BCIS Audit Returns
Adult Interventional Procedures

1st April 2017 to 31st March 2018

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

1. Structure

2. PCI and TAVI procedure and outcome

Previous year’s datasets re-analysed for year trends
Data Sources

1. Structure

Data: Financial Year 2017-18

ONS link: Delayed (data sent July 2018)

Cleaning → analysis → Outputs

Previous year’s datasets re-analysed for year trends
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 PCI
  - 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/LMS/CTO
  - 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
  - LAA occlusion
  - Mitral Valve: Balloon/ mitraclip / other
  - PV / AV / TV
  - ASD / PFO /Para-prosthetic leak closure
  - Renal Denervation

- **TAVI**
  - See BCIS web site (link)

- **NICOR Update**

- **Conclusions and summary**

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

## 1 of 2

<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 |
## Angiography only Centres

### 2 of 2

<table>
<thead>
<tr>
<th>Year</th>
<th>Stopped</th>
<th>Started</th>
</tr>
</thead>
</table>
| 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  
• Epsom and St Helier * |
| 2017 | • West Middlesex University Hospital  
(becomes PCI) | • Spire Manchester  
• Spire Leeds (previous PCI)  
• Belfast City (previous PCI) |

*Discovered in 2017*
## PCI Centres

<table>
<thead>
<tr>
<th>Year</th>
<th>Stopped</th>
<th>Started</th>
</tr>
</thead>
</table>
| 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>Stopped</th>
<th>Started</th>
</tr>
</thead>
</table>
| 2014 | None                | • Luton and Dunstable  
• Kent Institute of Medicine and Surgery  
• Spire Cardiff Hospital  
• Ipswich Hospital (previous angio)  
• Frenchay moves to Southmead       |
| 2015 | None                | • Nuffield Health, Bournemouth                                         |
| 2016 | Sandwell (activity to Birmingham City site) | • UCL closes and combines with BAL in move to Barts Heart Centre (SBH)  
• Duchy Hospital, Cornwall (previous angio) |
| 2017 | Belfast City Hospital  
• Spire Leeds | • West Middlesex University Hospital                                   |
• PCI Stopped: Belfast City (→ Royal Victoria) Spire Leeds

• New PCI Centre: West Middlesex University Hospital
## PCI Centres in 2017-18

### 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>85</td>
<td>17</td>
</tr>
<tr>
<td>N Ireland</td>
<td>3</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>20</td>
</tr>
</tbody>
</table>

| **Total**    | 118 |         |
# UK centres

## 2017-18

<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></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Private Interventional</td>
<td>20</td>
<td>0</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Diagnostic only</td>
<td>60</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>178</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No Data:
- Addenbrooke’s Hospital (ADD)
- Doncaster Royal Infirmary (DID)
- Diana Princess of Wales Hospital, Grimsby (GGH)
- Queen Elizabeth the Queen Mother Hospital (QEG)
- Rotherham Hospital (ROT)
- Royal Preston Hospital (RPH)
- Whiston Hospital (WHI)
- Manor Hospital, Walsall (WMH)
- Yorkshire Clinic Ramsay Health (YKC)

(estimated totals by using 2016 data)
CTCA
## UK centres
### 2017-18

<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>205,085</td>
<td>101,057</td>
</tr>
<tr>
<td>Private Interventional</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>4,230</td>
<td>1,201</td>
</tr>
<tr>
<td>Diagnostic only</td>
<td>60</td>
<td>9</td>
<td>-</td>
<td>35,017</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>178</td>
<td></td>
<td></td>
<td><strong>244,332</strong></td>
<td><strong>102,258</strong></td>
</tr>
</tbody>
</table>

Survey Monkey
Angiography (inc ?PCI) Performed in PCI and Angio-only centres

- Angiography centres
- PCI Centres

Year: 2002 to 2017-8

From 2002 to 2017-8, the number of angiography centres has shown a consistent increase, peaking at 209,648 in 2017-8. Conversely, the number of PCI centres has remained relatively stable, peaking at 35,017 in 2002 and declining to 35,017 in 2017-8.
Population estimates

Mid 2017

Total UK: 66.0 m

- Scotland 5.424 m
- Northern Ireland 1.870 m
- England 55.619 m
- Wales 3.125 m
  (Rx all repatriated to Wales in 2015)
Total PCI activity all UK

102,258 PCIs
1,548 pmp

Total PCI Procedures

Survey Monkey
PCI pmp all UK

Rate of Increase

Survey Monkey
Percutaneous coronary interventions (PCI) (per million people), 2016 or latest year

Source: Data on percutaneous coronary interventions (PCI) are from the EAPCI White Book database, 2016 (except Germany: 2015; Slovenia, Turkey: 2017), data on file. Notes: Greece: Extrapolation based on data representing 97% of total; Romania: Value covers 94% of the public and private interventional cardiology centers in the country.
Percutaneous coronary interventions (PCI) (per million people), 2016 or latest year

Source: Data on percutaneous coronary interventions (PCI) are from the EAPCI White Book database, 2016 (except Germany: 2015; Slovenia, Turkey: 2017), data on file. Notes: Greece: Extrapolation based on data representing 97% of total; Romania: Value covers 94% of the public and private interventional cardiology centers in the country.
PCI per Invasive Angiogram ratio

% of PCI per Invasive Angiogram ratio from 1998 to 2017-18.
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
2017-18

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

0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000

To Contents
Total PCI vs Isolated CABG

Survey Monkey and SCTS data from ‘Blue Book online’

Note: CABG data for financial year
PCI vs Isolated CABG Ratio

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

2017-18 data
Extract 21-11-2018

To Contents
Number of PCIs per Centre
NHS and Private

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

37 Centres performing < 400 cases (31%)
Number of PCIs per Centre
NHS Centres

17 Centres performing < 400 cases (17%)
Number of PCIs per Centre

% Centres < 400 cases pa

<table>
<thead>
<tr>
<th>Year</th>
<th>All Centres</th>
<th>NHS Centres</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>2011</td>
<td>40</td>
<td>29</td>
</tr>
<tr>
<td>2012</td>
<td>35</td>
<td>22</td>
</tr>
<tr>
<td>2013</td>
<td>34</td>
<td>22</td>
</tr>
<tr>
<td>2014</td>
<td>33</td>
<td>20</td>
</tr>
<tr>
<td>2015</td>
<td>36</td>
<td>23</td>
</tr>
<tr>
<td>2016</td>
<td>32</td>
<td>19</td>
</tr>
<tr>
<td>2017-18</td>
<td>31</td>
<td>17</td>
</tr>
</tbody>
</table>
Centres < 400 PCIs

NHS

PCI program start date

- WMU: West Middlesex University Hospital (2017) - 386
- CGH: Conquest Hospital (2007) - 382
- PIN: Pinderfields General Hospital (2010) - 381
- KMH: Kings Mill Hospital (2010) - 366
- PMS: Wiltshire Cardiac Centre (2006) - 348
- WAT: Watford General Hospital (2009) - 347
- BRD: Bradford Royal Infirmary (2005) - 327
- SCU: Scunthorpe General Hospital (2010) - 285
- GWH: Queen Elizabeth Hospital Woolwich (2007) - 281
- BSM: Southmead Hospital Bristol (2008) - 271
- KSX: Tunbridge Wells Hospital (2008) - 272
- MAY: Croydon University Hospital (2006) - 250
- DGE: Eastbourne Hospital (2006) - 248
- MDW: Medway Maritime Hospital (2010) - 218
- DVH: Darent Valley Hospital (2008) - 218
- YDH: York District General Hospital (2010) - 200
- EAL: Ealing Hospital (2009) - 186

To Contents
Centres < 400 PCIs
Private

HHW: Wellington Hospital (< 2002) 246
LBH: London Bridge Hospital (< 2002) 133
ANT: St Anthony's Hospital (< 2002) 116
AHM: BMI Alexandra Hospital (< 2002) 98
NBO: Nuffield Health Bournemouth Hospital (2015) 79
KIM: Kent Institute of Medicine & Surgery (2014) 72
SPC: Spire Cardiff Hospital (2014) 52
LNH: Leeds Nuffield Hospital (2003) 51
IND: London Independent Hospital (< 2002) 47
HSC: Harley Street Clinic (< 2002) 47
HBP: Spire Hospital Hull and East Riding (2004) 45
SSP: Spire Shawfair Park Hospital (2010) 43
RHH: Ross Hall Hospital (< 2002) 32
GHB: Spire Hospital Bristol (2012) 30
CRO: Cromwell Hospital (< 2002) 30
PHN: BMI Park Hospital (< 2002) 26
MHO: Manor Hospital Oxford (< 2002) 18
PHB: BMI Priory Hospital (< 2002) 14
DUC: Duchy Hospital (2016) 13
BMI: BMI Meriden Hospital (2007) 9
Centres < 200 PCIs
In 2015, 2016 and 2017-18
Centres < 200 PCIs
In 2015, 2016 and 2017-18
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

- Total 2012: 621
- Total 2013: 639
- Total 2014: 659
- Total 2015: 647
- Total 2016: 660
- Total 2017-18: 663

0.5% rise

38 Female (5.7%)
625 Male (94.3%)
Interventional cardiologists (per million people), 2016 or latest year

Source: Data on interventional cardiologists are from the EAPCI White Book database (except Italy: ESC Atlas of Cardiology database), 2016 (except Germany: 2015; Switzerland, Netherlands: 2017), data on file.
No. of Consultants
(Per NHS Centre)

Note: if work at two NHS centres will be counted twice
No. of Consultants
In NHS centres (2017-18)

Note: if work at two NHS centres will be counted twice.
PCIs per Consultant
(NHS Centres 2017-18)

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

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

BCIS STEMI GUIDELINES JULY 2016
Not less than 1:6
PPCI

On call Rotas (A-G)

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

2017-18 data
Extract 21-11-2018
PPCI

On call Rotas (H-P)

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

The chart shows the number of on-call rotations for different facilities or departments, with data from 2017 to 2018. The bars represent the frequency of on-call duties, with weekdays and weekends indicated.
PPCI
On call Rotas (Q-Y)

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

[Bar chart showing rotas for different days and weeks with specific values for each day or week, indicating the frequency of on-call shifts for each individual or team member.]
On v Off Site Surgery
All Centres (NHS and private)

Survey Monkey

2017-18 data
Extract 21-11-2018
On v Off Site Surgery
NHS Centres Only


Off Site
On Site

36 %
Surgical Cover
(NHS centres only)

<table>
<thead>
<tr>
<th></th>
<th>On site</th>
<th>Off site</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td>1651</td>
<td>686</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>1552</td>
<td>613</td>
</tr>
</tbody>
</table>

PCIs per Centre

Individual Centres

Survey Monkey
Total Number of PCIs
By Surgical cover NHS & Private

- On Site
- Off Site
- Total

2002-2017 data

- 2002: 57,809
- 2003: 60,029
- 2004: 63,100
- 2005: 66,200
- 2006: 70,300
- 2007: 74,400
- 2008: 78,500
- 2009: 82,600
- 2010: 86,700
- 2011: 90,800
- 2012: 95,200
- 2013: 99,400
- 2014: 103,800
- 2015: 108,100
- 2016: 112,400
- 2017: 116,700
- 2018: 121,000

- Total:
  - 2002: 101,057
  - 2003: 104,129
  - 2004: 107,210
  - 2005: 110,300
  - 2006: 113,400
  - 2007: 116,500
  - 2008: 120,600
  - 2009: 124,700
  - 2010: 128,800
  - 2011: 132,900
  - 2012: 137,000
  - 2013: 141,100
  - 2014: 145,200
  - 2015: 149,300
  - 2016: 153,400
  - 2017: 157,500
  - 2018: 161,600

- Off Site:
  - 2002: 30,148
  - 2003: 32,297
  - 2004: 34,500
  - 2005: 37,000
  - 2006: 40,100
  - 2007: 43,200
  - 2008: 46,300
  - 2009: 49,400
  - 2010: 52,500
  - 2011: 55,600
  - 2012: 58,700
  - 2013: 61,800
  - 2014: 64,900
  - 2015: 68,000
  - 2016: 71,100
  - 2017: 74,200
  - 2018: 77,300

- On Site:
  - 2002: 76,909
  - 2003: 71,832
  - 2004: 69,510
  - 2005: 63,700
  - 2006: 60,200
  - 2007: 57,300
  - 2008: 54,400
  - 2009: 51,500
  - 2010: 48,600
  - 2011: 45,700
  - 2012: 42,800
  - 2013: 40,200
  - 2014: 37,400
  - 2015: 34,600
  - 2016: 31,800
  - 2017: 29,000
  - 2018: 26,200

- Total:
  - 2002: 101,057
  - 2003: 104,129
  - 2004: 107,210
  - 2005: 110,300
  - 2006: 113,400
  - 2007: 116,500
  - 2008: 120,600
  - 2009: 124,700
  - 2010: 128,800
  - 2011: 132,900
  - 2012: 137,000
  - 2013: 141,100
  - 2014: 145,200
  - 2015: 149,300
  - 2016: 153,400
  - 2017: 157,500
  - 2018: 161,600

- Percentage:
  - On Site: 57%
  - Off Site: 43%
  - Total: 100%
Day Case PCI

- 111 answered query of whom 109 perform planned elective day case PCI
Day Case PCI
Planned Elective Procedures

Data extract analysis
Day Case PCI
Planned Elective Procedures

New QI analytic code
## Routine Repatriation

### NSTEMI and STEMI

**25 Centres**

<table>
<thead>
<tr>
<th>Hospital Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Royal Albert Edward Infirmary (Wigan) (AEI)</td>
<td></td>
</tr>
<tr>
<td>Altnagelvin Hospital (ALT)</td>
<td></td>
</tr>
<tr>
<td>Bedford Hospital (BED)</td>
<td></td>
</tr>
<tr>
<td>North Wales Cardiac Centre (CLW)</td>
<td></td>
</tr>
<tr>
<td>Craigavon Hospital (CRG)</td>
<td></td>
</tr>
<tr>
<td>Eastbourne Hospital (DGE)</td>
<td></td>
</tr>
<tr>
<td>Birmingham Heartlands Hospital (EBH)</td>
<td></td>
</tr>
<tr>
<td>Edinburgh Heart Centre (ERI)</td>
<td></td>
</tr>
<tr>
<td>Frimley Park Hospital (FRM)</td>
<td></td>
</tr>
<tr>
<td>Golden Jubilee National Hospital (GJH)</td>
<td></td>
</tr>
<tr>
<td>Royal Gwent Hospital (GWE)</td>
<td></td>
</tr>
<tr>
<td>Hairmyres Hospital (HAI)</td>
<td></td>
</tr>
<tr>
<td>Hamersmith Hospital (HAM)</td>
<td></td>
</tr>
<tr>
<td>Ipswich Hospital (IPS)</td>
<td></td>
</tr>
<tr>
<td>Kent Institute of Medicine &amp; Surgery (KIM)</td>
<td></td>
</tr>
<tr>
<td>Yorkshire Heart Centre (LGI)</td>
<td></td>
</tr>
<tr>
<td>Morriston Hospital (MOR)</td>
<td></td>
</tr>
<tr>
<td>Musgrove Park Hospital (MPH)</td>
<td></td>
</tr>
<tr>
<td>Manchester Royal Infirmary (MRI)</td>
<td></td>
</tr>
<tr>
<td>Northern General Hospital (NGS)</td>
<td></td>
</tr>
<tr>
<td>Pinderfields General Hospital (PIN)</td>
<td></td>
</tr>
<tr>
<td>Royal Victoria Hospital (RVB)</td>
<td></td>
</tr>
<tr>
<td>University Hospital of North Staffordshire (STO)</td>
<td></td>
</tr>
<tr>
<td>University Hospital of Wales (UHW)</td>
<td></td>
</tr>
<tr>
<td>Worcester Royal Hospital (WRC)</td>
<td></td>
</tr>
</tbody>
</table>
## Multidisciplinary Meetings
### For IHD (NHS Centres)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>1</td>
</tr>
<tr>
<td>3 times each week</td>
<td>3</td>
</tr>
<tr>
<td>2 times each week</td>
<td>10</td>
</tr>
<tr>
<td>Once a week</td>
<td>70</td>
</tr>
<tr>
<td>Once every 2 weeks</td>
<td>6</td>
</tr>
<tr>
<td>Once every 3 weeks</td>
<td>1</td>
</tr>
<tr>
<td>Once a month</td>
<td>3</td>
</tr>
<tr>
<td>Sporadically</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>98</strong></td>
</tr>
</tbody>
</table>
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>Southmead Hospital Bristol (BSM)</td>
</tr>
<tr>
<td>North Wales Cardiac Centre (CLW)</td>
</tr>
<tr>
<td>Darent Valley Hospital (DVH)</td>
</tr>
<tr>
<td>Queen Elizabeth Hospital Woolwich (GWH)</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>Royal Victoria Hospital (RVB)</td>
</tr>
<tr>
<td>Salisbury District Hospital (SAL)</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>

Total 17
Multi-disciplinary 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>Southmead Hospital Bristol (BSM)</td>
</tr>
<tr>
<td>North Wales Cardiac Centre (CLW)</td>
</tr>
<tr>
<td>Darent Valley Hospital (DVH)</td>
</tr>
<tr>
<td>Queen Elizabeth Hospital Woolwich (GWH)</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>Royal Victoria Hospital (RVB)</td>
</tr>
<tr>
<td>Salisbury District Hospital (SAL)</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>

Total 17
# Morbidity and Mortality Meetings

For IHD (NHS Centres)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly</td>
<td>7</td>
</tr>
<tr>
<td>Alt weeks</td>
<td>1</td>
</tr>
<tr>
<td>Monthly</td>
<td>62</td>
</tr>
<tr>
<td>6 weekly</td>
<td>1</td>
</tr>
<tr>
<td>Alt months</td>
<td>5</td>
</tr>
<tr>
<td>Quarterly</td>
<td>15</td>
</tr>
<tr>
<td>Sporadically</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>98</strong></td>
</tr>
</tbody>
</table>
Primary PCI

Pattern of activity offered (NHS 2017-18)

Ambulance arrivals for PPCI

- 24/7/365: 58
- 24/7/365 hybrid: 2
- Working hrs Hybrid: 8
- 24/7/365 in patients: 1
- Working hrs in patients: 18
- Exceptional only AND Never: 30
- Other: 1

Only self presenters and in patients
Primary PCI

Pattern of activity offered (NHS 2017-18)

Ambulance arrivals for PPCI

<table>
<thead>
<tr>
<th>24/7/365</th>
<th>24/7/365 hybrid</th>
<th>Working hrs Hybrid</th>
<th>24/7/365 In patients</th>
<th>Working hrs In patients</th>
<th>Exceptional only AND Never</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>58</td>
<td>2</td>
<td>8</td>
<td>1</td>
<td>18</td>
<td>30</td>
<td>1</td>
</tr>
</tbody>
</table>

Only self presenters and in patients
### Primary PCI

#### Pattern of activity offered (NHS 2017-18)

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

Pattern of activity offered (NHS 2017-18)

- Ambulance arrivals for PPCI
- Only self presenters and in patients

- 24/7/365: 58
- 24/7/365 hybrid: 2
- Working hrs Hybrid: 8
- 24/7/365 In patients: 1
- Working hrs in patients: 18
- Exceptional only AND Never: 30
- Other: 1

Manchester Royal Infirmary (MRI)
Wythenshawe Hospital (WYT)
Primary PCI

Pattern of activity offered (NHS 2017-18)

Ambulance arrivals for PPCI

Only self presenters and in patients

- Wycombe Hospital (AMG)
- Royal United Hospital Bath (BAT)
- Conquest Hospital (CGH)
- Cheltenham General Hospital (CGH)
- Eastbourne Hospital (DGE)
- Wiltshire Cardiac Centre (PMS)
- Salisbury District Hospital (SAL)
- Dorset County Hospital (WDH)

Harefield, Wexham Park, Royal Berkshire
Bristol
Eastbourne
Bristol
Conquest
Bristol
Southampton, Bournemouth
Bournemouth

24/7/365
24/7/365 hybrid
Working hrs
Hybrid
24/7/365 in
patients
Working hrs in
patients
Exceptional only
AND Never
Other

58
2
8
1
18
1

To Contents
Primary PCI

Pattern of activity offered (NHS 2017-18)

Ambulance arrivals for PPCI

Only self presenters and in patients

<table>
<thead>
<tr>
<th>Service</th>
<th>24/7/365</th>
<th>24/7/365 hybrid</th>
<th>Working hrs Hybrid</th>
<th>24/7/365 In patients</th>
<th>Working hrs In patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunderland Royal Hospital (SUN)</td>
<td>58</td>
<td>2</td>
<td>8</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Royal Blackburn Hospital (BLA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southmead Hospital Bristol (BSM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Craigavon Hospital (CRG)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cromwell Hospital (CRO)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Darent Valley Hospital (DVH)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ealing Hospital (EAL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Surrey Hospital (ESU)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Royal Gwent Hospital (GWE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tunbridge Wells Hospital (KSX)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luton and Dunstable University Hospital (LDH)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croydon University Hospital (MAY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medway Maritime Hospital (MDW)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northwick Park Hospital (NPH)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northampton General Hospital (NTH)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raigmore Hospital (RAI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watford General Hospital (WAT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Middlesex University Hospital (WMU)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worthing Hospital (WRG)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exception only

AND Never

24/7/365

24/7/365 hybrid

Working hrs

Hybrid

Others

To Contents
Primary PCI

Pattern of activity offered (NHS 2017-18)

- Royal Albert Edward Infirmary (Wigan) (AEI)
- BMI Alexandra Hospital (AHM)
- St Anthony's Hospital (ANT)
- Bedford Hospital (BED)
- BMI Meriden Hospital (BMI)
- Bradford Royal Infirmary (BRD)
- Acute Pennine Trust Fairfield (BRY)
- Duchy Hospital (DUC)
- Spire Hospital Bristol (GHB)
- Spire Hospital Hull and East Riding (HBP)
- Wellington Hospital (HHW)
- Harley Street Clinic (HSC)
- London Independent Hospital (IND)
- Ipswich Hospital (IPS)
- Kent Institute of Medicine & Surgery (KIM)
- Kings Mill Hospital (KMH)
- London Bridge Hospital (LBH)
- Leeds Nuffield Hospital (LNH)
- Manor Hospital Oxford (MHO)
- Nuffield Health Bournemouth Hospital (NBO)
- BMI Priory Hospital (PHB)
- BMI Park Hospital (PHN)
- Pinderfields General Hospital (PIN)
- Ross Hall Hospital (RHH)
- Calderdale Royal Hospital (RHI)
- Scunthorpe General Hospital (SCU)
- Spire Cardiff Hospital (SPC)
- Spire Shawfair Park Hospital (SSP)
- York District General Hospital (YDH)

Ambulance arrivals for PPCI

Only self presenters and in patients

Exceptional only AND Never
Primary PCI

Pattern of activity offered (NHS 2017-18)

Ambulance arrivals for PPCI

Only self presenters and in patients

24/7 cover for Chelsea and Westminster

Royal Brompton Hospital (NHB)
PPCI 2017-18

PPCI as part of ambulance network

- PPCI 24/7
- PPCI 24/7 Hybrid
- PPCI working hrs
- No PPCI as part of ambulance network
PPCI 2017-18

Hybrid links

PPCI as part of ambulance network

- PPCI 24/7
- PPCI 24/7 Hybrid
- PPCI working hrs
- No PPCI as part of ambulance network
Hospitals with cath labs on 24 hours/7 days service (per million people), 2016

Source: Data on hospitals with cath labs on 24 hours/7 days service are from EAPCI White Book database, 2016, data on file. Data unavailable: Romania, Turkey. Notes: United Kingdom: Defined as labs that are the destination for paramedics diagnosing STEMI in the community.
Data Entry

PCI

Local database

csv file export

NICOR Server
Patient Specific Data Collection

CSV Import Process

Needed to save record

Uploading by: PETER LUDMAN/QEB/NICOR

Hospital importing: QEB

Date: 20/12/2018 09:44

Audit: Please Select

Select CSV file

© 2015 National Institute For Cardiovascular Outcomes Research (NICOR) in collaboration with Uppsala Clinical Research Centre

NCAP User Guide

For Technical Support call: 0203 765 9400 or email nicor-helpdesk@britishhealth.nhs.uk
Patient Specific Data Collection

CSV Import Process

Previous imports for QEB

The information regarding the status of your upload does not automatically refresh. To check if the upload has completed, please click "Refresh".
Patient Specific Data Collection

Previous imports for QEB

The information regarding the status of your upload does not automatically refresh. To check if the upload has completed, please click "Refresh".

<table>
<thead>
<tr>
<th>Uploaded Date</th>
<th>Dataset Version</th>
<th>Records Count</th>
<th>Messages Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>03/12/2018:16:24</td>
<td>Pci_5,6,5</td>
<td>780 Total, 21 New Signed, 47 Modified Signed, 1 Rejected, 711 Not Modified</td>
<td>Warning: 16, Serious: 5, Fatal: 1</td>
</tr>
<tr>
<td>23/11/2018:16:51</td>
<td>Pci_5,6,5</td>
<td>758 Total, 19 New Signed, 20 Modified Draft, 0 Rejected, 716 Not Modified</td>
<td>Completed</td>
</tr>
<tr>
<td>14/11/2018:17:17</td>
<td>Pci_5,6,5</td>
<td>1676 Total, 6 New Signed, 10 Modified Draft, 1 Rejected, 1850 Not Modified</td>
<td>Completed</td>
</tr>
</tbody>
</table>
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 2017-18

<table>
<thead>
<tr>
<th></th>
<th>Total No. of Centres</th>
<th>Data to NICOR</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>England</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHS</td>
<td>85</td>
<td>85</td>
<td>0</td>
</tr>
<tr>
<td>Private</td>
<td>17</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td><strong>Wales</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHS</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Private</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>N Ireland</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Scotland</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHS</td>
<td>6</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Private</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
# Procedure Specific Analysis

## Participation in NICOR 2017-18

<table>
<thead>
<tr>
<th></th>
<th>Total No. of Centres</th>
<th>Data to NICOR</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>England</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHS</td>
<td>85</td>
<td>85</td>
<td>0</td>
</tr>
<tr>
<td>Private</td>
<td>17</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td><strong>Wales</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHS</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Private</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>N Ireland</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spire Hull &amp; East Riding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuffield Leeds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuffield Bournemouth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Scotland</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHS</td>
<td>6</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Private</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
# Procedure Specific Analysis

## Participation in NICOR 2017-18

<table>
<thead>
<tr>
<th></th>
<th>Total No. of Centres</th>
<th>Data to NICOR</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>England</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHS</td>
<td>85</td>
<td>85</td>
<td>0</td>
</tr>
<tr>
<td><strong>Wales</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHS</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Private</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>N Ireland</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHS</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Private</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Scotland</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHS</td>
<td>6</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Private</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Royal Victoria Hospital, Belfast
## Procedure Specific Analysis

### Participation in NICOR 2017-18

<table>
<thead>
<tr>
<th></th>
<th>Total No. of Centres</th>
<th>Data to NICOR</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>England</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHS</td>
<td>85</td>
<td>85</td>
<td>0</td>
</tr>
<tr>
<td>Private</td>
<td>17</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td><strong>Wales</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHS</td>
<td>4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>N Ireland</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Scotland</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHS</td>
<td>6</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Private</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
Patient Specific Data Analysis

• Data
  – Centre participation
  – Case ascertainment
  – Data completeness
Patient Specific Data Analysis

- Data cleaning
  - Extract 'PCI_2017to2018_21112018-clean'
  - Sent through first 39 steps of cleaning
  - Then r generated files
    - csv file called D0132017 (but multivalue data caused misaligned columns)
    - xlsx file d013
      Correct alignment but multivalue fields blank
  - Filtered for ‘Lesions attempted > 0’
    AND exclude ‘Lesions attempted’ = blank
  - D013X multival fields functional
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

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

The Aspiration
NICOR Case Ascertainment

UK PCI data in NICOR as % of Reported Totals

The Reality

To Contents
NICOR Case Ascertainment

UK PCI data in NICOR as % of Reported Totals

- RVB. Royal Victoria Hospital
- PHN. BMI Park Hospital
- NIN. Ninewells Hospital
- NBO. Nuffield Health Bournemouth Hospital
- LNH. Leeds Nuffield Hospital
- HPB. Spire Hospital Hull and East Riding

No Data
NICOR Case Ascertainment
UK PCI data in NICOR as % of Reported Totals

GWE. Royal Gwent Hospital
MHO. Manor Hospital
BMI. The BMI Meriden Hospital
WMU. West Middlesex University Hospital
SPC. Spire Cardiff Hospital
AHM. BMI The Alexandra Hospital
PHB. Priory Hospital
RHH. Ross Hall Hospital
SSP. Spire Shawfair Park Hospital
BLA. Blackburn Royal Infirmary
CRO. Cromwell Hospital
BHR. Battle Hospital
SUN. Sunderland Royal Hospital
LBH. London Bridge Hospital
KSX. Kent & Sussex Hospital
HSC. Harley Street Clinic
HHW. Wellington Hospital North
HAI. Hairmyers Hospital
NHH. Basingstoke and North Hampshire Hospital
BSM. Southmead Hospital
NTH. Northampton General Hospital
ALT. Altnagelvin Hospital
SCU. Scunthorpe General Hospital
IND. London Independent Hospital
LDH. Luton & Dunstable Hospital
ANT. Spire St Anthonys Hospital

<90%
NICOR Case Ascertainment

UK PCI data in NICOR as % of Reported Totals

- RDE. Royal Devon & Exeter Hospital
- BOU. Royal Bournemouth General Hospital
- GRL. Glenfield Hospital
- MOR. Morriston Hospital
- NGS. Northern General Hospital
- CLW. Glan Clwyd DGH Trust
- UHW. University Hospital of Wales
- MAY. Croydon University Hospital
- WEX. Wexham Park Hospital
- GWH. Queen Elizabeth Hospital; Woolwich
- RAI. Raigmore Hospital

> 105%
## Case Ascertainment

**Reported Totals v data in NICOR**

<table>
<thead>
<tr>
<th></th>
<th>UK</th>
<th>E NHS</th>
<th>W NHS</th>
<th>S NHS</th>
<th>NI NHS</th>
<th>E Private</th>
<th>W Private</th>
<th>S Private</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Declared PCIs</strong></td>
<td>102,258</td>
<td>83,482</td>
<td>4,356</td>
<td>8,998</td>
<td>4,221</td>
<td>1,074</td>
<td>52</td>
<td>75</td>
</tr>
<tr>
<td><strong>In NICOR</strong></td>
<td>96,633</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>7232</td>
<td>2257</td>
<td>446</td>
<td>1230</td>
<td>2811</td>
<td>422</td>
<td>34</td>
<td>32</td>
</tr>
<tr>
<td><strong>Missing (%)</strong></td>
<td>7.1</td>
<td>2.7</td>
<td>10.2</td>
<td>13.7</td>
<td>66.6</td>
<td>39.3</td>
<td>65.4</td>
<td>42.7</td>
</tr>
<tr>
<td><strong>Extras</strong></td>
<td>1607</td>
<td>1088</td>
<td>323</td>
<td>196</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Extra (%)</strong></td>
<td>1.6</td>
<td>1.3</td>
<td>7.4</td>
<td>2.2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Data Validation Rules

• Methods

– [https://www.bcis.org.uk/resources/bcis-ccad-database-resources/individual-outcomes/](https://www.bcis.org.uk/resources/bcis-ccad-database-resources/individual-outcomes/)

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

  Resources / BCIS Resources / BCIS-NICOR Data collection resources / BCIS Data collection and validation: how to and guidance documents
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>
</tr>
<tr>
<td>5.35 Creatinine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.18 Weight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.04 Cardiogenic shock (Pre- PCI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.03 Procedure urgency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.09 Vessels attempted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.04 Discharge date</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.03 Status at discharge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.01 PCI Hospital outcome</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.31 Consultant responsible GMC Number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.02 Consultant responsible Name</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Data Completeness Tool

### BCIS Reports

<table>
<thead>
<tr>
<th>Patient ID</th>
<th>Procedure Count</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-PCI Status</td>
<td>2.04 Cardiogenic shock (Pre-procedure)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Stable</td>
<td>2.07 Date/time of symptom onset (PCI; ACS only)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ACS</td>
<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>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Medical History</td>
<td>2.09 Admission route (ACS only)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>OOHA</td>
<td>2.10 Presenting ECG (ACS only)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>98.9</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Operators</td>
<td>2.11 Recent Lysis (ACS only)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Cardiac Anatomy</td>
<td>2.12 Cardiac Enzymes/Markers Raised</td>
<td>88.8</td>
<td>89.3</td>
<td>84.8</td>
<td>84.8</td>
<td>90.3</td>
<td>92</td>
<td>82.9</td>
<td>90.9</td>
<td>87</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>PCI Procedure</td>
<td>5.26 Date/Time arrival at PCI hospital (ACS only)</td>
<td>100</td>
<td>98.7</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>PCI Procedure</td>
<td>5.27 Date/time of call for help</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Adjunctive Rx</td>
<td>5.29 Date/Time of ECG triggering PPCI pathway</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Outcome</td>
<td>5.30 Patient location at time of STEMI onset</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### NICOR

- **Reports**
  - View Reports
    - Aggregate (by Hospital)
    - Aggregate (by GMC No.)
    - Delays
    - VLAD
    - Funnel (by Hospital)
    - Funnel (by GMC No.)
  - Completeness

- **Support**
  - 020 3108 1978
  - Technical Support

- **Data Completeness Tool**
  - 2017-18 data
  - Extract 21-11-2018
### Data Completeness Tool

#### New IT Platform

Tools to be re-programmed

<table>
<thead>
<tr>
<th>Reports</th>
<th>Completeness Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCIS Reports</td>
<td></td>
</tr>
<tr>
<td>Refresh</td>
<td></td>
</tr>
<tr>
<td>Hospital</td>
<td></td>
</tr>
<tr>
<td>QEB, Queen Elizabeth Hospital</td>
<td></td>
</tr>
</tbody>
</table>

#### Summary of Completeness

- **Medical History**:
  - Date/Time arrival at FIRST hospital (ACS only): 100%
  - Admission route (ACS only): 100%
  - Presenting ECG (ACS only): 100%
  - Recent Lysis (ACS only): 100%
  - Cardiac Enzymes/Markers Raised: 88.8%

- **Cardiac Anatomy**:
  - Date/Time arrival at PCI hospital (ACS only): 100%

- **PCI Procedure**:
  - Date/time of call for help: 100%

- **Adjunctive Rx**:
  - Date/Time of ECG triggering PPCI pathway: 100%

- **Outcome**:
  - Patient location at time of STEMI onset: 100%
### Consultant Public Reports

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

| 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      |

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

<table>
<thead>
<tr>
<th>Extent of Data Completeness in Variables Relevant to Risk Estimation (3 years of data):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Count</td>
</tr>
<tr>
<td>%Complete</td>
</tr>
</tbody>
</table>

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

### 2. Fields required for Primary PCI delays

<table>
<thead>
<tr>
<th>% complete for patients treated by primary PCI (and not already in hospital at time of symptoms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.07 Date / time of symptom onset</td>
</tr>
<tr>
<td>5.27 Data / time of call for help</td>
</tr>
<tr>
<td>2.08 Date / time of arrival at first hospital</td>
</tr>
<tr>
<td>5.26 Date / time of arrival at PCI hospital</td>
</tr>
<tr>
<td>3.26 Date / time of first balloon inflation</td>
</tr>
</tbody>
</table>
% Completeness

3. Fields required for NSTEMI delays

<table>
<thead>
<tr>
<th>Route of admission (NSTEMI)</th>
<th>Fields required</th>
</tr>
</thead>
</table>
| Data to assess delays for direct admission (NSTEMI) | • Admission route  
• Arrival at PCI centre |
| Data needed to assess delays for IHT (NSTEMI) | • Admission route  
• Symptom onset  
• Arrival at first hospital (Door 1)  
• Arrival at PCI centre |
% Completeness

3. Fields required for NSTE MI delays

Public Reports – Good data completeness

Extent of Complete Data in Variables Relevant to NSTE MI Door to Balloon Time Delays

<table>
<thead>
<tr>
<th>Route of admission *</th>
<th>Complete Records</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>349</td>
<td>100%</td>
</tr>
<tr>
<td>Completeness of data to assess delays: Direct Admission **</td>
<td>317</td>
<td>100%</td>
</tr>
<tr>
<td>Completeness of data to assess delays: IHT ***</td>
<td>12</td>
<td>100%</td>
</tr>
</tbody>
</table>

* Out of all NSTE MI 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): NSTE MI

<table>
<thead>
<tr>
<th>NSTE MI: % of ALL Cases Treated Within 72 Hours</th>
<th>Hospital Rate</th>
<th>National Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>56.27%</td>
<td>58.24%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NSTE MI: % of Direct Admission Treated Within 72 Hours</th>
<th>Hospital Rate</th>
<th>National Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>57.41%</td>
<td>63.96%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NSTE MI: % of IHT Cases Treated Within 72 Hours</th>
<th>Hospital Rate</th>
<th>National Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
<td>48.15%</td>
<td></td>
</tr>
</tbody>
</table>
% Completeness

3. Fields required for NSTEMI delays

Public Reports – Inadequate 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>
</tr>
</thead>
<tbody>
<tr>
<td>Route of admission *</td>
<td>205</td>
<td>99.51%</td>
</tr>
<tr>
<td>Completeness of data to assess delays: Direct Admission **</td>
<td>114</td>
<td>96.61%</td>
</tr>
<tr>
<td>Completeness of data to assess delays: IHT ***</td>
<td>72</td>
<td>88.89%</td>
</tr>
</tbody>
</table>

* 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’
Appropriateness
## Demographics

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean)</td>
<td>64.3</td>
<td>64.4</td>
<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>
<td>65.4</td>
</tr>
<tr>
<td>Sex (male %)</td>
<td>73.6</td>
<td>73.8</td>
<td>73.9</td>
<td>74.0</td>
<td>74.0</td>
<td>74.1</td>
<td>74.3</td>
<td>74.3</td>
<td>74.5</td>
<td>74.5</td>
<td>74.3</td>
</tr>
<tr>
<td>Diabetic (%)</td>
<td>17.5</td>
<td>18.0</td>
<td>18.2</td>
<td>18.7</td>
<td>19.5</td>
<td>20.2</td>
<td>20.7</td>
<td>21.0</td>
<td>22.0</td>
<td>22.9</td>
<td>23.5</td>
</tr>
<tr>
<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>
<td>7.5</td>
</tr>
<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>
<td>27</td>
<td>26.9</td>
</tr>
<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>
<td>27.4</td>
<td>27.5</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Current smoker (%)</td>
<td>26.0</td>
<td>26.1</td>
<td>25.4</td>
<td>25</td>
<td>24.4</td>
<td>24.0</td>
<td>22.9</td>
<td>22.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ex smoker (%)</td>
<td>39.0</td>
<td>37.0</td>
<td>36.9</td>
<td>37.7</td>
<td>37.3</td>
<td>37.9</td>
<td>37.3</td>
<td>37.6</td>
<td>36.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never smoked (%)</td>
<td>35.1</td>
<td>37.0</td>
<td>37.7</td>
<td>37.3</td>
<td>38.2</td>
<td>38.1</td>
<td>39.5</td>
<td></td>
<td></td>
<td></td>
<td>40.8</td>
</tr>
</tbody>
</table>
Demographics - Age

(N.B. Financial year, 2017 = 2017-18)
Demographics - Age

Graph showing the relationship between Mean Age (yrs) and No. of PCIs per Centre. The mean age is approximately 65.4 years. The data range from ages 49 to 75 years, with a scattered distribution across the centers.
Demographics - Age

Graph showing the relationship between the mean age and the number of PCIs per centre.
## Demographics

### Ethnic Origin

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Data available</td>
<td>46,643</td>
<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>
<td>66,987</td>
</tr>
<tr>
<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>
<td>91.0</td>
<td>90.1</td>
<td>89.4</td>
</tr>
<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>
<td>9.3</td>
</tr>
<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>
<td>1.0</td>
<td>1.1</td>
</tr>
<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>
<td>0.19</td>
</tr>
</tbody>
</table>
Clinical Syndrome

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

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

- PCI in patients with Acute Syndromes (%)
Staged - Totals

The graph shows a scatter plot with the number of staged procedures per centre on the y-axis and the number of PCIs per centre on the x-axis. The data points are distributed across the graph, indicating a correlation between staged procedures and PCIs per centre. A horizontal line at 52.52 on the y-axis indicates a threshold or benchmark for staged procedures.
Staged - Totals
Staged - Totals

No. of Staged Procedures per Centre

No. of PCIs per Centre
Staged % of all PCI

To Contents
Staged % of all PCI
PCI for Stent Thrombosis

Procedures with data recorded in this field

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedures</td>
<td>46,241</td>
<td>76,619</td>
<td>84,779</td>
<td>83,569</td>
</tr>
</tbody>
</table>

% of PCI for Stent Thrombosis

- Early (0-30/7): 0.74, 0.81, 0.74, 0.65
- Late (30/7 - 1yr): 0.26, 0.27, 0.28, 0.28
- Very Late (> 1yr): 1.94, 1.35, 0.74, 0.79
PCI for STEMI

No data from Ninewells or RVB data for 2017-18
# Primary PCI Demographics

- **PPCI only**

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (yrs)</td>
<td>63.6</td>
<td>63.6</td>
<td>63.7</td>
</tr>
<tr>
<td>Male (%)</td>
<td>74.6%</td>
<td>74.3%</td>
<td>74.2%</td>
</tr>
<tr>
<td>Diabetic (%)</td>
<td>15.6%</td>
<td>16.8%</td>
<td>17.7%</td>
</tr>
<tr>
<td>Shock (%)</td>
<td>8.7%</td>
<td>9.1%</td>
<td>8.6%</td>
</tr>
<tr>
<td>Past History of CABG</td>
<td>3.2%</td>
<td>3.6%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Past History of PCI</td>
<td>10.6%</td>
<td>10.9%</td>
<td>11%</td>
</tr>
<tr>
<td>Past History of MI</td>
<td>12.6%</td>
<td>12.5%</td>
<td>12.4%</td>
</tr>
</tbody>
</table>
# Demographics

## Overall versus PPCI subgroup

<table>
<thead>
<tr>
<th></th>
<th>2017-18 All Cases</th>
<th>2017-18 Non PPCI cases</th>
<th>2017-18 PPCI Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (yrs)</td>
<td>65.4</td>
<td>66.1</td>
<td>63.7</td>
</tr>
<tr>
<td>Male (%)</td>
<td>74.3</td>
<td>74.3</td>
<td>74.2</td>
</tr>
<tr>
<td>Diabetic (%)</td>
<td>27.6</td>
<td>25.6</td>
<td>19.8</td>
</tr>
<tr>
<td>Shock (%)</td>
<td>4.2</td>
<td>1.5</td>
<td>8.6</td>
</tr>
<tr>
<td>Past History of CABG (%)</td>
<td>7.5</td>
<td>9.2</td>
<td>2.4</td>
</tr>
<tr>
<td>Past History of PCI (%)</td>
<td>26.9</td>
<td>32.8</td>
<td>11</td>
</tr>
<tr>
<td>Past History of MI (%)</td>
<td>26.9</td>
<td>32.2</td>
<td>12.4</td>
</tr>
<tr>
<td>Current smoker (%)</td>
<td>22.7</td>
<td>17.7</td>
<td>36.7</td>
</tr>
<tr>
<td>Ex smoker (%)</td>
<td>36.5</td>
<td>40.3</td>
<td>25.8</td>
</tr>
<tr>
<td>Never smoked (%)</td>
<td>40.8</td>
<td>41.9</td>
<td>37.6</td>
</tr>
</tbody>
</table>
Demographics

Overall versus PPCI subgroup

- **Age (mean)**: 66.1 (Non PPCI), 63.7 (PPCI)
- **Male (%):** 74.3 (Non PPCI), 74.2 (PPCI)
- **Diabetic (%):** 17.7 (Non PPCI), 25.6 (PPCI)
- **Shock (%):** 8.6 (Non PPCI), 1.5 (PPCI)
- **PH CABG (%):** 9.2 (Non PPCI), 2.5 (PPCI)
- **PH PCI (%):** 32.8 (Non PPCI), 11 (PPCI)
- **PH MI (%):** 32.2 (Non PPCI), 12.4 (PPCI)
- **Current smoker (%):** 36.7 (Non PPCI), 17.7 (PPCI)
- **Ex smoker (%):** 40.3 (Non PPCI), 25.8 (PPCI)
- **Never smoked (%):** 41.9 (Non PPCI), 37.6 (PPCI)
Primary PCI for STEMI
Absolute numbers

2016

2017-18
Primary PCI for STEMI

Absolute numbers
Primary PCI for STEMI

Absolute numbers
Primary PCI for STEMI

Absolute numbers
Primary PCI for STEMI
As % of Total PCIs 2017-18
Primary PCI for STEMI

Increase
Primary PCI for STEMI

Increase
Primary PCI
UK Countries – Total number of procedures

First data from Hairmyres in 2013, no data from Ninewells or Royal Vic Belfast 2017-18
Primary PCI
UK Countries - pmp

First data from Hairmyres in 2013, no data from Ninewells or Royal Vic Belfast 2017-18
Primary percutaneous coronary interventions (pPCI) (per million people), 2016 or latest year

Source: Data on primary percutaneous coronary interventions (pPCI) are from the EAPCI White Book database (except Poland: ESC Atlas of Cardiology database), 2016 (except Germany: 2015), data on file. Data unavailable: France, Turkey. Notes: Greece: Estimation based on data representing 90% of total; Romania: Value covers 94% of the public and private interventional cardiology centers in the country.
Primary percutaneous coronary interventions (pPCI) (per million people), 2016 or latest year

Source: Data on primary percutaneous coronary interventions (pPCI) are from the EAPCI White Book database (except Poland: ESC Atlas of Cardiology database), 2016 (except Germany: 2015), data on file. Data unavailable: France, Turkey. Notes: Greece: Estimation based on data representing 90% of total; Romania: Value covers 94% of the public and private interventional cardiology centers in the country.
Primary PCI pmp
By LAT and Country 2010 to 2017-18

awaited
Out of Hospital Cardiac Arrest

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

Number of PCIs for Ventilated emergencies

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of PCIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>318</td>
</tr>
<tr>
<td>2009</td>
<td>532</td>
</tr>
<tr>
<td>2010</td>
<td>675</td>
</tr>
<tr>
<td>2011</td>
<td>958</td>
</tr>
<tr>
<td>2012</td>
<td>1,210</td>
</tr>
<tr>
<td>2013</td>
<td>1,359</td>
</tr>
<tr>
<td>2014</td>
<td>1,502</td>
</tr>
<tr>
<td>2015</td>
<td>1,510</td>
</tr>
<tr>
<td>2016</td>
<td>1,598</td>
</tr>
<tr>
<td>2017</td>
<td>1,801</td>
</tr>
<tr>
<td>2018</td>
<td></td>
</tr>
</tbody>
</table>

% of all PCIs

0.00 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00

0 500 1000 1500 2000 2500

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

![Graph showing total number of emergency cases with Pre PCI ventilation from 2014 to 2017-18 for Primary PCI and NSTEMI.](image-url)
Out of Hospital Cardiac Arrest

• Indication for PCI
  – (of emergencies with pre-PCI ventilation)

<table>
<thead>
<tr>
<th>Year</th>
<th>Primary PCI</th>
<th>NSTEMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>78</td>
<td>17.9</td>
</tr>
<tr>
<td>2016</td>
<td>77.7</td>
<td>17.9</td>
</tr>
<tr>
<td>2017-18</td>
<td>81.7</td>
<td>16</td>
</tr>
</tbody>
</table>

Percentage of PCIs performed in context of OOHA

From d013
Pre PCI Ventilation

- As % of ALL PCI activity
Pre PCI Ventilation

- As % of ALL PCI activity
Out of Hospital Cardiac Arrest

- Shock (2017-18)

- Shocked percentage: 34%

- Not shocked: 22%

From d013
# Out of Hospital Cardiac Arrest (Including self ventilated)

<table>
<thead>
<tr>
<th>Year</th>
<th>PCIs with data</th>
<th>OOHA in PCIs</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>46,513</td>
<td>1,398</td>
<td>3.0%</td>
</tr>
<tr>
<td>2015</td>
<td>66,678</td>
<td>2,118</td>
<td>3.2%</td>
</tr>
<tr>
<td>2016</td>
<td>73,696</td>
<td>2,337</td>
<td>3.2%</td>
</tr>
<tr>
<td>2017-18</td>
<td>79,854</td>
<td>2,644</td>
<td>3.3%</td>
</tr>
</tbody>
</table>

### Table 1: Example of CCAD Field Prompts

<table>
<thead>
<tr>
<th>CCAD Seq</th>
<th>Field Prompt</th>
<th>Short Code</th>
<th>Text for long code</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.03</td>
<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>0: No, 1: Yes, 9: Unknown</td>
</tr>
<tr>
<td>6.05</td>
<td>Ventilation</td>
<td></td>
<td>Pick most appropriate option to describe clinical scenario</td>
</tr>
<tr>
<td>6.06</td>
<td>Arterial blood gas on arrival in cath lab: pH</td>
<td></td>
<td>0: None, 1: Ventilated before PCI, Established-Intensive care patient</td>
</tr>
<tr>
<td>6.07</td>
<td>Arterial blood gas on arrival in cath lab: Lactate</td>
<td></td>
<td>2: Ventilated before PCI, Established-patient from other GA intervention</td>
</tr>
<tr>
<td>6.08</td>
<td>Arterial blood gas on arrival in cath lab: Base excess</td>
<td></td>
<td>3: Ventilated before PCI, Acute following arrest event—initiated before arrival to PCI team</td>
</tr>
<tr>
<td>6.09</td>
<td>Glasgow Coma Scale on arrival in cath lab</td>
<td></td>
<td>4: Ventilated before PCI, Acute following arrest event—initiated by PCI team</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5: Ventilated during PCI, Acute after start of PCI procedure</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6: Ventilated after PCI, Acute after completion of PCI procedure</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9: Not applicable</td>
</tr>
</tbody>
</table>

From d013
Out of Hospital Cardiac Arrest
(Including self ventilated)

- Not ventilated: 47.0%
- ITU patient: 10.5%
- Patient from other GA: 0.2%
- Acute following arrest event—initiated before arrival to PCI team: 37.6%
- Acute following arrest event—initiated by PCI team: 3.1%
- Acute after start of PCI procedure: 1.3%
- Acute after completion of PCI procedure: 0.3%

Established
Acute

From d013

2017-18 data
Extract 21-11-2018
Multi-Lesion Treatment

% of all PCIs

Number of lesions Treated per Case

- 69.4
- 22.8
- 6.1
- 1.8

PCI to Multiple Lesions and vessels

Lesions per case

Vessels per case


1.62 1.6 1.55 1.51 1.49 1.49 1.37 1.39 1.39 1.39 1.4 1.4

1.3 1.21 1.19 1.22 1.22 1.22 1.22 1.23 1.24 1.26 1.26 1.27
Disease Burden

Primary PCI v Non-Primary PCI Cases

Epicardial Territories with > 75% stenoses

2017-18
Primary PCI
Multi-vessel Rx

2017-18

% of all Primary PCs

1  2  3  4+

68  22.5  8.7  0.8

Territories stenosed
Vessels treated

Extract 21-11-2018
Primary PCI

Trends in Multi-vessel Rx at time of PPCI

2013
2014
2015
2016
2017-18

86.5
11.1
2
0.4

%
Primary PCI
Multi-vessel Rx at time of PPCI
2017-18
All PCI

Epicardial Territory Treated

No change 2015 to 2017-18

- LMS: 21%
- LAD: 42%
- Cx: 31%
- RCA: 4%
- Graft: 2%
Treated Epicardial Territory
By Presenting Syndrome

Territory Treated

Stable
NSTEMI
Primary PCI

Graft
RCA
Cx
LAD
LMS

Territory Treated

Stable
NSTEMI
Primary PCI

Graft
RCA
Cx
LAD
LMS

0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

2017-18 data
Extract 21-11-2018
Unprotected LMS

![Calendar Yr](image)

![Financial Yr](image)
Chronic Total Occlusion

Stable only
PCI for stable CTO

By LAT and Country 2016

2016
CTO for Stable symptoms
Rate pmp

[Bar chart showing PCI rates for stable CTO by LAT and Country in 2016]
### PCI for stable CTO

**By LAT and Country 2016**

<table>
<thead>
<tr>
<th>Region</th>
<th>PCI Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q47. Lancashire</td>
<td>19.85087</td>
</tr>
<tr>
<td>North Wales</td>
<td>30.52605</td>
</tr>
<tr>
<td>Q46. Greater Manchester</td>
<td>33.14163</td>
</tr>
<tr>
<td>Q51. South Yorkshire and Bassetlaw</td>
<td>33.64312</td>
</tr>
<tr>
<td>Q48. Merseyside</td>
<td>34.53644</td>
</tr>
<tr>
<td>Q44. Cheshire, Warrington and Wirral</td>
<td>36.01403</td>
</tr>
<tr>
<td>Q71. London</td>
<td>41.96262</td>
</tr>
<tr>
<td>Q53. Arden, Herefordshire and Worcestershire</td>
<td>44.6626</td>
</tr>
<tr>
<td>Q45. Durham, Darlington and Tees</td>
<td>45.7674</td>
</tr>
<tr>
<td>Q66. Devon, Cornwall and Isles Of Solly</td>
<td>48.55481</td>
</tr>
<tr>
<td>Q50. North Yorkshire and Humber</td>
<td>50.64314</td>
</tr>
<tr>
<td>Q59. Leicestershire and Lincolnshire</td>
<td>50.82739</td>
</tr>
<tr>
<td>Q56. East Anglia</td>
<td>51.13611</td>
</tr>
<tr>
<td>Q67. Kent and Medway</td>
<td>58.46041</td>
</tr>
<tr>
<td>Q55. Derbyshire and Nottinghamshire</td>
<td>59.06413</td>
</tr>
<tr>
<td>Scotland</td>
<td>63.18033</td>
</tr>
<tr>
<td>Q60. Shropshire and Staffordshire</td>
<td>63.60344</td>
</tr>
<tr>
<td>Q52. West Yorkshire</td>
<td>64.16491</td>
</tr>
<tr>
<td>South Wales</td>
<td>70.30043</td>
</tr>
<tr>
<td>Q64. Bath, Gloucestershire, Swindon and Wiltshire</td>
<td>76.12495</td>
</tr>
<tr>
<td>Q68. Surrey and Sussex</td>
<td>79.29004</td>
</tr>
<tr>
<td>Q58. Hertfordshire and The South Midlands</td>
<td>79.82186</td>
</tr>
<tr>
<td>Q57. Essex</td>
<td>80.00252</td>
</tr>
<tr>
<td>Q69. Thames Valley</td>
<td>80.65047</td>
</tr>
<tr>
<td>Q54. Birmingham and The Black Country</td>
<td>93.82104</td>
</tr>
<tr>
<td>Q65. Bristol, North Somerset, Somerset and South</td>
<td>106.7761</td>
</tr>
<tr>
<td>Q49. Cumbria, Northumberland, Tyne and Wear</td>
<td>108.4705</td>
</tr>
<tr>
<td>Q70. Wessex</td>
<td>109.8939</td>
</tr>
<tr>
<td>N Ireland</td>
<td>139.596</td>
</tr>
</tbody>
</table>
Stents
Procedures using Stents

![Graph showing % PCIs using Stents vs. No. of PCIs per Centre]

- 89.9%
Procedures using Stents

No. of PCIs per Centre

% PCIs using Stents

Ant

Bmi

Bch

Bnu

Bph

Bra

Bsp

Btv

Cmi

Ceu

Cpl

Cpa

Cph

Cpi

Cpu

Ctw

Dcu

Dfh

Dki

Dor

Dsp

Eai

Eha

Eiu

Elt

Erh

Ern

Erq

For

Fpa

Gbh

Gch

Gnw

Gpa

Gpr

Gqu

Gpu

Hai

Hba

Hca

Hch

Her

Hie

Hph

Hsu

Ibn

Icu

Ien

Ihi

Ing

Ips

Iph

Iwi

Kbh

Kch

Kcm

Kes

Ket

Kht

Kia

Kle

Knc

Kph

Kri

Kse

Ksh

Ksi

Ktw

Lai

Lch

Lct

Lgu

Lht

Lia

Lph

Lri

Lst

Lkp

Mch

Mci

Mdu

Mep

Mgt

Mcp

Min

Mos

Mph

Mri

Mta

Nch

Nem

Nen

Nho

Nph

Nor

Nou

Nov

Oai

Och

Ohn

Oph

Ori

Ost

Owh

Pch

Pda

Pdi

Pdu

Pgu

Phe

Pma

Pmc

Pnp

Psh

Pst

Pwa

Qch

Qec

Qhe

Qku

Quo

Qph

Qri

Qst

Quh

Rai

Rch

Rct

Rci

Rdu

Rgu

Rhe

Rmi

Rna

Rph

Rri

Rst

Rub

Ruc

Rup

Ruk

Rvi

Rwo

Sai

Sbo

Sbu

Sct

Sco

Sce

Sda

Sdc

Sds

Sed

Seq

Sqi

Sra

Ssh

Sst

Sth

Sto

Tch

Tda

Tec

Tep

Tga

Tga

Tgo

Tgu

Tia

Tme

Tph

Tpa

Tph

Tps

Tqu

Tqu

Tpt

Tst

Tui

Uai

Uch

Uct

Uui

Uih

Uph

Uqu

Urb

Uwh

Vai

Vch

Vct

Vci

Vda

Vem

Vga

Vga

Vkc

Vph

Vri

Vst

Vup

Vui

Vwh

Wai

Wch

Wci

Wda

Wic

Wic

Whb

Whd

Whu

Wiu

Wku

Wph

Wph

Wri

Wst

Wst

Wto

Wui

Xai

Xch

Xct

Xwi

Xwu

Yai

Ych

Yct

Ywi

Ywu

Zai

Zch

Zct

Zwi

Zwu

2017-18 data

Extract 21-11-2018
Procedures using Stents

No. of PCIs per Centre

% PCIs using Stents

2017-18 data
Extract 21-11-2018
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 0 17 53 62 63.5 65 57 63.5 67.1 71.1 76.2 81.6 85.7 88.5 90.2 87.9

0 10 20 30 40 50 60 70 80 90 100

BMS and DES use

% PCI with any Stent
% PCI with DES

% PCI with any Stent
% PCI with DES

To Contents
PCI with Drug Eluting Stents

2017-18 data
Extract 21-11-2018
PCI with Drug Eluting Stents

% PClS using DES

No. of PClS per Centre

2017-18 data
Extract 21-11-2018
PCI with Drug Eluting Stents

By Syndrome

% PCI using DES

88.9
91.5
91

Stable
UA / NSTEMI
PPCI

2008
2009
2010
2011
2012
2013
2014
2015
2016
2017-18

To Contents
DES use in Primary PCI

% DES use in patients treated with stent

PCI Procedure with any stent insertion
BMS and DES use v PCI for Restenosis

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

To Contents
Procedures for Restenosis

% PCI for restenosis vs No. of PCIs per Centre

- 5.1% average
- Data range from 0 to 50%
Procedures for Restenosis

% PCI for restenosis

No. of PCIs per Centre

2017-18 data
Extract 21-11-2018
PCI with Bioabsorbable Vascular Scaffolds

BVS +/- other stents

Number of PCI procedures

2014: 485
2015: 860
2016: 706
2017-18: 8

BOU 58 in 2014 but not recorded in NICOR

From raw dataset
PCI with Bioabsorbable Vascular Scaffolds

BVS +/- other stents

2017-18

Number of PCI procedures

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Number of Procedues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birmingham City Hospital</td>
<td>1</td>
</tr>
<tr>
<td>Freeman Hospital</td>
<td>2</td>
</tr>
<tr>
<td>Lincoln County Hospital</td>
<td>1</td>
</tr>
<tr>
<td>Papworth Hospital</td>
<td>2</td>
</tr>
<tr>
<td>Royal Sussex County Hospital</td>
<td>2</td>
</tr>
</tbody>
</table>
Stents per Case

- Mean number of stents per case
Mean Stents per Case
(by PCI unit)

2017-18 data
Extract 21-11-2018

To Contents
Mean Stents per Case (by PCI unit)
Adjunctive Therapy
GP IIb/IIIa Antagonists
Use by Syndrome

% Procedures with any GP IIb/IIIa blocker

- Stable
- UA
- NSTEMI
- PPCI

Years:
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017-18
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

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

% Stables NSTEMI / UA PPCI

- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017-18

- 2.1
- 8.7
- 38.7

Stable NSTEMI / UA PPCI
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
Ticagrelor or Prasugrel
Use in Primary PCI

2017-18

Note: Centre data included if:
>90% of cases recorded as using Prasugrel, Ticagrelor or Clopidogrel (to exclude those with missing or poor data)
> 20 primary PCI cases

To Contents
Prasugrel
Use in Diabetics with NSTEMI by centre
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.
LV Support

Diastole

Systole

IABP

Impella

Tandem Heart

Autopulse

Lucas
LV Support
Inotropes and IABP

% of PCIs

Inotropes

IABP

2008
2009
2010
2011
2012
2013
2014
2015
2016
2017-18
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%
- 2017-18: 18.4%
Shock Cases
Treated with IABP support

No. of PCIs per Centre

% Shocked Patients Treated with IABP Support

Mean = 18.3%

Does not include Impella use
Shock Cases
Treated with IABP support

% Shooked Patients Treated with IABP Support

No. of PCIs per Centre

Does not include Impella use
LV Support

% Cases using IABP v LV function

Financial Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Good LV</th>
<th>Moderate</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>0.22</td>
<td>1.7</td>
<td>7.93</td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
LV Support
Other options

No. of PCIs using LV Support

<table>
<thead>
<tr>
<th>Procedure</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impella</td>
<td>30</td>
<td>24</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>ECMO</td>
<td>18</td>
<td>18</td>
<td>24</td>
<td>42</td>
</tr>
<tr>
<td>Lucas</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td>Autopulse</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>
Cardiogenic Shock

% Cases with shock by PCI unit

Unadjusted for differing rates of OOHA

2017-18 data
Extract 21-11-2018
Cardiogenic Shock

% Cases with shock by PCI unit

Unadjusted for differing rates of OOHA
Cardiogenic Shock

% Cases with shock by PCI unit

Unadjusted for differing rates of OOHA
Primary PCI

% cases over 80

Case selection for PPCI?
Primary PCI

% cases over 80

Unadjusted for population demographics

No. of pPCIs per Centre

% of Cases with Age Over 80 Yrs

2 SD
3 SD

12.4%
Primary PCI

% cases over 80

Unadjusted for population demographics
Primary PCI

% cases over 80

Unadjusted for population demographics
Additional Interventional Coronary Techniques

Notes:
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

No. of PCIs per Centre

Rota Cases as % of Total PCIs
Primary PCI
Extraction Atherectomy

% of Primary PCIs

- Unknown
- No Device Used
- Device Used

Year | Unknown | No Device Used | Device Used |
--- | --- | --- | --- |
2012 | 50 | 44 | 19.5 |
2013 | 49.8 | 44 | 22.6 |
2014 | 53.1 | 32.9 | 22.6 |
2015 | 65.3 | 32.9 | 22.6 |
2016 | 75.6 | 32.9 | 22.6 |
2017-18 | 78.5 | 32.9 | 22.6 |

2017-18 data
Extract 21-11-2018
Overall Thrombectomy

Increase in use

2015 to 2016

2016 to 2017-18
Thrombectomy in PPCI 2017-18:

Thrombectomy use during Primary PCI

Number of Primary PCI procedures per Centre
Notes:
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 in Bypass Grafts
(all types - SVG and IMA etc)

![Bar Chart showing distal protection in Bypass Grafts]

- 2015: 8
- 2016: 8.1
- 2017: 7.7

Grafts treated using distal protection as % of all grafts treated

To Contents
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

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 Intervventional Coronary Techniques

Pressure Wire - Diagnostic only studies
Additional Interventional Coronary Techniques

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

2017-18

Diagnostic only data from Survey Monkey
IVUS during a PCI procedure
Pressure Wire

During a PCI procedure
IVUS

PCI to Unprotected LMS

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>IVUS not used</td>
<td>61</td>
<td>59</td>
<td>56</td>
<td>50</td>
<td>52</td>
</tr>
<tr>
<td>IVUS used</td>
<td>39</td>
<td>40.9</td>
<td>44</td>
<td>44.9</td>
<td>48</td>
</tr>
</tbody>
</table>

Note: Does not include OCT
IVUS

PCI to Unprotected LMS

Note: Does not include OCT
Arterial access
Radial Artery Access

PCI Via Radial (%)

- 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%
- 2017-18: 87.2%
Radial Artery Access

![Graph showing the percentage of cases via radial artery access vs. the number of PCI procedures per centre.](Image)
Radial Artery Access
By operator

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

PCI via Radial (%)

Stable
ACS not STEMI
PPCI

2008
2009
2010
2011
2012
2013
2014
2015
2016
2017-18

84.3
86.4
85.8

To Contents
Percent of percutaneous coronary interventions (PCI) performed by trans-radial access, 2016 or latest year

Source: Data on percent of percutaneous coronary interventions (PCI) performed by trans-radial access are from the EAPCI White Book database, 2016, data on file. Data unavailable: Romania. Notes: Greece: Estimation based on data representing 90% of total.
Femoral closure devices

Of PCI via FA - % punctures closed with a device

% of PCI via FA - % punctures closed with a device

- 2006: 39.6%
- 2007: 50.7%
- 2008: 53.5%
- 2009: 57.1%
- 2010: 55.6%
- 2011: 57%
- 2012: 58.9%
- 2013: 60.1%
- 2014: 61.4%
- 2015: 61.4%
- 2016: 61.3%
- 2017-18: 61.4%

2017-18 data
Extract 21-11-2018
Delays to PCI in NSTEMI
PCI in NSTEMI / UA

- PCI with indication NSTEMI / UA / Conv STEMI
  - Split by cardiac marker elevation

<table>
<thead>
<tr>
<th>Indication</th>
<th>2017-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>UA (no elevation)</td>
<td>7,750 (19%)</td>
</tr>
<tr>
<td>NSTEMI</td>
<td>28,164 (70%)</td>
</tr>
<tr>
<td>Missing data</td>
<td>4,042 (10%)</td>
</tr>
<tr>
<td>Total</td>
<td>39,956</td>
</tr>
</tbody>
</table>
**Delays to Rx NSTEMI**

Kofoed (VERDICT trial) Circulation 2018;138:2741

---

**Figure 2. Event rates of the combined primary end point.**

The combined primary end point: all-cause death, nonfatal recurrent myocardial infarction, hospital admission for refractory myocardial ischemia, or hospital admission for heart failure. Differences in cumulative incidence including 95% CIs are given early invasive: invasive coronary angiography and possible revascularization within 12 hours from time of diagnosis. Standard: invasive coronary angiography and possible revascularization within 48 to 72 hours from time of diagnosis.
Delays to PCI in NSTEMI

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

=2.3 days

2017-18 data
Extract 21-11-2018
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

= 3.3 days
Delays to PCI in NSTEMI
All Admission Routes (Direct and IHT)

Centres with < 90% data completeness excluded

To Contents
Delays to PCI in NSTEMI

2.3 days → 3.3 days

Hours

Direct: 60.6, 59.6, 61.8
IHT: 82.1, 80.1, 84, 79.9

24 hr Delay

2014, 2015, 2016, 2017-18
Delays to PCI in NSTEMI
Direct AND IHT % < 72 hr

% Patients Waiting <72 Hours

No. of PCIs for nSTEMI with Time Data

58.4%
Delays to PCI in NSTEMI
Direct AND IHT % < 72 hr
Delays to PCI in NSTEMI
Direct AND IHT % < 96 hr

No. of PCIs for nSTEMI with Time Data

% Patients Waiting <96 Hours

Better
Delays to PCI in NSTEMI
Direct AND IHT

<table>
<thead>
<tr>
<th>Year</th>
<th>&lt; 96 hr</th>
<th>&lt; 72 hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>49</td>
<td>52</td>
</tr>
<tr>
<td>2011</td>
<td>52</td>
<td>51.5</td>
</tr>
<tr>
<td>2012</td>
<td>51.5</td>
<td>58.7</td>
</tr>
<tr>
<td>2013</td>
<td>58.7</td>
<td>54.3</td>
</tr>
<tr>
<td>2014</td>
<td>54.3</td>
<td>56.6</td>
</tr>
<tr>
<td>2015</td>
<td>56.6</td>
<td>56.8</td>
</tr>
<tr>
<td>2016</td>
<td>56.8</td>
<td>58.4</td>
</tr>
<tr>
<td>2017-18</td>
<td>58.4</td>
<td>58.4</td>
</tr>
</tbody>
</table>
Delays to PCI in NSTEMI

Direct and IHT combined

Total Number of PCI for nSTEMI in 2016

Improvement (reduction) in delay hrs from 2017 to 2016
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
**Mortality relative to DTB 90 min**

McNamara RL JACC 2006;47:2180-6

**DTB times:**
- Each 15 min reduction
- 6.3 few deaths per 1000

especially if high risk and arrival within 1 hr

---

**Figure 1.** Relative Risk of In-Hospital Death with Each Additional 15-Minute Interval and Number of Deaths Associated with Increases in Door-to-Balloon Time as Compared with Treatment within 90 Minutes. The bars represent the number of in-hospital deaths per 1000 patients treated, and the line represents the relative risk associated with longer door-to-balloon times with primary PCI as compared with treatment within 90 minutes. Adapted from McNamara et al.²⁰
PCI for Acute Sx

Four admission scenarios

Admitted from
the community

Already in hospital

Admission to
Non-PCI centre

Direct admission to PCI centre

Transfer to PCI centre

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 and as median times
    - Graphics: funnel, cf last year (plotted against vol and last yrs %)
  - Door to ‘balloon’ time as % < 90 min and as median times
    - 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

To Contents
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
Call to Balloon

CTB

DTB
Primary PCI (excl shock/vent)

Direct and IHT: Call to Balloon times < 150 min

Better
Primary PCI (excl shock/vent)

Direct and IHT: Call to Balloon times < 150 min

% CTB < 150 min

No. of Cases per Centre

Better

2 SD
3 SD

2017-18 data
Extract 21-11-2018
Primary PCI (excl shock/vent)

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

Direct and IHT: Median Call to Balloon times

Median Call to Balloon time
2017-18

Number of Primary PCIs per Centre

Time (min)
Primary PCI Changes
(excluding pre-procedure shock/vent)

Direct and IHT: CTB < 150 min

To Contents
Primary PCI Changes
(excluding pre-procedure shock/vent)

Direct and IHT: CTB < 150 min

Difference:
Last Year v This Year

%CTB<150min in 2016

Better

(last year)
Primary PCI Changes
(excluding pre-procedure shock/vent)

Direct and IHT: CTB < 150 min

Albuquerque: BLA
Minneapolis: MPH
Dallas: MDW

Improvement in %CTB<150 min in 2017 from 2016

%CTB<150 min in 2016

Better
Already
Good

To Contents
Primary PCI Changes
(excluding pre-procedure shock/vent)

Direct and IHT: CTB < 150 min

Improved

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

Direct and IHT: CTB < 150 min

Longer delays getting worse

Improvement in %CTB<150 min in 2017 from 2016

%CTB<150min in 2016

To Contents
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
  - D1
  - D2
  - DTB device
Primary PCI (excl shock/vent)

Direct and IHT: Door to Balloon < 90 min

Better

% DTB < 90 min

No. of Cases per Centre

89.7%

2 SD

3 SD

To Contents
Primary PCI (excl shock/vent)

Direct and IHT: Door to Balloon < 90 min

---

To Contents
Primary PCI  (excl shock/vent)

Direct and IHT: Door to Balloon < 90 min

% DTB < 90 min

No. of Cases per Centre

NICOR

Better

To Contents
Primary PCI (excl shock/vent)

Direct and IHT: Median Door to Balloon

Median Door to Balloon time
2017-18

Better
Primary PCI (excl shock/vent)

Direct and IHT: Ratio of Median DTB / CTB time

Ratio of Median Door to Balloon time / Call to Balloon time

2017-18

Number of Primary PCIs per Centre

Ratio

0 1 2 3 4 5 6

0 100 200 300 400 500 600 700 800 900 1000

For example, the graph shows the ratio of median DTB to CTB time for different centers. Each point on the graph represents a center, with the x-axis showing the number of Primary PCIs per center and the y-axis showing the ratio of median DTB to CTB time.
Primary PCI (excl shock/vent)

Direct and IHT: CTB MINUS DTB time
Primary PCI (excl. shock/vent)

Direct and IHT

% Patients treated within time limits

CTB < 150 (%)  
- 2012: 79.5
- 2013: 79
- 2014: 78.8
- 2015: 77.9
- 2016: 75.2
- 2017-18: 70.7

DTB < 90 (%)  
- 2012: 88.7
- 2013: 90.6
- 2014: 90.3
- 2015: 90.9
- 2016: 91
- 2017-18: 89.7

Better
Primary PCI (excl. shock/vent)

Direct and IHT

% Patients treated within time limits

CTB < 150 (%)
- 2012: 79.5%
- 2013: 79%
- 2014: 78.8%
- 2015: 77.9%
- 2016: 75.2%
- 2017-18: 70.7%

DTB < 90 (%)
- 2012: 88.7%
- 2013: 90.6%
- 2014: 90.3%
- 2015: 90.9%
- 2016: 91%
- 2017-18: 89.7%

Better
Primary PCI Changes

Direct and IHT: DTB < 90 min

Improvement in %DTB<90 min in 2017 from 2016

Total Number of Primary PCI in 2016

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

Improvement in %DTB<90 min in 2017 from 2016

%DTB<90min in 2016

Better
Primary PCI (excl shock/vent)

Direct and IHT: PCI Door to Balloon < 60 min

![Graph showing the percentage of Door-to-Balloon times less than 60 minutes for PCI procedures, with data points and trend lines indicating performance improvements.](https://example.com/primary pci graph)
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-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

For interactive display - go to https://www.bcis.org.uk/door-balloon-time-interactive-plots/
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
  - D1
  - D2
  - DTB device
Primary PCI (excl shock/vent)

Direct ONLY: PCI Door to Balloon < 90 min

![Graph showing PCI Door to Balloon times versus number of cases per centre. The graph includes a line at 90.5% and two lines representing 2 SD and 3 SD.]
Primary PCI (excl shock/vent)

Direct ONLY: PCI Door to Balloon < 90 min

To Contents
Primary PCI (excl shock/vent)

Direct ONLY: PCI Door to Balloon < 90 min

% DTB < 90 min

No. of Cases per Centre
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

2 SD
3 SD
Primary PCI (excl shock/vent)

Direct only: PCI Door to Balloon < 60 min

2017-18 data
Extract 21-11-2018
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
  - Admission to Non-PCI centre
    - Direct admission to 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 vs Total pPCI (Direct and IHT) by Centre
PPCI Call to Balloon time
(excluding shock/vent)
By Admission Route

53 Min Delay

Median CTB (min)

Direct | IHT | All
---|---|---
119 | 164 | 119
115 | 171 | 124

---|---|---|---|---|---|---
0 | 0 | 0 | 0 | 0 | 0 | 0
PPCI Door to Balloon time
(exclude shock/vent)
By Admission Route

Median D2TB (min)


Direct: 39
IHT: 38
All: 39

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

## 2017-18

<table>
<thead>
<tr>
<th></th>
<th>All (median)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Call to ‘Balloon’</td>
<td>&lt; 150 min</td>
<td>70.7 %</td>
<td>77.2 %</td>
<td>42.0 %</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>124 min</td>
<td>119 min</td>
<td>171 min</td>
</tr>
<tr>
<td>PCI Door to ‘Balloon’</td>
<td>&lt; 90 min</td>
<td>89.7 %</td>
<td>89.5 %</td>
<td>91.0 %</td>
</tr>
<tr>
<td></td>
<td>&lt; 60 min</td>
<td>76.8 %</td>
<td>76.4 %</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>39 min</td>
<td>39 min</td>
<td>38 min</td>
</tr>
<tr>
<td>All (median)</td>
<td></td>
<td></td>
<td></td>
<td>2.7 days</td>
</tr>
</tbody>
</table>
## MACCE - All PCIs

<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 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>92</td>
<td>1.2</td>
<td>1.1</td>
<td>0.89</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>92</td>
<td>0.8</td>
<td>0.7</td>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>90</td>
<td>0.57</td>
<td>0.48</td>
<td>0.61</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>92</td>
<td>0.6</td>
<td>0.4</td>
<td>0.64</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>94</td>
<td>0.5</td>
<td>0.4</td>
<td>0.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>92</td>
<td>0.57</td>
<td>0.28</td>
<td>0.54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>92</td>
<td>0.36</td>
<td>0.29</td>
<td>0.53</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>93.5</td>
<td>0.30</td>
<td>0.21</td>
<td>0.56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>90.2</td>
<td>0.24</td>
<td>0.12</td>
<td>0.59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>95.5</td>
<td>0.15</td>
<td>0.74</td>
<td>0.09</td>
<td>0.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>92.1</td>
<td>0.15</td>
<td>0.59</td>
<td>0.08</td>
<td>0.05</td>
<td>0.92</td>
<td>1.5</td>
</tr>
<tr>
<td>2008</td>
<td>91.9</td>
<td>0.14</td>
<td>0.51</td>
<td>0.07</td>
<td>0.08</td>
<td>1.03</td>
<td>1.6</td>
</tr>
<tr>
<td>2009</td>
<td>91.2</td>
<td>0.11</td>
<td>0.46</td>
<td>0.08</td>
<td>0.09</td>
<td>1.24</td>
<td>2.0</td>
</tr>
<tr>
<td>2010</td>
<td>92.0</td>
<td>0.18</td>
<td>0.57</td>
<td>0.05</td>
<td>0.12</td>
<td>1.5</td>
<td>2.1</td>
</tr>
<tr>
<td>2011</td>
<td>91.8</td>
<td>0.13</td>
<td>0.37</td>
<td>0.05</td>
<td>0.08</td>
<td>1.6</td>
<td>2.4</td>
</tr>
<tr>
<td>2012</td>
<td>90.6</td>
<td>0.11</td>
<td>0.34</td>
<td>0.05</td>
<td>0.09</td>
<td>1.9</td>
<td>2.8</td>
</tr>
<tr>
<td>2013</td>
<td>91.3</td>
<td>0.09</td>
<td>0.3</td>
<td>0.05</td>
<td>0.09</td>
<td>1.8</td>
<td>2.9</td>
</tr>
<tr>
<td>2014</td>
<td>91.5</td>
<td>0.13</td>
<td>0.25</td>
<td>0.06</td>
<td>0.09</td>
<td>1.9</td>
<td>2.9</td>
</tr>
<tr>
<td>2015</td>
<td>91.5</td>
<td>0.09</td>
<td>0.18</td>
<td>0.06</td>
<td>0.08</td>
<td>1.9</td>
<td>3.0</td>
</tr>
<tr>
<td>2016</td>
<td>91.6</td>
<td>0.07</td>
<td>0.23</td>
<td>0.04</td>
<td>0.09</td>
<td>1.9</td>
<td>3.0</td>
</tr>
<tr>
<td>2017-18</td>
<td>90.6</td>
<td>0.05</td>
<td>0.2</td>
<td>0.05</td>
<td>0.08</td>
<td>2.1</td>
<td>3.2</td>
</tr>
</tbody>
</table>
Adverse Outcome
Death and emergency surgery

Mortality %

- Mortality
- em CABG

Year
- 1991
- 1992
- 1993
- 1994
- 1995
- 1996
- 1997
- 1998
- 1999
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017-18

2017-18 data
Extract 21-11-2018
Primary PCI Mortality

In Hospital Mortality (%)

- STEMI No Shock
- All PPCI

- 2014: 2.49, 5.25
- 2015: 2.56, 5.34
- 2016: 2.64, 5.48
- 2017-18: 2.83, 5.59
Primary PCI Mortality

- 15 min delay = 6.3 more deaths per 1000
Primary PCI Mortality

- 15 min delay = 6.3 more deaths per 1000
  - Median CTB increase 9 min since 2015
  - ≈ 3.8 more deaths per 1000
- 26,000 PPCI ≈ 99 deaths
Adverse Outcomes

Death

- Mortality to Discharge (self reported)
Adverse Outcomes

Death

• Mortality to Discharge (self reported)
Adverse Outcomes

Death

- Mortality to 30/7 (from ONS track)
Adverse Outcomes

CVA

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

CVA

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

Surgery

- % of all cases needing emergency cardiac surgery

![Graph showing percent vs. number of PCIs per centre with one data point at 1 case]
Adverse Outcomes
Surgery

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

Yearly data from 2009 to 2017-18:
- Aortic dissection: 1.09%
- Coronary perforation: 0.35%
- Heart block requiring pacing: 0.06%
- DC cardioversion: 0.08%
- No flow/slow flow phenomenon: 0.34%
- Shock induced by procedure: 0.78%
- Ventilated: 0.18%
- Side branch occlusion: 0.53%

Bar chart showing the percentage of peri-procedural complications from 2009 to 2017-18.
Peri-procedural Complications

No flow / Slow flow by syndrome

![Chart showing the percentage of no flow/slow flow by syndrome for different categories: Stable (0.2%), nSTEMI/UA (0.8%), and Primary (1.5%).]
Access site complications

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

Complications to hospital Dx:
- False aneurysm
- Haemorrhage (retroperitoneal, delay Dx, surgery)
- Art occlusion / dissection
- Any need for surgery

![Bar chart showing complication rates by access route and year]

- Femoral: 1.5% (2016), 0.3% (2015), 0.3% (2017)
- Radial: 0.3% (2016), 0.3% (2015), 0.3% (2017)
Complication by Access route

CVA

% of Cases with In-hospital CVA

<table>
<thead>
<tr>
<th>Year</th>
<th>Femoral</th>
<th>Radial</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>0.11%</td>
<td>0.08%</td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td>0.08%</td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To Contents
# Outcome 2017-18

## Elective Patients

<table>
<thead>
<tr>
<th></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>
</tr>
</thead>
<tbody>
<tr>
<td>Stable SV (no CTO)</td>
<td>19,305</td>
<td>93.2</td>
<td></td>
<td>5.5</td>
<td>0.1</td>
<td>0.04</td>
<td>0.02</td>
<td>0.02</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>MV (no CTO)</td>
<td>6,868</td>
<td>91.9</td>
<td>4.4</td>
<td>3.3</td>
<td>0.17</td>
<td>0.06</td>
<td>0.06</td>
<td>0.01</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>SV CTO</td>
<td>2,674</td>
<td>74.2</td>
<td></td>
<td>23.7</td>
<td>0.2</td>
<td>0.04</td>
<td>0</td>
<td>0</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>MV CTO</td>
<td>860</td>
<td>73.4</td>
<td>23.3</td>
<td>3.1</td>
<td>0.5</td>
<td>0</td>
<td>0</td>
<td>0.1</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>OVERALL STABLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Stable</td>
<td>29,707</td>
<td>90.6</td>
<td></td>
<td>6.6</td>
<td>0.1</td>
<td>0.04</td>
<td>0.03</td>
<td>0.02</td>
<td>0.16</td>
<td>0.37</td>
</tr>
</tbody>
</table>

Elective Patients
# Outcome 2017-18

<table>
<thead>
<tr>
<th></th>
<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>
</tr>
</thead>
<tbody>
<tr>
<td>NSTEMI / UA no shock</td>
<td></td>
<td>35,892</td>
<td>92.5</td>
<td>2.6</td>
<td>4.1</td>
<td>0.2</td>
<td>0.0</td>
<td>0.02</td>
<td>0.08</td>
<td>0.74</td>
<td>1.6</td>
</tr>
<tr>
<td>All STEMI no shock</td>
<td></td>
<td>23,366</td>
<td>92.0</td>
<td>1.7</td>
<td>3.3</td>
<td>0.6</td>
<td>0.09</td>
<td>0.14</td>
<td>2.83</td>
<td></td>
<td>4.4</td>
</tr>
<tr>
<td>*Primary PCI</td>
<td></td>
<td>25,612</td>
<td>89.1</td>
<td>1.8</td>
<td>3.3</td>
<td>0.6</td>
<td>0.12</td>
<td>0.13</td>
<td>5.59</td>
<td></td>
<td>7.8</td>
</tr>
<tr>
<td>*Rescue PCI</td>
<td></td>
<td>116</td>
<td>85.3</td>
<td>0.9</td>
<td>3.5</td>
<td>0.9</td>
<td>0</td>
<td>0</td>
<td>10.34</td>
<td></td>
<td>13.7</td>
</tr>
<tr>
<td>Shock</td>
<td></td>
<td>2,857</td>
<td>58.6</td>
<td>2.5</td>
<td>2.9</td>
<td>0.53</td>
<td>0.42</td>
<td>0.18</td>
<td>35.1</td>
<td></td>
<td>43.1</td>
</tr>
</tbody>
</table>

*all PPCI (includes shock / ventilation and onset in community or in hospital)
All Elective Stable Cases
SV no CTO, MV no CTO, SV CTO, MV CTO
NSTEMI, no Shock
All Primary PCI (includes shock)
Primary PCI Mortality

In Hospital Mortality (%)

- STEMI No Shock
- All PPCI

2014: 2.49%, 2015: 2.56%, 2016: 2.64%, 2017-18: 2.83%
Summary: Mortality
Risk Stratified by Syndrome

![Bar graph showing in-hospital mortality as reported (%) by syndrome for 2015, 2016, and 2017.]
Risk Prediction Calculator

PCI 30 day Mortality Calculator

Age (years)
58

Sex
Female

Indication for PCI
Primary

Urgency
Emergency

Diabetes
Yes

Cardiogenic shock
No

Renal function
Not dialysed and Creatinine < 200

Previous myocardial infarction
No

Previous cerebrovascular accident
No

Calculation result

Risk factor definitions

Acknowledgements

Terms and Conditions

Predicted 30 Day Mortality
Following PCI

2.8 %

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.
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)

3.1 %
Primary PCI - Direct admission
(shock/vent EXCLUDED)
Primary PCI
(shock/vent INCLUDED)

7.8 %
Cardiogenic Shock

43.1 %

Mortality %

No. of PCIs per Centre

2 SD
3 SD

49%
# Bypass grafts

**PCI of SVG and Arterial**

<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>In0.08 Hosp</th>
<th>Death (CR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>3900</td>
<td>88.5</td>
<td>2.72</td>
<td>7.79</td>
<td>0.23</td>
<td>0.21</td>
<td>0</td>
<td>0.78</td>
<td>1.6</td>
</tr>
<tr>
<td>2008</td>
<td>4284*</td>
<td>91.0</td>
<td>3.2</td>
<td>5.11</td>
<td>0.21</td>
<td>0.09</td>
<td>0.02</td>
<td>0.58</td>
<td>1.3</td>
</tr>
<tr>
<td>2009</td>
<td>2599</td>
<td>88.9</td>
<td>3.69</td>
<td>5.93</td>
<td>0.23</td>
<td>0.23</td>
<td>0</td>
<td>1.22</td>
<td>1.7</td>
</tr>
<tr>
<td>2010</td>
<td>2602</td>
<td>90.8</td>
<td>2.34</td>
<td>5.46</td>
<td>0.19</td>
<td>0.27</td>
<td>0</td>
<td>0.94</td>
<td>1.5</td>
</tr>
<tr>
<td>2011</td>
<td>2741</td>
<td>87.8</td>
<td>3.65</td>
<td>6.79</td>
<td>0.47</td>
<td>0.33</td>
<td>0</td>
<td>1.39</td>
<td>2.6</td>
</tr>
<tr>
<td>2012</td>
<td>2903</td>
<td>88.7</td>
<td>4.72</td>
<td>4.48</td>
<td>0.28</td>
<td>0.07</td>
<td>0.07</td>
<td>1.8</td>
<td>2.7</td>
</tr>
<tr>
<td>2013</td>
<td>2512</td>
<td>86.8</td>
<td>5.69</td>
<td>5.97</td>
<td>0.36</td>
<td>0.08</td>
<td>0</td>
<td>1.37</td>
<td>2.0</td>
</tr>
<tr>
<td>2014</td>
<td>2571</td>
<td>85.1</td>
<td>7.12</td>
<td>5.56</td>
<td>0.39</td>
<td>0.08</td>
<td>0.08</td>
<td>2.04</td>
<td>2.9</td>
</tr>
<tr>
<td>2015</td>
<td>2647</td>
<td>80.2</td>
<td>12.8</td>
<td>4.84</td>
<td>0.23</td>
<td>0.08</td>
<td>0</td>
<td>1.98</td>
<td>2.9</td>
</tr>
<tr>
<td>2016-17</td>
<td>2554</td>
<td>80</td>
<td>13.3</td>
<td>4.1</td>
<td>0.23</td>
<td>0.12</td>
<td>0.08</td>
<td>1.94</td>
<td>2.8</td>
</tr>
<tr>
<td>2017-18</td>
<td>2564</td>
<td>78</td>
<td>12.2</td>
<td>8.0</td>
<td>0.35</td>
<td>0.12</td>
<td>0.04</td>
<td>1.8</td>
<td>2.9</td>
</tr>
</tbody>
</table>

*Centre x = 1860 of 2111 cases in 2008*
# 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>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>583</td>
<td>86.8</td>
<td>4.5</td>
<td>0.9</td>
<td>0.3</td>
<td>0.51</td>
<td>0.17</td>
<td>7.0</td>
<td>8.81</td>
</tr>
<tr>
<td>2007</td>
<td>854</td>
<td>83.7</td>
<td>7.14</td>
<td>1.99</td>
<td>0.12</td>
<td>0.35</td>
<td>0.7</td>
<td>6.6</td>
<td>10.85</td>
</tr>
<tr>
<td>2008</td>
<td>1085</td>
<td>83.7</td>
<td>5.35</td>
<td>2.12</td>
<td>0.65</td>
<td>0.37</td>
<td>0.46</td>
<td>7.9</td>
<td>9.37</td>
</tr>
<tr>
<td>2009</td>
<td>1458</td>
<td>84.8</td>
<td>3.84</td>
<td>3.16</td>
<td>0.34</td>
<td>0.27</td>
<td>0.34</td>
<td>7.6</td>
<td>9.59</td>
</tr>
<tr>
<td>2010</td>
<td>1504</td>
<td>86.1</td>
<td>3.06</td>
<td>2.19</td>
<td>0.47</td>
<td>0.13</td>
<td>0.07</td>
<td>8.1</td>
<td>10</td>
</tr>
<tr>
<td>2011</td>
<td>1984</td>
<td>86.0</td>
<td>3.93</td>
<td>2.17</td>
<td>0.3</td>
<td>0.35</td>
<td>0.2</td>
<td>7.4</td>
<td>10</td>
</tr>
<tr>
<td>2012</td>
<td>2374</td>
<td>85.5</td>
<td>4.59</td>
<td>1.22</td>
<td>0.42</td>
<td>0.17</td>
<td>0.08</td>
<td>8.2</td>
<td>12</td>
</tr>
<tr>
<td>2013</td>
<td>2541</td>
<td>85.8</td>
<td>4.21</td>
<td>1.53</td>
<td>0.35</td>
<td>0.16</td>
<td>0.12</td>
<td>7.9</td>
<td>11.4</td>
</tr>
<tr>
<td>2014</td>
<td>2836</td>
<td>86.6</td>
<td>3.35</td>
<td>1.69</td>
<td>0.28</td>
<td>0.25</td>
<td>0.14</td>
<td>8.0</td>
<td>11.8</td>
</tr>
<tr>
<td>2015</td>
<td>3171</td>
<td>86.3</td>
<td>3.4</td>
<td>1.8</td>
<td>0.38</td>
<td>0.16</td>
<td>0.16</td>
<td>8.0</td>
<td>11.4</td>
</tr>
<tr>
<td>2016-17</td>
<td>3590</td>
<td>89.1</td>
<td>3.0</td>
<td>1.4</td>
<td>0.4</td>
<td>0.04</td>
<td>0.06</td>
<td>6.4</td>
<td>9.6</td>
</tr>
<tr>
<td>2017-18</td>
<td>3487</td>
<td>85.5</td>
<td>3.9</td>
<td>2.2</td>
<td>0.26</td>
<td>0.06</td>
<td>0.3</td>
<td>7.9</td>
<td>10.8</td>
</tr>
</tbody>
</table>
# Chronic Total Occlusion

**Stable only**

<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>In Hosp Death</th>
<th>Death 30/7 (CR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>3976</td>
<td>70.5</td>
<td>6.2</td>
<td>22.96</td>
<td>0.13</td>
<td>0.03</td>
<td>0.05</td>
<td>0.25</td>
<td>0.4</td>
</tr>
<tr>
<td>2012</td>
<td>4208</td>
<td>71.6</td>
<td>6.4</td>
<td>21.65</td>
<td>0.26</td>
<td>0.07</td>
<td>0.1</td>
<td>0.21</td>
<td>0.5</td>
</tr>
<tr>
<td>2013</td>
<td>3874</td>
<td>72.5</td>
<td>5.6</td>
<td>21.63</td>
<td>0.1</td>
<td>0.05</td>
<td>0.05</td>
<td>0.15</td>
<td>0.4</td>
</tr>
<tr>
<td>2014</td>
<td>4029</td>
<td>73.2</td>
<td>5.9</td>
<td>20.3</td>
<td>0.15</td>
<td>0.07</td>
<td>0.15</td>
<td>0.34</td>
<td>0.6</td>
</tr>
<tr>
<td>2015</td>
<td>4283</td>
<td>76.0</td>
<td>6.4</td>
<td>17.3</td>
<td>0.16</td>
<td>0.02</td>
<td>0.07</td>
<td>0.21</td>
<td>0.4</td>
</tr>
<tr>
<td>2016-17</td>
<td>4043</td>
<td>75.8</td>
<td>6.3</td>
<td>17.6</td>
<td>0.12</td>
<td>0.05</td>
<td>0.07</td>
<td>0.33</td>
<td>0.5</td>
</tr>
<tr>
<td>2017-18</td>
<td>3647</td>
<td>74.1</td>
<td>7.1</td>
<td>18.5</td>
<td>0.27</td>
<td>0.05</td>
<td>0</td>
<td>0.22</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Adult Non Coronary Intervention
HCM

Alcohol Mediated Septal Ablation

Number of Procedures

Year:
- 2007: 49
- 2008: 62
- 2009: 65
- 2010: 66
- 2011: 77
- 2012: 82
- 2013: 70
- 2014: 66
- 2015: 36
- 2016: 52
- 2017-8: 51
HCM

Alcohol Mediated Septal Ablation

Number of centres 2017-8: 10
# HCM Alcohol Mediated Septal Ablation

## 2017-18

<table>
<thead>
<tr>
<th>Type of Service</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>
</tr>
</thead>
<tbody>
<tr>
<td>Mainly treat patients in our own catchment area</td>
<td>17</td>
<td>0</td>
<td>17</td>
<td>3</td>
<td>0</td>
<td>Provide a regional service</td>
</tr>
<tr>
<td>Provide a regional service</td>
<td>7</td>
<td>?</td>
<td>?</td>
<td>2</td>
<td>?</td>
<td>Provide a regional service</td>
</tr>
<tr>
<td>Provide a supra-regional service</td>
<td>6</td>
<td>0</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>Provide a supra-regional service</td>
</tr>
<tr>
<td>Provide a supra-regional service</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>Provide a supra-regional service</td>
</tr>
<tr>
<td>Provide a regional service</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>Provide a regional service</td>
</tr>
<tr>
<td>Provide a regional service</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>Provide a regional service</td>
</tr>
<tr>
<td>Provide a supra-regional service</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>Other (please specify)</td>
</tr>
<tr>
<td>Provide a supra-regional service</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>Provide a supra-regional service</td>
</tr>
<tr>
<td>Provide a regional service</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>Provide a regional service</td>
</tr>
<tr>
<td>Provide a supra-regional service</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>Provide a supra-regional service</td>
</tr>
</tbody>
</table>
Structural Interventions

PPP process

- **LAAO**
  - Approved July 2018
  - ‘Interim measures’ (= procedures can go ahead)

- **Mitraclip**
  - Favourable draft Intervention Procedure Guidance
  - ? Approval at prioritisation meetings (May / Nov 2019)

- **PFO Closure**
  - ? Approval at prioritisation meetings (May / Nov 2019)
Integrated Impact Assessment Report for Clinical Commissioning Policies

Policy Reference Number | 1692
---|---
Policy Title | Left Atrial Appendage Occlusion (LAAO) for patients with atrial fibrillation and relative or absolute contraindications to anticoagulation (adults). Proposal for routine commission (ref A3.1)
Lead Commissioner | Andy Hughes
Clinical Lead | David Hildick-Smith
Finance Lead | Craig Charlton
Analytical Lead | Craig Charlton

Section A - Activity Impact

A1 Current Patient Population & Demography / Growth

A1.1 Prevalence of the disease/condition.

In a population of 53 million (England) there are 800,000 diagnosed with AF of which 650,000 have a risk profile requiring treatment and up to 30,000 may have relative contraindications to oral anticoagulants (OAC). Of these 30,000, half will be given anticoagulants anyway because the associated risks are felt to be low. Of the remaining 15,000 many will be frail and elderly, with a short life expectancy, or with comorbidities that make LAAO unsuitable. Of the remaining 5000 patients, about half are likely to be managed in general practice. Of the 2500 patients in secondary care, many will not be referred for LAAO, many will not want to be considered for LAAO, and some will be put off by the need for a general anaesthetic and the risks of the procedure. As a result the annual population for LAAO is expected to rise from 400 to a steady state of 1000 after 5 years.

Source: Policy Proposition section 6

A1.2 Number of patients currently eligible for the treatment according to the proposed policy commissioning criteria.

400 in year 1 rising to 1000 in year 5

Source: Epidemiology and clinical experience of the procedure PRIOR to and during Commissioning through Evaluation (CiE) from two high volume early adopting centres.
**LAAO ‘Activity Impact’**

- **53,000,000** Population England
- **800,000** AF
- **650,000** Indication for anticoagulation
- **30,000** Relative CI to anticoagulation
- **15,000** Anticoagulated anyway
- **15,000 left**
- **10,000** Frail, short life expectancy, not for AC
- **5000 left**
## LAAO ‘Activity Impact’

Of 5000

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2,500</td>
<td>Managed in general practice</td>
</tr>
</tbody>
</table>
| 2,500 | a) will not want to be considered  
      | b) not be referred  
      | c) not happy with need for GA  
      | d) concerned about complications |

400 rising to steady state 1000 pa
Left atrial appendage occlusions (per million people), 2016 or latest year

Source: Data on left atrial appendage occlusions are from the EAPCI White Book database, 2016 (except Poland: 2015), data on file. Data unavailable: Egypt, Netherlands, Romania, Turkey. Notes: Italy: It does not include part of the procedures done in EP units; Sweden: Estimated value, partially extrapolated from 2015.
LAA Occlusion

Number of Procedures 2017-18

Number of centres: 14
Mitral
Mitral Balloon Valvuloplasty

Number of Procedures

<table>
<thead>
<tr>
<th>Year</th>
<th>Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>154</td>
</tr>
<tr>
<td>2008</td>
<td>97</td>
</tr>
<tr>
<td>2009</td>
<td>113</td>
</tr>
<tr>
<td>2010</td>
<td>121</td>
</tr>
<tr>
<td>2011</td>
<td>171</td>
</tr>
<tr>
<td>2012</td>
<td>100</td>
</tr>
<tr>
<td>2013</td>
<td>84</td>
</tr>
<tr>
<td>2014</td>
<td>92</td>
</tr>
<tr>
<td>2015</td>
<td>82</td>
</tr>
<tr>
<td>2016</td>
<td>92</td>
</tr>
<tr>
<td>2017-18</td>
<td>76</td>
</tr>
</tbody>
</table>
Mitral Balloon Valvuloplasty

Number of Procedures

Number of centres: 18
Mitral Valve Repair

Taramasso M, EuroIntervention 2018;14:AB91-AB100
Percutaneous Valves

Mitra-Clip

Draft Intervention Procedure Guidance (IPG)

1 Draft recommendations

1.1 Current evidence on the safety and efficacy of percutaneous mitral valve leaflet repair for mitral regurgitation is adequate to support the use of this procedure. In patients for whom open surgery is contraindicated following risk assessment, provided that standard arrangements are in place for clinical governance, consent and audit.

1.2 Patient selection should be done by a multidisciplinary structural heart team, typically including an interventional cardiologist, an expert in transoesophageal echocardiography, an expert in heart failure, a cardiac anaesthetist, a cardiac surgeon and a specialist nurse.

1.3 Percutaneous mitral valve leaflet repair for mitral regurgitation should only be done in specialised centres with access to both cardiac surgical and vascular surgical support in case emergency treatment of complications is needed.

1.4 This procedure should only be done by clinicians with specialist training and supervision by an experienced mentor for at least the first 20 procedures.

1.5 Clinicians should enter details about all patients having percutaneous mitral valve leaflet repair for mitral regurgitation onto the National Institute for Cardiovascular Outcomes Research database.

Percutaneous Valves

Mitra-Clip

Number of Procedures

- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017-18
Percutaneous Valves

Mitra-Clip

Number of Procedures 2017-18

Number of centres: 10
Mitral valve repairs (per million people), 2016 or latest year

Source: Data on mitral valve repairs are from the EAPCI White Book database, 2016 (except Poland: 2017), data on file. Data unavailable: Netherlands, Turkey. Notes: Egypt: Procedure/resource not available in the country; France: it includes only procedures with Mitraclip; Sweden: Estimated value, partially extrapolated from 2015.
Mitral Valve Repair

Taramasso M, EuroIntervention 2018;14:AB91-AB100

LEAFLET REPAIR
MitraClip
NeoChord
Harpoon
ChordArt

ANNULOPLASTY
Cardioband
Carillon
Millipede
AMEND

LV REMODELLING
AccuCinch
VenTouch

TMVI
Tendyne
Tiara
CardiaQ
Intrepid
Mitral Valve Repair

Taramasso M, EuroIntervention 2018;14:AB91-AB100

Figure 3. Transcatheter mitral valve repair devices. 1) MiraClip. 2) PASCAL. 3) Carillon. 4) NeoChord. 5) Cardioband. 6) AMEND. 7) Millipede. 8) Harpoon. 9) Carillon® Mitral Contour System. 10) ARTO. 11) VenTouch. 12) AccuCinch.
Other Technologies
UK 2017-18

Carillon

ARTO

Twelve
Intrepid

Tendyne
Percutaneous Valves

Mitral Valve Repair – Other 2017-18

- **LGI (Leeds)**
  - 6 Carillon

- **NHB**
  - 10 Tendyne (1 harpoon, 2 neochord)

- **RSC (Brighton)**
  - 5 Arto
  - 2 Twelve Intrepid
  - 1 TAVI valve in mac

- **STH (St Thomas’s)**
  - 3 Arto
  - 1 Twelve Intrepid
Percutaneous Valves
Mitral Valve Repair – Other 2017-18

• LGI (Leeds)
  – 6 Carillon

• NHB (Brompton)
  – 10 Tendyne (1 harpoon, 2 neochord)

• RSC (Brighton)
  – 5 Arto
  – 2 Twelve Intrepid
  – 1 TAVI valve in mac

• STH (St Thomas’s)
  – 3 Arto
  – 1 Twelve Intrepid
Aortic

See TAVI Slide deck
www.bcis.org.uk/resources/audit-results/
Percutaneous Valves

TAVI Valve to treat failing bioprostheses

Number of Procedures

Mitral: 28 (2016), 14 (2017-18)
Pulmonary: 1 (2016), 1 (2017-18)

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

TAVI Valve to treat failing mitral bioprosthesis

Number of Procedures 2017-18

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAM</td>
<td>3</td>
</tr>
<tr>
<td>BRI</td>
<td>2</td>
</tr>
<tr>
<td>LGI</td>
<td>2</td>
</tr>
<tr>
<td>NHB</td>
<td>2</td>
</tr>
<tr>
<td>PLY</td>
<td>2</td>
</tr>
<tr>
<td>RSC</td>
<td>2</td>
</tr>
<tr>
<td>QEB</td>
<td>1</td>
</tr>
</tbody>
</table>
Percutaneous Pulmonary Valves

Number of Procedures

Number of Centres

Year | Procedures
--- | ---
2008 | 62
2009 | 29
2010 | 17
2011 | 46
2012 | 36
2013 | 41
2014 | 57
2015 | 45
2016 | 44
2017-18 | 71

2017-18 data
Extract 21-11-2018
Percutaneous Valves

Pulmonary Valves

Number of Procedures

<table>
<thead>
<tr>
<th></th>
<th>NHB</th>
<th>LGI</th>
<th>SGH</th>
<th>BRI</th>
<th>SBH</th>
<th>GJH</th>
<th>QEB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19</td>
<td>18</td>
<td>10</td>
<td>9</td>
<td>7</td>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>
Aortic Balloon Valuloplasty
(not as part of TAVI)

![Bar chart showing the number of Aortic Balloon Valuloplasty procedures from 2010 to 2017-18. The numbers are as follows:
- 2010: 420
- 2011: 473
- 2012: 495
- 2013: 668
- 2014: 789
- 2015: 817
- 2016: 827
- 2017-18: 687]
Adult Non-Coronary Intervention

Balloon Valvuloplasty not as part of valve implantation

Number of Procedures

- Tricuspid Valvuloplasty
- Pulmonary Valvuloplasty

- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017-18

- 3
- 68
Adult Non-Coronary Intervention

Number of Procedures

- ASD
- PFO

Year:
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017-18

Procedure Counts:
- ASD: 506
- PFO: 419
ASD Closure

Procedures in 2017-18

Number of centres: 26
Atrial septum closures (per million people), 2016 or latest year

Source: Data on atrial septum closures (per million people) are from the EAPCI White Book database, 2016, data on file. Data unavailable: Belgium, Netherlands, Romania, Turkey. Notes: Italy: PFO+DIA/ASD; Poland: Value based on 95% of the hospitals, pediatric centers are not included; Sweden: Estimated value, partially extrapolated from 2015.
PFO Closure

Number of procedures 2017-18

Number of centres: 34

2017-18 data
Extract 21-11-2018
Adult Non-Coronary Intervention

VSD congen
VSD post MI
Paravalvular leak closure

2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017-18

To Contents
Prosthetic paravalvular leak closure

Number of procedures 2017-18

Number of centres: 20
Coronary Sinus Reducer
(for refractory angina)

Number of procedures 2017-18:

<table>
<thead>
<tr>
<th>Centre</th>
<th>Number of Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>STH</td>
<td>12</td>
</tr>
<tr>
<td>KCH</td>
<td>8</td>
</tr>
<tr>
<td>ERI</td>
<td>6</td>
</tr>
<tr>
<td>BRD</td>
<td>5</td>
</tr>
</tbody>
</table>

Number of centres: 4
Renal Denervation

Number of Centres vs Number of Procedures

Year | Centres | Procedures
--- | --- | ---
2011 | 32 | 
2012 | 100 | 
2013 | 180 | 
2014 | 42 | 
2015 | 55 | 
2016 | 42 | 
2017-18 | 31 | 

2017-18 data
Extract 21-11-2018
Renal Denervation

Number of procedures 2017-18

- RDE: 9
- BAS: 6
- ERI: 6
- AMG: 3
- HAM: 3
- BOU: 2
- GRL: 2

Number of centres: 7
NICOR - Update

- New IT platform
  - Based on the Q Reg 5 platform
    - Uppsala Clinical Research
  - Data entry and upload now running across all domains
NICOR – Reports

• 2016 data (and three years 2014-2016):
  – Presented ACI January 2018 and available as slide deck
  – Lotus Notes based programmed analyses:
    • Time delays, aggregated, NQIP risk adjusted, cumm funnels / VLADs
    • No longer available from September 2018
  – COP analysis currently available on line BCIS web site
    • No risk adjusted analysis pending statistical re-programing
  – NICOR annual report published November 2018
    • 6 domains
    • 2016 for PCI
    • 2016-17 for other domains
NICOR – Reports

- 2016 data (and three years 2014-2016):
  - Presented ACI January 2018 and available as slide deck
  - Lotus Notes based programmed analyses:
    - Time delays, aggregated, NQIP risk adjusted, cumm funnels / VLADs
    - No longer available from September 2018
  - COP analysis currently available on line BCIS web site
    - No risk adjusted analysis pending statistical re-programing
  - NICOR annual report published November 2018
    - 6 domains
    - 2016 for PCI
    - 2016-17 for other domains

To Contents
NICOR – Reports

- 2017-18 data (and 3 years 2015-16 to 2017-18)
  - Data submission deadline June 30th 2018
  - Validation reports sent August 2018
  - Final data cut taken November 2018
  - ONS track delays (error in files supplied by NHS Digital)
  - Presented at ACI January 2019 and available as slide deck
    - (missing ONS track and post code track)
  - Final reports with outlier analysis to be sent to operators / centres - date?
  - Reports published (BCIS and NHS Choices) - date?
  - NICOR Annual report published in 2019 – date?
  - New QI measures to be included
NICOR – Reports

- 2017-18 data (and 3 years 2015-16 to 2017-18)
  - Data submission deadline June 30th 2018
  - Validation reports sent August 2018
  - Final data cut taken November 2018
  - ONS track delays (error in files supplied by NHS Digital)
    - Presented at ACI January 2019 and available as slide deck
    - (missing ONS track and post code track)

- Final reports with outlier analysis to be sent to operators / centres - date?
- Reports published (BCIS and NHS Choices) - date?
- NICOR Annual report published in 2019 – date?
- New QI measures to be included
NICOR – Reports

• 2017-18 data (and 3 years 2015-16 to 2017-18)
  • Data submission deadline June 30th 2018
  • Validation reports sent August 2018
  • Final data cut taken November 2018
  • ONS track delays (error in files supplied by NHS Digital)
    – Presented at ACI January 2019 and available as slide deck
      • (missing ONS track and post code track)

• Final reports with outlier analysis to be sent to operators / centres - date?
  – Reports published (BCIS and NHS Choices) - date?
  – NICOR Annual report published in 2019 – date?
  – New QI measures to be included
NICOR - Reports

• Healthcare Quality Improvement Partnership (HQIP)
  – Existing QI measures:
    • Centre volume
    • Data completeness
    • Primary PCI Door to Balloon times (IHT and direct admissions)
    • NSTEMI delays to treatment (IHT and direct admissions)
    • Radial access rates
    • Risk adjusted 30 day mortality
  – New QI Measures:
    • Day case treatment for elective PCI
    • Use of Thrombectomy during primary PCI (ESC 2017 STEMI guidance)
    • DES v BMS for primary PCI (ESC 2017 STEMI guidance)
    • Explore
      Appropriateness – Elective PCI
      Readmission rates using HES
Stenting with new-generation DES is recommended over BMS for primary PCI.\(^{148–151,178,179}\)

Routine use of thrombus aspiration is not recommended.\(^{157,159}\)
NICOR Future

• Entire pathway reporting
  – Clinical Service Quality Markers (CSQM)

• NICOR data to support
  – GIRFT
  – NICOR partnership with BHF Data Science Centre
  – Improved outputs to provide data for research

• New NICOR IT
  – Program reporting outputs for operators and centres
  – RCTs in collaboration with UCR
  – Add other structural intervention datasets
  – Modifications to dataset
NICOR

• CSQM Methodology: Data from MINAP and BCIS
  – e.g. For Primary PCI Centres:
    • Domain 1: Structure
    • Domain 2: Process – reperfusion for STEMI
    • Domain 3: Post reperfusion care for STEMI pts
    • Domain 4: Hospital outcome (STEMI pts)
    • Domain 5: Data completeness (STEMI pts)
    • Domain 6: Early management of NSTEMI ACS (in PPCI centre)
    • Domain 7: Post reperfusion care for NSTEMI ACS pts
    • Domain 8: Hospital outcome (NSTEMI pts)
    • Domain 9: Data completeness (NSTEMI ACS pts)
NICOR

- CSQM Methodology: Data from MINAP and BCIS
  - E.g. For Primary PCI Centres:
    - Domain 1: Structure
    - Domain 2: Process – reperfusion for STEMI
    - Domain 3: Post reperfusion care for STEMI pts
    - Domain 4: Hospital discharge (STEMI pts)
    - Domain 5: Data completeness (STEMI pts)
  
  - Domain 6: Early management of NSTEMI ACS (in PPCI centre)
  - Domain 7: Post reperfusion care for NSTEMI pts
  - Domain 8: Hospital outcome (NSTEMI pts)
  - Domain 9: Data completeness (NSTEMI ACS pts)

Use of echocardiography pre-discharge
Discharged on aspirin (no contraindication)
Discharged on thienopyridine or ticagrelor
Discharged on statin
Proportion offered cardiac rehabilitation
NICOR

- CSQM Methodology: Data from MINAP and BCIS
  - E.g. For Primary PCI Centres:
    - Domain 1: Structure
    - Domain 2: Process – reperfusion for STEMI
    - Domain 3: Post reperfusion care for STEMI pts
    - Domain 4: Hospital outcome (STEMI pts)
    - Domain 5: Data completeness (STEMI pts)
    - Domain 6: Early management of NSTEMI ACS (in PPCI centre)
    - Domain 7: Post reperfusion care for NSTEMI ACS pts
    - Domain 8: Hospital outcome (NSTEMI pts)
    - Domain 9: Data completeness (NSTEMI ACS pts)

→ Score → Banding 1, 2 or 3
→ Score → Banding 1, 2 or 3
→ Score → Banding 1, 2 or 3
→ Score → Banding 1, 2 or 3
→ Score → Banding 1, 2 or 3
NICOR

- CSQM Methodology: Data from MINAP and BCIS
  - E.g. For Primary PCI Centres:
    - Domain 1: Structure
    - Domain 2: Process – reperfusion for STEMI
    - Domain 3: Post reperfusion care for STEMI pts
    - Domain 4: Hospital discharge (STEMI pts)
    - Domain 5: Data completeness (STEMI pts)
    - Domain 6: Early management of NSTEMI ACS (in PCI centre)
    - Domain 7: Post reperfusion care for NSTEMI ACS pts
    - Domain 8: Hospital outcome (NSTEMI pts)
    - Domain 9: Data completeness (NSTEMI ACS pts)

→ Score → Banding 1, 2 or 3
→ Score → Banding 1, 2 or 3
→ Score → Banding 1, 2 or 3
→ Score → Banding 1, 2 or 3
→ Overall Score / Banding
NICOR

- CSQM Methodology: Data from MINAP and BCIS
  - E.g. For Primary PCI Centres:
    - Domain 1: Structure
    - Domain 2: Process reperfusion for STEMI
    - Domain 3: Post reperfusion care for STEMI pts
    - Domain 4: Hospital outcome (STEMI pts)
    - Domain 5: Data completeness (STEMI pts)
    - Domain 6: Early management of NSTEMI ACS (in PPCI centre)
    - Domain 7: Post reperfusion care for NSTEMI ACS pts
    - Domain 8: Hospital outcome (NSTEMI pts)
    - Domain 9: Data completeness (NSTEMI ACS pts)

→ Overall Score / Banding

→ Score / Band

→ Score /Band

→ Score / Band

→ Score / Band

→ Score / Band
Interactive reporting

Centre 1
Centre 2
Centre 3
Centre 4
Centre 5
Centre 6
Centre n

Domain 1
Domain 2
Domain 3
Domain 4
Domain 5
Domain 6
Domain 7
Domain 8
Domain 9

Echo pre Dx
ASA on Dx
Thien / Ticag
Statin
Rehab

Use of echo pre Dx: Score 20/100
NICOR Future

• Entire pathway reporting
  – Clinical Service Quality Markers

• NICOR data to support
  – GIRFT
  – NICOR partnership with BHF Data Science Centre
  – Improved outputs to provide data for research

• New NICOR IT
  – Program reporting outputs for operators and centres
  – RCTs in collaboration with UCR
  – Add other structural intervention datasets
  – Modifications to dataset
<table>
<thead>
<tr>
<th>STAGE</th>
<th>NICOR REVIEW STAGE</th>
<th>HQIP APPROVAL</th>
<th>Release Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-3 weeks</td>
<td>4 weeks</td>
<td>6 weeks to 3 months</td>
<td>4 weeks</td>
</tr>
</tbody>
</table>

### Pre application stage
- Applicant reviews HQIP and NICOR data access request guidance
- Application submits DARF to NICOR
- Application has initial review by NICOR, applicant contacted to discuss requirements and finalise DARF as required
- Applicant submits final DARF to NICOR

### Application Stage
- **DEG review**
  - Raise any queries with applicant and approve if satisfactory
  - 10 working days
- **NOM review**
  - All applications will receive a final review by the NOM clinical leads
  - 10 working days

### DARF submitted to DARS for approval
- **DARF submitted to HQIP DARS team**
  - Discuss requirements and ensure DARF has been fully completed before submission

### Approval
- **HQIP (data controller) releases approval**
- **Payment to be made to NICOR**
- **Data extract to be sent to applicant**
  - *Data destroyed one year after receipt and confirmation sent*

### Notes:
- DARF: Data Access Request Form
- DEG: Domain Expert Group
- NOM: NCAP Operational and Methodology Group
- *Unless data renewal or extension is requested*
Summary

• PCI
  – 118 PCI centres provide PCI at 1,548 pmp
  – Indication for PCI largely unchanged
  – Process
    • Further increases in pre-hospital delay for PPCI
    • Long in delays to Rx for NSTEMI

• Structural intervention
  – Changing rapidly
  – TAVI 61 pmp, 80% under local anaesthetic
  – Funding LAAO +/- Mitraclip, PFO? Slow progress

• Future
  – New IT platform
  – New data analysis and presentation programming to be developed
  – CSQM methodology
  – Data to GIRFT / BHF
  – Improved data outputs to research
Thank You
UK PCI Centre Codes 2017-18
<table>
<thead>
<tr>
<th>Code</th>
<th>Hospital Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEI</td>
<td>Royal Albert Edward Infirmary (Wigan)</td>
</tr>
<tr>
<td>AHM</td>
<td>BMI Alexandra Hospital</td>
</tr>
<tr>
<td>ALT</td>
<td>Altnagelvin Hospital</td>
</tr>
<tr>
<td>AMG</td>
<td>Wycombe Hospital</td>
</tr>
<tr>
<td>ANT</td>
<td>St Anthony's Hospital</td>
</tr>
<tr>
<td>BAS</td>
<td>Basildon and Thurrock University Hospitals</td>
</tr>
<tr>
<td>BAT</td>
<td>Royal United Hospital Bath</td>
</tr>
<tr>
<td>BED</td>
<td>Bedford Hospital</td>
</tr>
<tr>
<td>BHL</td>
<td>Liverpool Cardiothoracic Centre</td>
</tr>
<tr>
<td>BHR</td>
<td>Royal Berkshire and Battle Hospital</td>
</tr>
<tr>
<td>BLA</td>
<td>Royal Blackburn Hospital</td>
</tr>
<tr>
<td>BMI</td>
<td>BMI Meriden Hospital</td>
</tr>
<tr>
<td>BOU</td>
<td>Royal Bournemouth Hospital</td>
</tr>
<tr>
<td>BRD</td>
<td>Bradford Royal Infirmary</td>
</tr>
<tr>
<td>BRI</td>
<td>Bristol Royal Infirmary</td>
</tr>
<tr>
<td>BRY</td>
<td>Acute Pennine Trust Fairfield</td>
</tr>
<tr>
<td>BSM</td>
<td>Southmead Hospital Bristol</td>
</tr>
<tr>
<td>CGH</td>
<td>Conquest Hospital</td>
</tr>
<tr>
<td>CHG</td>
<td>Cheltenham General Hospital</td>
</tr>
<tr>
<td>CHH</td>
<td>Castle Hill Hospital (Hull and East Yorkshire NHS Trust)</td>
</tr>
<tr>
<td>CHN</td>
<td>Nottingham City Hospital</td>
</tr>
<tr>
<td>CLW</td>
<td>North Wales Cardiac Centre</td>
</tr>
<tr>
<td>CMI</td>
<td>Cumberland Infirmary</td>
</tr>
<tr>
<td>CRG</td>
<td>Craigavon Hospital</td>
</tr>
<tr>
<td>CRO</td>
<td>Cromwell Hospital</td>
</tr>
<tr>
<td>DER</td>
<td>Royal Derby Hospital</td>
</tr>
<tr>
<td>DGE</td>
<td>Eastbourne Hospital</td>
</tr>
<tr>
<td>DUC</td>
<td>Duchy Hospital</td>
</tr>
<tr>
<td>DUD</td>
<td>Birmingham City Hospital</td>
</tr>
<tr>
<td>DVH</td>
<td>Darent Valley Hospital</td>
</tr>
<tr>
<td>EAL</td>
<td>Ealing Hospital</td>
</tr>
<tr>
<td>EBH</td>
<td>Birmingham Heartlands Hospital</td>
</tr>
<tr>
<td>ERI</td>
<td>Edinburgh Heart Centre</td>
</tr>
<tr>
<td>FRE</td>
<td>Freeman Hospital</td>
</tr>
<tr>
<td>FRM</td>
<td>Frimley Park Hospital</td>
</tr>
<tr>
<td>GEO</td>
<td>St George's Hospital</td>
</tr>
<tr>
<td>GHB</td>
<td>Spire Hospital Bristol</td>
</tr>
<tr>
<td>GJH</td>
<td>Golden Jubilee National Hospital (formerly HCI)</td>
</tr>
<tr>
<td>GRL</td>
<td>Glenfield Hospital</td>
</tr>
<tr>
<td>GWE</td>
<td>Royal Gwent Hospital</td>
</tr>
<tr>
<td>GWH</td>
<td>Queen Elizabeth Hospital Woolwich</td>
</tr>
<tr>
<td>HAI</td>
<td>Hairmyres Hospital</td>
</tr>
<tr>
<td>HAM</td>
<td>Hammersmith Hospital</td>
</tr>
<tr>
<td>HBP</td>
<td>Spire Hospital Hull and East Riding</td>
</tr>
<tr>
<td>HH</td>
<td>Royal Brompton Hospital and Harefield NHS Trust, Harefield site</td>
</tr>
<tr>
<td>HHW</td>
<td>Wellington Hospital</td>
</tr>
<tr>
<td>HSC</td>
<td>Harley Street Clinic</td>
</tr>
<tr>
<td>IND</td>
<td>London Independent Hospital</td>
</tr>
<tr>
<td>IPS</td>
<td>Ipswich Hospital</td>
</tr>
<tr>
<td>KCH</td>
<td>Kings College Hospital</td>
</tr>
<tr>
<td>KGH</td>
<td>Kettering General Hospital</td>
</tr>
<tr>
<td>KIM</td>
<td>Kent Institute of Medicine &amp; Surgery</td>
</tr>
<tr>
<td>KMH</td>
<td>Kings Mill Hospital</td>
</tr>
<tr>
<td>KSX</td>
<td>Tunbridge Wells Hospital</td>
</tr>
<tr>
<td>LBH</td>
<td>London Bridge Hospital</td>
</tr>
<tr>
<td>LDH</td>
<td>Luton and Dunstable University Hospital</td>
</tr>
<tr>
<td>LGI</td>
<td>Yorkshire Heart Centre</td>
</tr>
<tr>
<td>Code</td>
<td>Hospital Name</td>
</tr>
<tr>
<td>------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>LIN</td>
<td>Lincoln County Hospital</td>
</tr>
<tr>
<td>LIS</td>
<td>Lister Hospital</td>
</tr>
<tr>
<td>LNH</td>
<td>Leeds Nuffield Hospital</td>
</tr>
<tr>
<td>MAY</td>
<td>Croydon University Hospital</td>
</tr>
<tr>
<td>MDW</td>
<td>Medway Maritime Hospital</td>
</tr>
<tr>
<td>MHO</td>
<td>Manor Hospital Oxford</td>
</tr>
<tr>
<td>MOR</td>
<td>Morriston Hospital</td>
</tr>
<tr>
<td>MPH</td>
<td>Musgrove Park Hospital</td>
</tr>
<tr>
<td>MRI</td>
<td>Manchester Royal Infirmary</td>
</tr>
<tr>
<td>NBO</td>
<td>Nuffield Health Bournemouth Hospital</td>
</tr>
<tr>
<td>NCR</td>
<td>New Cross Hospital</td>
</tr>
<tr>
<td>NGS</td>
<td>Northern General Hospital</td>
</tr>
<tr>
<td>NHB</td>
<td>Royal Brompton Hospital and Harefield NHS Trust,</td>
</tr>
<tr>
<td>NHH</td>
<td>Basingstoke and North Hampshire Hospital</td>
</tr>
<tr>
<td>NIN</td>
<td>Ninewells Hospital</td>
</tr>
<tr>
<td>NOR</td>
<td>Norfolk and Norwich University Hospital</td>
</tr>
<tr>
<td>NPH</td>
<td>Northwick Park Hospital</td>
</tr>
<tr>
<td>NTH</td>
<td>Northampton General Hospital</td>
</tr>
<tr>
<td>PAP</td>
<td>Papworth Hospital</td>
</tr>
<tr>
<td>PHB</td>
<td>BMI Priory Hospital</td>
</tr>
<tr>
<td>PHN</td>
<td>BMI Park Hospital</td>
</tr>
<tr>
<td>PIN</td>
<td>Pinderfields General Hospital</td>
</tr>
<tr>
<td>PLY</td>
<td>Derriford Hospital, Southwest Cardiothoracic Centre</td>
</tr>
<tr>
<td>PMS</td>
<td>Great Western Hospital, Wiltshire Cardiac Centre</td>
</tr>
<tr>
<td>QAP</td>
<td>Queen Alexandra Hospital</td>
</tr>
<tr>
<td>QEB</td>
<td>Queen Elizabeth Hospital, Birmingham</td>
</tr>
<tr>
<td>RAD</td>
<td>John Radcliffe Hospital</td>
</tr>
<tr>
<td>RAI</td>
<td>Raigmore Hospital</td>
</tr>
<tr>
<td>RCH</td>
<td>Royal Cornwall Hospital</td>
</tr>
<tr>
<td>RDE</td>
<td>Royal Devon &amp; Exeter Hospital</td>
</tr>
</tbody>
</table>
Versions

History of Changes to Slide Set

- **22-01-2019 First version**
- **24-02-2019 Update**
  - All dot plot slides and some overview slides updated with new analysis of 20-2-2019 after data fix of error caused by first phase hospitals migration to new IT platform (zeros incorrectly converted to NA)
  - Data analysed still as 21-11-2018 extract but with updates for 1st migration centres
  - Test hospital YYY now excluded
  - Some ONS tracked data included
- **27-02-2019 Update**
  - Remaining ONS tracked 30 day mortality dot plot data included