NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Guideline

Stroke and transient ischaemic attack in over 16s: diagnosis and initial management

Draft for consultation, November 2018

This guideline covers interventions in the acute stage of a stroke or transient ischaemic attack (TIA). It offers the best clinical advice on the diagnosis and acute management of stroke and TIA in the 48 hours after onset of symptoms, although some interventions of up to 2 weeks are covered as well.

Who is it for?

- Healthcare professionals in primary and secondary NHS healthcare settings
- Commissioners and providers of services
- People aged over 16 who have had a stroke or TIA, their families and carers

This guideline will update NICE guideline CG68 (published July 2008).

We have reviewed the evidence on the diagnosis and initial management of stroke and TIA. You are invited to comment on the new and updated recommendations. These are marked as **[2019]**.

You are also invited to comment on recommendations that NICE proposes to delete from the 2008 guideline. We have not reviewed the evidence for the recommendations shaded in grey, and cannot accept comments on them. In some cases, we have made minor wording changes for clarification.

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

This draft guideline contains:

- the draft recommendations
- recommendations for research
- rationale and impact sections that explain why the committee made the 2019 recommendations and how they might affect practice
- the guideline context.

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

Full details of the evidence and the committee's discussion on the 2019 recommendations are in the evidence reviews. Evidence for the 2008 recommendations is in the full version of the 2008 guideline.

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Recommendations

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

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

1.1 Rapid recognition of symptoms and diagnosis

Prompt recognition of symptoms of stroke and TIA

1.1.1 Use a validated tool, such as FAST (Face Arm Speech Test), outside hospital to screen people with sudden onset of neurological symptoms for a diagnosis of stroke or TIA. **[2008]**

1.1.2 Exclude hypoglycaemia in people with sudden onset of neurological symptoms as the cause of these symptoms. **[2008]**

1.1.3 For people who are admitted to the emergency department with a suspected stroke or TIA, establish the diagnosis rapidly using a validated tool, such as ROSIER (Recognition of Stroke in the Emergency Room). **[2008]**

Initial management of suspected and confirmed TIA

1.1.4 Offer aspirin (300 mg daily), unless contraindicated, to people who have had a suspected TIA, to be started immediately. **[2019]**

1.1.5 Refer immediately people who have had a suspected TIA for specialist assessment and investigation, to be done within 24 hours of onset of symptoms. **[2019]**

1.1.6 Do not use scoring systems, such as ABCD2, to assess risk of subsequent stroke. **[2019]**

1.1.7 Offer secondary prevention as soon as possible after the diagnosis of TIA is confirmed. **[2008, amended 2019]**

To find out why the committee made the 2019, recommendations on initial management of suspected and confirmed TIA and how they might affect practice, see rationale and impact.

1.2 Imaging in people who have had a suspected TIA

Suspected TIA

1.2.1 Do not offer CT brain scanning to people with a suspected TIA unless there is clinical suspicion of an alternative diagnosis that CT could detect – for example, intracerebral haemorrhage or mass lesion. **[2019]**

1.2.2 Consider MRI (including diffusion-weighted and blood-sensitive sequences) to detect ischaemia, haemorrhage or alternative pathologies after specialist assessment in the TIA clinic. If imaging is done, perform it on the same day as the assessment. **[2019]**

To find out why the committee made the 2019, recommendations on Imaging in people who have had a suspected TIA and how they might affect practice, see rationale and impact.

Carotid imaging

1.2.3 Everyone with TIA who after specialist assessment is considered as a candidate for carotid endarterectomy should have urgent carotid imaging. **[2008, amended 2019]**

Urgent carotid endarterectomy

1.2.4 Ensure that people with stable neurological symptoms from acute non-disabling stroke or TIA who have symptomatic carotid stenosis of 50-99%

according to the NASCET (North American Symptomatic Carotid Endarterectomy Trial) criteria, or 70-99% according to the ECST (European Carotid Surgery Trialists' Collaborative Group) criteria:

- are assessed and referred urgently for carotid endarterectomy to a service following current national standards[1]
- receive best medical treatment (control of blood pressure, antiplatelet agents, cholesterol lowering through diet and drugs, lifestyle advice). **[2008, amended 2019]**

1.2.5 Ensure that people with stable neurological symptoms from acute non-disabling stroke or TIA who have symptomatic carotid stenosis of less than 50% according to the NASCET criteria, or less than 70% according to the ECST criteria:

- do not have surgery
- receive best medical treatment (control of blood pressure, antiplatelet agents, cholesterol lowering through diet and drugs, lifestyle advice). **[2008]**

1.2.6 Ensure that carotid imaging reports clearly state which criteria (ECST or NASCET) were used when measuring the extent of carotid stenosis. **[2008]**

1.3 Specialist care for people with acute stroke

Specialist stroke units

1.3.1 Admit everyone with suspected stroke directly to a specialist acute stroke unit[2] after initial assessment, either from the community or from the emergency department. **[2008]**

[1] www.england.nhs.uk/publication/service-specification-neurointerventional-services-for-acute-ischaemic-haemorrhagic-stroke/

[2] An acute stroke unit is a discrete area in the hospital that is staffed by a specialist stroke multidisciplinary team. It has access to equipment for monitoring and rehabilitating patients. Regular multidisciplinary team meetings occur for goal setting.

Brain imaging for the early assessment of people with acute stroke

1.3.2 Perform brain imaging immediately[3] for people with acute stroke if any of the following apply:

- indications for thrombolysis or thrombectomy
- on anticoagulant treatment
- a known bleeding tendency
- a depressed level of consciousness (Glasgow Coma Score below 13)
- unexplained progressive or fluctuating symptoms
- papilloedema, neck stiffness or fever
- severe headache at onset of stroke symptoms. **[2008, amended 2019]**

1.3.3 Perform scanning as soon as possible[4] in everyone with acute stroke without indications for immediate brain imaging. **[2008]**

1.4 Pharmacological treatments and thrombectomy for people with acute stroke

Thrombolysis with alteplase

1.4.1 Alteplase is recommended within its marketing authorisation for treating acute ischaemic stroke in adults if:

- treatment is started as soon as possible within 4.5 hours of onset of stroke symptoms, and
- intracerebral haemorrhage has been excluded by appropriate imaging techniques. **[2008]**

[This recommendation is from NICE's technology appraisal guidance on alteplase for treating acute ischaemic stroke.]

1.4.2 Administer alteplase only within a well organised stroke service with:

[3] The committee felt that 'immediately' is defined as 'ideally the next slot and definitely within 1 hour, whichever is sooner', in line with the National Stroke Strategy.
[4] The committee felt that 'as soon as possible' is defined as 'within a maximum of 24 hours after onset of symptoms'.

- staff trained in delivering thrombolysis and in monitoring for any complications associated with thrombolysis
- level 1 nursing staff trained in acute stroke and thrombolysis[5]
- immediate access to imaging and re-imaging, and staff trained to interpret the images. **[2008, amended 2019]**

1.4.3 Staff in emergency departments, if appropriately trained and supported, can administer alteplase[6] for the treatment of ischaemic stroke provided that patients can be managed within an acute stroke service with appropriate neuroradiological and stroke physician support. **[2008]**

1.4.4 Ensure that protocols are in place for delivering and managing intravenous thrombolysis, including post-thrombolysis complications. **[2008]**

Thrombectomy

1.4.5 Offer thrombectomy within 6 hours of symptom onset, alongside intravenous thrombolysis (if not contraindicated and within the licensed time window) to people who have:

- acute ischaemic stroke and
- confirmed occlusion of the proximal anterior circulation demonstrated by computed tomographic angiography (CTA) or magnetic resonance angiography (MRA). **[2019]**

1.4.6 Offer thrombectomy[7] to people who were last known to be well between 6 hours and 24 hours previously (including wake-up strokes):

- who have acute ischaemic stroke and confirmed occlusion of the proximal anterior circulation demonstrated by CTA or MRA and

[5] See NHS Data Dictionary, Critical care level.
[6] In accordance with its marketing authorisation.

[7] At the time of publication (Month 2019), not all devices with a CE mark for thrombectomy are intended by the manufacturer for use as recommended here. The healthcare professional should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. MHRA's advice remains to use CE marked devices for their intended purpose where possible. See guidance on off-label use of a medical device for further information.

- if there is the potential to salvage brain tissue, as shown by CT or MRI scanning techniques. **[2019]**

1.4.7 Consider thrombectomy[7] alongside intravenous thrombolysis (where not contraindicated and within the licensed time window) for people last known to be well up to 24 hours previously (including wake-up strokes):

- who have acute ischaemic stroke and confirmed occlusion of the proximal posterior circulation (that is, basilar or posterior cerebral artery) demonstrated by CTA or MRA and
- if there is the potential to salvage brain tissue, as shown by CT or MRI scanning techniques. **[2019]**

1.4.8 Take into account the following factors when considering thrombectomy (in addition to recommendations 1.4.5 to 1.4.7):

- Pre-stroke functional status
- clinical severity of stroke
- extent of established infarction on initial brain imaging. **[2019]**

To find out why the committee made the 2019, recommendations on Thrombectomy and how they might affect practice, see rationale and impact.

Aspirin and anticoagulant treatment

People with acute ischaemic stroke

1.4.9 Offer the following as soon as possible, but certainly within 24 hours, to everyone presenting with acute stroke who has had a diagnosis of intracerebral haemorrhage excluded by brain imaging:

- aspirin 300mg orally if they do not have dysphagia or
- aspirin 300mg rectally or by enteral tube if they do have dysphagia.

Continue aspirin daily 300mg until 2 weeks after the onset of stroke symptoms, at which time start definitive long-term antithrombotic treatment. Start people on long-term treatment earlier if they are being discharged before 2 weeks. **[2008]**

1.4.10 Offer a proton pump inhibitor, in addition to aspirin, to anyone with acute ischaemic stroke for whom previous dyspepsia associated with aspirin is reported. **[2008]**

1.4.11 Offer an alternative antiplatelet agent to anyone with acute ischaemic stroke who is allergic to or genuinely intolerant of aspirin[8]. **[2008]**

1.4.12 Do not use anticoagulation treatment routinely[9] for the treatment of acute stroke. **[2008]**

People with acute venous stroke

1.4.13 Offer people diagnosed with cerebral venous sinus thrombosis (including those with secondary cerebral haemorrhage) full-dose anticoagulation treatment (initially full-dose heparin and then warfarin [INR 2-3] unless there are comorbidities that preclude its use. **[2008]**

People with stroke associated with arterial dissection

1.4.14 Offer people who have stroke secondary to acute arterial dissection either anticoagulants or antiplatelet agents, preferably as part of a randomised controlled trial to compare the effects of the 2 treatments. **[2008]**

People with acute ischaemic stroke associated with antiphospholipid syndrome

1.4.15 Manage acute ischaemic stroke associated with antiphospholipid syndrome in the same way as acute ischaemic stroke without antiphospholipid syndrome[10]. **[2008]**

[8] Aspirin intolerance is defined as either of the following: proven hypersensitivity to aspirin-containing medicines, or history of severe dyspepsia induced by low-dose aspirin.

[9] There may be a subgroup of people for whom the risk of venous thromboembolism outweighs the risk of haemorrhagic transformation. People considered to be at particularly high risk of venous thromboembolism include anyone with complete paralysis of the leg, a previous history of venous thromboembolism, dehydration or comorbidities (such as malignant disease), or who is a current or recent smoker. Such people should be kept under regular review if they are given prophylactic anticoagulation.

[10] There was insufficient evidence to support any recommendation on the safety and efficacy of anticoagulants versus antiplatelets for the treatment of people with acute ischaemic stroke associated with antiphospholipid syndrome.

Reversal of anticoagulation treatment in people with haemorrhagic stroke

1.4.16 Return clotting levels to normal as soon as possible in people with a primary intracerebral haemorrhage who were receiving anticoagulation treatment before their stroke (and have elevated INR). Do this by reversing the effects of the anticoagulation treatment using a combination of prothrombin complex concentrate and intravenous vitamin K. **[2008]**

Anticoagulation treatment for other comorbidities

1.4.17 Ensure that people with disabling ischaemic stroke who are in atrial fibrillation are treated with aspirin 300mg for the first 2 weeks before anticoagulation treatment is considered. **[2008]**

1.4.18 For~~In~~ people with prosthetic valves who have disabling cerebral infarction and who are at significant risk of haemorrhagic transformation, stop anticoagulation treatment for 1 week and substitute aspirin 300mg. **[2008]**

1.4.19 Ensure that people with ischaemic stroke and symptomatic proximal deep vein thrombosis or pulmonary embolism receive anticoagulation treatment in preference to treatment with aspirin unless there are other contraindications to anticoagulation. **[2008]**

1.4.20 Treat people who have haemorrhagic stroke and symptomatic deep vein thrombosis or pulmonary embolism to prevent the development of further pulmonary emboli using either anticoagulation or a caval filter. **[2008]**

Statin treatment

1.4.21 Immediate initiation of statin treatment is not recommended in people with acute stroke[11]. **[2008]**

1.4.22 Continue statin treatment in people with acute stroke who are already receiving statins. **[2008]**

[11] The consensus of the GDG is that it would be safe to start statins after 48 hours.

1.5 Maintenance or restoration of homeostasis

Supplemental oxygen therapy

1.5.1 Give supplemental oxygen to people who have had a stroke only if their oxygen saturation drops below 95%. The routine use of supplemental oxygen is not recommended in people with acute stroke who are not hypoxic. **[2008]**

Blood sugar control

1.5.2 Maintain a blood glucose concentration between 4 and 11 mmol/litre in people with acute stroke. **[2008]**

1.5.3 Provide optimal insulin therapy, which can be achieved by the use of intravenous insulin and glucose, to all adults with type 1 diabetes with threatened or actual stroke. Critical care and emergency departments should have a protocol for such management. **[2008]** [This recommendation is from the NICE guideline on Type 1 diabetes.]

Blood pressure control in acute intracerebral haemorrhage

1.5.4 Offer rapid blood pressure lowering to people with acute intracerebral haemorrhage who:

- present within 6 hours of symptom onset, and
- have a systolic blood pressure between 150 and 220 mmHg.

Aim for a systolic blood pressure target of below 140 mmHg within 2 hours of starting treatment and maintain the blood pressure for at least 7 days. **[2019]**

1.5.5 Consider controlled blood pressure lowering for people with acute intracerebral haemorrhage who:

- present beyond 6 hours of symptom onset, or
- have a systolic blood pressure greater than 220 mmHg. **[2019]**

Aim for a systolic blood pressure target of below 140 mmHg and maintain the blood pressure for at least 7 days. **[2019]**

To find out why the committee made the 2019 recommendations on Blood pressure control in acute intracerebral haemorrhage and how they might affect practice, see rationale and impact.

Blood pressure control in acute ischaemic stroke

1.5.6 Anti-hypertensive treatment in people with acute ischaemic stroke is recommended only if there is a hypertensive emergency with one or more of the following serious concomitant medical issues:

- hypertensive encephalopathy
- hypertensive nephropathy
- hypertensive cardiac failure/myocardial infarction
- aortic dissection
- pre-eclampsia/eclampsia.

[2008, amended 2019]

1.5.7 Blood pressure reduction to 185/110 mmHg or lower should be considered in people who are candidates for intravenous thrombolysis. **[2008]**

1.6 Nutrition and hydration

Assessment of swallowing function

1.6.1 On admission, ensure that people with acute stroke have their swallowing screened by an appropriately trained healthcare professional before being given any oral food, fluid or medication. **[2008]**

1.6.2 If the admission screen indicates problems with swallowing, ensure that the person has a specialist assessment of swallowing, preferably within 24 hours of admission and not more than 72 hours afterwards. **[2008]**

1.6.3 People with suspected aspiration on specialist assessment, or who require tube feeding or dietary modification for 3 days, should be:

- re-assessed and considered for instrumental examination
- referred for dietary advice. **[2008]**

1.6.4 People with acute stroke who are unable to take adequate nutrition and fluids orally should:

- receive tube feeding with a nasogastric tube within 24 hours of admission
- be considered for a nasal bridle tube or gastrostomy if they are unable to tolerate a nasogastric tube
- be referred to an appropriately trained healthcare professional for detailed nutritional assessment, individualised advice and monitoring. **[2008]**

Oral nutritional supplementation

1.6.5 Screen all hospital inpatients on admission for malnutrition and the risk of malnutrition. Repeat screening weekly for inpatients. **[2008]** [This recommendation is adapted from the NICE guideline on nutrition support in adults.]

1.6.6 Screening should assess body mass index (BMI) and percentage unintentional weight loss. It should also consider the time over which a nutrient intake has been unintentionally reduced and/or the likelihood of future impaired nutrient intake. The Malnutrition Universal Screening Tool (MUST), for example, may be used to do this. **[2008]** [This recommendation is adapted from the NICE guideline on nutrition support in adults.]

1.6.7 When screening for malnutrition and the risk of malnutrition, be aware that dysphagia, poor oral health and reduced ability to self-feed will affect nutrition in people with stroke. **[2008]**

1.6.8 Screening for malnutrition and the risk of malnutrition should be carried out by healthcare professionals with appropriate skills and training. **[2008]** [This recommendation is adapted from the NICE guideline on nutrition support in adults.]

1.6.9 Routine nutritional supplementation is not recommended for people with acute stroke who are adequately nourished on admission. **[2008]**

1.6.10 Start nutrition support for people with stroke who are at risk of malnutrition. This may include oral nutritional supplements, specialist dietary advice and/or tube feeding. **[2008]**

1.6.11 Assess, on admission, the hydration of everyone with acute stroke. Review hydration regularly and manage it so that normal hydration is maintained. **[2008]**

1.7 Early mobilisation and optimum positioning of people with acute stroke

1.7.1 Assess the individual clinical needs and personal preferences of people with acute stroke to determine their optimal head position. Take into account factors such as their comfort, physical and cognitive abilities and postural control. **[2019]**

To find out why the committee made this 2019 recommendation on Optimum positioning of people with acute stroke and how they might affect practice, see rationale and impact.

1.7.2 Help people with acute stroke to sit out of bed, stand or walk when their clinical condition permits as part of an active management programme in a specialist stroke unit. **[2019]**

1.7.3 Do not offer high-intensity mobilisation in the first 24 hours after symptom onset in people with acute stroke. **[2019]**

To find out why the committee made this 2019 recommendations on Early mobilisation of people with acute stroke and how they might affect practice, see rationale and impact.

1.8 Avoiding aspiration pneumonia

1.8.1 Give food and fluids to people with dysphagia, in a form that can be swallowed without aspiration, after specialist assessment of swallowing. (See recommendation 6.1.2.) **[2008]**

1.9 Surgery for people with acute stroke

Acute intracerebral haemorrhage

1.9.1 Stroke services should agree protocols for monitoring, referring and transferring people to regional neurosurgical centres for the management of symptomatic hydrocephalus. **[2008]**

1.9.2 People with intracerebral haemorrhage should be monitored by specialists in neurosurgical or stroke care for deterioration in function and referred immediately for brain imaging when necessary. **[2008]**

1.9.3 Previously fit people should be considered for surgical intervention following primary intracerebral haemorrhage if they have hydrocephalus. **[2008]**

1.9.4 People with any of the following rarely require surgical intervention and should receive medical treatment initially:

- small deep haemorrhages
- lobar haemorrhage without either hydrocephalus or rapid neurological deterioration
- a large haemorrhage and significant comorbidities before the stroke
- a score on the Glasgow Coma Scale of below 8 unless this is because of hydrocephalus
- posterior fossa haemorrhage. **[2008]**

Decompressive hemicraniectomy

1.9.5 Consider decompressive hemicraniectomy (which should be performed within 48 hours of symptom onset) for people with acute stroke who meet all of the following criteria:

- clinical deficits that suggest infarction in the territory of the middle cerebral artery, with a score above 15 on the National Institutes of Health Stroke Scale (NIHSS)
- decreased level of consciousness, with a score of 1 or more on item 1a of the NIHSS
- signs on CT of an infarct of at least 50% of the middle cerebral artery territory:
  - with or without additional infarction in the territory of the anterior or posterior cerebral artery on the same side, or
  - with infarct volume greater than 145 cm^3, as shown on diffusion-weighted MRI scan. **[2019]**

1.9.6 Discuss the risks and benefits of decompressive hemicraniectomy with people or their family members or carers (as appropriate), taking into account their functional status before the stroke, and their wishes and preferences. **[2019]**

1.9.7 People who are referred for decompressive hemicraniectomy should be monitored by appropriately trained professionals skilled in neurological assessment. **[2008]**

To find out why the committee made the 2019 recommendations on Surgical referral for decompressive hemicraniectomy and how they might affect practice, see rationale and impact.

Recommendations for research

As part of the 2019 update, the guideline committee made an additional research recommendation on MRI brain scanning.

Key recommendations for research

MRI brain scanning

Does early MRI brain scanning improve outcome after suspected transient ischaemic attack (TIA)?

To find out why the committee made the research recommendation on MRI brain scanning after TIA see rationale and impact.

Rationale and impact

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

Initial management of suspected and confirmed TIA

Recommendation 1.1.4

Why the committee made the recommendations

There was some evidence for a benefit of aspirin in the early management of confirmed TIA or minor stroke in reducing the risk of recurrent stroke within secondary care in stroke services units. This is not directly applicable to this review which was about TIA at first contact with a healthcare professional. However, in the committee’s experience, the earlier that aspirin can be administered the better this will be for patient outcomes in this group as well. The risk of haemorrhage in this group, and of other risks associated with administering aspirin (aspirin allergy or GI bleed), is low. The recommendation was based largely on the consensus of the committee supported by the indirect evidence.

How the recommendations might affect practice

The recommendation represents a change from current practice. However, because of the low unit cost of aspirin the committee did not expect the recommendation to result in a significant resource impact.

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

Recommendations 1.1.5 and 1.1.6

Why the committee made the recommendations

Evidence showed that risk prediction scores (ABCD2 and ABCD3) used in isolation are poor at discriminating low and high risk of stroke after TIA. Adding imaging of the brain and carotid arteries to the risk scores (as is done in the ABCD2-I and ABCD3-I tools) modestly improves discrimination. However, appropriate imaging (including MRI) is not available in general practice or for paramedics, two of the key situations where these tools would be used. Arranging specialist assessment less urgently for some people based on a tool with poor discriminative ability for stroke risk has the potential for harm. Therefore, the committee agreed that risk scores should not be used.

The committee agreed, based on their clinical experience and the limited predictive performance of risk scores that all cases of suspected TIA should be considered as potentially high risk for stroke. Also, as there is no reliable diagnostic test for TIA (the risk stratification tools are not diagnostic tests), it is important to urgently confirm or refute the diagnosis of a suspected TIA with specialist opinion, particularly as in practice a significant proportion of suspected TIA (30–50%) will have an alternative diagnosis (that is, TIA-mimic). Therefore, it was agreed that everyone who has had a suspected TIA should have specialist assessment and investigation within 24 hours of the onset of symptoms The committee noted the results of an original cost–utility analysis, which was undertaken for this review question in the 2008 version of the stroke guideline (CG68). The analysis concluded that 'immediate assessment' dominated 'assessment within a week' for the entire population of suspected TIA, without the use of a risk stratification tool.

The committee noted that having a TIA (or suspected TIA) is a worrying time and most people would prefer to be assessed as soon as possible. Urgent specialist assessment should ensure that people at high risk of stroke are identified early. This would allow the preventative treatment to begin, which should be introduced as soon as the diagnosis of TIA is confirmed.

How the recommendations might affect practice

The recommendation reflects current best practice of expert assessment in a TIA clinic within 24 hours, irrespective of risk stratification using clinical scoring systems. Everyone with a suspected TIA should be seen within 24 hours, but provision of daily TIA clinics is not universal. Some areas will need to set up daily TIA clinics to provide this best practice service.

This recommendation should not influence the absolute number of people who need to be subsequently assessed in a TIA clinic, but will result in all suspected TIAs being assessed with an equal degree of urgency. There are likely to be challenges in implementation for some areas in providing an adequately responsive 7 day a week TIA clinic (or a suitable alternative 7-day service) where they currently do not exist, although services are already being encouraged to implement TIA clinics 7 days a week. The committee acknowledged that setting up responsive (7 day a week) services in trusts which do not currently offer daily clinics could require significant additional resource and this may result in a substantial resource impact in the NHS in England. However, there are likely to be downstream cost savings due to prevention of stroke.

The recommendation on offering measures for secondary prevention reflects current practice so no change is expected.

Full details of the evidence and the committee's discussion are in evidence review B: TIA prediction rule.

Return to recommendations

Suspected TIA – urgent brain imaging

Recommendations 1.2.1 and 1.2.2

Why the committee made the recommendations

The committee agreed that CT is most useful when there is a clinical suspicion of finding a CT-detectable lesion, such as intracerebral haemorrhage or mass lesion, and should not be routinely performed for everyone with a suspected TIA. No evidence was identified from test-and-treat trials. In these, different imaging strategies are performed on randomised groups followed by management on the basis of the results, to compare patient outcomes of different imaging strategies. In the committee's knowledge and experience, clinical assessment is the best form of diagnosis at this point. Routine CT scanning of people with suspected TIA was not thought to be good practice as it rarely confirms a diagnosis in these patients.

Routine CT imaging is common in current practice and the committee agreed that this could waste resources, extend the length of stay in the emergency department, and expose people to unnecessary radiation.

The committee discussed the possible risks of not offering CT brain imaging to everyone with a suspected TIA. They agreed that, in the absence of clinical 'red flag' indicators (for example headache, anticoagulation, head injury, repetitive stereotyped events), it is rare for a CT scan to reveal an alternative diagnosis needing a different referral pathway. Therefore the numbers of referrals to TIA clinics should not increase greatly.

Clinical assessment by a specialist in a TIA clinic is important for identifying people who may need MRI to detect ischaemia or alternative pathologies.

There was uncertainty about whether urgent, routine MRI screening improves the outcomes for people with suspected TIA, and so the committee made a research recommendation in this area.

How the recommendations might affect practice

Not routinely offering CT brain imaging will be a change in practice for most providers (especially in the emergency department), whereas MRI use in the TIA clinic aligns with current practice.

The recommendations may have opposing impact implications. The committee was not confident of the effect of this recommendation on MRI requests, acknowledging

that this recommendation may slightly increase the number of MRI requests. However, the committee was confident that CT imaging will decrease and so expect that this will offset the potential increase in MRI requests. The committee was therefore uncertain whether the recommendations will be cost saving. It will be a tradeoff between a reduction of CT requests against a potential increase of MR requests.

Full details of the evidence and the committee's discussion are in evidence review C: TIA imaging.

Return to recommendations

Thrombectomy for people with acute stroke

Recommendations 1.4.5 to 1.4.8

Why the committee made the recommendations

Anterior circulation stroke

Overall, the evidence across time-frames showed that thrombectomy, with or without thrombolysis, improved functional outcome as measured by the mRS score in people last known to be well up to 24 hours previously, compared with usual care. There was also a potential benefit for improved quality of life. However, there was no clinical difference in mortality and there were low rates of symptomatic intracerebral haemorrhage. The committee noted there had been some procedural complications associated with thrombectomy, but agreed that these were outweighed by the benefits of improvements in functional outcome. The committee looked at the results of 2 published cost–utility analyses with a UK NHS perspective. The first estimated that endovascular therapy alongside intravenous thrombolysis (where appropriate) is cost effective compared with intravenous thrombolysis alone, when performed within 6 hours of stroke onset (that is, from when a person was last known to be well). The second demonstrated the cost effectiveness of endovascular therapy and best medical therapy compared with best medical therapy alone, when performed 6–24 hours after stroke onset. Therefore, the committee agreed to recommend thrombectomy up to 24 hours after stroke onset alongside intravenous thrombolysis if within the licensed time window in people with appropriate clinical and radiological

characteristics. The benefit of thrombectomy was seen for people presenting between 6 and 24 hours after stroke onset. Few of them received thrombolyisis because this is outside the licenced time window. Therefore, the recommendation for those presenting beyond 6 hours is for thrombectomy alone.

The evidence for thrombectomy within 6 hours of symptom onset was from populations selected using CTA or MRA to identify proximal anterior circulation occlusions. For thrombectomy undertaken between 6 and 24 hours after stroke onset, the evidence was based on more highly selected populations using CT perfusion, MRI diffusion and MRI perfusion imaging, in addition to identifying a proximal anterior circulation arterial occlusion. As the effectiveness of thrombectomy is likely to be lower in a less selected population, the committee recommended that, in line with the evidence, CT or MR imaging is performed if presentation is 6–24 hours after stroke onset. This would ensure that there is vulnerable but salvageable brain tissue to be targeted for thrombectomy.

Posterior circulation stroke

No clinical or cost effectiveness evidence was identified for the population with posterior circulation stroke. The committee discussed that prognosis is usually very poor in basilar artery occlusion, with around an 80% mortality. As few as 2–5% of people with basilar artery occlusion make a full neurological recovery in the absence of interventions to achieve recanalisation or reperfusion. The committee agreed that in their experience the prevalent current practice is to consider intravenous thrombolysis and mechanical thrombectomy, and that good outcomes can be achieved. This is the case even up to 24 hours after stroke onset, which is significant because diagnosis can be delayed in this population by a non-focal presentation or reduced conscious level, or both.

The main potential risk of thrombectomy and thrombolysis in this population relates to intervening when there is established disabling ischaemic brain injury. For example, if a person with basilar artery occlusion has irreversible bilateral damage to the pons, they may be left with locked-in-syndrome with complete face and body paralysis but clear consciousness, even if the basilar artery is opened. The committee agreed that it is standard practice to perform brain imaging and look for established tissue damage in the brain regions affected by the arterial occlusion,

particularly in areas of the brain stem, before intervening. This avoids increasing the number of patients surviving with severe neurological disability. CT or MR imaging should be performed to demonstrate that there is salvageable brain tissue and to seek evidence of established injury to functionally critical areas of the posterior circulation.

The outlook for this population without intervention is poor. But good outcomes can be achieved with intervention and there is supportive evidence from treating anterior stroke. Therefore the committee agreed that thrombectomy, and thrombolysis within its licensed indications, should be considered for people with posterior circulation proximal occlusions and without evidence of irreversible infarction who were last known well up to 24 hours previously.

How the recommendations might affect practice

The committee noted that in current practice around 10% of people presenting with all strokes in the UK are eligible for endovascular therapy. More people are likely to be offered endovascular therapy as a result of these recommendations. The recommendation on endovascular therapy alongside thrombolysis within 6 hours is aligned with current best practice and the NHS England Clinical Commissioning Policy on Mechanical Thrombectomy for Acute Iscahemic Stroke, published in March 2018. The recommendation for thrombectomy between 6 and 24 hours requires a change from current practice by most providers. Currently, the NHS England Cinical Commissioning Policy states that mechanical thrombectomy will be commissioned where substantial salvageable brain tissue is identified up to 12 hours. However, we reviewed new evidence from health economic modelling that supports the extension of the eligibility period up to 24 hours.The recommendation to consider endovascular therapy for posterior circulation stroke reflects current best practice.

Overall, the new recommendations are likely to have a substantial resource impact on the NHS. Endovascular therapy is already performed in most neuroscience centre, but the recommendations will mean 24 hour access to appropriate staffing and imaging.

The committee discussed the possibility that the new recommendations could initially result in a large increase in referrals to centres that already have endovascular

therapy services. The committee also noted that there are likely to be additional costs incurred in transferring people to these centres. This will have implications for the spoke site for arranging transfers, for the ambulance service and at the hub site, where more patients will be received. There will need to be networked arrangements for spoke sites around a thrombectomy 'hub' with fast image transfer, referral, eligibility assessment and responsive repatriation systems.

Balanced against this are the positive implications for other aspects of stroke care. For example, it is expected that there will be a decrease in demand for decompressive hemicraniectomies and in-patient rehabilitation. There may also be a reduction in the need for long-term social care.

Full details of the evidence and the committee's discussion are in evidence review D: Thrombectomy.

Return to recommendations

Blood pressure control in acute intracerebral haemorrhage

Recommendations 1.5.4 to 1.5.5

Why the committee made the recommendations

Good quality evidence from a large number of trial participants showed no clear harm associated with rapidly lower blood pressure for the groups covered by the recommendation using the target of 140 mmHg for systolic blood pressure. Specifically, no clinically relevant increase in the risk of increased neurological deterioration caused by reduced blood flow to the brain or renal failure caused by rapid lowering of systolic blood pressure was found. The intervention achieved a good functional outcome (defined as a modified Rankin Score [mRS] of 0–2), and the potential to improve quality of life, which was agreed to be clinically meaningful. The mortality rate without intervention is thought to be around 40% at 1 month, and up to 60% of people who do survive have moderate or severe disability. Therefore, any intervention to reduce this is important. It is also important to standardise care in this area where much inconsistency is known to exist. The committee noted that one trial used an even more aggressive blood pressure lowering strategy, with treatment started within 4.5 hours of symptom onset and a target for systolic blood pressure of

110–139 mmHg. This showed an increased incidence of renal failure compared to with standard treatment, and so this regimen has not been recommended.

There was little or no evidence on people presenting beyond 6 hours and those with a systolic blood pressure over 220 mmHg. However, the committee agreed that guidance is needed on treating hypertension in these groups and that it is logical to extrapolate from the available data to these groups. Therefore, they made a consensus recommendation to consider controlled systolic blood pressure reduction in these groups.

How the recommendations might affect practice

The recommendations reflect current best practice but might require a change in some settings as practice is currently variable. Although there is variation in current practice, this protocol is already being widely implemented in most trusts and so is not expected to result in a substantial resource impact to the NHS in England.

Full details of the evidence and the committee's discussion are in evidence review E: Blood Pressure.

Return to recommendations

Optimum positioning of people with acute stroke

Recommendation 1.7.1

Why the committee made the recommendations

The evidence did not indicate any difference in outcomes between lying flat or with the head elevated. No cost effectiveness evidence was identified and no cost difference between the 2 strategies is expected. Therefore, the committee used their knowledge and experience to recommend positioning people according to their preferences and individual requirements.

How the recommendations might affect practice

Optimal positioning is an important part of early acute stroke management and rehabilitation. In current practice people are assessed in bed and optimal head positioning is determined based on clinical presentation, medical needs and patient

comfort. The recommendation therefore reflects current practice in most hospitals and so the committee agreed that there should be little or no change.

Full details of the evidence and the committee's discussion are in evidence review G: Head positioning.

Return to recommendations

Early mobilisation of people with acute stroke

Recommendations 1.7.2 and 1.7.3

Why the committee made the recommendations

Regarding the recommendation to mobilise people after having a stroke when their clinical condition permits, there was no clear evidence of benefit or harm for early mobilisation within the first 48 hours after symptom onset compared with standard care. Therefore, the committee made a consensus recommendation. They agreed that early mobilisation may be appropriate in some cases where people need minimal assistance to mobilise, such as in those who have suffered a mild stroke, are experiencing language and/or upper limb dysfunction alone. These people often require little or no assistance to mobilise.

Regarding the recommendation not to offer high intensity mobilisation within the first 24 hours of symptom onset, a published within-trial cost effectiveness analysis from the Australian hospital perspective was identified. However, the treatment effect for the health outcome mRS 0-2 used in the study differed from the treatment effect calculated in the clinical review. As the cost effectiveness evidence was incongruous with the results of the clinical review, the committee chose to make a recommendation based on the clinical evidence for mortality which was suggestive of clinical harm associated with high intensity mobilisation within the first 24 hours after acute stroke.

How the recommendations might affect practice

The committee was confident that making this recommendation would not have a resource impact, as there was no indication that mobilising later and with a lower intensity leads to a longer length of stay. The committee noted that people will still be

assessed and mobilised and there are not likely to be differences in staff costs. In current practice, mobilisation strategies differ according to stroke severity and the clinical condition of the person with stroke. The strategy may also be impacted by the availability of different types of specialist seating. The recommendations may change current practice in stroke units where there is a 'soon as possible' focus on mobilisation. This recommendation will encourage health care professionals to consider the intensity of very early mobilisation and advice on intensity of activities to people discharged from hospital early after a stroke.

Full details of the evidence and the committee's discussion are in evidence review F: Very Early Mobilisation.

Return to recommendations

Surgical referral for decompressive hemicraniectomy

Recommendations 1.9.5 and 1.9.6

Why the committee made the recommendations

The evidence showed that surgery improved mortality rates and, to a lesser extent, functional outcomes as measured by the modified Rankin Score (mRS). The benefit on mortality was seen in all age groups considered, although the benefit for functional outcome was smaller in people aged over 60 years compared with people under 60 years. Based on this and to ensure that people over 60 have similar opportunities for the surgery as younger people, the committee removed the previous age cut-off for considering surgery. The committee also acknowledged that although surgery results in more people surviving and better functional outcome than without surgery, many still have overall poor functional outcome and their quality of life may be low. The acceptability of this trade-off was agreed to be a very individual judgement. Some people may choose not to have surgery if there is a risk of severe disability, whereas others may wish to go ahead based on mortality benefit alone. Therefore, the committee highlighted the need for careful discussion about risks and benefits between clinicians and family members or carers. They noted that patients would not be able to be involved at the time because of the severity of the stroke, so the family members or carers would be responsible for making the decision. In deciding whether to opt for surgery considerations should include pre-stroke

functional status, because surgery would not be appropriate for people with severe disability before stroke.

The committee noted that although some of the trials included people who had surgery as long as 96 hours after symptom onset, the benefits in terms of reduced mortality and improved functional outcome were largely driven by studies that only allowed surgery up to a maximum of 48 hours after onset. Therefore, they agreed to retain the reference to surgery being performed within 48 hours of onset from the original recommendations. The committee also reviewed the criteria used to determine eligibility for hemicraniectomy from the stroke guideline published in 2008. It was agreed that these were still appropriate and reflect the populations included in the studies used to inform the new recommendations.

The committee agreed that although the cost effectiveness of decompressive hemicraniectomy remains uncertain, it should be considered for some people because of the clear mortality benefit and the improved functional outcomes. Shared decision making between physicians, surgeons, families and carers is important given the high likelihood of residual moderate or severe disability after surgery.

How the recommendations might affect practice

In current practice, around 5% of people on the stroke unit are referred for decompressive hemicraniectomy. Decompressive hemicraniectomy is currently considered for those aged under 60.

This recommendation will require a change from current practice by all providers. The guidance will also require healthcare professionals to take into account people's pre-stroke functional status and to have a discussion about the risks and benefits.

The committee believed that including people over 60 years would not necessarily lead to significantly more people undergoing surgery because informed discussion of the outcomes might reduce its uptake in this population. In addition, increasing the population eligible for endovascular therapy and its provision is likely to decrease the population referred for decompressive hemicraniectomy. The committee therefore did not anticipate a substantial resource impact to result from this recommendation.

Full details of the evidence and the committee's discussion are in evidence review H: Surgery.

Return to recommendations

Context

Since NICE published its guideline on stroke and transient ischaemic attack (TIA) in 2008 the management of stroke has changed. New evidence has emerged in areas such as thrombectomy (clot retrieval procedures) in ischaemic stroke, controlling high blood pressure in people with acute haemorrhagic stroke, the role of hemicraniectomy and early mobilisation and optimum positioning of people with acute stroke. In addition, there is some uncertainty about the use of aspirin when TIA is first suspected, the role of conventional risk stratification in TIA and the best approach to intracerebral imaging after TIA. The purpose of this guideline update is to appraise the current evidence and develop guidance on these specific issues.

A stroke occurs when the blood supply to a part of the brain is acutely compromised. Most strokes (85%) are caused by a blockage in a blood vessel (artery) that supplies blood to the brain. A TIA or 'mini stroke' has the same clinical presentation as a stroke except that symptoms disappear within 24 hours.

The symptoms experienced depend on the part of the brain that is affected. They usually occur suddenly and without any warning. Common symptoms include loss of movement or sensation in an arm or leg, problems speaking, a drooping of one side of the face or problems with vision.

A stroke can occur at any age. The average age for stroke varies across the UK, with a median age of 77 years (interquartile range 67 to 85). A quarter of strokes occur in people of working age.

First ever stroke affects 230 people per 100,000 each year, with over 80,000 people hospitalised per year in England. Although the death rate has been falling, figures from the Sentinel Stroke National Audit Programme (SSNAP) show that 13.6% of people admitted to hospital with stroke in England and Wales died (either in hospital

or after being discharged from inpatient care) within 30 days. There are approximately 1.2 million stroke survivors in the UK. The risk of recurrent stroke is 26% within 5 years of a first stroke and 39% by 10 years.

Stroke is the single biggest cause of disability in adults, with an estimated annual cost to the NHS of £1.03 billion per year. A further £633 million was estimated to have been spent on social care between 2015 and 2016. One in 12 stroke survivors have to move into a care home because of the effects of their stroke.

This guideline covers people over 16 with suspected or confirmed TIAs or completed strokes – that is, an acute neurological event presumed to be vascular in origin and causing cerebral ischaemia, cerebral infarction or cerebral haemorrhage. This includes first and recurrent events, thrombotic and embolic events and primary intracerebral haemorrhage of any cause, including venous thrombosis. Areas that will not be covered include specific issues relating to the general management of underlying conditions and subarachnoid haemorrhage.

Finding more information and resources

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

Update information

This guideline is an update of NICE guideline CG68 (published July 2008) and will replace it.

We have reviewed the evidence on thrombectomy (clot retrieval procedures) in ischaemic stroke, controlling high blood pressure in people with acute haemorrhagic stroke, the role of hemicraniectomy and early mobilisation and optimum positioning of people with acute stroke. In addition, we have addressed the use of aspirin when TIA is first suspected, the role of conventional risk stratification in TIA and the best approach to intracerebral imaging after TIA.

Recommendations are marked **[2019]** if the evidence has been reviewed.

Recommendations that have been deleted or changed

We propose to delete some recommendations from the 2008 guideline. Table 1 sets out these recommendations and includes details of replacement recommendations. If there is no replacement recommendation, an explanation for the proposed deletion is given.

In recommendations shaded in grey and ending **[2008, amended 2019]**, we have made changes that could affect the intent without reviewing the evidence. Yellow shading is used to highlight these changes, and reasons for the changes are given in table 2.

In recommendations shaded in grey and ending **[2008]** we have not reviewed the evidence. In some cases minor changes have been made – for example, to update links, or bring the language and style up to date – without changing the intent of the recommendation. Minor changes are listed in table 3.

See also the previous NICE guideline and supporting documents.

Table 1 Recommendations that have been deleted

Recommendation in 2008 guideline	Comment
1.1.2.3 People with crescendo TIA (two ore more TIAs in a week) should be treated as being at high risk of stroke, even though they may have an ABCD score of 3 or below.	Deleted: not relevant any more as we are not recommending risk stratification with ABCD score
1.1.2.4 People who have had a suspected TIA who are at lower risk of stroke (that is, an ABCD score of 3 or below) should have: - Aspirin (300mg daily) started immediately - Specialist assessment and investigation as soon as possible, but definitely within 1 week of onset of symptoms - Measures for secondary prevention introduced as soon as the diagnosis is confirmed, including discussion of individual risk factors.	Replaced with new reccommendations 1.1.4, 1.1.5, 1.1.6 and 1.1.7
1.1.2.5 People who have had a TIA but who present late (more than 1 week after their las symptom has resolved) should	Deleted: no longer relevant because concept of “lower risk” no longer used.

be treated as though they are at lower risk of stroke.	
1.2.1.1 People who have had a suspected TIA (that is, whose symptoms and signs have completely resolved within 24 hours) should be assessed by a specialist (within 1 week of symptom onset) before a decision on brain imaging is made.	Replaced with new recommendation 1.1.5.
1.2.1.2 People who have had a suspected TIA who are at high risk of stroke (for example, an ABCD score of 4 or above, or with crescendo TIA) in whom the vascular territory or pathology is uncertain should undergo urgent brain imaging (preferably diffusion-weighted MRI]magnetic resonance imaging]).	Replaced with new recommendation 1.2.2.
1.2.1.3 People who have had a suspected TIA who are at lower risk of stroke (for example, an ABCD score of less than 4) in whom the vascular territory or pathology is uncertain should undergo brain imaging (preferably diffusion-weighted MRI).	Replaced with new recommendation 1.2.2.
1.2.2.1 People who have had a suspected TIA who need brain imaging (that is, those in whom vascular territory or pathology is uncertain) should undergo diffusion-weighted MRI except where contraindicated, in which case CT (computed tomography) scanning should be used.	Replaced with new recommendations 1.2.1 and 1.2.2.
1.7.1.2 People wth acute stroke should be helped to sit up as soon as possible (when their clinical condition permits)	Replaced with new recommendations 1.7.1 and 1.7.2.
1.9.2.1 People with middle cerebral artery infarction who meet all of the criteria below should be considered for decompressive hemicraniectomy. They should be referred within 24 hours of onset of symptoms and treated within a maximum of 48 hours. - Aged 60 years or under - Clinical deficits suggestive of infarction in the territory of the middle cerebral artery, with a score on the National Institutes of Health Stroke Scale (NIHSS) of above 15 - Decrease in the level of consciousness to give a score of 1 or more on item 1a of the	Replaced with new rec 1.9.5.

NIHSS - Signs on CT of an infarct of at least 50% of the middle cerebral artery territory, with or without additional infarction in the territory of the anterior or posterior cerebral artery on the same side, or infarct volume greater than 145 cm3 as shown on diffusion-weighted MRI. [2008]	1
1.7.1.1 People with acute stroke should be mobilised as soon as possible (when their clinical condition permits) as part of an active management programme in a specialist stroke unit.	Replaced with new rec 1.7.2.

2

3 **Table 2 Amended recommendation wording (change to intent) without an**

4 **evidence review**

Recommendation in 2008 guideline	Recommendation in current guideline	Reason for change
1.1.2.4 Last bullet People who have had a suspected TIA who are at lower risk of stroke (that is, an ABCD2 score of 3 or below) should have: • aspirin (300 mg daily) started immediately • specialist assessment[10] and investigation as soon as possible, but definitely within 1 week of onset of symptoms • measures for secondary prevention introduced as soon as the diagnosis is confirmed, including discussion of individual risk	1.1.7 Offer secondary prevention as soon as possible after the diagnosis of TIA is confirmed. **[2008, amended 2019]**	Amended to be consistent with new recommendations in relation to rapid referral and review in TIA clinic. The remaining part of the recommendation has been replaced by recommendations 1.1.4-1.1.6.

factors.		
1.2.3.1 All people with suspected non-disabling stroke or TIA who after specialist assessment are considered as candidates for carotid endarterectomy should have carotid imaging within 1 week of onset of symptoms. People who present more than 1 week after their last symptom of TIA has resolved should be managed using the lower-risk pathway.	1.2.3 Everyone with TIA who after specialist assessment are considered as a candidate for carotid endarterectomy should have urgent carotid imaging. **[2008, amended 2019]**	Amended to be consistent with new recommnedations in relation to rapid referral and review in TIA clinic.
1.2.4.1 People with stable neurological symptoms from acute non-disabling stroke or TIA who have symptomatic carotid stenosis of 50-99% according to the NASCET (North American Symptomatic Carotid Endarterectomy Trial) criteria, or 70-99% according to the ECST (European Carotid Surgery Trialists' Collaborative Group) criteria, should: - be assessed and referred for carotid endarterectomy within 1 week of onset of stroke or TIA symptoms - undergo surgery within a maximum of 2 weeks of onset of stroke or TIA symptoms - receive best medical treatment (control of blood pressure, antiplatelet agents, cholesterol lowering through	1.2.4 Ensure that people with stable neurological symptoms from acute non-disabling stroke or TIA who have symptomatic carotid stenosis of 50-99% according to the NASCET (North American Symptomatic Carotid Endarterectomy Trial) criteria, or 70-99% according to the ECST (European Carotid Surgery Trialists' Collaborative Group) criteria: - are assessed and referred urgently for carotid endarterectomy to a service following current national standards[12] - receive best medical treatment (control of blood pressure, antiplatelet agents, cholesterol lowering through diet and drugs, lifestyle advice). **[2008, amended 2019]**	Amended to be consistent with new recommendations in relation to rapid referral and review in TIA clinic.

[12] www.england.nhs.uk/publication/service-specification-neurointerventional-services-for-acute-ischaemic-haemorrhagic-stroke/

diet and drugs, lifestyle advice).		
1.3.2.1 Brain imaging should be performed immediately for people with acute stroke if any of the following apply: • Indications for thrombolysis or early anticoagulation treatment • on anticoagulant treatment • a known bleeding tendency • a depressed level of consciousness (Glasgow Coma Score below 13) • unexplained progressive or fluctuating symptoms • papilloedema, neck stiffness or fever • severe headache at onset of stroke symptoms.	1.3.2 Perform brain imaging immediately[13] for people with acute stroke if any of the following apply: • indications for thrombolysis or thrombectomy • on anticoagulant treatment • a known bleeding tendency • a depressed level of consciousness (Glasgow Coma Score below 13) • unexplained progressive or fluctuating symptoms • papilloedema, neck stiffness or fever • severe headache at onset of stroke symptoms. **[2008, amended 2019]**	Amended as early coagulation therapy is not relevant in this context.
1.4.1.2 Alteplase should be administered only within a well organised stroke service with: • staff trained in delivering thrombolysis and in monitoring for any complications associated with thrombolysis • level 1 and level 2 nursing care staff trained in acute stroke and thrombolysis[14]	1.4.2 Administer alteplase only within a well organised stroke service with: • staff trained in delivering thrombolysis and in monitoring for any complications associated with thrombolysis • level 1 nursing staff trained in acute stroke and thrombolysis[15] • immediate access to imaging and re-imaging, and staff trained to interpret the images. **[2008, amended 2019]**	Amended as unknown distinction between level 1 and level 2 nursing staff. Level 1 is more appropriate term to use.

[13] The committee felt that 'immediately' is defined as 'ideally the next slot and definitely within 1 hour, whichever is sooner', in line with the National Stroke Strategy.
[14] See NHS Data Dictionary, 'Critical care level' [online].
[15] See NHS Data Dictionary, Critical care level.

• immediate access to imaging and re-imaging, and staff trained to interpret the images.		
1.5.3.1 Anti-hypertensive treatment in people with acute stroke is recommended only if there is a hypertensive emergency with one or more of the following serious concomitant medical issues: • hypertensive encephalopathy • hypertensive nephropathy • hypertensive cardiac failure/myocardial infarction • aortic dissection • pre-eclampsia/eclampsia • intracerebral haemorrhage with systolic blood pressure over 200 mmHg.	1.5.6 Anti-hypertensive treatment in people with acute ischaemic stroke is recommended only if there is a hypertensive emergency with one or more of the following serious concomitant medical issues: • hypertensive encephalopathy • hypertensive nephropathy • hypertensive cardiac failure/myocardial infarction • aortic dissection • pre-eclampsia/eclampsia. • **[2008, amended 2019]**	Amended to be consistent with the title of this recommendation which now applies to “acute ischaemic stroke” ie not haemorrhagic.

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

Recommendation numbers in current guideline	Comment
All recommendations except those labelled **[2019]**	Recommendations have been edited into the direct style (in line with current NICE style for recommendations in guidelines) where possible. Minor changes have also been made for plain English purposes and to align with current NICE style. Yellow highlighting has not been applied to these changes.