



BCIS National Audit Adult Interventional Procedures

1st April 2020 to 31st March 2021

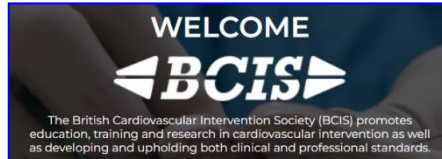
Peter F Ludman

BCIS Audit Lead

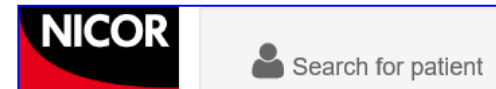
On behalf of

British Cardiovascular Intervention Society

Data Sources

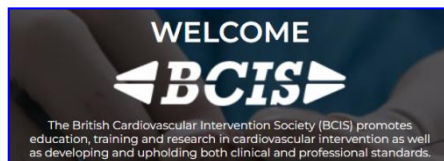


- Annual survey
 - Structure
 - Procedure totals
 - Slides labelled 'Survey'

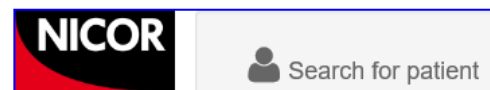


- PCI Procedural data
 - csv file upload
 - Direct entry
- Extract
- ONS track  Office for National Statistics
- Cleaning
- Analysis 
- Outputs
 - Benchmarking / COP / QI

Data Sources



- Annual survey
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 - Procedure totals
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Which Database do you use to collect data for the PCI audit ? *

Access database from BCIS web site

If 'other' database, please enter the name of the database used

0 of 100 max characters

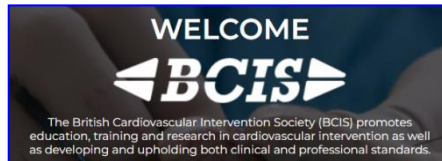
Thank you

You can save a part filled form and return to it later using the buttons below.

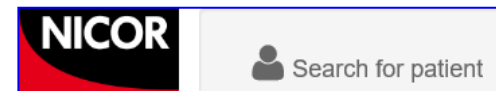
If you do request a link back to a part filled form, you can share with others who will also be able to use it to access your form.

Submit [Save and Continue Later](#)

Data Sources



- Annual survey
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 - Procedure totals
 - Slides labelled 'Survey'



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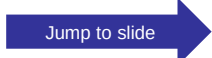
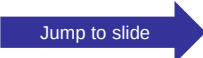
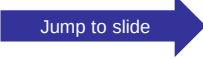
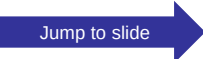
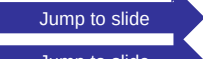
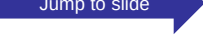


← or →

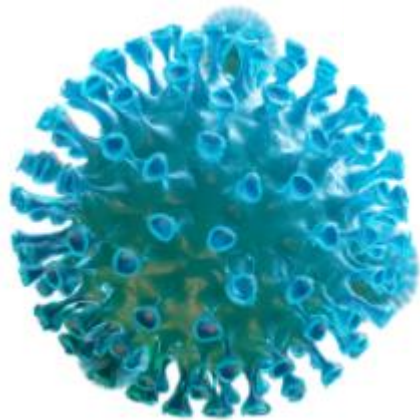


Data extract
xx-xx-2019

Contents

- **Structure (PCI)** 
 - 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 (PCI)** 
 - 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 (PCI)** 
 - Delays to treatment
 - NSTEMI (direct v IHT)
 - Primary PCI DTB / CTB
 - IHT versus Direct admission
 - Length of stay
- **Outcome (PCI)** 
 - MACCE
 - Peri-procedural complications and by access
 - Tracked 30 day mortality
 - Outcome by syndrome
 - Outcome by lesion subset
- **Adult non coronary intervention** 
 - Valves
 - **TAVI** and other Aortic 
 - Mitral
 - PV / AV / TV
 - Septal ablation for HOCM
 - LAA occlusion
 - ASD / PFO / Para-prosthetic leak closure
 - Coro sinus / great vessel
 - Renal Denervation
- NICOR Update
- Conclusions and summary
- **Appendix:**
 - PCI Centre NICOR / CCAD Centre codes 
 - COP report explanation 
 - Demonstration of analysis tools in NCAP 

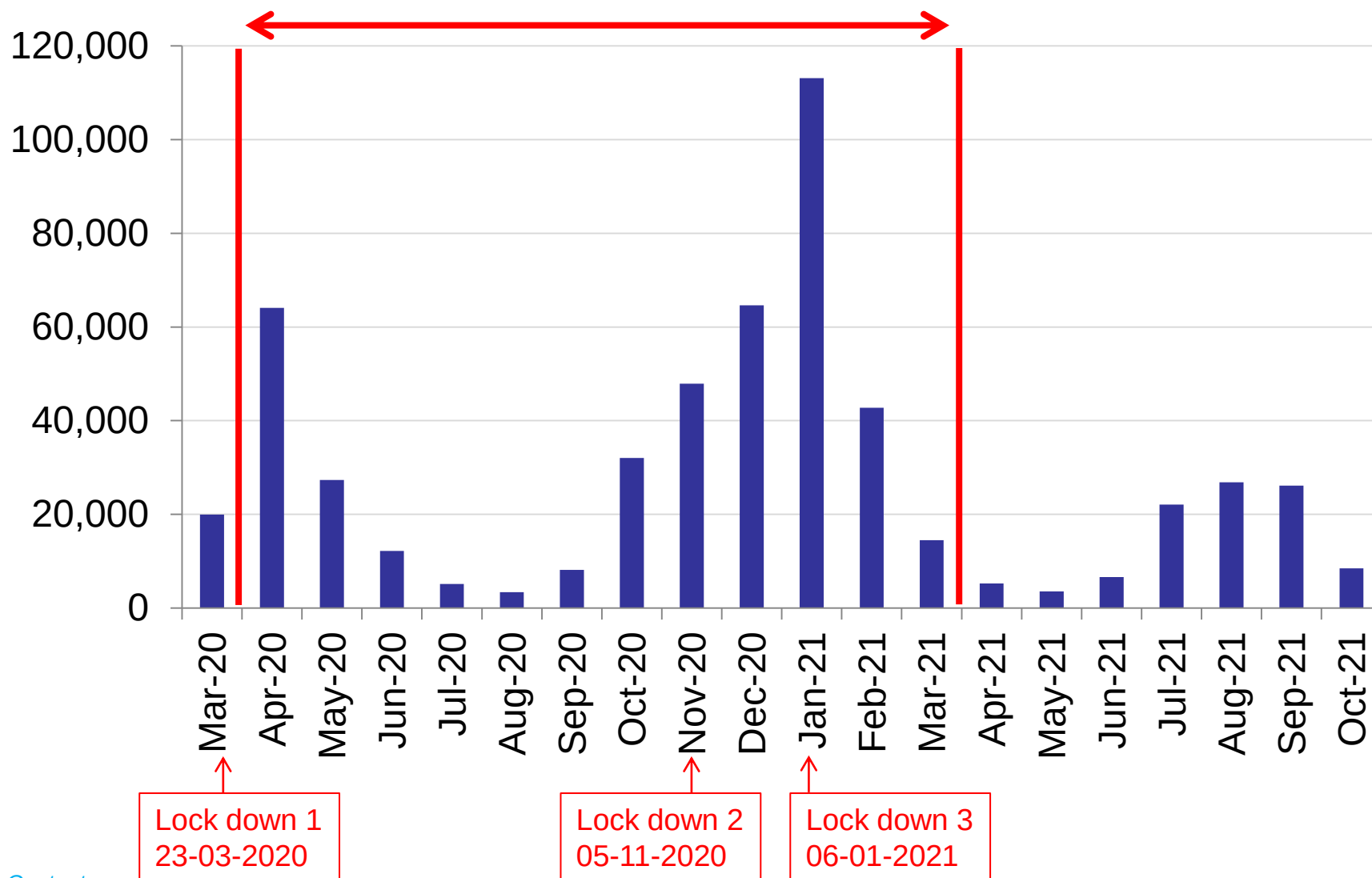
1st April 2020 to 31st March 2021



COVID-19

COVID-19

New COVID Admissions UK



Structure



PCI Centres

1 of 2

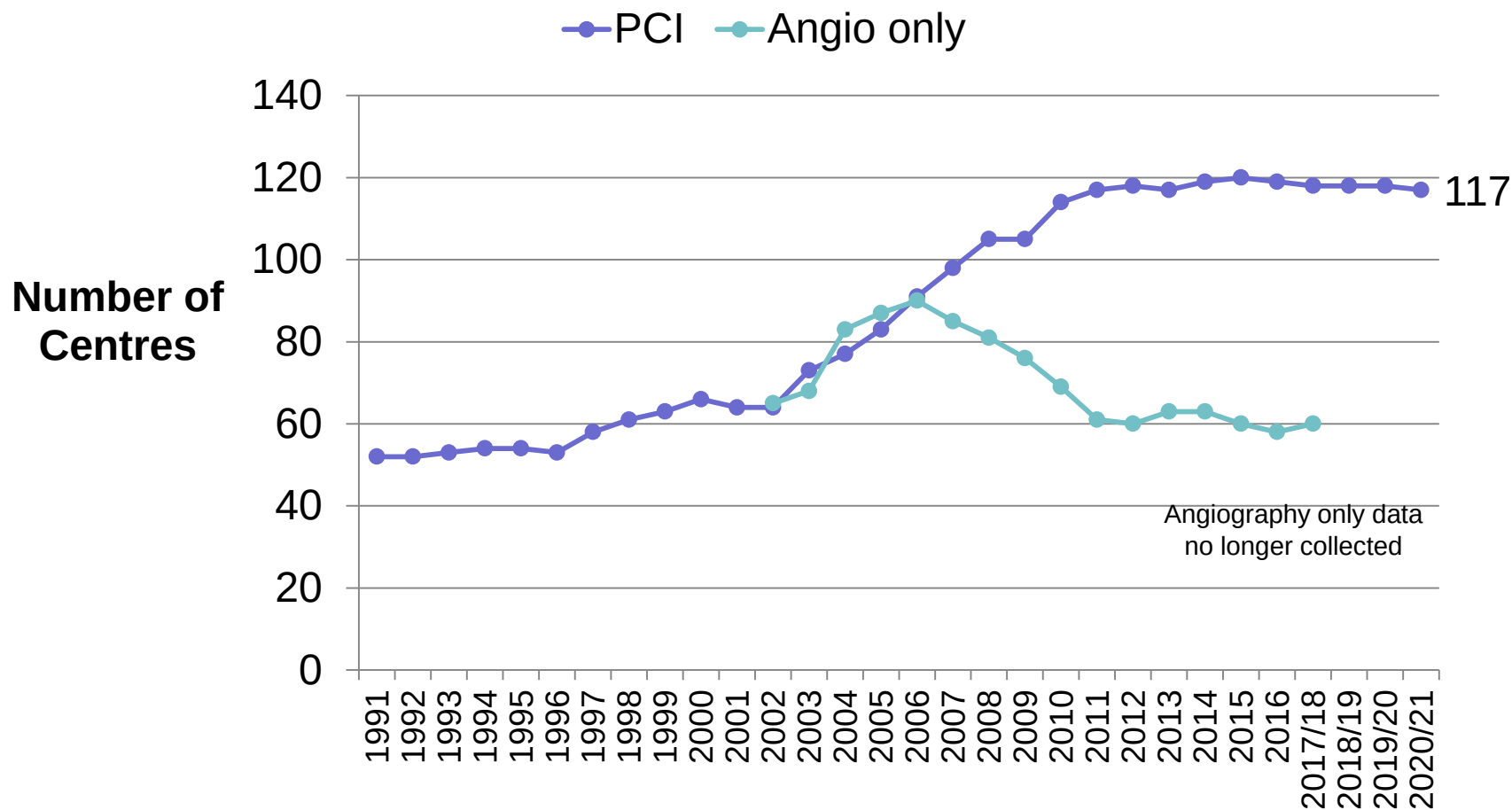
Year		PCI Centres
Stopped		Started
2010		• Spire Shawsfair Park, Edinburgh • Altnagelvin (previous angio) • Bedford (previous angio) • Medway (previous angio) • Pindefields (previous angio) • Raigmore, Inverness (previous angio) • Royal Blackburn (previous angio) • Salisbury (previous angio) • Scunthorpe (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

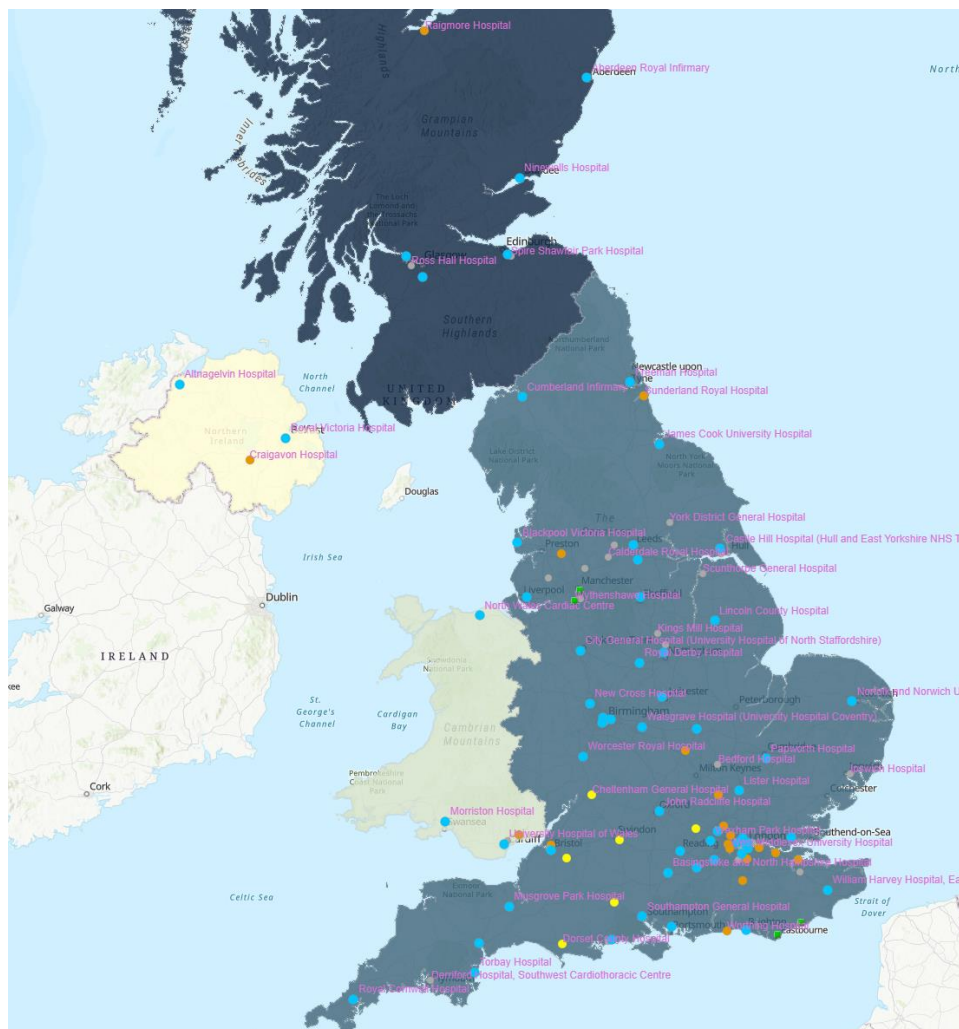
2 of 2

Year		PCI Centres	
	Stopped		Started
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
2018-19	• No change		• No change
2019-20	• Duchy Hospital, Cornwall		• Spire Manchester Hospital
2020-21	• London Independent		• Scunthorpe (SCU) moves to Diana Princess of Wales Hospital, Grimsby (GGH) • Royal Gwent Hospital (GWE) moves to GWE-> Grange University Hospital (GUH)

UK Centres



PCI Centres in 2020-21



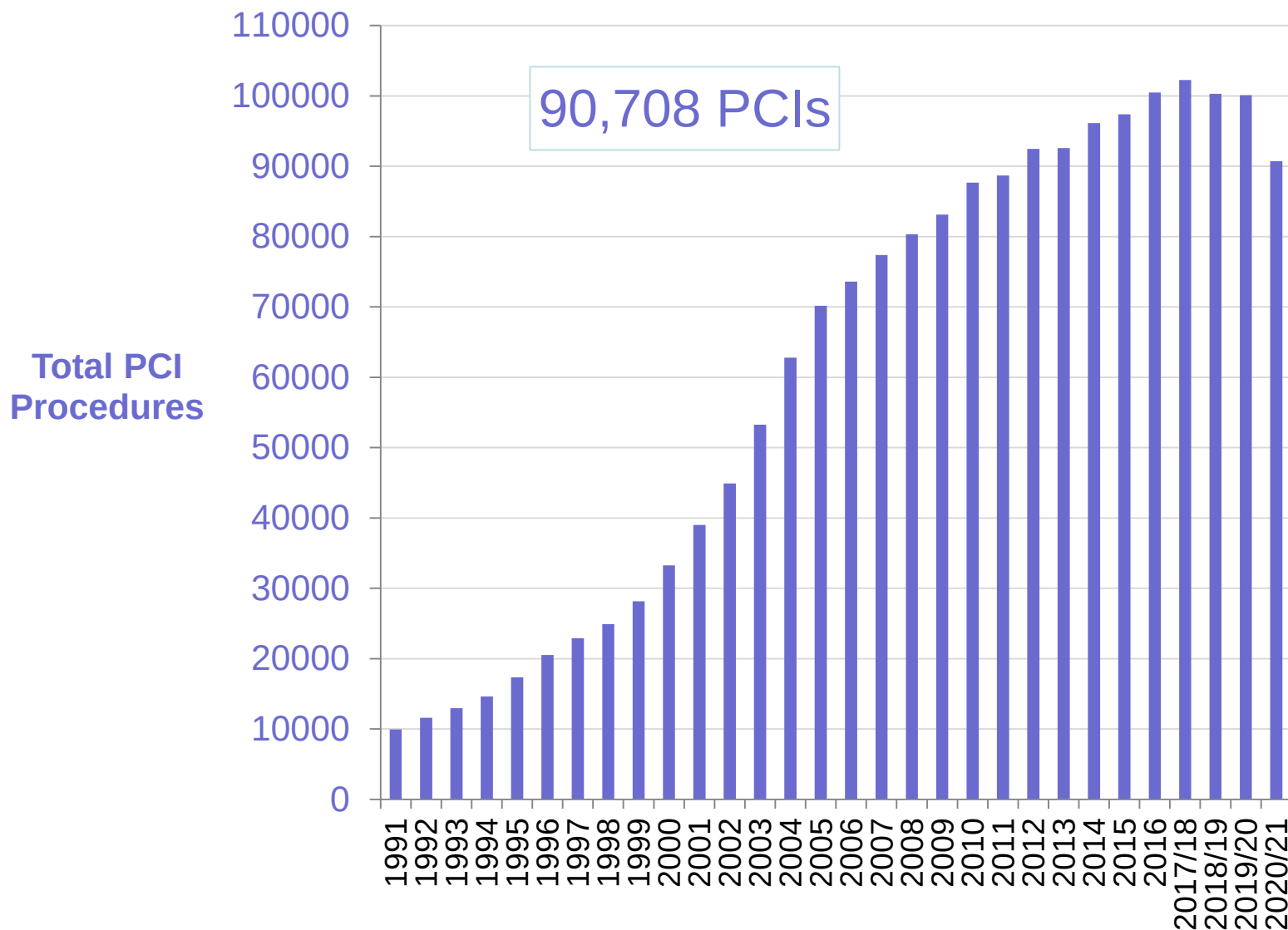
	NHS	Private
Scotland	6	2
England	85	16
N Ireland	3	0
Wales	4	1
Total	98	19
Total	117	

No Response to Annual Survey

Missing data

- Leeds Nuffield Hospital (LNH)
 - Ross Hall Hospital (RHH)
 - Spire Manchester Hospital (SMH)
 - Spire Shawfair Park Hospital (SSP)
-
- BMI Meriden responded – no pp work
 - NHS cases but no access to the data during refurbishment

Total PCI activity all UK



Population estimates

Mid 2020

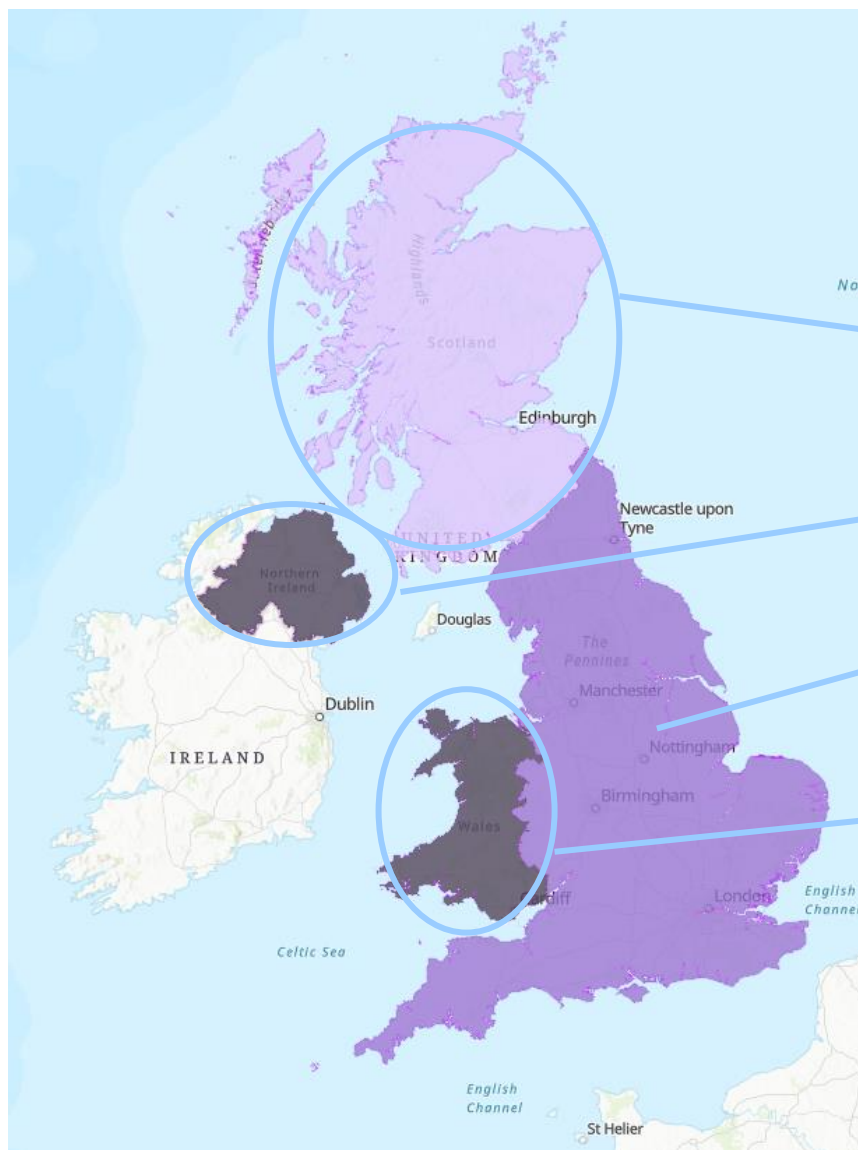
UK Total: 67.1 m

Scotland 5.466 m

Northern Ireland 1.896 m

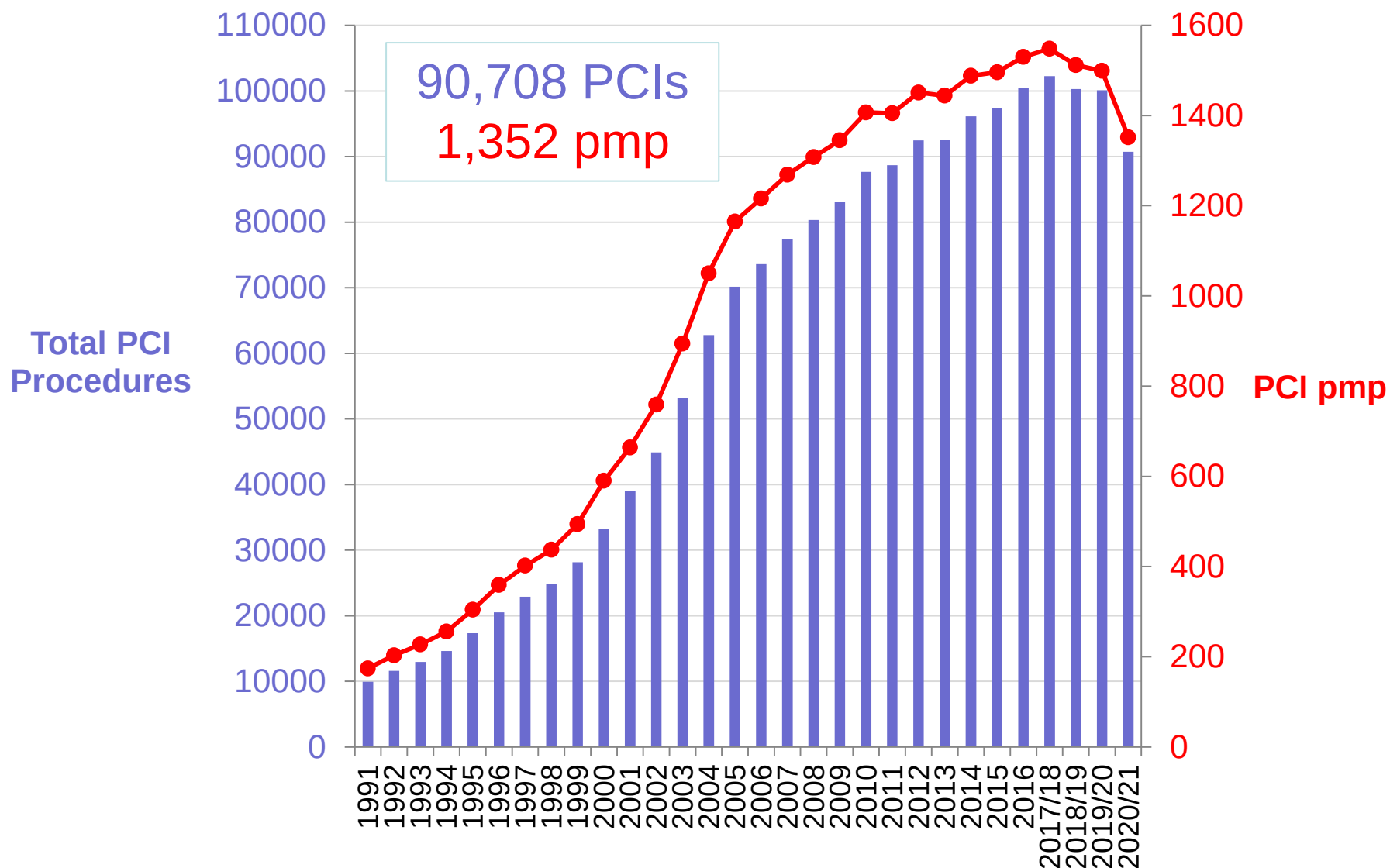
England 56.550 m

Wales 3.170 m



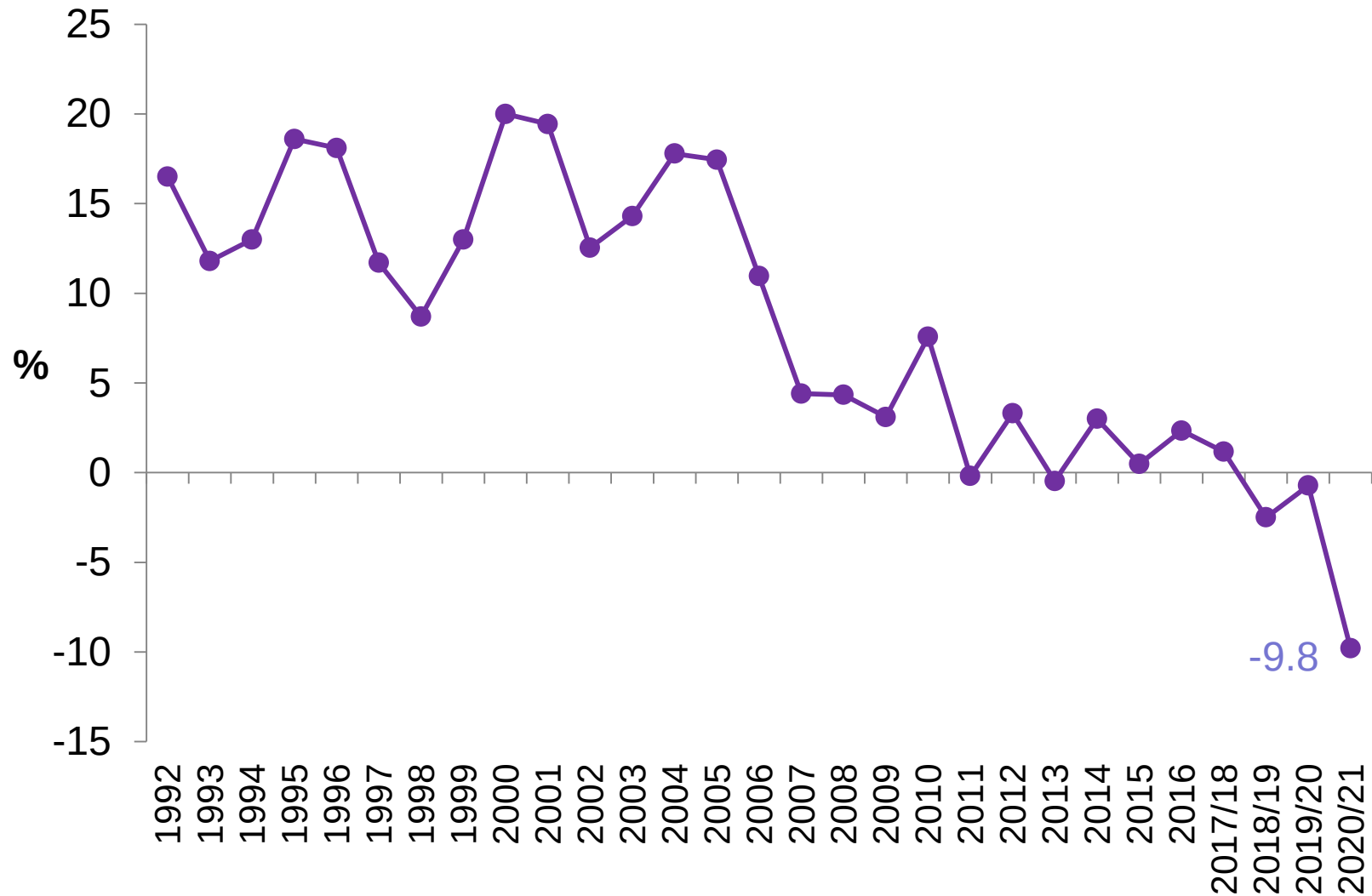
<https://www.ons.gov.uk/peoplepopulationandcommunity/>

Total PCI activity all UK



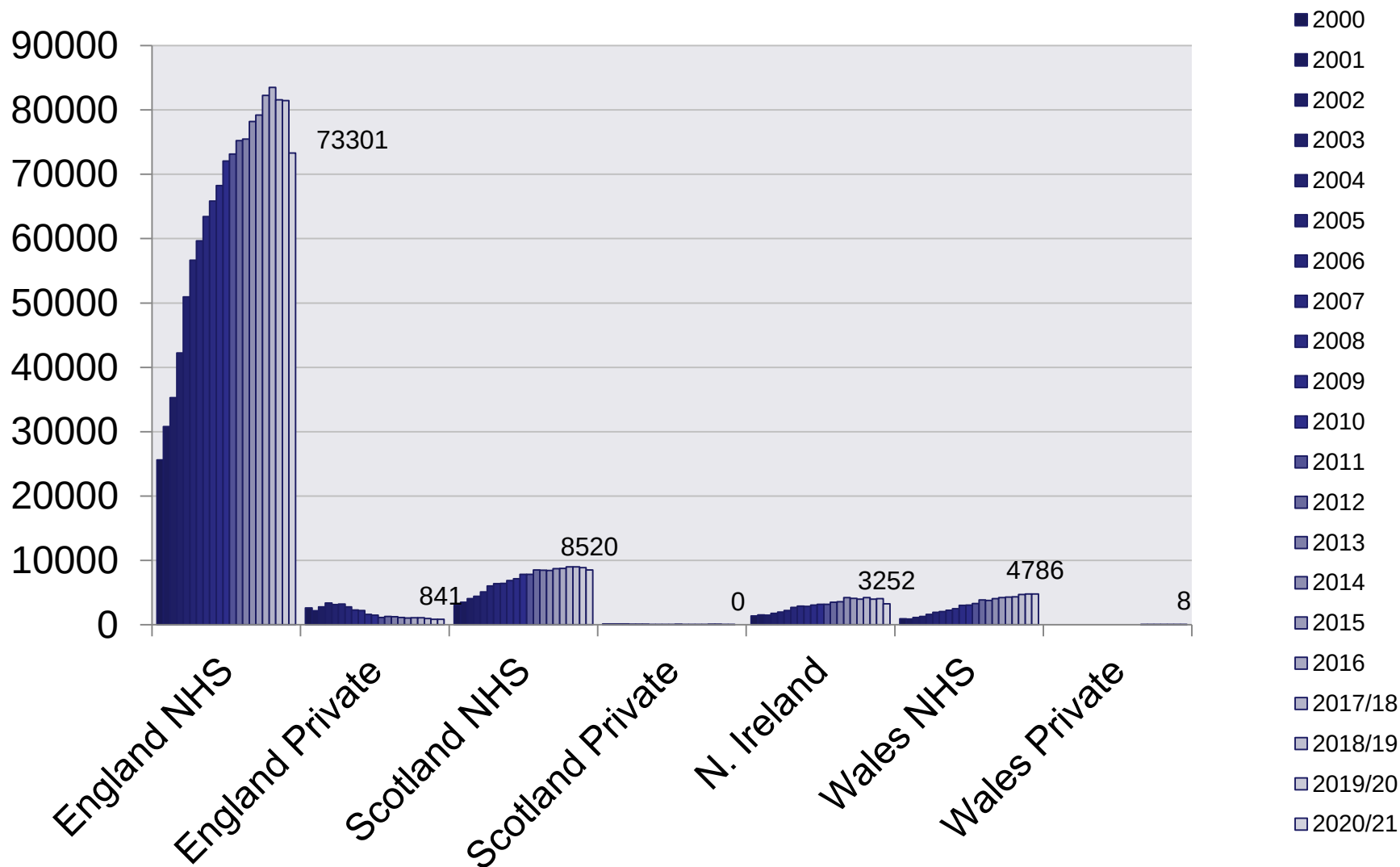
PCI pmp all UK

Rate of Increase



Total PCIs in the UK

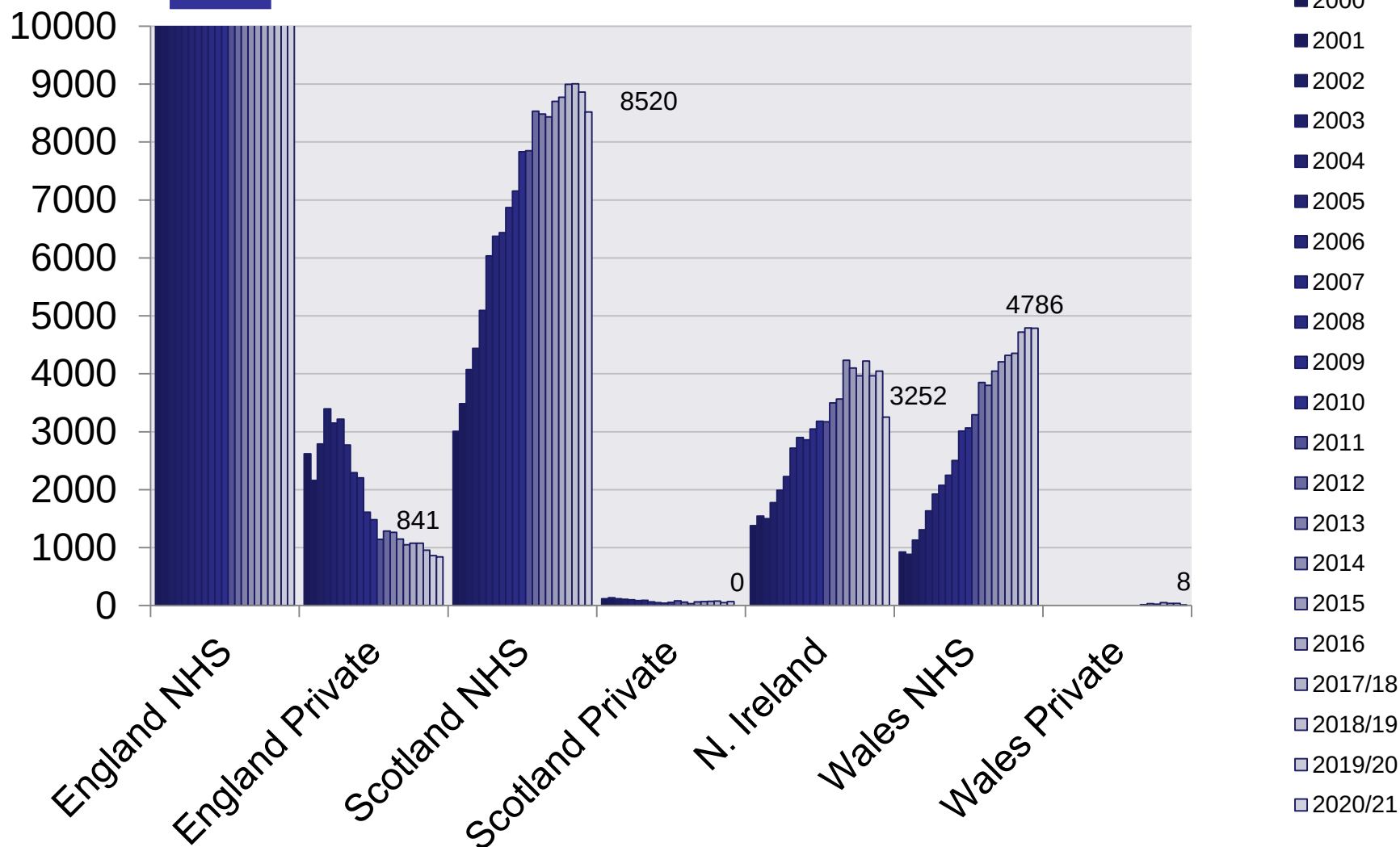
by Country and Type of Institution



Total PCIs in the UK

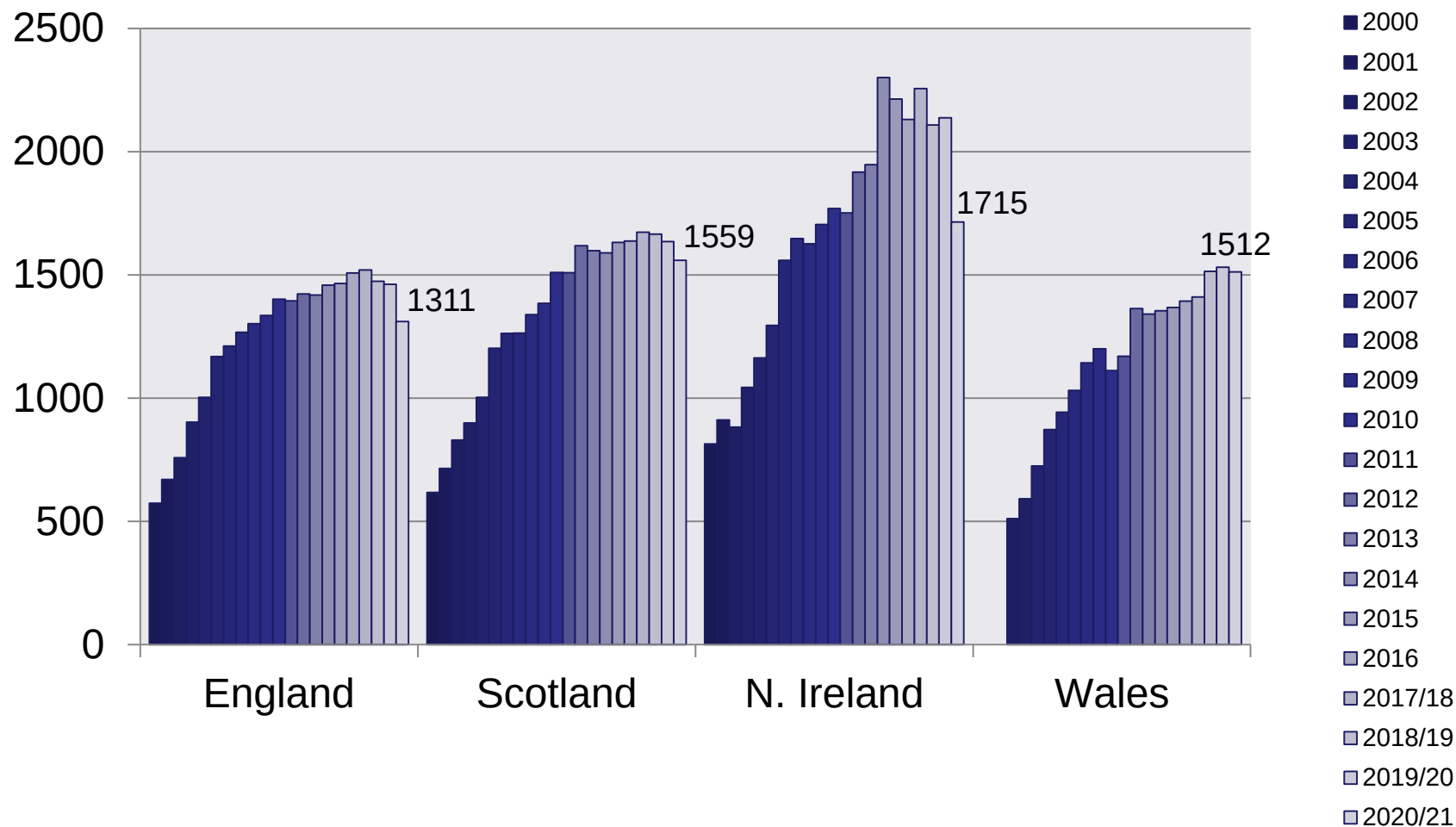
by Country and Type of Institution

Zoom



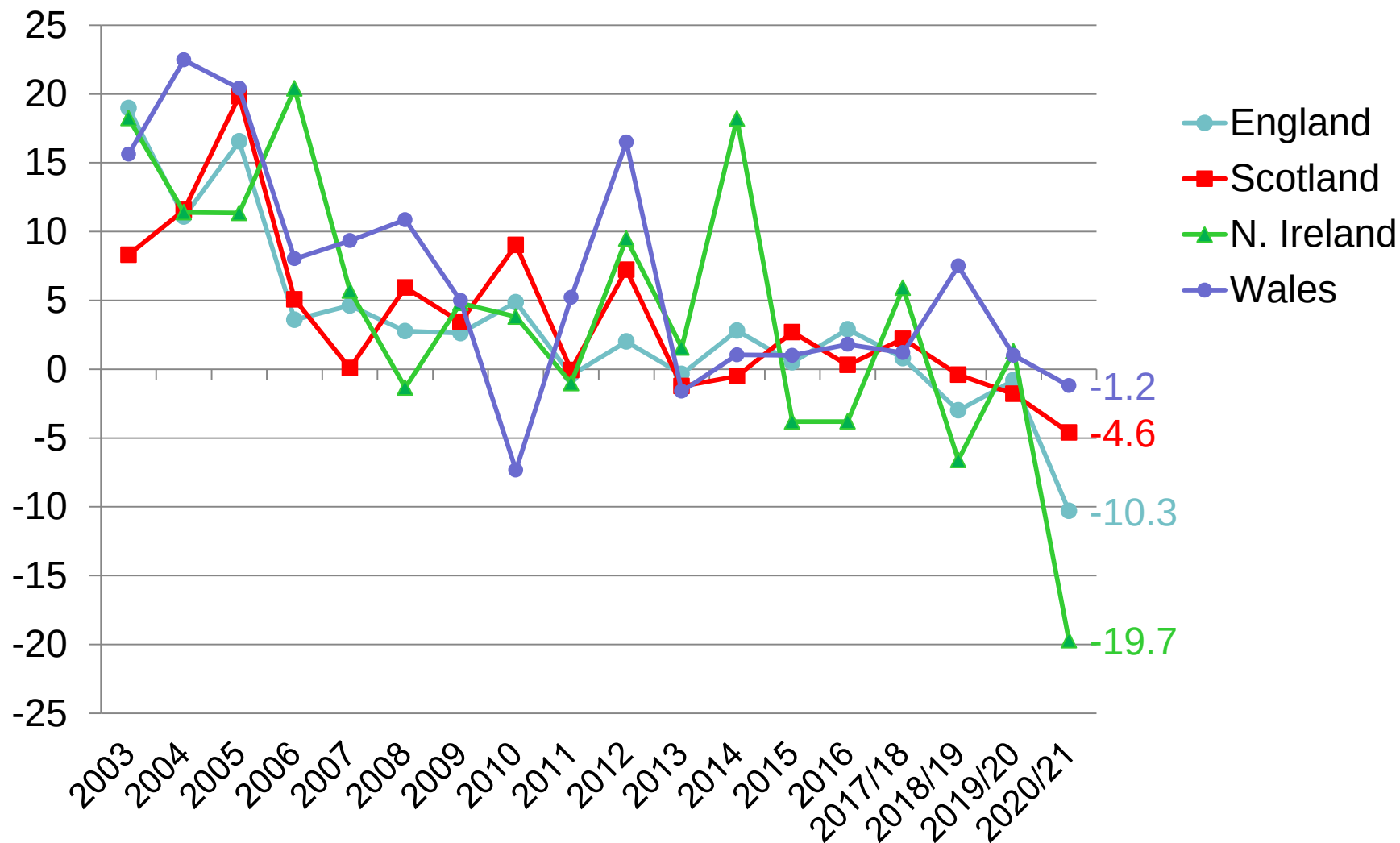
PCI pmp

By UK Country (value is of most recent year)



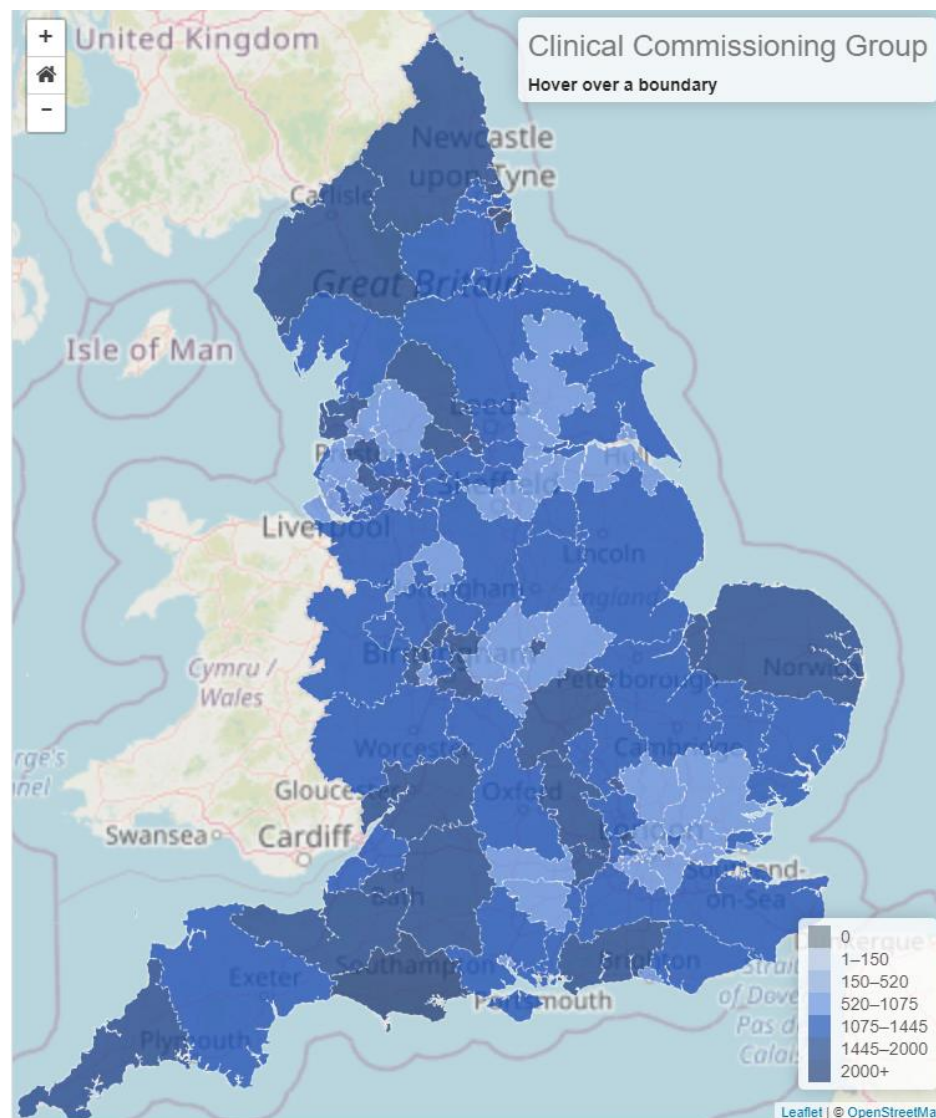
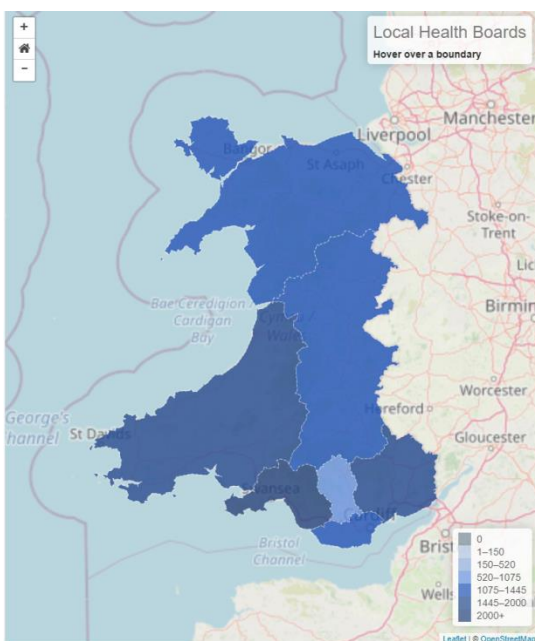
PCI pmp

Rate of Increase by UK Country



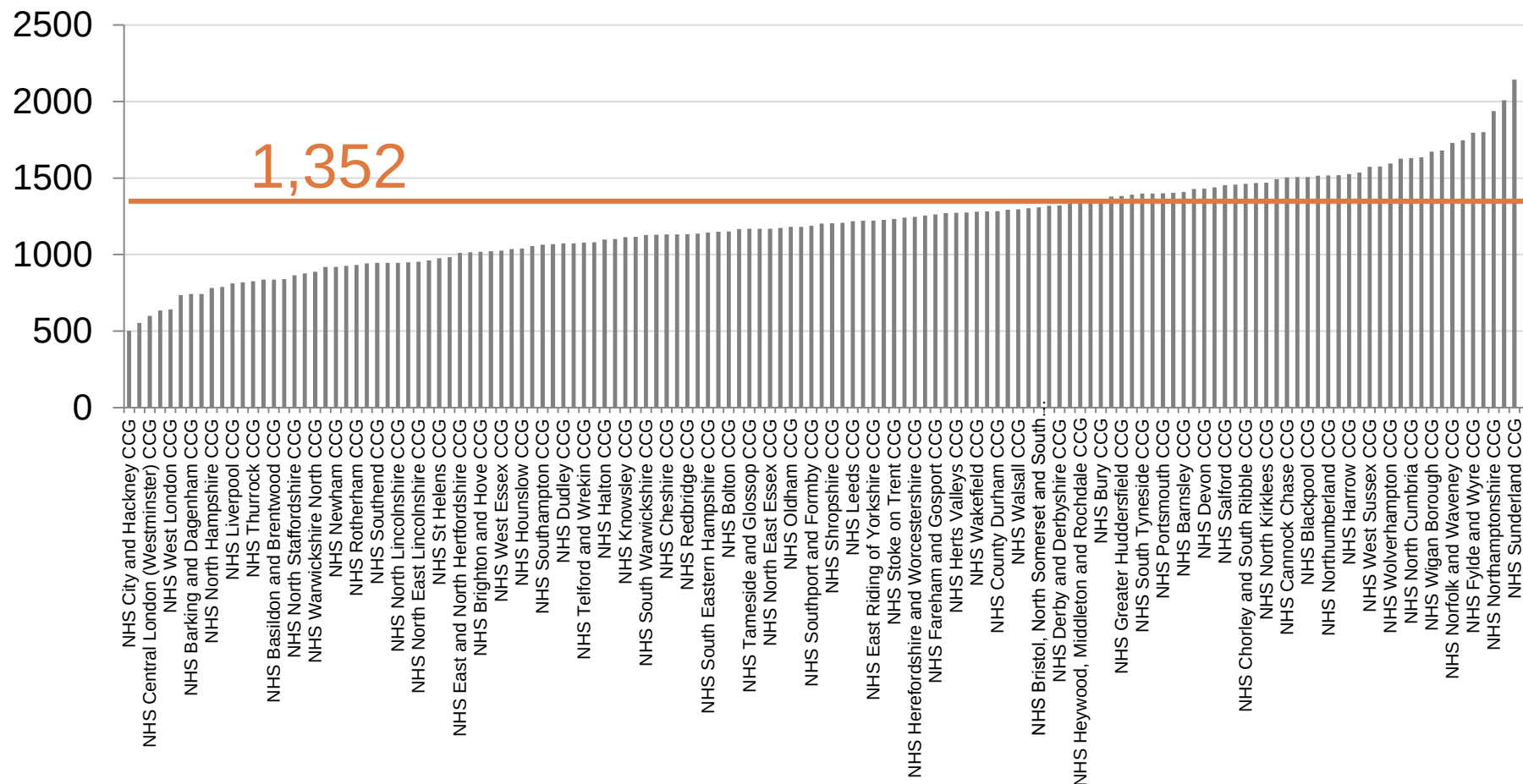
PCI pmp - all procedures

By Region 2020/21



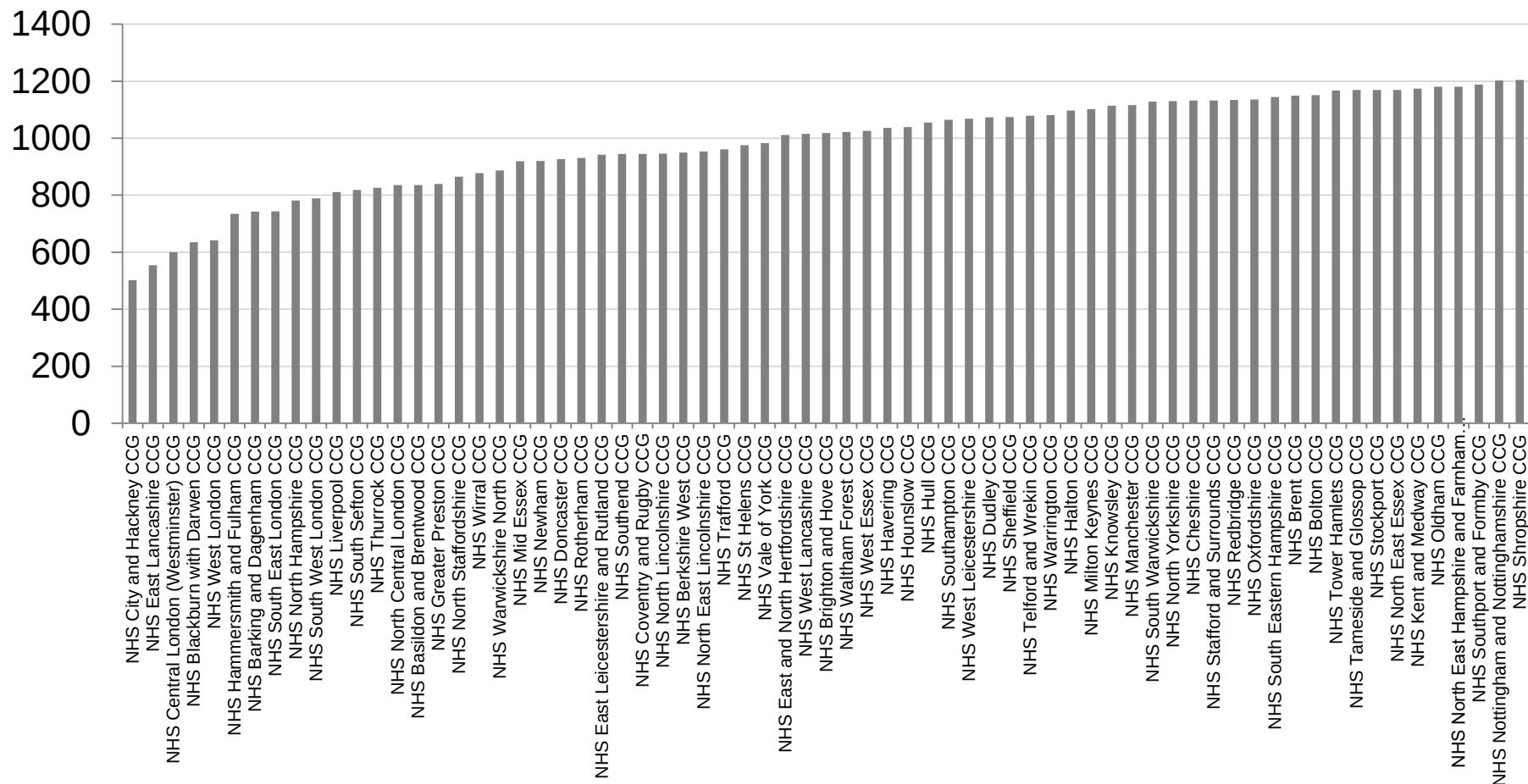
PCI pmp - all procedures

By Region 2020/21 (all)



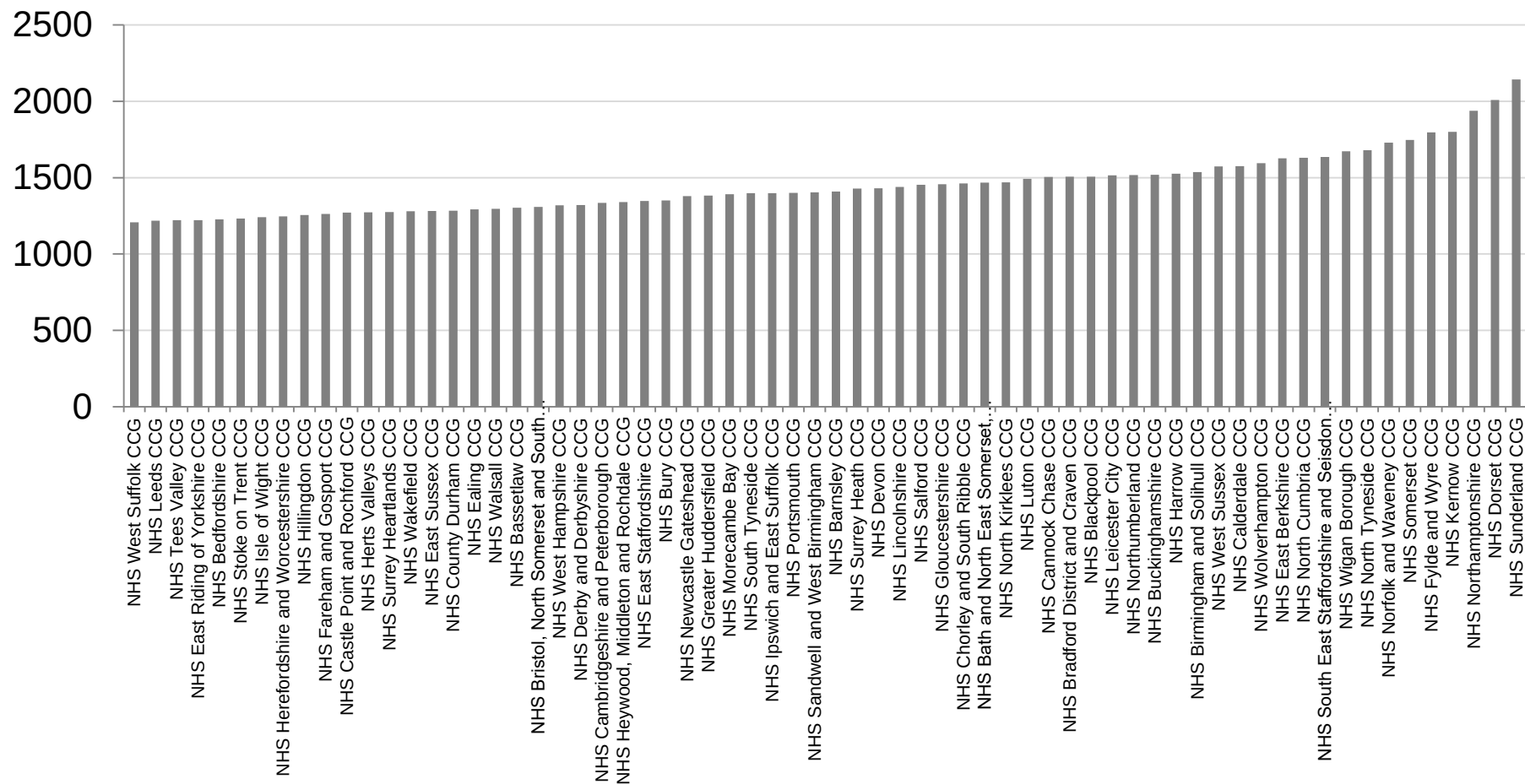
PCI pmp - all procedures

By Region 2020/21 (1 of 2)



PCI pmp - all procedures

By Region 2020/21 (2 of 2)

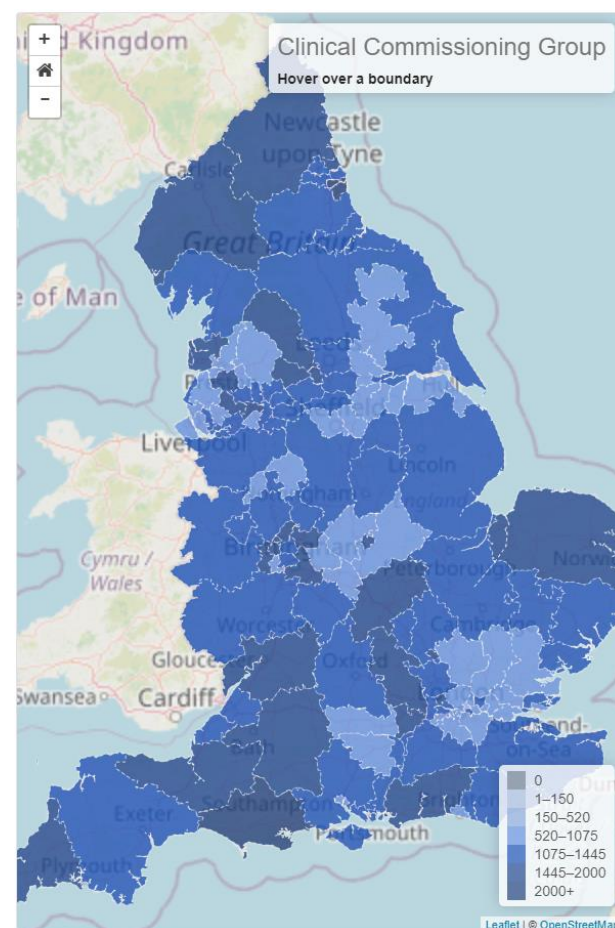
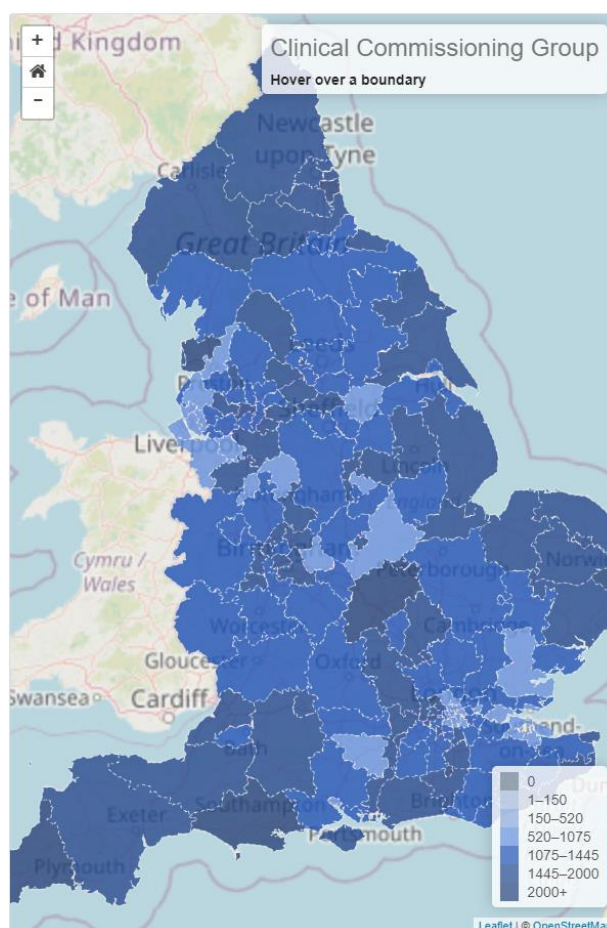
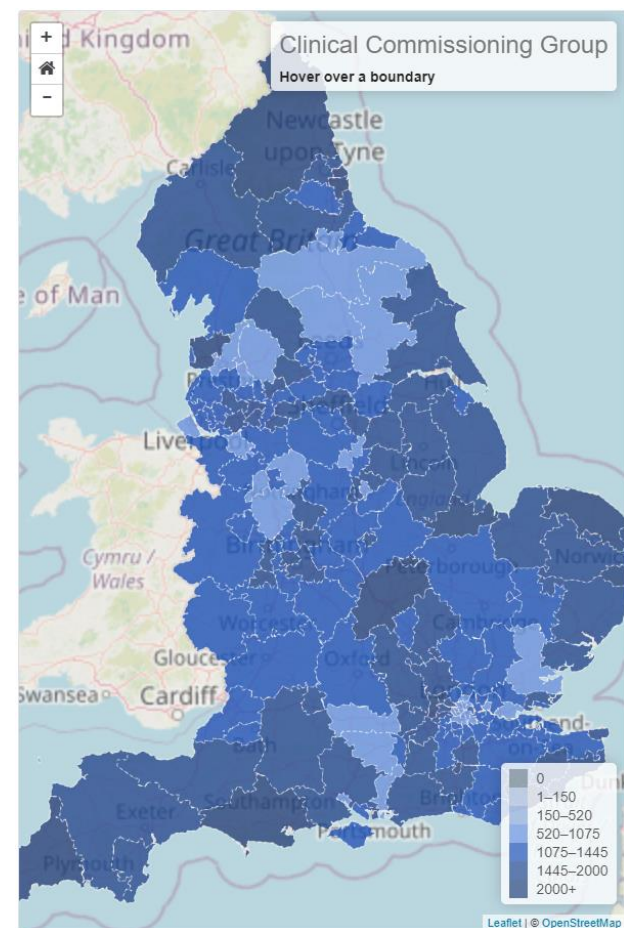


PCI pmp - All

2018/19

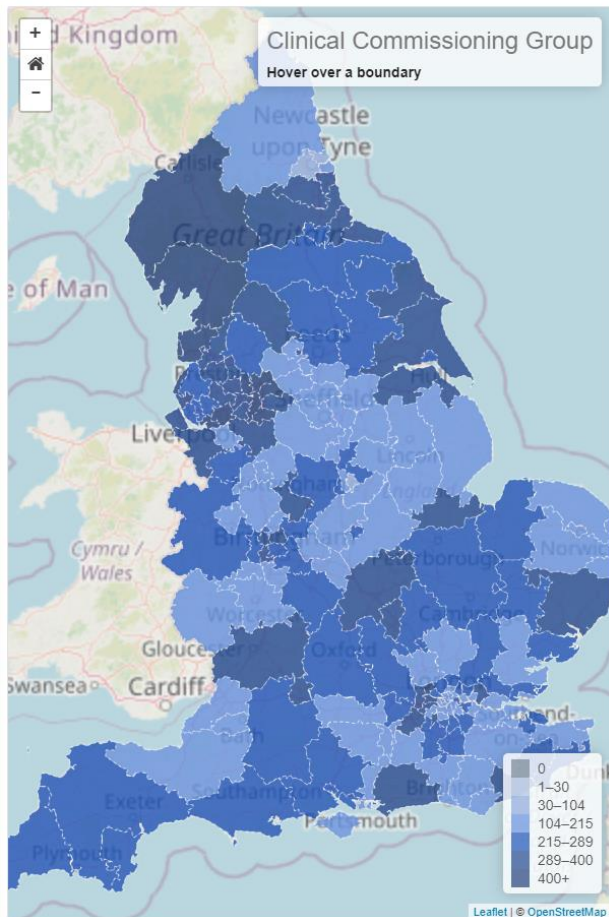
2019/20

2020/21

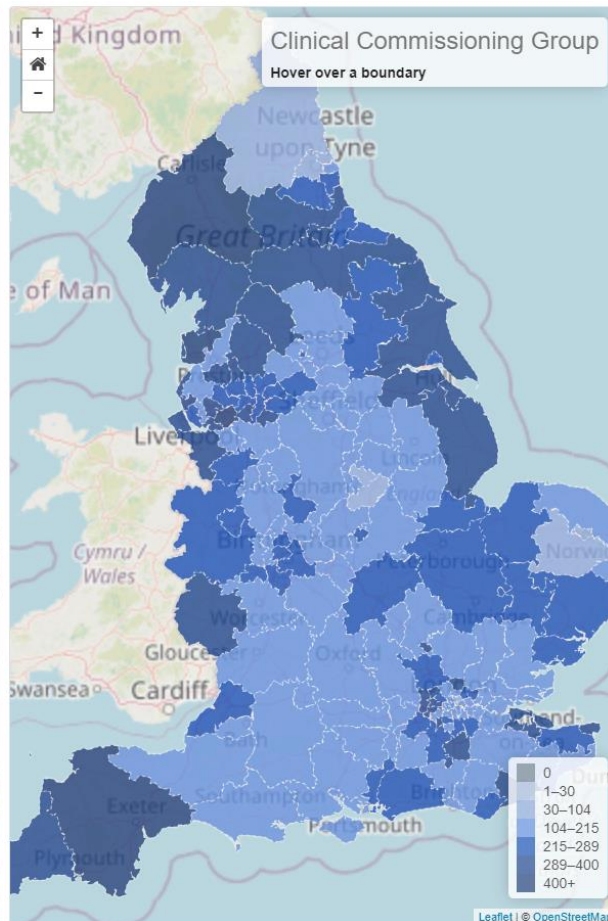


CABG (all)

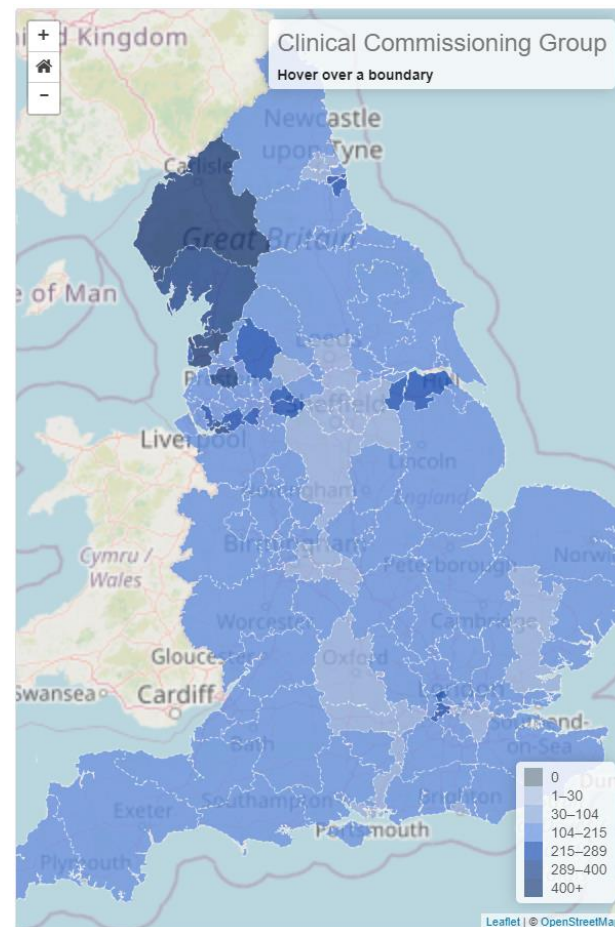
2018/19



2019/20



2020/21

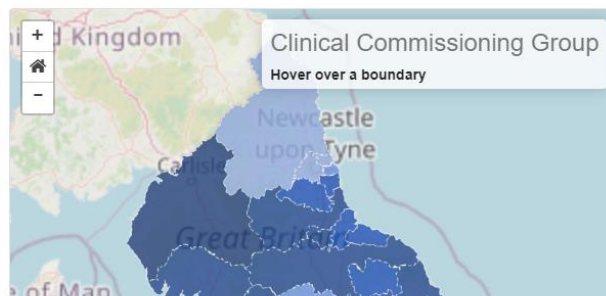
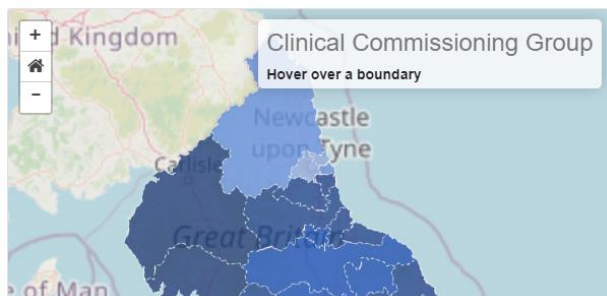


CABG (all)

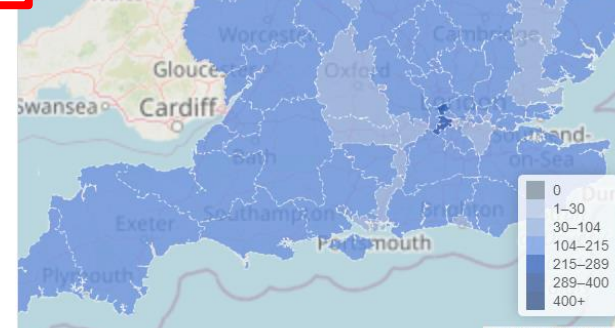
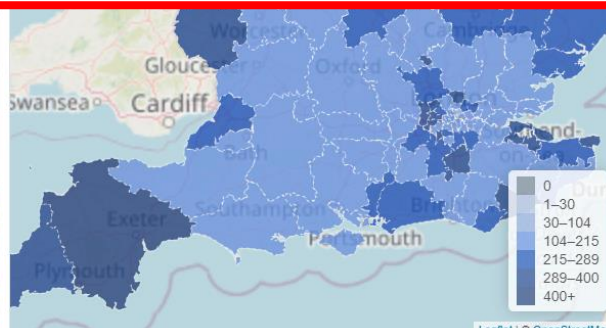
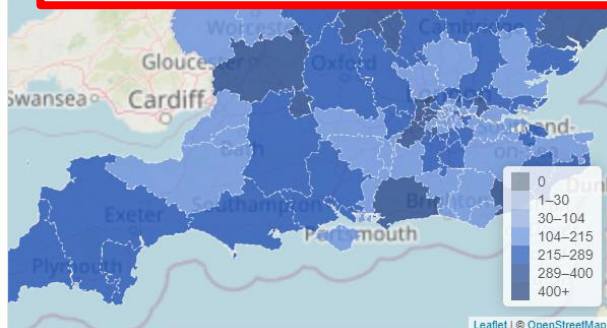
2018/19

2019/20

2020/21

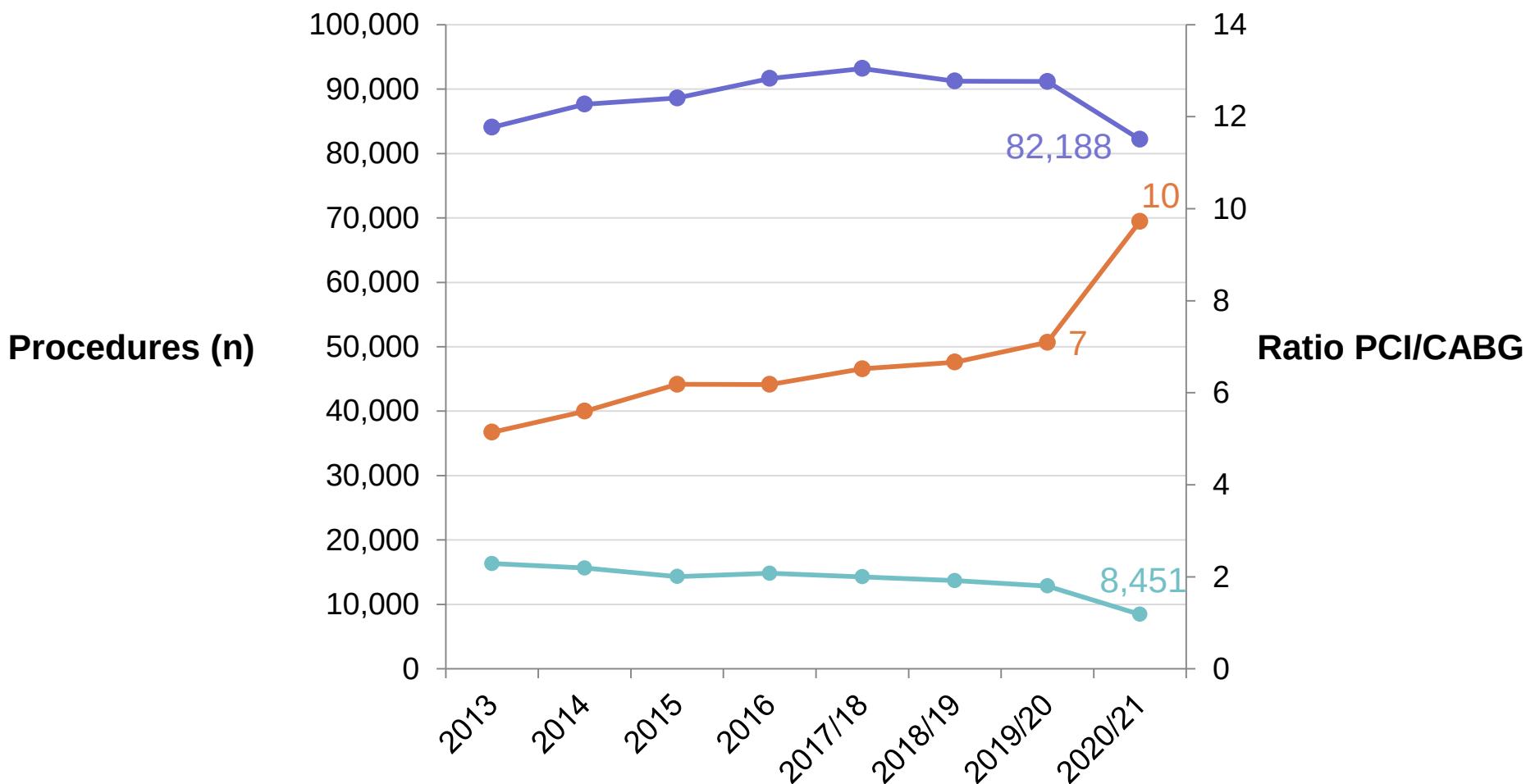


Ranking of least reduction in CABG
Freeman 3rd (↓10%)
Blackpool 5th (↓ 21%)

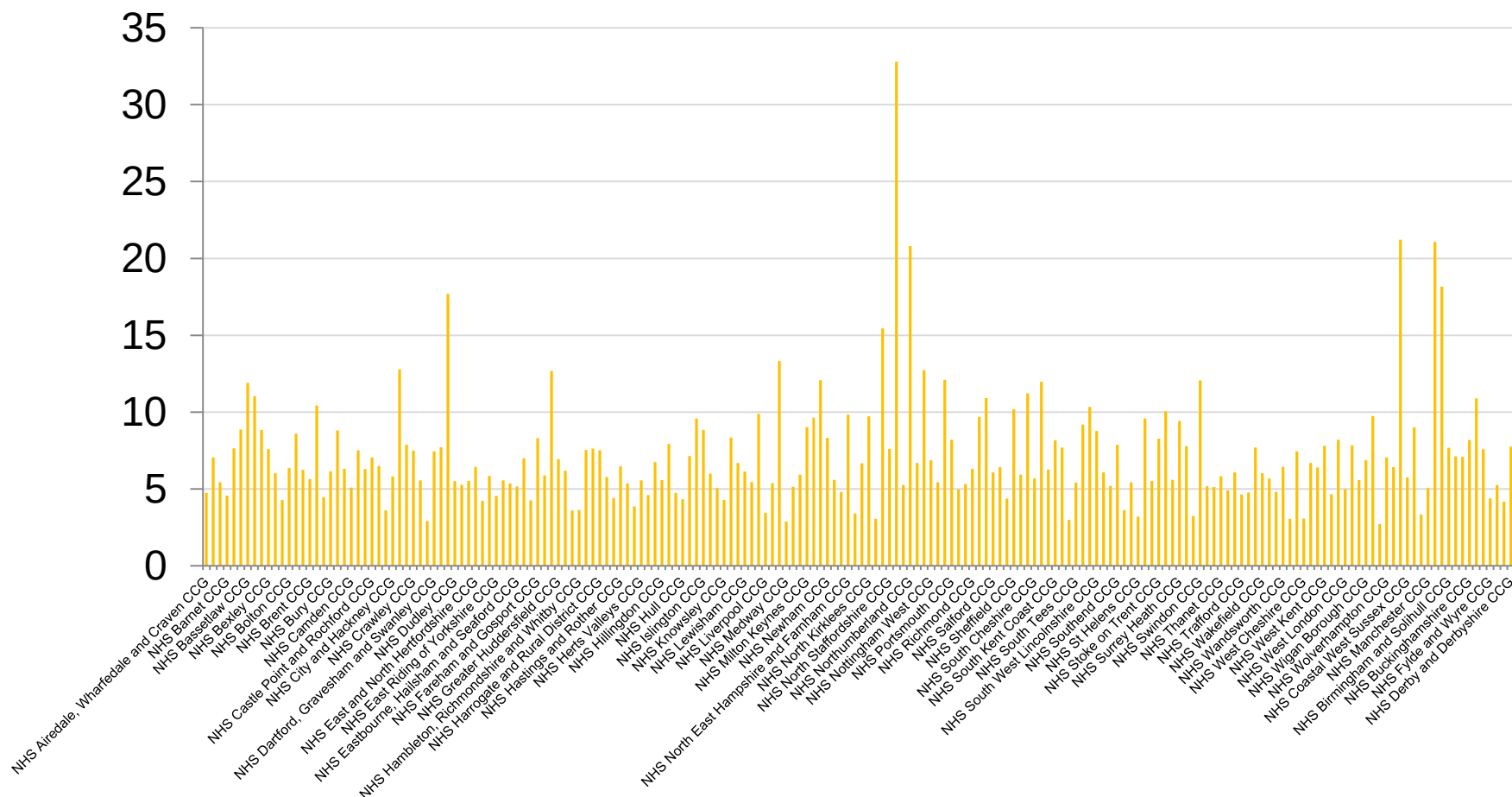


Total PCI vs Isolated CABG

—●— PCI (UK excluding Scotland) —●— CABG (excluding Scotland) —●— Ratio



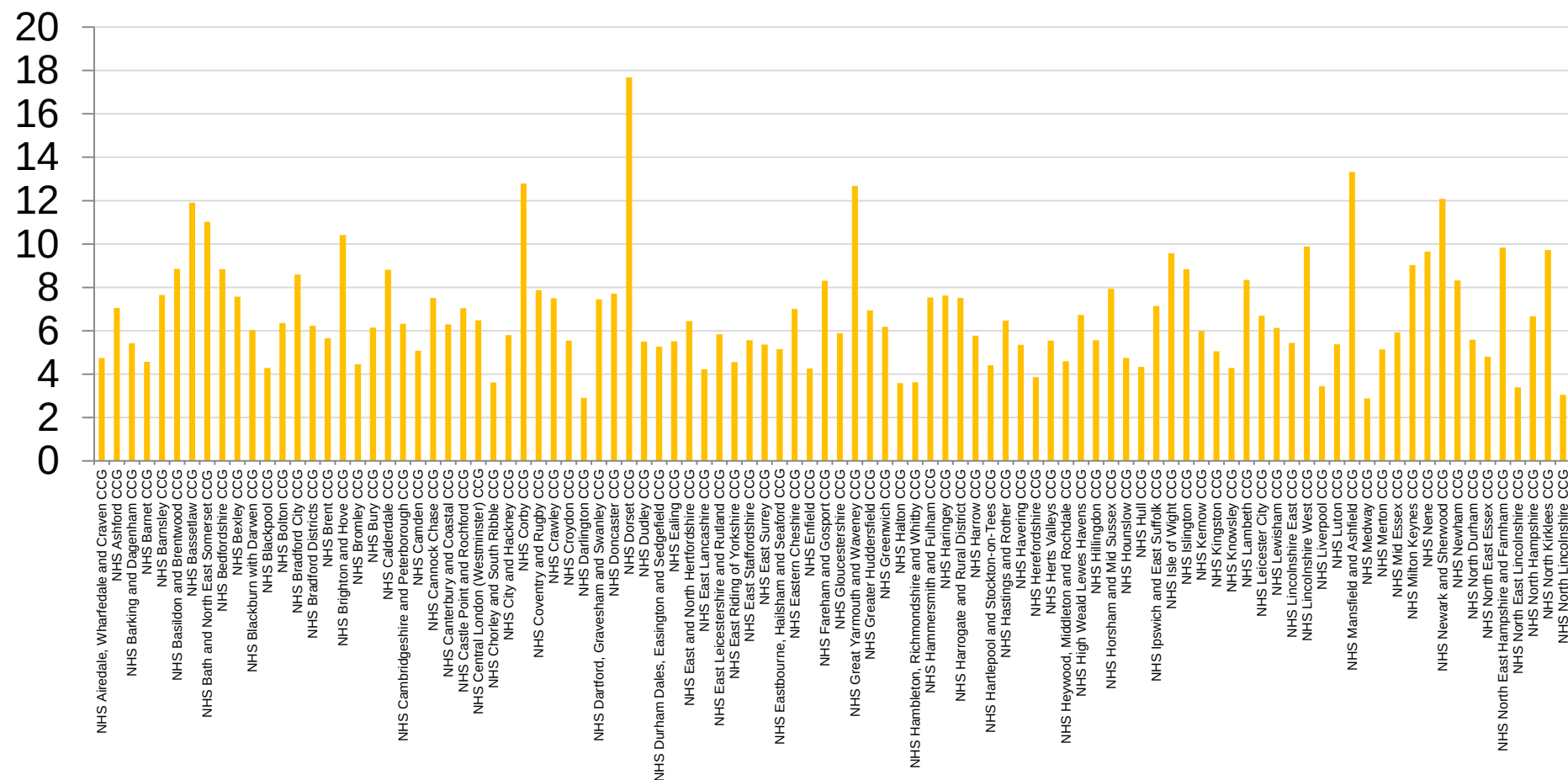
PCI / CABG



PCI:CABG pmp ratio

By Region 2019/20 (1 of 2)

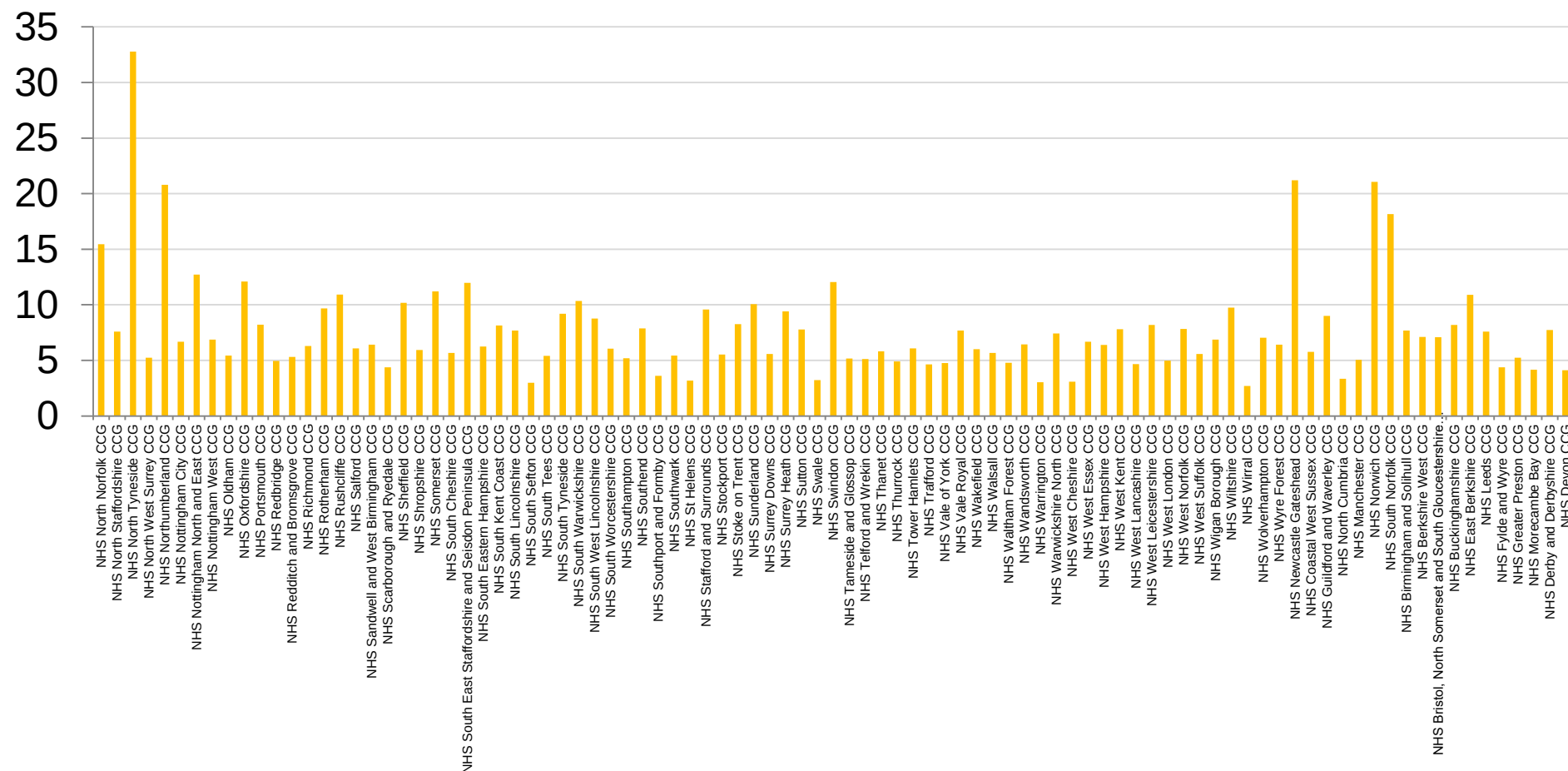
PCI / CABG



PCI:CABG pmp ratio

By Region 2019/20 (2 of 2)

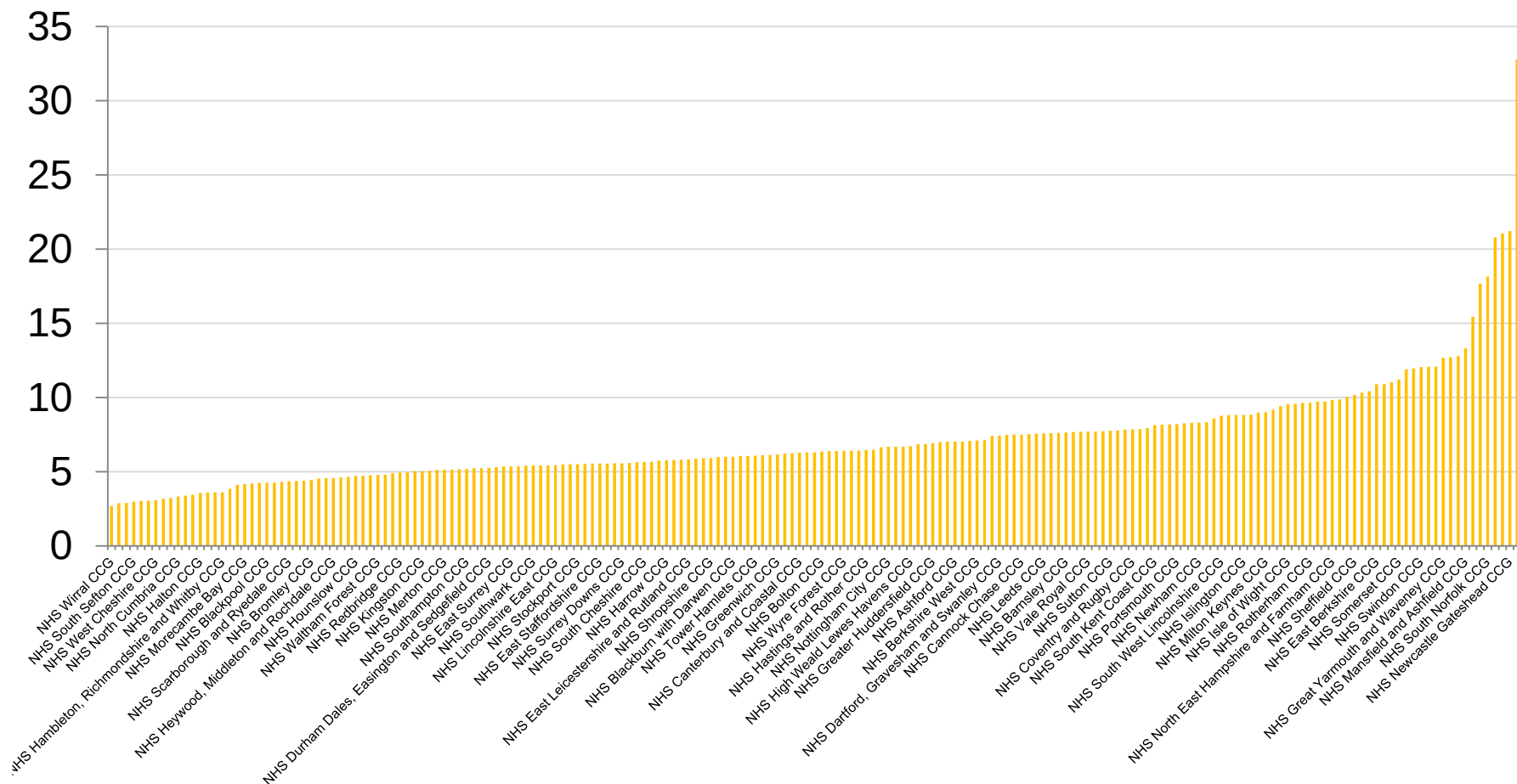
PCI / CABG



PCI:CABG pmp ratio

By Region 2019/20 (all)

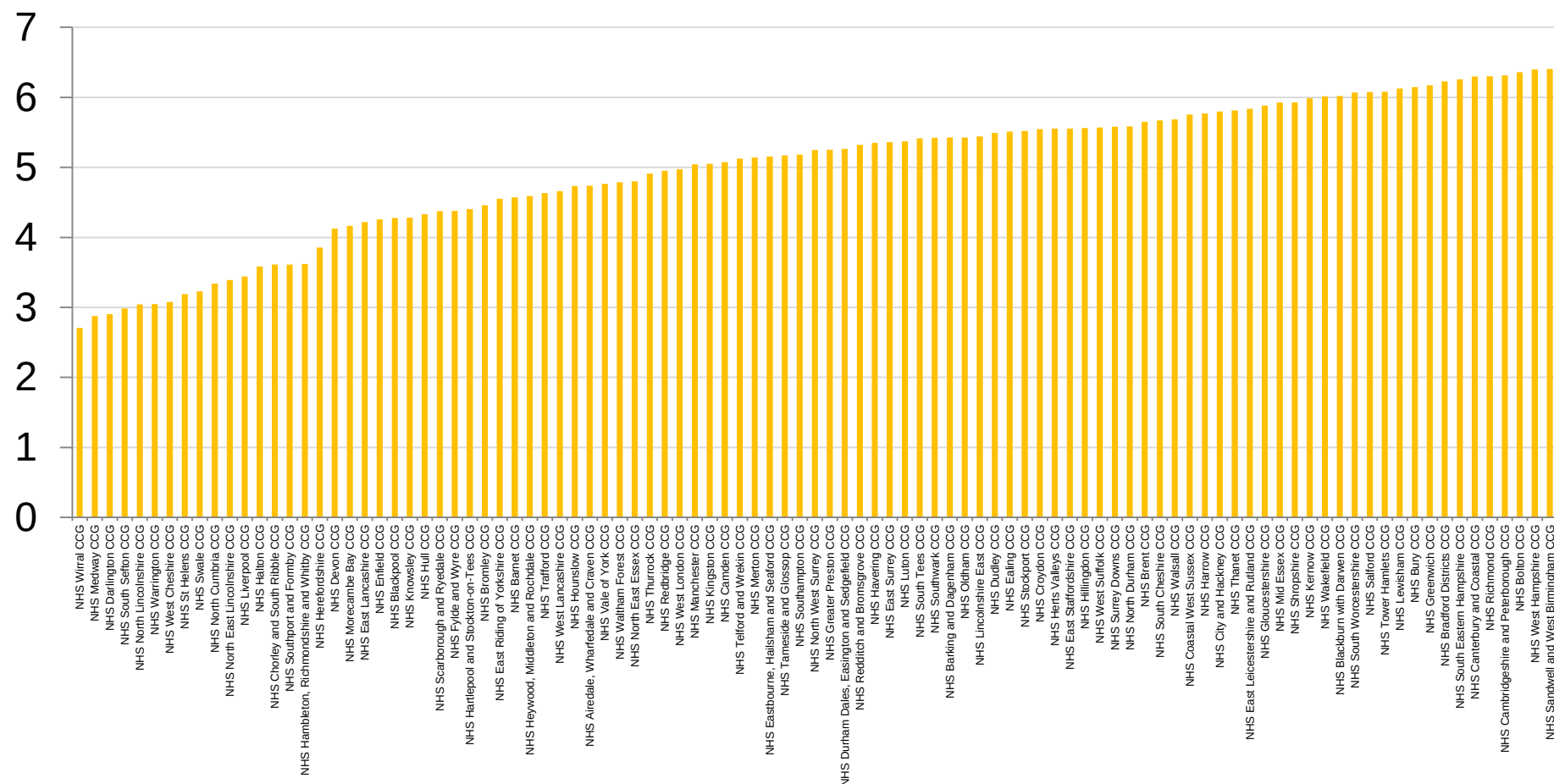
PCI / CABG



PCI:CABG pmp ratio

By Region 2019/20 (1 of 2)

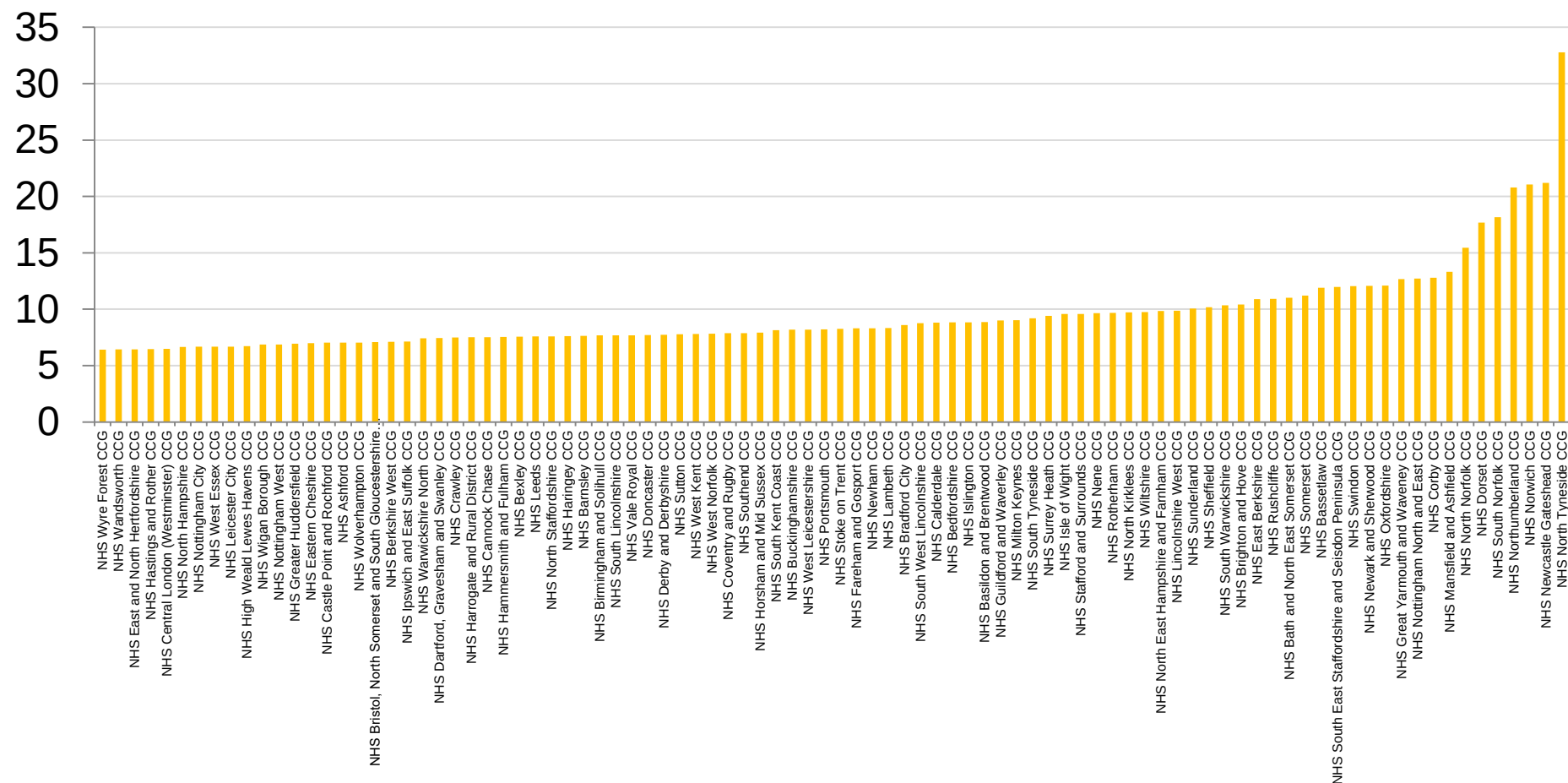
PCI / CABG



PCI:CABG pmp ratio

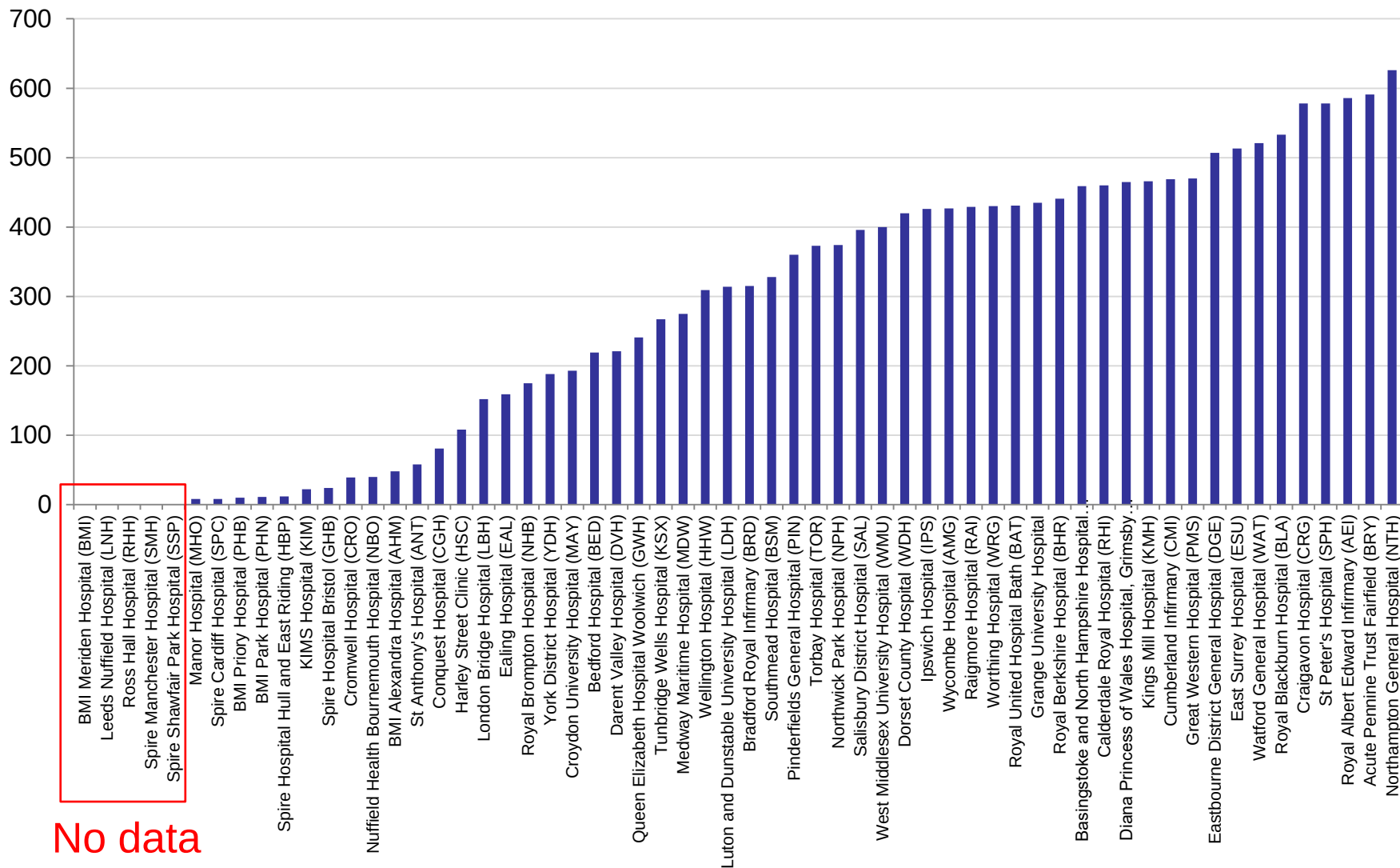
By Region 2019/20 (2 of 2)

PCI / CABG



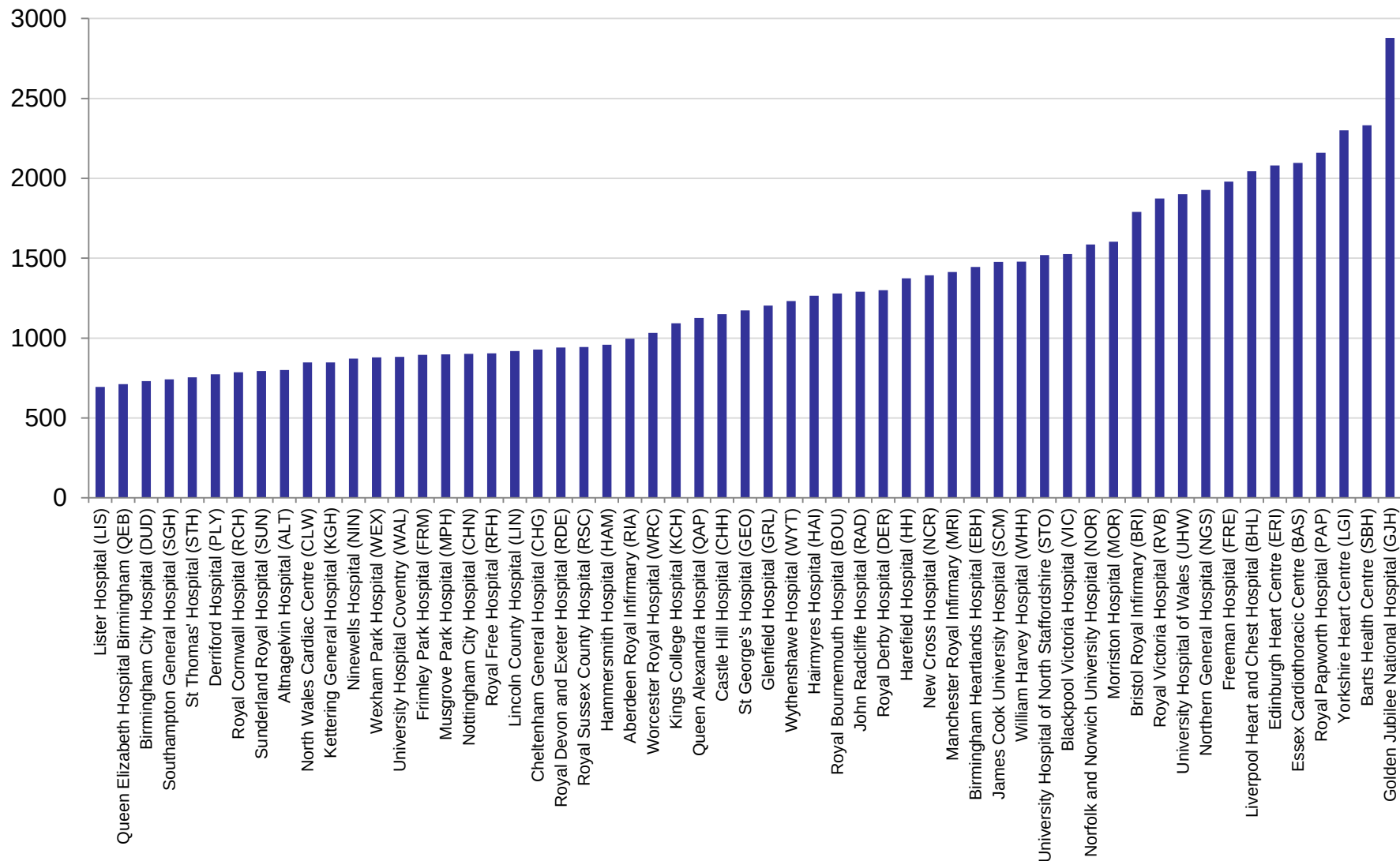
Number of PCIs per Centre

Ordered by 2020-2021 activity (part 1)



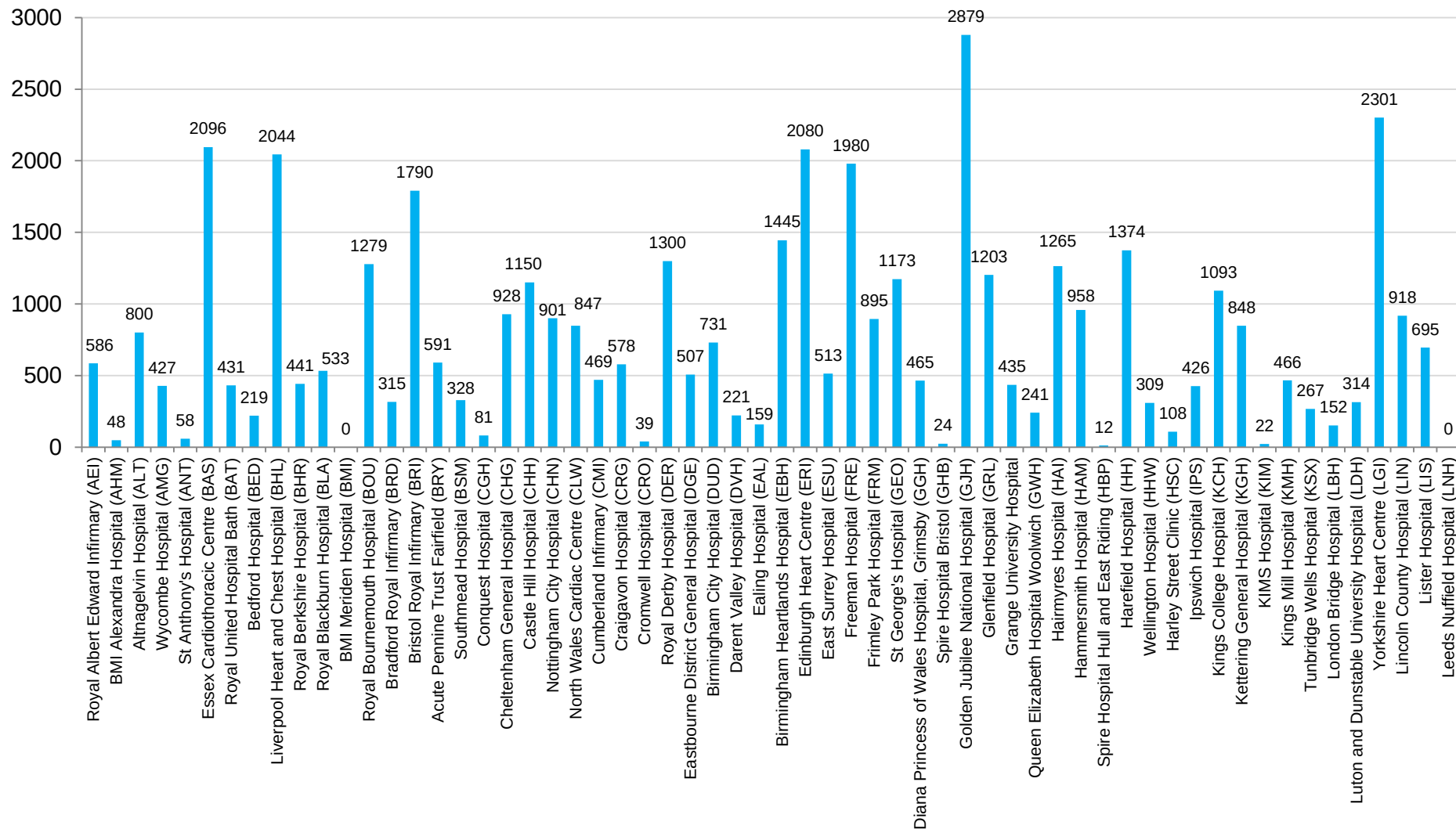
Number of PCIs per Centre

Ordered by 2020-21 activity (part 2)



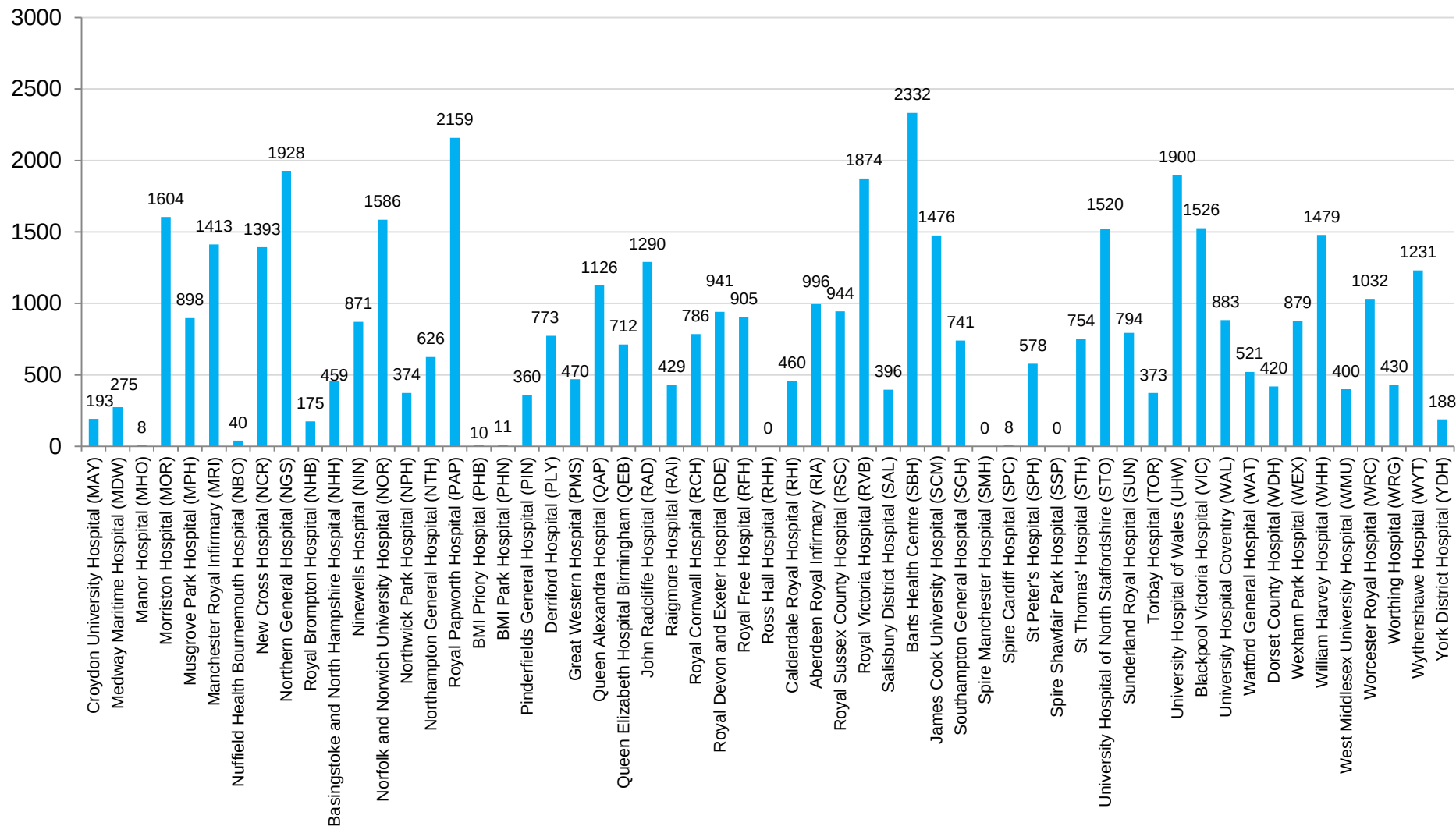
Number of PCIs per Centre

(Hosp code A to L)



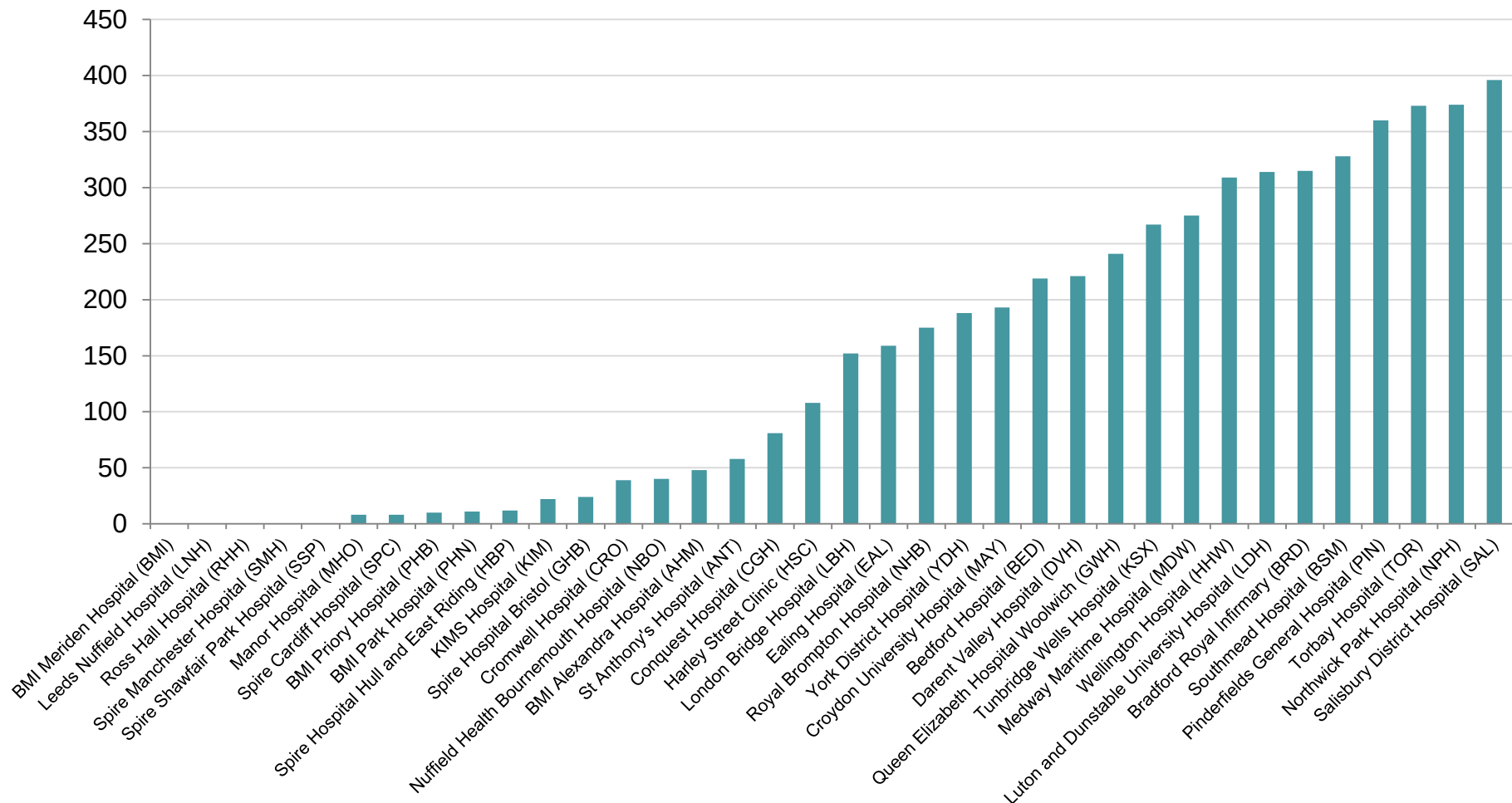
Number of PCIs per Centre

(Hosp code M to Z)



Centres < 400 PCIs

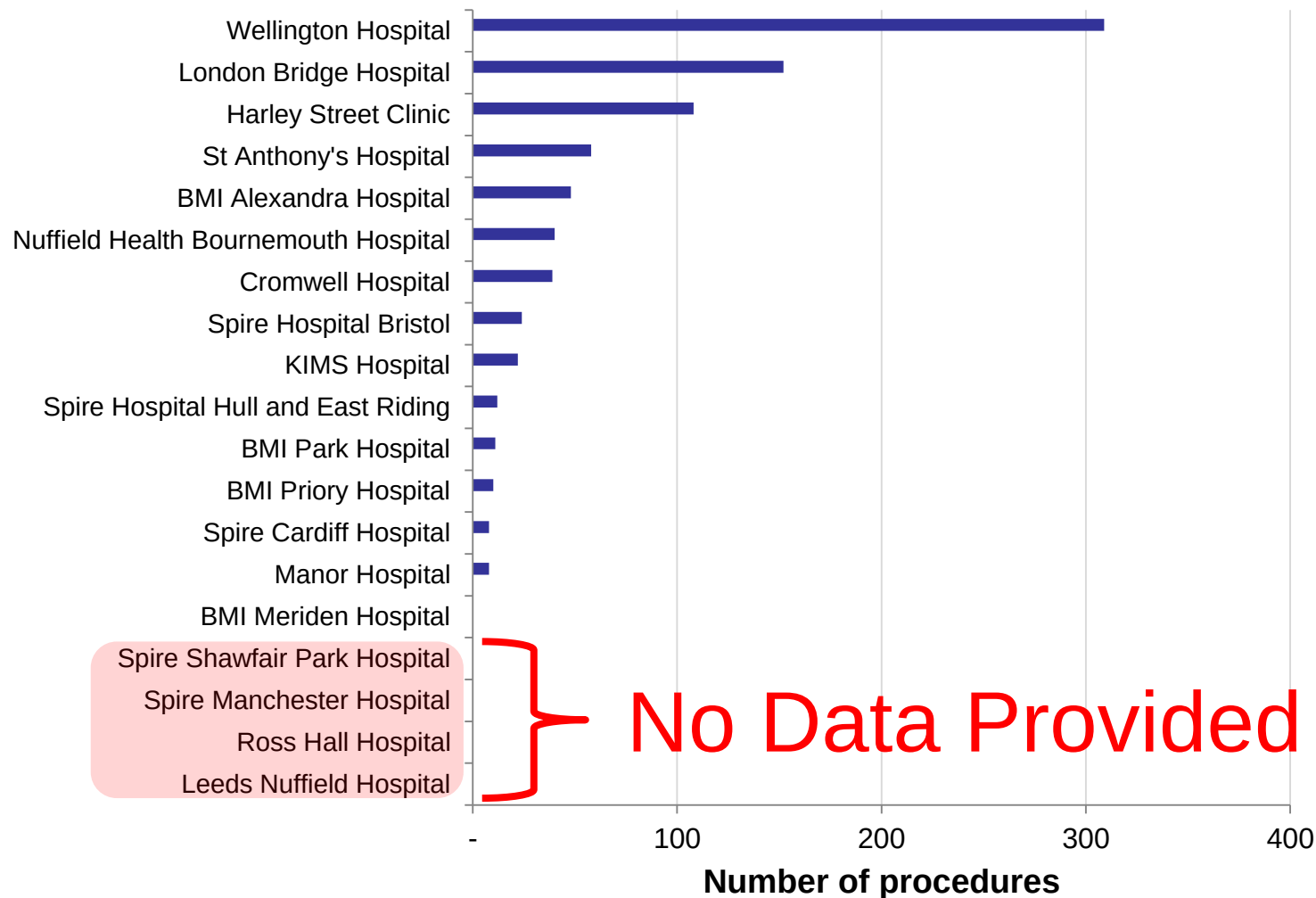
NHS and Private



36 Centres performing < 400 cases

Centres < 400 PCIs

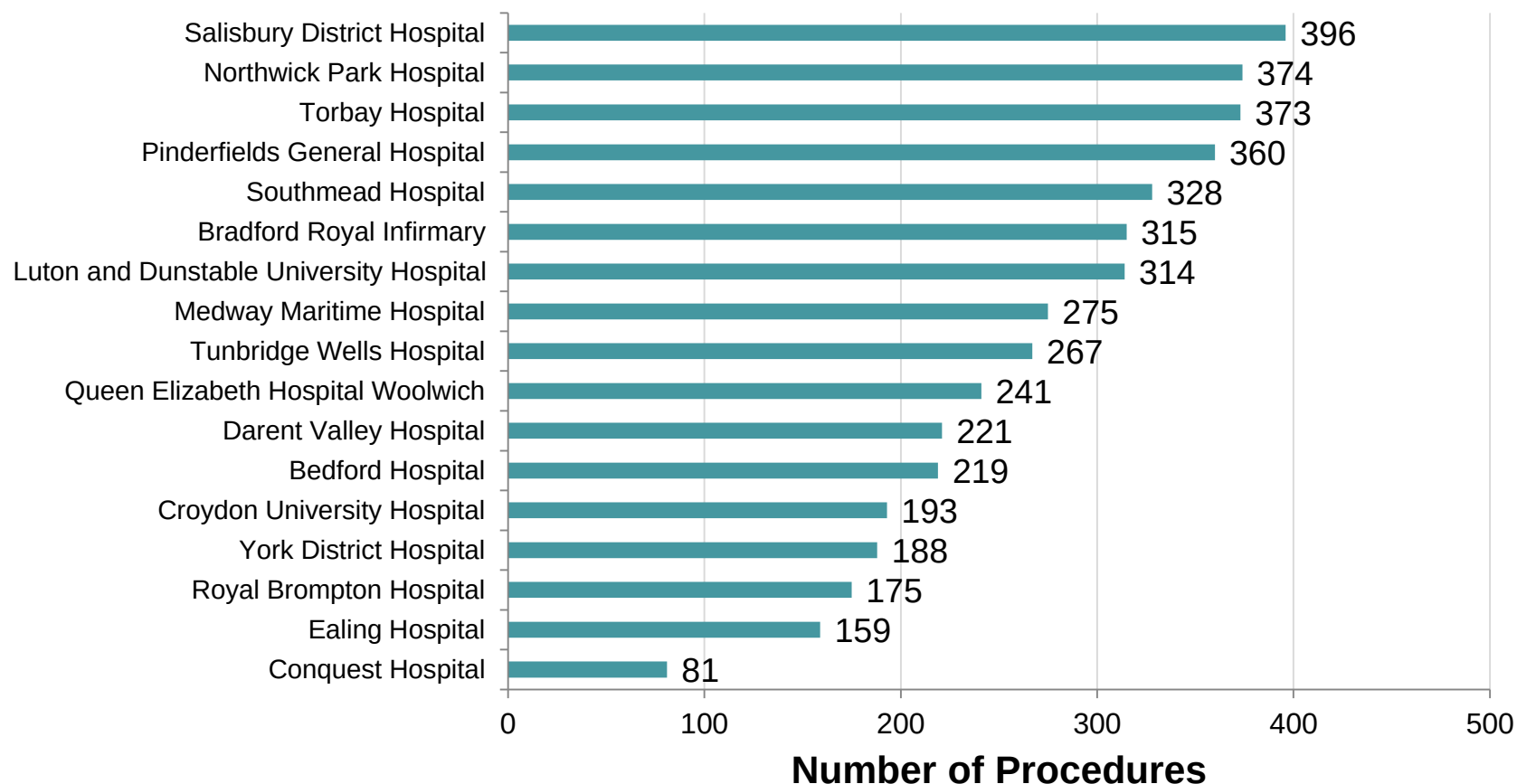
Private



19 Centres performing < 400 cases

Centres < 400 PCIs

NHS

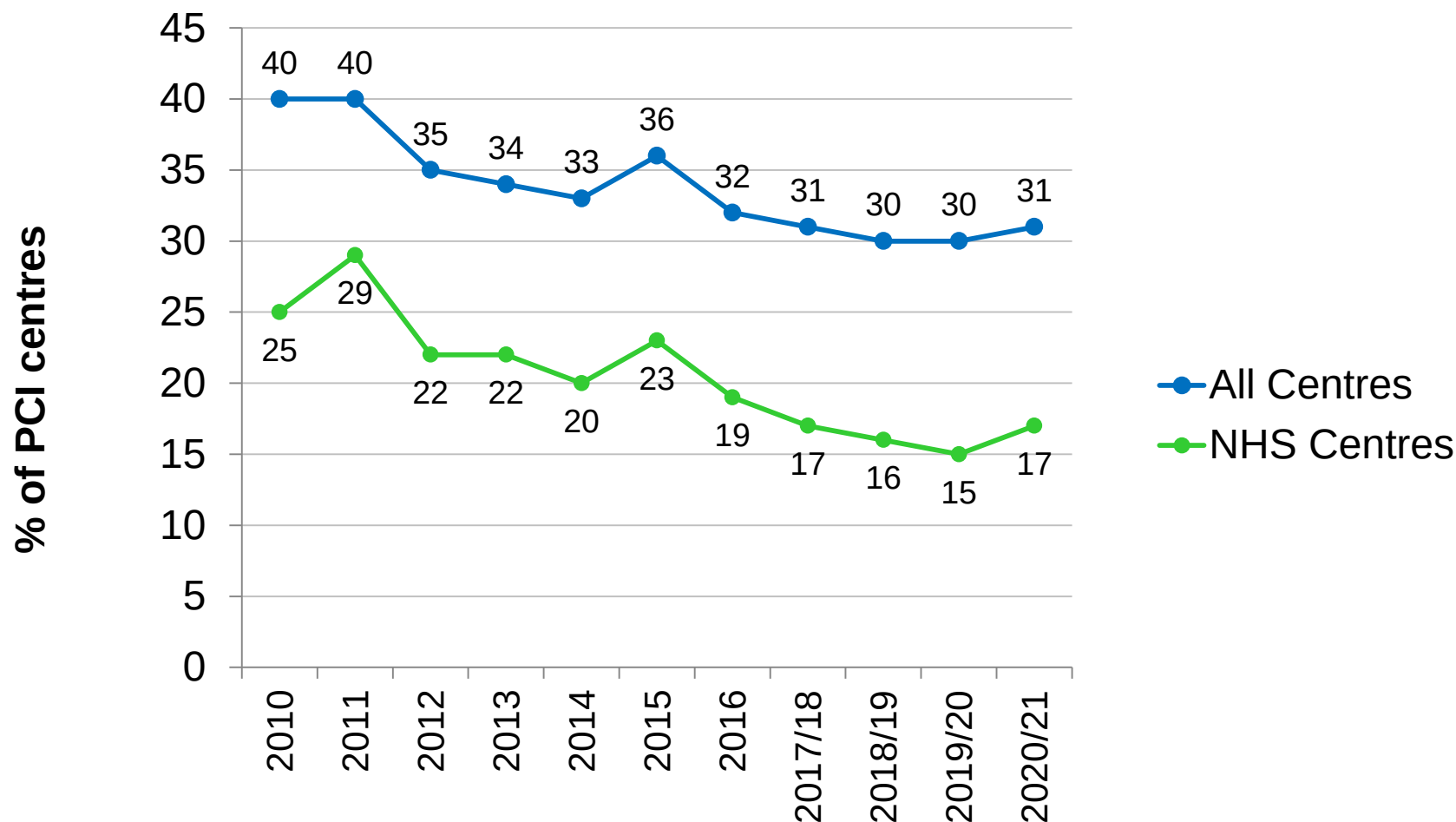


17 Centres performing < 400 cases

5 Centres performing < 200 cases

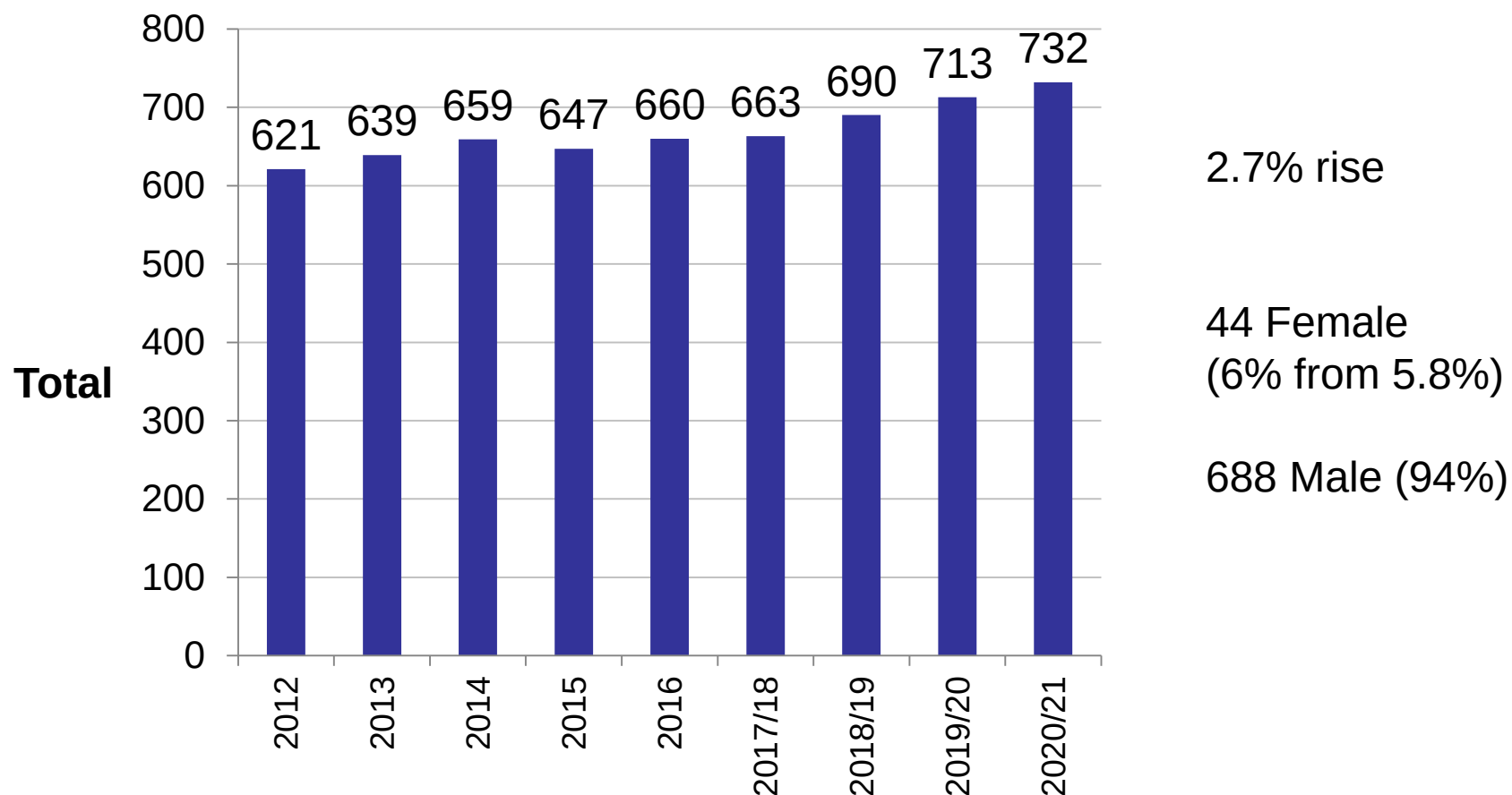
Number of PCIs per Centre

% Centres < 400 cases pa



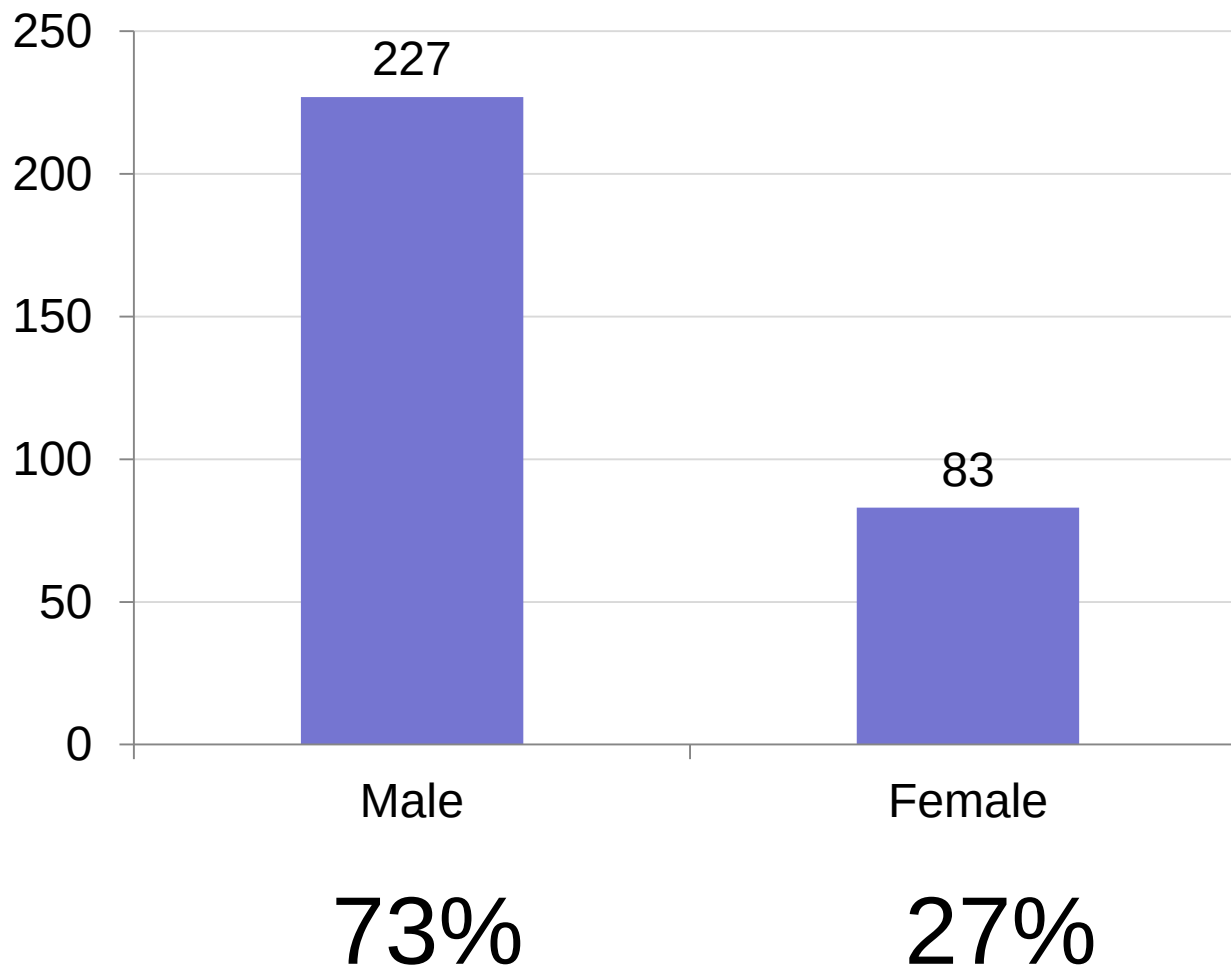
Interventional Consultants

- Number of PCI operators by GMC number

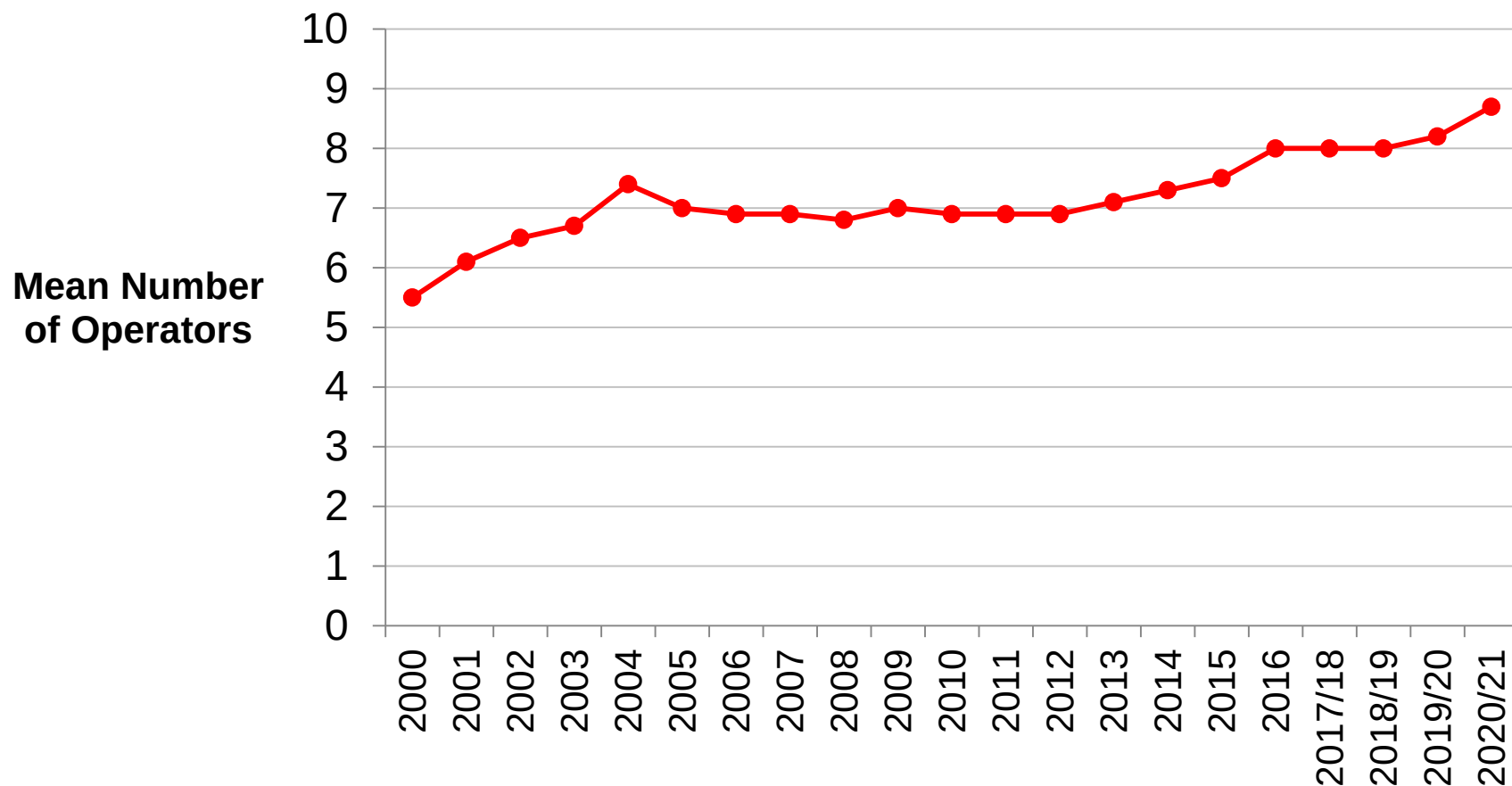


Trainees

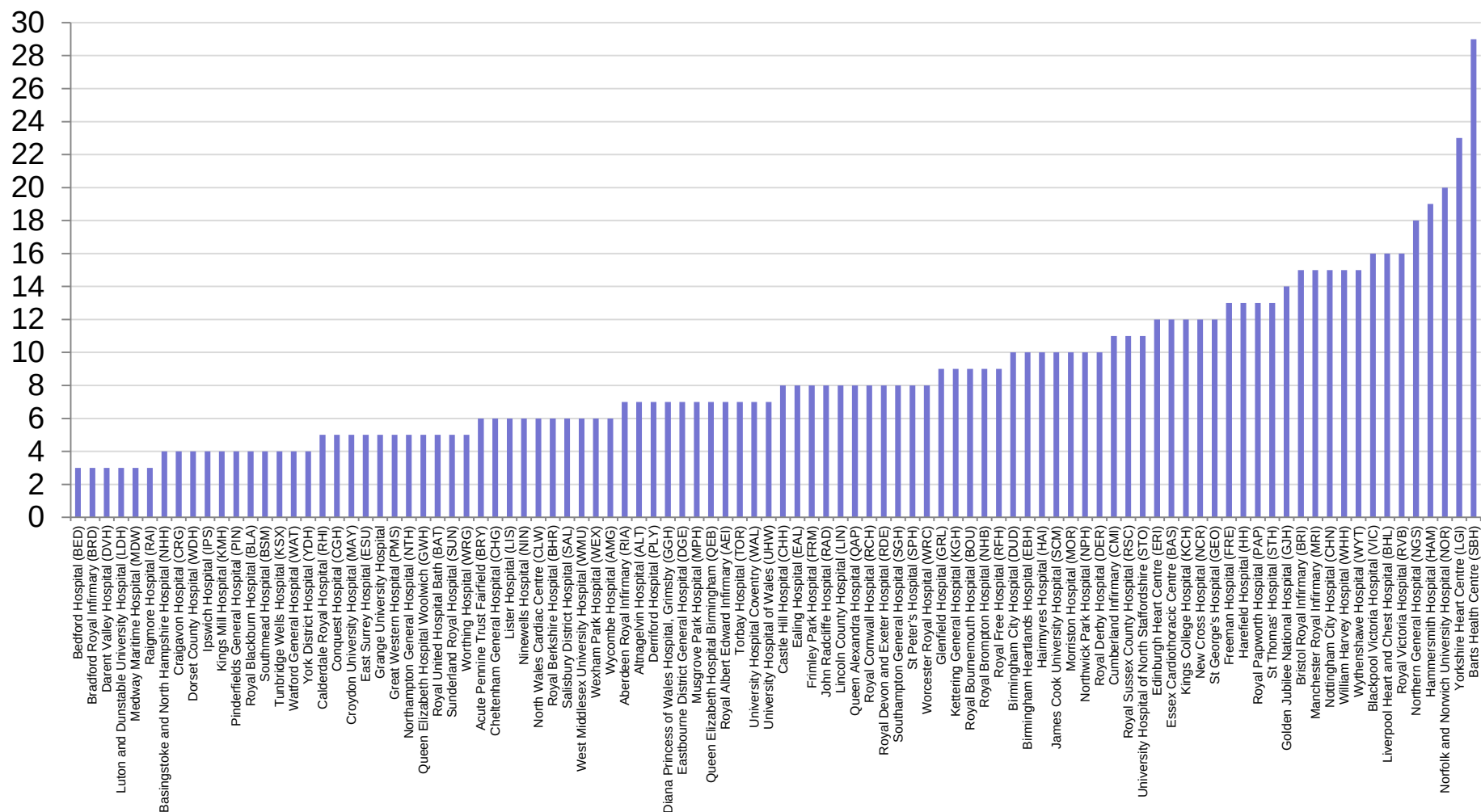
Number of SpRs as PCI trainees 2020/21



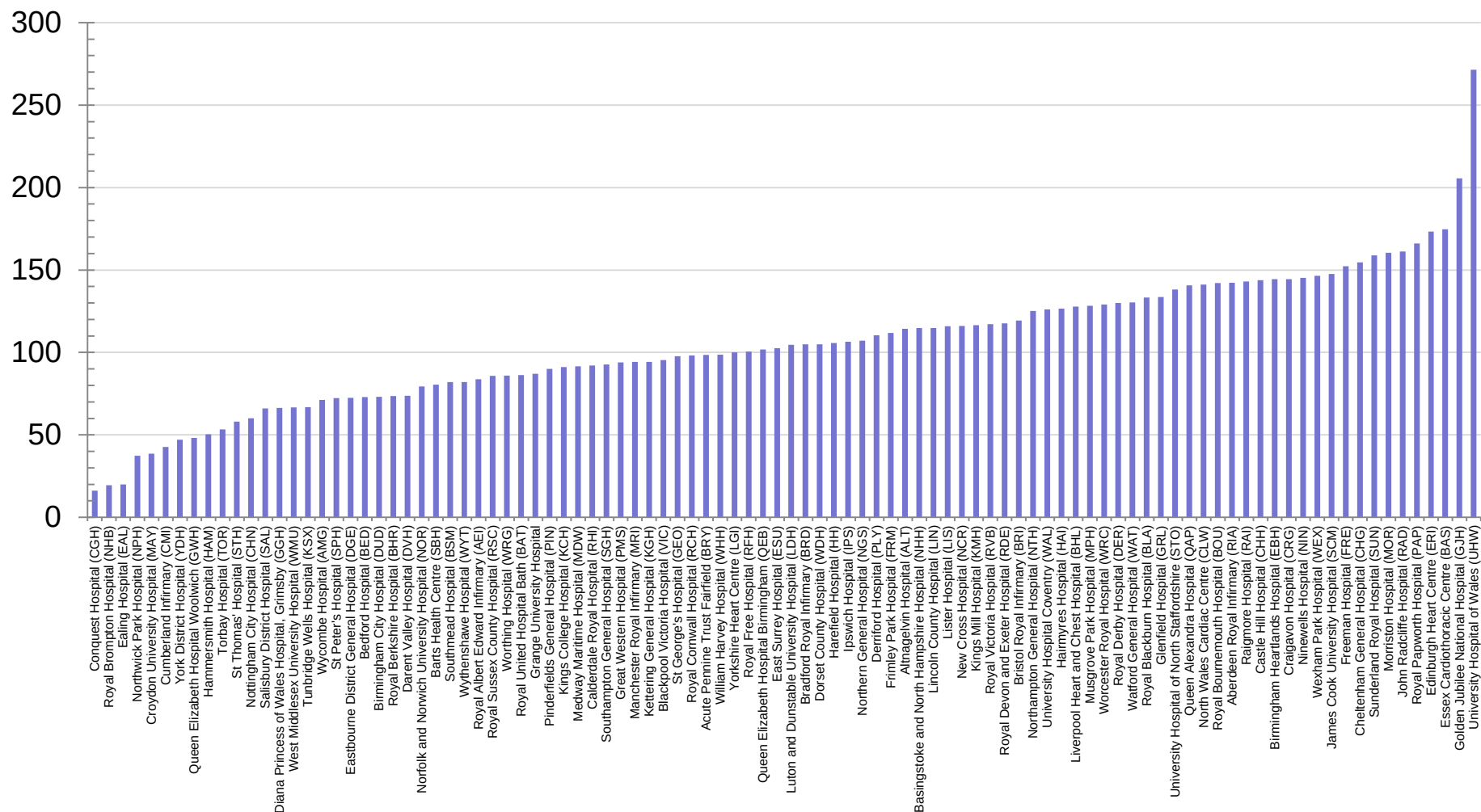
No. of Consultants (Per NHS Centre)



No. of Consultants In NHS centres (2020/21)

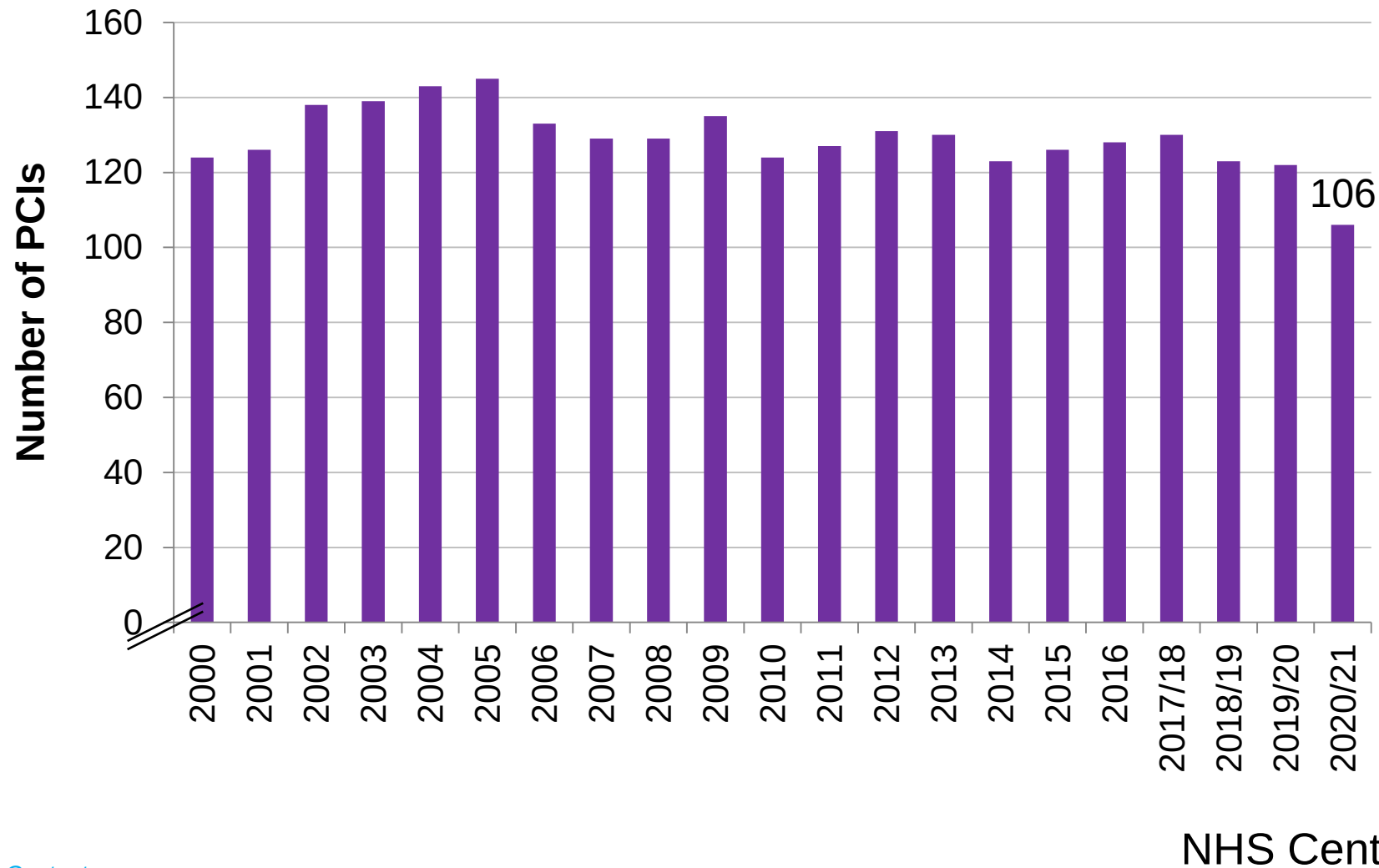


PCIs per Consultant (NHS Centres 2020/21)



PCI per Consultant

PCI Centre case volume / Number of operators



Primary PCI Rotas



Primary Percutaneous Coronary Intervention for ST Elevation Myocardial Infarction
Position statement for Facilities and Emergency Medical Staffing July 2016

MacCarthy PA, Blackman DJ, Hildick-Smith D, Banning AP

2 Staffing Standards

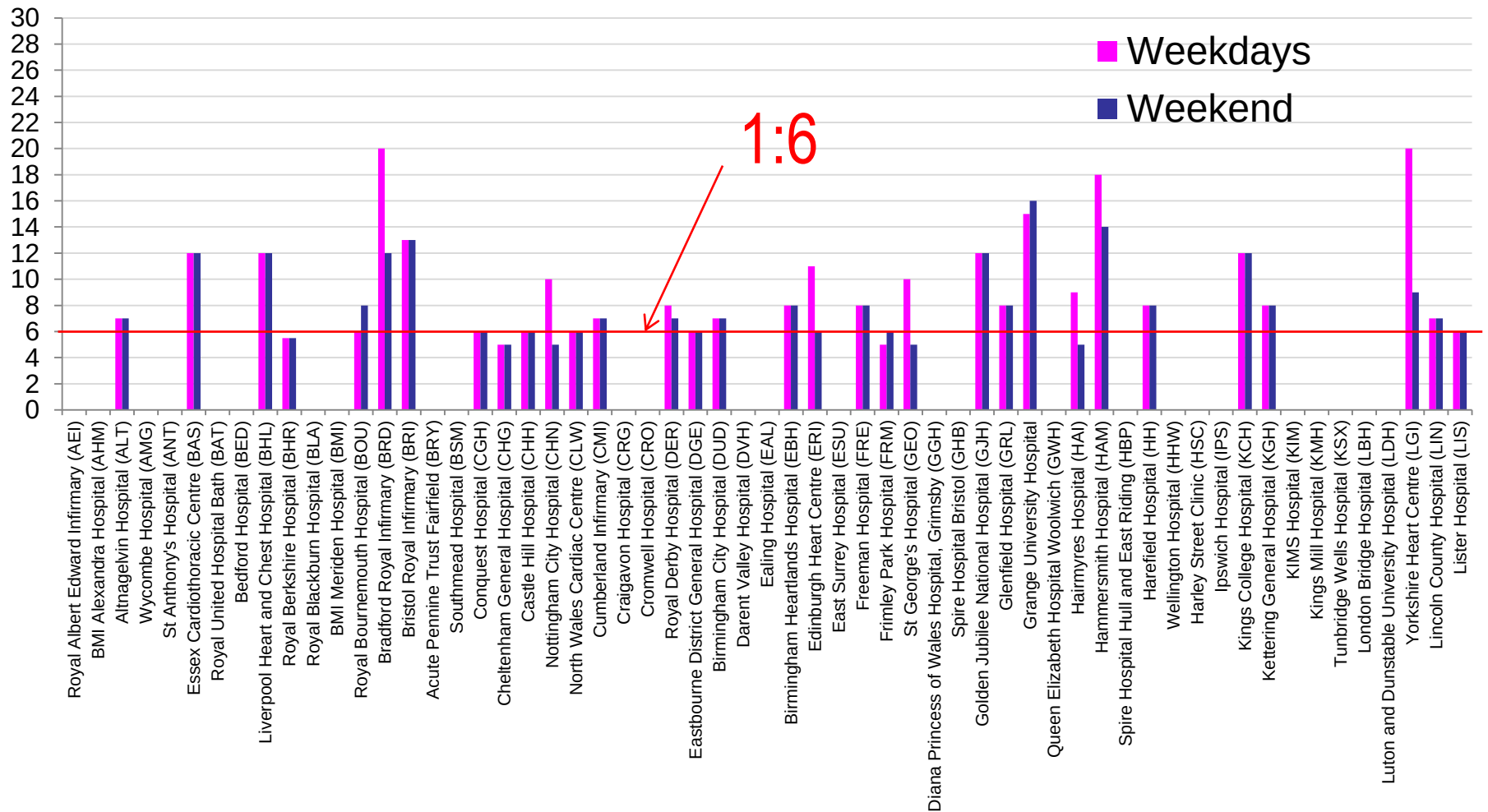
2.1 Primary PCI rotas:

Key Recommendations

- The maximum frequency of on-call rota for any individual should not be more frequent than 1:6
- A Consultant Interventional Cardiologists rota will include:-
 - One half-day of compensatory rest for each full day of consecutive on-call in lower volume centres (<400 PPCI procedures per year)
 - One full day of compensatory rest for each full day of consecutive on-call in higher volume centres ($\geq$ 400 PPCI procedures per year)

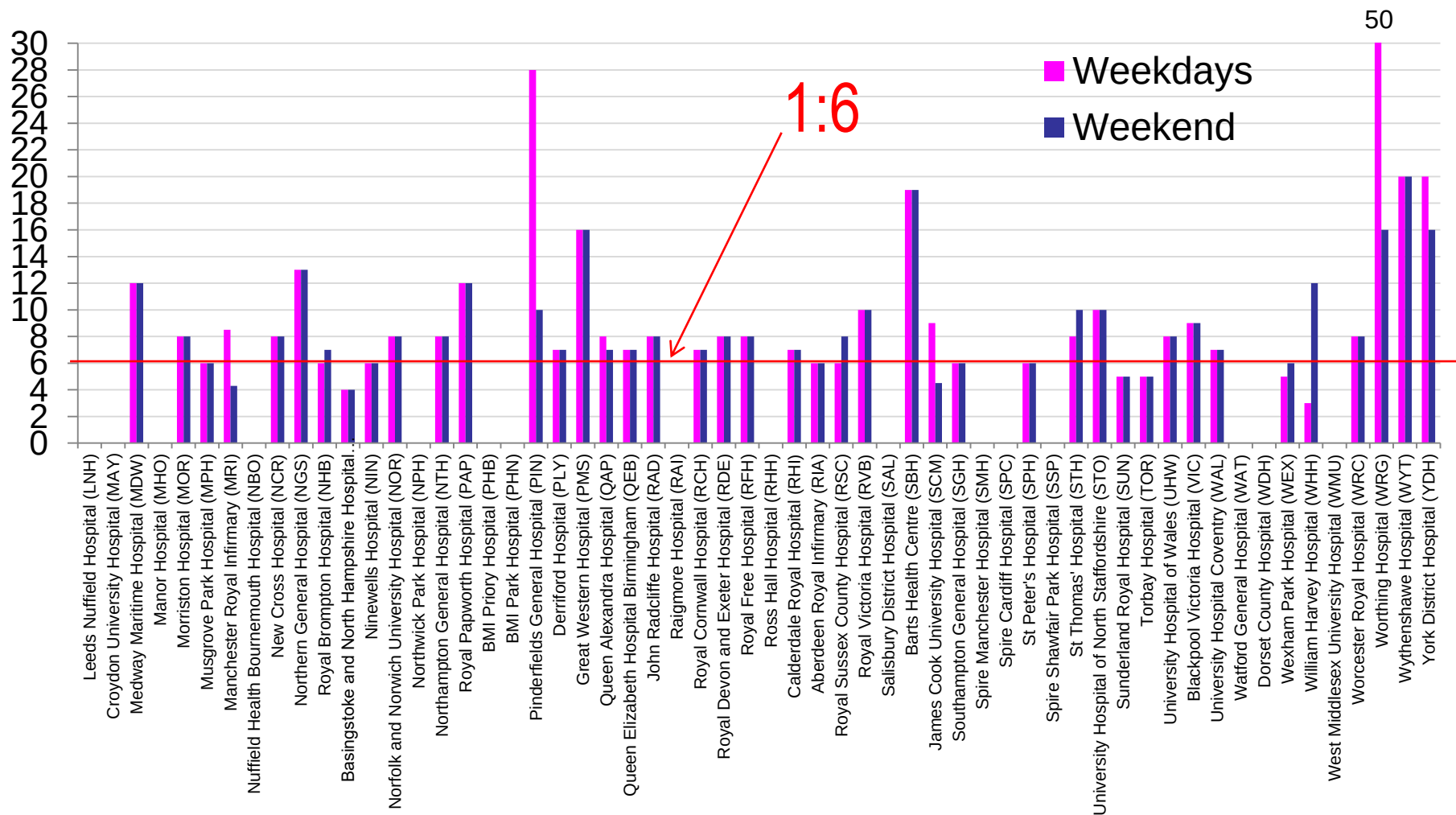
PPCI

On call Rotas (unit codes AEI to LIS)



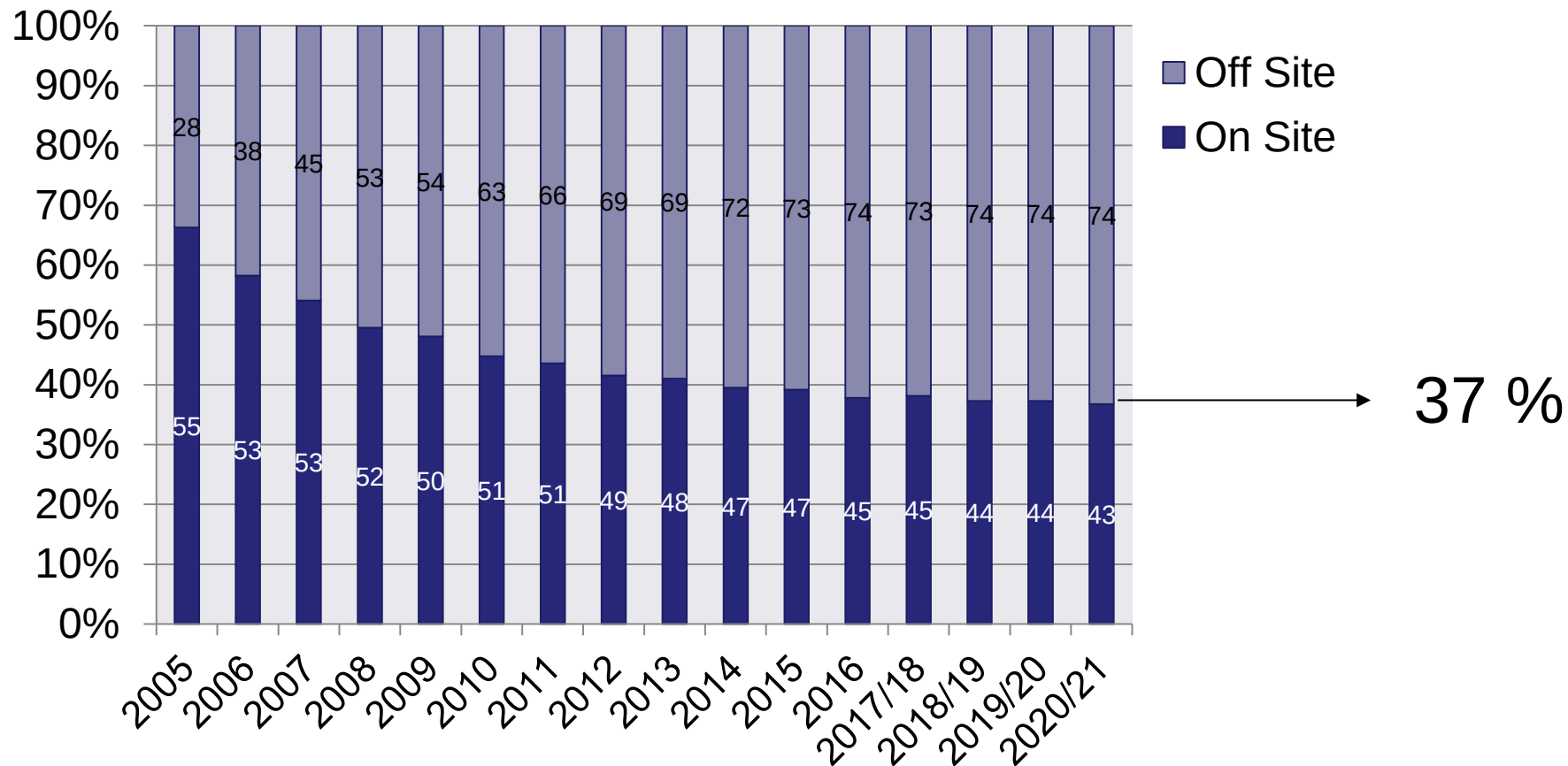
PPCI

On call Rotas (LHN to YDH)



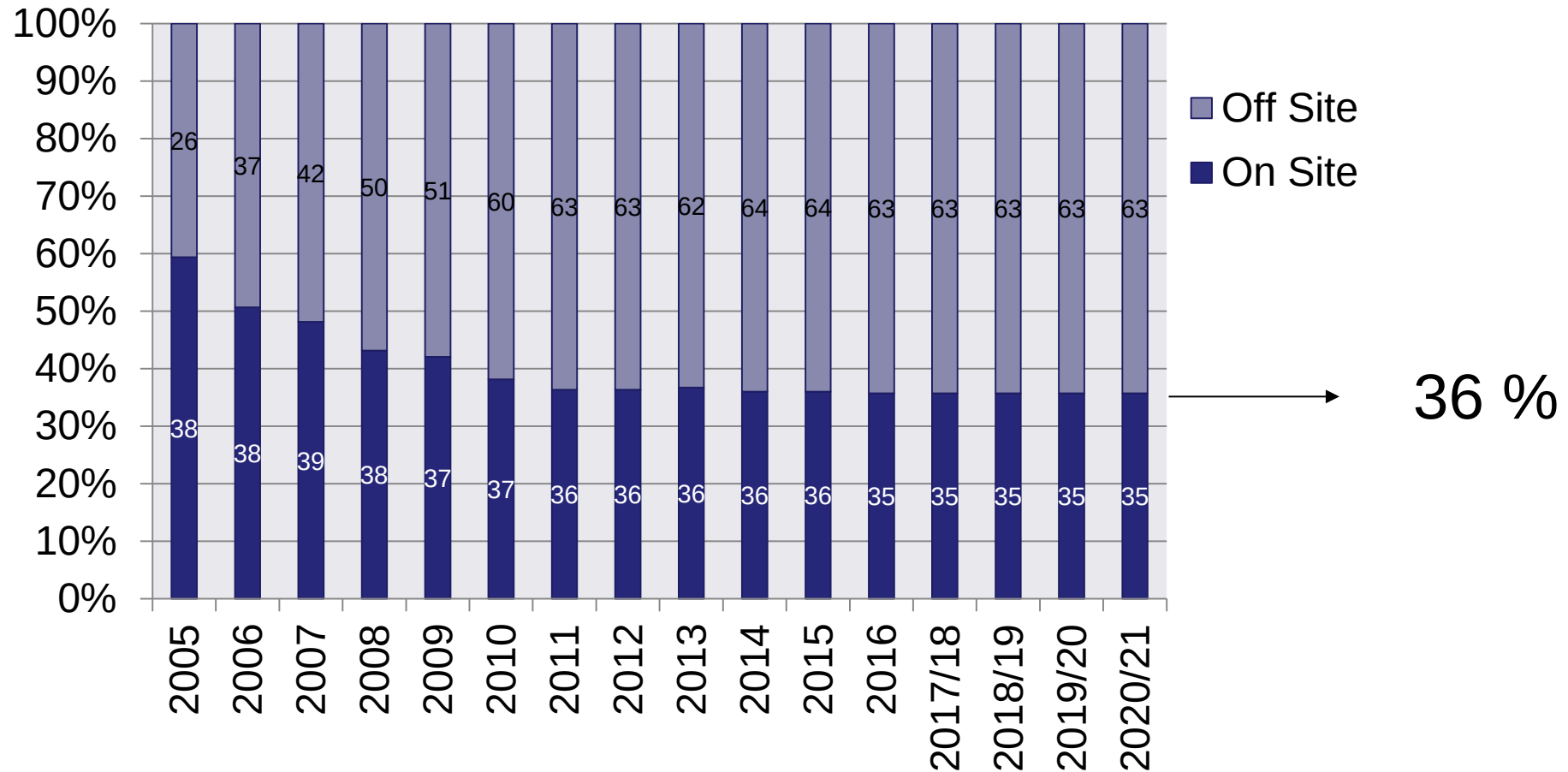
On v Off Site Surgery

All Centres (NHS and private)



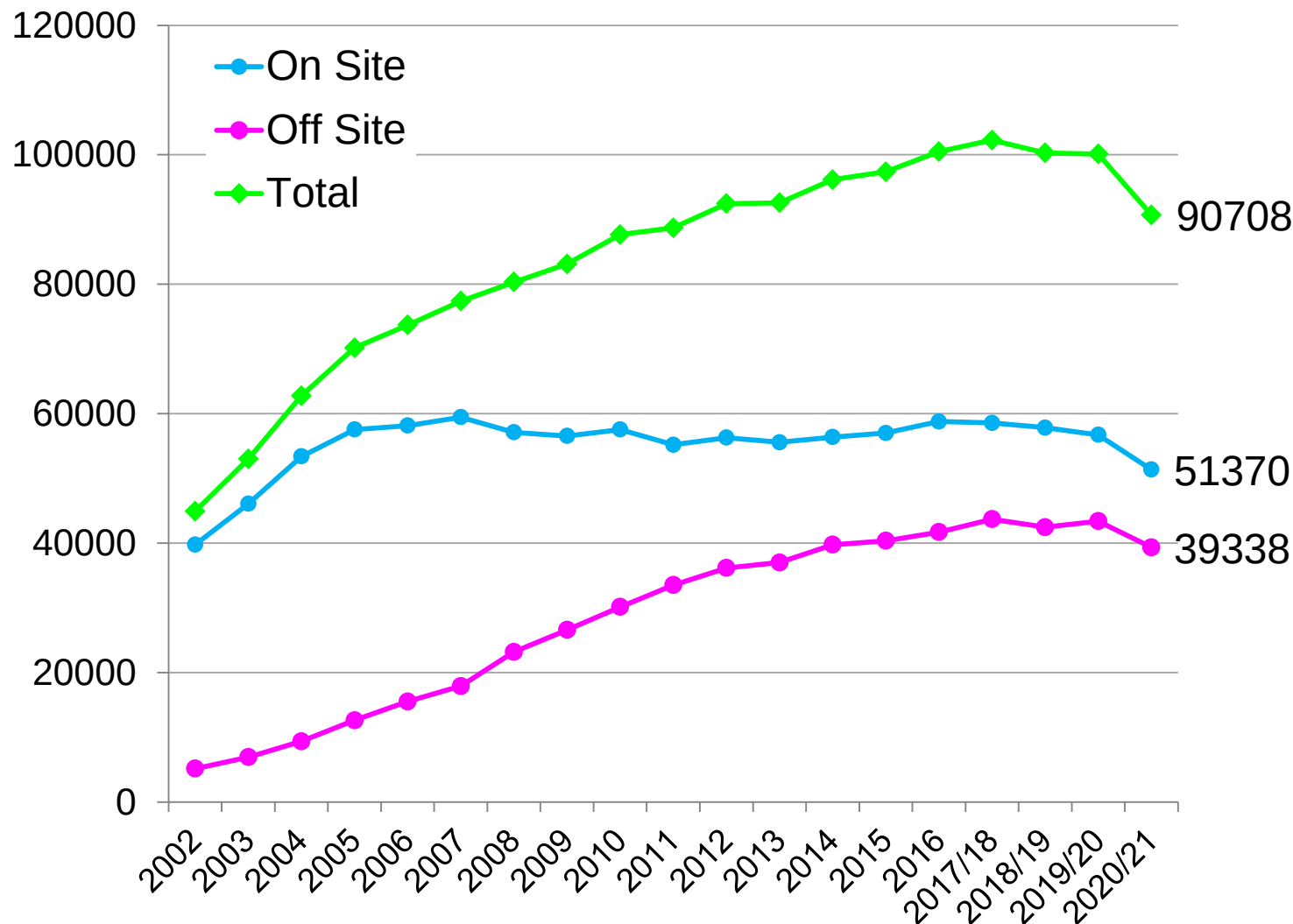
On v Off Site Surgery

NHS Centres Only



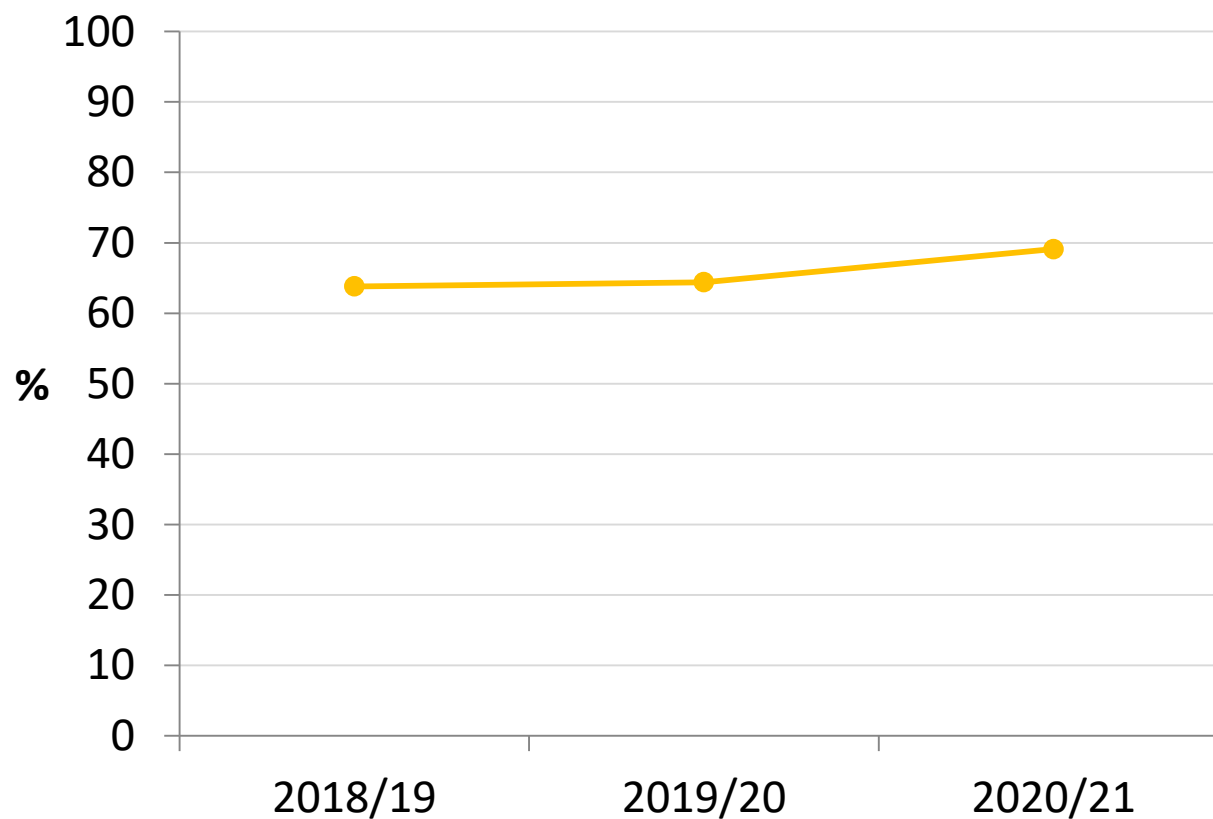
Total Number of PCIs

By Surgical cover NHS & Private



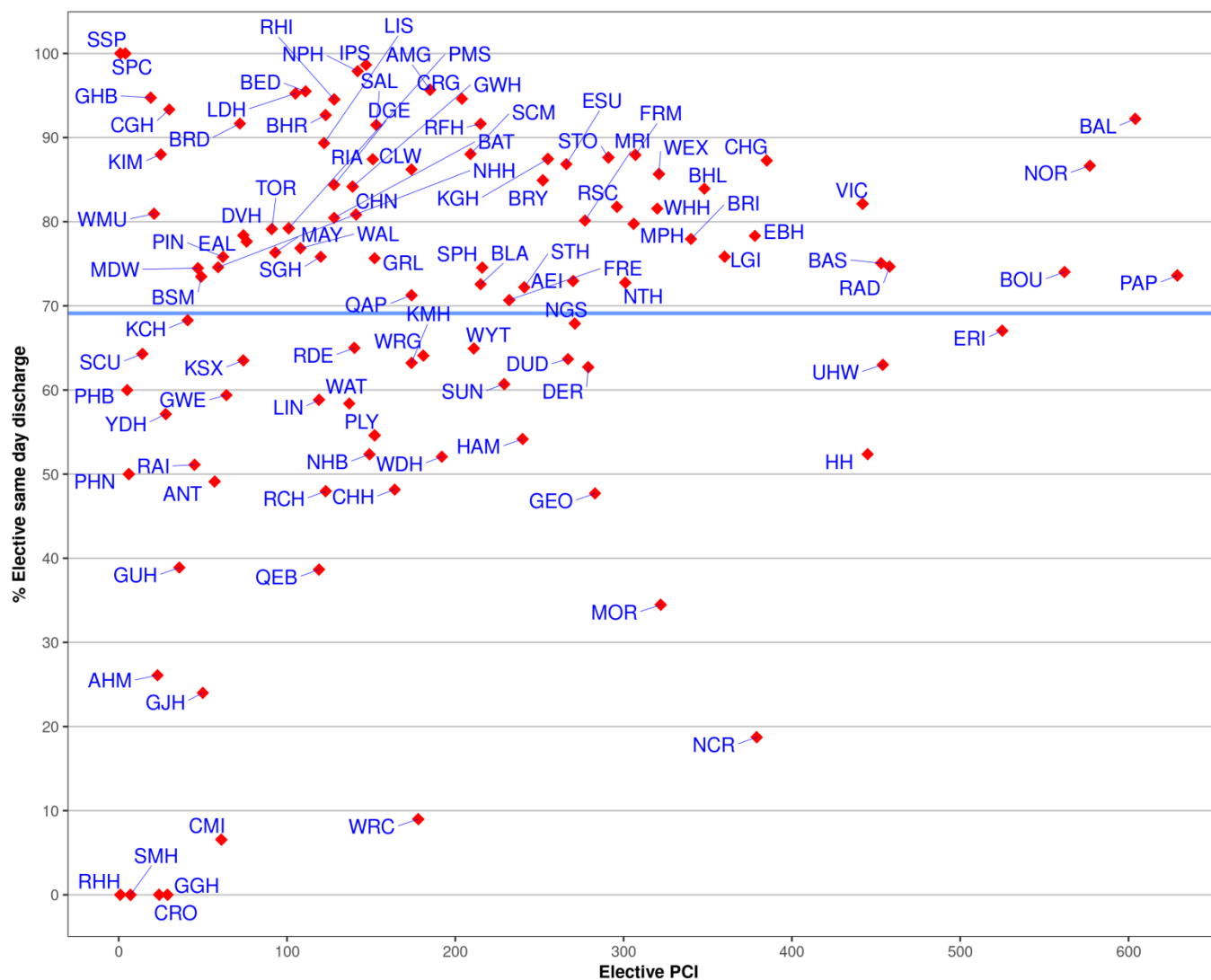
Day Case PCI

Elective Procedures - Trends



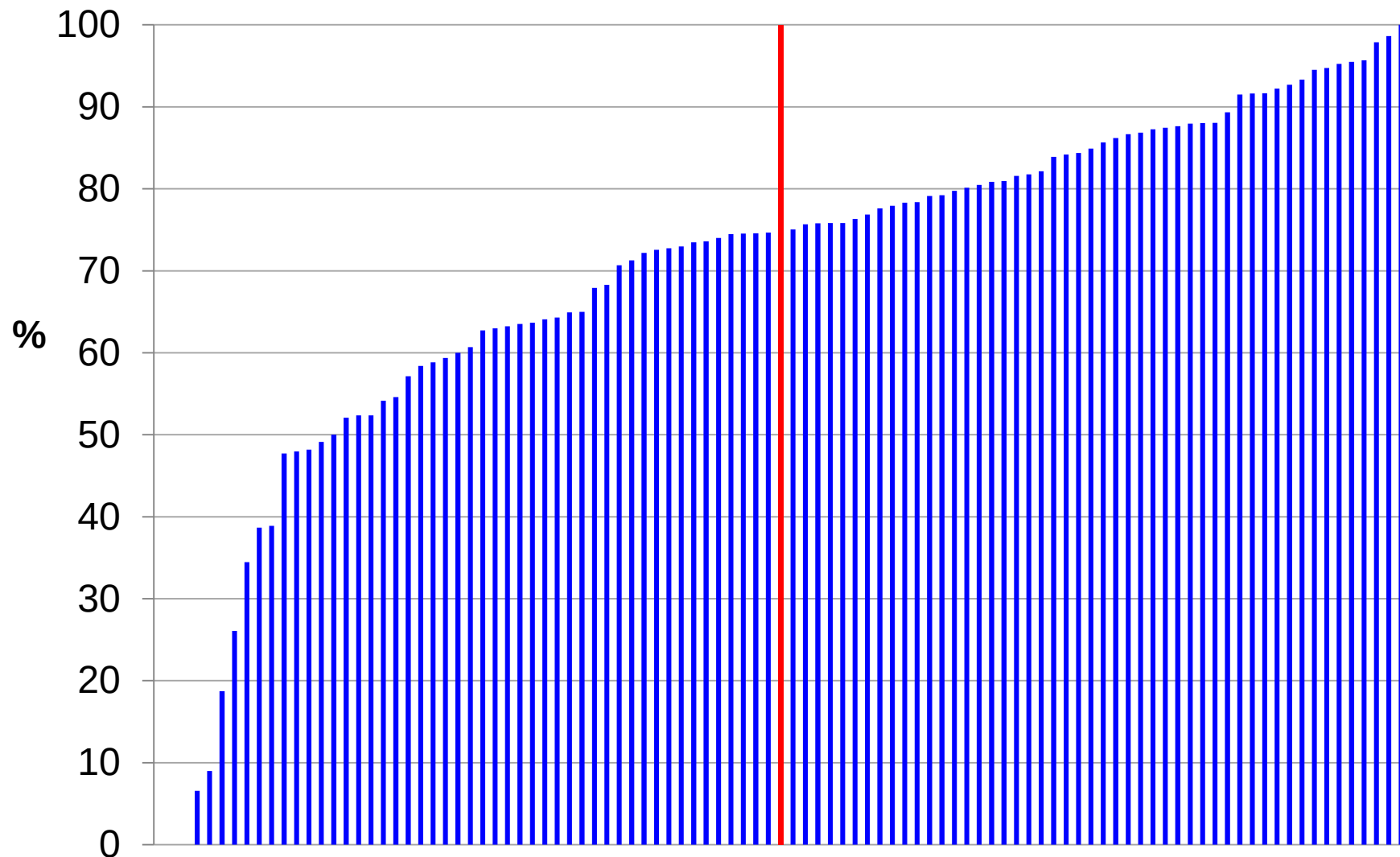
Day Case PCI

Elective Procedures



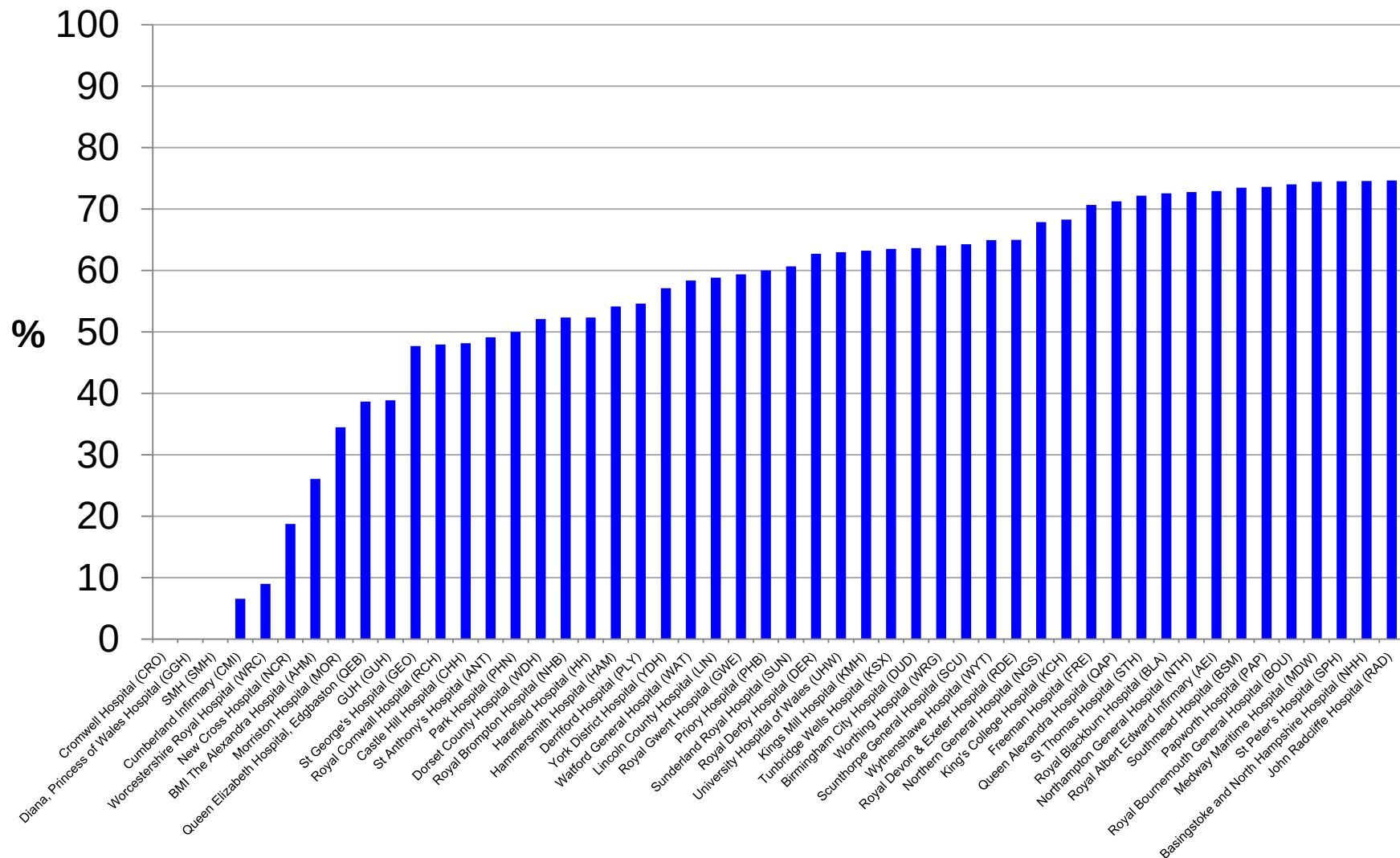
Day Case PCI

Planned Elective Procedures



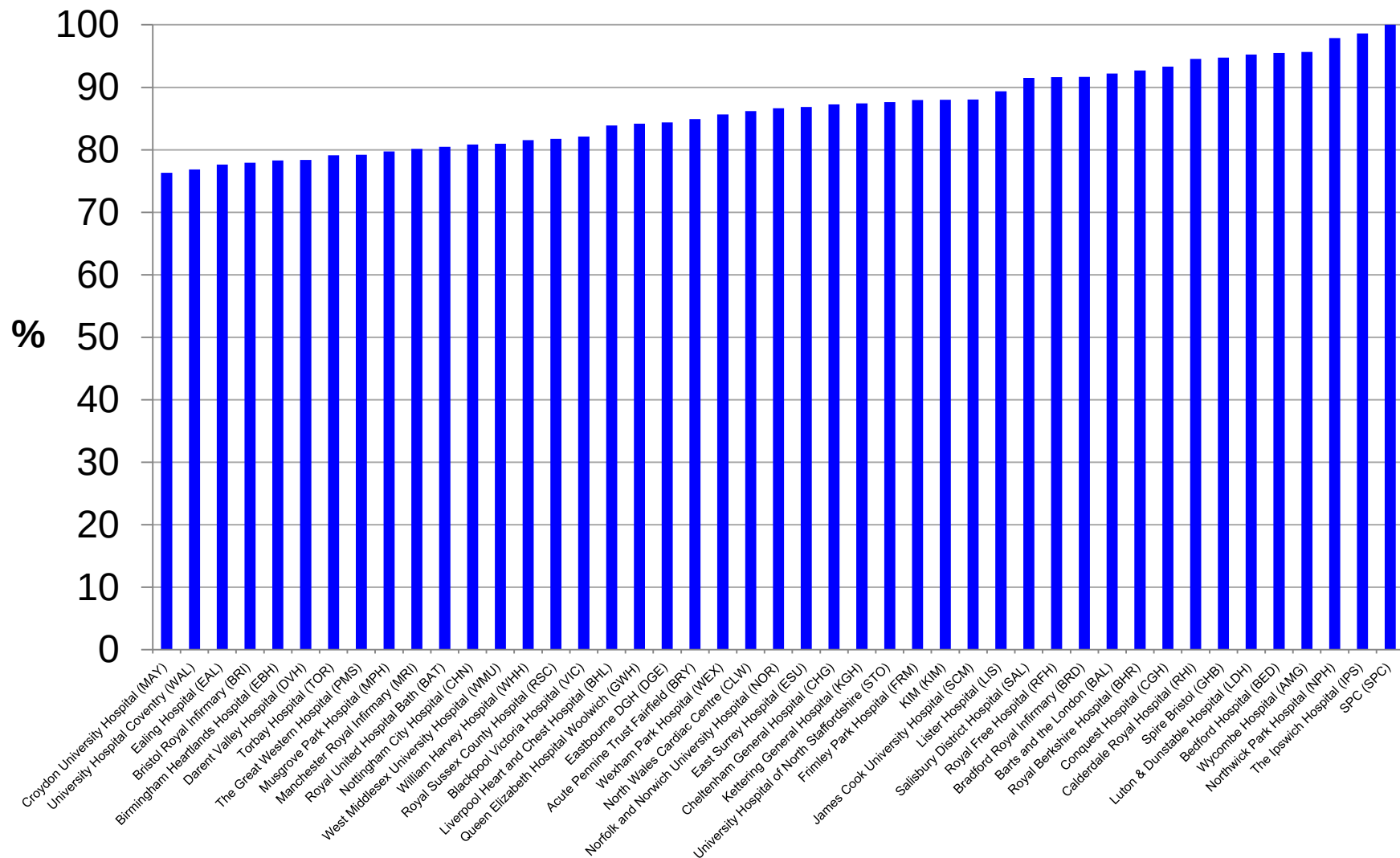
Day Case PCI

Planned Elective Procedures (0-75%)



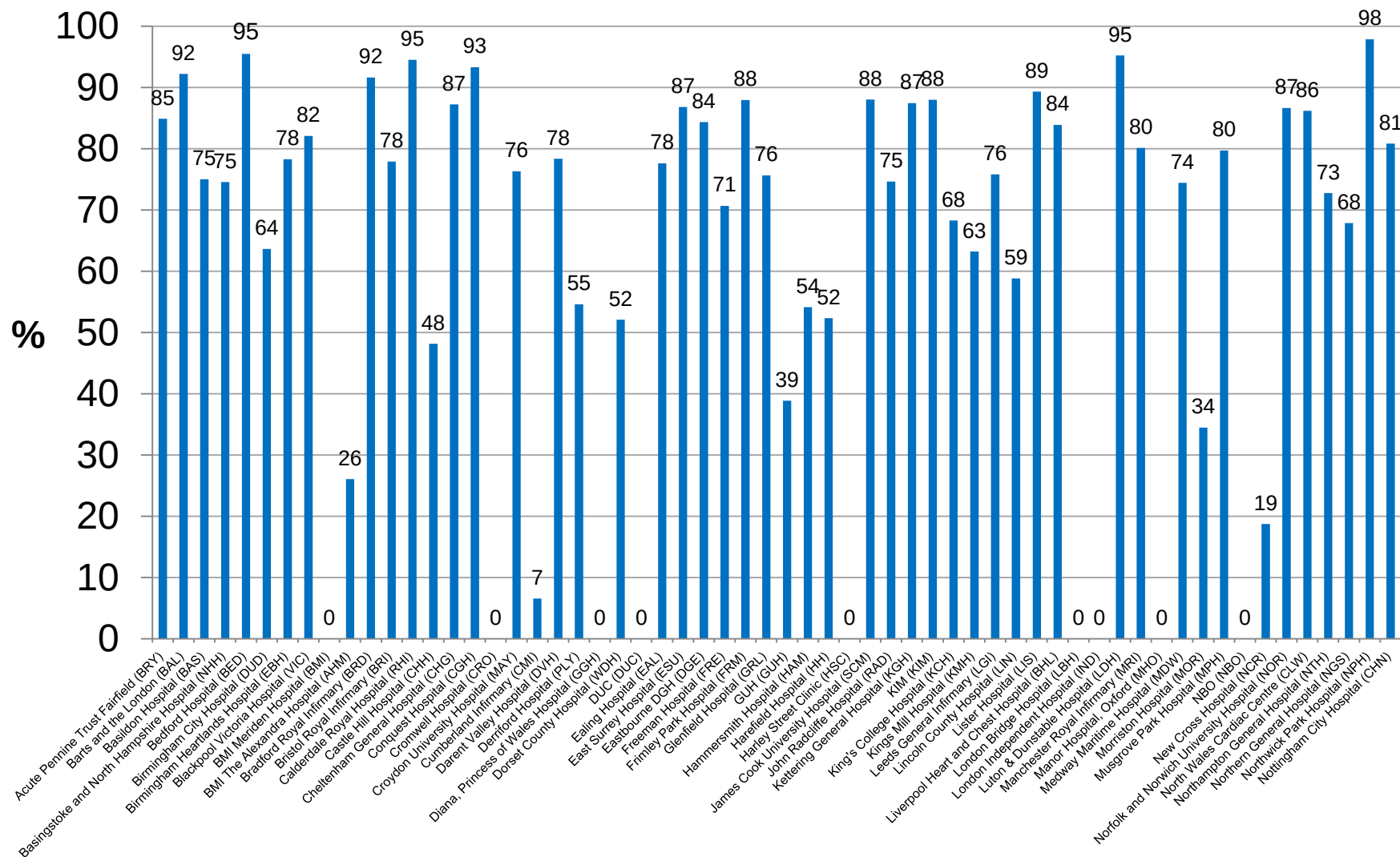
Day Case PCI

Planned Elective Procedures (> 75%)



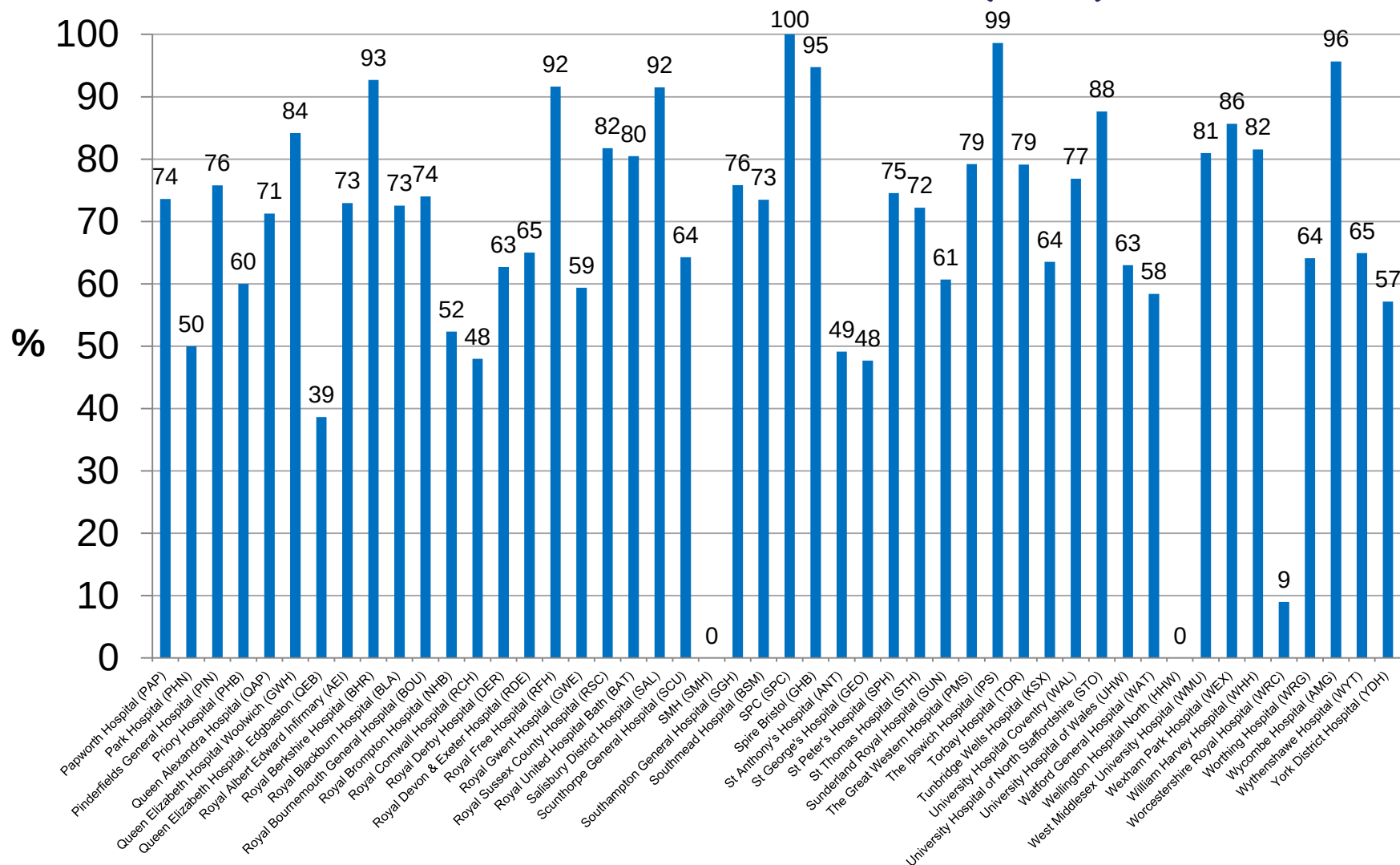
Day Case PCI

Planned Elective Procedures (A-N)

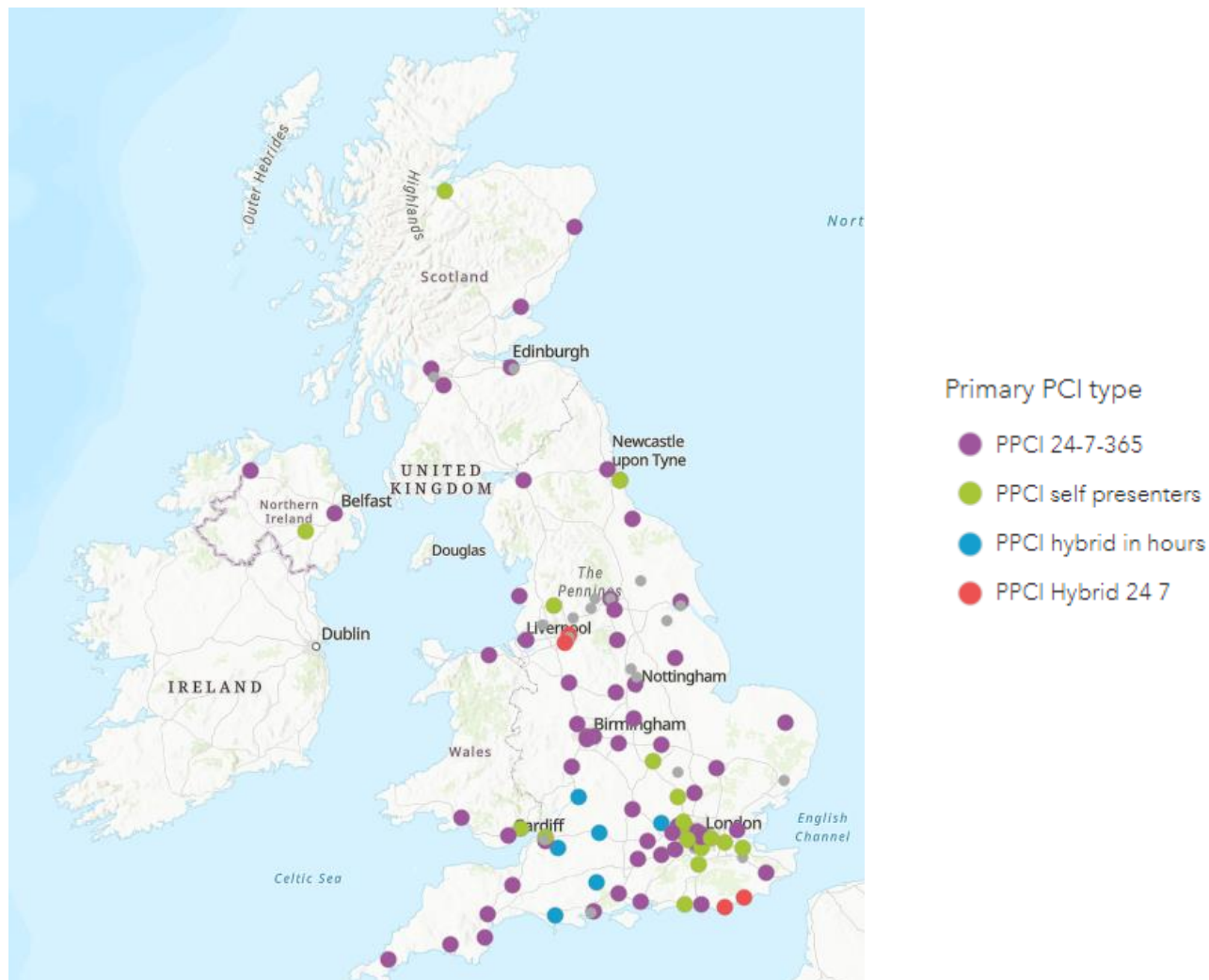


Day Case PCI

Planned Elective Procedures (O-Z)



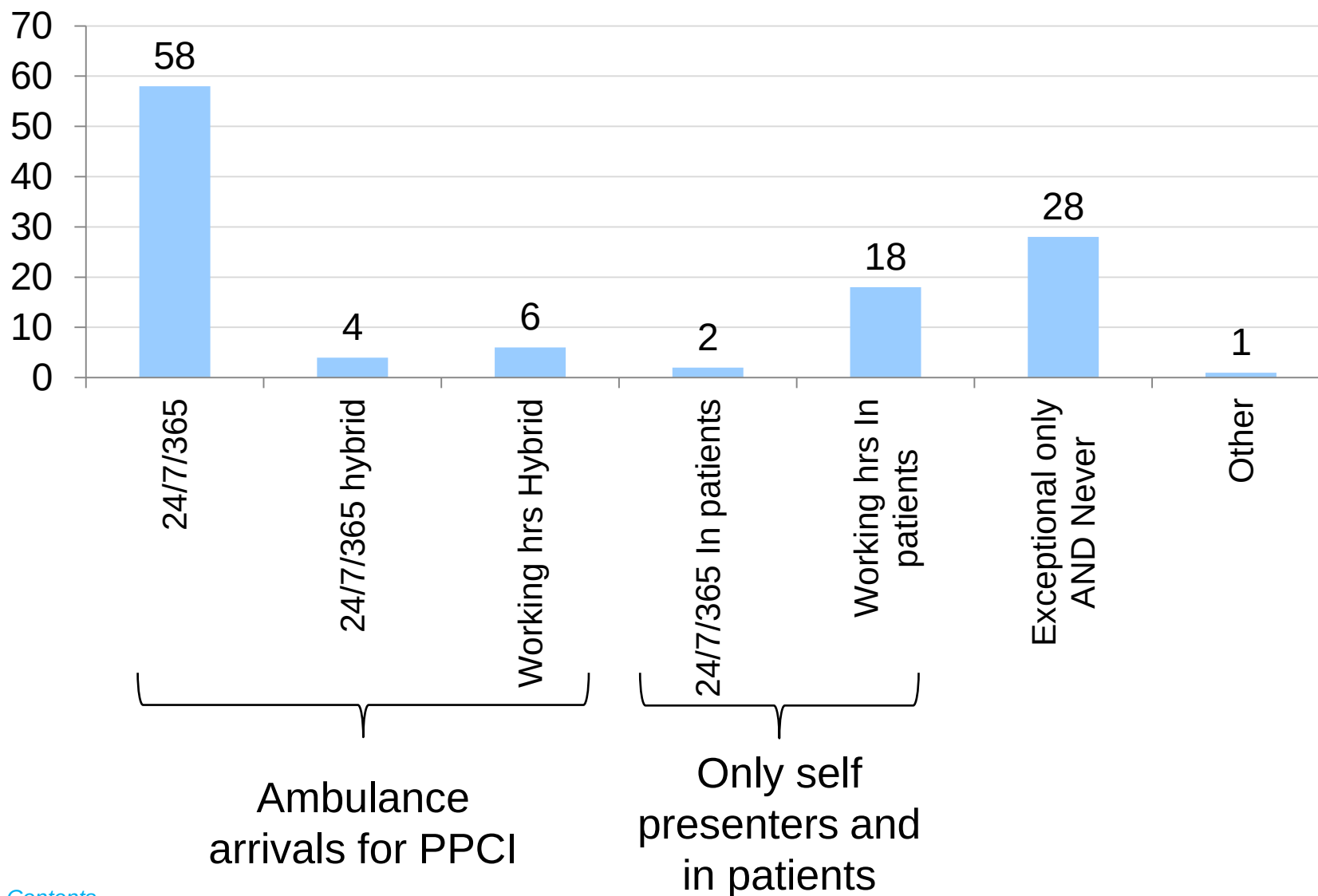
Primary PCI 2020/21



Interactive map: <https://arcg.is/0uW0av>

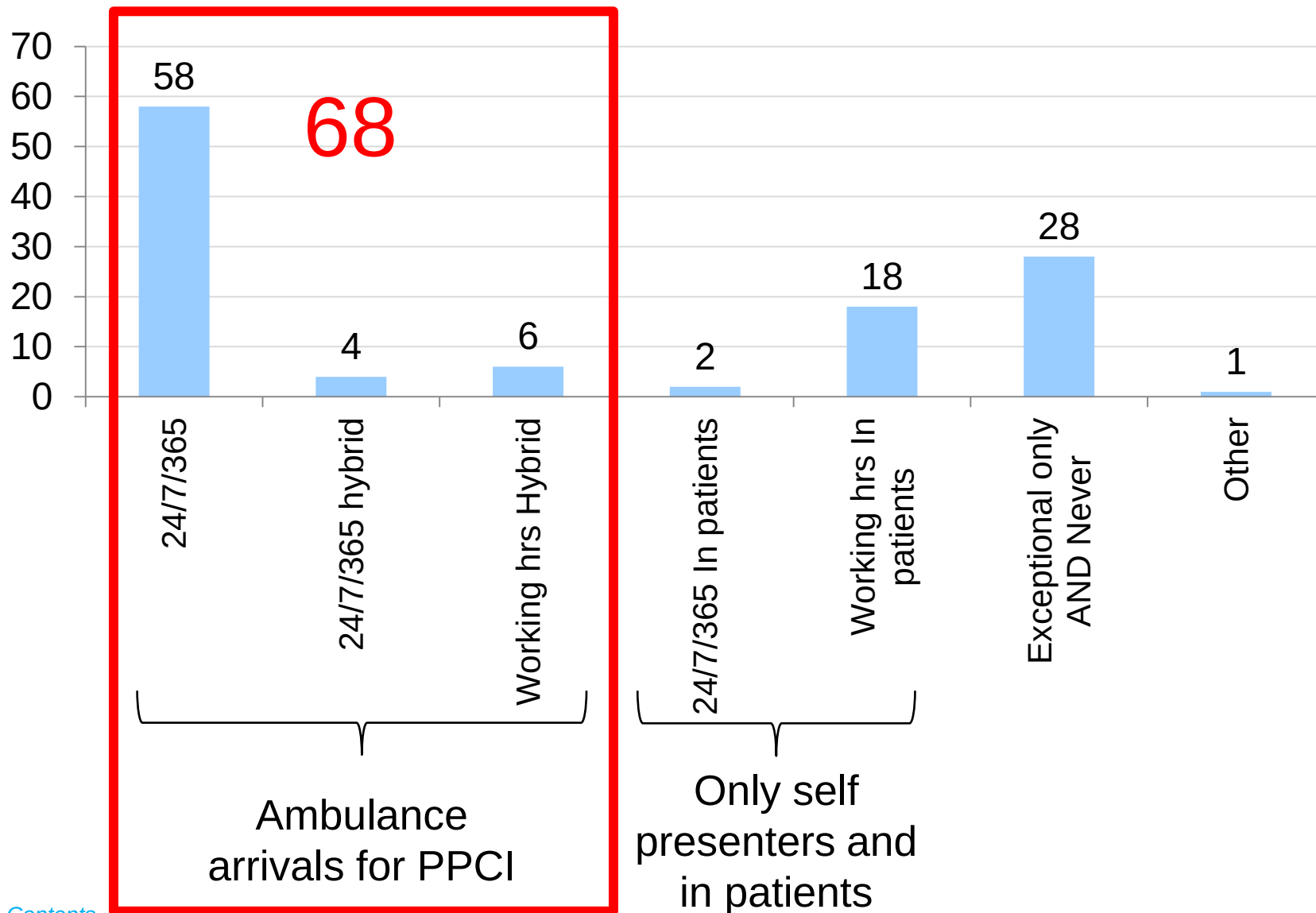
Primary PCI

Pattern of activity offered (NHS 2020/21)



Primary PCI

Pattern of activity offered (NHS 2020/21)



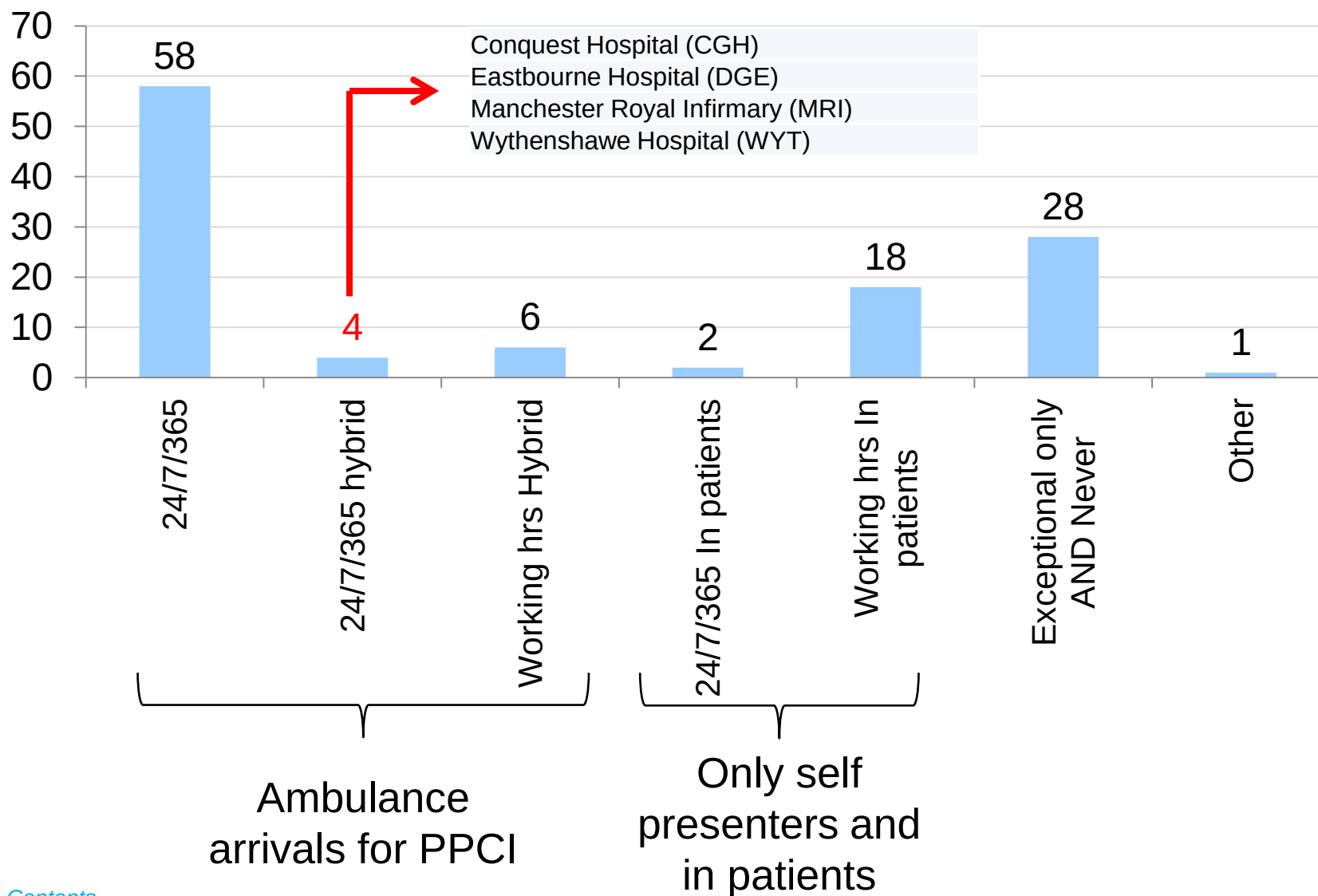
Primary PCI

Pattern of activity offered (NHS 2020/21)



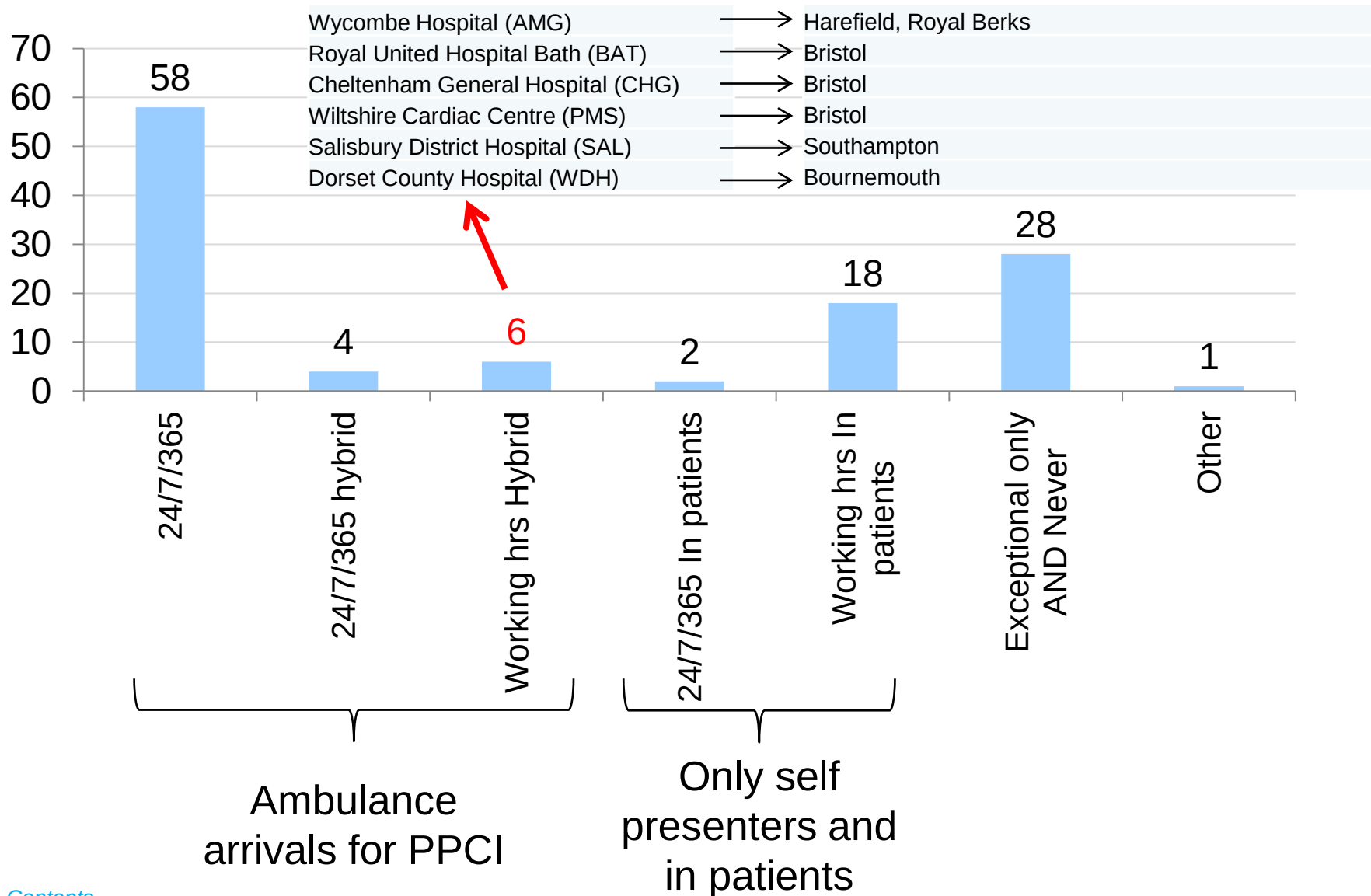
Primary PCI

Pattern of activity offered (NHS 2020/21)



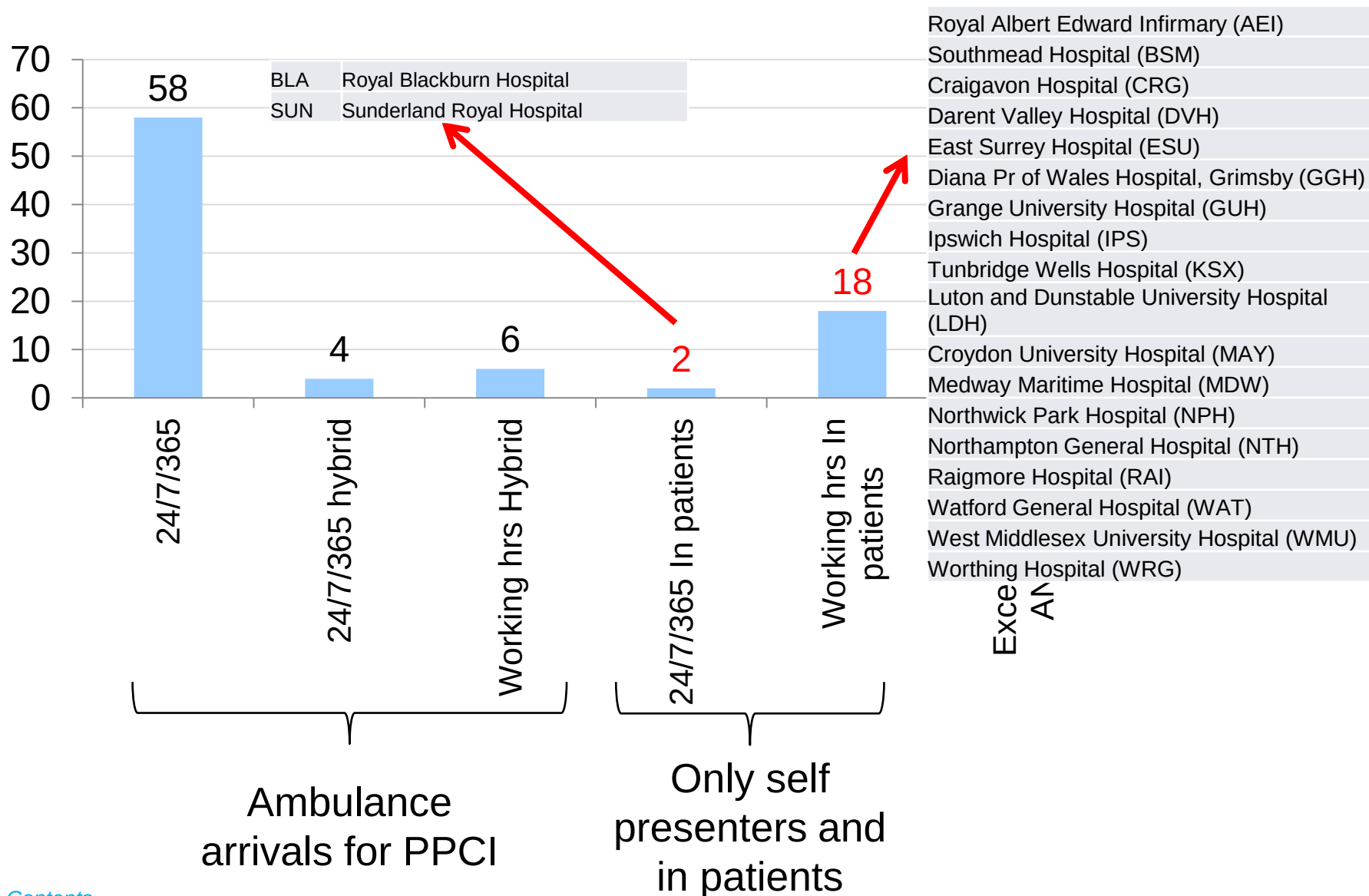
Primary PCI

Pattern of activity offered (NHS 2020/21)



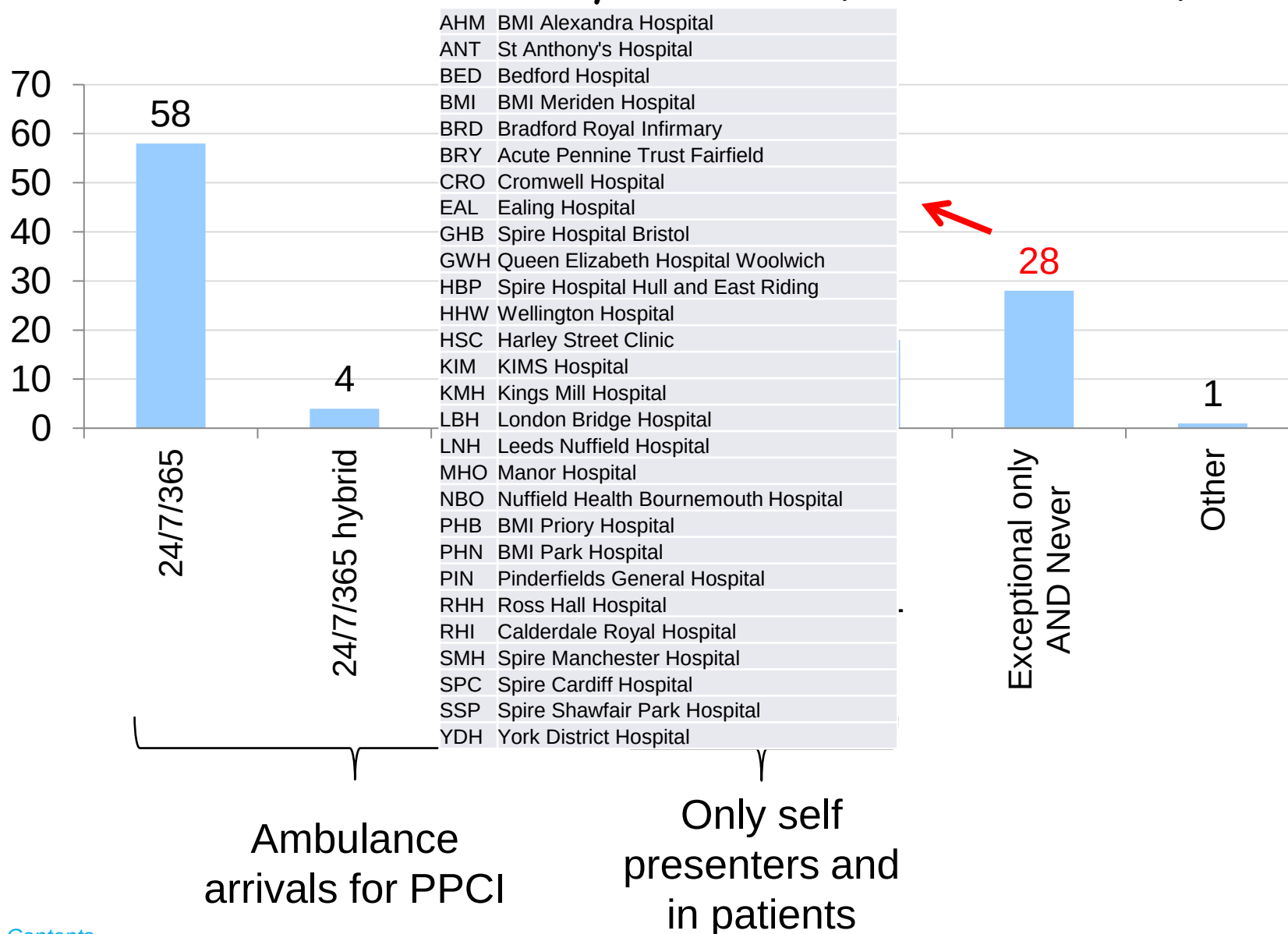
Primary PCI

Pattern of activity offered (NHS 2020/21)



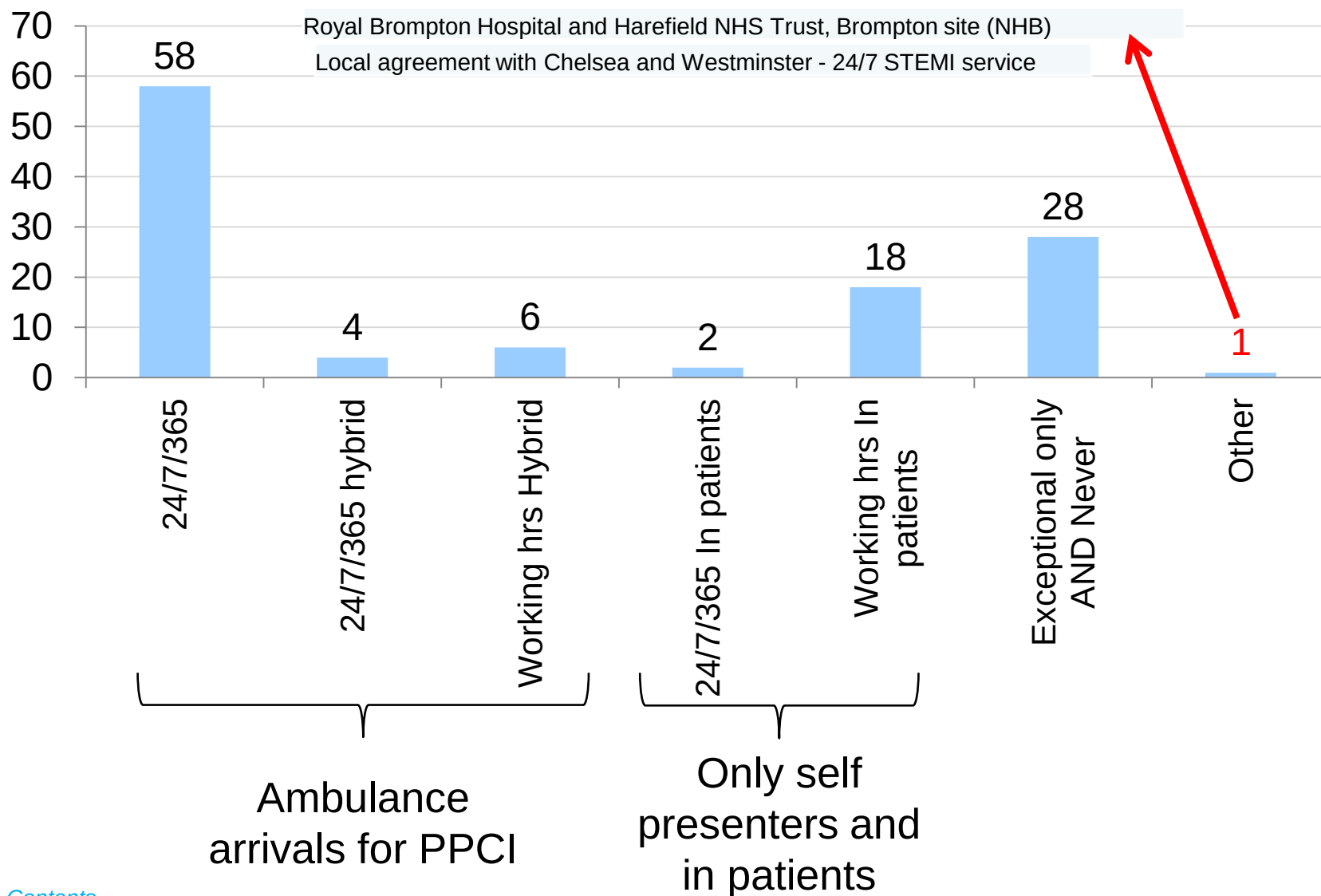
Primary PCI

Pattern of activity offered (NHS 2020/21)



Primary PCI

Pattern of activity offered (NHS 2020/21)



Routine Repatriation

Following Primary PCI for STEMI

16 Centres

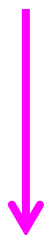
ALT	Altnagelvin Hospital
ERI	Edinburgh Heart Centre
GGH	Diana Princess of Wales Hospital, Grimsby
GJH	Golden Jubilee National Hospital
HAI	Hairmyres Hospital
KCH	Kings College Hospital
LGI	Yorkshire Heart Centre
LIS	Lister Hospital
MOR	Morrison Hospital
MPH	Musgrove Park Hospital
MRI	Manchester Royal Infirmary
NGS	Northern General Hospital
NIN	Ninewells Hospital
RVB	Royal Victoria Hospital
SPC	Spire Cardiff Hospital
UHW	University Hospital of Wales

Procedure Specific Data



Data Entry

PCI



Local
database



csv file
export



Direct

The screenshot shows the 'Patient' tab selected in the NICOR system. The form includes the following fields:

- Hospital Identifier ? *
- Local Patient Identifier ? *
- Patient Name (Surname) ?
- Patient Name (Forename) ?

CSV

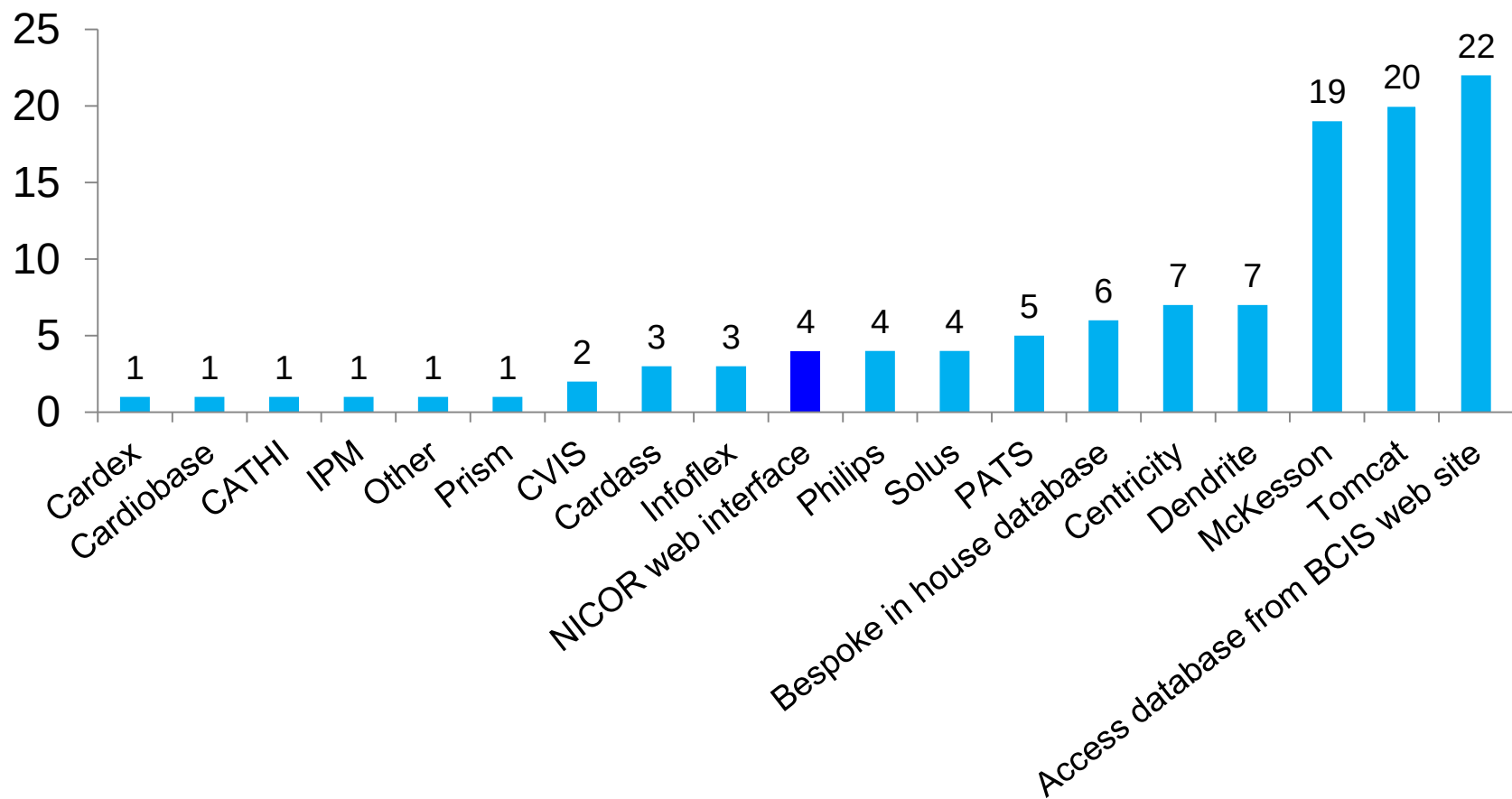
The screenshot shows the 'CSV Import Process' form in the NICOR system. The form includes the following fields:

- Uploading for: PETER LUDMANGEBINICOR
- Hospital importing: QEB
- Date: 20/12/2018 09:44
- Assets: Please Select (dropdown menu)
- Select CSV file: (Browse button)

At the bottom of the form, there is a footer with copyright information: © 2018 National Institute for Cardiovascular Outcomes Research (NICOR) in collaboration with Upgrade Clinical Research Centre. NICOR User Guide. For Technical Support call 0203 765 0000 or email nicor.helpdesk@nhs.uk

Data Gathering Software

2020/21



Procedure Specific Data Collection

The screenshot shows the NICOR Web Portal interface. The browser address bar displays <https://ncap.nicor.org.uk/web/restrictor>. The portal header includes navigation links: Home, Search Patient, Import (selected), Export, Completeness, and Logout. Below the header, the domain is set to PCI and the hospital to QEB (Queen Elizabeth Hospital, Edgbaston). The user is identified as PETER LUDMAN/QEB/NICOR. The main content area is titled 'CSV Import Process' and features an 'Upload File' button. A red asterisk indicates a required field: 'needed to save record'. The form contains several input fields: 'Uploading by' (PETER LUDMAN/QEB/NICOR), 'Hospital importing' (QEB), 'Date' (20/12/2018 09:44), 'Audit' (Please Select), and 'Select CSV file' (Browse...). A red circle highlights the 'NCAP User Guide' link in the footer.

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[NCAP User Guide](#)

For Technical Support call: 0203 760 6666 or email nicor-helpdesk@bartshealth.nhs.uk

Procedure Specific Data Collection

https://ncap.nicor.org.uk/web/restricted NICOR Web Portal NICOR NCAP

Home Search Patient Import Export Completeness Logout

Domain: PCI | Hospital : QEB. Queen Elizabeth Hospital, Edgbaston | PETER LUDMAN/QEB/NICOR

CSV Import Process

Upload File

* 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 *: Browse...

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NCAP User Guide

For Technical Support call: 0203 765 8550 or email nicor-

https://ncap.nicor.org.uk/web/restricted/im NICOR Web Portal NICOR NCAP

Home Search Patient Import Export Completeness Logout

Domain: PCI | Hospital : QEB. Queen Elizabeth Hospital, Edgbaston | PETER LUDMAN/QEB/NICOR

Previous imports for QEB

Refresh

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

Uploaded Date	Dataset Version	Records Count							Messages Count			Status	Log	CSV
		Total	New Signed	New Draft	Modified Signed	Modified Draft	Rejected	Not Modified	Warning	Serious	Fatal			
03/12/2018 10:24	Pci_5.6.5	780	21	0	47	0	1	711	16	5	1	Completed		
23/11/2018 16:51	Pci_5.6.5	758	19	2	20	1	0	716	13	5	0	Completed		
14/11/2018 17:17	Pci_5.6.5	1676	6	0	10	1	0	1659	33	3	0	Completed		

Procedure Specific Data Collection

https://ncap.nicor.org.uk/web/restricted/ NICOR Web Portal NICOR NCAP

Home Search Patient Import Export Completeness Logout

Domain: PCI | Hospital : QEB. Queen Elizabeth Hospital, Edgbaston | PETER LUDMAN/QEB/NICOR

CSV Import Process

Upload File

* 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 *: Browse...

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NCAP User Guide

For Technical Support call: 0203 765 8550 or email nicor-

https://ncap.nicor.org.uk/web/restricted/im NICOR Web Portal NICOR NCAP

Home Search Patient Import Export Completeness Logout

Domain: PCI | Hospital : QEB. Queen Elizabeth Hospital, Edgbaston | PETER LUDMAN/QEB/NICOR

Previous imports for QEB

Refresh

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

Uploaded Date	Dataset Version	Records Count							Messages Count			Status	Log	CSV
		Total	New Signed	New Draft	Modified Signed	Modified Draft	Rejected	Not Modified	Warning	Serious	Failed			
03/12/2018 10:24	Pci_5.6.5	780	21	0	47	0	1	711	16	5	1	Completed		
23/11/2018 16:51	Pci_5.6.5	758	19	2	20	1	0	716	13	5	0	Completed		
14/11/2018 17:17	Pci_5.6.5	1676	6	0	10	1	0	1659	33	3	0	Completed		

Procedure Specific Data Collection

RECORD SEQUENCE	LOG ENTRY					CONSULTANT RESPONSIBLE FOR												
NUMBER	DATE	SURNAME	FORENAME	HOSPITAL NUMBER	DATE_AND_TIME_O	PROCEDURE	TYPE	LOG										
292	02/12/2019 17:41				12/04/2019 13:30	6111053	WARNING	Out of Hospital Arrest is 1. Yes and Arterial blood gas on arrival: ph is blank										
292	02/12/2019 17:41				12/04/2019 13:30	6111053	WARNING	Out of Hospital Arrest is 1. Yes and Arterial blood gas on arrival: Base is blank										
292	02/12/2019 17:41				12/04/2019 13:30	6111053	WARNING	Out of Hospital Arrest is 1. Yes and Arterial blood gas on arrival: Lactate is blank										
326	02/12/2019 17:41				28/04/2019 21:06	3334722	WARNING	Out of Hospital Arrest is 1. Yes and Arterial blood gas on arrival: Base is blank										
388	02/12/2019 17:41				21/05/2019 18:58	4613174	WARNING	Postcode Of Usual Address is in invalid format. Please check and enter valid Postcode										
418	02/12/2019 17:41				02/06/2019 20:00	6048882	WARNING	Postcode Of Usual Address is in invalid format. Please check and enter valid Postcode										
426	02/12/2019 17:41				03/06/2019 17:27	4077196	WARNING	Postcode Of Usual Address is in invalid format. Please check and enter valid Postcode										
428	02/12/2019 17:41				04/06/2019 18:13	4613174	WARNING	Postcode Of Usual Address is in invalid format. Please check and enter valid Postcode										
444	02/12/2019 17:41				10/06/2019 15:56	6048882	WARNING	Postcode Of Usual Address is in invalid format. Please check and enter valid Postcode										
493	02/12/2019 17:41				27/06/2019 17:41	2820567	WARNING	Out of Hospital Arrest is 1. Yes and Arterial blood gas on arrival: Base is blank										
515	02/12/2019 17:41				07/07/2019 15:57	6111053	WARNING	Postcode Of Usual Address is in invalid format. Please check and enter valid Postcode										
717	02/12/2019 17:41				20/09/2019 12:07	6048882	WARNING	Out of Hospital Arrest is 1. Yes and Arterial blood gas on arrival: Lactate is blank										
717	02/12/2019 17:41				20/09/2019 12:07	6048882	WARNING	Out of Hospital Arrest is 1. Yes and Arterial blood gas on arrival: Base is blank										
717	02/12/2019 17:41				20/09/2019 12:07	6048882	WARNING	Out of Hospital Arrest is 1. Yes and Arterial blood gas on arrival: ph is blank										
773	02/12/2019 17:41				08/10/2019 13:10	4077196	WARNING	Cx Stenosis (PCI) is blank										
802	02/12/2019 17:41				17/10/2019 17:23	2820567	SERIOUS	Number lesions successful must be <= Number lesions attempted.										
815	02/12/2019 17:42				21/10/2019 17:52	4077196	FATAL	Number of lesions attempted =0 and number of vessels attempted =0 but none of the 1-6 options are selected as true										
827	02/12/2019 17:42				27/10/2019 16:50	4077196	SERIOUS	If Indication for Intervention is 4,5,6,7,8 or 12 then Procedure Urgency must be 3. Emergency or 4. Salvage										
828	02/12/2019 17:42				29/10/2019 10:20	4077196	WARNING	Postcode Of Usual Address is in invalid format. Please check and enter valid Postcode										

https://ncap.nicor.org.uk/web/restricted/im NICOR Web Portal NICOR NCAP

Home Search Patient Import Export Completeness Logout Domain: PCI | Hospital : QEB. Queen Elizabeth Hospital, Edgbaston | PETER LUDMAN/QEB/NICOR

NICOR

Previous imports for QEB [Refresh](#)

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

Uploaded Date	Dataset Version	Records Count							Messages Count			Status	Log	CSV
		Total	New Signed	New Draft	Modified Signed	Modified Draft	Rejected	Not Modified	Warning	Serious	Fatal			
03/12/201810:24	Pci_5.6.5	780	21	0	47	0	1	711	16	5	0	Completed		
23/11/201816:51	Pci_5.6.5	758	19	2	20	1	0	716	13	5	0	Completed		
14/11/201817:17	Pci_5.6.5	1676	6	0	10	1	0	1659	33	3	0	Completed		

Procedure Specific Data Analysis

- Data Quality
 - Centre participation
 - Case ascertainment
 - Data completeness

Procedure Specific Data Analysis

- Data Quality
 - Centre participation
 - Case ascertainment
 - Data completeness

Procedure Specific Analysis

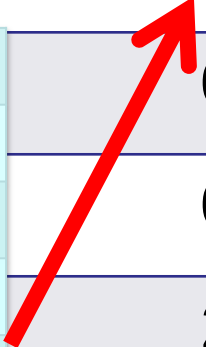
Participation in NICOR 2020/21

		Total No. of Centres	Data to NICOR	Missing
England	NHS	85	85	0
	Private	16	7	9
Wales	NHS	4	4	0
	Private	1	1	0
N Ireland		3	1	2
Scotland	NHS	6	2.5	3.5
	Private	2	2	0

Procedure Specific Analysis

Participation in NICOR 2020/21

		Total No. of Centres	Data to NICOR	Missing
England	NHS	85	82	3
	Private	16	7	9
BMI	BMI Meriden Hospital			0
HBP	Spire Hospital Hull and East Riding			0
HHW	Wellington Hospital			2
HSC	Harley Street Clinic			3.5
LBH	London Bridge Hospital			0
LNH	Leeds Nuffield Hospital			
MHO	Manor Hospital			
NBO	Nuffield Health Bournemouth Hospital			
PHN	BMI Park Hospital			



Procedure Specific Analysis

Participation in NICOR 2020/21

		Total No. of Centres	Data to NICOR	Missing
England	NHS	85	82	3
	Private	16	7	9
Wales	NHS	4	4	0
	Private	1	1	0
N Ireland		3	1	2
Scotland	NHS	6	2.5	3.5
	Private	2	2	0

Procedure Specific Analysis

Participation in NICOR 2020/21

		Total No. of Centres	Data to NICOR	Missing
England	NHS	85	82	3
	Private	16	7	9
ALT	Altnagelvin Hospital		4	0
RVB	Royal Victoria Hospital		1	0
N Ireland		3	1	2
Scotland	NHS	6	2.5	3.5
	Private	2	2	0



Procedure Specific Analysis

Participation in NICOR 2020/21

		Total No. of Centres	Data to NICOR	Missing
England	NHS	85	82	3
	Private	16	7	9
HAI	Hairmyres Hospital			
NIN	Ninewells Hospital			
GJH	Golden Jubilee National Hospital		90% missing	
RAI	Raigmore Hospital		44% missing	
Scotland	NHS	6	2.5	3.5
	Private	2	2	0

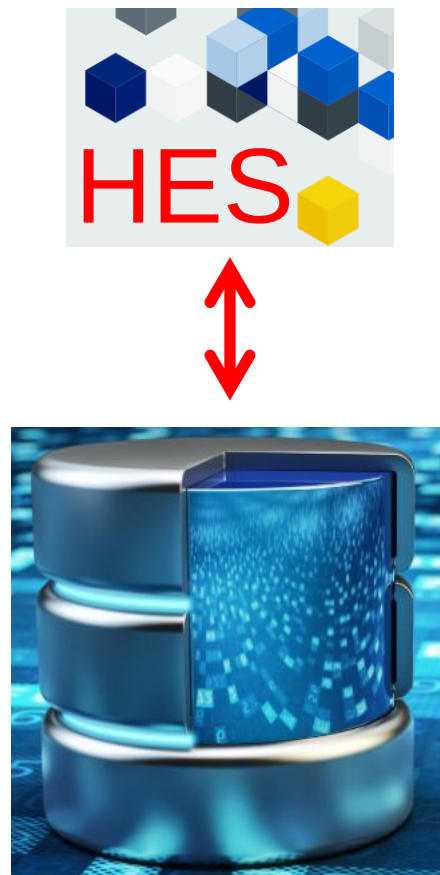
Procedure Specific Data Analysis

- Data Quality
 - Centre participation
 - Case ascertainment
 - Data completeness

Denominators in Analysis

- Interpreting the data
 - Data from the Annual Survey uses the Survey total as denominator for percentage calculations
 - This is the most complete count as almost all centres provided data (2020/21 – missing data from 4 private centres only)
 - Data from the Procedure specific analyses (i.e. data in the NICOR dataset) use the NICOR dataset totals for analysis
 - Data are therefore missing from those centres not uploading
 - **Total number of PCI procedures 2020/21**
 - **Annual Survey: 90,708**
 - **NICOR dataset: 78,315**

Case Ascertainment



NICOR
Data warehouse

Case Ascertainment



Analysis awaited



NICOR
Data warehouse

Data Validation Rules

- Methods

- <https://www.bcis.org.uk/resource/guides-to-the-data-import-process-for-pci-procedures-and-subsequent-analytical-process-to-create-outputs-for-the-cop-reports/>

- 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

Procedure Specific Data Analysis

- Data Quality
 - Centre participation
 - Case ascertainment
 - Data completeness

Procedure Specific Data Analysis

- Data Quality
 - 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

All PCI

1.03	NHS number (E&W)
1.06	Birth date
1.07	Sex
5.05	Medical History
2.13	Previous MI
5.06	History of renal disease
2.16	Diabetes
5.35	Creatinine
2.18	Weight
2.04	Cardiogenic shock (Pre- PCI)
2.03	Procedure urgency
3.09	Vessels attempted
4.04	Discharge date
4.03	Status at discharge
4.01	PCI Hospital outcome
5.31	Consultant responsible GMC Number
3.02	Consultant responsible Name

Primary PCI

(in community at symptom onset)

5.30	Location of Patient at STEMI onset
3.26	Date/time of first balloon inflation

PCI for all types of ACS

2.07	Date/time of symptom onset
5.27	Date/time of call for help
2.08	Date/time of arrival at first hospital
5.26	Date/time of arrival at PCI hospital
2.09	Admission Route

Data Completeness Tool

The screenshot displays the 'Data Completeness Tool' interface. At the top, a navigation bar includes links for Home, Search Patient, Import, Export, Data completeness (highlighted with a red box and a red arrow pointing to the bottom navigation bar), User Reports, QI Reports, and QI Resources. On the right of the navigation bar, it shows 'Domain: PCI | Hospital: QEB. C'. Below the navigation bar, the main content area features the NICOR logo, a 'Data Completeness' heading with a grid icon, and a 'Calculate Completeness' button. The form contains three input fields: 'Audit' (a dropdown menu with 'Please Select'), 'Date Interval' (a date picker with 'DD/MM/YYYY'), and 'Report Level' (a dropdown menu with 'COMPLETE'). There is an 'And' label between the 'Date Interval' and the second date picker. A red arrow points from the 'Data completeness' link in the top navigation bar to the 'Data completeness' button in the bottom navigation bar, which is also highlighted with a red box.

Home Search Patient Import Export **Data completeness** User Reports QI Reports QI Resources Domain: PCI | Hospital: QEB. C

NICOR Data Completeness Calculate Completeness

Audit Please Select

Date Interval DD/MM/YYYY And DD/MM/YYYY

Report Level COMPLETE

Data completeness User Reports QI Reports

(see appendix)

% Completeness

1. Fields required for risk adjusted outcome

Consultant Public Reports

Extent of Data Completeness in Variables Relevant to Risk Estimation (3 years of data):

	Age	Sex	Medical History	Shock	Urgency	Vessels Attempted	Diabetes	Prior MI	Renal Disease	Indication
Count	2359	2359	2359	2359	2359	2359	2356	2354	2358	2353
%Complete	100	100	100	100	100	100	99.87	99.79	99.96	99.75

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

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

% Completeness

1. Fields required for risk adjusted outcome

Consultant Public Reports

Extent of Data Completeness in Variables Relevant to Risk Estimation (3 years of data):

	Age	Sex	Medical History	Shock	Urgency	Vessels Attempted	Diabetes	Prior MI	Renal Disease	Indication
Count	2359	2359	2359	2359	2359	2359	2356	2354	2358	2353
%Complete	100	100	100	100	100	100	99.87	99.79	99.96	99.75

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

Any domain <95%



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

% Completeness

2. Fields required for Primary PCI delays

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

2.07 Date / time of symptom onset

5.27 Date / time of call for help

2.08 Date / time of arrival at first hospital

5.26 Date / time of arrival at PCI hospital

3.26 Date / time of first balloon inflation

% Completeness

3. Fields required for NSTEMI delays

	Fields required
Route of admission (NSTEMI)	• Admission route
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 NSTEMI delays

Public Reports – Good data completeness

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

	Complete Records	Percentage
Route of admission *	349	100%
Completeness of data to assess delays: Direct Admission **	317	100%
Completeness of data to assess delays: IHT ***	12	100%

* 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

	Hospital Rate	National Average
NSTEMI: % of ALL Cases Treated Within 72 Hours	56.27%	58.24%
NSTEMI: % of Direct Admission Treated Within 72 Hours	57.41%	63.96%
NSTEMI: % of IHT Cases Treated Within 72 Hours	20%	48.15%

% Completeness

3. Fields required for NSTEMI delays

Public Reports – Inadequate data completeness

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

	Complete Records	Percentage
Route of admission *	205	99.51%
Completeness of data to assess delays: Direct Admission **	114	96.61%
Completeness of data to assess delays: IHT ***	72	88.89%

* Out of all NSTEMI cases

** Out of all direct admission cases (requires admission route and arrival at PCI centre)

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

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

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

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

See public reports for analysis

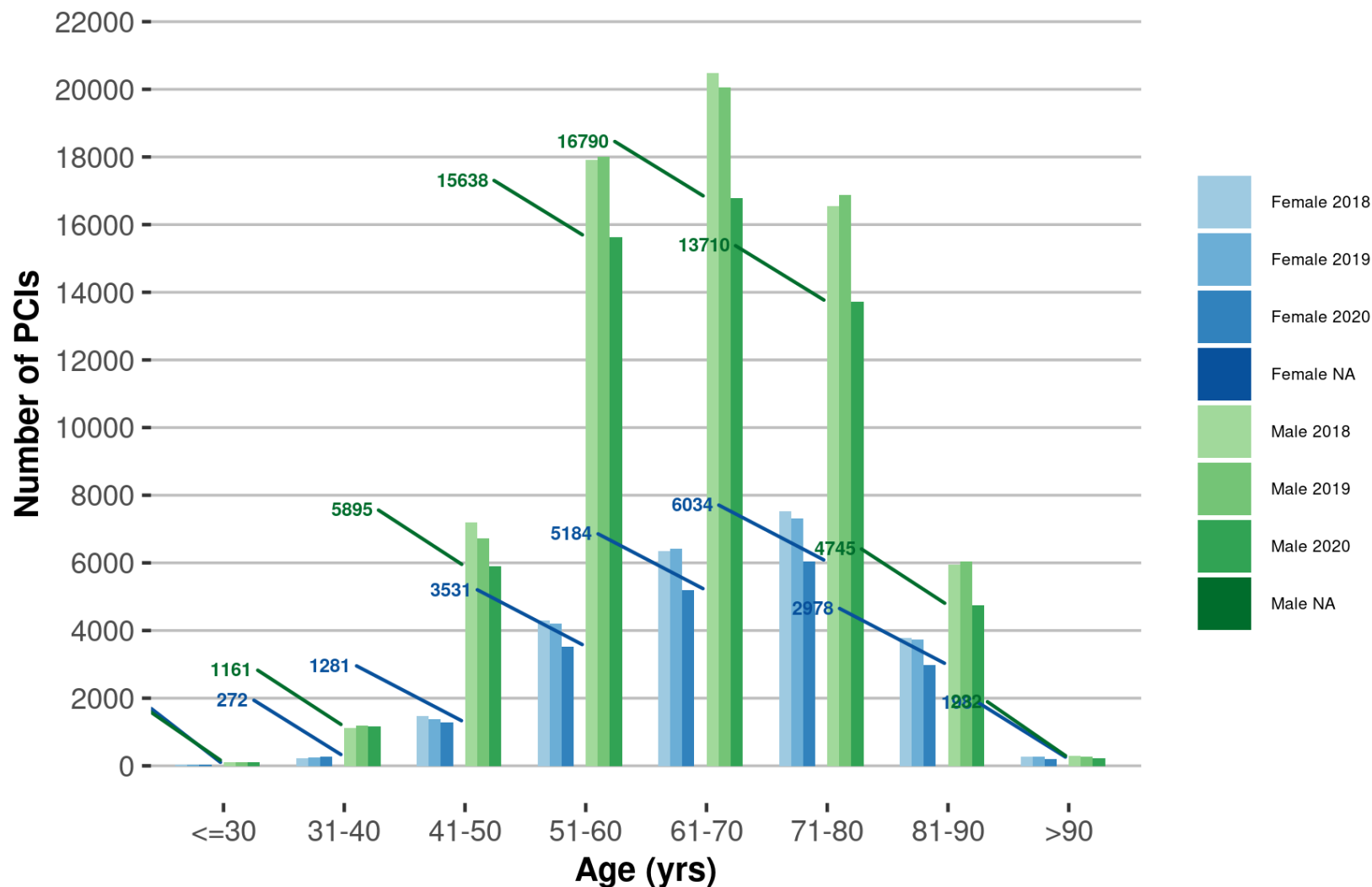
Appropriateness



Demographics

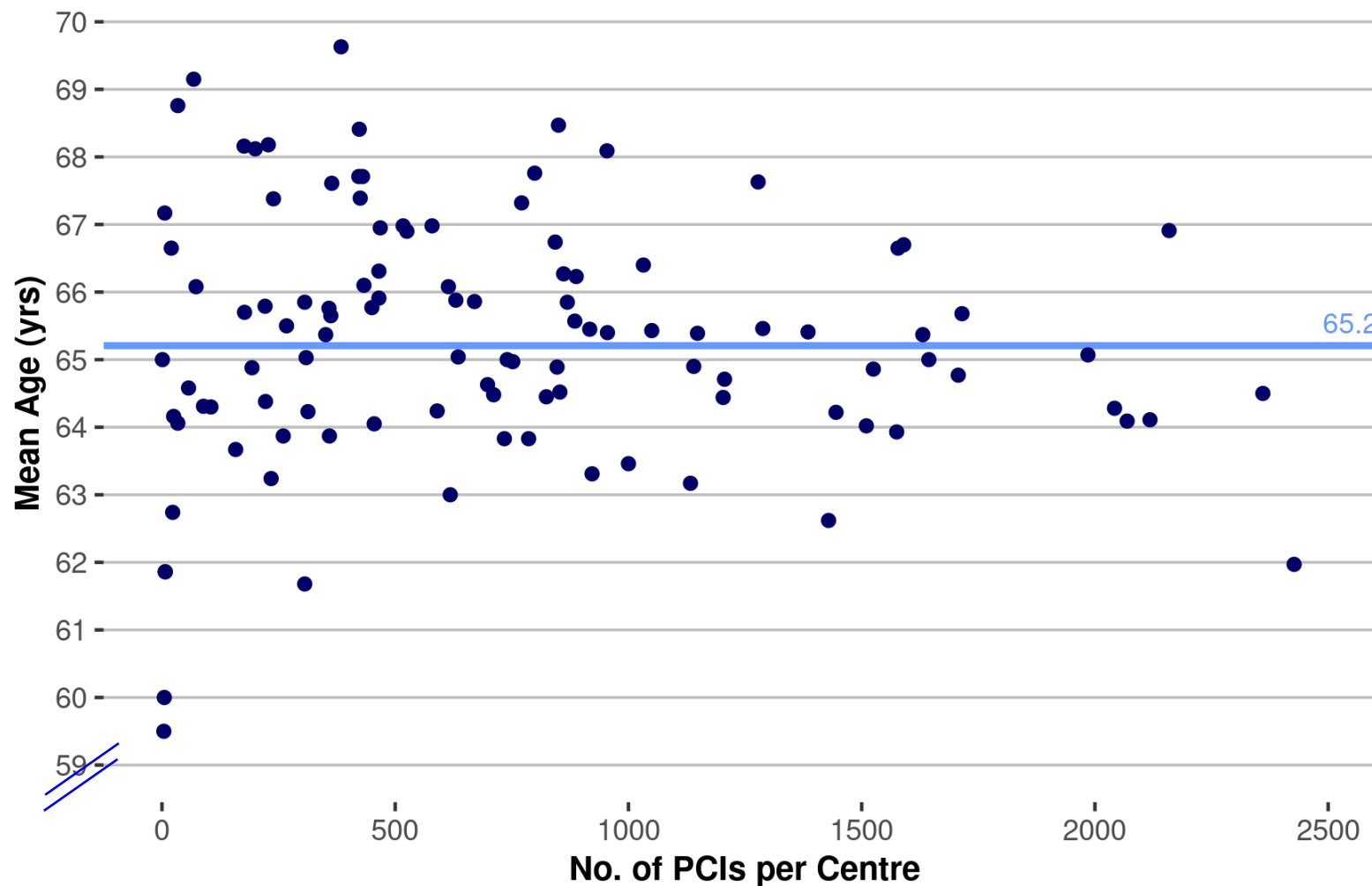
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017/ 18	2018/ 19	2019 /20	2020 /21
Age (mean)	64.3	64.4	65.0	65.1	65.3	64.9	64.9	65.1	65.1	65.3	65.4	65.6	65.7	65.2
Sex (male %)	73.6	73.8	73.9	74.0	74.0	74.1	74.3	74.3	74.5	74.5	74.3	74.4	73.9	75.0
Diabetic (%)	17.5	18.0	18.2	18.7	19.5	20.2	20.7	21.0	22.0	22.9	23.5	24.2	24.3	24.1
Previous CABG (%)	8.5	9.1	8.6	8.4	7.9	8.9	8.6	8.4	8.4	8.6	7.5	6.9	7.5	5.7
Previous PCI (%)	18.6	21.1	22.3	22.6	22.7	23.5	24.7	25.6	26.4	27	26.9	27.9	28.7	26.9
Previous MI (%)	29.5	30.2	28.8	28.4	27.6	26.8	27.2	27.4	27.5	27	27	27.5	26.5	25.6
Current smoker (%)				26.0	26.1	25.4	25	24.4	24.0	22.9	22.7	22.4	22	23.5
Ex smoker (%)				39.0	37.0	36.9	37.7	37.3	37.9	37.6	36.5	37	35.7	33.9
Never smoked (%)				35.1	37.0	37.7	37.3	38.2	38.1	39.5	40.8	40.7	42.3	42.6

Demographics - Age

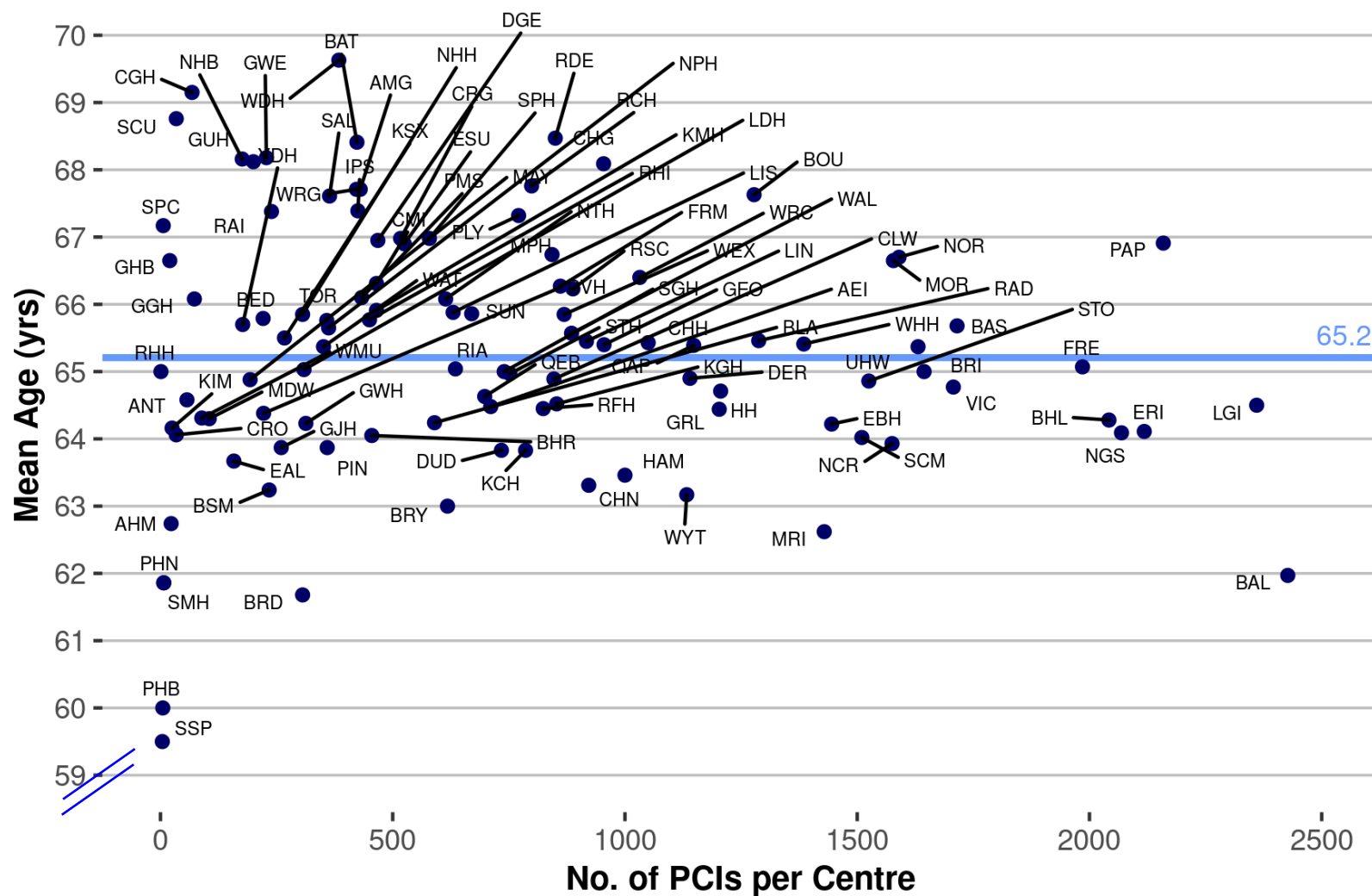


(N.B. Financial year, 2020 = 2020-21)

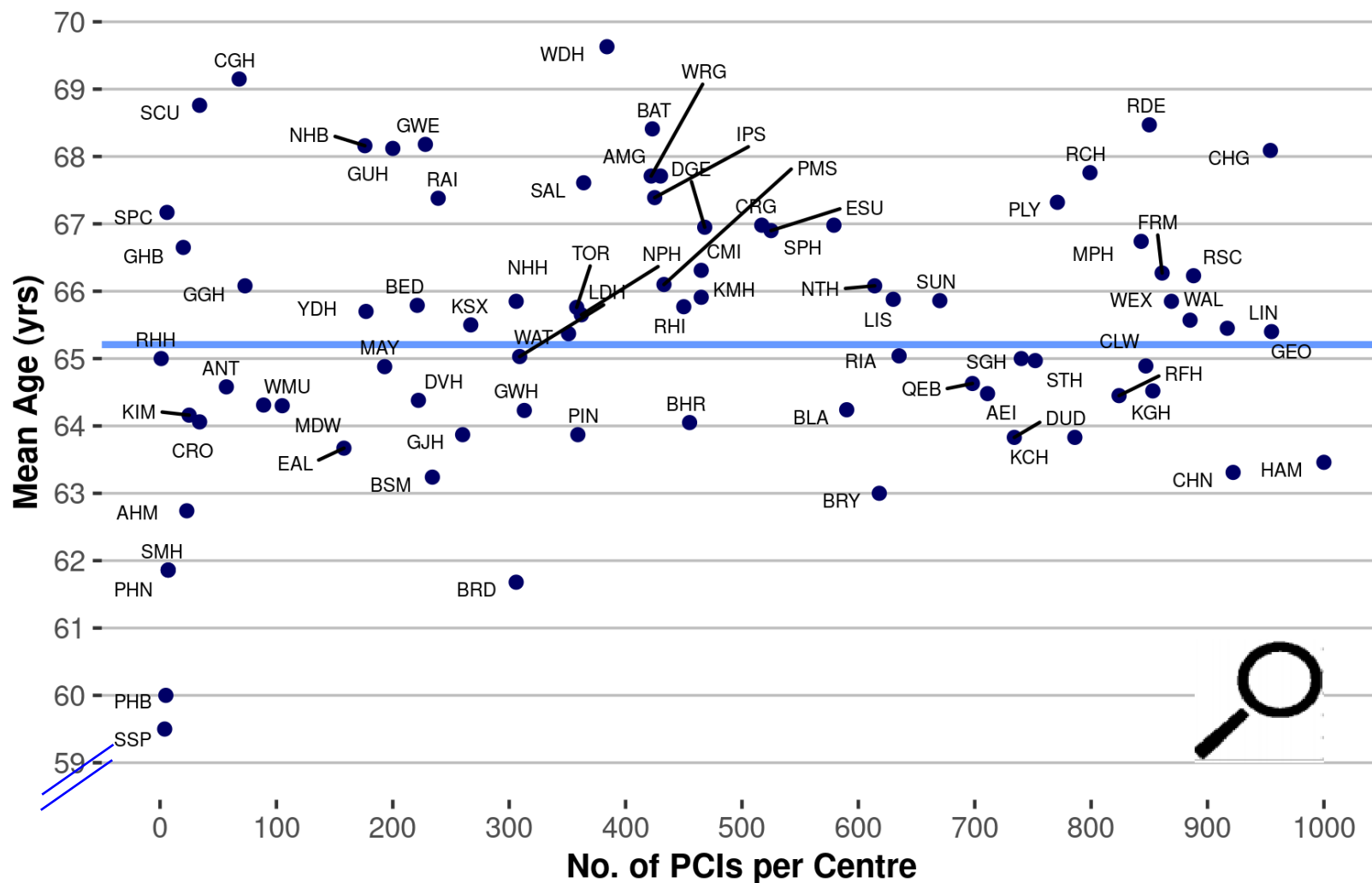
Demographics - Age



Demographics - Age



Demographics - Age

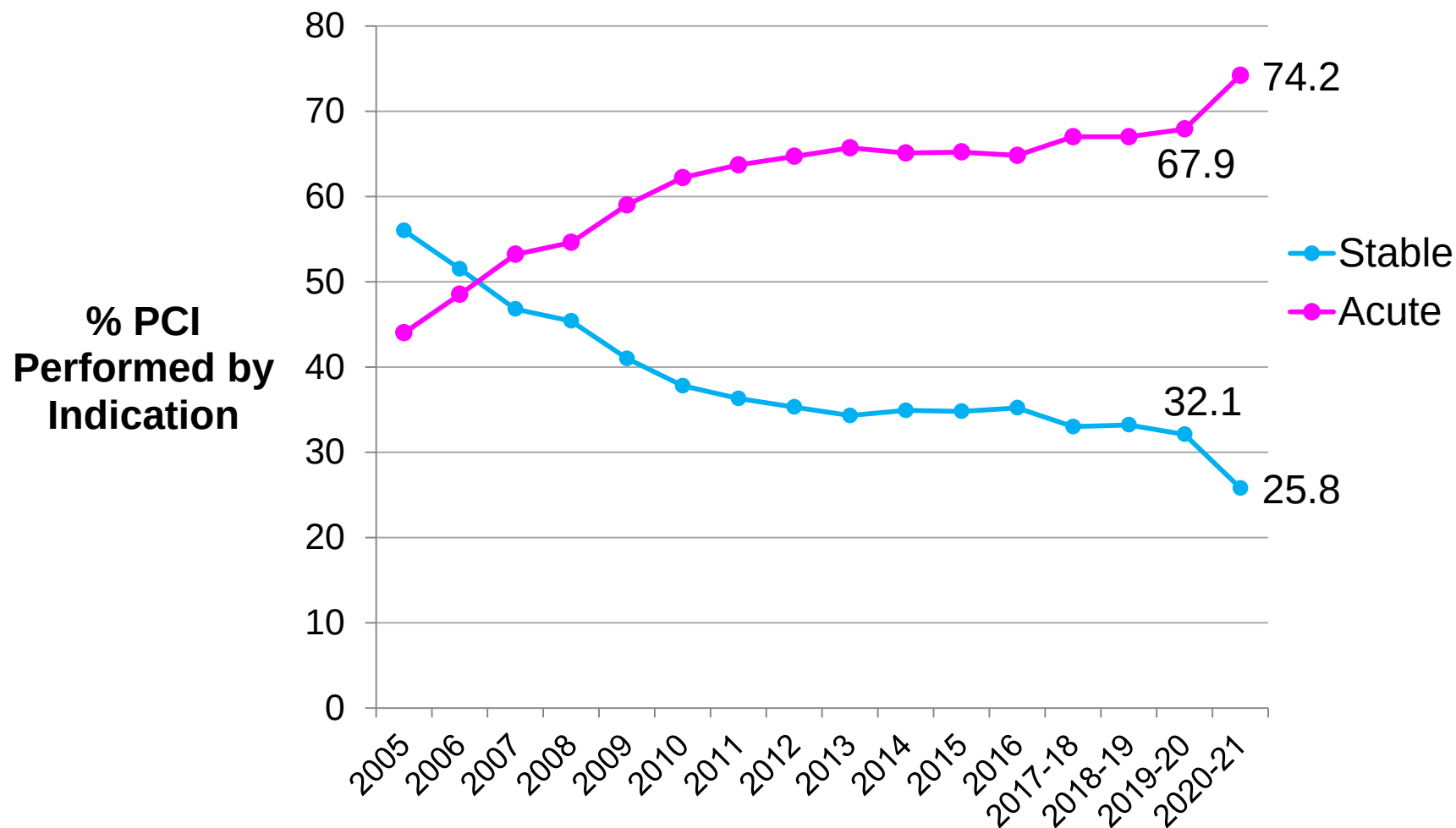


Demographics

Ethnic Origin

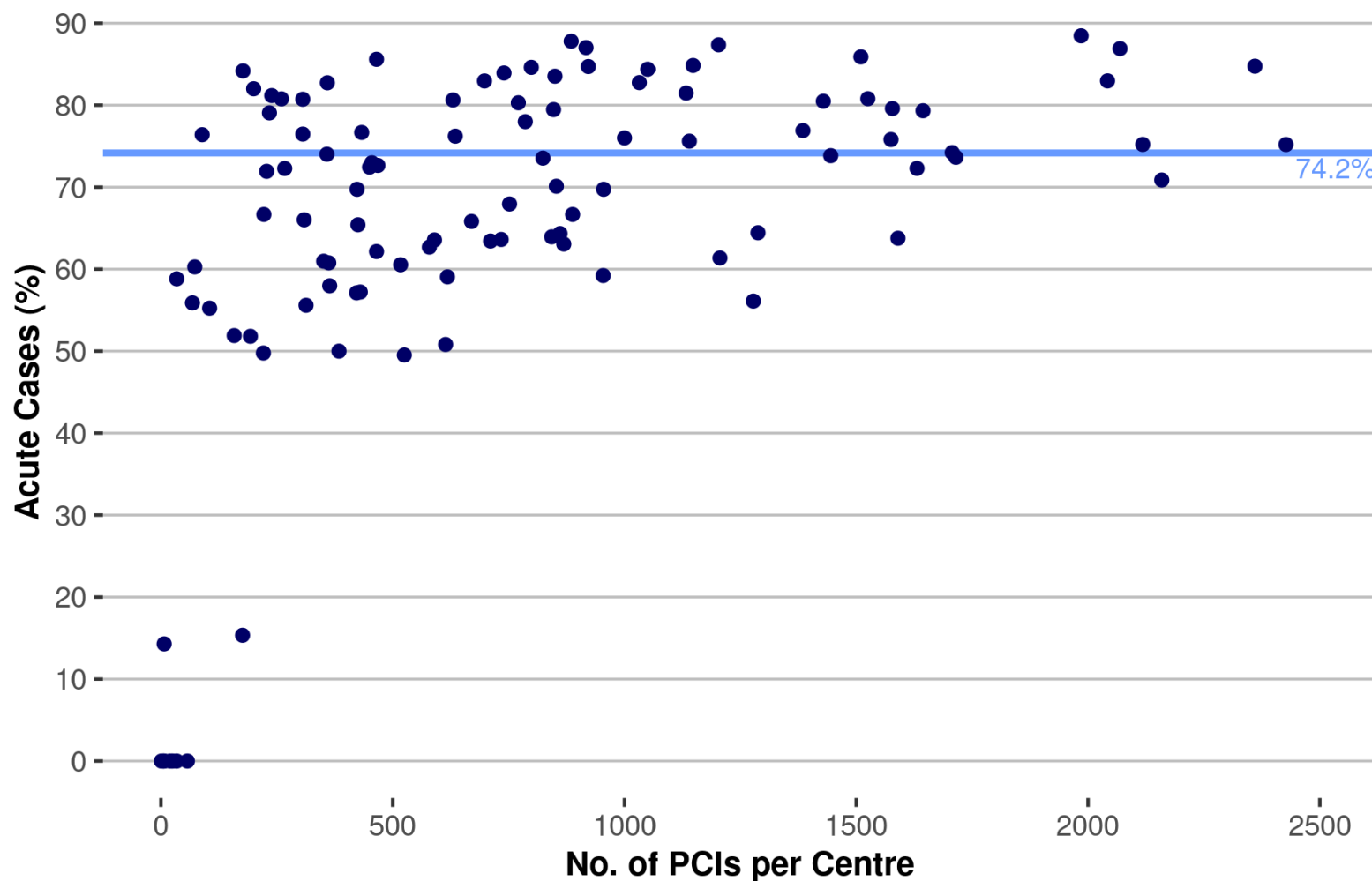
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017/ 18	2018/ 19	2019/ 20	2020/ 21
Data available	46,643	48,267	55,572	61,966	64,355	62,350	62,499	63,872	63,305	63,771	66,987	61,567	65,993	58,306
European (%)	92.3	92.0	93.0	92.3	91.8	92.1	91.6	91.4	91.0	90.1	89.4	89.2	89.3	89.5
Asian (%)	6.7	7.1	6.16	6.77	7.2	7.0	7.3	7.6	8.1	8.7	9.4	9.4	9.3	9.3
Black (%)	0.83	0.72	0.71	0.79	0.83	0.81	0.98	0.85	0.80	1.0	1.1	1.2	1.2	1.1
Oriental (%)	0.2	0.17	0.15	0.17	0.17	0.14	0.16	0.18	0.12	0.17	0.19	0.17	0.19	0.12

Clinical Syndrome



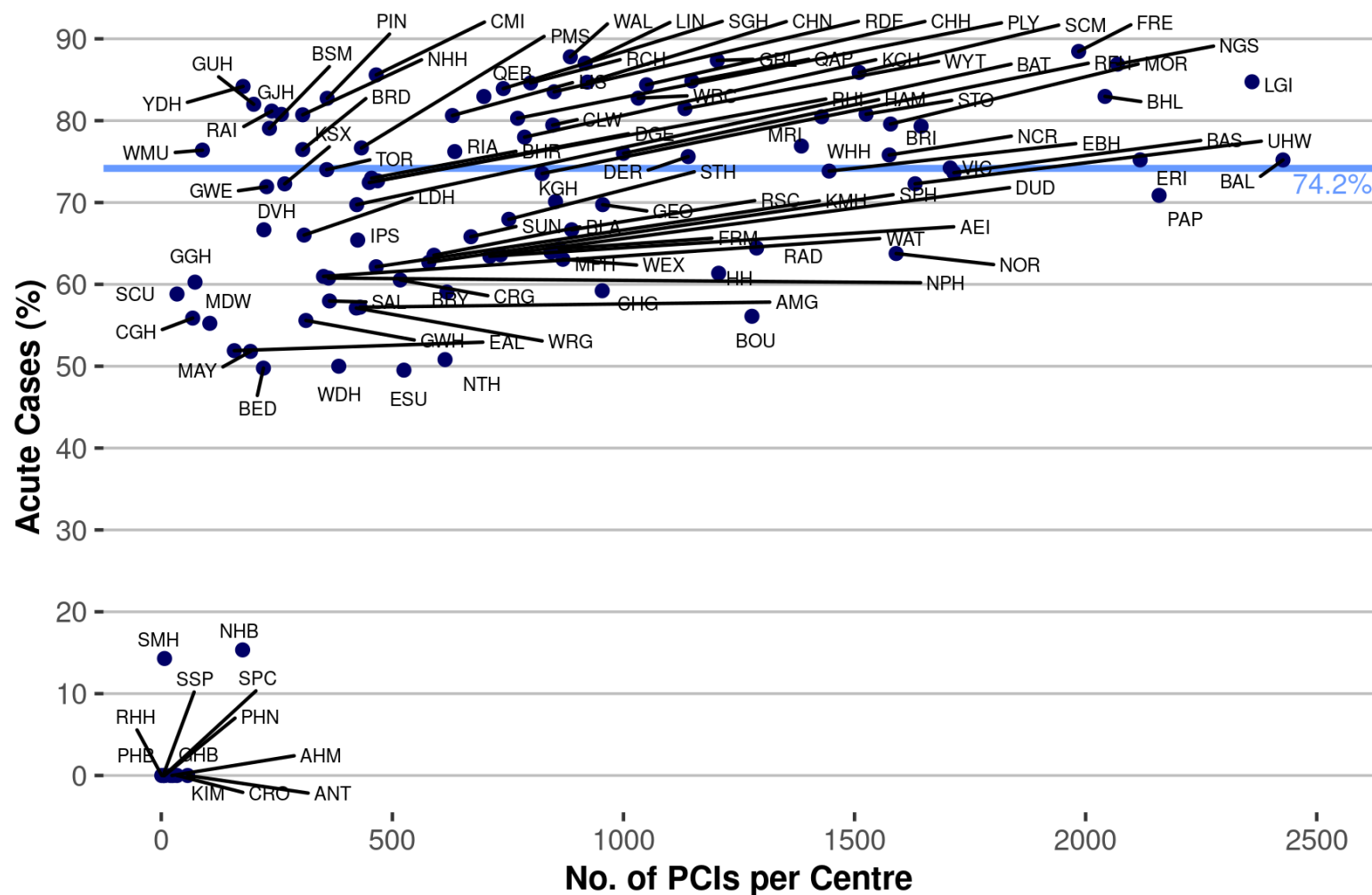
Clinical Syndrome

% Acute Coronary Syndrome



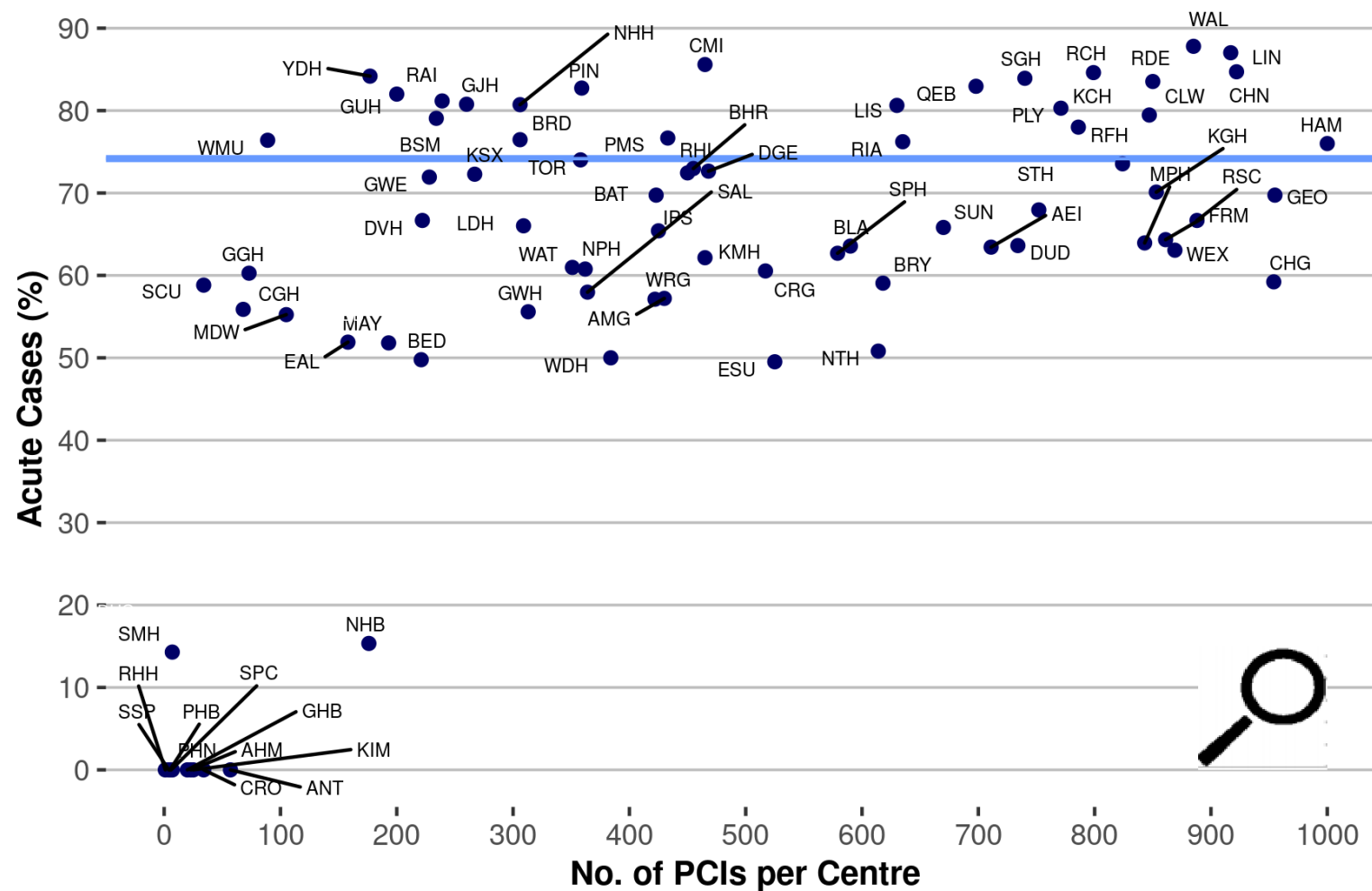
Clinical Syndrome

% Acute Coronary Syndrome

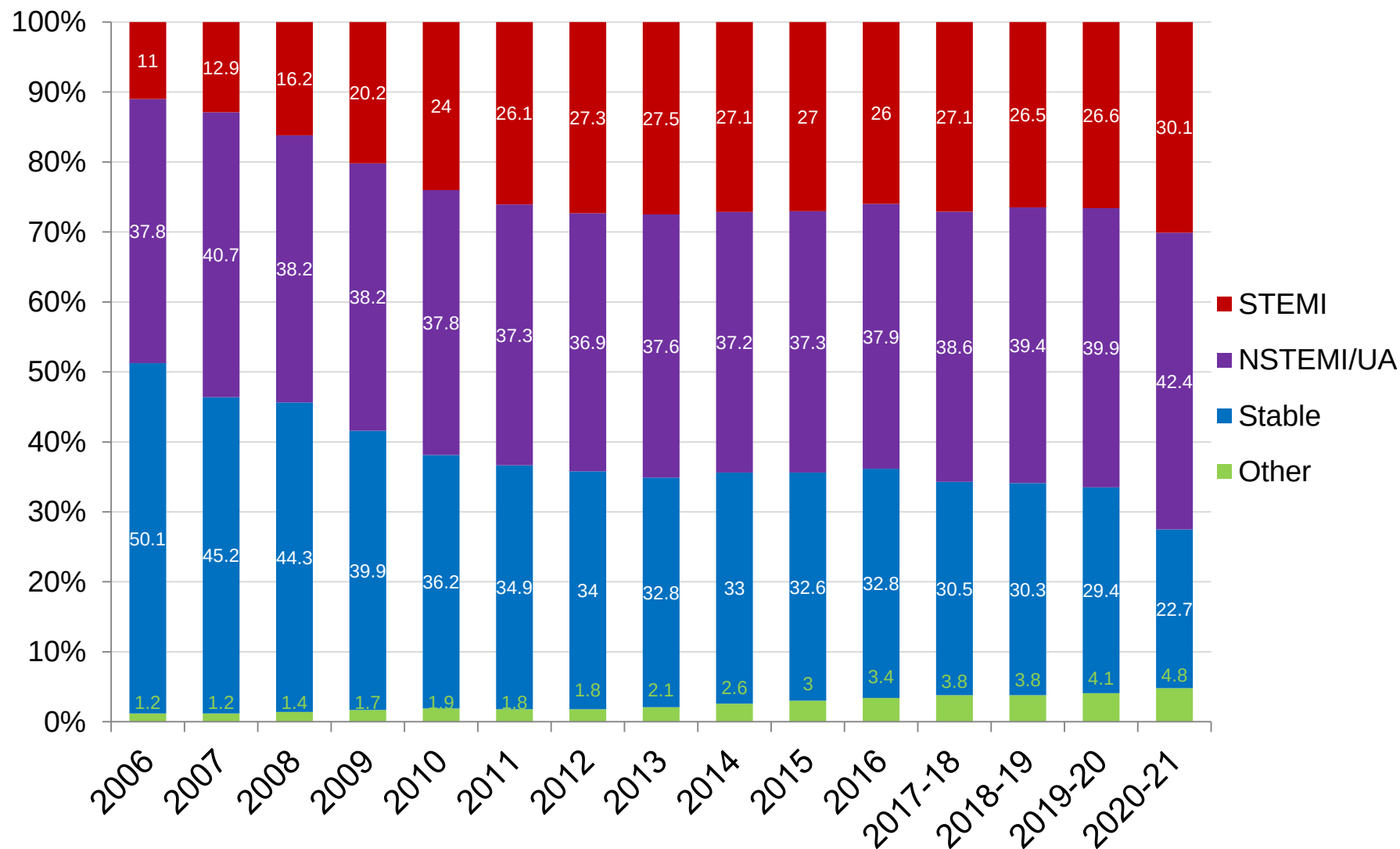


Clinical Syndrome

% Acute Coronary Syndrome

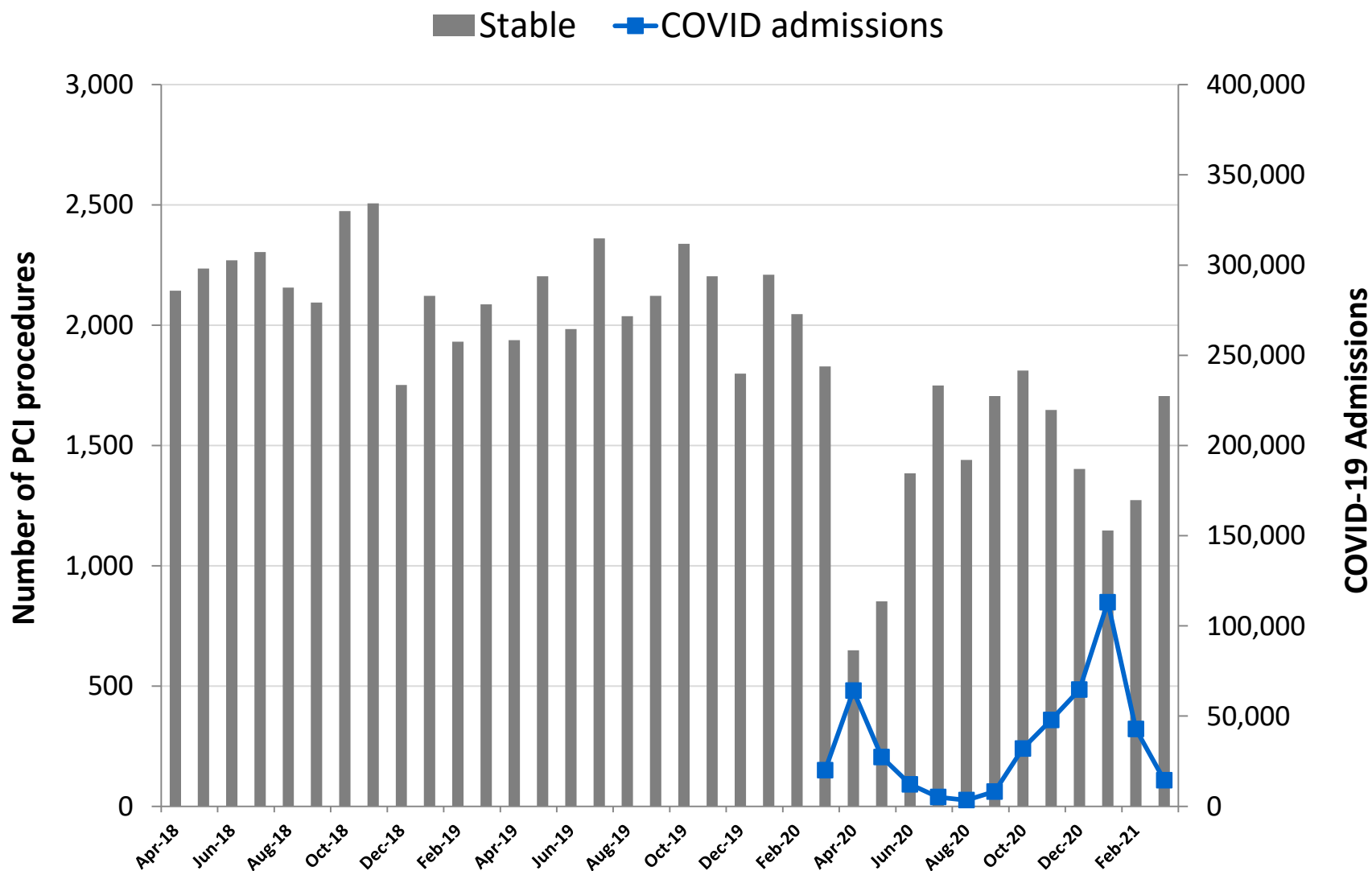


Indication for PCI



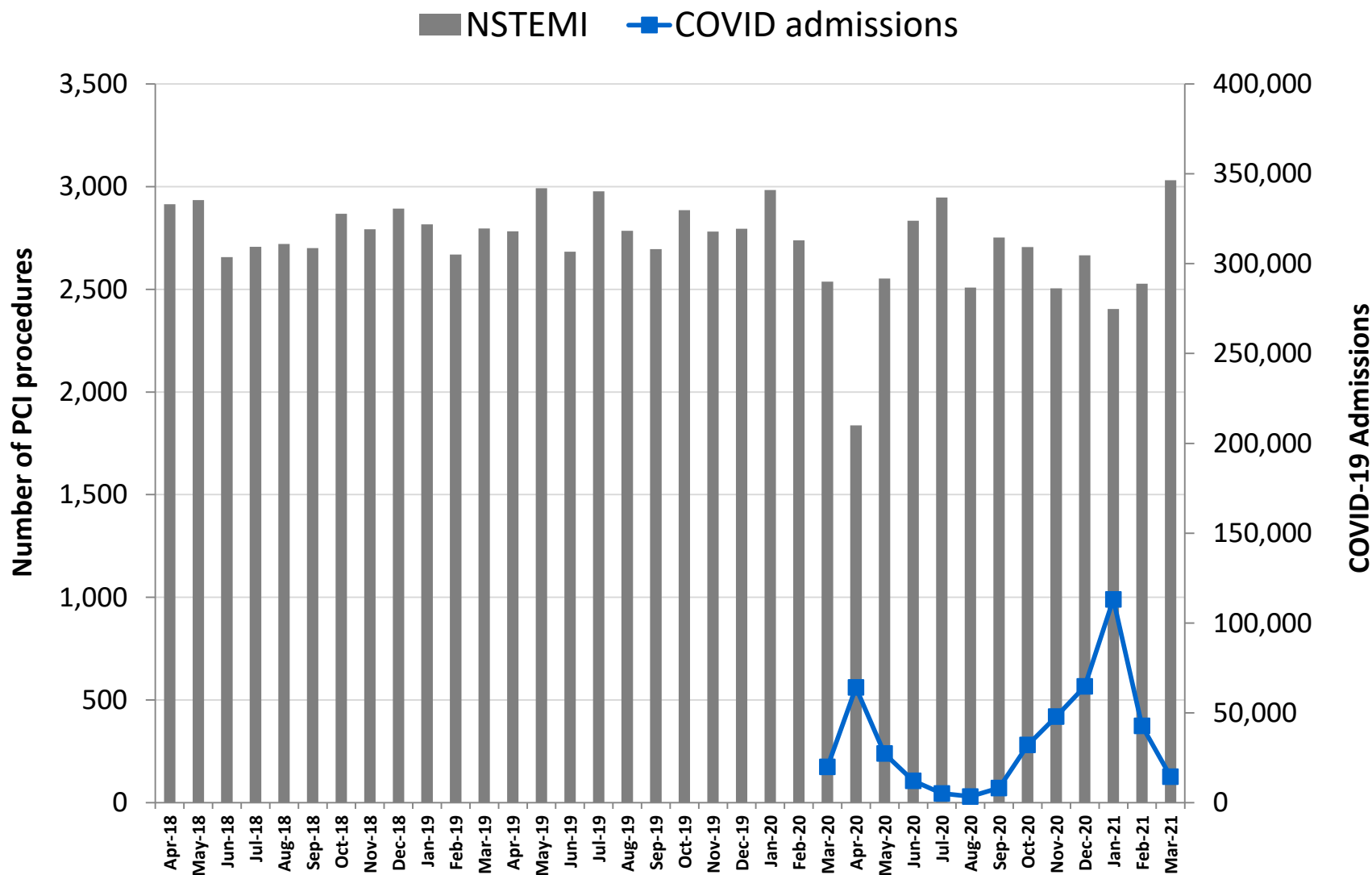
PCI Absolute Numbers

By Indication for PCI (E&W)



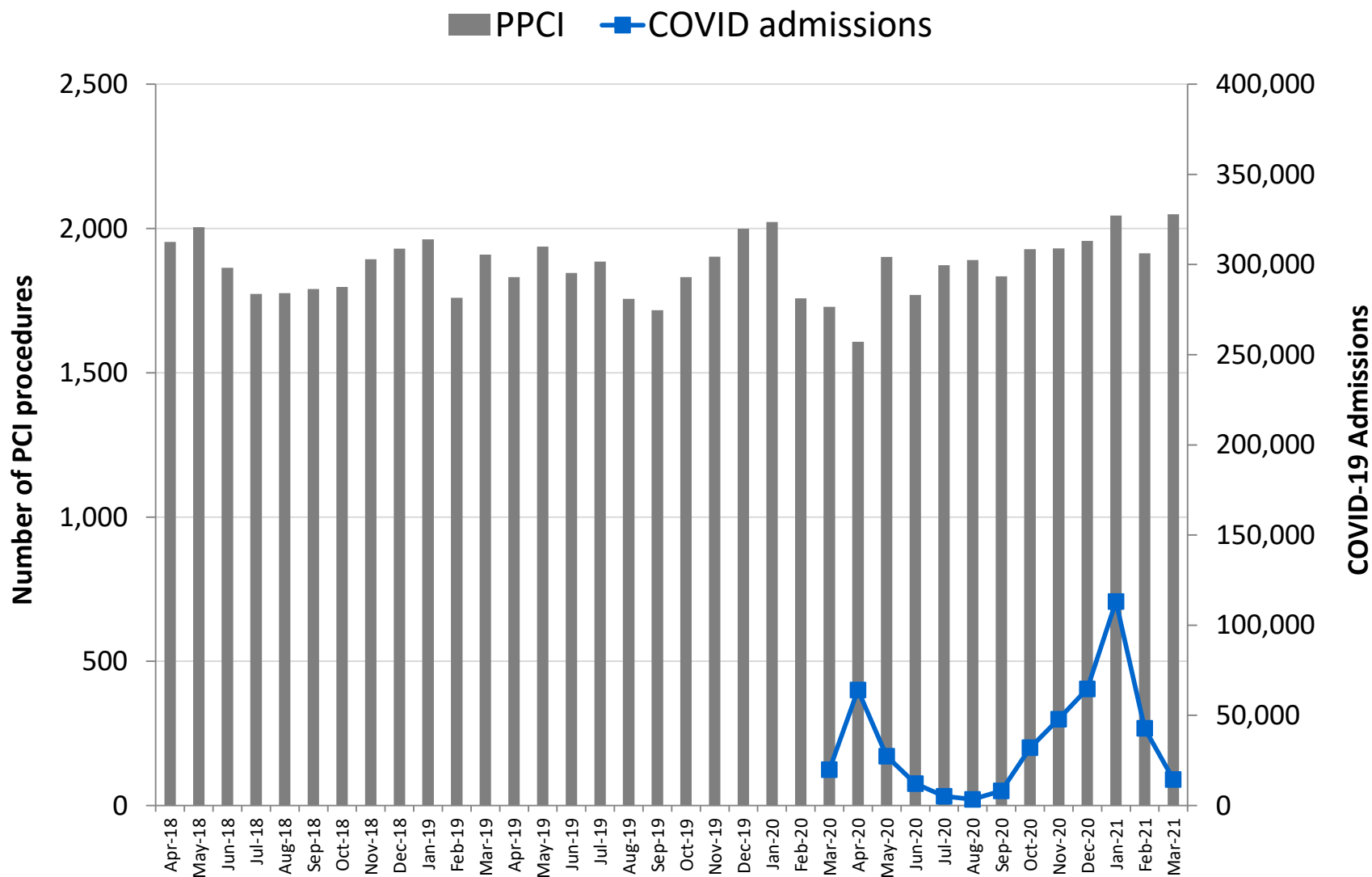
PCI Absolute Numbers

By Indication for PCI (E&W)



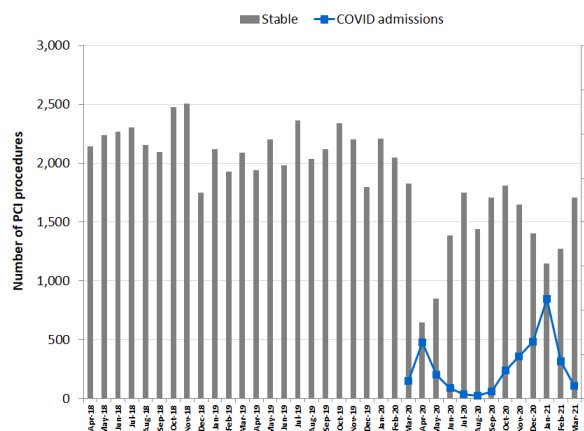
PCI Absolute Numbers

By Indication for PCI (E&W)

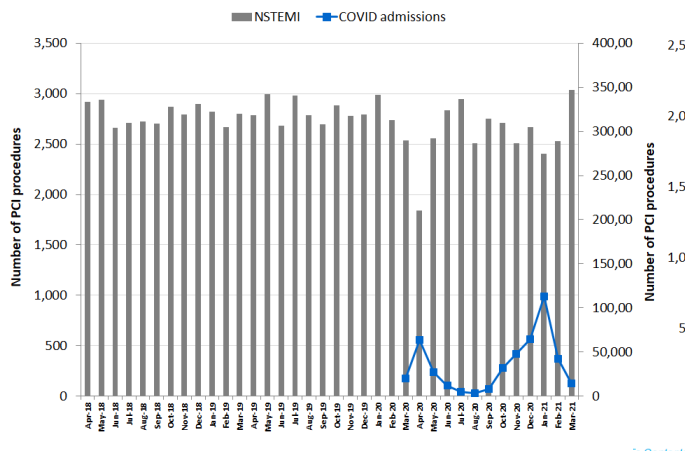


PCI Absolute Numbers By Indication for PCI (E&W)

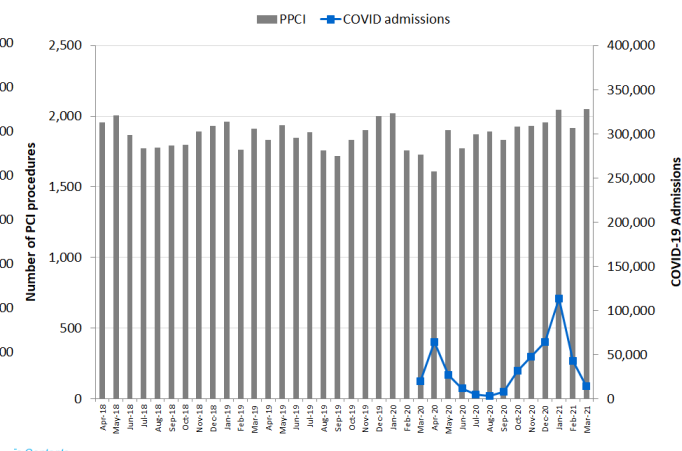
Stable



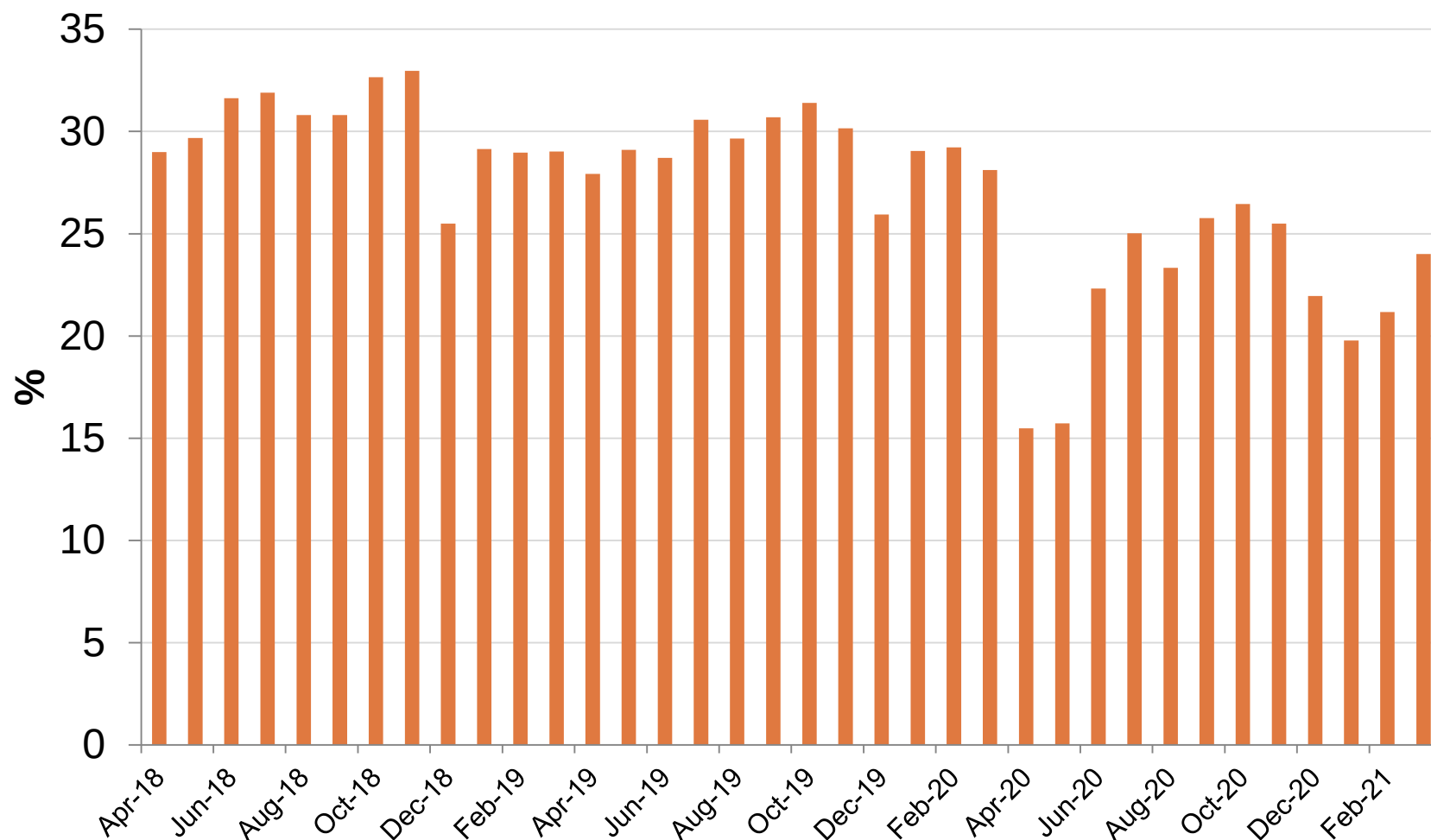
NSTEMI



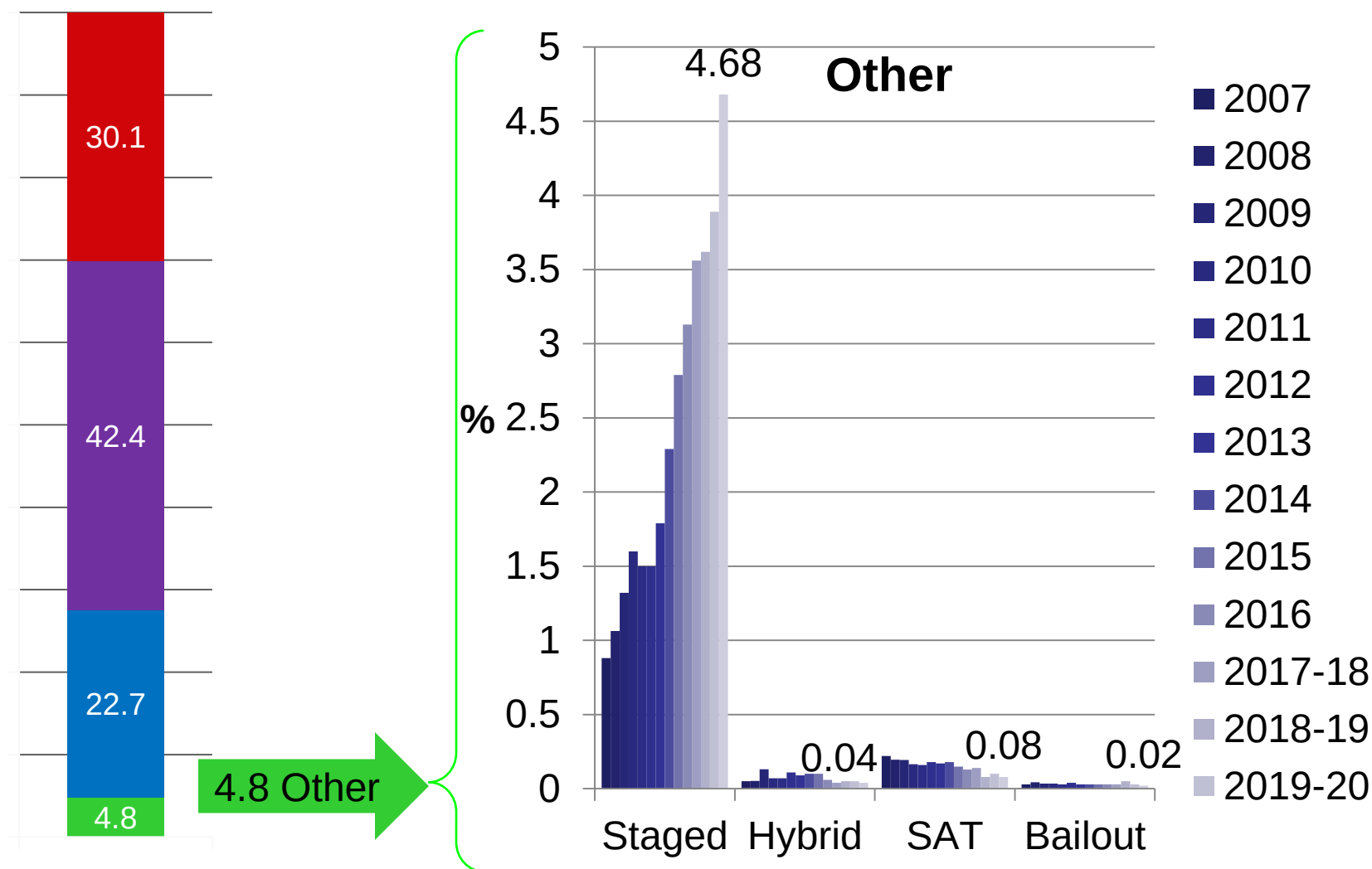
PPCI



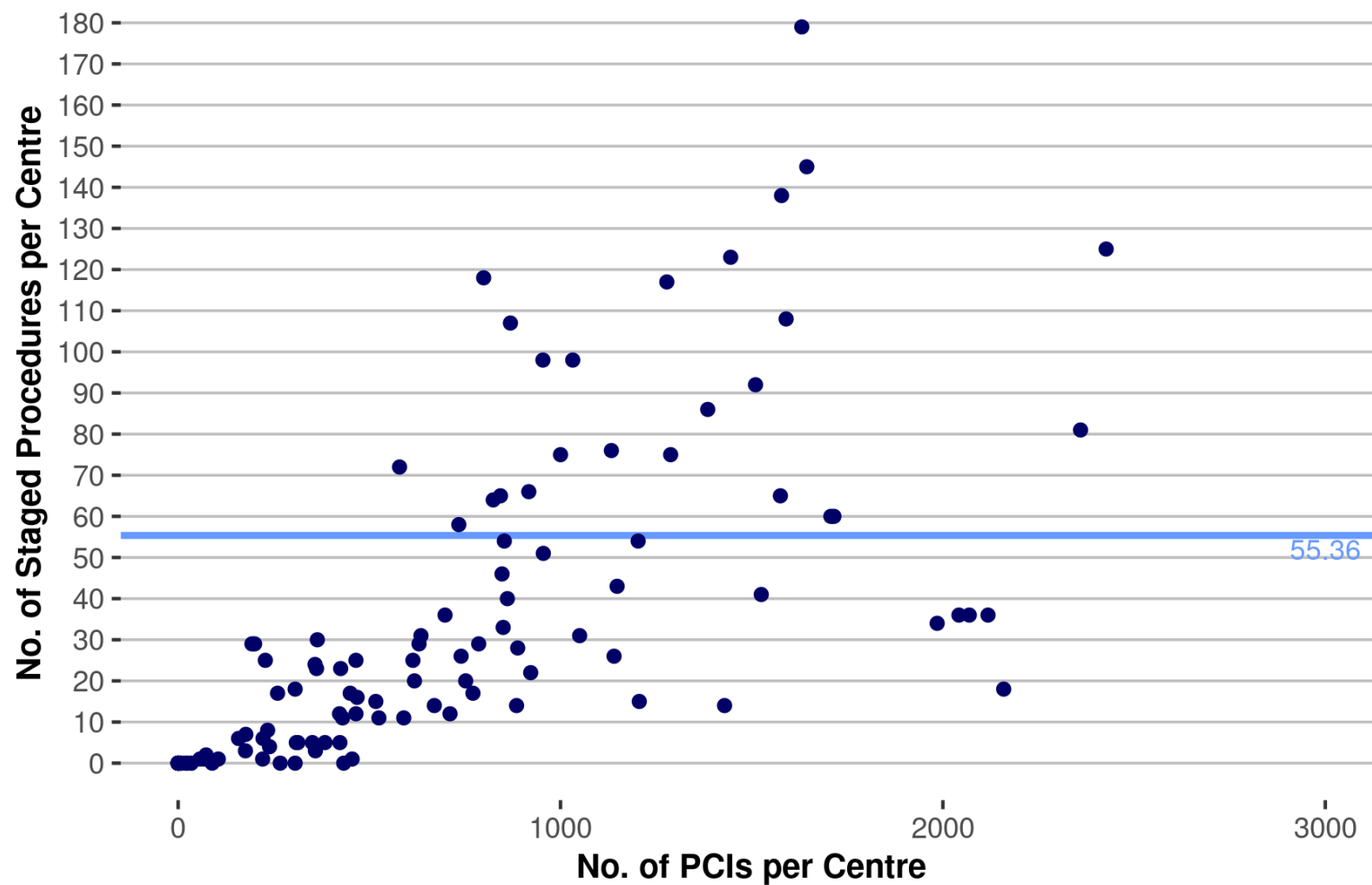
Stable PCI as % of all PCI



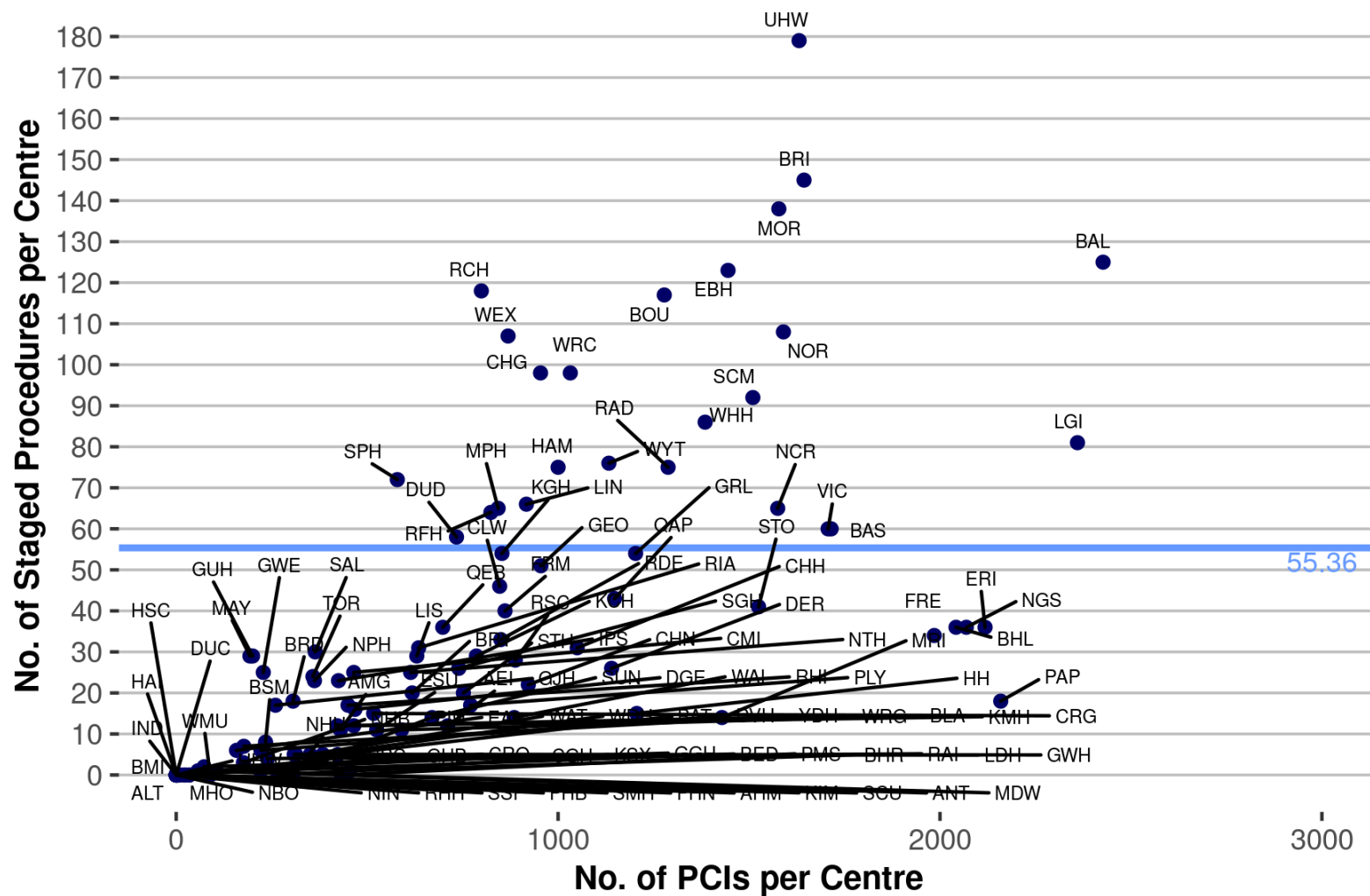
Indication for PCI



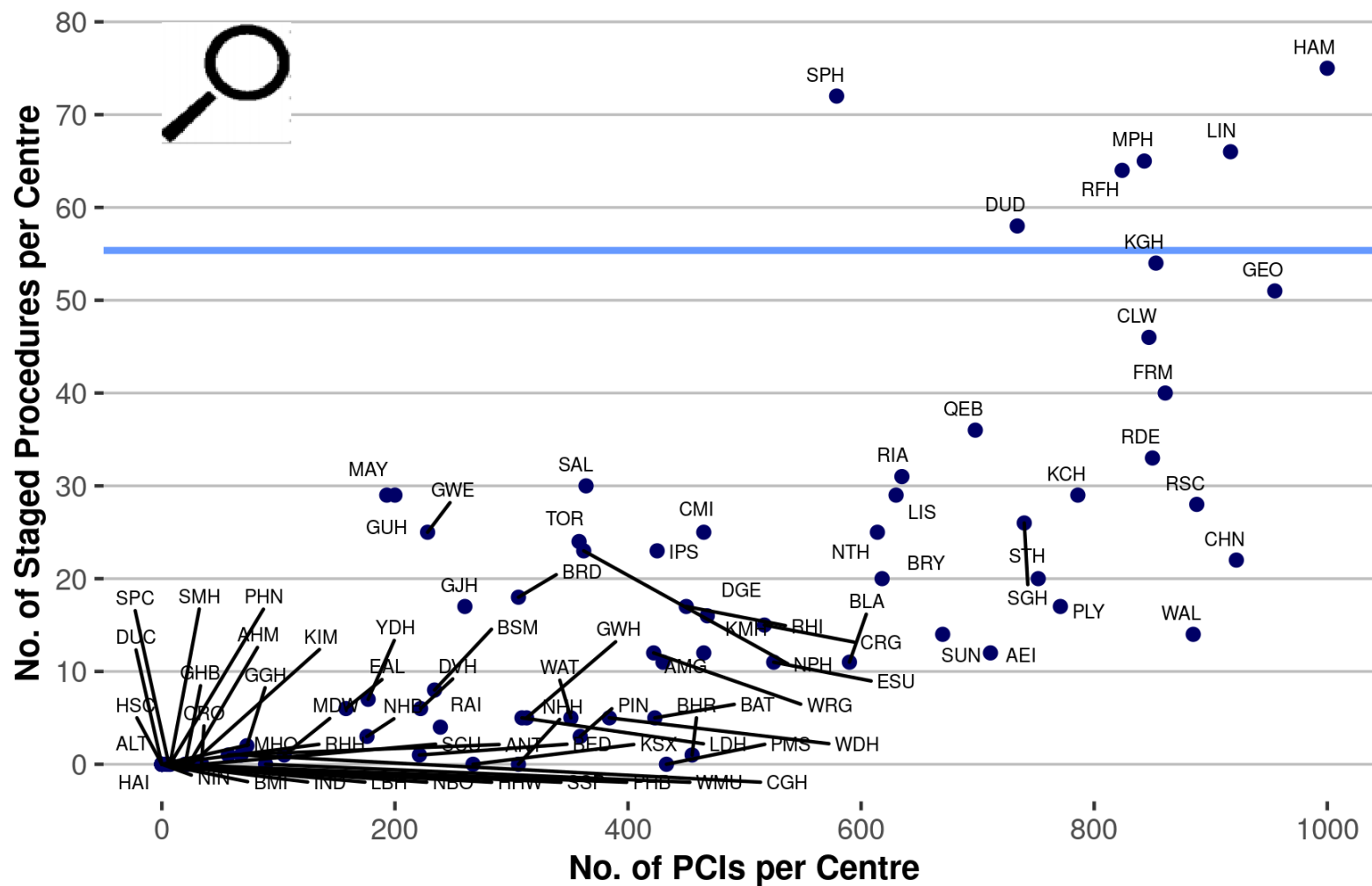
Staged - Totals



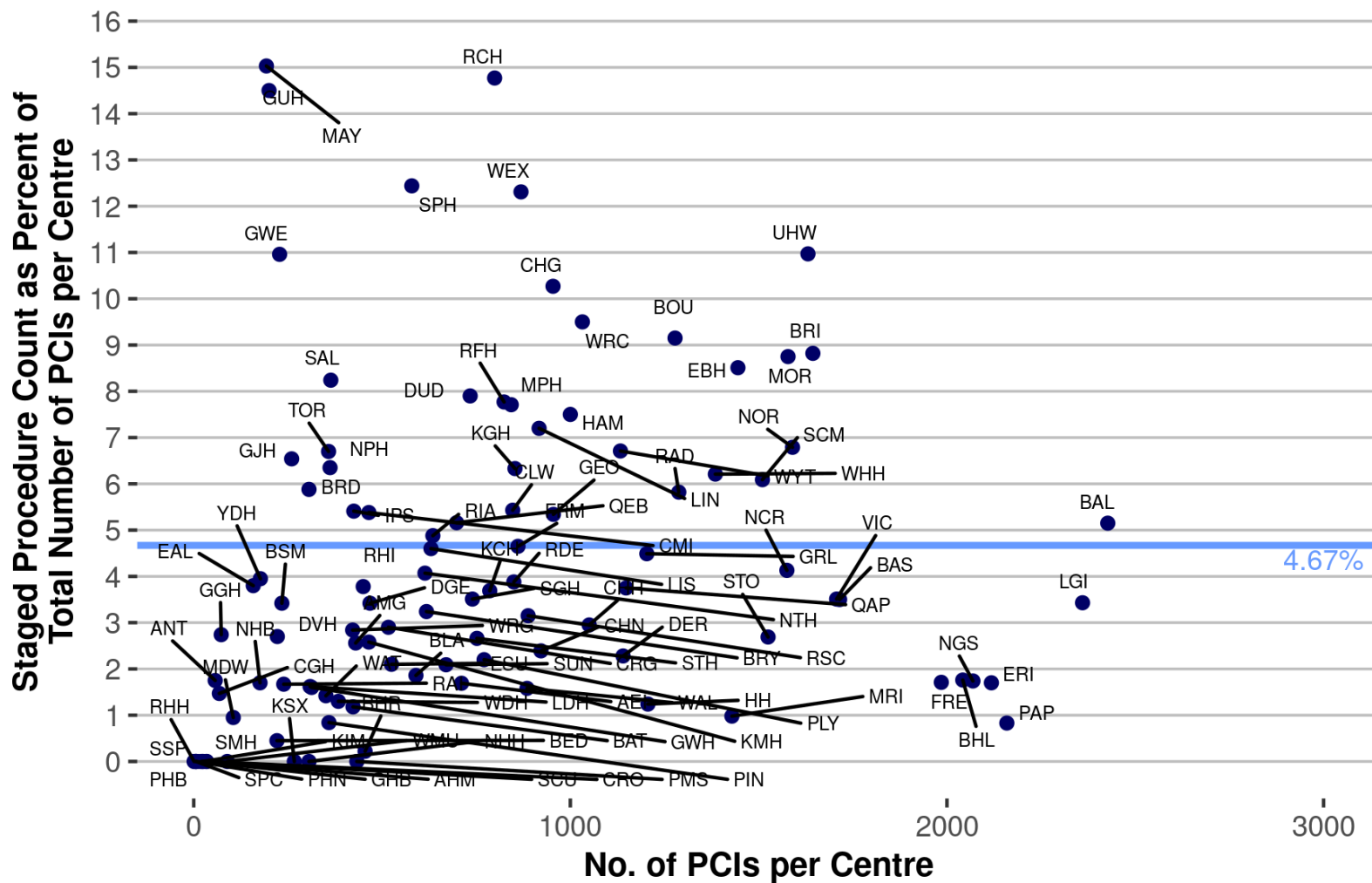
Staged - Totals



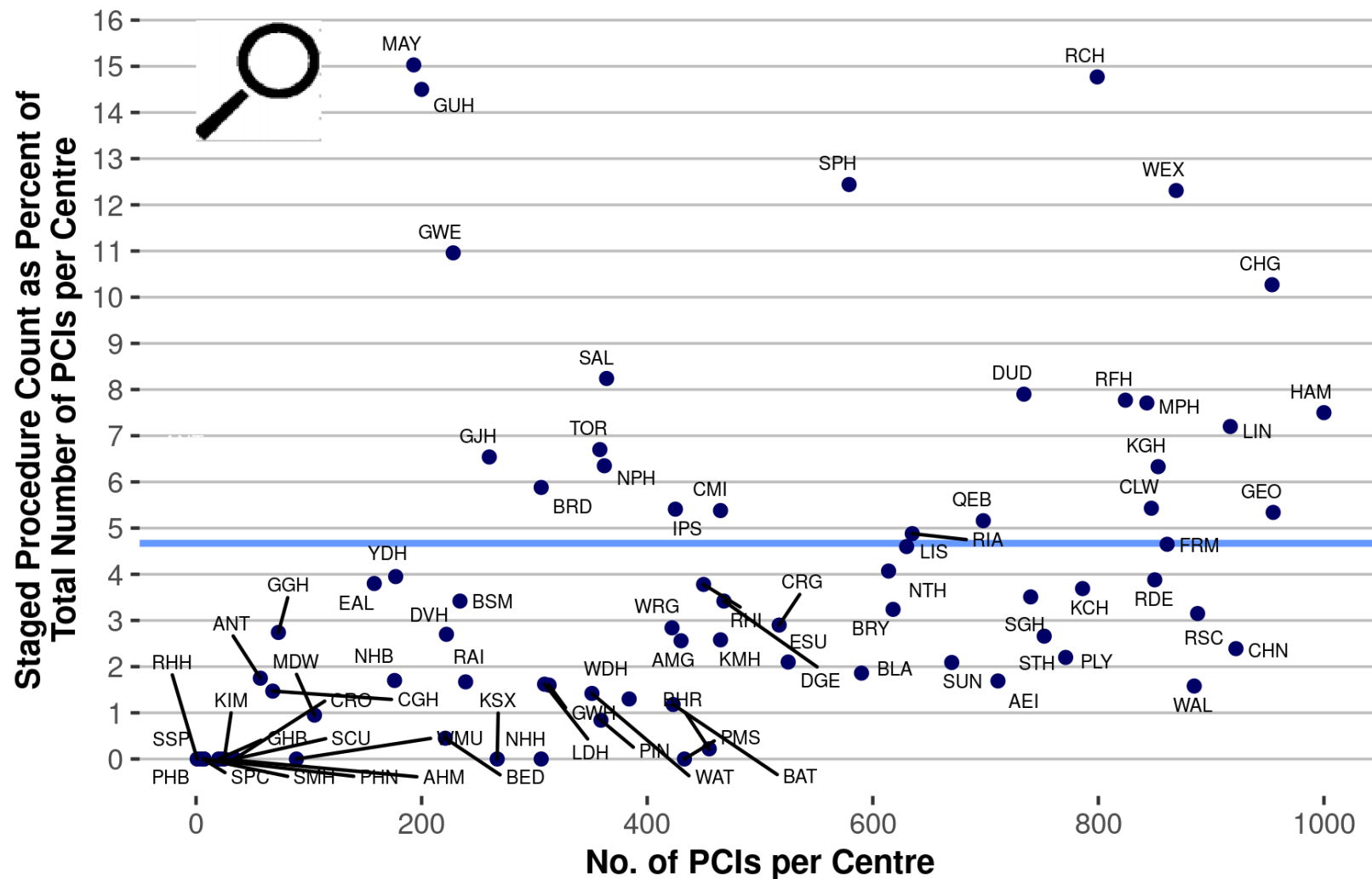
Staged - Totals



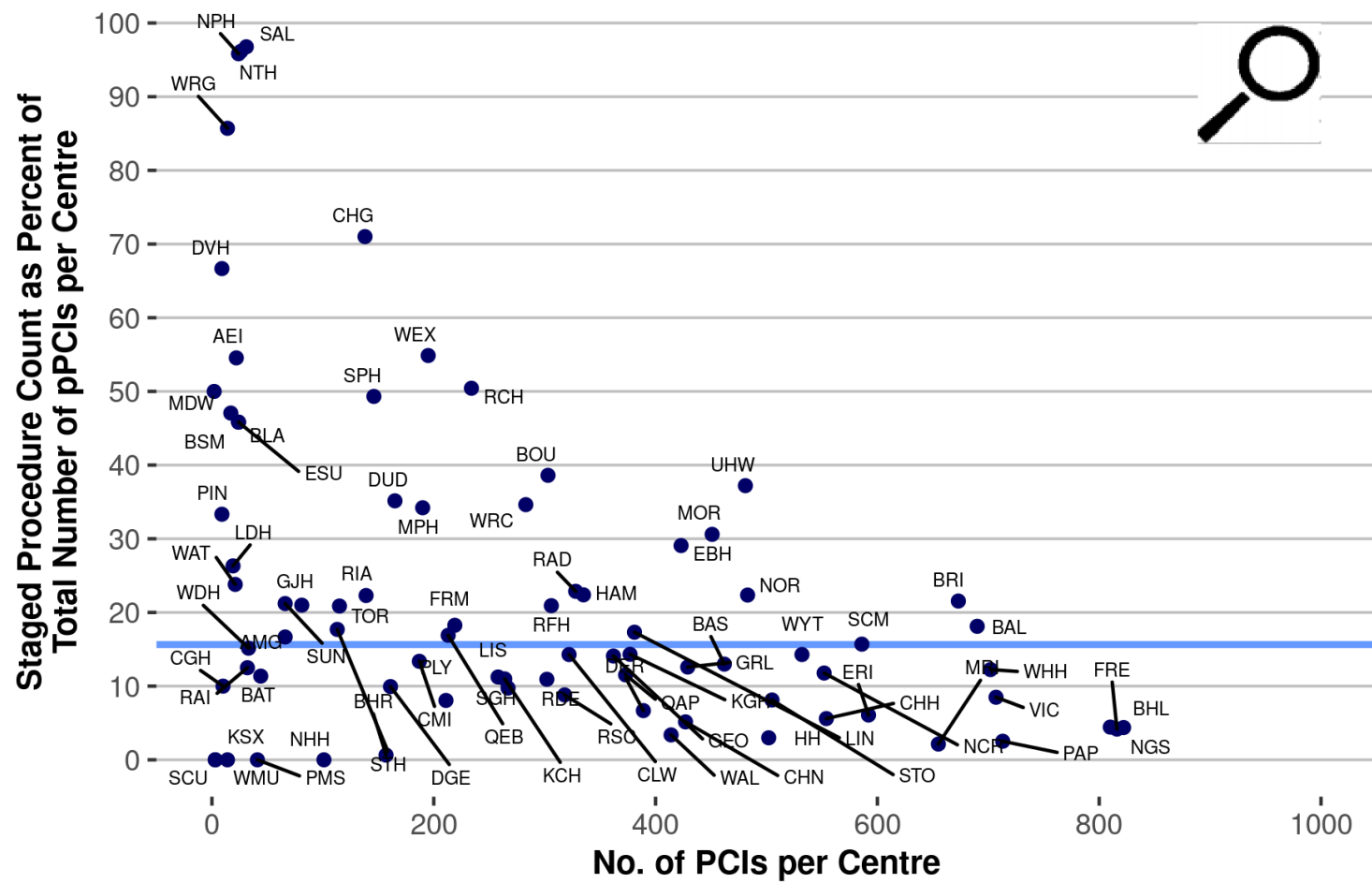
Staged % of all PCI



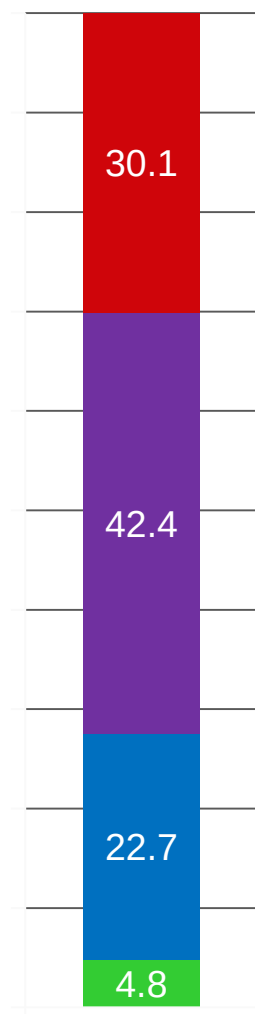
Staged % of all PCI



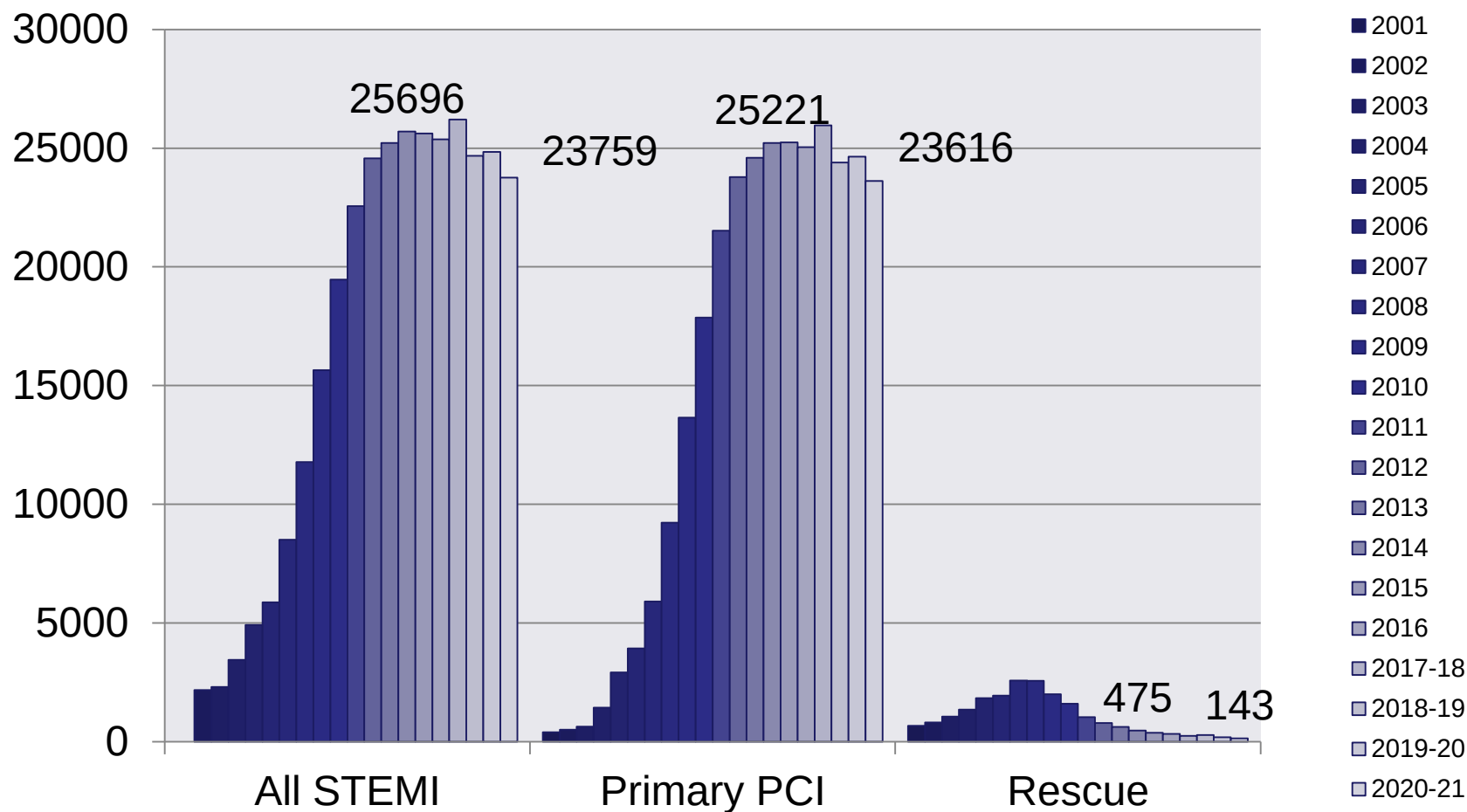
Staged % of Primary PCI



Indication for PCI



PCI for STEMI



PCI for STEMI

30000 ■ 2001

But beware comparison of totals:
No data from

2500

2000

BLA Royal Blackburn Hospital

DVH Darent Valley Hospital

1500

MDW Medway Maritime Hospital

1000

ALT Altnagelvin Hospital

RVB Royal Victoria Hospital

500

HAI Hairmyres Hospital

NIN Ninewells Hospital

GJH Golden Jubilee National Hospital 90% missing

RAI Raigmore Hospital 44% missing

■ 2001

■ 2006

■ 2007

■ 2008

■ 2009

■ 2010

■ 2011

■ 2012

■ 2013

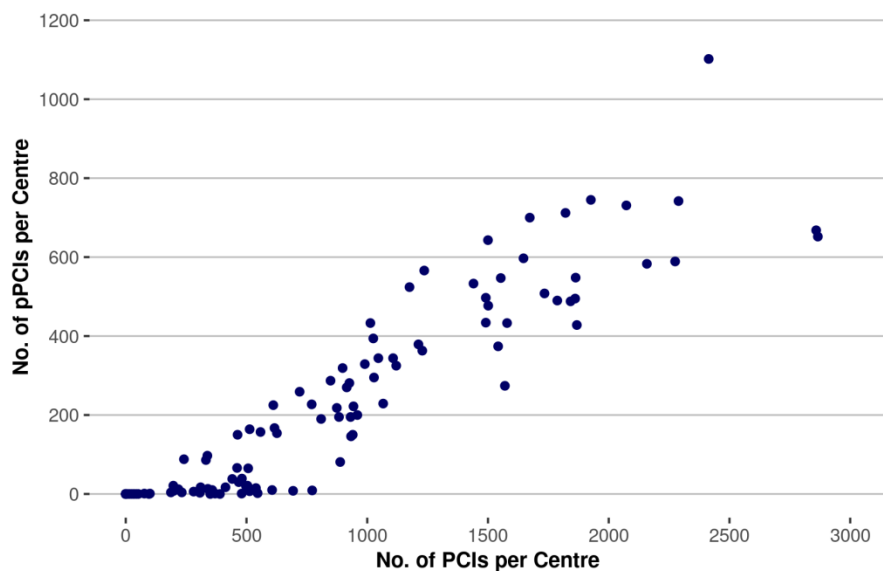
■ 2014

■ 2015

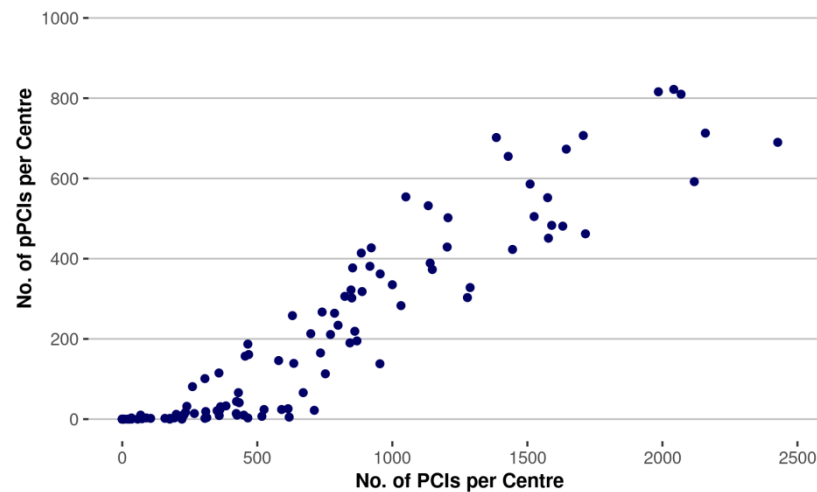
Primary PCI for STEMI

Absolute numbers

2019/20

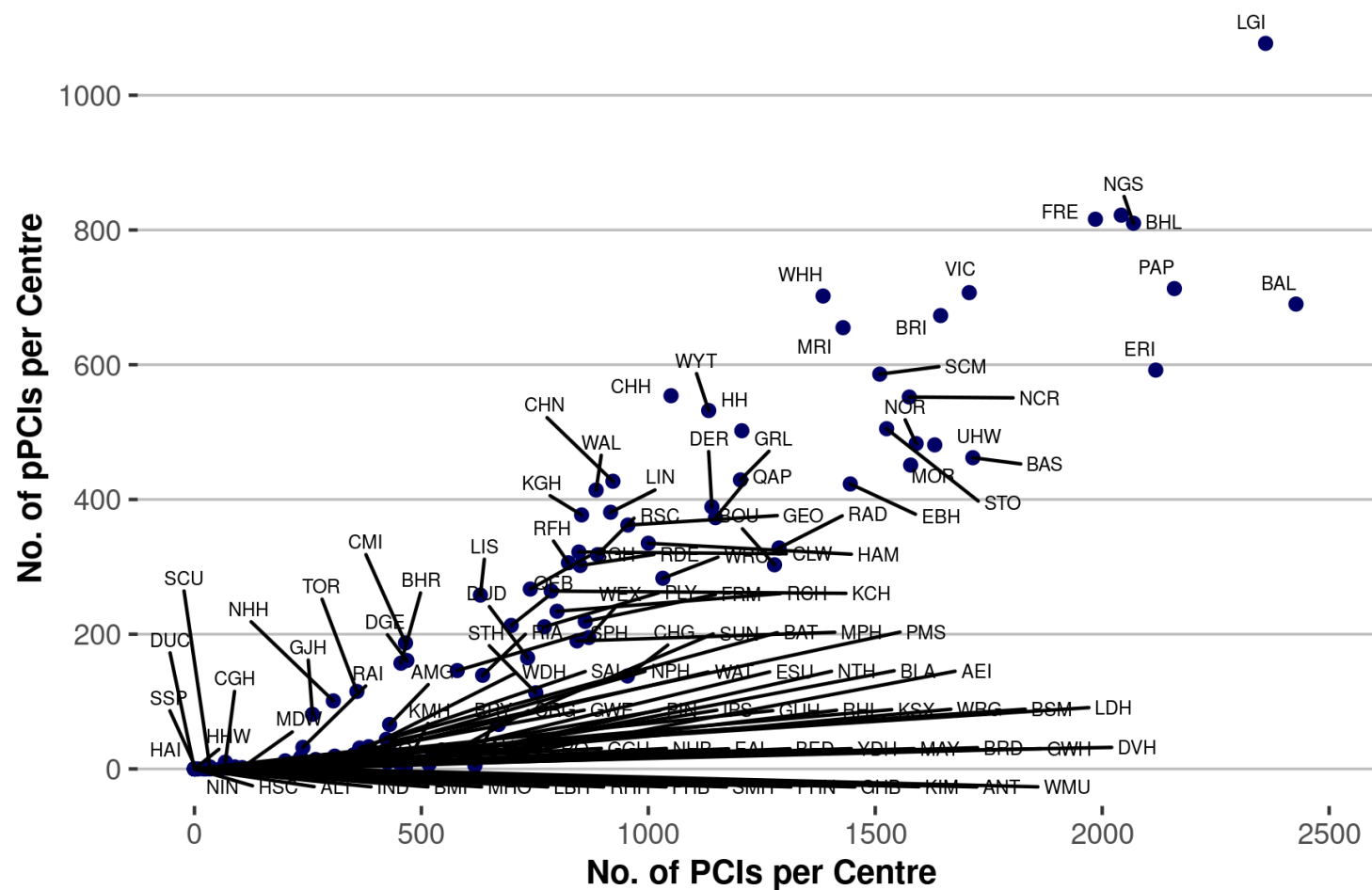


2020/21



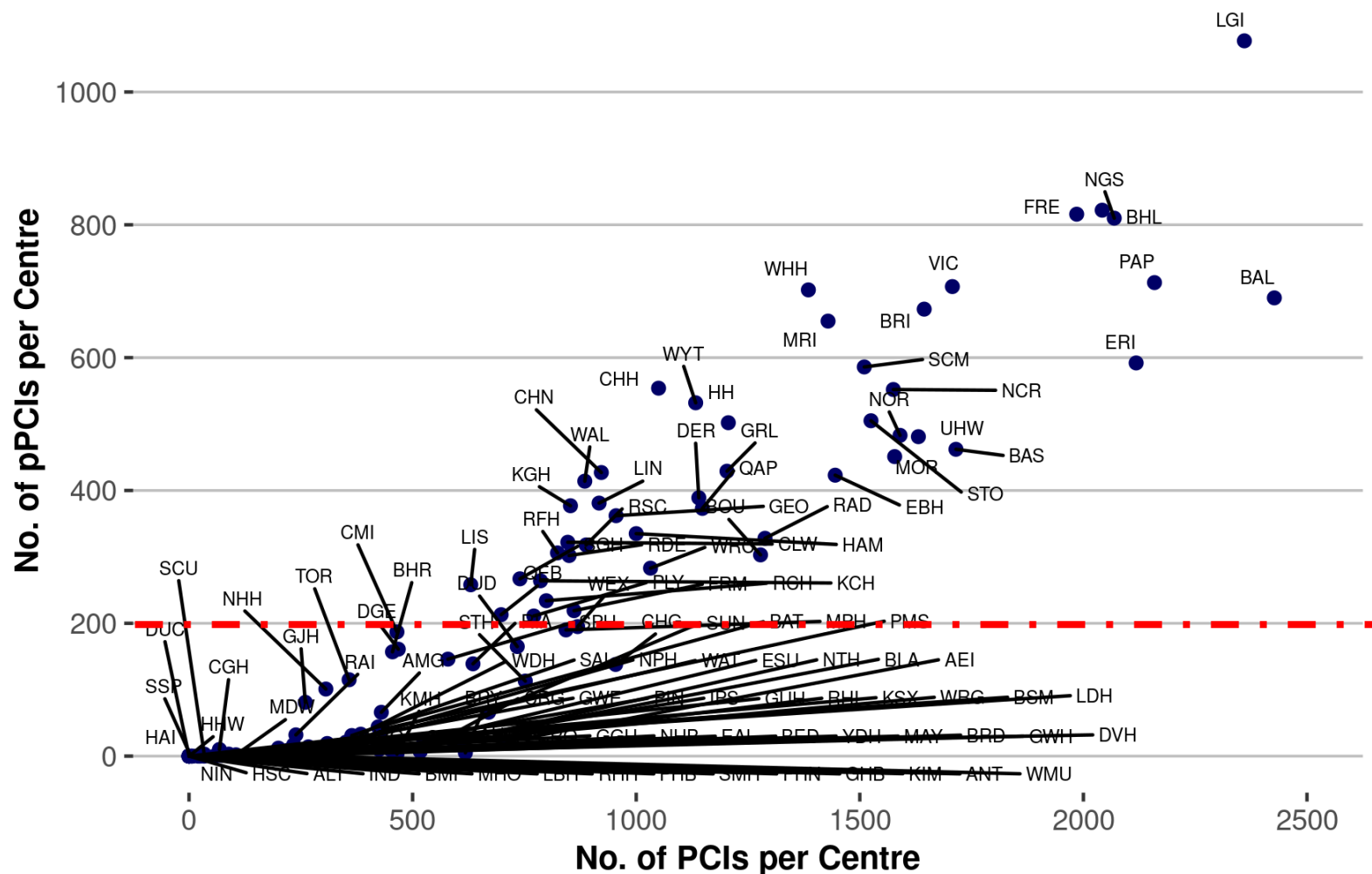
Primary PCI for STEMI

Absolute numbers



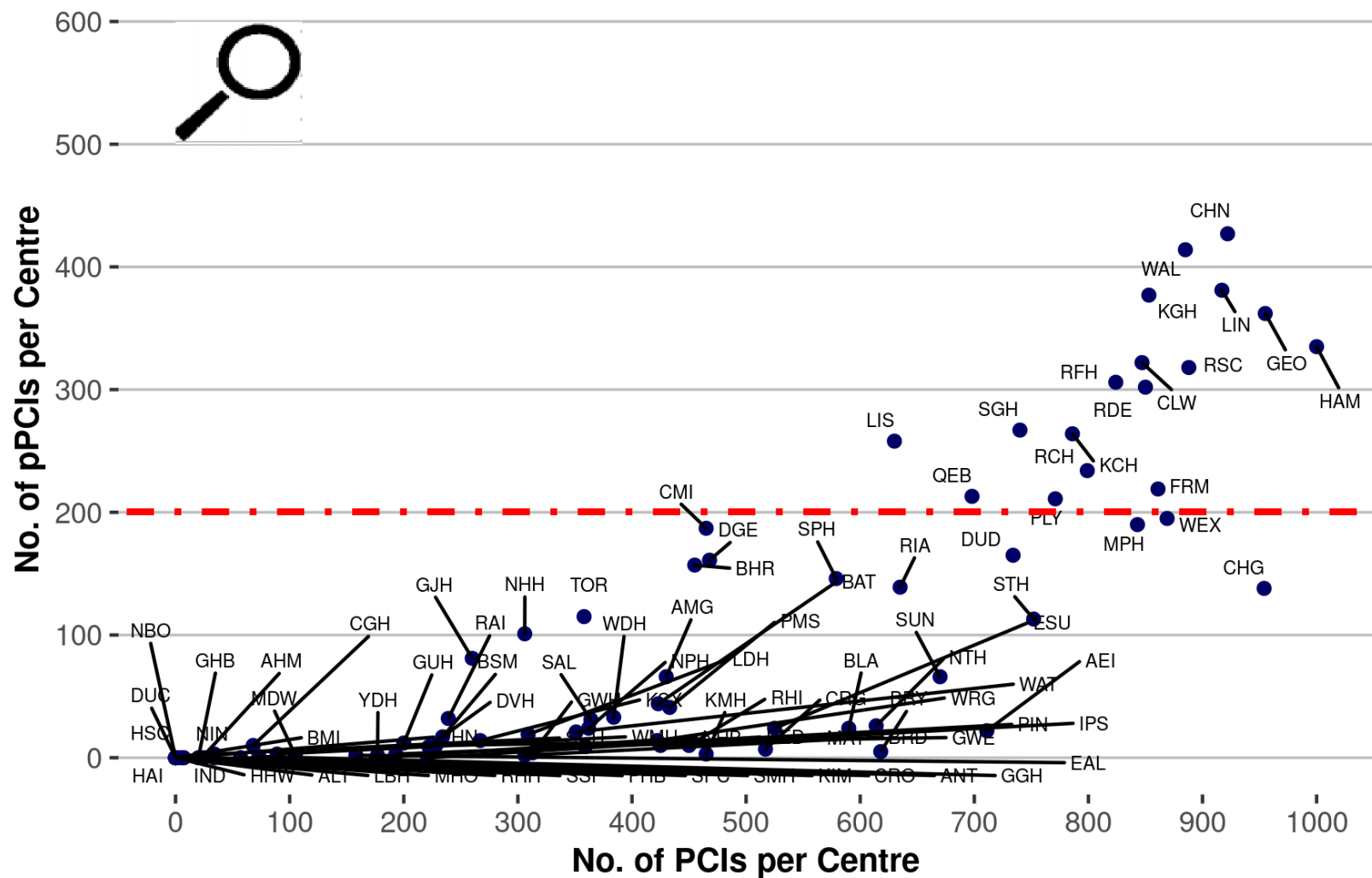
Primary PCI for STEMI

Absolute numbers



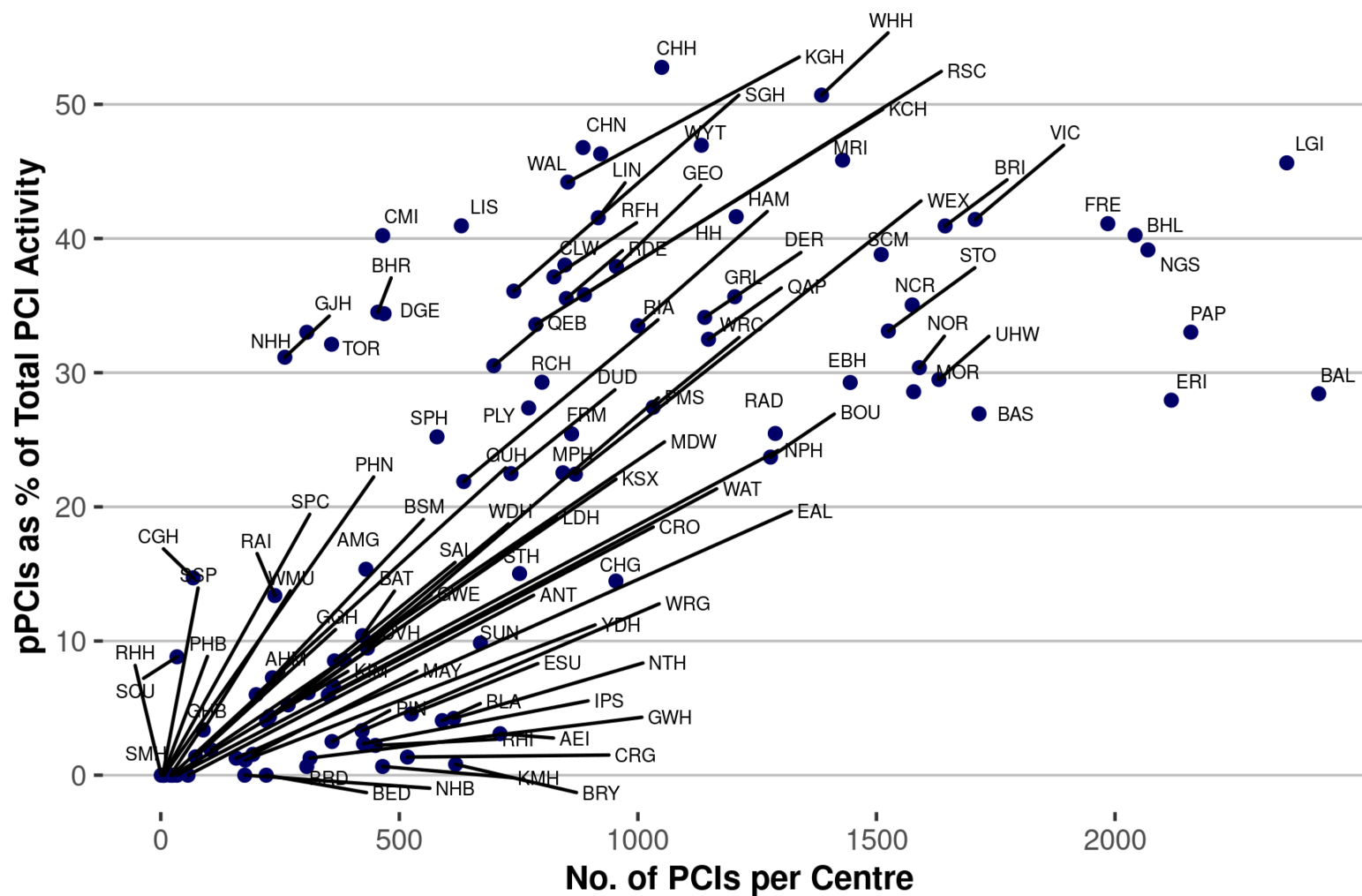
Primary PCI for STEMI

Absolute numbers



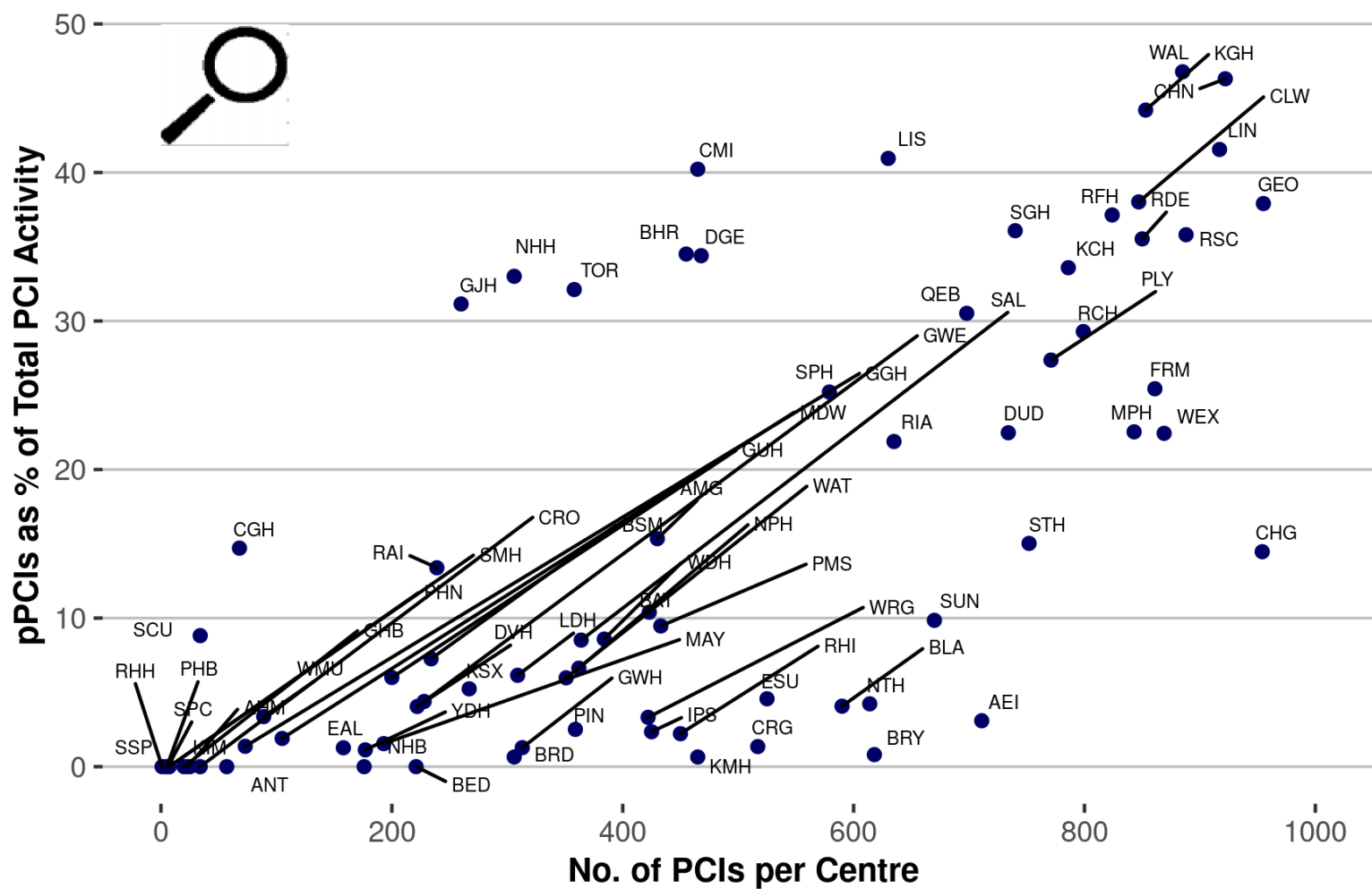
Primary PCI for STEMI

As % of Total PCIs



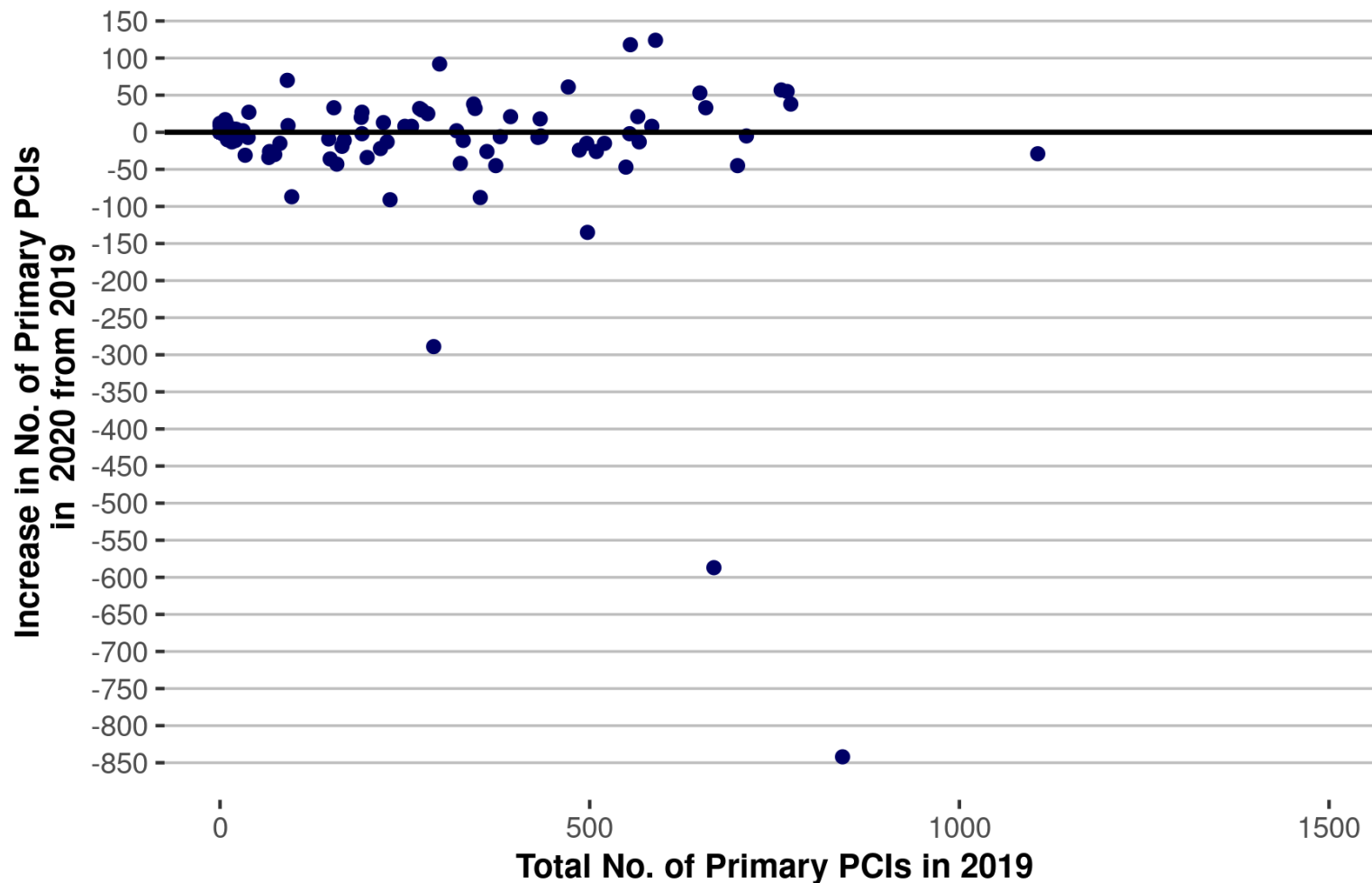
Primary PCI for STEMI

As % of Total PCIs

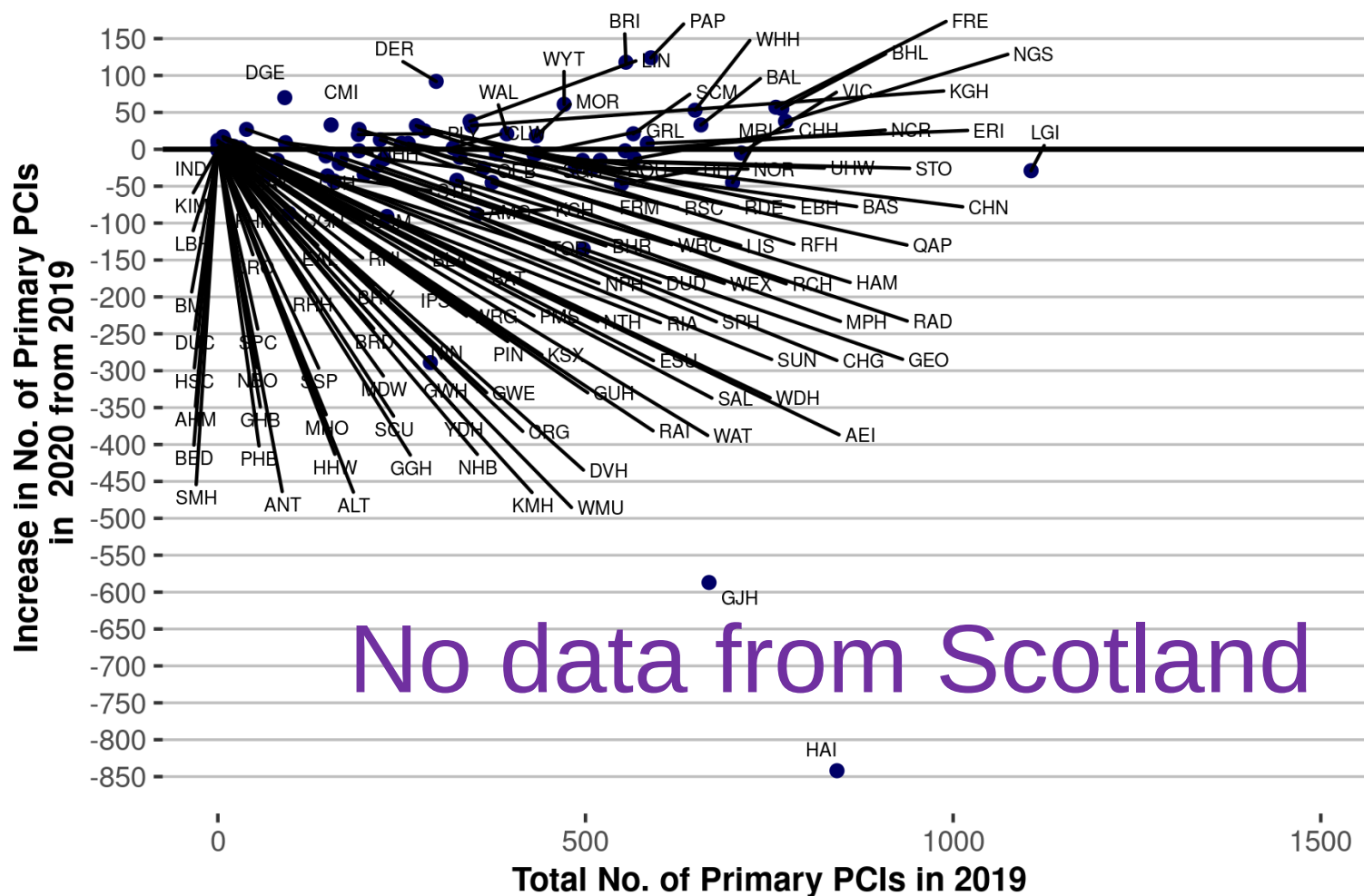


Primary PCI for STEMI

Increase



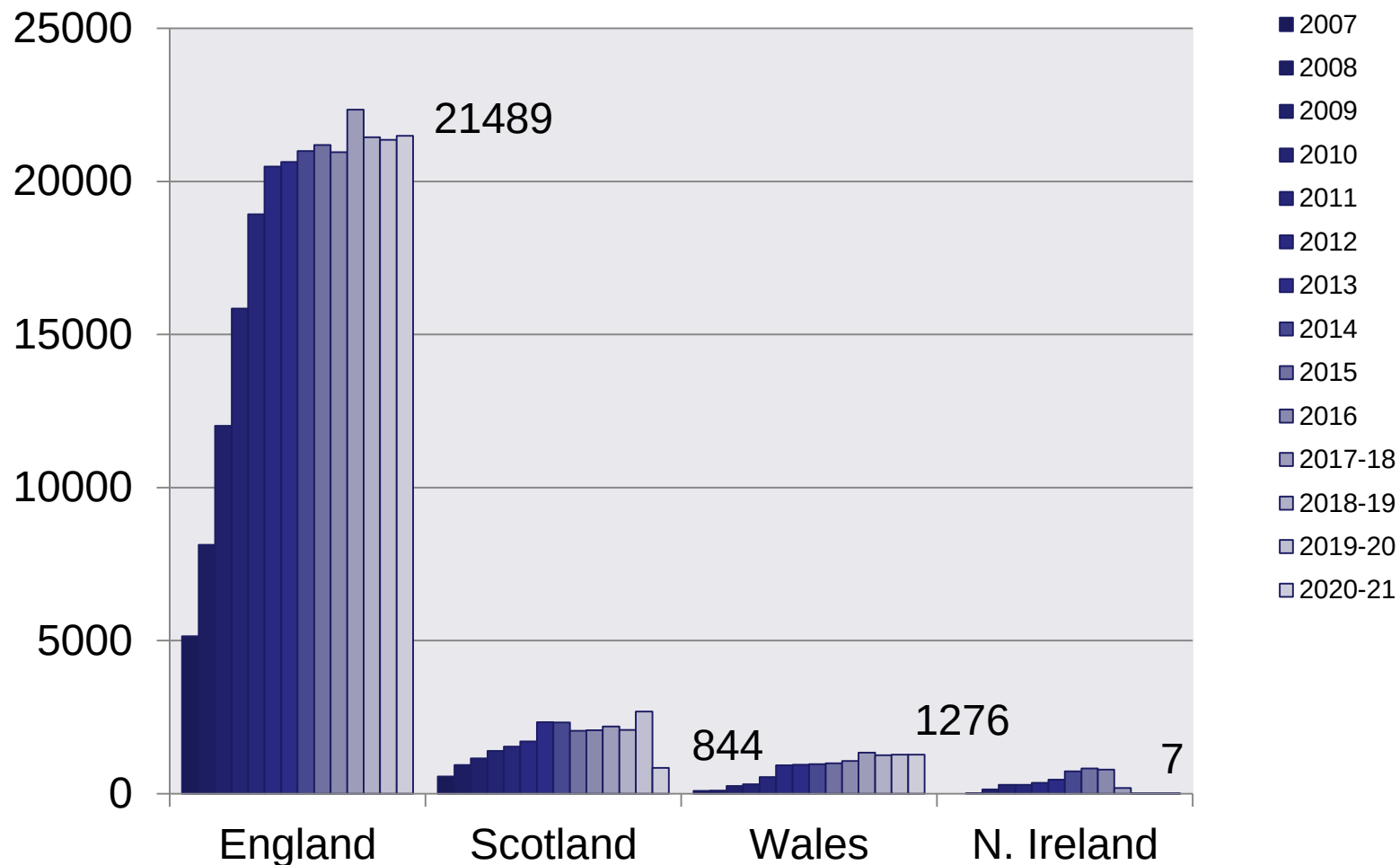
Primary PCI for STEMI Increase



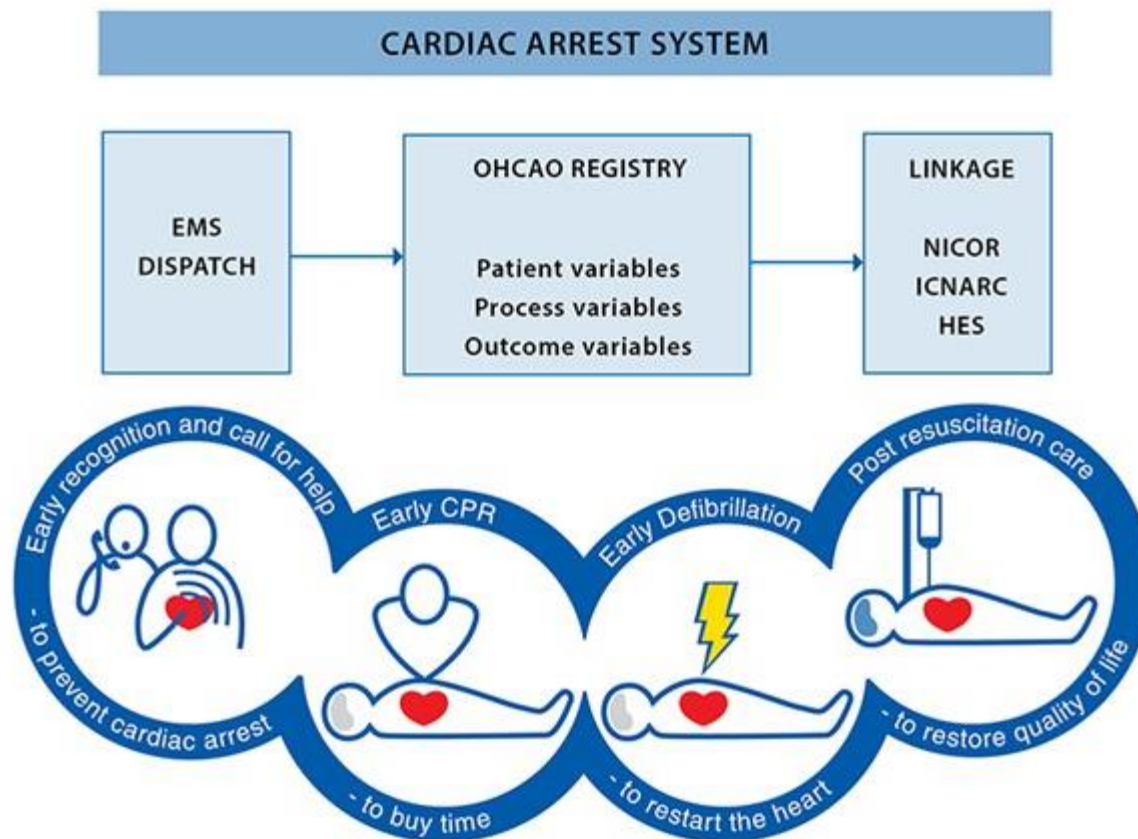
No data from Scotland

Primary PCI

UK Countries - Total number of procedures in NICOR

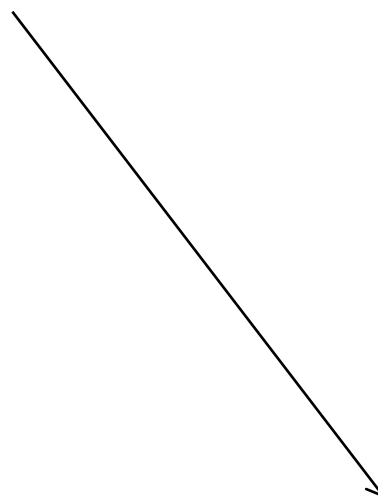


Note few Scottish and NI data uploaded in recent years



Out of Hospital Cardiac Arrest

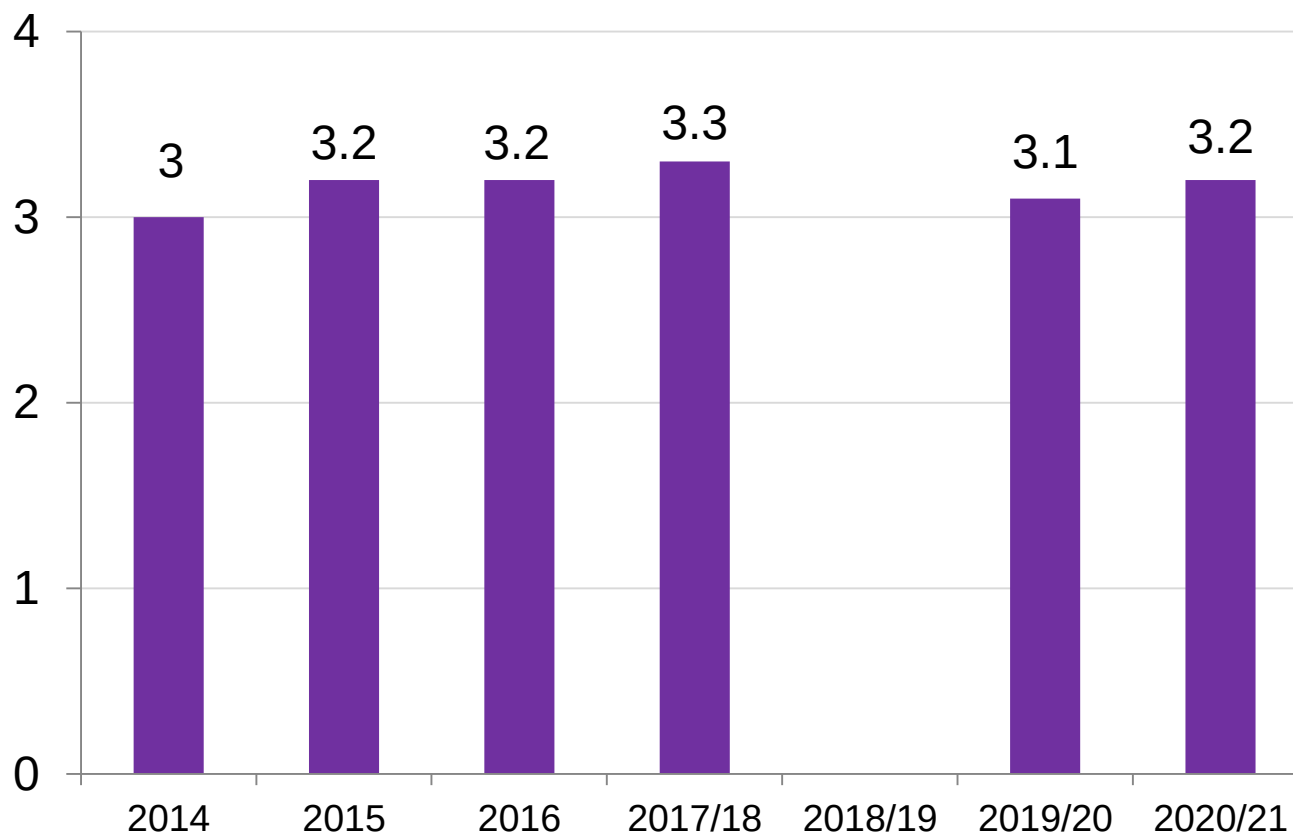
The only procedures we see in the PCI audit



PCI performed

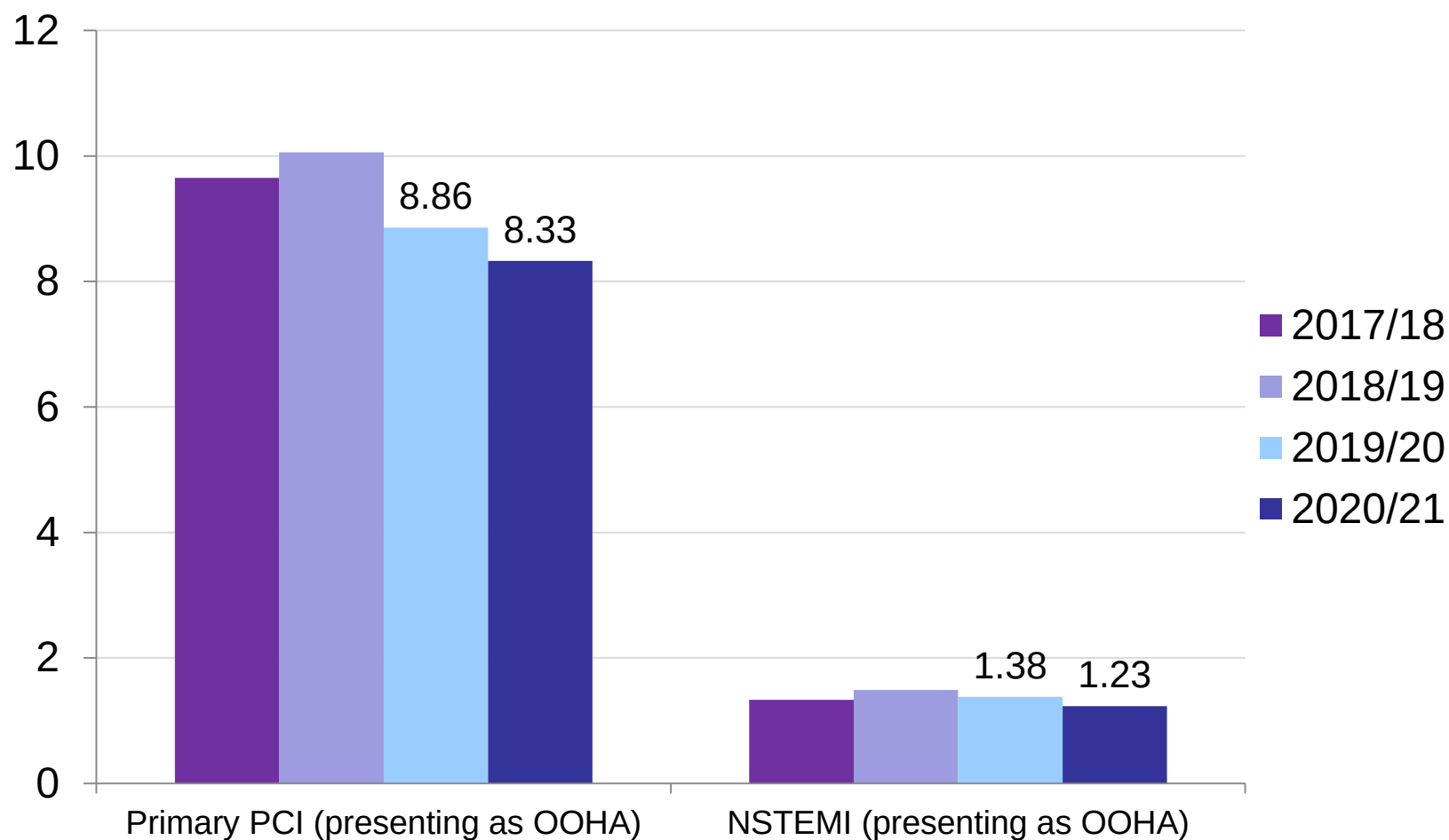
Out of Hospital Cardiac Arrest

- Of patients treated by PCI
 - % who had had an Out of Hospital Cardiac Arrest (ventilated or not)



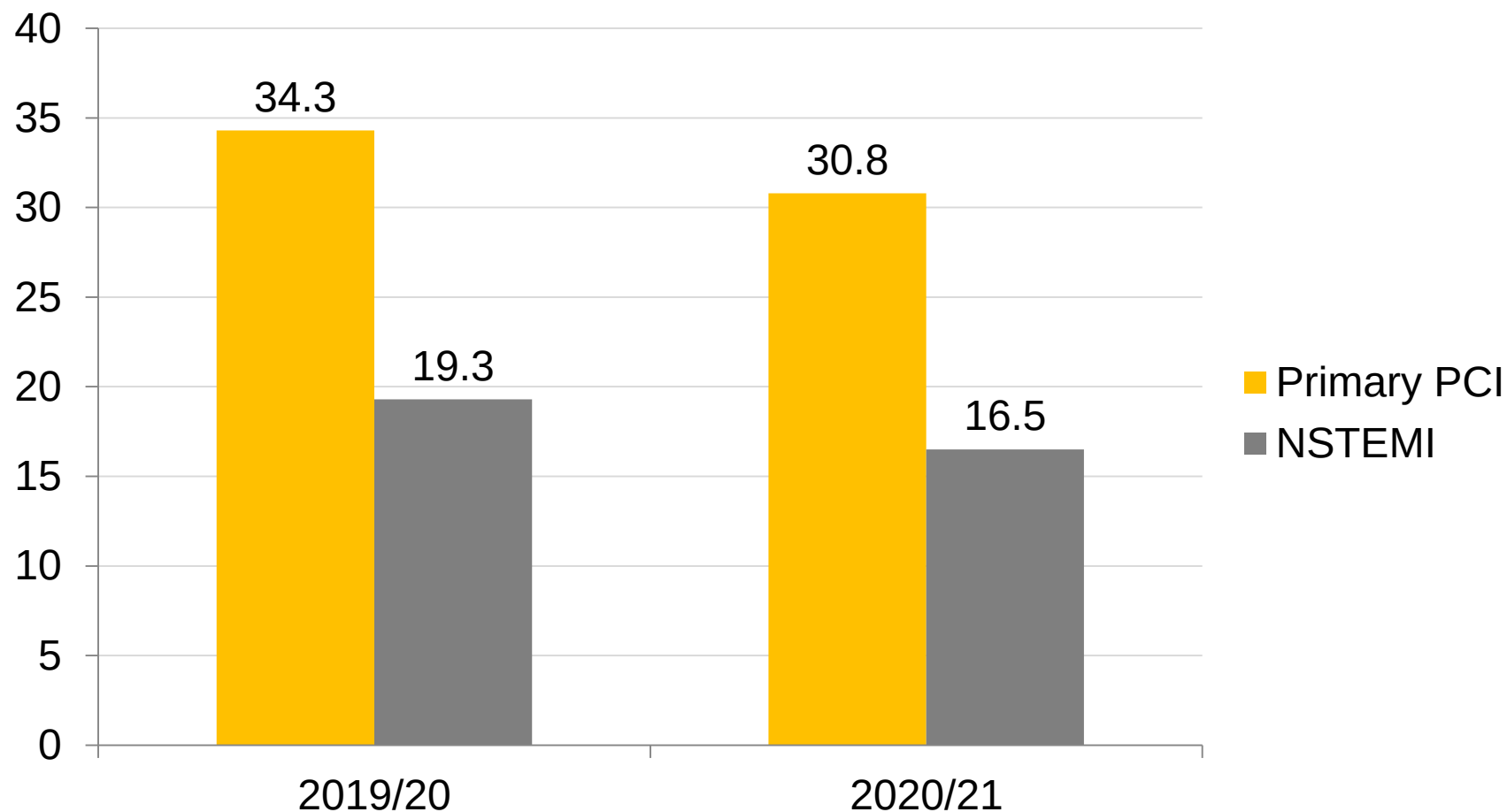
Out of Hospital Cardiac Arrest

As % of all cases with PCI Indication as below
(ventilated or not)



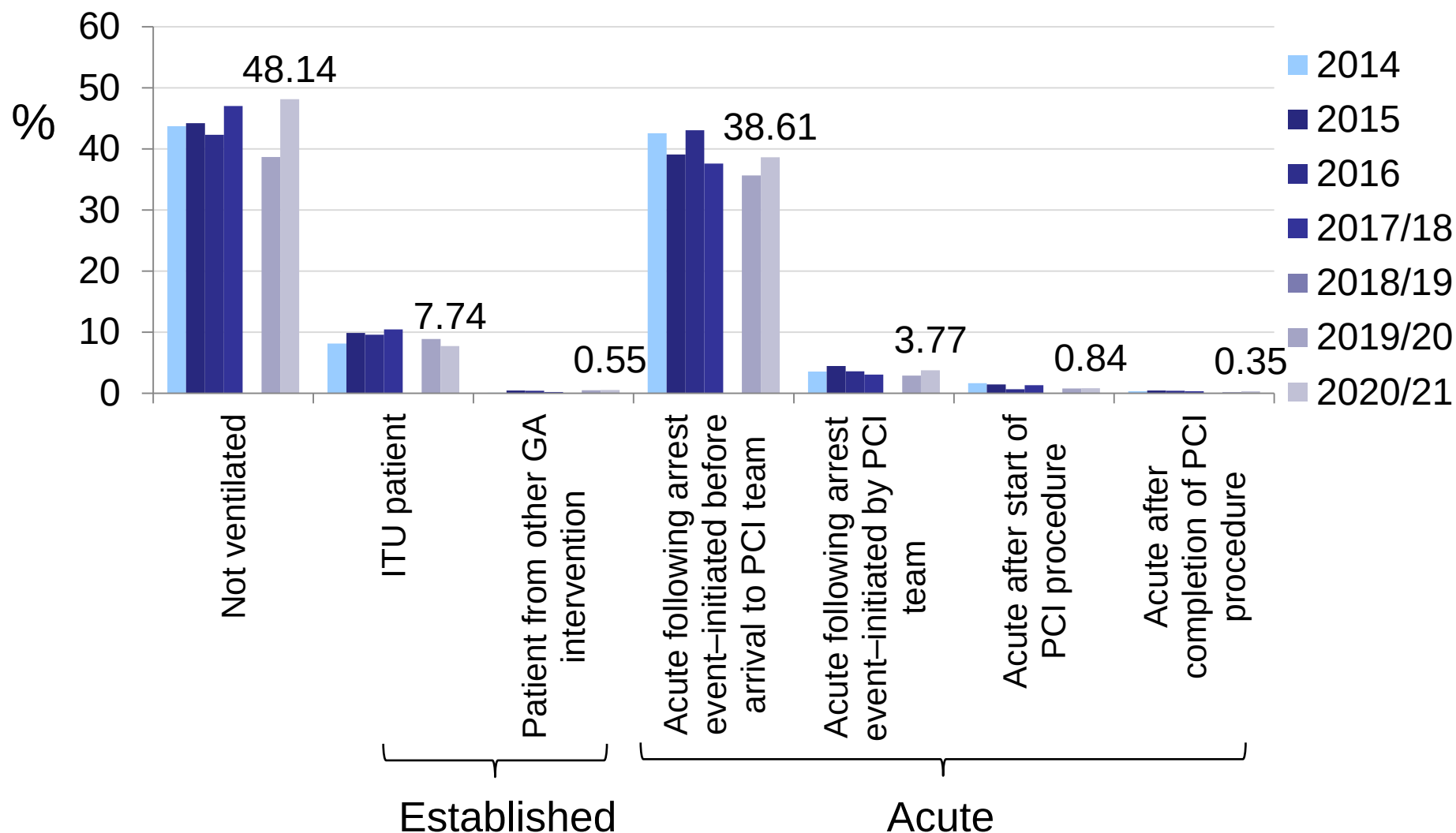
Out of Hospital Cardiac Arrest

% of Cases with OHCA treated by PCI in Shock



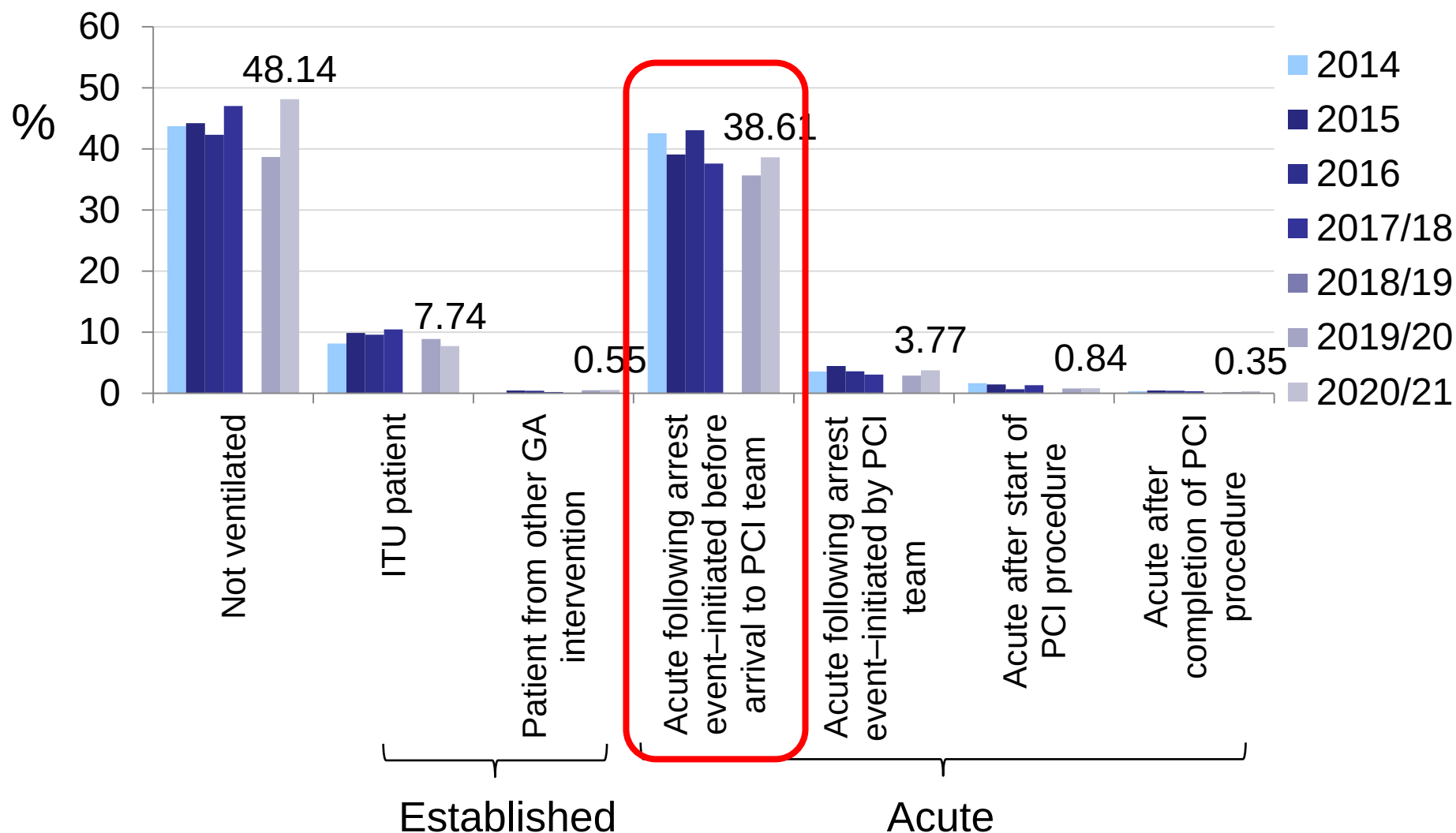
Out of Hospital Cardiac Arrest

(By type of ventilation requirement)



Out of Hospital Cardiac Arrest

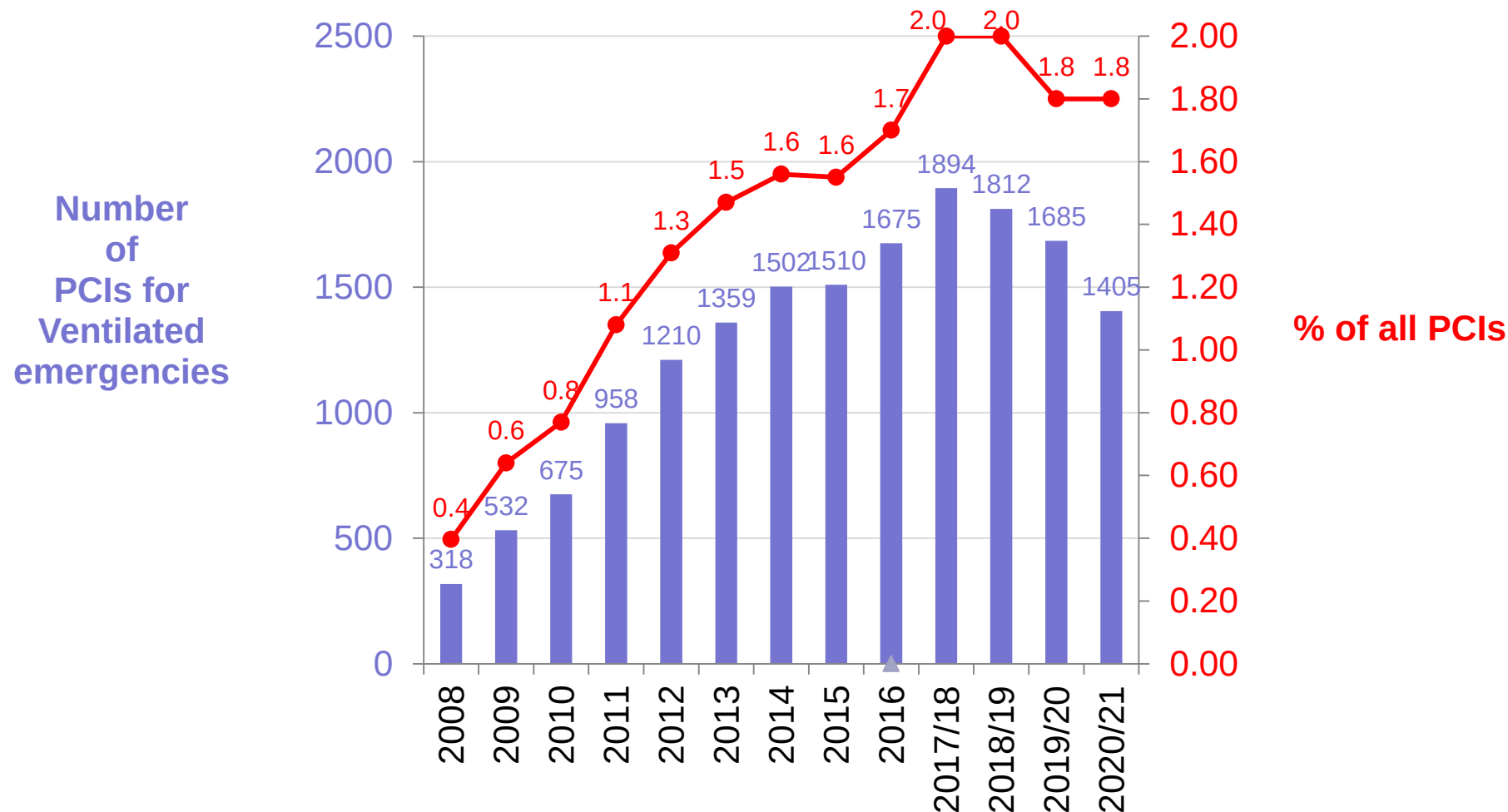
(By type of ventilation requirement)



Out of Hospital Cardiac Arrest

Total Number of Emergency cases with Pre PCI ventilation

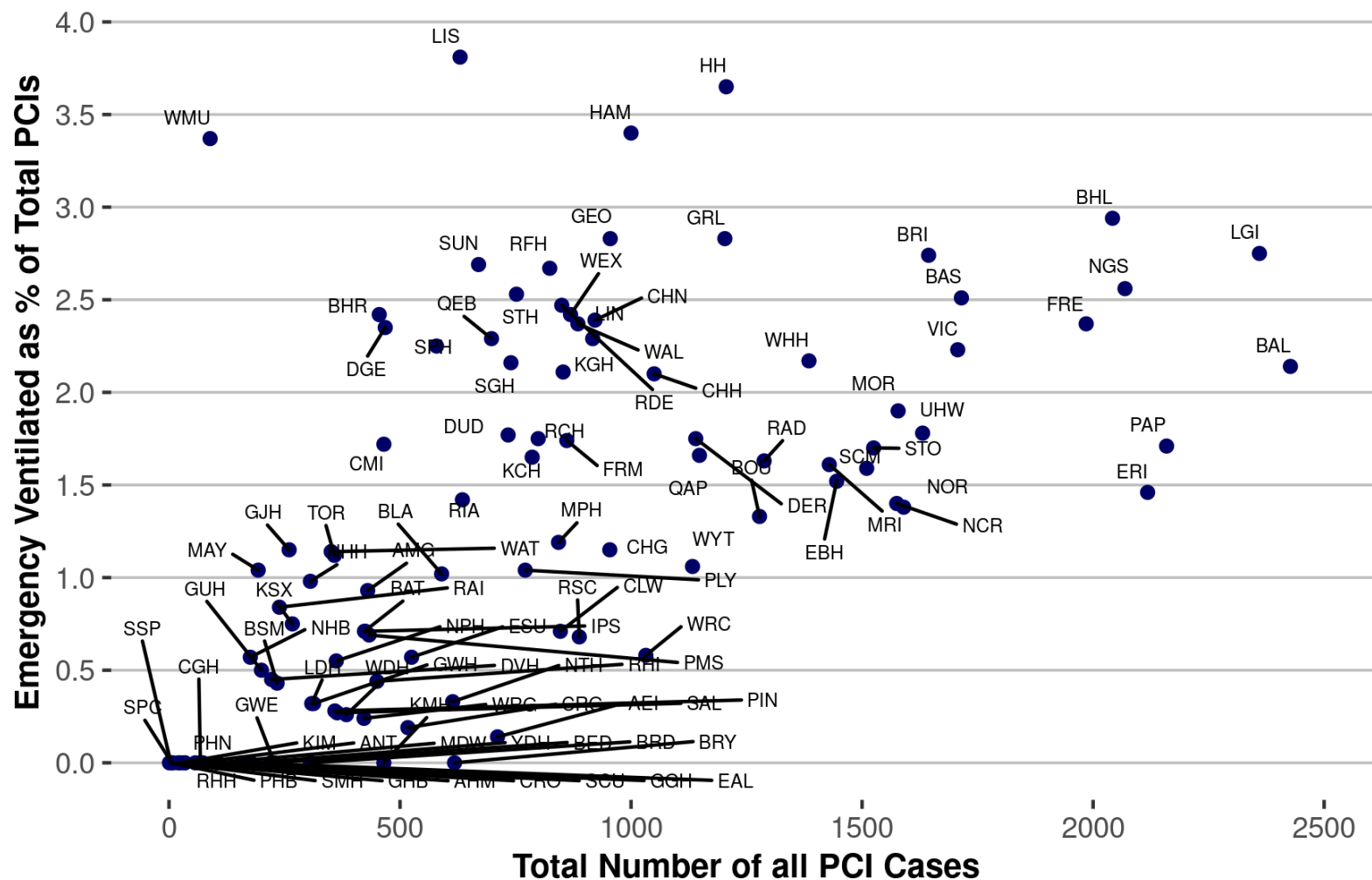
- Surrogate of out of hospital cardiac arrest



Note: missing centre's data in NICOR so absolute values low, but % $\approx$ correct

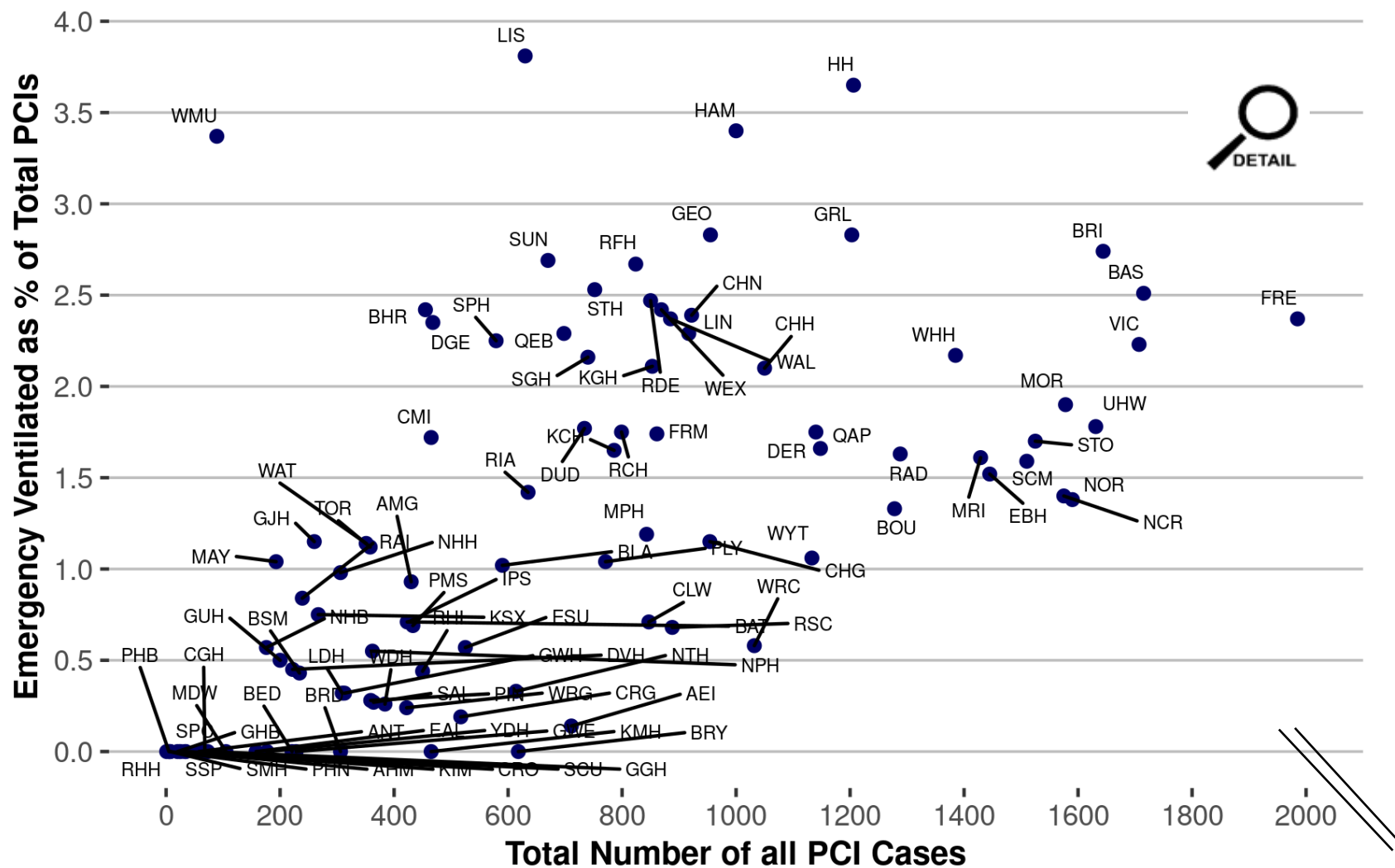
Pre PCI Ventilation

As % of all PCI activity

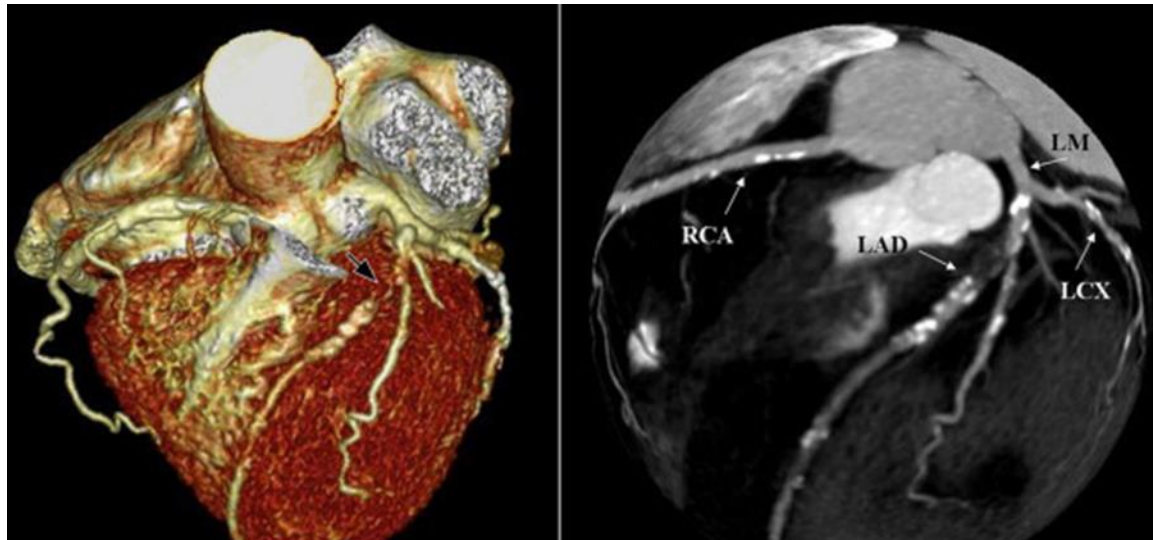


Pre PCI Ventilation

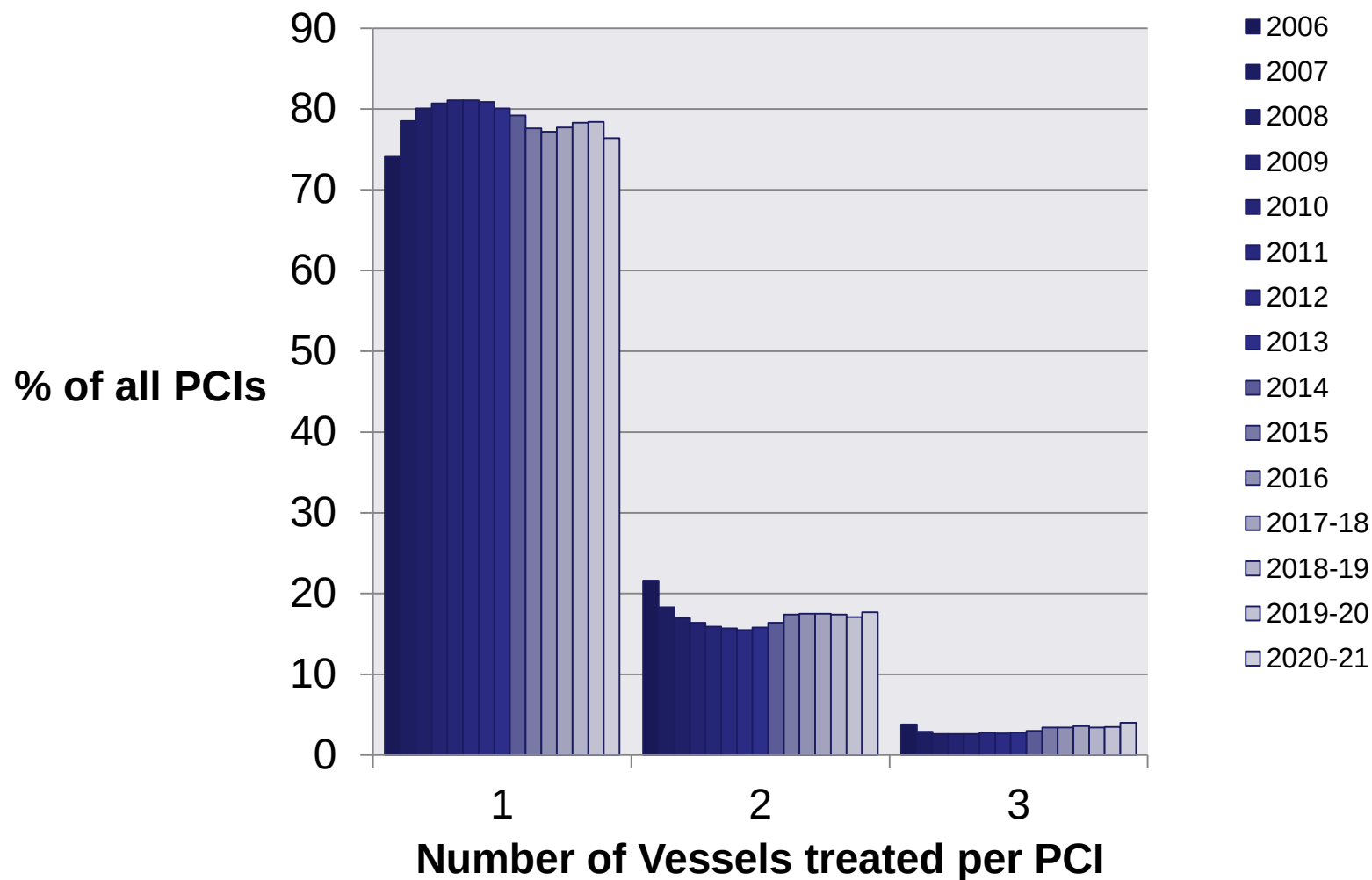
As % of all PCI activity



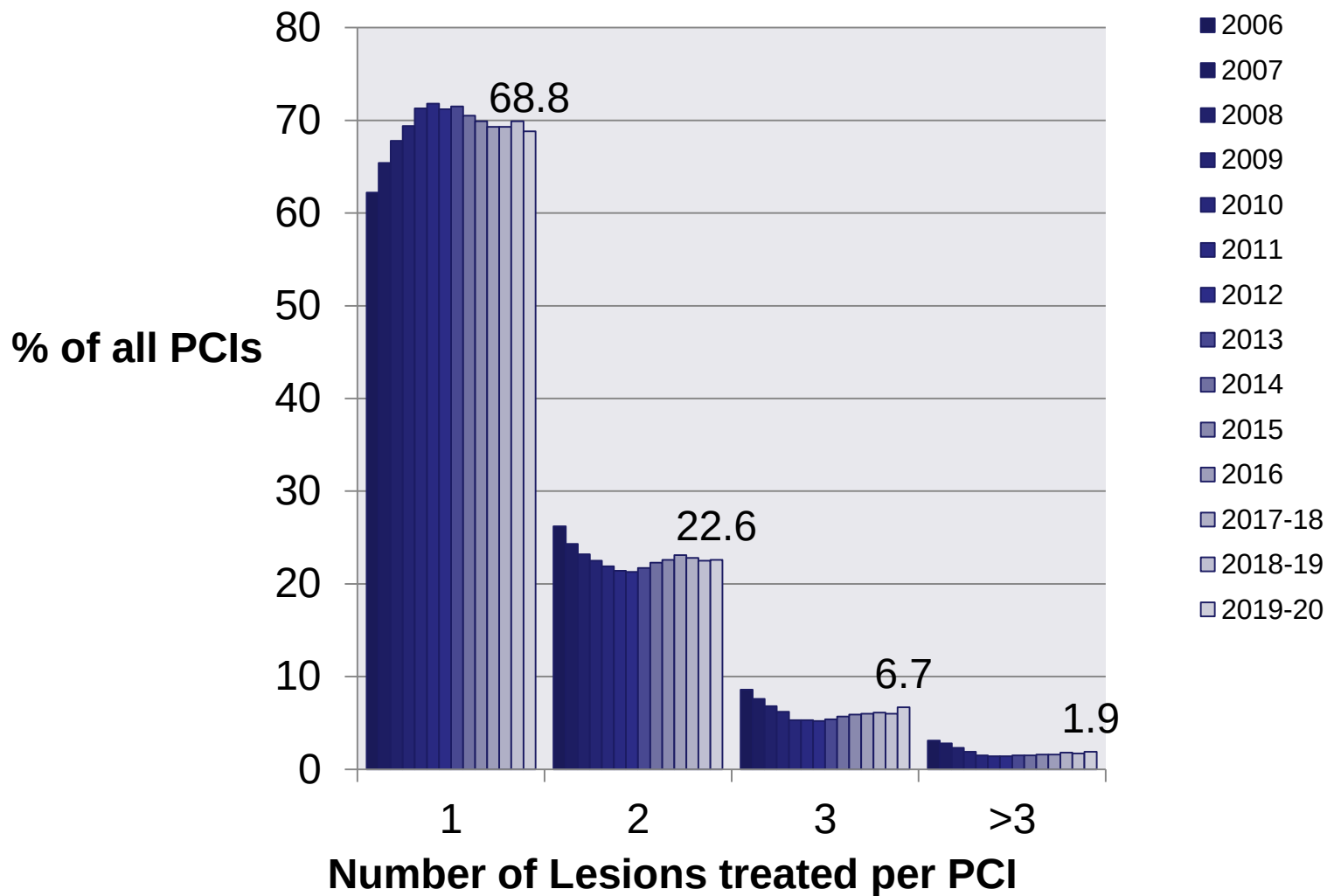
Multi-vessel Disease



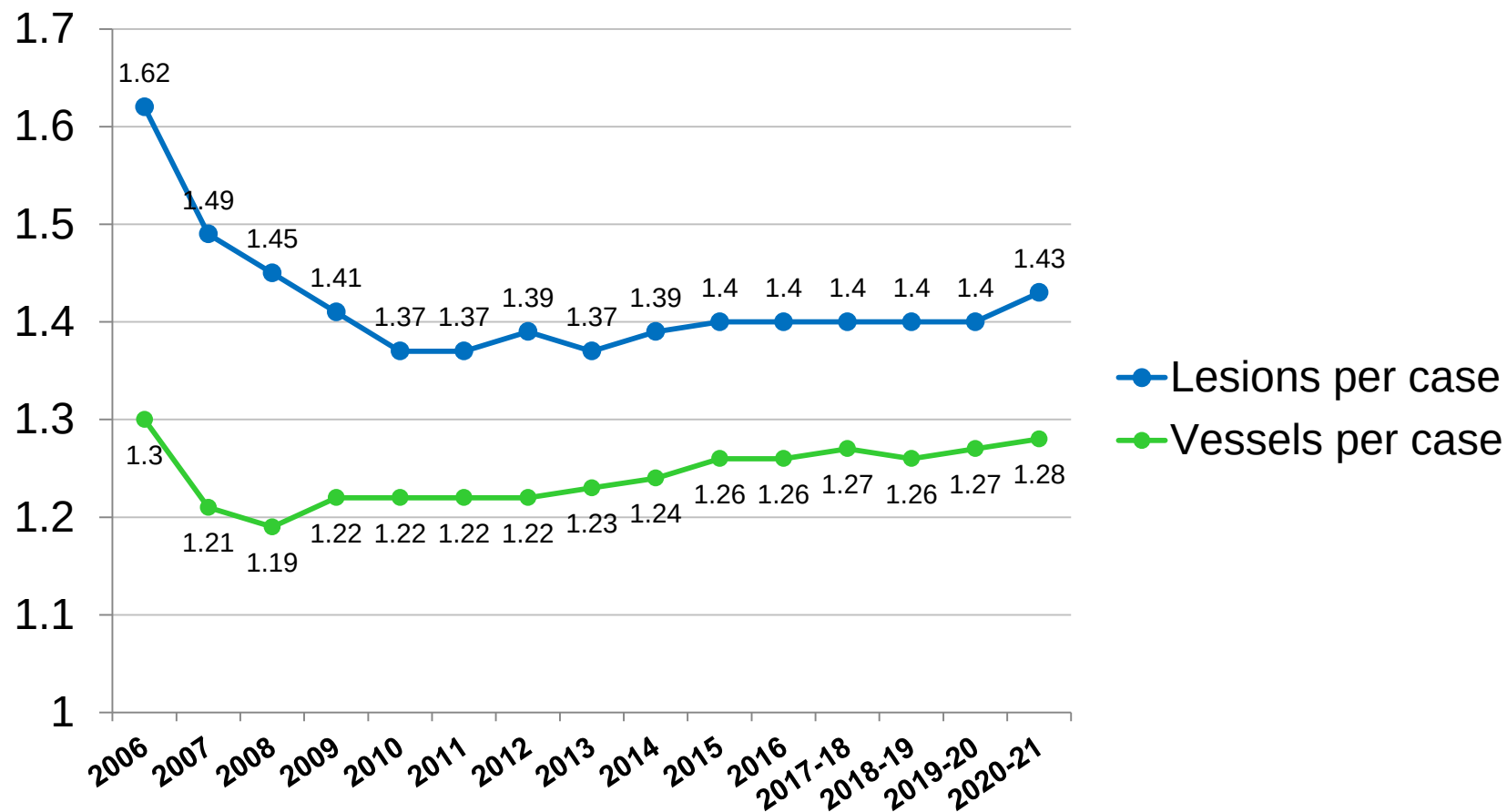
Multi-vessel Treatment



Multi-Lesion Treatment



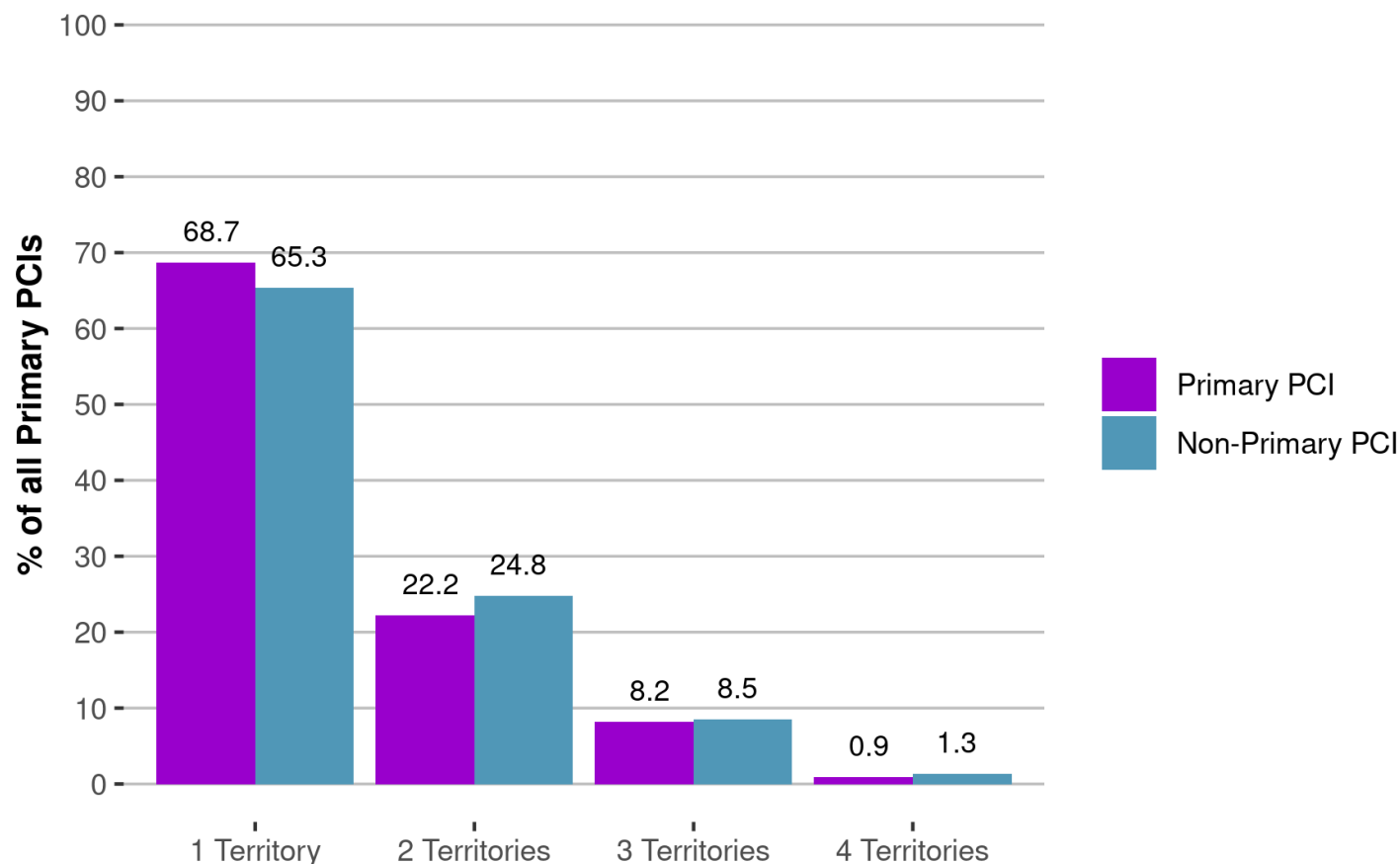
PCI to Multiple Lesions and vessels



Disease Burden

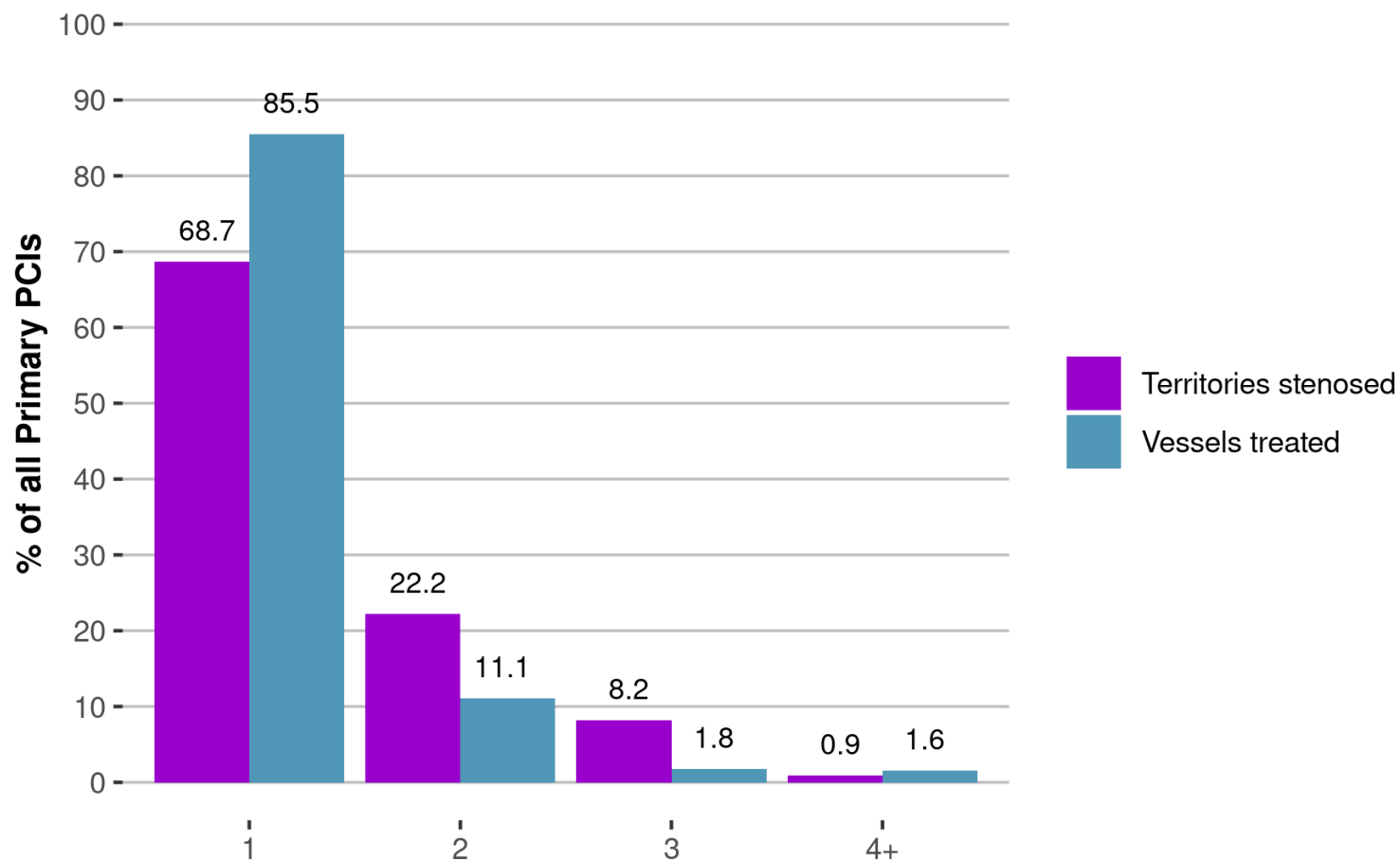
Primary PCI v Non-Primary PCI Cases

Epicardial Territories with > 75% stenoses



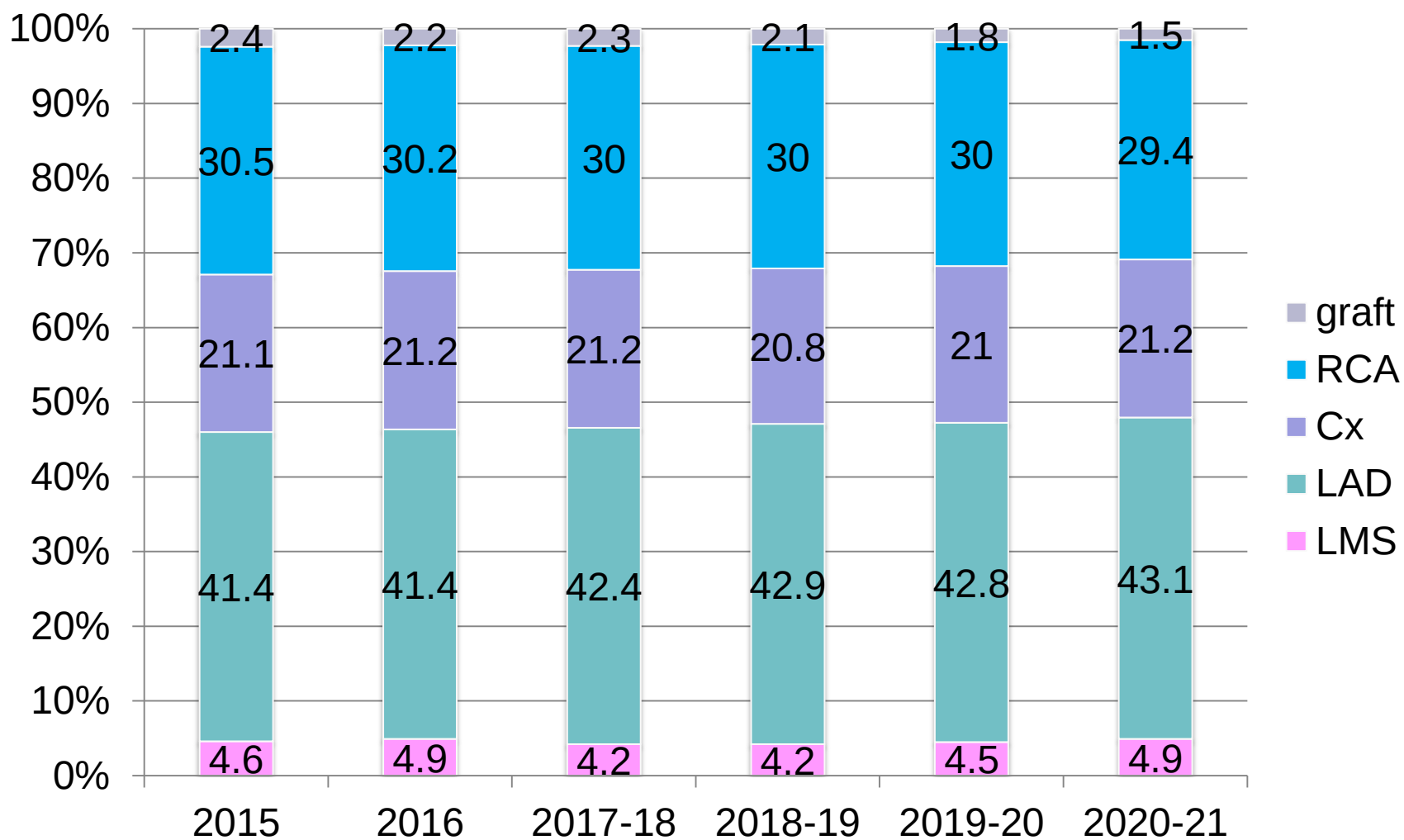
Primary PCI

Multi-vessel Rx

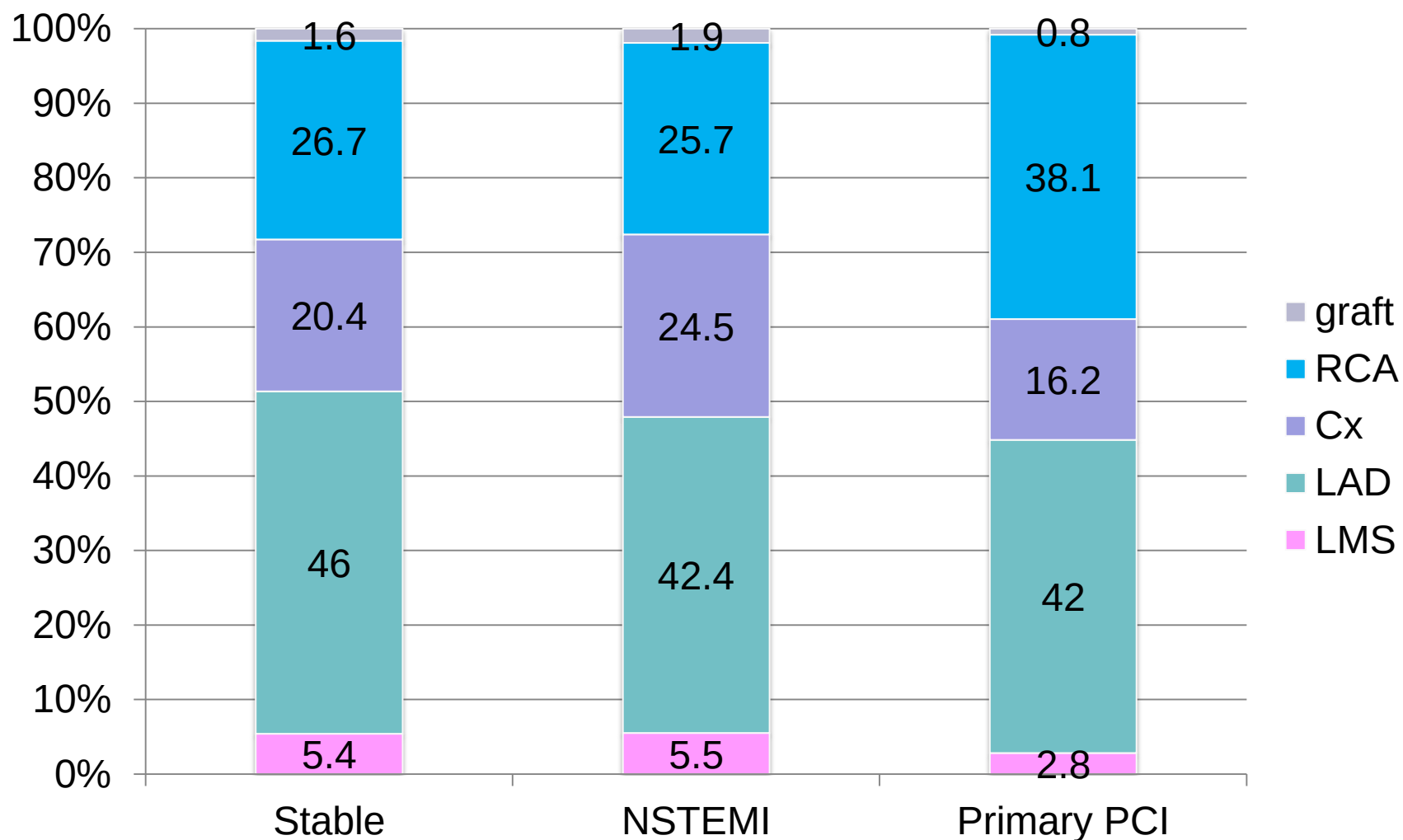


All PCI

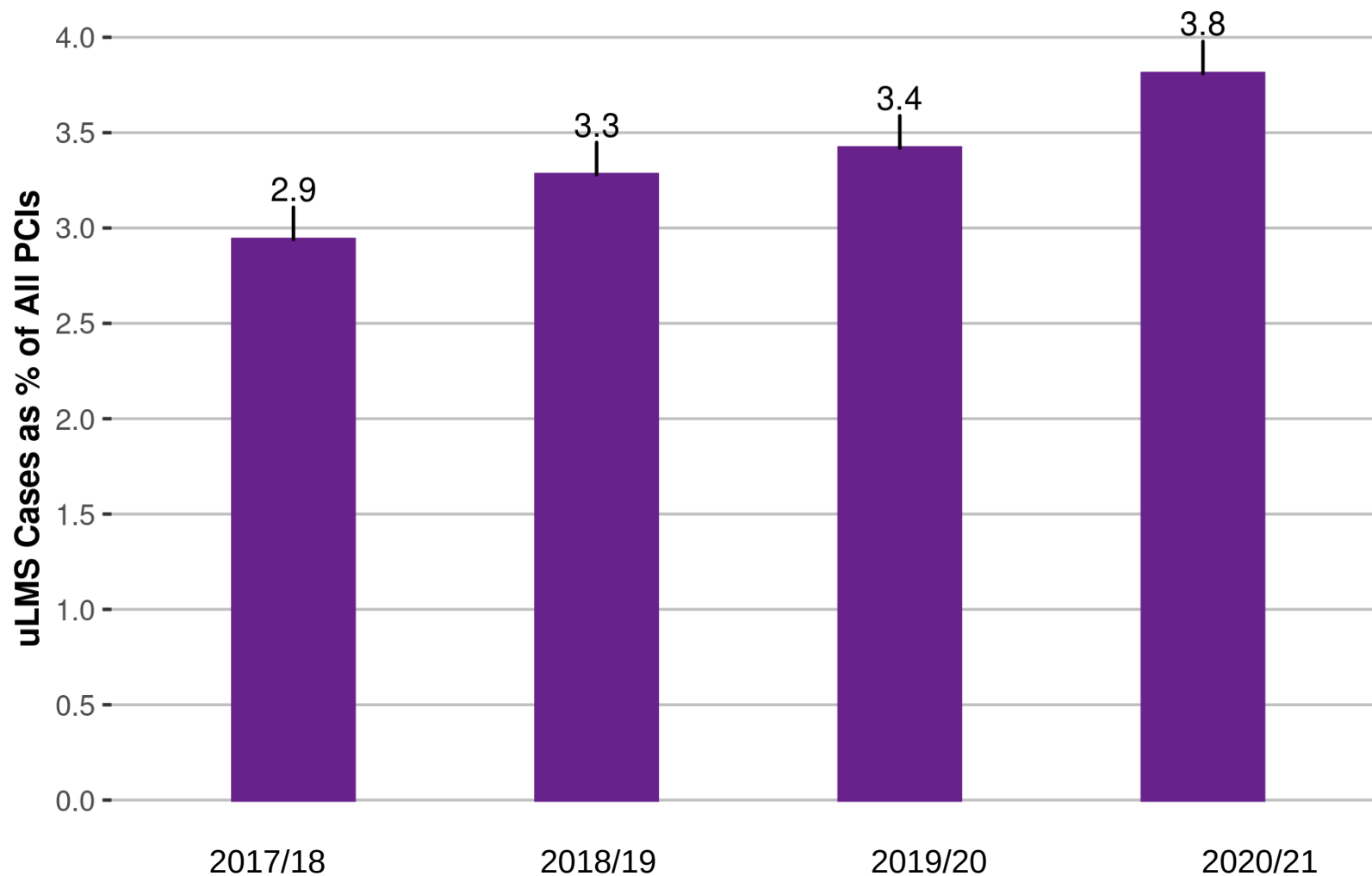
Epicardial Territory Treated



Treated Epicardial Territory By Presenting Syndrome

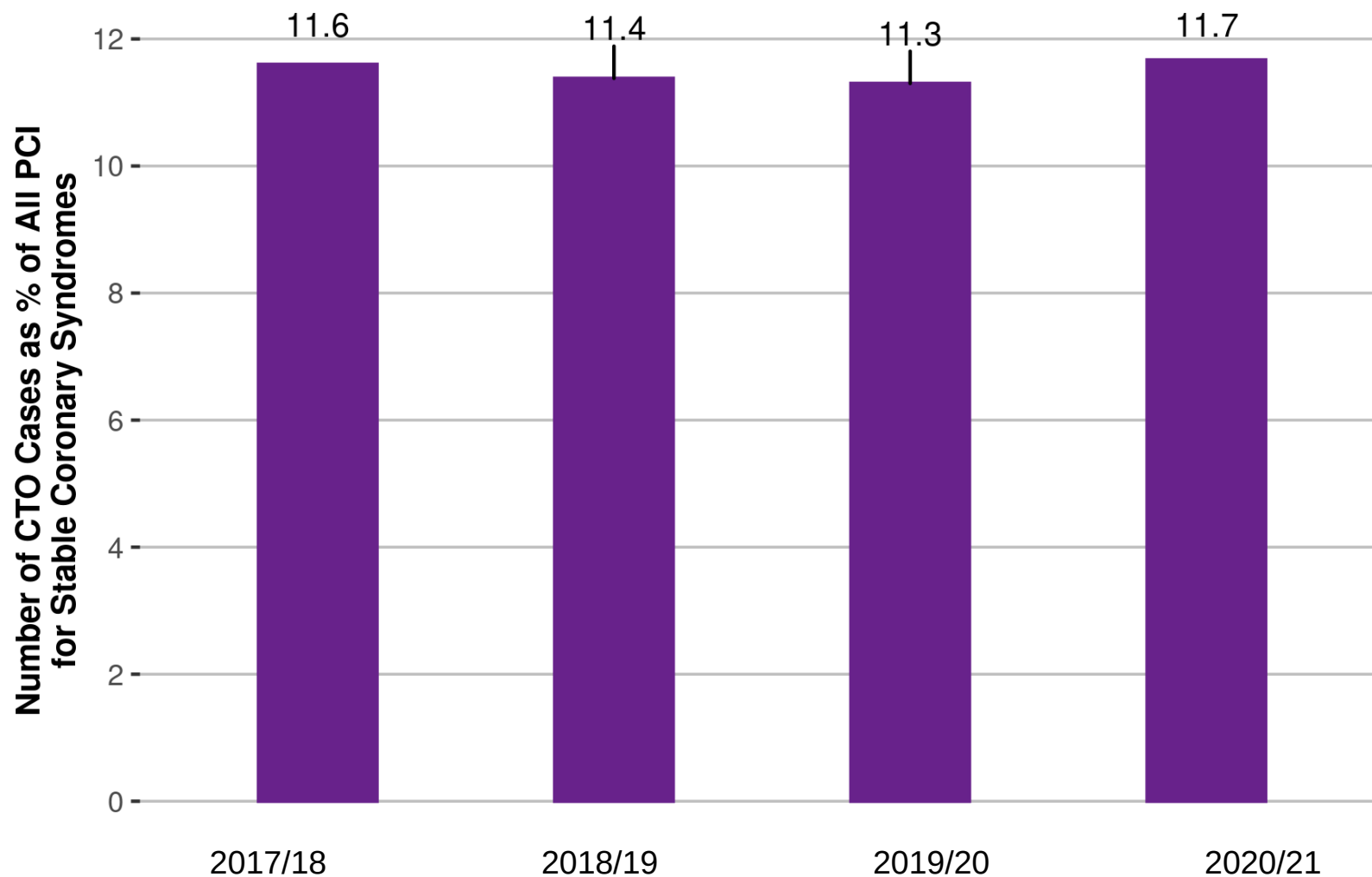


Unprotected LMS



Chronic Total Occlusion

Stable only



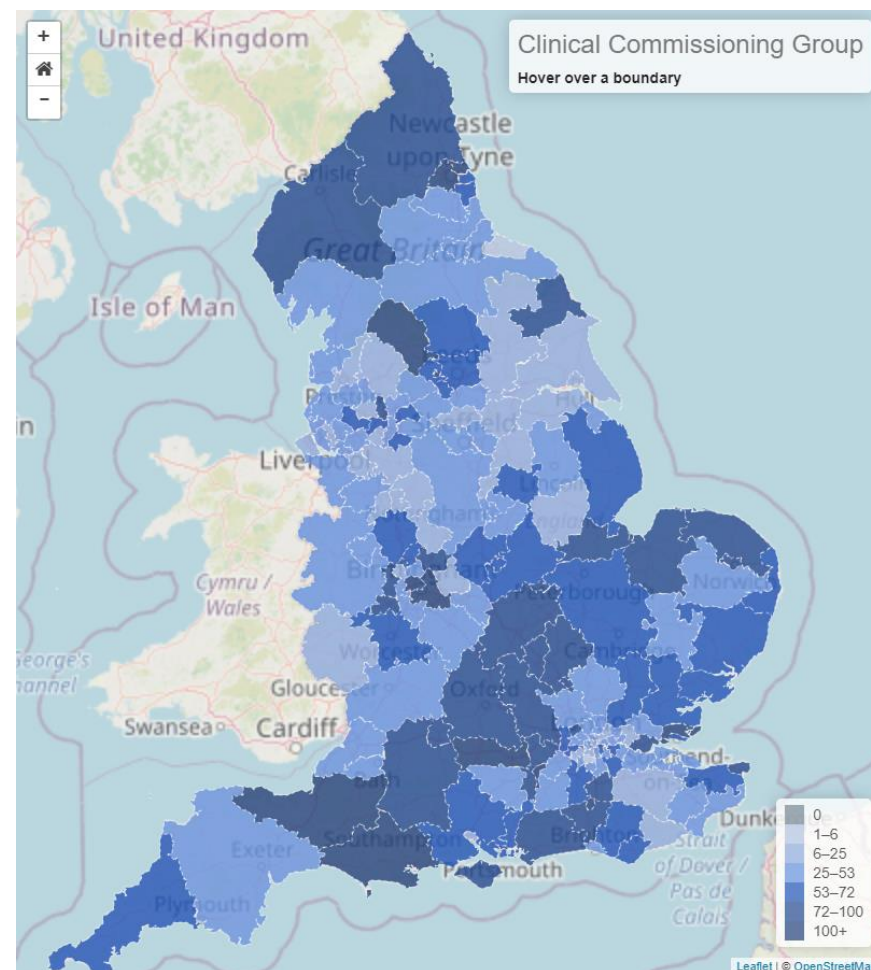
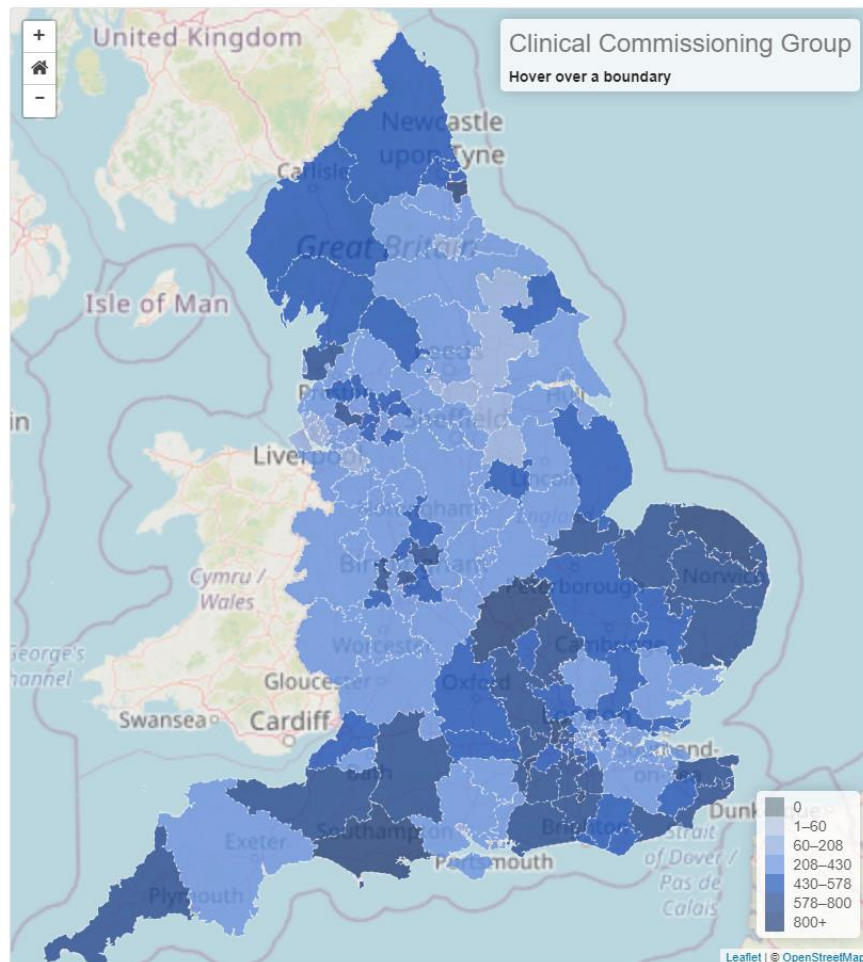
PCI pmp

By Region

2019/20

All Elective

Elective CTO



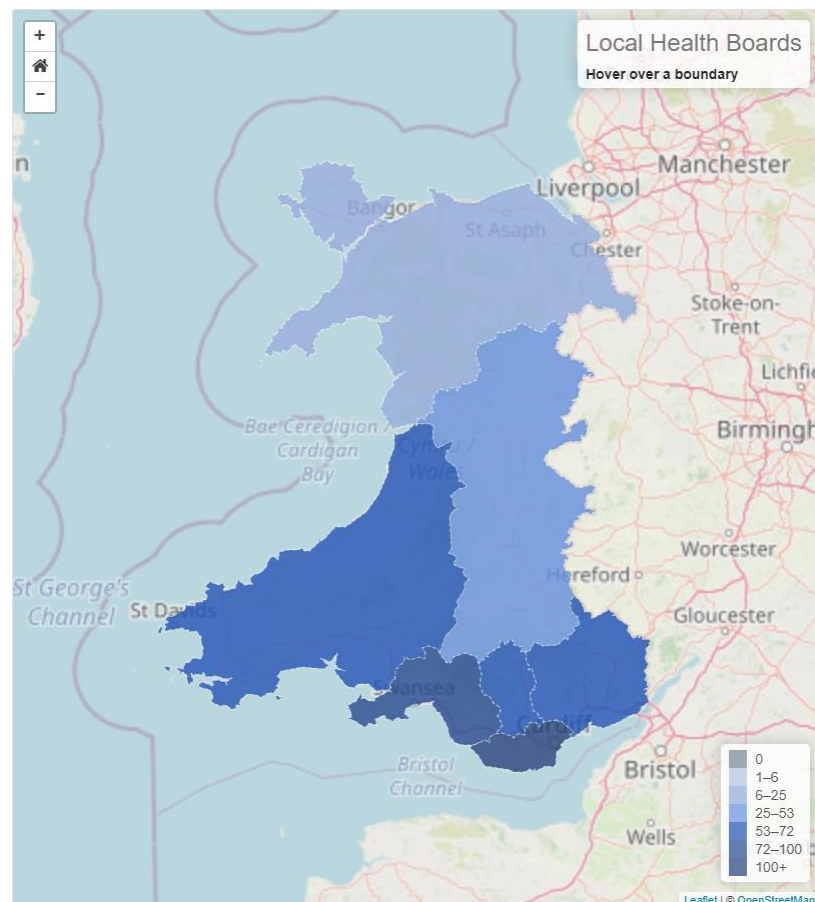
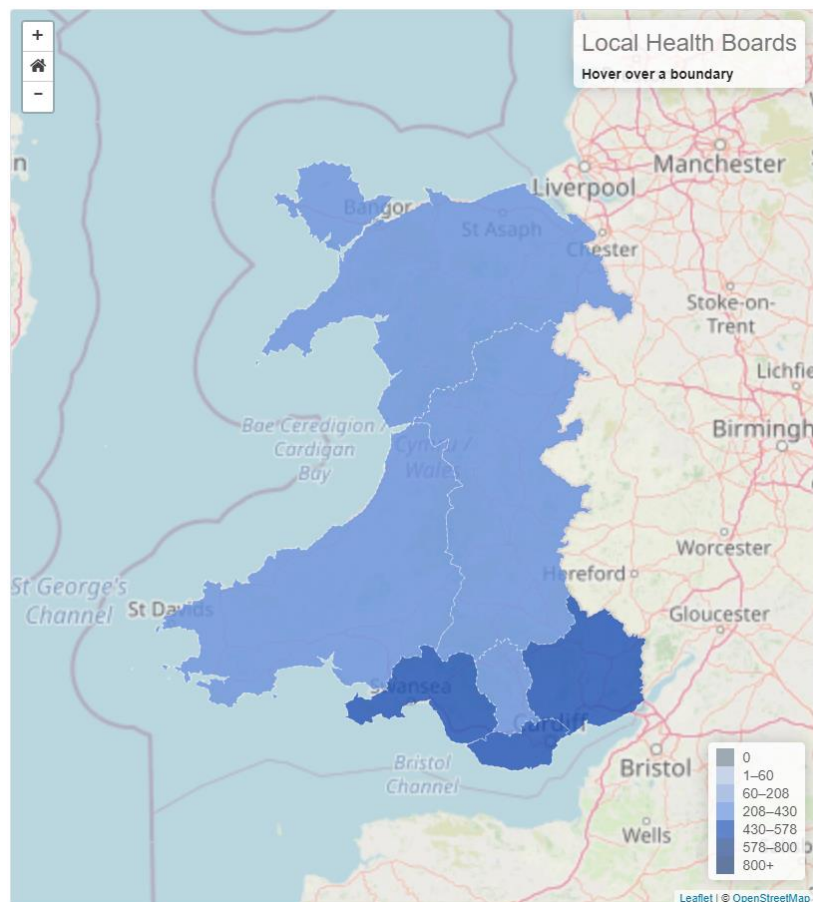
PCI pmp

By Region

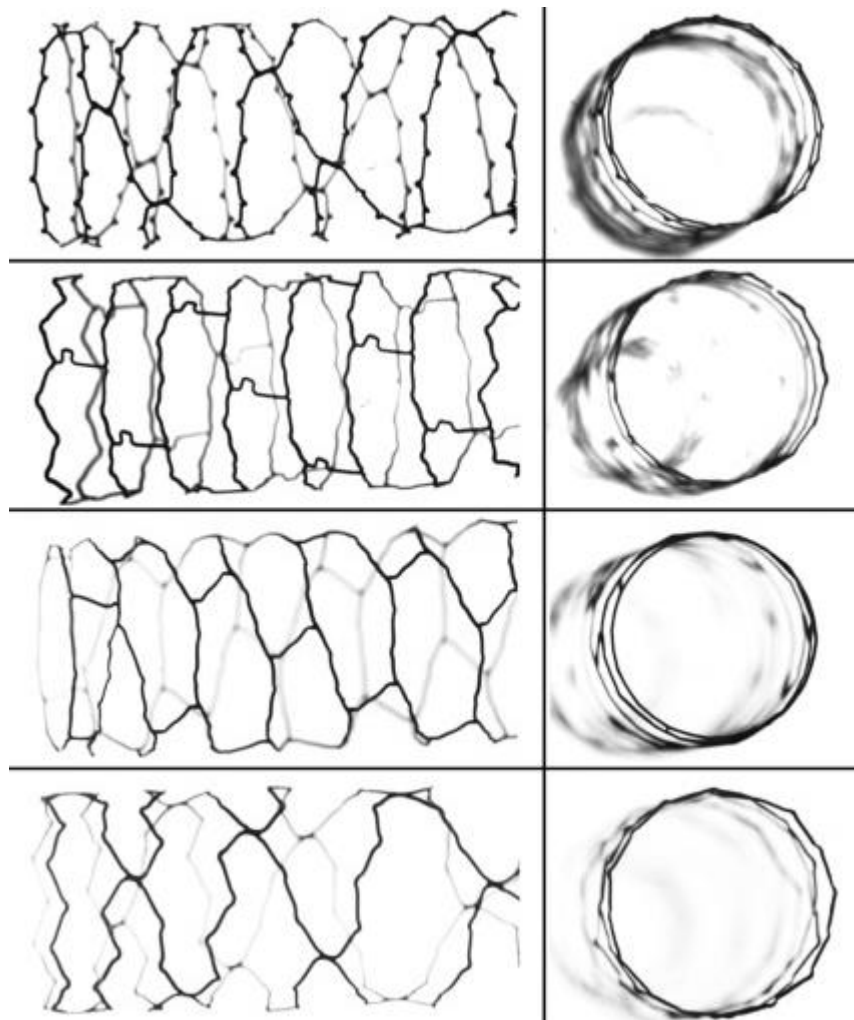
2019/20

All Elective

Elective CTO

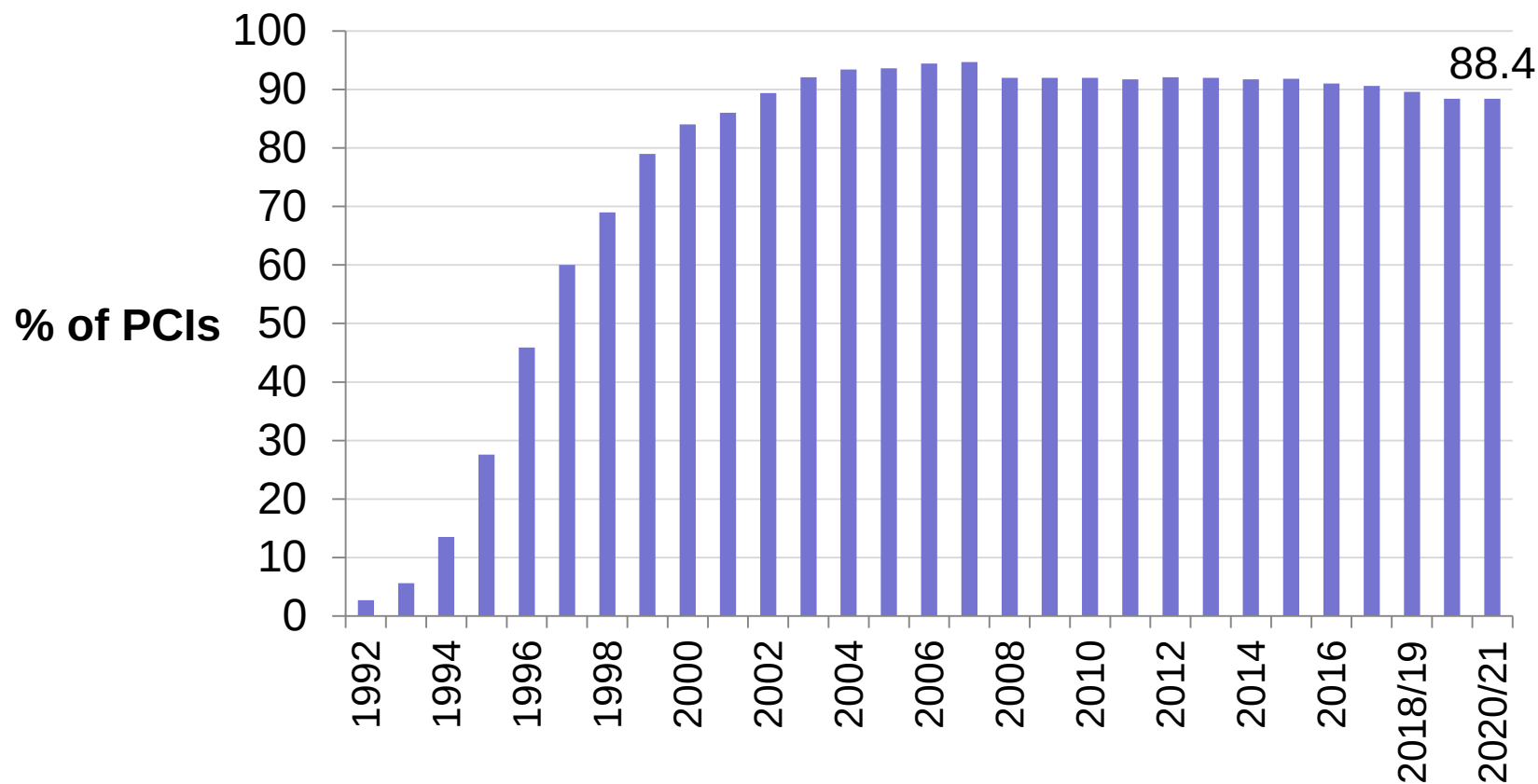


Stents

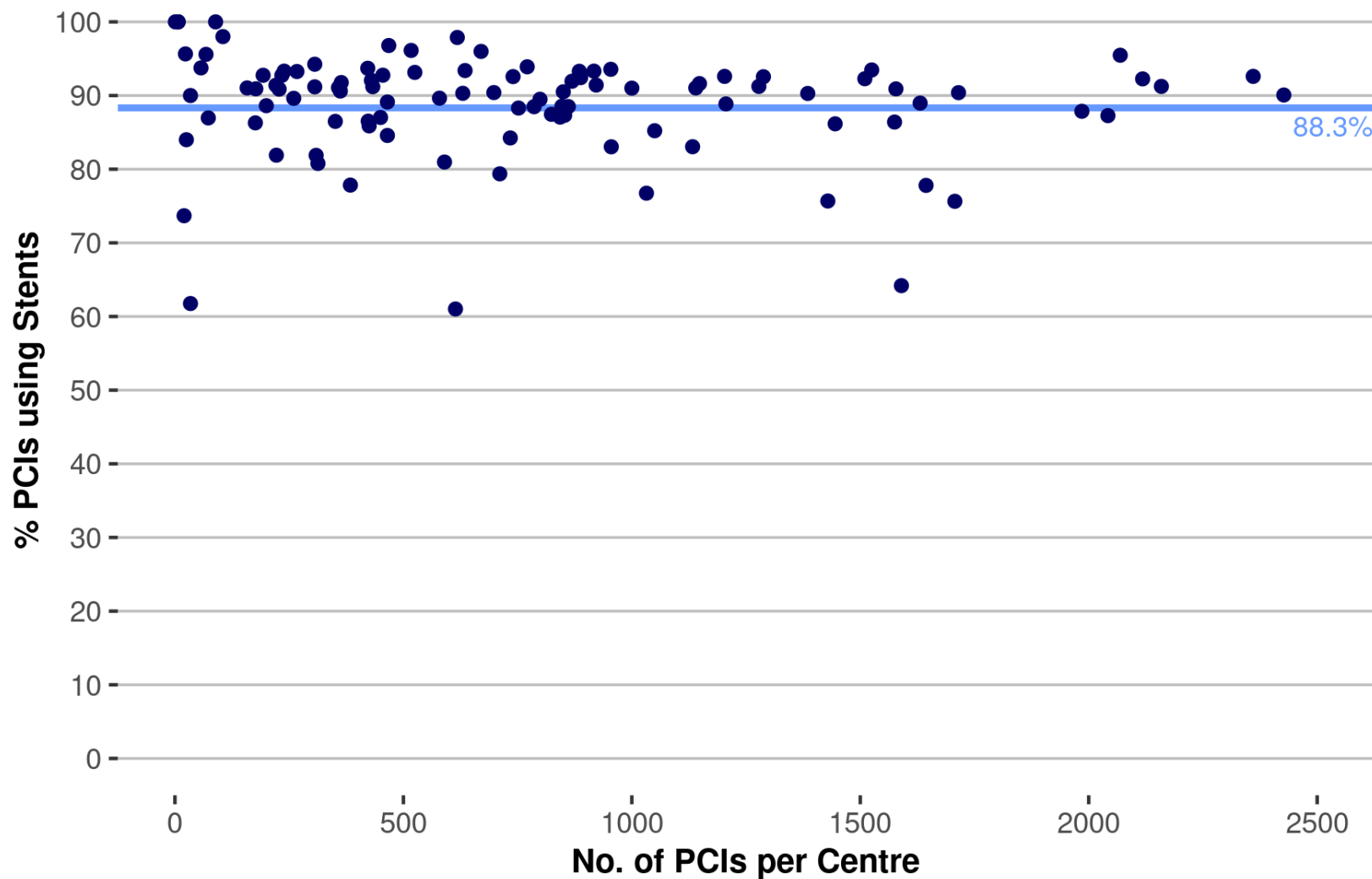


Jaryl Ng, Nicolas Foin, Hui Ying Ang, et al International Journal of Cardiology, 2016;221:171-179

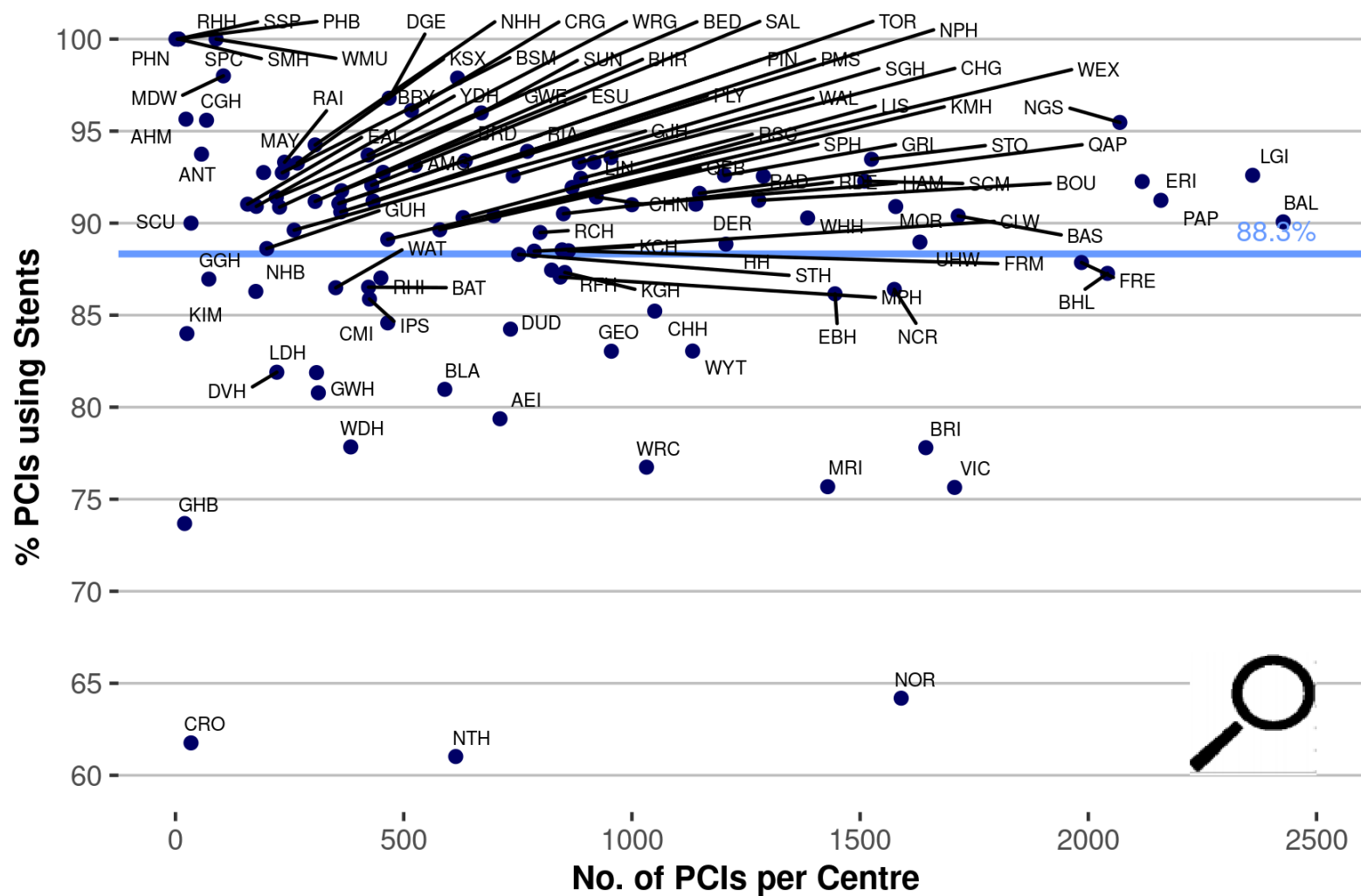
Procedures using Stents



Procedures using Stents



Procedures using Stents



Procedures using Stents

2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization

A Report of the American College of Cardiology/American Heart Association
Joint Committee on Clinical Practice Guidelines

Recommendation for Choice of Stent Type

Referenced studies that support the recommendation are summarized in [Online Data Supplement 24](#).

COR	LOE	RECOMMENDATION
1	A	1. In patients undergoing PCI, DES should be used in preference to BMS to prevent restenosis, MI, or acute stent thrombosis (1-4).

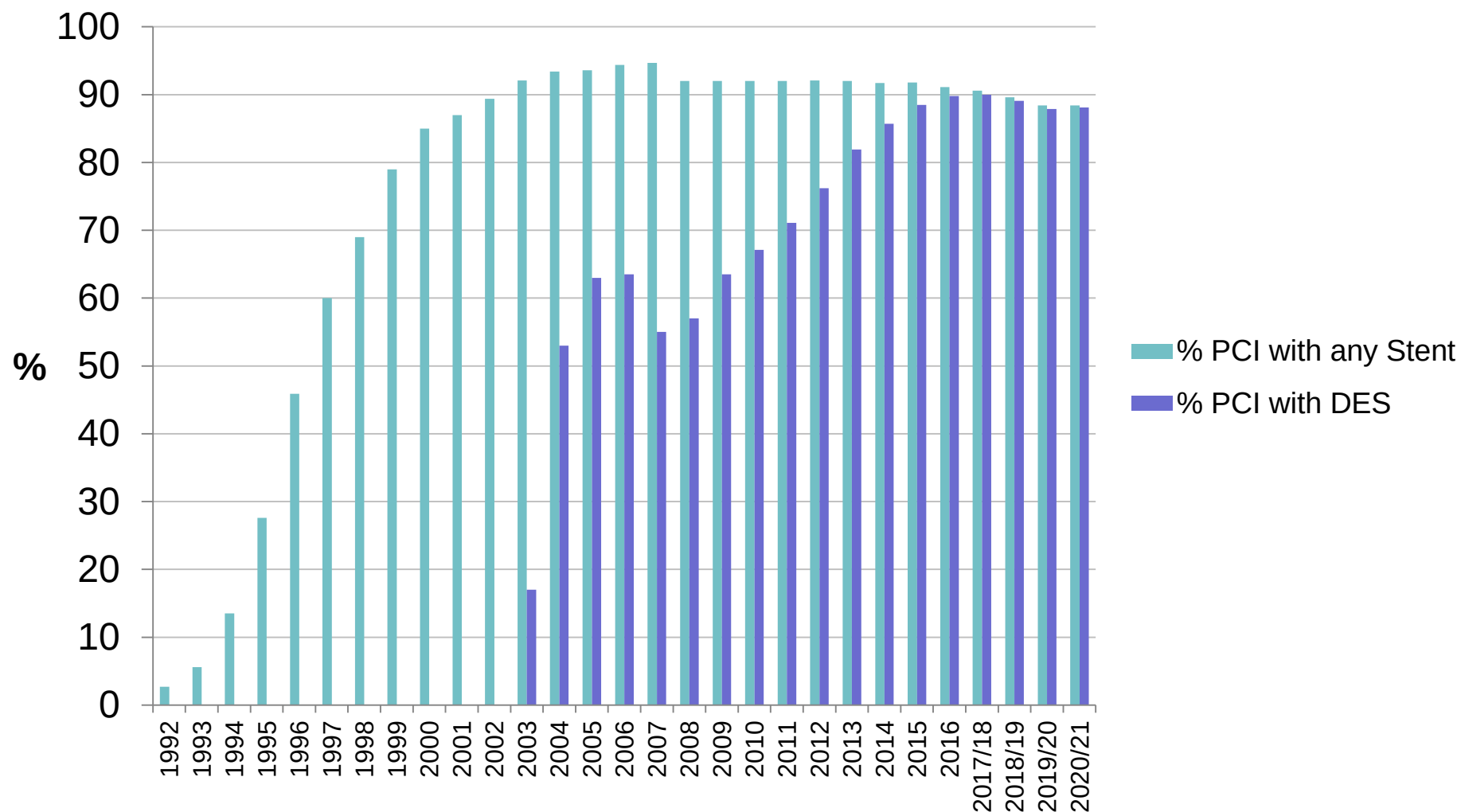
Acute coronary syndromes

NICE guideline [NG185] Published: 18 November 2020

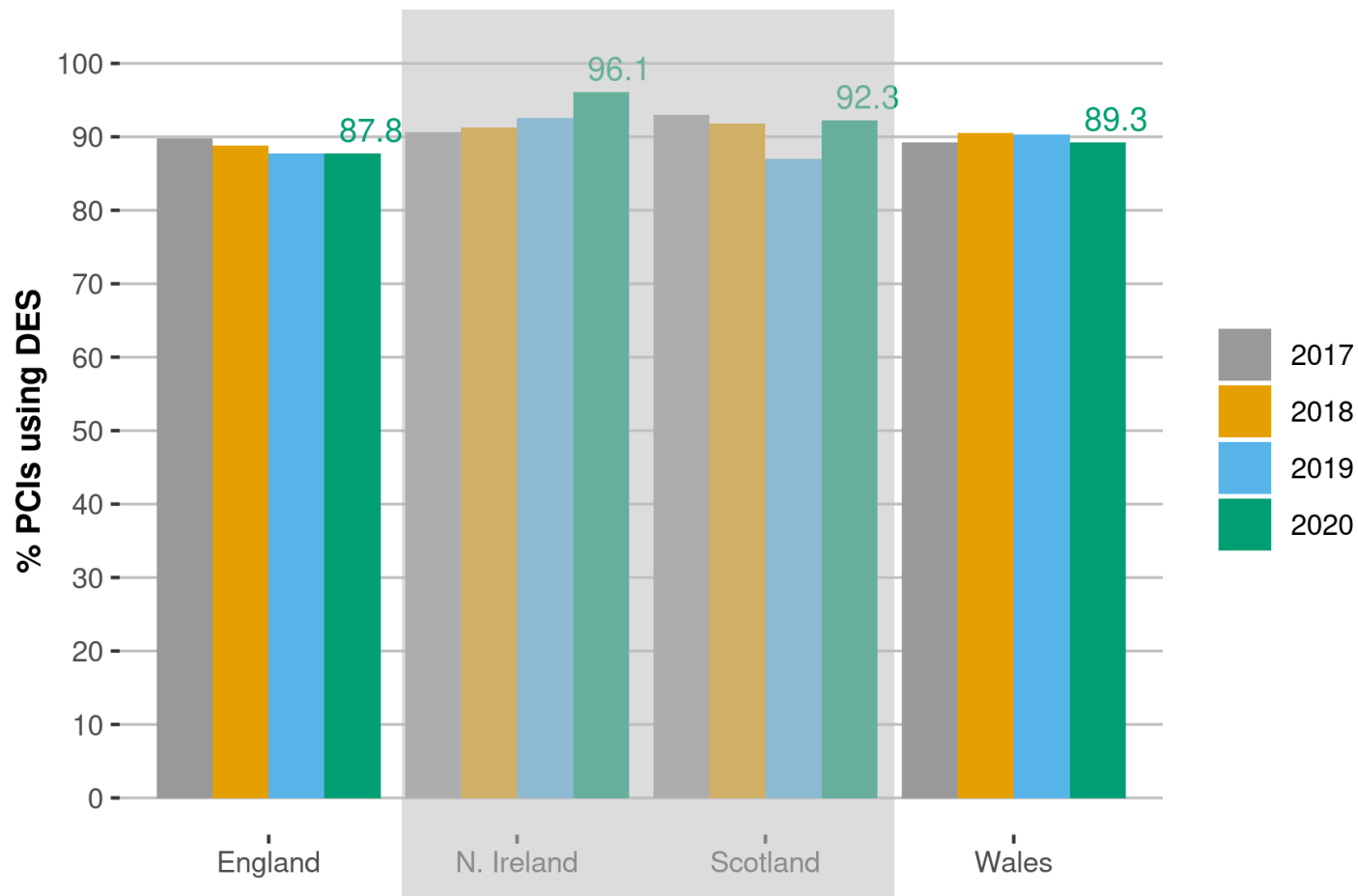
Stenting and revascularisation

- If stenting indicated, offer a drug-eluting stent

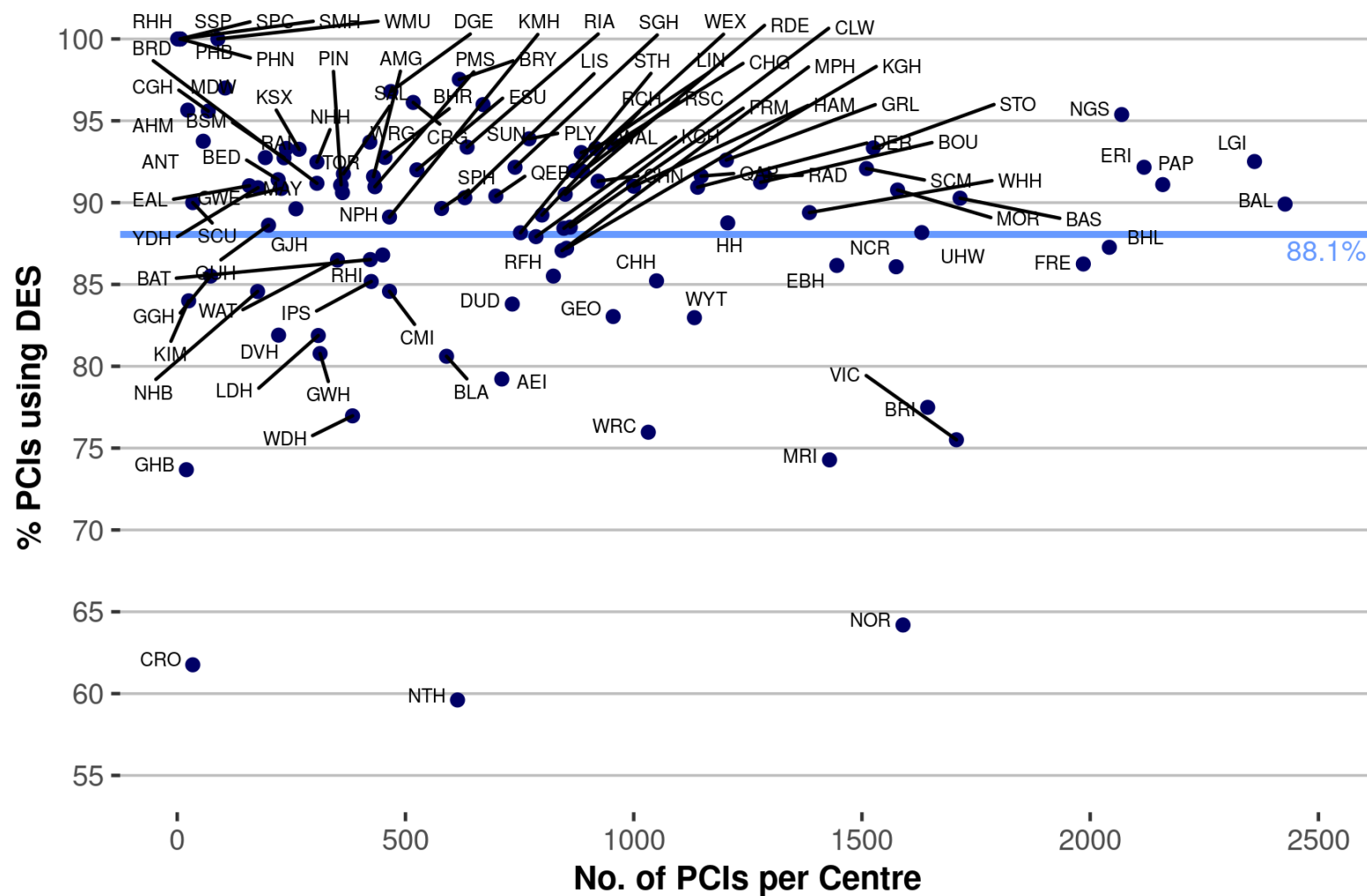
BMS and DES use



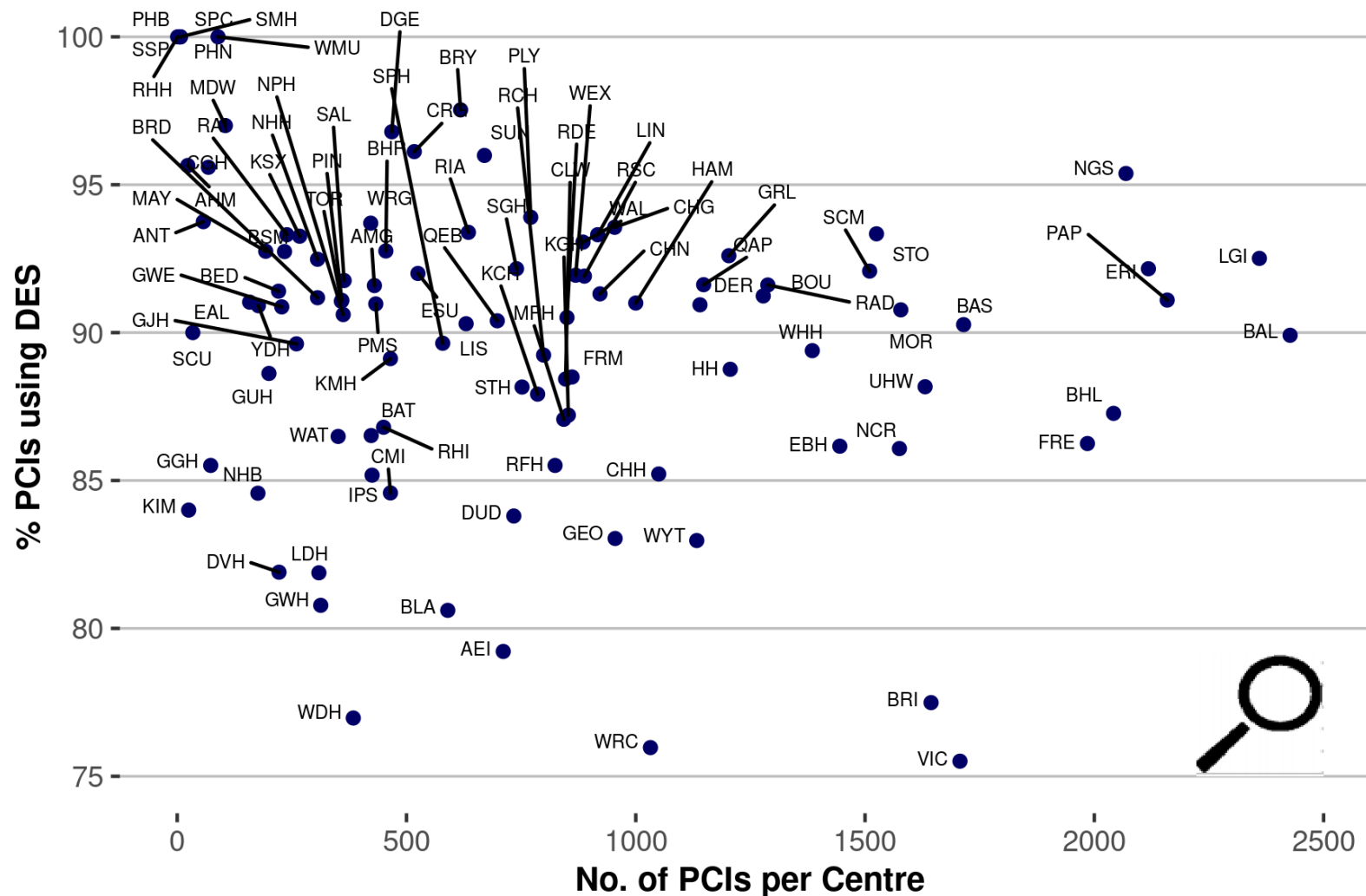
BMS and DES use By Country



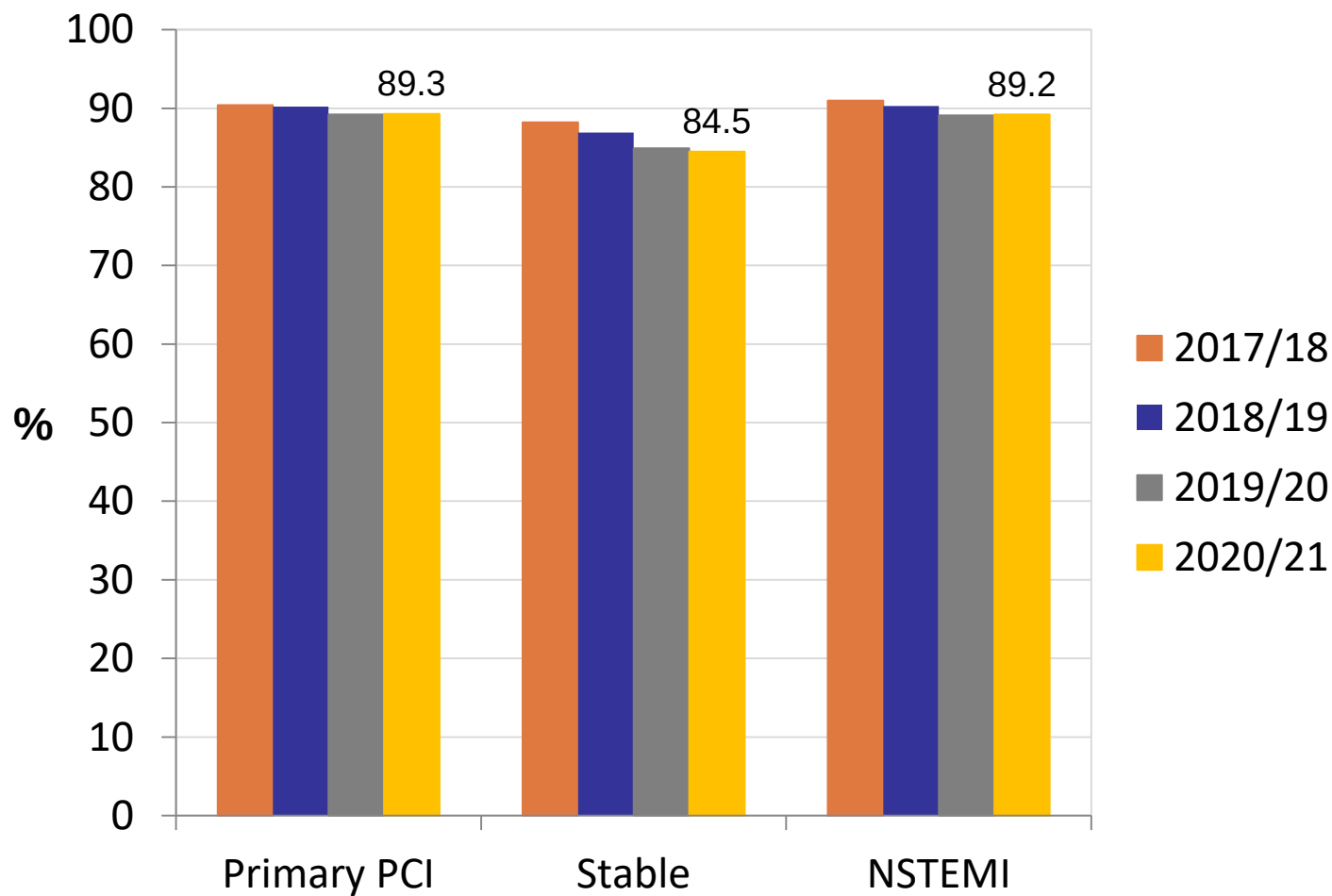
PCI with Drug Eluting Stents



PCI with Drug Eluting Stents

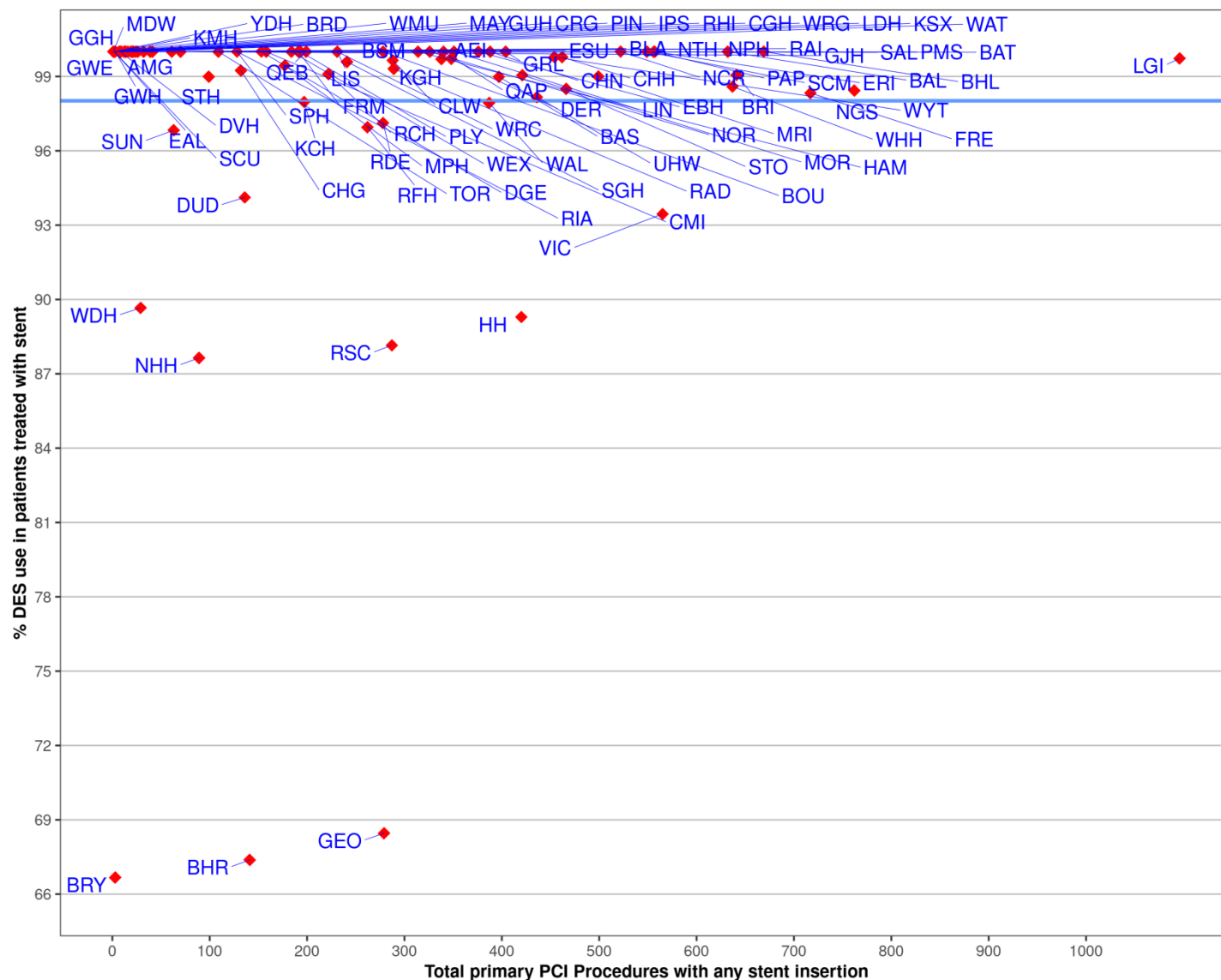


PCI with Drug Eluting Stents By Syndrome



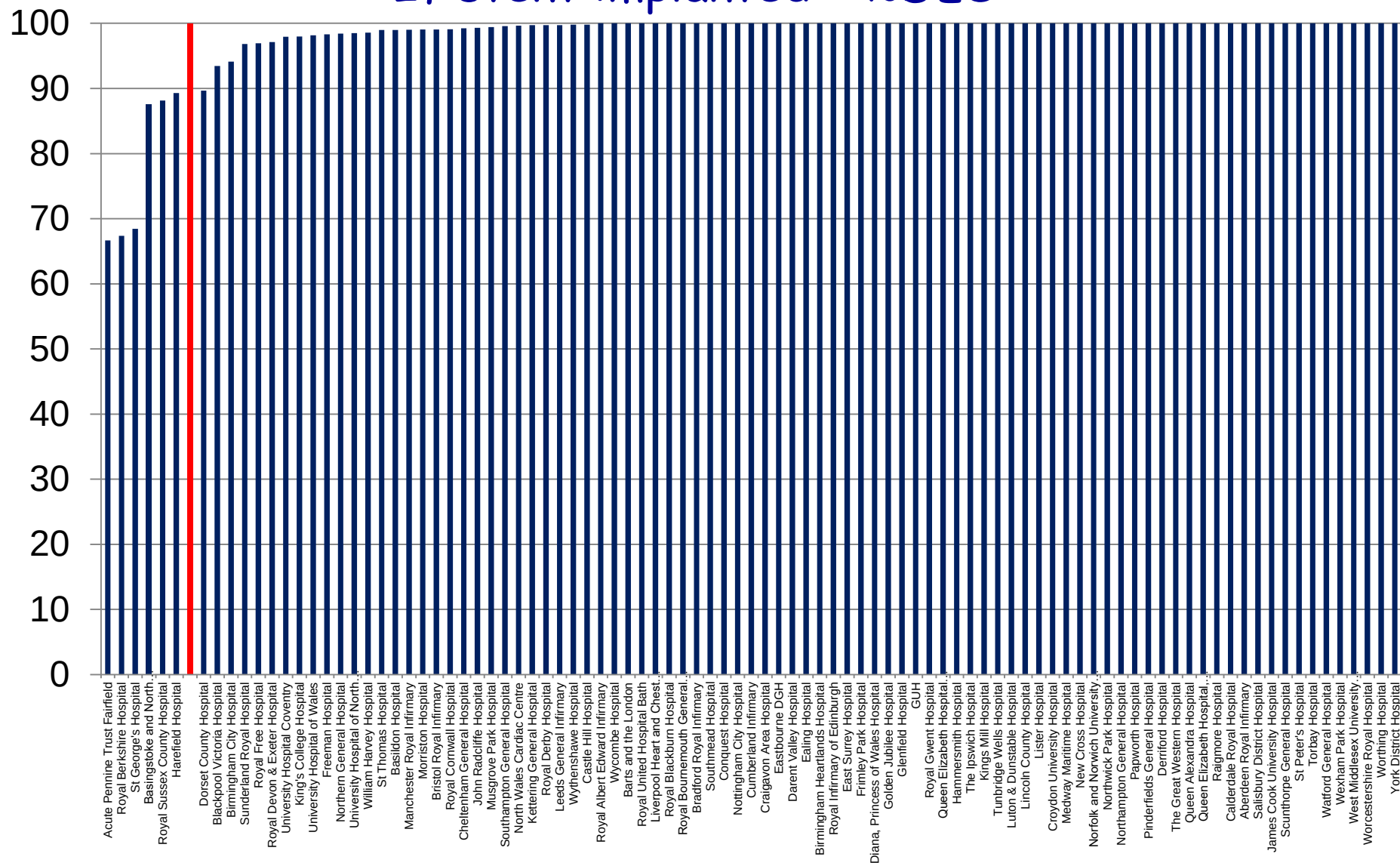
Primary PCI

If stent implanted - %DES

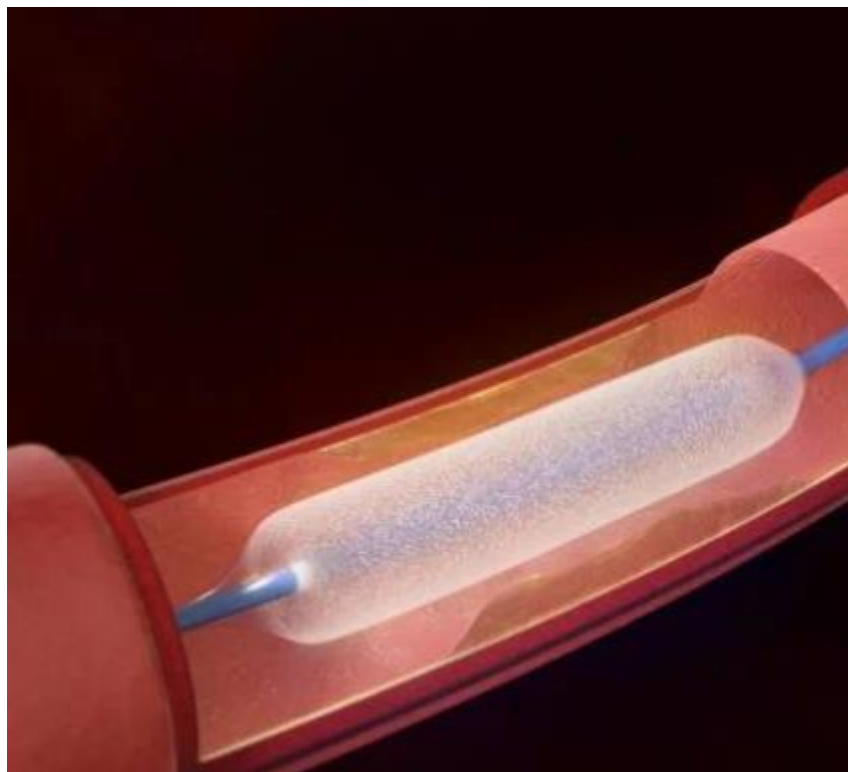


Primary PCI

If stent implanted - %DES



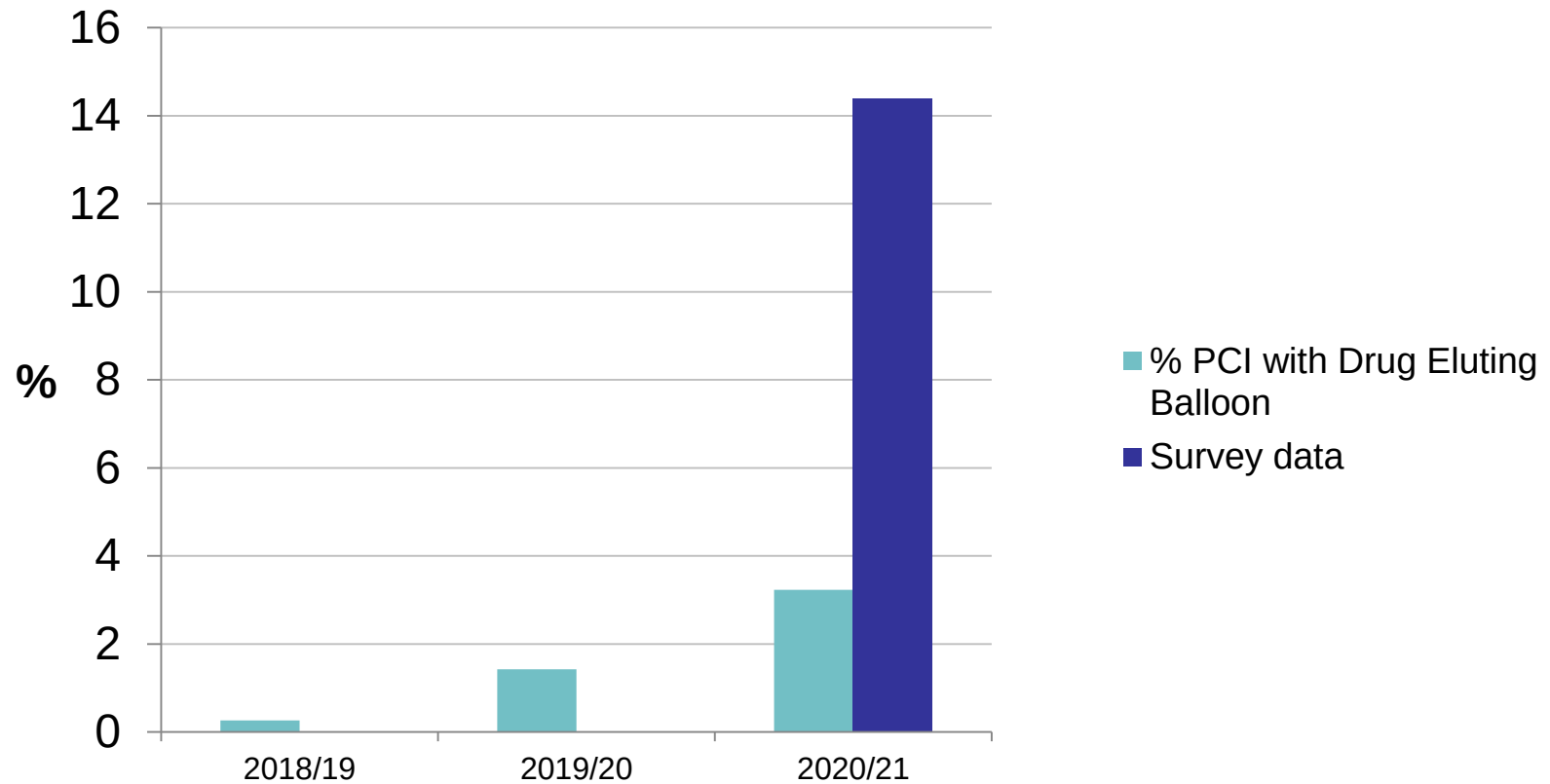
Drug Eluting Balloons



Drug Eluting Balloon use

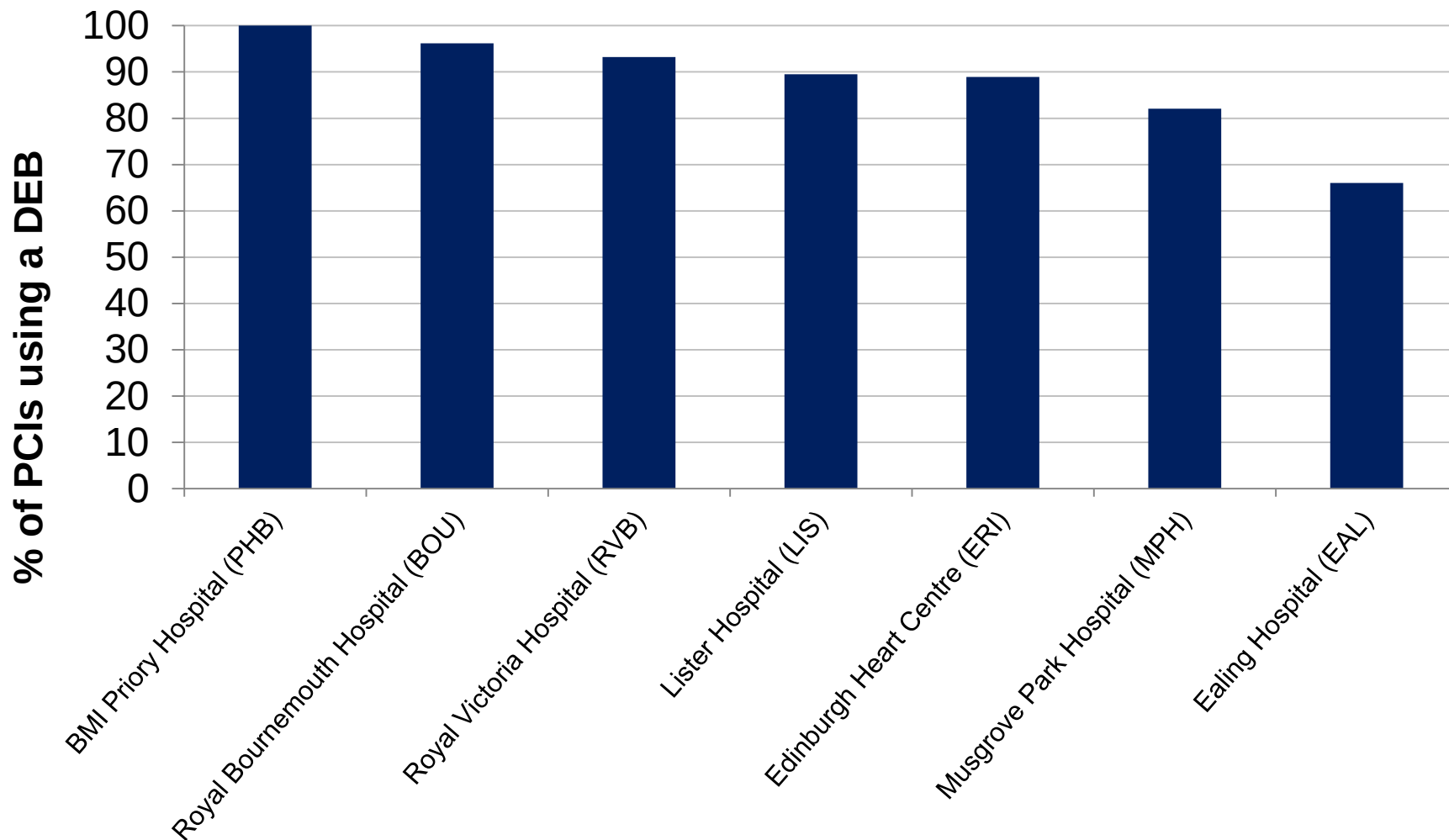
Live dataset v Survey

Drug eluting balloon used added as menu update in May 2019



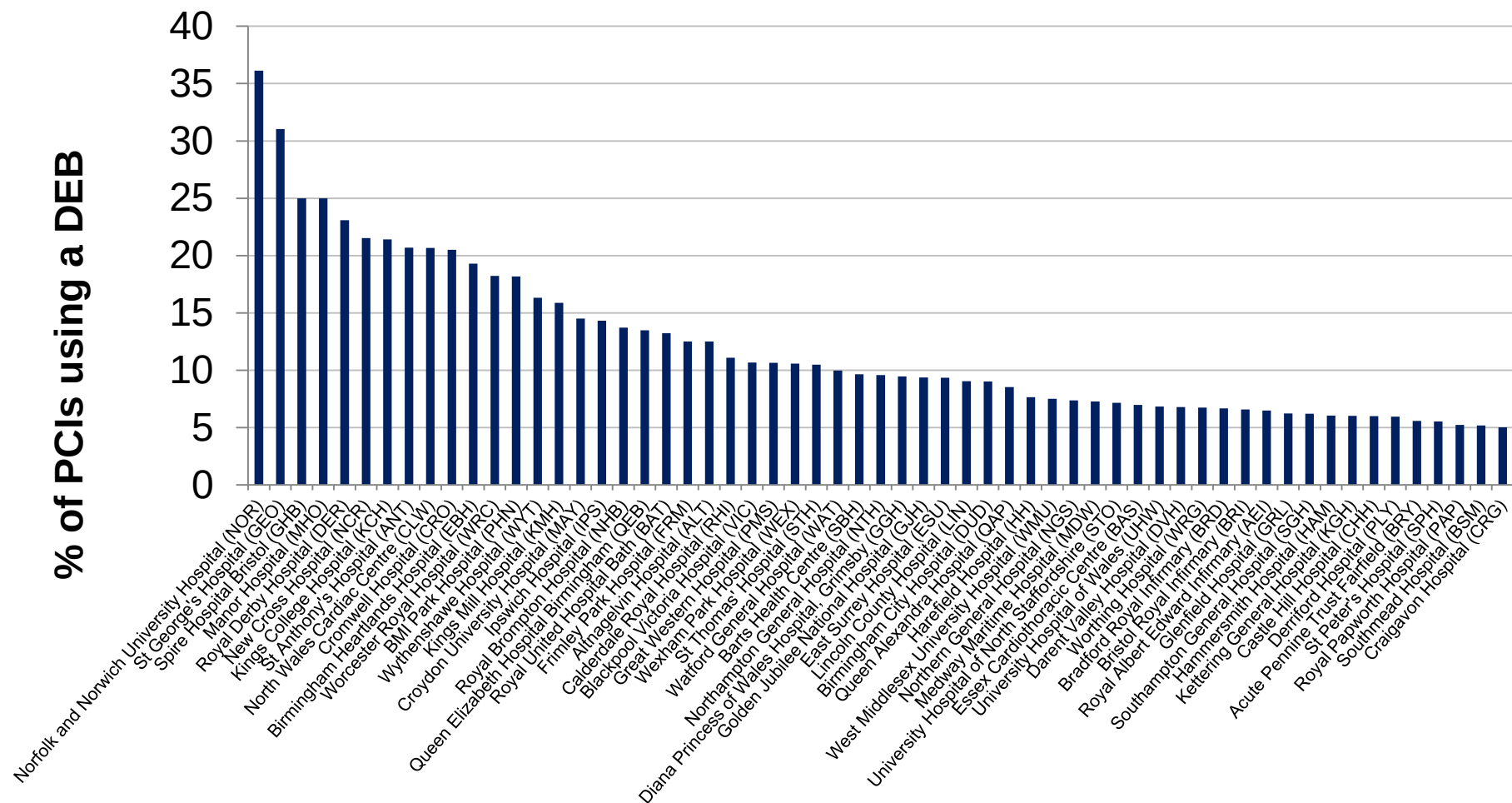
Drug Eluting Balloon use

Survey by Centre (>50%)



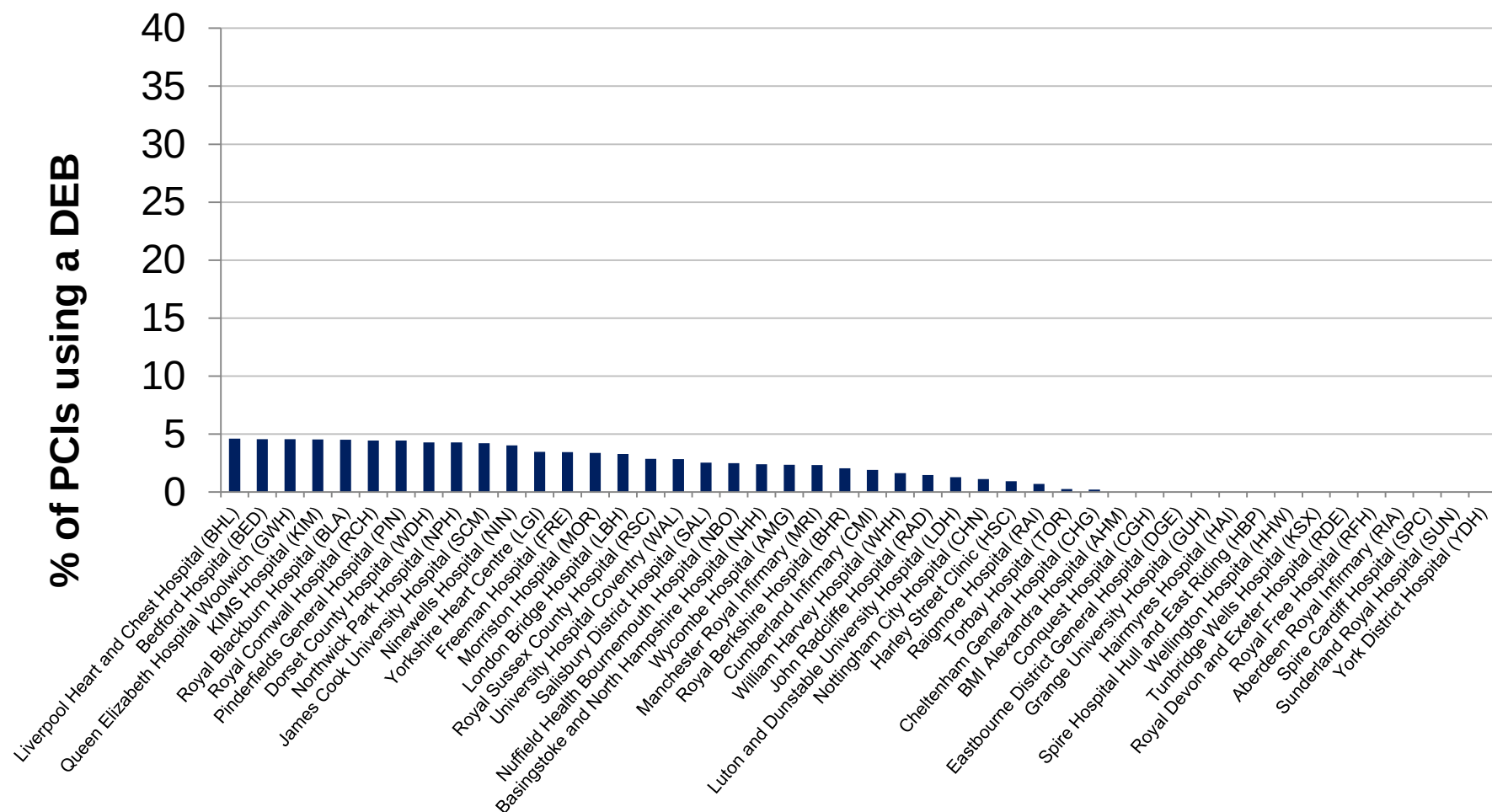
Drug Eluting Balloon use

Survey by Centre (50 to 5%)

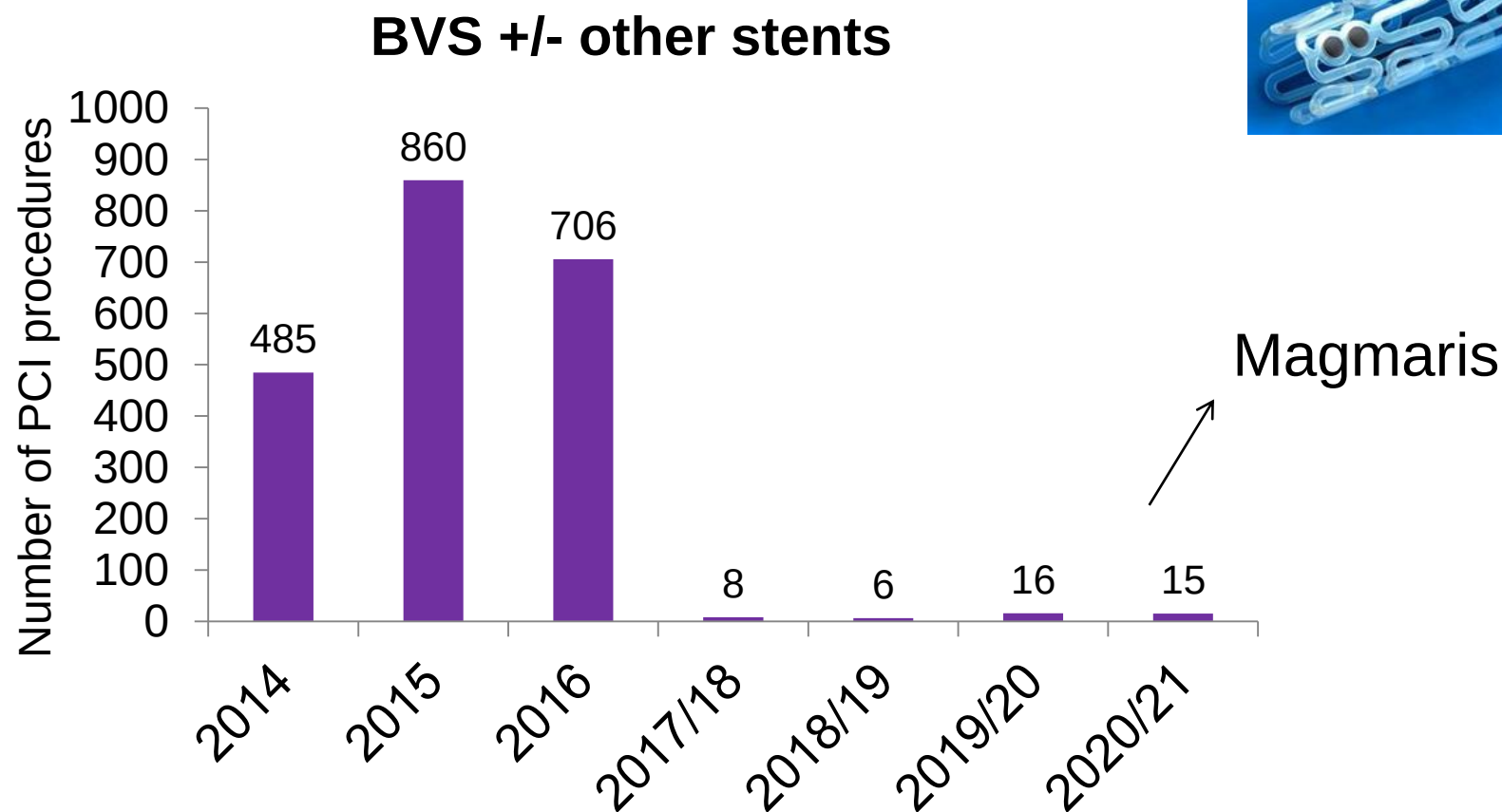


Drug Eluting Balloon use

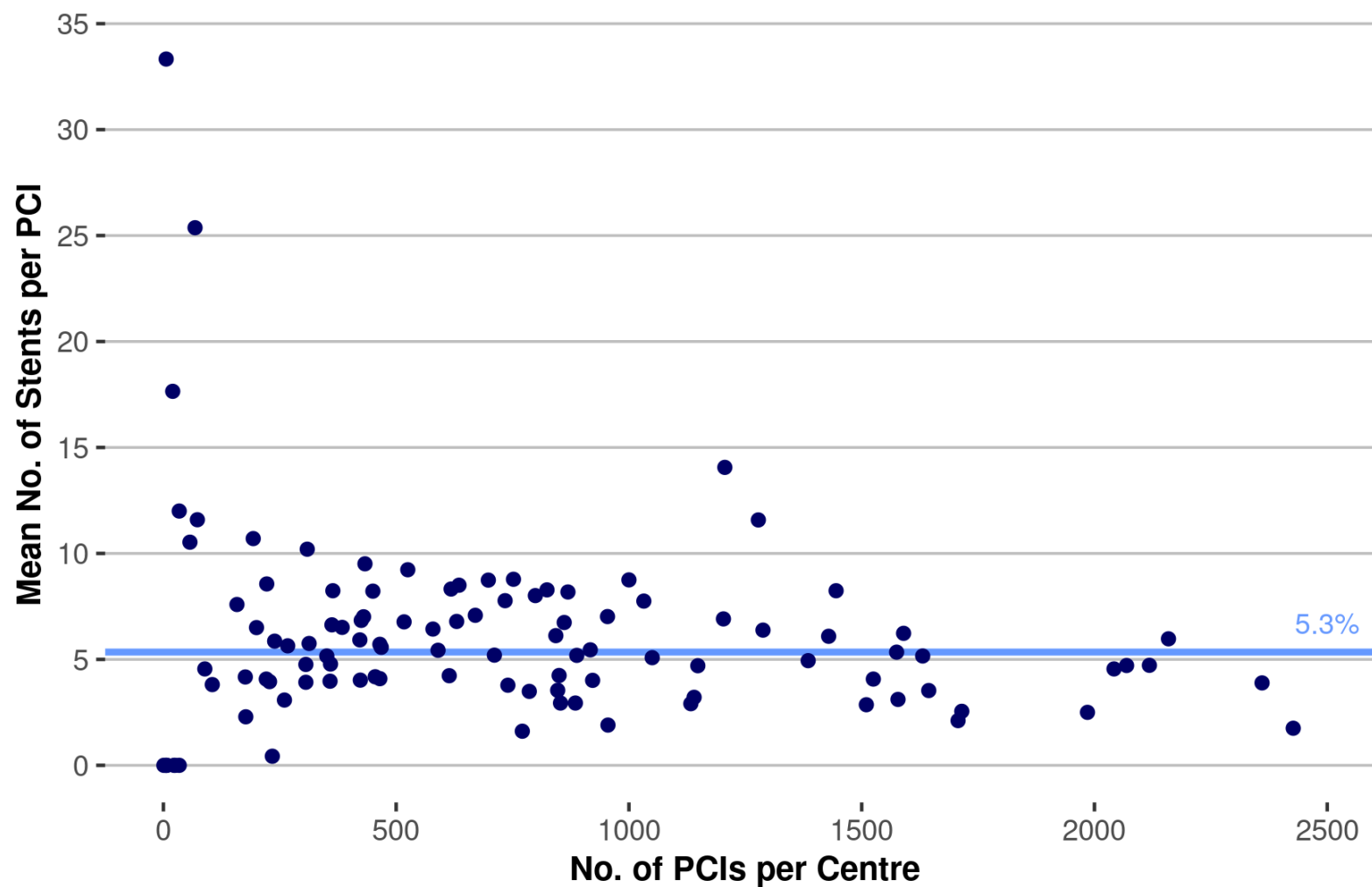
Survey by Centre (>5%)



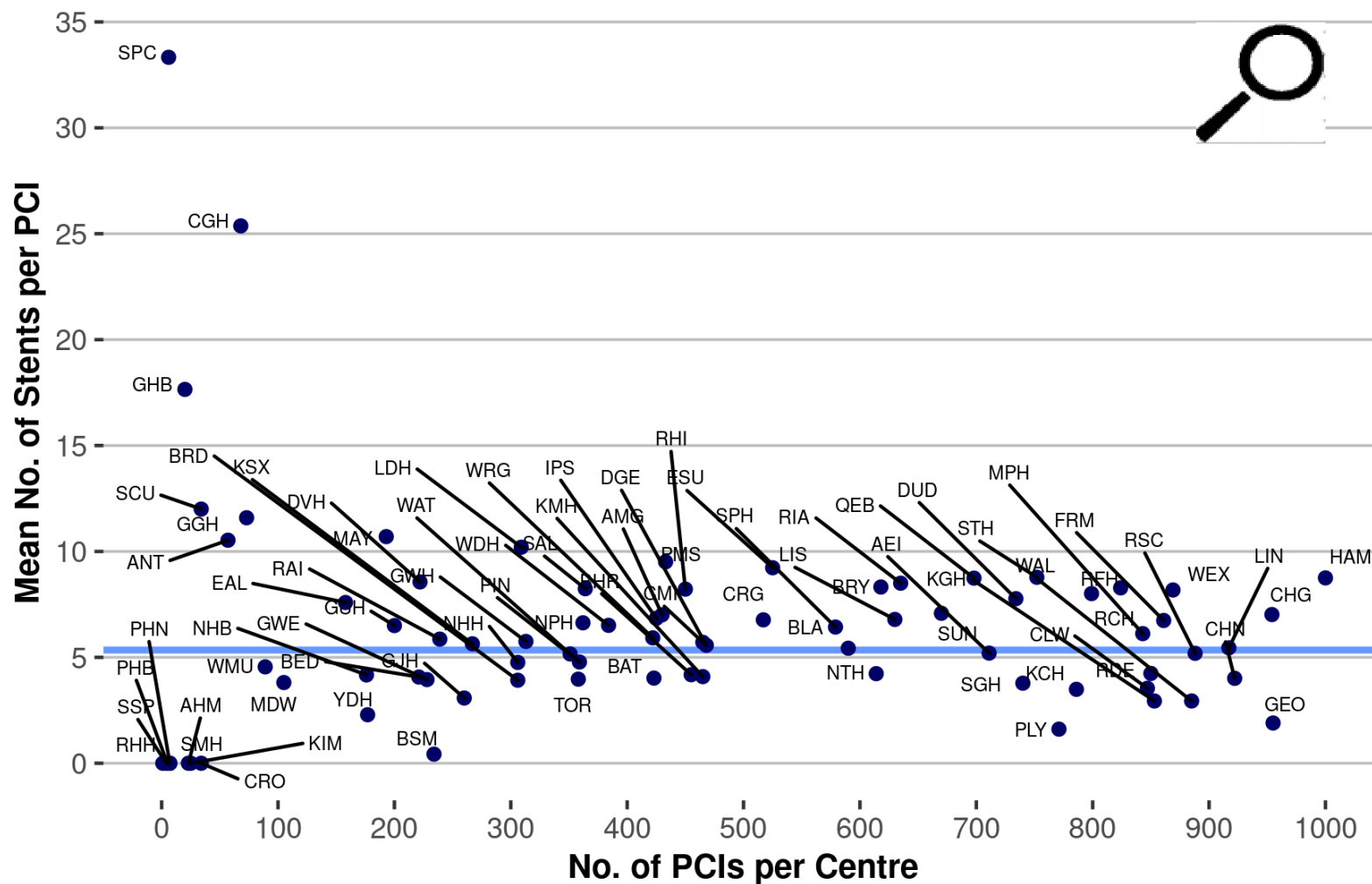
PCI with Bioabsorbable Vascular Scaffolds



Procedures for Restenosis

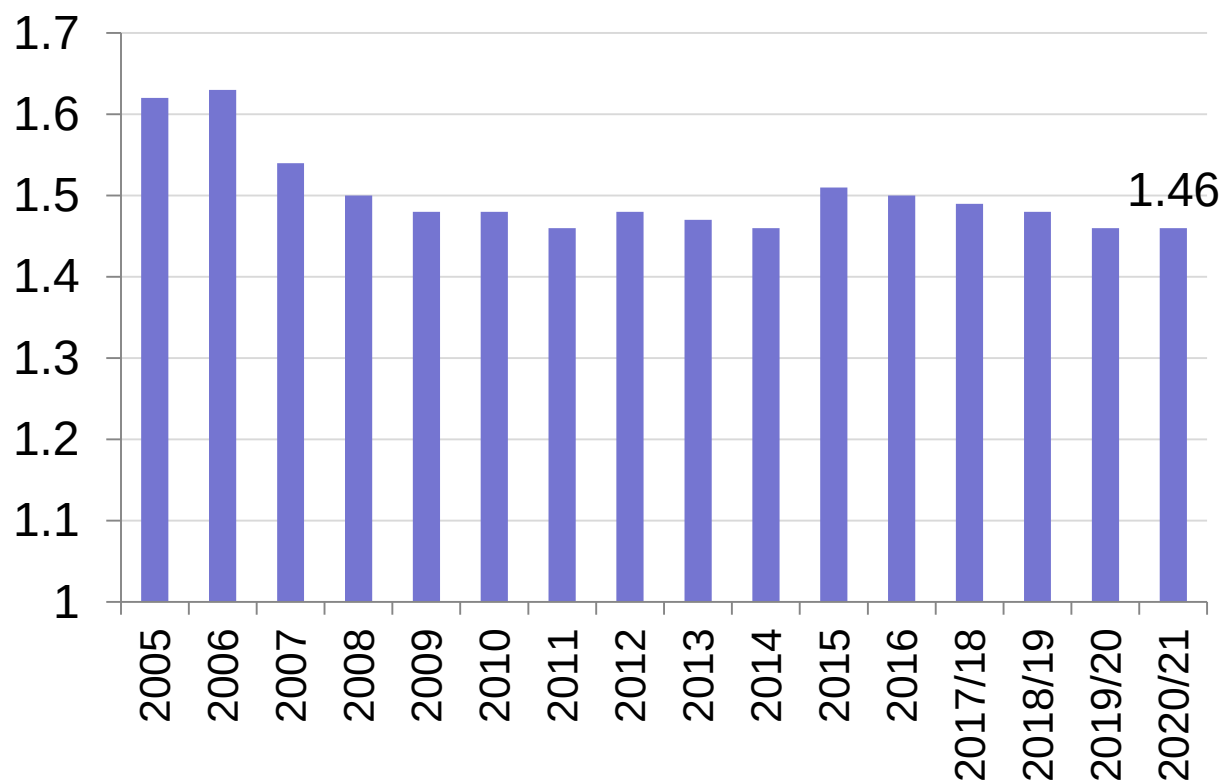


Procedures for Restenosis

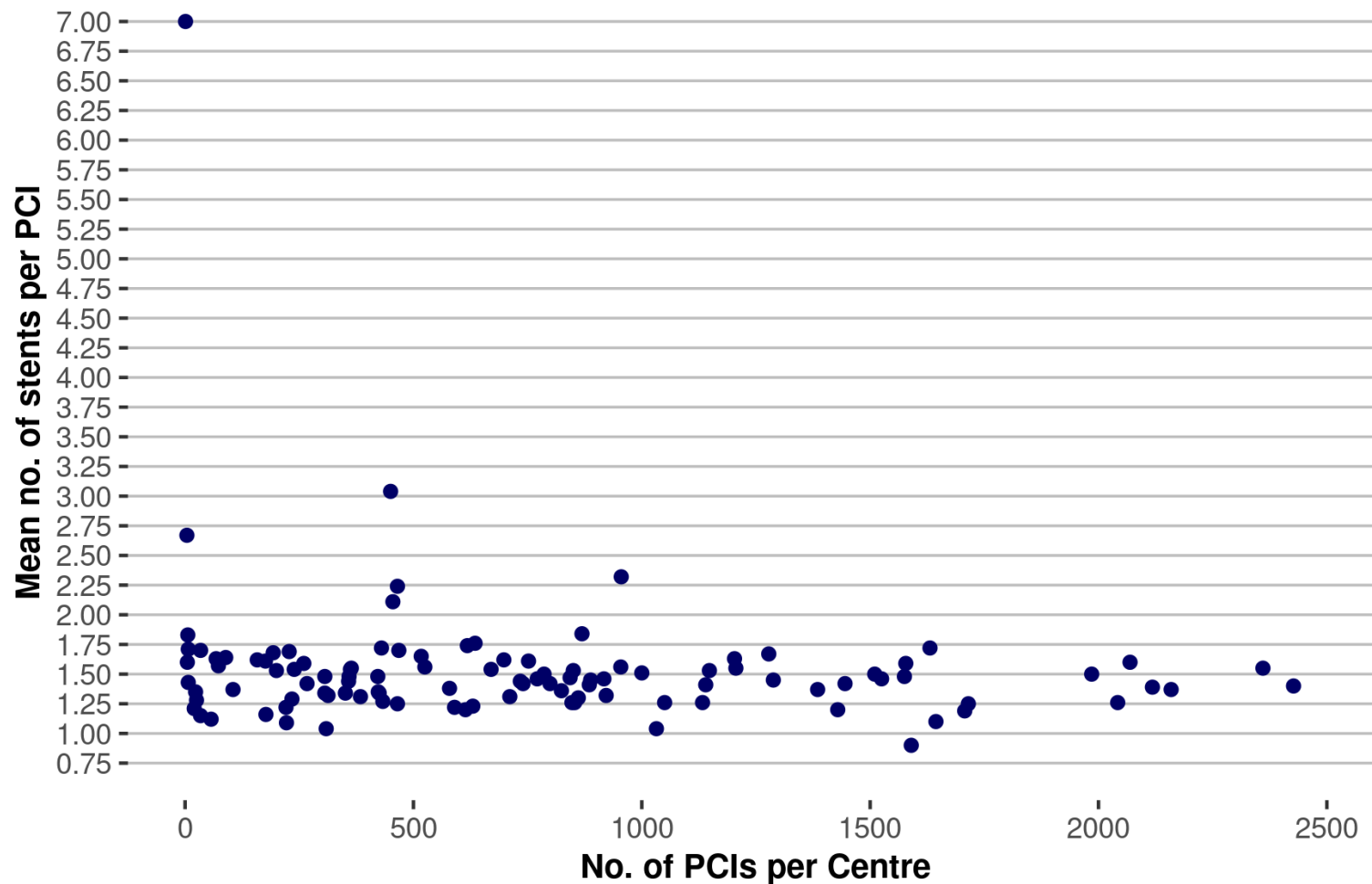


Stents per Case

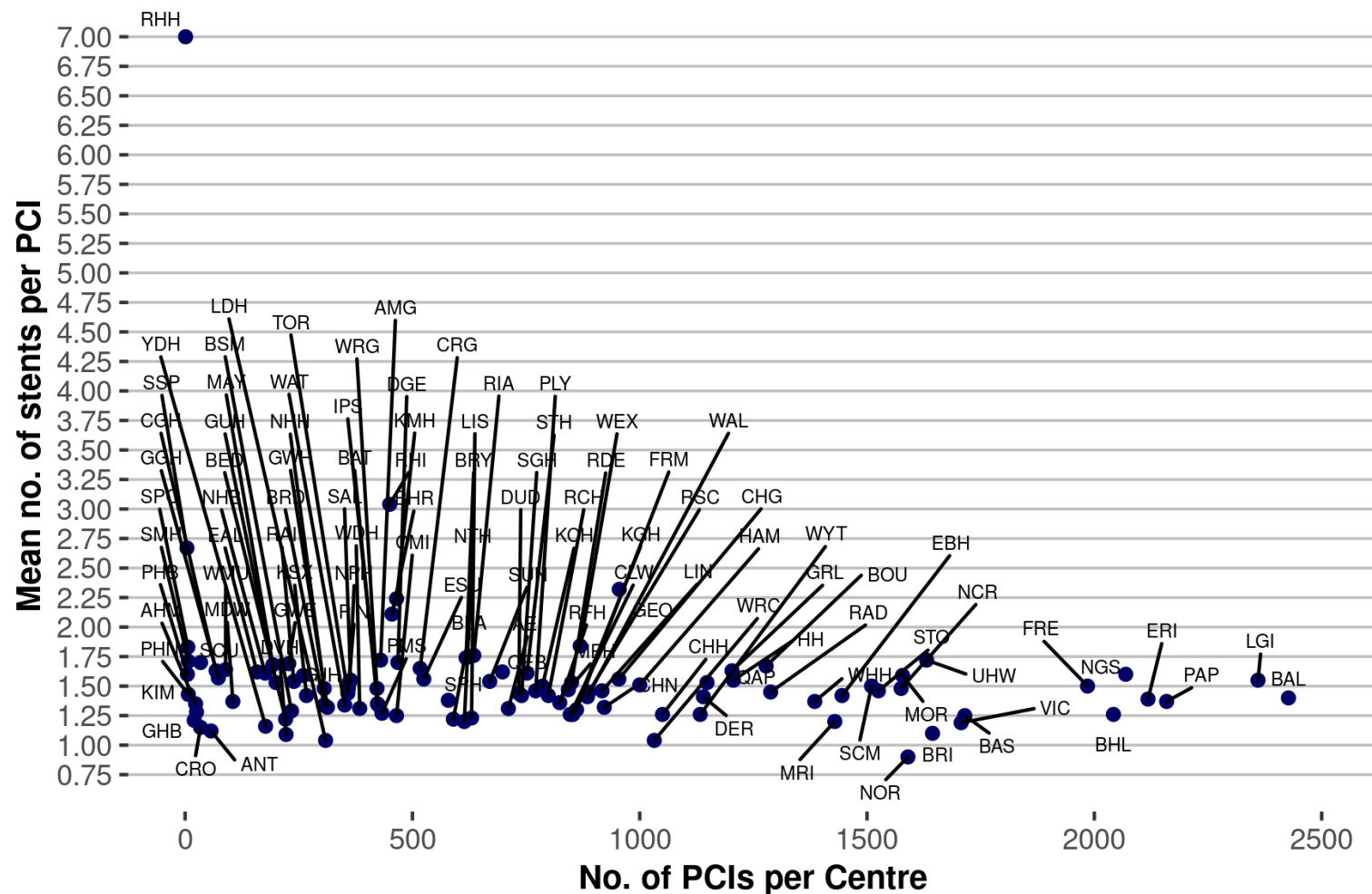
Mean number of stents per case



Mean Stents per Case (by PCI unit)



Mean Stents per Case (by PCI unit)



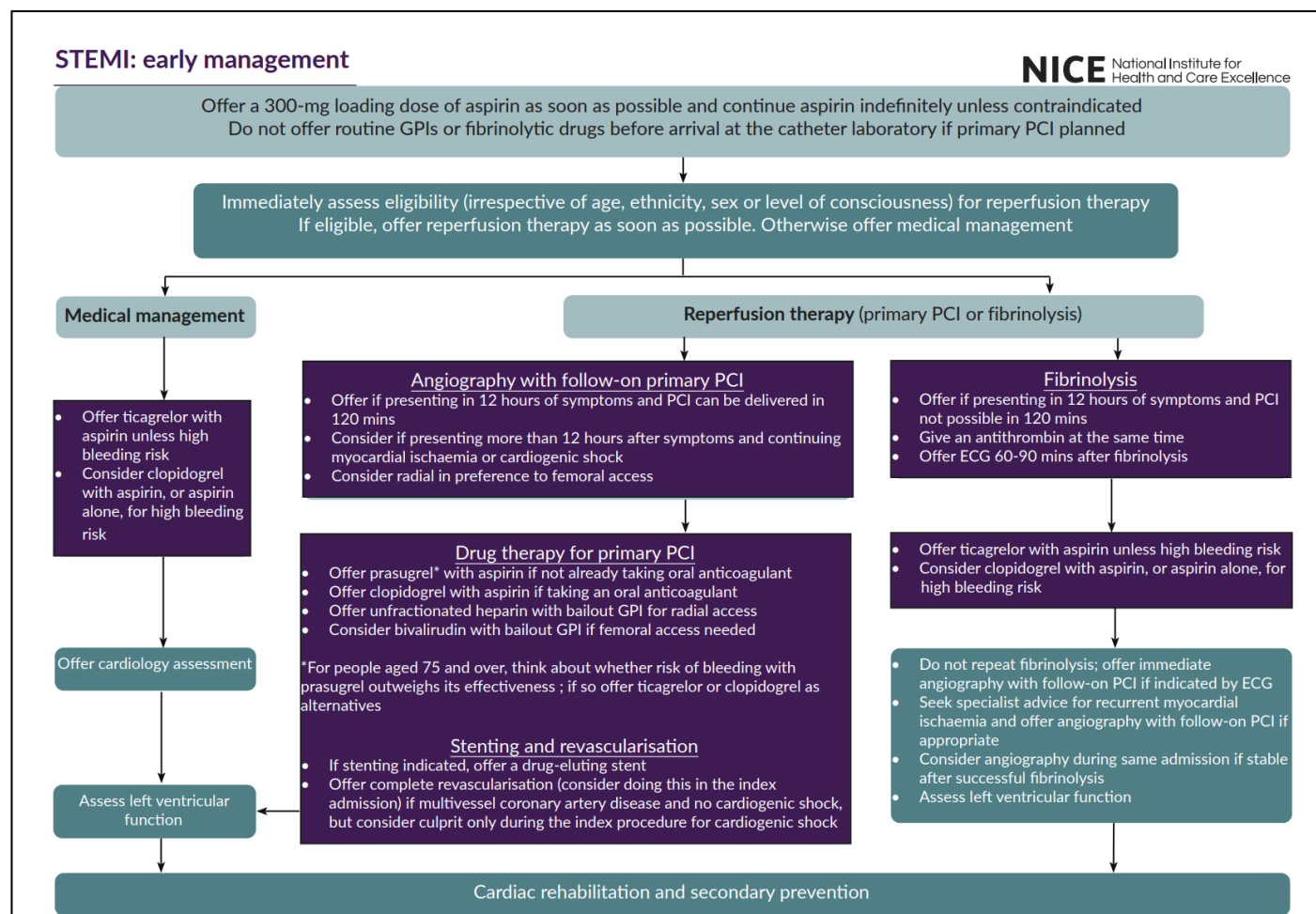
Adjunctive Therapy



Acute coronary syndromes

NICE National Institute for Health and Care Excellence

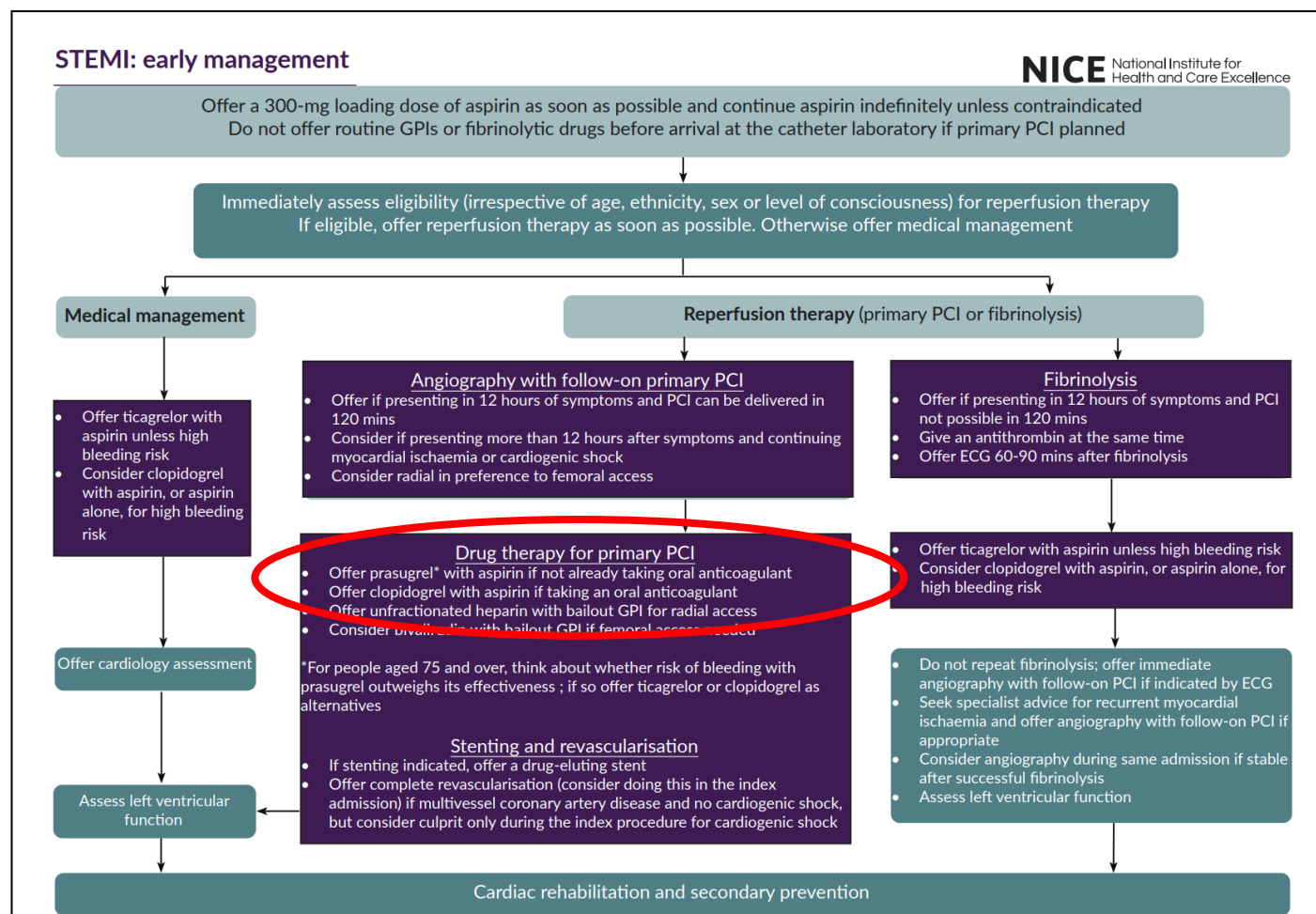
NICE guideline [NG185] Published: 18 November 2020



Acute coronary syndromes

NICE National Institute for
Health and Care Excellence

NICE guideline [NG185] Published: 18 November 2020



Acute coronary syndromes

NICE National Institute for
Health and Care Excellence

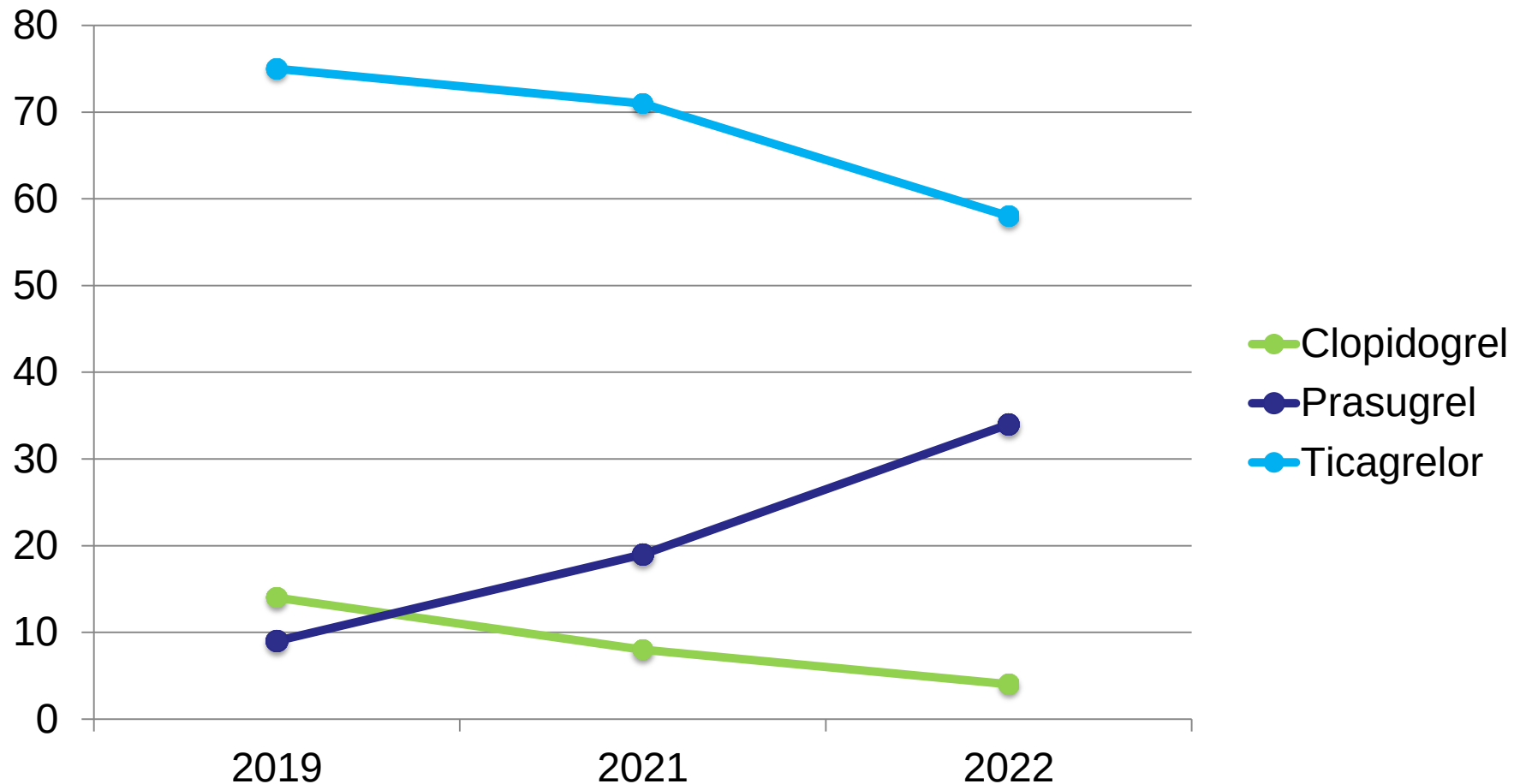
NICE guideline [NG185] Published: 18 November 2020

Drug therapy for primary PCI

- Offer prasugrel* with aspirin if not already taking oral anticoagulant
- Offer clopidogrel with aspirin if taking an oral anticoagulant
- Offer unfractionated heparin with bailout GPI for radial access
- Consider bivalirudin with bailout GPI if femoral access needed

*For people aged 75 and over, think about whether risk of bleeding with prasugrel outweighs its effectiveness ; if so offer ticagrelor or clopidogrel as alternatives

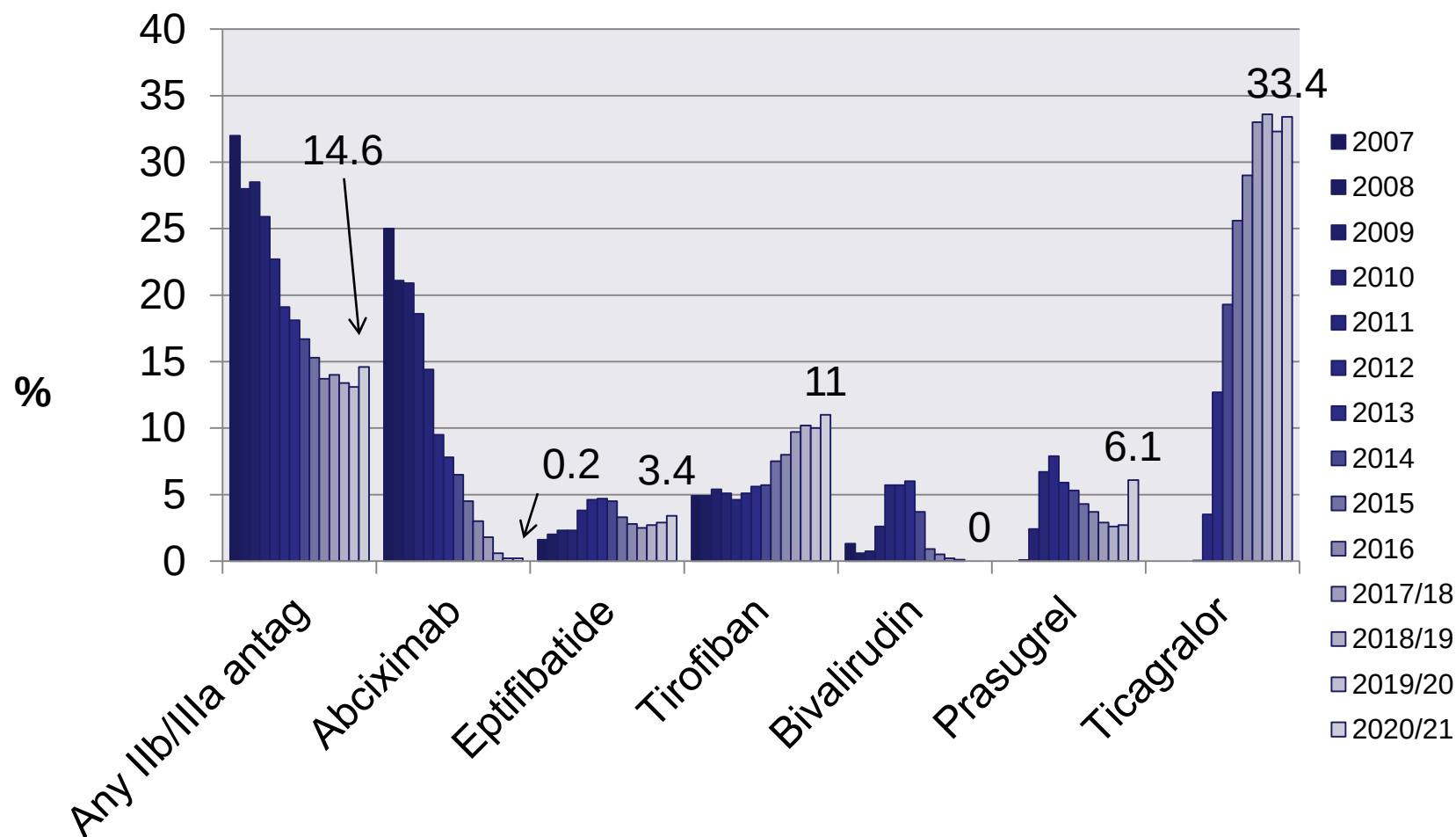
Survey: Default oral Anti-Platelets for Primary PCI for STEMI



In addition to ASA

Adjunctive therapy

All PCI Indications

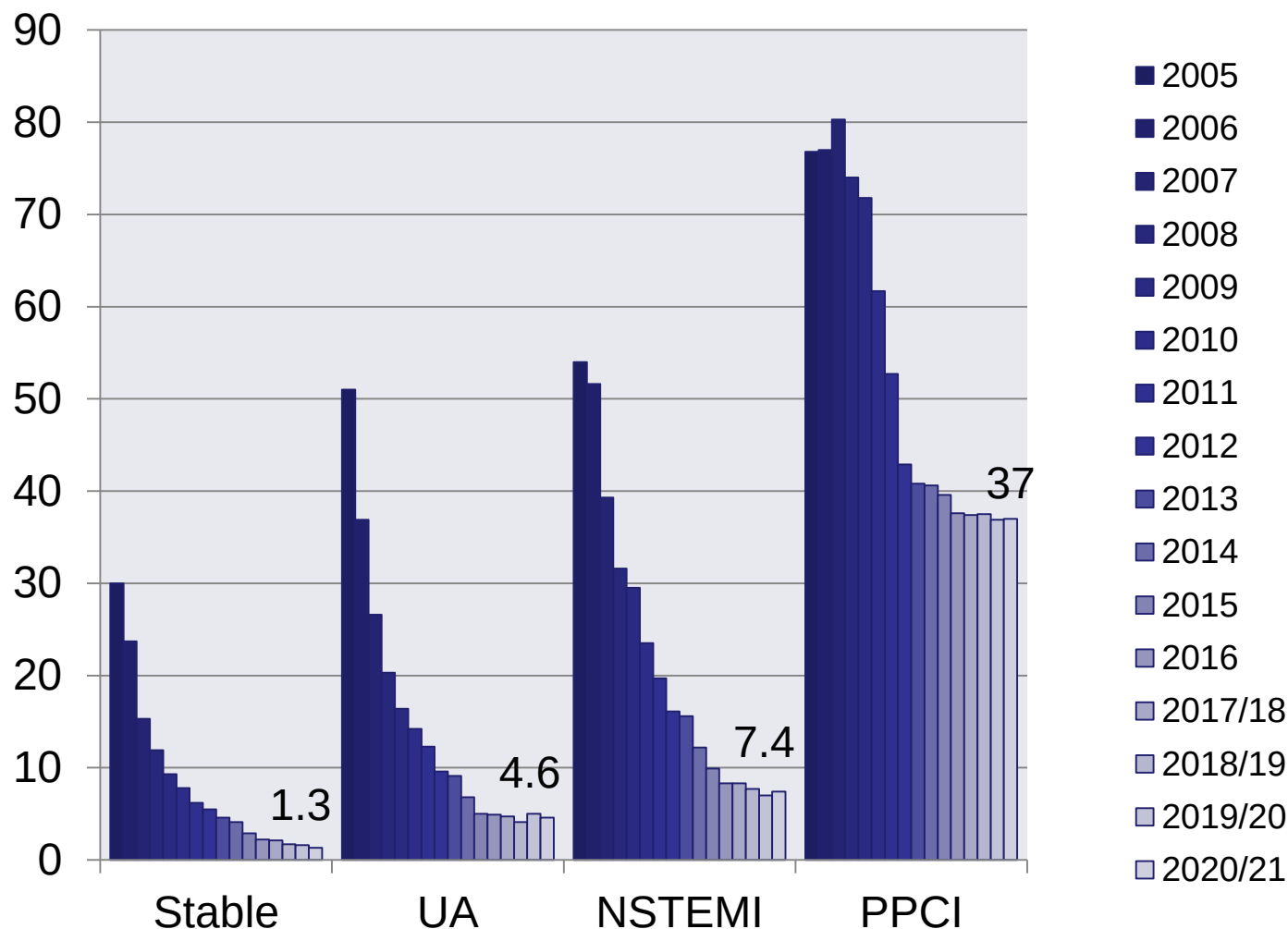


Number labels for latest year

GP I Ib/IIIa Antagonists

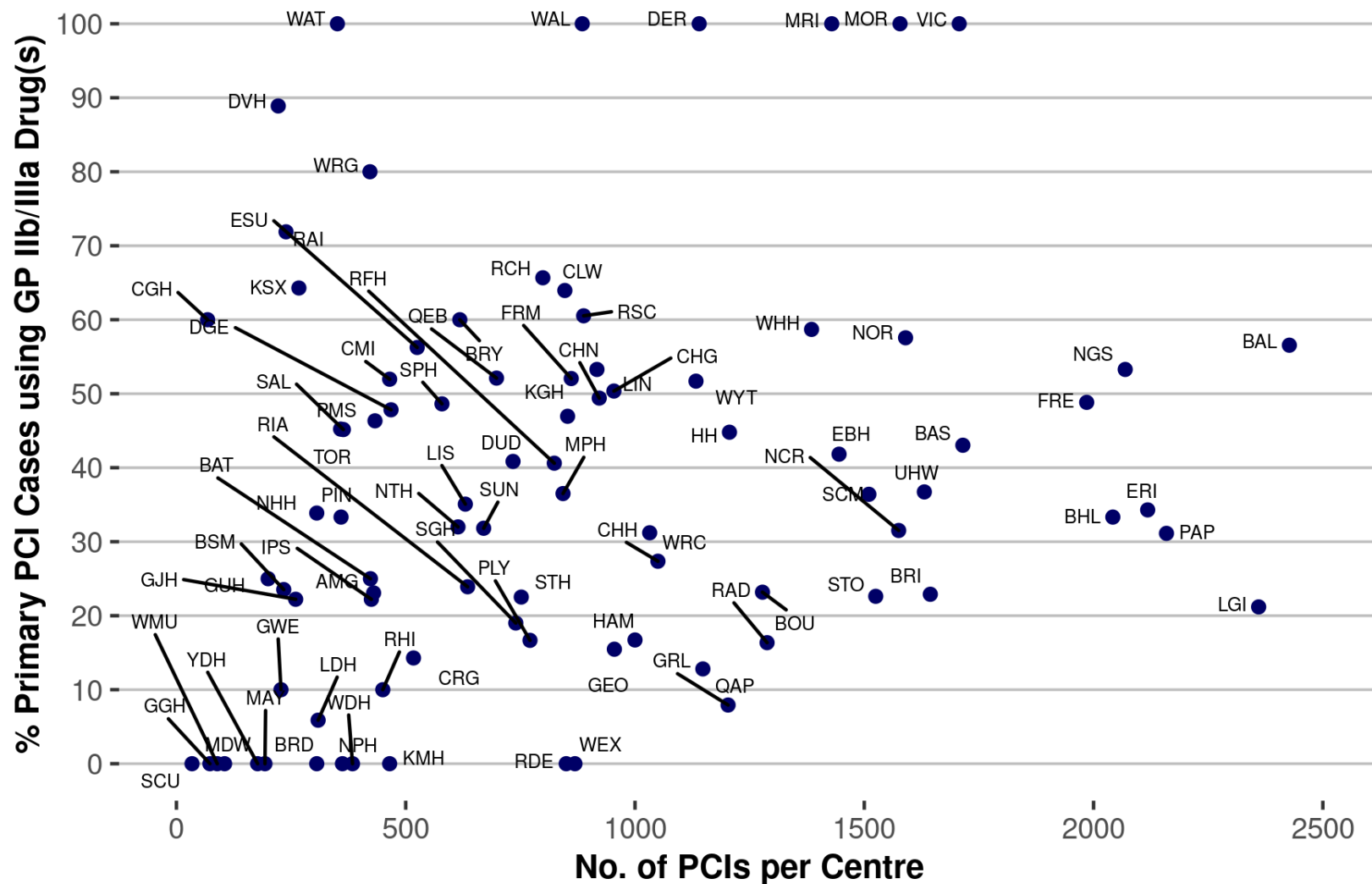
Use by Syndrome

% Procedures with any GP I Ib/IIIa blocker



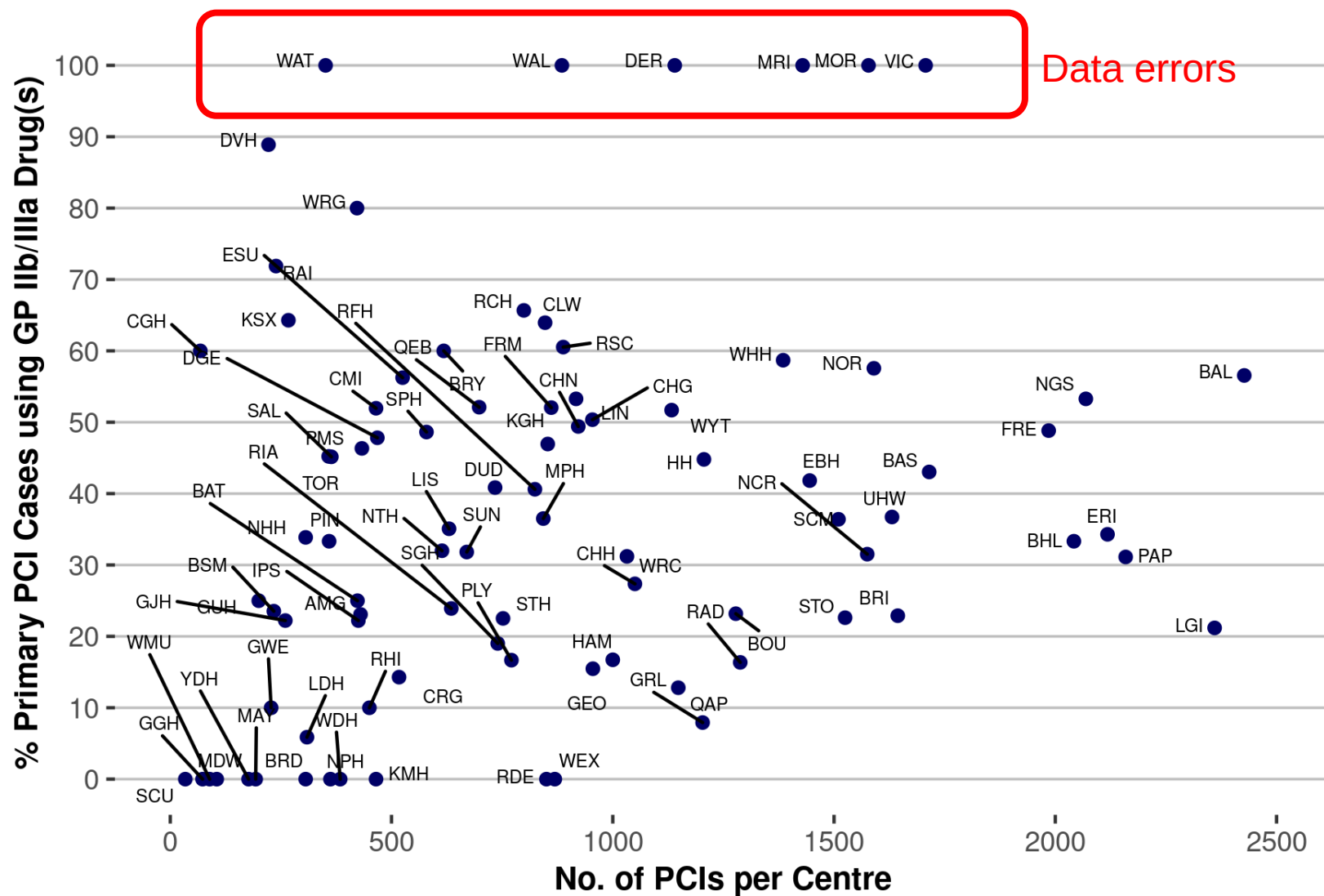
Any GP IIb/IIIa Antagonist

Use in Primary PCI v activity per unit



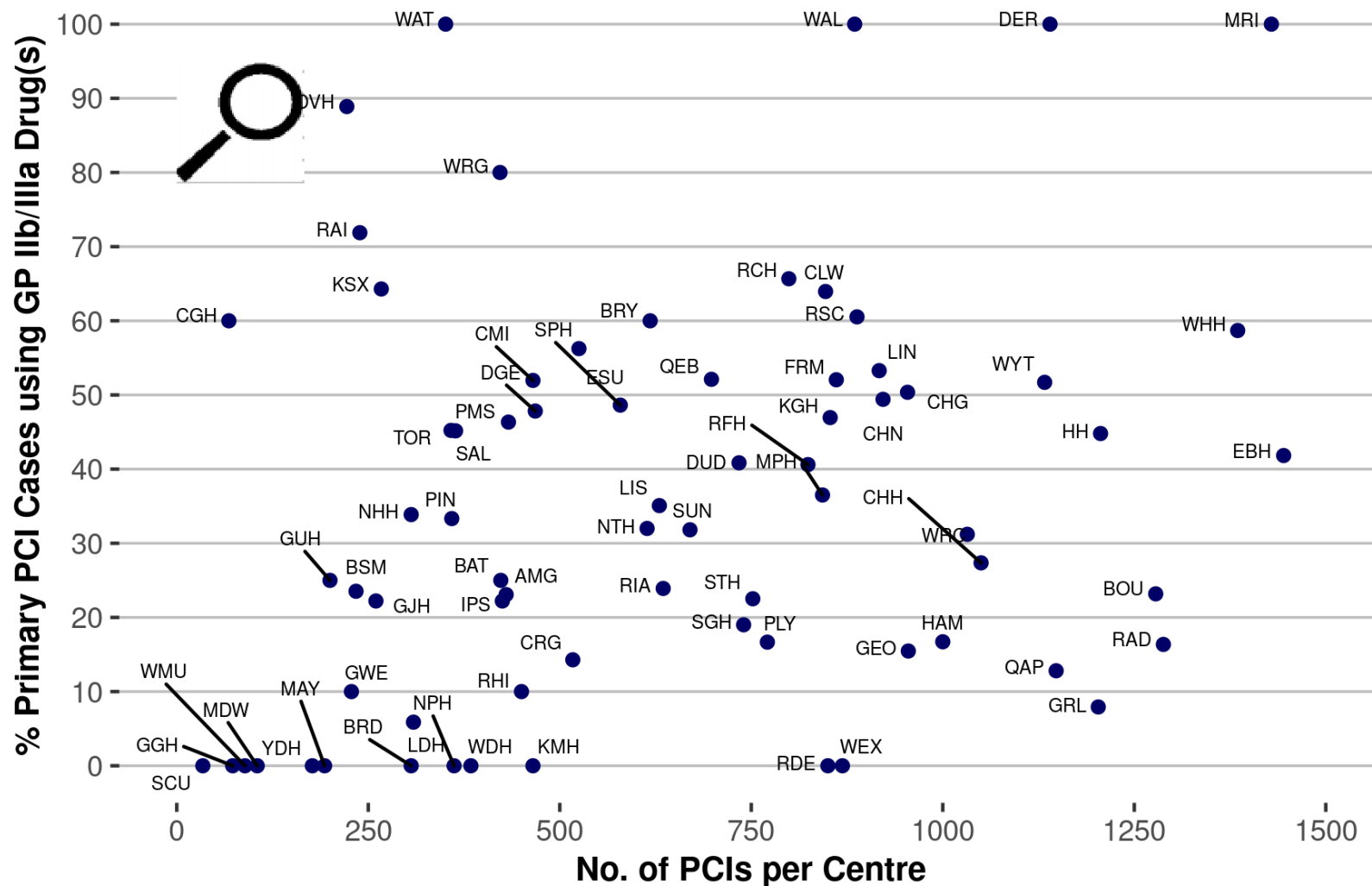
Any GP IIb/IIIa Antagonist

Use in Primary PCI v activity per unit



Any GP I Ib/IIIa Antagonist

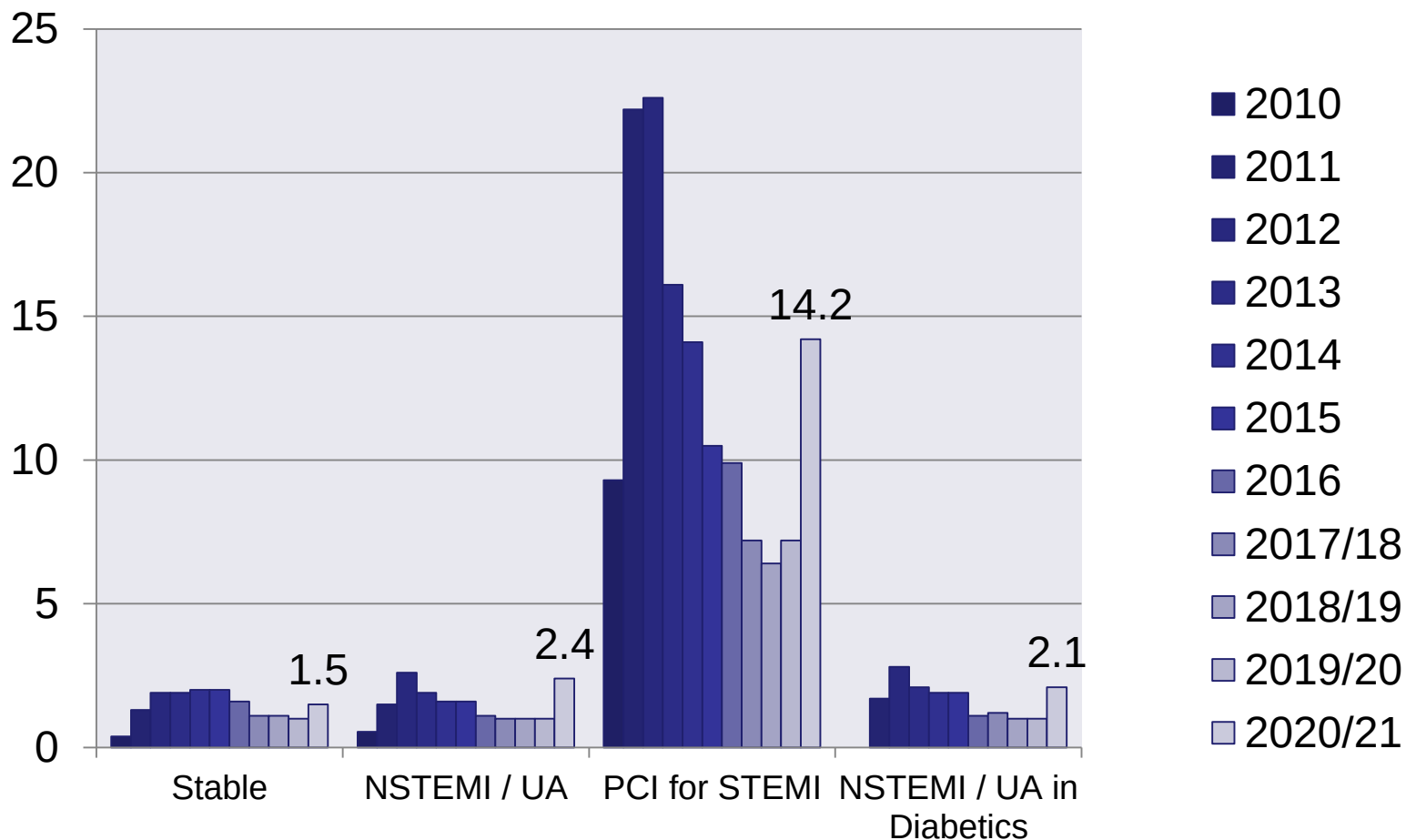
Use in Primary PCI v activity per unit



Prasugrel

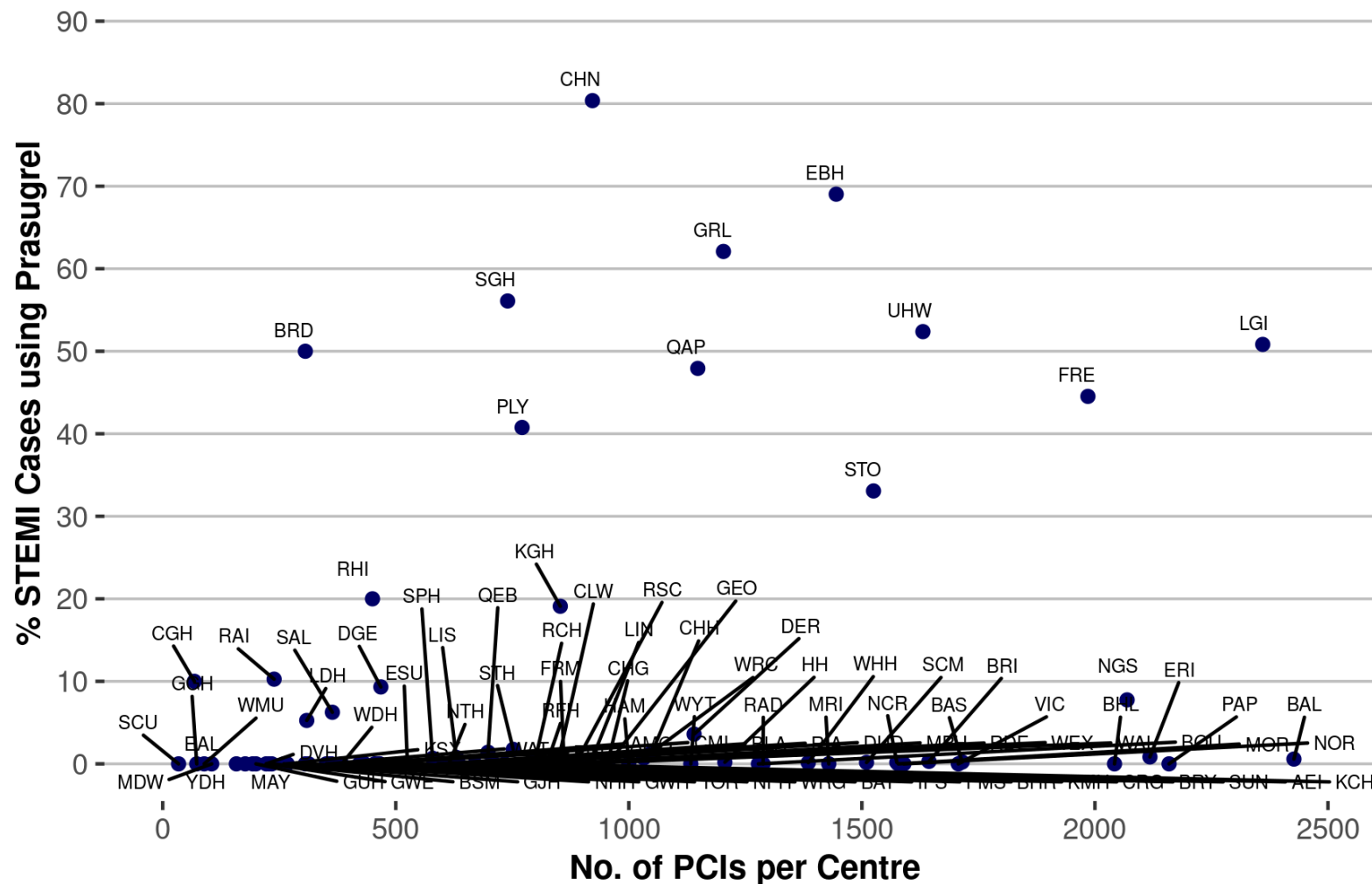
Use by Indication for PCI

% of
Procedures



Prasugrel

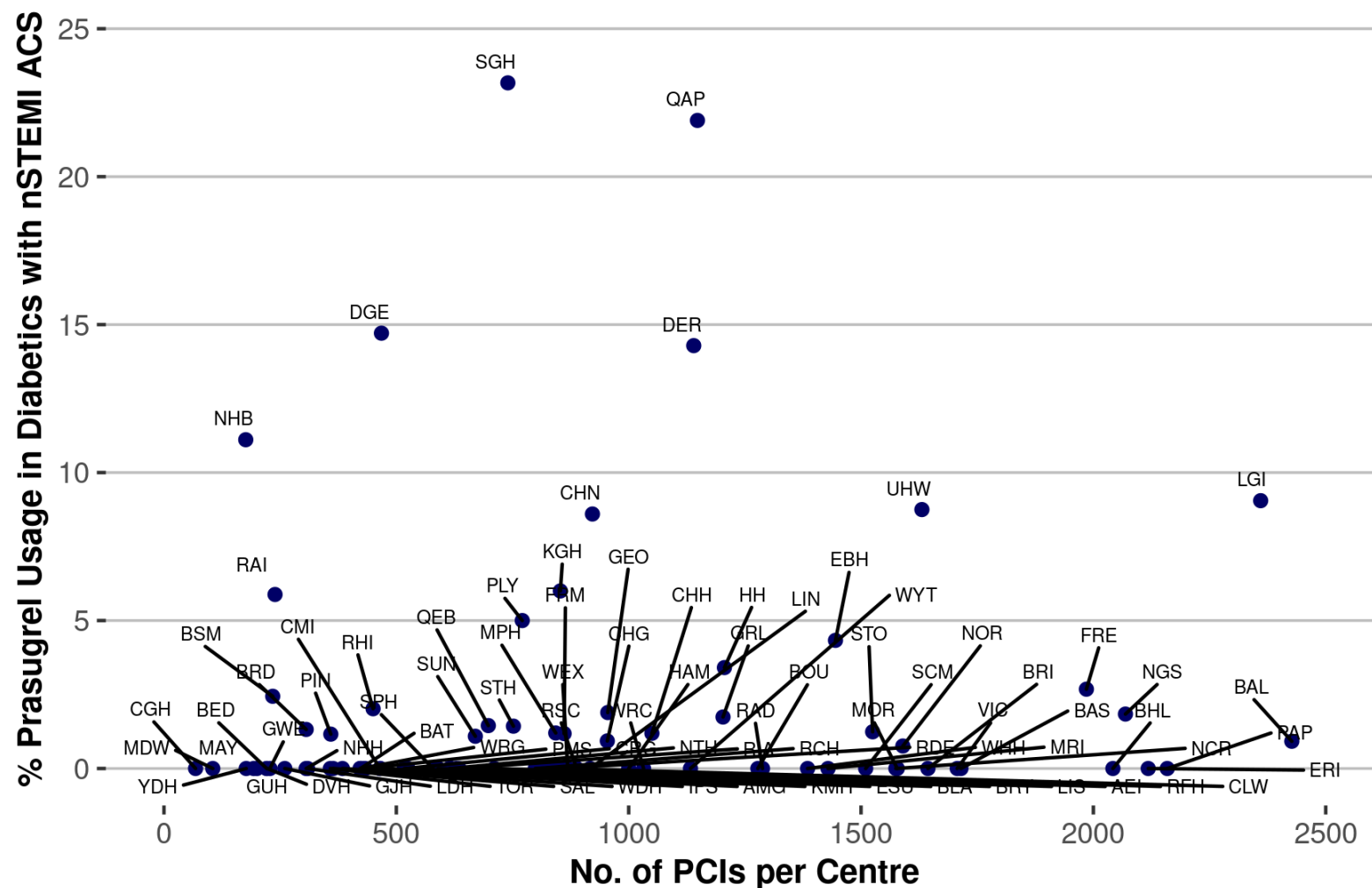
Use in PCI for STEMI v activity per unit



Note: PCI for STEMI includes all indications including rescue

Prasugrel

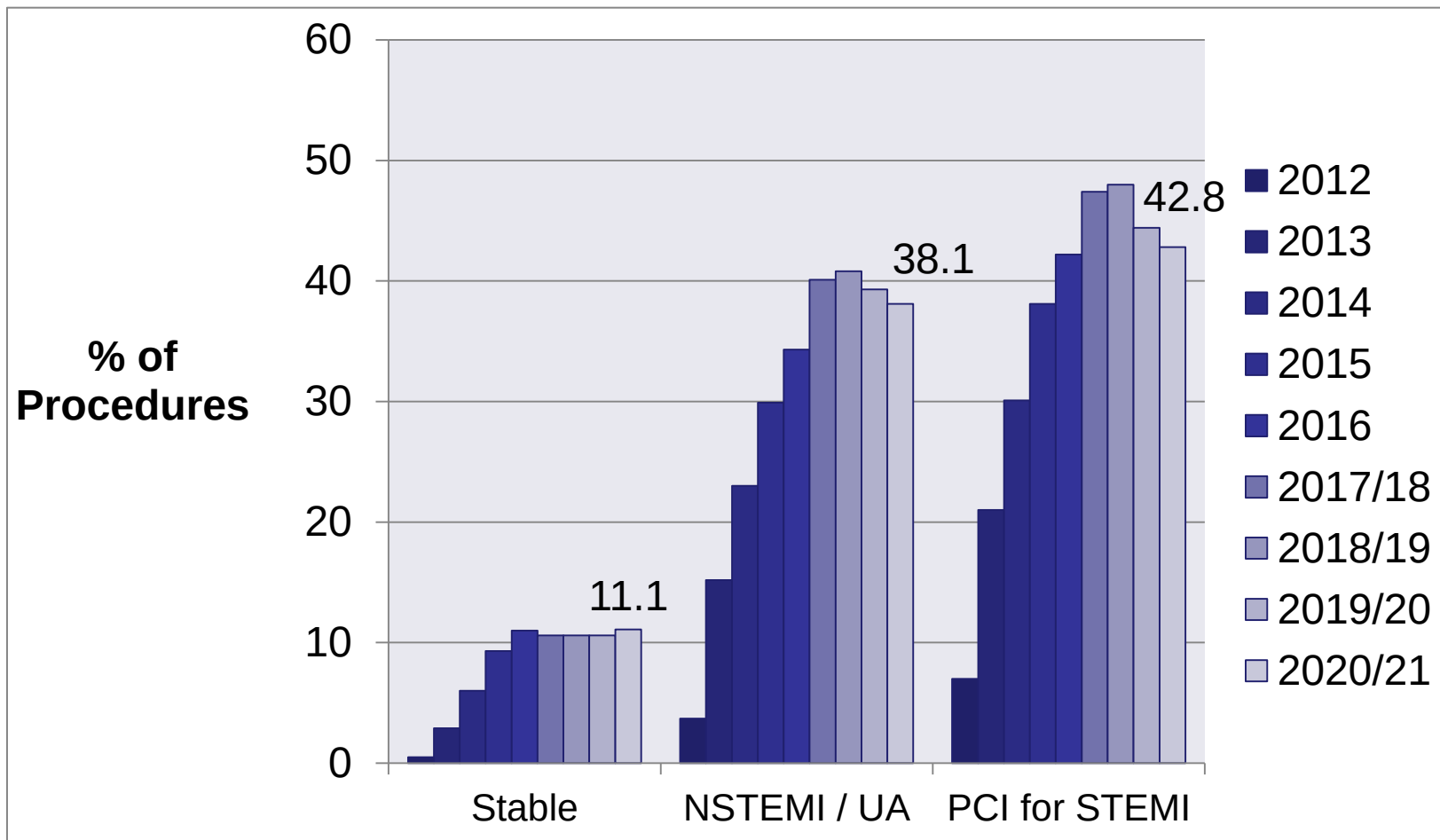
Use in Diabetics with NSTEMI by centre





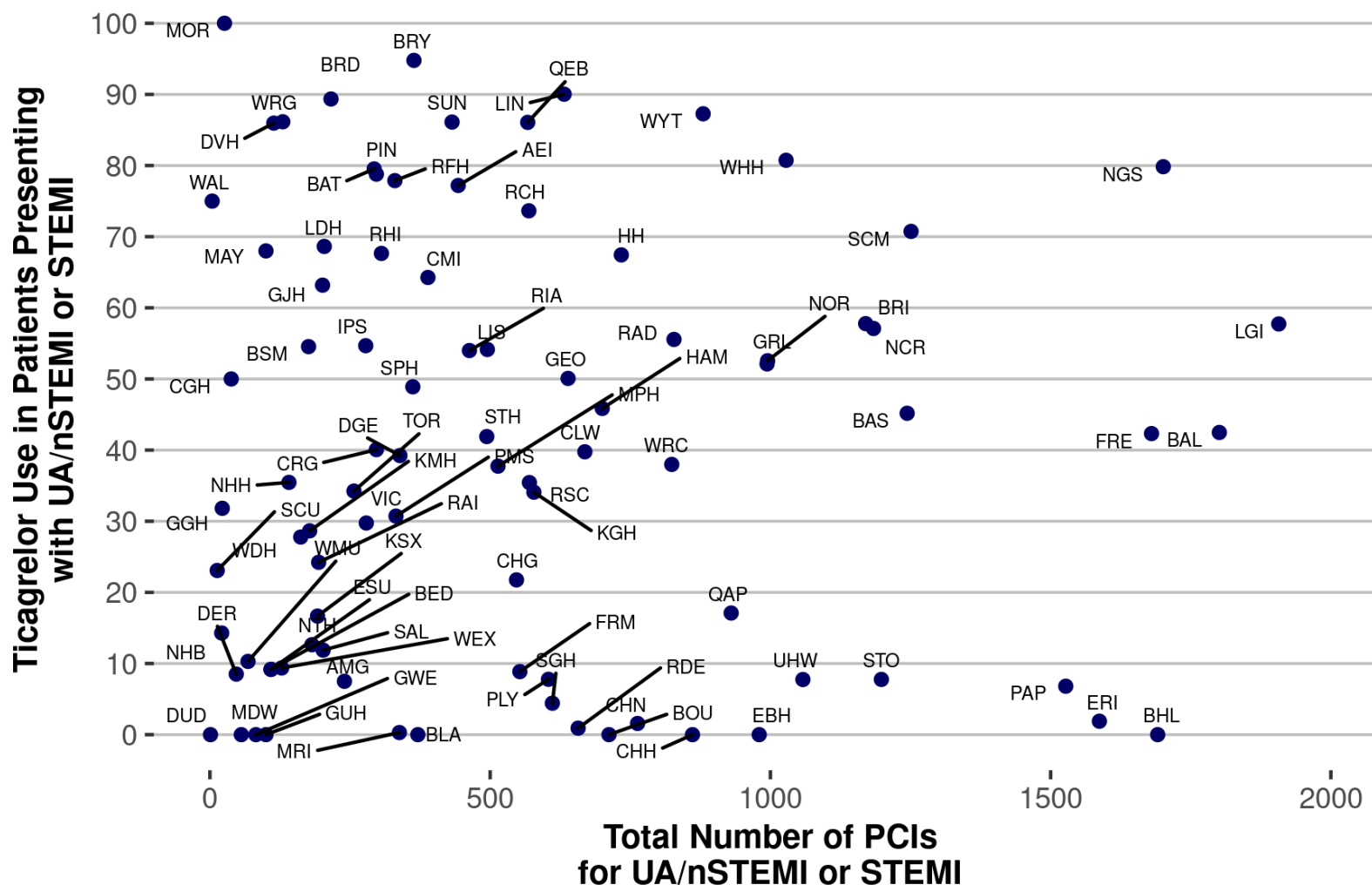
Ticagrelor

Use by Indication for PCI



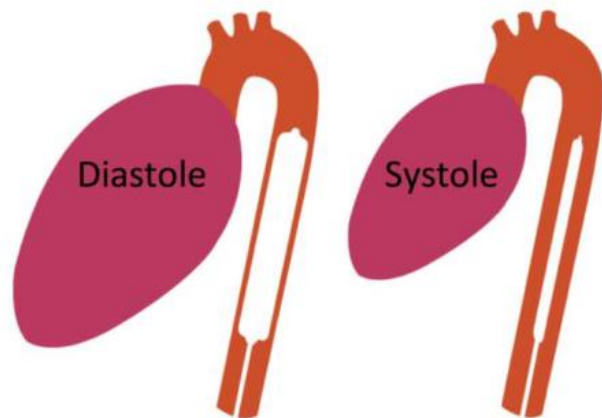
Ticagrelor

Use in all NSTEMI and STEMI by Centre

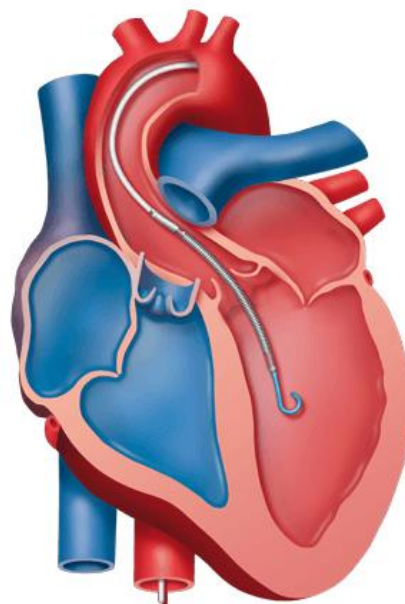


Note: PCI for STEMI includes all indications including rescue

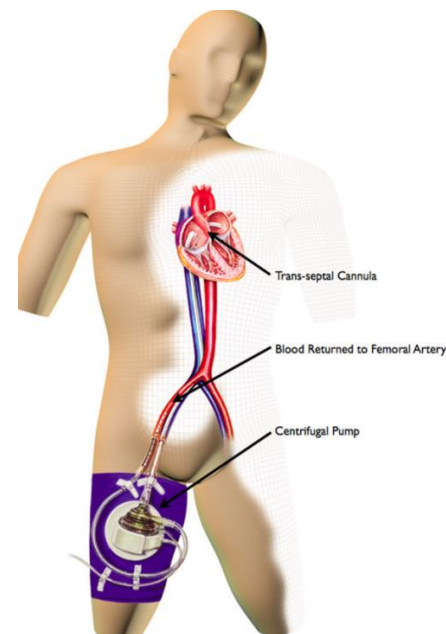
LV Support



IABP



Impella



Tandem Heart



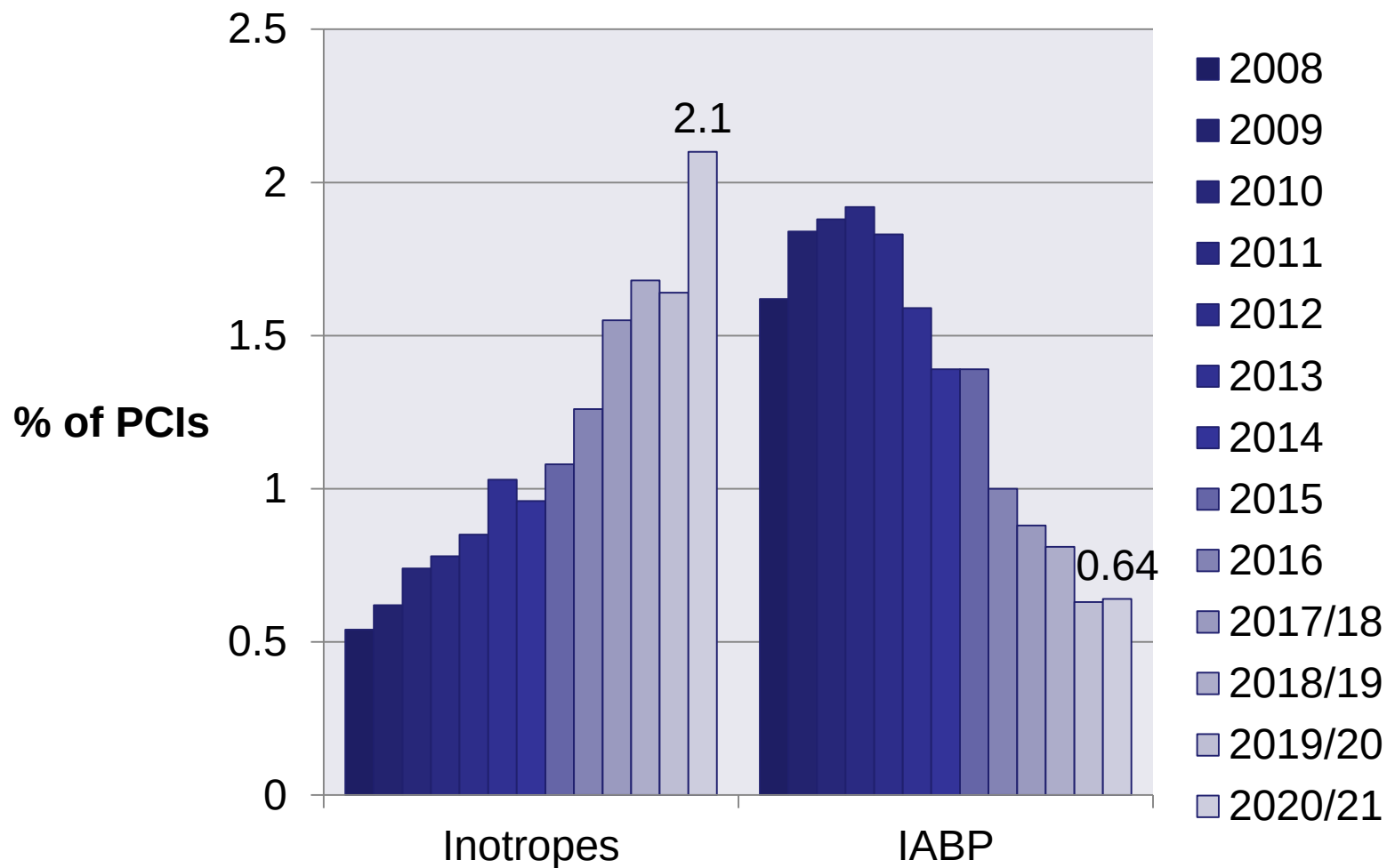
Autopulse



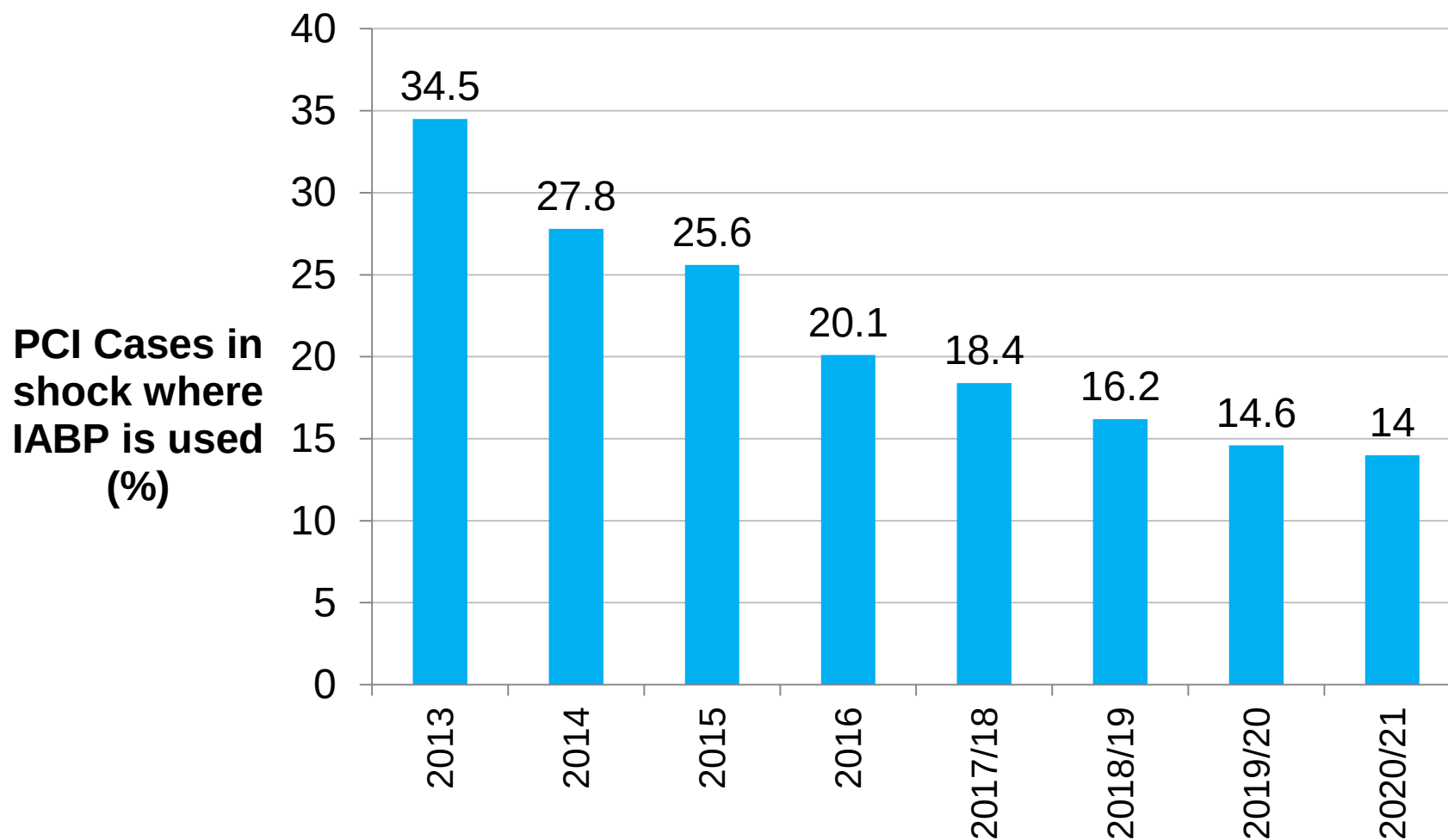
Lucas

LV Support

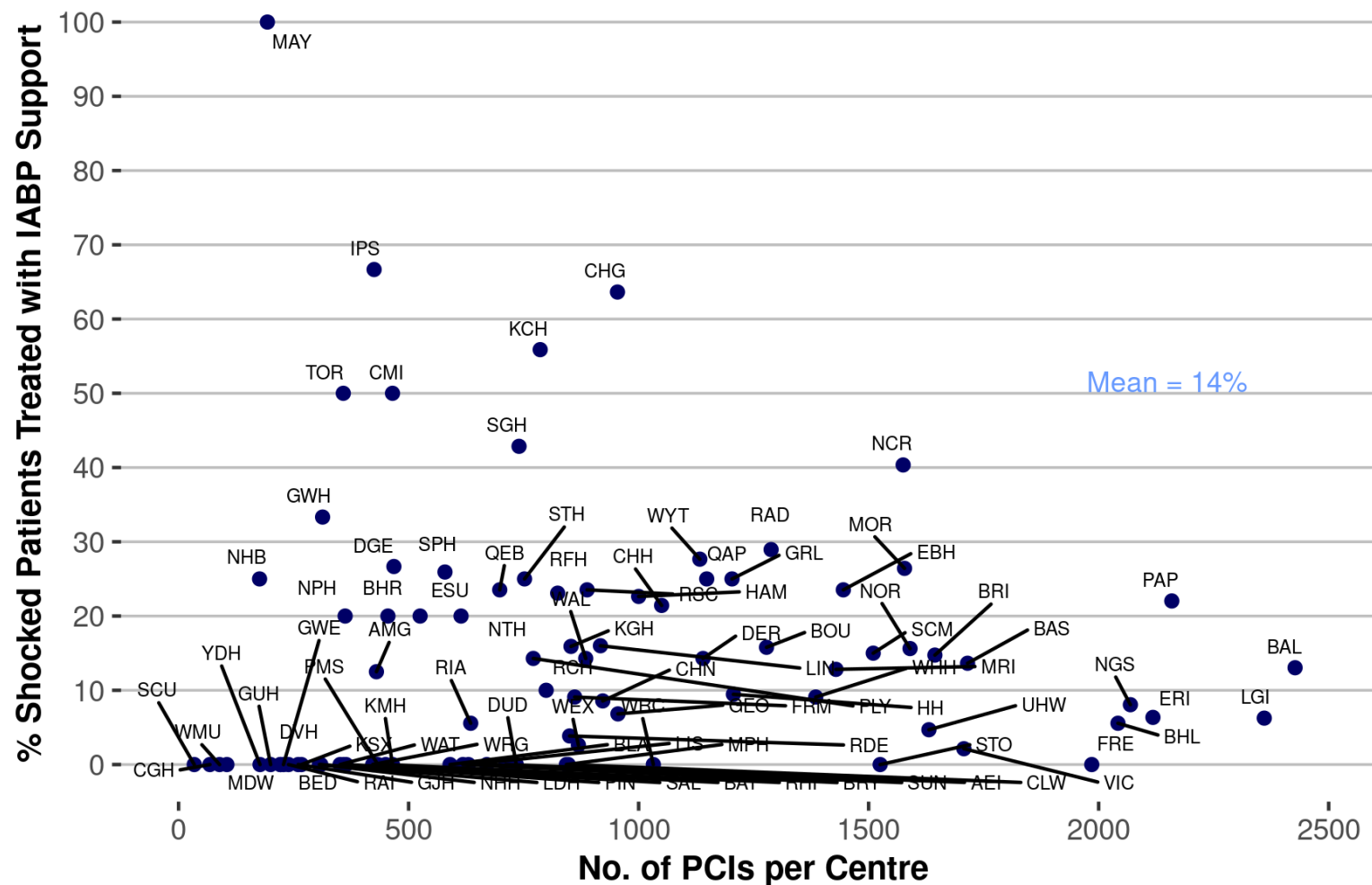
Inotropes and IABP



Shock Cases Treated with IABP



Shock Cases Treated with IABP support



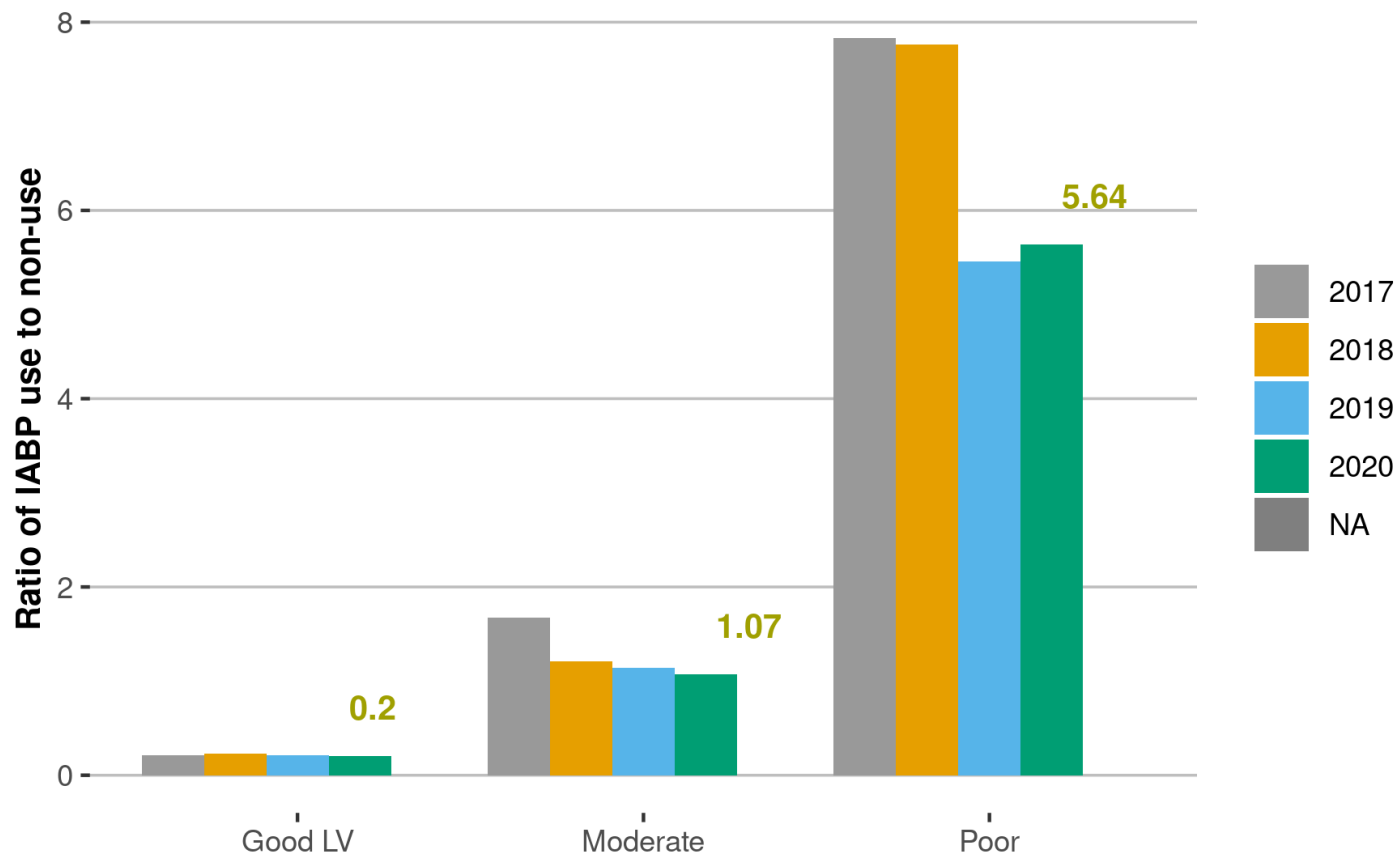
Does not include Impella use

[illegible]

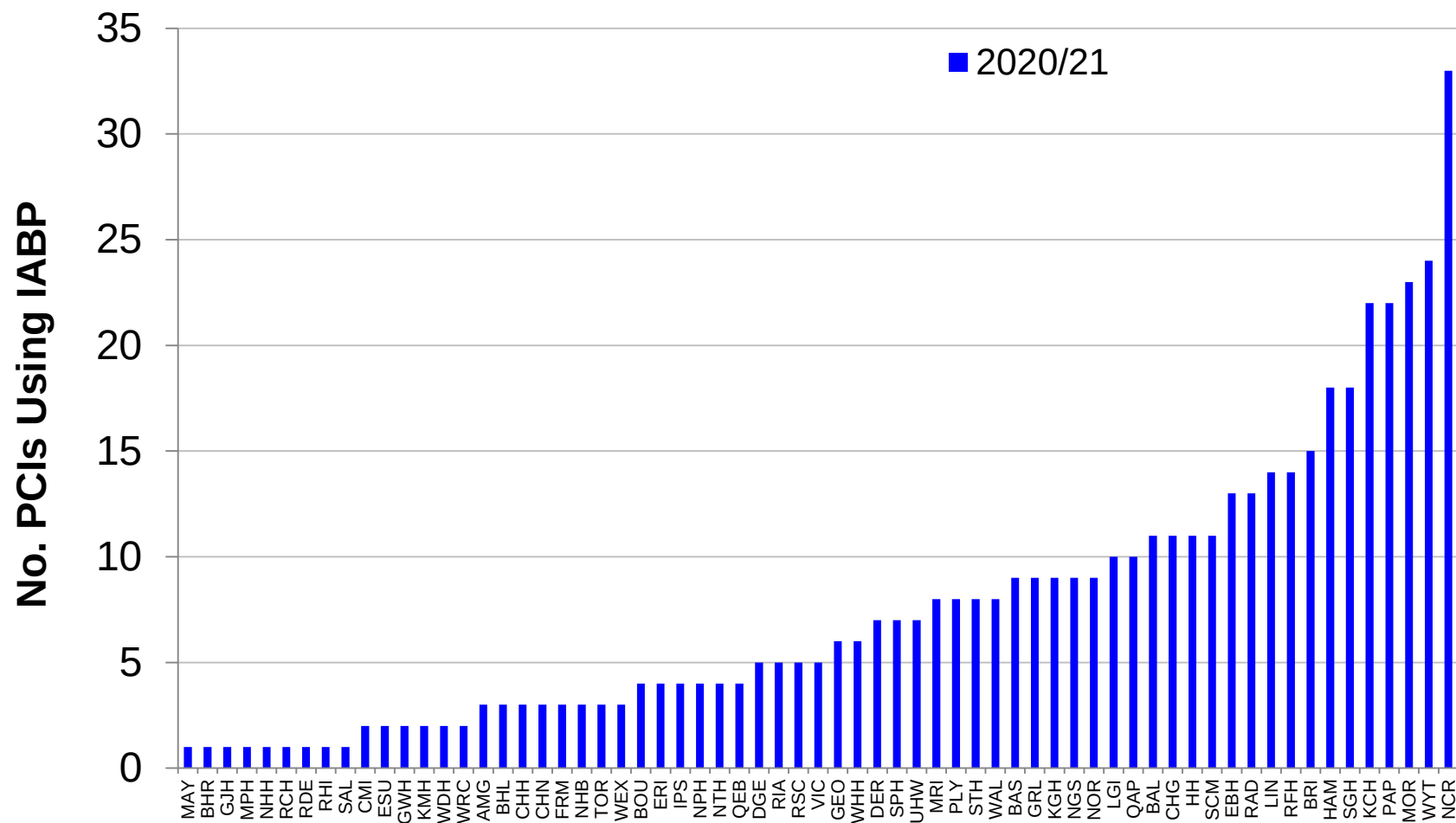
[To Contents](#)

LV Support

% Cases using IABP v LV function



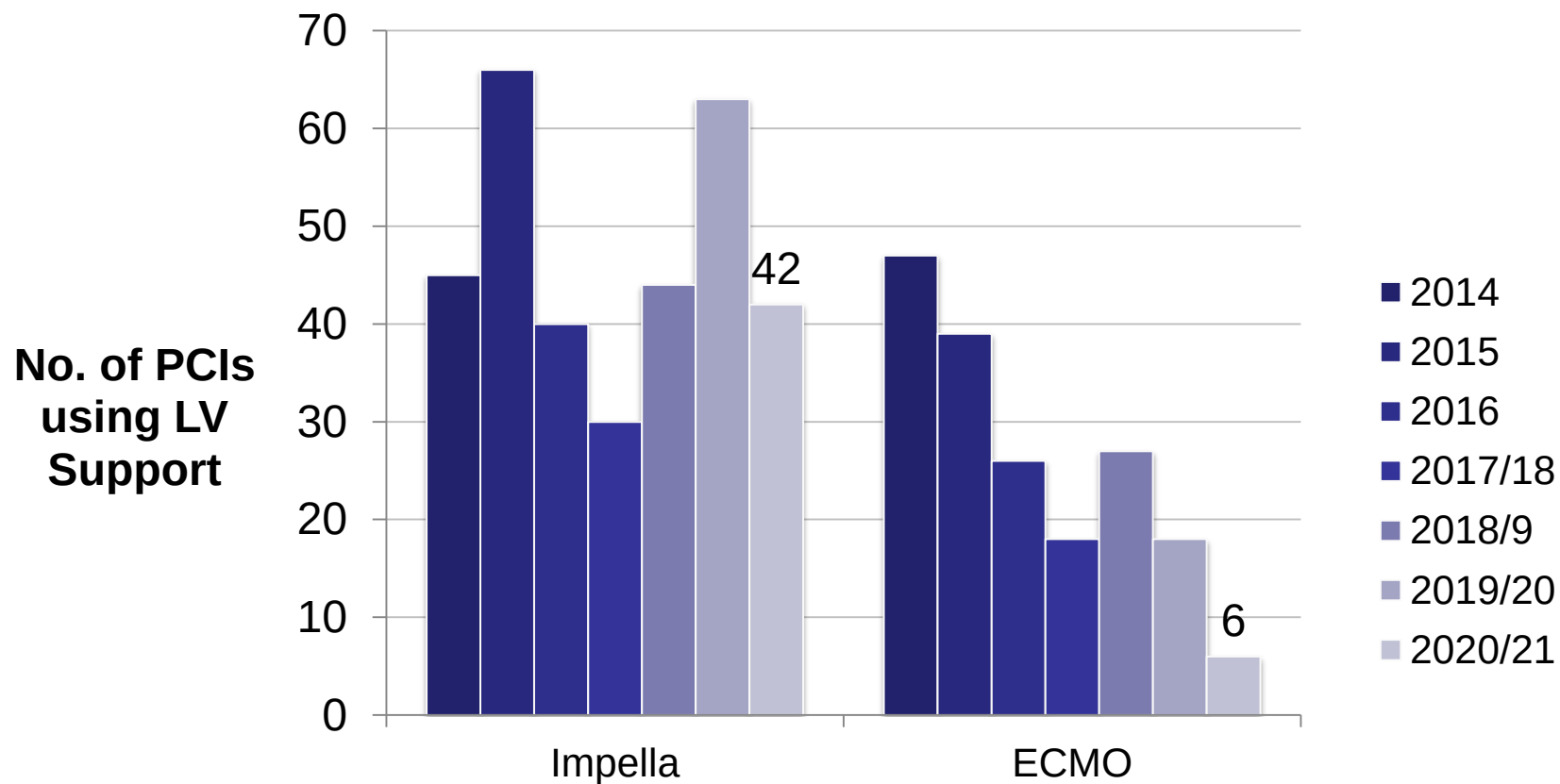
LV Support IABP



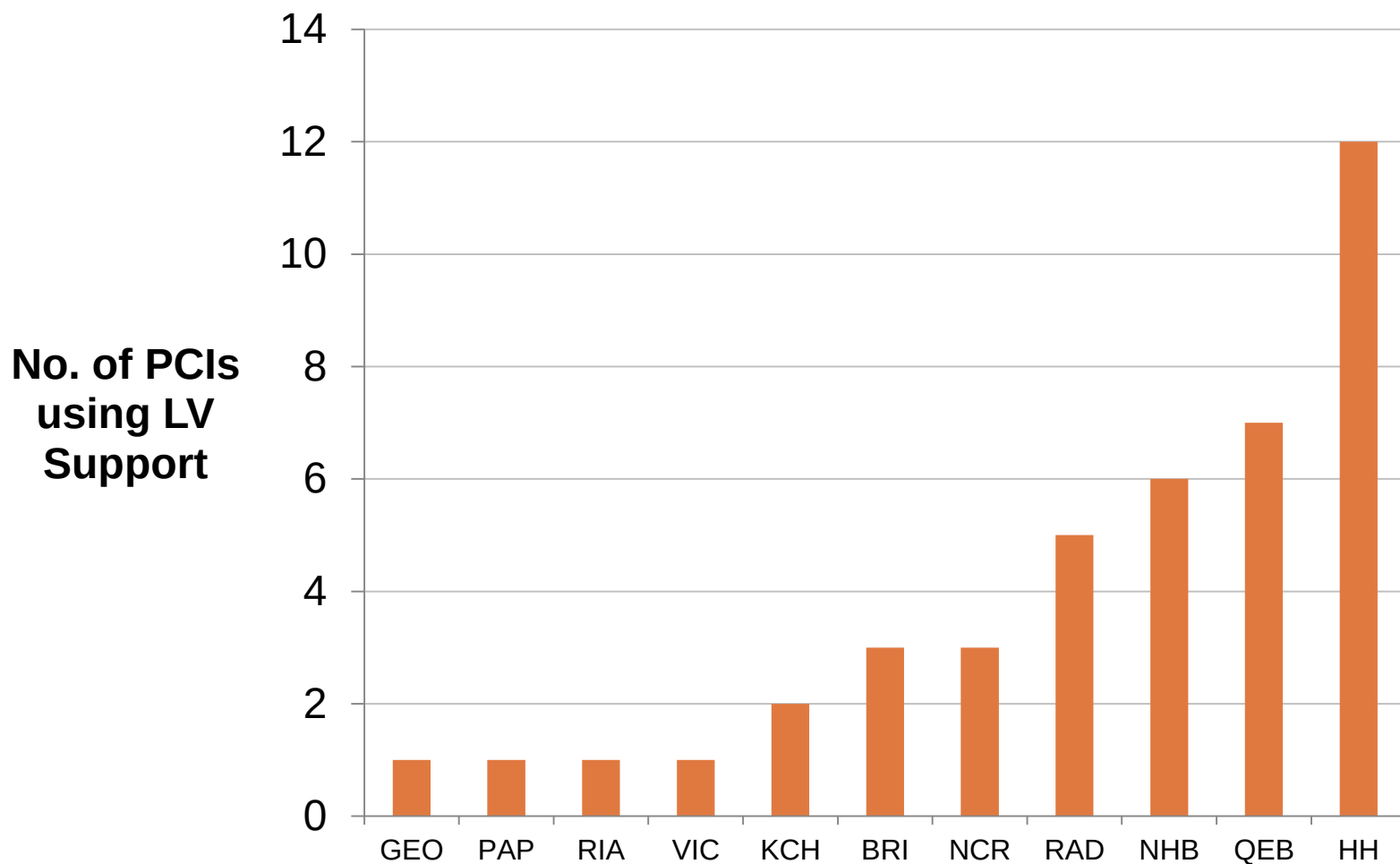
PCIs with at least this type of support

LV Support

Other options

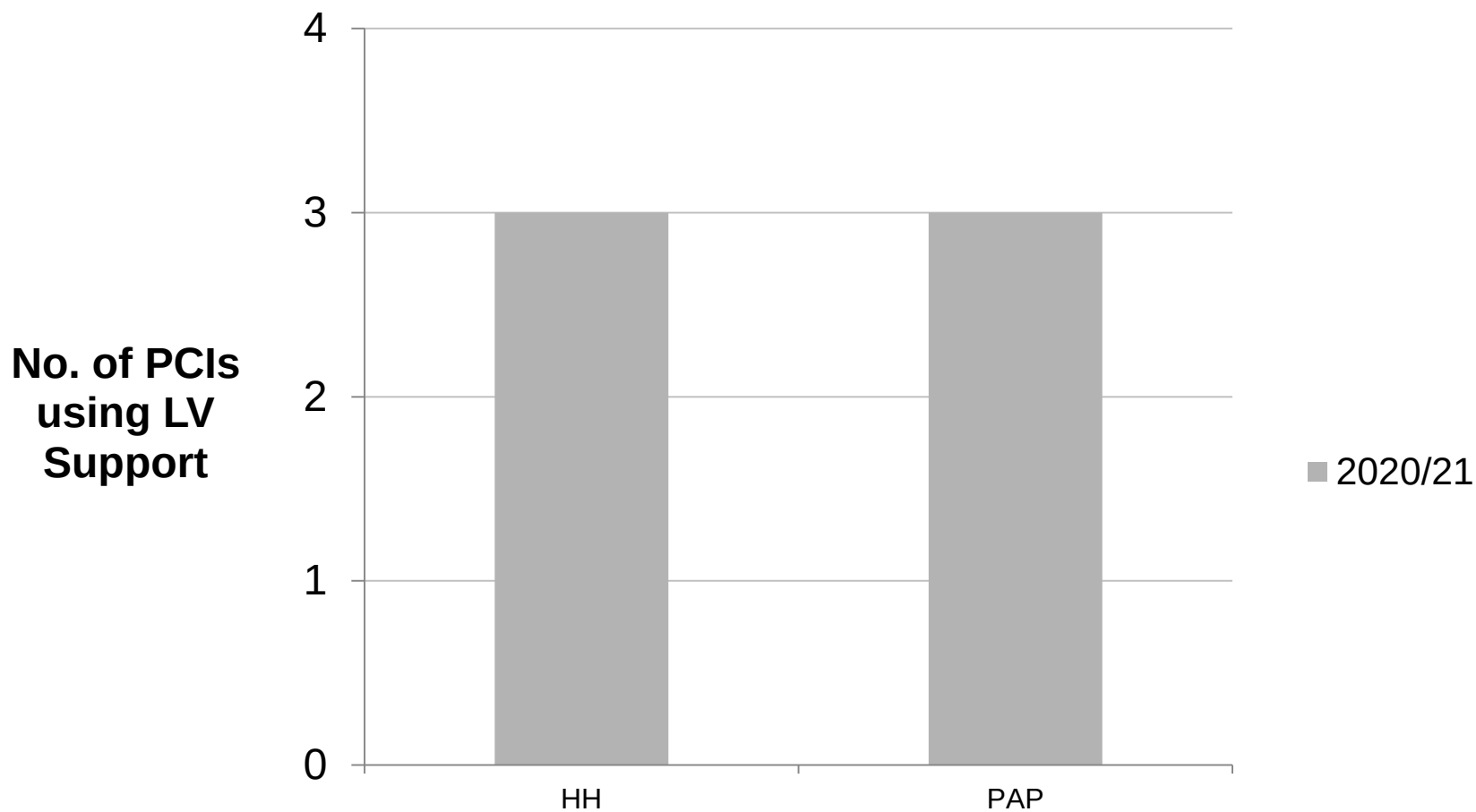


LV Support Impella



PCIs with at least this type of support

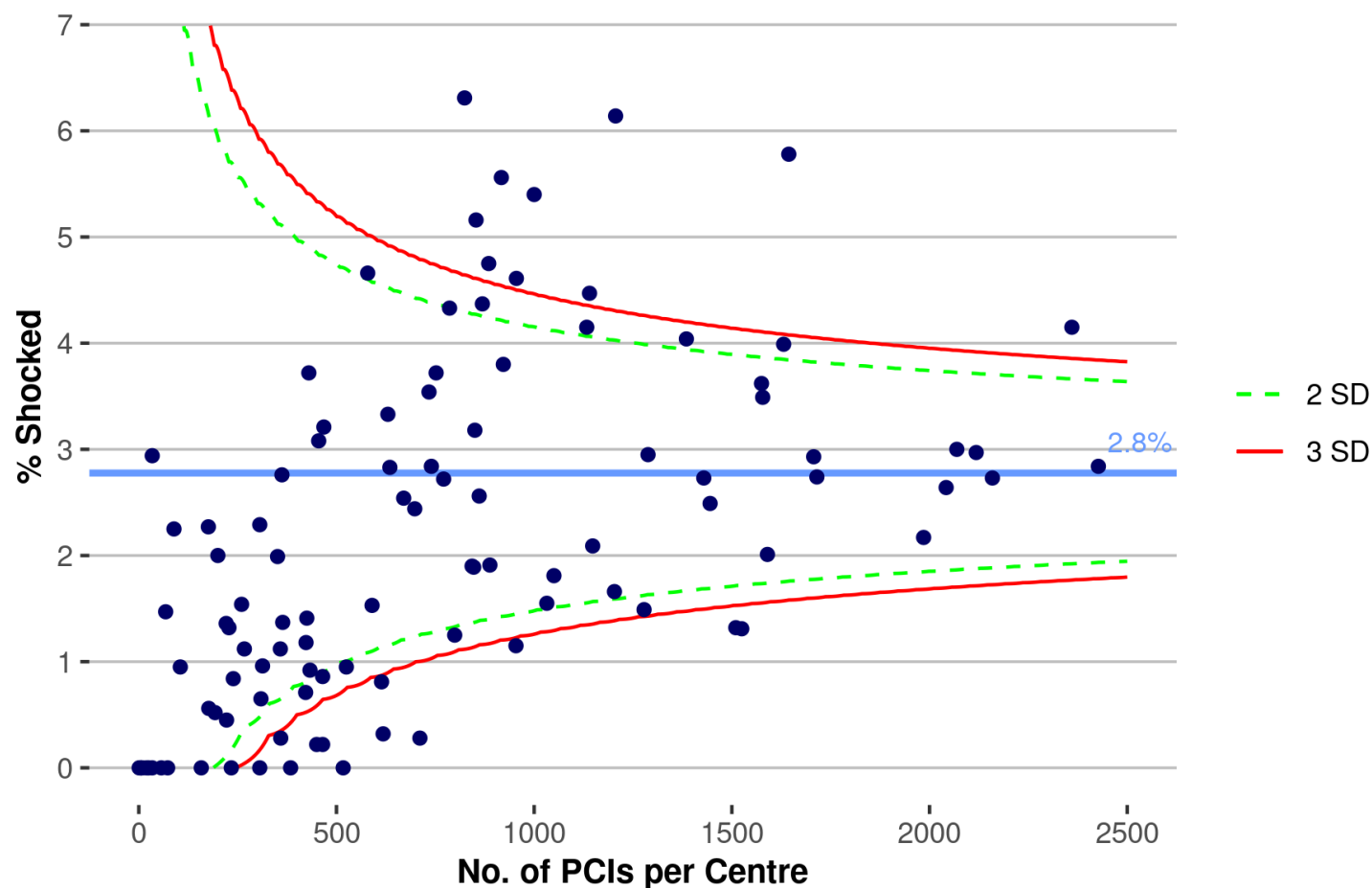
LV Support ECMO



PCIs with at least this type of support

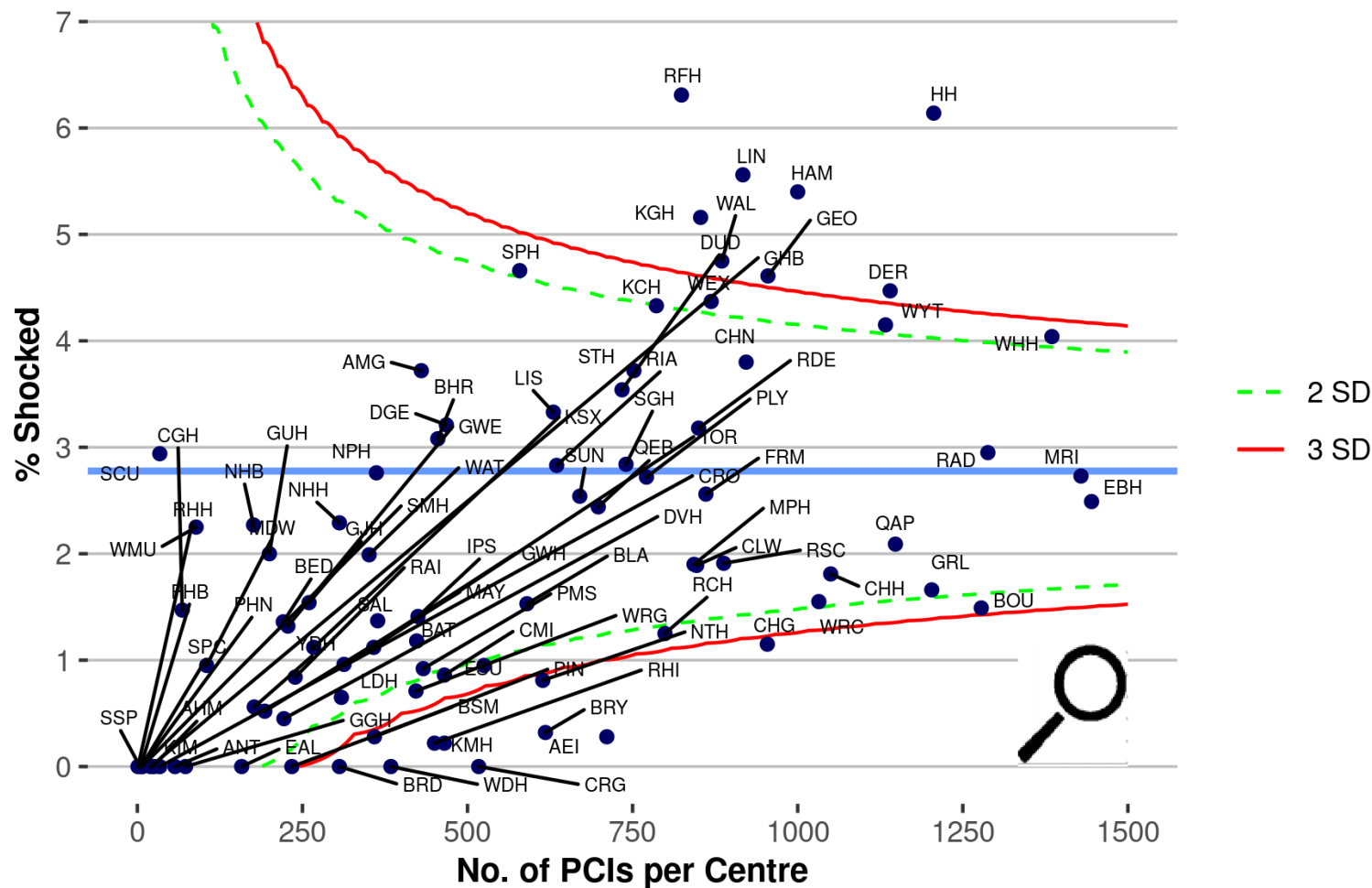
Cardiogenic Shock

% Cases with shock by PCI unit



Cardiogenic Shock

% Cases with shock by PCI unit



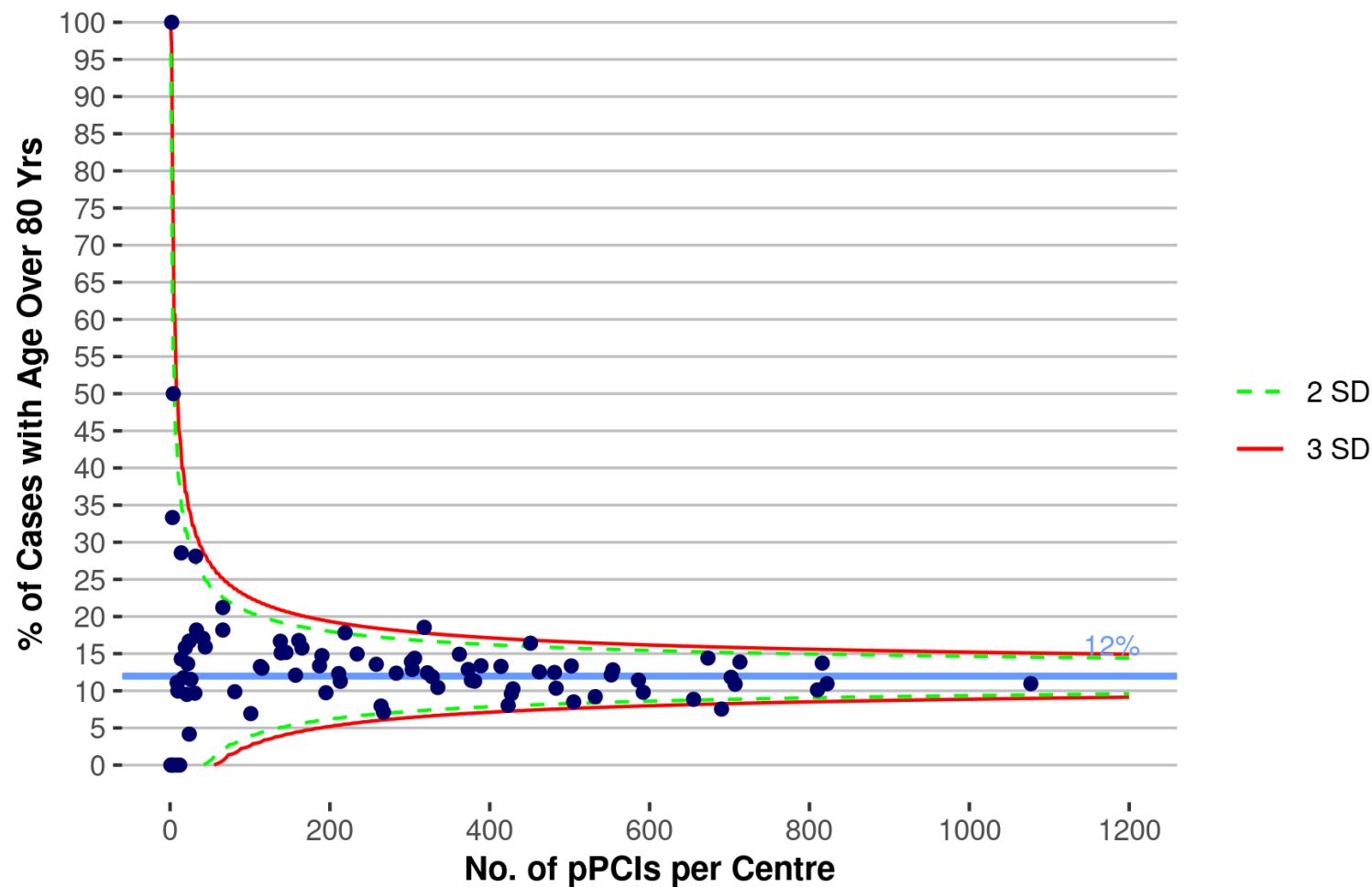
Primary PCI % cases over 80

Case selection for PPCI?



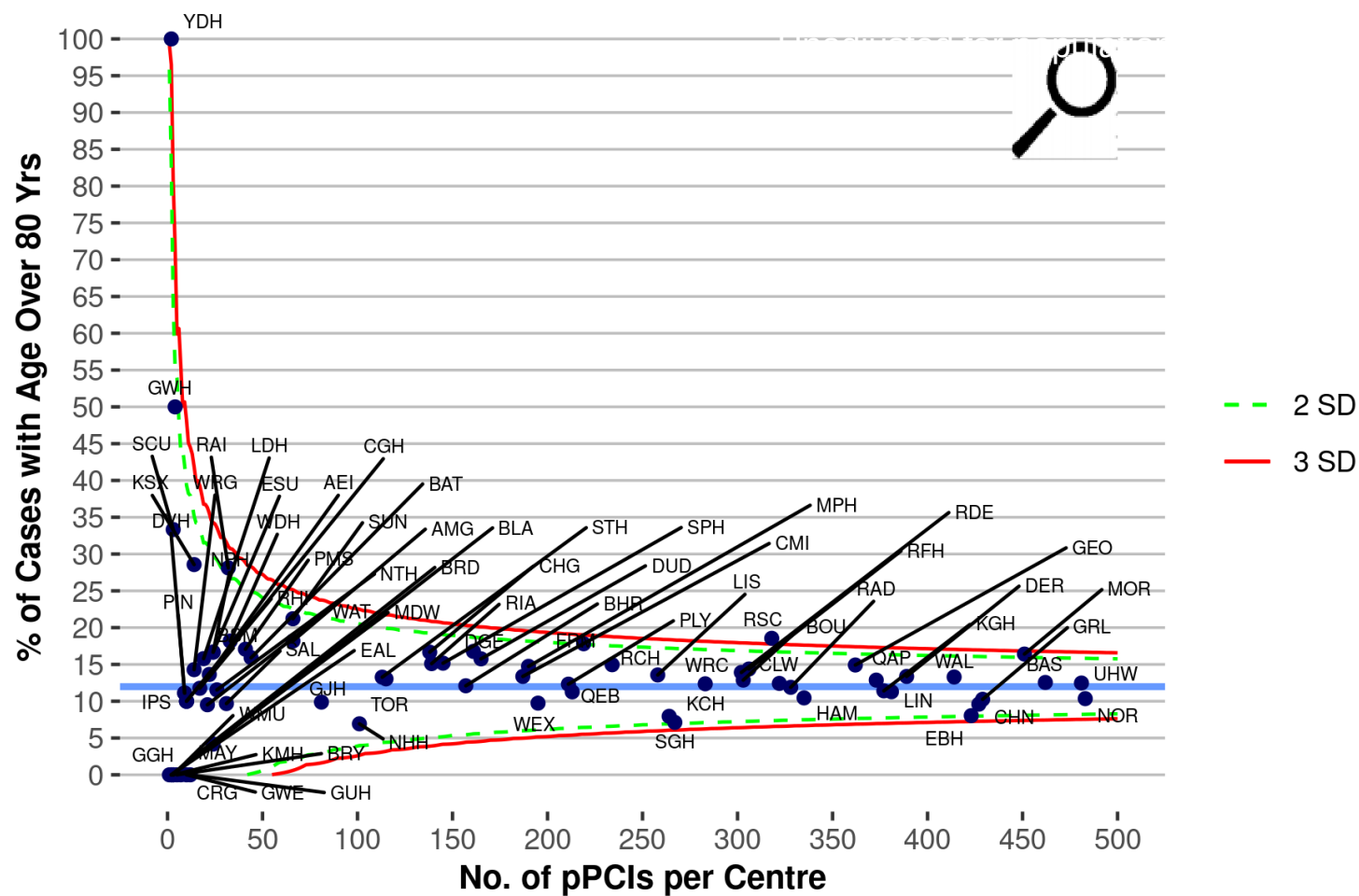
Primary PCI

% cases over 80

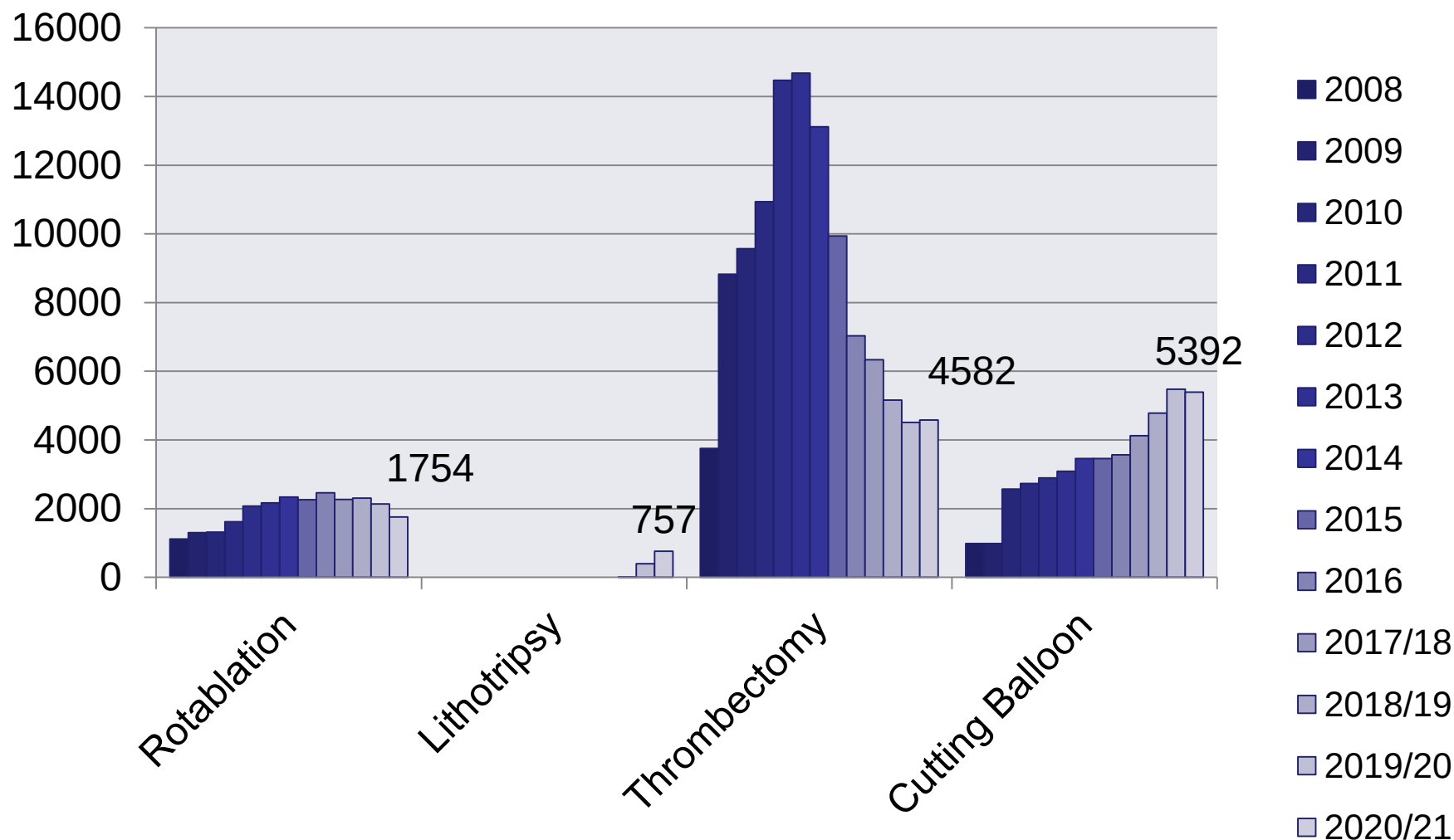


Primary PCI

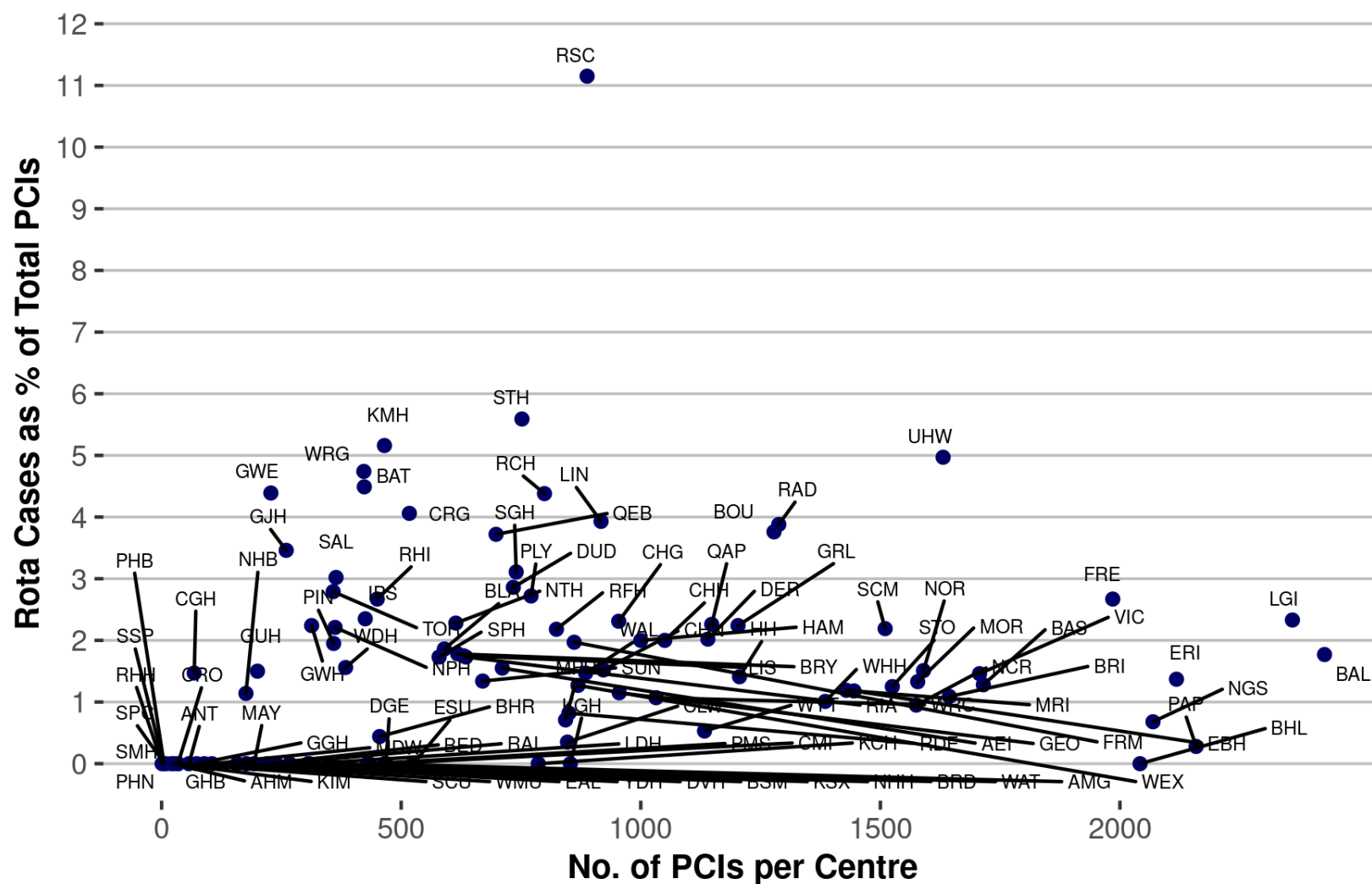
% cases over 80



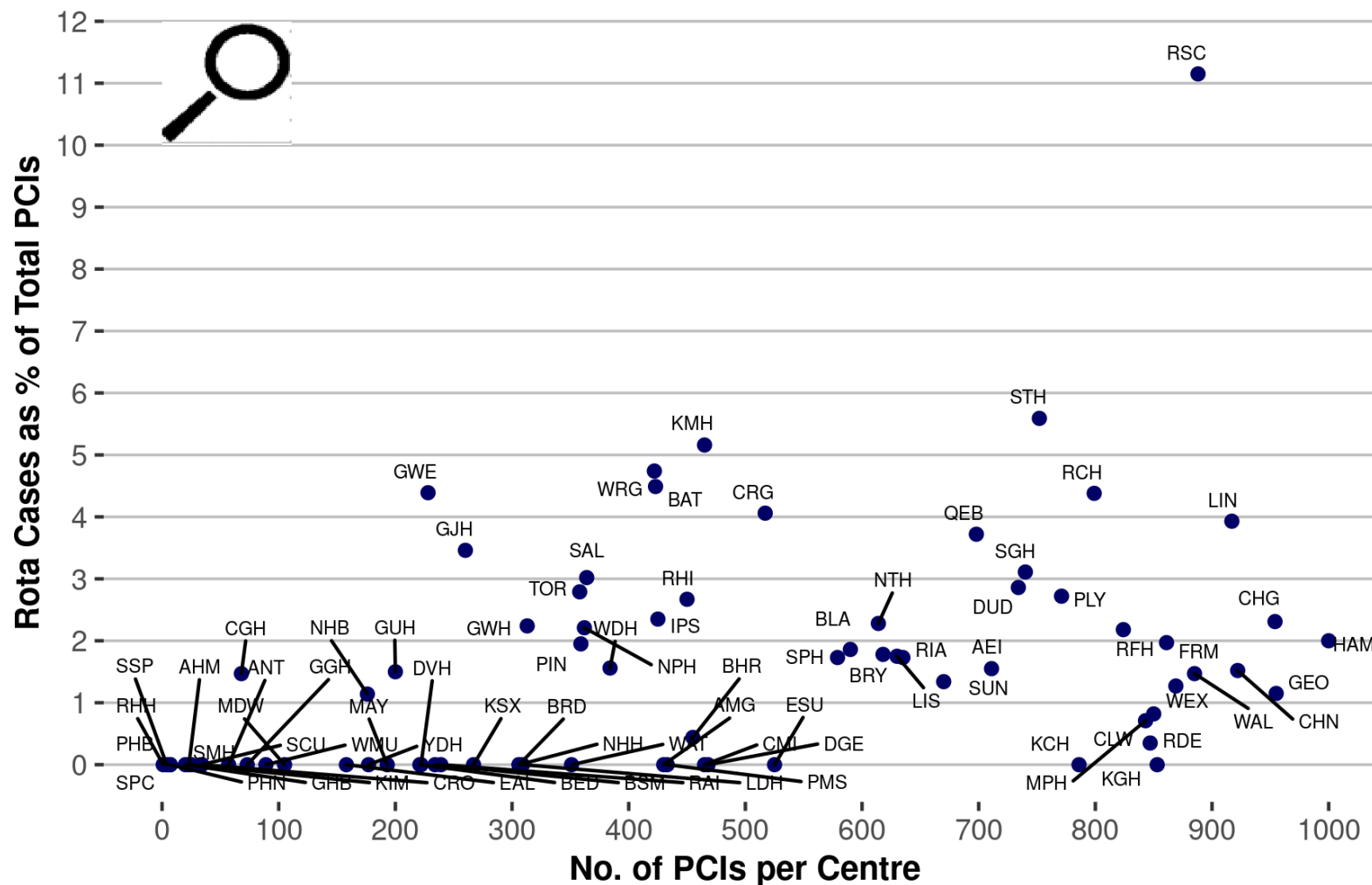
Additional Interventional Coronary Techniques



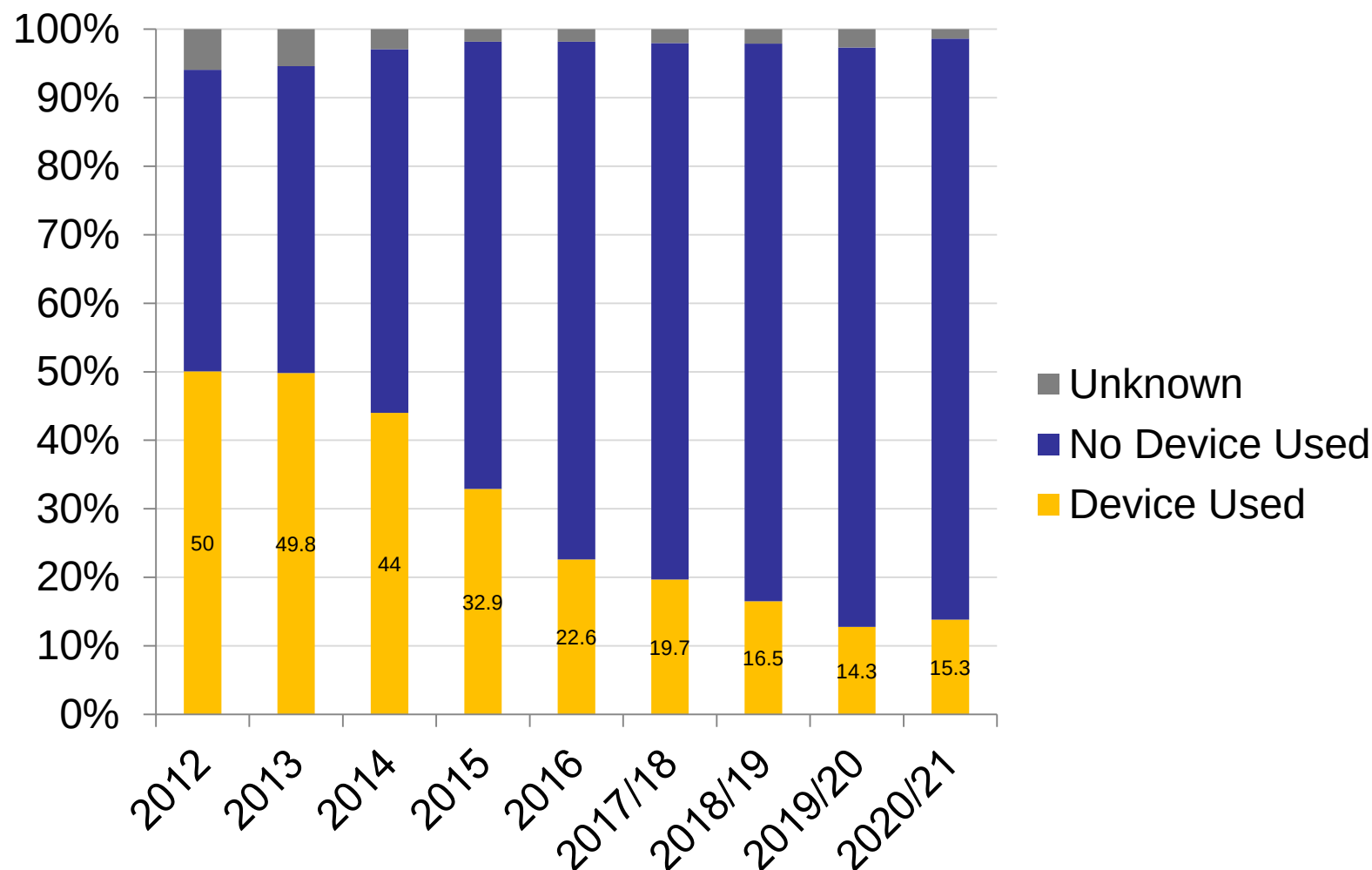
Rotational Atherectomy



Rotational Atherectomy

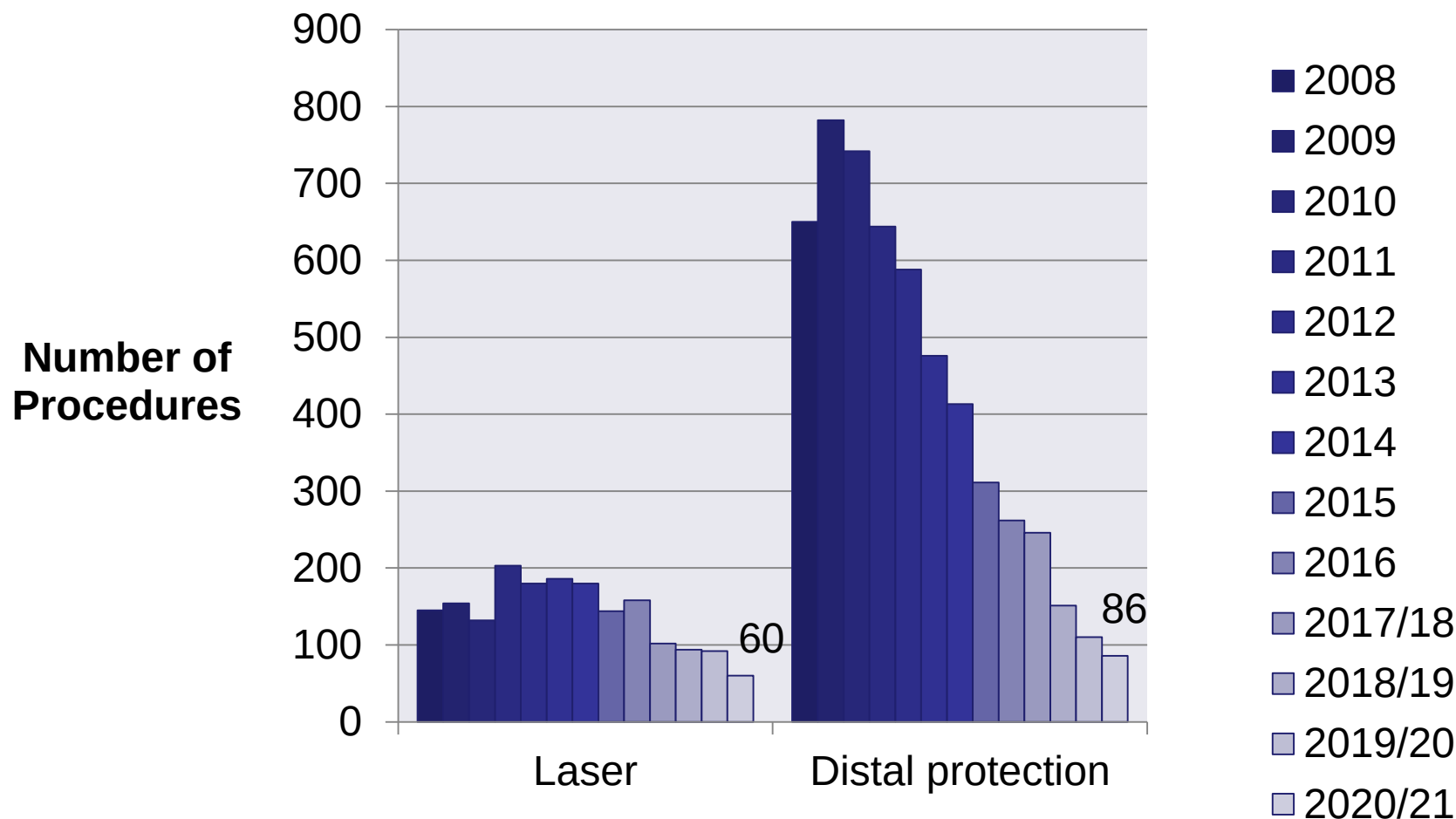


Primary PCI Extraction Atherectomy



[To Contents](#)

Additional Interventional Coronary Techniques

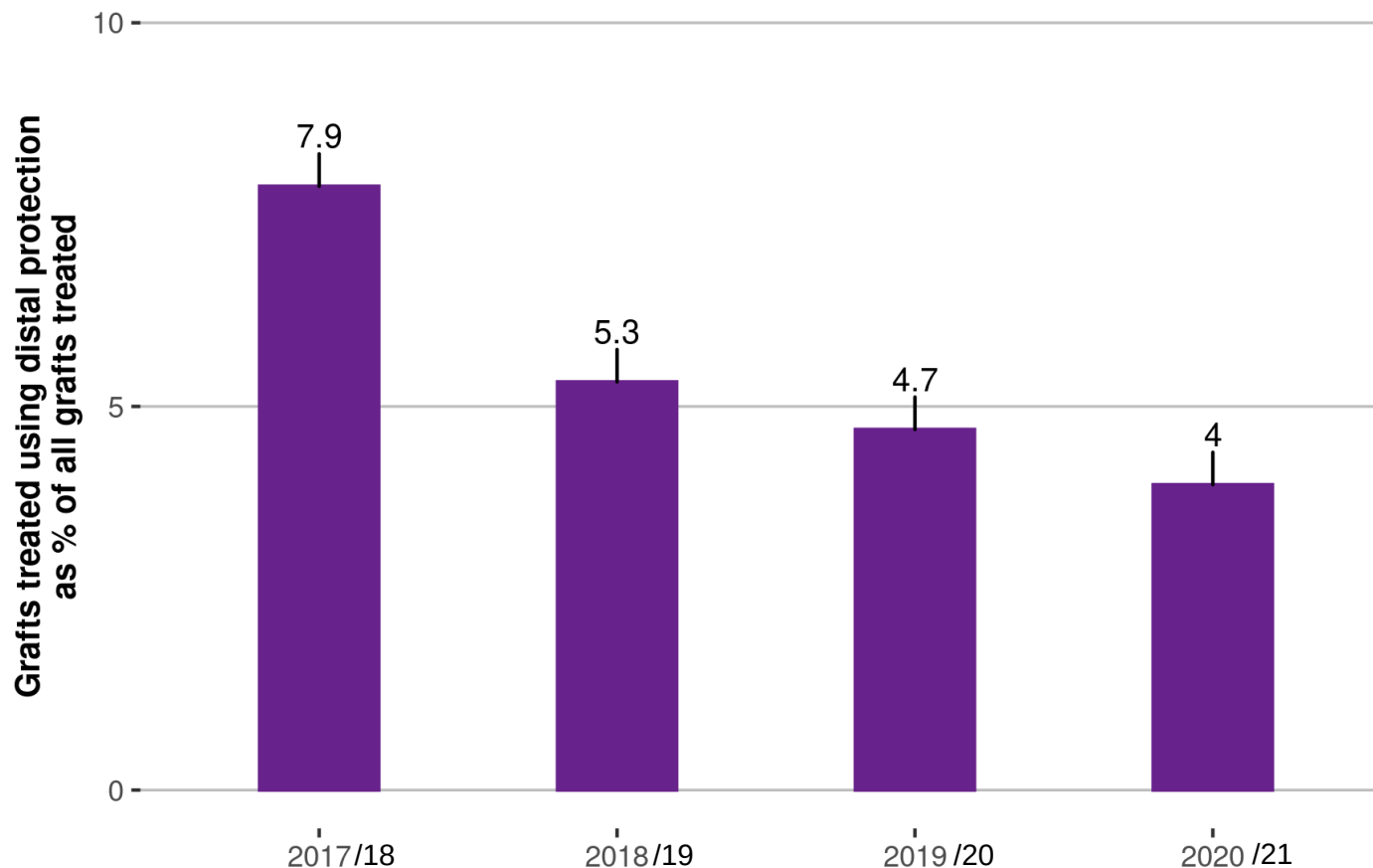


Notes:

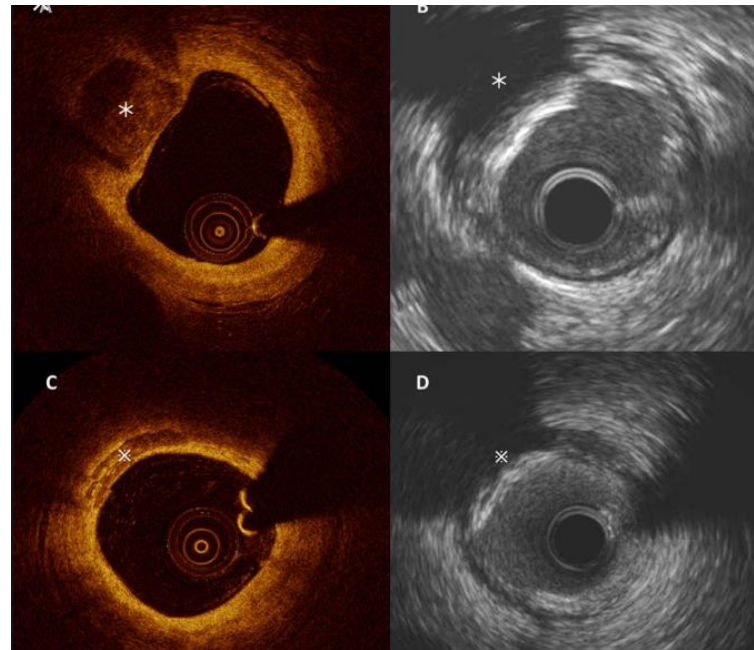
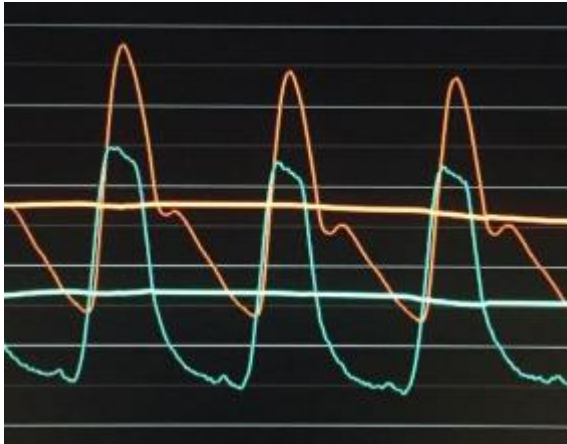
Laser wire and laser angioplasty summed to give 'laser'

Distal protection in Bypass Grafts

(all types - SVG and IMA etc)



Intravascular Physiology and Imaging



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.

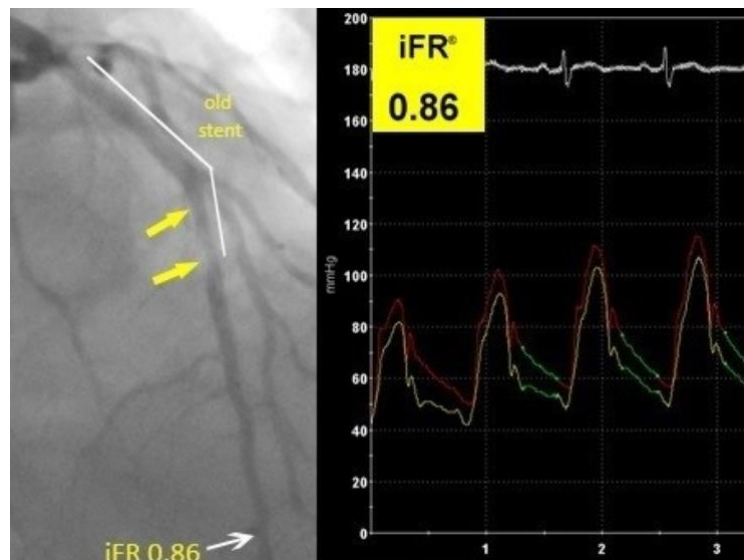
It is suggested that recording all 'Interventional Diagnostic Procedures' should start from Jan 2014

Interventional Diagnostic Procedure

Database entry

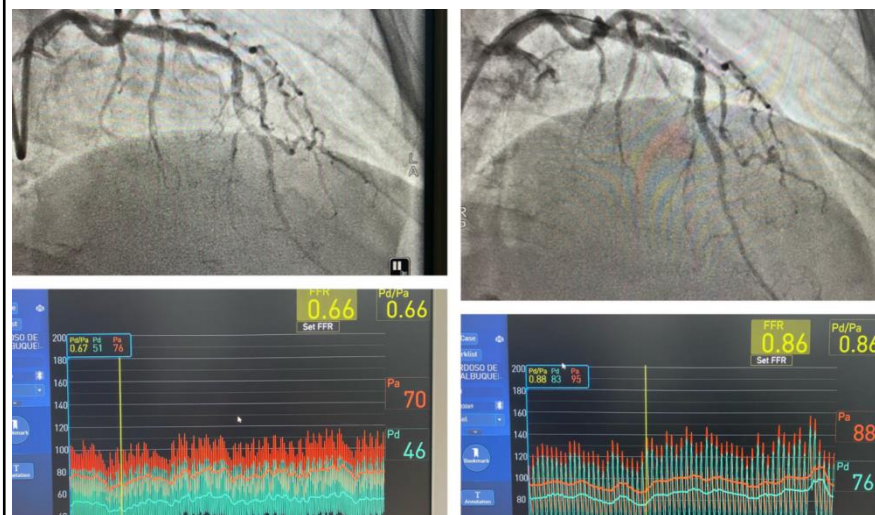
- Total number of lesions attempted (field 3.11) must = 0
 - And Total number of vessels attempted (field 3.10) must = 0
 - And 'Diagnostic device' (field 3.19) should include a device
 - And Vessels attempted (field 3.09) should be left empty
-
- Demographics and adverse in-hospital outcomes should be recorded in the same way as for a PCI procedure

Diagnostic Only v During PCI



Coronary anatomy assessed
But no PCI

Interventional Diagnostic Study
(IDP)

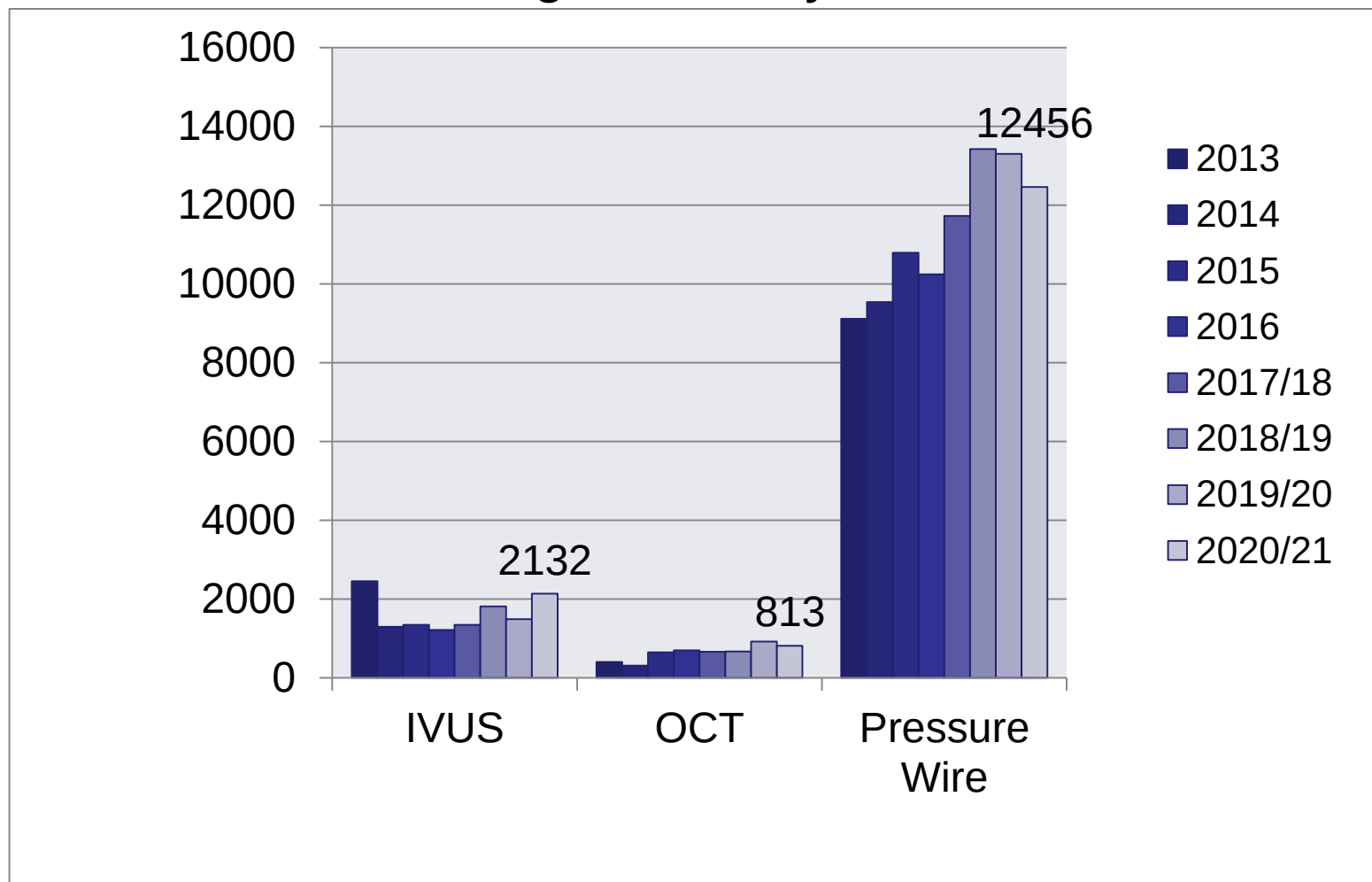


FFR and proceed to PCI

PCI with FFR/iFR

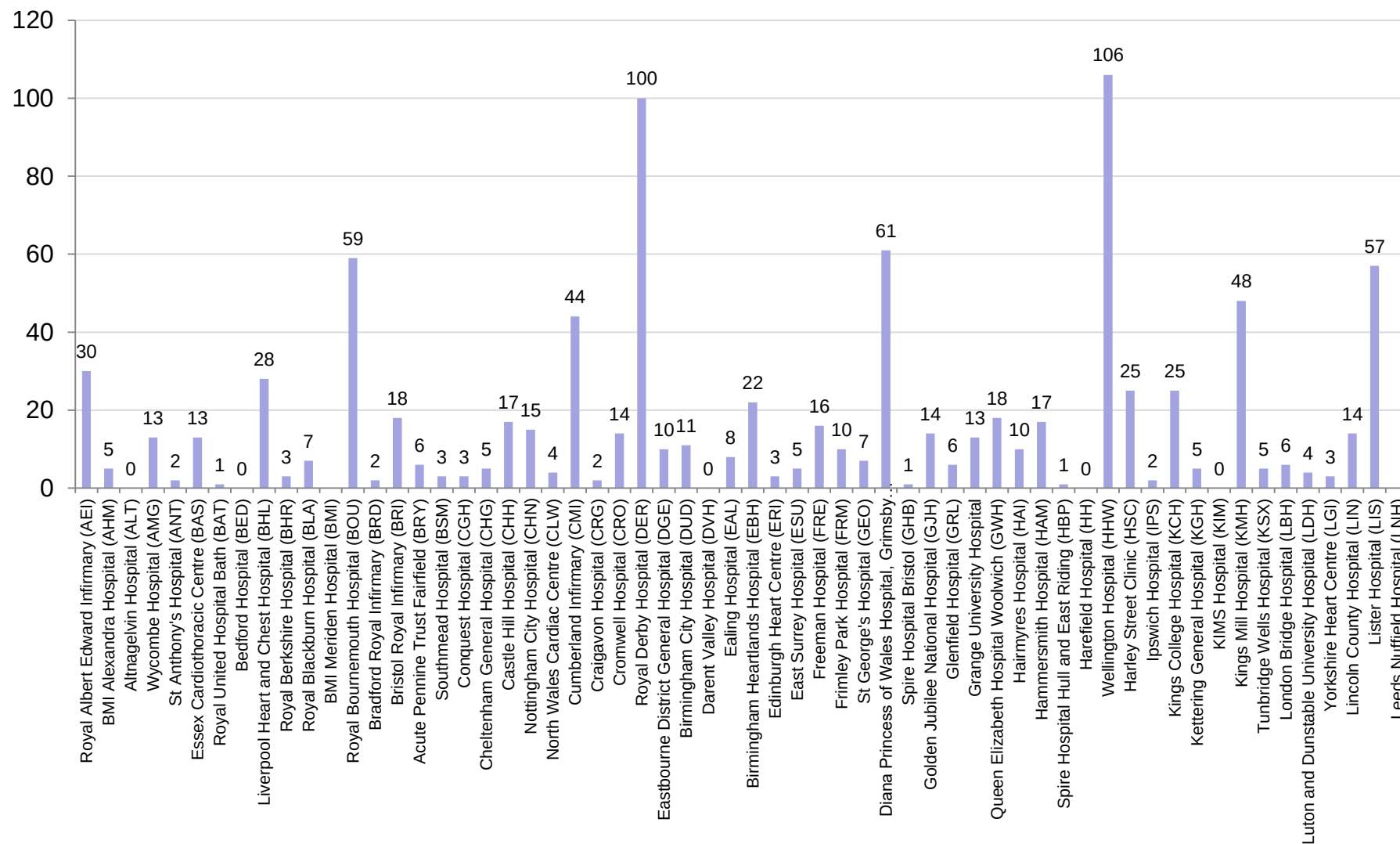
Additional Interventional Coronary Techniques

Diagnostic only



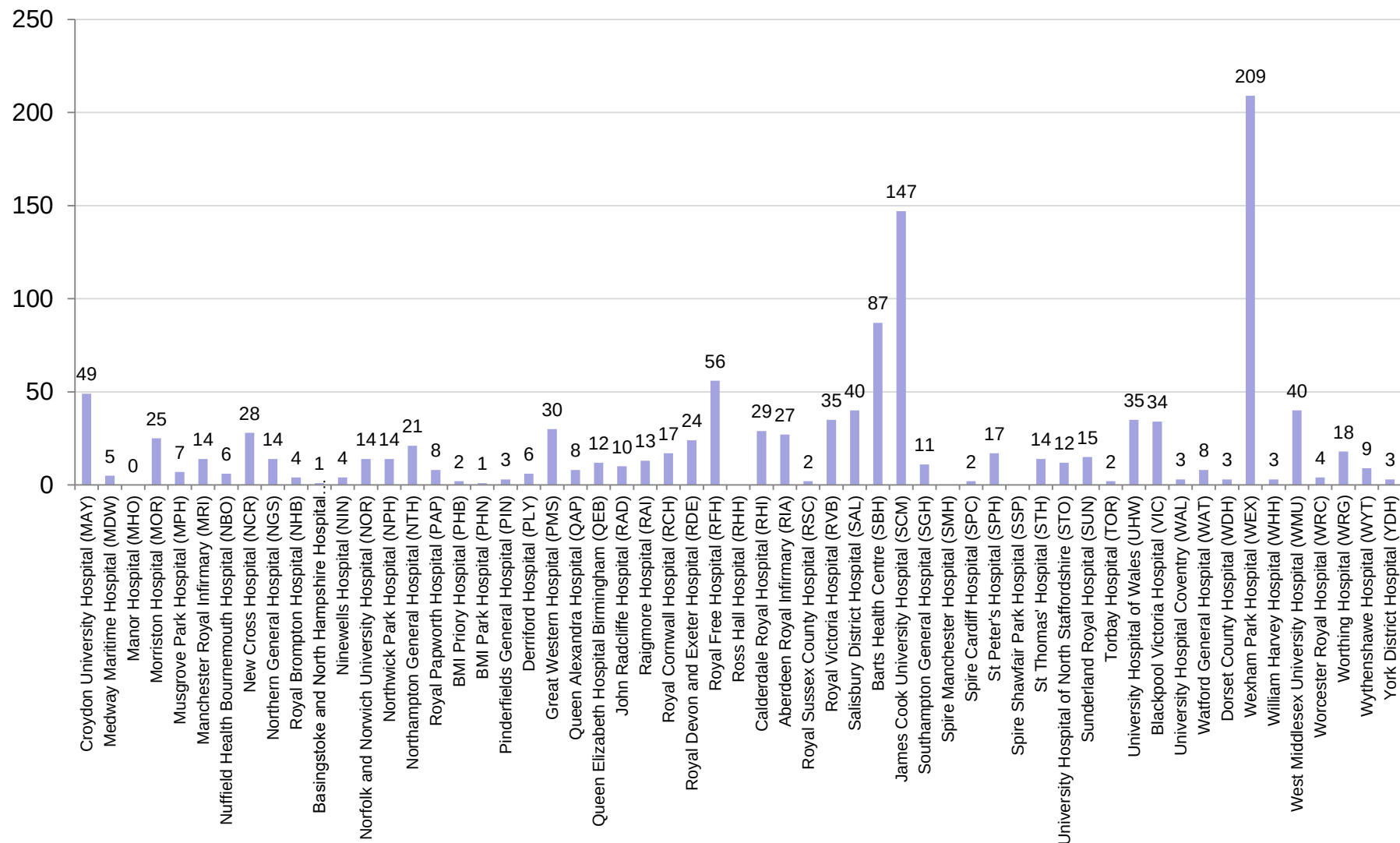
Intravascular Ultrasound

Diagnostic only studies (Centres codes A to L)



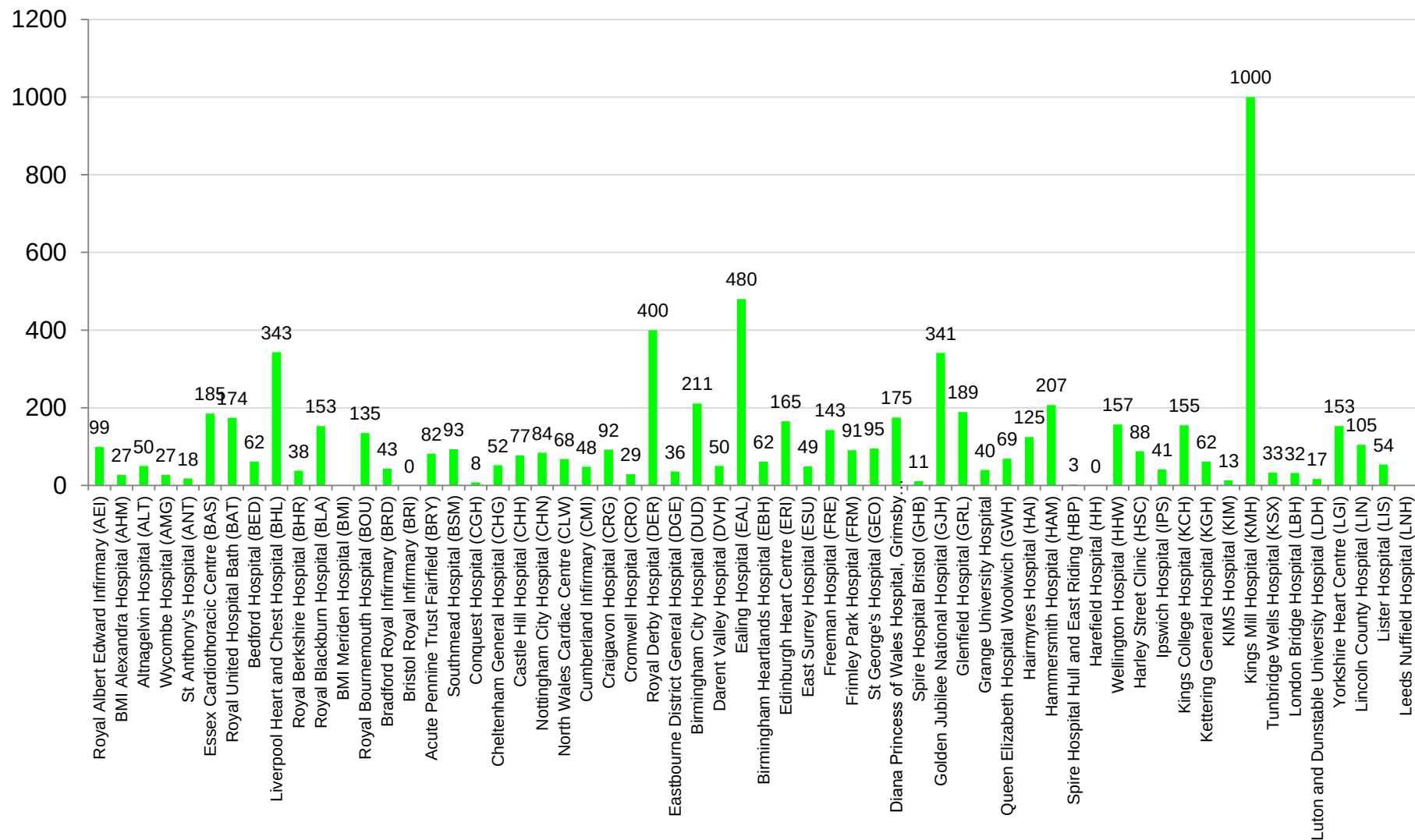
Intravascular Ultrasound

Diagnostic only studies (Centres codes M to Y)



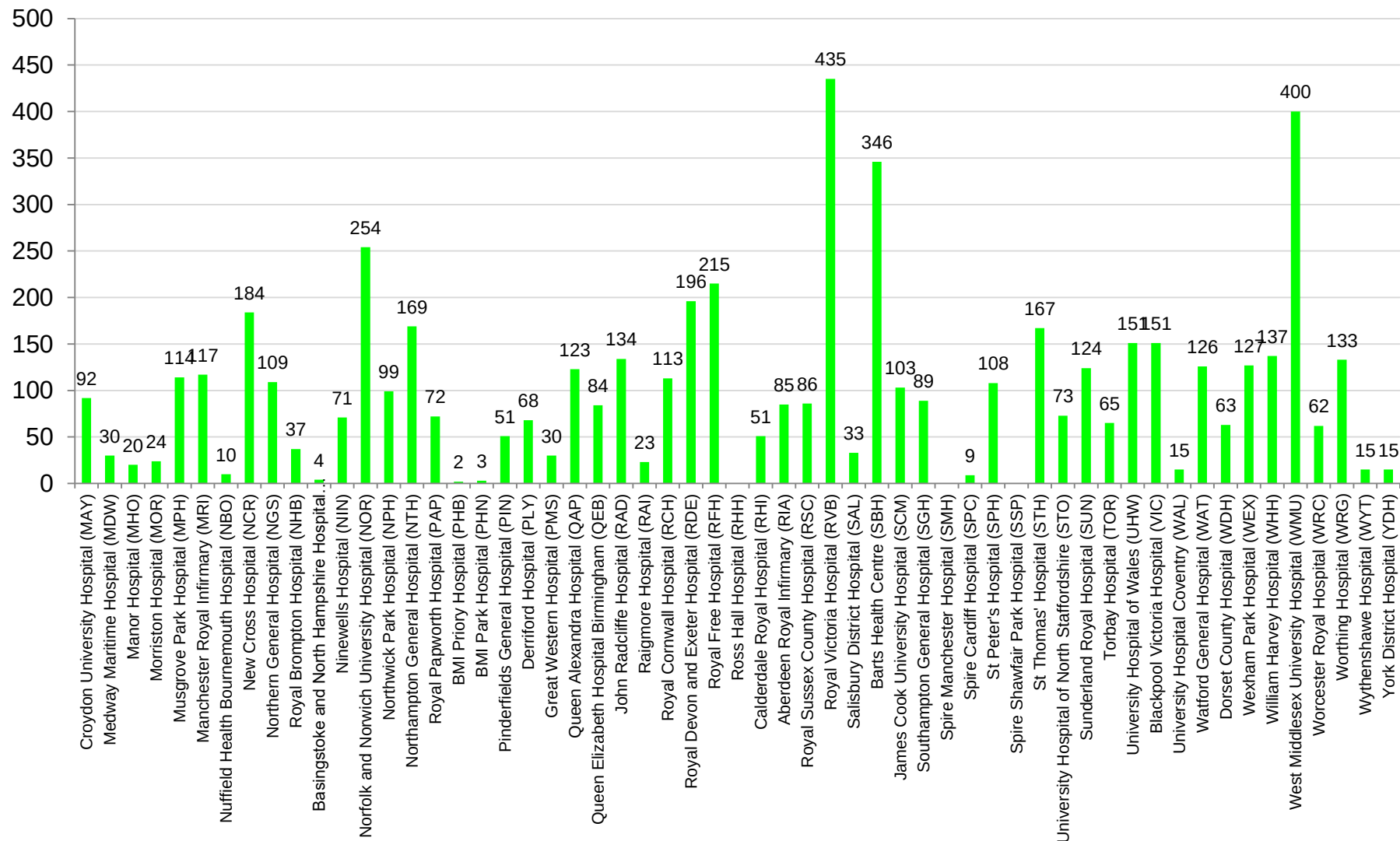
FFR, iFR, CFR, dPR, RFR etc

Diagnostic only studies (Centres codes A to L)



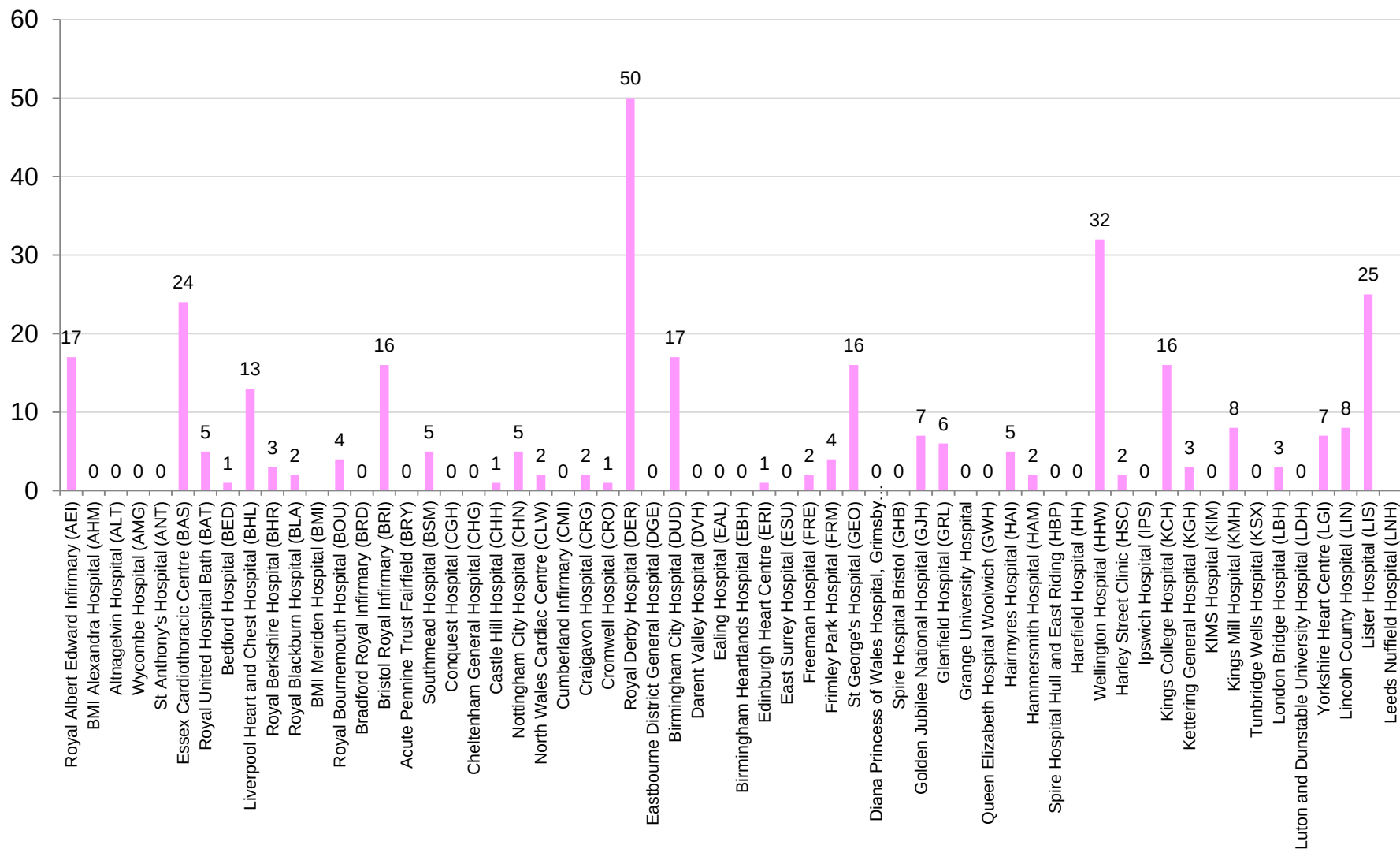
FFR, iFR, CFR, dPR, RFR etc

Diagnostic only studies (Centres codes M to Y)



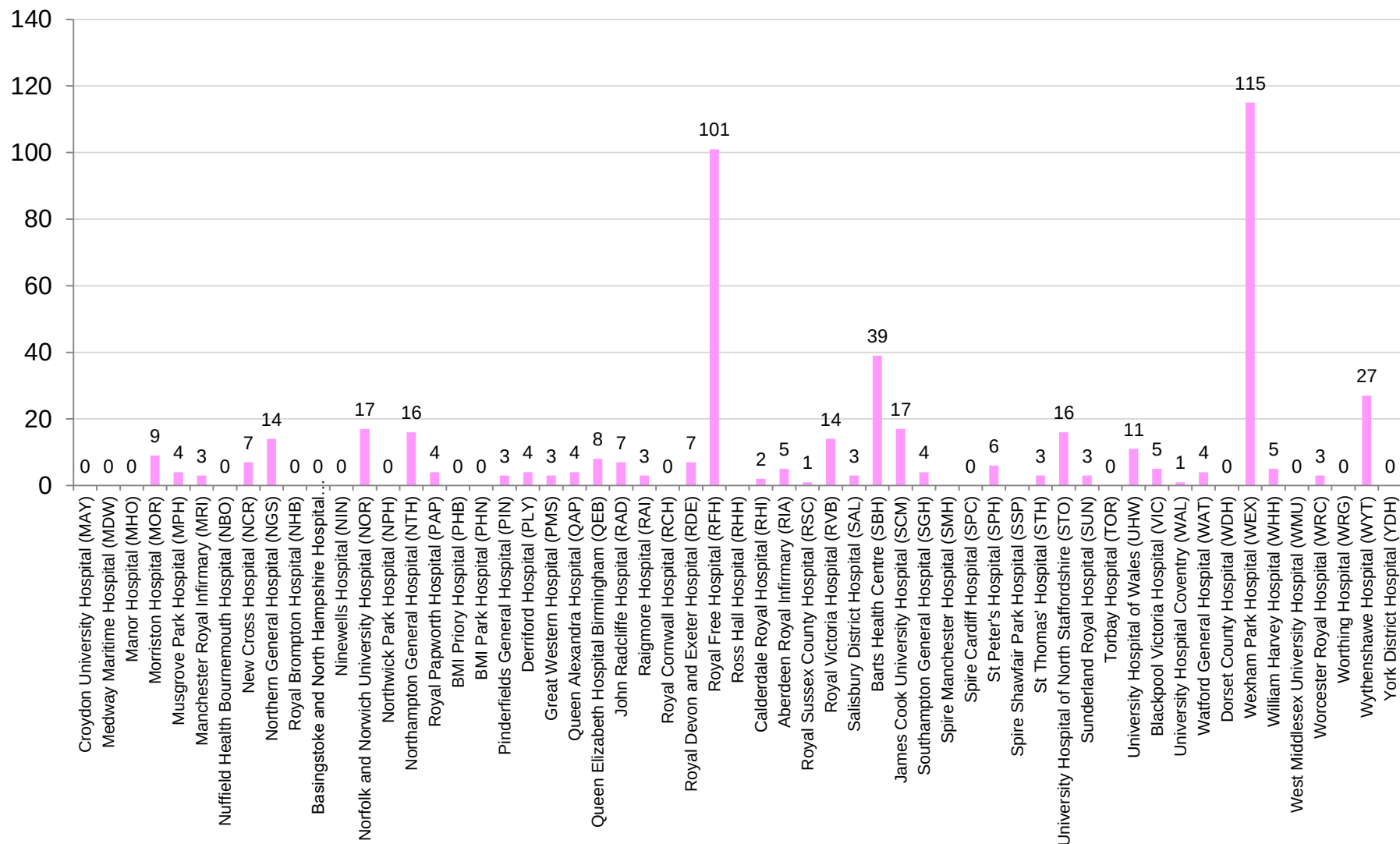
Swept Laser Imaging (OCT, OFDI)

Diagnostic only studies (Centres codes A to L)



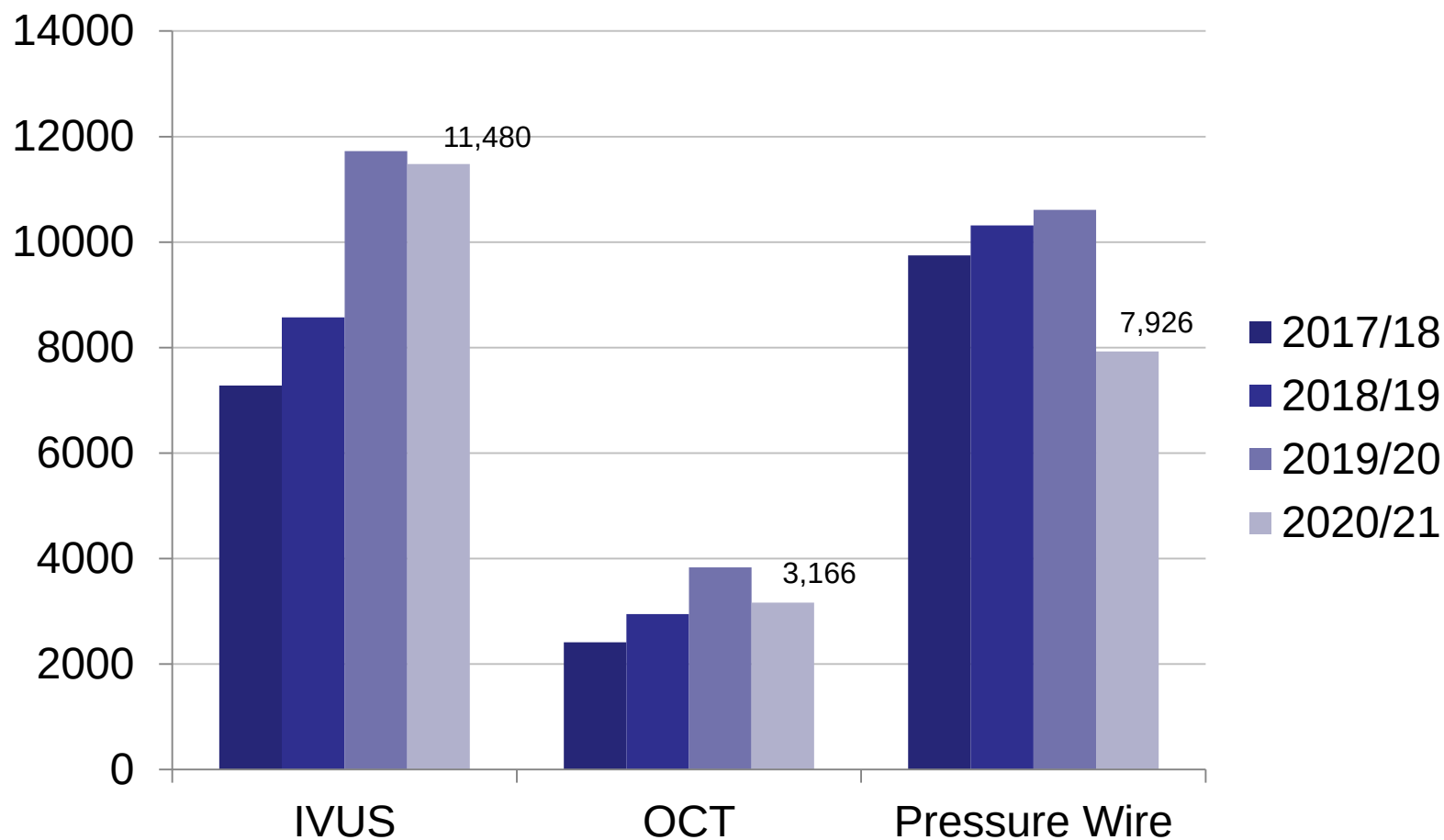
Swept Laser Imaging (OCT, OFDI)

Diagnostic only studies (Centres codes M to Y)



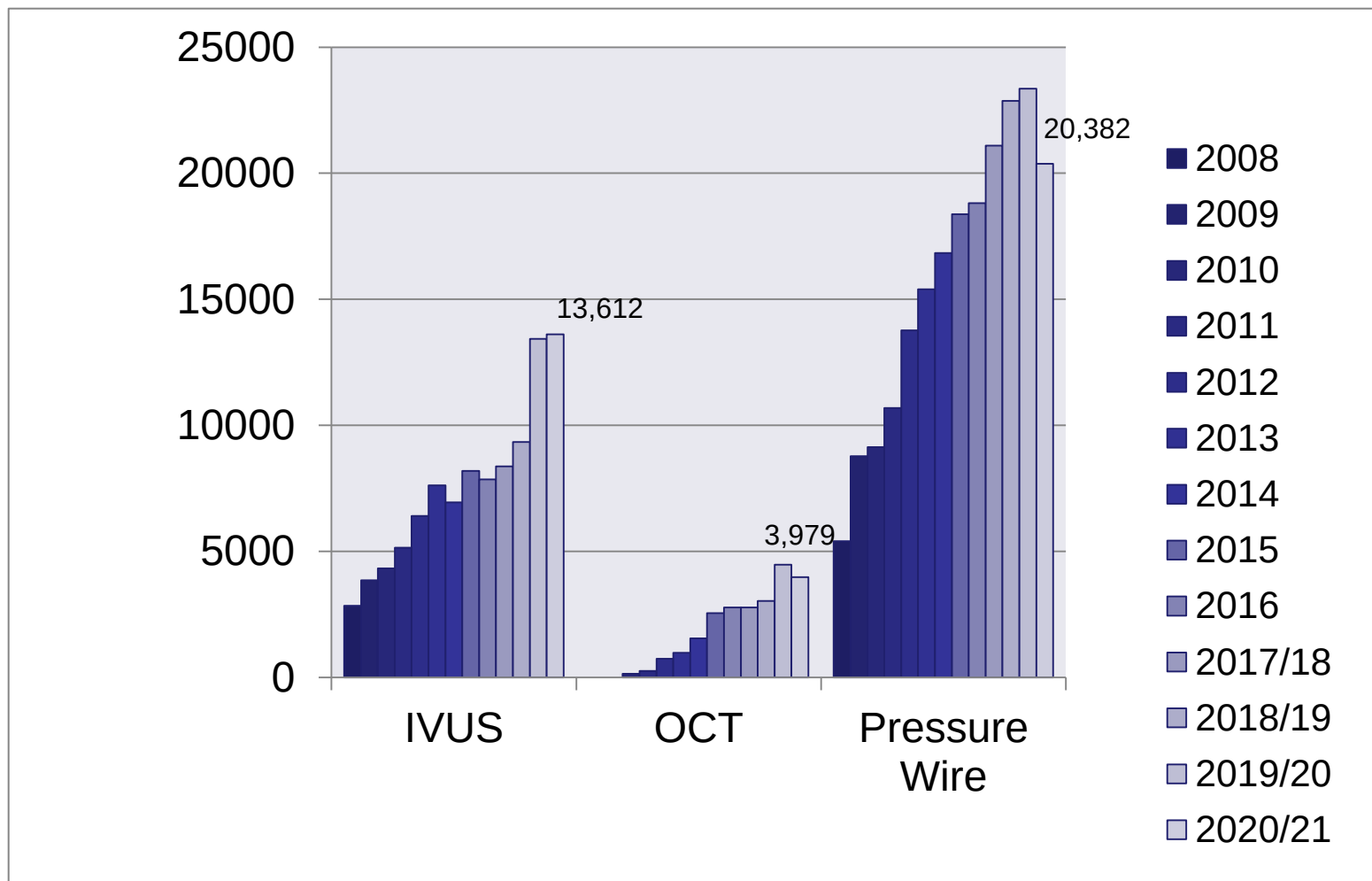
Additional Interventional Coronary Techniques

Used during a PCI procedure



Additional Interventional Coronary Techniques

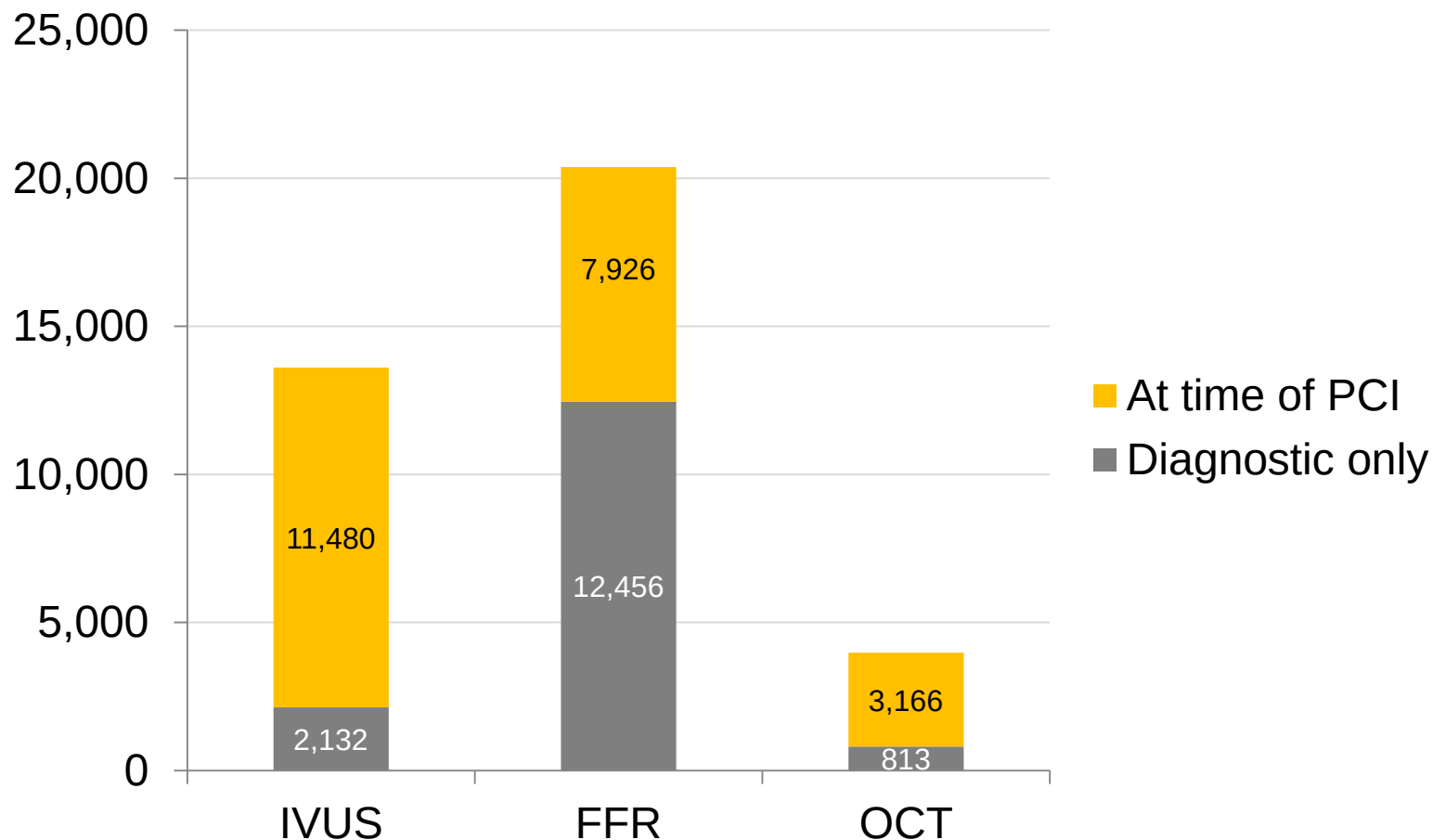
All cases: Diagnostic only + when part of a PCI procedure



Diagnostic only data from Survey Monkey, PCI data from NCAP

Additional Interventional Coronary Techniques

2020/21



Consensus on Intracoronary Imaging



ESC

European Society
of Cardiology

European Heart Journal (2018) 39, 3281–3300
doi:10.1093/eurheartj/ehy285

FASTTRACK CLINICAL RESEARCH

Coronary artery disease

Clinical use of intracoronary imaging. Part 1: guidance and optimization of coronary interventions. An expert consensus document of the European Association of Percutaneous Cardiovascular Interventions

Endorsed by the Chinese Society of Cardiology

Lorenz Räber¹, Gary S. Mintz², Konstantinos C. Koskinas¹, Thomas W. Johnson³,
Niels R. Holm⁴, Yoshinubo Onuma⁵, Maria D. Radu⁶, Michael Joner^{7,8}, Bo Yu⁹,
Haibo Jia⁹, Nicolas Meneveau^{10,11}, Jose M. de la Torre Hernandez¹², Javier
Escaned¹³, Jonathan Hill¹⁴, Francesco Prati¹⁵, Antonio Colombo¹⁶, Carlo di Mario¹⁷,
Evelyn Regar¹⁸, Davide Capodanno¹⁹, William Wijns²⁰, Robert A. Byrne²¹, and
Giulio Guagliumi^{22*}

Downloaded from <https://academic.oup.com/eurheartj/>



ESC

European Society
of Cardiology

European Heart Journal (2019) 40, 2566–2584
doi:10.1093/eurheartj/ehz332

FASTTRACK CLINICAL RESEARCH

Interventional cardiology

Clinical use of intracoronary imaging. Part 2: acute coronary syndromes, ambiguous coronary angiography findings, and guiding interventional decision-making: an expert consensus document of the European Association of Percutaneous Cardiovascular Interventions

Endorsed by the Chinese Society of Cardiology, the Hong Kong Society
of Transcatheter Endocardiovascular Therapeutics (HKSTENT) and the
Cardiac Society of Australia and New Zealand

Thomas W. Johnson¹, Lorenz Räber², Carlo di Mario³, Christos Bourantas⁴,
Haibo Jia⁵, Alessio Mattesini⁴, Nieves Gonzalo⁶, Jose M. de la Torre Hernandez⁷,
Francesco Prati⁸, Konstantinos Koskinas², Michael Joner⁹, Maria D. Radu¹⁰,
David Erlinge¹¹, Evelyn Regar¹², Vijay Kunadian¹³, Akiko Maehara¹⁴,
Robert A. Byrne⁹, Davide Capodanno¹⁵, Takashi Akasaka¹⁶, William Wijns¹⁷,
Gary S. Mintz¹⁴, and Giulio Guagliumi^{18*}

Downloaded from <https://academic.oup.com/eurheartj/article/40/3/2566/5461736>

Table 2 Recommendations on the adjunctive use of intravascular imaging for diagnostic evaluation of coronary artery disease, guidance and optimization of PCIs

- **Diagnostic assessment of coronary lesions**

Consensus opinion

Angiographically unclear/ambiguous findings (e.g. dissection, thrombus, calcified nodule)

Assessment of left main stenosis

Complex bifurcation lesions

Suspected culprit lesion of ACS

- **PCI guidance and optimization**

RCT evidence

Long lesions

Chronic total occlusions

Consensus opinion

Patients with acute coronary syndromes

Left main coronary artery lesions

Two stents bifurcation

Implantation of bioresorbable scaffolds

Patients with renal dysfunction (IVUS)

- **Identification of mechanism of stent failure**

Restenosis

Stent thrombosis

2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization

A Report of the American College of Cardiology/American Heart Association
Joint Committee on Clinical Practice Guidelines

10.3. Use of Intravascular Imaging

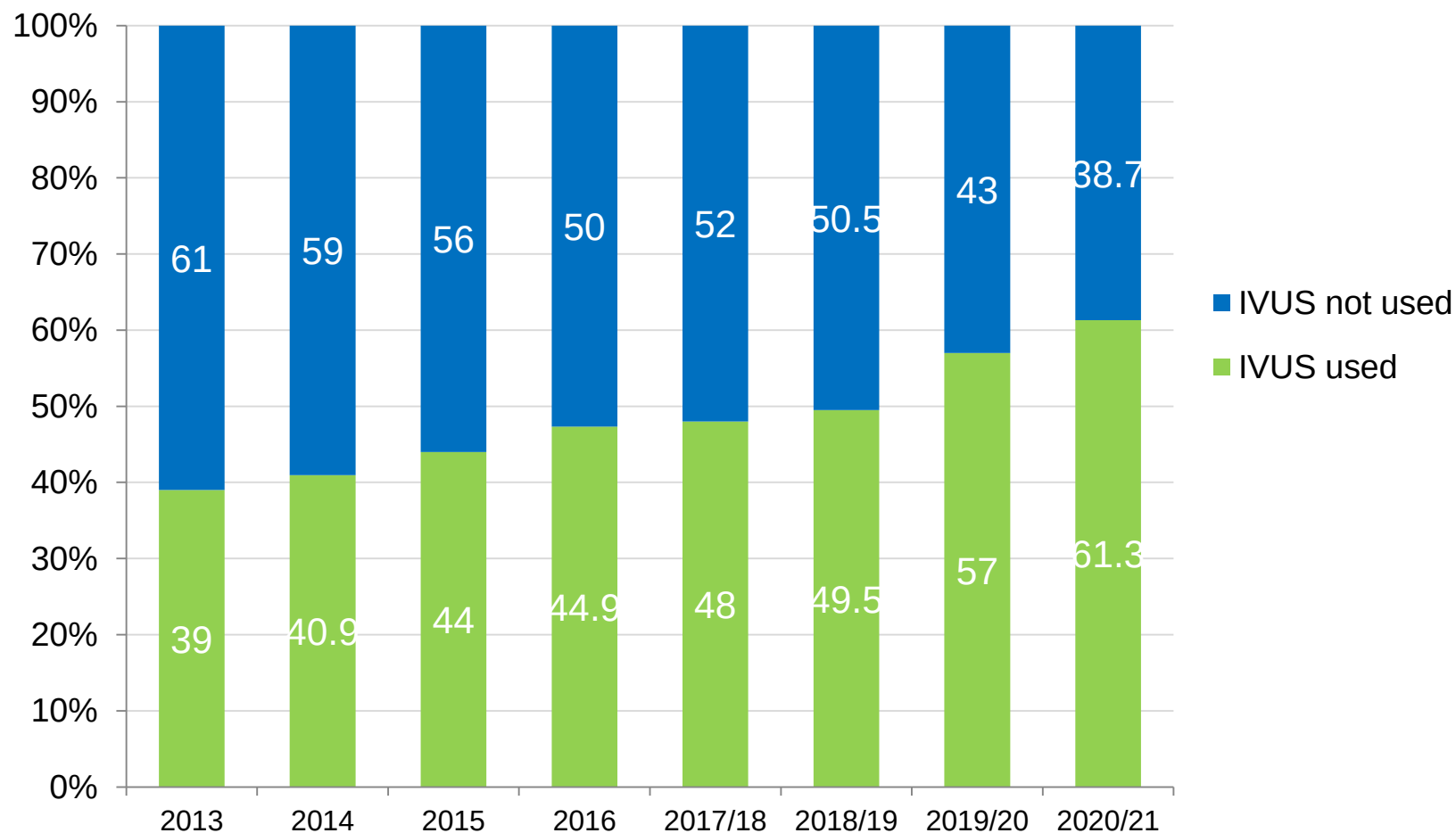
Recommendations for Use of Intravascular Imaging

Referenced studies that support the recommendations are summarized in [Online Data Supplement 25](#).

COR	LOE	RECOMMENDATIONS
2a	B-R	1. In patients undergoing coronary stent implantation, IVUS can be useful for procedural guidance, particularly in cases of left main or complex coronary artery stenting, to reduce ischemic events (1-10).
2a	B-R	2. In patients undergoing coronary stent implantation, OCT is a reasonable alternative to IVUS for procedural guidance, except in ostial left main disease (11-13).
2a	C-LD	3. In patients with stent failure, IVUS or OCT is reasonable to determine the mechanism of stent failure (14-17).

IVUS

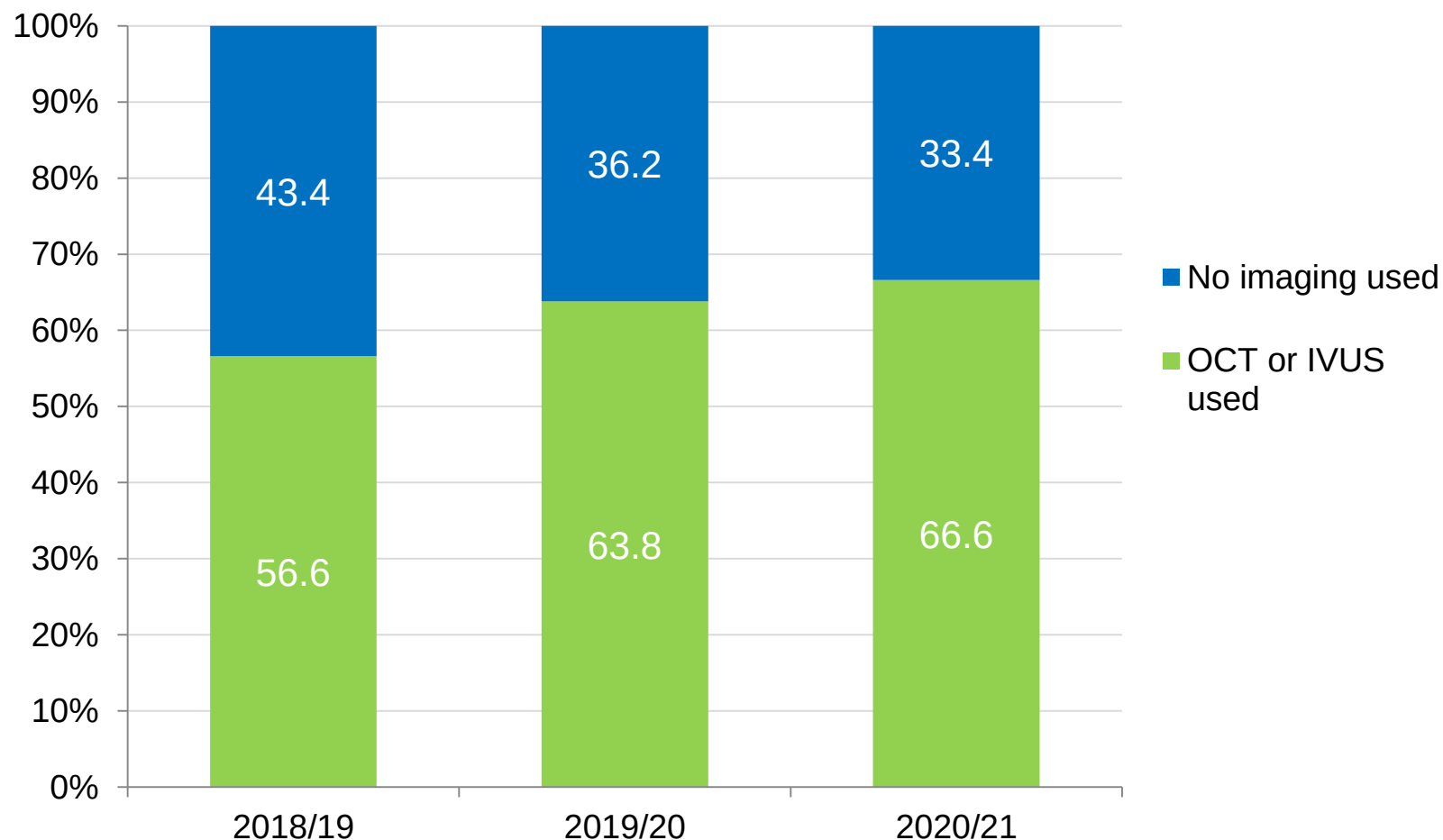
PCI to Unprotected LMS



Note:
Does not include OCT

OCT or IVUS

PCI to Unprotected LMS



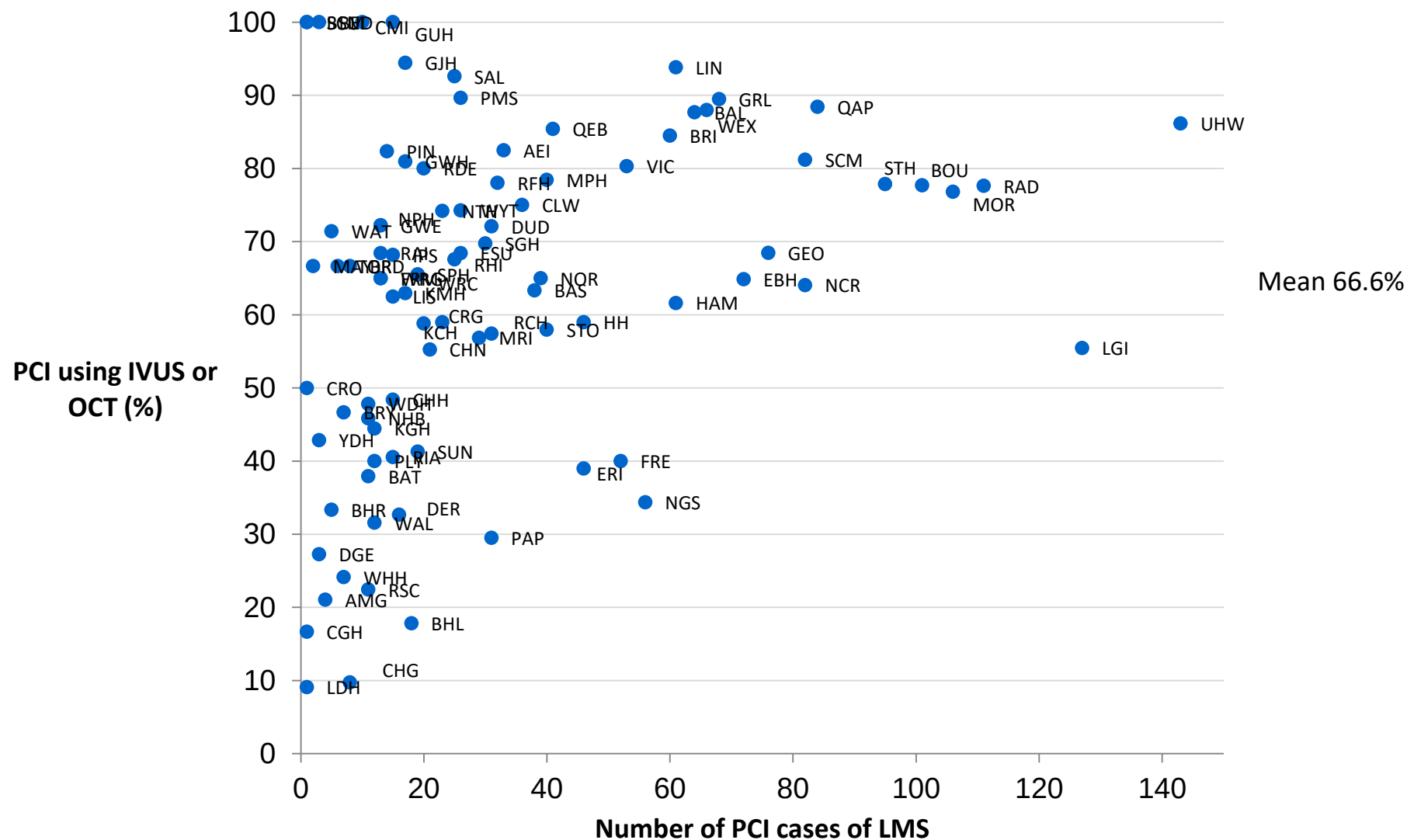
NCAP data

PCI to Unprotected LMS



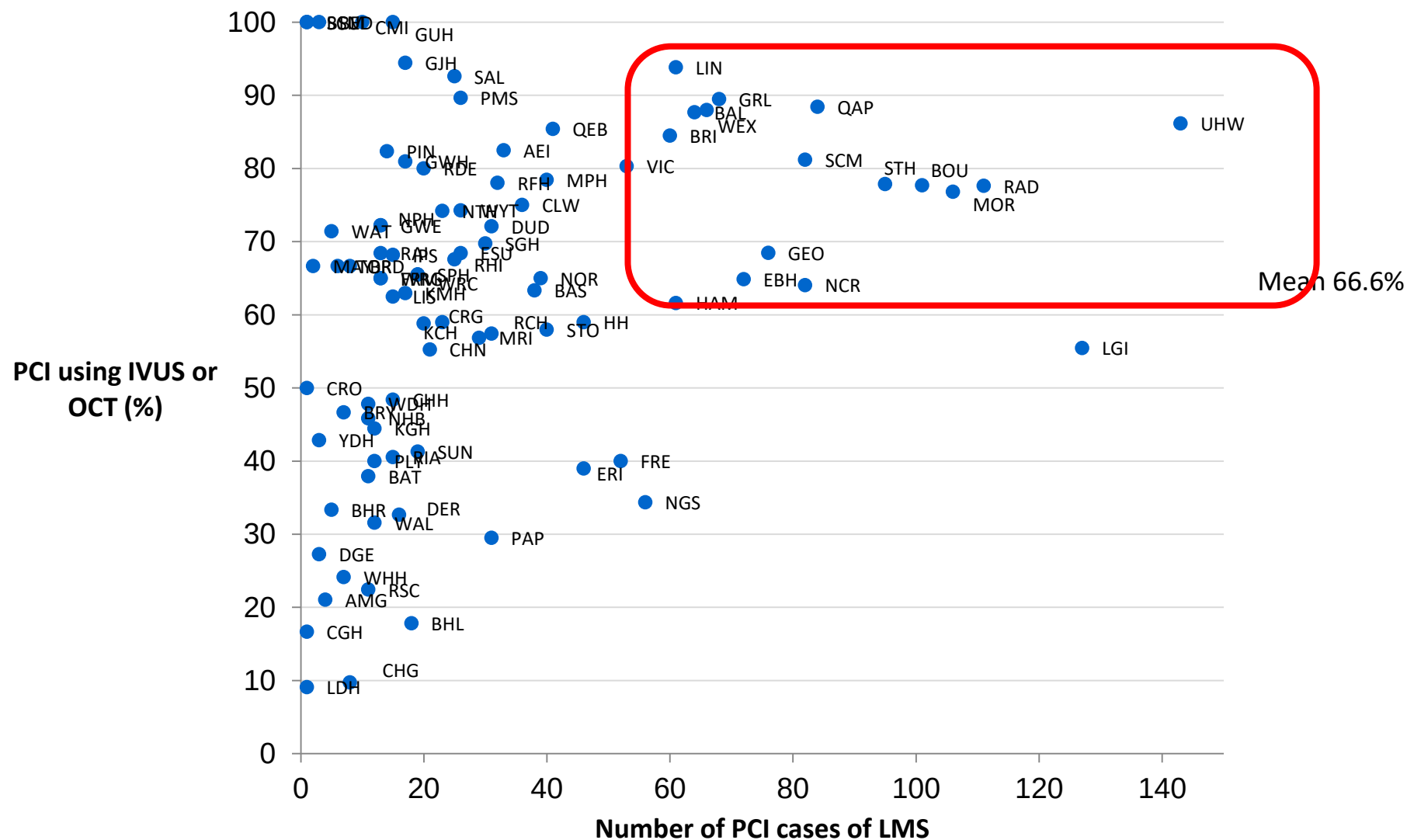
OCT or IVUS

PCI to Unprotected LMS

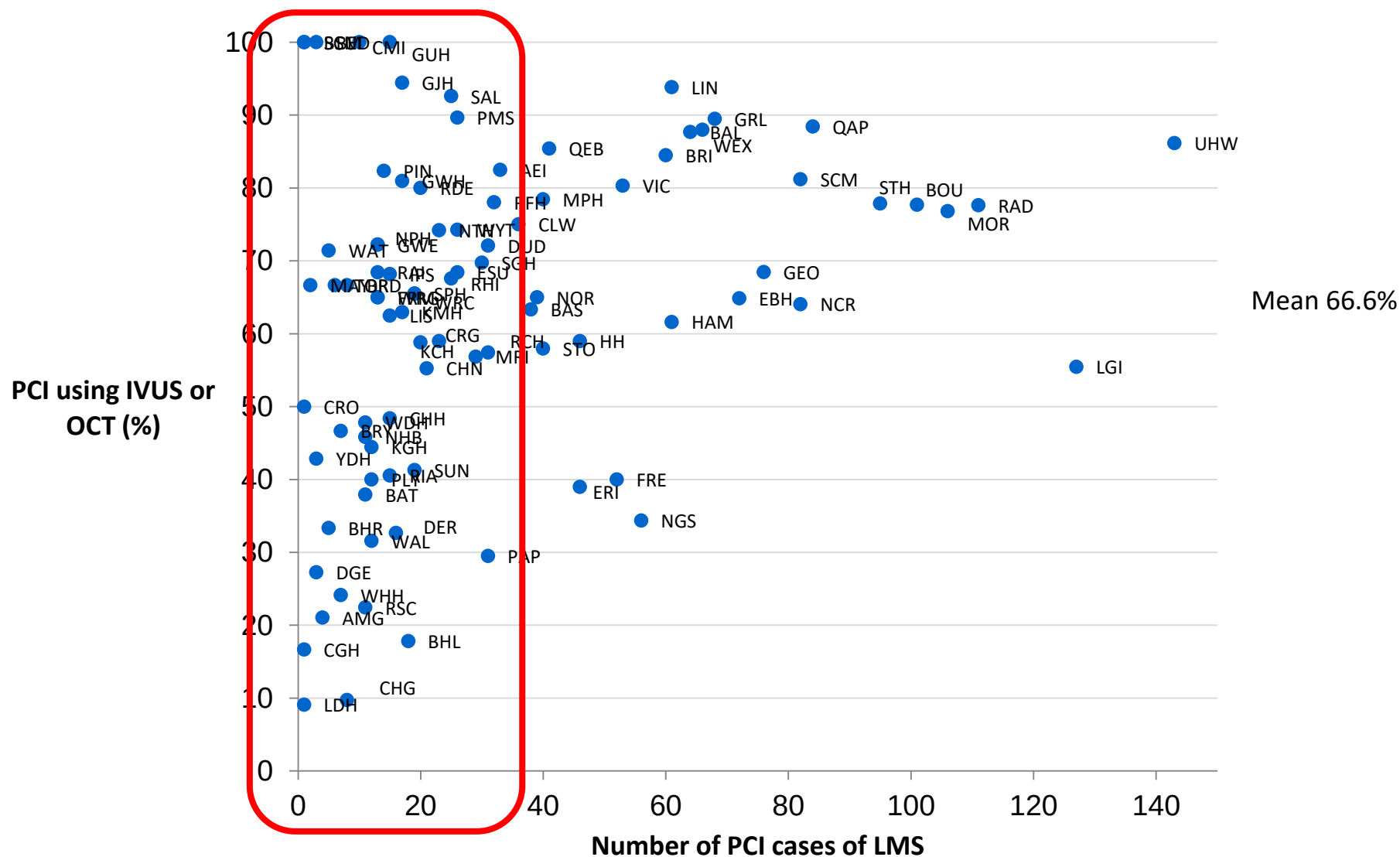


OCT or IVUS

PCI to Unprotected LMS

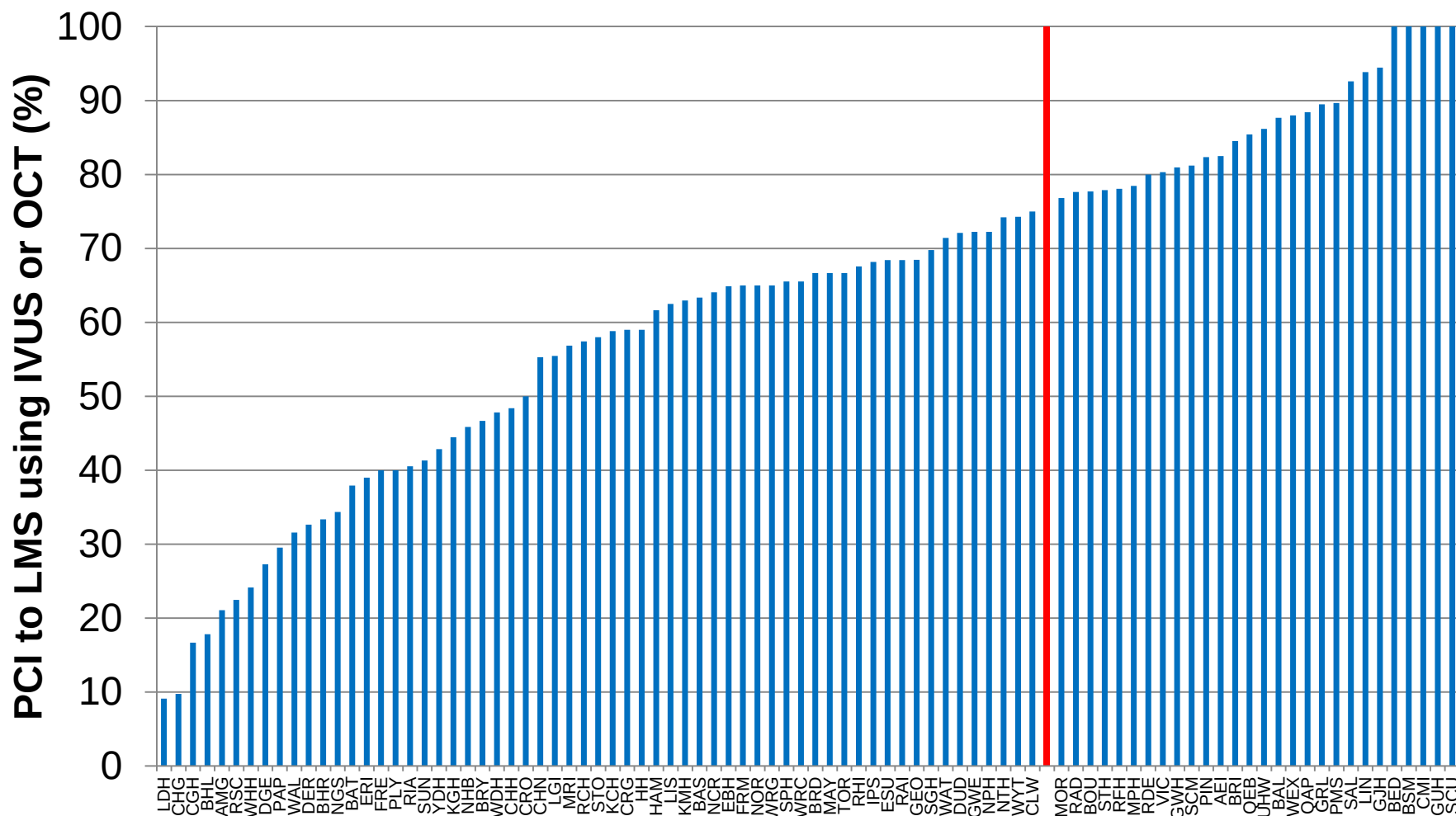


PCI to Unprotected LMS



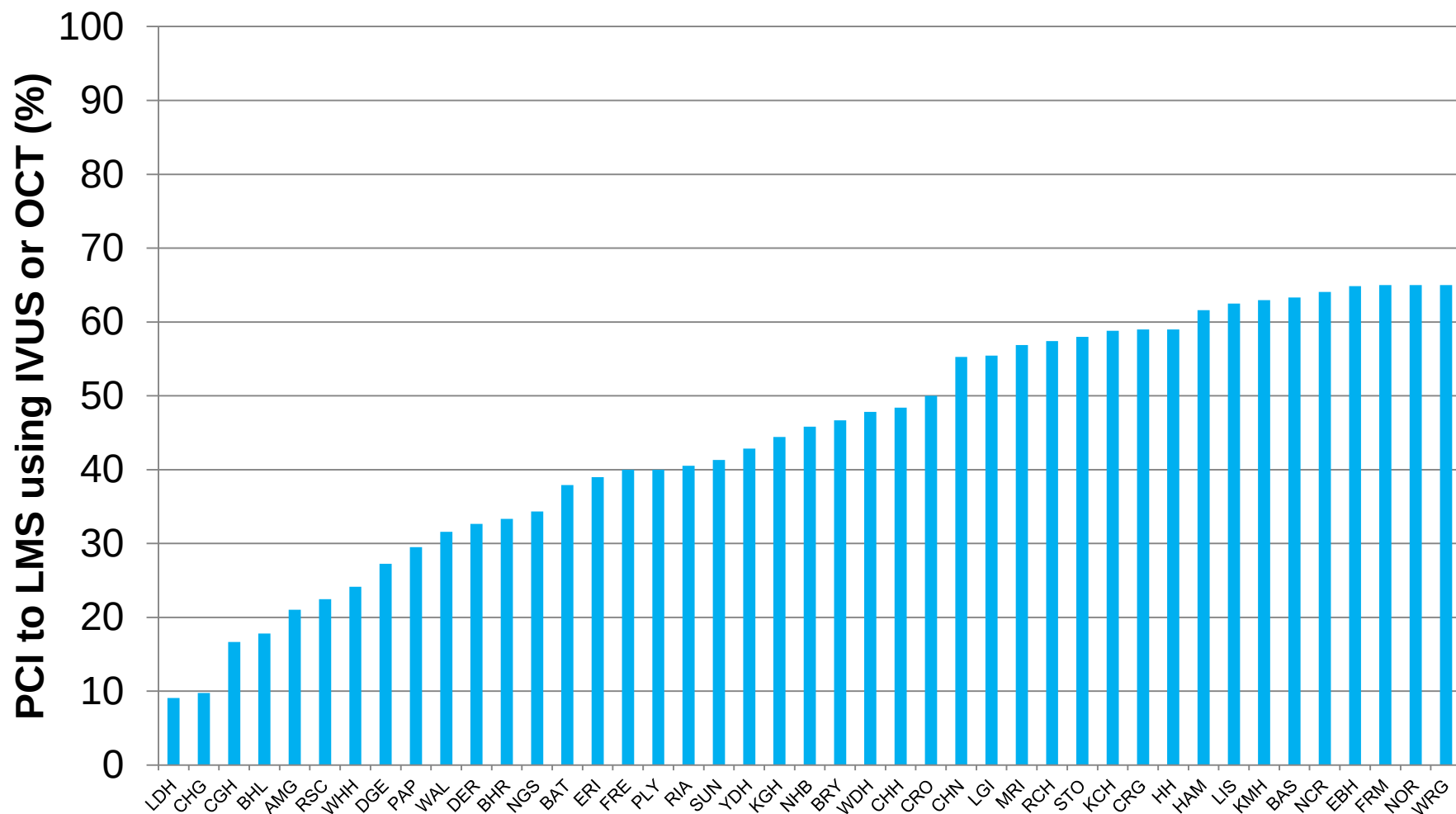
OCT or IVUS

PCI to Unprotected LMS (all Centres)



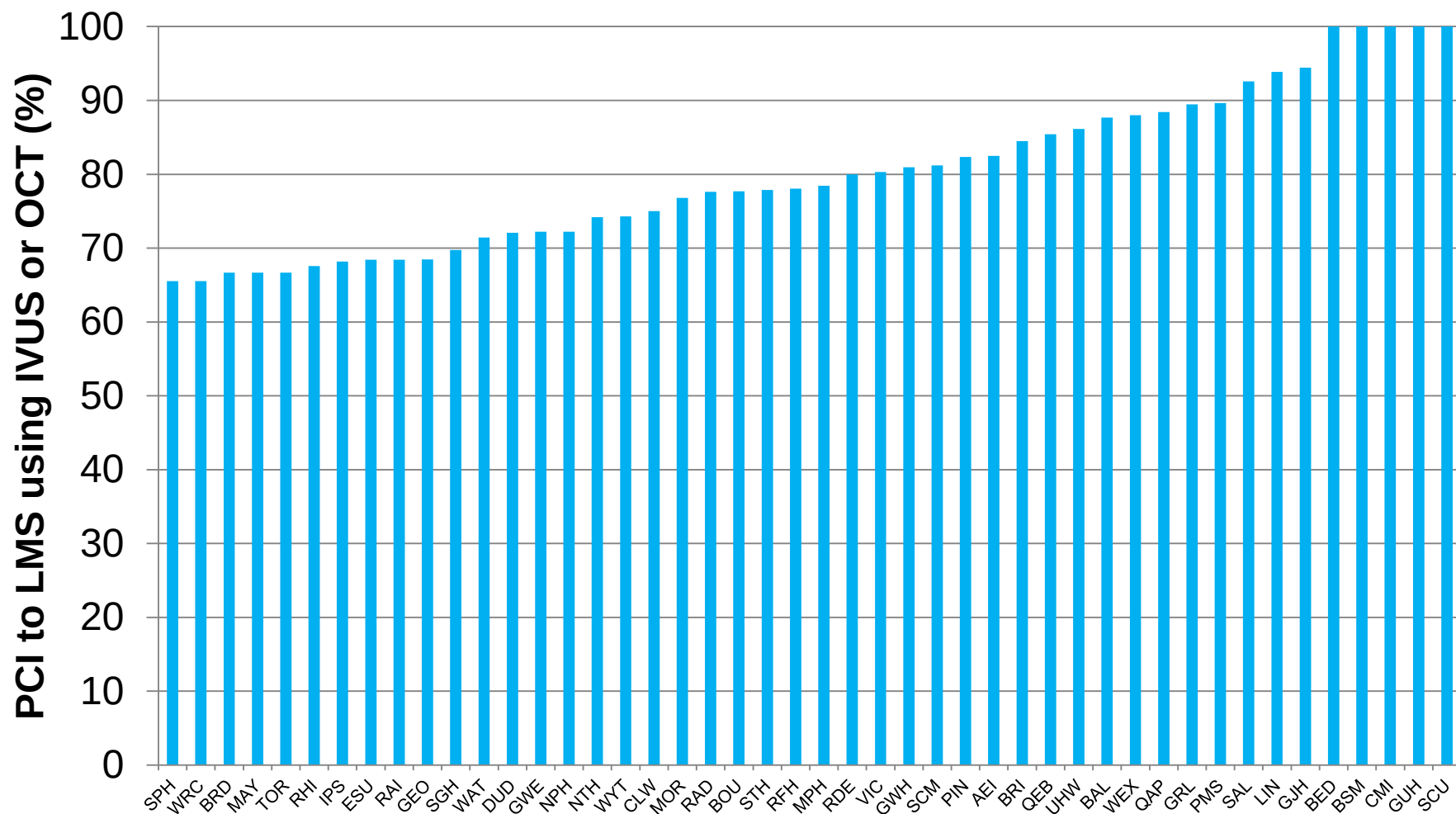
OCT or IVUS

PCI to Unprotected LMS (0 to 65%)



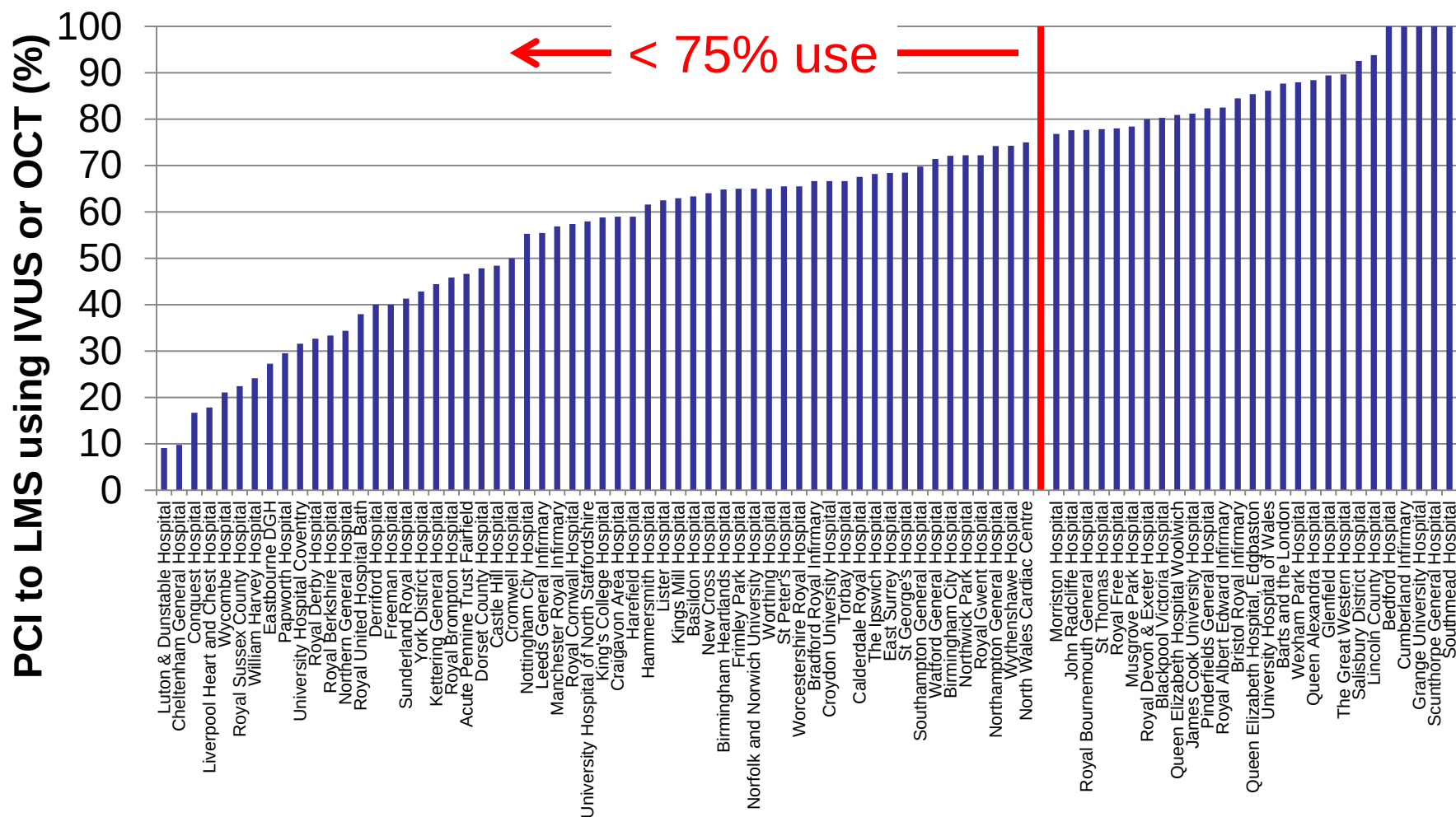
OCT or IVUS

PCI to Unprotected LMS (>65%)



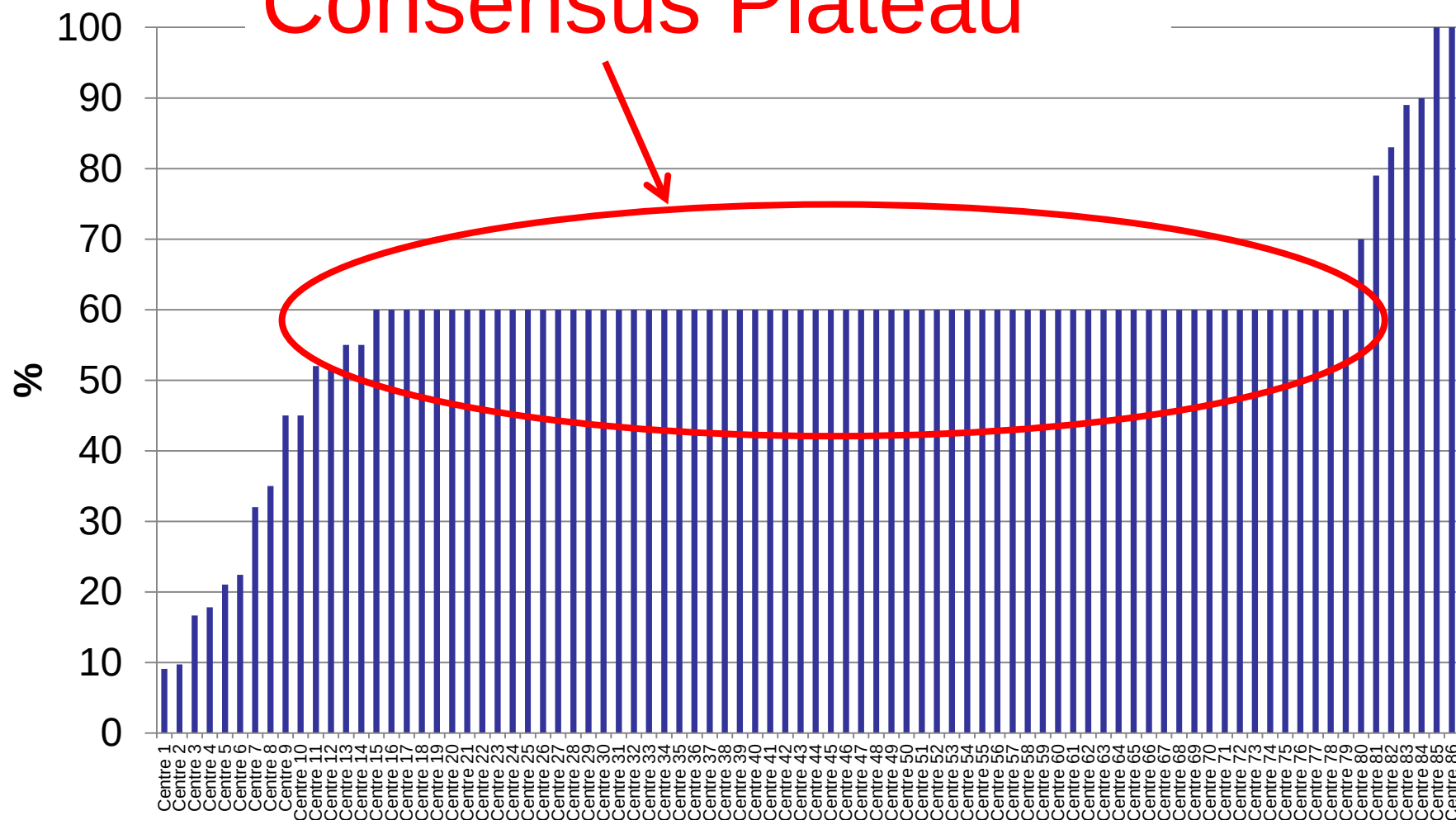
OCT or IVUS

PCI to Unprotected LMS (all Centres)

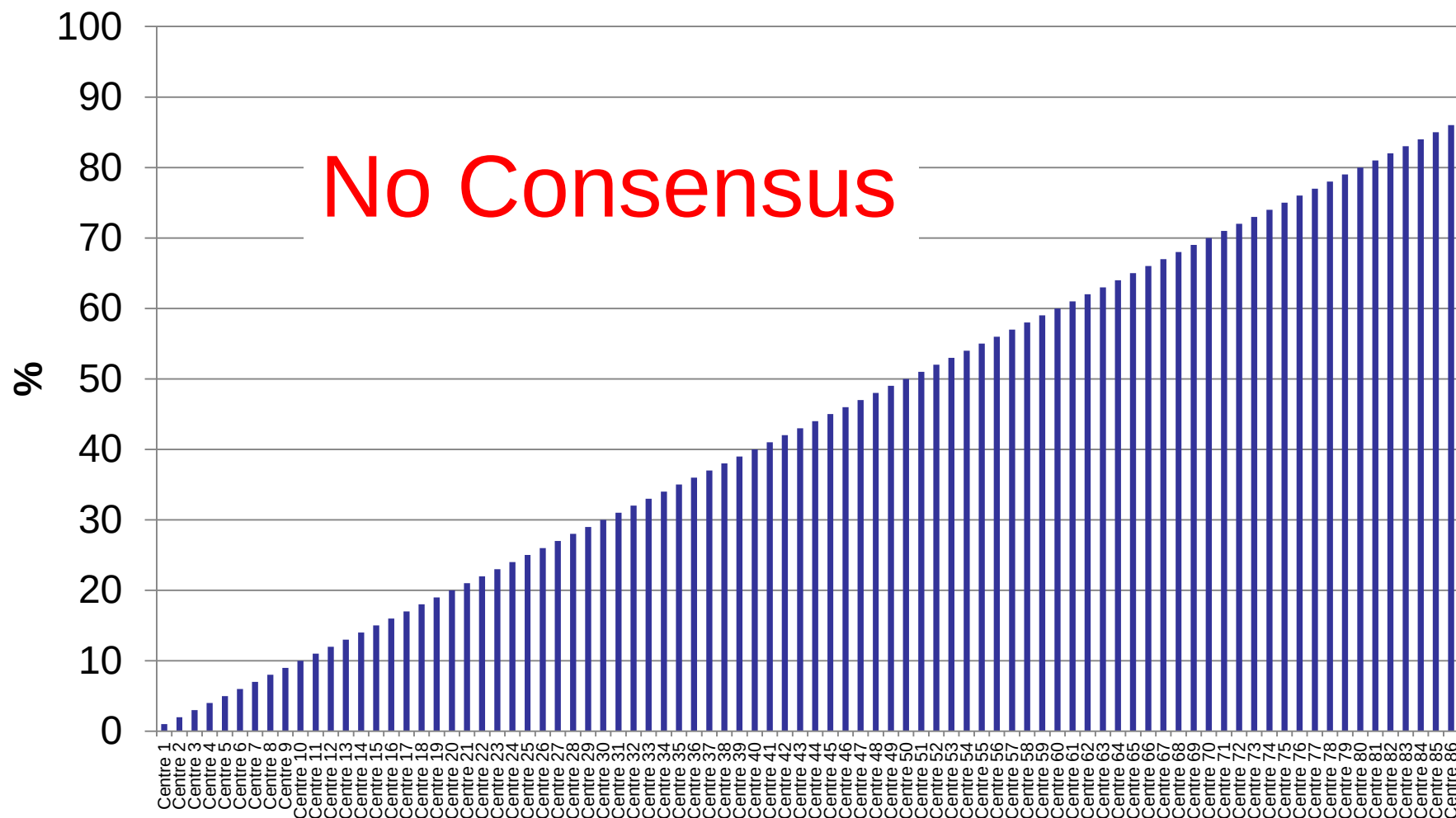


Ranked centre activity patterns

Consensus Plateau



Ranked centre activity patterns



2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization

A Report of the American College of Cardiology/American Heart Association
Joint Committee on Clinical Practice Guidelines

10.3. Use of Intravascular Imaging

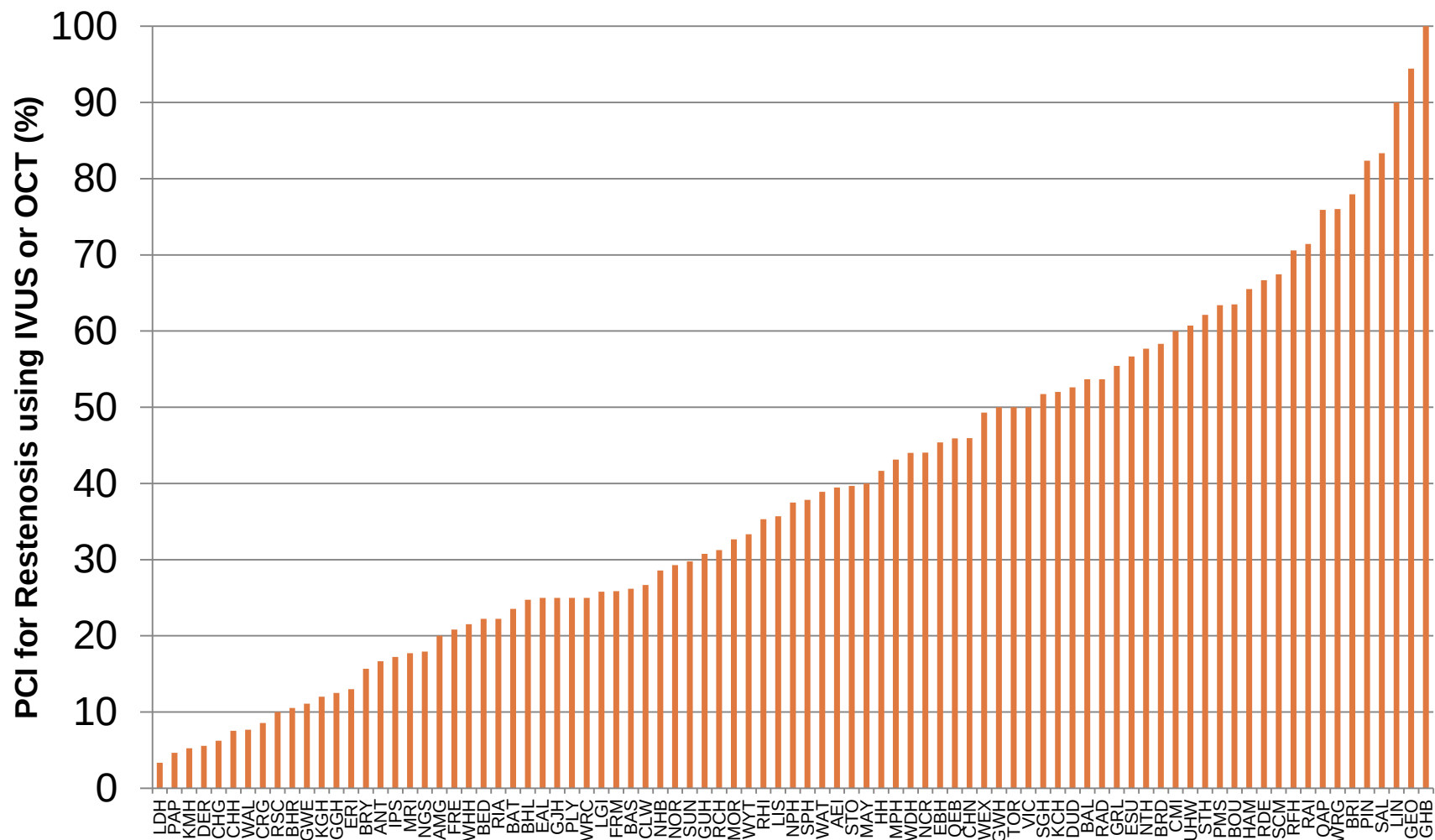
Recommendations for Use of Intravascular Imaging

Referenced studies that support the recommendations are summarized in [Online Data Supplement 25](#).

COR	LOE	RECOMMENDATIONS
2a	B-R	1. In patients undergoing coronary stent implantation, IVUS can be useful for procedural guidance, particularly in cases of left main or complex coronary artery stenting, to reduce ischemic events (1-10).
2a	B-R	2. In patients undergoing coronary stent implantation, OCT is a reasonable alternative to IVUS for procedural guidance, except in ostial left main disease (11-13).
2a	C-LD	3. In patients with stent failure, IVUS or OCT is reasonable to determine the mechanism of stent failure (14-17).

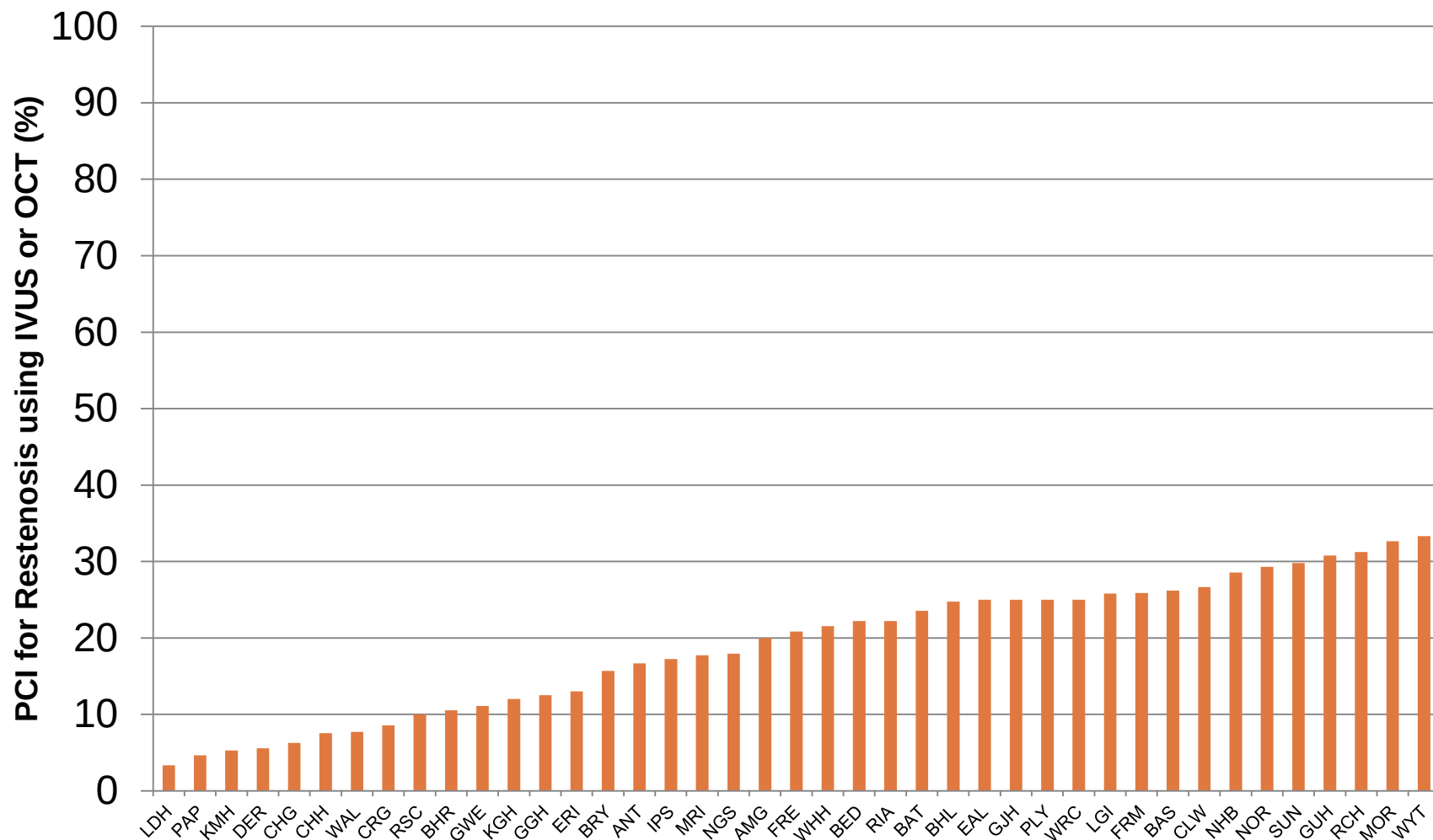
OCT or IVUS

PCI to Restenosis (all centres)



OCT or IVUS

PCI to Restenosis (0-35%)



OCT or IVUS

PCI to Restenosis (>35%)

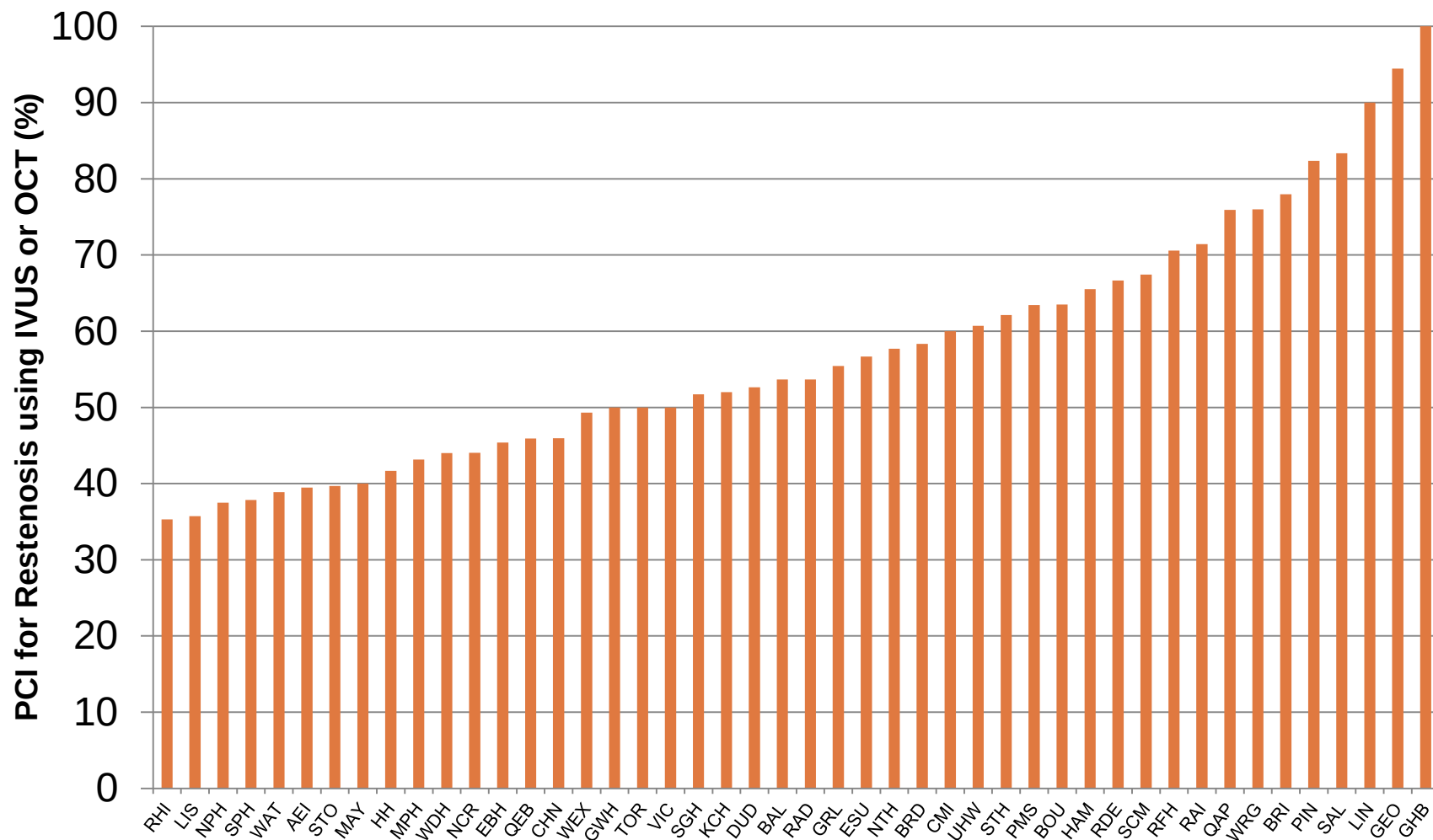


Table 2 Recommendations on the adjunctive use of intravascular imaging for diagnostic evaluation of coronary artery disease, guidance and optimization of PCIs

- **Diagnostic assessment of coronary lesions**

Consensus opinion

Angiographically unclear/ambiguous findings (e.g. dissection, thrombus, calcified nodule)

Assessment of left main stenosis

Complex bifurcation lesions

Suspected culprit lesion of ACS

- **PCI guidance and optimization**

RCT evidence

Long lesions

Chronic total occlusions

Consensus opinion

Patients with acute coronary syndromes

Left main coronary artery lesions

Two stents bifurcation

Implantation of bioresorbable scaffolds

Patients with renal dysfunction (IVUS)

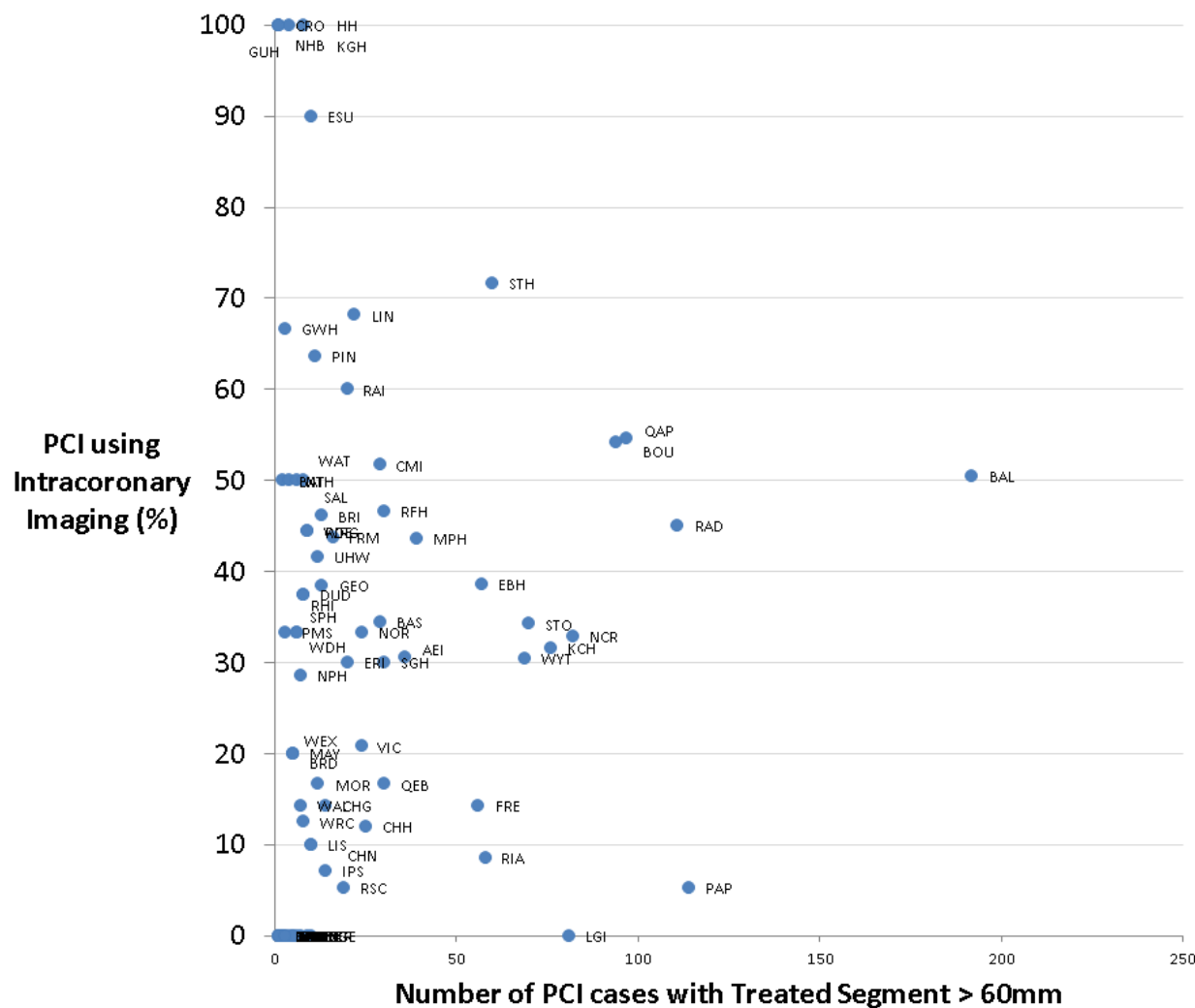
- **Identification of mechanism of stent failure**

Restenosis

Stent thrombosis

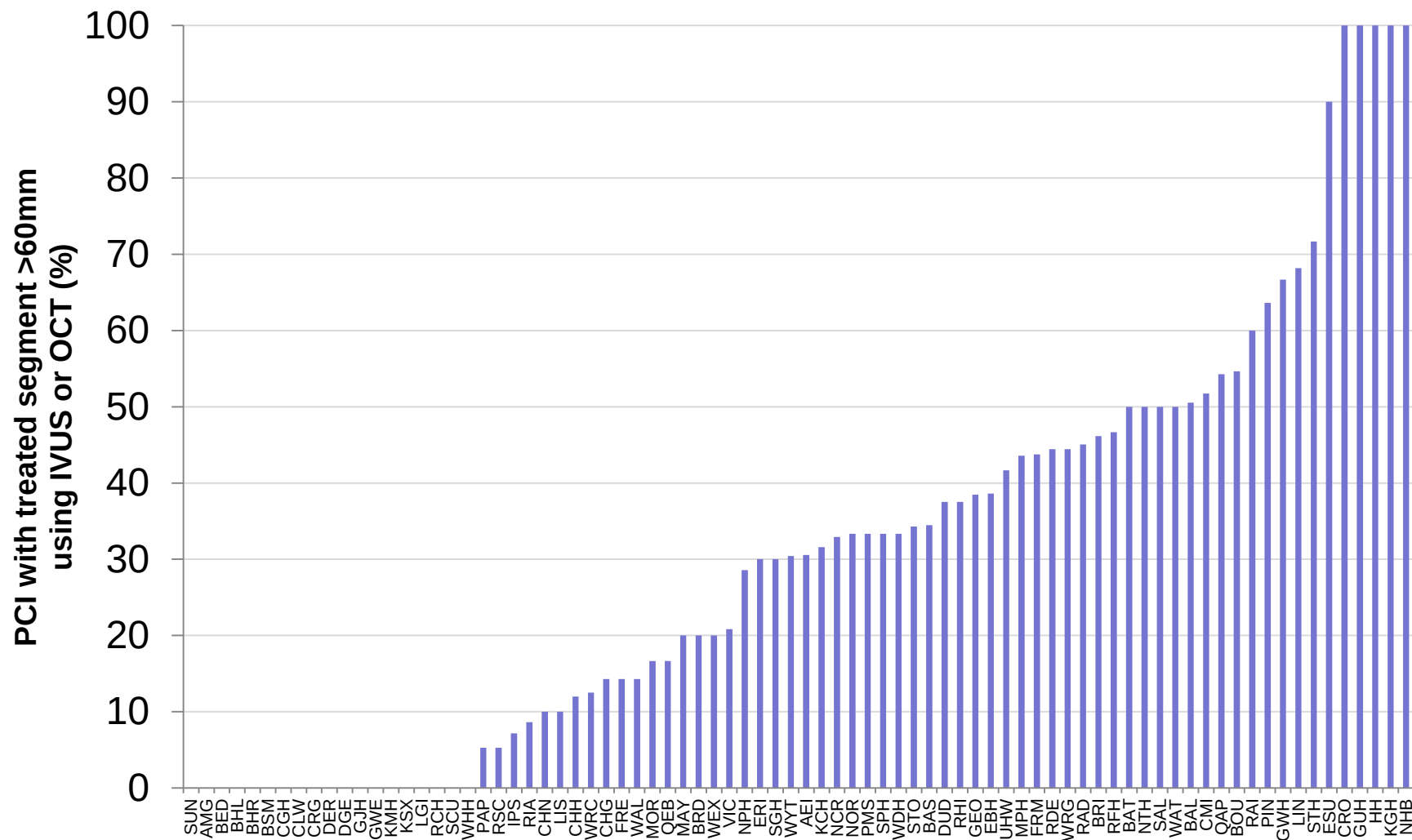
OCT or IVUS

PCI with Treated Segment length > 60mm

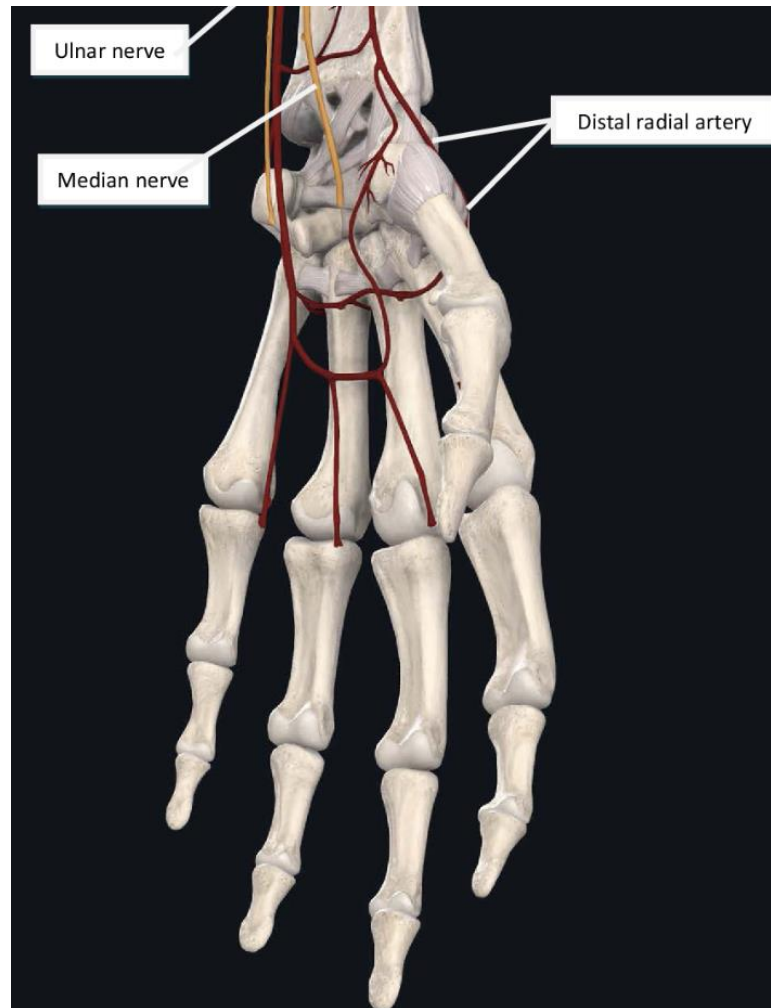


OCT or IVUS

PCI with Treated lesion length > 60mm



Arterial access



2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization

A Report of the American College of Cardiology/American Heart Association
Joint Committee on Clinical Practice Guidelines

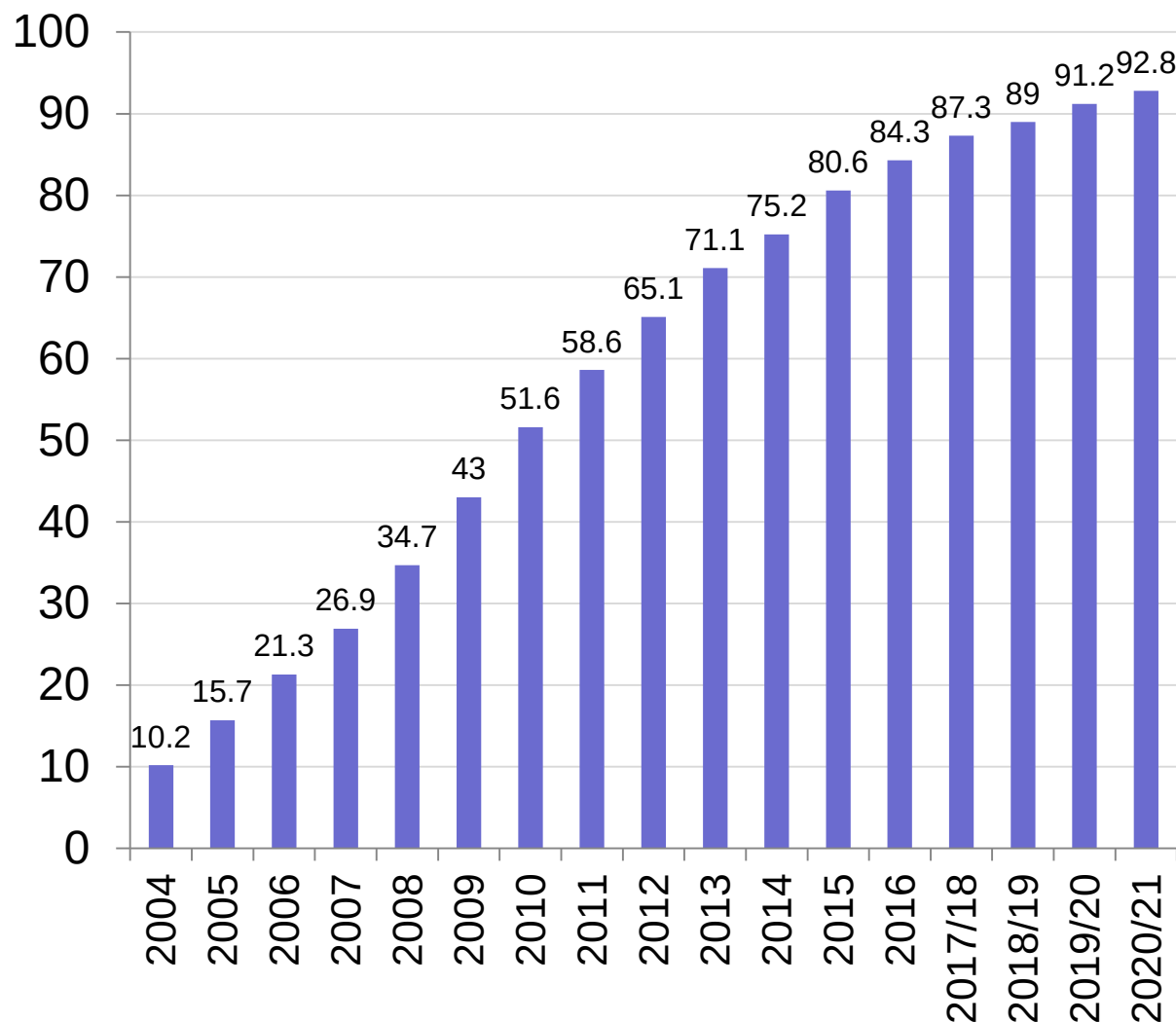
Recommendations for Radial and Femoral Approaches for PCI

Referenced studies that support the recommendations are summarized in [Online Data Supplement 23](#).

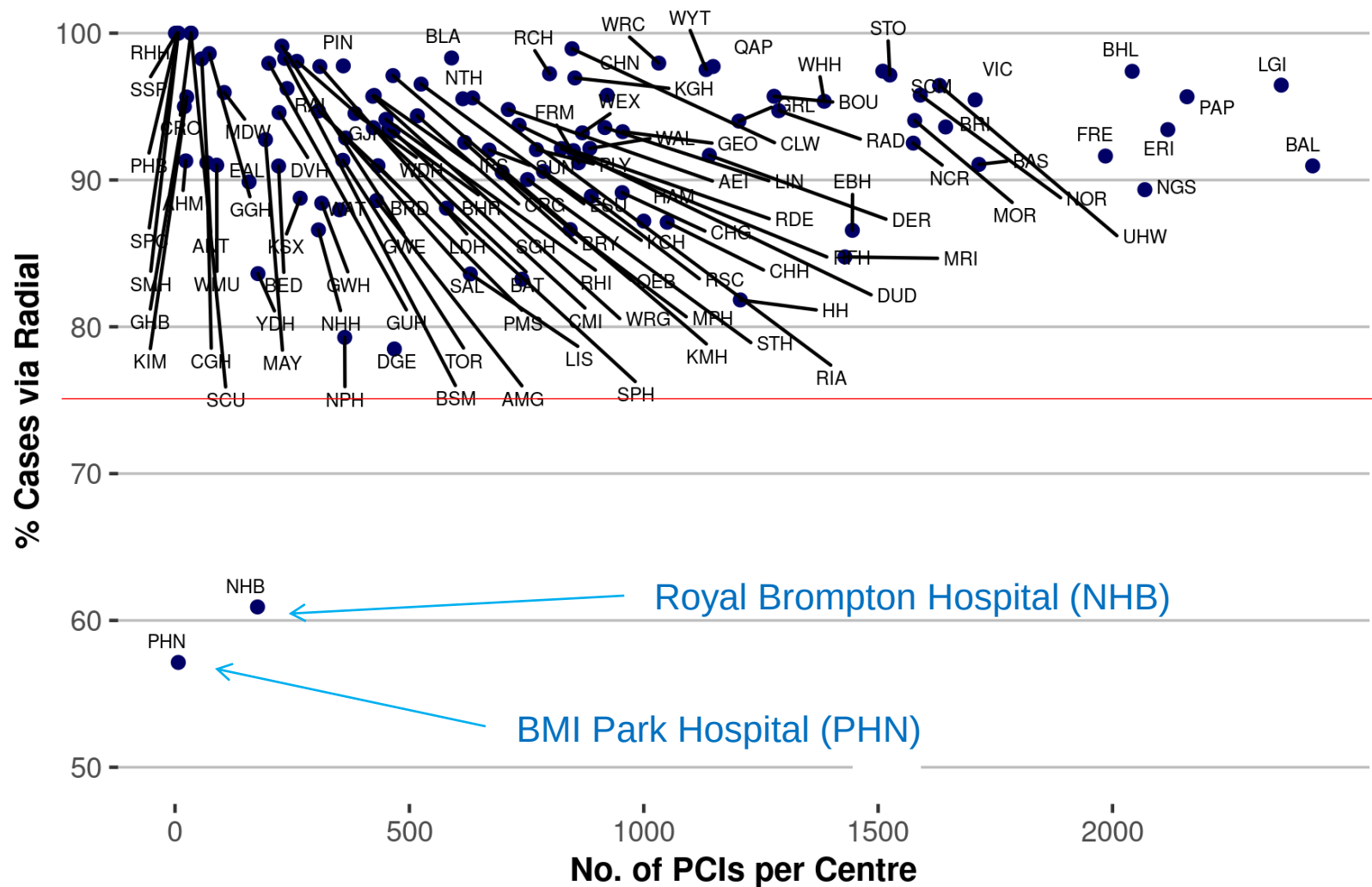
COR	LOE	RECOMMENDATIONS
1	A	1. In patients with ACS undergoing PCI, a radial approach is indicated in preference to a femoral approach to reduce the risk of death, vascular complications, or bleeding (1-4).
1	A	2. In patients with SIHD undergoing PCI, the radial approach is recommended to reduce access site bleeding and vascular complications (4-7).

Radial Artery Access

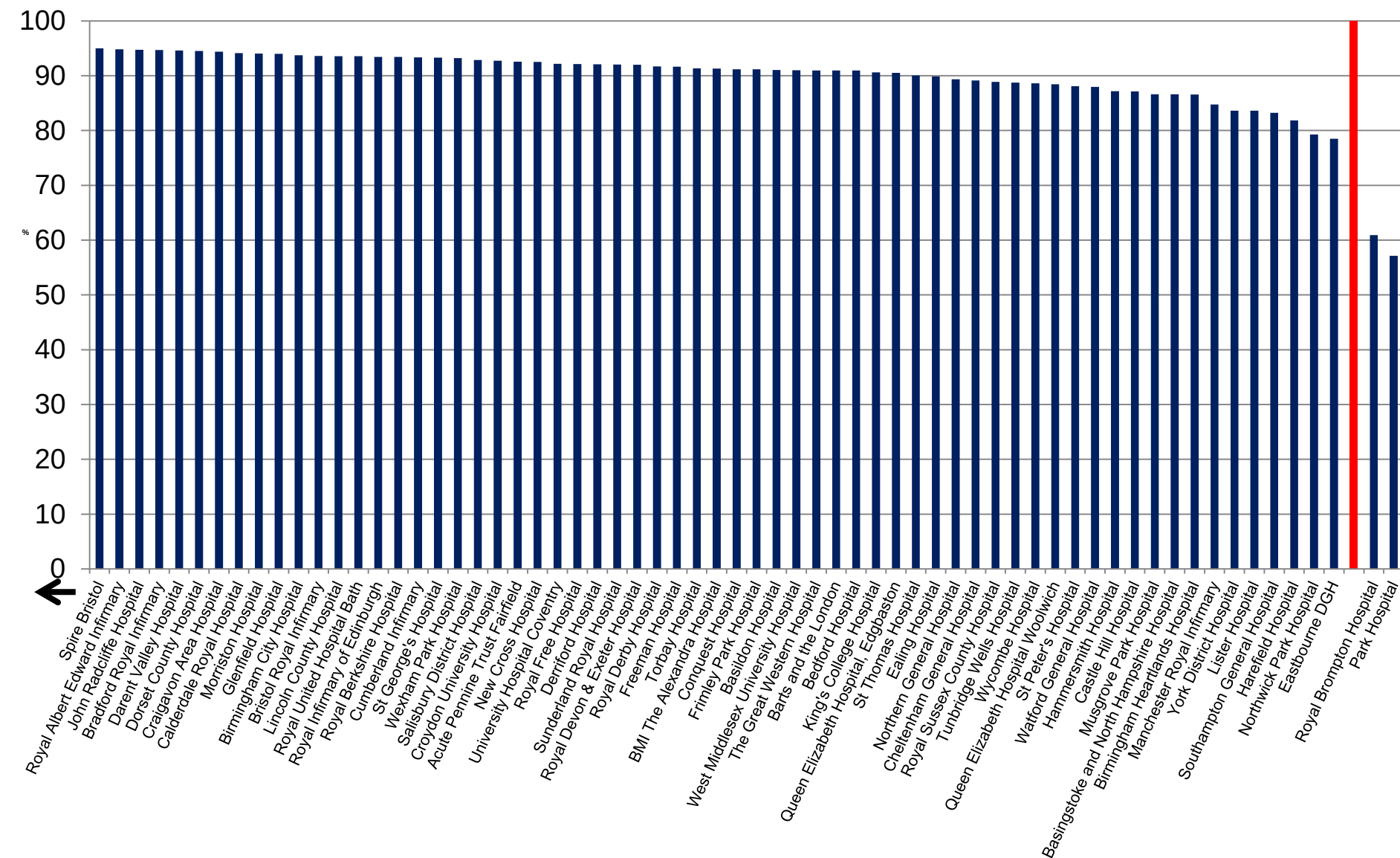
PCI Via Radial
(%)



Radial Artery Access



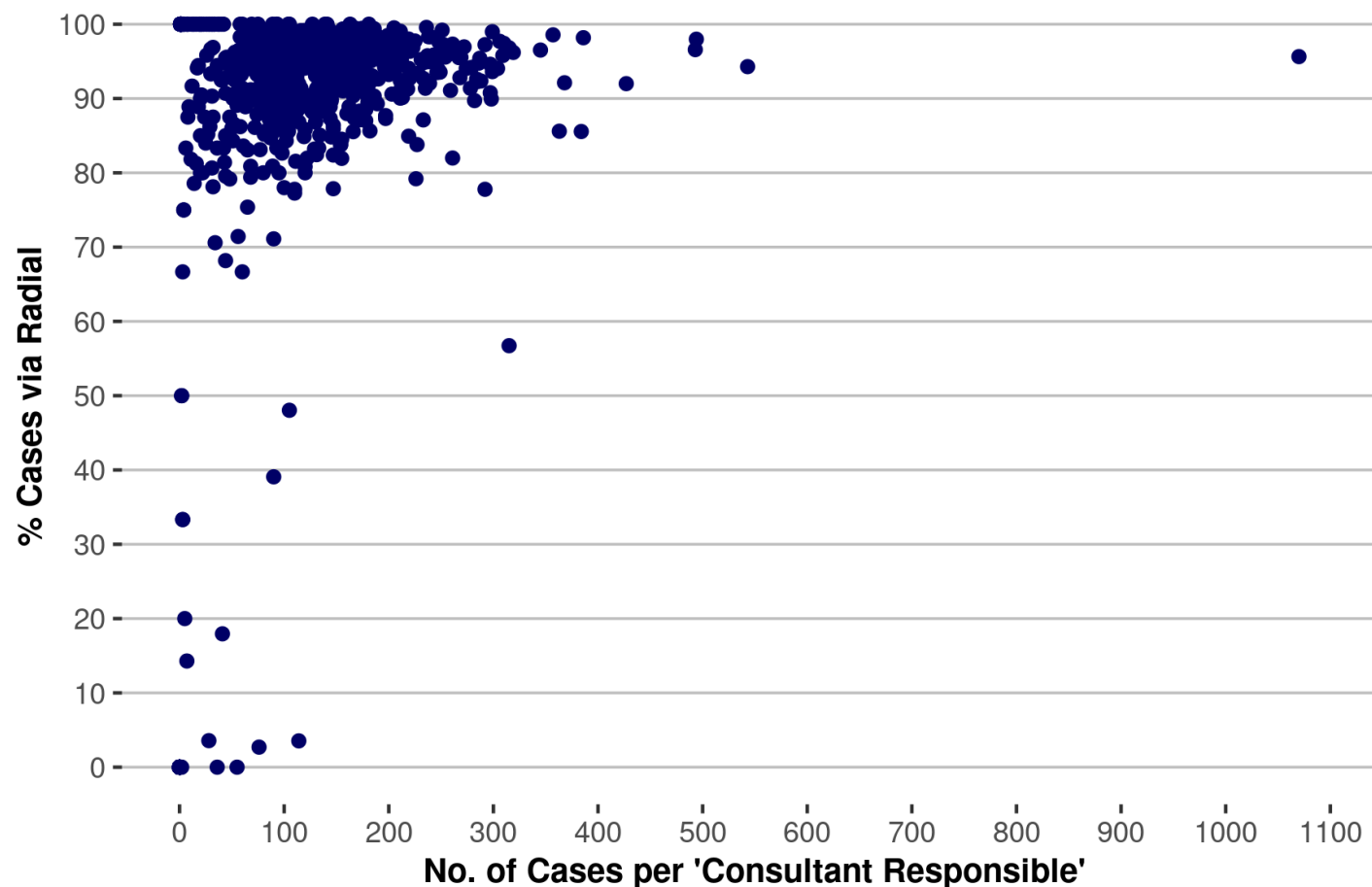
Radial Artery Access



Radial Artery Access

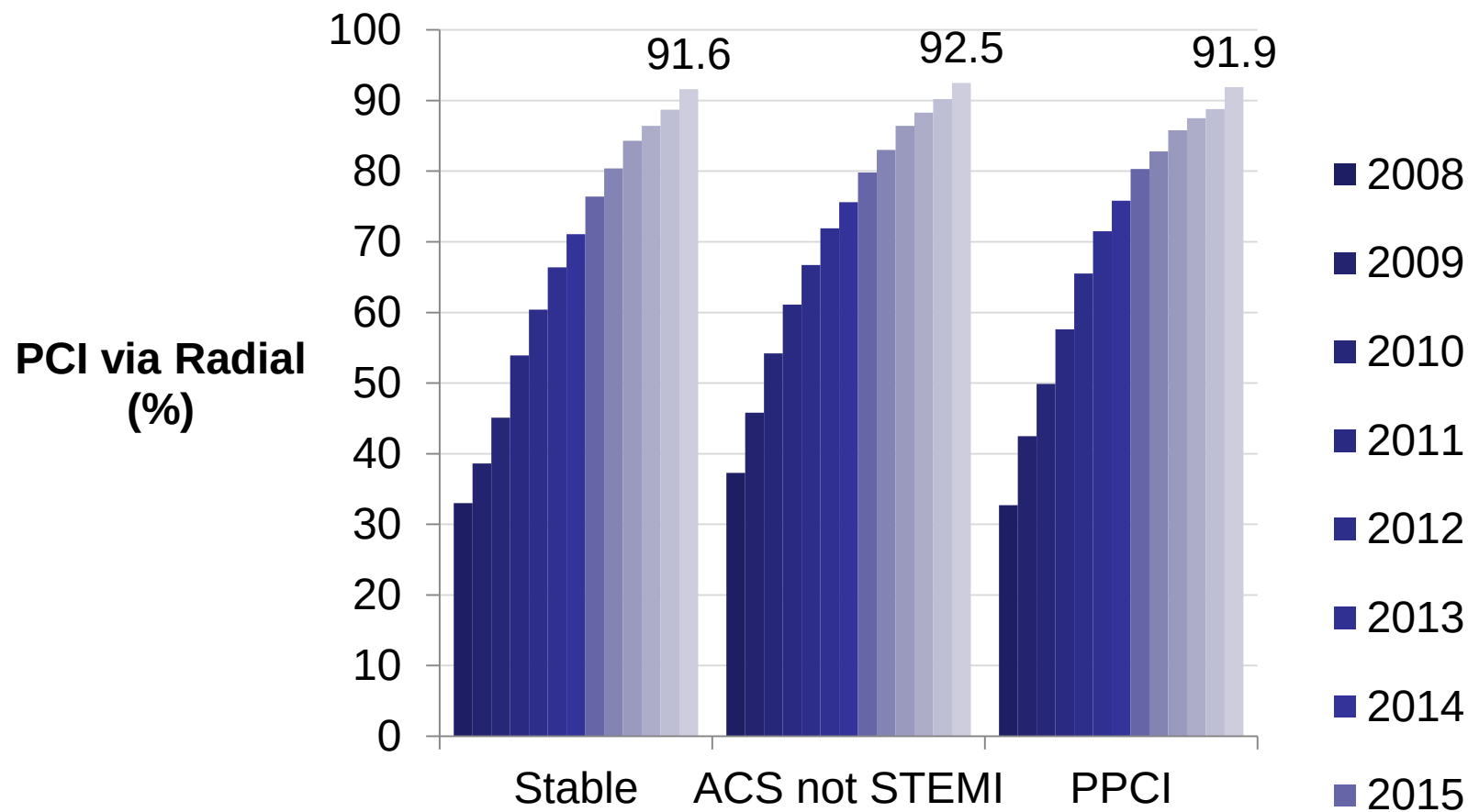
By operator

- Any case with any radial (including multiple access)



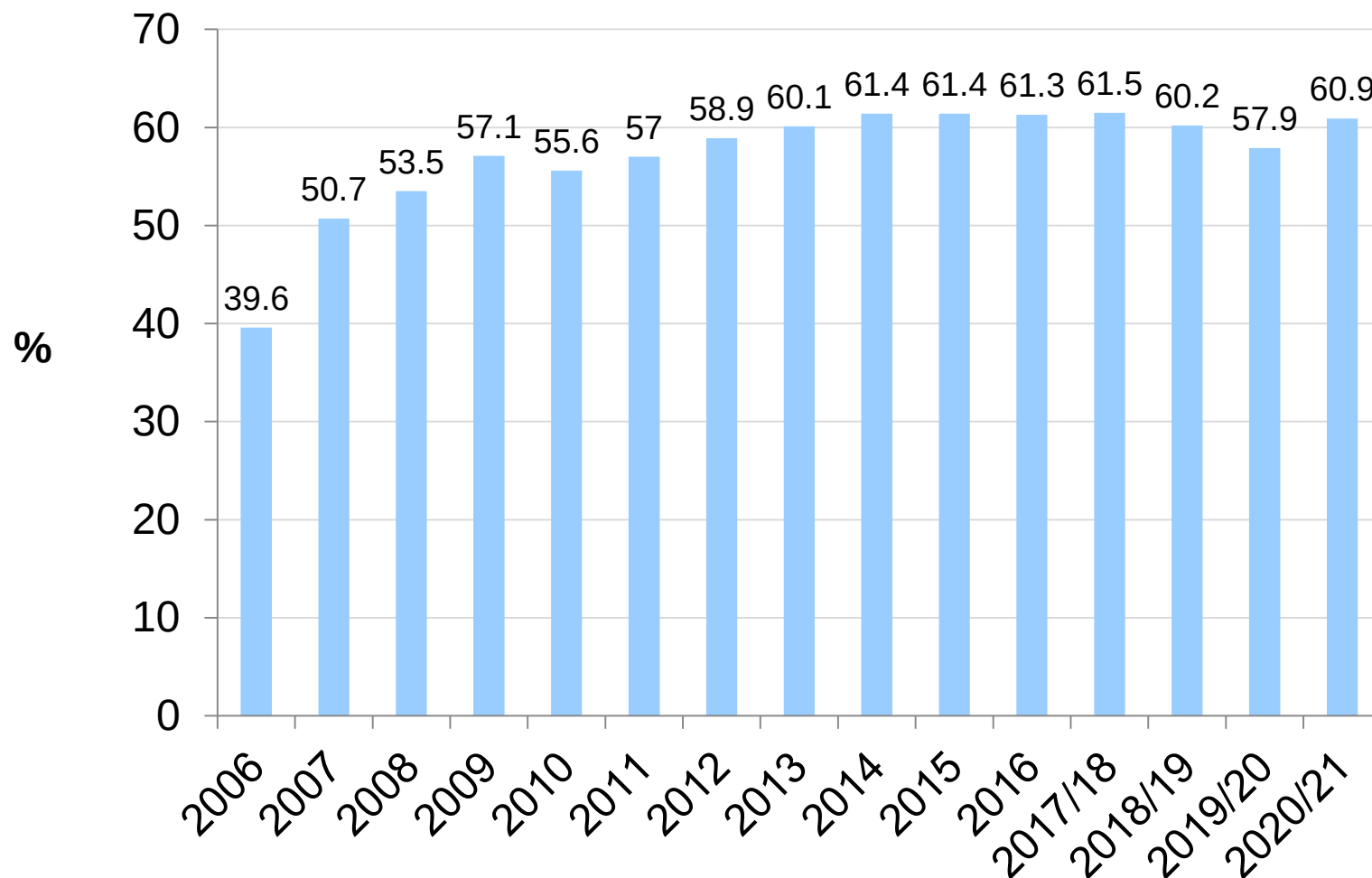
Radial Artery Access

Clinical Syndrome



Femoral closure devices

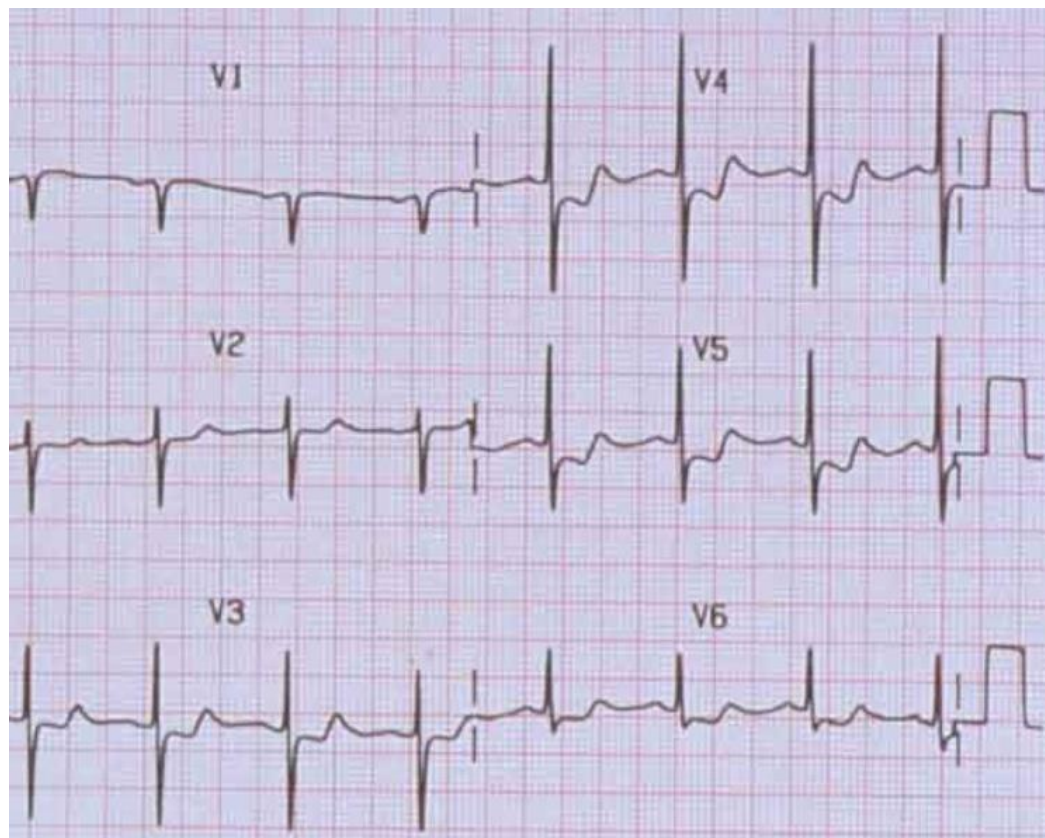
Of PCI via FA - % punctures closed with a device



Time Delays to Treatment



Delays to PCI in NSTEMI



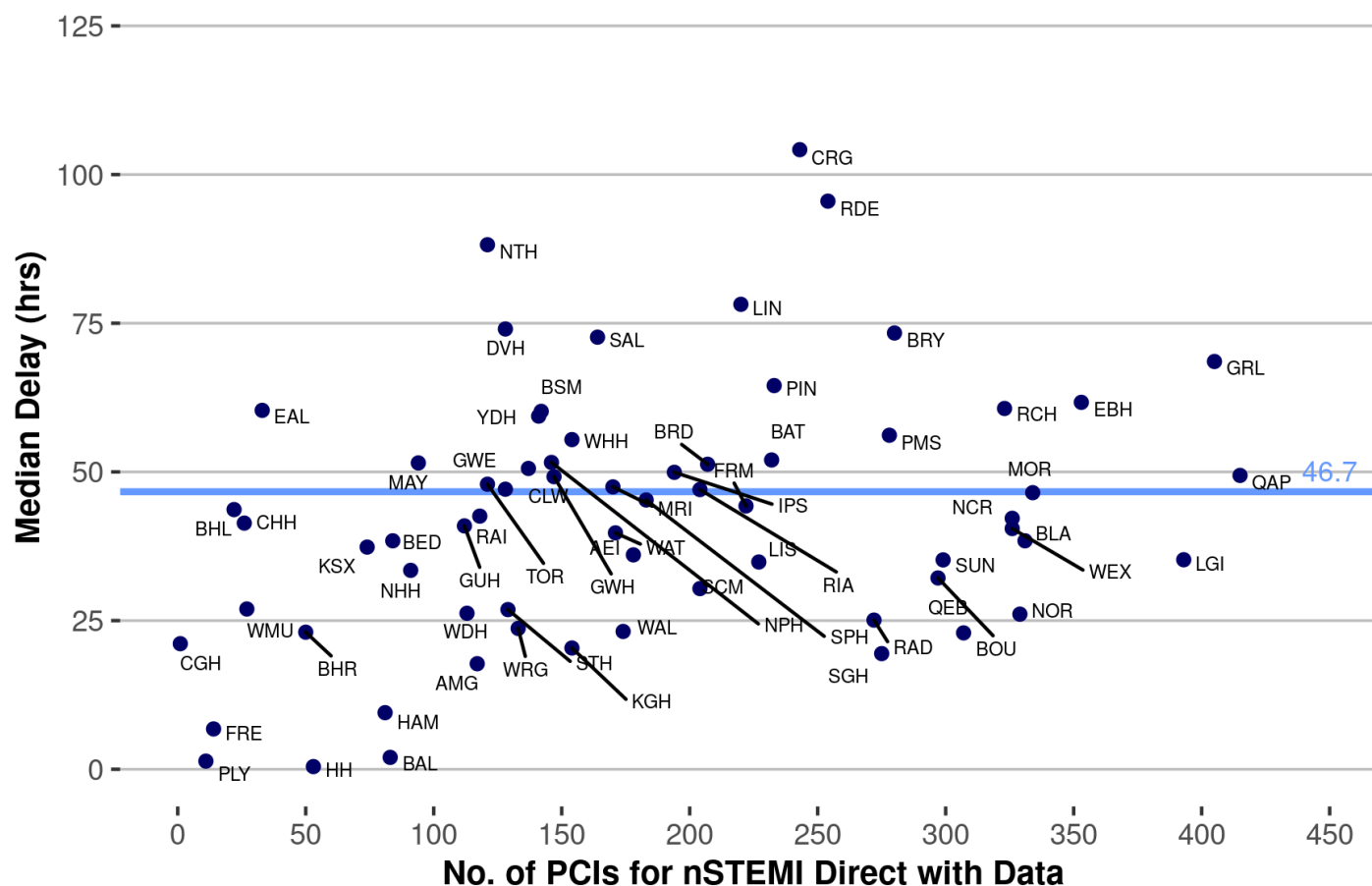
Delays to PCI in NSTEMI

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

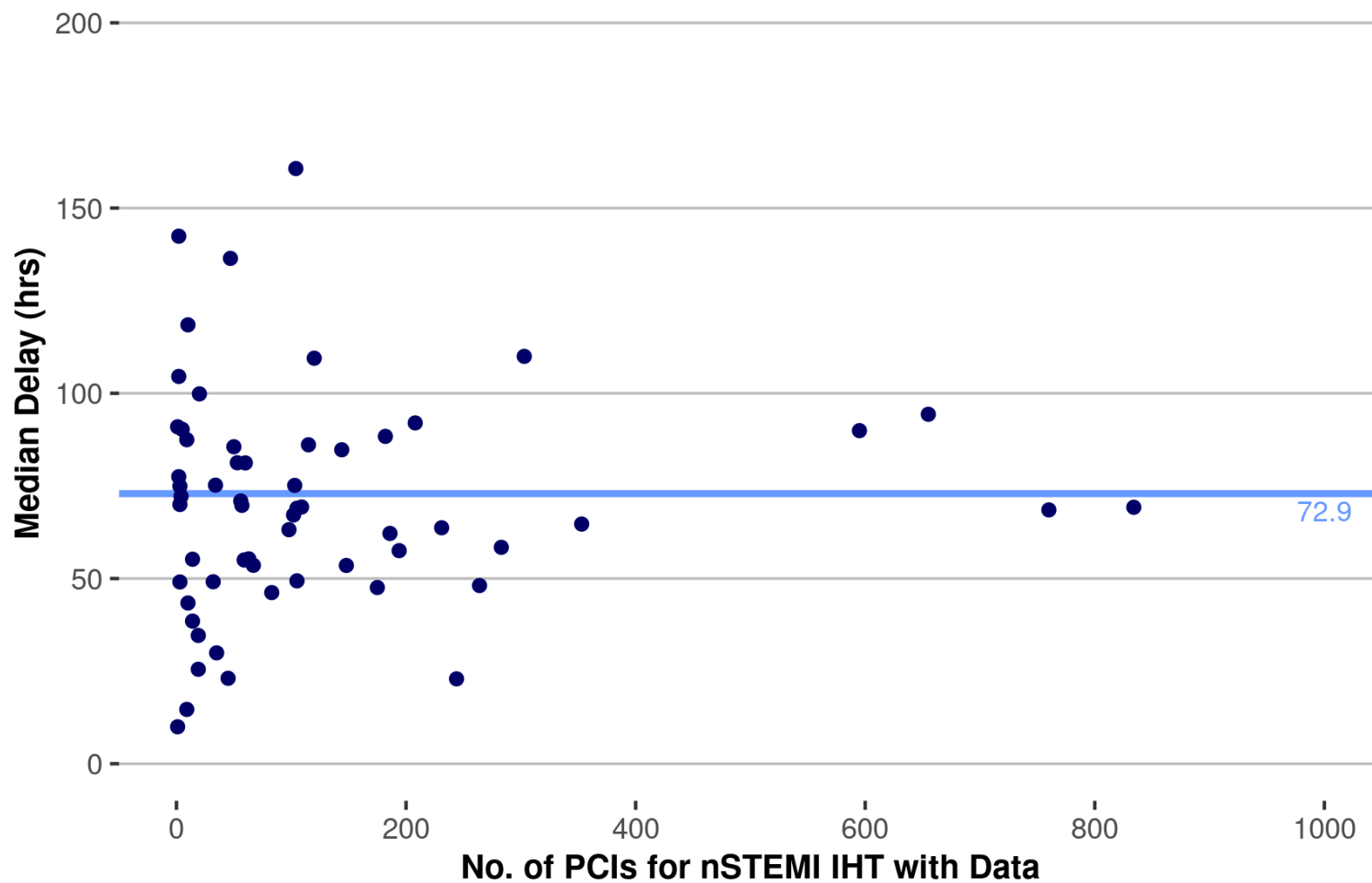
Admission Route - Direct to PCI Centre



Centres with < 90% data completeness excluded

Delays to PCI in NSTEMI

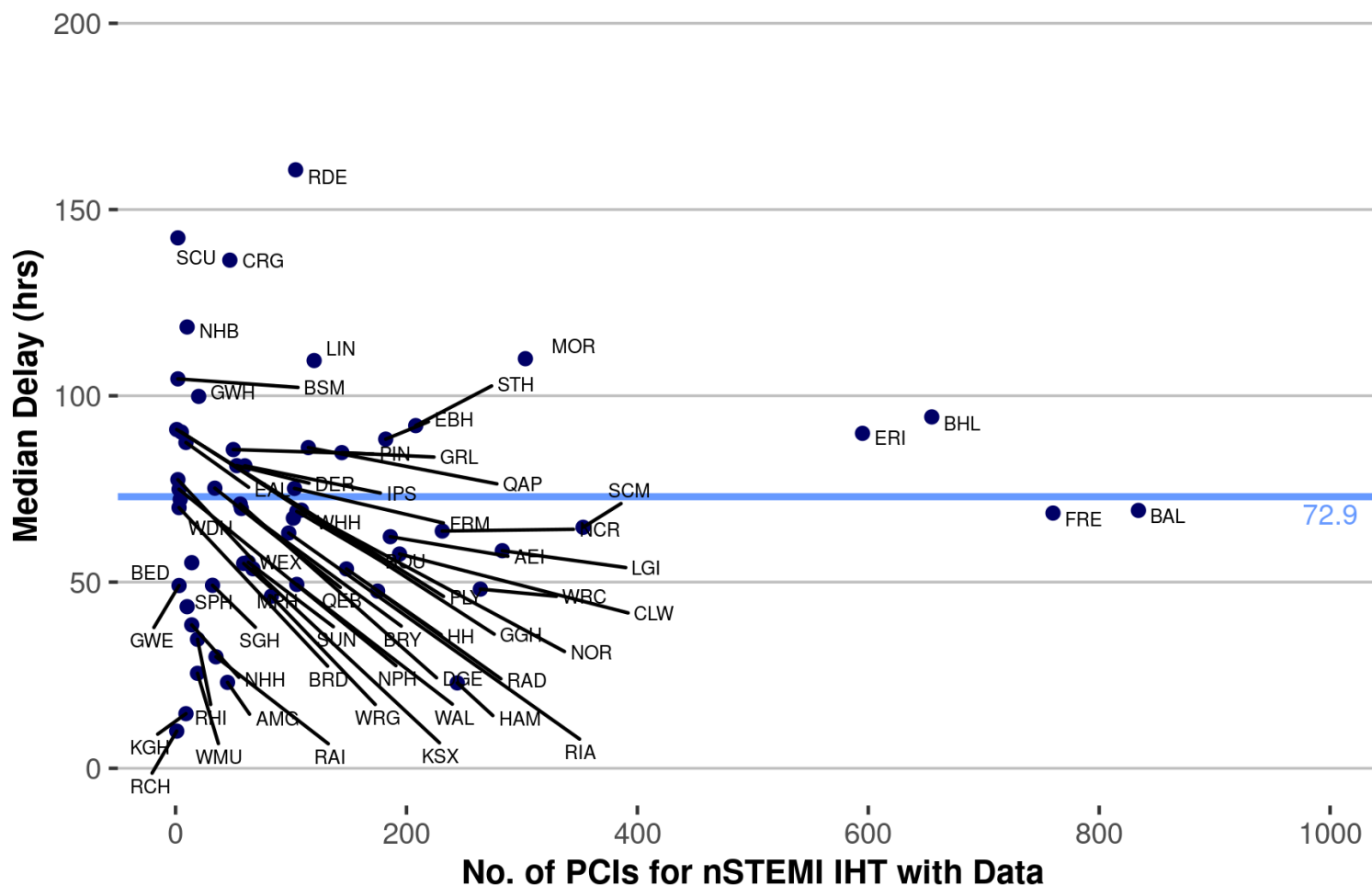
Admission Route - IHT



Centres with < 90% data completeness excluded

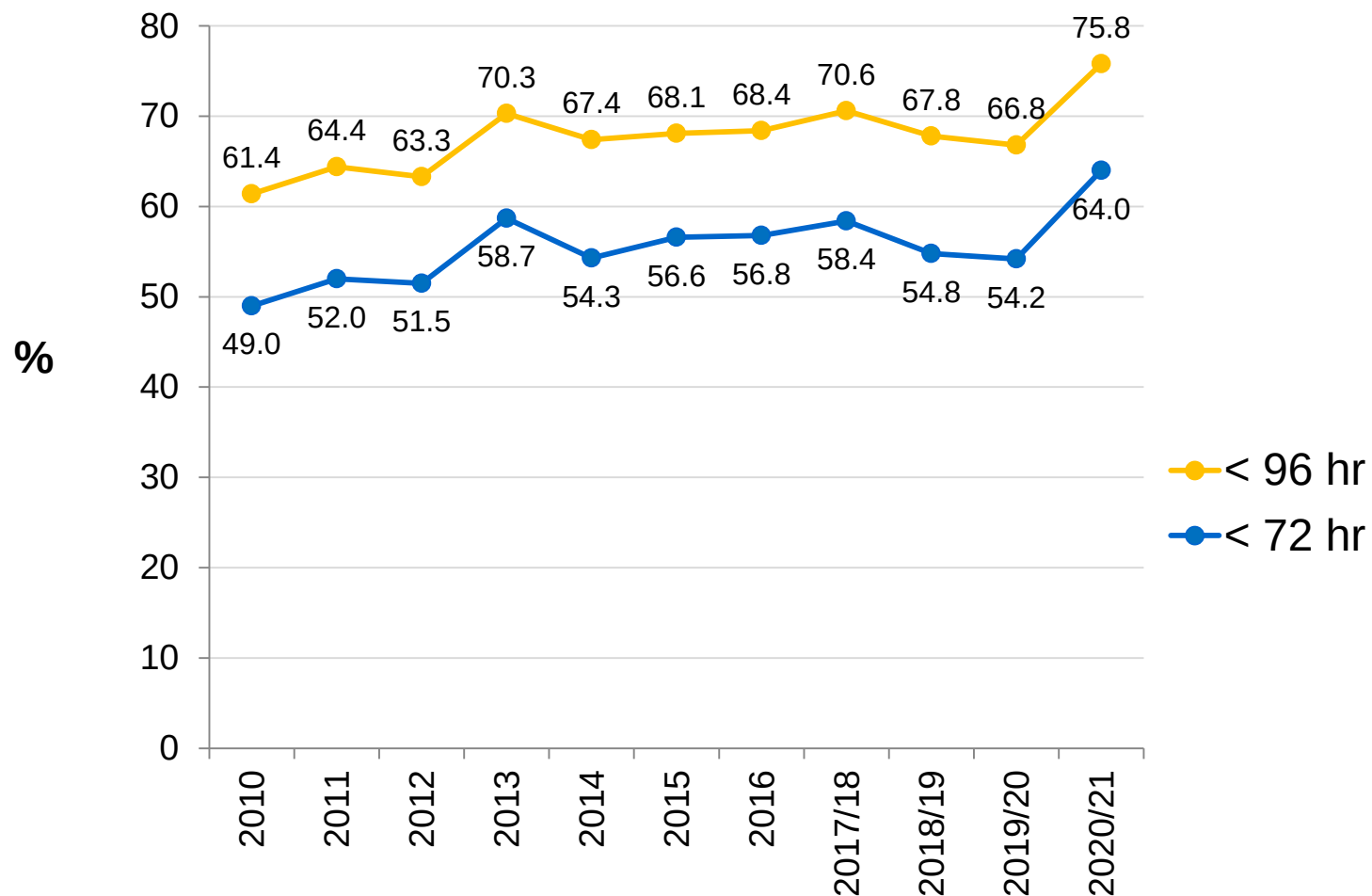
Delays to PCI in NSTEMI

Admission Route - IHT



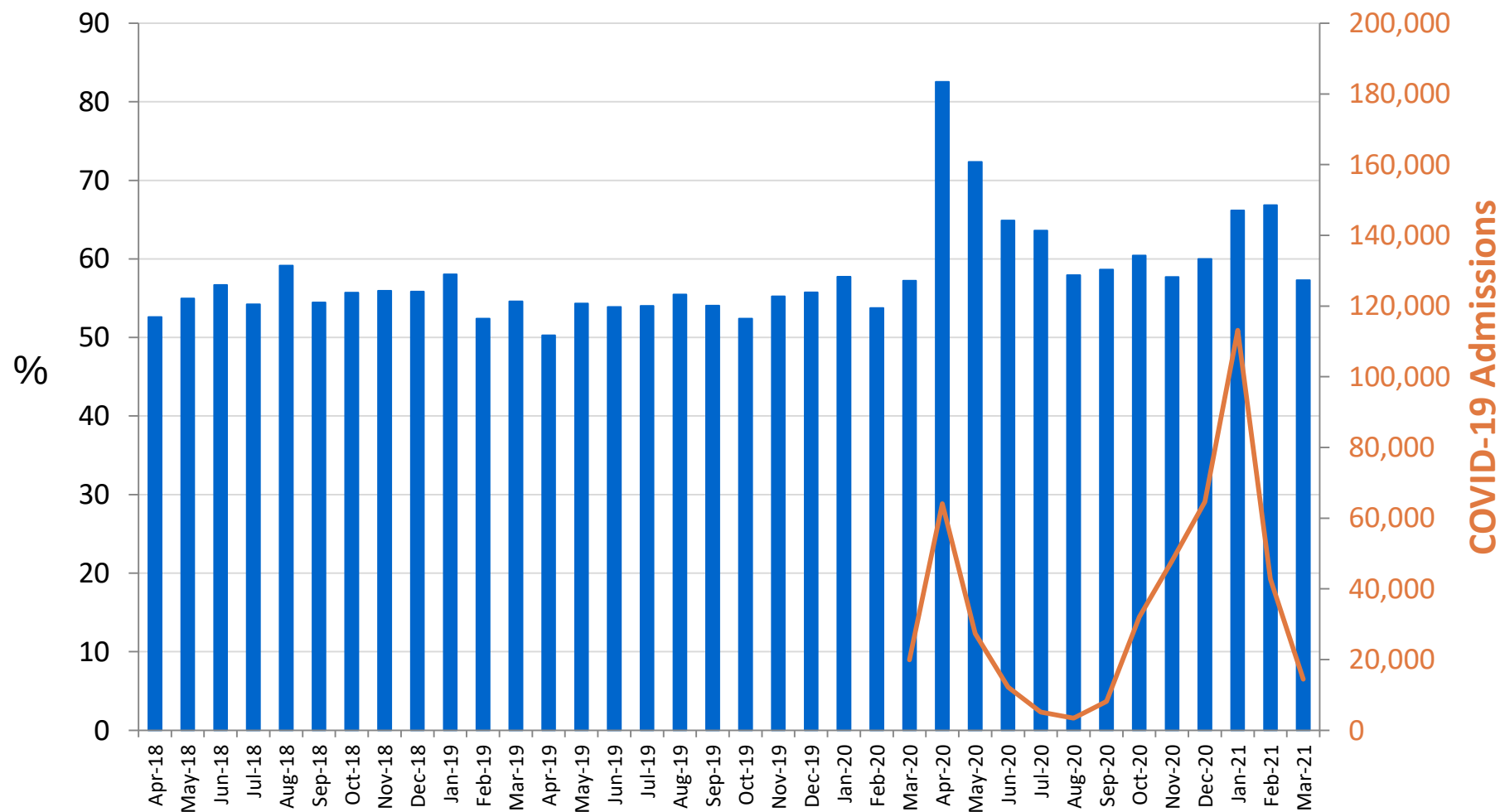
Delays to PCI in NSTEMI

Direct AND IHT



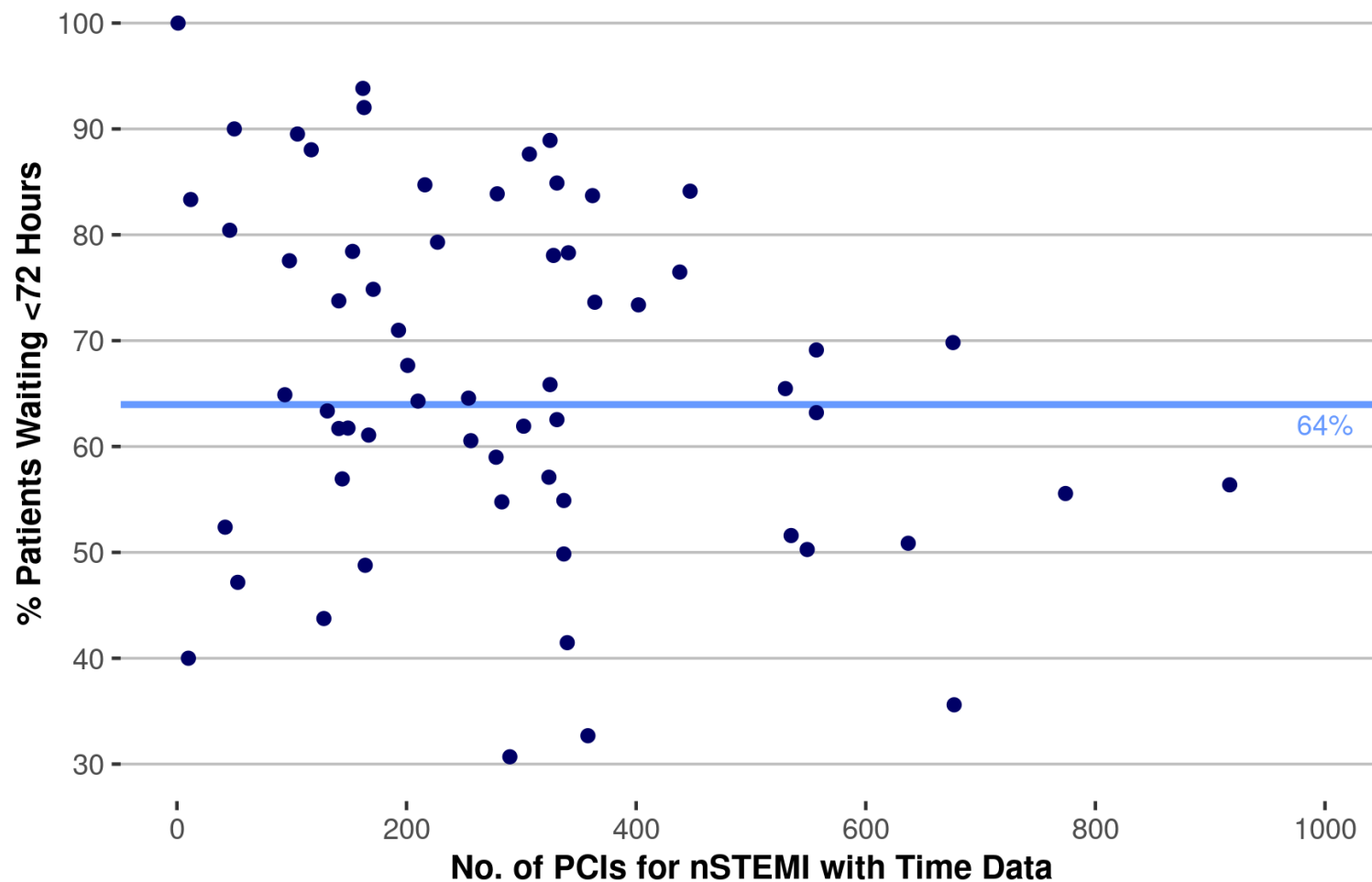
NSTEMI in <72 hrs

By Month (3 yr period)



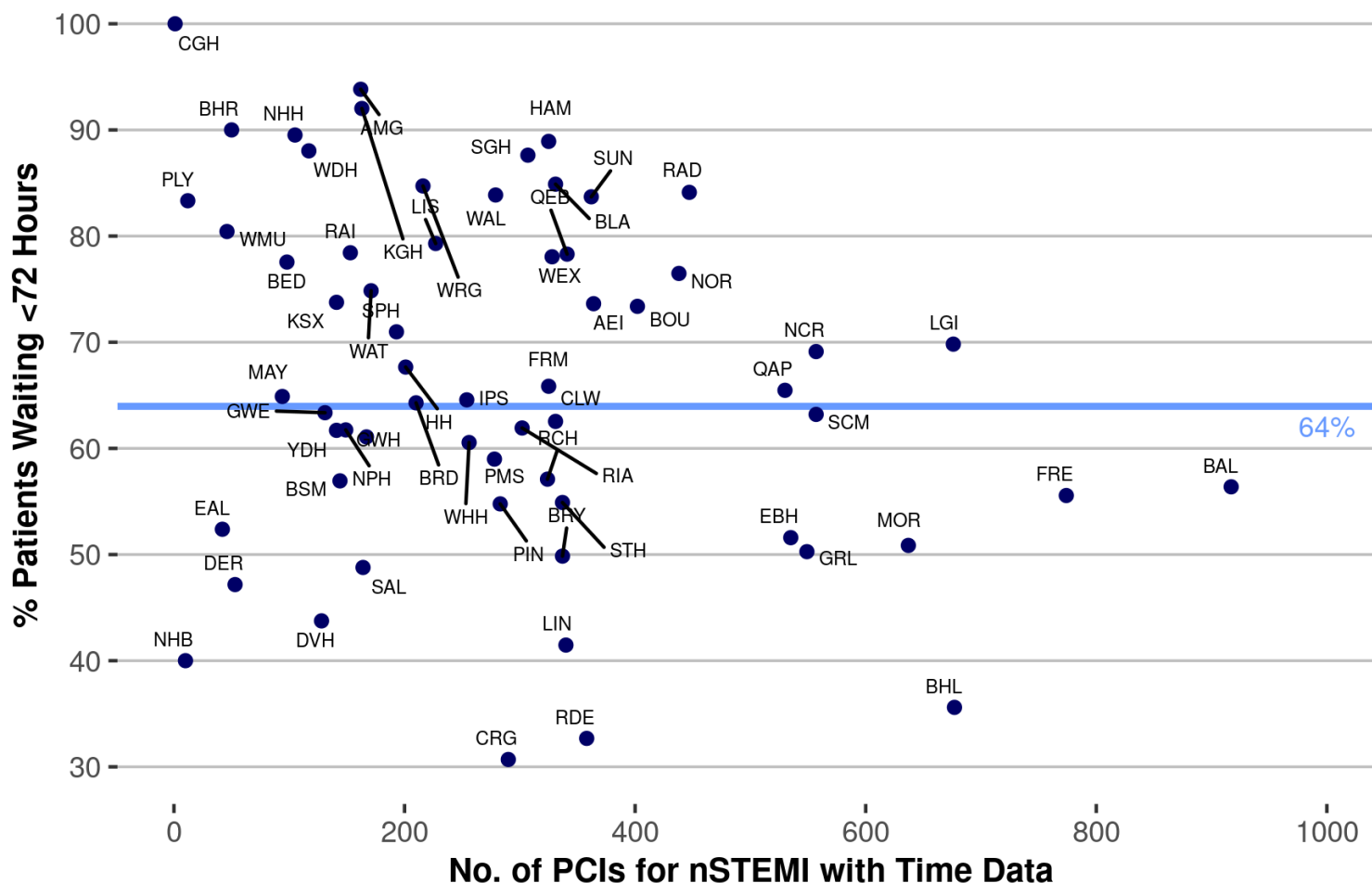
Delays to PCI in NSTEMI

Direct AND IHT % < 72 hr



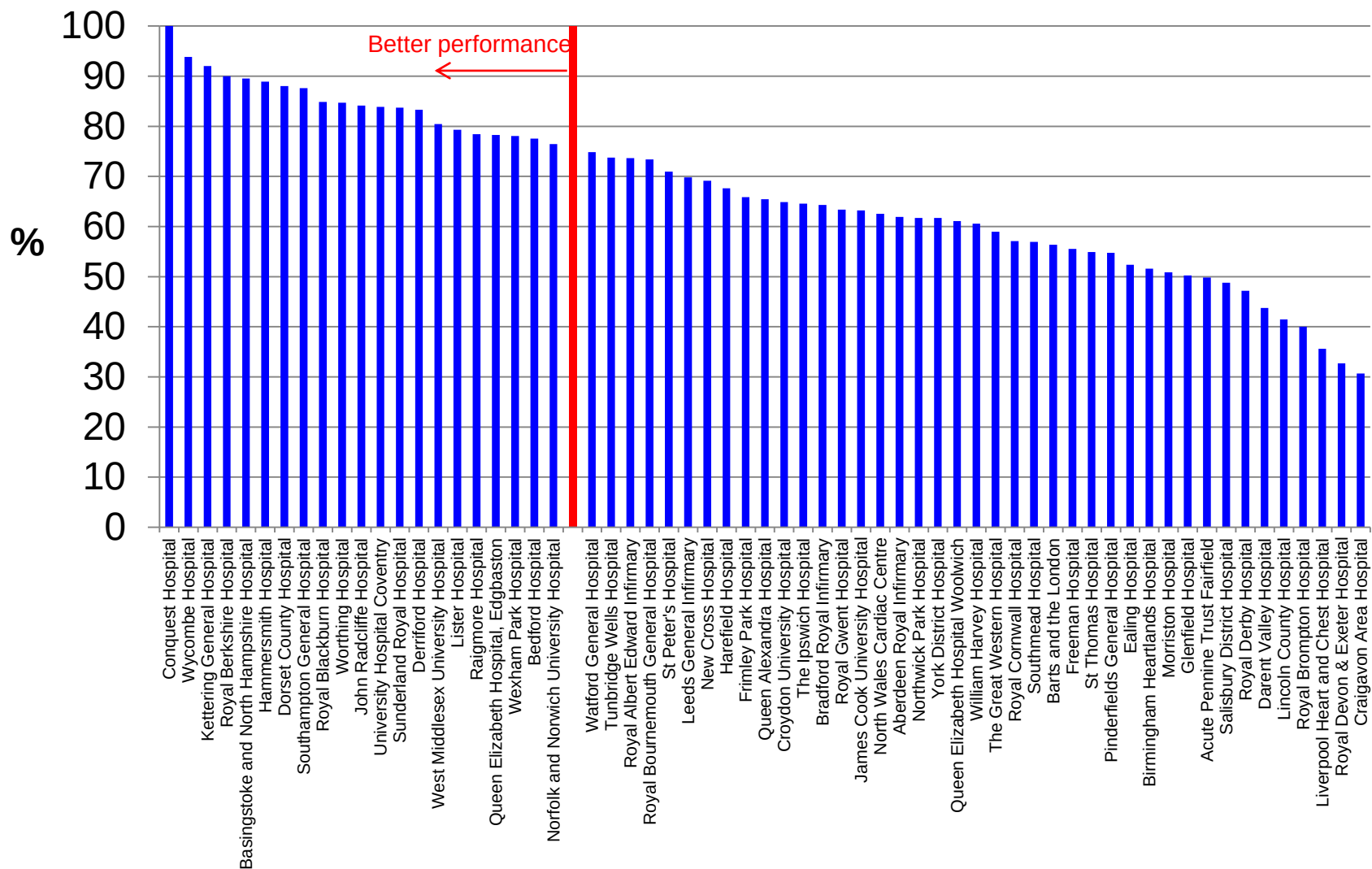
Delays to PCI in NSTEMI

Direct AND IHT % < 72 hr



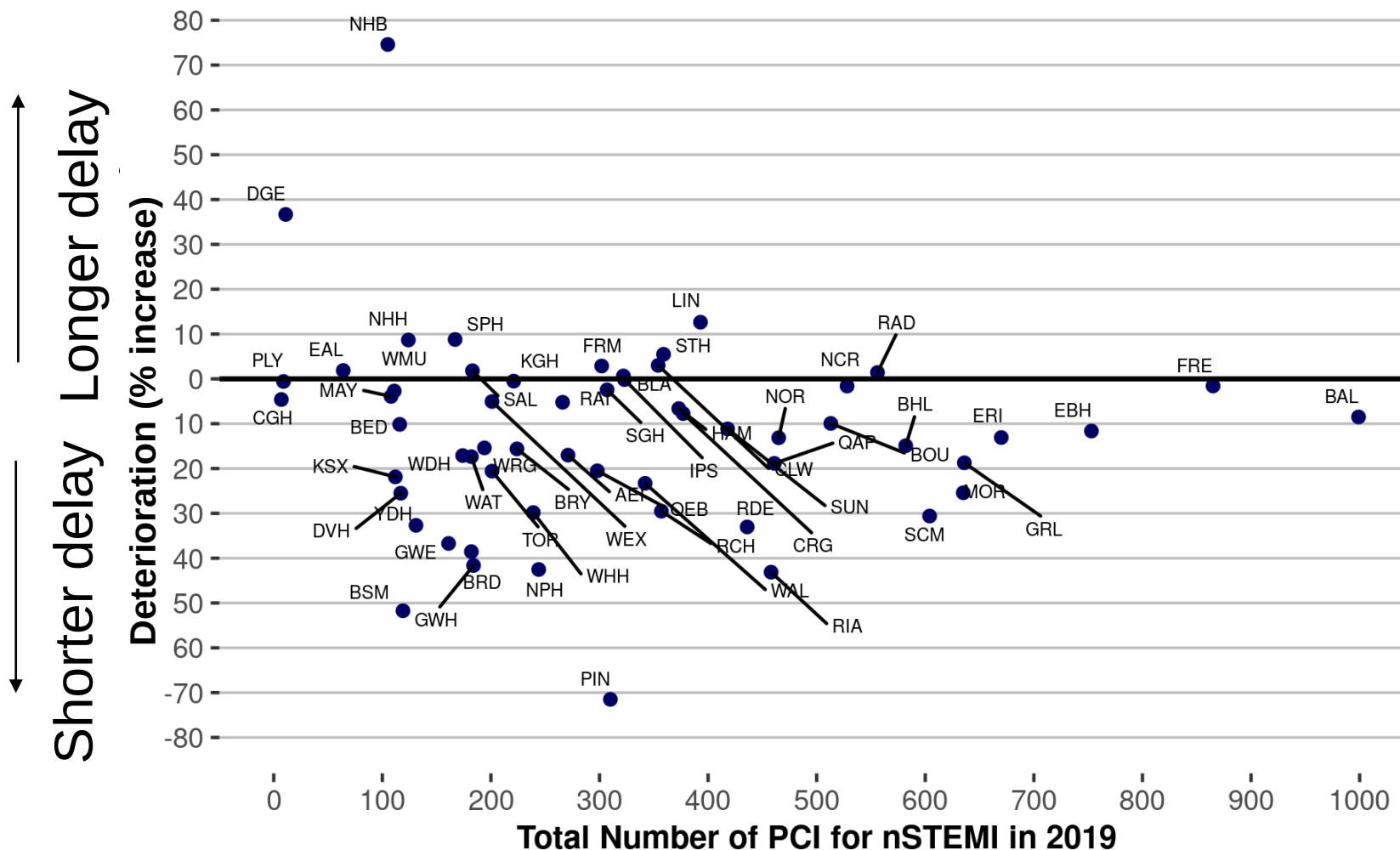
Delays to PCI in NSTEMI

Direct AND IHT % < 72 hr

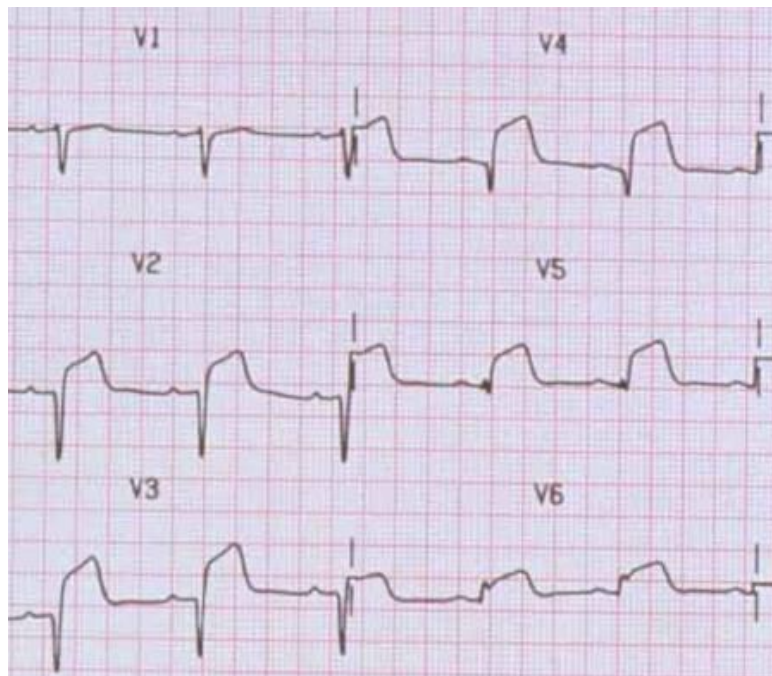


Delays to PCI in NSTEMI

Direct and IHT combined



Primary PCI



Primary PCI

Rx for STEMI (NHS centres)

- Funnel analysis for **TIMING DELAYS**
 - All units performing > 10 cases of PPCI
 - Patients with onset of symptoms in the community
 - Excludes patients in cardiogenic shock
 - Excludes those needing pre-PCI ventilation

PCI for Acute Sx

Four admission scenarios

Admitted from
the community

Already
in hospital

Admission to
Non-PCI centre

Direct admission
to PCI centre

Transfer
to PCI centre

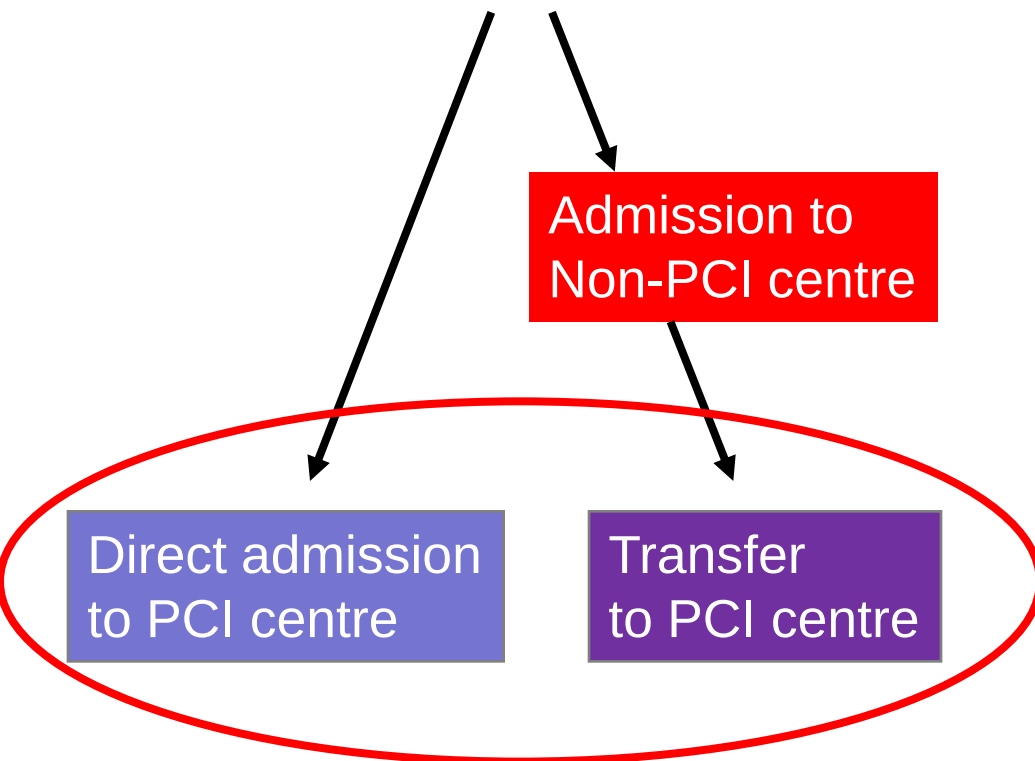
Hospital is a
PCI centre

Hospital is a
Non-PCI centre

PCI for Acute Sx

Four admission scenarios

Admitted from
the community



PCI for Acute Sx

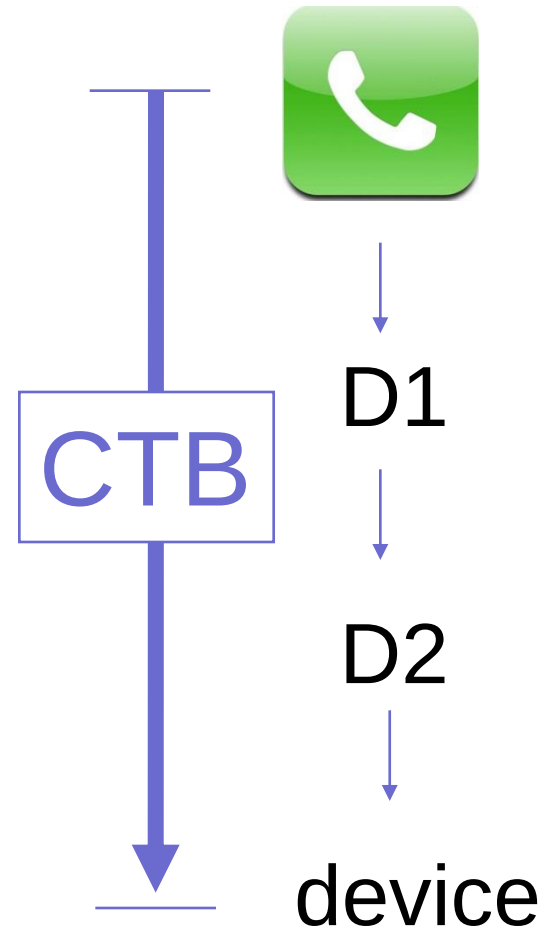
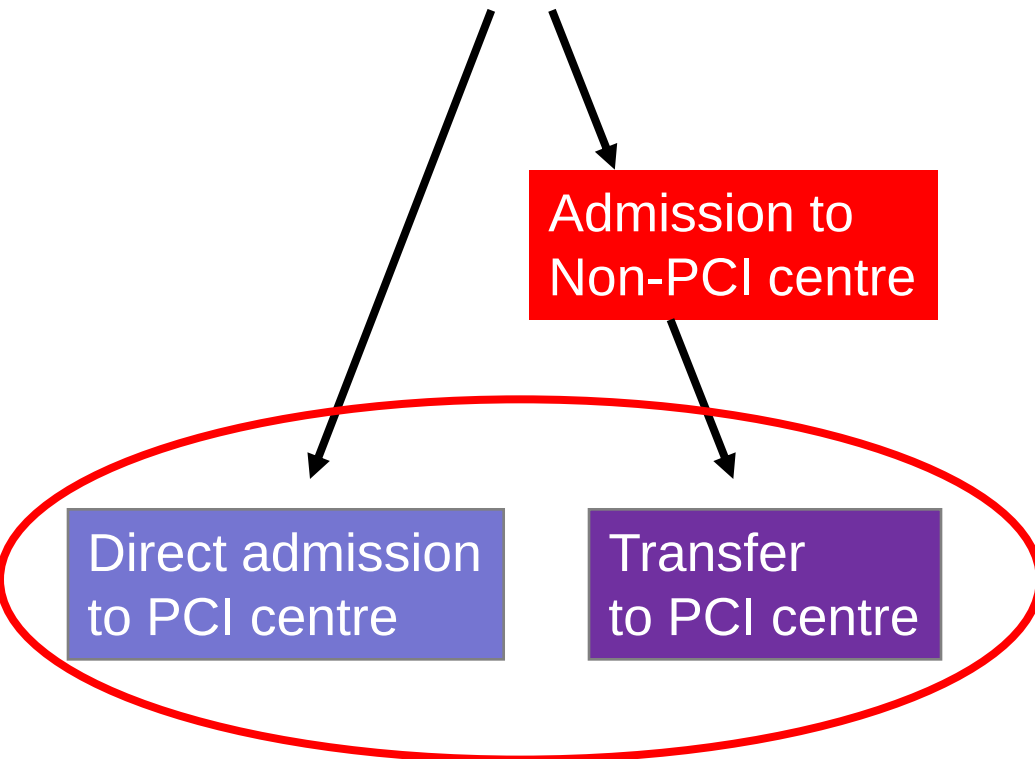
Variety of analysis methods

- 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
- Direct only
 - Door to 'balloon' time as % < 90 min (and analysis of weekend delays)
 - Door to 'balloon' time as % < 60 min
- Median time delays
 - IHT v Direct admission

PCI for Acute Sx

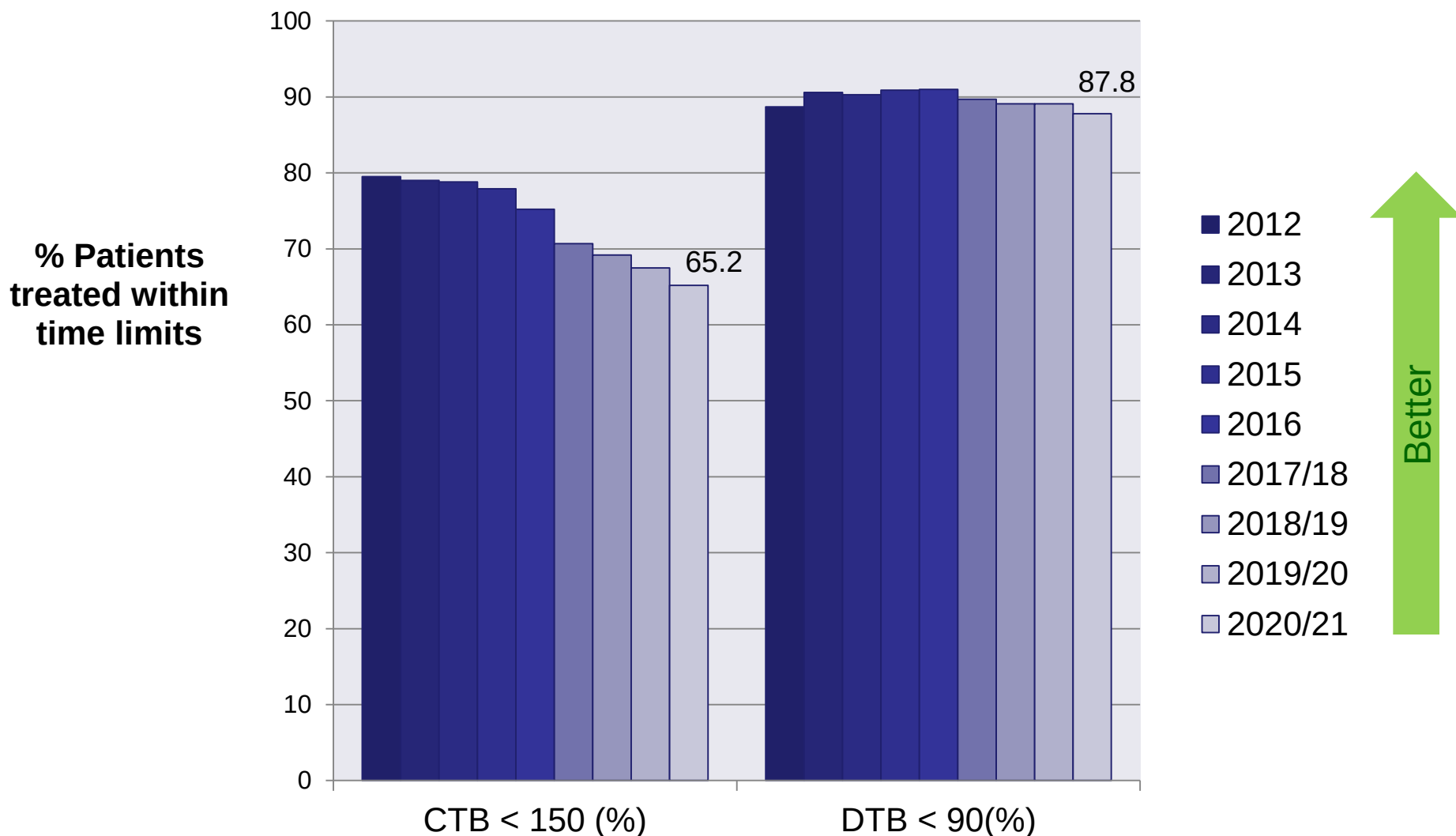
Four admission scenarios

Admitted from
the community



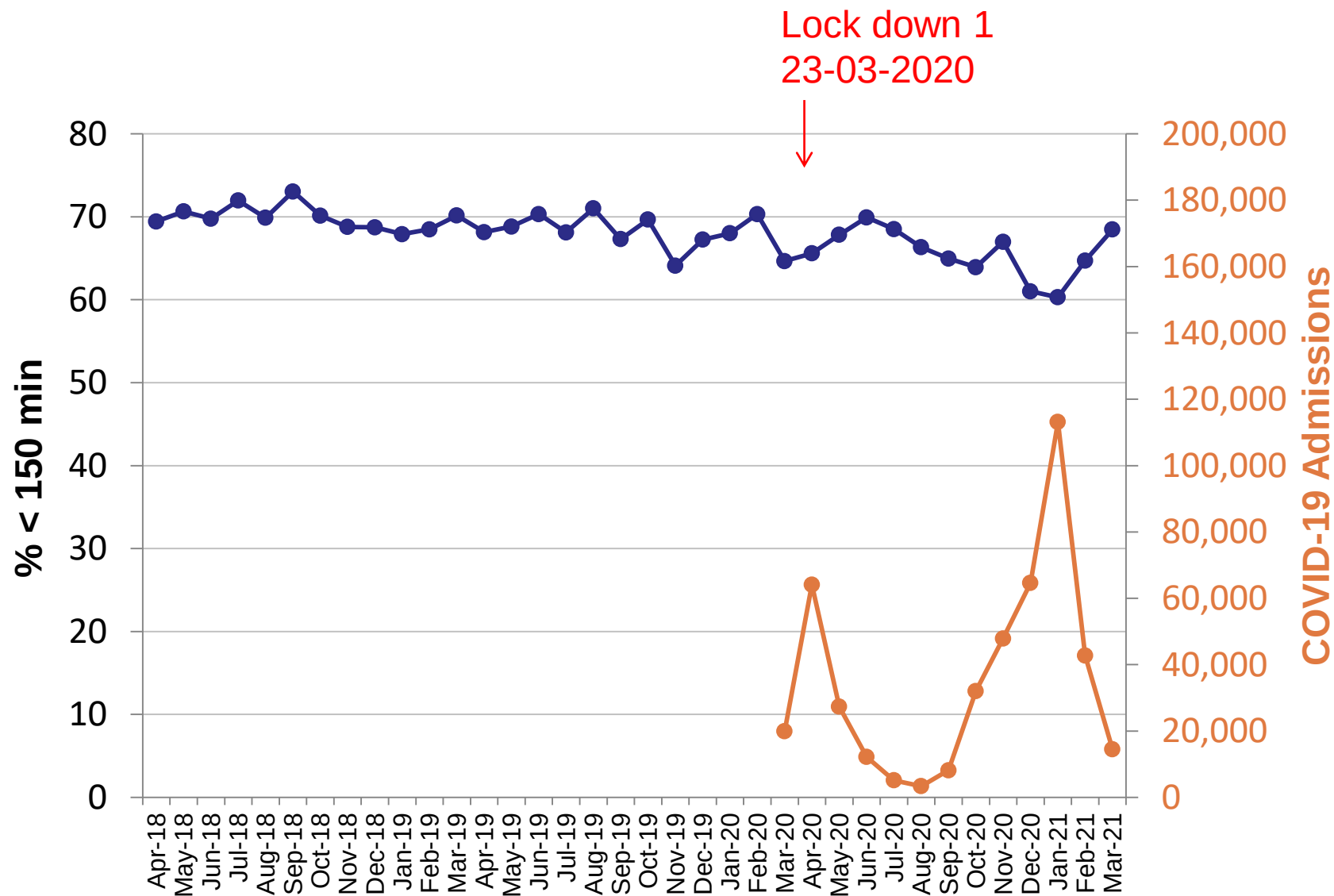
Primary PCI (excl shock/vent)

Direct and IHT



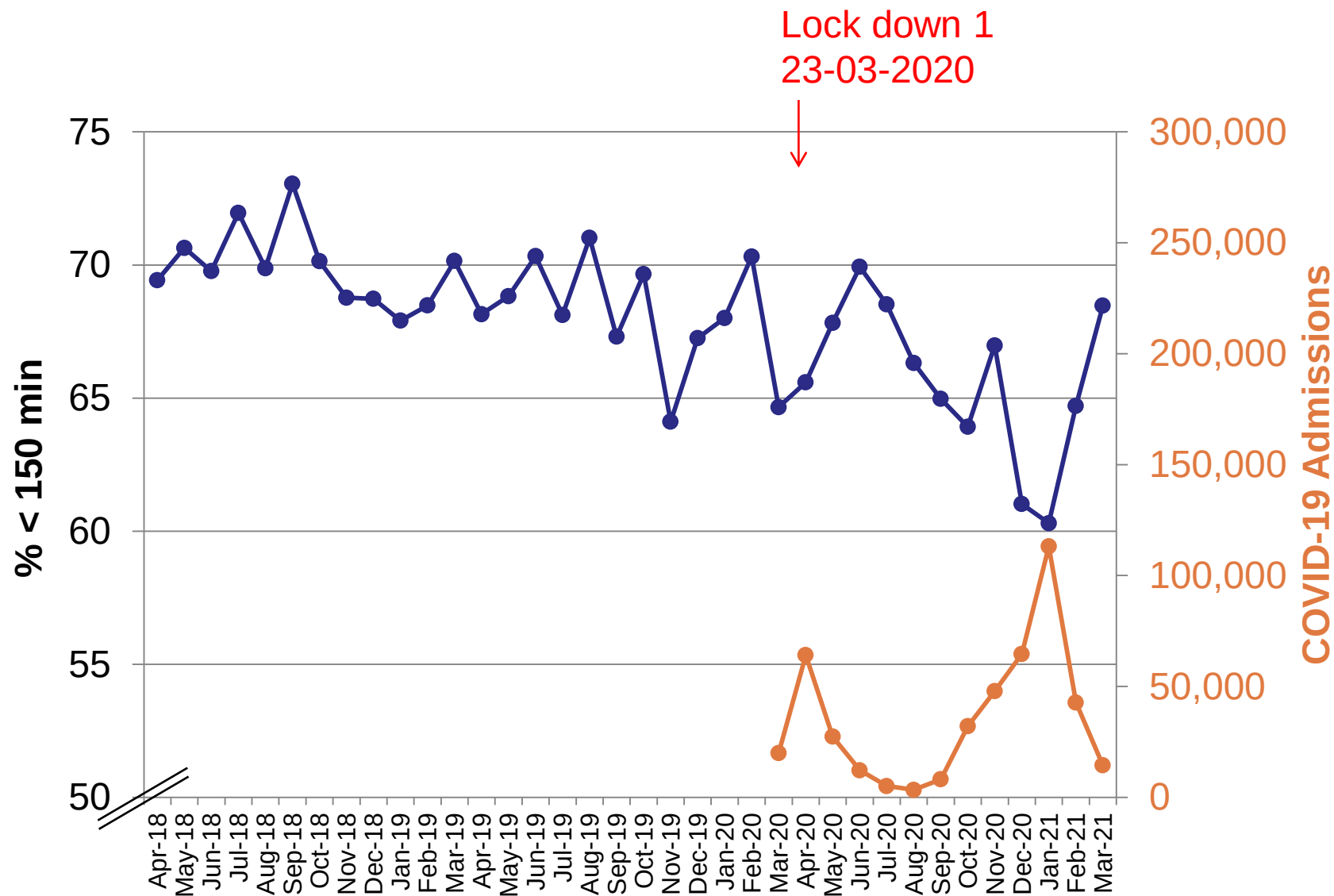
Primary PCI (excl shock/vent)

Direct and IHT: Call to Balloon times < 150 min



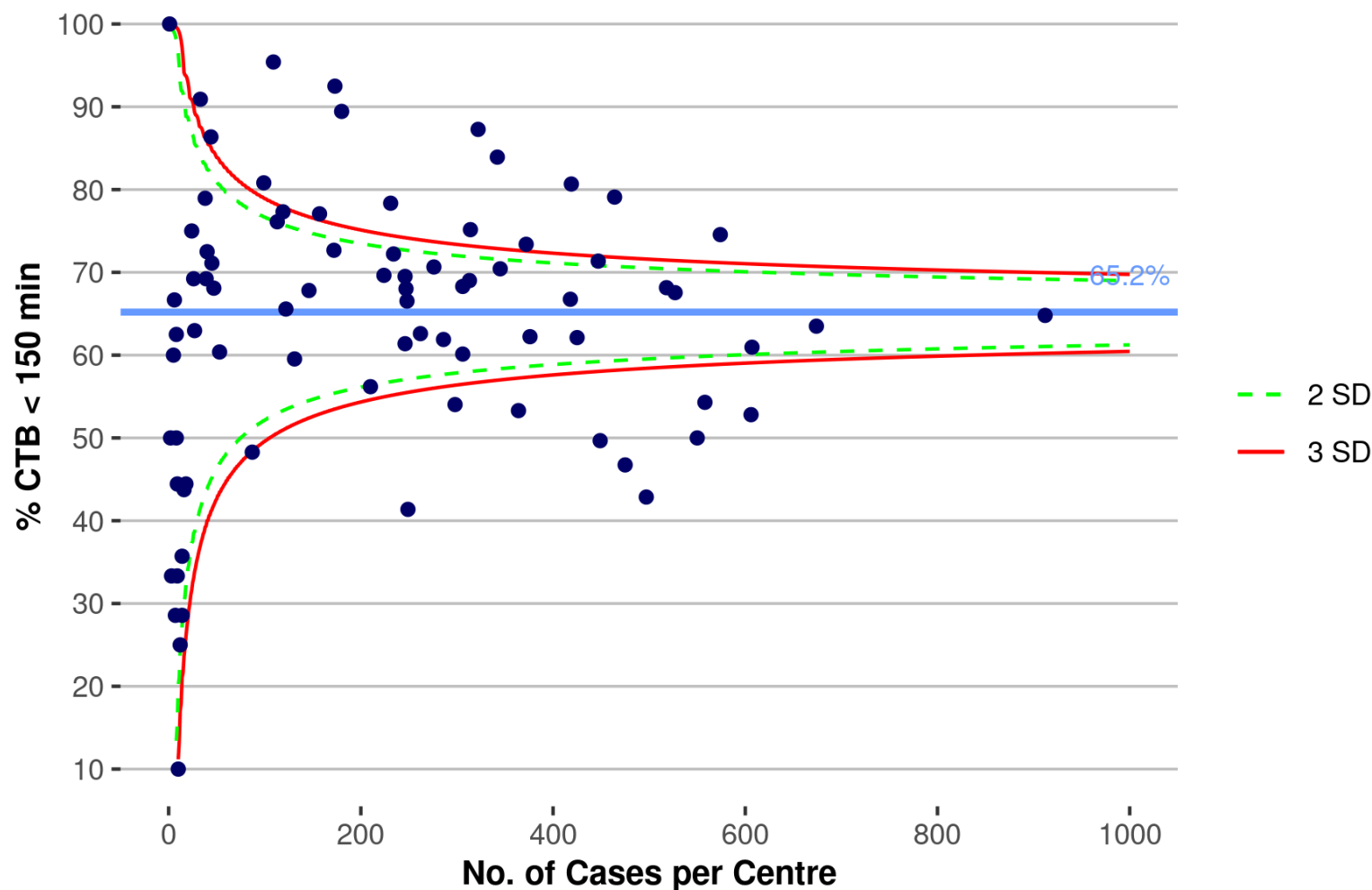
Primary PCI (excl shock/vent)

Direct and IHT: Call to Balloon times < 150 min



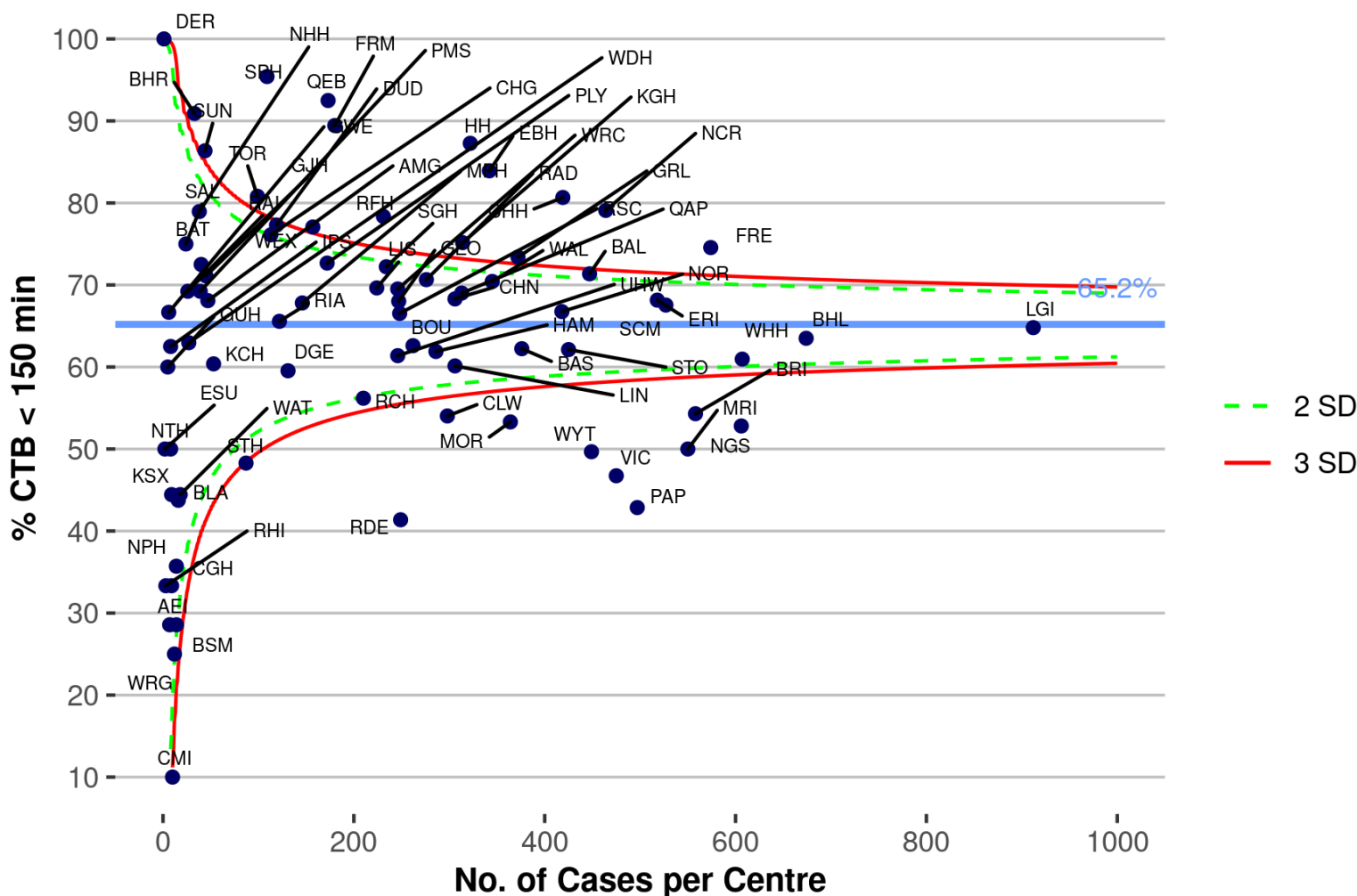
Primary PCI (excl shock/vent)

Direct and IHT: Call to Balloon times < 150 min



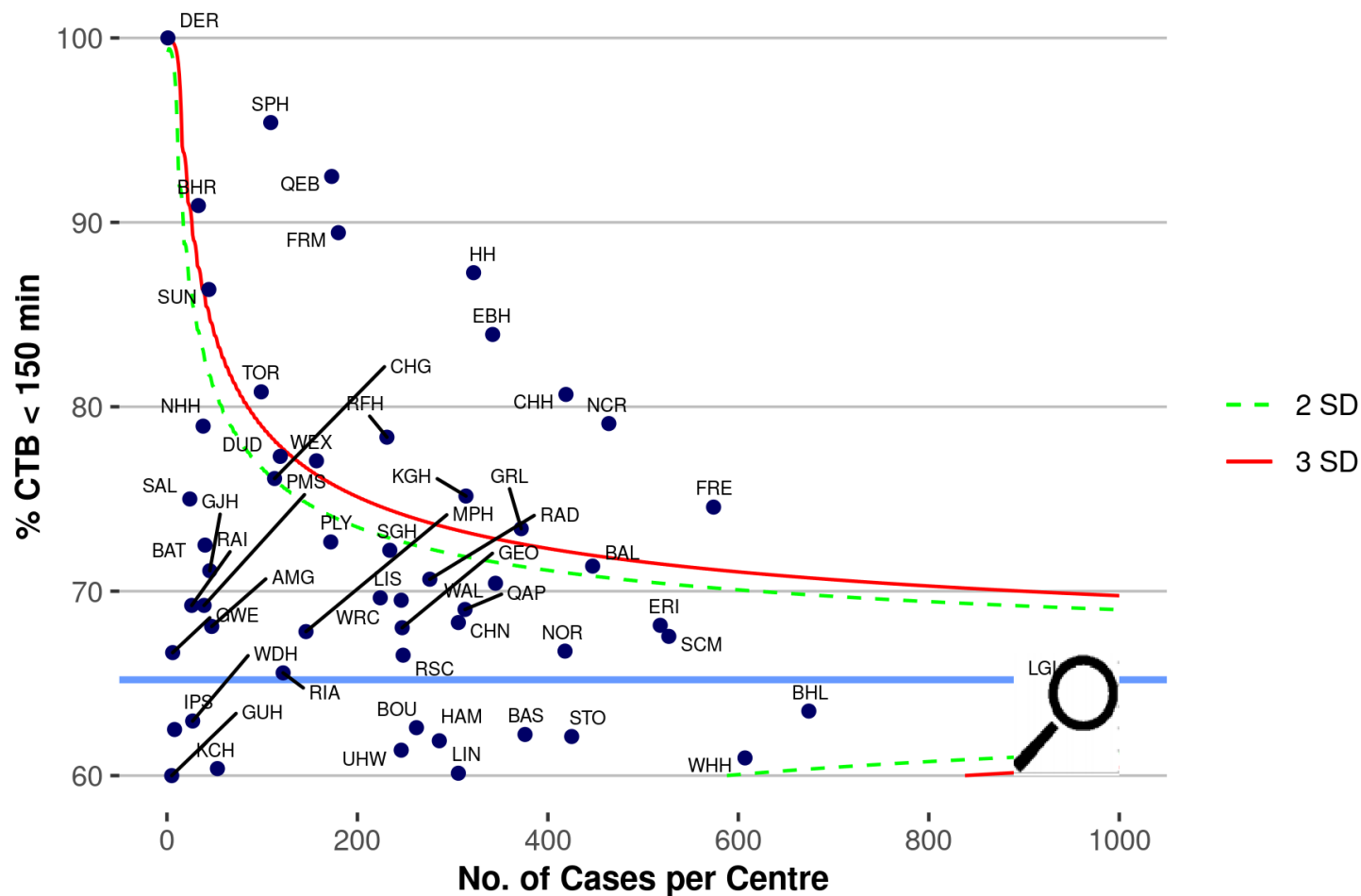
Primary PCI (excl shock/vent)

Direct and IHT: Call to Balloon times < 150 min



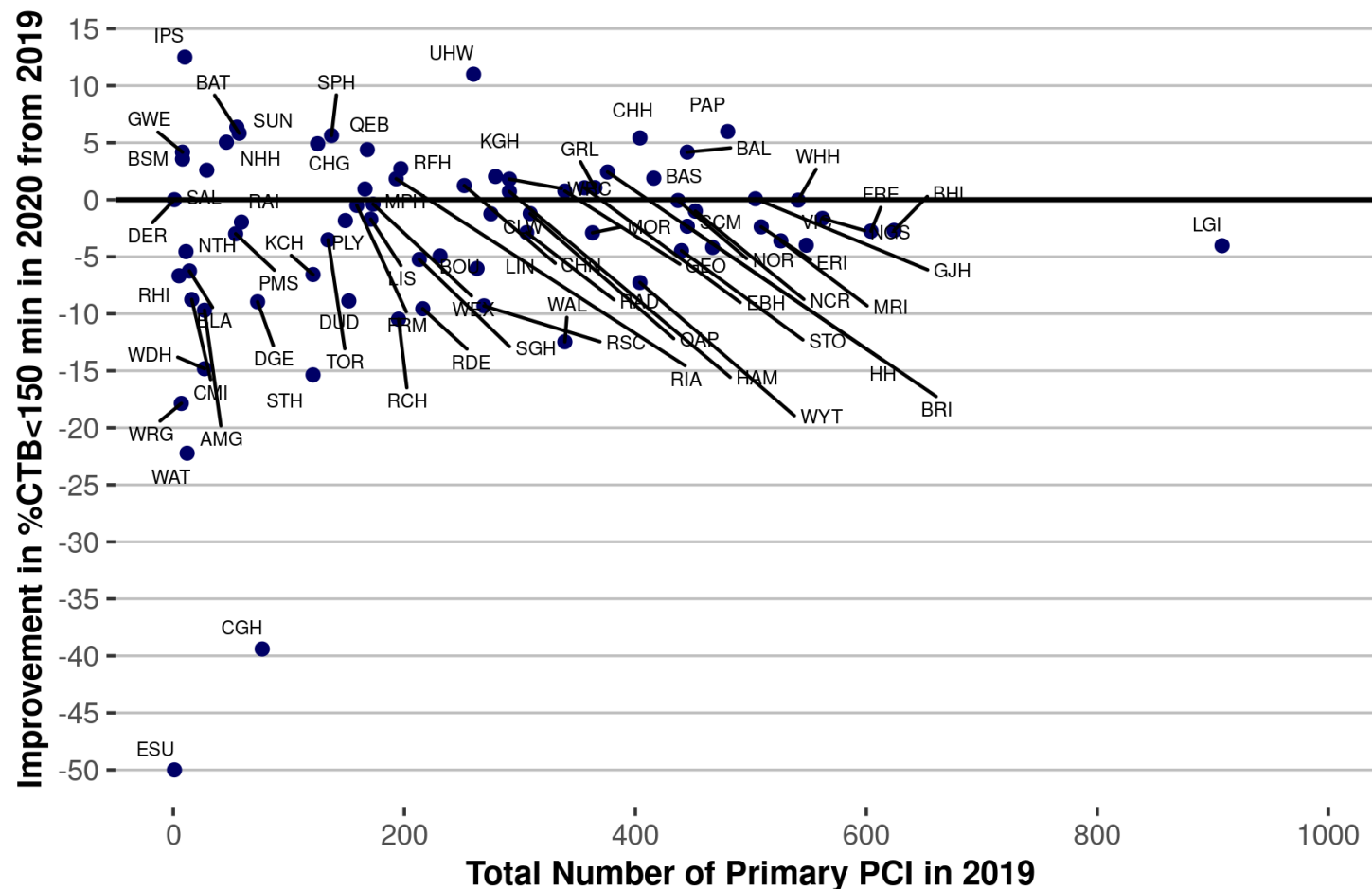
Primary PCI (excl shock/vent)

Direct and IHT: Call to Balloon times < 150 min



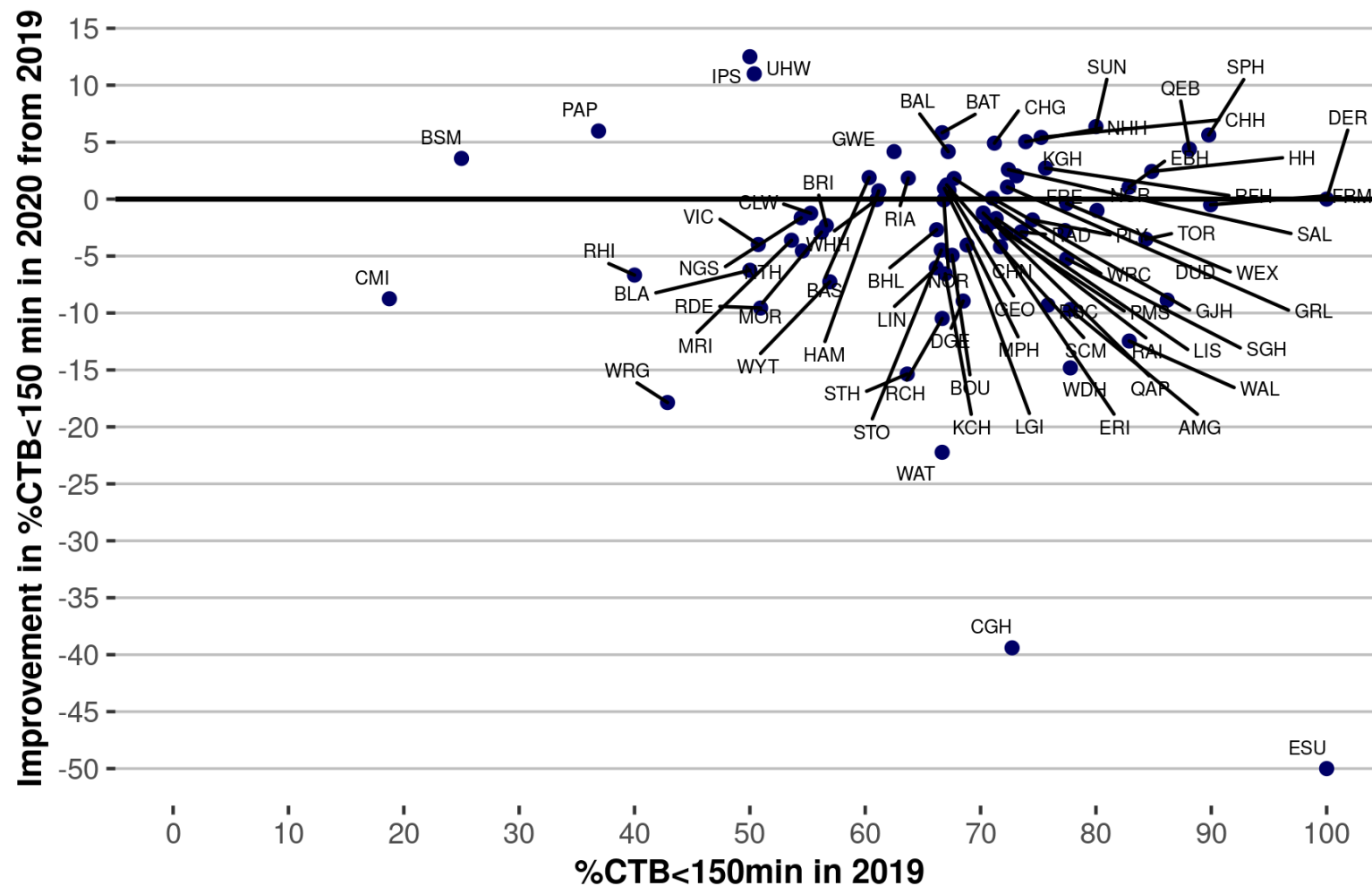
Primary PCI Changes (excl shock/vent)

Direct and IHT: CTB < 150 min



Primary PCI Changes (excl shock/vent)

Direct and IHT: CTB < 150 min



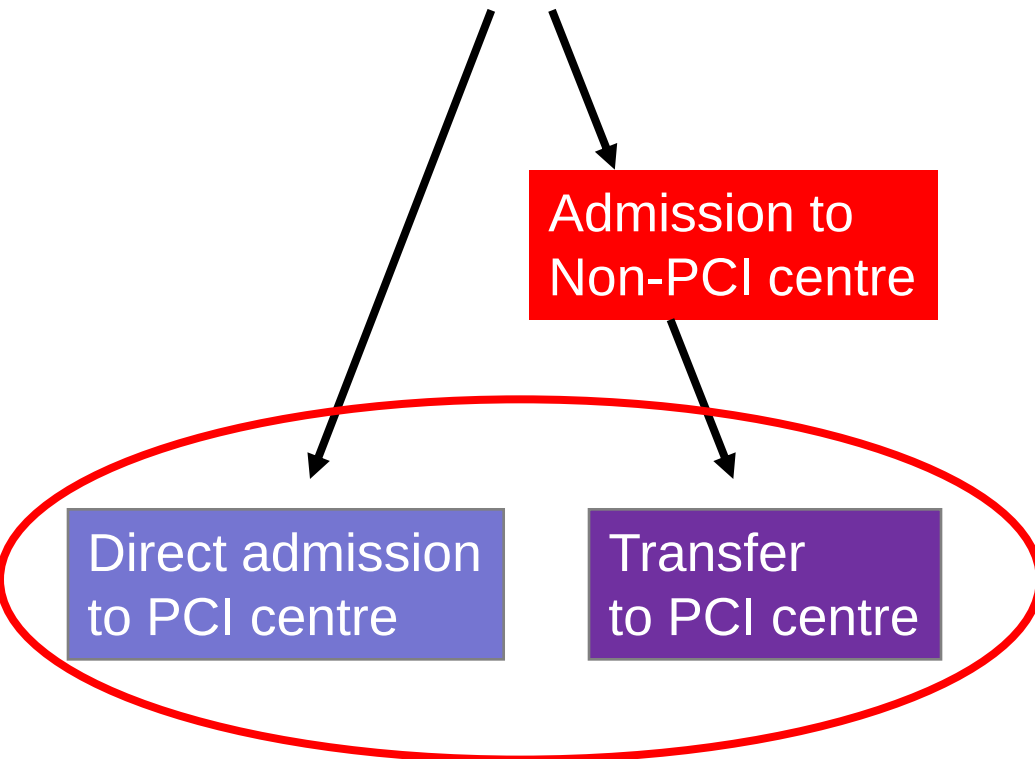
Better

2020=2020/21 etc

PCI for Acute Sx

Four admission scenarios

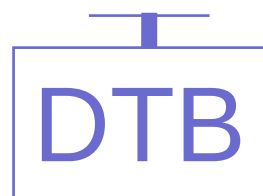
Admitted from
the community



D1

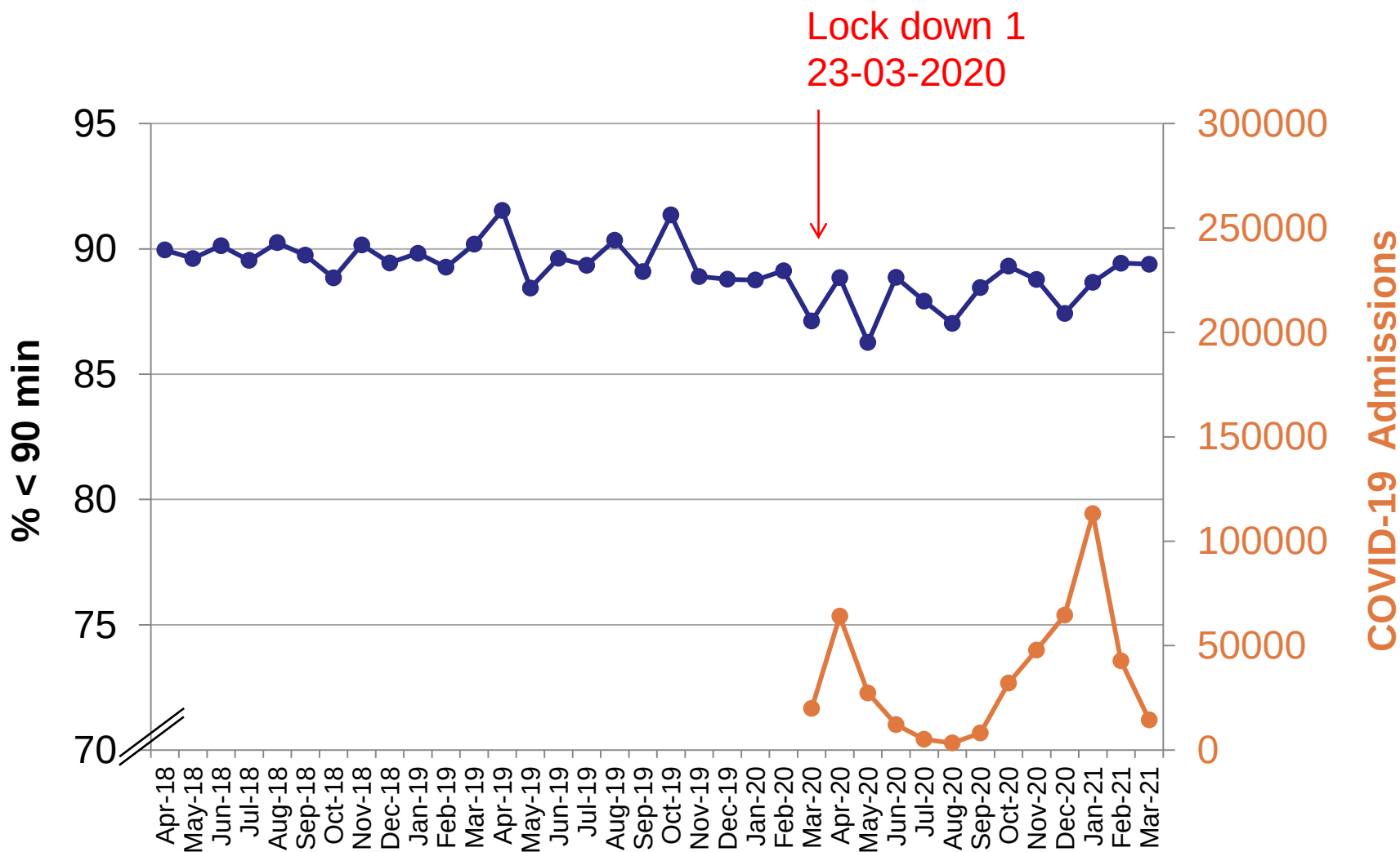
D2

device



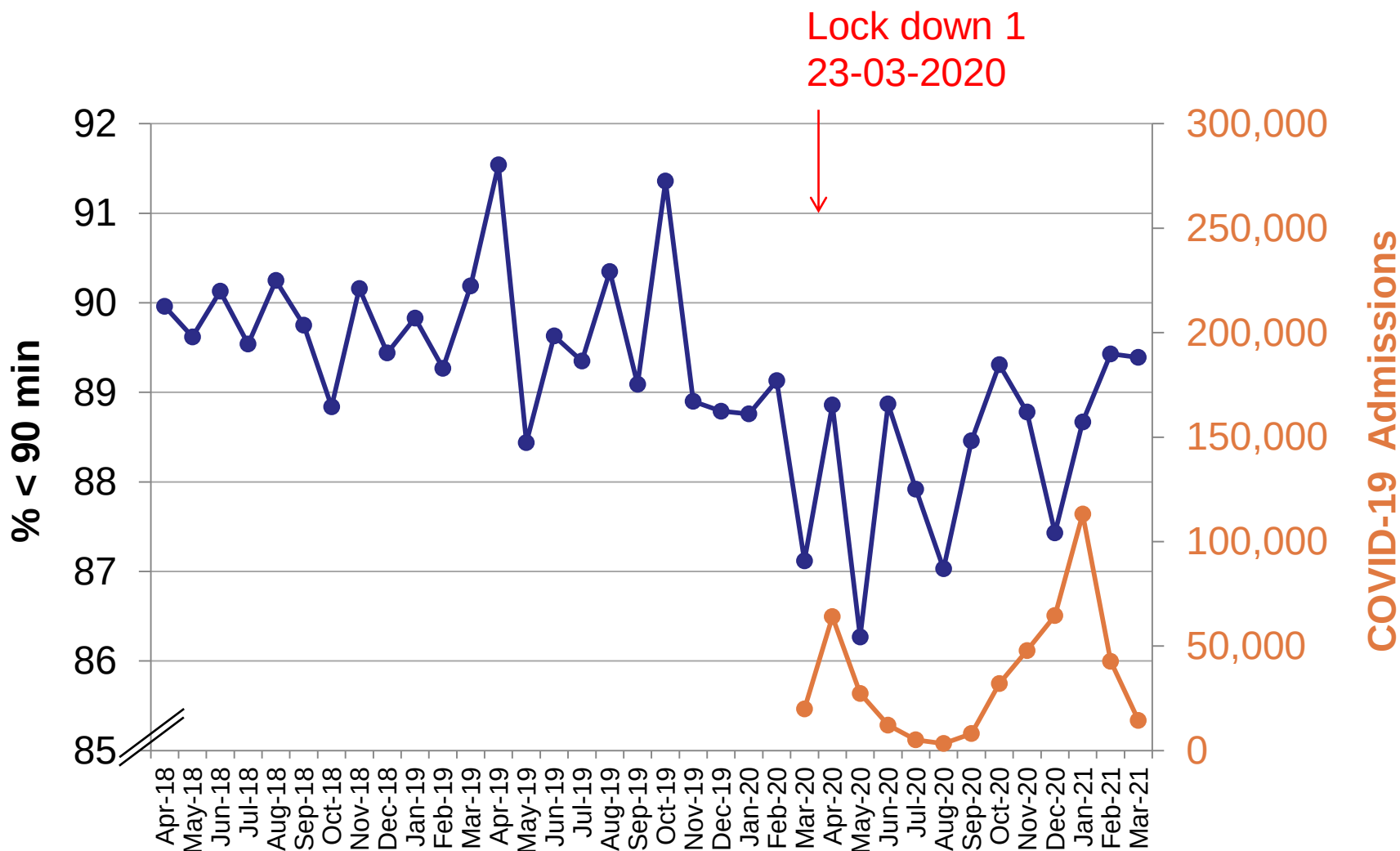
Primary PCI (excl shock/vent)

Direct and IHT: Door to Balloon < 90 min



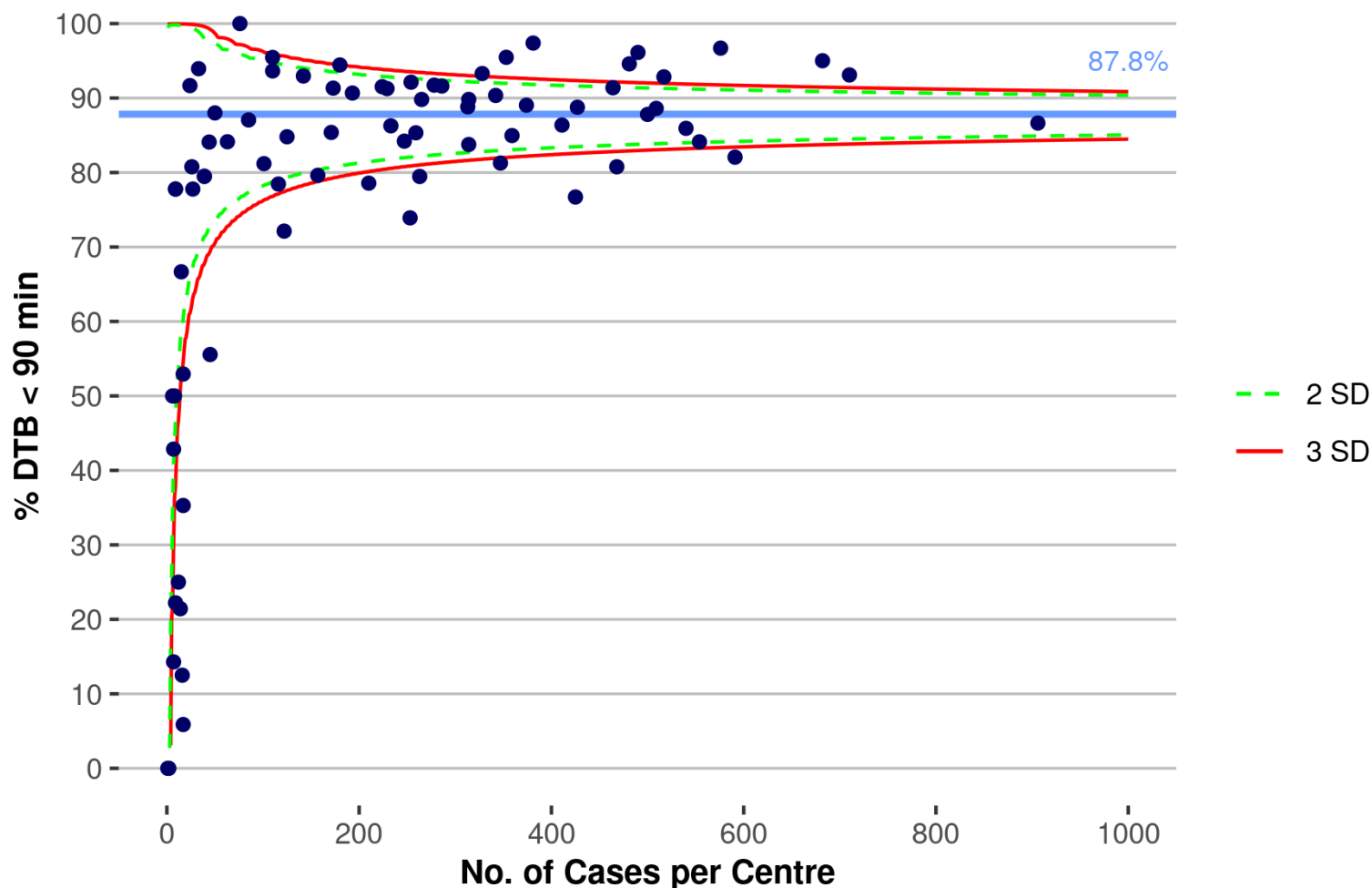
Primary PCI (excl shock/vent)

Direct and IHT: Door to Balloon < 90 min



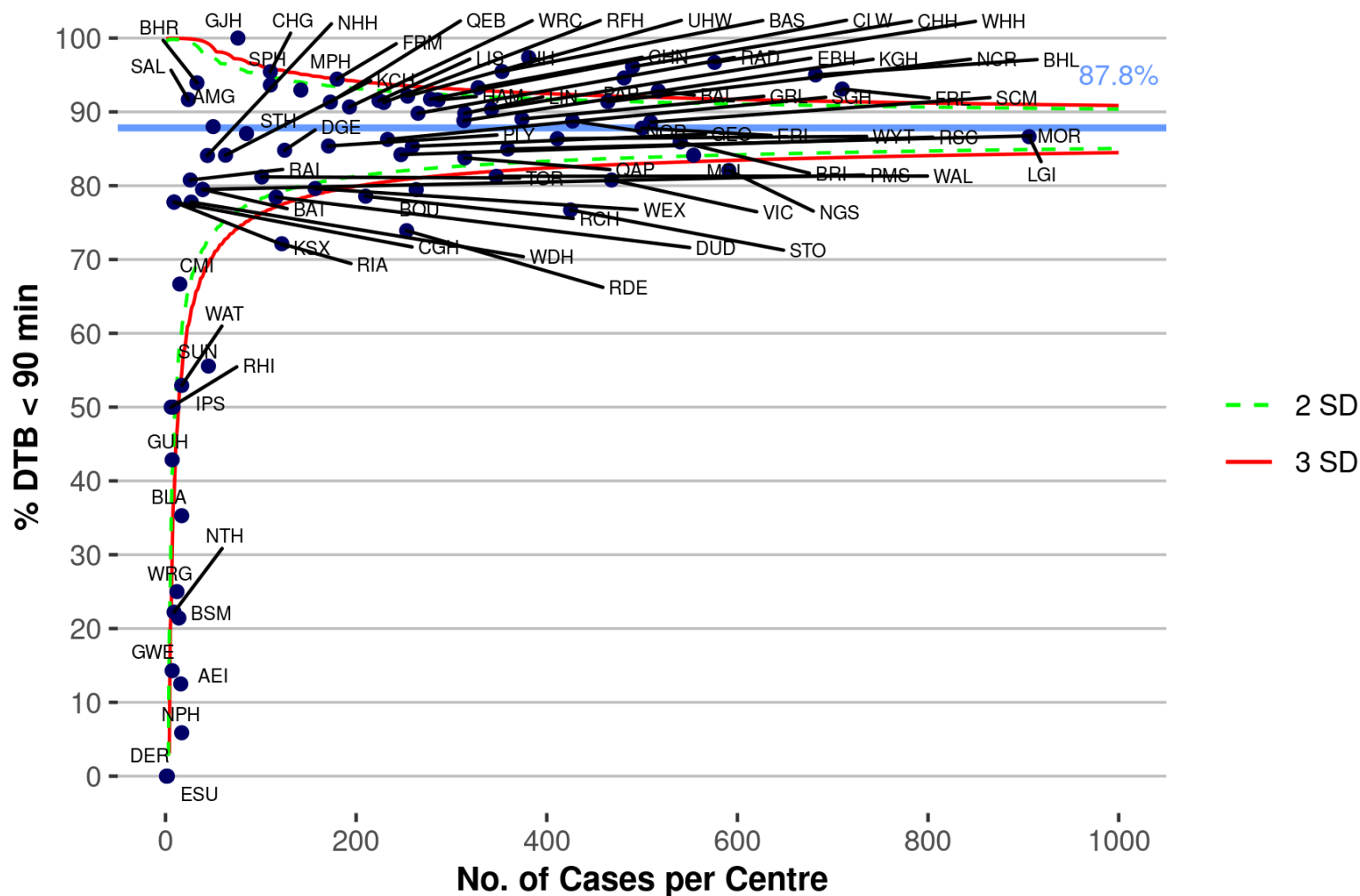
Primary PCI (excl shock/vent)

Direct and IHT: Door to Balloon < 90 min



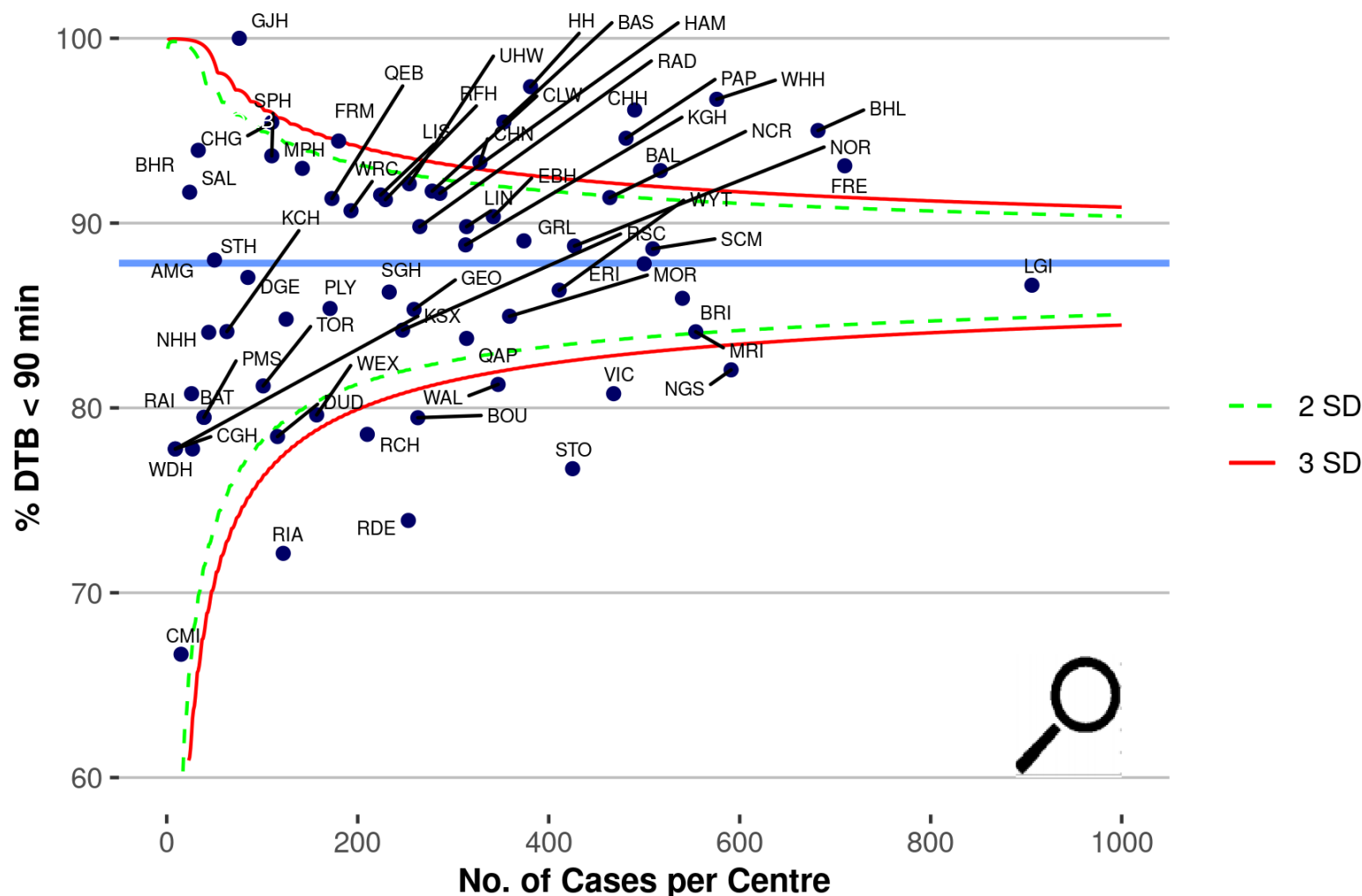
Primary PCI (excl shock/vent)

Direct and IHT: Door to Balloon < 90 min



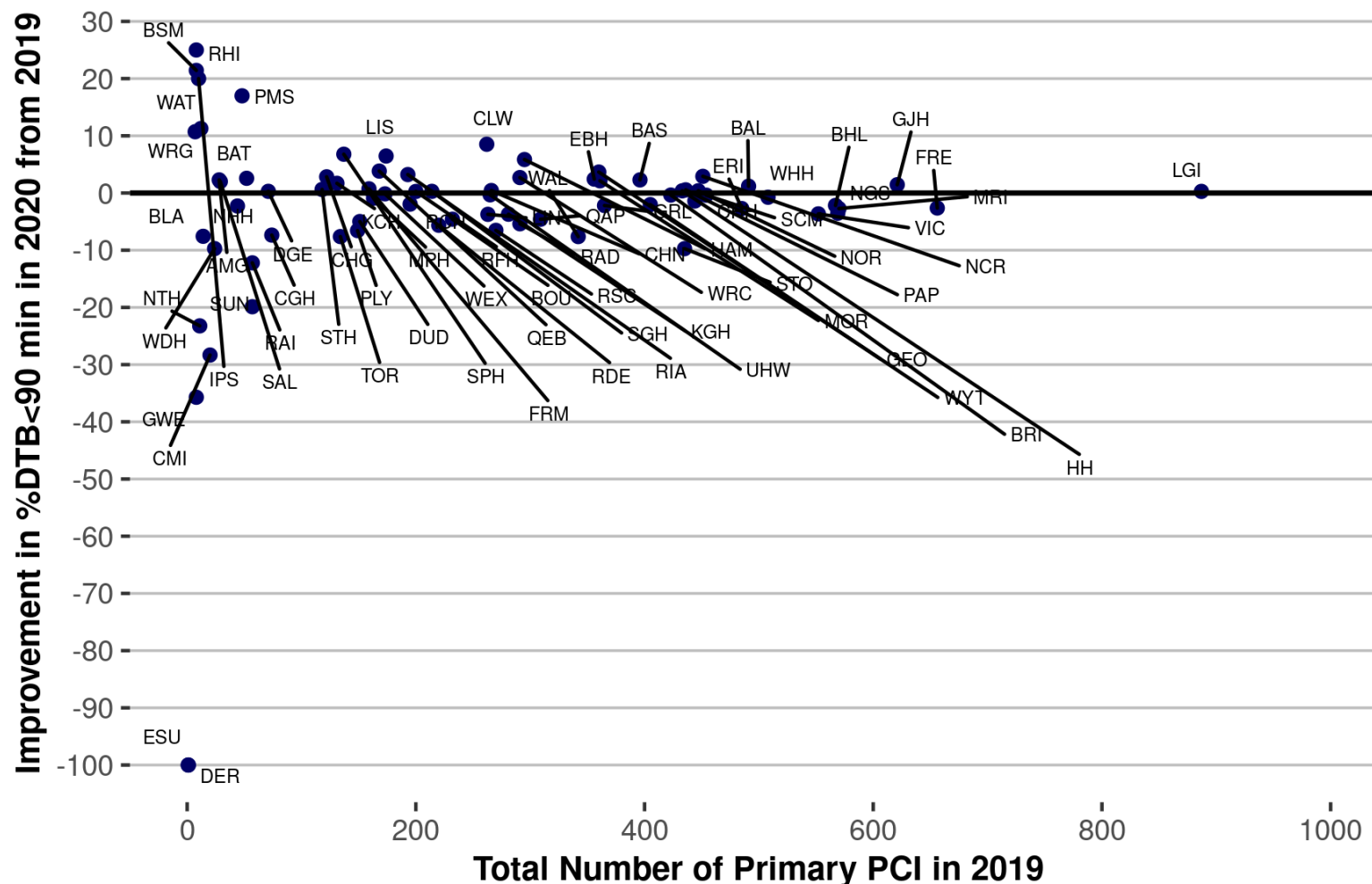
Primary PCI (excl shock/vent)

Direct and IHT: Door to Balloon < 90 min



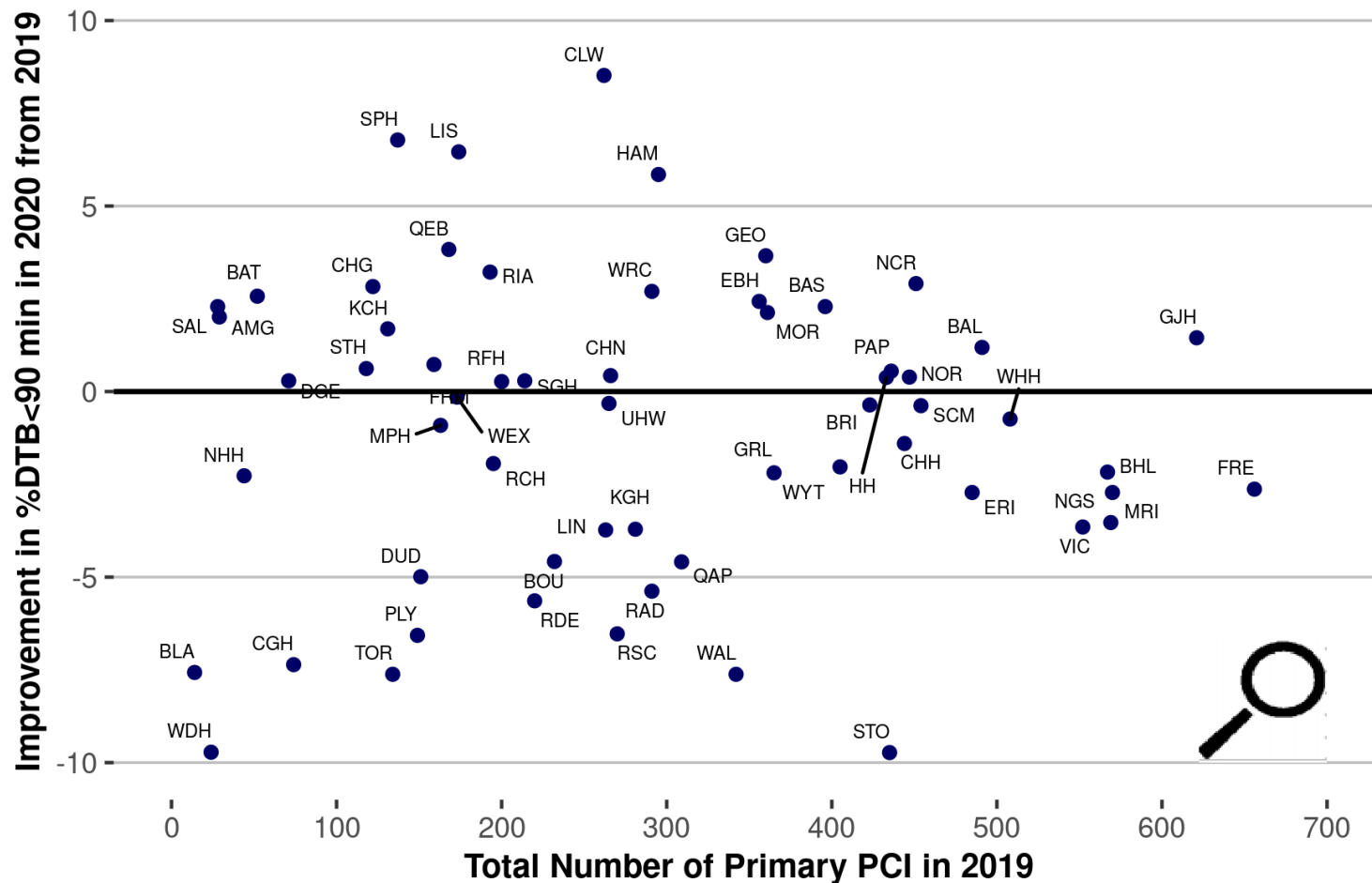
Primary PCI Changes

Direct and IHT: DTB < 90 min



Primary PCI Changes

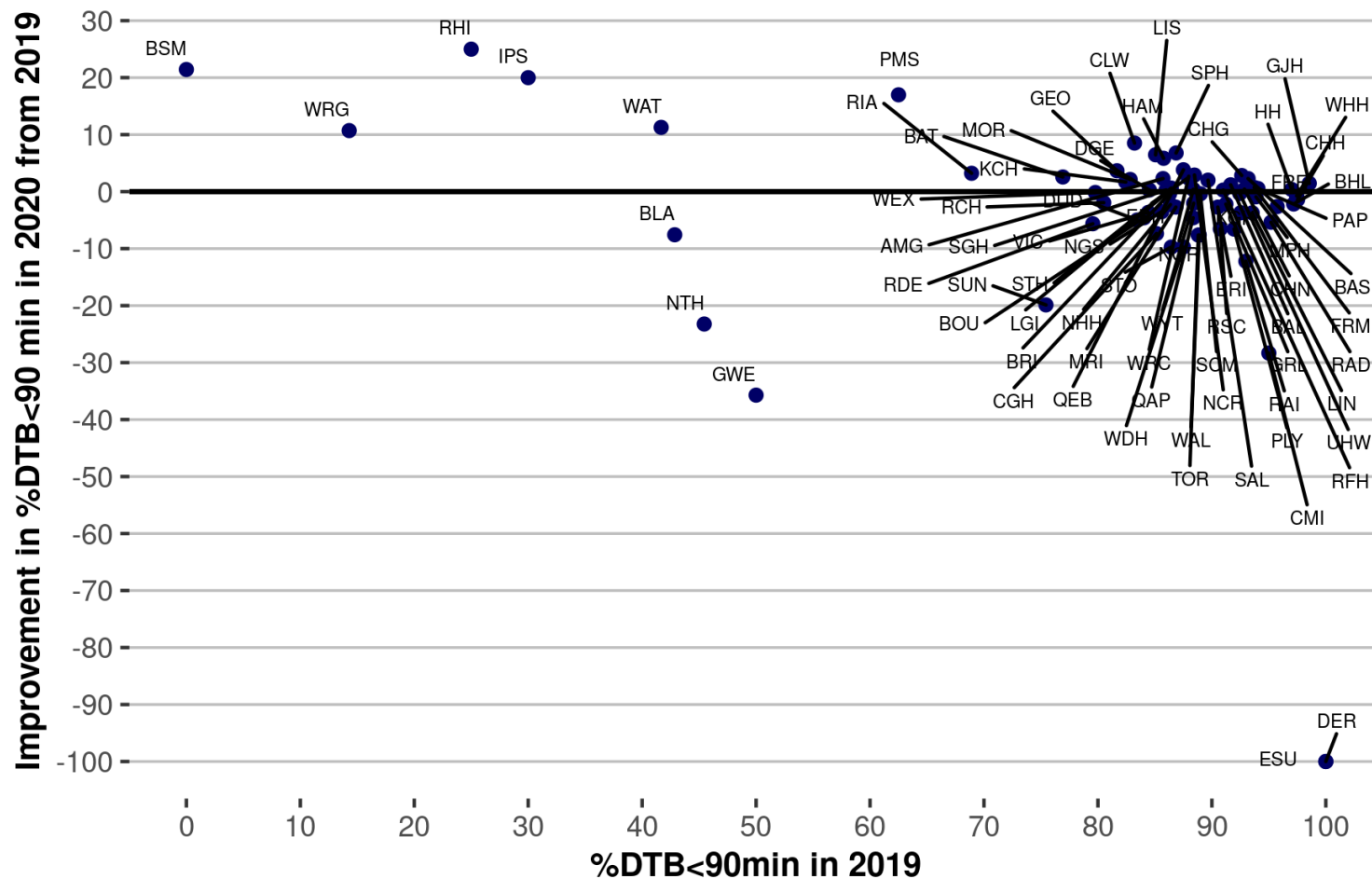
Direct and IHT: DTB < 90 min



Better

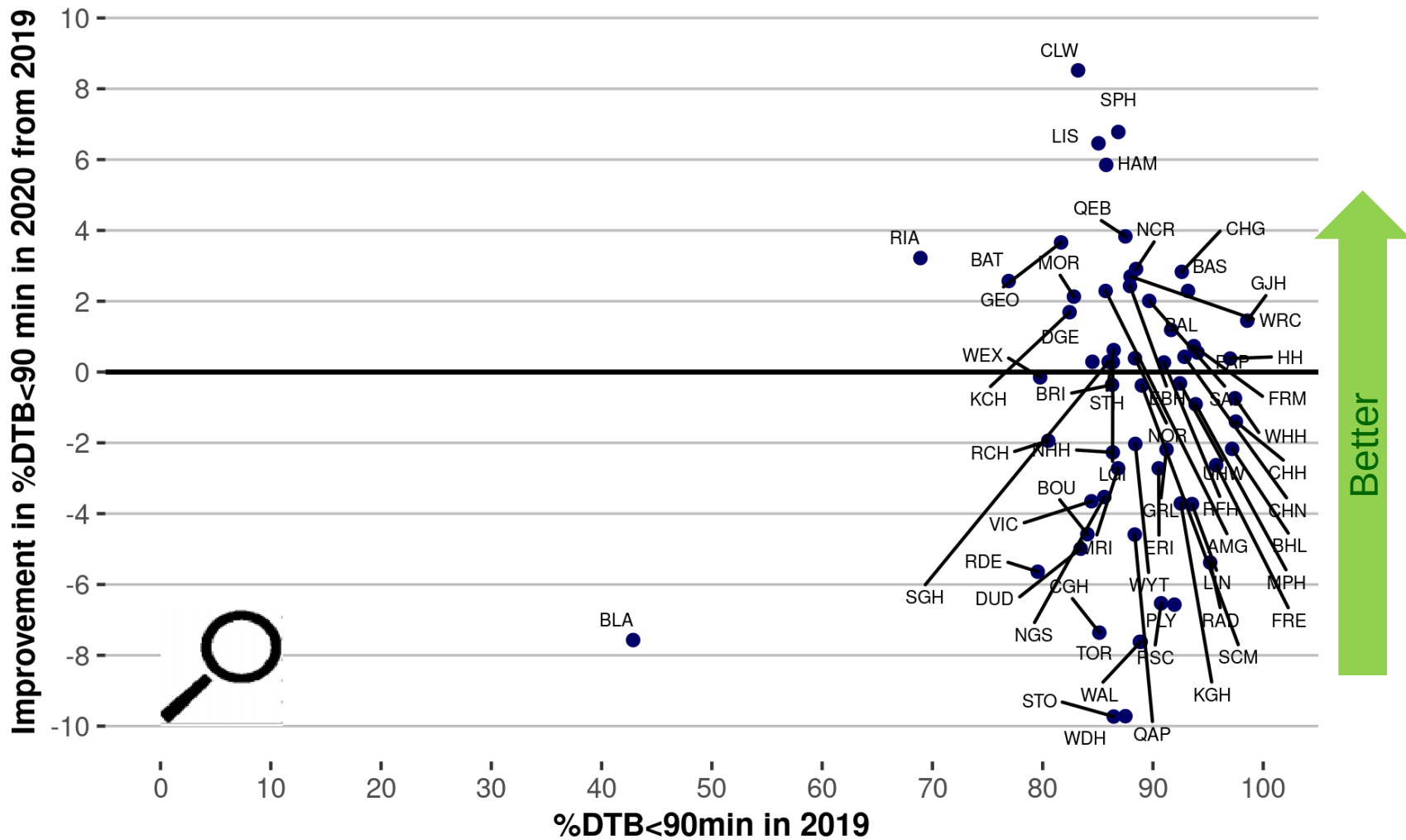
Primary PCI Changes

Direct and IHT: DTB < 90 min



Primary PCI Changes

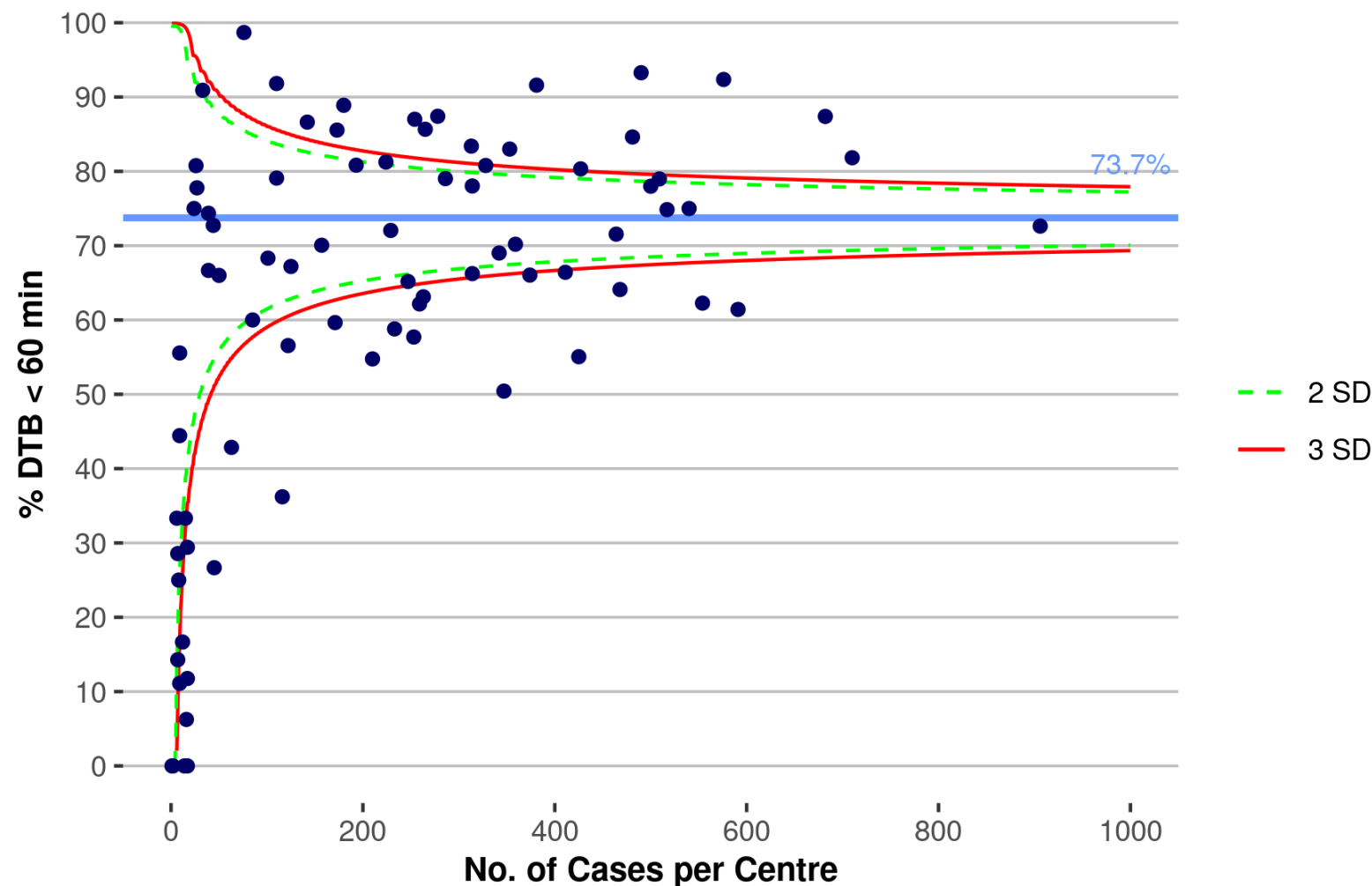
Direct and IHT: DTB < 90 min



N.B. 2019 = 2019/20 etc

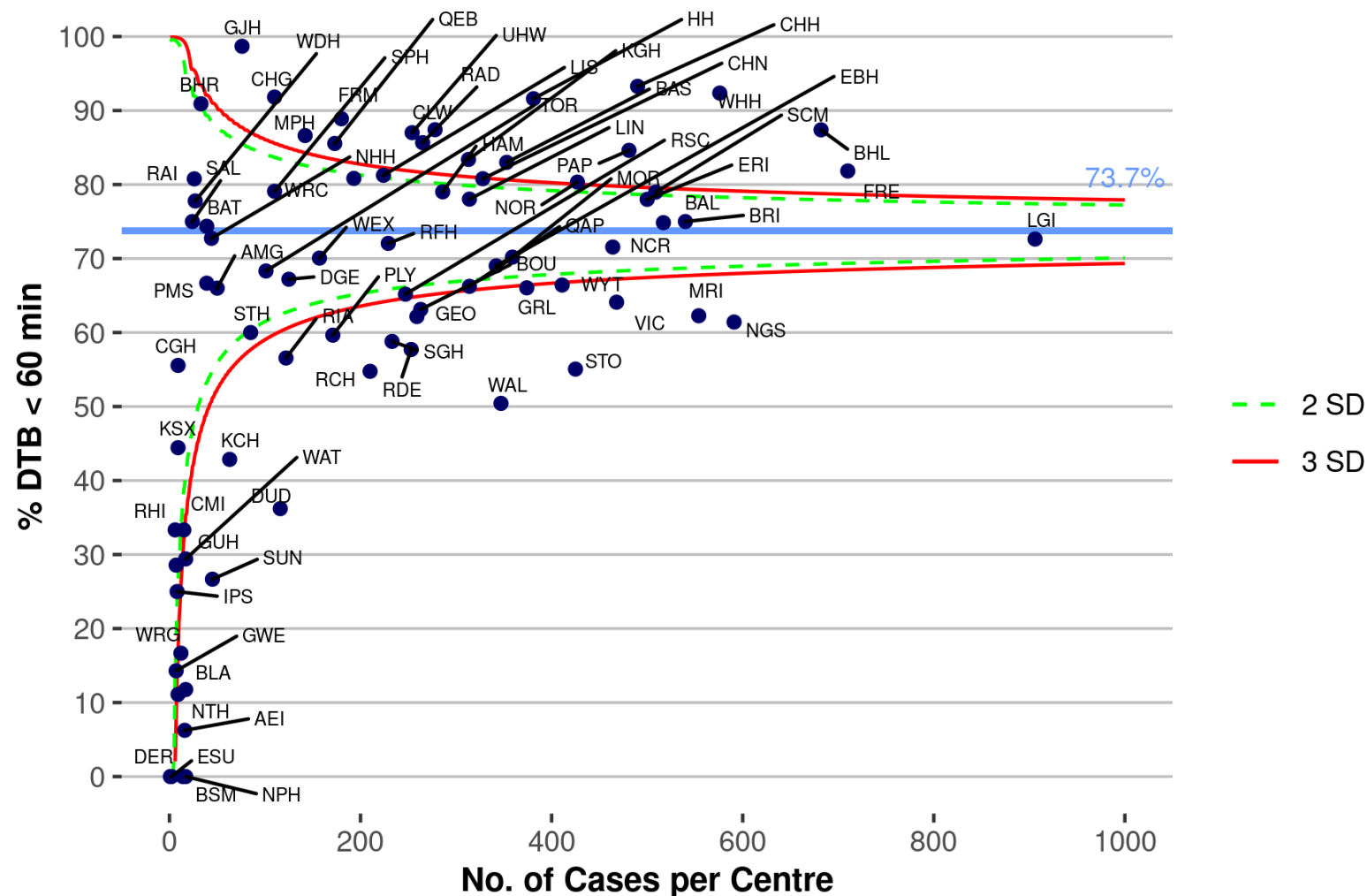
Primary PCI (excl shock/vent)

Direct and IHT: PCI Door to Balloon < 60 min



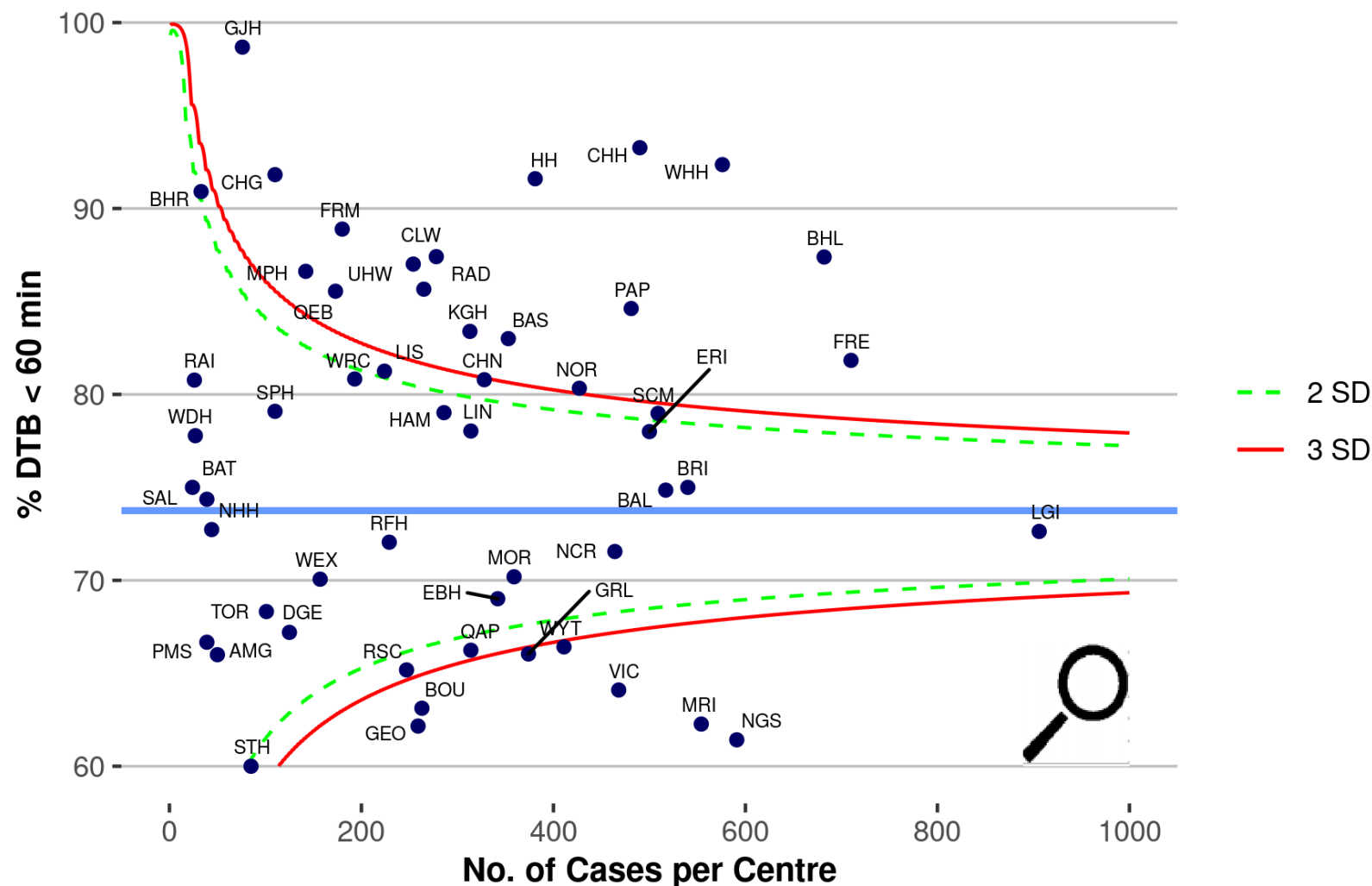
Primary PCI (excl shock/vent)

Direct and IHT: PCI Door to Balloon < 60 min



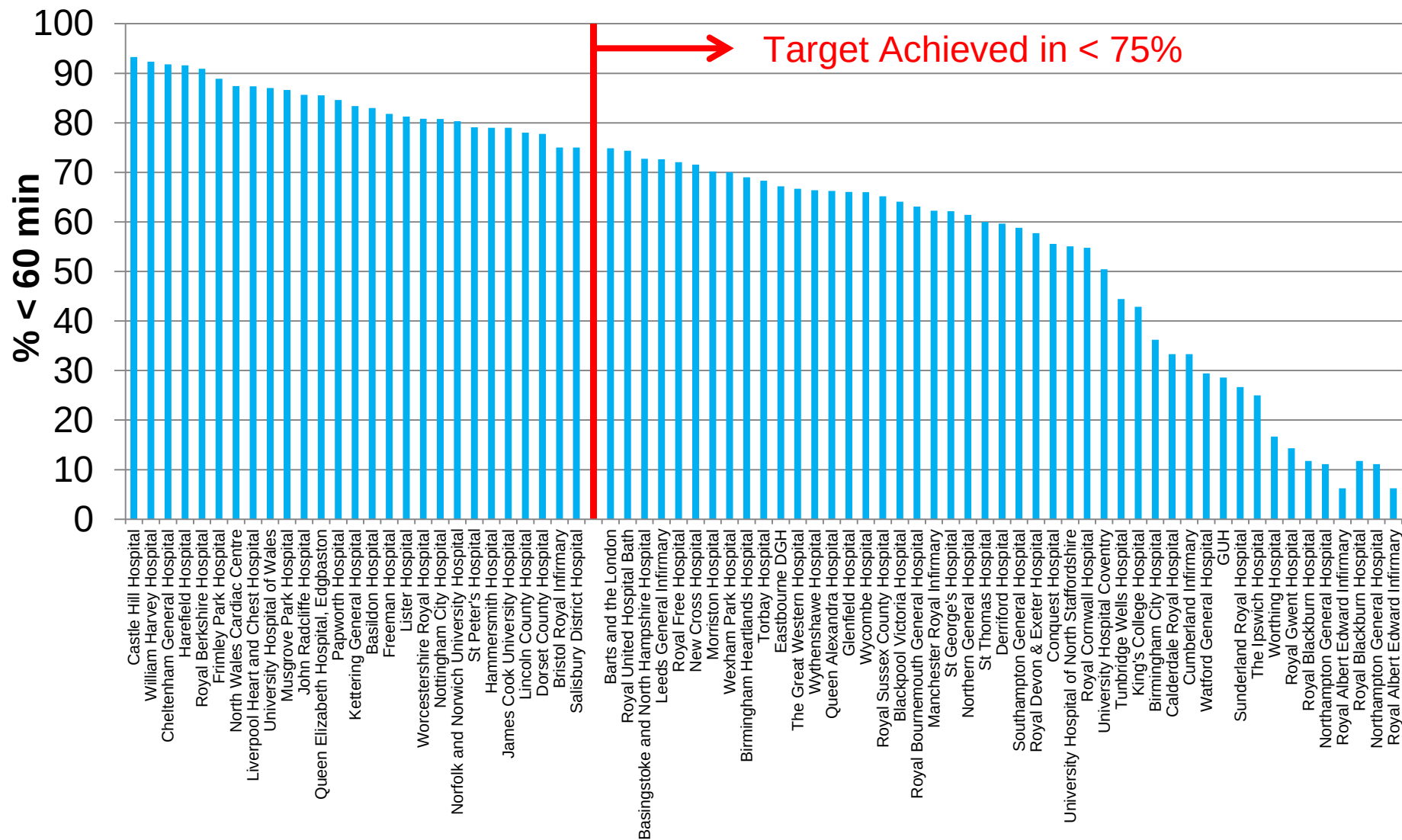
Primary PCI (excl shock/vent)

Direct and IHT: PCI Door to Balloon < 60 min



Primary PCI (excl shock/vent)

Direct and IHT: PCI Door to Balloon < 60 min (E&W)



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

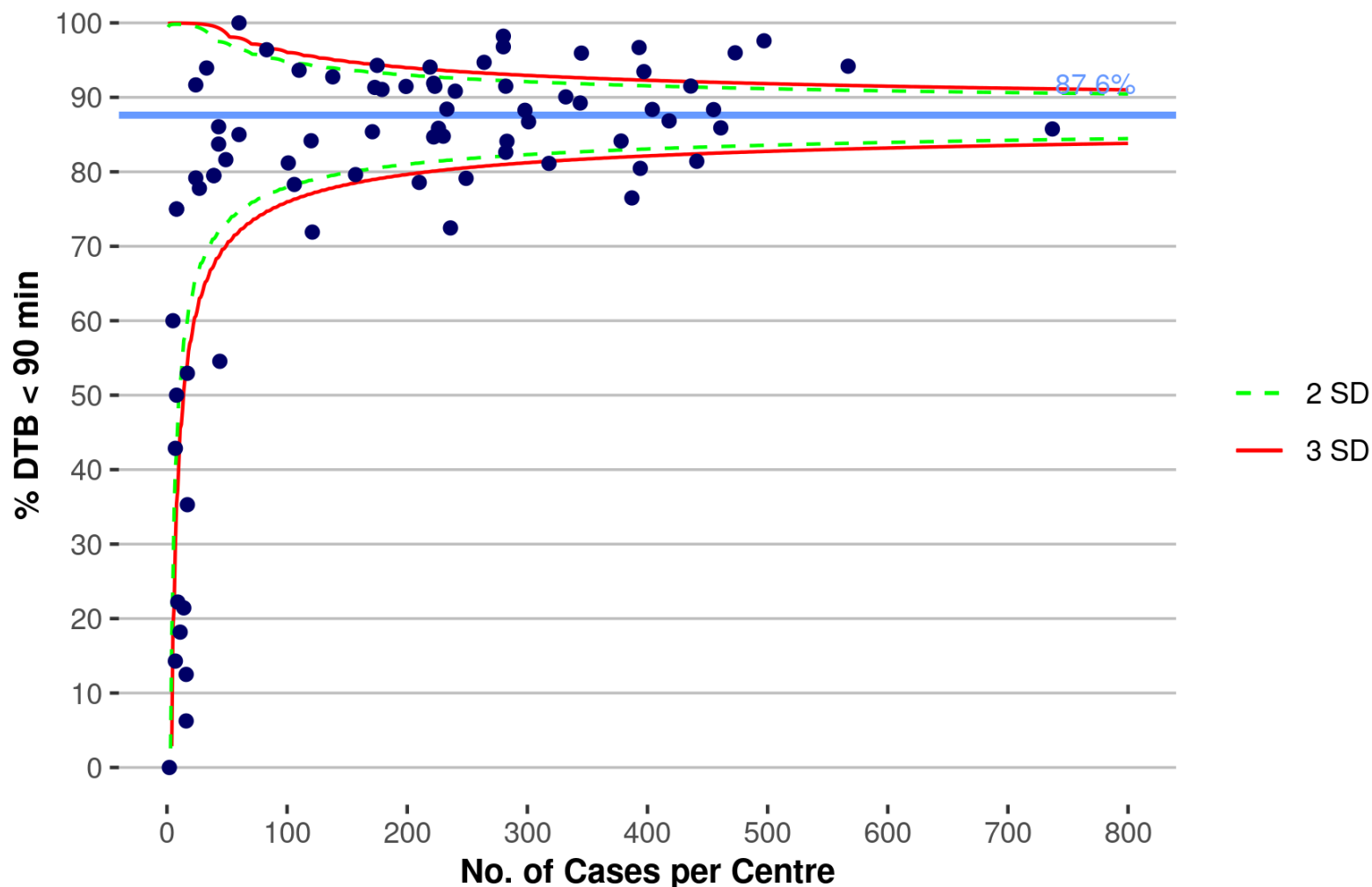
D2

DTB

device

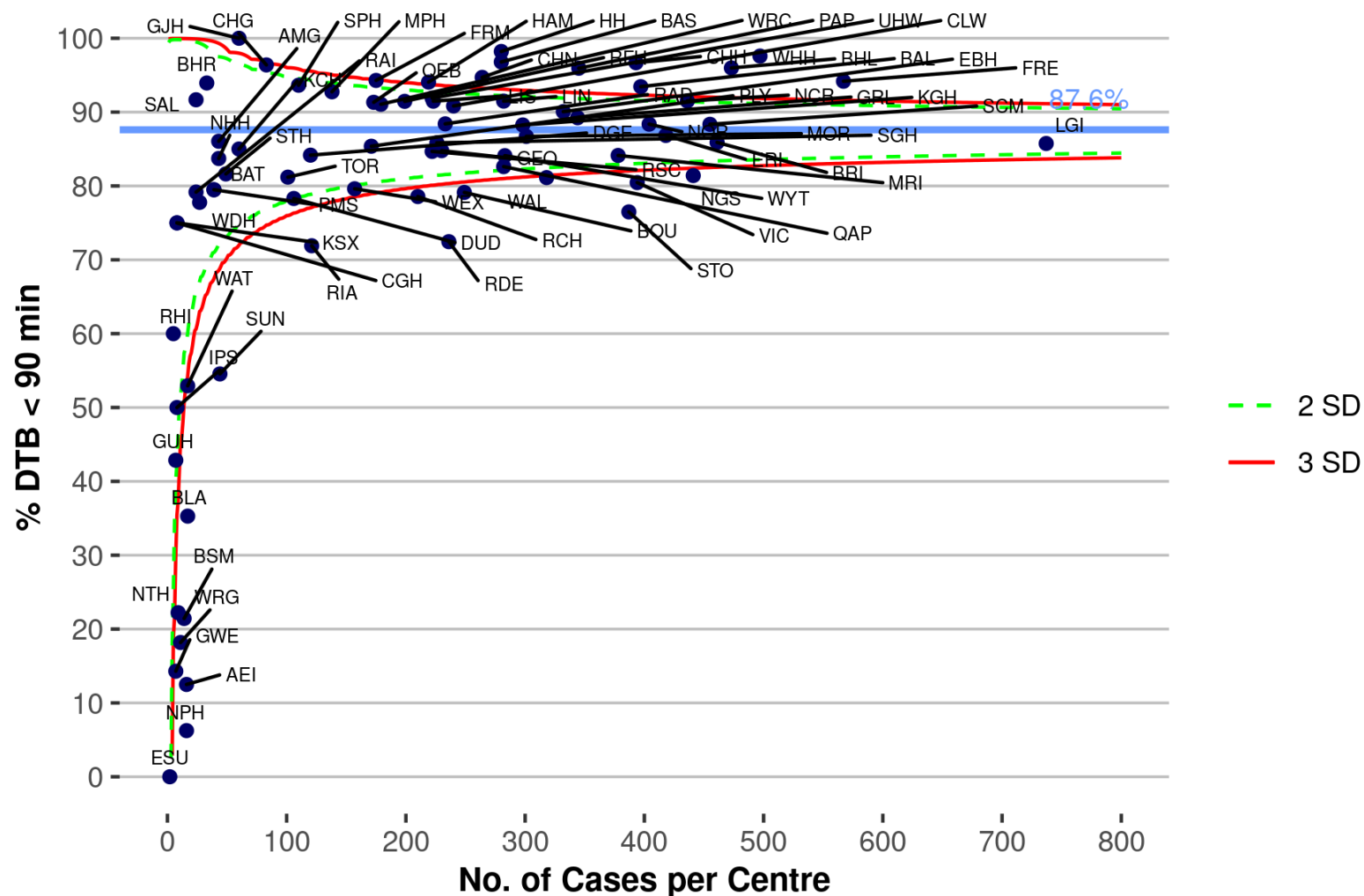
Primary PCI (excl shock/vent)

Direct ONLY: PCI Door to Balloon < 90 min



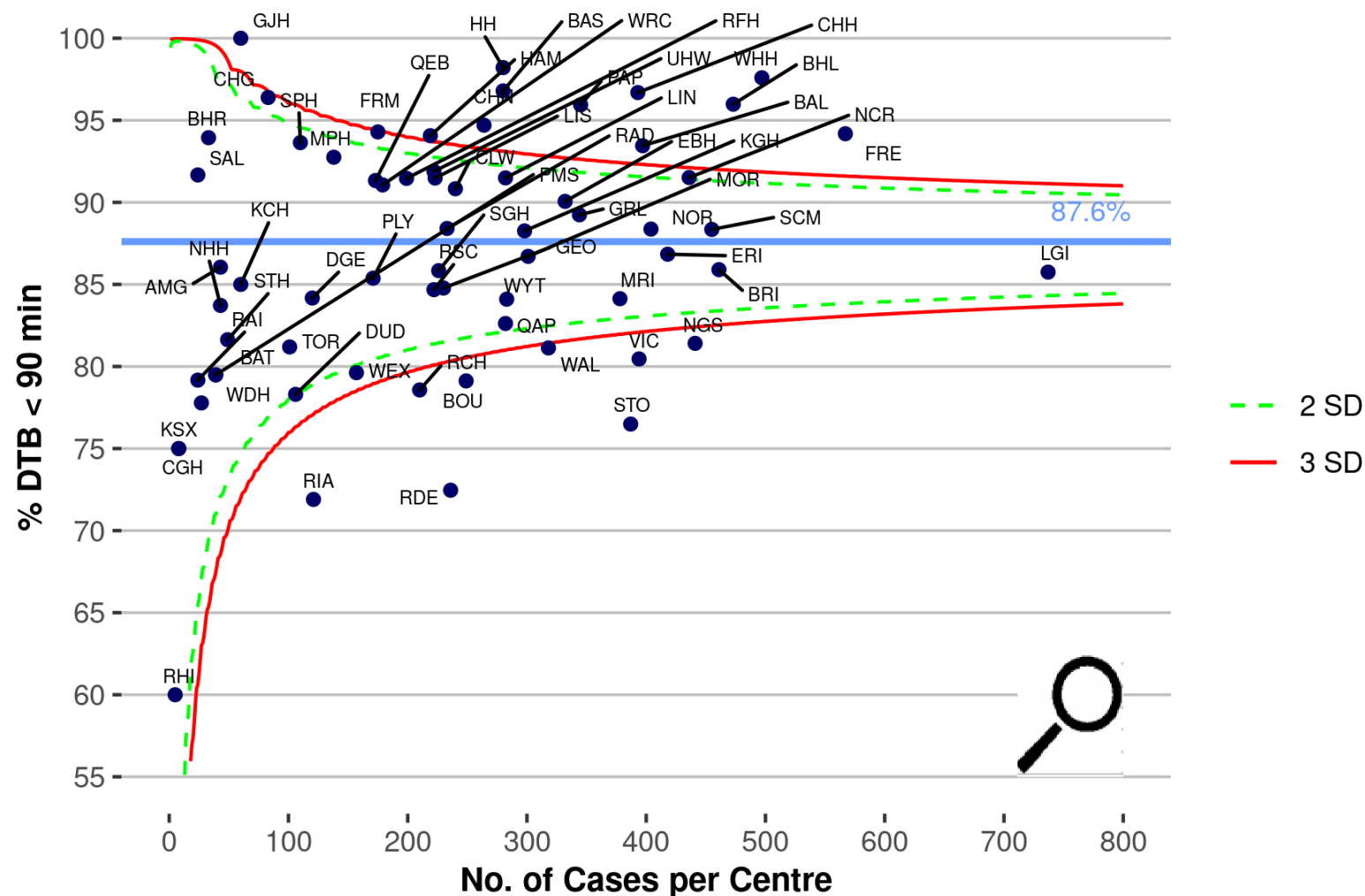
Primary PCI (excl shock/vent)

Direct ONLY: PCI Door to Balloon < 90 min



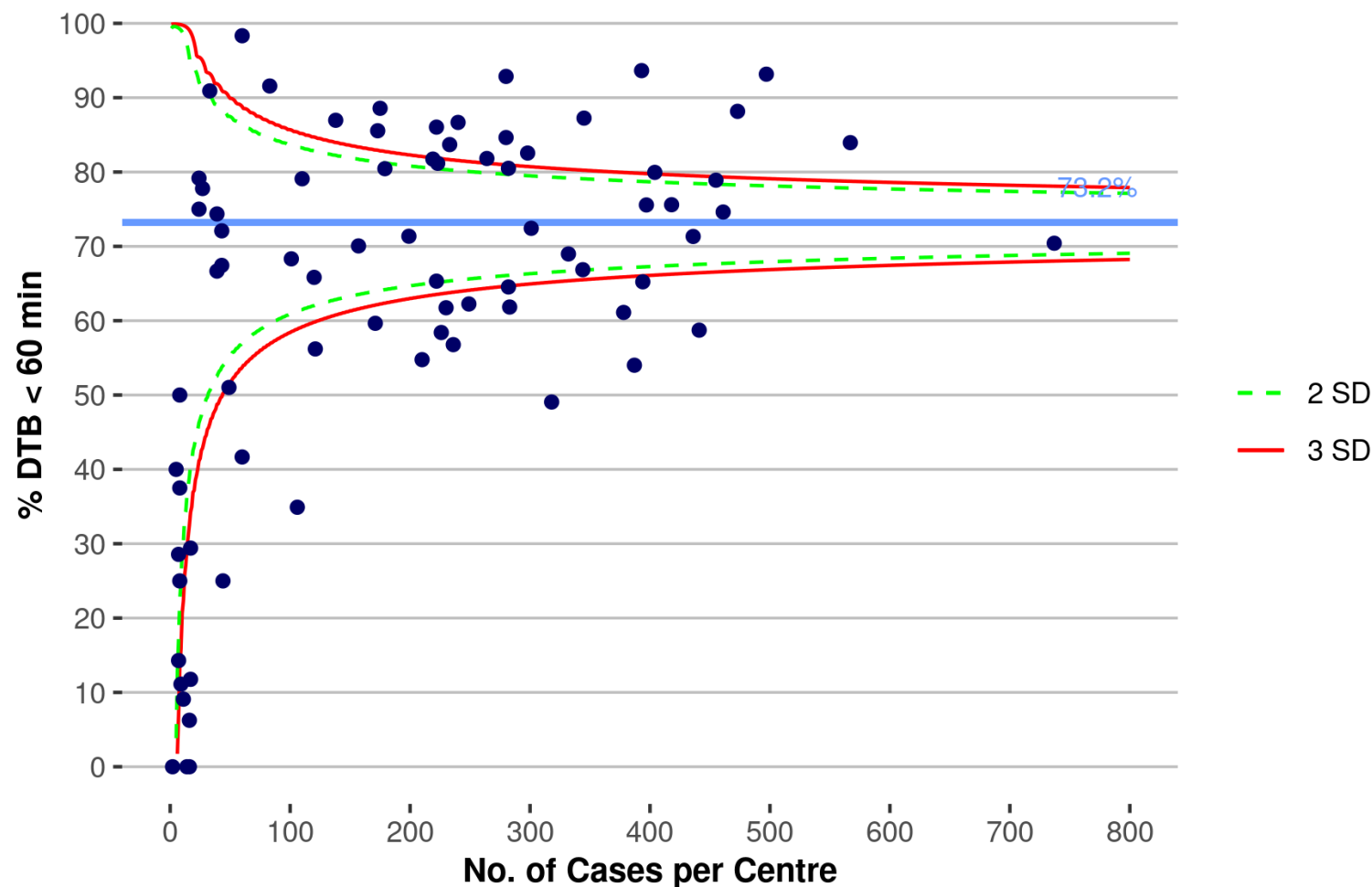
Primary PCI (excl shock/vent)

Direct ONLY: PCI Door to Balloon < 90 min



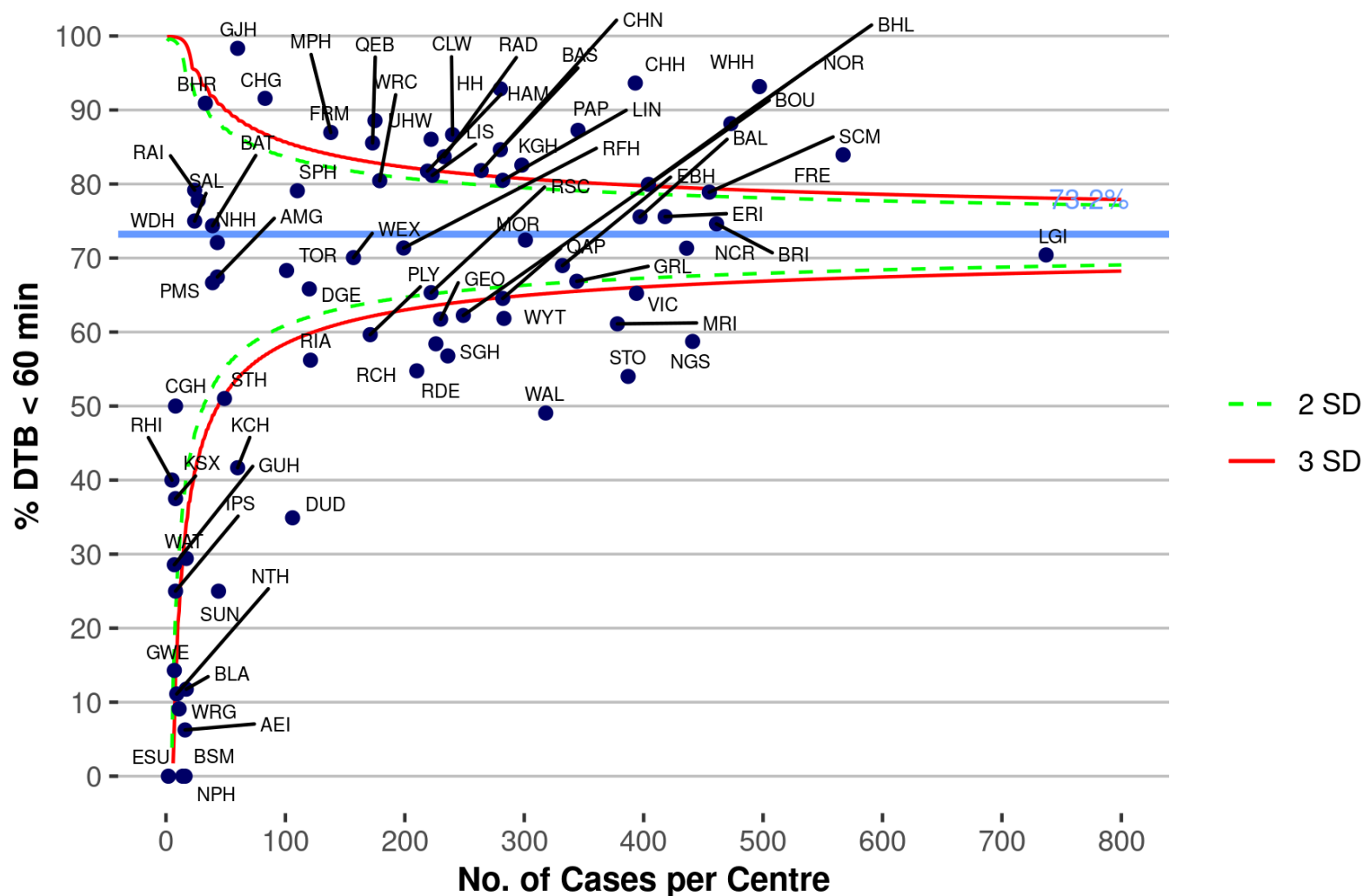
Primary PCI (excl shock/vent)

Direct only : PCI Door to Balloon < 60 min



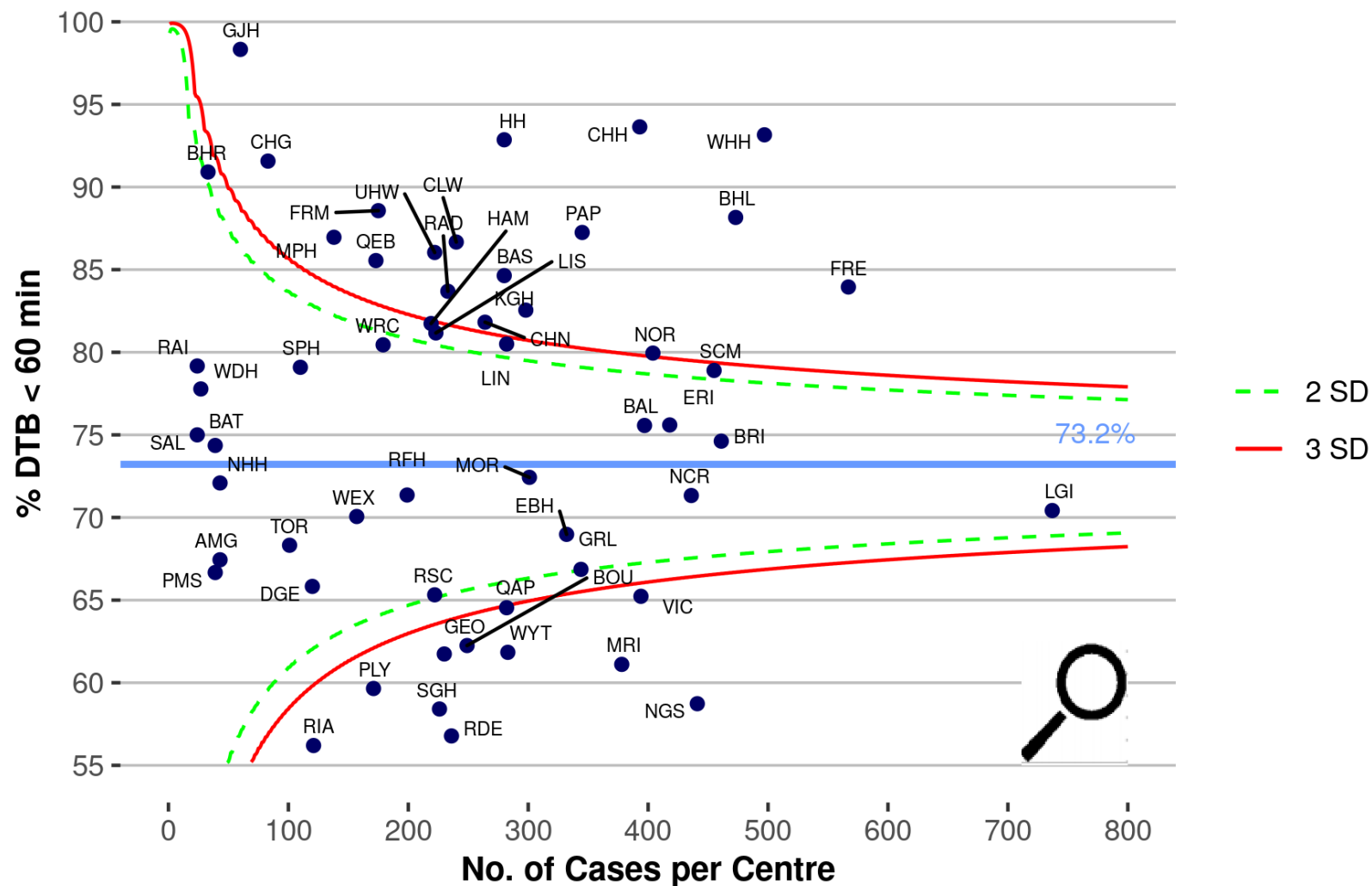
Primary PCI (excl shock/vent)

Direct only : PCI Door to Balloon < 60 min



Primary PCI (excl shock/vent)

Direct only : PCI Door to Balloon < 60 min



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

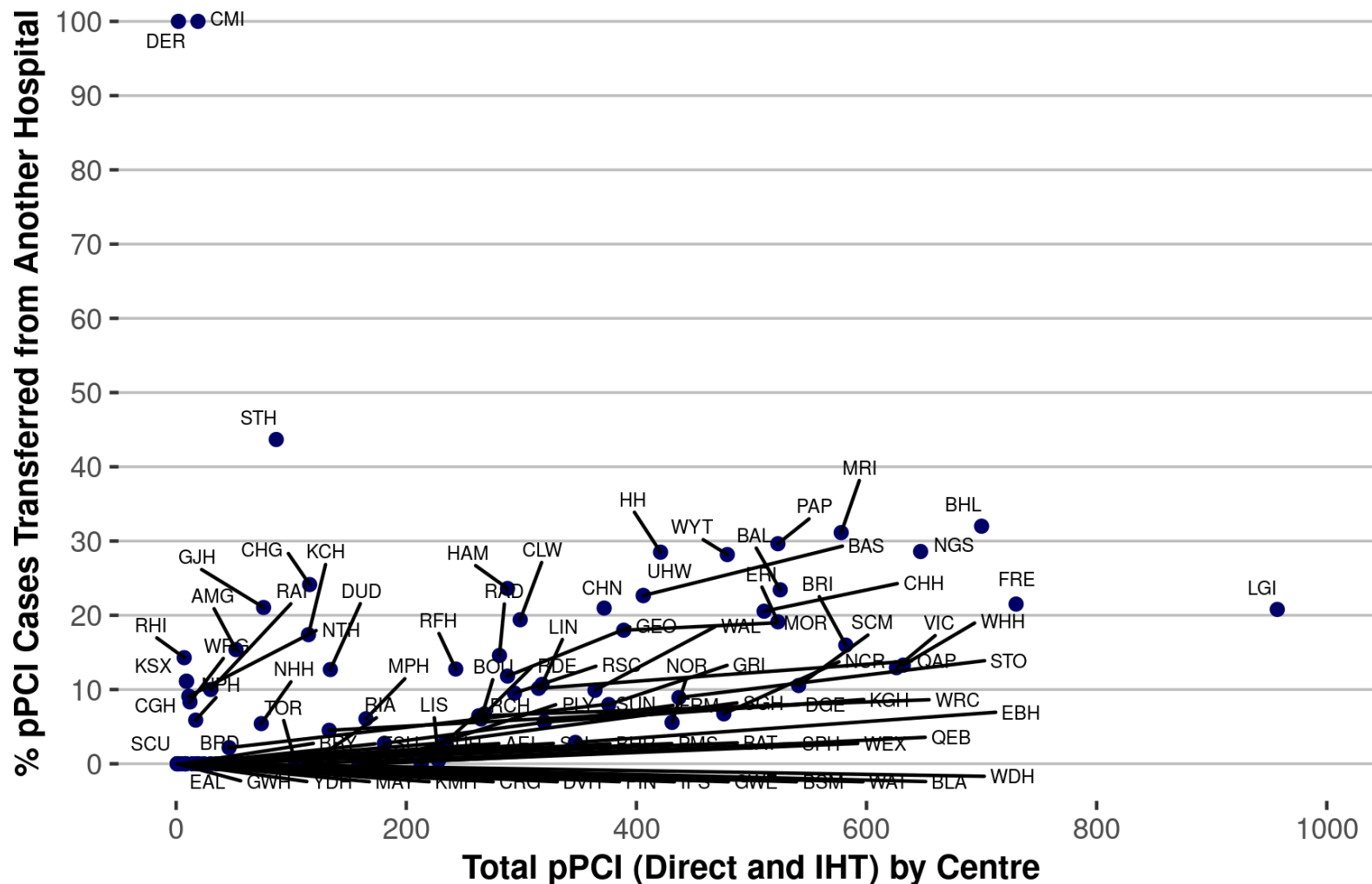
D2

DTB

device

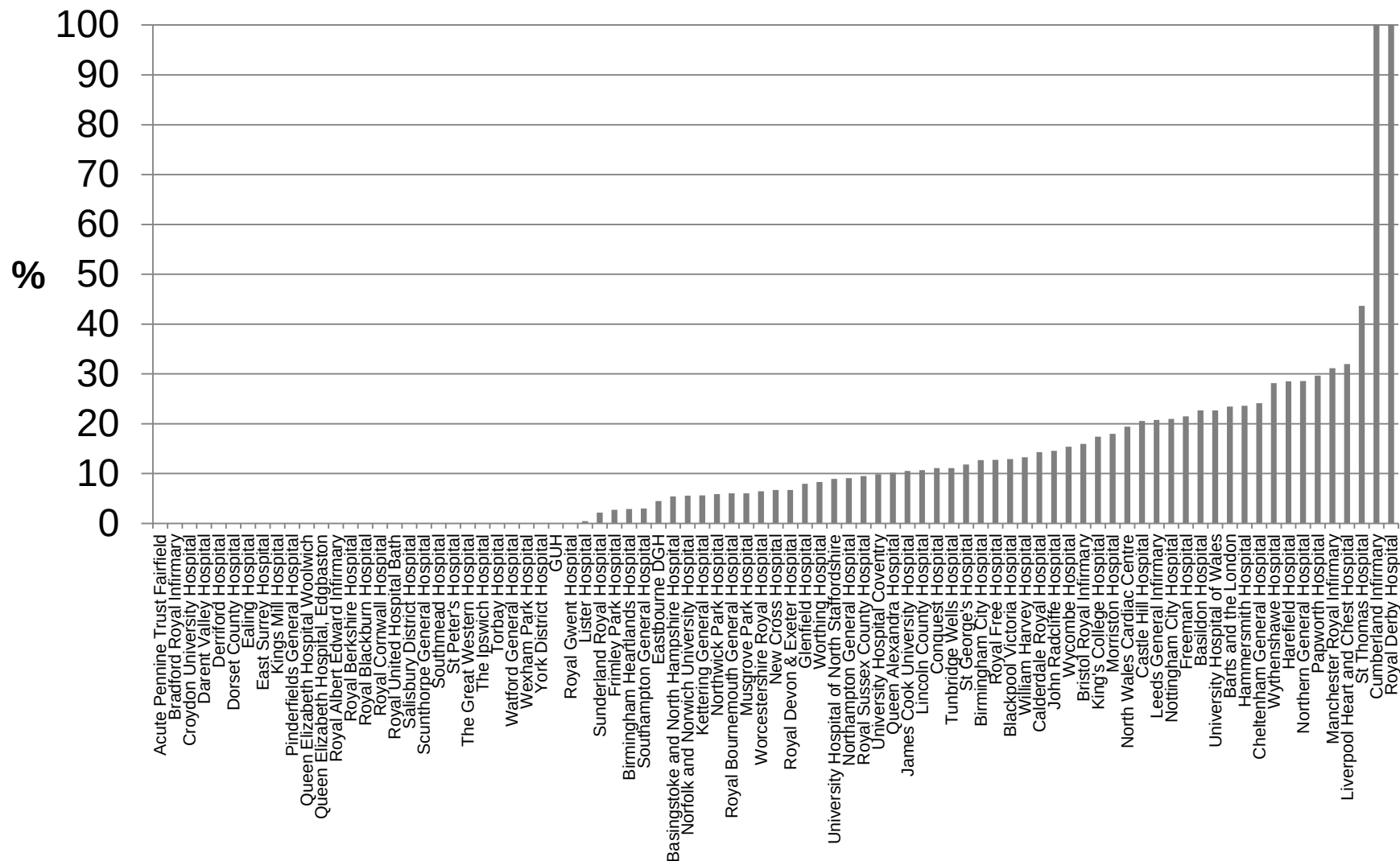
Primary PCI (exclude shock/vent)

Admission routes: Proportion of IHTs



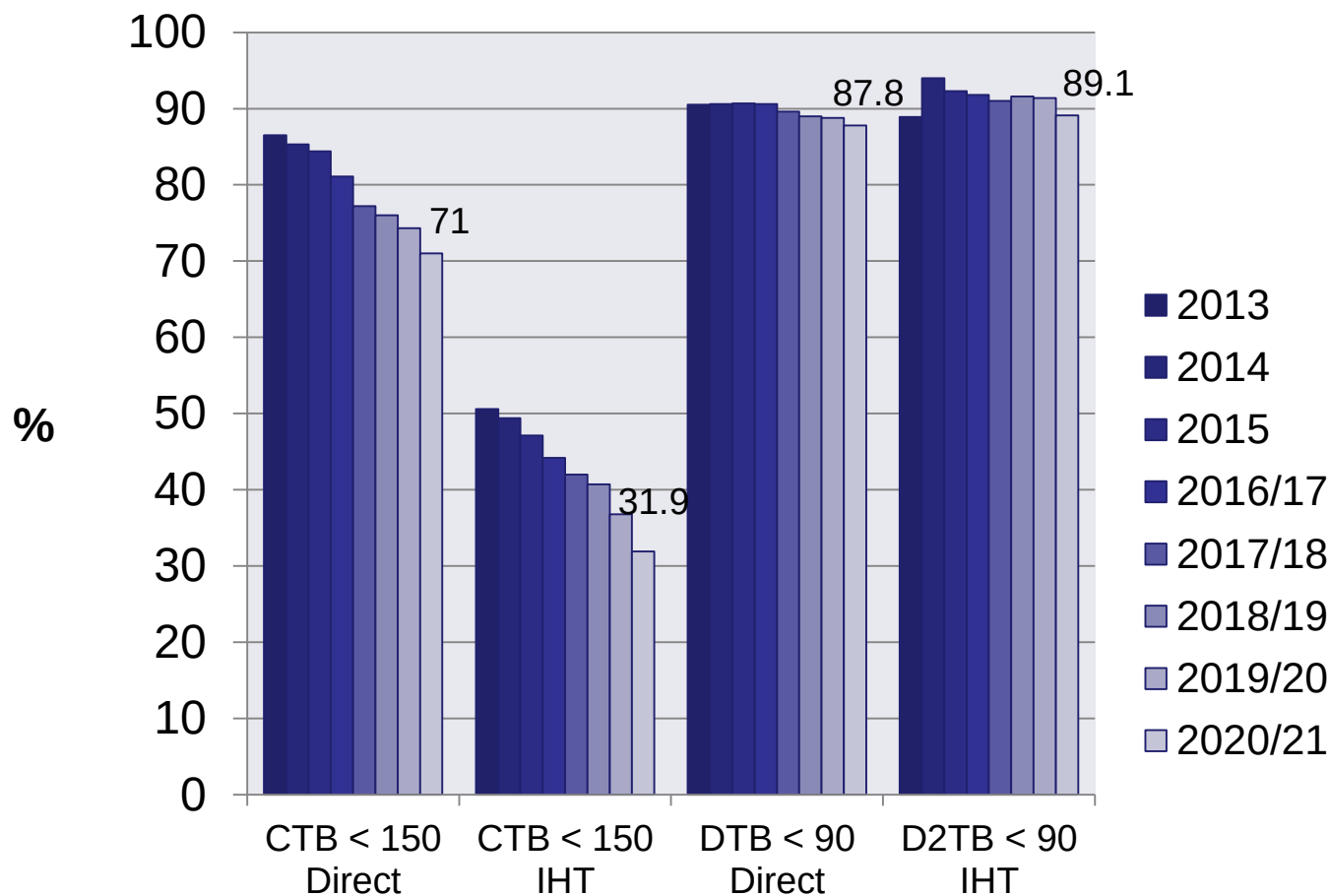
Primary PCI (exclude shock/vent)

Admission routes: Proportion of IHTs (E&W)



Primary PCI (excl shock/vent)

According to admission route

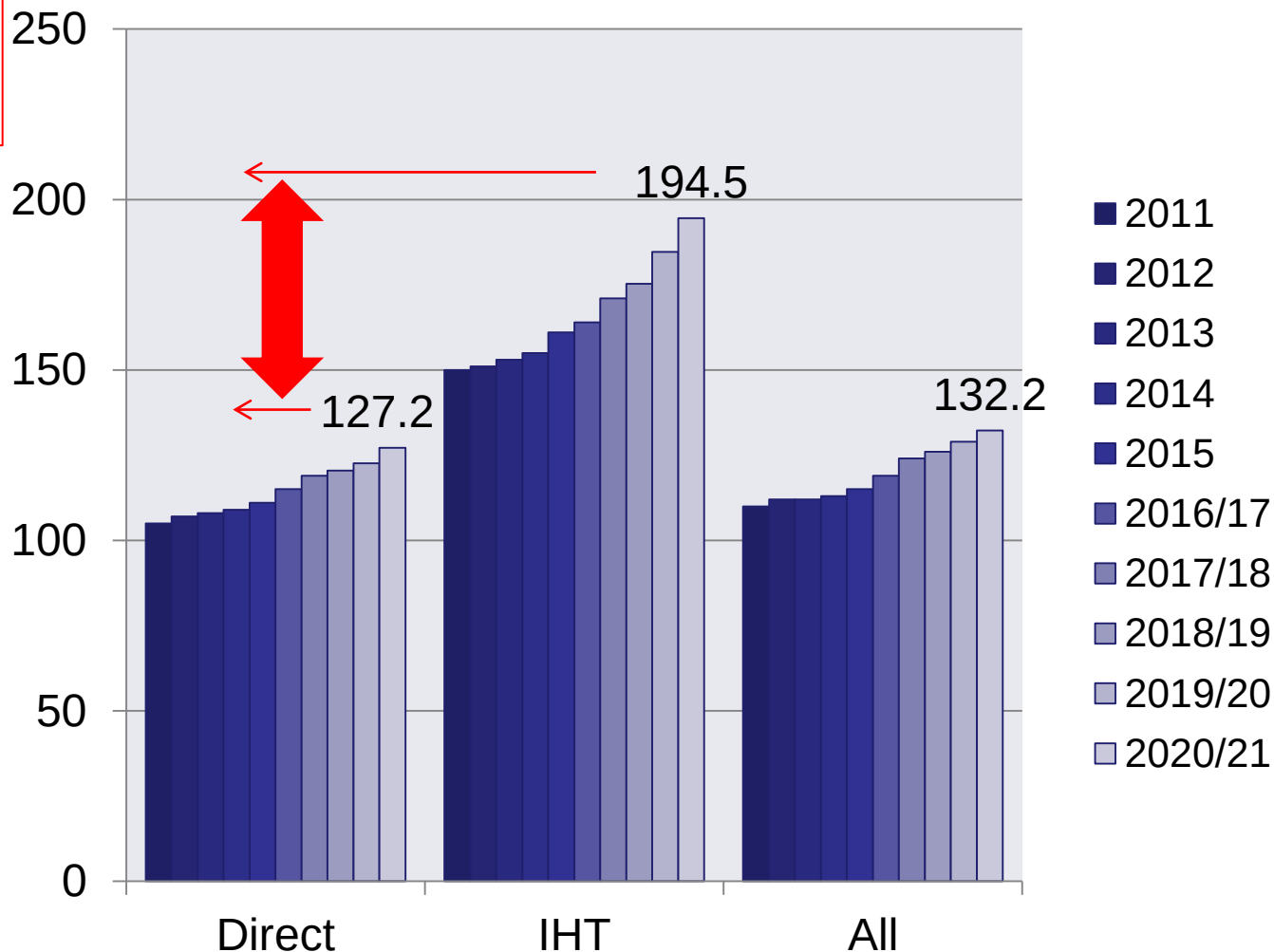


PPCI Call to Balloon time (excl shock/vent)

By Admission Route

67 Min
Delay

Median CTB
(min)

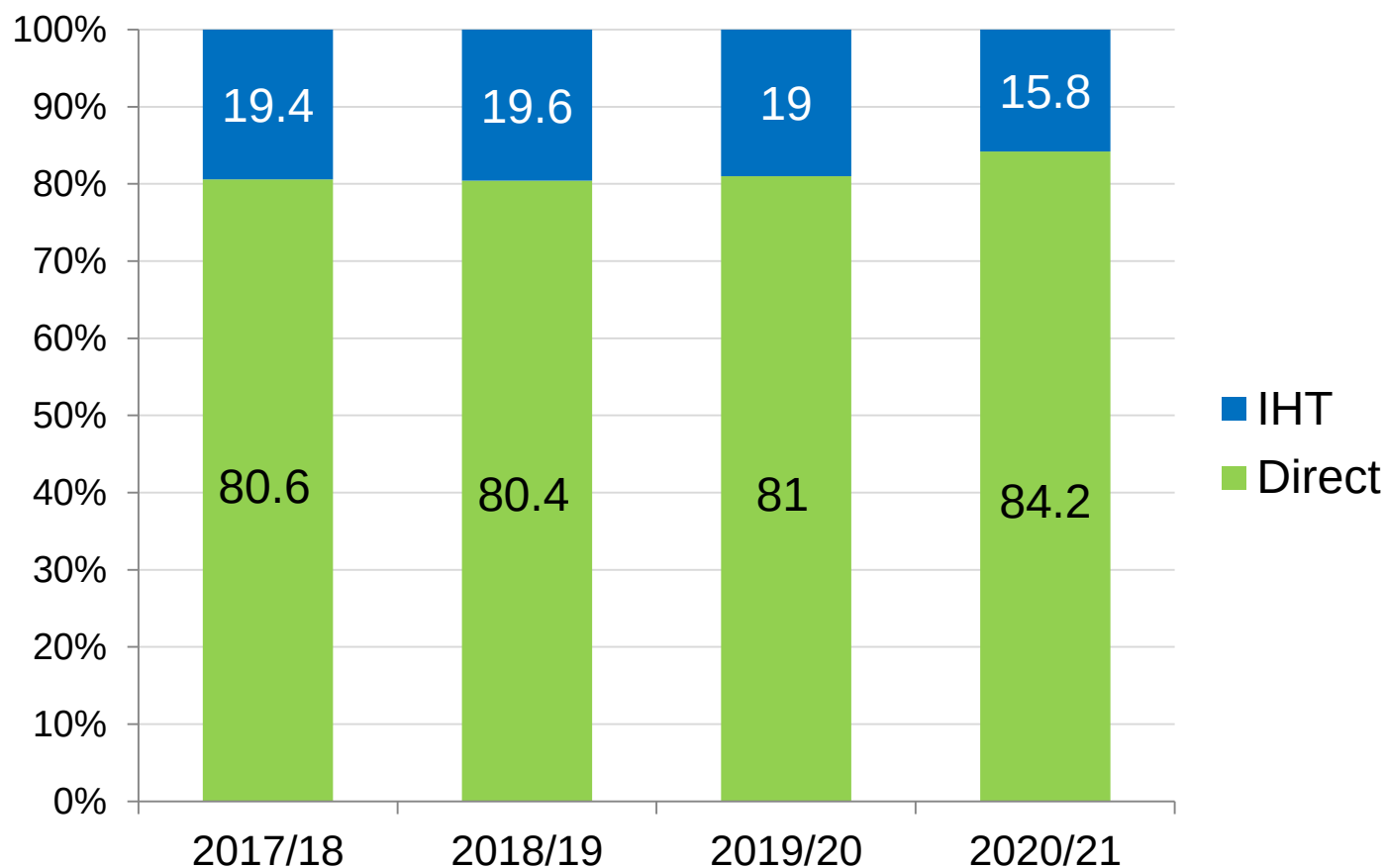


Better

Primary PCI

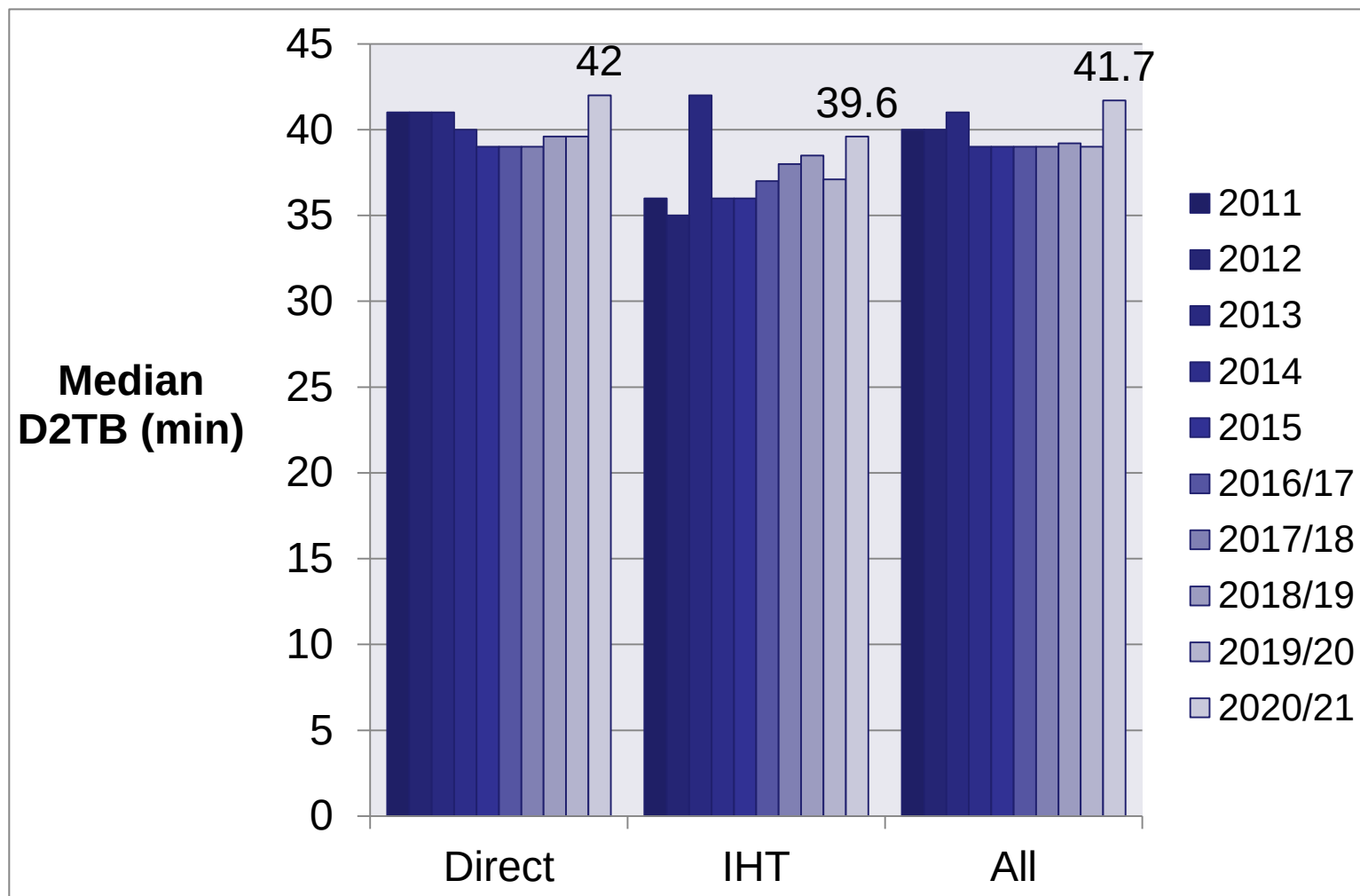
Admission routes

% Patients admitted directly or by IHT for PPCI



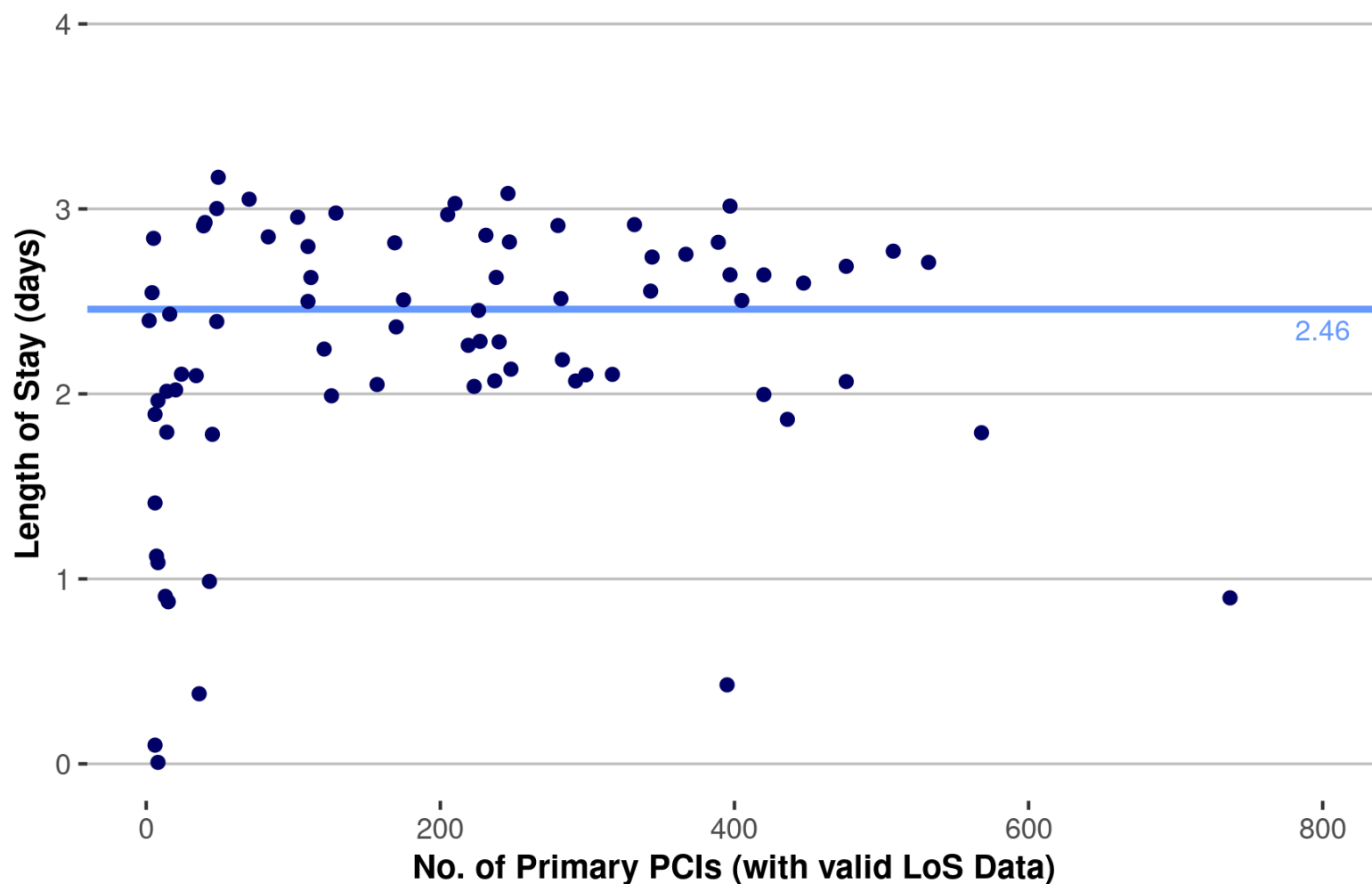
PPCI Door to Balloon time (excl shock/vent)

By Admission Route



PPCI Direct from Community

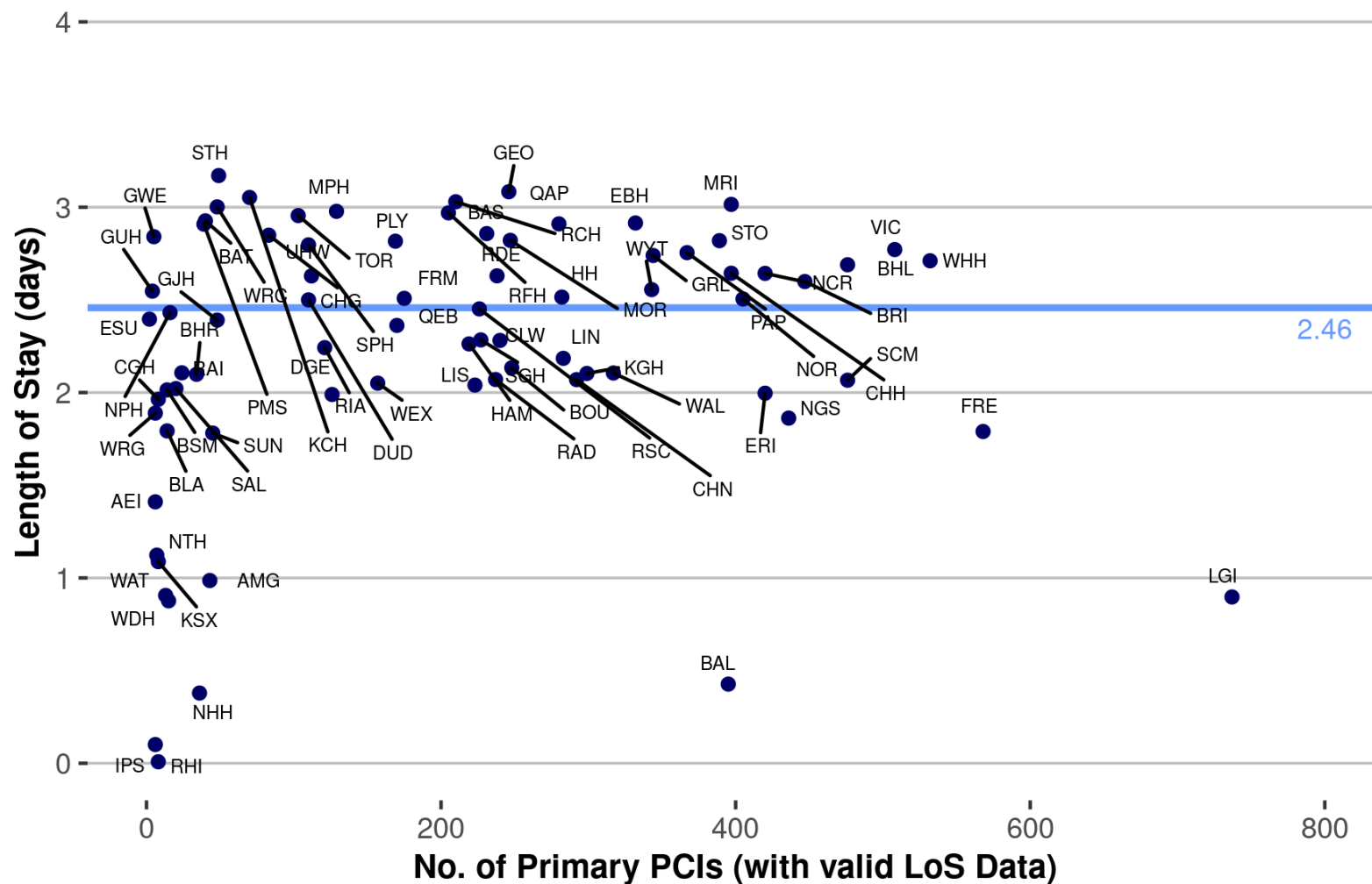
Median Length of stay in PCI Centre (excl shock and vent)



LOS = First device time to discharge (assuming discharge at midday)

PPCI Direct from Community

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



LOS = First device time to discharge (assuming discharge at midday)

PPCI Summary Stats

2020/21

		All	Direct	IHT	LOS
Call to 'Balloon'	< 150 min	65.2 %	71.0%	31.9 %	
	Median	132.2 min	127.2 min	194.5 min	
PCI Door to 'Balloon'	< 90 min	87.8 %	87.8 %	89.1 %	
	< 60 min	73.7 %	73.2%		
	Median	41.7 min	42.0 min	39.6 min	
All (mean of medians)					2.5 days

Outcome

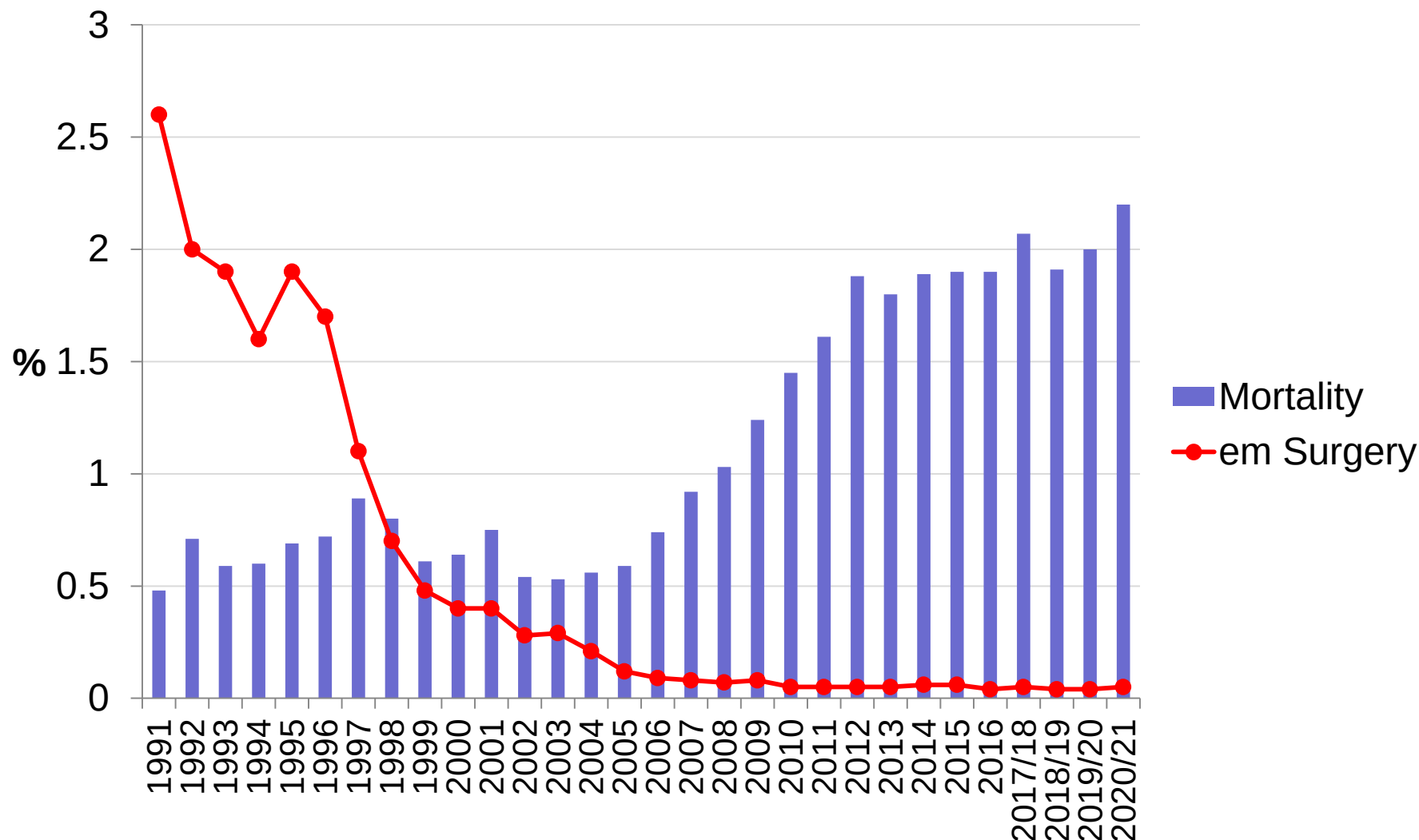


MACCE - All PCIs

Year	Procedure Success (%)	QMI %	NQMI (stable) (%)	Em CABG (%)	CVA (%)	Mortality (%)	30 day Mortality (%) (Tracked)
1997	92	1.2		1.1		0.89	
1998	92	0.8		0.7		0.80	
1999	90	0.57		0.48		0.61	
2000	92	0.6		0.4		0.64	
2001	94	0.5		0.4		0.75	
2002	92	0.57		0.28		0.54	
2003	92	0.36		0.29		0.53	
2004	93.5	0.30		0.21		0.56	
2005	90.2	0.24		0.12		0.59	
2006	95.5	0.15	0.74	0.09		0.74	
2007	92.1	0.15	0.59	0.08	0.05	0.92	1.5
2008	91.9	0.14	0.51	0.07	0.08	1.03	1.6
2009	91.2	0.11	0.46	0.08	0.09	1.24	2.0
2010	92.0	0.18	0.57	0.05	0.12	1.5	2.1
2011	91.8	0.13	0.37	0.05	0.08	1.6	2.4
2012	90.6	0.11	0.34	0.05	0.09	1.9	2.8
2013	91.3	0.09	0.3	0.05	0.09	1.8	2.9
2014	91.5	0.13	0.25	0.06	0.09	1.9	2.9
2015	91.5	0.09	0.18	0.06	0.08	1.9	3.0
2016	91.6	0.07	0.23	0.04	0.09	1.9	3.0
2017/18	90.5	0.05	0.2	0.05	0.08	2.1	3.5
2018/19	89.6	0.07	0.16	0.04	0.07	1.9	3.1
2019/20	88.8	0.08	0.1	0.04	0.08	2.0	3.1
2020/21	89.3	0.15	0.07	0.05	0.08	2.2	3.5

Adverse Outcome

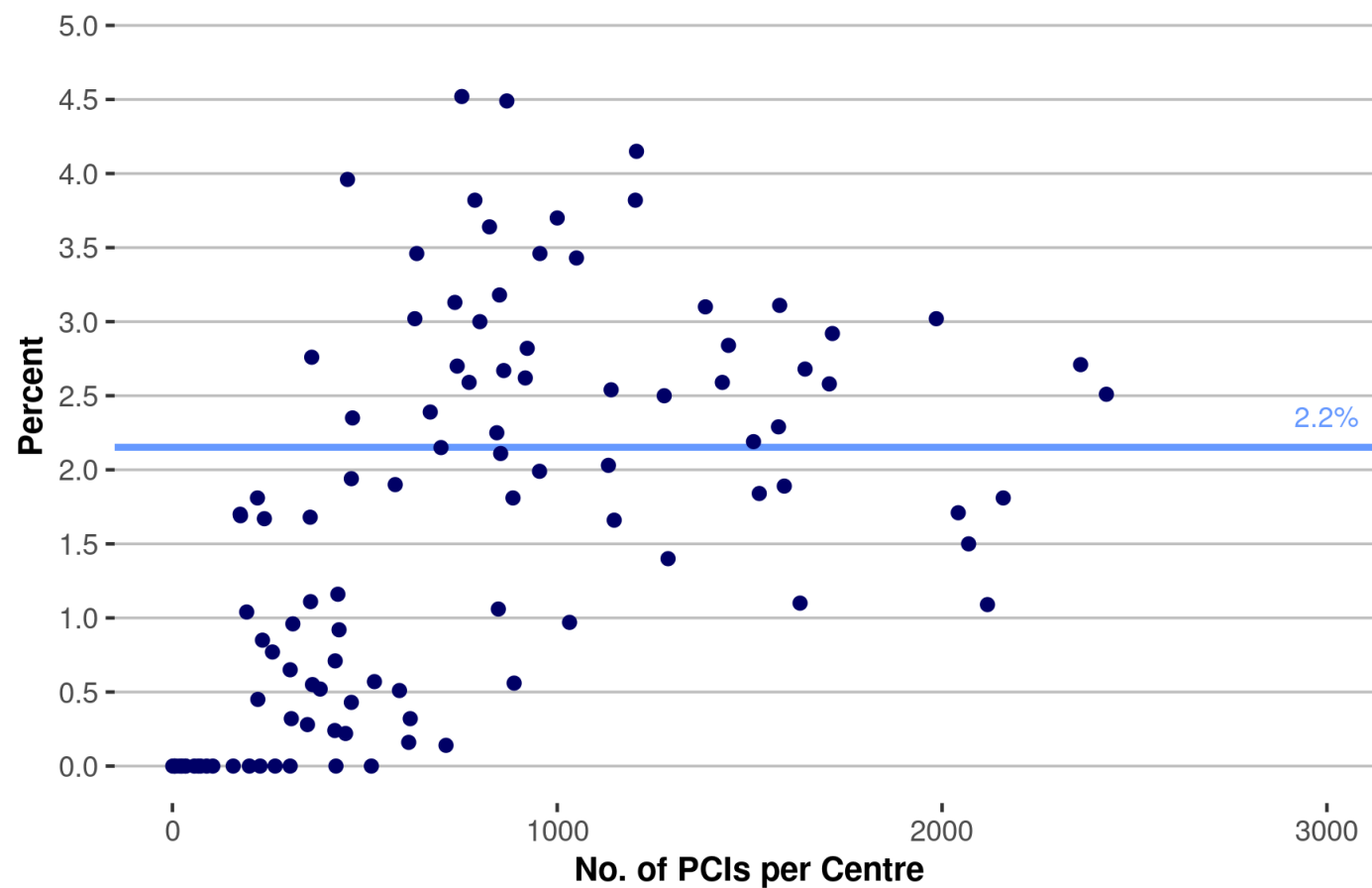
Death and emergency surgery



Adverse Outcomes

Death

- Mortality to Discharge (self reported)

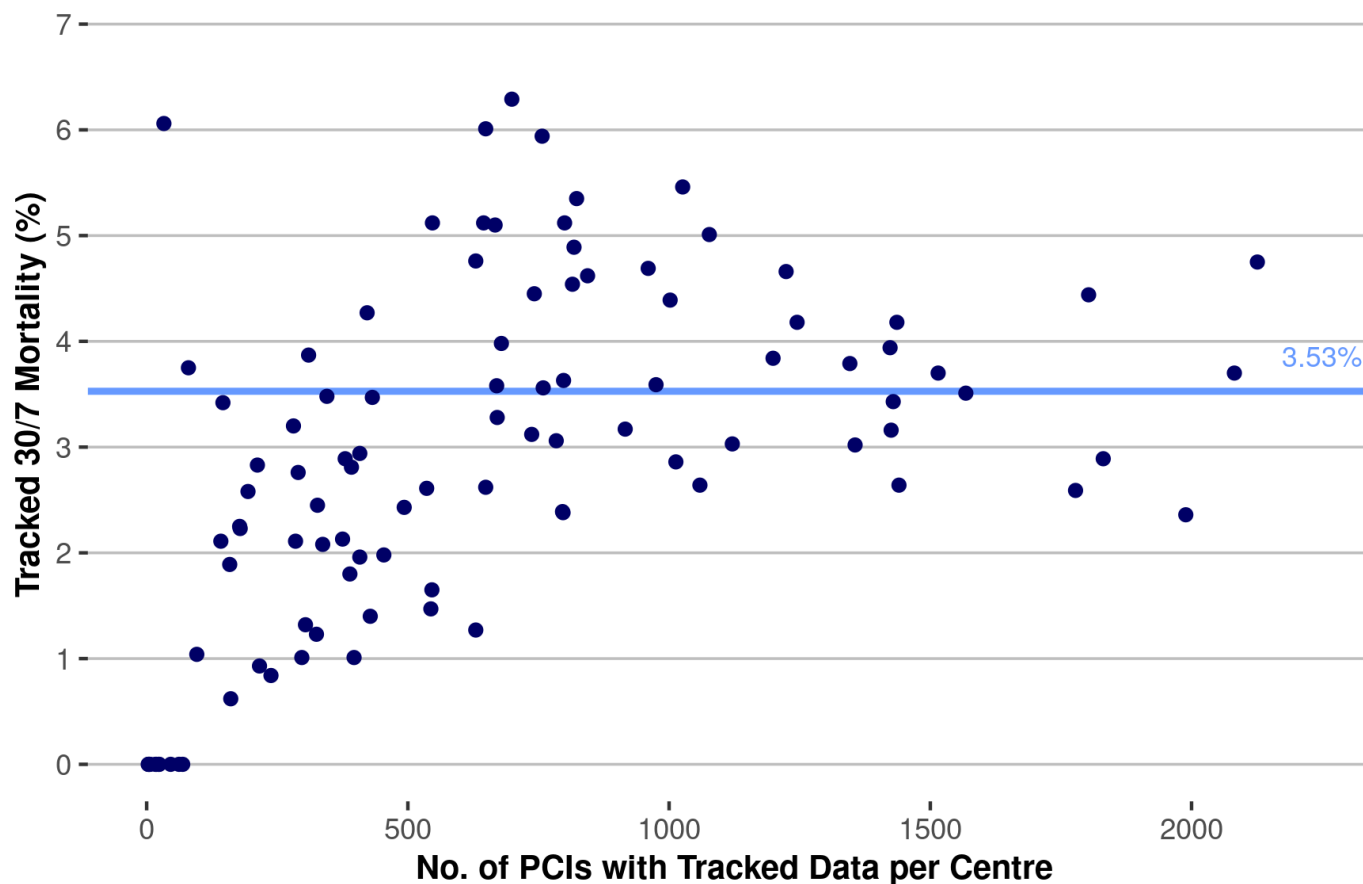


unadjusted

Adverse Outcomes

Death

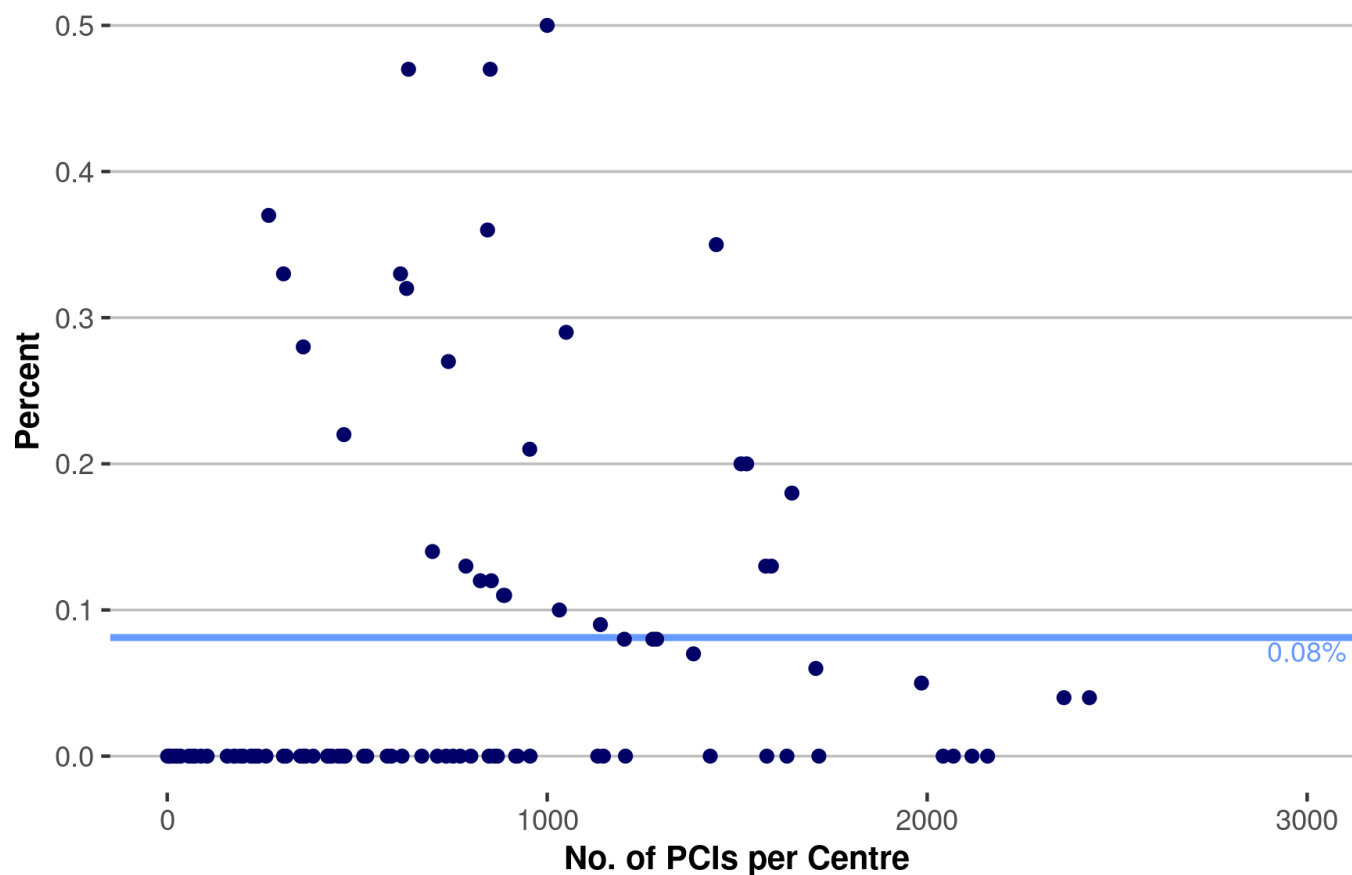
- Mortality to 30/7 (from ONS track)



Adverse Outcomes

CVA

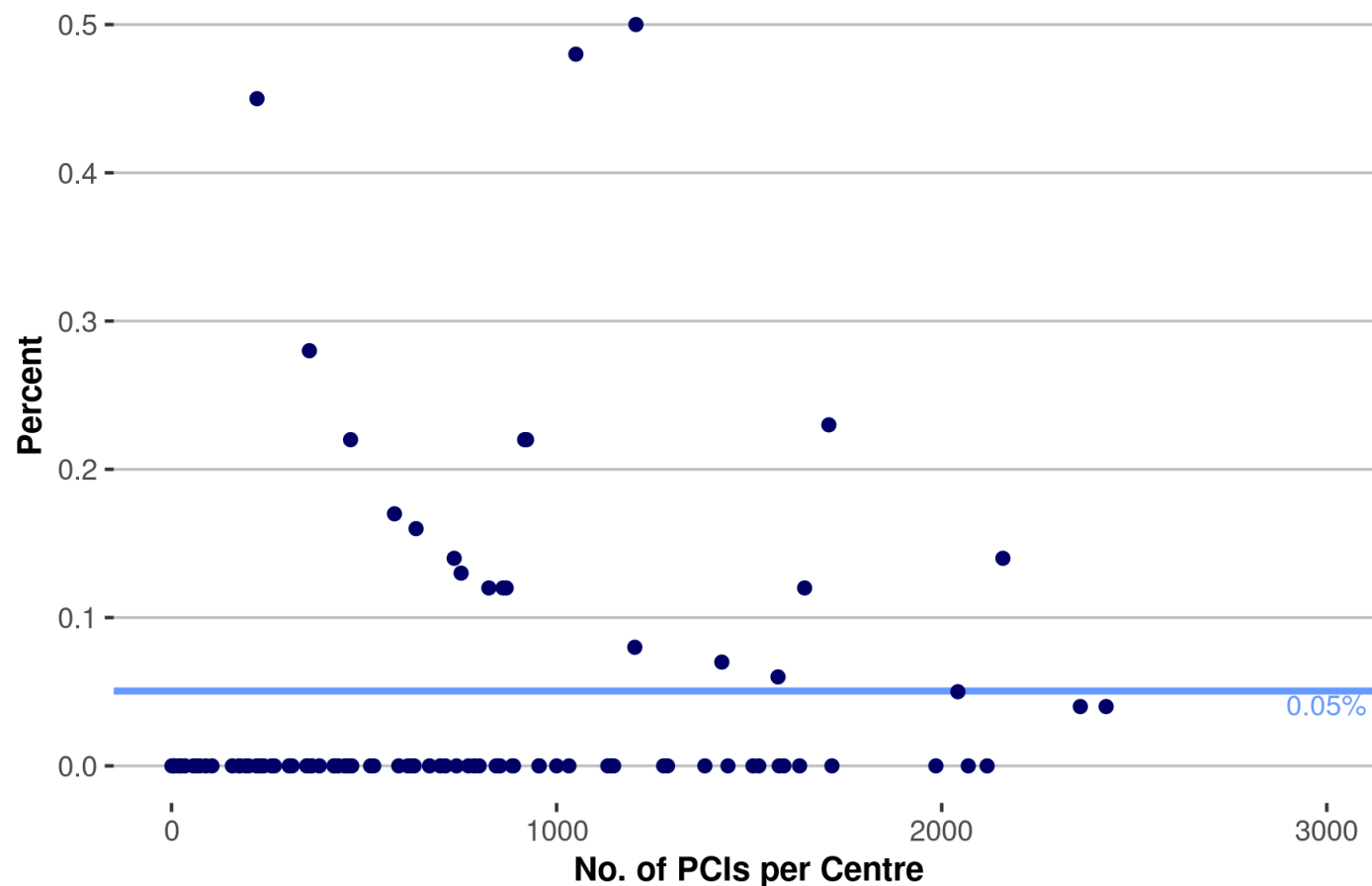
- % of all cases with CVA (not TIA)



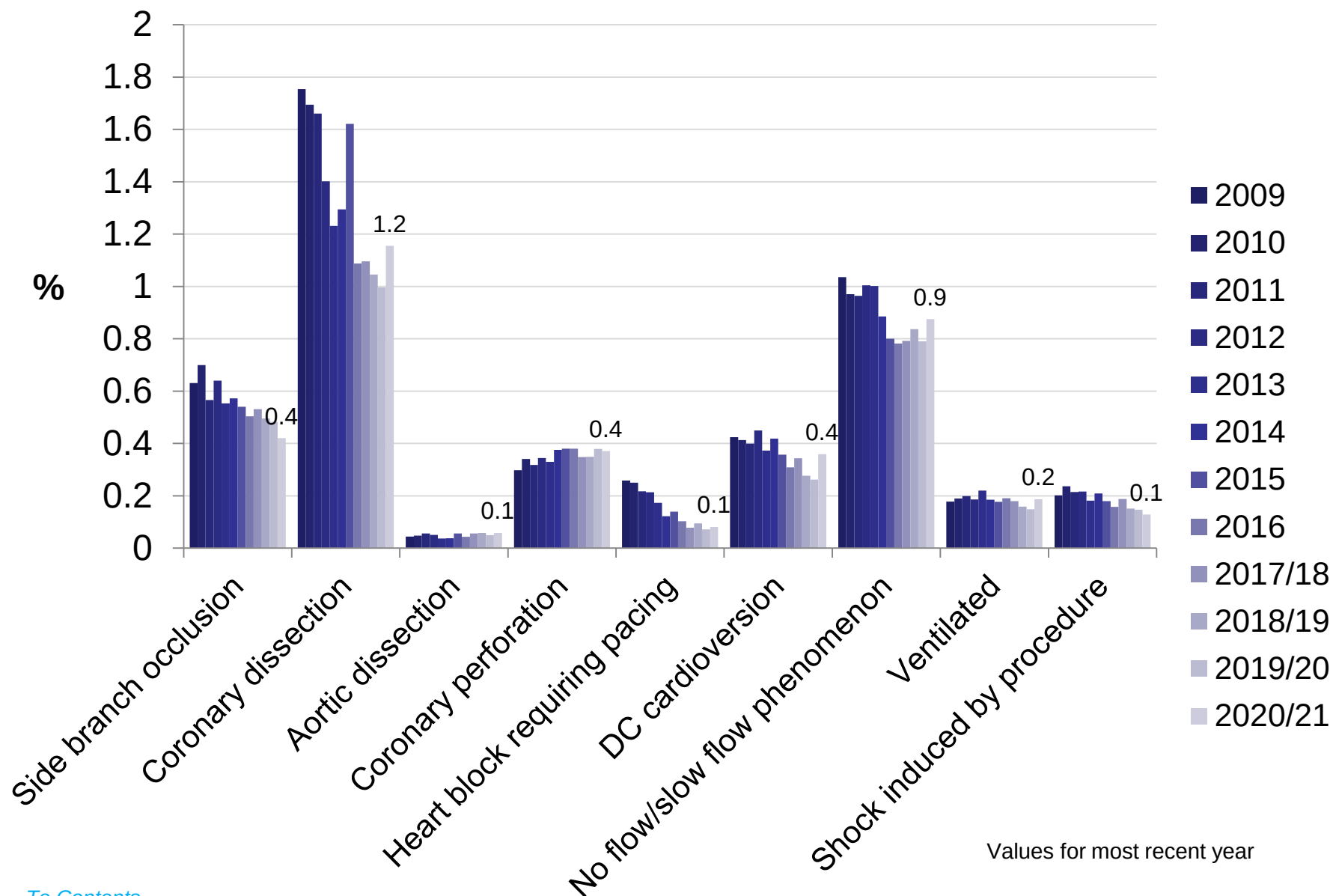
Adverse Outcomes

Surgery

- % of all cases needing emergency cardiac surgery

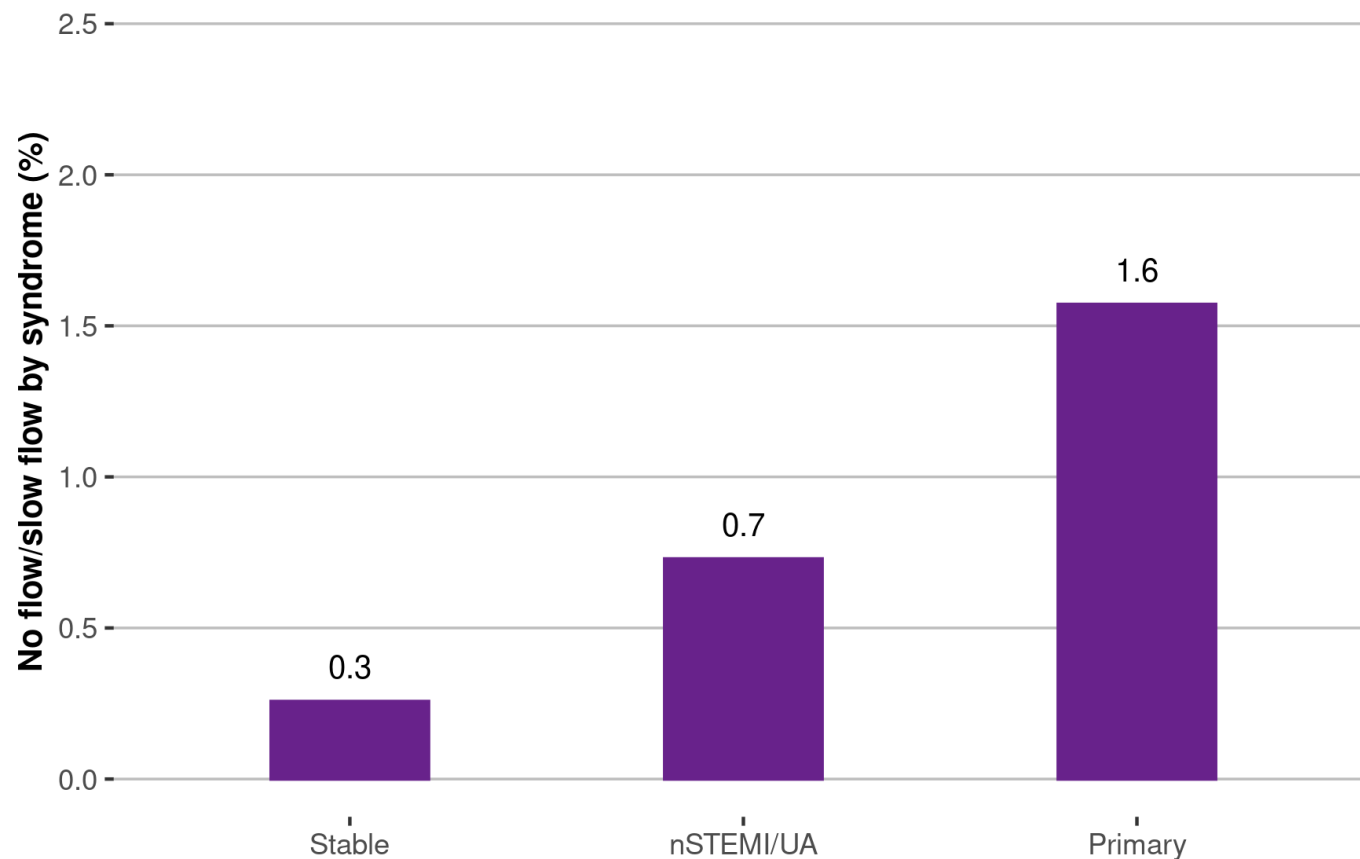


Peri-procedural Complications



Peri-procedural Complications

No flow / Slow flow by syndrome

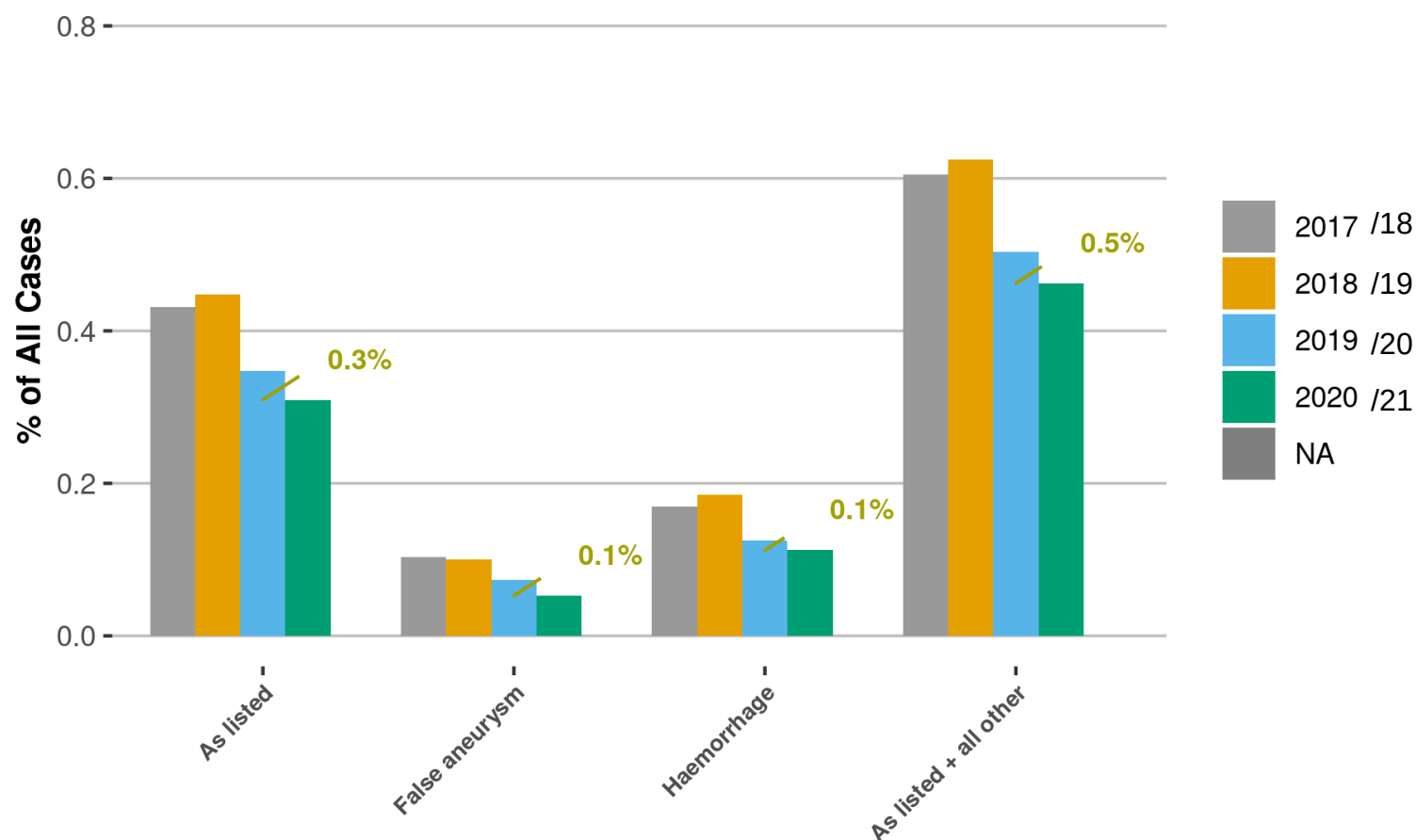


Access site complications

Complications to hospital Dx:

False aneurysm, haemorrhage, arterial occlusion / dissection

Any other surgical intervention



Complication by Access route

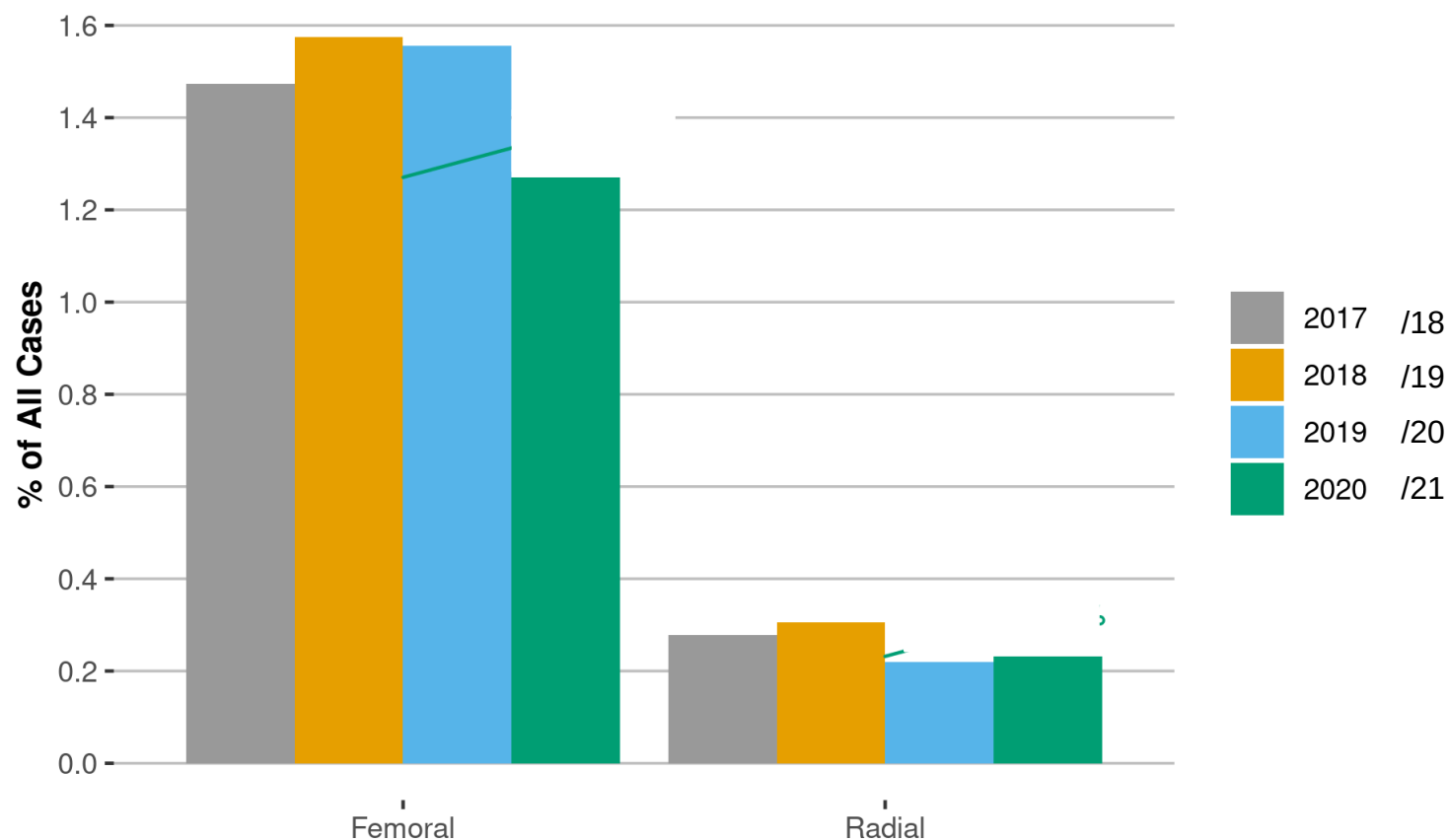
Complications to hospital Dx:

False aneurysm

Haemorrhage (retroperitoneal, delay Dx, surgery)

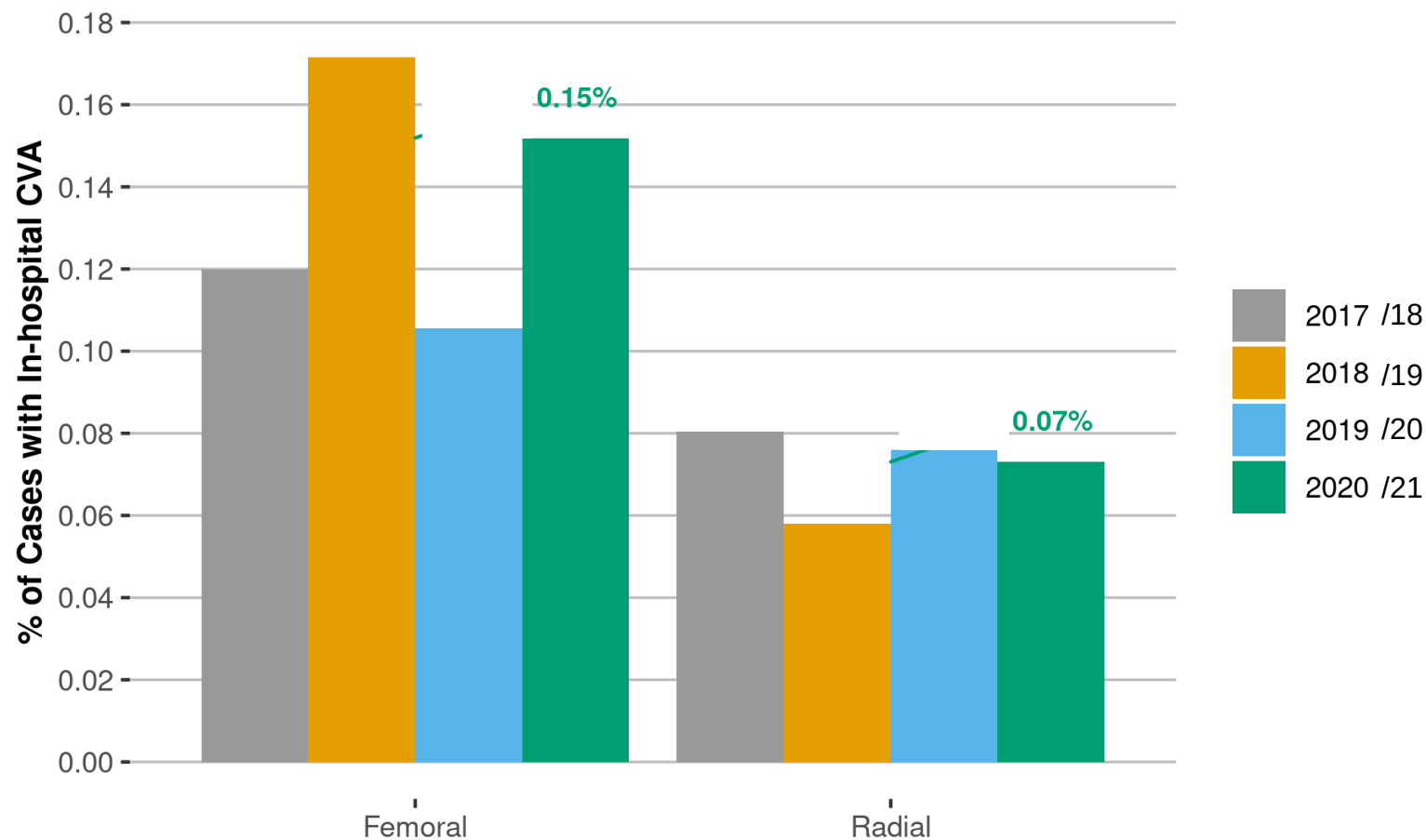
Art occlusion / dissection

Any need for surgery



Complication by Access route

CVA



Outcome 2020/21

Elective Patients

All as %	No. cases	Success	Partial success	Fail no comp	Re-PCI	QMI	Em CABG	CVA	Death In Hosp	Death 30/7 Track
Stable SV (no CTO)	12,325	91.6		7.2	0.19	0.04	0.02	0.06	0.12	
MV (no CTO)	4,674	89.4	5.3	4.9	0.11	0.04	0.02	0	0.3	
SV CTO	1,692	73.4		23.7	0.35	0	0.06	0.06	0.23	
MV CTO	589	77.8	18.5	3.1	0	0	0	0	0.68	
OVERALL STABLE										
All Stable	19,280	89.0		8.0	0.2	0.04	0.03	0.05	0.19	0.46

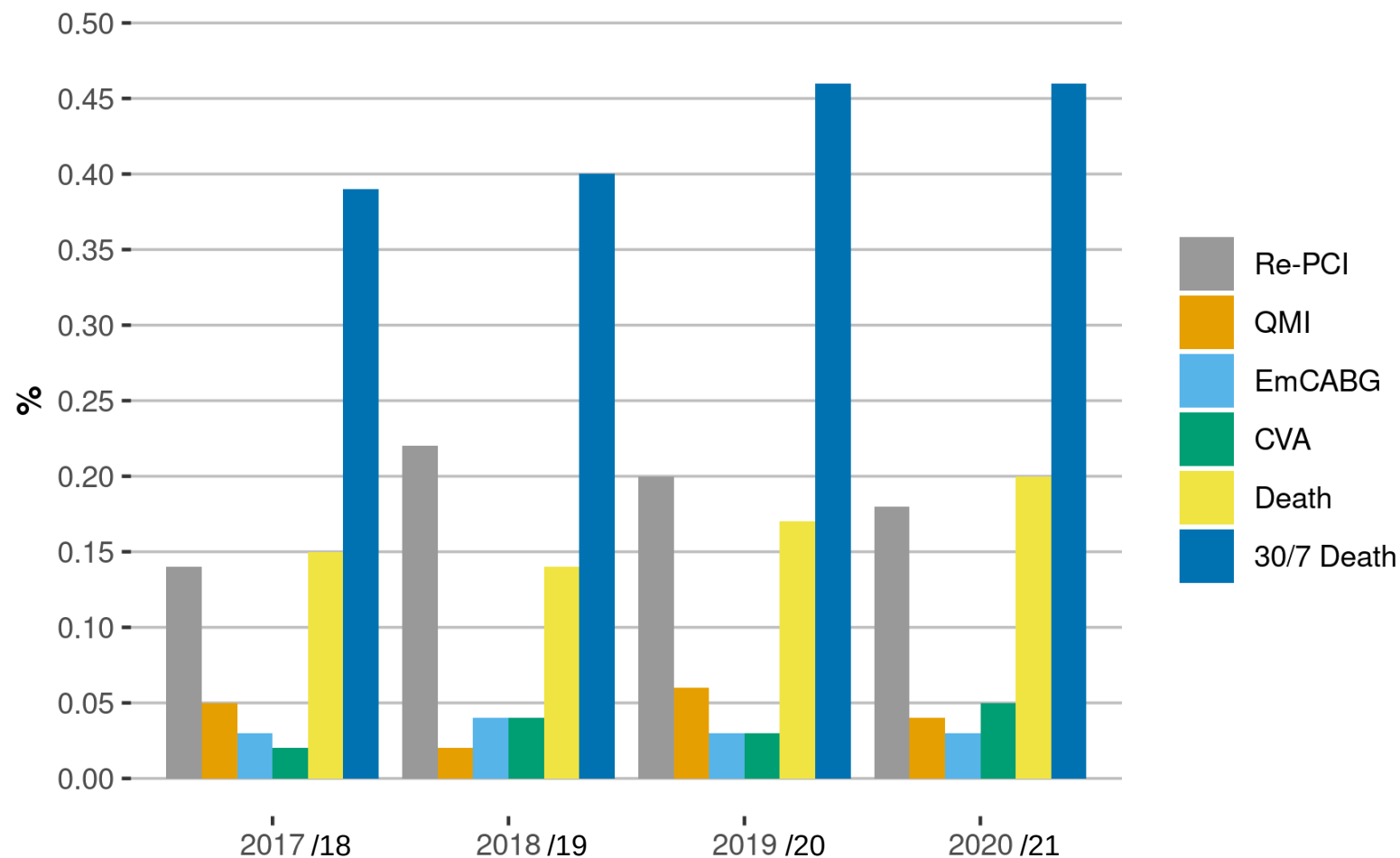
Outcome 2020/21

Acute Coronary Syndromes

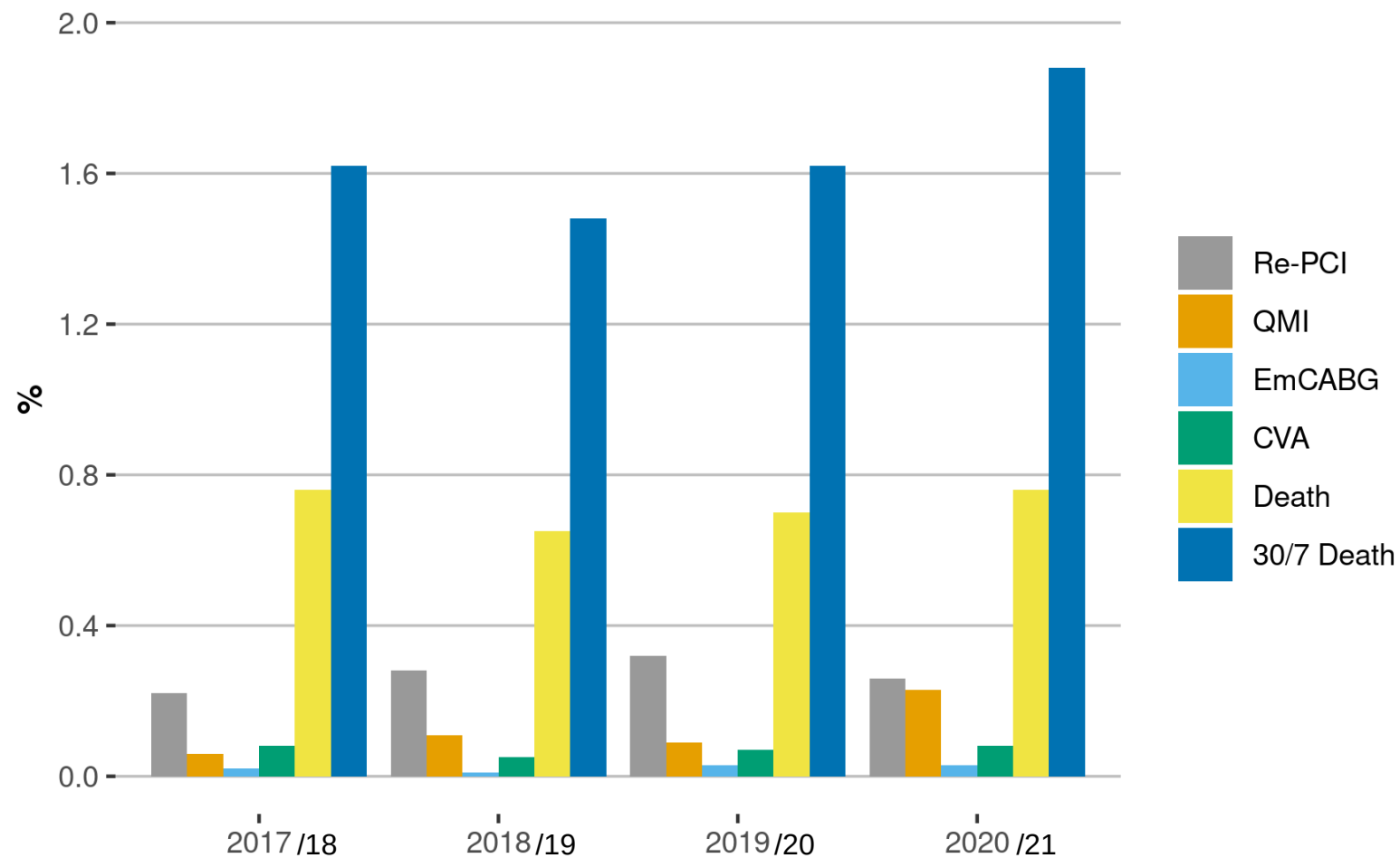
All as %	No.	Success	Partial success	Fail no comp	Re-PCI	QMI	Em CABG	CVA	Death In hosp	Death 30/7 CR
NSTEMI / UA no shock	32,555	91.7	2.3	4.9	0.3	0.2	0.03	0.08	0.8	1.9
All STEMI no shock	21,694	90.2	1.8	4.7	1.0		0.06	0.1	3.1	4.8
*Primary PCI	23,172	87.8	1.8	4.7	1.0		0.1	0.1	5.5	7.7
*Rescue PCI	68	76.5	0	7.4	0		0	0	16.2	21.4
Shock	2,179	58.5	2.1	3.8	1.3		0.6	0.3	34.4	43.2

All Elective Stable Cases

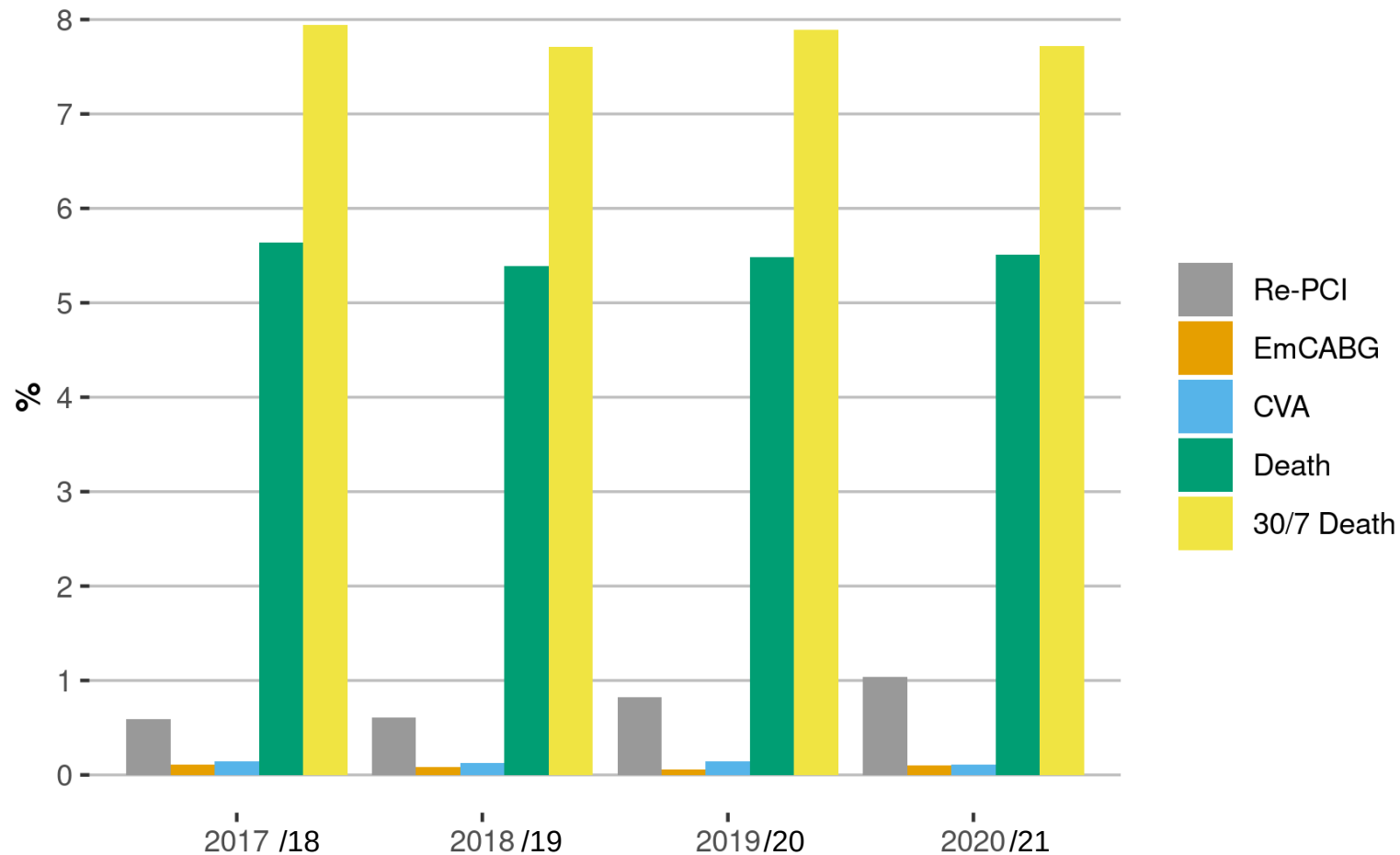
SV no CTO, MV no CTO, SV CTO, MV CTO



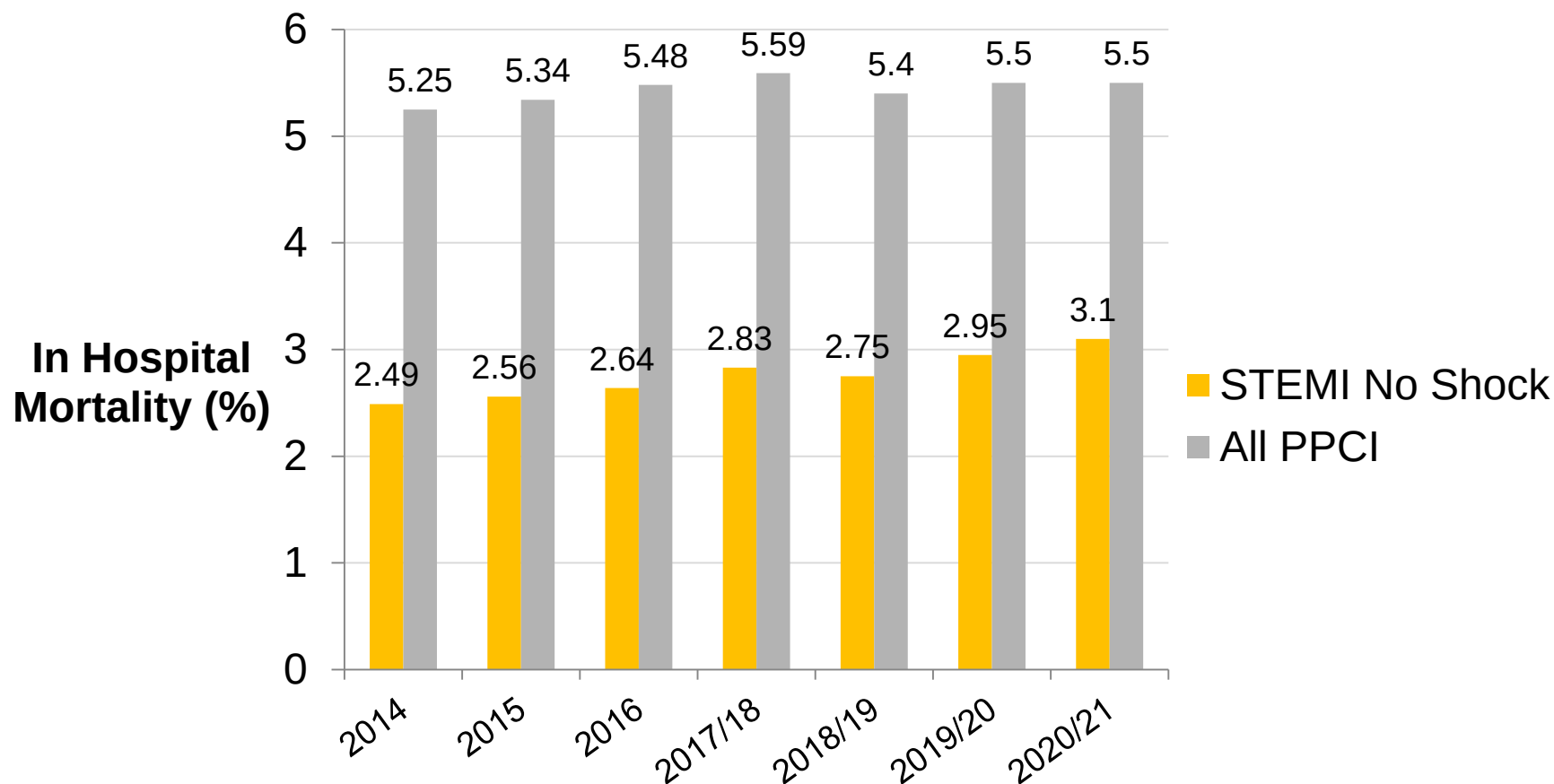
NSTEMI, no Shock



All Primary PCI (includes shock)

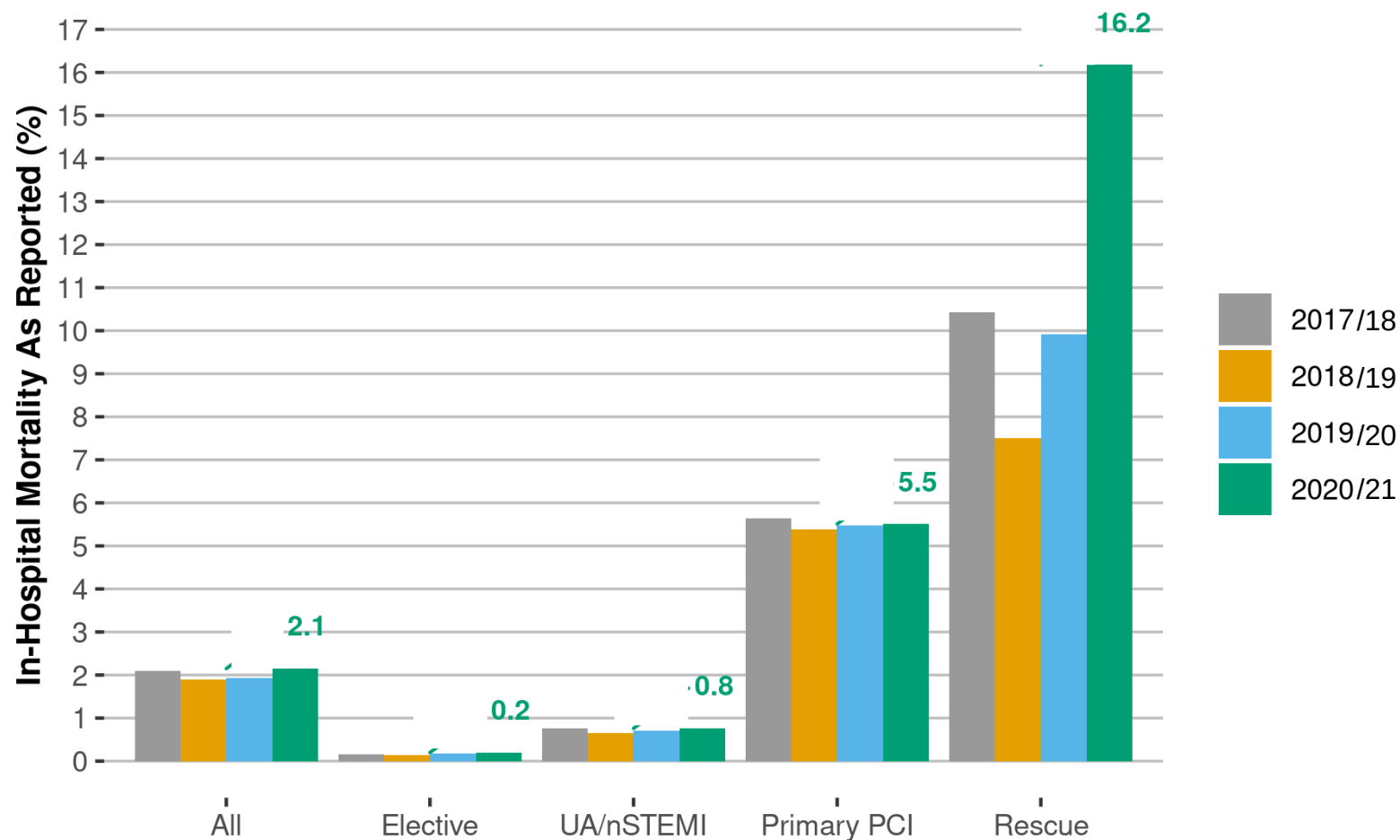


Primary PCI Mortality



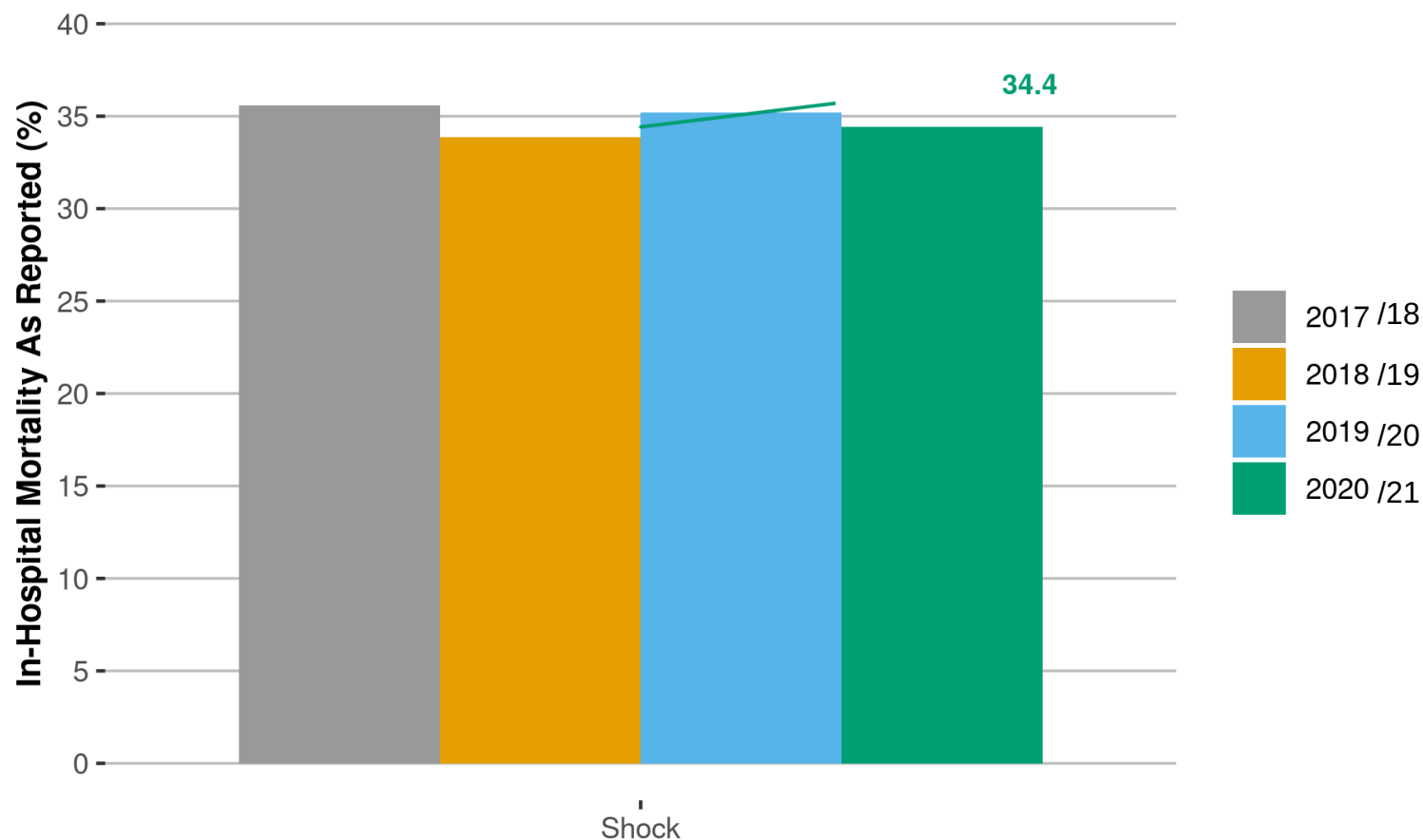
Summary: Mortality

Risk Stratified by Syndrome



Summary: Mortality

Risk Stratified by Syndrome



Risk Prediction Calculator

www.bcis.org

PCI 30 day Mortality Calculator

Age (years)

Sex

☒ Female

☐ Male

Indication for PCI

Urgency

Diabetes

Cardiogenic shock

Renal function

Previous myocardial infarction

Previous cerebrovascular accident



Calculation result

[Risk factor definitions](#)

[Acknowledgements](#)

[Terms and Conditions](#)

Predicted 30 Day Mortality

Following PCI

2.8 %

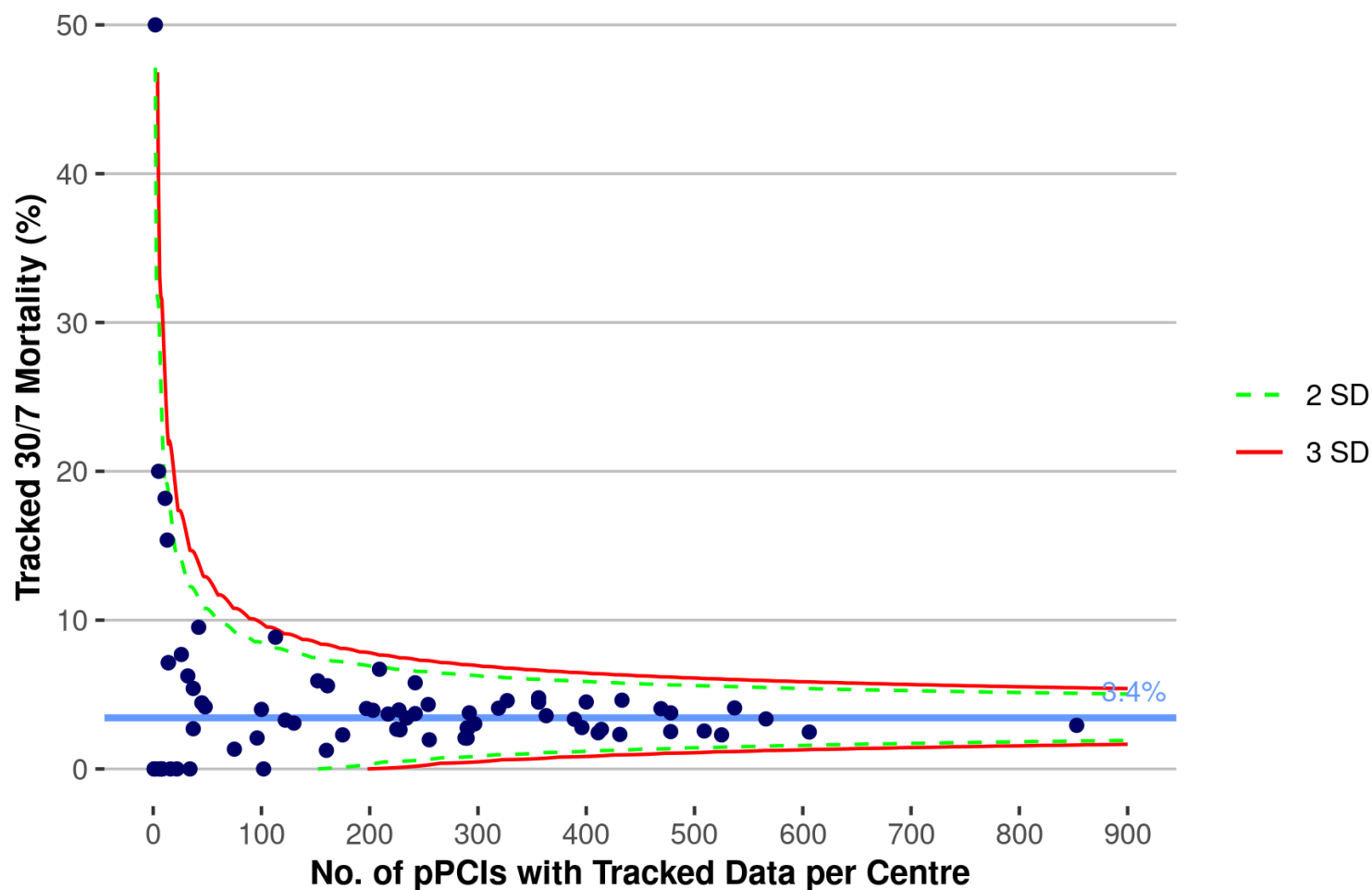
This model can only provide an estimate of the mortality risk. The precision of the estimate will be less good for cases that involve a combination of factors that is less frequently encountered

The model has not been validated for clinical decision support

Tracked Mortality at 30/7

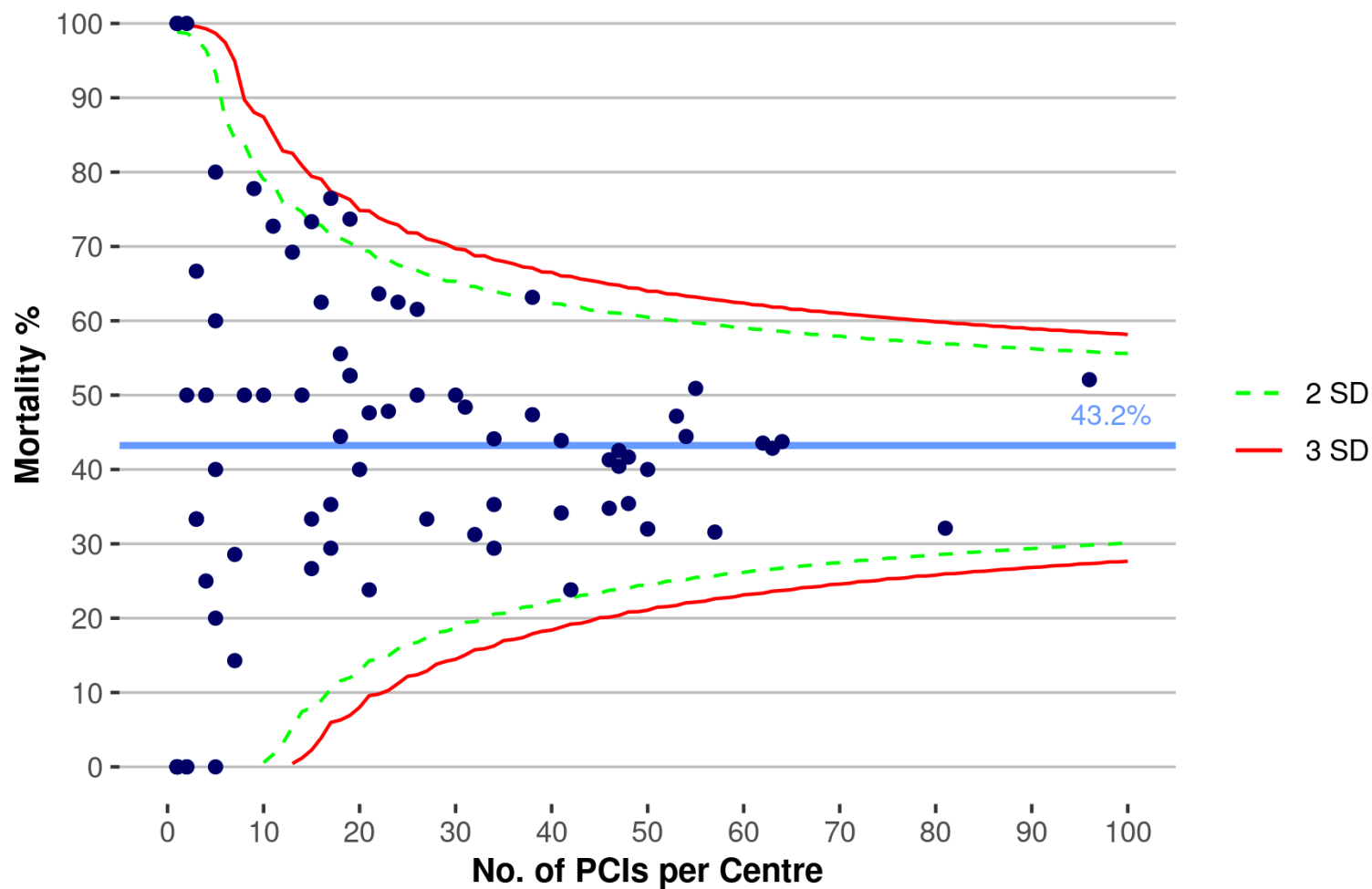
- 30 day Mortality by centre (England and Wales)

Primary PCI (shock/vent EXCLUDED)



Cardiogenic Shock

Tracked 30 day mortality



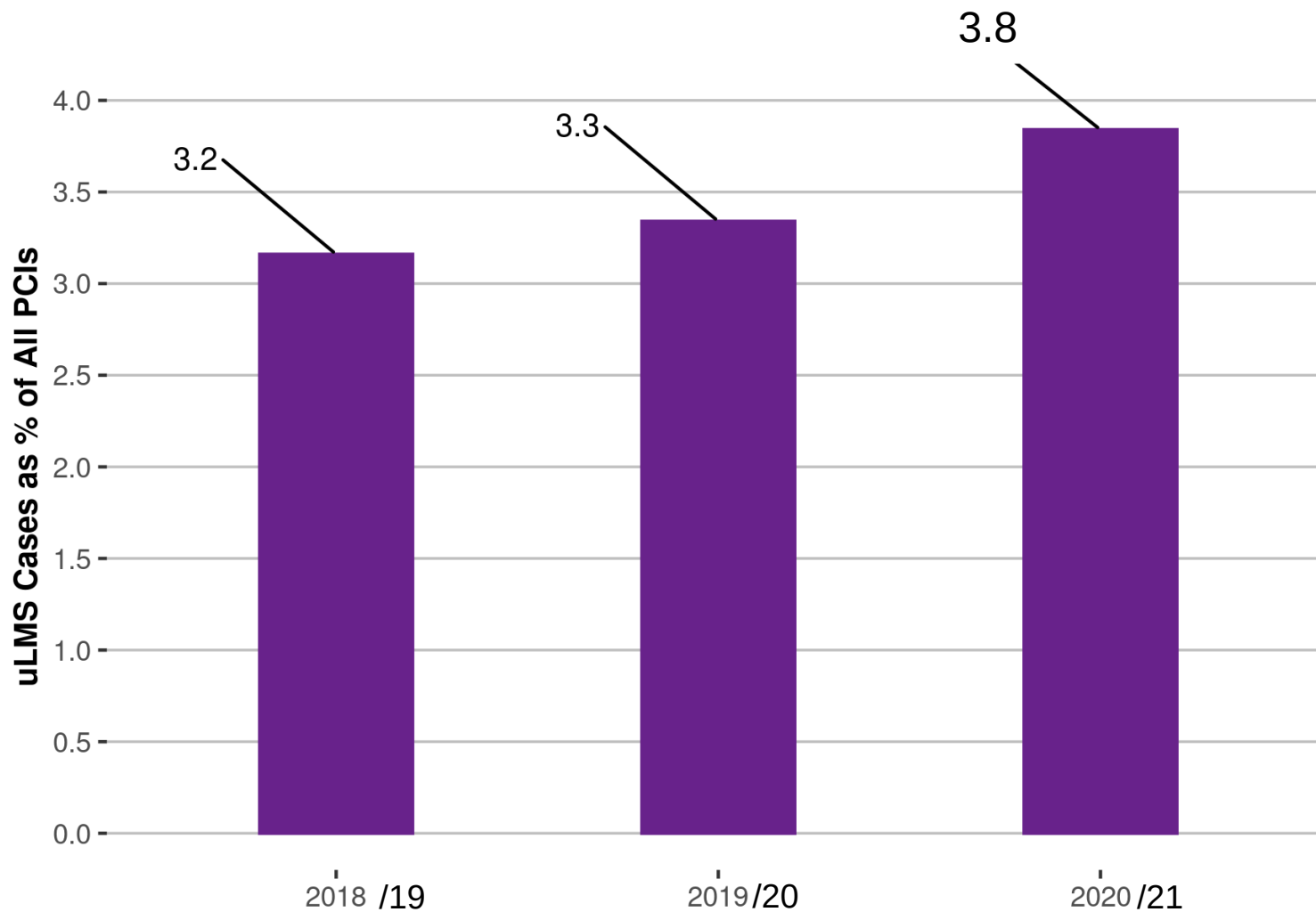


Bypass grafts

PCI of SVG and Arterial

All as %	No.	Success	Partial success	Fail no comp	Re-PCI	QMI	Em CABG	In Hosp Death	30/7 Death (CR)
2007	3900	88.5	2.72	7.79	0.23	0.21	0	0.78	1.6
2008	4284*	91.0	3.2	5.11	0.21	0.09	0.02	0.58	1.3
2009	2599	88.9	3.69	5.93	0.23	0.23	0	1.22	1.7
2010	2602	90.8	2.34	5.46	0.19	0.27	0	0.94	1.5
2011	2741	87.8	3.65	6.79	0.47	0.33	0	1.39	2.6
2012	2903	88.7	4.72	4.48	0.28	0.07	0.07	1.8	2.7
2013	2512	86.8	5.69	5.97	0.36	0.08	0	1.37	2.0
2014	2571	85.1	7.12	5.56	0.39	0.08	0.08	2.04	2.9
2015	2647	80.2	12.8	4.84	0.23	0.08	0	1.98	2.9
2016/17	2554	80	13.3	4.1	0.23	0.12	0.08	1.94	2.8
2017/18	2590	78.11	12.12	7.72	0.35	0.12	0.04	1.84	3.03
2018/19	2263	81.09	10.08	7.11	0.22	0.09	0	1.58	2.78
2019/20	2066	76.52	14.47	6.87	0.29	0.1	0.05	1.73	2.83
2020/21	1373	80.04	9.61	7.57	0.36	0.36	0	2.24	4.41

Unprotected LMS



Unprotected LMS

Including Shock and STEMI

All as %	No.	Success	Partial success	Fail no comp	Re-PCI	QMI	Em CABG	In Hosp Death	Death 30/7 (CR)
2006	583	86.8	4.5	0.9	0.3	0.51	0.17	7.0	
2007	854	83.7	7.14	1.99	0.12	0.35	0.7	6.6	8.81
2008	1085	83.7	5.35	2.12	0.65	0.37	0.46	7.9	10.85
2009	1458	84.8	3.84	3.16	0.34	0.27	0.34	7.6	9.37
2010	1504	86.1	3.06	2.19	0.47	0.13	0.07	8.1	9.59
2011	1984	86.0	3.93	2.17	0.3	0.35	0.2	7.4	10
2012	2374	85.5	4.59	1.22	0.42	0.17	0.08	8.2	12.0
2013	2541	85.8	4.21	1.53	0.35	0.16	0.12	7.9	11.4
2014	2836	86.6	3.35	1.69	0.28	0.25	0.14	8.0	11.8
2015	3171	86.3	3.4	1.8	0.38	0.16	0.16	8.0	11.4
2016	3590	89.1	3.0	1.4	0.4	0.04	0.06	6.4	9.6
2017/18	3515	85.6	3.9	2.2	0.26	0.06	0.3	7.9	12.0
2018/19	3443	86.7	4.0	2.8	0.32	0.12	0.09	6.3	9.2
2019/20	3648	85.6	4.3	3.4	0.38	0.11	0.08	6.2	9.2
2020/21	3538	86.0	4.2	3.3	0.28	0.31	0.2	6.0	8.9

Chronic Total Occlusion

Stable only

All as %	No.	Success	Partial success	Fail no comp	Re-PCI	QMI	Em CABG	In Hosp Death	Death 30/7 (CR)
2011	3976	70.5	6.2	22.96	0.13	0.03	0.05	0.25	0.4
2012	4208	71.6	6.4	21.65	0.26	0.07	0.1	0.21	0.5
2013	3874	72.5	5.6	21.63	0.1	0.05	0.05	0.15	0.4
2014	4029	73.2	5.9	20.3	0.15	0.07	0.15	0.34	0.6
2015	4283	76.0	6.4	17.3	0.16	0.02	0.07	0.21	0.4
2016	4043	75.8	6.3	17.6	0.12	0.05	0.07	0.33	0.5
2017/18	3714	73.64	7	19.06	0.27	0.05	0	0.21	0.53
2018/19	3513	74.32	6.12	19.19	0.63	0.03	0.09	0.22	0.49
2019/20	3449	74.86	6.35	18.3	0.61	0.06	0.06	0.37	0.6
2020/21	2369	74.93	6.54	18.15	0.25	0	0.04	0.34	0.66

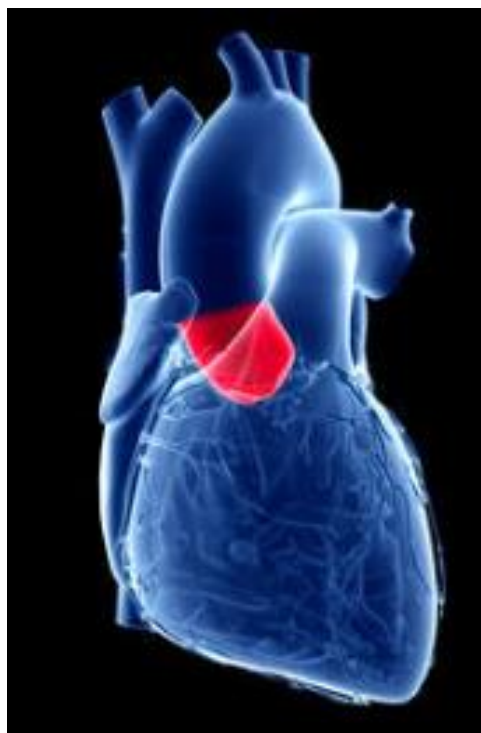
Adult Non Coronary and Structural Intervention



Adult Non Coronary and Structural Intervention

- Valves
 - Aortic
 - Mitral
- Septal ablation (HCM)
- LAA Occlusion
- Holes (ASD / PFO / VSD / Paravalve leaks)
- Coro sinus / Great vessels
- Renal denervation

Aortic



- TAVI
- ~ Orphan Registry
 - Maintained by NICOR with no funding
 - Data controllers Barts
 - Scottish data available

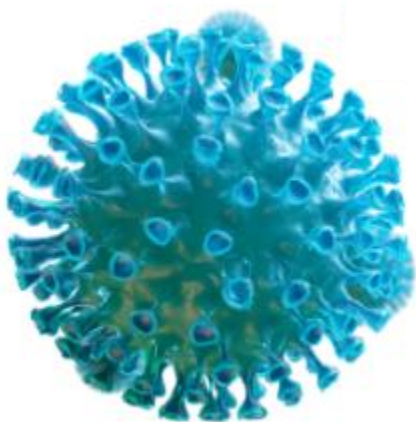
Transcatheter Aortic Valve Implantation



2020/21
43 centres

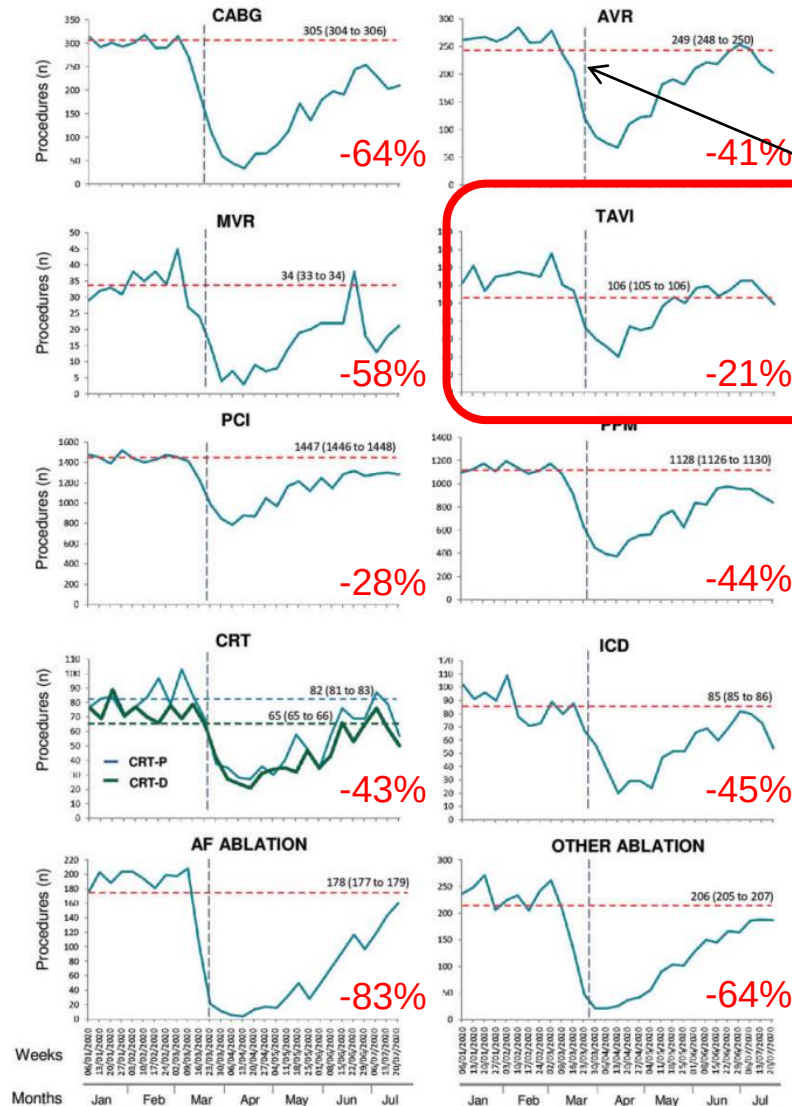
TAVI

Procedure Numbers



COVID-19



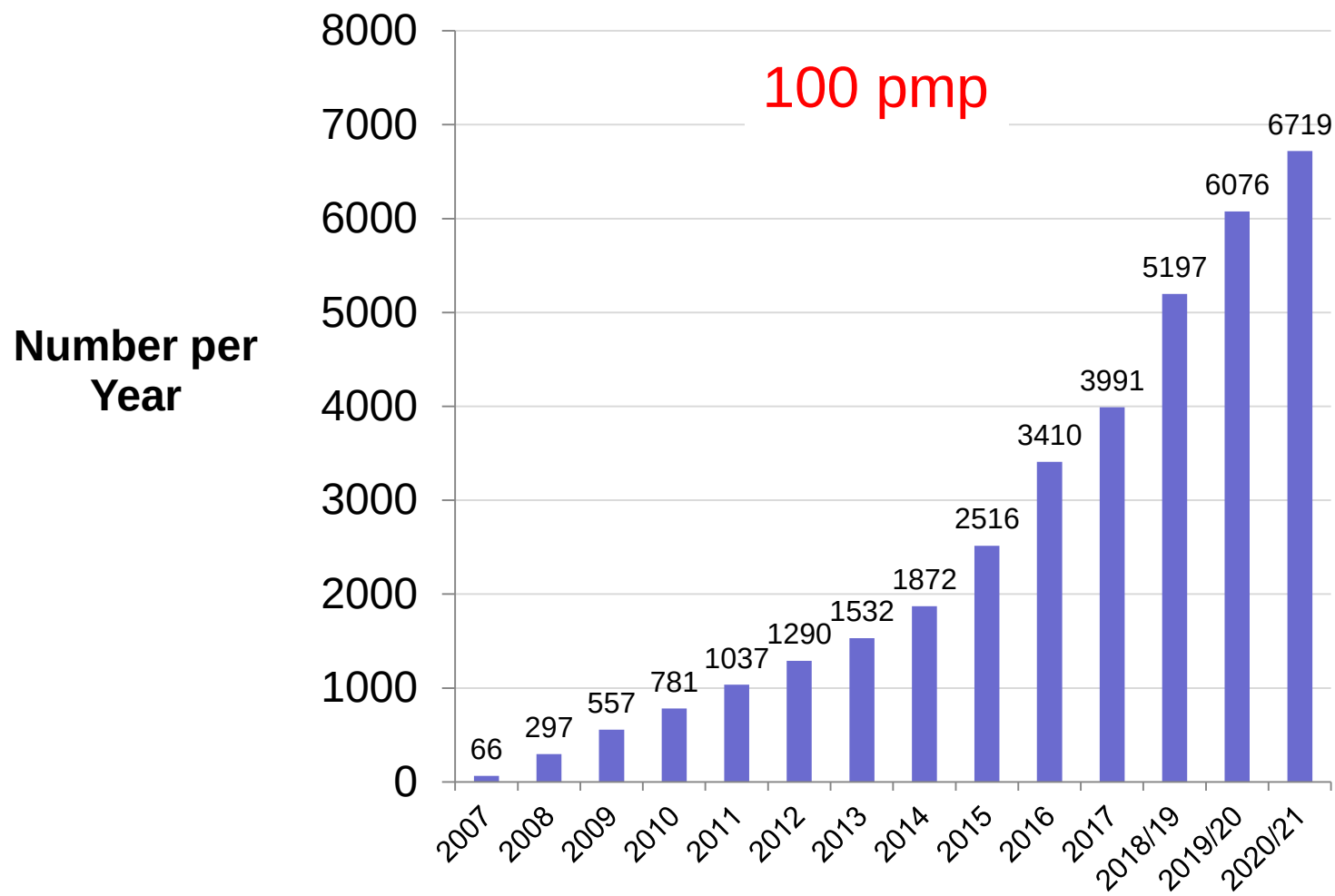


National Lock Down
23rd March

% = change in activity over
3 months of previous year

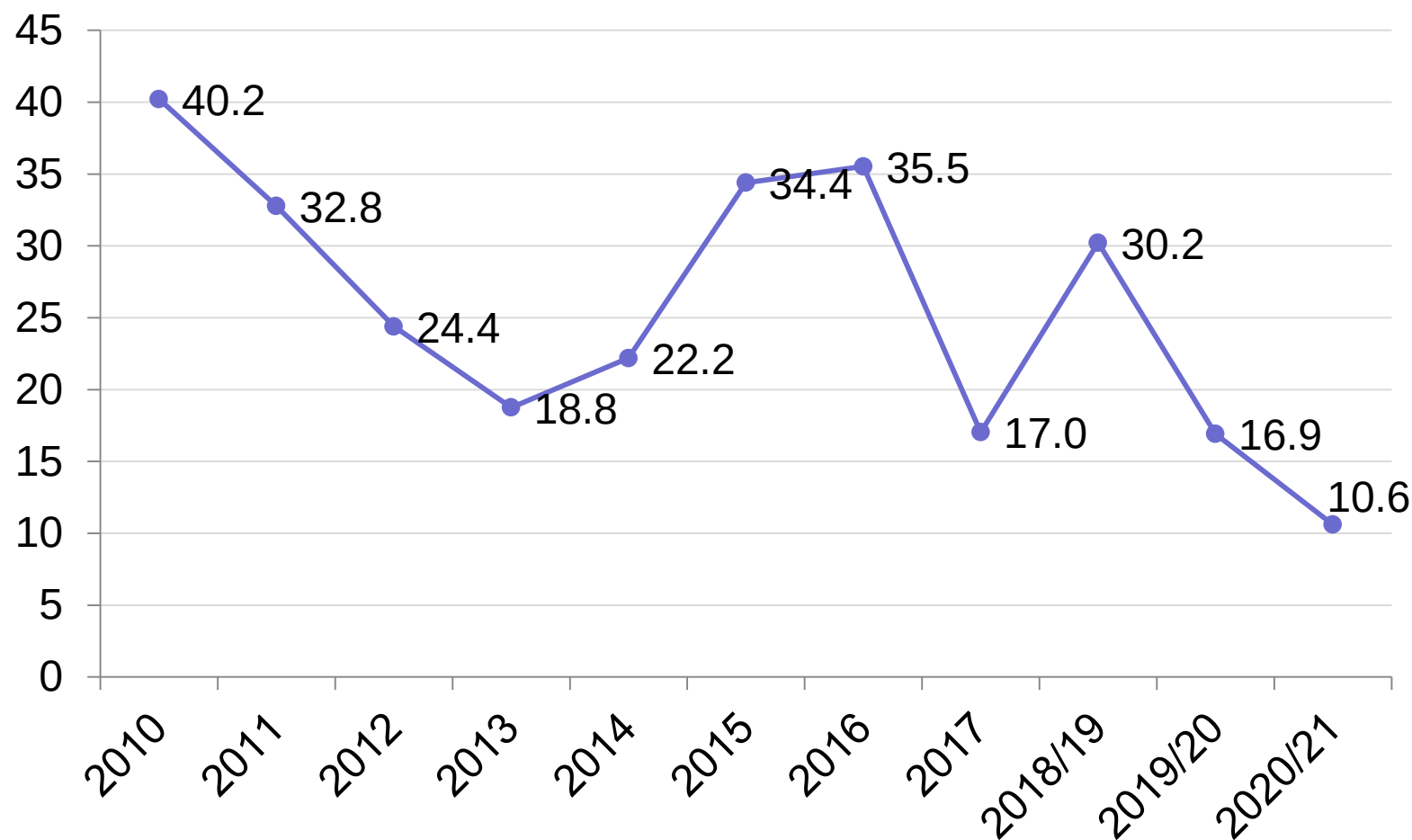
Figure 1 Number of cardiac operations and interventions in hospitalizations undertaken in England during the COVID-19 pandemic. Dashed horizontal lines indicate the mean weekly rate of procedures during the reference period in 2019. Mean and 95% CI are shown above the lines. The black, vertical, dashed line marks the announcement of the national 'lockdown' on 23 March 2020. AF, atrial fibrillation; AVR, surgical aortic valve replacement; CABG, coronary artery bypass graft; CRT-D, cardiac resynchronization therapy-defibrillation; CRT-P, cardiac resynchronization therapy-pacing; ICD, implantable cardioverter-defibrillator; MVR, mitral valve replacement; PCI, percutaneous coronary intervention; PPM, permanent pacemaker; TAVI, transcatheter aortic valve implantation.

TAVI



TAVI

Rate of Increase in Procedures



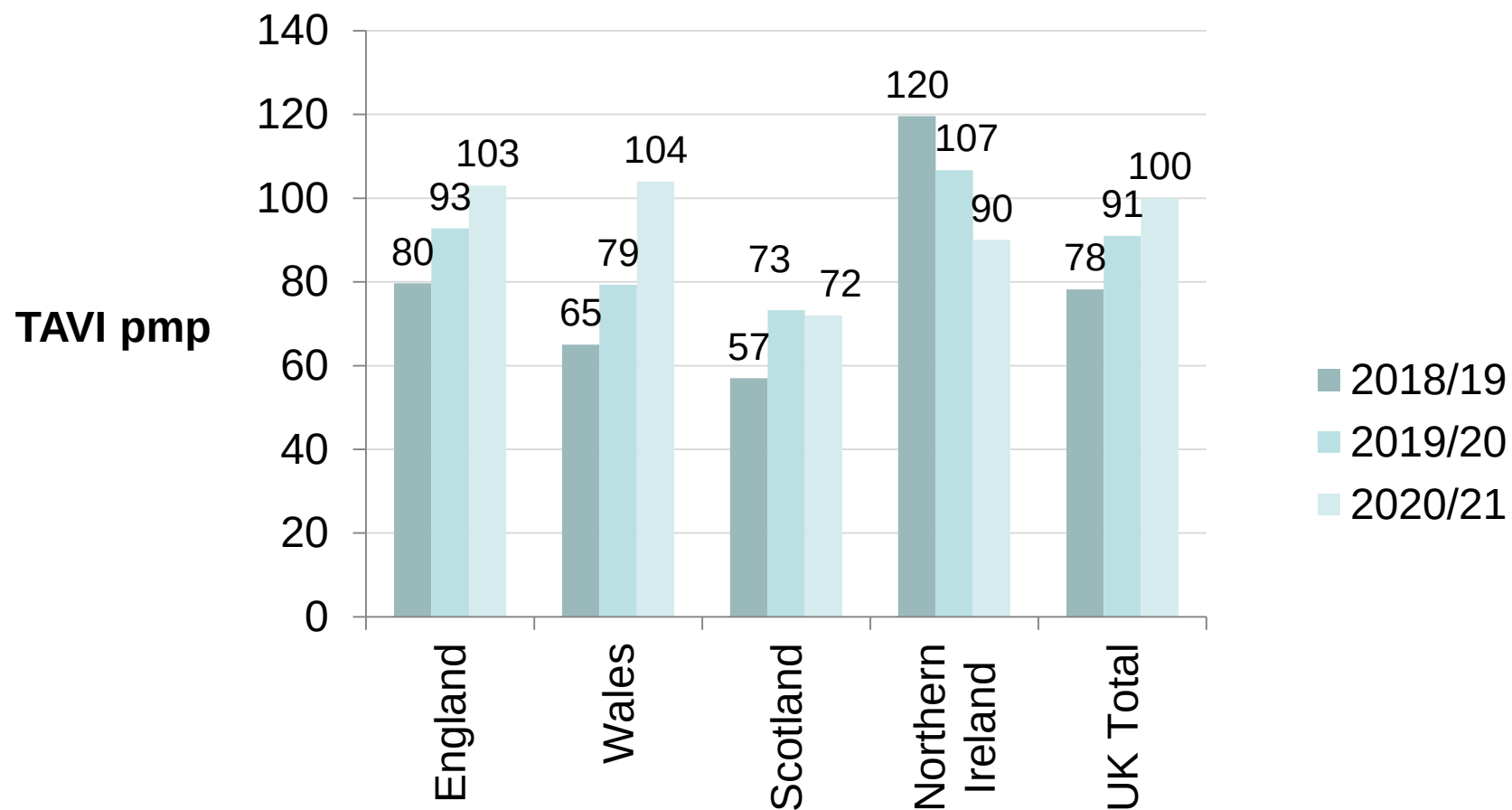
TAVI

By UK Country

Country Treated	Number of Centres	Total TAVI	Population mid 2020	TAVI pmp
England	37	5828	56.55	103
Wales	2	329	3.17	104
Scotland	3	391	5.466	72
Northern Ireland	1	171	1.896	90
ALL	43	6719	67.081	100

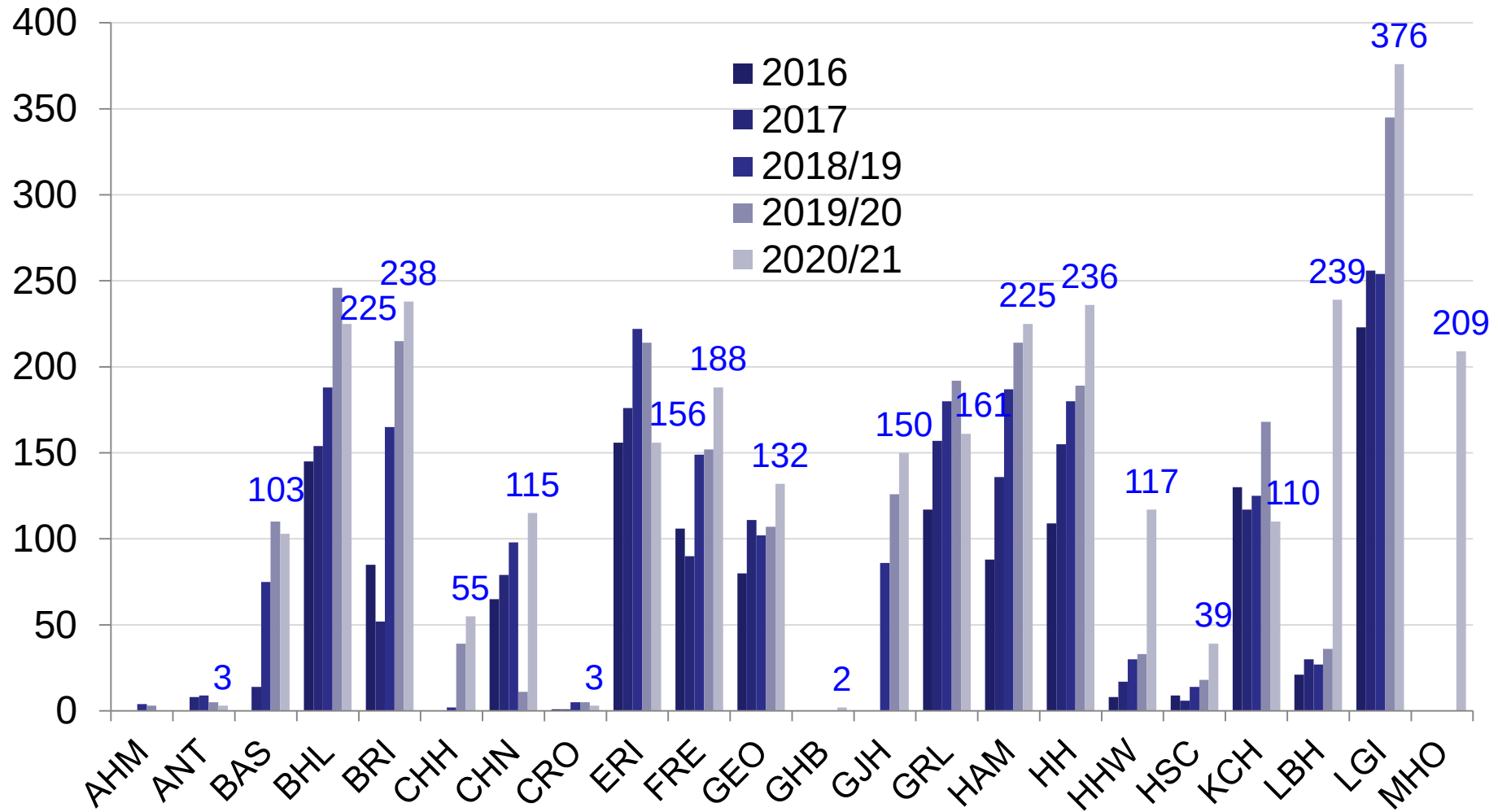
TAVI

pmp by Country



TAVI

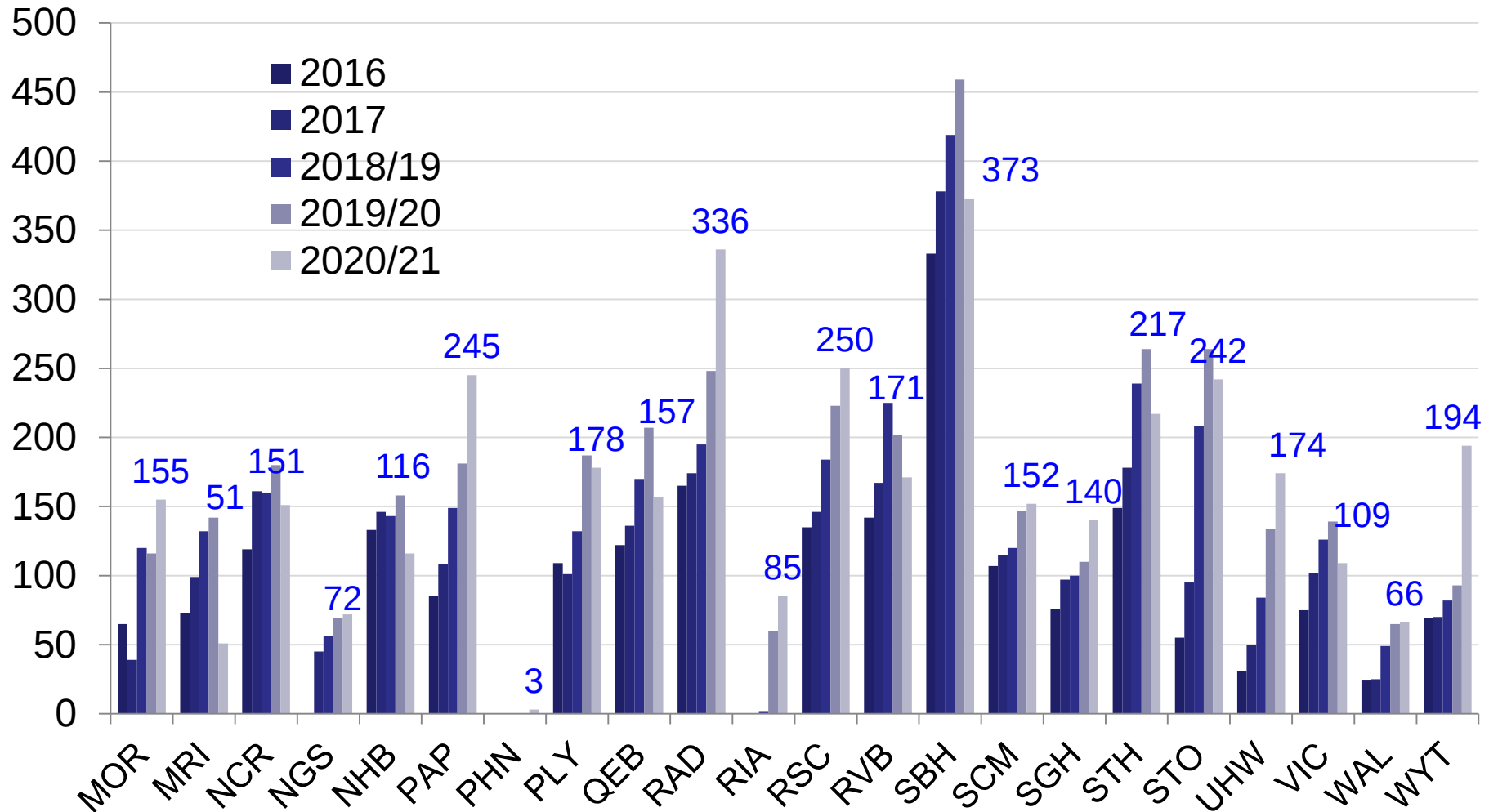
Centres by Site Code (AHM to MHO)



Number is for latest year

TAVI

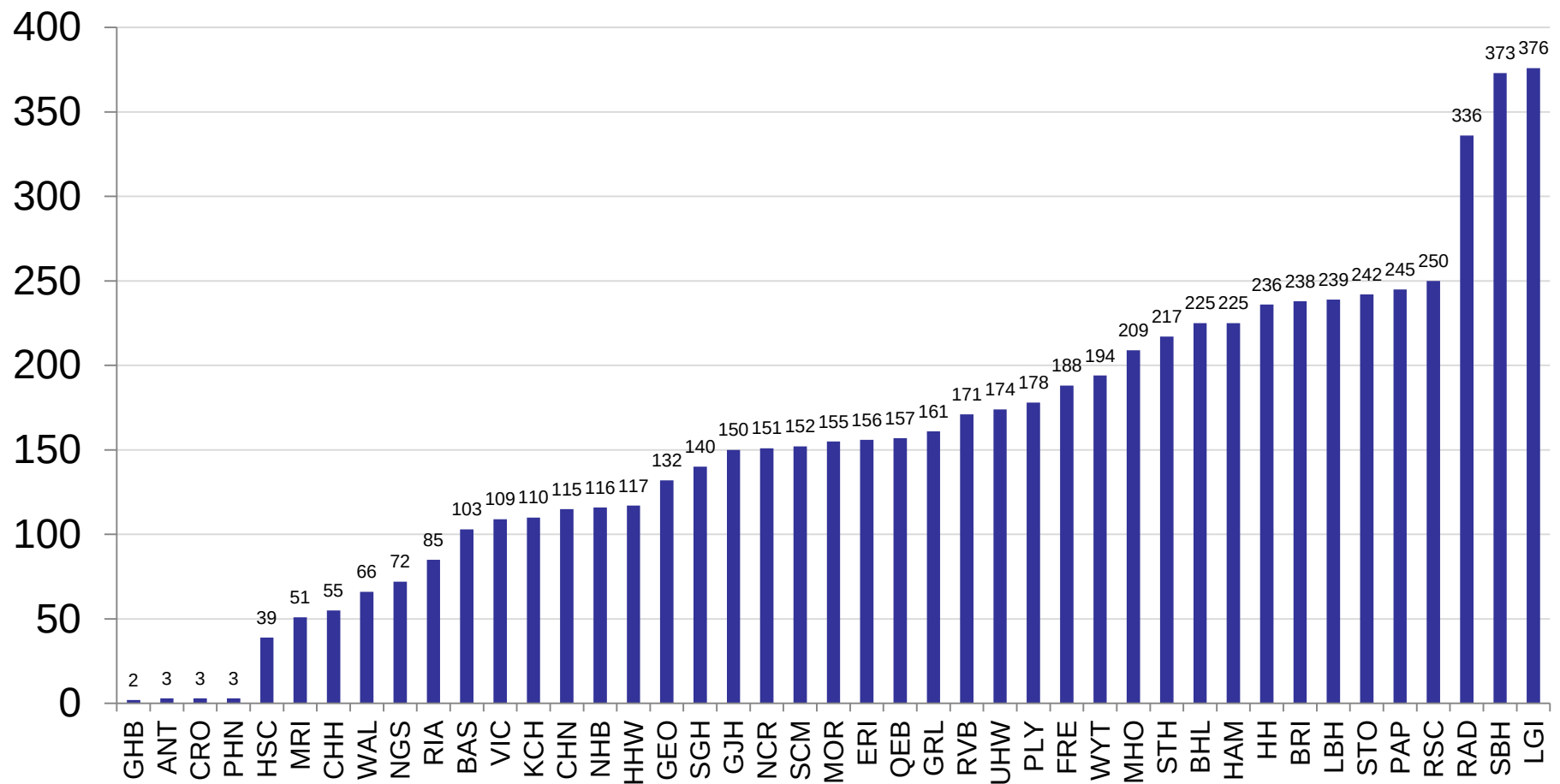
Centres by Site Code (AHM to MHO)



Number is for latest year

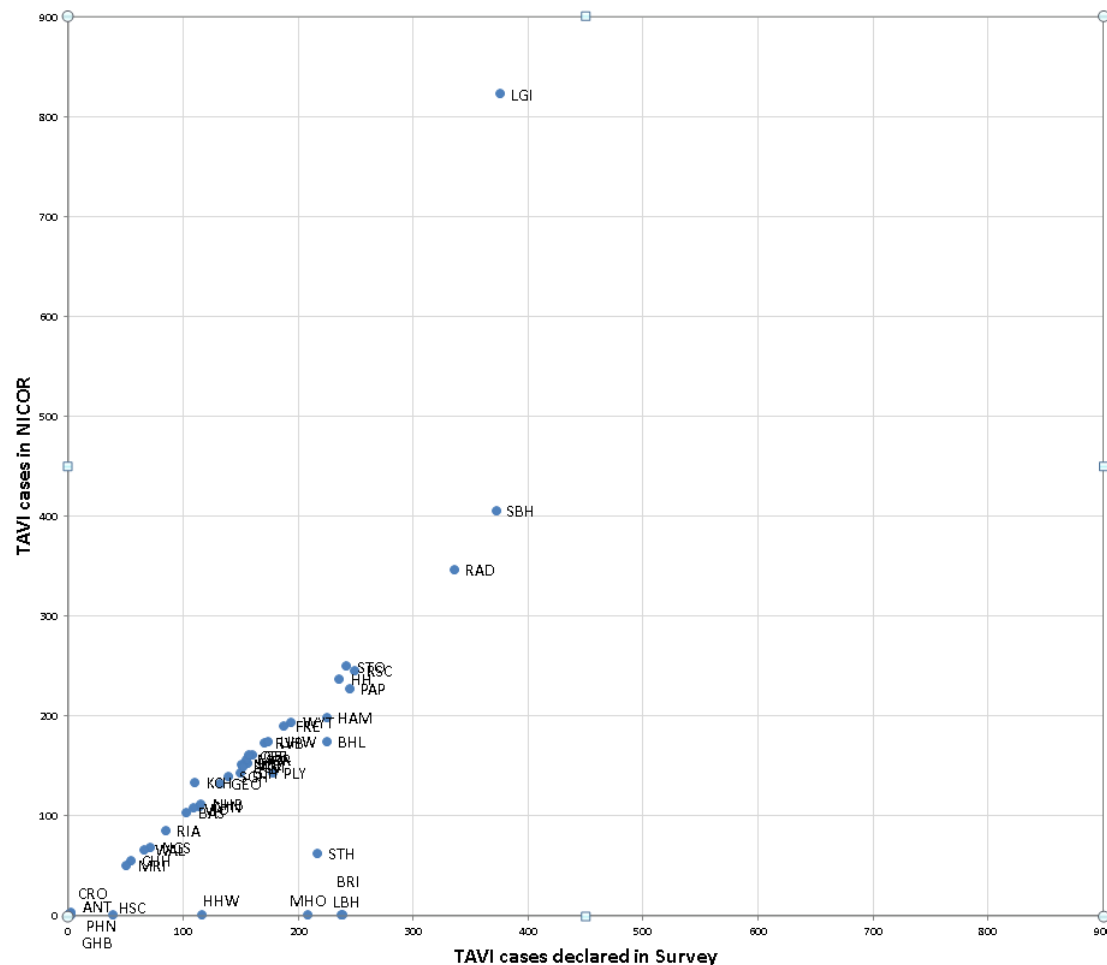
TAVI

Centres by Procedures in 2020/21



TAVI

Extract 25-10-2021 v declared
NICOR 6068 (versus declared 6719 in Survey)

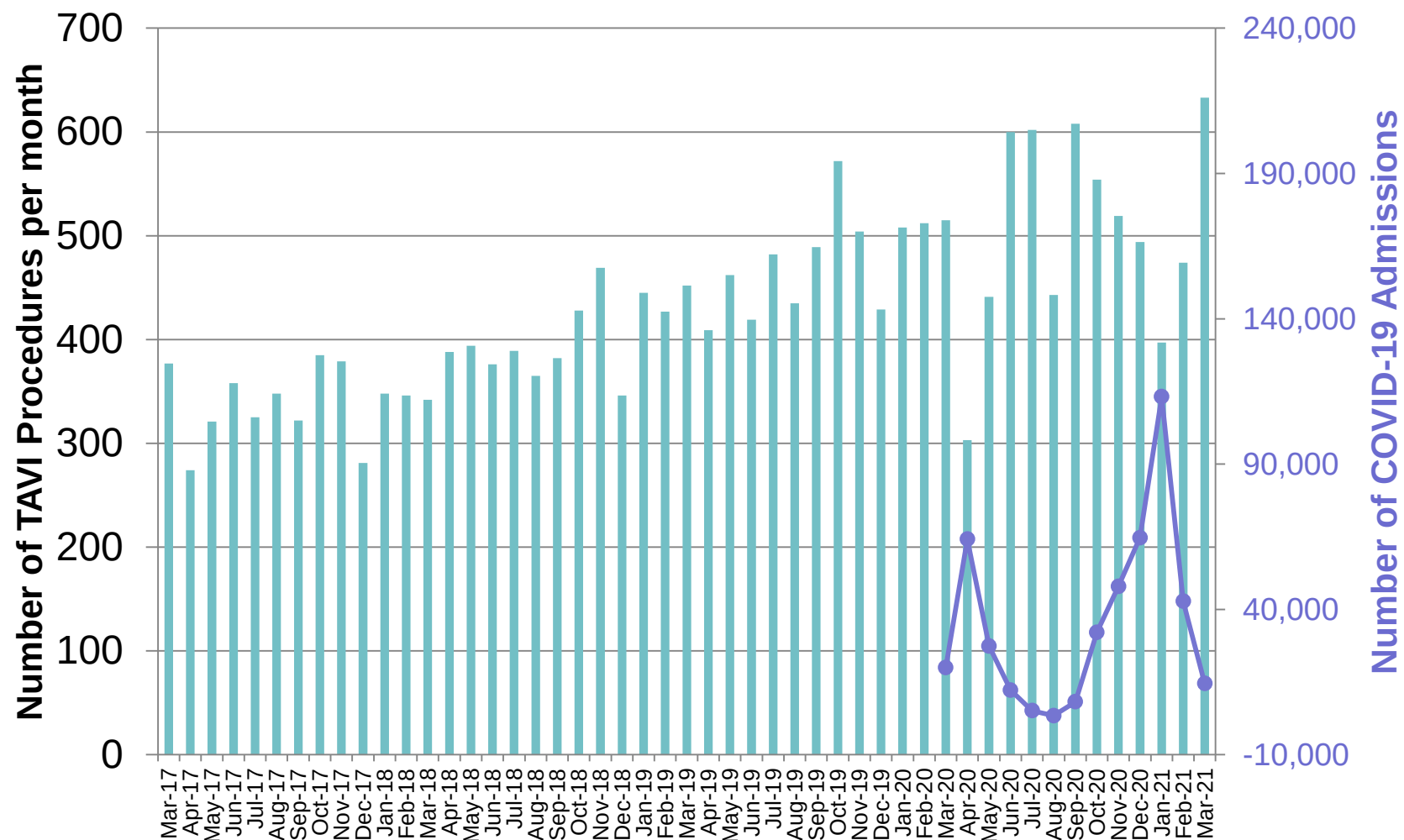


No Data in NICOR	
BMI Park Hospital	3
Harley Street Clinic (HSC)	39
Wellington Hospital (HHW)	117
Manor Hospital (MHO)	209
Bristol Royal Infirmary (BRI)	238
BRI subsequently uploaded but too late for analysis	
London Bridge Hospital (LBH)	239

LGI database glitch – subsequently fixed

TAVI per month

5 years: March 2017-March 2021

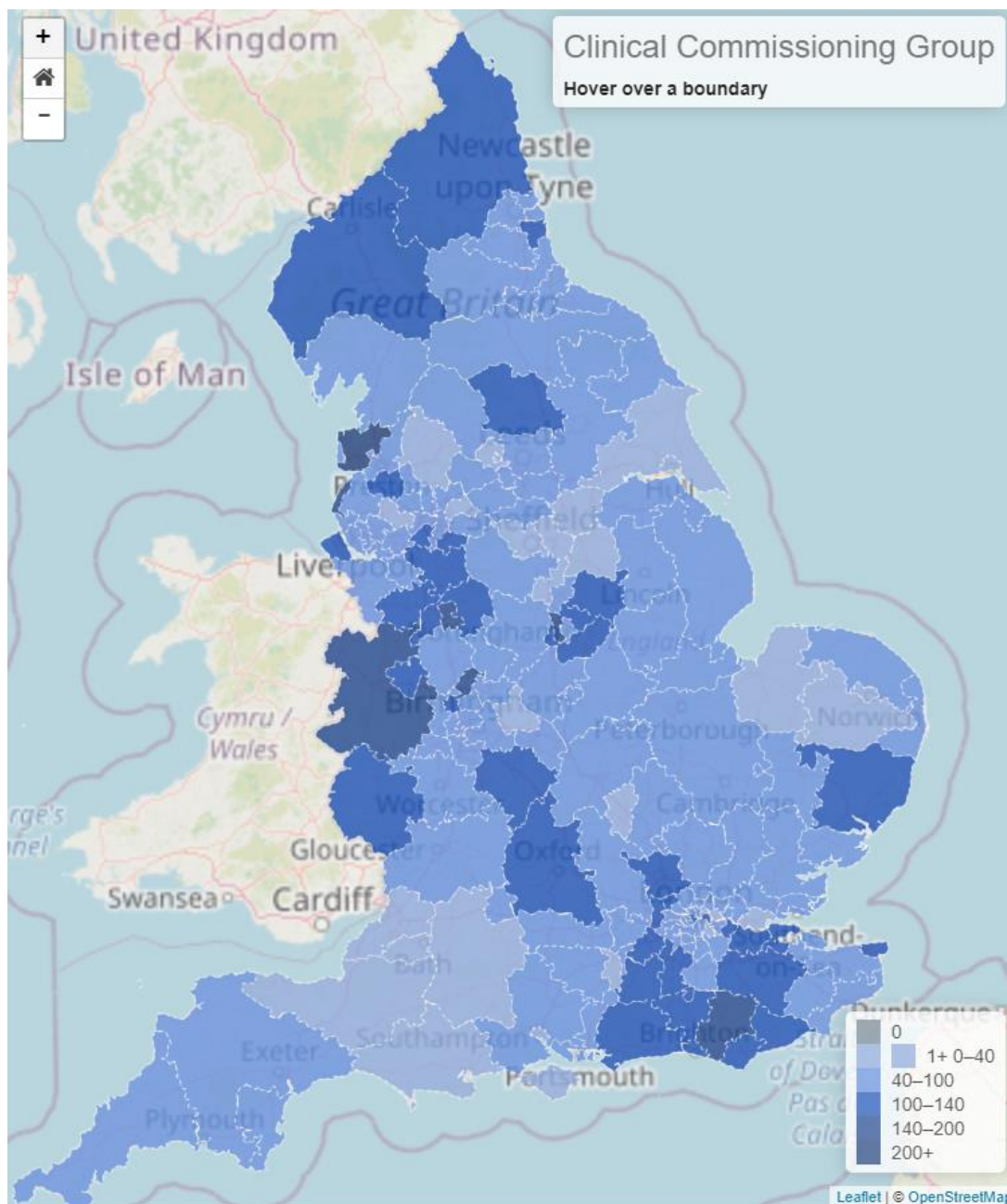
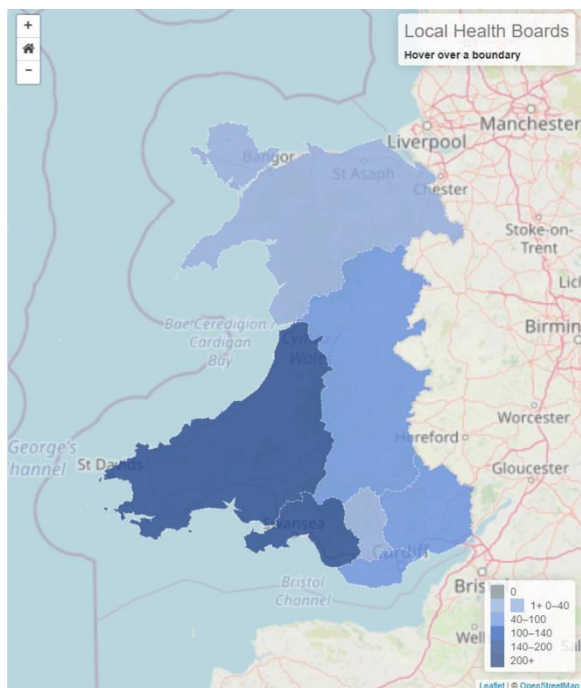


NB. Some centre's data missing from some years

TAVI

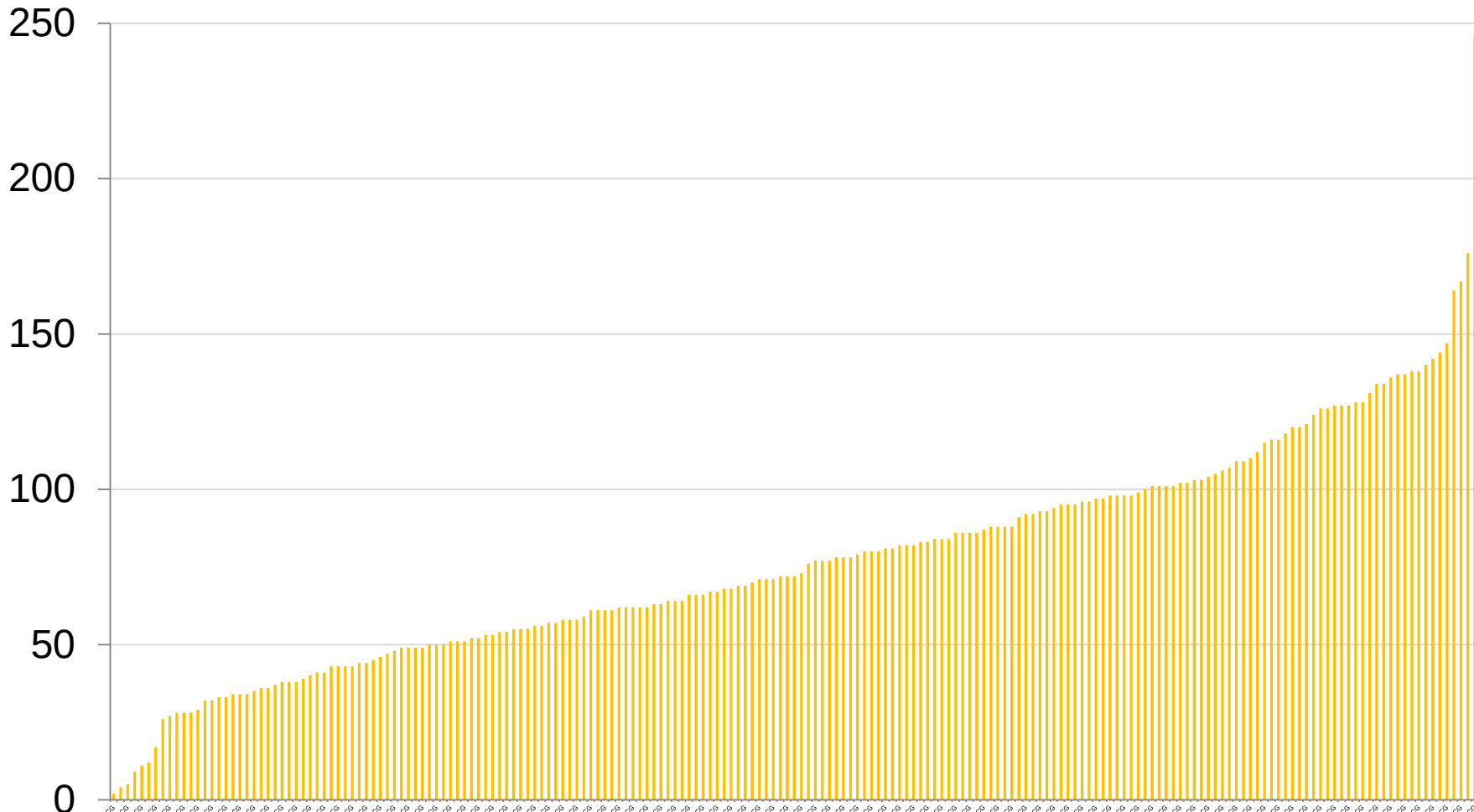
2018/19

Survey



TAVI

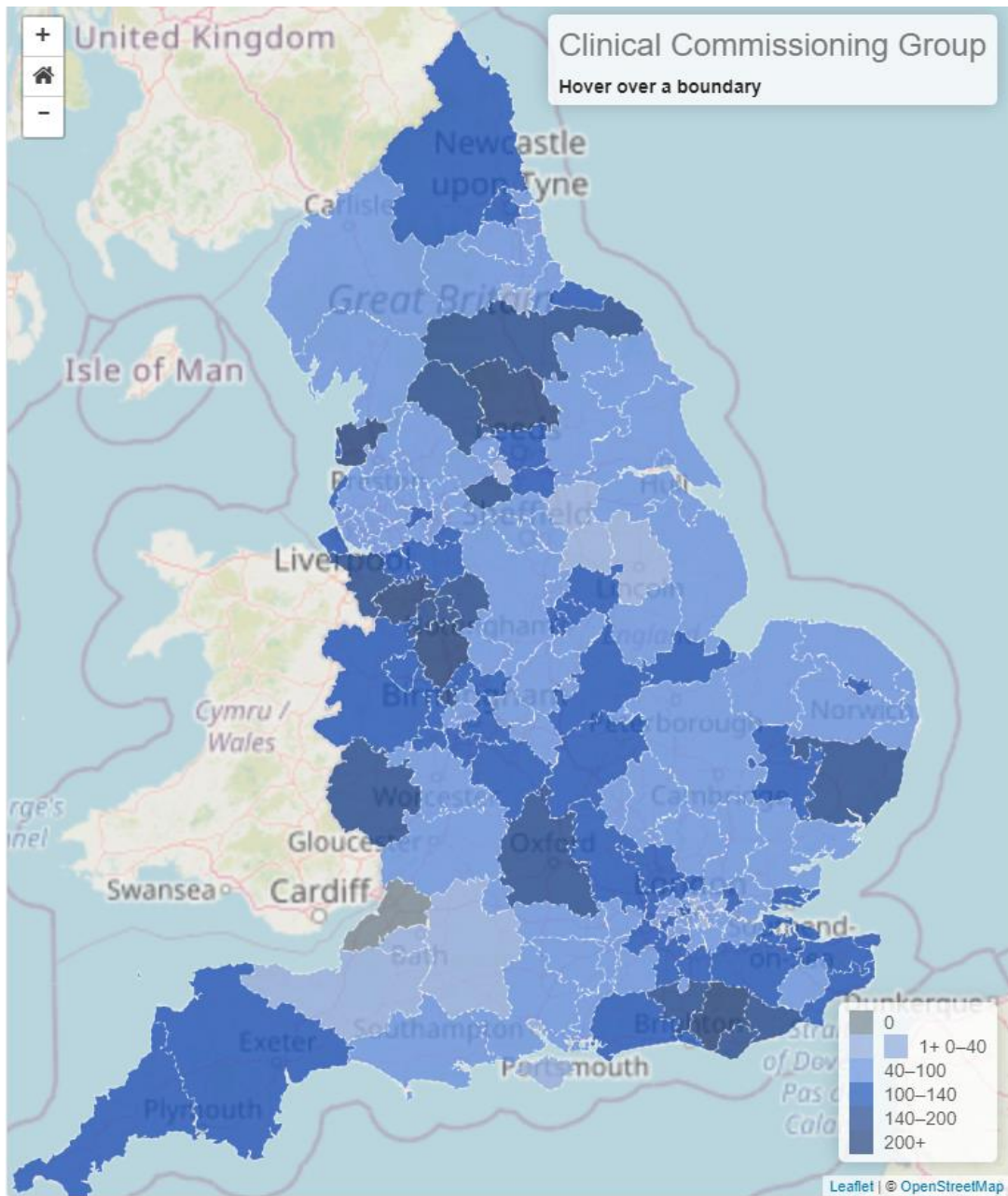
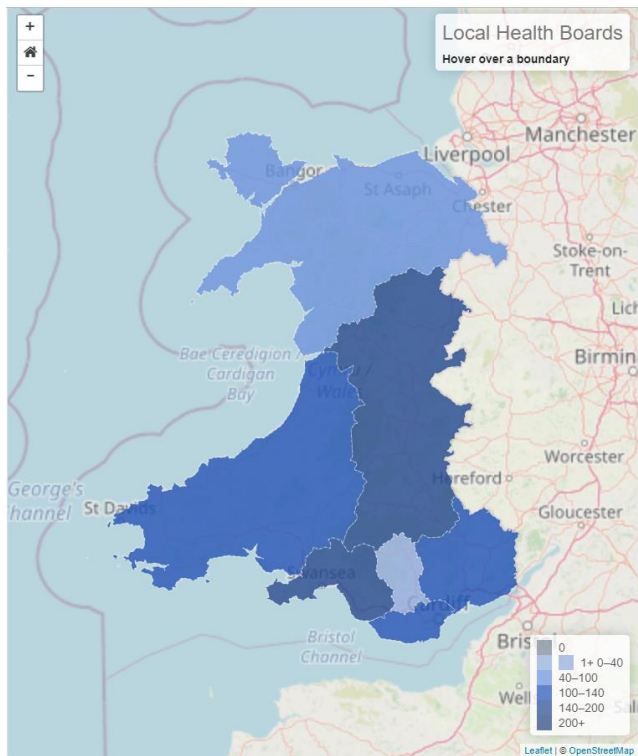
By Region 2018/19



TAVI

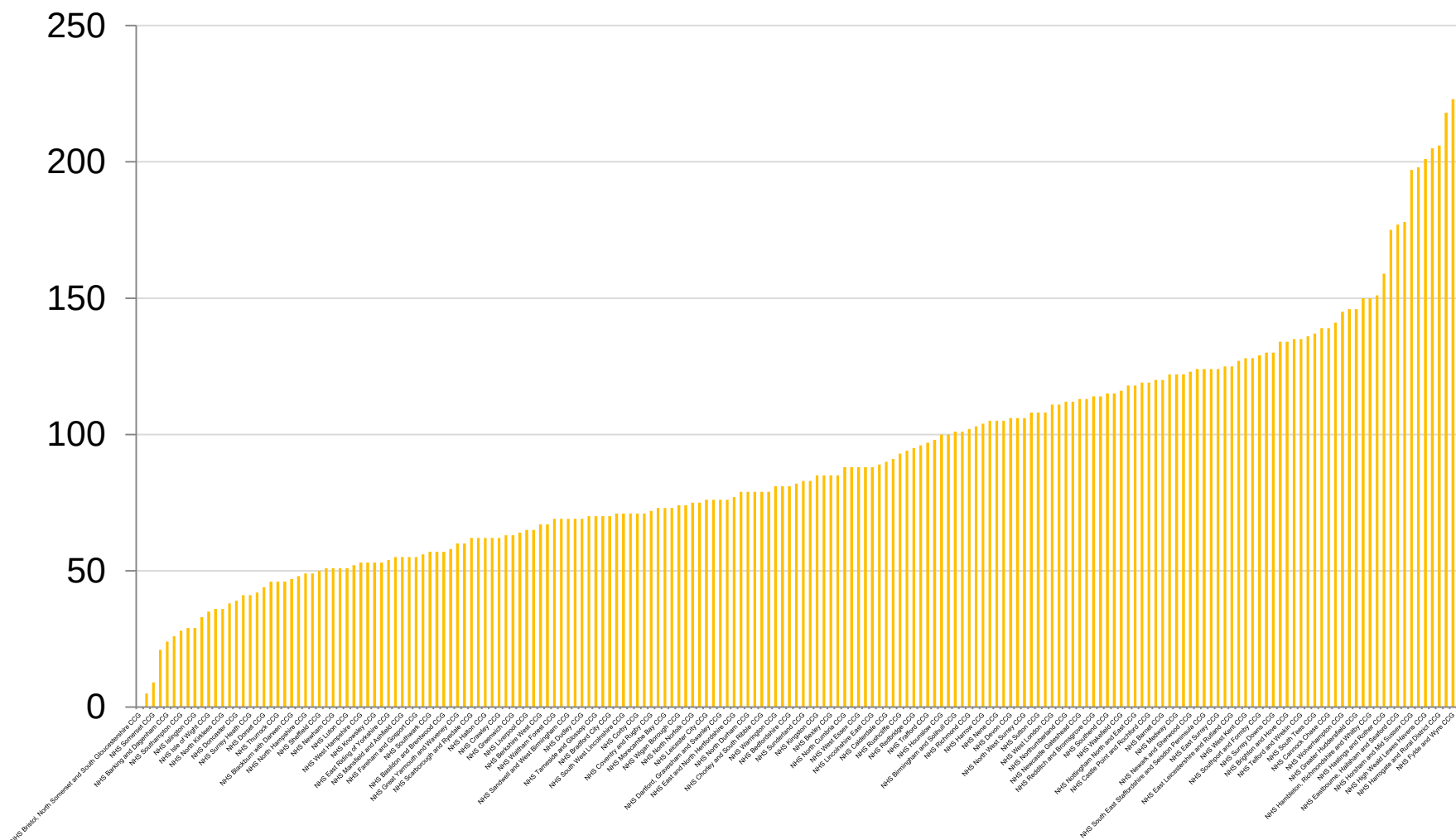
2019/20

Survey



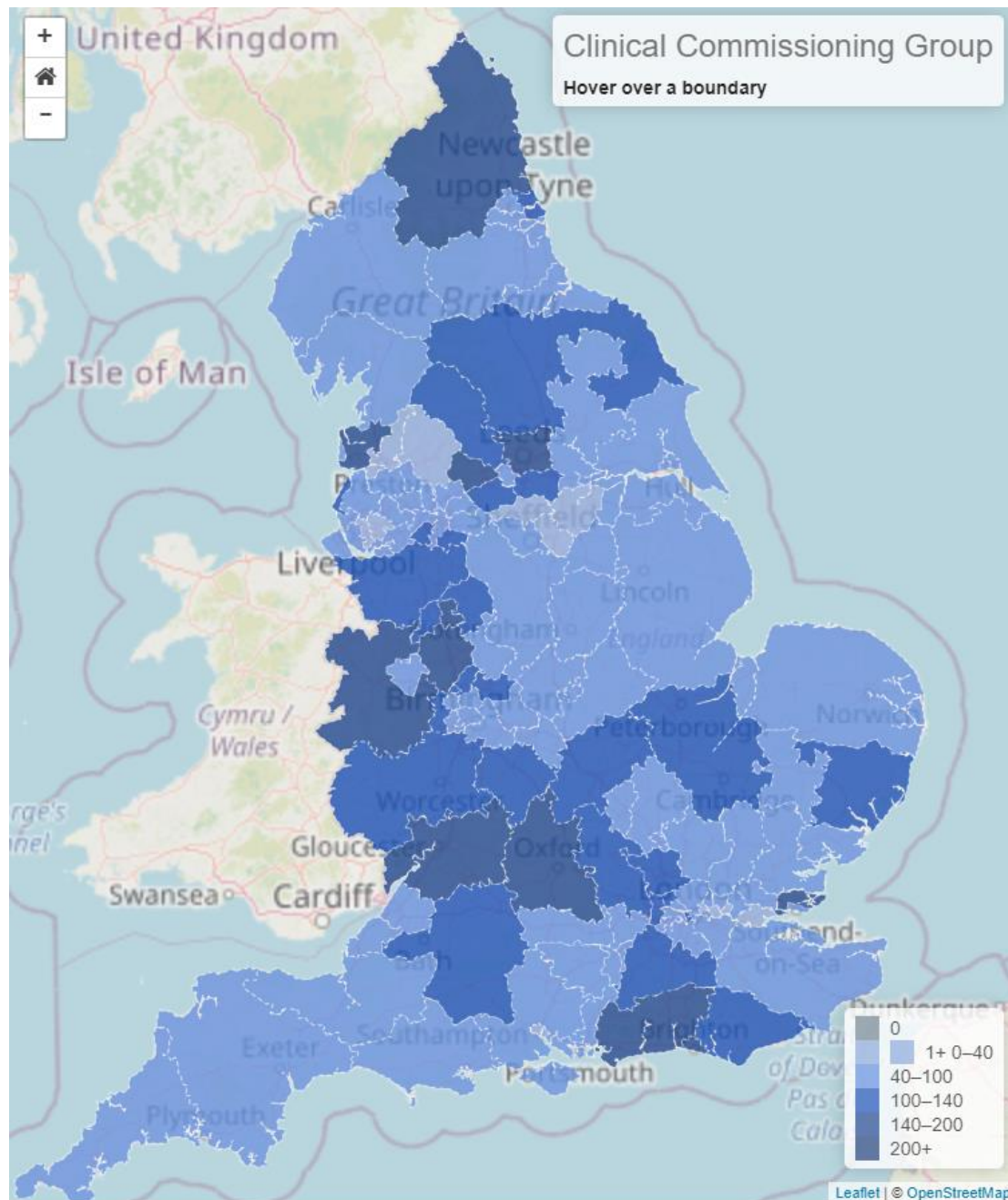
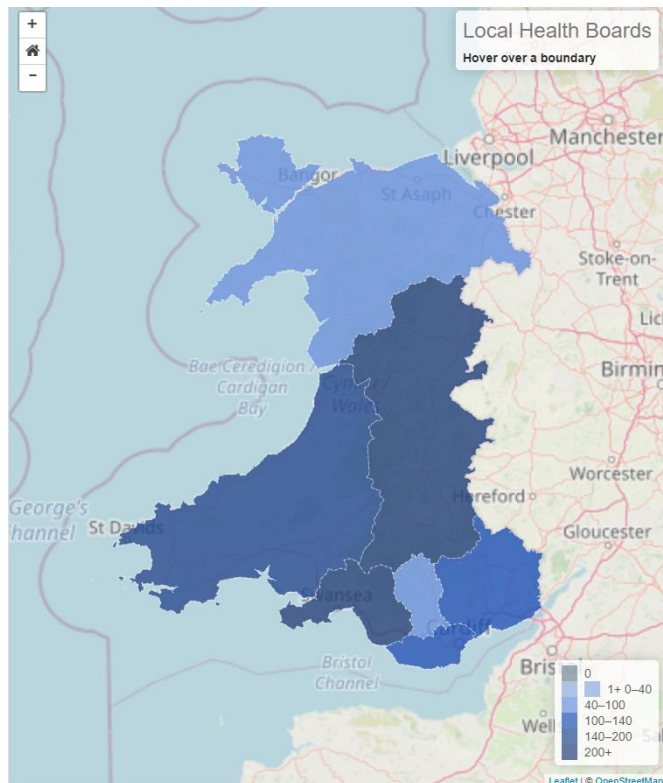
TAVI

By Region 2019/20



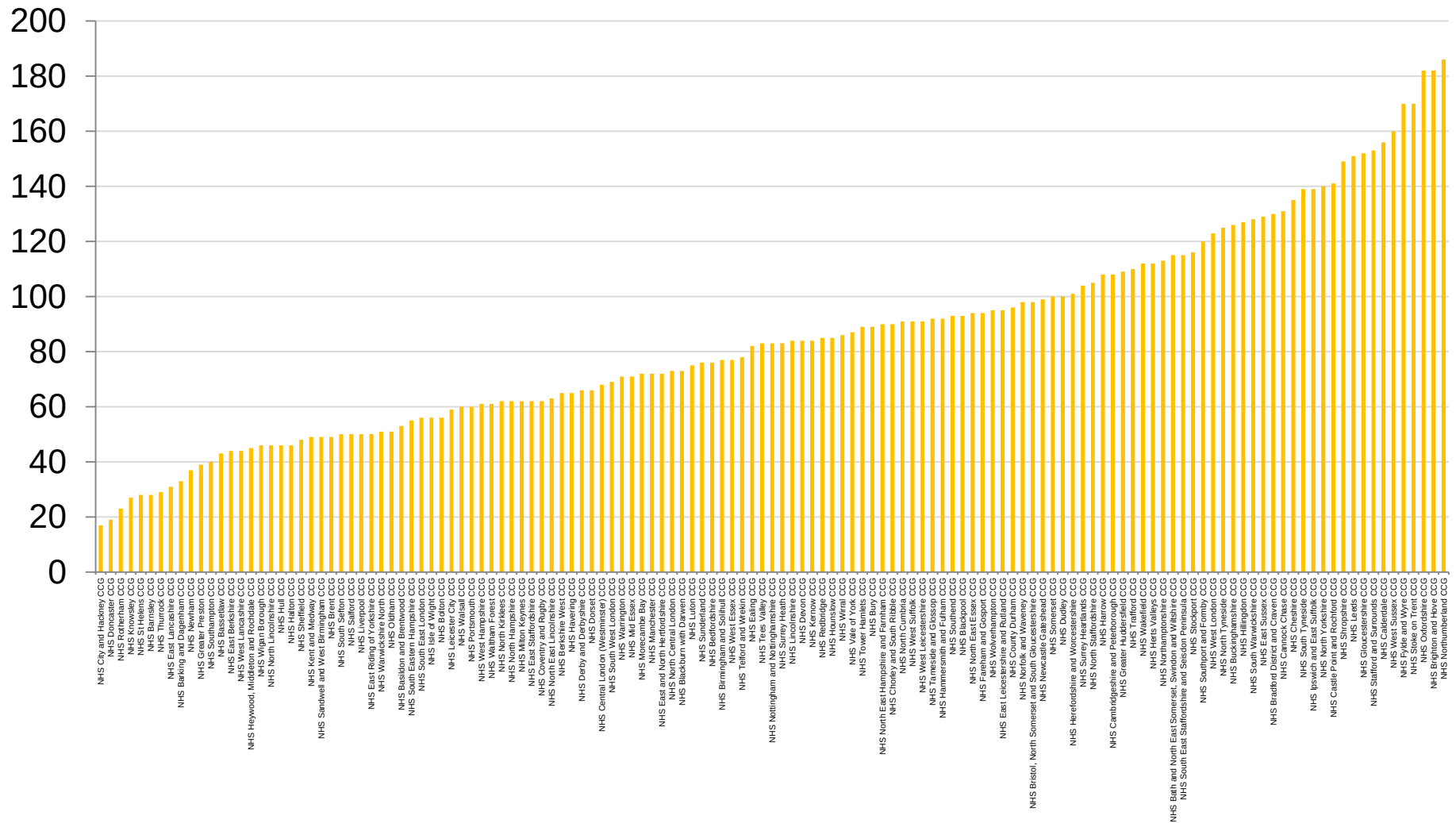
TAVI

2020/21



TAVI

By Region 2020/21



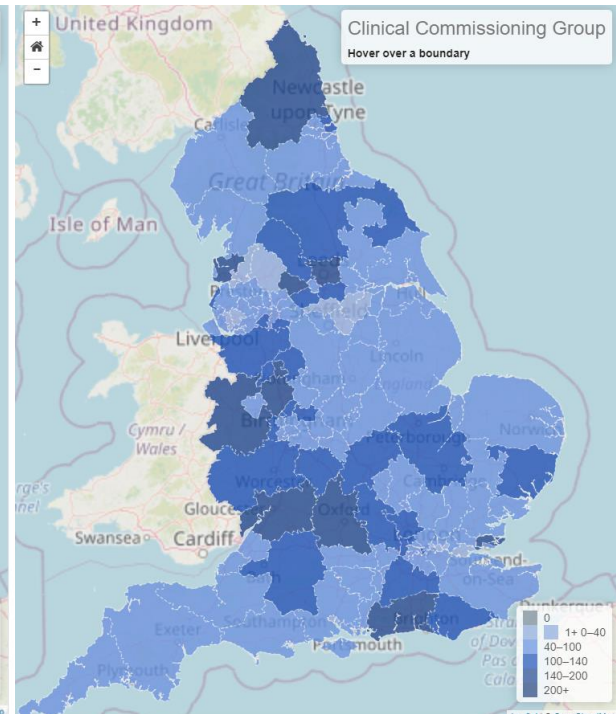
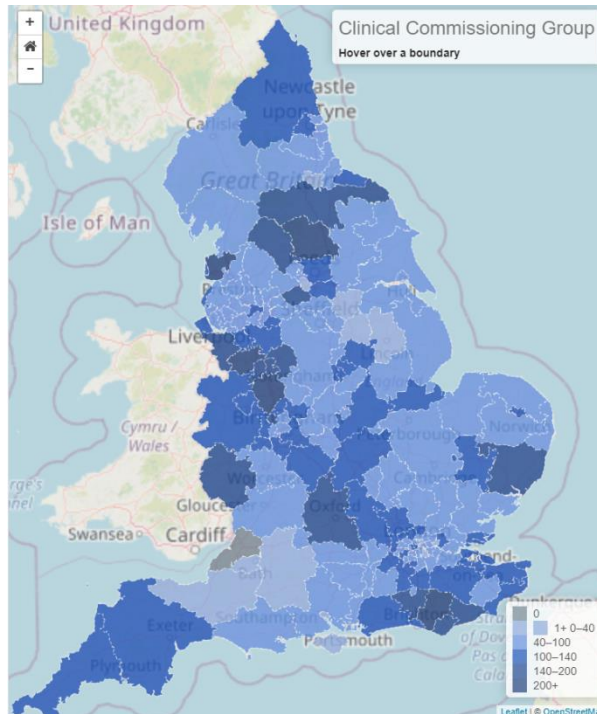
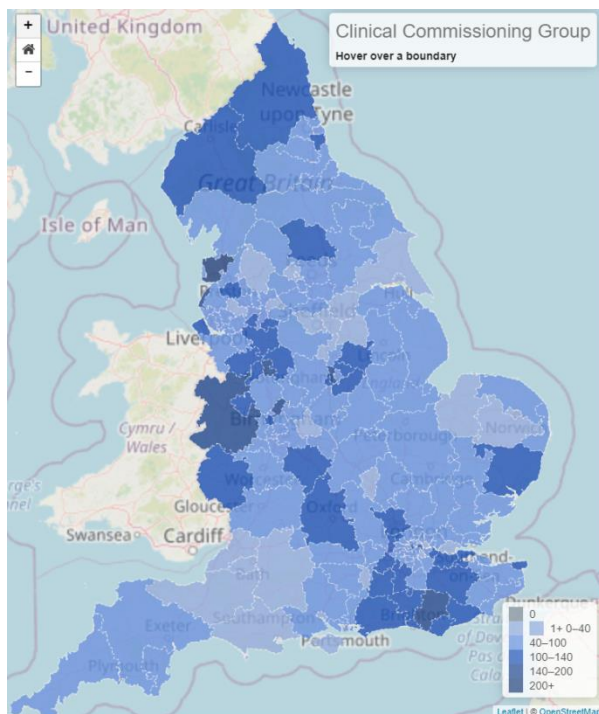
TAVI

pmp

2018/19

2019/20

2020/21



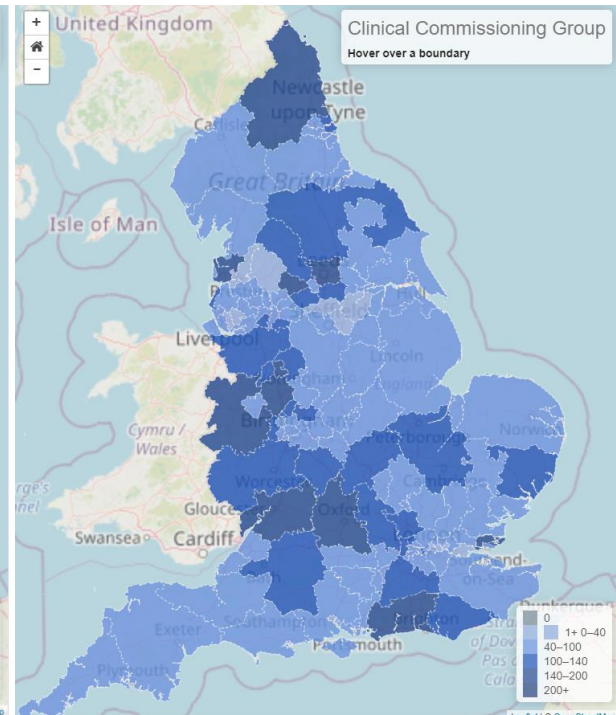
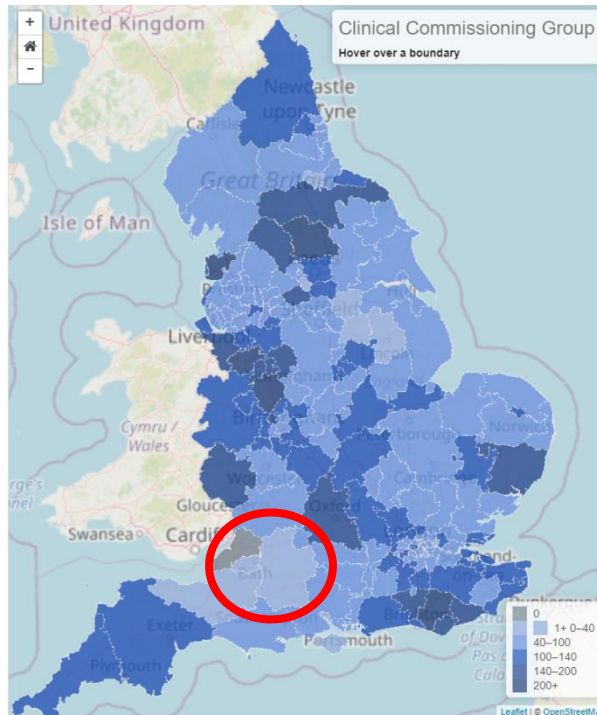
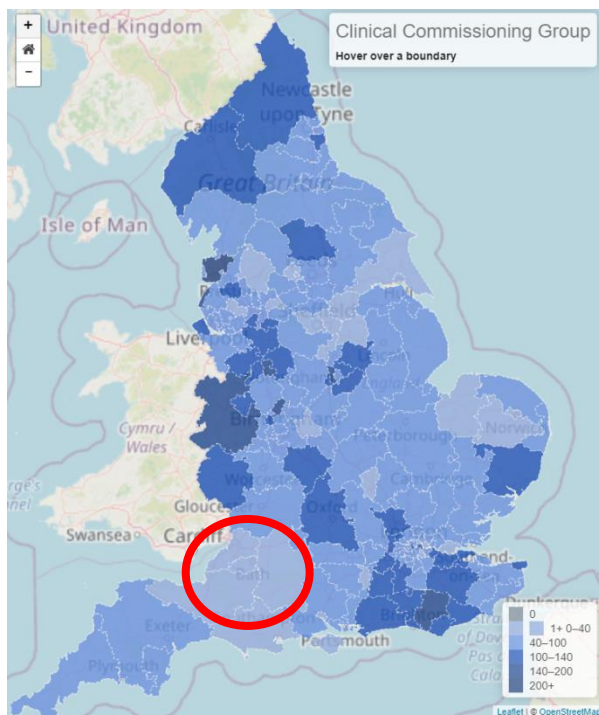
TAVI

pmp

2018/19

2019/20

2020/21



Bristol data missing 2018/19 and 2019/20

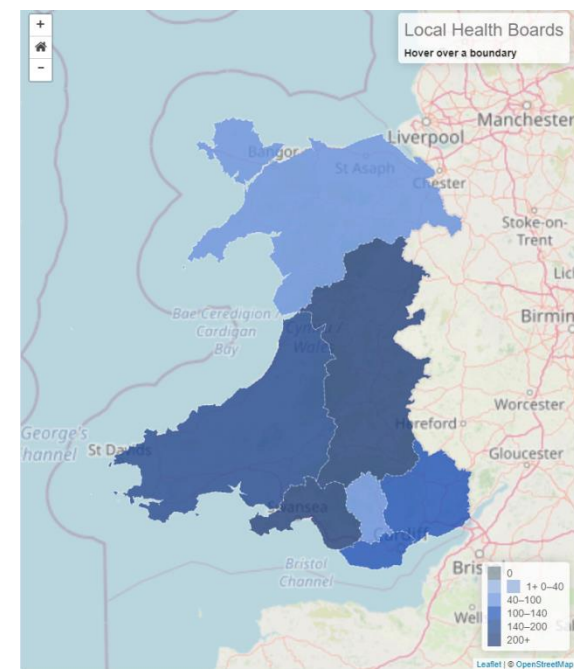
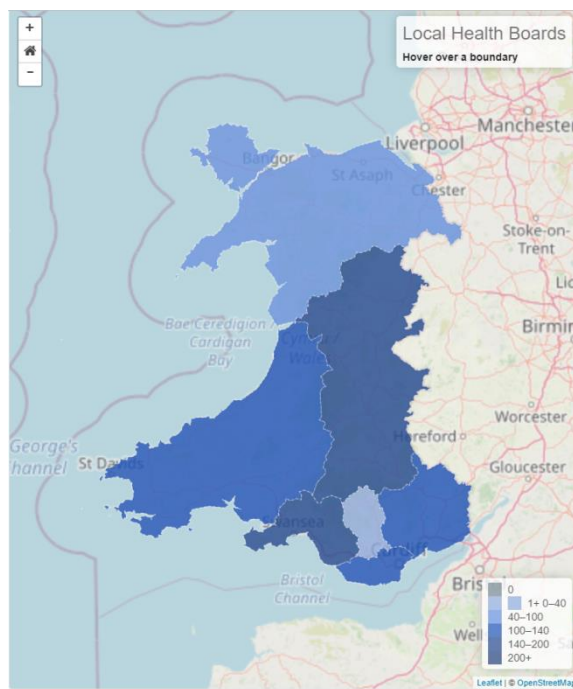
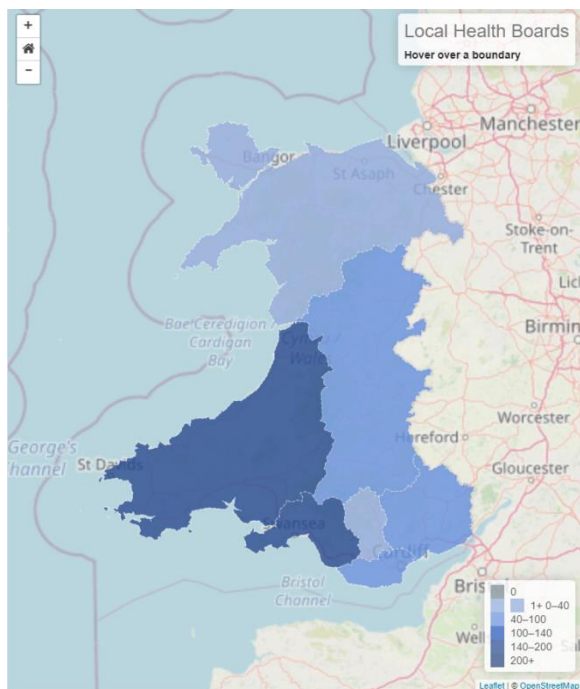
TAVI

pmp

2018/19

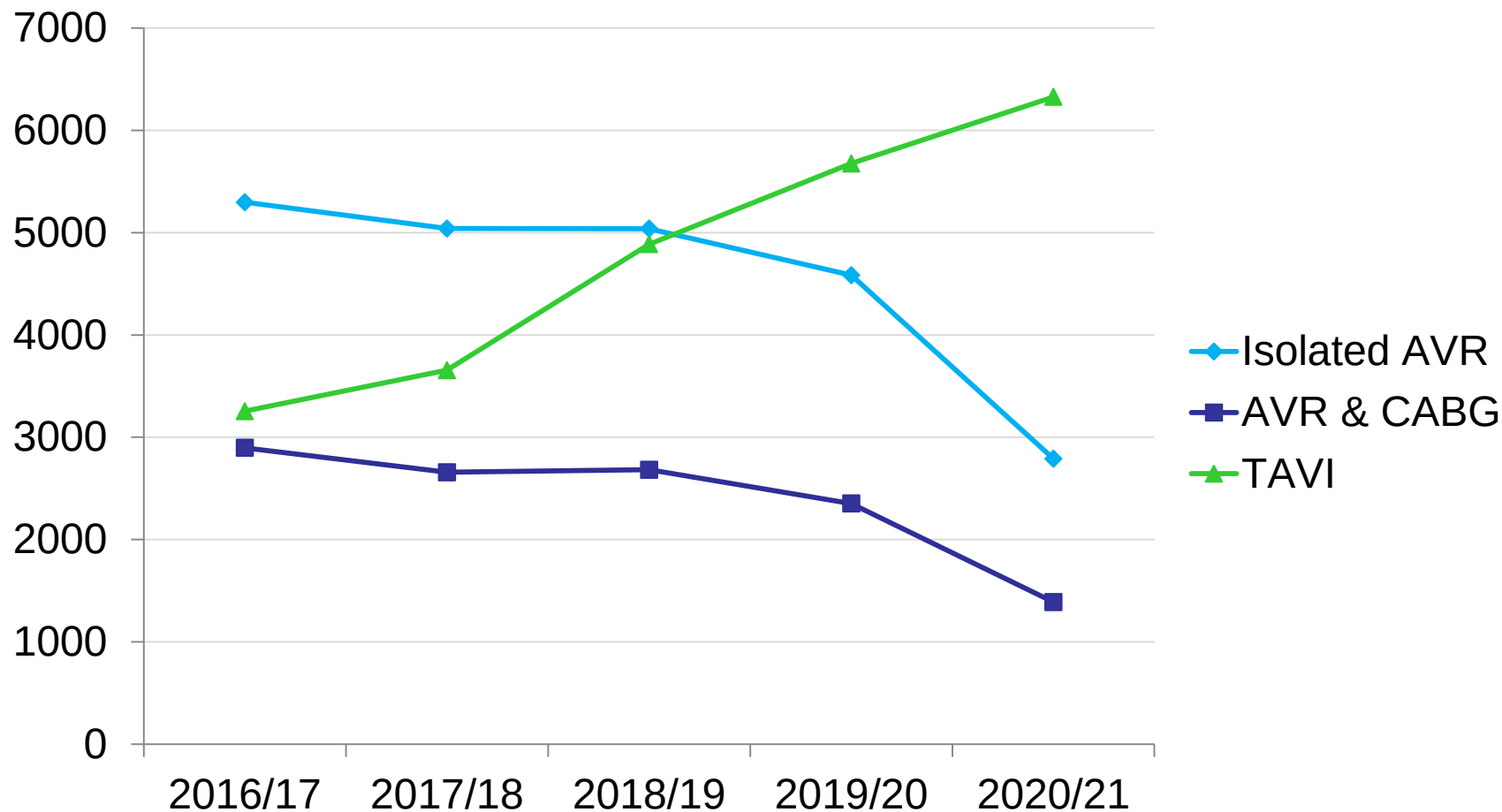
2019/20

2020/21



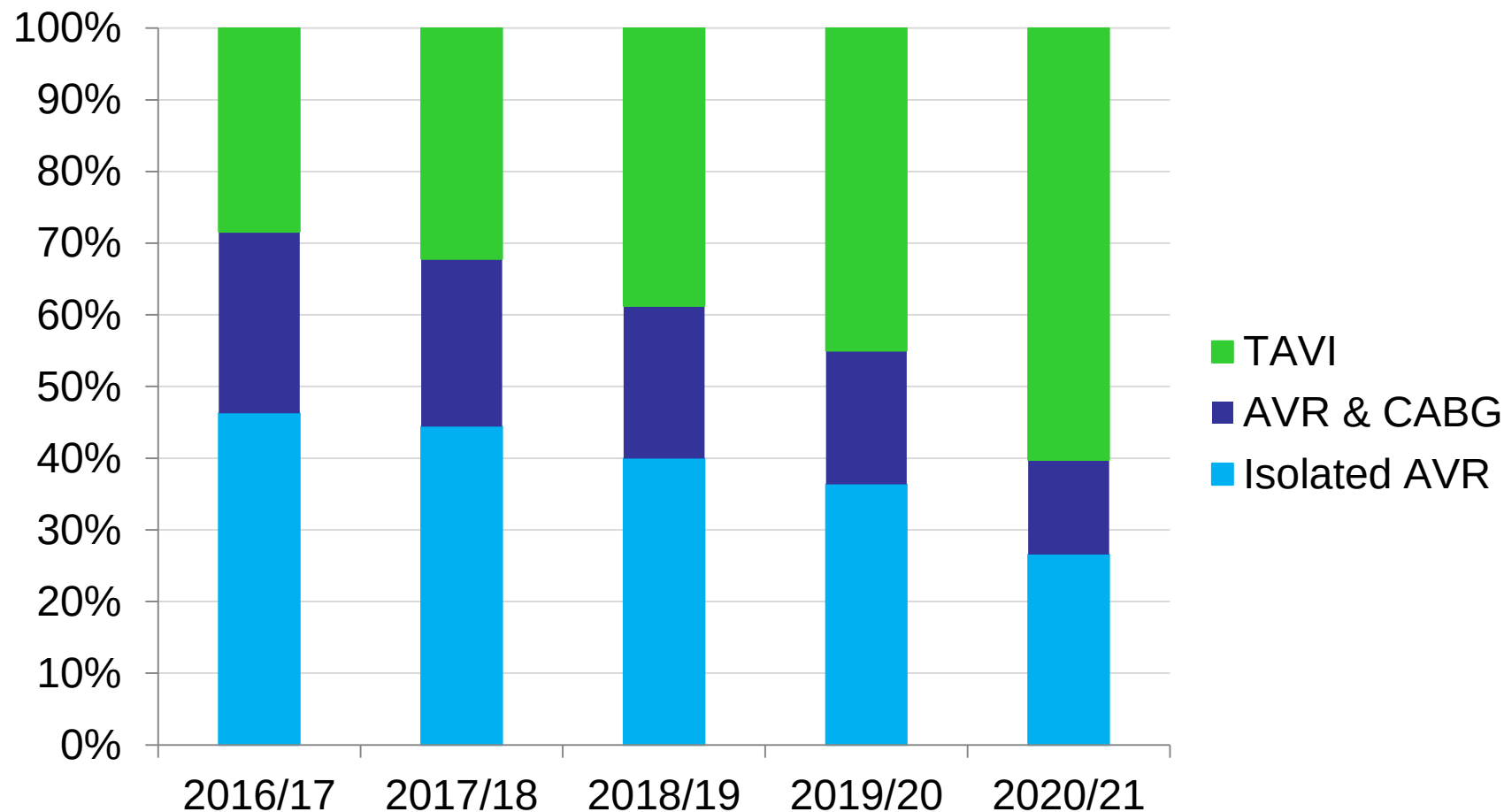
TAVI and sAVR

UK excluding Scotland



TAVI and sAVR

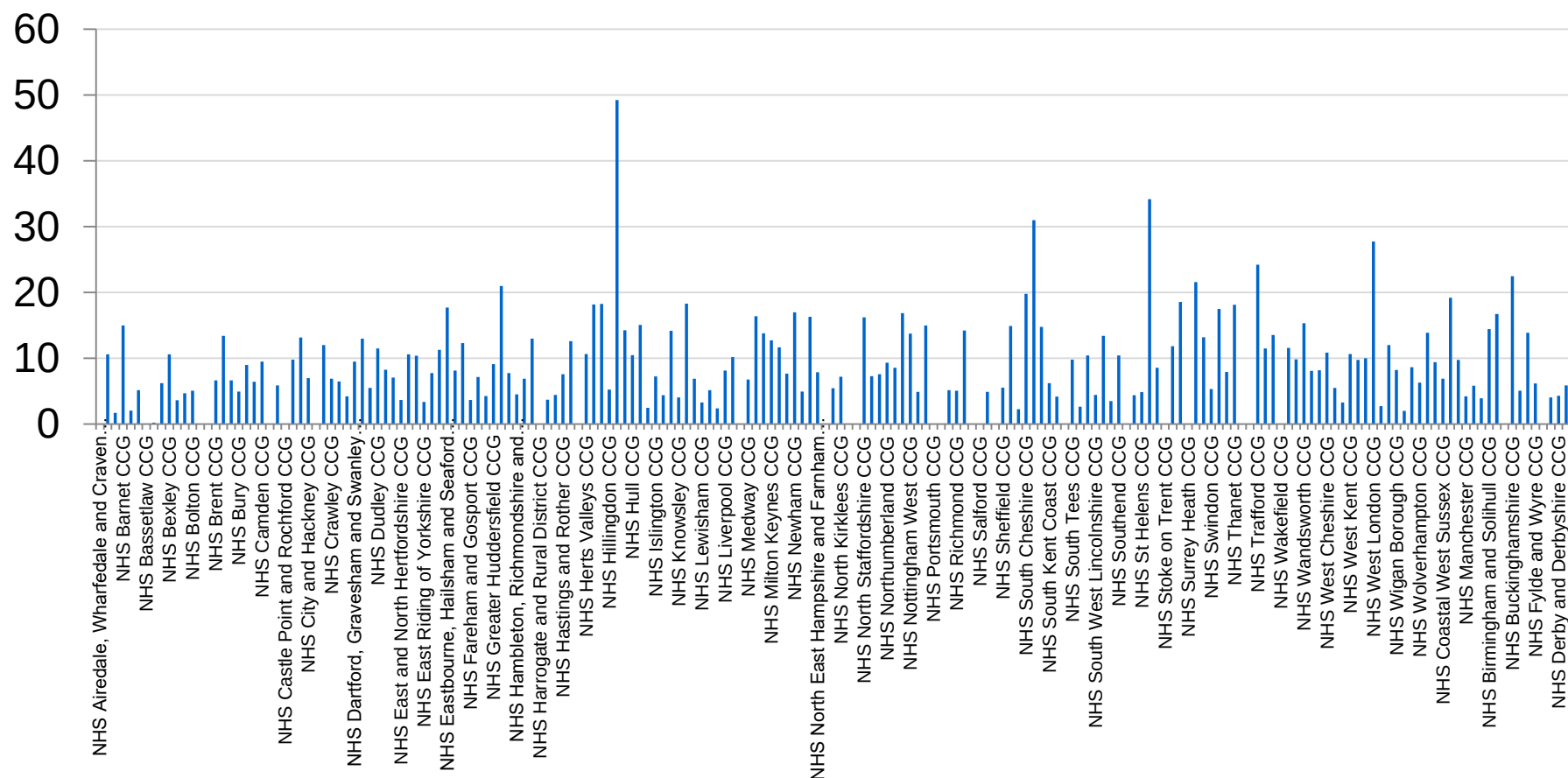
UK excluding Scotland



TAVI : SAVR ratio

2019/20 (all)

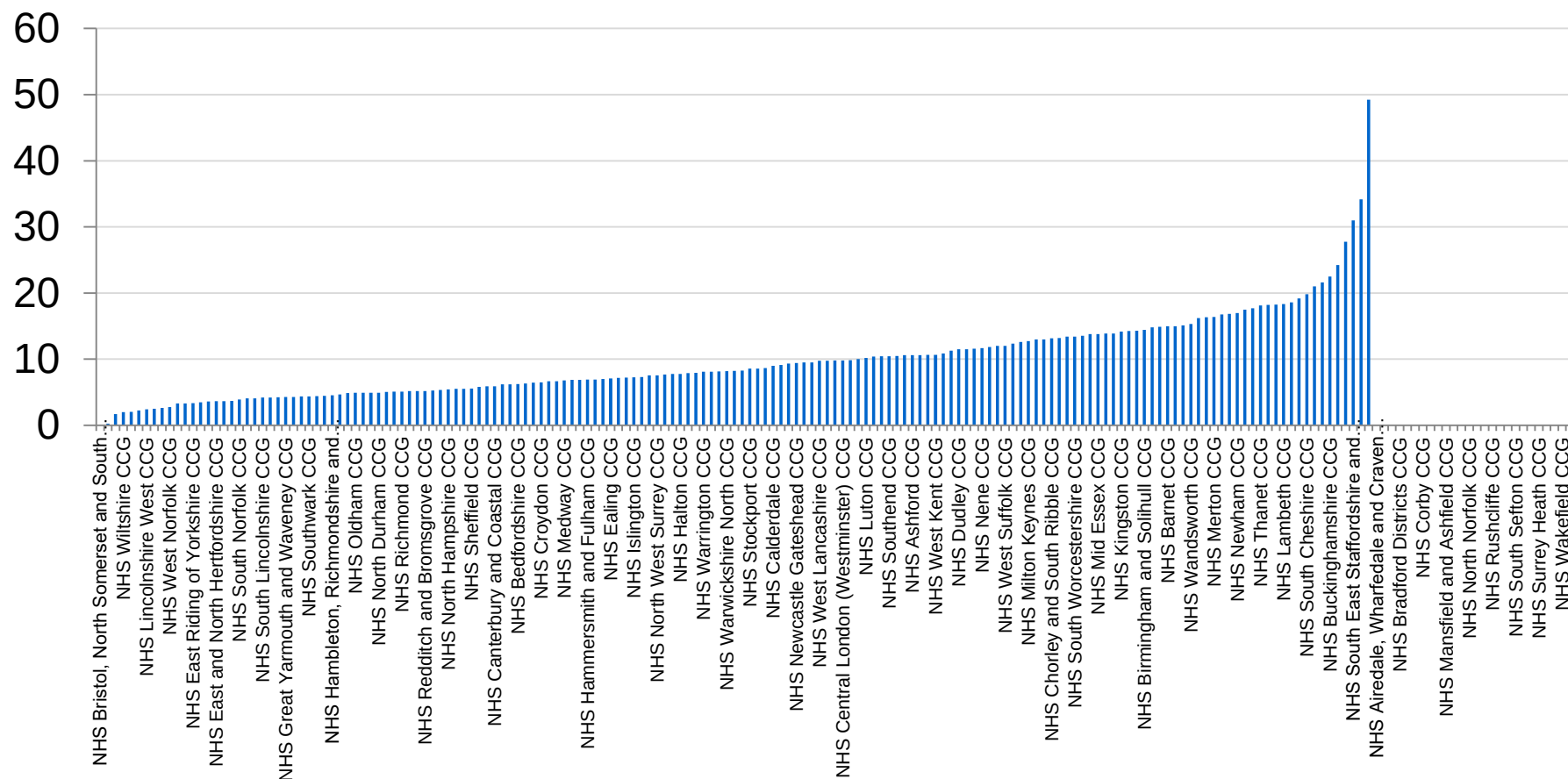
TAVI/SAVR



TAVI : SAVR ratio

2019/20 (all)

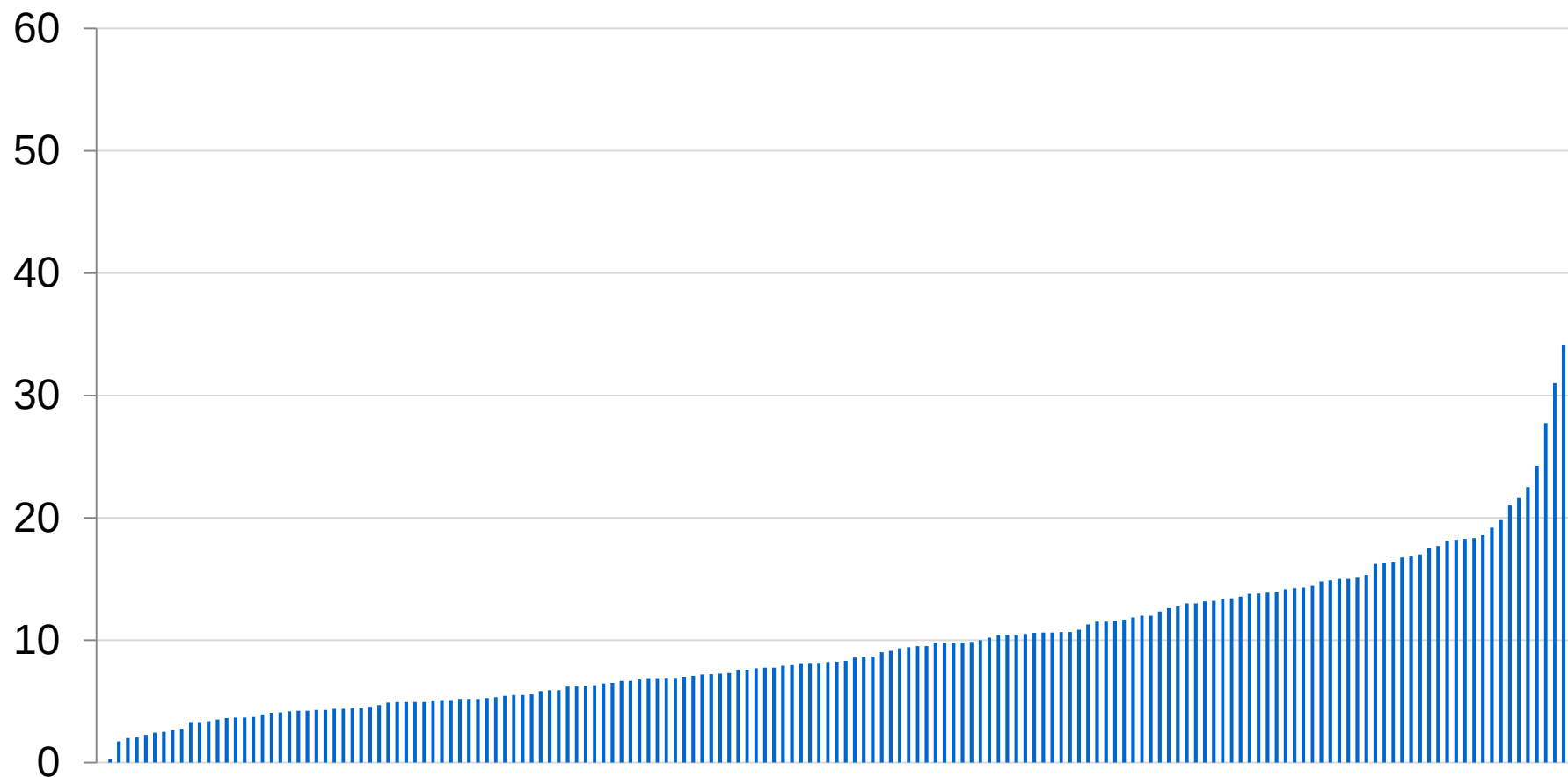
TAVI/SAVR



TAVI : SAVR ratio

2019/20 (all)

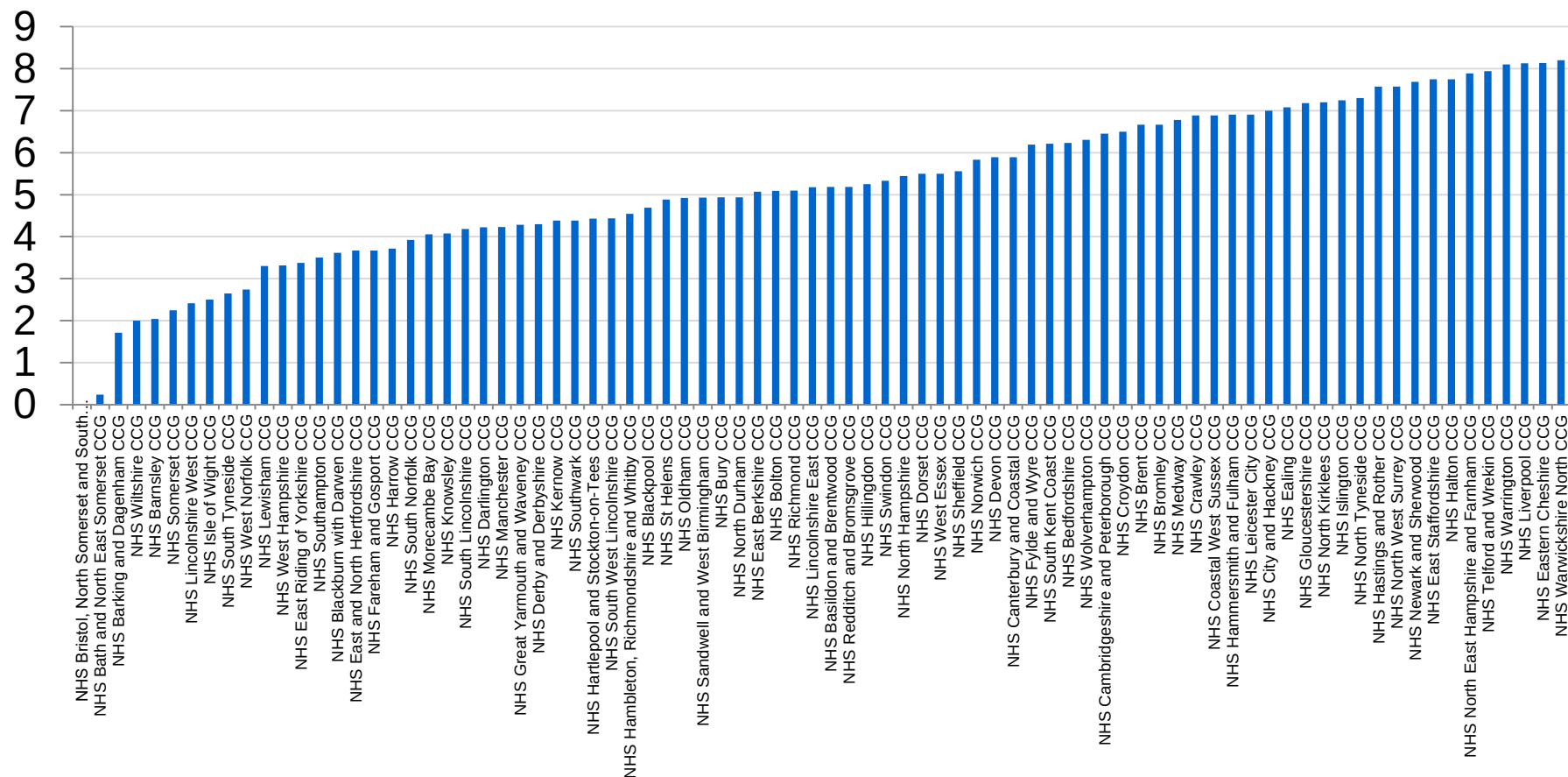
TAVI/SAVR



TAVI : SAVR ratio

2019/20 (1 of 2)

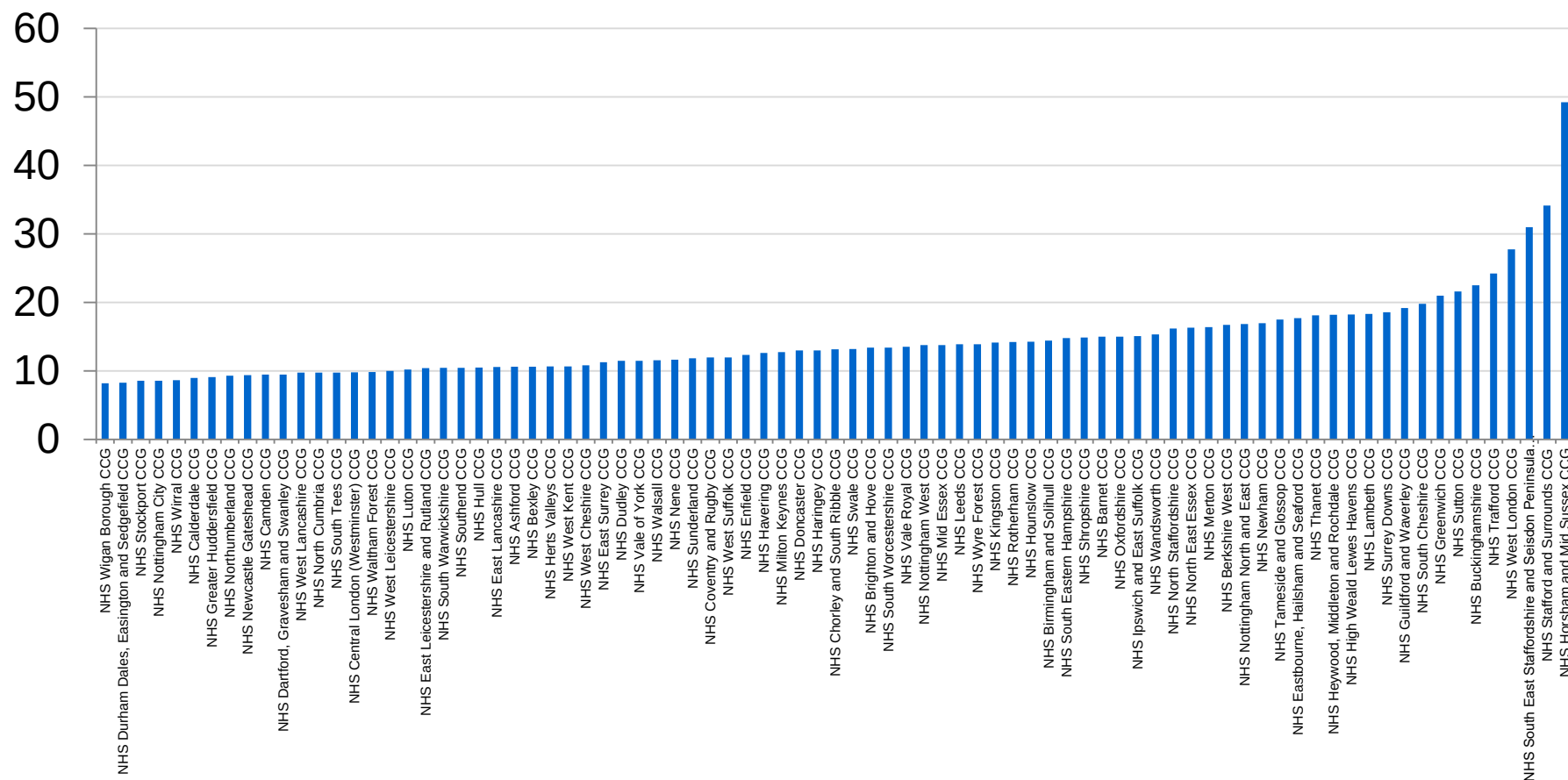
TAVI/SAVR



TAVI : SAVR ratio

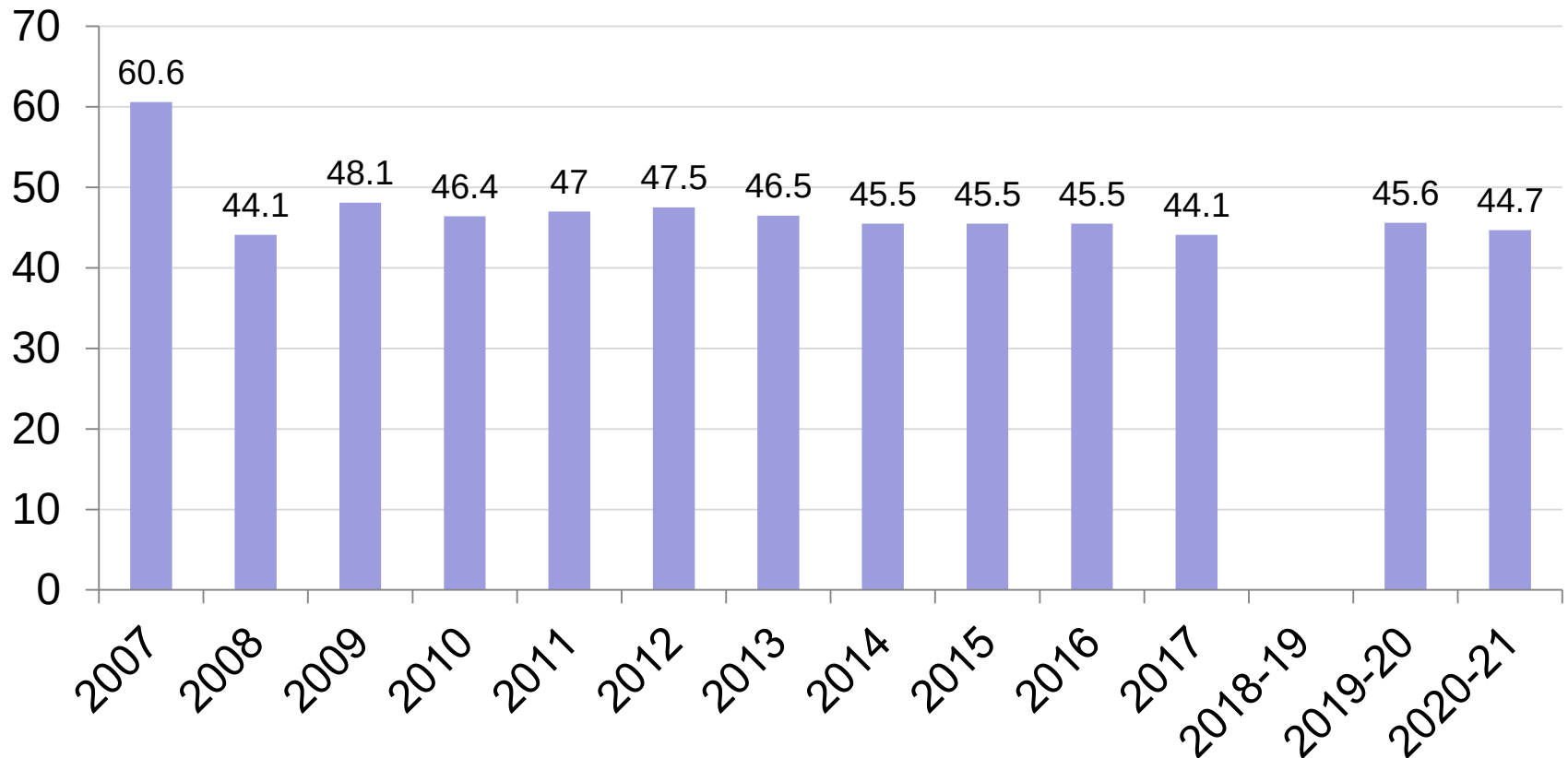
2019/20 (2 of 2)

TAVI/SAVR



Sex

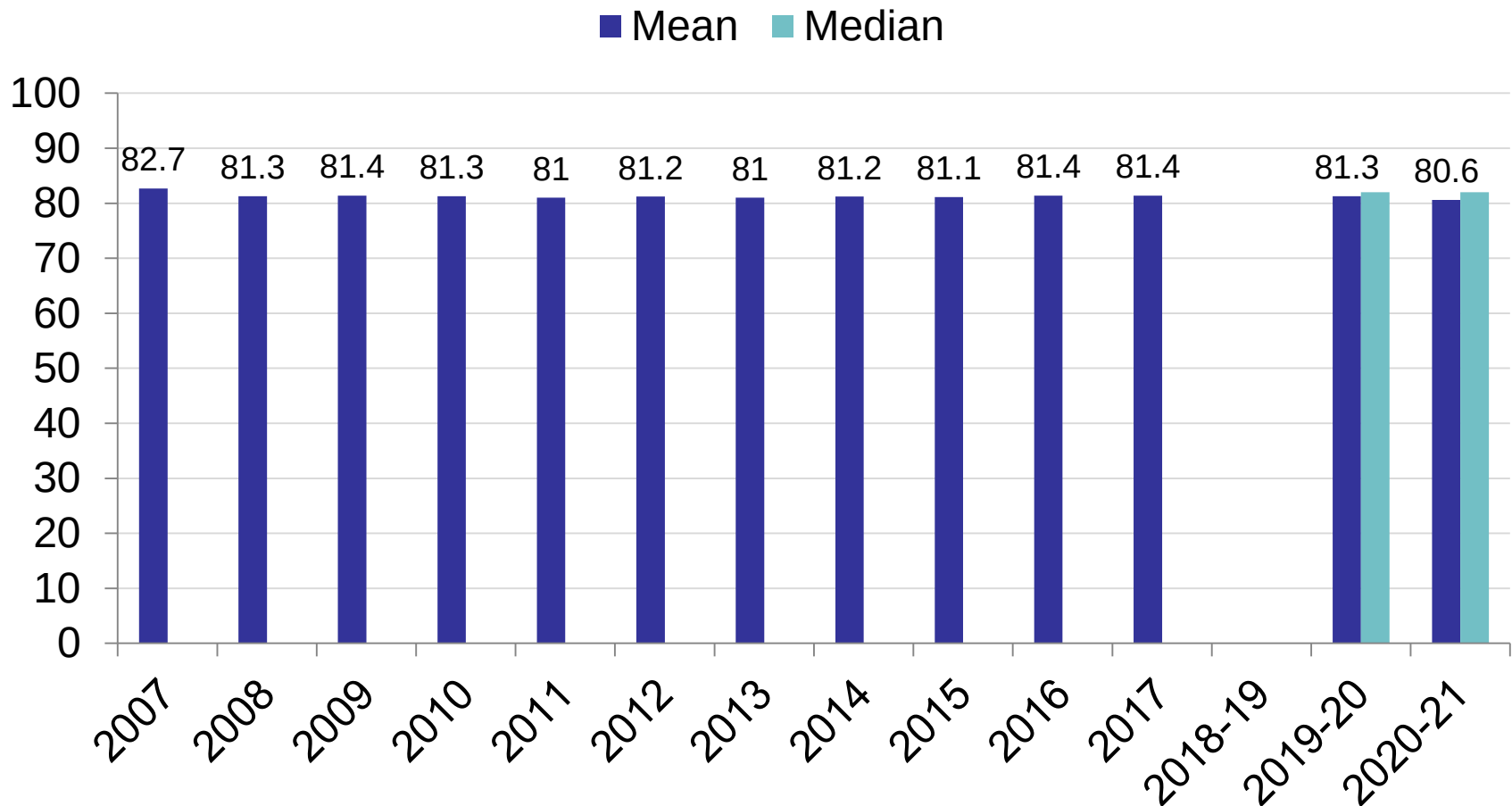
% Female



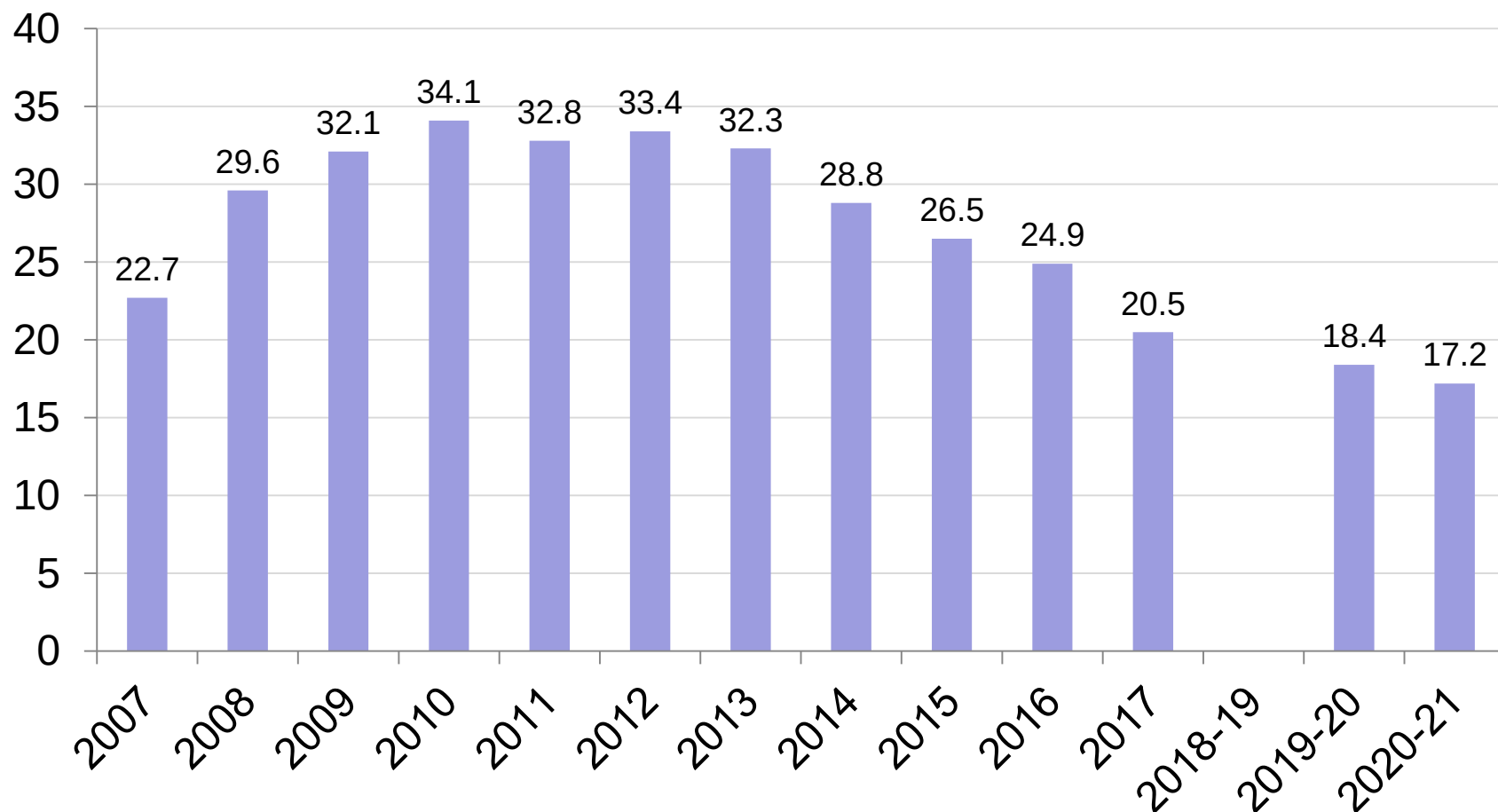
Ethnic Origin

	n	%
White	3967	96.66
Black	26	0.63
Asian	84	2.05
Chinese	2	0.05
Other	25	0.61
Unknown	557	13.57

Age

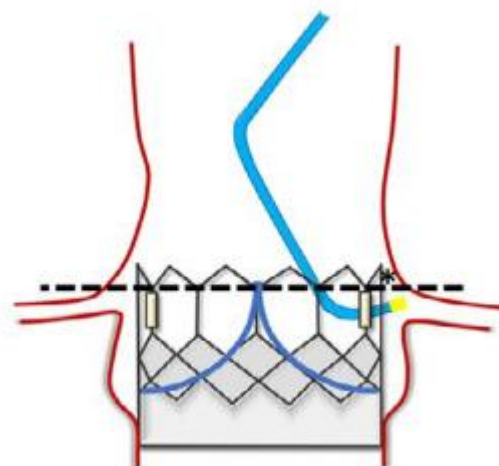
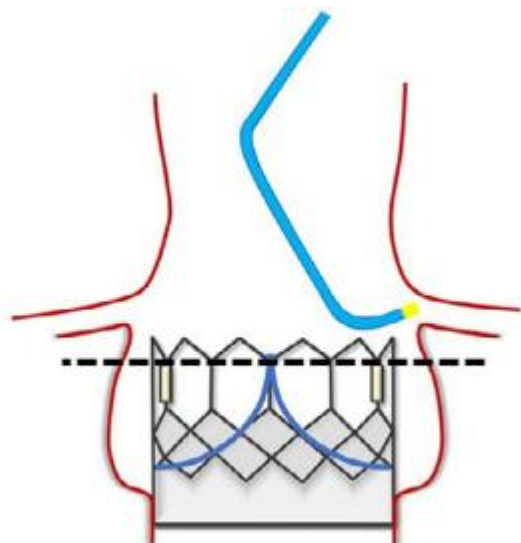


Prior Cardiac Surgery



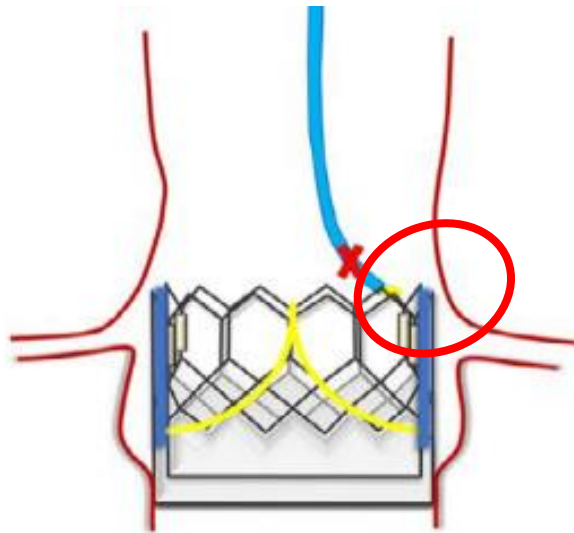
Prior TAVI

- 2 phases following TAVI
 - Coronary access post TAVI
 - Coronary access post V-in-V TAVI

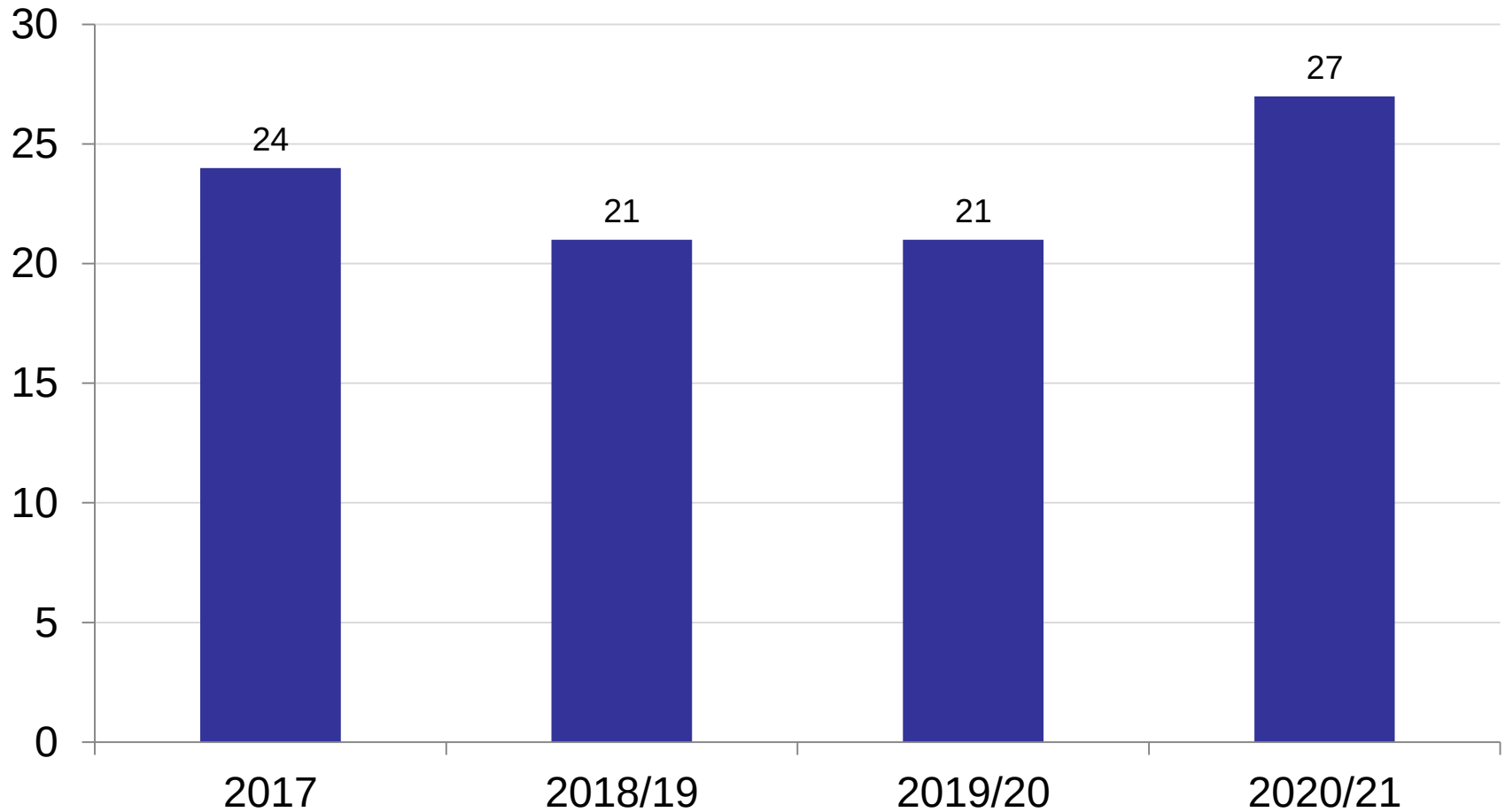


Prior TAVI

- 2 phases following TAVI
 - Coronary access post TAVI
 - Coronary access post V-in-V TAVI

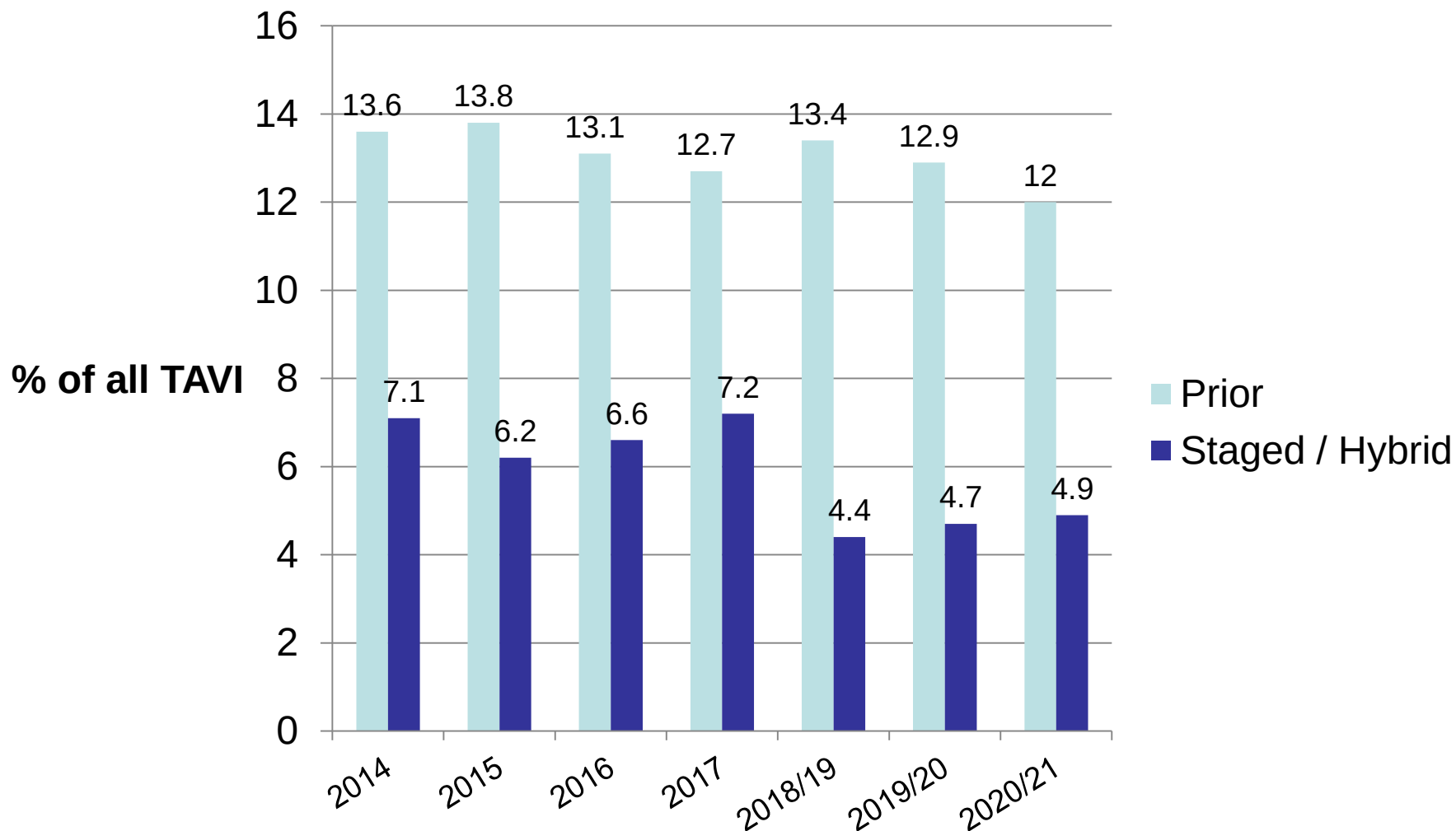


TAVI in TAVI (Prior TAVI)

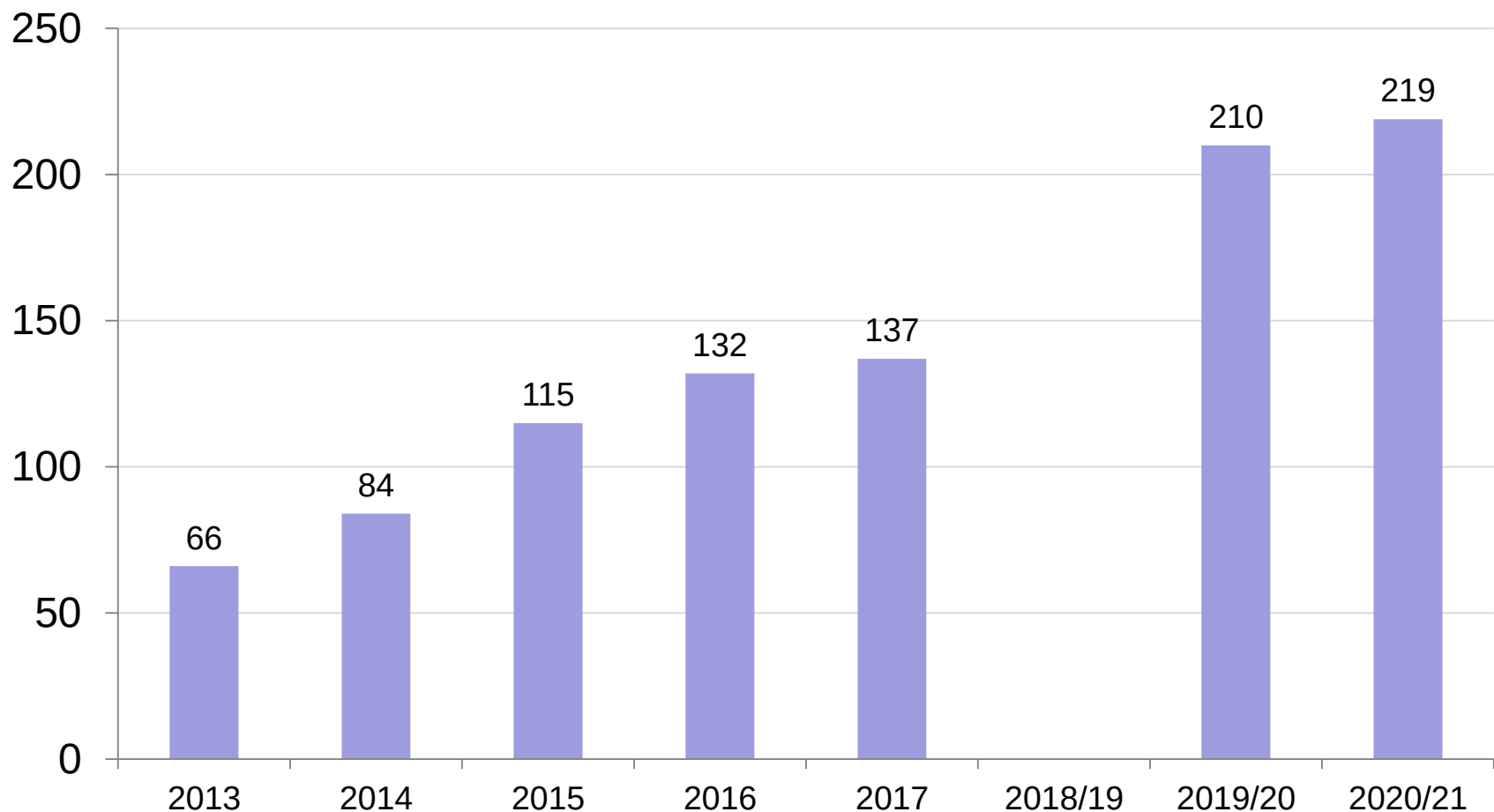


PCI

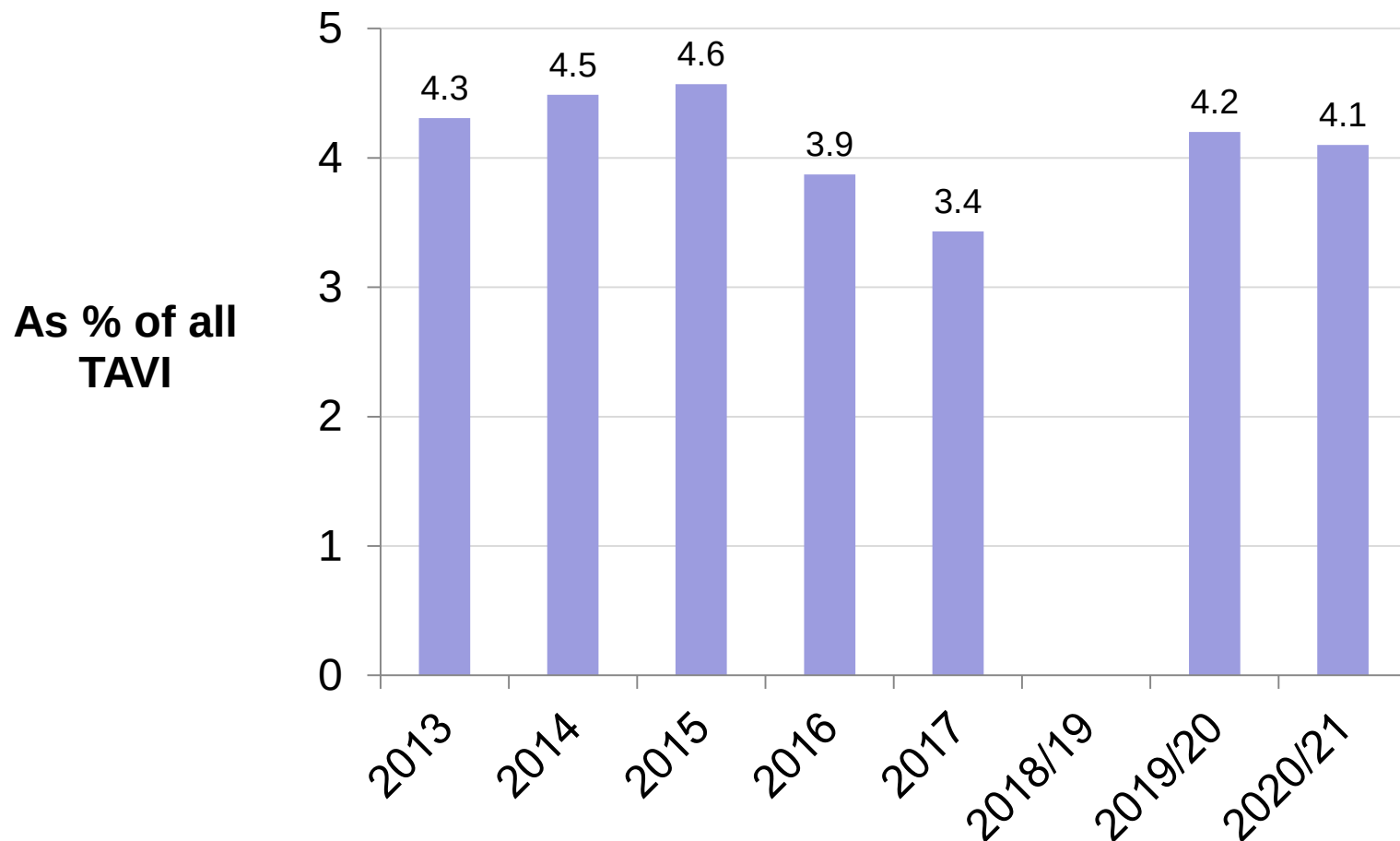
Prior or Staged/Hybrid



TAVI for Aortic Bioprosthetic Valve Failure

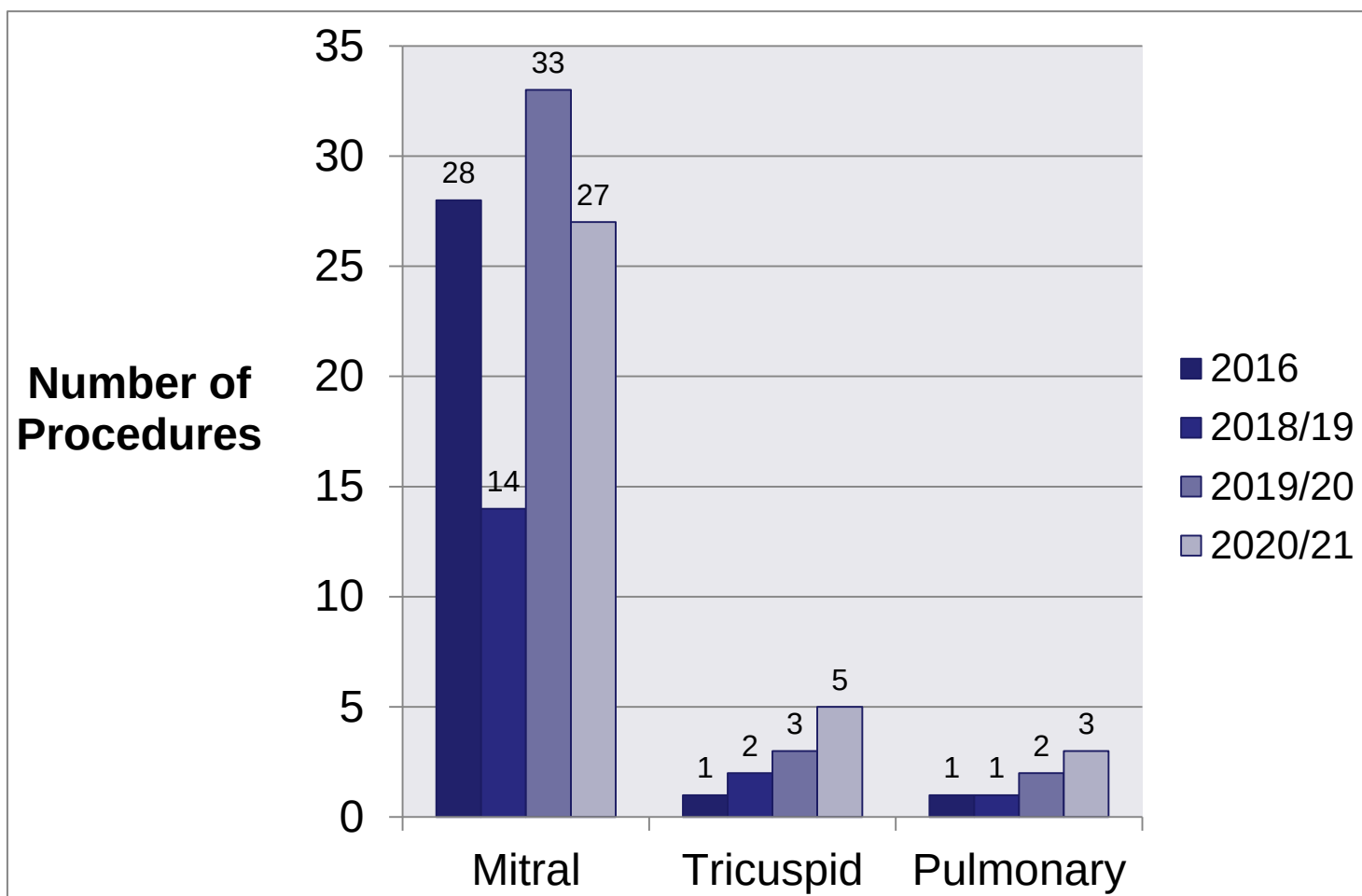


TAVI for Aortic Bioprosthetic Valve Failure



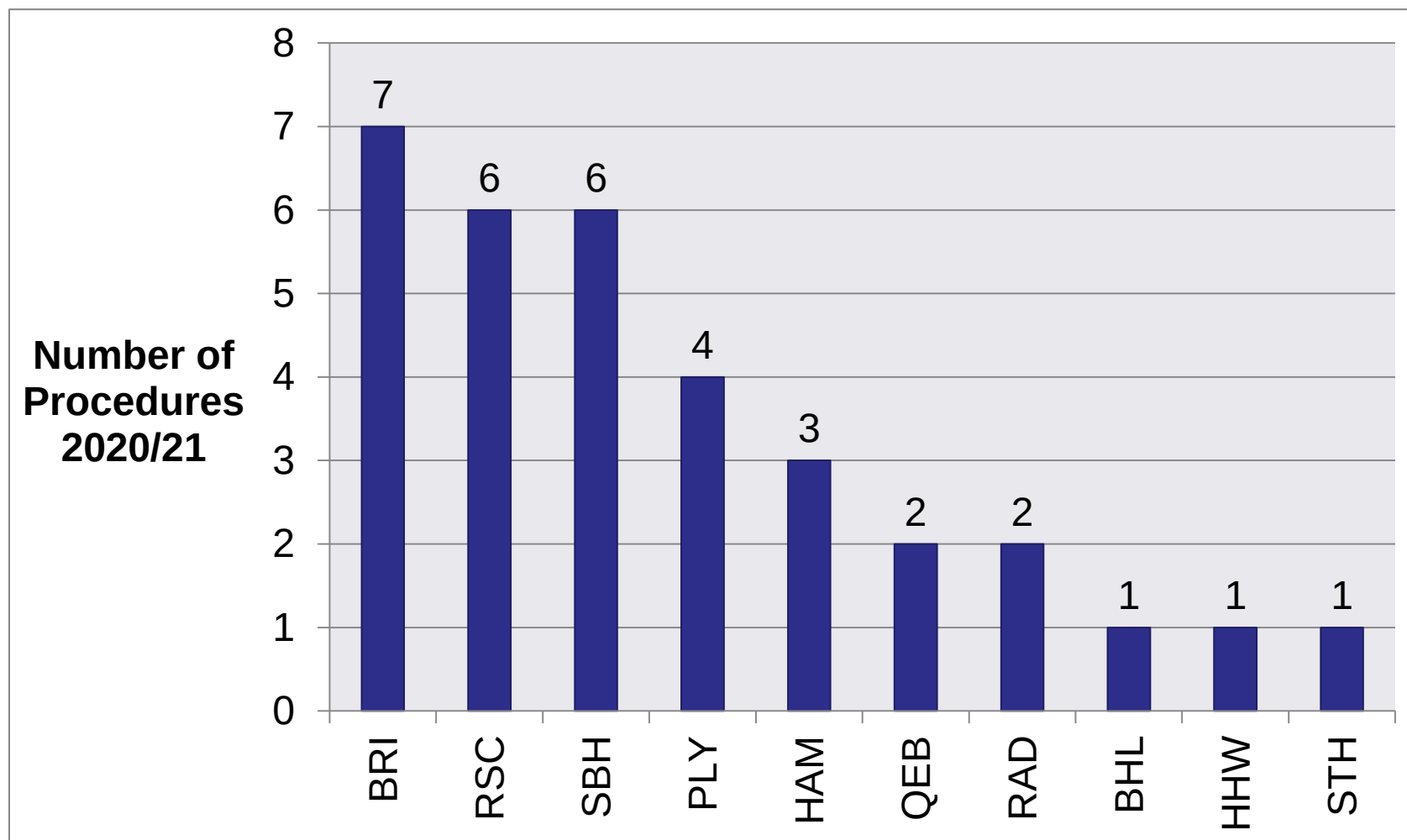
Percutaneous Valves

TAVI Valve to treat failing bioprostheses



Percutaneous Valves

TAVI Valve to treat failing mitral bioprosthesis

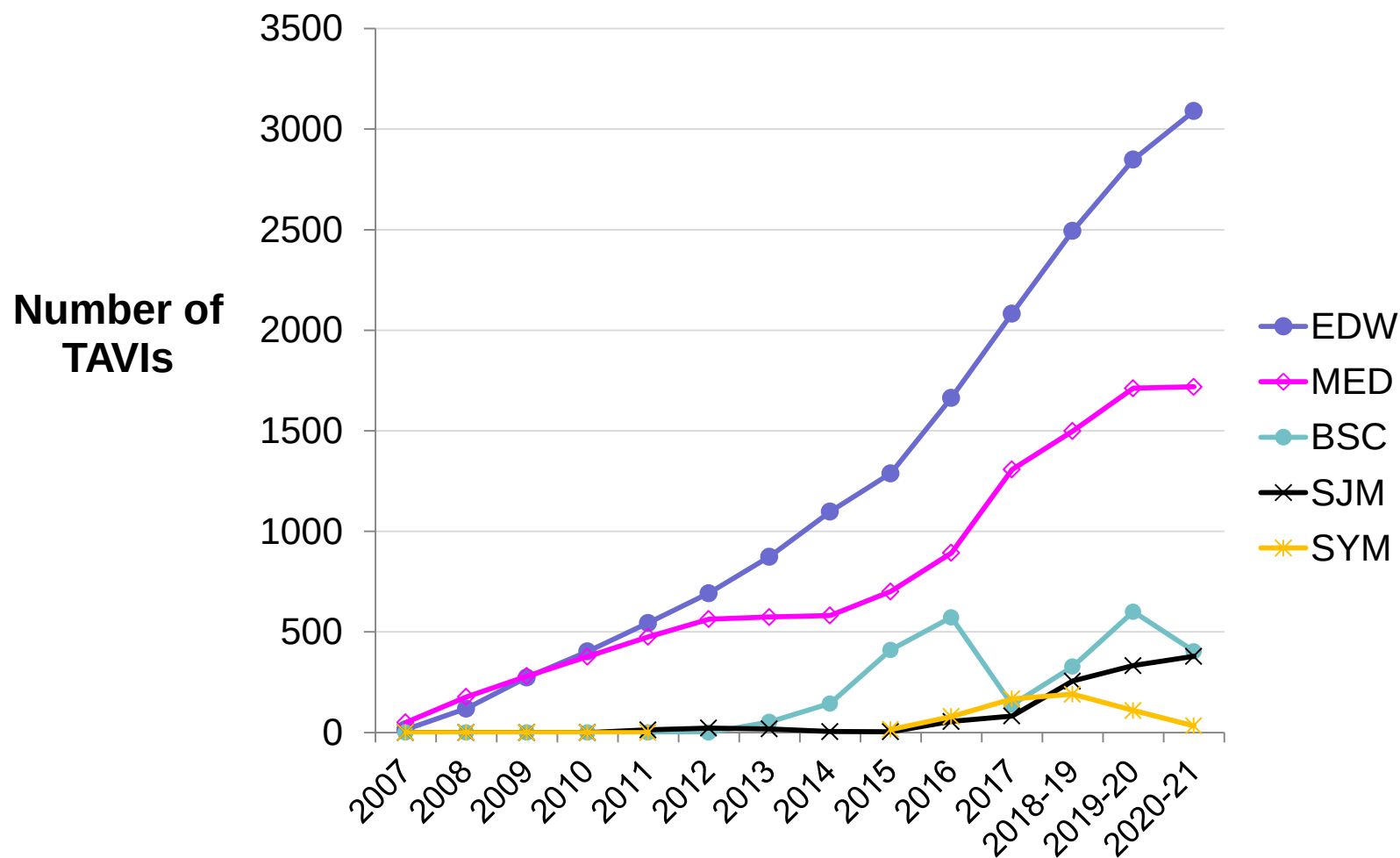


TAVI

Procedural Details

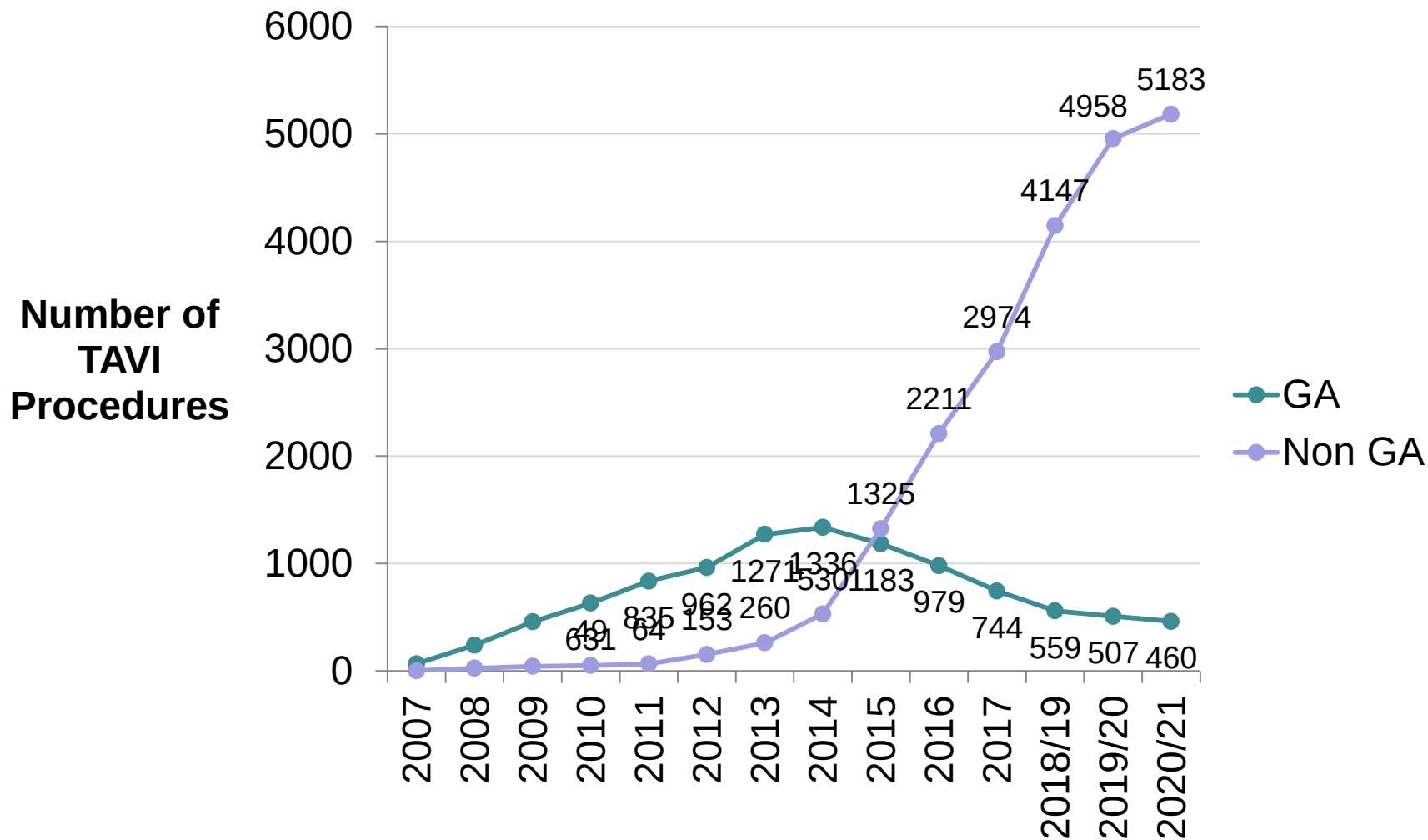
TAVI

Device Manufacturer



TAVI

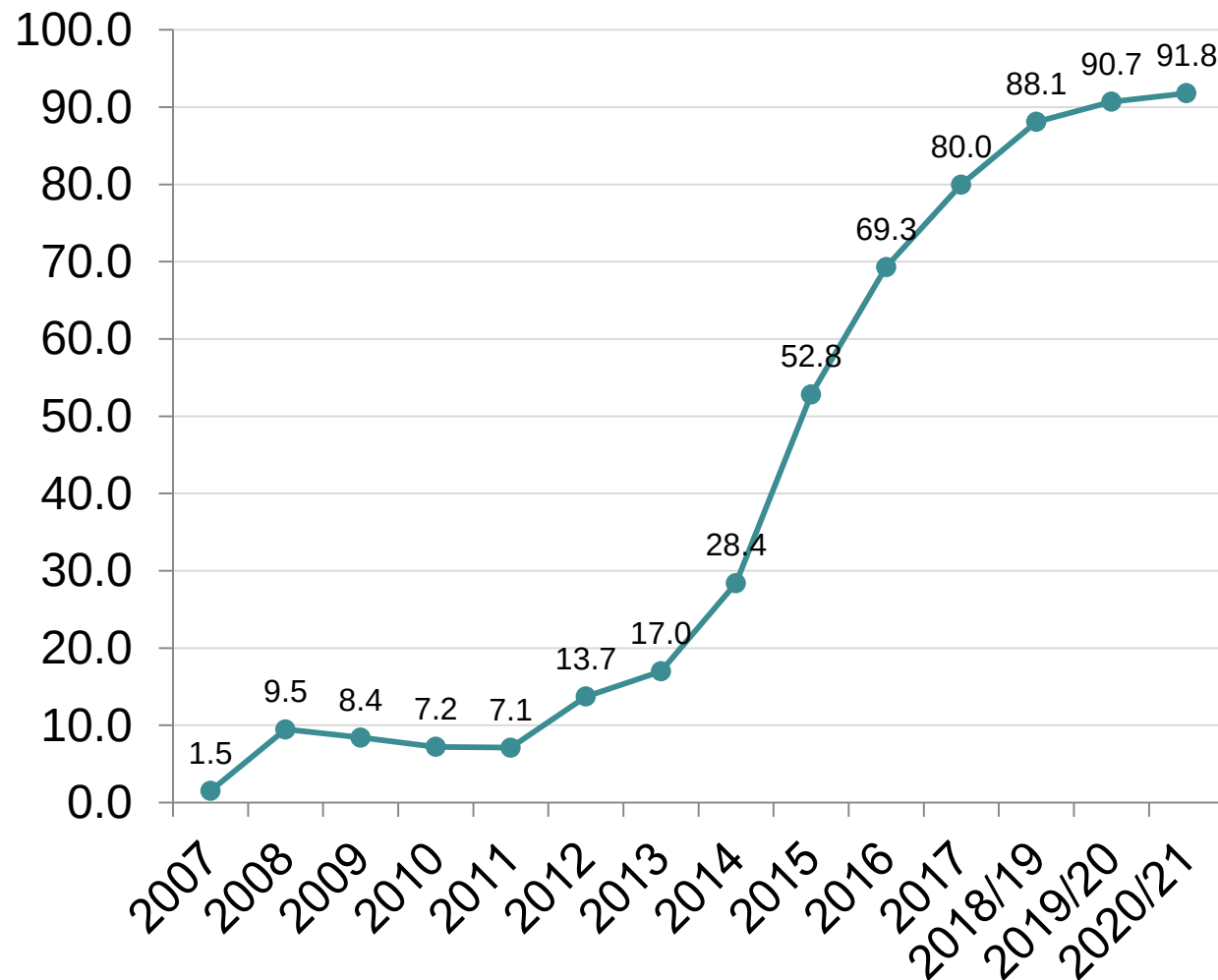
GA v Conscious Sedation



TAVI

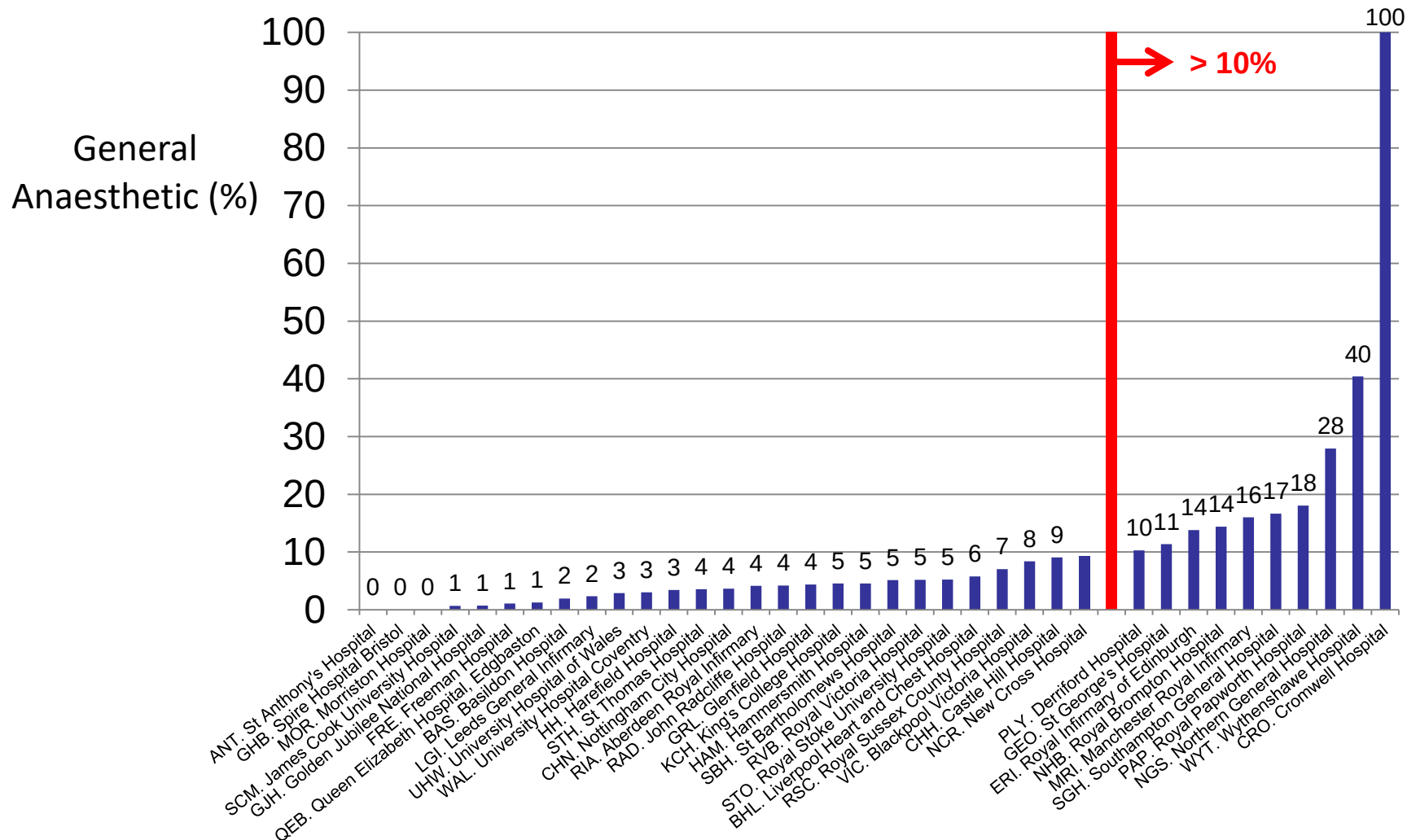
Conscious Sedation

**TAVI under
Conscious
Sedation (%)**



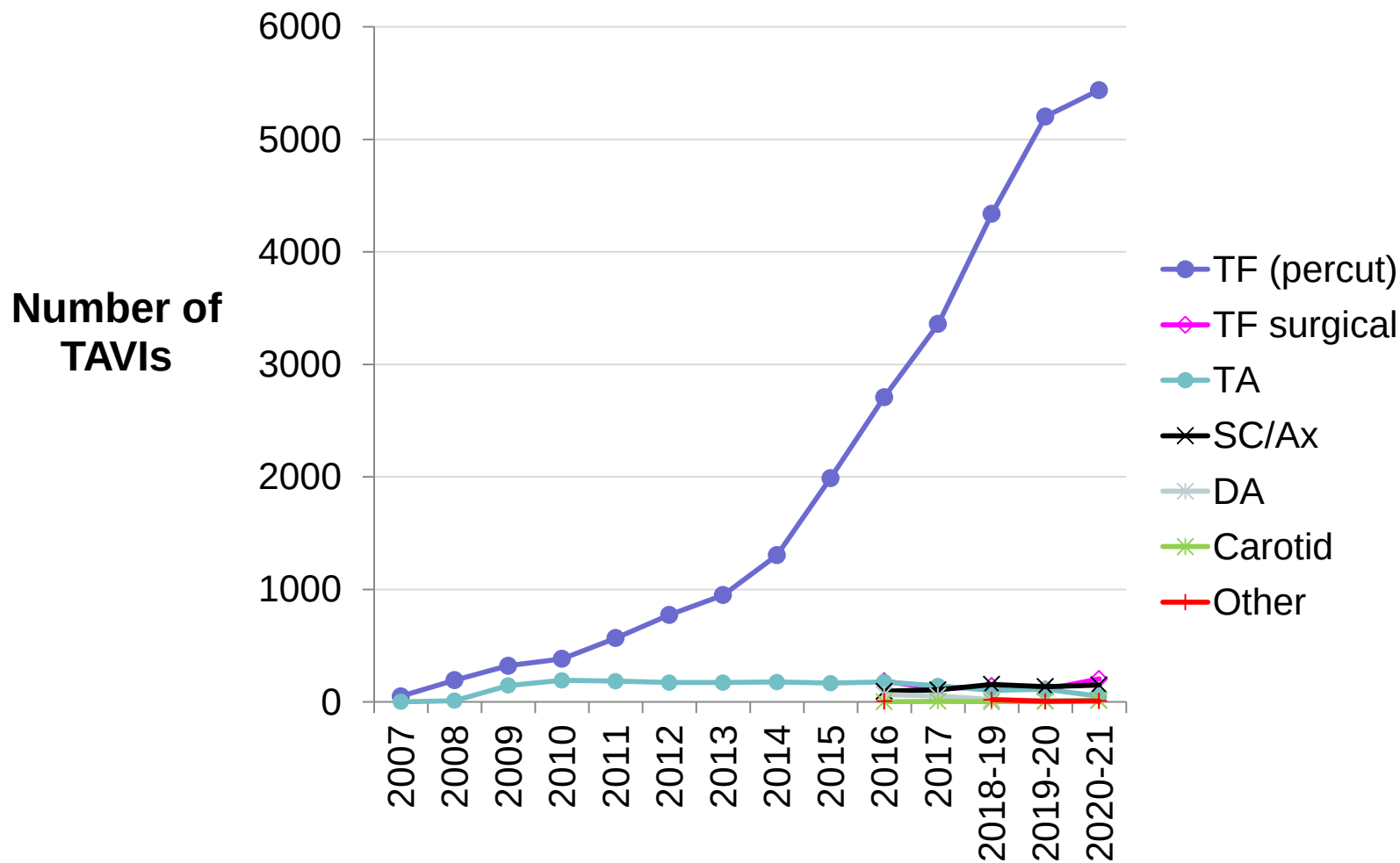
TAVI

GA v Conscious Sedation



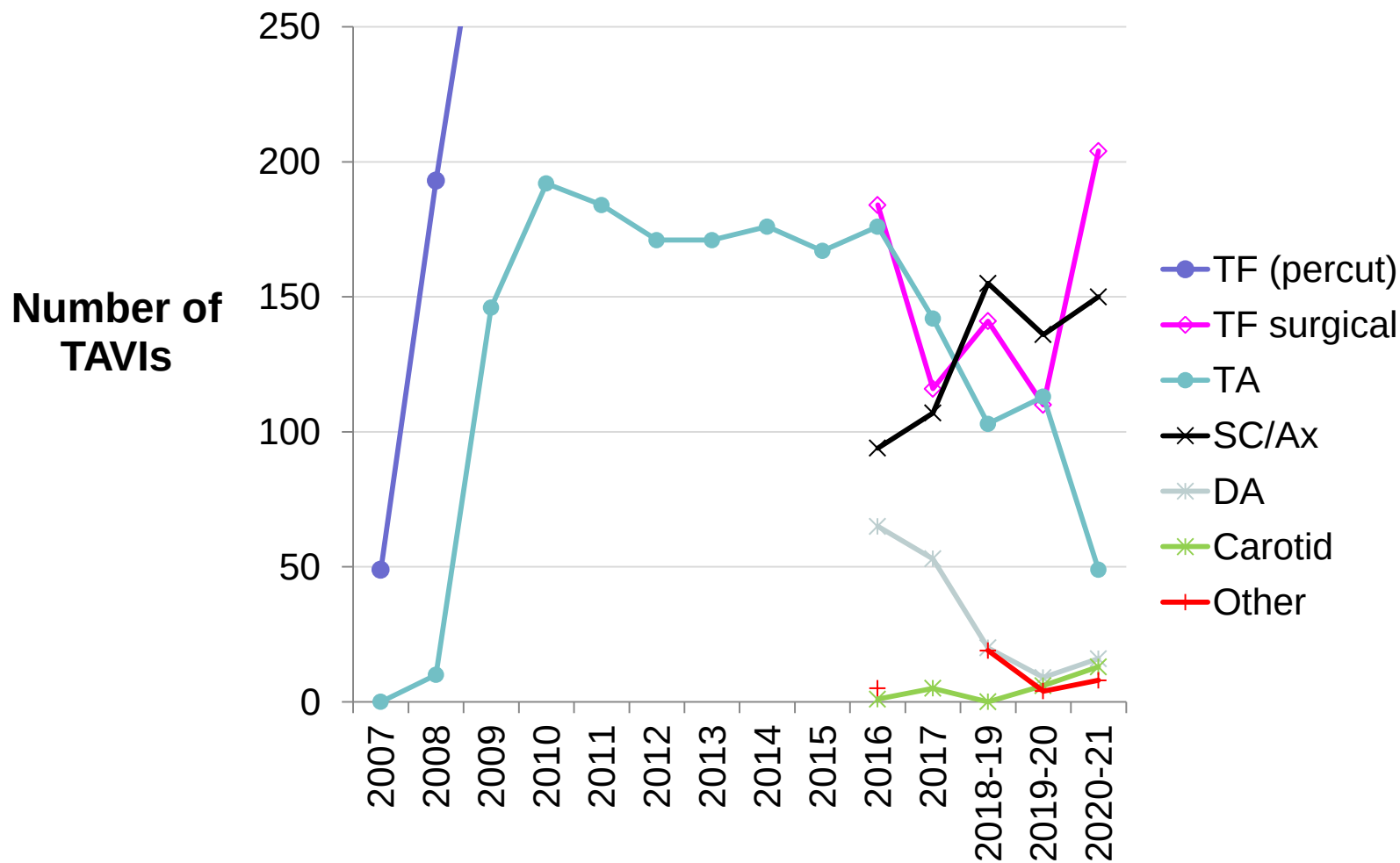
TAVI

Delivery Approach



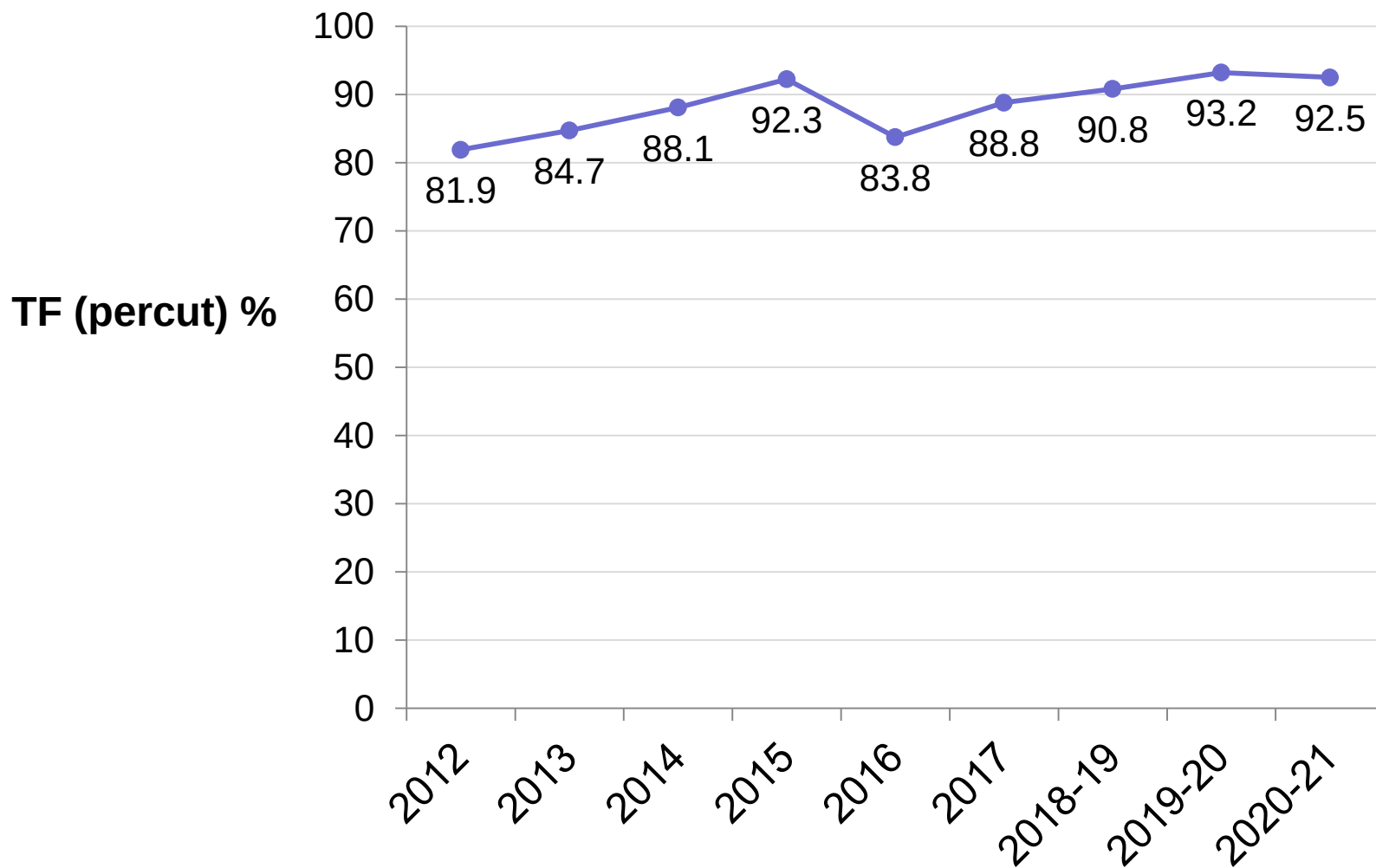
TAVI

Delivery Approach -Zoom graphic



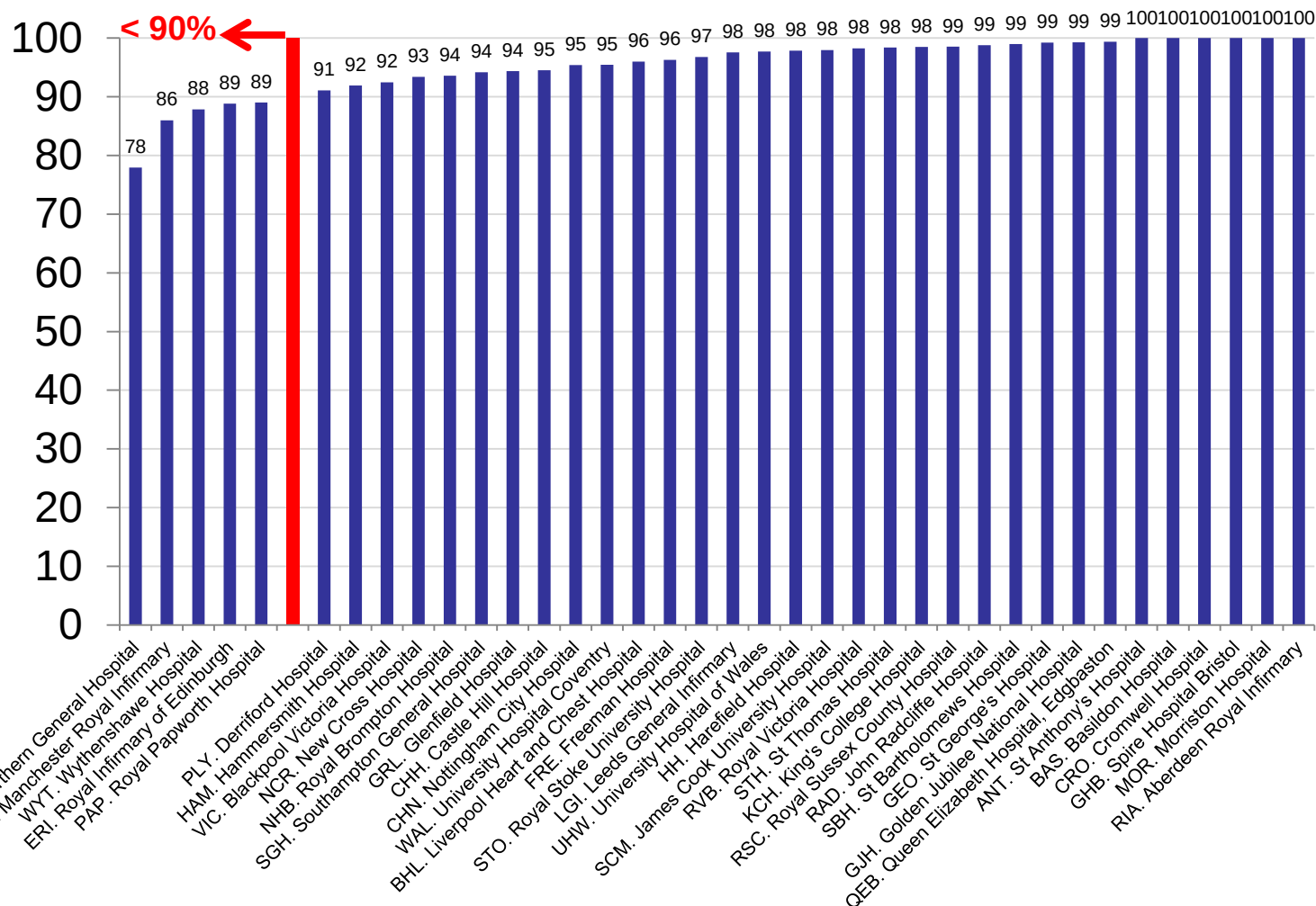
TAVI

Delivery Approach as %



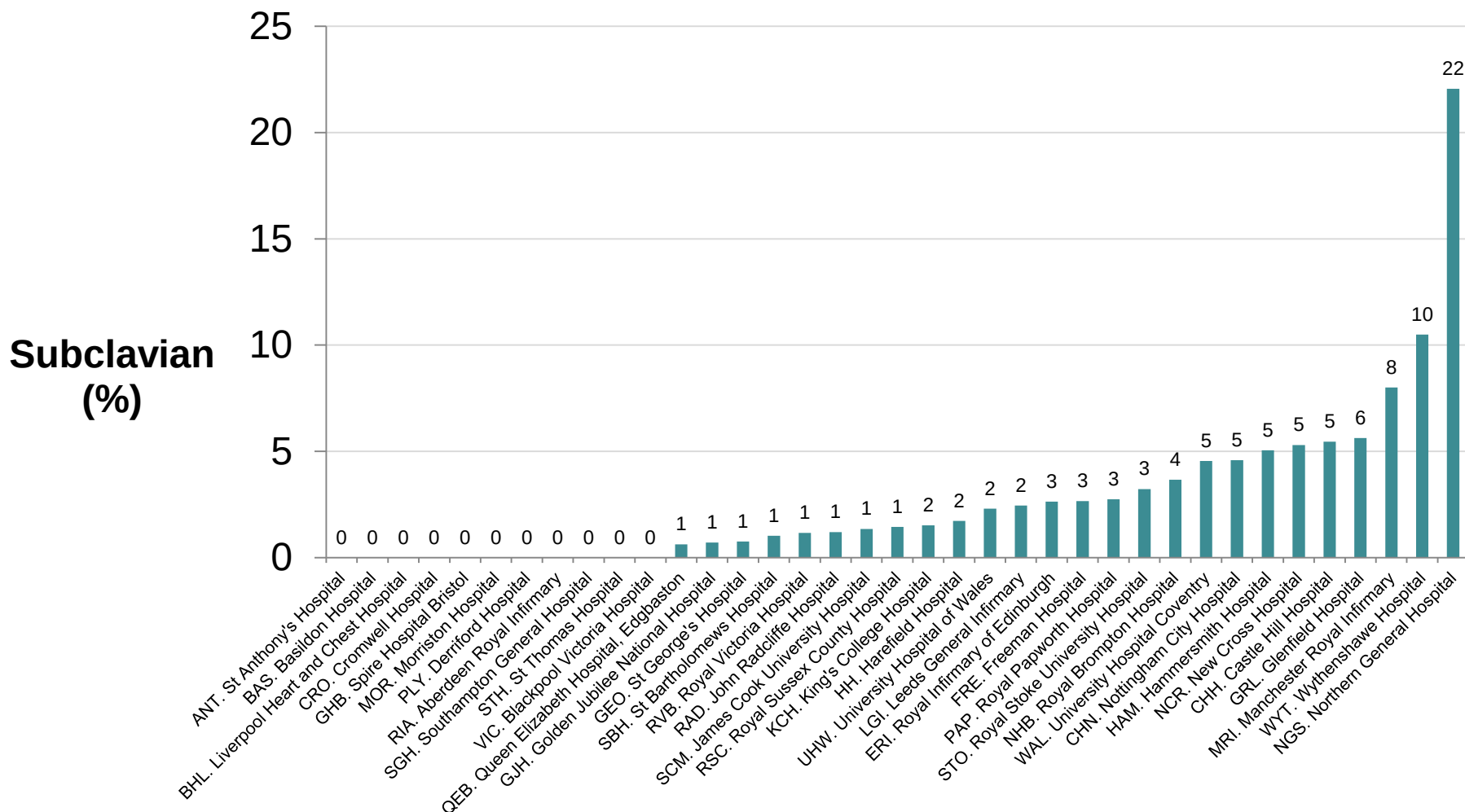
TAVI

Delivery Approach



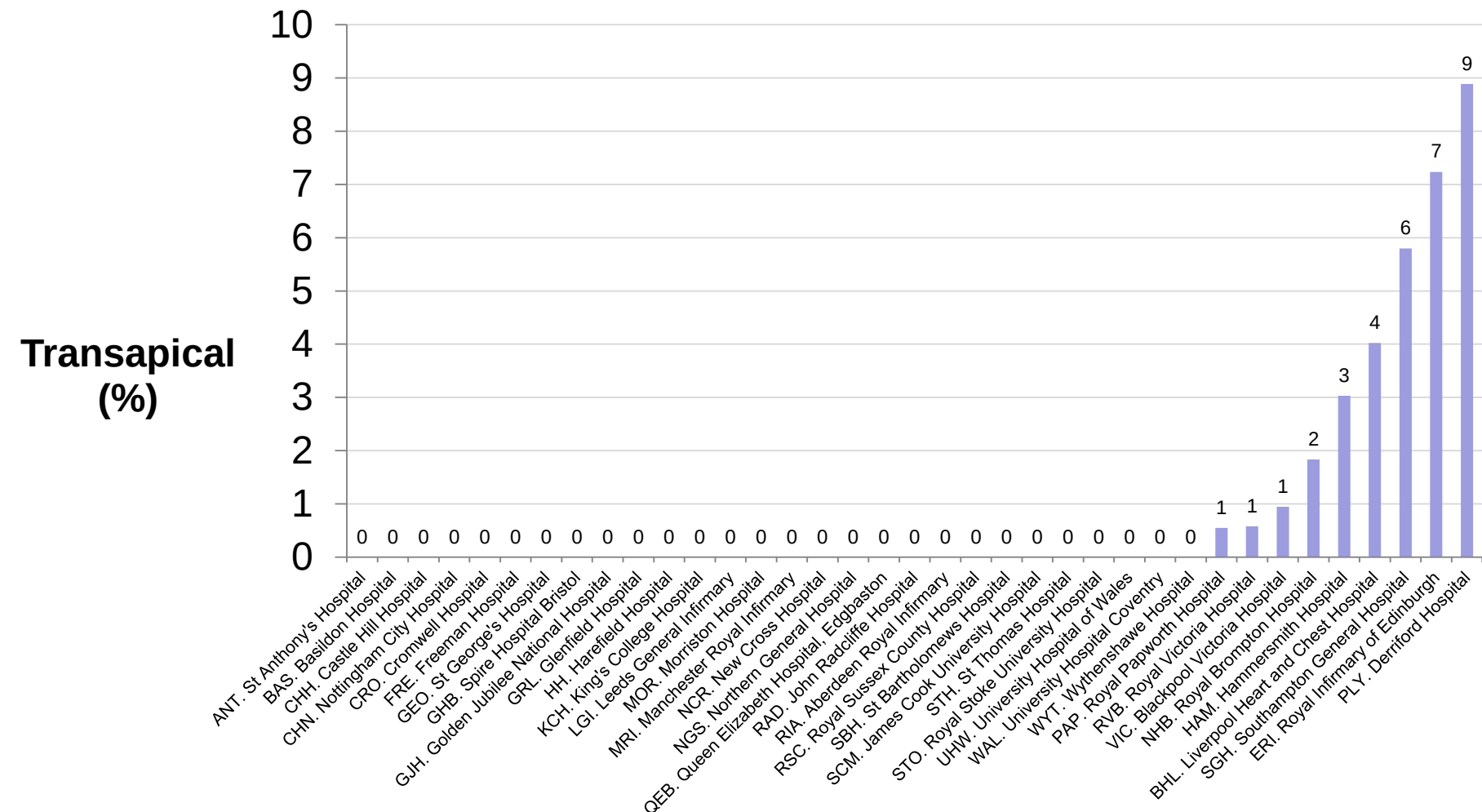
TAVI

Delivery Approach



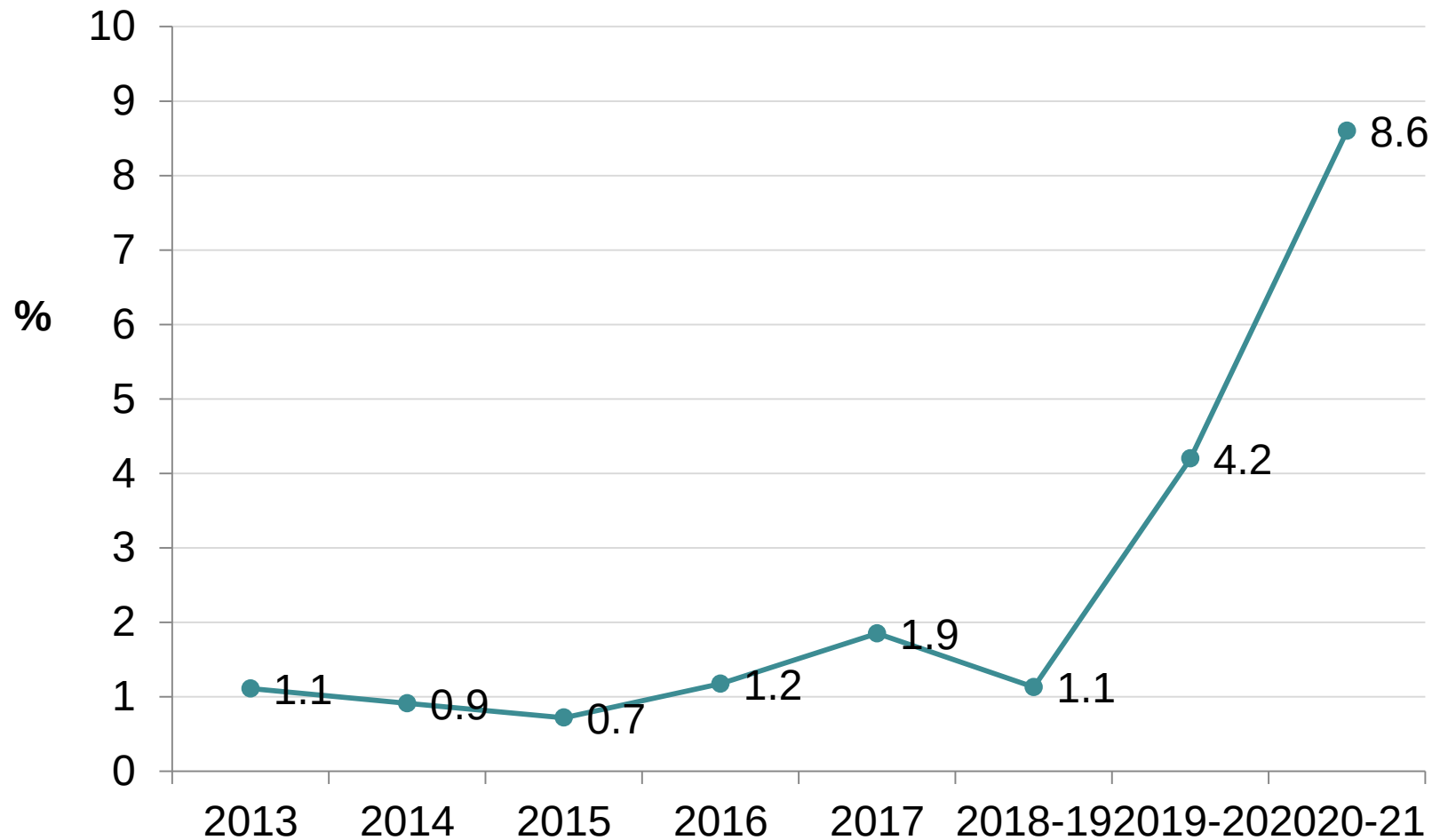
TAVI

Delivery Approach



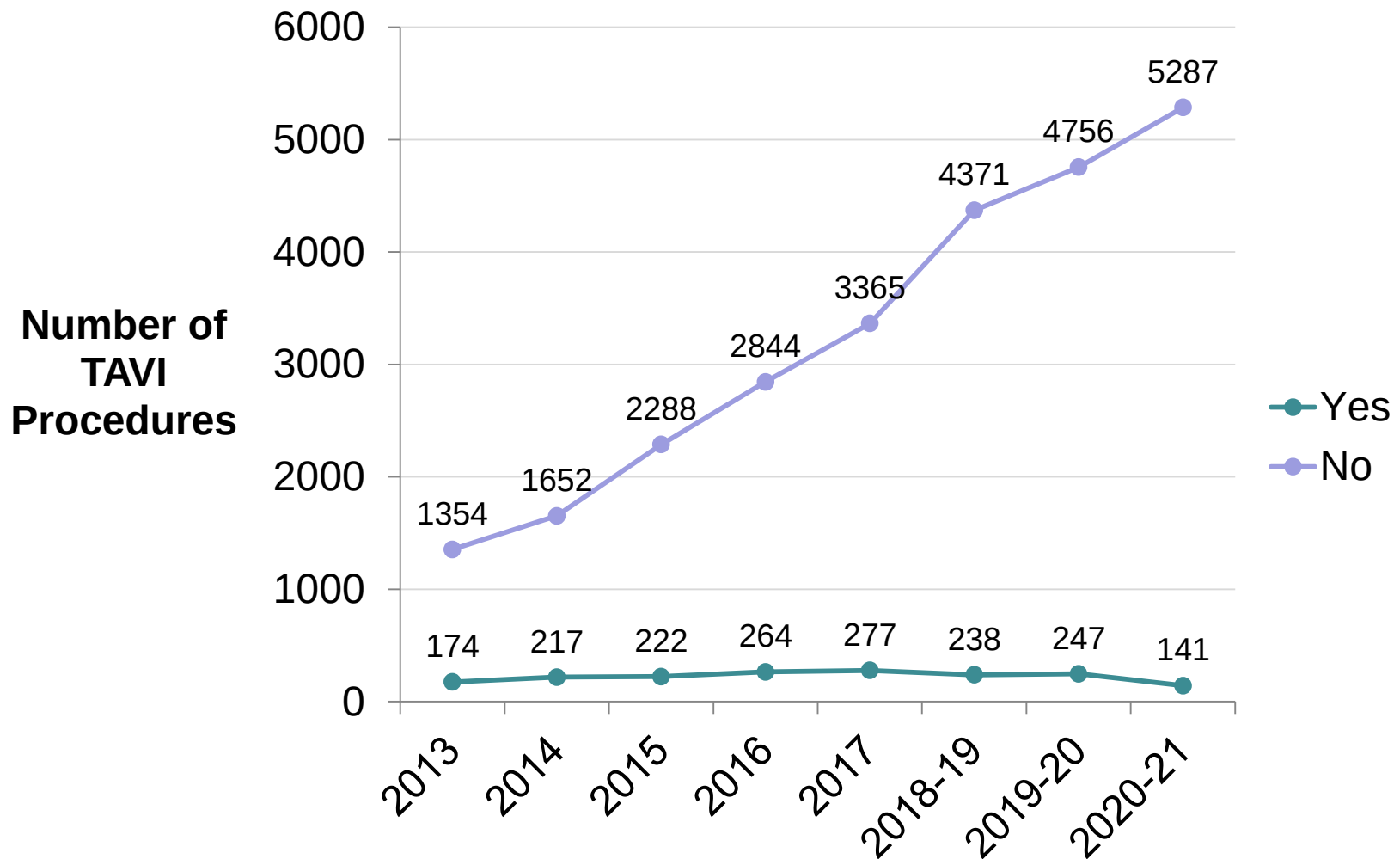
TAVI

Procedures where Cerebral Protection Device Used



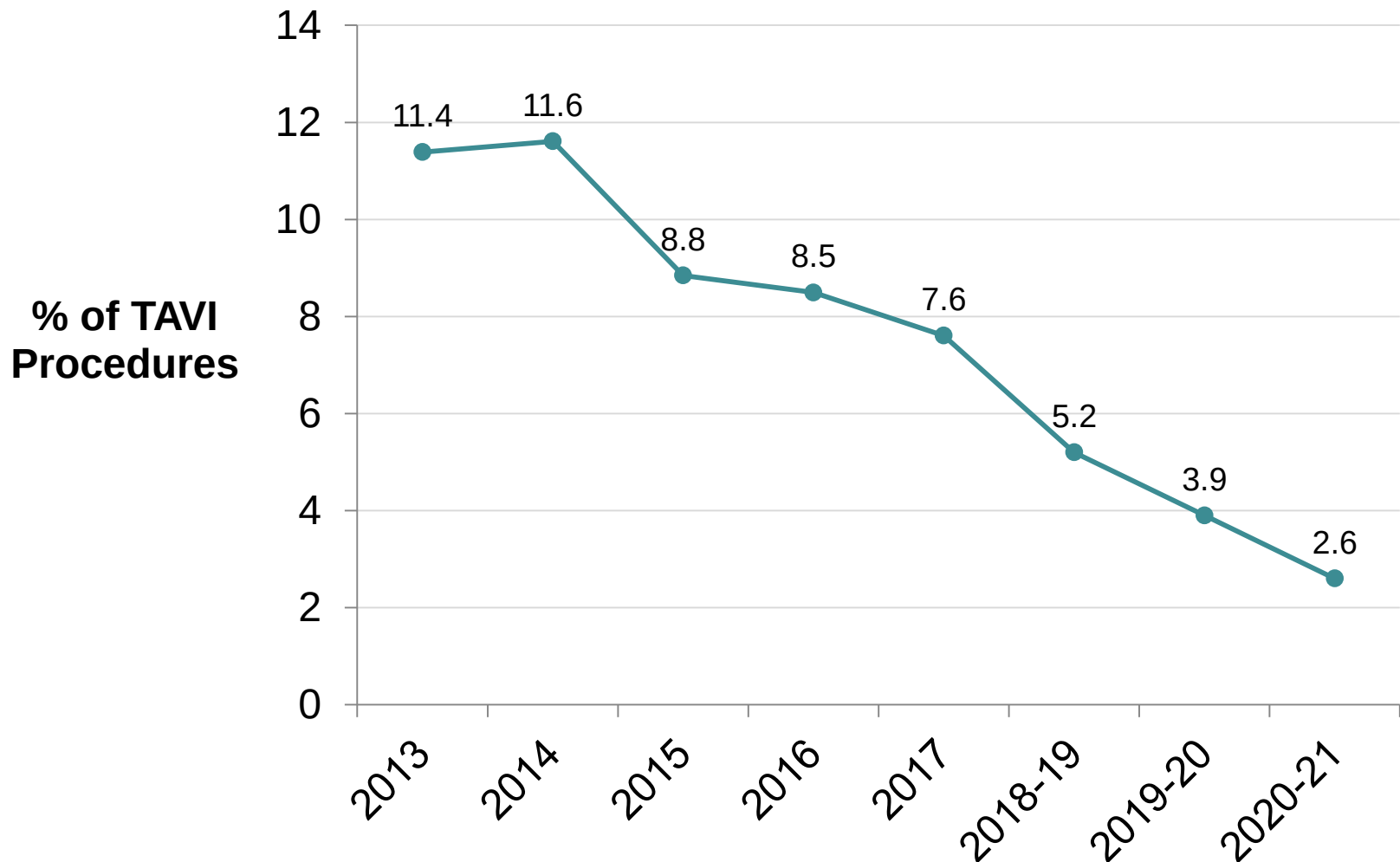
TAVI

Aortic Balloon Valvuloplasty Prior to TAVI Date



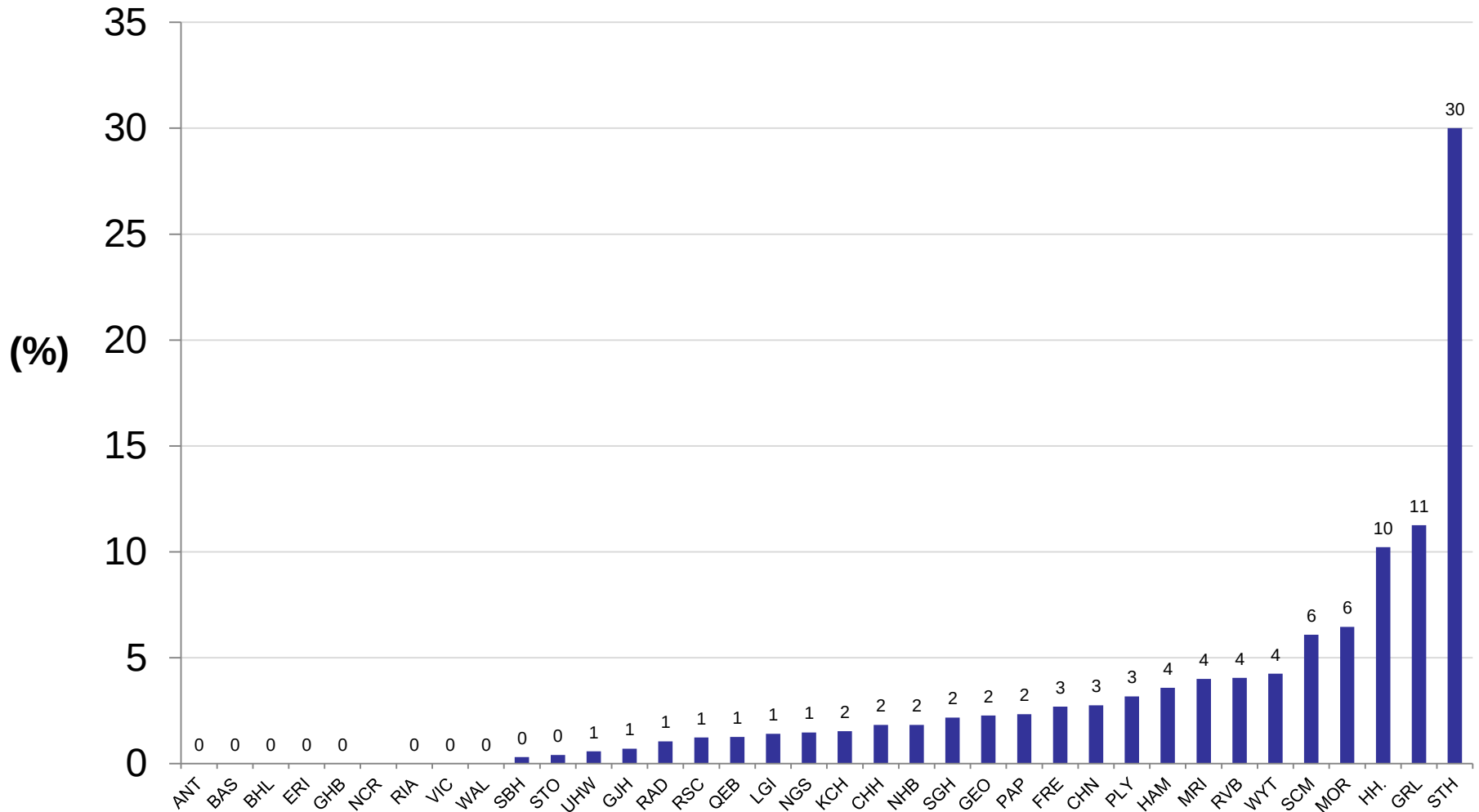
TAVI

Aortic Balloon Valvuloplasty Prior to TAVI Date

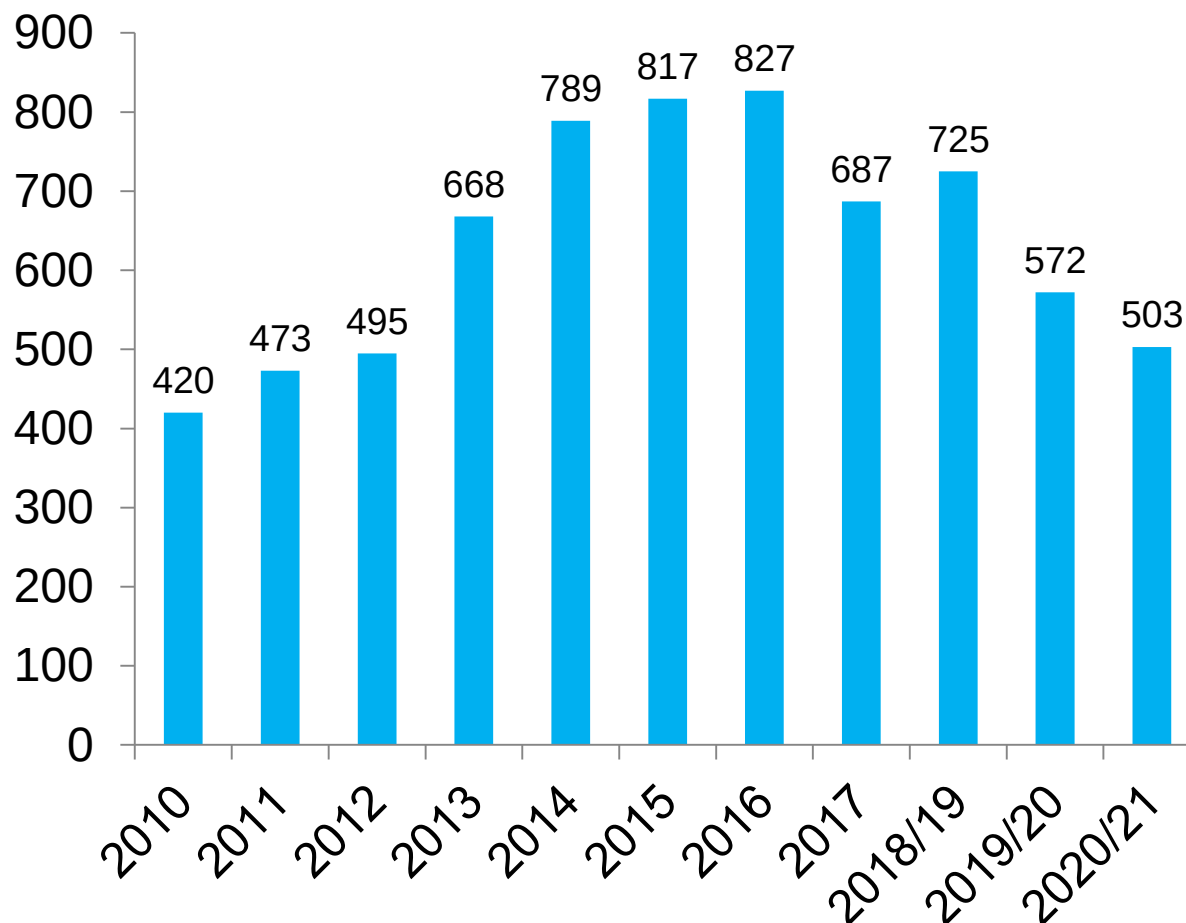


TAVI

Aortic Balloon Valvuloplasty Prior to TAVI Date

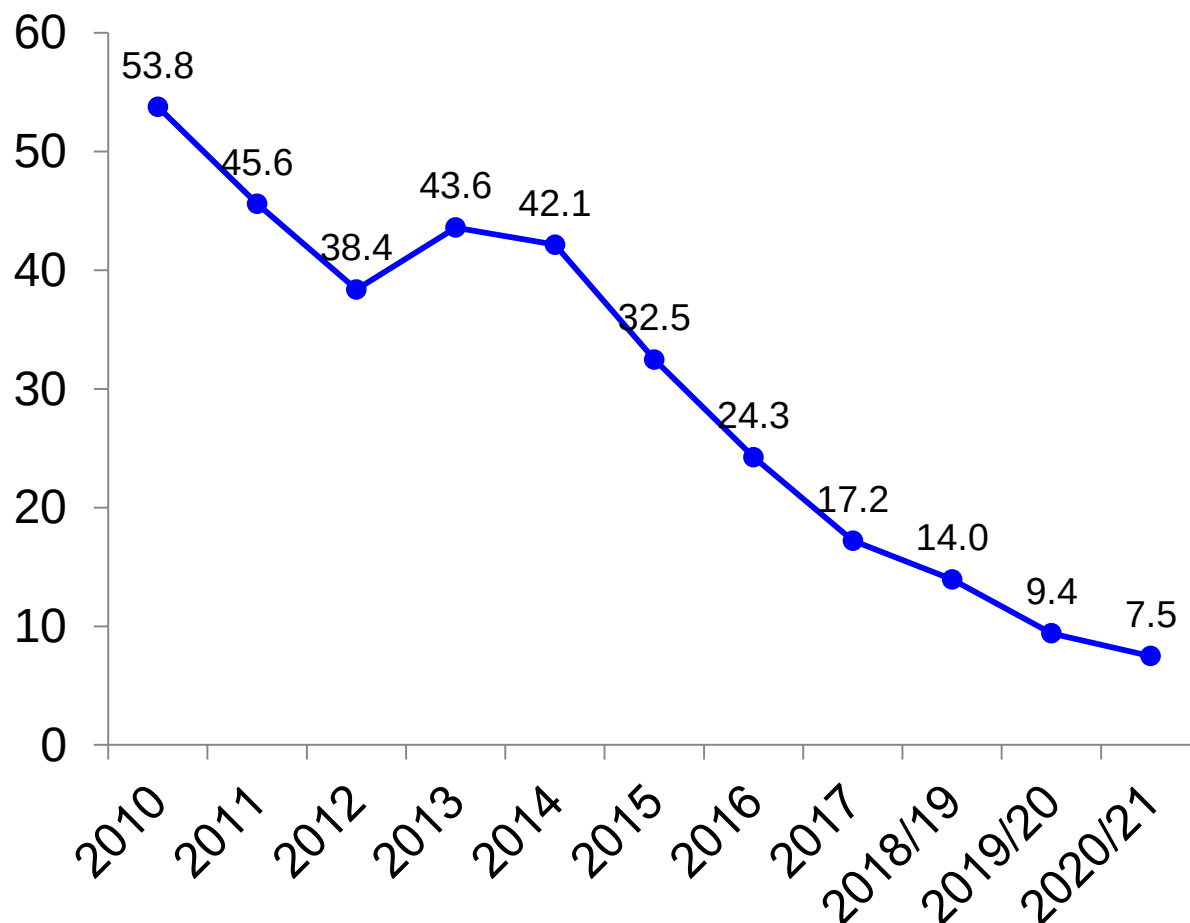


Stand Alone Aortic Balloon Valuloplasty (not as part of TAVI)



Aortic Balloon Valuloplasty

(not as part of TAVI - as a % of TAVI)

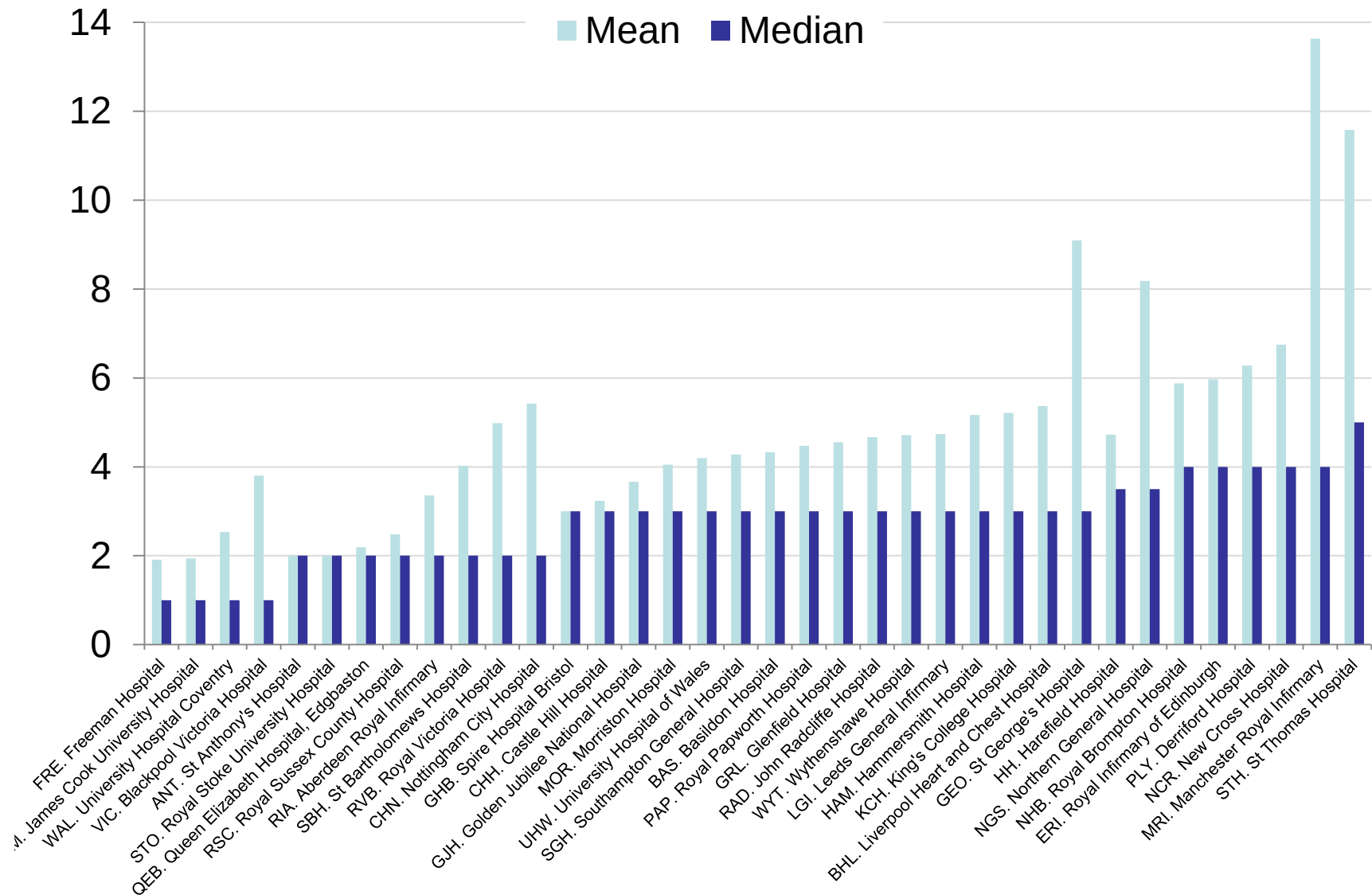


Time to TAVI and Dx

	Admission to TAVI (all)	TAVI to Dx (all)	LOS (all)	LOS (elective)
Mean (days)	4.8	3.9	7.7	4.8
Median (days)	1.9	2.1	3	3

TAVI Length Of Stay

Elective cases



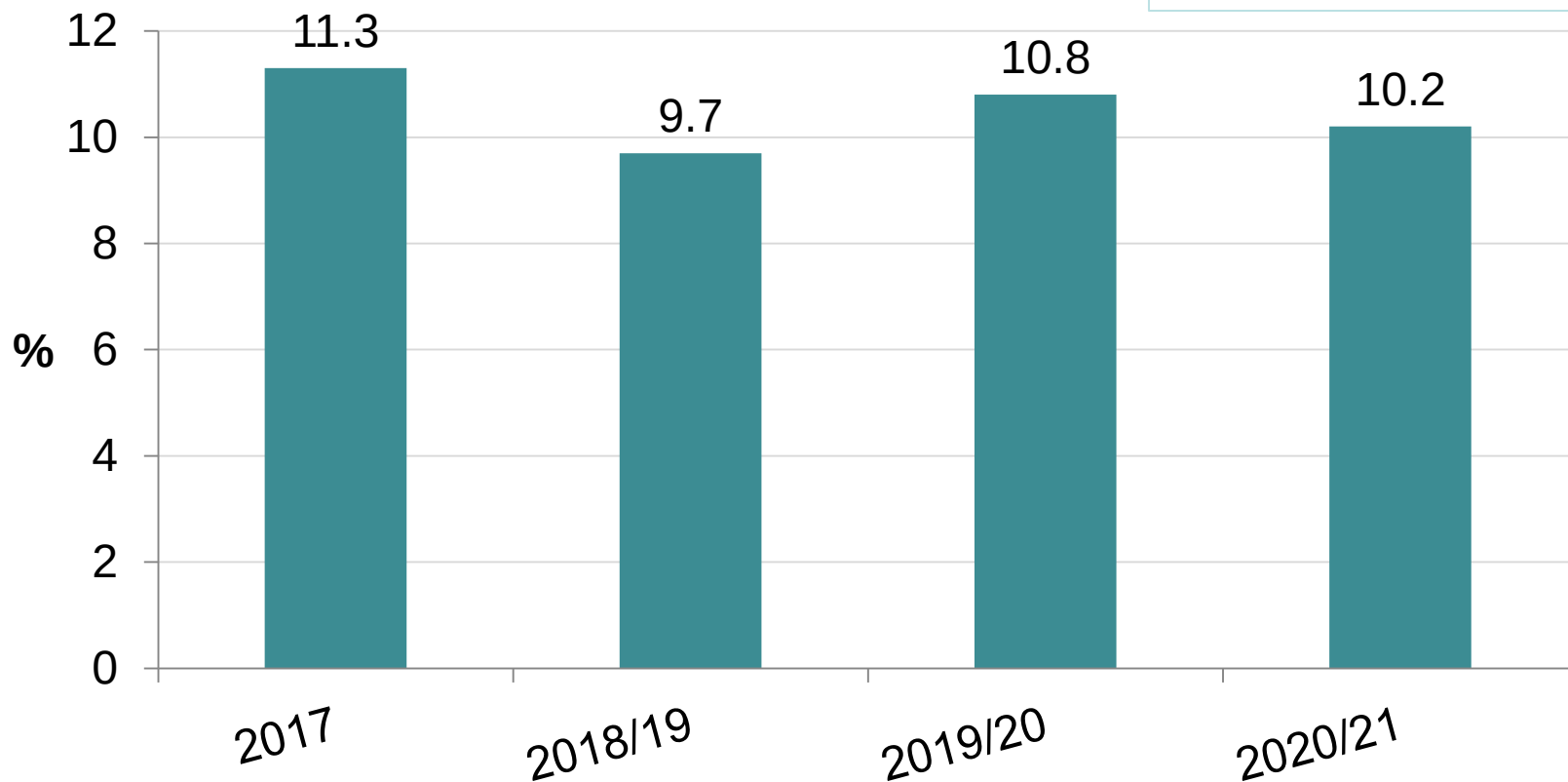
TAVI

Complications

Implantation of PPM Due to TAVI

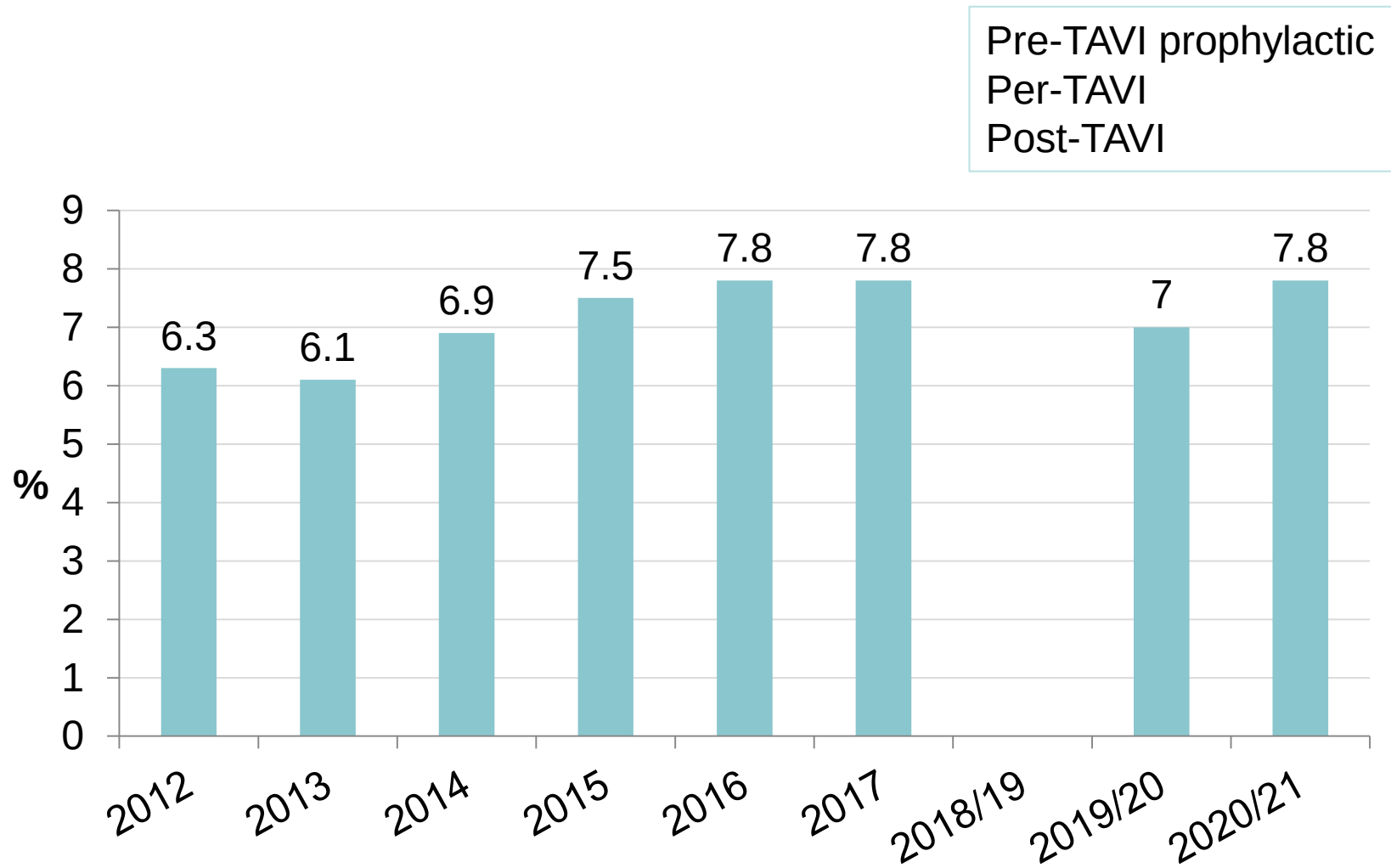
All procedures

Defined as:
Pre-TAVI prophylactic
Per-TAVI
Post-TAVI



Implantation of PPM Due to TAVI

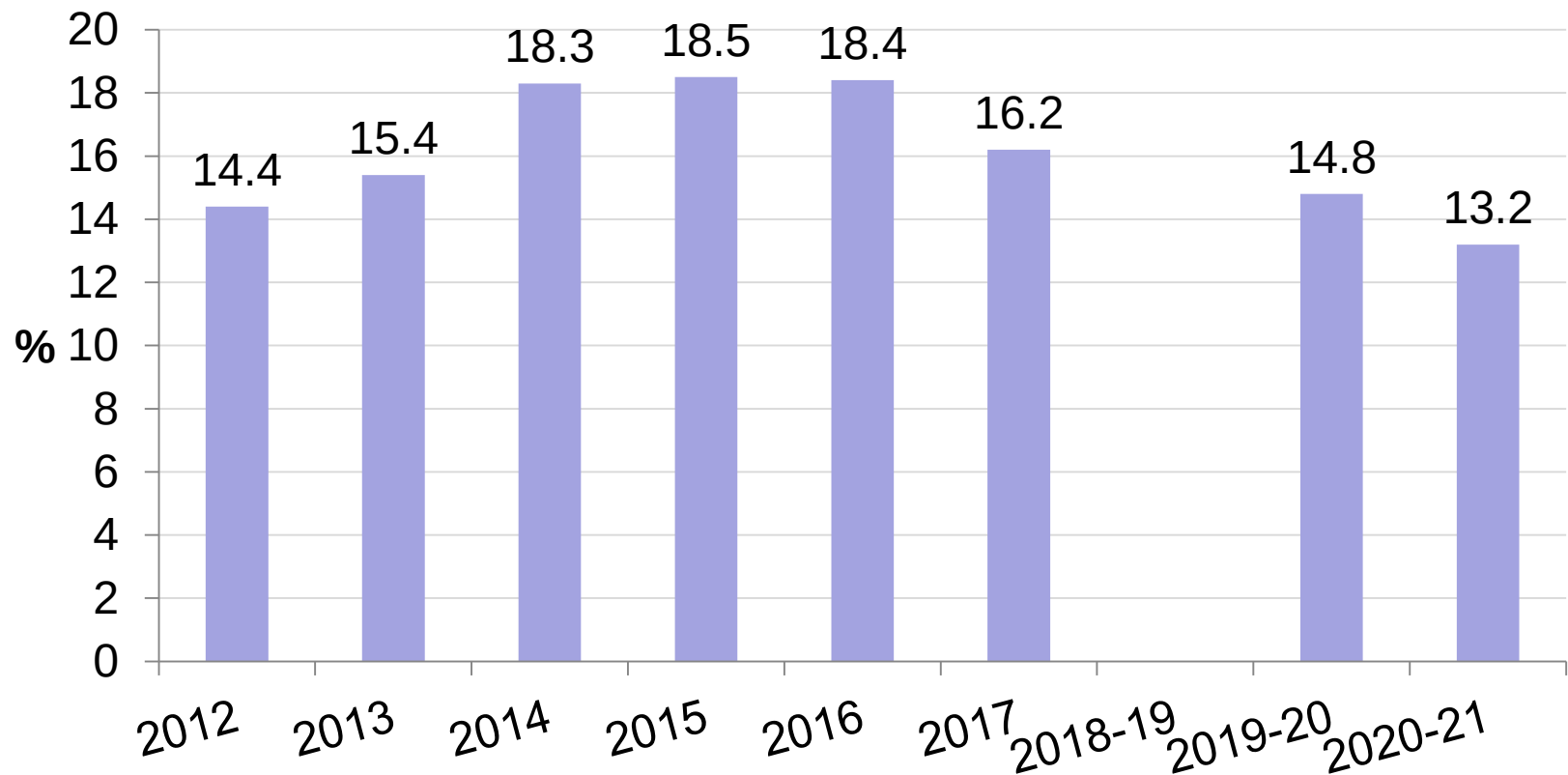
Edwards Sapien



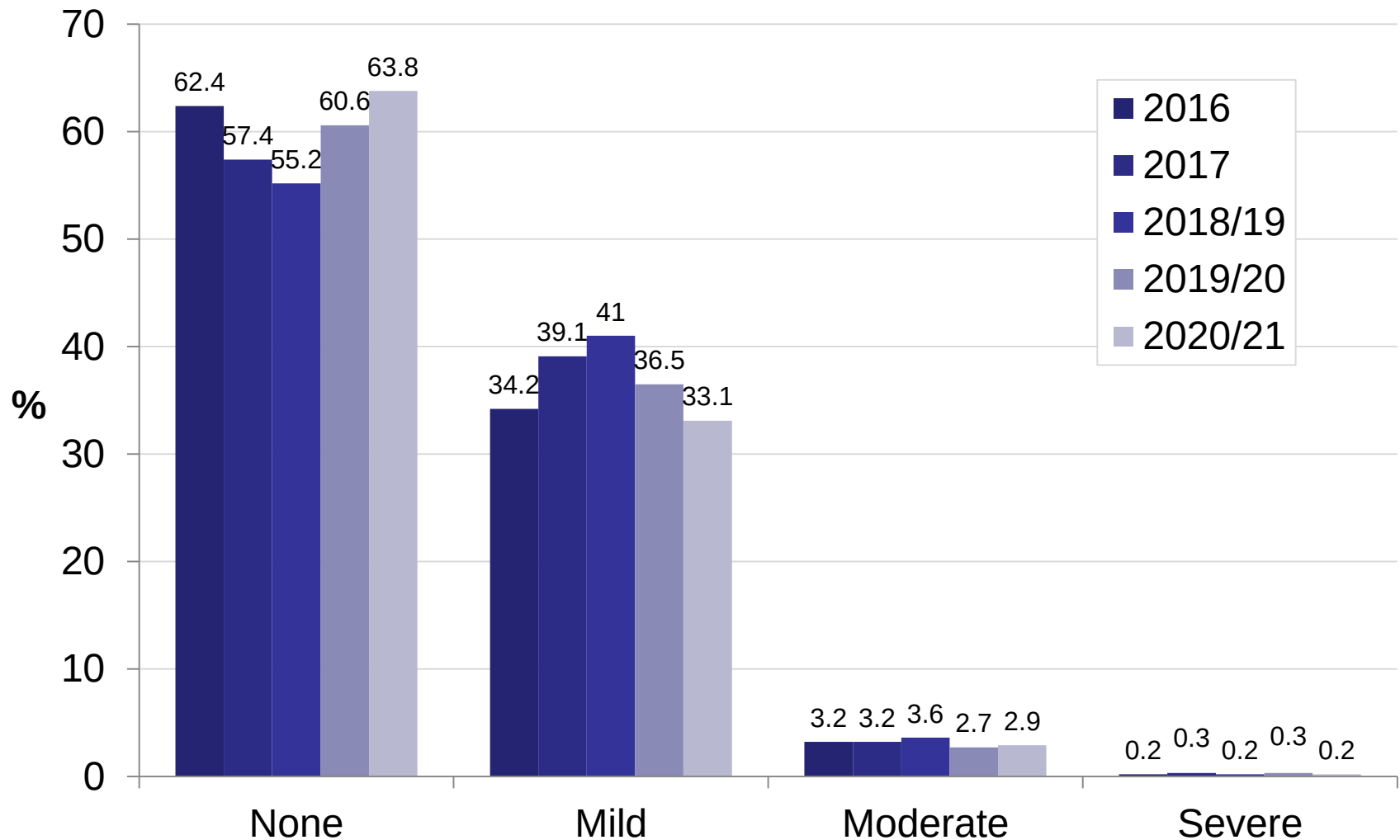
Implantation of PPM Due to TAVI

Medtronic

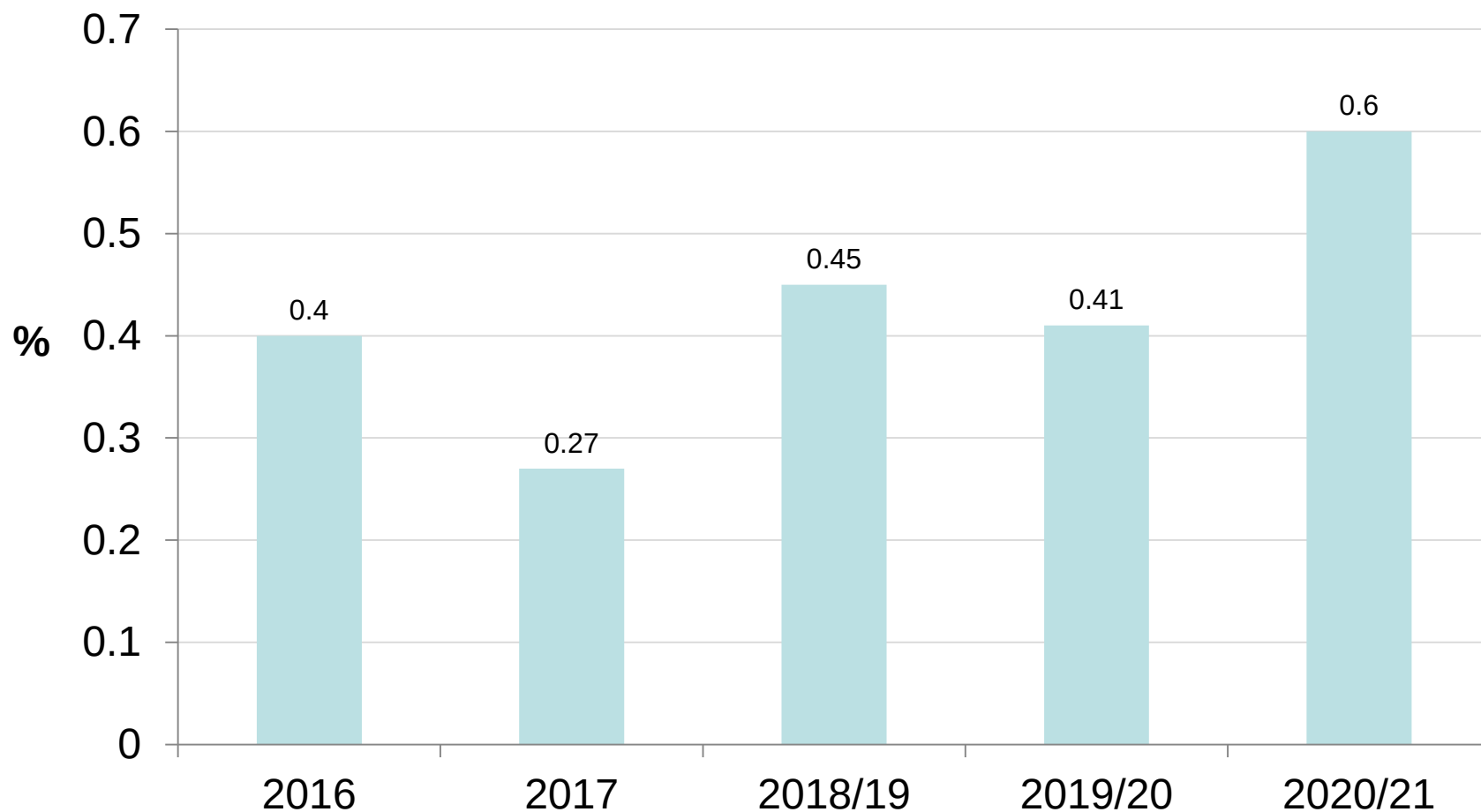
Pre-TAVI prophylactic
Per-TAVI
Post-TAVI



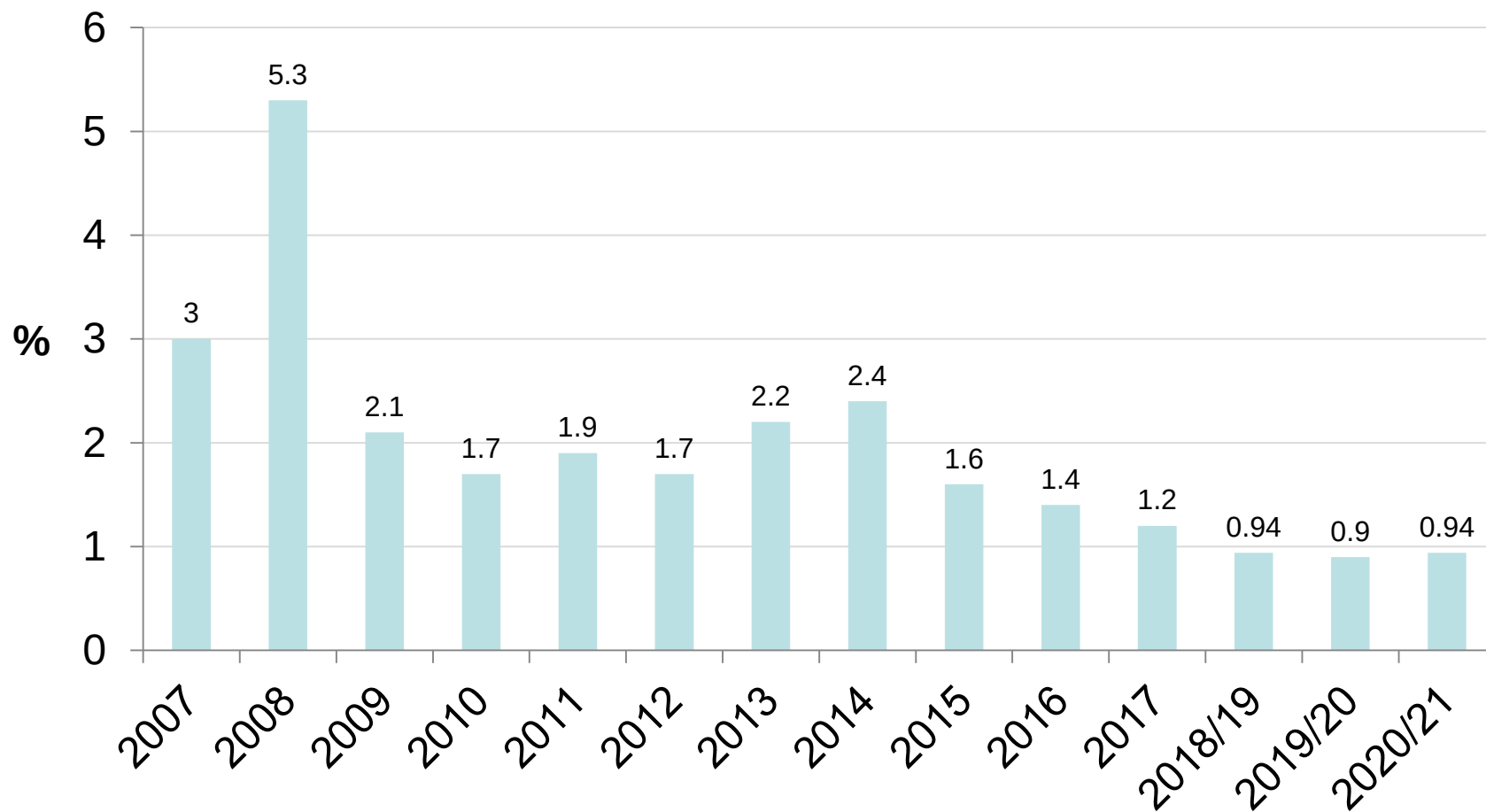
Post TAVI Aortic Regurgitation



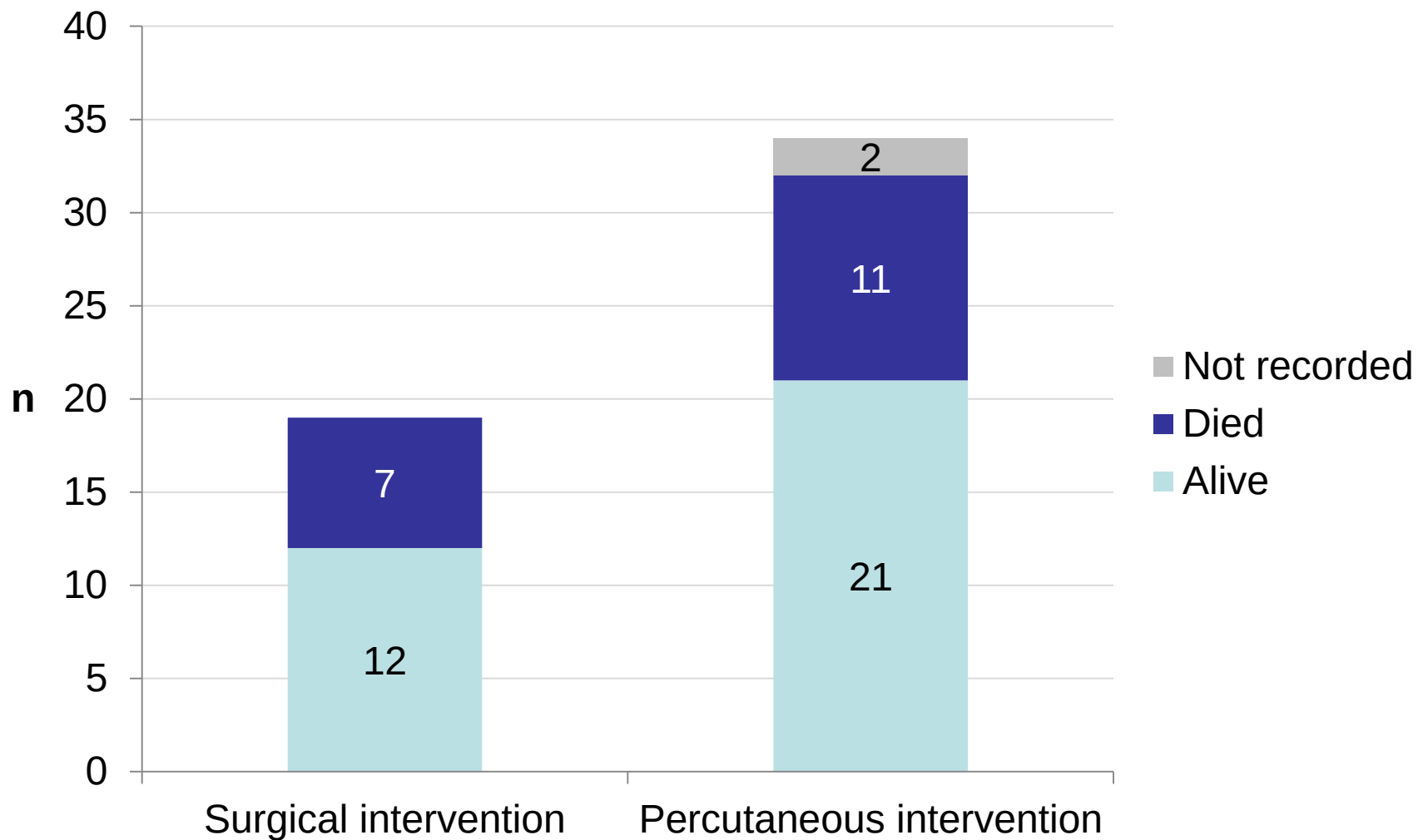
Bail out PCI



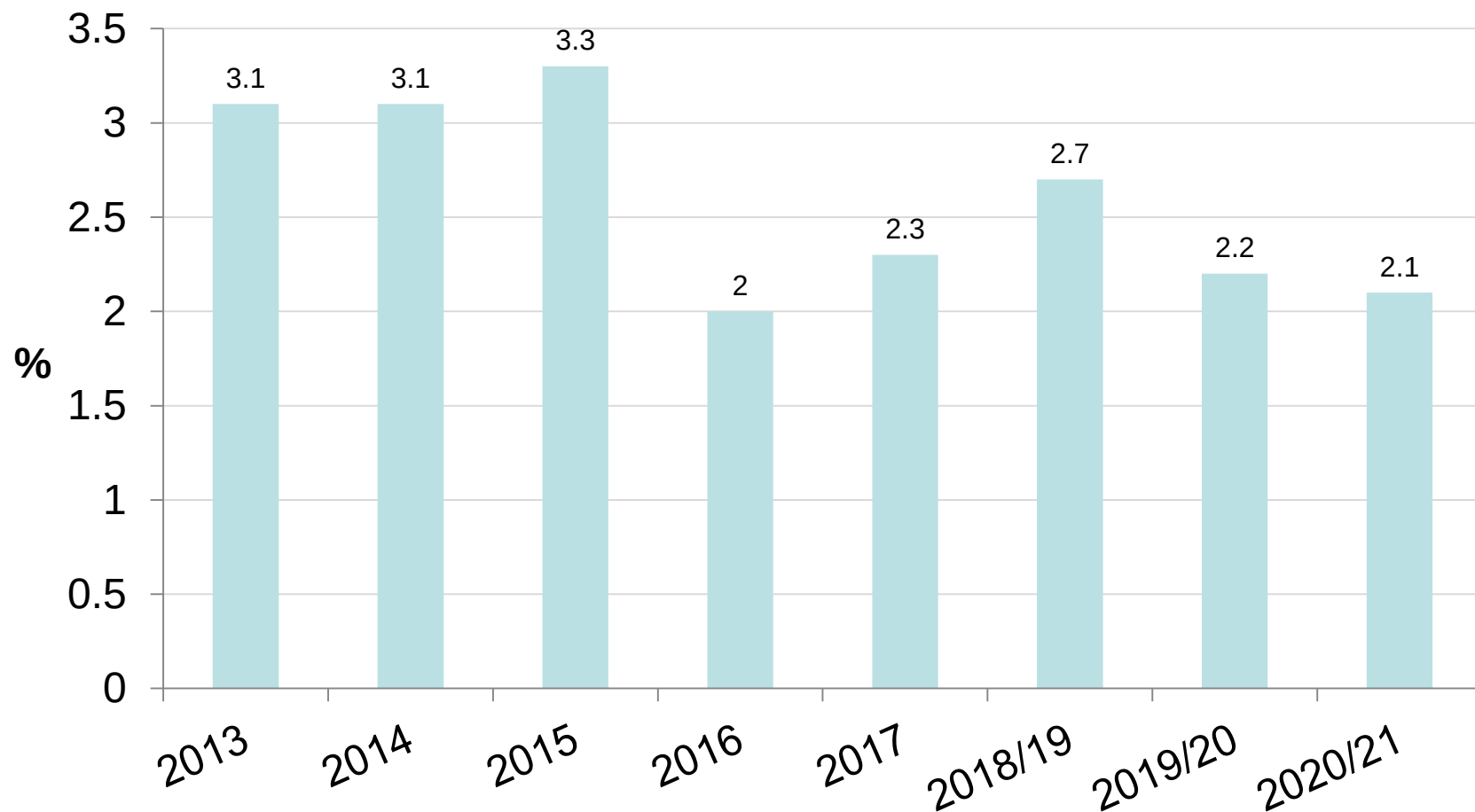
Tamponade



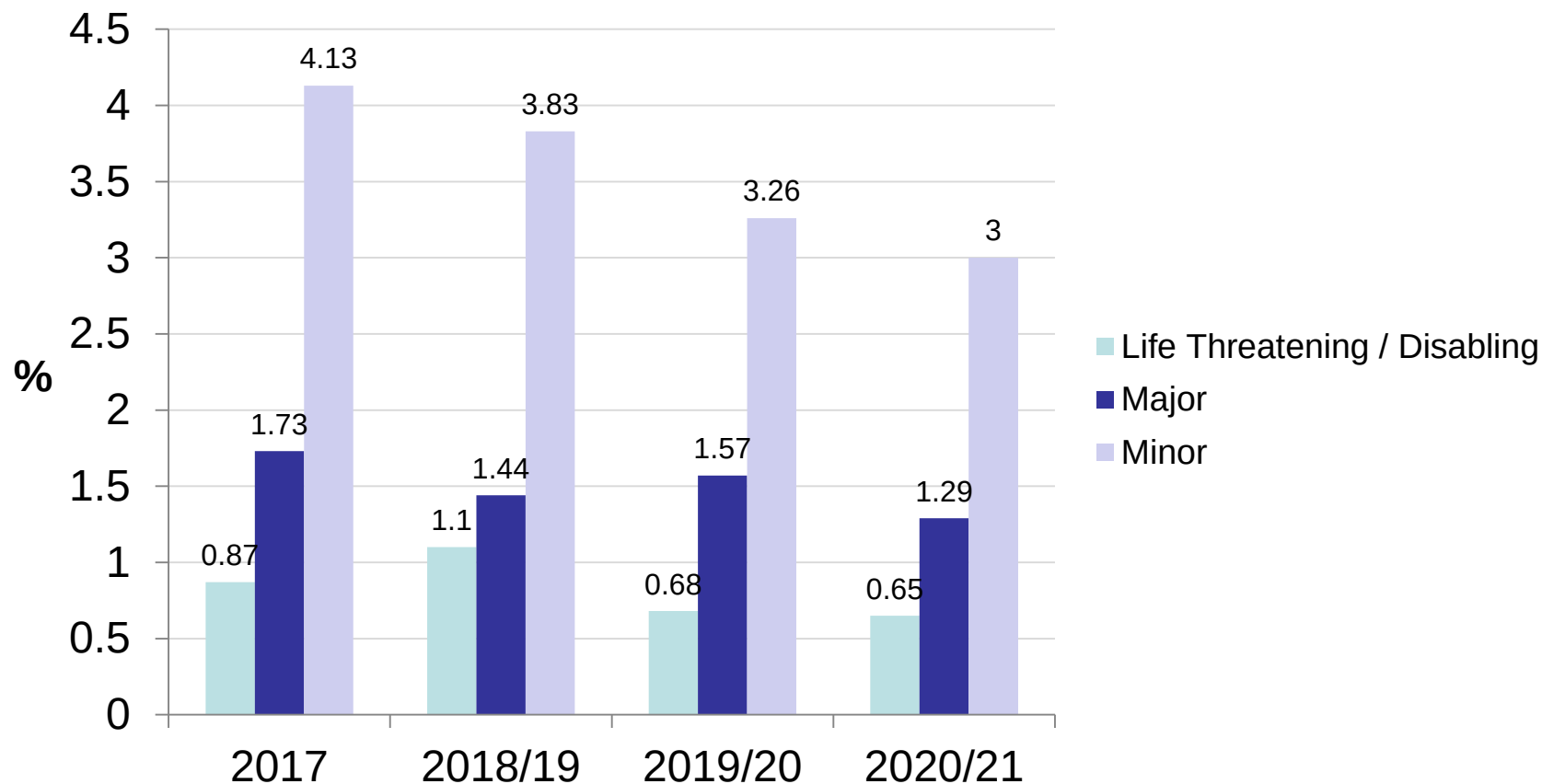
Tamponade 2020/21



Major Vascular Access Complication

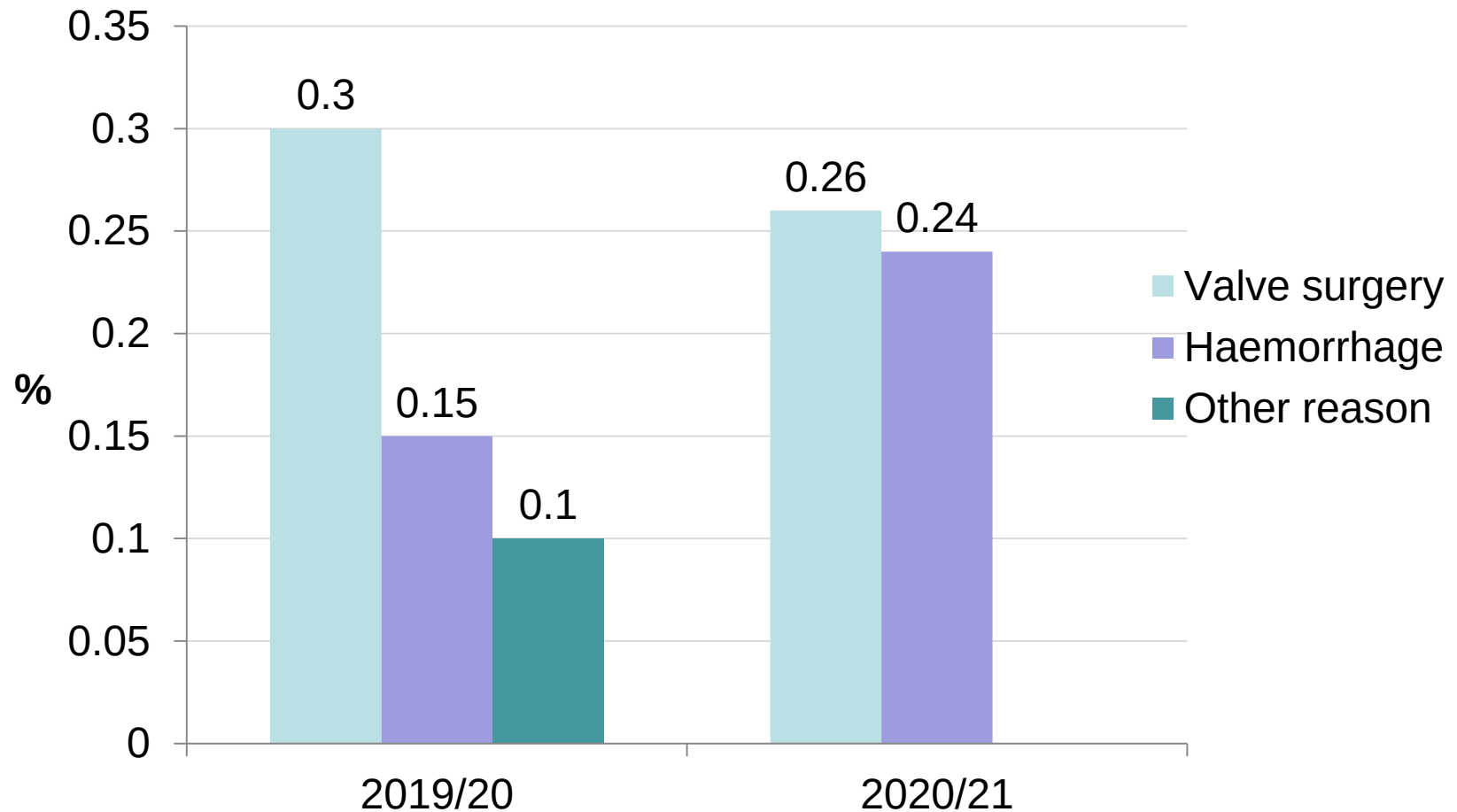


Major Bleeding

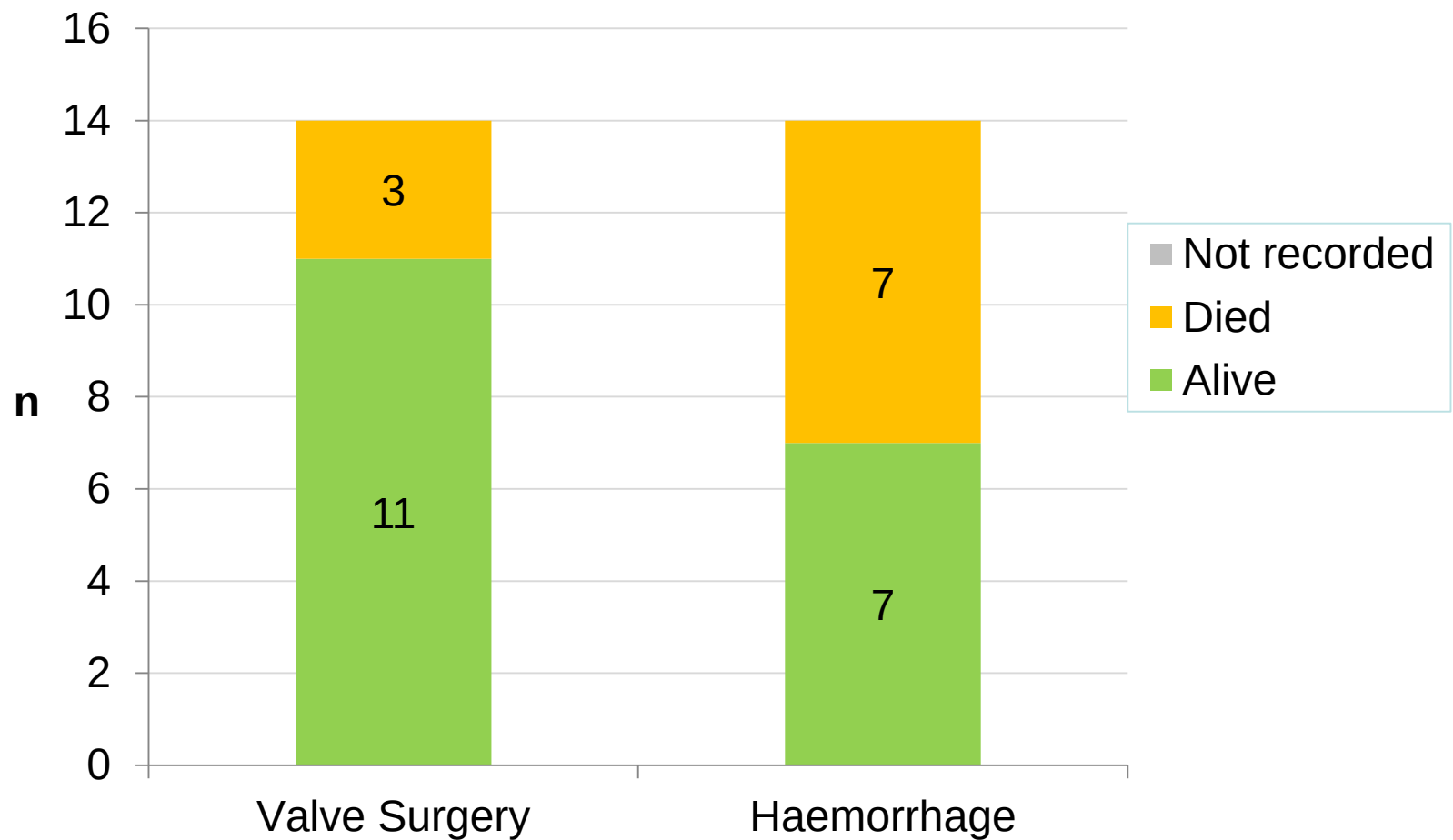


Life Threatening / Disabling = BARC 5, BARC 3b and 3c
Major = BARC 3a
Minor = BARC 2 or 3a according to severity

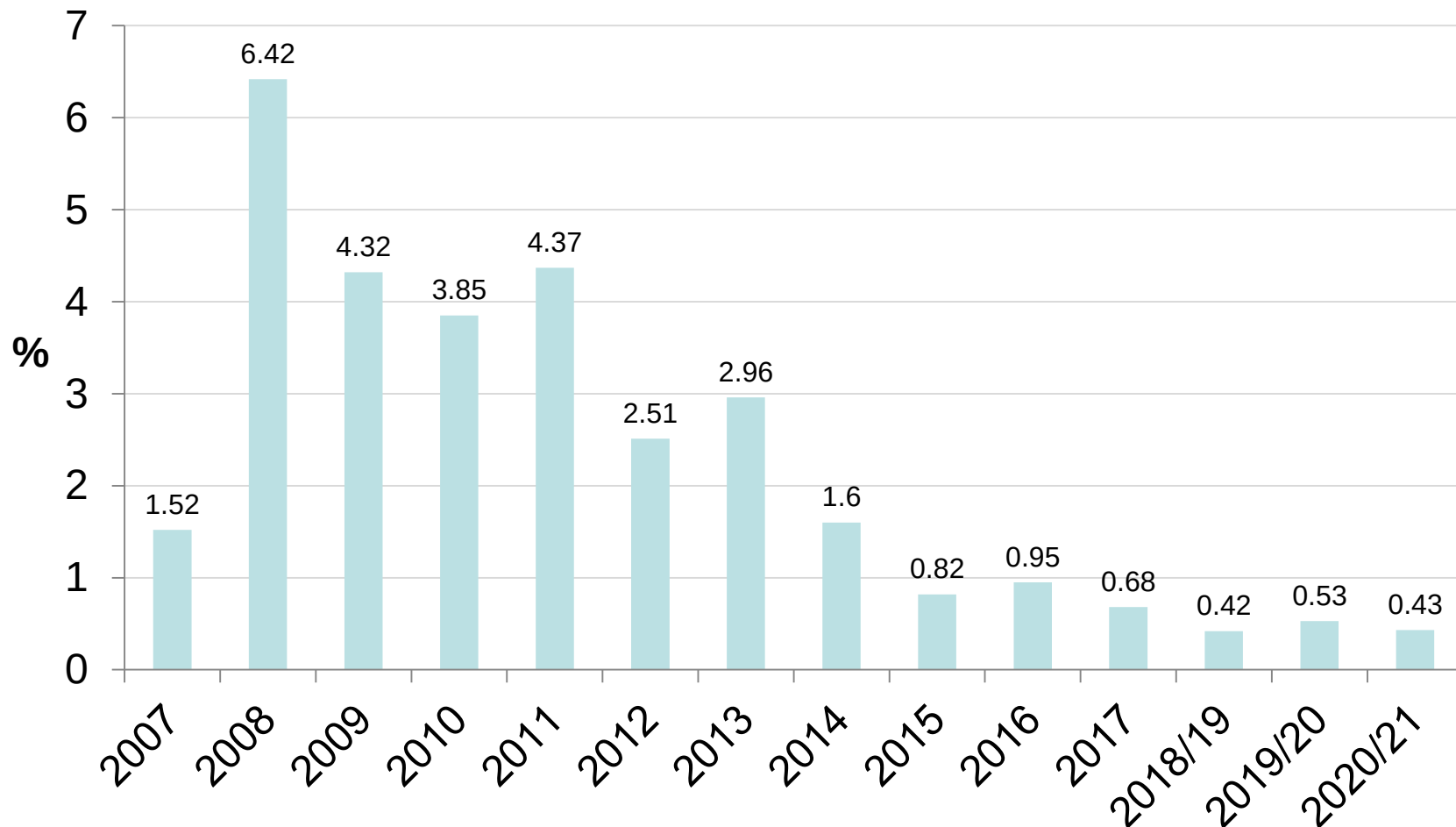
Conversion to Full Sternotomy



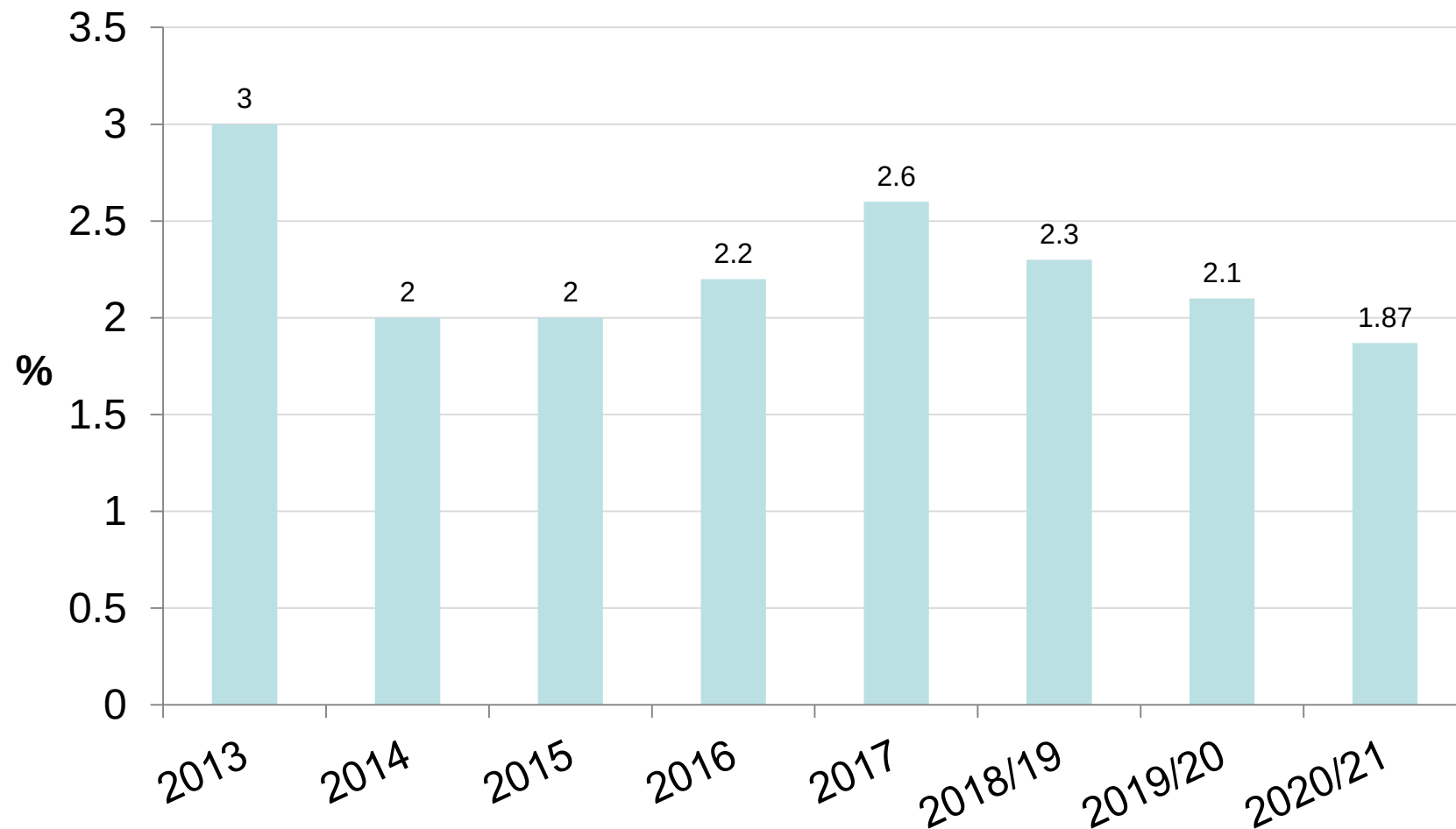
Conversion to Full Sternotomy



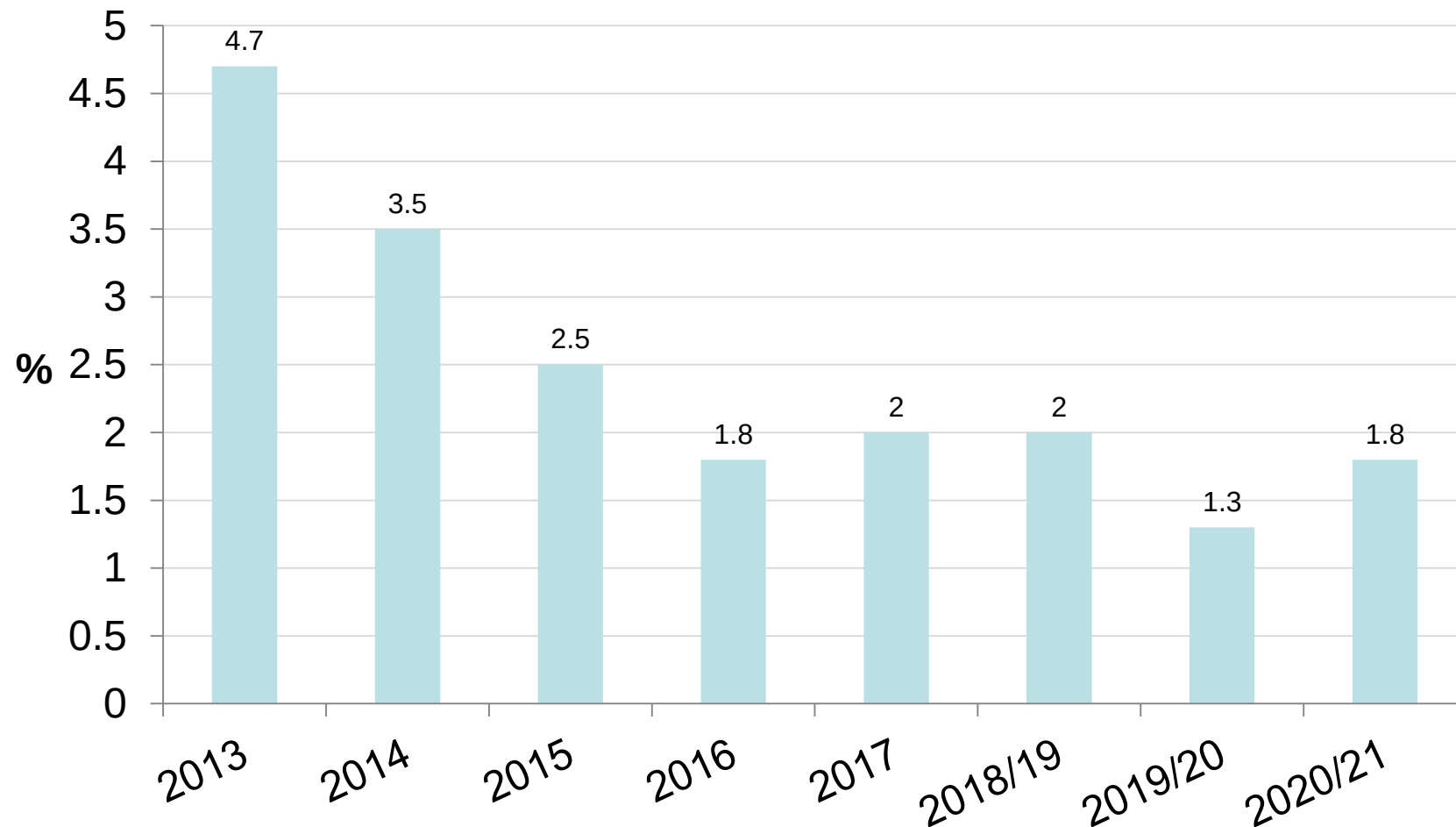
New Haemofiltration or Dialysis Post Procedure



In Hospital CVA



In Hospital Mortality



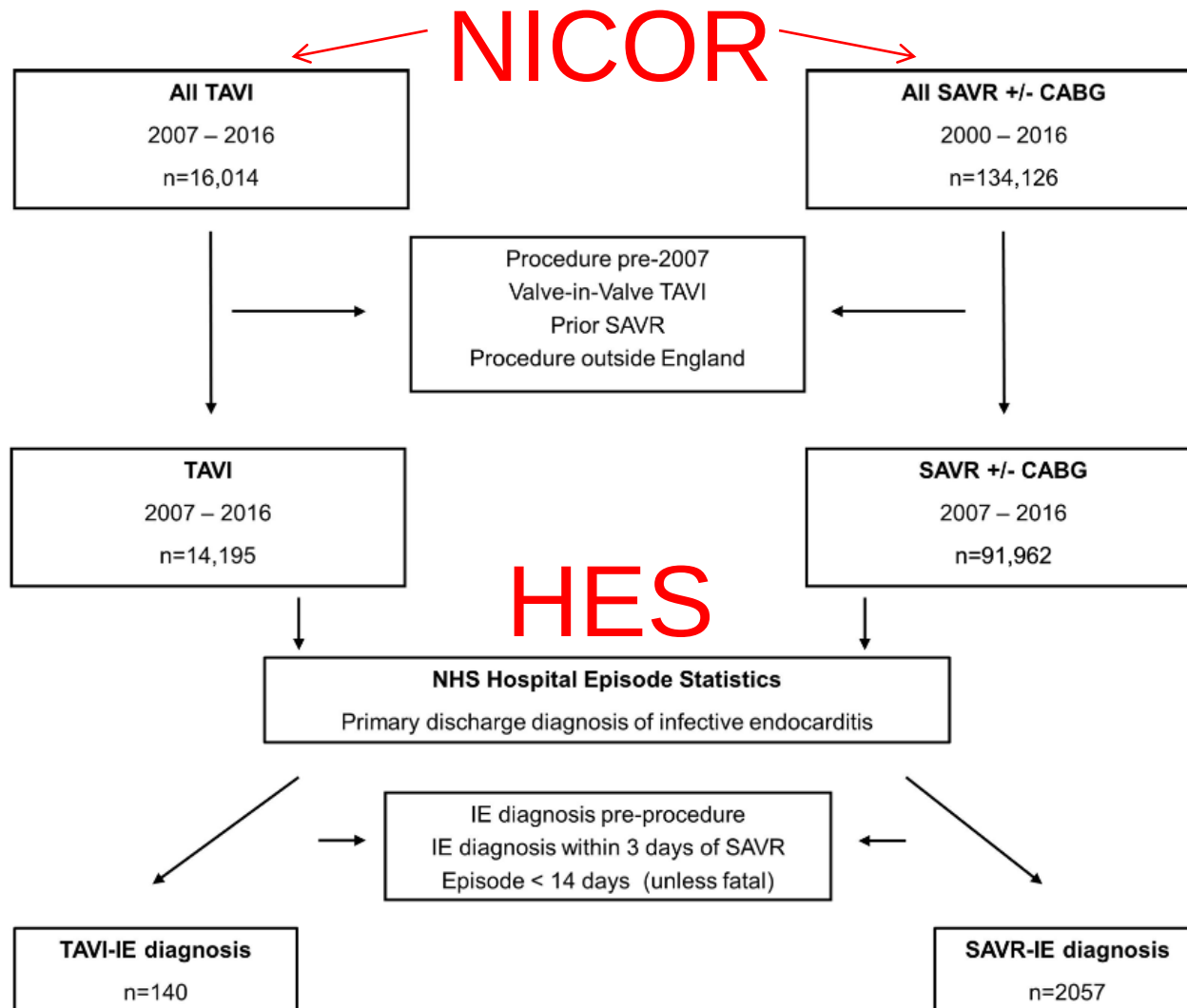
Infective Endocarditis

Risk of infective endocarditis after surgical and transcatheter aortic valve replacement

Thomas J Cahill ¹, Jonathan Raby,¹ Paul D Jewell,¹ Paul F Brennan,²
Adrian P Banning,¹ Jonathan Byrne,³ Rajesh K Kharbanda ¹,
Philip A MacCarthy ³, Martin H Thornhill,⁴ Jonathan A T Sandoe ^{5,6},
Mark S Spence,² Peter Ludman ⁷, David J R Hildick-Smith ⁸, Simon R Redwood,⁹
Bernard D Prendergast ⁹

Cahill TJ, *et al. Heart* 2022;**108**:639–647. doi:10.1136/heartjnl-2021-320080

Infective Endocarditis



Infective Endocarditis

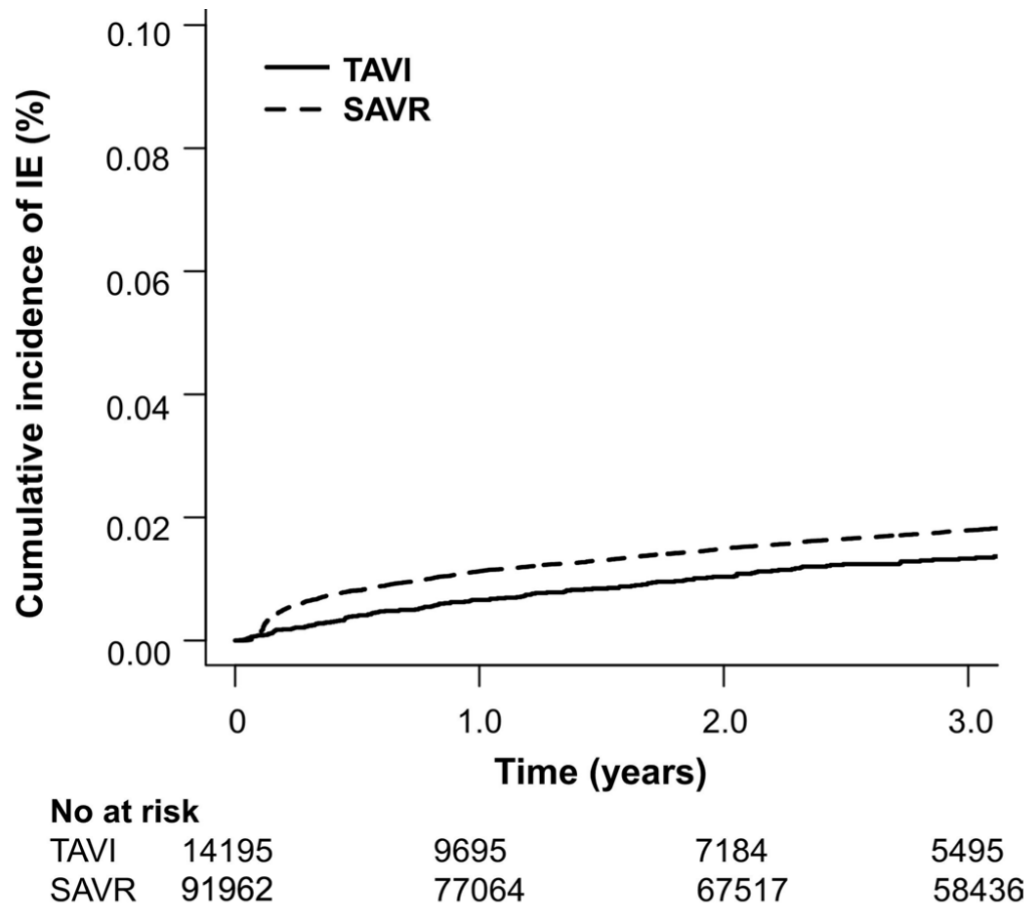
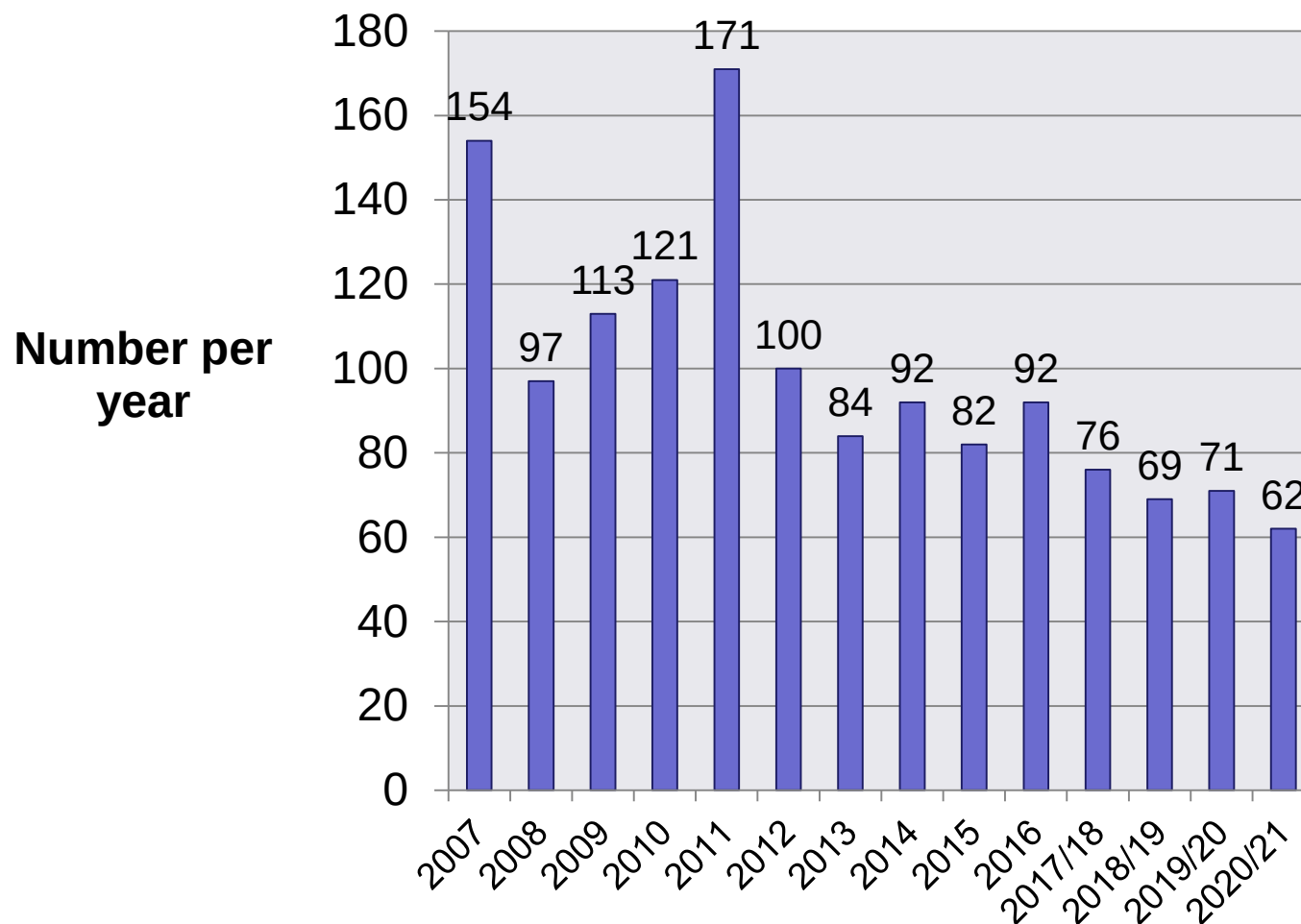


Figure 2 Cumulative incidence of IE in patients after surgical aortic valve replacement (SAVR) and transcatheter aortic valve implantation (TAVI).

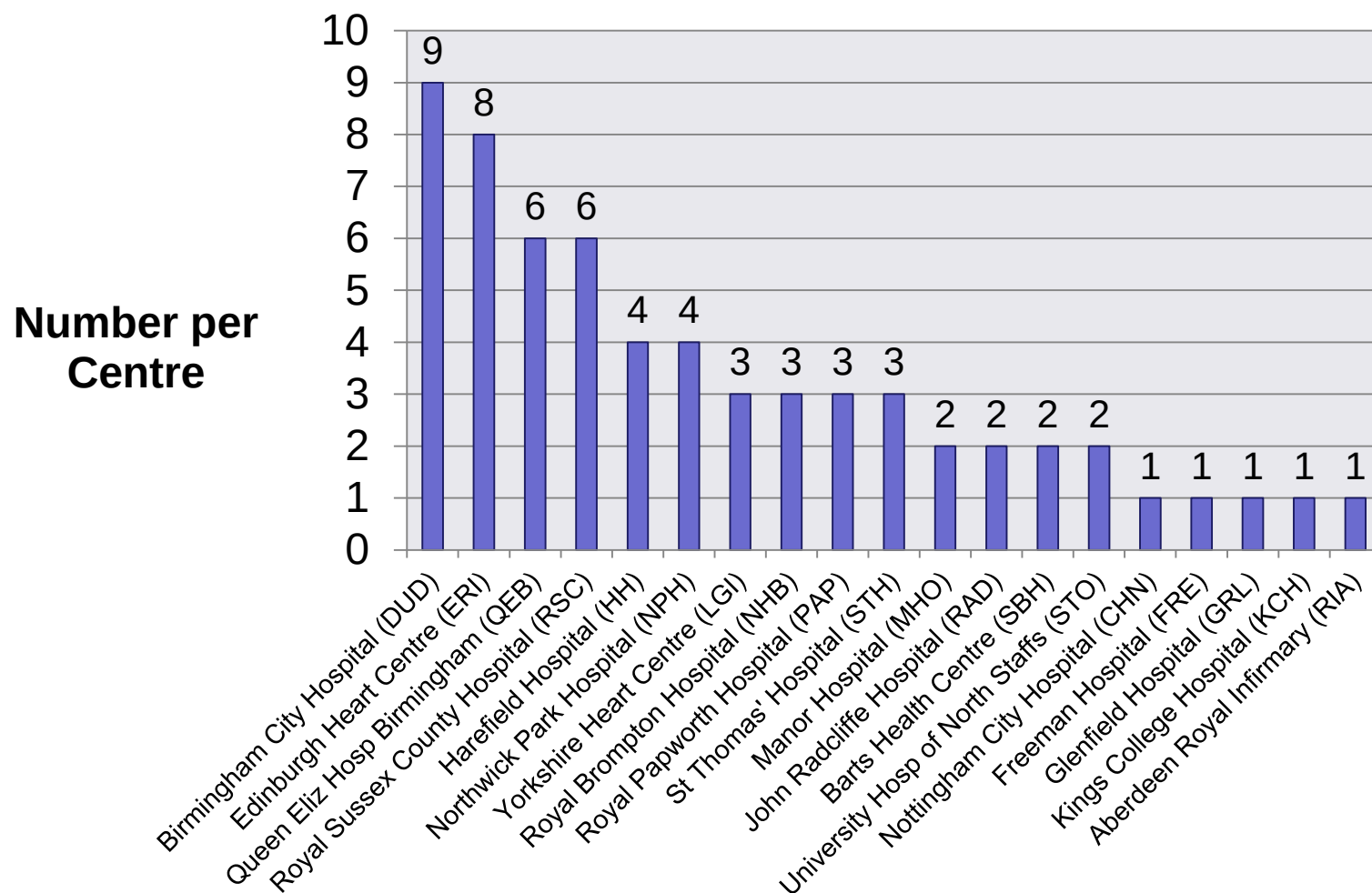
Mitral



Mitral Balloon Valuloplasty



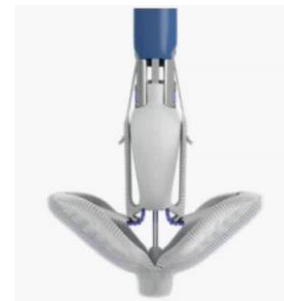
Mitral Balloon Valvuloplasty 2020/21



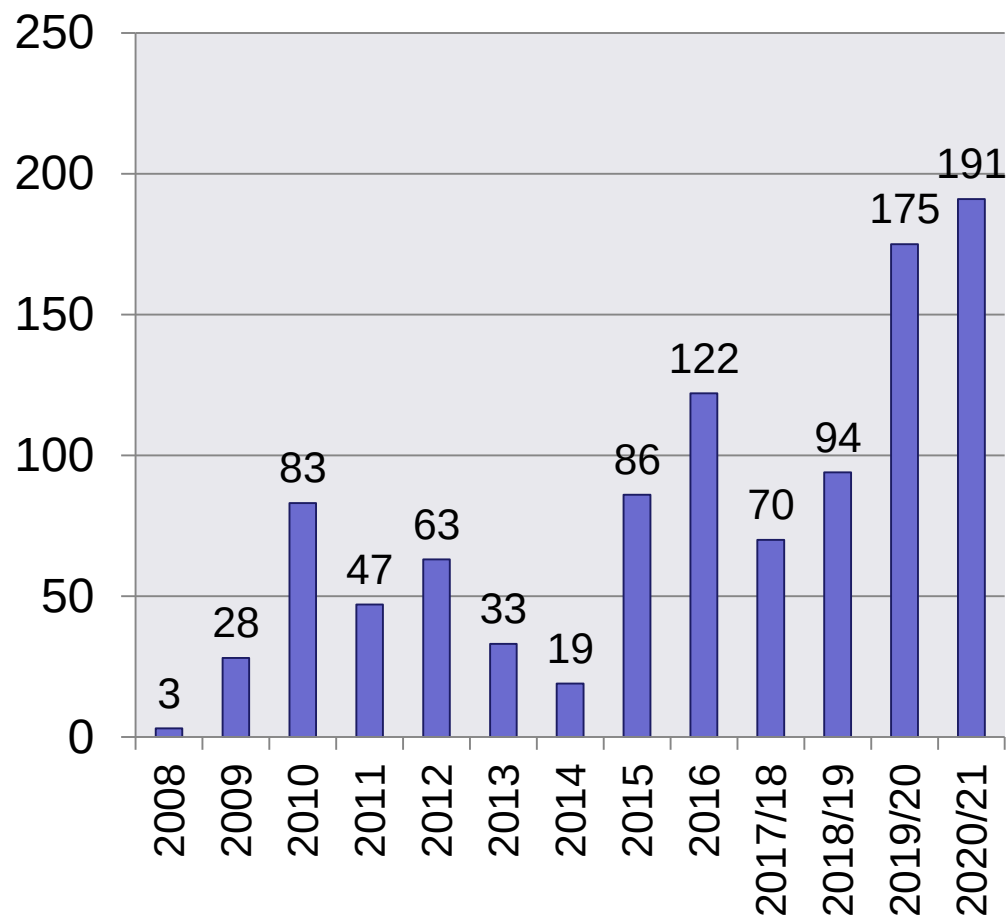
Number of centres: 19

Percutaneous Valves

Mitral Edge to Edge repair



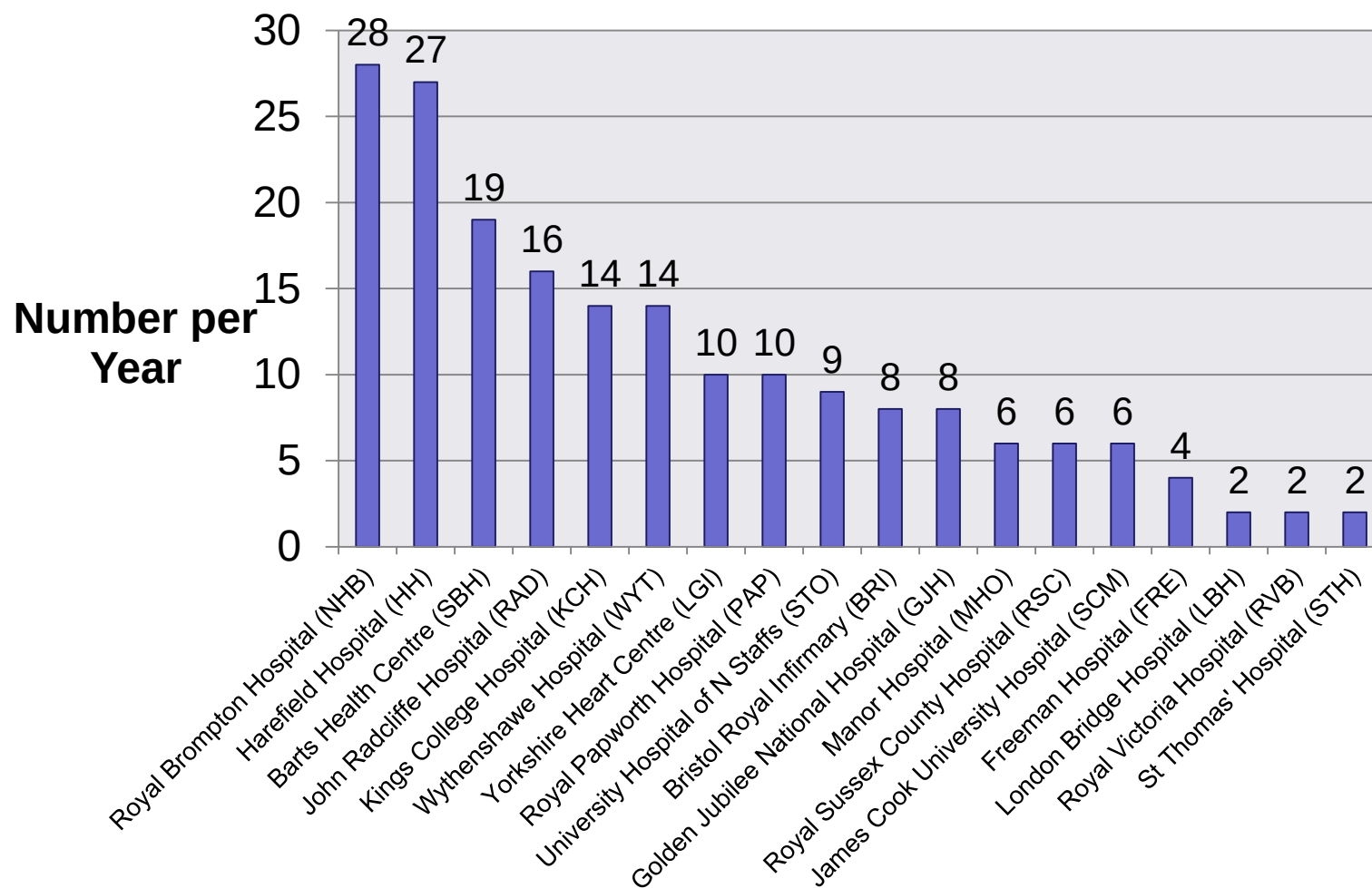
Number per
Year



Mitra-clip + Pascal

Percutaneous Valves

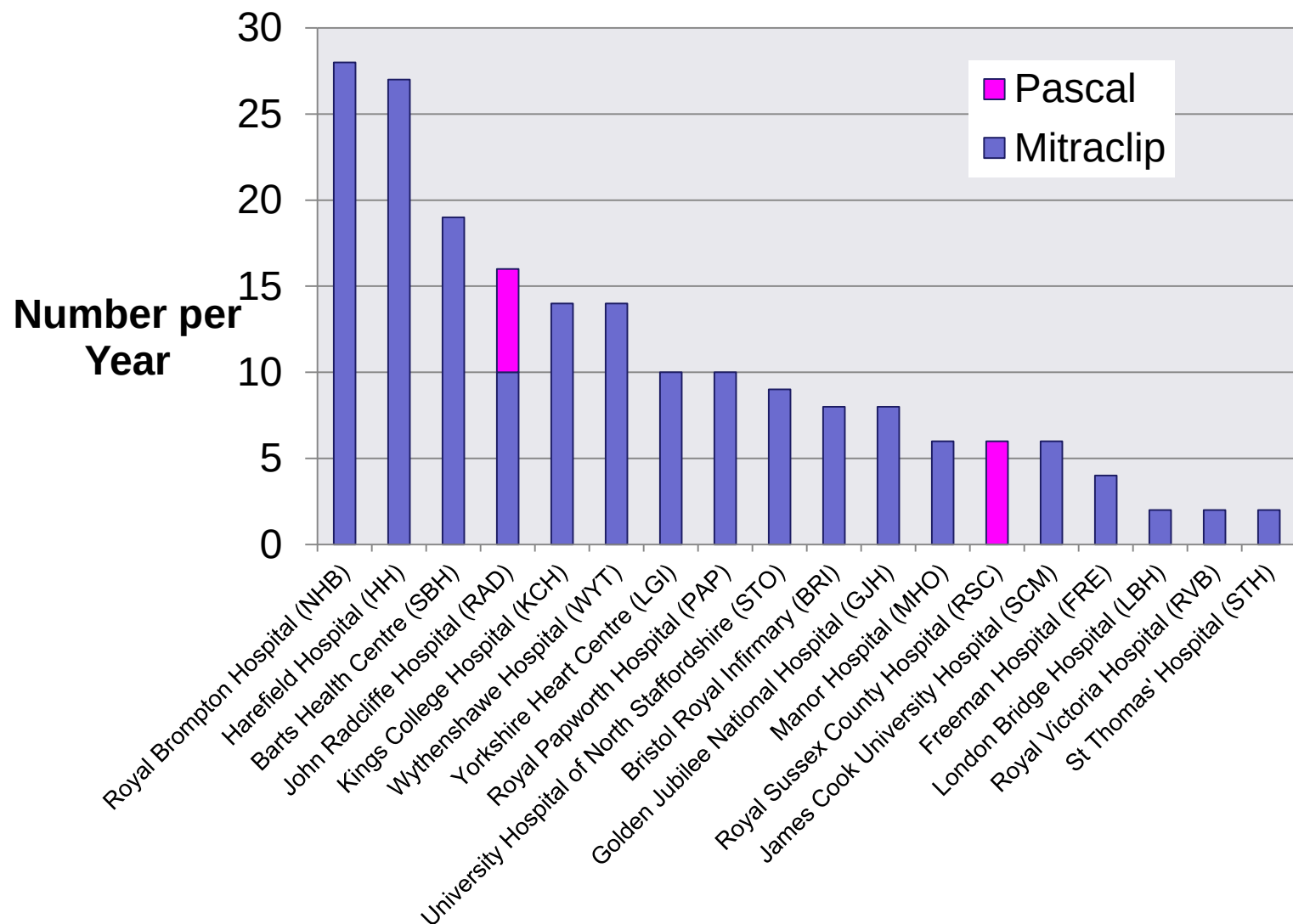
Mitral Edge to Edge repair 2020/21



Mitra-clip + Pascal

Percutaneous Valves

Mitral Edge to Edge repair 2020/21



Percutaneous Valves

Mitral Valve Repair - Other 2020/21

- NHB (Brompton)
 - 7 Neochord

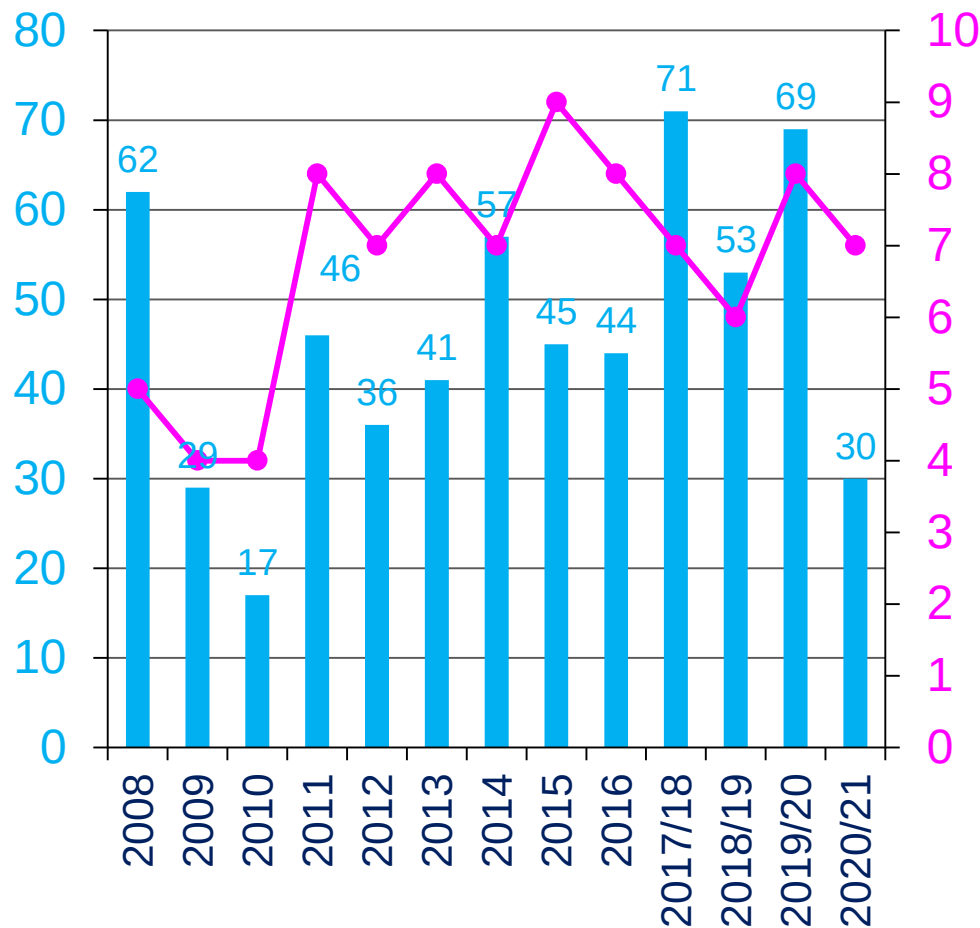


Percutaneous Valves

Pulmonary Valves



Number of
Procedures

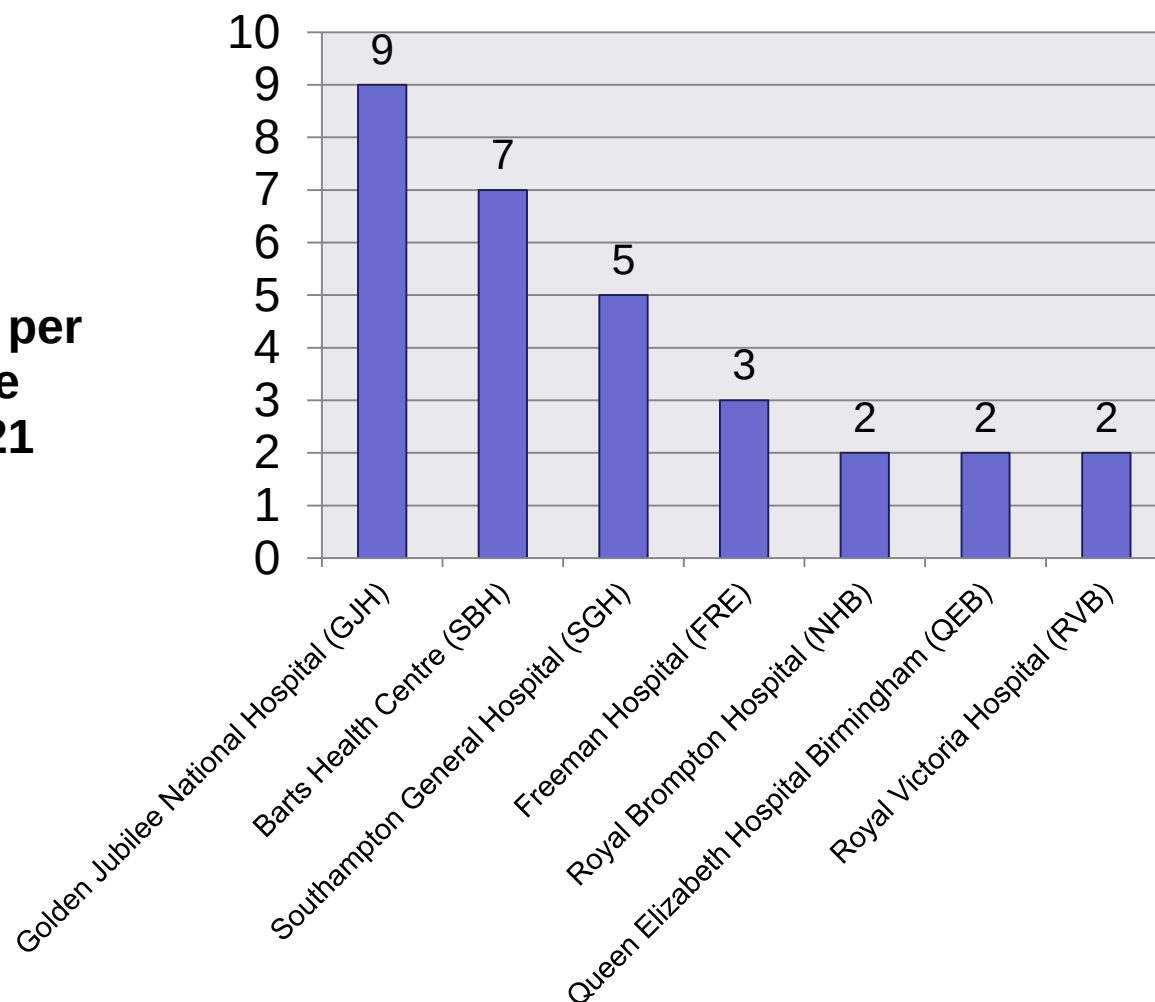


Number of
Centres

Percutaneous Valves

Pulmonary Valves

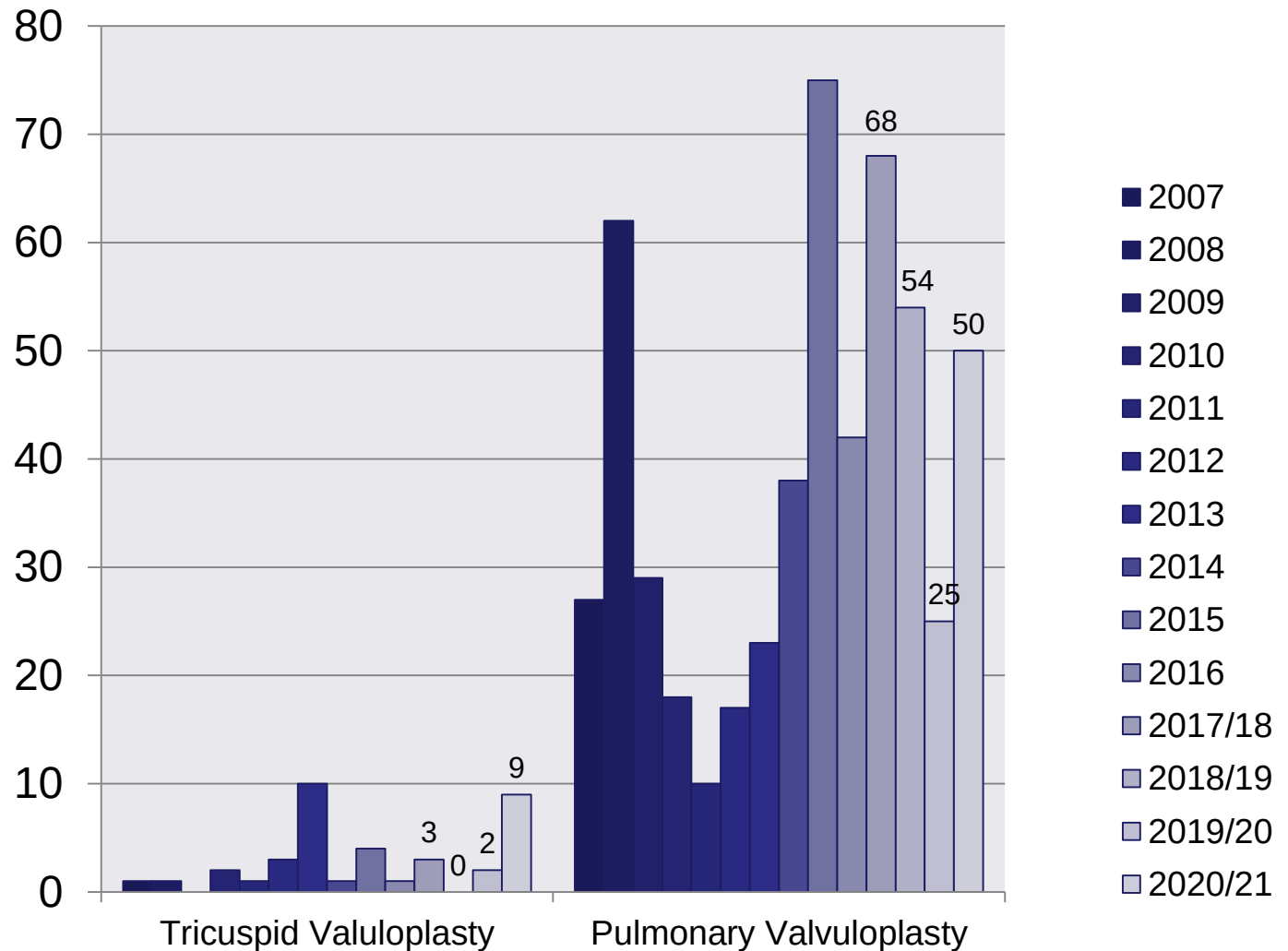
Number per
centre
2020/21



Balloon Valvuloplasty

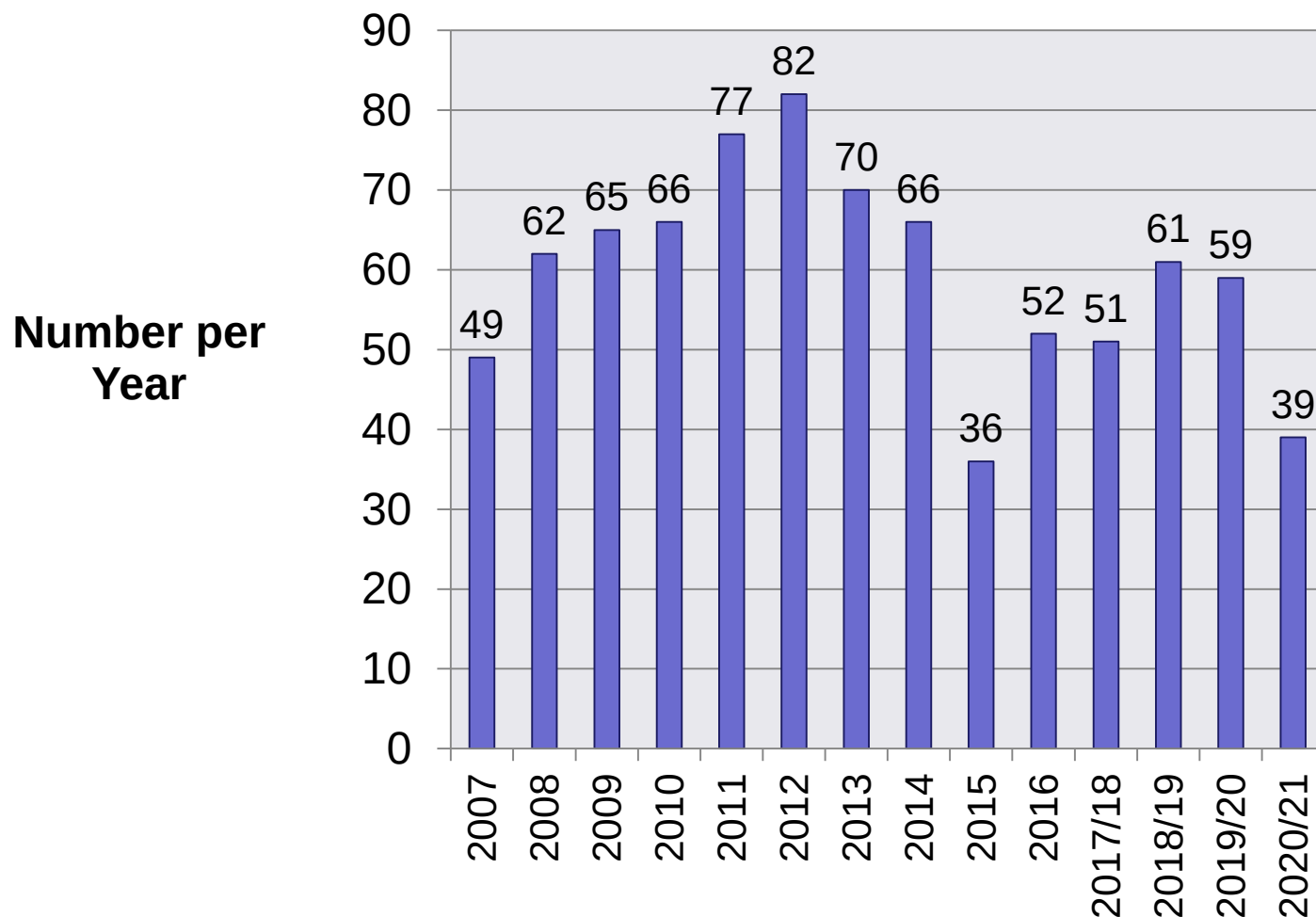
Not as part of valve implantation

Number of
Procedures



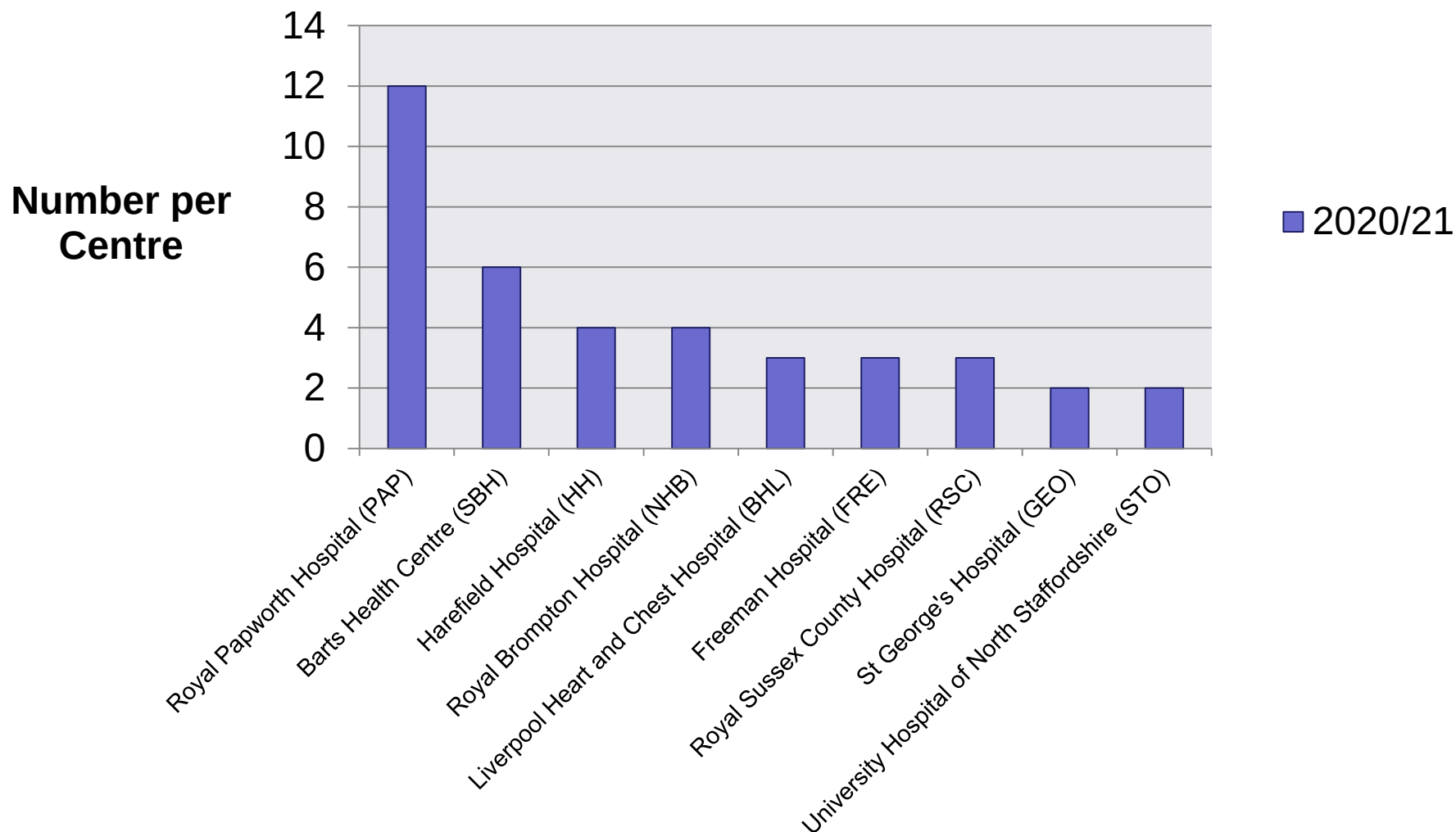
HCM

Alcohol Mediated Septal Ablation

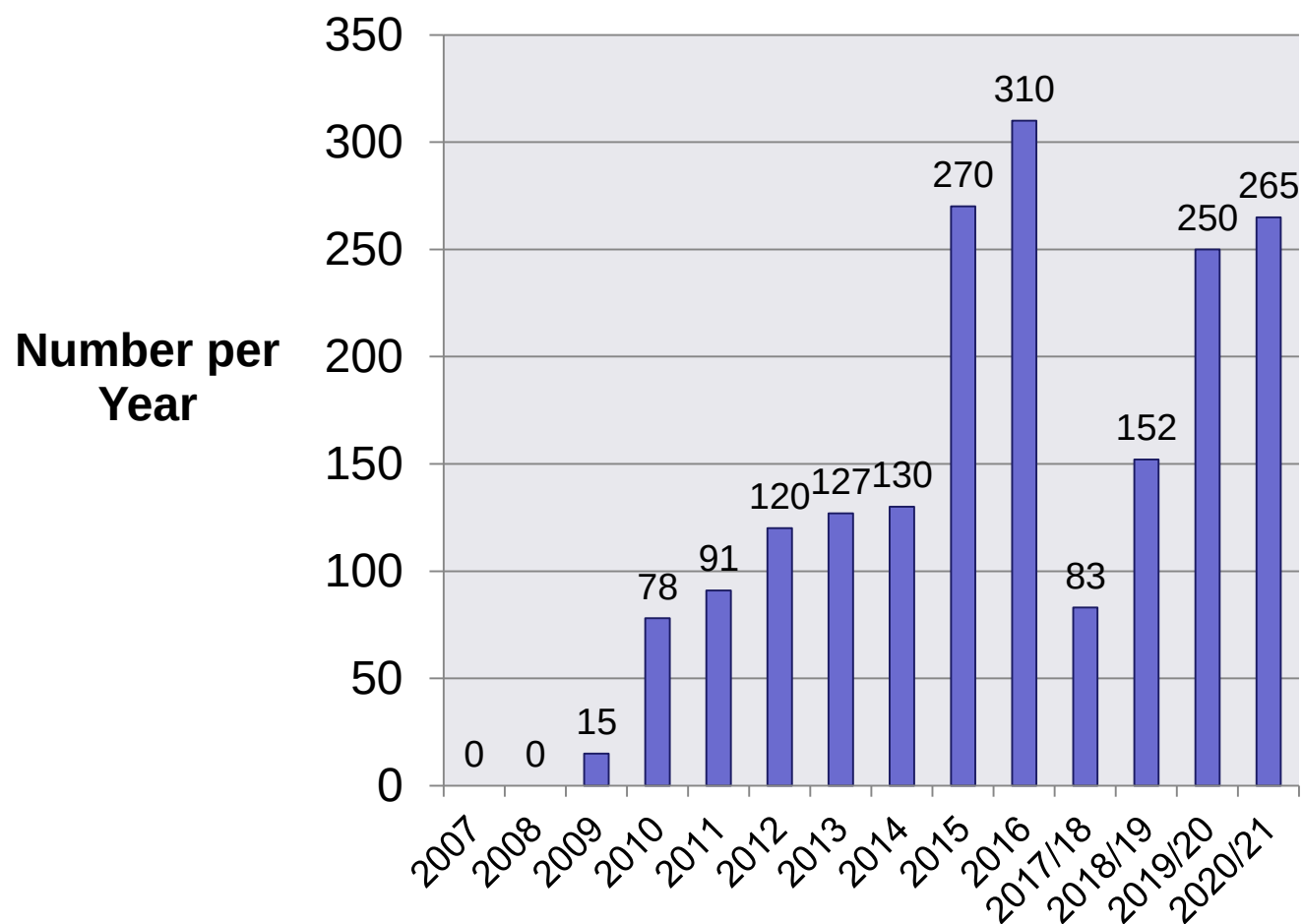


HCM

Alcohol Mediated Septal Ablation

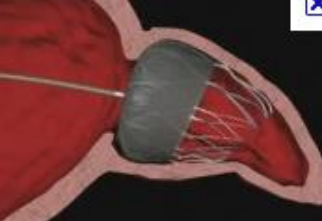


LAA Occlusion

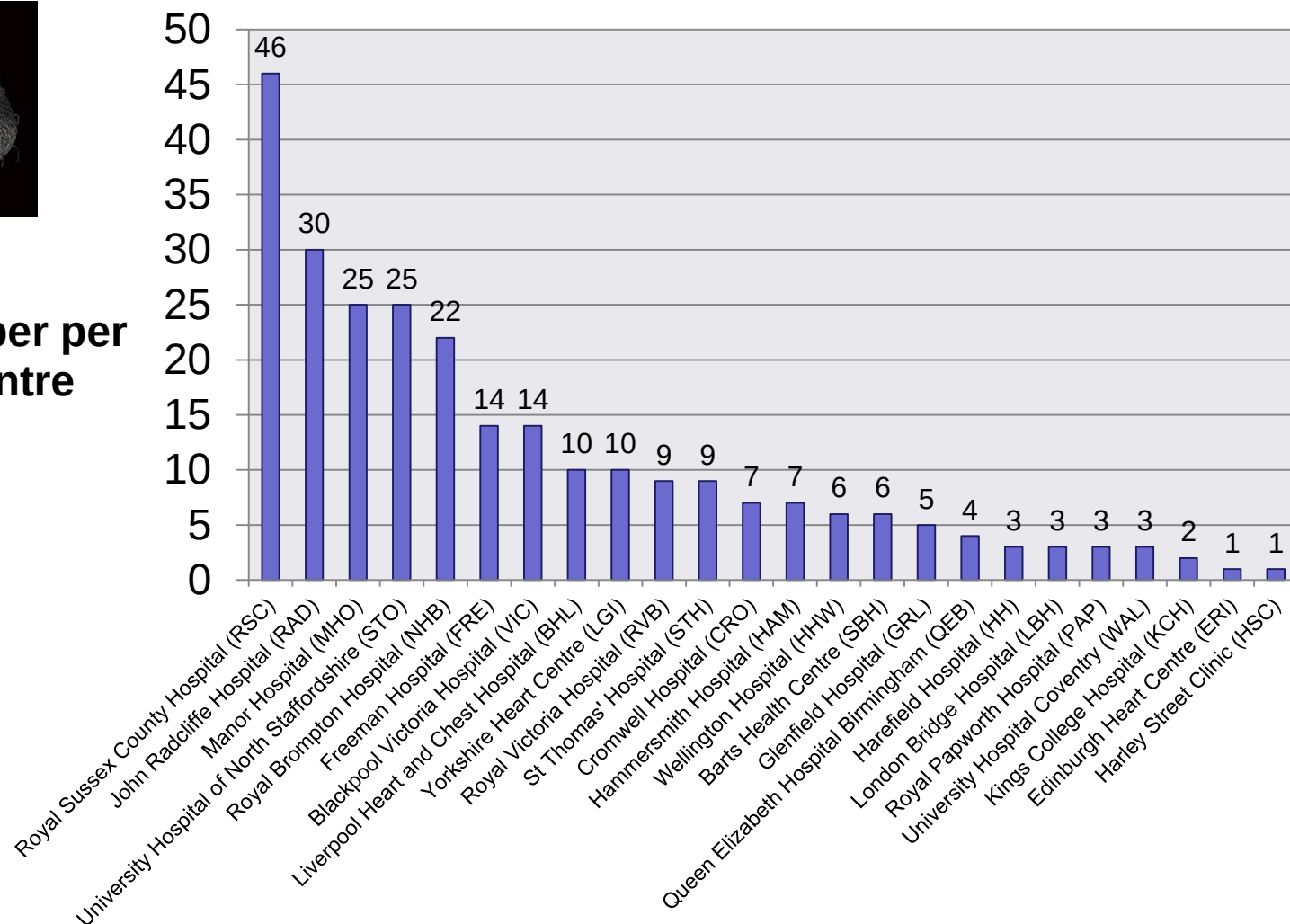


LAA Occlusion

2020/21



Number per
Centre

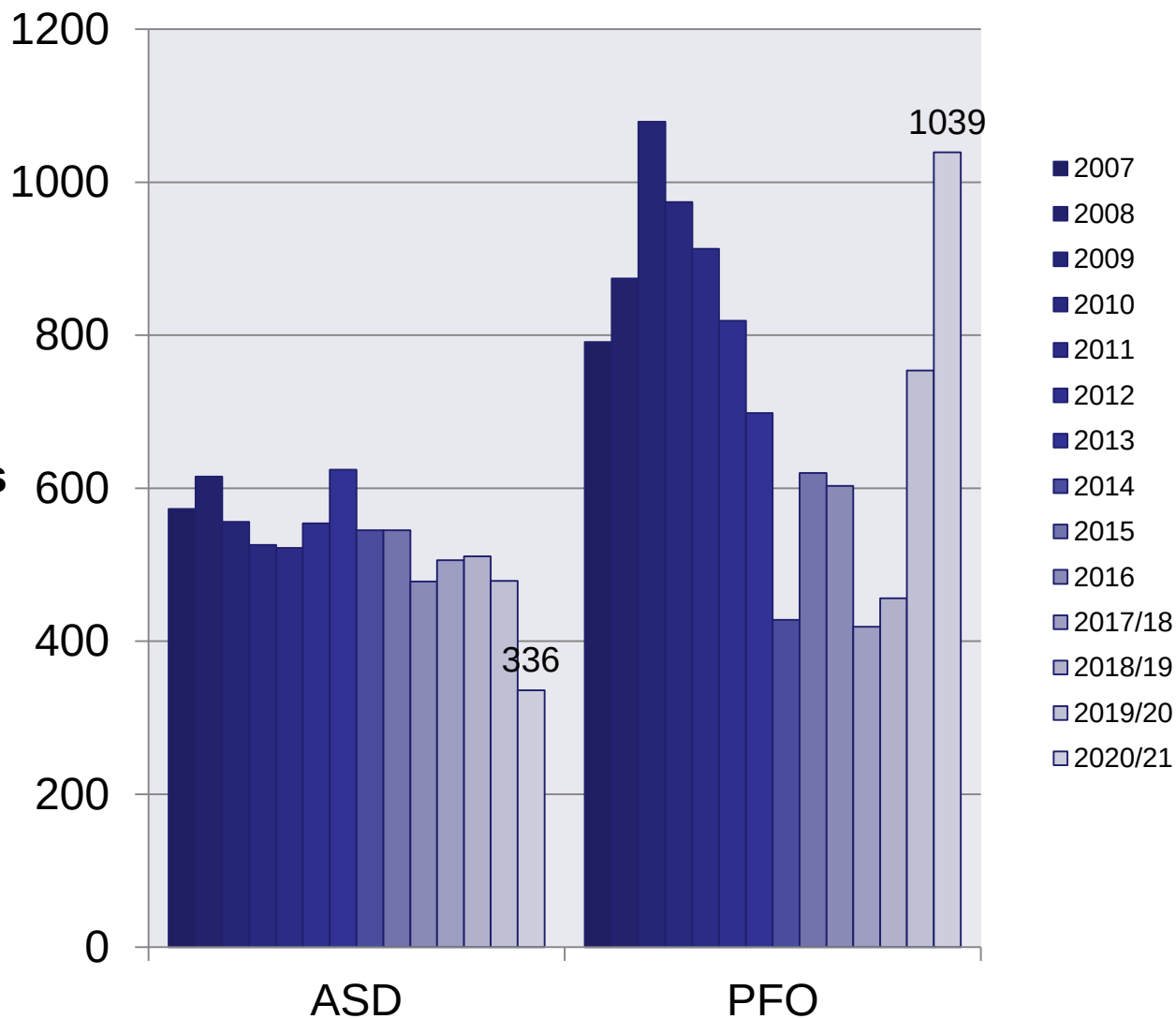


Number of centres: 24



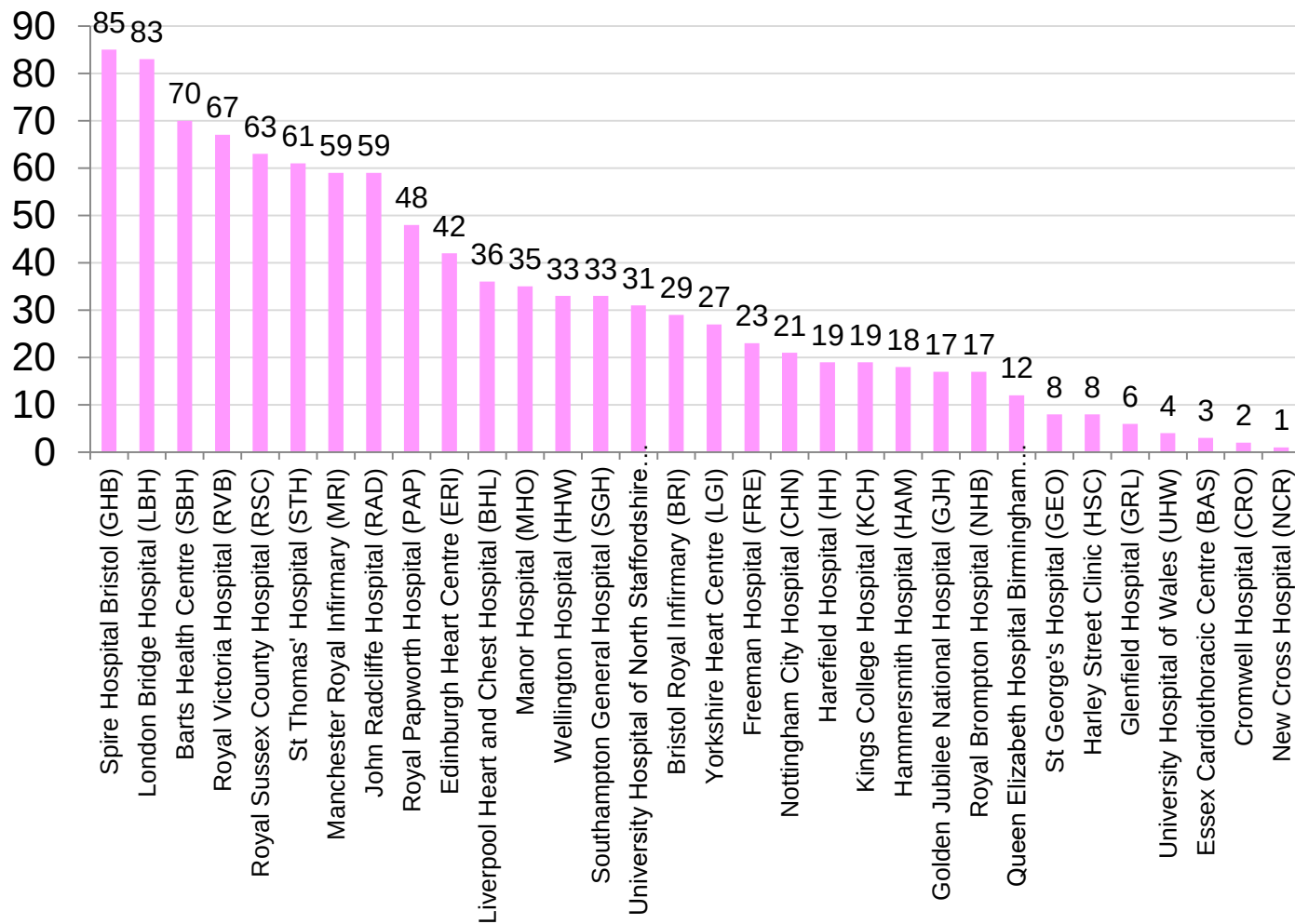
ASD and PFO Closure

Number of
Procedures



PFO Closure

Procedures in
2020/21

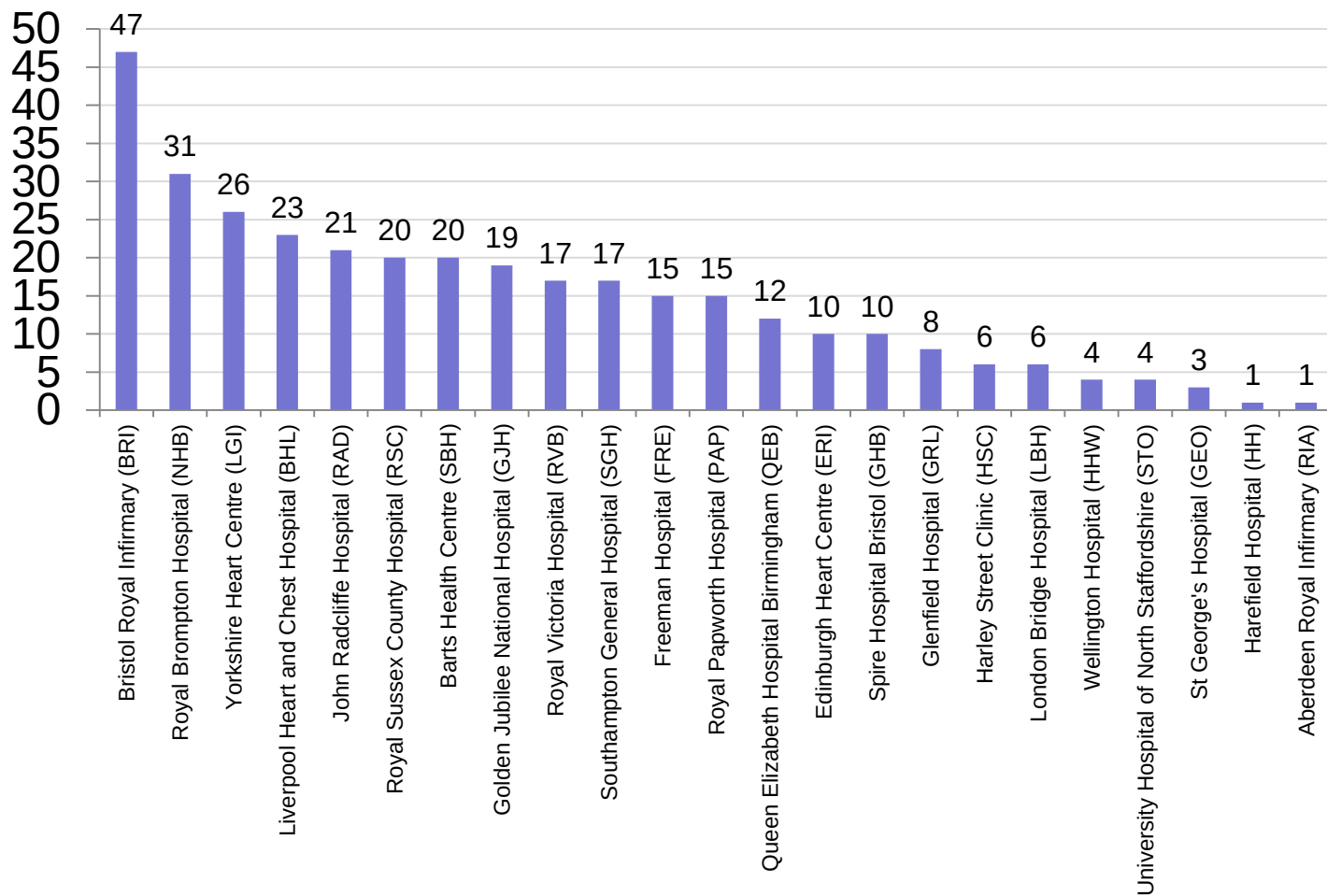


Number of centres: 32



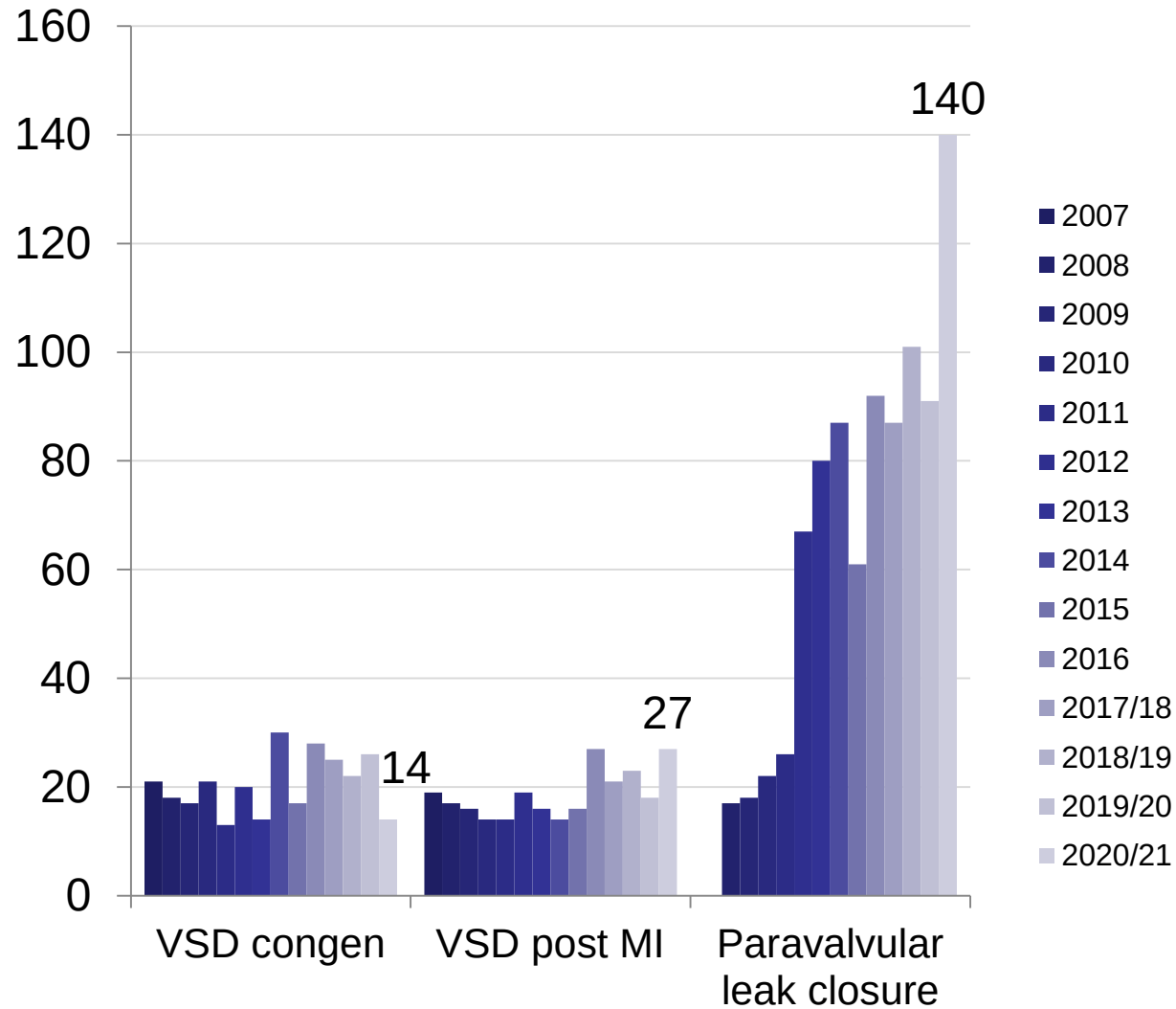
ASD Closure

Procedures in
2020/21



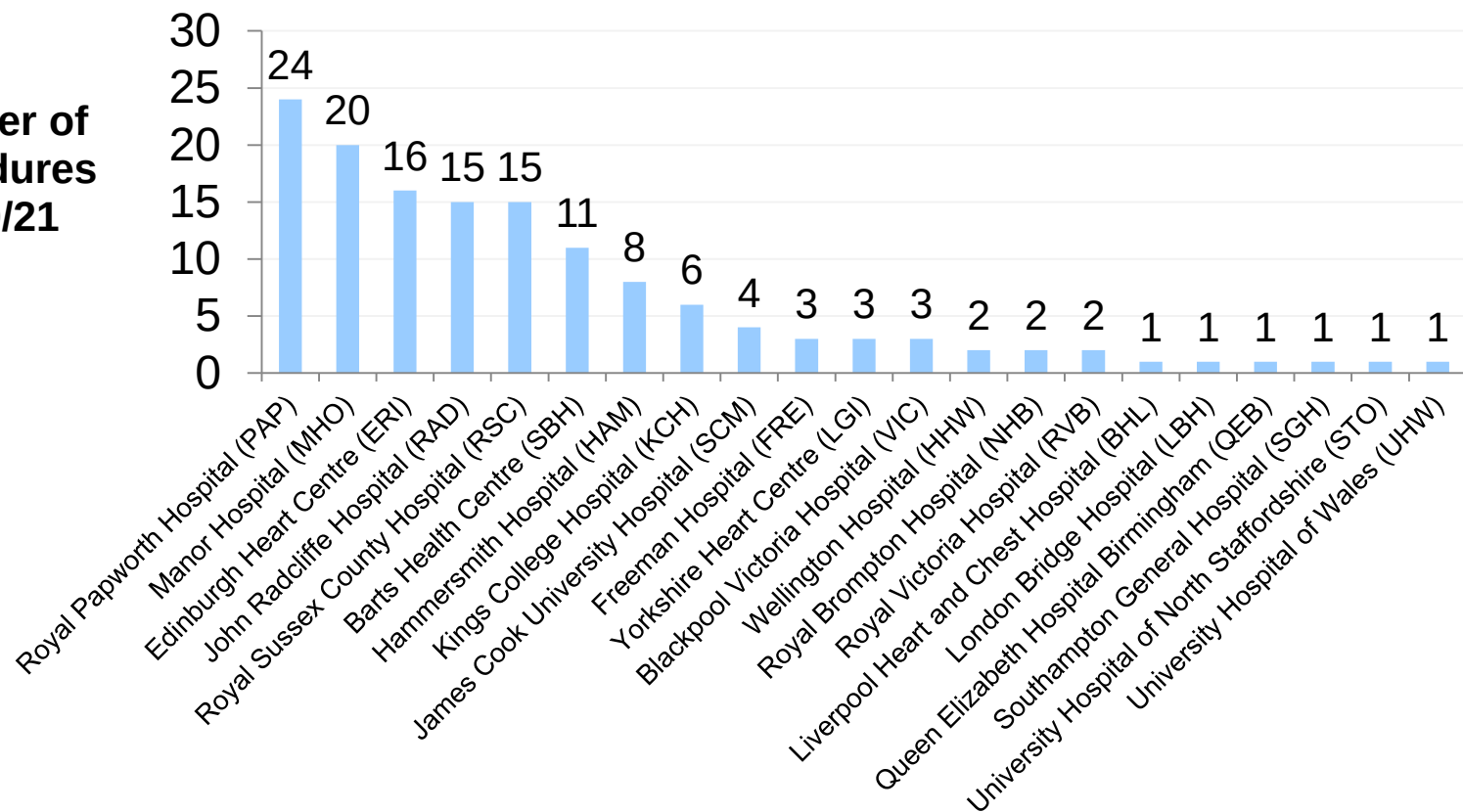
Number of centres: 23

VSDs and Paravalve Leaks



Prosthetic paravalular leak closure

Number of
procedures
2020/21

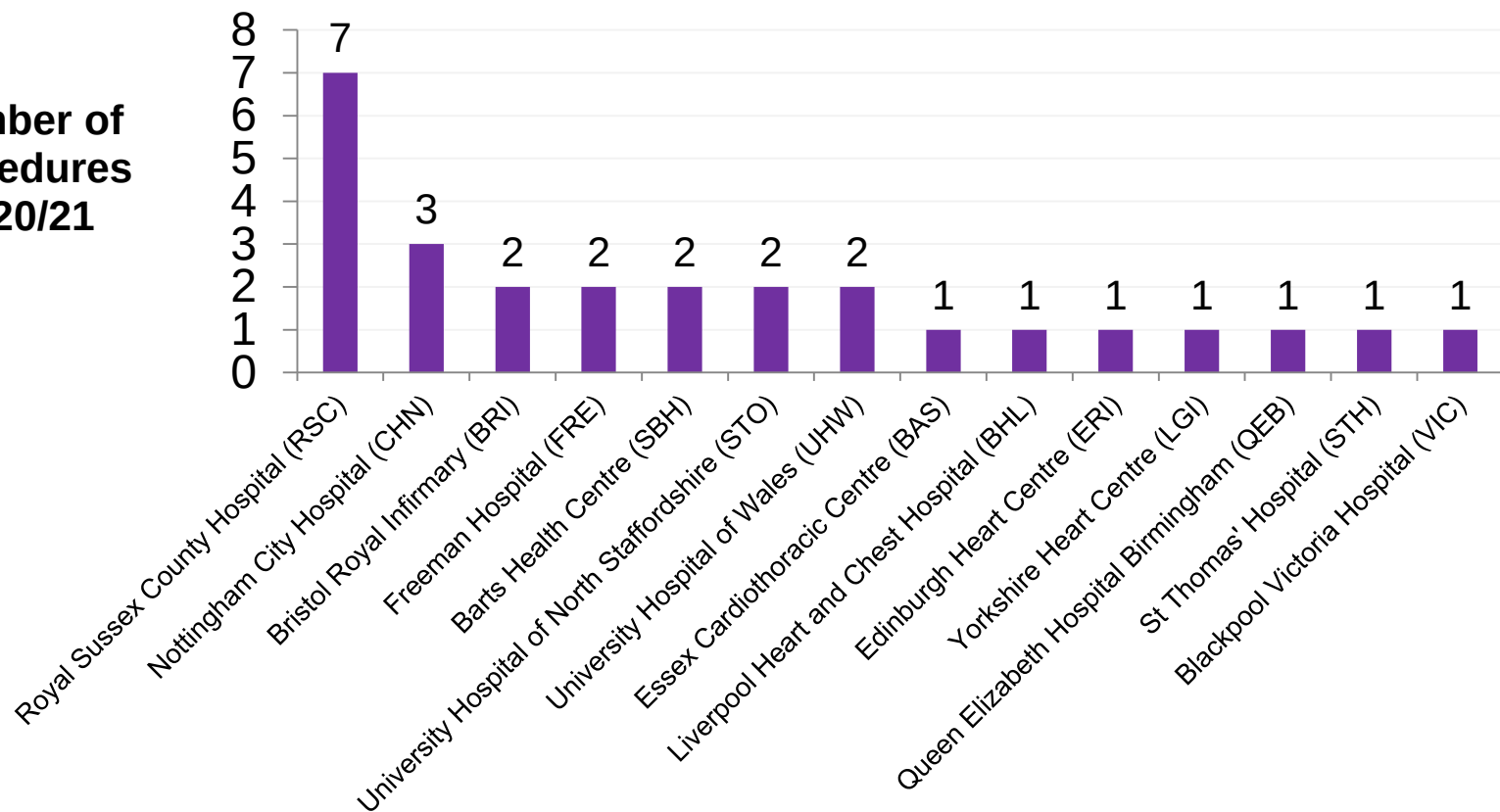


Number of centres: 21

Post Infarct VSD

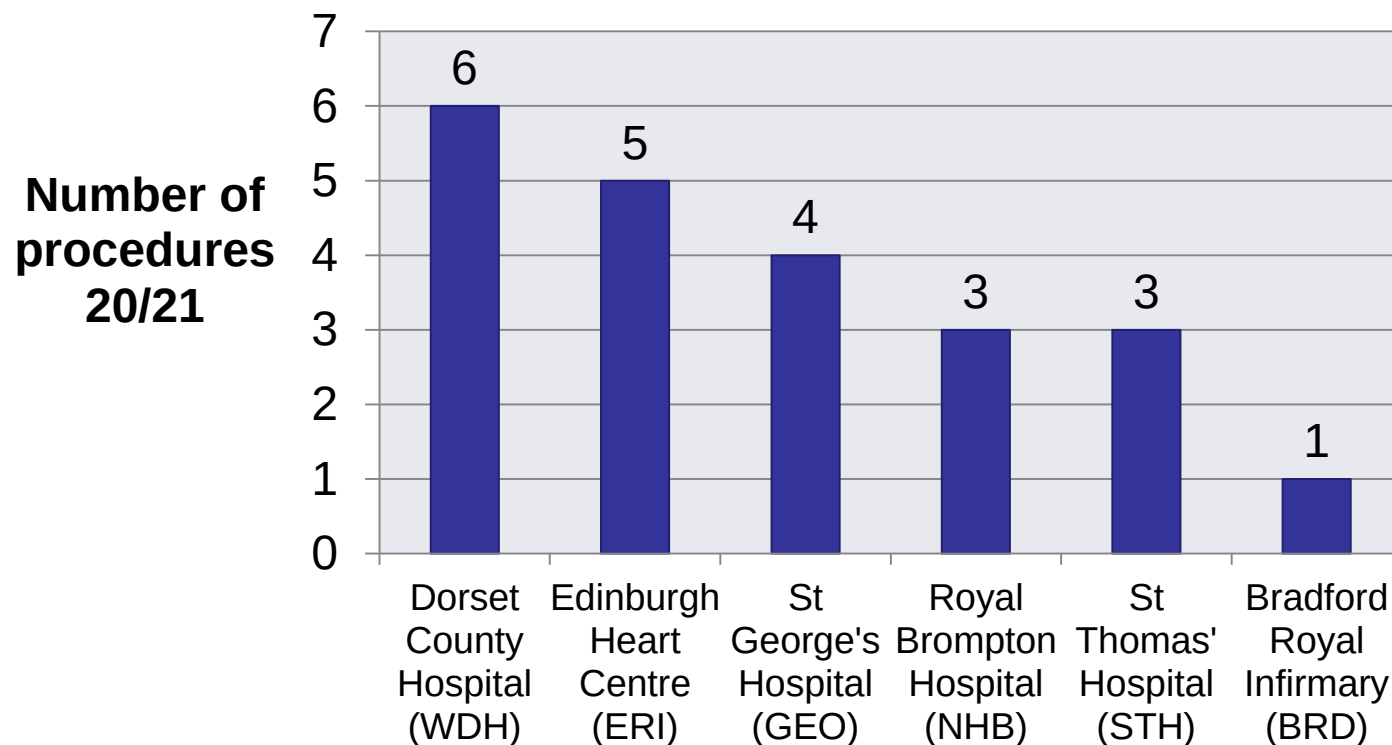
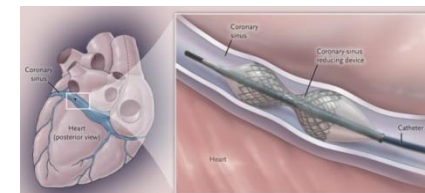
Device closure

Number of
procedures
2020/21



Number of centres: 14

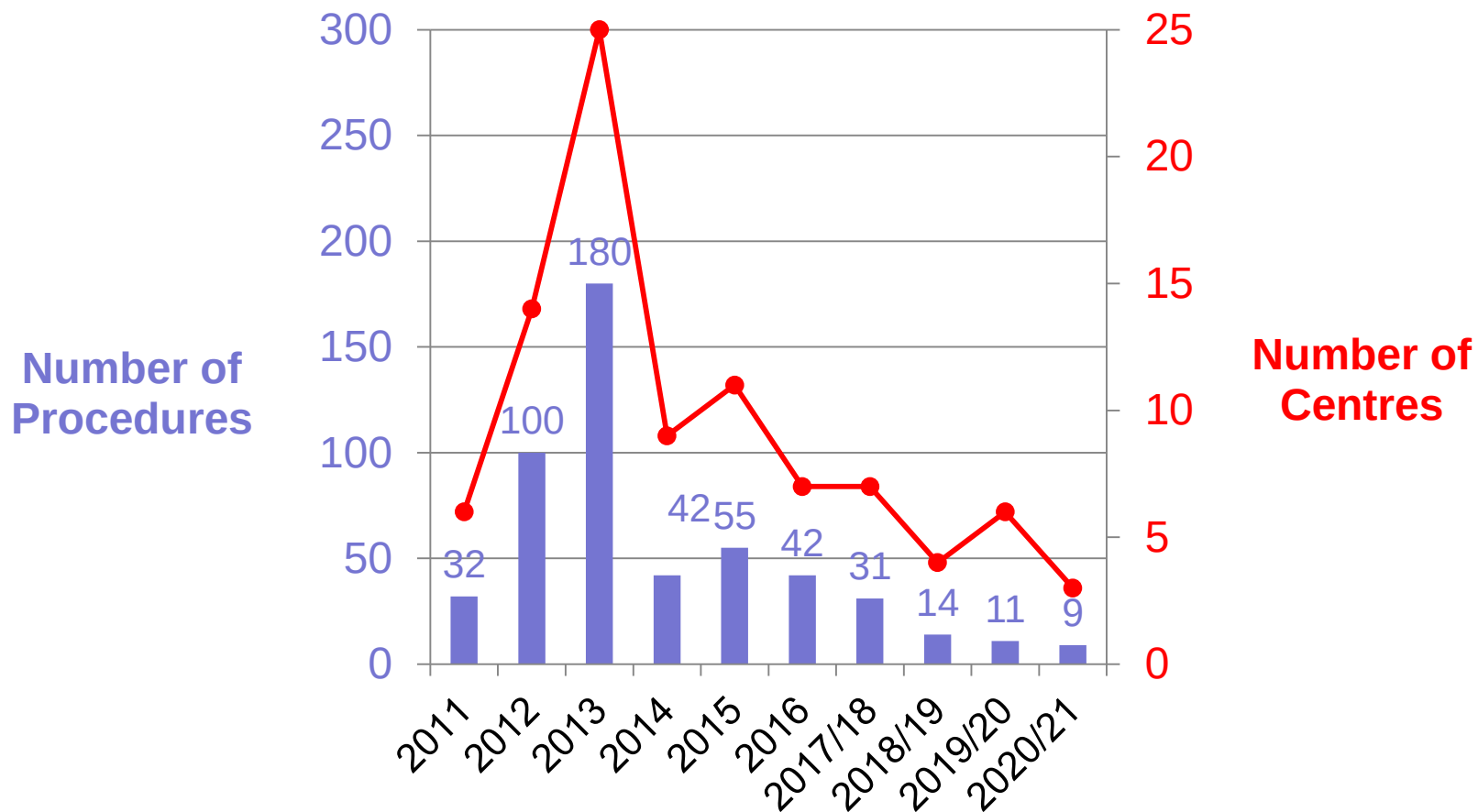
Coronary Sinus Reducer (for refractory angina)



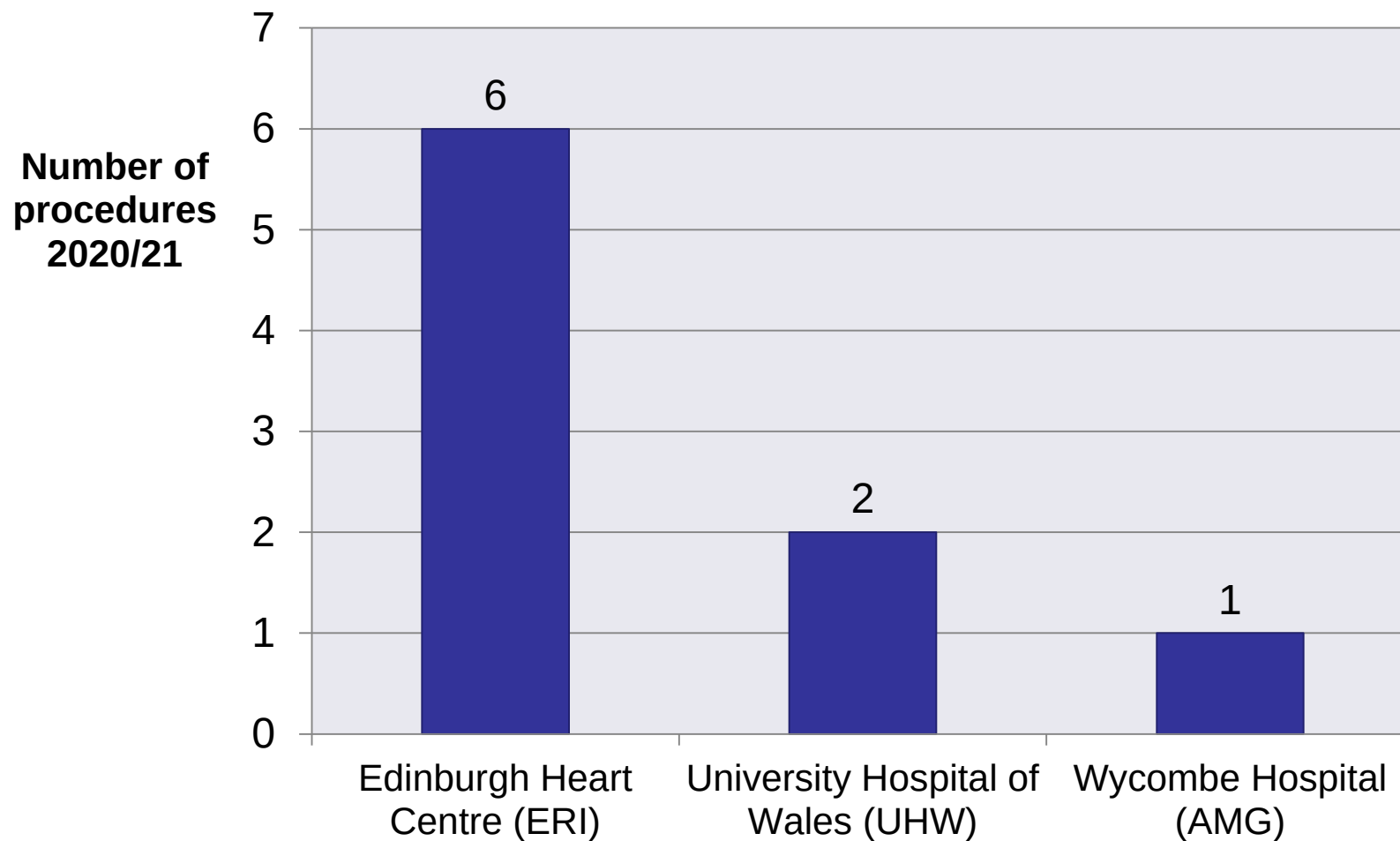
22 procedures in 6 Centres



Renal Denervation



Renal Denervation



Number of centres: 3

NICOR - Update



Please provide username and password to sign in

	Username
	

Login

NICOR

- Barts → NHS E&I
- National data 'opt-out'
- Devolved Nations
- Clinical Outcomes Publication
- Mapping tool

NICOR

- Barts → NHS E&I
- National data 'opt-out'
- Devolved Nations
- Clinical Outcomes Publication
- Mapping tool

NICOR to NHS England & Improvement

- HQIP contact ends June 2022
- NHS E&I bringing CVS registries into the NHS
 - 2 phases
 - ‘Lift and Shift’
 - Transformation

NICOR to NHS England & Improvement

- Transformation process
 - Wish list
 - Improve NICOR funding
 - Professional Societies to remain pivotal in oversight of data collection and analyses
 - Maintain and develop existing benchmarks and reporting
 - More contemporaneous data input and analyses
 - Collect new datasets (edge-to-edge repair, LAAO, etc)
 - Simplify and expand data linkage
 - (e.g. HES, ONS, Stroke, CVS prevention)
 - Simplify data access for audit and research

Devolved Nations

- Professional desire to maintain a UK wide audit / benchmarking program
 - Scotland
 - Political agenda
 - Withdrew from UK wide audit 2020/21
 - Current negotiations about reciprocal data sharing
 - Funding and governance issues
 - Northern Ireland
 - Governance issues
 - Pilot using trusted third party set up to link survival data
 - Aiming to send anonymised linked data
 - Funding issues

NICOR

- Barts → NHS E&I
- National data 'opt-out'
- Devolved Nations
- Clinical Outcomes Publication
- Mapping tool

Mapping Tool

Peter Ludman

DASHBOARD

INTERACTIVE MAPS

ORG Organisation Reports

QI QI Metrics

CR Comparison Reports

USER REPORTS

Organisation Reports

LOGOUT

Organisation Report Form

UPDATE MAP

Domain

Please select domain

PFM based on

Please select condition

Select Map

Please select map

Financial Year

Please select year

Postcode Criteria

Please select criteria

PMP bands (Lowest and Highest)

0

and

1000

United Kingdom Map

Report

Code

Name

#	Population	Total	per million
All gender groups			
Male			
Female			

Hospital Name	All Ages	Male	Female	#
---------------	----------	------	--------	---

Mapping Tool

NICOR

Peter Ludman

DASHBOARD

INTERACTIVE MAPS

OR Organisation Reports

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USER REPORTS

Organisation Reports

Organisation Report Form

Domain

Please select domain

PFM based on

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Select Map

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Financial Year

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Postcode Criteria

Please select criteria

PMP bands (Lowest and Highest)

0

and

1000

United Kingdom Map



Report

Code

Name

#	Population	Total	per million
All gender groups			
Male			
Female			

Hospital Name	All Ages	Male	Female	#
---------------	----------	------	--------	---

Please select domain

TAVI

NAPCI

NACSA

NACRM

NHFA

NCHDA

MINAP

Mapping Tool

The screenshot shows the NICOR Mapping Tool interface. On the left is a dark sidebar with the NICOR logo at the top, followed by the user name 'Peter Ludman'. Below are menu items: DASHBOARD, INTERACTIVE MAPS (highlighted with a red circle), Organisation Reports, QI Metrics, Comparison Reports, and USER REPORTS. The main content area is titled 'Organisation Reports' and contains an 'Organisation Report Form'. This form has several dropdown menus: 'Domain' (with a red arrow pointing to a dropdown menu), 'PFM based on' (with a red arrow pointing to another dropdown menu), 'Select Map', 'Financial Year', and 'Postcode Criteria'. Below these are input fields for 'PMP bands (Lowest and Highest)' with values '0' and '1000'. The bottom section of the interface is split: the left side shows a map of the 'United Kingdom Map' with labels for various regions and cities; the right side is a 'Report' section with a 'Code Name' field, a table for 'All gender groups' (with columns for #, Population, Total, per million), and a table for 'Hospital Name' (with columns for All Ages, Male, Female, #). Two red boxes with arrows highlight specific dropdown options: the first box shows the 'Domain' dropdown with 'NAPCI' selected, and the second box shows the 'PFM based on' dropdown with 'All procedures' selected.

Domain Dropdown:

- Please select domain
- TAVI
- NAPCI**
- NACSA
- NACRM
- NHFA
- NCHDA
- MINAP

PFM based on Dropdown:

- Please select condition
- All procedures**
- CTO for stable PCI
- Elective PCI

Mapping Tool

NICOR

Peter Ludman

DASHBOARD

INTERACTIVE MAPS

OR Organisation Reports

QI QI Metrics

CR Comparison Reports

USER REPORTS

< Organisation Reports

Organisation Report Form

Domain

Please select domain

PfM based on

Please select condition

Select Map

Please select map

Financial Year

Please select year

Postcode Criteria

Please select criteria

PMP bands (Lowest and Highest)

0

and

1000

United Kingdom Map

Report

Code

Name

#	Population	Total	per million
All gender groups			
Male			
Female			

Hospital Name	All Ages	Male	Female	#
---------------	----------	------	--------	---

Please select domain
TAVI
NAPCI
NACSA
NACRM
NHFA
NCHDA
MINAPPlease select condition
All procedures
Isolated AVR
CABG
Elective CABG

Mapping Tool

The screenshot shows the NICOR Mapping Tool interface. The left sidebar contains a navigation menu with the following items: **DASHBOARD**, **INTERACTIVE MAPS** (highlighted with a red circle), **Organisation Reports**, **QI Metrics**, **Comparison Reports**, and **USER REPORTS**. The main content area is titled "Organisation Reports" and contains the "Organisation Report Form".

The form includes the following fields:

- Domain:** A dropdown menu with the following options: TAVI, **NAPCI** (selected), NACSA, NACRM, NHFA, NCHDA, and MINAP.
- PfM based on:** A dropdown menu with the following options: **All procedures** (selected), CTO for stable PCI, and Elective PCI.
- Select Map:** A dropdown menu with the following options: Clinical Commissioning Group, Sustainability Transformation Partnerships Region, Local Health Boards, and Health and Social Care Trusts.
- Financial Year:** A dropdown menu with the following options: **2020/2021** (selected), 2019/2020, and 2018/2019.
- Postcode Criteria:** A dropdown menu with the following options: 0 and 1000.
- PfM bands (Lowest and Highest):** Two input fields, both set to 0.

Below the form is a map of the United Kingdom, showing the following regions: Alba / Scotland, United Kingdom, Belfast, Newcastle upon Tyne, Great Britain, Isle of Man, Leeds, Manchester, Sheffield, England, Cymru / Wales, Éire / Ireland, Cymru / Wales, Birmingham, Cardiff, and London.

Red arrows point from the form fields to callout boxes containing the following text:

- Please select domain**
- Please select condition**
- Please select map**
- Please select year**

Mapping Tool

The screenshot shows the NICOR Mapping Tool interface. The left sidebar contains a navigation menu with 'INTERACTIVE MAPS' highlighted. The main area is titled 'Organisation Reports' and contains an 'Organisation Report Form' with several dropdown menus. Red arrows point from these menus to callout boxes showing their options.

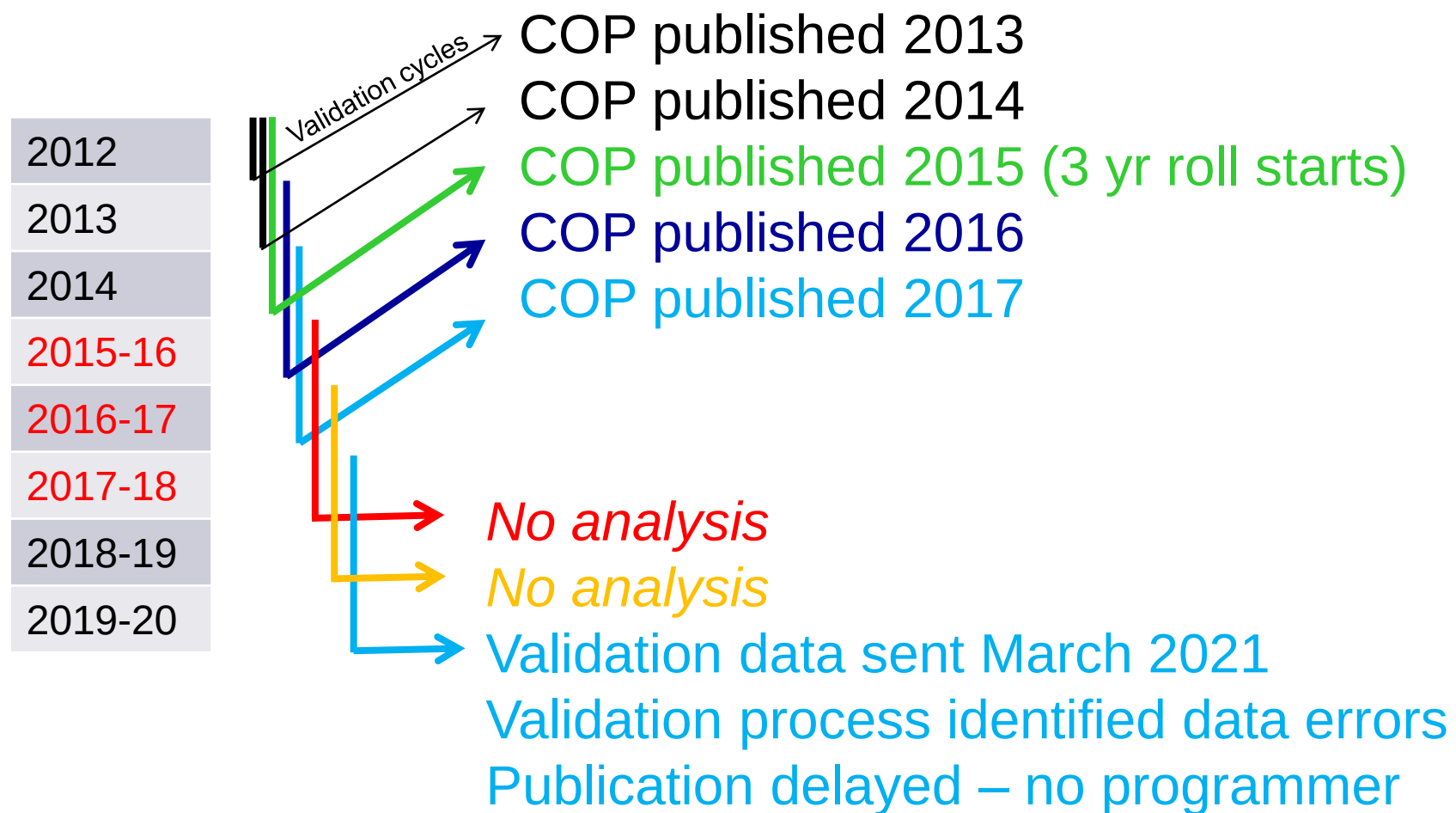
Organisation Report Form

- Domain:** Please select domain
 - TAVI
 - NAPCI**
 - NACSA
 - NACRM
 - NHFA
 - NCHDA
 - MINAP
- PFM based on:** Please select condition
 - All procedures**
 - CTO for stable PCI
 - Elective PCI
- Select Map:** Please select map
 - Clinical Commissioning Group**
 - Sustainability Transformation Partnerships Region
 - Local Health Boards
 - Health and Social Care Trusts
- Financial Year:** Please select year
 - 2020/2021
 - 2019/2020
 - 2018/2019**
- Postcode Criteria:** Please select criteria
- PMP bands (Lowest and Highest):** 0 and 1000

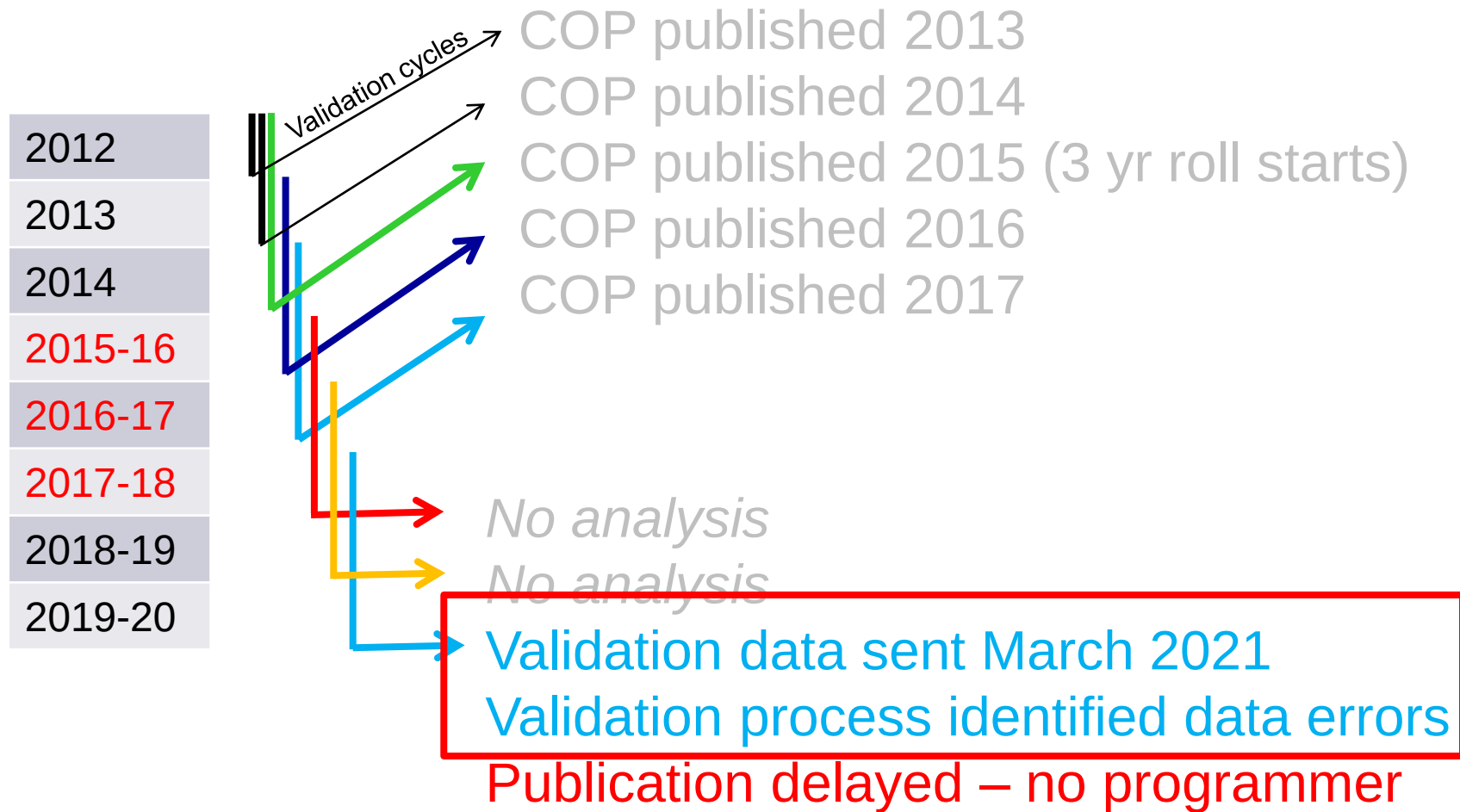
United Kingdom Map

The map shows the United Kingdom with Clinical Commissioning Groups (CCGs) highlighted in blue. A legend indicates the population ranges for the CCGs: 0, 1-150, 150-520, 520-1075, 1075-1445, 1445-2000, and 2000+.

Clinical Outcomes Publication



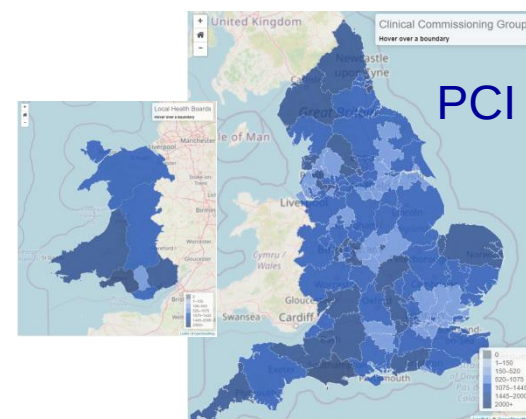
Clinical Outcomes Publication



Summary

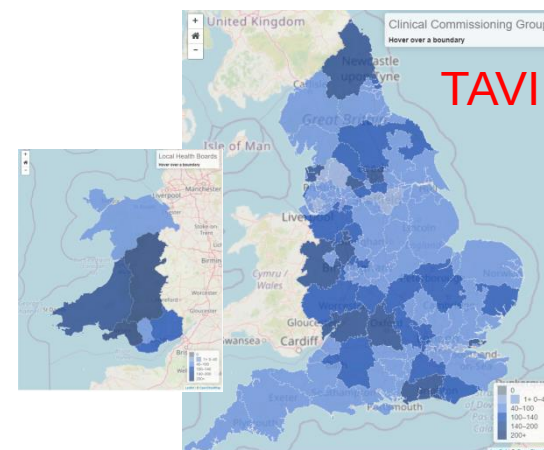
• PCI

- PCI centres ≈ unchanged
- Many COVID-19 related changes
 - Fall in total PCI procedures performed – mainly elective
 - Increased PCI complexity (LMS, No of lesions)
 - Improvement in delays to Rx NSTEMI
 - Further deterioration in Call to Door for PPCI
- Intravascular imaging
 - Increase in use for uLMS
 - No consensus apparent for restenosis or long stented segments



• Structural intervention

- TAVI least affected by COVID, now 100 pmp
- Regional variation in TAVI and in TAVI:SAVR ratios
- Some centres characterised by
 - High GA rates
 - Non TF percutaneous access
 - Increased LOS
- Small increases in Mitral edge to edge, LAAO and PFO



• Future

- NICOR to NHS E&I
- Plans to focus on regional variations in care
- Many challenges ahead

Acknowledgments

- All UK Centres for Survey completion and data upload
- NICOR
 - Developers
 - Sue Manuel, Satya Phanthala
 - Analysis
 - Robin Philip
 - Gabriel Burcea
 - Dr Glen Martin, Senior Lecturer in Health Data Science
 - The Health e-Research Centre, University of Manchester
 - Project Management
 - Sam Perwaiz

Thank You

UK PCI Centre Codes 2020/21



UK PCI Centre Codes 2020/21

AEI	Royal Albert Edward Infirmary (Wigan)	DVH	Darent Valley Hospital
AHM	BMI Alexandra Hospital	EAL	Ealing Hospital
ALT	Altnagelvin Hospital	EBH	Birmingham Heartlands Hospital
AMG	Wycombe Hospital	ERI	Edinburgh Heart Centre
ANT	St Anthony's Hospital	ESU	East Surrey Hospital, Surrey and Sussex NHS trust
BAS	Basildon and Thurrock University Hospitals	FRE	Freeman Hospital
BAT	Royal United Hospital Bath	FRM	Frimley Park Hospital
BED	Bedford Hospital	GEO	St George's Hospital
BHL	Liverpool Cardiothoracic Centre	GHB	Spire Hospital Bristol
BHR	Royal Berkshire and Battle Hospital	GJH	Golden Jubilee National Hospital (formerly HCI)
BLA	Royal Blackburn Hospital	GRL	Glenfield Hospital
BMI	BMI Meriden Hospital	GWE	Royal Gwent Hospital
BOU	Royal Bournemouth Hospital	GWH	Queen Elizabeth Hospital Woolwich
BRD	Bradford Royal Infirmary	HAI	Hairmyres Hospital
BRI	Bristol Royal Infirmary	HAM	Hammersmith Hospital
BRY	Acute Pennine Trust Fairfield	HBP	Spire Hospital Hull and East Riding
BSM	Southmead Hospital Bristol	HH	Royal Brompton Hospital and Harefield NHS Trust, Harefield site
CGH	Conquest Hospital	HHW	Wellington Hospital
CHG	Cheltenham General Hospital	HSC	Harley Street Clinic
CHH	Castle Hill Hospital (Hull and East Yorkshire NHS Trust)	IND	London Independent Hospital
CHN	Nottingham City Hospital	IPS	Ipswich Hospital
CLW	North Wales Cardiac Centre	KCH	Kings College Hospital
CMI	Cumberland Infirmary	KGH	Kettering General Hospital
CRG	Craigavon Hospital	KIM	Kent Institute of Medicine & Surgery
CRO	Cromwell Hospital	KMH	Kings Mill Hospital
DER	Royal Derby Hospital	KSX	Tunbridge Wells Hospital
DGE	Eastbourne Hospital	LBH	London Bridge Hospital
DUC	Duchy Hospital	LDH	Luton and Dunstable University Hospital
DUD	Birmingham City Hospital	LGI	Yorkshire Heart Centre

UK PCI Centre Codes 2020/21

LIN	Lincoln County Hospital	RFH	Royal Free Hospital
LIS	Lister Hospital	RHH	Ross Hall Hospital
LNH	Leeds Nuffield Hospital	RHI	Calderdale Royal Hospital
MAY	Croydon University Hospital	RIA	Aberdeen Royal Infirmary
MDW	Medway Maritime Hospital	RSC	Royal Sussex County Hospital
MHO	Manor Hospital Oxford	RVB	Royal Victoria Hospital
MOR	Morrison Hospital	SAL	Salisbury District Hospital
MPH	Musgrove Park Hospital	SBH	Barts Health Centre, St Bartholomew's Hospital
MRI	Manchester Royal Infirmary	SCM	James Cook University Hospital
NBO	Nuffield Health Bournemouth Hospital	SCU	Scunthorpe General Hospital
NCR	New Cross Hospital	SGH	Southampton General Hospital
NGS	Northern General Hospital	SPC	Spire Cardiff Hospital
NHB	Royal Brompton Hospital and Harefield NHS Trust, Brompton site	SPH	St Peter's Hospital
NHH	Basingstoke and North Hampshire Hospital	SSP	Spire Shawfair Park Hospital
NIN	Ninewells Hospital	STH	St Thomas' Hospital
NOR	Norfolk and Norwich University Hospital	STO	City General Hospital (University Hospital of North Staffordshire)
NPH	Northwick Park Hospital	SUN	Sunderland Royal Hospital
NTH	Northampton General Hospital	TOR	Torbay Hospital
PAP	Papworth Hospital	UHW	University Hospital of Wales
PHB	BMI Priory Hospital	VIC	Blackpool Victoria Hospital
PHN	BMI Park Hospital	WAL	Walsgrave Hospital (University Hospital Coventry)
PIN	Pinderfields General Hospital	WAT	Watford General Hospital
PLY	Derriord Hospital, Southwest Cardiothoracic Centre	WDH	Dorset County Hospital
PMS	Great Western Hospital, Wiltshire Cardiac Centre	WEX	Wexham Park Hospital
QAP	Queen Alexandra Hospital	WHH	William Harvey Hospital, East Kent Hospitals NHS Trust
QEB	Queen Elizabeth Hospital, Birmingham	WMU	West Middlesex University Hospital
RAD	John Radcliffe Hospital	WRC	Worcester Royal Hospital
RAI	Raigmore Hospital	WRG	Worthing Hospital
RCH	Royal Cornwall Hospital	WYT	Wythenshawe Hospital
RDE	Royal Devon & Exeter Hospital	YDH	York District General Hospital

Versions

History of Changes to Slide Set

- 22-04-2022 First version