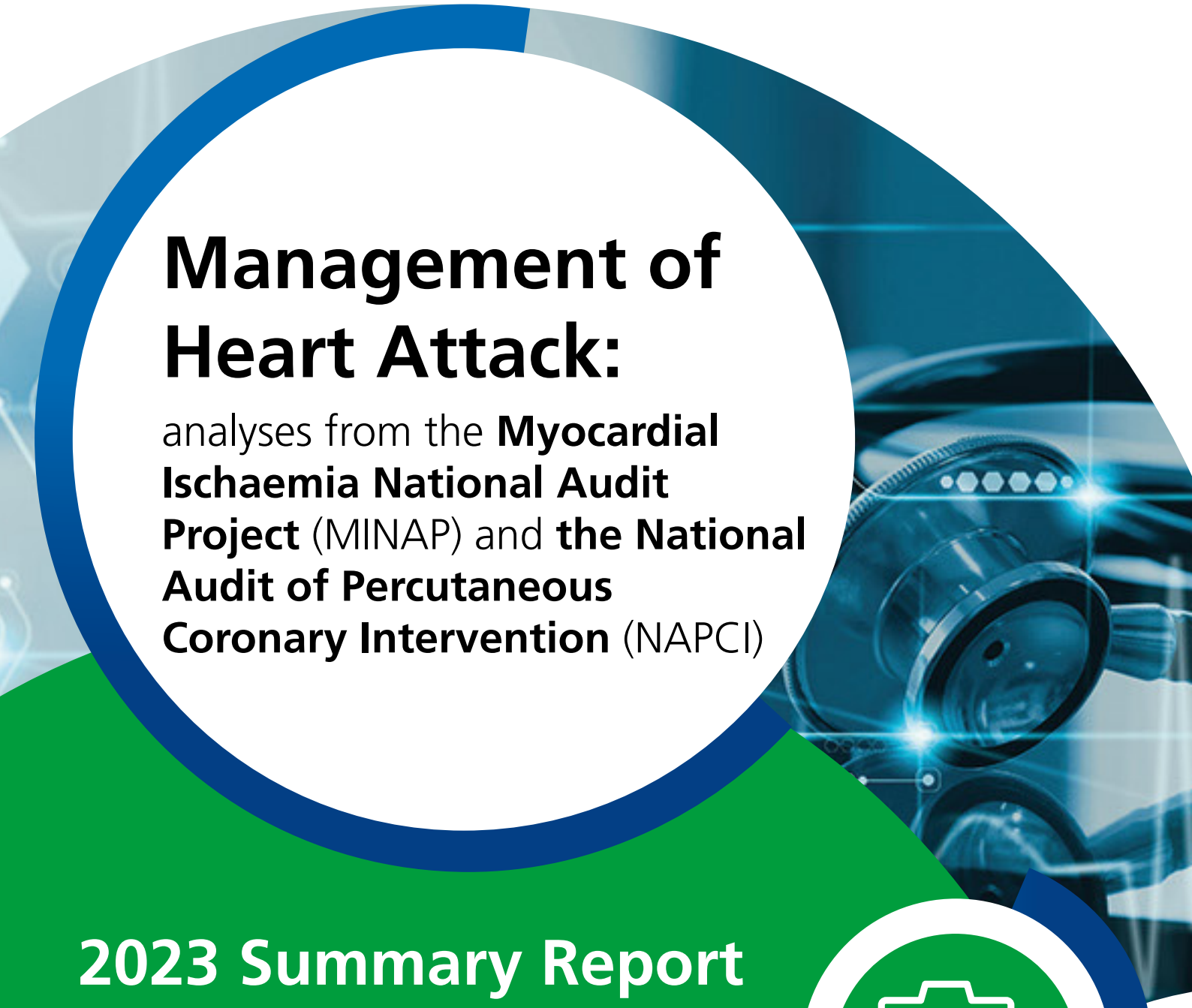
National Cardiac
Audit Programme

NICOR

Management of Heart Attack:

analyses from the **Myocardial Ischaemia National Audit Project** (MINAP) and **the National Audit of Percutaneous Coronary Intervention** (NAPCI)



2023 Summary Report

(2021/22 data)

British Cardiovascular Society

BCIS

Contents

Report at a glance

Data from the period 1 April 2021 to 31 March 2022

Number of recorded heart attacks had risen to pre-pandemic levels

Only 30% of patients with a high-risk heart attack received primary Percutaneous Coronary Intervention (PCI) within two hours of calling for help and 19% of heart attack patients self-presented to hospital rather than wait for an ambulance.

Heart attack care as we recover from the pandemic

84% of patients with a high-risk heart attack received **reperfusion treatment**, a slight increase from previous year despite the rise in the number of cases.

83% of patients with a low-risk heart attack received an **angiogram** during their admission, a rise from **81%** in 2020/21.

The number of patients with a low-risk heart attack that received an **angiogram within the 72-hour quality standard** fell to **56%** (**66%** in 2020/21) and the median delay was 64 hours. Lockdown periods during the pandemic in 2020/21 resulted in substantially fewer NSTEMI (lower risk) admissions. This allowed a significant improvement in the proportion of cases (over **80%**) to receive angiography followed by immediate PCI within 72 hours. This favourable trend has been reversed.

82% of patients underwent **echocardiography** prior to discharge, the highest level recorded.

Place of care and specialist care

Admission to a cardiac ward allows optimum cardiac monitoring and access to highly trained cardiac nursing staff. Specialist care has been associated with more positive outcomes and patients seen by specialists are more likely to be referred for recommended interventions.

64% of **low-risk heart attack (NSTEMI) patients** admitted to a cardiac ward, the highest reported level over the last six years.

97% of patients were seen by a cardiologist, or their team, during the admission, a consistently high performance.

Ongoing management of heart attack patients

There was a slight decline, **89%** of heart attack patients who were discharged on all standard secondary prevention drugs for which they were eligible. This year, **76%** of patients with poor left ventricular (LV) function were prescribed a mineralocorticoid receptor antagonist (MRA) on discharge (this is an improvement from **74%** the previous year).

These medicines have been shown to reduce the likelihood of subsequent coronary events in those who have suffered a heart attack.

Referral to cardiac rehabilitation programmes after their heart attack was at its highest recorded level and now exceeds the target of **85%** of patients to be referred.

Exercise-based cardiac rehabilitation programmes are associated with fewer cardiac deaths in patients with coronary artery disease.

Executive summary

This report summarises the care provided within hospitals in England, Wales and Northern Ireland to over 85,000 people who suffered a heart attack during the 2021/22 financial year.

Quality of care is assessed against a set of quality improvement (QI) metrics derived from national and/or international standards and guidelines. These cover patients diagnosed with higher-risk ST-segment elevation myocardial infarction (STEMI) heart attacks and those with non-ST-segment elevation myocardial infarction (NSTEMI) heart attacks.

The data used are drawn from the Myocardial Ischaemia National Audit Project (MINAP) and the National Audit of Percutaneous Coronary Intervention (NAPCI), both of which are part of the National Cardiac Audit Programme (NCAP).

Where things worsened / causes for concern	
There were significant delays for both primary PCI in STEMI cases and urgent PCI in NSTEMI cases	The median Call-To-Balloon (CTB) time in providing primary percutaneous coronary intervention (primary PCI) for patients with STEMI deteriorated to 142 minutes. Only 30% of patients received primary PCI within 120 minutes of calling for help (down from 55% in 2020/21). Just over half were treated within 150 minutes. Almost 19% of patients required a transfer between hospitals for primary PCI (up from 14% in 2020/21) which adds to delays in treatment. For this group, only 28% received primary PCI within 150 minutes. The improvement during the pandemic in undertaking timely angiography for NSTEMI patients (and PCI if needed) was reversed. Only 56% of eligible patients with NSTEMI received PCI within 72 hours (down from 66% in 2020/21).
More patients are self-presenting to hospital	Around 19% of heart attack patients presented themselves directly to hospital rather than via ambulance. Of those needing primary PCI, the proportion who self-presented rose from 4% in April 2021 to 8% by March 2022.

Where levels of care were maintained or remained stable	
Activity returned to pre-pandemic levels	There were 86,000 heart attack cases in total, similar to pre-pandemic levels. This was an increase of 16% on 2020/21 when admissions were substantially affected by COVID-19.
High rates of PCI were maintained in both STEMI and NSTEMI cases	Despite the rise in cases, the proportion of STEMI cases that received reperfusion treatment, mainly primary PCI, remained high at 84%. The proportion of eligible NSTEMI patients who underwent PCI before discharge increased slightly to 83%, a similar level to the last five years.

Where things improved / practices changed	
Referral to cardiac rehabilitation increased	Referral to cardiac rehabilitation programmes was at its highest recorded level and now exceeds the target of 85% of patients to be referred.
Prescription of aldosterone antagonists improved	Over three quarters of eligible patients with impaired left ventricular function post STEMI/NSTEMI received aldosterone antagonists at discharge, again the highest ever rate.
Echocardiography use increased	Provision of an echocardiogram prior to discharge was also at its highest level (82% in 2021/22 compared to 63% 2012/13).

Summary of recommendations

1. Where CTB time standards are not being met in STEMI cases, emergency departments, PCI centres, neighbouring non-interventional hospitals and ambulance trusts should work together to reduce delays in the provision of primary PCI. This may include improving the hospital response to patient arrivals (Door-To-Balloon (DTB) times) as well as pre-hospital Call-To-Door (CTD) times.

   Hospitals not able to offer primary PCI to patients with STEMI who self-present, especially if geographically remote from such services, should consider re-introducing care pathways that include immediate administration of intravenous thrombolytic drugs.

2. Hospitals with lower rates of echocardiogram provision, for STEMI and NSTEMI, should ensure that their data are being collected accurately and, if needed, should identify opportunities for echocardiography during the index admission.

   Use of limited 'bedside' targeted-assessment echocardiograms should be considered if there are difficulties obtaining timely detailed tests.

   Patients discharged to another hospital before an echocardiogram is performed must be accompanied by a clear request for the test at the receiving hospital.

3. Hospitals not sufficiently admitting heart attack patients to a cardiac ward should review their systems and bed allocations to maximise access to cardiac care. This may require novel use of dedicated multi-specialty 'high care' beds and provision of cardiac outreach services to those cared for elsewhere.

4. Hospitals reporting low rates of cardiology involvement in heart attack patient care should ensure their data are accurately reflecting practice. If they do, provision of cardiac care during admissions should be improved (for example by increased staffing or more flexible use of members of the cardiology team, such as nurse specialists and physician associates).

5. Low rates of angiography in eligible NSTEMI patients require hospitals to review their systems for managing acute coronary syndromes (ACS).

6. Where angiography for NSTEMI takes more than 72 hours, hospitals and commissioners should review pathways, referral networks and service commissioning to make quality improvements. Any lessons regarding more timely care that were learned during the pandemic should be incorporated within existing pathways.

There should be an emphasis on early and reliable identification of suitable patients, streamlined referrals, and adequate capacity for transferring patients into (and out of) interventional hospitals. This will involve weekend angiography lists for such patients.

7. Hospitals not meeting the prescribing standard for all secondary prevention medication prior to discharge of both STEMI and NSTEMI patients should assess the quality of their data and, if sub-optimal performance is confirmed, pursue quality improvement. These might include the use of discharge pro-forma or checklists, direct involvement of specialist cardiac pharmacists or ACS nurse specialists.

8. Hospitals with lower rates of prescribing aldosterone antagonists for patients with impaired LV function identified by echocardiography (or some other reliable assessment method) should act to ensure appropriate treatment. This could involve discharge pro-forma/checklists and the direct involvement of specialist cardiac pharmacists, ACS nurses and sonographers.

9. Hospitals not meeting the standards for referral of patients to cardiac rehabilitation following either STEMI or NSTEMI heart attacks should ensure early identification of patients who might benefit (for example through routine distribution of cardiac rehabilitation information/invitation in discharge checklists and in leaflets given to all patients).

All hospitals should ensure equitable access to cardiac rehabilitation. Rehabilitation staff who were redeployed to ward-based duties during the pandemic should return to their original practices.

1. Introduction

This report summarises the care provided by hospitals in England, Northern Ireland and Wales to over 85,000 heart attack patients during the 2021/22 financial year.

This covers a time when clinicians and managers were attempting to restore services that had been significantly affected by the COVID-19 pandemic but largely precedes the extraordinary pressures on the National Health Service witnessed during the winter of 2022/23, that resulted in delayed pre-hospital responses, delayed admissions through Hospital Emergency Departments and delayed discharges to the community.

For many heart attack patients, optimal care includes a percutaneous coronary intervention (PCI). The PCI procedure restores coronary artery blood flow at sites of complete or partial coronary obstruction. It is performed immediately as a 'primary PCI', for patients with higher-risk ST-segment elevation myocardial infarction (STEMI) heart attacks, or after a period of medical treatment, for patients with lower-risk non-ST-segment elevation myocardial infarction (NSTEMI) heart attacks.

Quality of care is described using quality improvement (QI) metrics derived from national and/or international standards and guidelines. The data are drawn from both the Myocardial Ischaemia National Audit Project (MINAP) and the National Audit of Percutaneous Coronary Intervention (NAPCI).

Working closely with the British Cardiovascular Society, MINAP is concerned with the care of people with a particular **condition**, namely heart attack, only some of whom require PCI as part of their care.

The NAPCI maintains close relationships with the British Cardiovascular Intervention Society and is concerned with the performance of **interventional procedures and tests** offered to people with coronary artery disease, only some of whom have been admitted following heart attack.

Combining data from these two audits enables us to report on **the overall care for heart attack patients** (both STEMI and NSTEMI), whether or not PCI forms part of their care. Further information about both audits, including contact details for the NICOR project teams and details of the datasets, can be found on the NICOR website.

Neither MINAP nor NAPCI capture every element of good quality care, including those vital but less tangible small acts that demonstrate the thoughtfulness, sensitivity and kindness of healthcare workers, and which are so important to the experiences of patients and those close to them during their time in hospital.

The rest of this report is structured as follows:

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

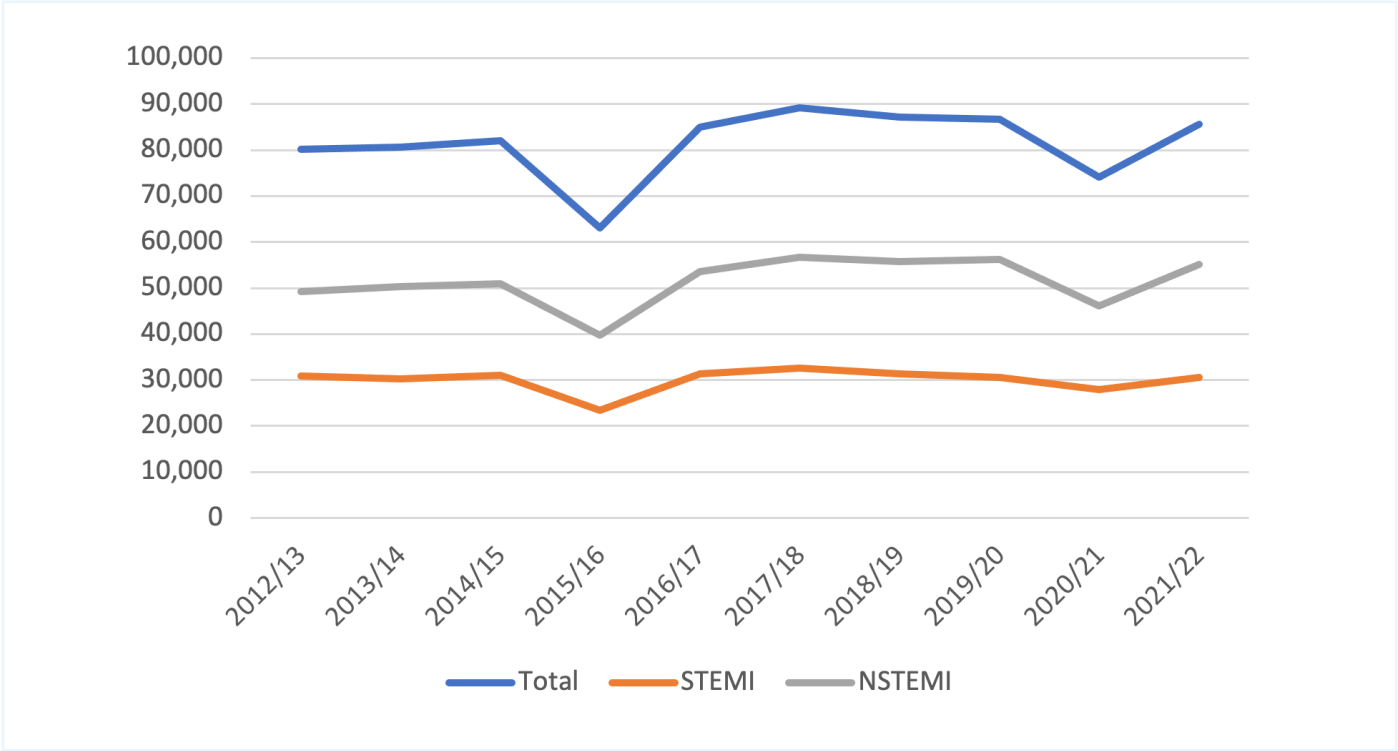
2. Observations from the second year of the pandemic

2.1 There were significantly more heart attack patients admitted to hospital

Hospitals admitted more than 85,000 patients with confirmed heart attacks in 2021/22 [Figure 2.1]. This is a 16% increase in the overall number of confirmed cases compared with the previous year, which was substantially affected by COVID-19, and only just over 900 cases fewer than were reported in 2019/20. The first year of the pandemic affected numbers of NSTEMI admissions more than STEMI admissions.

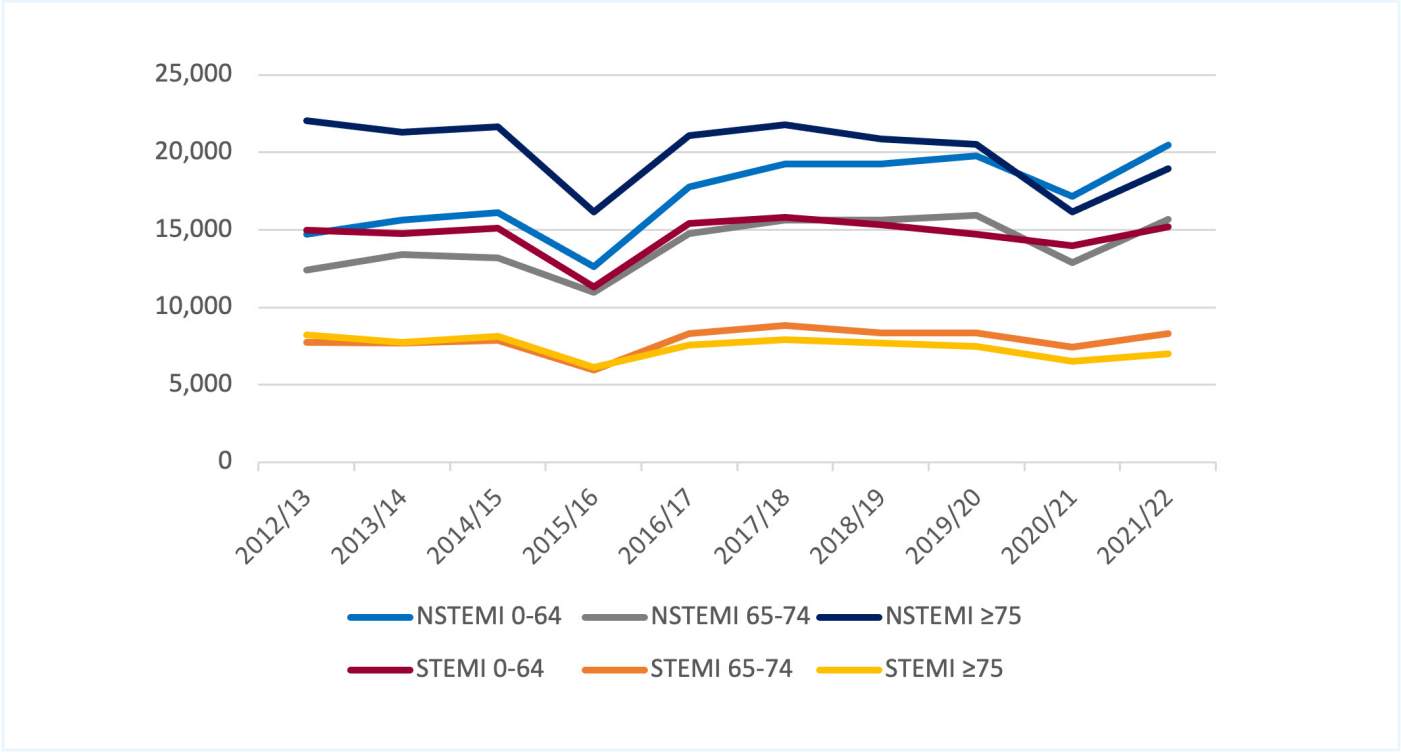
A little over 30,000 or 36% were higher-risk STEMI cases and some 55,000 NSTEMI [Figure 2.2]. There had been a gradual decline in elderly NSTEMI cases prior to the pandemic and there was a greater fall in the number of elderly patients during 2020/21 than other age groups. Conversely, there had been a gradual increase in the numbers of NSTEMI patients aged <65 years of age prior to the pandemic and the increase in 2021/22 following the dip in 2019/20 is such that this age group outnumbers the elderly cohort.

Figure 2.1: Trend in total number of confirmed heart attack admissions to hospital 2012/13 - 2021/22 [MINAP data]



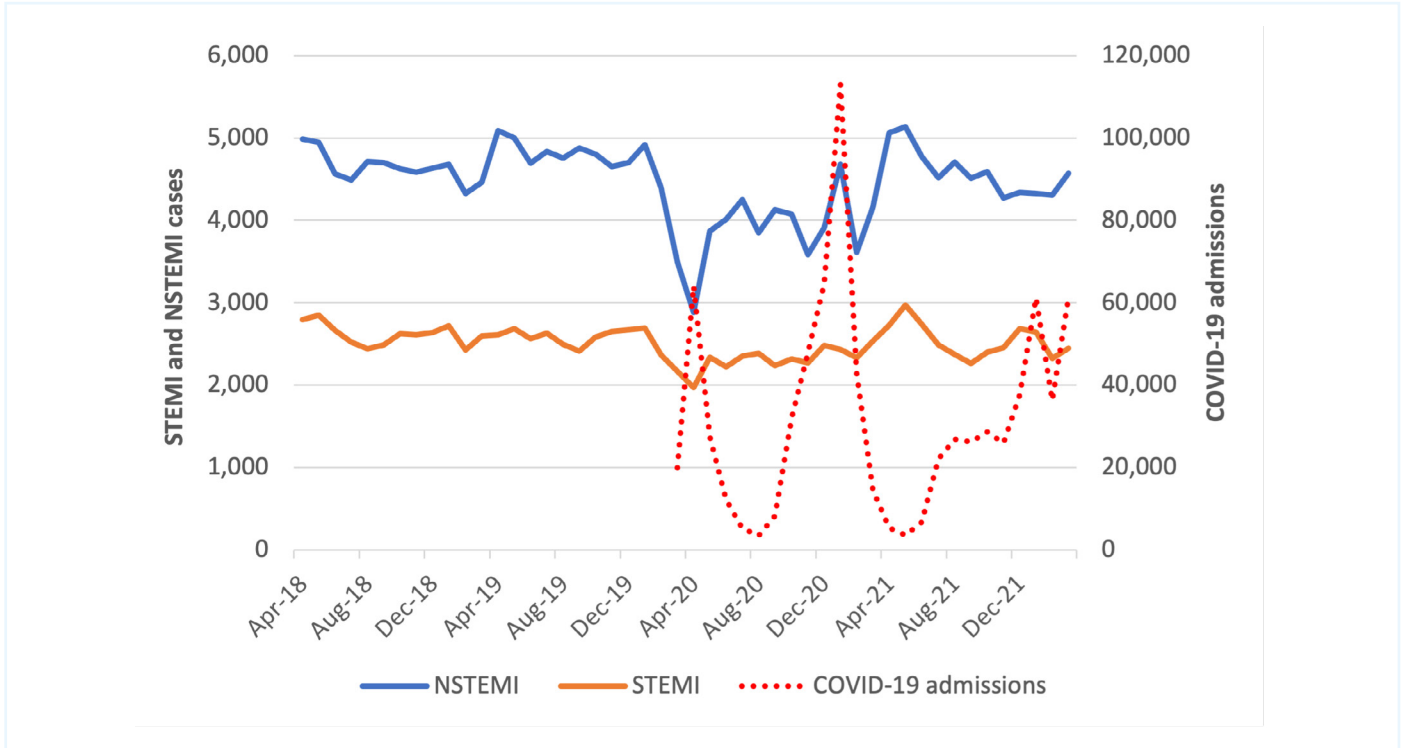
Note: In this and subsequent analyses of trends over time, values for 2015/16 are for 9 months only.

Figure 2.2: Patients admitted with STEMI and NSTEMI heart attacks, by age-band, 2012/13 - 2021/22 [MINAP data]



Note: 2015/16 figures are for 9 months only.

Figure 2.3: Monthly STEMI and NSTEMI admissions compared with COVID-19 admissions, 2019/20 - 2021/22 [MINAP and UKHSA data[1]]



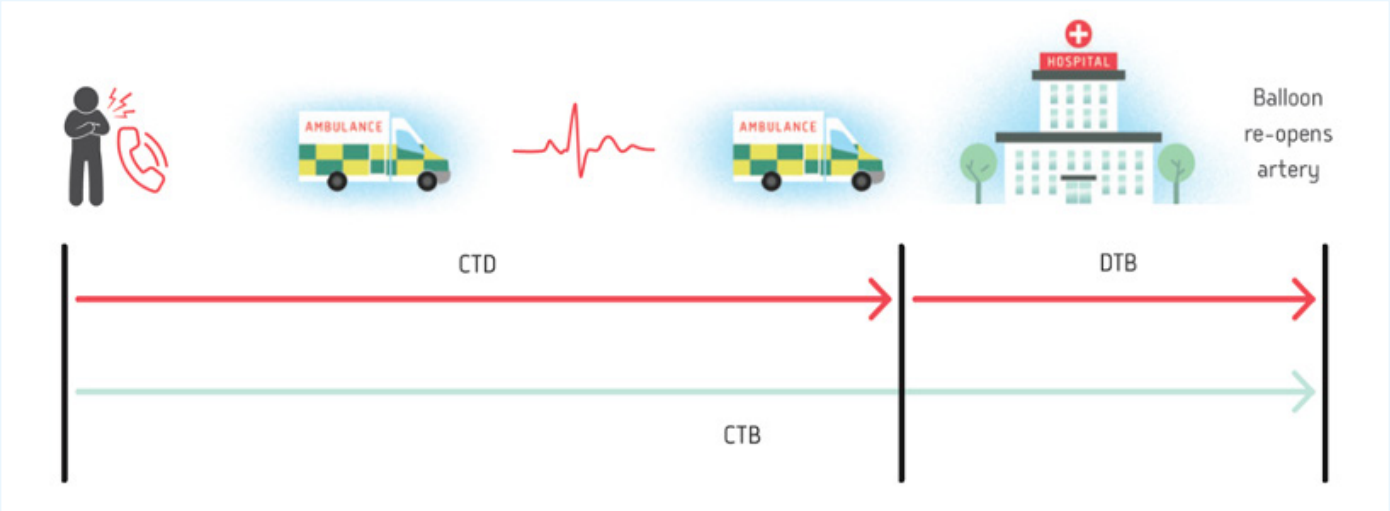
2.2 The time taken to treat higher-risk STEMI heart attacks with primary PCI continues to deteriorate

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.

The time taken for each of these steps is shown in Figure 2.4. For patients brought in by ambulance, the Call-To-Door (CTD time) covers the period when the patient is brought to hospital by the ambulance services. The Door-To-Balloon (DTB) time measures how long it takes the hospital to admit a patient and start PPCI treatment. For patients who present themselves to hospital (usually to the A&E department), the DTB period covers the 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. Taken together, the CTD and DTB times comprise the overall Call-To-Balloon time.

Figure 2.4: Time intervals relevant to reperfusion treatment for those receiving primary PCI



Call-To-Balloon time (CTB): the global response of the health service from the time the patient calls for help until the PCI. This consists: a) Call-To-Door time (CTD) during which the ambulance service must respond to the call, make a pre-hospital assessment, provide appropriate treatments and convey the patient to hospital. This is a measure of ambulance service response; b) Door-To-Balloon time (DTB) during which hospital staff must confirm the diagnosis, assess the patient's suitability for PCI, prepare for and begin to perform the PCI. This is a measure of the hospital response.

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:

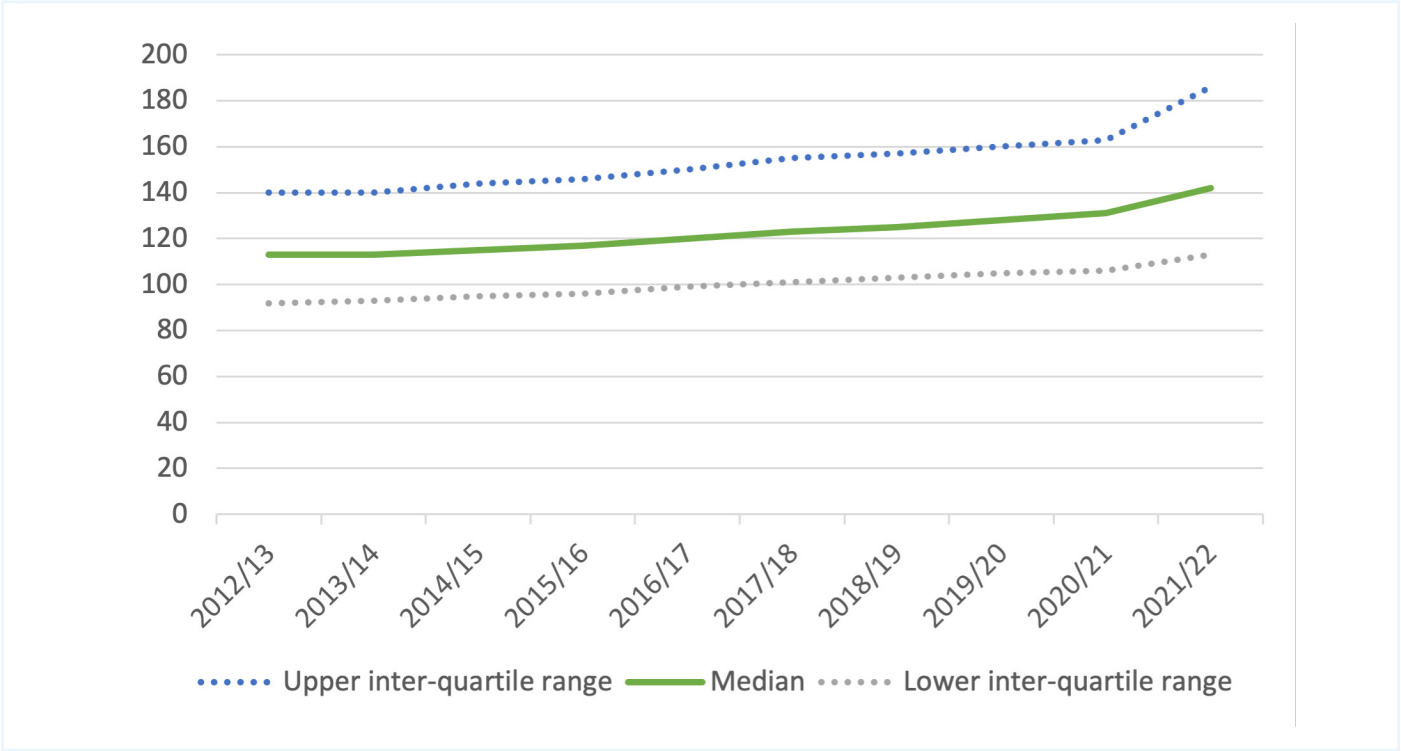
- Waiting times to take people by ambulance to hospital are under severe pressure (the delivery of ambulance services is complex and beyond the scope of this report)
- Difficulties in discharging people from hospital quickly cause makes it hard to find beds for new arrivals
- Primary care capacity has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

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

Figure 2.5: Call-To-Balloon time (minutes), 2012/13 - 2021/22 [MINAP data]



Upper interquartile range = absolute number for 75th percentile. Lower interquartile range = absolute number for 25th percentile

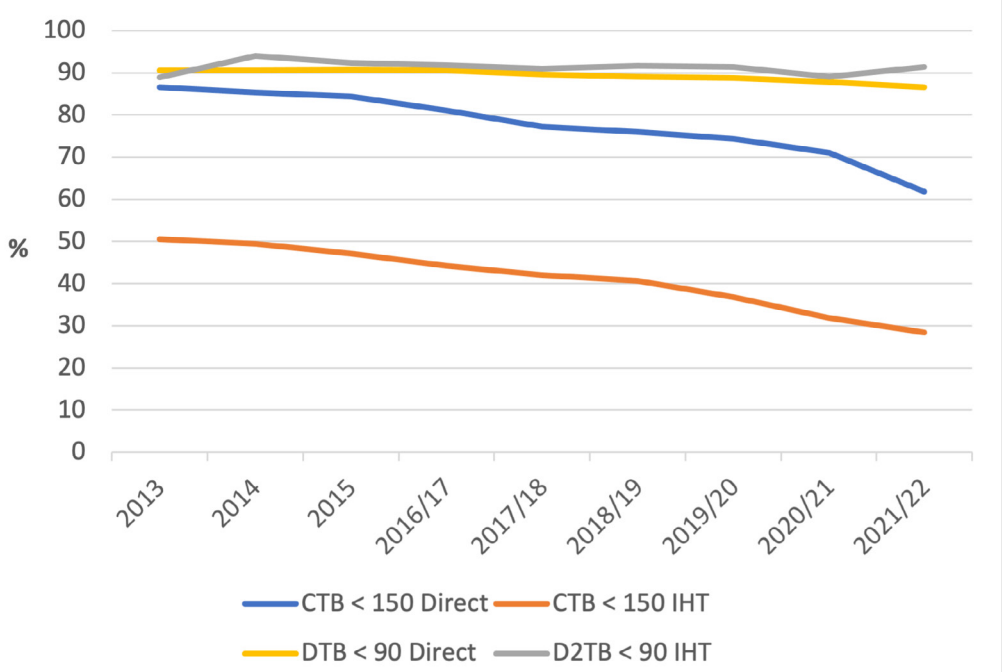
Patients suffering a heart attack and needing to undergo a primary PCI procedure can be admitted directly to a PCI-capable heart attack centre either via ambulance (direct transfer) or by self-presentation from the community or can be transferred via ambulance to one of these having initially presented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

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

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

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

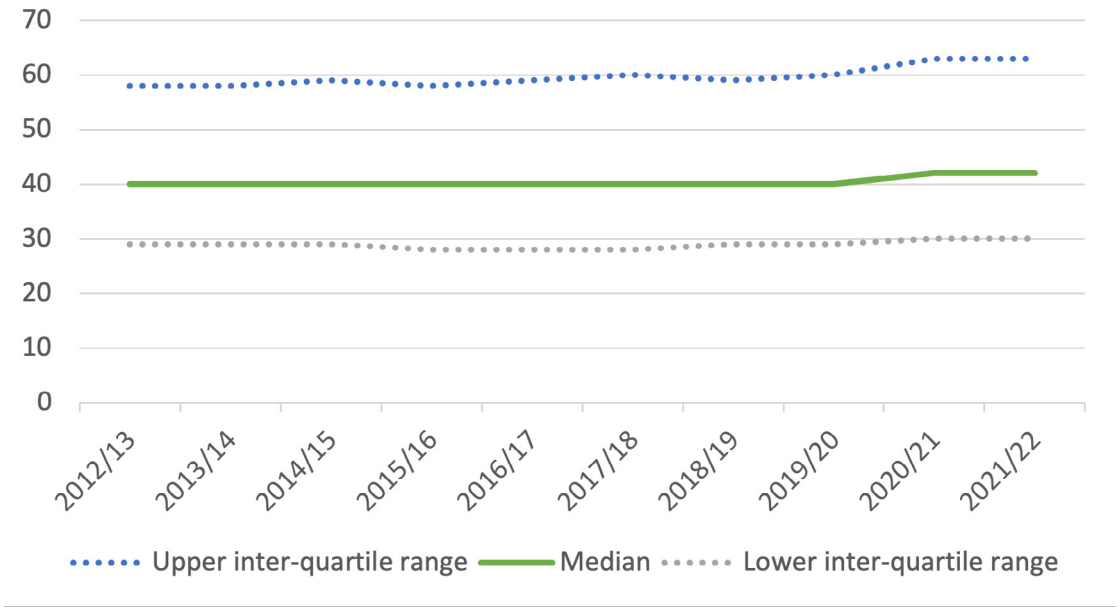
Figure 2.6: Proportion of cases of primary PCI with a Call-To-Balloon and Door-To-Balloon time of <150 and <90 minutes respectively, by mode of admission, 2013 - 2021/22 [NAPCI data]



CTB = Call-To-Balloon; DTB = Door-To-Balloon; D2TB = PCI centre Door-To-Balloon for IHT cases; IHT = inter-hospital transfer. The DTB in this figure is the time from arrival at the hospital within which the primary PCI was performed. In the case of inter-hospital transfer, it does not take into account the time of arrival at the first hospital the patient attended

Door-To-Balloon (DTB) times did not change as significantly as CTB, with the overall median DTB time increasing from 39 minutes in 2019/20 to just under 42 minutes in 2021/22 [Figure 2.7]. Cases requiring an inter-hospital transfer experienced a much larger increase, reaching almost 48 minutes in 2021/22, up from 37 minutes in 2019/20.

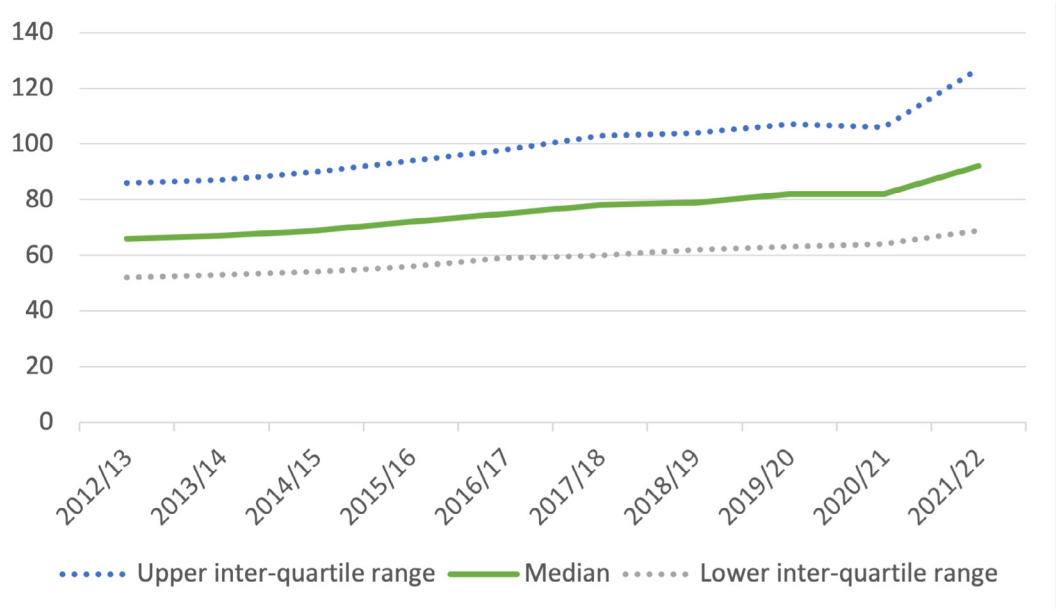
Figure 2.7: Door-To-Balloon time (minutes), 2012/13 - 2021/22 [MINAP data]



Upper interquartile range = absolute number for 75th percentile. Lower interquartile range = absolute number for 25th percentile.

The pre-hospital component of delay – the 'Call-To-Door' (CTD) time – increased to a median CTD of 92 minutes in 2021/22, up from 82 minutes the previous year [Figure 2.8]. Five percent of patients requiring a primary PCI had to wait more than four hours between calling for help and arriving at the hospital where the PCI was performed.

Figure 2.8: Call-To-Door time (minutes), 2012/13 - 2021/22 [MINAP data]



Upper interquartile range = absolute number for 75th percentile. Lower interquartile range = absolute number for 25th percentile.

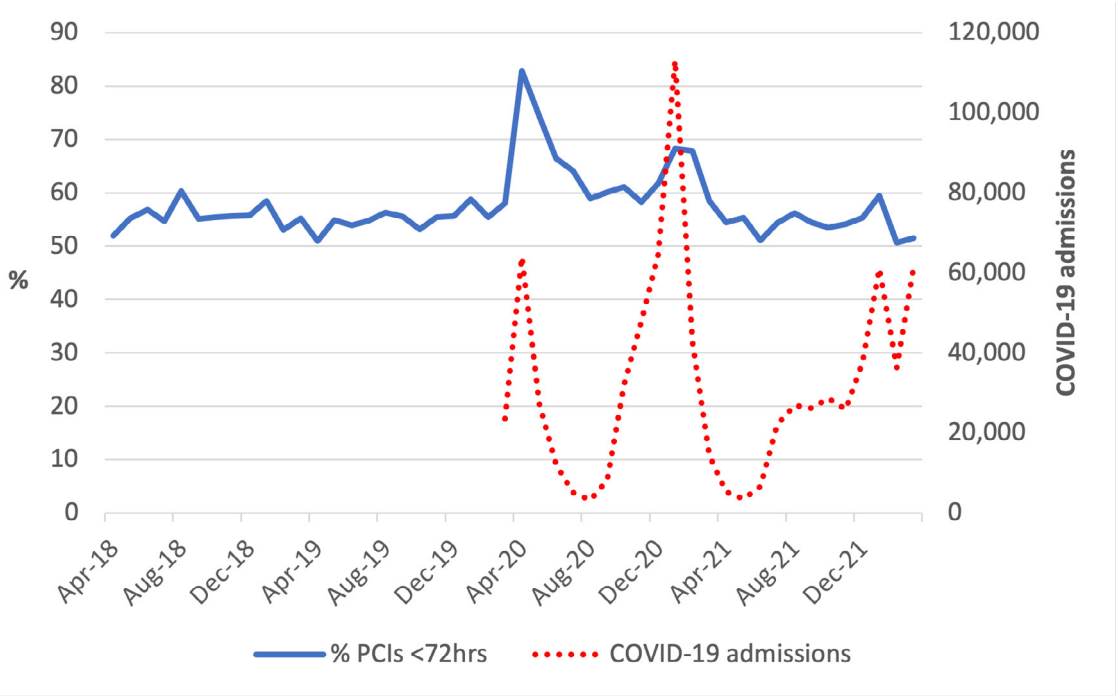
2.3 Angiography and PCI for NSTEMI – more cases and greater delays

Slightly more than 48,000 NSTEMI patients were judged to be eligible for angiography. Of these, 83% underwent an angiogram before discharge (81% in 2020/21).

Lockdown periods during the pandemic in 2020/21 resulted in substantially fewer NSTEMI admissions. This allowed a significant improvement in the proportion of cases (over 80%) to receive angiography followed by immediate PCI within 72 hours [Figure 2.9].

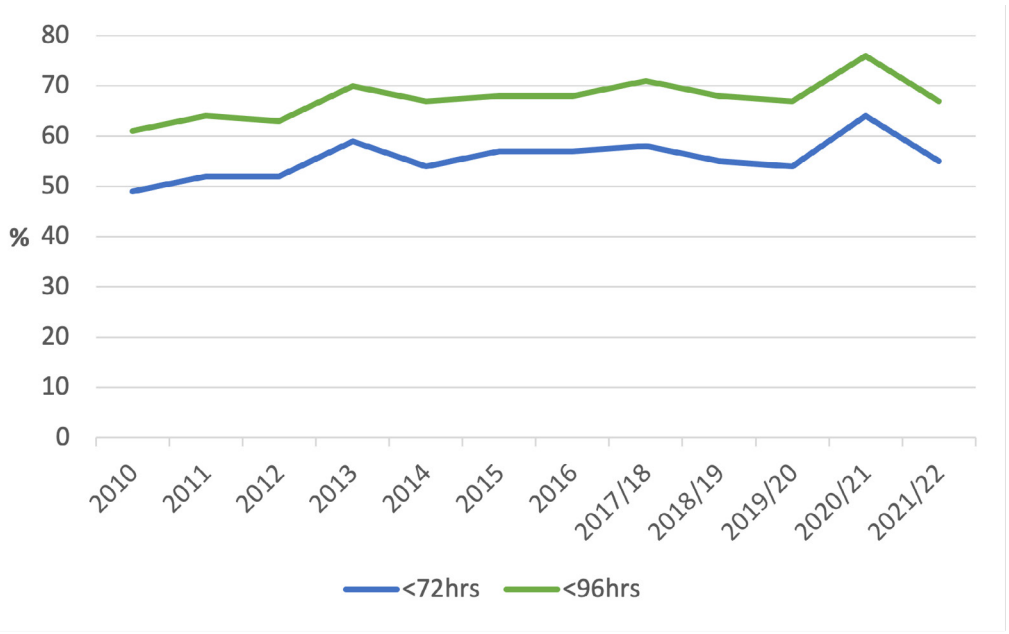
The proportion of patients receiving an angiogram within the 72-hour standard fell back in 2021/22 to 56% [Figure 2.10]. The median delay was 64 hours.

Figure 2.9: Proportion of NSTEMI patients receiving PCI within 72 hours of admission compared with UK monthly COVID-19 admissions, 2018/19 - 2021/22 [NAPCI and UKHSA data]



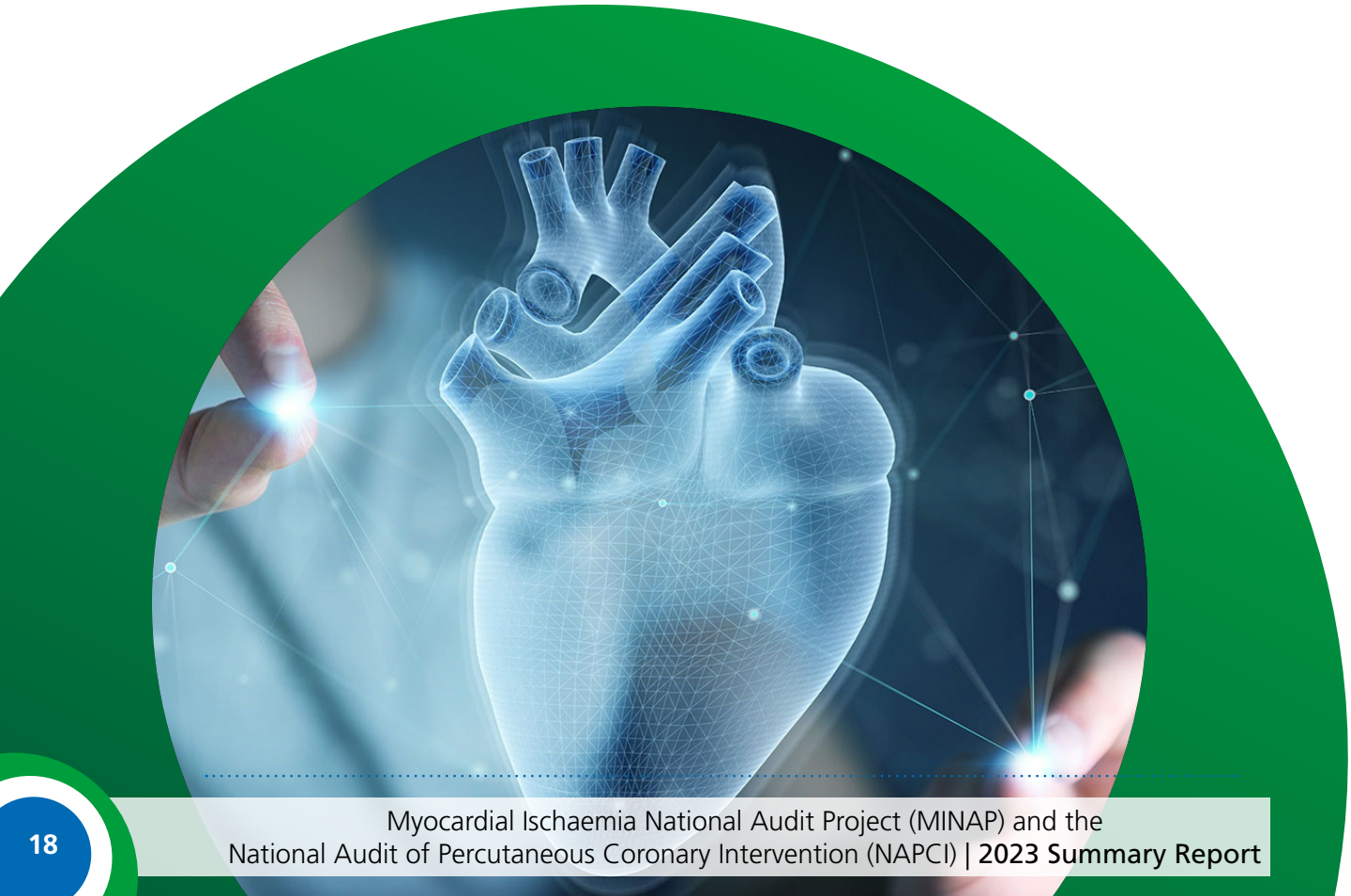
These data are for those with NSTEMI who proceed to immediate PCI following angiography in England & Wales only and exclude those who do not require PCI following angiography. The number of COVID-19 admissions is for the whole of the UK.

Figure 2.10: Proportion of NSTEMI patients receiving PCI within either 72 hours or 96 hours of admission, 2010 - 2021/22 [NAPCI data]



These data are for those with NSTEMI who proceed to immediate PCI following angiography in England & Wales only and exclude those who do not require PCI following angiography. They include all patients, whether or not an inter-hospital transfer was required.

The requirement for an inter-hospital transfer for treatment resulted in a median delay of 90 hours compared with 56 hours for those admitted directly or self-presenting to a hospital that was able to offer angiography with PCI. The differences in median delays between those requiring transfer and direct admissions had been 87 hours vs 63 hours in 2019/20, and 73 hours vs 47 hours in 2020/21 [NAPCI data].



2.4 Length of stay in hospital increased

Average length of stay times, which had fallen during the first year of the pandemic returned to 2019/20 levels. For STEMI patients, 25% were discharged within 2 days, 50% within 3 days and 75% within 5 days of admission (compared with 2, 3 and 4 days respectively in 2020/21).

For NSTEMI patients, 25% were discharged within 3 days, 50% within 5 days and 75% within 8 days (compared with 2, 4 and 7 days respectively in 2020/21).

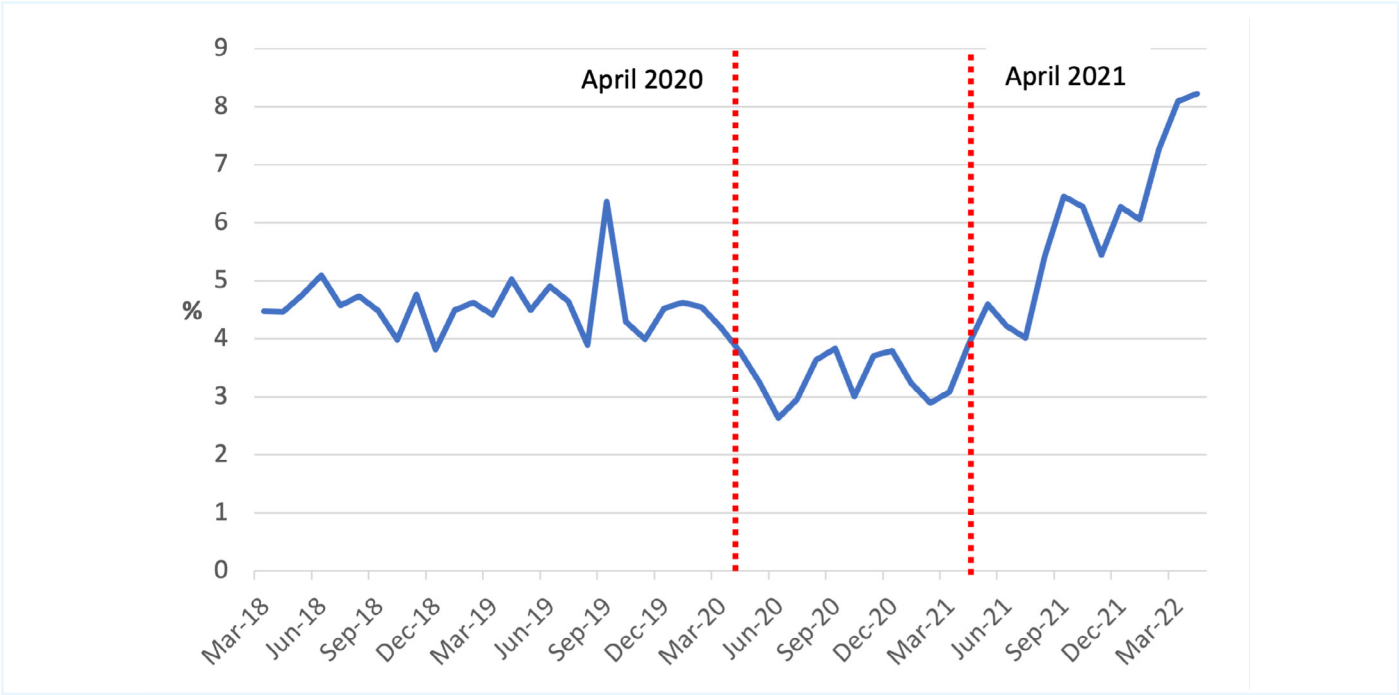
2.5 The number of people self-presenting to hospital rose

Just under 19% of patients made their own way to hospital rather than arriving by ambulance, an increase from 14% in 2020/21 and 16% in 2018/19.

Of patient who were given a 'definite' initial diagnosis of myocardial infarction, the vast majority of whom have a discharge diagnosis of STEMI, almost 1,900 self-presented to hospital (some 7% of total STEMI cases).

The rate of self-presentation among patients undergoing primary PCI also rose during the year, from 4% in April 2021 to 8% in March 2022 [Figure 2.11]. It is unknown whether any of these patients had initially contacted ambulance services before deciding to make their own way to hospital.

Figure 2.11: Proportion of patients undergoing primary PCI who self-presented to hospital, 2018/19 - 2021/22 [MINAP data]

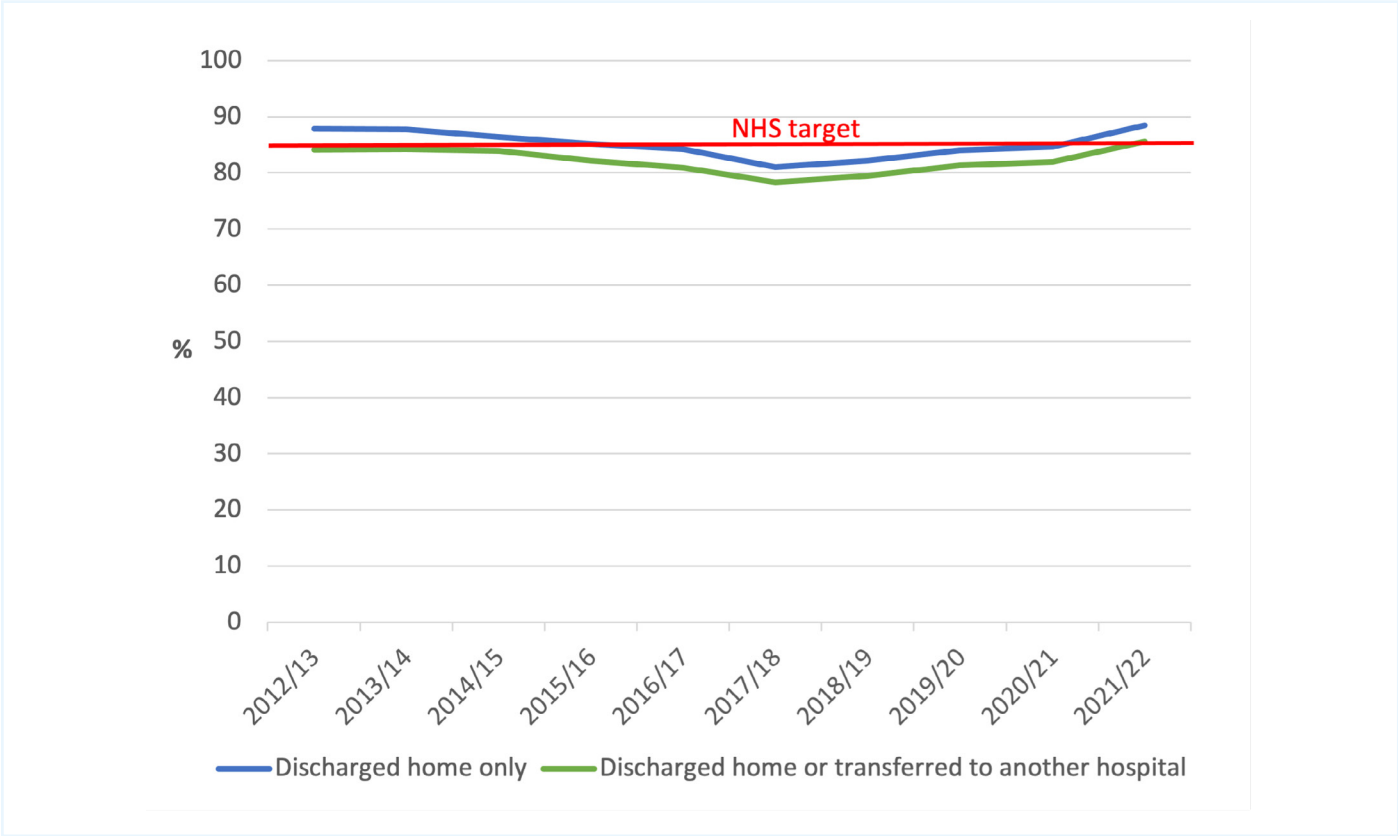


The direct involvement of ambulance paramedics in the earliest possible management of a heart attack patient in the community is preferable to someone taking themselves to hospital. Not only can paramedics attend with a defibrillator, their advanced diagnostic skills, including the performance of an electrocardiogram (ECG), enables patients with STEMI to be taken directly to hospitals that provide primary PCI services. Even in the case of lower-risk NSTEMI heart attacks, the performance of an ECG by an ambulance crew before hospital admission is associated with better outcomes.[2]

2.6 The national target for referral to cardiac rehabilitation has been achieved

The proportion of heart attack patients, either STEMI or NSTEMI, who were referred to cardiac rehabilitation services at the time of discharge from hospital reached almost 89%, surpassing again the 85% aspirational target [Figure 2.12].

Figure 2.12: Percent of patients (STEMI and NSTEMI combined) referred for cardiac rehabilitation programmes, 2012/13 - 2021/22 [MINAP data]



2.7 The provision of echocardiography following STEMI improved

Echocardiography following a heart attack assesses the remaining overall efficiency of the heart (the 'left ventricular function'), detects associated valve disorders, enables targeting of particular treatments for heart failure and identifies patients who later might benefit from 'device therapy'.

In 2021/22, 82% of STEMI patients underwent an echocardiogram before leaving hospital compared with 77% in 2020/21. In a further 5%, an echocardiogram was planned as an outpatient investigation.

3 Selected quality improvement metrics

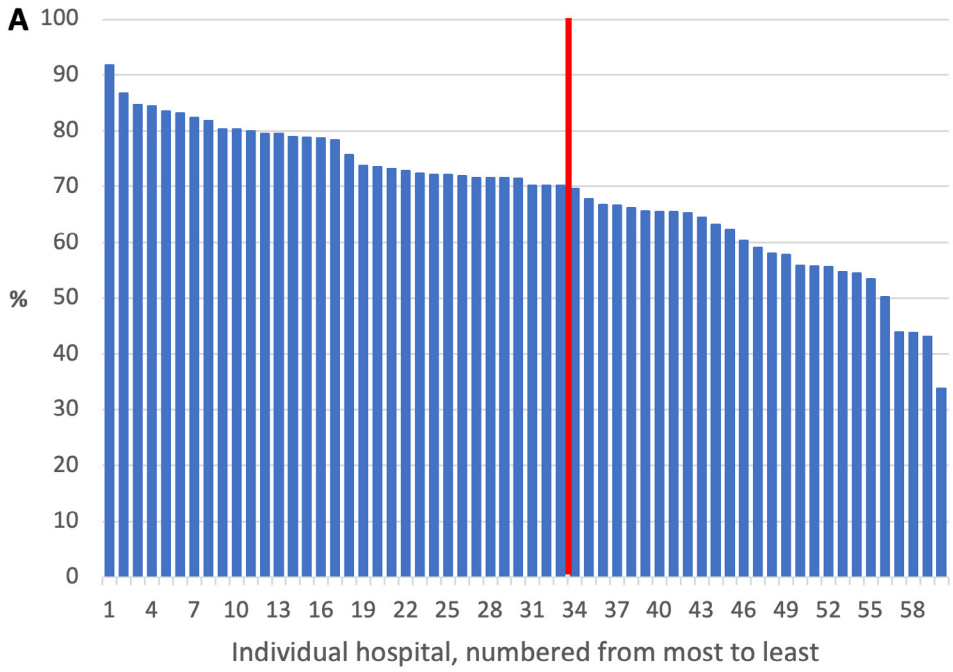
3.1 Door-To-Balloon times have changed little over 10 years

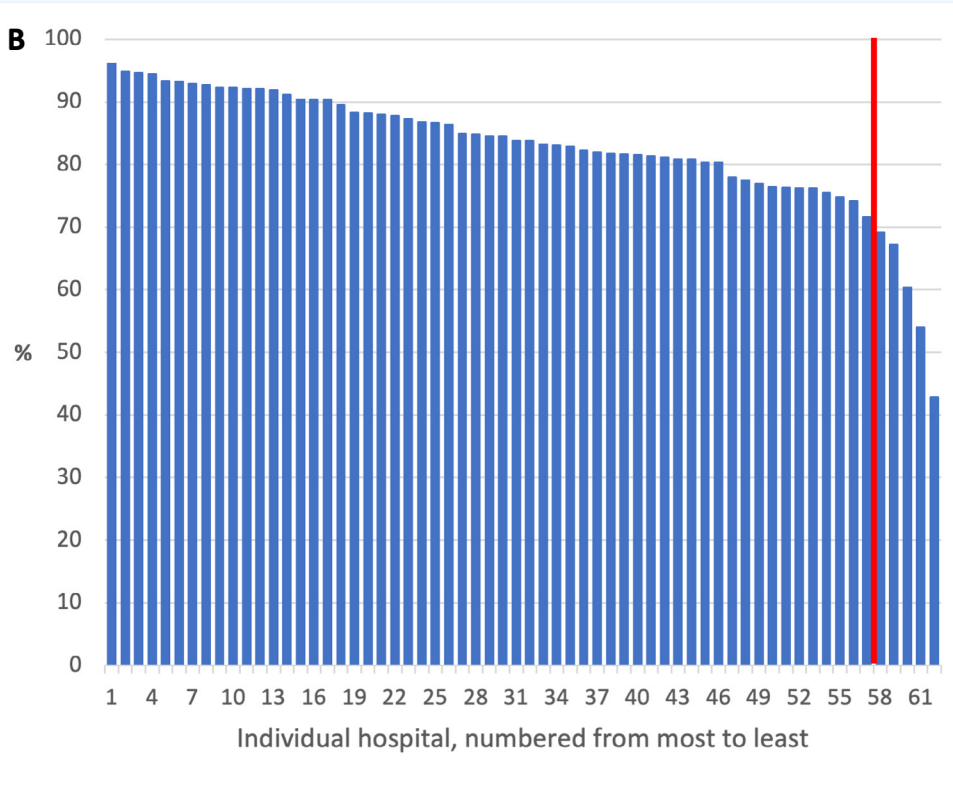
3.1.1 Overview of QI metric

QI Metric Description/Name	Door-To-Balloon time for STEMI
Why is this important?	Shorter Door-To-Balloon times (DTB) should be associated with better outcomes following STEMI.
QI theme	Effectiveness/timeliness.
What is the standard to be met?	a) DTB <60 minutes b) DTB <90 minutes
Key references to support the metric	European Society of Cardiology guidelines for STEMI: 'important time targets' – 'Maximum time from STEMI diagnosis to wire crossing the lesion in patients presenting at primary PCI hospital ≤60 minutes'.[3]
Numerator	a) All with STEMI who underwent primary PCI within 60 minutes of arrival at PPCI centre. b) All with STEMI who underwent primary PCI within 90 minutes of arrival at PPCI centre.
Denominator	All with STEMI who underwent primary PCI for whom a DTB can be calculated.
Trend	Median DTB has varied little during the last 10 years [Figure 2.7].
Variance	33 out of 60 hospitals achieved DTB 60 minutes in at least 70% of patients treated. In 14 hospitals, DTB 60 minutes was achieved in fewer than 60% patients [Figure 3.2]. The best performing hospital achieved DTB 60 minutes in more than 90% of patients treated. Eight hospitals achieved this for more than 80% of patients and five for fewer than 50% of patients. Fourteen hospitals achieved DTB times of 90 minutes in more than 90% of patients while five reached this target in fewer than 70% of patients.

3.1.2 **Audit results: hospital performance**

Figure 3.2: Proportion of STEMI patients undergoing primary PCI within 60 minutes (A) and within 90 minutes (B) of arrival at hospital, by hospital, 2021/22 [MINAP data]





These analyses are for hospitals providing primary PCI services for STEMI and exclude hospitals recording 20 or fewer patients within the relevant DTB metric. Those hospitals to the right of the red line did not provide primary PCI to at least 70% of patients for the relevant DTB metric.

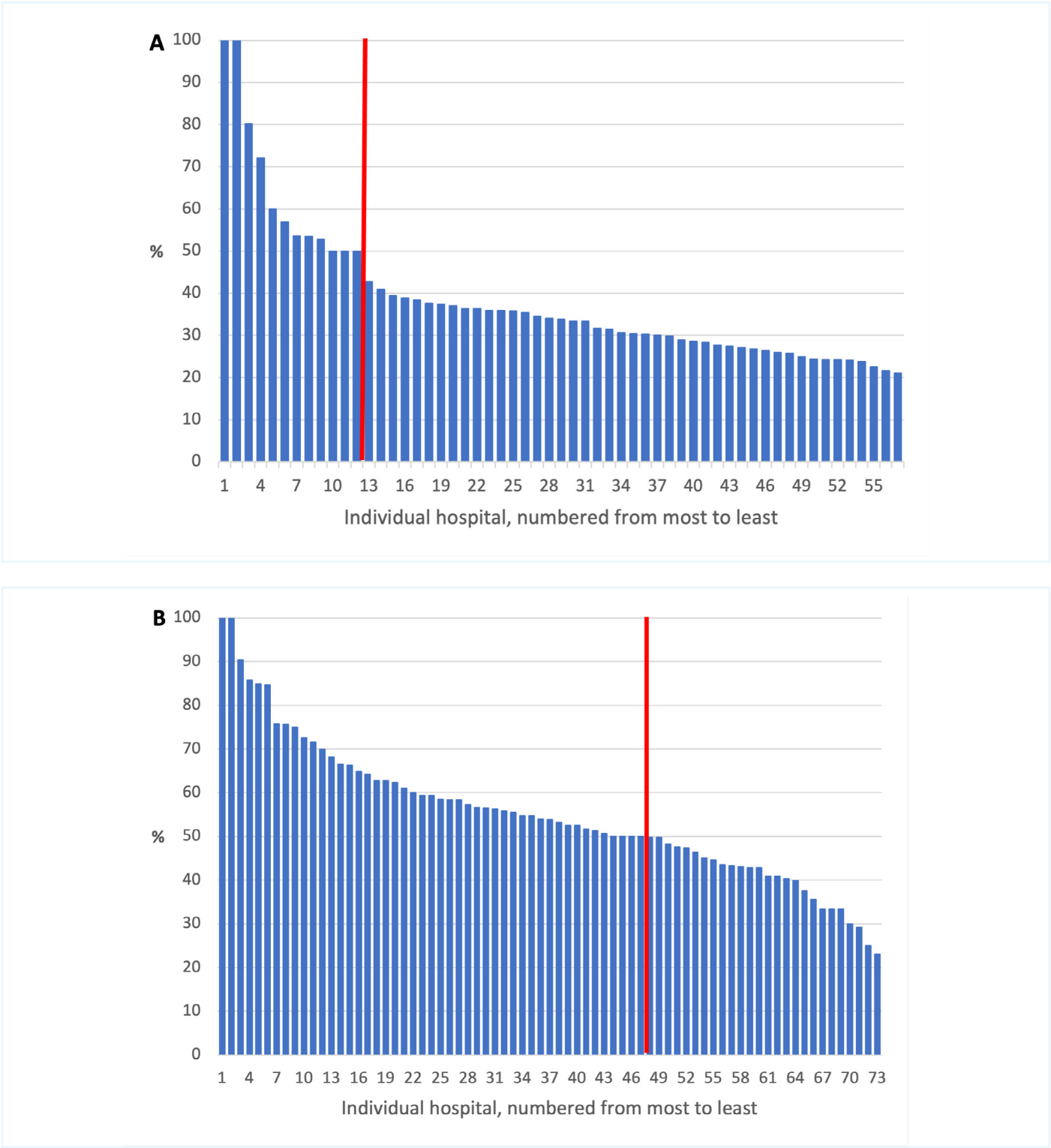
3.2 Call-To-Balloon times continued to lengthen with fewer patients receiving timely primary PCI

3.2.1 Overview of QI metric

QI Metric Description/Name	Call-To-Balloon time for STEMI
Why is this important?	Shorter Call-To-Balloon times (CTB) are associated with better outcomes.
QI theme	Effectiveness/timeliness.
What is the standard to be met?	a) CTB <120 minutes b) CTB <150 minutes
Key references to support the metric	NICE quality standard (QS 68)[4] 'Adults with acute ST-segment-elevation myocardial infarction (STEMI) who present within 12 hours of onset of symptoms have primary percutaneous coronary intervention (PCI), as the preferred coronary reperfusion strategy, as soon as possible but within 120 minutes of the time when fibrinolysis could have been given.' Given that pre-hospital fibrinolytic therapy may take 30 minutes to start, this leads to a standard of 'within 150 minutes'.
Numerator	a) All with STEMI who underwent primary PCI within 120 minutes of call for help. b) All with STEMI who underwent primary PCI within 150 minutes of call for help.
Denominator	All with STEMI who underwent primary PCI for whom a CTB can be calculated.
Trend	There has been progressive lengthening of CTB over last eight years. A smaller proportion of patients are receiving timely primary PCI: 30% within 120 minutes, 55% within 150 minutes [Figure 3.4]. There is a widening interquartile range (73 minutes in 2021/22).
Variance	Only 10 hospitals achieved a CTB of 120 minutes for more than 50% of patients. 22 hospitals achieved a CTB of 120 minutes in fewer than 30% of patients [Figure 3.3]. 44 hospitals achieved a CTB of 150 minutes in more than 50% of patients treated. Four hospitals achieved CTB 150 minutes in fewer than 30% of patients.

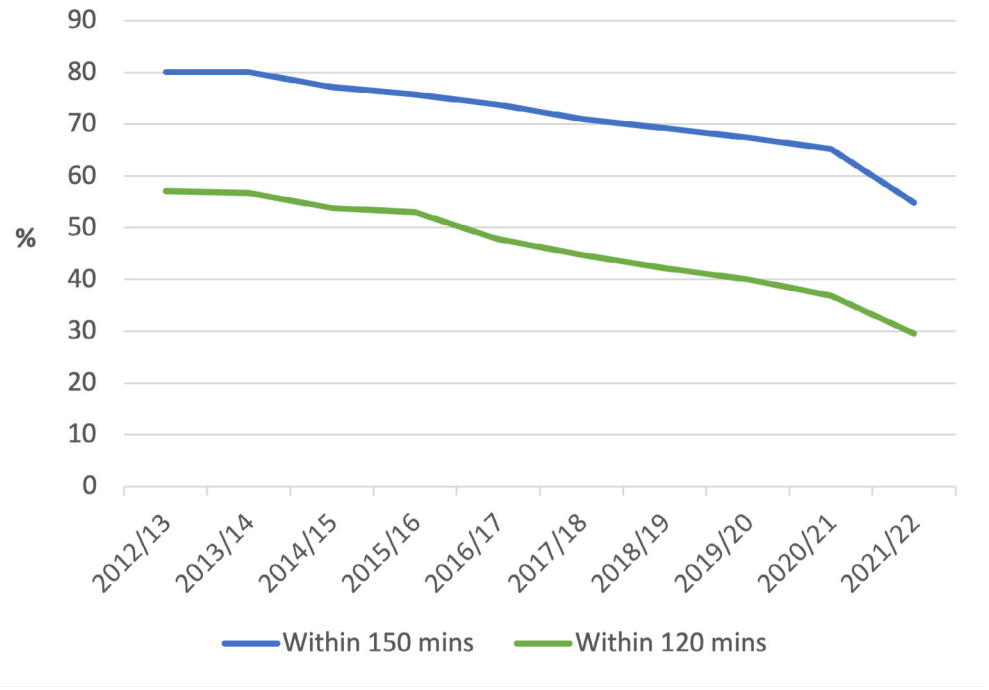
3.2.2 **Audit results: hospital performance**

Figure 3.3: Proportion of STEMI patients who undergo primary PCI within a CTB of (A) 120 minutes and (B) 150 minutes, by hospital, 2021/22 [MINAP data]



These analyses are for hospitals providing primary PCI services for STEMI and exclude hospitals recording 20 or fewer patients within the relevant CTB metric. Those hospitals to the right of the red line did not provide primary PCI to at least 50% of patients for the relevant CTB metric.

Figure 3.4: Proportion of patients with STEMI who underwent primary PCI within a CTB time of 120 and 150 minutes, 2012/13 - 2021/22 [MINAP data]



Median CTD has risen by 29 minutes over the last decade and 10 minutes over the last year. Lengthening pre-hospital CTD times [Figure 2.5 and Figure 2.8] appear to be the significant contributor to the worsening overall CTB times. Anecdotal reports suggest that, since April 2023, further significant pressures on the ability of Ambulance Trusts to hand over care of patients upon arrival at hospital may have further adversely affected this metric.

3.2.3 Recommendations for those not achieving the standard

Where CTB time standards are not being met in STEMI cases, emergency departments, PCI centres, neighbouring non-interventional hospitals and ambulance trusts should work together to reduce delays in the provision of primary PCI. This may include improving the hospital response to patient arrivals (Door-To-Balloon (DTB) times) as well as pre-hospital Call-To-Door (CTD) times.

Hospitals not able to offer primary PCI to patients with STEMI who self-present, especially if geographically remote from such services, should consider reintroducing care pathways that include immediate administration of intravenous thrombolytic drugs.

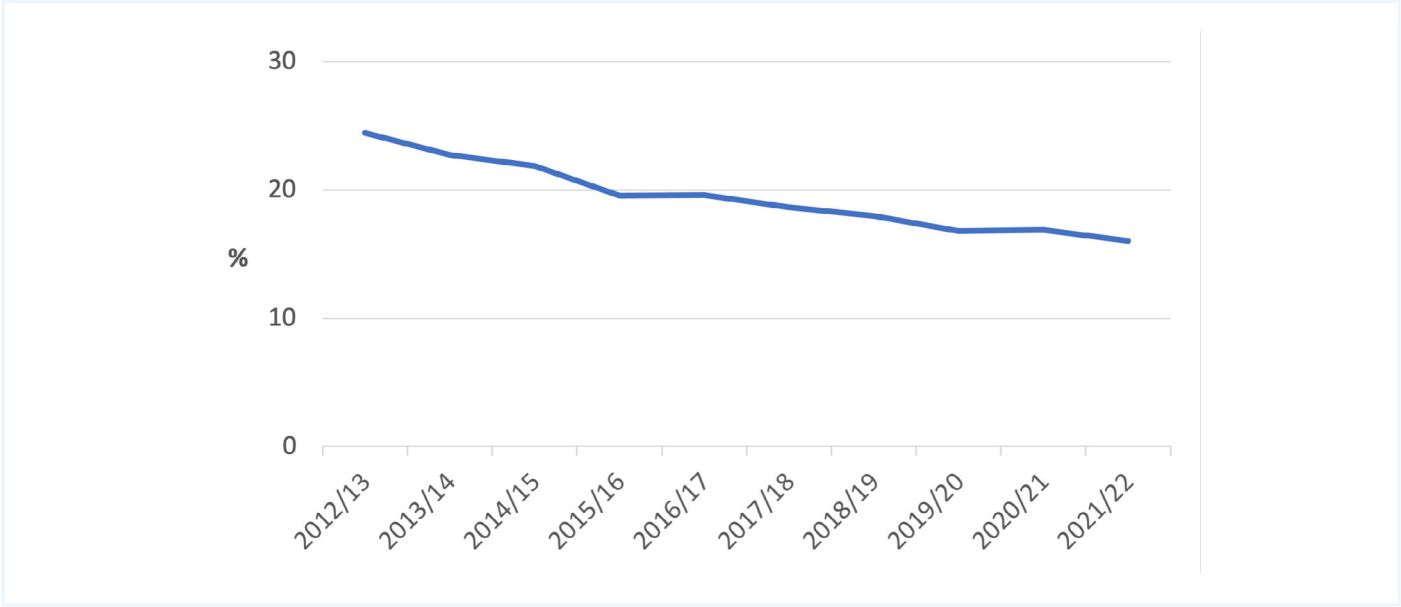
3.3 A greater proportion of STEMI treated with reperfusion therapy

3.3.1 Overview of QI metric

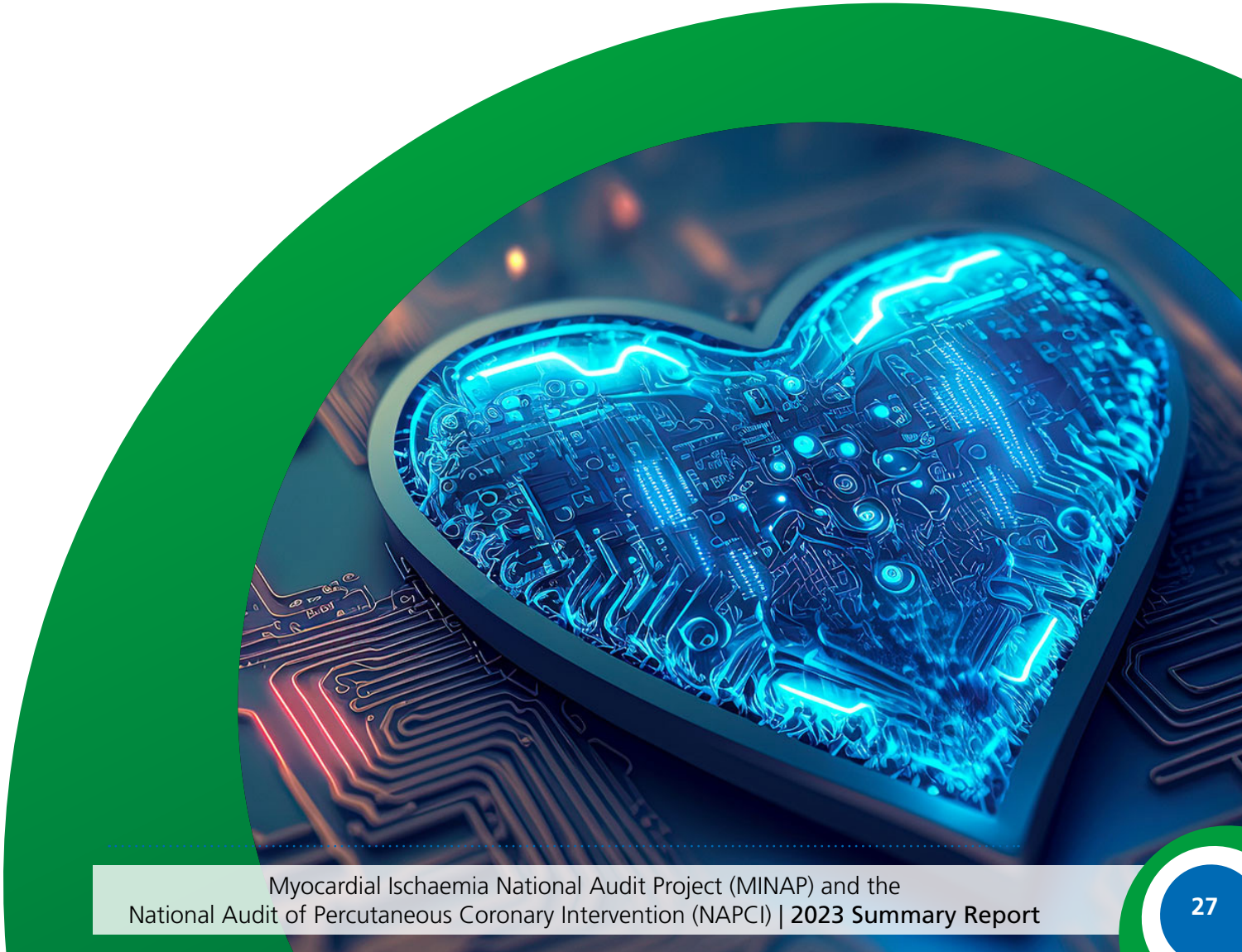
QI Metric Description/Name	No reperfusion for STEMI
Why is this important?	Reperfusion of a completely or partially occluded coronary artery is associated with reduced myocardial damage.
QI theme	Effectiveness
What is the standard to be met?	All patients with ST elevation within 12 hours of onset of symptoms should be considered for reperfusion. No specific target rate for 'no reperfusion'.
Key references to support the metric	ESC guideline for management of STEMI recommends 'Reperfusion therapy is indicated in all patients with symptoms of ischaemia of ≤ 12-hour duration and persistent ST segment elevation'.[2] ESC Quality Indicator – Proportion of STEMI patients arriving in the first 12 hours receiving reperfusion therapy.[5]
Numerator	Those patient with ST elevation myocardial infarction who do not receive reperfusion therapy.
Denominator	All patients with STEMI for whom reperfusion is not judged to be 'too late' by the admitting team.
Trend	The proportion not receiving reperfusion therapy has fallen over ten years to 16% [Figure 3.5].
Variance	Not reported for individual hospitals.

3.3.2 **Audit results**

Figure 3.5: Proportion of patients with STEMI who do not receive reperfusion therapy (neither primary PCI nor thrombolysis), 2012/13 - 2021/22 [MINAP data]



In 2021/22, nearly all reperfusion was via primary PCI. Only 86 patients received the alternative, intravenous thrombolysis.



3.4 More patients with STEMI underwent pre-discharge echocardiography

3.4.1 Overview of QI metric

QI Metric Description/Name	Echocardiography after STEMI
Why is this important?	Performance of echocardiography allows assessment of left ventricular (LV) function and targeted treatments of heart failure. It also identifies patients who might benefit from 'device therapy'.
QI theme	Safety/other.
What is the standard to be met?	No national standard has been published, but the aim is for 90% achievement.
Key references to support the metric	ESC guideline for management of STEMI recommends 'routine echocardiography to assess resting LV and RV function, detect early post-MI mechanical complications, and exclude LV thrombus…in all patients'.[2]
Numerator	Patients undergoing echocardiographic assessment during the index admission.
Denominator	Patients with STEMI who survived to discharge home (i.e. did not die during the index admission and were not transferred to another hospital) in whom echocardiography was not identified as 'not indicated'.
Trend	There has been an increase in the proportion of patients undergoing echocardiogram prior to discharge. This is now 82% and continues the year-on-year improvement from 63% in 2013/14 [Figure 3.6].
Variance	52 hospitals arranged echocardiography in at least 90% of STEMI patients. In eight hospitals, fewer than 50% of patients underwent an echocardiogram [Figure 3.7]. The highest performing hospitals reported arranging an echocardiogram for every patient, both STEMI and NSTEMI [Figure 3.8].

3.4.2 **Audit results**

Figure 3.6: Proportion of patients who undergo echocardiography following STEMI, 2012/13 - 2021/22 [MINAP data]

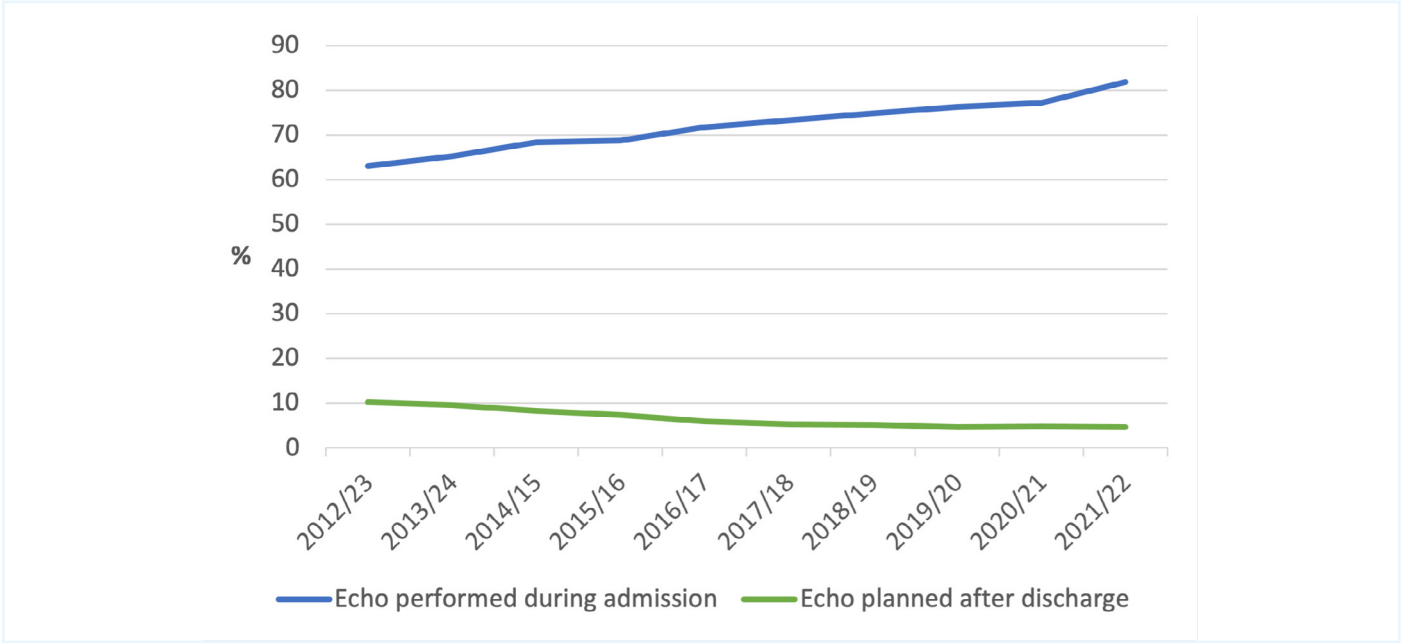
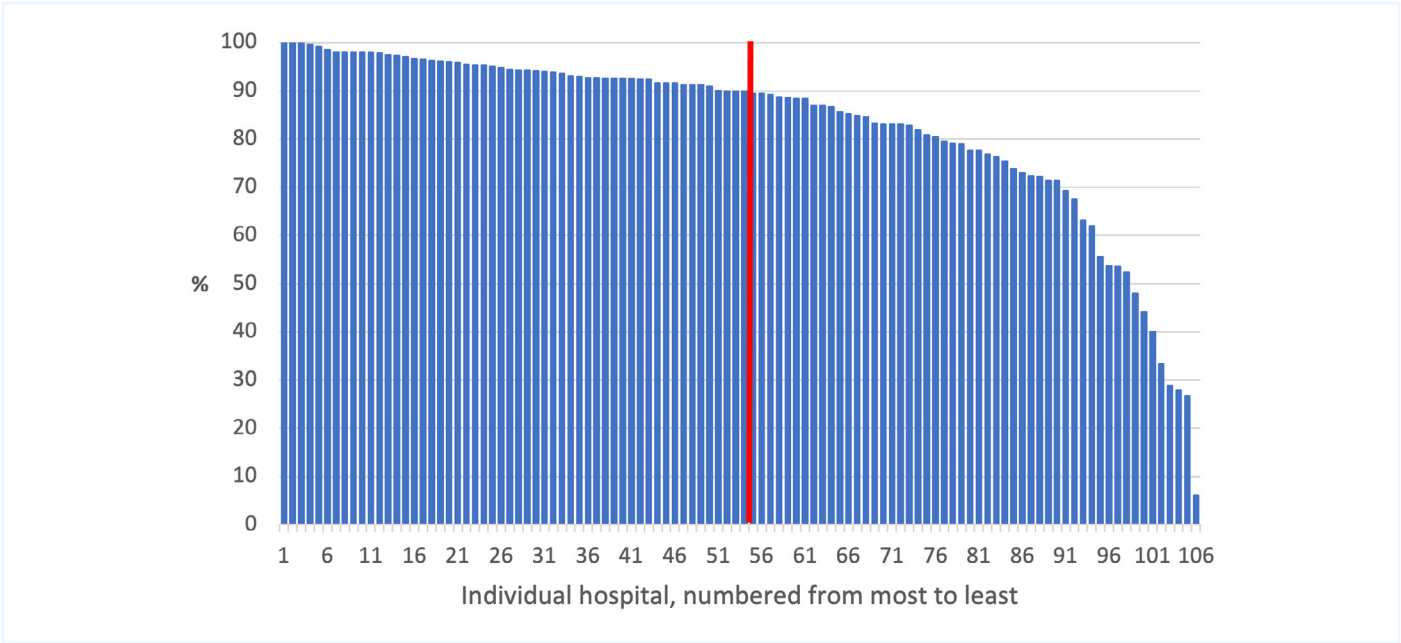
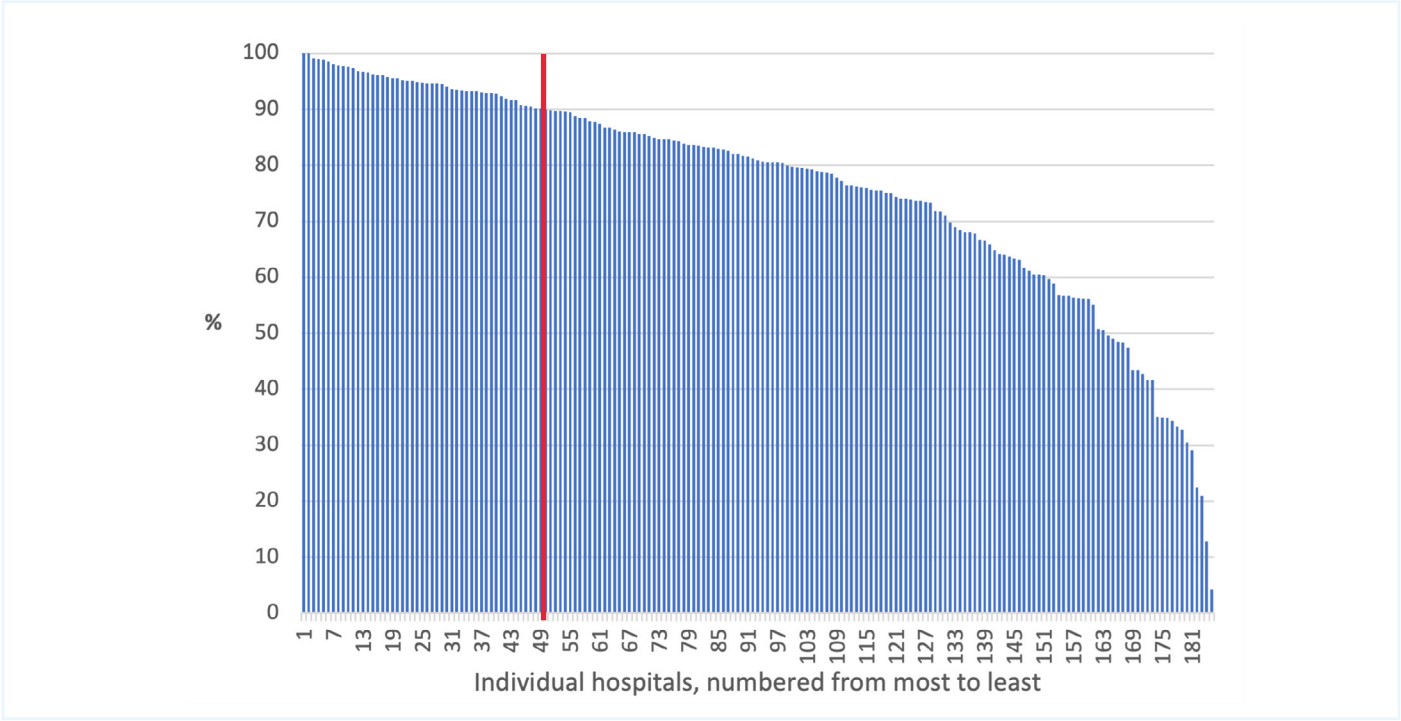


Figure 3.7: Proportion of hospitals with respect to the percentage of patients with STEMI who undergo an echocardiogram during admission, by hospital, 2021/22 [MINAP data]



*Hospitals to the right of the red line have **not** achieved ≥ 90% of patients undergoing echocardiography as an in-patient. Data from 106 hospitals; hospitals reporting fewer than 20 cases excluded.*

Figure 3.8: Proportion of all STEMI and NSTEMI patients undergoing an echocardiogram during admission, by hospital, 2021/22 [MINAP data]



*Hospitals to the right of the red line have **not** achieved ≥ 90% of patients undergoing echocardiography as an in-patient. Data from 185 hospitals. Hospitals reporting fewer than 20 cases excluded.*

3.4.3 Recommendations for those not achieving the standard

Hospitals with lower rates of echocardiogram provision, for STEMI and NSTEMI, should ensure that their data are being collected accurately and, if needed, should identify opportunities for echocardiography during the index admission.

Use of limited bedside 'targeted-assessment' echocardiograms should be considered if there are difficulties obtaining timely detailed tests.

Patients discharged to another hospital before an echocardiogram is performed must be accompanied by a clear request for the test at the receiving hospital.

3.5 There was a small increase in the proportion of patients with NSTEMI heart attacks admitted to cardiac wards

3.5.1 Overview of QI metric

QI Metric Description/Name	Admitted to cardiac ward after NSTEMI
Why is this important?	Admission to a cardiac ward allows optimum cardiac monitoring and access to highly trained cardiac nursing staff.
QI theme	Safety.
What is the standard to be met?	No national standard has been published, but aim for 80% achievement.
Key references to support the metric	Patients with NSTEMI admitted to a cardiac ward on admission are more likely to receive guideline directed management and have better clinical outcomes.[6] European Society of Cardiology Guidelines advise that patients with NSTEMI should be admitted to a monitored unit – coronary care, intensive care or intermediate care depending on risk – and managed by personnel adequately trained to manage life-threatening arrhythmias.[7]
Numerator	All patients with a final diagnosis of NSTEMI who were admitted to a cardiac care unit or cardiac ward or intensive care unit.
Denominator	All patients with a final diagnosis of NSTEMI who did not die in the Emergency Department before admission to a hospital ward.
Trend	There has been a gradual increase in the proportion of patients with NSTEMI who are admitted to a cardiac ward. This has increased by about 10% in absolute terms over 10 years to 64% [Figure 3.9].
Variance	At least 80% of patients with NSTEMI were admitted to a cardiac ward in 69 hospitals. In 19 hospitals fewer than 30% of NSTEMI patients were admitted to a cardiac ward [Figure 3.10].

3.5.2 **Audit results**

Figure 3.9: Proportion of patients with NSTEMI who are admitted to a cardiac ward or seen by a cardiologist during their admission, 2012/13 - 2021/22 [MINAP data]

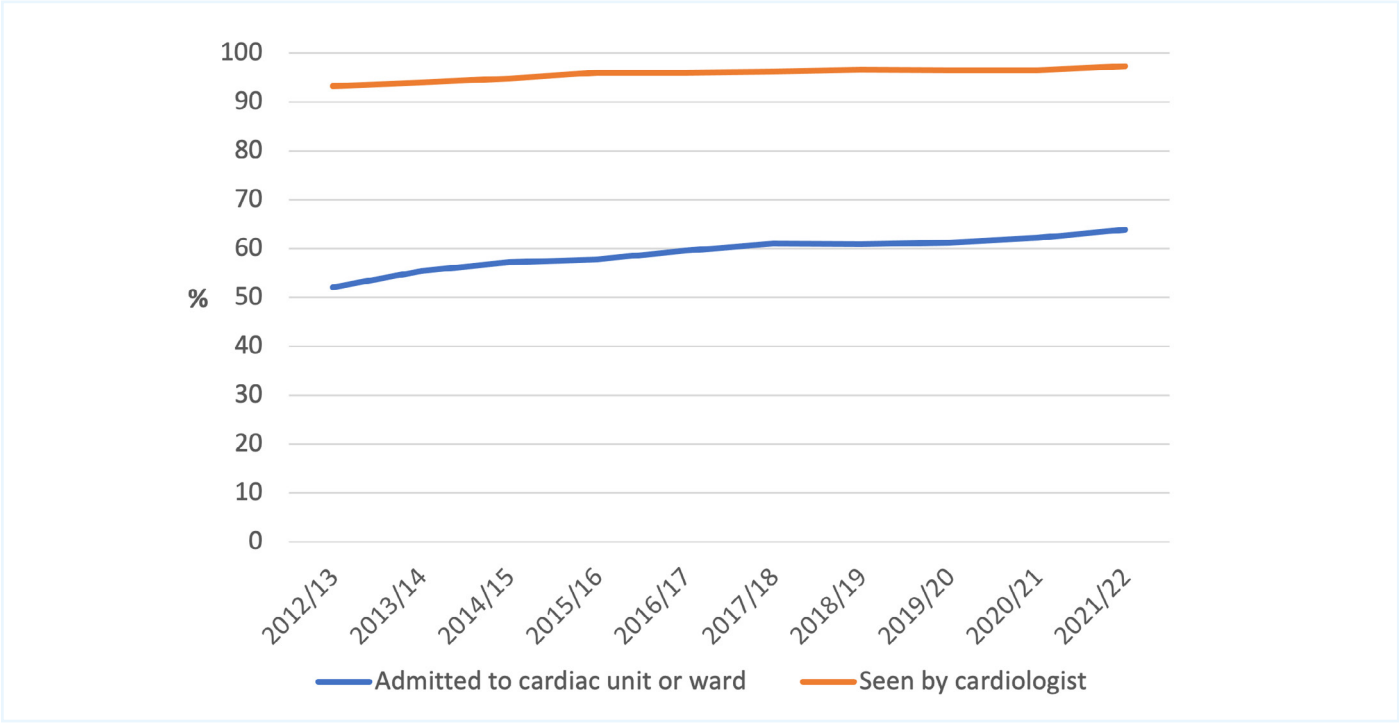
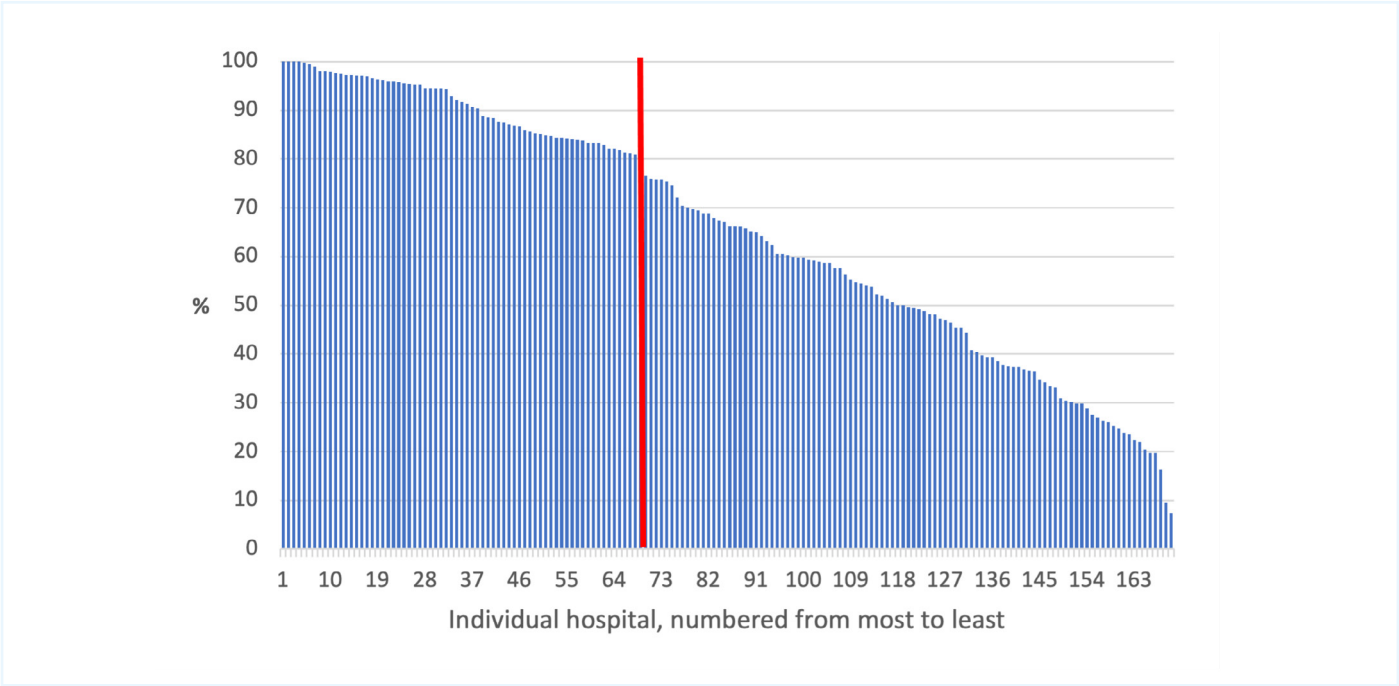


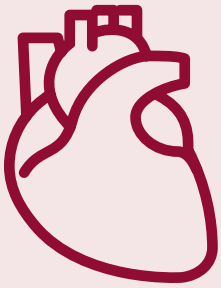
Figure 3.10: Proportion of NSTEMI patients who are admitted to a cardiac ward, by hospital, 2021/22 [MINAP data]



*Hospitals to the right of the red line have **not** achieved ≥ 80% of patients admitted to a cardiac ward. Hospitals reporting fewer than 20 cases excluded*

3.5.3 Recommendations for those not achieving the standard

Hospitals not sufficiently admitting heart attack patients to a cardiac ward should review their systems and bed allocations to maximise access to cardiac care. This may require novel use of dedicated multi-specialty 'high care' beds and provision of cardiac outreach services to those cared for elsewhere.



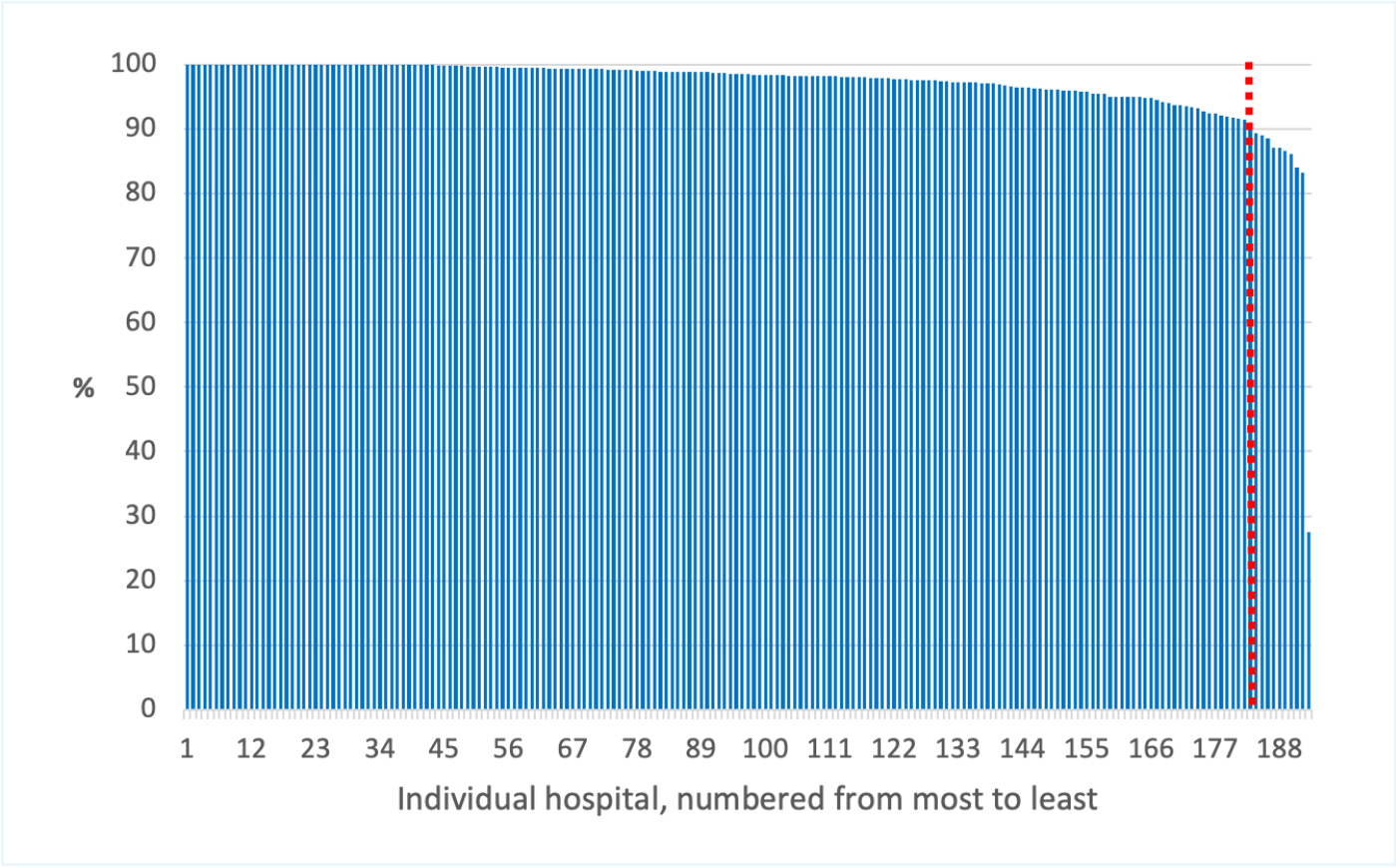
3.6 Cardiologists were involved in the care of most patients with NSTEMI heart attacks

3.6.1 Overview of QI metric

QI Metric Description/Name	Admitted to cardiac ward after NSTEMI
Why is this important?	Specialist involvement should ensure increased and more timely access to recommended interventions.
QI theme	Effectiveness.
What is the standard to be met?	All patients with NSTEMI felt to be caused by an acute coronary event should be reviewed by a cardiologist during the index admission.
Key references to support the metric	Patients with NSTEMI admitted under a cardiologist within 24 hours of hospital admission are more likely to receive guideline directed management and have better clinical outcomes.[8]
Numerator	Patients with NSTEMI who were seen by a cardiologist (or a member of the clinical team working under the supervision of a consultant cardiologist) during admission.
Denominator	All patients with final diagnosis of NSTEMI who are admitted to hospital.
Trend	The proportion of patients seen by cardiologists during the index admission has reached its highest ever level (97%), having been above than 90% over the last 10 years [Figure 3.11].
Variance	At least 90% of patients with NSTEMI are seen by a member of the specialist cardiology team in all but 10 hospitals.

3.6.2 **Audit results**

Figure 3.11: Proportion of NSTEMI patients seen by a member of a specialist cardiology team during admission, by hospital, 2021/22 [MINAP data]



*Hospitals to the right of the red line have **not** achieved ≥ 90% of patients being seen by a member of the specialist team. Hospitals reporting fewer than 20 cases excluded.*

3.6.3 **Recommendations for those not achieving the standard**

Hospitals reporting low rates of cardiology involvement in heart attack patient care should ensure their data are accurately reflecting practice. If they do, provision of cardiac care during admissions should be improved (e.g. by increased staffing or more flexible use of members of the cardiology team, such as nurse specialists and physician associates).

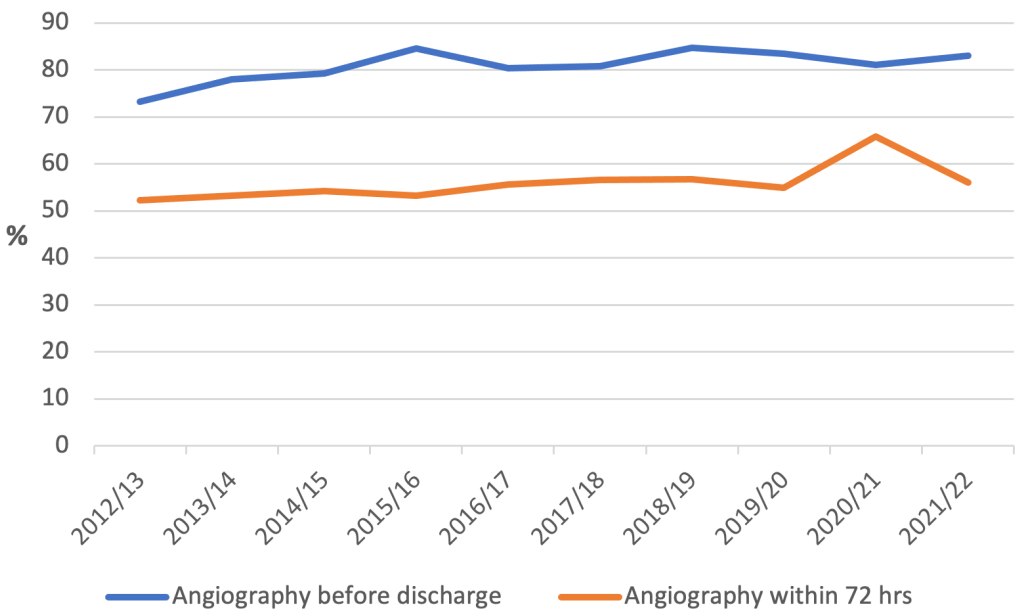
3.7 There was a slight increase in the provision of coronary angiography for patients with NSTEMI heart attacks

3.7.1 Overview of QI metric

QI Metric Description/Name	Coronary angiogram during admission with NSTEMI
Why is this important?	Angiography allows confirmation of the diagnosis and is a precursor for coronary interventions such as PCI and CABG.
QI theme	Effectiveness.
What is the standard to be met?	No national standard has been published but the aim is for 100% given that the denominator excludes those judged to be ineligible for angiography.
Key references to support the metric	NICE quality standard (QS 68): 'Coronary angiography is important to define the extent and severity of coronary disease'.[9] European Society of Cardiology Guidelines: '[Coronary angiography] allows confirmation of the diagnosis, identification of the culprit lesion in a coronary artery, establishment of suitability for PCI or CABG, and stratification of short term and long-term risk'.[6]
Numerator	All those for whom a coronary angiogram was performed during index admission (either in the admitting hospital or in another hospital).
Denominator	All patients with a final diagnosis of NSTEMI, excluding those who refused an angiogram and those for whom an angiogram was judged to be 'not applicable'.
Trend	There was a small increase in the proportion of patients who underwent angiography compared with the previous year, reaching 83%. This is similar to the pre-pandemic rate [Figure 3.12].
Variance	At least 90% of NSTEMI patients who were eligible underwent angiography before discharge in 97 hospitals. Fewer than 70% of such patients underwent an angiography in 19 hospitals [Figure 3.13].

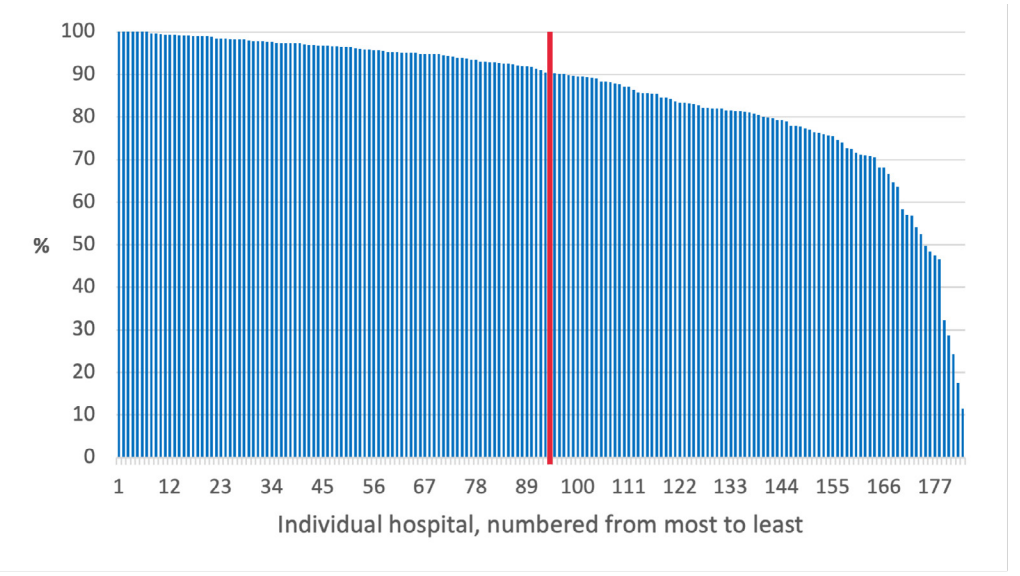
3.7.2 **Audit results**

Figure 3.12: Proportion of eligible patients with NSTEMI who undergo angiography during admission and in which an angiogram is performed within 72 hours of admission, 2012/13 - 2021/22 [MINAP data]



After a gradual rise between 2012/13 and 2015/16, the proportion undergoing angiography has remained relatively static. There has been a slight but gradual rise in the proportion undergoing early angiography (within 72 hours), and this peaked during the first year of the pandemic but has fallen again since the re-start of elective work and an increase in case numbers in 2021/22.

Figure 3.13: Distribution of hospitals based on the percentage of eligible patients with NSTEMI who undergo an angiogram during admission, 2021/22 [MINAP data]



*Hospitals to the right of the red line have **not** provided a coronary angiogram to ≥ 90% of eligible patients following NSTEMI. Hospitals reporting fewer than 20 cases excluded.*

3.7.3 Recommendations for those not achieving the standard

Low rates of angiography in eligible NSTEMI patients require hospitals to review their systems for managing acute coronary syndromes (ACS).

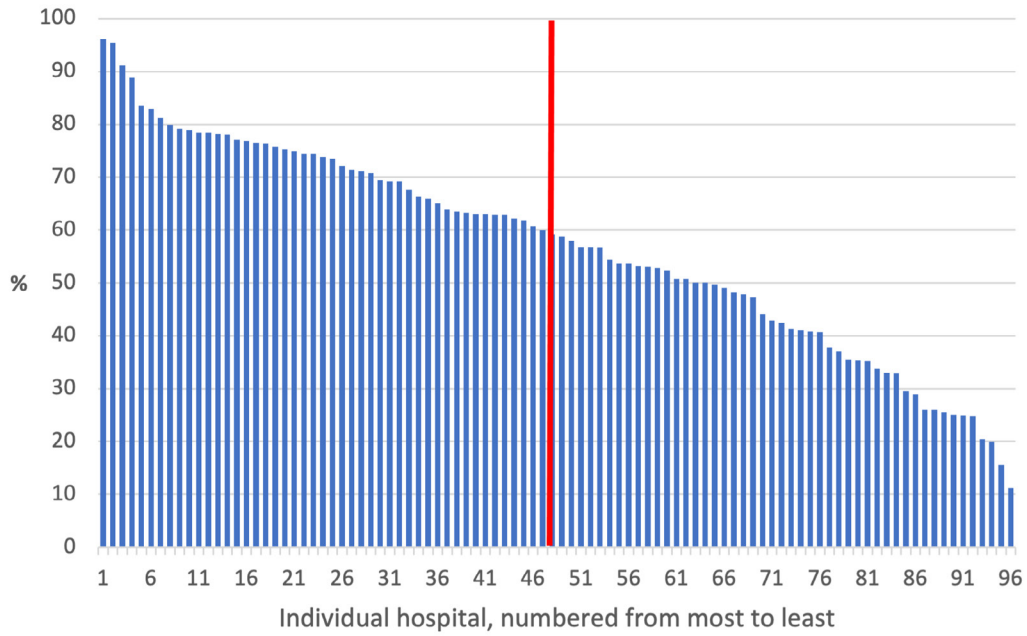
3.8 Delays to coronary angiography have worsened, returning to pre-pandemic levels

3.8.1 Overview of QI metric

QI Metric Description/Name	Proportion of patients undergoing angiography within 72 hours of admission to hospital with NSTEMI
Why is this important?	Early angiography leads to early revascularisation with better outcomes in high-risk patients and shorter hospital stays.
QI theme	Effectiveness/timeliness.
What is the standard to be met?	Angiography within 72 hours of admission to hospital in all cases unless angiography is deemed inappropriate.
Key references to support the metric	NICE quality standard (QS 68): 'Adults with non-ST-segment elevation myocardial infarction (NSTEMI) or unstable angina who have an intermediate or higher risk of future adverse cardiovascular events are offered coronary angiography (with follow-on percutaneous coronary intervention [PCI] if indicated) within 72 hours of first admission to hospital.[3]
Numerator	Those patients in whom the time to angiography – Interval from admission to angiography - is shorter than 72 hours.
Denominator	All patients with final diagnosis of NSTEMI who undergo angiography during admission and for whom the interval from admission to angiography can be calculated.
Trend	The improvement seen in this metric in 2020/21, when 66% of PCI was provided within 72 hours of admission, has fallen back to 56%, in keeping with previous years [Figure 3.12].
Variance	In seven hospitals, at least 80% of patients undergoing angiography for NSTEMI received the angiogram within 72 hours. 47 hospitals provided angiography for at least 60% of such patients within 72 hours while in 20 hospitals, fewer than 40% of patients received within the standard [Figure 3.14].

3.8.2 **Audit results**

Figure 3.14: Proportion of NSTEMI patients undergoing an angiogram within 72 hours, by hospital, 2020/21 [MINAP data]



*Hospitals to the right of the red line have **not** provided a coronary angiogram within 72 hours of admission in at least 60% of patients following NSTEMI. Hospitals reporting fewer than 20 cases excluded.*

3.8.3 **Recommendations for those not achieving the standard**

Where angiography for NSTEMI takes more than 72 hours, hospitals and commissioners should review pathways, referral networks and service commissioning to make quality improvements. Any lessons regarding more timely care that were learned during the pandemic should be incorporated within existing pathways.

There should be an emphasis on early and reliable identification of suitable patients, streamlined referrals, and adequate capacity for transferring patients into (and out of) interventional hospitals. This will involve weekend angiography lists for such patients.

3.9 Most patients were discharged from hospital on all eligible prevention medication

3.9.1 Overview of QI metric

QI Metric Description/Name	Percentage of patients discharged on all secondary prevention drugs for which they are eligible following either STEMI or NSTEMI
Why is this important?	These medicines have been shown to reduce the likelihood of subsequent coronary events in those who have suffered heart attack.
QI theme	Effectiveness.
What is the standard to be met?	No specified standard. The ambition is for 90% of relevant patients to receive all secondary prevention drugs for which they are eligible at time of discharge from hospital following STEMI and NSTEMI.
Key references to support the metric	NICE Guideline (CG 172): Offer all people who have had an acute MI treatment with the following drugs: ACE (angiotensin converting enzyme) inhibitor; dual antiplatelet therapy (aspirin plus a second antiplatelet agent); beta-blocker; statin.[10]
Numerator	Patients discharged on all secondary prevention drugs for which they were judged to be eligible.
Denominator	All patients with a final diagnosis of either STEMI or NSTEMI who were discharged home (i.e. not transferred to another hospital or who died during admission), excluding patients who were ineligible/unsuitable or declined to receive each one of the following drugs or drug classes: aspirin, beta blocker, statin, either ACE inhibitor or angiotensin receptor antagonist, and either thienopyridine or ticagrelor.
Trend	There was a very small decline in the proportion of patients (89%) discharged on all secondary prevention drugs for which they were eligible [Figure 3.15].
Variance	In 115 hospitals, at least 90% of patients were discharged on all secondary prevention drugs for which they were eligible. 20 hospitals discharged fewer than 60% of patients on all secondary prevention drugs for which they were eligible [Figure 3.16].

3.9.2 **Audit results**

Figure 3.15: Proportion of patients discharged on all secondary prevention medication for which they are eligible, 2012/13 - 2021/22 [MINAP data]

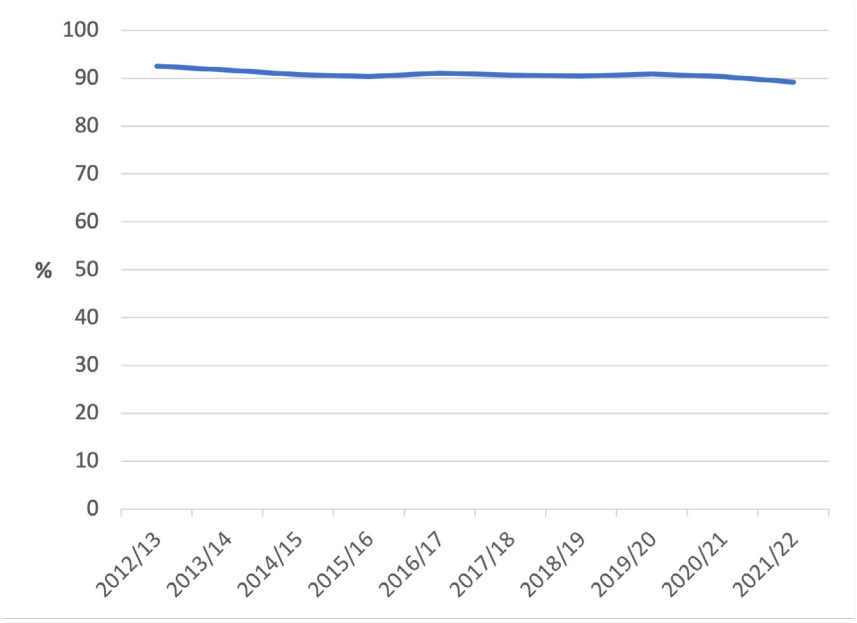
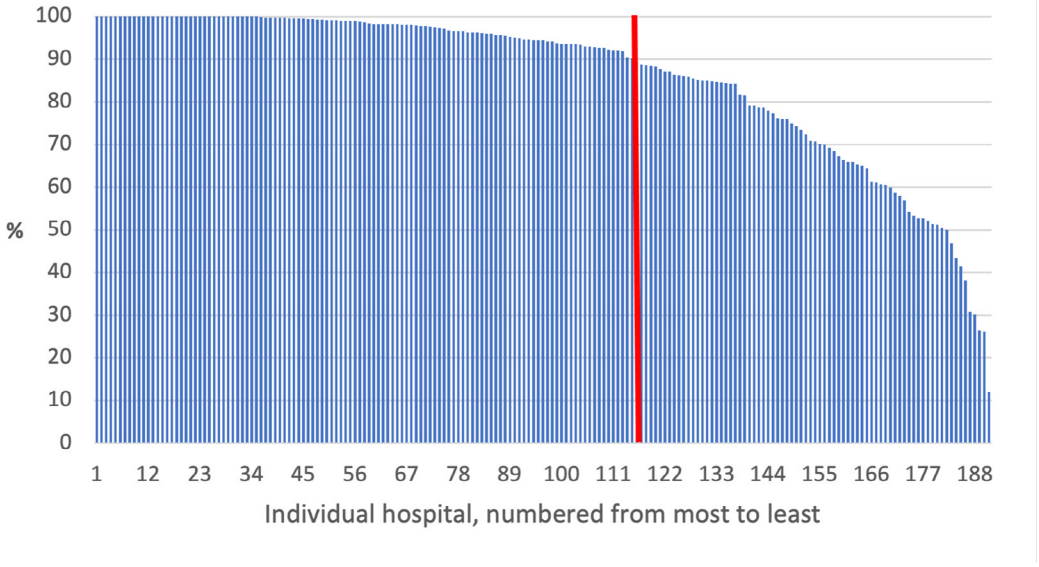


Figure 3.16: Proportion of STEMI and NSTEMI patients discharged home on all secondary prevention drugs for which they are eligible, by hospital, 2021/22 [MINAP data]



*Hospitals to the right of the red line have **not** achieved ≥ 90% of patients being discharged on all secondary prevention drugs for which they were eligible. Hospitals reporting fewer than 20 cases excluded.*

Considering prescription of individual secondary prevention drugs at the time of discharge: 94.8% who were eligible received either an Angiotensin Converting Enzyme inhibitor or angiotensin receptor antagonists; 98.1% received aspirin; 97.9% received another antiplatelet agent (thienopyridine inhibitor or ticagrelor); 96.7% received a beta blocker; 97.8% received a statin.

3.9.3 Recommendations for those not achieving the standard

Hospitals not meeting the prescribing standard for all secondary prevention medication prior to discharge of both STEMI and NSTEMI patients should assess the quality of their data and, if suboptimal performance is confirmed, pursue quality improvement. These might include the use of discharge pro-forma or checklists, direct involvement of specialist cardiac pharmacists or ACS nurse specialists.

3.10 Three quarters of eligible patients received aldosterone antagonists

3.10.1 Overview of QI metric

QI Metric Description/Name	Aldosterone antagonists, also known as mineralocorticoid receptor antagonists (MRA) following STEMI
Why is this important?	Improved outcomes when aldosterone antagonists are given to patients with impaired LV systolic function soon after STEMI.
QI theme	Effectiveness/timeliness.
What is the standard to be met?	No specified standard. The ambition is for 90% of eligible patients to receive MRA at time of discharge from hospital following STEMI.
Key references to support the metric	European Society of Cardiology Guideline: 'MRAs are recommended in patients with a LVEF (Left Ventricular Ejection Fraction) ≤40% and heart failure or diabetes, who are already receiving an ACE inhibitor and a beta-blocker, provided there is no renal failure or hyperkalaemia.[2]
Numerator	All patients who are prescribed an aldosterone antagonist at the time of discharge from hospital to home.
Denominator	Patients with a final diagnosis of STEMI, who are discharged home (i.e. do not die during index admission and are not transferred to another hospital), who undergo an echocardiogram during admission, which reveals LVEF is 'poor' (presently defined as LVEF <30% in MINAP).
Trend	There has been a steady increase to 76% of eligible patients receiving this class of drug in 2021/22. This is a 50% increase since 2013/14 [Figure 3.16].
Variance	21 hospitals reached at least 90% of relevant patients were discharged on an aldosterone antagonist. In eight hospitals, fewer than 70% of such patients were discharged on an aldosterone antagonist [Figure 3.17].

3.10.2 **Audit results**

Figure 3.17: Use of aldosterone antagonists in those with STEMI and significant left ventricular systolic impairment, 2012/13 to 2021/22 [MINAP data]

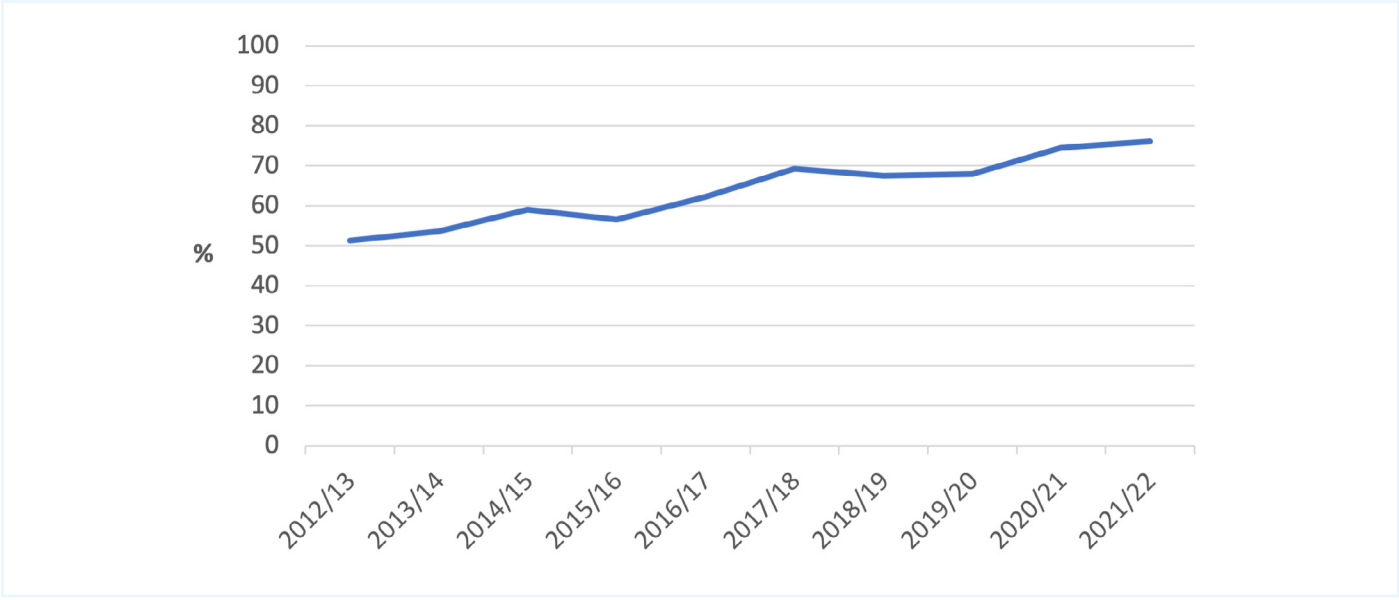
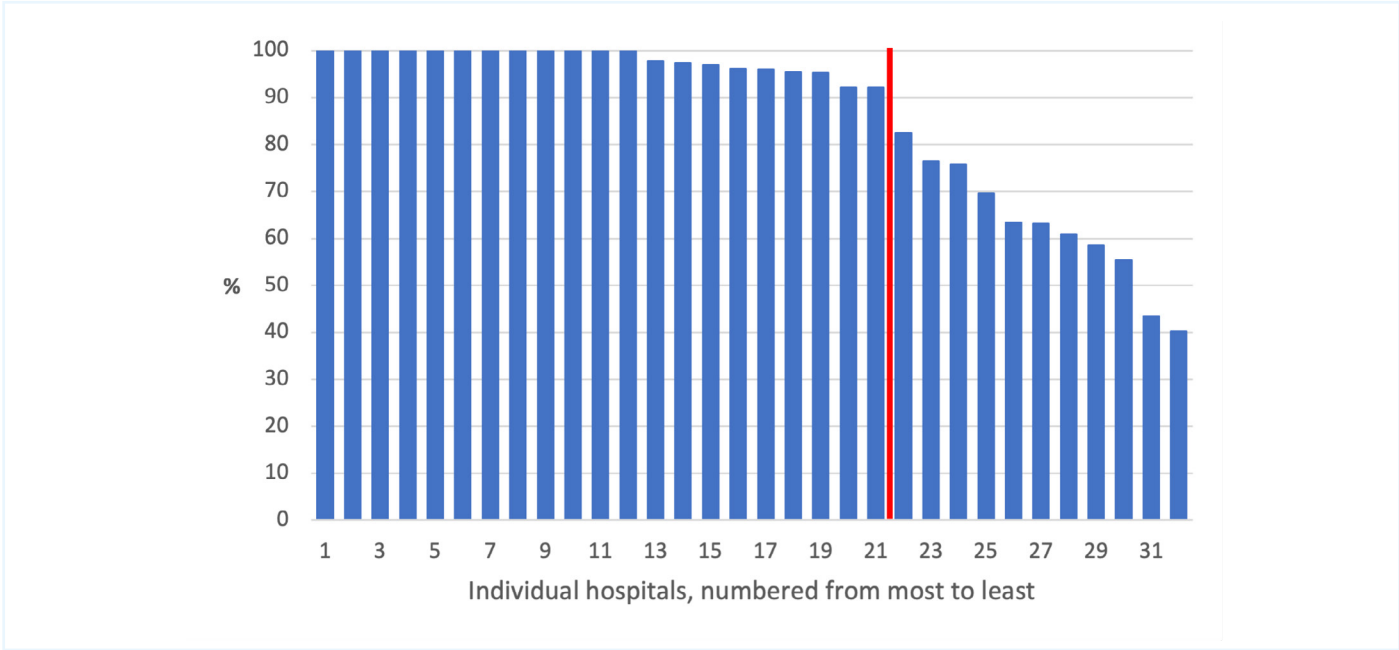


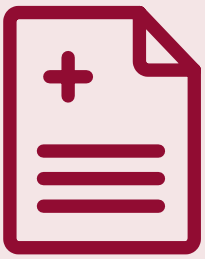
Figure 3.18: Distribution of hospitals based on the percentage of patients with STEMI and significantly impaired left ventricular systolic function discharged home on an aldosterone antagonist, by hospital, 2021/22 [MINAP data]



*Hospitals to the right of the red line have **not** achieved ≥ 90% of patients being discharged on aldosterone antagonist despite being eligible by virtue of significant left ventricular impairment. Data from 26 hospitals; hospitals reporting fewer than 20 cases excluded. Because patients with severely impaired left ventricular systolic function form the minority of people with STEMI, and hospitals reporting fewer than 20 such cases are excluded from analysis, relatively few hospitals appear.*

3.10.3 Recommendations for those not achieving the standard

Hospitals with lower rates of prescribing aldosterone antagonists for patients with impaired LV function identified by echocardiography (or some other reliable assessment method) should act to ensure appropriate treatment. This could involve discharge pro-forma/checklists and the direct involvement of specialist cardiac pharmacists, ACS nurses and sonographers.



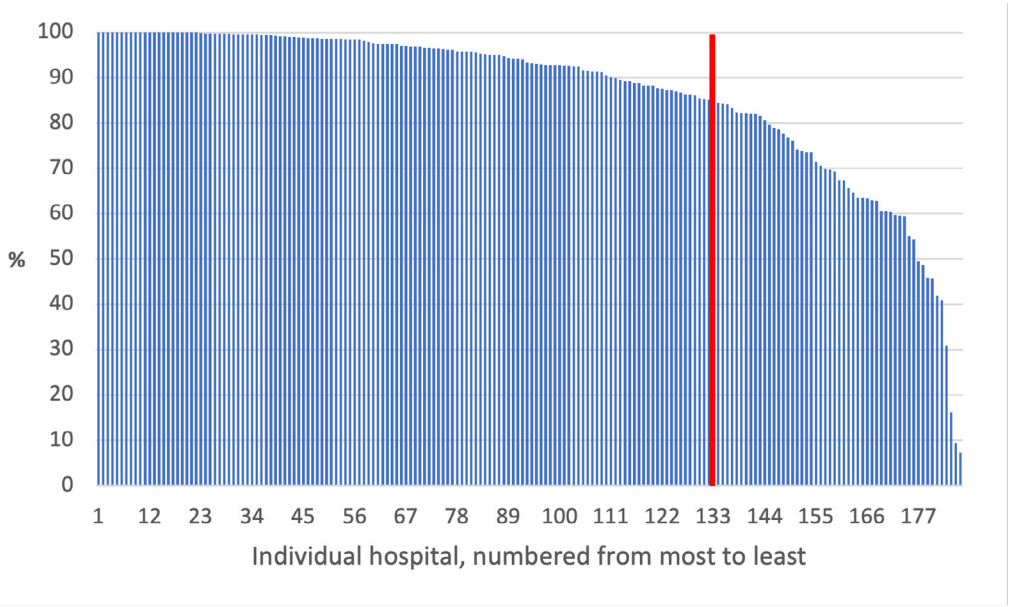
3.11 Referral to cardiac rehabilitation achieves target

3.11.1 Overview of QI metric

QI Metric Description/Name	Referral to cardiac rehabilitation
Why is this important?	Exercise-based cardiac rehabilitation programmes are associated with fewer cardiac deaths in patients with coronary artery disease.
QI theme	Effectiveness.
What is the standard to be met?	NHS Long Term Plan aspires to '85% of those eligible accessing cardiac rehabilitation'.
Key references to support the metric	NICE quality standard (QS 99) 'Adults admitted to hospital with a myocardial infarction are referred for cardiac rehabilitation before discharge.'[11]
Numerator	All patients who are referred to cardiac rehabilitation programme at the time of discharge from hospital to home.
Denominator	All STEMI and NSTEMI patients who survived to discharge home (ie did not die during index admission, and were not transferred to another hospital) who neither refused referral nor had reasons that would make cardiac rehabilitation 'not indicated'.
Trend	From a low in 2017/18, performance has improved to reach the aspiration that more than 85% of eligible patients are referred for cardiac rehabilitation [Figure 2.12].
Variance	Over 130 hospitals report referring at least 85% of eligible patients to cardiac rehabilitation programmes. Ten hospitals report referring fewer than 50% of patients [Figure 3.19].

3.11.2 **Audit results**

Figure 3.19: Proportion of STEMI and NSTEMI patients referred for cardiac rehabilitation at time of discharge home or transfer to another hospital, by hospital, 2021/22 [MINAP data]



Hospitals to the right of the red line have not achieved ≥ 85% of patients being referred for cardiac rehabilitation. Hospitals reporting fewer than 20 cases excluded.

3.11.3 **Recommendations for those not achieving the standard**

Hospitals not meeting the standards for referral of patients to cardiac rehabilitation following either STEMI or NSTEMI heart attacks should ensure early identification of patients who might benefit (for example through routine distribution of cardiac rehabilitation information/invitation in discharge checklists and in leaflets given to all patients).

All hospitals should ensure equitable access to cardiac rehabilitation. Rehabilitation staff who were redeployed to ward-based duties during the pandemic should return to their original practices.

4. Future direction

Plans for the further development of the audit data and reporting include:

- Streamlining data cleaning and validation to speed the time that performance data is available for reporting
- Offering an extended set of analytical tools to enable hospitals to analyse their performance 'in real time' and at a 'case-by-case' level
- Providing geographically breakdowns of the results, shown graphically, at different levels of the health system, for example by NHSE region or Integrated Care System (ICS)
- Using a risk adjustment model from University College London to express survival and mortality rates
- Linking data with other NCAP domains to produce additional insights (e.g. the rate of implantation of complex cardiac devices following heart attack or the proportion of patients referred to cardiac rehabilitation that complete rehabilitation programmes)
- Revising the MINAP dataset to capture more closely the developments in contemporary clinical practice
- Exploring whether routinely collected datasets via NHS Digital or local electronic health records can be used to deliver some, or all, of the present audit functions.

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Email: nicor.auditenquiries@nhs.net

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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 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).

Email: nicor.auditenquiries@nhs.net

British Cardiovascular Society

The British Cardiovascular Society is the voice for those working in cardiovascular health, science and disease management in the UK; we aim to promote and support both the healthcare professionals who work in cardiology and the patients for whom we want to encourage the best possible treatment. Our members are healthcare professionals, working in the field of cardiovascular health.

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GIG Cymru (NHS Wales)

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National Cardiac
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analyses from the Myocardial Ischaemia National Audit Project (MINAP) and the National Audit of Percutaneous Coronary Intervention (NAPCI)

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