

**Myocardial Ischaemia National Audit Project (MINAP)
Overview of Quality Improvement (QI) metrics**

1 Overview of QI metric: Door-To-Balloon time for patients with ST-elevation myocardial infarction (STEMI)

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'. ¹
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.

2 Overview of QI metric: Call-To-Balloon time for STEMI

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) 'Adults with acute ST-segment-elevation myocardial infarction (STEMI) who



	<p>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.²</p> <p>Given that pre-hospital fibrinolytic therapy may take 30 minutes to start, this leads to a standard of 'within 150 minutes'.</p>
Numerator	<p>a) All with STEMI who underwent primary PCI within 120 minutes of call for help.</p> <p>b) All with STEMI who underwent primary PCI within 150 minutes of call for help.</p>
Denominator	All with STEMI who underwent primary PCI for whom a CTB can be calculated.

3 Overview of QI metric: No reperfusion for STEMI

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	<p>ESC guideline for management of STEMI recommends 'Reperfusion therapy is indicated in all patients with symptoms of ischaemia of \leq 12-hour duration and persistent ST segment elevation'.¹</p> <p>ESC Quality Indicator – Proportion of STEMI patients arriving in the first 12 hours receiving reperfusion therapy.</p>
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.



4 Overview of QI metric: Echocardiography during admission for STEMI

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'. ¹
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'.

5 Overview of QI metric: Admission to cardiac wards for patients with non-ST-elevation myocardial infarction (NSTEMI)

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. ³



	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. ⁴
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.

6 Overview of QI metric: Seen by Cardiology team during admission for NSTEMI

QI Metric Description/Name	Seen by cardiologist following 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. ⁵
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.

7 Overview of QI metric: Performance of coronary angiography for NSTEMI

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'. ⁶ 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'. ⁴
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'.

8 Overview of QI metric: Performance of coronary angiography within 72 hour of admission for NSTEMI

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.' ²
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.



9 Overview of QI metric: Discharge from hospital on all eligible secondary prevention medication after STEMI and NSTEMI

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. ⁷
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. Included in the denominator are those with blank or 'unknown' responses.

10 Overview of QI metric: Discharged from hospital on aldosterone antagonists after STEMI and NSTEMI

QI Metric Description/Name	Aldosterone antagonists, also known as mineralocorticoid receptor antagonists (MRA) following STEMI and NSTEMI
Why is this important?	Improved outcomes when aldosterone antagonists are given to patients with impaired LV systolic function soon after STEMI.
QI theme	Effectiveness.
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 and NSTEMI.
Key references to support the metric	European Society of Cardiology Guideline: 'MRAs are recommended in patients with a LVEF (Left Ventricular Ejection Fraction) $\leq 40\%$ and heart failure or diabetes, who are already receiving an ACE inhibitor and a beta-blocker, provided there is no renal failure or hyperkalaemia. ¹



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 or NSTEMI 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).

11 Overview of QI metric: Referral to cardiac rehabilitation at point of discharge after STEMI and NSTEMI

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.' ⁸
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'.

References

¹ The Task Force for the management of acute myocardial infarction in patients presenting with ST-segment elevation of the European Society of Cardiology (ESC). 2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. *Eur Heart J* 2018;39:119-177.

² National Institute for Health and Care Excellence. Acute coronary syndromes in adults. Quality Standard [QS 68] Quality Statement 6: Primary PCI for acute STEMI. 2014. Available at:

<https://www.nice.org.uk/guidance/qs68/chapter/Quality-statement-6-Primary-PCI-for-acute-STEMI>

³ Moledina S, Shoaib A, Sun L, Myint P, Kotronias R, Shah B, Gale C, Quan H, Bagur R, Mamas M. Impact of the admitting ward on care quality and outcomes in non-ST-segment elevation myocardial infarction (NSTEMI): insights from a national registry. *Eur Heart J Qual Care Clin Outcomes*. 2021 Sep 4;qcab062. doi: 10.1093/ehjqcco/qcab062 Online ahead of print.

⁴ The Task Force for the management of acute myocardial infarction in patients presenting without persisting ST-segment elevation of the European Society of Cardiology (ESC). 2015 ESC Guidelines for the management of acute coronary syndrome in patients presenting without persistent ST segment elevation. *Eur Heart J* 2016;37:267-315.

⁵ Moledina S, Shoaib A, Graham M, Biondi-Zoccai G, Van Spall H, Kontopantelis E, Rashid M, Aktaa S, Gale C, Weston C, Mamas M. Association of admitting physician specialty and care quality and outcomes in non-ST-segment elevation myocardial infarction (NSTEMI): insights from a national registry. *Eur Heart J Qual Care Clin Outcomes*. 2021 May 12;qcab038. doi: 10.1093/ehjqcco/qcab038. Online ahead of print.



⁶ National Institute for Health and Care Excellence. Acute coronary syndromes in adults. Quality Standard [QS 68] Quality Statement 3: Coronary angiography and PCI within 72 hours for NSTEMI or unstable angina. 2014 Available at: <https://www.nice.org.uk/guidance/qs68/chapter/Qualitystatement-3-Coronary-angiography-and-PCI-within-72-hours-for-NSTEMI-or-unstable-angina>

⁷ National Institute for Health and Care Excellence. Myocardial Infarction: cardiac rehabilitation and prevention of further cardiovascular disease. Clinical Guideline [CG 172]. 2013 Available at: <https://www.nice.org.uk/guidance/CG172/chapter/1-Recommendations#drug-therapy-2>

⁸ National Institute for Health and Care Excellence. Acute coronary syndromes in adults. Quality Standard [QS 99] Quality Statement 2: Referral for cardiac rehabilitation. 2015 Available at: <https://www.nice.org.uk/guidance/qs99/chapter/Quality-statement-2-Referral-for-cardiac-rehabilitation>

