Chest pain of recent onset (standing committee update)
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British Association for Nursing in Cardiovascular Care	Addendum	11	5 & 6	This will have a big impact on the care of all patients. This recommendation will avoid discrimination and everyone will have equal opportunities in the care they receive. The challenges that might be faced with are, for people to access the service through their GP and not to feel that they are a burden. I feel that education will play a big role here. Educating the public on what their rights are when it comes to their care. The specialist nurses in the acute setting will play an important role here in education and provision of information to their clients who are accessing their service.	Thank you for your comment. The recommendations to which you refer (not to define typicality of chest pain differently in men and women or in different ethnic groups) were outside the remit of the current update, so have not changed since the original guideline was published (2010). NICE fully supports equity of access to cost-effective healthcare and is committed to patient and public involvement in healthcare decision-making. All guidelines and updates are published on the NICE website and are supported by an 'Information for the Public' version.
British Association for Nursing in Cardiovascular Care	Addendum	13	24 & 25	I am concerned about the time frame of when additional diagnostic investigations will occur, when non-invasive functional imaging is found to be inconclusive. I feel this might have a cost implication, because if the person have to wait in the hospital for this, it might block beds and that could potentially be a problem for Trusts. If the patient have to wait in the community, the psychological implications might be high for that person and their carers. I feel the guideline should be more specific regarding time frames for this to occur.	Thank you for your comment. Invasive coronary angiography for the diagnosis of coronary artery disease (CAD) is relatively costly and high risk in comparison with other diagnostic testing strategies. The recommendation to offer invasive coronary angiography when non-invasive functional imaging is found to be inconclusive has not changed from the original guideline. However, it is likely that that the updated guideline will reduces the overall number of patients needing to undergo coronary angiography for diagnostic purposes. This is due to the new recommendation to offer computed

					tomography coronary angiography (CTCA) as the first line test for all patients with typical or atypical angina. Previously, non-invasive functional imaging was recommended as the first line diagnostic test for all patients with an estimated likelihood of CAD between 30-60% (with the option to proceed to invasive coronary angiography if the result was inconclusive). For patients with an estimated CAD likelihood >60% invasive angiography was recommended as the first line test in the original guideline. In this update, non-invasive functional imaging is recommended only if CTCA shows CAD of uncertain functional significance or is nondiagnostic and subsequent invasive angiography would only be undertaken for diagnostic purposes if non-invasive functional imaging (following CTCA) proved inconclusive. The remit of the current update did not include evidence on the psychological effects of waiting times for diagnostic testing, so the committee are unable to make recommendations regarding the appropriate timing of any subsequent investigations that are required. However it should be noted that the original guideline also omitted to specify when invasive coronary angiography should follow an inconclusive non-invasive functional imaging test. This is because it is acknowledged that clinical facilities / capacity will vary between Trusts and the

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					preferences of individual patients should also be taken into account.
British Association for Nursing in Cardiovascular Care	Addendum	14	30	I feel that practitioners might find this a challenge. I feel that by establishing the national Registry that is highlighted in this document, will support practitioners in overcoming this challenge.	Thank you for your comment. The recommendation to which you refer concerns not using exercise ECG to diagnose or exclude stable angina in people without known coronary artery disease (CAD). This recommendation is unchanged from the original guideline CG95.
British Cardiovascular Intervention Society	Short	General		BCIS members have reviewed this document and have no major objections to the approaches given in the guidance. We consider that the new guidance is helpful and is line with recent evidence.	Thank you.
British Cardiovascular Intervention Society	Short	18	22	Re 1.3.6.2 Regadenason is also useful as a stressor for MPS and MR perfusion. Excerise is also a very good stressor (and provided valuable information on the patient) which isnt mentioned in this section.	Thank you for your comment. The topic experts did suggest that this recommendation should be updated, in line with current clinical practice, to include exercise and regadenoson as alternative stress modalities. However, we are unable to make changes to this recommendation at the present time because studies comparing different stress modalities in myocardial perfusion scanning were outside the remit of this update (which only focused on the diagnostic accuracy and cost-effectiveness of different

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					diagnostic tests vs. invasive coronary angiography). A comment has been added to the main addendum in the Linking Evidence to Recommendations table (4.1.3; see section on 'Trade-off between benefits and harms') as follows: **"**Other methods of inducing stress in myocardial perfusion scanning include exercise and regadenoson." We will pass your comment on to the NICE surveillance team, who regularly consider whether guideline recommendations may need updating.
British Nuclear Cardiology Society	Addendum	General	General	We cannot identify guidance regarding when CT may be contraindicated as a first line test, e.g., renal impairment or AF.	Thank you for your comment. Potential risks and contraindications for all tests, including CTCA, were discussed at length by the committee during decision-making and are acknowledged in the Linking Evidence to Recommendations table in the addendum (see 4.1.3), in the section entitled 'Trade-off of benefits and harms'. We have added further wording to re-iterate these important considerations to the end section of that table, as follows: "People with renal impairment or allergies to

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					contrast material would be contraindicated for certain tests, including CTCA. Other relative contraindications to CTCA include congestive cardiac failure and heart rhythm disorders." We did not review evidence for cost-effective testing of people who are contraindicated to CTCA, so are unable to make a recommendation specific to such instances. NICE clinical guidelines are expected to be taken into account by health professionals when exercising their clinical judgement and are not intended to override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of each individual patient. A note to this effect has been added at the end of the Linking Evidence to Recommendations table: "The committee's view is that CTCA should be considered the first choice diagnostic test for all people assessed as having typical or atypical angina. However individual circumstances, including potential contraindications, should be taken into account when deciding the most appropriate strategy for diagnostic investigation."
British Nuclear Cardiology Society	Addendum	General	General	The guideline does not acknowledge that functional tests also provide information on LV function, size and	Thank you for your comment. In the 'Other considerations' section of the Linking Evidence

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				viability which may be more pertinent to a particular individual undergoing assessment. We feel that the guideline should specifically allow for clinicians to individualise their approach to a patients' particular circumstances.	to Recommendations table (section 4.1.3 of the addendum) it is acknowledged that functional and anatomical tests provide different types of information of relevance to treatment decision-making. However, the remit of the review was restricted to the accurate and cost-effective *diagnosis* of the presence (or absence) of CAD. The *prognostic* value of different testing strategies could not be considered as an assessment criterion. NICE clinical guidelines are expected to be taken into account by health professionals when exercising their clinical judgement. However, the guidance does not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of each individual patient, in consultation with the patient and, where appropriate, their guardian or carer.
British Nuclear Cardiology Society	Addendum	13	24	Ischaemia is mis-spelt	Thank you for your comment. This error has now been amended.
British Nuclear Cardiology Society	Addendum	13	26	Cardiac perfusion PET is a well validated technique which should have been included as an alternative method for functional assessment (*J Nucl Med August 1, 2013 vol. 54 no. 8 1485-1507) and is already approved in the ESC guidelines (European Heart Journal 2013, 34: 2949-3003*)	Thank you for your comment. Cardiac perfusion PET was included as a diagnostic testing strategy in this update (test 7b in Table 2 of the addendum). A single study (Thomassen A, et al. (2013) was identified as meeting the review protocol inclusion criteria and was included in data

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					synthesis and evidence statements (see sections 4.1.2.1 and Appendix I.1). Other studies were identified which, on review of the full articles, did not meet our review protocol inclusion criteria. These studies, with the reasons for their exclusion, are presented below: - Adams G, et al. (2008) Nuclear Medicine Communications 29, 593-598. Excluded because not all participants had both index test and reference standard. - Al Moudi,M.et al. (2011) Biomed.Imaging Intervent.J, 7, e9- Excluded because this systematic review included studies in which patients had confirmed CAD. - Al Moudi M, Sun Z-H. (2014) J Geriatr Cardiol, 11, 229-236 Excluded because the study population included patients with known CAD. - Botvinick E, et al. (1977) Am J Cardiol, 39, 364-371

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					Excluded on topic expert advice because it used an obsolete (planar) imaging technique. - Chow B, et al. (2007) The Canadian J Cardiol, 23, 801-807 Excluded because the study population included patients with known CAD. - Danad I et al. (2013) Journal of Nuclear Medicine 54, 55-63 Excluded because the reference standard did not match our review protocol. - Danad I et al. (2014) European Heart Journal 35, 2094-2105. Excluded because the reference standard did not match our review protocol. - Danad I et al. (2014) J Am Coll Cardiol, 64: 1464-1475. Excluded because the reference standard did not match our review protocol and analyses had missing data.

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					- Fiechter M et al. (2012). Journal of Nuclear Medicine : 53, 1230-1234. Excluded because the study population included patients with known CAD. - Health,Quality Ontario (2010) Ontario Health Technology Assessment Series, 10, 1-80. Excluded because the reference standard did not match our review protocol. - Health,Quality Ontario (2005) Ontario Health Technology Assessment Series 5, 1-167. Excluded because the reference standard did not match our review protocol and study population included patients with known CAD. - Husmann L et al. (2008) Int J Card Imaging, 24:511-518. Excluded because some patients had reference standard to screen for CAD pre-operatively. - Mc Ardle B, et al. (2012) J Am Coll Cardiol , 60:1828-1837.

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					Excluded because the study population included patients with known or suspected CAD. - Nakazato R, et al. (2012) Journal of Nuclear Cardiology 19, 265-276. Excluded because the time between test and reference standard exceeded the 3 months specified in the review protocol - Namdar M, et al. (2005). Journal of Nuclear Medicine 46, 930-935. Excluded because the study population included patients with known CAD. - Slomka P, et al. (2015) J Nucl Cardiol 22, 1285-1295. Excluded because the study design was retrospective, not prospective as specified in the review protocol. - Tsai J-P, et al. (2014) Nuclear Medicine Communications, 35, 947-954. - Excluded because the reference standard did not match our review protocol.

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					The two papers you cite are both published guidelines (the SNMMI/ASNC/SCCT Guideline for Cardiac SPECT/CT and PET/CT, and the ESC Guideline on the Management of Stable Coronary Artery Disease). These were not themselves included in the evidence base for this update. This is because published guidelines relating to a topic area may use different review criteria (e.g. specifying a different population, outcomes, or eligible study designs), and may include recommendations based on expert consensus. The NICE Standing Committee update process is evidence-driven. The committee are advised during decision-making by topic experts but cannot make recommendations on the basis of expert opinion in the absence of sufficient supporting evidence. However, any studies reviewed as part of the development of the ECS and ACC guidelines which met the inclusion criteria for this review will have been considered.
British Nuclear Cardiology Society	Addendum	13	27	This comment is at odds to all international procedural guidelines regarding stress modalities with MPS. Exercise stress and regadenoson are validated and in many circumstances preferred over other modes of stress (Nuclear Medicine Communications. 34(8):813-826, August 2013).	Thank you for your comment. The topic experts did suggest that the recommendation to which you refer should be updated to include exercise and regadenoson as alternative stress modalities. However, we are currently unable to make this change because studies comparing different stress modalities in myocardial

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					perfusion scanning were outside the remit of this update (which was focused on the diagnostic accuracy and cost-effectiveness of different diagnostic tests vs. invasive coronary angiography). A comment has been added in the Linking Evidence to Recommendations table of the addendum (4.1.3; see section on 'Trade-off between benefits and harms') as follows: **"**Other methods of inducing stress in myocardial perfusion scanning include exercise and regadenoson." We will pass your comment on to the NICE surveillance team, who regularly consider whether guideline recommendations may need updating.
British Nuclear Cardiology Society	Addendum	14	31	This guideline does not fit seamlessly with the stable angina NICE guideline CG126 (2011). An attempt to combine the documents should be considered with the next iteration.	Thank you for your comment. On publication, new recommendations from this update to NICE guideline CG95 will be incorporated into the NICE stable angina pathway (http://pathways.nice.org.uk/pathways/stable-angina) The NICE guideline for 'Management of Stable Angina' (CG126) is due for review in 2017. At that time, NICE will ensure cross-reference is

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					made to the current updated CG95 guidance to ensure a more seamless fit.
British Nuclear Cardiology Society	Addendum	69	4	The clinical assessment does not explain how to assess patients with variable or difficult histories. For example, if a patient has pain both at rest and on exertion then how is that scored? Furthermore a patient with muscular pain on exertion, settling on rest, is classified as "atypical angina" when the pain is clearly non-anginal. Guidance would be appreciated for both these issues to avoid confusion.	Thank you for your comment. The focus of this update was on the accuracy and cost-effectiveness of different diagnostic tests and clinical prediction models. The section of the guideline detailing what should form the basis of an appropriate clinical assessment was therefore outside the remit of this update. The content of recommendation 4 (see section 1.2 of the addendum), which lists the criteria for assessing typicality of chest pain has not changed from the original guideline. Only the presentational format of the recommendation has been updated for improved clarity. In terms of the examples you cite, if pain is "clearly non-anginal" then the original guideline recommendation outlines that it should be classified as such and alternative non-cardiac causes should be considered. If the patient has pain "both at rest and on exertion" it should probably be classified as 'precipitated by physical exertion' although other aspects of the individual's clinical history and physical examination will need to be considered in

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					determining how the pain is classified (see recommendations 2,3 7 and 8 in section 1.2).
British Nuclear Cardiology Society	Addendum	547	10	The NHS reference or PbR payments are not a true reflection of the actual cost of the procedure. Whilst we acknowledge that true costs may be difficult to acquire, this should be acknowledged as a significant limitation of the cost analysis.	Thank you for your comment. Some committee members were concerned that the cost of CT coronary angiography (CTCA) may be too low and not reflect its true cost. Two comparisons were provided as to why the NHS reference cost was chosen as the base case. The 2015-16 tariffs for computerised tomography scan RA12Z, RA13Z, RA14Z and RA50Z range from £103 to £128 and therefore similar to the reference cost of £122.11. Secondly, a bottom-up micro-costing was conducted for NICE diagnostics guidance 3 (NICE DG3: 'New generation cardiac CT scanners for cardiac imaging in people with suspected or known coronary artery disease in whom imaging is difficult') with earlier generation CT scanners to establish the cost of 64-slice CT scanners and new generation CT scanners. Westwood et al. (2013) calculated a total cost per scan of £132.62, not substantially different to the NHS reference cost 2014-15 used in the base case. A sensitivity analysis was conducted and found that the cost of CTCA had to triple before it would not be considered the least cost per correct diagnosis (see Addendum appendix O.4).

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					The RA67Z tariff amount of £515 was used for cardiac magnetic resonance imaging (CMR) in the base case. This sensitivity analysis used the 2014-15 reference cost for RD10Z, Cardiac Magnetic Resonance Imaging Scan with pre and post contrast, £244.79, to match the source of the costs for other tests. CTCA remained the cheapest cost per correct diagnosis for all levels of pretest likelihood of disease.
British Nuclear Medicine Society	Addendum	General	General	The BNMS thanks the members of NICE who have spent a huge amount of time and effort in putting this document together. We feel that the document would benefit from including prospective patient outcome data which is awaited from the ISCHAEMIA trial.	Thank you for your comment. The ISCHAEMIA trial would not fall within the remit of this particular update. This is because this update focuses on the section of NICE guideline CG95 specifically concerned with *diagnosis* of CAD in the general population of patients referred from primary care with stable chest pain. Diagnostic accuracy was the outcome of interest (compared with invasive CA) for this update. The ISCHAEMIA trial is focused on management of confirmed ischaemia and is looking at outcomes such as cardiovascular death or non-fatal MI, rather than diagnostic accuracy. The prognostic value of different diagnostic testing procedures was outside the remit of NICE guideline GC95. NICE guideline CG126 deals with the management of stable angina. New evidence relating to that guideline will be reviewed by NICE surveillance in 2017.

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British Nuclear Medicine Society	Addendum	General	General	The guidelines should take into consideration what has been set out by the European and American College of Cardiology guidelines	Thank you for your comment. NICE develops guidelines for the provision of cost-effective healthcare in the UK context. Regular updates of these guidelines are undertaken on the basis of the best available research evidence meeting the review protocol inclusion / exclusion criteria. The review protocol is developed in conjunction with topic experts and standing members of the committee (see Appendix C of the addendum). Other guidelines covering the same topic area may use different review criteria (e.g. specifying a different population, outcomes, or eligible study designs) and may include recommendations that are based on expert consensus. However, any studies reviewed as part of the development of the ECS and ACC guidelines which also met the review protocol for this update will have been included in the body of evidence considered by the committee. Appendix F lists all excluded studies, with reasons for their exclusion. Included studies are detailed in the evidence tables in Appendix G.
British Nuclear Medicine Society	Addendum	General	General	The contraindications for CTCA such as contrast sensitivity, CCF, CRF and AF should be mentioned somewhere in the document.	Thank you for your comment. Potential risks and contraindications for all tests, including CTCA, were discussed at length by the committee during decision-making and are acknowledged in the Linking Evidence to Recommendations table in the addendum (see 4.1.3), in the section

					entitled 'Trade-off of benefits and harms'. We have added further wording to re-iterate these important considerations to the end section of that table, as follows: "People with renal impairment or allergies to contrast material would be contraindicated for certain tests, including CTCA. Other relative contraindications to CTCA include congestive cardiac failure and heart rhythm disorders." We did not review evidence for cost-effective testing of people who are contraindicated to CTCA, so are unable to make a recommendation specific to such instances. NICE clinical guidelines are expected to be taken into account by health professionals when exercising their clinical judgement and are not intended to override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of each individual patient. A note to this effect has been added at the end of the Linking Evidence to Recommendations table: "The committee's view is that CTCA should be considered the first choice diagnostic test for all people assessed as having typical or atypical angina. However individual circumstances, including potential contraindications, should be taken into account when deciding the most appropriate strategy for diagnostic

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					investigation."
British Nuclear Medicine Society	Addendum	13	26	We are disappointed that Rubidium-82 PET myocardial perfusion imaging has not been included as one of the alternative methods for functional imaging. This technique is well validated and FDA approved which will further strengthen this view. This technique reduces the patient journey and radiation significantly without compromise on sensitivity and specificity. (ref *J Nucl Med 2013 vol. 54 no. 8, pp 1485-1507*) (ref *ESC guideline, European Heart Journal 2013, 34: 2949-3003)*	Thank you for your comment. Rubidium-82 PET myocardial perfusion imaging was included as an index test in this review. However none of the studies identified in the literature search met the review protocol inclusion criteria. The studies that were considered are listed below with the reasons why each study was excluded from the review: - Botvinick E, et al. (1977) Am J Cardiol, 39, 364-371 Excluded on topic expert advice because it used an obsolete (planar) imaging technique. - Chow B, et al. (2007) The Canadian J Cardiol, 23, 801-807 Excluded because the study population included patients with known CAD. - Mc Ardle B, et al. (2012) J.Am.Coll.Cardiol., 60, 1828-1837. Excluded because the study population included patients with known or suspected CAD.

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					- Nakazato R, et al. (2012) Journal of Nuclear Cardiology 19, 265-276. Excluded because the time between test and reference standard exceeded the 3 months specified in the review protocol - Slomka P, et al. (2015) J Nucl Cardiol 22, 1285-1295. Excluded because the study design was retrospective not prospective, as specified in the review protocol. The two papers you cite are both published guidelines (the SNMMI/ASNC/SCCT Guideline for Cardiac SPECT/CT and PET/CT, and the ESC Guideline on the Management of Stable Coronary Artery Disease). These were not themselves included in the evidence base for this update. This is because published guidelines relating to a topic area may use different review inclusion criteria (e.g. specifying a different population, outcomes, or eligible study designs), and may include recommendations that are based on expert consensus. However, any studies reviewed as part of the development of the ECS and ACC guidelines which met the inclusion criteria for this review will have been considered.

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					As stated in the 'Other considerations' section of the Linking Evidence to Recommendations table of the addendum (section 4.1.3) the committee acknowledged that additional functional testing should be considered if results of a CTCA were inconclusive or non-diagnostic. Topic experts advised that rubidium PET is a good second line diagnostic test. However, the NICE Standing Committee update process is evidence-driven. The committee is unable to make recommendations on the basis of expert opinion alone, in the absence of sufficient supporting evidence. The committee noted that the evidence was unclear as to which type of functional test is most cost-effective following CTCA. Decisions regarding second-line functional testing should therefore take account of local availability and expertise, as well as individual's preferences and clinical suitability.
British Nuclear Medicine Society	Addendum	14	31	It would be helpful to the community if the current document could be tied up with the stable angina NICE guideline CG126 (2011), which was a very useful guide.	Thank you for your comment. On publication, new recommendations from this update to NICE guideline CG95 will be incorporated into the NICE stable angina pathway (http://pathways.nice.org.uk/pathways/stable-angina)

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					The NICE guideline for 'Management of Stable Angina' (CG126) is due for review in 2017. At that time, NICE will ensure cross-reference is made to the current updated CG95 guidance to ensure a more seamless fit.
British Nuclear Medicine Society	Addendum	547	Table 89 o.3.54 SA2	We concur with the view of the committee that the cost for CTCA mentioned (£122.49) does not capture the true complexity of the procedure.. The preparation time and expertise required to deliver a quality service will certainly add an additional financial cost. These cost limitations should be mentioned and acknowledged as a limitation of the cost analysis	Thank you for your comment. It is not usual practice to include training and running costs in economic modelling. Two comparisons were provided as to why the NHS reference cost was chosen as the base case. The 2015-16 tariffs for computerised tomography scan RA12Z, RA13Z, RA14Z and RA50Z range from £103 to £128 and therefore similar to the reference cost of £122.11. Secondly, a bottom-up microcosting was conducted for NICE diagnostics guidance 3 to establish the cost of 64-slice CT scanners and new generation CT scanners. Westwood et al. (2013) calculated a total cost per scan of £132.62, not substantially different to the NHS reference cost 2014-15 used in the base case. A sensitivity analysis was conducted (see Addendum appendix O.4) which found that the cost of CTCA had to triple before it would not be considered the least cost per correct diagnosis.
British Society of Echocardiography	Addendum	11	6	"Do not exclude ACS when the resting ECG is normal". This statement is not entirely clear. Suggest rewording to "Do not exclude ACS on the basis of a normal resting ECG alone".	Thank you for your comment. The evidence for the recommendation to which you refer was

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				hs TpT peaks at 3-4 hours rather than 10-12 hrs	not reviewed in this update and has therefore not been amended.
Department of Health	**general**	general	general	No comments	Thank you.
Heart Flow	Full	12	6 (bottom of page, bullet 22)	We applaud the recommendation to perform CT coronary angiography "for people in whom stable angina cannot be diagnosed or excluded by clinical assessment alone." We believe the high diagnostic sensitivity of CT coronary angiography make it the appropriate test for these patients.	Thank you.
Heart Flow	Full	72	3	Once NICE literature and economic reviews of FFR_{CT} are complete, we would encourage NICE to include FFR_{CT} in the list of "non-invasive functional imaging" following CT coronary angiography. We would highlight the following: • A comparison of validation studies (Nørgaard, B.L. e.a. (2015). European Radiology 25(8): 2282-2290) utilizing invasive FFR as the gold standard (as described in CG95) demonstrates that FFR_{CT} provides better diagnostic accuracy than the other functional tests (SPECT, Stress, MR) listed in the CG95 draft.	Thank you for your comment. At the time the evidence review for this update was undertaken, no published studies for computed tomography fractional flow reserve (CT FFR) were found that met the review protocol criteria. The searches were conducted between April and June 2015, so the study you cite (published in August 2015) was not identified. Any subsequent updates of this section of CG95 will consider all new published evidence for this and other diagnostic strategies where studies meet the inclusion criteria specified in the review protocol.

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				• FFR_{CT} is the only functional test that can be performed based on the patient's CT data and thus does not require a return visit.	
NHS England	General	General	general	No comments	Thank you.
Royal College of Nursing	Addendum	General	General	CCS Functional Classification has been taken out of these guidelines and yet there is evidence that a negative CCS is a good predictor of low risk of future events. This test can also be performed during the RACPC visit which would help with a 'one stop shop' approach. This is not possible if all patients with atypical or typical pain need to have a CTCA.	Thank you for your comment. We would like to stress that NICE is not recommending CT coronary angiography (CTCA), or indeed any investigation, for people with 'atypical pain'. Rather the recommendation relates to pain that has features of typical or atypical *angina* assessed as follows: <u>Recommendation 1.3.3.1</u> Assess the typicality of chest pain as follows: • Presence of three of the features below is defined as typical angina. • Presence of two of the three features below is defined as atypical angina. • Presence of one or none of the features below is defined as non-anginal chest pain Anginal pain is: • constricting discomfort in the front of the chest, or in the neck, shoulders, jaw, or arms • precipitated by physical exertion

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					• relieved by rest or GTN within about 5 minutes. **[2010, amended 2016]** To clarify, the new recommendation regarding CTCA as a first line diagnostic test has been amended as follows: 1.3.4.3 Offer 64-slice (or above) CT coronary angiography if: • clinical assessment (see recommendation 1.3.3.1) indicates typical or atypical angina~~l chest pain~~, or • clinical assessment indicates non-anginal chest pain but 12-lead resting ECG has been done and indicates ST-T changes or Q waves. [new 2016] Angina severity grading using the Canadian Cardiovascular Society (CCS) class scale (I to IV) was not included in the original guideline CG95. This update focuses on the cost-effective *diagnosis* of coronary artery disease (CAD). While the committee acknowledges that clinicians may wish to undertake other types of assessment during the RACPC visit to provide prognostic information (for example, an exercise ECG), such assessments do not have

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					utility for the accurate diagnosis of CAD so are not included within this update.
Royal College of Nursing	Addendum	General	General	We agree with removing the likelihood of Coronary Artery Disease assessment as this does overestimate, particularly in older patients.	Thank you for your comment.
Royal College of Nursing	Addendum	17	15	There is likely to be insufficient capacity in most centres to offer CT angiography for all patients thought to have stable angina. Most of these patients are seen in Rapid Access Chest Pain Clinic (RACPC) and not all centres which have RACPCs carry out Computer Tomography Coronary Angiography (CTCA). Current guidelines give an option for using a variety of testing options so choice can be made as to what is available and appropriate. Waiting times for investigation are likely to increase substantially. What is the evidence for only using CTCA in these patients?	Thank you for your comments. In order to meet the guideline recommendation to offer CTCA to patients assessed as having typical or atypical angina, (or non-anginal chest pain if a resting ECG indicates ST-T changes or Q waves), the committee acknowledges that all hospitals with a chest pain clinic will need to have a cardiac CT scanner. Potential resource consequences of this will be explored further in the resource impact tools produced to support the guideline. The original guideline specified different testing strategies for different threshold levels of coronary artery disease (CAD) likelihood. These options were *not* intended to be dependent on what testing facilities were available. Access to a cardiac CT scanner would be required for calcium scoring (which was previously recommended for patients with 10-29% likelihood of CAD). Invasive coronary angiography (which was previously recommended for patients with 61-90% likelihood of CAD) is a relatively lengthy, higher

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					risk day-case procedure likely to incur greater costs and longer waiting times than is the case for CTCA. The clinical and economic evidence strongly favoured CTCA as the first line diagnostic strategy in patients with stable chest pain who have features of typical or atypical angina. CTCA was found to have greater overall accuracy compared with stress echocardiography, myocardial perfusion scintigraphy – single photon emission computed tomography (MPS-SPECT0 and cardiac magnetic resonance (CMR) imaging. CTCA is also well-tolerated by the majority of patients with relatively few potential risks, and has the lowest cost per correct diagnosis at all pre-test probability thresholds. However, in people whose CTCA has shown CAD of uncertain functional significance or is nondiagnostic, additional functional imaging should be considered to confirm diagnosis.
Royal College of Nursing	Addendum	17	16	If patients have typical pain should they not go straight to invasive angiography?	Thank you for your comment. The remit of this update was limited to the accurate and cost-effective diagnosis of the presence (or absence) of coronary artery disease (CAD) and did not include the prognostic value of different testing strategies. After reviewing the clinical and economic evidence, the committee agreed that

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					the evidence strongly favoured CT coronary angiography (CTCA) as the first line diagnostic strategy for all patients presenting with stable chest pain who have features characteristic of typical or atypical angina. Topic experts advised the committee that recent registry-based evidence shows that clinical prediction models over- estimate actual prevalence of CAD. Even among the highest age groups, probability of coronary disease among people presenting with stable chest pain is accepted as being substantially less than 90% (see the committee's discussion of this issue in the 'Other considerations' section of the Linking Evidence to Recommendations table in section 4.2.4 of the addendum). The committee concluded that use of CTCA in order to establish a definitive diagnosis in patients assessed as having 'typical' *chest pain* will reduce recourse to expensive invasive angiographic investigation ,which carries the greater risk to patient safety and wellbeing. Please also note neither the European nor US guidelines now recommend invasive coronary angiography for diagnosis of CAD for patients with high probability of disease.

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Royal College of Nursing	Addendum	18	2	If patients have a CTCA which is non diagnostic and then have a functional test such as Myocardial Perfusion Scanning (MPS) which shows significant ischaemia so that the patient then needs an invasive angiogram, they will have been exposed to a large amount of radiation during their investigations.	Thank you for your comment. The Linking Evidence to Recommendations table in the addendum (see 4.1.3) notes the potential radiation exposure related to the different diagnostic tests in the section entitled 'Trade-off of benefits and harms'. This issue was discussed at length by the committee during decision-making. It was felt overall that radiation exposure is a very small concern with modern generation scanners. The following is noted: "In the case of all tests involving radiation exposure, this should be considered in the context of patient age. Radiation exposure is reduced with more modern machines and testing techniques". In the minority of patients who require secondary functional testing and subsequent invasive coronary intervention, the risk of radiation exposure will be outweighed by the potential risk of failing to diagnose significant coronary ischaemia if a particular test is not performed.
Royal College of Nursing	General	General	General	The Royal College of Nursing welcomes proposals to update this guidance.	Thank you.

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				The RCN invited members who care for people with cardiac conditions to review the draft document. The comments below reflect the views of our reviewers.	
Royal College of Radiologists	general	general	general	This update takes into account relevant recent research and makes sensible conclusions regarding investigations. In particular the increased use of CTCA for the detection or exclusion of obstructive coronary artery disease is supported by the British Society of Cardiovascular Imaging (BSCI)/ British Society of Cardiovascular CT (BSCCT) committee. We note that the 'gold standard' used in the original guidelines and therefore also used in this addendum is catheter angiography, an anatomical rather than a functional test. Furthermore, on page 26 of the addendum, the number of participants in SCOT-HEART is incorrect. It should be '4146 participants … were recruited'. In addition, for recommendation 27, regadenoson should be included in the list of potential stress agents.	Thank you for your comment. In the 'Other considerations' section of the Linking Evidence to Recommendations table (section 4.1.3) the committee acknowledged the different but important types of diagnostic information yielded by functional and anatomical tests, and the fact that the 'gold standard' reference (invasive coronary angiography) is anatomical. Topic experts advised that decisions about management in confirmed cases of coronary artery disease (CAD) would usually require prior visualisation of the coronary anatomy. The error regarding number of participants in the SCOT-HEART trial has now been amended, thank you. In respect of recommendation 27, the topic experts did suggest that this should be updated, in line with current clinical practice, to include exercise and regadenoson as alternative stress modalities. However, we are unable to make changes to this recommendation at the present time because studies comparing different stress modalities in myocardial perfusion scanning

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					were outside the remit of this update (which only focused on the diagnostic accuracy and cost-effectiveness of different diagnostic tests vs. invasive coronary angiography). A comment has been added in the Linking Evidence to Recommendations table of the addendum (4.1.3; see section on 'Trade-off between benefits and harms') as follows: **"**Other methods of inducing stress in myocardial perfusion scanning include exercise and regadenoson." We will pass your comment on to the NICE surveillance team, who regularly consider whether guideline recommendations may need updating.
Society of Cardiovascular Computed Tomography	Short	general	general	SCCT commends NICE for recognizing that cCTA should be the first line diagnostic test for patients with stable chest pain. cCTA evidence is supported by high quality randomized trial evidence with regard to its diagnostic and prognostic accuracy, safety, and clinical benefit for patients.	Thank you.
Society of Cardiovascular Computed Tomography	Short	general	general	cCTA has demonstrated a reduction in hard events enabled by CT guided therapeutic decision making.	Thank you for your comment. The remit of this update was focused only on diagnostic accuracy rather than prognostic outcomes.

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Society of Cardiovascular Computed Tomography	Short	general	general	The implementation of cCTA will reduce both the time spent in the diagnostic process and the overall costs of clinical evaluation in these populations, as documented by several randomized clinical trials.	Thank you for your comment.
Society of Cardiovascular Computed Tomography	Short	general	general	SCCT encourages wide availability of cCTA educational opportunities to include distance learning and other appropriate venues	Thank you for your comment.
Society of Cardiovascular Computed Tomography	Short	general	general	SCCT encourages NICE to review newer CT technology such as FFR CT, CT perfusion and spectral imaging.	Thank you for your comment. At the time the evidence review for this update was undertaken, no published studies for computed tomography fractional flow reserve (CT FFR) were found that met the review protocol criteria. One small study of CT perfusion did meet the review protocol criteria: Bettencourt,Nuno, Rocha,Joao, Ferreira,Nuno, et al. (2011) Incremental value of an integrated adenosine stress-rest MDCT perfusion protocol for detection of obstructive coronary artery disease. Journal of Cardiovascular Computed Tomography, 5 p.392-405 The results of this study are presented in the main addendum (Forest plot - Appx. J.1.9), the GRADE appraisal of evidence (Appx I.1) and the clinical evidence statements (section 4.1.2.1). The topic experts advised the committee that

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					cardiac CT perfusion testing is currently not widely used in the UK. However any subsequent updates of CG95 will consider new evidence for these and other diagnostic strategies where studies meet the inclusion criteria specified in the review protocol.