

Clinical Guidelines for Stroke Management

Summary – Nursing

1 This summary is a quick reference to the recommendations in the Clinical Guidelines for Stroke Management most relevant to nursing.

2 Nurses are an integral member of the interdisciplinary team across the whole stroke care continuum and many of these recommendations can be nurse-initiated working in conjunction as part of the team. Other recommendations may be primarily initiated by other team members but require critical input from nurses. The extent of nurses' contribution to implementing individual recommendations will vary depending on how your stroke service is resourced, how care is organised and individual nurses' scope of practice.

3 While this summary focuses on specific recommendations, stroke care is the most effective when all members of an interdisciplinary team are involved. For the comprehensive set of recommendations that covers the whole continuum of stroke care, please refer to further information on InformMe

<https://informme.org.au/Guidelines/Clinical-Guidelines-for-Stroke-Management>.

4 The Stroke Foundation in partnership with Cochrane Australia is testing a model of continually reviewing and updating recommendations for the Clinical Guidelines for Stroke Management in response to new evidence on a monthly basis. For changes to recommendations based on new research evidence, please refer to further information on InformMe <https://informme.org.au/Guidelines/Living-guidelines-for-stroke-management>

5 The Clinical Guidelines uses an internationally recognised guideline development approach called GRADE (Grading of Recommendations Assessment, Development and Evaluation) and an innovative guidelines development and publishing platform known as MAGICapp (MAKING Grade the Irresistible Choice). GRADE ensures a systematic process in developing recommendation, which are based on the balance of benefits and harms, quality of evidence, patient values, and resource considerations. MAGICapp enables transparent display of this process and access to additional practical information for recommendation implementation.

Recommendations

6 Each recommendation is given a strength based on GRADE. GRADE methodology includes four factors to guide the development of a recommendation and determine the strength of that recommendation.

- The balance between desirable and undesirable consequences
- Confidence in the estimates of effect (quality of evidence)
- Confidence in values and preferences and their variability (clinical and consumer preferences)
- Resource use (cost and implementation considerations).

7 The GRADE process uses only two categories for the strength of recommendation, based on how confidence the guideline developers are in that the “desirable effects of an intervention outweigh undesirable effect [...] across the range of patients for whom the recommendation is intended” (GRADE Handbook):

- **Strong recommendations:** where guideline developers are certain that the evidence supports a clear balance towards either desirable or undesirable effects; or
- **Weak recommendations:** where guideline developers are not as certain about the balance between desirable and undesirable effects as the evidence base isn’t as robust.

8 These strong or weak recommendations can either be for or against an intervention. If the recommendation is AGAINST an intervention this means it is recommended NOT to do that intervention.

9 **Consensus-based recommendations:** statements have been developed based on consensus and expert opinion (guided by any underlying or indirect evidence) for topics where there is either a lack of evidence or insufficient quality of evidence on which to base a recommendation but it was felt that advice should be made.

10 **Practice points:** for questions outside the search strategy (i.e. where no systematic literature search was conducted), additional considerations are provided.

11

12 Recommendations are presented as at December 2020 with a note if it has changed since the 2017 recommendations and are also presented in Chapter order for easier reference to the relevant section of the full Clinical Guidelines.

13 For the full list of references, please refer to the individual MAGICapp chapters through InformMe <https://informme.org.au/Guidelines/Clinical-Guidelines-for-Stroke-Management>.

14

15

Chapter 1 of 8: Pre-hospital care

Pre-hospital care

16 Strong recommendation

17 All stroke patients potentially eligible for reperfusion therapies should have an ambulance dispatched as an immediate response and be managed as a time critical emergency. (Berglund et al 2012)

18 Strong recommendation

- a. Ambulance services should preferentially transfer suspected stroke patients to a hospital capable of delivering reperfusion therapies as well as stroke unit care. (O'Brien et al 2012)
- b. Ambulance services should pre-notify the hospital of a suspected stroke case where the patient may be eligible for reperfusion therapies. (O'Brien et al 2012)

19 Info Box

20 Practice Point

21 General practitioners are encouraged to educate reception staff in the FAST stroke recognition message and to redirect any calls about suspected acute stroke to 000.

22

Chapter 2 of 8: Early assessment and diagnosis

Transient ischaemic attack

23 Strong recommendation

- All patients with suspected transient ischaemic attack (TIA), i.e. focal neurological symptoms due to focal ischaemia that have fully resolved, should have urgent clinical assessment. (Lavalley et al. 2007; Rothwell et al. 2007) (*Refer to the 'Practical Information' section for further useful information*)
- Patients with symptoms that are present or fluctuating at time of initial assessment should be treated as having a stroke and be immediately referred for emergency department and stroke specialist assessment, investigation and reperfusion therapy where appropriate. (Lavalley et al 2007; Rothwell et al. 2007)
- In pre-hospital settings, high risk indicators (e.g. crescendo TIA, current or suspected AF, current use of anticoagulants, carotid stenosis or high ABCD² score) can be used to identify patients for urgent specialist assessment. (Lavalley et al. 2007; Rothwell et al. 2007)

24 Strong recommendation

25 When TIA patients present to primary care, the use of TIA electronic decision support, when available, is recommended to improve diagnostic and triage decisions. (Ranta et al. 2015)

26

27 **Weak recommendation AGAINST**

28 In TIA patients, use of the ABCD² risk score in isolation to determine the urgency of investigation may delay recognition of atrial fibrillation and symptomatic carotid stenosis in some patients and should be avoided. (Wardlaw et al. 2015)

29 **Strong recommendation**

30 All TIA patients with anterior circulation symptoms should undergo early carotid imaging with CT angiography (aortic arch to cerebral vertex), carotid Doppler ultrasound or MR angiography. Carotid imaging should preferably be done during the initial assessment but should not be delayed more than 2 days (see [Imaging](#)).

31 **Weak recommendation**

32 Patients with TIA should routinely undergo brain imaging to exclude stroke mimics and intracranial haemorrhage. MRI, when available, is recommended to improve diagnostic accuracy (see [Imaging](#)).

33 **Strong recommendation**

34 Patients with suspected TIA should commence secondary prevention therapy urgently (see [Secondary Prevention](#)).

35 **Strong recommendation**

- All patients with TIA should be investigated for atrial fibrillation with ECG during initial assessment and referred for possible prolonged cardiac monitoring as required (see [Cardiac Investigations](#)).
- TIA patients with atrial fibrillation should commence anticoagulation therapy early after brain imaging has excluded haemorrhage, unless contraindicated (see [Anticoagulant therapy](#) in [Secondary Prevention](#)).

Practice statement

36 **Consensus-based recommendations**

- All patients and their family/carers should receive information about TIA, screening for diabetes, tailored advice on lifestyle modification strategies (smoking cessation, exercise, diabetes optimisation if relevant – see [Secondary prevention](#)), return to driving (see [Driving](#) in [Community participation and long-term care](#)) and the recognition of signs of stroke and when to seek emergency care.
- All health services should develop and use a local TIA pathway covering primary care, emergency and stroke specialist teams to ensure patients with suspected TIA are managed as rapidly and comprehensively as possible within locally available resources.

37

38

39

Assessment of suspected stroke

40 **Strong recommendation**

41 All suspected stroke patients who have been pre-notified to the stroke or ED team, and who may be candidates for reperfusion therapy, should be met at arrival and assessed by the stroke team or other experienced personnel. (Meretoja et al. 2012; Meretoja et al. 2013)

42 **Weak recommendation**

43 The use of clinical screening tools to identify stroke by ED staff is recommended where an expert stroke team is unable to immediately assess a patient. (Jiang et al. 2014; Whiteley et al. 2011)

44 **Info box**

45 **Practice points**

- Initial diagnosis should be reviewed by a clinician experienced in the evaluation of stroke.
- Stroke severity should be assessed and recorded on admission by a trained clinician using a validated tool (e.g. NIHSS).
- A blood glucose reading should be taken to improve specificity (hypoglycaemia can present as a 'stroke mimic').

Investigations

Imaging

Brain imaging

Strong recommendation

47 All patients with suspected stroke who are candidates for reperfusion therapies should undergo brain imaging immediately. All other suspected stroke patients should have an urgent brain CT or MRI ('urgent' being immediately where facilities are available and preferably within 60 minutes). (Brazzelli et al. 2009)

48 **Weak recommendation**

49 In patients with suspected stroke and TIA, MRI is more sensitive and specific than non-contrast CT and is the preferred modality when diagnostic confirmation is required. (Brazzelli et al. 2009)

Practice statement

50 **Consensus-based recommendations**

51 Either CT or MRI are acceptable acute imaging options but these need to be immediately accessible to avoid delaying reperfusion therapies.

Strong recommendation

56 If using CT to identify hyperdense thrombus, thin slice (< 2 mm) non-contrast CT should be used rather than the standard 5 mm slices to improve diagnostic sensitivity for vessel occlusion. (Mair et al. 2015)

57 Weak recommendation

58 CT perfusion imaging may be used in addition to routine imaging to improve diagnostic and prognostic accuracy. (Biesbroek et al. 2012)

59 Info box

60 Practice points

- If a patient with stroke develops neurological deterioration, immediate clinical assessment and further brain imaging (CT or MRI) should be considered.
- Routine brain imaging approximately 24 hours after reperfusion therapies have been administered is recommended to identify haemorrhagic transformation and delineate the extent of infarction, both of which are important when making decisions about antithrombotic therapy and DVT prophylaxis.

61

Imaging

Vascular imaging

Strong recommendation

- All patients who would potentially be candidates for endovascular thrombectomy should have vascular imaging from aortic arch to cerebral vertex (CTA or MRA) to establish the presence of vascular occlusion as a target for thrombectomy and to assess proximal vascular access. (Goyal et al. 2016; Broderick et al. 2013)
- All other patients with carotid territory symptoms who would potentially be candidates for carotid re-vascularisation should have early vascular imaging to identify stenosis in the ipsilateral carotid artery. CT angiography (if not already performed as part of assessment for reperfusion therapies), Doppler ultrasound or contrast-enhanced MR angiography are all reasonable options depending on local experience and availability. (Netuka et al. 2016; Chappell et al. 2009; Nonent et al. 2011; Anzidei et al. 2012)

63 Info box

64 Practice points

65 In ischaemic stroke and TIA patients, routinely imaging the entire vasculature from aortic arch to cerebral vertex with CTA or MRA is encouraged to improve diagnosis, recognition of stroke aetiology and assessment of prognosis.

66The administration of intravenous iodinated contrast for CT angiography/perfusion, when clinically indicated, should not be delayed by concerns regarding renal function. Post-hydration with intravenous 0.9% saline is advisable. (RANZCR guidelines 2016; Ang et al. 2015).

67Info box

68Practice points

69Vascular imaging should not be performed for syncope or other non-focal neurological presentations.

70

Cardiac investigations

71Weak recommendation

Initial ECG monitoring should be undertaken for all patients with stroke. The duration and mode of monitoring should be guided by individual patient factors but would generally be recommended for at least the first 24 hours. (Kurka et al. 2015)

Strong recommendation

74For patients with embolic stroke of uncertain source, longer term ECG monitoring (external or implantable) should be used. (Afzal et al. 2015)

Weak recommendation

Further cardiac investigations should be performed where clarification of stroke aetiology is required after initial investigations. In patients with ischaemic stroke, echocardiography should be considered based on individual patient factors. Transoesophageal echocardiography is more sensitive for suspected valvular, left atrial and aortic arch pathology. (Holmes et al. 2014)

Chapter 3 of 8: Acute medical and surgical management

Stroke unit care

Strong recommendation

79All stroke patients should be admitted to hospital and be treated in a stroke unit with an interdisciplinary team. (Langhorne 2020)

80Info box

81Practice points

- All stroke patients should be admitted directly to a stroke unit (preferably within three hours of stroke onset).
- For patients with suspected stroke presenting to non-stroke unit hospitals, transfer protocols should be developed and used to guide urgent transfers to the nearest stroke unit hospital.

- Where transfer is not feasible, smaller isolated hospitals should manage stroke services in a manner that adheres as closely as possible to the criteria for stroke unit care. Where possible, stroke patients should receive care in geographically discrete units.

Strong recommendation

83 All acute stroke services should implement standardised protocols to manage fever, glucose and swallowing difficulties in stroke patients. (Middleton et al. 2011)

Assessment for rehabilitation

85 Info box

Practice points

- Every stroke patient should have their rehabilitation needs assessed within 24–48 hours of admission to the stroke unit by members of the interdisciplinary team, using the [Assessment for Rehabilitation Tool](#) (Australian Stroke Coalition Working Group 2012).
- Any stroke patient with identified rehabilitation needs should be referred to a rehabilitation service.
- Rehabilitation service providers should document whether a stroke patient has rehabilitation needs and whether appropriate rehabilitation services are available to meet these needs.

87

Palliative care

88 **Strong recommendation**

Stroke patients and their families/carers should have access to specialist palliative care teams as needed and receive care consistent with the principles and philosophies of palliative care. (Gade et al. 2008)

Practice statement

90 **Consensus-based recommendations**

- For patients with severe stroke who are deteriorating, a considered assessment of prognosis or imminent death should be made.
- A pathway for stroke palliative care can be used to support stroke patients and their families/carers and improve care for people dying after stroke.

91

Reperfusion therapy

Thrombolysis

Strong recommendation

93 For patients with potentially disabling ischaemic stroke within 4.5 hours of onset who meet specific eligibility criteria, intravenous thrombolysis should be administered as early as possible after stroke onset (Wardlaw et al. 2014; Emberson et al. 2014)

Strong recommendation

95 For patients with potentially disabling ischaemic stroke due to large vessel occlusion who meet specific eligibility criteria, intravenous tenecteplase (0.25mg/kg, maximum of 25mg) or alteplase (0.9mg/kg, maximum of 90mg) should be administered up to 4.5 hours after the time the patient was last known to be well. (Parsons et al 2012; Campbell et al 2018)

96 Weak recommendation

For patients with potentially disabling ischaemic stroke without large vessel occlusion who meet specific clinical and brain imaging eligibility criteria, tenecteplase may be used as an alternative to alteplase within 4.5 hours of onset. (Huang et al 2016)

Strong recommendation

When using intravenous alteplase, a dose of 0.9 mg/kg, maximum of 90 mg should be administered. (Wardlaw et al. 2014; Emberson et al. 2014; Anderson et al. 2016)

Strong recommendation

101 For patients with potentially disabling ischaemic stroke who meet perfusion mismatch criteria in addition to standard clinical criteria, intravenous alteplase (dose of 0.9 mg/kg, maximum of 90 mg) should be administered up to 9 hours after the time the patient was last known to be well, or from the midpoint of sleep for patients who wake with stroke symptoms, unless immediate endovascular thrombectomy is planned. (Ma et al 2019; Campbell et al 2019)

102 Weak recommendation

For patients with potentially disabling ischaemic stroke of unknown onset time who meet MRI FLAIR-diffusion mismatch criteria in addition to standard clinical criteria, intravenous alteplase (dose of 0.9 mg/kg, maximum of 90 mg) may be administered (Thomalla et al 2019).

Practice statement

104 Consensus-based recommendations

105 Thrombolysis should be undertaken in a setting with appropriate infrastructure, facilities and network support (e.g. via telemedicine) including:

- access to an interdisciplinary acute care team with expert knowledge of stroke management, who are trained in delivery of thrombolysis and monitoring of patients receiving thrombolytic therapy
- a streamlined acute stroke assessment workflow (including ambulance pre-notification, code stroke team response and direct transport from triage to CT scan) to minimise treatment delays, and protocols available to guide medical, nursing and allied health acute phase management
- immediate access to imaging facilities and staff trained to interpret images
- routine data collected in a central register to allow monitoring, benchmarking and improvements of patient outcomes over time for those treated with reperfusion.

106 The patient and caregivers should be involved in the decision to give thrombolysis whenever possible and this discussion of risk and benefit documented in the medical record. However, as a time-critical emergency therapy, thrombolysis should not be delayed if the patient does not

have the capacity to consent and there are no legal representatives present. Clinicians should follow local health department policies regarding consent for emergency treatment in patients who are unable to consent for themselves.

Neurointervention

Strong recommendation

For patients with ischaemic stroke caused by a large vessel occlusion in the internal carotid artery, proximal middle cerebral artery (M1 segment), or with tandem occlusion of both the cervical carotid and intracranial large arteries, endovascular thrombectomy should be undertaken when the procedure can be commenced within six hours of stroke onset. (Goyal et al. 2016)

Strong recommendation

111 For patients with ischaemic stroke caused by a large vessel occlusion in the internal carotid artery, proximal middle cerebral artery (M1 segment), or with tandem occlusion of both the cervical carotid and intracranial large arteries, endovascular thrombectomy should be undertaken when the procedure can be commenced between 6-24 hours after they were last known to be well if clinical and CT perfusion or MRI features indicate the presence of salvageable brain tissue. (Nogueira et al. 2017, Albers et al. 2018)

Strong recommendation

113 Eligible stroke patients should receive intravenous thrombolysis while concurrently arranging endovascular thrombectomy, with neither treatment delaying the other. (Goyal et al. 2016)

114 Strong recommendation

115 In selected stroke patients with occlusion of the basilar artery, endovascular thrombectomy should be undertaken. (Kumar et al. 2015)

Practice statement

Consensus-based recommendations

117 For patients with ischaemic stroke caused by occlusion in the M2 segment of the middle cerebral artery, endovascular thrombectomy may be considered based on individual patient and advanced imaging factors.

118 Endovascular thrombectomy should be performed by an experienced neurointerventionist with recognised training in the procedure (Conjoint Committee for Recognition of Training in Interventional Neuroradiology CCINR.org.au).

Dysphagia

Practice statement

120 Consensus-based recommendations

People with acute stroke should have their swallowing screened within four hours of arrival at hospital and before being given any oral food, fluid or medication. (Bray et al. 2016)

122

123

124 Weak recommendation

125 People with acute stroke should have their swallowing screened, using a validated screening tool, by a trained healthcare professional. (Poorjavad et al. 2014)

126 Weak recommendation

All stroke patients who have failed swallow screening or who deteriorate should have a comprehensive assessment of swallowing performed by a speech pathologist. (Kertscher et al. 2014; O'Horo et al. 2015)

Strong recommendation

129 For stroke survivors with swallowing difficulties, behavioural approaches such as swallowing exercises, environmental modifications, safe swallowing advice, and appropriate dietary modifications should be used early. (Geeganage et al. 2012)

Weak recommendation AGAINST

131 For stroke survivors with dysphagia, non-invasive brain stimulation should only be provided within a research framework. (Pisegna et al. 2016)

Weak recommendation AGAINST

133 For patients with stroke, acupuncture should not be used for treatment of dysphagia in routine practice other than as part of a research study. (Long et al. 2012)

Weak recommendation AGAINST

135 For stroke survivors with dysphagia, surface neuromuscular electrical stimulation should only be delivered by clinicians experienced in this intervention, and be applied according to published parameters in a research framework. (Chen et al. 2016)

Weak recommendation AGAINST

For stroke survivors with dysphagia, pharyngeal electrical stimulation is not routinely recommended. (Bath et al. 2016; Scutt et al. 2015)

Practice statement

Consensus-based recommendations

- Until a safe swallowing method is established for oral intake, patients with dysphagia should have their nutrition and hydration assessed and managed with early consideration of alternative non-oral routes.
- Patients with dysphagia on texture-modified diets and/or fluids should have their intake and tolerance to the modified diet monitored regularly due to the increased risk of malnutrition and dehydration.

- Patients with dysphagia should be offered regular therapy that includes skill and strength training in direct therapy (with food/fluids) and indirect motor therapy which capitalises on the principles of neural plasticity to improve swallowing skills.
- Patients with persistent weight loss, dehydration and/or recurrent chest infections should be urgently reviewed.
- All staff and carers involved in feeding patients should receive appropriate training in feeding and swallowing techniques.
- All staff should be appropriately trained in the maintenance of oral hygiene, including daily brushing of teeth and/or dentures and care of gums.

138 Please also refer to the topic Early Nutrition in [Managing Complications](#).

139

Acute antithrombotic therapy

Strong recommendation

Patients with ischaemic stroke who are not receiving reperfusion therapy should receive antiplatelet therapy as soon as brain imaging has excluded haemorrhage. (Sandercock et al. 2014)

Strong recommendation AGAINST

Acute antiplatelet therapy should not be given within 24 hours of thrombolysis administration with the exception of patients who require stent implantation as part of acute stroke therapy. (Zinkstok et al. 2012)

Strong recommendation AGAINST

Routine use of anticoagulation in patients without cardioembolism (e.g. atrial fibrillation) following TIA/stroke is not recommended. (Sandercock et al. 2015; Whiteley et al. 2013)

Strong recommendation

Aspirin plus clopidogrel should be commenced within 24 hours and used in the short term (first three weeks) in patients with minor ischaemic stroke or high-risk TIA to prevent stroke recurrence. (Hao et al. 2018)

Weak recommendation

149 Aspirin plus ticagrelor commenced within 24 hours may be used in the short term (first 30 days) in patients with minor ischaemic stroke or high-risk TIA to prevent stroke recurrence. (Johnston et al 2020)

Acute blood pressure lowering therapy

Weak recommendation AGAINST

152 Intensive blood pressure lowering in the acute phase of care to a target SBP of < 140 mmHg is not recommended for any patient with stroke. (Bath and Krishnan 2014)

153 **Weak recommendation**

154 In patients with intracerebral haemorrhage, blood pressure may be acutely reduced to a target systolic blood pressure of around 140 mmHg (but not substantially below). (Tsvigoulis et al. 2014; Qureshi et al. 2016)

155 **Weak recommendation**

Pre-existing antihypertensive medication may be withheld until patients are neurologically stable and treatment can be given safely. (Bath and Krishnan 2014)

Practice statement

157 **Consensus-based recommendations**

- All acute stroke patients should have their blood pressure closely monitored in the first 48 hours after stroke onset.
- Patients with acute ischaemic stroke eligible for treatment with intravenous thrombolysis should have their blood pressure reduced to below 185/110 mmHg before treatment and in the first 24 hours after treatment.
- Patients with acute ischaemic stroke with blood pressure > 220/120 mmHg should have their blood pressure cautiously reduced (e.g. by no more than 20%) over the first 24 hours.

Intracerebral haemorrhage (ICH) management

Medical interventions

158 **Weak recommendation**

- For stroke patients with warfarin-related intracerebral haemorrhage, prothrombin complex concentrate should be urgently administered in preference to standard fresh frozen plasma to reverse coagulopathy. (Steiner et al. 2016)
- Intravenous vitamin K (5–10 mg) should be used in addition to prothrombin complex to reverse warfarin but is insufficient as a sole treatment. (Steiner et al. 2016)

159 **Weak recommendation**

160 Stroke patients with intracerebral haemorrhage related to direct oral anticoagulants should urgently receive a specific reversal agent where available. (Pollack et al. 2016; Connolly 2016)

Strong recommendation AGAINST

For stroke patients with intracerebral haemorrhage previously receiving antiplatelet therapy, platelet transfusion should not be administered. (Baharoglu et al. 2016)

163 **Weak recommendation**

164 For stroke patients with intracerebral haemorrhage, blood pressure may be acutely reduced to a target systolic blood pressure of around 140 mmHg (but not substantially below) (see [Acute blood pressure lowering therapy](#)).

Oxygen therapy

165 **Weak recommendation AGAINST**

166 For acute stroke and Transient Ischaemic Attack (TIA) patients who have $SpO_2 > 92\%$ on room air, the routine use of supplemental oxygen is not recommended. (Chu et al 2018; Ding et al 2018)

Weak recommendation AGAINST

168 For acute ischaemic stroke patients, hyperbaric oxygen therapy is not recommended. (Bennett et al. 2014)

Practice statement

169 Consensus-based recommendations

170 If supplemental oxygen is required ($SpO_2 < 93\%$ on room air) a target oxygen saturation of 94–96% is reasonable, or 88–92% if the patient is at risk of hypercapnic respiratory failure. (Beasley et al 2015)

Neuroprotection

Practice statement

171 Consensus-based recommendations

172 For stroke patients, putative neuroprotective agents, including hypothermic cooling, are not recommended outside the context of research.

Practice statement

173 Consensus-based recommendations

174 Patients with acute ischaemic stroke who were receiving statins prior to admission can continue statin treatment.

175

Glycaemic therapy

Strong recommendation

177 All stroke patients should have their blood glucose level monitored for the first 72 hours following admission, and appropriate glycaemic therapy instituted to treat hyperglycaemia (glucose levels greater than 10 mmol/L), regardless of their diabetic status. (Middleton et al. 2011)

Strong recommendation AGAINST

179 For stroke patients, an intensive approach to the maintenance of tight glycaemic control (between 4.0–7.5 mmol/L) is not recommended. (Bellolio et al. 2014; Ntaios et al. 2014; Johnston et al. 2019)

Pyrexia management

Strong recommendation

181 All stroke patients should have their temperature monitored at least four times a day for 72 hours. (Middleton et al. 2011)

182 Weak recommendation

183 Stroke patients with fever ≥ 37.5 °C may be treated with paracetamol as an antipyretic therapy. (Chen et al. 2018; Middleton et al. 2011)

Chapter 4 of 8: Secondary prevention

Adherence to pharmacotherapy

Weak recommendation

186 Interventions to promote adherence with medication regimens may be provided to all patients with stroke. Such regimens may include combinations of the following:

- reminders, self-monitoring, reinforcement, counselling, motivational interviewing, family therapy, telephone follow-up, supportive care and dose administration aids (Lawrence et al 2015; Mahtani et al 2011; Nieuwlaat et al 2014; Haynes et al 2008)
- development of self-management skills and modification of dysfunctional beliefs about medication (O'Carroll et al 2014; Kronish et al 2014)
- information and education in hospital and in the community (Lawrence et al 2015; Mahtani et al 2011; Nieuwlaat et al 2014).

187

Blood pressure lowering therapy

188

Acute blood pressure management

Practice statement

189 Consensus-based recommendations

- All patients with acute stroke should have their blood pressure closely monitored in the first 48 hours after stroke onset.
- Patients with acute ischaemic stroke eligible for treatment with intravenous thrombolysis should have their blood pressure reduced to below 185/110 mmHg before treatment and in the first 24 hours after treatment.
- Patients with acute ischaemic stroke with blood pressure $>220/120$ mmHg should have their blood pressure cautiously reduced (e.g. by no more than 20%) over the first 24 hours.

Weak recommendation AGAINST

191 Intensive blood pressure lowering in the acute phase of care to a target SBP of <140mmHg is not recommended for any patient with stroke. (Bath and Krishnan 2014)

192 **Weak recommendation**

193 In patients with intracerebral haemorrhage blood pressure may be acutely reduced to a target systolic blood pressure of around 140mmHg (but not substantially below). (Tsvigoulis et al 2014; Qureshi et al 2016)

194 **Weak recommendation**

195 Pre-existing antihypertensive agents may be withheld until patients are neurologically stable and treatment can be given safely. (Bath and Krishnan 2014)

196

Long term blood pressure management

Strong recommendation

- All patients with stroke or TIA, with a clinic blood pressure of >140/90mmHg should have long term blood pressure lowering therapy initiated or intensified. (Zonneveld et al 2018; Ettehad et al 2016)
- Blood pressure lowering therapy should be initiated or intensified before discharge for those with stroke or TIA, or soon after TIA if the patient is not admitted. (Zonneveld et al 2018; Ettehad et al 2016)
- Any of the following drug classes are acceptable as blood pressure lowering therapy; angiotensin-converting-enzyme inhibitor, angiotensin II receptor antagonists, calcium channel blocker, thiazide diuretics. Beta-blockers should not be used as first-line agents unless the patient has ischaemic heart disease. (Zonneveld et al 2018; Mukete et al 2015)

198 **Weak recommendation**

- In patients with a systolic blood pressure of 120-140mmHg who are not on treatment, initiation of antihypertensive treatment is reasonable, with best evidence for dual (ACEI/diuretic) therapy. (Ettehad et al 2016; Kitagawa et al 2019; Katsanos et al 2017)
- The ideal long term blood pressure target is not well established. A target of <130mmHg systolic may achieve greater benefit than a target of 140mmHg systolic, especially in patients with stroke due to small vessel disease, provided there are no adverse effects from excessive blood pressure lowering. (Kitagawa et al 2019; Ettehad et al 2016)

199

Management of atrial fibrillation

200 **Strong recommendation**

- For patients with ischaemic stroke or TIA, with atrial fibrillation (both paroxysmal and permanent), oral anticoagulation is recommended for long-term secondary prevention. (Saxena et al 2004; Saxena 2004; Ruff et al 2014)
- Direct oral anticoagulants (DOACs) should be initiated in preference to warfarin for patients with non-valvular atrial fibrillation and adequate renal function. (Ruff et al 2014)

- For patients with valvular atrial fibrillation or inadequate renal function, warfarin (target INR 2.5, range 2.0-3.0) should be used. Patients with mechanical heart valves or other indications for anticoagulation should be prescribed warfarin. (Tawfik et al 2016)

Practice statement

201 Consensus-based recommendations

202 For patients with ischaemic stroke, the decision to begin anticoagulant therapy can be delayed for up to two weeks but should be made prior to discharge.

203 Info box

204 Practice points

- Concurrent antiplatelet therapy should not be used for patients who are anticoagulated for atrial fibrillation unless there is clear indication (e.g. recent coronary stent). Addition of antiplatelet for stable coronary artery disease in the absence of stents should not be used.
- For patients with TIA, anticoagulant therapy should begin once CT or MRI has excluded intracranial haemorrhage as the cause of the current event.
- For patients with ischaemic stroke due to atrial fibrillation and a genuine contraindication to long-term anticoagulation, percutaneous left atrial appendage occlusion may be a reasonable treatment to reduce recurrent stroke risk.

205

Antiplatelet therapy

Strong recommendation

Long-term antiplatelet therapy (low-dose aspirin, clopidogrel or combined low-dose aspirin and modified release dipyridamole) should be prescribed to all patients with ischaemic stroke or TIA who are not prescribed anticoagulation therapy, taking into consideration patient co-morbidities. (Rothwell et al 2016; Niu et al 2016; Greving et al 2019)

Strong recommendation

All ischaemic stroke and TIA patients should have antiplatelet therapy commenced as soon as possible once brain imaging has excluded haemorrhage unless thrombolysis has been administered, in which case antiplatelet therapy can commence after 24-hour brain imaging has excluded major haemorrhagic transformation. (see [Antithrombotic therapy](#) in [Acute medical and surgical management](#))

Strong recommendation

Aspirin plus clopidogrel should be commenced within 24 hours and used in the short term (first three weeks) in patients with minor ischaemic stroke or high-risk TIA to prevent stroke recurrence. (Hao et al. 2018) (see [Antithrombotic therapy](#) in [Acute medical and surgical management](#))

Strong recommendation AGAINST

The combination of aspirin plus clopidogrel should not be used for the long-term secondary prevention of cerebrovascular disease in people who do not have acute coronary disease or recent coronary stent. (Zhang et al 2015; Greving et al 2019)

Strong recommendation AGAINST

215 Antiplatelet agents should not be used for stroke prevention in patients with atrial fibrillation. (Connolly et al 2011)

Weak recommendation Draft

217 In patients with spontaneous (or primary) intracerebral haemorrhage who were previously prescribed antiplatelet therapy for secondary prevention of cardiovascular and/or cerebrovascular disease, restarting antiplatelet therapy after the acute phase is reasonable.

Cholesterol lowering therapy

Strong recommendation

All patients with ischaemic stroke or TIA with possible atherosclerotic contribution and reasonable life expectancy should be prescribed a high-potency statin, regardless of baseline lipid levels. (Manktelow et al 2009; Tramacer et al 2019)

Strong recommendation Draft

In patients with ischaemic stroke, cholesterol lowering therapy should target LDL cholesterol < 1.8 mmol/L for secondary prevention of atherosclerotic cardiovascular disease. (Amarenco et al 2020)

Weak recommendation AGAINST

224 Statins should not be used routinely for intracerebral haemorrhage. (Manktelow et al 2009; Amarenco et al 2006)

Weak recommendation AGAINST

226 Fibrates should not be used routinely for the secondary prevention of stroke. (Zhou et al 2013; Wang et al 2015)

227

Diabetes management

228 Info box

Practice point

230 Patients with glucose intolerance or diabetes should be managed in line with [Diabetes Australia Best Practice Guidelines](#).

231

Lifestyle modifications

232 Info box

233 Practice points

234 All patients with stroke or TIA (except those receiving palliative care) should be assessed and informed of their risk factors for recurrent stroke and strategies to modify identified risk factors. This should occur as soon as possible and prior to discharge from hospital.

Diet

235 Info box

236 Practice points

- Patients with stroke or TIA should be advised to manage their dietary requirements in accordance with the [Australian Dietary Guidelines](#). (NHMRC 2013)
- All patients with stroke should be referred to an Accredited Practising Dietitian who can provide individualised dietary advice.

237

Physical activity

238 Info box

239 Practice points

240 Patients with stroke or TIA should be advised and supported to undertake appropriate, regular physical activity as outlined in one of the following existing guidelines:

- [Australia's Physical Activity & Sedentary Behaviour Guidelines for Adults \(18-64 years\)](#) (Commonwealth of Australia 2014) OR
- [Physical Activity Recommendations for Older Australians \(65 years and older\)](#) (Commonwealth of Australia 2005).

Obesity

242 Info box

243 Practice points

Patients with stroke or TIA who are overweight or obese should be offered advice and support to aid weight loss as outlined in the [Clinical Practice Guidelines for the Management of Overweight and Obesity in Adults, Adolescents and Children in Australia](#). (NHMRC 2013)

245

Smoking

246 Info box

247 Practice points

248 Patients with stroke or TIA who smoke should be advised to stop and assisted to quit in line with existing guidelines, such as [Supporting smoking cessation: a guide for health professionals](#). (RACGP 2019)

Alcohol

249 Info box

250 **Practice points**

People with stroke or TIA should be advised to avoid excessive alcohol consumption (>4 standard drinks per day) in line with the [Australian Guidelines to Reduce Health Risks from Drinking Alcohol](#). (NHMRC 2020)

Chapter 5 of 8: Rehabilitation

Commencement of rehabilitation

Strong recommendation AGAINST

For stroke patients, starting intensive out-of-bed activities within 24 hours of stroke onset is not recommended. (Rethnam et al. 2020, Langhorne et al. 2018, Bernhardt et al. 2015)

Strong recommendation

All stroke patients should commence mobilisation (out-of-bed activity) within 48 hours of stroke onset unless otherwise contraindicated (e.g. receiving end-of-life care). (Bernhardt et al. 2015; Lynch et al. 2014)

257 **Weak recommendation**

258 For patients with mild and moderate stroke, frequent, short sessions of out-of-bed activity should be provided, but the optimal timing within the 48-hour post-stroke time period is unclear. (Bernhardt et al. 2015)

Amount of rehabilitation

Strong recommendation

- For stroke survivors, rehabilitation should be structured to provide as much scheduled therapy (occupational therapy and physiotherapy) as possible. (Lohse et al. 2014; Schneider et al. 2016; Veerbeek et al. 2014)
- For stroke survivors, group circuit class therapy should be used to increase scheduled therapy time. (English et al. 2015)

Practice statement

Consensus-based recommendations

261 Stroke survivors should be encouraged to continue with active task practice outside of scheduled therapy sessions. This could include strategies such as:

- self-directed, independent practice;
- semi-supervised and assisted practice involving family/friends, as appropriate.

262 **Weak recommendation**

263 A minimum of three hours a day of scheduled therapy (occupational therapy and physiotherapy) is recommended, ensuring at least two hours of active task practice occurs during this time. (Lohse et al. 2014; Schneider et al. 2016)

264

Early supported discharge services

265 Strong recommendation

266 Where appropriate home-based coordinated stroke services are available (see Practical information section), early supported discharge services should be offered to stroke patients with mild to moderate disability. (Langhorne et al. 2017)

267

Home-based rehabilitation

268 Weak recommendation

269 Home-based rehabilitation may be considered as a preferred model for delivering rehabilitation in the community. Where home rehabilitation is unavailable, stroke patients requiring rehabilitation should receive centre-based care. (Rasmussen et al. 2016; Hillier et al. 2010)

Goal setting

- Health professionals should initiate the process of setting goals, and involve stroke survivors and their families and carers throughout the process. Goals for recovery should be client-centred, clearly communicated and documented so that both the stroke survivor (and their families/carers) and other members of the rehabilitation team are aware of goals set. (Sugavanam et al. 2013; Taylor et al. 2012)
- Goals should be set in collaboration with the stroke survivor and their family/carer (unless they choose not to participate) and should be well-defined, specific and challenging. They should be reviewed and updated regularly. (Sugavanam et al. 2013; Taylor et al. 2012)

271

Sensorimotor impairments

Weakness

Strong recommendation

For stroke survivors with reduced strength in their arms or legs, progressive resistance training should be provided to improve strength. (Dorsch et al. 2018)

Weak recommendation

- For stroke survivors with arm weakness repetitive practice using assistive technology, constraint induced movement therapy (CIMT), and robotics may be used to improve arm strength. (de Sousa et al 2018)
- For stroke survivors with leg weakness task specific training, repetitive practice using cycling or electrical stimulation may be used to improve leg strength. (de Sousa et al 2018)

275

Loss of sensation

276 **Weak recommendation**

277 For stroke survivors with sensory loss of the upper limb, sensory-specific training may be provided. (de Diego et al. 2013; Carey et al. 2011; Doyle et al. 2010)

278

Loss of cardiorespiratory fitness

280 **Strong recommendation**

For stroke survivors, rehabilitation should include individually-tailored exercise interventions to improve cardiorespiratory fitness. (Saunders et al. 2020)

Practice statement

282 **Consensus-based recommendations**

- All stroke survivors should commence cardiorespiratory training during their inpatient stay.
- Stroke survivors should be encouraged to participate in ongoing regular physical activity regardless of their level of disability.

283

Visual field loss

Practice statement

284 **Consensus-based recommendations**

- All stroke survivors should have an:
 - assessment of visual acuity while wearing the appropriate glasses, to check their ability to read newspaper text and see distant objects clearly;
 - examination for the presence of visual field deficit (e.g. hemianopia) and eye movement disorders (e.g. strabismus and motility deficit).

285

Activity limitations

Sitting

Strong recommendation

For stroke survivors who have difficulty sitting, practising reaching beyond arm's length while sitting with supervision/assistance should be undertaken. (Veerbeek et al. 2014)

Standing up from sitting

Strong recommendation

For stroke survivors who have difficulty in standing up from a chair, practice of standing up should be undertaken. (Pollock et al. 2014; French et al. 2016)

Standing balance

Strong recommendation Draft update

293 For stroke survivors who have difficulty with standing balance, standing activities that are functional and challenge balance should be provided (French et al. 2016, van Duijnhoven et al. 2016, Hugues et al. 2019).

294

Weak recommendation Draft update

296 For stroke survivors who have difficulty with standing balance, one or more of the following interventions may be used in addition to practicing functional tasks:

- Virtual reality training, which may include treadmill training, motion capture or force sensing devices (e.g. Wii Balance Boards) (Corbetta et al. 2015; Laver et al. 2017; Mohammadi et al. 2019)
- Visual or auditory feedback e.g. force platform biofeedback (Veerbeek et al. 2014; Stanton et al. 2017)
- Electromechanically assisted gait or standing training (Zheng et al. 2019)

Weak recommendation

For stroke survivors who have difficulty with standing balance, virtual reality including treadmill training with virtual reality or use of Wii Balance Boards may be used. (Corbetta et al. 2015)

Walking

Strong recommendation

300 Stroke survivors with difficulty walking should be given the opportunity to undertake tailored repetitive practice of walking (or components of walking) as much as possible. (French et al. 2016)

The following modalities may be used:

- Circuit class therapy (with a focus on overground walking practice) (Veerbeek et al. 2014);
- Treadmill training with or without body weight support (Mehrholz et al. 2014).

301 Weak recommendation

302 For stroke survivors with difficulty walking, one or more of the following interventions may be used in addition to those listed above:

- Virtual reality training. (Corbetta et al. 2015)
- Electromechanically assisted gait training. (Mehrholz et al. 2013)

- Biofeedback. (Stanton et al. 2017)
- Cueing of cadence. (Nascimento et al. 2015)
- Electrical stimulation. (Howlett et al. 2015)

303 **Weak recommendation**

For stroke survivors, individually fitted lower limb orthoses may be used to minimise limitations in walking ability. Improvement in walking will only occur while the orthosis is being worn. (Tyson et al. 2013)

Arm activity

Strong recommendation

For stroke survivors with some active wrist and finger extension, intensive constraint-induced movement therapy (minimum 2 hours of active therapy per day for 2 weeks, plus restraint for at least 6 hours a day) should be provided to improve arm and hand use. (Corbetta et al. 2015)

308 **Weak recommendation**

309 For stroke survivors with mild to severe arm weakness, mechanically assisted arm training (e.g. robotics) may be used to improve upper limb function. (Mehrholtz et al. 2015)

Strong recommendation AGAINST

Hand and wrist orthoses (splints) should not be used as part of routine practice as they have no effect on function, pain or range of movement. (Tyson et al. 2011)

312 **Weak recommendation**

313 For stroke survivors with mild to moderate arm impairment, virtual reality and interactive games may be used to improve upper limb function. Virtual reality therapy should be provided for at least 15 hours total therapy time and is most effective when used in the first six months after stroke. (Laver et al. 2015)

314 **Weak recommendation**

315 For stroke survivors with mild to severe arm or hand weakness, electrical stimulation in conjunction with motor training may be used to improve upper limb function. (Howlett et al. 2015; Yang et al. 2019)

316 **Weak recommendation**

317 For stroke survivors with mild to moderate weakness of their arm, mental practice in conjunction with active motor training may be used to improve arm function. (Barcley-Goddard et al. 2020; Borges et al. 2018)

318 **Weak recommendation**

319 For stroke survivors with mild to moderate weakness, mirror therapy may be used as an adjunct to routine therapy to improve arm function after stroke. (Thieme et al. 2018)

320 **Weak recommendation**

321 For stroke survivors with at least some voluntary movement of the arm and hand, repetitive task-specific training may be used to improve arm and hand function. (French et al. 2016)

322 **Weak recommendation AGAINST**

323 Brain stimulation (transcranial direct stimulation or repetitive transcranial magnetic stimulation) should not be used in routine practice for improving arm function, and only used as part of a research framework. (Elsner et al. 2020; van Lieshout et al (2019); Hao et al. 2013)

Participation restrictions

Activities of daily living

Strong recommendation

- Community-dwelling stroke survivors who have difficulties performing daily activities should be assessed by a trained clinician. (Legg et al. 2017)
- Community-dwelling stroke survivors with confirmed difficulties in personal or extended activities of daily living should have specific therapy from a trained clinician (e.g. task-specific practice and training in the use of appropriate aids) to address these issues. (Legg et al. 2017)

325 **Weak recommendation AGAINST**

For older stroke survivors living in a nursing home, routine occupational therapy is not recommended to improve activities of daily living function. (Sackley et al. 2015)

Weak recommendation AGAINST Draft update

327 Acupuncture is not routinely recommended to improve activities of daily living. (Yang et al. 2016)

Strong recommendation AGAINST

Administration of amphetamines to improve activities of daily living is not recommended. (Martinsson et al. 2007)

Weak recommendation AGAINST Draft update

331 Selective serotonin reuptake inhibitors should not be used to reduce disability. (Legg et al. 2019; AFFINITY collaborators 2020; EFFECTS collaborators 2020)

Weak recommendation AGAINST

Brain stimulation (transcranial direct stimulation or repetitive transcranial magnetic stimulation) should not be used in routine practice to improve activities of daily living and only used as part of a research framework. (Elsner et al. 2020; Hao et al. 2013)

334 **Weak recommendation**

335 For stroke survivors, virtual reality technology may be used to improve activities of daily living in addition to usual therapy. (Laver et al. 2017)

Communication difficulties

Assessment of communication deficits

337Info box

338Practice point

- All stroke survivors should be screened for communication deficits using a screening tool that is valid and reliable.
- Those stroke survivors with suspected communication difficulties should receive formal, comprehensive assessment by a specialist clinician to determine the nature and type of the communication impairment.

339

Aphasia

340Info box

341Practice point

342Treatment for aphasia should be offered as early as tolerated.

Strong recommendation

For stroke survivors with aphasia, speech and language therapy should be provided to improve functional communication. (Brady et al. 2016)

345Weak recommendation

346For stroke survivors with aphasia, intensive aphasia therapy (at least 45 minutes of direct language therapy for five days a week) may be used in the first few months after stroke. (Brady et al. 2016)

Weak recommendation

Brain stimulation (transcranial direct current stimulation or repetitive transcranial magnetic stimulation), with or without traditional aphasia therapy, should not be used in routine practice for improving speech and language function and only used as part of a research framework. (Ren et al. 2014; Elsner et al. 2015)

348Info box

349Practice points

350Where a stroke patient is found to have aphasia, the clinician should:

- Document the provisional diagnosis.
- Explain and discuss the nature of the impairment with the patient, family/carers and treating team, and discuss and teach strategies or techniques which may enhance communication.
- Identify goals for therapy, and develop and initiate a tailored intervention plan, in collaboration with the patient and family/carer.
- Reassess the goals and plans at appropriate intervals over time.

- Use alternative means of communication (such as gesture, drawing, writing, use of augmentative and alternative communication devices) as appropriate.

351 All written information on health, aphasia, social and community supports (such as that available from the [Australian Aphasia Association](#) or local agencies) should be available in an aphasia-friendly format.

352 Info box

353 Practice points

- Stroke survivors with chronic and persisting aphasia should have their mood monitored.
- Environmental barriers facing people with aphasia should be addressed through training communication partners, raising awareness of and educating about aphasia to reduce negative attitudes, and promoting access and inclusion by providing aphasia-friendly formats or other environmental adaptations. People with aphasia from culturally and linguistically diverse backgrounds may need special attention from trained healthcare interpreters.
- The impact of aphasia on functional activities, participation and quality of life, including the impact upon relationships, vocation and leisure, should be assessed and addressed as appropriate from early post-onset and over time for those chronically affected.

354

Apraxia of speech

355 Weak recommendation

356 For stroke survivors with apraxia of speech, individually tailored interventions incorporating articulatory-kinematic and rate/rhythm approaches may be used. (Ballard et al. 2015)

In addition, therapy may incorporate (Ballard et al. 2015):

- Use of modelling and visual cueing.
- Principles of motor learning to structure practice sessions.
- Prompts for Restructuring Oral Muscular Phonetic Targets (PROMPT) therapy.
- Self-administered computer programs that use multimodal sensory stimulation.
- For functional activities, the use of augmentative and alternative communication modalities such as gesture or speech-generating devices is recommended.

Dysarthria

358 Weak recommendation

359 For stroke survivors with dysarthria, individually tailored interventions provided by a speech and language pathologist or a trained communication partner may be provided. (Bowen et al. 2012)

Weak recommendation AGAINST

361 For stroke survivors with dysarthria, non-speech oromotor exercises have not been shown to provide additional benefit to behavioural speech practice and are not recommended. (Mackenzie et al. 2014)

Cognitive communication deficits

Practice statement

Consensus-based recommendations

364 Stroke survivors with difficulties in communication following right hemisphere damage should have input from a suitably trained health professional including:

- a comprehensive assessment,
- development of a management plan, and
- family education, support and counselling as required. (Lehman Blake et al. 2013; Ferre et al. 2011)

365 Management may include:

- Motoric-imitative, cognitive-linguistic treatments to improve use of emotional tone in speech production. (Rosenbek et al. 2006)
- Semantic-based treatment connecting literal and metaphorical senses to improve comprehension of conversational and metaphoric concept. (Lungren et al. 2011)

Cognition and perception difficulties

Assessment of cognition

367 Info box

368 Practice points

- All stroke survivors should be screened for cognitive and perceptual deficits by a trained person (e.g. neuropsychologist, occupational therapist or speech pathologist) using validated and reliable screening tools, ideally prior to discharge from hospital.
- Stroke survivors identified during screening as having cognitive deficits should be referred for comprehensive clinical neuropsychological investigations.

Perception

Practice statement

370 Consensus-based recommendations

- Stroke survivors with identified perceptual difficulties should have a formal perceptual (i.e. neurological and neuropsychological) assessment.

- Stroke survivors with an identified perceptual impairment and their carer should receive:
 - verbal and written information about the impairment;
 - an assessment and adaptation of their environment to reduce potential risk and promote independence;
 - practical advice/strategies to reduce risk (e.g. trips, falls, limb injury) and promote independence;
 - intervention to address the perceptual difficulties, ideally within the context of a clinical trial.

371

Attention and concentration

Practice statement

Consensus-based recommendations

373 For stroke survivors with attentional impairments or those who appear easily distracted or unable to concentrate, a formal neuropsychological or cognitive assessment should be performed.

Weak recommendation

375 For stroke survivors with attention and concentration deficits, cognitive rehabilitation may be used. (Loetscher et al. 2019; Rogers et al. 2018; Virk et al. 2016)

376 Weak recommendation

377 For stroke survivors with attention and concentration deficits, exercise training and leisure activities may be provided. (Liu-Ambrose et al. 2015)

Memory

Practice statement

Consensus-based recommendations

379 Any stroke survivor found to have memory impairment causing difficulties in rehabilitation or adaptive functioning should:

- be referred to a suitably qualified healthcare professional for a more comprehensive assessment of their memory abilities;
- have their nursing and therapy sessions tailored to use techniques that capitalise on preserved memory abilities;
- be notebooks, diaries, audio, and audio alarms;
- have therapy delivered in an environment as similar to the stroke survivor's usual environment as possible to encourage generalisation;
- be taught strategies aimed at assisting their memory, e.g. using a notebook, diary, mobile phone/audio alerts, electronic calendars and/or reminders;
- be taught approaches aimed at directly improving their memory, e.g. computerised memory training games and learning mnemonic strategies.

380

Executive function

381 Info box

382 Practice points

- Stroke survivors considered to have problems associated with executive functioning deficits should be formally assessed by a suitably qualified and trained person, using reliable and valid tools that include measures of behavioural symptoms.
- For stroke survivors with impaired executive functioning, the way in which information is provided should be tailored to accommodate/compensate for the particular area of dysfunction.

383 Weak recommendation

384 For stroke survivors with cognitive impairment, meta-cognitive strategy and/or cognitive training may be provided. (Zucchella et al. 2014; Skidmore et al. 2015)

Limb apraxia

386 Info box

387 Practice point

388 Stroke survivors who have suspected difficulties executing tasks but who have adequate limb movement and sensation should be screened for apraxia.

389 Weak recommendation

390 For stroke survivors with limb apraxia, interventions such as gesture training, strategy training and/or errorless learning may be provided. (Lindsten-McQueen et al. 2014)

Neglect

392 Info box

393 Practice point

394 Any stroke survivor with suspected or actual neglect or impairment of spatial awareness should have a full assessment using validated tools.

395 Weak recommendation

396 For stroke survivors with symptoms of unilateral neglect, cognitive rehabilitation (e.g. computerised scanning training, pen and paper tasks, visual scanning training, eye patching, mental practice) may be provided. (Bowen et al. 2013)

397 Weak recommendation

398 For stroke survivors with symptoms of unilateral neglect, mirror therapy may be used to improve arm function and ADL performance. (Thieme et al. 2018)

Practice statement

399 Consensus-based recommendations

400 Stroke survivors with impaired attention to one side should be:

- given a clear explanation of the impairment;
- taught compensatory strategies systematically, such as visual scanning to reduce the impact of neglect on activities such as reading, eating and walking;
- given cues to draw attention to the affected side during therapy and nursing procedures;
- monitored to ensure that they do not eat too little through missing food on one side of the plate.

Weak recommendation AGAINST

Non-invasive brain stimulation should not be used in routine clinical practice to decrease unilateral neglect, but may be used within a research framework. (Salazar et al 2018; Kwon et al 2018; Fan et al 2018)

Chapter 6 of 8: Managing complications

Nutrition and hydration

Early hydration

Strong recommendation

- All stroke patients should have their hydration status assessed, monitored, and managed throughout their hospital admission.
- Where fluid support is required, crystalloid solution should be used in preference to colloid solutions as the first option to treat or prevent dehydration. (Visvanathan et al. 2015)

405

Early feeding

Strong recommendation

All stroke patients should be screened for malnutrition at admission and on an ongoing basis (at least weekly) while in hospital. (Dennis et al 2005)

Strong recommendation

For stroke patients whose nutrition status is poor or deteriorating, nutrition supplementation should be offered. (Geeganage et al 2012; Dennis et al 2005)

Weak recommendation

- For stroke patients who do not recover a functional swallow, nasogastric tube feeding is the preferred method of feeding in the short term. (Geeganage et al 2012; Gomes et al 2015; Dennis et al 2005)

- For stroke patients, there is no preference with regard to continuous pump (meaning using a pump for greater than or equal to 16hrs out of 24hrs for less than or equal to 80ml/hr) feeding versus intermittent bolus feeding (meaning 250-400mls/hr for 4-5times/day) therefore practical issues, cost and patient preferences should guide practice. (Lee et al 2010)

Weak recommendation

411 For stroke patients who are adequately nourished, routine oral nutrition supplements are not recommended. (Geeganage et al 2012; Dennis et al 2005)

412 Info box

413 Practice points

- For patients with acute stroke food and fluid intake should be monitored.
- Stroke patients who are at risk of malnutrition, including those with dysphagia, should be referred to an Accredited Practising Dietitian for assessment and ongoing management.

414

Oral hygiene

Strong recommendation

All stroke patients, particularly those with swallowing difficulties, should have assistance and/or education to maintain good oral and dental (including dentures) hygiene. (Chipps et al 2014; Lam et al 2013; Brady et al 2006)

Strong recommendation

Staff and carers of stroke patients (in hospital, in residential care and home settings) should be trained in assessment and management of oral hygiene. (Brady et al 2006)

419 Weak recommendation

420 For stroke patients, chlorhexidine in combination with oral hygiene instruction, and/or assisted brushing may be used to decrease dental plaque and gingiva bleeding. Caution should be taken, however, for patients with dysphagia. (Lam et al 2013)

Spasticity

422 Weak recommendation

For stroke survivors with **upper** limb spasticity, Botulinum Toxin A in addition to rehabilitation therapy may be used to reduce spasticity, but is unlikely to improve activity or motor function. (Foley et al 2013; Gracies et al 2014)

424 Weak recommendation

For stroke survivors with **lower** limb spasticity, Botulinum Toxin A in addition to rehabilitation therapy may be used to reduce spasticity but is unlikely to improve motor function or walking. (Wu et al 2016; McIntyre et al 2012; Olvey et al 2010)

Weak recommendation AGAINST

For stroke survivors with spasticity, acupuncture should not be used for treatment of spasticity in routine practice other than as part of a research study. (Lim et al 2015)

428 **Weak recommendation**

429 For stroke survivors with spasticity, adjunct therapies to Botulinum Toxin A, such as electrical stimulation, casting and taping, may be used. (Stein et al 2015; Mills et al 2016; Santamato et al 2015)

Weak recommendation AGAINST

431 For stroke survivors, the routine use of stretch to reduce spasticity is not recommended. (Harvey et al 2017)

432

Contracture

Strong recommendation AGAINST

For stroke survivors at risk of developing contracture who are receiving comprehensive, active therapy the routine use of splints or stretch of the arm or leg muscles is not recommended. (Harvey et al 2017)

Practice statement

Consensus-based recommendations

- For stroke survivors, serial casting may be trialled to reduce severe, persistent contracture when conventional therapy has failed.
- For stroke survivors at risk of developing contracture or who have developed contracture, active motor training or electrical stimulation to elicit muscle activity should be provided.

436

Subluxation

437 **Weak recommendation**

438 For stroke survivors at risk of shoulder subluxation, electrical stimulation may be used in the first six months after stroke to prevent or reduce subluxation. (Vafadar et al 2015)

Weak recommendation AGAINST

For stroke survivors at risk of shoulder subluxation, shoulder strapping is not recommended to prevent or reduce subluxation. (Appel et al 2014)

Practice statement

441 Consensus-based recommendations

442 For stroke survivors at risk of shoulder subluxation, firm support devices (e.g. devices such as a laptray) may be used. A sling may be used when standing or walking.

Practice statement

443 Consensus-based recommendations

444 To prevent complications related to shoulder subluxation, education and training about correct manual handling and positioning should be provided to the stroke survivor, their family/carer and health professionals, and particularly nursing and allied health staff.

Pain

Shoulder pain

446 **Weak recommendation**

447 For stroke survivors with shoulder pain, shoulder strapping may be used to reduce pain. (Appel et al 2014)

Weak recommendation

449 For stroke survivors with shoulder pain, electrical stimulation may be used to manage pain. (Qiu et al 2019)

450 **Weak recommendation**

451 For stroke survivors with shoulder pain, shoulder injections (either sub acromial steroid injections for patients with rotator cuff syndrome, or methylprednisolone and bupivacaine for suprascapular nerve block) may be used to reduce pain. (Adey-Wakeling et al. 2013; Rah et al. 2012)

452 **Weak recommendation**

For stroke survivors with shoulder pain and upper limb spasticity, Botulinum Toxin A may be used to reduce pain. (Singh et al 2010)

Weak recommendation

For stroke survivors with shoulder pain, acupuncture in addition to comprehensive rehabilitation may be used to reduce pain. (Liu et al 2019)

Practice statement

455 **Consensus-based recommendations**

456 For stroke survivors with severe weakness who are at risk of developing shoulder pain, management may include:

- shoulder strapping;
- education of staff, carers and stroke survivors about preventing trauma;
- active motor training to improve function.

457 **Info box**

458 **Practice point**

459 For stroke survivors who develop shoulder pain, management should be based on evidence-based interventions for acute musculoskeletal pain.

460

Swelling of the extremities

Practice statement

Consensus-based recommendations

462 For stroke survivors with severe weakness who are at risk of developing swelling of the extremities, management may include the following

- dynamic pressure garments;
- electrical stimulation;
- elevation of the limb when resting.

463

Practice statement

Consensus-based recommendations

465 For stroke survivors who have swelling of the hands or feet management may include the following:

- dynamic pressure garments;
- electrical stimulation;
- continuous passive motion with elevation;
- elevation of the limb when resting.

Fatigue

Practice statement

466 Consensus-based recommendations **Draft update**

- Therapy for stroke survivors with fatigue should be organised for periods of the day when they are most alert.
- Stroke survivors and their families/carers should be provided with information, education and strategies to assist in managing fatigue.
- Potential modifying factors for fatigue should be considered including avoiding sedating drugs and alcohol, screening for sleep-related breathing disorders and depression.
- While there is insufficient evidence to guide practice, possible interventions could include cognitive behavioural therapy (focusing on fatigue and sleep with advice on regular exercise), exercise and improving sleep hygiene.

Incontinence

Urinary incontinence

468 **Weak recommendation**

- All stroke survivors with suspected urinary continence difficulties should be assessed by trained personnel using a structured functional assessment. (Martin et al 2006)
- For stroke survivors, a portable bladder ultrasound scan should be used to assist in diagnosis and management of urinary incontinence. (Martin et al 2006)

469 Weak recommendation

- Stroke patients in hospital with confirmed continence difficulties, should have a structured continence management plan formulated, documented, implemented and monitored. (Thomas et al 2008)
- A community continence management plan should be developed with the stroke survivor and family/carer prior to discharge, and should include information on accessing continence resources and appropriate review in the community. (Thomas et al 2008)
- If incontinence persists the stroke survivor should be re-assessed and referred for specialist review. (Thomas et al 2008)

470 Weak recommendation

471 For stroke survivors with urge incontinence:

- anticholinergic drugs can be tried (Nabi et al 2006);
- a prompted or scheduled voiding regime program/ bladder retraining can be trialled (Thomas et al 2015; Thomas et al 2008);
- if continence is unachievable, containment aids can assist with social continence.

Practice statement

472 Consensus-based recommendations

473 For stroke patients with urinary retention:

- The routine use of indwelling catheters is not recommended. However if urinary retention is severe, intermittent catheterisation should be used to assist bladder emptying during hospitalisation. If retention continues, intermittent catheterisation is preferable to indwelling catheterisation.
- If using intermittent catheterisation, a closed sterile catheterisation technique should be used in hospital.
- Where management of chronic retention requires catheterisation, consideration should be given to the choice of appropriate route, urethral or suprapubic.
- If a stroke survivor is discharged with either intermittent or indwelling catheterisation, they and their family/carer will require education about management, where to access supplies and who to contact in case of problems.

Practice statement

474 Consensus-based recommendations

For stroke survivors with functional incontinence, a whole-team approach is recommended.

Practice statement

476 Consensus-based recommendations

477 For stroke survivors, the use of indwelling catheters should be avoided as an initial management strategy except in acute urinary retention.

Faecal incontinence

Weak recommendation

- All stroke survivors with suspected faecal continence difficulties should be assessed by trained personnel using a structured functional assessment. (Harari et al 2004)
- For stroke survivors with constipation or faecal incontinence, a full assessment (including a rectal examination) should be carried out and appropriate management of constipation, faecal overflow or bowel incontinence established and targeted education provided. (Harari et al 2004)

480 Weak recommendation

For stroke survivors with bowel dysfunction, bowel habit retraining using type and timing of diet and exploiting the gastro-colic reflex should be used. (Venn et al 1992; Munchiando et al 1993)

Practice statement

482 Consensus-based recommendations

483 For stroke survivors with bowel dysfunction:

- Education and careful discharge planning should be provided.
- Use of short-term laxatives may be trialled.
- Increase frequency of mobilisation (walking and out of bed activity) to reduce constipation.
- Use of the bathroom rather than use of bed pans should be encouraged.
- Use of containment aids to assist with social continence where continence is unachievable.

Mood disturbance

Mood assessment

485 Info box

486 Practice points

- Stroke survivors with suspected altered mood (e.g. depression, anxiety, emotional lability) should be assessed by trained personnel using a standardised and validated scale.
- Diagnosis should only be made following clinical interview.

Personality and behaviour

Treatment for Emotionalism

Weak recommendation

489 For stroke survivors with emotionalism, antidepressant medication such as selective serotonin reuptake inhibitors (SSRIs) or tricyclic antidepressants may be used. (Allida et al 2019)

Prevention of depression

Weak recommendation **AGAINST**

492 For stroke survivors, routine use of antidepressants to prevent post-stroke depression is not recommended. (Allida et al 2020)

Weak recommendation

494 For stroke survivors, psychological strategies (e.g. problem solving, motivational interviewing) may be used to prevent depression. (Allida et al 2020)

Treatment of depression

Strong recommendation

497 For stroke survivors with depression or depressive symptoms, antidepressants, which includes SSRIs should be considered. There is no clear evidence that particular antidepressants produce greater effects than others and will vary according to the benefit and risk profile of the individual. (Mead et al 2012; Hackett et al 2008)

498 Weak recommendation

499 For stroke survivors with depression or depressive symptoms, structured exercise programs, particularly those of high intensity, may be used. (Eng et al 2014)

Weak recommendation

501 For stroke survivors with depression or depressive symptoms, acupuncture may be used. (Zhang et al 2010)

Weak recommendation **AGAINST**

503 For stroke survivors with depression, non-invasive brain stimulation (transcranial direct stimulation or repetitive transcranial magnetic stimulation) should not be used in routine practice and only used as part of a research framework. (Tian et al 2011)

Deep venous thrombosis or pulmonary embolism

505 Weak recommendation

506 For acute ischaemic stroke patients who are immobile, low molecular weight heparin in prophylactic doses may be used in the absence of contraindications. (Sandercock et al 2015; Sherman et al 2007)

507 **Weak recommendation**

508 For acute stroke patients who are immobile, the use of intermittent pneumatic compression may be used, either as an alternative to low molecular weight heparin or in those with a contraindication to pharmacological DVT prophylaxis (including patients with intracerebral haemorrhage or within 24 hours of thrombolysis). (Dennis et al 2013)

Strong recommendation AGAINST

510 Antithrombotic stockings are not recommended for the prevention of DVT or PE post stroke. (Naccarato et al 2010)

511 **Info box**

512 **Practice points**

- For stroke patients, pharmacological prophylaxis should not be used in the first 24 hours after thrombolysis until brain imaging has excluded significant haemorrhagic transformation.
- For acute stroke patients, early mobilisation and adequate hydration should be encouraged to help prevent DVT and PE.
- For stroke patients receiving intermittent pneumatic compression, skin integrity should be assessed daily.
- For patients with intracerebral haemorrhage, pharmacological prophylaxis may be considered after 48-72 hours and once haematoma growth has stabilised, although evidence is limited.

Falls

Practice statement

514 **Consensus-based recommendations**

- For stroke patients, a falls risk assessment, including fear of falling, should be undertaken on admission to hospital. A management plan should be initiated for all patients identified as at risk of falls.
- For stroke survivors at high risk of falls, a comprehensive home assessment for the purposes of reducing falling hazards should be carried out by a qualified health professional. Appropriate home modifications (as determined by a health professional) for example installation of grab rails and ramps may further reduce falls risk.

Weak recommendation

516 For stroke survivors who are at risk of falling, multifactorial interventions in the community, including an individually prescribed exercise program and advice on safety, should be provided. (Denissen et al 2019; Gillespie et al 2012)

Chapter 7 of 8: Discharge planning and transfer of care

Information and education

Strong recommendation

- All stroke survivors and their families/carers should be offered information tailored to meet their individual needs using relevant language and communication formats. (Forster et al 2012)
- Information should be provided at different stages in the recovery process. (Forster et al 2012)
- An approach of active engagement with stroke survivors and their families/carers should be used allowing for the provision of material, opportunities for follow-up, clarification, and reinforcement. (Forster et al 2012)

519 Info box

520 Practice points

- Stroke survivors and their families/carers should be educated in the FAST stroke recognition message to maximise early presentation to hospital in case of recurrent stroke.
- The need for education, information and behaviour change to address long-term secondary stroke prevention should be emphasized (refer to [Secondary Prevention](#)).

521

Discharge care plans

Strong recommendation

523 Comprehensive discharge care plans that address the specific needs of the stroke survivor should be developed in conjunction with the stroke survivor and carer prior to discharge. (Johnston et al 2010; Goncalves-Bradley et al 2016)

524 Info box

525 Practice point

526 Discharge planning should commence as soon as possible after the stroke patient has been admitted to hospital.

Practice statement

527 Consensus-based recommendation

528 A discharge planner may be used to coordinate a comprehensive discharge program for stroke survivors.

Practice statement

529 Consensus-based recommendations

530 To ensure a safe discharge process occurs, hospital services should ensure the following steps are completed prior to discharge:

- Stroke survivors and families/carers have the opportunity to identify and discuss their post-discharge needs (physical, emotional, social, recreational, financial and community support) with relevant members of the multidisciplinary team.
- General practitioners, primary healthcare teams and community services are informed before or at the time of discharge.
- All medications, equipment and support services necessary for a safe discharge are organised.
- Any necessary continuing specialist treatment required has been organised.
- A documented post-discharge care plan is developed in collaboration with the stroke survivor and family and a copy provided to them. This discharge planning process may involve relevant community services, self-management strategies (i.e. information on medications and compliance advice, goals and therapy to continue at home), stroke support services, any further rehabilitation or outpatient appointments, and an appropriate contact number for any post-discharge queries

531 A locally developed protocol or standardised tool may assist in implementation of a safe and comprehensive discharge process. This tool should be aphasia and cognition friendly.

532

Patient and carer needs

Practice statement

533 Consensus-based recommendation

534 Hospital services should ensure that stroke survivors and their families/carers have the opportunity to identify and discuss their post-discharge needs (including physical, emotional, social, recreational, financial and community support) with relevant members of the interdisciplinary team.

Home assessments

Practice statement

536 Consensus-based recommendation

537 Prior to hospital discharge, all stroke survivors should be assessed to determine the need for a home visit, which may be carried out to ensure safety and provision of appropriate aids, support and community services.

Carer training

Weak recommendation

Relevant members of the interdisciplinary team should provide specific and tailored training for carers/family before the stroke survivor is discharged home. This training should include, as

necessary, personal care techniques, communication strategies, physical handling techniques, information about ongoing prevention and other specific stroke-related problems, safe swallowing and appropriate dietary modifications, and management of behaviours and psychosocial issues. (Forster et al 2013)

Chapter 8 of 8: Community participation and long-term care

Self-management

Weak recommendation

- Stroke survivors who are cognitively able and their carers should be made aware of the availability of generic self-management programs before discharge from hospital and be supported to access such programs once they have returned to the community.
- Stroke-specific self-management programs may be provided for those who require more specialised programs.
- A collaboratively developed self-management care plan may be used to harness and optimise self-management skills.

543 (Fryer et al 2016; Pedersen et al 2020)

Driving

Practice statement

545 Consensus-based recommendations

- All stroke survivors or people who have had a transient ischaemic attack should be asked if they wish to resume driving.
- Any person wishing to drive again after a stroke or TIA should be provided with information about how stroke may affect his/her driving and the requirements and processes for returning to driving. Information should be consistent with the Austroads standards and any relevant state guidelines.
- For private licenses, stroke survivors should be instructed not to return to driving for a minimum of four weeks post stroke. People who have had a TIA should be instructed not to drive for two weeks. (Austroads standards 2016)
- For commercial licenses, stroke survivors should be instructed not to return to driving for a minimum of 3 months post stroke. People who have had a TIA should be instructed not to drive for four weeks. (Austroads standards 2016)
- A follow-up assessment should be conducted by an **appropriate specialist** to determine medical fitness prior to return to driving. (Austroads standards 2016)
- If a stroke survivor is deemed medically fit but has residual motor, sensory or cognitive changes that may influence driving, they should be referred for an occupational therapy

driving assessment. This may include clinic based assessments to determine on-road assessment requirements (for example modifications, type of vehicle, timing), on-road assessment and rehabilitation recommendations.

Weak recommendation

For stroke survivors needing driving rehabilitation, driving simulation may be used. Health professionals using driving simulation need to receive training and education to deliver intervention effectively and appropriately, and mitigate driving simulator sickness. (George et al 2014; Classen et al 2014)

Practice statement

547 Consensus-based recommendation

548 On-road driving rehabilitation may be provided by health professionals specifically trained in driving rehabilitation.

Community mobility and outdoor travel

550 Weak recommendation

551 Stroke survivors who have difficulty with outdoor mobility in the community should set individualised goals and get assistance with adaptive equipment, information and referral on to other agencies. Escorted walking practice may be of benefit to some individuals and if provided, should occur in a variety of community settings and environments, and may also incorporate virtual reality training that mimics community walking. (Barclay et al 2015; Logan et al 2014)

552

Leisure

Weak recommendation

554 For stroke survivors, targeted occupational therapy programs including leisure therapy may be used to increase participation in leisure activities. (Dorstyn et al 2014; Walker et al 2004)

555

Return to work

Weak recommendation

- All stroke survivors should be asked about their employment (paid and unpaid) prior to their stroke and if they wish to return to work.
- For stroke survivors who wish to return to work, assessment should be offered to establish abilities relative to work demands. In addition, assistance to resume or take up work including worksite visits and workplace interventions, or referral to a supported employment service should be offered. (Ntsiea et al 2015)

557

Sexuality

Practice statement

558Consensus-based recommendations

559 Stroke survivors and their partners should be offered:

- the opportunity to discuss sexuality and intimacy with an appropriate health professional; *and*
- written information addressing issues relating to sexual intimacy and sexual dysfunction post stroke.

560 Any discussion or written information should address psychosocial as well as physical function.

Support

Peer support

562 Weak recommendation

563 Stroke survivors and their families/carers should be given information about the availability and potential benefits of a local stroke support group and/or other sources of peer support before leaving hospital and when back in the community. (Kruithof et al 2013)

Carer support

Strong recommendation

Carers of stroke survivors should be provided with tailored information and support during all stages of the recovery process. This support includes (but is not limited to) information provision and opportunities to talk with relevant health professionals about the stroke, stroke team members and their roles, test or assessment results, intervention plans, discharge planning, community services and appropriate contact details. Support and information provision for carers should occur prior to discharge from hospital and/or in the home and can be delivered face-to-face, via telephone or computer. (Legg et al 2011; Eames et al 2013)

Practice statement

567Consensus-based recommendations

- Carers should receive psychosocial support throughout the stroke recovery continuum to ensure carer wellbeing and the sustainability of the care arrangement. Carers should be supported to explore and develop problem solving strategies, coping strategies and stress management techniques. The care arrangement has a significant impact on the relationship between caregiver and stroke survivor so psychosocial support should also be targeted towards protecting relationships within the stroke survivors support network.

- Where it is the wish of the stroke survivor, carers should be actively involved in the recovery process by assisting with goal setting, therapy sessions, discharge planning, and long-term activities.
- Carers should be provided with information about the availability and potential benefits of local stroke support groups and services, at or before the person's return to the community.
- Assistance should be provided for families/carers to manage stroke survivors who have behavioural problems.

568

569

570 For access to the full Clinical Guidelines and further information refer to InformMe <https://informme.org.au/Guidelines/Clinical-Guidelines-for-Stroke-Management>.