



**NCAP**

NATIONAL CARDIAC AUDIT PROGRAMME

**MYOCARDIAL  
ISCHAEMIA  
NATIONAL AUDIT  
PROJECT  
2016/17 SUMMARY  
REPORT**

**NICOR**

## INTRODUCTION

The Myocardial Ischaemia National Audit Project (MINAP) is a domain within the National Cardiac Audit Programme (NCAP) that contains information about the care provided to patients who are admitted to hospital with acute coronary syndromes (heart attack). Participating centres collect and submit data that relate to the patient journey; from a call to the emergency services or self-presentation at an Emergency Department, through diagnosis and treatment at hospital, to the prescription of preventive medications on discharge. Data analyses are presented with respect to the provision of care at each participating hospital, and, where relevant, for Ambulance Trusts that provide care before arrival at hospital.

MINAP works closely with the [British Cardiovascular Society](https://www.bcs.com/pages/default.asp) – the body that represents and supports those professionals who practise cardiology in the UK and that maintains close links with patients and carers of patients with cardiac disease, and with cardiac nurses and physiologists

Further information about MINAP, including contact details for the NICOR project team can be found [here](#). The main aggregate report also contains (in Appendix A) a useful description of the mechanisms by which heart attacks occur and basic summary of recommended treatments.

Details of the MINAP dataset, including definitions of the variables and guidance on applying the various options, are available [here](#).

## ANALYSIS

The current analysis is for heart attacks admitted to hospital during the 12 months between April 2016 and March 2017. Hospital and Ambulance Trust performance, with respect to a number of aspects of care, are presented in tabular form. Additionally some key findings derived from the overall dataset are described below.

## KEY FINDINGS

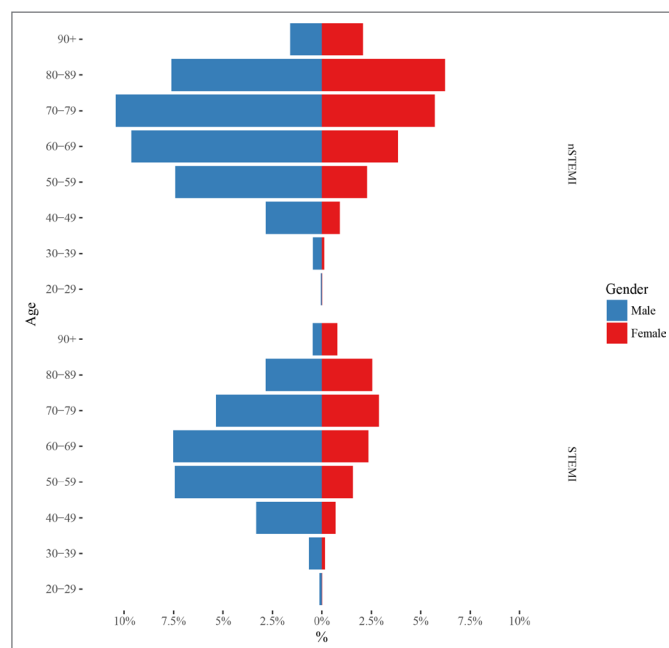
Between April 2016 and March 2017, 97,783 records were submitted of which 87,557 were confirmed cases of heart attack. The majority (53,541—61%) of these were non-ST elevation myocardial infarction (NSTEMI) – referred to as “lower-risk heart attacks” in the NCAP aggregate report – and 34,016 (39%) were ST elevation myocardial infarction (STEMI) – referred to as “high-risk heart attacks” in the NCAP aggregate report.

## PATIENT CHARACTERISTICS

NSTEMI tends to occur in older patients. The number of cases of NSTEMI and STEMI are roughly equal up to age 60 years, but the ratio of NSTEMI to STEMI increases to 2:1 in the age range 70-79 years and almost 3:1 in the range 80-89 years. Half of

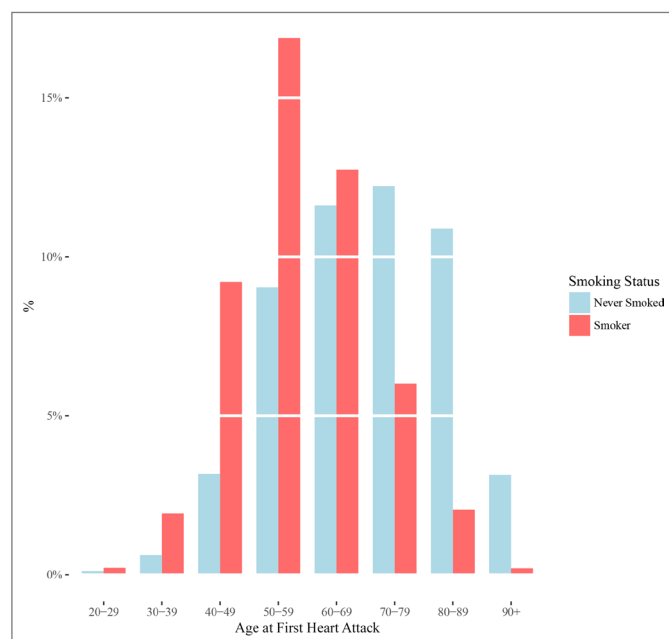
those with STEMI are 65 years of age or younger while most people with NSTEMI are over 70 years of age (50% of those with NSTEMI are 71 years of age or older).

Figure 1 - Age Distribution of STEMI and nSTEMI



Patients in MINAP are more likely to be male (67.8%). Males with heart attack tend to be younger than females – a difference in median age for STEMI of 10 years and for NSTEMI of 7 years. Half of males with STEMI are 62 years of age or younger while half of females with STEMI are 72 years of age or older; 50% of males with NSTEMI are 69 years of age or younger; 50% of females with NSTEMI are 76 years of age or older - see Figure 1.

Figure 2 - Impact of Smoking on Age at First Heart Attack



In both men and women, those who reported smoking tobacco in the month before their heart attack tended to be younger than those who had stopped smoking or had never regularly smoked. The difference in median age between smokers and non-smokers at the time of first heart attack was approximately

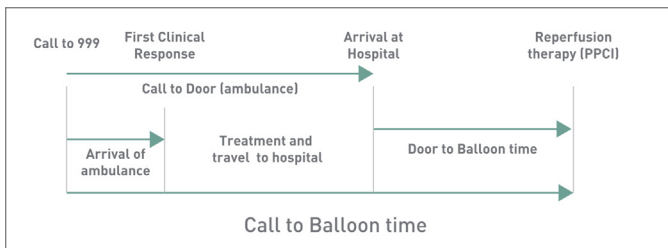
10 years for males (57.8 vs 67.7 years) and 13 years for females (62.1 vs 75.8 years) - see Figure 2.

## STEMI

Management of STEMI often requires immediate specialised treatment. A primary percutaneous coronary intervention (PCI) is the preferred reperfusion procedure. Compared with 2011, the proportion of patients with STEMI receiving PCI as their reperfusion therapy has increased in all nations. Only in 301 cases was thrombolytic treatment used as the method of reperfusion (instead of primary PCI) - 0.9% of all STEMI and 1% of those receiving reperfusion. Almost half of cases (143) where thrombolytic treatment was used occurred in Wales where it was used for 7.8% of all STEMI and 11.4% of those receiving reperfusion.

Hospitals provide primary PCI to most patients presenting with STEMI within the recommended\* timeframes - 72% within 150 minutes from call for help (call to balloon, CtB); 89% within 90 minutes from arrival at hospital (door to balloon, DtB). In 27% primary PCI was performed within half an hour of arrival at hospital.

Figure 3 - Delay in treatment of STEMI



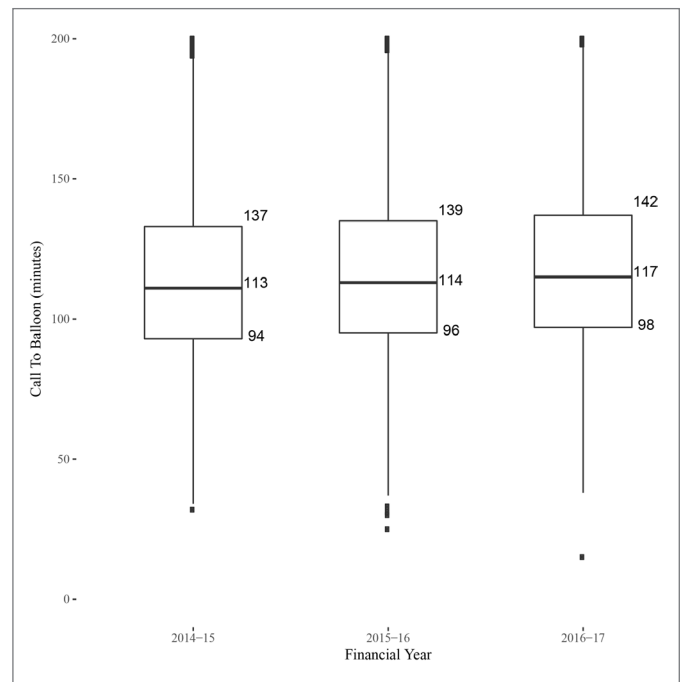
However, the percentage of patients treated within 150 minutes of calling for professional help has fallen from 75% in 2015/16 to 72% in 2016/17. There has been a lengthening of median CtB time in all nations: increasing in England, Wales and Northern Ireland from 117, 127 and 107 to 120, 134 and 111 minutes respectively. This continues a trend identified in the previous MINAP report (2015/16) - See Figures 3 and 4.

89% of patients receive PCI within 90 minutes of arrival at hospital - the equivalent figure being 52% in 2005. The median DtB time in 2016/17 is 40 minutes in England as it was in 2015/16. Median DtB time has increased by 2 minutes in Wales to 43 minutes and has fallen by 2 minutes to 31 minutes in Northern Ireland. This maintenance of in-hospital performance coupled with an increase in CtB time points to increasing delays to treatment being incurred prior to the patient arriving at the PCI centre. Increases in call-to-door times are discussed in the main NCAP report.

Almost four in every five patients (78.5%) with STEMI who receive primary PCI are taken by ambulance directly to the hospital where PCI is performed. These patients - 'direct admissions' - receive more timely treatment than those who first attend a hospital that cannot provide primary PCI and subsequently need an inter-hospital transfer. While inter-

hospital transfer is associated with shorter delays to PCI upon arrival at the interventional hospital (50% with a DtB of 37 minutes or fewer compared with 40 minutes for direct admissions), which probably reflects increased preparedness by the PCI team who are made aware of the impending transfer before the transfer begins, the overall CtB for those admitted directly to an interventional/PCI centre is substantially shorter than for those requiring inter-hospital transfer. 51% of direct admissions are treated within 120 minutes and 78% within 150 minutes of calling for help, compared with 29% and 46% respectively for those transferred between hospitals.

Figure 4 - Call to Balloon times 2014 - 2017



Trend in Call-to-Balloon time for all nations combined: Box and Whisker plots contain middle two quartiles and median times

NHS England has proposed a target for CtB, whereby by 2020 90% of eligible heart attack patients receive primary PCI within 150 minutes of calling for help. In order to achieve this there will need to be a reversal of the lengthening CtB times mentioned above (72% within 150 minutes; 48% within 120 minutes in 2016/17). This improvement will need to occur against a context of increased demand for emergency ambulance care and the implementation of new ambulance response targets that may have the effect of prolonging response times for patients reporting chest pain, rather than collapse, in the community.

The call-to-balloon time represents the overall response of the health service to the patient with STEMI and is made up of care provided both in the community and in hospital. The particular role of the ambulance services includes the receipt of the call for help, despatch of appropriate personnel, provision of early management on-scene (including resuscitation if necessary, accurate diagnosis, continuous monitoring and administration of appropriate drugs), transfer to the most suitable hospital and adequate handover of clinical details to the receiving hospital clinicians. All of this, up to the point of arrival at hospital,

\* National Institute for Health and Care Excellence Quality standard QS68, Acute coronary syndromes in adults, 2014)



occurs within the 'call-to-door' (CtD) interval. There is variation between Ambulance Trusts in the median CtD for those patients with STEMI who are transported to hospital by ambulance and who receive primary PCI. It is unclear whether these reported differences simply reflect the geographic nature and transport connections of the areas served by each Trust. There is no 'minimum or maximum' acceptable CtD time and there is likely to be a 'trade-off' between the benefit of meticulous but time-consuming pre-hospital assessment and care and the detriment of consequent delays to hospital admission.

Reporting CtD will at least allow Ambulance Trusts to 'benchmark' their performance and to explore aspects of data quality to ensure that this metric is a valid representation of the care they provide. NICOR is collaborating with NHS England and representatives of Ambulance Trusts to create and validate such novel metrics.

Notwithstanding discussions about pre-hospital delays, a key recommendation of the NCAP aggregate report remains the need to call an ambulance if symptoms suggestive of a heart attack are experienced.

## ■ NSTEMI

Patients with NSTEMI should be managed in a cardiac ward and assessed by a cardiologist. In 2016/17, 59.6% of patients with NSTEMI were admitted to a cardiac ward compared with 57.5% in the previous year and 49% in 2010/11. The proportion being seen by a cardiologist remains large (96% in both 2016/17 and 2015/16 compared with 90% in 2010/11).

A little over 83% were eligible for an angiogram to investigate their coronary arteries, of which 85% underwent the procedure before discharge home. This compares with 86% in 2015/16 and 68% in 2010/11.

[NICE guidelines](#) suggest a benefit for diagnostic coronary angiography with PCI (if necessary) when performed up to 96 hours after admission to hospital with symptoms of NSTEMI in those patients estimated to be at moderate to high risk – nearly all those patients recorded in MINAP. NICE also proposes that performance of angiography within 72 hours is a marker of good quality care.

In 2016/17, 19.3% patients with NSTEMI who underwent angiography did so within 24 hours; 56.1% within 72 hours and 68.8% within 96 hours. This compares with 17.5% within 24 hours; 53% within 72 hours; 66.3% within 96 hours in 2015/16 and 21% within 24 hours, 55% within 72 hours and 67% within 96 hours in 2010/11. This demonstrates an area for significant quality improvement.

Importantly, and in keeping with the [NHS England Best Practice Tariff \(BPT\)](#) metric for 2016/17, through which participating hospitals receive a higher reimbursement where at least 60% of all NSTEMI patients receive angiography within 72 hours, these data only include patients admitted directly to hospitals capable of providing on-site angiography. Presently, those patients

who require transfer between hospitals for the purpose of undergoing angiography are excluded from these analyses; such patients have been shown to experience longer delays to angiography.

The role of BPT in promoting improvements in performance is uncertain, but cannot be discounted; such improvement was the primary motive for its implementation. It will be interesting to compare future changes in England, where BPT is used, with those in the devolved nations where BPT is not used.

The 2017/18 NSTEMI BPT has been expanded to include those patients requiring inter-hospital (or 'inter-facility') transfers. The existing MINAP dataset will allow for identification of such patients, but those responsible for data entry in interventional hospitals will need to follow guidance on how reliably to do this.

## ■ SECONDARY PREVENTION MEDICATION

Certain drugs have been shown to reduce the likelihood of subsequent heart attacks in heart attack survivors – both STEMI and NSTEMI. Originally the performance of individual hospitals was reported with respect to each of the various "secondary prevention" medications prescribed at time of discharge from hospital, excluding patients who were ineligible/unsuitable to receive the medication or who declined to do so. The proportion of patients discharged on each drug class, other than aldosterone antagonists (mineralocorticoid receptor antagonists – MRA), which is reserved for those with specific post-heart attack characteristics, has been over 90% for some years. Use of each drug class in the entire dataset is: ACE inhibitor, 94.4%; Aspirin, 98.5%; Beta blocker, 96.8%; statin, 97.7%; clopidogrel or prasugrel or ticagrelor, 97.8%. Because of this high performance with respect to individual drug classes, the measure of performance with respect to secondary prevention drugs has been expressed as a composite – the proportion of patients discharged on all the secondary prevention drugs for which they were eligible based upon their particular situation. Despite this more taxing performance measure, some hospitals appear capable of providing optimal care but others do not reach these levels.

## ■ IMPROVEMENTS IN DATA QUALITY

The MINAP Annual Report 2015/16 recommended continued investment in cardiac audit and improving data completeness. Data quality remains an important issue; rates of case ascertainment and data completeness, for nSTEMI episodes in particular, influence the ability of MINAP to provide accurate and reliable reports. For the first time the annual report contains analysis of case ascertainment for both STEMI and NSTEMI through comparison of Trusts in England with relevant HES data, and Hospitals in Wales with relevant PEDW data – see table via MINAP Landing page.

Data quality is also of importance in providing the means to

pursue reliable modelling of outcomes and then performing case-mix adjustments to compare outcomes between participating hospitals. The table containing information on 3-year 30-day mortality following admission with STEMI, while not including a risk adjustment, does allow a comparison of data completeness of three key fields that are predictive of outcome – patient age, systolic blood pressure and heart rate on arrival at hospital. Many hospitals have made substantial improvements. In 2013/14, 58 hospitals had achieved completeness of these three fields in at least 95% of cases. This number had risen to 89 hospitals in 2016/17.

## **NEW QUALITY IMPROVEMENT MEASURE FOR 2016/17**

As outlined in the NCAP aggregate report (section 5.1.2) new targets for quality improvement are being proposed. Expert professional groups and patient representatives have identified in-hospital assessment of cardiac function following heart attack as such a target. Those with significant impairment of cardiac pump function following heart attack may benefit from particular treatments, including implanted devices. To this end, this year the MINAP domain reports hospital-specific performance of in-house echocardiography following STEMI.

## **ECHOCARDIOGRAPHY**

Following STEMI patients should undergo evaluation of left ventricular function. This is most often achieved by echocardiography, a non-invasive ultrasound technique that should be available in all hospitals that admit such patients. An echocardiogram also facilitates assessment of cardiac valve function. This requirement, for an in-patient echocardiogram, is implicit within the NICE guideline for management of heart attacks, which suggests those with reduced ejection fraction, should receive an MRA.

Overall, 73% of patients with STEMI underwent an echocardiogram during the index admission. In Northern Ireland the rate was 88.5%. There is significant variation in practice, with 53 hospitals reporting performance during admission in at least 90% of patients, yet others below 50%. With length of stay of only a few days after STEMI many clinicians appear to arrange echocardiography following discharge from hospital rather than during hospitalization – 11 participating hospitals report arranging echocardiograms in the outpatient setting in more than 30% of patients.

Performance of echocardiography is a new metric and comes with the caveat that there are other less-commonly-used methods of assessing ventricular function. There may also be patients whose ventricular function is already known to be poor at the time of admission to hospital in whom further echocardiography is unlikely to change their care needs.

# RECOMMENDATIONS

## **Policy Makers, Service Directors and Clinical Commissioning Groups (CCG), National Delivery Groups (Wales), Health and Social Care Board (NI), Professional Societies and National Charities should:**

- Continue working closely with those that deliver care to ensure provision of the most accurate data for clinical audit
- Raise public awareness of the risk factors known to increase the chance of heart attack including: obesity, type 2 diabetes, hypertension, tobacco smoking & hyperlipidaemia
- Support initiatives to: mitigate known risk factors, publicise the signs and symptoms of heart attack, and encourage prompt responses at the onset of symptoms
- Work with service providers and centres more clearly to understand how they can provide better care. This might include facilitating meetings between neighbouring hospitals and Ambulance Trusts to share best practice and to consider reconfiguration of services

## **Chief Executives, Medical Directors and Clinical Leaders at provider centres should:**

- Ensure that the MINAP report findings are widely disseminated to relevant clinical teams and acted upon
- Explore, understand and act upon variations in the care of people with both STEMI and NSTEMI
- Improve and maintain quality of care by comparing the performance of hospitals within their organisation, or their specific hospital with similar centres, and against published national standards
- Ensure NSTEMI patients at moderate to high risk have access to timely angiography
- Ensure there are sufficient resources allocated to clinical audit and associated quality improvement activity
- Ensure that MINAP findings are presented at board level and identified gaps in service provision are addressed by:
  - ▶ Nominating a trust clinical lead to progress the work

- ▶ Working with teams to explore contributing factors
- ▶ Agreeing clear quality improvement action plans and implement changes by agreed deadlines

## **Leaders of Ambulance Trusts should:**

- Continue to monitor and act upon the response to emergency calls and the prioritisation of heart attack
- Understand the effects of the provision of appropriate and equitable care for all who require their services
- Ensure the timeliness of care for patients with STEMI

## **Clinicians and Audit Teams should:**

- Where a patient is admitted to hospital via the ambulance service, ensure that the 'date/time arrival at hospital' variable is indicative of the arrival time of the ambulance at the hospital NOT the administrative registration time.
- Continue to ensure that data provided to MINAP are accurate and timely – being of high quality data, as outlined in the MINAP Minimum Data Standard
- Interrogate data on a regular basis, and use these data to facilitate quality improvement initiatives aimed at targeting MINAP identified limitations in the care provision of people with STEMI and NSTEMI
- Work with the appointed Trust clinical lead to explore and address known limitations demonstrated by MINAP audit findings – including consideration of root cause analysis of cases where processes of care do not reach the expected standard
- Widely share successful QI initiatives resulting from MINAP work, for example through:
  - ▶ RCP 'Tell us your story': <https://www.rcplondon.ac.uk/projects/future-hospital-tell-us-your-story>
  - ▶ HQIP case studies: <http://www.hqip.org.uk/resources/>
- Remember that many important aspects of compassionate patient-centred care cannot be quantified or represented through clinical audit, but must not be ignored