

National Cardiac Audit Programme (NCAP)

2023 Summary Report

(2021/22 and 2019/22 data)

**Time is of the essence:
delays and waits need urgent
action.**



Contents

Report at a glance	3
Executive summary	5
Restoring activity to pre-pandemic levels	6
Tackling the waiting list backlog	7
Ensuring timely treatment of patients suffering a heart attack	8
Summary of recommendations	10
1. Introduction	11
2. Activity levels, capacity and some reasons for optimism	14
2.1 Levels of activity recovered across all seven cardiovascular domains in 2021/22, albeit to varying degrees	14
2.2 The backlog of cardiovascular cases has increased and waiting times have lengthened	17
2.3 Access to catheter laboratories, ICU beds and support staff may be a greater priority in ensuring necessary capacity than increasing consultant numbers	20
3. Delays in the care pathways for patients with a heart attack are serious and urgent action must reverse these trends	22
3.1 Delays worsened in the treatment of patients with higher-risk STEMI heart attacks	23
3.2 Appraisals at ICS level are needed to enable NSTEMI patients to receive timely treatment	27
4. There has been steady progress on a range of QI measures across all the cardiovascular sub-specialties	30
5. References	32
6. Thanks and acknowledgements	33
7. Appendix: Glossary	34



The report covers the 12 months from 1 April 2021 to 31 March 2022 and focuses on the impact on cardiovascular care as services start to recover from the COVID-19 pandemic. The main focus is on the time delays and waits for treatments. As we have learnt to accept and understand COVID-19, assisted by vaccine-induced and natural immunity, the healthcare services are also in recovery, aiming to reach pre-pandemic levels of activity and meet national targets.

Recovery on admissions and procedures



A **16%** increase in the number (**85,650**) of confirmed high risk (STEMI) and low risk (NSTEMI) heart attacks.



12% rise in the number of all procedures for children and adults with congenital heart disease, but still 8% fewer than prior to the pandemic



The total number of percutaneous coronary intervention (PCI) procedures in the UK has risen to **97,765**, an increase from 2020/21, but not back to pre-pandemic levels.



Transcatheter aortic valve procedures were up **25%** compared with 2019/20, compensating for **24%** fewer isolated surgical aortic valve replacements.



Recovery is slow for the number of adult cardiac operations. **16%** fewer were carried out compared to 2019/20, but an improvement from 2020/21 when a **34%** drop was seen.



Around **50%** of conditions which need an operation within the first year of life were diagnosed antenatally and figures remain stable.



Validated admissions for heart failure rose **3%** (to **63,644**) compared to 2020/21 but still 8% fewer than pre-pandemic levels.



Overall survival rate for the **3,282** surgical operations undertaken in children under 16 years of age was **98.4%** and remains among the best reported anywhere in the world.



Fewer than **50%** of patients with heart failure were admitted to cardiology wards and people aged over 75 and women had less access to cardiology wards compared to people aged under 74 and men.



Emergency operations on the thoracic aorta increased to **644** cases, a **68%** increase since 2013/14.

Recovery on clinical pathways



Average waiting time for elective cardiac surgery in England was **114** days, **109** days in Wales and **199** days in Northern Ireland. An improvement compared to 2020/21, but not back to pre-pandemic waits of **102** days in England.



Only **55%** of patients undergoing PCI for NSTEMI are treated within 72 hours, and **67%** within 96 hours of arrival in hospital. **78%** of hospitals fail to achieve the national 72-hour standard for timeliness of treatment for these patients.



Waiting times for urgent coronary artery bypass graft (CABG) procedures were worse, a rise to **12** days in England and **27** days in Northern Ireland, the national target is 7 days.



Increased use of secondary prevention medication for patients with heart failure but still only **56%** received all three disease modifying drugs.



The number of implanted pacemakers and other electronic devices improved by **11%**, but overall activity remains **7.7%** less than prior to the pandemic.



Just under **10%** of patients with heart failure were referred for cardiac rehabilitation during hospitalisation.



The average Call-To-Balloon (CTB) time for patients with a high-risk heart attack has increased to **142** minutes. A quarter of patients now wait more than three hours or more for treatment.



More than **85%** of all heart attack patients who were discharged home were referred to a cardiac rehabilitation programme, continuing an upward trend.



In-hospital mortality for patients with a heart attack (without cardiogenic shock) undergoing primary PCI was higher at **3.3%** compared to **2.6%** in 2015.

Executive summary



The 2023 National Cardiac Audit Programme (NCAP) report covers quality of care and outcome measures across six cardiovascular domains.

Each of these sub-specialty audits is concerned with a particular cardiovascular disease (CVD) of 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](#))



- National Audit of Cardiac Rhythm Management ([NACRM](#))



Selected data is also drawn from the [UK Transcatheter Aortic Valve Implantation Registry \(UK TAVI Registry\)](#).

This report focuses on the 12 months from 1 April 2021 to 31 March 2022. It assesses what was happening to cardiovascular services as the NHS attempted to recover from the COVID-19 pandemic to restore levels of activity, tackle a growing backlog of cases and ensuring the timely treatment of those with urgent heart conditions.



Restoring activity to pre-pandemic levels

Acute heart attack activity fully restored	→	<p>The numbers of higher-risk ST-segment elevation myocardial infarction (STEMI) heart attacks and lower-risk non-ST-segment elevation myocardial infarction (NSTEMI) heart attacks were similar to those recorded in 2019/20.</p> <p>There were just over 30,000 STEMI admissions and 56,000 NSTEMI heart attack patients.</p>
Acute heart failure admissions increased but not to pre-pandemic levels	→	<p>There were over 63,000 validated admissions for acute heart failure, a 3% increase from 2020/21 but still more than 8% fewer than in 2019/20.</p>
Cardiac surgical activity remained lower than before the pandemic	→	<p>Cardiac surgical procedures increased to 84% of 2019/20 activity, but with wide variation between hospitals (from 42% to 115%).</p> <p>Transcatheter aortic valve implantation (TAVI) cases reached 125% of pre-pandemic numbers, compensating for surgical aortic valve procedures which recovered to only 80%.</p> <p>The volume of coronary artery bypass grafts (CABG) operations was also 15% below those in 2019/20.</p>
PCI activity for heart attacks recovered but elective PCI numbers remained lower	→	<p>Percutaneous coronary intervention (PCI) activity for heart attack patients returned to pre-pandemic levels but elective PCI procedures only reached 85% of the activity in 2019/20.</p>
Some paediatric activity fully recovered while some remains lower than 2019/20	→	<p>Overall paediatric procedures recovered to 88% of pre-pandemic levels. Paediatric intervention activity reached 98%, electrophysiological (EP)/device treatments 96% and paediatric surgery 78%.</p>
Cardiac rhythm management procedures in adults increased but were still lower than prior to the pandemic	→	<p>All ablation activity rose to 89% of that in 2020/21 with complex atrial ablations up to 92%. There was significant variability between centres.</p> <p>Different regions have recovered levels of ablation activity at different rates (ranging from 30% lower than 2019/20 to 18% higher).</p> <p>Pacing procedures were up to 93%, implantable cardioverter defibrillator (ICD) procedures 89% and cardiac resynchronisation therapy (CRT) procedures 93% of pre-pandemic levels.</p>

Tackling the waiting list backlog

Waiting times for elective CABG are over 100 days



Average waiting times from the diagnostic angiogram were 114 days in England, 109 in Wales and 199 in Northern Ireland.

Delays to urgent CABG are too long



No surgical centre reached the target of 75% of patients needing urgent CABG to be operated on within seven days.

Actual proportions operated on in the first week were 28% (England), 20% (Wales), 15% (Republic of Ireland) and 4% (Northern Ireland).

Consultant surgeons are doing fewer cases per annum



Cardiac surgeons performed an average of 96 cases in 2021/22. This continues the long-term decline, having fallen from 140 in 2013/14.

Lack of access to fully staffed and ring-fenced intensive care unit (ICU) beds has been proposed as the most important block to faster recovery of surgical activity.

Constrained consultant capacity for PCI and ablations relates to the number of procedures they are able to perform



The number of PCI consultants increased to 752 in 2021/22, from 713 in 2019/20. However, the average number of PCI procedures per consultant fell to 106 from 122 over the same period.

There are also still eight NHS adult centres and 79 consultants doing fewer than the recommended minimum number of ablation procedures.

Consultants performing PCI and ablations need additional access to fully staffed catheter laboratory slots if targets are to be met.

Ensuring timely treatment of patients suffering a heart attack

Call-To-Balloon and Call-To-Door times have increased further



The median Call-To-Balloon (CTB) time for patients with a high-risk heart attack has had its biggest annual jump to reach 142 minutes. A quarter of patients now wait more than three hours or more for treatment.

At 90 minutes, the Call-to-Door (CTD) time from calling for an ambulance to being admitted to the hospital was 32 minutes longer than in 2010/11.

In-hospital mortality for patients with a heart attack undergoing primary PCI was higher



Unadjusted in-hospital mortality rose from 2.6% in 2015 to 3.3% in 2021/22 for primary PCI patients who did not present with cardiogenic shock.

For all patients undergoing primary PCI, including those with cardiogenic shock, the in-hospital mortality rose to 6.2%, up from previous levels of between 5.3% to 5.5%.

Continuing delays for patients with NSTEMI to undergo angiography and PCI



Only 55% of patients undergoing PCI for NSTEMI are treated within 72 hours, and 67% within 96 hours of arrival in hospital.

78% of hospitals fail to achieve the national 72-hour standard for timeliness of treatment for these patients.

It is remarkable that despite the pandemic, quality of care has largely been maintained or even improved over a wide range of quality measures. While there is still scope for improvement, especially in terms of under-achieving hospitals reaching the level of the best performing, the table below highlights a selection of metrics where there has been change for the better over the years.

For patients suffering a heart attack

82%	STEMI patients receiving in-house echocardiography (up from 63% in 2012/13)
76%	Number of eligible patients receiving aldosterone antagonists (up from 51% in 2012/13)
88%	Referrals to cardiac rehabilitation for patients being discharged home (up from 81% in 2017/18)

For patients admitted with heart failure

56%	Prescribing of all three best-practice medications for patients with heart failure with reduced ejection fraction (HFrEF) (up from 47% in 2017/18)
63%	Prescribing of mineralocorticoid antagonists (MRAs) to those with HFrEF (up from 53% in 2017/18)
14%	30-day mortality (down from 16% in 2021/22)

For patients undergoing PCI

71%	Use of intracoronary imaging for left main PCI (up from 51% in 2017/18)
71%	Use of day case elective PCI (up from 64% in 2018/19)
55%	Use of P2Y12 antiplatelet agents for Primary PCI (up from 44% in 2014)

For patients undergoing cardiac surgery

1362	Occlusion of the left atrial appendage for patients with pre-operative atrial fibrillation at the time of other cardiac surgery (up from 467 in 2017/18)
644	Emergency aortic surgery (up from 382 cases in 2013/14)
1%	Highest risk cases operated on by two consultants to offer patients with severe and complex problems a greater chance of a good outcome

For patients with cardiac rhythm problems

2

Only two adult NHS centres failed to reach the minimum target for AF ablations (down from 12 in 2014/15)

72%

Centre compliance with pacing modality for AV block (up from 58% in 2014/15)

For patients with congenital heart disease

≥80%

Antenatal diagnosis for infants with hypoplastic left heart syndrome or transposition of the great arteries (up from 40% in 2012/13) or Fallot's tetralogy (up from 33% in 2012/13)

Summary of recommendations

All Integrated Care Systems (ICSs) should:

1. Focus on every step of the clinical care pathways for patients suffering a higher-risk ST-segment elevation myocardial infarction heart attack to improve treatment times for primary PCI
2. Undertake a full re-appraisal of the NSTEMI pathway to determine how to reduce time-to-treatment.

The [individual domain reports](#) contain more specific recommendations for each sub-specialty.

1 Introduction



The 2023 National Cardiac Audit Programme (NCAP) report covers quality of care and outcome measures across six cardiovascular domains.

Each of these sub-specialty audits is concerned with a particular cardiovascular disease (CVD) of treatment:

- National Congenital Heart Disease Audit ([NCHDA](#))



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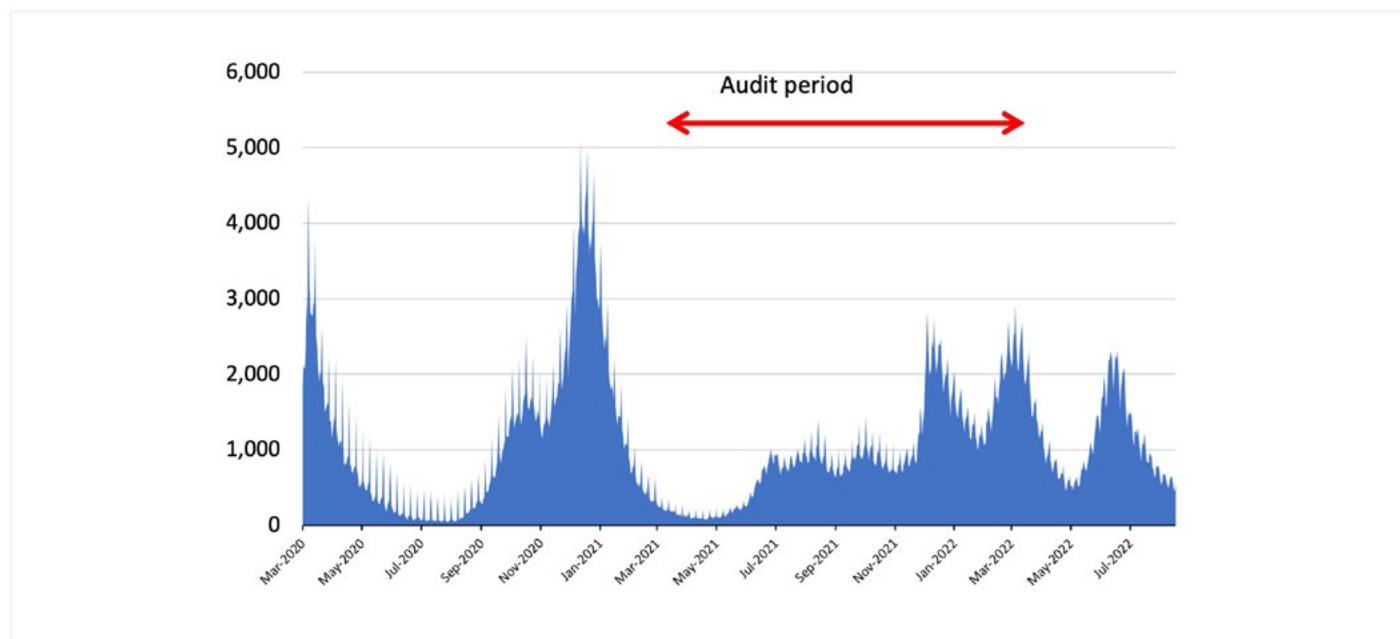
Selected data is also drawn from the [UK Transcatheter Aortic Valve Implantation Registry \(UK TAVI Registry\)](#).

This report covers the 12 months from 1 April 2021 to 31 March 2022. The preceding 2022 report examined the impact of the initial waves of the COVID-19 pandemic, highlighting the impact on admissions, care pathways and service performance.¹

Our new report extends these observations to assess what was happening to cardiovascular services as the NHS attempted to recover towards pre-COVID levels of activity, including tackling a growing backlog of cases. During this period, the number of COVID-19 cases continued to spike from time-to-time [Figure 1.1].



Figure 1.1: Plot of daily UK COVID-19 admissions highlighting the audit period for this report [UK Health Security Agency data²]



Apart from the direct results of COVID-19 itself, the indirect impact of falling admissions for patients with CVD, the reduction in provision of hospital treatments and lost opportunities to identify and manage risk factors have all contributed to a period of excess mortality.

Many of the planned steps to improve services for patients with cardiovascular disease, as outlined in the Long-Term Plan³, were postponed or re-prioritised because of the COVID-19 pandemic.

In February 2022, NHS England set out its recovery plan⁴ and considerable work has been done to return services to normal. Nevertheless, the continuing admissions to hospital related to COVID-19, together with the winter pressures and dealing with an increasing backlog of

CVD cases have created a hugely challenging environment.

This report shows that recovery occurred during 2020/21, but not to pre-pandemic levels for most services. Especially for patients suffering high-risk heart attacks, the timeliness of treatment is often well outside expected standards. Various factors (probably related to staff fatigue, morale and turnover) jeopardise efforts not only to return to pre-pandemic levels of service but to continue the improvements seen prior to this.

Despite this, many aspects of hospital care have been maintained or even improved, a huge achievement for NHS staff during difficult times. Considerable work is ongoing to improve care pathways and outcomes and there is evidence demonstrated in each report of excellent care being provided at individual hospitals. There is scope for others to learn from these centres.

A regional and/or national approach should identify and resolve some problems preventing high-quality care. This is particularly the case for patients suffering a heart attack and those in need of either urgent or elective cardiac bypass surgery.

The NHS published its new Urgent and Emergency Care Strategy in January 2023. This commits to increasing capacity and workforce

numbers, easing hospital discharges, improving community services and addressing unwarranted variation in care.⁵ The National Institute for Cardiovascular Outcomes Research (NICOR) will continue to monitor quality of care to show where these efforts pay off, as well as shining a light on where a more focused approach may be necessary.

The rest of this report comprises three further sections:

- **Section 2** focuses on activity levels, the scale of the backlog and factors affecting the capacity of cardiovascular services
- **Section 3** highlights the continued delays being faced by patients experiencing higher risk heart attacks
- **Section 4** sets out the steady progress on quality measures across the different domains.

The 2023 reports for each of the six domains provide more detail on progress across those cardiovascular sub-specialties. Hospitals can find their own annual data in the various reports but also contemporary data using the data tools provided by the National Institute for Cardiovascular Outcomes Research (NICOR). The methodology used for the NCAP analyses are summarised in previous reports.^{1,6}



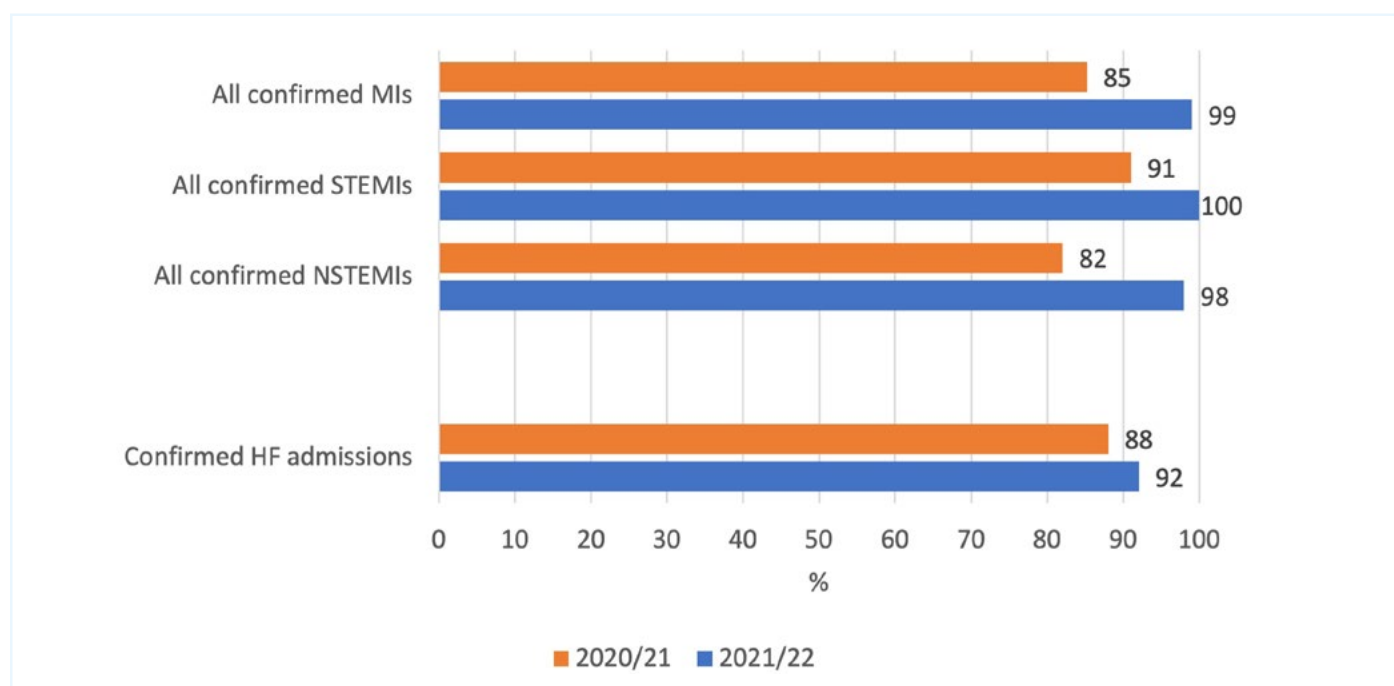
2 Activity levels, capacity and some reasons for optimism



2.1 Levels of activity recovered across all seven cardiovascular domains in 2021/22, albeit to varying degrees.

Amongst acute cases, admissions for heart attacks have returned faster to pre-pandemic levels than for heart failure. The number of heart attack admissions to hospital had returned to pre-pandemic levels, especially for patients with ST-elevation myocardial infarction (STEMI) while the number of acute heart failure admissions had increased, but not quite to those seen prior in 2019/20 [Figure 2.1].

Figure 2.1: Acute admissions in 2020/21 and 2021/22 as a % of those recorded in the pre-pandemic year 2019/20



Legend: HF = heart failure; NSTEMI = non-ST-elevation myocardial infarction; STEMI = ST-elevation myocardial infarction; MI = myocardial infarction

Therapeutic procedure numbers showed variability in recovering from the lows seen in 2020/21 [Figure 2.2]. Paediatric treatments for congenital heart disease were 88% of those prior to the pandemic but paediatric surgical procedures only reached 78%. Adult cardiac surgery reached nearly 84% compared to only 76% for aortic valve surgery.

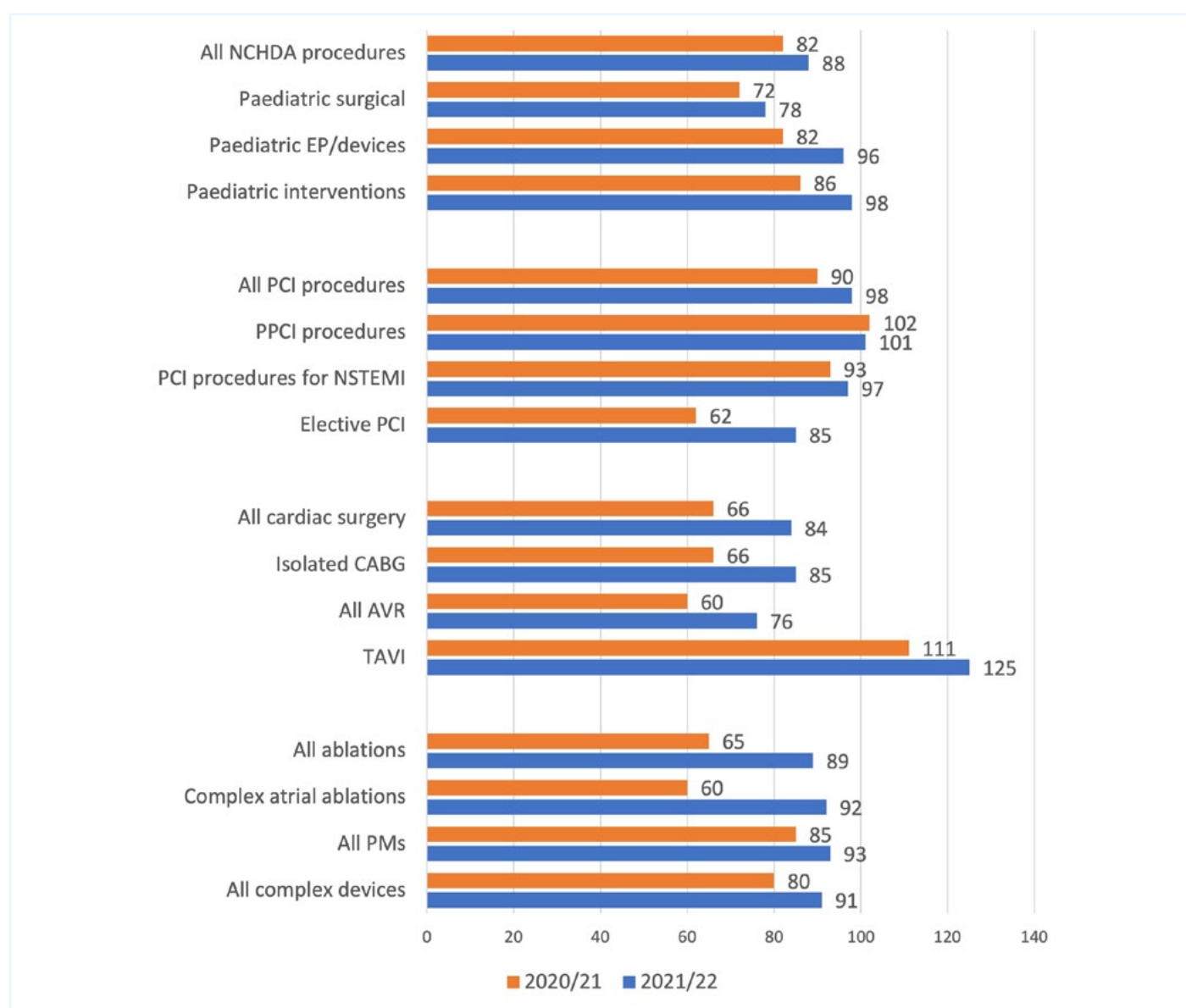
Although percutaneous coronary interventions (PCIs) activity had been restored for heart attack patients, elective PCI procedures were only at 85% of pre-pandemic levels.

For ablation procedures in England and Wales, there had been a steady rise in the number of cases prior to the pandemic reaching a total of over 20,000 in 2019/20. During the peaks of COVID-19 admissions in 2020/21, the virtual cessation of ablation procedures (mainly, an elective procedure) resulted in a significant fall overall to just over 13,000. In 2021/22, this recovered to more than 18,000 procedures, 11% below the pre-pandemic high. That figure likely represents an under-estimate of 'lost treatments' that would have been expected because of

predicted growth in demand, especially in atrial fibrillation (AF) ablation procedures.

The only treatment area to grow substantially beyond pre-pandemic levels was transcatheter aortic valve implantation (TAVI) procedures, which were 25% higher than in 2019/20. This is likely a result of TAVI being used in preference to surgical aortic valve replacement in many instances, especially where there were potential delays to surgery.

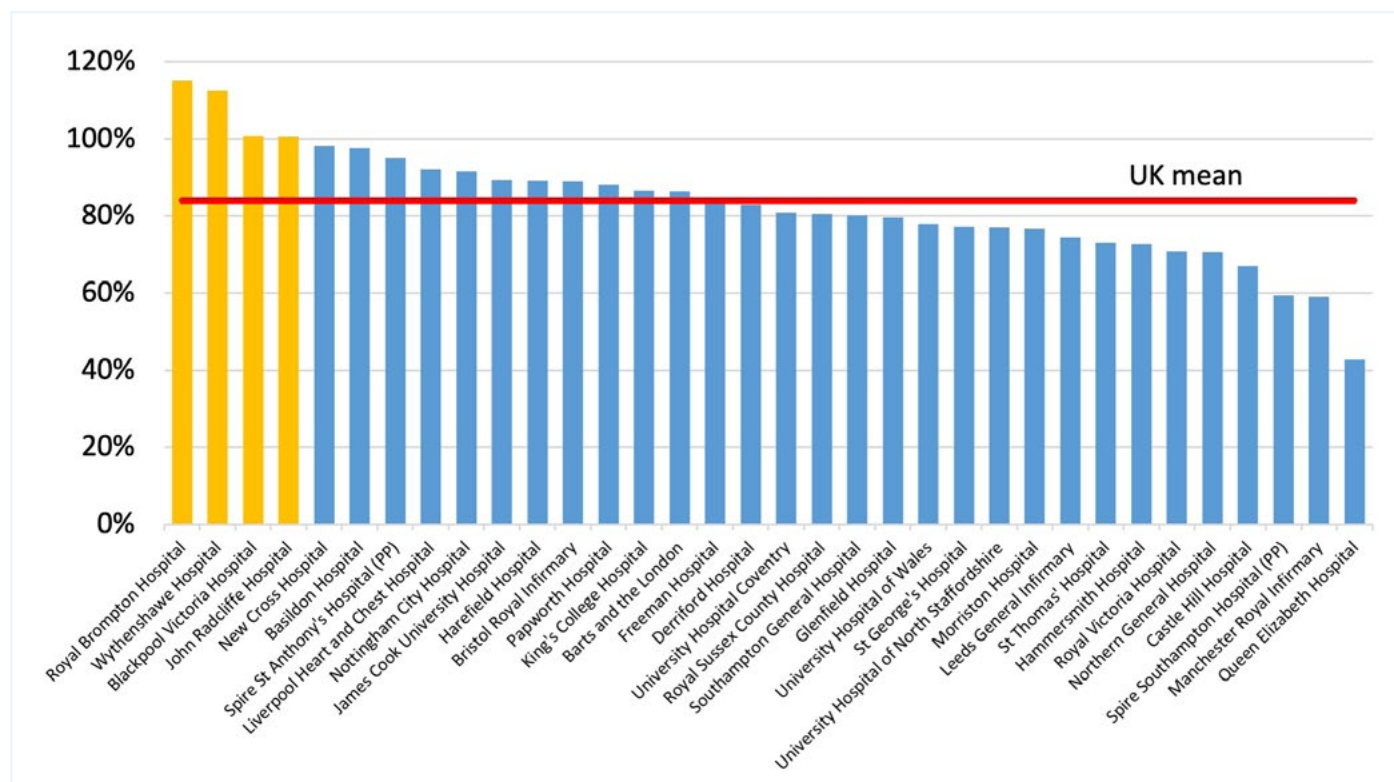
Figure 2.2: Number of cardiac procedures in 2020/21 and 2021/22 as a % of those recorded in the pre-pandemic year 2019/20



Legend: PM = pacemaker; TAVI = transcatheter aortic valve implantation; AVR = aortic valve replacement; CABG = coronary artery bypass grafting; PCI = percutaneous coronary intervention; NSTEMI = non-ST-elevation myocardial infarction; PPCI = primary percutaneous coronary intervention; EP = electrophysiological; NCHDA = National Congenital Heart Disease Audit

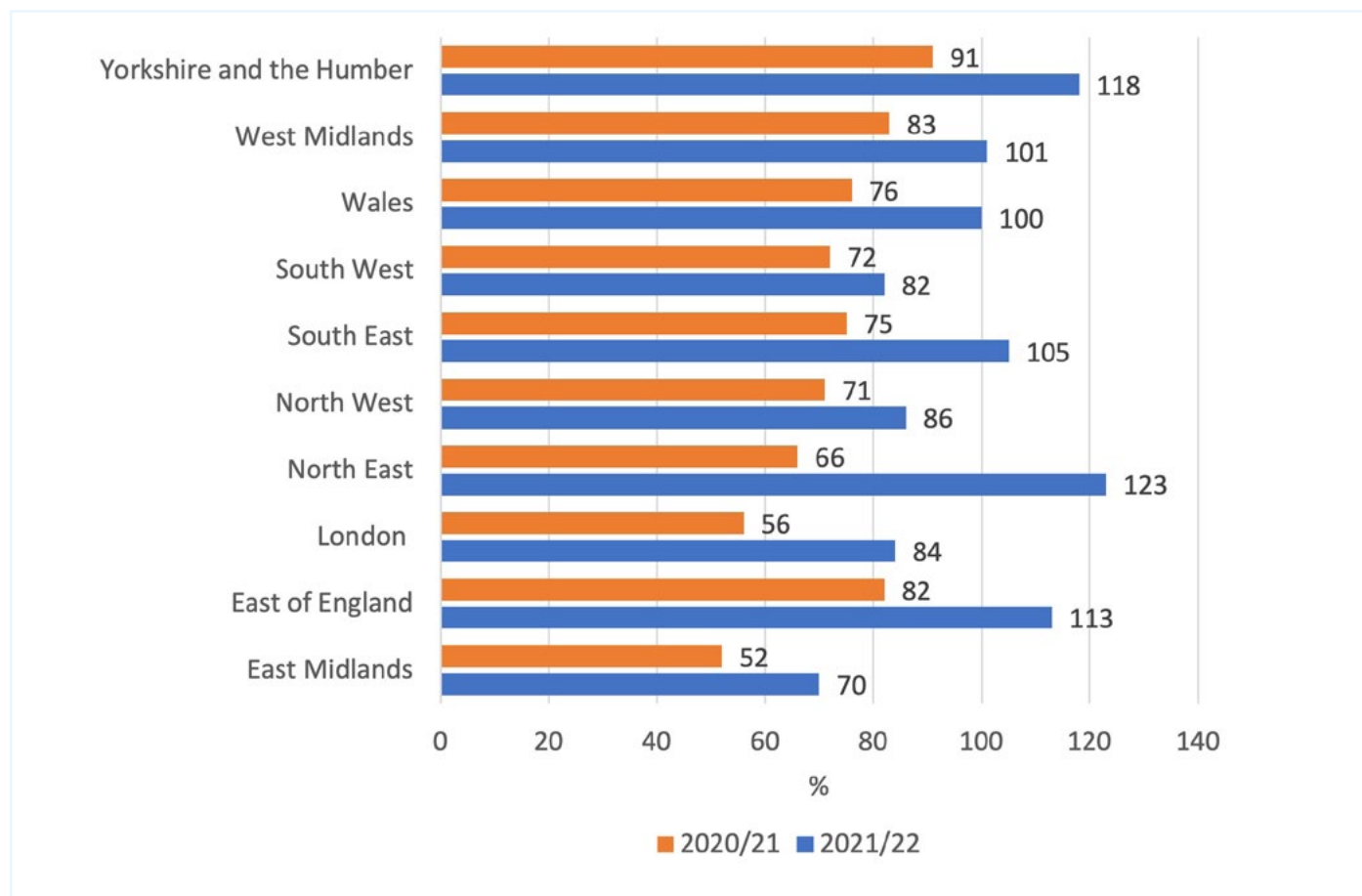
There was also significant variation, both regionally and across individual hospitals, in the recovery of activity to pre-pandemic levels. For example, in cardiac surgical services, the spread was 42% to 115% [Figure 2.3]. A period of coordinated cross-referral and collaboration between centres may help ease the national picture and improve outcomes.

Figure 2.3: Cardiac surgical service activity in 2021/22 as a % of 2019/20 activity [NACSA data]



For ablation services, the spread in recovery ranged from the number of cases being 30% below that in 2020/21 up to 18% above pre-pandemic numbers [Figure 2.4]. Again, cross-referral between centres for a period may pay dividends.

Figure 2.4: Variation in ablation numbers by region, England and Wales, 2020/21 and 2021/22 compared to activity in 2019/20 [NACRM data]



Regions and number of procedures reported in 2019/20; % = % change compared to 2019/20 activity

2.2 The backlog of cardiovascular cases has increased and waiting times have lengthened

Typically, a backlog of cases awaiting treatment is based on elective activity falling behind demand. This happened to a considerable extent during 2020/21. However, during the peaks of COVID-19, some patients requiring urgent care may also have been added to a waiting list rather than being treated immediately. Delays in the provision of certain care (AF ablation procedures for example) may result in a lost possibility to treat as the success rate of the intervention reduces with time and may subsequently be deemed too low to proceed with the intervention.

Consequently, the reduction in urgent procedures during the pandemic will almost certainly have contributed to the excessive non-COVID-19 mortality seen during the first and second years of the pandemic.^{7,8,9,10,11}

These ‘missed opportunities’ for hospital treatments, together with an inability to identify and manage risk factors both within hospital and community settings, can lead to what otherwise would have been preventable episodes of heart attack, heart failure and stroke.

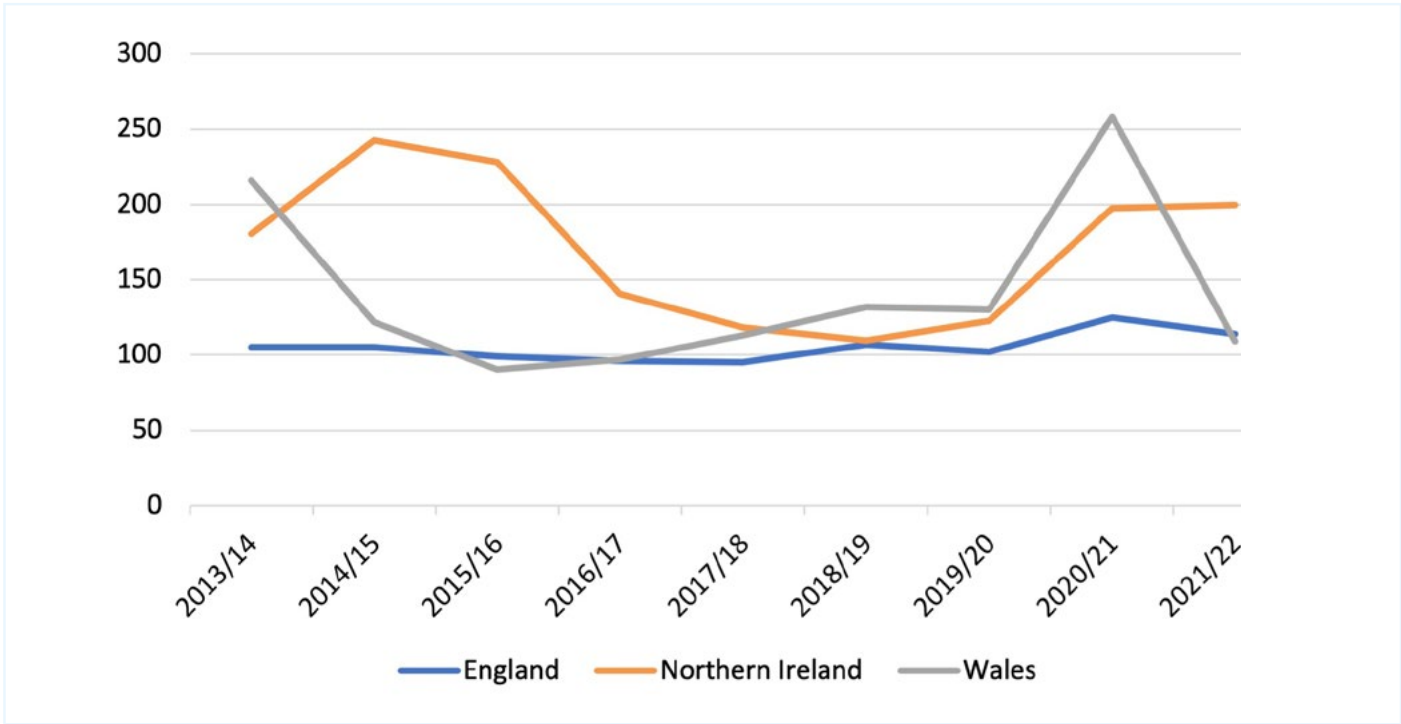
NICOR does not hold waiting list or waiting time data on behalf of the NHS. Several other sources estimate the impact of COVID-19 on waiting times for procedures and the total backlog of cases ^{7,12,13}. One of these suggests that almost 7,500 patients had been waiting more than a year for a cardiac procedure at the end of August 2022. By April 2023, just short of 400,000 patients are estimated to have been waiting for a diagnostic procedure or treatment.¹²

Some data from individual domains also points towards more people on waiting lists and lengthening times to treatment. For ablation procedures, hospitals have suggested to the audit that waiting lists have grown substantially,

notwithstanding that some regions have recovered activity rates faster than others. Similarly, waiting times for elective CABG are longer than pre-pandemic. Waiting times had started to rise prior to the pandemic and peaked in 2020/21. While they have since fallen, they remain higher than they were in 2016/17, especially in Northern Ireland where the calculated waiting time is 199 days [Figure 2.5].



Figure 2.5: Waiting times (days) for elective CABG, 2013/14 - 2021/22 [NACSA data]



The same is true for urgent CABG cases. Following a gradual reduction in the average wait for surgery between 2013/14 and 2019/20, times deteriorated in 2021/22. The average waits in England, Wales and Northern Ireland were 12, 14 and 27 days respectively. No surgical centre met the target of 75% of cases being operated on within 7 days. The proportions were respectively 28%, 20% and 15% in England, Wales and the Republic of Ireland and only 4% for Northern Ireland.

Recent evidence from NHS England suggests that there has been a reduction in numbers waiting greater than one year in 2023 [Figure 2.6 and Figure 2.7].

Figure 2.6: Weekly reported CABG patients grouped by their waiting times, May 2021 - May 2023 [NHS England data]

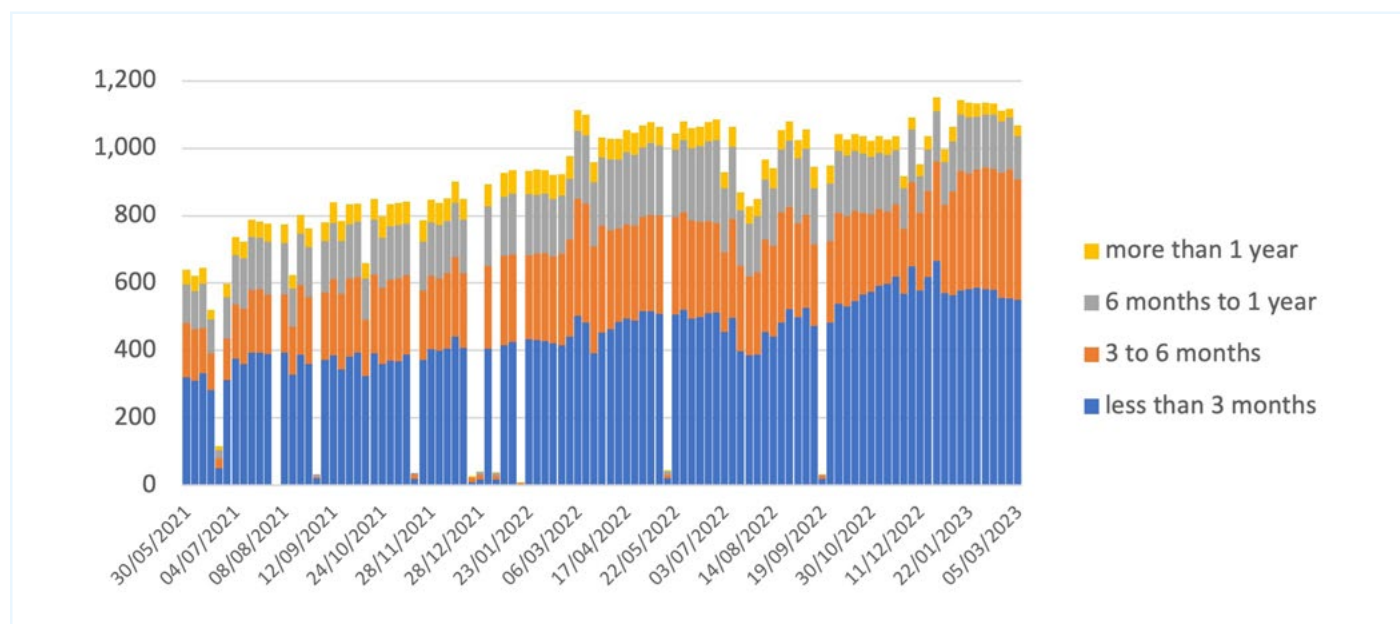
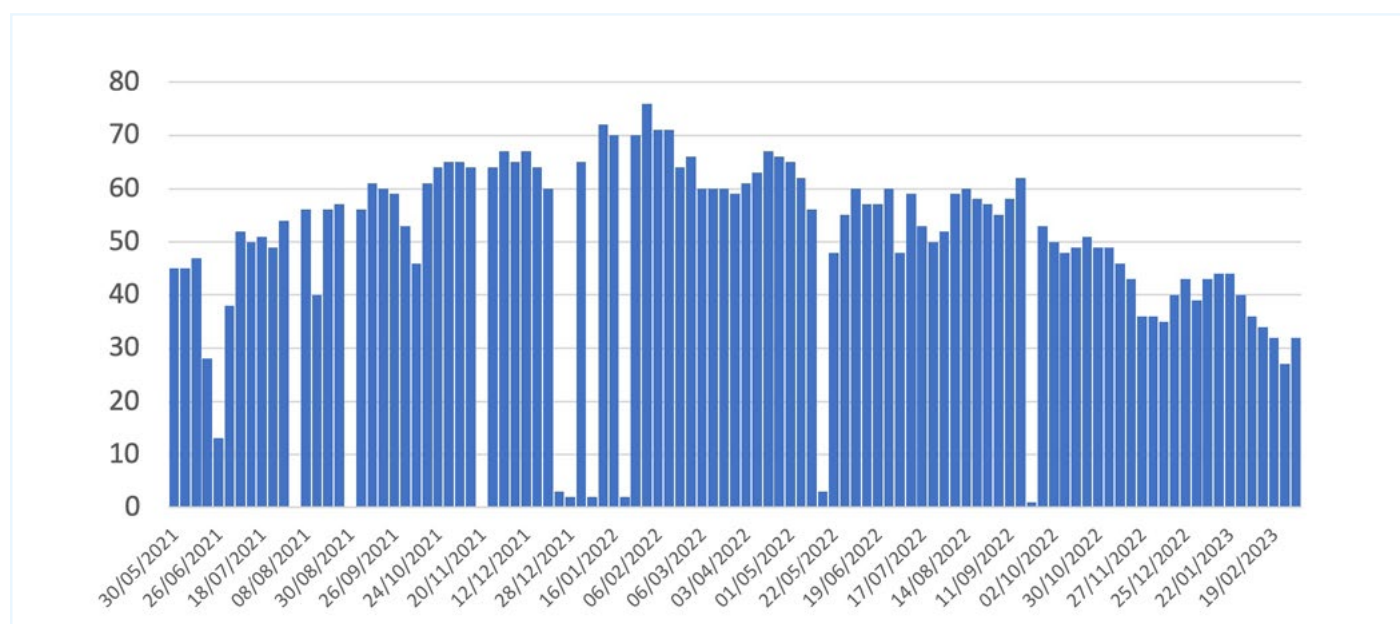


Figure 2.7: CABG patients waiting more than 1 year, May 2021 - May 2023 [NHS England data]



2.3 Access to catheter laboratories, ICU beds and support staff may be a greater priority in ensuring necessary capacity than increasing consultant numbers

The Getting It Right First Time (GIRFT) Cardiology and Cardiothoracic reports highlighted infrastructural and staffing requirements needed to optimise care. They also described regional variations in infrastructure and staff shortages (e.g. with respect to cardiac physiologists) that need to be addressed.^{14,15} The NCAP audits provide some additional insights from the first year of recovery.

For example, while overall PCI activity is nearly back to pre-COVID levels, longer term reductions in younger STEMI cases through risk factor control may be balanced by an increasingly older population (usually with a higher proportion of NSTEMI cases) and so heart attacks may be delayed rather than prevented.

In the short-term, numbers of procedures are unlikely to change. One aspect of the capacity needed to meet this demand is the number of available PCI operators. Since 2019/20, these have risen from 713 to 752 in 2020/21. However, over the same period, the average number of procedures per year has fallen from 122 per operator to 109.

With no evidence of worsening efficiency per catheter laboratory, it is likely that the current numbers of PCI consultants will suffice for national requirements if they have appropriate sessions in their job plans, access to sufficient catheter laboratories and patients are in the right place to be considered for early treatment. Moreover, it is essential that correct levels of support staff are available, whether cardiac physiologists, nurses or others. Getting this right will be critical to reducing the lengthening times for NSTEMI cases to be treated (see section 3).

Turning to adult cardiac surgery, over the last

decade, fewer procedures have been performed year-on-year and the number of cases undertaken by each cardiac surgeon has been falling. Since 2013/14, consultant surgical workloads have gone from a median of around 140 cases per year to 93 in 2021/22. This indicates that the limiting factor on tackling waiting list backlogs is less the number of cardiac surgeons and more to do with their ability to take on a higher rate of procedures. Reports from cardiac surgical units suggest this is not related to a reduction in cardiac operating theatre slots, but rather a lack of access to ICU beds. Multiple reasons for this are provided, including the diversion of ICU facilities to support the COVID-19 pandemic requirements and, increasingly, a shortage of nurses to staff the available ICU beds.

It is also apparent that the gradual displacement of some cardiac surgery by PCI is continuing. Having gradually increased over the previous 10 years, the ratio of PCI procedures to CABG cases has risen from around 7:1 pre-COVID to 8:1 in 2021/22 (having peaked at nearly 10:1 in 2019/20 before elective cardiac surgery restarted after the initial COVID-19 waves). Similarly, the ratio of transcatheter aortic valve implantation cases to surgical aortic valve replacement (TAVI:sAVR) has been increasing [Figure 2.8].

Figure 2.8: Aortic valve surgery and TAVI procedures in the UK (not including Scotland), 2016/17 - 2021/22 [NACSA data]



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

Finally, although more centres are now reaching ablation targets (at least 100 ablations overall), eight adult NHS centres still fail to meet these. Moreover, 79 out of the 281 consultants performing ablations performed less than the minimum number of 50 per annum, with some undertaking very small numbers of procedures. This implies scope to expand activity based on the present numbers of consultants with appropriate job planning and access to catheter laboratory slots. It may be that this capacity planning is best designed at a regional level. At a national level, there may also be the need for action to tackle concerns about the shortage of physiologists and specialised nurses that could jeopardise plans to accelerate the provision of care.

3 Delays in the care pathways for patients with a heart attack are serious and urgent action must reverse these trends

The number of confirmed heart attack patients presenting to hospital in 2021/22 was 85,650. This was a 16% increase from the first year of the pandemic but very slightly fewer than reported in 2019/20.

The total is made up of just over 30,000 'higher risk' ST-elevation myocardial infarction cases (STEMI) (back to pre-pandemic levels) and a little more than 56,000 cases of 'lower-risk' non-ST-elevation myocardial infarction (NSTEMI) heart attacks.

The management of a patient with a heart attack covers a series of steps. After a patient calls for help or self-presents at hospital, they must be rapidly assessed, and an ECG performed. If a 'higher risk' STEMI heart attack is confirmed, the patient should be considered for primary PCI (PPCI).

If the hospital initially receiving the patient does not have its own PCI centre, a rapid inter-hospital transfer will be necessary. The patient should be taken directly to the catheter laboratory, bypassing the A&E department or the coronary care unit.

Rapid treatment is essential to achieve the best outcomes and delays should be avoided. This takes coordinated action between the ambulance

services, A&E departments, and the PCI services. Various inter-related issues are having a direct impact on the quality of care delivered:

- Waiting times to take people by ambulance to hospital are under severe pressure (the delivery of ambulance services is complex and beyond the scope of this report)
- Difficulties in discharging people from hospital quickly makes it hard to find beds for new arrivals
- Primary care capacity has resulted in increased demands on A&E departments.

These factors have resulted in long trolley waits and an inability on the part of ambulance crews to rapidly hand over patients to A&E and other services. Ambulance queues outside hospitals have then impacted on the ability of the ambulance services to respond to urgent and emergency calls.

At the same time, patients' expectations have changed and, when told of delays in an ambulance response, families might take a sick relative to A&E. However, for heart attack management, this has a deleterious knock-on effect on the speed of their assessment and triage for immediate care.

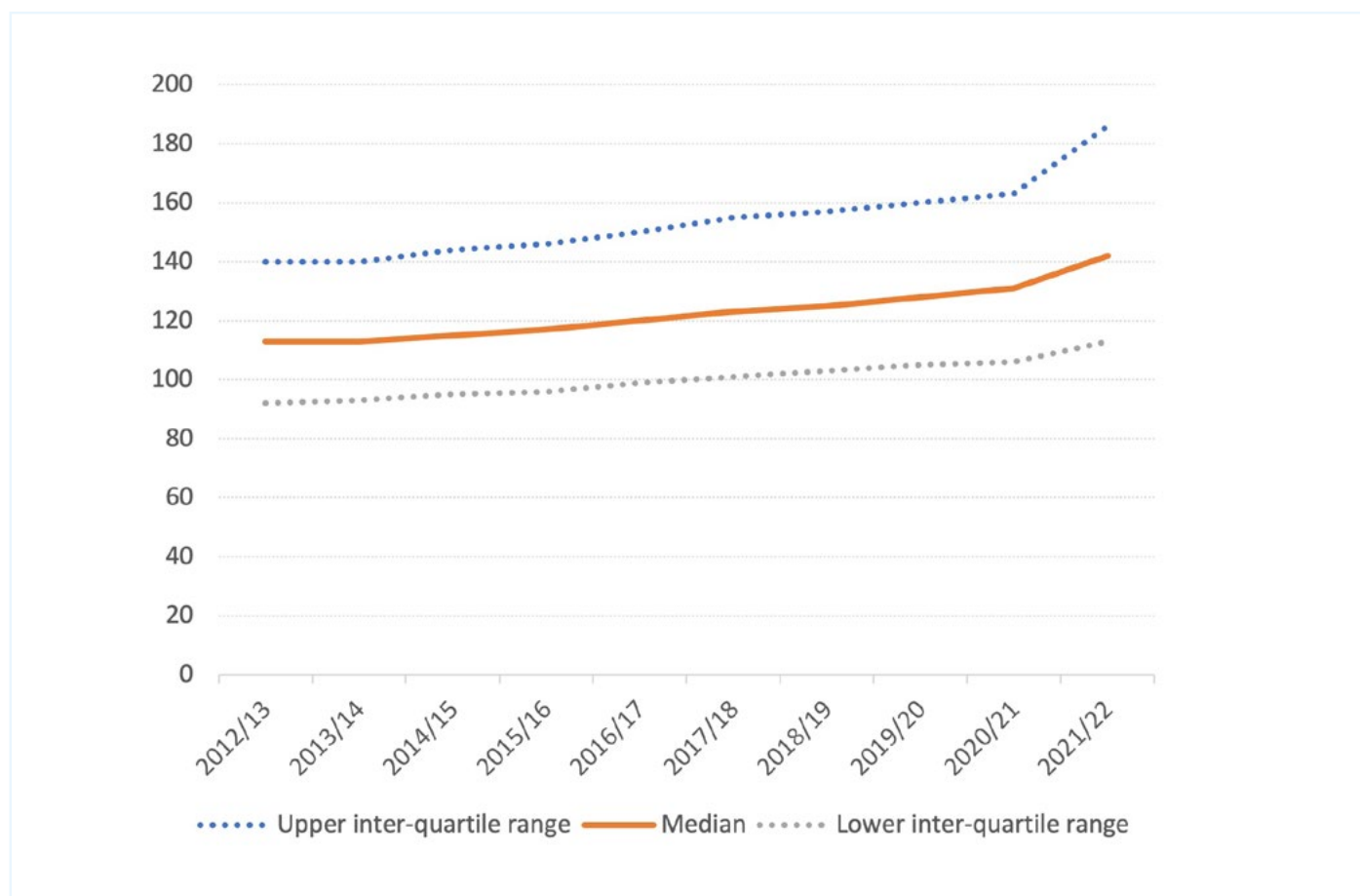


3.1 Delays worsened in the treatment of patients with higher-risk STEMI heart attacks

A concerning rise in the Call-To-Balloon (CTB) time for patients with a ‘higher risk’ STEMI heart attack has been happening over the last decade. For patients brought in by ambulance, it covers the period when the patient is brought to hospital by the ambulance services (Call-To-Door or CTD time) as well as the time taken for the hospital to admit and start PPCI treatment (Door-to-Balloon or DTB time). For patients who present themselves to hospital (usually to the A&E department), it covers the period from arrival at hospital to the start of treatment. This might involve an inter-hospital transfer should a patient go to a hospital that does not have PPCI services.

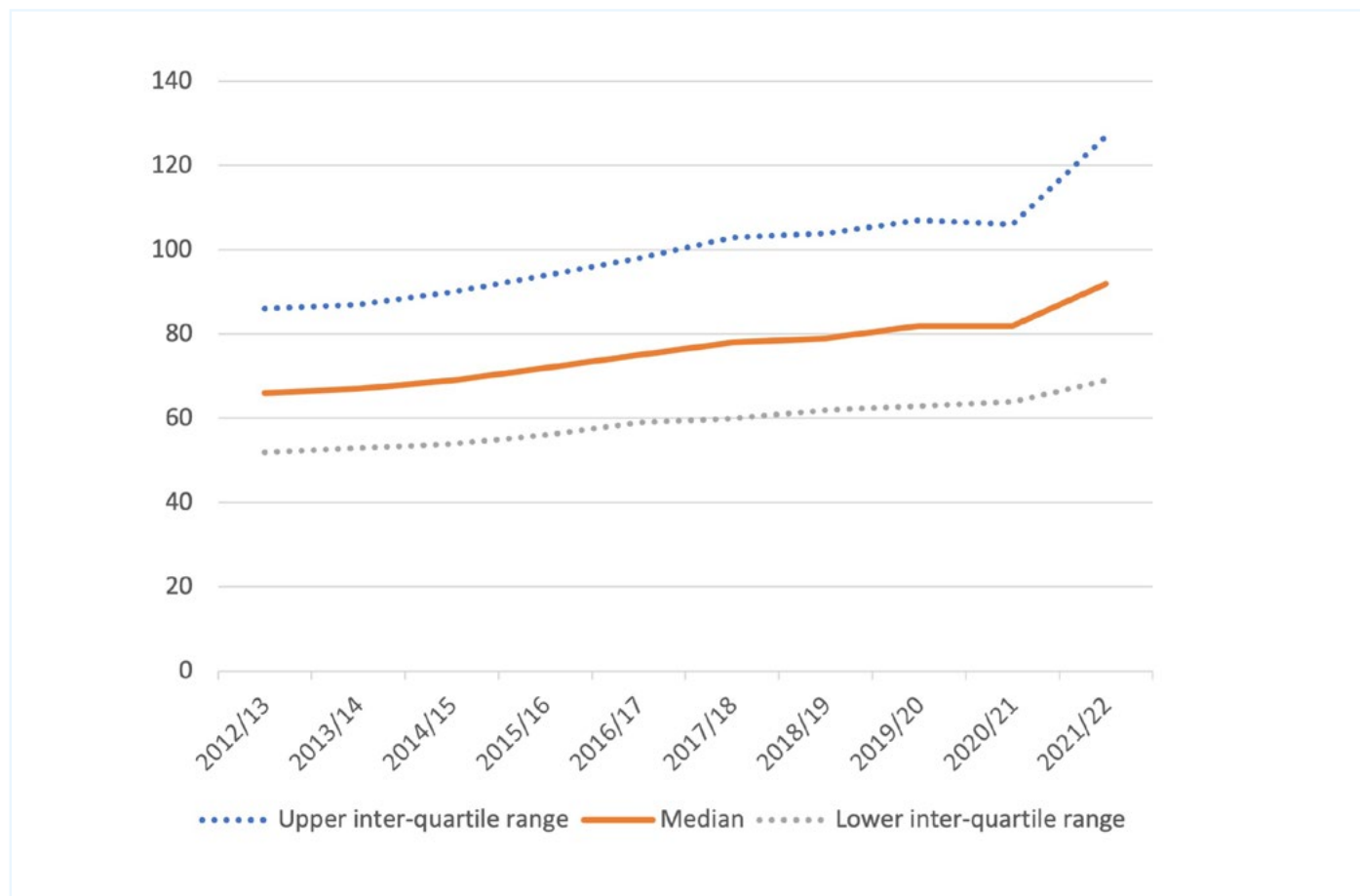
In 2021/22, the median CTB time was 142 minutes. This is now 29 minutes longer than in 2012/13 [Figure 3.1] and represents the biggest annual rise in the delay to PPCI treatment. A quarter of patients received treatment three or more hours after a call for help.

Figure 3.1: Call-To-Balloon times (minutes) for patients undergoing primary PCI, 2012/13 - 2021/22 [MINAP data]



By far the largest impact on the CTB times is the increase in median CTD time (now 90 minutes, an increase of 32 minutes compared to 2010/11) [Figure 3.2].

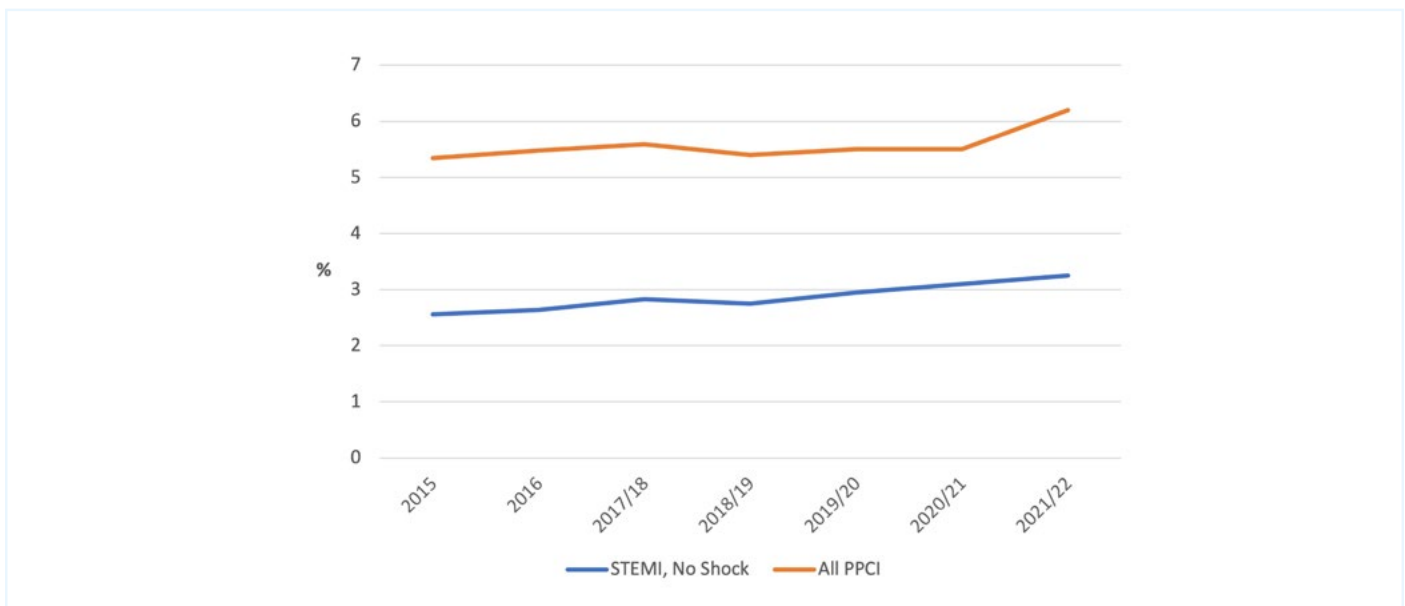
Figure 3.2: Call-To-Door times (minutes) for patients undergoing primary PCI, 2012/13 - 2021/22 [MINAP data]



There is now also some evidence that DTB times are deteriorating, having remained relatively stable over time (around 41 minutes). This increasing delay is both for patients who are admitted directly to hospitals with a PCI centre as well as those requiring an inter-hospital transfer. Overall, in 2021/22, 63% of hospitals failed to reach the DTB target of 75% treated within 60 minutes of arrival, so there is considerable scope for improvement.

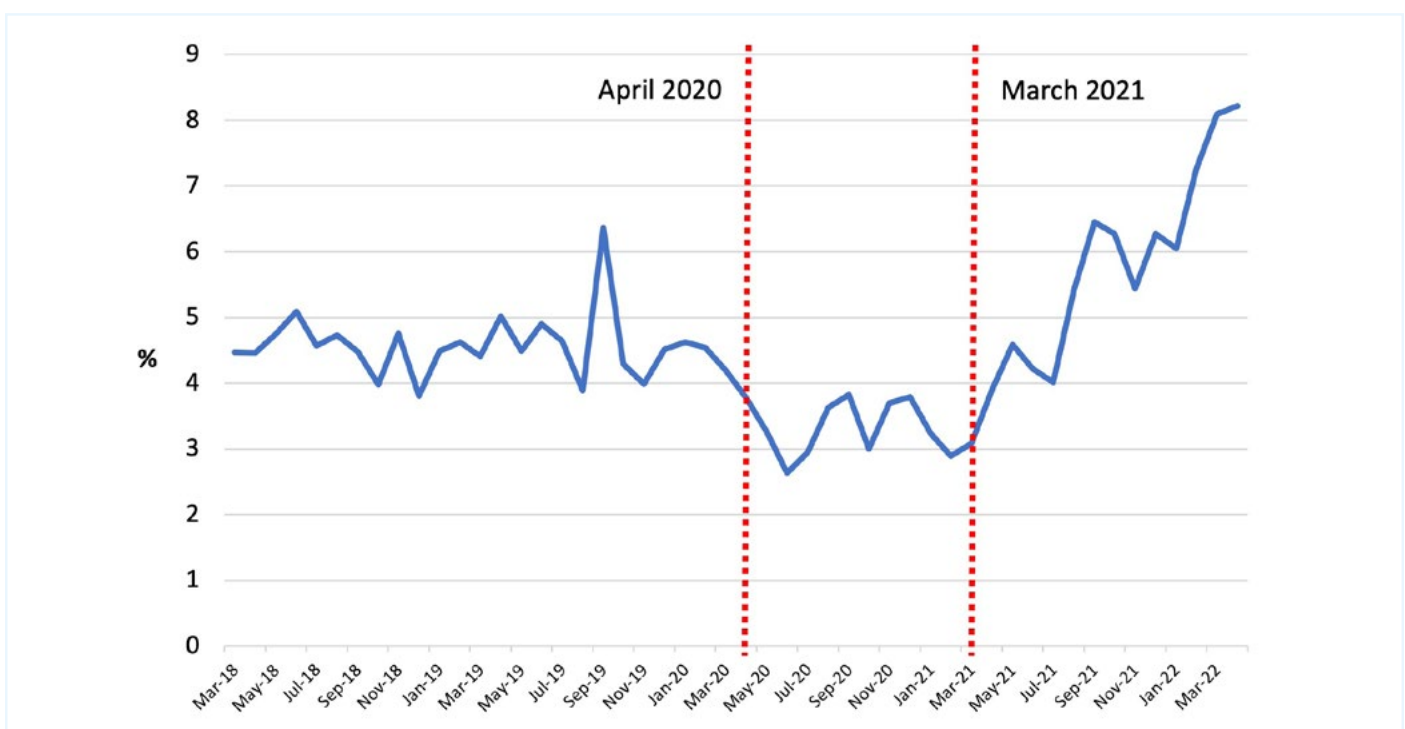
It is well established that longer delays impact on survival rates after a 'higher risk' STEMI heart attack. The broad rule of thumb is that every 60 minutes delay results in a 10% increase in mortality. Although a careful analysis of case mix characteristics is needed before any final conclusions are made, the raw mortality data for STEMI patients is worsening [Figure 3.3].

Figure 3.3: In-hospital mortality (%) of patients undergoing primary PCI (all PPCI and those without cardiogenic shock), 2014 - 2021/22 [NAPCI data]



Patients and their families told that there is a delay in an ambulance response may make efforts to expedite things by taking themselves to their local A&E Department. Although well-intentioned, there are likely to be significant delays after arrival as they are assessed and triaged to the catheter laboratory for treatment (as opposed to being taken directly to the catheter laboratory by the ambulance team, the preferred pathway). DTB times are considerably longer for those who present to A&E than for those taken by the ambulance crews directly to the catheter laboratory. These delays may negate any perceived advantage of self-presentation. The 2021/22 data show an increase in the proportion who self-present rather than call an ambulance [Figure 3.4].

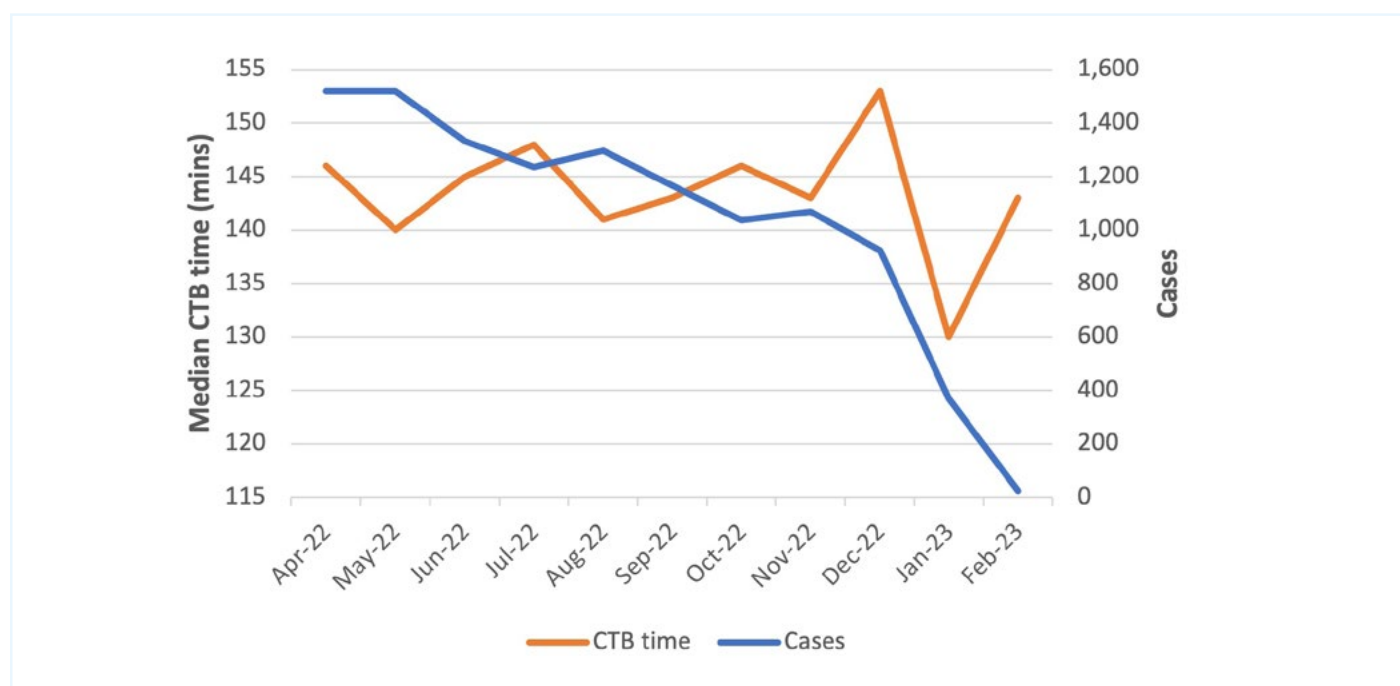
Figure 3.4: Proportion (%) of patients undergoing primary PCI who self-present to hospitals, 2018/19 - 2021/22 [MINAP data]



The Cardiac Transformation Programme in NHS England is working with cardiac networks to tackle the increase in CTB times (together with other time-sensitive acute emergencies). As steps are taken to reverse the trend, hospitals will be expected to deliver their timings data for the management of patients with STEMI to allow rapid monitoring of the care pathway.

Hospitals can also see their contemporary data using NICOR's online portal that collects local audit data. Interrogation of the latest (unvalidated) data demonstrates that the adverse trends seen over the last decade are, unsurprisingly, continuing over the 2022/23 period [Figure 3.5]. With the caveat that these are incomplete data, the pressures on the ambulance services in December 2022, reported elsewhere, seem to be reflected in the CTB times for that month.

Figure 3.5: Median CTB times (minutes) and case episodes received by NICOR, April 2022 to February 2023 (data interrogated 14/03/23) [MINAP data]



Although a continuous flow of data will allow this situation to be carefully monitored, urgent action is needed within each Integrated Care System (ICS) to analyse every step of the STEMI care pathway and to make improvements. The NHS is providing funding to create leadership posts for cardiovascular disease within each ICS, alongside clinically-led cardiac networks, to ensure care pathways are optimised.

All Integrated Care Systems (ICSs) should focus on every step of the clinical care pathways for patients suffering an ST-elevation myocardial infarction to improve treatment times.

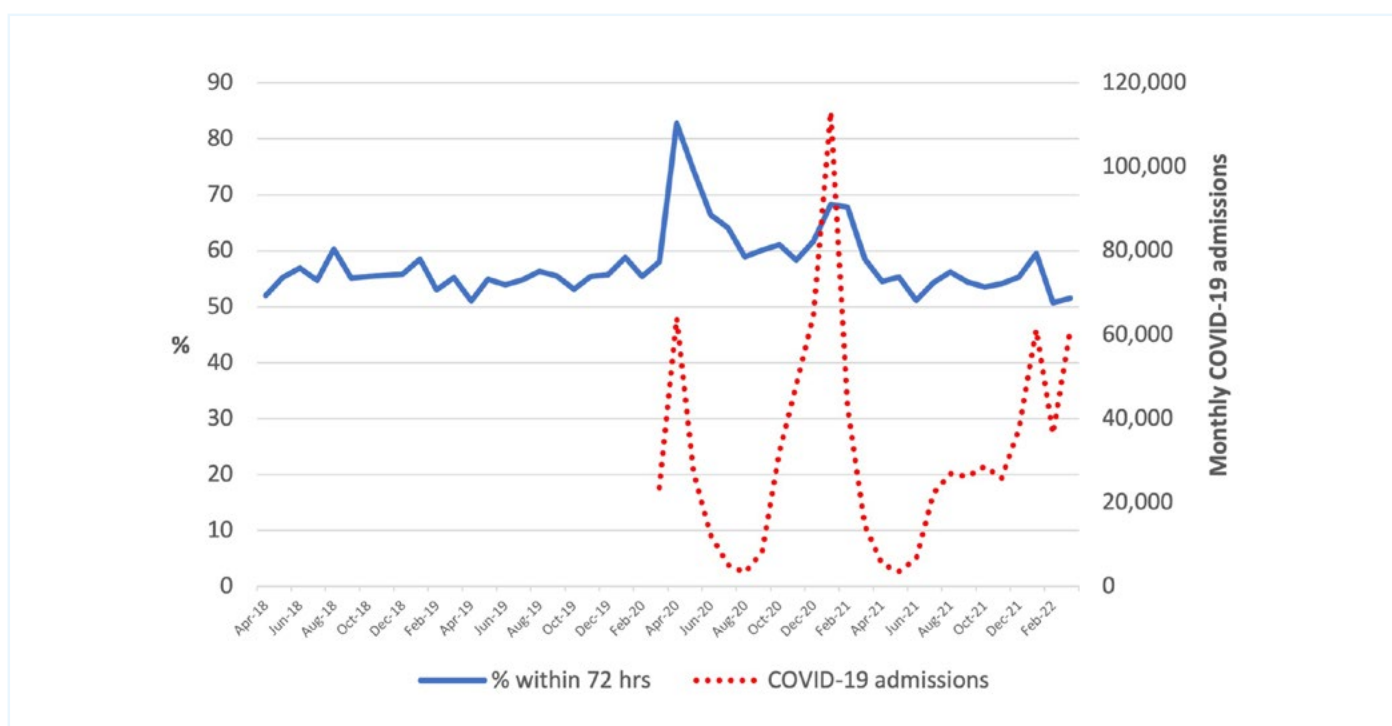


3.2 Appraisals at ICS level are needed to enable NSTEMI patients to receive timely treatment

There are also concerns at the delays to treatment for patients with 'lower-risk' NSTEMI heart attacks. The [2022 NCAP report](#) highlighted how the additional capacity that became available during the first year of the pandemic (both from the temporary cessation of elective PCI and the reduction in NSTEMI cases being admitted) were associated with an increase in the number of patients with NSTEMI being treated within 72 hours of arrival in hospital (the guideline-recommended target).

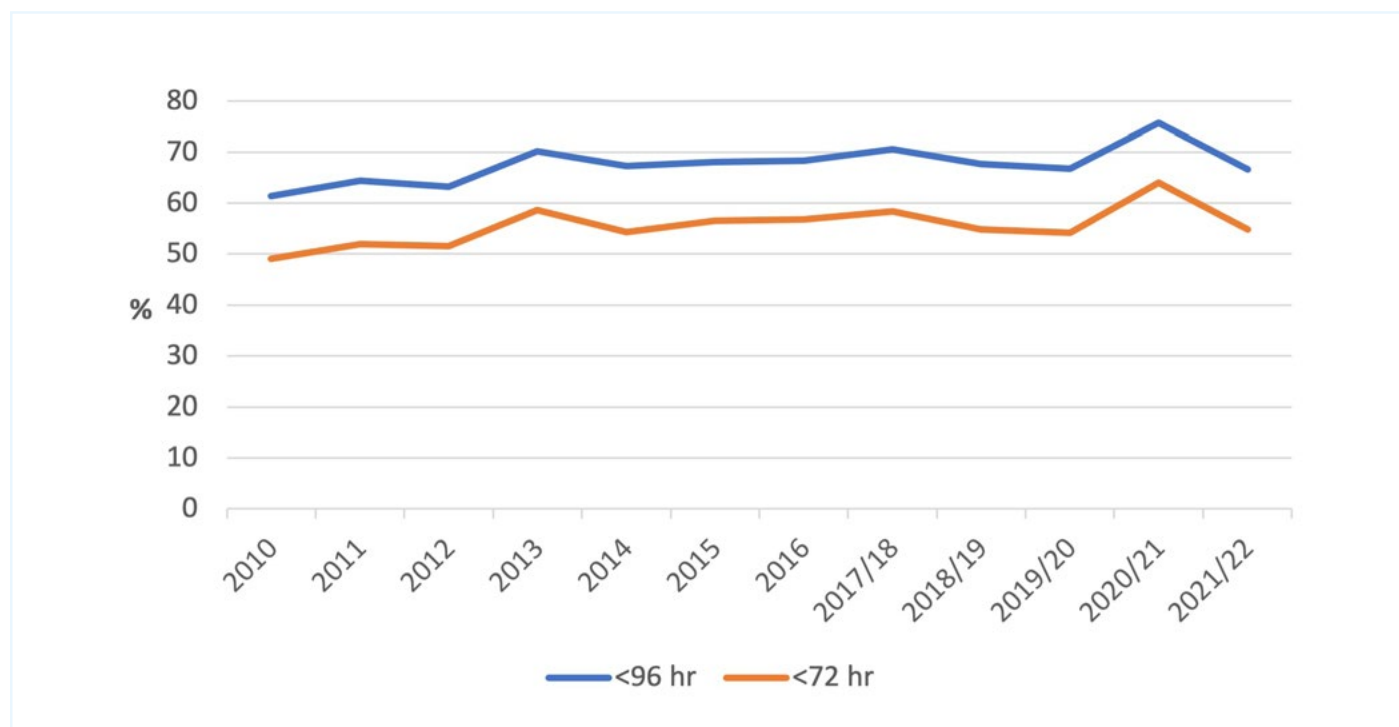
As elective work has re-started and more patients are being admitted, the proportion being treated within the recommended times has fallen again and, towards the end of 2021/22, was below average pre-pandemic levels [Figure 3.6].

Figure 3.6: Proportion of patients with NSTEMI waiting <72 hours for PCI against UK COVID-19 admissions, 2018/19 - 2021/22 [NAPCI data]



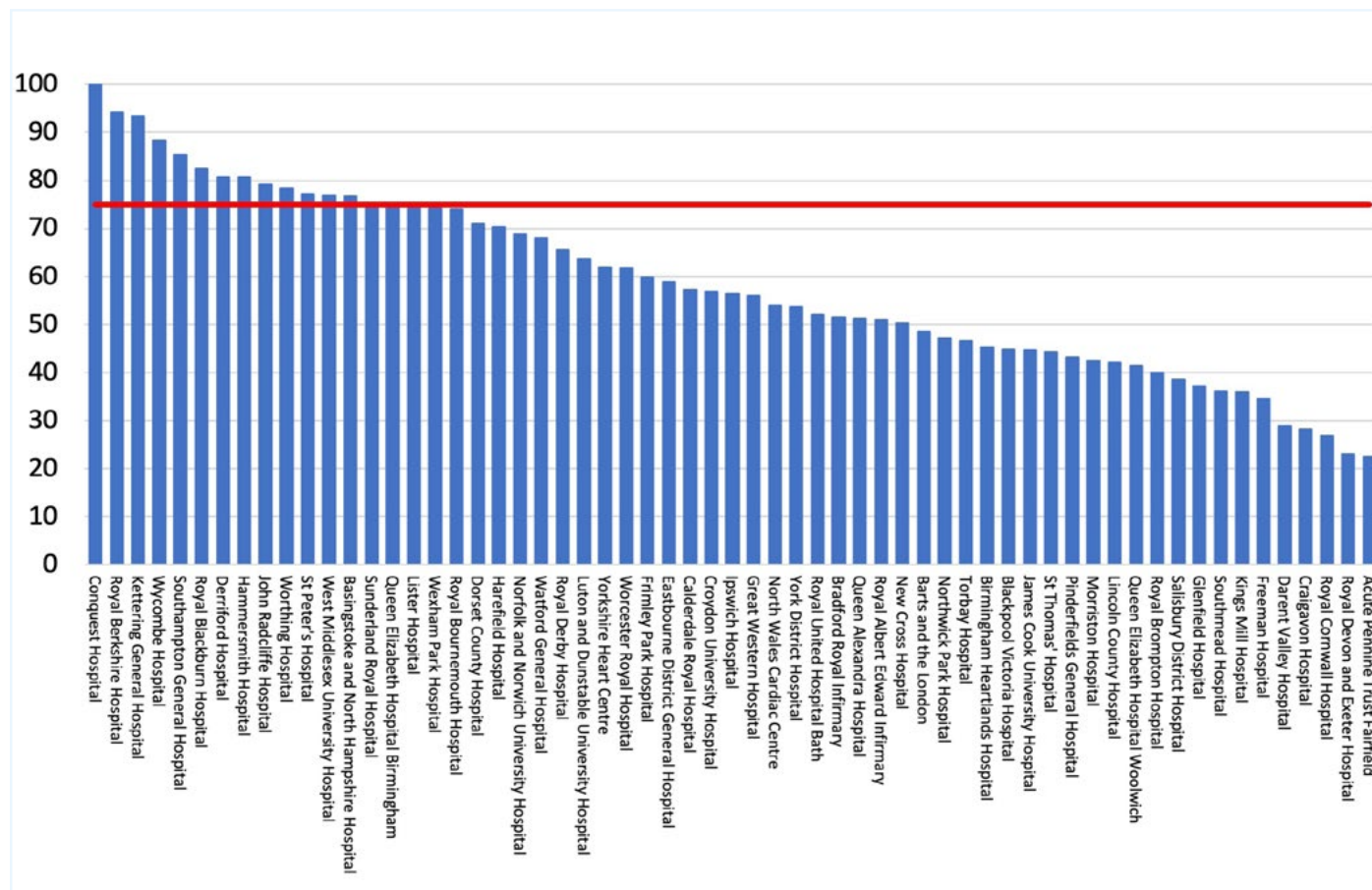
In 2021/22, only 55% were treated within 72 hours (British Cardiovascular Intervention Society target set at 75%), and 68% within 96 hours of admission, including all patients whether direct admissions or requiring an inter-hospital transfer (IHT) to the primary angioplasty centre [Figure 3.7].

Figure 3.7: Proportion of all patients with NSTEMI receiving PCI within 72 or 96 hours of admission, 2010 - 2021/22 [NAPCI data]



Almost 79% of hospitals did not achieve the 72-hour target [Figure 3.8]. The failure to provide timely treatment for these patients over many years suggests either an organisational or a capacity issue (or both).

Figure 3.8: Proportion (%) of NSTEMI patients treated by PCI within 72 hours (direct admissions and inter-hospital transfers), 2021/22 [NAPCI data]



Hospitals under the red line do not achieve the target of performing PCI on more than 75% of cases within 72 hours

All ICSs should undertake a full re-appraisal of the NSTEMI pathway to determine how to reduce time-to-treatment.



4 There has been steady progress on a range of QI measures across all the cardiovascular sub-specialties

Each NCAP [sub-specialty domain reports](#) on where things have improved, where things are unchanged and where there has been a declining performance.

It is remarkable that despite the pandemic, quality of care has largely been maintained or even improved over a wide range of quality measures. While there is still scope for improvement, especially in terms of under-achieving hospitals reaching the level of the best performing, Table 4.1 highlights a selection of metrics where there has been change for the better over the years.

Table 4.1: Selected improvements in performance, 2021/22 [NCAP audit data]

For patients suffering a heart attack	
82%	STEMI patients receiving in-house echocardiography (up from 63% in 2012/13)
76%	Number of eligible patients receiving aldosterone antagonists (up from 51% in 2012/13)
88%	Referrals to cardiac rehabilitation for patients being discharged home (up from 81% in 2017/18)

For patients admitted with heart failure	
56%	Prescribing of all three best-practice medications for patients with heart failure with reduced ejection fraction (HFrEF) (up from 47% in 2017/18)
63%	Prescribing of mineralocorticoid antagonists (MRAs) to those with HFrEF (up from 53% in 2017/18)
14%	30-day mortality (down from 16% in 2021/22)

For patients undergoing PCI

71%	Use of intracoronary imaging for left main PCI (up from 51% in 2017/18)
71%	Use of day case elective PCI (up from 64% in 2018/19)
55%	Use of P2Y12 antiplatelet agents for Primary PCI (up from 44% in 2014)

For patients undergoing cardiac surgery

1362	Occlusion of the left atrial appendage for patients with pre-operative atrial fibrillation at the time of other cardiac surgery (up from 467 in 2017/18)
644	Emergency aortic surgery (up from 382 cases in 2013/14)
1%	Highest risk cases operated on by two consultants to offer patients with severe and complex problems a greater chance of a good outcome

For patients with cardiac rhythm problems

2	Only two adult NHS centres failed to reach the minimum target for AF ablations (down from 12 in 2014/15)
72%	Centre compliance with pacing modality for AV block (up from 58% in 2014/15)

For patients with congenital heart disease

≥80%	Antenatal diagnosis for infants with hypoplastic left heart syndrome or transposition of the great arteries (up from 40% in 2012/13) or Fallot's tetralogy (up from 33% in 2012/13)
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7 Appendix: Glossary



A glossary of relevant terminology, abbreviations and acronyms is available [here](#).



National Institute of Cardiovascular Outcomes Research (NICOR)

NICOR is a partnership of clinicians, IT experts, statisticians, academics and managers who are responsible for the National Cardiac Audit Programme (NCAP) and several health technology registries, including the UK TAVI registry. Hosted by 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. NICOR is funded by NHS England and the GIG Cymru (NHS Wales).

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