BCIS Audit Returns
Adult Interventional Procedures

Jan 2016 to Dec 2016

Peter F Ludman
BCIS National Audit Lead
On behalf of
British Cardiovascular Interventional Society
Data Sources

1. Structure

Previous year’s datasets re-analysed for year trends

2. PCI and TAVI procedure and outcome

Cleaning analysis Outputs

DELAYED

Office for National Statistics

Nicor

Bcis Aggregates, Audit for Audit Compliance Intervention Procedure

(Office for Health, 2012 to end December 2016)
Contents

- **Structure**
  - Angio and PCI centres and maps
  - Total angio and PCI numbers
  - No of PCIs per centre and per angio
  - PCI pmp and by country and v CABG
  - Centre PCI volumes
  - PCI operators, by centre, by PPCI
  - On call rotas for PPCI
  - On site v off site surgical cover
  - Day case activity
  - Primary PCI units

- **NICOR data collection**
  - Centre participation
  - Databases used
  - Case ascertainment
  - Data completeness

- ** Appropriateness**
  - Demographics
  - Indication for PCI / Clinical syndrome
  - PPCI activity (by unit, pmp, by vessel)
  - PCI for out of hospital arrest
  - PCI territories / vessels / lesions
  - Stents (BMS and DES)
  - Adjunctive pharmacotherapy
  - LV support and shock
  - Primary PCI for > 80 yrs
  - Extraction / Rota / IVUS / OCT / FFR / Laser etc.
  - Arterial access

- **Process of care**
  - Delays to treatment
  - NSTEMI (direct v IHT)
  - Primary PCI DTB / CTB
  - IHT versus Direct admission
  - Length of stay

- **Outcome**
  - MACCE
  - Peri-procedural complications and by access
  - Tracked 30 day mortality
    - Outcome by syndrome
    - Outcome by lesion subset

- **Adult non coronary intervention**
  - Septal ablation for HOCM
  - Mitral valvuloplasty
  - Mitraclip / PFO / ASD closure / LAA occlusion
  - Para-prosthetic leak closure
  - Renal Denervation
  - Percutaneous Pulmonary valve

- **TAVI**
  - Now presented in separate slide set

- **Conclusions and summary**

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Appendix: PCI Centre NICOR / CCAD Centre codes
Structure
## Angiography only Centres

<table>
<thead>
<tr>
<th>Year</th>
<th>Stopped</th>
<th>Started</th>
</tr>
</thead>
</table>
| 2010 | • Huddersfield | • Whiston, Prescot  
• Whittington Hospital, London  
• Yorkshire Clinic Bingley (from PCI) |
| 2011 | • Bath BMI  
• Royal Boulton  
• Tameside Hospital  
• Thornbury Hospital BMI  
• West Cumberland Hospital | • Ulster Hospital, Dundonald |
| 2012 | • Hope Hospital, Salford | • None |
| 2013 | • None | • Queen’s Hospital Burton  
• Duchy Hospital, Cornwall |
| 2014 | • Dumfries and Galloway | • Spire Southampton (previous PCI)  
• Spire Leicester (previous PCI) |
| 2015 | • Dewsbury  
• Shrewsbury  
• Hartlepool  
• Spire Leicester | • University North Tees (Takes Hartlepool activity) |
| 2016 | • Mid staffordshire  
• North Tyneside  
• Neville Hall | • West Middlesex University Hospital |
### PCI Centres

#### 2010
- Spire Shawsfair Park, Edinburgh
- Altnagelvin (previous angio)
- Bedford (previous angio)
- Medway (previous angio)
- Pindefields (previous angio)
- Raigmore, Inverness (previous angio)
- Royal Blackburn (previous angio)
- Salisbury (previous angio)
- Scunthorpe (previous angio)
- York District general (previous angio)

#### 2011
- St Mary’s, London
- Royal Gwent, Newport (previous angio)
- Spire Hospital, Southampton (previous angio)
- Calderdale Royal, Halifax (previous angio)
- Cumberland Infirmary, Carlisle (previous angio)

#### 2012
- None
- Spire Bristol Hospital

#### 2013
- Whipps Cross
- None
## PCI Centres

### 2 of 2

<table>
<thead>
<tr>
<th>Year</th>
<th>PCI Centres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stopped</td>
</tr>
<tr>
<td>2014</td>
<td>• None</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>• None</td>
</tr>
<tr>
<td>2016</td>
<td>• Sandwell (activity to Birmingham City site)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PCI Centres in 2016
UK Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>NHS</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scotland</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>England</td>
<td>84</td>
<td>18</td>
</tr>
<tr>
<td>N Ireland</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Wales</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>98</td>
<td>21</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>119</td>
<td></td>
</tr>
</tbody>
</table>
PCI and Angiography Totals

• Note change in data request:

• Previous years:
  – Total number of diagnostic angiograms
    • include any cath? proceed (whether proceeded to PCI or not)

• 2016 data question:
  – Total number of diagnostic angiograms
  – Total number of cath? proceed (whether proceeded to PCI or not)
### UK centres

#### 2016

<table>
<thead>
<tr>
<th>Centre Type</th>
<th>No.</th>
<th>No cath data</th>
<th>No PCI data</th>
<th>Caths</th>
<th>PCIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHS Interventional</td>
<td>98</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Private Interventional</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Diagnostic only</td>
<td>57</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>176</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

STD South Tyneside District Hospital
WIR Arrowe Park
YKD Yorkshire Clinic
(estimated totals by using 2015 data)

NB. In past years, requested all Caths + Proceeds. This year asked for all caths and separately all Proceeds, but some were unable to provide split, so estimates have been included to try to maintain continuity.

Survey Monkey

To Contents
<table>
<thead>
<tr>
<th>Centre Type</th>
<th>No.</th>
<th>No cath data</th>
<th>No PCI data</th>
<th>Caths (inc ? PCI)</th>
<th>PCIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHS Interventional</td>
<td>98</td>
<td>0</td>
<td>0</td>
<td>218,929</td>
<td>99,312</td>
</tr>
<tr>
<td>Private Interventional</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>5,719</td>
<td>1,171</td>
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<tr>
<td>Diagnostic only</td>
<td>57</td>
<td>3</td>
<td>-</td>
<td>36,160</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>176</td>
<td></td>
<td></td>
<td><strong>260,808</strong></td>
<td><strong>100,483</strong></td>
</tr>
<tr>
<td>UK centres</td>
<td>2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>No.</th>
<th>Isolated Diagnostic Caths</th>
<th>Caths as part of PCI</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHS and Private Interventional</td>
<td>119</td>
<td>118,823</td>
<td>105,825</td>
<td>224,648</td>
</tr>
<tr>
<td>Diagnostic only</td>
<td>57</td>
<td>36,160</td>
<td>-</td>
<td>36,160</td>
</tr>
<tr>
<td>TOTAL</td>
<td>176</td>
<td>154,983</td>
<td>-</td>
<td>260,808</td>
</tr>
</tbody>
</table>
Angiography (inc ?PCI)
Performed in PCI and Angio-only centres

- Angiography centres
- PCI Centres

2016 data
Population estimates

Mid 2016

Total UK: 65.6 m

- Scotland: 5.404 m
- Northern Ireland: 1.862 m
- England: 55.268 m
- Wales: 3.113 m

(Rx all repatriated to Wales in 2015)
Total PCI activity all UK

100,483 PCIs
1,530 pmp

Total PCI Procedures

PCI pmp
PCI pmp all UK
Rate of Increase

Survey Monkey
PCI per Angiogram ratio

2016 data

%
Total PCIs in the UK
by Country and Type of Institution

Zoom

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016

England NHS
England Private
Scotland NHS
Scotland Private
N. Ireland
Wales NHS
Wales Private

Total PCIs in the UK by Country and Type of Institution

2016 data
PCI pmp
By UK Country

England  1508
Scotland  1637
N. Ireland 2130
Wales  1394

Total PCI pmp
By LAT and Country

NB Based on mid 2011 populations, and postcode of patient treated (except Scotland)

To Contents
Total PCI vs Isolated CABG

Note: CABG data for financial year

Survey Monkey and SCTS data from 'Blue Book online'
PCI vs Isolated CABG Ratio

Survey Monkey and SCTS data from ‘Blue Book online’
Number of PCIs per Centre

2016 data
Number of PCIs per Centre

To Contents
Number of PCIs per Centre
NHS and Private

38 Centres performing < 400 cases (32%)

PERCUTANEOUS CORONARY INTERVENTION IN THE UK: RECOMMENDATIONS FOR GOOD PRACTICE 2015
Clinical guideline
Adrian P Banning, Andreas Baumbach, Dan Blackman, Nick Curzen, Sen Devadathan, Douglas Fraser, Peter Ludman, Micheal Norell, Dougie Muir, James Nolan, Simon Redwood, On behalf of the British Cardiovascular Intervention society
Number of PCIs per Centre
NHS Centres

17 Centres performing < 400 cases (19%)

[Graph showing distribution of PCI cases per centre]
Centres < 400 PCIs

NHS

- IPS: Ipswich Hospital (2014)
- MAY: Croydon University Hospital (2006)
- NHH: Basingstoke and North Hampshire Hospital (2003)
- PIN: Pinderfields General Hospital (2010)
- WAT: Watford General Hospital (2009)
- DGE: Eastbourne Hospital (2006)
- KMH: Kings Mill Hospital (2010)
- GWH: Queen Elizabeth Hospital Woolwich (2007)
- BRD: Bradford Royal Infirmary (2005)
- KSX: Tunbridge Wells Hospital (2008)
- LDH: Luton and Dunstable University Hospital (2014)
- DVH: Darent Valley Hospital (2008)
- BSM: Southmead Hospital Bristol (2008)
- EAL: Ealing Hospital (2009)
- MDW: Medway Maritime Hospital (2010)
- BFT: Belfast Trust City Hospital (<2002)

PCI program start date

2006 2007 2008 2009 2010 2014
Centres < 400 PCIs
Private

- HHW: Wellington Hospital (< 2002)
- LBH: London Bridge Hospital (< 2002)
- AHM: BMI Alexandra Hospital (< 2002)
- ANT: St Anthony's Hospital (< 2002)
- NBO: Nuffield Health Bournemouth Hospital (2015)
- SSP: Spire Shawfair Park Hospital (2010)
- KIM: Kent Institute of Medicine & Surgery (2014)
- PHN: BMI Park Hospital (< 2002)
- HBP: Spire Hospital Hull and East Riding (2004)
- GHB: Spire Hospital Bristol (2012)
- RHH: Ross Hall Hospital (< 2002)
- CRO: Cromwell Hospital (< 2002)
- MHO: Manor Hospital Oxford (< 2002)
- SPC: Spire Cardiff Hospital (2014)
- PHB: BMI Priory Hospital (< 2002)
- LEB: Spire Hospital Leeds (< 2002)
- BMI: BMI Meriden Hospital (2007)
- DUC: Duchy Hospital (2016)

PCI program start date

2016 data

To Contents
Centres < 200 PCIs
In either 2014, 2015 or 2016
Volume Outcome

O’Neill D, Circ Cardiovasc QO 2017;10:e003186

- **All PCI** (NHS centres, E&W, no pre-PCI vent)
  - 5.4% < 200, 87.1% 200 to 2000 procedures

Mean 1.9%
Volume Outcome

O’Neill D, Circ Cardiovasc QO 2017;10:e003186

- Primary PCI (NHS centres, E&W, no pre-PCI vent)

Mean 4.8%
No relationship between PCI centre volume and risk adjusted outcome

Reassurance of uniformly high standard of care with service development in context of existing guidance

Phenotype varied with volume
- Smaller centres – less PPCI but higher risk cases (more shock)
- ? Patients too sick to move to larger centre
- ? Differential classification of shock
- Operators at low vol centres with access to higher vol centres
- Very few low vol operators in UK

O’Neill D, Circ Cardiovasc QO 2017;10:e003186
Interventional Consultants
(NHS centres)

Note: if work at two NHS centres will be counted twice
Includes cardiologists and radiologists
Interventional Consultants

- Actual number of PCI operators by GMC number
- No double counting if work on more than one site

2% Rise
5.7% Female
### No. of Consultants (Per NHS Centre)

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean Number of Operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>5.0</td>
</tr>
<tr>
<td>2001</td>
<td>6.0</td>
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<tr>
<td>2002</td>
<td>6.0</td>
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<tr>
<td>2003</td>
<td>6.5</td>
</tr>
<tr>
<td>2004</td>
<td>7.0</td>
</tr>
<tr>
<td>2005</td>
<td>7.0</td>
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<td>2006</td>
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<td>2007</td>
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<td>2009</td>
<td>7.0</td>
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<td>2010</td>
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<td>2011</td>
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<td>2013</td>
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<td>2014</td>
<td>7.5</td>
</tr>
<tr>
<td>2015</td>
<td>8.0</td>
</tr>
<tr>
<td>2016</td>
<td>8.0</td>
</tr>
</tbody>
</table>

Note: if work at two NHS centres will be counted twice. 2016 data
No. of Consultants
In NHS centres

Note: if work at two NHS centres will be counted twice
PCIs per Consultant
(NHS Centres 2016)

Note:
Data from institutional volume divided by No operators per institution
Some consultants work in multiple institutions
PCI per Consultant

PCI Centre case volume / Number of operators


Number of PCIs

NHS Centres
PPCI
On call Rotas (A-G)

- **Weekdays**: 1 in ...
- **Weekends**: 1 in ...

Bar chart showing the distribution of on-call rotas for different individuals (A to G) across weekdays and weekends.
PPCI

On call Rotas (A-G)

weekdays: 1 in ....  weekends: 1 in ...

BCIS STEMI GUIDELINES JULY 2016

Not less than 1:6
PPCI

On call Rotas (H-P)

- weekdays: 1 in ...
- weekends: 1 in ...

2016 data
PPCI
On call Rotas (Q-Y)

weekdays: 1 in ....  weekends: 1 in ...

2016 data
On v Off Site Surgery
All Centres (NHS and private)

Survey Monkey

2016 data

Off Site
On Site

38 %
On v Off Site Surgery
NHS Centres Only

2016 data

Survey Monkey
Surgical Cover
(NHS centres only)

2016 data

PCIs per Centre

On site
Off site

Mean
1656
656

Median
1504
544
Total Number of PCIs
By Surgical cover NHS & Private

On Site
Off Site
Total


58,786 ← 59%
41,697 ← 41%
100,483
Day Case PCI

- 106 of 114 Units perform planned elective day case PCI

Data from: 114 of 119 centres
Day Case PCI

Planned Elective Procedures

Elective totals identified from PCI data upload, and compared with Survey responses
# Routine Repatriation

**NSTEMI and STEMI**

<table>
<thead>
<tr>
<th>Centre Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Royal Albert Edward Infirmary (Wigan) (AEI)</td>
</tr>
<tr>
<td>BMI Alexandra Hospital (AHM)</td>
</tr>
<tr>
<td>Altnagelvin Hospital (ALT)</td>
</tr>
<tr>
<td>Bedford Hospital (BED)</td>
</tr>
<tr>
<td>Royal Bournemouth Hospital (BOU)</td>
</tr>
<tr>
<td>Acute Pennine Trust Fairfield (BRY)</td>
</tr>
<tr>
<td>Conquest Hospital (CGH)</td>
</tr>
<tr>
<td>Nottingham City Hospital (CHN)</td>
</tr>
<tr>
<td>Craigavon Hospital (CRG)</td>
</tr>
<tr>
<td>Eastbourne Hospital (DGE)</td>
</tr>
<tr>
<td>Ealing Hospital (EAL)</td>
</tr>
<tr>
<td>Birmingham Heartlands Hospital (EBH)</td>
</tr>
<tr>
<td>Edinburgh Heart Centre (ERI)</td>
</tr>
<tr>
<td>Frimley Park Hospital (FRM)</td>
</tr>
<tr>
<td>St George's Hospital (GEO)</td>
</tr>
<tr>
<td>Golden Jubilee National Hospital (GJH)</td>
</tr>
<tr>
<td>Hairmyres Hospital (HAI)</td>
</tr>
<tr>
<td>Hammersmith Hospital (HAM)</td>
</tr>
<tr>
<td>Tunbridge Wells Hospital (KSX)</td>
</tr>
<tr>
<td>Luton and Dunstable University Hospital (LDH)</td>
</tr>
<tr>
<td>Yorkshire Heart Centre (LGI)</td>
</tr>
<tr>
<td>Medway Maritime Hospital (MDW)</td>
</tr>
<tr>
<td>Morriston Hospital (MOR)</td>
</tr>
<tr>
<td>Musgrove Park Hospital (MPH)</td>
</tr>
<tr>
<td>Manchester Royal Infirmary (MRI)</td>
</tr>
<tr>
<td>Northern General Hospital (NGS)</td>
</tr>
<tr>
<td>BMI Priory Hospital (PHB)</td>
</tr>
<tr>
<td>John Radcliffe Hospital (RAD)</td>
</tr>
<tr>
<td>Royal Free Hospital (RFH)</td>
</tr>
<tr>
<td>Royal Victoria Hospital (RVB)</td>
</tr>
<tr>
<td>St Thomas' Hospital (STH)</td>
</tr>
<tr>
<td>University Hospital of Wales (UHW)</td>
</tr>
</tbody>
</table>

## 32 Centres
Multidisciplinary Meetings
For IHD (NHS Centres)

- **Frequency**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Times a week</td>
<td>2</td>
</tr>
<tr>
<td>2 Times a week</td>
<td>6</td>
</tr>
<tr>
<td>Weekly</td>
<td>76</td>
</tr>
<tr>
<td>Every 2 weeks</td>
<td>5</td>
</tr>
<tr>
<td>Monthly</td>
<td>5</td>
</tr>
<tr>
<td>Sporadically</td>
<td>4</td>
</tr>
</tbody>
</table>
### Multidisciplinary Meetings

For IHD (NHS Centres)

#### Membership

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Number of MDT groups With specialty represented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interventional cardiologist</td>
<td>96 (all)</td>
</tr>
<tr>
<td>Cardiothoracic surgeon</td>
<td>85 (plus 1 MDT at tertiary centre)</td>
</tr>
<tr>
<td>Non Interventional Cardiologist</td>
<td>85</td>
</tr>
<tr>
<td>Anaesthetist</td>
<td>15</td>
</tr>
<tr>
<td>Cardiac Radiologist</td>
<td>3</td>
</tr>
<tr>
<td>Elderly care physician</td>
<td>1</td>
</tr>
<tr>
<td>Devices / heart failure cardiologist</td>
<td>1</td>
</tr>
<tr>
<td>Microbiologist</td>
<td>2</td>
</tr>
</tbody>
</table>

Data from 96 of 98 NHS Centres
Multidisciplinary Meetings
For IHD (NHS Centres)

According to replies: No Cardiothoracic Surgeon at MDT

<table>
<thead>
<tr>
<th>Hospital Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Royal Albert Edward Infirmary (Wigan) (AEI)</td>
</tr>
<tr>
<td>Royal United Hospital Bath (BAT)</td>
</tr>
<tr>
<td>Darent Valley Hospital (DVH)</td>
</tr>
<tr>
<td>Kings Mill Hospital (KMH)</td>
</tr>
<tr>
<td>Tunbridge Wells Hospital (KSX)</td>
</tr>
<tr>
<td>Ninewells Hospital (NIN)</td>
</tr>
<tr>
<td>Queen Alexandra Hospital (QAP)</td>
</tr>
<tr>
<td>Royal Cornwall Hospital (RCH)</td>
</tr>
<tr>
<td>Calderdale Royal Hospital (RHI)</td>
</tr>
<tr>
<td>Barts Health Centre, St Bartholomew’s Hospital (SBH)</td>
</tr>
<tr>
<td>Scunthorpe General Hospital (SCU)</td>
</tr>
<tr>
<td>Dorset County Hospital (WDH)</td>
</tr>
</tbody>
</table>

Data from 96 of 98 NHS Centres
Morbidity and Mortality Meetings
For IHD (NHS Centres)

- **Frequency**

<table>
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<th>Frequency</th>
<th>Count</th>
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</thead>
<tbody>
<tr>
<td>Weekly</td>
<td>2</td>
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<tr>
<td>Monthly</td>
<td>64</td>
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<tr>
<td>Every 6 weeks</td>
<td>1</td>
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<tr>
<td>Every 2 months</td>
<td>5</td>
</tr>
<tr>
<td>Every 3 months (quarterly)</td>
<td>21</td>
</tr>
<tr>
<td>Sporadically</td>
<td>4</td>
</tr>
</tbody>
</table>
Primary PCI

Pattern of activity offered (NHS 2016)

Ambulance arrivals for PPCI

Only self presenters and in patients

2016 data
Primary PCI

Pattern of activity offered (NHS 2016)

Ambulance arrivals for PPCI

Only self presenters and in patients

24/7/365
24/7/365 hybrid
Working hrs Hybrid

57
4
7

48
12
16
20
1

24/7/365 In patients
Working hrs In patients
Exceptional only
Never
Other

68
Pattern of activity offered (NHS 2016)

- 24/7/365: 57
- 24/7/365 hybrid: 4
- Working hrs: 7
- Hybrid: 1
- Exceptional only: 1

Ambulance arrivals for PPCI

- Only self presenters and in patients

Hospitals:
- Altnagelvin Hospital (ALT)
- Essex Cardiothoracic Centre (BAS)
- Liverpool Cardiothoracic Centre (BHL)
- Royal Berkshire and Battle Hospital (BHR)
- Royal Bournemouth Hospital (BOU)
- Bristol Royal Infirmary (BRI)
- Castle Hill Hospital (CHH)
- Nottingham City Hospital (CHN)
- Cumberland Infirmary (CMI)
- Royal Derby Hospital (DER)
- Birmingham City Hospital (DUD)
- Birmingham Heartlands Hospital (EBH)
- Edinburgh Heart Centre (ERI)
- Freeman Hospital (FRE)
- Frimley Park Hospital (FRM)
- St George's Hospital (GEO)
- Golden Jubilee National Hospital (GJH)
- Glenfield Hospital (GRL)
- Harimyes Hospital (HAI)
- Hammersmith Hospital (HAM)
- Harefield Hospital (HH)
- Kings College Hospital (KCH)
- Kettering General Hospital (KGH)
- Yorkshire Heart Centre (LGI)
- Lincoln County Hospital (LIN)
- Lister Hospital (LIS)
- Morriston Hospital (MOR)
- Musgrove Park Hospital (MPH)
- New Cross Hospital (NCR)
- Northern General Hospital (NGS)
- Basingstoke and North Hampshire Hospital (NHH)
- Ninewells Hospital (NIN)
- Norfolk and Norwich University Hospital (NOR)
- Papworth Hospital (PAP)
- Derriford Hospital, Southwest Cardiothoracic Centre (PLY)
- Queen Alexandra Hospital (QAP)
- Queen Elizabeth Hospital, Birmingham (QEB)
- John Radcliffe Hospital (RAD)
- Royal Cornwall Hospital (RCH)
- Royal Devon & Exeter Hospital (RDE)
- Royal Free Hospital (RFH)
- Aberdeen Royal Infirmary (RIA)
- Royal Sussex County Hospital (RSC)
- Royal Victoria Hospital (RVB)
- Barts Health Centre, St Bartholomew’s Hospital (SBH)
- James Cook University Hospital (SCM)
- Southampton General Hospital (SGH)
- St Peter’s Hospital (SPH)
- St Thomas' Hospital (STH)
- University Hospital of North Staffordshire (STO)
- Torbay Hospital (TOR)
- University Hospital of Wales (UHW)
- Blackpool Victoria Hospital (VIC)
- University Hospital Coventry (WAL)
- Wrexham Maelor Hospital (WEX)
- William Harvey Hospital (WHH)
- Worcester Royal Hospital (WRC)
Primary PCI

Pattern of activity offered (NHS 2016)

Ambulance arrivals for PPCI

Only self presenters and in patients

2016 data
Primary PCI
Pattern of activity offered (NHS 2016)

Ambulance arrivals for PPCI

Only self presenters and in patients

- Wycombe Hospital (AMG)
- Royal United Hospital Bath (BAT)
- Cheltenham General Hospital (CHG)
- Northampton General Hospital (NTH)
- Wiltshire Cardiac Centre (PMS)
- Salisbury District Hospital (SAL)
- Dorset County Hospital (WDH)

- Harefield, Wexham Park, Royal Berkshire
- Bristol
- Bristol
- Kettering
- Bristol, John Radcliffe
- Southampton, Bournemouth
- Bournemouth

2016 data

To Contents
Primary PCI

Pattern of activity offered (NHS 2016)

Ambulance arrivals for PPCI

Only self presenters and in patients

Northwick Park Hospital (NPH)
Sunderland Royal Hospital (SUN)

24/7/365
24/7/365 hybrid
Working hrs Hybrid
24/7/365 In patients
Working hrs In patients

Exceptional only
Never
Other

North Wales Cardiac Centre (CLW)
Craigavon Hospital (CRG)
Darent Valley Hospital (DVH)
Ealing Hospital (EAL)
East Surrey Hospital (ESU)
Tunbridge Wells Hospital (KSX)
Luton and Dunstable University Hospital (LDH)
Croydon University Hospital (MAY)
Medway Maritime Hospital (MDW)
Raigmore Hospital (RAI)
Watford General Hospital (WAT)
Worthing Hospital (WRG)
Primary PCI

Pattern of activity offered (NHS 2016)

2016 data

Ambulance arrivals for PPCI

Only self presenters and in patients

Royal Albert Edward Infirmary (Wigan) (AEI)
BMI Alexandra Hospital (AHM)
St Anthony's Hospital (ANT)
Bedford Hospital (BED)
Bradford Royal Infirmary (BRD)
Acute Pennine Trust Fairfield (BRY)
Southmead Hospital Bristol (BSM)
Royal Gwent Hospital (GWE)
Queen Elizabeth Hospital Woolwich (GWH)
Wellington Hospital (HHW)
Harley Street Clinic (HSC)
Ipswich Hospital (IPS)
Pinderfields General Hospital (PIN)
Calderdale Royal Hospital (RHI)
Scunthorpe General Hospital (SCU)
York District General Hospital (YDH)
Primary PCI

Pattern of activity offered (NHS 2016)

Ambulance arrivals for PPCI

- Belfast Trust City Hospital (BFT)
- Royal Blackburn Hospital (BLA)
- BMI Meriden Hospital (BMI)
- Cromwell Hospital (CRO)
- Duchy Hospital (DUC)
- Spire Hospital Bristol (GHB)
- Spire Hospital Hull and East Riding (HBP)
- London Independent Hospital (IND)
- Kent Institute of Medicine & Surgery (KIM)
- Kings Mill Hospital (KMH)
- London Bridge Hospital (LBH)
- Spire Hospital Leeds (LEB)
- Leeds Nuffield Hospital (LNH)
- Manor Hospital Oxford (MHO)
- Nuffield Health Bournemouth Hospital (NBO)
- BMI Priory Hospital (PHB)
- BMI Park Hospital (PHN)
- Ross Hall Hospital (RHH)
- Spire Cardiff Hospital (SPC)
- Spire Shawfair Park Hospital (SSP)

Only self presenters and in patients

2016 data

To Contents
Primary PCI

Pattern of activity offered (NHS 2016)

- 24/7/365: 57
- 24/7/365 hybrid: 4
- Working hrs Hybrid: 7
- 24/7/365 In patients: 2
- Working hrs In patients: 12
- Exceptional only: 16
- Never: 20
- Other: 1

Royal Brompton Hospital (NHB)

24/7 cover for Chelsea and Westminster

Ambulance arrivals for PPCI

Only self presenters and in patients
PPCI 2016

PPCI as part of ambulance network

- **PPCI 24/7**
- **PPCI 24/7 Hybrid**
- **PPCI working hrs**
- No PPCI as part of ambulance network
PPCI 2015

PPCI as part of ambulance network
- PPCI 24/7
- PPCI 24/7 Hybrid
- PPCI working hrs
- No PPCI as part of ambulance network
PPCI 6

PPCI as part of ambulance network

- PPCI 24/7
- PPCI 24/7 Hybrid
- PPCI working hrs
- No PPCI as part of ambulance network

2016 data
Contents

- **Structure**
  - Angio and PCI centres and maps
  - Total angio and PCI numbers
  - No of PCIs per centre and per angio
  - PCI pmp and by country and v CABG
  - Centre PCI volumes
  - PCI operators, by centre, by PPCI
  - On call rotas for PPCI
  - On site v off site surgical cover
  - Day case activity
  - Primary PCI units

- **NICOR data collection**
  - Centre participation
  - Databases used
  - Case ascertainment
  - Data completeness

- **Appropriateness**
  - Demographics
  - Indication for PCI / Clinical syndrome
  - PPCI activity (by unit, pmp, by vessel)
  - PCI for out of hospital arrest
  - PCI territories / vessels / lesions
  - Stents (BMS and DES)
  - Adjunctive pharmacotherapy
  - LV support and shock
  - Primary PCI for > 80 yrs
  - Extraction / Rota / IVUS / OCT / FFR / Laser etc.
  - Arterial access

- **Process of care**
  - Delays to treatment
  - NSTEMI (direct v IHT)
  - Primary PCI DTB / CTB
  - IHT versus Direct admission
  - Length of stay

- **Outcome**
  - MACCE
  - Peri-procedural complications and by access
  - Tracked 30 day mortality
    - Outcome by syndrome
    - Outcome by lesion subset

- **Adult non coronary intervention**
  - Septal ablation for HOCM
  - Mitral valvuloplasty
  - Mitraclip / PFO / ASD closure / LAA occlusion
  - Para-prosthetic leak closure
  - Renal Denervation
  - Percutaneous Pulmonary valve

- **TAVI**
  - Now presented in separate slide set

- **Conclusions and summary**

**Appendix: PCI Centre NICOR / CCAD Centre codes**
Patient Specific Data Collection
Challenges to the creation of the Audit Analysis of 2016 data
James Chal
Jamie Turnbull
Jiaqiu Wang
Abderrahim Hechachena

• ‘Research’ application
• Funding from BCIS
• Short time frame
Patient Specific Data Analysis

- **Data**
  - Centre participation
  - Case ascertainment
  - Data completeness
Patient Specific Data Analysis

• Data
  – Centre participation
  – Case ascertainment
  – Data completeness
# Procedure Specific Analysis

## Participation in NICOR 2016

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<td>Scotland</td>
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<td>5</td>
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## Procedure Specific Analysis

### Participation in NICOR 2016

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</tr>
<tr>
<td>Private</td>
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Wales

- NHS: 4
- Private: 1

N Ireland

- NHS: 4
- Private: 2

Scotland

- NHS: 6
- Private: 2

*Ninewells (but data upload imminent)*
## Procedure Specific Analysis

### Participation in NICOR 2016

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<th>NHS Centres</th>
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<td>N Ireland</td>
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<td>0</td>
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<td>Scotland</td>
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<td>1</td>
</tr>
<tr>
<td></td>
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</tbody>
</table>

- **BMI Meriden**
- **London Independent**
- **Spire Hull & East Riding**
- **Spire Leeds**
- **Nuffield Leeds**
- **Nuffield Bournemouth**
- **BMI Park Notts**
- **Spire Cardiff (IT glitch)**
Patient Specific Data Analysis

- Data
  - Centre participation
  - Case ascertainment
  - Data completeness
Case Ascertainment

BCIS Aggregate Audit for Adult Percutaneous Interventional Procedures
(1st January 2012 to 31st December 2012)

Interventional procedures

51. Overall Total Number of PCI procedures

Note
- This does not include procedures where ONLY a pressure wire / IVUS or OCT study has taken place.
- This number will be compared with the number of cases uploaded to NICOR in order to assess case ascertainment.

NICOR Data warehouse
Case Ascertainment

? Hospital Episode Statistics ↔ NICOR Data warehouse

NICOR Data warehouse

2016 data
NICOR Case Ascertainment
UK PCI data in NICOR as % of Reported Totals

No Data

Data as 17-09-2017

To Contents
NICOR Case Ascertainment
UK PCI data in NICOR as % of Reported Totals

SPC. Spire Cardiff Hospital
PHN. BMI Park Hospital
NIN. Ninewells Hospital
NBO. Nuffield Health Bournemouth Hospital
LNH. Leeds Nuffield Hospital
LEB. Spire Hospital Leeds
IND. London Independent Hospital
HBP. Spire Hull & East Riding Hospital
BMI. The BMI Meriden Hospital

No Data

Data as 17-09-2017
NICOR Case Ascertainment
UK PCI data in NICOR as % of Reported Totals

Data as 17-09-2017

To Contents
NICOR Case Ascertainment

UK PCI data in NICOR as % of Reported Totals

- MDW. Medway Maritime Hospital
- RHH. Ross Hall Hospital
- AHM. BMI The Alexandra Hospital
- NHH. Basingstoke and North Hampshire
- SCU. Scunthorpe General Hospital
- GHB. Spire Bristol
- WDH. Dorset County Hospital
- CRO. Cromwell Hospital
- GWE. Royal Gwent Hospital
- SBH. St Bartholomews Hospital
- ANT. Spire St Anthony's Hospital
- DUC. Duchy Hospital Truro
- SUN. Sunderland Royal Hospital
- KMH. Kings Mill Hospital
- MHO. Manor Hospital

Data as 17-09-2017

<90%

Data as 17-09-2017
NICOR Case Ascertainment
UK PCI data in NICOR as % of Reported Totals

Data as 17-09-2017

To Contents
NICOR Case Ascertainment

UK PCI data in NICOR as % of Reported Totals

Data as 17-09-2017

Data as 17-09-2017
# Case Ascertainment

## Reported Totals v data in NICOR

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<th>W NHS</th>
<th>S NHS</th>
<th>NI NHS</th>
<th>E Private</th>
<th>W Private</th>
<th>S Private</th>
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<td>Declared PCIs</td>
<td>100,483</td>
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<td>4,316</td>
<td>8,774</td>
<td>3,966</td>
<td>1,077</td>
<td>23</td>
<td>71</td>
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<tr>
<td>In NICOR</td>
<td>97,496</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Missing</td>
<td>3,910</td>
<td>2,471</td>
<td>105</td>
<td>875</td>
<td>37</td>
<td>378</td>
<td>23</td>
<td>21</td>
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<tr>
<td>Missing (%)</td>
<td>3.9</td>
<td>3.0</td>
<td>2.4</td>
<td>10.0</td>
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<td>Extras</td>
<td>923</td>
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<td>144</td>
<td>109</td>
<td>257</td>
<td>5</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Extra (%)</td>
<td>0.9</td>
<td>0.5</td>
<td>3.3</td>
<td>1.2</td>
<td>6.5</td>
<td>0.5</td>
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</table>

NICOR data as 17-09-2017
Duplicate Identification

• Methods

  – ‘Guidance to data validation and description of analytical steps used in report creation’

• Available on BCIS web site
• Click link above or go to www.BCIS.org.uk and select:

  https://www.bcis.org.uk/resources/bcis-ccad-database-resources/individual-outcomes/
Patient Specific Data Analysis

- Data
  - Centre participation
  - Case ascertainment
  - Data completeness
Patient Specific Data Analysis

- **Data**
  - Centre participation
  - Case ascertainment
  - Data completeness

- **Assessed for 3 scenarios:**
  - 1. Risk adjusted outcomes
  - 2. Delays to treatment for Primary PCI
  - 3. Delays to treatment for UA / NSTEMI
# NICOR Minimum Data Standard

- > 95% completeness

<table>
<thead>
<tr>
<th>All PCI</th>
<th>Primary PCI (in community at symptom onset)</th>
<th>PCI for all types of ACS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.03 NHS number (E&amp;W)</td>
<td>5.30 Location of Patient at STEMI onset</td>
<td>2.07 Date/time of symptom onset</td>
</tr>
<tr>
<td>1.06 Birth date</td>
<td>3.26 Date/time of first balloon inflation</td>
<td>5.27 Date/time of call for help</td>
</tr>
<tr>
<td>1.07 Sex</td>
<td></td>
<td>2.08 Date/time of arrival at first hospital</td>
</tr>
<tr>
<td>5.05 Medical History</td>
<td></td>
<td>5.26 Date/time of arrival at PCI hospital</td>
</tr>
<tr>
<td>2.13 Previous MI</td>
<td></td>
<td>2.09 Admission Route</td>
</tr>
<tr>
<td>5.06 History of renal disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.16 Diabetes</td>
<td></td>
<td></td>
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<tr>
<td>5.35 Creatinine</td>
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<td></td>
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<tr>
<td>2.18 Weight</td>
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<td>2.04 Cardiogenic shock (Pre- PCI)</td>
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<td>2.03 Procedure urgency</td>
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<td></td>
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<tr>
<td>3.09 Vessels attempted</td>
<td></td>
<td></td>
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<td>4.04 Discharge date</td>
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<tr>
<td>4.03 Status at discharge</td>
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<td>5.31 Consultant responsible GMC Number</td>
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<td>3.02 Consultant responsible Name</td>
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Data Completeness Tool

BCIS Reports

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<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<td>100</td>
<td>100</td>
<td>100</td>
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<td>2.08 Date/Time arrival at FIRST hospital (ACS only)</td>
<td>100</td>
<td>98.7</td>
<td>100</td>
<td>100</td>
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<td>2.09 Admission route (ACS only)</td>
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<td>100</td>
<td>100</td>
<td>100</td>
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<td>2.10 Presenting ECG (ACS only)</td>
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<td>100</td>
<td>100</td>
<td>98.9</td>
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<tr>
<td>2.12 Cardiac Enzymes/Markers Raised</td>
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<td>84.8</td>
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<td>5.26 Date/Time arrival at PCI hospital (ACS only)</td>
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<td>5.27 Date/time of call for help</td>
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### Data Completeness Tool

#### BCIS Reports

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<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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</thead>
<tbody>
<tr>
<td>Pre-PCI Status</td>
<td>2.04 Cardiogenic shock (Pre-procedure)</td>
<td>100</td>
<td>100</td>
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**% Completeness**

1. Fields required for risk adjusted outcome

Consultant Public Reports

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<th>Urgency</th>
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The data completeness provided for this report’s risk adjusted outcomes are considered to be: ADEQUATE

BCIS require data completeness levels of >95% to allow appropriate analysis of PCI outcome data.
### % Completeness

#### 1. Fields required for risk adjusted outcome

**Consultant Public Reports**

| Extent of Data Completeness in Variables Relevant to Risk Estimation (3 years of data): |
|---------------------------------|-------------------------------------------------|-------------------------------------------------|------------------|-----------------|-----------------|-----------------|
|                                | Age     | Sex     | Medical History | Shock  | Urgency | Vessels Attempted | Diabetes | Prior MI | Renal Disease | Indication |
| Count                          | 2359    | 2359    | 2359            | 2359   | 2359    | 2359            | 2356     | 2354     | 2358          | 2353       |
| %Complete                      | 100     | 100     | 100             | 100    | 100     | 100             | 99.87    | 99.79    | 99.96         | 99.75      |

The data completeness provided for this report’s risk adjusted outcomes are considered to be: **ADEQUATE**

Any domain <95%

The data completeness provided for this report’s risk adjusted outcomes are considered to be: **INADEQUATE**
## % Completeness

### 1. Fields required for risk adjusted outcome

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<th>Procedure urgency</th>
<th>Vessels treated</th>
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<th>Diabetes</th>
<th>Discharge date</th>
<th>Discharge status</th>
<th>PCI hospital outcome</th>
<th>NHS number</th>
<th>Creatinine</th>
<th>Weight</th>
<th>Location at time of STEMI</th>
<th>Responsible GMC Number</th>
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Notes:
- NHS number not included in ranking as only E&W
- Where STEMI onset location is not applicable – given a rating of 100

Total score

< 90%

< 50%
% Completeness

1. Field required for Risk Adjustment

Data as 07-11-2016

| Hospital                          | Date of Birth | Sex | Medical History | Prior MI | Pre-procedure shock | Procedure urgency | Vessels treated | Renal disease | Diabetes | Discharge date | Discharge status | PCI hospital outcome | NHS number | Creatinine | Weight | Consultant responsible Name |
|-----------------------------------|---------------|-----|-----------------|----------|---------------------|------------------|-----------------|---------------|----------|-------------|-------------------|-------------------|-------------------|------------|----------|--------|--------------------------------|
| Ipswich Hospital                 | 100           | 100 | 100             | 100      | 100                 | 100              | 100             | 100           | 100      | 100         | 100               | 100               | 100               | 100        | 100      | 100    |                                |
| Southmead Hospital               | 100           | 100 | 100             | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Worcestershire Royal Hospital    | 100           | 100 | 99.9            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Hammersmith Hospital             | 100           | 100 | 100             | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Rainmore Hospital                | 100           | 100 | 100             | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Northwick Park Hospital          | 100           | 100 | 99.9            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Craigavon Area Hospital          | 100           | 100 | 99.6            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Tayside Hospital                 | 100           | 100 | 100             | 99.7     |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Torbay Hospital                  | 100           | 100 | 99.5            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Queen Elizabeth Hospital, Edgbaston | 100       | 100 | 99.7           | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Bradford Royal Infirmary         | 100           | 100 | 99.7            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Southamptom General Hospital     | 100           | 100 | 99.4            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Pinderfields General Hospital    | 100           | 100 | 99.3            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Doncaster Hospital               | 100           | 100 | 99.6            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Glentified Hospital              | 100           | 100 | 99.9            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| James Cook University            | 100           | 100 | 98.8            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| St. Peter's Hospital             | 100           | 100 | 97.9            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Airedale Royal Infirmary         | 100           | 100 | 99.5            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Royal Devon & Exeter Hospital    | 100           | 100 | 99.7            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Cheltenham General Hospital      | 100           | 100 | 99.7            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Croydon University Hospital      | 100           | 100 | 99.5            | 97.8     |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Kettering General Hospital       | 100           | 100 | 99.8            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Acute Pennon Trust Fairfield     | 100           | 100 | 99.8            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Queen Alexandra Hospital         | 100           | 100 | 99.9            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Northamptom General Hospital     | 100           | 100 | 99.9            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Luton & Dunstable Hospital       | 100           | 100 | 99.6            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Frimley Park Hospital            | 100           | 100 | 99.7            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Bedford Hospital                 | 100           | 100 | 99.7            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Royal Berkshire Hospital         | 100           | 100 | 99.7            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| John Radcliffe Hospital          | 100           | 100 | 99.9            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Eastbourne DCH                   | 100           | 100 | 99.9            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Wexham Park Hospital             | 100           | 100 | 99.3            | 96.7     |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Great Western Hospital           | 100           | 100 | 97.7            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Musgrove Park Hospital           | 100           | 100 | 99.5            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Leeds General Infirmary          | 100           | 100 | 99.5            | 99.8     |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| New Cross Hospital               | 100           | 100 | 99.4            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
| Wycombe Hospital                 | 100           | 100 | 99.7            | 100      |                      |                  |                 |               |          |             |                   |                  |                  |            |          |        |                                |
% Completeness

To Contents

2016 data


## % Completeness

### Room for Improvement

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<th>Date of Birth</th>
<th>Sex</th>
<th>Medical History</th>
<th>Prior MI</th>
<th>Pre-procedure shock</th>
<th>Procedure urgency</th>
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<th>Diabetes</th>
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<th>NHR number</th>
<th>Creatinine</th>
<th>Weight</th>
<th>Location at time of STEMI alert</th>
<th>Consultant</th>
<th>Consultant Name</th>
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% Completeness

2. Fields required for Primary PCI delays

% complete for patients treated by primary PCI (and not already in hospital at time of symptoms)

2.07 Date/time of symptom onset (PPCI)
2.08 Date/time of arrival at first hospital (PPCI)
5.26 Date/time of arrival at PCI hospital (PPCI)
3.26 Date/time of first balloon inflation (PPCI)
4.04 Discharge date (PPCI)
% Completeness

2. Fields required for Primary PCI delays

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<th>5.27 Datetime of call for help (PPCI)</th>
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% Completeness

2. Fields required for Primary PCI delays

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# Completeness

## 2. Fields required for Primary PCI delays

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<th>4.04 Discharge date (PPCI)</th>
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To Contents
## % Completeness

### 3. Fields required for NSTEMI delays

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<td>• Arrival at first hospital (Door 1)</td>
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<td>Discharge Date (NSTEMI)</td>
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### Fields required for NSTEMI delays

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#### 2017 addition to Minimum Data Standard

- % Completeness
- 3. Fields required for NSTEMI delays

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To Contents
% Completeness

3. Fields required for NSTEMI delays

Public Reports – Good data completeness

<table>
<thead>
<tr>
<th>Extent of Complete Data in Variables Relevant to NSTEMI Door to Balloon Time Delays</th>
<th>Complete Records</th>
<th>Percentage</th>
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* Out of all NSTEMI cases
** Out of all direct admission cases (requires admission route and arrival at PCI centre)
*** Out of all IHTs (requires admission route, symptom onset time, arrival at first hospital, and arrival at PCI centre)

Door to Balloon Times (where admission route and timings are recorded): NSTEMI

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<td>NSTEMI: % of Direct Admission Treated Within 72 Hours 57.41%</td>
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<td>NSTEMI: % of IHT Cases Treated Within 72 Hours 20%</td>
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% Completeness

3. Fields required for NSTEMI delays

Public Reports – Inadequate data completeness

| Extent of Complete Data in Variables Relevant to NSTEMI Door to Balloon Time Delays |
|-----------------------------------|--------------------------------------------------|
| Complete Records | Percentage |
| Route of admission * | 205 | 99.51% |
| Completeness of data to assess delays: Direct Admission ** | 114 | 96.61% |
| Completeness of data to assess delays: IHT *** | 72 | 88.89% |

* Out of all NSTEMI cases
** Out of all direct admission cases (requires admission route and arrival at PCI centre)
*** Out of all IHTs (requires admission route, symptom onset time, arrival at first hospital, and arrival at PCI centre)

Door to Balloon Times (where admission route and timings are recorded): NSTEMI

Inadequate data completeness. This precludes analysis. See local report for analysis of the data provided.

BCIS require completeness levels of greater than 95 percent in each of the fields 'Route of Admission', 'Symptom Onset', 'Arrival at First Hospital' and 'Arrival at PCI Centre'
### Time fields NSTEMI

**Excellent**

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Data as 17-10-2016
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# Time fields NSTEMI

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Contents

• **Structure**
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  – Total angio and PCI numbers
  – No of PCIs per centre and per angio
  – PCI pmp and by country and v CABG
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  – Case ascertainment
  – Data completeness

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  – Indication for PCI / Clinical syndrome
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  – Mitral valvuloplasty
  – Mitraclip /PFO / ASD closure / LAA occlusion
  – Para-prosthetic leak closure
  – Renal Denervation
  – Percutaneous Pulmonary valve

• **TAVI**
  – Now presented in separate slide set

• **Conclusions and summary**

Appendix: PCI Centre NICOR / CCAD Centre codes
Appropriateness
## Demographics

<table>
<thead>
<tr>
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<td>65.0</td>
<td>65.1</td>
<td>65.3</td>
<td>64.9</td>
<td>64.9</td>
<td>65.1</td>
<td>65.1</td>
<td>65.3</td>
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<td>Sex (male %)</td>
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<td>73.8</td>
<td>73.9</td>
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<td>74.0</td>
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<td>Diabetic (%)</td>
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<td>18.0</td>
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<td>20.2</td>
<td>20.7</td>
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<td>22.9</td>
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<td>Previous CABG (%)</td>
<td>8.5</td>
<td>9.1</td>
<td>8.6</td>
<td>8.4</td>
<td>7.9</td>
<td>8.9</td>
<td>8.6</td>
<td>8.4</td>
<td>8.4</td>
<td>8.6</td>
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<tr>
<td>Previous PCI (%)</td>
<td>18.6</td>
<td>21.1</td>
<td>22.3</td>
<td>22.6</td>
<td>22.7</td>
<td>23.5</td>
<td>24.7</td>
<td>25.6</td>
<td>26.4</td>
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<tr>
<td>Previous MI (%)</td>
<td>29.5</td>
<td>30.2</td>
<td>28.8</td>
<td>28.4</td>
<td>27.6</td>
<td>26.8</td>
<td>27.2</td>
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<td>Current smoker (%)</td>
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<td></td>
<td></td>
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<td>26.0</td>
<td>26.1</td>
<td>25.4</td>
<td>25</td>
<td>24.4</td>
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<tr>
<td>Ex smoker (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>39.0</td>
<td>37.0</td>
<td>36.9</td>
<td>37.7</td>
<td>37.3</td>
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<tr>
<td>Never smoked (%)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>35.1</td>
<td>37.0</td>
<td>37.7</td>
<td>37.3</td>
<td>38.2</td>
</tr>
</tbody>
</table>
Demographics - Age

2016 data
Demographics - Age

The graph shows the scatter plot of Mean Age (yrs) against No. of PCIs per Centre. The mean age across all centres is approximately 65.3 years. The data points are distributed across a range of ages, with a slight clustering near the average value.
Demographics - Age

[Graph showing the relationship between mean age (years) and the number of PCIs per centre. The graph includes various data points representing different centres.]
# Demographics

<table>
<thead>
<tr>
<th></th>
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<td>48,267</td>
<td>55,572</td>
<td>61,966</td>
<td>64,355</td>
<td>62,350</td>
<td>62,499</td>
<td>63,872</td>
<td>63,305</td>
<td>63,771</td>
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<td>European (%)</td>
<td>92.3</td>
<td>92.0</td>
<td>93.0</td>
<td>92.3</td>
<td>91.8</td>
<td>92.1</td>
<td>91.6</td>
<td>91.4</td>
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<td>90.1</td>
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<tr>
<td>Asian (%)</td>
<td>6.7</td>
<td>7.1</td>
<td>6.16</td>
<td>6.77</td>
<td>7.2</td>
<td>7.0</td>
<td>7.3</td>
<td>7.6</td>
<td>8.1</td>
<td>8.7</td>
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<tr>
<td>Black (%)</td>
<td>0.83</td>
<td>0.72</td>
<td>0.71</td>
<td>0.79</td>
<td>0.83</td>
<td>0.81</td>
<td>0.98</td>
<td>0.85</td>
<td>0.80</td>
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<tr>
<td>Oriental (%)</td>
<td>0.2</td>
<td>0.17</td>
<td>0.15</td>
<td>0.17</td>
<td>0.17</td>
<td>0.14</td>
<td>0.16</td>
<td>0.18</td>
<td>0.12</td>
<td>0.17</td>
</tr>
</tbody>
</table>
Clinical Syndrome

% PCI Performed for each Indication

- Stable
- Acute


2016 data
Clinical Syndrome

- PCI in patients with Acute Syndromes (%)
Clinical Syndrome

- PCI in patients with Acute Syndromes (%)
Clinical Syndrome

- PCI in patients with Acute Syndromes (%)
Indication for PCI

2016 data
Staged - Totals

![Graph showing the relationship between the number of staged procedures per centre and the number of PCIs per centre. The data is from 2016.](image)

To Contents
Staged % of all PCI

2016 data
Staged % of all PCI

2016 data
PCI for Stent Thrombosis

2016 data

Procedures with data recorded in this field:
- 2014: 46,241
- 2015: 76,619
- 2016: 84,779

Very Late (> 1yr)
- 2014: 1.94
- 2015: 1.35
- 2016: 0.74

Late (30/7 - 1yr)
- 2014: 0.74
- 2015: 0.81
- 2016: 0.28

Early (0-30/7)
- 2014: 2.9
- 2015: 2.4
- 2016: 1.8

%
Indication for PCI

2016 data

26.1 % STEMI
PCI for STEMI

No data from Ninewells for 2015 and 2016
## Primary PCI Demographics

- **PPCI only**

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (yrs)</td>
<td>63.6</td>
<td>63.6</td>
</tr>
<tr>
<td>Male (%)</td>
<td>74.6%</td>
<td>74.3%</td>
</tr>
<tr>
<td>Diabetic (%)</td>
<td>15.6%</td>
<td>16.8%</td>
</tr>
<tr>
<td>Shock (%)</td>
<td>8.7%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Past History of MI</td>
<td>12.6%</td>
<td>12.5%</td>
</tr>
<tr>
<td>Past History of PCI</td>
<td>10.6%</td>
<td>10.9%</td>
</tr>
<tr>
<td>Past History of CABG</td>
<td>3.2%</td>
<td>3.6%</td>
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</table>
Primary PCI for STEMI

Absolute numbers

2015

2016
Primary PCI for STEMI

Absolute numbers
Primary PCI for STEMI

Absolute numbers
Primary PCI for STEMI
As % of Total PCIs 2016

No. of PCIs per Centre

pPCIs as % of Total PCI Activity
Primary PCI for STEMI
As % of Total PCIs 2016
Primary PCI for STEMI
As % of Total PCIs 2016
Primary PCI for STEMI
As % of Total PCIs 2016

2016 data
Primary PCI for STEMI

Increase

2016 data
Primary PCI for STEMI

Increase
Primary PCI

UK Countries – Total number of procedures

<table>
<thead>
<tr>
<th>Year</th>
<th>England</th>
<th>Scotland</th>
<th>Wales</th>
<th>N. Ireland</th>
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<tr>
<td>2007</td>
<td>20,950</td>
<td>2,072</td>
<td>992</td>
<td>784</td>
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<tr>
<td>2008</td>
<td>21,203</td>
<td>2,051</td>
<td>1,072</td>
<td>820</td>
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<td>2009</td>
<td>20,950</td>
<td>2,072</td>
<td>992</td>
<td>784</td>
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<tr>
<td>2010</td>
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<td>2011</td>
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<td>2014</td>
<td>20,950</td>
<td>2,072</td>
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<td>784</td>
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<tr>
<td>2015</td>
<td>20,950</td>
<td>2,072</td>
<td>992</td>
<td>784</td>
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<tr>
<td>2016</td>
<td>20,950</td>
<td>2,072</td>
<td>992</td>
<td>784</td>
</tr>
</tbody>
</table>

Primary PCI
UK Countries - pmp

Primary PCI pmp
By LAT and Country 2010 to 2016

UK 379 pmp

300-500 pmp

N Ireland
N. Wales
## Primary PCI pmp

### By LAT and Country 2016

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<thead>
<tr>
<th>Region</th>
<th>pmp</th>
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<tbody>
<tr>
<td>North Wales</td>
<td>82.85642</td>
</tr>
<tr>
<td>Q71. London</td>
<td>253.3662</td>
</tr>
<tr>
<td>Q65. Bristol, North Somerset, Somerset and South Gloucestershire</td>
<td>318.221</td>
</tr>
<tr>
<td>Q69. Thames Valley</td>
<td>332.4976</td>
</tr>
<tr>
<td>Q57. Essex</td>
<td>351.3145</td>
</tr>
<tr>
<td>Q67. Kent and Medway</td>
<td>353.0777</td>
</tr>
<tr>
<td>Q51. South Yorkshire and Bassetlaw</td>
<td>361.1486</td>
</tr>
<tr>
<td>Q64. Bath, Gloucestershire, Swindon and Wiltshire</td>
<td>361.4221</td>
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<tr>
<td>Q68. Surrey and Sussex</td>
<td>367.7867</td>
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<tr>
<td>Q70. Wessex</td>
<td>369.9141</td>
</tr>
<tr>
<td>Q58. Hertfordshire and The South Midlands</td>
<td>387.7602</td>
</tr>
<tr>
<td>Q44. Cheshire, Warrington and Wirral</td>
<td>388.7878</td>
</tr>
<tr>
<td>Q47. Lancashire</td>
<td>390.1723</td>
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<tr>
<td>Scotland</td>
<td>392.974</td>
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<tr>
<td>Q56. East Anglia</td>
<td>395.8925</td>
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<tr>
<td>Q60. Shropshire and Staffordshire</td>
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<td>414.4487</td>
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<td>Q52. West Yorkshire</td>
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<tr>
<td>Q46. Greater Manchester</td>
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<td>South Wales</td>
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<tr>
<td>Q53. Arden, Herefordshire and Worcestershire</td>
<td>449.1092</td>
</tr>
<tr>
<td>Q59. Leicestershire and Lincolnshire</td>
<td>451.0931</td>
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<tr>
<td>Q54. Birmingham and The Black Country</td>
<td>457.9459</td>
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<tr>
<td>Q50. North Yorkshire and Humber</td>
<td>460.6114</td>
</tr>
<tr>
<td>Q45. Durham, Darlington and Tees</td>
<td>469.3746</td>
</tr>
<tr>
<td>Q49. Cumbria, Northumberland, Tyne and Wear</td>
<td>471.7689</td>
</tr>
<tr>
<td>Q66. Devon, Cornwall and Isles Of Scilly</td>
<td>499.3352</td>
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</table>

NB Based on mid 2011 populations
Chronic Total Occlusion

Stable only

![Bar chart showing the number of CTO cases as a percentage of all PCI for stable coronary syndromes from 2012 to 2016. The data shows a slight increase from 2012 to 2015, with a slight decrease in 2016.](image)
PCI for stable CTO
By LAT and Country 2016

2016 CTO for Stable symptoms
Rate pmp

0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360

QD Lancashire
QG Greater Manchester
QG South Yorkshire and Bassetlaw
QG Cheshire, Wirral and Merseyside
QD London
QD Northumberland and Cumbria
QG Leeds, Harrogate and York
QG Worcestershire, Dudley, Walsall
QG Wirral and Cheshire
QG South West
QG Dorset
QG Kent
QG South West
QG Northern
QG Buckinghamshire, Milton Keynes, Oxfordshire, Berkshire and
QG South East
QG Kent and Medway
QG Essex, Hertfordshire and
QG Warwickshire
QG Leicestershire and Rutland
QG Cumbria
QG North West
QG South West
QG Birmingham and The Black Country
QG Greater Manchester
QG Lancashire
QG West Yorkshire
QG South East
QG The City of London
QG Greater London
QG London
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<td>Lancashire</td>
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<td>Greater Manchester</td>
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<td>South Yorkshire and Bassetlaw</td>
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<tr>
<td>Merseyside</td>
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<tr>
<td>Cheshire, Warrington and Wirral</td>
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<td>London</td>
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<td>Arden, Herefordshire and Worcestershire</td>
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<tr>
<td>Durham, Darlington and Tees</td>
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<tr>
<td>Devon, Cornwall and Isles Of Scilly</td>
<td>48.55481</td>
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<tr>
<td>North Yorkshire and Humber</td>
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<tr>
<td>Leicestershire and Lincolnshire</td>
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<tr>
<td>East Anglia</td>
<td>51.13611</td>
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<tr>
<td>Kent and Medway</td>
<td>58.46041</td>
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<td>Hertfordshire and The South Midlands</td>
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<td>Essex</td>
<td>80.00252</td>
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<td>Thames Valley</td>
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<td>Birmingham and The Black Country</td>
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<tr>
<td>Bristol, North Somerset, Somerset and South</td>
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<td>Cumbria, Northumberland, Tyne and Wear</td>
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<td>Wessex</td>
<td>109.8939</td>
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<tr>
<td>N Ireland</td>
<td>139.596</td>
</tr>
</tbody>
</table>
Out of Hospital Cardiac Arrest

- Total Number of **Emergency** cases with Pre PCI ventilation
  - Surrogate of out of hospital cardiac arrest
Indication for PCI

- Total Number of **Emergency** cases with Pre PCI ventilation
  - Surrogate of out of hospital cardiac arrest

![Bar chart showing the number of cases with Pre PCI ventilation for different categories over years 2014, 2015, and 2016.](chart.png)

- **All STEMI**
  - 2014: 1240
  - 2015: 1264
  - 2016: 1346

- **Primary PCI**
  - 2014: 1196
  - 2015: 1217
  - 2016: 1292

- **NSTEMI**
  - 2014: 202
  - 2015: 231
  - 2016: 220

From raw dataset
Pre PCI Ventilation

- As % of ALL PCI activity
Pre PCI Ventilation

- As % of ALL PCI activity

2016 data
# Out of Hospital Cardiac Arrest

<table>
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<tr>
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<th>Field Prompt</th>
<th>Short Code</th>
<th>Text for long code</th>
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<td>Out Of Hospital Cardiac Arrest</td>
<td>99</td>
<td>Unknown</td>
</tr>
<tr>
<td>6.04</td>
<td>Presumed date / time of arrest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.05</td>
<td>Ventilation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.06</td>
<td>Arterial blood gas on arrival in cath lab: pH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.07</td>
<td>Arterial blood gas on arrival in cath lab: Lactate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.08</td>
<td>Arterial blood gas on arrival in cath lab: Base excess</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.09</td>
<td>Glasgow Coma Scale on arrival in cath lab</td>
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</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>PCIs with data</th>
<th>OOHA in PCIs with data</th>
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</thead>
<tbody>
<tr>
<td>2014</td>
<td>46,513</td>
<td>1,398 (3.0%)</td>
</tr>
<tr>
<td>2015</td>
<td>66,678</td>
<td>2,118 (3.2%)</td>
</tr>
<tr>
<td>2016</td>
<td>73,696</td>
<td>2,337 (3.2%)</td>
</tr>
</tbody>
</table>

From raw dataset
Out of Hospital Cardiac Arrest


From raw dataset
Out of Hospital Cardiac Arrest

- Not ventilated
- ITU patient
- Patient from other GA intervention
- Acute following arrest event initiated before arrival to PCI team
- Acute following arrest event initiated by PCI team
- Acute after start of PCI procedure
- Acute after completion of PCI procedure

- 2014
- 2015
- 2016

2016 data

Established

Acute

From raw dataset
Out of Hospital Cardiac Arrest

• Indication for PCI

Percentage of PCIs performed in context of OOHA

From raw dataset
Out of Hospital Cardiac Arrest

- Shock (2016)

- Shocked percentage: 37% 21%

From raw dataset
Out of Hospital Cardiac Arrest

<table>
<thead>
<tr>
<th>Ventilation Status</th>
<th>n</th>
<th>pH Mean</th>
<th>BE mean</th>
<th>Lactate mean</th>
</tr>
</thead>
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<tr>
<td>0. None</td>
<td>842</td>
<td>7.29</td>
<td>-1.81</td>
<td>2.84</td>
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<tr>
<td>1. Ventilated before PCI: Established on ITU</td>
<td>191</td>
<td>7.18</td>
<td>-1.92</td>
<td>4.60</td>
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<td>2. Ventilated before PCI: Established other GA</td>
<td>8</td>
<td>7.51</td>
<td>-5.10</td>
<td>2.82</td>
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<tr>
<td>3. Ventilated before PCI:</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Acute following arrest before arrival to PCI team</td>
<td>857</td>
<td>7.14</td>
<td>-6.38</td>
<td>6.19</td>
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<tr>
<td>4. Ventilated before PCI:</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute following arrest –initiated by PCI team</td>
<td>72</td>
<td>7.16</td>
<td>-5.33</td>
<td>5.64</td>
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<tr>
<td>5. Ventilated during PCI:</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Acute after start of PCI procedure</td>
<td>13</td>
<td>7.16</td>
<td>-11.84</td>
<td>6.60</td>
</tr>
<tr>
<td>6. Ventilated after PCI:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute after completion of PCI procedure</td>
<td>8</td>
<td>7.10</td>
<td>-5.83</td>
<td>9.14</td>
</tr>
</tbody>
</table>
Multi-vessel Disease
Multi-vessel Treatment

% of all PCI

Number of Vessels treated per Case

- 1 vessel: 77.2%
- 2 vessels: 17.5%
- 3 vessels: 3.4%

Years: 2006 to 2016

2016 data
Multi-Lesion Treatment

% of all PCIs

Number of lesions Treated per Case

- 1
- 2
- 3
- >3

- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016

2016 data
PCI to Multiple Lesions and vessels

Lesions per case: 1.62, 1.49, 1.45, 1.41, 1.37, 1.39, 1.39, 1.4, 1.4

Vessels per case: 1.3, 1.21, 1.19, 1.22, 1.22, 1.22, 1.23, 1.24, 1.26, 1.26

Disease Burden
All v Primary PCI v Shock Cases

Epicardial Territories with > 75% stenoses

<table>
<thead>
<tr>
<th>Territories</th>
<th>Primary PCI</th>
<th>Non-Primary PCI</th>
<th>Shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Territory</td>
<td>68.0</td>
<td>66.1</td>
<td>65.9</td>
</tr>
<tr>
<td>2 Territories</td>
<td>22.8</td>
<td>23.9</td>
<td>23.4</td>
</tr>
<tr>
<td>3 Territories</td>
<td>8.6</td>
<td>8.7</td>
<td>10.7</td>
</tr>
<tr>
<td>4 Territories</td>
<td>0.7</td>
<td>1.3</td>
<td>2.7</td>
</tr>
</tbody>
</table>
Primary PCI
Trends in Multi-vessel Rx at time of PPCI

![Bar chart showing trends in multi-vessel treatment at time of PCI from 2013 to 2016.](chart.png)
PCI in Shock

Multi-vessel Rx v Primary PCI in 2016

<table>
<thead>
<tr>
<th>Vessels Rx in Primary PCI</th>
<th>Vessels treated in Shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>86.3</td>
</tr>
<tr>
<td>2</td>
<td>10.9</td>
</tr>
<tr>
<td>3</td>
<td>1.7</td>
</tr>
<tr>
<td>4+</td>
<td>1.1</td>
</tr>
</tbody>
</table>

2016 data
All PCI

Epicardial Territory Treated

No change 2015 to 2016

2016 data
Treated Epicardial Territory
By Presenting Syndrome

<table>
<thead>
<tr>
<th>Territory Treated</th>
<th>Stable</th>
<th>NSTEMI</th>
<th>Primary PCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>graft</td>
<td>21</td>
<td>24.2</td>
<td>16.3</td>
</tr>
<tr>
<td>RCA</td>
<td>27.9</td>
<td>39.4</td>
<td>40</td>
</tr>
<tr>
<td>Cx</td>
<td>2.1</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>LAD</td>
<td>43</td>
<td>40.7</td>
<td>40</td>
</tr>
<tr>
<td>LMS</td>
<td>5.4</td>
<td>5.3</td>
<td>3.1</td>
</tr>
</tbody>
</table>

2016 data
Unprotected LMS

<table>
<thead>
<tr>
<th>Year</th>
<th>uLMS Cases as % of All PCIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>2.3</td>
</tr>
<tr>
<td>2013</td>
<td>2.5</td>
</tr>
<tr>
<td>2014</td>
<td>2.6</td>
</tr>
<tr>
<td>2015</td>
<td>2.9</td>
</tr>
<tr>
<td>2016</td>
<td>3.1</td>
</tr>
</tbody>
</table>

2016 data
Stents
Procedures using Stents

Graph showing the percentage of PCI procedures using stents against the number of PCIs per centre. The graph indicates that 91% of centres use stents, with a range of 0 to 3500 PCIs per centre.
Procedures using Stents

2016 data

% PCIs using Stents

No. of PCIs per Centre

91%

To Contents
Procedures using Stents

No. of PCIs per Centre

% PCIs using Stents
Procedures using Stents

% of PCI Procedures

aggregate data up to 2007, NICOR for 2008 on
PCI with Drug Eluting Stents

Mean of % use by Centres

% Cases using DES


0 17 53 62 63.5 63.5 57 63.5 67.1 71.1 76.2 81.6 85.7 88.5 90.2

2016 data
Drug Eluting Stent

% PCI with DES

% PCIs using DES

Scotland: 89.9, 90.2, 89.3, 90.9
England: 89.9, 90.2, 89.3, 90.9
Wales: 89.9, 90.2, 89.3, 90.9
N. Ireland: 89.9, 90.2, 89.3, 90.9

2003: 89.9, 90.2, 89.3, 90.9
2004: 89.9, 90.2, 89.3, 90.9
2005: 89.9, 90.2, 89.3, 90.9
2006: 89.9, 90.2, 89.3, 90.9
2007: 89.9, 90.2, 89.3, 90.9
2008: 89.9, 90.2, 89.3, 90.9
2009: 89.9, 90.2, 89.3, 90.9
2010: 89.9, 90.2, 89.3, 90.9
2011: 89.9, 90.2, 89.3, 90.9
2012: 89.9, 90.2, 89.3, 90.9
2013: 89.9, 90.2, 89.3, 90.9
2014: 89.9, 90.2, 89.3, 90.9
2015: 89.9, 90.2, 89.3, 90.9
2016: 89.9, 90.2, 89.3, 90.9

To Contents
PCI with Drug Eluting Stents

% PCIs using DES vs. No. of PCIs per Centre

2016 data

To Contents
PCI with Drug Eluting Stents
PCI with Drug Eluting Stents

By Syndrome

% PCI using DES

Stable | UA / NSTEMI | PPCI
---|---|---
89.2 | 90.9 | 89.1


2016 data
BMS and DES use v PCI for Restenosis

2016 data

% PCI with any Stent
% PCI with DES
% PCI for restenosis

To Contents
Procedures for Restenosis

![Graph showing the relationship between the number of PCIs per centre and the mean number of stents per PCI](image)

- **Mean No. of Stents per PCI**
- **No. of PCIs per Centre**

- **5.1%**
Procedures for Restenosis

2016 data

To Contents
Procedures for Restenosis
PCI with Bioabsorbable Vascular Scaffolds

BVS +/- other stents

Number of PCI procedures

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>485</td>
<td>860</td>
<td>706</td>
</tr>
</tbody>
</table>

BOU 58 in 2014 but not recorded in NICOR

From raw dataset
PCI with Bioabsorbable Vascular Scaffolds

BVS +/- other stents

2016

From raw dataset

To Contents
Stents per Case

- Mean number of stents per case

2005: 1.62
2006: 1.63
2007: 1.54
2008: 1.5
2009: 1.48
2010: 1.48
2011: 1.46
2012: 1.48
2013: 1.47
2014: 1.46
2015: 1.51
2016: 1.5
Mean Stents per Case
(by PCI unit)

[Graph showing data distribution]

2016 data
Adjunctive Therapy
Adjunctive therapy
All PCI Indications

2007: Any IIb/IIIa antag (31%), Abciximab (29%), Eptifibatide (9%), Tirofiban (11%), Bivalirudin (8%), Prasugrel (5%), Ticagralor (0.5%), 2008: Any IIb/IIIa antag (31%), Abciximab (29%), Eptifibatide (9%), Tirofiban (11%), Bivalirudin (8%), Prasugrel (5%), Ticagralor (0.5%), 2009: Any IIb/IIIa antag (31%), Abciximab (29%), Eptifibatide (9%), Tirofiban (11%), Bivalirudin (8%), Prasugrel (5%), Ticagralor (0.5%), 2010: Any IIb/IIIa antag (31%), Abciximab (29%), Eptifibatide (9%), Tirofiban (11%), Bivalirudin (8%), Prasugrel (5%), Ticagralor (0.5%), 2011: Any IIb/IIIa antag (31%), Abciximab (29%), Eptifibatide (9%), Tirofiban (11%), Bivalirudin (8%), Prasugrel (5%), Ticagralor (0.5%), 2012: Any IIb/IIIa antag (31%), Abciximab (29%), Eptifibatide (9%), Tirofiban (11%), Bivalirudin (8%), Prasugrel (5%), Ticagralor (0.5%), 2013: Any IIb/IIIa antag (31%), Abciximab (29%), Eptifibatide (9%), Tirofiban (11%), Bivalirudin (8%), Prasugrel (5%), Ticagralor (0.5%), 2014: Any IIb/IIIa antag (31%), Abciximab (29%), Eptifibatide (9%), Tirofiban (11%), Bivalirudin (8%), Prasugrel (5%), Ticagralor (0.5%), 2015: Any IIb/IIIa antag (31%), Abciximab (29%), Eptifibatide (9%), Tirofiban (11%), Bivalirudin (8%), Prasugrel (5%), Ticagralor (0.5%), 2016: Any IIb/IIIa antag (31%), Abciximab (29%), Eptifibatide (9%), Tirofiban (11%), Bivalirudin (8%), Prasugrel (5%), Ticagralor (0.5%)
GP IIb/IIIa Antagonists

Use by Syndrome

% Procedures with any GP IIb/IIIa blocker

- Stable
- UA
- NSTEMI
- PPCI

2005 to 2016 data
Any IIb/IIIa Antagonist

Use in Primary PCI v activity per unit
Any IIb/IIIa Antagonist
Use in Primary PCI v activity per unit
Any IIb/IIIa Antagonist
Use in Primary PCI v activity per unit
Bivalirudin
Use by Indication for PCI

Note: PCI for STEMI includes all indications including rescue
Bivalirudin

Use in PCI for STEMI v activity per unit

Data error?

Note: PCI for STEMI includes all indications including rescue
Bivilirudin or Any GP IIb/IIIa Blocker

2016 data

Graph showing the percentage of patients receiving Bivilirudin or Any GP IIb/IIIa Blocker from 2011 to 2016. The graph includes categories for Stable, NSTEMI / UA, and PPCI.

- Stable: 2.5% in 2011, 8.5% in 2012, 39.4% in 2016
- NSTEMI / UA: 2.5% in 2011, 8.5% in 2012, 39.4% in 2016
- PPCI: 39.4% in 2016
Prasugrel

Use by Indication for PCI

Note: PCI for STEMI includes all indications including rescue
Prasugrel

Use in PCI for STEMI v activity per unit

Note: PCI for STEMI includes all indications including rescue
Prasugrel

Use in PCI for STEMI v activity per unit

Note: PCI for STEMI includes all indications including rescue
Prasugrel

Use in Diabetics with NSTEMI by centre

![Graph showing Prasugrel usage in Diabetics with NSTEMI by centre.](graph.png)
Ticagrelor
Use by Indication for PCI

Note: PCI for STEMI includes all indications including rescue
Ticagrelor

Use in all NSTEMI and STEMI by Centre

Note: PCI for STEMI includes all indications including rescue
Antiplatelet Use and Outcomes

Olier I, Heart 2018 in press

• 2007 to 2014 England and Wales
  – Primary PCI
  – 89,067 PCIs
  – Multivariate risk adjustment
• Prasugrel and ticagrelor are similarly effective
• Economically motivated switches to clopidogrel not associated with an increased risk of ischemic events.
LV Support

- IABP
- Impella
- Tandem Heart
- Autopulse
- Lucas
Shock Cases
Treated with IABP

PCI Cases in shock where IABP is used (%)

- 2013: 34.5%
- 2014: 27.8%
- 2015: 25.6%
- 2016: 20.1%

(2016 data)
Shock Cases
Treated with IABP support

Mean = 20.2%
Shock Cases
Treated with IABP support

2016 data

Does not include Impella use
LV Support
% Cases using IABP v LV function

Ratio of IABP use to non-use

0.3
1.72
8.49

2012
2013
2014
2015
2016
NA

Good LV
Moderate
Poor
LV Support
Other options

PCI Cases (n)

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impella</td>
<td>45</td>
<td>66</td>
<td>60</td>
</tr>
<tr>
<td>ECMO</td>
<td>40</td>
<td>40</td>
<td>39</td>
</tr>
<tr>
<td>Lucas</td>
<td>26</td>
<td>113</td>
<td>125</td>
</tr>
<tr>
<td>Autopulse</td>
<td>89</td>
<td>65</td>
<td>60</td>
</tr>
</tbody>
</table>
Disease Burden
All v Primary PCI v Shock Cases

Epicardial Territories with > 75% stenoses
PCI in Shock

Multi-vessel Rx v Primary PCI in 2016

<table>
<thead>
<tr>
<th>Vessels Rx in Primary PCI</th>
<th>Vessels treated in Shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>86.3%</td>
<td>69.2%</td>
</tr>
<tr>
<td>10.9%</td>
<td>20.6%</td>
</tr>
<tr>
<td>1.7%</td>
<td>7.1%</td>
</tr>
<tr>
<td>1.1%</td>
<td>1.4%</td>
</tr>
<tr>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

2016 data
Cardiogenic Shock

% Cases with shock by PCI unit

Unadjusted for differing rates of OOHA

2016 data
Cardiogenic Shock

% Cases with shock by PCI unit

Unadjusted for differing rates of OOHA

No. of PCIs per Centre

% Shocked

2 SD

3 SD

2016 data
Cardiogenic Shock

% Cases with shock by PCI unit

2016 data

To Contents
Cardiogenic Shock

% Cases with shock by PCI unit

Unadjusted for differing rates of OOHA

No. of PCIs per Centre

% Shocked

2016 data
Primary PCI
% cases over 80

Case selection for PPCI?
Primary PCI

% cases over 80

Unadjusted for population demographics
Primary PCI

% cases over 80

Unadjusted for population demographics

2016 data
Additional Interventional Coronary Techniques

Notes:
2010 onward data from NICOR
Assume DCA usually is actually rota, therefore DCA and Rota summed to give ‘Rotablation’
Laser wire and laser angioplasty summed to give ‘laser’
Rotational Atherectomy

2016 data
Rotational Atherectomy

[Graph showing the number of PCIs per centre vs. Rota Cases as % of Total PCIs for various hospitals, such as LBH, QEB, WRG, etc.]
Rotational Atherectomy

- Rotablation in context of STEMI

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>62</td>
<td>68</td>
</tr>
<tr>
<td>As % of PPCI</td>
<td>0.25 %</td>
<td>0.27 %</td>
</tr>
<tr>
<td>Mean age</td>
<td>72.6 yrs</td>
<td>75.9 yrs</td>
</tr>
<tr>
<td>Male (%)</td>
<td>72.6 %</td>
<td>67.6 %</td>
</tr>
<tr>
<td>Diabetic (%)</td>
<td>35.5%</td>
<td>36.8 %</td>
</tr>
<tr>
<td>Shock (%)</td>
<td>25.8 %</td>
<td>22.1 %</td>
</tr>
<tr>
<td>Rota definitely to IRA</td>
<td>39 of 62</td>
<td></td>
</tr>
<tr>
<td>TIMI 3 pre</td>
<td>10 of 52</td>
<td></td>
</tr>
<tr>
<td>TIMI 3 post</td>
<td>42 of 53</td>
<td></td>
</tr>
<tr>
<td>In hospital death (all)</td>
<td>8.2%</td>
<td></td>
</tr>
<tr>
<td>In hospital death (not shocked)</td>
<td>7.1%</td>
<td></td>
</tr>
<tr>
<td>In hospital death (shocked)</td>
<td>50%</td>
<td></td>
</tr>
</tbody>
</table>
TASTE and TOTAL

Fröbert NEJM 2013;369:1587
Cairns NEJM 2015;372:1389

- PPCI randomised, thrombus aspiration

Cumulative Risk of Death from Any Cause (%)

Days

No. at Risk
PCI+TA 3621 3568 3540 3532 3526 3524 3519
PCI 3623 3567 3545 3530 3523 3517 3513

Primary Outcome

Cumulative Hazard Rate

No. at Risk
Thrombectomy 5033 4734 4696 4678 4662 4647 4628
PCI alone 5030 4727 4688 4666 4653 4642 4618

Hazard ratio, 0.99 (95% CI 0.85–1.15) P=0.86
TASTE and TOTAL

Fröbert NEJM 2013;369:1587
Cairns NEJM 2015;372:1389

• PPCI randomised, thrombus aspiration
### Primary PCI

#### Extraction Atherectomy

<table>
<thead>
<tr>
<th>Year</th>
<th>Unknown (%)</th>
<th>No Device Used (%)</th>
<th>Device Used (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>5.9</td>
<td>50</td>
<td>49.1</td>
</tr>
<tr>
<td>2013</td>
<td>5.4</td>
<td>49.8</td>
<td>44.8</td>
</tr>
<tr>
<td>2014</td>
<td>2.9</td>
<td>53.1</td>
<td>44.0</td>
</tr>
<tr>
<td>2015</td>
<td>1.8</td>
<td>65.3</td>
<td>32.9</td>
</tr>
<tr>
<td>2016</td>
<td>1.8</td>
<td>75.6</td>
<td>22.6</td>
</tr>
</tbody>
</table>

2016 data
Overall Thrombectomy

Increase in use

2015 to 2016
Primary PCI
Extraction Atherectomy

Angeras JAHA 2018;7:e007680
- SCAAR PPCI 2005 to 2014
- \( n = 42,829 \)
- No difference in in-hospital CVA

**Mortality**

**Stent thrombosis**

Impact of Thrombus Aspiration on Mortality, Stent Thrombosis, and Stroke in Patients With ST-Segment–Elevation Myocardial Infarction: A Report From the Swedish Coronary Angiography and Angioplasty Registry

Angeras JAHA 2018;7:e007680
Notes:
2010 onwards data from NICOR
Assume DCA usually is actually rota, therefore DCA and Rota summed to give ‘Rotablation’
Laser wire and laser angioplasty summed to give ‘laser’
Distal Protection

SAFER trial Baim Circulation 2002;105:1285

[Diagrams and figures related to distal protection techniques]

2016 data
2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention

- EPD = Embolic Protection Device

5.8.2. SVGs: Recommendations

Class I
1. EPDs should be used during SVG PCI when technically feasible.\(^{532-535}\) (Level of Evidence: B)

Class III: NO BENEFIT
1. Platelet GP IIb/IIIa inhibitors are not beneficial as adjunctive therapy during SVG PCI.\(^{212,571,720,721}\) (Level of Evidence: B)

Class III: HARM
1. PCI is not recommended for chronic SVG occlusions.\(^{722-724}\) (Level of Evidence: C)
Distal protection in Bypass Grafts
(all types - SVG and IMA etc)

2016 data

Grafts treated using distal protection as % of all grafts treated

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>16.3</td>
<td>14.1</td>
<td>12.7</td>
<td>9.6</td>
<td>8.1</td>
</tr>
</tbody>
</table>
Distal Protection

Paul TK Circ C int 2017;10:e005538

- All cause mortality
- Baim and Dixon only randomised trials
Distal Protection

• Peri-procedural MI

Paul TK Circ C Int 2017;10:e005538
Interventional Diagnostic Procedure
Recording in PCI database

3 September 2013
Sent to all BCIS members and database contacts

Diagnostic Interventional Procedures

Invasive coronary angiography with the use of adjunctive invasive diagnostic equipment such that a coronary device approaches, probes or crosses one or more coronary lesions (including - but not limited to – a pressure wire, intravascular ultrasound and swept laser imaging), before the intention to treat by mechanical revascularisation has been decided. Interventional diagnostic cases should be performed by interventional cardiologists in intervention capable centres.

It is suggested that recording all ‘Interventional Diagnostic Procedures’ should start from Jan 2014.
Interventional Diagnostic Procedure

Database entry

- Total number of lesions attempted (field 3.11) must = 0
- And Total number of vessels attempted (field 3.10) must = 0
- And ‘Diagnostic device’ (field 3.19) should include a device
- And Vessels attempted (field 3.09) should be left empty

- Demographics and adverse in-hospital outcomes should be recorded in the same way as for a PCI procedure
Additional Interventional Coronary Techniques

Used during a PCI procedure

![Graph showing the number of procedures for different techniques across years: IVUS, OCT, Pressure Wire. The numbers correspond to 7527 (2012), 2079 (2013), 8549 (2016).](image)
Additional Interventional Coronary Techniques

All cases: Diagnostic only + when part of a PCI procedure

Diagnostic only data from Survey Monkey
Additional Interventional Coronary Techniques

IVUS as Diagnostic only studies
Additional Interventional Coronary Techniques

IVUS as *Diagnostic only studies* (as percentage of total PCI activity)
Additional Interventional Coronary Techniques

Pressure Wire - Diagnostic only studies
Additional Interventional Coronary Techniques

Pressure Wire - **Diagnostic only studies** (as percentage of total PCI activity)
Additional Interventional Coronary Techniques

Optical Coherence Tomography *Diagnostic only studies*
Additional Intervventional Coronary Techniques

OCT - Diagnostic only studies (as percentage of total PCI activity)
Additional Interventional Coronary Techniques

2016

Diagnostic only data from Survey Monkey
Pressure Wire

During a PCI procedure
IVUS during a PCI procedure
## Recommendations

### ESC Guidelines PCI 2014

#### Recommendations for the clinical value of intracoronary diagnostic techniques

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFR to identify haemodynamically relevant coronary lesion(s) in stable patients when evidence of ischaemia is not available.</td>
<td>I</td>
<td>A</td>
<td>50,51,713</td>
</tr>
<tr>
<td>FFR-guided PCI in patients with multivessel disease.</td>
<td>IIa</td>
<td>B</td>
<td>54</td>
</tr>
<tr>
<td>IVUS in selected patients to optimize stent implantation.</td>
<td>IIa</td>
<td>B</td>
<td>702,703,706</td>
</tr>
<tr>
<td>IVUS to assess severity and optimize treatment of unprotected left main lesions.</td>
<td>IIa</td>
<td>B</td>
<td>705</td>
</tr>
<tr>
<td>IVUS or OCT to assess mechanisms of stent failure.</td>
<td>IIa</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>OCT in selected patients to optimize stent implantation.</td>
<td>IIb</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>
IVUS

PCI to Unprotected LMS

<table>
<thead>
<tr>
<th>Year</th>
<th>IVUS not used</th>
<th>IVUS used</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>61</td>
<td>39</td>
</tr>
<tr>
<td>2014</td>
<td>59</td>
<td>40.9</td>
</tr>
<tr>
<td>2015</td>
<td>56</td>
<td>44</td>
</tr>
<tr>
<td>2016</td>
<td>50</td>
<td>44.9</td>
</tr>
</tbody>
</table>

2016 data
Arterial access
Radial Artery Access

% Cases using Radial Access

- 2004: 10.2%
- 2005: 15.7%
- 2006: 21.3%
- 2007: 26.9%
- 2008: 34.7%
- 2009: 43%
- 2010: 51.6%
- 2011: 58.6%
- 2012: 65.1%
- 2013: 71.1%
- 2014: 75.2%
- 2015: 80.6%
- 2016: 84.3%

2016 data
Lives saved

Mamas M, Circulation 2016;133:1655

- Heterogenous uptake 2005 to 2012
  - 450 lives saved by radial access
  - Additional 264 if uniform uptake (i.e. if radial rate everywhere as high as the highest in any year)

14.0 %

58.6%
Radial Artery Access

2016 data

To Contents
Radial Artery Access
By operator

- % Radial by ‘Consultant Responsible for PCI’ in 2015
- Any case with any radial (including multiple access)
Radial Artery Access
By operator

2012

2013

2014

2015

2016
Radial Artery Access
Clinical Syndrome

% Cases using Radial Access

<table>
<thead>
<tr>
<th>Year</th>
<th>Stable</th>
<th>ACS not STEMI</th>
<th>PPCI</th>
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<td>2008</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stable: 80.4
ACS not STEMI: 83
PPCI: 82.8

2016 data
Femoral closure devices

Of PCI via FA - % punctures closed with a device


% FA Punctures Device closed

0 10 20 30 40 50 60 70

39.6 50.7 53.5 57.1 55.6 57 58.9 60.1 61.4 61.4 61.3

2016 data
Contents

- **Structure**
  - Angio and PCI centres and maps
  - Total angio and PCI numbers
  - No of PCIs per centre and per angio
  - PCI pmp and by country and v CABG
  - Centre PCI volumes
  - PCI operators, by centre, by PPCI
  - On call rotas for PPCI
  - On site v off site surgical cover
  - Day case activity
  - Primary PCI units

- **NICOR data collection**
  - Centre participation
  - Databases used
  - Case ascertainment
  - Data completeness

- **Appropriateness**
  - Demographics
  - Indication for PCI / Clinical syndrome
  - PPCI activity (by unit, pmp, by vessel)
  - PCI for out of hospital arrest
  - PCI territories / vessels / lesions
  - Stents (BMS and DES)
  - Adjunctive pharmacotherapy
  - LV support and shock
  - Primary PCI for > 80 yrs
  - Extraction / Rota / IVUS / OCT / FFR / Laser etc.
  - Arterial access

- **Process of care**
  - Delays to treatment
  - NSTEMI (direct v IHT)
  - Primary PCI DTB / CTB
  - IHT versus Direct admission
  - Length of stay

- **Outcome**
  - MACCE
  - Peri-procedural complications and by access
  - Tracked 30 day mortality
    - Outcome by syndrome
    - Outcome by lesion subset

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  - Septal ablation for HOCM
  - Mitral valvuloplasty
  - Mitraclip / PFO / ASD closure / LAA occlusion
  - Para-prosthetic leak closure
  - Renal Denervation
  - Percutaneous Pulmonary valve

- **TAVI**
  - Now presented in separate slide set

- **Conclusions and summary**

*Appendix: PCI Centre NICOR / CCAD Centre codes*
Time Delays to Treatment
Delays to PCI in NSTEMI
PCI in NSTEMI / UA

• PCI with indication NSTEMI / UA / Conv STEMI
  – Elevated cardiac markers = 27,223 (81%)
  – No elevation = 6,379 (19%)
  – Unknown = 3,584 (9.6% missing)
  – Total = 37,186
Delays to Rx NSTEMI

Bonello L. JACC Intv 2016;9:2267

**Mortality**

**Recurrent Ischaemia**
Note:

• For NSTEMI overall delays are calculated from FIRST hospital arrival to treatment

• For PPCI the timing for the ‘Direct’ admissions is from PCI door (which in transferred patients is door 2)
Delays to PCI in NSTEMI

Admission Route – **Direct** to PCI Centre

Centres with < 90% data completeness excluded

= 2.6 days
Delays to PCI in NSTEMI

Admission Route – Direct to PCI Centre

Median Delay (hrs)

No. of PCIs for nSTEMI Direct with Data

Better = 2.6 days

2016 data
Delays to PCI in NSTEMI

Admission Route – Direct to PCI Centre

Centres with < 90% data completeness excluded
Delays to PCI in NSTEMI

Admission Route – IHT

Centres with < 90% data completeness excluded
Delays to PCI in NSTEMI

Admission Route – IHT

Centres with < 90% data completeness excluded

Better

= 3.5 days
Delays to PCI in NSTEMI
All Admission Routes (Direct and IHT)

Centres with < 90% data completeness excluded
Delays to PCI in NSTEMI
All Admission Routes (Direct and IHT)

Centres with < 90% data completeness excluded
Delays to PCI in NSTEMI

20 hr Delay

2.5 days → 3.5 days

<table>
<thead>
<tr>
<th>Years</th>
<th>Direct</th>
<th>IHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>60.6</td>
<td>82.1</td>
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<tr>
<td>2015</td>
<td>59.6</td>
<td>80.1</td>
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<tr>
<td>2016</td>
<td>61.8</td>
<td>84</td>
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</tbody>
</table>

2016 data
Delays to PCI in NSTEMI
Direct AND IHT % < 72 hr

2016 data
Delays to PCI in NSTEMI

Direct AND IHT % < 72 hr

2016 data
Delays to PCI in NSTEMI Direct AND IHT

% Better


< 96 hr

< 72 hr
Delays to PCI in NSTEMI

Direct and IHT combined

Total Number of PCI for nSTEMI in 2015

Improvement (reduction) in delay hrs from 2016 from 2015

Longer delay

Shorter delay
Delays to PCI in NSTEMI

• Caveats
  – Time delay is from First hospital admission to PCI
  – Centres have differing proportions of patients treated after inter-hospital transfer versus direct admission
  – This proportion changes over time
  – Only procedures with time / date data are displayed.
Primary PCI
Primary PCI
Rx for STEMI (NHS centres)

• Funnel analysis for TIMING DELAYS
  – All units performing > 10 cases of PPCI
  – Patients with onset of symptoms in the community
  – Excludes patients in cardiogenic shock
  – Excludes those needing pre-PCI ventilation
PCI for Acute Sx
Four admission scenarios

Admitted from the community
- Direct admission to PCI centre
- Transfer to PCI centre
- Admission to Non-PCI centre

Already in hospital
- Hospital is a PCI centre
- Hospital is a Non-PCI centre
PCI for Acute Sx

Four admission scenarios

- Admitted from the community
  - Admission to Non-PCI centre
    - Direct admission to PCI centre
    - Transfer to PCI centre
PCI for Acute Sx

Variety of analysis methods

• Direct and Inter-hospital transfer (IHT)
  – Call to ‘balloon’ time as % < 150 min
    • Graphics: funnel, cf last year (plotted against vol and last yrs %)
  – Door to ‘balloon’ time as % < 90 min
    • Graphics: funnel, cf last year (plotted against vol and last yrs %)
  – Door to ‘balloon’ time as % < 60 min
    
    https://www.bcis.org.uk/door-balloon-time-interactive-plots/

• Direct only
  – Door to ‘balloon’ time as % < 90 min (and analysis of weekend delays)
  – Door to ‘balloon’ time as % < 60 min

• Median time delays
  – IHT v Direct admission
PCI for Acute Sx

Four admission scenarios

- Admitted from the community
  - Direct admission to PCI centre
  - Transfer to PCI centre
  - Admission to Non-PCI centre

CTB

D1

D2

device
Primary PCI (excl shock/vent)

Direct and IHT: Call to Balloon times < 150 min

2016 data
Primary PCI (excl shock/vent)

Direct and IHT: Call to Balloon times < 150 min
Primary PCI (excl shock/vent)

Direct and IHT: Call to Balloon times < 150 min
Primary PCI Changes
(excluding pre-procedure shock/vent)

Direct and IHT: CTB < 150 min
Primary PCI Changes
(excluding pre-procedure shock/vent)

Direct and IHT: CTB < 150 min

2016 data
Primary PCI Changes
(excluding pre-procedure shock/vent)

Direct and IHT: CTB < 150 min
Primary PCI Changes
(excluding pre-procedure shock/vent)

Direct and IHT: CTB < 150 min
PCI for Acute Sx

Four admission scenarios

- Admitted from the community
  - Direct admission to PCI centre
  - Admission to Non-PCI centre
    - D1
    - D2
    - DTB
      - device
Primary PCI (excl shock/vent)

Direct and IHT: PCI Door to Balloon < 90 min

![Graph showing PCI Door to Balloon time vs. number of cases per centre with 91% target.]
Primary PCI (excl shock/vent)

Direct and IHT: PCI Door to Balloon < 90 min

2016 data

NICOR

To Contents
Primary PCI (excl shock/vent)

Direct and IHT: PCI Door to Balloon < 90 min

2016 data

To Contents
Primary PCI (excl. shock/vent)

Direct and IHT

% Patients treated within time limits

<table>
<thead>
<tr>
<th>Year</th>
<th>CTB &lt; 150 (%)</th>
<th>DTB &lt; 90 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>79.5</td>
<td>88.7</td>
</tr>
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<td>2013</td>
<td>79</td>
<td>90.6</td>
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<td>2014</td>
<td>78.8</td>
<td>90.3</td>
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<td>2015</td>
<td>77.9</td>
<td>90.9</td>
</tr>
<tr>
<td>2016</td>
<td>75.2</td>
<td>91</td>
</tr>
</tbody>
</table>

Better
Primary PCI Changes

Direct and IHT: DTB < 90 min

![Diagram showing changes in DTB for Primary PCI in 2016]
Primary PCI Changes
Direct and IHT: DTB < 90 min

2016 data

Better
Primary PCI Changes
Direct and IHT: DTB < 90 min

2016 data

Better
Primary PCI (excl shock/vent)

Direct and IHT: PCI Door to Balloon < 60 min
Primary PCI (excl shock/vent)

Direct and IHT: PCI Door to Balloon < 60 min

For interactive display - go to https://www.bcis.org.uk/door-balloon-time-interactive-plots/
Primary PCI (excl shock/vent)

Direct and IHT: PCI Door to Balloon < 60 min

For interactive display - go to https://www.bcis.org.uk/door-balloon-time-interactive-plots/
Interactive Data Display

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PCI for Acute Sx
Four admission scenarios

Admitted from the community

- Direct admission to PCI centre
- Transfer to PCI centre
- Admission to Non-PCI centre

Device

D1

D2

DTB
Primary PCI (excl shock/vent)

Direct ONLY: PCI Door to Balloon < 90 min

2016 data
Primary PCI (excl shock/vent)

Direct ONLY: PCI Door to Balloon < 90 min

2016 data

% DTB < 90 min

No. of Cases per Centre

Better
Primary PCI (excl shock/vent)

Direct ONLY: PCI Door to Balloon < 90 min

2016 data
Primary PCI (excl shock/vent)

Direct only: PCI Door to Balloon < 60 min
Primary PCI (excl shock/vent)

Direct only: PCI Door to Balloon < 60 min

% DTB - 60 min

No. of Cases per Centre
Primary PCI  (excl shock/vent)

Direct only :  PCI Door to Balloon < 60 min

2016 data
PCI for Acute Sx

Four admission scenarios

- Admitted from the community
  - Admission to Non-PCI centre
    - Direct admission to PCI centre
    - Transfer to PCI centre
  - CTB
    - D1
      - D2
        - device
    - DTB
PCI for Acute Sx

Four admission scenarios

Admitted from the community

- Direct admission to PCI centre
- Admission to Non-PCI centre
- Transfer to PCI centre

CTB

D1

D2

device

DTB
Primary PCI (exclude shock/vent)

According to admission route

% PCI Cases Transferred from Another Hospital

Total PCI (Direct and IHT) by Centre
Primary PCI (excl. shock/vent) According to admission route

- CTB < 150
  - Direct (%): 82.1
  - IHT (%): 44.6
  - 2013
  - 2014
  - 2015
  - 2016

- DTB < 90
  - Direct (%): 90.9
  - IHT (%): 91.9
  - 2013
  - 2014
  - 2015
  - 2016

Better
PPCI Call to Balloon time
(excluding shock/vent)
By Admission Route

50 Min Delay

Median CTB (min)

To Contents
Primary PCI
Admission routes

% Patients admitted directly or by IHT for PPCI

2011: 77.5%
2012: 81.4%
2013: 82.2%
2014: 82.1%
2015: 82.6%
2016: 83.4%

2016 data
PPCI Door to Balloon time
(exclude shock/vent)
By Admission Route

2011
2012
2013
2014
2015
2016

Better
PPCI Direct from Community

Median Length of stay in PCI Centre (exc shock and vent)

LOS = First device time to discharge (assuming discharge at midday)
PPCI Direct from Community

Median Length of stay in PCI Centre  (exc shock and vent)

LOS = First device time to discharge (assuming discharge at midday)
## PPCI Summary Stats

### 2016

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Direct</th>
<th>IHT</th>
<th>LOS</th>
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</thead>
<tbody>
<tr>
<td>Call to ‘Balloon’</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>&lt; 150 min</td>
<td>76.2%</td>
<td>82.1%</td>
<td>44.6%</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>118 min</td>
<td>114 min</td>
<td>163 min</td>
<td></td>
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<tr>
<td>PCI Door to ‘Balloon’</td>
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<td>&lt; 90 min</td>
<td>91.3%</td>
<td>90.9%</td>
<td>91.9%</td>
<td></td>
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<tr>
<td>&lt; 60 min</td>
<td>77.6%</td>
<td>77.2%</td>
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<tr>
<td>Median</td>
<td>38 min</td>
<td>39 min</td>
<td>37 min</td>
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<tr>
<td>All</td>
<td></td>
<td></td>
<td></td>
<td>2.6 days</td>
</tr>
</tbody>
</table>
Contents

• **Structure**
  – Angio and PCI centres and maps
  – Total angio and PCI numbers
  – No of PCIps per centre and per angio
  – PCI pmp and by country and v CABG
  – Centre PCI volumes
  – PCI operators, by centre, by PPCI
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    • Outcome by syndrome
    • Outcome by lesion subset

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  – Renal Denervation
  – Percutaneous Pulmonary valve

• **TAVI**
  – Now presented in separate slide set

• **Conclusions and summary**

Appendix: PCI Centre NICOR / CCAD Centre codes
Outcome
<table>
<thead>
<tr>
<th>Year</th>
<th>Procedure Success (%)</th>
<th>QMI (%)</th>
<th>NQMI (stable) (%)</th>
<th>Em CABG (%)</th>
<th>CVA (%)</th>
<th>Mortality (%)</th>
<th>30 day Mortality (%) (Tracked)</th>
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</thead>
<tbody>
<tr>
<td>1997</td>
<td>92</td>
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<td>0.05</td>
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<td>0.05</td>
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<td>1.6</td>
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<td>0.34</td>
<td>0.05</td>
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<td>0.05</td>
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<td>1.8</td>
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<td>0.06</td>
<td>0.09</td>
<td>1.9</td>
<td>2.8</td>
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<td>2015</td>
<td>91.5</td>
<td>0.09</td>
<td>0.18</td>
<td>0.06</td>
<td>0.08</td>
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<tr>
<td>2016</td>
<td>91.6</td>
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<td>0.23</td>
<td>0.04</td>
<td>0.09</td>
<td>1.9</td>
<td>awaited</td>
</tr>
</tbody>
</table>
Adverse Outcome
Death and emergency surgery

Mortality
em CABG
Adverse Outcomes

Death

- Mortality to Discharge (self reported)
Adverse Outcomes

Death

- Mortality to Discharge (self reported)
Adverse Outcomes

CVA

- % of all cases with CVA (not TIA)

1 of 23 cases
Adverse Outcomes

CVA

- % of all cases with CVA (not TIA)
Adverse Outcomes
Surgery

- % of all cases needing emergency cardiac surgery
Adverse Outcomes Surgery

- % of all cases needing emergency cardiac surgery
Peri-procedural Complications

No flow / Slow flow by syndrome

![Bar chart showing the percentage of no flow/slow flow complications by syndrome.](chart.png)

- Stable: 0.3%
- nSTEMI/UA: 0.7%
- Primary: 1.6%

2016 data
Access site complications

Complications to hospital Dx:
False aneurysm, haemorrhage, arterial occlusion / dissection
Any other surgical intervention

2016 data
Access site complications

Complications to hospital Dx:
False aneurysm, haemorrhage, arterial occlusion / dissection
Any other surgical intervention
Access site complications

- Northampton General (NTH)
  - False aneurysms = 437 (545 PCIs)
  - 80% complication rate
  - Error fixed 23rd Jan 2018

Database error: MCKESSION
Access site complications

- Royal United Bath (BAT)
  - 602 unlisted arterial access complications (621 PCIs)
  - 97% complication rate
  - Error under investigation

2016 data
## Outcome 2016

### Elective Patients

<table>
<thead>
<tr>
<th>All as %</th>
<th>No. cases</th>
<th>Success</th>
<th>Partial success</th>
<th>Fail no comp</th>
<th>Re-PCI</th>
<th>QMI</th>
<th>Em CABG</th>
<th>CVA</th>
<th>Death In Hosp</th>
<th>Death 30/7 Track</th>
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<tbody>
<tr>
<td>Stable SV (no CTO)</td>
<td>20,547</td>
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<td>0.02</td>
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<tr>
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<td>0.16</td>
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<td>0.04</td>
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<tr>
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<td>19.8</td>
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<td>0.1</td>
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</tbody>
</table>

### OVERALL STABLE

| All Stable | 31,662 | 92.1 | 5.2 | 0.10 | 0.04 | 0.03 | 0.04 | 0.17 | 0.36 |
# Outcome 2016

<table>
<thead>
<tr>
<th>All as %</th>
<th>No.</th>
<th>Success</th>
<th>Partial success</th>
<th>Fail no comp</th>
<th>Re-PCI</th>
<th>QMI</th>
<th>Em CABG</th>
<th>CVA</th>
<th>Death In hosp</th>
<th>Death 30/7 CR</th>
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<tbody>
<tr>
<td>NSTEMI / UA no shock</td>
<td>35,349</td>
<td>93.2</td>
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<td>0.09</td>
<td>0.70</td>
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<td>0.38</td>
<td>34.53</td>
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</table>

*all PPCI (includes shock / ventilation and onset in community or in hospital)
Public Reports

• 1\textsuperscript{st} validation round sent
  – Total activity and split by syndromes
  – Similar to last year but additional focus on data completeness for NSTEMI
  – Risk adjustment by NWQIP only

• 2\textsuperscript{nd} round will be sent once ONS data received
  – As first round but using updated data and risk adjusted outcomes using BCIS 30/7 mortality model

---

30 Day Post-PCI Survival (ONS Tracked):

- National average: 97.66%
- Percentage of tracked cases surviving to 30 days

BCIS 30/7: Based on patient sex, age, and CHADS2 or CHA2DS2-VASc score.
30 day Mortality Risk Calculator

https://www.bcis.org.uk/resources/pci-risk-calculator/

Predicted 30 Day Mortality Following PCI

1.7 %

This model can only provide an estimate of the mortality risk. The precision of the estimate will be less good for cases that involve a combination of factors that is less frequently encountered.

The model has not been validated for clinical decision support.
All Elective Stable Cases
SV no CTO, MV no CTO, SV CTO, MV CTO

2016 data
NSTEMI, no Shock

2016 data

[Diagram showing data trends over years with various categories]
All Primary PCI (includes shock)

2016 data
Summary: Mortality
Risk Stratified by Syndrome
Summary: Mortality
Risk Stratified by Syndrome
Tracked Mortality at 30/7

- 30 day Mortality by centre (England and Wales)
  - Primary PCI excluding shock and ventilation pre PCI (when coded with emergency/salvage)
  - Primary PCI direct admission only (excluding shock and ventilation as above)
  - Primary PCI – all comers
  - Cardiogenic shock
Primary PCI
(shock/vent EXCLUDED)

2.9 %
Primary PCI - Direct admission

(shock/vent EXCLUDED)
Primary PCI
(shock/vent INCLUDED)

7.6%
Primary PCI
(shock/vent INCLUDED)
Cardiogenic Shock

![Graph showing the relationship between No. of PCIs per Centre and Tracked 30/7 Mortality % with 2 SD and 3 SD lines, indicating a 42.7% mortality rate at a certain point.]
## Bypass grafts
### PCI of SVG and Arterial

<table>
<thead>
<tr>
<th>All as %</th>
<th>No.</th>
<th>Success</th>
<th>Partial success</th>
<th>Fail no comp</th>
<th>Re-PCI</th>
<th>QMI</th>
<th>Em CABG</th>
<th>In0.08 Hosp Death</th>
<th>30/7 Death (CR)</th>
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<tbody>
<tr>
<td>2007</td>
<td>3900</td>
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<td>2.72</td>
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<td>5.11</td>
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<td>0.27</td>
<td>0</td>
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<td>6.79</td>
<td>0.47</td>
<td>0.33</td>
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<td>0.07</td>
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<td>2013</td>
<td>2512</td>
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<td>5.97</td>
<td>0.36</td>
<td>0.08</td>
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<td>0.12</td>
<td>0.08</td>
<td>1.94</td>
<td>3.0</td>
</tr>
</tbody>
</table>

*Centre x = 1860 of 2111 cases in 2008
Unprotected LMS

![Bar chart showing unprotected LMS cases as % of all PCIs from 2012 to 2016.]

- 2012: 2.3
- 2013: 2.5
- 2014: 2.6
- 2015: 2.9
- 2016: 3.1

2016 data
## Unprotected LMS
**Including Shock and STEMI**

<table>
<thead>
<tr>
<th>Year</th>
<th>No.</th>
<th>Success</th>
<th>Partial success</th>
<th>Fail no comp</th>
<th>Re-PCI</th>
<th>QMI</th>
<th>Em CABG</th>
<th>In Hosp Death</th>
<th>Death 30/7 (CR)</th>
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</thead>
<tbody>
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<td>0.7</td>
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<td>0.37</td>
<td>0.46</td>
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<td>9.37</td>
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<td>11</td>
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<td>8.2</td>
<td>12.0</td>
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<tr>
<td>2013</td>
<td>2541</td>
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<td>4.21</td>
<td>1.53</td>
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<td>0.06</td>
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## Chronic Total Occlusion

### Stable only

<table>
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<th>All as %</th>
<th>No.</th>
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<th>Partial success</th>
<th>Fail no comp</th>
<th>Re-PCI</th>
<th>QMI</th>
<th>Em CABG</th>
<th>In Hosp Death</th>
<th>Death 30/7 (CR)</th>
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</thead>
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<td>0.05</td>
<td>0.07</td>
<td>0.33</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Contents

- **Structure**
  - Angio and PCI centres and maps
  - Total angio and PCI numbers
  - No of PCIs per centre and per angio
  - PCI pmp and by country and v CABG
  - Centre PCI volumes
  - PCI operators, by centre, by PPCI
  - On call rotas for PPCI
  - On site v off site surgical cover
  - Day case activity
  - Primary PCI units

- **NICOR data collection**
  - Centre participation
  - Databases used
  - Case ascertainment
  - Data completeness

- **Appropriateness**
  - Demographics
  - Indication for PCI / Clinical syndrome
  - PPCI activity (by unit, pmp, by vessel)
  - PCI for out of hospital arrest
  - PCI territories / vessels / lesions
  - Stents (BMS and DES)
  - Adjunctive pharmacotherapy
  - LV support and shock
  - Primary PCI for > 80 yrs
  - Extraction / Rota / IVUS / OCT / FFR / Laser etc.
  - Arterial access

- **Process of care**
  - Delays to treatment
  - NSTEMI (direct v IHT)
  - Primary PCI DTB / CTB
  - IHT versus Direct admission
  - Length of stay

- **Outcome**
  - MACCE
  - Peri-procedural complications and by access
  - Tracked 30 day mortality
    - Outcome by syndrome
    - Outcome by lesion subset

- **Adult non coronary intervention**
  - Septal ablation for HOCM
  - Mitral valvuloplasty
  - Mitraclip / PFO / ASD closure / LAA occlusion
  - Para-prosthetic leak closure
  - Renal Denervation
  - Percutaneous Pulmonary valve

- **TAVI**
  - Now presented in separate slide set

- **Conclusions and summary**

Appendix: PCI Centre NICOR / CCAD Centre codes
Adult Non Coronary Intervention
HCM

Alcohol Mediated Septal Ablation

Number of procedures

2007: 49
2008: 62
2009: 65
2010: 66
2011: 77
2012: 82
2013: 70
2014: 66
2015: 36
2016: 52

2016 data
HCM

Alcohol Mediated Septal Ablation

2016 data

Number of procedures 2016

- St Bartholomew's Hospital (SBH): 20
- Edinburgh Heart Centre (ERI): 8
- Freeman Hospital (FRE): 8
- Papworth Hospital (PAP): 6
- London Independent Hospital (IND): 4
- St Thomas' Hospital (STH): 3
- University Hospital Coventry (WAL): 1

Number of centres: 8
## Alcohol Mediated Septal Ablation

### Number of alcohol septal ablations

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Number of alcohol septal ablations</th>
<th>Of which – second attempt</th>
<th>LVOT MDT</th>
<th>Number of operators performing at least one</th>
<th>Other methods for septal reduction</th>
<th>Type of Service</th>
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<tbody>
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<td>?</td>
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<td>1</td>
<td>1</td>
<td>0</td>
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<tr>
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<td>1</td>
<td>1</td>
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Mitral Intervention
Mitral Balloon Valuloplasty

Number of procedures

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<tr>
<td>2015</td>
<td>82</td>
</tr>
<tr>
<td>2016</td>
<td>92</td>
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</tbody>
</table>
Mitral Balloon Valvuloplasty

Number of centres: 21

Number of procedures 2016
MitraClip
Percutaneous Valves

Mitra-Clip

Number of procedures

- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016

2016 data
Percutaneous Valves

Mitra-Clip

Number of Procedures

---|---|---|---|---
FRE | CHH | NHB | STO | UCL | HAM | HSC | BRI | WYT | ERI | GJH
0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45
Percutaneous Valves

Mitra-Clip

Number of centres: 7

Number of procedures 2016

NHB: 42
BRI: 26
WYT: 21
STO: 15
HH: 11
ERI: 4
GJH: 3
Percutaneous Valves
Mitral Valve Repair - Other

• LGI
  – 8 Carillon mitral contour system
  – 2 Medtronic Intrepid

• RSC
  – 2 ARTO System
Percutaneous Valves

TAVI Valve to treat failing bioprostheses

Number of procedures 2016

- Mitral: 28
- Tricuspid: 1
- Pulmonary: 1

Please see TAVI Slide deck for TAVI in failing aortic bioprostheses
Percutaneous Valves

TAVI Valve to treat failing mitral bioprosthesis

Number of procedures 2016

<table>
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<tr>
<th>Hospital</th>
<th>Procedures</th>
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Percutaneous Pulmonary Valves

Number of Centres

Number of Procedures

- 2008: 62 procedures
- 2009: 29 procedures
- 2010: 17 procedures
- 2011: 46 procedures
- 2012: 36 procedures
- 2013: 41 procedures
- 2014: 57 procedures
- 2015: 45 procedures
- 2016: 44 procedures

2016 data
Percutaneous Valves

Pulmonary Valves

Number of procedures 2016

- BRI: 10
- LGI: 9
- SBH: 7
- GJH: 6
- NHB: 5
- SGH: 5
- FRE: 1
- QEB: 1
Aortic Balloon Valuloplasty
(not as part of TAVI)

2010: 420
2011: 473
2012: 495
2013: 668
2014: 789
2015: 817
2016: 827

2016 data
Adult Non-Coronary Intervention

Balloon Valvuloplasty not as part of valve implantation
Adult Non-Coronal Intervention

![Bar Chart]


2016 data
ASD Closure

Number of procedures 2016

Number of centres: 26
PFO Closure

Number of procedures 2016

Number of centres: 35
LAA Closure

Number of procedures 2016

Number of centres: 23
Adult Non-Coronary Intervention

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<th>Paravalvular leak closure</th>
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<tr>
<td>2016</td>
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</table>

Note: 2016 data
Prosthetic paravalvular leak closure

Number of procedures 2016

Number of centres: 21
Coronary Sinus Reducer
(for refractory angina)

Number of centres: 4

- ERI: 15
- BRD: 10
- NHB: 10
- STH: 7

Number of procedures 2016
Renal Denervation

Number of Centres

Number of Procedures


0 5 10 15 20 25 30 35 40

0 10 20 30 40


6 14 25 42 55 42

32 100 180 9 11 7

2016 data
Renal Denervation

Number of procedures 2016

- ERI: 12
- BRI: 11
- HAM: 9
- RDE: 6
- AMG: 3
- BAS: 1
- SSP: 1

Number of centres: 11
Contents

- **Structure**
  - Angio and PCI centres and maps
  - Total angio and PCI numbers
  - No of PCI per centre and per angio
  - PCI pmp and by country and v CABG
  - Centre PCI volumes
  - PCI operators, by centre, by PPCI
  - On call rotas for PPCI
  - On site v off site surgical cover
  - Day case activity
  - Primary PCI units

- **NICOR data collection**
  - Centre participation
  - Databases used
  - Case ascertainment
  - Data completeness

- **Appropriateness**
  - Demographics
  - Indication for PCI / Clinical syndrome
  - PPCI activity (by unit, pmp, by vessel)
  - PCI for out of hospital arrest
  - PCI territories / vessels / lesions
  - Stents (BMS and DES)
  - Adjunctive pharmacotherapy
  - LV support and shock
  - Primary PCI for > 80 yrs
  - Extraction / Rota / IVUS / OCT / FFR / Laser etc.
  - Arterial access

- **Process of care**
  - Delays to treatment
  - NSTEMI (direct v IHT)
  - Primary PCI DTB / CTB
  - IHT versus Direct admission
  - Length of stay

- **Outcome**
  - MACCE
  - Peri-procedural complications and by access
  - Tracked 30 day mortality
    - Outcome by syndrome
    - Outcome by lesion subset

- **Adult non coronary intervention**
  - Septal ablation for HOCM
  - Mitral valvuloplasty
  - Mitraclip / PFO / ASD closure / LAA occlusion
  - Para-prosthetic leak closure
  - Renal Denervation
  - Percutaneous Pulmonary valve

- **TAVI**
  - Now presented in separate slide set

- **Conclusions and summary**

Appendix: PCI Centre NICOR / CCAD Centre codes
TAVI data are available on the BCIS web site

https://www.bcis.org.uk/resources/audit-results/
NICOR progress

- New IT platform
- Move to financial year
- Combined ‘aggregate’ report for HQIP
  - 6 domains
  - June 2017
- BCIS audit analyses (professional audience) funded by BCIS this year
- Outstanding issues
  - Information Governance permissions to share ONS and HES data for research
  - Funding outside the limited HQIP remit
Summary

• 119 PCI centres provide PCI at 1,530 pmp
• Indication for PCI largely unchanged (staged ↑)
• Patterns of Rx responsive to literature
• Process
  – Increasing pre-hospital delay for PPCI
  – Fast delivery of PPCI but some variation
  – Long in delays to Rx for NSTEMI
• Structural intervention changing rapidly
  – TAVI under local anaesthetic
  – New options for mitral intervention
• Future
  – NICOR responding to challenging time for audit delivery
  – New IT platform on track
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<td>Royal Albert Edward Infirmary (Wigan)</td>
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<td>AHM</td>
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<tr>
<td>ALT</td>
<td>Altnagelvin Hospital</td>
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<tr>
<td>AMG</td>
<td>Wycombe Hospital</td>
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<tr>
<td>ANT</td>
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<tr>
<td>BAS</td>
<td>Basildon and Thurrock University Hospitals</td>
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<td>BED</td>
<td>Bedford Hospital</td>
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<tr>
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<td>BOU</td>
<td>Royal Bournemouth Hospital</td>
</tr>
<tr>
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<td>Bradford Royal Infirmary</td>
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<tr>
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<tr>
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<td>Freeman Hospital</td>
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<tr>
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# UK PCI Centre Codes 2016

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Versions

History of Changes to Slide Set

• 20-02-2018  addition of Overall PCI rate pmp
• 08-03-2018  addition of 30 day ONS tracked mortality
• 08-03-2018  New dot plot labelling to reduce overlap