National Cardiac
Audit Programme

NICOR

National Audit of Percutaneous Coronary Intervention (NAPCI)

2023 Summary Report

(2021/22 data)

BCIS

Contents

Report at a glance

Data from the period April 2021 to March 2022

On the road to recovery with more Percutaneous Coronary Intervention (PCI) procedures (97,765) carried out in 2021/22 compared to last year (90,708), but not back to pre-pandemic levels (100,112). An increase was seen across the UK, except for Scotland, where figures remained unchanged.

PCI activity

Recovery seen in total PCI procedures, but long wait times continue and wide variation across hospitals

2021/22 saw a **16% increase in the number of confirmed heart attacks**, and despite the increase in the number of patients, high rates of PCI were delivered for both STEMI and NSTEMI cases.

Rise in total PCI procedures across the UK (figures do not include Scotland) **8%** in England, **7.7%** in Wales and **12.1%** in Northern Ireland.

Delays continue to worsen. Proportion with Call-To-Balloon (CTB) time of less than 150 minutes fell from **65%** to **55%** with wide variation across hospitals.

The use of intracoronary imaging (ICI) has increased from just under **51%** in 2017/18 to **70.5%** in 2021/22, however there is significant variation between hospitals.

There has been more use of newer antiplatelet agents in primary PCI, with **60%** of primary PCI cases receiving either prasugrel or ticagrelor (**57%** in 2020/21) and an increase in prasugrel use from **14.2%** to **18%** over the same time. There remains wide variation in adoption of newer antiplatelet agents.

Day case PCI

Greater adoption of same day discharge has the potential to improve patient satisfaction, increase bed availability, and reduce hospital costs without increasing adverse patient outcomes. It also reduces exposure to hospital-acquired infections.

71% of elective PCI procedures carried out as a day case, up from **69%** in 2019/20 (though wide variation between hospitals).

Executive summary

This report summarises selected key findings from the National Audit of Percutaneous Coronary Intervention (NAPCI) which is as part of the National Cardiac Audit Programme (NCAP).

It covers the financial year from April 2021 to March 2022, during which the direct impact of the COVID-19 pandemic on cardiovascular services was less severe than the previous year. Nevertheless, healthcare systems around the world continued to face challenges, especially in relation to their capacity.

We have seen a rise in overall PCI activity compared to 2020/21 but not fully to the level seen in 2019/20. Total PCI procedures increased by almost 7,000 to 97,765 in 2021/21. This represents nearly 98% of the 100,112 cases reported in the pre-pandemic year. The number of primary PCIs for patients with ST-elevation myocardial infarction (STEMI) returned to pre-pandemic levels and PCI for other acute coronary syndromes almost did so. However, elective PCI numbers were significantly lower.

The report focuses on several specific quality improvement (QI) metrics for the delivery of PCI services. These are derived from national and/or international standards and guidelines. A number of important metrics reported here which relate to the management of patients with acute coronary syndromes are also included in the joint MINAP/NAPCI Heart Attack report.

Where things worsened / causes for concern		
Significant delays for primary PCI	→	There has been a substantial deterioration in the time taken to undertake primary PCI. The proportion of patients with a Call-To-Balloon (CTB) time of less than 150 minutes fell from 65% to 55%. There was also wide variation amongst centres. Of greatest concern, only 28% of patients requiring an inter-hospital transfer achieved a CTB time of under 150 minutes
Many hospitals need to increase use of ICI	→	Although there has been an improvement in the use of intracoronary imaging (ICI) when undertaking PCI for the unprotected left main stem (LMS), it should be used more widely. The rate has increased from just under 51% in 2017/18 to 70.5% in 2021/22. There is again significant variation between hospitals.

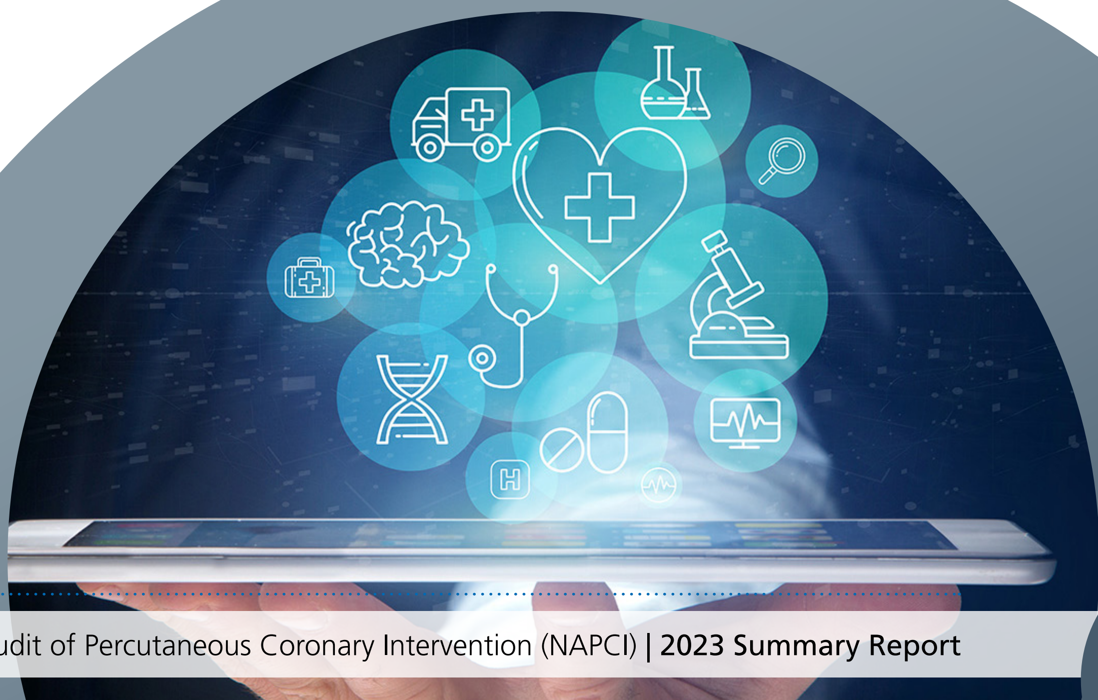
Where things improved / practices changed		
Increase in the proportion of day cases	→	71% of elective PCI procedures were performed as a day case, up slightly from 69% in 2019/20. There remains considerable variation in practice, which cannot be explained by patient characteristics.
More use of newer P2Y12 inhibitors in primary PCI	→	Whilst there has been an improvement in the use of newer antiplatelet agents, with 60% of primary PCI cases receiving either prasugrel or ticagrelor (57% in 2020/21) and an increase in prasugrel use from 14.2% to 18% over the same time period, there remains wide variation in adoption of newer antiplatelet agents. It is hoped that these positive trends will continue to grow.

Summary of recommendations

1. Operators undertaking Left Main Stem PCI should use intracoronary imaging (either IVUS or OCT) to guide interventional strategy and optimise stent expansion and apposition, in line with international consensus statements around best practice.

2. Hospitals should modify their pathways and ward structures to maximise the use of day-case procedures so reducing avoidable overnight stays for patients.

3. Hospitals should review their STEMI protocols to see where improvements can be made in the use of newer antiplatelet agents, in particular prasugrel, during primary PCI.



1. Introduction

This report summarises selected key findings from the National Audit of Percutaneous Coronary Intervention (NAPCI), which is a part of the National Cardiac Audit Programme (NCAP).

It covers the financial year 2021/22, during which the direct impact of the COVID-19 pandemic was markedly reduced compared to the previous year. Nevertheless, there have been significant disruptions to cardiovascular care, with impacts seen in the length of waiting lists and the delivery of important diagnostics. Some of the declines in PCI activity have been reversed, both in elective and acute settings, although elective activity has still not reached pre-pandemic levels.

The report focuses on several specific quality improvement (QI) metrics in relation to the delivery of PCI services derived from national and/ or international standards and guidelines.

The data generated by NAPCI are also used as the basis for a slide deck of comprehensive analyses published as the British Cardiovascular Intervention Society (BCIS) National Audit. This is the full audit report of all adult interventional procedures performed in the UK from 1st April 2021 to 31st March 2022. The report can be found on the BCIS website.

Data from NAPCI is also being combined with data in the Myocardial Ischaemia National Audit Project (MINAP) to create a report that focuses on the care given to individuals admitted to hospital with a heart attack. As optimal care for many patients suffering a heart attack includes a PCI procedure, the time delays to treatment for patients presenting with ST-segment elevation myocardial infarction (STEMI) will be partly covered within this report.

The rest of this report is structured as follows:

- **Section 2** highlights the continuing impacts of the COVID-19 pandemic
- **Section 3** focuses on a small number of Quality Improvement (QI) metrics which should continue to be a priority, either for teams within hospitals or for those leading service commissioning and development at Integrated Care System (ICS) level
- **Section 4** provides some pointers towards the future direction of the audit.

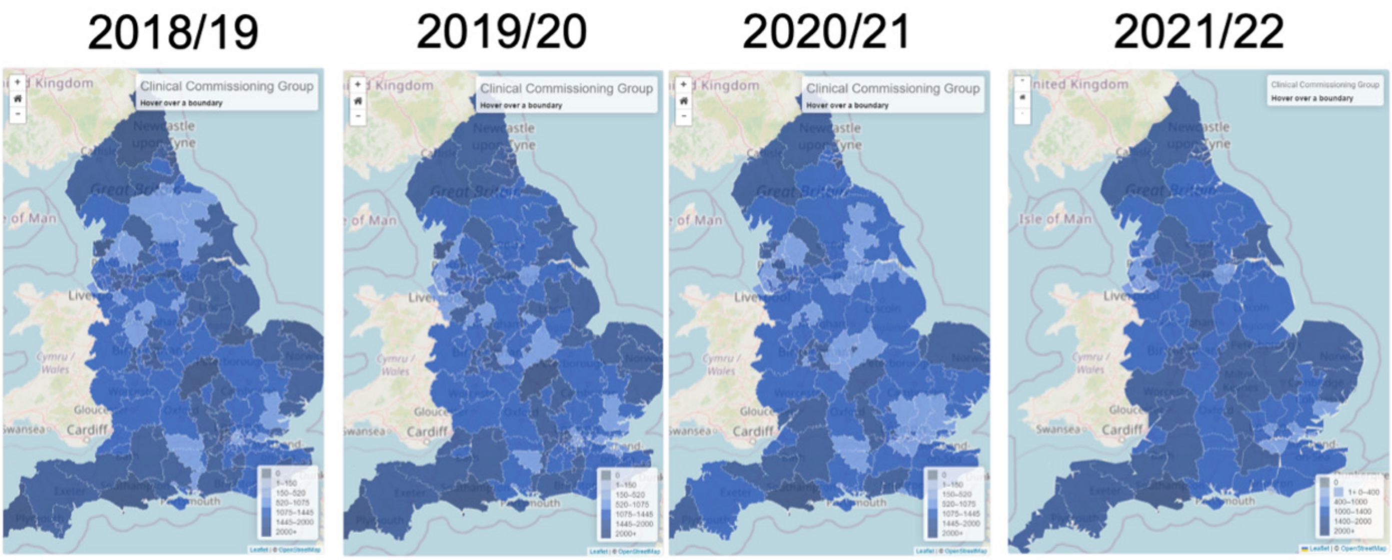
2. Principal impacts of the second year of the COVID-19 pandemic

2.1 PCI activity levels have recovered close to pre-pandemic levels, though with significant variations between CCGs

During 2020/21, there was an increase in the number of PCI procedures performed in the UK compared to the first year of the COVID-19 pandemic. Total PCI procedures increased by almost 7,000 to 97,765 in 2021/21. This represents a return to nearly 98% of the 100,112 cases reported in the pre-pandemic year.

Activity in 2021/22 increased in England to an average of 1,460 procedures per million population (pmp), an 8% increase on the preceding year. Figure 2.1 shows the change in PCI activity levels since 2018/19 for different Clinical Commissioning Groups (CCGs) across the country. In 2021/22, there was significant variation between CCGs, from 2,143 pmp for Sunderland down to 681 pmp for Wirral.

Figure 2.1: PCI per million population by Clinical Commissioning Groups in England 2018/19 to 2021/22 [NAPCI data]



PCI volumes increased in Northern Ireland by 12.1% (to 1,923 pmp), and by 7.7% in Wales (to 1,629 pmp). The figure in Scotland remained unchanged at 1,585 pmp.

Changes in the volume of PCI procedures are not the result of a decline in the number of PCI operators either during or after the COVID-19 pandemic. The number of PCI operators increased from 713 in 2019/20 to 732 in 2020/21 and 752 in 2021/22. However, the average number of cases per operator fell to 106 in 2020/21 (from 122 the year before) and rose only slightly to 109 in 2021/22.

As highlighted in a NICOR 2021 report, this is likely to have been driven by patients avoiding hospitalisation during the pandemic and from reductions in capacity at the hospital level, particularly during the spikes of COVID-19 admissions (as shown in Figure 2.2). The greatest impact on PCI activity was seen during the first wave.

Figure 2.2: Total PCI procedures in England and Wales by month, against number of monthly UK COVID-19 admissions, 2021/22 [NAPCI and UKHSA data[1]]

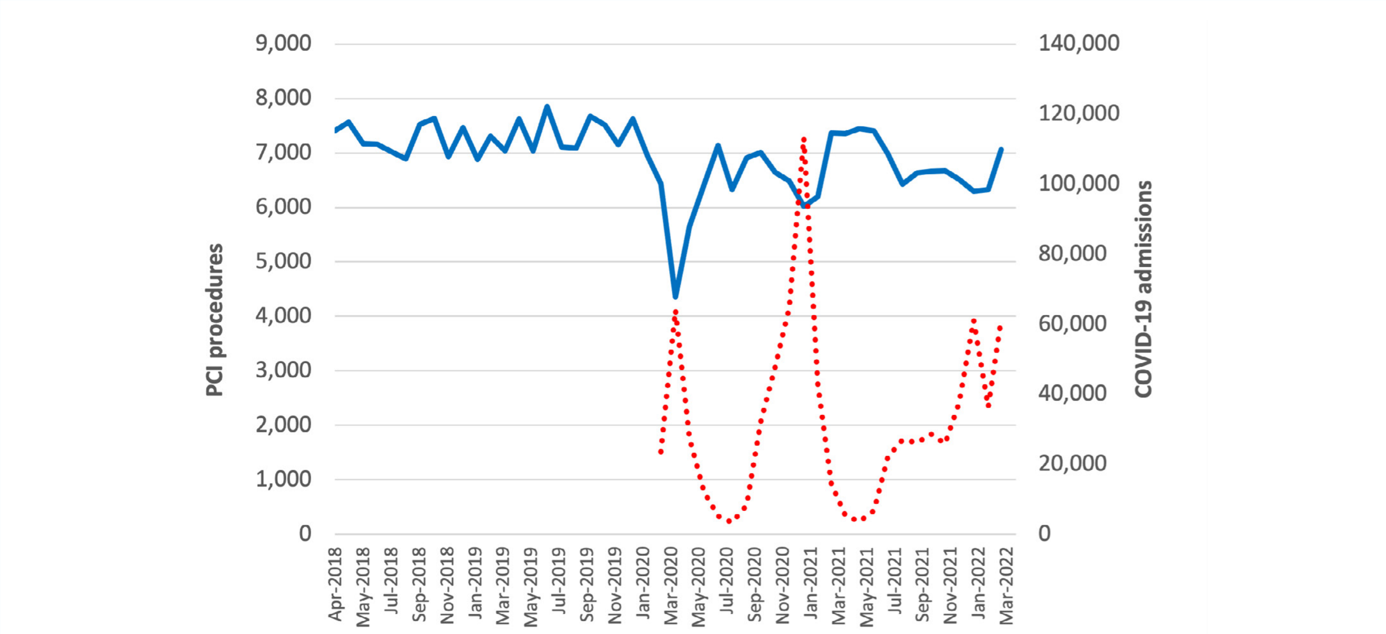
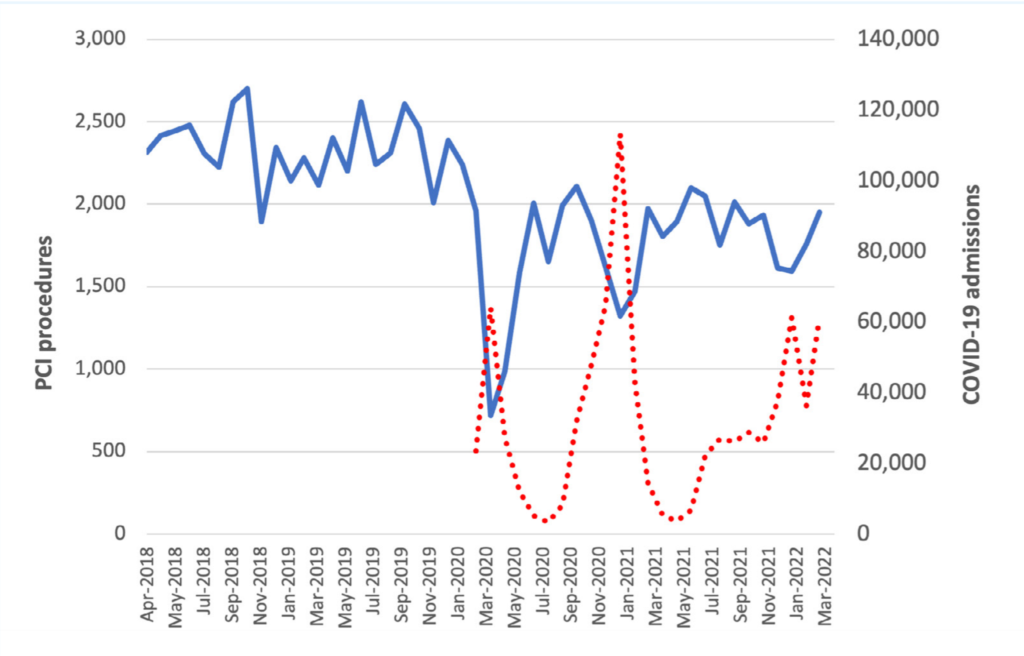
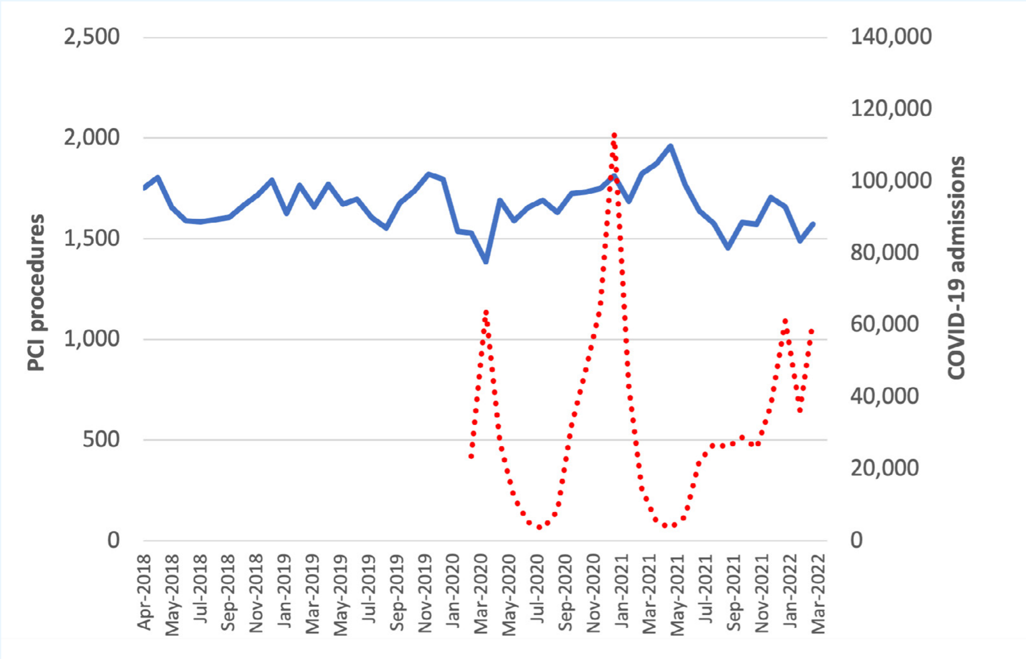


Figure 2.3: Elective PCI procedures in England and Wales by month, against number of monthly UK COVID-19 admissions, 2021/22 [NAPCI and UKHSA data]



The decrease in PCI activity was most evident in elective PCI activity. Each peak in COVID-19 admissions saw an associated fall in procedure numbers, although the decreases in activity was most severe during the first wave [Figure 2.3]

Figure 2.4: **Primary PCI procedures in England and Wales by month, against number of monthly UK COVID-19 admissions, 2021/22 [NAPCI and UKHSA data]**

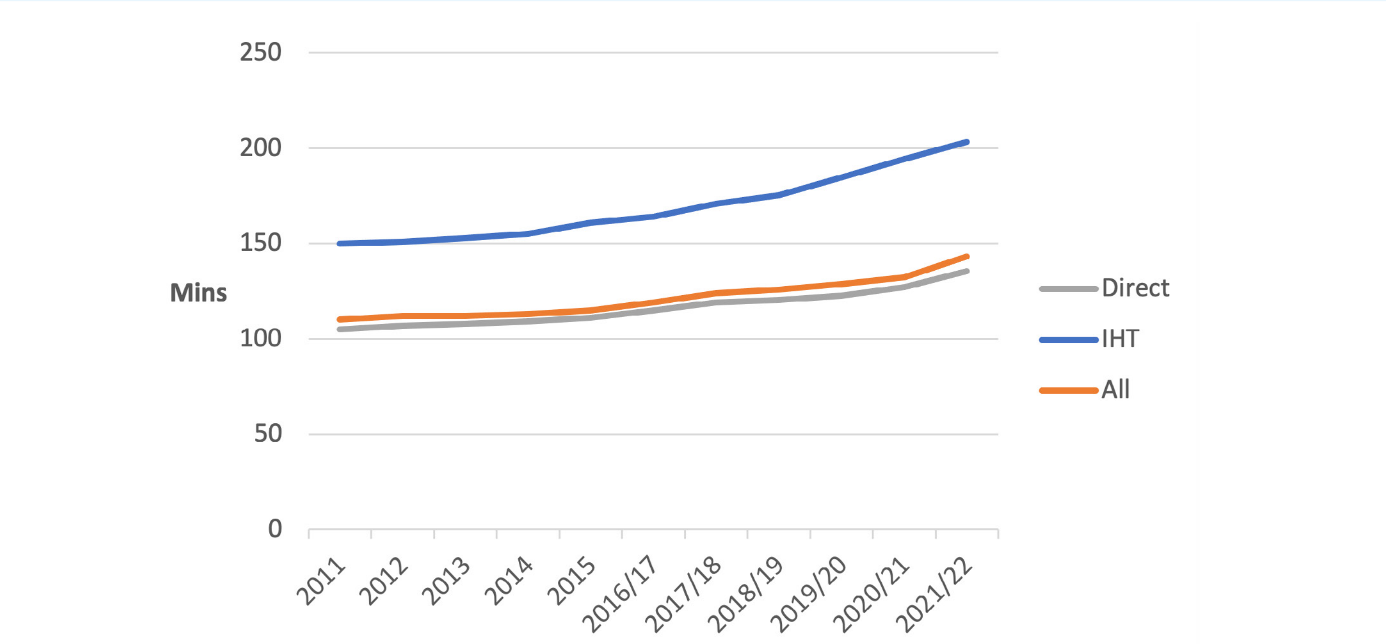


For primary PCI the changes in activity, particularly after the first wave, were less evident with no clear relationship between primary PCI activity and COVID-19 admissions [Figure 2.4].

2.2 The time taken before primary PCI treatment of those with heart attacks continues to increase

Call-To-Balloon (CTB) times for primary PCI have been steadily increasing over the last 12 years but have seen a marked jump in 2021/22 [Figure 2.5]. The median time had lengthened from a median of 112 minutes in 2013 to 129 minutes by 2019/2020. During the first year of the COVID-19 pandemic (2020/21), this increased to 132 minutes and rose substantially in 2021/22 to 143 minutes.

Figure 2.5: Median Call-To-Balloon time (minutes) for primary PCI, 2011 - 2021/22 [NAPCI data]



Direct = direct admissions; IHT = inter-hospital transfer; Mins = minutes

Patients suffering a heart attack and needing to undergo a primary PCI procedure can be admitted directly to a PCI-capable heart attack centre either via ambulance (direct transfer) or by self-presentation from the community or can be transferred via ambulance to one of these having initially presented at a hospital that does not offer the procedure (inter-hospital transfer). The proportion of cases admitted directly to a heart attack centre in 2021/22 remained steady at around 81%.

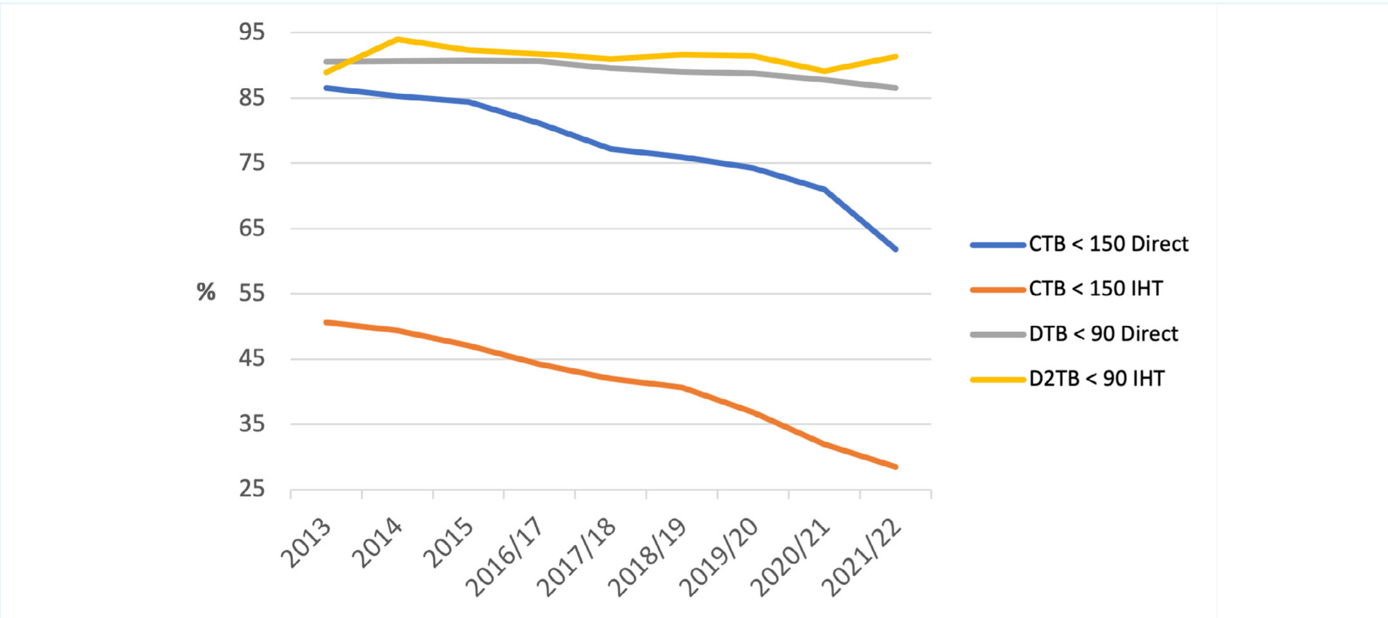
The greatest increase in CTB times was for patients requiring inter-hospital transfer (IHT). The median CTB times for these cases in 2019/20 was 185 minutes, 195 minutes in 2020/21 and 203 minutes in 2021/22. This compares with CTB times for direct transfer (DT) cases of 122 minutes in 2019/20, 127 minutes in 2020/21 and 135 minutes in 2021/22.

For those going directly to the PCI centre, 62% met the target of being treated in less than 150 minutes (compared with 71% in 2020/21 and 74% in 2019/20) [Figure 2.6]. Only 28% of IHT cases met this target in 2021/22 (down from 37% in 2019/20 and 32% in 2020/21).

Door-To-Balloon (DTB) times did not change as significantly as CTB, with the overall median DTB time increasing from 39 minutes in 2019/20 to just under 42 minutes in 2021/22. For direct admissions, the DTB time increased from 39 minutes in 2019/20 to 42 minutes in 2021/22. IHT cases experienced a much larger increase, reaching almost 48 minutes in 2021/22, up from 37 minutes in 2019/20.

The proportion of IHT cases with a DTB time of less than 90 minutes has remained relatively stable at around 90% over the past 3 years. For direct admissions, the proportion has fallen slightly from 89% to 86%.

Figure 2.6: Proportion of cases (%) of primary PCI with a Call-To-Balloon and Door-To-Balloon time of <150 and <90 minutes respectively, stratified by mode of admission, 2013 - 2021/22 [NAPCI data]



CTB = Call-To-Balloon; DTB = Door-To-Balloon; D2TB = PCI centre Door-To-Balloon for IHT cases; IHT = inter-hospital transfer

3. Selected quality improvement metrics

3.1 Use of intracoronary imaging for left main stem (LMS) PCI is improving but still suboptimal

3.1.1 Overview of QI Metric: The use of intracoronary imaging to guide PCI of left main stem lesions

QI Metric Description/Name	The use of intracoronary imaging (ICI) to guide PCI of left main stem lesions
Why is this important?	The use of intracoronary imaging assists in planning the PCI procedure, guiding which branches are to be treated with a stent and allows for the optimal deployment of stents during LMS PCI. Intracoronary imaging is associated with fewer acute and longer-term complications and improves outcomes.
QI theme	Safety and Outcomes.
What is the standard to be met?	Intracoronary imaging should be used in more than 75% of PCI procedures of the unprotected LMS.
Key references to support the metric	See reference list.[2 3 4] 2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularisation[5] Class 2a, level of evidence B-R 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 Class 2a, Level of evidence B-R In patients undergoing coronary stent implantation, OCT is a reasonable alternative to IVUS for procedural guidance, except in ostial left main disease

QI Metric Description/Name	The use of intracoronary imaging (ICI) to guide PCI of left main stem lesions
Numerator	All PCI procedures to treat LMS stenosis in patient without prior bypass grafts, on which either intravascular ultrasound or optical coherence tomography has been used. This is defined as: A PCI (3.11 lesions attempted >0), AND LMS – defined as '3.09 vessel attempted =2.Lmain' AND protected LMS defined as '5.25 Left Main protected = 1.' AND either IVUS (3.19 option 1) OR OCT (3.19 option of 6) is selected.
Denominator	All PCI procedures to treat LMS stenosis in patient without prior bypass grafts. Defined as: A PCI (3.11 lesions attempted >0), AND LMS – defined as '3.09 vessel attempted =2.Lmain' AND protected LMS defined as '5.25 Left Main protected = 1.'
Trend	Unprotected LMS PCI accounted for 4% of all PCIs performed in 2021/22. There has been a slow improvement in the use of intracoronary imaging from 50.7% in 2017/18 to 70.5% in 2021/22 [Figure 3.1].
Variance	Wide differences in practice between hospitals are documented with a number of units performing intravascular imaging in <50% of LMS PCI [Figure 3.2 and Figure 3.3].

The left main stem (LMS) coronary artery supplies blood to the left ventricle and left atrium. Patency of the left main stem is therefore critical as it provides the blood supply to most of the heart. Abrupt occlusion of the left main stem is almost always fatal.

In treating the LMS by PCI, the risk of complications that occur during the procedure or over the longer-term, such as stent thrombosis or restenosis, should be minimised by ensuring that the stent is well expanded and well opposed to the vessel wall.

Furthermore, there are choices about which PCI techniques are used in treating the LMS, in part determined by the disease distribution and the nature of the coronary artery disease. This is often difficult to assess from coronary angiography so intracoronary imaging can help define both disease distribution and characteristics of the coronary lesions. This helps guide how the lesion can be prepared prior to stenting, the number of stents to be used and the appropriate stenting technique.

Intracoronary imaging with ultrasound (intravascular ultrasound or IVUS) and laser (optical coherence tomography or OCT) provides a large amount of additional information. Both these tools offer detailed images from within the coronary artery, including assessment of the vessel wall, its size and tissue characteristics. This includes characteristics of any atheroma and whether there is calcium deposition that may need better preparation with different techniques that allow the stent to expand optimally.

Intracoronary imaging also enables detailed images of how well the stent has expanded and whether the stent struts are in contact with the wall. Suboptimal stent deployment and/or expansion is often difficult to identify on angiography alone, and angiography cannot determine whether the stent struts are in contact with the wall. This helps guard against the risk of potentially fatal vessel occlusion and reduces the risk of longer-term restenosis necessitating further procedures (including further PCI or coronary artery bypass grafting).

A number of trials and meta-analyses have shown a reduction in clinical events such as mortality, stent thrombosis and repeat revascularisation when intracoronary imaging is used to guide PCI, particularly in the LMS. A recent publication derived from the NAPCI audit has shown that intracoronary imaging is associated with a 30% decrease in mortality at 1-year following LMS PCI.[2] More recently, the European Association of Percutaneous Coronary Intervention, a group of the European Society of Cardiology, has published a consensus statement recommending the use of intracoronary imaging as best practice in complex PCI cases, including LMS PCI.[3 4] This recommendation is also now part of the latest guidelines for coronary artery revascularisation from the American College of Cardiology and American Heart Association.[5]

3.1.2 Audit results

Figure 3.1: Use of intracoronary imaging (%) by IVUS or OCT during LMS PCI procedures, 2017/18 - 2021/22 [NAPCI data]

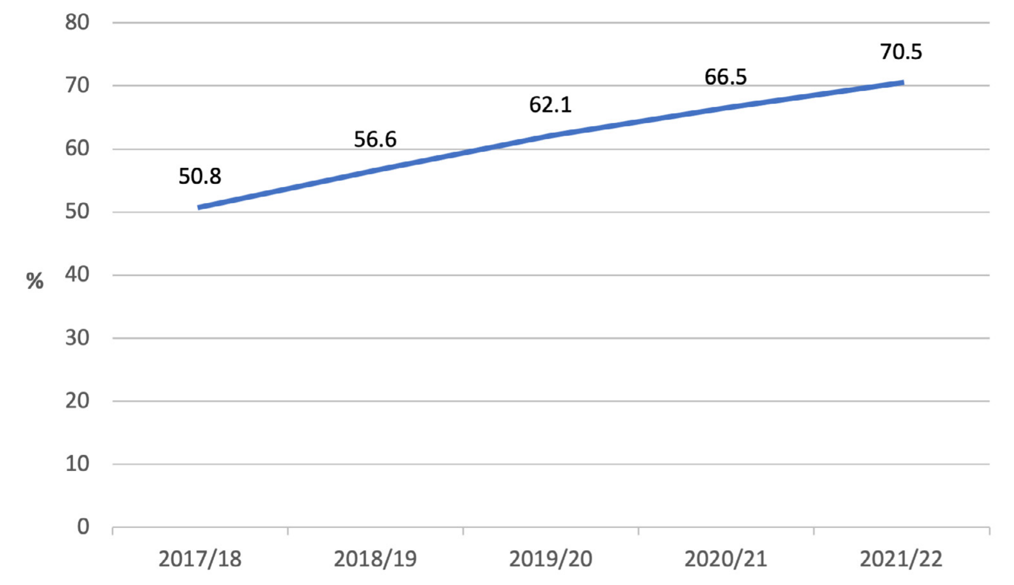
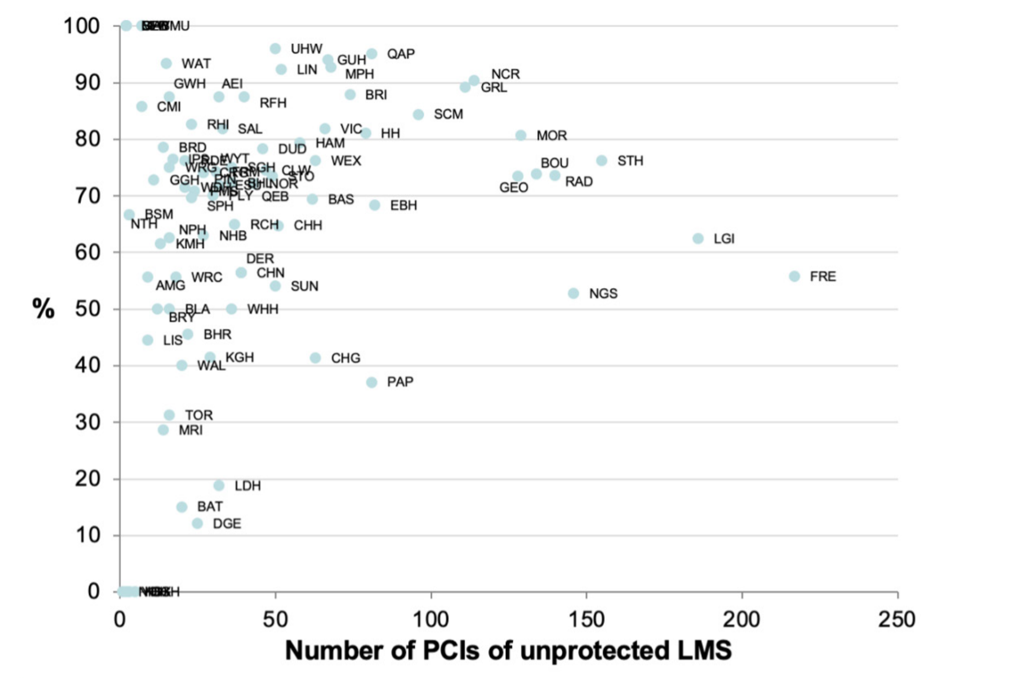
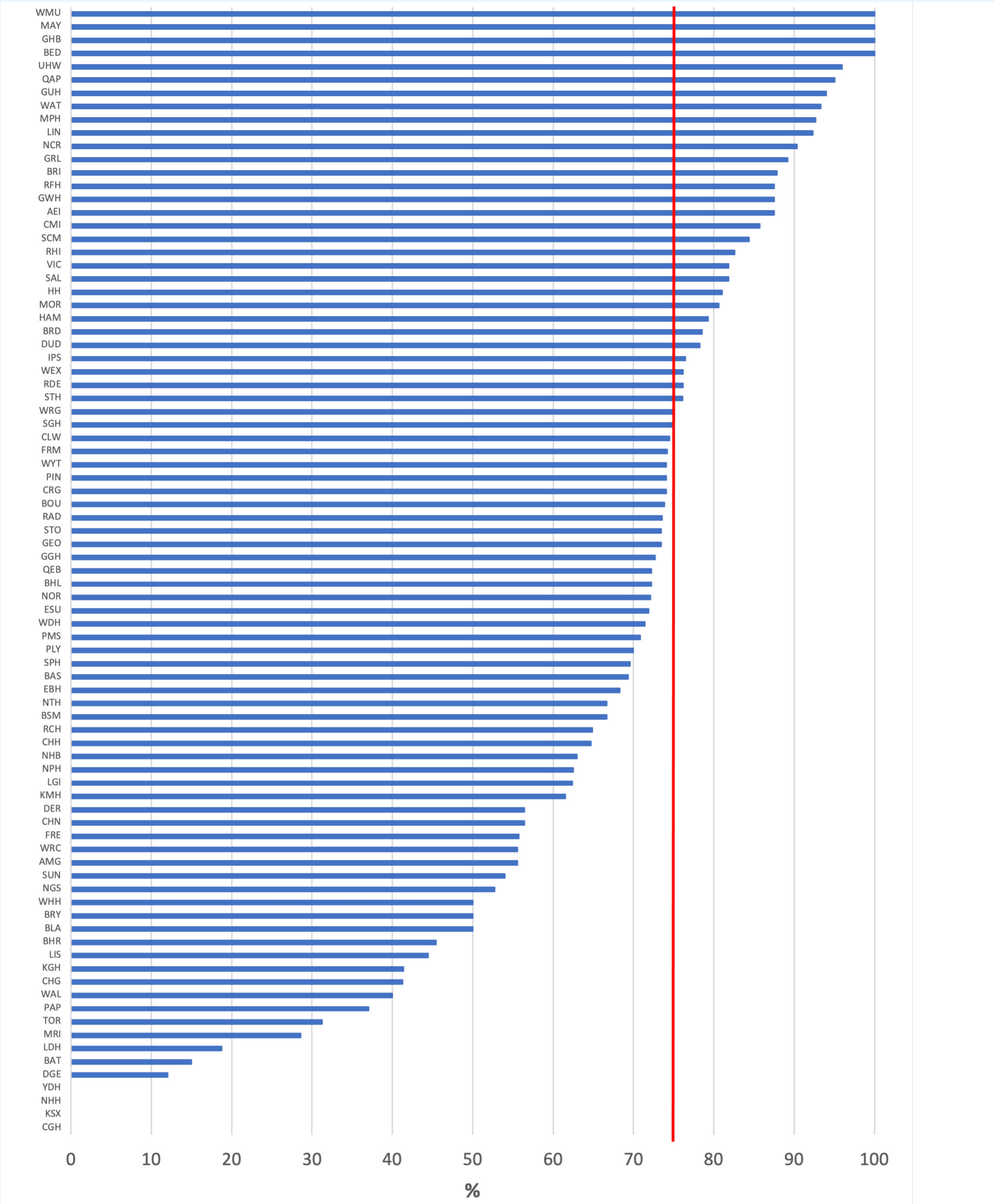


Figure 3.2: Scatter graph to show inter-hospital variance in use (%) of intracoronary imaging by IVUS or OCT for LMS PCI procedures, 2020/21 [NAPCI data]



See end of report for site codes

Figure 3.3: **Use of intracoronary imaging (%) by IVUS or OCT for LMS PCI, by hospital in rank order, 2021/22 [NAPCI data]**



Hospitals whose values are to the left of the red line do not perform intravascular imaging in >75% of LMS PCI procedures. See end of report for site codes.

3.1.3 Recommendations for those not achieving the standard

Operators undertaking Left Main Stem PCI should use intracoronary imaging (either IVUS or OCT) to guide interventional strategy and optimise stent expansion and apposition, in line with international consensus statements around best practice.

3.2 Day case PCI should become more commonly utilised

3.2.1 Overview of QI metric

QI Metric Description/Name	Proportion of patients treated by PCI for stable symptoms who are treated as a day case
Why is this important?	Improved patient experience and cost savings.
QI theme	Effectiveness.
What is the standard to be met?	>75% as day cases The BCIS Domain Expert Working Group recommended that >75% of PCI procedures performed electively for stable symptoms should be discharged on the same day as the procedure.
Key references to support the metric	References in text below are in reference list at end of report.[6,7,8,9,10]
Numerator	Day case procedure for PCI for stable elective patients defined as: 2.03 Procedure Urgency = 1. Elective & 3.11 Number of lesions attempted >0 AND 3.01 Date and time of operation = same DATE as 4.04 Discharge Date.
Denominator	PCI for stable elective patients defined as: 2.03 Procedure Urgency = 1. Elective & 3.11 Number of lesions attempted >0.
Trends	There has been an increase in day case elective work over the last four years from 63.8% in 2018/19 to 71.4% in 2021/22 [Figure 3.4].
Variance	This audit has demonstrated that there is significant variation in day case rates, with some centres performing day case PCI in almost all elective cases, and some where almost all patients are kept in overnight following their procedure [Figure 3.5, Figure 3.6].

When PCI was first introduced, the first few hours after the procedure saw serious complications occur in about 5% of cases. This required emergency intervention including surgery. As a result, all patients were kept in hospital overnight and monitored carefully. However, it is now a much safer treatment as a result of developments including the use of stents, anti-platelet agents and radial artery access. More contemporary data from observational studies have shown that complications following elective PCI occur early either in the first 4 hours or long after 24 hours. Monitoring of patients overnight would not be within the timeframe to capture such complications.

The safety of same-day discharge following uncomplicated PCI for stable symptoms has been demonstrated in several randomised trials,[6] and through analyses of the audit dataset across a broad range of indications for PCI.[7 8 9 10] Greater adoption of same-day discharge has the potential to save money, improve patient satisfaction and increase bed availability, all without an impact on patient safety. This is particularly relevant in the COVID era, where same-day discharge would minimise any potential exposure to hospital acquired infections, particularly in periods when COVID-19 admissions increase.

3.2.2 Audit results

Figure 3.4: Mean percentage of elective PCI patients treated as Day Cases, 2018/19 - 2021/22 [NAPCI data]

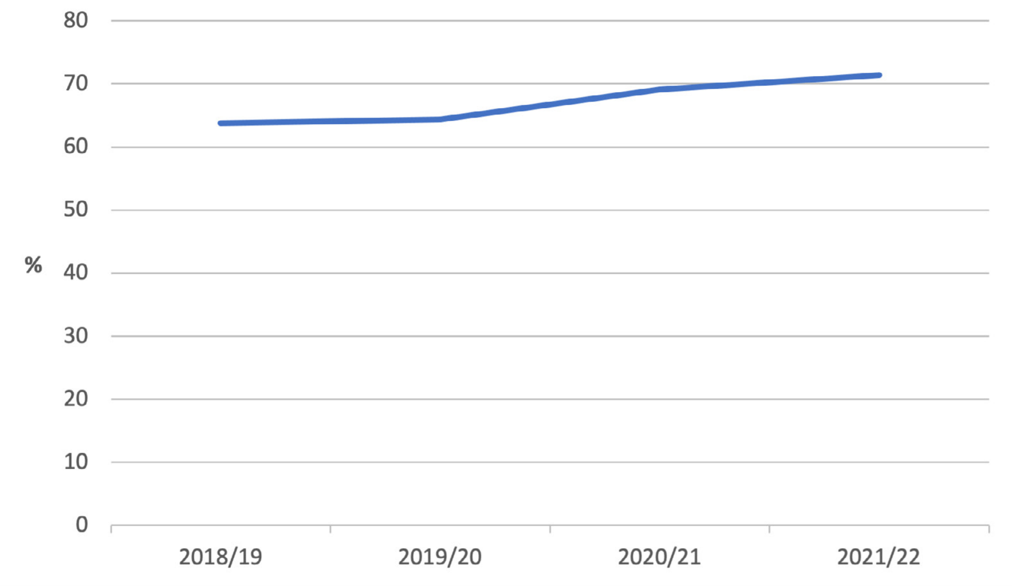
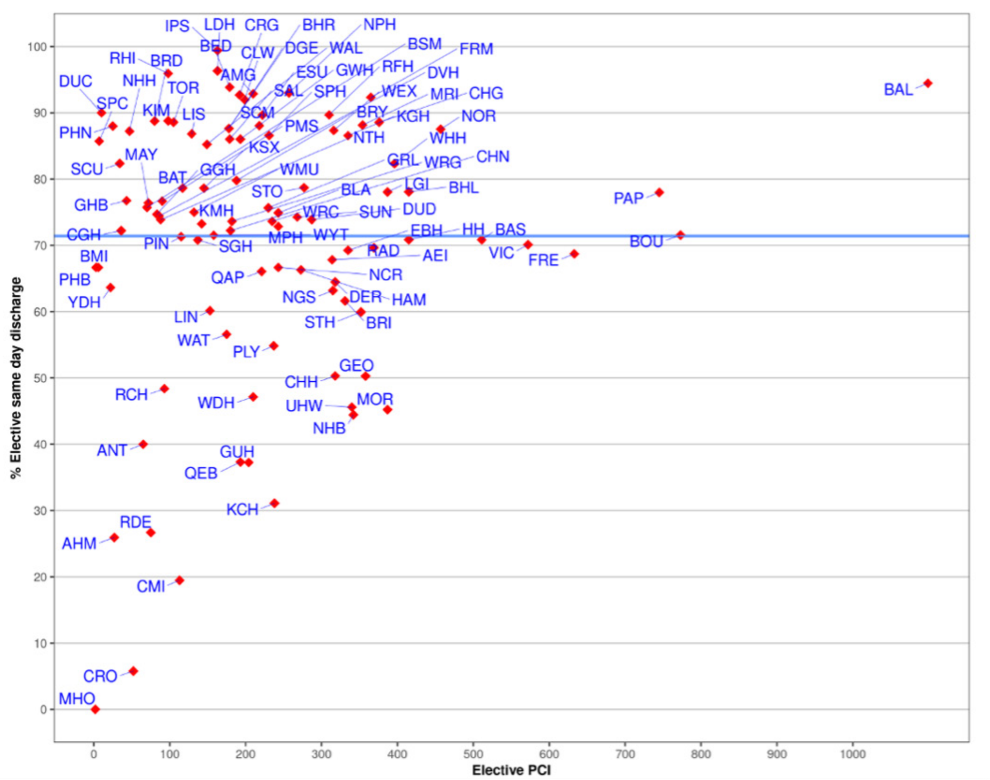
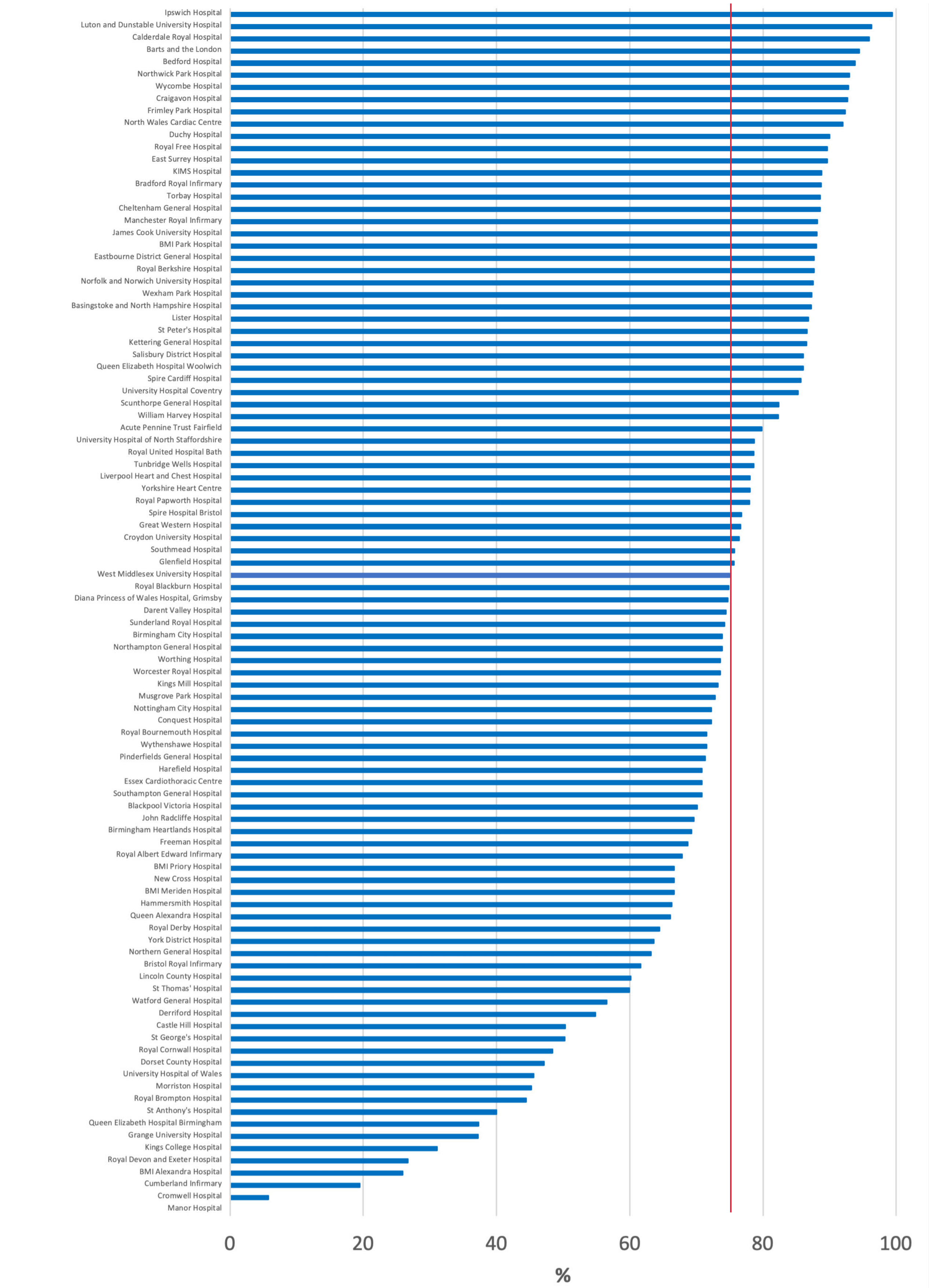


Figure 3.5: Scatter graph showing proportion of elective PCI performed as a day case by hospital, according to overall hospital PCI activity, 2021/22 [NAPCI data]



See end of report for site codes.

Figure 3.6: Percentage of elective PCI cases performed as a day case by hospital, 2021/22 [NAPCI data]



Hospitals whose values are to the left of the red line do not perform PCI as a day case in >75% of elective PCI procedures.

3.2.3 Recommendations for those not achieving the standard

Hospitals should modify their pathways and ward structures to maximise the use of day-case procedures so reducing avoidable overnight stays for patients.

3.3 Increased utilisation of newer P2Y12 antiplatelet agents during PPCI, although still room for improvement

3.3.1 Overview of QI metric

QI Metric Description/Name	Utilisation of newer P2Y12 antiplatelet agents during Primary PCI
Why is this important?	Antiplatelet agents are one of the cornerstones for the treatment of heart attacks. They make platelets in the blood less sticky, reducing the risk of them clumping together to form blood clots. Antiplatelet agents are also used following PCI to reduce the risk of clots developing within the stents. Two different types of antiplatelet are used, aspirin and a P2Y12 inhibitor. Traditionally the P2Y12 inhibitor that has been used is clopidogrel, although more recently large trials (TRITON-TIMI 38[11] and PLATO[12]) have shown that newer antiplatelet agents such as prasugrel and ticagrelor are associated with better clinical outcomes following PCI for acute coronary syndromes including ST-elevation myocardial infarction. A recent trial ISAR REACT 5[13] has shown better outcomes associated with the use of prasugrel compared to ticagrelor.
QI theme	Effectiveness, outcomes.
What is the standard to be met?	>75% use of a newer P2Y12 antiplatelet agent where a stent is deployed to treat STEMI, with a preference towards prasugrel.

QI Metric Description/Name	Utilisation of newer P2Y12 antiplatelet agents during Primary PCI
Key references to support the metric	2017 ESC Guidelines for STEMI[5] Class 1, Level of evidence A A potent P2Y12 inhibitor (prasugrel or ticagrelor) or clopidogrel is recommended for the treatment of STEMI during primary PCI (or clopidogrel if there is a contraindication to the newer agents or if they are not available) 2020 ESC guidelines A P2Y12 receptor inhibitor is recommended in addition to aspirin, and maintained over 12 months unless there are contraindications or an excessive risk of bleeding. Class 1, level of evidence B. Clopidogrel should be used when prasugrel or ticagrelor are not available, cannot be tolerated, or are contraindicated Class 1. Level of Evidence C Prasugrel should be preferred over ticagrelor Class 2a. Level of Evidence B
Numerator	5.10 Drug therapy PreOp is one of: 3. clopidogrel 8. prasugrel 9. ticagrelor (only in PPCI cases as per below).
Denominator	Primary PCI where a stent is used, defined as: 3.11 Number of lesions attempted >0 AND 2.02 Indication for Intervention = 4. ACS - Primary PCI for STEMI (no lysis) AND 3.15 Number Stents used >0.

QI Metric Description/Name	Utilisation of newer P2Y12 antiplatelet agents during Primary PCI
Trends	There has been a significant increase in the use of newer P2Y12 antiplatelet use over time for all acute coronary syndromes, increasing from 44.2% use of prasugrel and ticagrelor in 2014 to 55.3% in 2021/22. The most commonly used newer P2Y12 agent used for PPCI in 2021/22 was ticagrelor (41.7%) and prasugrel was only used in 18% of cases [Figure 3.7 and Figure 3.9]. Prasugrel use increased up to a peak of 22.6% in 2012, then declined to 6.4% in 2018/19 but has increased since [Figure 3.7]. In contrast, ticagrelor use increased steadily from 7% in 2012 to a peak in 2018/19 of 48% with a subsequent decline to 41.7% in 2021/22 [Figure 3.8]. A trial (ISAR REACT 5[13]) has shown the superiority of prasugrel compared to ticagrelor in 2019 in acute myocardial infarction with no interaction by clinical syndrome (STEMI vs NSTEMI). The decline in ticagrelor use and increase in prasugrel use may reflect this evolving evidence basis. Whilst current European Society of Cardiology recommendations suggest that prasugrel should be preferred over ticagrelor (Class 2a. Level of Evidence B) it appears that prasugrel use lags behind that of ticagrelor. Guidelines recommend that clopidogrel be used where there is a contraindication to prasugrel / ticagrelor use, a high risk of bleeding complications or when newer P2Y12 agents are not available. The lack of wider adoption of newer antiplatelet agents is unlikely to be related to contraindications to the use / unavailability of these newer P2Y12 agents, particularly given that use of prasugrel (that is recommended in preference over ticagrelor) is only 18% in 2021/22.
Variance	With respect to the use of prasugrel during STEMI PCI, there are low generally levels of compliance and variance between centres is from 0% to close to 70% [Figure 3.9].

3.3.2 Audit results

Figure 3.7: Use of prasugrel (%) during PCI procedures in specific syndromes, 2010/11 - 2021/22 [NAPCI data]

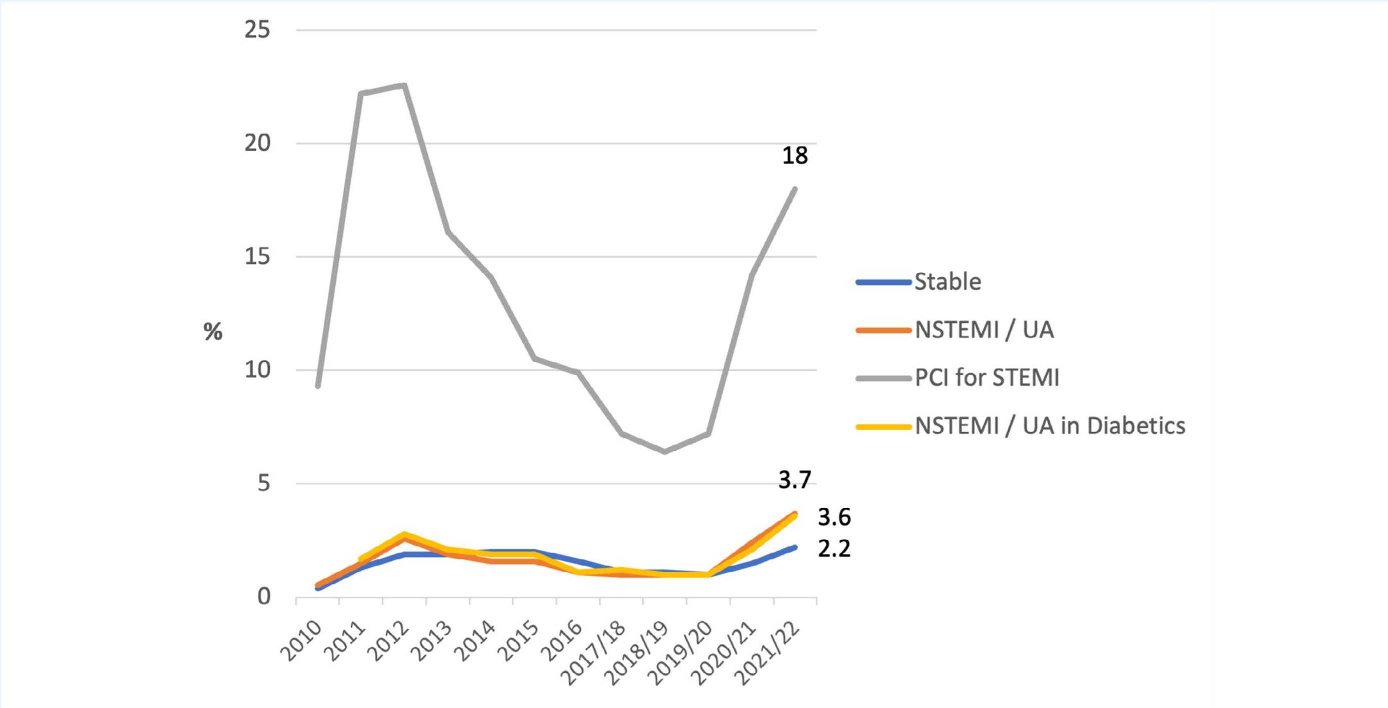


Figure 3.8: Use of ticagrelor (%) during PCI procedures in specific syndromes, 2010/11 - 2021/22 [NAPCI data]

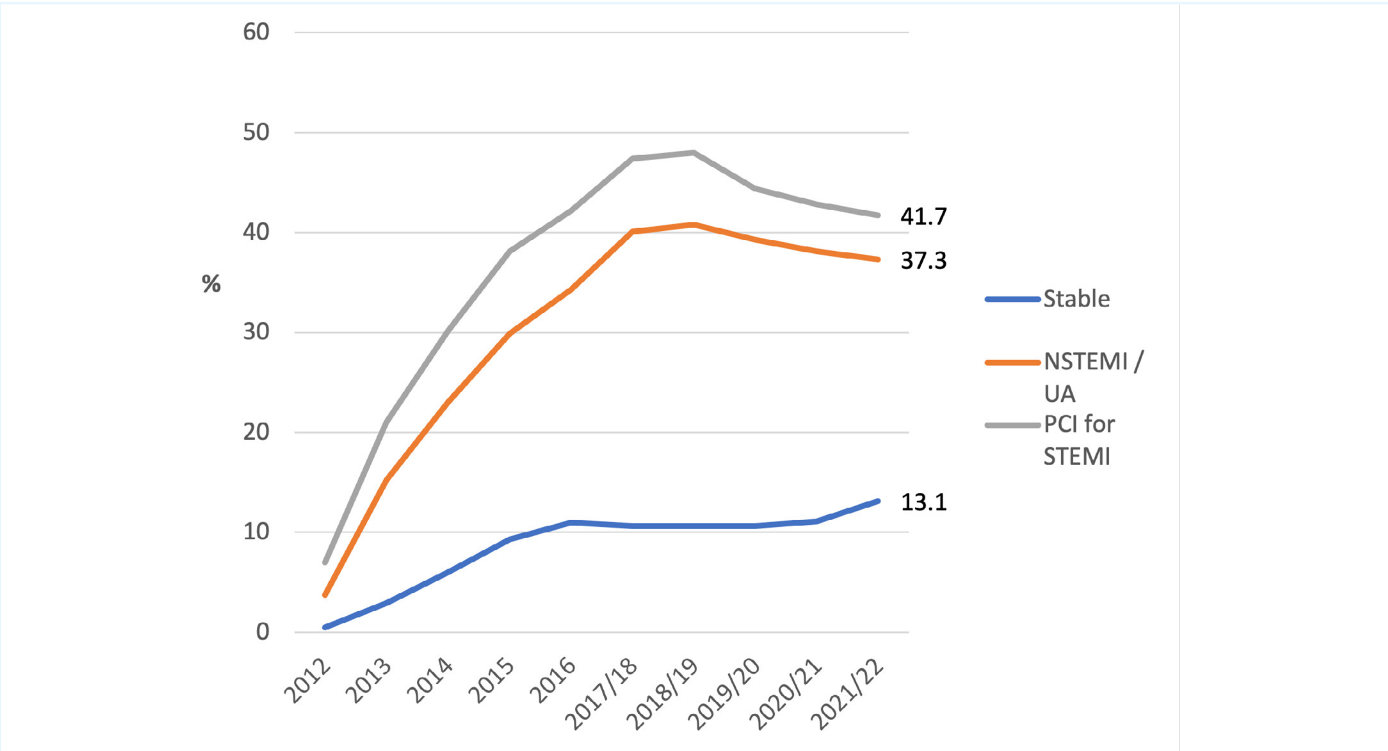
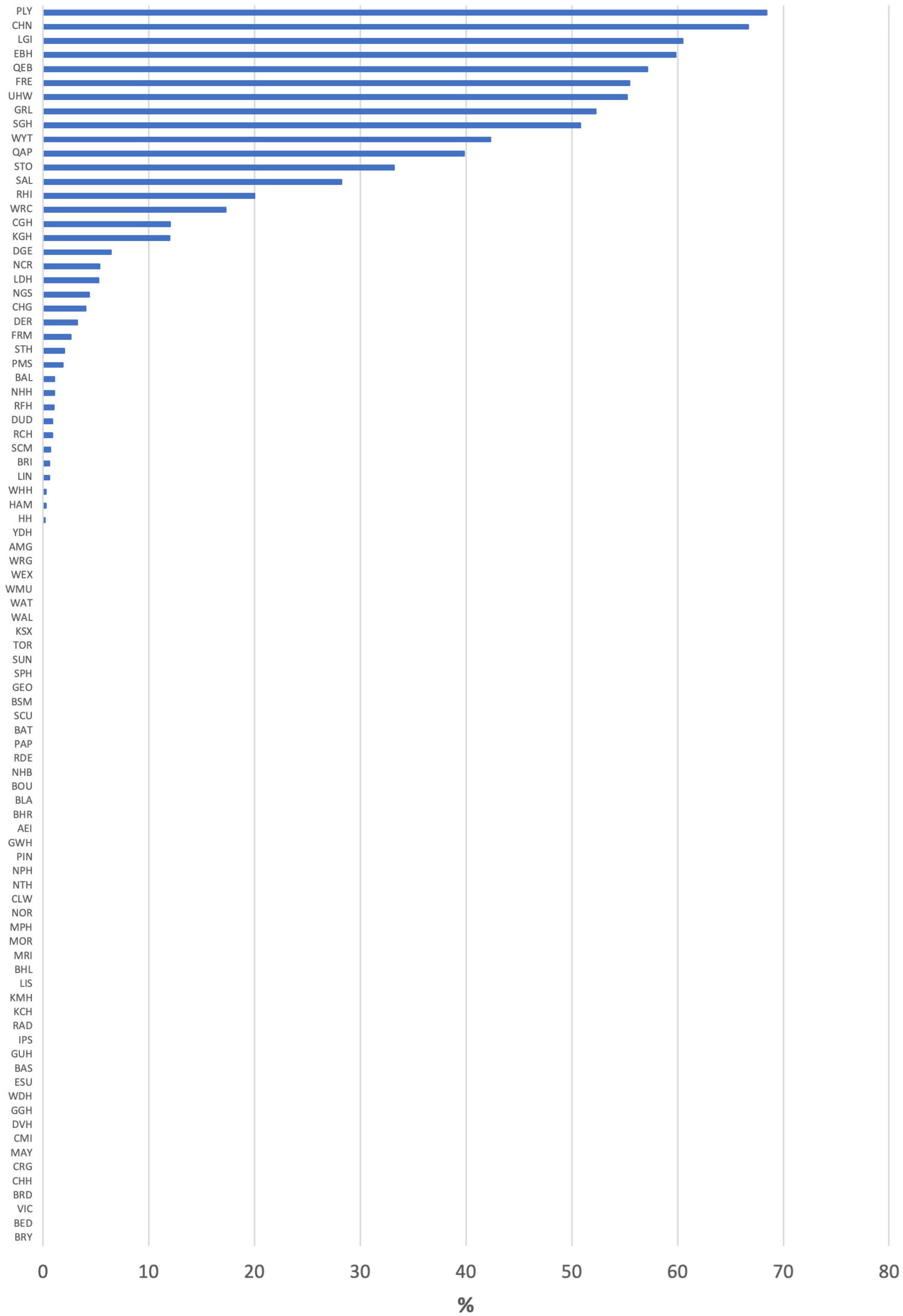


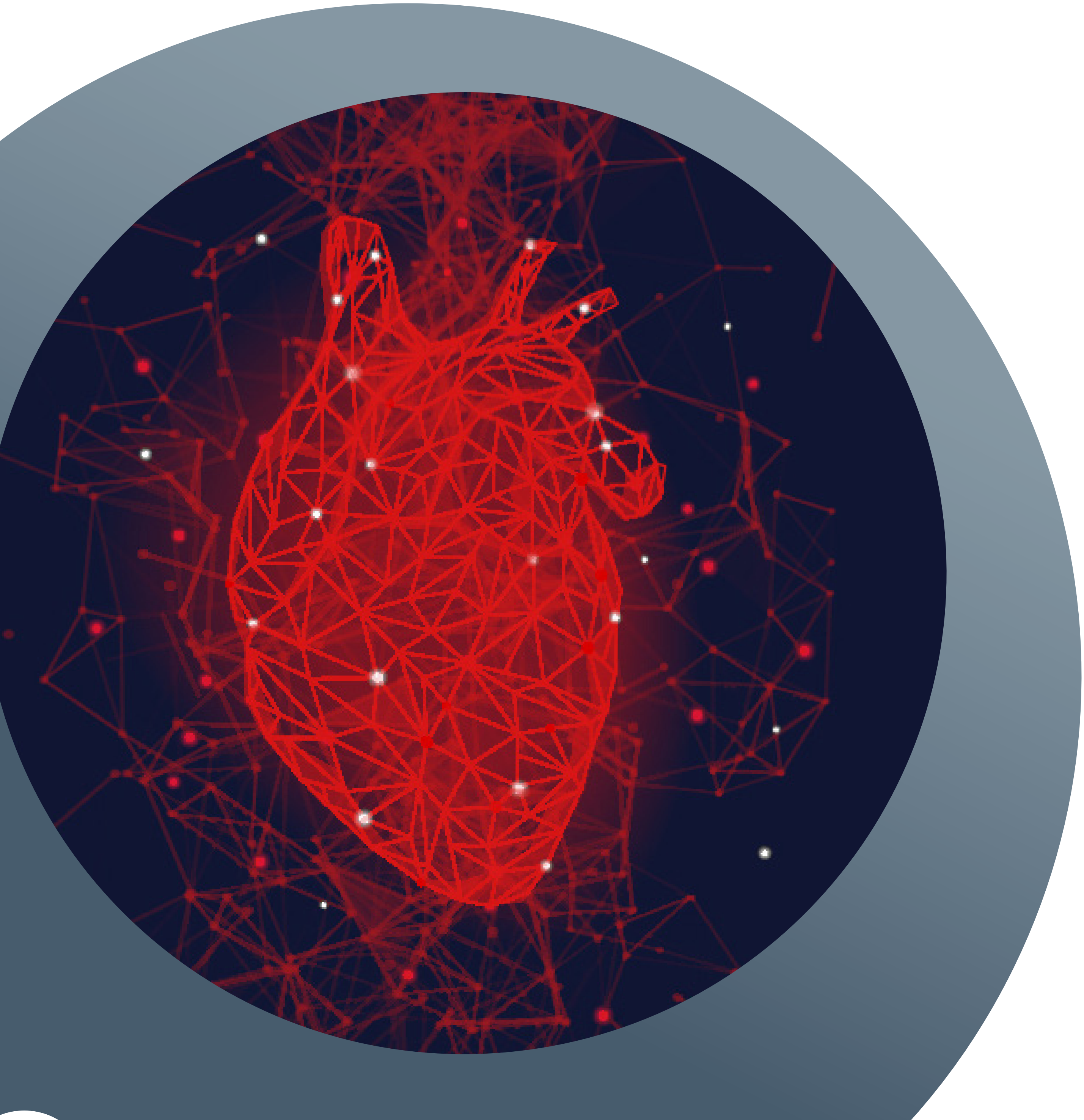
Figure 3.9: Use of prasugrel (% of total cases) in PPCI in individual hospitals, 2021/22 [NAPCI data]



See end of report for site codes. Hospitals not shown provided inadequate data.

3.3.3 Recommendations for those not achieving the standard

Hospitals should review their STEMI protocols to see where improvements can be made in the use of newer antiplatelet agents, in particular prasugrel, during primary PCI.



4 Future direction

The NAPCI audit reports the practice of individual operators and hospitals and their associated outcomes through the analysis of in-hospital complications and mortality and 30-day mortality. Whilst the audit captures in-hospital complications, these are self-reported with no validation, and are often only entered at the time of the procedure. If a complication occurs when the patient has been transferred to another unit, or repatriated to another hospital, there could well be variability amongst centres in the capturing of these.

There is also likely to be significant under-reporting. This is evidenced by the fact that complications derived from patients undergoing PCI in the randomised trial setting, which represent lower risk cohorts, are significantly greater than those found in the audit data. As an example, major bleeding complications are five times more common place in the trial setting than reported through the audit. Some of this may relate to differences in definitions used but is more probably the result of widespread failure to capture events.

Furthermore, there is no means currently to capture important post-discharge complications such as major bleeding, stroke, myocardial infarction or stent thrombosis. Consequently, the frequency, causes and outcomes of complications following a PCI are unknown and there are no data around whether they vary by operator or centre. It is hoped that linkage of the NICOR datasets to hospital episode statistics (HES) will provide a means of capturing these data. That will allow validation of in-hospital complications reported following PCI, helping to determine the magnitude of the problem of under-reporting, and the extent to which this varies by centre. This will be important for the future development of risk stratification models that are necessary for benchmarking. At present, mortality is the only outcome these models can predict.

Linkage of HES will also allow assessment of post-discharge complications and unplanned readmissions, an important quality metric. Such data provide insights into the safety and efficacy of PCI, particularly in relation to post-discharge complications that necessitate hospital admission (and whether there are differences at the hospital or individual operator level).

Finally, it is hoped to submit future analyses from the national audit to external peer review and publication in the scientific literature. This would be valuable both from a quality perspective in providing the evidence basis for future guidelines and practice statements in a rapidly advancing field. This approach has been adopted as the norm in Sweden (SWEDEHEART registry), Spain (Spanish Cardiac Catheterization and Coronary Intervention Registry), and the United States (National Cardiovascular Data Registry). Specific analyses from these contribute to the audit reports and are published as peer reviewed articles in the scientific literature.

5 References

1. https://coronavirus.data.gov.uk/details/healthcare
2. Kinnaird T, Johnson T, Anderson R, Gallagher S, Sirker A, Ludman P, et al. Intravascular Imaging and 12-Month Mortality After Unprotected Left Main Stem PCI: An Analysis From the British Cardiovascular Intervention Society Database. JACC Cardiovasc Interv. 2020;13(3):346–57
3. Räber L, Mintz GS, Koskinas KC, Johnson TW, Holm NR, Onuma Y, et al. 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. Eur Heart J. 2018;39(35):3281–300
4. Johnson TW, Räber L, Di Mario C, Bourantas C, Jia H, Mattesini A, et al. 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. Eur Heart J. 2019;40(31):2566–84
5. Lawton JS, Tamis-Holland JE, Bangalore S, Bates ER, Beckie TM, Bischoff JM, et al. 2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization. J Am Coll Cardiol. 2022;79(2):e21–129
6. Shroff A, Kupfer J, Gilchrist IC, Caputo R, Speiser B, Bertrand OF, et al. Same-day discharge after percutaneous coronary intervention: Current perspectives and strategies for implementation. JAMA Cardiol. 2016;1(2):216–23
7. Taxiarchi P, Kontopantelis E, Martin GP, Kinnaird T, Curzen N, Banning AP, et al. Same-Day Discharge After Elective Percutaneous Coronary Intervention: Insights From the British Cardiovascular Intervention Society. JACC Cardiovasc Interv. 2019;12(15)
8. Taxiarchi P, Martin GP, Kinnaird T, Curzen N, Ahmed J, Ludman P, et al. Contributors to the Growth of Same Day Discharge after Elctive Percutaneous Coronary Intervention. Circ Cardiovasc Interv. 2020;(March):1–9
9. Taxiarchi P, Kontopantelis E, Kinnaird T, Curzen N, Banning A, Ludman P, et al. Adoption of same day discharge following elective left main stem percutaneous coronary intervention. Int J Cardiol [Internet]. 2020;321:38–47. Available from: https://doi.org/10.1016/j.ijcard.2020.07.038
10. Taxiarchi P, Martin GP, Curzen N, Kinnaird T, Ludman P, Johnson T, et al. Rotational atherectomy and same day discharge: Safety and growth from a national perspective. Catheter Cardiovasc Interv. 2020;(July):1–11
11. Wiviott SD, Braunwald E, McCabe CH, Montalescot G, Ruzyllo W, Gottlieb S, Neumann FJ, Ardissino D, De Servi S, Murphy SA, Riesmeyer J, Weerakkody G, Gibson CM, Antman EM; TRITON-TIMI 38 Investigators. Prasugrel versus clopidogrel in patients with acute coronary syndromes. N Engl J Med. 2007 Nov 15;357(20):2001-15
12. Wallentin L, Becker RC, Budaj A, Cannon CP, Emanuelsson H, Held C, Horrow J, Husted S, James S, Katus H, Mahaffey KW, Scirica BM, Skene A, Steg PG, Storey RF, Harrington RA; PLATO Investigators; Freij A, Thorsén M. Ticagrelor versus clopidogrel in patients with acute coronary syndromes. N Engl J Med. 2009 Sep 10;361(11):1045-57
13. Schüpke S, Neumann FJ, Menichelli M, Mayer K, Bernlochner I, Wöhrle J, Richardt G, Liebetrau C, Witzenbichler B, Antoniucci D, Akin I, Bott-Flügel L, Fischer M, Landmesser U, Katus HA, Sibbing D, Seyfarth M, Janisch M, Boncompagni D, Hilz R, Rottbauer W, Okrojek R, Möllmann H, Hochholzer W, Migliorini A, Cassese S, Mollo P, Xhepa E, Kufner S, Strehle A, Leggewie S, Allali A, Ndrepepa G, Schühlen H, Angiolillo DJ, Hamm CW, Hapfelmeier A, Tölg R, Trenk D, Schunkert H, Laugwitz KL, Kastrati A; ISAR-REACT 5 Trial Investigators. Ticagrelor or Prasugrel in Patients with Acute Coronary Syndromes. N Engl J Med. 2019 Oct 17;381(16):1524-1534

6 Thanks and acknowledgements

We would like to thank the contribution of the following individuals and organisations:

- All hospitals and individual cardiologists, nurses, clinical teams, data managers and clinical audit teams who contribute to this audit. Without their engagement, patients would not have benefited from improved care over the last ten years, and we would not have been able to record the national impact of the pandemic.
- Our patient representatives in the NAPCI Domain Expert Group and the NCAP Operational and Methodology Group, the NICOR Patient Representative Group and Virtual Patient Panel for their contribution to the programme and their help in determining the content of this report.

This report was prepared by Prof Mamas Mamas, the newly appointed Clinical Lead for the NAPCI and Audit Lead for the British Cardiovascular Intervention Society (BCIS) and Prof Peter Ludman, who has held this role for the past 22 years, together with the NCAP team: Samuel Perwaiz (Project Manager), Dr Glen Martin (Analyst) and Jane Kerr (Project Co-ordinator). Additional input was provided from members of the NAPCI Domain Expert Group/Data Monitoring Group for BCIS.

We also appreciate the continuing support of colleagues within the National Institute for Cardiovascular Outcomes Research (NICOR), the Clinical Leads of the other domains within the National Cardiac Audit Programme (NCAP), members of the NCAP Operational & Methodology Group, chaired by Prof Mark de Belder, and the NCAP Delivery Group, chaired by Mr James Chal. In particular, we are grateful to Nadeem Fazal, Sue Manuel, Satya Phantala and Satya Kalla for the development of the on-line contemporary data tools. We also acknowledge the encouragement of Ross Pow, of Power of Numbers Ltd, who facilitated workshops to guide the interpretation and presentation of various aspects of NCAP. We are grateful to the work of Dr Menelaos Pavlou and Professors Rumana Omar and Gareth Ambler, Department of Statistical Science at University College London, for their work on the outliers' process.

The National Institute for Cardiovascular Outcomes Research (NICOR) is hosted by NHS Arden & GEM Commissioning Support Unit (Arden & GEM). NICOR is funded by NHS England and the GIG Cymru (NHS Wales) to collect and report patient information nationally in order to improve the quality of care received in hospital by patients with heart disease.

Please go to www.nicor.org.uk for more information.

Email: nicor.auditenquiries@nhs.net

This report is available online via the NICOR website.

This report was published on 8 June 2023.

National Institute of Cardiovascular Outcomes Research (NICOR)

NICOR is a partnership of clinicians, IT experts, statisticians, academics and managers who, together, are responsible for the National Cardiac Audit Programme (NCAP) and a number of new health technology registries, including the UK TAVI registry. Hosted by NHS Arden & GEM CSU, NICOR collects, analyses and interprets vital cardiovascular data into relevant and meaningful information to promote sustainable improvements in patient well-being, safety and outcomes. It is commissioned by NHS England and GIG Cymru /NHS Wales.

Email: nicor.auditenquiries@nhs.net

British Cardiovascular Intervention Society

The British Cardiovascular Intervention Society promotes education, training and research in cardiovascular intervention and develops and upholds clinical and professional standards.

www.bcis.org.uk

NHS Arden and GEM

NHS Arden & GEM is a Commissioning Support Unit (CSU) working across the health and care sector in England to provide a range of services including procurement and contracting, service transformation, business intelligence, business support and clinical support. Its ability to draw upon expertise from over 1000 staff, working in multidisciplinary teams, enables the CSU to help healthcare commissioners and providers navigate and implement the change needed to improve patient care and outcomes. Arden & GEM's clients include more than 70 customers including Integrated Care Boards, NHS England, Integrated Care Systems, Primary Care Networks, NHS provider trusts and local authorities.

www.ardengemcsu.nhs.uk

NHS England

NHS England leads the National Health Service (NHS) in England. NHS England provides national leadership for the NHS. Through the NHS Long Term Plan, we promote high quality health and care for all, and support NHS organisations to work in partnership to deliver better outcomes for our patients and communities, at the best possible value for taxpayers and to continuously improve the NHS. We are working to make the NHS an employer of excellence and to enable NHS patients to benefit from world-leading research, innovation and technology.

GIG Cymru (NHS Wales)

NHS Wales is the public funded National Health Service of Wales providing healthcare to some 3 million people who live in the country. The Welsh Government sets the Health Care strategy and NHS in Wales delivers that strategy and services via the seven Local Health Boards, three NHS Trusts and two Special Health Authorities. The NHS has a key principle which is that good healthcare should be available to all.

7 Hospital codes

AEI	Royal Albert Edward Infirmary
AHM	BMI Alexandra Hospital
ALT	Altnagelvin Hospital
AMG	Wycombe Hospital
ANT	St Anthony's Hospital
BAS	Essex Cardiothoracic Centre
BAT	Royal United Hospital Bath
BED	Bedford Hospital
BHL	Liverpool Heart and Chest Hospital
BHR	Royal Berkshire Hospital
BLA	Royal Blackburn Hospital
BMI	BMI Meriden Hospital
BOU	Royal Bournemouth Hospital
BRD	Bradford Royal Infirmary
BRI	Bristol Royal Infirmary
BRY	Acute Pennine Trust Fairfield
BSM	Southmead Hospital
CGH	Conquest Hospital
CHG	Cheltenham General Hospital
CHH	Castle Hill Hospital
CHN	Nottingham City Hospital
CLW	North Wales Cardiac Centre
CMI	Cumberland Infirmary
CRG	Craigavon Hospital
CRO	Cromwell Hospital
DER	Royal Derby Hospital
DGE	Eastbourne District General Hospi-tal
DUC	Duchy Hospital
DUD	Birmingham City Hospital
DVH	Darent Valley Hospital
EBH	Birmingham Heartlands Hospital
ERI	Edinburgh Heart Centre
ESU	East Surrey Hospital
FRE	Freeman Hospital
FRM	Frimley Park Hospital
GEO	St George's Hospital
GGH	Diana Princess of Wales Hospital, Grimsby
GHB	Spire Hospital Bristol
GJH	Golden Jubilee National Hospital
GRL	Glenfield HospitalGUH Grange University Hospital
GWH	Queen Elizabeth Hospital Woolwich
HAI	Hairmyres Hospital
HAM	Hammersmith Hospital
HBP	Spire Hospital Hull and East Riding
HH	Harefield Hospital
HHW	Wellington Hospital
HSC	Harley Street Clinic
IPS	Ipswich Hospital
KCH	Kings College Hospital
KGH	Kettering General Hospital
KIM	KIMS Hospital
KMH	Kings Mill Hospital
KSX	Tunbridge Wells Hospital
LBH	London Bridge Hospital
LDH	Luton and Dunstable University Hospital
LGI	Yorkshire Heart Centre
LIN	Lincoln County Hospital
LIS	Lister Hospital
LNH	Leeds Nuffield Hospital

MAY	Croydon University Hospital
MDW	Medway Maritime Hospital
MHO	Manor Hospital
MOR	Morriston Hospital
MPH	Musgrove Park Hospital
MRI	Manchester Royal Infirmary
NBO	Nuffield Health Bournemouth Hospi-tal
NCR	New Cross Hospital
NGS	Northern General Hospital
NHB	Royal Brompton Hospital
NHH	Basingstoke and North Hampshire Hospital
NIN	Ninewells Hospital
NOR	Norfolk and Norwich University Hospital
NPH	Northwick Park Hospital
NTH	Northampton General Hospital
PAP	Royal Papworth Hospital
PHB	BMI Priory Hospital
PHN	BMI Park Hospital
PIN	Pinderfields General Hospital
PLY	Derriford Hospital
PMS	Great Western Hospital
QAP	Queen Alexandra Hospital
QEB	Queen Elizabeth Hospital Birmingham
RAD	John Radcliffe Hospital
RAI	Raigmore Hospital
RCH	Royal Cornwall Hospital
RDE	Royal Devon and Exeter Hospital
RFH	Royal Free Hospital
RHH	Ross Hall Hospital
RHI	Calderdale Royal Hospital

RIA	Aberdeen Royal Infirmary
RSC	Royal Sussex County Hospital
RVB	Royal Victoria Hospital
SAL	Salisbury District Hospital
SBH	Barts Health Centre
SCM	James Cook University Hospital
SCU	Scunthorpe General Hospital
SGH	Southampton General Hospital
SMH	Spire Manchester Hospital
SPC	Spire Cardiff Hospital
SPH	St Peter's Hospital
SPN	Spire Nottingham (SPN)
SSP	Spire Shawfair Park Hospital
STH	St Thomas' Hospital
STO	University Hospital of North Staffordshire
SUN	Sunderland Royal Hospital
TOR	Torbay Hospital
UHW	University Hospital of Wales
VIC	Blackpool Victoria Hospital
WAL	University Hospital Coventry
WAT	Watford General Hospital
WDH	Dorset County Hospital
WEX	Wexham Park Hospital
WHH	William Harvey Hospital
WMU	West Middlesex University Hospital
WRC	Worcester Royal Hospital
WRG	Worthing Hospital
WYT	Wythenshawe Hospital
YDH	York District Hospital

National Cardiac
Audit Programme

NICOR

National Audit of Percutaneous Coronary Intervention (NAPCI)

2023 Summary Report (2021/22 data)