

NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Health and social care directorate

Quality standards and indicators

Briefing paper

Quality standard topic: Acute coronary syndromes (including myocardial infarction)

Output: Prioritised quality improvement areas for development.

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1 Introduction

This briefing paper presents a structured overview of potential quality improvement areas for acute coronary syndromes (including myocardial infarction). It provides the Committee with a basis for discussing and prioritising quality improvement areas for development into draft quality statements and measures for public consultation.

1.1 Structure

This briefing paper includes a brief description of the topic, a summary of each of the suggested quality improvement areas and supporting information.

If relevant, recommendations selected from the key development source below are included to help the Committee in considering potential statements and measures.

1.2 Development source

The key development source(s) referenced in this briefing paper is:

- [Myocardial infarction with ST-segment elevation](#). NICE clinical guideline 167 (2013).
- [Chest pain of recent onset](#). NICE clinical guideline 95 (2010).
- [Unstable angina and NSTEMI](#). NICE clinical guideline 94 (2010).

2 Overview

2.1 Focus of quality standard

This quality standard will cover the diagnosis and management of acute coronary syndromes (including myocardial infarction) in adults aged 18 years and older. It will not cover the secondary prevention of myocardial infarction, including cardiac rehabilitation, because this will be covered by a separate quality standard.

2.2 Definition

The term 'acute coronary syndromes' (ACS) encompasses a range of conditions including unstable angina, non-ST-segment-elevation myocardial infarction (NSTEMI) and ST-segment-elevation myocardial infarction (STEMI) that are due to a sudden reduction of blood flow to the heart. This is usually caused by a blood clot that forms on a patch on atheroma within a coronary artery.

STEMI occurs when a coronary artery or one of the smaller branches that supplies blood to the heart becomes suddenly blocked by a blood clot, causing the heart

muscle supplied by the artery to die. In unstable angina and NSTEMI the blood clot causes a reduced blood flow, but not a total blockage so the heart muscle supplied by the affected artery does not die. The location of the blockage, the length of time that blood flow is blocked, and the amount of damage that occurs determine the type of acute coronary syndrome.

The most common symptom of ACS is severe chest pain that can last for several hours. Other symptoms include sweating, feeling sick, breathlessness and feeling faint.

2.3 Incidence and prevalence

STEMI

The incidence of STEMI has been declining over the past 20 years. It varies between regions and averages around 500 hospitalised episodes per million people each year in the UK. The London Ambulance Service attended 9657 cardiac arrests in 2011–12 for a population of around 8.2 million people (1177 per million people). Most of these will have been attributed to acute coronary syndromes, so the overall population prevalence of STEMI is likely to be in the region of 750–1250 per million people. Over the past 30 years, in-hospital mortality after acute coronary syndromes has fallen from around 20% to nearer 5%. This has been attributed to various factors, including improved drug therapy and speed of access to effective treatments¹.

Unstable angina and NSTEMI

The diagnosis of NSTEMI is more difficult to establish than STEMI and therefore its prevalence is harder to estimate. The annual incidence of hospital admissions for non-ST elevation ACS is about 3 per 1,000².

2.4 Management

Acute coronary syndromes have a potentially poor prognosis, emphasising the importance of prompt and accurate diagnosis. Treatments are available to help ease the pain, improve the blood flow and to prevent any future complications.

People who are suspected of having an ACS based on their history of chest pain, cardiovascular risk factors, history of ischaemic heart disease and any previous treatment, and previous investigations for chest pain are admitted to hospital and receive an ECG and blood tests. An ECG shows changes to the normal pattern of the heart tracing if you have an ACS. However, an ECG can also be normal in some cases. The blood test measures a chemical called troponin that is present in heart

¹ [Myocardial infarction with ST-segment elevation](#). NICE clinical guideline 167 (2013).

² [Unstable angina and NSTEMI](#). NICE clinical guideline 94 (2010).

muscle cells. Damage to heart muscle cells releases troponin into the bloodstream. The level of troponin is raised if you have an MI and continues to rise in the hours following the onset of chest pain but it is not raised in unstable angina.

A quick but thorough assessment of the patient's history and findings on physical examination, ECG and blood tests permit accurate diagnosis and aids in early risk stratification, essential for guiding treatment.

STEMI

For people diagnosed with STEMI, nearly half of potentially salvageable myocardium is lost within 1 hour of the coronary artery being blocked and two-thirds are lost within 3 hours. Apart from resuscitation from any cardiac arrest, the highest priority in managing STEMI is to restore an adequate coronary blood flow as quickly as possible. To restore blood flow, people are treated with drug therapy and/or revascularisation.

The preferred treatment for STEMI is primary PCI if it can be delivered in a timely fashion (120 minutes). For people with STEMI where primary PCI cannot be delivered within 120 minutes, thrombolytic treatment (clot dissolved by a drug) should be given.

NSTEMI and Unstable angina

The treatment of people with NSTEMI and unstable angina is directed to alleviate pain and anxiety, prevent recurrences of ischaemia and prevent or limit progression to acute myocardial infarction. Treatment is determined by the patients risk of future cardiovascular events. Antiplatelet and antithrombotic treatment is given as the initial treatment. Further treatments may include coronary angiography followed by revascularisation if appropriate.

2.5 National audits

Myocardial Ischaemia National Audit Project (MINAP) April 2012-March 2013

The Myocardial Ischaemia National Audit Project (MINAP) is a national cardiac clinical audit which collects data on the management of heart attacks from participating hospital and ambulance services from across England, Wales and Northern Ireland. The audit collects data from across the patient pathway and covers diagnosis and treatment to discharge. Initially the audit focussed on the early provision of reperfusion treatment for people presenting with STEMI. Recently the audit has been extended to include people with NSTEMI however the number of NSTEMI reported in MINAP are incomplete.

National Audit of Percutaneous Coronary Interventional (PCI) Procedures Jan-Dec 2011

The British Cardiovascular Society’s (BCIS) National Audit of Percutaneous Coronary Interventional Procedures audits PCI activity through the submission of an annual return. The audit provides information on the structure of the provision of PCI services across the UK, the clinical care and treatment provided by each hospital, the process of care including delays in treatment and the outcome for patients such as complications, adverse cardiac events and death.

See appendices 1–3 for the associated care pathway and algorithms from NICE clinical guidelines 94, 95 and 167.

2.6 National Outcome Frameworks

Tables 1–2 show the outcomes, overarching indicators and improvement areas from the frameworks that the quality standard could contribute to achieving.

Table 1 [NHS Outcomes Framework 2014-15](#)

Domain	Overarching indicators and improvement areas
1 Preventing people from dying prematurely	<p>Overarching indicator</p> <p>Improvement areas</p> <p>Reducing premature mortality from the major causes of death</p> <p>1.1 Under 75 mortality rate from cardiovascular disease*</p>
4 Ensuring that people have a positive experience of care	<p>Overarching indicator</p> <p>4a Patient experience of primary care i GP services</p> <p>4b Patient experience of hospital care</p> <p>Improvement areas</p> <p>Improving people’s experience of accident and emergency services</p> <p>4.3 Patient experience of A&E services</p>
Alignment across the health and social care system	
* Indicator shared	

Table 2 [Public health outcomes framework for England, 2013–2016](#)

Domain	Objectives and indicators
4 Healthcare public health and preventing premature mortality	<p>Objective</p> <p>Reduced numbers of people living with preventable ill health and people dying prematurely, whilst reducing the gap between communities</p> <p>Indicators</p> <p>4.3 Mortality rate from causes considered preventable</p> <p>4.4 Under 75 mortality rate from all cardiovascular diseases (including heart disease and stroke)*</p>
Alignment across the health and social care system	
* Indicator shared with the NHS Outcomes Framework	

3 Summary of suggestions

3.1 Responses

In total 9 stakeholders responded to the 2-week engagement exercise 9/12/13–23/12/13.

Stakeholders were asked to suggest up to 5 areas for quality improvement. Specialist committee members were also invited to provide suggestions. The responses have been merged and summarised in table 3 for further consideration by the Committee. Please note those suggestions relating to secondary prevention have not been summarised in the briefing paper as a separate quality standard on this area is due to be developed.

Full details on the suggestions provided are given in appendix 8 for information.

Table 3 Summary of suggested quality improvement areas

Suggested area for improvement	Stakeholders
Diagnosis <ul style="list-style-type: none"> • ECG • Cardiac biomarkers • Making a diagnosis 	CEM, EM, PSF
Risk assessment <ul style="list-style-type: none"> • Assessment of risk of future adverse events (unstable angina and NSTEMI) 	AZ, CEM, SCM
Management of NSTEMI and unstable angina <ul style="list-style-type: none"> • Antiplatelet therapy • Coronary angiography • Revascularisation strategy 	AZ, RCS, SCM
Management of STEMI <ul style="list-style-type: none"> • Eligibility for PPCI • Timely PPCI • Rescue PCI 	AZ, SCM
Functional assessment	BNCS&BNMS, SCM
Review <ul style="list-style-type: none"> • Specialty review • Training and cardiogenic shock • Organisational responsibility 	SCM
AZ, AstraZeneca UK BNCS&BNMS, British Nuclear Cardiology Society and British Nuclear Medicine Society CEM, The College of Emergency Medicine DH, Department of Health EM, East Midlands Ambulance Service MSD, Merck, Sharp and Dohme Ltd PSF, National Health Service Commissioning Board Patient Safety Function RCN, Royal College of Nursing RCPCH, Royal College of Paediatrics and Child Health	

RCSE, The Royal College of Surgeons of Edinburgh
Roche, Roche Diagnostics Ltd
SCM, Specialist Committee Member

4 Suggested improvement areas

4.1 *Diagnosis*

4.1.1 Summary of suggestions

ECG

Stakeholders highlighted all people with symptoms compatible with ACS should have a 12-lead ECG recorded within 10 minutes of first medical contact (either arrival in the Emergency Department or first contact with pre-hospital emergency medical services). ECG is the diagnostic test of first choice for diagnosing STEMI. Early diagnosis is essential to determine the need for immediate revascularisation (PCI or thrombolysis) which can have a mortality benefits for patients with STEMI. In addition, stakeholders report there is evidence that recording of the ECG within 10 minutes of arrival is associated with reductions in (unadjusted) mortality even in patients without ST elevation.

Cardiac Biomarkers

Stakeholders highlighted patients with suspected ACS should have cardiac troponin measured in a peripheral blood sample at the time of arrival in hospital and should undergo serial troponin testing. Cardiac troponin is the biomarker of choice for diagnosing acute myocardial infarction. Stakeholders highlighted that with high sensitivity troponin assays, approximately 90% of patients with acute myocardial infarction will have an elevated troponin level on arrival. The detection of acute myocardial infarction is highly important given the increase in mortality if untreated and correct and early diagnosis is important to direct appropriate treatment and improve outcomes. Identification of a troponin elevation enables early treatment and triage to an appropriate level of inpatient care. In addition, measurement of the initial troponin permits detection of a rise and/or fall of troponin on serial sampling, which is essential for the diagnosis of acute myocardial infarction. All patients should therefore undergo serial troponin testing unless peak symptoms were clearly greater than 12 hours prior to the initial test. Approximately 2% of patients with acute myocardial infarction have that diagnosis missed in the Emergency Department³. Those patients have a higher mortality than similar patients who received appropriate treatment.

Prior to the publication of CG95, troponin testing on arrival was not a standard of care in this country. However, with contemporary troponin assays, false positive troponin elevations (i.e. elevations that are not caused by an acute myocardial

³ Emergency Medicine Specialty Audit Group (EMSAG) [Cardiac chest pain CPI](#)

infarction) are common. The detection of a rise and/or fall on serial sampling is therefore essential to ensure that accurate diagnoses are made.

Making a diagnosis

The importance of making an accurate diagnosis in line with the universal definition of myocardial infarction was highlighted by stakeholders (definition outlined in the guideline recommendations below). Evidence from the UK was suggested that showed adoption of the internationally recommended diagnostic cut-off for acute myocardial infarction lead to mortality benefits for patients.

4.1.2 Selected recommendations from development source

Table 4 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 4 to help inform the Committee’s discussion.

Table 4 Specific areas for quality improvement

Suggested quality improvement area	Suggested source guidance recommendations
ECG	NICE CG95 Recommendations 1.2.2.1 (KPI) and 1.2.4.1
Cardiac Biomarkers	NICE CG95 Recommendations 1.2.4.1, 1.2.5.1 and 1.2.5.2
Making a diagnosis	NICE CG95 Recommendation 1.2.6.1

ECG

NICE CG95 – Recommendation 1.2.2.1 (key priority for implementation)

Take a resting 12-lead ECG as soon as possible. When people are referred, send the results to hospital before they arrive if possible. Recording and sending the ECG should not delay transfer to hospital.

NICE CG95 – Recommendation 1.2.4.1

Take a resting 12-lead ECG and a blood sample for troponin I or T measurement (see section 1.2.5) on arrival in hospital.

Cardiac Biomarkers

NICE CG95 – Recommendation 1.2.4.1

Take a resting 12-lead ECG and a blood sample for troponin I or T measurement (see section 1.2.5) on arrival in hospital.

NICE CG95 – Recommendation 1.2.5.1

Take a blood sample for troponin I or T measurement on initial assessment in hospital. These are the preferred biochemical markers to diagnose acute MI.

NICE CG95 – Recommendation 1.2.5.2

Take a second blood sample for troponin I or T measurement 10-12 hours after onset of symptoms.

Making a diagnosis

NICE CG95 – Recommendation 1.2.6.1

When diagnosing MI, use the universal definition of myocardial infarction⁴. This is the detection of rise and/or fall of cardiac biomarkers (preferably troponin) with at least one value above the 99th percentile of the upper reference limit, together with evidence of myocardial ischaemia with at least one of the following:

- symptoms of ischaemia
- ECG changes indicative of new ischaemia (new ST-T changes or new LBBB)
- development of pathological Q wave changes in the ECG
- imaging evidence of new loss of viable myocardium or new regional wall motion abnormality⁵.

The clinical classification of MI includes:

- Type 1: spontaneous MI related to ischaemia due to a primary coronary event such as plaque erosion and/or rupture, fissuring or dissection.
- Type 2: MI secondary to ischaemia due to either increased oxygen demand or decreased supply, such as coronary spasm, coronary embolism, anaemia, arrhythmias, hypertension, or hypotension.

4.1.3 Current UK practice

ECG

⁴ Thygesen K, Alpert JS, White HD et al. on behalf of the joint ESC/ACCF/AHA/WHF Task Force for the redefinition of myocardial infarction (2007). Universal definition of myocardial infarction. *Journal of the American College of Cardiology* 50: 2173–95.

⁵ The Guideline Development Group did not review the evidence for the use of imaging evidence of new loss of viable myocardium or new regional wall motion abnormality in the diagnosis of MI, but recognised that it was included as a criterion in the universal definition of MI. The Guideline Development Group recognised that it could be used, but would not be done routinely when there were symptoms of ischaemia and ECG changes

No published studies on current practice were highlighted for this suggested area for quality improvement; this area is based on stakeholder's knowledge and experience from local audit data.

Cardiac Biomarkers

Stakeholders reported that within the NHS, the current strategies for cardiac troponin testing can vary greatly, with some hospitals still reliant on a single measurement up to 12 hours post onset of symptoms and other hospitals using newer strategies based on high-sensitive troponins.

Making a diagnosis

As part of the engagement process the NHS commissioning board patient safety function (see separate patient safety report which outlines relevant patient safety issues for ACS) identified diagnostic error and delay as two areas for quality improvement. Data from the National Learning and Reporting System (NRLS) identified 16 reports of diagnostic error, 6 reported for ward areas and 10 from the emergency department. In three cases the patient was admitted following a collapse / fall and started on ACS regime, as determined by a raised troponin or on interpretation of ECG and later found to have suffered a cerebral bleed. Two cases where a patient was treated for ACS resulted in a GI bleed.

Diagnostic delay was reported in 9 cases, some of these were linked to delay in review between clinical teams in the emergency department and some issues related to poor documentation and handover.

Previous NRLS data submitted from 2008-2010 identified missed diagnosis of MI in the emergency department, primary care and mental health as areas with reported incidents. Failure to review ECGs, misinterpretation of ECGs and a lack of review by senior teams were all identified.

No published studies on current practice were highlighted for this suggested area for quality improvement; this area is based on stakeholder's knowledge and experience.

4.2 Risk assessment

4.2.1 Summary of suggestions

Assessment of risk of future adverse events (Unstable angina and NSTEMI)

Stakeholders highlighted the management of patients with ACS is dependent on effective risk stratification as all interventions subsequently recommended are done so on the basis of a specific risk which is in turn based on 6 month mortality.

The majority of patients who are admitted to hospital with a suspected acute coronary syndrome have non-threatening disease. It would not be cost-effective to investigate all of these patients with further investigations. Risk stratification at the time of admission is therefore necessary to identify those patients who are likely to require further investigation. Effective risk stratification will also facilitate judicious use of high dependency resources such as Coronary Care Units. Stakeholders highlighted the use of risk stratification has the potential to increase the cost efficacy of treatment by identifying patients most likely to benefit.

4.2.2 Selected recommendations from development source

Table 5 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 5 to help inform the Committee's discussion.

Table 5 Specific areas for quality improvement

Suggested quality improvement area	Selected source guidance recommendations
Assessment of risk of future adverse events (Unstable angina and NSTEMI)	NICE CG94 Recommendations 1.2.1 (KPI), 1.2.2, 1.2.3, 1.2.4 and 1.2.5

Assessment of risk of future adverse events (Unstable angina and NSTEMI)

NICE CG94 Recommendation 1.2.1

As soon as the diagnosis of unstable angina or NSTEMI is made, and aspirin and antithrombin therapy have been offered, formally assess individual risk of future adverse cardiovascular events using an established risk scoring system that predicts 6-month mortality (for example, Global Registry of Acute Cardiac Events [GRACE]).

NICE CG94 Recommendation 1.2.2

Include in the formal risk assessment:

- a full clinical history (including age, previous myocardial infarction [MI] and previous percutaneous coronary intervention [PCI] or coronary artery bypass grafting [CABG])
- a physical examination (including measurement of blood pressure and heart rate)
- resting 12-lead electrocardiography (ECG) (looking particularly for dynamic or unstable patterns that indicate myocardial ischaemia)
- blood tests (such as troponin I or T, creatinine, glucose and haemoglobin).

NICE CG94 Recommendation 1.2.3

Record the results of the risk assessment in the patient's care record.

NICE CG94 Recommendation 1.2.4

Use risk assessment to guide clinical management, and balance the benefit of a treatment against any risk of related adverse events in the light of this assessment.

NICE CG94 Recommendation 1.2.5

Use predicted 6-month mortality to categorise the risk of future adverse cardiovascular events as follows:

Predicted 6-month mortality	Risk of future adverse cardiovascular events
1.5% or below	Lowest
> 1.5 to 3.0%	Low
> 3.0 to 6.0%	Intermediate
> 6.0 to 9.0%	High
over 9.0%	Highest

4.2.3 Current UK practice

Stakeholders highlighted that there is limited national audit data on the performance of risk stratification on this group of people. Stakeholders agreed variation in practice across England and Wales is likely to be substantial.

Stakeholders reported the recommendation of the GRACE score represents a significant change to scoring used in many emergency departments to date (which previously used the TIMI risk score).

No published studies on current practice were highlighted for this suggested area for quality improvement; this area is based on stakeholder's knowledge and experience.

4.3 *Management of NSTEMI and Unstable angina*

4.3.1 Summary of suggestions

Antiplatelet therapy

Stakeholders highlighted that the discontinuation of clopidogrel treatment should be considered 5 days before CABG in patients who have a low risk of adverse cardiovascular events was important however no additional information was submitted.

Coronary angiography

Stakeholders highlighted there is good evidence that patients with proven non-STEMI should receive timely angiography in order to identify and treat anatomically remediable coronary artery lesions. This is important as patients are at risk of progressing to major MI if managed medically. Other outcomes were also reported including an impact on mortality/ morbidity and medical efficiency for example length of stay meaning the NHS has to spend more resources.

Revascularisation strategy

Stakeholders suggested the choice of revascularisation strategy, taking into account coronary angiographic findings, comorbidities and the benefits and risks of the different interventions and discussion at an MDT were both important areas.

Stakeholders specifically highlighted that patients with NSTEMI found to have occluded vessels at angiography should have some assessment of myocardial viability and of ischaemia before undergoing revascularisation. Stakeholders reported there is some evidence that late re-opening of occluded vessels may be, at best, unnecessary and, at worst, harmful. Revascularisation procedures whether PCI or CABG, should be offered to those patients most likely to derive benefit from them.

Additionally stakeholders highlighted patients with NSTEMI found to have multivessel disease at angiography should, where practical, have their test results discussed at an MDT prior to revascularisation. Important that revascularisation is appropriate for the patient's long-term outcome rather than treating presumed culprit vessel only. Revascularisation decisions for patients with stable symptoms are now often made at MDT but MDT process for acute patients may be less widespread.

4.3.2 Selected recommendations from development source

Table 6 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 6 to help inform the Committee's discussion.

Table 6 Specific areas for quality improvement

Suggested quality improvement area	Suggested source guidance recommendations
Antiplatelet therapy	NICE CG94 Recommendation 1.3.7
Coronary angiography	NICE CG94 Recommendation 1.5.1(KPI)
Revascularisation strategy	NICE CG94 Recommendations 1.5.4 and 1.5.5 (KPI)

Antiplatelet therapy

NICE CG94 – Recommendation 1.3.7

Consider discontinuing clopidogrel treatment 5 days before CABG in patients who have a low risk of adverse cardiovascular events

Coronary angiography

NICE CG94 – Recommendation 1.5.1

Offer coronary angiography (with follow-on PCI if indicated) within 96 hours of first admission to hospital to patients who have an intermediate or higher risk of adverse cardiovascular events (predicted 6-month mortality above 3.0%) if they have no contraindications to angiography (such as active bleeding or comorbidity). Perform angiography as soon as possible for patients who are clinically unstable or at high ischaemic risk.

Revascularisation strategy

NICE CG94 – Recommendation 1.5.4

When advising patients about the choice of revascularisation strategy (PCI or CABG), take account of coronary angiographic findings, comorbidities, and the benefits and risks of each intervention

NICE CG94 – Recommendation 1.5.5

When the role of revascularisation or the revascularisation strategy is unclear, resolve this by discussion involving an interventional cardiologist, cardiac surgeon and other healthcare professionals relevant to the needs of the patient. Discuss the choice of revascularisation strategy with the patient.

4.3.3 Current UK practice

Antiplatelet therapy

No published studies on current practice were highlighted for this suggested area for quality improvement; this area is based on stakeholder's knowledge and experience.

Coronary angiography

The frequency with which patients are referred for angiography for NSTEMI continues to rise from 47% in 2007/8 to 74% in 2012/13⁶. In England in 2012/13, 73% of NSTEMI patients were referred and in Wales 80% of patients were referred. Of those referred in England, 21% received angiography in 24 hours, 55% within 72 hours and 68% within 96 hours.

Revascularisation strategy

The BCIS PCI audit reported that 37% of people with NSTEMI receive PCI, a level that has remained constant since 2006⁷.

In England in 2012/13, 53% of NSTEMI patients were admitted to cardiac care unit or ward compared to 50% in 2011/12. In Wales 60% of patients were admitted compared to 65% in 2011/12. MINAP data shows that in England 94% of NSTEMI patient were seen by a cardiologist or member of their team and in Wales, 83% were seen⁸.

⁶ [How the NHS cares for patients with heart attack. Annual public report April 2012–March 2013.](#) Myocardial Ischaemia National Audit Project (MINAP) (2013).

⁷ [National audit of percutaneous coronary interventional procedures. Annual report 2011.](#) British Cardiovascular Intervention Society (2013).

⁸ [How the NHS cares for patients with heart attack. Annual public report April 2012–March 2013.](#) Myocardial Ischaemia National Audit Project (MINAP) (2013).

4.4 Management of STEMI

4.4.1 Summary of suggestions

Eligibility for PPCI

Stakeholders suggested delivery of PPCI for patients with return of circulation following out-of-hospital cardiac arrest caused by suspected acute myocardial infarction. There is good evidence that patients who have had out-of-hospital cardiac arrest with return of circulation due to suspected AMI have a better outcome when taken directly to a centre capable of performing PPCI.

Timely PPCI

Stakeholders highlighted there is good evidence that patients with STEMI eligible for PPCI should receive this therapy as quickly as possible, earlier reperfusion can lead to a better prognosis. Reduction in treatment delays would be expected to lead to improved outcomes. The timings recommended in guidance should be achievable for all patients, not only during the working day but also at night and weekends.

Rescue PCI

Stakeholders suggested rescue PCI for people treated with fibrinolysis. Patients with STEMI treated with fibrinolysis are a relatively small and diminishing group nevertheless it is still felt to be important.

4.4.2 Selected recommendations from development source

Table 7 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 7 to help inform the Committee's discussion.

Table 7 Specific areas for quality improvement

Suggested quality improvement area	Suggested source guidance recommendations
Eligibility for PPCI	NICE CG167 Recommendations 1.1.1 (KPI), 1.1.2 (KPI) and 1.1.20 (KPI)
Timely PPCI	NICE CG167 Recommendation 1.1.3 (KPI) and 1.1.4 (KPI)
Rescue PCI	NICE CG167 Recommendation 1.1.16 (KPI)

Eligibility for PPCI

NICE CG167 – Recommendation 1.1.1

Immediately assess eligibility (irrespective of age, ethnicity or sex) for coronary reperfusion therapy (either primary percutaneous coronary intervention [PCI] or fibrinolysis) in people with acute ST-elevation myocardial infarction (STEMI).

NICE CG167 – Recommendation 1.1.2

Do not use level of consciousness after cardiac arrest caused by suspected acute STEMI to determine whether a person is eligible for coronary angiography (with follow-on primary PCI if indicated).

NICE CG167 – Recommendation 1.1.20

When commissioning primary PCI services for people with acute STEMI, be aware that outcomes are strongly related to how quickly primary PCI is delivered, and that they can be influenced by the number of procedures carried out by the primary PCI centre.

Timely PPCI

NICE CG167 – Recommendation 1.1.3

Deliver coronary reperfusion therapy (either primary PCI or fibrinolysis) as quickly as possible for eligible people with acute STEMI.

NICE CG167 – Recommendation 1.1.4

Offer coronary angiography, with follow-on primary PCI if indicated, as the preferred coronary reperfusion strategy for people with acute STEMI if:

- presentation is within 12 hours of onset of symptoms **and**
- primary PCI can be delivered within 120 minutes of the time when fibrinolysis could have been given.

Rescue PCI

NICE CG167 – Recommendation 1.1.16

Offer an electrocardiogram to people treated with fibrinolysis, 60–90 minutes after administration. For those who have residual ST-segment elevation suggesting failed coronary reperfusion:

- offer immediate coronary angiography, with follow-on PCI if indicated
- do not repeat fibrinolytic therapy

4.4.3 Current UK practice

Eligibility for PPCI

Data published in the recent MINAP Report by a centre performing PPCI post cardiac arrest in all patients suspected of AMI reports survival of approximately 60% compared with national survival rates of 2-10% in this population⁹.

The delivery of patients following cardiac arrest to heart attack centres is very variable in the UK at present; MINAP does not yet systematically report this data. Stakeholders report that networks and protocols are being developed in the UK to facilitate the delivery of patients post cardiac arrest to heart attack centres for PPCI.

Timely PPCI

The timely delivery of PPCI has been improving over the last decade as reported by MINAP¹⁰ but does still not reach the standards universally and is variable between regions.

Of those people treated with PPCI, 92% of eligible patients in England and 85% in Wales received it within 90 minutes of arrival at hospital¹¹ and 82% of eligible patients in England and 70% in Wales were treated with PPCI within 150 minutes of calling for professional help. The proportion achieving the more stringent call-to-balloon time, of treatment within 120 minutes of the call for help, was 60% in England and 48% in Wales.

The proportion receiving PPCI within 150 minutes of calling for help was 87% for those transported directly to Heart Attack Centre in England (compared with 56% for those who were transferred to the Heart Attack Centre following initial assessment in another hospital). The equivalent value in Wales was 76% for those directly transported and 18% for those transferred from other hospitals. There are particular issues when inter-hospital transfer is required for patients that do not present directly to a heart attack centre.

Considering the provision of PPCI at the Local Area Team Level, the percentage of patients that received PPCI ranged between 49% and 83%. In the two Welsh cardiac networks, 8% and 69% of patients received PPCI.

⁹ [How the NHS cares for patients with heart attack. Annual public report April 2012–March 2013.](#) Myocardial Ischaemia National Audit Project (MINAP) (2013).

¹⁰ [How the NHS cares for patients with heart attack. Annual public report April 2012–March 2013.](#) Myocardial Ischaemia National Audit Project (MINAP) (2013).

¹¹ [How the NHS cares for patients with heart attack. Annual public report April 2012–March 2013.](#) Myocardial Ischaemia National Audit Project (MINAP) (2013).

The BCIS PCI audit reported that 60% of centres offer a 24/7 service¹².

There is evidence of variation in the 'timeliness' of PPCI across the country, partly reflecting variation in access to PPCI services (for example by restricted hours PPCI services). Reduction in treatment delays would be expected to lead to improved outcomes.

Rescue PCI

The use of thrombolytic treatment has been declining over a number of years. Currently only 5% of patients with STEMI receive thrombolytic treatment and occurs mainly in those few areas where timely access to PPCI is not available.

The use of angiography for patients with STEMI who did not receive PPCI but instead received thrombolytic treatment or had no treatment has steadily risen from approximately 55% in 2007/8 to nearly 70% in 2012/13¹³.

¹² [National audit of percutaneous coronary interventional procedures. Annual report 2011.](#) British Cardiovascular Intervention Society (2013).

¹³ [How the NHS cares for patients with heart attack. Annual public report April 2012–March 2013.](#) Myocardial Ischaemia National Audit Project (MINAP) (2013).

4.5 Functional assessment

4.5.1 Summary of suggestions

Stakeholders suggested patients with STEMI who have residual lesions not treated at the initial procedures should have a functional assessment (stress MR, stress echo, stress perfusion scan) within a given period of time (?4 weeks). Patients with STEMI may have acute lesion treated and may then be lost to follow-up or placed on a long waiting list for review. Patients are at risk of further events. It was highlighted that this applies to approximately 30% of PPCI patients.

Stakeholders also suggested access to perfusion scintigraphy (MPS) for the assessment of ischaemic burden in patients post ACS. MPS is recommended for the management of patients with known and suspected coronary heart disease. MPS has been shown to be useful for the assessment of patients with suspected ACS, especially in hospitals that do not have access to immediate coronary interventional facilities or in patients deemed to be unsuitable for angiography.

4.5.2 Selected recommendations from development source

Table 8 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 8 to help inform the Committee's discussion.

Table 8 Specific areas for quality improvement

Suggested quality improvement area	Suggested source guidance recommendations
Functional assessment	NICE CG94 Recommendation 1.5.6 (KPI) NICE CG95 Recommendation 1.3.6.1

NICE CG94 – Recommendation 1.5.6

To detect and quantify inducible ischaemia, consider ischaemia testing before discharge for patients whose condition has been managed conservatively and who have not had coronary angiography.

NICE CG95 – Recommendation 1.3.6.1

When offering non-invasive functional imaging for myocardial ischaemia use:

- myocardial perfusion scintigraphy with single photon emission computed tomography (MPS with SPECT) **or**
- stress echocardiography **or**

- first-pass contrast-enhanced magnetic resonance (MR) perfusion **or**
- MR imaging for stress-induced wall motion abnormalities.

Take account of locally available technology and expertise, the person and their preferences, and any contraindications when deciding on the imaging method. [This recommendation updates and replaces recommendation 1.1 of Myocardial perfusion scintigraphy for the diagnosis and management of angina and myocardial infarction (NICE technology appraisal guidance 73)].

4.5.3 Current UK practice

Stakeholders reported access to timely and high quality MPS services in the UK is variable.

No other published studies on current practice were highlighted for this suggested area for quality improvement; this area is based on stakeholder's knowledge and experience.

4.6 Review

4.6.1 Summary of suggestions

Specialty review

Stakeholders suggested specialty review as it was reported there was good evidence that too many people are admitted via the emergency department with suspected ACS and receive inappropriate ACS medication. This can lead to an increased risk of bleeding and death. Stakeholders highlighted that it is not uncommon for patients to sit on an admissions ward for several days or longer before they get specialty review. Early specialty review is reported to reduce unnecessary medication and reduce length of stay. It would also ensure that patients are put on correct pathway i.e. PCI earlier in their spell and meet Keogh recommendations on 7/7 working.

Training and cardiogenic shock

Stakeholders highlighted that cardiogenic shock is responsible for most of ACS mortality and yet patients are often cared in environments which may not have the skills or expertise. Specialist care and interventions are therefore very important.

Organisational responsibility

Stakeholders highlighted that the benefits to be derived from excellent clinical, procedural and technical guidance and advice can only be gained if the organisation(s) responsible for delivering it firstly; take ownership of the process and all of the operational and administrative arrangements involved in its implementation; are able to command the resources necessary for their delivery, and have or can configure the resources – human, organisational, locational and physical that are required for that delivery.

4.6.2 Selected recommendations from development source

Table 9 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 9 to help inform the Committee's discussion.

Table 9 Specific areas for quality improvement

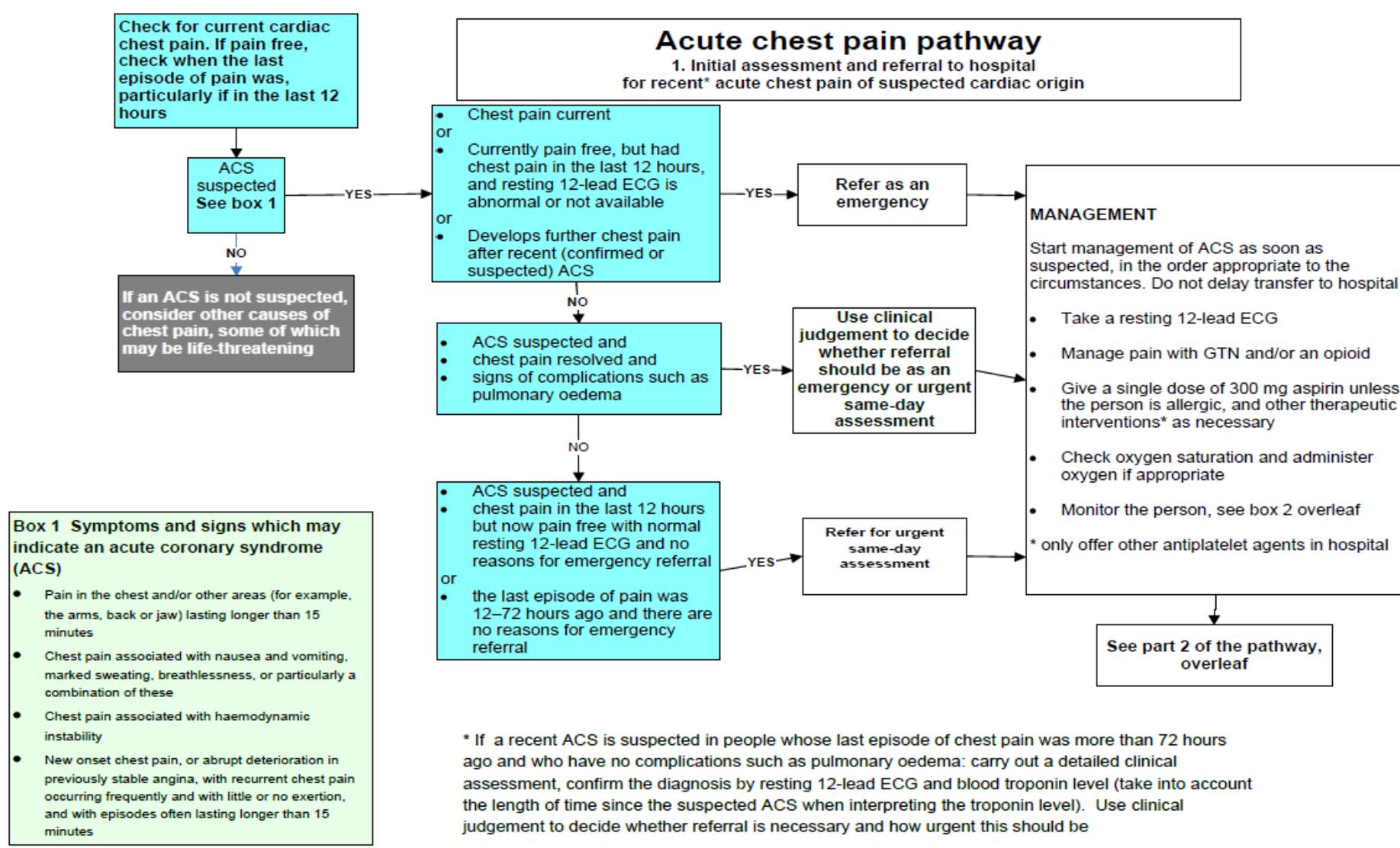
Suggested quality improvement area	Suggested source guidance recommendations
Specialty review	No recommendations in the source guidance

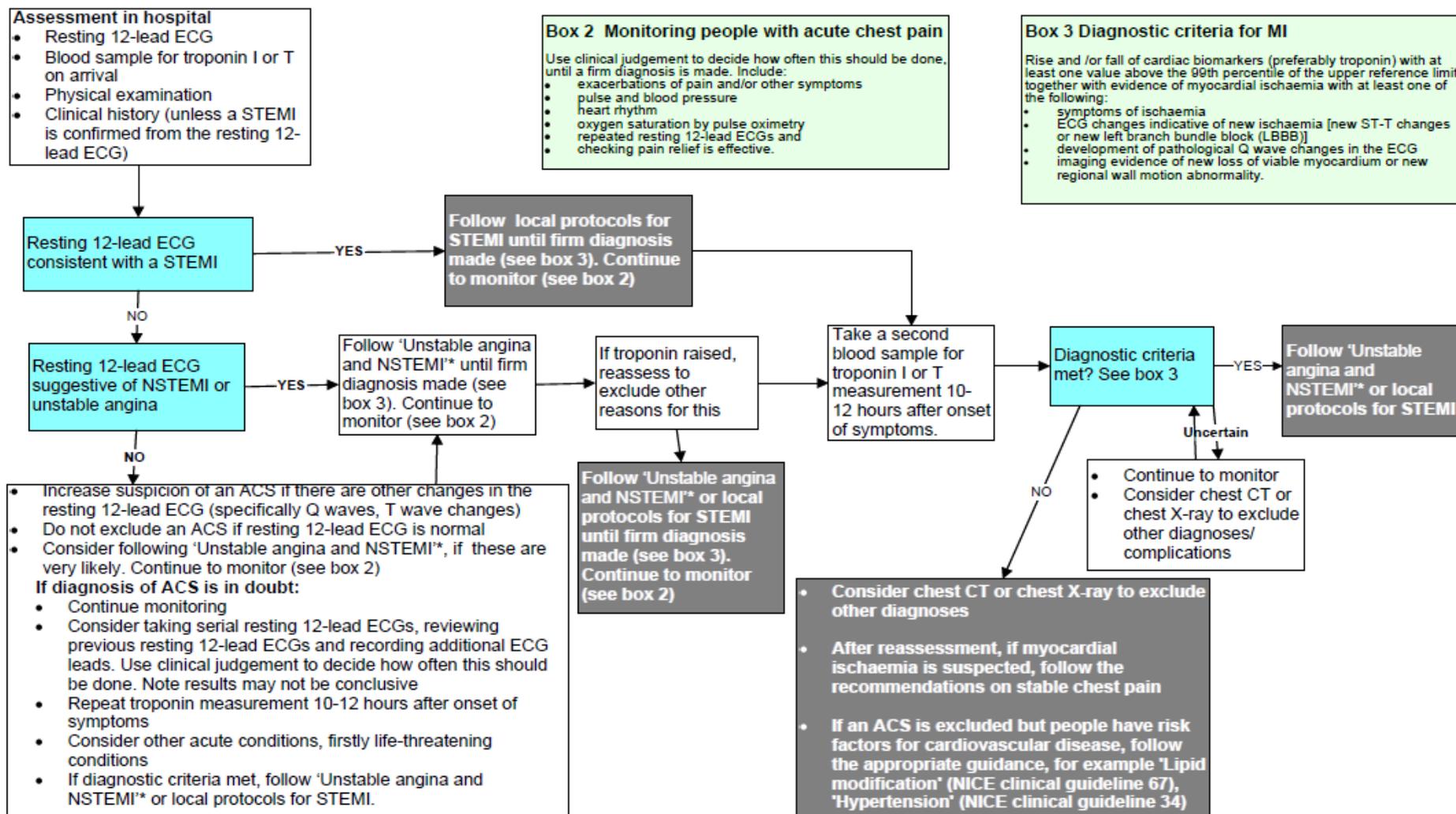
Training and cardiogenic shock	No recommendations in the source guidance
Organisational responsibility	No recommendations in the source guidance

4.6.3 Current UK practice

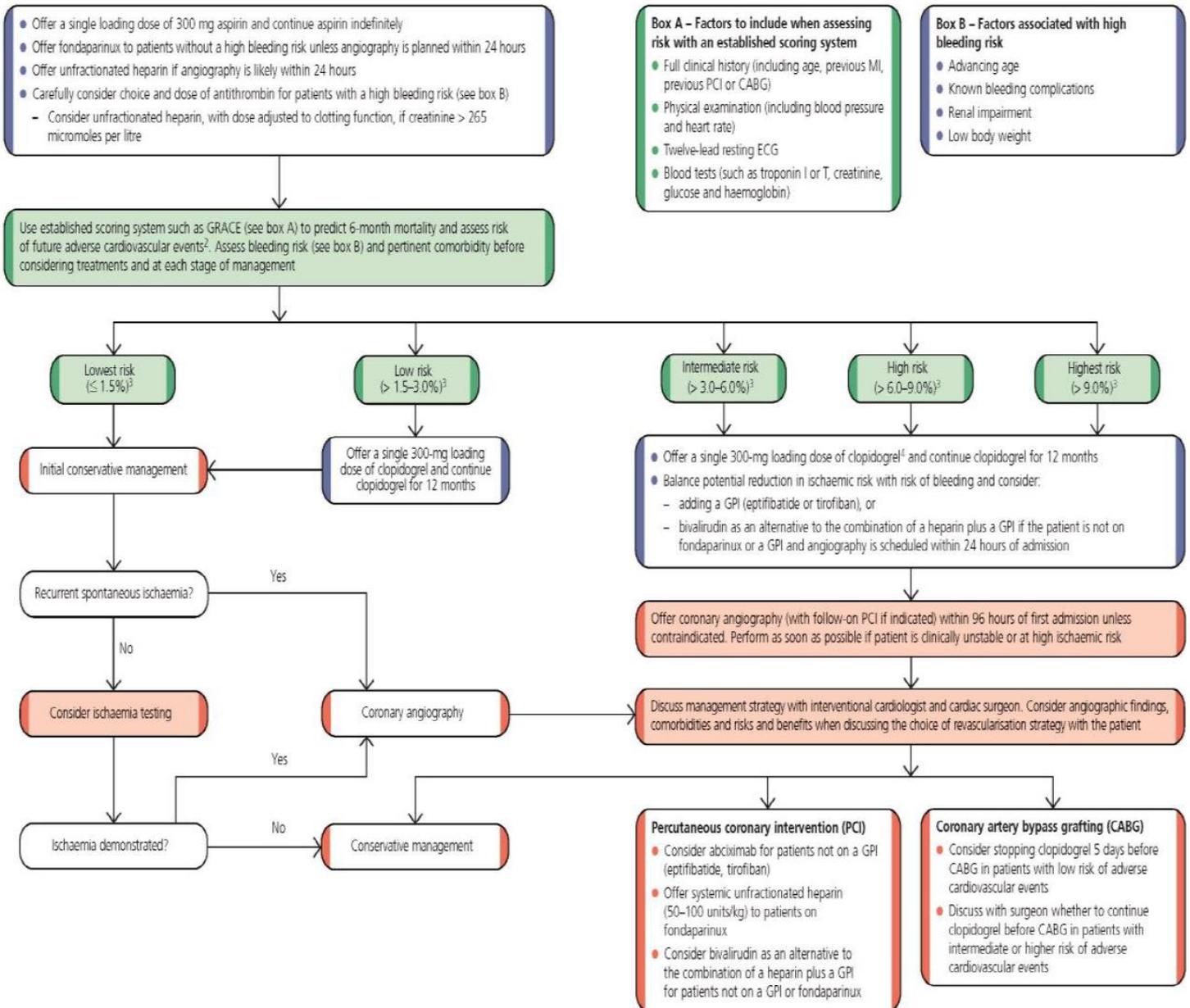
No published studies on current practice were highlighted for this suggested area for quality improvement; this area is based on stakeholder's knowledge and experience.

Appendix 1: Acute chest pain care pathway

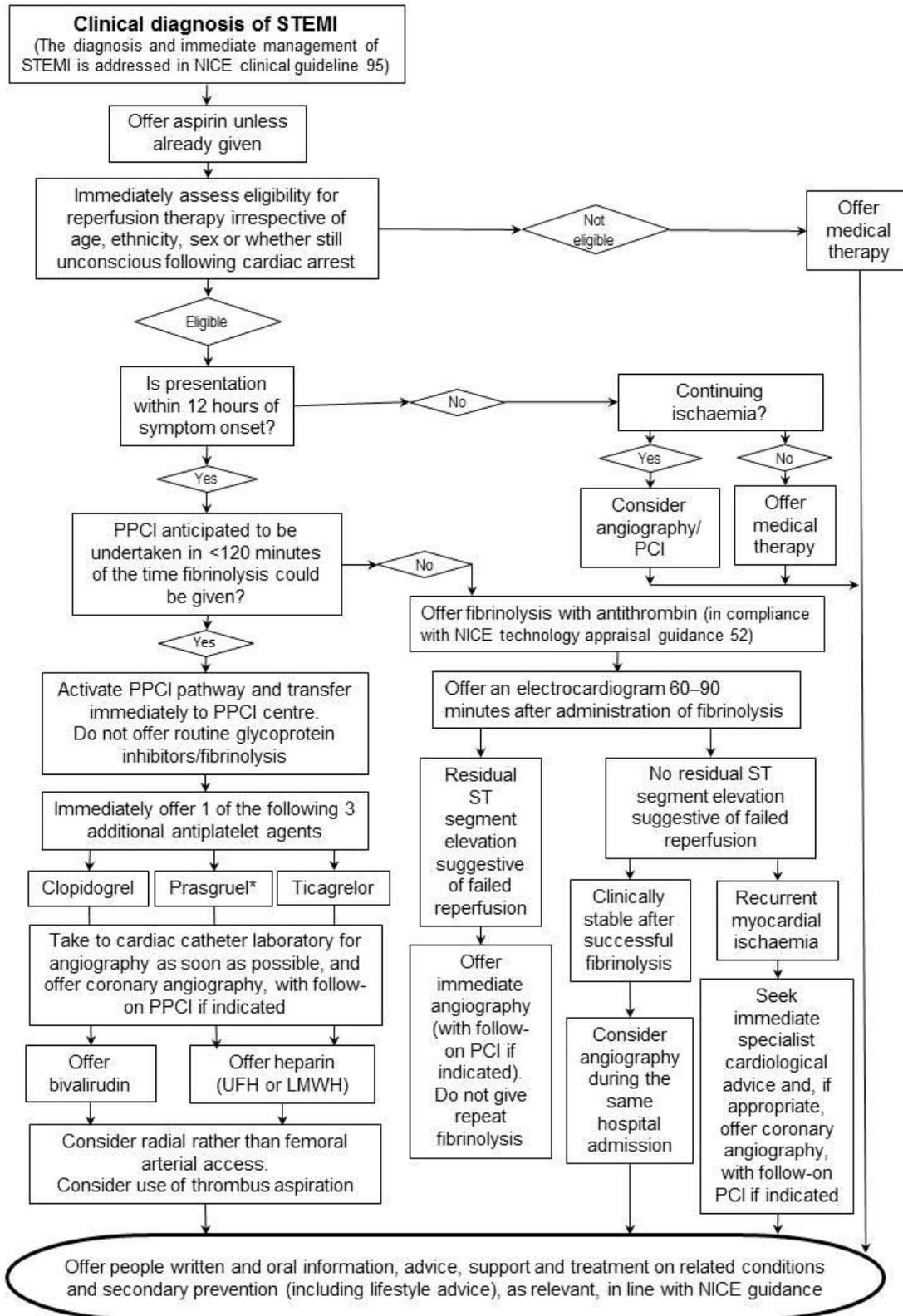




Appendix 2: Early management of unstable angina and NSTEMI pathway



Appendix 3: Management of STEMI pathway



Appendix 4: Key priorities for implementation (CG95)

Recommendations that are key priorities for implementation in the source guideline and that have been referred to in the main body of this report are highlighted in grey.

Presentation with acute chest pain

- Take a resting 12-lead electrocardiogram (ECG) as soon as possible. When people are referred, send the results to hospital before they arrive if possible. Recording and sending the ECG should not delay transfer to hospital.
- Do not exclude an acute coronary syndrome (ACS) when people have a normal resting 12-lead ECG.
- Do not routinely administer oxygen, but monitor oxygen saturation using pulse oximetry as soon as possible, ideally before hospital admission. Only offer supplemental oxygen to:
 - people with oxygen saturation (SpO₂) of less than 94% who are not at risk of hypercapnic respiratory failure, aiming for SpO₂ of 94–98%
 - people with chronic obstructive pulmonary disease who are at risk of hypercapnic respiratory failure, to achieve a target SpO₂ of 88–92% until blood gas analysis is available.
- Do not assess symptoms of an ACS differently in ethnic groups. There are no major differences in symptoms of an ACS among different ethnic groups.

Appendix 5: Key priorities for implementation (CG94)

Recommendations that are key priorities for implementation in the source guideline and that have been referred to in the main body of this report are highlighted in grey.

- As soon as the diagnosis of unstable angina or NSTEMI is made, and aspirin and antithrombin therapy have been offered, formally assess individual risk of future adverse cardiovascular events using an established risk scoring system that predicts 6-month mortality (for example, Global Registry of Acute Cardiac Events [GRACE]).
- Consider intravenous eptifibatide or tirofiban² as part of the early management for patients who have an intermediate or higher risk of adverse cardiovascular events (predicted 6-month mortality above 3.0%), and who are scheduled to undergo angiography within 96 hours of hospital admission.
- Offer coronary angiography (with follow-on PCI if indicated) within 96 hours of first admission to hospital to patients who have an intermediate or higher risk of adverse cardiovascular events (predicted 6-month mortality above 3.0%) if they have no contraindications to angiography (such as active bleeding or comorbidity). Perform angiography as soon as possible for patients who are clinically unstable or at high ischaemic risk.
- When the role of revascularisation or the revascularisation strategy is unclear, resolve this by discussion involving an interventional cardiologist, cardiac surgeon and other healthcare professionals relevant to the needs of the patient. Discuss the choice of revascularisation strategy with the patient.
- To detect and quantify inducible ischaemia, consider ischaemia testing before discharge for patients whose condition has been managed conservatively and who have not had coronary angiography.
- Before discharge offer patients advice and information about:
 - their diagnosis and arrangements for follow-up (in line with 'MI: secondary prevention', NICE clinical guideline 48)
 - cardiac rehabilitation (in line with 'MI: secondary prevention', NICE clinical guideline 48)
 - management of cardiovascular risk factors and drug therapy for secondary prevention (in line with 'MI: secondary prevention', NICE clinical guideline 48, and 'Lipid modification', NICE clinical guideline 67)
 - lifestyle changes (in line with 'MI: secondary prevention', NICE clinical guideline 48).

Appendix 6: Key priorities for implementation (CG167)

Recommendations that are key priorities for implementation in the source guideline and that have been referred to in the main body of this report are highlighted in grey.

- Immediately assess eligibility (irrespective of age, ethnicity or sex) for coronary reperfusion therapy (either primary percutaneous coronary intervention [PCI] or fibrinolysis) in people with acute ST-elevation myocardial infarction (STEMI).
- Do not use level of consciousness after cardiac arrest caused by suspected acute STEMI to determine whether a person is eligible for coronary angiography (with follow-on primary PCI if indicated).
- Deliver coronary reperfusion therapy (either primary PCI or fibrinolysis) as quickly as possible for eligible people with acute STEMI.
- Offer coronary angiography, with follow-on primary PCI if indicated, as the preferred coronary reperfusion strategy for people with acute STEMI if:
 - presentation is within 12 hours of onset of symptoms **and**
 - primary PCI can be delivered within 120 minutes of the time when fibrinolysis could have been given.
- Offer fibrinolysis to people with acute STEMI presenting within 12 hours of onset of symptoms if primary PCI cannot be delivered within 120 minutes of the time when fibrinolysis could have been given.
- Consider coronary angiography, with follow-on primary PCI if indicated, for people with acute STEMI presenting more than 12 hours after the onset of symptoms if there is evidence of continuing myocardial ischaemia.
- Offer coronary angiography, with follow-on primary PCI if indicated, to people with acute STEMI and cardiogenic shock who present within 12 hours of the onset of symptoms of STEMI.
- Offer an electrocardiogram to people treated with fibrinolysis, 60–90 minutes after administration. For those who have residual ST-segment elevation suggesting failed coronary reperfusion:
 - offer immediate coronary angiography, with follow-on PCI if indicated
 - do not repeat fibrinolytic therapy.
- If a person has recurrent myocardial ischaemia after fibrinolysis, seek immediate specialist cardiological advice and, if appropriate, offer coronary angiography, with follow-on PCI if indicated.

- When commissioning primary PCI services for people with acute STEMI, be aware that outcomes are strongly related to how quickly primary PCI is delivered, and that they can be influenced by the number of procedures carried out by the primary PCI centre.

Appendix 7: Glossary

Acute chest pain: Chest pain / discomfort which has occurred recently and may still be present, is of suspected cardiac origin and which may be due to acute myocardial infarction or unstable angina

Cardiac biomarkers: An objective measure of an indicator of a normal biologic process, a pathogenic process, or pharmacologic response to a therapeutic intervention.

Coronary angiography: An invasive diagnostic test which provides anatomical information about the degree of stenosis (narrowing) in a coronary artery. It involves manipulation of cardiac catheters from an artery in the arm or top of the leg. A contrast medium is injected into the coronary arteries, and the flow of contrast in the artery is monitored by taking a rapid series of X-rays. It is considered the 'gold standard' for providing anatomical information and defining the site and severity of coronary artery lesions (narrowing's).

Coronary artery bypass graft (CABG): A surgical procedure used to treat coronary heart disease. The procedure involves taking a blood vessel from another part of the body, usually the chest or leg, and attaching it to the coronary artery above and below the narrowed area or blockage. This new blood vessel is known as a graft and improves blood flow and oxygen supply to the heart.

ECG: A test to record the rhythm and electrical activity of the heart. The ECG can often show if a person has had a heart attack, either recently or some time ago. It can also tell if reperfusion therapy is appropriate and if it has been effective¹⁴.

Myocardial perfusion scintigraphy with SPECT (MPS): MPS involves injecting small amounts of radioactive tracer to evaluate perfusion of the myocardium via the coronary arteries at stress and at rest. The distribution of the radioactive tracer is imaged using a gamma camera. In SPECT the camera rotates round the patient and the raw data processed to obtain tomographic images of the myocardium. Cardiovascular stress may be induced by either pharmacological agents or exercise.

Percutaneous coronary intervention (PCI): A technique to re-open the blocked coronary artery. A fine catheter (tube) is passed, under local anaesthetic, from an artery in the leg or arm into the blocked heart artery. A thin wire is then passed through the catheter and across the blockage, allowing the artery to be re-opened by temporary inflation of a balloon. Once the artery has been re-opened and widened by a balloon, it is usually scaffolded by the implementation of a small expandable metal tube (stent) which is passed into the artery and deployed with an angioplasty

¹⁴ [National audit of percutaneous coronary interventional procedures. Annual report 2011](#). British Cardiovascular Intervention Society (2013).

balloon. The umbrella term that encompasses both balloon dilation (angioplasty) and stent insertion (stenting) is PCI¹⁵.

¹⁵ [National audit of percutaneous coronary interventional procedures. Annual report 2011](#). British Cardiovascular Intervention Society (2013).

Appendix 8: Suggestions from stakeholder engagement exercise

ID	Stakeholder	Suggested key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
Diagnosis - ECG					
001	The College of Emergency Medicine	All patients with symptoms compatible with an acute coronary syndrome should have a 12-lead electrocardiogram (ECG) recorded within 10 minutes of first medical contact (either arrival in the Emergency Department or first contact with pre-hospital emergency medical services)	The 12-lead ECG is the diagnostic test of first choice for diagnosing ST elevation myocardial infarction (STEMI). Patients with STEMI derive a mortality benefit from immediate revascularisation (percutaneous coronary intervention or thrombolysis), which should be achieved within 90 minutes of first medical contact. Early diagnosis is essential to facilitate this. In addition, there is evidence that recording of the ECG within 10 minutes of arrival is associated with reductions in (unadjusted) mortality even in patients without ST elevation.	Published data and data from the Greater Manchester Cardiac and Stroke Network show that Emergency Departments currently fail to hit the 10-minute target in the majority of cases. Only 33% of high risk patients without ST elevation had an ECG recorded within 10 minutes of arrival in the Emergency Department in a cohort of 63,478 patients. Women were more likely than men to experience delays in the recording of the initial ECG. Local audit data provided by the Emergency Medicine Specialty Audit Group (EMSAG) also demonstrate deficiencies in this area, with Trusts achieving the 10-minute door to ECG target on only 19 to 68% of occasions.	Please see the following cohort study of 63,478 patients from Diercks et al: http://www.ncbi.nlm.nih.gov/pubmed/16461033 We also have data provided by Greater Manchester Cardiac and Stroke Network, January 2013, which can be forwarded upon request Please also refer to the European Society of Cardiology guideline for the management of ST elevation myocardial infarction: http://www.escardio.org/guidelines-surveys/esc-guidelines/GuidelinesDocuments/Guidelines_AMI_STE_MI.pdf Data provided regarding 6 audits of Cardiac Chest Pain between August 2010 and April 2012 by the Emergency Medicine Specialty Audit Group

ID	Stakeholder	Suggested key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
					(EMSAG) in a personal communication (available on request)
002	East Midlands Ambulance Service	Acute Coronary Syndrome (Including myocardial infarction)	<p>Including in this concern is a group of patients who seem to be overlooked. It is the 14 to 35 year olds. These proposed guidelines are more for the coronary artery, lifestyle and aged reasons for coronary syndromes.</p> <p>The younger generation may have congenital inherited or acquired cardiac conditions which are usually only detected in screening or sudden death.</p>	<p>12 young adults die each week due to undiagnosed cardiac conditions and although most of the are not coronary syndromes it may be good to either include them or consider a separate guidelines to cover this. NICE Guidelines CG 109 (Transient Loss of Consciousness) and CG 95 (chest pains of recent onset) cover some of this but I think it needs a cross guidelines approach to include younger patients with conditions such as Marfan's or premature coronary artery disease as not everyone collapses and do not fit the CG 109 Guidelines The ambulance service historically have concentrated on elderly screening and routinely take ECGs on cardiac or chest pains. This should extend to the 14-35 year olds. There is a need for the frontline services to have a big part of this prevention and detection process.</p>	<p>ECGs should be taken for each patient complaining of chest pains and a copy should be retained and complying to the data protection act should be analysed by a cardiac specialist.</p> <p>I am conducting an ECG Evaluation pilot project in partnership with EMAS (East Midlands Ambulance Service) and CRY (Cardiac Risk in the Young) where ECGs are taken by ambulance frontline staff from any chest pains or collapse aged between 14 to 35 that they attend. A copy of the ECG is forwarded to a specialist cardiologist for review. If any ECG shows concern, the patient can be contacted via EMAS. This would be a cost effective way of screening and would reduce the</p>

ID	Stakeholder	Suggested key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
					incidences of sudden death, increase lifelong earnings and in return contributions to society and taxes.
Diagnosis – Cardiac Biomarkers					
003	The College of Emergency Medicine	Patients with suspected acute coronary syndrome should have cardiac troponin measured in a peripheral blood sample at the time of arrival in hospital.	Cardiac troponin is the biomarker of choice for diagnosing acute myocardial infarction. With contemporary high sensitivity troponin assays, approximately 90% of patients with acute myocardial infarction will have an elevated troponin level on arrival. Identification of a troponin elevation enables early treatment and triage to an appropriate level of inpatient care. In addition, measurement of the initial troponin permits detection of a rise and/or fall of troponin on serial sampling, which is essential for the diagnosis of acute myocardial infarction	NICE guideline CG95 recommends troponin testing on arrival for all patients. Prior to this guidance, troponin testing on arrival was not a standard of care in this country. However, with contemporary troponin assays, false positive troponin elevations (i.e. elevations that are not caused by an acute myocardial infarction) are common. The detection of a rise and/or fall on serial sampling is therefore essential to ensure that accurate diagnoses are made.	Please refer to the following papers for the diagnostic accuracy of high sensitivity troponin on arrival: http://www.nejm.org/doi/full/10.1056/NEJMoa0900428 and http://www.nejm.org/doi/full/10.1056/NEJMoa0903515 Please refer to the following paper for the universal diagnostic criteria for acute myocardial infarction, which emphasise the centrality of the detection of a rise and/or fall of troponin to the diagnosis of acute myocardial infarction: http://www.escardio.org/guidelines-surveys/esc-guidelines/GuidelinesDocuments/Guidelines_Univ_Def_Myocardial_Infarct_FT.pdf Please refer to the following paper highlighting the

ID	Stakeholder	Suggested key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
					importance of quantifying the rise and/or fall of troponin on serial sampling to diagnose acute myocardial infarction: http://www.ncbi.nlm.nih.gov/pubmed/22203537
004	The College of Emergency Medicine	Patients who present within 12 hours of their latest symptoms should undergo serial troponin testing [timing to be dictated by NICE Diagnostics Advisory Committee; guidance due September 2013]	At less than 12 hours from symptom onset, the sensitivity of troponin testing at the time of admission is imperfect (approximately 90% even with a high sensitivity assay). The detection of acute myocardial infarction is highly important given the increase in mortality if untreated. All patients should therefore undergo serial troponin testing unless peak symptoms were clearly greater than 12 hours prior to the initial test.	Approximately 2% of patients with acute myocardial infarction have that diagnosis missed in the Emergency Department. Those patients have a higher mortality than similar patients who received appropriate treatment. NICE guideline CG95, the European Society of Cardiology guideline and the Third Universal Definition of Myocardial Infarction all recommend serial troponin testing.	The timing of serial testing for high sensitivity troponin is currently being evaluated by NICE (http://guidance.nice.org.uk/DT/18), which is due to report in October 2014. Current NICE guidance (CG95) recommends troponin testing 10-12 hours after symptom onset. There is evidence that it may be possible to exclude acute myocardial infarction at an earlier timepoint, although cost-effectiveness has not yet been established: http://www.nejm.org/doi/full/10.1056/NEJMoa0903515 Please see this reference demonstrating the incidence of missed acute myocardial infarction and prognostic

ID	Stakeholder	Suggested key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
					implications: http://www.nejm.org/doi/full/10.1056/NEJM200004203421603
005	Roche Diagnostics Ltd	Cardiac troponin testing strategies for people with acute chest pain.	Correct and early diagnosis of acute MI is important to direct appropriate treatment and improve outcomes for patients.	Within the NHS, the current strategies for cardiac troponin testing can vary greatly, with some hospitals still reliant on a single measurement up to 12 hours post onset of symptoms and other hospitals using newer strategies based on high-sensitive troponins. The current NICE recommendations for troponin testing in CG 95 (recommending 2 tests) are currently scheduled for update due to new evidence identified regarding the use of high-sensitive troponins. The NICE diagnostic assessment programme is currently producing guidance on high-sensitivity troponin for the early rule out or diagnosis of acute MI in people with acute chest pain.	<ul style="list-style-type: none"> - CG 95, guideline review documents (at http://guidance.nice.org.uk/CG95). - Scoping documents for NICE diagnostic assessment programme on high-sensitivity troponin for the early rule out or diagnosis of acute MI in people with acute chest pain (at http://guidance.nice.org.uk/DT/18)
Diagnosis – Making a diagnosis					
006	The College of Emergency Medicine	Acute myocardial infarction should be diagnosed according to	The Third Universal Definition of Myocardial Infarction is an international expert consensus	There is now evidence from the UK that adoption of the internationally recommended	See the papers by Mills et al: http://www.ncbi.nlm.nih.gov/

ID	Stakeholder	Suggested key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
		the Third Universal Definition, which necessitates detection of a rise and/or fall of cardiac troponin with at least one level above the 99 th percentile of a healthy reference population in the appropriate clinical context.	<p>guideline advocated by the European Society of Cardiology and American Heart Association. The guideline states the following criteria are sufficient to make a diagnosis of acute myocardial infarction:</p> <p>* Detection of a rise and/or fall of cardiac biomarker values [preferably cardiac troponin (cTn)] with at least one value above the 99th percentile upper reference limit (URL) and with at least one of the following:</p> <p>(a) Symptoms of ischaemia. (b) New or presumed new significant ST-segment–T wave (ST–T) changes or new left bundle branch block (LBBB). (c) Development of pathological Q waves in the ECG. (d) Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality. (e) Identification of an intracoronary thrombus by angiography or autopsy.</p>	diagnostic cut-off for acute myocardial infarction leads to mortality benefits for patients. Indeed, Mills et al clearly demonstrated that, prior to adopting this cut-off, patients with small troponin elevations had a disproportionately high mortality compared to those with larger elevations. This disparity was corrected once clinical protocols were changed to be more in accordance with the Universal Definition of Myocardial Infarction.	pubmed/21427373 and http://www.ncbi.nlm.nih.gov/pubmed/22422871
Risk assessment					
007	SCM1	Formal risk stratification of patients with unstable	The management of patients with acute coronary syndromes is	There is limited national audit data on the performance of risk	NICE CG94: http://www.nice.org.uk/nice

ID	Stakeholder	Suggested key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
		angina and non-STEMI	dependent on effective risk stratification. NICE CG94 recommends the use of the GRACE score which predicts 6 month mortality. Indeed, all interventions subsequently recommended in CG94 are done so on the basis of a specific risk which is in turn based on 6 month mortality.	stratification on this group of patients. The recommendation of the GRACE score represents a significant change to scoring used in many emergency departments to date (which previously used the TIMI risk score). Local data from my Emergency Department indicates that documented risk stratification using GRACE scoring is variable and it is highly likely that this reflects the wider situation in the UK.	media/live/12949/47921/47921.pdf For information on the GRACE Score please see the following link: http://www.outcomes-umassmed.org/grace/
008	The College of Emergency Medicine	Patients presenting to hospital with suspected acute coronary syndrome should be formally risk stratified using a validated tool to (a) determine the appropriate level of care within the hospital; and (b) establish whether the patient will require further inpatient investigation and/or treatment even if cardiac troponin levels are normal.	Unstable angina is an acute coronary syndrome without evidence of myocardial necrosis, i.e. without a troponin rise and/or fall. These patients have plaque rupture and/or erosion that may progress to acute myocardial infarction in the near future if untreated. Diagnosis relies on clinical judgement and further investigation such as functional imaging of the myocardium, coronary CT scanning or coronary angiography. The majority of patients who are admitted to hospital with a suspected acute coronary syndrome have non-	NICE guideline CG94 (Acute Coronary Syndromes) recommends that patients should be risk stratified using a tool that has been validated to predict 6 month mortality. Although there is as yet no published evidence, variation in practice across England and Wales is still likely to be substantial. Data from the Emergency Medicine Specialty Audit Group from 2010 to 2012 shows that Emergency Departments currently underperform in this area with substantial variation in	There are many validated algorithms for risk stratification of undifferentiated patients with suspected acute coronary syndromes available. Contemporary algorithms include: The GRACE score, http://www.ncbi.nlm.nih.gov/pubmed/19699862 The Goldman score, http://www.ncbi.nlm.nih.gov/pubmed/11435183 The Manchester Acute Coronary Syndromes (MACS) decision rule,

ID	Stakeholder	Suggested key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
			<p>threatening disease. It would not be cost-effective to investigate all of these patients. Risk stratification at the time of admission is therefore necessary to identify those patients who are likely to require further inpatient investigation even if troponin levels are normal. Effective risk stratification will also facilitate judicious use of high dependency resources such as Coronary Care Units.</p>	<p>practice. In 6 audits between August 2010 and April 2012 the proportion of patients who underwent formal risk stratification varied from 6% to 90%.</p>	<p>http://www.controlled-trials.com/ISRCTN86818215/ The Thrombolysis in Myocardial Infarction (TIMI) risk score, http://www.ncbi.nlm.nih.gov/pubmed/20530163 NICE guideline CG94 recommends the risk stratification of patients with acute coronary syndromes. Data provided regarding 6 audits of Cardiac Chest Pain between August 2010 and April 2012 by the Emergency Medicine Specialty Audit Group (EMSAG) in a personal communication (available on request)</p>
009	SCM2	Use of risk stratification tools in patients with non-ST segment elevation acute coronary syndromes	Use of risk stratification is recommended by CG94 but is not used widely in clinical practice.	Use of risk stratification has the potential to increase the cost efficacy of treatment by identifying patients most likely to benefit.	
010	AstraZeneca UK Ltd	1: Risk stratification of NSTEMI/UA patients using the GRACE Risk Score tool	Older age, higher Killip class, elevated heart rate, lower systolic blood pressure, and anterior location of the infarct have been identified as the most important	The task of risk stratifying NSTEMI/UA patients remains inconsistent across the UK. Utilisation universally of tools such as the GRACE Risk Score	<ul style="list-style-type: none"> - NICE NSTEMI/UA Guidelines (CG94) - ESC STEMI Guidelines–EHJ 2012 33:2569 – 2619

ID	Stakeholder	Suggested key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
			independent predictors of early mortality in clinical trials and registries (ESC Guidelines).	can help identify the patients who have the earliest predictors of mortality.	
Management of NSTEMI and Unstable angina – Antiplatelet therapy					
011	The Royal College of Surgeons of Edinburgh	1.3.7		Consider discontinuing clopidogrel treatment 5 days before CABG in patients who have a low risk of adverse cardiovascular events.	
Management of NSTEMI and Unstable angina – Coronary angiography					
012	SCM1	Delivery of angiography for patients with non-STEMI	There is good evidence that patients with proven non-STEMI should receive timely angiography in order to identify and treat anatomically remediable coronary artery lesions. NICE CG94 recommends a 96 hour maximum delay whilst the European Society of Cardiology recommends a 72 hour maximum.	The delivery of angiography for non-STEMI is very variable both in absolute terms and in terms of delay to procedure. 73% of patients with non-STEMI in England in 2012/13 were referred for angiography compared to 80% in Wales and 93% in Belfast. Of those referred in England, 55% received angiography within 72 hours and 68% within 96 hours. Local audit data from my Trust indicates that 70.5% of patients are referred for angiography of which only 56% are receiving it within 96 hours.	NICE CG94: http://www.nice.org.uk/nice/media/live/12949/47921/47921.pdf Please see the Myocardial Ischaemia National Audit Project (MINAP) Twelfth Public Report: http://www.ucl.ac.uk/nicor/audits/minap/publicreports/pdfs/minap2013publicreportmedium.pdf
013	SCM2	Time to angiography in patients with non-ST segment elevation acute	CG94 recommends an invasive strategy (coronary angiography with follow-on PCI if indicated)	Data from the BCIS PCI registry shows considerable variation in time to angiography in patients	BCIS registry data 2012

ID	Stakeholder	Suggested key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
		coronary syndromes who are selected for an invasive strategy	within 96 hours of first admission in patients who have an intermediate or higher risk of adverse cardiovascular events (predicted 6-month mortality above 3.0%) if they have no contraindications to angiography (such as active bleeding or comorbidity).	with non-ST segment elevation ACS, which delays appropriate treatment and increases the costs of the hospital admission.	
014	AstraZeneca UK Ltd	3: Offer coronary angiography (with follow-on PCI if indicated) within 96 hours of first admission to hospital to patients who have an intermediate or higher risk of adverse cardiovascular events (predicted 6-month mortality above 3.0%) if they have no contraindications to angiography (such as active bleeding or co-morbidity). Perform angiography as soon as possible for patients who are clinically unstable or at high ischaemic risk.	The Guideline Development Group (GDG) for the UA and NSTEMI guidelines judged that in people with a predicted 6-month mortality of >3.0% (our risk cohorts 2a, 2b, 3 & 4) an early invasive strategy was likely to be both clinically and cost effective. The GDG concluded that on the basis of the evidence available for review at the time, the definition of 'early angiography' could be interpreted as being within 96 hours of admission to hospital.	The BCIS audit found that only 65.9% of NSTEMI patients get PCI within 96hours	<ul style="list-style-type: none"> - NICE NSTEMI/UA Guidelines (CG94) - British Cardiovascular Intervention Society (BCIS) Audit. www.bcis.org.uk

ID	Stakeholder	Suggested key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
015	SCM3	Reduction of time spent waiting for inpatient angiography/ angioplasty	NICE CG 94 and ESC Guidelines all support that delayed revascularisation leads to longer lengths of stay, diminishing treatment returns and increased mortality	Primary impact on mortality/ morbidity with a secondary general medical efficiency i.e. length of stay meaning the NHS has to spend more resources	
016	SCM5	Patients with NSTEMI should be considered for coronary angiography with follow-on PCI if appropriate, and the procedure should be carried out within 48-72 hours of admission.	Important because patients are at risk of progressing to major MI if managed medically.	However, in the current NHS, the main driver for prompt assessment and treatment is to shorten hospital stay and free up bed days while also improving patient experience.	Several studies.
Management of NSTEMI and Unstable angina – Revascularisation strategy					
017	The Royal College of Surgeons of Edinburgh	1.5.4		When advising patients about the choice of revascularisation strategy (PCI or CABG), take account of coronary angiographic findings, comorbidities, and the benefits and risks of each intervention.	
018	The Royal College of Surgeons of Edinburgh	1.5.5		When the role of revascularisation or the revascularisation strategy is unclear, resolve this by discussion involving an interventional cardiologist, cardiac surgeon and other healthcare professionals	

ID	Stakeholder	Suggested key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				relevant to the needs of the patient. Discuss the choice of revascularisation strategy with the patient.	
019	SCM5	Patients with NSTEMI found to have occluded vessels at angiography should have some assessment of myocardial viability and of ischaemia before undergoing revascularisation.	There is some evidence that late re-opening of occluded vessels may be, at best, unnecessary and, at worst, harmful.	Revascularisation procedures, whether PCI or CABG, should be offered to those patients most likely to derive benefit from them.	
020	SCM5	Patients with NSTEMI found to have multivessel disease at angiography should, where practical, have their test results discussed at an MDT prior to revascularisation.	Important that revascularisation is appropriate for the patient's long-term outcome rather than treating presumed culprit vessel only.	Revascularisation decisions for patients with stable symptoms are now often made at MDT but MDT process for acute patients may be less widespread.	
Management of STEMI – Eligibility for PPCI					
021	SCM1	Delivery of PPCI for patients with return of circulation following out-of-hospital cardiac arrest caused by suspected acute myocardial infarction	There is good evidence that patients who have had out-of-hospital cardiac arrest with return of circulation due to suspected AMI have a better outcome when taken directly to a centre capable of performing PPCI. Indeed, NICE CG167 recommends that patients with cardiac arrest due to	The delivery of patients following cardiac arrest to heart attack centres is very variable in the UK at present; MINAP does not yet systematically report this data. Networks and protocols are being developed in the UK to facilitate the delivery of patients post cardiac arrest to	NICE CG167: http://www.nice.org.uk/nice/media/live/14208/64410/64410.pdf Please see the Myocardial Ischaemia National Audit Project (MINAP) Twelfth

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			suspected STEMI should be considered eligible for PPCI irrespective of their level of consciousness. Data published in the recent MINAP Report by a centre performing PPCI post cardiac arrest in all patients suspected of AMI reports survival of approximately 60% compared with national survival rates of 2-10% in this population.	heart attack centres for PPCI. In our local Network in the South West, there is not yet a robust pathway for these patients. There are considerable logistic and cost implications of this intervention in these patients which are potential barriers to implementation.	Public Report, see Case Study 5: http://www.ucl.ac.uk/nicor/audits/minap/publicreports/pdfs/minap2013publicreportmedium.pdf
Management of STEMI – Timely PPCI					
022	SCM1	Delivery of timely PPCI for patients with STEMI	There is good evidence that patients with STEMI eligible for PPCI should receive this therapy as quickly as possible. National and international guidelines recommend that PPCI should be performed within 120 minutes of a patient's call for help (European Guidelines propose 90 minutes). NICE CG167 states that PPCI should be delivered within 120 minutes of the time that thrombolysis could have been given (equating to an approximate call to balloon time of 150 minutes).	The timely delivery of PPCI has been improving over the last decade as reported by MINAP but does still not reach these standards universally and is variable between regions. In England 82% of patients received PPCI within 150 minutes and 60% within 90 minutes in 2012/13. This compares to 70% and 48% respectively in Wales and 89% and 80% in Belfast. In my region, the figures are 73% and 50% respectively. There are particular issues when inter-hospital transfer is required for patients that do not present	NICE CG167: http://www.nice.org.uk/nice/media/live/14208/64410/64410.pdf Please see the Myocardial Ischaemia National Audit Project (MINAP) Twelfth Public Report: http://www.ucl.ac.uk/nicor/audits/minap/publicreports/pdfs/minap2013publicreportmedium.pdf For ESC Guidelines on management of STEMI please see following link: http://www.escardio.org/guid

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				directly to a heart attack centre.	elines-surveys/esc-guidelines/GuidelinesDocuments/Guidelines_AMI_STE MI.pdf
023	SCM2	Time to PPCI in patients with STEMI considered eligible for reperfusion therapy.	CG167 recommends that coronary reperfusion therapy (either primary PCI or fibrinolysis) is delivered as quickly as possible for eligible people with acute STEMI. Coronary angiography, with follow-on primary PCI if indicated, is the preferred coronary reperfusion strategy for people with acute STEMI if: presentation is within 12 hours of onset of symptoms and primary PCI can be delivered within 120 minutes of the time when fibrinolysis could have been given.	There is evidence of variation in the ‘timeliness’ of PPCI across the country, partly reflecting variation in access to PPCI services (for example by restricted hours PPCI services). Reduction in treatment delays would be expected to lead to improved outcomes.	BCIS registry data 2012
024	SCM6	Meet guideline door to balloon time target of 90 minutes for coronary reperfusion in patients with STEMI	There is clear evidence that the earlier reperfusion can be delivered, the better the prognosis	Because it is a process measure that should be achievable for all patients, not only during the working day, but also at night and weekends.	
Management of STEMI – Rescue PCI					
025	SCM2	Use of rescue PCI in patients with acute STEMI treated by fibrinolysis	CG167 recommends that patients with acute STEMI treated with fibrinolysis are offered an electrocardiogram 60–90 minutes	Patients with STEMI treated by fibrinolysis are a relatively small and diminishing group of patients. Nevertheless, those	

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			after drug administration. Patients with residual ST-segment elevation suggesting failed coronary reperfusion should be offered immediate coronary angiography, with follow-on PCI if indicated.	patients that are treated by fibrinolysis but have electrocardiographic evidence of failed reperfusion should have timely access to coronary angiography and if appropriate rescue PCI.	
Functional assessment					
026	British Nuclear Cardiology Society (BNCS) and British Nuclear Medicine Society (BNMS)	Access to myocardial perfusion scintigraphy (MPS) for the assessment of ischaemic burden in patients post acute coronary syndrome (ACS).	MPS is recommended within NICE guidance for the management of patients with known and suspected coronary heart disease. MPS has been shown to be useful for the assessment of patients with suspected ACS, especially in hospitals that do not have access to immediate coronary interventional facilities or in patients deemed to be unsuitable for angiography.	Access to timely and high quality MPS services in the UK is variable. In the United States, according to the ACCF/ASNC/ACR/AHA/ASE/SCCT/SCMR/SNM 2009 Appropriate Use Criteria for Cardiac Radionuclide Imaging, a resting MPS scan is considered a Class A indication in patients with suspected ACS (non ischaemic ECG with borderline or minimally elevated Troponin). This practice is widespread in the United States. While a UK wide 24/7 rest MPS service is not practical, it should be possible to offer a '9-5' acute MPS service for patients presenting with suspected ACS.	NICE CG94 & CG95 ACCF/ASNC/ACR/AHA/ASE/SCCT/SCMR/SNM 2009 Appropriate Use Criteria for Cardiac Radionuclide Imaging. http://www.asnc.org/imageuploads/AUCCardiacRadionuclideImaging2009.pdf
027	SCM5	Patients with STEMI who have residual lesions not	Patients with STEMI may have acute lesion treated and may then	Patients are at risk of further events. This applies to approx.	

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		treated at the initial procedure should have a functional assessment (stress MR, stress echo, stress perfusion scan) within a given period of time (?4 weeks)	be lost to follow-up or placed on a long waiting list for review.	30% of PPCI patients.	
Review – Specialty review					
028	SCM3	Reduce time to specialty review	There is good evidence that too many patients are admitted via the Emergency Department as ? ACS and receive inappropriate ACS medication. This can lead to an increased risk of bleeding and death. It is not uncommon for patients to sit on an admissions ward for several days or longer before they get specialty review.	Early specialty review will reduce unnecessary pharmacotherapy and reduce length of stay. It would also ensure that patients are put on correct pathway i.e. PCI early in their spell and meet Keogh recommendations on 7/7 working.	
Review – Training and cardiogenic shock					
029	SCM3	Cardiogenic shock	Most of ACS mortality sits in cardiogenic shock yet patients are often cared in environments who may not have the skills or expertise (revasc/ IABP/ inotrope and vasopressors)	Cardiogenic shock carries a high mortality and requires specialist care and intervention.	
Review - Organisational responsibility					
030	SCM4	Provision of structured guidance and advice relating to ownership,	There is no doubt that the benefits to be derived from excellent clinical, procedural and technical	Much of modern medicine is turning towards what might be called a matrix approach to the	For an example of a choice framework, see the text and diagrams under that

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		<p>choice frameworks, matching service delivery commitments to existing resources and identifying shortfalls; and mapping of service delivery infrastructures onto the existing or reconfigured health estate</p>	<p>guidance and advice can only be gained if the organisation(s) responsible for delivering it firstly; take ownership of the process and all of the operational and administrative arrangements involved in its implementation; are able to command the resources necessary for their delivery, and have or can configure the resources – human, organisational, locational and physical that are required for that delivery</p>	<p>delivery healthcare services, and away from what is currently called a silo approach. Many of our most established and esteemed clinical and service delivery agencies and institutions are firmly lodged in and constrained by the latter, and can only with difficulty be reconfigured to adapt to more modern, horizontally configured, models of care, such as those emerging in the reactions to the Mid Staffordshire NHS Foundation Trust public inquiry</p> <p>The problem is further exacerbated by the fact that the overwhelming majority of the inherited health estate, both in terms of its overall configuration and in its local provisions, is designed to support the silo model and is difficult to adapt to the requirements of any other. While it is not proposed that estate consideration should or needs to form any substantial part of this Quality Statement, service providers would it is believed benefit from a brief</p>	<p>heading that form a part of the Department of Health's 'Choice Framework for Local Practices and Procedures' initiative</p> <p>For an example of new thinking about the configuration of health care services in an acute healthcare setting and the relationship between that and other service locations and providers see The Royal College of Physician's evidence to the Mid Staffordshire inquiry, and the same College's recently published report on its internally commissioned 'Future Hospital' study</p> <p>For an example of the mapping of service delivery infrastructures onto the existing or reconfigured health estate se the Department of Health Hospital Building Note 'Planning and Design of Services and facilities for</p>

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				reminder that it is a factor to be considered in establishing overall programme 'fit'	Adult Cardiac Services'
Other					
031	Department of Health	I wish to confirm that the Department of Health has no substantive comments to make regarding this engagement exercise.			
032	Royal College of Paediatrics and Child Health	Thank you for inviting the Royal College of Paediatrics and Child Health to comment on the Acute Coronary Syndrome topic engagement exercise. We have not received any responses for this consultation			
033	Royal College of Nursing	This is to inform you that there are no comments to submit on behalf of the Royal College of Nursing to inform on the above topic engagement at this present time, we look forward to participating in the next stage of the process			
034	SCM1	Formal coronary artery disease risk estimation of patients who have had an ACS excluded following acute presentation with chest pain	NICE CG95 recommends the formal estimation of coronary artery disease (CAD) likelihood in patients without confirmed CAD and who have presented with suspected angina. This should be performed using the relevant Table published in the NICE Guidance; estimation of CAD probability is critical to determine subsequent evidence-based investigation as per NICE CG95.	The concept of formal assessment of CAD pre-test probability is novel in the UK. Prior to this guidance, referral for further investigation of patients presenting to the emergency department with suspected angina in whom an ACS had been excluded was arbitrary and not evidence-based. Uptake of this new guidance is likely to be variable, not least because the subsequently recommended investigation strategies (eg CT coronary calcification) are not yet widely available. A quality standard related to this issue	NICE CG95: http://www.nice.org.uk/nice/media/live/12947/47938/47938.pdf

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				would improve the rational choice of investigation for these patients. I have implemented formal CAD risk stratification in my Trust Emergency Department and have audited uptake: 80% of patients now have a formal PTP of CAD calculated and are referred as appropriate for further investigation. I am not aware of any national audit data related to uptake of this NICE recommendation.	
035	SCM2	Cardiac rehabilitation	Cardiac rehabilitation with an exercise component improves long term outcome in patients with myocardial infarction. Cardiac rehabilitation is recommended by CG94 and by CG172.	Cardiac rehabilitation with an exercise component reduces all-cause and cardiovascular mortality. Cardiac rehabilitation is a key component of the secondary prevention guideline (CG172) but should be started during hospital admission in all patients with acute myocardial infarction.	Only 44% of MI patients enter cardiac rehabilitation (NSF target >85%). National audit shows that patients wait mean 53 days to start Phase III (exercise). Early cardiac rehabilitation (within 10 days) significantly reduces unplanned cardiac re-admissions (MINAP 2012).
036	Merck Sharp & Dohme Ltd (MSD)	Patient follow-up after acute MI	It is crucial for a follow-up plan to be agreed with the patient prior to being discharged from hospital to ensure continued, effective management of these patients.	Patient outcomes are the most important consideration post MI, with medicines adherence and optimisation as critical steps for the health of the patient. The transfer of care relating to the	CG76 Medicines adherence: http://publications.nice.org.uk/medicines-adherence-cg76 CG Medicines optimisation:

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				sharing of information about medicines as the patient moves from secondary to primary care is crucial in this process, with adequate follow-up being vital.	currently under development: http://guidance.nice.org.uk/CG/Wave0/676 CG172 Myocardial infarction – secondary prevention: http://publications.nice.org.uk/mi-secondary-prevention-cg172
037	Merck Sharp & Dohme Ltd (MSD)	The use of statins post MI	The use of medication post MI is vital for patient outcomes, with the effective management of lipid levels important in preventing future cardiovascular (CV) events.	Effectively managing patients lipid levels is key in managing their CVD risk. The optimisation of statin therapy to treat the patient to target is therefore critical in preventing future CV events. A recent study has shown that despite widespread use of statins, many individuals at high risk of CV events have persistently abnormal lipid levels, see: http://onlinelibrary.wiley.com/doi/10.1111/ijcp.12238/abstract	TA94 Cardiovascular disease – statins: http://guidance.nice.org.uk/TA94 CG167 Myocardial infarction with ST-segment elevation: http://publications.nice.org.uk/myocardial-infarction-with-st-segment-elevation-cg167 CG172 Myocardial infarction – secondary prevention: http://publications.nice.org.uk/mi-secondary-prevention-cg172
038	Merck Sharp & Dohme Ltd (MSD)	Aligning this quality standard with the secondary prevention of MI	It is noted that NICE will develop a quality standard on secondary prevention of myocardial infarction and cardiac rehabilitation. It is important for this secondary prevention quality standard and the quality standard on acute coronary syndrome to be		CG167 Myocardial infarction with ST-segment elevation: http://publications.nice.org.uk/myocardial-infarction-with-st-segment-elevation-cg167 CG172 Myocardial infarction – secondary prevention: http://publications.nice.org.uk

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			aligned efficiently, given that secondary prevention is a continuation of care following ACS.		k/mi-secondary-prevention-cg172
039	AstraZeneca UK Ltd	Ensuring adherence to dual oral anti-platelet (OAP) therapy for up to 12 months as a treatment in people with STEMI that cardiologists intend to treat with primary PCI.	ESC Guidelines - A P2Y12 inhibitor should be added to aspirin as soon as possible and maintained up to 12 months, unless there are contraindications such as excessive risk of bleeding.	Adherence to dual OAP therapy remains inconsistent across the UK.	<ul style="list-style-type: none"> - ESC ACS Guidelines. European Heart Journal (2011) 32, 2999–3054 - ESC STEMI Guidelines – EHJ 2012 33:2569 – 2619
040	AstraZeneca UK Ltd	Offer MI secondary prevention treatment options in line with NICE guidance, and deliver Patient Education/ advice on all the alternatives	<p>NICE give clear treatment options in the UA/NSTEMI clinical guidelines for the secondary prevention of MI which include:</p> <ul style="list-style-type: none"> - Medical management - Cardiac rehabilitation - Diagnosis and arrangement for follow up - Lifestyle changes <p>NICE guidelines have deemed these treatment options are appropriate and need to be offered to all patients to ensure consistent and effective treatment options across the UK. NICE guidelines also recommend education and advice on these treatment options for all MI patients prior to discharge.</p>	Treatment options for discharged patients remain inconsistent across different regions of the country which is detrimental to the quality of patient care. In addition patient education and advice on each of the options is inconsistent across the country.	NICE NSTEMI/UA Guidelines (CG94) MI Secondary Prevention Guidelines

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041	AstraZeneca UK Ltd	Regular Follow up of NSTEMI/UA patients after an event	6 month mortality rates for STEMI and NSTEMI patients are 12% and 13% respectively in addition to the fact that after leaving the hospital, patients with NSTEMI are at a greater risk of death 6 months post event and readmitted as STEMI patient, yet they do not have follow-up, so as a QS, all NSTEMI-ACS patients should have managed follow up care and 6 month readmission should be logged (in addition to 30 day readmission). 68% of STEMI deaths occurred after discharge, compared to 86% of NSTEMI deaths and 97% of UA deaths 5-Year GRACE Risk Score (Fox et al)	Currently only STEMI patients are recommended to have a 30 day follow up	<ul style="list-style-type: none"> - Fox KAA et al Eur Heart J 2010. 31(22):2755-64 - NICE STEMI Guidelines (CG167)
042	SCM3	Optimisation of secondary prevention medications	NICE CG 172 specifies secondary prevention medications post AMI that can reduce mortality and readmission.	Reduced lengths of stay make medication optimisation more difficult and acute units have to rely on primary care to optimise medications in the early post discharge period	
043	SCM3	Inpatient assessment of LV function	Consideration for ICD (TA95) and commencement of appropriate medication. Patients can wait for many days awaiting and echo and in some parts of the county may be sent home and receive an	Early initiation of correct therapies in LCSD can reduce mortality/ morbidity and said medications should be optimised prior to device (ICD/ CRT) consideration	

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			echo as an outpatient.		
044	SCM4	Provision of information geared to the needs of the general public on acute coronary syndromes associated risk factors, exposure, protection and avoidance	The recent substitution of the words 'care excellence' for 'clinical excellence' in NICE's title and a number of initiatives now in place suggests that a substantial part of NICE's role has been extended into areas that in the past have been largely dominated by public sector non-acute healthcare and other related service providers. Much of this work involves offering guidance to the public on the topic areas listed, guidance to which NICE, with its strong clinical research and evidence based background could make a substantial and highly valuable contribution	Apart from its intrinsic importance in the control and reduction of acute coronary events its inclusion, either as stand-alone Quality Statement or as part of a larger statement package provides an opportunity for NICE to demonstrate its commitment to multi agency working across a wide range of disciplines and in a variety of settings, not all of them healthcare related. Feedback from such participation could also be valuable to other Quality Statement topic areas which have a strong public health component	As a lay member of the Guidance Development Group responsible for the preparation of the original NICE Acute Coronary Events Syndrome Guidance document have no doubt that the clinical aspects including pharmacological aspects of the topic area will be very well represented in the responses of other specialist members of the in the development of this new Quality Standard. I have therefore focussed in my contribution to this stakeholder involvement exercise upon aspects of the total care package that may more appropriately come from a lay member. and particularly on those that reflect what I see as the broadening of NICE's remit to incorporate into its advice and recommendations reference to aspects of the total patient journey that lie

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					on either side of the acute episode, and of which I have had and continue to have direct and generally very positive experience
045	SCM4	Provision of information relating to the post – discharge care of patients who have experienced an Acute Coronary Syndromes related episode. Of particular importance in this context is the involvement of relatives or carers in the delivery of the post-discharge care plan, and the implementation and monitoring of longer term rehabilitation and lifestyle change initiatives	Again this proposal reflects the widening to NICE’s remit to include aspects of care provided in non acute largely community based service providers, and is seen as part of a multi disciplinary, multi agency approach to the delivery of a ‘whole journey’ care plan in which NICE, as a research driven evidence based guidance agency has a key role to play	Discontinuity in post acute episode is frequently reported by patients across a very wide range of clinical services and specialities. By including this topic area, either as stand-alone Quality Statement or as part of a larger statement package NICE is demonstrating its commitment to a multi-professional, multi-agency approach to the delivery of appropriate ‘whole journey’ patient care and its ability to support such commitment from an evidence base of high quality	See previous statement
046	SCM6	Ensure that patients with ACS are discharged on a beta-blocker, irrespective of a history of COPD	Evidence shows that beta blocker therapy in patients with COPD improves survival after ACS	Doctors commonly withhold beta-blockers in patients with COPD	
047	SCM6	Provide smoking clinic appointment for all	Smokers who quit reduce mortality by up to 50% - more	Only about one third of current smokers manage to quit after	

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		current smokers with ACS	than any of the 2° prevention drugs prescribed after ACS	ACS.	
048	SCM6	In patients with suspected ACS who are shown to have normal coronary arteries make explicit recommendations about the need (or not) for ongoing 2° prevention treatment	Many people admitted with suspected ACS who have normal coronary arteries are discharged on 2° prevention drugs and remain on treatment in the long-term	There is no evidence that 2° prevention drugs are of value in patients with suspected ACS who have normal coronary arteries	