NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Guideline

Acute coronary syndromes

Draft for consultation, February 2020

This guideline covers the early and longer-term (rehabilitation) management of acute coronary syndromes. These include ST-segment elevation myocardial infarction (STEMI), non-ST-segment elevation MI (NSTEMI) and unstable angina. The guideline aims to improve survival and quality of life for people who have a heart attack or unstable angina.

Who is it for?

- Healthcare professionals
- Commissioners and providers
- Adults with acute coronary syndromes, their families and carers

This guideline will update NICE guideline CG172 (published November 2013), NICE guideline CG167 (published July 2013), NICE technology appraisal guidance 230 (published July 2011), NICE guideline CG94 (published March 2010) and NICE technology appraisal guidance 152 (published July 2008).

It will incorporate and contextualise NICE technology appraisal guidance 317 (published July 2014) and NICE technology appraisal guidance 236 (published October 2011). It will incorporate unchanged NICE guideline CG130 (published October 2011).

We have reviewed the evidence on dual antiplatelet therapy, early angiography for unstable angina and NSTEMI, antithrombin therapy before percutaneous coronary intervention (PCI), complete revascularisation versus culprit vessel only PCI for STEMI, drug-eluting stents, combination antiplatelet and anticoagulant treatment for

people with an indication for anticoagulation, and duration of beta-blocker treatment for people with reduced left ventricular ejection fraction after MI. You are invited to comment on the new and updated recommendations. These are marked as **[2020].**

You are also invited to comment on recommendations that NICE proposes to delete from the guideline.

We have not reviewed the evidence for the recommendations shaded in grey, and cannot accept comments on them. In some cases, we have made minor wording changes for clarification.

See update information for a full explanation of what is being updated.

This draft guideline contains:

- the draft recommendations
- recommendations for research
- rationale and impact sections that explain why the committee made the 2020 recommendations and how they might affect practice
- the guideline context.

Information about how the guideline was developed is on the guideline's page on the NICE website. This includes the evidence reviews, the scope, and details of the committee and any declarations of interest.

Full details of the evidence and the committee's discussion on the 2020 recommendations are in the evidence reviews.

We will produce an algorithm and visual summaries of the guidance for publication.

Contents

Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in making decisions about your care.

Making decisions using NICE guidelines explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

1.1 STEMI – early management

Assessment

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). **[2013]**

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). **[2013]**

1.1.3 Deliver coronary reperfusion therapy (either primary PCI or fibrinolysis) as quickly as possible for eligible people with acute STEMI. **[2013]**

Initial drug therapy

1.1.4 Offer aspirin as soon as possible to all people with acute STEMI and continue indefinitely unless contraindicated by bleeding risk or aspirin hypersensitivity. **[2010]**

1.1.5 Offer people with acute STEMI a single loading dose of 300 mg aspirin as soon as possible unless there is clear evidence that they are allergic to it. **[2010]**

1.1.6 Do not offer routine glycoprotein IIb/IIIa inhibitors or fibrinolytic drugs before arrival at the catheter laboratory to people with acute STEMI for whom primary PCI is planned. **[2013]**

Coronary angiography with follow-on primary PCI

1.1.7 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. **[2013]**

1.1.8 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. **[2013]**

1.1.9 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. **[2013]**

1.1.10 Consider coronary angiography, with a view to coronary revascularisation if indicated, for people with acute STEMI who present more than 12 hours after the onset of symptoms and who have cardiogenic shock or go on to develop it. **[2013]**

1.1.11 Consider radial (in preference to femoral) arterial access for people undergoing coronary angiography (with follow-on primary PCI if indicated). **[2013]**

Dual antiplatelet therapy for acute STEMI intended for primary PCI

1.1.12 Offer prasugrel as part of dual antiplatelet therapy with aspirin to people with acute STEMI intended for treatment with primary PCI. Use the maintenance dose in the summary of product characteristics. **[2020]**

Also see the NICE technology appraisal on ticagrelor for the treatment of acute coronary syndromes.

For a short explanation of why the committee made the 2020 recommendation on dual antiplatelet therapy for acute STEMI intended for primary PCI, and how it might affect practice, see rationale and impact

Full details of the evidence and the committee's discussion are in evidence review A: antiplatelet therapy

Antithrombin therapy during primary PCI

1.1.13 Offer unfractionated heparin with bailout glycoprotein IIb/IIIa inhibitor in combination with dual antiplatelet therapy to people with acute STEMI undergoing primary PCI with radial access. **[2020]**

1.1.14 Consider bivalirudin with bailout glycoprotein IIb/IIIa inhibitor in combination with dual antiplatelet therapy for people with acute STEMI undergoing primary PCI when femoral access is needed. **[2020]**

For a short explanation of why the committee made the 2020 recommendations on antithrombin therapy during primary PCI, and how they might affect practice, see rationale and impact.

Full details of the evidence and the committee's discussion are in evidence review D: antithrombin therapy in adults with STEMI intended for primary percutaneous coronary intervention.

Thrombus extraction during primary PCI

1.1.15 Consider thrombus aspiration during primary PCI for people with acute STEMI. **[2013]**

1.1.16 Do not routinely use mechanical thrombus extraction during primary PCI for people with acute STEMI. **[2013]**

Complete or culprit vessel only revascularisation with PCI in people with acute STEMI treated by primary PCI

1.1.17 Offer complete revascularisation with PCI for people with acute STEMI and multivessel coronary artery disease without cardiogenic shock. Consider doing this during the index hospital admission. **[2020]**

1.1.18 Consider culprit vessel only revascularisation with PCI rather than complete revascularisation with PCI for people with acute STEMI and multivessel coronary artery disease if they have cardiogenic shock. **[2020]**

For a short explanation of why the committee made the 2020 recommendations on complete revascularisation with PCI or culprit vessel only PCI, and how they might affect practice, see rationale and impact

Full details of the evidence and the committee's discussion are in evidence review E: culprit versus complete revascularisation

Drug-eluting stents in primary PCI

1.1.19 If stenting is indicated, offer a drug-eluting stent to people with acute STEMI undergoing revascularisation by primary PCI. **[2020]**

For a short explanation of why the committee made the 2020 recommendation on drug-eluting stents, and how it might affect practice, see rationale and impact.

Full details of the evidence and the committee's discussion are in evidence review F: drug-eluting stents

Fibrinolysis

1.1.20 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. **[2013]**

1.1.21 When treating people with fibrinolysis, give an antithrombin at the same time. **[2013]**

1.1.22 Offer an electrocardiogram (ECG) to people with acute STEMI treated with fibrinolysis, 60 to 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. **[2013]**

1.1.23 If a person with acute STEMI has recurrent myocardial ischaemia after fibrinolysis, seek immediate specialist cardiological advice and, if appropriate, offer coronary angiography, with follow-on PCI if indicated. **[2013]**

1.1.24 Consider coronary angiography during the same hospital admission for people with acute STEMI who are clinically stable after successful fibrinolysis. **[2013]**

Management for people with STEMI not treated with PCI

1.1.25 Offer ticagrelor, as part of dual antiplatelet therapy with aspirin, to people with acute STEMI not treated with PCI, unless they have a high bleeding risk. **[2020]**

1.1.26 Consider clopidogrel, as part of dual antiplatelet therapy with aspirin, or aspirin alone, for people with acute STEMI not treated with PCI, if they have a high bleeding risk. **[2020]**

Also see the NICE technology appraisal on rivaroxaban for preventing adverse outcomes after management of acute coronary syndromes

For a short explanation of why the committee made the 2020 recommendations on dual antiplatelet therapy for people with STEMI not treated with PCI, and how they might affect practice, see rationale and impact.

Full details of the evidence and the committee's discussion are in evidence review A: antiplatelet therapy

1.1.27 Offer medical management to people with acute STEMI who are ineligible for any reperfusion therapy. **[2013]**

Tests before discharge

1.1.28 Assess left ventricular function in all people who have had a STEMI. **[2013]**

1.2 NSTEMI and unstable angina – early management

Initial drug therapy

1.2.1 Offer aspirin as soon as possible to all people with unstable angina and non-ST-segment elevation MI (NSTEMI) and continue indefinitely unless contraindicated by bleeding risk or aspirin hypersensitivity. **[2010]**

1.2.2 Offer people with unstable angina and NSTEMI a single loading dose of 300 mg aspirin as soon as possible unless there is clear evidence that they are allergic to it. **[2010]**

1.2.3 Offer fondaparinux to people with unstable angina and NSTEMI who do not have a high bleeding risk, unless they are undergoing immediate coronary angiography. **[2020]**

See recommendation 1.2.15 for advice about people with unstable angina and NSTEMI who are undergoing immediate coronary angiography.

For a short explanation of why the committee made the 2020 recommendation on initial antithrombin therapy for people with unstable angina and NSTEMI, and how it might affect practice, see rationale and impact.

Full details of the evidence and the committee's discussion are in evidence review C: antithrombin for unstable angina and NSTEMI.

1.2.4 Consider unfractionated heparin, with dose adjustment guided by monitoring of clotting function, as an alternative to fondaparinux for people with unstable angina and NSTEMI and significant renal impairment (creatinine above 265 micromoles per litre). **[2010]**

1.2.5 Carefully consider the choice and dose of antithrombin for people with unstable angina and NSTEMI who have a high risk of bleeding associated with any of the following:

- advancing age
- known bleeding complications
- renal impairment
- low body weight. **[2010]**

1.2.6 Do not offer dual antiplatelet therapy to people with chest pain before a diagnosis of unstable angina or NSTEMI is made. **[2020]**

For a short explanation of why the committee made the 2020 recommendations on dual antiplatelet therapy for people with unstable angina and NSTEMI, and how they might affect practice, see rationale and impact.

Full details of the evidence and the committee's discussion are in evidence review A: antiplatelet therapy

Risk assessment

1.2.7 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]). **[2010]**

1.2.8 Include in the formal risk assessment:

- a full clinical history (including age, previous MI and previous PCI or coronary artery bypass grafting [CABG])
- a physical examination (including measurement of blood pressure and heart rate)
- a resting 12-lead ECG, looking particularly for dynamic or unstable patterns that indicate myocardial ischaemia

- blood tests (such as troponin I or T, creatinine, glucose and haemoglobin). **[2010]**

1.2.9 Record the results of the risk assessment in the person's care record. **[2010]**

1.2.10 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. **[2010]**

1.2.11 Use predicted 6-month mortality to categorise the risk of future adverse cardiovascular events as follows **[2010]**:[1]

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

Coronary angiography with follow-on PCI

1.2.12 Offer immediate coronary angiography to people with unstable angina and NSTEMI if their clinical condition is unstable. **[2020]**

1.2.13 Consider coronary angiography (with follow-on PCI if indicated) within 72 hours of first admission for people with unstable angina and NSTEMI who have an intermediate or higher risk of adverse cardiovascular events (predicted 6-month mortality above 3.0%) and no contraindications to angiography (such as active bleeding or comorbidity). **[2020]**

1.2.14 Consider coronary angiography (with follow-on PCI if indicated) for people with unstable angina and NSTEMI who are initially assessed to be at low risk of adverse cardiovascular events (predicted 6-month mortality 3.0%

[1] Categories of risk are derived from the Myocardial Ischaemia National Audit Process (MINAP) database.

or less) if ischaemia is subsequently experienced or is demonstrated by ischaemia testing. **[2020]**

> For a short explanation of why the committee made the 2020 recommendations on early invasive versus conservative management for people with unstable angina and NSTEMI, and how they might affect practice, see rationale and impact.
>
> Full details of the evidence and the committee's discussion are in evidence review B: early invasive versus conservative management for unstable angina and NSTEMI

1.2.15 Offer systemic unfractionated heparin in the cardiac catheter laboratory to people with unstable angina and NSTEMI who are undergoing PCI[2] whether or not they have already received fondaparinux. **[2020]**

> For a short explanation of why the committee made the 2020 recommendations on antithrombin therapy for people with unstable angina and NSTEMI, and how they might affect practice, see rationale and impact.
>
> Full details of the evidence and the committee's discussion are in evidence review C: antithrombin for unstable angina and NSTEMI

1.2.16 Offer prasugrel or ticagrelor, as part of dual antiplatelet therapy with aspirin, to people with unstable angina and NSTEMI who are having coronary angiography. If treating with prasugrel, only give it once coronary anatomy has been defined and PCI is intended. Use the maintenance dose in the summary of product characteristics. **[2020]**

> For a short explanation of why the committee made the 2020 recommendation on dual antiplatelet therapy for people with unstable angina and NSTEMI, and how it

[2] At the time of consultation (February 2020), unfractionated heparin did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's Prescribing unlicensed medicines for further information.

might affect practice, see rationale and impact.

Full details of the evidence and the committee's discussion are in evidence review A: antiplatelet therapy.

1.2.17 If stenting is indicated, offer a drug-eluting stent to people with unstable angina and NSTEMI undergoing revascularisation by PCI. **[2020]**

For a short explanation of why the committee made the 2020 recommendation on drug-eluting stents, and how it might affect practice, see rationale and impact.

Full details of the evidence and the committee's discussion are in evidence review F: drug-eluting stents

Management when PCI is not indicated

1.2.18 Consider conservative management without early coronary angiography for people with unstable angina and NSTEMI who have a low risk of adverse cardiovascular events (predicted 6-month mortality 3.0% or less). **[2020]**

For a short explanation of why the committee made the 2020 recommendations on early invasive versus conservative management for people with unstable angina and NSTEMI, and how they might affect practice, see rationale and impact.

Full details of the evidence and the committee's discussion are in evidence review B: early invasive versus conservative management for unstable angina and NSTEMI.

1.2.19 Offer ticagrelor, as part of dual antiplatelet therapy with aspirin, to people with unstable angina and NSTEMI when PCI is not indicated, unless they have a high bleeding risk. **[2020]**

1.2.20 Consider clopidogrel as part of dual antiplatelet therapy with aspirin, or aspirin alone, for people with unstable angina and NSTEMI when PCI is not indicated, if they have a high bleeding risk. **[2020]**

Also see the NICE technology appraisal on rivaroxaban for preventing adverse outcomes after management of acute coronary syndromes.

> For a short explanation of why the committee made the 2020 recommendations on dual antiplatelet therapy, and how they might affect practice, see rationale and impact.
>
> Full details of the evidence and the committee's discussion are in evidence review A: antiplatelet therapy

Advice on management strategies

1.2.21 Offer people with unstable angina and NSTEMI clear information about the risks and benefits of the treatments offered so that they can make informed choices about management strategies. Information should be appropriate to the person's underlying risk of a future adverse cardiovascular event and any comorbidities. **[2010]**

1.2.22 When advising people with unstable angina and NSTEMI about the choice of revascularisation strategy (PCI or CABG), take account of coronary angiographic findings, comorbidities, and the benefits and risks of each intervention. **[2010]**

1.2.23 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 person. Discuss the choice of revascularisation strategy with the person. **[2010]**

Tests before discharge

1.2.24 To detect and quantify inducible ischaemia, consider ischaemia testing before discharge for people whose condition has been managed conservatively and who have not had coronary angiography. **[2010]**

1.2.25 Assess left ventricular function in all people who have had an NSTEMI. **[2013]**

1.2.26 Consider assessing left ventricular function in all people with unstable angina. **[2010]**

1.2.27 Record measures of left ventricular function in the person's care record and in correspondence with the primary healthcare team and the person. **[2010]**

1.3 Hyperglycaemia in acute coronary syndromes

Managing hyperglycaemia in inpatients within 48 hours of acute coronary syndrome

1.3.1 Manage hyperglycaemia in people admitted to hospital for an acute coronary syndrome by keeping blood glucose levels below 11.0 mmol/litre while avoiding hypoglycaemia. In the first instance, consider a dose-adjusted insulin infusion with regular monitoring of blood glucose levels. **[2011]**

1.3.2 Do not routinely offer intensive insulin therapy (an intravenous infusion of insulin and glucose with or without potassium) to manage hyperglycaemia (blood glucose above 11.0 mmol/litre) in people admitted to hospital for an acute coronary syndrome unless clinically indicated. **[2011]**

Identifying people with hyperglycaemia after acute coronary syndrome who are at high risk of developing diabetes

1.3.3 Offer all people with hyperglycaemia after acute coronary syndrome and without known diabetes tests for:

- HbA1c levels before discharge

- fasting blood glucose levels no earlier than 4 days after the onset of acute coronary syndrome.

These tests should not delay discharge. **[2011]**

1.3.4 Do not routinely offer oral glucose tolerance tests to people with hyperglycaemia after acute coronary syndrome and without known diabetes if HbA1c and fasting blood glucose levels are within the normal range. **[2011]**

Advice and ongoing monitoring for people with hyperglycaemia after acute coronary syndrome and without known diabetes

1.3.5 Offer people with hyperglycaemia after acute coronary syndrome and without known diabetes lifestyle advice on the following:

- healthy eating
- physical exercise
- weight management
- smoking cessation
- alcohol consumption

See section 1.9 for more information. **[2011]**

1.3.6 Advise people without known diabetes that if they have had hyperglycaemia after an acute coronary syndrome they:

- are at increased risk of developing type 2 diabetes
- should consult their GP if they experience the following symptoms:
  - frequent urination
  - excessive thirst
  - weight loss
  - fatigue
- should be offered tests for diabetes at least annually. **[2011]**

1.3.7 Inform GPs that they should offer at least annual monitoring of HbA1c and fasting blood glucose levels to people without known diabetes who have had hyperglycaemia after an acute coronary syndrome. **[2011]**

1.4 Drug therapy for secondary prevention

1.4.1 Offer all people who have had an acute MI, treatment with the following drugs:

- ACE (angiotensin-converting enzyme) inhibitor
- dual antiplatelet therapy (aspirin plus a second antiplatelet agent)
- beta-blocker
- statin. **[2007, amended 2013]**

1.4.2 Ensure that a clear management plan is available to the person who has had an MI and is also sent to the GP, including:

- details and timing of any further drug titration
- monitoring of blood pressure
- monitoring of renal function. **[2013]**

1.4.3 Offer all people who have had an MI an assessment of bleeding risk at their follow-up appointment. **[2013]**

Also see the NICE guideline on medicines adherence: involving patients in decisions about prescribed medicines and supporting adherence

ACE inhibitors

1.4.4 Offer people who present acutely with an MI, an ACE inhibitor as soon as they are haemodynamically stable. Continue the ACE inhibitor indefinitely. **[2013]**

1.4.5 Titrate the ACE inhibitor dose upwards at short intervals (for example, every 12 to 24 hours) before the person leaves hospital until the maximum tolerated or target dose is reached. If it is not possible to complete the titration during this time, it should be completed within 4 to 6 weeks of hospital discharge. **[2013]**

1.4.6 Do not offer combined treatment with an ACE inhibitor and an angiotensin II receptor blocker (ARB) to people after an MI, unless there are other reasons to use this combination. **[2013]**

1.4.7 After an MI, offer people who are intolerant to ACE inhibitors, an ARB instead of an ACE inhibitor. **[2013]**

1.4.8 Renal function, serum electrolytes and blood pressure should be measured before starting an ACE inhibitor or ARB and again within 1 or 2 weeks of starting treatment. People should have appropriate monitoring as the dose is titrated upwards, until the maximum tolerated or target dose is reached, and then at least annually. More frequent monitoring may be needed in people who are at increased risk of deterioration in renal function. People with chronic heart failure should be monitored in line with the NICE guideline on chronic heart failure in adults. **[2007]**

1.4.9 Offer an ACE inhibitor to people who have had an MI more than 12 months ago. Titrate to the maximum tolerated or target dose (over a 4- to 6-week period) and continue indefinitely. **[2013]**

1.4.10 Offer people who have had an MI more than 12 months ago and who are intolerant to ACE inhibitors an ARB instead of an ACE inhibitor. **[2013]**

Antiplatelet therapy

1.4.11 Offer aspirin to all people after an MI and continue it indefinitely, unless they are aspirin intolerant or have an indication for anticoagulation. **[2007, amended 2013]**

1.4.12 Offer aspirin to people who have had an MI more than 12 months ago and continue it indefinitely. **[2013]**

1.4.13 Continue dual antiplatelet therapy for up to 12 months after an MI unless contraindicated (see recommendations 1.1.12, 1.1.25, 1.1.26, 1.2.16, 1.2.19 and 1.2.20 for more information about dual antiplatelet therapy). **[2020]**

1.4.14 For people with aspirin hypersensitivity who have had an MI, clopidogrel monotherapy should be considered as an alternative treatment. **[2007]**

1.4.15 People with a history of dyspepsia should be considered for treatment in line with the NICE guideline on gastro-oesophageal reflux disease and dyspepsia in adults. **[2007, amended 2013]**

1.4.16 After appropriate treatment, people with a history of aspirin-induced ulcer bleeding whose ulcers have healed and who are negative for *Helicobacter pylori* should be considered for treatment in line with the NICE guideline on gastro-oesophageal reflux disease and dyspepsia in adults. **[2007, amended 2013]**

1.4.17 Offer clopidogrel instead of aspirin to people who also have other clinical vascular disease, in line with NICE's technology appraisal guidance on clopidogrel and modified-release dipyridamole for the prevention of occlusive vascular events, and who have:

- had an MI and stopped dual antiplatelet therapy **or**
- had an MI more than 12 months ago. **[2013]**

Antiplatelet therapy for people with an ongoing separate indication for anticoagulation

1.4.18 Take into account all of the following when thinking about treatment for people who have had an acute coronary syndrome and who have a separate indication for anticoagulation:

- bleeding risk
- thromboembolic risk
- cardiovascular risk
- person's wishes. **[2020]**

1.4.19 For people already on anticoagulation who have had an acute coronary syndrome and PCI with stenting, continue anticoagulation and add clopidogrel for up to 12 months. If the person is taking a direct oral

anticoagulant, adjust and monitor dose according to bleeding risk, thromboembolic risk and cardiovascular risk. **[2020]**

1.4.20 For people already on anticoagulation who have had an acute coronary syndrome and have not had stenting (medical management, balloon angioplasty, CABG), continue anticoagulation and, unless there is a high risk of bleeding, consider adding aspirin (or clopidogrel for people with contraindication for aspirin) for up to 12 months. **[2020]**

1.4.21 For people with an acute coronary syndrome and a new indication for anticoagulation, offer clopidogrel for up to 12 months and an oral anticoagulant licensed for the indication, which best matches the person's:

- thromboembolic risk
- bleeding risk
- cardiovascular risk
- wishes. **[2020]**

1.4.22 Do not routinely offer prasugrel or ticagrelor in combination with anticoagulant needed for an ongoing separate indication for anticoagulation. **[2020]**

1.4.23 For people with an ongoing indication for anticoagulation 12 months after an MI, take into consideration all of the following when thinking about the need for continuing antiplatelet therapy:

- the indication for anticoagulation
- thromboembolic risk
- bleeding risk
- cardiovascular risk
- the person's wishes. **[2013]**

For a short explanation of why the committee made the 2020 recommendations on antiplatelet therapy for people with an indication for anticoagulation, and how they might affect practice, see rationale and impact.

Full details of the evidence and the committee's discussion are in evidence review G: combination therapy

Beta-blockers

1.4.24 Offer people a beta-blocker as soon as possible after an MI, when the person is haemodynamically stable. **[2013]**

1.4.25 Communicate plans for titrating beta-blockers up to the maximum tolerated or target dose – for example, in the discharge summary. **[2013]**

1.4.26 Continue a beta-blocker for 12 months after an MI for people without reduced left ventricular ejection fraction. **[2020]**

1.4.27 Discuss the potential benefits and risks of stopping or continuing beta-blockers beyond 12 months after an MI for people without reduced left ventricular ejection fraction. Include in the discussion:

- the lack of evidence on the relative benefits and harms of continuing beyond 12 months
- the person's experience of adverse effects. **[2020]**

For a short explanation of why the committee made the 2020 recommendations on duration of beta-blocker treatment after an MI, and how they might affect practice, see rationale and impact.

Full details of the evidence and the committee's discussion are in evidence review H: beta-blockers

1.4.28 Continue a beta-blocker indefinitely in people with reduced left ventricular ejection fraction. **[2013]**

1.4.29 Offer all people who have had an MI more than 12 months ago, who have reduced left ventricular ejection fraction, a beta-blocker whether or not they have symptoms. For people with heart failure plus reduced left ventricular ejection fraction, manage the condition in line with the NICE guideline on chronic heart failure in adults . **[2013]**

1.4.30 Do not offer people without reduced left ventricular ejection fraction or heart failure, who have had an MI more than 12 months ago, treatment with a beta-blocker unless there is an additional clinical indication for a beta-blocker. **[2013]**

Calcium channel blockers

1.4.31 Do not routinely offer calcium channel blockers to reduce cardiovascular risk after an MI. **[2007]**

1.4.32 If beta-blockers are contraindicated or need to be discontinued, diltiazem or verapamil may be considered for secondary prevention in people without pulmonary congestion or reduced left ventricular ejection fraction. **[2007]**

1.4.33 For people whose condition is stable after an MI, calcium channel blockers may be used to treat hypertension and/or angina. For people with heart failure with reduced ejection fraction, use amlodipine, and avoid verapamil, diltiazem and short-acting dihydropyridine agents in line with the NICE guideline on chronic heart failure in adults. **[2007,amended 2020]**

Potassium channel activators

1.4.34 Do not offer nicorandil to reduce cardiovascular risk after an MI. **[2007]**

Aldosterone antagonists in people with heart failure and reduced left ventricular ejection fraction

1.4.35 For people who have had an acute MI and who have symptoms and/or signs of heart failure and reduced left ventricular ejection fraction, initiate treatment with an aldosterone antagonist licensed for post-MI treatment within 3 to 14 days of the MI, preferably after ACE inhibitor therapy. **[2007]**

1.4.36 People who have recently had an acute MI and have clinical heart failure and reduced left ventricular ejection fraction, but who are already being treated with an aldosterone antagonist for a concomitant condition (for

example, chronic heart failure), should continue with the aldosterone antagonist or an alternative, licensed for early post-MI treatment. **[2007]**

1.4.37 For people who have had a proven MI in the past and heart failure due to reduced left ventricular ejection fraction, treatment with an aldosterone antagonist should be in line with the NICE guideline on chronic heart failure in adults. **[2007]**

1.4.38 Monitor renal function and serum potassium before and during treatment with an aldosterone antagonist. If hyperkalaemia is a problem, halve the dose of the aldosterone antagonist or stop the drug. **[2007]**

Statins and other lipid-lowering agents

1.4.39 Statin therapy is recommended for adults with clinical evidence of cardiovascular disease in line with the NICE guideline on cardiovascular disease. **[2007]**

1.5 Coronary revascularisation after an MI

1.5.1 Offer a cardiological assessment to everyone who has had a previous MI, but not had coronary revascularisation to consider whether coronary revascularisation is appropriate. This should take into account comorbidity. **[2007, amended 2020]**

1.6 Selected patient subgroups

People with reduced left ventricular ejection fraction

1.6.1 People who have reduced left ventricular ejection fraction should be considered for an implantable cardioverter defibrillator in line with NICE technology appraisal guidance on implantable cardioverter defibrillators and cardiac resynchronisation therapy for arrhythmias and heart failure. **[2007]**

People with hypertension

1.6.2 Treat hypertension in line with the NICE guideline on hypertension in adults. **[2007, amended 2013]**

1.7 Communication of diagnosis and advice

1.7.1 After an acute MI, ensure that the following are part of every discharge summary:

- confirmation of the diagnosis of acute MI
- results of investigations
- incomplete drug titrations
- future management plans
- advice on secondary prevention. **[2007, amended 2013]**

1.7.2 Offer a copy of the discharge summary to the person. **[2007]**

1.8 Cardiac rehabilitation after an MI

1.8.1 All people (regardless of their age) should be given advice about and offered a cardiac rehabilitation programme with an exercise component. **[2007]**

1.8.2 Cardiac rehabilitation programmes should provide a range of options, and people should be encouraged to attend all those appropriate to their clinical needs. People should not be excluded from the entire programme if they choose not to attend certain components. **[2007]**

1.8.3 If a person has cardiac or other clinical conditions that may worsen during exercise, these should be treated if possible before they are offered the exercise component of cardiac rehabilitation. For some people, the exercise component may be adapted by an appropriately qualified healthcare professional. **[2007]**

1.8.4 People with reduced left ventricular ejection fraction who are stable can safely be offered the exercise component of cardiac rehabilitation. **[2007]**

Encouraging people to attend

1.8.5 Deliver cardiac rehabilitation in a non-judgemental, respectful and culturally sensitive manner. Consider employing bilingual peer educators or cardiac rehabilitation assistants who reflect the diversity of the local population. **[2013]**

1.8.6 Establish people's health beliefs and their specific illness perceptions before offering appropriate lifestyle advice and to encourage attendance to a cardiac rehabilitation programme. **[2013]**

1.8.7 Offer cardiac rehabilitation programmes designed to motivate people to attend and complete the programme. Explain the benefits of attending. **[2013]**

1.8.8 Discuss with the person any factors that might stop them attending a cardiac rehabilitation programme, such as transport difficulties. **[2013]**

1.8.9 Offer cardiac rehabilitation programmes in a choice of venues (including at the person's home, in hospital and in the community) and at a choice of times of day, for example, sessions outside of working hours. Explain the options available. **[2013]**

1.8.10 Provide a range of different types of exercise, as part of the cardiac rehabilitation programme, to meet the needs of people of all ages, or those with significant comorbidity. Do not exclude people from the whole programme if they choose not to attend specific components. **[2013]**

1.8.11 Offer single-sex cardiac rehabilitation programme classes if there is sufficient demand. **[2013]**

1.8.12 Enrol people who have had an MI in a system of structured care, ensuring that there are clear lines of responsibility for arranging the early initiation of cardiac rehabilitation. **[2013]**

1.8.13 Begin cardiac rehabilitation as soon as possible after admission before discharge from hospital, and invite the person to a cardiac rehabilitation session. This should start within 10 days of their discharge from hospital. **[2013]**

1.8.14 Contact people who do not start or do not continue to attend the cardiac rehabilitation programme with a further reminder, such as:

- a motivational letter

- a prearranged visit from a member of the cardiac rehabilitation team
- a telephone call
- a combination of the above. **[2013]**

1.8.15 Seek feedback from cardiac rehabilitation programme users and aim to use this feedback to increase the number of people starting and attending the programme. **[2013]**

1.8.16 Be aware of the wider health and social care needs of a person who has had an MI. Offer information and sources of help on:

- economic issues
- welfare rights
- housing and social support issues. **[2013]**

1.8.17 Make cardiac rehabilitation equally accessible and relevant to all people after an MI, particularly people from groups that are less likely to access this service. These include people from black, Asian and minority ethnic groups, older people, people from lower socioeconomic groups, women, people from rural communities, people with a learning disability and people with mental and physical health conditions. **[2007, amended 2013]**

1.8.18 Encourage all staff, including senior medical staff, involved in providing care for people after an MI, to actively promote cardiac rehabilitation. **[2013]**

Health education and information needs

1.8.19 Comprehensive cardiac rehabilitation programmes should include health education and stress management components. **[2007**]

1.8.20 A home-based programme validated for people who have had an MI (such as The heart manual) that incorporates education, exercise and stress management components with follow-ups by a trained facilitator may be used to provide comprehensive cardiac rehabilitation. **[2007]**

1.8.21 Take into account the physical and psychological status of the patient, the nature of their work and their work environment when giving advice on returning to work. **[2007]**

1.8.22 Be up to date with the latest Driver and Vehicle Licensing Agency (DVLA) guidelines. Regular updates are published on the DVLA website. **[2007]**

1.8.23 After an MI without complications, people who wish to travel by air should seek advice from the Civil Aviation Authority website. People who have had a complicated MI need expert individual advice. **[2007, amended 2013]**

1.8.24 People who have had an MI who hold a pilot's licence should seek advice from the Civil Aviation Authority. **[2007]**

1.8.25 Take into account the person's physical and psychological status, as well as the type of activity planned when offering advice about the timing of returning to normal activities. **[2007]**

1.8.26 An estimate of the physical demand of a particular activity, and a comparison between activities, can be made using tables of metabolic equivalents (METS) of different activities (for further information please refer to the information from the Centers for Disease Control and Prevention). Advise people how to use a perceived exertion scale to help monitor physiological demand. People who have had a complicated MI may need expert advice. **[2007]**

1.8.27 Advice on competitive sport may need expert assessment of function and risk, and is dependent on what sport is being discussed and the level of competitiveness. **[2007]**

Psychological and social support

1.8.28 Offer stress management in the context of comprehensive cardiac rehabilitation. **[2007]**

1.8.29 Do not routinely offer complex psychological interventions such as cognitive behavioural therapy. **[2007]**

1.8.30 Involve partners or carers in the cardiac rehabilitation programme if the person wishes. **[2007]**

1.8.31 For recommendations on managing clinical anxiety or depression, refer to the NICE guidelines on anxiety, depression in adults and depression in adults with a chronic physical health problem. **[2007]**

Sexual activity

1.8.32 Reassure people that after recovery from an MI, sexual activity presents no greater risk of triggering a subsequent MI than if they had never had an MI. **[2007]**

1.8.33 Advise people who have made an uncomplicated recovery after their MI that they can resume sexual activity when they feel comfortable to do so, usually after about 4 weeks. **[2007]**

1.8.34 Raise the subject of sexual activity within the context of cardiac rehabilitation and aftercare for people who have had an MI. **[2007]**

1.9 Lifestyle changes after an MI

Changing diet

1.9.1 Advise people to eat a Mediterranean-style diet (more bread, fruit, vegetables and fish; less meat; and replace butter and cheese with products based on plant oils). **[2007]**

1.9.2 Do not routinely recommend eating oily fish for the sole purpose of preventing another MI. If people choose to consume oily fish after an MI, be aware that there is no evidence of harm, and fish may form part of a Mediterranean-style diet. **[2013]**

1.9.3 Do not offer or advise people to use the following to prevent another MI:

- omega-3 fatty acid capsules
- omega-3 fatty acid supplemented foods.

1.9.4 If people choose to take omega-3 fatty acid capsules or eat omega-3 fatty acid supplemented foods, be aware that there is no evidence of harm. **[2013]**

1.9.5 Advise people not to take supplements containing beta-carotene. Do not recommend antioxidant supplements (vitamin E and/or C) or folic acid to reduce cardiovascular risk. **[2007]**

1.9.6 Offer people an individual consultation to discuss diet, including their current eating habits, and advice on improving their diet. **[2007]**

1.9.7 Give people consistent dietary advice tailored to their needs. **[2007]**

1.9.8 Give people healthy eating advice that can be extended to the whole family. **[2007]**

Alcohol consumption

1.9.9 For advice on alcohol consumption, see the UK Chief Medical Officer's guidelines on low risk drinking. **[2020]**

Regular physical activity

1.9.10 Advise people to undertake regular physical activity sufficient to increase exercise capacity. **[2007]**

1.9.11 Advise people to be physically active for 20 to 30 minutes a day to the point of slight breathlessness. Advise people who are not active to this level to increase their activity in a gradual, step-by-step way, aiming to increase their exercise capacity. They should start at a level that is comfortable, and increase the duration and intensity of activity as they gain fitness. **[2007]**

1.9.12 Advice on physical activity should involve a discussion about current and past activity levels and preferences. The benefit of exercise may be enhanced by tailored advice from a suitably qualified professional. **[2007]**

Smoking cessation

1.9.13 Advise all people who smoke to stop and offer assistance from a smoking cessation service in line with the NICE guideline on stop smoking interventions and services. **[2007]**

1.9.14 If a person is unable or unwilling to accept a referral to a stop smoking service, they should be offered pharmacotherapy in line with the NICE guideline on stop smoking interventions and services. **[2007, amended 2020]**

Weight management

1.9.15 After an MI, offer all people who are overweight or obese advice and support to achieve and maintain a healthy weight in line with the NICE guideline on obesity. **[2007]**

Terms used in this guideline

Bailout glycoprotein IIb/IIIa inhibitor

Bailout glycoprotein inhibitor (GPI) refers to the use of GPI when the PCI operator has not intended to use GPI from the outset, but considers that clinical or angiographic features (such as worsening or persistent thrombus burden) have changed during the course of the procedure, such that there may be benefit to giving the patient GPI.

Recommendations for research

The guideline committee has made the following recommendations for research.

Key recommendations for research

1 Primary PCI and fibrinolysis in people with acute STEMI who have a long anticipated transfer time for primary PCI

In people with acute STEMI who present more than 1 hour after the onset of symptoms, is a primary PCI-related delay of 120–180 minutes associated with outcomes similar to, better or worse than pre-hospital administered fibrinolysis? **[2013]**

Why this is important

Primary PCI is the preferred coronary reperfusion therapy provided it can be delivered 'in a timely fashion'. It is suggested that primary PCI is the preferred reperfusion strategy for primary PCI-related delays of at least up to 2 hours. However, there is inadequate evidence to conclude whether primary PCI is still preferable at primary PCI-related time delays of more than 2 hours.

No specifically designed randomised controlled trial (RCT) or observational study has addressed the issue of the extent to which primary PCI-related time delay (and other factors such as presentation delay and a person's risk profile) diminishes the advantages of primary PCI over fibrinolysis. For example, in more geographically remote areas, a short presentation delay together with an anticipated long primary PCI-related delay could favour a strategy of pre-hospital fibrinolysis.

To answer this question, a RCT of pre-hospital fibrinolysis versus primary PCI in people with acute STEMI who have a primary PCI-related time delay of 2 hours or more is needed. Primary endpoints would include cardiovascular and all-cause mortality and other major adverse cardiovascular events.

2 Ischaemia testing

What is the role of ischaemia testing in people after an acute coronary syndrome and what is the comparative efficacy and cost effectiveness of the different non-invasive tests (for example, stress ECG, echocardiography, radionuclide scanning and magnetic resonance imaging)? **[2010]**

Why this is important

An increasing number of non-invasive tests are now available for the investigation of suspected myocardial ischaemia. These tests need different equipment, different clinical expertise, come at different costs and may differ in their ability to detect and quantify myocardial ischaemia. Their place in the routine investigation of patients admitted with unstable angina and NSTEMI (particularly those who have not undergone angiography), as opposed to their selective use, is not clear. Management of unstable angina and NSTEMI would be enhanced if the relative place of these investigations was better understood and an assessment of their cost effectiveness made.

3 Relationship between volume of procedures and clinical outcomes

What is the relationship between hospital volume of primary PCI procedures and optimal outcomes in people with acute STEMI? **[2013]**

Why this is important

There is a suggestion that outcomes may be better in larger-volume primary PCI units, and some retrospective registries have reported data to support this. However, the quality of the data is poor and still leaves the question open. In the UK, primary PCI is provided by units that vary greatly in the number of cases per year. The development of services has been ad hoc and not designed specifically around the provision of primary PCI. If it was possible to conclusively show that people were or were not better off being treated in larger volume units, then it would have important implications for the national provision of primary PCI.

4 Risk assessment – risk scoring systems

What is the clinical and cost effectiveness of the systematic use of risk scoring systems (in addition to clinical assessment) for ischaemic outcomes and bleeding complications in the management of unstable angina and NSTEMI (at all levels of risk) compared with clinical assessment alone? **[2010]**

Most risk scoring systems currently predict the likelihood of mortality or ischaemic cardiovascular events at various times after a patient's admission to hospital with an acute coronary syndrome. A number of interventions (such as drugs and revascularisation procedures) have been shown to reduce these adverse outcomes. This effect tends to be greatest in patients at highest risk. However, as a broad generalisation patients who are at highest ischaemic risk are also those who are at higher risk of bleeding complications associated with the use of multiple antiplatelet and antithrombin agents. There are fewer scoring systems that predict bleeding risk, but we know that bleeding complications are associated with a significantly worse outcome. Using a combination of scoring systems assessing ischaemic and bleeding risk when evaluating data from randomised trials and registries may help to determine where the net clinical benefit (reduction in ischaemic risk minus any increase in bleeding risk) lies.

5 Risk assessment – data from cardiac registries

For patients with unstable angina and NSTEMI (at differing levels of risk), how do clinical outcome data (adverse cardiovascular events and bleeding complications) collected in cardiac registries compare with data derived from RCTs? **[2010]**

Why this is important

Patients recruited to participate in clinical trials are often highly selected; trials tend not to include patients who are very elderly, are at high risk, or have significant comorbidity. On the other hand, good registry data include information on all patients, but are observational and not randomised. Often there is uncertainty about how the outcome data from RCTs can be applied to the much larger unselected population of patients admitted to UK hospitals with unstable angina or NSTEMI. A greater understanding of the differences between RCT and registry populations, and their levels of ischaemic and bleeding risk would help inform future management. Collection of well-validated registry data is essential if conclusions from RCTs are to be applied appropriately to all patients with unstable angina and NSTEMI, not just to patients who are comparable to trial populations.

6 Management of hyperglycaemia

What is the optimal management of hyperglycaemia in people with acute coronary syndrome who have diagnosed or previously undiagnosed diabetes? **[2011]**

Why this is important

Existing studies on the optimal management of hyperglycaemia in people who have acute coronary syndrome and diagnosed or previously undiagnosed diabetes are generally of poor quality.

It is recommended that a large RCT is conducted for people with acute coronary syndrome and hyperglycaemia (blood glucose 11 mmol/litre and over) stratified by NSTEMI and STEMI and by known diabetes and without a previous diagnosis of diabetes.

The interventions for the trial should be intravenous insulin or subcutaneous insulin administered within 4 hours of presentation to hospital. The aim is to achieve blood

glucose between 6 and 11 mmol/litre for at least 24 hours. The comparator should be standard care.

7 Beta blockers

Does continuing beta-blocker treatment beyond 1 year after an MI improve outcomes for people with normal left ventricular systolic function? **[2013]**

Why this is important

Recent cohort studies have suggested that continuing treatment with a beta-blocker beyond a year after an acute MI may not confer any benefit to the person in terms of reduced morbidity or mortality. This is particularly relevant given recent changes in acute management strategies. While beta-blockers are valuable in reducing mortality and morbidity for up to a year after an MI, they have side effects and represent an additional treatment burden to people who are already taking many other medications. However, there is also some suggestion that there are risks associated with withdrawal of beta-blockers in this population. The balance of risks and benefits of long-term beta blockade has not been clearly determined, particularly in the context of modern acute treatment of MI.

Rationale and impact

These sections briefly explain why the committee made the recommendations and how they might affect practice. They link to details of the evidence and a full description of the committee's discussion.

Dual antiplatelet therapy for acute STEMI intended for primary PCI

Recommendation 1.1.12

Why the committee made the recommendations

Evidence was reviewed comparing the clinical effectiveness of clopidogrel, prasugrel and ticagrelor, each in combination with aspirin, at time points of 30 days and 1 year. Prasugrel and ticagrelor were more effective than clopidogrel at both time-points. In a network meta-analysis of the 30-day data, prasugrel was more effective than ticagrelor, although with some uncertainty around this conclusion. Prasugrel was more effective than ticagrelor at 1 year with noteworthy differences in all-cause

mortality and re-infarction. A detailed cost-effectiveness analysis was performed incorporating data at both time-points and this indicated that prasugrel is the most cost-effective option. The committee agreed that clinical evidence and cost-effectiveness results are directly applicable to the treatment of ST-elevation myocardial infarction (STEMI) in the NHS, and recommended prasugrel for people with STEMI undergoing percutaneous coronary intervention (PCI).

How the recommendations might affect practice

In the UK, prasugrel is currently used less than ticagrelor or clopidogrel. The recommendation will therefore require a change in prescribing for most centres, but should be easily achievable. Prasugrel costs less than ticagrelor, but considerably more than clopidogrel, and although some areas will see a cost saving from switching to prasugrel from ticagrelor, the overall effect of this recommendation will be an increase in cost to the NHS.

Full details of the evidence and the committee's discussion are in evidence review A: antiplatelet therapy

Return to recommendations

Antithrombin therapy during primary PCI for acute STEMI

Recommendations 1.1.13 to 1.1.14

Why the committee made the recommendations

When considering the evidence on the effectiveness of bivalirudin for people with acute STEMI undergoing primary PCI, the committee gave more weight to studies that were closest to current UK practice. These included studies that used bailout or selective, rather than routine, glycoprotein inhibitors (GPIs) and radial artery rather than femoral artery access. The committee concluded that there was no convincing difference between bivalirudin and the main alternative, heparin, in terms of mortality, and that bivalirudin is inferior to heparin in reducing the need for subsequent unplanned revascularisation. The committee discussed data on bleeding risk and agreed that there is no clinically significant difference between bivalirudin and heparin when radial access is used, but bivalirudin probably lowers the bleeding

risk when access via the femoral artery is needed. The committee noted that heparin is cheaper than bivalirudin and easier to administer.

How the recommendations might affect practice

The committee agreed that the recommendations generally reflect current practice and are not expected to result in a substantial resource impact to the NHS in England.

Full details of the evidence and the committee's discussion are in evidence review D: antithrombin therapy in adults with STEMI intended for primary percutaneous coronary intervention

Return to recommendations

Complete revascularisation with PCI or culprit vessel only PCI for acute STEMI

Recommendations 1.1.17 to 1.1.18

Why the committee made the recommendations

Evidence showed that complete revascularisation with multivessel PCI reduced cardiovascular mortality, MI and repeat revascularisation at 1 year compared with culprit vessel only PCI for people with acute STEMI without cardiogenic shock. It was also associated with lower overall costs.

Although the evidence clearly favoured complete revascularisation, there was less certainty about the timing of the non-culprit procedure. There are a number of different possible approaches to multivessel PCI: undertaking multivessel revascularisation at the time of primary PCI; treating the culprit vessel during the primary procedure and then bringing the person back to the catheter laboratory for revascularisation of other vessels later in the index admission; or treating the culprit vessel during primary PCI, discharging the person and then electively readmitting them for further revascularisation. The committee agreed that multivessel PCI during the index admission should be considered, either at the time of primary PCI or later during the same admission. They were concerned that the clinical benefits may be lower and costs may be higher when people are discharged and readmitted, and

noted that delaying treatment of the non-culprit lesions is worrying for patients. However, they agreed that the optimal timing within the index admission will depend on a number of variables and is best left to the discretion of the clinical team.

People with cardiogenic shock were excluded from the studies of multivessel PCI and the committee agreed that, in view of the results from the CULPRIT-SHOCK trial, it was not appropriate to recommend multivessel PCI for this group.

How the recommendations might affect practice

Current practice is variable across centres and also within centres. Some offer multivessel PCI during the first procedure for acute STEMI but others may postpone this (either to later within the index admission or to a later readmission). Some operate on the culprit vessel only. The recommendations are therefore likely to result in a change in practice, but not for all centres or all professionals performing PCI. As the recommendations allow for multivessel PCI to be either at the time of primary PCI or later within the index admission, they offer flexibility to accommodate situations in which there are a number of other people waiting for primary PCI. Healthcare professionals can move on to treat the next person after completing revascularisation of the culprit vessel, minimising the overall impact on primary PCI services.

There will be a resource impact for centres not currently undertaking multivessel PCI, because multivessel PCI has higher costs than culprit vessel only PCI. Audit data reported by MINAP (the Myocardial Ischaemia National Audit Project) between April 2016 and March 2017 show there were 33,797 cases of STEMI reported in England, Wales, Northern Ireland and the Isle of Man. It is estimated that around 30% will present with multivessel disease, which would be around 10,000 people. However, it is unclear for how many of these people multivessel PCI would be suitable. The change from current practice is likely to be cost saving overall because of the reduction in later revascularisation procedures.

Full details of the evidence and the committee's discussion are in evidence review E: culprit versus complete revascularisation.

Return to recommendations

Drug-eluting stents

Recommendations 1.1.19 and 1.2.17

Why the committee made the recommendations

Evidence from angiography studies showed that drug-eluting stents are less likely to fail than bare metal stents in terms of both recurrence of obstruction to the target vessel and the need for further revascularisation. The evidence also shows that drug-eluting stents may be beneficial in reducing deaths (all-cause and cardiac). There is also a reduced incidence of MI in the 3 years after revascularisation when drug-eluting stents are used. Costs of drug-eluting stents are higher than bare metal stents, but analyses using current cost and benefit data suggest that they are a cost-effective use of resources.

How the recommendations might affect practice

The use of drug-eluting stents has been slowly increasing over recent years in the UK and the most recent national audit data show that 91% of PCIs for acute coronary syndromes used stents and 97% of these used drug-eluting stents. The recommendation will therefore involve little change from current practice and will not have a substantial resource impact for the NHS in England.

Full details of the evidence and the committee's discussion are in evidence review F: evidence review F: drug-eluting stents.

Return to recommendations

Antiplatelet therapy for STEMI not treated with PCI

Recommendations 1.1.25 to 1.1.26

Why the committee made the recommendations

The UK licence for prasugrel is for people with acute coronary syndrome who are proceeding to coronary angiography with a view to PCI. Although this is usual practice for most people with STEMI, for some people either medical management without coronary revascularisation or coronary artery surgery are better options. The evidence comparing the clinical effectiveness of clopidogrel and ticagrelor was largely for people receiving PCI. This showed convincing superiority of ticagrelor in

reducing mortality (cardiac and all-cause) and in preventing re-infarction and the need for future revascularisation procedures, although there was some evidence of increased risk of bleeding complications. The committee agreed to recommend ticagrelor for people with STEMI having medical management without coronary revascularisation or coronary artery surgery, unless they were at high risk of bleeding. For people at higher risk of bleeding, clopidogrel or no second antiplatelet may be the safer option.

How the recommendations might affect practice

In the UK, both ticagrelor and clopidogrel are currently used for STEMI that is managed without PCI. The recommendations require a change in practice for most, but not all, people who would otherwise receive clopidogrel. Ticagrelor costs considerably more than clopidogrel, and although the recommendations apply to a minority of people with STEMI, the effect will be an increase in cost to the NHS.

Full details of the evidence and the committee's discussion are in evidence review A: antiplatelet therapy

Return to recommendations

Initial antithrombin therapy for unstable angina and NSTEMI

Recommendation 1.2.3 and 1.2.15

Why the committee made the recommendation

The 2010 NICE guideline on unstable angina and NSTEMI recommended fondaparinux rather than low molecular weight heparin for initial management. The recommendation was based mainly on evidence from a single large study (the OASIS-5 study). This study showed a small risk of catheter thrombosis when fondaparinux was the only antithrombin used before angiography, and therefore the 2010 guideline recommended not to use fondaparinux when angiography is planned within 24 hours. The thrombosis risk was noted by the OASIS-5 investigators before the study ended, and in the later phase of the study people were given intravenous unfractionated heparin with fondaparinux during angiography; this appeared to remove the excess risk of catheter thrombosis. Two further small studies published after 2010 have confirmed that giving unfractionated heparin to people already

receiving fondaparinux removed the excess risk of catheter thrombosis. The committee consider that unfractionated heparin is already used in this way in many centres, and agreed with the 2010 guideline that fondaparinux is the most cost-effective option. They therefore recommended that fondaparinux should be given to people who are not at high risk of bleeding unless they are having immediate angiography. People receiving fondaparinux should be given additional systemic unfractionated heparin in the catheter laboratory.

How the recommendations might affect practice

Fondaparinux is already used before angiography in many centres in the UK, with additional unfractionated heparin given during the procedure. The recommendations will affect those centres currently withholding fondaparinux from people having angiography in the next 24 hours. Fondaparinux is a cheaper option than low molecular weight heparin so the recommendation could be cost saving in these centres.

Full details of the evidence and the committee's discussion are in evidence review C: antithrombin for unstable angina and NSTEMI

Return to recommendations

Early invasive versus conservative management for unstable angina and NSTEMI

Recommendations 1.2.12 to 1.2.14 and 1.2.18

Why the committee made the recommendations

The 2010 guideline on unstable angina and NSTEMI recommended a comprehensive assessment of baseline risk of adverse events. The committee agreed that this should influence the choice between early invasive intervention (coronary angiography, with PCI if indicated) and conservative management (initial medical management, proceeding to coronary angiography and PCI if indicated only if there is evidence of recurrent ischemia). Studies comparing these options show a short-term harm with an invasive strategy, but this is offset by the clinical benefits in the months following the procedure. A cost-effectiveness analysis found that routine early invasive intervention was cost effective in people at higher risk of adverse

events but conservative management was the most cost-effective option for people at lower risk. This was because overall health gains were greater in those at higher baseline risk. Most of the evidence was already available at the time of the 2010 guideline, and the committee recognised that the data may be less applicable to modern practice than had been the case in 2010. However, they agreed that early angiography should be the default recommendation for most people at intermediate or higher baseline risk of adverse outcomes and accepted the previous committee's interpretation of the appropriate risk cut-offs based on their detailed work mapping the evidence to real world UK risk data.

The committee noted that the 2010 guideline had recommended that angiography should be done within 96 hours of admission for those who are likely to benefit from an early invasive strategy. However, they considered this a conservative target and knew that angiography within 72 hours is now common practice. This allows time for a correct diagnosis, immediate stabilisation and treatment of symptoms, and transfer to a centre with PCI facilities if necessary.

How the recommendations might affect practice

The recommendations largely reflect current NHS practice. Although the timeframe for early invasive management has been reduced from 96 hours, 72 hours has been specified in the NICE quality standard for a number of years and a best practice tariff on the same basis was introduced in 2017. Audit data are only currently available from the same year as the introduction of the tariff and report that, of people who are admitted to a hospital that can perform angiography, 56% received angiography within 72 hours and 69% within 96 hours. The proportion receiving angiography within 72 hours is likely to be higher since the introduction of the best practice tariff. Performing angiography earlier is likely to result in a shorter hospital stay. The recommendations are unlikely to result in a substantial resource impact for the NHS.

Full details of the evidence and the committee's discussion are in evidence review B: early invasive versus conservative management for unstable angina and NSTEMI.

Return to recommendations

Antiplatelet therapy for unstable angina and NSTEMI

Recommendations 1.2.6, 1.2.16, 1.2.19 to 1.2.20

Why the committee made the recommendations

Unstable angina and NSTEMI intended for PCI

Evidence was reviewed comparing the clinical effectiveness of clopidogrel, prasugrel and ticagrelor, each in combination with aspirin, at time points of 30 days and 1 year. A detailed cost-effectiveness analysis for people with unstable angina or NSTEMI undergoing PCI was performed incorporating these data. Although the overall conclusion was that prasugrel is a more-effective agent than ticagrelor, which in turn is more effective than clopidogrel, there was considerable uncertainty around the cost-effectiveness results, with either prasugrel or ticagrelor being most cost effective in different scenarios. The results favouring prasugrel were driven by the ISAR-REACT 5 trial, in which time to angiography was much shorter than is currently achieved in the UK for people with unstable angina or NSTEMI. This could cause practical difficulty in using prasugrel because its licence effectively prevents its use before angiography, and this could leave people with unstable angina or NSTEMI without dual antiplatelet therapy for several days. The committee therefore recommended either prasugrel or ticagrelor for people with unstable angina or NSTEMI intended for PCI, depending on individual circumstances.

Unstable angina and NSTEMI – management when PCI is not indicated

Although usual practice is to proceed to PCI, for some people either medical management without coronary revascularisation or coronary artery surgery are better options. Prasugrel is not licensed in these circumstances. The evidence available for medical management shows better outcomes with ticagrelor than clopidogrel. This is consistent with results from the larger datasets for people having PCI. The committee therefore recommended ticagrelor for people with unstable angina or NSTEMI having either medical management without coronary revascularisation or coronary artery surgery. However, the committee also noted that clopidogrel may be the safer agent for people who are at high risk of bleeding but still need dual antiplatelet therapy. They therefore made a recommendation to cover this situation.

How the recommendations might affect practice

In the UK, prasugrel is currently used less than ticagrelor or clopidogrel. The recommendations may therefore involve a change in practice for some centres. Prasugrel costs less than ticagrelor, but considerably more than clopidogrel, and although some areas will see a cost saving from switching to prasugrel from ticagrelor, others will see an increase where either prasugrel or ticagrelor is used instead of clopidogrel. The overall effect of these recommendations will be an increase in cost to the NHS.

Full details of the evidence and the committee's discussion are in evidence review A: antiplatelet therapy

Return to recommendations

Antiplatelet therapy for people with an indication for anticoagulation

Recommendations 1.4.18 to 1.4.22

Why the committee made the recommendations

The committee noted that current practice is to use dual antiplatelet therapy at the time of PCI, and found no evidence to recommend changing this practice for people who are on an anticoagulant at the time of admission. In the absence of any conclusive data, the committee based their recommendations for treatment after this initial phase on their knowledge and experience. For people who have had PCI and stent insertion they agreed that it would be safest to combine an anticoagulant with a potent antiplatelet agent (clopidogrel), whereas for those who have been managed medically or had angioplasty without stenting the anticoagulant should be combined with aspirin. There was not enough evidence for the committee to recommend a particular anticoagulant.

How the recommendations might affect practice

Current practice is variable, with people taking different variations of antiplatelets and anticoagulants. The number of people affected is small. It is estimated that between 5 and 15% of people with an acute coronary syndrome will have an indication for oral anticoagulation. The recommendations are mostly unchanged from the 2013

guideline and the minor changes that have been made are unlikely to result in a substantial resource impact for the NHS in England.

Full details of the evidence and the committee's discussion are in evidence review G: combination therapy

Return to recommendations

Duration of beta-blocker treatment after an MI

Recommendations 1.4.26 to 1.4.27

Why the committee made the recommendations

There was no direct evidence on the optimal duration of beta-blocker treatment for people who have had an MI but do not have reduced left ventricular ejection fraction. The 2013 guideline recommended beta-blocker treatment for at least 12 months. In the absence of any conclusive evidence, the committee agreed that they could not recommend a definite time for stopping treatment. However, they agreed that healthcare professionals should discuss the absence of clear evidence for benefit of continuing beyond 12 months with people taking beta-blockers after an MI who have normal left ventricular function. This should prompt a personalised approach to stopping or continuing beta-blockers based on the person's attitude to risk and experience of side effects.

How the recommendations might affect practice

Beta-blockers are currently offered for at least 12 months after an MI to people without reduced left ventricular ejection fraction. Audit data show that around 97% of people with MI are discharged on beta-blockers. A discussion of the absence of clear evidence for benefit of continuing treatment beyond 12 months is likely to lead to more people deciding to stop treatment at this point. Any reduction in prescriptions for beta-blockers will be cost saving.

Full details of the evidence and the committee's discussion are in evidence review H: beta-blockers

Return to recommendations

Context

Acute coronary syndromes due to ischaemic heart disease remain a significant cause of morbidity and mortality. In 2015, heart disease remained the leading cause of death in men and second most-common cause of death in women in England. In 2015/16, more than 58,000 people were admitted to hospital in England with a heart attack. Although many more people now survive than in the past, there remains considerable scope to reduce their future risk of death, angina, heart failure and further heart attack.

National audits continue to show variation in practice across the UK in the treatments offered for acute coronary syndromes. This, combined with evidence of novel ways of treating acute coronary syndromes and updates to existing treatments, indicates a need for an updated guideline that will help deliver best practice to the large number of people treated for acute coronary syndromes by the NHS.

Finding more information and resources

To find out what NICE has said on topics related to this guideline, see our webpage on cardiovascular conditions.

Update information

July 2020

This guideline updates NICE guideline CG172 (published November 2013), NICE guideline CG167 (published July 2013), NICE technology appraisal guidance 230 (published July 2011), NICE guideline CG94 (published March 2010) and NICE technology appraisal guidance 152 (published July 2008). It incorporates and contextualises NICE technology appraisal guidance 317 (published July 2014) and NICE technology appraisal guidance 236 (published October 2011). It incorporates unchanged NICE guideline CG130 (published October 2011).

We have reviewed the evidence on the dual antiplatelet therapy, early angiography for unstable angina and NSTEMI, antithrombin therapy before percutaneous coronary intervention (PCI), complete revascularisation versus culprit vessel only PCI for STEMI, drug-eluting stents, combination antiplatelet and anticoagulant

treatment for people with an indication for anticoagulation, and duration of beta-blocker treatment for people with reduced left ventricular ejection fraction after MI.

Recommendations are marked **[2020]** if the evidence has been reviewed.

Recommendations that have been deleted or changed

We propose to delete some recommendations from the guideline. Table 1 sets out these recommendations and includes details of replacement recommendations. If there is no replacement recommendation, an explanation for the proposed deletion is given.

In recommendations shaded in grey and ending **[….amended 2020]**, we have made changes that could affect the intent without reviewing the evidence. Yellow shading is used to highlight these changes, and reasons for the changes are given in table 2.

In recommendations shaded in grey without yellow highlighting we have not reviewed the evidence and have not changed the intent of the recommendation. In some cases minor changes have been made – for example, to update links, or bring the language and style up to date – without changing the intent of the recommendation. The types of minor changes are indicated in table 3.

See also the previous NICE guidelines and supporting documents.

1 Table 1 Recommendations that have been deleted

Recommendation in previous guideline	Comment
CG167 (1.1.12) Offer unfractionated heparin or low molecular weight heparin to people with acute STEMI who are undergoing primary PCI and have been treated with prasugrel or ticagrelor.	Replaced by: Offer unfractionated heparin with bailout glycoprotein IIb/IIIa inhibitor in combination with dual antiplatelet therapy to people with acute STEMI undergoing primary PCI with radial access. [2020] (1.1.13) Consider bivalirudin with bailout glycoprotein IIb/IIIa inhibitor in combination with dual antiplatelet therapy for people with acute STEMI undergoing primary PCI when femoral access is needed. [2020] (1.1.14)
CG167 (1.1.19) Offer people who have had an acute STEMI written and oral information, advice, support and treatment on related conditions and secondary prevention (including lifestyle advice), as relevant, in line with published NICE guidance (see table 1). [2013]	This recommendation has been deleted because the advice is covered by recommendations from CG172.
CG167 (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.	This recommendation has been deleted because commissioning of primary PCI services is now covered by NHS England special commissioning arrangements and NICE quality standards
TA230 Bivalirudin in combination with aspirin and clopidogrel is recommended for the treatment of adults with STEMI undergoing primary PCI. [This recommendation is from Bivalirudin for the treatment of ST-segment-elevation myocardial infarction (NICE technology appraisal guidance 230).]	Replaced by: Offer unfractionated heparin with bailout glycoprotein IIb/IIIa inhibitor in combination with dual antiplatelet therapy to people with acute STEMI undergoing primary PCI with radial access. [2020] (1.1.13) Consider bivalirudin with bailout glycoprotein IIb/IIIa inhibitor in combination with dual antiplatelet therapy for people with acute STEMI undergoing primary PCI when femoral access is needed. [2020] (1.1.14)
CG94 (1.3.1) For people with unstable angina and NSTEMI with aspirin hypersensitivity, clopidogrel monotherapy should be	Not required as the advice is covered by a recommendation from CG172: For people with aspirin hypersensitivity who have had an MI, clopidogrel

considered an alternative treatment. [2007]	monotherapy should be considered as an alternative treatment. [2007] (1.4.14)
CG94 (1.3.4) As soon as the risk of adverse cardiovascular events has been assessed, offer a loading dose of 300 mg clopidogrel in addition to aspirin to people with a predicted 6-month mortality of more than 1.5% and no contraindications (for example, an excessive bleeding risk). **[2010]**	Replaced by: Offer prasugrel or ticagrelor, as part of dual antiplatelet therapy with aspirin, to people with unstable angina and NSTEMI who are having coronary angiography. If treating with prasugrel, only give it once coronary anatomy has been defined and PCI is intended. Use the maintenance dose in the summary of product characteristics. [2020] (1.2.16) Consider clopidogrel as part of dual antiplatelet therapy with aspirin, or aspirin alone, for people with unstable angina and NSTEMI when PCI is not indicated, if they have a high bleeding risk [2020] (1.2.20)
CG94 (1.3.5) Offer a 300-mg loading dose of clopidogrel to all people with unstable angina and NSTEMI and no contraindications who may undergo PCI within 24 hours of admission to hospital, . **[2010]**	Replaced by: Offer prasugrel or ticagrelor, as part of dual antiplatelet therapy with aspirin, to people with unstable angina and NSTEMI who are having coronary angiography. If treating with prasugrel, only give it once coronary anatomy has been defined and PCI is intended. Use the maintenance dose in the summary of product characteristics. [2020] (1.2.16) Consider clopidogrel as part of dual antiplatelet therapy with aspirin, or aspirin alone, for people with unstable angina and NSTEMI when PCI is not indicated, if they have a high bleeding risk [2020] (1.2.20)
CG94 (1.3.6) Offer clopidogrel as a treatment option for up to 12 months to people who have had an NSTEMI, regardless of treatment. This recommendation is from MI-secondary prevention (http://www.nice.org.uk/guidance/cg172), NICE clinical guideline 172.)	Replaced by: Offer prasugrel or ticagrelor, as part of dual antiplatelet therapy with aspirin, to people with unstable angina and NSTEMI who are having coronary angiography. If treating with prasugrel, only give it once coronary anatomy has been defined and PCI is intended. Use the maintenance dose in the summary of product characteristics. [2020] (1.2.16) Consider clopidogrel as part of dual antiplatelet therapy with aspirin, or aspirin alone, for people with unstable angina

	and NSTEMI when PCI is not indicated, if they have a high bleeding risk [2020] (1.2.20)
CG94 (1.3.7) Consider discontinuing clopidogrel treatment 5 days before CABG in people who have a low risk of adverse cardiovascular events. **[2010]**	This recommendation is no longer valid because clopidogrel is no longer the main second antiplatelet agent.
CG94 (1.3.8) For people at intermediate or higher risk of adverse cardiovascular events, discuss the continuation of clopidogrel before CABG with the cardiac surgeon and base the decision on the balance of ischaemic and bleeding risk. **[2010]**	This recommendation is no longer valid because clopidogrel is no longer the main second antiplatelet agent.
CG94 (1.3.9) Consider intravenous eptifibatide or tirofiban 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. **[2010]**	This recommendation has been deleted because there are limited data on the effects of adding a glycoprotein inhibitor to prasugrel or ticagrelor, and routine addition of a GPI for these patients is not in line with current clinical practice.
CG94 (1.3.10) Consider abciximab as an adjunct to PCI for people at intermediate or higher risk of adverse cardiovascular events who are not already receiving a GPI. **[2010]**	This recommendation has been deleted because abciximab is no longer manufactured.
CG94 (1.3.11) Balance the potential reduction in a patient's ischaemic risk with any increased risk of bleeding, when determining whether a GPI should be offered. **[2010]**	This recommendation has been deleted in line with the removal of recommendations 1.3.9 and 1.3.10 from CG94.
CG94 (1.4.2) Offer unfractionated heparin as an alternative to fondaparinux to patients who are likely to undergo coronary angiography within 24 hours of admission. **[2010]**	Replaced by: Offer fondaparinux to people who do not have a high bleeding risk, unless they are undergoing immediate coronary angiography. [2020] (1.2.3)
CG94 (1.4.6) As an alternative to the combination of heparin plus a GPI, consider bivalirudin for patients who: • are at intermediate or higher risk of adverse cardiovascular events (predicted 6-month mortality above 3%), and	This recommendation has been deleted because it is no longer clinical practice.

• are not already receiving a GPI or fondaparinux, and • are scheduled to undergo angiography (with follow-on PCI if indicated) within 24 hours of admission.	
CG94 (1.4.7) As an alternative to the combination of a heparin plus a GPI, consider bivalirudin for patients undergoing PCI who: • are at intermediate or higher risk of adverse cardiovascular events, and • are not already receiving a GPI or fondaparinux.	This recommendation has been deleted because it is no longer clinical practice.
CG94 (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.	Replaced by: Consider coronary angiography (with follow-on PCI if indicated) within 72 hours of first admission for people with unstable angina and NSTEMI who have an intermediate or higher risk of adverse cardiovascular events (predicted 6-month mortality above 3.0%) and no contraindications to angiography (such as active bleeding or comorbidity). [2020] (1.2.13)
CG94 (1.5.2) Offer conservative management without early coronary angiography to patients with a low risk of adverse cardiovascular events (predicted 6-month mortality 3.0% or less).	Replaced by: Consider conservative management without early coronary angiography for people with unstable angina and NSTEMI who have a low risk of adverse cardiovascular events (predicted 6-month mortality 3.0% or less). [2020] (1.2.18)
CG94 (1.5.3) Offer coronary angiography (with follow-on PCI if indicated) to patients initially assessed to be at low risk of adverse cardiovascular events (predicted 6-month mortality 3.0% or less) if ischaemia is subsequently experienced or is demonstrated by ischaemia testing.	Replaced by: Consider coronary angiography (with follow-on PCI if indicated) for people with unstable angina and NSTEMI who are initially assessed to be at low risk of adverse cardiovascular events (predicted 6-month mortality 3.0% or less) if ischaemia is subsequently experienced or is demonstrated by ischaemia testing. [2020] (1.2.14)
CG94 (1.5.10) Before discharge offer people with unstable angina and NSTEMI advice and information about: • their diagnosis and arrangements for follow-up (in line with 'MI: secondary prevention', NICE	Advice is covered by recommendations from CG172

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). [2010]	
TA 152 Drug-eluting stents are recommended for use in percutaneous coronary intervention for the treatment of coronary artery disease, within their instructions for use, only if: • the target artery to be treated has less than a 3-mm calibre or the lesion is longer than 15 mm, and • the price difference between drug-eluting stents and bare-metal stents is no more than £300.	Replaced by: If stenting is indicated, offer a drug-eluting stent to people with acute STEMI undergoing revascularisation by primary PCI [(1.1.19) If stenting is indicated, offer a drug-eluting stent to people with unstable angina and NSTEMI undergoing revascularisation by PCI. [2020] (1.2.17)
CG172 (1.3.19) Offer clopidogrel as a treatment option for at least 1 month and consider continuing for up to 12 months to: • people who have had a STEMI and medical management with or without reperfusion treatment with a fibrinolytic agent [2013]	Replaced by: Continue dual antiplatelet therapy for up to 12 months after an MI unless contraindicated. [2020] (1.4.13)
CG172 (1.3.20) Continue the second antiplatelet agent for up to 12 months in people who have had a STEMI and who received coronary artery bypass graft (CABG) surgery. [2013]	Replaced by: Continue dual antiplatelet therapy for up to 12 months after an MI unless contraindicated. [2020] (1.4.13)
CG172 (1.3.23) Unless there is a high risk of bleeding, continue anticoagulation and add aspirin to treatment in people who have had an MI who otherwise need anticoagulation and who: • have had their condition managed medically or • have undergone balloon	Replaced by: For people already on anticoagulation who have had an acute coronary syndrome and PCI with stenting, continue anticoagulation and add clopidogrel for up to 12 months. If the person is taking a direct oral anticoagulant, adjust and monitor dose according to bleeding risk, thromboembolic risk and cardiovascular

angioplasty or • have undergone CABG surgery. [new 2013]	risk. [2020] (1.4.19) For people already on anticoagulation who have had an acute coronary syndrome and have not had stenting (medical management, balloon angioplasty, CABG), continue anticoagulation and, unless there is a high risk of bleeding, consider adding aspirin (or clopidogrel for people with contraindication for aspirin) for up to 12 months. [2020] (1.4.20)
CG172 (1.3.25) Offer clopidogrel with warfarin for people with a sensitivity to aspirin who otherwise need anticoagulation and aspirin and who have had an MI. [2013]	Replaced by: For people already on anticoagulation who have had an acute coronary syndrome and have not had stenting (medical management, balloon angioplasty, CABG), continue anticoagulation and, unless there is a high risk of bleeding, consider adding aspirin (or clopidogrel for people with contraindication for aspirin) for up to 12 months. [2020](1.4.20)
CG172 (1.3.28) Do not add a new oral anticoagulant (rivaroxaban, apixaban or dabigatran) in combination with dual antiplatelet therapy in people who otherwise need anticoagulation, who have had an MI. [new 2013]	This recommendation has been deleted because it is now covered by recommendations 1.4.18 – 1.4.23.
CG172 (1.3.29) Consider using warfarin and discontinuing treatment with a new oral anticoagulant (rivaroxaban, apixaban or dabigatran) in people who otherwise need anticoagulation and who have had an MI, unless there is a specific clinical indication to continue it. [new 2013]	Replaced by: For people already on anticoagulation who have had an acute coronary syndrome and PCI with stenting, continue anticoagulation and add clopidogrel for up to 12 months. If the person is taking a direct oral anticoagulant, adjust and monitor dose according to bleeding risk, thromboembolic risk and cardiovascular risk. [2020] (1.4.19) For people already on anticoagulation who have had an acute coronary syndrome and have not had stenting (medical management, balloon angioplasty, CABG), continue anticoagulation and, unless there is a high risk of bleeding, consider adding aspirin (or clopidogrel for people with contraindication for aspirin) for up to 12 months. [2020] (1.4.20)

	For people with an acute coronary syndrome and a new indication for anticoagulation, offer clopidogrel for up to 12 months and an oral anticoagulant licensed for the indication, which best matches the person's: • thromboembolic risk • bleeding risk • cardiovascular risk • wishes. [2020] (1.4.21) Do not routinely offer prasugrel or ticagrelor in combination with anticoagulant needed for an ongoing separate indication for anticoagulation. [2020] (1.4.22).

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Table 2 Amended recommendation wording (change to intent) without an evidence review

Recommendation in previous guideline	Recommendation in current guideline	Reason for change
CG 172 (1.2.8) Advise people who drink alcohol to keep weekly consumption within safe limits (no more than 21 units of alcohol per week for men, or 14 units per week for women) and to avoid binge drinking (more than 3 alcoholic drinks in 1–2 hours). **[2007]**	For advice on alcohol consumption, please refer to the UK Chief Medical Officer's low risk drinking guidelines [2020] (1.9.9)	Recommendation changed to reflect latest DHSC guidance on alcohol
CG172, 1.3.4 Offer an assessment of left ventricular function to all people who have had an MI [2013]	Replaced by: Assess left ventricular function in all people who have had a STEMI (1.1.28) Assess left ventricular function in all people who have had an NSTEMI (1.2.25)	For ease of reading, the recommendation has been split for STEMI and NSTEMI
CG 172, 1.3.38 For patients who are stable after an MI, calcium channel blockers may be used to treat hypertension and /or angina. For patients with heart failure, use amplodipine, and avoid verapamil, diltiazem and short-acting dihydropyridine agents in line with Chronic heart failure (NICE clinical guideline 108). [2007]	For people whose condition is stable after an MI, calcium channel blockers may be used to treat hypertension and/or angina. For people with heart failure with reduced ejection fraction, use amlodipine, and avoid verapamil, diltiazem and short-acting dihydropyridine agents in line with the NICE guideline on chronic heart failure in adults. [2007,amended 2020] (1.4.33)	Amend to align with updated guideline NG106
CG 172 (1.4.1) Offer everyone who has had an MI a cardiological assessment to consider whether coronary revascularisation is appropriate. This should take into account comorbidity. [2007]	Offer a cardiological assessment to everyone who has had a previous MI, but not had coronary revascularisation to consider whether coronary revascularisation is appropriate. This should take into account comorbidity. [2007] (1.5.1)	
CG167 (1.1.7)	Offer medical management to people with acute STEMI	Added 'any' to make clear reperfusion

	who are ineligible for any reperfusion therapy. [2013] (1.1.27)	includes PCI and fibrinolysis in this recommendation, as was intended by CG167.

Table 3 Minor changes to recommendation wording (no change to intent)

Recommendation numbers in current guideline	Comment
All recommendations except those labelled **[2020]**	In some cases, we have updated links and made minor language changes without changing the intent of the recommendation. Yellow highlighting has not been applied to these changes.