



Complete Summary

GUIDELINE TITLE

Management of consequences of stroke. In: Clinical guidelines for stroke rehabilitation and recovery.

BIBLIOGRAPHIC SOURCE(S)

Management of consequences of stroke. In: National Stroke Foundation. Clinical guidelines for stroke rehabilitation and recovery. Melbourne (Australia): National Stroke Foundation; 2005 Sep 8. p. 15-40.

GUIDELINE STATUS

This is the current release of the guideline.

** REGULATORY ALERT **

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- [February 28, 2008, Heparin Sodium Injection](#): The U.S. Food and Drug Administration (FDA) informed the public that Baxter Healthcare Corporation has voluntarily recalled all of their multi-dose and single-use vials of heparin sodium for injection and their heparin lock flush solutions. Alternate heparin manufacturers are expected to be able to increase heparin products sufficiently to supply the U.S. market. There have been reports of serious adverse events including allergic or hypersensitivity-type reactions, with symptoms of oral swelling, nausea, vomiting, sweating, shortness of breath, and cases of severe hypotension.

COMPLETE SUMMARY CONTENT

** REGULATORY ALERT **

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INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT

SCOPE

DISEASE/CONDITION(S)

- Stroke
- Transient ischemic attack (TIA)
- Consequences of stroke

Note: While stroke is discussed broadly in these guidelines, it is recognised that there are different types of stroke. It is noted that haemorrhagic stroke (particularly subarachnoid haemorrhage) is often excluded from some studies. Furthermore the prevalence of ischaemic stroke has meant that the evidence is predominantly derived from, and focused on, this type of stroke.

GUIDELINE CATEGORY

Counseling
Evaluation
Management
Prevention
Rehabilitation
Risk Assessment
Treatment

CLINICAL SPECIALTY

Family Practice
Geriatrics
Hematology
Internal Medicine
Neurology
Nursing
Nutrition
Ophthalmology
Optometry
Pharmacology
Physical Medicine and Rehabilitation
Preventive Medicine
Psychiatry
Psychology
Sleep Medicine
Speech-Language Pathology
Urology

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Dietitians

Health Care Providers
Health Plans
Hospitals
Nurses
Occupational Therapists
Patients
Pharmacists
Physical Therapists
Physician Assistants
Physicians
Podiatrists
Psychologists/Non-physician Behavioral Health Clinicians
Respiratory Care Practitioners
Social Workers
Speech-Language Pathologists

GUIDELINE OBJECTIVE(S)

- To provide a series of evidence-based recommendations related to stroke rehabilitation and recovery
- To help health care workers improve the quality and effectiveness of the care they provide to stroke patients

TARGET POPULATION

Adults hospitalized with stroke after the acute phase who require rehabilitation

INTERVENTIONS AND PRACTICES CONSIDERED

Management/Treatment

Sensorimotor Impairment Interventions

1. Progressive resistance exercise
2. Electromyographic biofeedback
3. Electrical stimulation
4. Sense-targeted training, task-specific training
5. Antispasticity treatments (botulinum toxin A, intrathecal baclofen, dynamic splinting, vibration)
6. Stretching
7. Manipulation, continuous passive motion
8. Support devices, casting
9. Pressure garments
10. Joint position biofeedback
11. Exercise for cardiovascular fitness (home-based, water-based)
12. Exercise program to prevent falls
13. Education of staff, carers, and patients
14. Overhead pulley exercise (specifically not recommended)

Physical Activity

1. Task-specific physical activity with or without biofeedback
2. Cueing of cadence for walking
3. Treadmill with or without support
4. Use of orthoses
5. Robot-assisted reaching
6. Constraint-induced movement therapy
7. Group therapy

Activities of Daily Living

1. Occupational therapy or multidisciplinary interventions targeting daily activities
2. Amphetamines to improve activity (not recommended)

Cognitive Capacities

1. Cognitive therapy, including cognitive behavioral therapy, and rehabilitation
2. External memory and functioning cueing

Visuospatial/Perceptual Capacities

1. Prism glasses
2. Computer-based therapy programs

Communication

1. Speech therapy
2. Constraint-induced therapy
3. Computer-based therapy
4. Modeling, visual cueing, integral stimulation, articulatory placement cueing
5. Augmentative and alternative communication devices
6. Pharmacological therapy for aphasia (not routinely recommended)
7. Biofeedback, voice amplification, overarticulation, decreased rate, gesture
8. Palatal lift
9. Oral musculature exercises

Dysphagia

1. Compensatory strategies
2. Muscle-specific (Shaker) therapy
3. Thermo-tactile or electrical stimulation

Hydration and Nutrition

1. Fluid and nutritional supplementation
2. Use of a nasogastric tube
3. Use of percutaneous endoscopic gastrostomy

Mood

1. Antidepressants (not recommended as a preventative measure)

2. Cognitive behavioral therapy with or without antidepressants
3. Electroconvulsive therapy

Bladder and Bowel Function

1. Intermittent catheterization of the bladder
2. Anticholinergic drugs for urgency
3. Bladder or bowel training
4. Containment aids
5. Additional testing in cases of persistent incontinence
6. Appropriate testing and education

Medical

1. Amitriptyline (preferred) or carbamazepine for pain
2. Antiplatelet therapy (heparin, low-molecular-weight heparin or thigh-length antithrombotic stockings)
3. Antipyretic therapy (paracetamol and/or physical cooling)
4. Anticonvulsants for recurrent seizure
5. Continuous positive airway pressure (CPAP) for sleep apnea

Secondary Prevention

1. Antiplatelet therapy (aspirin, clopidogrel, or low-dose aspirin plus dipyridamole) in selected patients
2. Anticoagulation therapy
3. Blood pressure lowering therapy
4. Cholesterol lowering therapy
5. Lifestyle behavior changes (smoking cessation, improved diet, potassium supplements, exercise, alcohol restriction, counseling)
6. Medication adherence intervention (counseling, reminder aids, reduction in daily doses)

Complementary and Alternative Therapies

1. Acupuncture, Reiki therapy, other therapies (not recommended)
2. Physician counseling

Palliation and Death

1. Carer support and counseling
2. Multidisciplinary care

MAJOR OUTCOMES CONSIDERED

- Changes in cognitive capacity
- Rate of nutritional and fluid stabilization
- Rate of return to normal bladder and bowel function
- Rate of development of sequelae (sleep apnea, deep venous thrombosis [DVT], pulmonary embolism [PE], heart attack, seizures, depression, anxiety)
- Rate of recurrent stroke

- Mortality
- Time to return of function
- Time to reduction in impairment
- Changes in range of motion
- Falling rates
- Side effects from pharmacotherapy
- Rate of adherence to medications

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Systematic Searches and Literature Review

The systematic identification of relevant literature was conducted according to National Health and Medical Research Council (NHMRC) standards between May and October 2004.

Question Formulation

Clinical questions were developed by the Expert Working Group (EWG) to address interventions relevant to stroke rehabilitation and recovery. The questions generally queried the effects of a specific intervention and were developed in three parts: the intervention, the population and the outcomes. An example is "What is the effect of anticonvulsant therapy on reducing seizures in people with post-stroke seizures?" In this example, anticonvulsant therapy is the intervention, reduction of post-stroke seizures is the outcome, and the population is people with post-stroke seizures.

Finding Relevant Studies

To avoid duplication, the systematic literature search was undertaken in conjunction with the Stroke Therapy Evaluation Program (STEP) team from Scotland, who have been instrumental in identifying, appraising and collating the evidence for stroke care. The STEP team have developed and maintain 'effectivestrokecare.org', a fully indexed, searchable, web-enabled database of evidence for stroke management. STEP works in conjunction with the Cochrane Stroke Group.

Key words based on the components of the formulated question were used to guide searching. The search strategies were developed in partnership with the STEP team to ensure comparability of the outcomes of the searches. Relevant systematic reviews were initially identified. Where no systematic review was found, primary studies were searched. STEP was initially used for each question although additional searches were required. In these cases standardised methodological filters were used for MEDLINE, CINAHL or psycINFO electronic databases. Updated searches were conducted prior to the end of the consultation

period (early February, 2005), with significant literature included in order to provide the most up-to-date evidence.

Cost Analysis

Literature regarding the economic impact of stroke rehabilitation and recovery has been identified during the systematic development process of these guidelines. It is noted that the vast majority of the studies identified were conducted overseas and related to cost descriptions of individual factors or interventions, rather than economic evaluations comparing both the costs and effects of interventions.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus
Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

I	Evidence obtained from a systematic review of all relevant randomised controlled trials.
II	Evidence obtained from at least one properly designed randomised controlled trial.
III-1	Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method).
III-2	Evidence obtained from comparative studies with concurrent controls and allocation randomised (cohort studies), case-control studies, or interrupted time-series with group.
III-3	Evidence obtained from comparative studies with historical control, two or more studies, or interrupted time series without a parallel control group.
IV	Evidence obtained from case series, either post-test or pre-test and post-test.

Clinical Practice Points

CPP	Recommended best practise based on clinical experience and expert opinion.
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METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Appraising and Selecting Studies

The Stroke Therapy Evaluation Program (STEP) team and the Expert Working Group (EWG) critically appraised the literature using a standardised checklist consistent with National Health and Medical Research Council (NHMRC) standards. The strength (study design and issues of quality), size of effect, relevance, applicability (benefits/harms) and generalisability were all considered. Examples of completed checklists can be found on the STEP website (www.effectivestrokecare.org). Where Level I or II evidence was unavailable the search was broadened to include lower levels of evidence.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The *Clinical Guidelines for Stroke Rehabilitation and Recovery* have been developed according to processes prescribed by the National Health and Medical Research Council (NHMRC) under the direction of an interdisciplinary Expert Working Group (EWG) (see Appendix 1 in the original guideline document). Consultation from other individuals and organisations was also included in the development process in line with NHMRC standards. The EWG has worked through a collaborative process, and networked with a number of formal and informal groups and individuals from around Australia and overseas.

Consumer Involvement

Consumer input has been a key component in the development process. Three consumers were included in the EWG and have been involved in every phase of the development process, including the development of the clinical questions to guide the literature searching. In addition a number of consumer organisations participated in the consultation process including the State Stroke Associations, the Health Consumer Council of WA and the Carers Australia.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

The level of the evidence (see "Rating Scheme for the Strength of the Evidence") highlights the methodology of the studies contributing to the evidence that underpins the recommendations. However this does not always translate into an equivalent strength of the recommendation for two reasons: studies vary in quality and different studies may produce conflicting results. The Expert Working Group (EWG) has therefore used 'may' or 'should' to indicate the strength of the recommendation. 'May' is used when the evidence is not clear cut or when there is a wide range of opinions relating to a specific intervention; 'should' is used when there is clear outcomes of all relevant research or a narrow range of opinion. Key references for each guideline are also included. Where no level I, II,

III or IV evidence was available but there was sufficient consensus of the EWG, clinical practice points have been provided.

COST ANALYSIS

Carer Training

One study was identified that assessed the economic outcome of training carers. Evidence was based on one randomized controlled trial (RCT) conducted in the United Kingdom (UK).

Costs were based at 2001-2 prices and included health and other formal care costs as well as informal costs. Providing carer training during inpatient rehabilitation reduced total costs (mean saving of 4,043 pounds), primarily reflecting savings due to earlier discharge from inpatient care, while also improving health outcomes. No difference in quality adjusted life years (QALYs) in carers were found however the authors suggested that this was likely to be influenced by the insensitivity of the outcome measure used (EuroQol five-dimensional questionnaire).

Since the burden of providing both formal and informal care after stroke in Australia is significant inpatient rehabilitation services in Australia should be encouraged to introduce formal carer training as part of their care. Further cost-effectiveness studies in this area are needed which include appropriate assessment of the impact on carers.

Secondary Prevention

There are few economic evaluation studies available for secondary prevention based on Australian data in stroke. The majority of the literature related to the cost-effectiveness of prevention interventions relate to drug therapies and/or generic outcomes that may include stroke, but are not stroke specific. One study has investigated the cost-effectiveness of antithrombotic (warfarin) treatment for people with atrial fibrillation as a primary and secondary prevention measure. This investigator determined that 1851 disease adjusted life years (DALYs) could be recovered with a cost/DALY saved (in Australian dollars) of A\$480. This finding was based on the 1997 Australian population modeled using MORUCOS, an economic model with resource utilization data derived from the North East Melbourne Stroke Incidence Study.

One published systematic review has identified three studies assessing the cost-effectiveness of anticoagulation for primary prevention in people with atrial fibrillation (AF). Warfarin was more cost-effective than aspirin for people with two or more stroke risk factors, in addition to those with chronic non-valvular AF in one study. Warfarin was also found to be cost-effective for people with only one other stroke risk factor costing (in United States [US] dollars) US\$8,000 per QALY. However, warfarin use for people with no other stroke risk factors, apart from AF, was not cost effective with costs of US\$370,000 per QALY. A second study confirmed these findings. The third study found anticoagulation for AF caused by mitral stenosis to be cost effective with costs of only US\$3,700 per QALY.

Economic benefits of a specific blood pressure medication (Ramipril) for people at high risk of heart disease and stroke has been studied. An Australian study reported a potential reduction of 9,188 strokes over 5 years. The incremental cost-effectiveness result, estimated as a cost per life-year saved, was A\$17,214 based on a combined cardiovascular death endpoint. Six international studies were identified that assessed the cost-effectiveness of antiplatelet therapy in secondary stroke prevention. Two studies compared a combination of dipyridamole plus aspirin to aspirin alone. One study compared clopidogrel to aspirin. The other three studies compared all three therapy options. The studies predicted costs in the UK, United States of America (USA) and France over a period of 2 years, 5 years or over a lifetime. The combination therapy of dipyridamole plus aspirin was found to be cost effective compared with aspirin alone in all five studies. However, there was conflicting evidence for the cost effectiveness of clopidogrel. Two studies reporting no cost effectiveness using clopidogrel. Two other studies found clopidogrel was cost effective and reported incremental cost-effectiveness ratios (ICERs) of US\$31,200 and US\$26,580 per QALY saved.

Cost-effectiveness studies undertaken for lifestyle changes are limited in that they have not been undertaken for stroke specifically. This is also influenced by the fact that many lifestyle interventions have not been systematically evaluated to provide adequate cost and effects data. For example, a systematic review reported that there were only five economic evaluations for lifestyle interventions aimed at reducing obesity. One study in the UK suggested the costs saved far outweigh the costs spent on exercise in those over 45 years old. Smoking cessation has been reported to cost between 270-1,500 pounds per QALY saved depending on the intervention (e.g., advice from a general practitioner [GP] or nicotine replacement strategies). Clearly, stroke specific studies are needed to assess the potential cost-effectiveness of lifestyle change interventions as well as other prevention interventions.

Section 5 *Resource Implications* in the original guideline document outlines the economic evidence for aspects of stroke recovery and rehabilitation. The section aims to be useful in guiding decisions about the structure of services and may be used by those who plan or organise care.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Public consultation was undertaken, with the draft document circulated to relevant professional bodies, interested individuals, consumers and consumer organisations. A public notice was also published in *The Australian* newspaper. Feedback received during consultation was considered by the Expert Working Group (EWG) and the draft document amended. A formal letter of reply was sent to all individuals and organisations that provided feedback during this period outlining the response taken by the EWG.

The outcomes of the consultation period suggested:

- Greater focus on person-centred care
- Greater focus on rural and remote issues
- Minor clarification on relevant literature
- Revision of the roles of stroke team members

Many points made during consultation related to grammatical or semantic interpretations and the EWG was able to make changes to correct or clarify certain points. In one instance, an additional study was identified. Overall the consultation process provided valuable assistance by increasing the accuracy and comprehensiveness of the document.

These guidelines were approved by the National Health and Medical Research Council at its 158th Session on 8 September 2005, under section 14A of the National Health and Medical Research Council Act 1992.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The levels of evidence supporting the recommendations (I-IV) and clinical practice points (CPP) are defined at the end of the "Major Recommendations" field.

Sensorimotor Impairments

Strength

- One or more of the following interventions should be used for people who have reduced strength: Progressive resistance exercises; (**Level II**, Morris, Dodd, & Morris, 2004])
- Electromyographic biofeedback in conjunction with conventional therapy; (**Level II**, [Basmajian et al., 1975; Inglis et al., 1984])
- Electrical stimulation; (**Level I**, [Glanz et al., 1996]; **Level II**, [Cauraugh et al., 2000])
- Task-specific training. (**Level II**, [Duncan et al., 2003; Winstein et al., 2004])

Sensation

One or more of the following interventions for increasing tactile and kinaesthetic sensation may be provided for people who have sensory impairments:

- Sensory-specific training; (**Level III-2**, [Yekutiel & Guttman, 1993]; **Level III-3**, [Carey, Matyas, & Oke, 1993; Byl et al., 2003])
- Sensory-related training; (**Level III-2**, [Carey & Matyas, 2000])
- Cutaneous electrical stimulation in conjunction with conventional therapy. (**Level IV**, [Peurala et al., 2002])

Spasticity

One or more of the following interventions may be provided for people who have moderate to severe spasticity (i.e., spasticity that interferes with a stroke survivor's activity or personal care):

- Botulinum Toxin A; (**Level I**, [Van Kuijk et al., 2002])
- Intrathecal baclofen; (**Level I**, [Creedon, Kijkers, & Hinderer, 1997] **Level II**, [Meythaler et al., 2001])
- Dynamic splinting; (**Level III-2**, [Gracies et al., 2000])
- Vibration; (**Level II**, [Ageranioti et al., 1990])
- Stretch; (**Level II**, [Carey, 1990] **Level III-2**, [Nuyens et al., 2002])
- Electromyographic biofeedback. (**Level III-2**, [Swaan, van Wieringen, & Fokkema, 1974])

Interventions to decrease spasticity should not be routinely provided for people who have mild to moderate spasticity (i.e., spasticity that does not interfere with a stroke survivor's activity or personal care). (**CPP**)

Contracture

For people at risk of developing contractures, management may include prolonged positioning of muscles in a lengthened position to maintain range of motion. (**Level II**, [Ada et al., 2005])

Overhead pulley exercise should not be used to maintain range of motion of the shoulder. (**Level III-1**, [Kumar et al., 1990])

For people who have contractures, management may include the following interventions to increase range of motion:

- Electrical stimulation; (**Level III-3**, [Pandyan, Granat, & Stott, 1997])
- Casting. (**Level I**, [Mortenson & Eng, 2003])

Subluxation of the Shoulder

For people with severe weakness who are at risk of developing a subluxed shoulder, management should include either or both of the following interventions to minimise subluxation:

- Electrical stimulation; (**Level I**, [Ada & Foongchomcheay, 2002])
- Firm support devices. (**CPP**)

For people who have developed a subluxed shoulder, management may include firm support devices to prevent further subluxation. (**Level III-2**, [Brooke et al., 1991; Moodie, Brisbin, & Morgan, 1986; Williams, Taffs, & Minuk, 1988; Zorowitz et al., 1995])

Shoulder Pain

For people with severe weakness who are at risk of developing shoulder pain, management should include interventions to educate staff, carers and people with stroke to prevent trauma. (**CPP**)

Swelling of the Extremities

For people who are immobile, management may include the following interventions to prevent swelling in the hand and foot:

- Electrical stimulation; (**Level III-1**, [Faghri, 1997])
- Continuous passive motion in elevation; (**Level III-2**, [Giudice, 1990])
- Pressure garments. (**Level III-2**, [Gracies et al., 2000])

For people who have swollen extremities, management may include the following interventions to reduce swelling of the hand and foot:

- Electrical stimulation; (**Level III-1**, [Faghri, 1997])
- Continuous passive motion in elevation. (**Level III-2**, [Giudice, 1990])

Cardiovascular Fitness

Rehabilitation should include interventions to increase cardiovascular fitness once people have sufficient strength in the large lower limb muscle groups. (**Level I**, [Van Peppen et al., 2004]; **Level II**, [Duncan et al., 2003; Chu et al., 2004])

Falling

Multifactorial interventions provided in the community, including an individually prescribed exercise program, may be provided for people who are at risk of falling, in order to prevent or reduce the number and severity of falls. (**Level I**, [Gillespie et al., 2003])

Physical Activity

Sitting

Supervised task-specific sitting practice should be provided for people who have difficulty sitting. (**Level II**, [Dean & Shepherd, 1997])

Standing Up from a Chair

Task-specific practice of standing up should be provided for people who have difficulty in standing up from a chair. (**Level I**, [Van Peppen et al., 2004])

Standing

Task-specific standing practice with feedback may be provided for people who have difficulty standing. (**Level I**, [Van Peppen et al., 2004; Barclay-Goddard et al., 2004])

Walking

One or more of the following interventions should be provided for people who can walk but with difficulty:

- Joint position biofeedback with or without conventional therapy; (**Level II**, [Morris et al., 1992]; **Level III-2**, [Ceceli, Dursun, & Cakci, 1996])
- Cueing of cadence; (**Level I**, [Van Peppen et al., 2004])
- Treadmill with or without body weight support; (**Level I**, [Van Peppen et al., 2004; Moseley et al., 2003])
- Multichannel electrical stimulation in conjunction with conventional therapy; (**Level II**, [Bogataj et al., 1995]; **Level III-2**, [Malezic et al., 1987])
- Task-specific training. (**Level II**, [Duncan et al., 2003; Dean, Richards, & Malouin, 2000; Salbach et al., 2004])

Ankle-foot orthoses may be considered for people with persistent foot drop. If used it should be individually fitted. (**Level III-2**, [Leung & Moseley, 2003])

Upper Limb Activity

One or more of the following interventions should be provided for people with difficulty using their upper limb:

- Task-specific training; (**Level II**, [Winstein et al., 2004; Nelson et al., 1996])
- Joint position biofeedback in conjunction with conventional therapy; (**Level III-2**, [Maulucci & Eckhouse, 2001])
- Robot-assisted reaching; (**Level II**, [Lum et al., 2002; Volpe et al., 2000])
- Constraint-induced movement therapy. (**Level I**, [Van Peppen et al., 2004])

Amount of Practice

Rehabilitation should be structured to provide as much practice as possible within the first six months after stroke. (**Level I**, [Kwakkel et al., 2004])

Group therapy involving task-specific training or video self-modelling may be used to increase the amount of practice in rehabilitation. (**Level II**, [Dean, Richards, & Malouin, 2000; McClellan & Ada, 2004]; **Level III-3**, [Eng et al., 2003])

Activities of Daily Living (ADL)

People who have difficulty in ADL should receive occupational therapy or multidisciplinary interventions targeting ADL. (**Level I**, [Outpatient Service Trialists, 2002; Legg & Drummond, 2001; Walker et al., 2004])

Until clinical safety is proven, administration of amphetamines to improve ADL is not recommended. (**Level I**, [Martinsson, Wahlgren, & Hardemark, 2003])

Cognitive Capacities

Attention and Concentration

Cognitive therapy may be used in rehabilitation of attention and concentration deficits. (**Level I**, [Lincoln, Majid, & Weyman, 2000])

Memory

External cues may be used to help prompt memory in people with memory difficulties. (**Level II**, [Wilson et al., 2001])

Executive Functions

External cues, such as a pager, may be used to initiate everyday activities in people with impaired executive functioning. (**Level II**, [Wilson et al., 2001])

Visuospatial/Perceptual Capacities

Visual Function

Prism glasses may be used to improve visual function in people with homonymous hemianopia but there is no evidence of benefit in ADL function. (**Level II**, [Rossi, Kheifets, & Reding, 1990])

Computer-based visual restitution training may be used to improve visual function in people with visual field deficits. (**Level II**, [Kasten et al., 1998])

Agnosia

There is insufficient evidence to guide recommendations regarding interventions for agnosia.

Neglect

People with unilateral spatial neglect may benefit from cognitive rehabilitation (for example, scanning training). (**Level I**, [Bowen, Lincoln, & Dewey, 2002])

Apraxia

Strategy training in conjunction with conventional therapy to improve ADL may help people with apraxia in the short term (<5 months) to improve planning and task execution. (**Level II**, [Donkervoort et al., 2001])

Communication

Aphasia

Interventions for people with aphasia may include:

- Treatment of phonological and semantic deficits following models derived from cognitive neuropsychology; (**Level II**, [Doesborgh et al., 2004])
- Constraint-induced therapy; (**Level II**, [Pulvermuller et al., 2001])
- The use of gesture. (**CPP**)

The following techniques may be used to enhance therapy for people with aphasia:

- Use of volunteers (including family or staff) trained in supported conversation techniques; (**Level II**, [Kagan et al., 2001])
- Computer-based therapy programs. (**Level II**, [Katz & Wertz, 1997])

People with aphasia may be considered for group therapy. (**Level II**, [Elman & Bernstein-Ellis, 1999])

Until clinical safety is proven and any benefits clearly outweigh any harms, the routine use of the following interventions for aphasia are not recommended:

- Piracetam; (**Level I**, [Greener, Enderby, & Whurr, 2001])
- Other pharmacological interventions. (**CPP**)

Aphasia therapy should be commenced as early as possible following a stroke. (**CPP**)

People with aphasia may benefit from intensive intervention by a speech pathologist. (**CPP**)

People with severe aphasia may benefit from augmentative and alternative communication devices used in functional activities. (**CPP**)

Dyspraxia of Speech

Interventions for the treatment of dyspraxia of speech may include modelling, visual cueing, integral stimulation and articulatory placement cueing. (**Level IV**, [Wambaugh et al., 1998])

People with severe apraxia of speech may benefit from augmentative and alternative communication devices used in functional activities. (**CPP**)

Dysarthria

Interventions for the treatment of dysarthria may include:

- Biofeedback or a voice amplifier to change intensity and increase loudness; (**Level IV**, [Simpson, Till, & Goff, 1988])
- A palatal lift to compensate for velopharyngeal incompetency; (**Level IV**, [Bedwinek & O'Brien, 1985; Kerman, Singer, & Davidoff, 1973; Yorkston et al., 1989])
- The use of strategies such as decreased rate, overarticulation or gesture; (**CPP**)
- Oral musculature exercises. (**CPP**)

People with severe dysarthria may benefit from augmentative and alternative communication devices used in functional activities. (**CPP**)

Dysphagia

Compensatory strategies such as positioning, therapeutic manoeuvres or modification of food and fluids to facilitate safe swallowing may be provided for people with dysphagia. (**Level IV**, [Elmstahl et al., 1999])

One or more of the following methods may be provided to facilitate resolution of dysphagia:

- "Shaker" therapy targeting specific muscle groups; (**Level II**, [Shaker et al., 2002])
- Thermo-tactile stimulation; (**Level II**, [Rosenbek et al., 1998])
- Electrical stimulation. (**Level III-3**, [Freed et al., 2001])

Hydration and Nutrition

Fluid supplementation by appropriate methods should be used to treat or prevent dehydration. (**Level I**, [Whelan, 2001; Simmons, Alessi, & Schnelle, 2001; Hodgkinson, Evans, & Wood, 2003])

Nutritional supplementation should be offered to people whose nutritional status is poor or deteriorating. (**Level I**, [Milne, Potter, & Avenelle, 2002])

Early enteral tube feeding via a nasogastric (NG) tube may be used for people who require alternative feeding methods as a consequence of dysphagia. (**Level II**, [Dennis et al., 2005])

NG rather than percutaneous endoscopic gastrostomy (PEG) feeding should be used routinely during the first month post-stroke for people who do not recover a functional swallow. (**Level II**, [Dennis et al., 2005])

Decisions regarding long-term enteral feeding for people who do not recover a functional swallow should be made in consultation with the person with stroke and the family. (**CPP**)

If a decision is taken for long-term enteral feeding, a PEG or similar permanent feeding tube should be used. (**CPP**)

People with stroke should be monitored to prevent dehydration. (**CPP**)

People who are at risk of malnutrition, including those with dysphagia, should be referred to a dietitian for assessment and management. (**CPP**)

Mood

Routine use of pharmacological therapy to prevent post-stroke depression is not currently recommended. (**Level I**, [Anderson, Hackett, & House, 2004])

Psychological interventions may be provided to improve mood for people without depression however it is unclear if such interventions prevent depression. (**Level II**, [Anderson, Hackett, & House, 2004])

Antidepressants and/or psychological interventions may be provided for people with depression or emotional lability. (**Level I**, [House et al., 2004; Hackett, Anderson, & House, 2004])

Cognitive behaviour therapy and/or antidepressants may be used for people with anxiety disorders. (**CPP**)

ECT may be considered in major, drug-resistant depression following stroke. (**CPP**)

Continence

Bladder Function

All people with urinary dysfunction should be managed using an organised, functional approach to rehabilitation. (**Level II**, [Wikander, Ekelund, & Milsom, 1998])

For people with urinary retention:

- The routine use of indwelling catheters is not recommended. However if urinary retention is severe, then intermittent catheterisation should be used to assist bladder emptying. (**CPP**)
- If using intermittent catheterisation, then a closed catheterisation technique should be used. (**Level II**, [Quigley & Riggin, 1993])

For people with urge incontinence:

- A prompted or scheduled voiding regime program, bladder retraining and anticholinergic drugs should be considered. (**CPP**)
- If continence is unachievable, containment aids may assist with social continence. (**CPP**)

For people with functional incontinence, a whole-team approach is recommended. (**CPP**)

If incontinence persists then further tests should be undertaken. (**CPP**)

Bowel Function

For those with bowel dysfunction, an appropriate assessment (including a rectal examination) and targeted education should be provided. (**Level II**, [Harari et al., 2004])

Bowel training may be used for people who have bowel dysfunction. (**Level III-3**, [Venn et al., 1992; Munchiando & Kendall, 1993])

If continence is unachievable, containment aids may assist with social continence. (**CPP**)

Medical

Pain

Amitriptyline should be preferred over carbamazepine, however either may be considered when treating people with central post-stroke pain (CPSP). (**Level II**, [Leijon & Boivie, 1989])

Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE)

Antiplatelet therapy should be used for people with ischaemic stroke to prevent DVT/PE. (**Level I**, ["Collaborative overview," 1994])

The following interventions may be used with caution (taking into account the risks and benefits) for selected people at high risk of DVT/PE (i.e., history of DVT/PE, morbid obesity or known prothrombotic tendency):

- Heparin or low molecular weight heparin in prophylactic doses; (**Level I**, [Bath, Iddendan, & Bath, 2000; Counsell & Sandercock, 2001]; **Level II**, ["The International Stroke Trial (IST)," 1997])
- Thigh-length antithrombotic stockings. (**Level I**, [Amaragiri & Lees, 2000; Mazzone et al., 2004])

Pyrexia

People with fever should be investigated to identify the source (e.g., infection of urinary tract, respiratory tract, skin, intravenous site). (**CPP**)

Antipyretic therapy, comprising regular paracetamol and/or physical cooling measures, should be used routinely where fever occurs. (**CPP**)

Seizures

Anti-convulsant medication may be used for people with recurrent seizures. (**Level I**, [Marson et al., 2000; Tudur Smith et al., 2002; Tudur Smith, Marson, & Williamson, 2003])

Sleep Apnoea

For people with sleep apnoea after stroke:

- Continuous positive airway pressure (CPAP) should be considered as the first line treatment. (**Level I**, [White, Cates, & Wright, 2001]; **Level II**, [Wessendorf et al., 2001; Sandberg et al., 2001])
- If the person is unable or unwilling to use CPAP, then oral appliances or postural therapy may be considered. (**CPP**)

Secondary Prevention

Antiplatelet Therapy

Antiplatelet therapy in the form of aspirin, or clopidogrel, or a combination of low dose aspirin and modified release dipyridamole, should be prescribed to all people with ischaemic stroke who are not prescribed anticoagulation therapy. (**Level I**, [Antithrombotic Trialists Collaboration, 2002])

Anticoagulation

Anticoagulation therapy for long-term secondary prevention should be used in all people with ischaemic stroke or transient ischemic attack (TIA) who have documented atrial fibrillation, cardioembolic stroke from valvular heart disease, or recent myocardial infarction, unless a contraindication exists. (**Level I**, [Gubitz, Sandercock, & Counsell, 2004; Sandercock et al., 2002])

Anticoagulation should not be started for 7-14 days after a disabling ischaemic stroke, to minimise the risk of cerebral haemorrhage. (**CPP**)

Blood Pressure Lowering Therapy

All people after stroke or TIA, whether normotensive or hypertensive, should receive blood pressure lowering advice or drug therapy, unless contraindicated by symptomatic hypotension. (**Level I**, [Rashid, Leonardi-Bee, & Bath, 2003])

Commencement of new blood pressure lowering therapy should generally be delayed until the person with stroke is clinically stable. (**CPP**)

Cholesterol

Therapy with a statin should be considered for people with a total cholesterol level >3.5 mmol/L following ischaemic stroke. (**Level II**, Collins et al., 2004])

People with high cholesterol levels should be considered for dietetic referral for nutritional review and counselling. (**CPP**)

Behaviour Change

Every person with stroke should be assessed and informed of their risk factors for a further stroke and possible strategies to modify identified risk factors. The risk factors and interventions include:

- Smoking cessation: nicotine replacement therapy and behavioural therapy should be used; (**Level I**, [Lancaster & Stead, 2002; Silagy et al., 2004; Rice & Stead, 2004; Rigotti et al., 2002])
- Improved diet: a diet that is low in fat (especially saturated fat) and sodium, but high in fruit and vegetables should be consumed. Potassium supplements may be used; (**Level I**, [Hooper et al., 2001; He & MacGregor, 2004; Hooper et al., 2004; Mulrow et al., 1998; Cappucio & MacGregor, 1991]; **Level II**, [Jula et al., 2002; Sdringola et al., 2003; Appel et al., 1997; de Lorgeril et al., 1999; Sacks et al., 2001; Barzi et al., 2003])
- Increase regular exercise; (**CPP**)
- Avoidance of excessive alcohol. (**CPP**)

Interventions should be individualised and may be delivered using behavioural techniques (e.g., counselling) via a group or on a one-to-one basis. **(Level I, [Lancaster & Stead, 2002; Rice & Stead, 2004; Stead & Lancaster, 2002])**

Concordance with Medication

Interventions to promote adherence to medication regimes are often complex and may include one or more of the following:

- Information, reminders, self-monitoring, reinforcement, counselling, family therapy; **(Level I, [Haynes et al., 2002; Schedlbauer et al., 2004])**
- Reduction in the number of daily doses; **(Level I, [Haynes et al., 2002; Schroeder, Fahey, & Ebrahim, 2004])**
- Multi-compartment medication compliance device; **(CPP)**
- Specific aids to counter stroke-related deficits (physical or cognitive). **(CPP)**

Complementary Medicine and Alternative Therapies

Until clinical safety is proven and any benefits clearly outweigh harms, the routine use of the following complementary and alternative therapies are not recommended in stroke rehabilitation:

- Acupuncture; **(Level I, [Park et al., 2001; Sze et al., 2002])**
- Reiki therapy; **(Level II, [Shiflett et al., 2002])**
- Other alternative therapies. **(CPP)**

Health professionals should be aware of different forms of complementary and alternative therapies and be available to discuss these with stroke survivors and their families. **(CPP)**

Palliation and Death

Health professionals who are trained in communication associated with palliative care should be involved in the care of people with stroke who are dying and with their families. **(CPP)**

People with stroke who are dying, and their families, should have care that is consistent with the principles and philosophies of palliative care. **(CPP)**

Definitions:

Levels of Evidence

I	Evidence obtained from a systematic review of all relevant randomised controlled trials.
II	Evidence obtained from at least one properly designed randomised controlled trial.
III-1	Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method).

III-2	Evidence obtained from comparative studies with concurrent controls and allocation randomised (cohort studies), case-control studies, or interrupted time-series with group.
III-3	Evidence obtained from comparative studies with historical control, two or more studies, or interrupted time series without a parallel control group.
IV	Evidence obtained from case series, either post-test or pre-test and post-test.

Clinical Practice Points

CPP	Recommended best practise based on clinical experience and expert opinion.
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CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

[References open in a new window](#)

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Appropriate management of consequences of stroke
- Prevention of recurrent stroke
- Improved outcomes for stroke survivors

POTENTIAL HARMS

- Intrathecal baclofen decreased severe spasticity, but significant harms such as infection have been reported.
- Percutaneous endoscopic gastrostomy (PEG) feeding can raise complex ethical and quality of life issues.
- The known cardiotoxic risks of tricyclic antidepressants (especially in overdose) need to be balanced by the analgesic benefits for the more elderly patients with stroke.
- Early use of heparin and low molecular weight heparin is consistently associated with increased risk of cerebral haemorrhage when used in the first few days or weeks after the onset of ischaemic stroke. The routine use of low

- molecular weight heparin or standard heparin is not recommended as the risks outweigh the benefits and other therapy is available (i.e., aspirin).
- Risks of graduated compression (antithrombotic) stockings include acute limb ischaemia (especially in stroke survivors with diabetes), peripheral neuropathy, and peripheral vascular disease.
 - Antiplatelet therapy does have adverse effects, particularly a small risk of hemorrhage; however, the significant benefits far outweigh the risks.

CONTRAINDICATIONS

CONTRAINDICATIONS

- Possible contraindications to electrical stimulation and thermal tactile stimulation for dysphagia must be assessed (e.g., pregnant, presence of pacemaker). Electrical stimulation should only be considered by clinicians experienced with this intervention and applied according to published parameters.
- Major contraindications for antiplatelet therapy are poor compliance and major bleeding risk.
- Blood pressure lowering agents are contraindicated in patients with symptomatic hypotension.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- This document is a general guide to appropriate practice, to be followed subject to the clinician's judgement and the patient's preference in each individual case. The guidelines are designed to provide information to assist decision-making and are based on the best evidence available at the time of publication.
- The guidelines should not be seen as an inflexible recipe for stroke care; rather, they provide a framework that is based on the best available evidence that can be adapted to local needs, resources and individual circumstances.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Reviewing the evidence and developing evidence-based recommendations for care involves only the first steps to ensuring that evidence-based care is available. Following publication of the *Clinical Guidelines for Stroke Rehabilitation and Recovery*, the guidelines must be disseminated to all those who provide care of relevance to stroke rehabilitation and recovery, who may then identify ways in which the guidelines may be taken up at a local level.

Strategies by which guidelines may be disseminated and implemented include:

- Distribution of education materials - for example: mailing of guidelines to members of the target audience.

- Educational meetings - for example: interdisciplinary conferences.
- Educational outreach visits - for example: one on one visits by trained educators for short periods of time or visits by trained educators for longer periods of time; local opinion leaders (with brief training, they may provide covering letters for guidelines mailed to colleagues or host meetings; with training for longer periods of time, they may head task forces, etc).
- Audit and feedback - for example: regular, frequent e-mails to clinicians with computer generated reports on compliance with guidelines.
- Reminders - for example: computer generated alerts and flags.

A systematic review of dissemination and implementation strategies found that there was insufficient evidence of the effectiveness of these interventions. Methodological weaknesses, poor reporting of the study setting and uncertainty about the generalisability of the results were the prime reasons that made interpretation difficult. The review also indicated that single interventions may or may not be as effective as multifaceted interventions and there is no relationship between the number of interventions and the effect of the interventions.

All of the above strategies may therefore be considered and used where appropriate for implementation of the *Clinical Guidelines for Stroke Rehabilitation and Recovery*. Health professionals are encouraged to identify the barriers and facilitators to evidence-based care within their environment when determining the best strategy for local needs. Implementation of the Guidelines may be supported by existing resources and networks. These include:

- The *Stroke Services in Australia* report, which outlines how stroke services may be organised in different parts of Australia and the resources that may be needed to do this (available at www.strokefoundation.com.au).
- The *Stroke Care Pathway*, which provides a checklist addressing key processes of care as outlined in both documents (Acute, and Rehabilitation and Recovery) and a guide to developing local protocols.
- The *Australasian Stroke Unit Network*: comprising health professionals from acute and post-acute settings across Australasia from different disciplines who are interested in stroke care (see www.asun.com.au).

The following principles, relating to the *Clinical Guidelines for Stroke Rehabilitation and Recovery*, are essential to the planning and delivery of rehabilitation and recovery services and should be considered when implementing the evidence in a local setting:

- Focus on and respect for the individual needs of each person with stroke, with care tailored specifically to those needs.
- Inclusion of the person with stroke and, where relevant, the family in the interdisciplinary team and, in particular, in setting realistic and achievable rehabilitation goals in order to facilitate informed decision-making, empowerment, autonomy and person-centred care.
- Recognition that the person with stroke is part of a family and a community, with all the demands, needs and strengths that this entails.
- Respect for cultural and other differences and the different service delivery needs that these may entail. Care, and particularly information, should be provided using an appropriate language and format.

- Equity of access, across geographic, cultural, linguistic and socioeconomic groups, to the full range of rehabilitation services.
- Continuity of care across acute, rehabilitation and community services, to enable each person with stroke to move smoothly from one to another.

See the original guideline document for further discussion of the implications for service equity.

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

IMPLEMENTATION TOOLS

Patient Resources
Quick Reference Guides/Physician Guides

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

End of Life Care
Getting Better
Living with Illness

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Management of consequences of stroke. In: National Stroke Foundation. Clinical guidelines for stroke rehabilitation and recovery. Melbourne (Australia): National Stroke Foundation; 2005 Sep 8. p. 15-40.

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2005 Sep 8

GUIDELINE DEVELOPER(S)

National Stroke Foundation (Australia) - Private Nonprofit Organization

SOURCE(S) OF FUNDING

Australian Government Department of Health and Ageing

GUIDELINE COMMITTEE

Expert Working Group

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

ENDORSER(S)

Australasian Faculty of Rehabilitation Medicine - Professional Association
Australasian Stroke Unit Network - Professional Association
Australian College of Rural and Remote Medicine - Professional Association
Australian Physiotherapy Association - Medical Specialty Society
Australian Society for Geriatric Medicine - Medical Specialty Society
Dietitians Association of Australia - Professional Association
Occupational Therapy Australia - Professional Association
Royal Australian and New Zealand College of Psychiatrists - Professional Association
Royal Australian and New Zealand College of Radiologists - Professional Association
Royal College of Nursing - Professional Association
Speech Pathology Australia - Medical Specialty Society
Stroke Society of Australasia - Disease Specific Society

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [National Stroke Foundation \(Australia\) Web site](#).

Print copies: Available from the National Stroke Foundation (Australia), Level 7, 461 Bourke Street, Melbourne Victoria 3000, Australia.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Physiotherapy. Concise guidelines. Stroke rehabilitation and recovery. Melbourne (Australia): National Stroke Foundation; 2008 Mar. 4 p.
- Speech pathology. Concise guidelines. Stroke rehabilitation and recovery. Melbourne (Australia): National Stroke Foundation; 2005 2 p.
- Occupational therapy. Concise guidelines. Stroke rehabilitation and recovery. Melbourne (Australia): National Stroke Foundation; 2008 Mar. 4 p.
- Dietetics. Concise guidelines. Stroke rehabilitation and recovery. Melbourne (Australia): National Stroke Foundation; 2008 Mar. 2 p.

Electronic copies: Available in Portable Document Format (PDF) from the [National Stroke Foundation \(Australia\) Web site](#).

Print copies: Available from the National Stroke Foundation (Australia), Level 7, 461 Bourke Street, Melbourne Victoria 3000, Australia.

PATIENT RESOURCES

The following are available:

- Driving after stroke. Fact sheet 1. Melbourne (Australia): National Stroke Foundation; 2008 July. 4 p.
- Sexuality after stroke. Fact sheet 2. Melbourne (Australia): National Stroke Foundation; 2008 July. 2 p.
- Depression after stroke. Fact sheet 3. Melbourne (Australia): National Stroke Foundation; 2008 July. 2 p.
- Fatigue after stroke. Fact sheet 4. Melbourne (Australia): National Stroke Foundation; 2008 July. 2 p.
- Medication after stroke. Fact sheet 5. Melbourne (Australia): National Stroke Foundation; 2008 July. 4 p.
- Thinking and perception after stroke. Fact sheet 6. Melbourne (Australia): National Stroke Foundation; 2008 July. 4 p.
- Diet after stroke. Fact sheet 7. Melbourne (Australia): National Stroke Foundation; 2008 July. 2 p.
- Movement and exercise after stroke. Fact sheet 8. Melbourne (Australia): National Stroke Foundation; 2008 July. 2 p.

- Communication after stroke. Fact sheet 9. Melbourne (Australia): National Stroke Foundation; 2008 Sept. 4 p.

Electronic copies: Available in Portable Document Format (PDF) from the [National Stroke Foundation \(Australia\) Web site](#).

Print copies: Available from the National Stroke Foundation (Australia), Level 7, 461 Bourke Street, Melbourne Victoria 3000, Australia.

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Date Modified: 1/12/2009

