Subarachnoid haemorrhage due to ruptured aneurysms

Consultation on draft guideline - Stakeholder comments table
12/02/2021 – 26/03/2021

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1	Association for Clinical Biochemistry and Laboratory Medicine	Evidence Review B	General	General	The requirement for CSF spectrophotometry [i.e. as opposed to visual inspection] is welcomed, although is probably already the norm for the great majority of UK laboratories undertaking xanthochromia analysis. [We note that of the 6 studies cited which considered the performance of CSF xanthochromia analysis as the index test, two used visual inspection rather than spectrophotometry]. For those studies which used CSF spectrophotometry most [but not all] used The United Kingdom National External Quality Assessment Services (UK NEQAS) recommendations [2008] to define the presence of excess CSF bilirubin. https://journals.sagepub.com/doi/10.1258/acb.2008.007257	Thank you for your comment. We agree that xanthochromia should be assessed by spectrophotometry and we have added a comment to the discussion in the evidence chapter.
2	Association for Clinical Biochemistry and Laboratory	Guideline	018	014	Research Recommendations A future research recommendation might include an evaluation of the spectrophotometric absorbance cut-offs used to define excess CSF bilirubin so as to provide maximum clinical utility. The current UKNEQAS guideline cut-offs, although in general use are somewhat arbitrary and have never been robustly evaluated.	Thank you for your comment. The committee agree this research would be interesting but did not consider it to be a priority for research.

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	Medicine					
3	Association for Clinical Biochemistry and Laboratory Medicine	Guideline	General	General	The element of this guideline relevant to clinical biochemistry professionals is that relating to the diagnostic role of CSF examination [red cells and xanthochromia].	Thank you for your comment.
4	Association for Clinical Biochemistry and Laboratory Medicine	Guideline	General	General	These guidelines should not pose any additional challenges on UK clinical biochemistry services given the already widespread availability of CSF spectrophotometry and indeed might reduce request numbers by obviating the need for CSF analysis for patients with a negative CT scan within 6 hours of onset of symptoms.	Thank you for your comment. This has been added to the committee discussion of the evidence and is noted in the rationale and impact section.
5	Association of	Guideline	004	006	Please define "sudden-onset" headache (1 minute? 5 minutes?) and the expected minimum duration (at least an hour?).	Thank you for your comment. "'Thunderclap' headache" is defined in the glossary in the methods chapter (sudden severe headache typically peaking in intensity within 1-5

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	British Neurologists					minutes)). We have now also included this definition in the recommendation wording. The committee based the definition of thunderclap headache on the mean times to peak intensity of headache reported in people with subarachnoid haemorrhage which ranged from 10 seconds to over 3 minutes. Taking account of the discrepancy in the available evidence the committee agreed a definition of thunderclap headache that covers a time range to peak intensity of headache of 1-5 minutes. We found no evidence for the duration of headache and the committee therefore made no comment on this. Duration of the headache is not a key feature, it is the time to peak intensity that is the important factor.
6	Association of British Neurologists	Guideline	004	014	"Altered neurology" – although this phrase has been used during verbal communication among healthcare personnel, taken literally, it means that "the study of the nervous system has changed". "Altered cardiology" or "altered gastroenterology" would not be acceptable terms to most doctors… "New neurological symptoms or signs" or "New symptoms or signs of altered brain function," would be accurate alternatives.	Thank you for your comment. We agree and have changed 'altered neurology' to 'new symptoms or signs of altered brain function' here and throughout the whole guideline.

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7	Association of British Neurologists	Guideline	005	007	Suggest you could include the phrase *in italics* as follows: '…given effective pain relief *following a structured pain management pathway such as that from the World Health Organisation*, including opiate analgesia if needed.'	Thank you for your comment. The committee agreed that analgesia should be escalated as necessary to relieve headache and this is acknowledged in the rationale. The committee did not review the WHO pain ladder, although were aware of its use within practice but did not consider any specific reference to a structured pain management pathway was required.
8	Association of British Neurologists	Guideline	005	013	Offer *and organise* non-contrast CT	Thank you for your comment. The 'organisation' of the test should the person accept it is implicit in the recommendation and does not need to be stated explicitly.
9	Association of British Neurologists	Guideline	006	001	Type of patients. The Ottawa rule that underpins this was for, "Neurologically intact adults with a new acute headache peaking in intensity within one hour of onset", so this should be specified.	Thank you for your comment. The evidence does not relate directly to all patients with SAH but they provide the best available evidence about symptoms and signs in patients with suspected SAH. The committee considered it was reasonable to extrapolate the results of the included studies to the wider unselected population, partly as suspicion of SAH in patients with acute neurological signs will be high and the decision to proceed with CT scan in these cases is straightforward. We do not recommend the Ottawa rule as this was found to be of limited diagnostic value.

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10	Association of British Neurologists	Guideline	006	001	Quality of reporting. The Ottawa study required reporting by, "a neuroradiologist or general radiologist who routinely reports head computed tomography images" so this should be required for a CT head to be deemed to show, "no evidence of SAH."	Thank you for your comment. The sensitivity of a CT head scan was further discussed with the committee. It was noted that the clinical evidence found that the sensitivity of a CT head scan done within 6 hours of symptom onset was above 95% in all studies. Based on the economic analysis reported in evidence review B, when the sensitivity of a CT head scan is above 95%, LP is not a cost effective strategy for patients receiving a CT head scan within 6 hours of symptom onset. The committee noted the healthcare professional reporting the results of the CT head scan in the studies included in the clinical review was a combination of radiologists and neuroradiologists, or was not reported; they were not exclusively neuroradiologists. Perry 2011 was deemed the most appropriate study to inform the health economic analysis and it stated that the CT head scans were interpreted by qualified local radiologists (a neuroradiologist or general radiologist who routinely reports head computed tomography images), who were blinded to the study and data forms but who had routine clinical information.

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						Furthermore, none of the studies reported the differential accuracy of CT scans interpreted by different types of radiologists. Based on this the committee agreed that it was not appropriate to specify which type of radiologist should be reporting the results of the CT head scan, given that the clinical evidence is based on a mix of radiologists, and not exclusively by neuroradiologists. The committee discussion of the evidence and resource and impact sections relating to this recommendation have been edited to clarify this. Please note the recommendation does specify that if the CT head scan (done within 6 hours of symptom onset and reported by a radiologist) is negative to 'think about alternative diagnoses and seek advice from a specialist.' In addition, the committee considered that there may be some rare cases where LP is still indicated despite a negative result from a CT performed within 6 hours, for example if a strong clinical suspicion of SAH remains, but highlighted that this should not be routine practice given the high diagnostic accuracy of early CT. Instead, the healthcare professional should think about alternative diagnoses and seek advice from a specialist. in

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						neurosurgery, neuroradiology, neurology or stroke medicine. The rationale for the recommendation has been updated and can be found in the committee discussion of the evidence.
11	Association of British Neurologists	Guideline	006	001	Quality of scanning. The Ottawa rule was done with "computed tomography scanners were third generation, multi-slice scanners (from 4 to 320 slices/rotation). The protocols at the beginning of the study (2000-2) used 5 mm slices for the posterior fossa and 10 mm for the remainder of the brain. Since 2002, all sites adopted 5-7.5 mm cuts for the brain with 2.5-5 mm for the posterior fossa." Please specify scan acquisition characteristics for this rule to apply.	Thank you for your comment. The scan parameters are a local Trust issue and it is outside the remit of the guideline to specify the slice thickness in the recommendations. The committee noted however that modern scanners and scanning algorithms will be at least as good as the scans used in the studies on which the recommendations are based.
12	Association of British Neurologists	Guideline	006	004	Suggest add to this text: "think about alternative diagnoses *and liaise with neurosurgery, neurology or stroke specialists, if possible".*	Thank you for your comment. We have added seek advice from a specialist to the recommendation, and describe the clinicians with the necessary expertise in the Rationale and impact section of the guideline and the committee discussion in the diagnostic accuracy and strategies evidence review.
13	Association of British	Guideline	006	005	1.1.9 If a CT head scan done more than 6 hours after symptom onset shows no evidence of a subarachnoid haemorrhage, consider a lumbar puncture.	Thank you for your comment. The committee were aware that the use of LP in patients with a negative CT head scan more than 6 hours after symptom onset varies between centres in the UK. Currently, LP is done

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	Neurologists				Comment: we understand the need for NICE terminology to reflect the strength of evidence but in this instance "consider" might imply that an LP is optional or only done sometimes, which could lead to SAH being missed. Patients with headache alone are commonly going to present and get their CT outside the 6 hour window; this needs to be clearer as it remains a potential pitfall and Acute Medical Units need clear direction on this. We suggest that an LP should normally be performed to rule out SAH if the presentation is suggestive of SAH and a CT done more than 6 hours from symptom onset is normal. It might also be worth emphasising that patients presenting late also need urgent investigation (i.e. not referred as an outpatient). The LP remains useful for 2 weeks and if the patient presents later than this the case should be discussed urgently with a member of the neurovascular MDT with a view to doing a CTA and/or MRI.	routinely in many hospitals but this practice is not supported by the best clinical and cost-effectiveness evidence. On the strength of the available evidence, the committee agreed that LP should only to be used in certain circumstances and therefore we think the word 'consider' is still appropriate. Specifically the committee recognised that LP may be appropriate when CT performed beyond 6 hours from ictus is negative but suspicion of SAH remains. The committee agrees that referral should be made urgently regardless of time of presentation, and a recommendation has been made to refer for urgent non-contrast CT scan if signs and symptoms suggest subarachnoid haemorrhage. We agree if a patient presents late this would require specialist opinion within the neurovascular team.
14	Association of British Neurologists	Guideline	006	020	Please specify the technical requirements of the CT scan needed and emphasise that whole brain coverage (not just the Circle of Wilis) is essential.	Thank you for your comment. The committee consider that the healthcare professional undertaking the CT head scan should know the technical requirements required and it is not necessary to include these in the recommendation. The recommendation states non-contrast CT head scan, which does not limit it to just the circle of Willis.

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15	Association of British Neurologists	Guideline	007	004	"the pattern of subarachnoid blood is compatible with aneurysm rupture" – it may be worth adding here that subarachnoid bleeding limited to the cerebral convexities is not suggestive of aneurysmal rupture.	Thank you for your suggestion. The committee have considered this but do not think this detail is required in the recommendation. Healthcare professionals reporting CT head scans in people with suspected SAH should have appropriate training and experience, and would be expected to recognise the significance of variations in the distribution of subarachnoid blood.
16	Association of British Neurologists	Guideline	007	005	All MDTs are elective so it is better to say 'Seek specialist opinion from the *on-call* neurovascular multidisciplinary team member straight away' – implying on-call neuro-radiologist, interventional neuro-radiologist, neurosurgeon, neurologist or stroke physician.	Thank you for your comment. We disagree that the words 'on-call' need to be added to the recommendation. The recommendation assumes that the suitably qualified personnel are available and the committee considers the wording conveys the sense of urgency. The recommendation now states the personnel should be an interventional neuroradiologist and a neurosurgeon.
17	Association of British Neurologists	Guideline	008	005	1.2.1 Consider enteral nimodipine for people with a confirmed subarachnoid haemorrhage. Comment: It might be helpful to put the dose and regime here (usually 60mg 4 hourly for 21 days, I believe). Again, I am not sure how to interpret "consider". I assume they mean that nimodpine should be used in most cases to reduce the risk of neurological defect due to vasospasm unless contraindicated (by low bp for example) or it is deemed inappropriate (due to high severity).	Thank you for your comment. NICE recommendations assume the dosing given in the BNF/SPC will be followed unless otherwise stated. The recommendation wording 'consider' reflects the strength of the evidence and is applied when the

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						committee wish to convey that evidence of benefit is less certain. The committee noted that the entirety of evidence came from trials conducted before the introduction of endovascular coiling into routine practice and involved mostly patients undergoing neurosurgical clipping after a period of medical stabilisation. In most trials nimodipine was commenced up to 96 hours after ictus and continued for up to 3 weeks before surgical management. Hence, the results of the trials were not considered to be directly applicable to contemporary practice. The committee could not be sure that the benefits from nimodipine are maintained with current treatments to secure the ruptured aneurysm, but they considered without evidence of harms a recommendation to consider nimodipine was appropriate.
18	Association of British Neurologists	Guideline	009	003	Suggest specify an *interventional* neuroradiologist and a neurosurgeon.	Thank you for your comment. We agree and have made this change to add 'interventional' neuroradiologist.
19	Association	Guideline	010	019	Suggest change – 'offer a non-contrast CT' should ideally change to 'organise a non-contrast CT head	Thank you for your suggestion, however the committee believe a clinician would generally offer the CT scan and

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	of British Neurologists				scan immediately' as more often, in this situation, patients are not in a position to make an informed decision	explain why it is needed. Not all people with suspected aneurysmal SAH are unconscious or lack capacity and many are able to participate in decisions about their management .
20	Association of British Neurologists	Guideline	011	013	Suggest add phrase as follows: consider a trial of temporary drainage (*for example serial lumbar punctures*)	Thank you for your comment. We have added 'for example, serial lumbar punctures' to the rationale to clarify the meaning of 'temporary drainage'.
21	Association of British Neurologists	Guideline	018	016	Recommendations for research – not clear that CT timing is a top priority given existing knowledge of declining sensitivity with time. Other potentially more relevant ones: what is the role of novel CSF biomarkers of SAH (e.g ferritin) for delayed presentation? What is the role of MRI scan to detect SAH for delayed presenters?	Thank you for your comment. The committee disagree and consider that this research is high priority as limited evidence was found for the diagnostic accuracy of CT head scan at various time intervals after symptom onset. The committee recognised the significance of understanding the diagnostic accuracy of both CT and LP within the current diagnostic pathway, and considered that the evidence suggests that most patients present with SAH beyond 6 hours from ictus. Therefore, further research in this area would allow more specific recommendations on timing of investigations to be made and improve the diagnostic pathway for people presenting with possible SAH.
22	Association	Guideline	026	014	Suggest add a sentence on what's the next modality if CTA is contraindicated (example in	Thank you for your comment. We agree that if CTA is contraindicated, for example because of impaired renal

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	of British Neurologists				renal impairment). Suggest – Consider MRA and then DSA depending on local resource availability.	function, it is usual practice that an alternative investigation modality would be considered. We do not think it is necessary to include this in the recommendations.
23	Association of British Neurologists	Guideline	026	08	Need to define 'early' – suggest add 'early (<6 hours) negative CT head scan.'	Thank you for your comment. This is reflected in the recommendations on diagnosing SAH. 'If a CT head scan done more than 6 hours after symptom onset shows no evidence of a subarachnoid haemorrhage, consider a lumbar puncture'.
24	Association of British Neurologists	Guideline	05	015	Specify whether you mean exclusively or predominantly SAH? Confusion often arises when there is intraparenchymal blood as well as SAH (which may be due to ICH extending into the subarachnoid space, or aSAH bursting into the parenchyma). It would be worth clarifying that here.	Thank you for your comment. The committee considers the recommendation to be clear. If the CT head scan demonstrates blood in the subarachnoid space the patient has by definition had a subarachnoid haemorrhage. We agree, however, that the cause of the subarachnoid haemorrhage should be sought by critical review of the CT scan and additional investigations. If there is blood in the CSF the patient has had a SAH and presence of intraparenchymal blood is a secondary issue, regardless of whether the intraparenchymal is due to a ruptured extraparenchymal aneurysm or due to a spontaneous intraparenchymal bleed.
25	Association of	Guideline	General	General	In line with GMC Good Medical Practice, this document could recommend a minimum set of points to document during follow-ups which	Thank you for your comment. The committee discussed smoking cessation advice in SAH patients and agreed that the advice should be the same as general advice given to

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	British Neurologists				should include: smoking cessation advice (that would often be missed or addressed very superficially); alcohol intake reduction; and relative screening	all patients. Hence the committee made a cross-referral to the stop-smoking interventions recommendations in the NICE guideline on tobacco.. We agree that alcohol intake is generally considered to be a risk factor although the evidence is not as strong as for smoking (see Juvela Lancet Neurol 2011;10:596) and the raised risk may simply reflect the fact that alcohol raises BP. This was not identified as a priority area to include in the guideline questions. There was no clinical evidence for screening of relatives therefore the committee made a recommendation in this area which mirrors the current NHS advice, and made a recommendation for further research in this area.
26	Association of British Neurologists	Recommendations	008	008	This recommendation is not justified in view of the result of the recently published ULTRA trial: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)32518-6/fulltext	Thank you for your comment. The committee have reviewed the recommendation and agreed to remove it from the guideline.
27	British Association	Recomme	004	006	Specify what "sudden-onset" means (most studies of 'thunderclap headache specify time to peak severity within 5 minutes) and what the expected	Thank you for your comment. "'Thunderclap' headache" is defined in the glossary in the methods chapter (sudden severe headache typically

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	of Stroke Physicians	ndations			minimum duration of aSAH headache is (most studies/experts suggest at least an hour) so that it's clear to whom these diagnostic reommendations apply.	peaking in intensity within 1-5 minutes). We have now included this definition in the recommendation wording. The committee based the definition of thunderclap headache on the mean times to peak intensity of headache reported in people with subarachnoid haemorrhage which ranged from 10 seconds to over 3 minutes. Taking account of the discrepancy in the available evidence the committee agreed a definition of thunderclap headache that covers a time range to peak intensity of headache of 1-5 minutes.
28	British Association of Stroke Physicians	Recommendations	005	015	Specify whether you mean exclusively or predominantly SAH? Confusion often arises when there is intraparenchymal blood as well as SAH (which may be due to ICH extending into the subarachnoid space, or aSAH bursting into the parenchyma). It would be worth clarifying that here.	Thank you for your comment. The committee considers the recommendation to be clear. If the CT head scan demonstrates blood in the subarachnoid space the patient has by definition had a subarachnoid haemorrhage. We agree, however, that the cause of the subarachnoid haemorrhage should be sought by critical review of the CT scan and additional investigations. If there is blood in the CSF the patient has had a SAH and presence of intraparenchymal blood is a secondary issue, regardless of whether the intraparenchymal is due to a ruptured extraparenchymal aneurysm or due to a spontaneous intraparenchymal bleed.

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29	British Association of Stroke Physicians	Recommendations	006	001	Type of patients. The Ottawa rule that underpins this was for, "Neurologically intact adults with a new acute headache peaking in intensity within one hour of onset", so this should be specified.	Thank you for your comment. The evidence does not relate directly to all patients with SAH it provided the best available evidence about symptoms and signs in patients with suspected SAH. The committee considered it was reasonable to extrapolate the results of the included studies to the wider unselected population, partly as suspicion of SAH in patients with acute neurological signs will be high and the decision to proceed with CT scan in these cases is straightforward. We do not recommend the Ottawa rule as this was found to be of limited diagnostic value
30	British Association of Stroke Physicians	Recommendations	006	001	Quality of reporting. The Ottawa study required reporting by, "a neuroradiologist or general radiologist who routinely reports head computed tomography images" so this should be required for a CT head to be deemed to show, "no evidence of SAH."	Thank you for your comment. The sensitivity of a CT head scan was discussed with the committee. It was noted that the clinical evidence found that the sensitivity of a CT head scan done within 6 hours of symptom onset was above 95% in all studies. Based on the economic analysis reported in evidence review B, when the sensitivity of a CT head scan is above 95%, LP is not a cost effective strategy for patients receiving a CT head scan within 6 hours of symptom onset. The committee noted the healthcare professional reporting the results of the CT head scan in the studies

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						included in the clinical review was a combination of radiologists and neuroradiologists, or was not reported; they were not exclusively neuroradiologists. Perry 2011 was deemed the most appropriate study to inform the health economic analysis and it stated that the CT head scans were interpreted by qualified local radiologists (a neuroradiologist or general radiologist who routinely reports head computed tomography images), who were blinded to the study and data forms but who had routine clinical information. Furthermore, none of the studies reported the differential accuracy of CT scans interpreted by different types of radiologists. Based on this the committee agreed that it was not appropriate to specify which type of radiologist should be reporting the results of the CT head scan, given that the clinical evidence is based on a mix of radiologists, and not exclusively by neuroradiologists. The committee discussion of the evidence and resource and impact sections relating to this recommendation have been edited to clarify this.

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						Please note the recommendation does specify that if the CT head scan (done within 6 hours of symptom onset and reported by a radiologist) is negative, healthcare professionals should 'think about alternative diagnoses and seek advice from a specialist.' In addition, the committee considered that there may be some rare cases where LP is still indicated despite a negative result from a CT performed within 6 hours, for example if a strong clinical suspicion of SAH remains, but highlighted that this should not be routine practice given the high diagnostic accuracy of early CT. Instead, the healthcare professional should think about alternative diagnoses and seek advice from a specialist in neurosurgery, neuroradiology, neurology or stroke medicine. The rationale for the recommendation has been updated and can be found in the committee discussion of the evidence.
31	British Association of Stroke Physicians	Recommendations	006	001	Quality of scanning. The Ottawa rule was done with "computed tomography scanners were third generation, multi-slice scanners (from 4 to 320 slices/rotation). The protocols at the beginning of the study (2000-2) used 5 mm slices for the posterior fossa and 10 mm for the remainder of the brain. Since 2002, all sites adopted 5-7.5 mm	Thank you for your comment. The scan parameters are a local Trust issue and it is outside the remit of the guideline to specify the slice thickness in the recommendations. The committee noted however that modern scanners and scanning algorithms will be at least

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					cuts for the brain with 2.5-5 mm for the posterior fossa." Please specify scan acquisition characteristics for this rule to apply.	as good as the scans used in the studies on which the recommendations are based.
32	British Association of Stroke Physicians	Recommendations	006	020	Clarify that, "CT angiography of the head" means the whole arterial system. With SAH that isn't around the Circle of Willis (CoW), a standard CoW CTA is often a knee-jerk response and may miss distal aneurysms, AVMs, dAVFs etc.	Thank you for your comment. We disagree that the technical requirements of CT head scans need to be stated in the recommendation. The recommendation states non-contrast CT head scan, which does not limit it to just the circle of Willis.
33	British Association of Stroke Physicians	Recommendations	007	006	Please define "straight away" for clarity and auditing purposes. MDTs will have variable frequencies between centres.	Thank you for your comment. We found no evidence about the timing of investigation and management of patients with SAH. We were therefore unable to specify a precise timeframe in the recommendation as this would have a resource impact which can only be justified with robust evidence. We have used the phrase 'seek specialist opinion without delay from an interventional neuroradiologist and neurosurgeon'.
34	British Association of Stroke	Recommendations	007	008	"and" should be "or"	Thank you for your comment. The recommendation refers to the situation in which a patient with confirmed subarachnoid haemorrhage is also found to have an intracranial arterial aneurysm but the pattern of subarachnoid blood is not thought to be compatible with

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	Physicians					rupture of the aneurysm. The conjunction 'and' is therefore appropriate and an urgent specialist neurovascular review should be arranged to consider the cause of the subarachnoid bleed.
35	British Association of Stroke Physicians	Recommendations	007	019	Suggest you add, "a detected intracranial aneurysm is anatomically unrelated to the SAH." Unruptured intracranial aneurysms are common, or may reside on feeding arteries to AVMs.	Thank you for your comment. We do not agree that this is needed in the recommendation. The decision on whether a detected aneurysm is the cause of SAH takes multiple factors (as well as anatomical location of SAH) into account and should be made on a case-by-case basis by a neuroradiologist or neurosurgeon.
36	British Association of Stroke Physicians	Recommendations	008	001	Add or cross reference advice as to what to do with patients taking DOAC's/warfarin and antiplatelets in context of acute SAH - i.e. stop and/or use reversal agents?	Thank you for your comment. Management of people already taking antithrombotic treatments was not within the scope of the committee to comment on.
37	British Association of Stroke Physicians	Recommendations	008	008	This recommendation is not justified in view of the result of the recently published ULTRA trial: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)32518-6/fulltext	Thank you for your comment. The committee have reviewed the recommendation and agreed to remove it from the guideline.
38	British Associ	Recomme	008	017	I couldn't find a section of the NICE VTE prevention guideline that's relevant to people with	Thank you for your comment. The NICE VTE prophylaxis guideline states that pharmacological VTE prophylaxis

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	ation of Stroke Physicians	ndations			active bleeding. Shouldn't there be SAH-specific advice here?	should not be given to people at risk of bleeding but other forms of VTE prophylaxis e.g. mechanical etc, can be used until the aneurysm is secured. We have added a sentence to the rationale to reinforce this point.
39	British Association of Stroke Physicians	Recommendations	008	019	It seems unsatisfactory that for important topics such as blood pressure control, VTE prevention, headache and fluid balance the reader is referred to the generic NICE guidance on these conditions. There is published evidence on these topics relevant to SAH; indeed at later points in the guideline, condition specific guidance is offered. To suggest that management of these conditions in SAH is completely generic and the same as for an adult with no neurological insult threatens the credibility and utility of the guideline.	Thank you for your comment. These topics were included in the scope of the guideline and evidence on them was searched for, however there was no/poor evidence to make specific recommendations for these topics. The committee made cross-referral recommendations to the existing NICE guidelines as they were considered to be appropriate to SAH patients. However, we have deleted the cross-referral to the NICE Intravenous fluid therapy in adults in hospital guideline as the committee agreed it did not add specific information relevant to management of patients with SAH. The committee made research recommendations on blood pressure targets for SAH patients to address the paucity of evidence in this area.
40	British Association of Stroke Physicians	Recommendations	009	021	Please define "earliest opportunity" for clarity / auditing purposes, perhaps with a maximum acceptable timescale, influenced by the evidence available (e.g. https://pubmed.ncbi.nlm.nih.gov/22700527/).	Thank you for your comment. There was no evidence on which to specify in the recommendation the timescale for transfer/treatment. The committee agreed that 'at the earliest opportunity' conveyed urgency and in the absence of evidence the committee were unable to be more specific. Any stronger recommendation on timeframe for intervention would incur a resource

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						impact would need to be supported by strong clinical evidence. However, based partly on recent evidence from the ULTRA trial the GC have added the sentence to the end of the recommendation 'Be aware that the risk of rebleeding is highest within 24 hours of the onset of symptoms' to convey the urgency. The cited reference (Dourhout-Mees 2012) is an exploratory analysis of the ISAT trial, which reported lower risk of delayed cerebral ischaemia in patients who underwent intervention to secure the aneurysm within 48h of the haemorrhage when compared with patients who underwent later intervention. Analyses were adjusted for age, clinical condition at admission, and amount of blood on initial computed tomography scan, but confounding due to other factors cannot be excluded. These data are not definitive but suggest that intervention should be carried out within 48h. The committee agreed that in current practice in England the objective is to secure the aneurysm within 48h in the majority of patients, but even earlier intervention (for example within 24h) would require significant resource and could not be justified by the available evidence.

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41	British Association of Stroke Physicians	Recommendations	010	011	Place of care, physiological monitoring, and impaired swallow/feeding should be mentioned.	Thank you for your comment. Place of care is determined locally dependent on configuration of services and is outside the remit of NICE guidelines. We agree that physiological monitoring and management of impaired swallowing/feeding are important aspects of general ICU aspects of care but they are outside of the remit of this guideline. The clinician would assess the outcomes following intervention and risks of any further investigation or intervention.
42	British Association of Stroke Physicians	Recommendations	012	009	Although the stroke rehabilitation guideline covers many important generic issues after stroke, we were concerned that some problems that particularly affect SAH survivors (e.g. neuropsychiatric consequences) are omitted.	Thank you for your comment. We agree that psychological aftercare is not currently universally robust hence the committee made a recommendation on patient information to address this issue. Therefore, the recommendation should address the gaps in the stroke guideline. 1.5.7) Tell the person (and their family or carers if appropriate) that common symptoms reported by people who have had a subarachnoid haemorrhage include: • headaches, fatigue and sleep disturbances • anxiety, low moods and increased irritability • problems with memory and cognitive function • changes to smell, taste, hearing or vision.
43	British Associ	Recomme	013	003	Shouldn't this also include the extent of a person's recovery? For example, if the patient is dependent	Thank you for your comment. We agree this would include the assessment of a person's extent of recovery and the

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	ation of Stroke Physicians	ndations			on others and in a care home, they are unlikely to be candidates for follow-up imaging or further intervention.	clinician would assess the outcomes following intervention and risks of any further investigation or intervention. We have revised the recommendation to make clear any follow-up neuroimaging should take into account the extent of the person's recovery and suitability of further imaging.
44	British Association of Stroke Physicians	Recommendations	014	014	Alcohol misuse is also a risk factor for aneurysm development and rupture, so please include a section addressing this too.	Thank you for your comment. We agree that alcohol intake is generally considered to be a risk factor although the evidence is not as strong as for smoking (see Juvela Lancet Neurol 2011;10:596) and the raised risk may simply reflect the fact that alcohol raises BP. This was not identified as a priority area to include in the medical management question

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45	**British Association of Stroke Physicians**	**Recommendations**	**015**	**012**	**Recurrent headaches also bring back memories of the initial haemorrhage and trigger anxiety. This should be acknowle**dged; and sometimes these memories are associated with PTSD.	Thank you for your comment. We agree hence the committee made a recommendation on patient information to address this issue. 1.5.7 Tell the person (and their family or carers if appropriate) that common symptoms reported by people who have had a subarachnoid haemorrhage include: • headaches, fatigue and sleep disturbances • anxiety, low moods and increased irritability • problems with memory and cognitive function • changes to smell, taste, hearing or vision.
46	British Association of Stroke Physicians	Recommendations	016	004	Typing error aneuryisms	Thank you for your comment. We have corrected this typo.
47	British Association of Stroke Physicians	Recommendations	016	009	Please define first-degree relative for clarity; the distinction between first and second degree hasn't always been clear in the research studies that underpin this recommendation.	Thank you for your comment. No evidence was found on investigating relatives for intracranial aneurysms **.** The recommendation is essentially a cross-referral to the current NHS advice on screening for relatives which includes the definition of first-degree relatives in parentheses "(father, mother, sister or brother)". However, we agree this definition is missing from the

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						guideline and we have added it to the recommendation and the glossary.
48	British Association of Stroke Physicians	Recommendations	017	008	This section focuses on what the doctor should tell the patient. Equally important is the patient and relative perspective-in particular their views about the appropriateness or not about life saving treatment. This section should really be about shared decision making.	Thank you for your comment. The recommendations include a cross-referral to the NICE guideline on patient experience which covers shared-decision making, however, to reinforce this point we have added a new recommendation "Ensure the person understands the information and ask if they have any questions and address any additional concerns."
49	British Association of Stroke Physicians	Recommendations	018	003	Include alcohol misuse and blood pressure control	Thank you for your comment. We agree that alcohol intake is generally considered to be a risk factor although the evidence is not as strong as for smoking (see Juvela Lancet Neurol 2011;10:596) and the raised risk may simply reflect the fact that alcohol raises blood pressure. This was not identified as a priority area to include in the guideline questions. There was no evidence to base a specific recommendation on blood pressure targets and a consensus could not be reached. Hence the committee made a recommendation for research in this area.
50	British Association of	Recommendations	018	011	The common issues at follow up include pain, fatigue, depression, anxiety, and PTSD. These are often what matter most to patients. They don't	Thank you for your comment. These symptoms are included in the patient information recommendations.

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	Stroke Physicians				really have the prominence that they should in this guideline.	1.5.7 Tell the person (and their family or carers if appropriate) that common symptoms reported by people who have had a subarachnoid haemorrhage include: • headaches, fatigue and sleep disturbances • anxiety, low moods and increased irritability • problems with memory and cognitive function • changes to smell, taste, hearing or vision.
51	British Association of Stroke Physicians	Recommendations for research	018	016	The frequency and treatment of mood, fatigue, psychiatric and cognitive problems after SAH are in need of research and are known to be the most important issues for stroke survivors in priority-setting exercises. They should be included here.	Thank you for your comment. The committee agree this is an important area for research but psychiatric issues in SAH survivors is outside the scope of this guideline and therefore the committee were not able to formulate a research recommendation in this area.
52	British Association of Stroke Physicians	Recommendations for research	18	017	Is this really an uncertainty? CT scans beyond 6h are known to be unreliable – see references in the introduction of https://www.bmj.com/content/343/bmj.d4277	Thank you for your comment. Limited evidence was found for the accuracy of CT more than 6 hours after symptom onset. Further research in this area would allow for more specific recommendations on timing of investigations to be made. Please see evidence review B.
53	British Association of Stroke	Recommendations for	19	001	This research question is already answered. More important is how risk prediction tools can be implemented in clinical practice and if they make any difference to management or outcome (like recommendation 5 [Risk stratification tool to estimate risk of recurrence]).	Thank you for your comment. We disagree that this question has already been answered as none of the risk tools included in our review have been properly validated for use in unselected patients with SAH. Please see

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	Physicians	research				Circulation. 2009;119:2408 for a discussion of standards for risk prediction models.
54	British neurovascular group	Guideline	004	006	Diagnosis While the statement is accurate we are very concerned the way it is phrased here and throughout the document. It implies clinicians should think twice before investigating patients with thunderclap headache rather than emphasising to always investigate thunderclap headache unless there are very good reasons not to do so. The main finding from NCEPOD 'Managing the Flow' (November 2013) was that most avoidable problems after SAH relate to the delayed initial diagnosis of SAH. It is our strongly held view that the default position should be that patients with thunderclap headache should be investigated with CT. It may then be appropriate to qualify this with circumstances where this may not apply in a list (such as where the patient has had multiple thunderclap headaches for which they have been investigated previously).	Thank you for your comment. Thank you for highlighting the NCEPOD report 'Managing the Flow'. The guideline committee is aware of this report but it did not meet the criteria for inclusion in the evidence reviews conducted for this guideline. The committee acknowledge the link between a delayed diagnosis of SAH and a poor clinical outcome. The committee agreed that healthcare professionals should maintain a high index of suspicion for SAH in people with acute headache or other symptoms and signs suggestive of subarachnoid haemorrhage and added this to the recommendation. The best available clinical and cost-effectiveness evidence does not support investigating everyone with a thunderclap headache with CT head scan. Whilst acknowledging that thunderclap headache is a red flag symptom of SAH, the committee considered that decisions to investigate patients presenting with unexplained sudden severe headache should be based on

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						a clinical assessment that takes account of all symptoms and clinical signs, and if relevant considers other possible conditions or causes associated with thunderclap headache. The committee agreed that further investigation with an urgent non-contrast CT head scan is indicated if a senior clinical decision maker in the emergency department or in secondary care confirms unexplained thunderclap headache or other signs and symptoms suggesting SAH. The committee noted that in Perry 2013 only 9% of 1201 patients with thunderclap headache were found to have subarachnoid haemorrhage and lower rates of subarachnoid haemorrhage have been reported in other studies of headache.
55	British neurovascular group	Guideline	005	013-014	CT scan Unless page 4 is amended as per comment 1. The indication for CT scan currently listed as "suspicion of SAH" is not clear enough. As per comment 1 we believe guidance should be clear in that all thunderclap headache should be investigated with CT scan and then a number of exceptional	Thank you for your comment. We agree that anyone who is suspected of having SAH should be offered urgent investigation. This may include people who present with an isolated thunderclap headache when the index of suspicion for SAH is high upon clinical assessment. The committee have recommended urgent referral for CT

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					circumstances could be listed after this in which it might be reasonable to consider not doing so.	scan on confirmation of unexplained thunderclap headache or other symptoms and signs suggest SAH. The order of the recommendations has also been revised to better outline the process of identifying and diagnosing aneurysmal SAH.
56	British neurovascular group	Guideline	006	001-002	CT scan / lumbar puncture We acknowledge the new evidence suggesting LP is unnecessary after a negative early CT. However, this only applies where the scan is of good technical quality scan AND reported by a Neuroradiologist. If it remains part of the guidance then it should be qualified if the scan is of good technical quality and reported by a consultant neuroradiologist. It should be noted that the latter requirement for neuroradiology reporting will inevitably lead to a significant resource issue as this will frequently need to be done out of hours and in different hospitals by a speciality that already struggles with recruitment. It should be noted that our concern is that even if the presented evidence prove true, many patients referred with SAH diagnosed on LP, in retrospect did have SAH visible on their early CT, but this was not noted by the reporting consultant radiologist (from outside of the neurosciences centre). This is a common occurrence that all	Thank you for your comment. The sensitivity of a CT head scan was discussed by the committee. It was noted that the clinical evidence found that the sensitivity of a CT head scan done within 6 hours of symptom onset was above 95% in all studies. Based on the economic analysis reported in evidence review B, when the sensitivity of a CT head scan is above 95%, LP is not a cost effective strategy for patients receiving a CT head scan within 6 hours of symptom onset. The committee noted the healthcare professional reporting the results of the CT head scan in the studies included in the clinical review was a combination of radiologists and neuroradiologists, or was not reported; they were not exclusively neuroradiologists. Perry 2011 was deemed the most appropriate study to inform the health economic analysis and it stated that the CT head scans were interpreted by qualified local

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					neurosurgeons note in day to day practice. In the real world these cases would be missed if there had been no LP. Therefore, application of this guidance risks an increase in medicolegal cases relating to missed SAH due to misreporting of scans unless it is appropriately qualified.	radiologists (a neuroradiologist or general radiologist who routinely reports head computed tomography images), who were blinded to the study and data forms but who had routine clinical information. Furthermore, none of the studies reported the differential accuracy of CT scans interpreted by different types of radiologists. Based on this the committee agreed that it was not appropriate to specify which type of radiologist should be reporting the results of the CT head scan, given that the clinical evidence is based on a mix of radiologists, and not exclusively by neuroradiologists. The committee discussion of the evidence and resource and impact sections relating to this recommendation have been edited to clarify this. Please note the recommendation does specify that if the CT head scan (done within 6 hours of symptom onset and reviewed by a radiologist) is negative, healthcare professionals should 'think about alternative diagnoses and seek advice from a specialist.' In addition, the committee considered that there may be some rare cases

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						where LP is still indicated despite a negative result from a CT performed within 6 hours, for example if a strong clinical suspicion of SAH remains, but highlighted that this should not be routine practice given the high diagnostic accuracy of early CT. Instead, the healthcare professional should think about alternative diagnoses and seek advice from a specialist in neurosurgery, neuroradiology, neurology or stroke medicine. The rationale for the recommendation has been updated and can be found in the committee discussion of the evidence.
57	British neurovascular group	Guideline	008	005-006	We feel the strength of evidence available means nimodipine should be "recommended" rather than "considered". The British Aneurysm Nimodipine Trial showed a significant difference in outcome in an RCT of 554 patients. Subsequent metanalysis reinforced this. We acknowledge that the trial was performed a long time ago, however it also has to be recognised how difficult it is to regularly repeat RCTs, for the sole purpose of making sure the evidence is recent, in a relatively rare condition that meets the criteria of an Orphan indication. There is also no evidence at all to suggest that nimodipine's effect is any different in	Thank you for your comment. A 'strong' recommendation is made when the committee believes that the vast majority of practitioners or commissioners and people using services would choose a particular intervention if they considered the evidence in the same way as the committee. This is generally the case if the benefits clearly outweigh the harms for most people and the intervention is likely to be cost effective. Based on the evidence considered by the committee they did not believe this to be the case and decided to make a 'consider' recommendation to reflect the strength of the

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					endovascularly treated patients to those treated with microsurgery. It is unlikely that such a trial would be funded, and if funded our membership generally would be uncomfortable randomising patients to placebo. Therefore, to only consider nimodipine during this time would potentially deny patients treatment while decades may pass before a further trial is done.	evidence and convey that evidence of benefit is less certain. The study you cited was included and considered alongside the remaining body of evidence comparing nimodipine to a control group. The committee noted that the entirety of evidence came from trials conducted before the introduction of endovascular coiling into routine practice and involved mostly patients undergoing neurosurgical clipping after a period of medical stabilisation. In most trials nimodipine was commenced up to 96 hours after ictus and continued for up to 3 weeks before surgical management. Hence, the results of the trials were not considered to be directly applicable to contemporary practice. The committee could not be sure that the benefits from nimodipine are maintained with current treatments to secure the ruptured aneurysm, but they considered without evidence of harms a recommendation to consider nimodipine was appropriate. The committee recognised the concerns raised in repeating research trials, but highlighted the changes in clinical practice that have occurred since the evidence base was produced. With the reduced time between ictus and intervention to secure aneurysms in current practice, there is less certainty that intervention with

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						nimodipine would provide the previously observed benefits, particularly with respect to rebleeding. NICE also must consider the cost-effectiveness of interventions, which may in turn be lessened with a reduced opportunity for benefit of nimodipine in current practice. As such, the committee made a recommendation to consider and recommended further research to clarify both the clinical and cost efficacy of nimodipine in contemporaneous practice. The committee acknowledged that many clinicians may not currently be in equipoise about the use of nimodipine in patients with aneurysmal subarachnoid haemorrhage, but anticipated that the equipoise may evolve over time and in response to this guideline. Further randomised trials of clinical and cost effectiveness of nimodipine in current practice may then be feasible.
58	British neurovascular group	Guideline	008	009-010	Tranexamic acid It is hard to understand why this treatment is listed as an option given a very recent and high quality RCT showed it did not reduce rebleeding and did not improve outcome https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)32518-6/fulltext. Discussion as an option (even where stated it should not delay treatment), still inevitably detracts from the main message which should be	Thank you for your comment. The evidence you have cited was reviewed and considered by the committee alongside a second study assessing the use of short-course tranexamic acid within this setting. The findings from this pooled evidence showed tranexamic acid may reduce the rate of rebleeding. However, the committee reviewed the recommendation on tranexamic acid and agreed to remove it from the guideline The committee

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					that efforts should be directed at securing the aneurysm	agree that tranexamic acid should not delay efforts to secure the ruptured aneurysm and have emphasised this within the committee discussion section of the guideline.
59	British neurovascular group	Guideline	008	022	Fluid therapy As described in the document, there is no evidence for fluid management in SAH. We cannot see how it can therefore be recommended to use fluid management guidance for other conditions from the alternate NICE guidance for adults. SAH patient differ significantly from the patients for whom that guideline was developed in that they have high risks of cerebral oedema and hyponatraemia. Most neurosurgeons would consider giving significant amounts of hypotonic fluids as in the referenced guidelines as damaging, and would by this guidance be forced to use fluid therapy they felt harmful. It would be more appropriate to just say there is no evidence at all.	Thank you for your comment. The committee considered the NICE Intravenous fluid therapy in adults in hospital guideline to be appropriate for this population group. The NICE Intravenous fluid therapy in adults in hospital guideline recommends administration of fluid appropriate for the clinical circumstances, which will include people with SAH. Whilst we consider that cross-referral to the existing NICE Intravenous fluid therapy in adults in hospital guideline is appropriate, we acknowledge that it does not add anything to current practice, and we have therefore decided to delete this recommendation.
60	British neurovascular group	Guideline	010	014-016	Transcranial Doppler Ultrasound We believe that the paucity of evidence means it is impossible to give a recommendation on transcranial doppler ultrasound. We are surprised that there is a hard recommendation based on one piece of level 3 evidence. The quoted evidence (the authors of which are amongst the	Thank you for your comment. We consider the recommendation wording conveys that TCD should not be used routinely but can be used in the context of clinical research. We found no evidence to support clinical or cost-effectiveness of TCD. The committee

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					membership of the BNVG and this feedback) discusses the many limitations to the data and this risks of bias. We therefore feel it remains an option in the management of SAH	recognised that it may have a role, however, and wanted to encourage further research.
61	British neurovascular group	Guideline	010	017-020	Unexplained neurological deterioration While a non contrast CT will diagnose hydrocephalus, it will provide no information about DCI we therefore feel CTA or CTP should be considered or is at least an option at the same time of CT to prevent repeat scanning.	Thank you for your comment. This is not usual practice, and CTA or CTP is not performed in all people with neurological deterioration. The recommendation does not exclude CTA or CTP as second-line investigations. The committee was not aware of any evidence for CTA and CTP in patients with suspected DCI and this area was not prioritised by the committee for review. By consensus the committee agreed that DCI is a diagnosis of exclusion and noted that use of CTA and CTP is not routine in most neuroscience centres.
62	British neurovascular group	Guideline	014	015	Hypertension While this is listed under managing other conditions and probably implies this relates to the long term care of hypertension it is slightly ambiguous and could be mistaken for applying to the acute phase. It may be appropriate to clarify there is no evidence for the correct blood pressure management acutely after SAH but likely to differ from healthy patients but that on recovery from SAH the referenced NICE guideline should apply.	Thank you for your comment. We agree and have amended the heading 'Managing other conditions' to include 'after discharge from hospital' to clarify that the subsequent recommendations relate to long-term follow-up, and not the acute phase. We have also provided a summary in the committees discussion of evidence within the evidence review for medical management in the acute phase to highlight that there was no evidence for the correct blood pressure management acutely after SAH.

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63	British Neurovascular Nurses Group	Guideline	008	007	The suggestion of the use of intravenous Nimodipine if enteral feeding not suitable is worriying as in practice it is rarely used in its IV format due to the potential of more severe hypotensive side effects which would be serious following subarachnoid haemorrhage and only used in specialist highly controlled settings. As this reads there is a worry that in non neurosurgical units they may administer IV Nimodipine if easy oral or enteral options not easy. This point is concerning as could be misleading	Thank you for your comment. IV nimodipine should be given by people who know how to administer it based on its licenced indications. This route of administration is very rare and usually only performed in ICU. The committee has edited the recommendation to clarify its use should be within specialist settings.
64	British Neurovascular Nurses Group	Guideline	008	008	Tranexamic acid is not used commonly in many places and it does not appear in the guideline or the rationale that there is sufficient evidence to support its routine use especially as stated that it has not been shown to improve clinical outcomes in this patient group	Thank you for your comment. The committee reviewed the recommendation on tranexamic acid and agreed to remove it from the guideline.
65	British Neurovascular Nurses Group	Guideline	008	022	As stated also in rationale, there is no supporting evidence to support specific fluid therapy recommendations in this patient group so should just say this instead of referring to a general guide	Thank you for your comment. Whilst we consider that cross-referral to the existing NICE Intravenous fluid therapy in adults in hospital guideline is appropriate, we acknowledge that it does not add anything to current practice, and we have therefore decided to delete this cross-referral recommendation.

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66	British Neurovascular Nurses Group	Guideline	010	014	Should maybe say Do Not use transcranial dopplers as an independent, stand alone guide to the clinical management of aneurysmal subarachnoid haemorrhage, but where used should be in combination with other measures of observation	Thank you for your comment. We consider the recommendation wording conveys that TCD should not be used routinely but can be used in the context of clinical research. We found no evidence to support routine use of TCD to monitor patients with SAH for cerebral arterial vasospasm or intracranial arterial hypertension, either alone or in combination with other measures of observation. The only available clinical evidence suggests that routine use of TCD may be associated with worse clinical outcome than no monitoring/TCD use. The committee therefore made a recommendation for use only in the context of clinical research.
67	British Neurovascular Nurses Group	Guideline	011	017	Controlled hypervolaemia is used in practice and in your rationale you state that agreed management of delayed cerebral ischaemia is to increase cerebral blood flow.	Thank you for your comment. We agree that there is a slight discrepancy in the wording here and we have changed 'increase' to 'maintain cerebral blood flow' in the rationale for this recommendation. By consensus the committee agreed that clinicians should aim to achieve euvolemia rather than hypervolaemia.
68	British Neurovascular Nurses Group	Guideline	012	014	Age is also a factor that needs to be considered in planning follow up as it will influence potential elective treatment decisions which with increasing age would not be considered and therefore will impact on decision to follow up	Thank you for your comment. A person's clinical condition and any risks associated with future investigations or intervention would need to be considered by the health professional as part of their assessment, and a person's age may be a factor and is

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						therefore not excluded from the recommendation, but the committee have focused on the main considerations within the recommendation.
69	British Neurovascular Nurses Group	Guideline	014	019	Generally this section would be acceptable for those working in a specialist areas but to open for generalists to make a decision on antiplatelet therapy on	Thank you for your comment. The GC were concerned that patients with an indication for antiplatelet or anticoagulant drugs should not be denied anti-thrombotic treatment simply because they have had SAH. Rather the decision should be based on a careful assessment of individual risks and benefits, if necessary taking account of specialist opinion about the risks of future SAH. We consider that generalists and specialists should work collaboratively to reach agreement about treatment in these circumstances. However the recommendations have been reordered to make it clearer that treatment should not be withheld on the basis of aneurysmal SAH.
70	British Neurovascular Nurses Group	Guideline	015	015	This is not necessary as covered in hydrocephalus and most people with post haemorrhagic hydrocephalus do not have features of raised intracranial pressure	Thank you for your comment. Because of the lack of evidence the recommendation was made based on consensus of the committee. The committee agree with comments received by stakeholders and we have amended the recommendation to take out 'raised ICP' and added the features that might raise suspicion of chronic hydrocephalus 'such as gait disturbance, incontinence, incoordination or cognitive impairment'.

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71	British Neurovascular Nurses Group	Research	021	003	Acute hydrocephalus would not be treated with a shunt after a subarachnoid haemorrhage as permanent drainage may not be needed and blood remaining in the cerebrospinal fluid means it is likely to block	Thank you for your comment. Based on the clinical and cost-effectiveness review of managing hydrocephalus the committee considered there was sufficient uncertainty in this area to make a recommendation for research. The committee acknowledged there is a recognised risk with invasive interventions such as shunt surgery, external ventricular drain surgery and lumbar drain. In the acute setting hydrocephalus may be observed clinically or treated with a temporary CSF drainage either by LP, or external ventricular drain (EVD). If the patient develops longer term symptoms that indicate they need on-going CSF drainage the temporary measure may be converted to a permanent one (either a ventriculo-peritoneal or lumbo-peritoneal shunt.
72	Intensive Care Society	Guideline	General	General	ICS Standards and Guidelines Committee member: Personally I think it would be really useful to provide more info on: • Nimodipine - timing/duration • Blood pressure - targets/duration • Prophylactic anticoagulation for DVT prevention	Thank you for your comment. Unfortunately, the committee had limited evidence available for these areas of medical management and were unable to provide consensus recommendation with the level of detail requested. NICE recommendations assume the dosing given in the BNF/SPC will be followed unless otherwise stated.

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					These issues commonly arise on the ICU and nobody has a clear answer for them, which is presumably why they aren't in this guideline.	The use of nimodipine is mainly based on low to moderate quality evidence from randomised trials, which enrolled patients undergoing neurosurgical clipping after a period of medical stabilisation. In most of these trials, nimodipine was commenced up to 96 hours after ictus and continued for up to 3 weeks before surgical clipping of the ruptured aneurysm. Hence, the results of the trials are not directly applicable to patients treated by endovascular coiling and the committee could not be sure that the benefits from nimodipine are maintained in current practice. Moreover, modifications to the timing or duration of nimodipine therapy have not been assessed and the committee made a therefore made a research recommendation to assess the role of nimodipine in contemporary practice. There was no evidence to base a specific recommendation on blood pressure targets and a consensus could not be reached. Hence the committee made a recommendation for research in this area. The guideline has a recommendation cross-referring to the NICE guideline on VTE prophylaxis. VTE prophylaxis was not identified as a priority area for a research recommendation.

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73	Medtronic	Guideline	009	002 - 021	Medtronic would like to thank NICE for the opportunity to comment on the draft clinical guidelines, furthermore Medtronic would like to publicly state we have consistently and will continue to support the approach that NICE in all its forms takes in the evaluation of technologies and its place in ensuring best value for the National Health Service (NHS). However, we would like to highlight where the use of flow diverters is not given as a treatment option. We would courteously ask that NICE to consider that in some certain circumstances the use of flow diverters to treat patients with ruptured aneurysms may be considered a favourable option versus other endovascular or surgical approaches as decided by the neurosurgical and neurovascular multi-disciplinary team in a neuroscience centre.	Thank you for your comment. The recommendations do not preclude the use of novel technologies in specific clinical circumstances. From the evidence available the committee were unable to make any recommendations on newer intervention techniques. Cross reference has been made to NICE's interventional procedures guidance on other endovascular procedures for culprit aneurysms. The committee made a recommendation for research on novel endovascular techniques, 'What is the clinical and cost effectiveness of novel endovascular techniques and devices such as coated coils, endoluminal flow diverters, and intrasaccular devices to treat aneurysmal subarachnoid haemorrhage?'.
74	Medtronic	Guideline	013	005 - 022	We think the guideline as they are written overlook the importance of flow diverters. We would reverentially ask that NICE consider several publications about the benefits of flow diverters for the management of non-culprit (unruptured) aneurysms.	Thank you for your comment. While the committee recognises the potential for flow diverters for managing non-culprit aneurysms, there was insufficient evidence to draw any firm conclusions. The evidence you have highlighted relates to single arm non-randomised studies, which do not fit our review protocol inclusion criteria.

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					Appreciating NICE should be guided by the evidence in this area, we have highlighted some studies below. This is by no means exhaustive, but serves to emphasise that flow diverters should be a considered option if deemed clinically appropriate: • Becske, T., Brinjikji, W., Potts, M., Kallmes, D., Shapiro, M., Moran, C., Levy, E., McDougall, C., Szikora, I., Lanzino, G., Woo, H., Lopes, D., Siddiqui, A., Albuquerque, F., Fiorella, D., Saatci, I., Cekirge, S., Berez, A., Cher, D., Berentei, Z., Marosfői, M. and Nelson, P., 2016. Long-Term Clinical and Angiographic Outcomes Following Pipeline Embolization Device Treatment of Complex Internal Carotid Artery Aneurysms: Five-Year Results of the Pipeline for Uncoilable or Failed Aneurysms Trial. *Neurosurgery*, 80(1), pp.40-48. • Hanel, R., Kallmes, D., Lopes, D., Nelson, P., Siddiqui, A., Jabbour, P., Pereira, V., Szikora István, I., Zaidat, O., Bettegowda,	

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					C., Colby, G., Mokin, M., Schirmer, C., Hellinger, F., Given II, C., Krings, T., Taussky, P., Toth, G., Fraser, J., Chen, M., Priest, R., Kan, P., Fiorella, D., Frei, D., Aagaard-Kienitz, B., Diaz, O., Malek, A., Cawley, C. and Puri, A., 2019. Prospective study on embolization of intracranial aneurysms with the pipeline device: the PREMIER study 1 year results. *Journal of NeuroInterventional Surgery*, 12(1), pp.62-66. • Martínez-Galdámez, M., Lamin, S., Lagios, K., Liebig, T., Ciceri, E., Chapot, R., Stockx, L., Chavda, S., Kabbasch, C., Faragò, G., Nordmeyer, H., Boulanger, T., Piano, M. and Boccardi, E., 2018. Treatment of intracranial aneurysms using the pipeline flex embolization device with shield technology: angiographic and safety outcomes at 1-year follow-up. *Journal of NeuroInterventional Surgery*, 11(4), pp.396-399. • Rice, H., Martínez Galdámez, M., Holtmannspötter, M., Spelle, L., Lagios,	

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					K., Ruggiero, M., Vega, P., Sonwalkar, H., Chapot, R. and Lamin, S., 2020. Periprocedural to 1-year safety and efficacy outcomes with the Pipeline Embolization Device with Shield technology for intracranial aneurysms: a prospective, post-market, multi-center study. *Journal of NeuroInterventional Surgery*, 12(11), pp.1107-1112.	
75	Microvention UK	Evidence review L	026	004	• Hydrogel coils are not bioactive according to the bioactive materials definition « Bioactive materials induce the formation of a direct chemical bond between the implant and the host tissue by eliciting a biological response at the interface ». • This error is commonly found in the literature. Hydrogel is an inert material which expands in contact with blood. It does not promote the inflammatory response. • Mechanism of action of Hydrogel model is described in the three following articles : o A Comparison of Experimental Aneurysm Occlusion Determination by Angiography, Scanning Electron Microscopy,	Thank you for your comment. We acknowledge your definition of bioactive and have added reference in the committee discussion section of the evidence review to the different types of coils reviewed. Our literature review only included studies in human subjects that met our inclusion criteria. The additional papers cited in your comment relate to experiments in rabbits and a post mortem study and do not meet the criteria for inclusion in the review.

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					MICROFIL1 Perfusion, and Histology; Journal of Biomedical Materials Research 2009 ○ Angiographic and Histologic Analysis of Experimental Aneurysms Embolized with Platinum Coils, Matrix, and HydroCoil; AJNR 2005 ○ Clinical Device-Related Article Histomorphology of thrombus organization, neointima formation and foreign body response in retrieved human aneurysms treated with Hydrocoil devices ; Journal of Biomedical Materials Research 2010	
76	Microvention UK	Evidence review L	026	018	By expanding, Hydrogel improves aneurysm filling and coil mass stability	Thank you for your comment. We recognise that this is the proposed advantage of Hydrogel coated coils. However, the committee agreed that the available clinical evidence could not support a separate recommendation for the routine use of Hydrogel coated coils.
77	Microvention UK	Evidence review L	028	026	• The hydrogel coils used were on average fewer than that of bare platinum coils. • Significant results show that the length of Hydrogel coils used were less than that of	Thank you for your comment. The review was assessing different types of intervention to prevent re-bleeding and did not specifically look at the different technical aspects

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					only bare platinum needed to treat the aneurysms • Packing density was also significantly better using Hydrogel coils, showing more occlusion stability. Higher rates of compaction were seen in the bare platinum arms.	of those interventions such as length of coil and packing density. While this information was not extracted from the included studies, when considering the costs of intervention, the committee considered the number of coils required and the subsequent packing density to secure a ruptured aneurysm, and this discussion has now been added to the evidence review.
78	Microvention UK	Evidence review P	006	003	• Twenty-five studies from 19 randomised controlled trials and cohorts were included in the review. The following study is not listed: Bendok BR, Abi-Aad KR, Ward JD, Kniss JF, Kwasny MJ, Rahme RJ et al. The Hydrogel Endovascular Aneurysm Treatment Trial (HEAT): a randomized controlled trial of the second-generation Hydrogel coil. Neurosurgery. 2020 ; 86(5):615-624 • HEAT was excluded from the Evidence review L due to the small population of ruptured aneuryms included in the study, however, following the same rule, due to the high population of unruptured aneurysms enrollled, HEAT should be considered in the review P	Thank you for your comment. This study was not included for evidence review P due to the indirect population (with a mix of patients with ruptured or unruptured aneurysms and no outcome data breakdown for each category). The committee prioritised evidence from direct populations for inclusion in this evidence review.

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79	Microvention UK	Evidence review P	033	040	• The evidence from six RCTs comparing bioactive coils to bare-platinum coils showed no clinically important difference between interventions for mortality, poor postoperative neurological status (as indicated by mRS 3-5), subsequent aneurysm rupture or complication of intervention. • Reviews should consider technological equivalence in the implementation of recommendation, i.e. comparing all RCTs of current or second generation coil technology; for example, GREAT which showed a positive trend in results, utilising second generation Hydrogel coils. • The HEAT Study shows to be in favour of the newest generation of Hydrogel coils with statistically significant lower rates of recurrences at 24 months and superior occlusion stability at 3-12 months and at 18-24 months compared to bare platinum coils.	Thank you for your comment. The GREAT trial has been included in the review. The HEAT trial has been excluded because it has an indirect population of ruptured and unruptured aneurysms. The review protocol did not set out to compare different generations of coils and the quality and quantity of the evidence available on various generations of coils did not support any further sub-comparisons, but this has been added into the discussion section of the review. However, the committee recognised this as an important area for practice and made a research recommendation.

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					• This result influences patient population in both follow up outcomes and retreatment cost.	
80	Microvention UK	Evidence review P	033	040	• Evidence Review P refers to o Matrix and Cerecyte coils which are rarely if not used anylonger and were having a different mode of action than the Hydrogel coils o HELPS with the first generation of Hydrogel coils which is not commercialized anylonger • The most recent RCTs – GREAT and HEAT – were done with the same second generation of Hydrogel coils.	Thank you for your comment. The review did not set out to compare different generations or varying technologies of coated coils, but details on the types of coils used has been added to the discussion section of the review. The committee noted that second generation hydrogel coils are more commonly used in current practice. The committee agreed that the quality and quantity of the evidence available on various generations of coils did not support any further sub-comparisons, but did acknowledge that this is an important area for practice and have made a research recommendation. The GREAT trial has been included in the review. The HEAT trial has been excluded because it has an indirect population of ruptured and unruptured aneurysms.
81	Neuroanaesthesia and Critical Care	Guidance	009	003	Must mention contribution of neuroanaesthetist and neurointensivist to decision making. No frailty assessment mentioned.	Thank you for your comment. This has been added to the committee's discussion of the evidence in evidence review L, 'other factors' section. We agree that neuroanaesthetists and neurointensivists are key members of the multidisciplinary team caring for

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	Society					patients with aneurysmal SAH and should participate fully in clinical decision-making. Recommendation 1.2.4 seeks to ensure that a neurosurgeon and a neurointerventionist contribute to the technical decision about the optimal treatment to secure the ruptured intracranial aneurysm. The recommendation does not preclude participation of other members of the MDT in the decision-making process, but does not mandate a full MDT meeting as this might delay treatment. Moreover, in some situations a treatment decision is made before the patient is admitted to a neurointensive care unit. Frailty assessment tools have generally been developed to assess people of advanced age and have not been validated for use specifically in people with aneurysmal SAH. Decisions about the management of a person with aneurysmal SAH should be based on a holistic clinical assessment that takes account of the person's overall condition and circumstances.
82	Neuroanaesthesia and	Guideline	008	009	Include the does and specifics of infusion or bolus of tranexamic acid	Thank you for your comment. The committee reviewed the recommendation on tranexamic acid and agreed to remove it from the guideline.

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	Critical Care Society					
83	Neuroanaesthesia and Critical Care Society	Guideline	008	018	Cross-reference to NICE Guidelines on VTE in >16's. No mention of aSAH. Could there be a more explicit about this recommendation, e.g. "withhold pharmacological thromboprophylaxis until aneurysm secured, or a decision not to (or inability to) occlude the aneurysm fully is made", or something along those lines.	Thank you for your comment. The committee consider that the NICE guideline on VTE prophylaxis provides appropriate guidance for this population within the recommendations for people undergoing cranial surgery. The NICE VTE prophylaxis guideline states that pharmacological VTE prophylaxis should not be given to people at risk of bleeding but other forms of VTE prophylaxis e.g. mechanical etc, can be used until the aneurysm is secured. We have added a sentence to the rationale to reinforce this point. The VTE prophylaxis guideline also provides a recommendation on the use of pharmacological prophylaxis after securing the aneurysm (recommendation 1.12.10). VTE prophylaxis in SAH patients was not identified by the committee as a priority area for a research recommendation.
84	Neuroanaesthesia and	Guideline	008	022	The 'NICE guideline on IV fluid therapy in adults in hospital' linked to in this document does not mention aSAH at all. It does recommend sodium chloride 0.18% in 4% glucose. This can lead to	Thank you for your comment. Whilst we consider that cross-referral to the existing NICE Intravenous fluid therapy in adults in hospital guideline is appropriate, we acknowledge that it does not add anything to current

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	Critical Care Society				hyponatraemia. This NICE document about aSAH has to stress the need for a fluid regime that does not risk hypovolaemia/hyponatraemia.	practice, and we have therefore decided to delete this recommendation.
85	Neuroanaesthesia and Critical Care Society	Guideline	010	018	Consider DSA or CTA for cause of deterioration (vasospasm)	Thank you for your comment. The recommendation does not exclude these tests as second-line investigations. We have added to the recommendation that CT is the 'first test' to clarify that other tests are not excluded and this is stated in the rationale section of the guideline.
86	Neuroanaesthesia and Critical Care Society	Guideline	011	007	It also should say consider those *at risk of* deterioration, e.g. evolving increased size of ventricles, or patients who are difficult to assess, i.e. receiving sedation and mechanical ventilation.	Thank you for your comment. The recommendation does not exclude the possibility of intervention in other circumstances e.g. patients at extremely high risk of developing hydrocephalus.
87	Neuroanaesthesia and Critical Care	Guideline	014	016	This needs to be more detailed. There has to be specific blood pressure guidance for aSAH pre and post treatment.	Thank you for your comment. We looked for evidence for the long-term management of blood pressure specifically in patients with previous SAH but found none or only evidence of poor quality. The committee agreed that in the long-term, blood pressure should be managed in line with the NICE guideline on hypertension in adults. The committee also agreed a research recommendation to

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	Society					assess the clinical and cost-effectiveness of a long-term blood pressure treatment target for people with subarachnoid haemorrhage.
88	Neuroanaesthesia and Critical Care Society	Guideline	015	018	There is no reference to management of acute seizures (in context of aSAH) or consideration of one seizure at presentation could be benign.	Thank you for your comment. We looked for evidence in this area but the evidence was of poor quality and could not support a recommendation for seizure prophylaxis in the acute phase. The committee agreed that anticonvulsant treatment should be considered for patients who have seizures in the acute phase, but considered this to be basic routine practice and a consensus recommendation was not necessary . The committee did not consider seizure prophylaxis to be a priority area for a research recommendation.
89	Neuroanaesthesia and Critical Care Society	Guideline	General	General	No comment on location to manage patients (specialist neuroscience centres) and available services required, e.g. stroke rehabilitation, neurophysiology, etc.	Thank you for your comment. It is outside the scope of this guideline to specify the setting in which the recommendations should be carried out. However, where specialist input may be needed this has been stated in the recommendations.

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90	Neuroanaesthesia and Critical Care Society	Guideline	General	General	No details on therapeutics during coiling eg. Antiplatelets, anticoagulants and reversal if inadvertent rupture during the procedure.	Thank you for your comment. This was not included in the scope as it was not deemed a priority at the time the scope was developed.
91	NHS England and NHS Improvement	General	General	General	This is concise and helpful to primary care although much of the content is of most relevance in the hospital setting. In the community, recognition, access and consistent messaging are probably the key aspects.	Thank you for your comment.
92	NHS England and NHS Improvement	Guideline	004	006	This is a helpful comment to contextualise but flag severe sudden onset headache as the key presenting symptom. In general practice first presentation is now (since the onset of the pandemic) likely to be by telephone and a headache with these features will usually result in immediate referral to A&E without waiting for face-to-face assessment. Telephone call back requests are much greater so practices must have an effective way to prioritise this symptom as one which warrants urgent action/clinician advice against the many presentations of headache to general practice. I	Thank you for your comment. We agree that the key presenting symptom of SAH is a severe sudden onset headache, however, the only way to prioritise people with headache for further investigation is through clinical assessment. This could either be through telephone consultation or face-to-face assessment. The committee agreed that immediate referral should be made for further assessment and diagnostic investigations if initial clinical assessment raises suspicion of subarachnoid

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					wonder whether any comment about the possible "warning leak" symptom should be included?	haemorrhage. The order of the recommendations has been revised to better outline this point. The importance of a careful history to assess the rate of onset and time to peak intensity of the headache has been emphasized and the recommendations now include a definition of thunderclap headache and a list of other symptoms associated with subarachnoid haemorrhage. These recommendations should support health care professionals making an initial assessment of patients. The committee have highlighted in the recommendations that urgent investigation to confirm a diagnosis and early treatment to prevent rebleeding from a ruptured aneurysm can minimise disability and death. A comment about warning leaks or sentinel headaches has been added to the discussion in the signs and symptoms evidence chapter. The committee agreed that sentinel leaks are generally diagnosed retrospectively in patients with an established diagnosis of subarachnoid haemorrhage. A sentinel headache can be a sudden onset and severe headache, which could indicate a 'warning leak' of blood from an intracranial aneurysm. Nevertheless, the committee agreed that in isolation sentinel headache has not been shown to be an independent and clinically useful determinant of risk of

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						future SAH and were unable to make a specific recommendation about this symptom.
93	NHS England and NHS Improvement	Guideline	004	017	Thinking about a serious incident in which subarachnoid haemorrhage (SAH) was missed, the subject could not adequately describe their symptoms or tolerate protracted questioning which led to multiple contacts and increased clinician cognitive bias against an acute serious diagnosis which further delayed care.	Thank you for your comment. The committee have recommended people seen outside of acute hospital settings with suspected SAH are referred immediately to an emergency department for further assessment. People with suspected SAH seen within the emergency department should be reviewed urgently by a senior clinical decision maker to assess the person, and if symptoms and signs suggesting SAH are confirmed they are referred for an urgent CT scan. If a person is unable to describe their symptoms, the committee have recommended to ask any person who has witnessed the onset of symptoms for a description. The committee recognises that the most common symptoms are not always present in people with SAH. Unfortunately, no collection of words could identify 100% of people with SAH but the recommendations are based on the best available clinical and cost-effectiveness evidence, allow for clinical judgement and should capture the majority of SAH patients.
94	NHS Englan	Guideline	005	002	This statement is helpful to ensure that acceptance of referral from primary care is	Thank you for your comment.

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	d and NHS Improvement				not obstructed by overly rigid adherence to the classic symptom set.	
95	NHS England and NHS Improvement	Guideline	005	006	This is interesting, opiates would not usually be given in primary care because of concerns about the evaluation of conscious level once at hospital and any effect on cerebral perfusion. Is this aimed at secondary care since it would represent a change in practice at GP level?	Thank you for your comment. The recommendation seeks to ensure that patients with severe headache are given effective pain relief. We agree that GPs usually would not administer intravenous opioids for this condition, but GPs do use oral opioids for severe headache e.g. co-codamol. The committee acknowledged sedative effects of opioid analgesics should be taken into account but should not preclude their use and this is highlighted in the rationale. The committee also amended the recommendation to include documenting administration of opioid analgesia in the person's healthcare record, and this should be checked when conducting a neurological assessment.
96	NHS England and NHS Improvement	Guideline	007	004	My comment on this would be about the notion of "warning leak" and discharge messaging to ensure that the patient re-presents with further symptoms rather than commits to an alternative diagnosis.	Thank you for your comment. We agree that symptoms of a 'warning leak' (sentinel headache) are associated with increased risk of rebleeding, but in isolation sentinel headache has not been shown to be an independent and clinically useful determinant of risk.
97	NHS England and	Guideline	012	004-005	Concerned that this statement doesn't include the person whom the care plan will apply. Need to ensure coproduction wherever possible with	Thank you for your comment. The recommendations include a cross-referral to the NICE guideline on patient

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	NHS Improvement				patients, their families and carers. "Develop and document a plan for follow-up care after an aneurysmal 5 subarachnoid haemorrhage."	experience. However, to convey the message of coproduction, we have added a recommendation to say 'Agree and document a plan for follow-up care…'..'
98	NHS England and NHS Improvement	Guideline	012	006	It would be helpful for the GP practice to have a copy	Thank you for your comment. We agree and have now included a new recommendation 'Include a copy of the follow-up plan in the person's medical record and discharge correspondence' to reflect this.
99	NHS England and NHS Improvement	Guideline	016	005	Advice for relatives to discuss blood pressure and lifestyle with their GP practice may be helpful.	Thank you for your comment. There was no clinical evidence on which to base specific recommendations about screening relatives. The recommendation in the guideline mirrors the current NHS advice on screening for relatives, which recommends that people with 2 or more first degree relatives with SAH contact their general practitioner to discuss future management options and so your point is covered by the recommendation.
100	NHS England and NHS Improvement	Guideline	016	019	"Who lack capacity" - this should be for those where the person is suspected to lack the mental capacity to make a decision and not just for those where the decision (in principle) has already been made.	Thank you for your comment. We agree that in clinical practice we would usually assess capacity before deciding whether we need to make the decision or support the patient without capacity to make the decision. In an emergency we would take a best interests decision. The recommendation has been amended to people who may

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						lack capacity and cross reference is made to the NICE guideline on decision making and mental capacity.
101	NHS England and NHS Improvement	Guideline	017	001	"Adapt written and verbal information about aneurysmal subarachnoid 2 haemorrhage to the needs and preferences of the person (and their family 3 or carers if appropriate)" - Isn't sufficient, reasonable adjustments on a wider scale should be made.	Thank you for your comment. The evidence considered was limited to the information needs of people who have had SAH. We are therefore unable to comment on adjustments or adaptations that may be required in other areas. Cross reference has been made to the Patient experience guideline which includes observing the requirements of the Equality Act and enabling access to NHS services.
102	NHS England and NHS Improvement	Guideline	017	008	This section is very one-directional. Suggest there needs to be more emphasis upon asking about concerns, questions, queries etc so the information is clearly understood and the care is codesigned to meet their needs.	Thank you for your comment. The recommendations include a cross-referral to the NICE guideline on patient experience which covers shared decision-making and patient understanding. However, to convey the message of coproduction, we have amended the cross-referral recommendation to specify these points' We have also softened 1 of the directive verbs e.g. changed 'Give' to 'Provide'.
103	NHS England and NHS Improvement	Guideline	017	017	Written information would be good as most forget by the time they get home and written information helps consistent messaging across healthcare settings	Thank you for your comment. We have added a recommendation to specify that a paper copy of the follow-up care plan should be given to the person.

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104	NHS England and NHS Improvement	Rationale and Impact	024	026	This would be a change in practice in primary care	Thank you for your comment. The committee were aware that GPs do not usually administer IV opioids to people with headache in primary care and this is unlikely to change in the future. We therefore disagree that the recommendations on pain relief are likely to bring about a significant change in current practice in primary care.
105	NHS England and NHS Improvement	Rationale and Impact	038	021	This could be read to imply that the resource implication rather than the available evidence underpins this advice (particularly given that SAH is relatively rare in the general population).	Thank you for your comment. There was no clinical evidence on the screening of relatives on which to base a recommendation. A recommendation in favour of screening for relatives over and above the current NHS advice on screening for relatives would have a resource impact which there was no evidence to justify. The sentence in the rationale to which you are referring to simply states that the committee are aware of the current NHS advice on screening for relatives.
106	Royal College of Nursing	All	General	General	The Royal College of Nursing (RCN) welcome the proposal to develop NICE guidance for Subarachnoid haemorrhage due to ruptured aneurysms. The RCN invited members who work with people in these settings and care for people with this condition to review and comment on the draft guidelines on our behalf.	Thank you for your comment.

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					The comments below, reflect the views of our reviewers.	
107	Royal College of Nursing	Guideline	Question	001	• *Which areas will have the biggest impact on practice and be challenging to implement? Please say for whom and why.* Seldom heard groups and an easy read card that could be made available for people with for e.g. learning disabilities, language problems or altered consciousness due to potential limited easy read information being provided.	Thank you for your comment. Decisions on how information is delivered are made by the service provider and beyond the scope of the committee.
108	Royal College of Nursing	Guideline	Question	002	• *Would implementation of any of the draft recommendations have significant cost implications?* There is potential for increasing costs for additional investigations that may need to be carried out if symptoms present, in addition to workforce cost implications, having the right health care professionals to carry out and undergo procedures/ investigations will potentially have significant cost implications.	Thank you for your comment. The diagnosis recommendations are based on the best available clinical and cost-effectiveness evidence. All NICE recommendations should be delivered by an appropriate health professional and the committee does not consider that there are significant cost implications.
109	Royal College of Nursing	Guideline	Question	002	• *Would implementation of any of the draft recommendations have significant cost implications?* Additional training and development for health care professionals	Thank you for your comment. Delivery of care for patients can require training of health professionals by the health provider, however we do not think implementation of the recommendations will have any significant cost impact.

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110	Royal College of Nursing	Guideline	Question	003	• *What would help users overcome any challenges? (For example, existing practical resources or national initiatives, or examples of good practice.)* Best practice markers led by royal colleges, professional bodies and external stakeholders to support healthcare professionals in early detection and management	Thank you for your comment. We agree that best practice markers may support HCPs to deliver high quality care to patients with SAH but this is not within the remit of the NICE guideline committee.
111	Royal College of Nursing	Guideline	Question	003	• *What would help users overcome any challenges? (For example, existing practical resources or national initiatives, or examples of good practice.)* Best practice markers to support those seldom heard groups who may not be aware of initial symptoms and actions required as a result to further investigate (in addition to simplified language resources that can be used at a local level)	Thank you for your comment. We hope that the recommendations will raise awareness of the most common symptoms and signs suggestive of aneurysmal SAH.
112	Royal College of Paediatrics and Child Health	Guideline	General	General	This guideline possesses all of the attributes of a good clinical guideline.	Thank you for your comment.

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113	Royal College of Paediatrics and Child Health	Guideline	General	General	The reviewer is happy with the recommendations laid out in this guideline.	Thank you for your comment.
114	Royal College of Paediatrics and Child Health	Guideline	General	General	The reviewer suggested that more emphasis could be laid on preventive measures.	Thank you for your comment. Prevention is outside the remit of this guideline as set out in the scope. The guideline covers diagnosis and management.
115	Royal College of Paediatrics and Child Health	Guideline	General	General	The reviewer suggested that the Hunt and Hess scale could be employed in the guideline.	Thank you for your comment. The Hunt and Hess scale was included in the review of severity scores, please see evidence review C. The evidence did not support a recommendation for any one severity score to be used in isolation to predict outcome.
116	Royal College of	Guideline	General	General	Vaso-spasm treatment should not be initiated empirically.	Thank you for your comment. The guideline does not make specific recommendations on treatment for vasospasm.

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	Paediatrics and Child Health					
117	Royal College of Paediatrics and Child Health	Guideline	General	General	DVT prophylaxis should be used.	Thank you for your comment. The guideline has a recommendation cross-referring to the NICE guideline on VTE prophylaxis.
118	Royal College of Paediatrics and Child Health	Guideline	General	General	The reviewer also suggest that serum magnesium should be maintained equal to or more than 1.8mg.	Thank you for your comment. Magnesium was not identified during the scoping of this guideline as a priority area to review for the medical management of SAH.
119	Royal College of Paediatrics and	Guideline	General	General	The reviewer noted some issues that need to be taken into consideration during COVID times: • Despite pandemic related restrictive measures and reallocation of resources, patients with neuro emergencies should be encouraged to present regardless of	Thank you for your comment. • We are aware that the COVID-19 pandemic has meant that service delivery for other conditions has adjusted in some cases. The guideline is intended for use long term and sets out the most

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	Child Health				the severity of symptoms because deferred presentation may result in more severe adverse outcome • COVID 19 has disrupted the neurological health care system and a myriad of potential ethical situations could arise for neurologists during the pandemic • It is imperative that goals of care are discussed pro-actively with patients • Preparation of a functional reorganisation plan should be done to address the need to maintain the provision of neurological care • Strategies should be implemented for hospitalisation, emergency management and the use of telephone consultations to maintain neurological provision of care at the unit outside the hospital for priority patients. A robust or palliative care program could be developed for patients with limitations of therapeutic effort.	clinically and cost-effective care for people with or suspected of having aneurysmal SAH. • The guideline contains recommendations on discussing treatment plans with patients. • Reorganisation of services, the use of tele-healthcare and palliative care programmes are outside of the scope of this guideline.
120	Royal College of Pathologists	Evidence Review A-T	General	General	The NICE guidance relates to the clinical presentation, diagnosis and management of SAH due to a ruptured aneurysm. We would encourage post-mortem assessment of fatal outcomes to assist in morbidity and mortality meetings.	Thank you for your comment. We agree that post-mortem examination may provide important information to inform morbidity and mortality meetings but this was not within the scope of the guideline and therefore we could not make recommendations on this.

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121	Society and College of Radiographers	Guideline	005 - 006	012-022	The SCoR welcomes the offer of *a non-contrast CT head scan as the first-line diagnostic investigation for a suspected subarachnoid haemorrhage* and the offer of a *CT angiography of the head to people with a confirmed diagnosis of subarachnoid haemorrhage to identify the cause of bleeding and guide treatment* It is disappointing not to see reference made to joining these two investigations together so that rapid transition can be made from the non-contrast CT head scan to the CT angiogram using on table diagnosis. SCoR believes there is expertise available in the workforce to be able to achieve faster transitions and avoid unnecessary patient re-calls to the scanner. This in turn may lead to faster decisions to treat culprit aneurysms. Similar processes may already be in place for diagnosis of stroke where there are indications for thrombolysis or thrombectomy.	Thank you for your comment. We agree that combined CT head scan and CT angiography may be appropriate if facilities and suitably trained staff are available, and may facilitate rapid diagnosis and treatment. Moreover, the option of combined CT head scan and CT angiography is not excluded by our guidance. We are not aware of any evidence to support this practice, however, and as this is a service delivery issue it is beyond the remit of this guideline.
122	Society and College of Radiographers	Guideline	012	013 - 018	*Follow-up neuroimaging* SCoR welcomes the recommendation that the choice of imaging modality and frequency of imaging follow-up is based on the type and outcome of any neurointervention or neurosurgery on the initial aneurysm. However it is disappointing not to see reference made to the safety measure SCoR previously highlighted regarding the importance of	Thank you for your comment. Currently available coils and clips and other intracranial devices are non-ferromagnetic. In general, individual Trusts set their own policies regarding referral criteria for radiological or MR investigations and this is beyond the scope of NICE guidelines.

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					specifically indicating the presence of aneurysm coils or clips in the referral criteria.	
123	Society and College of Radiographers	Guideline	025	005 - 009	Given *There was good evidence showing that CT head scans done within 6 hours of symptom onset have a high diagnostic accuracy* and *If the CT head scan is done more than 6 hours after symptom onset, the evidence showed that diagnostic accuracy is reduced and false negative results are more likely* SCoR would suggest this is made clear to the patient and all stakeholders and some urgency is associated with the initial offer of a non-contrast CT head scan as the first-line diagnostic investigation. This is particularly important to the patient given the statement (p6 1-3) that *If a CT head scan done within 6 hours of symptom onset shows no evidence of a subarachnoid haemorrhage:* • *do not routinely offer a lumbar puncture*	Thank you for your comment. We agree and have moved the referral for investigations recommendation to appear earlier in the list of recommendations to convey the urgency, and state in the recommendation to refer the person for urgent non-contract CT if signs and symptoms suggest subarachnoid haemorrhage.
124	Society and College of Radiographers	Guideline	025	014 - 016	Given *There was limited evidence on the relative accuracy of non-contrast CT head scanning at various time intervals greater than 6 hours after symptom onset, so the committee made a recommendation for research on timing of CT head scans* The SCoR welcomes this recommendation.	Thank you for your comment.
125	Society and Colleg	Guideline	026	004 - 006	*How the recommendations might affect practice* The SCoR supports this statement *Non-contrast CT*	Thank you for your comment.

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	e of Radiographers				*head scans are the usual first-line investigation in current practice and this is not expected to change*	
126	Society for Acute Medicine	Guideline	004-006	General	#Although a lot of evidence has been reviewed would it be useful to comment on something such as the Ottawa score that is common in clinical practice?	Thank you for your comment. We are aware that the Ottawa score is used in clinical practice and refer to the score in the initial assessment and referral for diagnostic investigations rationale and impact section. The rationale also discusses that these tools have a high level of accuracy in ruling out subarachnoid haemorrhage, but are less accurate at ruling it in, with a large number of false positive identifications. Based on this information, the committee was not able to make a recommendation for routine use of the Ottawa score.
127	Society for Acute Medicine	Guideline	General	General	Very good guidance but a frequent occurrence of proven SAH without finding a culprit aneurysm has not been covered at all – is this going to be a separate document as is really needed esp around areas such as nimodipine	Thank you for your comment. We agree that patients with subarachnoid haemorrhage who do not have a culprit aneurysm are an important group, but they were not included in the scope for this guideline. We will pass your comment to the NICE surveillance team which monitors guidelines to ensure that they are up to date.

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128	Society of British Neurological Surgeons	Comments on specific questions from NICE	General	General	In addition to your comments below on our guideline documents, we would like to hear your views on these questions: 1. Which areas will have the biggest impact on practice and be challenging to implement? Please say for whom and why. Expert reporting of CT scans at DGHs, decisions regarding role and timing of Lumbar puncture, Defining timeline for treatment of ruptured aneurysms 2. Would implementation of any of the draft recommendations have significant cost implications? Missed diagnosis of SAH, Screening of relatives, Research projects 3. What would help users overcome any challenges? (For example, existing practical resources or national initiatives, or examples of good practice.) Clarity of recommendations, Resources in some instances (reporting of CT scans) 4. The recommendations in this guideline were developed before the coronavirus pandemic. Please tell us if there are any	Thank you for your comment. 1. The recommendations are based on the available clinical and cost-effectiveness evidence and the guideline aims to raise standards of care for people with suspected SAH. The CT scans performed in the best available evidence (Perry 2013) were reported by general and neuro-radiologists. 2. As above, the recommendations are based on the available evidence on diagnosis of aneurysmal SAH. The committee recognise the need for clinical judgement and this is reflected in the wording of the recommendations. In terms of screening for relatives, there was no evidence on which to base a specific recommendation and the recommendation in the guideline mirrors the current NHS advice on screening for relatives. Therefore the recommendation reflects current practice and there is no additional cost implication. In recognition of a paucity of evidence in a number of areas the committee made a number of research recommendations. The cost of research will not have a cost implication to the NHS.

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					particular issues relating to COVID-19 that we should take into account when finalising the guideline for publication. Although acute emergency pathways for SAH were maintained during the pandemic the availability of critical care beds was a factor that may have influenced timing and locations of care.	3. The committee consider the wording of the recommendations to be clear and reflects the strength of the available evidence, but they have amended the recommendation to advise the CT head scan should be reported and documented by a radiologist.. 4. We are aware that the COVID-19 pandemic has meant that service delivery for other conditions has adjusted in some cases. The guideline is intended for use long term and sets out the most clinically and cost-effective care for people with or suspected of having aneurysmal SAH.
129	Society of British Neurological Surgeons	Evidence B	General	General	CT Head scans P5 as above Comment from expert: I think this statement is the one that should be far more forceful to make it very clear that in anyone where there is a suspicion of SAH they need immediate investigation and in the evidence considered at the end they should quote the National NCEPOD Audit 'Managing the Flow' (November 2013) which overwhelmingly showed the major deficiencies in the SAH pathway.	Thank you for your comment. The committee agree immediate investigation is needed and have reflected this in the recommendation to refer people immediately for diagnostic investigations. The data from the NCEPOD audit did not fit the eligibility criteria to be included for any of the evidence reviews for this guideline, although the committee were aware of its findings and there was consensus that treatment should be carried out as soon as possible to minimise the risk of rebleeding. We were unable to make a recommendation about the specific timing, which would have a major resource

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						implication. Nevertheless, we agree that anyone who is suspected of having SAH requires urgent investigation. We have added a sentence at the end of the recommendation to be aware that the diagnostic accuracy of CT head scans is highest within 6 hours of symptom onset to convey the urgency, while recognising that other conditions e.g. stroke, trauma etc may need prioritisation for head CT.
130	Society of British Neurological Surgeons	General	General	General	Pregnancy and SAH We are surprised that the guideline does not refer to this group of patients.	Thank you for your comment. The scope does not specifically exclude pregnant women; therefore this population group is included by default. However, pregnant women have generally been excluded from RCTs and evidence for management of SAH in this group is likely to be limited. In implementing the recommendations in the guideline, clinicians should take individual patient characteristics into account.
131	Society of British Neurological Surgeons	Guideline	004	006-007-008	Symptoms and signs We are concerned that the statement 'most people with a Thunderclap headache do not have a subarachnoid haemorrhage' is misleading. We believe that all persons presenting with an acute onset sudden severe (=thunderclap like) headache should be investigated as suspected SAH until proven otherwise. Also, the headache of SAH is not always of a Thunderclap type and there should	Thank you for your comment. We agree that healthcare professionals should maintain a high index of clinical suspicion for SAH in people presenting with unexplained headache and have added this point to the recommendations. The committee also agree that the diagnosis is more likely in people with sudden onset severe 'thunderclap'

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					be a high sense of suspicion to avoid missing the diagnosis. Comment received from a member: I find the SAH consultation paper adds very little as far as I can see. I don't know if it is aimed at primary care, secondary care or Neurosurgical care. I know of a clinical negligence case of a man who didn't have thunderclap headache, with headache who died a few days later of an aneurysm bleeding. i.e. people do not necessarily follow the rules and that scientific evidence may simply not be available because medicine is an art as well as a science.	headache, which is a red flag symptom of SAH. The committee made a recommendation for healthcare professionals to identify people with 'thunderclap headache' by taking a careful history of the rate of onset and time to peak pain intensity of the headache. Nevertheless, the best available clinical and cost-effectiveness evidence does not support investigating everyone with a thunderclap headache with CT head scan. The committee considered that such a liberal investigation policy would unnecessarily expose some people to ionising radiation or lumbar puncture, and incur additional costs. The committee considered that decisions to investigate patients presenting with unexplained sudden severe headache or other suggestive symptoms and signs should be based on a full clinical assessment and clinical judgement, along with consideration of other possible conditions or causes for sudden acute headache. The recommendations on 'Assessment and diagnosis' are for either primary or secondary healthcare professionals

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						carrying out an assessment of people presenting with headache or other symptoms that raise suspicion of SAH. We have added a recommendation to refer people seen with suspected SAH in a primary care setting to an emergency department immediately for further assessment. The committee agreed that patients with suspected SAH seen in an acute hospital setting such as an emergency department, should be reviewed urgently by a senior clinical decision maker. If the senior decision maker confirms unexplained thunderclap headache or other symptoms or signs suggestive of SAH, urgent referral for a non-contrast CT head scan is recommended.
132	Society of British Neurological Surgeons	Guideline	005	013-014	Diagnosis – CT Head scan Missed diagnosis of a ruptured aneurysm can have serious clinical consequences and is a common reason for clinical negligence claims. We recommend that the recommendation regarding a CT Brain scan should be far more forceful to make it very clear that where there is a suspicion of SAH they need immediate investigation with a CT Brain scan.	Thank you for your comment. We agree that anyone who is suspected by a senior clinical decision maker of having SAH should be referred for an urgent CT scan and this is stated in the recommendation.

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133	Society of British Neurological Surgeons	Guideline	005	015-016	CT Head scan We are concerned that the finding of blood on the CT scan may be missed unless it is of good technical quality scan AND reported by a Neuroradiologist or a radiologist with appropriate experience.	Thank you for your comment. The committee agrees and in line with all guidance issued by NICE, investigations should be carried out to a high technical standard and reported by an appropriately trained and competent healthcare professional. The committee noted that in the included studies, the personnel reviewing the CT images varied between general radiologists and neuroradiologists. The committee also revised the recommendations and added that if a CT head scan done within 6 hours of symptom onset and reported by a radiologist shows no evidence of a subarachnoid haemorrhage, clinicians should think about alternative diagnoses and seek advice from a specialist. The committee consider this addresses concern about missing a diagnosis and reflects current practice.
134	Society of British Neurological Surgeons	Guideline	006	003	Lumbar Puncture We are concerned that the recommendations indicated may result in missed or delayed diagnosis. The CT must be reported by an expert to avoid the initial pitfall of diagnosis. The decision to perform a lumbar puncture must be influenced by strong clinical suspicion of SAH which is a huge factor in the diagnosis of this condition. The risk of a LP should be compared to the risk of missed diagnosis of SAH.	Thank you for your comment. The sensitivity of a CT head scan was discussed with the committee. It was noted that the clinical evidence found that the sensitivity of a CT head scan done within 6 hours of symptom onset was above 95% in all studies. Based on the economic analysis reported in evidence review B, when the sensitivity of a CT head scan is above 95%, LP is not a cost effective strategy for patients receiving a CT head scan within 6 hours of symptom onset.

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						The committee noted the healthcare professional reporting the results of the CT head scan in the studies included in the clinical review was a combination of radiologists and neuroradiologists, or was not reported; they were not exclusively neuroradiologists. Perry 2011 was deemed the most appropriate study to inform the health economic analysis and it stated that the CT head scans were interpreted by qualified local radiologists (a neuroradiologist or general radiologist who routinely reports head computed tomography images), who were blinded to the study and data forms but who had routine clinical information. Furthermore, none of the studies reported the differential accuracy of CT scans interpreted by different types of radiologists. Based on this the committee agreed that it was not appropriate to specify which type of radiologist should be reporting the results of the CT head scan, given that the clinical evidence is based on a mix of radiologists, and not exclusively by neuroradiologists.

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						The committee discussion of the evidence and resource and impact sections relating to this recommendation have been edited to clarify this. Please note the recommendation does specify that if the CT head scan (done within 6 hours of symptom onset and reported by a radiologist) is negative, healthcare professionals should 'think about alternative diagnoses and seek advice from a specialist.' In addition, the committee considered that there may be some rare cases where LP is still indicated despite a negative result from a CT performed within 6 hours, for example if a strong clinical suspicion of SAH remains, but highlighted that this should not be routine practice given the high diagnostic accuracy of early CT. Instead, the health care professional should think about alternative diagnoses and seek advice from a specialist in neurosurgery, neuroradiology, neurology or stroke medicine. The rationale for the recommendation has been updated and can be found in the committee discussion of the evidence.
135	Society of British Neurol	Guideline	006	015-016-017	Transfer Severity scores are well embedded in clinical practice in the UK. We agree with the recommendation that the score should not be	Thank you for your comment. We agree that several severity scores are currently in routine clinical use but our evidence review showed that none of the scores has

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	ogical Surgeons				the SOLE criterion of transfer or decision to treat. However, we suggest that the guideline should recommend the use of clinical grade, imaging and co-morbidities and also pre-morbid performance status (Clinical Frailty score) in relation to decisions regarding transfer and treatment. Furthermore, we strongly recommend that the guideline emphasises timelines of transfer of patients because SAH is an emergency condition and patients should be discussed with the regional neurosurgery unit without delay and rapid decisions made regarding need for transfer/admission.	been fully validated for use in unselected populations with subarachnoid haemorrhage. The committee was therefore concerned that use of such severity scores may categorise patients incorrectly and the committee could not recommend use of any particular score. Standards for the development of prognostic risk scores and evaluation of novel risk markers are recognised (Circulation 2009;119:2408). There was insufficient evidence on which to base a recommendation on the timescale for transfer/treatment. Nevertheless the committee agreed that the risk of rebleeding is highest in the first 24-48 hours after ictus and investigation and treatment to prevent rebleeding is likely to be most effective if carried out as soon as practicable. The GC could not be more specific as any firm recommendation on timeframe for investigation and intervention would incur a resource impact and would need to be supported by strong clinical evidence. Based partly on recent evidence from the ULTRA trial the GC have added the sentence 'Be aware that the risk of rebleeding is highest within 24 hours of the onset of symptoms' to the end of the recommendation 1.2.8 to convey the urgency. This sentence has also been added

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						to the end of recommendation 1.1. 17 In order to convey urgency, recommendations have been made for immediate referral to the emergency department for further assessment (1.1.5), urgent review by a senior clinical decision-maker (1.1.6), referral for urgent CT head scan (1.1.7) and if SAH is confirmed urgent referral to a neurosurgical centre (1.1.16)
136	Society of British Neurological Surgeons	Guideline	006	020-021-022	CT Angiogram We are again concerned that the guideline does not indicate the urgency of the clinical situation. An urgent CT angiogram should be performed in all patients with confirmed SAH. Some DGHs perform the CTA along with the CT Brain scan. The CTA should be of good diagnostic quality and reported by an experienced radiologist (ideally by a Neuroradiologist). We agree that the CTA should be discussed with the on call neurosurgery team urgently. In this context, the term MDT is not ideal and misleading. The discussion with and within the specialist team should be urgent and may often be done out of hours. The neurovascular team may decide that the CTA should be repeated after transfer to the specialist unit. It is essential that the transfer is not delayed pending a CTA being done at the DGH.	Thank you for your comment. We agree that the urgency is not conveyed in the CTA recommendation and so we have added 'without delay'. The committee agrees and in line with all guidance issued by NICE, investigations should be carried out to a high technical standard and reported by an appropriately trained and competent healthcare professional. The recommendation has been amended to specify the CT scan should be reported by a radiologist and that if the CT scan is negative for SAH, healthcare professionals should consider alternative diagnoses and seek specialist advice.

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137	Society of British Neurological Surgeons	Guideline	008	005-006	Nimodipine Given the strength of the available evidence we do not agree with the term 'Consider' and suggest 'Commence' instead. The British Aneurysm Nimodipine Trial was a double blind PRCT with 554 patients. The results were very significantly in favour of using oral Nimodipine to reduce brain infarction and improve outcome after SAH. The Metanalysis paper by Barker et al (J of Neurosurgery 1996; 84: 405-414) that provided further evidence has not been included in Evidence D. We agree that further research in the era of endovascular treatment will be helpful but in the interim the use of Nimodipine should be offered to all patients after the diagnosis of SAH.	Thank you for your comment. The recommendation wording 'consider' reflects the strength of the evidence and is applied when the committee wish to convey that evidence of benefit is less certain. The study you cited was included and considered alongside the remaining body of evidence comparing nimodipine to a control group. The committee noted that the entirety of evidence came from trials conducted before the introduction of endovascular coiling into routine practice and involved mostly patients undergoing neurosurgical clipping after a period of medical stabilisation. In most trials nimodipine was commenced up to 96 hours after ictus and continued for up to 3 weeks before surgical management. Hence, the results of the trials were not considered to be directly applicable to contemporary practice. The committee could not be sure that the benefits from nimodipine are maintained with current treatments to secure the ruptured aneurysm, but they considered without evidence of harms a recommendation to consider nimodipine was appropriate.

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138	Society of British Neurological Surgeons	Guideline	008	009-010	Tranexamic Acid We are very concerned about the recommendation because it is based on weak evidence (one RCT), could encourage delays in treatment rather than efforts to improve local services to move towards early treatment and the increased risk of ischaemia that has been well proven in SAH patients in the early studies.	Thank you for your comment. The committee reviewed the recommendation on tranexamic acid and agreed to remove it from the guideline. Within the discussion section the committee have emphasised it's use should not delay interventional treatment.
139	Society of British Neurological Surgeons	Guideline	008	022-023-024	Fluid therapy We are concerned because there is no evidence that the NICE guideline on Fluid therapy relates to patients with SAH. Comment from expert: if they want to rely solely on evidence, we can say that the guideline they want to refer to for fluid management has no evidence in SAH. Therefore if they do not want to take our opinion what fluids should be used in SAH, then they should just say they cannot provide any guidance in this area at all (rather than recommend a guideline which contradicts most of our clinical experience). We agree that it is important to maintain a state of euvolaemia in SAH patients. The use of glucose in the fluid regime is not in keeping with current neurosurgical practice.	Thank you for your comment. Whilst we consider that cross-referral to the existing NICE Intravenous fluid therapy in adults in hospital guideline is appropriate, we acknowledge that it does not add anything to current practice, and we have therefore decided to delete this recommendation.

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140	Society of British Neurological Surgeons	Guideline	009	003-007 012-013	Culprit Aneurysm Once again the sense of urgency of the discussion and treatment being performed is missing in this guideline. The concept of equipoise in relation to coiling or clipping is fundamental to the discussion between the INR and the neurosurgeon in accordance with the ISAT evidence. We agree with this statement but suggest a more positive message indicating the factors that should be considered including patient choice, neurological status, performance status and co-morbidities.	Thank you for your comment. We feel that the recommendations reflect all the important points that you are making, notwithstanding the fact that they cannot be repeated in each and every recommendation. For example a recommendation has been made to discuss the proposed treatment plan with the person, family, or carers to jointly agree a treatment plan which would take account of patient preferences. The information and support section of the guideline also places emphasis on explaining the treatment options and the associated risks and benefits of these, information about possible complications resulting from aSAH and ongoing symptoms the person may experience. All of these recommendations have been made by the committee so that the person has the information to be able to make an informed decision when discussing treatment options with the clinician. The committee agrees there is a need to proceed with treatment (coiling or clipping)to secure a ruptured aneurysm as soon as possible. The committee were aware that in current practice coiling and clipping procedures are generally carried out during usual working hours and evidence to support earlier intervention is limited. A recommendation has been made to carry out

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						interventional treatment at the earliest opportunity to prevent rebleeding, and the risk of rebleeding is highest within 24 hours of onset of symptoms. The recommendations specifically take account of evidence from ISAT, but this trial was conducted some time ago (patients were recruited from 1997 to 2002) and by contemporary standards used outdated technologies and techniques.
141	Society of British Neurological Surgeons	Guideline	009	020-021	Timeline for treatment The meaning of 'earliest opportunity' is unclear and vague. The timeline of 48 hours was raised after the NCEPOD audit. It is generally accepted that this is from the time of admission to the specialised unit. The waiting time increases because elective sessions are not universally available at weekends and Bank holidays. Furthermore, the timeline for stroke thrombectomy being a few hours, there is a potential risk that coiling of aneurysms in patients with SAH may be delayed.	Thank you for your comment. We are not able to specify a precise time in the recommendation because the evidence was not available to support this. Recommending a timeframe would have a significant resource impact and therefore needs robust supporting evidence. In order to convey a sense of urgency, we have added a sentence to the end of that recommendation to say 'Be aware that the risk of rebleeding is highest within 24 hours of the onset of symptoms', which is based partly on recent evidence from the ULTRA trial.
142	Society of British Neurol	Guideline	010	013-015	Transcranial Doppler We found inconsistency in the way lack of evidence is interpreted to make recommendations. TCD is a risk free non-	Thank you for your comment. We disagree that routine use of TCD within this setting is risk free. Whilst we agree that the procedure itself is harmless, data from a cohort

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	ogical Surgeons				invasive procedure and along with other clinical and imaging features assists the management of SAH patients. Comment from expert: They themselves say there is no evidence so I do not understand why they are willing to give hard guidance against its use when in other sections where there is no evidence they give firm guidance for use of an intervention (see DCI) and in others they just say there is no evidence What they do not realise is that this guidance will kill any further data from TCD which otherwise is likely to come from analysis of data from existing clinical services.	study (Hollingworth M, Jamjoom AAB, Bulters D, Patel HC. How is vasospasm screening using transcranial doppler associated with delayed cerebral ischemia and outcomes in aneurysmal subarachnoid hemorrhage? Acta Neurochirurgica. 2019; 161(2):385-392) suggests that use of TCD may be associated with harm. This was observed with a poorer patient outcome (as reported with Glasgow outcome scale) in people who received care in hospitals exercising routine TCD monitoring. It could be inferred that this harm was as a result of subsequent investigation and intervention, triggered by the findings of the TCD monitoring. In addition, the procedure is not cost free and NICE recommendations are developed on the basis of health economic and clinical factors. The recommendation specifically states that TCD can be done in a research context. The committee made a research recommendation on TCD so we disagree the guideline will 'kill any further data from TCD'.
143	Society of British Neurol	Guideline	011	003-005	Hydrocephalus Also consider evidence form CT Angiogram and perfusion scan if available.	Thank you for your comment. Although there was no evidence for the diagnosis of hydrocephalus, the committee agreed that diagnosis could be made on the

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	ogical Surgeons					basis of symptoms and signs of raised intracranial pressure such as altered level of consciousness or neurological deterioration, and that the diagnosis should be confirmed by CT head. The wording of the recommendation does not prevent clinicians from considering these investigations when making a diagnosis of hydrocephalus if they have been done but GC did not consider these additional investigations to be necessary to establish the diagnosis.
144	Society of British Neurological Surgeons	Guideline	011	017-019	Delayed cerebral ischaemia This is a complication that should be treated aggressively to avoid death and severe disability from a stroke. We agree with the recommendation of Euvolaemia and Vasopressors. We are concerned that the conclusions regarding the use of Vasopressors and Angioplasty are different although the evidence is not strong for either. Also, the risk of Stroke as a complication of angioplasty needs to be compared to the probably higher risk of a stroke from DCI. Comment from member: It is intriguing that they are happy to provide positive guidance on this	Thank you for your comment. We agree that there is no good evidence to guide management of patients with DCI. The committee therefore made consensus recommendations for management of DCI to ensure euvolemia in people with DCI and to consider treatment with vasopressors if necessary. The committee was unable to come to a consensus about the use of angioplasty in people with DCI and made a research

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					despite their own admission in the evidence section that there is none.	recommendation to investigate vasopressors and intra-arterial therapies to manage DCI. The committee acknowledged that DCI is associated with a high risk of stroke and disability. Vasopressors are used widely in practice and committee experience was that they may result in short-term clinical benefit. The committee noted that angioplasty (and cerebral arterial vasodilators) is used much less frequently and practice varies widely between centres – hence the committee were unable to reach a consensus about the use of angioplasty.
145	Society of British Neurological Surgeons	Guideline	012	009-012	Rehabilitation We strongly agree with this recommendation and campaigned for SAH to be included in the Stroke Rehabilitation pathway.	Thank you for your comment.
146	Society of British Neurological	Guideline	013	012-013	Non-culprit aneurysm Incidental non-culprit aneurysms in patients with SAH have a higher risk of rupture and this factor needs to be considered and explained to patients.	Thank you for your comment. We agree and have added a sentence to the rationale to say that 'the risk of a non-culprit aneurysm rupturing is higher in people who have had an aneurysmal subarachnoid haemorrhage than those who have not'.

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	Surgeons					
147	Society of British Neurological Surgeons	Guideline	014	016-018	Hypertension We are concerned that this recommendation is too simplistic and does not encompass the issues pertaining to cerebral pathophysiology and raised blood pressure in SAH patients. The medical management needs to be guided by a variety of factors following acute SAH, mainly the need to maintain adequate cerebral perfusion. The scenarios include high BP after the bleed, patients with a haematoma or raised intracranial pressure due to any cause.	Thank you for your comment. This recommendation relates to the long-term management of people who have had a SAH. The title of the section 'Management of other conditions' has been amended to 'after discharge from hospital' to make it clearer. Evidence was reviewed for the medical management of blood pressure within the acute setting but the quality of the evidence was too low to support any recommendation. Moreover, the committee could not reach consensus about blood pressure control within the acute setting. We looked for evidence for the long-term management of blood pressure specifically in patients with previous SAH but found none or only evidence of poor quality. The committee agreed that in the long-term, blood pressure should be managed in line with the NICE guideline on hypertension in adults. The committee also agreed a research recommendation to assess the clinical and cost-effectiveness of a long-term blood pressure treatment target for people with subarachnoid haemorrhage.

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148	Society of British Neurological Surgeons	Guideline	016	001-004	Screening Relatives We are of the opinion that the recommendations are not strong enough and current practice will continue to prevail. There are a growing number of persons who are anxious and request advise on screening. The increased risk in first degree relatives is real although not quantifiable. The strict application of the 2 first degree evidence is not always reassuring to relatives. As a result many undergo screening scans for reassurance. The protocol for repeat scans even if screening is negative is also unclear. These protocols are already impacting on the cost of care. New research evidence will require large population studies.	Thank you for your comment. There was no clinical evidence on which to base specific recommendations about screening for relatives. The recommendation in the guideline mirrors the current NHS advice on screening for relatives. In recognition of a paucity of evidence the committee made a research recommendation in this area.
149	Society of British Neurological Surgeons	Guideline	General	General	As a whole, we found the guideline to be weak and disappointing and some of the recommendations caused significant concerns regarding patient safety. 1. The guideline does not convey the degree of clinical urgency of treatment in dealing with an emergency condition. SAH (Subarachnoid haemorrhage) is a life threatening condition and a neurosurgical	Thank you for your comment. NICE guidelines are based on the best available evidence for clinical and cost-effectiveness. The committee were surprised that much of the evidence for the investigation and management of subarachnoid haemorrhage is very old and of poor quality. 'Strong' recommendations are made when the committee believes that the majority of practitioners or commissioners and people using services would choose a particular intervention if they considered the evidence in the same way as the committee. This is generally the

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					emergency. The guideline does not convey this sense of urgency. Neurosurgery On-call Teams allow high clinical priority for admission of SAH patients. Many are admitted to Critical Care directly and require emergency intervention. The lack of this sense of urgency is a serious deficiency in the message to clinicians. We are concerned that the message is diluted and watered down because the guideline is intended not only for clinicians but also for patients/family and carers. It is far too scientific for the public and far too basic for Neurosurgeons and Interventional Neuroradiologists for who manage these patients. We recognise the need to engage with and share decisions with patients and families. A separate example in Plain English versions for lay purposes would be a solution. Also, providing treatment plans is laudable but not pragmatic in the emergency setting. Informed consent (shared decision making) for treatment and documentation of discussions in the	case if the benefits clearly outweigh the harms for most people and the intervention is likely to be cost effective. Based on the evidence considered by the committee they did not believe this to be the case and decided to make weaker recommendations to reflect the strength of the evidence and convey the uncertainty around the evidence of benefit. We also recognise that some of the recommendations in this guideline challenge established practice and we accept that this may cause disappointment. In response to the paucity of data in some clinical areas the committee made a number of recommendations for research which may inform future versions of the guideline. 1. We have strengthened the message of urgency in the recommendations. The committee have emphasised urgent investigation to confirm a diagnosis of subarachnoid haemorrhage facilitates early treatment to prevent rebleeding thereby minimising the risk of poor outcomes for patients. We found no evidence to suggest that treatment to secure the aneurysm should be carried out within a specific time-frame although there is consensus that treatment should be as soon as possible to minimise risk of rebleeding.

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					clinical record are already well recognised as best practice. 2. We are concerned that there is inconsistency in the way lack of evidence was translated to recommendations throughout the recommendations. 3. We suggest that the guideline recognises that the management of a ruptured aneurysm in the neuroscience unit involves a Team of specialists in neurosurgery, neuroradiology as well as critical care and anaesthesia. Very importantly, Specialist Nurse practitioners play a key role in the care and communications with patients and carers. 4. We believe there should be a foreword at the beginning of the guideline outlining the epidemiology, causes, etc. and indicating patient numbers that can be anticipated.	We were therefore unable to make a recommendation about timing, which would have a major resource implication. The committee have emphasised within the recommendations that the risk of rebleeding is highest within 24 hours of the onset of symptoms. 2. All NICE guidelines are intended for use by HCPs, including specialist and non-specialist clinicians, and by patients. NICE no longer produce the 'information for the public' versions of guidelines. The committee agreed that in current practice a treatment plan is not always formally agreed between relevant HCPs and the patient, but the committee considered this to be good practice and therefore made a recommendation. The committee disagrees that 'Informed consent (shared decision making) for treatment and documentation of discussions in the clinical record' is established practice and made a

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						recommendation to encourage best practice in every setting. 3. The committee have followed the NICE guidelines manual in producing its evidence-based recommendations. Where there was no or poor quality evidence the committee made consensus recommendations in several important areas. The committee recognise that there are some areas where they could not reach a consensus, usually due to significant variation in practice and opinion. The discussions about variation in practice often led the committee to make a research recommendation. A more in-depth justification of all the evidence and how this translated into recommendations is provided in the committee discussion of evidence sections of the full evidence review chapters. Here, the rationale has been given for decisions made by the committee and should clarify areas that may seem to contain inconsistencies in the strength of recommendations made. 4. NICE guidelines do not generally assign responsibility for specific aspects of patient care to particular HCPs. Individual neurosurgical and neurointerventional services need to determine the type and number of staff locally with the objective of delivering optimal care for patients

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						with SAH. We agree that specialist nurses can play an important role in the care of patients with SAH, but this should not absolve all healthcare professionals of responsibility for ensuring good communication with patients and a holistic approach to their management. 5. NICE guidelines do not currently include a detailed 'clinical introduction' but we have added a short 'context' section at the beginning of the document outlining the areas you describe and emphasising the need for urgent investigation and referral for treatment to achieve the optimum outcomes for patients.
150	St George's University Hospitals NHS Foundation Trust	Guideline	005	007-009	Here and throughout the guideline, the term 'opioid' should be used rather than 'opiate'. 'Opiate' refers only to naturally-occurring opioids, and therefore excludes synthetic opioids (e.g. fentanyl), which is inappropriate.	Thank you for your comment. We agree and have changed this in the guideline to 'opioid' drugs in the text and added a definition to the glossary.
151	St Georg	Guideline	005	009	You may wish to amend 'sedating effects' to include 'sedating and pupillary effects'.	Thank you for your comment. We agree and have added 'pupillary effects' to the recommendation.

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	e's University Hospitals NHS Foundation Trust					
152	St George's University Hospitals NHS Foundation Trust	Guideline	007	005	In the recommendation 'Seek specialist opinion from the neurovascular multidisciplinary team (MDT) straight away (do not delay until the next MDT meeting)', neurovascular MDT is too abstract. People outside the team are unlikely to know who/what, in a concrete sense, this refers to. It would be better either to define the point of contact (most likely, the local/regional on-call neurological team) or to recommend that the MDT should itself define who will be the point of contact (if it is considered possible that this could be someone other than the on-call neurosurgeon).	Thank you for your comment. We agree and have edited this recommendation to mirror the recommendation on non-culprit aneurysms to specify the personnel should be an interventional neuroradiologist and a neurosurgeon.
153	St George's University Hospit	Guideline	008	018	The NICE guideline on VTE does not provide adequate guidance. There are specific considerations in relation to SAH that it does not capture – e.g. when, after securing the aneurysm, should pharmacological prophylaxis be offered?	Thank you for your comment. The committee consider that the NICE guideline on VTE prophylaxis provides appropriate guidance for this population. The NICE VTE prophylaxis guideline states that pharmacological VTE prophylaxis should not be given to people at risk of bleeding but other forms of VTE prophylaxis e.g.

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	als NHS Foundation Trust					mechanical etc, can be used until the aneurysm is secured. We have added a sentence to the rationale to reinforce this point. The VTE prophylaxis guideline also provides a recommendations on the use of pharmacological prophylaxis after securing the aneurysm (recommendation 1.12.10). The timing of starting VTE prophylaxis after securing the aneurysm is an individualised decision balancing bleeding and thrombotic risks, and depends on the outcome of the surgical or neurointerventional procedure.
154	St George's University Hospitals NHS Foundation Trust	Guideline	009	003	The specialists involved in decision-making should include a (neuro) intensivist, if the patient is in an intensive care unit – as many will be. The intensivist is likely to be the person with the most detailed knowledge of the patient's overall clinical condition. They are also the specialists who will deliver the 'medical management and monitoring' if this is selected as the initial treatment plan (but see also comment 10), and be the team that will communicate the plan to the patient's relatives.	Thank you for your comment. The recommendation relates to a technical decision about the most appropriate way to secure the aneurysm and does not exclude the neurointensivist from the discussion. The discussion may occur before the patient arrives in ICU and a neurointensivist might not yet be involved in the patient's care.
155	St George's University	Guideline	009	010	Use of the term 'medical management' as a euphemistic substitute for 'no surgical/interventional management' is imprecise, unhelpful and potentially misleading. Given the	Thank you for your comment.. A patient would still be managed medically if intervention by clipping/coiling was not deemed suitable, but we have amended the wording of the recommendation to clarify the person is monitored if no interventional procedure is planned.

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	Hospitals NHS Foundation Trust				importance rightly placed on clarity of language in NICE guidelines, it should be avoided. Interpreted literally in the context of this guideline, it could be referring just the medical options specified under the 'medical management' header (i.e. nimodipine, tranexamic acid, venous thromboembolism prophylaxis and fluid therapy). But the intention is probably to refer to a much broader set of options that could range from invasive, mechanical life support to palliative care. All of these are equally available to people for whom an intervention is recommended, and none of them are treatments that directly address 'management of the culprit aneurysm' which is the subject of this section. So to present 'medical management' in a manner that suggests it includes additional/unique management options for this therapeutic objective is misleading. Unless more precision can be offered, the language used should be a concrete term for what is actually being recommended, which in this case is 'no interventional procedure'. 'Monitoring and reassessment' are part of all options so need not be stated (or should be stated for all). Of course, if more precision can be offered, this would be	

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					desirable. For example, how long should invasive life support be continued to 'check for clinical improvement'? What features should be taken to imply that the continuation/escalation of invasive life support is inappropriate?	
156	St George's University Hospitals NHS Foundation Trust	Guideline	20	21	'…at the earliest opportunity' is too abstract and implies that there is an element of convenience. If the patient is admitted on Friday afternoon, 'the earliest opportunity' could be sometime the following week. A concrete timeframe (e.g. within 24 h) should be specified	Thank you for your comment. We found no evidence to support a timescale for treatment to secure a ruptured intracranial aneurysm. The committee recognise that the phrase 'at the earliest opportunity' is a compromise but could not be more specific as any firm recommendation on timeframe for intervention would have major resource impact, and could only be justified by strong clinical evidence. However, based partly on recent evidence from the ULTRA trial the committee added a sentence to the end of the recommendation to convey the urgency: 'Be aware that the risk of rebleeding is highest within 24 hours of the onset of symptoms'
157	St George's University Hospitals NHS Found	Guideline	General	General	Generally, the guideline offers no recommendations on blood pressure control in the acute phase (before or shortly after securement of the aneurysm). This is an important consideration that was within the scope and key issues/draft questions (2.1).	Thank you for your comment. Evidence was reviewed for the medical management of blood pressure within the acute setting. The quality of the evidence was too low to support any recommendation and the committee could not reach consensus about blood pressure control within the acute setting. Instead the committee made a research recommendation on blood pressure targets.

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	ation Trust					
158	St George's University Hospitals NHS Foundation Trust	Guideline	General	General	Generally, no recommendations are offered on seizure prophylaxis in the acute phase. This is an important consideration that was within the scope and key issues/draft questions (2.1).	Thank you for your comment. We looked for evidence in this area but the evidence was of poor quality and could not support a recommendation for seizure prophylaxis in the acute phase. Only one study met the inclusion criteria and this showed no difference between those receiving anti-epileptic medication and those who did not in the number of people with a high disability score, but did show a clinically significant increase in the number of people experiencing delayed cerebral ischaemia complications with antiseizure medication. The committee agreed that anti-seizure medications are not routinely used for seizure prophylaxis in people with aSAH. The committee did not consider seizure prophylaxis to be a priority area for a research recommendation.
159	St George's University Hospitals	Guideline	General	General	Generally, no recommendations are offered on the monitoring or management of sodium disturbance. Hyponatraemia is a common and important acute complication. This is an important consideration that was within the scope and key issues/draft questions (2.1, as part of fluid management).	Thank you for your comment. We agree that sodium disturbance is common in aneurysmal SAH. We looked for evidence in this area but the evidence was of insufficient quality to support a recommendation. Furthermore, the committee could not reach a consensus on recommended practice in this area. The committee

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	NHS Foundation Trust					did not consider sodium disturbance to be a priority area for a research recommendation.
160	St George's University Hospitals NHS Foundation Trust	Guideline	General	General	Generally, no recommendations are offered about decision-making the context of poor neurological condition, and end-of-life care. These are conspicuous omissions for a condition that has high mortality and, among survivors, often devastating neurological morbidity, and for which these elements of assessment and management are among the most demanding for clinicians.	Thank you for your comment. We agree that decision-making about the management and care of patients with major neurological injury is challenging. There was no evidence on the best treatment for these patients, however, and the committee therefore made a recommendation for research in this area.
161	UK Neurointerventional Group	Evidence Review B	033	014	The cost of £610 for Lumbar Puncture (LP) may be inflated. LP can be performed in the emergency room setting without the need for a short stay admission tariff. LP may also provide additional information for alternate diagnoses such as meningoencephalitis and vasculitis which can also present with severe headache.	Thank you for your comment. The cost of LP was discussed with the guideline committee and they concluded the cost of £610 (non-elective short stay) was the most appropriate cost to use in the analysis. The committee concluded it was highly unlikely people with a suspected SAH receiving LP would not be admitted. Additional costs for LP were discussed with the committee, including the cost of 'day case' LP (£565) and

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						'outpatient procedure' LP (£283). The committee also noted that there is no NHS reference cost for A&E LP. Based on the number FCEs, the committee agreed it was appropriate to conduct a sensitivity analysis for 'day case' LP and the results and discussion are presented in the evidence review. The lower costs indicate a lower QALY gain is required for LP to be cost effective for patients presenting to ED >6 hours from symptom onset. For patients that receive a CT head scan <6 hours from symptom onset, a CT head scan is 100% sensitive so will pick up all diagnoses of SAH. The additional sensitivity analysis therefore did not lead to any changes in the recommendations.
162	UK Neurointerventional Group	Guideline	006	001	1.1.8 The evidence for CT within 6 hours having near 100% sensitivity and specificity is based on interpretation by Neuroradiologists. The vast majority of patients presenting to secondary (& indeed some Neuroscience centres) will not have imaging interpreted by a specialist Neuroradiologist. Each responding centre reports that they not infrequently have patients presenting with external imaging that on specialist review does demonstrate SAH.	Thank you for your comment. The sensitivity of 100% taken from Perry 2011 was based on interpretation of results from 'a qualified local radiologist'. This was defined in the study as a neuroradiologist or general radiologist who routinely reports head computed tomography images. Originally in the 'Other factors the committee took into account' section of the evidence review we had incorrectly said "The committee also noted than in most of the studies a neuroradiologist

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					The facility for specialist Neuroradiologist review does not exist (& likely will not) become available in the near future.	reported the CT scans". However, the healthcare professional reporting the results of the CT head scan varied in the included studies between radiologists, neuroradiologists, a combination of both or it was not reported. This has been corrected in the committee discussion of the evidence. The sensitivity of a CT head scan was further discussed with the committee. It was noted that the clinical evidence found that the sensitivity of a CT head scan done within 6 hours of symptom onset was above 95% in all studies. Based on the economic analysis reported in evidence review B, when the sensitivity of a CT head scan is above 95%, LP is not a cost effective strategy for patients receiving a CT head scan within 6 hours of symptom onset. Of note, none of the studies reported the differential accuracy of CT scans interpreted by different types of radiologists. The committee agreed that it was not appropriate to specify which type of radiologist should be reporting the results of the CT head scan, given that the clinical evidence is based on mix of radiologists, and not exclusively by neuroradiologists.

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						Please note the recommendation does specify that if the CT head scan (done within 6 hours of symptom onset and reported by a radiologist) is negative, healthcare professionals should 'think about alternative diagnoses and seek advice from a specialist.' In addition, the committee considered that there may be some rare cases where LP is still indicated despite a negative result from a CT performed within 6 hours, for example if a strong clinical suspicion of SAH remains, but highlighted that this should not be routine practice given the high diagnostic accuracy of early CT. Instead, the healthcare professional should think about alternative diagnoses and seek advice from a specialist in neurosurgery, neuroradiology, neurology or stroke medicine. The rationale for the recommendation has been updated and can be found in the committee discussion of the evidence.
163	UK Neurointerventional Group	Guideline	009	020	1.2.9- Why has the recommendation from NCEPOD (*Managing the Flow*? -2013) for treatment within 48 hours not been included. The lack of specified time may inadvertently delay treatment in those centres not providing 6/7 day coiling.	Thank you for your comment. We are not able to specify a precise time interval to treatment to secure the ruptured aneurysm because the evidence was not available to support such a recommendation. Recommending a timeframe would have a significant

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						resource impact and therefore needs robust supporting evidence. In order to convey a sense of urgency, we have added a sentence to the end of that recommendation to say 'Be aware that the risk of rebleeding is highest within 24 hours of the onset of symptoms', which is partly based on recent evidence from the ULTRA trial.
164	UK Neurointerventional Group	Guideline	016	004	Typo; "aneuryisms" should read "aneurysms"	Thank you for your comment. This correction has been made.
165	UK Neurointerventional Group	Guideline	General	General	Terson's syndrome (vitreous haemorrhage associated with SAH) is not mentioned at all in the document. Some comment/ recommendation regarding diagnosis, severity assessment and management should be included.	Thank you for your comment. This is outside the remit of this guideline on aneurysmal SAH.