	86	3495	89	9993	87
Atrial fibrillation	31	1	34	1	42	1	107	1
2 <sup>nd</sup> /3 <sup>rd</sup> AVB	21	1	22	1	22	1	65	1
LBBB	20	1	14	0	24	1	58	1
RBBB	22	1	26	1	43	1	91	1
NYHA, No. (%) (among patients with history of heart failure only)								
N	133	119	210	462	133	119	210	462
NYHA I	36	27.1	40	33.6	36	27.1	40	33.6
NYHA II	65	48.9	56	47.1	65	48.9	56	47.1
NYHA III	22	16.5	15	12.6	22	16.5	15	12.6
NYHA IV	5	3.8	8	6.7	5	3.8	8	6.7
Not Available	5	3.8	0	0	5	3.8	0	0
Functional Ischaemia, No. (%)								
Not Available	3024	77	2810	76.9	3089	78.9	8923	77.6
Positive	707	18	645	17.7	703	18	2055	17.9
Negative	50	1.3	104	2.8	66	1.7	220	1.9
Equivocal	31	0.8	46	1.3	35	0.9	112	1
Not Available	116	3	49	1.3	23	0.6	188	1.6
Canadian Cardiovascular Score (CCS), No. (%)								
CCS 1	1284	33	1034	28	1799	46	4117	36
CCS 2	1542	39	1720	47	1174	30	4436	39
CCS 3	184	5	196	5	157	4	537	5
CCS 4	130	3	96	3	87	2	313	3
Asymptomatic	267	7	487	13	600	15	1354	12
Not Available	521	13	121	3	99	3	741	6
Intra-Aortic Balloon Pump (IABP), No. (%)								
Yes	70	1.8	70	1.9	71	1.8	211	1.8
No	3777	96.2	3568	97.6	3825	97.7	11170	97.1
Not Available	81	2.1	16	0.4	20	0.5	117	1
Acute Coronary Syndrome, No. (%)								
Yes	1322	33.7	1389	38	2343	59.8	5054	44
No	2530	64.4	2263	61.9	1573	40.2	6366	55.4
Not Available	76	1.9	2	0.1	0	0	78	0.7

Table 3.1 Patient clinical status at time of PCI procedure, NCVD-PCI Registry, 2007-2009

	2007 Total No. of Procedures =3928		2008 Total No. of Procedures =3654		2009 Total No. of Procedures =3916		ALL Total No. of Procedures =11498	
	No.	%	No.	%	No.	%	No.	%
ACS Type, No. (%)								
STEMI	661	50	693	49.9	1274	54.4	2628	52
NSTEMI	496	37.5	581	41.8	820	35	1897	37.5
UA	147	11.1	104	7.5	242	10.3	493	9.8
Not Available	18	1.4	11	0.8	7	0.3	36	0.7
STEMI, No. (%)								
Anterior	342	56	354	56	732	60	1428	58
Non-Anterior	216	36	191	30	437	36	844	34
Not Available	48	8	88	14	46	4	182	7
Ejection Fraction (EF) Status,								
N	792		1236		2062		4090	
Mean (SD)	51(13)		52(14)		52(12)		52(13)	
Median (min,max)	53 (18,80)		53 (15,80)		52 (15,80)		53 (15,80)	
Not Available	3136	80	2418	66	1854	48	7408	65
Ejection Fraction (EF) Status, No. (%)								
< 30	42	5	72	6	68	3	182	4
30 - < 45	188	24	284	23	474	23	946	23
45 - ≤ 55	186	23	317	26	589	29	1092	27
≥ 55	376	47	563	46	931	45	1870	46
Killip Class, No. (%) (STEMI only)								
I	248	37.5	287	41.4	467	36.7	1002	38.1
II	59	8.9	61	8.8	462	36.3	582	22.1
III	17	2.6	11	1.6	33	2.6	61	2.3
IV	28	4.2	24	3.5	35	2.7	87	3.3
Not Applicable / Not Available	309	46.7	310	44.7	277	21.7	896	34.1
STEMI : Time-to-Treatment Analysis								
Symptom-to-door (min)								
N	56		41		32		129	
Mean (SD)	181(145)		147(151)		165(147)		167(147)	
Median (min,max)	128 (0,659)		113 (0,720)		123 (10,716)		120 (0,720)	
Not Available	605	92	652	94	1242	97	2499	95

Table 3.1 Patient clinical status at time of PCI procedure, NCVD-PCI Registry, 2007-2009

	<b>2007 Total No. of Procedures =3928</b>		<b>2008 Total No. of Procedures =3654</b>		<b>2009 Total No. of Procedures =3916</b>		<b>ALL Total No. of Procedures =11498</b>	
	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
<b>Door-to-Balloon (min)</b>								
<b>N</b>	<b>89</b>		<b>93</b>		<b>141</b>		<b>323</b>	
<b>Mean (SD)</b>	<b>129 (126)</b>		<b>144 (159)</b>		<b>130 (133)</b>		<b>134 (139)</b>	
<b>Median (min,max)</b>	<b>97 (0,868)</b>		<b>90 (7,870)</b>		<b>85 (0,842)</b>		<b>90 (0,870)</b>	
<b>Not Available</b>	<b>572</b>	<b>87</b>	<b>600</b>	<b>87</b>	<b>1133</b>	<b>89</b>	<b>2305</b>	<b>88</b>
<b>Door-to-Balloon (min), No. (%)</b>								
<b>&lt; 90</b>	<b>40</b>	<b>45</b>	<b>46</b>	<b>49</b>	<b>75</b>	<b>53</b>	<b>161</b>	<b>50</b>
<b>≥ 90</b>	<b>49</b>	<b>55</b>	<b>47</b>	<b>51</b>	<b>66</b>	<b>47</b>	<b>162</b>	<b>50</b>
<b>Transfer Time</b>								
<b>N</b>	<b>57</b>		<b>39</b>		<b>39</b>		<b>135</b>	
<b>Mean (SD)</b>	<b>182(261)</b>		<b>179(212)</b>		<b>180(210)</b>		<b>180(232)</b>	
<b>Median (min,max)</b>	<b>75 (0,1260)</b>		<b>105 (0,840)</b>		<b>105 (0,855)</b>		<b>98 (0,1260)</b>	
<b>Not Available</b>	<b>604</b>	<b>91</b>	<b>654</b>	<b>94</b>	<b>1235</b>	<b>97</b>	<b>2493</b>	<b>95</b>



**Table 3.2 Time to treatment for STEMI, comparing patients with or without transfer, NCVD-PCI Registry, 2007**

Year		With transfer				Without transfer			
		Mean	SD	Median	Min, Max	Mean	SD	Median	Min, Max
2007	N	48				8			
	Symptom- to -door (minutes)	176.7	150.6	121.5	(0, 659)	210.0	105.4	210.0	(33, 366)
	N	41				48			
	Door- to -balloon (minutes)	111.2	112.8	85.0	(0, 542)	143.3	136.4	112.5	(28, 868)
	N	57				-	-		
	Transfer- to-PCI centre (minutes)	181.6	260.8	75.0	(0, 1260)	-	-		
	N	37				47			
	Symptom- to-balloon (minutes)	419.9	200.5	400.0	(90, 806)	303.0	153.1	268.0	(84, 719)
2008	N	35				6			
	Symptom- to -door (minutes)	142.4	126.0	113.0	(0, 480)	177.3	269.4	88.0	(15, 720)
	N	31				62			
	Door- to -balloon (minutes)	107.7	155.1	60.0	(17, 680)	162.7	159.6	111.5	(7, 870)
	N	39				-	-		
	Transfer- to-PCI centre (minutes)	178.7	212.4	105.0	(0, 840)	-	-		
	N	29				53			
	Symptom- to-balloon (minutes)	358.7	209.3	330.0	(63, 868)	347.1	203.6	300.0	(32, 945)
2009	N	28				4			
	Symptom- to -door (minutes)	148.4	113.1	121.5	(10, 407)	281.5	297.3	167.5	(75, 716)
	N	31				110			
	Door- to -balloon (minutes)	128.4	170.2	70.0	(0, 842)	129.9	120.8	90.0	(6, 639)
	N	39				-	-		
	Transfer- to-PCI centre (minutes)	179.6	209.6	105.0	(0, 855)	-	-		
	N	26				95			
	Symptom- to-balloon (minutes)	366.9	252.3	261.0	(41, 967)	336.1	214.3	284.0	(36, 974)



Table 3.2 Time to treatment for STEMI, comparing patients with or without transfer, NCVD-PCI Registry, 2007

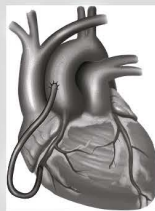
Year		With transfer				Without transfer			
		Mean	SD	Median	Min, Max	Mean	SD	Median	Min, Max
All	N	111				18			
	Symptom- to -door (minutes)	158.7	134.1	120.0	(0, 659)	215.0	207.5	151.0	(15, 720)
	N	103				220			
	Door- to -balloon (minutes)	115.3	143.7	72.0	(0, 842)	142.1	136.2	101.0	(6, 870)
	N	135				-	-		
	Transfer- to-PCI centre (minutes)	180.2	231.7	98.0	(0, 1260)	-	-		
	N	92				195			
	Symptom- to-balloon (minutes)	385.6	365.0	(41, 967)		331.1	198.0	285.0	(32, 974)

Table 3.3 Comparison of heart rate according to PCI status, NCVD-PCI Registry, 2007-2009

Year	Heart rate (beats/min)	Elective		NSTEMI/UA		AMI		Not Available	
		No.	%	No.	%	No.	%	No.	%
2007	≤60	626	18	26	14	18	10	2	18
	60-80	2018	57	88	46	59	32	6	55
	> 80-100	527	15	45	24	61	34	1	9
	>100	104	3	18	9	31	17	1	9
	Not Available	270	8	13	7	13	7	1	9
	Total	3545	100	190	100	182	100	11	100
2008	≤60	614	18	14	8	21	14	1	33
	60-80	1761	53	82	47	51	33	2	67
	> 80-100	416	13	44	25	39	25	0	0
	>100	82	2	13	8	34	22	0	0
	Not Available	450	14	20	12	10	6	0	0
	Total	3323	100	173	100	155	100	3	100
2009	≤60	649	19	22	13	16	7	4	25
	60-80	2042	58	81	50	83	34	8	50
	> 80-100	586	17	43	26	83	34	4	25
	>100	132	4	11	7	51	21	0	0
	Not Available	86	2	6	4	9	4	0	0
	Total	3495	100	163	100	242	100	16	100
All	≤60	1889	18	62	12	55	9	7	23
	60-80	5821	56	251	48	193	33	16	53
	> 80-100	1529	15	132	25	183	32	5	17
	>100	318	3	42	8	116	20	1	3
	Not Available	806	8	39	7	32	6	1	3
	Total	10363	100	526	100	579	100	30	100

**Table 3.4 Comparison of heart rate according to ACS subtypes, NCVD-PCI Registry, 2007-2009**

Year	Heart rate (beats/min)	STEMI		NSTEMI		UA		NA	
		No.	%	No.	%	No.	%	No.	%
2007	≤60	86	13	97	19.6	19	12.9	3	16.7
	60-80	335	50.7	261	52.6	80	54.4	9	50
	> 80-100	148	22.4	94	19	29	19.7	3	16.7
	>100	47	7.1	25	5	4	2.7	1	5.6
	Not Available	45	6.8	19	3.8	15	10.2	2	11.1
	<b>Total</b>	661	100	496	100	147	100	18	100
2008	≤60	92	13.3	108	18.6	13	12.5	3	27.3
	60-80	352	50.8	310	53.4	59	56.7	4	36.4
	> 80-100	129	18.6	108	18.6	19	18.3	1	9.1
	>100	59	8.5	26	4.5	4	3.8	0	0
	Not Available	61	8.8	29	5	9	8.7	3	27.3
	<b>Total</b>	693	100	581	100	104	100	11	100
2009	≤60	193	15.1	143	17.4	53	21.9	0	0
	60-80	693	54.4	463	56.5	132	54.5	3	42.9
	> 80-100	286	22.4	156	19	32	13.2	1	14.3
	>100	82	6.4	44	5.4	9	3.7	0	0
	Not Available	20	1.6	14	1.7	16	6.6	3	42.9
	<b>Total</b>	1274	100	820	100	242	100	7	100
All	≤60	371	14.1	348	18.3	85	17.2	6	16.7
	60-80	1380	52.5	1034	54.5	271	55	16	44.4
	> 80-100	563	21.4	358	18.9	80	16.2	5	13.9
	>100	188	7.2	95	5	17	3.4	1	2.8
	Not Available	126	4.8	62	3.3	40	8.1	8	22.2
	<b>Total</b>	2628	100	1897	100	493	100	36	100



## **CHAPTER 4: PROCEDURAL DETAILS**

### **4.1 PROCEDURAL SETTINGS**

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This chapter summarizes the procedural details and treatment received by patients who underwent PCI in 2007-2009 based on our registry.

Over the 3 years period from 2007-2009, a total of 11,498 PCI procedures were performed. The majority of the PCI were performed as Elective case (90.1%; n=10,263). Five percent (5%) (n=579) of the total procedures were performed for Acute Myocardial Infarction (AMI) and 4.6% (n=526) were for NSTEMI/UA (Table 4.1.1).

Femoral is the most common approach for percutaneous entry for PCI which accounts for 59% (n=6472), followed by Radial which is 40% (n=4374). There has been an increasing trend of radial approach from 36% in 2007 to 44% in 2009 (Table 4.1.1). The other site includes brachial 1%. In emergency cases (NSTEMI/UA), Femoral approach is the more preferred choice at 78% (n=394) (Table 4.1.6).

The size of percutaneous access was measured based on the French size. 79.1% (n=9090) of patients had a size 6 French, 16.3% (n=1876) size 7 French, 1.3% (n=135) size 5 French and 1% (n=114) size 8 French (Table 4.1.1).

As for the methods of closure for percutaneous entry, we used 2.5% (n=287) of seal and 1.9% (n=214) suture. The majority of the cases (93%; n=10697) had no closure device and were manually compressed (Table 4.1.1).

Looking at the extent of coronary artery disease, 53.1% (n=6110), we found that PCI were performed in multiple vessel disease, 46.1% (n=5301) in single vessel disease and the remaining were grafts (1.1%; n=130) and Left Main disease (0.7%; n=82) (Table 4.1.1).

The mean fluoroscopy time was 21 minutes (SD 19), and the median was 15min (2,180). The mean dose of radiation was 686mGy (SD 2203), median dose was 123mGy (3, 47351) (Table 4.1.1).

Most of the contrasts used for these procedures were non ionic in 86% (n=9868). Only 2% (n=192) were ionic. The mean contrast volume was 177 mls (SD 66), and the median was 160 ml (Table 4.1.1).

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

19.5% (n=513) of STEMI patients received thrombolytic treatment prior to the procedure. Of these patients, 24.6% (n=126) received thrombolysis more than 7 days before procedure, 34.7% (n=178) within 12-24 hours and 6.8% (n=35) received it within less than 3 hours (Table 4.1.1).

6% (n=689) of PCI received GP IIb/IIIa blocker, and in this group of patients, 42% (n=289) received it prior to PCI, 40% (n=275) received it during procedure and 9.0% (n=65) received it after the procedure (Table 4.1.1).



Intravenous unfractionated Heparin was given in 92% (n=10565). In 80% (n=8418), Heparin were given during the procedure, and 17% (n=1845) were given prior to the procedure (Table 4.1.1).

Four-percent (n=512) of patients received low molecular weight heparin (LMWH). The majority 83% (n=423) of these patients received prior to procedure, 6% (n=30) received it during procedure and 6% (n=31) received it after procedure (Table 4.1.1).

Both Aspirin and Clopidogrel are the two most common antiplatelet agents used in PCI. Aspirin use is in 97% (n=11,147) and Clopidogrel in 98% (n=11,278). In both Aspirin and Clopidogrel use, 94% of cases were given prior to the procedure. The most common loading dose for Clopidogrel is 300mg which accounts for 47% (n=5265) of cases and 5% (n=526) received a loading dose of 600mg. 37% (n=4161) received only 75mg prior to the PCI (these patients had been on long term Clopidogrel therapy prior to procedure). Ticlopidine was only used in 3% (n=350) of cases (Table 4.1.1).

Following PCI, the duration of Clopidogrel will depend on the clinical setting and the type of stents implanted. About 24.1% (n=2774) of the cases were planned for 1 month of Clopidogrel, 5.8% (n=670) for 3 months, 12.5% (n=1432) for 6 months, 38.7% (n=4454) for 12 months and 11.2% (n=1291) for longer than 1 year (Table 4.1.5).

### Summary

1. The majority of PCI performed in Malaysia from 2007-2009 were performed as Elective case (90.1%).
2. Femoral access remains the most common percutaneous entry; however, radial approach is becoming more popular (36% in 2007 to 40% in 2009).
3. 53.1% of PCI were performed in multiple vessel disease and 46.1% in single vessel disease.
4. Clopidogrel and Aspirin are the two most common antiplatelet therapies for patients undergoing coronary intervention and more than 90% received Clopidogrel as loading dose. Those who did not receive loading dose of Clopidogrel had been on long term Clopidogrel therapy prior to the procedure.

**Table 4.1.1 Characteristics of PCI procedures performed, NCVD-PCI Registry, 2007-2009**

	<b>2007 Total No. of Procedures =3928</b>		<b>2008 Total No. of Procedures =3654</b>		<b>2009 Total No. of Procedures =3916</b>		<b>ALL Total No. of Procedures =11498</b>	
	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
<b>PCI Status, No. (%)</b>								
Elective	3545	90.2	3323	90.9	3495	89.2	10363	90.1
NSTEMI/UA	190	4.8	173	4.7	163	4.2	526	4.6
AMI	182	4.6	155	4.2	242	6.2	579	5
Not Available	11	0.3	3	0.1	16	0.4	30	0.3
<b>Percutaneous entry, No. (%)</b>								
Brachial	28	1	39	1	47	1	114	1
Radial	1331	36	1336	39	1707	44	4374	40
Femoral	2340	63	2050	59	2082	54	6472	59
<b>French size, No. (%)</b>								
5	15	0.4	35	1	85	2.2	135	1.2
6	2902	73.9	2908	79.6	3280	83.8	9090	79.1
7	801	20.4	575	15.7	500	12.8	1876	16.3
8	50	1.3	42	1.1	22	0.6	114	1
Others	0	0	0	0	1	0	1	0
Not Available	1	0	0	0	2	0.1	3	0
<b>Closure device, No. (%)</b>								
No	3619	92.1	3393	92.9	3685	94.1	10697	93
Seal	83	2.1	82	2.2	122	3.1	287	2.5
Suture	40	1	127	3.5	47	1.2	214	1.9
Others	6	0.2	1	0	17	0.4	24	0.2
Not Available	180	4.6	51	1.4	45	1.1	276	2.4
<b>Extent of Coronary disease, No. (%)</b>								
Single vessel disease	1706	43.4	1626	44.5	1969	50.3	5301	46.1
Multiple vessel disease	2172	55.3	2016	55.2	1922	49.1	6110	53.1
Graft	38	1	49	1.3	43	1.1	130	1.1
Left main	36	0.9	29	0.8	17	0.4	82	0.7
<b>Fluoroscopy time, minutes</b>								
N	3153		3139		3754		10046	
Mean(SD)	22 (22)		21 (19)		19 (16)		21 (19)	
Median(min,max)	16 (2,180)		16 (2,180)		15 (2,180)		15 (2,180)	
Not Available	775	20	515	14	162	4	1452	13
<b>Total dose, mGy</b>								
N	1480		1209		1774		4463	
Mean(SD)	615 (2650)		769 (2466)		689 (1484)		686 (2203)	
Median(min,max)	122 (3,47351)		118 (3,39166)		129 (4,18341)		123 (3,47351)	
Not Available	2448	62	2445	67	2142	55	7035	61

Table 4.1.1 Characteristics of PCI procedures performed, NCVD-PCI Registry, 2007-2009

	2007 Total No. of Procedures =3928		2008 Total No. of Procedures =3654		2009 Total No. of Procedures =3916		ALL Total No. of Procedures =11498	
	No.	%	No.	%	No.	%	No.	%
Contrast type, No. (%)								
Ionic	156	4	20	1	16	0	192	2
Non-ionic	2977	76	3022	83	3869	99	9868	86
Not Available	795	20	612	17	31	1	1438	13
Contrast volume, ml								
N	3223		3173		3765		10161	
Mean(SD)	180 (72)		176 (64)		175 (63)		177 (66)	
Median(min,max)	165 (25,500)		160 (18,480)		160 (15,500)		160 (15,500)	
Not Available	705	18	481	13	151	4	1337	12
Thrombolytics prior to PCI Procedure in STEMI, No. (%)								
Yes	129	19.5	159	22.9	225	17.7	513	19.5
No	527	79.7	534	77.1	1049	82.3	2110	80.3
Not Available	5	0.8	0	0	0	0	5	0.2
Thrombolytics given prior to PCI Procedure in STEMI, No. (%)								
<3 hrs	17	13.2	8	5	10	4.4	35	6.8
3-6 hrs	14	10.9	12	7.5	9	4	35	6.8
6-12 hrs	13	10.1	13	8.2	16	7.1	42	8.2
12-24 hrs	27	20.9	62	39	89	39.6	178	34.7
1-7 days	13	10.1	17	10.7	32	14.2	62	12.1
>7 days	33	25.6	35	22	58	25.8	126	24.6
Not Available	12	9.3	12	7.5	11	4.9	35	6.8
Adjunctive pharmacotherapy								
IIb/IIIa Blockade, No. (%)								
Yes	247	6	226	6	216	6	689	6
No	3648	93	3428	94	3700	94	10776	94
Missing	33	1	0	0	0	0	33	0
IIb/IIIa Blockade given, No. (%)								
Prior	101	41	79	35	109	50	289	42
After	21	9	20	9	24	11	65	9
During	98	40	104	46	73	34	275	40
Not Available	27	11	23	10	10	5	60	9
Heparin, No. (%)								
Yes	3531	90	3267	89	3767	96	10565	92
No	381	10	387	11	149	4	917	8
Not Available	16	0	0	0	0	0	16	0



Table 4.1.1 Characteristics of PCI procedures performed, NCVD-PCI Registry, 2007-2009

	2007 Total No. of Procedures =3928		2008 Total No. of Procedures =3654		2009 Total No. of Procedures =3916		ALL Total No. of Procedures =11498	
	No.	%	No.	%	No.	%	No.	%
Heparin given, No. (%)								
Prior	681	19	485	15	679	18	1845	17
After	8	0	5	0	13	0	26	0
During	2724	77	2681	82	3013	80	8418	80
Not Available	118	3	96	3	62	2	276	3
LMWH, No. (%)								
Yes	210	5	152	4	150	4	512	4
No	3661	93	3502	96	3766	96	10929	95
Not Available	57	1	0	0	0	0	57	0
LMWH given, No. (%)								
Prior	165	79	130	86	128	85	423	83
After	19	9	5	3	7	5	31	6
During	12	6	9	6	9	6	30	6
Not Available	14	7	8	5	6	4	28	5
Ticlopidine, No. (%)								
Yes	152	4	100	3	98	3	350	3
No	3738	95	3554	97	3818	97	11110	97
Not Available	38	1	0	0	0	0	38	0
Ticlopidine given, No. (%)								
Prior	132	87	92	92	91	93	315	90
After	2	1	1	1	2	2	5	1
During	2	1	2	2	1	1	5	1
Not Available	16	11	5	5	4	4	25	7
Aspirin, No. (%)								
Yes	3751	95	3559	97	3837	98	11147	97
No	162	4	95	3	79	2	336	3
Not Available	15	0	0	0	0	0	15	0
Aspirin given, No. (%)								
Prior	3440	92	3349	94	3735	97	10524	94
After	40	1	14	0	21	1	75	1
During	58	2	15	0	22	1	95	1
Not Available	213	6	181	5	59	2	453	4
Clopidogrel, No. (%)								
Yes	3831	98	3584	98	3863	99	11278	98
No	90	2	70	2	53	1	213	2
Not Available	7	0	0	0	0	0	7	0

Table 4.1.1 Characteristics of PCI procedures performed, NCVD-PCI Registry, 2007-2009

	2007 Total No. of Procedures =3928		2008 Total No. of Procedures =3654		2009 Total No. of Procedures =3916		ALL Total No. of Procedures =11498	
	No.	%	No.	%	No.	%	No.	%
Clopidogrel given, No. (%)								
Prior	3567	93	3320	93	3663	95	10550	94
After	72	2	85	2	137	4	294	3
During	97	3	72	2	46	1	215	2
Not Available	95	2	107	3	17	0	219	2
Prior, No. (%)								
<6 hrs	615	17	634	19	547	15	1796	17
6-12 hrs	1181	33	791	24	894	24	2866	27
>34-72 hrs	315	9	380	11	1084	30	1779	17
>72 hrs	1164	33	1250	38	978	27	3392	32
Not Available	292	8	265	8	160	4	717	7
First starting dose, No. (%)								
75 mg	1331	35	1142	32	1688	44	4161	37
300 mg	1802	47	1676	47	1787	46	5265	47
600 mg	282	7	169	5	75	2	526	5
>600 mg	1	0	0	0	0	0	1	0
Not Available	415	11	597	17	313	8	1325	12
Loading Dose (STEMI Only), No. (%)								
75	190	29	192	28	574	46	956	37
300	340	52	368	54	587	47	1295	50
600	67	10	34	5	17	1	118	5
>600	1	0	0	0	0	0	1	0
Not Available	60	9	88	13	77	6	225	9
Planned duration of Clopidogrel/Ticlopidine, No. (%)								
1 month	1008	25.7	894	24.5	872	22.3	2774	24.1
3 months	267	6.8	187	5.1	216	5.5	670	5.8
6 months	834	21.2	299	8.2	299	7.6	1432	12.5
12 months	875	22.3	1642	44.9	1937	49.5	4454	38.7
>12 months	548	14	334	9.1	409	10.4	1291	11.2
Not Available	396	10.1	298	8.2	183	4.7	877	7.6



**Table 4.1.2 Comparison of STEMI and NSTEMI patients who received ad-hoc PCI, NCVD-PCI Registry, 2007-2009**

Year	Cath/PCI same lab visit	STEMI		NSTEMI	
		No.	%	No.	%
2007	Yes	591	89.4	453	91.3
	No	59	8.9	40	8.1
	Not Available	11	1.7	3	0.6
	Total	661	100	496	100
2008	Yes	584	84.3	472	81.2
	No	102	14.7	102	17.6
	Not Available	7	1	7	1.2
	Total	693	100	581	100
2009	Yes	1103	86.6	632	77.1
	No	161	12.6	182	22.2
	Not Available	10	0.8	6	0.7
	Total	1274	100	820	100
All	Yes	2278	86.7	1557	82.1
	No	322	12.3	324	17.1
	Not Available	28	1.1	16	0.8
	Total	2628	100.1	1897	100

**Table 4.1.3 Usage of thrombolytics in STEMI patients who underwent PCI, NCVD-PCI Registry, 2007-2009**

Year	PCI status	STEMI					
		Thrombolytics					
		Yes		No		Missing	
		No.	%	No.	%	No.	%
2007	Rescue	52	40.3	17	3.2	1	20
	Primary	3	2.3	91	17.3	1	20
	Not Available	74	57.4	419	79.5	3	60
	Total	129	100	527	100	5	100
2008	Rescue	46	28.9	20	3.7	0	0
	Primary	4	2.5	69	12.9	0	0
	Not Available	109	68.6	445	83.3	0	0
	Total	159	100	534	99.9	0	0
2009	Rescue	70	31.1	35	3.3	0	0
	Primary	8	3.6	107	10.2	0	0
	Not Available	147	65.3	907	86.5	0	0
	Total	225	100	1049	100	0	0
All	Rescue	168	32.7	72	3.4	1	20
	Primary	15	2.9	267	12.7	1	20
	Not Available	330	64.3	1771	83.9	3	60
	Total	513	99.9	2110	100	5	100

**Table 4.1.4 Patients who underwent PCI after thrombolytics therapy, NCVD-PCI Registry, 2007-2009**

Year	Thrombolytics given	PCI Status			
		Urgent		Rescue	
		No.	%	No.	%
2007	<3 hrs	5	17.9	11	20.8
	3-6 hrs	1	3.6	11	20.8
	6-12 hrs	4	14.3	7	13.2
	12-24 hrs	11	39.3	9	17.0
	>24 hrs	3	10.7	11	20.8
	Not Available	4	14.3	4	7.5
	<b>Total</b>	<b>28</b>	<b>100</b>	<b>53</b>	<b>100</b>
2008	<3 hrs	2	8.3	3	6.3
	3-6 hrs	3	12.5	7	14.6
	6-12 hrs	0	0	9	18.8
	12-24 hrs	12	50.0	17	35.4
	>24 hrs	6	25.0	9	18.8
	Not Available	1	4.2	3	6.3
	<b>Total</b>	<b>24</b>	<b>100</b>	<b>48</b>	<b>100</b>
2009	<3 hrs	5	15.6	5	6.9
	3-6 hrs	1	3.1	4	5.6
	6-12 hrs	2	6.3	10	13.9
	12-24 hrs	15	46.9	24	33.3
	>24 hrs	5	15.6	26	36.1
	Not Available	4	12.5	3	4.2
	<b>Total</b>	<b>32</b>	<b>100</b>	<b>72</b>	<b>100</b>
All	<3 hrs	12	14.3	19	11.0
	3-6 hrs	5	6.0	22	12.7
	6-12 hrs	6	7.1	26	15.0
	12-24 hrs	38	45.2	50	28.9
	>24 hrs	14	16.7	46	26.6
	Not Available	9	10.7	10	5.8
	<b>Total</b>	<b>84</b>	<b>100</b>	<b>173</b>	<b>100</b>

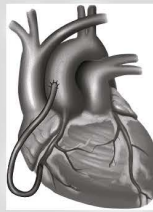
**Table 4.1.5 Duration of Thienopyridine in patients who underwent PCI, NCVD-PCI Registry, 2007-2009**

Year	Duration of Clopidogrel/Ticlopidine	Intracoronary devices used					
		Balloon only		Drug Eluting Stent		Bare Metal Stent	
		No.	%	No.	%	No.	%
2007	1 month	132	29	35	1	1039	44
	3 months	21	5	120	5	199	8
	6 months	95	21	709	30	376	16
	12 months	84	19	844	35	305	13
	>12 months	53	12	489	20	239	10
	Not Available	64	14	201	8	192	8
	Total	449	100	2398	100	2350	100
2008	1 month	108	28	19	1	914	50
	3 months	18	5	41	2	136	7
	6 months	39	10	235	9	141	8
	12 months	130	33	1714	68	412	23
	>12 months	36	9	352	14	101	6
	Not Available	60	15	167	7	117	6
	Total	391	100	2528	100	1821	100
2009	1 month	113	26	70	3	789	46
	3 months	29	7	30	1	136	8
	6 months	35	8	164	6	145	9
	12 months	176	40	2023	73	445	26
	>12 months	33	8	427	15	135	8
	Not Available	50	11	48	2	55	3
	Total	436	100	2762	100	1705	100
All	1 month	353	28	124	2	2742	47
	3 months	68	5	191	2	471	8
	6 months	169	13	1108	14	662	11
	12 months	390	31	4581	60	1162	20
	>12 months	122	10	1268	16	475	8
	Not Available	174	14	416	5	364	6
	Total	1276	100	7688	100	5876	100

**Table 4.1.6 Access site of patients who underwent procedures, by PCI status, NCVD-PCI Registry, 2007-2009**

Year		Elective		NSTEMI/UA		AMI		Not Available	
		No.	%	No.	%	No.	%	No.	%
2007	Brachial	28	1	0	0	0	0	28	1
	Radial	1276	38	37	20	0	0	1276	38
	Femoral	2030	61	145	80	0	0	2030	61
2008	Brachial	38	1	0	0	0	0	0	0
	Radial	1287	41	33	20	0	0	0	0
	Femoral	1780	57	132	80	0	0	0	0
2009	Brachial	42	1	2	1	0	0	0	0
	Radial	1622	47	42	26	0	0	0	0
	Femoral	1755	51	117	73	0	0	0	0
All	Brachial	108	1	2	0	0	0	0	0
	Radial	4185	42	112	22	0	0	0	0
	Femoral	5565	56	394	78	0	0	0	0





## 4.2 LESION CHARACTERISTICS

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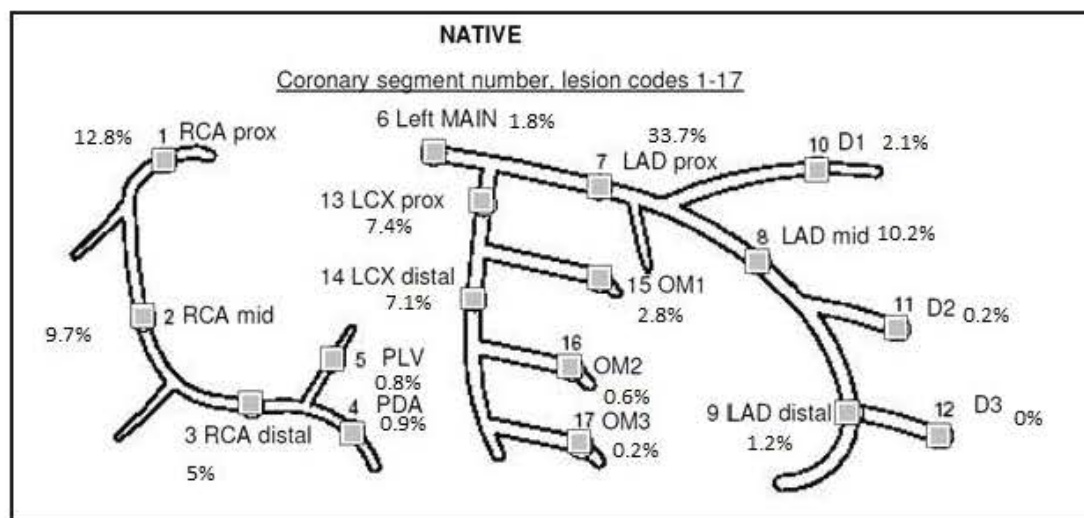




From 2007 to 2009, a total of 10,602 patients were admitted for PCI procedure. This registry reported 11,498 PCI procedures were done during the same period. A total of 15,538 lesions were treated with PCI. On average, 1.47 lesions per patient were treated with PCI and 1.35 lesions were treated during each procedure.

#### Anatomical location of the lesion

Figure 4.1 Anatomical location of lesions treated with Percutaneous Coronary Intervention, NCVD-PCI Registry, 2007-2009



Among the 15,538 lesions treated with PCI, proximal left anterior descending artery is the commonest lesion location (33.7%). This is followed by proximal right coronary artery (12.8%), mid left anterior descending artery (10.2%) and mid right coronary artery (9.7%). Left main stem PCI was performed in 1.8% of all PCI. PCI to the graft was performed in 204 lesions. Among the graft lesions, three lesions were in previous radial graft, twenty four lesions were located within the LIMA graft and one in the RIMA graft. The majority of lesions were in the saphenous vein grafts. (Table 4.2.1)

**Table 4.2.1 Summary of location of lesions treated with Percutaneous Coronary Intervention, NCVD-PCI Registry, 2007-2009**

Location of lesion	2007		2008		2009		All	
	No.	%	No.	%	No.	%	No.	%
<b>Left Main Stem</b>	<b>97</b>	<b>1.8</b>	<b>95</b>	<b>1.8</b>	<b>95</b>	<b>1.8</b>	<b>287</b>	<b>1.8</b>
<b>Left Anterior Descending Artery (LAD)</b>	<b>2646</b>	<b>47.9</b>	<b>2407</b>	<b>46.7</b>	<b>2473</b>	<b>47.5</b>	<b>7526</b>	<b>47.4</b>
LAD proximal	1906	34.5	1654	32.1	1780	34.2	5340	33.7
LAD mid	534	9.7	571	11.1	520	10	1625	10.2
LAD distal	73	1.3	62	1.2	50	1	185	1.2
D1	122	2.2	109	2.1	110	2.1	341	2.1
D2	9	0.2	10	0.2	11	0.2	30	0.2
D3	2	0	1	0	2	0	5	0
<b>Right Coronary Artery (RCA)</b>	<b>1654</b>	<b>30.1</b>	<b>1427</b>	<b>27.7</b>	<b>1559</b>	<b>30</b>	<b>4640</b>	<b>29.2</b>
RCA proximal	727	13.2	610	11.9	696	13.4	2033	12.8
RCA mid	567	10.3	472	9.2	506	9.7	1545	9.7
RCA distal	279	5.1	249	4.8	258	5	786	5
PDA	45	0.8	48	0.9	49	0.9	142	0.9
PLV	36	0.7	48	0.9	50	1	134	0.8
<b>Left Circumflex Artery (LCx)</b>	<b>998</b>	<b>18.1</b>	<b>931</b>	<b>18.2</b>	<b>952</b>	<b>18.4</b>	<b>2881</b>	<b>18.1</b>
LCX proximal	387	7	369	7.2	424	8.2	1180	7.4
LCX distal	412	7.5	374	7.3	344	6.6	1130	7.1
OM1	154	2.8	147	2.9	140	2.7	441	2.8
OM2	35	0.6	30	0.6	36	0.7	101	0.6
OM3	10	0.2	11	0.2	8	0.2	29	0.2
<b>Graft</b>	<b>60</b>	<b>1.0</b>	<b>84</b>	<b>1.7</b>	<b>60</b>	<b>1.0</b>	<b>204</b>	<b>1.3</b>
Saphenous Vein Graft	52	0.9	74	1.5	50	0.9	176	1.1
Left Internal Mammary Artery Graft	7	0.1	10	0.2	7	0.1	24	0.2
Right Internal Mammary Artery Graft					1	0.0	1	0.0
Radial Artery Graft	1	0.0			2	0.0	3	0.0

## Lesion characteristics

**Table 4.2.2 Characteristics of lesions treated by PCI, NCVD-PCI Registry, 2007-2009**

Lesion type	No.	%
De Novo	14614	92
Restenosis		
In Stent restenosis	740	5
Restenosis (No prior stent)	34	0
Stent thrombosis	80	1
Missing Data	400	3

The majority of the lesions treated in the registry are de novo (14614 lesions, 92%). In-stent restenosis (ISR) constitute a total of 740 lesions (5%). Acute stent thrombosis was very rare in the registry.

The mean lesion length was 23.5 mm (SD  $\pm$  14.2mm). The mean pre-procedure lesion estimated stenosis was 84.2% (SD  $\pm$  12.0%).

Most of the lesions were of type B (48%) followed by type C (36%). Among the lesions treated by PCI, about 28% were of high risk characteristics (such as ostial, bifurcation, totally occluded and thrombus). The cardiac centres involved in the registry were treating high risk lesions with PCI.

**Table 4.2.3 Prevalence of lesion according to American College of Cardiology (ACC) classifications, NCVD-PCI Registry, 2007-2009**

Lesion type	No.	%
A	1989	13
B1	4151	26
B2	3546	22
C	5711	36
Missing Data	471	3

**Table 4.2.4 Prevalence of high risk lesion type, NCVD-PCI Registry, 2007-2009**

Lesion type	No.	%
Ostial	1084	7
Bifurcation	1299	8
CTO<3mo	449	3
CTO>3mo	1132	7
Thrombus	530	3

Most of the lesions (92%) achieved TIMI 3 flow after the intervention (Table 4.2.5).

**Table 4.2.5 Comparison of TIMI flow grade before and after procedure, NCVD-PCI Registry, 2007-2009**

TIMI flow grade	Pre-Procedure (%)	Post-Procedure (%)
TIMI-0	1804 (11%)	265 (2%)
TIMI-1	1162 (7%)	80 (1%)
TIMI-2	3101 (20%)	170 (1%)
TIMI-3	9088 (57%)	14623 (92%)
Missing Data	713 (4%)	730 (5%)

## Type of Stents Used

**Table 4.2.6 Types of stents used, NCVD-PCI Registry, 2007-2009**

Type of stent	2007		2008		2009		All	
	No.	%	No.	%	No.	%	No.	%
Drug Eluting Stent	3469	54	3405	59	3624	62	10498	58
Bare Metal Stent	2864	44	2185	38	2061	35	7110	39
Antibody stent	109	2	127	2	133	2	369	2
Bio-absorbable polymer	20	0	50	1	69	1	139	1

A total of 18,116 stents were used in 15,538 lesions treated with PCI. An average of 1.17 stents was used per lesion treated. Drug eluting stents were used in 58% of PCI while bare metal stents were used in 39% of PCI. From 2007 to 2009, we notice a trend of reduction in bare metal stents usage and a trend of increase in drug eluting stents usage (Table 4.2.6).

About 17.6% of patients were treated with direct stenting. Balloon only angioplasty (POBA) without stenting was performed in 1276 (8%) patients. Drug eluting balloon was getting increasing popular over the registry period.

The mean stent length was 29.5 mm (standard deviation  $\pm$  17.0mm). The mean stent diameter was 3.0mm (SD  $\pm$  1.8mm).

## Lesion Complications during PCI

**Table 4.2.7 Types of post procedure complications, NCVD-PCI Registry, 2007-2009**

Type of complication	No.	% of procedure
Dissection	685	4
No reflow	195	1
Transient	130	
Persistent	43	
Non specified	22	
Acute closure	57	0
Perforation	49	0

The most common complication during PCI was vessel dissection. PCI failed in about 3.1% of lesions. Perforation and acute closure were rare during PCI.

## Additional Devices during PCI

Other devices were not commonly used during PCI. The most common additional devices used during PCI were cutting balloon and intravascular ultrasound.



**Table 4.2.8 Types of devices used during PCI, NCVD-PCI Registry, 2007-2009**

Device	No.	%
Cutting balloon	331	2
IVUS	603	4
Rotablator	134	1
Distal Embolic Protection	64	0
Other Intracoronary devices	915	6

**In stent restenosis (ISR)**

A total of 740 (5% of all lesions treated) in-stent restenosis (ISR) were noted in the 2007-2009 registry. Nearly all of the reported ISR occurred in the native coronary artery (97%). ISR within the saphenous vein graft occurred in 17 cases. No ISR was reported in the LIMA graft. The majority of the ISR (338 lesions, 46%) occurred in the previous drug eluting stent (DES) implantation. A total of 284 (38%) of ISR occurred in the previous bare metal stent (BMS) implantation.

**Table 4.2.9 Types of prior stents used in In-Stent Restenosis, NCVD-PCI Registry, 2007-2009**

Type of prior stent	No.	%
Bare Metal Stent	284	38
Drug Eluting Stent	338	46
Others	15	2
Missing Data	103	14

The mean estimated length of the lesions was 22.2 (SD  $\pm$ 14.6) mm. Among all the ISR, 12.6% of cases was of TIMI 0 flow. TIMI 3 flow was seen only in 53.7% of cases prior to intervention. Nearly all (94.2%) achieved TIMI 3 flow after the intervention.

A total of 273 cases of ISR presented as acute coronary syndrome (ACS). Most of them presented with myocardial infarct. Non ST elevation MI were the diagnosis of presentation in 44.3% and ST elevation MI was diagnosed in 37.7% of ISR. Unstable angina was diagnosed in 18% of patients with ISR presented with ACS.

Balloon angioplasty (including cutting balloon) without stenting was performed in 34% of cases. About half of the ISR's were treated with stenting. Most (75.3%) of the ISR's were treated with drug eluting stents. Bare metal stents were used in 19% of the ISR. The mean stent diameter was 4.0 (SD  $\pm$ 2.0) mm. The mean length of stents used was 29.5 (SD  $\pm$  18.3) mm. Direct stenting was not used as frequently as in naïve coronary artery lesion. Drug eluting balloons (DEB) have become increasingly popular over the three years. DEB was used in 10% of patients with ISR stenting.

**Table 4.2.10 Types of stents used in the In-Stent Restenosis, NCVD-PCI Registry, 2007-2009**

Type of stents used in the ISR	No.	%
Drug eluting stent	367	75
Bare metal stent	90	19
Antibody coated stent	3	1
Other stent	20	4

Cutting balloon was used more frequently among patients with ISR. A total of 20% of cases used cutting balloon in the intervention. Intravascular ultrasound (IVUS) guidance was used in about 18% of cases.

**Table 4.2.11 Types of devices used in the In-Stent Restenosis, NCVD-PCI Registry, 2007-2009**

Device	No.	% of all ISR cases
Cutting balloon	145	20
IVUS	130	18
Rotablator	4	1
Distal Embolic Protection	2	0
Other Intracoronary devices	32	4

Complications were uncommon in the intervention of in-stent restenosis. Dissection was the most common complication. PCI was unsuccessful in seven patients.

**Table 4.2.12 Types of complications in post In-Stent Restenosis, NCVD-PCI Registry, 2007-2009**

Type of complication	No.	% of Total Procedure
Dissection	17	2
Unsuccessful PCI	19	2.6
No reflow (transient)	4	1
Perforation	3	0

**PCI of left main stem****Table 4.2.13 Types of complications in post In-Stent Restenosis, NCVD-PCI Registry, 2007-2009**

Types of lesion	No.	%
De Novo	266	91
In-Stent Restenosis		8
Previous DES	14	
Previous BMS	4	
Missing data	2	1

A total of 291 LMS lesion interventions were performed from 2007 to 2009. Most of the lesions were of de novo lesions and 8% were in stent restenosis. The majority of the left main stem intervention was done on unprotected LMS. Indeed, only 44 (12.1%) patients have had previous bypass surgery. Most of the interventions were performed using femoral approach (74.9%) but radial approach was not uncommon (19.2%).

Most of the LMS interventions were done as elective cases. About 34.7% of all LMS interventions were performed in patients presented with acute coronary syndrome. We see an increasing trend of LMS interventions among patients with acute coronary syndrome over the years.

**Table 4.2.14 Clinical Presentation of Left Main Stem, NCVD-PCI Registry, 2007-2009**

Clinical Presentation	No.	% of total procedure
Elective PCI	189	65
Acute Coronary Syndrome		
ST elevation Myocardial Infarct	48	16.5
NSTEMI	39	13.4
Unstable Angina	13	4.5
Missing data	1	1

Mean pre-procedure lesion stenosis was 80.5% (SD  $\pm$ 13.6%). TIMI flow prior to PCI is presented in the table. The TIMI flow 3 was achieved in 95.9% of patients after the procedure.

**Table 4.2.15 TIMI Flow Prior to Intervention, NCVD-PCI Registry, 2007-2009**

TIMI flow Prior to Intervention	No.	%
TIMI-0	25	9
TIMI-1	19	7
TIMI-2	63	22
TIMI-3	179	62
Missing	5	2

The mean length of the lesions was 27.4 mm (SD  $\pm$ 18.4). Most lesions were stented. Direct stenting technique was used in six patients. Most of the lesions (86%) were stented with

drug eluting stents. The mean stent length was 34.4 mm (SD  $\pm$ 21.2) and the mean stent diameter was 5.2 mm (SD  $\pm$  2.5). This long length is most likely due to the operator stenting across the left main stem into either into the LAD or LCx.

**Table 4.2.16 TIMI Flow Prior to Intervention, NCVD-PCI Registry, 2007-2009**

Type of stents	No.	%
Drug Eluting Stent (DES)	381	86
Bare Metal Stent (BMS)	55	12
Antibody stent	6	1
Missing	1	0

LMS intervention with intravascular ultrasound (IVUS) was uncommon in this cohort of patients. Only 34% of the interventions were performed with IVUS guidance. Intra-aortic balloon pump support was used in 13.4% of patients undergoing LMS intervention.

**Table 4.2.17 Types of devices used in Left Main Stem, NCVD-PCI Registry, 2007-2009**

Device	No.	% of total LMS
IVUS	98	34
Intra aortic balloon pump	39	13.4
Rotablator	14	5
Cutting balloon	18	6
Distal Embolic Protection	11	4

#### PCI to the Grafts

A total of 204 PCI were performed in the bypass grafts. Most of the grafts were saphenous vein grafts (76.3%) and LIMA grafts (11.8%).

**Table 4.2.18 Lesion types, NCVD-PCI Registry, 2007-2009**

Lesion type	No.	%
De Novo	179	88
In Stent restenosis	4	2
Stent thrombosis	0	0
Restenosis (No prior stent)	17	8
Missing data	4	2

The mean length of the lesions was 34.4 mm (SD $\pm$ 21.2). TIMI flow before and after PCI is shown in the table.



**Table 4.2.19 Lesion types, NCVD-PCI Registry, 2007-2009**

<b>TIMI flow grade</b>	<b>Pre-Procedure</b>	<b>Post-Procedure</b>
TIMI-0	9	3
TIMI-1	19	0
TIMI-2	69	2
TIMI-3	103	195
Missing	4	4

Most patients were discharged with long term dual antiplatelet therapy. About 60% of patients were planned for dual antiplatelet therapy for twelve months or more.

**Table 4.2.20 Planned duration of dual antiplatelet therapy, NCVD-PCI Registry, 2007-2009**

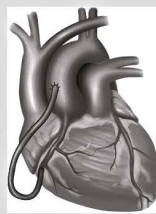
<b>Planned duration of dual antiplatelet therapy</b>	<b>No.</b>	<b>%</b>
1 month	33	16
3 months	6	3
6 months	26	13
12 months	109	53
>12 months	20	10
Missing data	10	5

### Summary

1. Both in stent re-stenosis (ISR) and stent thrombosis were uncommon; ISR accounted for 5% of the lesion treated. The incidence of stent thrombosis was only 1%.
2. Most (58%) of the lesions treated were type B2 or type C. 28% of the lesions had high risk characteristics.
3. There is a trend of increasing use of drug-eluting stents (DES). In our registry, DES comprised 58% of stents.
4. Procedural success was about 97%. Perforation and other major complications were very rare during PCI.
5. ISR in the previous DES accounted for 46% of the lesion and 3/4<sup>th</sup> of them were treated with DES.
6. 1.9% (291 lesions) of PCI included left main stem and only 34% were performed with IVUS guidance.







## **CHAPTER 5: OUTCOME**

### **5.1 IN-HOSPITAL OUTCOME**

### **5.2 OUTCOME AT DISCHARGE & AT 30-DAY FOLLOW UP**

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The overall in-hospital, all-cause mortality for the entire cohort for year 2007-2009 was 1% (123), of which 85% (104) were cardiac related, 2% (2) were renal related and the rest were related to other non-cardiac causes. Of total in-hospital mortality, 11.4% death occurred in cath-lab and 84.6% death occurred out of cath-lab.

The occurrences of post-procedural complications were low; cardiogenic shock in 1%, arrhythmia in 1%, bleeding 1% and new renal impairment in less than 1% of cases. Less than 1% (51) of patients had periprocedural MI and even smaller number (29) required emergency re-intervention/PCI. Only one patient needed bail-out CABG.

Only 6% (458) patients required readmission, of these patients, the majority (53%) of them were readmitted for planned PCI. Other reasons for readmission were recurrent angina, AMI, arrhythmia, heart failure, CABG and unplanned PCI.

Regarding medication, 94% of patients continued Clopidogrel during 1-year follow-up. The poor prognostic factors for in-hospital mortality among patients who underwent PCI were acute coronary syndrome (especially AMI) cases, higher Killip class at presentation and elderly patients. Female gender and diabetes showed a trend towards poor prognosis. Those who had heart rate of  $\geq 90$  beats/ minute at presentation had relatively longer hospital stay.

In patients who did not achieve TIMI III, post PCI had in-hospital mortality of 7% to 11%. The overall 30-day mortality was less than 1% (33), 6-month mortality was 1% (38) and 1-year mortality was 1% (27). All the above mentioned findings were almost consistent over three years.

### Summary

1. The overall mortality rate for PCI is comparable to other registries.
2. There were low incidences of post-procedural complications.
3. The poor prognostic factors for in-hospital mortality were emergency cases, higher Killip class at presentation, increasing age and diabetes.

## 5.1 IN-HOSPITAL OUTCOME

**Table 5.1.1 Summary of in-hospital outcome for patients who underwent PCI, NCVD-PCI Registry, 2007-2009**

	2007 Total No. of Procedures =3928		2008 Total No. of Procedures =3654		2009 Total No. of Procedures =3916		2007-2009 Total No. of Procedures =11498	
	No.	%	No.	%	No.	%	No.	%
Periprocedural MI, No. (%) (based on clinical diagnosis)								
Yes	18	0	12	0	21	1	51	0
No	3827	97	3632	99	3892	99	11351	99
Not Available	83	2	10	0	3	0	96	1
Emergency Reintervention/PCI, No. (%)								
Yes	15	0	5	0	9	0	29	0
No	3828	97	3645	100	3907	100	11380	99
Not Available	85	2	4	0	0	0	89	1
Bail-out CABG, No. (%)								
Yes	1	0	2	0	3	0	6	0
No	3848	98	3648	100	3913	100	11409	99
Not Available	79	2	4	0	0	0	83	1
<b>Other complications</b>								
Cardiogenic shock (after procedure), No. (%)	19	0	24	1	21	1	64	1
Arrhythmia(VT/VF/Brady), No. (%)	18	0	28	1	17	0	63	1
TIA/Stroke, No. (%)	3	0	2	0	1	0	6	0
Tamponade, No. (%)	4	0	0	0	2	0	6	0
Contrast reaction, No. (%)	4	0	3	0	2	0	9	0
New onset/worsened heart failure, No. (%)	8	0	1	0	3	0	12	0
New renal impairment, No. (%)	8	0	6	0	4	0	18	0
Max post procedural rise in creatinine, No. (%)	21	1	8	0	11	0	40	0



	2007 Total No. of Procedures =3928		2008 Total No. of Procedures =3654		2009 Total No. of Procedures =3916		2007-2009 Total No. of Procedures =11498	
	No.	No.	%	No.	%	No.	%	No.
Max post procedural rise in creatinine, micromol/L								
N	21		8		11		40	
Mean (SD)	401.14 (220.04)		387.11 (267.65)		304.91 (163.55)		371.87 (215.22)	
Median(min,max)	375 (86,880)		375 (95,890)		347 (134,651)		351 (86,890)	
<b>Vascular complications</b>								
Bleeding, No. (%)	36	1	29	1	14	0	79	1
Type of bleeding, No. (%)								
Major	3	8	2	7	0	0	5	6
Minor	4	11	5	17	4	29	13	16
Minimal	24	67	21	72	8	57	53	67
Not Available	5	14	1	3	2	14	8	10
Bleeding site, No. (%)								
Retroperitoneal	1	3	0	0	0	0	1	1
Percutaneous entry site	23	64	20	69	13	93	56	71
Others	5	14	3	10	1	7	9	11
Not Available	7	19	6	21	0	0	13	16
Access site occlusion, No. (%)	0	0	7	0	3	0	10	0
Loss distal pulse, No. (%)	0	0	2	0	0	0	2	0
Dissection, No. (%)	10	0	15	0	5	0	30	0
Pseudoaneurysm, No. (%)	4	0	3	0	1	0	8	0
Management of Pseudoaneurysm, No. (%)								
Ultrasound compression	0	0	0	0	0	0	0	0
Surgery	1	25	0	0	0	0	1	13
Others	1	25	1	33	1	100	3	38
Not Available	2	50	2	67	0	0	4	50

## 5.2 OUTCOME AT DISCHARGE & 30-DAY FOLLOW-UP

**Table 5.2.1a Overall outcome of patients who underwent PCI, NCVD-PCI Registry, 2007-2009**

	OUTCOME*	Overall outcome							
		Outcome at discharge		30-day**		6-month**		1-year**	
		No.	%	No.	%	No.	%	No.	%
2007	Death	39	1	46	1	52	1	61	2
	Alive	3579	99	1723	48	1300	36	1117	31
	Lost to follow-up	0	0	1849	51	2266	63	2440	67
2008	Death	43	1	53	1	67	2	76	3
	Alive	3331	99	2665	79	1793	53	1527	45
	Lost to follow-up	0	0	656	20	1514	45	1771	52
2009 <sup>†</sup>	Death	41	1	57	1	75	3	84	4
	Alive	3569	99	3175	88	2414	97	1959	96
	Lost to follow-up	0	0	378	11	0	0	0	0
All	Death	123	1	156	2	194	2	221	2
	Alive	10479	99	7563	71	5507	58	4603	51
	Lost to follow-up	0	0	2883	27	3781	40	4212	47

\*The outcome data is derived based on data matching with the National Death Register

\*\* Includes patients who died in hospital

<sup>†</sup>For year 2009, total for 6-month and 1-year follow up were based on cases registered in the database

Table 5.2.1b Overall outcome for patients who underwent PCI, by age group (years), NCVD-PCI Registry, 2007-2009

2007	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.	%
	Death	1	1	15	1	23	2	2	1	19	2	25	0	2	23	22	3	28	5	3	27	27	4	31	7
	Alive	153	99	2040	99	1386	98	69	95	1002	97	652	97	53	75	771	96	476	93	46	72	669	93	402	90
	Lost to follow-up	0	0	0	0	0	0	3	4	30	3	16	2	2	2	12	1	10	2	1	1	24	3	14	3
2008	Death	1	1	14	1	28	2	2	2	16	1	35	3	2	2	19	2	46	6	2	3	24	3	50	7
	Alive	138	99	1905	99	1288	98	109	92	1480	96	1076	94	82	88	983	92	728	89	65	83	827	91	635	89
	Lost to follow-up	0	0	0	0	0	0	7	6	46	3	31	3	9	10	70	6	42	5	11	14	54	6	30	4
2009	Death	0	0	15	1	26	2	1	1	20	1	36	3	2	2	27	2	46	4	2	2	30	3	52	6
	Alive	154	99	1956	99	1459	98	145	95	1729	94	1301	93	114	98	1331	95	969	93	83	93	1111	95	765	91
	Lost to follow-up	0	0	0	0	0	0	7	4	88	5	57	4	0	0	39	3	26	3	4	5	32	2	26	3
All	Death	2	0	44	1	77	2	5	2	55	1	96	3	6	2	68	2	120	5	7	3	81	3	133	7
	Alive	445	99	5901	99	4133	98	325	98	4212	95	3026	94	245	93	3090	94	2172	92	195	89	2607	93	1804	90
	Lost to follow-up	0	0	44	1	0	0	0	0	164	4	104	3	12	5	121	4	78	3	16	8	110	4	70	3

\*The outcome data is derived based on data matching with the National Death Register

\*\* Includes patients who died in hospital

Note: Total for 30-day, 6-month and 1-year follow up were based on cases registered in the database

Note: 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 5.2.1c Overall outcome of patients who underwent PCI, by gender, NCVD-PCI Registry, 2007-2009

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.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%	No.
2007	Death	29	1	10	1	36	2	10	3	10	3	39	3	13	6	48	5	13	7					
	Alive	2907	99	672	98	1431	95	292	95	1090	95	210	94	940	92	177	92							
	Lost to follow-up	0	0	0	0	43	3	6	2	23	2	1	0	36	3	3	1							
2008	Death	26	1	17	3	32	1	21	4	39	2	28	7	44	3	32	10							
	Alive	2742	99	589	97	2196	96	469	93	1456	91	337	87	1243	91	283	86							
	Lost to follow-up	0	0	0	0	67	3	17	3	99	7	22	6	80	6	15	4							
2009	Death	29	1	12	2	40	1	17	3	49	2	26	6	56	3	28	7							
	Alive	2904	99	665	98	2602	94	573	91	1988	95	426	91	1618	94	341	90							
	Lost to follow-up	0	0	0	0	115	5	37	6	49	3	17	3	50	3	12	3							
All	Death	84	1	39	2	108	2	48	3	127	3	67	6	148	4	73	8							
	Alive	8553	99	1926	98	6229	95	1334	93	4534	94	973	90	3802	92	801	89							
	Lost to follow-up	0	0	0	0	225	3	60	4	171	3	40	4	166	4	30	3							

\*The outcome data is derived based on data matching with the National Death Register

\*\* Includes patients who died in hospital

Note: Total for 30-day, 6-month and 1-year follow up were based on cases registered in the database

Table 5.2.1d Overall outcome of patients who underwent PCI, by pre-morbid diabetes, NCVD-PCI Registry, 2007-2009

OUTCOME*	Outcome at discharge						30-day**						6-month**						1-year**					
	Diabetic			Non-diabetic			Not known			Diabetic			Non-diabetic			Not known			Diabetic			Non-diabetic		
	No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%	
	No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%	
2007	Death	22	1	13	1	4	5	26	3	16	2	4	10	30	5	18	2	4	12	35	7	22	3	15
	Alive	1632	98	1878	99	69	94	745	96	944	96	34	83	549	93	721	96	30	88	466	91	628	93	85
	Lost to follow-up	0	0	0	0	0	0	24	3	22	2	3	7	10	2	14	2	0	0	12	2	27	4	0
2008	Death	22	1	18	1	3	4	27	2	22	1	4	7	38	4	25	2	4	10	44	6	28	3	10
	Alive	1502	98	1764	99	65	95	1192	95	1423	95	50	93	813	90	943	91	37	90	689	90	801	91	90
	Lost to follow-up	0	0	0	0	0	0	38	3	46	4	0	0	51	6	70	7	0	0	45	4	50	6	0
2009	Death	31	2	8	0	2	3	40	2	15	1	2	3	54	4	19	1	2	9	63	6	19	2	18
	Alive	1685	99	1806	100	78	97	1527	94	1597	94	50	86	1172	94	1224	95	18	82	952	92	1000	95	64
	Lost to follow-up	0	0	0	0	0	0	53	4	93	5	6	11	20	2	44	4	2	9	21	2	39	3	18
All	Death	75	2	39	1	9	4	93	3	53	1	10	6	122	4	62	2	10	11	132	6	69	3	12
	Alive	4819	98	5448	99	212	96	3454	94	3976	95	133	88	2530	93	2894	94	83	87	2110	91	2424	93	85
	Lost to follow-up	0	0	0	0	0	0	115	3	161	4	9	6	81	3	128	4	2	2	79	3	115	4	3

\*The outcome data is derived based on data matching with the National Death Register

\*\* Includes patients who died in hospital

Note: Total for 30-day, 6-month and 1-year follow up were based on cases registered in the database



Table 5.2.1e Overall outcome of patients who underwent PCI, by pre-morbid hypertension, NCVD-PCI Registry, 2007-2009

OUTCOME*	Outcome at discharge						30-day**						6-month**						1-year**								
	Hypertensive			Non-Hypertensive			Not known			Hypertensive			Non-Hypertensive			Not known			Hypertensive			Non-Hypertensive			Not known		
	No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%	
2007	Death	31	1	6	1	2	3	35	3	9	2	2	7	39	4	11	3	2	7	46	5	13	4	2	8		
	Alive	2660	98	857	99	62	97	1255	97	443	96	25	86	946	94	330	95	24	89	812	92	284	91	21	88		
	Lost to follow-up	0	0	0	0	0	0	36	2	11	2	2	7	17	2	6	2	1	4	23	3	15	5	1	4		
2008	Death	27	1	12	1	4	7	35	2	14	2	4	10	48	3	13	3	4	14	55	4	17	4	4	14		
	Alive	2392	99	885	98	53	93	1941	96	688	94	36	90	1313	91	456	89	24	86	1137	91	366	87	24	86		
	Lost to follow-up	0	0	0	0	0	0	52	2	32	4	0	0	79	6	42	8	0	0	59	5	36	9	0	0		
2009	Death	31	1	7	1	3	7	43	2	11	1	3	8	58	3	14	2	3	20	67	4	14	3	3	33		
	Alive	2660	99	870	99	39	93	2410	95	739	92	26	68	1868	95	536	94	10	67	1534	93	421	93	4	44		
	Lost to follow-up	0	0	0	0	0	0	86	3	57	7	9	24	40	2	24	4	2	13	41	3	19	4	2	22		
2010	Death	89	1	25	1	9	6	113	2	34	2	9	8	145	3	40	3	9	13	168	4	44	4	9	15		
	Alive	7712	98	2613	99	154	94	5596	95	1879	93	88	81	4131	94	1320	92	56	82	3481	92	1073	91	49	80		
	Lost to follow-up	0	0	0	0	0	0	174	3	100	5	11	11	137	3	71	5	3	5	125	4	68	5	3	5		

\*The outcome data is derived based on data matching with the National Death Register

\*\* Includes patients who died in hospital

Note: Total for 30-day, 6-month and 1-year follow up were based on cases registered in the database

Table 5.2.1f Overall outcome of patients who underwent PCI, by pre-morbid dyslipidaemia, NCVD-PCI Registry, 2007-2009

2007	OUTCOME*	Outcome at discharge						30-day**						6-month**						1-year**					
		Dyslipidaemic		Non-dyslipidaemic		Not known		Dyslipidaemic		Non-dyslipidaemic		Not known		Dyslipidaemic		Non-dyslipidaemic		Not known		Dyslipidaemic		Non-dyslipidaemic		Not known	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
	Death	24	1	8	1	7	4	28	2	11	3	7	7	33	3	12	4	7	9	40	5	13	5	8	12
	Alive	2748	99	669	99	162	95	1276	95	364	95	83	86	933	95	300	95	67	87	802	92	258	92	57	84
	Lost to follow-up	0	0	0	0	0	0	34	3	8	2	7	7	16	2	5	1	3	4	28	3	8	3	3	4
2008	Death	12	1	19	2	12	8	20	1	20	3	13	10	26	2	24	5	17	16	34	3	25	6	17	16
	Alive	2355	99	840	98	136	92	1874	97	676	92	115	89	1270	93	434	86	89	83	1088	92	350	85	89	83
	Lost to follow-up	0	0	0	0	0	0	47	2	36	5	1	1	73	5	47	9	1	1	59	5	35	9	1	1
2009	Death	26	1	12	2	3	2	38	1	16	2	3	2	53	3	19	4	3	6	61	4	20	6	3	13
	Alive	2615	99	785	98	169	98	2458	95	607	89	110	87	1971	96	401	91	42	84	1636	94	307	89	16	70
	Lost to follow-up	0	0	0	0	0	0	78	4	60	9	14	11	39	1	22	5	5	10	40	2	18	5	4	17
All	Death	62	1	39	2	22	4	86	1	47	3	23	7	111	3	56	4	27	12	134	4	59	6	28	14
	Alive	7718	99	2294	99	466	95	5604	96	1654	91	305	87	4174	95	1135	90	198	85	3522	93	917	89	164	82
	Lost to follow-up	0	0	0	0	0	0	157	3	107	6	21	6	127	2	75	6	9	3	128	3	60	5	8	5

\*The outcome data is derived based on data matching with the National Death Register

\*\* Includes patients who died in hospital

Note: Total for 30-day, 6-month and 1-year follow up were based on cases registered in the database

**Table 5.2.1g Overall outcome of patients who underwent PCI, by PCI status, NCVD-PCI Registry, 2007-2009**

	OUTCOME*	Outcome at discharge						30-day**						6-month**						1-year**					
		Effective			Non-Effective			Effective			Non-Effective			Effective			Non-Effective			Effective			Non-Effective		
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
2007																									
	Death	14	0	24	7	20	1	25	13	24	2	27	17	30	3	30	21								
	Alive	3265	99	307	93	1561	96	159	83	1169	96	128	82	1004	94	110	77								
	Lost to follow-up	0	0	0	0	41	3	8	4	22	2	2	1	37	3	2	2								
2008																									
	Death	11	0	32	11	17	1	36	16	28	2	39	21	37	2	39	24								
	Alive	3064	99	264	89	2478	96	185	80	1659	92	133	72	1414	92	112	69								
	Lost to follow-up	0	0	0	0	74	3	9	4	107	6	12	7	92	5	11	7								
2009																									
	Death	10	0	31	9	23	2	34	12	41	2	34	20	49	2	35	26								
	Alive	3233	100	320	91	2952	87	217	78	2281	96	130	77	1862	95	95	71								
	Lost to follow-up	0	0	0	0	122	11	26	10	62	2	4	3	58	3	4	3								
All																									
	Death	35	0	87	9	59	1	96	14	92	2	101	20	115	3	105	24								
	Alive	9562	99	891	91	6997	96	555	80	5115	95	384	76	4285	94	312	72								
	Lost to follow-up	0	0	0	0	236	3	44	6	191	3	18	4	177	3	17	4								

\*The outcome data is derived based on data matching with the National Death Register

\*\* Includes patients who died in hospital

Note: Total for 30-day, 6-month and 1-year follow up were based on cases registered in the database

Table 5.2.1h Overall outcome of patients who underwent PCI, by acute coronary syndrome, NCVD-PCI Registry, 2007-2009

	OUTCOME*	Outcome at discharge						30-day**						6-month**						1-year**					
		STEMI		NSTEMI		UA		STEMI		NSTEMI		UA		STEMI		NSTEMI		UA		STEMI		NSTEMI		UA	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
2007	Death	24	4	5	1	1	1	24	7	8	2	1	2	27	10	2	2	1	2	31	13	9	3	4	9
	Alive	568	96	464	99	128	99	308	90	350	96	61	95	226	88	322	96	54	96	194	83	310	95	41	89
	Lost to follow-up	0	0	0	0	0	0	11	3	7	2	2	3	5	2	5	2	1	2	10	4	6	2	1	2
2008	Death	28	4	6	1	1	1	32	6	9	2	2	3	36	9	13	3	2	3	37	11	15	5	3	5
	Alive	604	95	523	99	94	99	471	90	431	89	73	97	306	80	351	85	52	85	271	80	252	83	49	86
	Lost to follow-up	0	0	0	0	0	0	23	4	47	9	0	0	39	11	47	12	7	12	32	9	38	12	5	9
2009	Death	26	2	10	1	1	1	30	3	13	2	1	0	31	4	19	5	2	1	34	5	22	7	3	3
	Alive	1125	98	738	99	228	100	1008	92	592	91	199	98	805	94	372	93	140	97	653	92	285	92	107	94
	Lost to follow-up	0	0	0	0	0	0	53	5	48	7	4	2	21	2	7	2	3	2	23	3	3	1	4	3
All	Death	78	3	21	1	3	1	87	4	30	2	4	1	95	6	40	4	5	2	102	8	46	5	10	5
	Alive	2297	97	1824	98	450	99	1775	91	1388	91	337	97	1332	89	1040	91	250	93	1111	87	848	90	199	90
	Lost to follow-up	0	0	0	0	0	0	87	5	102	7	6	2	64	5	58	5	13	5	66	5	46	5	10	5

\*The outcome data is derived based on data matching with the National Death Register

\*\* Includes patients who died in hospital

Note: Total for 30-day, 6-month and 1-year follow up were based on cases registered in the database



**Table 5.2.2 Medication for patients who underwent PCI, NCVD-PCI Registry, 2007-2009**

	Medication	Outcome at discharge		30-day		6-month		1-year	
		No.	%	No.	%	No.	%	No.	%
2007	N	3561		1599		1226		1079	
	Aspirin	3401	96	1519	95	1168	95	1029	95
	Clopidogrel	3382	95	1520	95	1157	94	1020	95
	Ticlopidine	271	8	201	13	144	12	135	13
	**Dual antiplatelet	3285	92	1470	92	1125	92	991	92
	Statin	3199	90	1420	89	1080	88	950	88
	Beta blocker	2475	70	1099	69	840	69	739	68
	Ace inhibitor	1938	54	776	49	570	46	493	46
	ARB	468	13	207	13	153	12	126	12
	Warfarin	43	1	16	1	12	1	10	1
2008	N	3325		2519		1749		1479	
	Aspirin	3244	98	2469	98	1721	98	1454	98
	Clopidogrel	3144	95	2392	95	1664	95	1401	95
	Ticlopidine	109	3	86	3	57	3	55	4
	**Dual antiplatelet	3116	94	2381	95	1660	95	1400	95
	Statin	3074	92	2334	93	1605	92	1349	91
	Beta blocker	2455	74	1854	74	1304	75	1106	75
	Ace inhibitor	1847	56	1388	55	927	53	793	54
	ARB	467	14	365	14	253	14	220	15
	Warfarin	32	1	24	1	16	1	14	1
2009	N	3540		3059		2286		1845	
	Aspirin	3467	98	2996	98	2236	98	1798	97
	Clopidogrel	3357	95	2901	95	2174	95	1753	95
	Ticlopidine	145	4	135	4	105	5	93	5
	**Dual antiplatelet	3346	95	2894	95	2166	95	1744	95
	Statin	3309	93	2859	93	2144	94	1738	94
	Beta blocker	2497	71	2155	70	1634	71	1315	71
	Ace inhibitor	1874	53	1666	54	1307	57	1058	57
	ARB	524	15	471	15	364	16	320	17
	Warfarin	36	1	31	1	21	1	15	1
All	N	10,426		7177		5261		4403	
	Aspirin	10112	97	6984	97	5125	97	4281	97
	Clopidogrel	9883	95	6813	95	4995	95	4174	95
	Ticlopidine	525	5	422	6	306	6	283	6
	**Dual antiplatelet	9747	93	6745	94	4951	94	4135	94
	Statin	9582	92	6613	92	4829	92	4037	92
	Beta blocker	7427	71	5108	71	3778	72	3160	72
	Ace inhibitor	5659	54	3830	53	2804	53	2344	53
	ARB	1459	14	1043	15	770	15	666	15
	Warfarin	111	1	71	1	49	1	39	1

\* Available for those who are alive

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



**Table 5.2.3 Cause of death of patients who underwent PCI, NCVD-PCI Registry, 2007-2009**

	*Cause of death	Outcome at discharge		30-day**		6-month**		1-year**	
		No.	%	No.	%	No.	%	No.	%
2007	N	39		46		52		61	
	Cardiac	31	79	31	67	31	60	31	51
	Renal	0	0	0	0	0	0	0	0
	Other	2	5	2	4	2	4	2	3
	Infection	1	3	1	2	1	2	1	2
	Neurological	1	3	1	2	1	2	1	2
	Vascular	1	3	1	2	1	2	1	2
	Pulmonary	0	0	0	0	0	0	0	0
	Non cardiac	0	0	0	0	0	0	0	0
	Not Available	3	8	10	23	16	30	25	39
2008	N	43		53		67		76	
	Cardiac	39	91	39	76	39	58	39	51
	Renal	0	0	0	0	0	0	0	0
	Other	1	2	1	2	1	2	1	1
	Infection	1	2	1	2	1	2	1	1
	Neurological	1	2	1	2	1	2	1	1
	Vascular	0	0	0	0	0	0	0	0
	Pulmonary	0	0	0	0	0	0	0	0
	Non cardiac	0	0	0	0	0	0	0	0
	Not Available	1	2	11	18	25	36	34	45
2009	N	41		57		75		84	
	Cardiac	34	83	34	60	34	45	34	40
	Renal	2	5	2	4	2	3	2	2
	Other	3	7	3	5	3	4	3	4
	Infection	1	2	1	2	1	1	1	1
	Neurological	0	0	0	0	0	0	0	0
	Vascular	0	0	0	0	0	0	0	0
	Pulmonary	0	0	0	0	0	0	0	0
	Non cardiac	0	0	0	0	0	0	0	0
	Not Available	1	2	17	30	35	47	44	52
All	N	123		156		194		221	
	Cardiac	104	85	104	67	104	54	104	47
	Renal	2	2	2	1	2	1	2	1
	Other	6	5	6	4	6	3	6	3
	Infection	3	2	3	2	3	2	3	1
	Neurological	2	2	2	1	2	1	2	1
	Vascular	1	1	1	1	1	1	1	0
	Pulmonary	0	0	0	0	0	0	0	0
	Non cardiac	0	0	0	0	0	0	0	0
	Not Available	5	4	38	24	76	39	103	47

\*The outcome data is derived based on data matching with the National Death Register

\*\* Includes patients who died in hospital

Note: Patients may have more than one condition that caused death

**Table 5.2.4 Location of death of patients who underwent PCI, NCVD-PCI Registry, 2007-2009**

	2007		2008		2009		All	
	In-hospital Mortality		In-hospital Mortality		In-hospital Mortality		In-hospital Mortality	
Location of death	No.	%	No.	%	No.	%	No.	%
In Lab	4	10.3	1	2.3	9	22	14	11.4
Out of Lab	32	82.1	42	97.7	30	73.2	104	84.6
Not Available	3	7.7	0	0	2	4.9	5	4.1

*\*The outcome data is derived based on data matching with the National Death Register*

**Table 5.2.5 Outcome at discharge of patients who developed cardiogenic shock peri-procedure, NCVD-PCI Registry, 2007-2009**

	Outcome*	Cardiogenic Shock Peri-Procedure					
		Yes		No		Missing	
		No.	%	No.	%	No.	%
2007	Death	15	79	23	1	1	1
	Alive	4	21	3507	99	68	98
	Lost to follow-up	0	0	0	0	0	0
2008	Death	17	74	26	1	0	0
	Alive	6	26	3321	99	4	100
	Lost to follow-up	0	0	0	0	0	0
2009	Death	11	55	30	1	0	0
	Alive	9	45	3560	99	0	0
	Lost to follow-up	0	0	0	0	0	0
All	Death	43	69	79	1	1	1
	Alive	19	31	10388	99	72	98
	Lost to follow-up	0	0	0	0	0	0

*\*The outcome data is derived based on data matching with the National Death Register*

**Table 5.2.6 Outcome at discharge, by post PCI TIMI flow, NCVD-PCI Registry, 2007-2009**

	*Outcome at discharge	Post PCI TIMI flow									
		0		1		2		3		Not Available	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007	Death	6	8	3	13	4	8	26	1	2	1
	Alive	73	92	21	88	45	92	3299	99	139	98
	Lost to follow-up	0	0	0	0	0	0	0	0	0	0
2008	Death	1	2	1	10	5	15	28	1	5	3
	Alive	54	98	9	90	29	85	3099	99	143	97
	Lost to follow-up	0	0	0	0	0	0	0	0	0	0
2009	Death	5	9	2	6	6	13	29	1	1	1
	Alive	51	91	32	94	41	87	3303	99	140	99
	Lost to follow-up	0	0	0	0	0	0	0	0	0	0
All	Death	11	5	4	7	13	10	87	1	8	2
	Alive	195	95	54	93	112	90	9701	99	417	98
	Lost to follow-up	0	0	0	0	0	0	0	0	0	0

\*The outcome data is derived based on data matching with the National Death Register

**Table 5.2.7 Outcome at discharge, by contrast volume used, NCVD-PCI Registry, 2007-2009 (row percentage)**

Contrast volume, ml	2007				2008				2009				All			
	Death*		Alive**		Death*		Alive**		Death*		Alive**		Death*		Alive**	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
≥300	6	2	264	98	3	2	170	98	1	0	201	100	10	2	635	98
<300	25	1	2659	99	36	1	2724	99	37	1	3210	99	98	1	8593	99

\*The outcome data is derived based on data matching with the National Death Register

+Alive includes those transferred to another centres

**Table 5.2.8 Summary of 30-day readmission status of patients who underwent PCI, NCVD-PCI Registry, 2007-2009 (N = total no. of procedures for 30-day follow- up)**

	Readmission	No.	%
2007	Yes	120	7
	No	1608	91
	Not Available	48	3
	Readmission reason, no. %		
	CHF	2	2
	AMI	1	1
	Recurrent angina	18	15
	Arrhythmia	0	0
	PCI-planned	63	53
	PCI-unplanned	2	2
	CABG	2	2
	Others	18	15
	Not Available	14	12
2008	Yes	178	6
	No	2573	94
	Not Available	0	0
	Readmission reason, no. %		
	CHF	3	2
	AMI	3	2
	Recurrent angina	21	12
	Arrhythmia	0	0
	PCI-planned	100	56
	PCI-unplanned	7	4
	CABG	0	0
	Others	31	17
	Not Available	13	7

**Table 5.2.8 Summary of 30-day readmission status of patients who underwent PCI, NCVD-PCI Registry, 2007-2009 (N = total no. of procedures for 30-day follow-up)**

	<b>Readmission</b>	<b>No.</b>	<b>%</b>
<b>2009</b>	<b>Yes</b>	<b>160</b>	<b>5</b>
	<b>No</b>	<b>3181</b>	<b>95</b>
	<b>Not Available</b>	<b>0</b>	<b>0</b>
	<b>Readmission reason, no.%</b>		
	CHF	1	1
	AMI	3	2
	Recurrent angina	22	14
	Arrhythmia	1	1
	PCI-planned	81	51
	PCI-unplanned	5	3
	CABG	2	1
	Others	37	23
	Not Available	8	5
<b>All</b>	<b>Yes</b>	<b>458</b>	<b>6</b>
	<b>No</b>	<b>7362</b>	<b>94</b>
	<b>Not Available</b>	<b>48</b>	<b>1</b>
	<b>Readmission reason, no.%</b>		
	CHF	6	1
	AMI	7	2
	Recurrent angina	61	13
	Arrhythmia	1	0
	PCI-planned	244	53
	PCI-unplanned	14	3
	CABG	4	1
	Others	86	19
	Not Available	35	8



**Table 5.2.9.1 Procedural complications and clinical outcomes, according to PCI status, NCVD-PCI Registry, 2007**

	Elective N=3279		NSTEMI/UA N=172		AMI N=159		Not Available N=8	
	No.	%	No.	%	No.	%	No.	%
*Death	14	35.9	8	20.5	16	41.0	1	2.6
Procedural complications								
Periprocedural MI	4	0	0	0	0	0	0	0
Emergency Reintervention/PCI	5	0	0	0	1	1	0	0
Stent thrombosis	2		0		1		0	
Dissection	3		0		0		0	
Perforation	0		0		0		0	
Bail-out CABG	0	0	0	0	0	0	0	0
Cardiogenic shock	4	0	0	2	1	1	0	0
Arrhythmia	2	0	3	2	0	0	1	13
TIA/Stroke	0	0	1	1	8	5	0	0
Tamponade	0	0	0	0	2	1	0	0
Contrast reaction	0	0	0	0	0	0	0	0
New onset/worsen heart failure	2	0	1	1	1	1	0	0
New renal impairment	0	0	0	0	0	0	0	0
Bleeding	1	0	2	1	2	1	0	0
Access site occlusion	0	0	0	0	3	2	0	0
Loss of distal pulse	0	0	0	0	1	1	0	0
Dissection	0	0	0	0	0	0	0	0
Pseudoaneurysm	0	0	0	0	0	0	0	0

\*The outcome data is derived based on data matching with the National Death Register

**Table 5.2.9.2 Procedural complications and clinical outcomes, according to PCI status, NCVD-PCI Registry, 2008**

	Elective N=3075		NSTEMI/UA N=157		AMI N=139		Not Available N=3	
	No.	%	No.	%	No.	%	No.	%
*Death	11	0.4	5	3.2	27	19.4	0	0
Procedural complications								
Periprocedural MI	3	0	0	0	3	2	0	0
Emergency Reintervention/PCI	0	0	0	0	0	0	0	0
Stent thrombosis	0		0		0		0	
Dissection	0		0		0		0	
Perforation	0		0		0		0	
Bail-out CABG	0	0	0	0	0	0	0	0
Cardiogenic shock	5	0	1	1	11	8	0	0
Arrhythmia	5	0	0	0	4	3	0	0
TIA/Stroke	0	0	0	0	0	0	0	0
Tamponade	0	0	0	0	0	0	0	0
Contrast reaction	0	0	0	0	0	0	0	0
New onset/worsen heart failure	0	0	0	0	0	0	0	0
New renal impairment	0	0	1	1	3	2	0	0
Bleeding	0	0	0	0	5	4	0	0
Access site occlusion	0	0	0	0	0	0	0	0
Loss of distal pulse	0	0	0	0	0	0	0	0
Dissection	0	0	0	0	0	0	0	0
Pseudoaneurysm	0	0	0	0	0	0	0	0

\*The outcome data is derived based on data matching with the National Death Register

**Table 5.2.9.3 Procedural complications and clinical outcomes, according to PCI status, NCVD-PCI Registry, 2009**

	Elective N=3243		NSTEMI/UA N=146		AMI N=205		Not Available N=16	
	No.	%	No.	%	No.	%	No.	%
*Death	10	0.3	6	4.1	25	12.2	0	0
Procedural complications								
Periprocedural MI	0	0	0	0	2	1	0	0
Emergency Reintervention/PCI	1	0	1	1	0	0	0	0
Stent thrombosis	0		0		0		0	
Dissection	1		1		0		0	
Perforation	0		0		0		0	
Bail-out CABG	0	0	0	0	1	0	0	0
Cardiogenic shock	2	0	1	1	8	4	0	0
Arrhythmia	2	0	0	0	6	3	0	0
TIA/Stroke	0	0	0	0	0	0	0	0
Tamponade	0	0	0	0	0	0	0	0
Contrast reaction	0	0	0	0	0	0	0	0
New onset/worsen heart failure	0	0	0	0	2	1	0	0
New renal impairment	0	0	0	0	4	2	0	0
Bleeding	0	0	0	0	2	1	0	0
Access site occlusion	0	0	0	0	0	0	0	0
Loss of distal pulse	0	0	0	0	0	0	0	0
Dissection	0	0	0	0	0	0	0	0
Pseudoaneurysm	0	0	0	0	0	0	0	0

\*The outcome data is derived based on data matching with the National Death Register

**Table 5.2.9.4 Procedural complications and clinical outcomes, according to PCI status, NCVD-PCI Registry, 2007-2009**

	Elective N=9597		NSTEMI/UA N=475		AMI N=503		Not Available N=27	
	No.	%	No.	%	No.	%	No.	%
*Death	35	0.4	19	4.0	68	13.5	1	3.7
Procedural complications								
Periprocedural MI	7	0	0	0	5	1	0	0
Emergency Reintervention/PCI	6	0	1	0	1	0	0	0
Stent thrombosis	2		0		1		0	
Dissection	4		1		0		0	
Perforation	0		0		0		0	
Bail-out CABG	0	0	0	0	1	0	0	0
Cardiogenic shock	11	0	5	1	27	5	0	0
Arrhythmia	9	0	3	1	12	2	1	4
TIA/Stroke	0	0	1	0	0	0	0	0
Tamponade	0	0	0	0	1	0	0	0
Contrast reaction	0	0	0	0	0	0	0	0
New onset/worsen heart failure	2	0	1	0	4	1	0	0
New renal impairment	0	0	1	0	10	2	0	0
Bleeding	1	0	2	0	8	2	0	0
Access site occlusion	0	0	0	0	0	0	0	0
Loss of distal pulse	0	0	0	0	0	0	0	0
Dissection	0	0	0	0	2	0	0	0
Pseudoaneurysm	0	0	0	0	0	0	0	0

\*The outcome data is derived based on data matching with the National Death Register

Table 5.2.10 Heart rate at presentation versus outcome, NCVD-PCI Registry, 2007-2009

Heart rate at presentation, beats/minute	2007				2008				2009				All			
	Alive		Death*		Alive		Death*		Alive		Death*		Alive		Death*	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<90	2906	82	21	54	2574	77	21	49	3019	85	21	51	8499	81	63	51
≥90	387	11	16	41	311	9	21	49	447	13	17	41	1145	11	54	44
Missing	270	7	2	5	441	4	1	1	76	2	3	10	787	8	6	5
Total	3563	100	39	100	3326	100	43	100	1542	100	41	100	10431	100	123	100

\*The outcome data is derived based on data matching with the National Death Register data

Table 5.2.11 Heart rate at presentation versus length of stay, NCVD-PCI Registry, 2007-2009

	2007				2008				2009				All			
	Heart rate at presentation, beats/minute		Heart rate at presentation, beats/minute		Heart rate at presentation, beats/minute		Heart rate at presentation, beats/minute		Heart rate at presentation, beats/minute		Heart rate at presentation, beats/minute		Heart rate at presentation, beats/minute		Heart rate at presentation, beats/minute	
	<90	≥90	<90	≥90	<90	≥90	<90	≥90	<90	≥90	<90	≥90	<90	≥90	<90	≥90
N	N=3185	N=446	N=2814	N=360	N=3299	N=516	N=9298	N=1322	N=3299	N=516	N=9298	N=1322	N=3299	N=516	N=9298	N=1322
Mean(SD)	2888 3.8 (18.9)	400 8.1 (37.4)	2559 3.8 (20.4)	327 5.2 (20.9)	3003 3.3 (22.4)	461 7.0 (48.2)	8450 3.6 (20.7)	1188 6.9 (38.7)	3003 3.3 (22.4)	461 7.0 (48.2)	8450 3.6 (20.7)	1188 6.9 (38.7)	3003 3.3 (22.4)	461 7.0 (48.2)	8450 3.6 (20.7)	1188 6.9 (38.7)
Median, (min,max)	2 (0, 401)	2 (0, 379)	2 (0, 370)	2 (0, 368)	2 (0, 1097)	2 (0, 733)	2 (0, 1097)	2 (0, 733)	2 (0, 1097)	2 (0, 733)	2 (0, 1097)	2 (0, 733)	2 (0, 1097)	2 (0, 733)	2 (0, 1097)	2 (0, 733)
Missing	52	5	40	6	52	5	40	6	52	5	40	6	52	5	40	6



**Table 5.2.12 Prognostic factors for in-hospital mortality among patients who underwent PCI, NCVD-PCI Registry, 2007-2009**

Factor	N	Hazard ratio	95% CI	*P value
<b>Age group</b>				
20 - <60 (ref)	6344	1.00		
>= 60	4178	1.92	(1.05, 3.50)	0.034
<b>Gender</b>				
Male (ref)	8569	1.00		
Female	1954	1.35	(0.73, 2.51)	0.341
<b>PCI status</b>				
Elective (ref)	9555	1.00		
NSTEMI/UA	469	3.10	(1.14, 8.41)	0.026
AMI	499	8.84	(4.04, 19.34)	<0.001
<b>Diabetes mellitus</b>				
No (ref)	5446	1.00		
Yes	4859	1.70	(0.95, 3.04)	0.075
<b>Myocardial infarction history</b>				
No (ref)	5747	1.00		
Yes	4363	0.99	(0.55, 1.79)	0.980
<b>Hypertension</b>				
No (ref)	2623	1.00		
Yes	7739	1.06	(0.55, 2.06)	0.854
<b>Killip class</b>				
I (ref)	2298	1.00		
II	1054	1.23	(0.56, 2.70)	0.606
III	107	2.33	(0.88, 6.20)	0.090
IV	101	5.79	(2.88, 11.65)	<0.001

\* using Cox regression with forward variable selection

## APPENDIX A: DATA MANAGEMENT

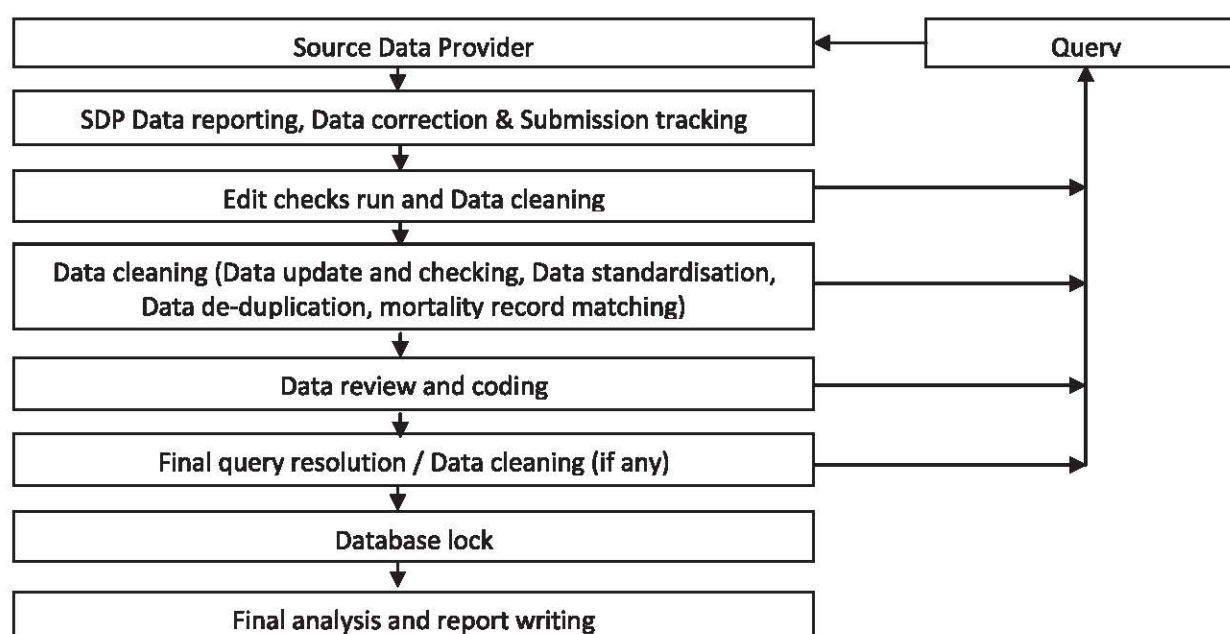
The National Cardiovascular Disease Database (NCVD) Registry maintains two different databases for cardiovascular diseases, i.e. for Acute Coronary Syndrome and Percutaneous Coronary Intervention. Data is stored in SQL Server due to the high volume of data accumulated throughout the years.

### Data sources

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



### SDP Data reporting, Data Correction and Submission tracking

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

There are a number of data security features that are designed into the NCVD web application (eCRF) such as web owner authentication, 2-level user authentication (user name and password authentication and a Short Messaging System (SMS) of authorisation code 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 was performed. SDP also submits follow-up data at 30-day, 6-month and 1-year post notification date intervals. An alert page containing all the overdue submissions for follow-up at 30-day, 6-month and 1-year post notification date is available to users for ease of submissions tracking.

Prior to registering a patient record, a verification process is done by using the search functionality to search if the patient already exists in the registry. The application will still detect a duplicate record if the same MyKad number is keyed in, should the step of searching patient not done. This step is done to avoid duplicate records. For patients whose records already exist in the database, the SDP need only add a new PCI notification as the basic patient particulars are pre-filled, based on existing patient information in the database. The 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 function to reduce human error, in calculations. There is also an inconsistency check functionality that disables certain fields and prompts the user, if the value entered is out of range.

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

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

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

#### *Edit checks run and Data cleaning*

Edit checks 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 standardisation, missing data are handled based on derivation from existing data. Data de-duplication is also performed to identify duplicate records in the database that might have been missed out by SDPs. Finally record matching against the National Death Register (*Jabatan Pendaftaran Negara*) is performed to verify the mortality status of the patient.

#### *Final query resolution / data cleaning / database lock*

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

#### *Data analysis*

Please refer to Statistical Analysis Method section for further details.



#### **Data release policy**

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

#### **Registry ICT Infrastructure and Data centre**

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

The NCVD subscribes to co-location service with a high availability and highly secured Internet Data Centre at Cyberjaya in order to provide 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 half-yearly, security policy maintenance, maintenance and monitoring of audit trail of user access, etc. Managed system services such as usage and performance report, operating system maintenance and monitoring, bandwidth monitoring and systems health monitoring, are also provided.

## APPENDIX B: STATISTICAL METHODS

The analyses for this report were generated based on the NCVD-PCI registry data from year 2007 until 2009. All suspicious variables were verified against the original sources. When no solutions can be found via verification process, then, variables that lay outside the acceptable range as mentioned in the following table were treated as missing values. All analyses were performed based on available data; no statistical imputation method was performed in replacing the missing value.

The outliers were set to missing as below:

Fields	Acceptable range
Age	> 18 years old
Heart rate	25 – 200 beats/min
Systolic BP	60 – 230 mmHg
Diastolic BP	10 – 120 mmHg
Height	130 – 250 cm
Weight	40 – 200 kg
Creatinine	≥ 44 micromol/L (min)
Total Cholesterol	2.5 – 25.0 mmol/L
LDL	0.7 – 20.0 mmol/L
EF status	15 - 80%
Fluroscopy time	2 – 180 mins
Contrast volume	15 – 500ml
Pre-stenosis	10 - 100%
Post-stenosis	0 - 100%
Estimated lesion length	1 – 150 mm
Stent Length	8 – 50 mm
Diameter	2.0 – 7.0 mm
Max balloon size used	1 – 6 mm
Max stent/ balloon deploy pressure	1 – 30 atm

All continuous data were summarized using summary statistics such as mean, standard deviation, median, minimum and maximum. On the other hand, frequency and percentage were reported for categorical data.



## APPENDIX C: PARTICIPATING CENTRE DIRECTORY

### SDP Code: 1001

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

*c/o Department of Medicine, Lembah Pantai, 59100 KUALA LUMPUR*

Investigator: Prof Dr Wan Azman Wan Ahmad

Coordinator: Yusliati Ahmad

### SDP Code: 1002

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

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

Investigator: Dato' Dr Rosli Mohd Ali

Coordinator: Norehan Mihad

### SDP Code: 1004

#### **Hospital Pulau Pinang**

*c/o Department of Cardiology, Jalan Residensi, 10990 PULAU PINANG*

Investigator: Dato' Dr Omar Ismail

Coordinator: Sr Jamelah Ahmad

### SDP Code: 1005

#### **Hospital Umum Sarawak (Sarawak General Hospital)**

*c/o Sarawak General Hospital Heart Centre, Kota Samarahan Expressway, 94300 Kuching, SARAWAK*

Investigator: Prof Dr Sim Kui Hian

Coordinator: Matron Margaret Puyang

### SDP Code: 1006

#### **Hospital Sultanah Aminah**

*c/o Department of Cardiology, Jalan Skudai, 80100 Johor Bahru, JOHOR*

Investigator: Dr Lee Chuey Yan

Coordinator: SN Sharifah Ibrahim

### SDP Code: 1015

#### **Hospital Queen Elizabeth**

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

Investigator: Dr Liew Hiong Bang

Coordinator: Sr Siti Rahmah Idris

### SDP Code: 1016

#### **Hospital Tengku Ampuan Afzan**

*c/o Department of Cardiology, Jalan Tanah Putih, 25100 Kuantan, PAHANG*

Investigator: Dr Abdul Hadi Ja'afar

Coordinator: Sr Asanah Asbi

**SDP Code: 1019**

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## APPENDIX D: NOTE OF APPRECIATION

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 Dr Surinder Kaur  
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 Dr Do Van Buu Dan  
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**SN Norzee Hussin**

**SN Azrina Nasir**

**SN Suhaila Abu Bakir**

**SN Juliana AK Nyadong**

**Sn Norziliana Nordin**



**APPENDIX E: GLOSSARY**

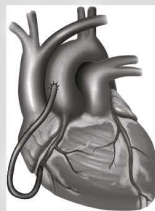
Access site occlusion	Indicates whether an access site occlusion occurred at the site of percutaneous entry during the procedure or after the laboratory visit, but before any subsequent laboratory visits. This is defined as total obstruction of the artery usually by thrombus (but may have other causes) 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>
Baseline creatinine	The amount of serum creatinine in the blood at admission. Records the absolute result of the most recent serum creatinine measurement, in micromol/L to two decimal points.
Blood pressure (Diastolic) at start of PCI	The person's measured diastolic blood pressure in mmHg (at start of PCI).
Blood pressure (Systolic) at start of PCI	The person's measured systolic blood pressure in mmHg (at start of PCI).
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>

Cath/PCI same lab visit	Indicates if the patient had a PCI at the same time as the diagnostic coronary angiogram. Elective patients may have the diagnostic and therapeutic procedures separately. Emergency or acute patients often have their diagnostic and therapeutic procedures concurrently (Ad-hoc).
Cerebrovascular disease	Indicates if the patient has a history of stroke and/or transient ischaemic attack (TIA) or documented evidence of cerebrovascular disease (CT scan, MRI), prior to this admission to the hospital.
Chronic lung disease	Indicates if the patient has a history of chronic lung disease including chronic obstructive pulmonary disease (COPD), chronic pulmonary fibrosis, cystic fibrosis or bronchiectasis, or receiving treatments for these conditions, prior to this admission to the hospital. Previous acute pneumonia and ventilation for acute respiratory distress are excluded.
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.
Congestive heart failure (more than 2 weeks prior)	Indicates if the patient has a history of heart failure or documented evidence (echocardiography, MRI, nuclear imaging, ventriculography) of left ventricular systolic dysfunction prior to this admission to the hospital.
Congestive heart failure (recent 2 weeks)	Indicates whether, within 2 weeks prior to this procedure, a physician has diagnosed that the patient is currently in congestive heart failure (CHF), the diagnosis of CHF was made before this admission, OR CHF can be diagnosed based on careful history and physical examination, or by one of the following criteria: <ul style="list-style-type: none"> <li>a. Paroxysmal nocturnal dyspnoea (PND) and/or fatigue</li> <li>b. Dyspnoea on exertion (DOE) due to heart failure</li> <li>c. chest x-ray (CXR) showing pulmonary congestion</li> <li>d. Pedal oedema or dyspnoea treated with medical therapy for heart failure</li> </ul>
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	Indicates if the patient has a history of diabetes mellitus diagnosed prior to this admission to the hospital or currently receiving treatment for diabetes.
Dissection	Indicates whether a dissection occurred at the site of percutaneous entry during the procedure or after the laboratory visit, but before any subsequent laboratory 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.
Dyslipidaemia	Indicates if the patient has a history of dyslipidaemia diagnosed prior to this admission to the hospital or currently receiving treatment for dyslipidaemia.
Elective PCI	Indicates whether the patient's cardiac function has been stable in the days or weeks prior to the procedure. The procedure could be deferred without increased risk of compromised cardiac outcome.
Family History of Premature Cardiovascular Disease	Indicates if the patient has a 1st degree family member (parents or siblings) who suffered a myocardial infarction and/or stroke before the age of 55 years.



Former smoker	Patient who has stopped smoking tobacco products more than 30 days before this admission.
Functional ischaemia	Indicates if the patient has functional ischaemia. Where a noninvasive test such as exercise or pharmacologic stress test, radionuclide, echo, CT scan was done to rule out ischaemia. The test could be performed during this admission (prior to the PCI), or it could be a test that resulted in the admission.
Heart rate (at start of PCI)	Indicates the patient's heart rate in beats/minute at start of PCI.
Height (in cm)	Measurement of the patient's height in cm. Indicates if the height was taken. Measurements may be taken at any time prior to discharge. However measurements taken after prolonged hospitalisation (>2 weeks) or following surgery or after prolonged intensive unit stay, may not be accurate.
Hypertension	Indicates if the patient has a history of hypertension diagnosed prior to this admission to the hospital or is currently receiving treatment for hypertension, or if the blood pressure is more than 140mmHg systolic or more than 90mmHg diastolic on at least 2 occasions.
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
Loss of distal pulse	Indicates whether a loss of the pulse distal to the arterial access site occurred (peripheralembolization). Peripheral embolization is defined as a loss of distal pulse, pain and/or discolouration (especially the toes). This can include cholesterol emboli.
Low Density Lipids (LDL) levels	Most recent LDL-C level recorded in mmol/L.
Myocardial infarction history	Indicates if the patient has a myocardial infarction history prior to this admission to the hospital.
New onset angina (Less than 2 weeks)	Indicates if the patient has new angina symptoms within the past 2 weeks prior to this admission to the hospital.
New York Heart Association	Indicates the patient's NYHA classification as follows: 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 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) 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 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

<b>Percutaneous entry</b>	Indicates the percutaneous entry location used to provide vascular access for the procedure.
<b>Peripheral vascular disease</b>	Indicates if the patient has a history and/or documented evidence and/or has undergone treatment for peripheral vascular disease (including aortic aneurysm; peripheral artery disease, intermittent claudication and/or previous peripheral artery stenting or bypass; renal artery stenosis and/or previous renal artery stenting).
<b>Previous CABG</b>	Previous Coronary Artery Bypass surgery by any approach prior to the current PCI procedure.
<b>Previous PCI</b>	Indicates if patient has had a prior Percutaneous Transluminal Coronary Angioplasty, Coronary Atherectomy, and/or Coronary Stent done at any time prior to this PCI procedure (which may include those done during the current admission).
<b>Pseudoaneurysm</b>	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.
<b>Smoking status</b>	Indicates if the patient has a history confirming any form of tobacco use in the past. This includes use of cigarettes / cigars / pipes/ tobacco chewing.
<b>Staged PCI</b>	For an elective PCI only. Indicates if this PCI is being performed as part of a multi-vessel revascularization strategy.
<b>Time of first balloon inflation / stent / aspiration</b>	Indicates the date and time of the intra-coronary treatment device deployment. If the exact time of first treatment device deployment is not known, the time of the start of the procedure can be taken as an indication.
<b>Urgent PCI (within 24 hours)</b>	Indicates when all of the following conditions are met: <ul style="list-style-type: none"> <li>- Not elective status</li> <li>- Not rescue status</li> <li>- Procedure required during same hospitalization in order to minimize chance of further clinical deterioration</li> <li>- Worsening, sudden chest pain, CHF, acute myocardial infarction (AMI), IABP, unstable angina</li> </ul>
<b>Weight (in kg)</b>	Measurement of the patient's weight in kg. Indicates the weight taken to two decimal points. Measurements may be taken at any time prior to discharge. However measurements taken after prolonged hospitalisation (>2 weeks) or following surgery or after prolonged intensive unit stay may not be accurate.



## **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 (x) one or more boxes. Where radio buttons ☐ are provided, check (x) 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

<b>1. Patient Name :</b> *			
<b>2. Local RN No:</b> (if applicable)			
<b>3. Identification Card</b> * <b>Number :</b>	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"/>
<b>4. Gender:</b> *	<input type="radio"/> Male <input type="radio"/> Female		<b>5. Nationality:</b> <input type="radio"/> Malaysian <input type="radio"/> Non Malaysian
<b>6a. Date of Birth:</b> * (write DOB as dd/mm/yy If age is known)	<input type="text"/> <input type="text"/> <input type="text"/> (dd/mm/yy)	<b>6b. Age on admission:</b> *	<input type="text"/> (Auto Calculate)
<b>7. Ethnic Group:</b> *	<input type="radio"/> Malay <input type="radio"/> Punjabi <input type="radio"/> Melanau <input type="radio"/> Bidayuh <input type="radio"/> Foreigner, specify country of origin: _____ <input type="radio"/> Chinese <input type="radio"/> Orang Asli <input type="radio"/> Murut <input type="radio"/> Iban <input type="radio"/> Indian <input type="radio"/> Kadazan Dusun <input type="radio"/> Bajau <input type="radio"/> Other M'sian, specify : _____		
<b>8. Contact Number</b>	(1): <input type="text"/>	(2): <input type="text"/>	
<b>9. Admission Status:</b>	<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 : _____		

## SECTION 2 : STATUS BEFORE EVENT

<b>1. 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>2. Medical history :</b> *			
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 (Presence of stenosis & positive stress test)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known
c) Diabetes	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not known <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

<b>1. Anthropometric :</b>	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
<b>2. Heart rate (at start of PCI):</b>	<input type="text"/> (beats / min)	<b>3. Blood pressure (at start of PCI):</b>	a. Systolic: <input type="text"/> (mmHg) b. Diastolic: <input type="text"/> (mmHg)
<b>4. Baseline creatinine :</b>	<input type="text"/> micromol/L <input type="checkbox"/> Not Available	<b>5. Hb A1c:</b>	<input type="text"/> mmol/L
<b>6a. Total cholesterol:</b>	<input type="text"/> mmol/L <input type="checkbox"/> Not Available	<b>6b. LDL levels:</b>	<input type="text"/> mmol/L <input type="checkbox"/> Not Available
<b>7. Baseline ECG :</b> (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		
<b>8. Glomerular Filtration Rate (GFR):</b>	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

<b>1. Previous * PCI :</b>	<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	<b>2. Previous * CABG:</b>	<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
--------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

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"/> III Acute Pulmonary Oedema (APO)	<input type="radio"/> Not Applicable/ Not Available	
	<input type="radio"/> II Left Heart Failure (LHF)	<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 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:	* 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 <input type="radio"/> No		
	* 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			
5. Planned duration of clopidogrel/ticlopidine:	<input type="radio"/> 1 month <input type="radio"/> 6 months <input type="radio"/> >12 months <input type="radio"/> 3 months <input type="radio"/> 12 months <input type="radio"/> Not Available		6a. Percutaneous entry: * <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 <input type="radio"/> 6 <input type="radio"/> 8 <input type="radio"/> Other,specify: _____		6c. Closure device: <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 <input type="checkbox"/> Not Available		8b. Total Dose: <input type="text"/> mGy <input type="checkbox"/> Not Available	
9a. Contrast type :	<input type="radio"/> Ionic <input type="radio"/> Non-Ionic <input 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 Intermedia Lesions as lesion code 15.  
 3. For long lesions, 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></td></tr> <tr><td><input type="checkbox"/> 19 RIMA</td><td></td></tr> <tr><td><input type="checkbox"/> 20 SVG 1</td><td></td></tr> <tr><td><input type="checkbox"/> 21 SVG 2</td><td></td></tr> <tr><td><input type="checkbox"/> 22 SVG 3</td><td></td></tr> <tr><td><input type="checkbox"/> 23 RAD 1</td><td></td></tr> <tr><td><input type="checkbox"/> 24 RAD 2</td><td></td></tr> <tr><td><input type="checkbox"/> 25 RAD 3</td><td></td></tr> </tbody> </table>	Graft	Target Vessel	<input type="checkbox"/> 18 LIMA		<input type="checkbox"/> 19 RIMA		<input type="checkbox"/> 20 SVG 1		<input type="checkbox"/> 21 SVG 2		<input type="checkbox"/> 22 SVG 3		<input type="checkbox"/> 23 RAD 1		<input type="checkbox"/> 24 RAD 2		<input type="checkbox"/> 25 RAD 3	
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<input type="checkbox"/> 22 SVG 3																			
<input type="checkbox"/> 23 RAD 1																			
<input type="checkbox"/> 24 RAD 2																			
<input type="checkbox"/> 25 RAD 3																			

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

2. Lesion Codes * (1-25)	to (if applicable)																						
3. Coronary lesion:	<input type="radio"/> De novo <input type="radio"/> Stent thrombosis <input type="radio"/> Restenosis (No prior stent) <input type="radio"/> In stent restenosis																						
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"/> Mid <input type="radio"/> Native <input type="radio"/> Proximal <input type="radio"/> Distal <input type="radio"/> Anastomosis																						
6. Lesion description:	<input type="checkbox"/> Total Occlusion <input type="checkbox"/> CTO > 3mo <input type="checkbox"/> Thrombus <input type="checkbox"/> Not Applicable <input type="checkbox"/> Bifurcation (if intervention involved sidebranch, please record as a second lesion) a) Medina Classification: I) MB prox: (auto) 0 1 II) MB dist: (auto) 0 1 III) SB: (auto) 0 1																						
7. Pre-stenosis % :	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 % :	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> </tr> </thead> <tbody> <tr> <td>#1</td> <td></td> <td></td> </tr> <tr> <td colspan="3">Others, specify:</td> </tr> <tr> <td>#2</td> <td></td> <td></td> </tr> <tr> <td colspan="3">Others, specify:</td> </tr> <tr> <td>#3</td> <td></td> <td></td> </tr> <tr> <td colspan="3">Others, specify:</td> </tr> </tbody> </table>		a. Stent Code	b. Length (mm)	c. Diameter (mm)	#1			Others, specify:			#2			Others, specify:			#3			Others, specify:		
a. Stent Code	b. Length (mm)	c. Diameter (mm)																					
#1																							
Others, specify:																							
#2																							
Others, specify:																							
#3																							
Others, specify:																							
16. Maximum balloon size / pressure:	a) Maximum balloon size used: mm b) Maximum stent / balloon deploy pressure: 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. Periprocedural MI	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Available
	* b. Emergency Reintervention / PCI:	<input type="radio"/> Yes <input type="radio"/> No <div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between;"> <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 </div> </div> </div>
	* c. Bail-out CABG	<input type="radio"/> Yes <input type="radio"/> No
	* d. Cardiogenic shock (after procedure)	<input type="radio"/> Yes <input type="radio"/> No
	* e. Arrhythmia (VT/VF/Brady)	<input type="radio"/> Yes <input type="radio"/> No
	* f. TIA / Stroke	<input type="radio"/> Yes <input type="radio"/> No
	* g. Tamponade	<input type="radio"/> Yes <input type="radio"/> No
	* h. Contrast reaction	<input type="radio"/> Yes <input type="radio"/> No
	* i. New onset / worsened heart failure	<input type="radio"/> Yes <input type="radio"/> No
	* j. New renal impairment	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Available
	k. Max post procedural rise in creatinine	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Available <div style="display: flex; justify-content: space-between;"> <div> a) _____ micromol/L </div> <div> b) Date (dd/mm/yy): _____ </div> <div> c) Autocalculate: (days) _____ </div> </div>
2. Vascular Complications:	* a. Bleeding	<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 →	* a) Date of Discharge (dd/mm/yy): _____ / _____ / _____ <table border="1" style="width: 100%;"> <tr> <th>b) Medication:</th> <th>Yes</th> <th>No</th> <th>Yes</th> <th>No</th> </tr> <tr> <td>Aspirin</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>Ace Inhibitor</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> </tr> <tr> <td>Ticlodipine</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>Warfarin</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> </tr> <tr> <td>Beta blocker</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td></td> <td></td> </tr> </table>	b) Medication:	Yes	No	Yes	No	Aspirin	<input type="radio"/>	<input type="radio"/>	Ace Inhibitor	<input type="radio"/>	Clopidogrel	<input type="radio"/>	<input type="radio"/>	ARB	<input type="radio"/>	Ticlodipine	<input type="radio"/>	<input type="radio"/>	Warfarin	<input type="radio"/>	Statin	<input type="radio"/>	<input type="radio"/>	Others, specify _____	<input type="radio"/>	Beta blocker	<input type="radio"/>	<input type="radio"/>		
	b) Medication:	Yes	No	Yes	No																											
	Aspirin	<input type="radio"/>	<input type="radio"/>	Ace Inhibitor	<input type="radio"/>																											
Clopidogrel	<input type="radio"/>	<input type="radio"/>	ARB	<input type="radio"/>																												
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Statin	<input type="radio"/>	<input type="radio"/>	Others, specify _____	<input type="radio"/>																												
Beta blocker	<input type="radio"/>	<input type="radio"/>																														
<input type="radio"/> Death →	* a) Date of Death (dd/mm/yy): _____ / _____ / _____ <table border="1" style="width: 100%;"> <tr> <td>b) Primary cause of death:</td> <td> <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 </td> </tr> <tr> <td>c) Location of death:</td> <td> <input type="radio"/> In Lab <input type="radio"/> Out of Lab </td> </tr> </table>	b) Primary cause of death:	<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	c) Location of death:	<input type="radio"/> In Lab <input type="radio"/> Out of Lab																											
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c) Location of death:	<input type="radio"/> In Lab <input type="radio"/> Out of Lab																															
<input type="radio"/> Transferred to other centre: →	* a) Date of transfer (dd/mm/yy): _____ / _____ / _____ b) Name of centre: _____																															



# 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 (X) one or more boxes. Where radio buttons ☐ are provided, check (R) one box only.

For NCVD Use only:

ID:  /

Centre:

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

### SECTION 1 : OUTCOME

<b>1. Outcome:</b> *	<input type="radio"/> <b>Alive</b> → <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;"><b>b) Medication:</b></td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">No</td> <td style="text-align: center;">Unknown</td> </tr> <tr> <td>Aspirin</td> <td style="text-align: center;"><input type="radio"/></td> <td style="text-align: center;"><input type="radio"/></td> <td style="text-align: center;"><input type="radio"/></td> </tr> <tr> <td>Clopidogrel</td> <td style="text-align: center;"><input type="radio"/></td> <td style="text-align: center;"><input type="radio"/></td> <td style="text-align: center;"><input type="radio"/></td> </tr> <tr> <td>Ticlopidine</td> <td style="text-align: center;"><input type="radio"/></td> <td style="text-align: center;"><input type="radio"/></td> <td style="text-align: center;"><input type="radio"/></td> </tr> <tr> <td>Others, specify: _____</td> <td style="text-align: center;"><input type="radio"/></td> <td style="text-align: center;"><input type="radio"/></td> <td style="text-align: center;"><input type="radio"/></td> </tr> </table>	<b>b) Medication:</b>	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"/>
<b>b) Medication:</b>	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"/>																		
	<input type="radio"/> <b>Death</b> → <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;"><b>* a) Date of Death (dd/mm/yy):</b></td> <td><input type="text"/> / <input type="text"/> / <input type="text"/></td> </tr> <tr> <td style="text-align: left;"><b>b) Cause of death:</b></td> <td> <input type="radio"/> Cardiac  <input type="radio"/> Non cardiac  <input type="radio"/> Others, specify: _____         </td> </tr> </table>	<b>* a) Date of Death (dd/mm/yy):</b>	<input type="text"/> / <input type="text"/> / <input type="text"/>	<b>b) Cause of death:</b>	<input type="radio"/> Cardiac <input type="radio"/> Non cardiac <input type="radio"/> Others, specify: _____																
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<input type="radio"/> <b>Transferred to other centre:</b> → <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;"><b>* a) Date of transfer (dd/mm/yy):</b></td> <td><input type="text"/> / <input type="text"/> / <input type="text"/></td> </tr> <tr> <td style="text-align: left;"><b>b) Name of centre:</b></td> <td>_____</td> </tr> </table>	<b>* a) Date of transfer (dd/mm/yy):</b>	<input type="text"/> / <input type="text"/> / <input type="text"/>	<b>b) Name of centre:</b>	_____																	
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<b>b) Name of centre:</b>	_____																				
<input type="radio"/> <b>Lost to follow up</b> → <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;"><b>* a) Date of last follow up (dd/mm/yy):</b></td> <td><input type="text"/> / <input type="text"/> / <input type="text"/></td> </tr> </table>	<b>* a) Date of last follow up (dd/mm/yy):</b>	<input type="text"/> / <input type="text"/> / <input type="text"/>																			
<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"/> <b>Yes</b> → <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;"><b>a) Date of readmission (dd/mm/yy):</b></td> <td><input type="text"/> / <input type="text"/> / <input type="text"/></td> </tr> <tr> <td style="text-align: left;"><b>b) Readmission location:</b></td> <td>_____</td> </tr> <tr> <td style="text-align: left;"><b>c) Readmission Reason:</b> →</td> <td> <table style="width: 100%;"> <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>_____</td> </tr> </table> </td> </tr> </table>	<b>a) Date of readmission (dd/mm/yy):</b>	<input type="text"/> / <input type="text"/> / <input type="text"/>	<b>b) Readmission location:</b>	_____	<b>c) Readmission Reason:</b> →	<table style="width: 100%;"> <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>_____</td> </tr> </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	_____					
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<input type="radio"/> Recurrent angina	<input type="radio"/> PCI – unplanned	_____																			
	<input type="radio"/> <b>No</b>																				



## For NCVD Use only:

ID:  /

Centre:

<b>A1. Name of Reporting centre:</b>		<b>A11. Reporting centre code:</b>	
<b>B. Patient Name :</b>			
<b>C. Identification Card Number :</b>	<i>MyKad / MyKid:</i>	<div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> </div> <div>-</div> <div> <div></div> <div></div> </div> <div>-</div> <div> <div></div> <div></div> <div></div> <div></div> </div>	<i>Old IC:</i> <div></div>
	<i>Other ID document No:</i>	<div></div> <div>→ <i>Specify type (eg.passport, armed force ID):</i></div>	<div></div>
<b>D. Type of Follow Up:</b>	<input type="radio"/> 6 months <input type="radio"/> 12 months	<b>E. Date of Follow Up (dd/mm/yy):</b>	<div></div> <div>/</div> <div></div> <div>/</div> <div></div>

**1. Outcome:**

\* Medication

☐ Alive → a) Medication: 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"/>
Statin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beta blocker	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ace Inhibitor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ARB	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Warfarin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Others, specify _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

☐ Death → a) Date of Death (dd/mm/yy):   /   /

b) Cause of death: ☐ Cardiac ☐ Non cardiac ☐ Others, specify: \_\_\_\_\_

☐ Transferred to other centre: → a) Date of transfer (dd/mm/yy):   /   /

b) Name of centre: \_\_\_\_\_

☐ Lost to follow up → a) Date of last follow up (dd/mm/yy):   /   /

1. Smoking Status: ☐ Never ☐ Former (quit >30 days) ☐ Current (any tobacco use within last 30 days) ☐ Not Available

1. Has patient been readmitted to hospital?

☒ YES ☐ NO

	Date of Readmission	Readmission location:	Readmission reason:	CCS	Angiography	AMI	PCI	CABG
1	<div> <div> <div></div><div></div> </div> <div> <div></div><div></div> </div> <div> <div></div><div></div> </div> </div> <div>(dd/mm/yy)</div>		<div> <input type="radio"/> CHF           <input type="radio"/> AMI         </div> <div> <input type="radio"/> Recurrent angina         </div> <div> <input type="radio"/> Arrhythmia         </div> <div> <input type="radio"/> PCI – planned         </div> <div> <input type="radio"/> PCI – unplanned         </div> <div> <input type="radio"/> CABG         </div> <div> <input type="radio"/> Others, specify _____         </div>	<div> <input type="radio"/> Asymptomatic         </div> <div> <input type="radio"/> CCS 1         </div> <div> <input type="radio"/> CCS 2         </div> <div> <input type="radio"/> CCS 3         </div> <div> <input type="radio"/> CCS 4         </div> <div> <input type="radio"/> Not Available         </div>	<div> <input type="radio"/> Yes         </div> <div> <input type="radio"/> No         </div> <div> <input type="radio"/> Not Applicable         </div>	<div> <input type="radio"/> No         </div> <div> <input type="radio"/> STEMI         </div> <div> <input type="radio"/> NSTEMI         </div> <div> <input type="radio"/> Not Applicable         </div>	<div> <input type="radio"/> No         </div> <div> <input type="radio"/> TVR         </div> <div> <input type="radio"/> Non TVR         </div> <div> <input type="radio"/> Not Applicable         </div> <div> <input type="radio"/> TLR         </div> <div> <div> <div></div><div></div> </div> <div>Lesion Code (1-25):</div> </div>	<div> <input type="radio"/> Yes         </div> <div> <div> <div>TVR:</div> <div> <input type="radio"/> Yes           <input type="radio"/> No         </div> </div> </div> <div> <input type="radio"/> No         </div> <div> <input type="radio"/> Not Applicable         </div>
2	<div> <div> <div></div><div></div> </div> <div> <div></div><div></div> </div> <div> <div></div><div></div> </div> </div> <div>(dd/mm/yy)</div>		<div> <input type="radio"/> CHF           <input type="radio"/> AMI         </div> <div> <input type="radio"/> Recurrent angina         </div> <div> <input type="radio"/> Arrhythmia         </div> <div> <input type="radio"/> PCI – planned         </div> <div> <input type="radio"/> PCI – unplanned         </div> <div> <input type="radio"/> CABG         </div> <div> <input type="radio"/> Others, specify _____         </div>	<div> <input type="radio"/> Asymptomatic         </div> <div> <input type="radio"/> CCS 1         </div> <div> <input type="radio"/> CCS 2         </div> <div> <input type="radio"/> CCS 3         </div> <div> <input type="radio"/> CCS 4         </div> <div> <input type="radio"/> Not Available         </div>	<div> <input type="radio"/> Yes         </div> <div> <input type="radio"/> No         </div> <div> <input type="radio"/> Not Applicable         </div>	<div> <input type="radio"/> No         </div> <div> <input type="radio"/> STEMI         </div> <div> <input type="radio"/> NSTEMI         </div> <div> <input type="radio"/> Not Applicable         </div>	<div> <input type="radio"/> No         </div> <div> <input type="radio"/> TVR         </div> <div> <input type="radio"/> Non TVR         </div> <div> <input type="radio"/> Not Applicable         </div> <div> <input type="radio"/> TLR         </div> <div> <div> <div></div><div></div> </div> <div>Lesion Code (1-25):</div> </div>	<div> <input type="radio"/> Yes         </div> <div> <div> <div>TVR:</div> <div> <input type="radio"/> Yes           <input type="radio"/> No         </div> </div> </div> <div> <input type="radio"/> No         </div> <div> <input type="radio"/> Not Applicable         </div>
3	<div> <div> <div></div><div></div> </div> <div> <div></div><div></div> </div> <div> <div></div><div></div> </div> </div> <div>(dd/mm/yy)</div>		<div> <input type="radio"/> CHF           <input type="radio"/> AMI         </div> <div> <input type="radio"/> Recurrent angina         </div> <div> <input type="radio"/> Arrhythmia         </div> <div> <input type="radio"/> PCI – planned         </div> <div> <input type="radio"/> PCI – unplanned         </div> <div> <input type="radio"/> CABG         </div> <div> <input type="radio"/> Others, specify _____         </div>	<div> <input type="radio"/> Asymptomatic         </div> <div> <input type="radio"/> CCS 1         </div> <div> <input type="radio"/> CCS 2         </div> <div> <input type="radio"/> CCS 3         </div> <div> <input type="radio"/> CCS 4         </div> <div> <input type="radio"/> Not Available         </div>	<div> <input type="radio"/> Yes         </div> <div> <input type="radio"/> No         </div> <div> <input type="radio"/> Not Applicable         </div>	<div> <input type="radio"/> No         </div> <div> <input type="radio"/> STEMI         </div> <div> <input type="radio"/> NSTEMI         </div> <div> <input type="radio"/> Not Applicable         </div>	<div> <input type="radio"/> No         </div> <div> <input type="radio"/> TVR         </div> <div> <input type="radio"/> Non TVR         </div> <div> <input type="radio"/> Not Applicable         </div> <div> <input type="radio"/> TLR         </div> <div> <div> <div></div><div></div> </div> <div>Lesion Code (1-25):</div> </div>	<div> <input type="radio"/> Yes         </div> <div> <div> <div>TVR:</div> <div> <input type="radio"/> Yes           <input type="radio"/> No         </div> </div> </div> <div> <input type="radio"/> No         </div> <div> <input type="radio"/> Not Applicable         </div>









