

Stroke and transient ischaemic attack

Overview of management

Use the FAST test to screen for symptoms suggestive of acute stroke.

For people presenting with ongoing neurological symptoms suggestive of acute stroke

- Dial 999 to arrange emergency admission (unless admission would be inappropriate).

For people presenting with a history suggestive of a completed transient ischaemic attack (TIA)

▪ **Refer for urgent specialist assessment:**

- If they are at high risk of an early stroke, the target is to be seen within 24 hours of onset of symptoms:
 - The risk of an early stroke is high if the ABCD2 score is 4 or more, or if there have been two TIAs within 1 week.
- If they are not at high risk of an early stroke, the target is to be seen within 1 week of onset of symptoms.

- **Aspirin (300 mg daily) should be started immediately**, unless it is contraindicated or not tolerated, and continued until the person is reviewed in secondary care.

Long-term care and support of people who have had a stroke or TIA

- All people should be followed up 1 month after the event, either in primary or secondary care, so that medication and other interventions to modify risk factors can be assessed.
- The role of primary care is to ensure that secondary prevention measures have been started and are being maintained and monitored, and that rehabilitation is progressing.
- **Secondary prevention** of stroke and other cardiovascular events involves:
 - **Lifestyle measures:** stopping smoking; adopting a cardioprotective diet, including reducing salt intake; regular exercise; prudent use of alcohol; and achieving and maintaining a satisfactory body weight.
 - **Drug treatments:** antithrombotic, antihypertensive, and lipid modifying treatments.
- **The complications and consequences of stroke** are diverse and may require referral to a wide range of services, for example speech and language therapy.

Acute stroke/transient ischaemic attack with ongoing neurological symptoms and signs

- This section covers the management of people presenting with ongoing neurological symptoms and signs that suggest an acute stroke or transient ischaemic attack (TIA).
- In this situation it is not possible to differentiate between a stroke and a TIA until the symptoms have resolved within 24 hours, or persisted for more than 24 hours. Because stroke requires urgent specialist assessment and treatment, suspected TIA with ongoing neurological symptoms

and signs should be managed as if it is a stroke.

How should I manage someone presenting with an acute stroke?

▪ **Urgently admit all people with suspected acute stroke:**

- Particular urgency is necessary for people who might be suitable for thrombolysis or whose clinical condition is poor (e.g. depressed level of consciousness, progressing symptoms, severe headache).
- A small number of people have severe comorbidity and might not benefit from admission. If, after discussion with the person and their family or carer, a decision is made not to admit, the reasons for this should be clearly documented.

▪ **Do not start antiplatelet treatment** until haemorrhagic stroke has been ruled out by a brain scan.

Clarification / Additional information

- Thrombolysis is less effective the longer the delay:
 - The deadline for thrombolysis is 3 hours from the start of symptoms. However, some units will treat up to 4.5 hours from start of symptoms, as recent evidence suggests that there may still be some benefit.
 - Brain imaging is required before thrombolysis can be given.
- Therefore, if the person might be eligible for thrombolysis:
 - Ensure that ambulance control understands the urgency of the situation and that the person needs to be taken immediately to the nearest hospital with facilities for stroke thrombolysis.
 - Ensure that the hospital is warned to expect the person.
- If you are consulted over the telephone and the symptoms are suggestive of acute stroke, tell the person or carer to dial 999.
- Use the FAST test to screen for symptoms of acute stroke — see the section on Diagnosis with ongoing symptoms.

Basis for recommendation

These recommendations are in line with guidelines issued by the National Institute for Health and Clinical Excellence (NICE) and the Royal College of Physicians Intercollegiate Stroke Working Party (RCP ICSWP) [Intercollegiate Stroke Working Party, 2008; National Collaborating Centre for Chronic Conditions, 2008], and the National Stroke Strategy [DH, 2007]:

- The National Stroke Strategy is based on evidence that a more urgent response to both stroke and transient ischaemic attack (TIA) saves lives and reduces long-term disability.
- **Rapid recognition of acute stroke or TIA and immediate admission:**
 - Rapid recognition of acute stroke or TIA and immediate admission are necessary because people who are eligible for thrombolysis should have treatment started within 3 hours of the start of their symptoms, and brain imaging needs to be performed to confirm eligibility for thrombolysis.
- **Antiplatelet therapy:**

- A Cochrane systematic review found strong evidence for the benefits of aspirin (160 mg to 300 mg given as soon as is practicable and continued daily) in people with suspected acute ischaemic stroke:
 - This evidence applies chiefly to people seen within 48 hours of stroke onset, in whom intracranial haemorrhage had been excluded or was thought to be clinically unlikely, and who had no definite contraindications to aspirin.
 - Aspirin therapy was associated with a significant reduction in the number of people who died or were left dependent, or who had symptomatic pulmonary embolism or recurrent stroke.
 - There was a small but statistically significant increase in the number of symptomatic intracranial haemorrhages and major extracranial haemorrhages.
- Because antiplatelet therapy increases the risk of intracranial haemorrhage, it should not be given until haemorrhagic stroke has been ruled out. The NICE and RCP ICSWP guidelines recommend that a brain scan be used to rule out haemorrhagic stroke.

■ **Thrombolysis with alteplase:**

- Thrombolysis with alteplase in acute ischaemic stroke has been shown to significantly improve outcome in selected people treated within 3 hours of onset of symptoms. The evidence is reviewed in a NICE Technology Appraisal [NICE, 2007].
- Evidence from a randomized controlled trial published after the NICE and RCP ICSWP guidelines suggests that intravenous alteplase administered between 3 hours and 4.5 hours after the onset of symptoms of acute ischaemic stroke significantly improves disability outcomes [Hacke et al, 2008].
- The authors emphasized that their trial does not provide evidence that it is safe to delay treatment that can be given in a shorter time frame — the delay in starting treatment must be kept as short as possible because the benefits of thrombolysis decrease as the delay in giving it increases.

Immediate management for someone presenting with a completed transient ischaemic attack

What treatment should be started immediately after presentation with a transient ischaemic attack?

- **Aspirin (300 mg daily) should be started immediately**, unless it is contraindicated or not tolerated, and continued at this dose until reviewed in secondary care:
 - Do not delay initiating aspirin treatment in people with uncontrolled blood pressure.
 - Consider gastroprotection (e.g. a proton pump inhibitor) if the person is at high risk of adverse gastrointestinal effects or experiences aspirin-induced dyspepsia.
 - Consider clopidogrel (75 mg daily — off-label use) *only* if the person is allergic or cannot tolerate aspirin.
 - Both aspirin and clopidogrel are contraindicated in people with active gastrointestinal bleeding or ulceration.
 - For further information on antiplatelet therapy (including managing gastrointestinal issues), see the CKS topic on Antiplatelet treatment.
- **For people who are already prescribed low-dose aspirin:**
 - Continue the current dose of aspirin until reviewed in secondary care.

- If non-compliance is suspected, start aspirin 300 mg daily immediately (see above).
- Check for unrecognized risk factors for transient ischaemic attack, such as atrial fibrillation (for more information, see the CKS topic on Atrial fibrillation).
- **For people who have a transient ischaemic attack while on warfarin:**
 - Admit immediately for an urgent brain scan to exclude haemorrhagic stroke.
- Other measures for secondary prevention should be introduced as soon as the diagnosis is confirmed.

Basis for recommendation

These recommendations are in line with guidelines issued by the Department of Health, the National Institute for Health and Clinical Excellence (NICE), and the Royal College of Physicians Intercollegiate Stroke Working Party (RCP ICSWP) [Intercollegiate Stroke Working Party, 2008; National Collaborating Centre for Chronic Conditions, 2008; NICE, 2010b].

Rationale for giving aspirin

- The recommendation to offer immediate aspirin (300 mg) to people who have possibly had a transient ischaemic attack (TIA) is based on the National Stroke Strategy issued by the Department of Health [DH, 2007] and evidence showing that early initiation of treatment (including aspirin) was associated with an 80% reduction in the risk of early recurrent stroke in people with a TIA or minor stroke [Rothwell et al, 2007]:
 - Aspirin is given after a TIA to reduce the risk of subsequent stroke.
 - Unlike in people with acute ischaemic stroke, the risk that aspirin will provoke or aggravate intracerebral bleeding is low after a TIA.

For people with uncontrolled blood pressure who develop a TIA

- CKS did not identify any evidence for withholding aspirin in people with uncontrolled blood pressure who develop a TIA.
- Feedback from expert reviewers recommended that aspirin treatment should not be delayed in these people.

For people who require an antiplatelet drug and are intolerant of aspirin

- The NICE Guideline Development Group found little evidence to guide the management of people who develop a TIA who are intolerant of aspirin.
- The consensus of the Guideline Development Group (based on their clinical experience) was that people should take aspirin (with proton pump inhibitor cover where appropriate) unless there are absolute contraindications, such as true allergy to aspirin.
- The recommendation to offer clopidogrel (off-label use) to people intolerant of aspirin is in line with guidance issued by the RCP ICSWP [Intercollegiate Stroke Working Party, 2008].

Dosage of clopidogrel for people in whom aspirin is contraindicated

- There is uncertainty regarding whether a loading dose of 300 mg should be given (followed by 75 mg daily) in people with TIA:

- Although a loading dose is licensed for people with acute coronary syndrome, the use of clopidogrel immediately after a TIA is unlicensed.
- National guidelines provide no recommendation regarding dosage [SIGN, 2002; Intercollegiate Stroke Working Party, 2008; National Collaborating Centre for Chronic Conditions, 2008]. The NICE Technology Appraisal on clopidogrel does not cover unlicensed uses [NICE, 2005a].
- Feedback from expert reviewers was divided and highlighted an uncertainty as to whether a loading dose is required. Although a loading dose was used in the EXPRESS study [Rothwell et al, 2007], it was acknowledged among expert reviewers that there is no good evidence to support this.
- Given the uncertainty, the unlicensed status of clopidogrel in TIA, and lack of evidence for the use of loading dose after TIA, CKS recommends initiating clopidogrel at 75 mg daily until further evidence or guidance indicates otherwise.

For people who develop a TIA and are already taking aspirin

- CKS did not identify any evidence on what to do when TIA occurs in a person already taking aspirin.
- The recommendation to maintain the current aspirin dose is in line with guidance issued by the American Heart Association and American Stroke Association Council on Stroke, which is based on expert opinion [Sacco et al, 2006]. They found no evidence on:
 - Increasing the dose of aspirin.
 - Alternative antiplatelet drugs.
 - Combinations of antiplatelet drugs.
- Feedback from expert reviewers generally recommended that the current dose of aspirin should be continued in people who develop TIA and are already prescribed low-dose aspirin.

For people on an anticoagulant who develop a TIA

- The recommendation for immediate admission for brain imaging to exclude haemorrhagic stroke is based on the consensus opinion of the RCP ICSWP [Intercollegiate Stroke Working Party, 2008].

How should I assess the ABCD² score?

- Use the ABCD² scoring system to help assess the risk of stroke early after a transient ischaemic attack:
 - **A** — age: 60 years of age or older, 1 point.
 - **B** — blood pressure at presentation: 140/90 mmHg or greater, 1 point.
 - **C** — clinical features: unilateral weakness, 2 points; speech disturbance without weakness, 1 point.
 - **D** — duration of symptoms: 60 minutes or longer, 2 points; 10–59 minutes, 1 point.
 - **D** — presence of diabetes: 1 point.
- Points from the individual items are added to give the ABCD² score.
- People with a score of 4 or more are regarded as being at high risk of an early stroke.

Clarification / Additional information

- The ABCD² scoring system excludes certain populations who may be at particularly high risk, such as:
 - People who have had two or more transient ischaemic attacks (TIAs) within 1 week — they are at higher risk for early stroke.
 - People on anticoagulation treatment — brain imaging is required to exclude intracranial bleeding.
- They also may not be relevant to people who present days after a TIA.

Basis for recommendation

These recommendations are in line with guidelines issued by the National Institute for Health and Clinical Excellence (NICE) and the Royal College of Physicians Intercollegiate Stroke Working Party (RCP ICSWP) [Intercollegiate Stroke Working Party, 2008; National Collaborating Centre for Chronic Conditions, 2008].

Use of the ABCD² scoring system to assess the risk of stroke early after a transient ischaemic attack (TIA)

- The consensus of the NICE Guideline Development Group was that high-risk people need to be immediately identified so that they can be urgently assessed and secondary prevention initiated.
- A systematic review of the risk of stroke within 7 days of TIA identified 18 independent cohorts (n = 10,126) [Giles and Rothwell, 2007]:
 - The pooled risk of stroke within 2 days was 3.1% (95% CI 2.0 to 4.1) and within 7 days 5.2% (95% CI 3.9 to 6.5). There was considerable heterogeneity.
- Four studies rigorously evaluated the accuracy of the ABCD or ABCD² scoring systems in predicting the risk of early stroke risk after TIA [Rothwell et al, 2005; Tsvigoulis et al, 2006; Bray et al, 2007; Johnston et al, 2007]:
 - The four studies had different populations and reported different outcomes but provide consistent evidence that such scoring systems as the ABCD² are accurate at identifying people who are at high risk of early subsequent stroke.
- The health economic modelling conducted by NICE found that the cost effectiveness of immediate assessment declines with ABCD² score [National Collaborating Centre for Chronic Conditions, 2008].
- On the basis of this evidence, the NICE Guideline Development Group defined a risk of greater than 4% over 7 days as high risk requiring urgent referral to be seen within 24 hours. This risk is equivalent to an ABCD² score of 4 or greater.

How urgently should I refer someone presenting after a transient ischaemic attack?

- **Consider admission if:**
 - The person has atrial fibrillation — they are at higher risk for early stroke.

- **Refer immediately (the target is to be seen by a specialist and investigated within 24 hours of the start of symptoms) if:**
 - The person's ABCD2 score is 4 or more — they are at higher risk for early stroke.
 - The person has had two or more transient ischaemic attacks (TIAs) within 1 week — they are at higher risk for early stroke.
 - The person is on anticoagulation treatment — brain imaging is required to exclude intracranial bleeding.
- **Consider immediate referral if:**
 - The person has recurrent TIAs more than 1 week apart — they are at higher risk for early stroke.
- **Refer urgently (the target is to be seen by a specialist and investigated within 1 week of the onset of symptoms) if:**
 - The person presents sufficiently early and is at lower risk of an early stroke, that is has both:
 - An ABCD2 score of 3 or less.
 - No other TIAs within the past week.

Clarification / Additional information

- The purpose of referral for specialist assessment and imaging of the brain and carotid arteries is to:
 - Exclude bleeding (especially in people with symptoms of long duration and in people on anticoagulants).
 - Exclude other stroke mimics.
 - Confirm the diagnosis and identify the likely causes.
 - Identify the vascular territory compromised by the transient ischaemic attack (TIA).
 - Identify the appropriate treatment.
- Referral is not needed when the person is already on optimal therapy, a confident diagnosis of TIA can be made, the carotid arteries have been assessed, new atrial fibrillation has been excluded, and the TIA does not involve new vascular territory.
- Arrangements for referral out of hours:
 - Follow local arrangements when making a referral out of hours.
 - Local stroke services have TIA pathways with different arrangements for meeting the 24-hour target for being assessed. For example, some services have a protocol-driven out of hours service for the emergency department.

Basis for recommendation

These recommendations are in line with guidelines issued by the National Institute for Health and Clinical Excellence (NICE) and the Royal College of Physicians Intercollegiate Stroke Working Party (RCP ICSWP) [Intercollegiate Stroke Working Party, 2008; National Collaborating Centre for Chronic

Conditions, 2008], and goals set by the National Stroke Strategy [DH, 2007]:

▪ **National Stroke Strategy goals:**

- The National Stroke Strategy goals are for all people with a potential TIA to be assessed and investigated at a specialist clinic — within 24 hours if they are at high risk, or within 1 week if they are not at high risk.

▪ **Applicability of the ABCD² score:**

- The NICE and RCP ICSWP guidelines recommend that the imminent risk of stroke be assessed using a validated tool, such as the ABCD² score. The guidelines point out that:
 - These scoring systems exclude people who may be at particularly high risk of stroke, such as those with recurrent events and those on anticoagulation who also need urgent evaluation.
 - These scoring systems may not be relevant to people who present late.

▪ **Brain imaging:**

- All people in whom anticoagulation is being considered after a TIA (or stroke) should have brain imaging because:
 - Haemorrhage can present as a TIA and would be aggravated by anticoagulation treatment.
 - Brain imaging may show other unsuspected contraindications to anticoagulation.

▪ **When referral is not needed:**

- The Quality and Outcomes Framework guidance for General Medical Services (GMS) contract 2008/09 states, 'However, if the patient is already on optimal therapy and has had their carotid arteries assessed, there is no need for further referral' [BMA and NHS Employers, 2008].
- CKS expert reviewers pointed out that the diagnosis of TIA should be certain, and that new atrial fibrillation and involvement of new vascular territory should also be excluded.

What investigations should I consider for someone who has had a TIA?

Follow local arrangements on which tests should be done in primary care.

- For people with a transient ischaemic attack and at low risk for early stroke, consider arranging the following tests to be done before they are seen in secondary care:
 - Blood tests:
 - Full blood count.
 - Urea and electrolytes.
 - Glucose.
 - Lipid profile.
 - Liver function tests.
 - Thyroid-stimulating hormone (TSH).
 - Electrocardiography if there are signs of atrial fibrillation, such as an irregular pulse.

Basis for recommendation

- These recommendations are based on CKS expert reviewers' opinion of what constitutes good practice:
 - Local arrangements vary as to which tests are recommended to be done in primary care and which in secondary care.
 - Electrocardiography is recommended to be done in primary care because paroxysmal atrial fibrillation may be missed if this test is delayed until the person is seen in secondary care.

What information and advice should I give someone presenting after a transient ischaemic attack?

- Provide information about the mechanisms and causes of transient ischaemic attacks (TIAs).
- Advise on the need for people with a TIA to have immediate antithrombotic treatment to reduce the risk of having a stroke within the next few days or weeks. For most people, the appropriate treatment is aspirin.
- Explain to people that they need specialist assessment and treatment and that they need to be seen urgently, within 24 hours, if the imminent risk for a stroke is high:
 - The assessment is to clarify the diagnosis (and revise it if necessary), determine the cause of the TIA, and decide what further investigations and treatments are needed.
 - Everyone will need blood tests and electrocardiography (ECG). Many people will need a brain scan and/or a scan of their carotid arteries. Some people will need other tests, for example chest radiography, echocardiography, or ambulatory ECG monitoring.
 - People with atrial fibrillation or artificial heart valves will usually need anticoagulation (if they not are already on it).
- Advise that, after the specialist assessment and treatment, they can reduce their risk of future stroke and other cardiovascular events by adopting a healthier lifestyle and taking drugs to reduce certain risk factors. For details, see Stroke/TIA long-term care and support.
- Advise on driving restrictions:
 - The person should not drive until they have been assessed by a specialist (when definitive guidance will be given).
 - Driving is not permitted until at least 1 month after a TIA.
 - Return to driving should be discussed with the GP or stroke team.
 - People who have had a TIA and hold a heavy goods vehicle licence must contact the Driver and Vehicle Licensing Agency.
 - For more details, see Driving after a stroke or TIA.
 - Additional information and advice is available from the Stroke Association:
 - Stroke Information Service, The Stroke Association, 240 City Road, London EC1V 2PR
 - Online: www.stroke.org.uk

- Helpline: 0845 3033 100 (calls charged at local rate, open Monday to Friday, 9 a.m. to 5 p.m.)

Basis for recommendation

- These recommendations are in line with guidelines issued by the National Institute for Health and Clinical Excellence (NICE), the Royal College of Physicians Intercollegiate Stroke Working Party (RCP ICSWP), and the Driver and Vehicle Licensing Agency [Intercollegiate Stroke Working Party, 2008; National Collaborating Centre for Chronic Conditions, 2008; DVLA, 2010].

Stroke and transient ischaemic attack long-term care and support

How should I follow up someone who has had a stroke or TIA?

Planned follow up

- Local arrangements should make it clear how this is decided and where the person will be followed up.
- Follow-up arrangements and frequency depend on individual clinical needs and response to treatment. Where there are no problems requiring more frequent assessments:
 - **People who have had a stroke:**
 - Schedule primary care follow up (together with the carers) within 6 weeks of discharge home, again within 6 months of discharge, and then annually.
 - **People who have had a transient ischaemic attack (TIA) or minor stroke:**
 - Follow up within 1 month of the event (in primary or secondary care) and then annually in primary care.

Management

- Assess the need for further specialist review, advice, information, support, and rehabilitation — see Referral guidance.
- Assess social care needs.
- Assess health care needs — see Assessment.
- Check and optimize lifestyle measures and drug treatments for secondary prevention:
 - Check and record annually blood pressure and lipid profile.
- Arrange for annual pre-winter influenza immunizations.

Basis for recommendation

- The recommendations on planned follow-up arrangements are in line with recommendations in the National Stroke Strategy and national guidelines [DH, 2007; Intercollegiate Stroke Working Party, 2008].
- The recommendations on the frequency of recording blood pressure and lipid profiles are in line with recommendations in national guidelines and reflect the Quality and Outcomes Framework of the General Medical Services contract [BMA and NHS Employers, 2008; Intercollegiate Stroke

Working Party, 2008].

- The recommendation that people who have had a stroke or transient ischaemic attack be offered annual immunization against influenza is from the Chief Medical Officer and is reflected in the Quality and Outcomes Framework of the General Medical Services contract [CMO, 2007; BMA and NHS Employers, 2008].

How should I assess a person who has a history of stroke?

- When people with a history of stroke consult (for whatever reason), be alert for problems that may require new assessment and management:
 - Neurological problems — balance, movement, tone, sensation, power.
 - Pain — neuropathic, shoulder pain and subluxation, musculoskeletal pain.
 - Mood and social interaction problems — depression, anxiety, emotionalism, disinhibition, aggression.
 - Cognitive impairments:
 - Attention and concentration.
 - Memory.
 - Disturbances of spatial awareness — neglect.
 - Disturbance of perception — visual agnosia.
 - Apraxia — loss of the conceptual ability to organize activities to achieve a goal.
 - Planning, organizing, initiating, and monitoring behaviour (i.e. disturbances of executive functioning).
 - Speech and communication difficulties — aphasia, dysarthria, apraxia of speech.
 - Visual impairments and hemianopia.
 - Bladder and bowel problems — urinary incontinence, faecal incontinence, constipation.
 - Swallowing and nutrition problems — oral health, malnutrition, dehydration, artificial feeding.
 - Sexual dysfunction.
 - Difficulties with activities of daily living — personal, social, and vocational:
 - There is a separate section on Driving after a stroke or TIA.

Clarification / Additional information

- Many of the problems require referral to a specialist service.
- Specialist services and the problems that they can manage are summarized in the section Referral guidance.

Basis for recommendation

- This section summarizes recommendations that the Royal College of Physicians Intercollegiate Stroke Working Party (RCP ICSWP) made on specific problems and complications of a stroke or

transient ischaemic attack [Intercollegiate Stroke Working Party, 2008].

- Although people who have had a stroke will be followed up by specialist stroke services, regular and opportunistic assessment in primary care is required to assess for problems that have not been previously recognized or that require changes in management.

Neurological problems

▪ **Balance impairment:**

- Balance training and walking aids should be considered for people with balance impairment.
- Many people have impaired balance after a stroke. This is due to a combination of:
 - Reduced limb and trunk motor control.
 - Altered sensation on one side.
 - Altered representation in the brain of the body and posture, often associated with left visual and spatial neglect.

▪ **Reduced movement, weakness, clumsiness (motor control impairment):**

- People with impaired motor control should be referred to a physiotherapist with experience in neurodisability.
- Weakness on one side (hemiparesis) is probably the single most disabling factor after a stroke.

▪ **Impaired tone — spasticity and spasms:**

- Anyone with motor weakness after a stroke should be assessed for spasticity.
 - There is considerable debate on the definition, physiology, and importance of spasticity.
 - For clinical purposes, consider spasticity to be a problem if there is increased tone, abnormal posturing, or involuntary spasms, and if this causes discomfort or limited activity for the person or difficulty for the carer.
- Spasticity can be treated by:
 - Exercise and stretching — refer to a physiotherapist.
 - Intramuscular botulinum toxin (for focal spasticity affecting one or two joints) — refer to specialist stroke service.
 - Antispastic drugs (for generalized spasticity). First try baclofen, gabapentin, or tizanidine.
 - If adequate control cannot be achieved with one of these drugs, refer to a specialist with expertise in managing spasticity who can consider trying combinations of these drugs or other treatments.

▪ **Impaired sensation:**

- People with marked sensory loss but good motor function should be taught how to take care of the limb and avoid accidental injury.
- Touch, position sense, pain and other sensations may be impaired after a stroke. Its severity is probably associated with the extent of motor loss.

Pain

■ Neuropathic pain:

- Five percent to 20% of people experience neuropathic pain after a stroke.
- It can occur together with spasticity or sensory loss. It is (in principle) separate from musculoskeletal pain.
- Everyone who has had a stroke should be asked whether they are experiencing pain as a result of the stroke.
- Neuropathic pain can be treated with one or more of:
 - An antidepressant (e.g. amitriptyline).
 - An anticonvulsant (e.g. carbamazepine, gabapentin).
- For more information on drug treatments for neuropathic pain, see the CKS topic on Neuropathic pain - drug treatment.
- People with pain that is poorly controlled within a few weeks should be referred to a specialist in pain management.

■ Shoulder pain and subluxation:

- People with arm weakness after a stroke should be asked about shoulder pain from time to time.
- People with shoulder pain and their carers should have advice on position and handling the weak arm — overhead arm slings and shoulder supports should not be used.
- Offer simple analgesics (e.g. paracetamol, a nonsteroidal anti-inflammatory drug [NSAID] with a proton pump inhibitor [PPI] for gastroprotection) to people with shoulder pain — intra-articular corticosteroids should not be used.
- Consider referring people with persistent troublesome shoulder pain for specialist treatments such as shoulder strapping, high-intensity transcutaneous nerve stimulation, and functional electrical stimulation.

■ Musculoskeletal pain other than shoulder pain:

- After a stroke, immobility and abnormal posture can cause pain, especially in people who have osteoarthritis or inflammatory arthritis.
- Everybody with significant motor loss after a stroke should be asked about musculoskeletal pain.
- People with musculoskeletal pain should be assessed to determine whether the pain can be reduced by improvements in handling techniques, posture or movement.
- Offer simple analgesics to be taken regularly:
 - Paracetamol, up to 1 g four times daily.
 - An NSAID — together with a PPI for gastroprotection. The recommendation to routinely use a PPI is in line with NICE guidelines.
 - Codeine or similar morphine derivative.

Depression, anxiety, emotionalism, disturbed social interaction

- Mood disturbance is common after a stroke and presents as depression, anxiety, or both.

- The severity of mood disturbance is associated with the severity of cognitive impairments, motor impairments, and limitation of activity.
- Mood disturbances can exacerbate other impairments and limit the recovery of function.
- **Depression:**
 - Depression is common but often remits as function is recovered.
 - Everyone who has had a stroke should be screened for depression from time to time.
 - People with depression should be screened for anxiety and emotionalism.
 - People with depression sufficient to cause distress or impede rehabilitation and not responding to primary care management should be assessed by an expert (e.g. clinical psychologist, appropriately trained stroke physician, psychiatrist).
 - Contributory factors (e.g. pain, social isolation) should be addressed.
 - People with minor depression should be:
 - Monitored for progression.
 - Involved in increased social interaction, increased exercise, goal setting, and other psychosocial interventions.
 - People with more severe or persistent depression should be offered one or more of:
 - Antidepressant drug treatment, to be monitored, and continued for at least 6 months if a benefit is achieved.
 - Psychological therapy.
 - For more information, see the CKS topic on Depression.
- **Anxiety:**
 - Anxiety after stroke is often focused on fear of falling and fear of recurrence.
 - Everyone should be screened for anxiety after a stroke.
 - Anyone with anxiety sufficient to impede recovery or to cause distress should be assessed and considered for psychological treatment.
- **Emotionalism:**
 - People who cry (or, less commonly, laugh) in an overly emotional way or after what appears to be minimal provoking stimuli are said to have emotionalism or emotional lability.
 - People with troublesome emotionalism may be offered antidepressant drug treatment.
 - Refer people with troublesome emotionalism not responding to primary care management to a specialist.
- **Social interaction — interpersonal relationships:**
 - Stroke infrequently causes disinhibited or aggressive behaviour.
 - People whose style of social interaction after a stroke causes distress to others should be assessed by a clinical psychologist, and other specialists (e.g. psychiatrist or speech and language therapist) if necessary.

- Management may include:
 - Information and advice for the person, their family, and others in contact socially or professionally.
 - Treatment of causal or aggravating factors (e.g. an antidepressant or an antipsychotic).

Cognitive impairments

■ **General:**

- Almost all people with cerebrovascular disease have some degree of cognitive loss.
- Everyone who has had a stroke or transient ischaemic attack (TIA) should be considered to have at least some cognitive losses initially, and should be screened to identify the range of cognitive impairments (e.g. with the Mini-Mental State Examination or short Orientation-Memory-Concentration Test):
 - The Mini-Mental State Examination tests orientation, registration, attention, calculation, recall, and language [Folstein et al, 1975].
 - The short Orientation-Memory-Concentration Test discriminates among mild, moderate, and severe cognitive deficits [Katzman et al, 1983].
- People who have had a stroke should be assessed before returning to cognitively demanding activities (e.g. driving, some work activities).
- People with cognitive impairment should be formally assessed by a specialist.
- The approach to management should include:
 - Identification and, if possible, removal of any causative or aggravating factors (e.g. drugs, hypothyroidism).
 - Information and advice for the person and their family and carers.
 - Teaching of strategies to compensate for the impairment (e.g. using notebooks, diaries, audiotapes, electronic organizers, and audio alarms).

■ **Attention and concentration:**

- Disturbed alertness is common after stroke, especially in the initial period of recovery, and with right cerebral hemisphere strokes, when it can be asymmetrical with the left side more severely affected.

■ **Memory:**

- Almost all people who have had a stroke experience memory difficulties. About 20% of people who survive for 6 months after a stroke have dementia.

■ **Disturbances of spatial awareness — neglect:**

- Disturbances of spatial awareness are more common in people with right cerebral hemisphere brain damage and hemianopia. The person acts as if they have reduced awareness of some part of their environment, usually the left side.

■ **Disturbance of perception — visual agnosia:**

- After a stroke, some people have a specific difficulty in recognizing objects (agnosia). Agnosia is usually visual.

- Behaviours due to visual agnosia can be mistakenly attributed to impaired memory, language, or deliberate pretence.
- **Apraxia — loss of the conceptual ability to organize activities to achieve a goal:**
 - People with motor apraxia have difficulty in carrying out tasks, such as making a hot drink, despite adequate sensation and muscle strength.
 - Apraxia is usually associated with damage to the left cerebral hemisphere.
- **Disturbances of executive functioning:**
 - 'Executive functioning' refers to the ability to plan and execute a series of tasks and to the ability to foresee the consequences of actions.
 - The dysexecutive syndrome encompasses several impairments including difficulties with planning, organizing, initiating, and monitoring behaviour and adapting it as circumstances change.
 - Any person who appears to have adequate skills to perform complex activities but who fails to organize the tasks needed should be formally assessed.

Speech and communication difficulties

People with speech difficulties should be referred to a speech and language therapist for assessment and treatment:

- **Aphasia — impairment of language:**
 - Aphasia (also known as *dysphasia*) is a specific impairment of language function; the ability to form and understand words, whether orally or in writing.
 - Aphasia is associated with damage to the dominant cerebral hemisphere (usually the left). Subtle difficulties with communication can occur with damage to the non-dominant cerebral hemisphere.
- **Dysarthria:**
 - Dysarthria occurs when control over the muscles responsible for speech is impaired. Speech is slurred. Dysarthria is often associated with swallowing difficulties (dysphagia).
- **Apraxia of speech:**
 - A small proportion of people with stroke have specific impairment of the ability to plan and execute the multiple skilled motor tasks required for successful talking; this is apraxia of speech. It is usually associated with damage to the left cerebral hemisphere.

Visual impairments and hemianopia

- Stroke often causes visual problems, such as diplopia (due to disruption of control of eye movement), nystagmus, blurred vision, loss of depth perception, visual agnosia (difficulty in recognizing objects), and visuospatial neglect.
- Loss of part of a visual field (hemianopia) is also common.
- Age-related visual problems may also be present and include cataract, glaucoma, macular degeneration, and uncorrected refractive errors.
- Everyone who has had a stroke should have their visual acuity assessed (while wearing their

glasses) — check whether they can read the print in a newspaper and whether they can clearly see distant objects.

- People with a visual field defect should be:
 - Informed about the consequences for driving — see the section on Driving after a stroke or TIA.
 - Taught compensatory techniques if the defect causes practical problems — this may require referral.
- Treatment with prisms should only be considered if the person is aware that prisms might not have any benefit for them and if the treatment is provided and evaluated by an expert.

Bladder and bowel problems

- **Bowel and bladder impairment:**

- Disturbance of control of excretion is common in the acute phase of a stroke and remains a problem for a significant minority of people.

- **Incontinence:**

- Incontinence is demeaning for the person, is a major stress factor for carers, and greatly increases the risk of skin pressure ulceration.
- People with urinary or faecal incontinence should only be discharged home after the person and their carer have been trained and arrangements for continuing supply of continence aids and services have been put in place.
- For problems that need specialist treatment and support in the community, consider referral to a continence adviser.

- **Constipation:**

- People with troublesome constipation should:
 - Have a review of their drugs to minimize use of constipating drugs.
 - Be given advice on diet, fluids, and physical activity.
 - Be offered oral laxatives.
 - Be offered rectal laxatives only if severe problems remain.
- For more information, see the CKS topic on Constipation.

Swallowing problems, oral health, malnutrition, dehydration

- **Swallowing problems and oral health:**

- Difficulty in swallowing (dysphagia) is common in people who have had a stroke.
- Dysphagia can lead to:
 - Food, fluid, or saliva entering the lungs and causing aspiration pneumonia.
 - Reduced intake of food and fluid, causing malnutrition or dehydration.
 - Embarrassment when eating in social settings.

- Everybody who has had a stroke should have their ability to swallow assessed as soon as possible by a person with appropriate training.
 - People with difficulty in swallowing should be assessed by a speech and language therapist, or other appropriately trained professional. Management often requires a multidisciplinary team.
 - All people who are not swallowing should have oral and dental hygiene maintained (by the person or their carers) through regular (e.g. 4-hourly) removal of secretions and brushing of teeth or dentures.
 - People who have been assessed for swallowing problems may need to be reassessed.
- **Nutritional problems:**
- Malnutrition, poor nutrition, and dehydration are common in people who have had a stroke:
 - To identify adults who are malnourished, at risk of malnutrition (undernutrition), or obese, the Malnutrition Universal Screening Tool (MUST) is recommended.
 - MUST also includes management guidelines which can be used to develop a care plan, and is available online at www.bapen.org.uk.
 - The management of people being artificially fed should be checked.
 - For problems that need specialist assessment, treatment, and support in the community, consider referral to a dietitian or a speech and language therapist.

Sexual dysfunction

- In people who have had a stroke, sexual dysfunction is common for many reasons, including altered sensation, limited mobility, effects of drugs, and changes in mood.
- People who have had a stroke should be asked, at an appropriate moment, whether they have any concerns about their sexual functioning.
- People who request help should be:
 - Assessed for treatable causes.
 - Assessed for the use of a phosphodiesterase type 5 inhibitor, such as sildenafil (although recent stroke is a contraindication for sildenafil).
 - Advised about ways to overcome practical problems.
 - Referred to a person with expertise in managing sexual dysfunction if problems persist despite primary care management.
- For more information, see the CKS topic on Erectile dysfunction.

Difficulties with activities of daily living

- Difficulties with activities of daily living should be assessed in terms of:
 - Difficulties with personal activities of daily living, including dressing, washing, feeding, and personal hygiene.
 - Difficulties with extended activities of daily living, including domestic and community social activities.
 - Difficulties with vocational activities of daily living, including productive work and leisure activities.

- People who have had a stroke should be formally assessed (by a therapist or nurse) for their safety and independence in all activities of daily living.
- People who have limitations on any aspect of the activities of daily living should be referred to an occupational therapist with experience in neurological disabilities.
- Management may include:
 - Information and advice on coping with the disabilities.
 - Aids, equipment, and home or work adaptations to achieve safe activities (and the training needed to use the aids, equipment, and adaptations).
- There is a separate section on Driving after a stroke or TIA.

What lifestyle measures should I advise for secondary prevention after a transient ischaemic attack or stroke?

- Advise lifestyle measures that reduce the risk of stroke and other cardiovascular disease events, including:
 - Stopping smoking.
 - Adopting a cardioprotective diet, including reducing salt intake.
 - Regular exercise.
 - Prudent use of alcohol — men should drink no more than three units per day, and women no more than two units per day.
 - Achieving and maintaining a satisfactory body weight.
- Because lifestyle changes can be a major challenge, consider measures to support behaviour change.
- For more information, see the section Advice on lifestyle interventions in the CKS topic on CVD risk assessment and management.

What drug treatments should I advise for secondary prevention after a transient ischaemic attack or stroke?

- Antithrombotic, antihypertensive, and lipid modifying treatments are recommended, and will need to be started by the GP if this has not already been done in secondary care.
- For full management details, see the CKS topics on:
 - Antiplatelet treatment, or Atrial fibrillation for people with this condition.
 - Hypertension - not diabetic.
 - Lipid modification - CVD prevention.
 - Diabetes type 2, for people with this condition.
- People should be followed up 1 month after the event, either in primary or secondary care, so that medication and other interventions to modify risk factors (for example diabetes, hypertension, hyperlipidaemia, or ischaemic heart disease) can be assessed [DH, 2007].

What antithrombotic treatment is recommended for someone who has had a stroke or TIA?

For the management of acute stroke or TIA, see Acute stroke/TIA.

For the management of someone presenting with a suspected completed TIA, see TIA, completed.

Secondary prevention of TIA

- For people who have had a TIA, long-term antiplatelet treatment should usually be started in primary care as soon as the diagnosis is confirmed.
- A combination of modified-release dipyridamole (200 mg twice daily) and aspirin (50 mg to 300 mg daily) is recommended indefinitely.
 - Consider also prescribing a proton pump inhibitor to reduce the risk of gastrointestinal bleeding in people at high risk of gastrointestinal bleeding or to relieve aspirin-induced dyspepsia.
 - If aspirin is contraindicated or not tolerated, give modified-release dipyridamole alone.
 - If modified-release dipyridamole is contraindicated or not tolerated, give aspirin alone.
 - If both aspirin and modified-release dipyridamole are contraindicated or not tolerated, give clopidogrel (75 mg daily) alone (off-label use).
- For further information on antiplatelet therapy (including managing gastrointestinal issues), see the CKS topic on Antiplatelet treatment.

Secondary prevention of ischaemic stroke

- For people who have had an ischaemic stroke, high-dose aspirin is usually continued for about 2 weeks after the event, and then low-dose long-term antiplatelet treatment is started.
- Clopidogrel (75 mg daily) is the preferred antiplatelet for secondary prevention of ischaemic stroke.
 - If clopidogrel is contraindicated or not tolerated, give a combination of modified-release dipyridamole (200 mg twice daily) and aspirin (50 mg to 300 mg daily).
 - Consider also prescribing a proton pump inhibitor to reduce the risk of gastrointestinal bleeding in people at high risk of gastrointestinal bleeding or to relieve aspirin-induced dyspepsia.
 - If both clopidogrel and modified-release dipyridamole are contraindicated or not tolerated, give aspirin alone.
 - If both clopidogrel and aspirin are contraindicated or not tolerated, give modified-release dipyridamole alone.
- For further information on antiplatelet therapy (including managing gastrointestinal issues), see the CKS topic on Antiplatelet treatment.

Recurrent stroke or TIA

- People who have recurrent strokes or TIAs should not be given more intensive antiplatelet treatment or anticoagulation unless there are exceptional circumstances or as part of a clinical trial. Seek specialist advice regarding management of these people.

People with persistent or paroxysmal atrial fibrillation or with cerebral venous sinus thrombosis

- Anticoagulation is recommended for people with persistent or paroxysmal atrial fibrillation, and is usually recommended for people with cerebral venous sinus thrombosis.
- Anticoagulation is normally initiated in secondary care, and should not be started until intracerebral haemorrhage has been excluded by brain imaging.
- For more information on managing anticoagulation in people with atrial fibrillation, see the CKS topic on Atrial fibrillation and the CKS topic on Anticoagulation - oral.

Basis for recommendation

These recommendations are in line with guidelines issued by the National Institute for Health and Clinical Excellence (NICE) and the Royal College of Physicians Intercollegiate Stroke Working Party (RCP ICSWP) [Intercollegiate Stroke Working Party, 2008; National Collaborating Centre for Chronic Conditions, 2008; NICE, 2010b].

Basis for antiplatelet therapy

- **Long-term antiplatelet therapy is recommended** because evidence from a large meta-analysis indicates that prolonged antiplatelet therapy reduces the risk of all-cause mortality, vascular mortality, and non-fatal vascular events (stroke and myocardial infarction) in people with a history of stroke or transient ischaemic attack [Antithrombotic Trialists' Collaboration, 2002].
- **Treatment is no longer limited to 2 years from the most recent event [NICE, 2010b].**
 - In their previous guidance [NICE et al, 2004], NICE found the combination of aspirin and modified-release dipyridamole to be most cost effective when given for 2 years from the most recent event. This recommendation was based on the European Stroke Prevention Study 2 (ESPS-2), which had a 2-year follow up [Diener et al, 1996].
 - However, the subsequent ESPRIT study had a duration of follow-up of 3.5 years [The ESPRIT Study Group, 2006]. The Kaplan-Meier survival curves for each treatment group in this study continued to diverge over time, and NICE concluded that a time limit on the duration of treatment was no longer needed [NICE, 2010b].
- **Secondary prevention of occlusive vascular events following an ischaemic stroke**
 - There is good evidence from two large randomized controlled trials that the combination of aspirin and modified-release dipyridamole is more effective than aspirin alone in reducing stroke recurrence in people with stroke or TIA in the preceding 3–6 months [Diener et al, 1996; ESPRIT Study Group et al, 2006].
 - Evidence from the Clopidogrel versus Aspirin in Patients at Risk for Ischemic Events (CAPRIE) trial found clopidogrel to be only marginally more effective than aspirin at reducing serious vascular events [CAPRIE Steering Committee, 1996].
 - Compared with aspirin (325 mg daily), 196 people would need to be treated with clopidogrel (75 mg daily) for one extra person to benefit from treatment (number needed to treat = 196) [MeReC, 2005].
 - Evidence from ESPS-2 [Diener et al, 1996] and the PRoFESS trial [Sacco et al, 2008] showed no statistical difference between the modified-release dipyridamole-only and aspirin-only groups in reducing the risk of any of the primary outcomes reported (e.g. stroke, death)

- Following the availability of generic clopidogrel [NICE, 2010b], NICE found that generic clopidogrel was now a cost-effective use of NHS resources. Modified-release dipyridamole plus aspirin was now cost-effective only when used in people who had a contraindication or intolerance to clopidogrel. Modified-release dipyridamole alone was now cost effective only when used in people where both aspirin and clopidogrel were contraindicated or not tolerated.
- **Secondary prevention of occlusive vascular events following a TIA**
 - NICE recommends modified-release dipyridamole with aspirin first line because it is licensed for this indication, and is more cost-effective than use of aspirin alone [NICE, 2010b].
 - NICE was unable to make a recommendation regarding the place of clopidogrel for the prevention of occlusive vascular events following a TIA because it is not licensed for this indication [NICE, 2010b]. However, feedback from CKS expert reviewers is that off-label use of clopidogrel is considered to be a reasonable option if both aspirin and dipyridamole are contraindicated or not tolerated.
 - **People who have further occlusive vascular events whilst on antiplatelet treatment**
 - CKS recommends seeking specialist advice for people who have a further ischaemic cerebrovascular event while taking aspirin and modified-release dipyridamole. The evidence to support treatments using other combinations of antiplatelet drugs is poor:
 - Although the Joint British Societies guidance recommends changing aspirin to clopidogrel (75 mg daily) in people with recurrent stroke while taking aspirin and modified-release dipyridamole [British Cardiac Society et al, 2005], CKS found no trials involving the combined use of clopidogrel and dipyridamole. The evidence from the CAPRIE trial found the difference between aspirin and clopidogrel to be marginal.
 - CKS does not recommend a combination of aspirin and clopidogrel as evidence from two large trials did not find the combination to be more effective than aspirin monotherapy (the Clopidogrel for High Atherothrombotic Risk and Ischemic Stabilization, Management, and Avoidance [CHARISMA] trial) or clopidogrel monotherapy (Management of Atherosclerosis with Clopidogrel in High-risk patients [MATCH] trial) in reducing stroke [Diener et al, 2004; Bhatt et al, 2006]. The combination is associated with a higher risk of major bleeding.

What blood pressure lowering treatment is recommended for someone who has had a stroke or TIA?

- All people with stroke or transient ischaemic attack (TIA) should have their blood pressure checked and be offered antihypertensive treatment in line with national guidelines:
 - For people with a TIA: consider starting antihypertensive treatment as soon as possible.
 - For people with an acute stroke: treatment will usually be initiated in secondary care about 2 weeks after the event (unless a hypertensive emergency requires urgent reduction in blood pressure).
- **Optimal target blood pressure:**
 - **For people with established cardiovascular disease:** aim to reduce blood pressure to 140/90 mmHg or less, and preferably to 130/80 mmHg.
 - **For people with bilateral, severe (more than 70%) stenosis of the internal carotid arteries** a slightly higher target blood pressure (e.g. systolic blood pressure 150 mmHg) may be appropriate.
 - For information and prescription details, see the CKS topic on Hypertension - not diabetic for people without Type 2 diabetes; otherwise, see the CKS topic on Diabetes type 2.

Basis for recommendation

- These recommendations are in line with guidance issued by the National Institute for Health and Clinical Excellence (NICE), the Royal College of Physicians Intercollegiate Stroke Working Party (RCP ICSWP), and the Department of Health [DH, 2007; Intercollegiate Stroke Working Party, 2008; National Collaborating Centre for Chronic Conditions, 2008].
- **When to start antihypertensive treatment:**
 - NICE found no evidence to suggest that manipulating blood pressure in acute stroke (within the first 72 hours) using beta-blockers or calcium-channel antagonists, compared with control or placebo, had any beneficial effect on mortality, dependency, or stroke recurrence. Because there are also concerns about possible adverse effects with early reduction in blood pressure, NICE recommends starting antihypertensive treatment in people with acute stroke only if there is a hypertensive emergency.
 - Experts suggested that waiting about 2 weeks before starting treatment would be reasonable [Sudlow, 2008].
- **Blood pressure targets:**
 - The recommended blood pressure targets reflect national guidelines and expert opinion.
 - NICE recommends a target blood pressure of 140/90 mmHg or less for people with existing cardiovascular disease or target organ damage [NICE, 2006]. This is consistent with the National Stroke Strategy, which recommends a systolic blood pressure less than 140 mmHg for prevention [DH, 2007].
 - For secondary prevention of stroke, the RCP ICSWP guideline recommends a blood pressure target of 130/80 mmHg based on recommendations issued by the Joint British Hypertension Society [BHS, 2004; Intercollegiate Stroke Working Party, 2008]. This blood pressure target is also advocated by the Joint British Societies guideline [British Cardiac Society et al, 2005].
 - A higher target blood pressure (e.g. systolic blood pressure of 150 mmHg) for people with bilateral severe carotid artery stenosis is recommended by the RCP ICSWP guidelines [Intercollegiate Stroke Working Party, 2008]. No evidence suggests that people with severe stenosis should have a systolic blood pressure more than 150 mmHg.
 - The RCP ICSWP report acknowledged that there is little research into the relationship between blood pressure and risk of recurrent stroke [Intercollegiate Stroke Working Party, 2008]. However, the report highlights that there is research on the effects of lowering blood pressure on the risk of further strokes and other acute vascular events.

What lipid modification treatment is recommended for someone who has had a stroke or TIA?

The following recommendations apply to most people. They do not apply to people with lipid disorders, such as familial hypercholesterolaemia.

- A statin should be started:
 - As soon as possible for people with a transient ischaemic attack (TIA).
 - 48 hours after the event for people with an acute stroke.
- People with an acute stroke or TIA who are already receiving statins should continue their statin treatment.

- Seek specialist advice before initiating a statin in people with a history of haemorrhagic stroke, particularly those with inadequately controlled hypertension.
- Before starting treatment:
 - Consider whether treatment is appropriate, taking into account comorbidities and life expectancy.
 - Perform baseline blood tests (see the section on Tests before drug treatment in the CKS topic on Lipid modification - CVD prevention).
 - Investigate for (and if found, manage) any conditions, such as diabetes, that are suggested by the baseline tests.
 - If dyslipidaemia is present, investigate for, and manage, secondary causes.
- Consider higher-intensity statin therapy if the total cholesterol level does not decrease to below 4 mmol/L or the low-density lipoprotein cholesterol level does not decrease to below 2 mmol/L.
- Optimize, as far as possible, the management of comorbidities and implementation of lifestyle interventions.
- For more information (including options when simvastatin is not suitable), see the CKS topic on Lipid modification - CVD prevention and the appropriate sections in the CKS topic on Diabetes type 2.

Basis for recommendation

- The above recommendations for lipid modifications reflect stroke guidelines issued by the National Institute for Health and Clinical Excellence (NICE) and the Royal College of Physicians Intercollegiate Stroke Working Party (RCP ICSWP) [Intercollegiate Stroke Working Party, 2008; National Collaborating Centre for Chronic Conditions, 2008]. These are in line with NICE guidance on lipid modification for secondary prevention of cardiovascular disease [NICE, 2008a].
- **Prescribing statins in people with an acute stroke:**
 - Evidence reviewed by the NICE Guideline Development Group found that statin withdrawal is associated with worse clinical outcome after ischaemic stroke than when premorbid statin treatment is continued. They found no evidence regarding the safety and efficacy of initiating lipid-lowering statin therapy for people with an acute stroke.
 - The consensus of the NICE Guideline Development group was [National Collaborating Centre for Chronic Conditions, 2008]:
 - There is no evidence for initiating statins in acute stroke, but there is evidence to support continuing statin treatment in those who were taking statins before the stroke.
 - It would be safe to start statins after 48 hours. There is benefit from initiation of statins after the acute phase of stroke in vascular risk reduction.
- **Prescribing statins for people who have had a haemorrhagic stroke:**
 - The RCP ICSWP recommended that statins should be prescribed with caution, if at all, in people who have had a haemorrhagic stroke, particularly if they have inadequately controlled hypertension [Intercollegiate Stroke Working Party, 2008]:
 - The manufacturer of atorvastatin warns that, for people with prior haemorrhagic stroke or lacunar

infarct, the balance of risks and benefits of atorvastatin 80 mg is uncertain and the potential risk of haemorrhagic stroke should be considered carefully before initiating treatment [Pfizer Ltd, 2007].

- One meta-analysis found the evidence for statins causing haemorrhagic stroke to be uncertain [Law and Rudnicka, 2006]. Cohort studies showed an association while randomized trials were uninformative because the confidence intervals on the summary estimate were too wide. However, the authors concluded that the possible risk is greatly outweighed by the protective effect against thromboembolic stroke and coronary artery disease.
- A more recent study found that the risk of haemorrhagic stroke was increased in people who were taking atorvastatin: hazard ratio 1.68, 95% CI 1.09 to 2.59; $p = 0.02$ [Goldstein et al, 2008].
- CKS therefore recommends seeking specialist advice before prescribing a statin for people who have had a haemorrhagic stroke, particularly if they have uncontrolled high blood pressure.

What should I advise about driving after a stroke or transient ischaemic attack?

- **Always consult the latest Driver and Vehicle Licensing Agency (DVLA) regulations to ensure that your advice is accurate and up to date – see the 'At a Glance' booklet available on the DVLA website.**
- **For people with a group II licence – for large goods vehicles or passenger carrying vehicles – who have had a stroke or TIA:**
 - They must notify the DVLA, who will not allow them to drive under this licence for at least 12 months.
 - They can be considered for re-licensing after this period provided that they have no residual impairment likely to affect safe driving and no other significant risk factors.
 - Re-licensing will also be subject to satisfactory medical reports, including exercise electrocardiography.
 - Where there is imaging evidence of essentially normal carotid arteries Group 2 licensing may be allowed without the need for functional cardiac assessment.
- **For people with a group I licence – an ordinary driving licence for car or motorcycle – who have had a stroke or TIA:**
 - They must not drive for at least 4 weeks.
 - They may resume driving after this period if clinical recovery is satisfactory.
 - There is no need to notify the DVLA unless there is residual neurological deficit 1 month after the episode: for example, visual field defects, cognitive defects, and impaired limb function:
 - Minor limb weakness alone does not require notification unless the person is restricted to driving certain types of vehicle or vehicles with adapted controls.
 - Vehicle adaptations may be able to overcome severe physical impairment.
 - The DVLA will need to know which, if any, of the controls require modification and will ask the person to complete a simple questionnaire. The driving licence will then be coded to reflect the modifications.
 - People who have multiple TIAs over a short period should notify the DVLA of this; the DVLA will require at least 3 months free of further attacks before allowing driving to be resumed.
- **For all people (group I or II licence) who wish to resuming driving after recovering**

from a stroke or TIA:

- They will need to be assessed for factors that preclude safe driving. These factors include:
 - Significant visual field defect or reduction in visual acuity.
 - An epileptic seizure within the past 12 months (a seizure within the first 24 hours after the onset of the stroke is considered to be a provoked seizure, not an epileptic seizure).
 - A disorder of focused attention, especially hemi-spatial neglect.
- They will need sufficient muscle control to control their car (which may require adaptations).
- They will need sufficient cognitive ability to drive safely on a busy road. On-the-road assessment of ability may be required because assessment in the clinic is inaccurate.
- Advice on mechanical adaptations can be obtained from a number of sources, including the DVLA.
- They can get computer-based driving training and should consider having driving skills reassessed.
- They should inform their car insurance company before resuming driving, as failure to do so could result in the insurance being void.

Basis for recommendation

- These recommendations are based on guidelines published by the Driver and Vehicle Licensing Agency and the Royal College of Physicians Intercollegiate Stroke Working Party (RCP ISWP) [Intercollegiate Stroke Working Party, 2008; DVLA, 2010].

To which specialists should I refer people who have specific problems following a stroke?

- The GP is responsible for the general medical care of people who have had a stroke and been discharged from hospital. They should ensure that problems related to stroke are detected early and, when necessary, referred to the appropriate community health service, local social services, voluntary services, and specialists in secondary care.
- **Only general guidelines for referral can be given for referral to specialist services** because the service organization and provision of stroke aftercare vary with locality:
 - Information on local specialist stroke rehabilitation and support services in the community should be available from the primary care trust.
 - Community services include a community stroke team, a community stroke coordinator, communication groups, stroke support groups, and stroke exercise groups.
 - Secondary care services used by people who have had a stroke are diverse and may include gastrostomy clinics, spasticity clinics, and pain clinics.
- The following is an incomplete list of specialist services to which referral may be useful for people who have had a stroke:
 - **A chiropodist** can assess the need for, and provide, foot care for people who have problems caused by paralysis and lack of movement.
 - **A community or district nurse** can make regular home visits, for example to:

- Arrange for equipment, such as a wheelchair, commode, or hoist, to be provided through social services.
- Take blood pressure measurements.
- **A community matron** may be the appropriate referral for people with high-intensity needs. They can coordinate inputs from all other agencies.
- **A community psychiatric nurse** service may be the appropriate initial referral for people with depression, mood swings, and personality changes.
- **A continence adviser** can assess and treat people who have urinary or faecal incontinence.
- **A dietitian** can provide advice on a healthy diet. This is especially useful for people who have difficulty swallowing or are fed artificially, are underweight or overweight, or have diabetes.
- **An occupational therapist** can assess, advise, and provide aids, equipment, or adaptations for people who have problems with everyday activities at home or work.
- **An orthotist** can provide braces which support and control weak or paralysed limbs and improve function and prevent muscles tightening.
- **A physiotherapist** can assess and treat mobility and movement problems caused by paralysis, muscle weakness, or poor balance.
- **A speech and language therapist** can assess and treat:
 - Communication and language difficulties.
 - Swallowing problems.

Basis for recommendation

- These recommendations are in line with the *National clinical guideline for stroke: third edition* [Intercollegiate Stroke Working Party, 2008].