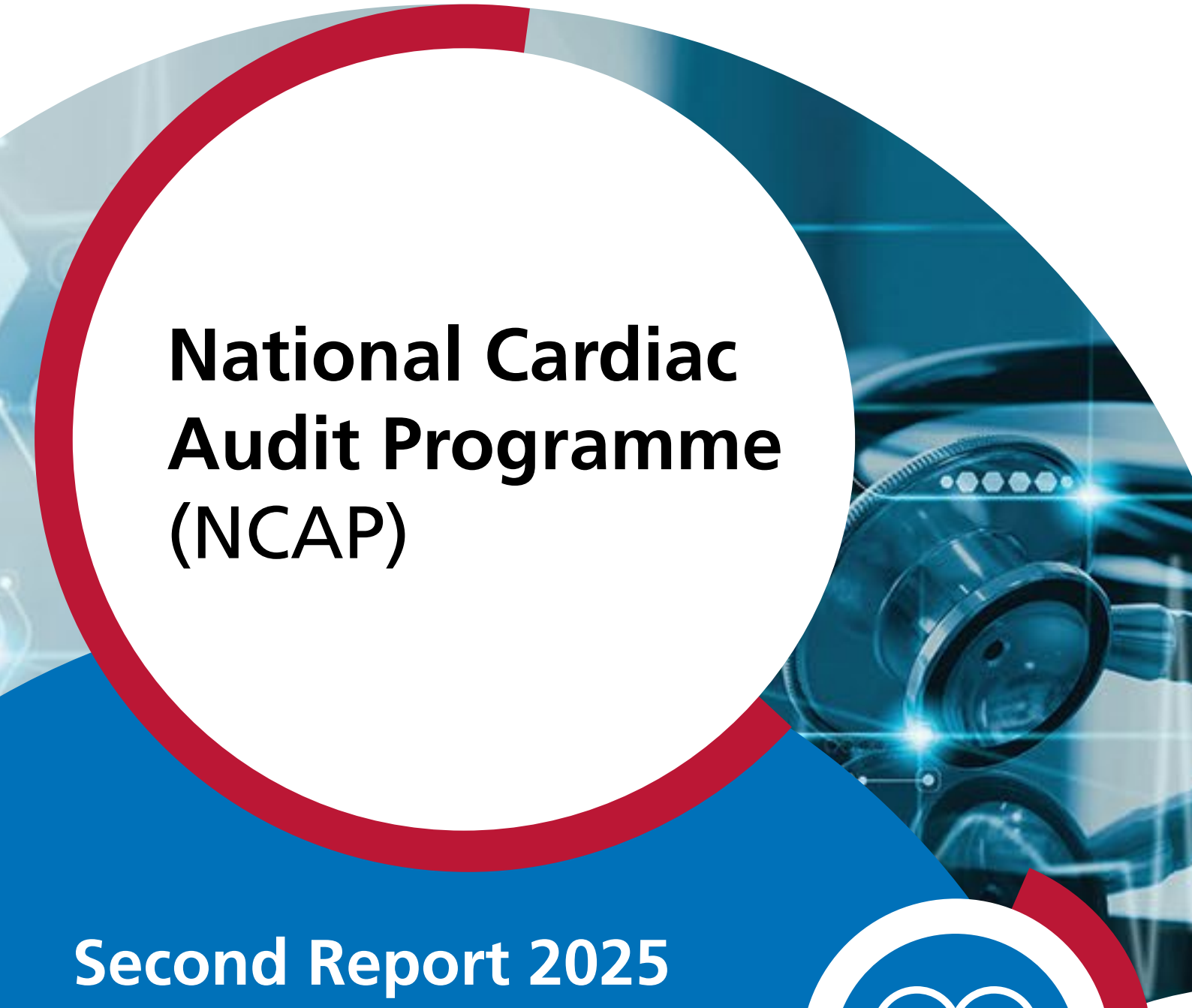
National Cardiac
Audit Programme

NICOR

National Cardiac Audit Programme (NCAP)



Second Report 2025

(2024/25 and 2022/25 data)

Contents

Executive summary

This second 2025 NCAP report sets out quality of care and outcome measures across 11 cardiovascular audits and registries

The National Cardiac Audit Programme (NCAP) informs hospitals and commissioners about the quality of care provided by their cardiovascular services and makes recommendations for quality improvement (QI).

The NCAP comprises 11 cardiovascular sub-specialties (or 'domains'):

- National Congenital Heart Disease Audit (NCHDA)
- Myocardial Ischaemia National Audit Project (MINAP)
- National Audit of Percutaneous Coronary Interventions (NAPCI)
- National Adult Cardiac Surgery Audit (NACSA)
- National Heart Failure Audit (NHFA)
- National Audit of Cardiac Rhythm Management (NACRM)
- UK Transcatheter Aortic Valve Implantation (TAVI) Registry
- The Transcatheter Mitral and Tricuspid Valve (TMTV) Registry
- The Left Atrial Appendage Occlusion (LAAO) Registry
- The Patent Foramen Ovale Closure (PFOC) Registry.
- The National Audit of Cardiac Rehabilitation (NACR)

TMTV, LAAO and PFOC are structural heart intervention registries introduced over the last 2 years. While there are insufficient cases for these yet to provide a full set of quality improvement (QI) outputs, the current state of play is summarised.

The National Audit of Cardiac Rehabilitation is aligned to the NCAP and provides information to support QI while continuing to **report** with a separate timetable.

This NCAP report is based on data for the financial year 2024/25, or from 2022/23 to 2024/25 where performance and QI metrics cover a 3-year period. It is the second report published in 2025 following the previous report in March, reflecting the fact that the results are becoming available earlier and enabling hospitals and commissioners to access ever more timely information.

Online interactive reports are available for each sub-specialty domain

In addition to this summary report highlighting key messages from across the NCAP, each domain has an online interactive report available through the NICOR website (alongside documents with additional background information and results).

These reports enable patients, members of the public, clinicians, hospital and health system managers, and healthcare commissioners to explore in detail the specific findings that are of most interest to them.

Patient safety:
Patients should receive timely and effective care

Blue headline figures = positive results

Red headline figures = adverse results

Black headline figures = changes where interpretation is less clear

Data for 2024/25 and changes compared with 2023/24, unless otherwise stated

Action is needed to reduce long times to emergency treatment for patients with 'higher-risk' STEMI heart attacks

+20 mins	Increase in Call-To-Door (CTD) times compared with 10 years ago for ST-elevated myocardial infarction (STEMI) heart attack patients
+25 mins	Increase in Call-To-Balloon (CTB) times compared with 10 years ago for STEMI patients
9	Out of 12 ambulance trusts, the number that did not improve or delivered worse CTD times for STEMI patients
10%	Percentage of STEMI patients who potentially delay their treatment by self-presenting to hospital rather than being taken by emergency services
+46%	Relative increase in Symptom-To-Balloon (STB) times for self-presenting STEMI patients compared to those brought by ambulance
+4 mins	Increase in the median Door-To-Balloon (DTB) time for primary percutaneous coronary intervention (PPCI) over 9 years
1 in 3	Hospitals meeting the target of delivering PPCI to at least 70% of STEMI patients within 60 minutes
22%	Percentage of STEMI patients requiring an inter-hospital transfer who received PPCI within 150 minutes of a call for help

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Waiting times for elective cardiac surgery have fallen	
↓14%	Reduction in waiting time for elective coronary artery bypass graft (CABG) operations (from 130 to 112 days)
27	Hospitals with average CABG operation waits above the target of less than 84 days (26 NHS and 1 private)
To optimise outcomes for some CABG and TAVI patients, better understanding is needed on whether to treat urgently or defer to an elective procedure	
22%	Percentage of patients requiring urgent CABG surgery who were operated on within 7 days of angiography
↓6.3%	Drop in urgent CABG cases while elective procedures have increased by 1.6%
0.5% v 1%	In-hospital mortality for elective CABG operations versus urgent cases
24%	Proportion of transcatheter aortic valve implantation (TAVI) procedures performed as urgent procedures (over 50% of all cases in some hospitals)
0.7% v 1.9%	In-hospital mortality for elective TAVI procedures versus urgent cases
Too few patients admitted with heart failure and atrial fibrillation are receiving anticoagulants	
17%	Heart failure (HF) and atrial fibrillation (AF) patients admitted to hospital who are not then prescribed an anticoagulant

Productivity:
Services should be delivered efficiently

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Unless otherwise stated, all data for 2024/25 and changes shown over 2023/24

The number of cardiac surgical operations is increasing with more cases per surgeon	
↑3.1%	Relative increase in the number of cardiac operations
39%	NHS cardiac hospitals performing more operations than before the pandemic
↑8%	Relative increase in median number of operations performed by individual cardiac surgeons
Day-Of-Surgery Admissions for elective cardiac operations have increased but this approach could be used more	
↑19%	Relative growth in Day-Of-Surgery Admissions (DOSA) for elective cardiac operations in England (although still only offered to 1 in 5 patients)
20%	Proportion of elective cardiac operations in England undertaken as DOSA
Reduced lengths of stay in hospital could potentially be associated with more readmissions	
7-8 days	Average length of stay (LOS) following CABG
6-10 days	Range of average LOS following CABG between NHS hospitals
7-24%	30-day readmission rates across hospitals following cardiac surgery (with higher rates possibly associated with shortening LOS times)

Productivity:
Services should be delivered efficiently

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Data for 2024/25 and changes compared with 2023/24, unless otherwise stated

More patients with congenital heart disease are being treated but the number of surgical procedures remains below pre-pandemic levels

+6%	Relative increase in the total number of procedures for congenital heart disease (CHD) patients
+10%	Relative rise in percutaneous interventional procedures
+15%	Relative rise in electrophysiology (EP) and pacing procedures
↓0.5%	Relative drop in cardiac surgical procedures for patients with CHD

Prevention:
Hospital treatments should improve future outcomes for patients

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Data for 2024/25 and changes compared with 2023/24, unless otherwise stated

Targeted prevention strategies are required to reduce variation in disease prevalence between geographic areas and genders

x6.8	Difference in age-standardised rates of heart attack admissions across different geographic areas
+83%	Additional hospital admissions for HF patients aged over 65 years in the most deprived areas compared to the least
x2.4	Age-standardised rates of admission with a heart attack are 2.4 times higher for males than females

Drug-based prevention strategies for heart failure are improving but there is much more to do

75%	Proportion of admitted HF patients with reduced ejection fraction (HFrEF) prescribed a sodium glucose transporter 2 inhibitor (SGLT2i) drug prior to discharge (individual hospitals vary from 3% to 100%)
72%	Proportion of admitted HFrEF patients prescribed a mineralocorticoid receptor antagonist (MRA) drug prior to discharge (individual hospitals vary from 9% to 100%)
50%	Proportion of admitted HFrEF patients prescribed all 4 drug classes that can improve outcomes prior to discharge (individual hospitals vary from 7% to 100%)

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Hospital treatments should improve future outcomes for patients

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Many hospitals could improve prevention strategies for patients following a heart attack

85%	Proportion of eligible NSTEMI patients undergoing coronary angiography prior to discharge
55%	Proportion of NSTEMI patients undergoing angiography within 72 hours of admission
↓7.4%	Relative fall over the last 5 years in proportion of eligible heart attack patients discharged on all conventional preventive drugs (78% overall)
↑6.6%	Relative increase in proportion of eligible heart attack patients discharged on an MRA drug over the last 5 years (73% overall)
81%	Heart attack patients referred before discharge for cardiac rehabilitation (individual hospitals vary from 2% to 100%)

More patients are receiving cardiac rehabilitation and accreditation of cardiac rehabilitation services is improving

+61%	Relative increase in new patients registered with cardiac rehabilitation over the last 10 years (64,217 patients in 2023)
41%, 51%	Proportion of acute coronary syndrome patients undergoing cardiac rehabilitation in England and Wales respectively
13%, 17%	Proportion of admitted HF patients undergoing cardiac rehabilitation in England and Wales respectively

Prevention:
Hospital treatments should improve future outcomes for patients

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More hospitals are using intracoronary imaging for PCI procedures on left main and complex coronary artery lesions

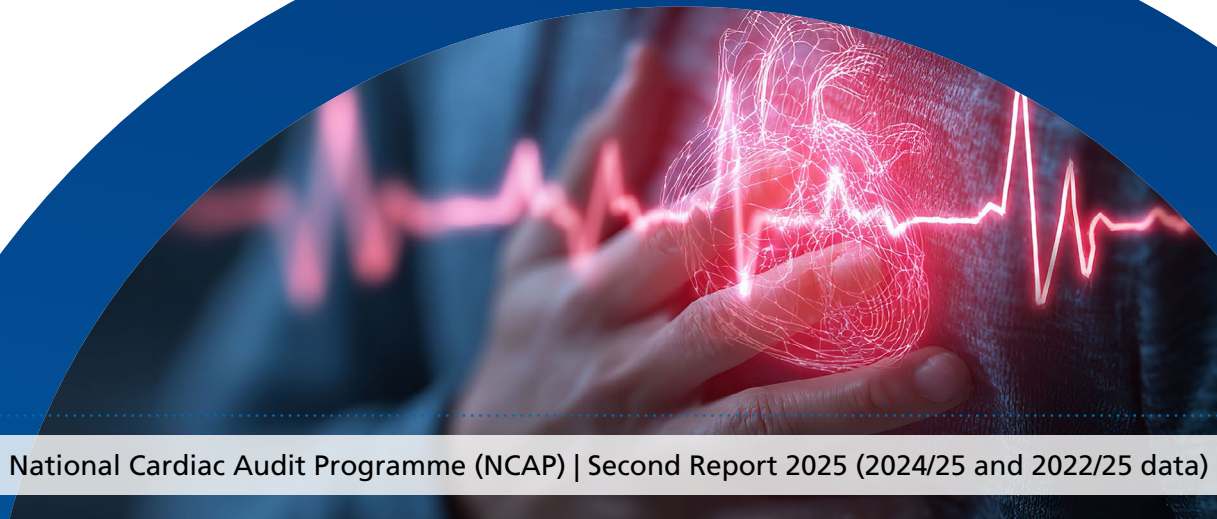
77%	Proportion of patients undergoing percutaneous coronary intervention (PCI) to the left main stem having intracoronary imaging (individual hospitals vary from 0% to 100%)

More 'higher-risk' STEMI heart attack patients undergoing PPCI are receiving new more effective antiplatelet drugs

57%	Proportion of STEMI patients prescribed either prasugrel or ticagrelor instead of clopidogrel following PPCI (individual hospitals vary from 0% to 100%)

More ablation procedures for patients with atrial fibrillation will improve their quality of life

+11%	Relative increase in AF ablation procedures
x10	Variation in ablation rates between different Integrated Care Boards (ICBs)



Prevention:
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The use of devices to reduce stroke rates in patients with atrial fibrillation is increasing

267	Percutaneous left atrial appendage occlusion (LAAO) procedures reported from 13 hospitals
4%	Average pre-procedural annual risk of stroke for patients undergoing LAAO
33%	Proportion of LAAO procedures performed in women (lower than expected)
2,136	Cardiac operations where a left atrial clip was used (individual hospitals vary from 3% to 17% of cases)

More patients are being offered treatment for valve disease but access to this is unequal

15,732	Aortic stenosis patients treated by either surgical aortic valve replacement (AVR) or transcatheter aortic valve implantation (TAVI) (highest ever)
2.8:1	Ratio of aortic stenosis cases undertaken using TAVI compared with surgical AVR
2.4%	Readmission rates for HF following TAVI
+8.7%	Relative increase in all mitral valve surgery (13% rise in mitral valve repairs)
613	Mitral transcatheter edge-to-edge repair (TEER) procedures

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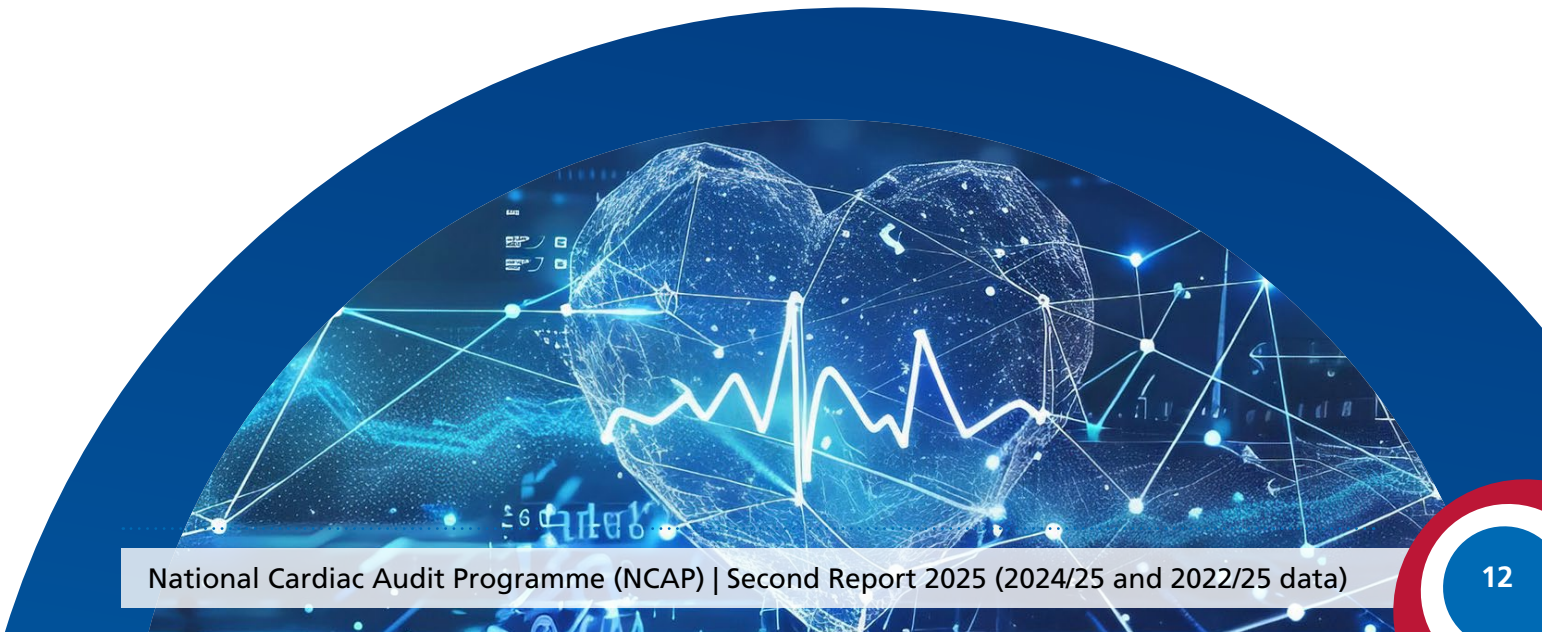
72%	Proportion of mitral TEER patients with no or mild mitral regurgitation (MR) post-procedure (97% had severe MR pre-procedure)
x15	Variation in age-standardised rates of mitral TEER procedures per million population between Cardiac Network areas

Cerebral embolic protection during a TAVI procedure has not been shown to prevent strokes and so its use is falling rapidly

↓60%	Relative drop in use of protection devices during TAVI procedures following completion of UK trial (from 12% of all cases in 2021/22 to 5% in 2024/25)

PFOC will reduce recurrent stroke rates, but referral patterns are variable across the country

0.6-14.9	Varying rates of patients receiving a patent foramen ovale closure (PFOC) device to prevent stroke per million population in ICBs and Health Boards
15.9%	PFOC procedures for patients in the least deprived areas (against an expectation of 20%)



1. Introduction

1.1 This NCAP report sets out quality of care and outcome measures across 11 cardiovascular audits and registries

The National Cardiac Audit Programme (NCAP) supports hospitals and healthcare commissioners to make their cardiovascular services more effective and efficient by providing information to enable quality improvement (QI).

The NCAP's work aligns with both the 10 year health plan and the government's review of patient safety, which emphasise the importance of regular data collection and analysis and the monitoring of care quality in the NHS. The NCAP reports are delivered by the National Institute for Cardiovascular Outcomes Research (NICOR), which is hosted by the NHS Arden & Greater East Midlands Commissioning Support Unit. The reports are commissioned directly by NHS England and NHS Wales (GIG Cymru).

This new report highlights some key findings on the quality of care and outcomes across 11 cardiovascular sub-specialty audits and registries. Each of these 'domains' is concerned with a particular area of cardiovascular disease (CVD) treatment:

- National Congenital Heart Disease Audit (NCHDA)
- Myocardial Ischaemia National Audit Project (MINAP)
- National Audit of Percutaneous Coronary Interventions (NAPCI)
- National Adult Cardiac Surgery Audit (NACSA)
- National Heart Failure Audit (NHFA)
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TMTV, LAAO and PFOC are structural heart intervention registries introduced over the last 2 years. While there are insufficient cases for these yet to provide a full set of quality improvement (QI) outputs, the current state of play is summarised.

The National Audit of Cardiac Rehabilitation (NACR) is also aligned to the NCAP and provides information to support QI while continuing to report with a separate timetable.

1.2 The report is based on data from 2024/25 and highlights trends in service delivery and current challenges for cardiovascular services

This NCAP report is based on data for the financial year 2024/25 or from 2022/23 to 2024/25 where performance and QI metrics cover a 3-year period. It is the second report published in 2025 following the previous report in March, reflecting the fact that the results are becoming available earlier and enabling hospitals and commissioners to access ever more timely information.

It is the first time the NCAP has been able to publish a report in the calendar year following the financial year reported on. This has been achieved by the commitment and work of the NCAP team in developing new data tools for hospitals, shortening the data validation process and introducing interactive Power BI reports.

1.3 Online interactive reports provide detail for each sub-specialty domain

This summary report highlights key messages across the NCAP, but each cardiovascular sub-specialty has an online interactive report available on the NICOR website (alongside documents with additional background information and results).

These individual domain reports highlight metrics across the cardiovascular sub-specialties, showcasing many examples of good performance and improving standards of care.

As before, interactive reports are provided so that patients and caregivers, members of the public, clinicians, hospital and health system managers and healthcare commissioners can explore in detail the specific findings that are of most interest to them. The reports are not exhaustive but if there are findings that you feel should be in the public domain, please email nicor.auditenquiries@nhs.net.

Interactive data are provided at different levels:

- by country
- by Integrated Care Board (ICB) in England or University Health Board in Wales (service commissioning organisations)
- by Cardiac Network (service delivery networks)
- by individual hospital.

Our aim is to support improvement in care. Considerable variation is seen for most metrics. Local health systems and individual hospitals that are performing less well can learn from those providing better levels of care. In addition to these published reports, hospitals have direct access via the NICOR data portal to assess their relative performance in real time and can identify areas where they should be investing in a quality improvement programme.

1.4 Results are presented under 3 national policy priority themes: Patient safety, Productivity, and Prevention

The remainder of this report contains key messages on new developments in care, improving performance across hospitals and areas of concern. These are grouped under 3 themes that align with national policy priorities.

Section 2: Patient safety – care for patients should be timely and effective

- Action is needed to reduce high Call-To-Door (CTD) and Call-To-Balloon (CTB) times for patients with 'higher-risk' STEMI heart attacks
- Waiting times for elective cardiac surgery have fallen
- To optimise outcomes for some CABG and TAVI patients, better understanding is needed on whether to treat urgently or defer to an elective procedure
- Too few patients admitted with heart failure and atrial fibrillation are receiving anticoagulants.

Section 3: Productivity – services should be delivered efficiently

- More cardiac surgical operations are being performed with each cardiac surgeon undertaking more cases per year
- Day-Of-Surgery Admissions for elective cardiac operations have increased, but this approach could be used more
- Reduced lengths of stay in hospital following CABG could potentially be associated with more readmissions
- More patients with congenital heart disease are being treated but the number of surgical procedures remains below pre-pandemic levels.

Section 4: Prevention – hospital treatments should improve future patient outcomes

- Prevention strategies should be for all relevant cases, but more effort is needed in areas with higher admission rates
- Drug-based prevention strategies for heart failure are improving, but there is much more to do
- Many hospitals could improve their prevention strategies for patients following a heart attack
- More patients are receiving cardiac rehabilitation and accreditation of cardiac rehabilitation services is improving
- More hospitals are incorporating intracoronary imaging into their PCI practice on left main and complex coronary artery lesions
- More 'higher-risk' STEMI heart attack patients undergoing PPCI are receiving new more effective antiplatelet drugs
- The use of devices to reduce stroke rates in patients with atrial fibrillation is increasing
- More patients are being offered treatment for valve disease but access to this is unequal

Section 4: Prevention – hospital treatments should improve future patient outcomes

- Cerebral embolic protection during a TAVI procedure has not been shown to prevent strokes and so its use is falling rapidly
- PFOC will reduce recurrent stroke rates in those with cryptogenic stroke, but referral patterns are variable across the country.

STEMI: ST-elevation myocardial infarction; CABG: coronary artery bypass grafting; TAVI: transcatheter aortic valve implantation; PCI: percutaneous coronary intervention; PPCI: primary percutaneous coronary intervention; PFOC: patent foramen ovale closure

A final section highlights benefits available to all users from developments in our IT platform. This will have been rolled out to all domains by March 2026. The utility of the platform has been significantly improved, but is still dependent on timely submission of complete and accurate data by all participating hospitals.

2. Patient safety – patients should receive timely and effective care

Ensuring patient safety is central to all aspects of cardiac care. The timeliness and effectiveness of care are critical determinants of outcomes in cardiovascular disease, where delays or deviations from evidence-based pathways can rapidly increase risk.

The continuous benchmarking of hospitals and networks against national standards allows early detection of outliers and supports focused QI initiatives. This systematic approach promotes organisational learning and accountability to reduce preventable harm and procedural complications.

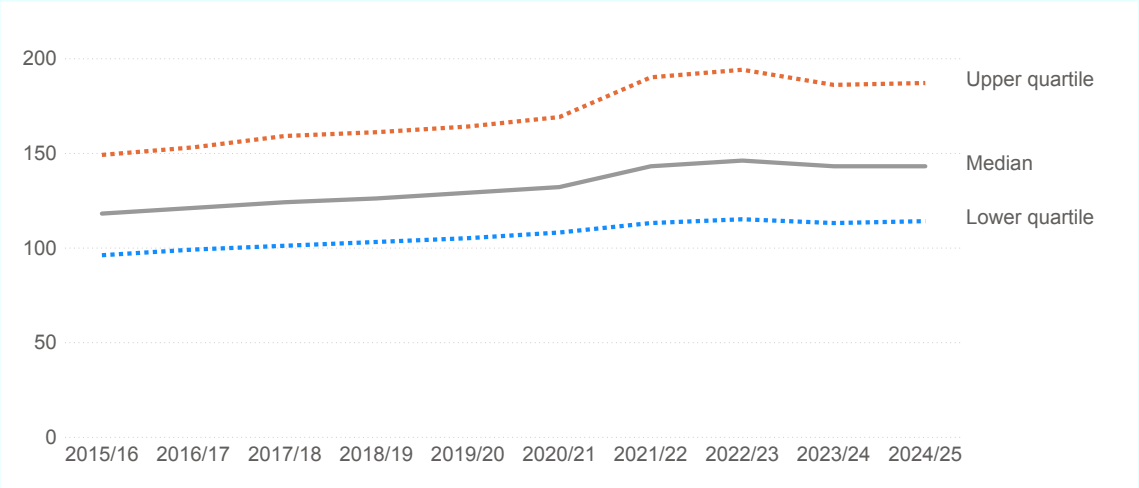
2.1 Action is needed to reduce long times to emergency treatment for patients with 'higher-risk' STEMI heart attacks

'Higher-risk' heart attacks (known as an ST-elevation myocardial infarction or STEMI for short), involve an abrupt narrowing or blocking of the coronary artery. The resulting drop in oxygen to the heart muscle can lead to heart failure (a loss of the heart's pumping function) followed possibly by death or irreversible damage to the heart.

The sooner the artery can be re-opened, the less heart damage occurs and the greater the chance of surviving the episode ('time is muscle'). The overall measure used to assess the speed of treatment times is known as the Call-To-Balloon (CTB) time, from when a patient calls the emergency services to when primary percutaneous coronary intervention (PPCI) treatment is started to re-open the artery.

Sadly, for nearly 30,000 patients, the median CTB time taken to treat STEMI patients is now 25 minutes longer than it was in 2015/16 [Figure 2.1]

Figure 2.1: Call-To-Balloon times (minutes) for patients with STEMI – 2015/16 to 2024/25 [MINAP data]

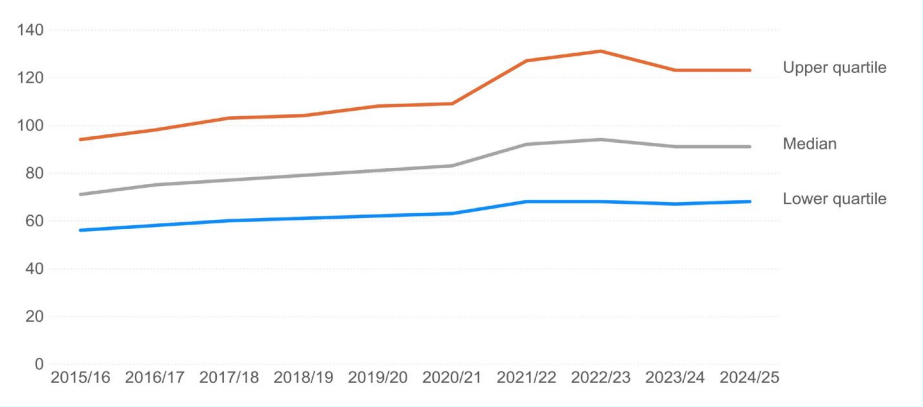


STEMI: ST-elevation myocardial infarction

This delay in treatment times is mainly because it is taking longer from when a patient calls the emergency services for help to their arriving at a hospital where the diagnosis can be confirmed and treatment provided. This Call-To-Door (CTD) time did improve marginally in 2023/24 (for the first time in many years), but there has been no further improvement in 2024/25.

Consequently, CTD times are still 20 minutes longer than they were 10 years ago [Figure 2.2].

Figure 2.2: Call-To-Door times (minutes) for patients with STEMI – 2015/16 to 2024/25 [MINAP data]

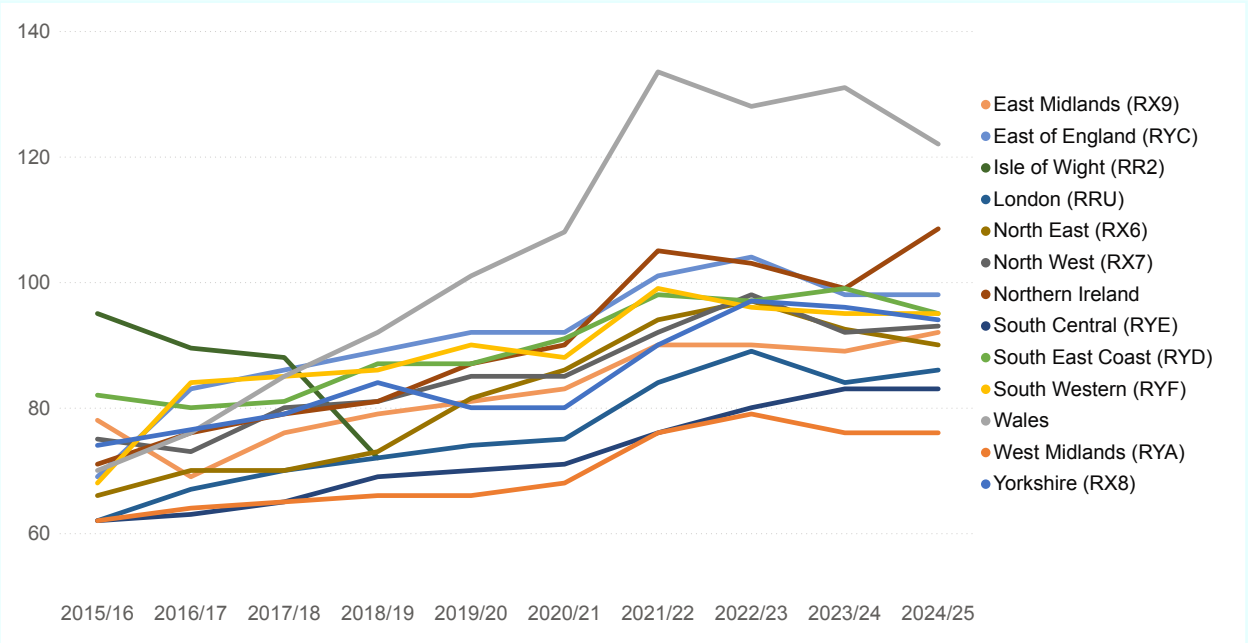


STEMI: ST-elevation myocardial infarction

Ambulance services are responsible for responding to calls for help and delivering the patient to the treatment centre. Improvements in CTD times for 'higher-risk' STEMI patients should be a priority, notwithstanding the pressures on the ambulance services and the number of cases of chest pain seen for every confirmed heart attack.

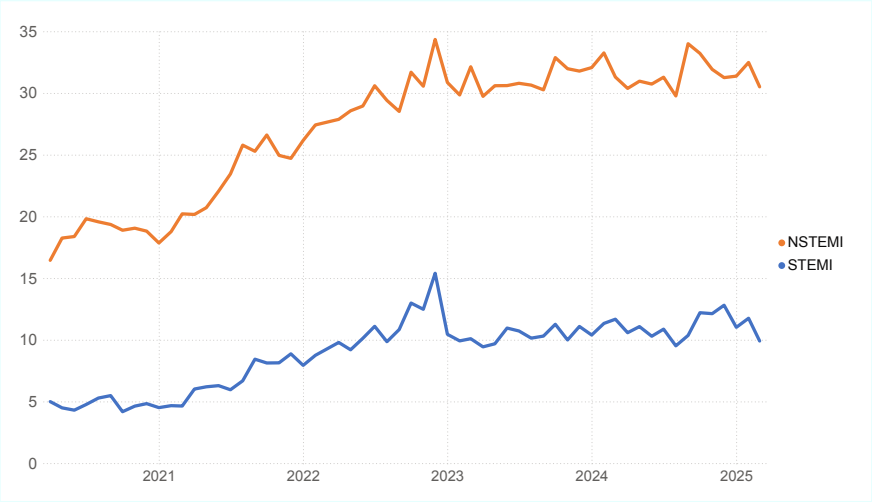
While many managed to reduce their CTD times in 2023/24, only 3 areas saw an improvement in 2024/25 (South East Coast, North East Ambulance Trusts, and Wales), with some seeing their performance worsen [Figure 2.3].

Figure 2.3: Median Call-To-Door times (minutes) by Ambulance Trust – 2015/16 to 2024/25 [MINAP data]



Perhaps partly in response to public perceptions of delays in emergency response times, a much higher proportion of heart attack patients – about 10% with STEMI and 30% with non-NSTEMI (NSTEMI) – are now self-presenting to hospital compared with before the COVID-19 pandemic, and this trend is persisting [Figure 2.4].

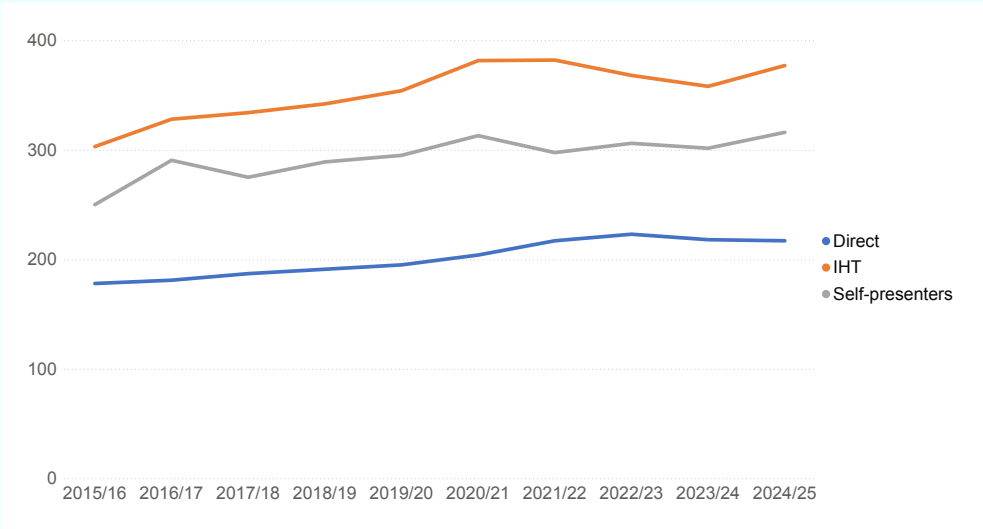
Figure 2.4: Percentage of heart attack patients (STEMI and NSTEMI) self-presenting to hospital by month – 2020 to 2025 [MINAP data]



NSTEMI: non-ST-elevation myocardial infarction; STEMI: ST-elevation myocardial infarction

Self-presenting STEMI patients have longer Symptom-to-Balloon (STB) times than those patients brought directly by ambulance [Figure 2.5]. This means they have not received treatment faster and have simultaneously jeopardised their safety by removing the potential for early resuscitation, if needed, by paramedics. It is possible that patients have died either prior to reaching hospital or in A&E departments because of this (though the audit does not collect data on these patients).

Figure 2.5: Symptom-To-Balloon times (minutes) by admission route, 2015/16 to 2024/25 [MINAP data]

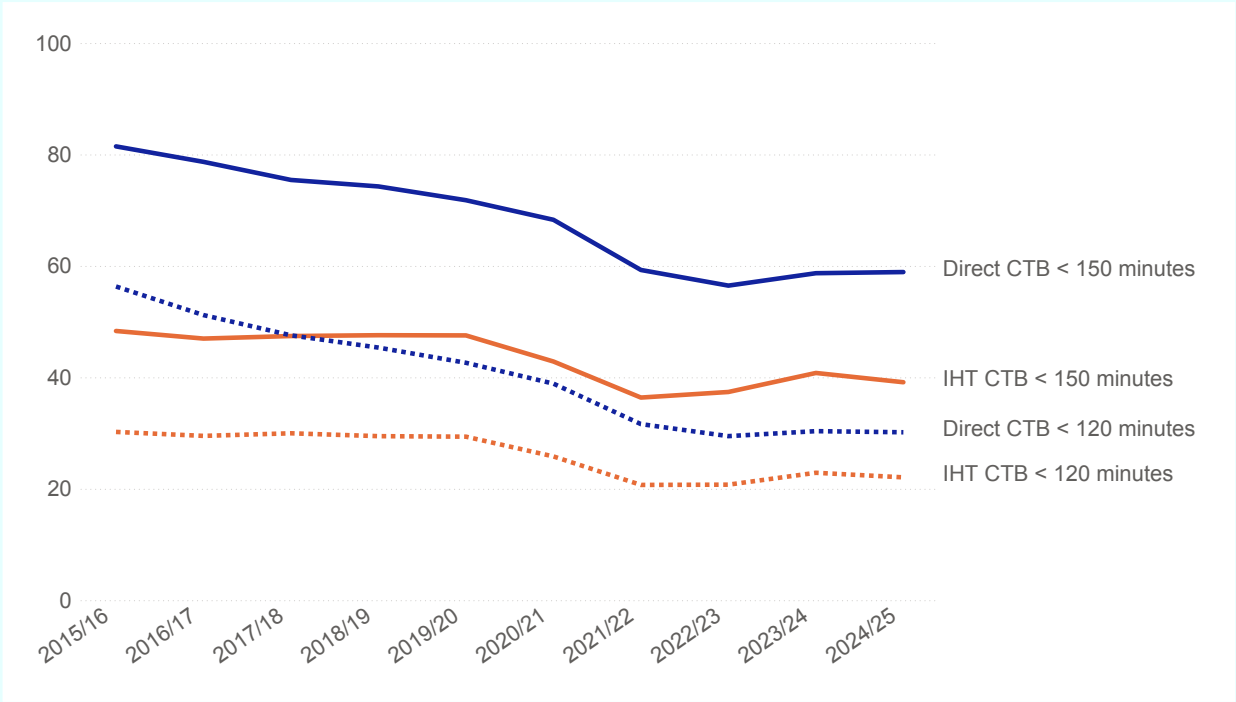


Direct: brought directly to PPCI hospital by ambulance services; IHT: inter-hospital transfer

Figure 2.5 also highlights the longer times to treatment for patients who require an inter-hospital transfer (IHT), having to be taken from a hospital that does not have PPCI facilities to one that does. The optimal pathway is for patients who think they are having a heart attack to call for help from the ambulance services. The latter can make a clinical assessment, perform an electrocardiogram (ECG) and then transfer the patient as quickly as possible directly to the most appropriate hospital.

The proportion of STEMI patients who are treated within the target CTB times has dropped substantially over the last decade [Figure 2.6]. There has been an especially marked decline in the percentage of patients taken directly to a PPCI-enabled hospital who are treated within the more stringent target time of 120 minutes, although this worsening trend seems to have plateaued over the last 3 years.

Figure 2.6: Percentage of STEMI patients treated by PPCI within target times – 2015/16 to 2024/25 [MINAP data]

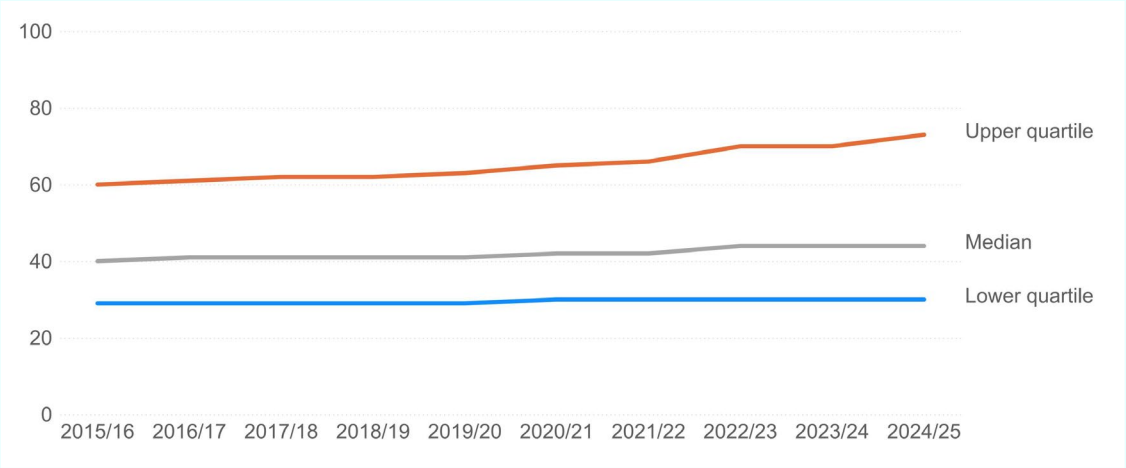


STEMI: ST-elevation myocardial infarction; CTB: Call-To-Balloon time; IHT: inter-hospital transfer

Overall CTB times combine CTD times with Door-To-Balloon (DTB) times (the period from when a patient arrives at a PPCI-capable hospital to the moment the treatment starts). While DTB times have remained relatively unchanged over time, it is concerning to see a small deterioration over the last few years [Figure 2.7]. This is reflected in the fact that too few hospitals are now meeting the target of initiating treatment within 60 minutes of arrival [Figure 2.8].

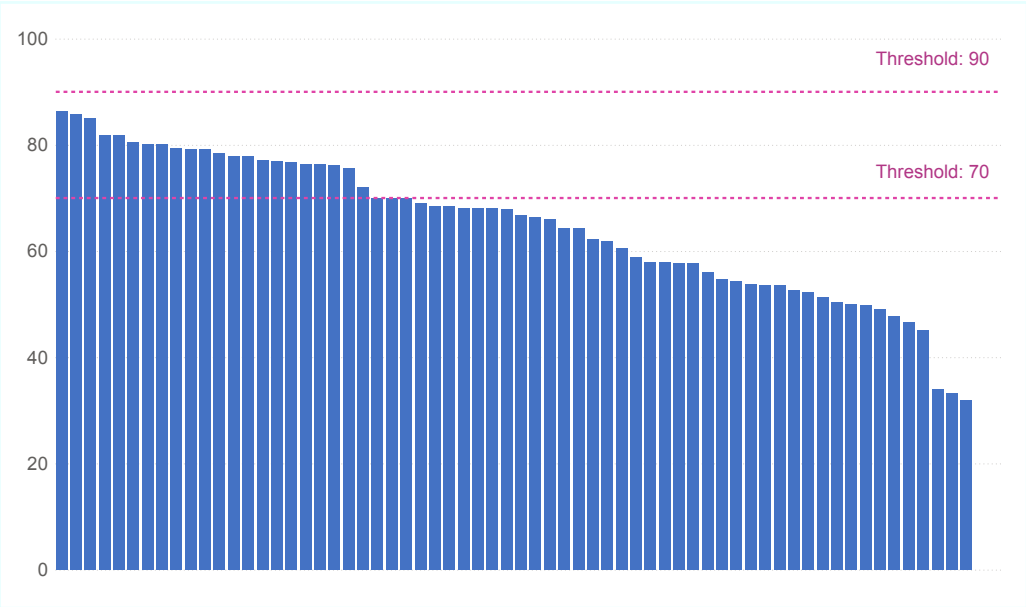
Hospitals that are not providing rapid PPCI treatment to all patients need to review their clinical pathways and make changes that improve their performance in a sustainable way. The lack of improvements in these performance metrics, despite these data being reported each year, is of considerable concern. A re-appraisal of the national STEMI pathway is required to optimise patient care and ensure the best possible outcomes.

Figure 2.7: Door-To-Balloon times (minutes) for patients with STEMI – 2015/16 to 2024/25 [MINAP data]



STEMI: ST-elevation myocardial infarction

Figure 2.8: Percentage of patients with STEMI who undergo PPCI within 60 minutes of arrival, by hospital – 2024/25 [MINAP data]



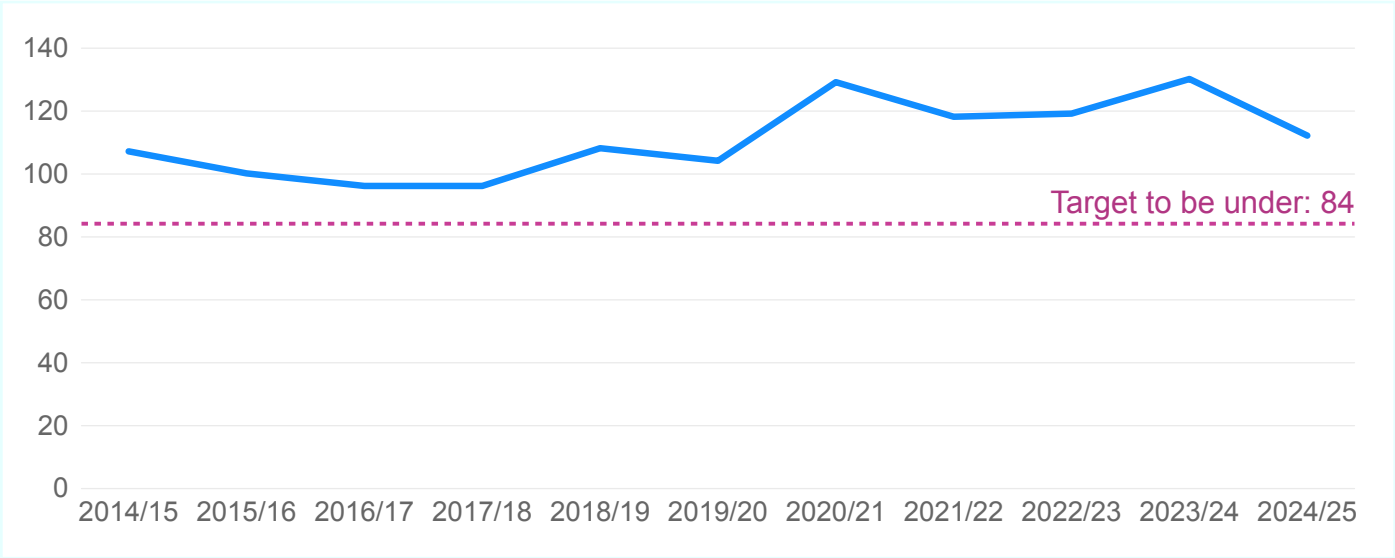
STEMI: ST-elevation myocardial infarction
Individual hospitals can be identified in the MINAP report

2.2 Waiting times for elective cardiac surgery have fallen

Much has been written over the last few years about the increased amount of time patients have to wait to get a diagnosis or treatment from the NHS. These waiting times reflect the relationship between the demand for diagnostic or treatment capacity and the available capacity in the NHS services.

It is encouraging that the average waiting time for a coronary artery bypass graft (CABG) operation fell by 14% during 2024/25, especially after the additional delays introduced by the COVID-19 pandemic [Figure 2.9].

Figure 2.9: Average waiting time (days) from angiography to elective CABG operation – 2014/15 to 2024/25 [NACSA data]



CABG: coronary artery bypass grafting

The NACSA audit has set a target of 12 weeks (84 days) from angiography to elective CABG surgery, reflecting the time required from referral to see a cardiac surgeon and to ensure all aspects of pre-care are addressed. Short intervals are achieved in the private sector. A few NHS hospitals have met or surpassed the 84-day target, but most deliver much longer waiting times [Figure 2.10]. These data may influence patients in choosing which cardiac centre to be referred to.

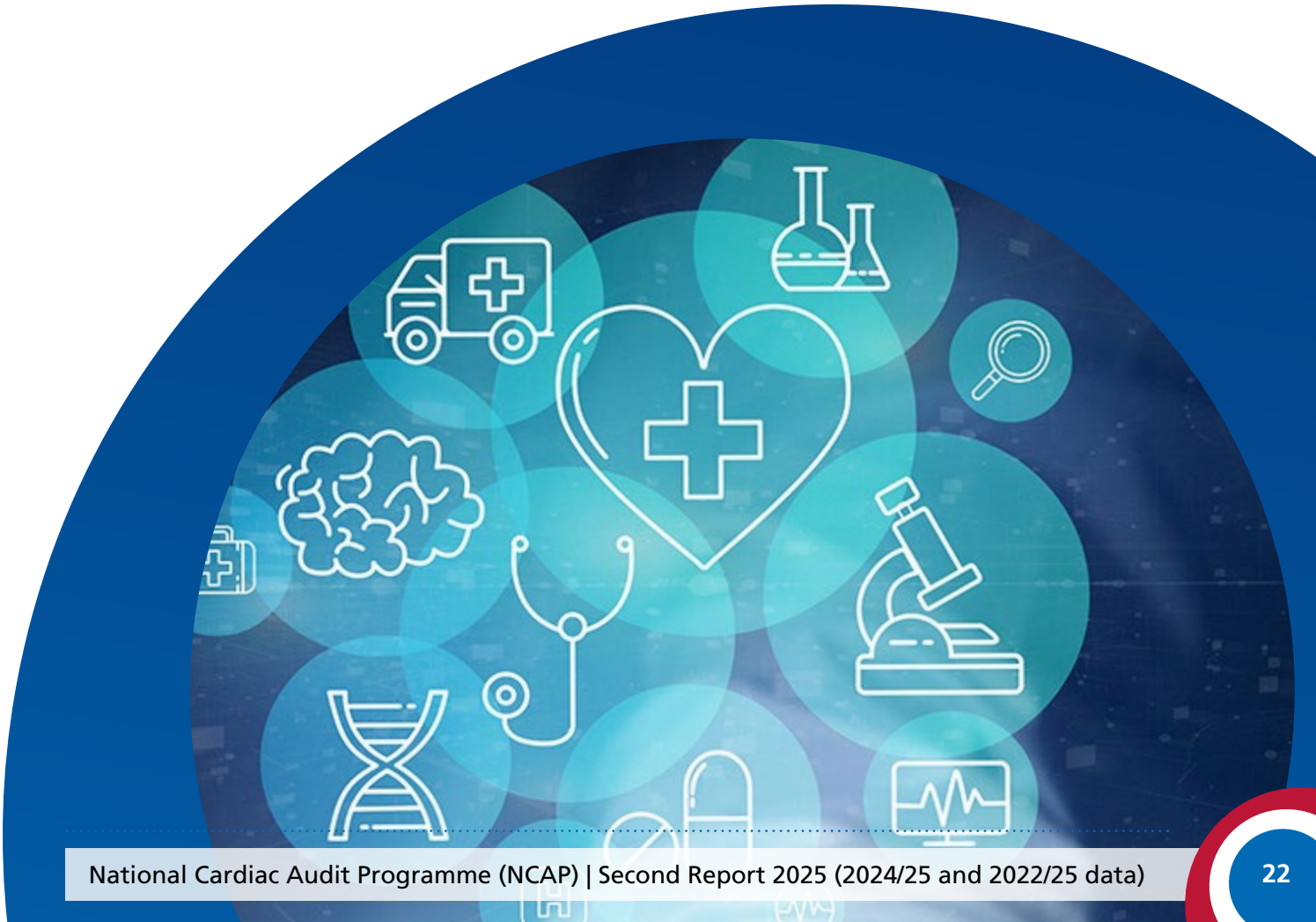
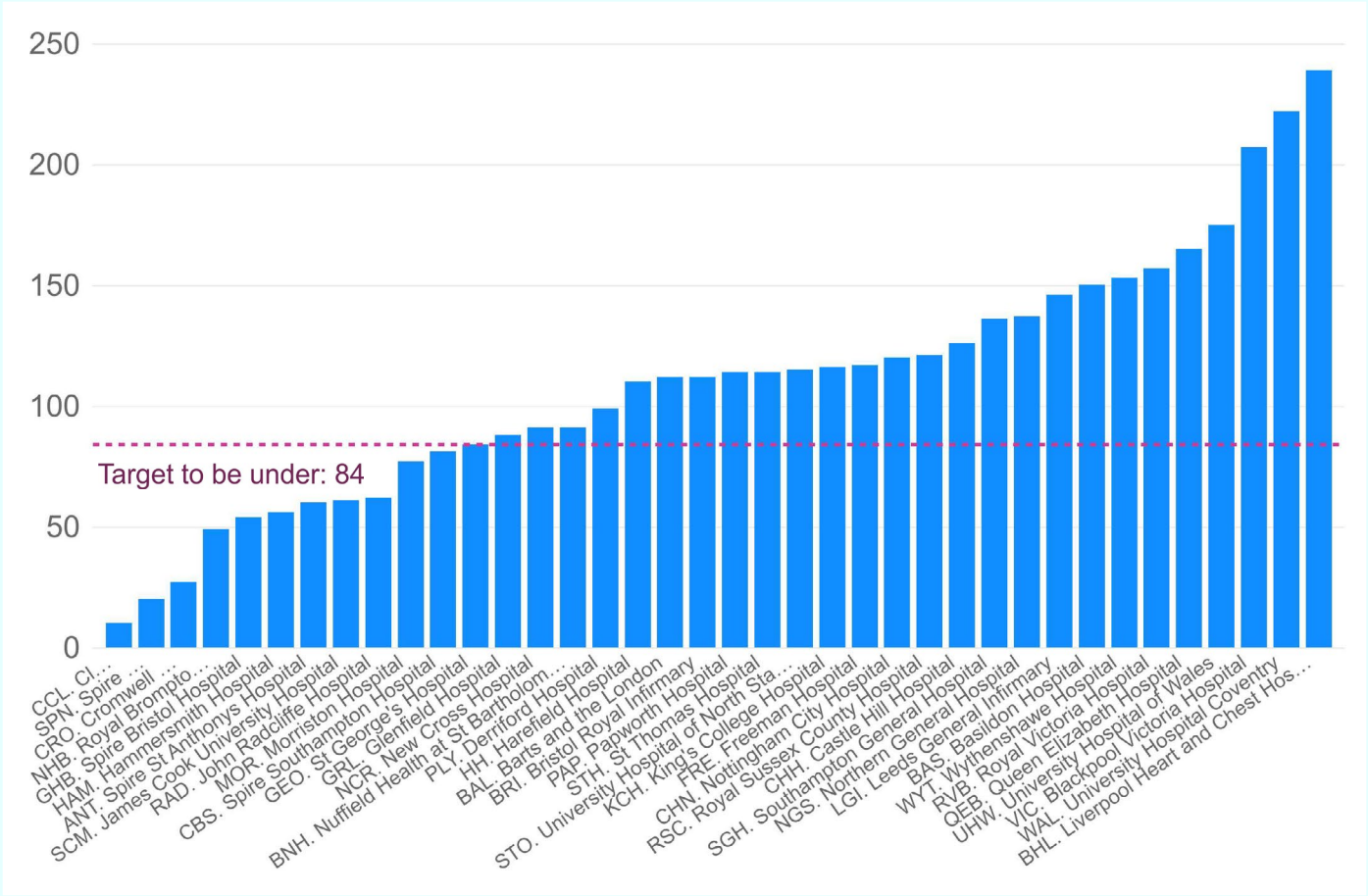


Figure 2.10: Waiting time (days) from angiography to elective CABG, by hospital – 2024/25 [NACSA data]

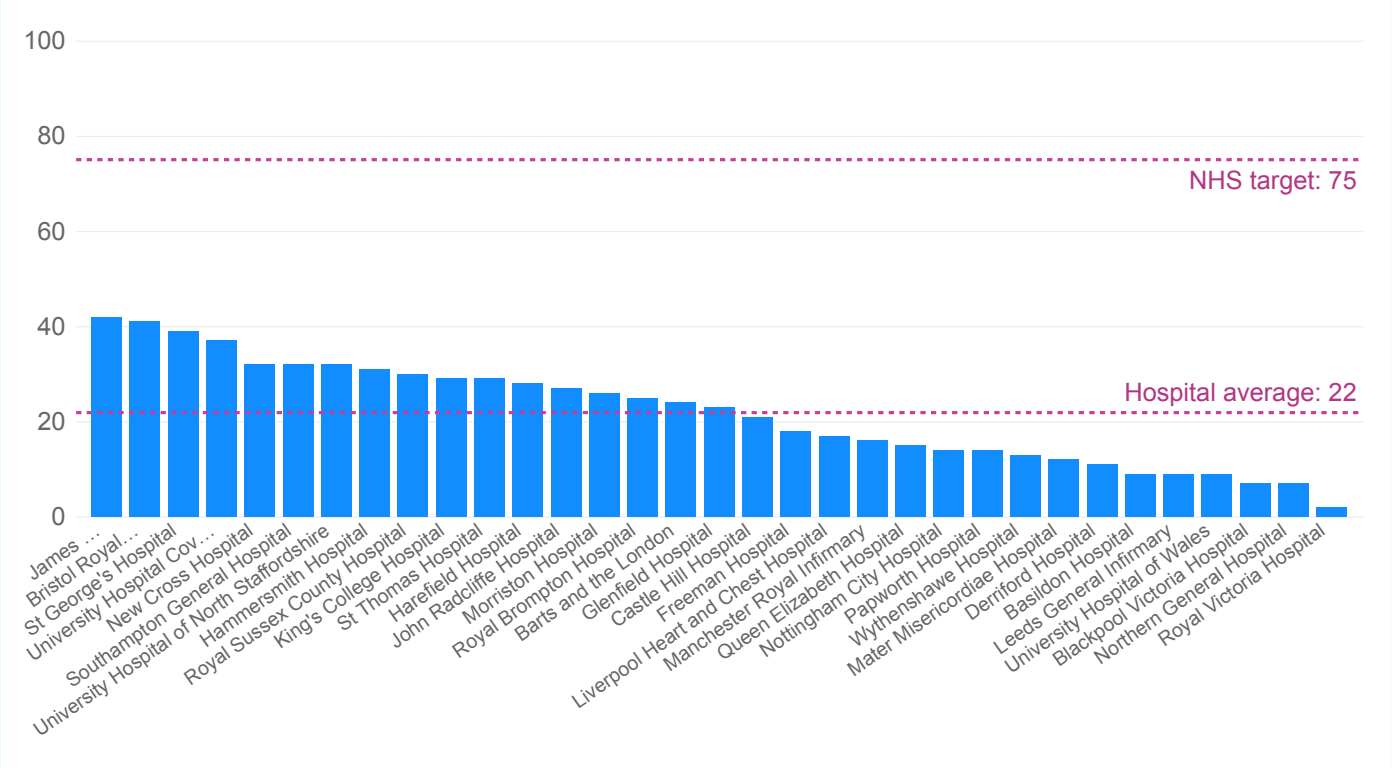


CABG: coronary artery bypass grafting

2.3 To optimise outcomes for some CABG and TAVI patients, better understanding is needed on whether to treat urgently or defer to an elective procedure

There has been no real improvement in the wait for urgent CABG procedures. All hospitals fail to reach the target of performing CABG for at least 75% of patients within 7 days of the angiogram that resulted in the decision to offer surgery [Figure 2.11].

Figure 2.11: Percentage of patients undergoing urgent CABG within 7-day target, by hospital – 2024/25 [NACSA data]



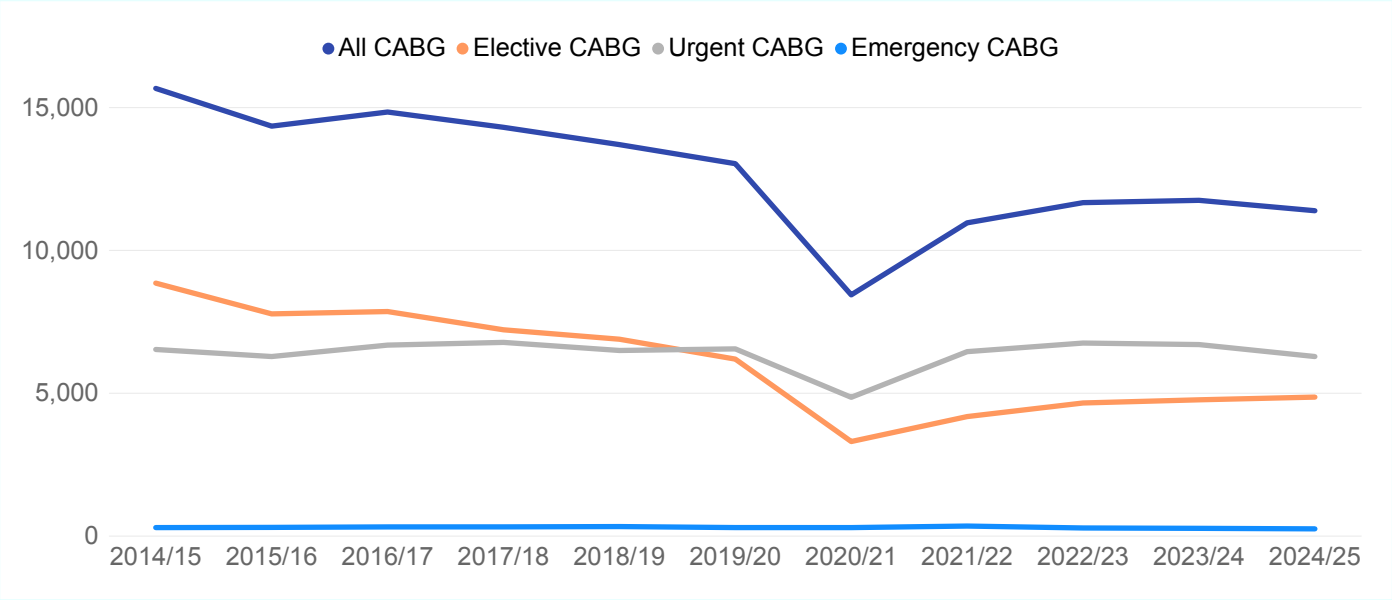
CABG: coronary artery bypass grafting

Urgent CABG surgery is mostly offered to patients with 'lower-risk' NSTEMI heart attacks to reduce the likelihood of a second event, improve longer-term prognosis and minimise the chance of future disabling symptoms.

Having one cardiac event increases the chance of having another, and these recurrent heart episodes can occur in the first 3 months after the initial presentation. This is the rationale for advocating urgent 'in-house' treatment (i.e. the CABG surgery is offered before the patient goes home after their first admission). The audit reveals that most hospitals find it difficult to meet this target and, meanwhile, many bed-days are spent on patients waiting for treatment.

Given the overall number of heart attack patients admitted to hospital in 2024/25 rose slightly, it is perhaps surprising that the number of urgent CABG cases fell by 6.3% compared with 2023/24 while elective CABG cases increased by 1.6% [Figure 2.12].

Figure 2.12: Number of isolated CABG operations by urgency – 2014/15 to 2024/25 [NACSA data]



CABG: coronary artery bypass grafting

This fall in urgent CABG cases may reflect an increasing tendency for patients to be sent home after an acute admission with a plan for subsequent elective surgery. Some have argued that because elective CABG surgery carries a lower mortality risk (0.5%) than urgent surgery (1%), it is better to discharge the patients and bring them back later as elective cases.

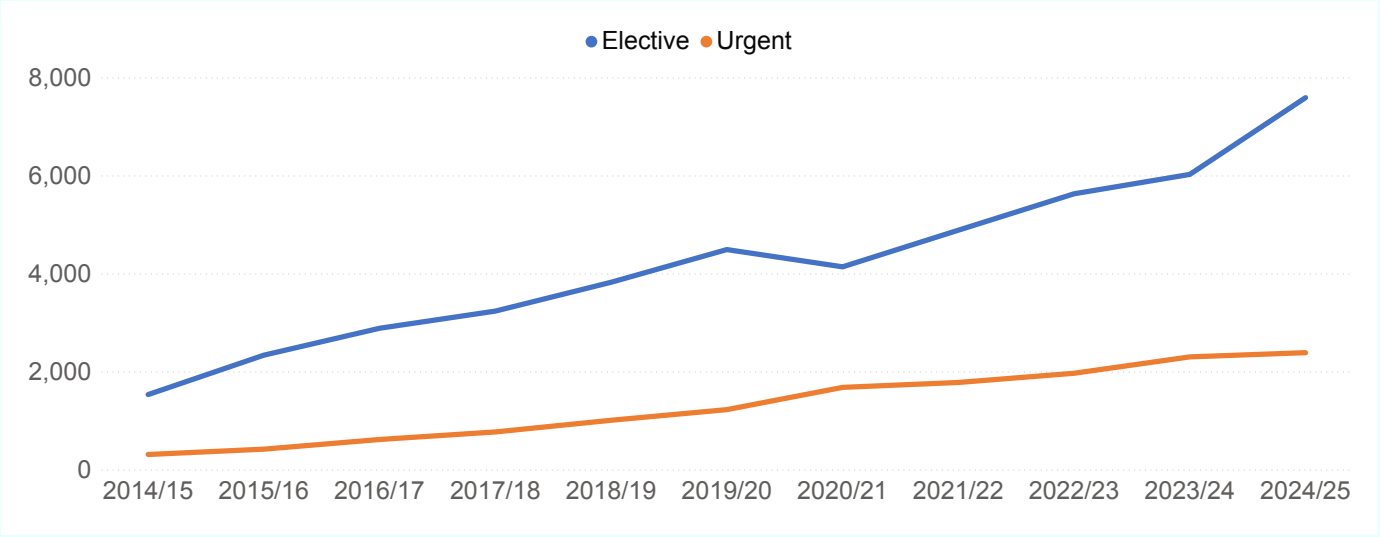
However, the risk for an individual patient is dependent on multiple risk factors, and the time from a heart attack is only one of these. Waiting longer before offering treatment may only marginally reduce the risk of surgery given all the other risk factors for that patient. Moreover, the delay may result in harm in some patients. Patients discharged home with a view to delayed surgery cannot currently be tracked by the national audit and so the balance between benefits and harm cannot be ascertained. Hospitals are recommended to review the outcomes of patients selected for this care pathway.

Patients with aortic stenosis who are being considered for surgical aortic valve replacement (AVR) or transcatheter aortic valve implantation (TAVI) form another group which highlights the balancing act between letting an acute illness settle, to minimise the risk of a procedure, but not leaving things so long that patients suffer further cardiac events or lose the benefits the treatment offered.

Some patients with aortic stenosis are treated electively having first been seen as an outpatient but many others first present with more severe symptoms such as syncope (a 'blackout'), chest pain or the development of pulmonary oedema ('fluid on the lungs'). This may lead to an urgent or emergency admission to hospital during which clinical teams may offer definitive treatment.

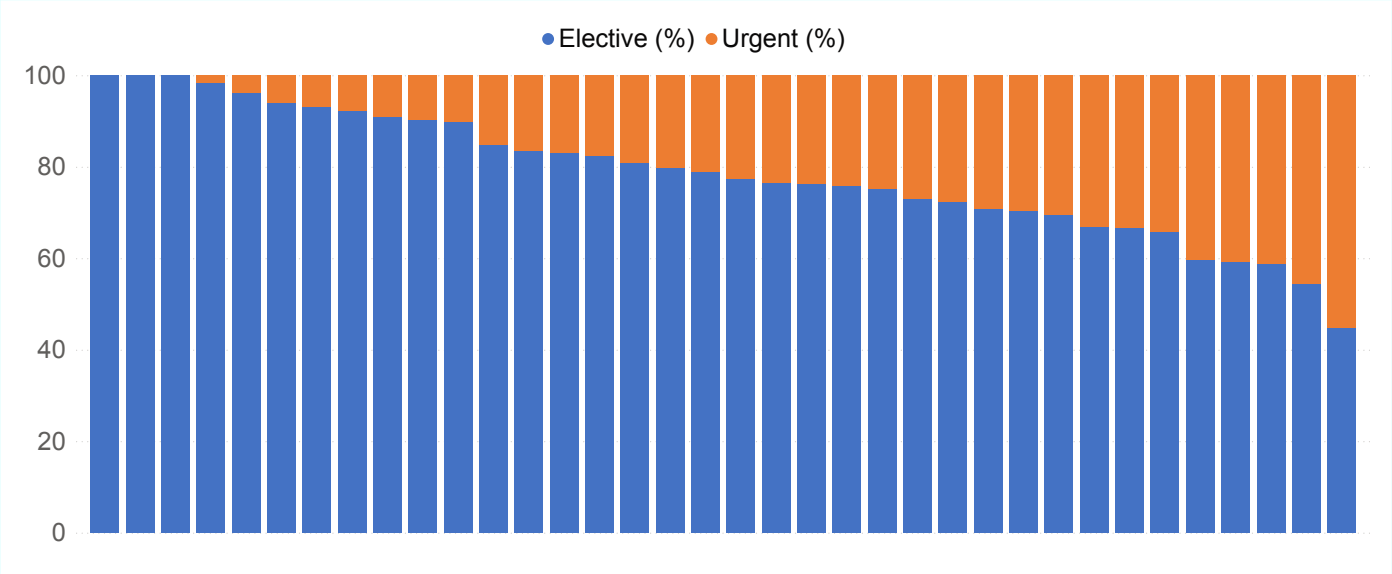
Consequently, there has been a rise in the number of patients undergoing urgent TAVI procedures over the last few years and these cases accounted for 24% of all TAVI operations in 2024/25 [Figure 2.13]. In some hospitals, urgent cases account for 50% of all TAVI patients [Figure 2.14].

Figure 2.13: Number of TAVI cases by urgency – 2014/15 to 2024/25 [UK TAVI Registry data]



TAVI: transcatheter aortic valve implantation

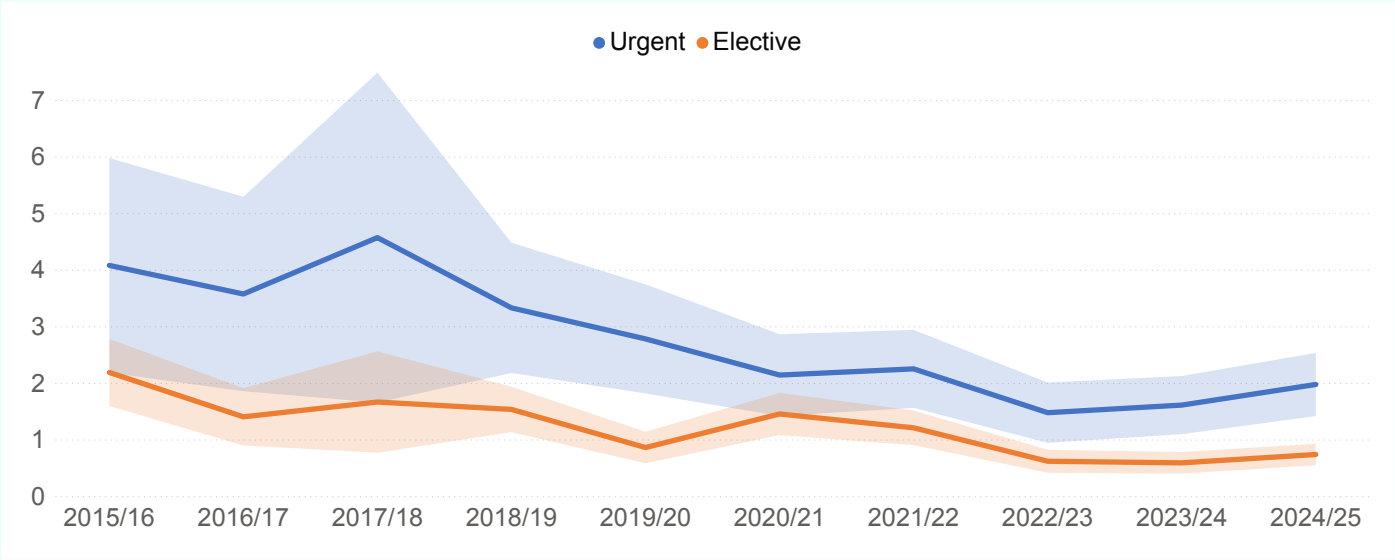
Figure 2.14: Percentage of TAVI procedures by urgency, by hospital - 2024/25 [UK TAVI Registry data]



TAVI: transcatheter aortic valve implantation
Individual hospitals can be identified in the UK TAVI Registry report

Urgent treatments, however, do involve more risks and the in-hospital mortality rate for urgent cases of 1.97% is greater than for elective patients (0.73%) [Figure 2.15].

Figure 2.15: In-hospital mortality (%) following a TAVI procedure, by urgency – 2015/16 to 2024/25 [UK TAVI Registry data]



TAVI: transcatheter aortic valve implantation

As for CABG procedures, it could be argued that it would be better to stabilise and discharge urgent TAVI patients before re-admitting them as an elective planned case a few weeks later, allowing for a period of optimisation with the hope that the treatment will then be offered at lower risk.

However, as with CABG cases, deferring treatment may not necessarily reduce its risk for the individual patient by very much and some patients may then deteriorate in the meantime and never get to treatment. This is an area that needs more research, both in classifying urgency and considering optimal pathways of care.

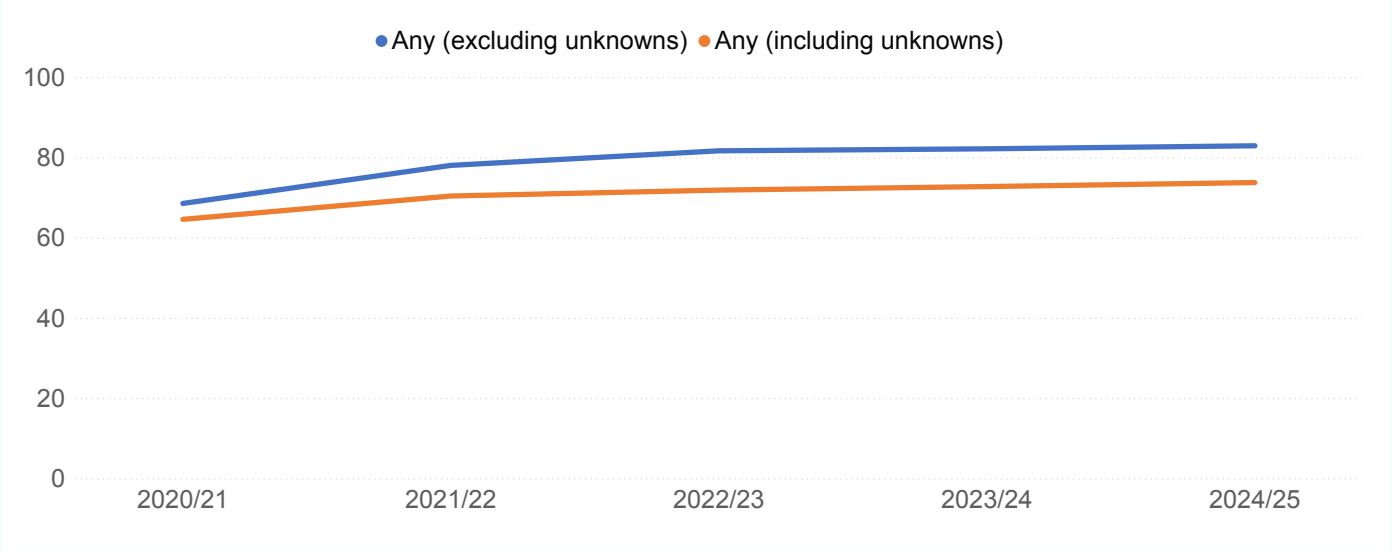
2.4 Too few patients admitted with heart failure and atrial fibrillation are receiving anticoagulants

Patients with heart rhythm irregularities called atrial fibrillation (AF) are at increased risk of having a stroke (the risk also increasing with various other factors, such as age, sex, blood pressure and impaired heart pump function).

These patients have abnormal blood flow in the back left chamber of the heart (the left atrium) and blood clots can subsequently develop in certain areas of that chamber. These clots can break loose and pass up into the brain, blocking a vessel and causing damage to brain tissue. This risk can be reduced by the prescription of an anticoagulant drug ('blood thinner').

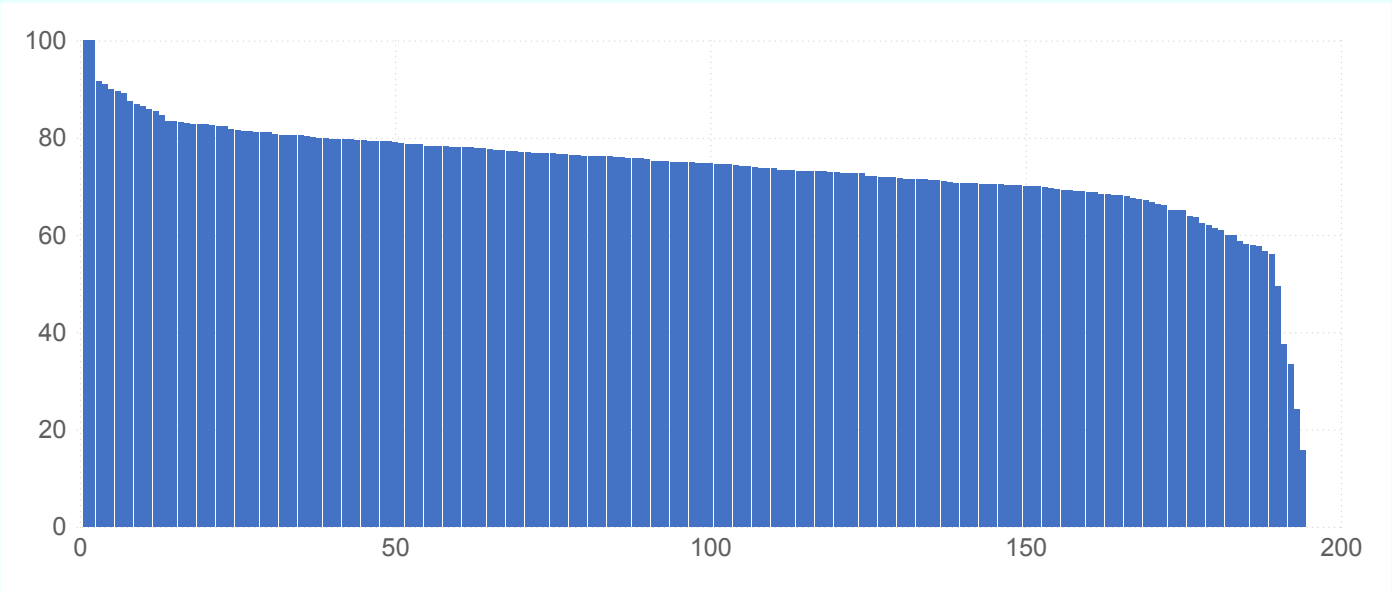
It is therefore concerning that a significant minority of patients with AF are not prescribed an anticoagulant, something the National Heart Failure Audit (NHFA) has reported on over the last couple of years. Those with a contra-indication to treatment are not included in this metric, suggesting that potentially up to 1 in 4 eligible HF patients are being discharged from hospital without being prescribed an anticoagulant [Figure 2.16]. Only 5 hospitals discharged 90% or more of these patients on an anticoagulant in 2024/25 [Figure 2.17].

Figure 2.16: Prescription of anticoagulants (%) for patients admitted with heart failure and atrial fibrillation, with and without inclusion of 'unknowns' in the denominator – 2020/21 to 2024/25 [NHFA data]



Note: Some hospitals did not complete this field. In the above analyses, the cases where the variable is marked 'unknown' either remain in the denominator (orange line), on the assumption that these patients did not have a contra-indication to treatment, or are removed from the denominator (blue line).

Figure 2.17: Prescription of anticoagulants for patients admitted for heart failure and atrial fibrillation (including 'unknowns' in denominator), by hospital – 2024/25 [NHFA data]



Individual hospitals can be identified in the NHFA report

3. Productivity – services should be delivered efficiently

Delivering cardiac services efficiently makes the most of the available healthcare resources so that patients receive the right care in the right place. Being able to deal with more cases, shortening hospital stays, and preventing unnecessary readmissions are all examples of improvements that contribute to treating more people, helping patients recover faster, and keeping services sustainable as the demand for cardiac care continues to grow.

3.1 The number of cardiac surgical operations is increasing with more cases per surgeon

There has been a 3.1% rise in the number of cardiac operations, albeit still not to pre-pandemic levels [Figure 3.1]. Part of this may result from an 8% rise in the number of operations performed each year by each cardiac surgeon [Figure 3.2].

This suggests that some of the post-pandemic obstacles to increasing surgical activity, examined by an NHS England Cardiac Surgery Think Tank in 2023, are being overcome. Hopefully, we will see these numbers increase uniformly across the country and waiting times fall.

Figure 3.1: Number of cardiac surgical operations in England, Wales and Northern Ireland – 2014/15 to 2024/25 [NACSA data]

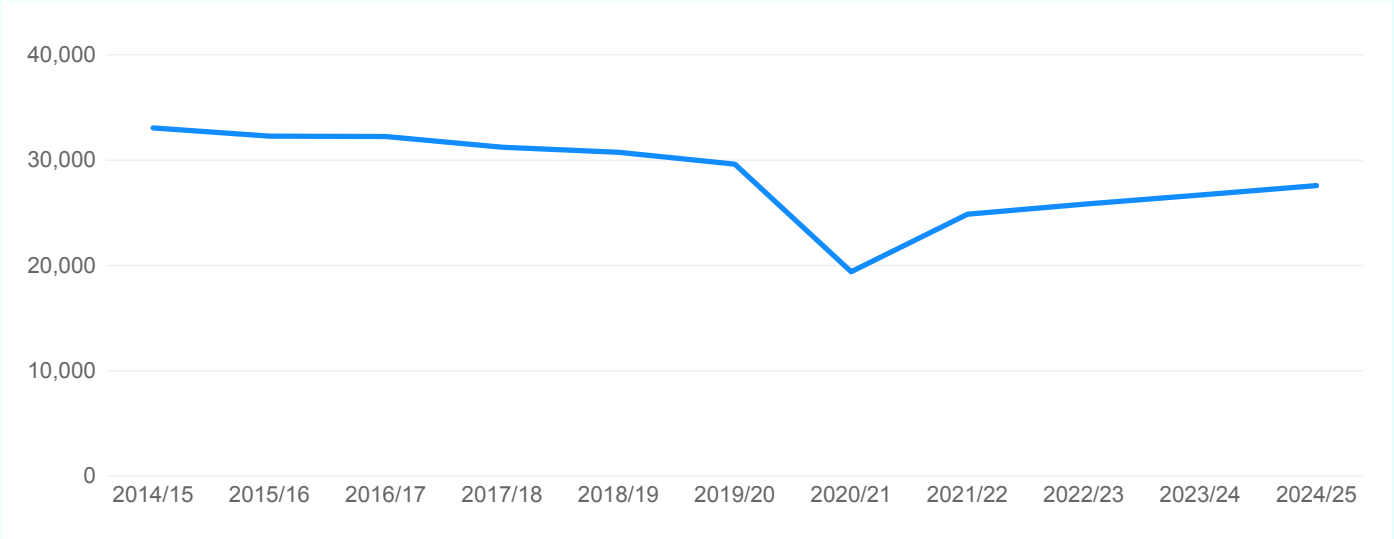
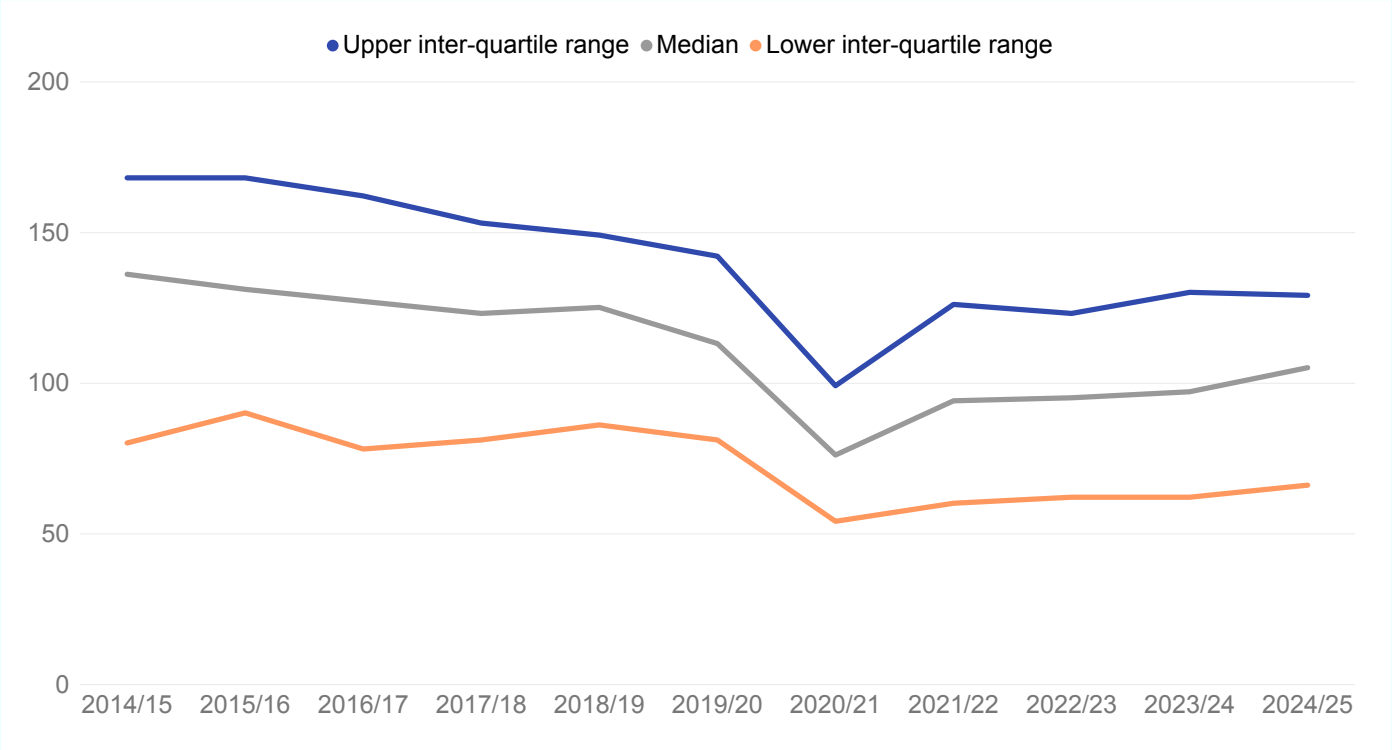


Figure 3.2: Number of cardiac surgical operations in England, Wales and Northern Ireland – 2014/15 to 2024/25 [NACSA data]

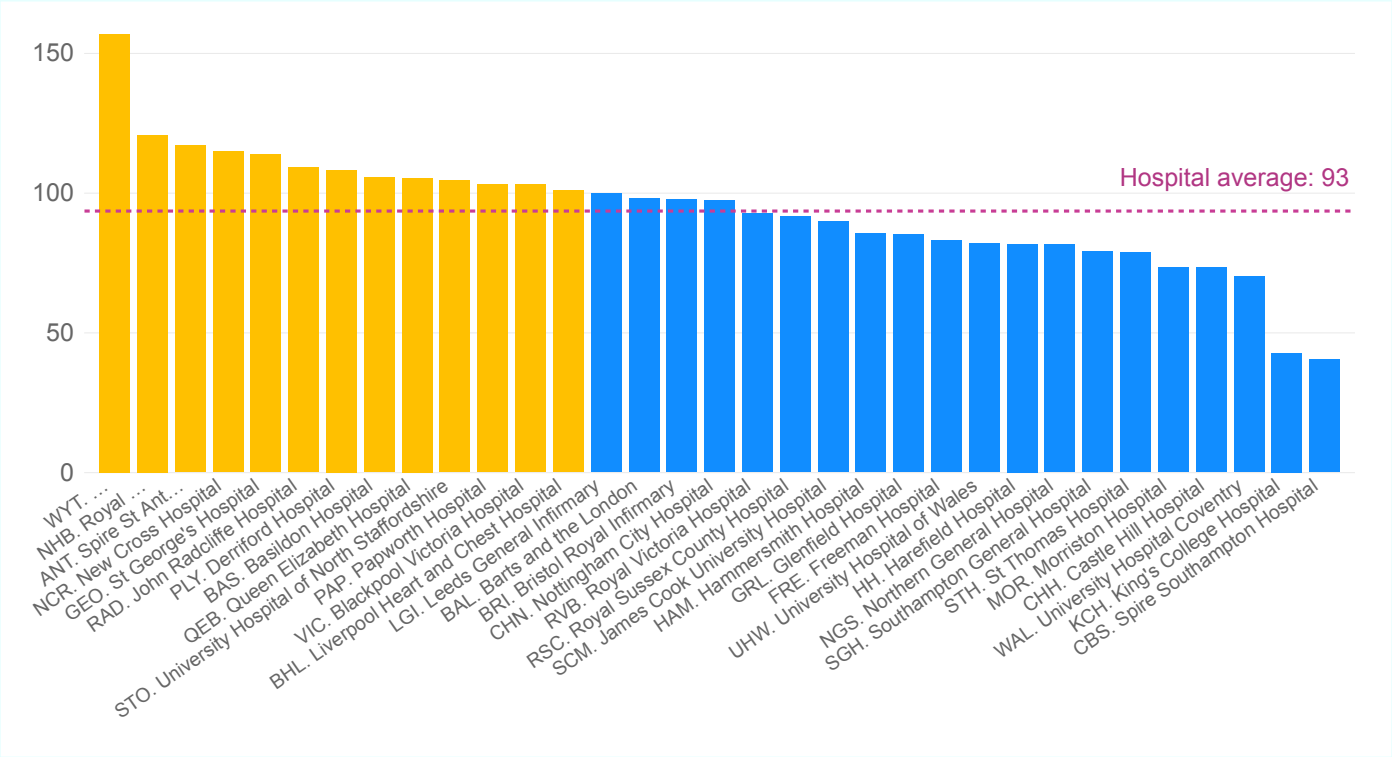


Several factors, though, play a part in suppressing the number of cardiac operations:

- There was a major disruption of services during the pandemic and, while some hospitals are performing more operations than they were prior to the pandemic, others continue to deliver fewer than they did in 2019/20 [Figure 3.3]. The reasons for this variation are unclear.

- The growing evidence on the benefits of drug treatment suggests that once patients are on optimal medical treatment (including a statin and ACE-inhibitor/equivalent drug) they are less likely to receive additional prognostic benefit from revascularisation therapy such as coronary artery bypass graft (CABG) operations or percutaneous coronary intervention (PCI) ('angioplasty'). These procedures are then more often used to improve symptoms and quality of life.

Figure 3.3: Percentage of cardiac procedures performed by individual hospitals – 2024/25 compared to 2019/20 [NACSA data]



Centres in yellow are performing more surgery than prior to the pandemic

3.2 Day-Of-Surgery Admissions for elective cardiac operations have increased, but this approach could be used more

A 19% increase in the rate of Day-Of-Surgery Admission (DOSA) has helped the efficiency of cardiac surgical units. DOSA rates in England are getting back to pre-pandemic levels and have grown slightly in Northern Ireland [Figure 3.4]. However, few hospitals use DOSA on a large scale [Figure 3.5].

It may be easier for private centres or hospitals with no A&E department, where the pressures around urgent cases are less. Those with low DOSA levels could learn from better-performing hospitals – especially Blackpool Victoria Hospital – about how to make the necessary changes to clinical pathways and use of pre-admission clinics.

Figure 3.4: Percentage of Day-Of-Surgery Admission cases for elective cardiac surgery by country – 2019/20 to 2024/25 [NACSA data]

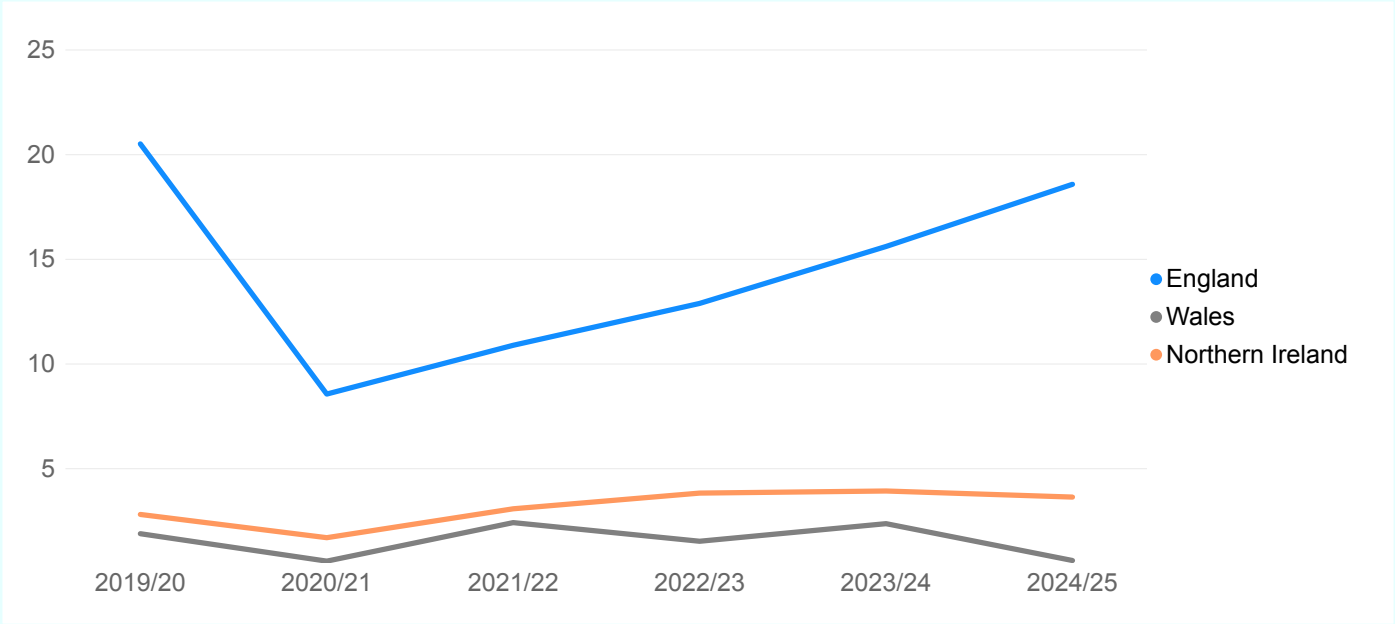
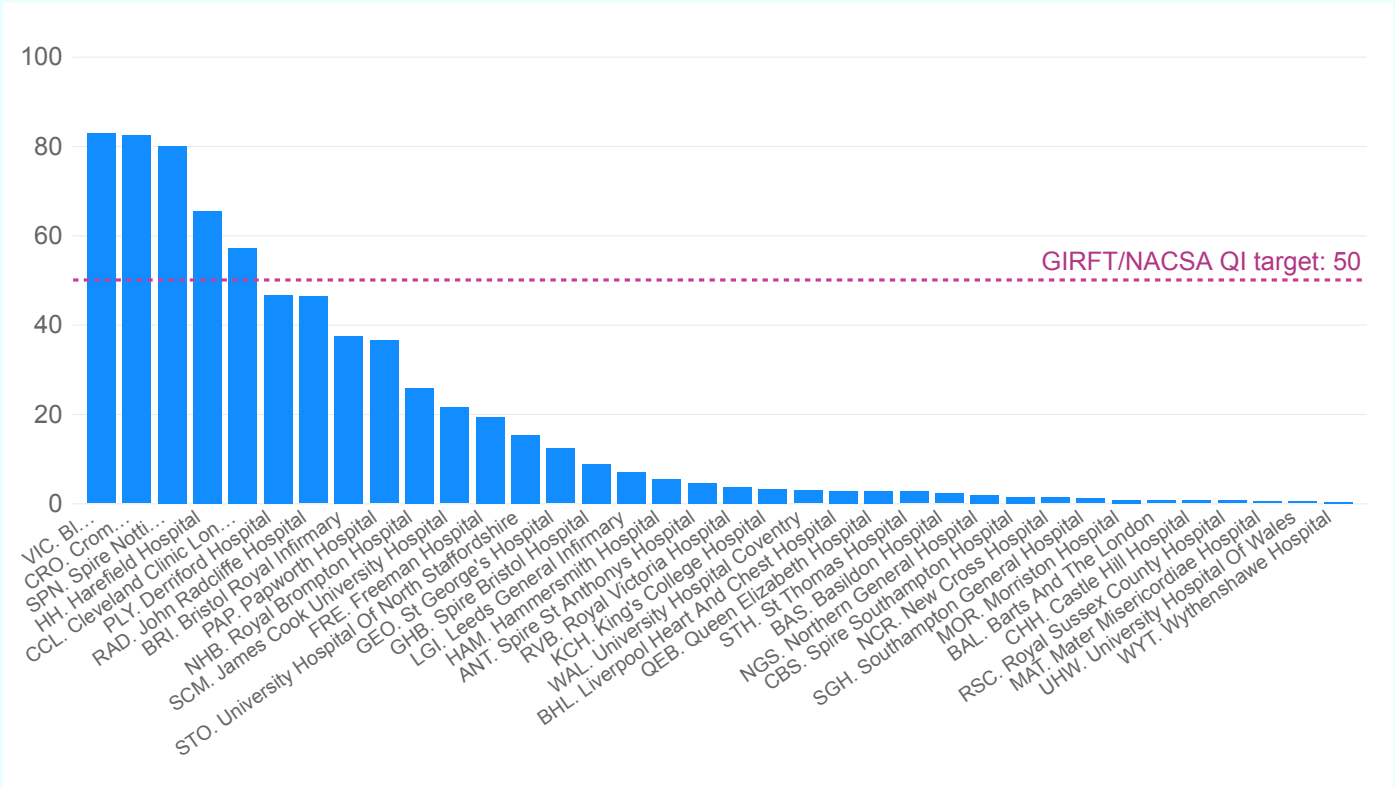


Figure 3.5: Percentage of Day-Of-Surgery Admissions for elective cardiac surgery, by hospital – 2024/25 [NACSA data]



GIRFT: Getting It Right First Time

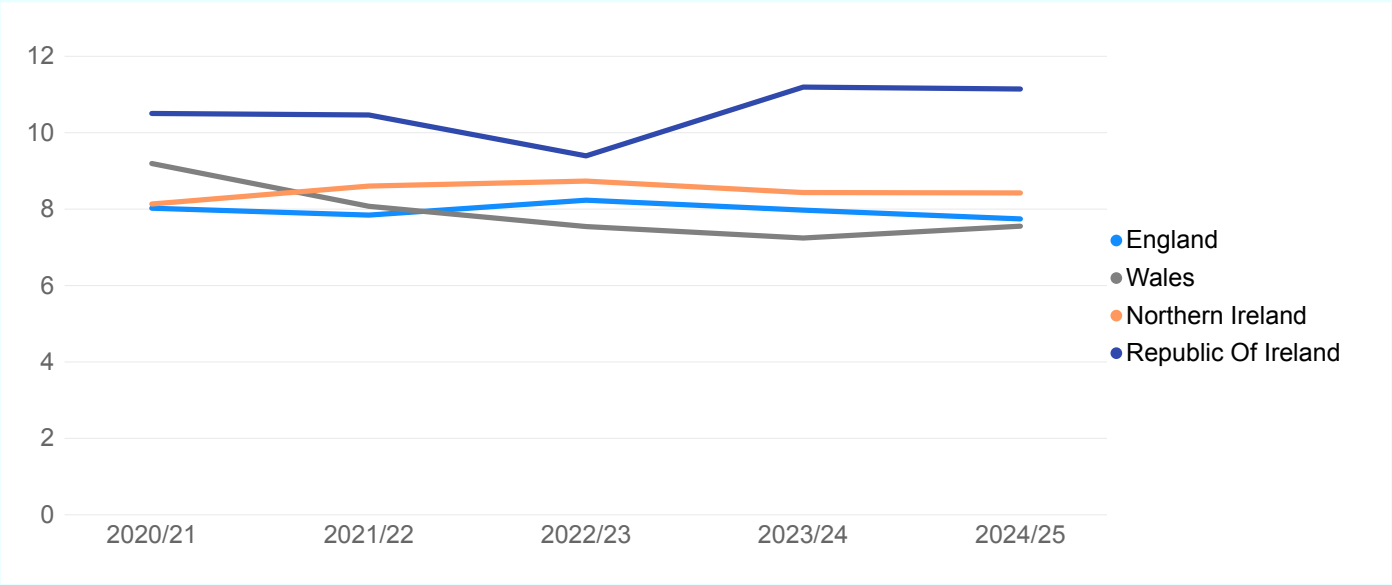
3.3 Reduced lengths of stay in hospital following CABG could potentially be associated with adverse outcomes and more readmissions

Another potential means of increasing productivity is to reduce the length of stay (LOS) a patient has in hospital following a procedure (if this can be done safely). In England and Northern Ireland there has been a slight reduction in LOS after CABG operations [Figure 3.6], but this varies considerably between hospitals, notwithstanding the evidence of a difference in their case mix [Figure 3.7].

There is potentially a risk that the faster discharges which enable lower LOS could result in higher rates of subsequent readmission if patients are sent home before having their treatment optimised or insufficient community support is available. The NACSA audit has for the first time provided data on readmissions in the first 30 days after CABG operations and these reveal wide variation between hospitals [Figure 3.8].

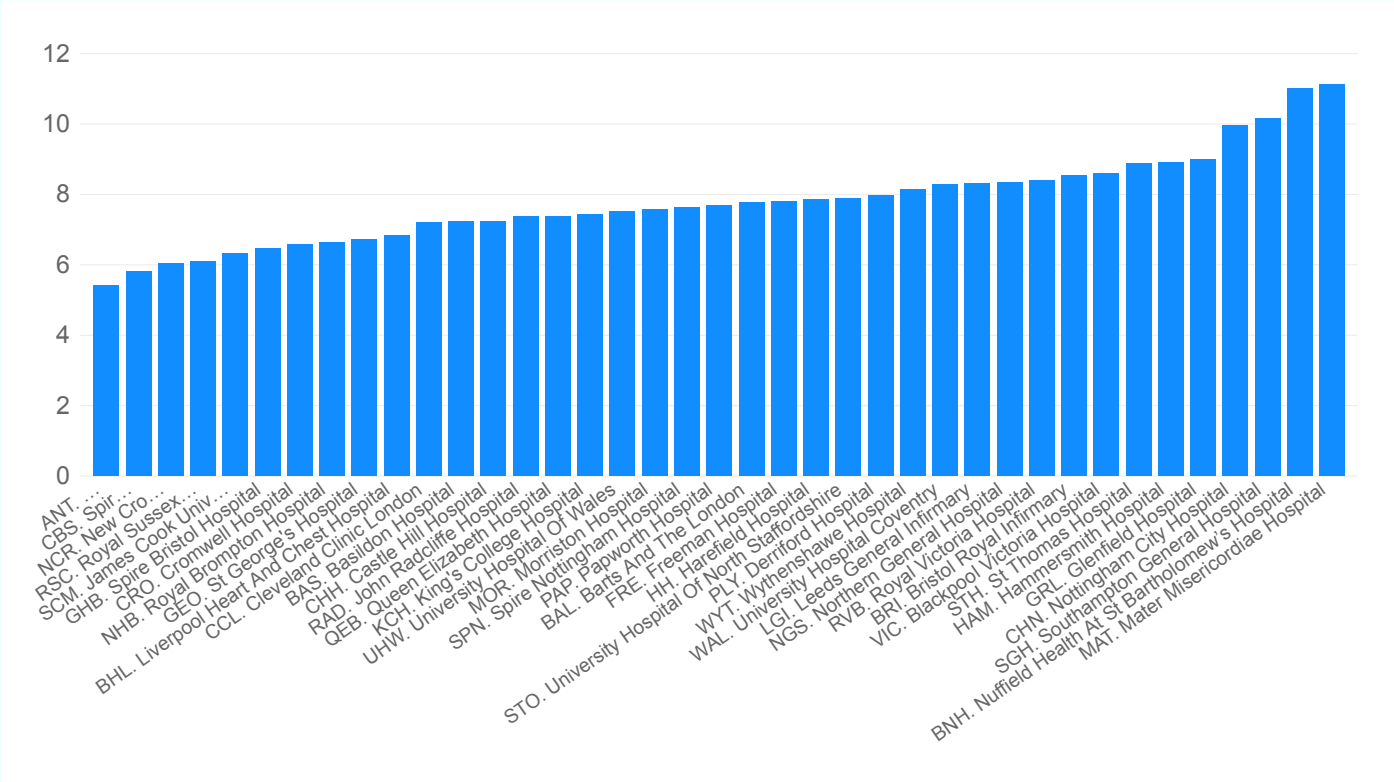
Further analysis is required to determine the exact causes of this, including assessing the extent to which this may or may not be driven in part by early discharge.

Figure 3.6: Post-operative length of stay (days) in hospital after CABG, by country – 2020/21 to 2024/25 [NACSA data]



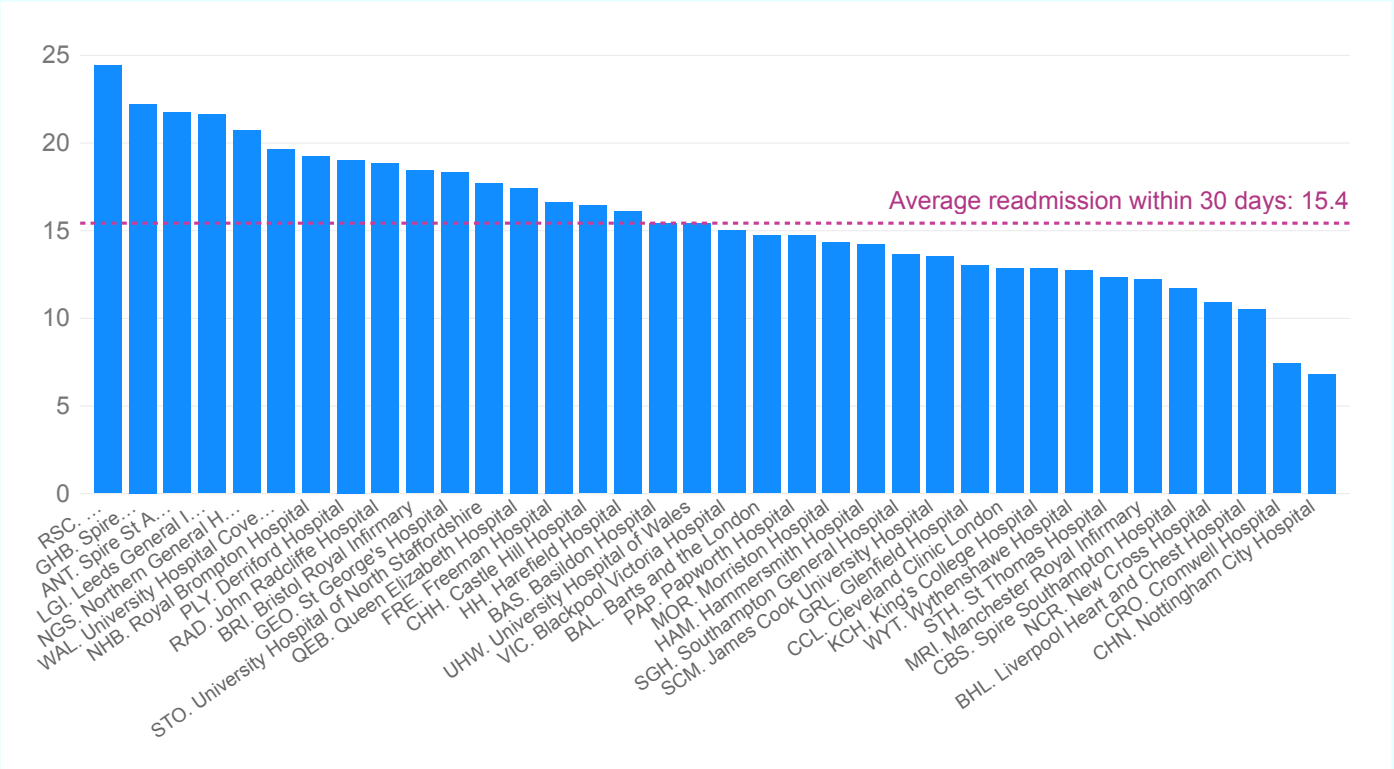
CABG: coronary artery bypass grafting

Figure 3.7: Post-operative length of stay (days) after CABG, by hospital – 2024/25 [NACSA data]



CABG: coronary artery bypass grafting

Figure 3.8: Readmission rates (%) within 30 days following cardiac surgery, by hospital – 2024/25 [NACSA data]



Our last report also highlighted the reduced lengths of stay for patients undergoing transcatheter aortic valve implantation (TAVI) for aortic stenosis. The observation was also made that the 30-day mortality rate of treated patients is slightly higher than the in-hospital mortality rate, demonstrating that a few patients die shortly after discharge. The challenge is to ensure that care is optimised for patients to prevent avoidable deaths.

The latest report from the UK TAVI Registry also shows the in-hospital mortality rate of 0.73% (elective cases) and 1.97% (urgent cases) increasing to rates of 1.1% and 3.1%, respectively, at 30 days.

3.4 More patients with congenital heart disease are being treated but the number of surgical procedures remains below pre-pandemic levels

Treatments for congenital heart disease were especially affected by the pandemic but have steadily risen back to pre-pandemic levels [Figure 3.9]. This is largely down to a rise in percutaneous interventional procedures and pacing/electrophysiological treatments, while the number of cardiac surgery operations has not returned to pre-pandemic levels, most notably amongst neonates and infants [Figure 3.10].

Whether this reflects a changing requirement for surgery, greater use of more complex procedures (rather than sequential staged procedures), or shifts in management strategies towards interventional procedures is not yet clear.

Figure 3.9: Total NHS procedures for patients with congenital heart disease – 2014/15 to 2024/25 [NCHDA data]

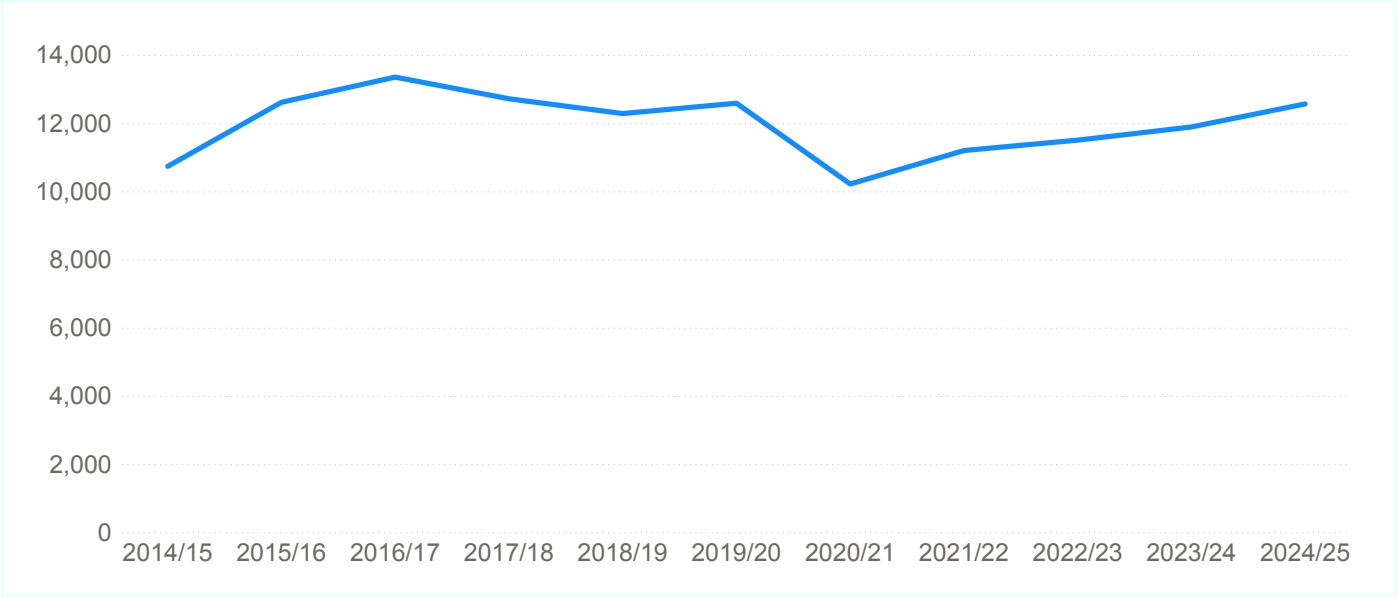
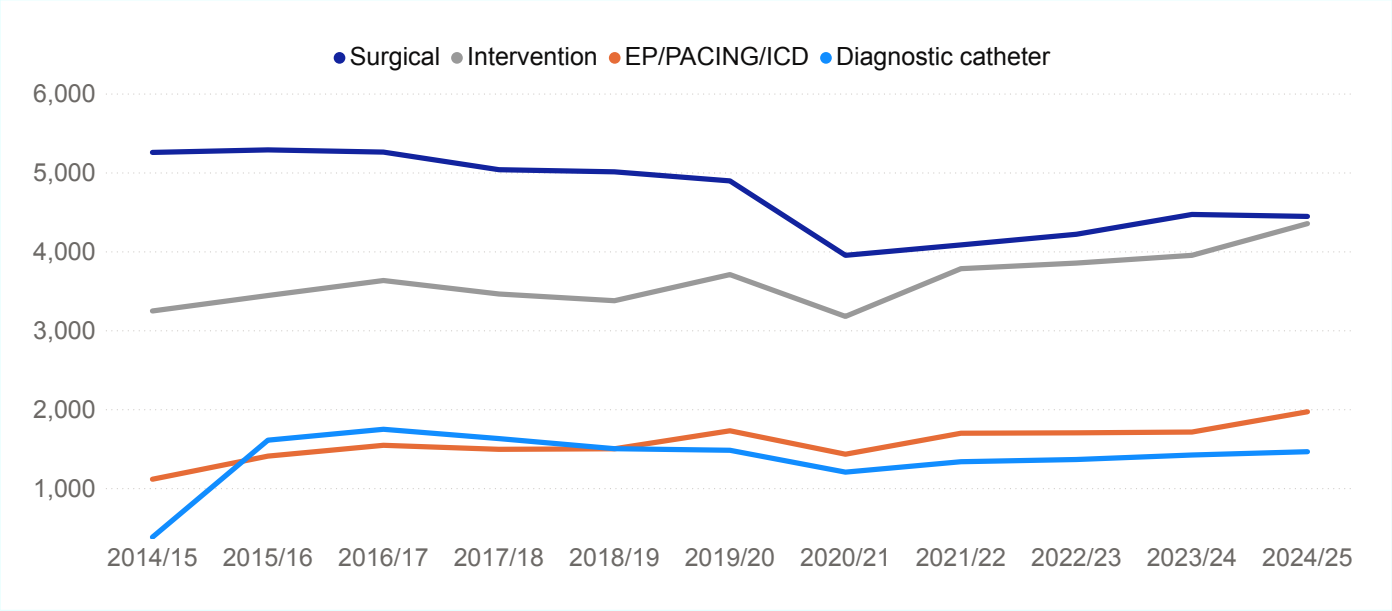


Figure 3.10: NHS Congenital heart disease procedures by category – 2014/15 to 2024/25 [NCHDA data]



EP: electrophysiology; ICD: implantable cardioverter defibrillator

4. Prevention – hospital treatments should improve future outcomes for patients

Preventing heart disease reduces deaths, avoids lifelong disability, lowers healthcare costs, and helps people stay healthier and active for longer. Hospitals play an increasingly important role in detecting and treating disease in its early stages to prevent its progression (called secondary prevention) and minimising the impact of an existing and established disease (tertiary prevention).

This contribution sits alongside efforts in 'primary prevention', which focuses on stopping the disease occurring in the first instance and is largely the remit of public health and primary care organisations.

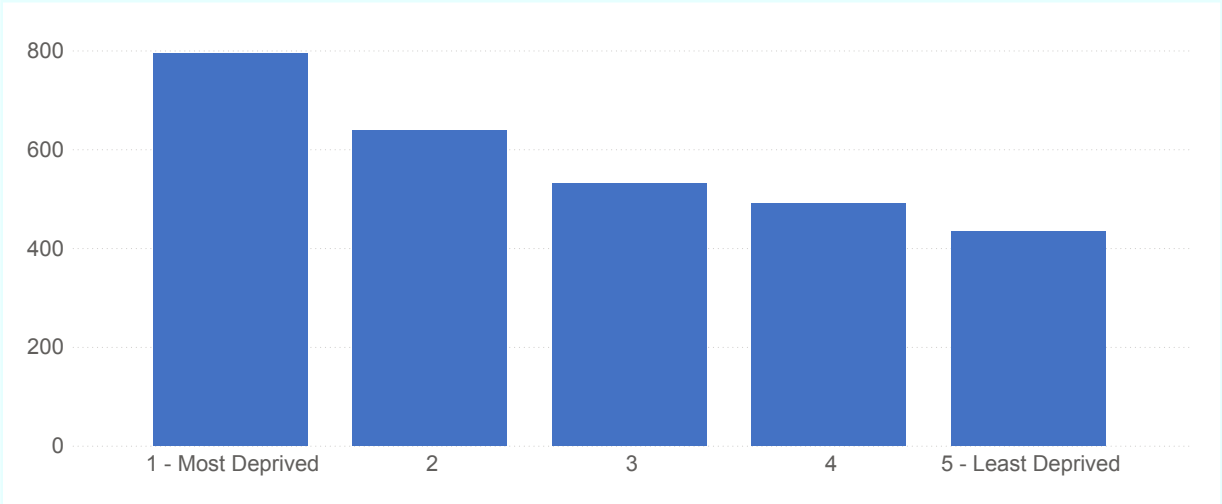
4.1 Targeted prevention strategies are required to reduce variation in disease prevalence between geographic areas and genders

Primary preventive measures, as recorded by the national CVDPrevent programme, have almost certainly played an important role in reducing the number of heart attacks and revascularisation procedures. These measures have had less impact in cutting HF admissions and there is a wide range of these cases across different parts of the country.

There are 83% more HF admissions in the most deprived areas compared to the least deprived [Figure 4.1]. This could result from a higher incidence and prevalence of HF in these communities and/or a lack of early community-based diagnosis and management initiatives aimed at preventing admissions.

Either way, local health systems should focus on prevention and management of risk factors in these areas.

Figure 4.1: Admissions with heart failure (cases per 100,000) for patients >65 years of age, by index of multiple deprivation quintiles – 2024/25 [NHFA data]

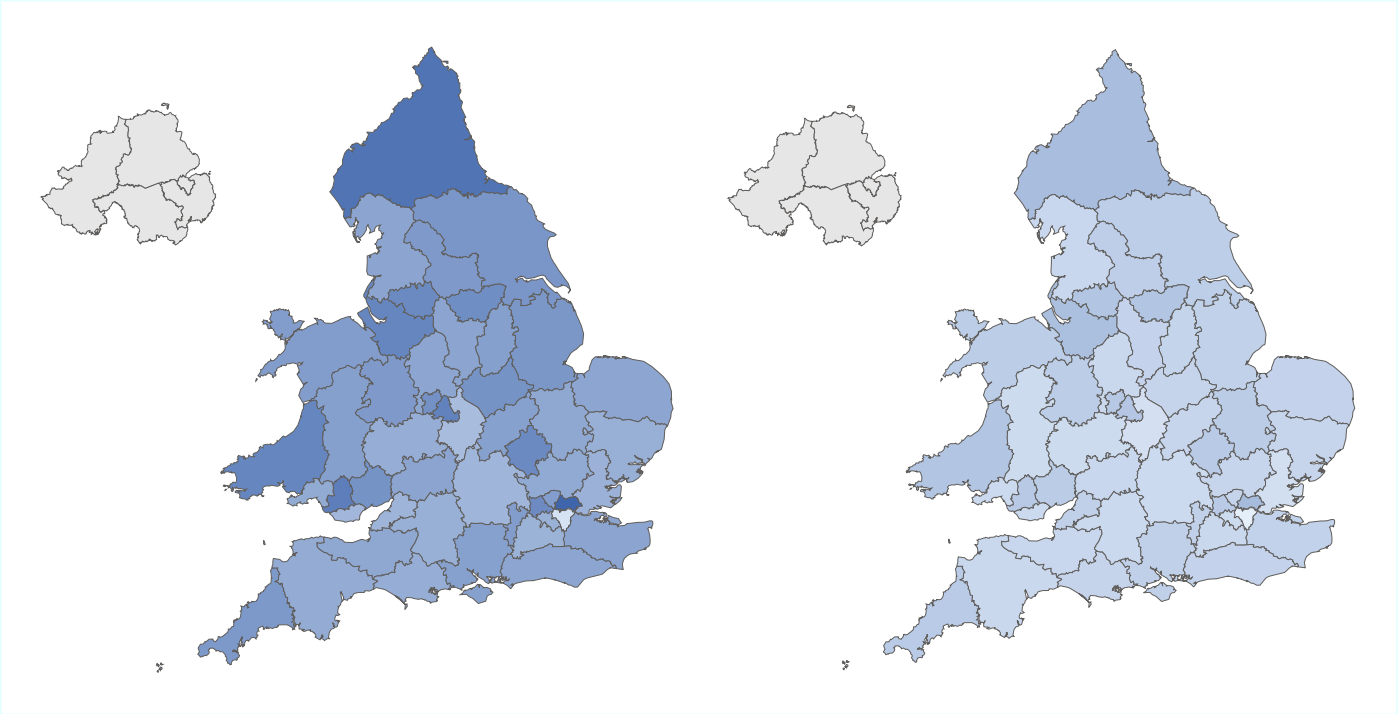


A similar variation can be seen for heart attack:

- Males are 2.4 times more likely to be admitted for a heart attack than females
- Some geographic areas (e.g. the North East and North West of England, Wales and North East London) have heart attack admission rates that are almost 7 times higher compared with others [Figure 4.2].

These results, which are age-adjusted and take account of local demographic differences, point to places where primary and secondary preventive measures might most be needed.

Figure 4.2: Age-standardised rates of admission with a heart attack based on patient home location for males (left) and females (right), by ICB/Health Board – 2024/25 [MINAP data]



Note: Darker shades reflect a higher rate. Rates vary between 22 and 149 per 100,000 population for males and 9 and 61 per 100,000 population for females.

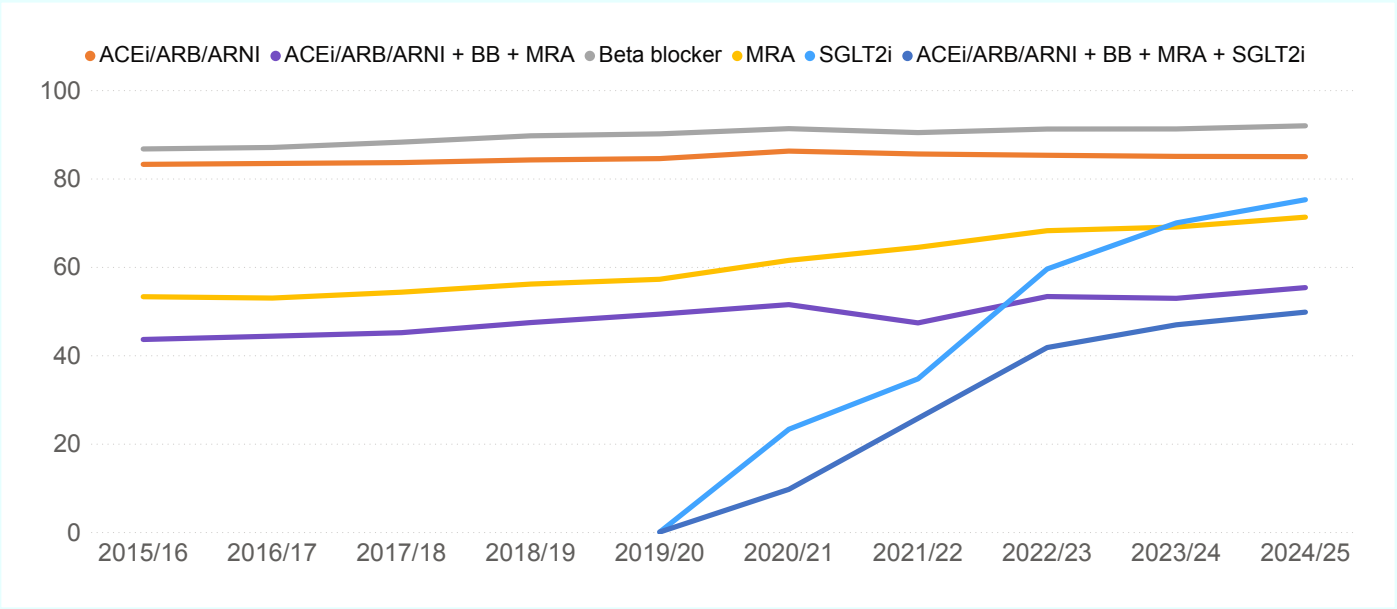
4.2 Drug-based prevention strategies for heart failure are improving but there is much more to do

HF patients with reduced ejection fraction (HFrEF – where the heart does not pump out as much blood as it should) who are admitted to hospital should be prescribed the 'four pillars of care' (unless this is 'contra-indicated' as not appropriate for the individual):

- A beta blocker
- An ACE-inhibitor (or equivalent)
- A mineralocorticoid receptor antagonist (MRA)
- A sodium glucose transporter 2 inhibitor (SGLT2i) drug (the fourth 'pillar').

Much more effort is needed to ensure that every patient is discharged on all 4 drugs as this currently only occurs in 50% of cases [Figure 4.3].

Figure 4.3: Percentage of patients with HFrEF prescribed different drug treatments – 2015/16 to 2024/25 [NHFA data]



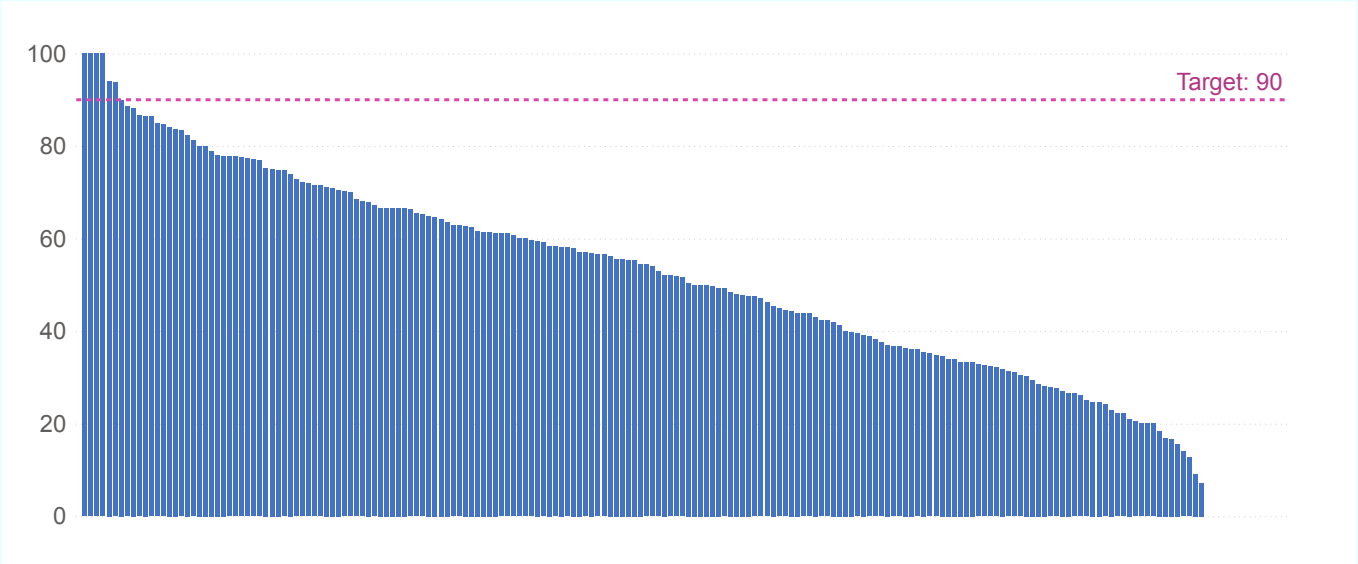
ACEi: angiotensin converting enzyme inhibitor; ARB: aldosterone receptor blocker; ARNI: angiotensin receptor-neprilysin inhibitor; BB: beta blocker; HFrEF: heart failure with reduced ejection fraction; MRA: mineralocorticoid receptor antagonist; SGLT2i: sodium glucose transporter 2 inhibitor

There has been sustained use of beta blockers and ACE-inhibitors (or equivalent) and a significant increase in the prescribing of the SGLT2i drugs (now for 75% of eligible patients). However, MRAs (72%) are not being prescribed to all patients, despite the positive evidence which has been available for many years. This is possibly related to too much caution about the possibility of MRAs contributing to renal failure or inducing higher potassium – as the NHFA has shown there is little difference in the creatinine and potassium levels of those receiving and not receiving an MRA drug.

Hospitals vary very widely in their prescribing of these preventative drugs, with some ensuring that 100% of patients are discharged on all 4 while other hospitals achieve this in just 7% of cases [Figure 4.4].

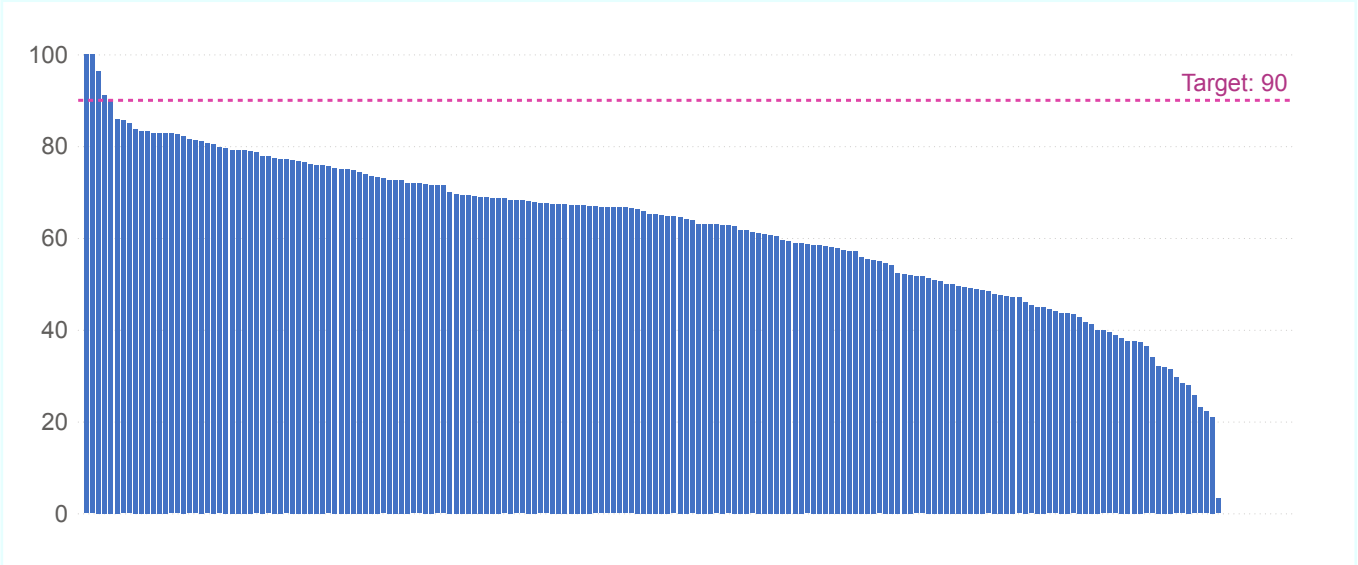
It is possible for missing drugs to be added after the patient returns home, but this does not always happen, and guidelines recommend starting on at least low doses of all 4 drug classes prior to discharge (with a view to increasing the doses later if needed). Prescribing rates of newer SGLT2i drugs prior to discharge also vary widely by hospital (from 3% to 100%) [Figure 4.5].

Figure 4.4: Percentage of HFrEF patients prescribed all 4 guideline-recommended drugs prior to discharge, by hospital – 2024/25 [NHFA data]



HFrEF: heart failure with reduced ejection fraction
Target: NHFA-recommended target
Individual hospitals can be identified in the NHFA report

Figure 4.5: Percentage of patients with HFrEF prescribed an SGLT2i drug prior to discharge, including unknowns in the denominator, by hospital – 2024/25 [NHFA data]



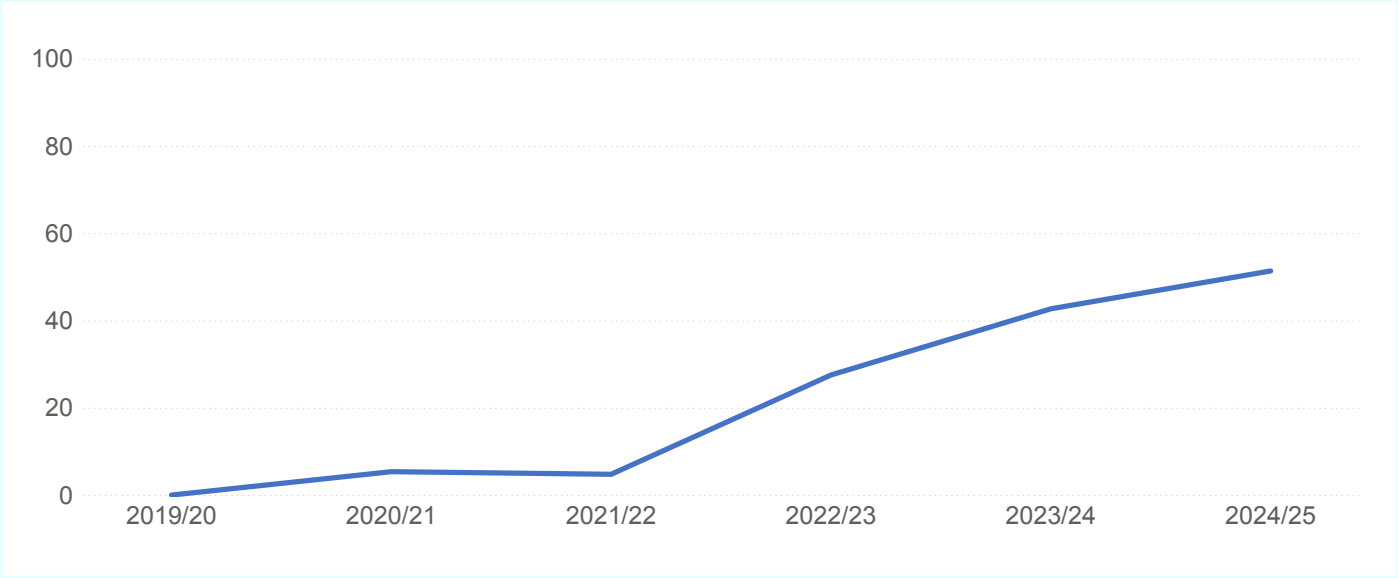
HFrEF: heart failure with reduced ejection fraction; SGLT2i: sodium glucose transporter 2 inhibitor
Target: NHFA-recommended target
Individual hospitals can be identified in the NHFA report

HF patients with preserved ejection fraction (HFpEF) have symptoms of heart failure and yet their systolic ('pumping') function is relatively well preserved. These patients have abnormalities with the relaxing ('filling up') phase of the heart pump cycle.

Until recently, no medication had been shown to improve longer-term outcomes, although symptoms could be treated by diuretics and other drugs. There is now evidence that the use of SGLT2i drugs can lead to better outcomes for patients with HFpEF.

It is encouraging that there is early take-up by some hospitals of this medication for both patients with HFpEF and the 'intermediate' patient group (those between 'preserved' and 'reduced') [Figure 4.6].

Figure 4.6: Percentage of non-HFrEF patients prescribed an SGLT2i drug – 2019/20 to 2024/25 [NHFA data]



Non-HFrEF: those who do not have heart failure with reduced ejection fraction

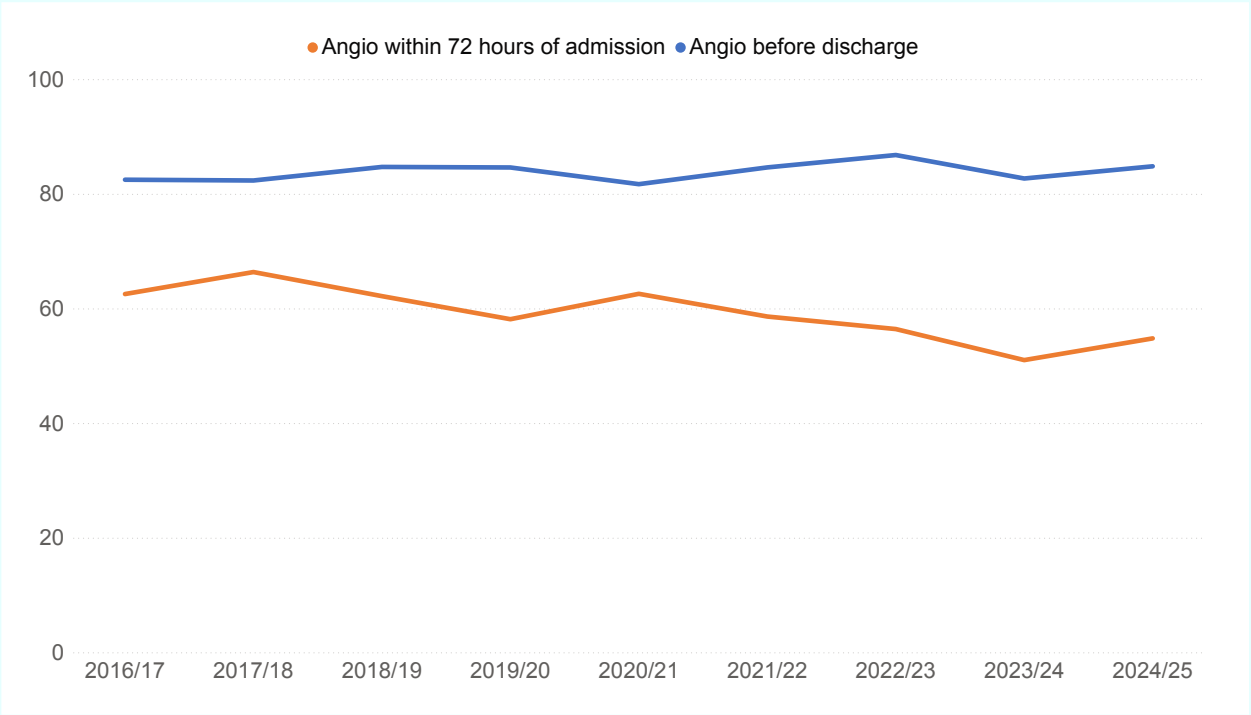
4.3 Many hospitals could improve prevention strategies for patients following a heart attack

Guidelines recommend that patients with 'lower-risk' NSTEMI heart attacks should undergo coronary angiography to reveal the extent of coronary disease, evaluate immediate and future risks, and determine whether coronary revascularisation therapy (with either PCI or CABG) is warranted. A high use of coronary angiography has been achieved with 85% of patients undergoing this, a slight increase compared with 2023/24 and slightly higher than a decade ago [Figure 4.7].

It is recommended that patients with certain adverse clinical features undergo coronary angiography within 72 hours as this not only identifies those at greatest risk of early adverse events, but also improves the efficiency of services. Although there was a slight improvement in 2024/25, timely coronary angiography is only achieved in 55% of cases. Few hospitals are offering early coronary angiography to most of their patients [Figure 4.8].

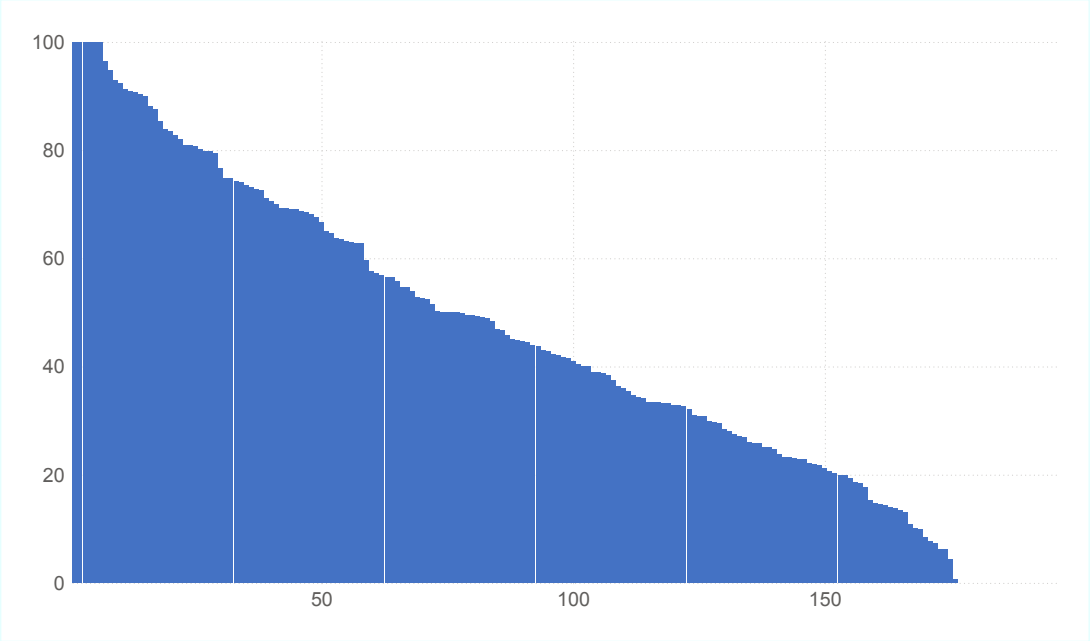
More understanding is needed of why this variation is happening and how the blocks to better performance can be overcome. Some of the variation may be explained by the increased use of CT angiography for these patients, avoiding the need for transcatheter coronary angiography in some.

Figure 4.7: Percentage of patients with NSTEMI receiving timely coronary angiography – 2016/17 to 2024/25 [MINAP data]



NSTEMI: non-ST-elevation myocardial infarction; Angio: coronary angiography

Figure 4.8: Percentage of patients with NSTEMI undergoing coronary angiography within 72 hours of admission, by hospital – 2024/25 [MINAP data]



NSTEMI: non-ST-elevation myocardial infarction
Individual hospitals can be identified in the MINAP report

Following a heart attack, guidelines recommend the use of antiplatelet drugs, a beta blocker, a statin and an ACE-inhibitor (or equivalent) to help stabilise the build-up of fatty deposits inside arteries (so-called atherosclerotic condition) and to prevent further harmful cardiac events.

In patients with impaired heart pump function, treatment with a mineralocorticoid receptor antagonist (MRA) is also recommended. Most hospitals perform well, with improvement in the use of an MRA drug (otherwise known as aldosterone antagonists) (to 73%) but there is a worrying decline in the use of secondary prevention drugs with only 78% of eligible patients receiving all recommended drug classes [Figure 4.9].

Many hospitals are not achieving optimal care and need to improve their prescribing, so their patients stand a chance of better long-term outcomes [Figure 4.10 and Figure 4.11].

Figure 4.9: Percentage of eligible patients receiving guideline-recommended drugs following a heart attack – 2019/20 to 2024/25 [MINAP data]

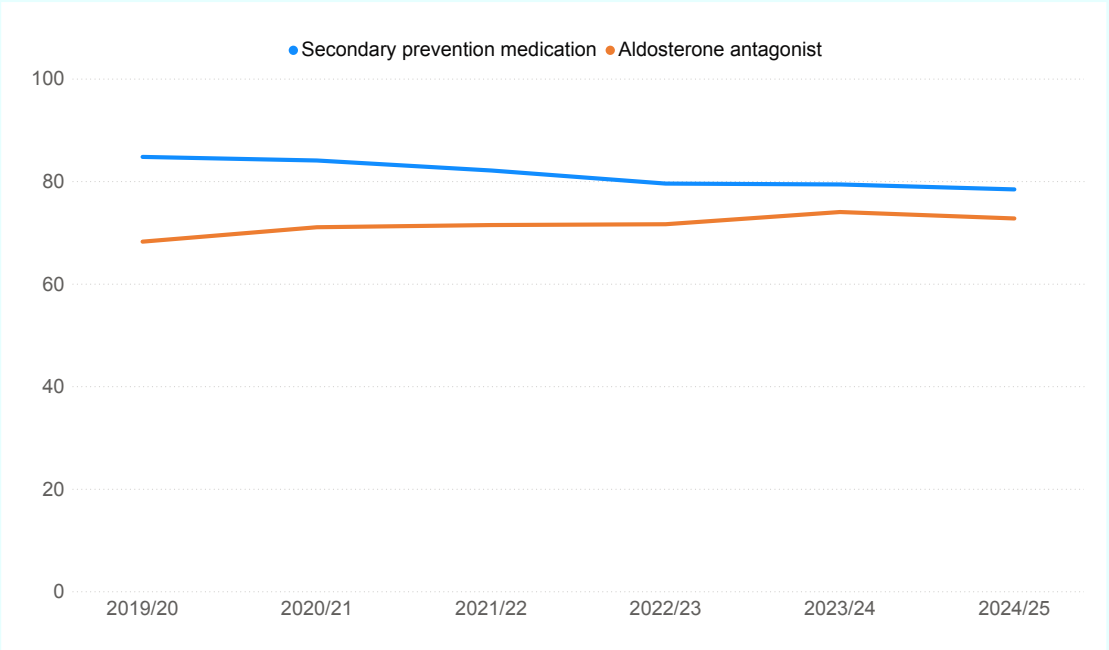
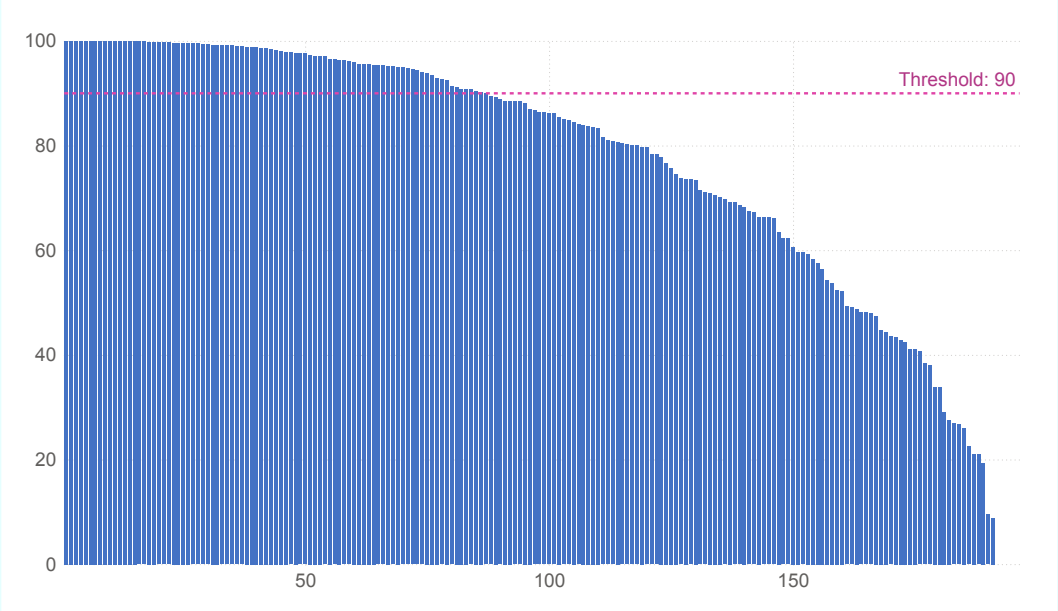
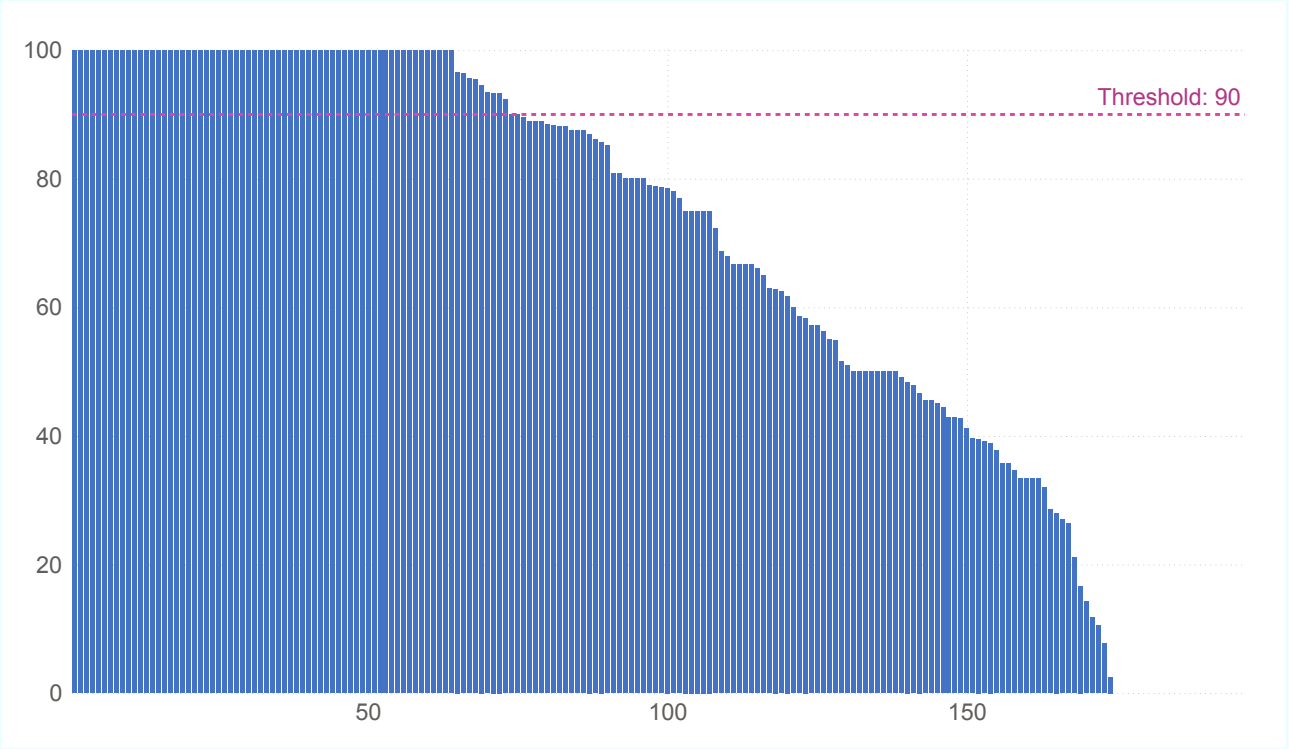


Figure 4.10: Percentage of eligible patients receiving guideline-recommended drugs following a heart attack, by hospital – 2024/25 [MINAP data]



Threshold: MINAP recommended target
Individual hospitals can be identified in the MINAP report

Figure 4.11: Percentage of eligible patients receiving a mineralocorticoid receptor antagonist (MRA) drug following a heart attack, by hospital – 2024/25 [MINAP data]



Threshold: MINAP recommended target
Individual hospitals can be identified in the MINAP report

4.4 More patients are receiving cardiac rehabilitation, and accreditation of cardiac rehabilitation services is improving

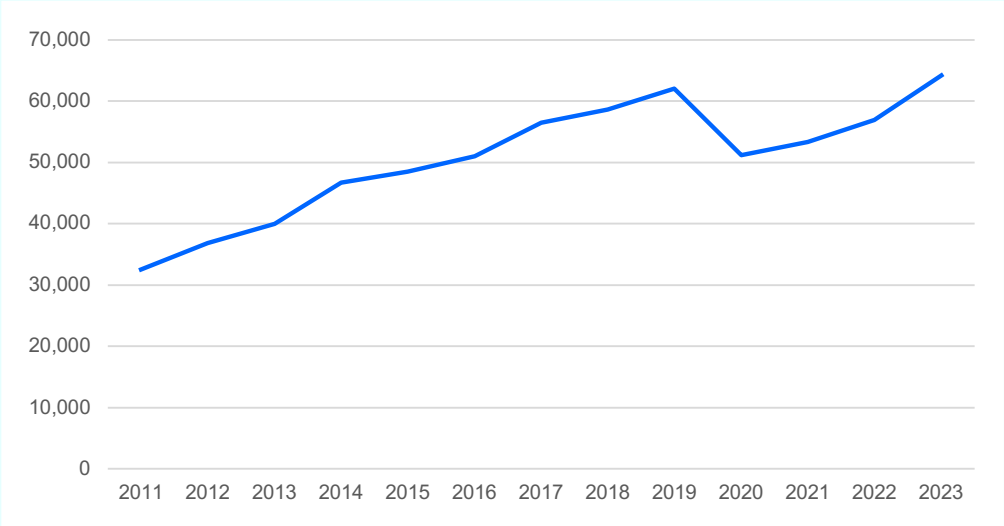
Cardiac rehabilitation is offered after a range of treatments to reduce the risk of future heart problems and improve long-term health. Through exercise, education, and support for lifestyle changes (such as stopping smoking, improving diet, and managing stress), it strengthens the heart, raises fitness levels, improves psychosocial wellbeing, and enhances recovery.

Encouragingly, the NACR audit recorded a record 64,217 patients starting cardiac rehabilitation in England, Wales and Northern Ireland during 2023, an increase of 61% over the last decade [Figure 4.12].[1] More cardiac rehabilitation services are achieving full accreditation (where all 7 key performance indicators are met).

Following the pandemic there has been a move towards a hybrid approach for delivery of cardiac rehabilitation, incorporating both group-based and home-based/self-managed elements. This is despite challenges from staff turnover and some concern that replacement staff are being employed on different bandings.

[1] The 2025 NACR report is shortly to be published separately to the other NICOR domains

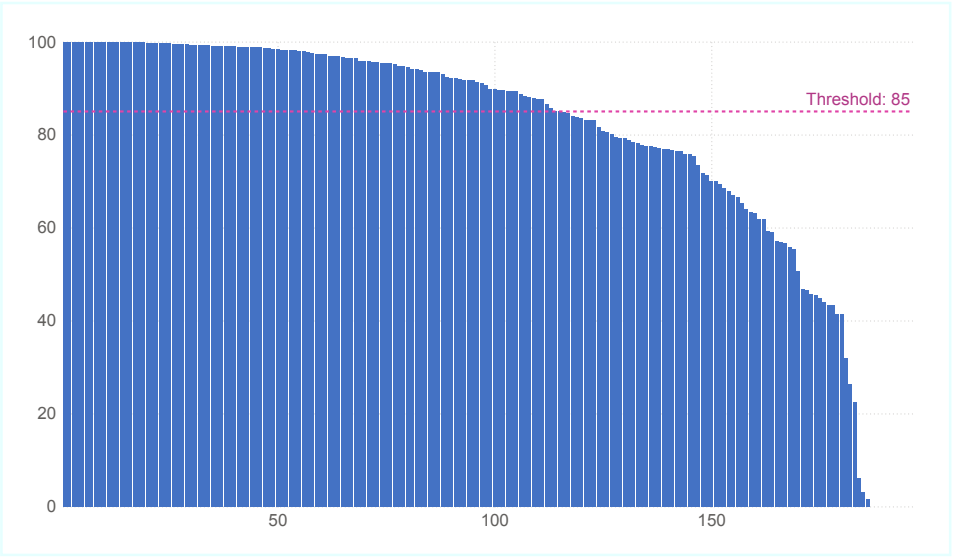
Figure 4.12: Number of patients recorded as starting cardiac rehabilitation (England, Wales and Northern Ireland) – 2011 to 2023 [NACR data]



Although rates of referral for cardiac rehabilitation after a heart attack are reported to be high in the MINAP report, the NACR audit records that only 41% of patients in England then undergo cardiac rehabilitation in practice (up from 33% in 2020) alongside 51% in Wales.

A large number of hospitals remain poor at organising referrals for cardiac rehabilitation for all their patients prior to discharge from hospital, despite the benefits this offers in the take-up of preventive medications, patient wellbeing and outcomes [Figure 4.13].

Figure 4.13: Percentage of all heart attack patients who were referred for cardiac rehabilitation by discharge, by hospital – 2024/25 [MINAP data]



Threshold: MINAP recommended target
Individual hospitals can be identified in the MINAP report

Disappointingly, the NHFA audit suggests only 21% of HF patients admitted to a cardiology ward in hospital are referred to cardiac rehabilitation (albeit an improvement on previous years, and a greater proportion than for those admitted to other wards). This is reflected in the NACR data with only 13% of HF patients admitted to hospital going on to have rehabilitation in England and 17% in Wales.

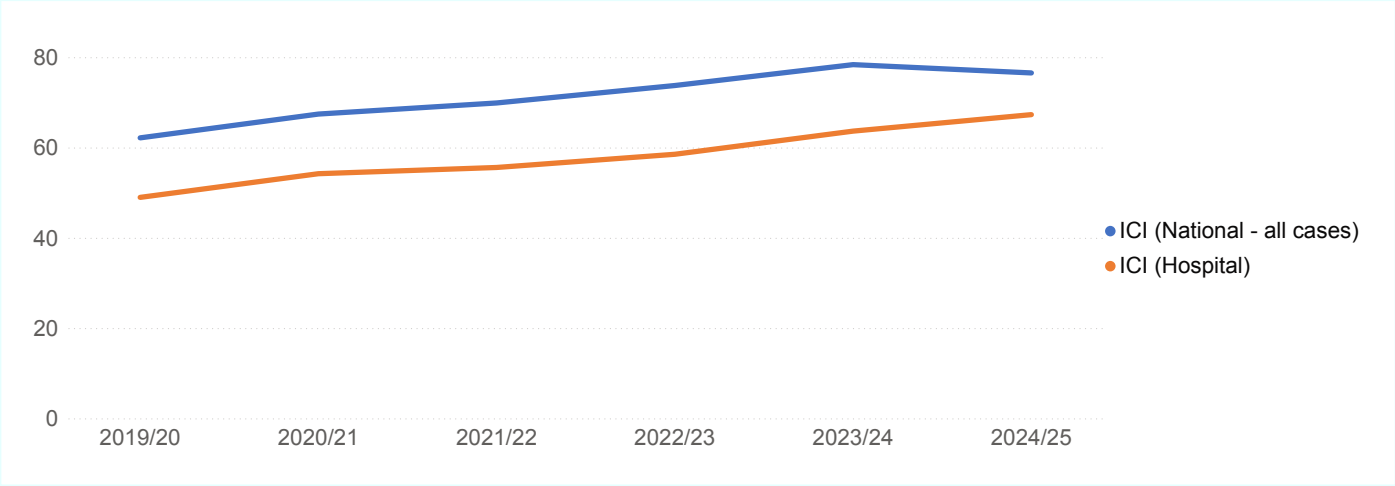
4.5 More hospitals are using intracoronary imaging for PCI procedures on left main and complex coronary artery lesions

The NAPCI audit has driven some major shifts in percutaneous coronary intervention (PCI) treatment strategy over time, including the push to radial access (involving insertion through the wrist rather than the groin) and, together with the MINAP audit, better access to treatment for patients with a heart attack. Both these aspects of care are associated with improved survival and fewer complications.

Over the last few years, further areas of practice have been selected as targets for QI initiatives. These include the use of intracoronary imaging (ICI) in patients requiring stenting of the left main stem coronary artery, or with complex disease subsets. The use of ICI to ensure the optimal expansion of the stents has been shown to improve outcomes, reducing future complications such as readmission with a heart attack or the need for another PCI because of re-narrowing of the treated vessel.

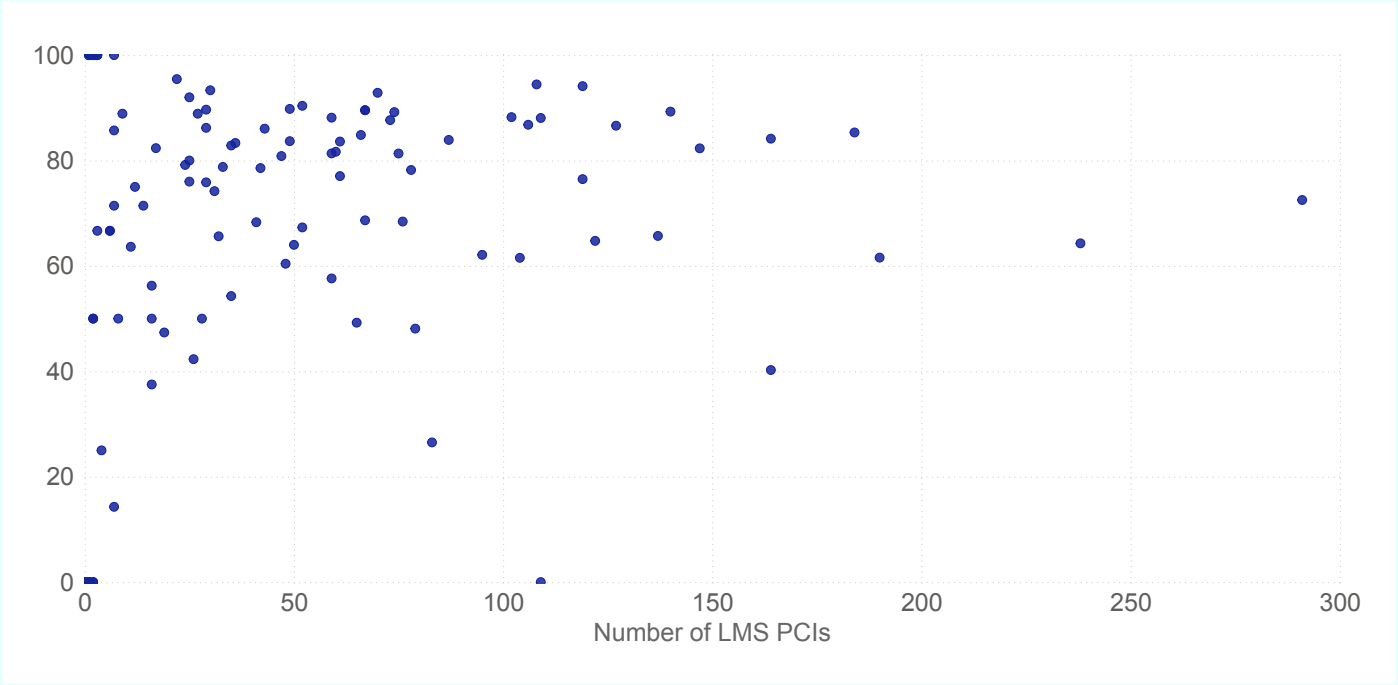
ICI is now used for 77% of patients treated for left main lesions, having risen steadily though with a small drop in 2024/25 [Figure 4.14]. However, its use varies hugely between hospitals and those with low rates should make an active plan to improve their performance [Figure 4.15].

Figure 4.14: Use of intracoronary imaging in patients undergoing PCI for a left main stem lesion showing gradual increase in use – 2019/20 to 2024/25 [NAPCI data]



ICI: intracoronary imaging; the national average is the average of all left main cases, whereas the average by hospitals reflects the average of the percent use by hospitals; PCI: percutaneous coronary intervention

Figure 4.15: Range of use of intracoronary imaging in PCI for left main stem cases in individual hospitals versus their case load for this subset of patients – 2024/25 [NAPCI data]



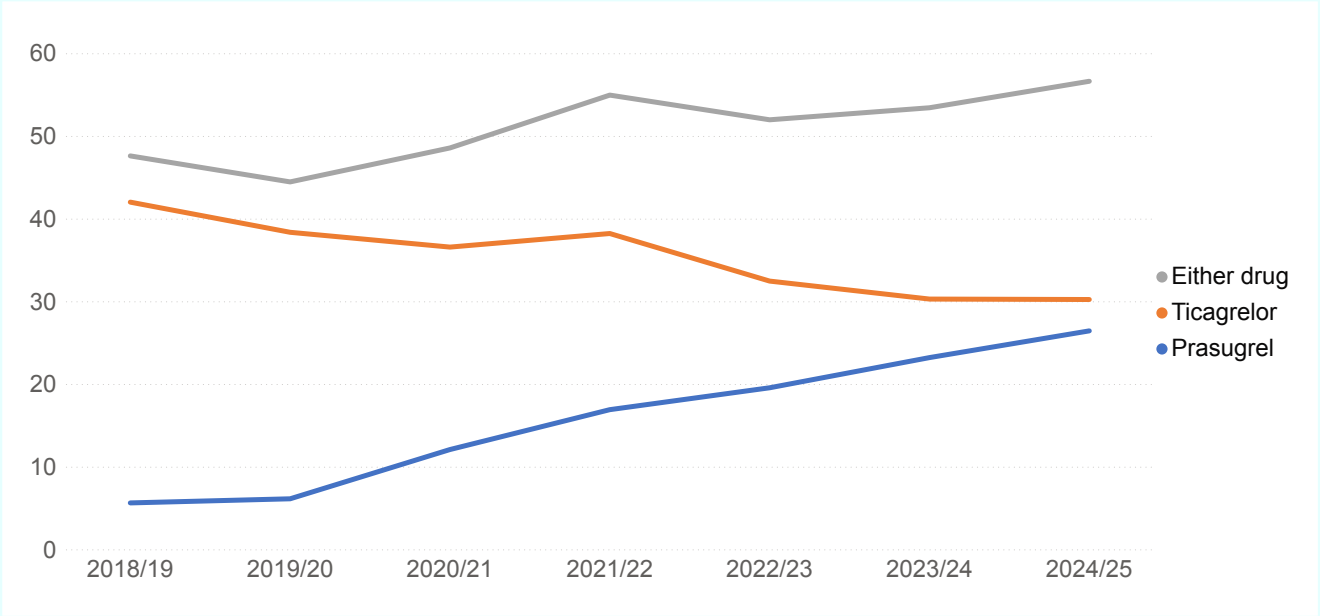
LMS: left main stem; PCI: percutaneous coronary intervention
Note: Each dot in the right graph represents a separate hospital, identified in the NAPCI report

4.6 More 'higher-risk' STEMI heart attack patients undergoing PPCI are receiving new more effective antiplatelet drugs

After undergoing a primary PCI, 'higher-risk' STEMI heart attack patients are treated with two separate anti-platelet drugs, usually aspirin and clopidogrel. Guidelines recommend the use of new anti-platelet drugs (prasugrel or ticagrelor) instead of clopidogrel for these patients, as outcomes are better.

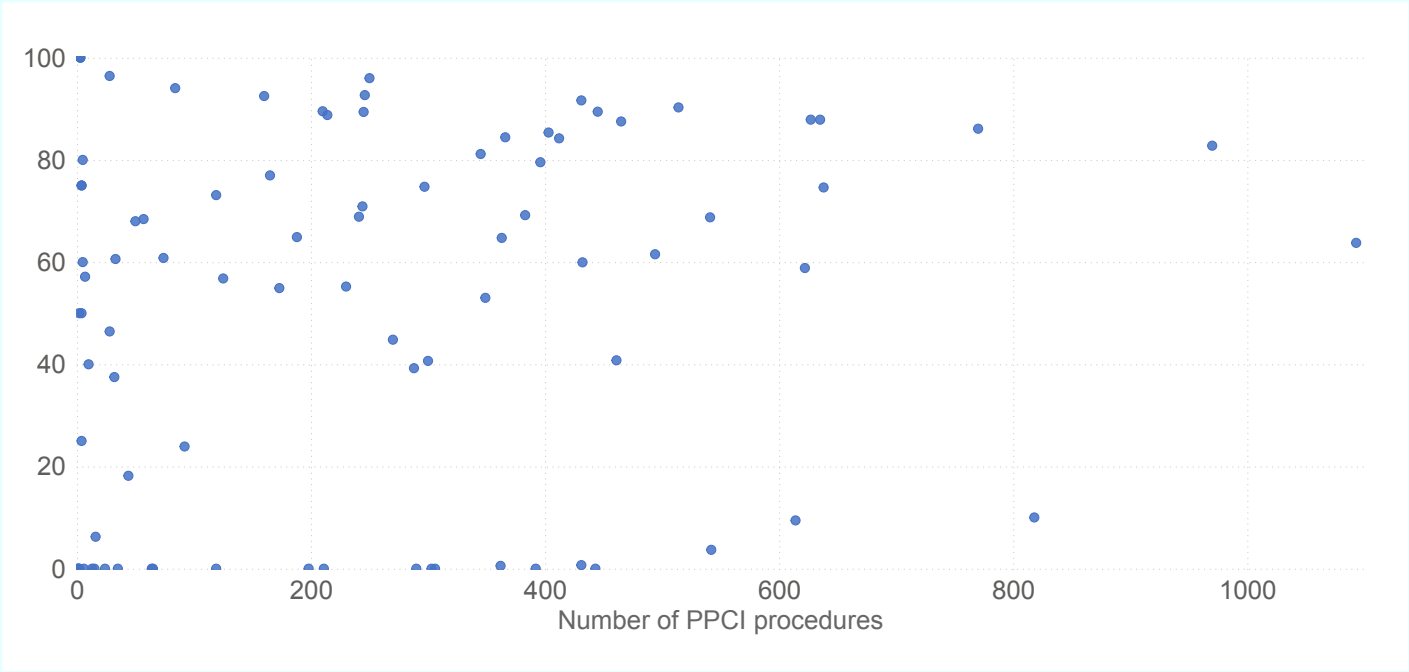
Prescribing of these drugs is increasing, driven largely by a rise in prasugrel as the use of ticagrelor is falling [Figure 4.16]. Contrary to guidelines, some hospitals are still using clopidogrel in many cases [Figure 4.17].

Figure 4.16: Use of new antiplatelet drugs in patients with STEMI undergoing PPCI, 2018/19 to 2024/25 [NAPCI data]



PPCI: primary percutaneous coronary intervention; STEMI: ST-elevation myocardial infarction

Figure 4.17: Range of use of new antiplatelet drugs in patients with STEMI undergoing PPCI in individual hospitals – 2024/25 [NAPCI data]



STEMI: ST-elevation myocardial infarction; PPCI: primary percutaneous coronary intervention
Note: Each dot in the right graph represents a separate hospital, identified in the NAPCI report

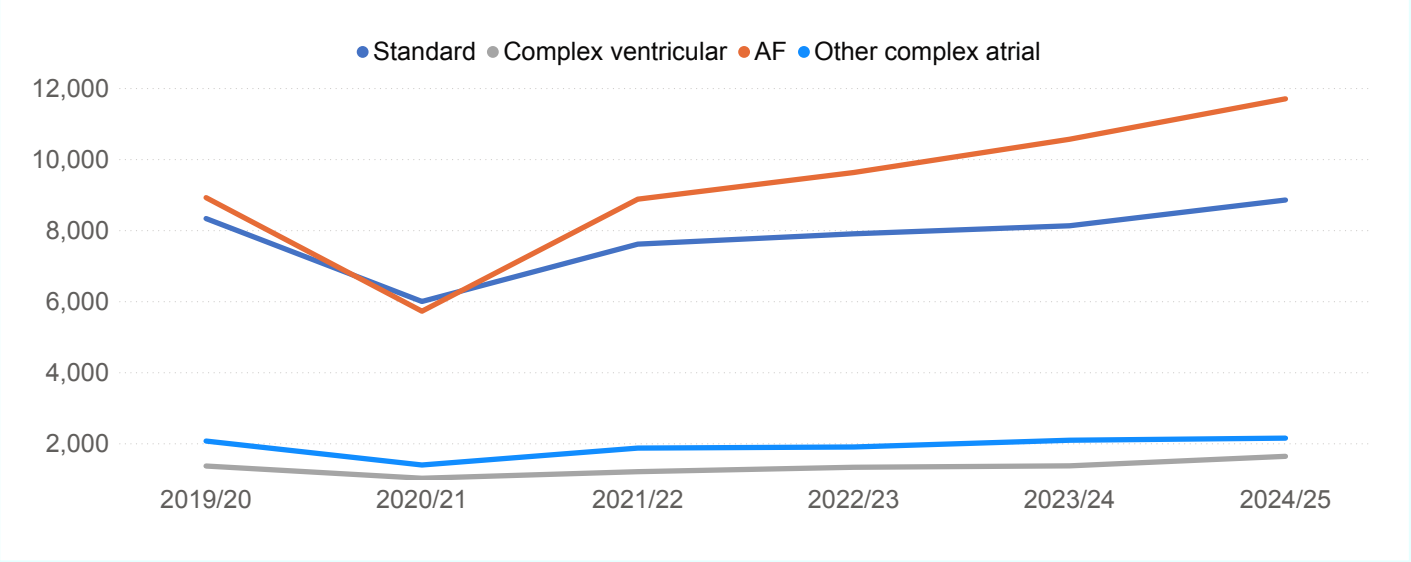
4.7 More ablation procedures for patients with atrial fibrillation will improve their quality of life

Patients with a heart rhythm disorder called atrial fibrillation (AF) can suffer from palpitations, chest pain, breathlessness and fatigue. They can develop impaired heart pump function and are at risk of stroke and early death.

Treatment strategies are aimed at controlling the heart rate and using anticoagulants to prevent blood clots or trying to keep the patient in normal heart rhythm. There is increasing evidence that the latter can be effectively achieved with a treatment called AF ablation.

There is increasing availability and application of this treatment in the NHS, with an 11% growth in procedures over the last year [Figure 4.18].

Figure 4.18: Growth in ablation procedures for different arrythmias – 2019/2020 to 2024/25 [NACRM data]



AF: atrial fibrillation

There is however significant variation in use of this treatment around the country, with a 10-fold difference in the rates of ablation across different ICBs and Health Boards. Referral pathways should ensure that appropriate patients are provided the opportunity to receive the benefits in quality of life the treatment offers. As demand increases at the same time as a growing demand for other transcatheter procedures like TAVI, there will be a need to review catheter laboratory capacity.

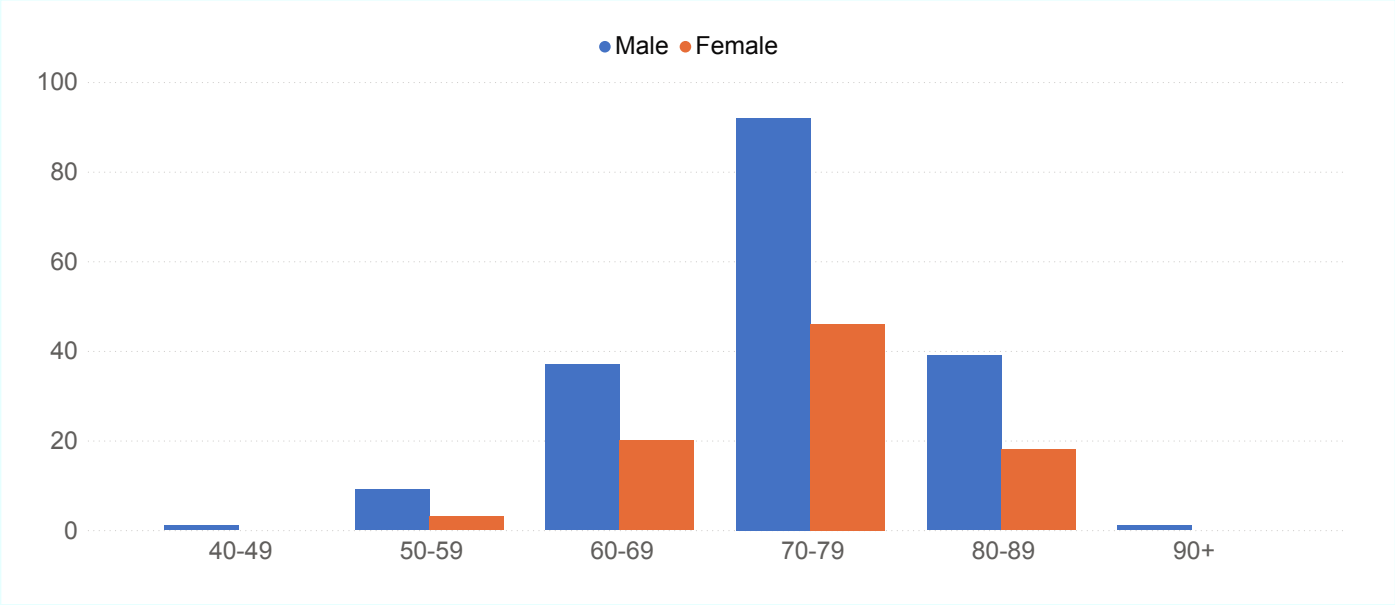
4.8 The use of devices to reduce stroke rates in patients with atrial fibrillation is increasing

The risk of stroke in some patients with atrial fibrillation (AF) from blood clots forming in the left atrium (the left back chamber of the heart) can be reduced by using anticoagulants ('blood-thinners') but not all patients can take these. A transcatheter device to close off a small pocket of the heart chamber known as the left atrial appendage is now available from the NHS for AF patients who are not suitable for anticoagulants because of the potential for bleeding risk.

In 2024/25, the LAAO Registry collected data on 266 patients undergoing a left atrial appendage occlusion (LAAO) procedure from 13 hospitals (not all procedures are included as some hospitals are yet to register with NICOR and submit their data). The limited evidence so far suggests that patients are being selected appropriately and according to the NHS England commissioning policy.

Despite a previous stroke in 61% of cases, most have no or only mild disability or frailty. The average annual risk of stroke (or recurrent stroke) prior to treatment is 4% per annum. There is some evidence to suggest that women overall are very slightly less likely to suffer from AF than men, but to date only 33% of cases have been performed for women [Figure 4.19]. There are also fewer patients than expected from minority ethnicities, suggesting that work is needed on referral pathways across regions.

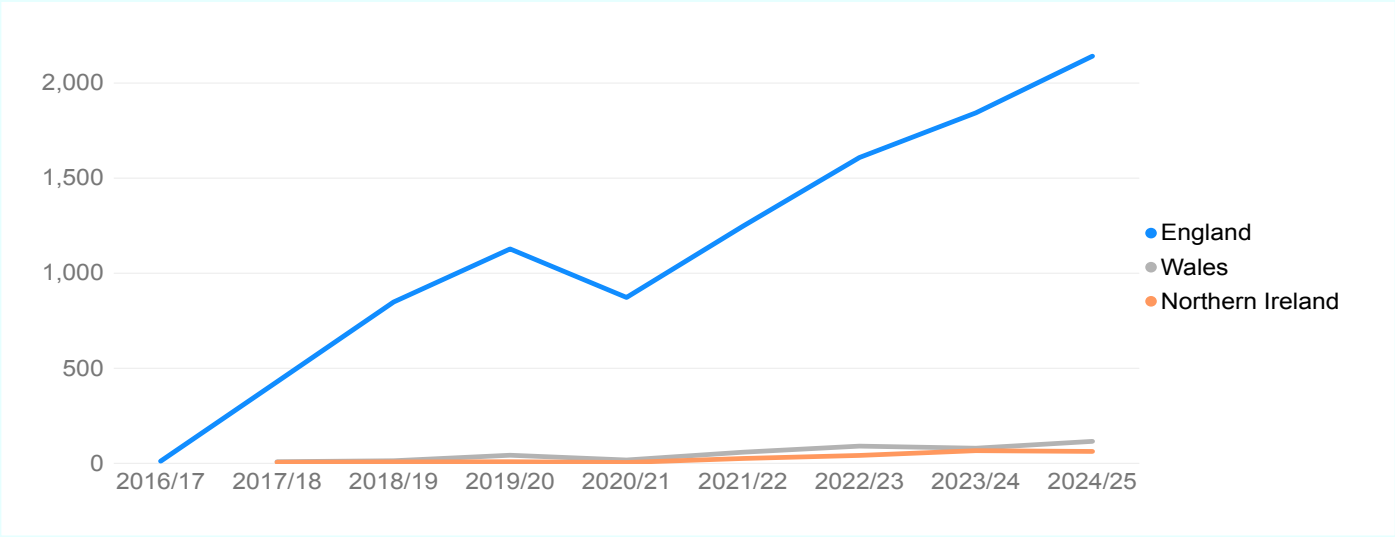
Figure 4.19: Patients undergoing an LAAO procedure by age group and sex – 2024/25 [LAAO Registry data]



LAAO: left atrial appendage occlusion

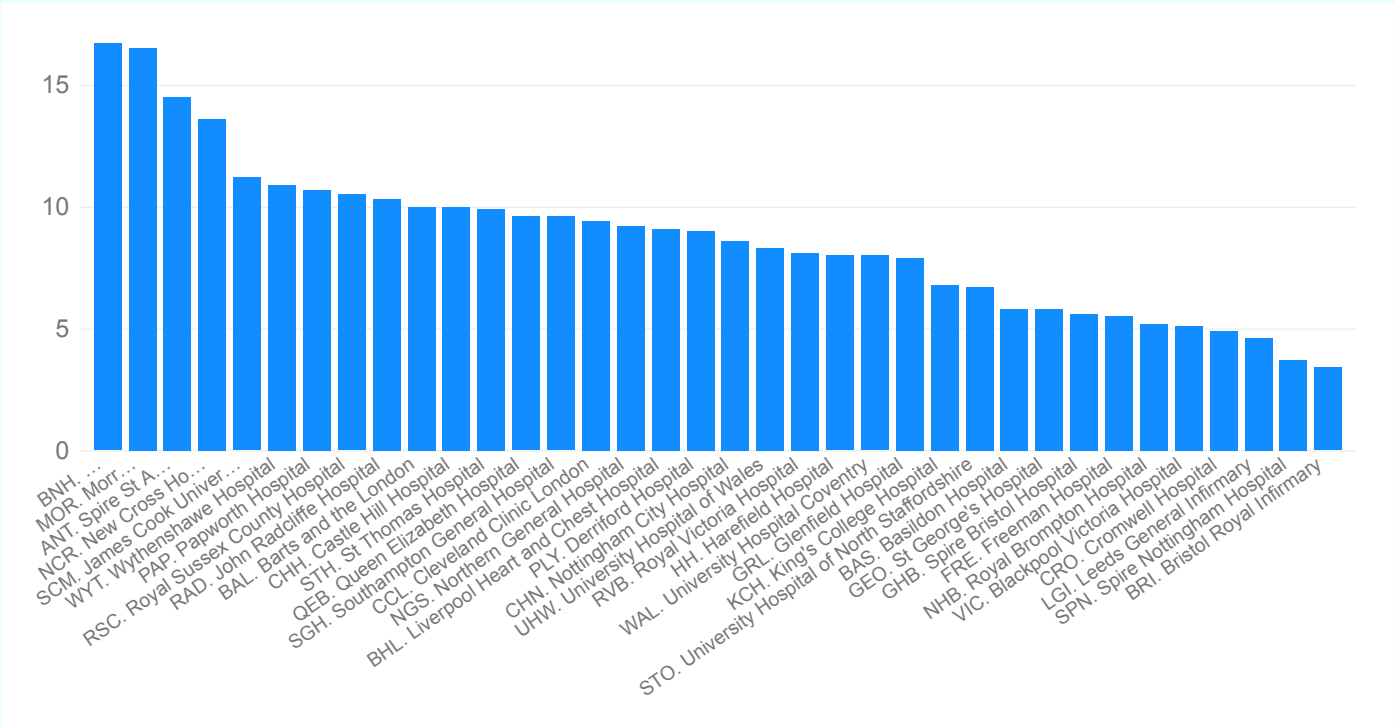
Another procedure to reduce future risk of stroke is clipping of the left atrial appendage at the time of cardiac surgery for patients with AF who are at higher risk of stroke. There has been a significant growth in the use of a left atrial appendage clip [Figure 4.20].

Figure 4.20: Number of left atrial clip procedures at the time of cardiac surgery – 2016/17 to 2024/25 [NACSA data]



The NACSA audit does not currently have a reliable means of determining the presence of AF at the time of cardiac surgery, but it is unlikely that this varies significantly between hospitals performing a lot of cases. Although not adjusted for the presence of AF, the variance in atrial clip procedures between hospitals suggests that some patients are not being considered for this treatment [Figure 4.21].

Figure 4.21: Percent of LAAO procedures during cardiac procedures, by hospital – 2024/25 [NACSA data]



LAAO: left atrial appendage occlusion

4.9 More patients are being offered treatment for valve disease but access to this is unequal

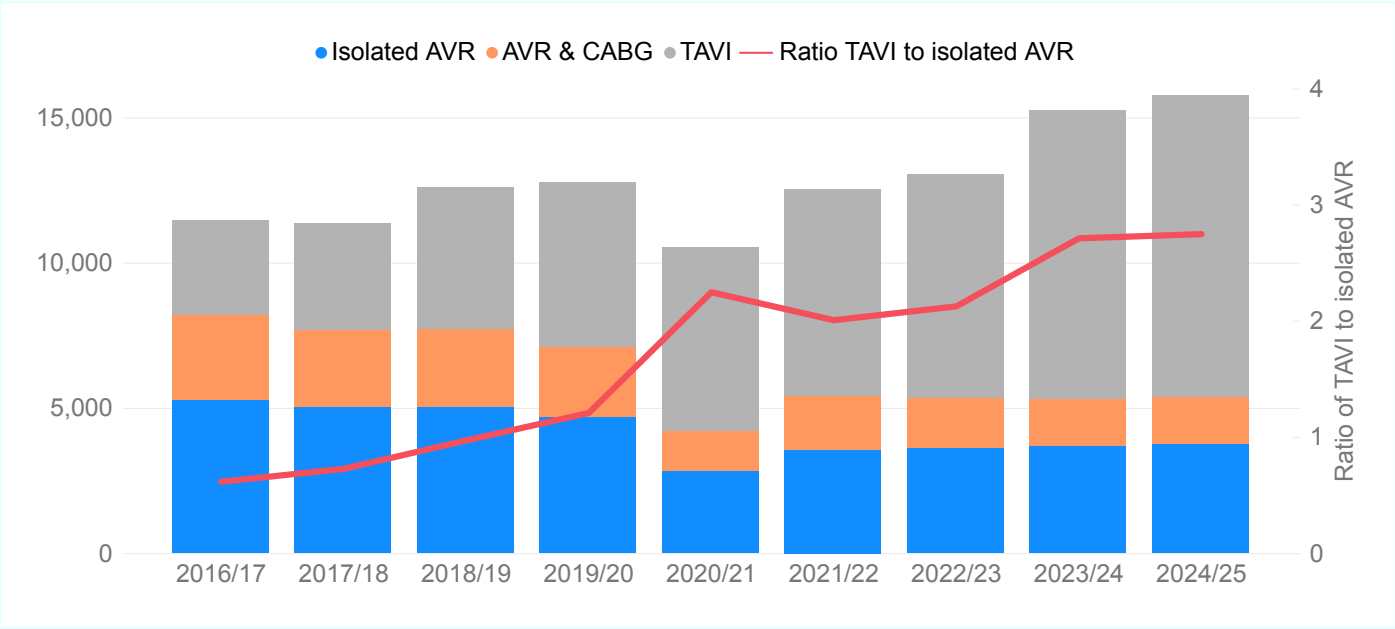
In the past, patients with aortic stenosis could only be offered surgical aortic valve replacement (AVR). This is a highly effective treatment, improving symptoms and prolonging life, but open-heart surgery is considered too risky for some patients. The development of transcatheter aortic valve implantation (TAVI), which can be offered at lower risk, gives these patients an alternative option.

As new evidence emerges, the use of TAVI has grown and the number of AVR cases has fallen. Taking both together, more patients than ever are being offered a treatment for this condition [Figure 4.22].

Both the NACSA audit and UK TAVI Registry are now tracking readmissions following these procedures. It is encouraging that the rate of readmissions for heart failure in the first year following TAVI is low at 2.4%.

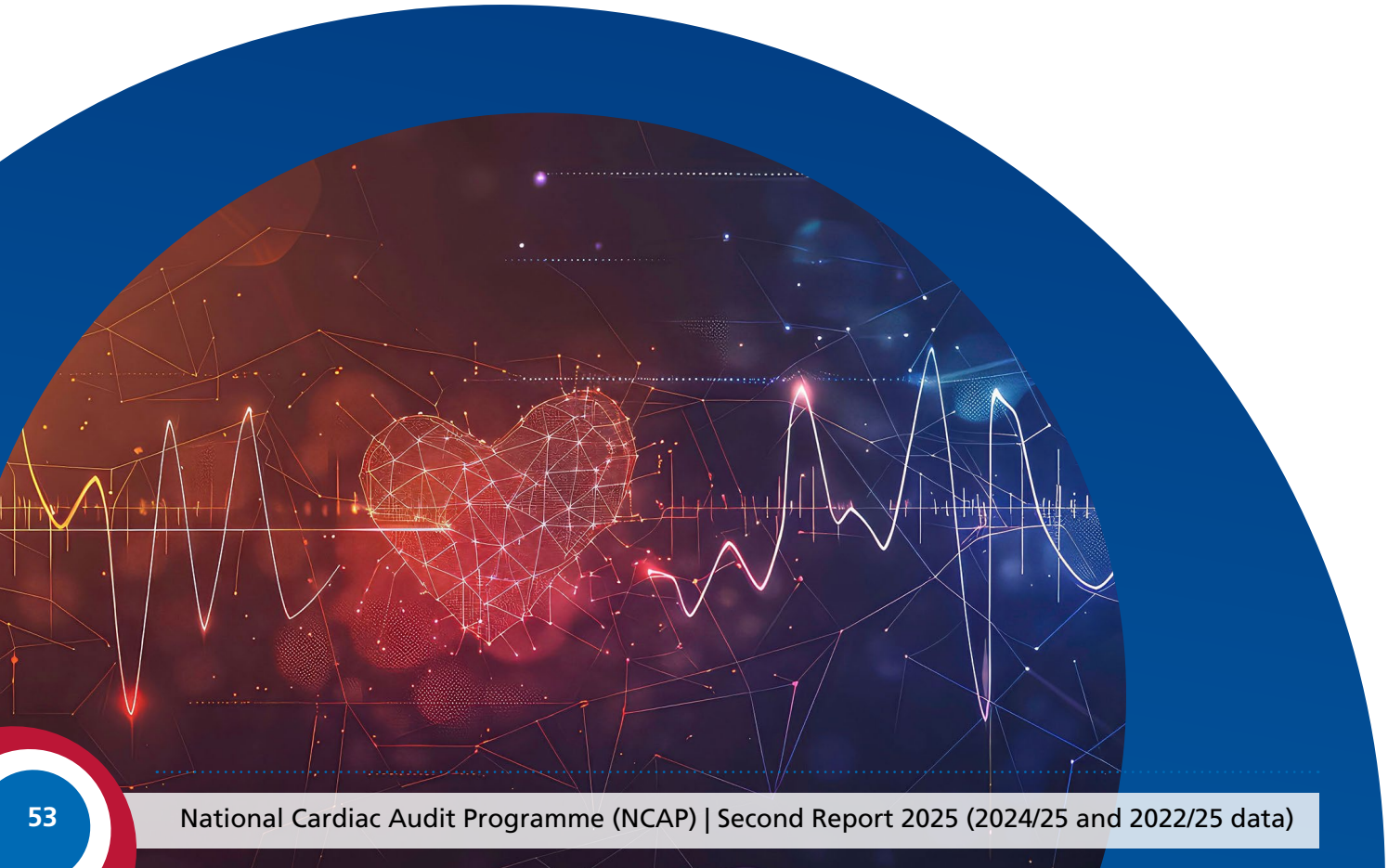
The previously highlighted variance in readmissions between hospitals following cardiac surgery requires further analysis to see if factors could be modified early on to prevent many of these [Figure 3.8].

Figure 4.22: Types of aortic valve procedure and TAVI: isolated AVR ratio – 2016/17 to 2024/25 [NACSA and UK TAVI Registry data]



AVR: aortic valve replacement; CABG: coronary artery bypass grafting; TAVI: transcatheter aortic valve implantation

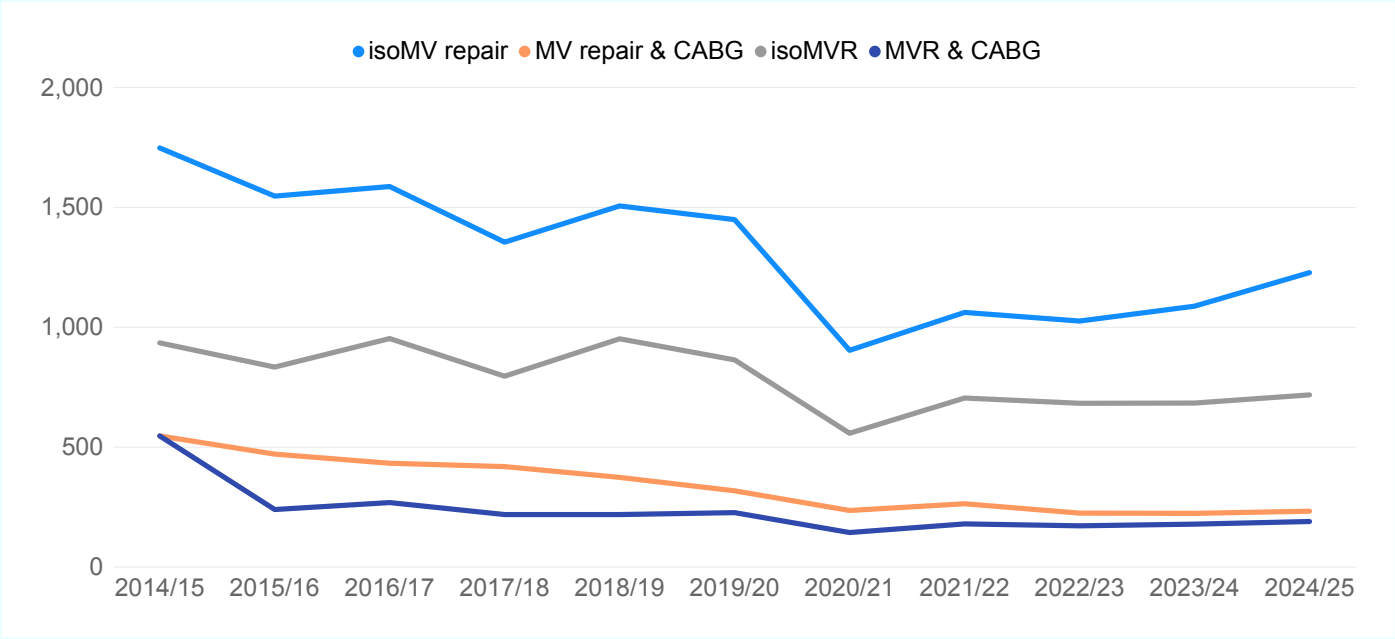
There are now new percutaneous means of treating mitral and tricuspid valve problems, but their recent introduction did not explain the gradual reduction in mitral valve surgery seen over the last few years.



This may have been as the result of a change in demand (e.g. with a reduction in rheumatic heart disease cases) but, as the population grows and ages, more patients with either primary degenerative conditions or secondary mitral regurgitation in patients with heart failure might be expected. The volume of mitral surgery was particularly affected by the pandemic.

In line with the gradual recovery of cardiac surgery overall, there has been an 8.7% uplift in mitral surgery over the last year, and it is encouraging to see an increase in mitral repair surgery (which is offered at lower risk than mitral valve replacement) [Figure 4.23].

Figure 4.23: Number of MV operations by type – 2014/15 to 2024/25 [NACSA data]



Iso: isolated; MV: mitral valve; MVR: mitral valve replacement; CABG: coronary artery bypass grafting

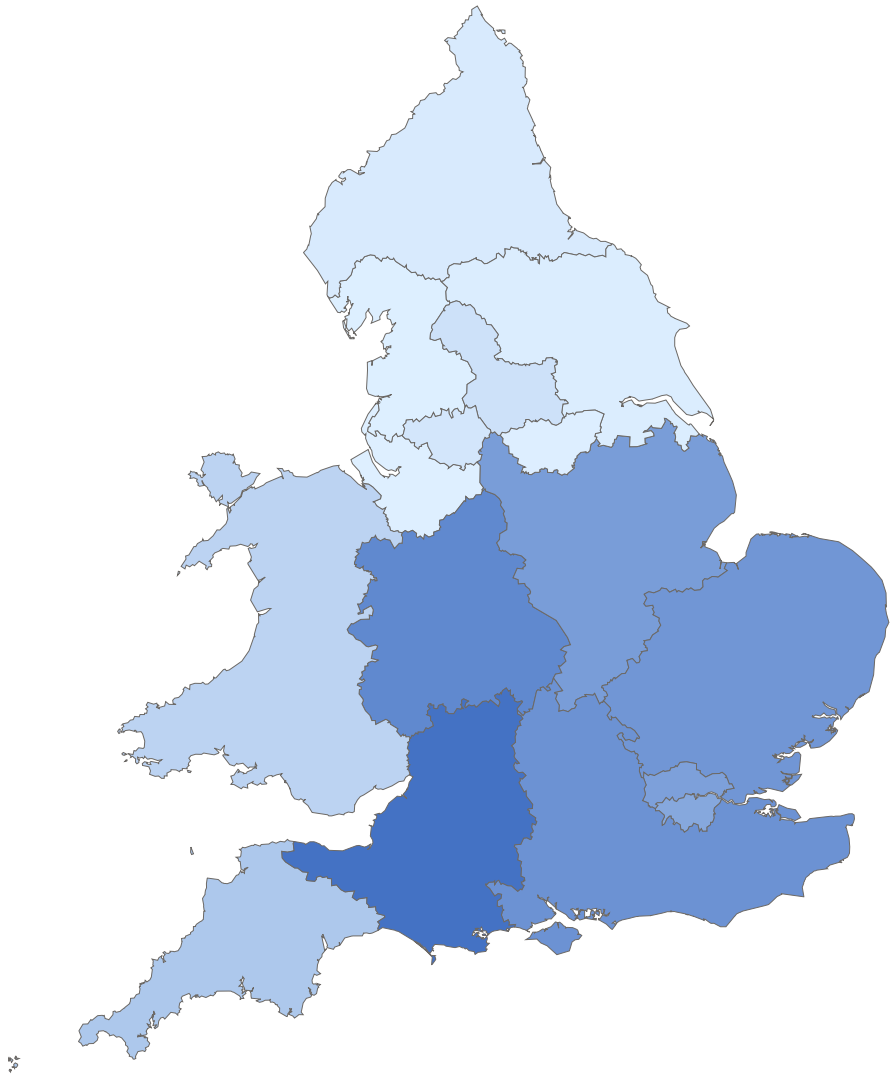
The NHS commissions percutaneous transcatheter edge-to-edge repair (TEER) procedures for primary degenerative mitral regurgitation in adults, but there are a number of other treatments available to those with severe tricuspid valve regurgitation (where the valve is leaking).

The TMTV Registry received data on 916 mitral or tricuspid valve procedures in 2024/25, 613 of which were mitral TEER procedures. The treated cohort has a median age of 80, consistent with being at high risk for surgical mitral valve repair or replacement. Complications are low and 72% of patients had either no or mild mitral regurgitation (MR) following the procedure (97% had severe MR prior to treatment).

Perhaps not surprisingly, as ICBs and Health Boards refine their referral pathways and capacity is increased, there is currently an unequal distribution of age-standardised cases across the country, with a 15-fold variation between Cardiac Networks when comparing the lowest and highest rates of treatment per million population [Figure 4.24].

There is no evidence of inequitable treatment by ethnicity, but fewer females are undergoing treatment than males.

Figure 4.24: Number of age-standardised Mitral TEER procedures per million population based on patient home location, by Cardiac Network – 2024/25



TEER: transcatheter edge-to-edge repair
Note: Rates vary from 0.3 (lightest) to 8.5 (darkest) procedures per million population

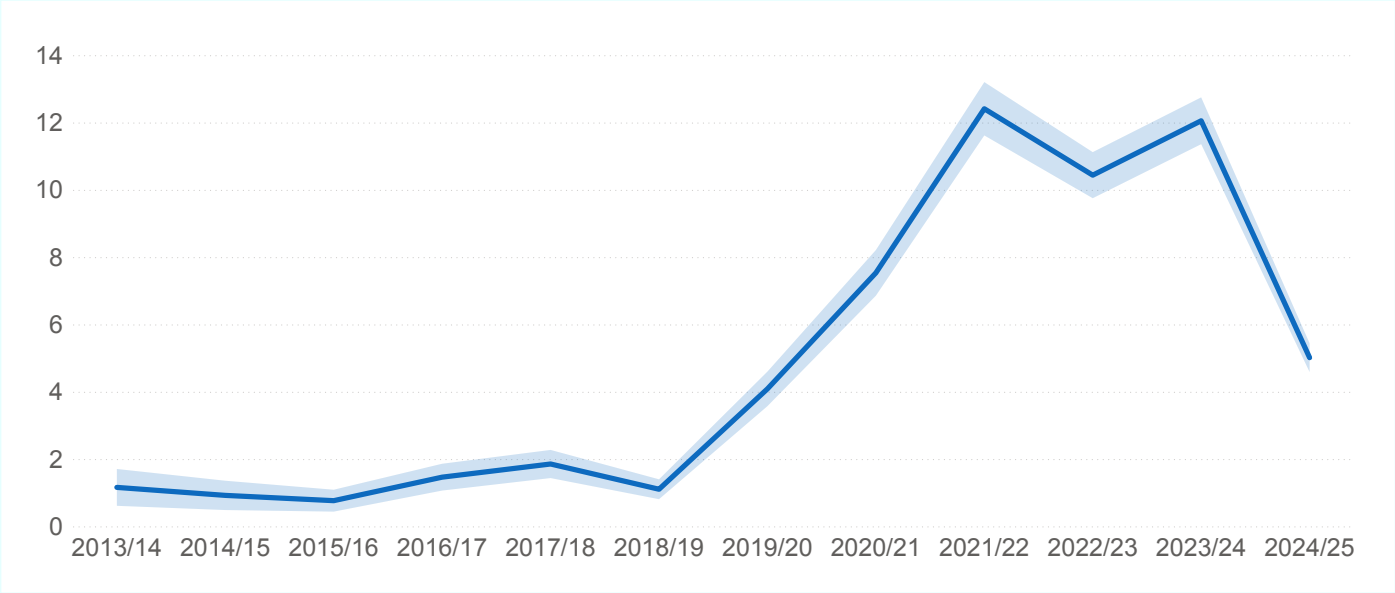
4.10 Cerebral embolic protection during a TAVI procedure has not been shown to prevent strokes and so its use is falling rapidly

Stroke is one of the most devastating complications following a TAVI procedure, though fortunately it occurs infrequently. In some cases, this results from calcific material or clot embolising from a patient's natural (or native) valve during the procedure. There was hope that the use of cerebral embolic protection devices (small baskets placed in the carotid arteries prior to the procedure) would reduce the chance of stroke.

Following the recent publication of a UK trial (and other studies), the peri-procedural stroke rate has not been reduced by these devices, and their use has rapidly fallen [Figure 4.25]. The UK TAVI centres are to be congratulated for wide engagement with the UK trial which recruited the patients rapidly.

There are ongoing studies to determine whether some high-risk characteristics may guide which patients may benefit but they will not be used routinely, reducing the time, complexity, and cost of procedures.

Figure 4.25: Percentage of TAVI procedures where cerebral embolic protection was used – 2013/14 to 2024/25 [UK TAVI Registry data]



TAVI: transcatheter aortic valve implantation

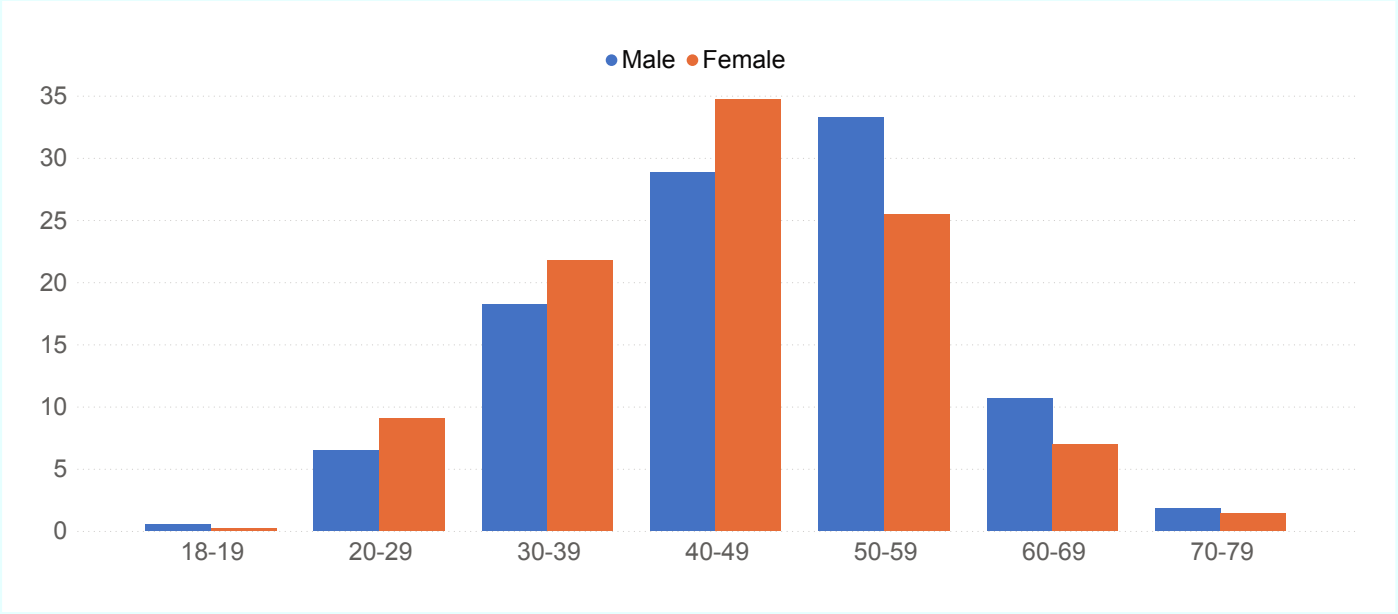
4.11 PFOC will reduce recurrent stroke rates, but referral patterns are variable across the country

Patent foramen ovale closure (PFOC) procedures aim to reduce further strokes in patients who have suffered these without an identifiable underlying reason (known as cryptogenic strokes). Formally commissioned by the NHS in 2019, this technique to close a small hole between the back chambers of the heart has been available for many years.

The new PFOC Registry has reported differences in volumes of activity by age and sex of patient [Figure 4.26]. This does not necessarily reflect inequitable treatment. More females may require PFOC closure at an earlier age, possibly because of increased thromboembolic risk associated with the oral contraceptive pill or pregnancy.

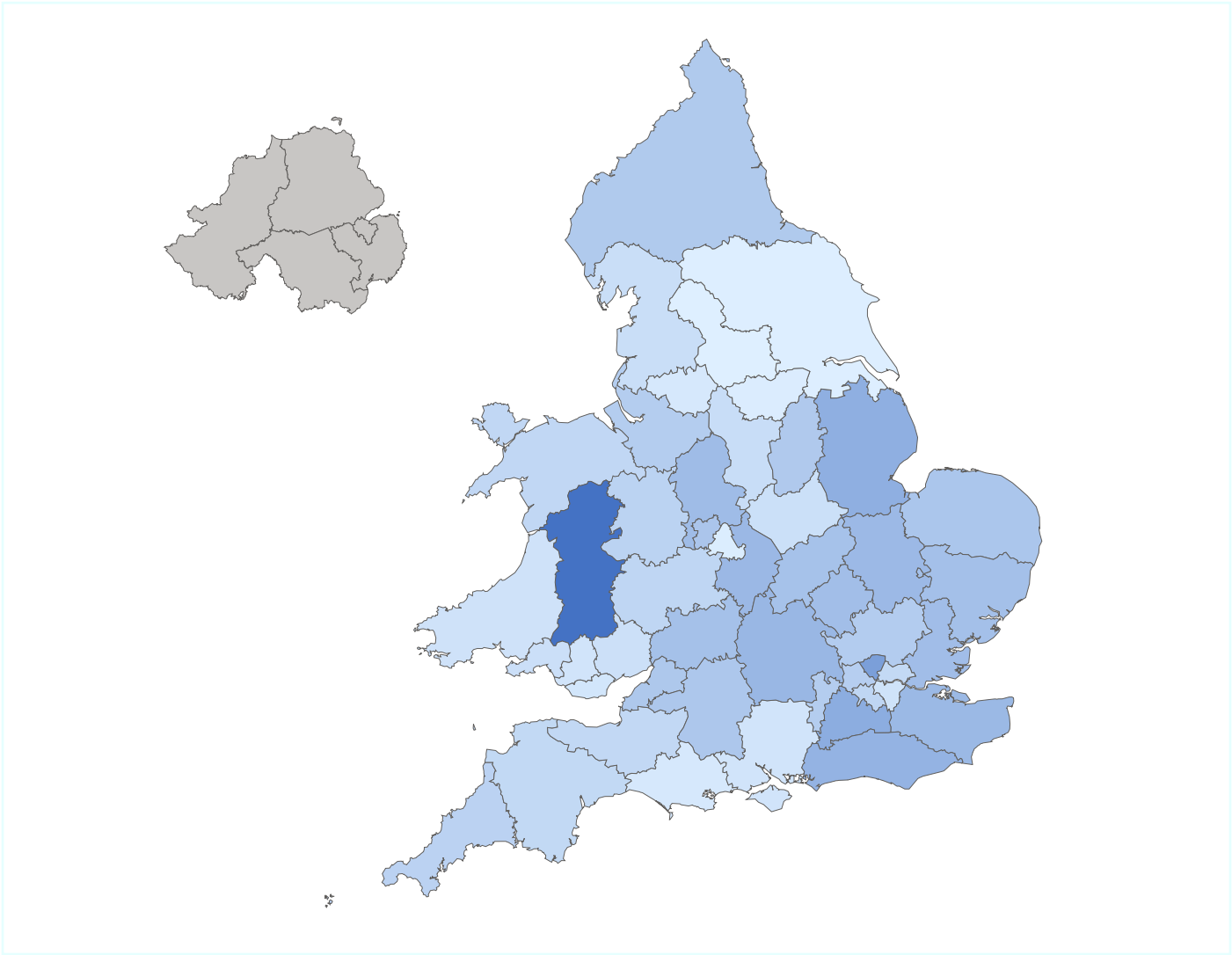
However, although the case numbers are increasing, the registry demonstrates unequal access to treatment across the country, with actual rates of 0.6 to 14.9 per million population in different ICBs/Health Boards [Figure 4.27].

Figure 4.26: Percentage of PFOC procedures by age and gender – 2024/25 [PFOC Registry data]



PFOC: patent foramen ovale closure

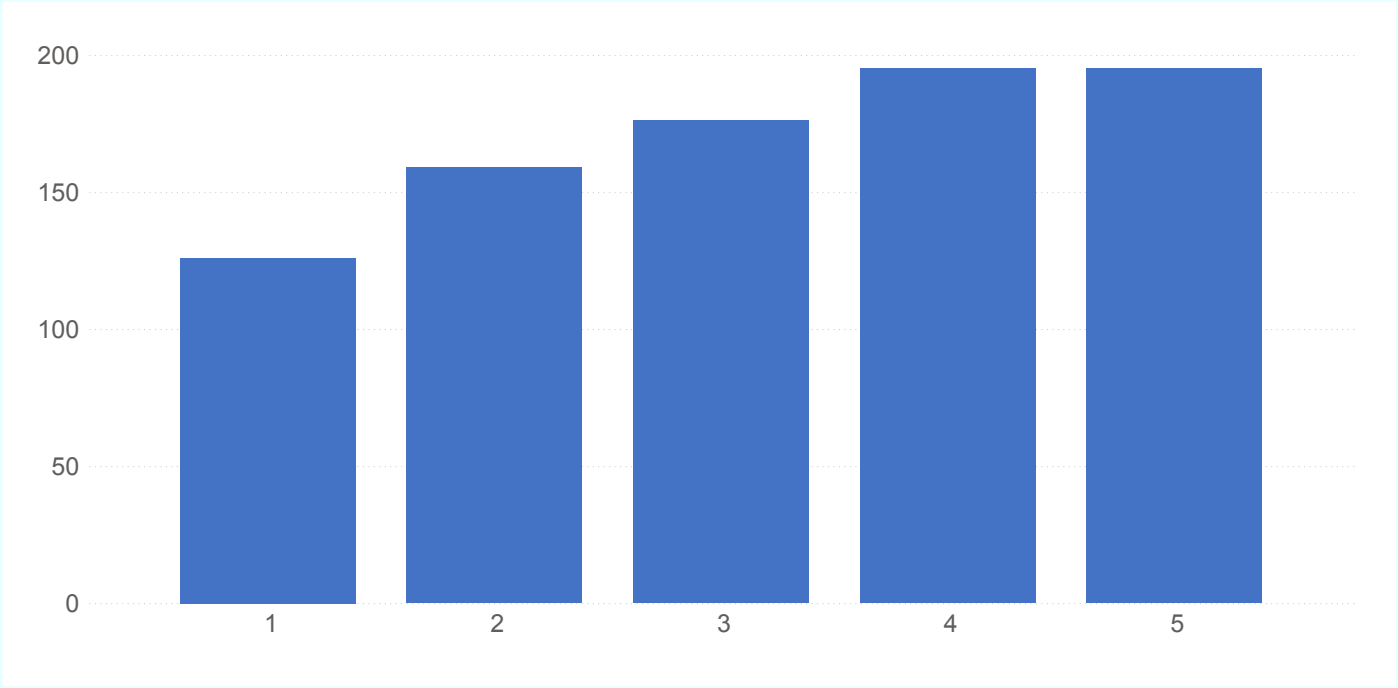
Figure 4.27: Rates of PFO closure procedures per million population, based on patient home location, by ICB/Health Board – 2024/25



PFO: patent foramen ovale
Note: Darker shades reflect a higher rate. Rates vary between 0.3 (lightest) and 14.9 (darkest) procedures per million population

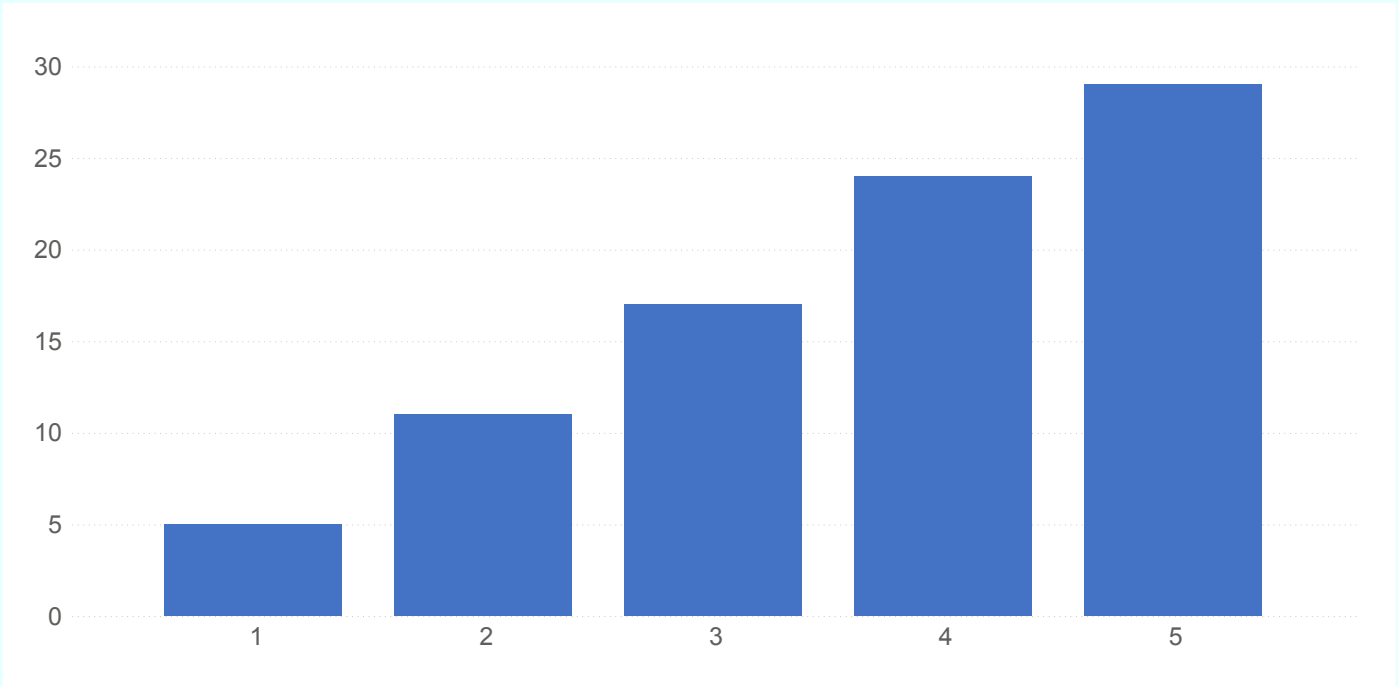
The registry also reveals fewer NHS procedures (15.9%) than would be expected for the 20% of patients in the most deprived areas [Figure 4.28]. Private centres perhaps not surprisingly treat proportionately more patients from the least deprived areas [Figure 4.29]. ICBs and Health Boards need to work with the commissioned heart units to improve referral pathways.

Figure 4.28: NHS PFOC closure cases by IMD quintile – 2024/25 [PFOC Registry data]



IMD: index of multiple deprivation (1 = most deprived); PFOC: patent foramen ovale closure

Figure 4.29: Private PFOC closure cases by IMD quintile – 2024/25 [PFOC Registry data]



IMD: index of multiple deprivation (1 = most deprived); PFOC: patent foramen ovale closure

5. Smarter, faster and ready for the future: developments in NICOR's IT platform

The NICOR audits and registries rely on gathering huge amounts of data from individual hospitals before analysing and reporting these back to them and to commissioners as promptly as possible. The NICOR team has recently developed its own IT system to support this process, having previously used an adapted version of the QREG platform built initially for the national cardiovascular audit programme in Sweden.

The new NICOR system, called CAR (Collect, Analyse, Report), is gradually being rolled out, having first been successfully tested with a few of the NCAP domains. The aim is to have this modernised platform working across all the NCAP audits and registries by the end of March 2026.

The CAR platform introduces:

- a streamlined, modern interface with advanced search tools
- instant reporting after data submission
- a consolidated patient record table that spans multiple clinical domains
- a refreshed dashboard that combines news, updates and interactive insight reports to enable real-time monitoring
- a single comprehensive report that hospitals can use to bring together all the individual outputs into one downloadable file with spine chart style graphs
- customisable narrative summaries for clinicians
- the ability to adjust graph views and export results to suit local needs
- the ability to collect patient reported outcomes (PROMs).

Additional enhancements include barcode scanning for devices, improved visibility of patient records across domains, the ability to clear field values, and seamless switching between hospitals or domains within the same session for multi-login users. Collectively, these updates make data capture and reporting significantly more efficient, supporting both local service improvement and national audit requirements.

NICOR will continue to build on this foundation, with planned future developments to include integrated data quality tools, the use of artificial intelligence (AI) frameworks to deliver real-time data insights, and customised reporting that allows users to drill down to individual records. In addition, clinicians will benefit from operator-level validation reports, providing a clearer view of performance and outcomes at the individual operator level.

More than just a system upgrade, CAR represents a step change in how national clinical audit and registry data are collected, analysed and reported. It equips hospitals and clinicians with future-ready tools that strengthen both local and national reporting.

Of course, all of this is dependent on continued compliance with the requirements of the NCAP and our push for earlier data submission will continue:

Timely data in = Rapid information out

Thanks and acknowledgements

The NCAP thanks the staff of participating hospitals for providing data on the care they deliver. We are particularly indebted to the Community Representative Group, our patient and carer group chaired by Sarah Murray, as well as the patients and carers who work with the domain expert groups to help shape our programme. In particular, our thanks go to Pat Khan, who works with Sarah Murray on the Patient, Public and Carer reports. We are also grateful to other patients and carers who contribute through our Virtual Patient Panel. We were saddened by the deaths of Richard Corder and James Bradley in the last year. Both did so much to help shape our services, our outputs and the detail in the patient and carer reports.

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Appendix: Glossary

A glossary of relevant terminology, abbreviations and acronyms is available on the NICOR website.

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 & Greater East Midlands CSU, NICOR collects, analyses and interprets vital cardiovascular data into relevant and meaningful information to promote sustainable improvements in patient wellbeing, safety and outcomes. The NCAP is commissioned by NHS England and GIG Cymru / NHS Wales.

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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 more than 1,000 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.

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NHS England

NHS England

NHS England provides national leadership for the NHS. Through the 10 Year Health Plan, they 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. They work 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 publicly 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 the NHS in Wales delivers that strategy and services via the seven Local Health Boards, three NHS Trusts and two Special Health Authorities. The key principle is that good healthcare should be available to all.

NICOR

National Cardiac Audit Programme (NCAP)

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