
“I wish to express my gratitude for every involvements, participation and sacrifices.”
(Dato’ Seri Dr Robaayah Zambahari; Co-chair of NCVD Governance Board)

“...look forward to 100% participation nationwide for it to be a truly “national” cardiovascular database and following the establishment of this registry I hope to see many more publications in the years ahead. “
(Prof Dr Sim Kui-Hian; Co-chair of NCVD Governance Board)

“We realised the importance of having our own national data. With it we can calculate the number of PCI procedures performed in the country, the different types of devices used, the complexity of the cases and importantly, the outcome of the procedures.”
(Dato’ Dr Rosli Mohd Ali; Chairman of NCVD-PCI Registry)

“We believe that the Annual report of the NCVD-PCI registry 2007 together with the CPG-PCI will provide valuable information of the gap lies in between ‘real’ practice and guidelines for further improvement.”
(Prof Dr Wan Azman Wan Ahmad; NCVD Medical Writing and Publication Committee)

“This report is the “beginning of the beginnings”; to share the findings from our collaboration among the main Malaysian PCI centres in the first year of this registry.”
(Dr Liew Houng Bang; Secretary of NCVD-PCI Registry Steering Committee)

“This is one continuous journey; we are just at the beginning of it.
The success of NCVD is in OUR holding hands. Thanks a lot Mira & Mima!”
(Ms Gunavathy Selvaraj; Registry Manager of NCVD)

List of Contributors

Prof Dr Sim Kui-Hian, Dato’ Seri Dr Robaayah Zambahari, Dato’ Dr Rosli Mohd Ali, Dato’ Dr Omar Ismail, Prof Dr Wan Azman Wan Ahmad, Dr Lim Teck Onn, Dr Liew Houng Bang, Dr Chee Kok Han, Dr Alan Fong Yean Yip, Dr Lu Hou Tee, Dr Azmee Mohd Ghazi, Dr Syahidah Syed Tamin, Ms S Gunavathy Selvaraj, Ms Hamimatunnisa Johar, Ms Noor Amirah Muhamad
The NCVD-PCI registry was initiated on the 13th January 2007. PCI registry is established to fulfill the need, for a large scale national level, multi-centre, collaborative group; to ensure uniform data collection and clinical follow-up. The eventual goal of NCVD-PCI Registry is to provide a contemporary appraisal of Malaysian interventional cardiology practice, and to improve short-term and long-term outcomes of coronary artery disease. The standardised data abstraction form and dataset definitions were adopted with kind permission from those of the Melbourne Interventional Group (MIG) Interventional Cardiology Group¹.

The first PCI in Malaysia was performed by Dr Singham and Dr Anuar Masduki in University Hospital in 1983.
The development of Percutaneous Coronary Intervention (PCI) in Malaysia covers different centres including Hospital Kuala Lumpur, Institut Jantung Negara (IJN), other Ministry of Health Hospitals, University Malaya Medical Centre and Private Hospitals.
The decentralisation policy was carried out by establishing Ministry of Health Heart centres at various states all over Malaysia.

The establishment of Percutaneous Coronary Intervention (PCI) in Malaysia

- The NCVD-PCI registry was initiated on the 13th January 2007.
- PCI registry is established to fulfill the need, for a large scale national level, multi-centre, collaborative group; to ensure uniform data collection and clinical follow-up.
- The eventual goal of NCVD-PCI Registry is to provide a contemporary appraisal of Malaysian interventional cardiology practice, and to improve short-term and long-term outcomes of coronary artery disease.
- The standardised data abstraction form and dataset definitions were adopted with kind permission from those of the Melbourne Interventional Group (MIG) Interventional Cardiology Group¹.

Steering committee of PCI Registry

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Hospitals with PCI Catheterisation Laboratory Services Available:

**JOHOR:** KPJ Johor Specialist Hospital, Sultanah Aminah Hospital  
**KEDAH:** Pantai Utara Hospital, Kedah Medical Centre, Metro Specialist Hospital, Sultanah Bahiyah Hospital  
**KELANTAN:** Perdana Specialist Hospital, Universiti Sains Malaysia Hospital  
**MALACCA:** Pantai Hospital Ayer Keroh, Mahkota Medical Centre, Putra Specialist Hospital  
**NEGERI SEMBILAN:** Seremban Specialist Hospital  
**PERAK:** Fatimah Hospital, KPJ Ipoh Specialist Hospital, Pantai-Putri Hospital  
**PENANG:** Gleneagles Medical Centre, Island Hospital, Lam Wah Ee Hospital, Loh Guan Lye Specialists Centre, Pantai Hospital Penang, Penang Adventist Hospital, Penang Hospital  
**SABAH:** Sabah Medical Centre  
**SARAWAK:** Kuching Specialist Hospital, Normah Medical Specialist Centre, Sarawak General Hospital, Timberland Medical Centre  
**SELANGOR:** Assunta Hospital, KPJ Ampang Puteri Specialist Hospital, KPJ Damansara Specialist Hospital, KPJ Selangor Specialist Hospital, Serdang Hospital, Sri Kota Specialist Medical Centre, Sime Darby Medical Centre Subang Jaya, Sunway Medical Centre, Tropicana Medical Centre  
**WP KUALA LUMPUR:** Gleneagles Intan Medical Centre, Institut Jantung Negara (IJN), Pantai Medical Centre, Pusrawi Hospital Sdn.Bhd., Universiti Kebangsaan Malaysia Hospital, University Malaya Medical Centre, Prince Court Medical Centre, HSC Medical Center (KL) Sdn Bhd

*Source: ICL Survey ‘Cardiology Cath Lab Services Procedures Information for Year 2007 & 2008’ conducted from June 2009 – July 2009, with participation from 43 hospitals.*

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**Number of PCI Catheterisation Laboratories Available in Malaysia**

<table>
<thead>
<tr>
<th>Sector</th>
<th># of hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOH</td>
<td>5</td>
</tr>
<tr>
<td>Private</td>
<td>34</td>
</tr>
<tr>
<td>University</td>
<td>3</td>
</tr>
<tr>
<td>IJN</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
</tr>
</tbody>
</table>
In 2007, 3677 patients underwent PCI procedures registered in NCVD-PCI Registry with 3920 procedures performed: 3442 patients had one PCI performed, 227 patients had two PCIs performed, and eight patients had three PCIs performed.

**List of Source Data Providers (SDP) for NCVD-PCI Registry 2007**
1. KPJ Selangor Specialist Hospital, Selangor
2. Institut Jantung Negara (IJN), Kuala Lumpur
3. Penang Hospital, Penang
4. Sarawak General Hospital, Sarawak
5. Serdang Hospital, Selangor
6. Sultanah Aminah Hospital, Johor
7. University Malaya Medical Centre, Kuala Lumpur
8. Universiti Kebangsaan Malaysia Hospital, Kuala Lumpur

*(Note: The List of SDP is by alphabetical order. It DOES NOT reflect the order of centre codes in the graph above)*
**Age group (years) distribution for patients who underwent PCI, NCVD-PCI Registry 2007**

- Mean age = 56.7 years old
- Age Range = 23-90 years old

- Our patients are younger (56.7 in NCVD-PCI vs. 65.7 in SCAAR\(^3\) vs. 62.3 in Ontario\(^4\), [mean age in years])
- A higher proportion of male patients (81.2% in NCVD-PCI vs. 71.7% in SCAAR\(^3\) vs. 72.2% in Ontario\(^4\))

**Distribution of patients who underwent PCI based on ethnicity, NCVD-PCI Registry 2007**

- 75.3% of patients had a history of dyslipidaemia
- 74.2% of them had hypertension
- 45.6% of patients had diabetes
- 98.4% of patients undergoing PCI had at least one established cardiovascular risk factor

*Other Malaysian includes Punjabi, Iban, Kadazan Dusun, Melanau, Bidayuh, Other Sabahan and Other Sarawakian

**Distribution of patients underwent PCI by gender, NCVD-PCI Registry 2007**

**Presence of cumulative risk factors**

- 75.3% of patients had a history of dyslipidaemia
- 74.2% of them had hypertension
- 45.6% of patients had diabetes
- 98.4% of patients undergoing PCI had at least one established cardiovascular risk factor

Cardiovascular risk factor (CVRF) comprise of: smoking status, dyslipidaemia, hypertension, diabetes, family history of premature cardiovascular disease (CVD) and a known history of myocardial infarction (MI)
Clinical presentation...

- Chronic stable angina was noted in 57% of cases, with majority in CCS class I-II
- Majority of patients (94%) have low TIMI risk index
- Acute coronary syndrome comprise of 20% of cases

Clincial presentation of ACS Stratum, NCVD-PCI Registry 2007

- Percentage of patients (%)
- Note:
  - STEMI=ST segment Elevation Myocardial Infarction
  - NSTEMI=Non ST segment Elevation Myocardial Infarction
  - UA=Unstable Angina

Procedural setting

- Majority of PCI performed in Malaysia in 2007 were elective cases
- In most cases PCI were performed as ad hoc
- Femoral access remains the common percutaneous entry

- 55.3% of PCI were performed in multiple vessels disease
- 73.9% (n=2897) of patients had a size 6 French
- Aspirin and Clopidogrel are the two most common choice of antiplatelet therapy used in PCI

 PCI Status for patients who underwent PCI, NCVD-PCI Registry 2007

- Elective: 90.1%
- Urgent: 4.8%
- Rescue: 1.9%
- Primary: 2.7%
- Not Available: 0.4%

Ad hoc PCI

- Yes: 87%
- No: 12%
- Not Available: 1%
Summary of location of lesion treated with PCI

- Total lesion treated = 5512
- Proximal left anterior descending artery is the commonest lesion location (34.5%)
- The majority of the lesions treated in the registry are de novo (92.8%)
- Mean lesion length = 24.40 mm (15.18mm)
- An average of 1.23 stents was used per lesion treated
- Most of the lesions were of type C (44.2%)
- Most of the lesions (90.9%) achieved TIMI 3 flow after the intervention
• In-hospital mortality was 1.1 % and 30-day mortality rate was 1.8 %

• Follow-up data was not available for 41% of patients

• Mortality rates among patients who presented with shock were high (28%)

• High rate of mortality in patients with poor TIMI flow post-PCI

• Poor prognostic factors were Killip Class IV and poor TIMI flow post PCI (0-2)

• Half of re-admissions were due to staged/planned PCI (54%)

• High mortality rate was seen among patients who developed shock during or post PCI

• Low number of deaths seen in elective cases

### Overall outcome for patients who underwent PCI, NCVD-PCI Registry 2007

<table>
<thead>
<tr>
<th>Outcome*</th>
<th>At discharge, n (%)</th>
<th>30-days, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alive</td>
<td>3637 (98.9 %)</td>
<td>1457 (41.3%)</td>
</tr>
<tr>
<td>Death</td>
<td>40 (1.1%)</td>
<td><strong>64 (1.8%)</strong></td>
</tr>
<tr>
<td>Follow up Not Available</td>
<td>2006 (56.0%)</td>
<td></td>
</tr>
</tbody>
</table>

*The outcome status data was derived based on data matching with the National Death Register 2007 & 2008
** Included patients who died at discharge

### In-hospital outcome for patients who underwent PCI by age groups, NCVD-PCI Registry 2007

<table>
<thead>
<tr>
<th>Age group*</th>
<th>Young</th>
<th>Middle-age</th>
<th>Elderly</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome</strong></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Alive</td>
<td>158</td>
<td>99.4</td>
<td>2065</td>
</tr>
<tr>
<td>Death</td>
<td>1</td>
<td>0.6</td>
<td>15</td>
</tr>
</tbody>
</table>

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

* Young is defined as age from 20 to <40 years, middle-age is defined as age 40 to <60 years and elderly is defined as ≥60 years old

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**Outcome at discharge**

- Alive: 99%
- Death: 1%

**Outcome at 30-days follow-up**

- Alive: 57%
- Death: 41%
- Follow-up Not Available: 2%
Acknowledgment

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Will be available soon at www.acrm.org.my/ncvd
The National Cardiovascular Disease Database (NCVD) is accessible online at www.acrm.org.my/ncvd/
References:


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